1. GENERAL INFORMA1

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SERVICE RULES

1. Use Honda Genuine or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown in the Cable and Harness Routing (page 1-25).
9. Do not bend or twist control cables. Damaged control cables will not operates smoothly and may stick or bind.

ABBREVIATION

Throughout this manual, the following abbreviations are used to identify the respective parts or systems.

Abbrev. term	Full term
ABS	Anti-lock Brake System
CKP sensor	Crankshaft Position sensor
CMP sensor	Camshaft Position sensor
DLC	Data Link Connector
DTC	Diagnostic Trouble Code
ECM	Engine Control Module
ECT sensor	Engine Coolant Temperature sensor
EEPROM	Electrically Erasable Programmable Read Only Memory
ECV	Exhaust Control Valve
ECV POT	Exhaust Control Valve Potentiometer
EGBV	Exhaust Gas Bypass Valve
EGCA	Exhaust Gas Control Actuator
EOP switch	Engine Oil Pressure switch
EVAP	Evaporative Emission
HESD	Honda Electronic Steering Damper
IACV	Idle Air Control Valve
IAT sensor	Intake Air Temperature sensor
IDC solenoid valve	Intake Duct Control solenoid valve
MAP sensor	Manifold Absolute Pressure sensor
MCS	Motorcycle Communication System
MIL	Malfunction Indicator Lamp
PAIR	Pulsed Secondary Air Injection
PGM-FI	Programmed Fuel Injection
SCS connector	Service Check Short connector
TP sensor	Throttle Position sensor
VS sensor	Vehicle Speed sensor

DESTINATION CODE

Throughout this manual, the following codes are used to identify individual types for each region.

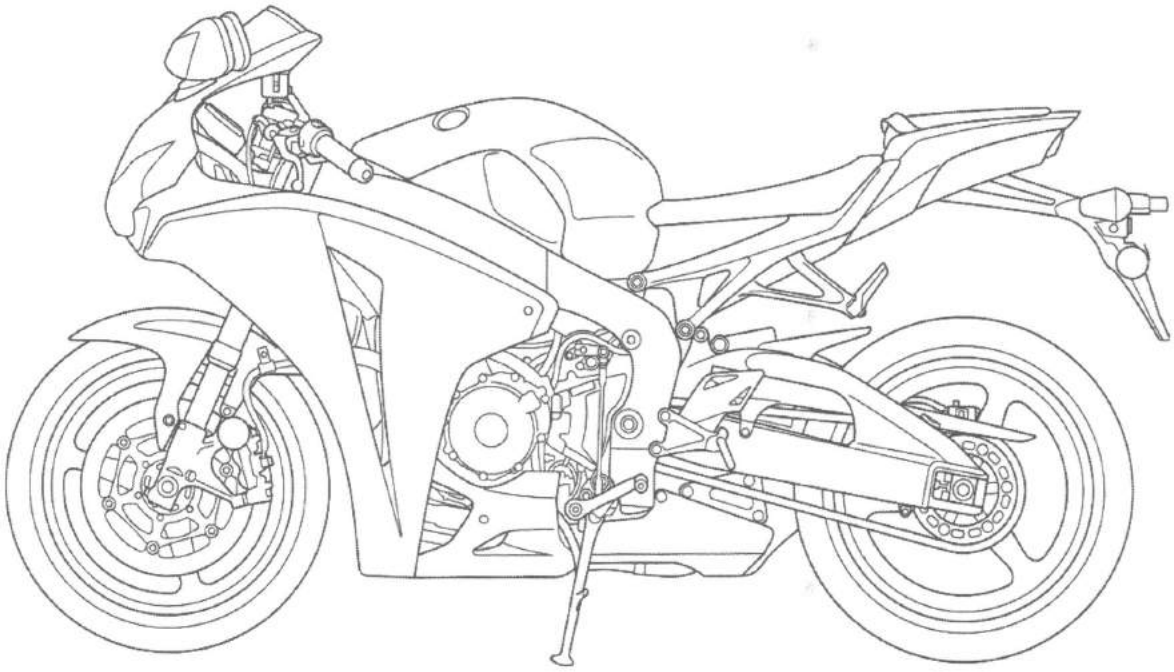
DESTINATION CODE	REGION
A	49-State
AC	50-State (meets California emissions standards)
CM	Canada

Each code is shown in parentheses in this manual.

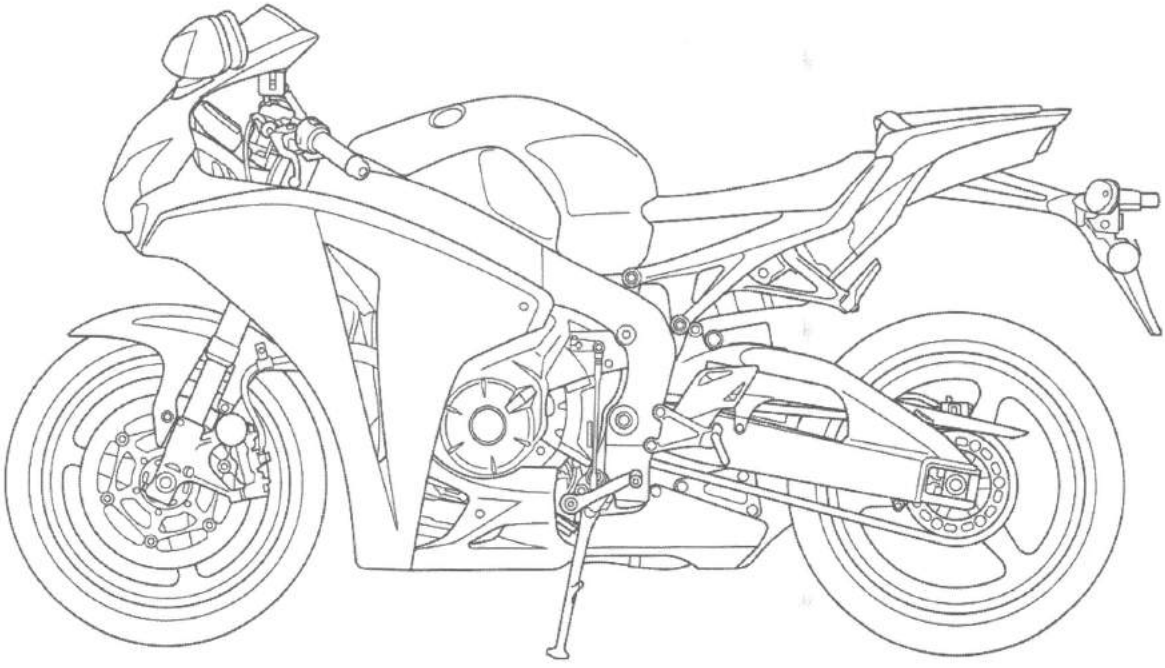
MODEL IDENTIFICATION

'08 – '11 model

STANDARD type ('08, '09 model shown):

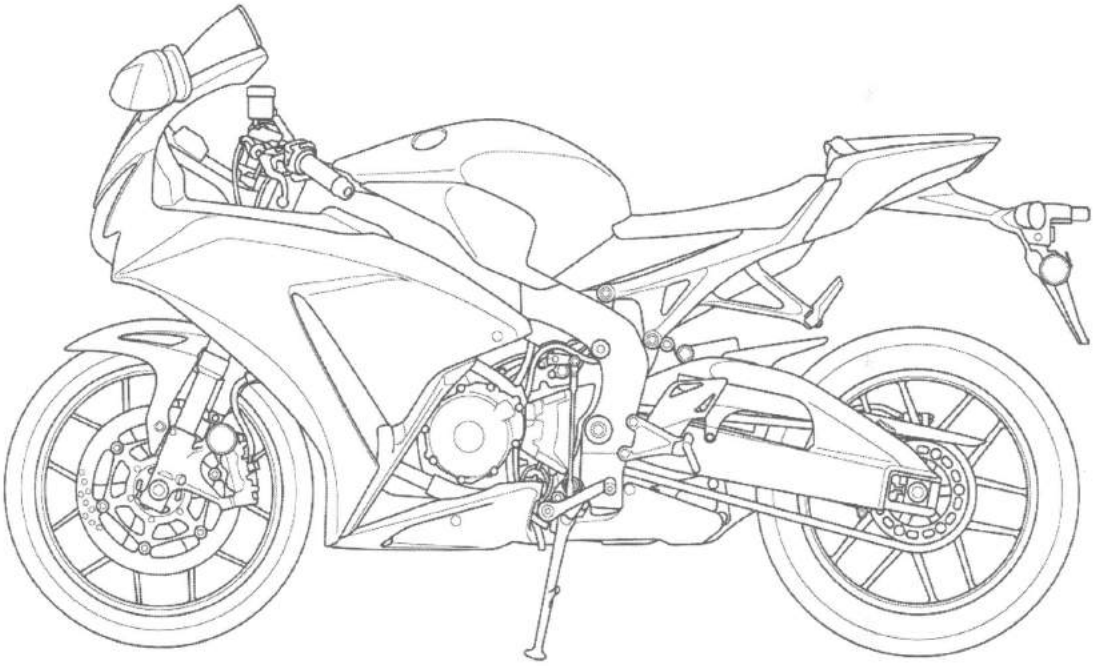


ABS type ('09 model shown):

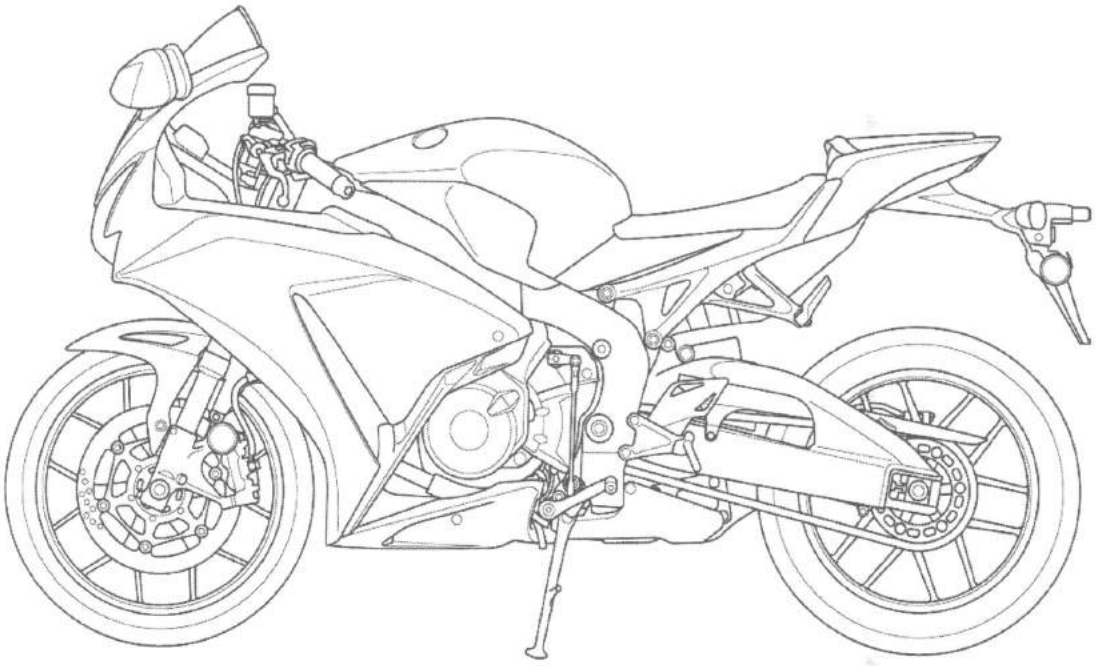


After '11 model

STANDARD type ('12, '13 model shown):

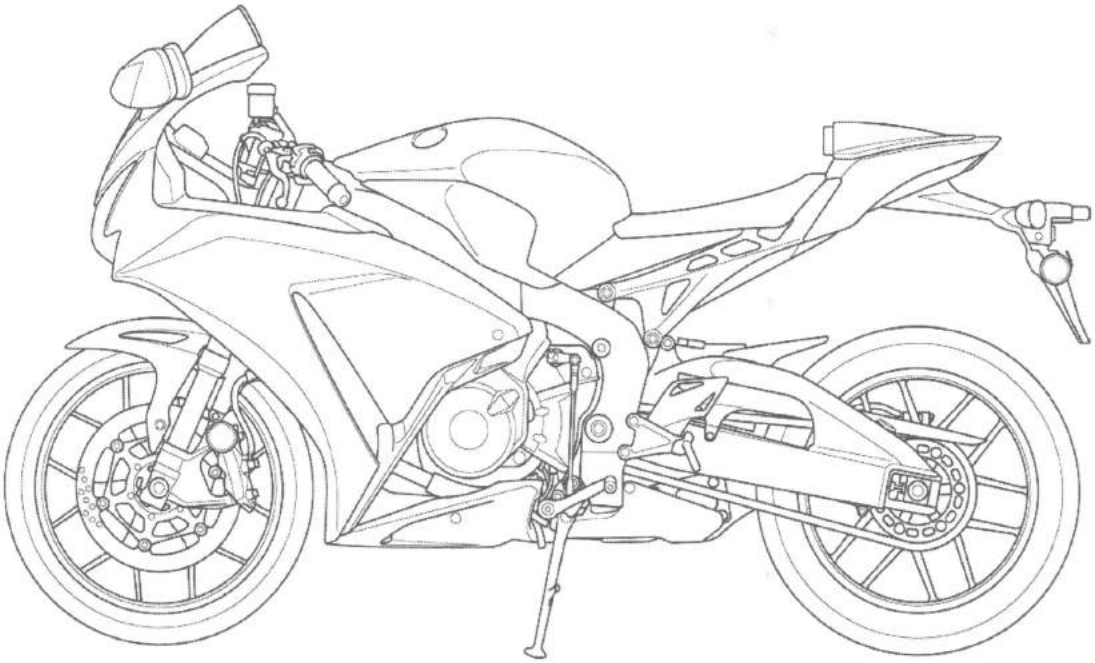


ABS type ('12, '13 model shown):



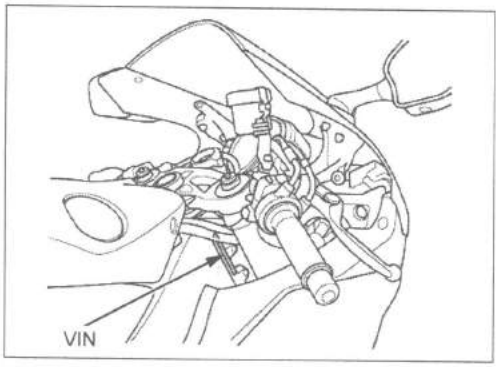
After '13 additional model

SP type ((AC) type shown):

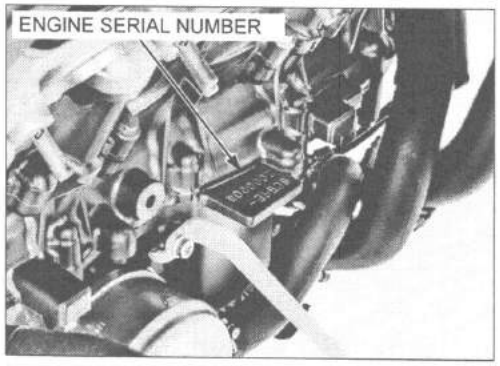


SERIAL NUMBERS

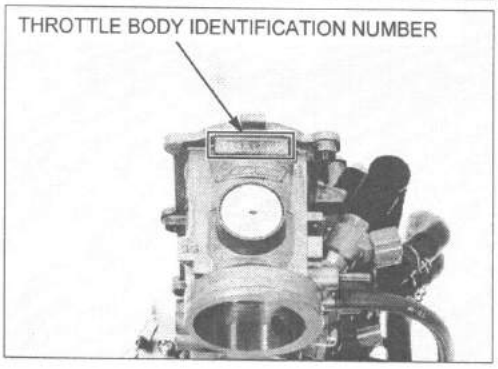
The Vehicle Identification Number (VIN) is stamped on the right side of the steering head as shown.



The engine serial number is stamped on the front side of the lower crankcase as shown.



The throttle body identification number is stamped on the left side of the throttle body as shown.



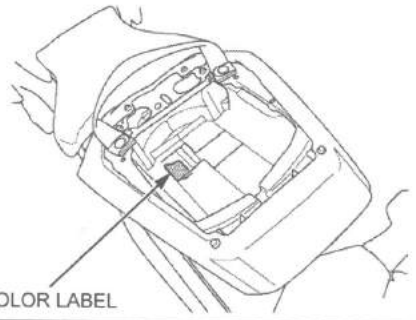
LABEL

The Safety Certification Label is located on left side of the frame.



The color label is attached on the license light stay ('08, '09 model)/rear center cowl under the pillion seat (STANDARD/ABS type)/single seat cowl (SP type) as shown. When ordering color-coded parts, always specify the designated color code.

'08, '09 model shown:

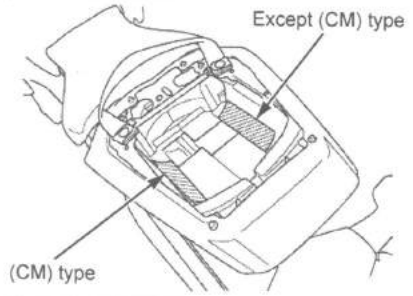


The Emission Control Information Label is located on the license light stay ('08, '09 model)/rear center cowl as shown.

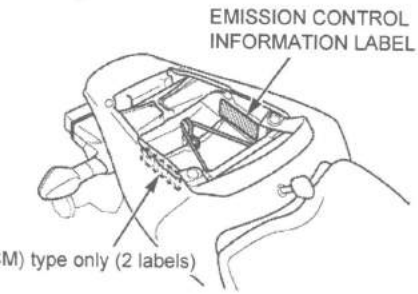
'08 – '11 model:

EMISSION CONTROL INFORMATION LABEL

'08, '09 model shown:



After '11:



GENERAL SPECIFICATIONS

ITEM			SPECIFICATIONS
DIMENSIONS	Overall length	'08, '09 model:	2,080 mm (81.9 in)
		After '09 model:	2,075 mm (81.7 in)
	Overall width	'08 – '13 model:	685 mm (27.0 in)
		After '13 model:	720 mm (28.3 in)
	Overall height	'08 – '11 model:	1,130 mm (44.5 in)
		After '11 model:	1,135 mm (44.7 in)
	Wheelbase		1,410 mm (55.5 in)
	Seat height		820 mm (32.3 in)
	Footpeg height	'08 – '13 model:	396 mm (15.6 in)
		After '13 model:	395 mm (15.6 in)
	Ground clearance		130 mm (5.1 in)
	Curb weight	'08 – '11 model:	
		Except (AC) type:	STANDARD type: 199 kg (439 lbs)
			ABS type: 210 kg (463 lbs)
		(AC) type:	STANDARD type: 200 kg (441 lbs)
			ABS type: 211 kg (465 lbs)
		'11, '12 model:	
		Except (AC) type:	STANDARD type: 200 kg (441 lbs)
			ABS type: 211 kg (465 lbs)
		(AC) type:	STANDARD type: 201 kg (443 lbs)
			ABS type: 212 kg (467 lbs)
		After '13 model:	
		Except (AC) type:	STANDARD type: 200 kg (441 lbs)
			ABS type: 210 kg (463 lbs)
			SP type: 199 kg (439 lbs)
		(AC) type:	STANDARD type: 201 kg (443 lbs)
			ABS type: 212 kg (467 lbs)
			SP type: 200 kg (441 lbs)
	Maximum weight capacity		STANDARD/ABS type: 166 kg (366 lbs)
			SP type: 110 kg (243 lbs)
FRAME	Frame type		Diamond
	Front suspension		Telescopic fork
	Front axle travel		110 mm (4.3 in)
	Rear suspension		Swingarm
	Rear axle travel		STANDARD/ABS type: 138 mm (5.4 in)
			SP type: 134 mm (5.3 in)
	Front tire size		120/70ZR17 M/C (58W)
	Rear tire size		190/50ZR17 M/C (73W)
	Front tire brand	'08 – '11 model:	BT015F RADIAL F (Bridgestone), Qualifier PTK (Dunlop)
		'12, '13 model:	S20F G (Bridgestone), Qualifier II K (Dunlop)
		After '13 model:	STANDARD/ABS type: S20F G (Bridgestone), Qualifier II K (Dunlop)
			SP type: DIABLO SUPERCORSA SP (PIRELLI)
	Rear tire brand	'08 – '11 model:	BT015R RADIAL F (Bridgestone), Qualifier NK (Dunlop)
		'12, '13 model:	S20R G (Bridgestone), Qualifier II K (Dunlop)
		After '13 model:	STANDARD/ABS type: S20R G (Bridgestone), Qualifier II K (Dunlop)
			SP type: DIABLO SUPERCORSA SP (PIRELLI)
	Front brake		Hydraulic double disc
	Rear brake		Hydraulic single disc
	Caster angle		23° 18'
	Trail length	'08 – '13 model:	96.3 mm (3.79 in)
		After '13 model:	96 mm (3.8 in)
	Fuel tank capacity	'08 – '13 model:	17.7 liters (4.68 US gal, 3.89 Imp gal)
		After '13 model:	17.5 liters (4.62 US gal, 3.85 Imp gal)

ITEM				SPECIFICATIONS
ENGINE	Cylinder arrangement			4 cylinders in-line, inclined 27.6° from vertical
	Bore and stroke			76.0 x 55.1 mm (2.99 x 2.17 in)
	Displacement			999 cm³ (60.9 cu-in)
	Compression ratio			12.3 : 1
	Valve train			Chain driven, DOHC
	Intake valve	opens	at 1 mm (0.04 in) lift	21° BTDC
		closes	at 1 mm (0.04 in) lift	43° ABDC
	Exhaust valve	opens	at 1 mm (0.04 in) lift	41° BBDC
		closes	at 1 mm (0.04 in) lift	14° ATDC
	Lubrication system			Forced pressure and wet sump
	Oil pump type			Trochoid
	Cooling system			Liquid cooled
	Air filtration			Paper element
	Engine dry weight		'08, '09 model:	62.5 kg (137.8 lbs)
			After '09 model:	62.7 kg (138.2 lbs)
	Firing order			1 - 2 - 4 - 3
FUEL DELIVERY SYSTEM	Type			PGM-FI
	Throttle bore			46 mm (1.8 in)
DRIVE TRAIN	Clutch system			Multi-plate, wet
	Clutch operation system			Cable operating
	Transmission			Constant mesh, 6-speeds
	Primary reduction			1.717 (79/46)
	Final reduction			2.625 (42/16)
	Gear ratio		1st	2.285 (32/14)
			2nd	1.777 (32/18)
			3rd	1.500 (33/22)
			4th	1.333 (32/24)
			5th	1.214 (34/28)
			6th	1.137 (33/29)
	Gearshift pattern			Left foot operated return system, 1 - N - 2 - 3 - 4 - 5 - 6
ELECTRICAL	Ignition system			Computer-controlled digital transistorized with electric advance
	Starting system			Electric starter motor
	Charging system			Triple phase output alternator
	Regulator/rectifier			FET shorted/triple phase, full wave rectification
	Lighting system			Battery

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	2.8 liters (3.0 US qt, 2.5 Imp qt)	–
	After oil filter change	3.0 liters (3.2 US qt, 2.6 Imp qt)	–
	After disassembly	3.7 liters (3.9 US qt, 3.3 Imp qt)	–
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	–
Oil pressure at EOP switch		590 kPa (6.0 kgf/cm^2, 86 psi) at 6,000 rpm/(80°C/176°F)	–
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.04 – 0.09 (0.002 – 0.004)	0.17 (0.007)

FUEL SYSTEM (PGM-FI) SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle body identification number	Except (AC) type	GQ23C
	(AC) type	GQ23B
Idle speed		1,200 ± 100 rpm
Throttle grip freeplay	'08 – '13 model	2 – 6 mm (0.08 – 0.24 in)
	After '13 model	2 – 4 mm (0.08 – 0.16 in)
IAT sensor resistance (at 20 C/68 F)		1 – 4 k
Fuel injector resistance (at 20°C /68°F)	Primary fuel injector	11 – 13
	Secondary fuel injector	11 – 13
PAIR control solenoid valve resistance (at 20 C/68 F)		23 – 27
IDC solenoid valve resistance (at 20 C/68 F)		28 – 32
EVAP purge control solenoid valve resistance (at 20°C/68°F)		30 – 34
O_2 sensor heater resistance (at 20°C/68°F)		5 – 20
CKP sensor peak voltage (at 20 C/68 F)		0.7 V minimum
Fuel pressure at idle		343 kPa (3.5 kgf/cm^2, 50 psi)
Fuel pump flow (at 12 V)		167 cm^3 (5.6 US oz, 5.9 Imp oz) minimum/10 seconds

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	3.0 liters (3.2 US qt, 2.6 Imp qt)
	Reserve tank	0.34 liter (0.36 US qt, 0.30 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm^2, 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate free corrosion inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,196 kPa (12.2 kgf/cm², 174 psi) at 210 rpm	–
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	–
		EX	0.30 ± 0.03 (0.012 ± 0.001)	–
Camshaft	Cam lobe height	IN	37.34 – 37.58 (1.470 – 1.480)	37.32 (1.469)
		EX	36.58 – 36.82 (1.440 – 1.450)	36.56 (1.439)
	Runout		–	0.05 (0.002)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Valve lifter	Valve lifter O.D.	IN/EX	25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.	IN/EX	26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.	IN	4.475 – 4.490 (0.1762 – 0.1768)	4.465 (0.1758)
		EX	3.965 – 3.980 (0.1561 – 0.1567)	3.955 (0.1557)
	Valve guide I.D.	IN	4.500 – 4.512 (0.1772 – 0.1776)	4.54 (0.179)
		EX	4.000 – 4.012 (0.1575 – 0.1580)	4.04 (0.159)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN	15.1 – 15.4 (0.59 – 0.61)	–
		EX	15.7 – 16.0 (0.62 – 0.63)	–
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	IN	Inner	35.25 (1.388)	34.5 (1.36)
		Outer	38.93 (1.533)	38.2 (1.50)
	EX		39.68 (1.562)	38.9 (1.53)
Cylinder head warpage			–	0.10 (0.004)

CLUTCH/STARTER CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever freeplay			10 – 20 (0.4 – 0.8)	–
Clutch	Spring free height		5.70 (0.224)	4.7 (0.19)
	Disc thickness	Disc A	3.72 – 3.88 (0.146 – 0.153)	3.6 (0.14)
		Disc B	3.22 – 3.38 (0.127 – 0.133)	3.1 (0.12)
		Disc C	3.22 – 3.38 (0.127 – 0.133)	3.1 (0.12)
	Plate warpage		–	0.30 (0.012)
Clutch outer guide ('08 model)	A (Without O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	35.004 – 35.012 (1.3781 – 1.3784)	34.994 (1.3777)
	B (With O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	34.996 – 35.004 (1.3778 – 1.3781)	34.986 (1.3774)
Clutch outer guide (After '08 model)	A (Two O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	35.007 – 35.012 (1.3782 – 1.3784)	35.004 (1.3781)
	B (Three O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	35.001 – 35.007 (1.3780 – 1.3782)	34.998 (1.3779)
	C (Four O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	34.996 – 35.001 (1.3778 – 1.3780)	34.993 (1.3777)
Primary driven gear I.D. ('08 model)		White	41.008 – 41.016 (1.6145 – 1.6148)	41.026 (1.6152)
		Black	41.000 – 41.008 (1.6142 – 1.6145)	41.018 (1.6149)
Primary driven gear I.D. (After '08 model)		Blue	41.011 – 41.016 (1.6146 – 1.6148)	41.019 (1.6149)
		Yellow	41.005 – 41.011 (1.6144 – 1.6146)	41.014 (1.6147)
		Green	41.000 – 41.005 (1.6142 – 1.6144)	41.008 (1.6145)
Oil pump drive sprocket guide		I.D.	28.000 – 28.021 (1.1024 – 1.1032)	28.030 (1.1035)
		O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Oil pump drive sprocket I.D.			35.025 – 35.145 (1.3789 – 1.3837)	35.155 (1.3841)
Mainshaft O.D. at clutch outer guide			27.980 – 27.990 (1.1016 – 1.1020)	27.96 (1.101)
Mainshaft O.D. at oil pump drive sprocket guide			27.980 – 27.990 (1.1016 – 1.1020)	27.96 (1.101)
Starter driven gear boss O.D.			45.657 – 45.673 (1.7975 – 1.7981)	45.642 (1.7969)

CRANKCASE/TRANSMISSION/BALANCER SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Shift fork	I.D.		14.000 – 14.018 (0.5512 – 0.5519)	14.03 (0.552)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
Shift fork shaft O.D.			13.957 – 13.975 (0.5495 – 0.5502)	13.95 (0.549)
Transmission	Gear I.D.	M5, M6	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
		C1	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C2, C3, C4	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Gear busing O.D.	M5	30.955 – 30.980 (1.2187 – 1.2197)	30.935 (1.2179)
		M6	30.950 – 30.975 (1.2185 – 1.2195)	30.930 (1.2177)
		C2	32.955 – 32.980 (1.2974 – 1.2984)	32.935 (1.2967)
		C3, C4	32.950 – 32.975 (1.2972 – 1.2982)	32.930 (1.2965)
	Gear-to-bushing clearance	M5, C2	0.020 – 0.070 (0.0008 – 0.0028)	0.10 (0.004)
		M6, C3, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Gear bushing I.D.	M5	27.985 – 28.006 (1.1018 – 1.1026)	28.016 (1.1030)
		C2	29.985 – 30.006 (1.1530 – 1.1813)	30.021 (1.1819)
	Mainshaft O.D.	at M5	27.967 – 27.980 (1.1011 – 1.1016)	27.957 (1.1007)
	Countershaft O.D.	at C2	29.967 – 29.980 (1.1798 – 1.1803)	29.960 (1.1795)
	Bushing to shaft clearance	M5, C2	0.005 – 0.039 (0.0002 – 0.0015)	0.06 (0.002)

CRANKSHAFT/PISTON/CYLINDER SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.15 – 0.30 (0.006 – 0.012)	0.35 (0.014)
	Crankpin bearing oil clearance		0.030 – 0.052 (0.0012 – 0.0020)	0.06 (0.002)
	Main journal bearing oil clearance		0.019 – 0.037 (0.0007 – 0.0015)	0.05 (0.002)
	Runout		–	0.05 (0.002)
Piston, piston rings	Piston O.D. at 5 mm (0.2 in) from bottom		75.965 – 75.985 (2.9907 – 2.9915)	75.895 (2.9880)
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.030 (0.6705)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)	16.980 (0.6685)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.22 – 0.32 (0.009 – 0.126)	0.52 (0.020)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.74 (0.029)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.00 (0.040)
	Piston ring-to-ring groove clearance	Top	0.040 – 0.080 (0.0016 – 0.0032)	0.120 (0.0050)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.075 (0.0030)
Cylinder	I.D.		76.000 – 76.015 (2.9921 – 2.9927)	76.025 (2.9931)
	Out-of-round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.10 (0.004)
Cylinder-to-piston clearance			0.015 – 0.050 (0.0006 – 0.0020)	0.10 (0.004)
Connecting rod small end I.D.			17.030 – 17.042 (0.6705 – 0.6709)	17.048 (0.6712)
Connecting rod-to-piston pin clearance			0.030 – 0.048 (0.0012 – 0.0019)	0.07 (0.003)

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

STANDARD/ABS type

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
HESD linear solenoid resistance (at 20°C/68°F)			10 – 15	–
Minimum tire tread depth			–	1.5 (0.06)
Cold tire pressure	Up to maximum weight capacity		250 kPa (2.50 kgf/cm², 36 psi)	–
	Up to 90 kg (200 lbs) load		250 kPa (2.50 kgf/cm², 36 psi)	–
Axle runout			–	0.2 (0.01)
Wheel rim runout	Radial		–	2.0 (0.08)
	Axial		–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Fork ('08 – '11 model)	Spring free length		234.0 (9.21)	229.3 (9.03)
	Tube runout		–	0.20 (0.008)
	Recommended fork fluid		Pro Honda Suspension Fluid SS-47 (10 W)	–
	Fluid level		93 (3.7)	–
	Fluid capacity		517 ± 2.5 cm³ (17.5 ± 0.08 US oz, 18.2 ± 0.09 Imp oz)	–
	Pre-load adjuster initial setting		6 turns from minimum	–
	Rebound damping adjuster initial setting		2-1/4 turns out from full hard	–
	Compression damping adjuster initial setting	STANDARD type	2 turns out from full hard	–
		ABS type	2-1/4 turns out from full hard	–
Fork (After '11 model)	Spring free length		229.5 (9.04)	224.9 (8.85)
	Tube runout		–	0.20 (0.008
	Recommended fork fluid		Pro Honda Suspension Fluid SS-47 (10 W)	–
	Fluid level		84 (3.5)	–
	Fluid capacity		515 ± 2.5 cm³ (17.4 ± 0.08 US oz, 18.1 ± 0.09 Imp oz)	–
	Pre-load adjuster initial setting		7-1/2 turns from minimum	–
	Rebound damping adjuster initial setting	'12, '13 model	4-3/4 turns out from full hard	–
		After '13 model	4-1/2 turns out from full hard	–
	Compression damping adjuster initial setting		5-1/2 turns out from full hard	–
Steering head bearing pre-load			12 – 17 N (1.2 – 1.7 kgf)	–

SP type

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
HESD linear solenoid resistance (at 20°C/68°F)			10 – 15	–
Minimum tire tread depth			–	1.5 (0.06)
Cold tire pressure	Up to maximum weight capacity		250 kPa (2.50 kgf/cm², 36 psi)	–
Axle runout			–	0.2 (0.01)
Wheel rim runout		Radial	–	2.0 (0.08)
		Axial	–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Fork	Pre-load adjuster initial setting		6 turns from minimum	–
	Rebound damping adjuster initial setting		12 clicks from full hard	–
	Compression damping adjuster initial setting		12 clicks from full hard	–
Steering head bearing pre-load			12 – 17 N (1.2 – 1.7 kgf)	–

REAR WHEEL/SUSPENSION SPECIFICATIONS

STANDARD/ABS type

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			–	2.0 (0.08)
Cold tire pressure	Up to maximum weight capacity		290 kPa (2.90 kgf/cm², 42 psi)	–
	Up to 90 kg (200 lbs) load		290 kPa (2.90 kgf/cm², 42 psi)	–
Axle runout			–	0.2 (0.01)
Wheel rim runout	Radial		–	2.0 (0.08)
	Axial		–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Drive chain	Size/link	DID	DID 50VA11-120ZB/116	–
		RK	RK 50HFOZ6-120LJFZ/116	–
	Slack		25 – 35 (1.0 – 1.4)	–
Shock absorber	Spring pre-load adjuster standard position		4 position from minimum	–
	Rebound damping adjuster initial setting	'08 – '11 model	2-1/4 turns out from full hard	–
		After '11 model	2-1/2 turns out from full hard	–
	Compression damping adjuster initial setting	STANDARD type ('08, '09 model)	2 turns out from full hard	–
		ABS type ('09 model)	2-1/2 turns out from full hard	–
		'10, '11 model	2-1/2 turns out from full hard	–
		'12, '13 model	2-3/4 turns out from full hard	–
		After '13 model	2 turns out from full hard	–

SP type

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			–	2.0 (0.08)
Cold tire pressure	Up to maximum weight capacity		290 kPa (2.90 kgf/cm², 42 psi)	–
Axle runout			–	0.2 (0.01)
Wheel rim runout	Radial		–	2.0 (0.08)
	Axial		–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Drive chain	Size/link	DID	DID 50VA11-120ZB/116	–
		RK	RK 50HFOZ6-120LJFZ/116	–
	Slack		25 – 35 (1.0 – 1.4)	–
Shock absorber	Spring pre-load adjuster standard position		6 turns from maximum	–
	Rebound damping adjuster initial setting		16 clicks from full hard	–
	Compression damping adjuster initial setting		15 clicks from full hard	–

HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		DOT 4	–
	Brake disc thickness		4.4 – 4.6 (0.17 – 0.18)	3.5 (0.14)
	Brake disc runout		–	0.20 (0.008)
	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.503 (0.6891)
	Master piston O.D.		17.321 – 17.367 (0.6819 – 0.6837)	17.321 (0.6819)
	Caliper cylinder I.D. (STANDARD/ABS type)	A	32.080 – 32.130 (1.2630 – 1.2650)	32.130 (1.2650)
		B	30.280 – 30.330 (1.1921 – 1.1941)	30.330 (1.1941)
	Caliper piston O.D. (STANDARD/ABS type)	A	31.967 – 32.000 (1.2585 – 1.2598)	31.967 (1.2585)
		B	30.167 – 30.200 (1.1877 – 1.1890)	30.167 (1.1877)
Rear	Specified brake fluid		DOT 4	–
	Brake disc thickness		4.8 – 5.2 (0.19 – 0.20)	4.0 (0.16)
	Brake disc runout		–	0.30 (0.012)
	Master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.043 (0.5529)
	Master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.957 (0.5495)
	Caliper cylinder I.D.		30.230 – 30.280 (1.1902 – 1.1921)	30.280 (1.1921)
	Caliper piston O.D.		30.082 – 30.115 (1.1843 – 1.1856)	30.082 (1.1843)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Type	STANDARD/ SP type	YTZ7S
		ABS type	YTZ10S
	Capacity	STANDARD/ SP type	12 V – 6 Ah
		ABS type	12 V – 8.6 Ah
	Current leakage		2.0 mA max.
	Voltage (at 20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current (STANDARD/ SP type)	Normal	0.6 A/5 – 10 h
		Quick	3 A/1 h
	Charging current (ABS type)	Normal	0.9 A/5 – 10 h
		Quick	4.5 A/1 h
Alternator	Capacity	STANDARD type ('08, '09 model)	0.399 kW/5000 rpm
		ABS type ('09 model)	0.413 kW/5000 rpm
	Capacity (After '09 model)	STANDARD/ SP type	0.372 kW/5000 rpm
		ABS type	0.417 kW/5000 rpm
	Charging coil resistance (at 20°C/68°F)		0.1 – 1.0

IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug (Iridium)	NGK	IMR9E-9HES
	DENSO	VUH27ES
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
CKP sensor peak voltage		0.7 V minimum
Ignition timing ("F" mark)		3.3° BTDC at idle

ELECTRIC STARTER SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 (0.47)	6.5 (0.26)

LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	High	12 V – 55 W
		Low	12 V – 55 W
	Position light		LED
	Brake/taillight		LED
	License light		12 V – 5 W
	Turn signal light		12 V – 21 W x 4
	Instrument light		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Neutral indicator		LED
	MIL		LED
	Low fuel indicator		LED
	REV indicator		LED
	HESD indicator		LED (After '11 model)
	Engine oil pressure/coolant temperature warning indicator ('08 – '11 model)		LED
	Low oil pressure indicator (After '11 model)		LED
	High coolant temperature indicator (After '11 model)		LED
	Combined ABS indicator (ABS type)		LED
Fuse	Main fuse		30 A
	Sub fuse		10 A x 4, 20 A x 4
	ABS fuse (ABS type)		30 A x 2, 10 A x 1
Tachometer peak voltage			10.5 V minimum
ECT sensor resistance		50°C (122°F)	6.8 – 7.4 k
		80°C (176°F)	2.1 – 2.7 k

TORQUE VALUES

STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5.2 (0.5, 3.8)	5 mm screw	4.2 (0.4, 3.1)
6 mm bolt and nut	10 (1.0, 7)	6 mm screw	9.0 (0.9, 6.6)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange)	10 (1.0, 7)
10 mm bolt and nut	34 (3.5, 25)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
12 mm bolt and nut	54 (5.5, 40)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut	27 (2.8, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

ENGINE & FRAME TORQUE VALUES

- Torque specifications listed below are for important fasteners.
- Others should be tightened to standard torque values (page 1-17).

FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Windscreen mounting bolt	4	5	1.5 (0.2, 1.1)	
Seat rail mounting nut	2	10	54 (5.5, 40)	
Seat rail mounting bolt	2	10	44 (4.5, 32)	
Air duct resonator mounting screw ('08 – '11 model)	2	4	1.1 (0.1, 0.8)	
Vacuum chamber stay mounting screw	2	4	1.1 (0.1, 0.8)	
Lower cowl mounting special screw	2	6	10 (1.0, 7)	
Lower cowl mounting screw	2	5	1.5 (0.2, 1.1)	
Center cross plate mounting bolt	4	6	12 (1.2, 9)	
Exhaust pipe joint nut	8	7	12 (1.2, 9)	
Front fender mounting screw	4	6	12 (1.2, 9)	
Rearview mirror mounting nut	4	6	10 (1.0, 7)	
Rearview mirror front cover screw	2	5	1.0 (0.1, 0.7)	
Main step bracket mounting bolt	4	8	37 (3.8, 27)	
Pillion step bracket mounting bolt (STANDARD/ABS type)	4	8	27 (2.8, 20)	
Exhaust pipe stud bolt	8	8	–	See page 3-65
Air duct mounting screw ('08 – '11 model)	4	4	1.1 (0.1, 0.8)	
Air duct mounting screw (After '11 model)	2	5	5.2 (0.5, 3.8)	
Air duct cover mounting screw ('08 – '11 model)	4	5	1.5 (0.2, 1.1)	
Air duct cover mounting screw (After '11 model)	2	5	5.2 (0.5, 3.8)	
Heat guard mounting screw	3	6	10 (1.0, 7)	
Muffler cover mounting screw (After '09 model)	4	6	10 (1.0, 7)	
Muffler rear cap mounting bolt	3	5	5.3 (0.5, 3.9)	
Middle cowl mounting screw	4	5	1.5 (0.2, 1.1)	
Seat mounting special screw	2	6	4.3 (0.4, 3.2)	
Muffler band bolt	1	8	17 (1.7, 13)	
Front reflector mounting nut	2	6	1.8 (0.2, 1.3)	
Rear side reflector mounting nut	2	6	1.8 (0.2, 1.3)	

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	4	10	16 (1.6, 12)	
Timing hole cap	1	45	18 (1.8, 13)	Apply grease to the threads.
Oil filter cartridge	1	20	26 (2.7, 19)	Apply oil to the threads and O-ring.
Oil drain bolt	1	12	30 (3.1, 22)	
Oil filter boss	1	20	–	See page 4-22 Apply locking agent to the crankcase side threads.
Air cleaner element mounting screw	2	4	0.8 (0.1, 0.6)	
EGCA cable lock nut	1	10	22 (2.2, 16)	

LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pump assembly bolt	4	6	12 (1.2, 9)	CT bolt
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	Apply locking agent to the threads.
Oil cooler bolt	1	20	59 (6.0, 44)	
Oil pipe mounting bolt	2	6	12 (1.2, 9)	Apply locking agent to the threads.

FUEL SYSTEM (PGM-FI)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Bank angle sensor mounting screw ('08 – '11 model)	2	4	1.1 (0.1, 0.8)	
Bank angle sensor mounting nut (After '11 model)	2	4	2.0 (0.2, 1.5)	
IDC solenoid valve screw (After '11 model)	2	5	1.1 (0.1, 0.8)	
ECT sensor	1	12	23 (2.3, 17)	
Primary fuel rail mounting bolt	4	5	5.1 (0.5, 3.8)	
IACV setting plate torx screw	2	4	2.1 (0.2, 1.5)	
Knock sensor mounting bolt	1	8	22 (2.2, 16)	
Fuel pump mounting nut	6	6	12 (1.2, 9)	See page 6-58
Fuel tank mounting bolt	4	6	10 (1.0, 7)	
IAT sensor mounting screw	2	5	1.1 (0.1, 0.8)	
MAP sensor mounting screw	1	5	5.0 (0.5, 3.7)	
ECM setting plate screw	2	4	0.8 (0.1, 0.6)	
Fuel fill cap socket bolt	6	4	1.8 (0.2, 1.3)	
Air cleaner housing screw	14	4	0.8 (0.1, 0.6)	
Throttle cable adjuster lock nut	1	6	5.5 (0.6, 4.1)	
EVAP canister mounting bolt (STANDARD (AC)/ ABS (AC) type)	2	6	8.0 (0.8, 5.9)	
O_2 sensor (After '11 model)	1	12	24.5 (2.5, 18)	

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Water pump assembly bolt	4	6	12 (1.2, 9)	CT bolt
Water pump drain bolt	1	6	12 (1.2, 9)	CT bolt
Thermostat housing cover bolt	2	6	12 (1.2, 9)	CT bolt
Fan motor shroud mounting bolt	6	6	8.4 (0.9, 6.2)	
Left fan motor mounting screw	3	4	2.7 (0.3, 2.0)	
Left cooling fan mounting nut	1	3	1.0 (0.1, 0.7)	Apply locking agent to the threads.
Right fan motor mounting nut	3	5	5.2 (0.5, 3.8)	
Right cooling fan mounting nut	1	5	2.7 (0.3, 2.0)	Apply locking agent to the threads.

ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Drive sprocket bolt	1	10	54 (5.5, 40)	
Front engine hanger bolt	2	12	64 (6.5, 47)	
Upper engine hanger adjusting bolt	1	20	10 (1.0, 7)	
Upper engine hanger lock nut	1	20	54 (5.5, 40)	
Upper engine hanger nut	1	12	64 (6.5, 47)	
Lower engine hanger nut	1	12	84 (8.6, 62)	

CYLINDER HEAD/VALVES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head nut	10	9	–	See page 9-29
Camshaft holder bolt	20	6	12 (1.2, 9)	Apply oil to the threads and seating surface.
Cylinder head cover bolt	4	6	10 (1.0, 7)	
PAIR check valve cover bolt	4	6	12 (1.2, 9)	Apply locking agent to the threads.
Cam sprocket bolt	4	7	20 (2.0, 15)	Apply locking agent to the threads.
CMP sensor rotor bolt	2	6	12 (1.2, 9)	Apply locking agent to the threads.
Cam chain tensioner A pivot bolt	1	6	10 (1.0, 7)	Apply locking agent to the threads.
Cam chain tensioner B pivot bolt	1	24	74 (7.5, 55)	
Cam chain guide A bolt	1	6	12 (1.2, 9)	Apply locking agent to the threads.
Insulator mounting bolt	6	6	12 (1.2, 9)	
Breather plate mounting bolt	3	6	12 (1.2, 9)	Apply locking agent to the threads.
Cylinder stud bolt	10	9	20 (2.0, 15)	

CLUTCH/STARTER CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch center lock nut	1	25	128 (13.1, 94)	Apply oil to the threads and seating surface. Stake the nut.
Shift drum center bolt	1	8	23 (2.3, 17)	ALOC bolt; replace with a new one.
Shift drum stopper arm pivot bolt	1	6	12 (1.2, 9)	Apply locking agent to the threads.
Gearshift spindle stopper pin	1	8	23 (2.3, 17)	
Starter clutch mounting bolt	1	10	93 (9.5, 69)	Apply oil to the threads and seating surface.
Oil pump drive chain guide mounting bolt	1	6	12 (1.2, 9)	Apply locking agent to the threads.
Gearshift spindle setting plate bolt	1	6	12 (1.2, 9)	Apply locking agent to the threads.

ALTERNATOR

ITEM		Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Stator mounting bolt		4	6	12 (1.2, 9)	
Flywheel bolt	('08, '09 model)	1	10	113 (11.5, 83)	Apply oil to the threads and seating surface.
	(After '09 model)	1	10	103 (10.5, 76)	

CRANKCASE/TRANSMISSION/BALANCER

ITEM		Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Mainshaft bearing set plate bolt		3	6	12 (1.2, 9)	Apply locking agent to the threads.
Shift drum bearing set bolt		2	6	12 (1.2, 9)	Apply locking agent to the threads.
Crankcase	(7 mm bolt)	12	7	18 (1.8, 13)	
	(8 mm bolt)	3	8	24 (2.4, 18)	
	(10 mm bolt)	1	10	39 (4.0, 29)	
Main journal bolt		10	9	20 (2.0, 15) + 150°	See page 12-23

CRANKSHAFT/PISTON/CYLINDER

ITEM		Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankpin bearing cap bolt	(new)	8	8	27.5 (2.8, 20) + 90°	See page 13-8
	(retightening)	8	8	21.6 (2.2, 16) + 90°	See page 13-12
Oil jet pipe mounting bolt		2	6	12 (1.2, 9)	Apply locking agent to the threads.

FRONT WHEEL/SUSPENSION/STEERING

ITEM		Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Handlebar weight mounting screw		2	6	10 (1.0, 7)	ALOC screw; replace with a new one.
Front brake disc bolt		12	6	20 (2.0, 15)	ALOC bolt; replace with a new one.
Front axle bolt		1	18	79 (8.1, 58)	
Front axle holder bolt		4	8	22 (2.2, 16)	
Fork socket bolt ('08 – '11 model)		2	10	34 (3.5, 25)	
Fork bolt ('08 – '11 model)		2	46	34 (3.5, 25)	
Fork piston rod nut (After '11 model STANDARD/ABS type)		2	12	27.5 (2.8, 20)	
Fork rod guide case (After '11 model STANDARD/ABS type)		2	40.5	90 (9.2, 66)	
Fork cap (After '11 model STANDARD/ABS type)		2	46.5	35 (3.6, 26)	
Handlebar pinch bolt	('08 – '13 model)	2	8	26 (2.7, 19)	
	(After '13 model)	2	8	22 (2.2, 16)	
Top bridge pinch bolt	(STANDARD/ ABS type)	2	8	22 (2.2, 16)	
	(SP type)	2	8	24 (2.4, 18)	
Bottom bridge pinch bolt		4	8	27 (2.8, 20)	
Steering stem adjusting nut		1	35	–	See page 14-59
Steering stem adjusting lock nut		1	35	–	See page 14-59
Steering stem nut		1	33	137 (14.0, 101)	
Compression adjuster plug bolt ('08 – '11 model)		2	14	17 (1.7, 13)	
HESD mounting bolt		4	6	10 (1.0, 7)	ALOC bolt; replace with a new one.
Second arm nut		2	6	12 (1.2, 9)	U-nut
Fork damper rod lock nut ('08 – '11 model)		2	10	20 (2.0, 15)	
Front brake hose clamp bolt		1	6	9.0 (0.9, 6.6)	
HESD torque arm nut		1	6	12.5 (1.3, 9.2)	U-nut
Right handlebar switch housing screw		2	4	0.9 (0.1, 0.7)	
Front pulser ring mounting bolt (ABS type)		3	5	7 (0.7, 5.2)	ALOC bolt; replace with a new one.

REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear brake disc bolt	4	8	42 (4.3, 31)	ALOC bolt; replace with a new one.
Driven sprocket nut	6	10	64 (6.5, 47)	U-nut
Rear axle nut (STANDARD/ABS type)	1	22	113 (11.5, 83)	U-nut
(SP type)	1	22	124 (12.6, 91)	U-nut
Shock absorber mounting nut	2	10	44 (4.5, 32)	U-nut
Shock arm-to-swingarm nut	1	10	44 (4.5, 32)	U-nut
Drive chain case bolt	2	6	12 (1.2, 9)	
Drive chain slider bolt	3	6	9.0 (0.9, 6.6)	ALOC bolt; replace with a new one.
Swingarm pivot nut ('08 – '13 model STANDARD type/ '09 model ABS type)	1	22	113 (11.5, 83)	U-nut
(After '13 model STANDARD type/ After '09 model ABS/ SP type)	1	22	124 (12.6, 91)	U-nut
Shock link nut	2	10	44 (4.5, 32)	U-nut
Rear pulser ring mounting bolt (ABS type)	4	5	7 (0.7, 5.2)	ALOC bolt; replace with a new one.

HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Reserve tank stopper plate screw (STANDARD/SP type)	2	4	1.2 (0.1, 0.9)	
(ABS type)	1	4	1.2 (0.1, 0.9)	
Front brake lever pivot bolt	1	6	1.0 (0.1, 0.7)	Apply silicone grease to the sliding surface.
Front brake lever pivot nut	1	6	6.0 (0.6, 4.4)	
Front brake light switch screw	1	4	1.2 (0.1, 0.9)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Front brake caliper mounting bolt (STANDARD/ABS type)	4	10	45 (4.6, 33)	ALOC bolt; replace with a new one.
(SP type)	4	10	40 (4.1, 30)	ALOC bolt; replace with a new one.
Front brake reserve tank stay bolt	1	6	12 (1.2, 9)	
Rear master cylinder push rod lock nut	1	8	18 (1.8, 13)	
Rear master cylinder mounting nut	2	6	10 (1.0, 7)	
Front brake caliper pad pin	4	10	15 (1.5, 11)	
Rear brake caliper pad pin	1	10	18 (1.8, 13)	
Brake hose oil bolt	5	10	34 (3.5, 25)	
Front brake hose clamp nut	1	6	10 (1.0, 7)	
Front brake hose 3-way joint bolt	1	6	10 (1.0, 7)	
Front master cylinder bleed valve	1	6	5.4 (0.6, 4.0)	
Front brake caliper bleed valve (STANDARD/ABS type)	2	8	8.0 (0.8, 5.9)	
(SP type)	2	8	13 (1.3, 10)	
Rear brake caliper bleed valve	1	8	6.0 (0.6, 4.4)	
Rear brake hose clamp screw	1	5	4.2 (0.4, 3.1)	
Heat guard mounting screw	2	5	4.2 (0.4, 3.1)	
ABS valve unit bleed valve (ABS type)	4	8	5.4 (0.6, 4.0)	
Power unit bleed valve (ABS type)	2	8	5.4 (0.6, 4.0)	

COMBINED ABS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake pipe joint nut	10	10	14 (1.4, 10)	Apply brake fluid to the threads.

ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter motor terminal nut	1	6	12 (1.2, 9)	
Starter motor setting bolt	2	5	4.0 (0.4, 3.0)	ALOC bolt; replace with a new one.
Negative brush mounting screw	1	5	3.7 (0.4, 2.7)	

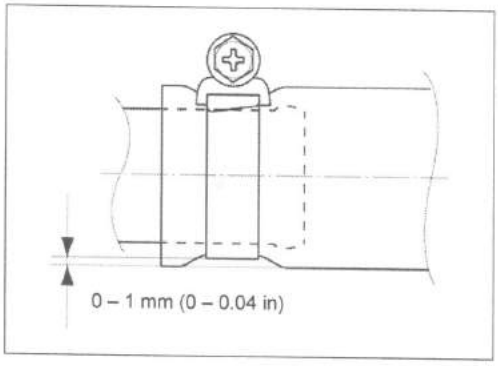
LIGHTS/METERS/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
EOP switch	1	PT 1/8	12 (1.2, 9)	Apply sealant to the threads.
EOP switch wire terminal bolt	1	4	2.0 (0.2, 1.5)	
Neutral switch ('08 – '11 model)	1	10	12 (1.2, 9)	
Combination meter screw	8	5	1.0 (0.1, 0.7)	
Ignition switch mounting bolt	2	8	26 (2.7, 19)	Replace with a new one.
Sidestand switch mounting bolt	1	6	10 (1.0, 7)	ALOC bolt; replace with a new one.
Right handlebar switch housing screw	2	4	0.9 (0.1, 0.7)	
Clutch switch mounting screw	1	3	0.6 (0.1, 0.4)	ALOC screw; replace with a new one.
Combination meter stay mounting bolt	2	8	32 (3.3, 24)	

OTHERS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Sidestand pivot bolt	1	10	10 (1.0, 7)	
Sidestand pivot nut	1	10	29 (3.0, 21)	
Sidestand spring hook bolt	1	8	21.5 (2.2, 16)	
Gearshift pedal pivot bolt	1	8	22 (2.2, 16)	

Water hose clamp:



LUBRICATION & SEAL POINTS

ENGINE

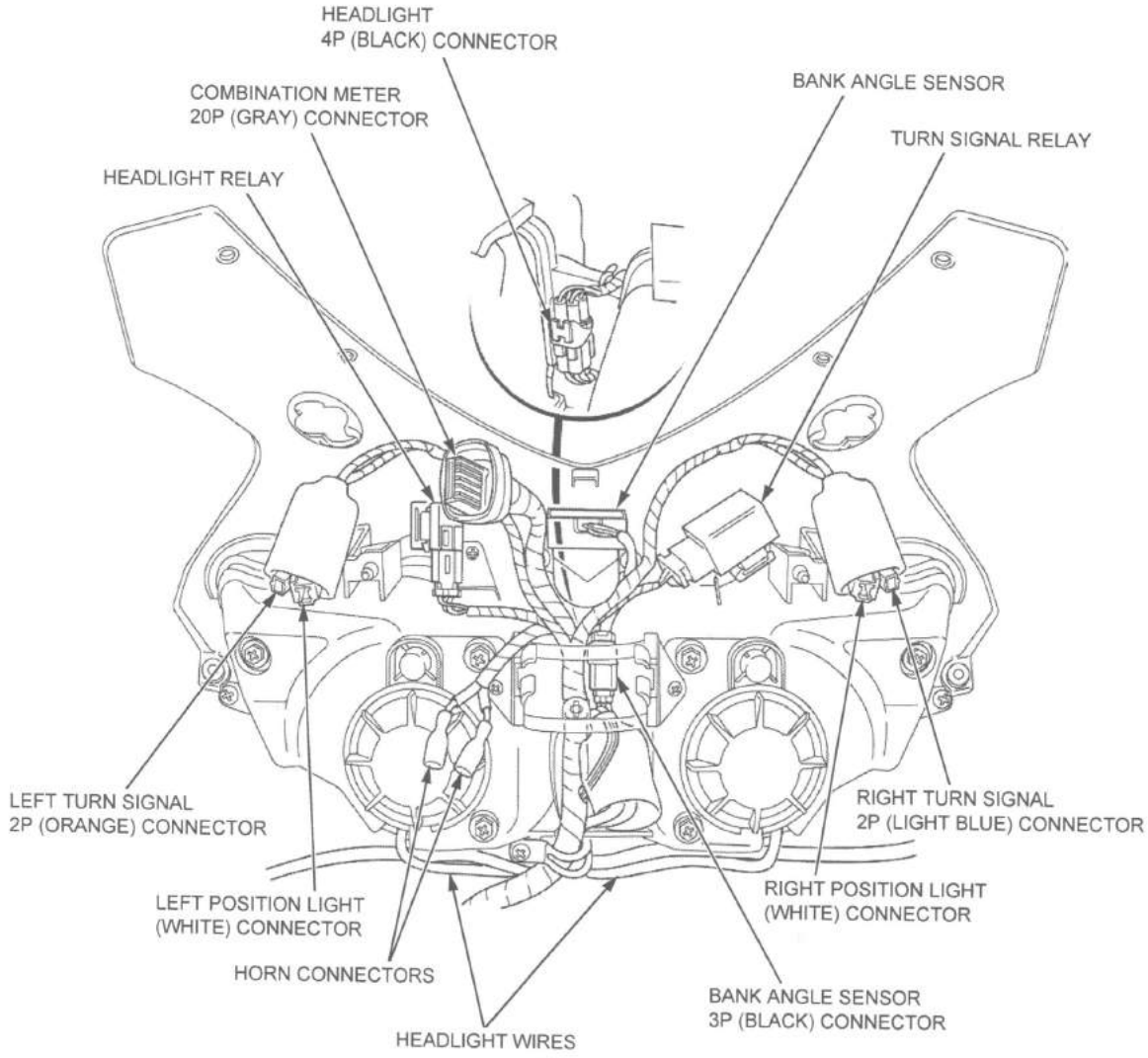
MATERIAL	LOCATION	REMARKS
Liquid sealant (Three Bond 1207B or equivalent)	Crankcase mating surface	See page 12-22
	Oil pan mating surface	See page 5-12
	Right crankcase cover mating surface	See page 10-35
	Alternator cover mating surface	See page 11-10
	Alternator cover wire grommet	
	Cylinder head semi-circular cut-out	See page 9-35
	EOP switch threads	
Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	Main journal bearing sliding surface	
	Piston pin sliding surface	
	Crankpin bearing sliding surface	
	Connecting rod small end inner surface	
	Crankshaft thrust surface	
	Camshaft lobes, journals and thrust surface	
	Valve stem sliding surface	
	Valve lifter sliding surface	
	Oil pump drive sprocket guide sliding surface	
	Clutch outer sliding surface	
	Clutch outer guide sliding surface	
	M3/4, C5, C6 shifter gear (shift fork grooves)	
	Starter reduction gear sliding surface	
	Starter idle gear shaft sliding surface	
Engine oil	Cylinder head mounting nut/washer/stud bolt threads and seating surface	
	Piston and piston ring sliding surface	
	Clutch disc surface	
	Starter one-way clutch sliding surface	
	Each gear teeth and rotating surface	
	Each bearing	
	Each O-ring/seal ring	
	Other rotating area and sliding surface	
Multi-purpose grease	Each oil seal lips	
	Balancer rubber damper	
	Oil pipe O-ring	
	Right/left/transmission oil jet pipe O-ring	
Locking agent	CMP sensor rotor bolt threads	Coating width: 4.5 ± 0.5 mm
	Oil pump driven sprocket bolt threads	Coating width: 6.5 ± 1 mm
	Shift drum bearing set bolt threads	Coating width: 6.5 ± 1 mm
	Mainshaft bearing set plate bolt threads	Coating width: 6.5 ± 1 mm
	Cam sprocket bolt threads	Coating width: 6.5 ± 1 mm
	Cam chain tensioner A pivot bolt threads	Coating width: 6.5 ± 1 mm
	Cam chain guide A bolt threads	
	Shift drum stopper arm pivot bolt threads	Coating width: 6.5 ± 1 mm
	Oil pump drive chain guide mounting bolt threads	Coating width: 6.5 ± 1 mm
	Shift spindle setting plate bolt threads	Coating width: 6.5 ± 1 mm
	Oil jet pipe mounting bolt threads	Coating width: 6.5 ± 1 mm
	Oil filter boss threads (crankcase side)	Coating width: 6.5 ± 1 mm
	Oil pipe mounting bolt threads	Coating width: 6.5 ± 1 mm
	Breather plate bolt threads	Coating width: 6.5 ± 1 mm

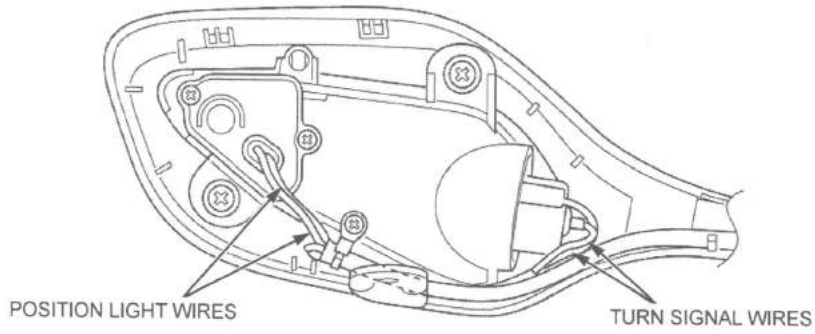
FRAME

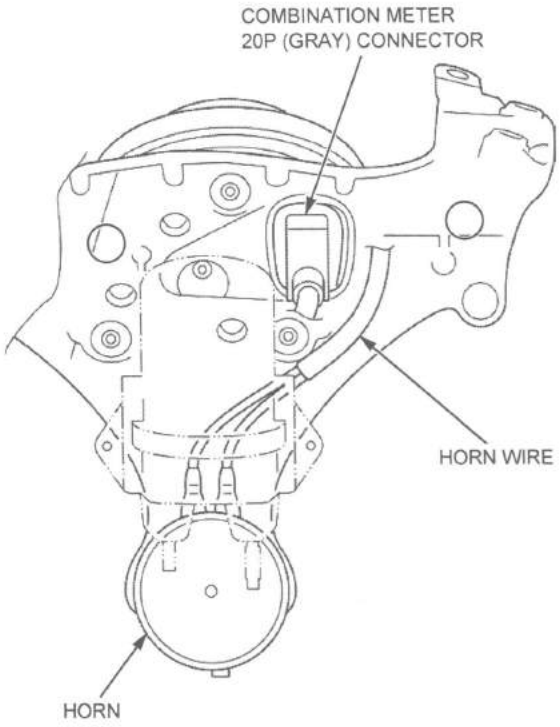
MATERIAL	LOCATION	REMARKS
Multi-purpose grease	Main step sliding surface Pillion step sliding surface (STANDARD/ABS type) Pillion seat catch hook sliding area (STANDARD/ABS type) Single seat cowl catch hook sliding area (SP type) Front wheel dust seal lips Rear wheel dust seal lips Throttle pipe flange cable groove Clutch lever pivot bolt sliding surface Rear brake pedal pivot sliding surface Gearshift pedal link tie-rod ball joints Gearshift pedal pivot sliding surface Axle surface Swingarm pivot bolt surface Brake pedal-to-master cylinder joint pin Rear wheel O-ring Second arm fitting area	
Urea based multi-purpose grease with extreme pressure (example: EXCELITE EP2 manufactured by KYODO YUSHI, Japan) or equivalent	Steering head bearing sliding surface Steering head dust seal lips Steering stem adjusting nut threads	3 – 5 g 0.1 – 0.3 g
Molybdenum disulfide grease	Sidestand pivot sliding surface Swingarm pivot bearings Swingarm pivot dust seal lips Shock link needle bearings Shock link dust seal lips Shock absorber needle bearing (STANDARD/ABS type) Shock absorber dust seal lips (STANDARD/ABS type)	
Cable lubricant	Throttle cable inside Clutch cable inside EGCA cable inside	
Pro Honda Handgrip cement or equivalent adhesive	Handlebar grip rubber inner surface	
Engine oil	Each O-ring	
Silicone grease	Front brake push rod-to-master piston contact surface Front brake push rod tip Front brake lever pivot bolt sliding surface Rear brake master piston-to-push rod contacting area Rear brake caliper slide pin sliding surface Rear brake caliper pad pin O-ring Brake caliper dust seal	
DOT 4 brake fluid	Brake master piston and cups Brake caliper piston and piston seals	
Fork fluid	Fork O-ring (STANDARD/ABS type) Fork dust seal and oil seal lips (STANDARD/ABS type)	
Locking agent	Rear brake caliper slide pin threads	

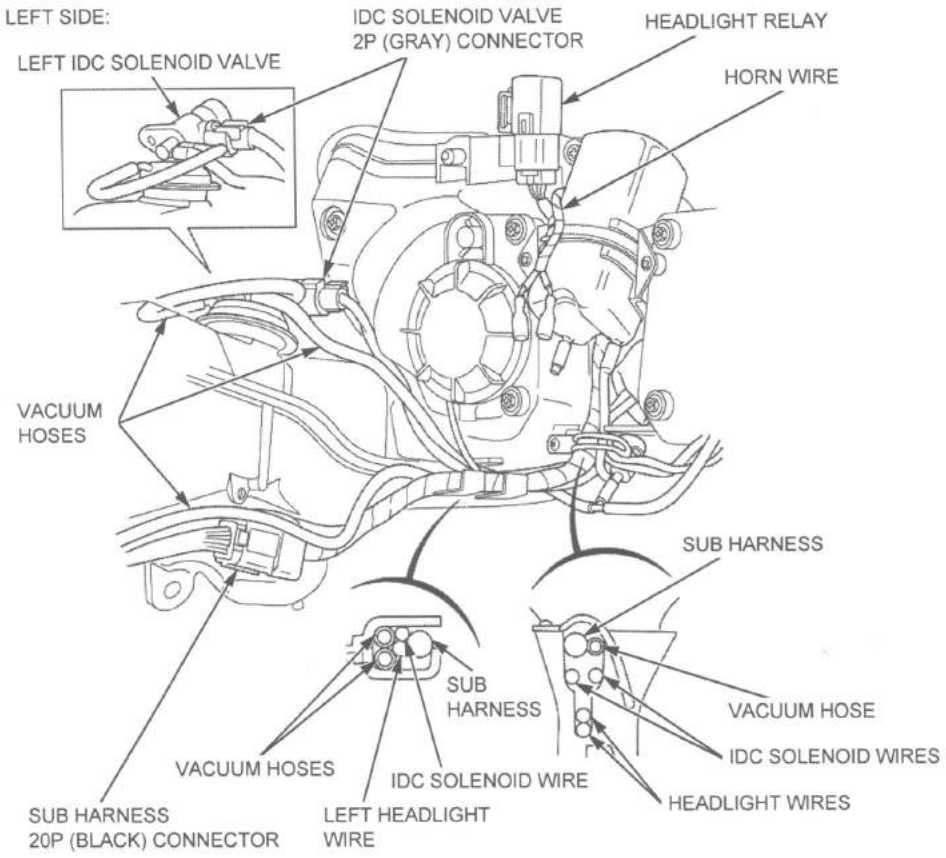
CABLE & HARNESS ROUTING ('08 – '11 model)

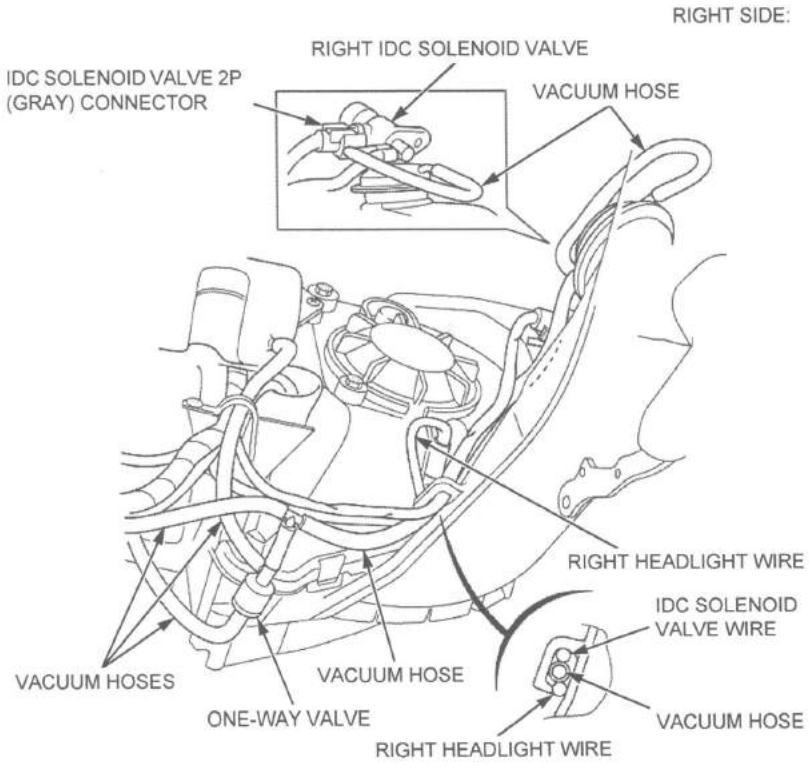
'08 – '11 STANDARD type:

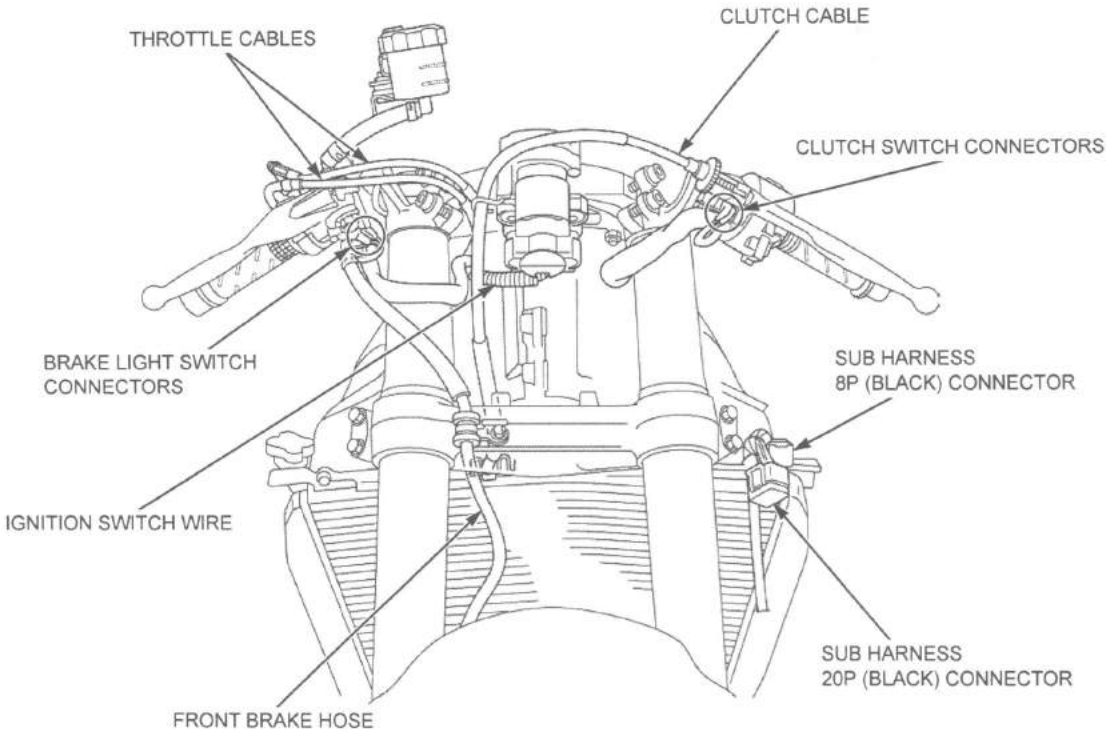


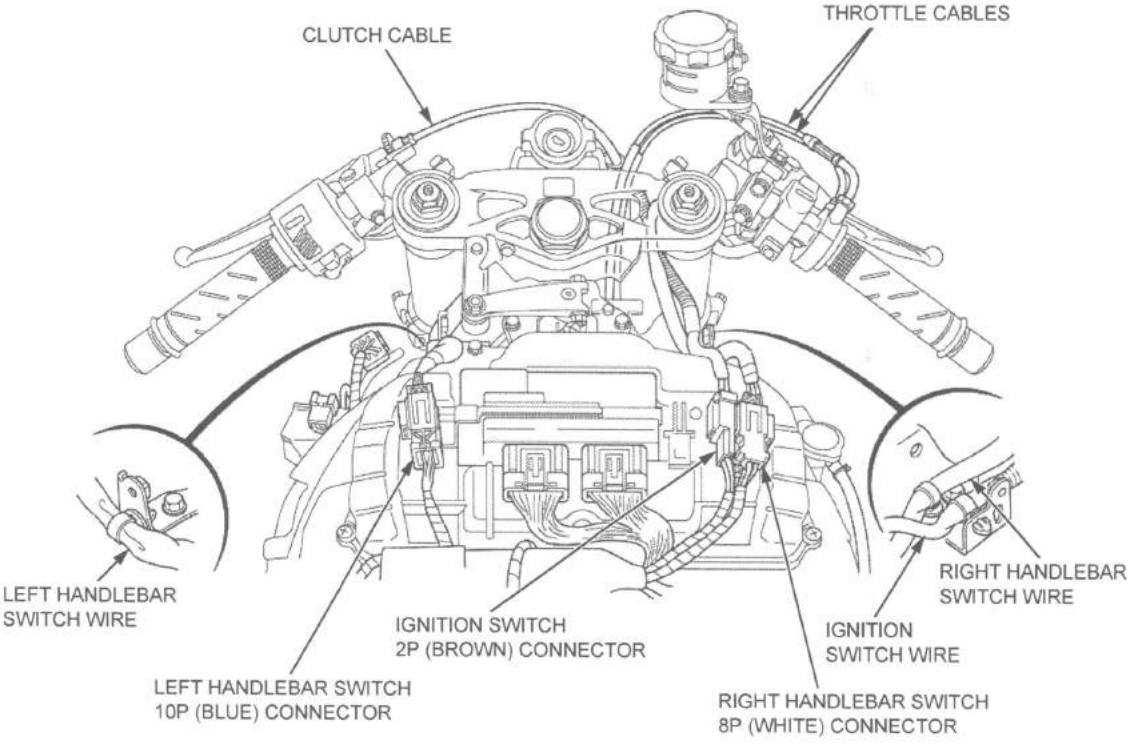


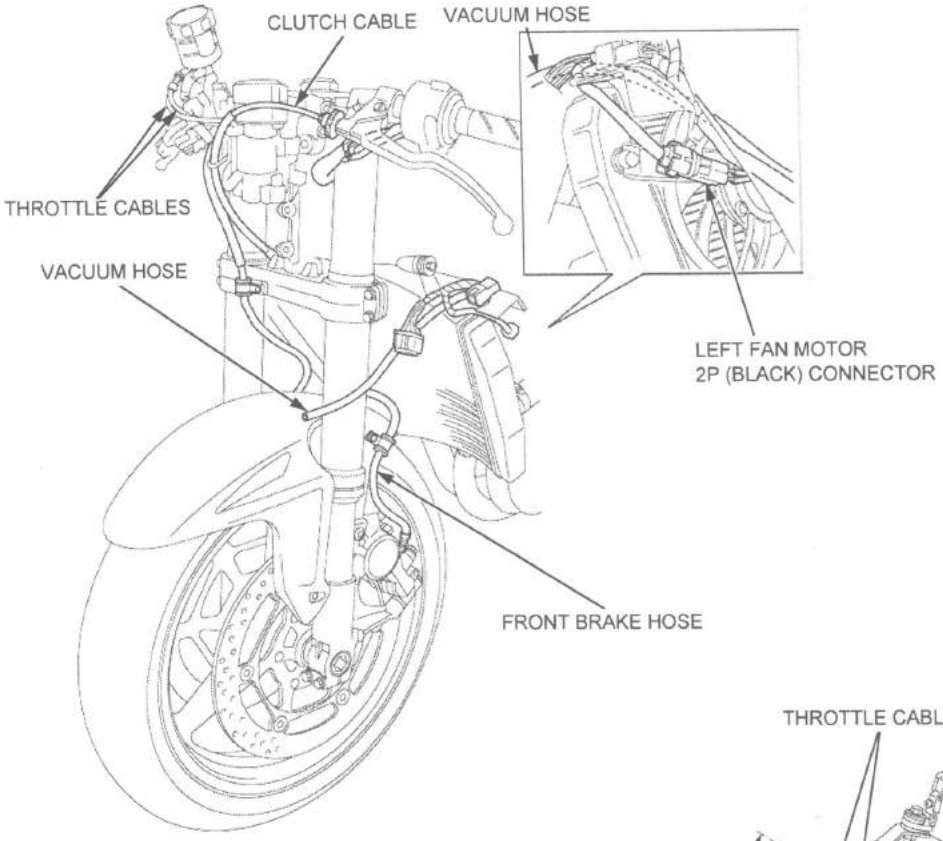

COMBINATION METER
20P (GRAY) CONNECTOR
HORN WIRE
HORN

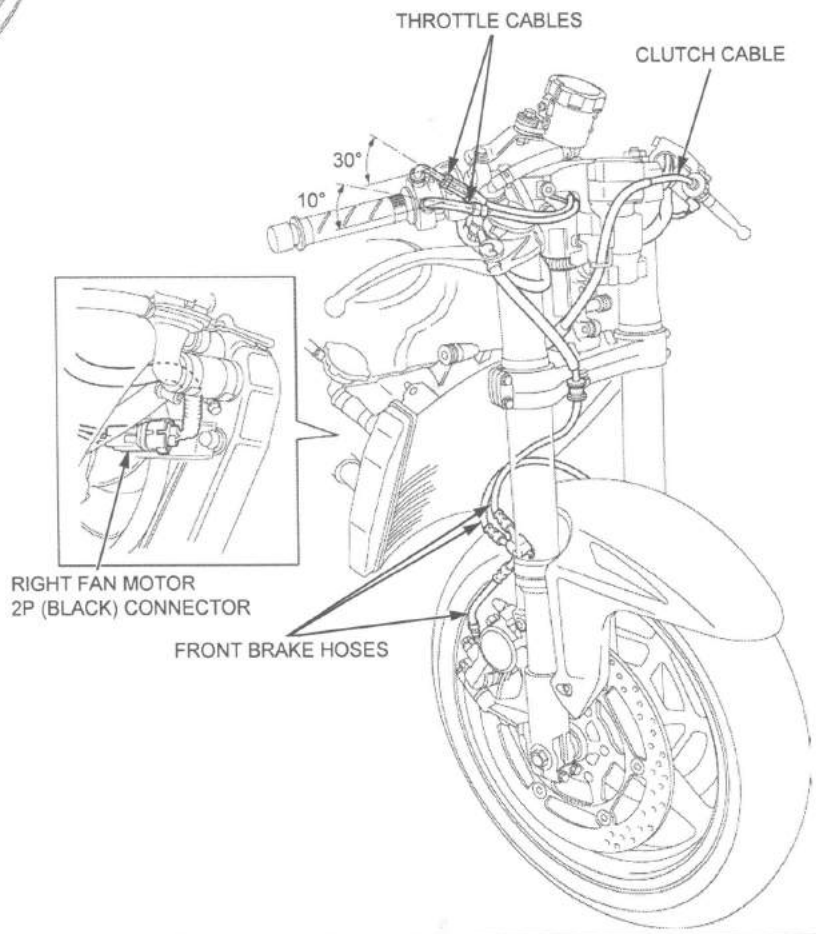

LEFT SIDE:
LEFT IDC SOLENOID VALVE
IDC SOLENOID VALVE 2P (GRAY) CONNECTOR
HEADLIGHT RELAY
HORN WIRE
VACUUM HOSES
SUB HARNESS
SUB HARNESS
VACUUM HOSE
IDC SOLENOID WIRES
VACUUM HOSES
IDC SOLENOID WIRE
HEADLIGHT WIRES
SUB HARNESS 20P (BLACK) CONNECTOR
LEFT HEADLIGHT WIRE

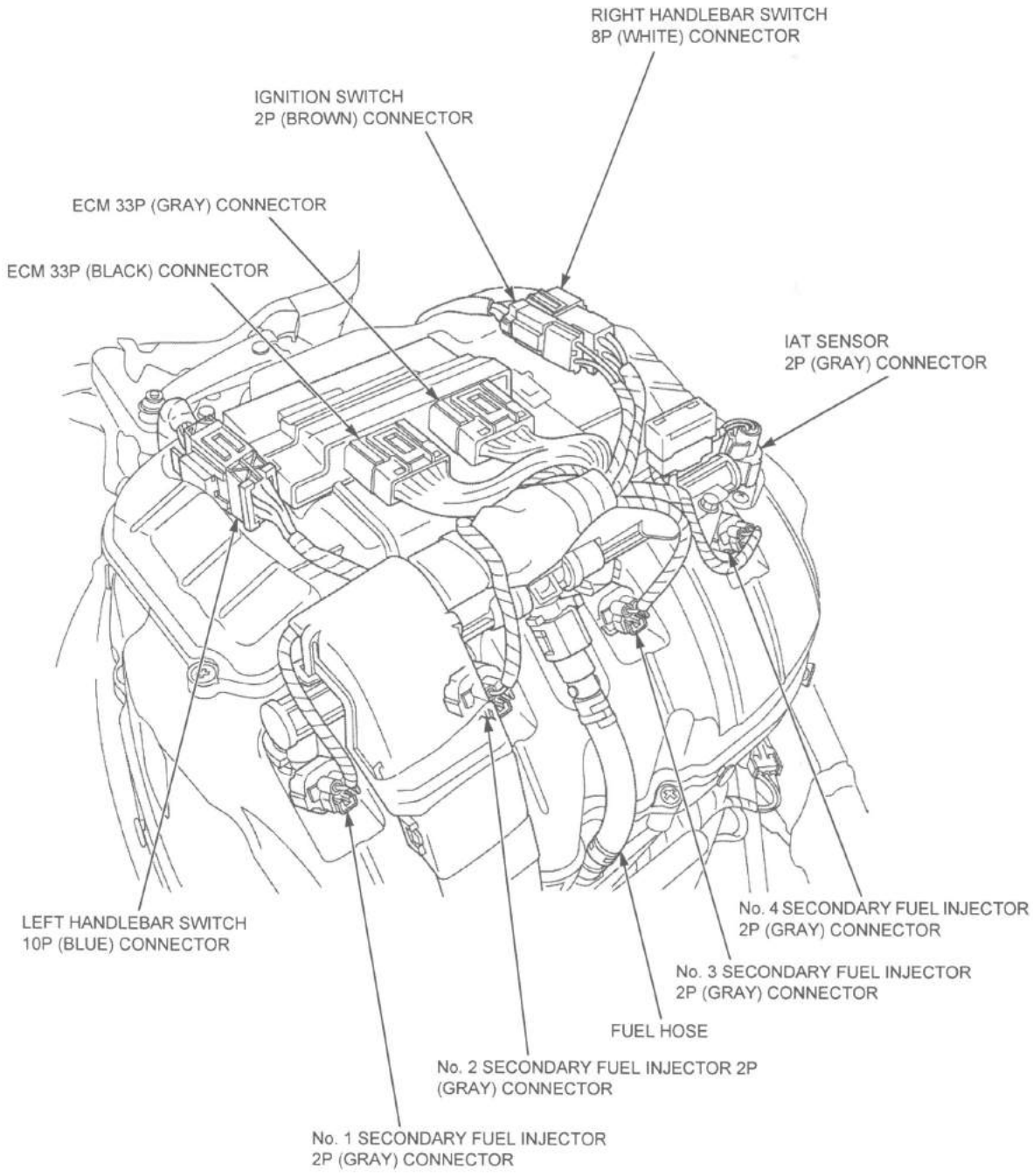

RIGHT SIDE:
RIGHT IDC SOLENOID VALVE
IDC SOLENOID VALVE 2P (GRAY) CONNECTOR
VACUUM HOSE
RIGHT HEADLIGHT WIRE
IDC SOLENOID VALVE WIRE
VACUUM HOSES
VACUUM HOSE
ONE-WAY VALVE
VACUUM HOSE
RIGHT HEADLIGHT WIRE

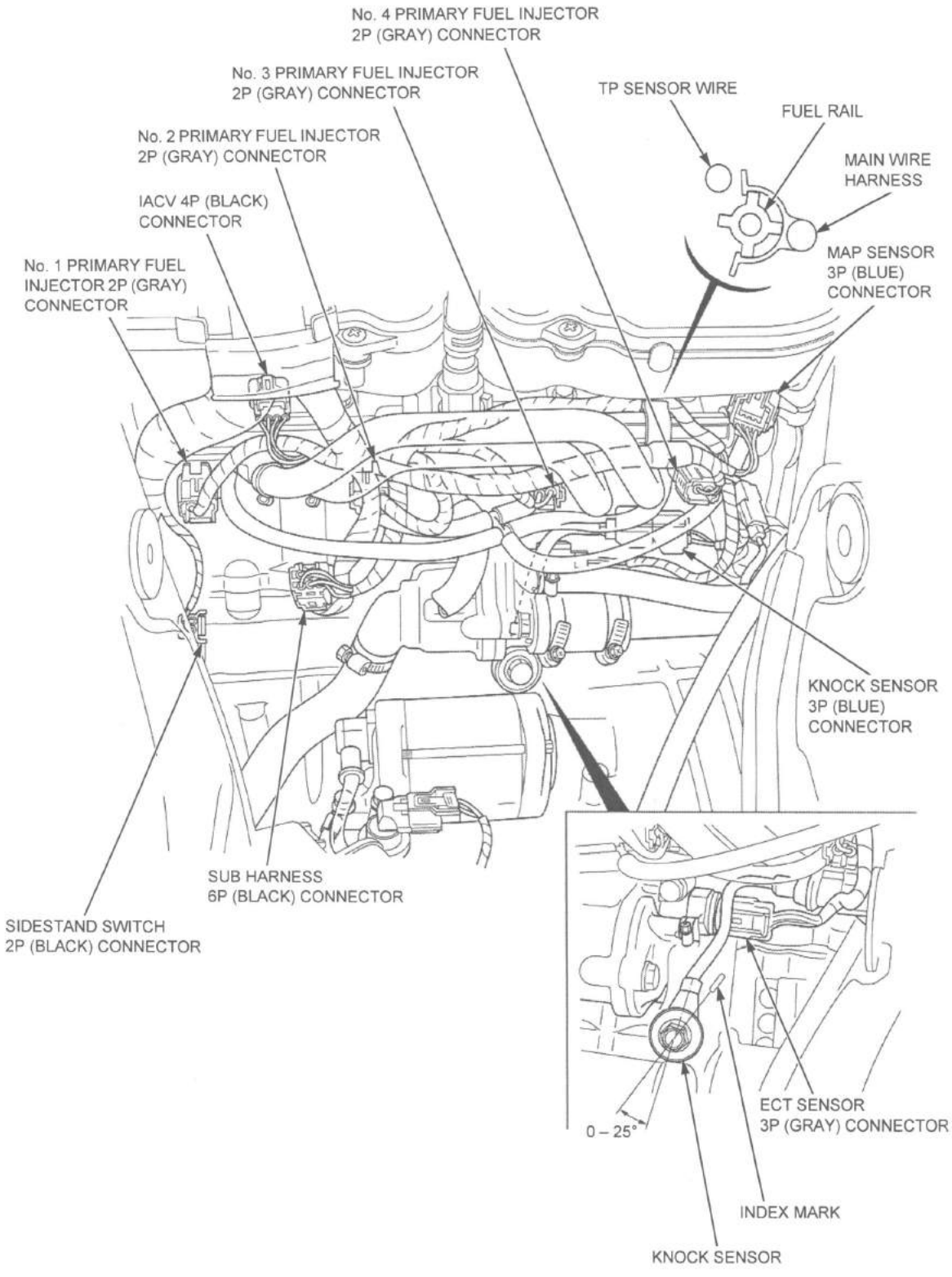

THROTTLE CABLES
CLUTCH CABLE
CLUTCH SWITCH CONNECTORS
BRAKE LIGHT SWITCH CONNECTORS
SUB HARNESS 8P (BLACK) CONNECTOR
IGNITION SWITCH WIRE
SUB HARNESS 20P (BLACK) CONNECTOR
FRONT BRAKE HOSE

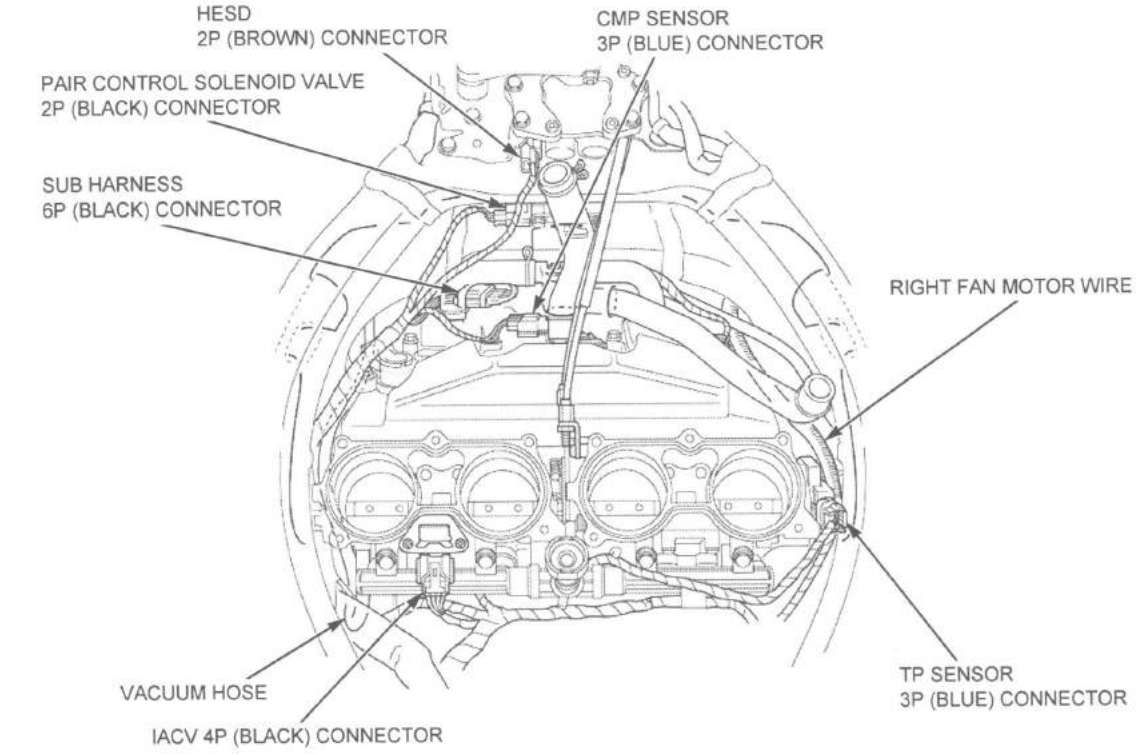

CLUTCH CABLE
THROTTLE CABLES
LEFT HANDLEBAR SWITCH WIRE
IGNITION SWITCH 2P (BROWN) CONNECTOR
RIGHT HANDLEBAR SWITCH WIRE
IGNITION SWITCH WIRE
LEFT HANDLEBAR SWITCH 10P (BLUE) CONNECTOR
RIGHT HANDLEBAR SWITCH 8P (WHITE) CONNECTOR

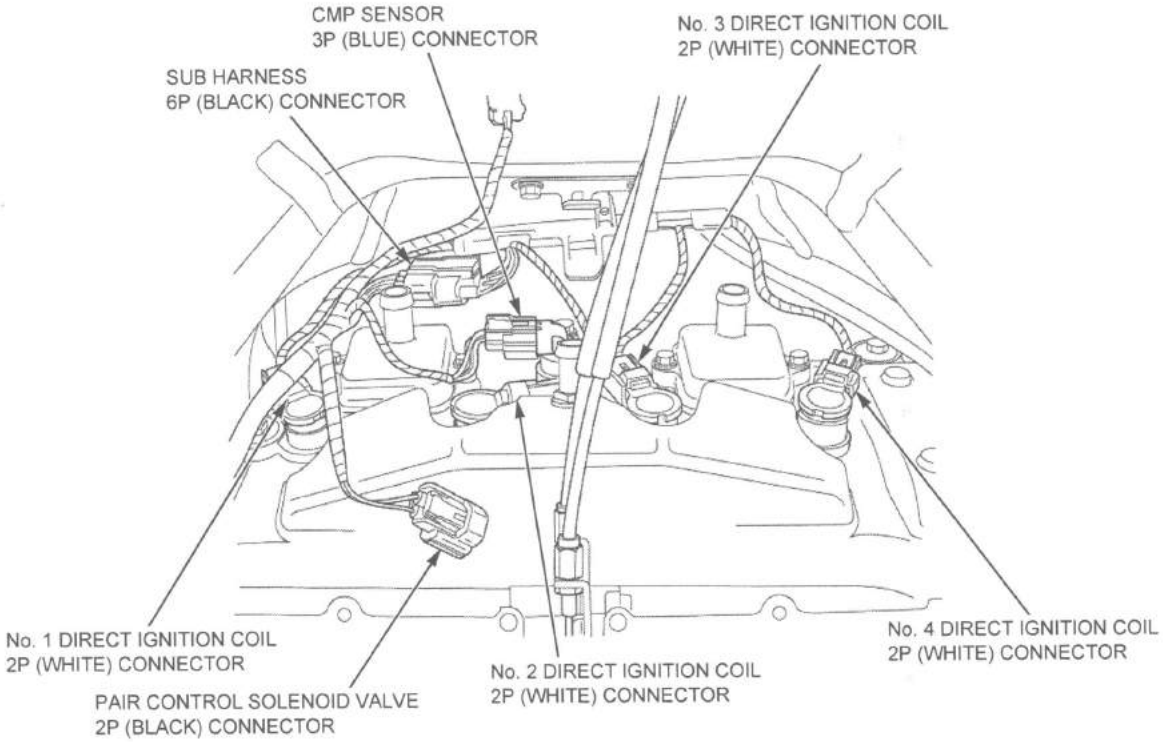

CLUTCH CABLE
VACUUM HOSE
THROTTLE CABLES
VACUUM HOSE
LEFT FAN MOTOR
2P (BLACK) CONNECTOR
FRONT BRAKE HOSE


THROTTLE CABLES
CLUTCH CABLE
30°
10°
RIGHT FAN MOTOR
2P (BLACK) CONNECTOR
FRONT BRAKE HOSES

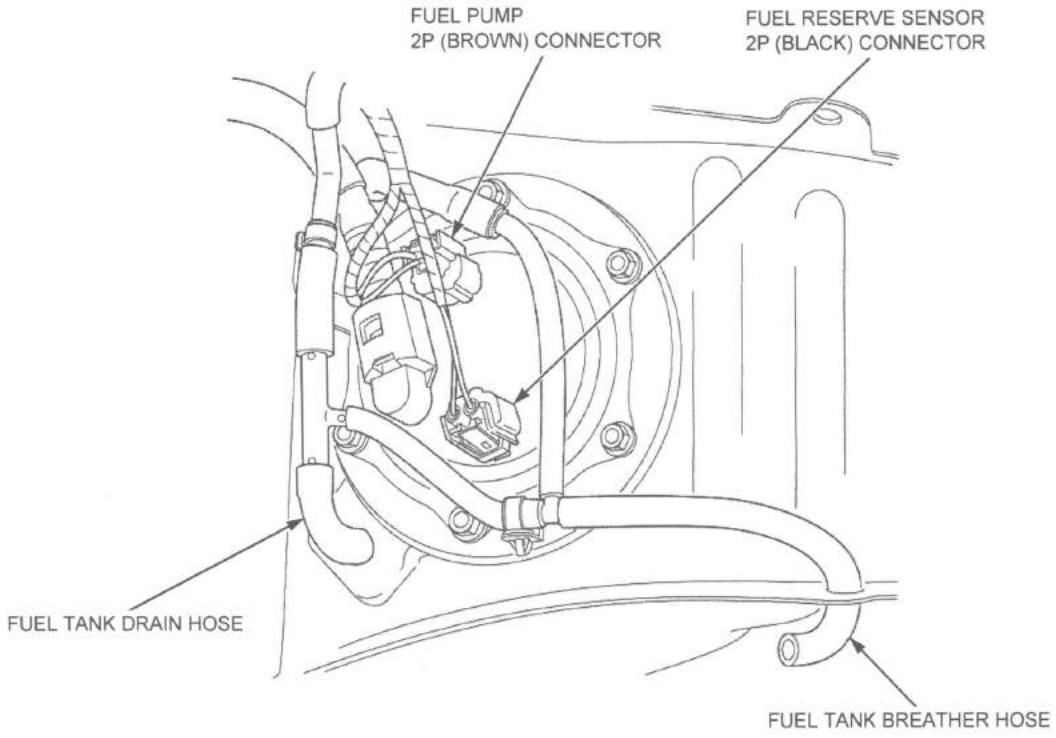

RIGHT HANDLEBAR SWITCH
8P (WHITE) CONNECTOR
IGNITION SWITCH
2P (BROWN) CONNECTOR
ECM 33P (GRAY) CONNECTOR
ECM 33P (BLACK) CONNECTOR
IAT SENSOR
2P (GRAY) CONNECTOR
LEFT HANDLEBAR SWITCH
10P (BLUE) CONNECTOR
No. 4 SECONDARY FUEL INJECTOR
2P (GRAY) CONNECTOR
No. 3 SECONDARY FUEL INJECTOR
2P (GRAY) CONNECTOR
FUEL HOSE
No. 2 SECONDARY FUEL INJECTOR 2P
(GRAY) CONNECTOR
No. 1 SECONDARY FUEL INJECTOR
2P (GRAY) CONNECTOR


No. 4 PRIMARY FUEL INJECTOR 2P (GRAY) CONNECTOR
No. 3 PRIMARY FUEL INJECTOR 2P (GRAY) CONNECTOR
No. 2 PRIMARY FUEL INJECTOR 2P (GRAY) CONNECTOR
IACV 4P (BLACK) CONNECTOR
No. 1 PRIMARY FUEL INJECTOR 2P (GRAY) CONNECTOR
TP SENSOR WIRE
FUEL RAIL
MAIN WIRE HARNESS
MAP SENSOR 3P (BLUE) CONNECTOR
KNOCK SENSOR 3P (BLUE) CONNECTOR
SUB HARNESS 6P (BLACK) CONNECTOR
SIDESTAND SWITCH 2P (BLACK) CONNECTOR
0 – 25°
ECT SENSOR 3P (GRAY) CONNECTOR
INDEX MARK
KNOCK SENSOR

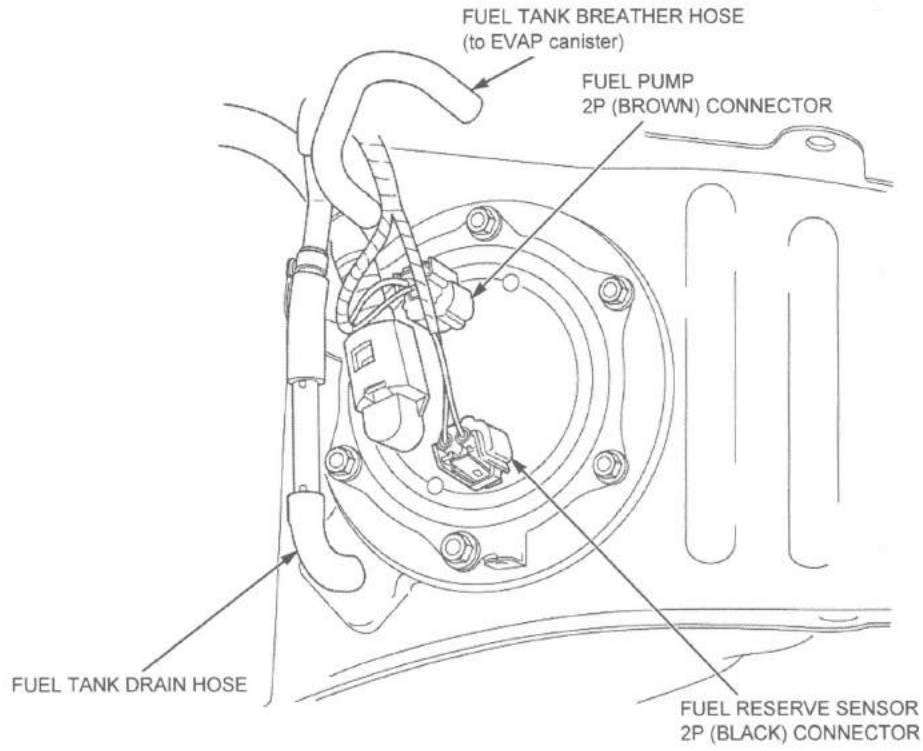

HESD
2P (BROWN) CONNECTOR
CMP SENSOR
3P (BLUE) CONNECTOR
PAIR CONTROL SOLENOID VALVE
2P (BLACK) CONNECTOR
SUB HARNESS
6P (BLACK) CONNECTOR
RIGHT FAN MOTOR WIRE
VACUUM HOSE
IACV 4P (BLACK) CONNECTOR
TP SENSOR
3P (BLUE) CONNECTOR


CMP SENSOR
3P (BLUE) CONNECTOR
No. 3 DIRECT IGNITION COIL
2P (WHITE) CONNECTOR
SUB HARNESS
6P (BLACK) CONNECTOR
No. 1 DIRECT IGNITION COIL
2P (WHITE) CONNECTOR
PAIR CONTROL SOLENOID VALVE
2P (BLACK) CONNECTOR
No. 2 DIRECT IGNITION COIL
2P (WHITE) CONNECTOR
No. 4 DIRECT IGNITION COIL
2P (WHITE) CONNECTOR

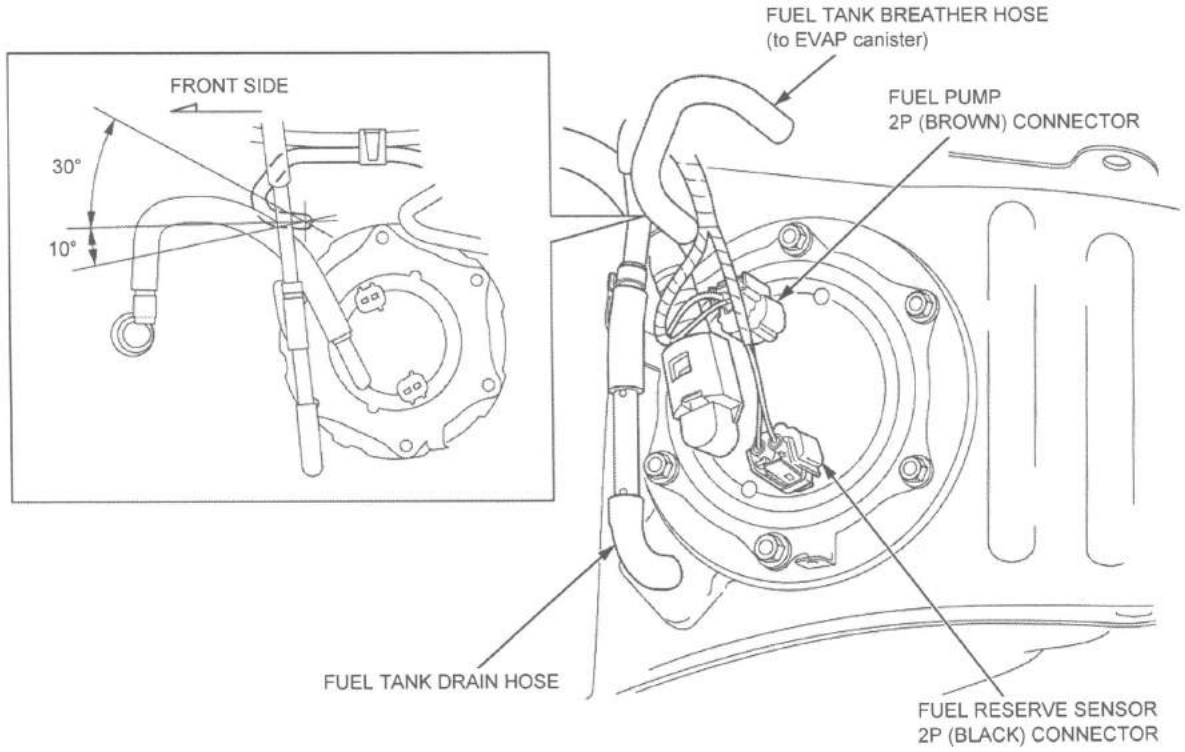
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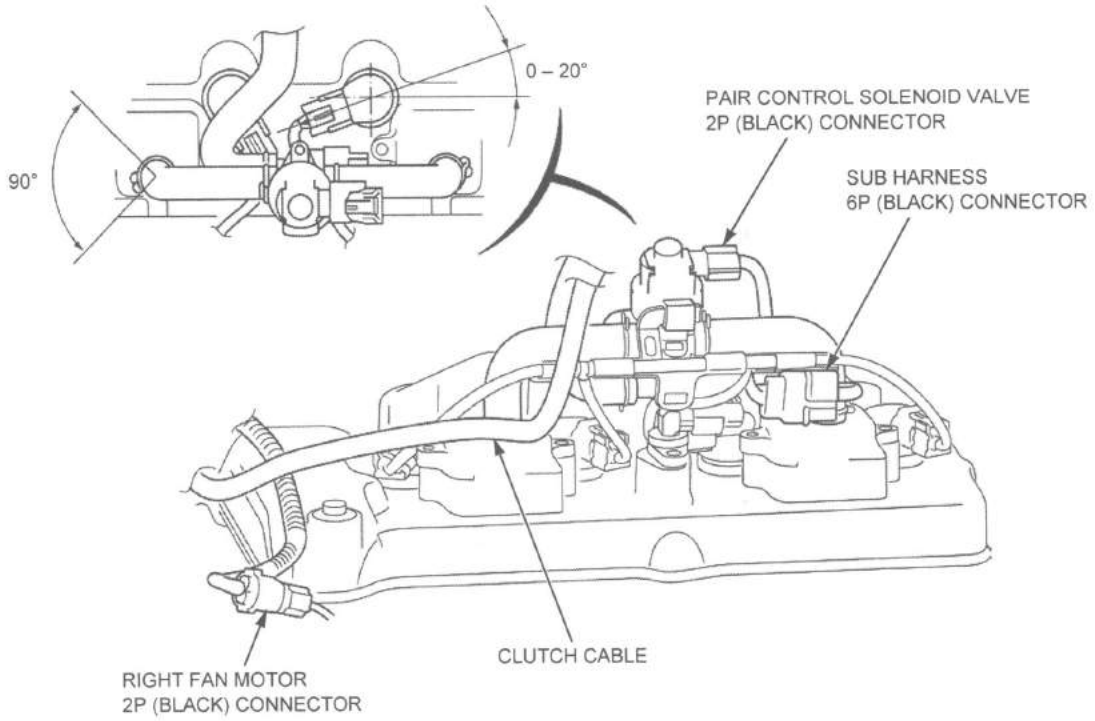


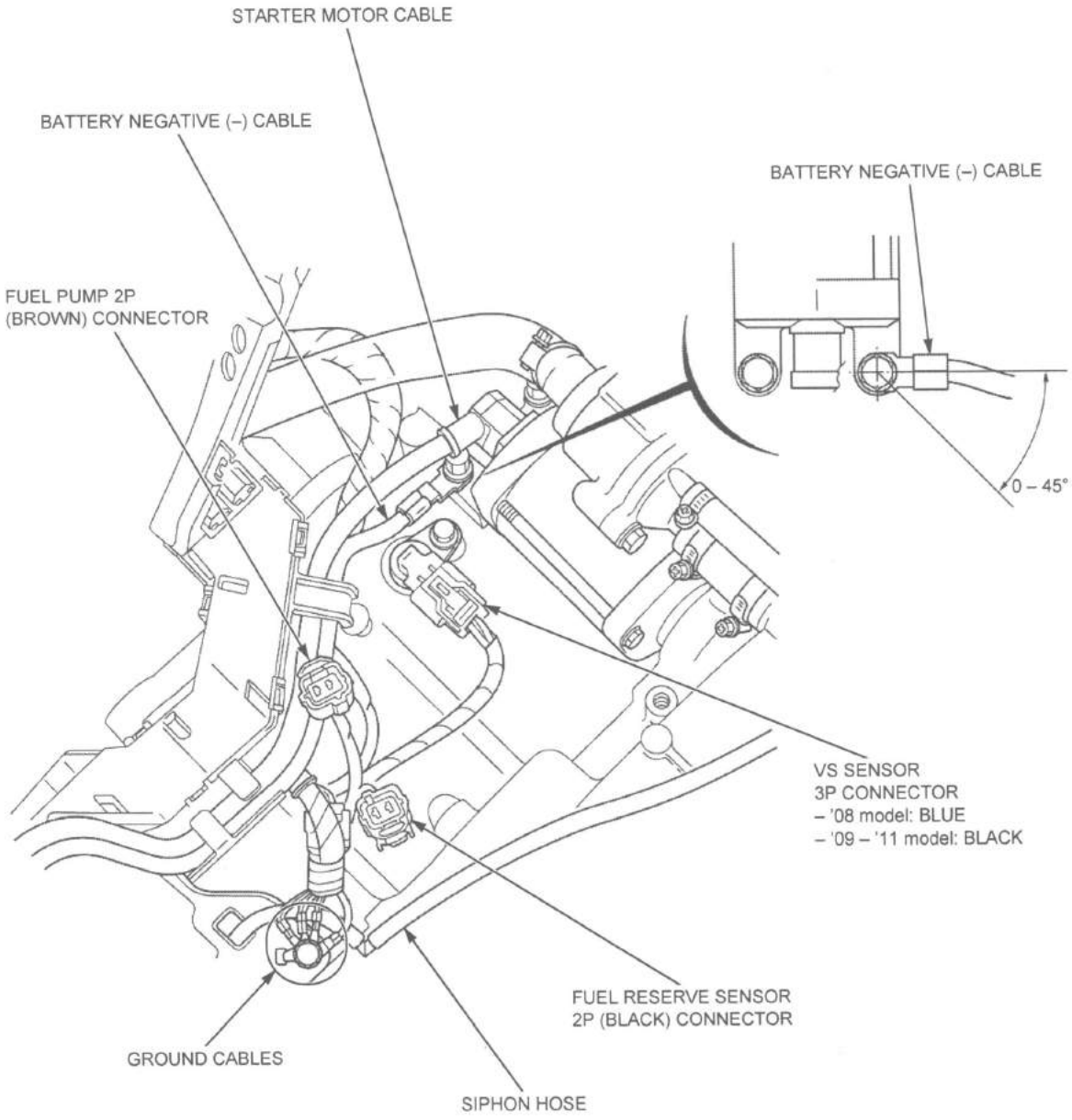
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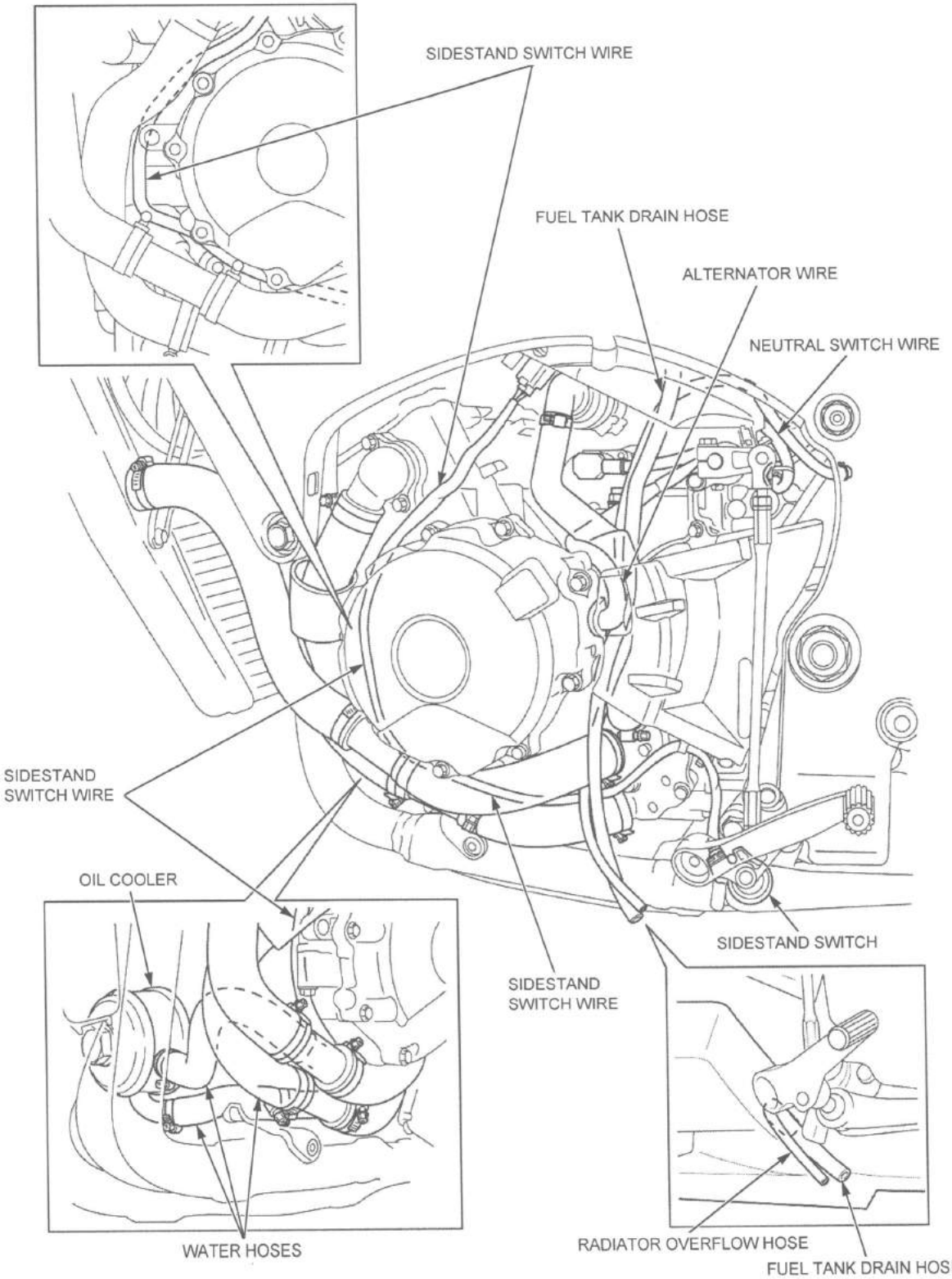


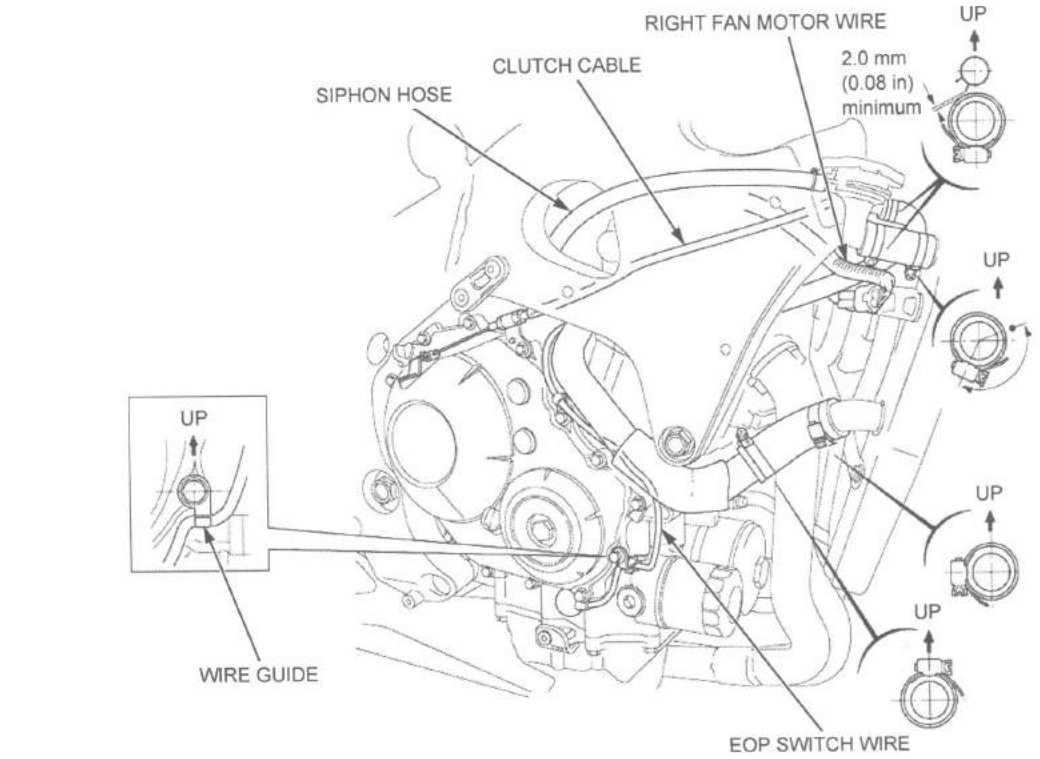
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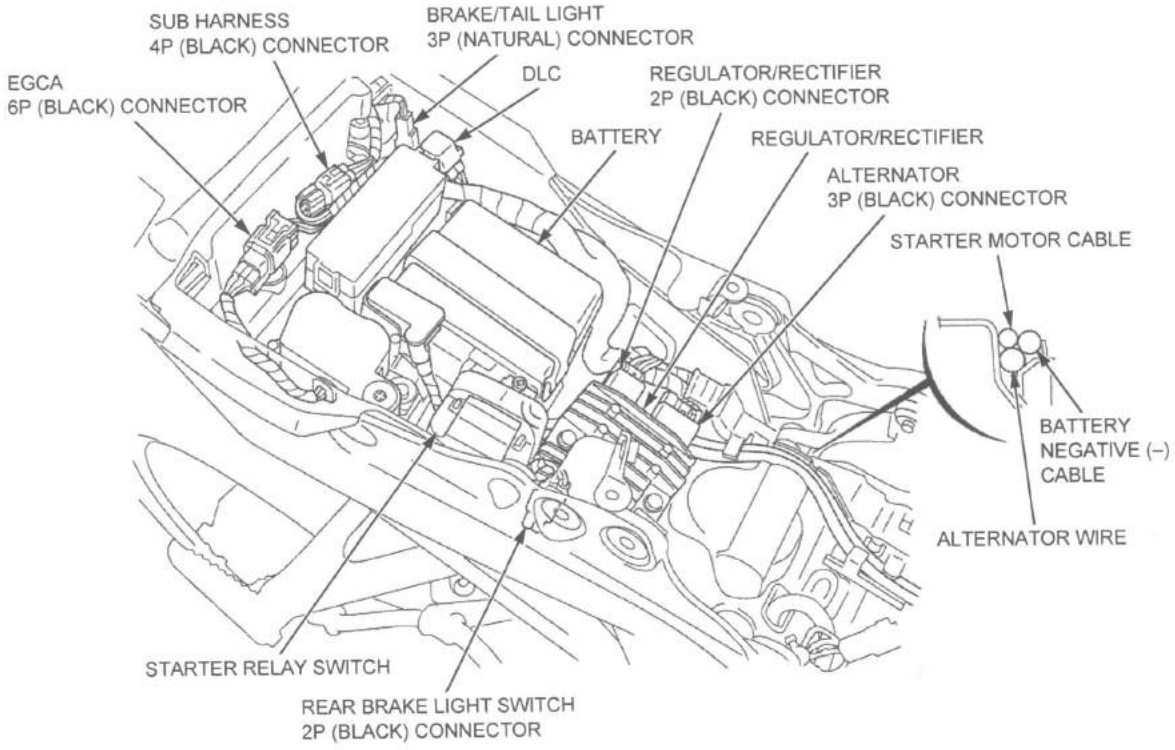


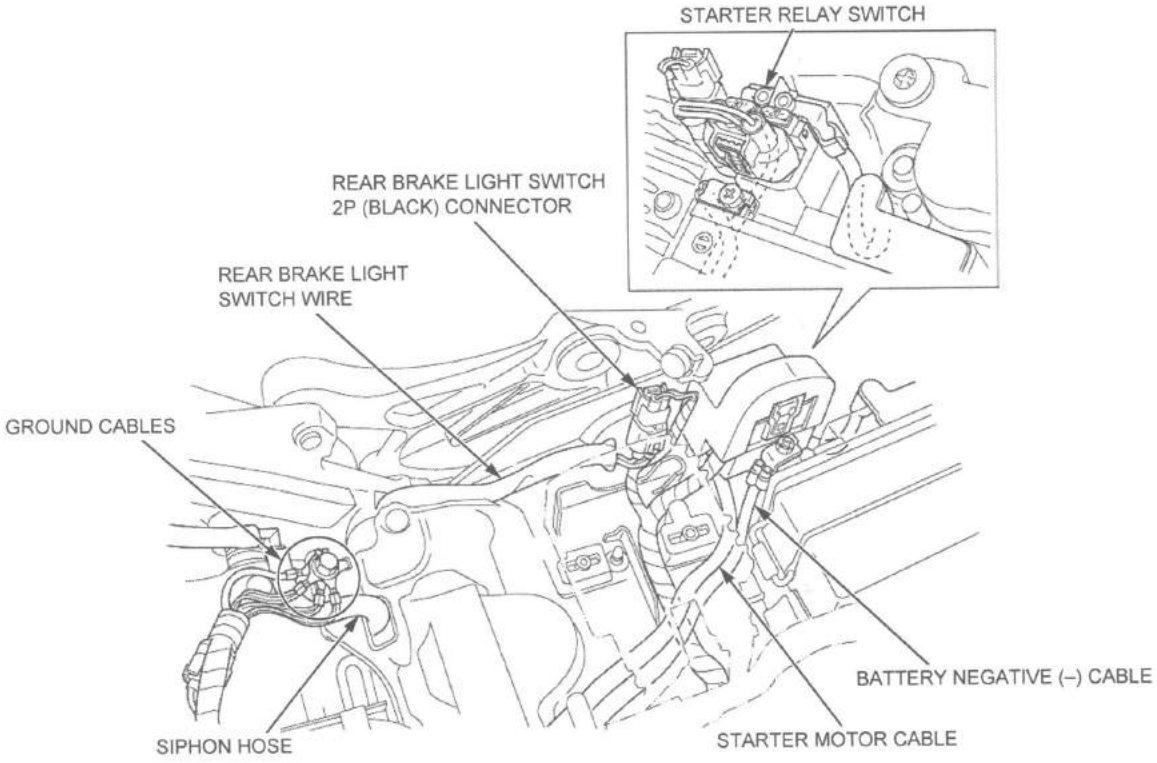

0 – 20°
90°
PAIR CONTROL SOLENOID VALVE
2P (BLACK) CONNECTOR
SUB HARNESS
6P (BLACK) CONNECTOR
CLUTCH CABLE
RIGHT FAN MOTOR
2P (BLACK) CONNECTOR

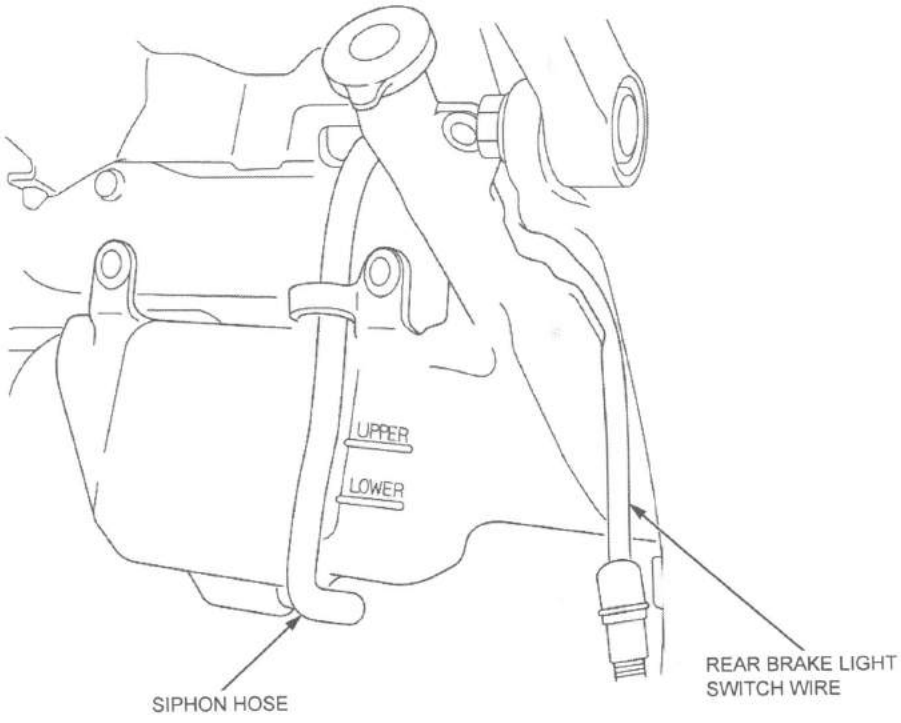

STARTER MOTOR CABLE
BATTERY NEGATIVE (–) CABLE
BATTERY NEGATIVE (–) CABLE
FUEL PUMP 2P
(BROWN) CONNECTOR
0 – 45°
VS SENSOR
3P CONNECTOR
– '08 model: BLUE
– '09 – '11 model: BLACK
FUEL RESERVE SENSOR
2P (BLACK) CONNECTOR
GROUND CABLES
SIPHON HOSE


SIDESTAND SWITCH WIRE
FUEL TANK DRAIN HOSE
ALTERNATOR WIRE
NEUTRAL SWITCH WIRE
SIDESTAND SWITCH WIRE
OIL COOLER
SIDESTAND SWITCH
SIDESTAND SWITCH WIRE
WATER HOSES
RADIATOR OVERFLOW HOSE
FUEL TANK DRAIN HOSE

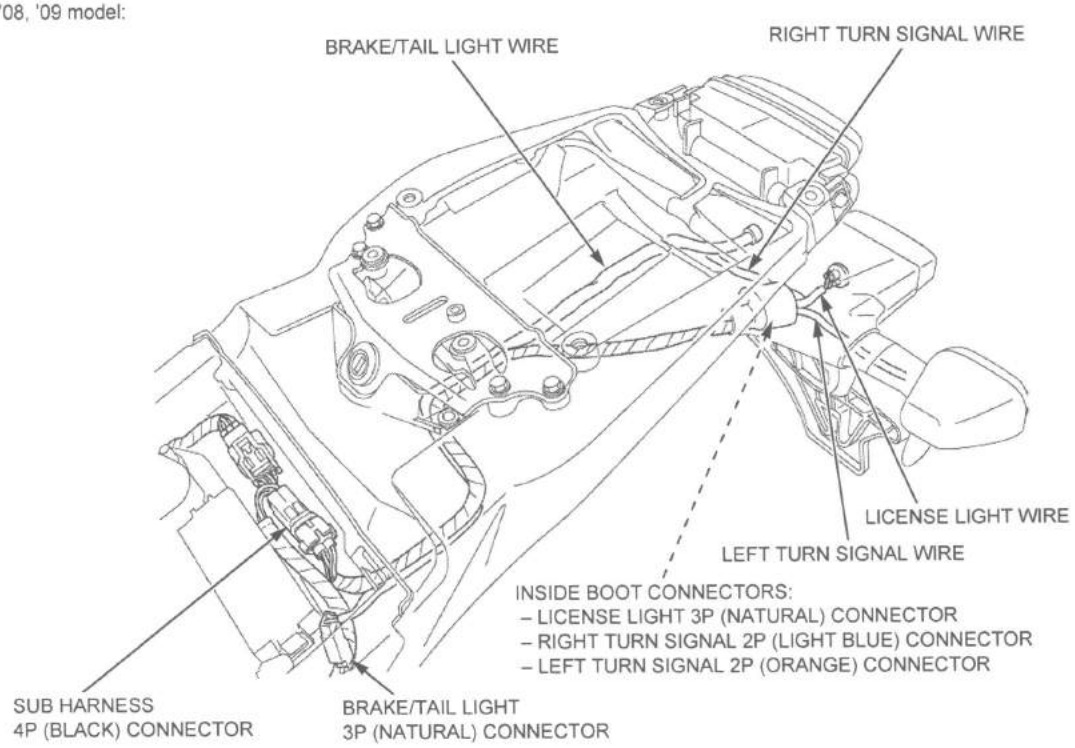

RIGHT FAN MOTOR WIRE
UP
2.0 mm
(0.08 in)
minimum
CLUTCH CABLE
SIPHON HOSE
UP
UP
UP
UP
WIRE GUIDE
EOP SWITCH WIRE


SUB HARNESS
4P (BLACK) CONNECTOR
BRAKE/TAIL LIGHT
3P (NATURAL) CONNECTOR
EGCA
6P (BLACK) CONNECTOR
DLC
REGULATOR/RECTIFIER
2P (BLACK) CONNECTOR
BATTERY
REGULATOR/RECTIFIER
ALTERNATOR
3P (BLACK) CONNECTOR
STARTER MOTOR CABLE
BATTERY
NEGATIVE (–)
CABLE
ALTERNATOR WIRE
STARTER RELAY SWITCH
REAR BRAKE LIGHT SWITCH
2P (BLACK) CONNECTOR

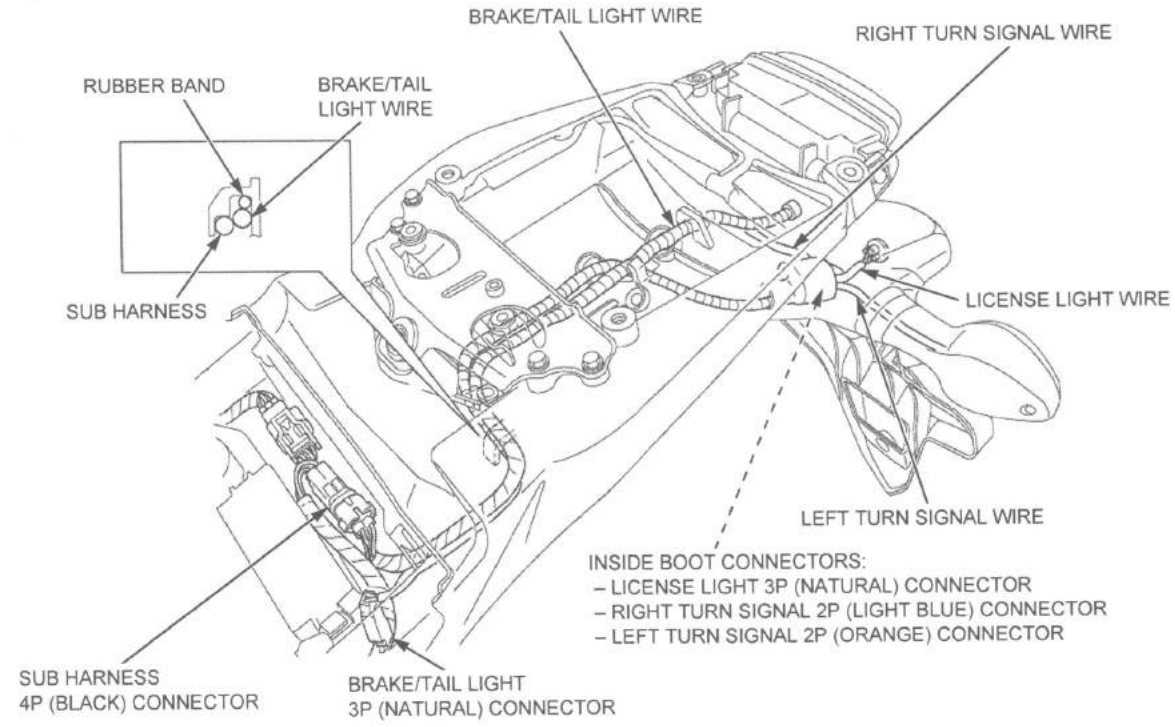

STARTER RELAY SWITCH
REAR BRAKE LIGHT SWITCH
2P (BLACK) CONNECTOR
REAR BRAKE LIGHT
SWITCH WIRE
GROUND CABLES
BATTERY NEGATIVE (–) CABLE
STARTER MOTOR CABLE
SIPHON HOSE


UPPER
LOWER
REAR BRAKE LIGHT
SWITCH WIRE
SIPHON HOSE

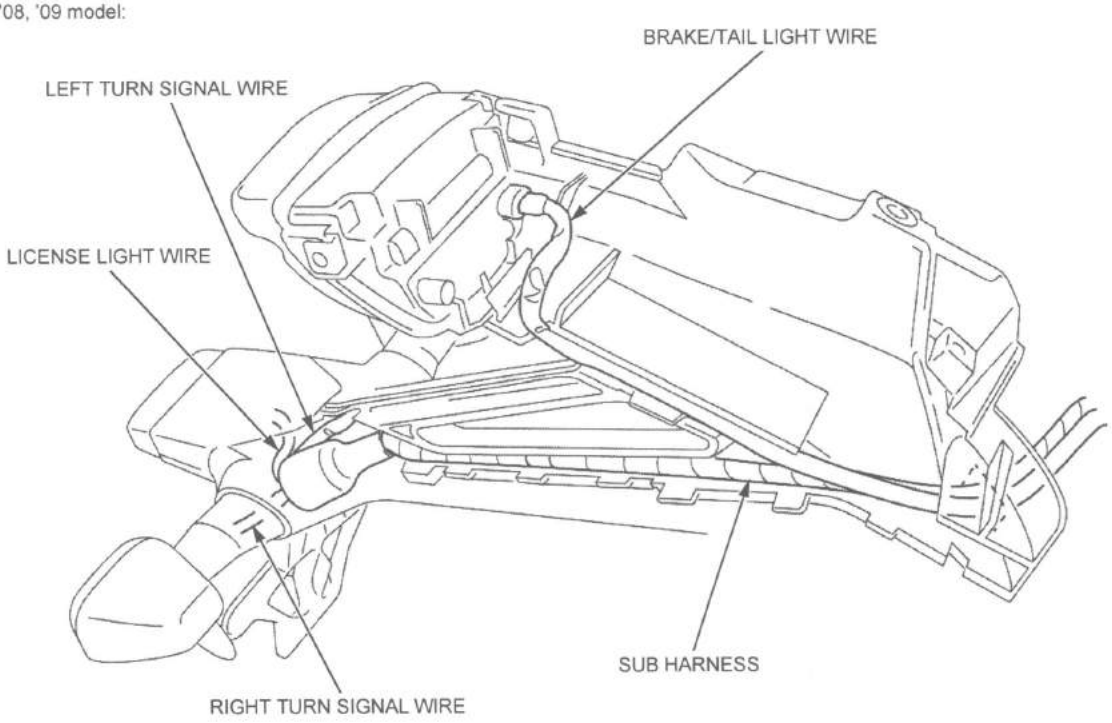
'08, '09 model:



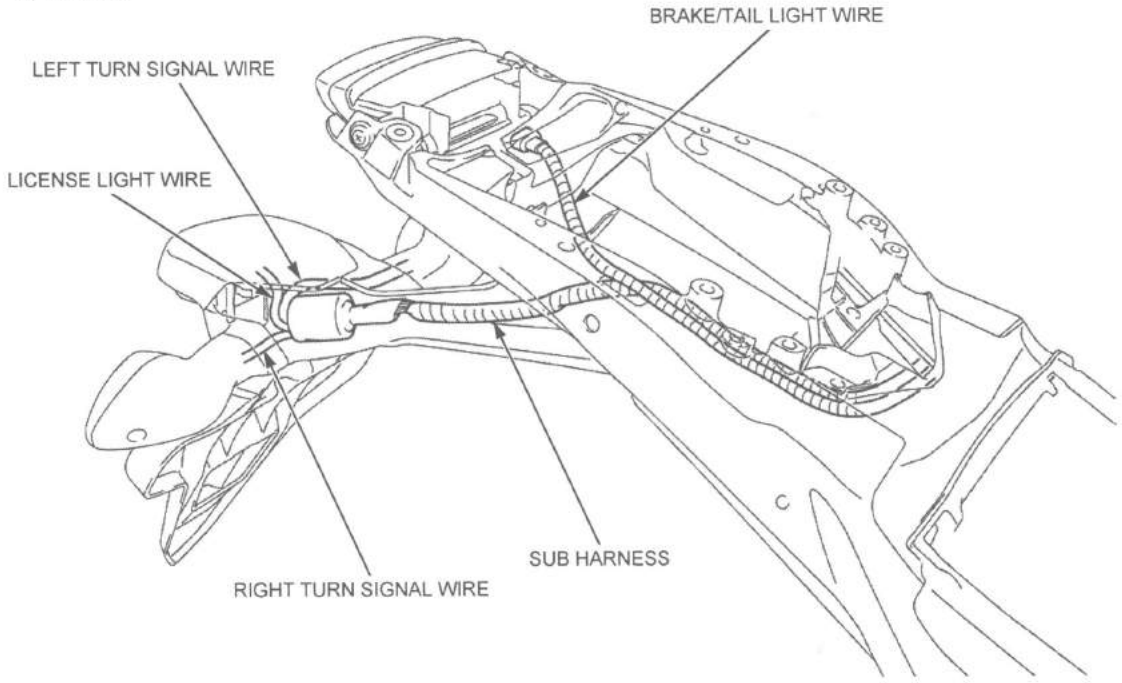
'10, '11 model:

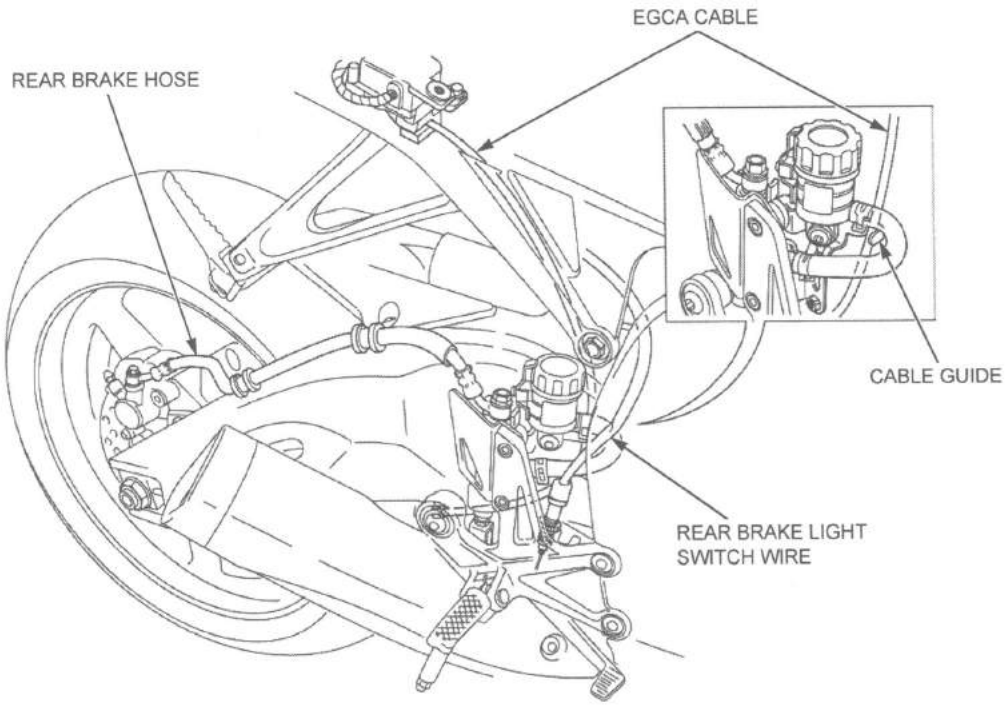


'08, '09 model:

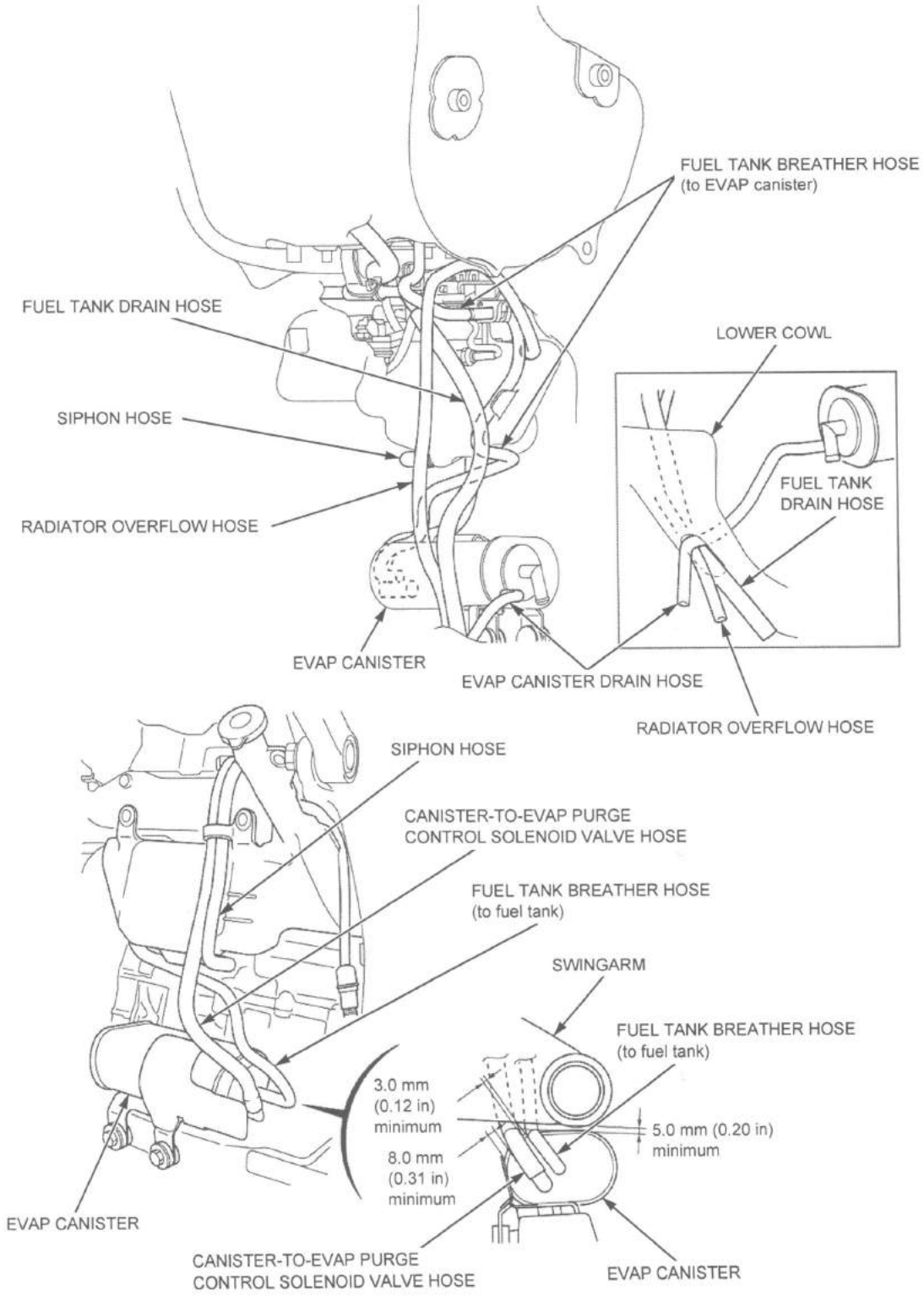


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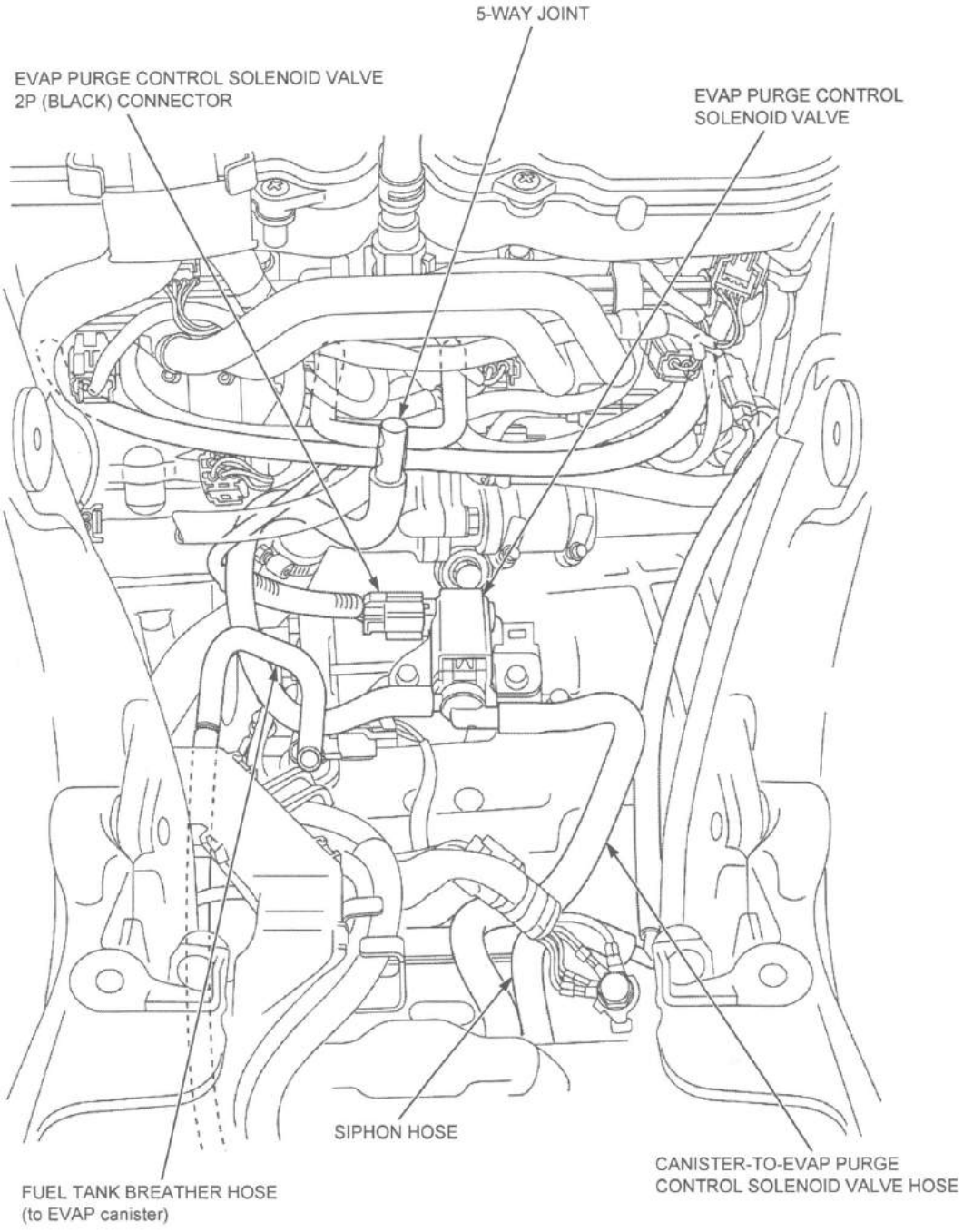



EGCA CABLE
REAR BRAKE HOSE
CABLE GUIDE
REAR BRAKE LIGHT
SWITCH WIRE

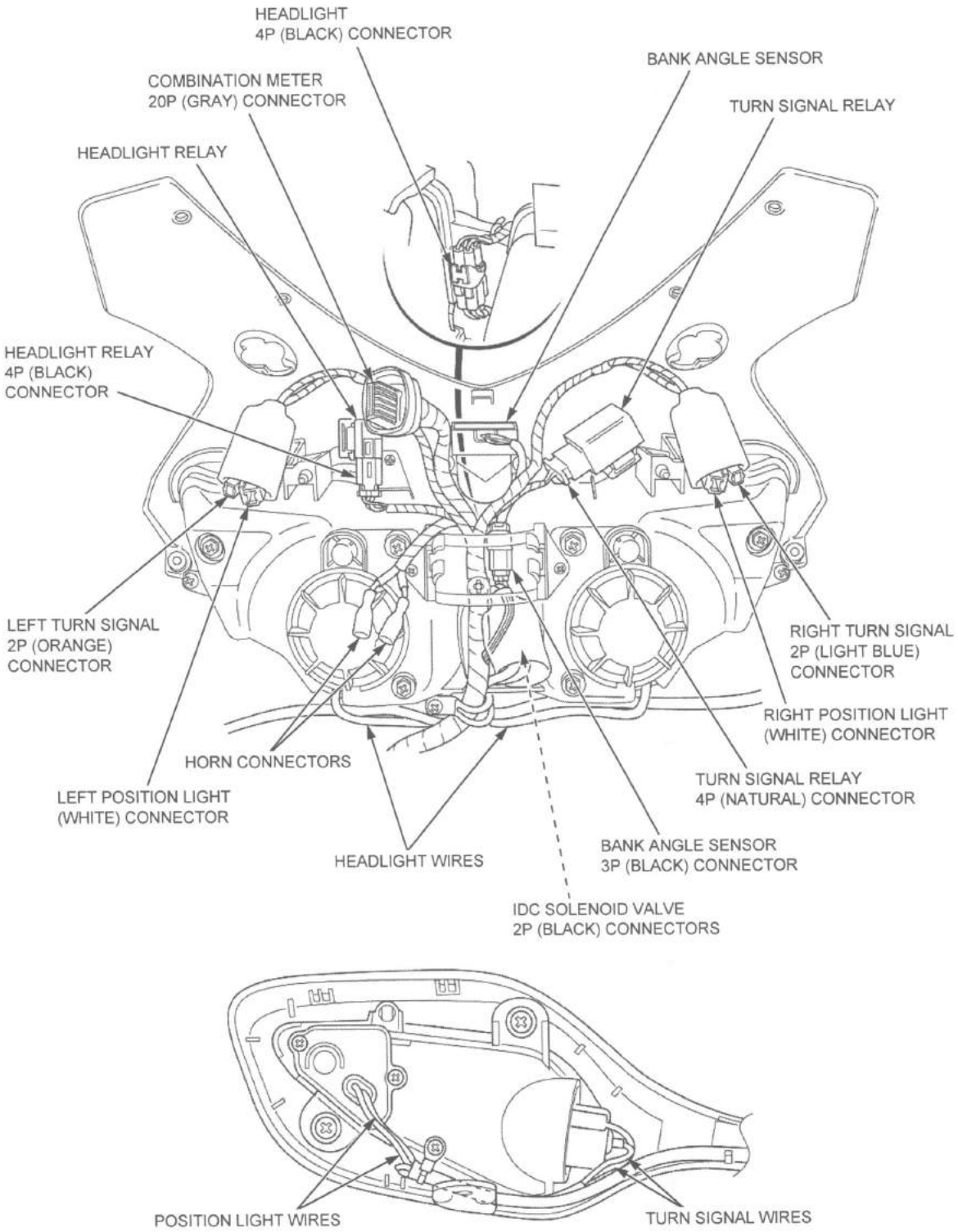
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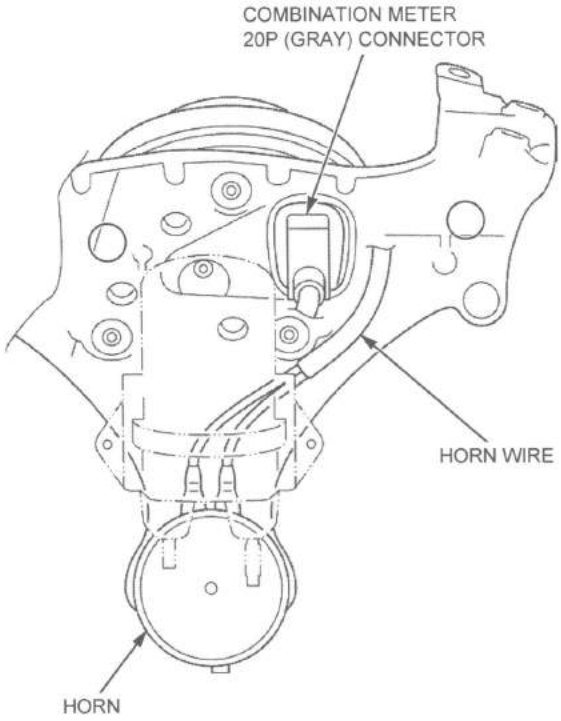

FUEL TANK BREATHER HOSE
(to EVAP canister)
FUEL TANK DRAIN HOSE
LOWER COWL
SIPHON HOSE
FUEL TANK
DRAIN HOSE
RADIATOR OVERFLOW HOSE
EVAP CANISTER
EVAP CANISTER DRAIN HOSE
RADIATOR OVERFLOW HOSE
SIPHON HOSE
CANISTER-TO-EVAP PURGE
CONTROL SOLENOID VALVE HOSE
FUEL TANK BREATHER HOSE
(to fuel tank)
SWINGARM
FUEL TANK BREATHER HOSE
(to fuel tank)
3.0 mm
(0.12 in)
minimum
8.0 mm
(0.31 in)
minimum
5.0 mm (0.20 in)
minimum
EVAP CANISTER
CANISTER-TO-EVAP PURGE
CONTROL SOLENOID VALVE HOSE
EVAP CANISTER

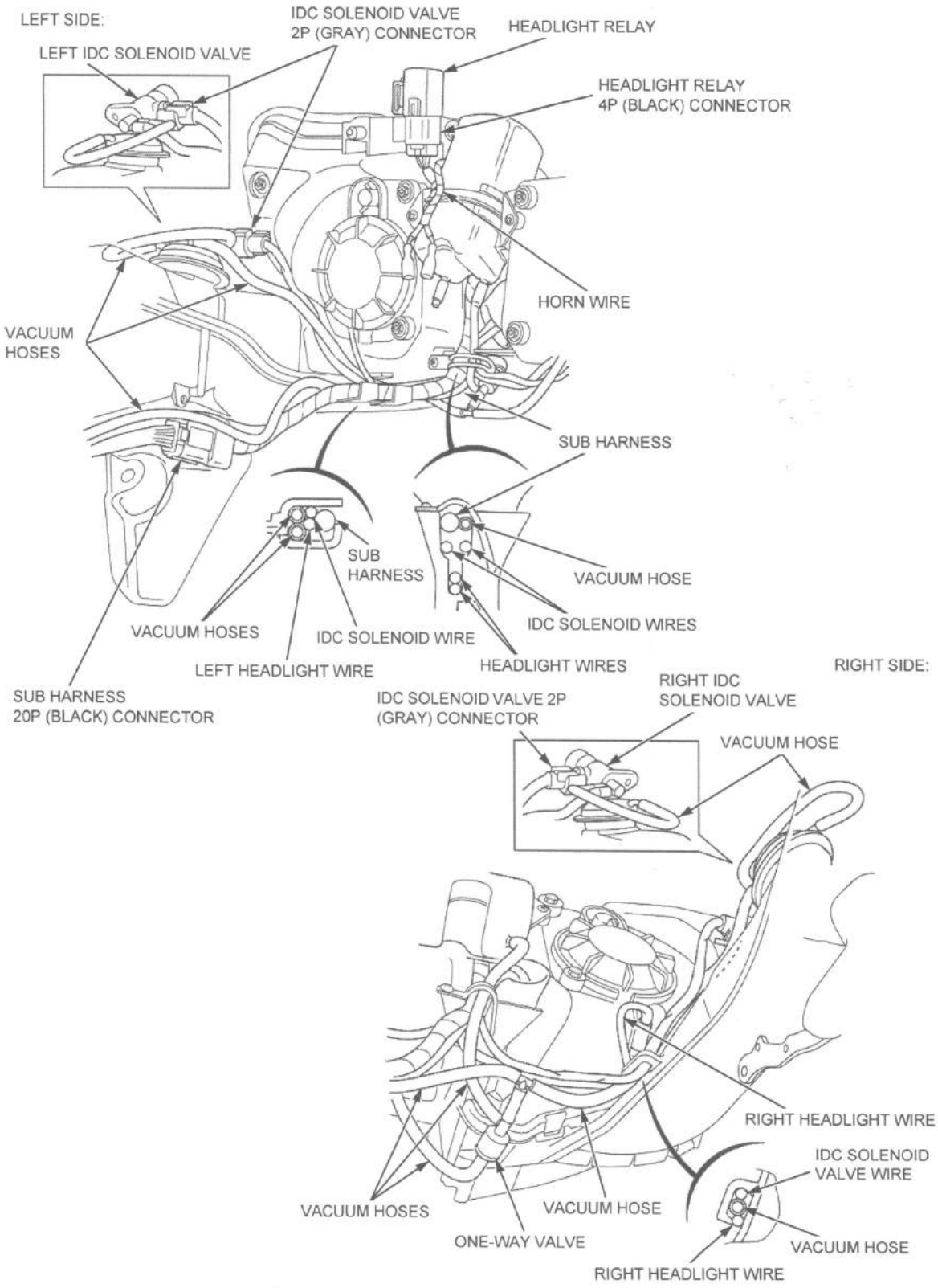
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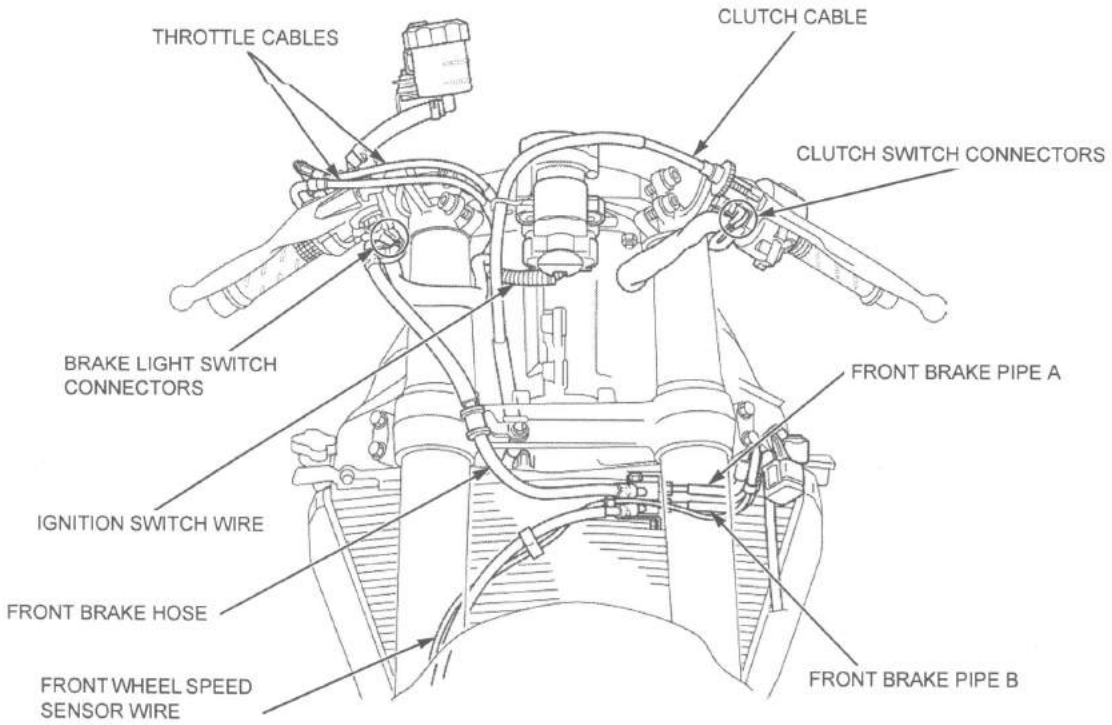

5-WAY JOINT
EVAP PURGE CONTROL SOLENOID VALVE 2P (BLACK) CONNECTOR
EVAP PURGE CONTROL SOLENOID VALVE
SIPHON HOSE
CANISTER-TO-EVAP PURGE CONTROL SOLENOID VALVE HOSE
FUEL TANK BREATHER HOSE (to EVAP canister)

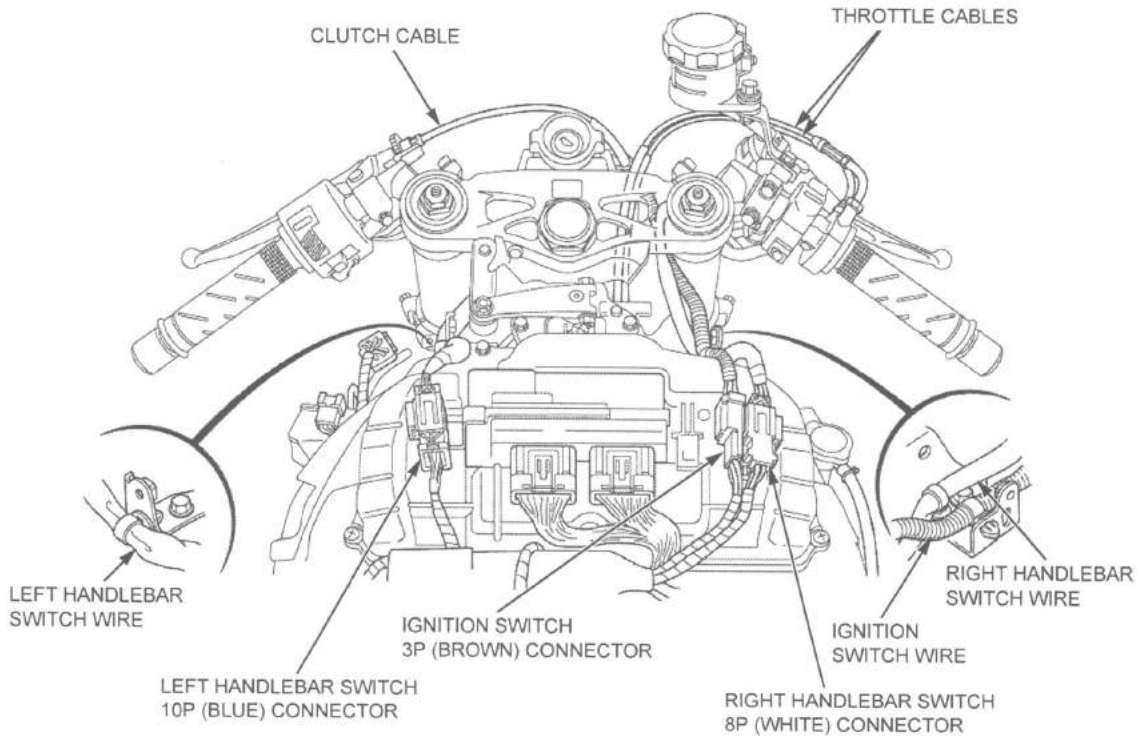
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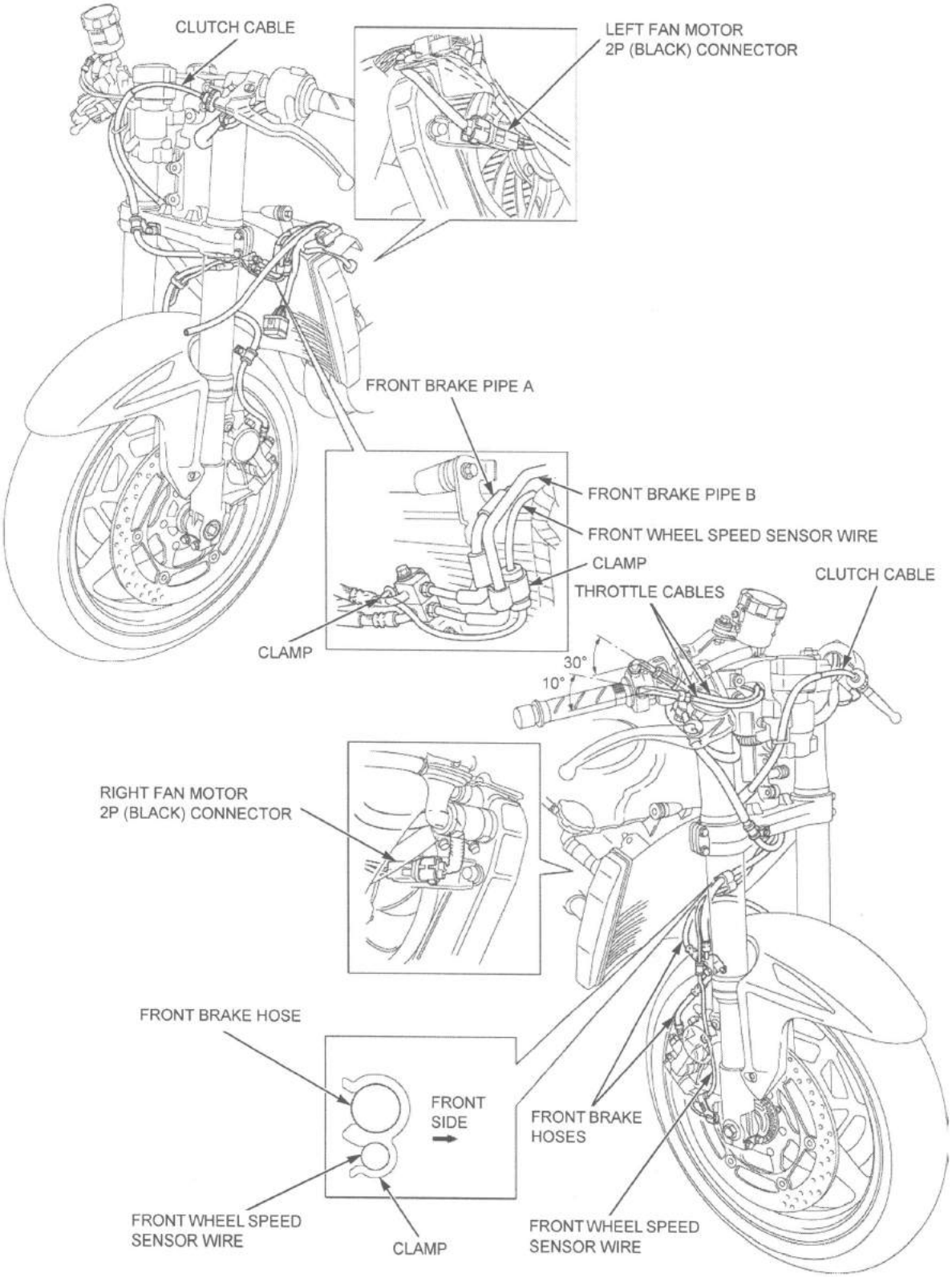


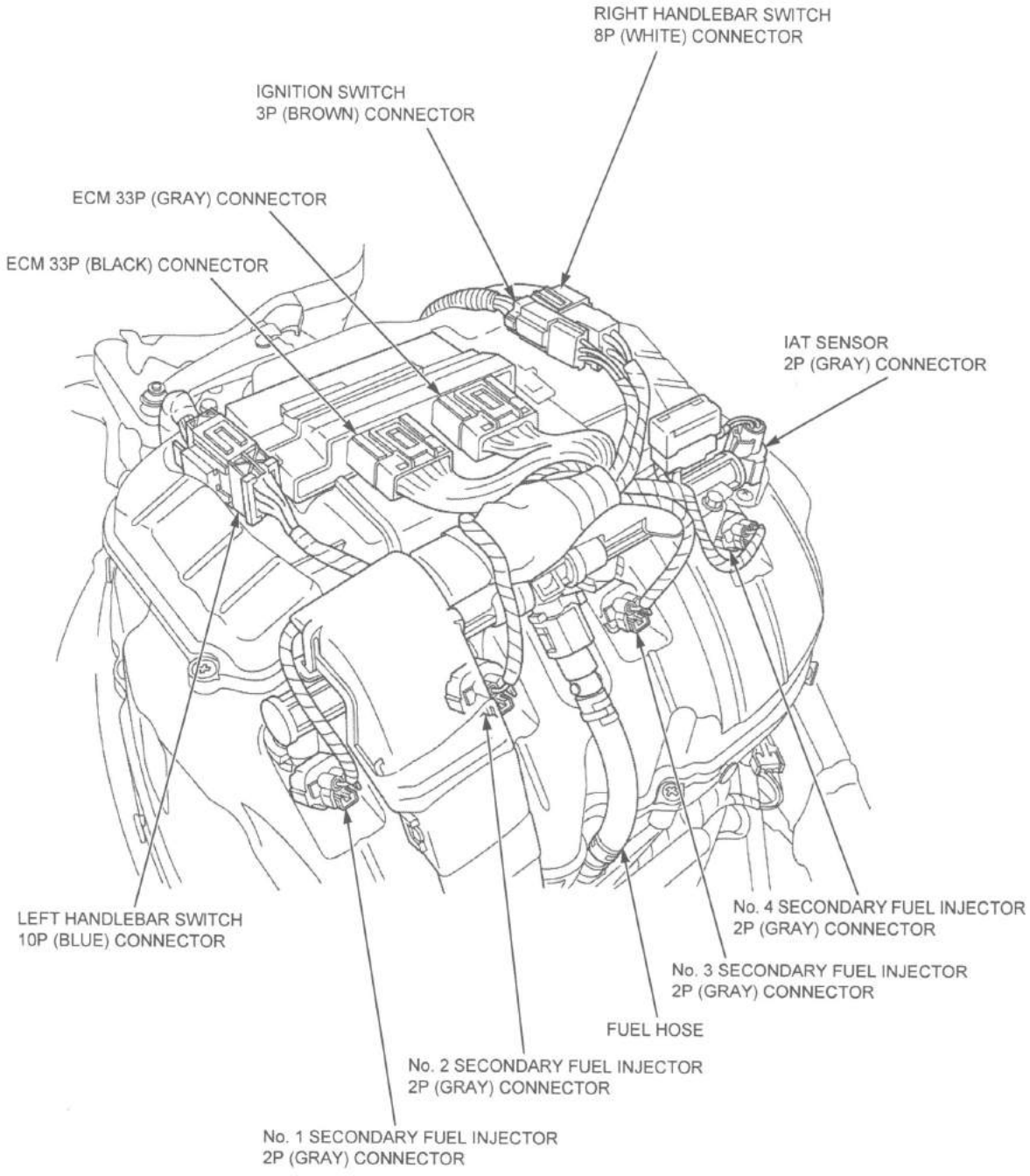

COMBINATION METER
20P (GRAY) CONNECTOR
HORN WIRE
HORN

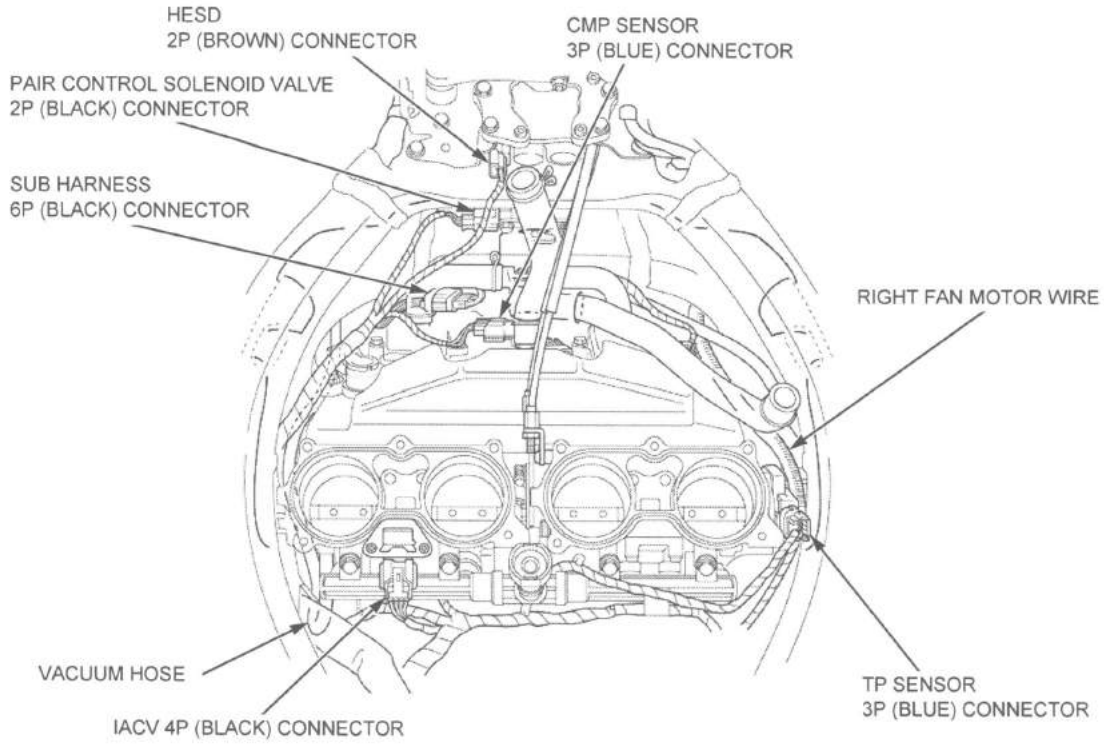

LEFT SIDE:
LEFT IDC SOLENOID VALVE
IDC SOLENOID VALVE
2P (GRAY) CONNECTOR
HEADLIGHT RELAY
HEADLIGHT RELAY
4P (BLACK) CONNECTOR
HORN WIRE
VACUUM
HOSES
SUB HARNESS
SUB
HARNESS
VACUUM HOSE
IDC SOLENOID WIRES
VACUUM HOSES
IDC SOLENOID WIRE
LEFT HEADLIGHT WIRE
HEADLIGHT WIRES
SUB HARNESS
20P (BLACK) CONNECTOR
IDC SOLENOID VALVE 2P
(GRAY) CONNECTOR
RIGHT SIDE:
RIGHT IDC
SOLENOID VALVE
VACUUM HOSE
RIGHT HEADLIGHT WIRE
IDC SOLENOID
VALVE WIRE
VACUUM HOSES
VACUUM HOSE
ONE-WAY VALVE
VACUUM HOSE
RIGHT HEADLIGHT WIRE

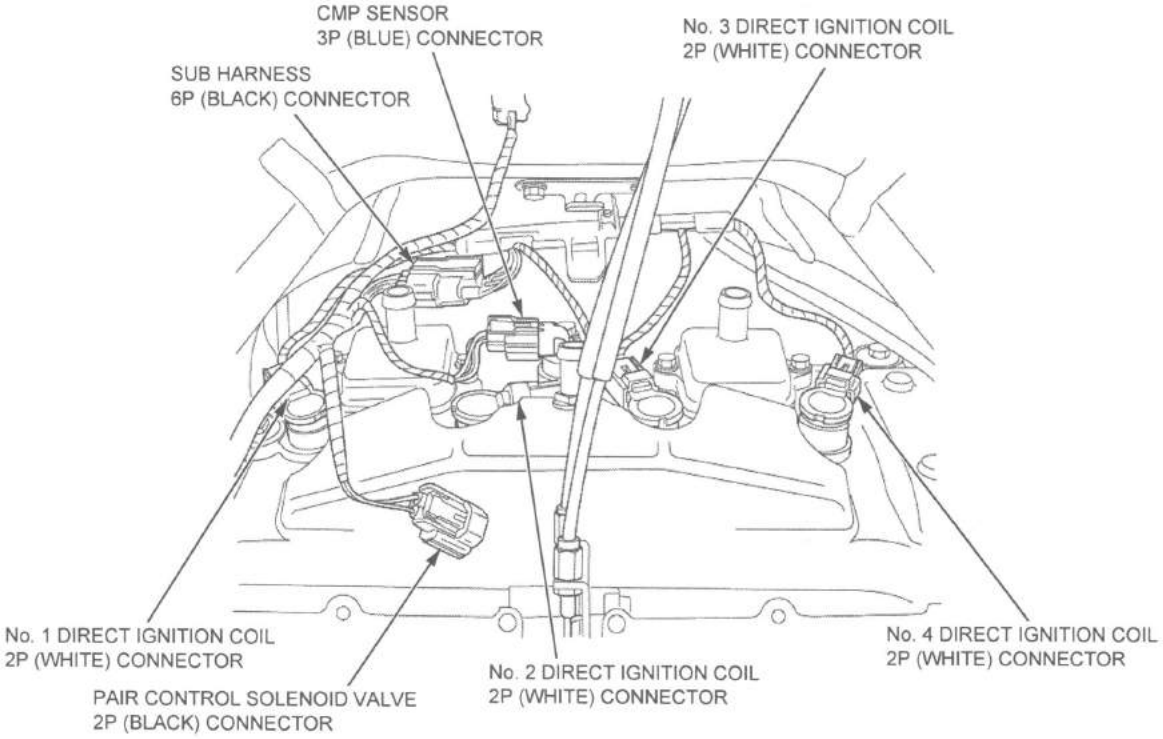

THROTTLE CABLES
CLUTCH CABLE
CLUTCH SWITCH CONNECTORS
BRAKE LIGHT SWITCH CONNECTORS
FRONT BRAKE PIPE A
IGNITION SWITCH WIRE
FRONT BRAKE HOSE
FRONT WHEEL SPEED SENSOR WIRE
FRONT BRAKE PIPE B

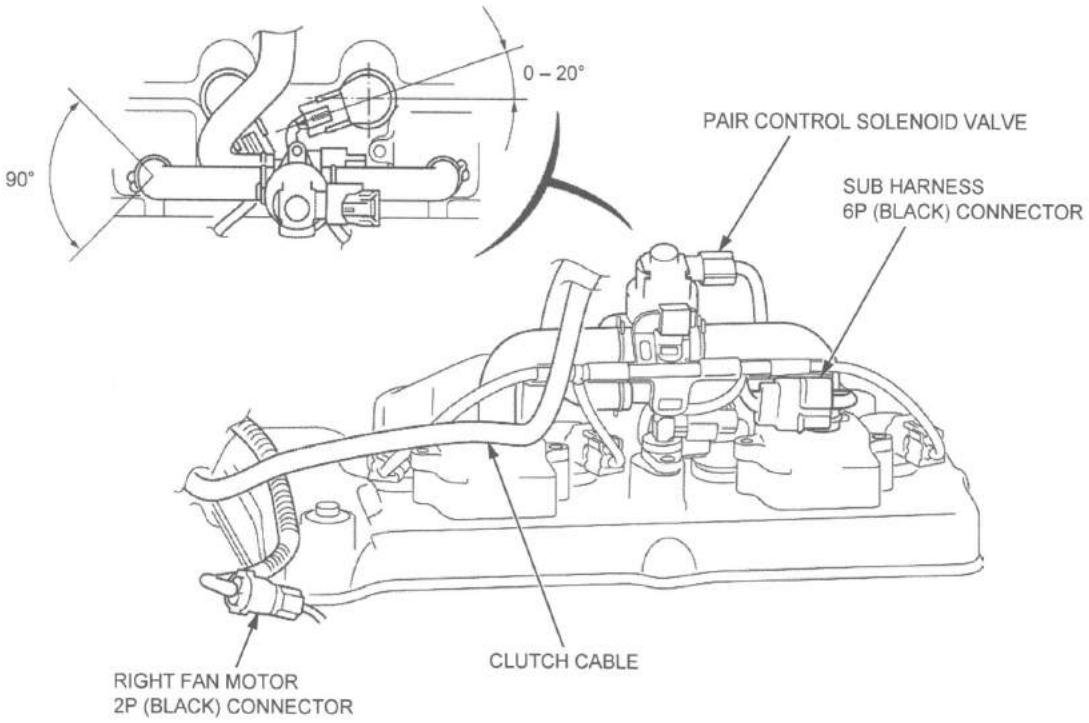

CLUTCH CABLE
THROTTLE CABLES
LEFT HANDLEBAR SWITCH WIRE
IGNITION SWITCH 3P (BROWN) CONNECTOR
RIGHT HANDLEBAR SWITCH WIRE
IGNITION SWITCH WIRE
LEFT HANDLEBAR SWITCH 10P (BLUE) CONNECTOR
RIGHT HANDLEBAR SWITCH 8P (WHITE) CONNECTOR


CLUTCH CABLE
LEFT FAN MOTOR
2P (BLACK) CONNECTOR
FRONT BRAKE PIPE A
FRONT BRAKE PIPE B
FRONT WHEEL SPEED SENSOR WIRE
CLAMP
CLAMP
THROTTLE CABLES
CLUTCH CABLE
30°
10°
RIGHT FAN MOTOR
2P (BLACK) CONNECTOR
FRONT BRAKE HOSE
FRONT
SIDE
FRONT BRAKE
HOSES
FRONT WHEEL SPEED
SENSOR WIRE
CLAMP
FRONT WHEEL SPEED
SENSOR WIRE

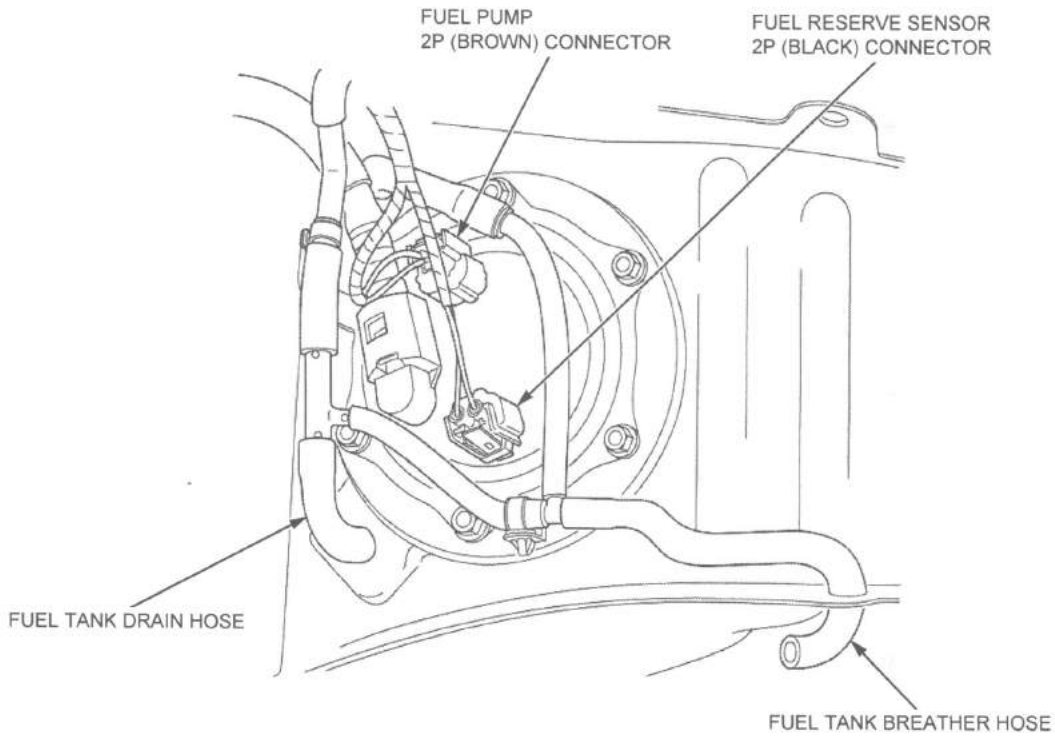

RIGHT HANDLEBAR SWITCH
8P (WHITE) CONNECTOR
IGNITION SWITCH
3P (BROWN) CONNECTOR
ECM 33P (GRAY) CONNECTOR
ECM 33P (BLACK) CONNECTOR
IAT SENSOR
2P (GRAY) CONNECTOR
LEFT HANDLEBAR SWITCH
10P (BLUE) CONNECTOR
No. 4 SECONDARY FUEL INJECTOR
2P (GRAY) CONNECTOR
No. 3 SECONDARY FUEL INJECTOR
2P (GRAY) CONNECTOR
FUEL HOSE
No. 2 SECONDARY FUEL INJECTOR
2P (GRAY) CONNECTOR
No. 1 SECONDARY FUEL INJECTOR
2P (GRAY) CONNECTOR


HESD
2P (BROWN) CONNECTOR
CMP SENSOR
3P (BLUE) CONNECTOR
PAIR CONTROL SOLENOID VALVE
2P (BLACK) CONNECTOR
SUB HARNESS
6P (BLACK) CONNECTOR
RIGHT FAN MOTOR WIRE
VACUUM HOSE
IACV 4P (BLACK) CONNECTOR
TP SENSOR
3P (BLUE) CONNECTOR

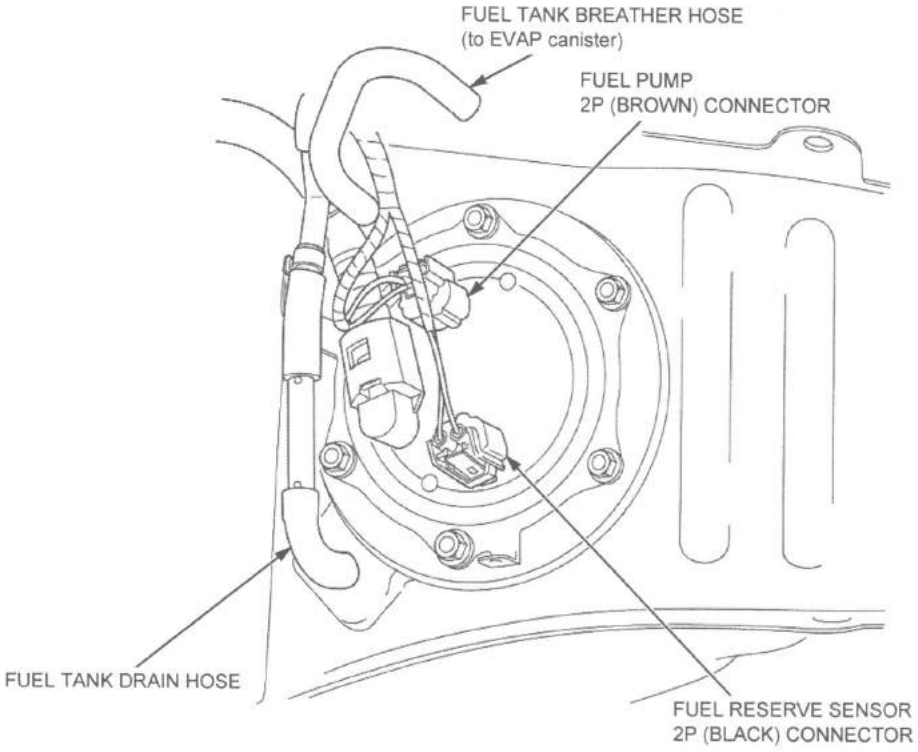

CMP SENSOR
3P (BLUE) CONNECTOR
No. 3 DIRECT IGNITION COIL
2P (WHITE) CONNECTOR
SUB HARNESS
6P (BLACK) CONNECTOR
No. 1 DIRECT IGNITION COIL
2P (WHITE) CONNECTOR
PAIR CONTROL SOLENOID VALVE
2P (BLACK) CONNECTOR
No. 2 DIRECT IGNITION COIL
2P (WHITE) CONNECTOR
No. 4 DIRECT IGNITION COIL
2P (WHITE) CONNECTOR



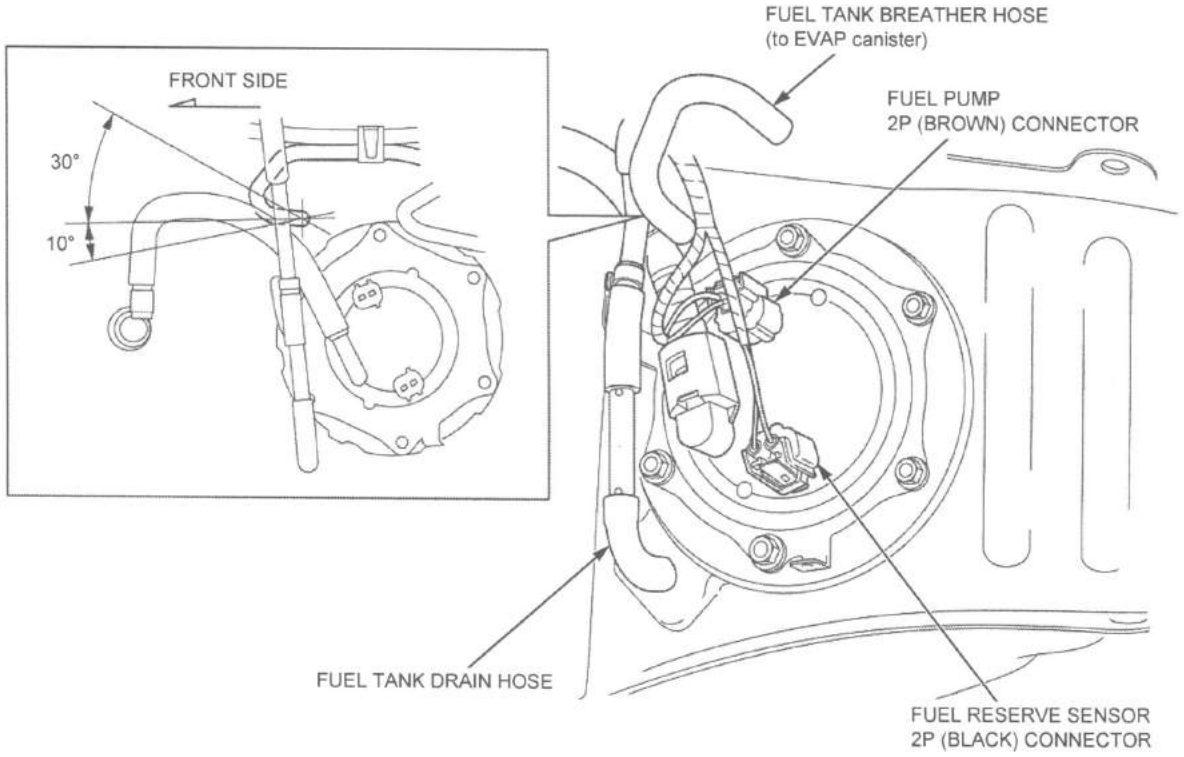
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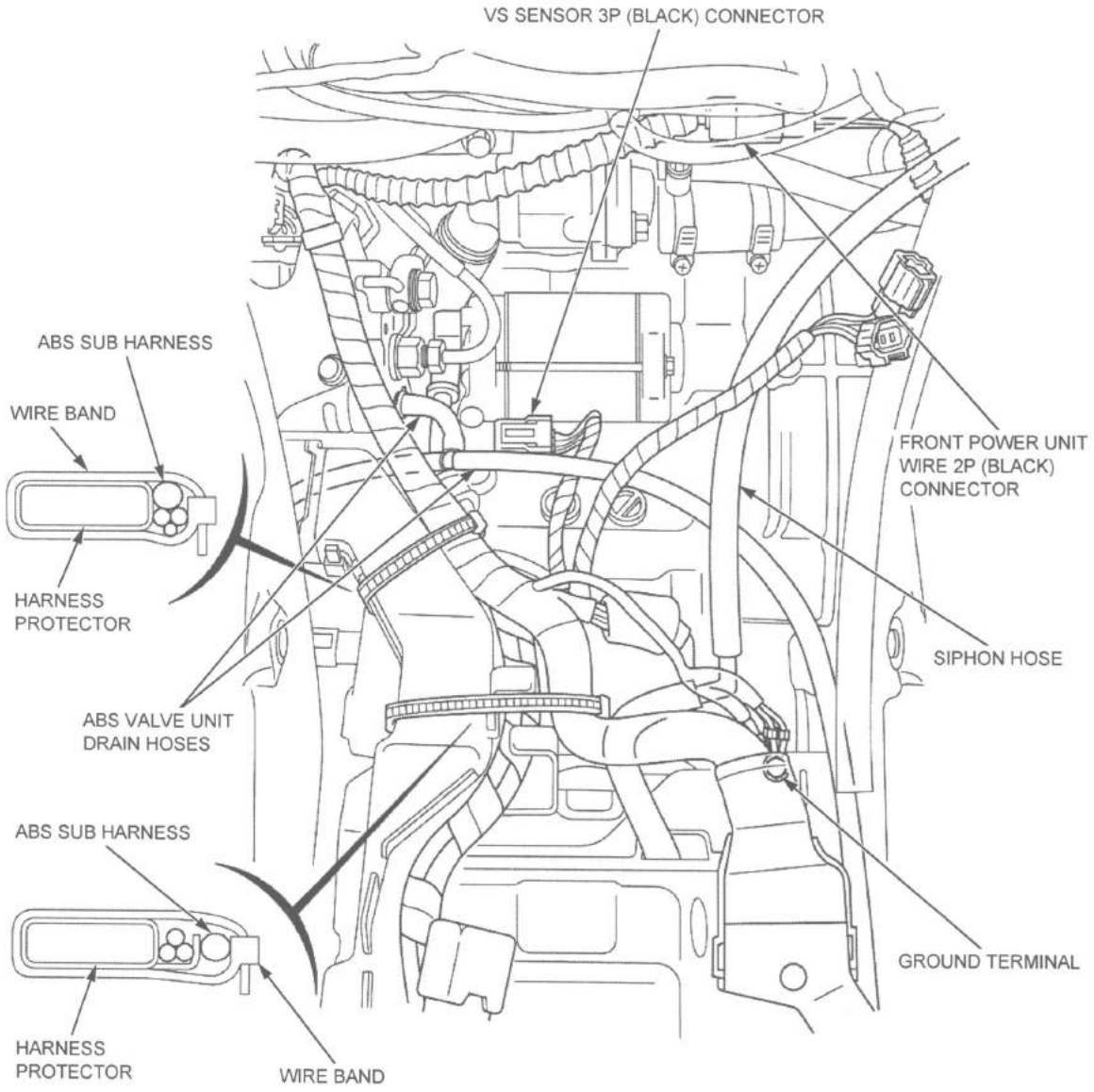


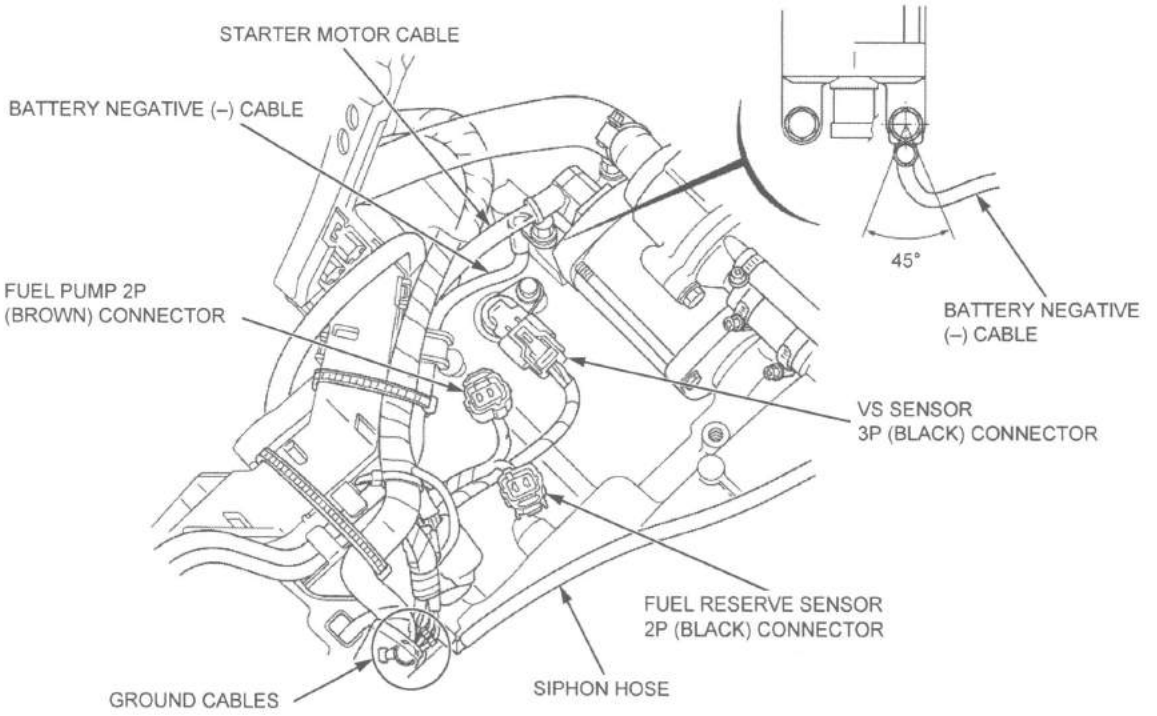
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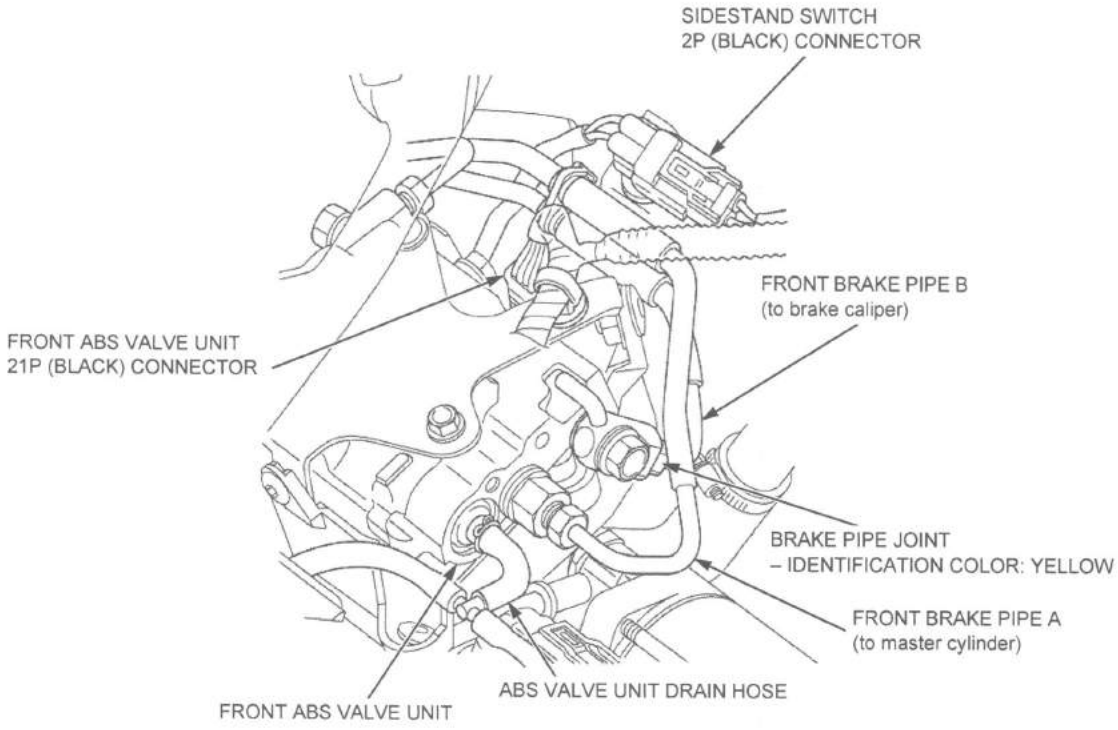


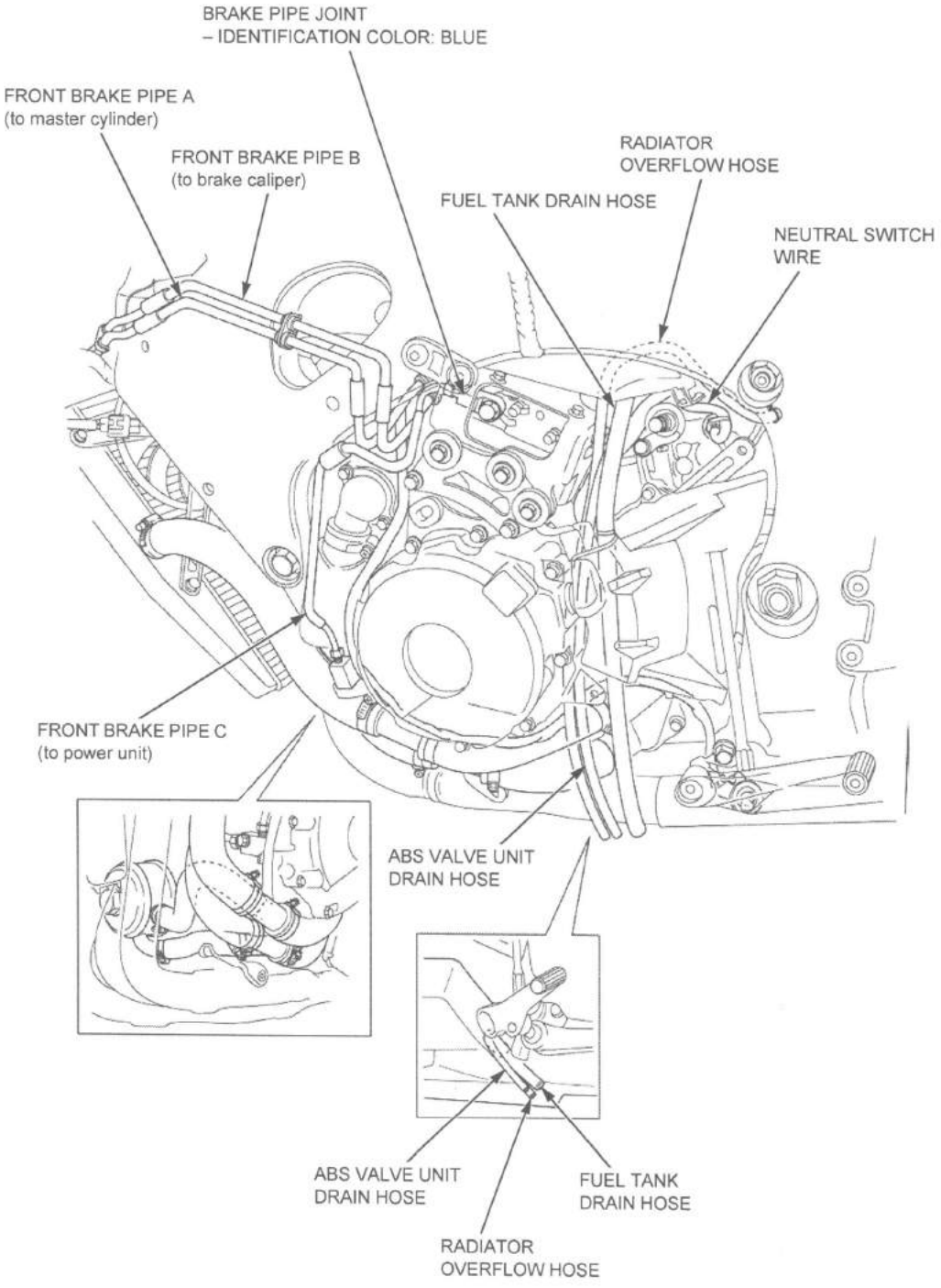
(AC) type ('10, '11 model):

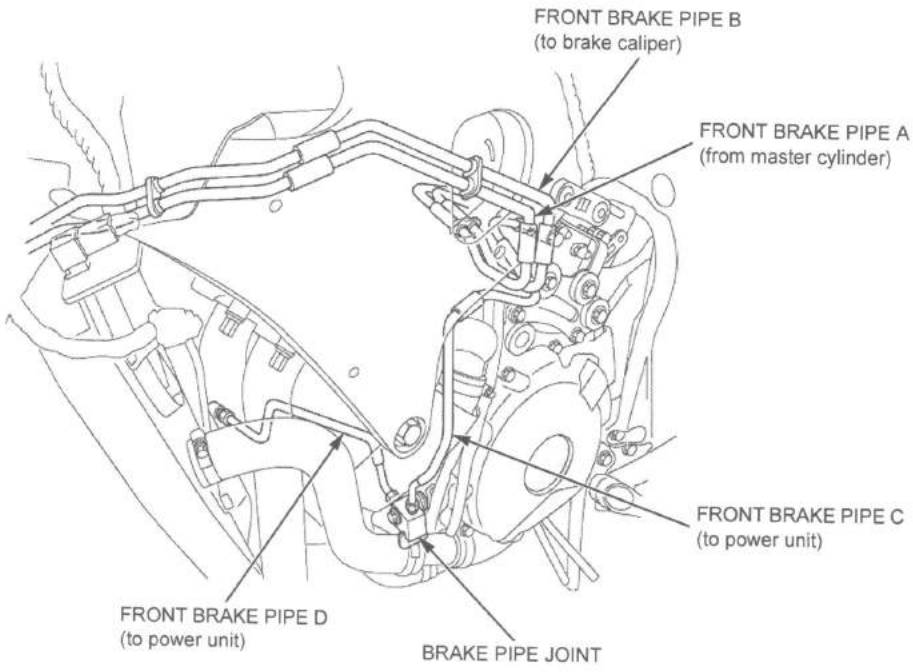


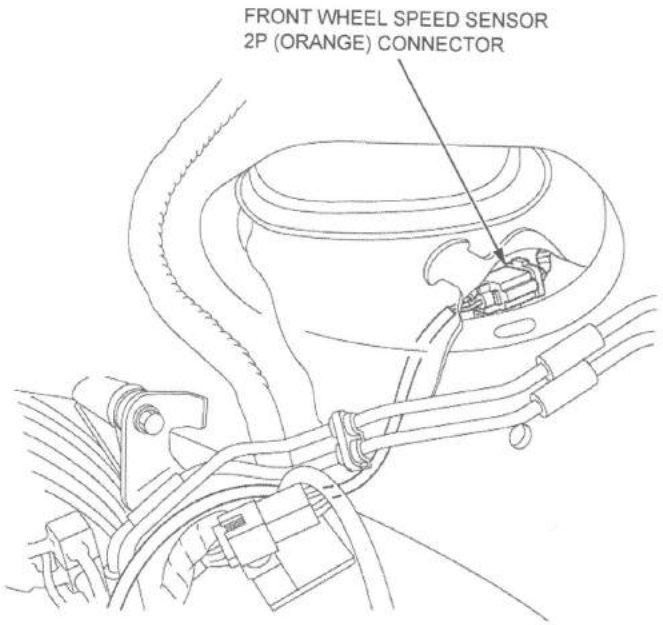

VS SENSOR 3P (BLACK) CONNECTOR
ABS SUB HARNESS
WIRE BAND
HARNESS PROTECTOR
ABS VALVE UNIT DRAIN HOSES
FRONT POWER UNIT WIRE 2P (BLACK) CONNECTOR
SIPHON HOSE
ABS SUB HARNESS
GROUND TERMINAL
HARNESS PROTECTOR
WIRE BAND

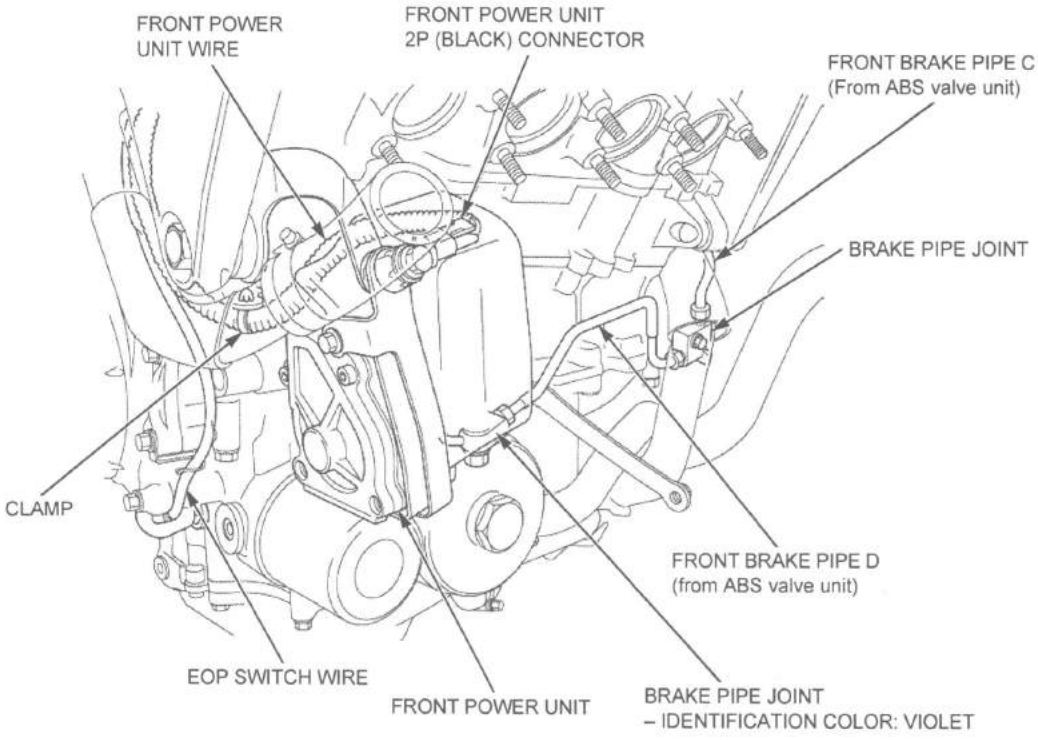

STARTER MOTOR CABLE
BATTERY NEGATIVE (–) CABLE
FUEL PUMP 2P
(BROWN) CONNECTOR
45°
BATTERY NEGATIVE
(–) CABLE
VS SENSOR
3P (BLACK) CONNECTOR
FUEL RESERVE SENSOR
2P (BLACK) CONNECTOR
GROUND CABLES
SIPHON HOSE

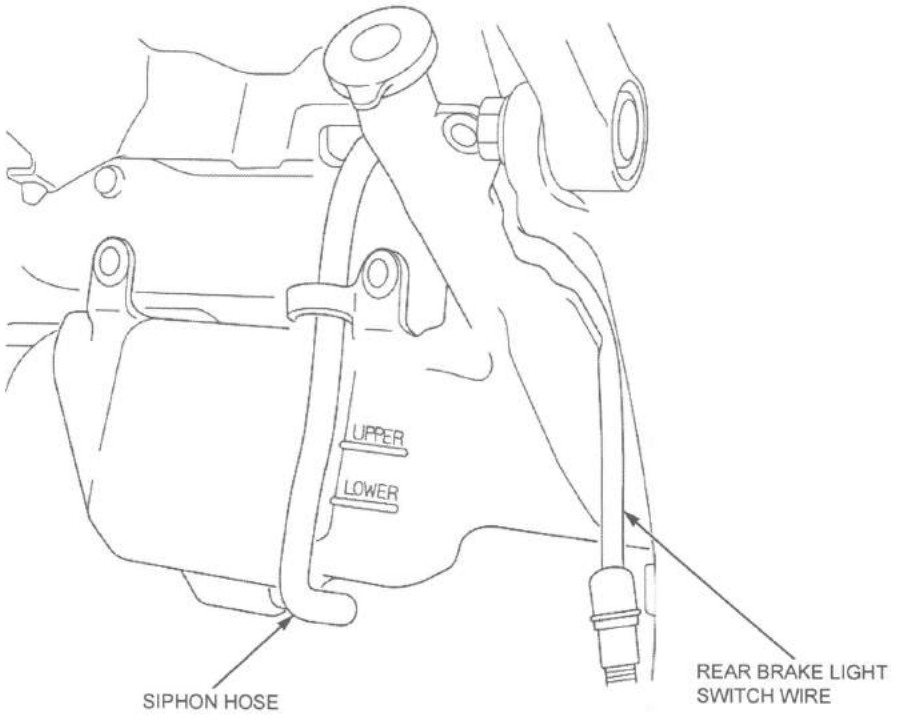

SIDESTAND SWITCH
2P (BLACK) CONNECTOR
FRONT BRAKE PIPE B
(to brake caliper)
FRONT ABS VALVE UNIT
21P (BLACK) CONNECTOR
BRAKE PIPE JOINT
– IDENTIFICATION COLOR: YELLOW
FRONT BRAKE PIPE A
(to master cylinder)
ABS VALVE UNIT DRAIN HOSE
FRONT ABS VALVE UNIT

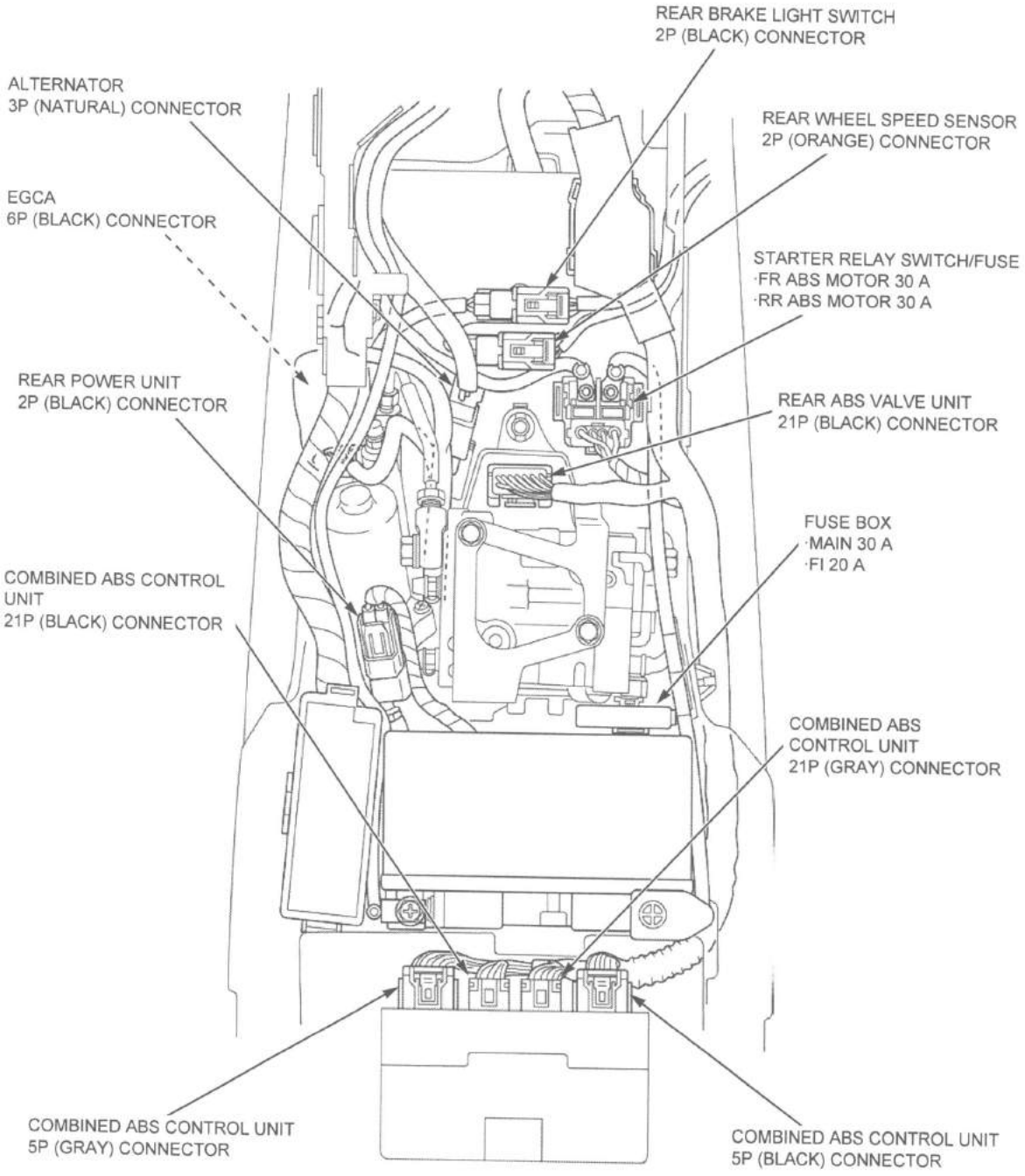

BRAKE PIPE JOINT
– IDENTIFICATION COLOR: BLUE
FRONT BRAKE PIPE A
(to master cylinder)
FRONT BRAKE PIPE B
(to brake caliper)
RADIATOR
OVERFLOW HOSE
FUEL TANK DRAIN HOSE
NEUTRAL SWITCH
WIRE
FRONT BRAKE PIPE C
(to power unit)
ABS VALVE UNIT
DRAIN HOSE
ABS VALVE UNIT
DRAIN HOSE
FUEL TANK
DRAIN HOSE
RADIATOR
OVERFLOW HOSE

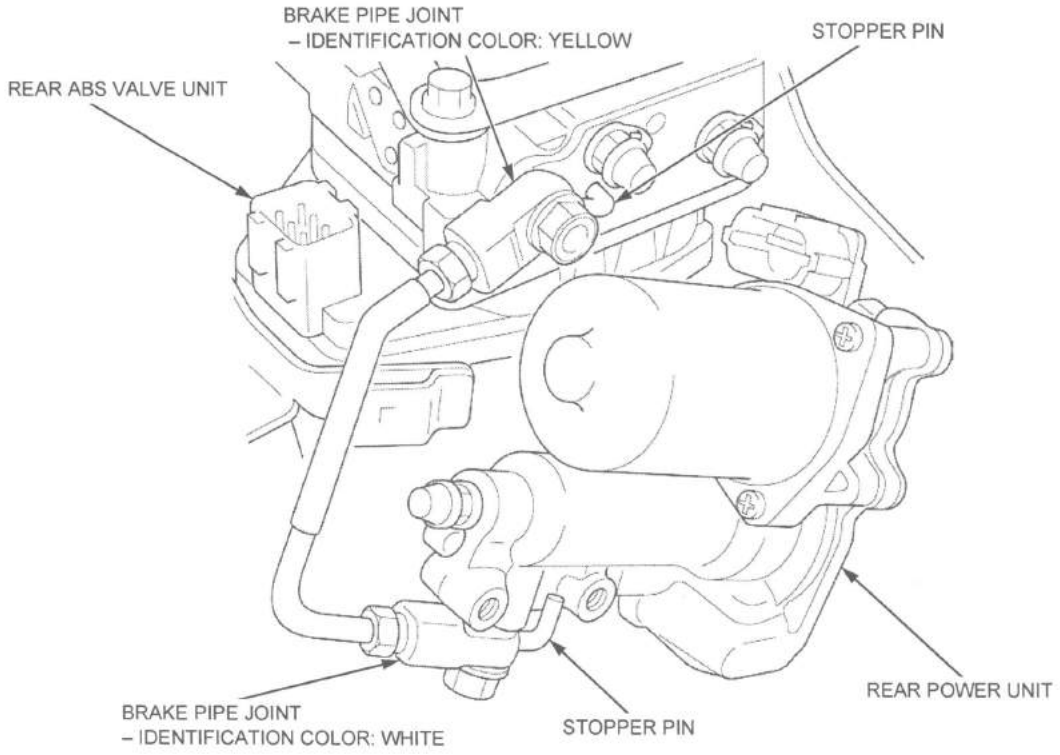

FRONT BRAKE PIPE B
(to brake caliper)
FRONT BRAKE PIPE A
(from master cylinder)
FRONT BRAKE PIPE C
(to power unit)
FRONT BRAKE PIPE D
(to power unit)
BRAKE PIPE JOINT

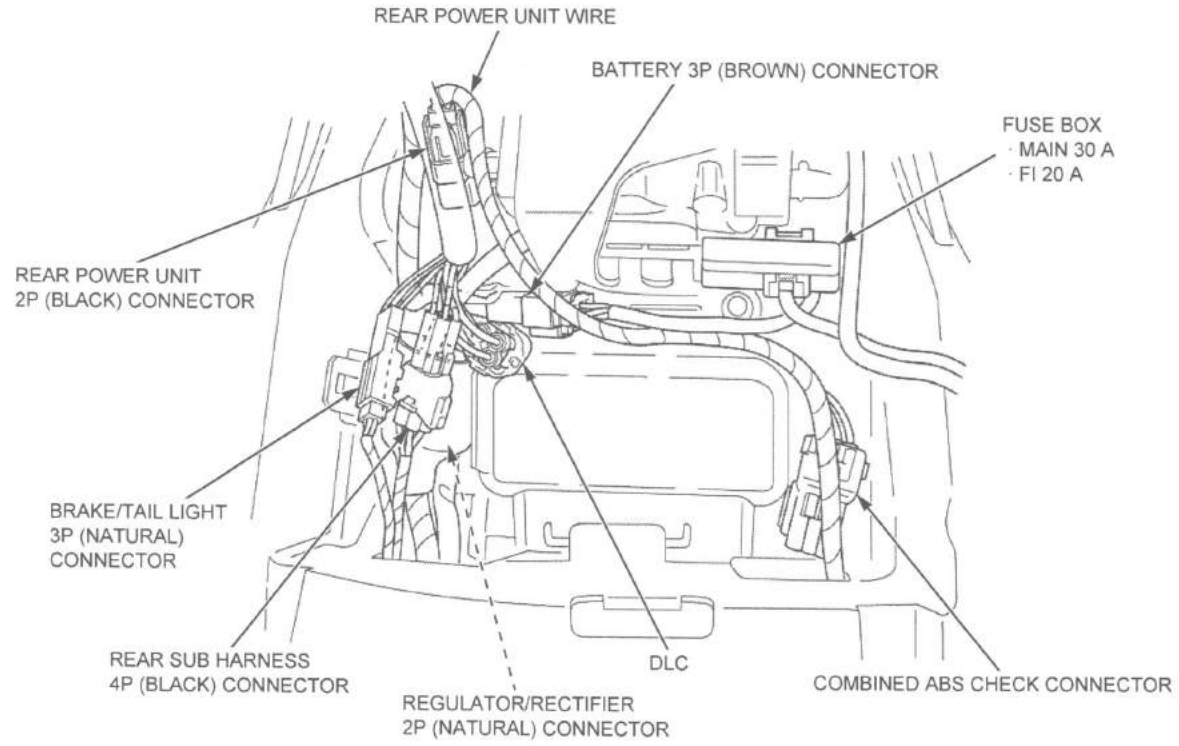

FRONT WHEEL SPEED SENSOR
2P (ORANGE) CONNECTOR

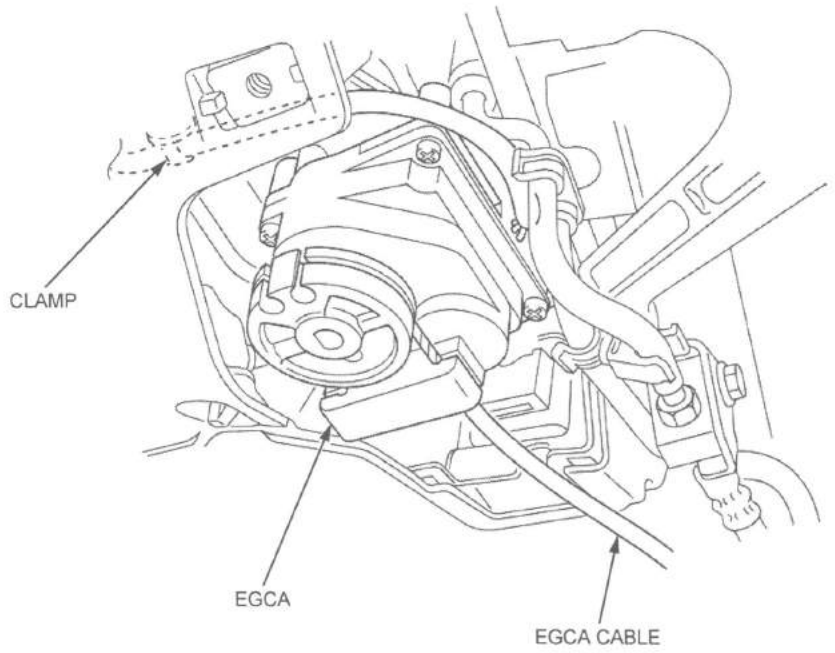

FRONT POWER UNIT WIRE
FRONT POWER UNIT 2P (BLACK) CONNECTOR
FRONT BRAKE PIPE C (From ABS valve unit)
BRAKE PIPE JOINT
CLAMP
FRONT BRAKE PIPE D (from ABS valve unit)
EOP SWITCH WIRE
FRONT POWER UNIT
BRAKE PIPE JOINT – IDENTIFICATION COLOR: VIOLET

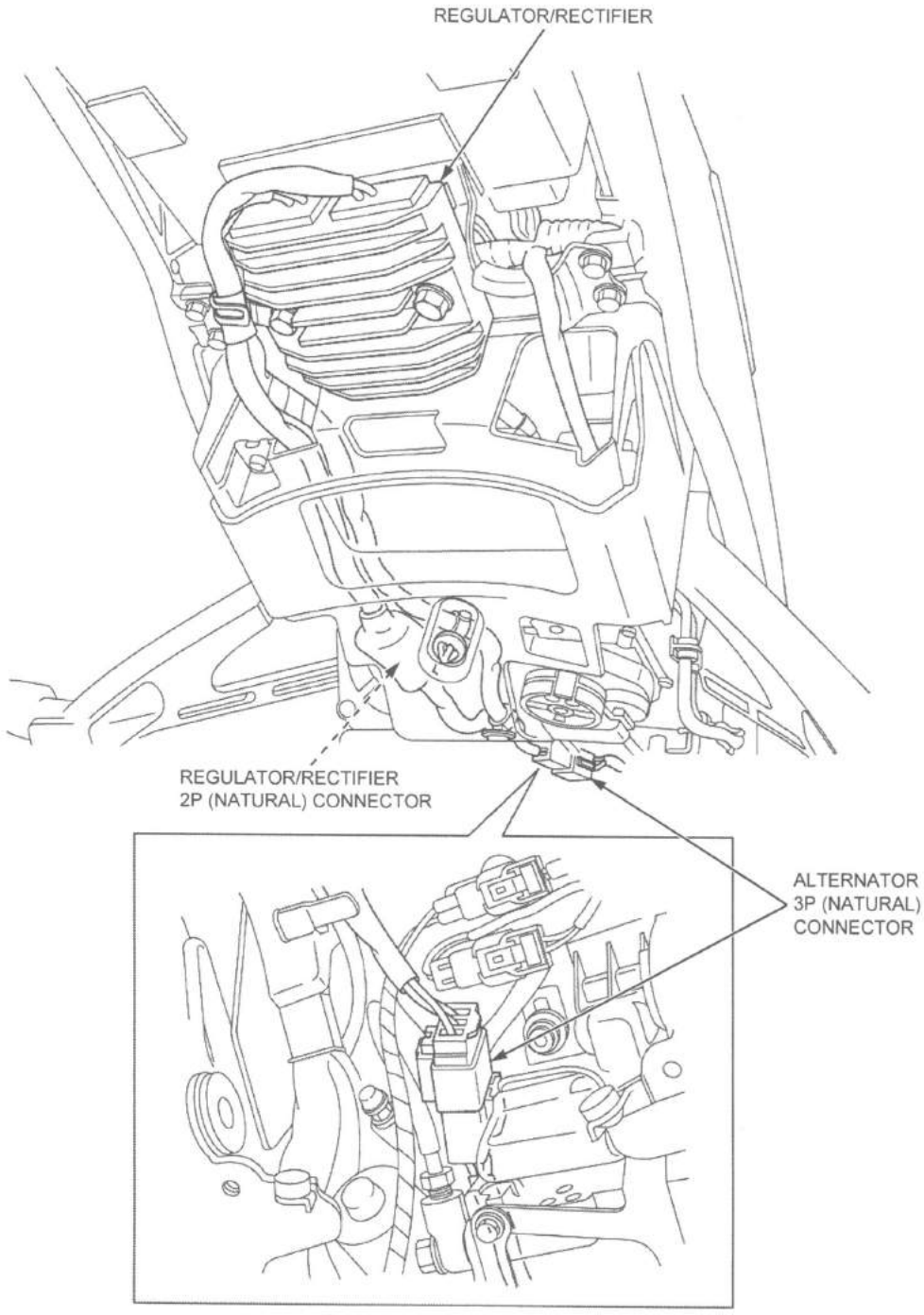

UPPER
LOWER
SIPHON HOSE
REAR BRAKE LIGHT SWITCH WIRE

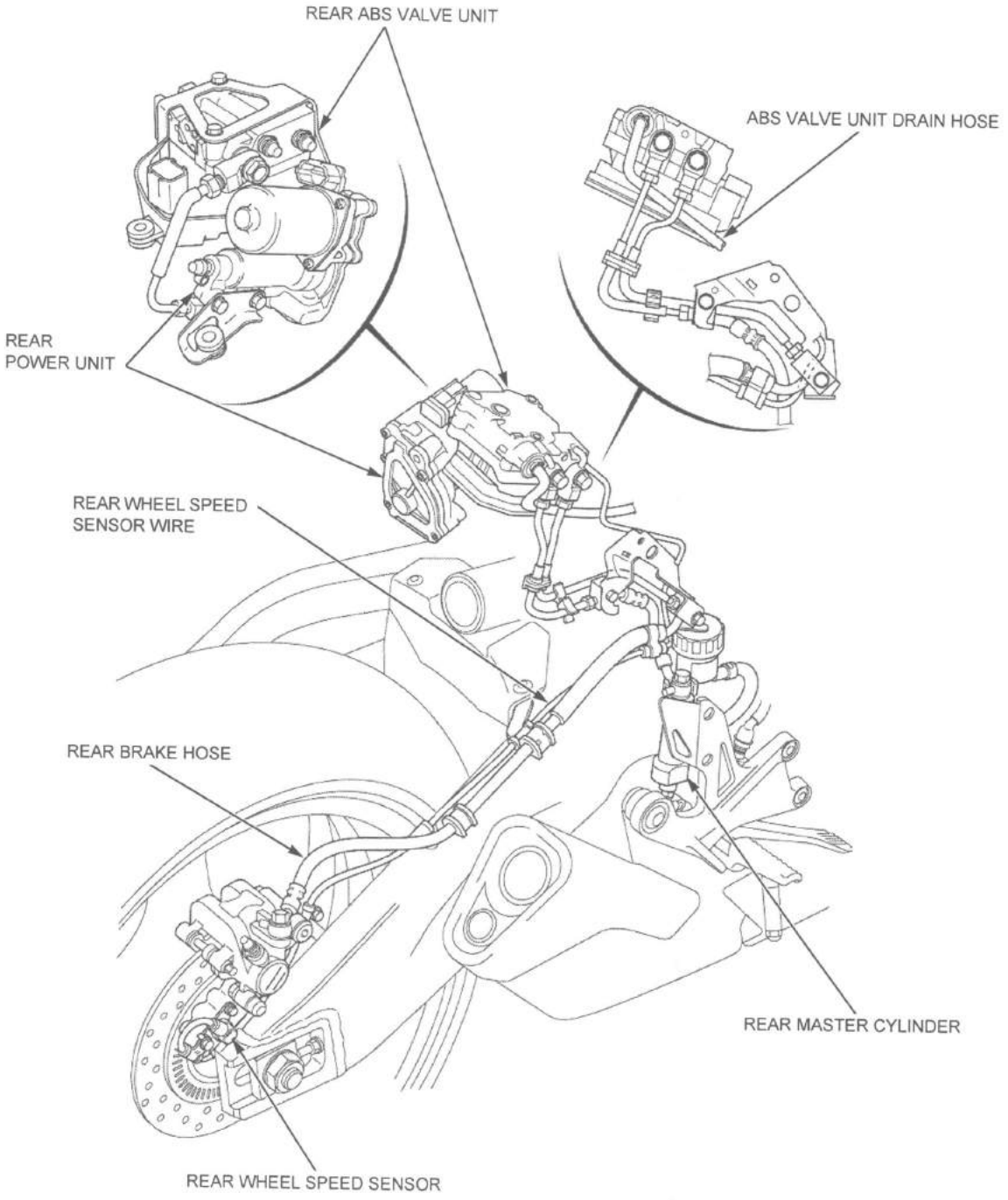

REAR BRAKE LIGHT SWITCH
2P (BLACK) CONNECTOR
ALTERNATOR
3P (NATURAL) CONNECTOR
REAR WHEEL SPEED SENSOR
2P (ORANGE) CONNECTOR
EGCA
6P (BLACK) CONNECTOR
STARTER RELAY SWITCH/FUSE
·FR ABS MOTOR 30 A
·RR ABS MOTOR 30 A
REAR POWER UNIT
2P (BLACK) CONNECTOR
REAR ABS VALVE UNIT
21P (BLACK) CONNECTOR
FUSE BOX
·MAIN 30 A
·FI 20 A
COMBINED ABS CONTROL
UNIT
21P (BLACK) CONNECTOR
COMBINED ABS
CONTROL UNIT
21P (GRAY) CONNECTOR
COMBINED ABS CONTROL UNIT
5P (GRAY) CONNECTOR
COMBINED ABS CONTROL UNIT
5P (BLACK) CONNECTOR


BRAKE PIPE JOINT
– IDENTIFICATION COLOR: YELLOW
STOPPER PIN
REAR ABS VALVE UNIT
REAR POWER UNIT
BRAKE PIPE JOINT
– IDENTIFICATION COLOR: WHITE
STOPPER PIN

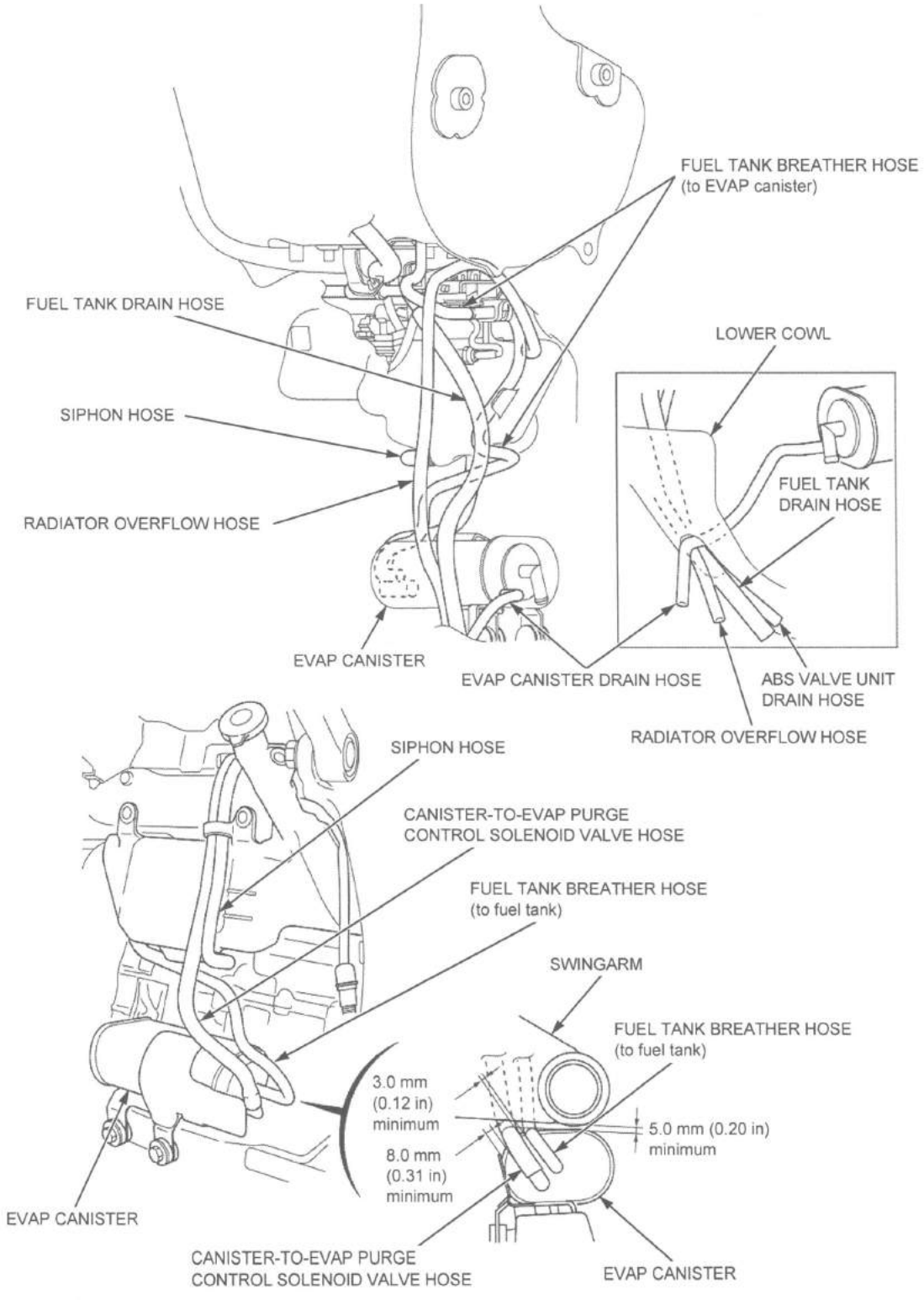

REAR POWER UNIT WIRE
BATTERY 3P (BROWN) CONNECTOR
FUSE BOX
· MAIN 30 A
· FI 20 A
REAR POWER UNIT
2P (BLACK) CONNECTOR
BRAKE/TAIL LIGHT
3P (NATURAL)
CONNECTOR
REAR SUB HARNESS
4P (BLACK) CONNECTOR
DLC
COMBINED ABS CHECK CONNECTOR
REGULATOR/RECTIFIER
2P (NATURAL) CONNECTOR


CLAMP
EGCA
EGCA CABLE

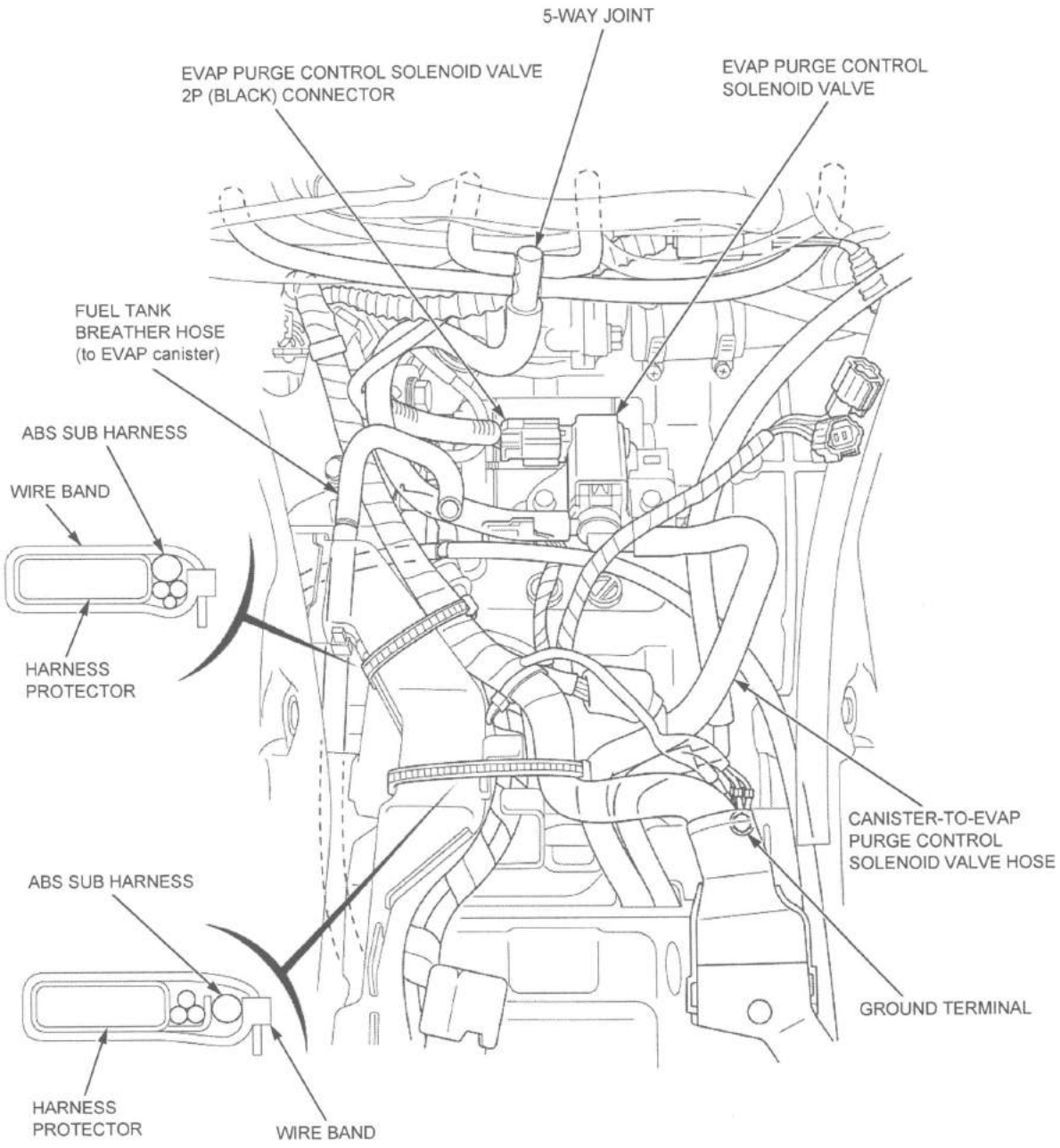

REGULATOR/RECTIFIER
REGULATOR/RECTIFIER
2P (NATURAL) CONNECTOR
ALTERNATOR
3P (NATURAL)
CONNECTOR


REAR ABS VALVE UNIT
ABS VALVE UNIT DRAIN HOSE
REAR
POWER UNIT
REAR WHEEL SPEED
SENSOR WIRE
REAR BRAKE HOSE
REAR MASTER CYLINDER
REAR WHEEL SPEED SENSOR

(AC) type:

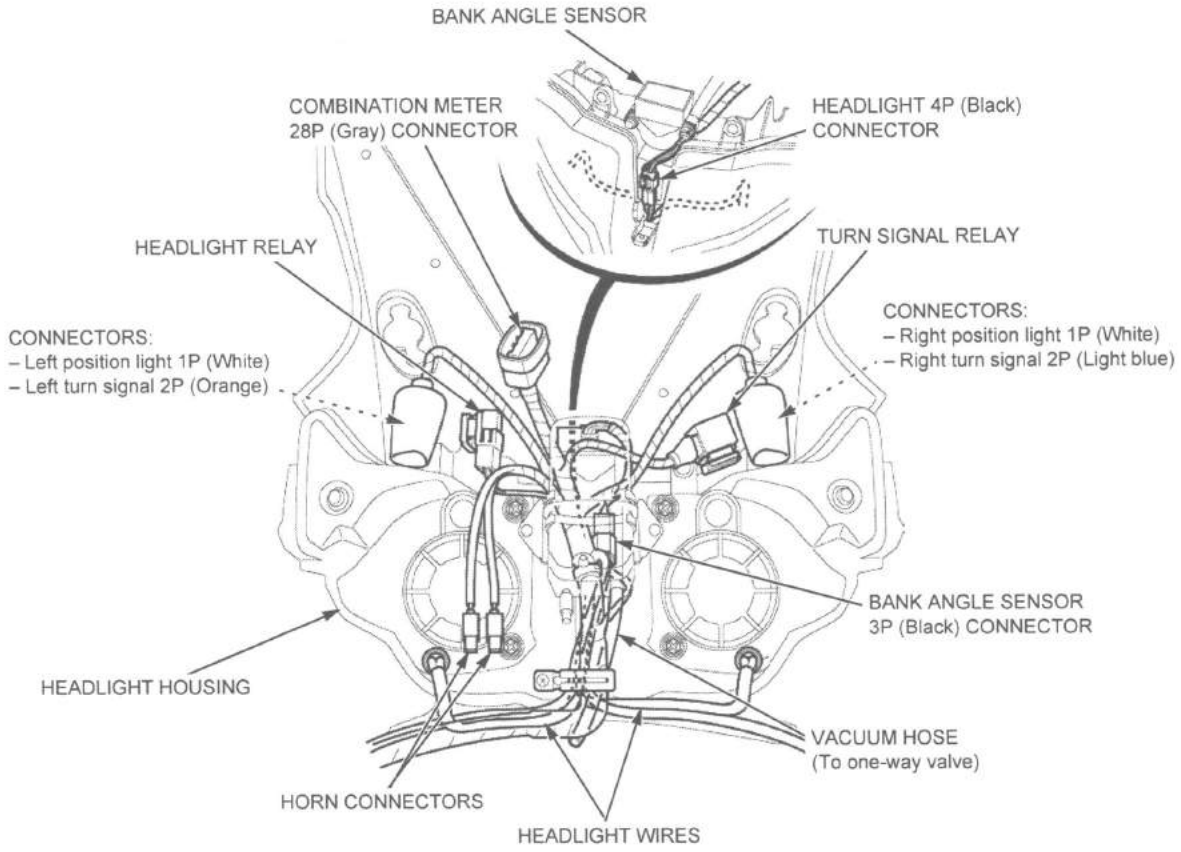

FUEL TANK BREATHER HOSE
(to EVAP canister)
FUEL TANK DRAIN HOSE
LOWER COWL
SIPHON HOSE
FUEL TANK
DRAIN HOSE
RADIATOR OVERFLOW HOSE
EVAP CANISTER
EVAP CANISTER DRAIN HOSE
ABS VALVE UNIT
DRAIN HOSE
RADIATOR OVERFLOW HOSE
SIPHON HOSE
CANISTER-TO-EVAP PURGE
CONTROL SOLENOID VALVE HOSE
FUEL TANK BREATHER HOSE
(to fuel tank)
SWINGARM
FUEL TANK BREATHER HOSE
(to fuel tank)
3.0 mm
(0.12 in)
minimum
5.0 mm (0.20 in)
minimum
8.0 mm
(0.31 in)
minimum
EVAP CANISTER
CANISTER-TO-EVAP PURGE
CONTROL SOLENOID VALVE HOSE
EVAP CANISTER

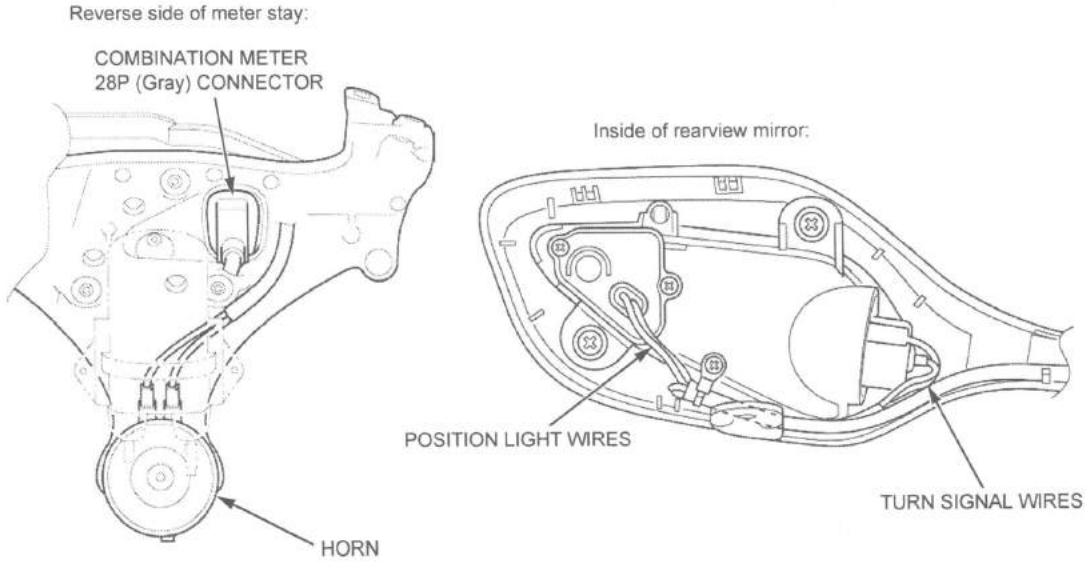
(AC) type:


5-WAY JOINT
EVAP PURGE CONTROL SOLENOID VALVE 2P (BLACK) CONNECTOR
EVAP PURGE CONTROL SOLENOID VALVE
FUEL TANK BREATHER HOSE (to EVAP canister)
ABS SUB HARNESS
WIRE BAND
HARNESS PROTECTOR
CANISTER-TO-EVAP PURGE CONTROL SOLENOID VALVE HOSE
ABS SUB HARNESS
GROUND TERMINAL
HARNESS PROTECTOR
WIRE BAND

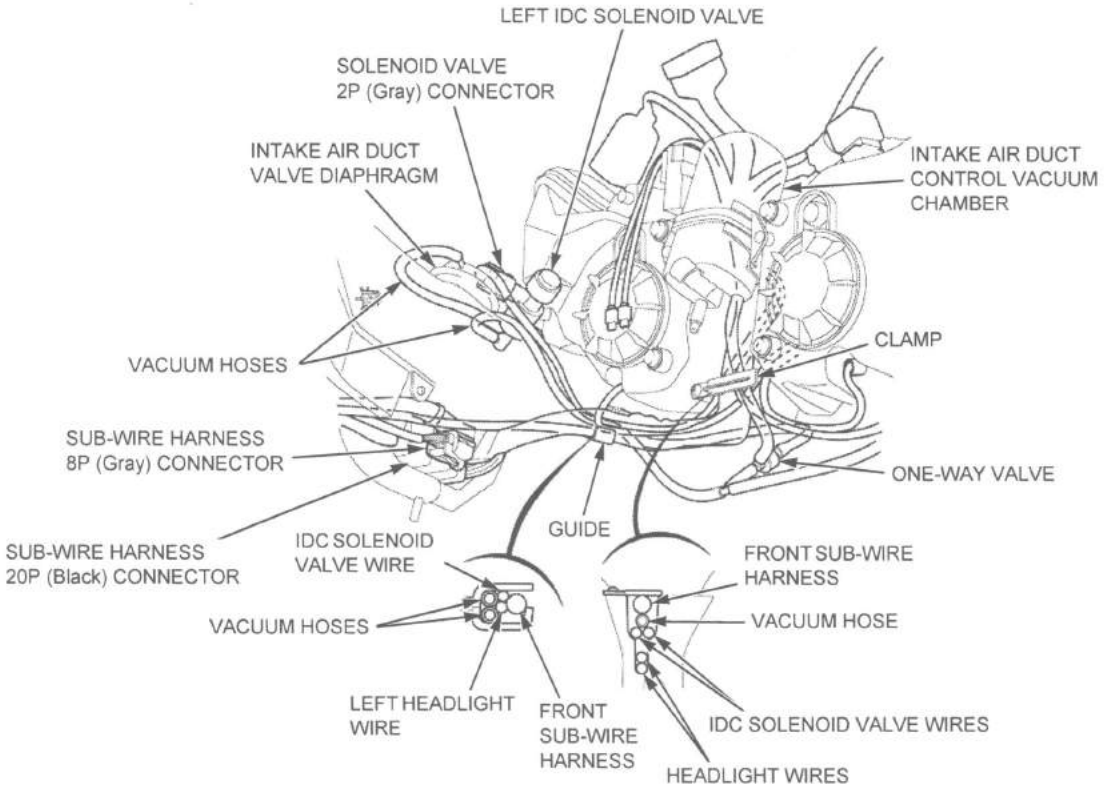
CABLE & HARNESS ROUTING (After '11 model)

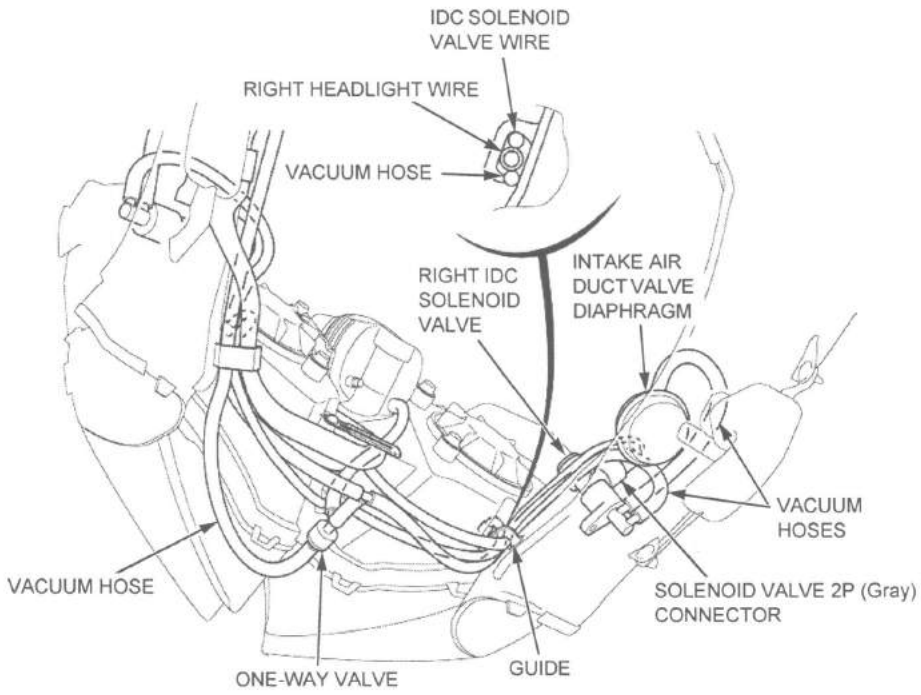
After '11 STANDARD/SP type:



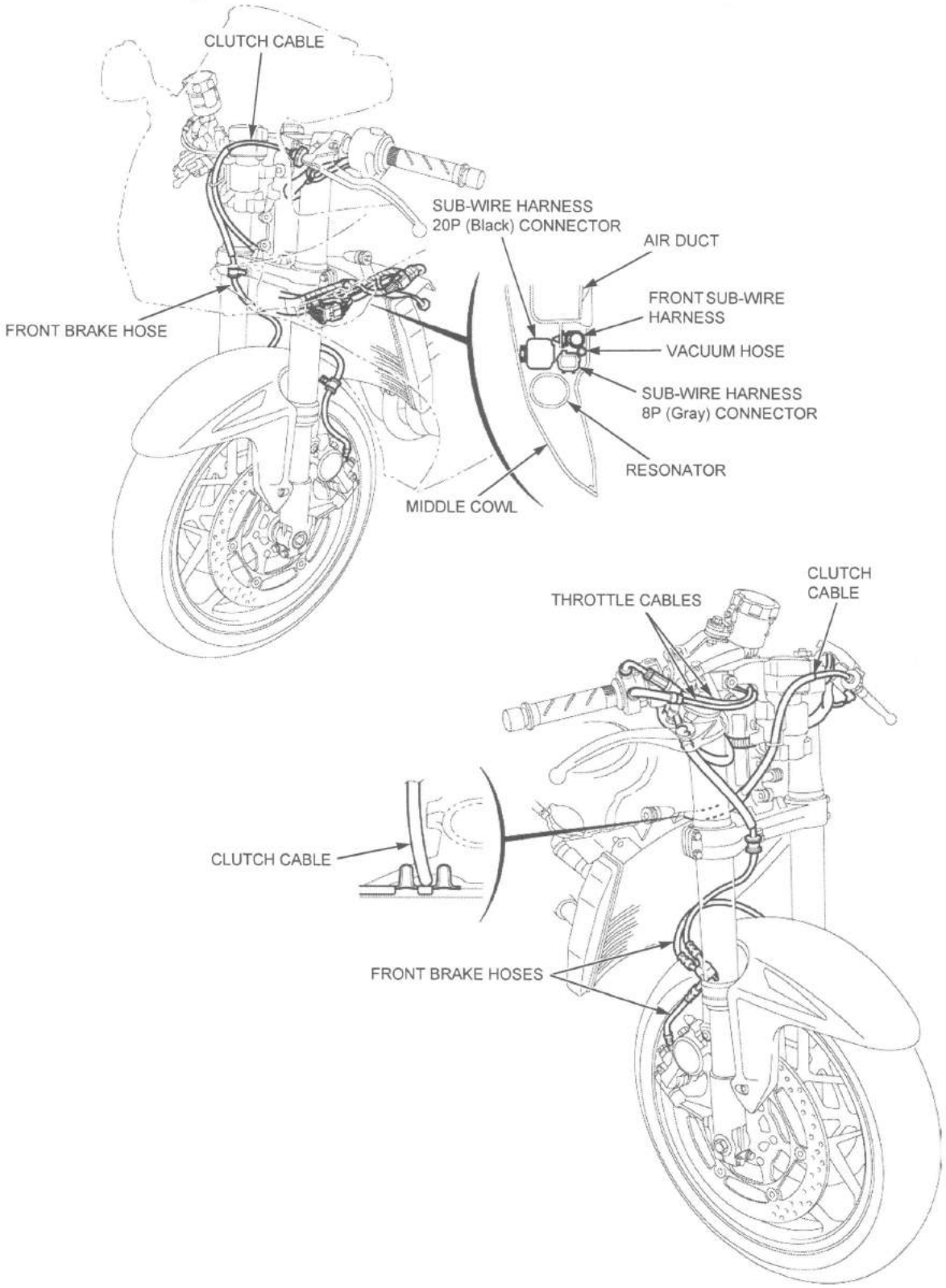


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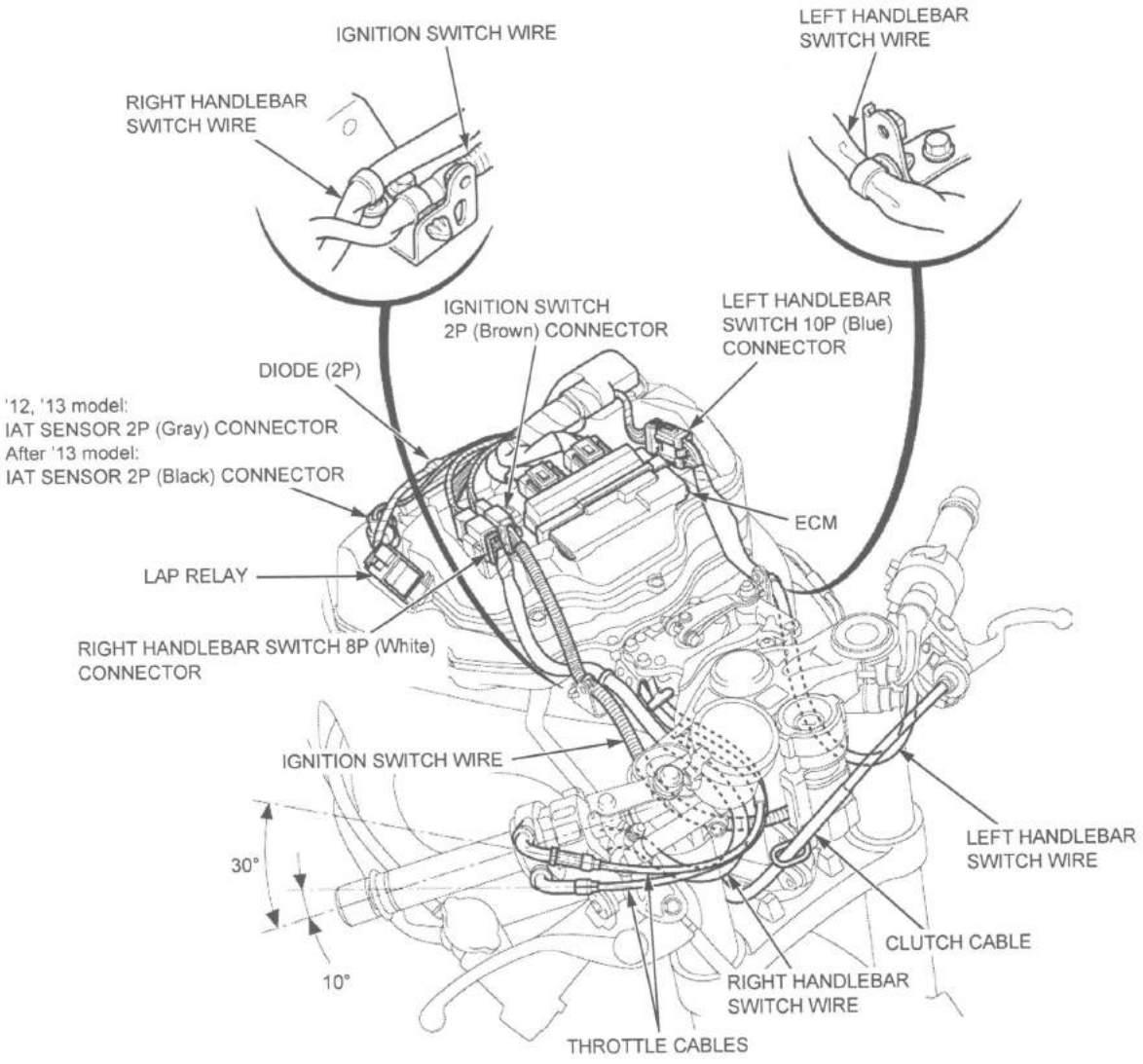




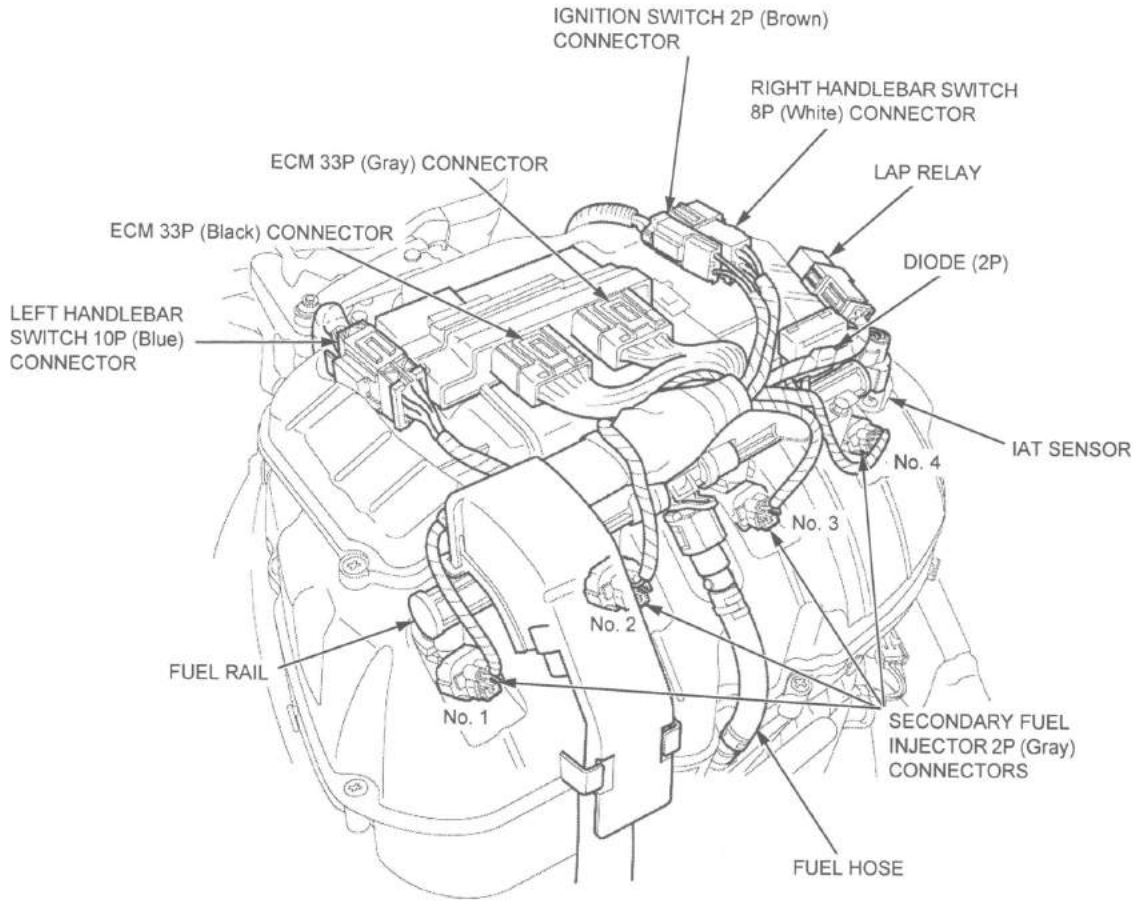
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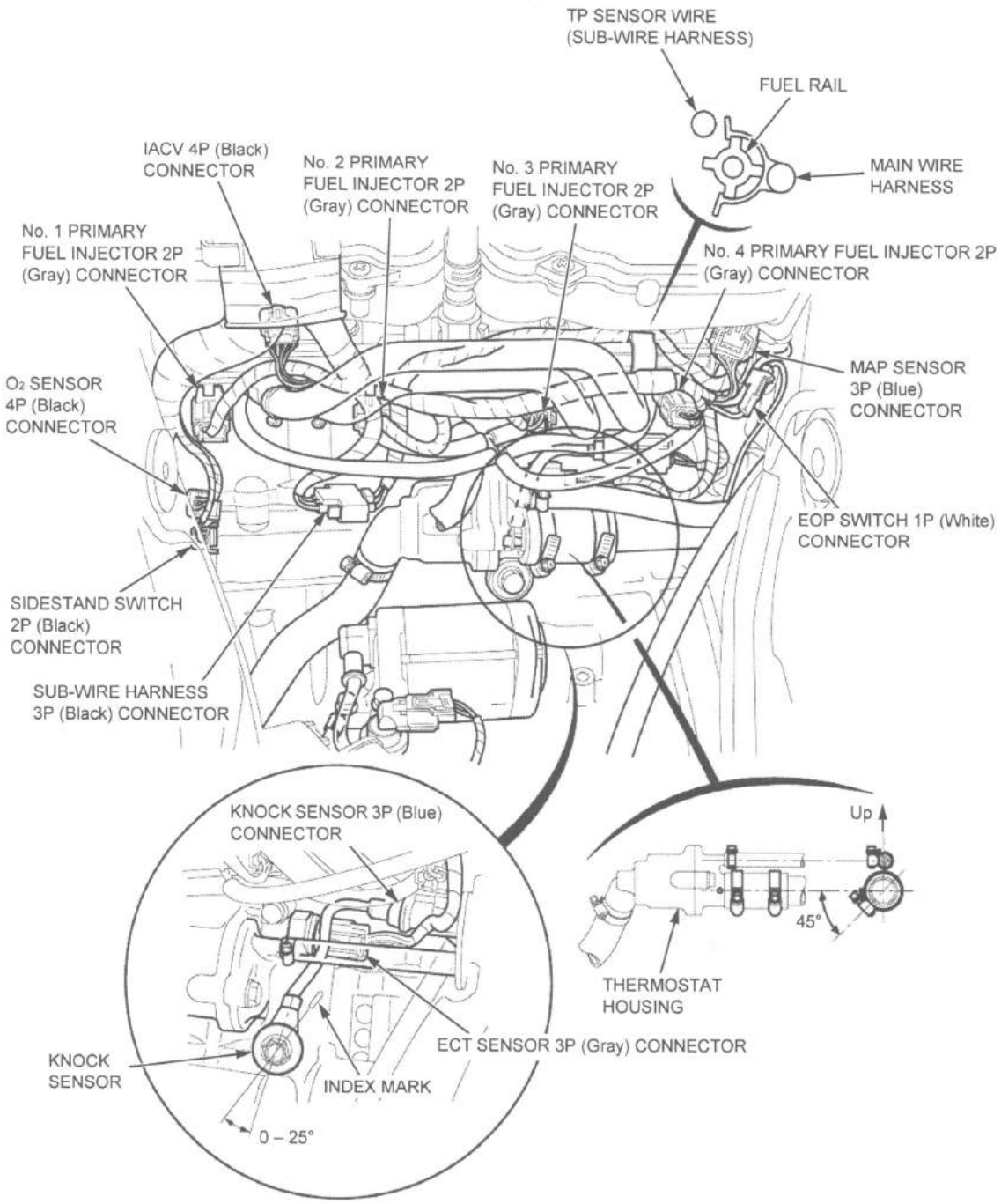
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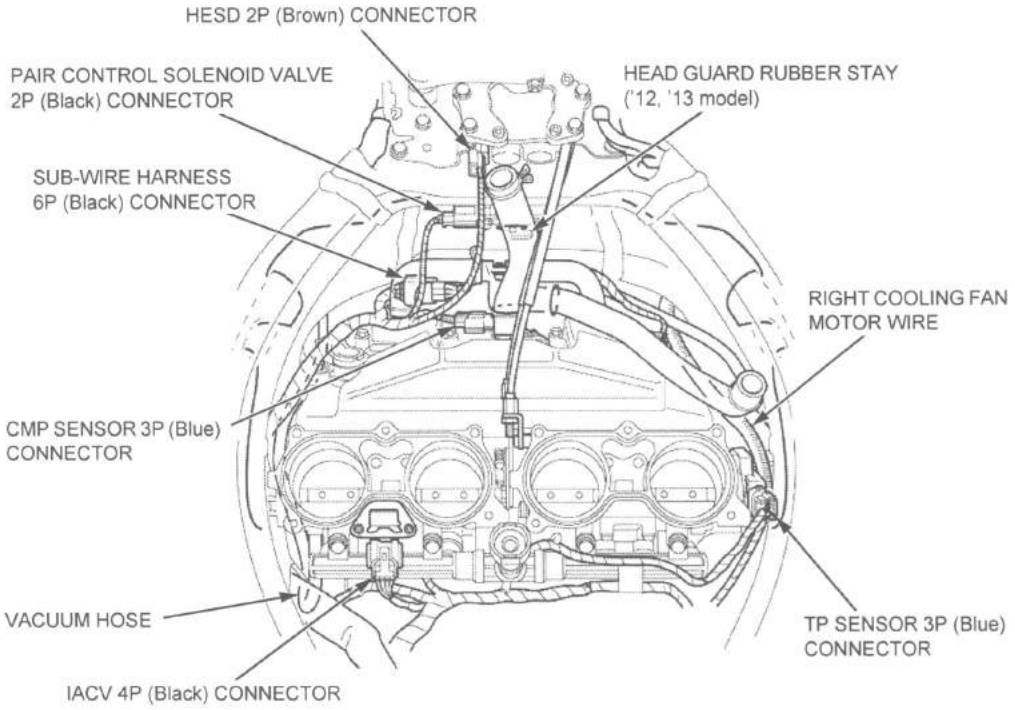
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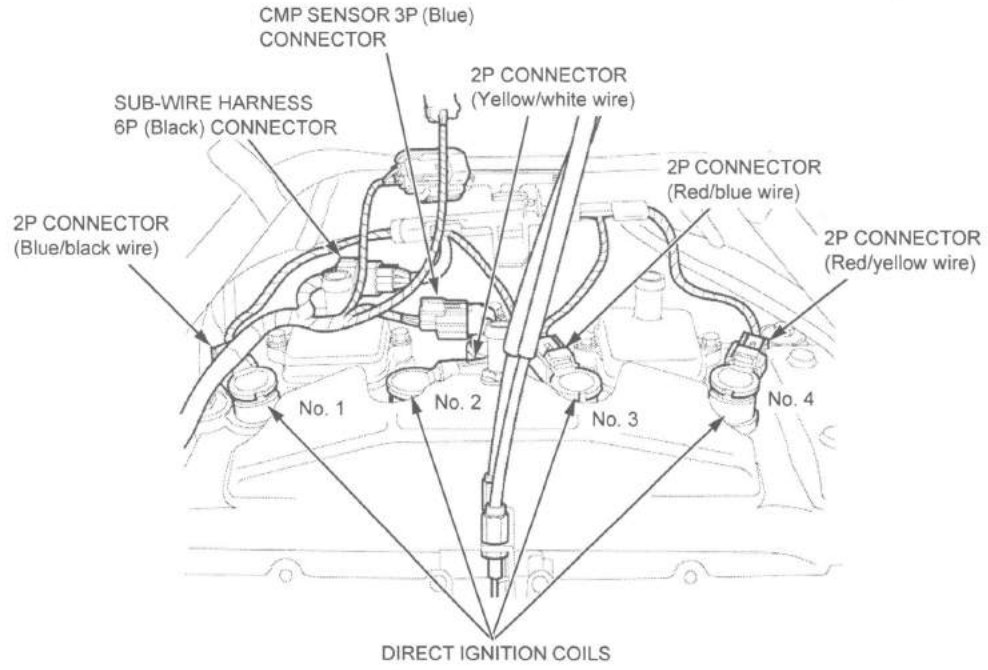


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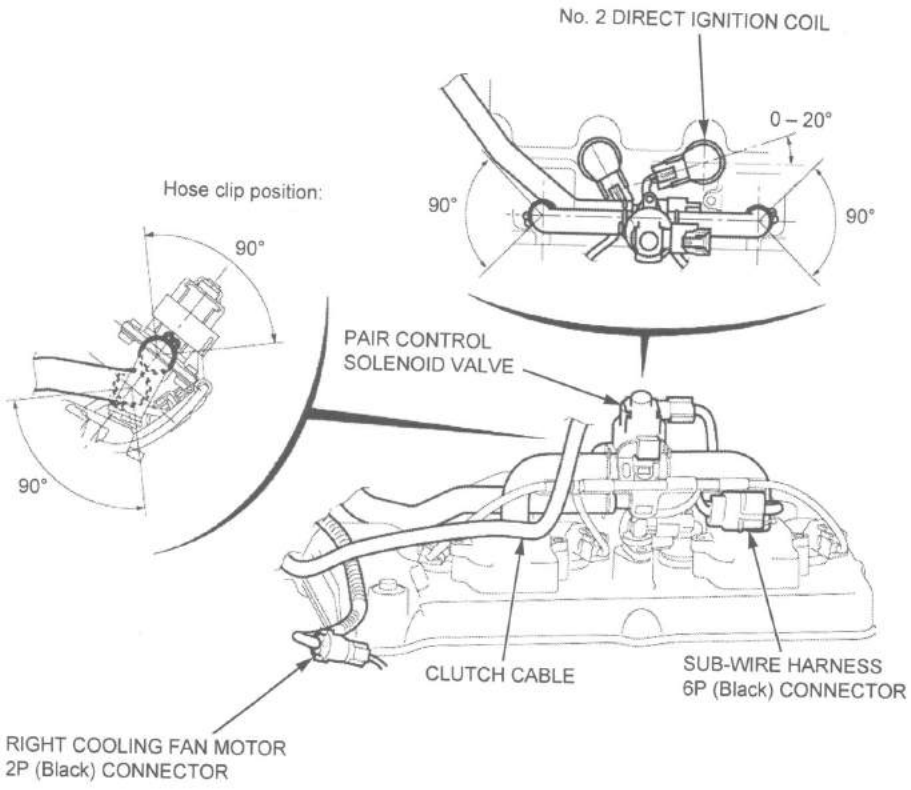


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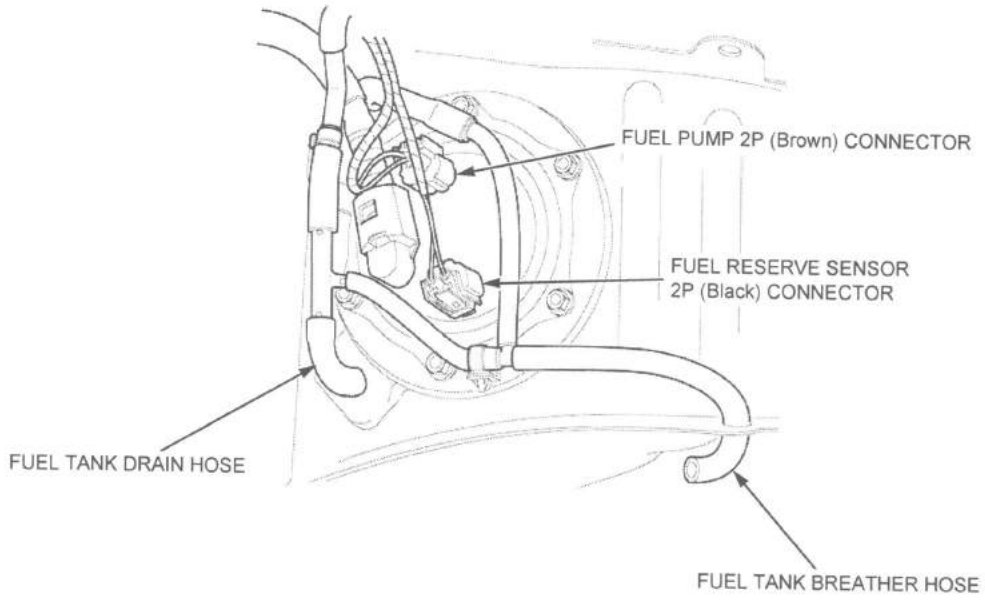
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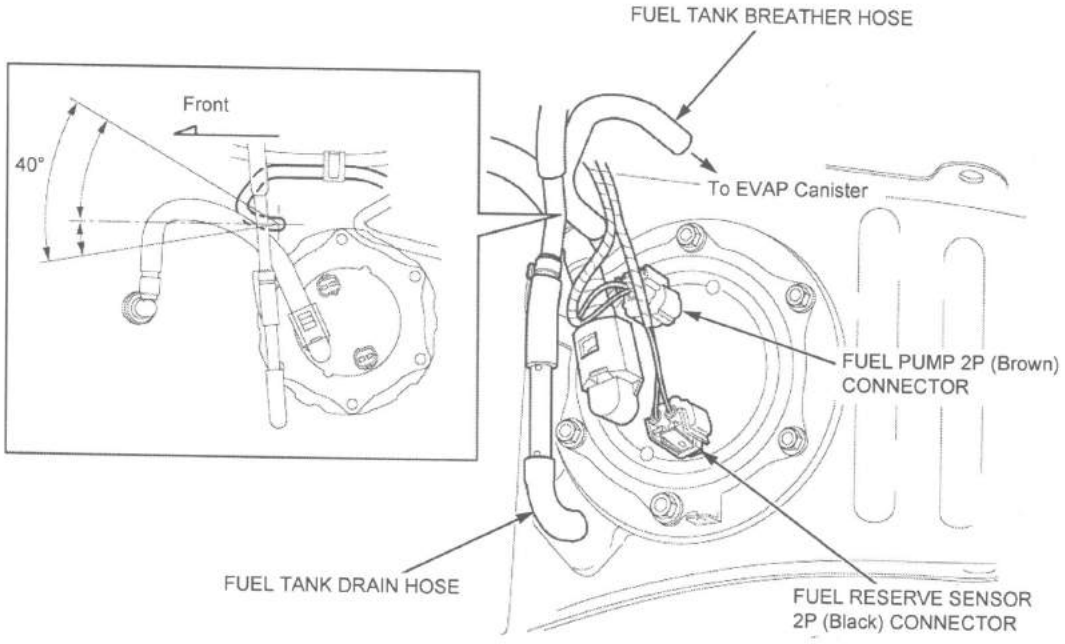
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Except (AC) type:

Bottom of fuel tank:

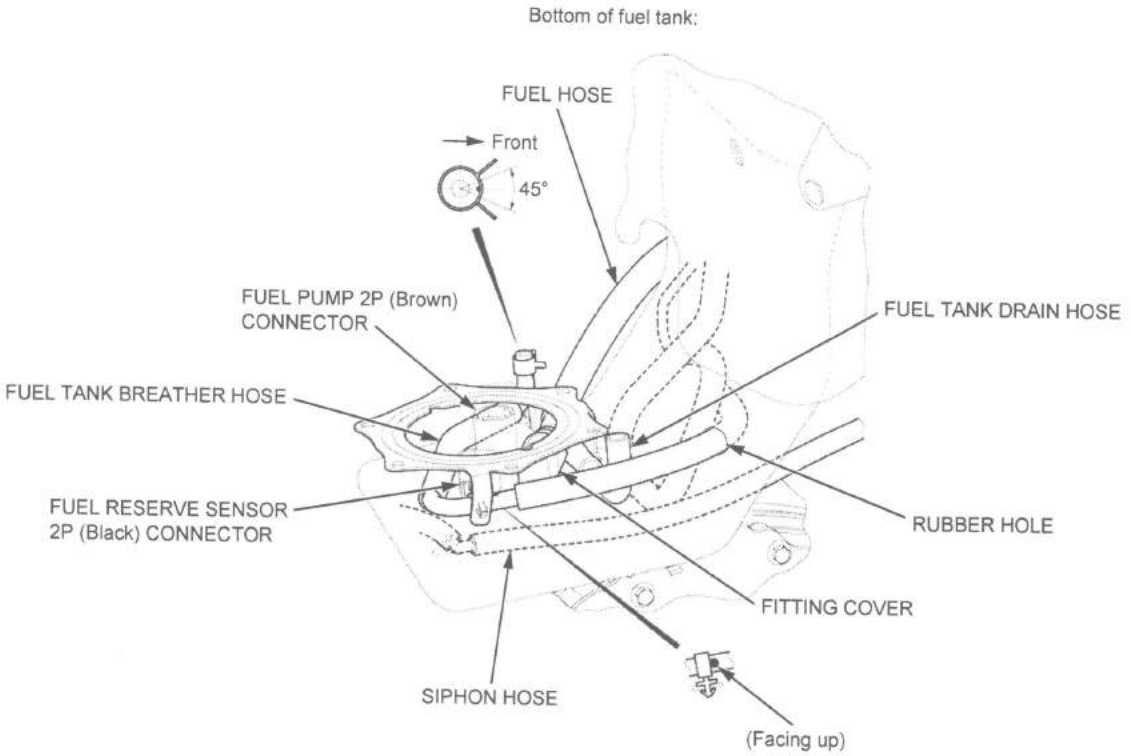


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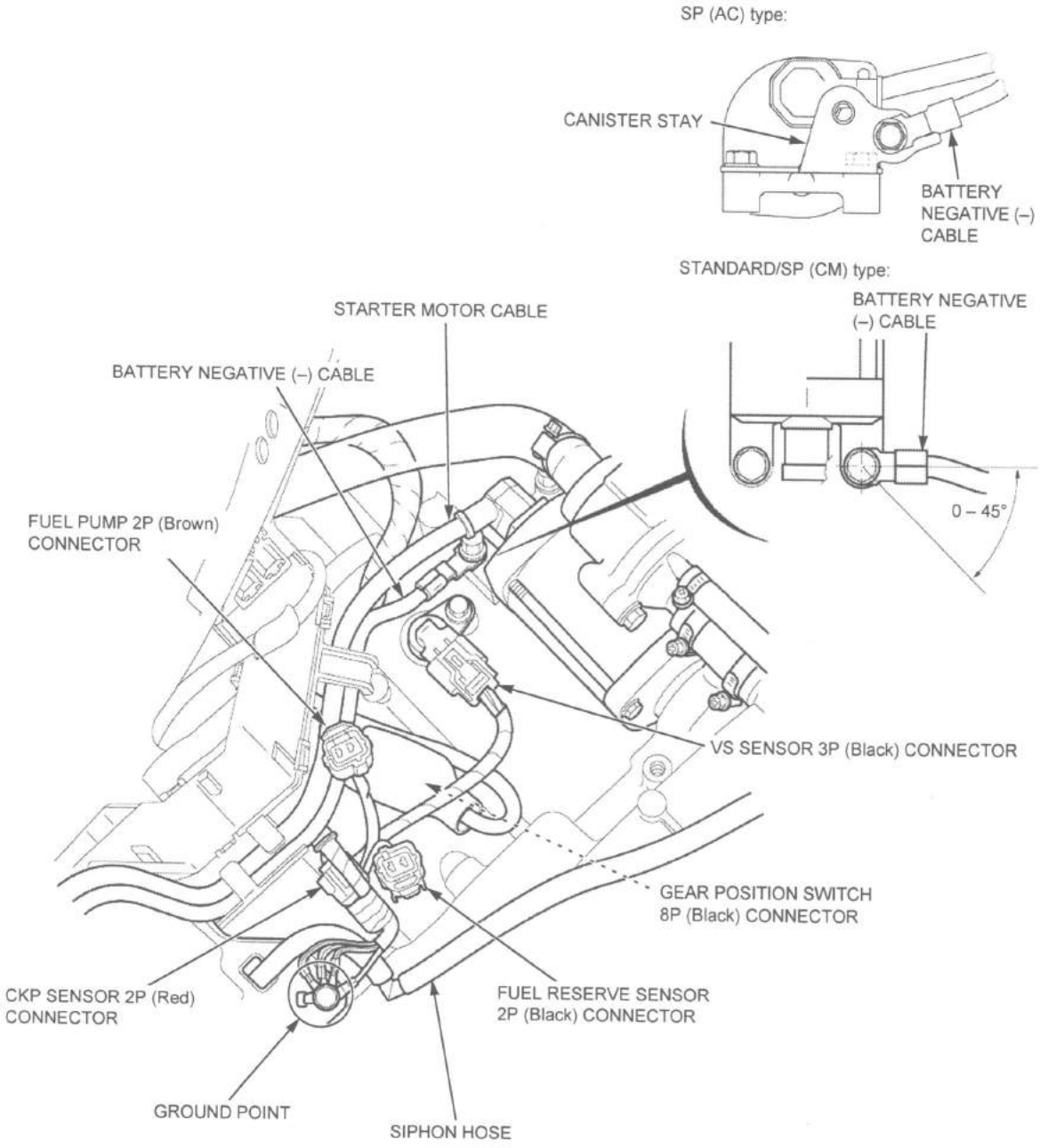


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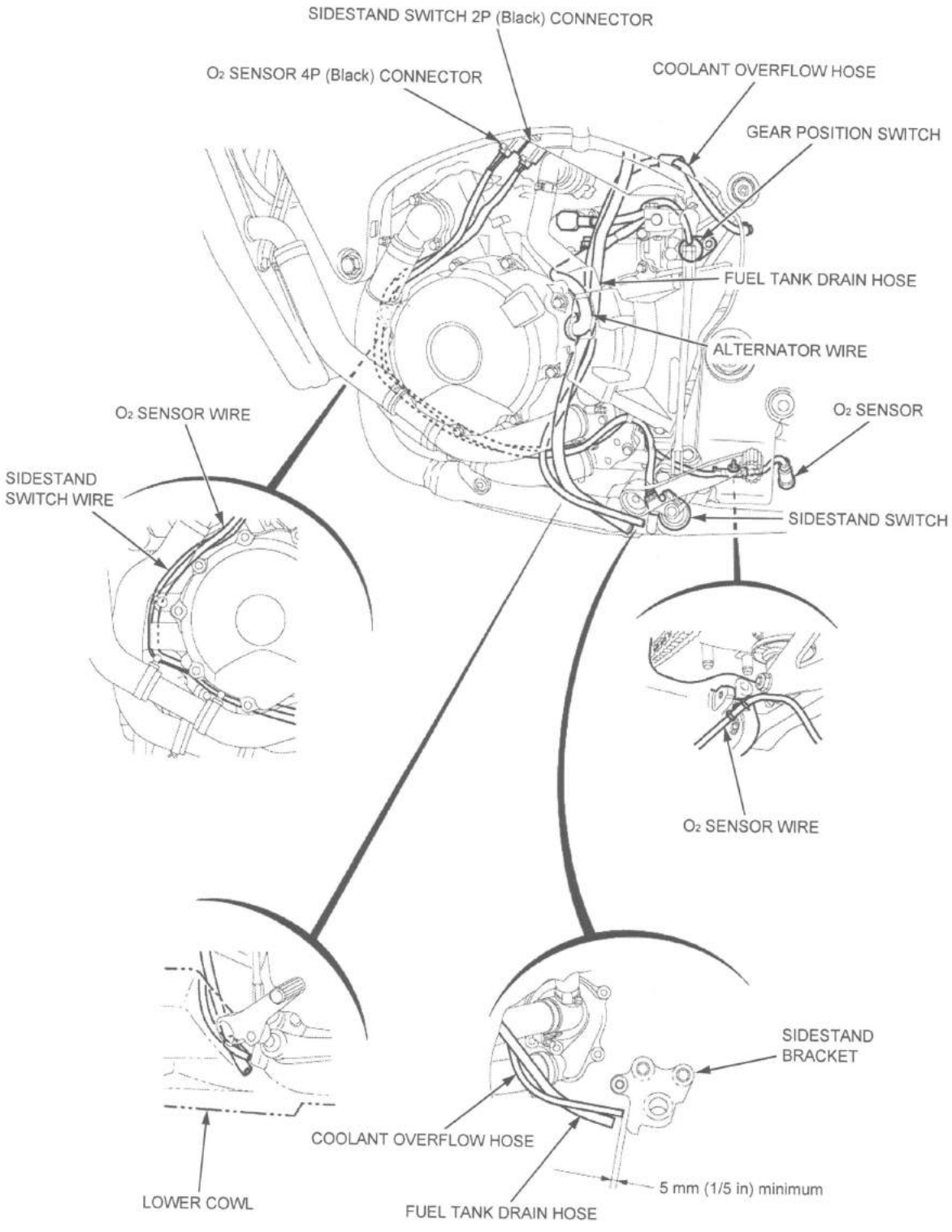
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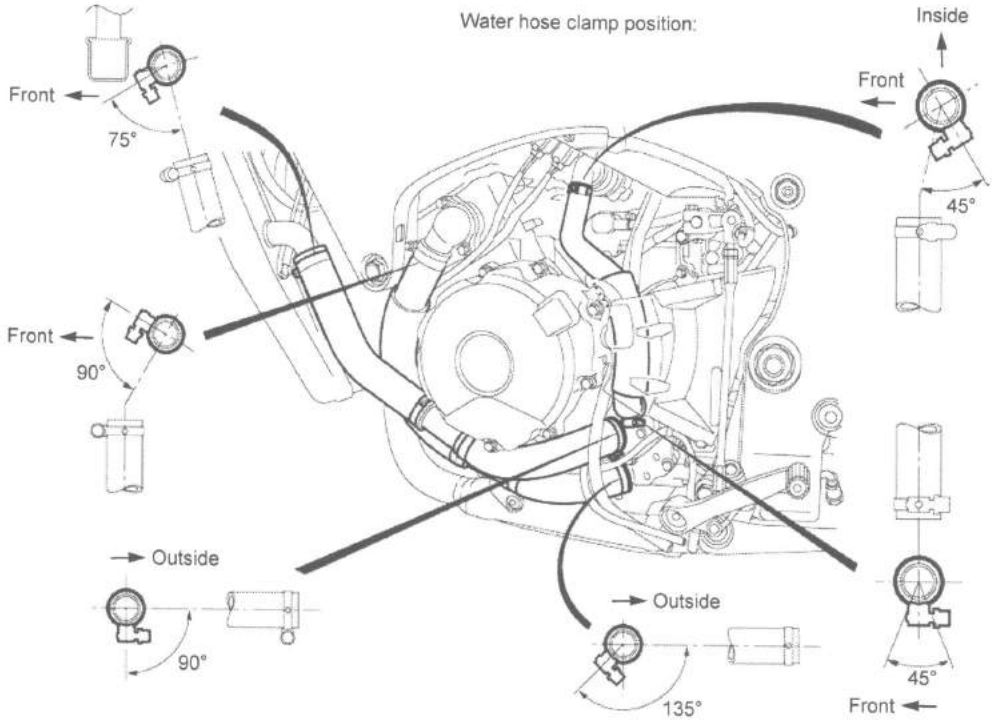


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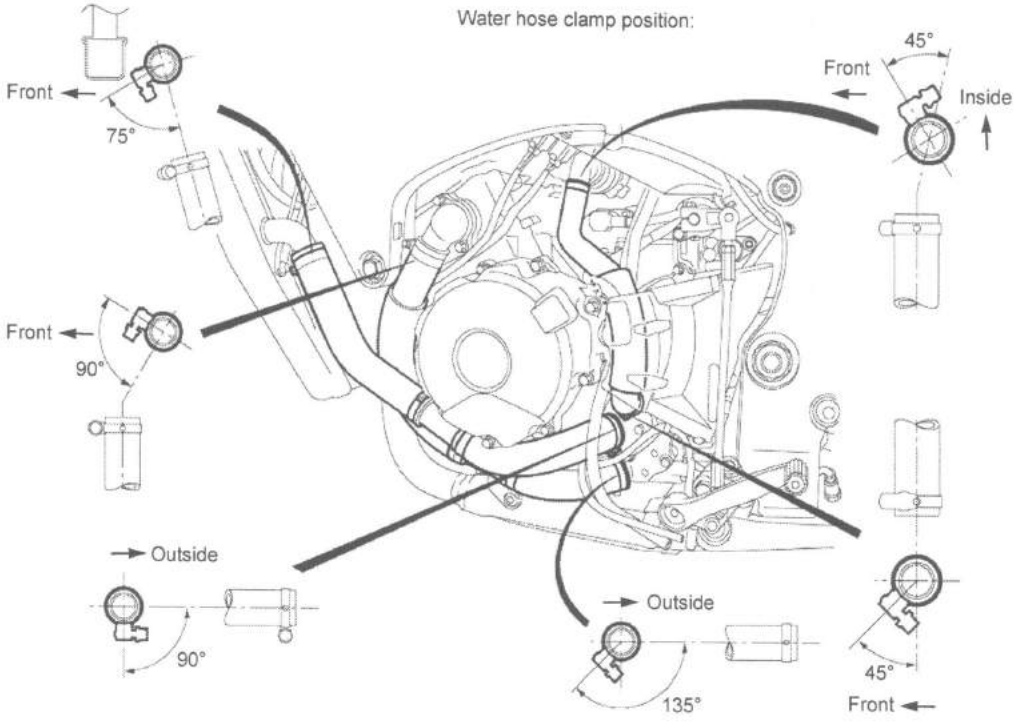


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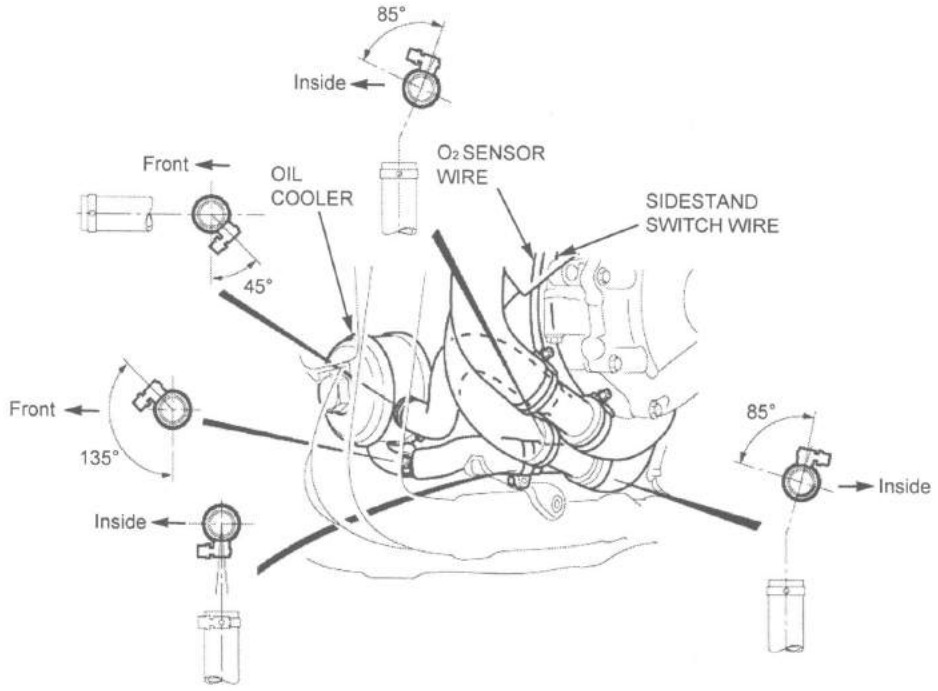
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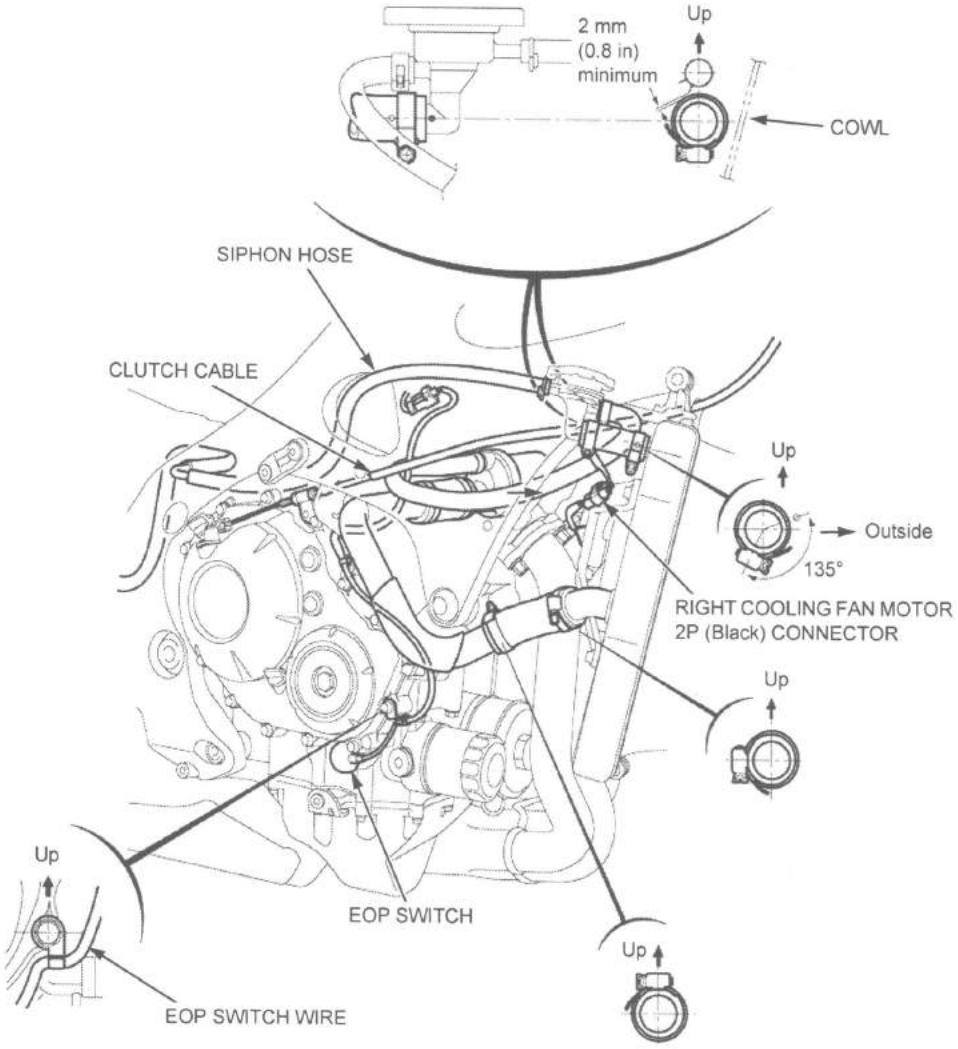
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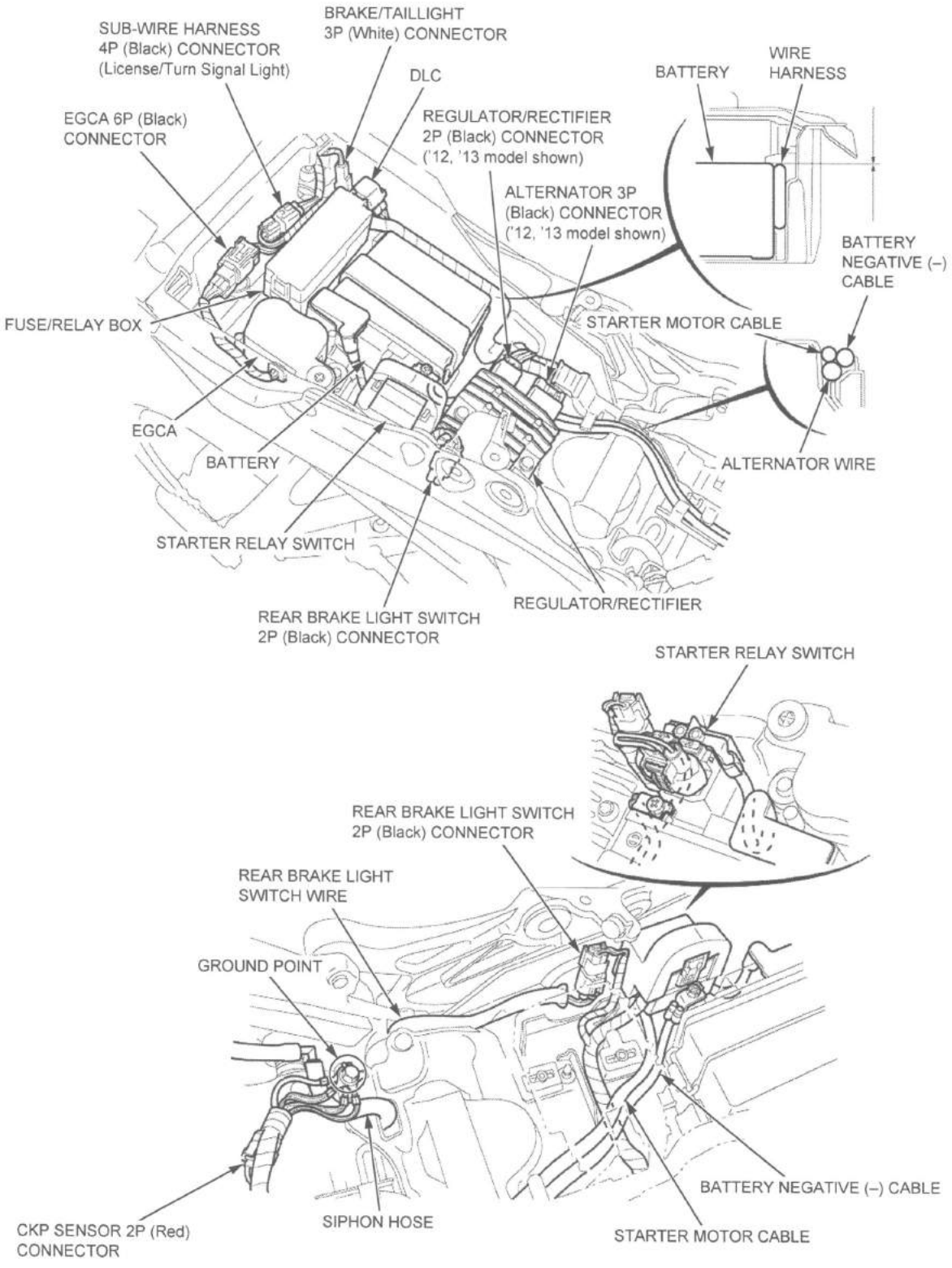
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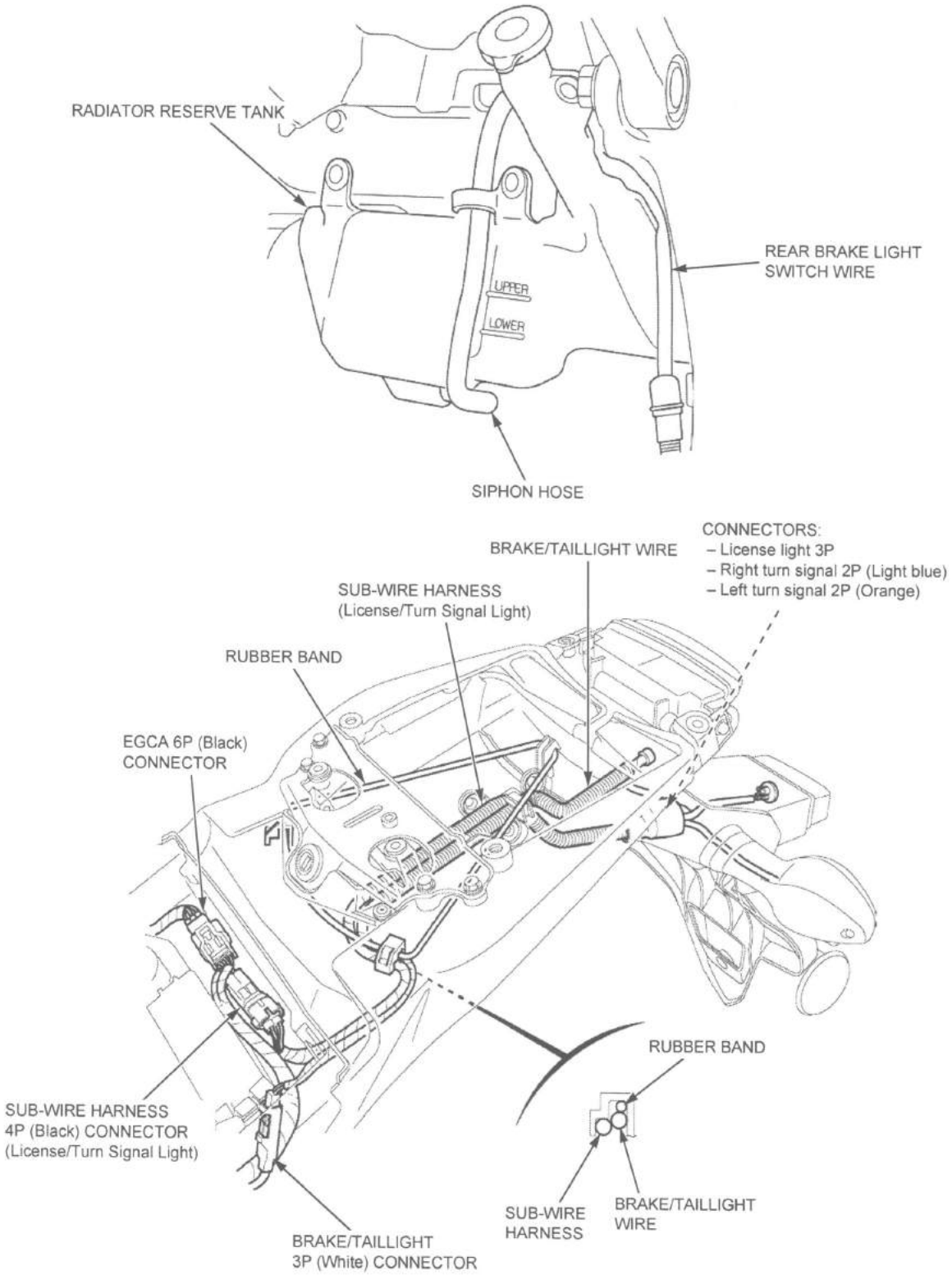
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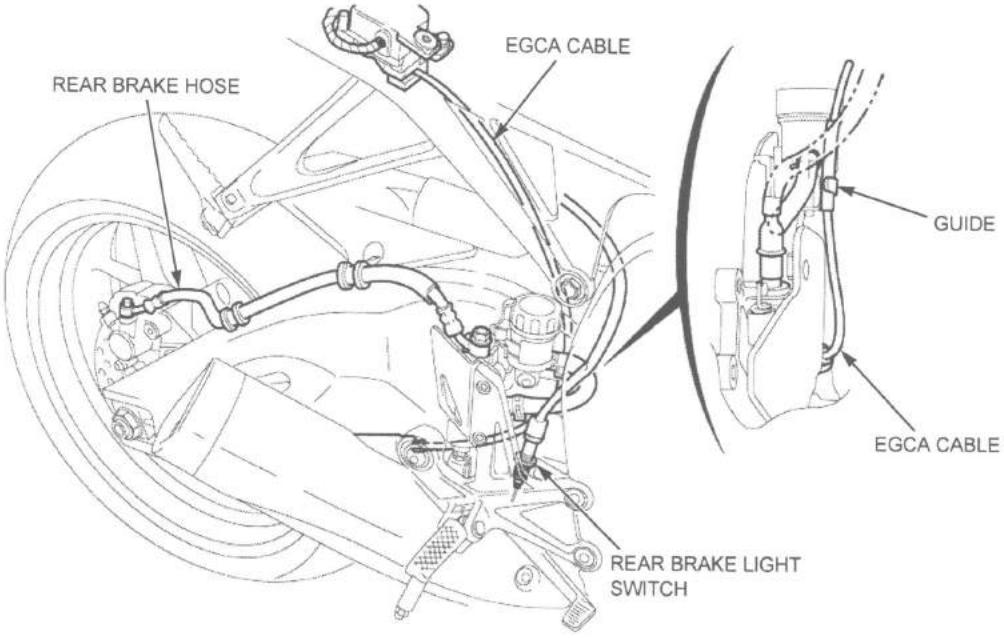
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After '11 STANDARD/SP type:

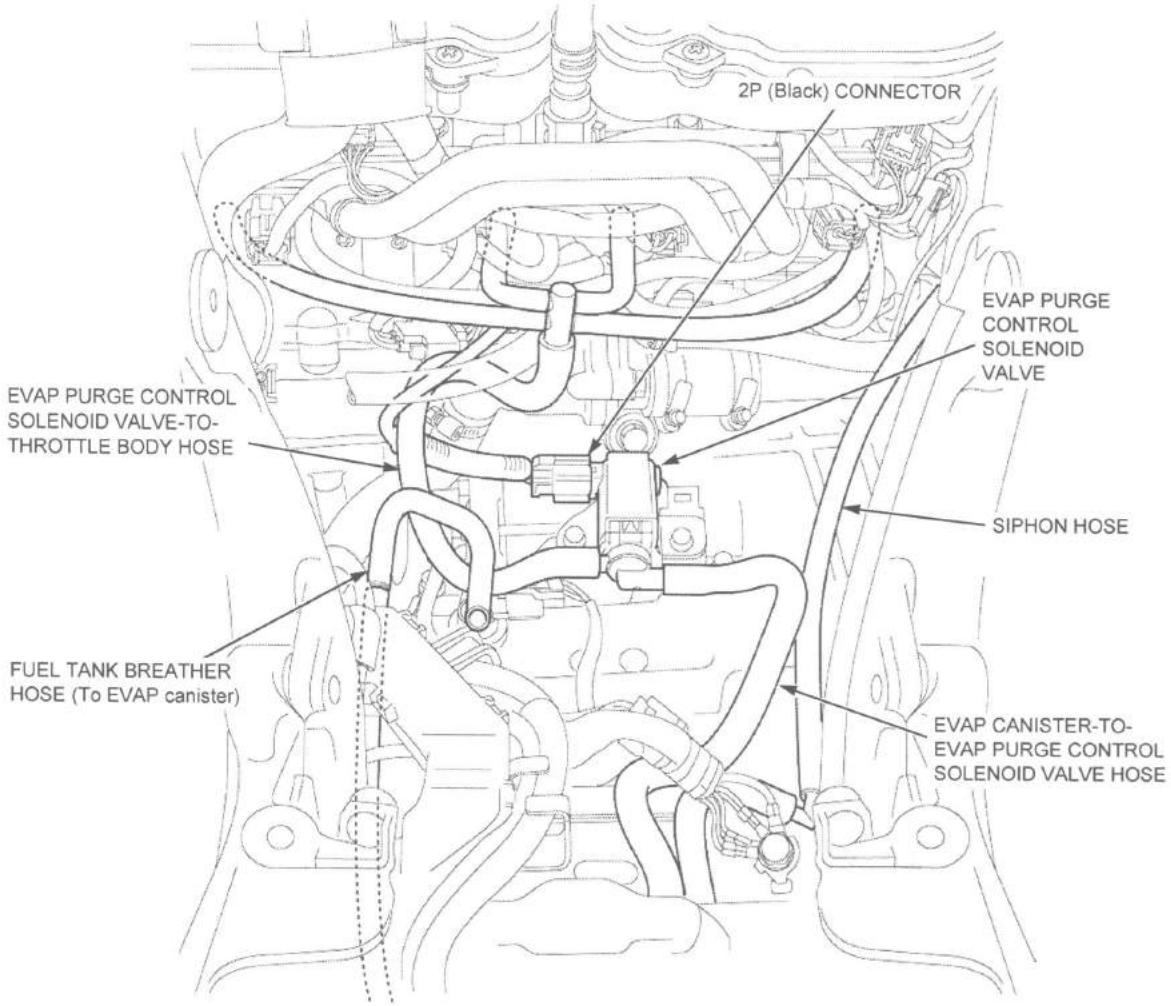


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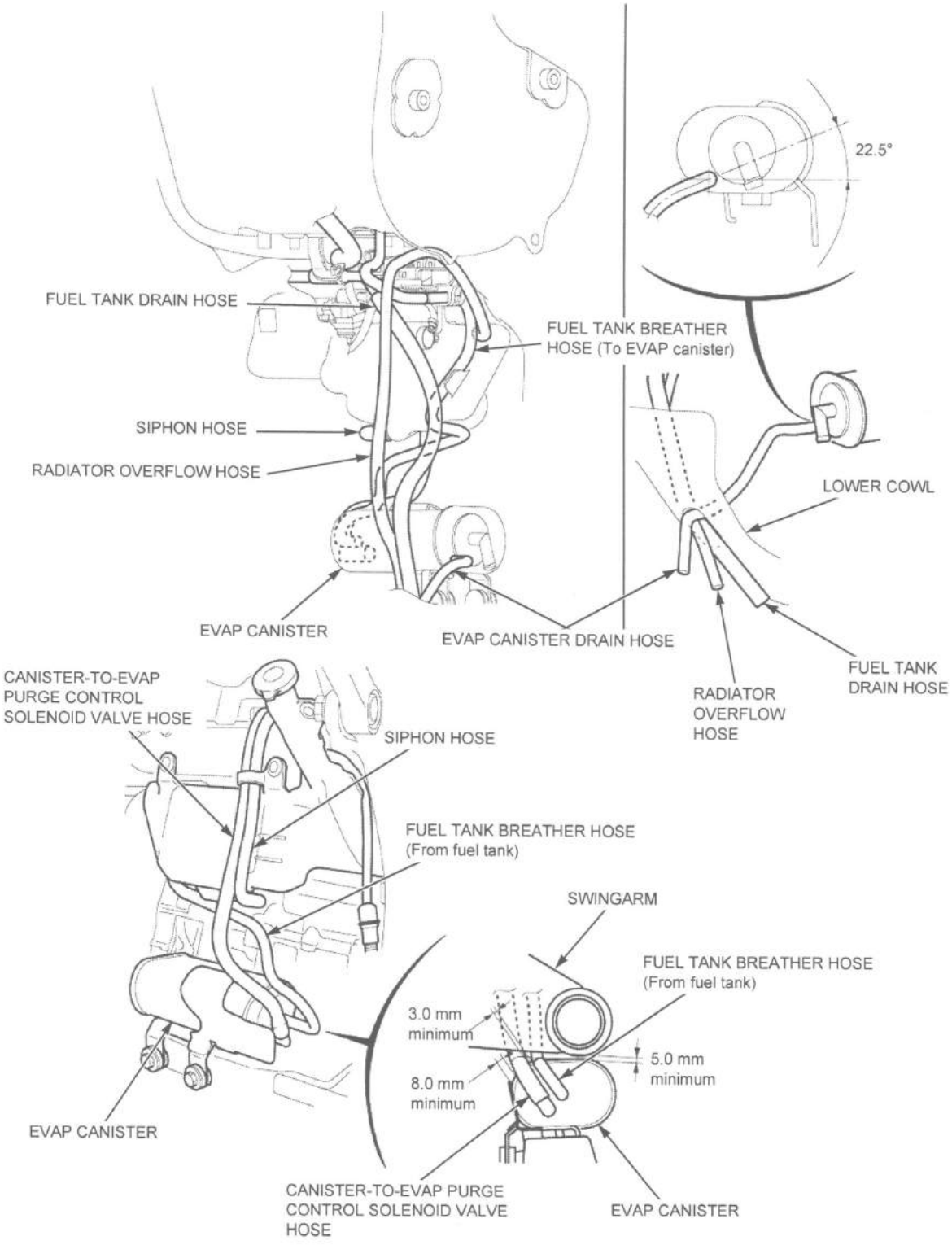
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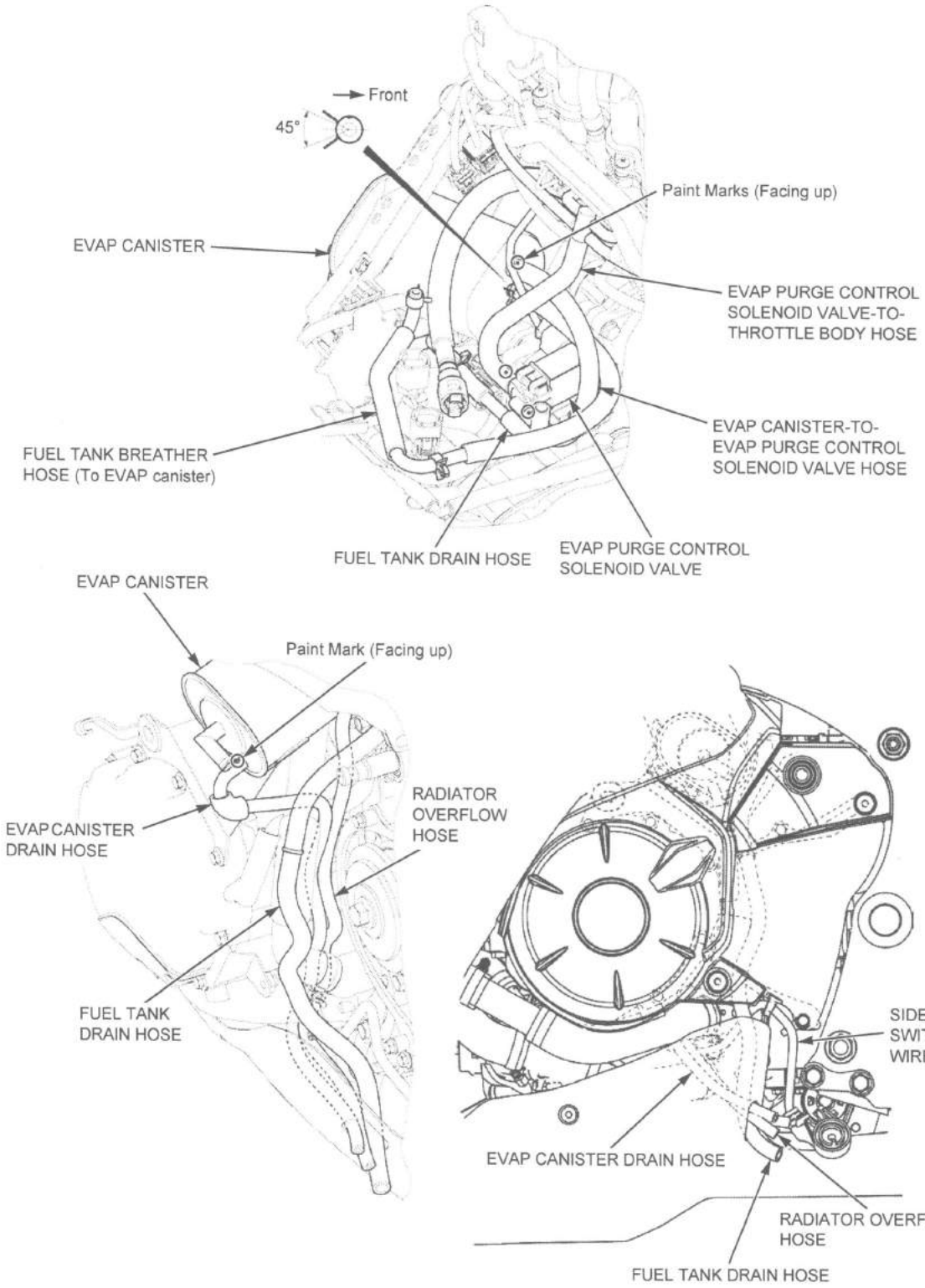
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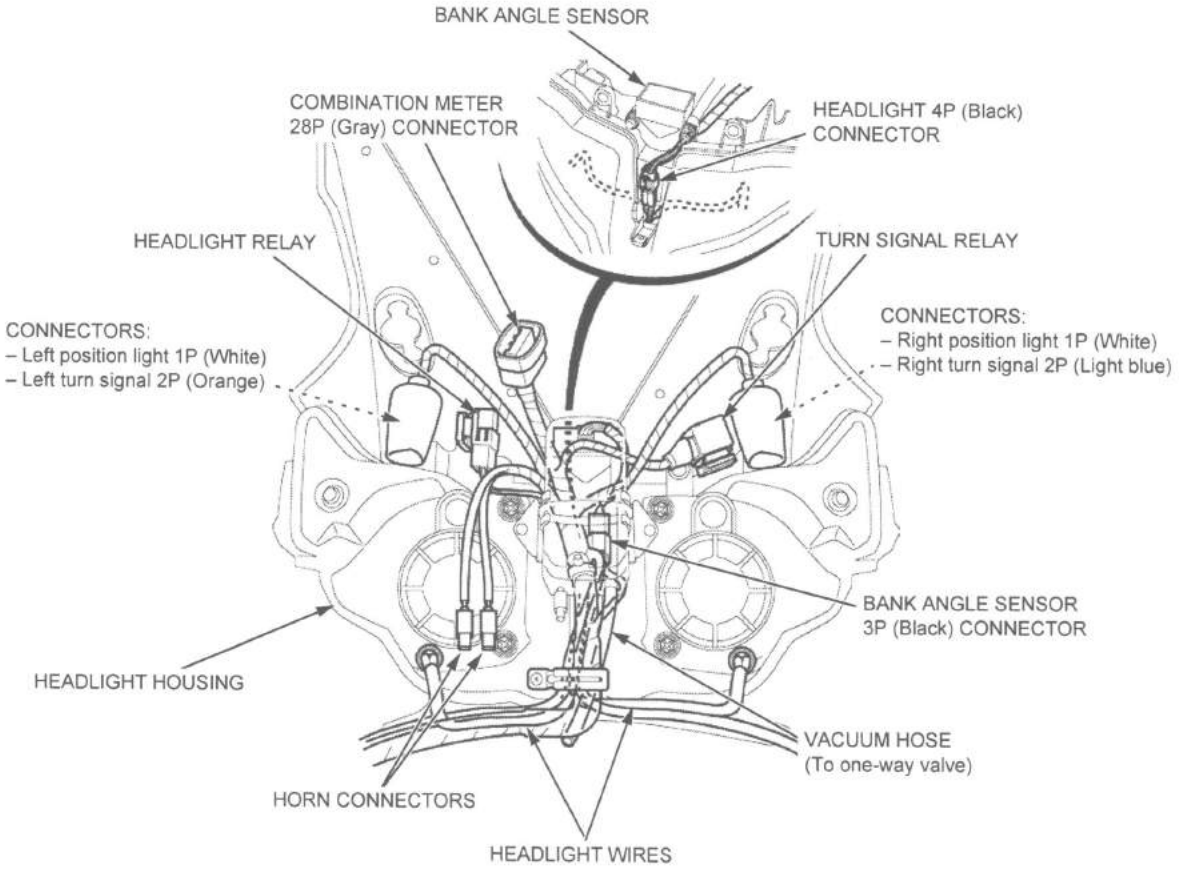


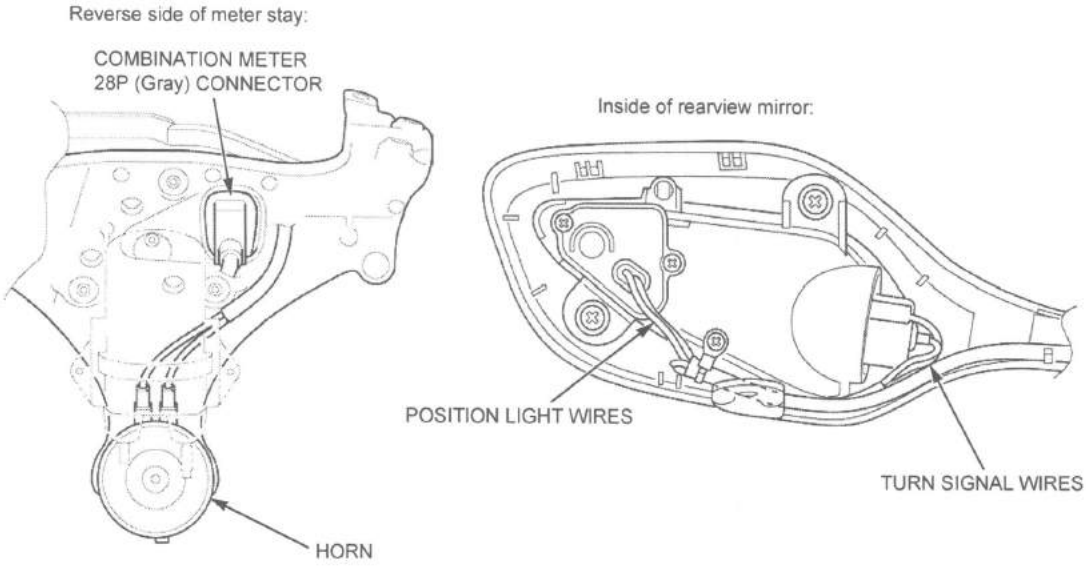
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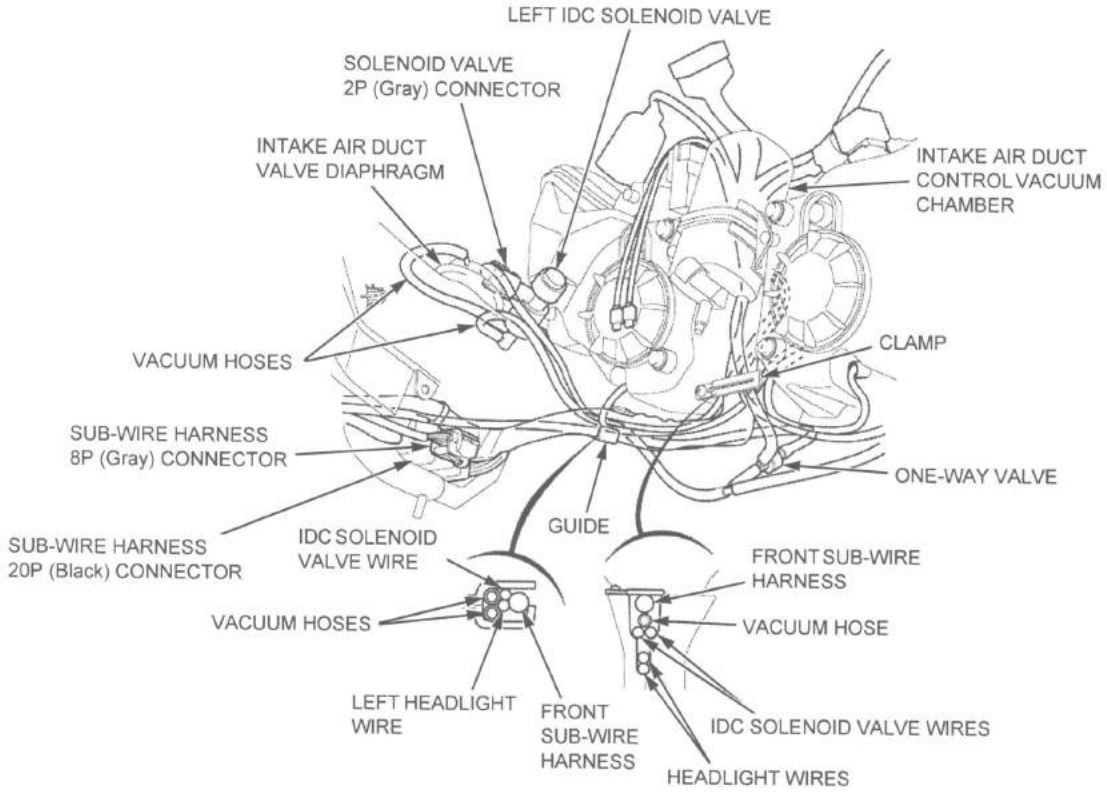


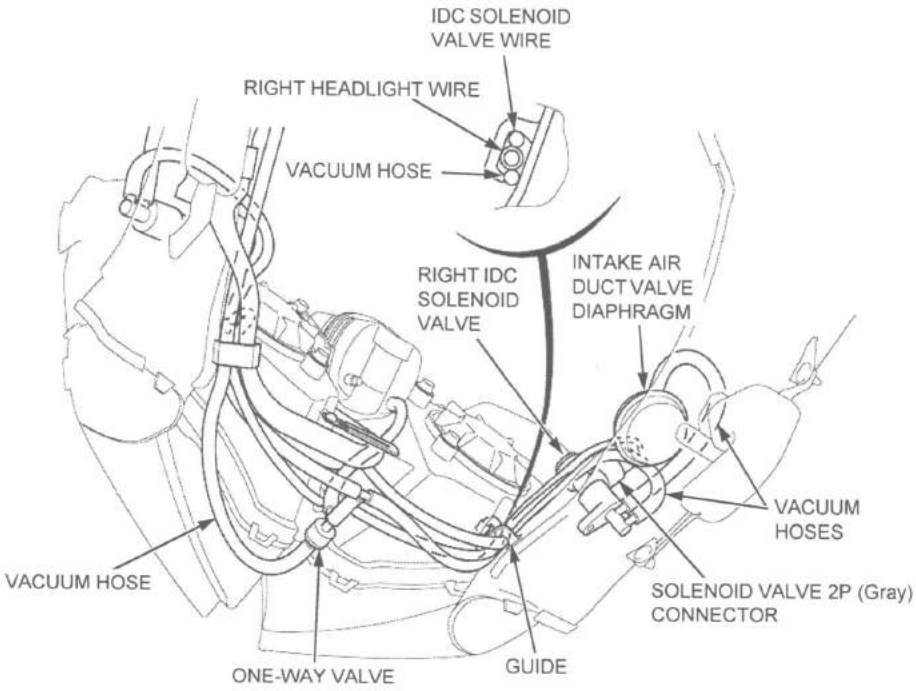
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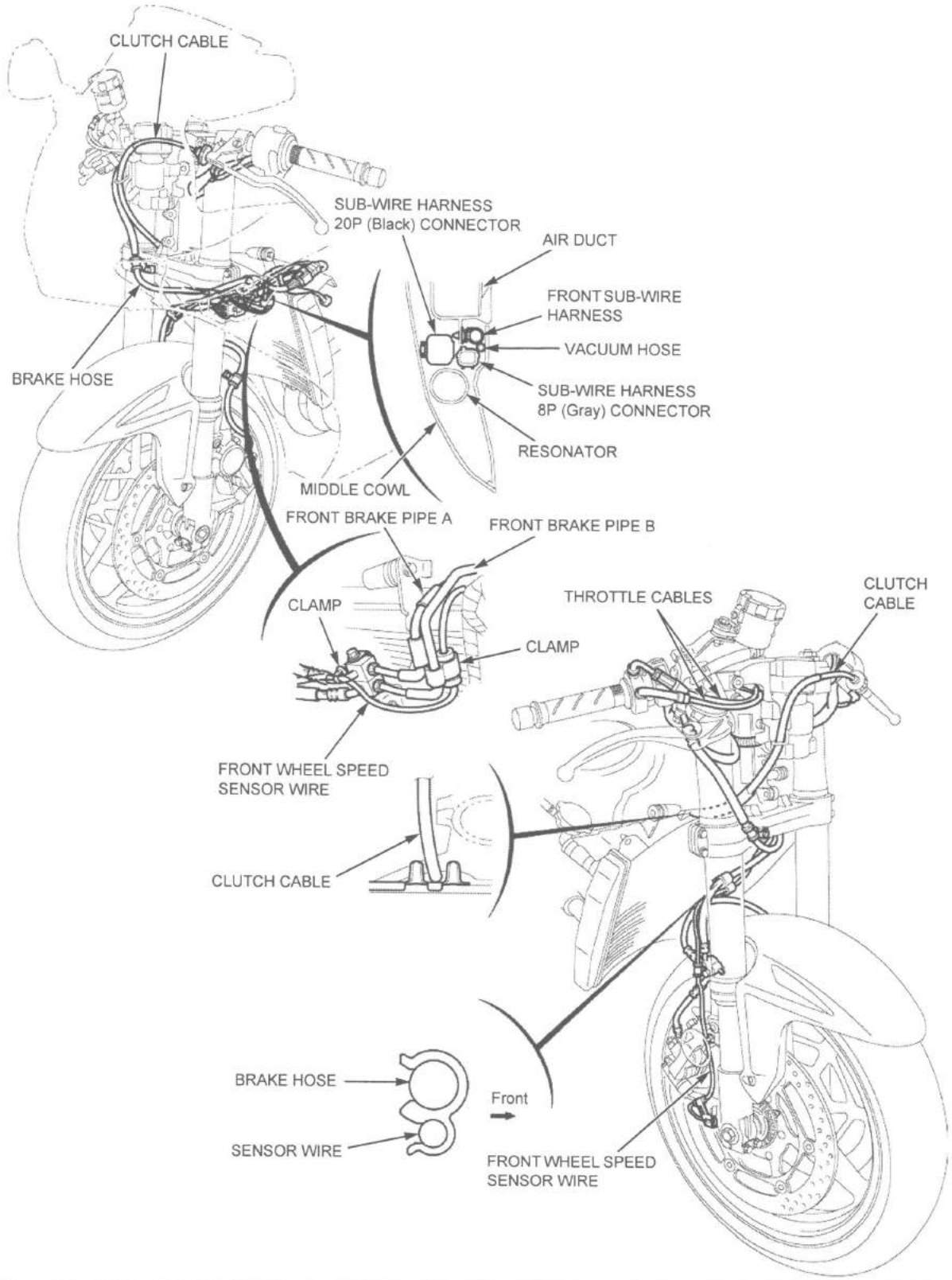


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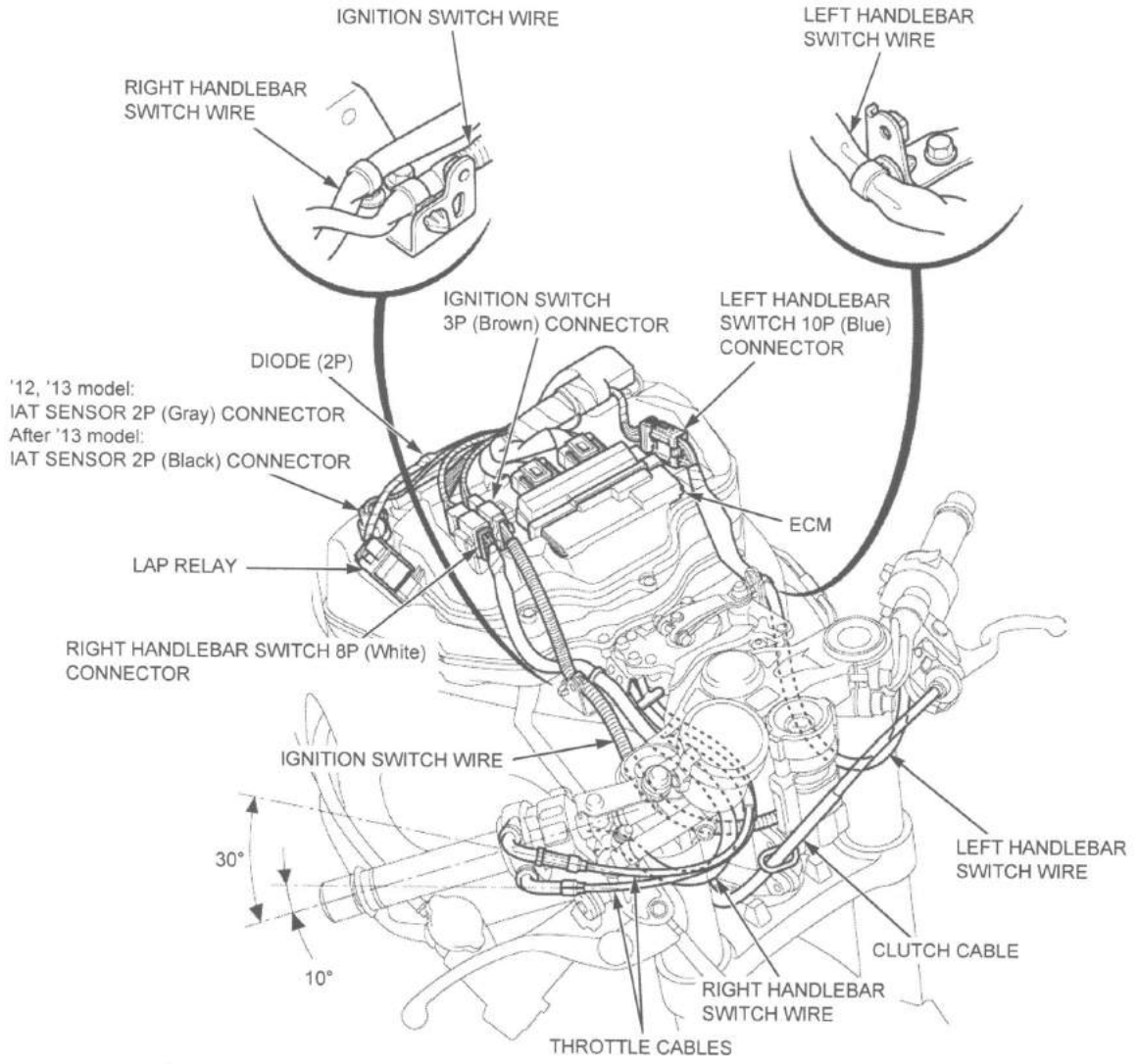




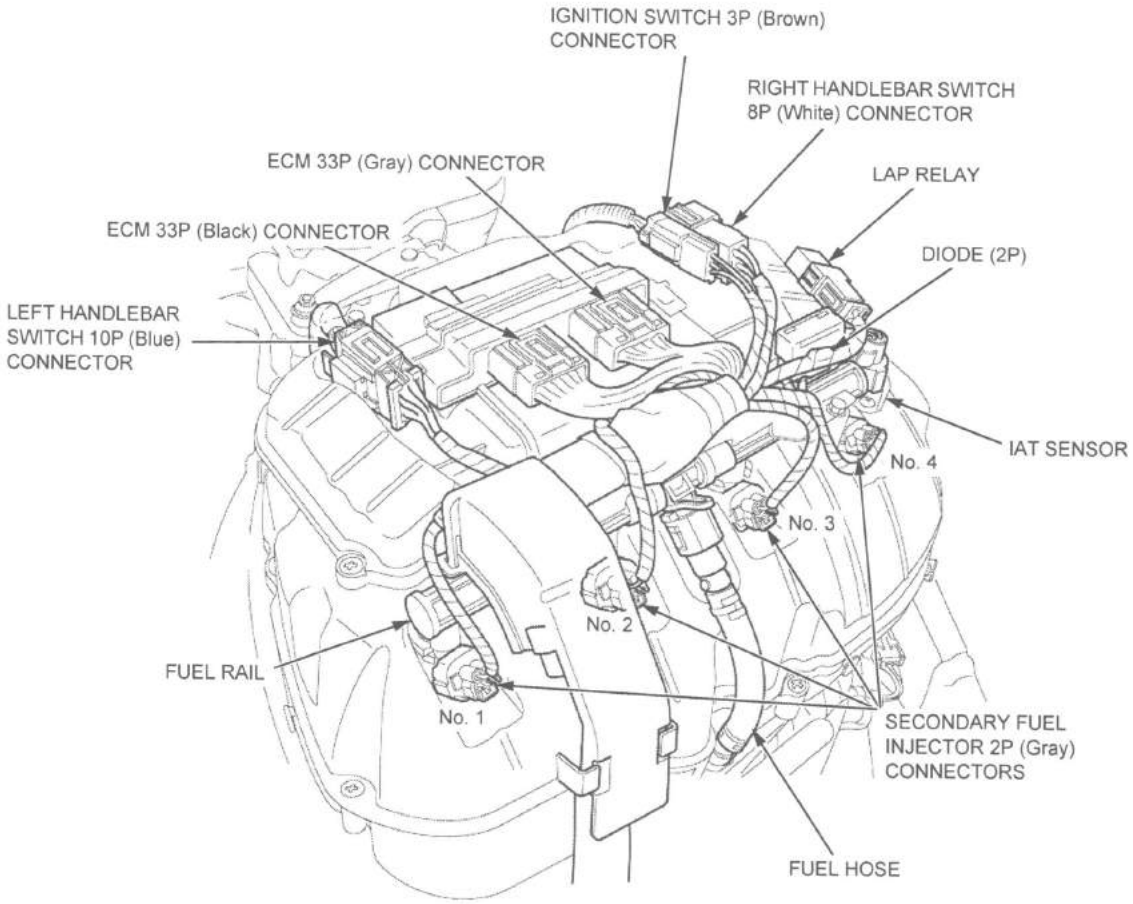
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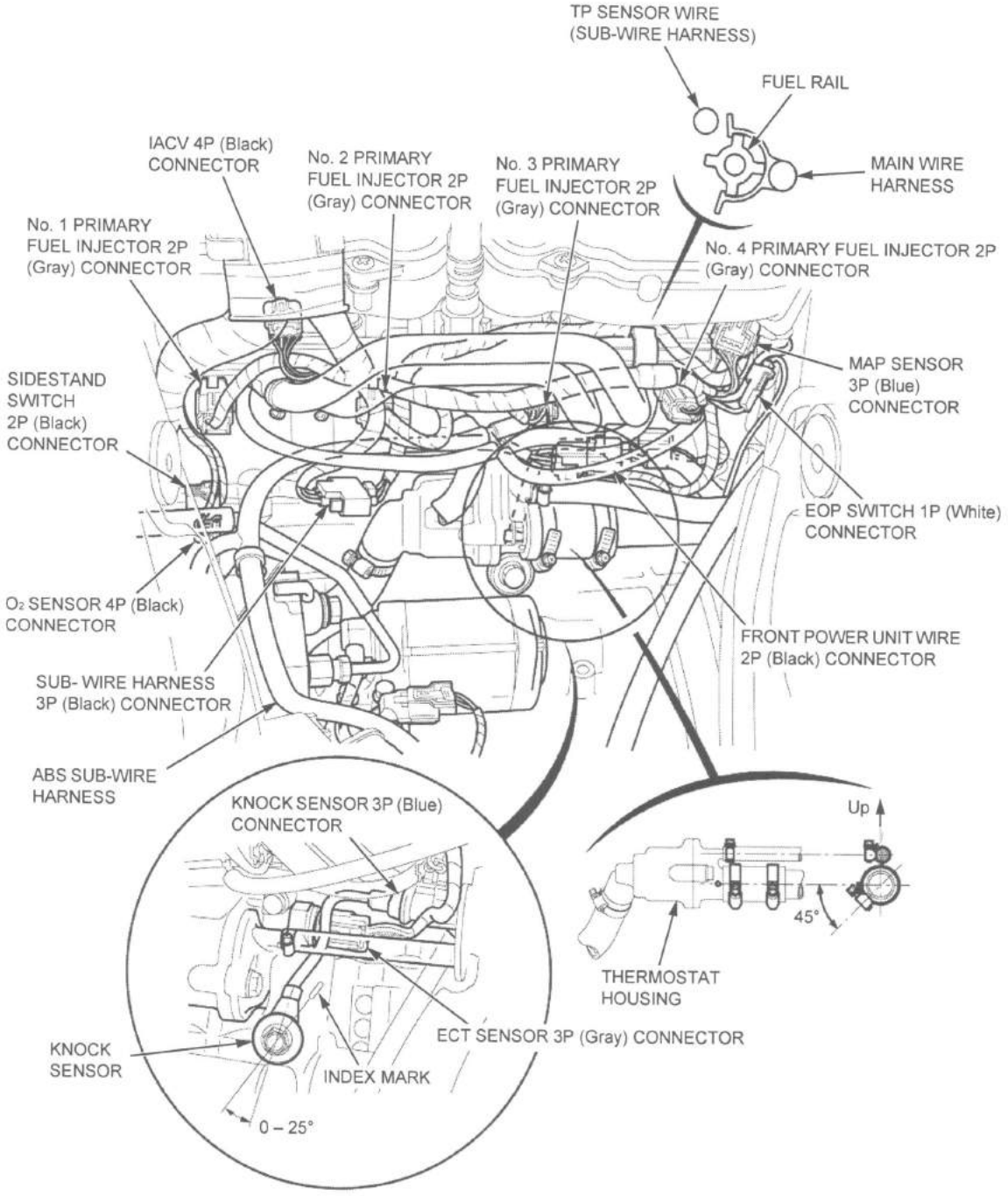
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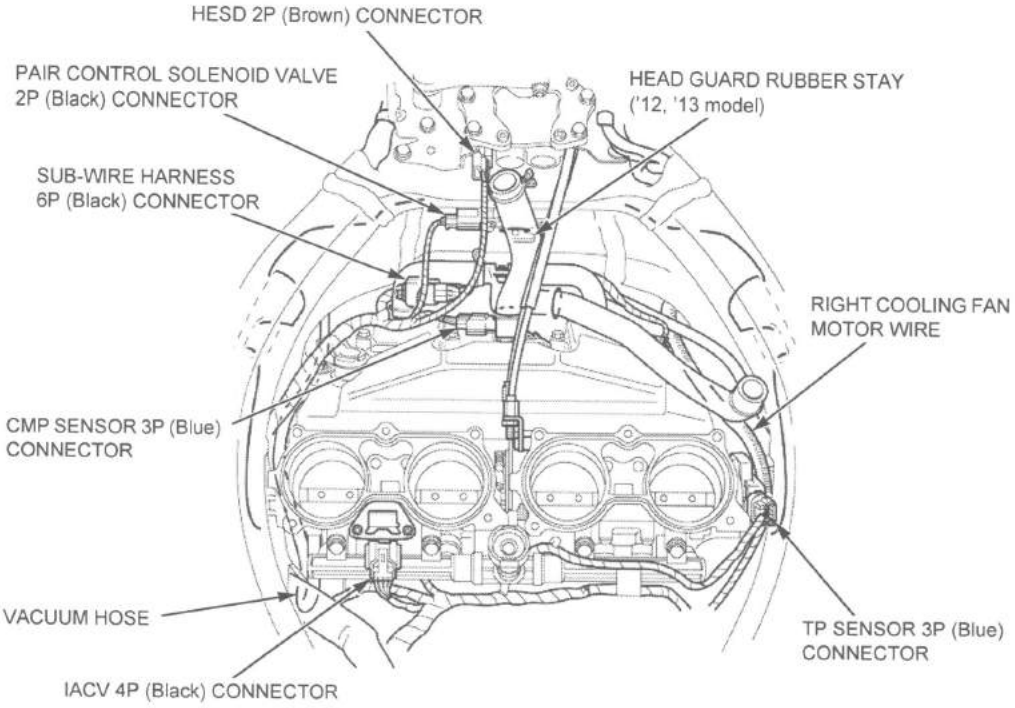
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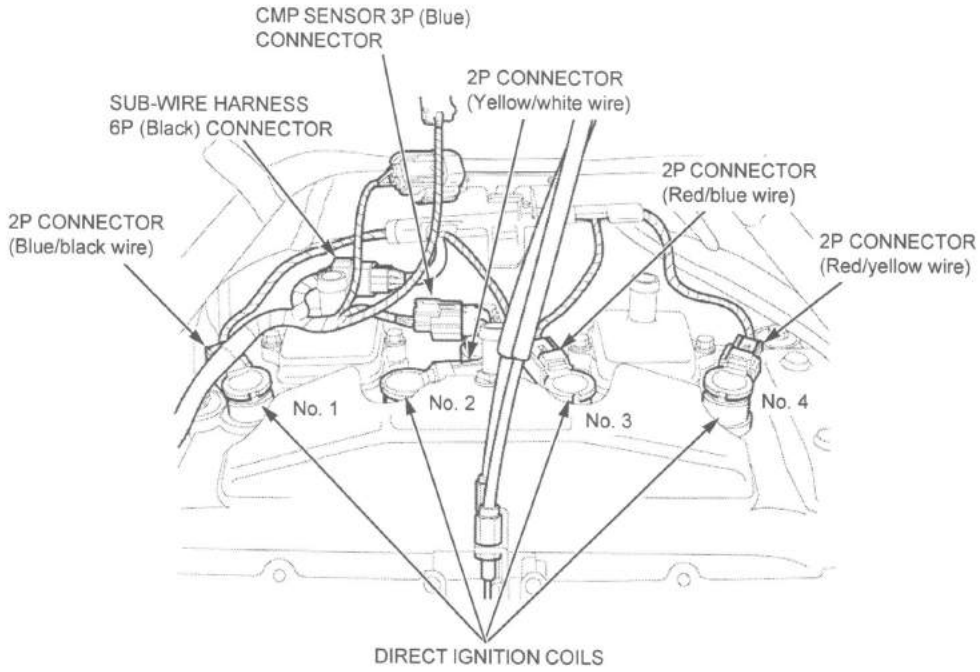


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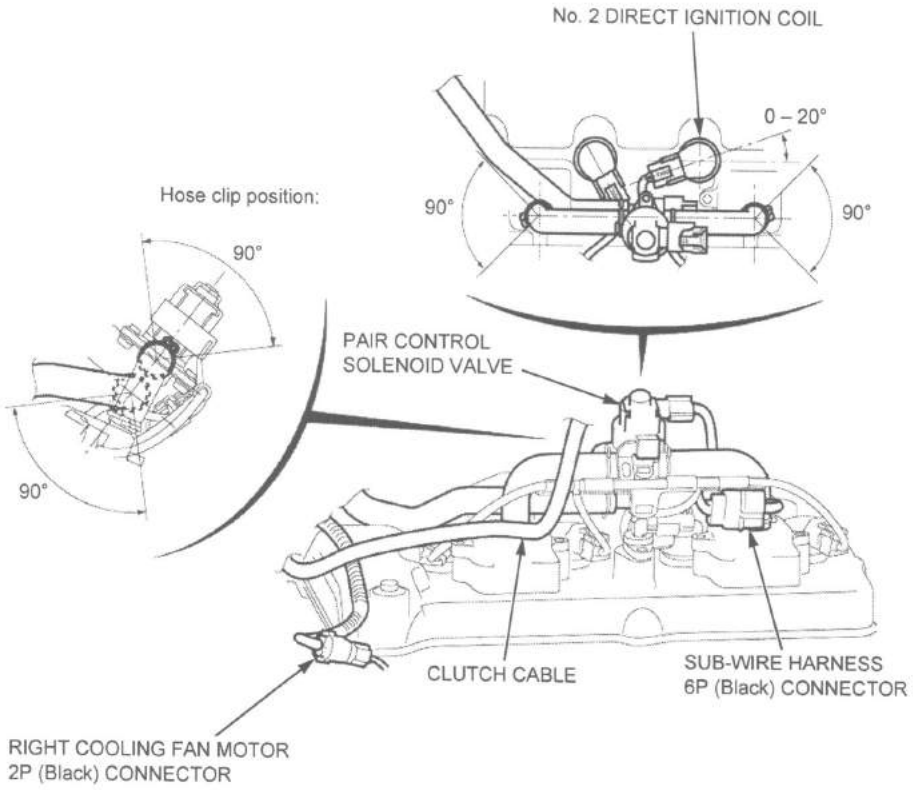


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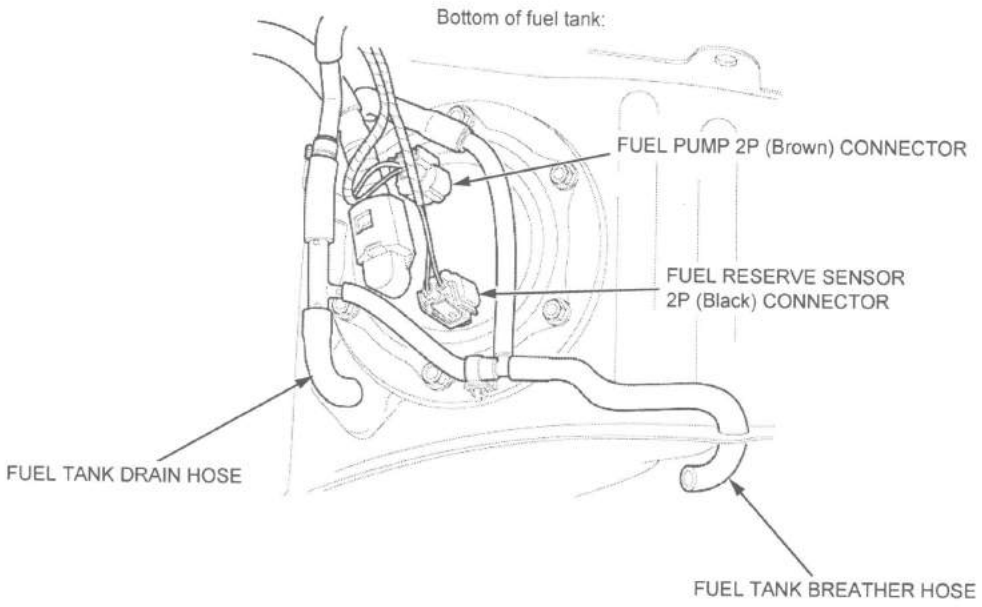


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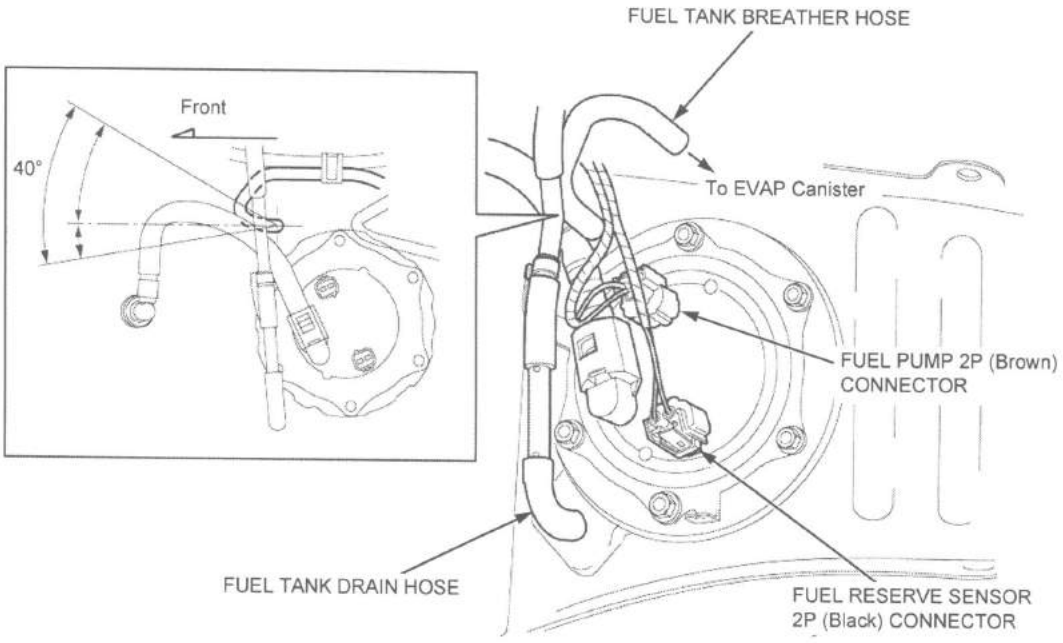


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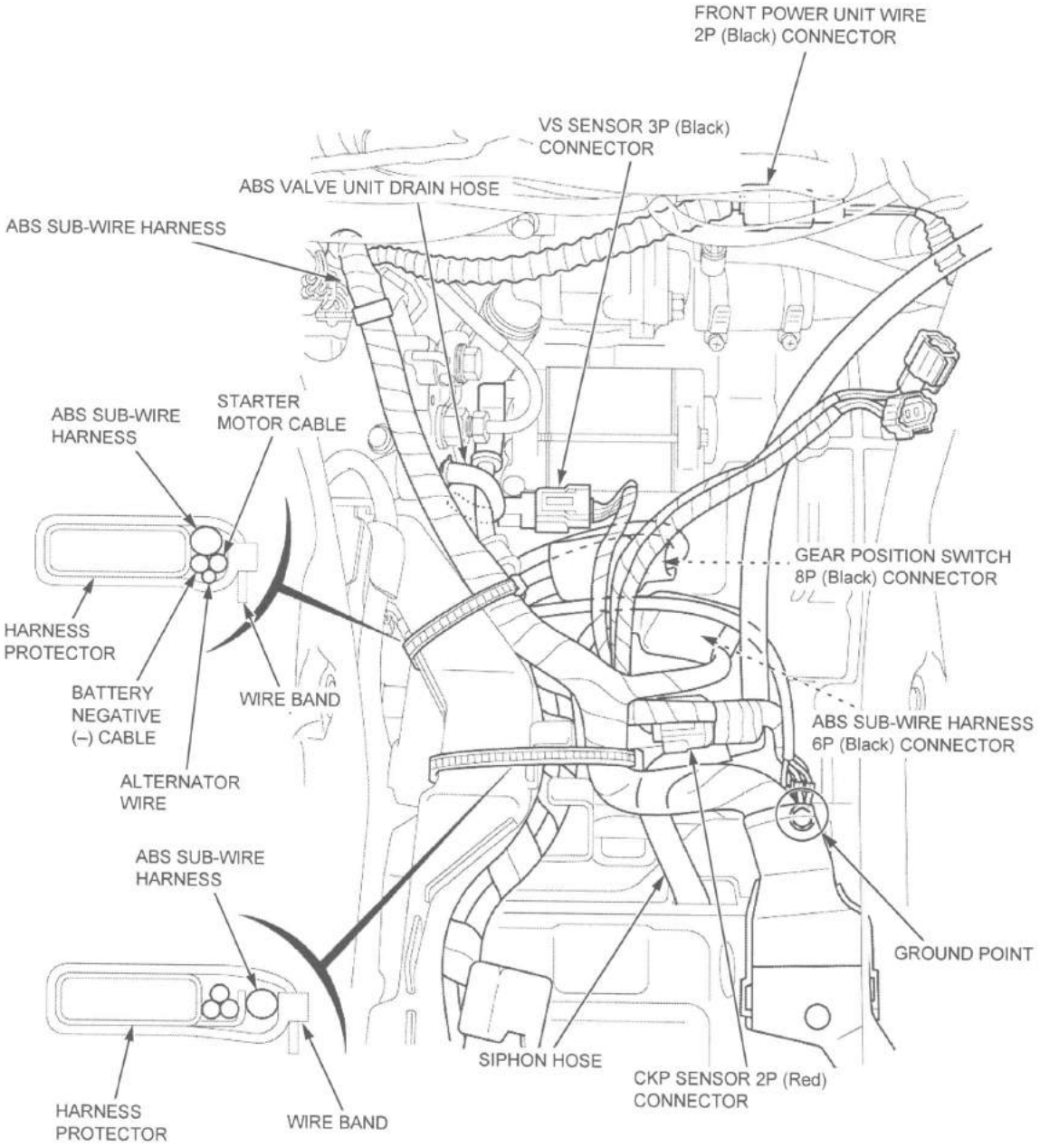
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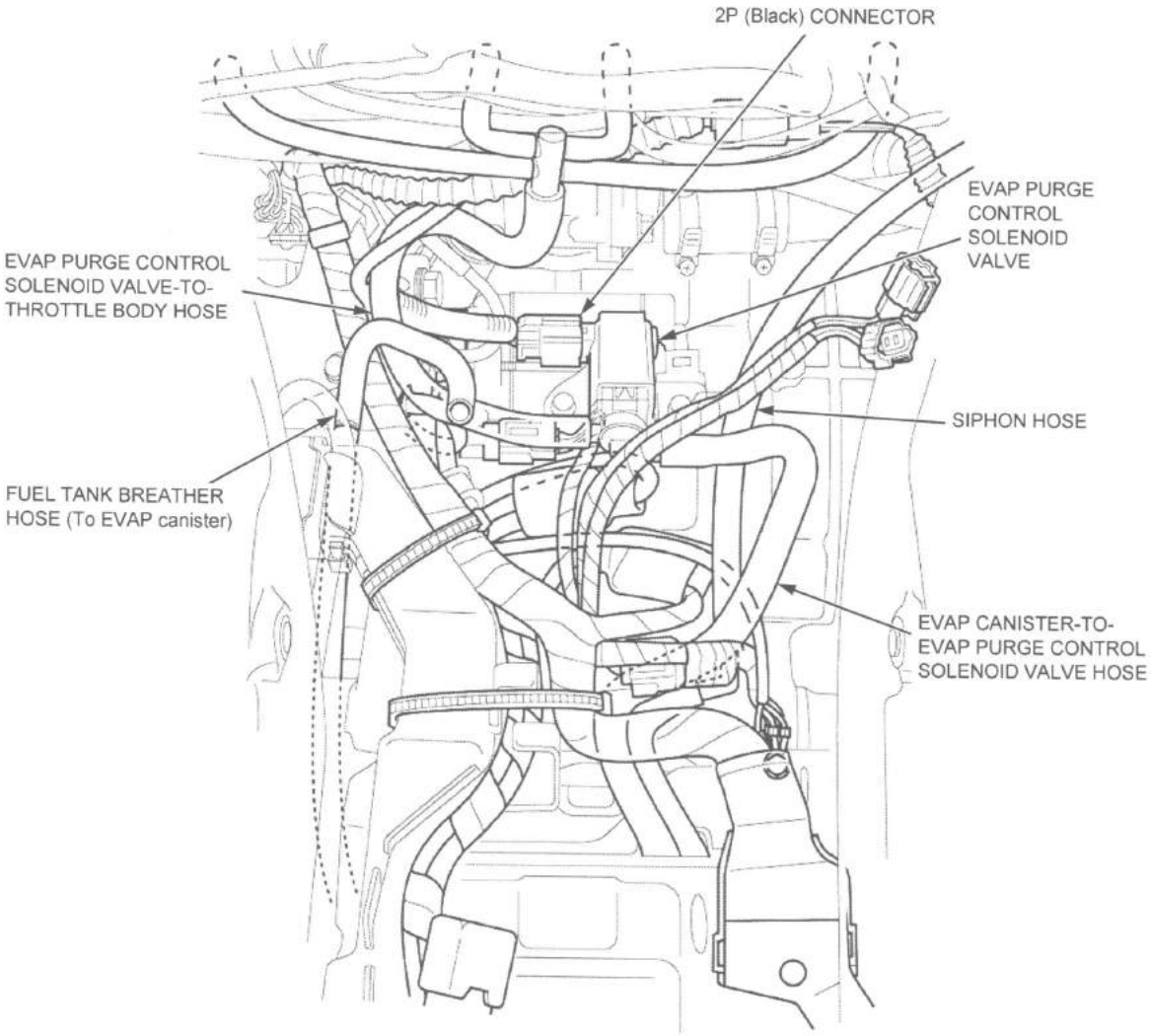


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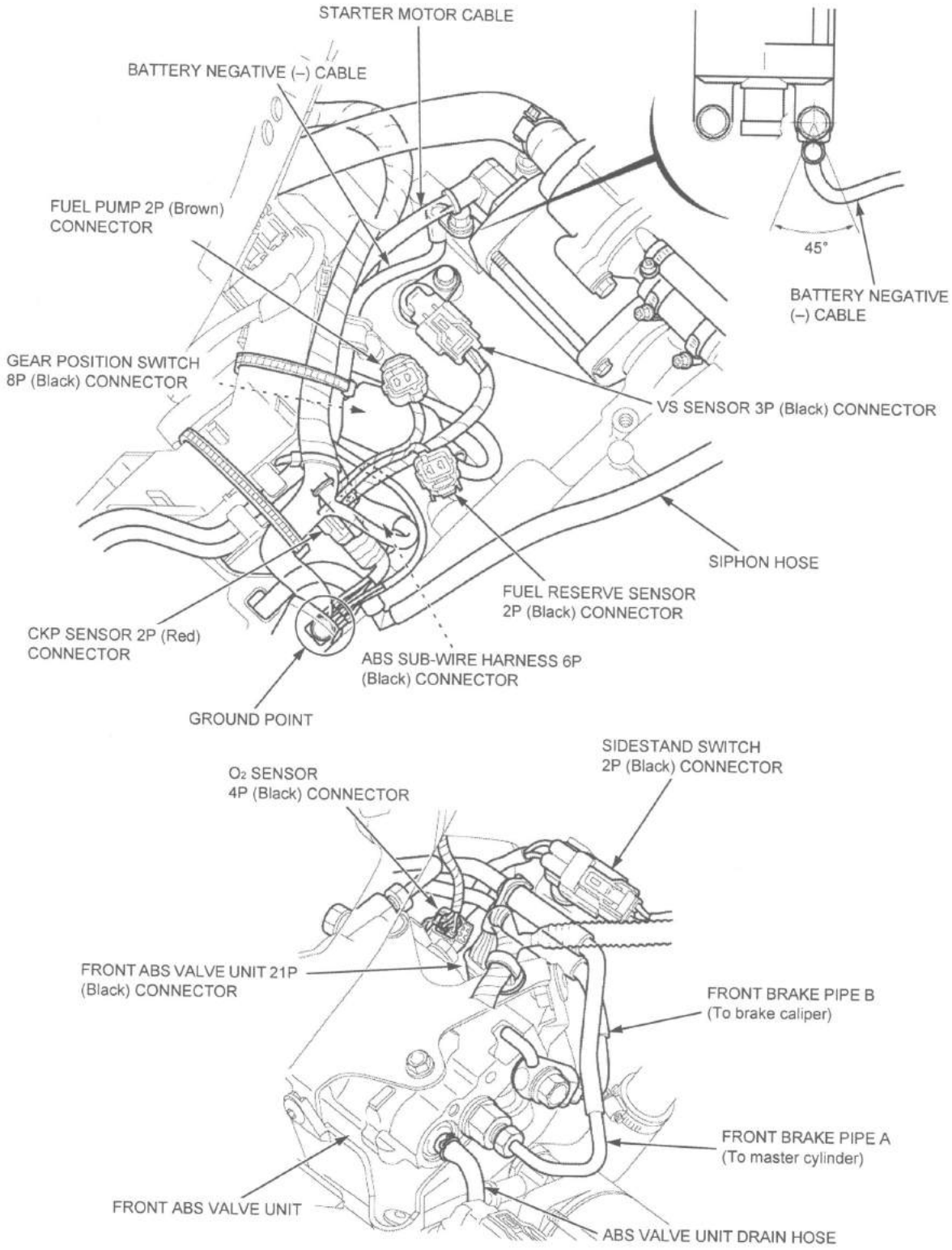


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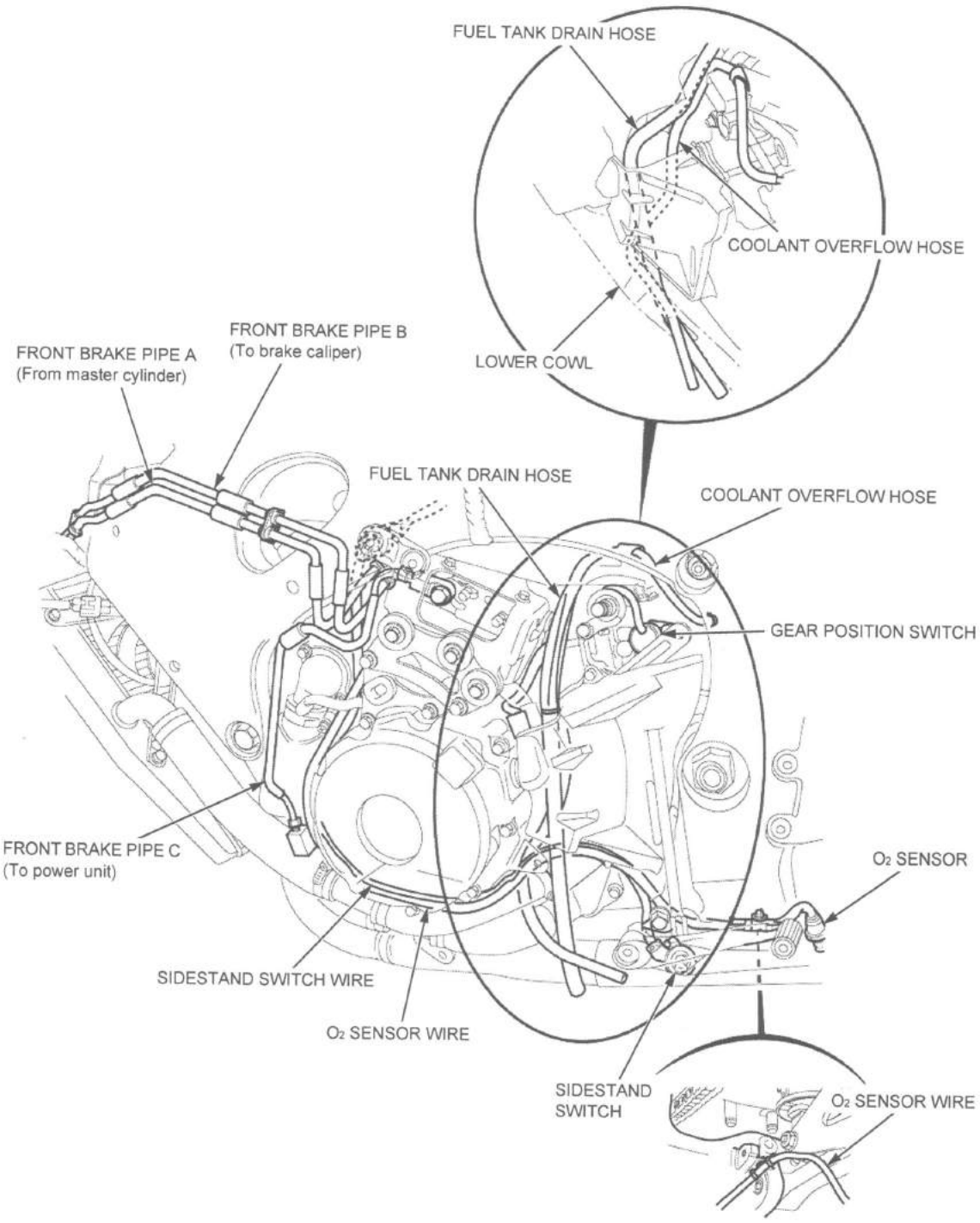
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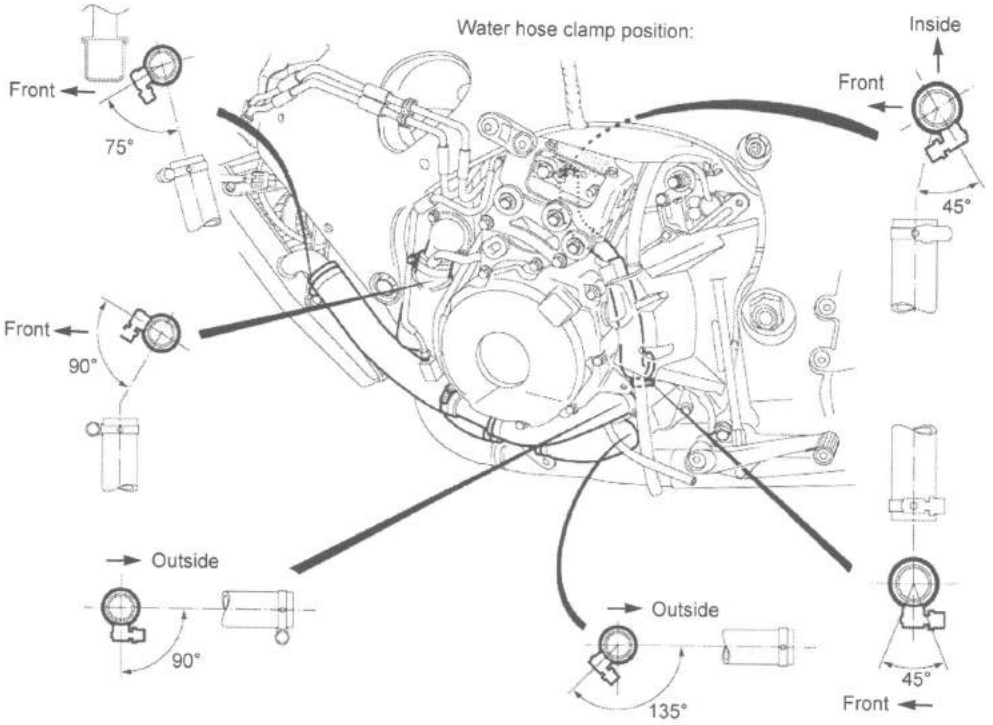


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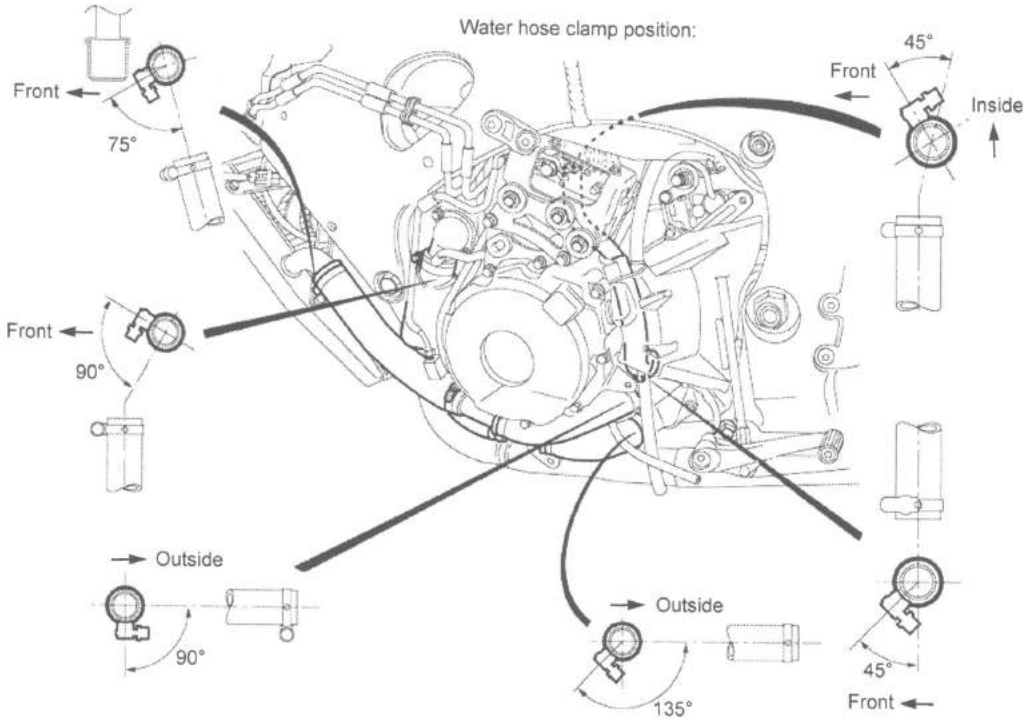


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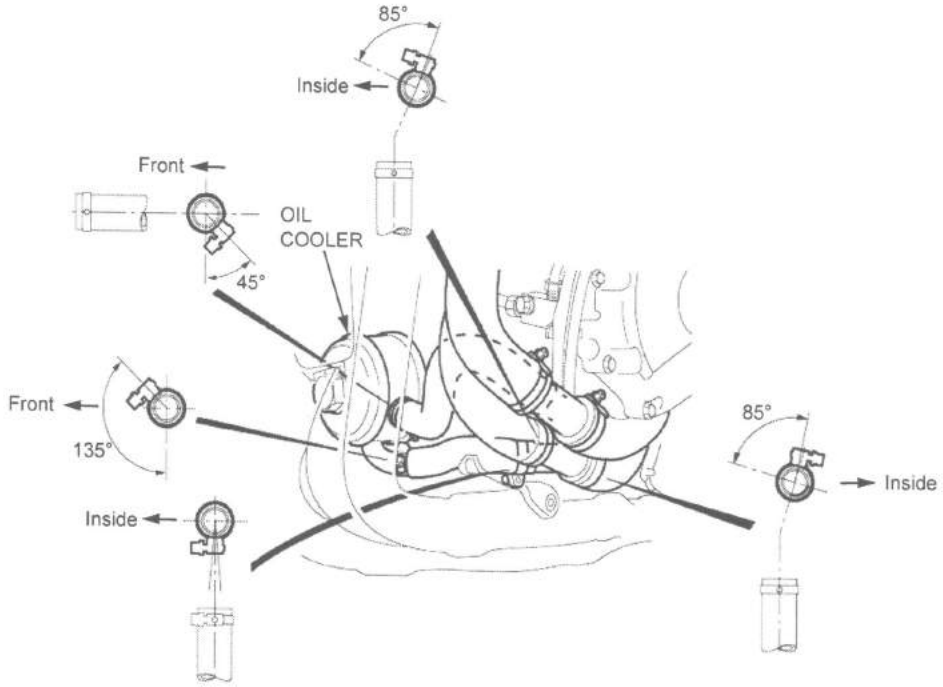
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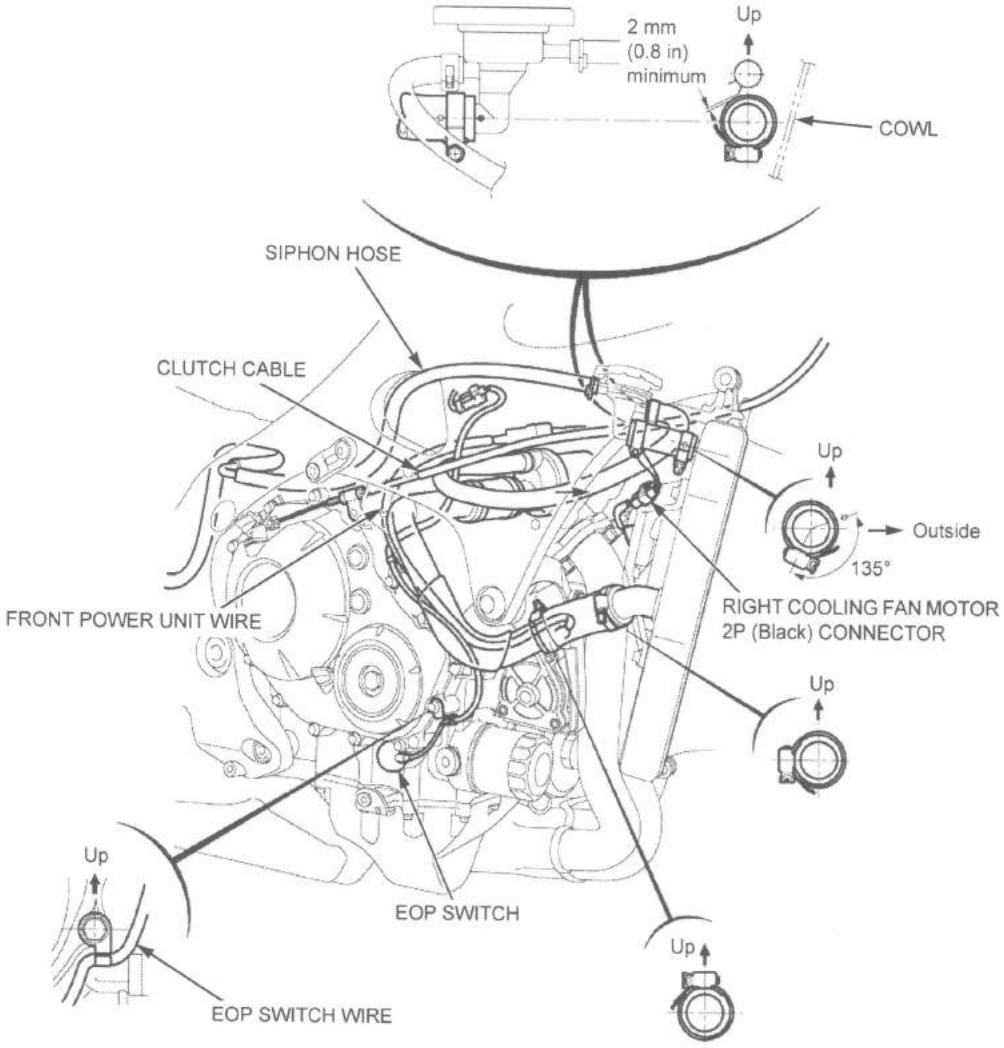
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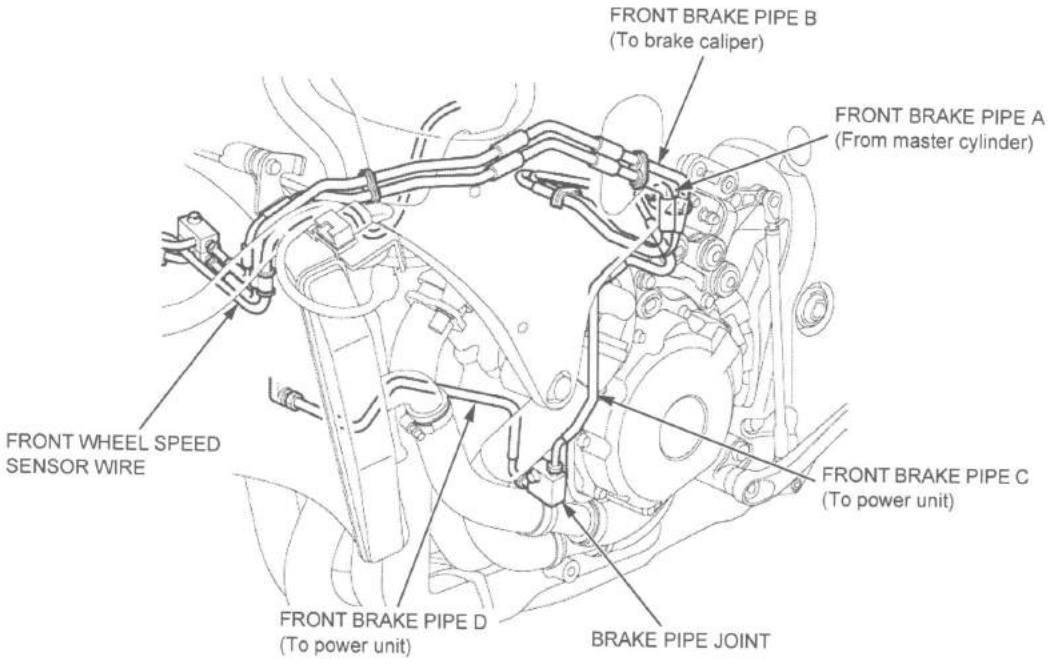
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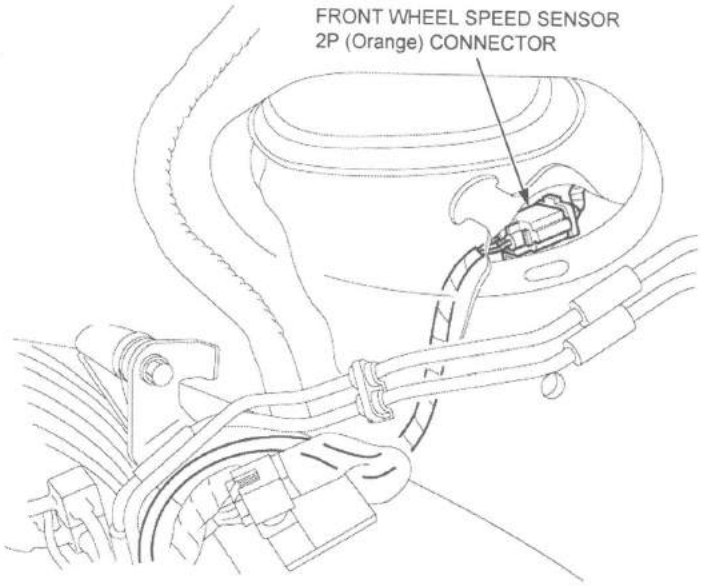


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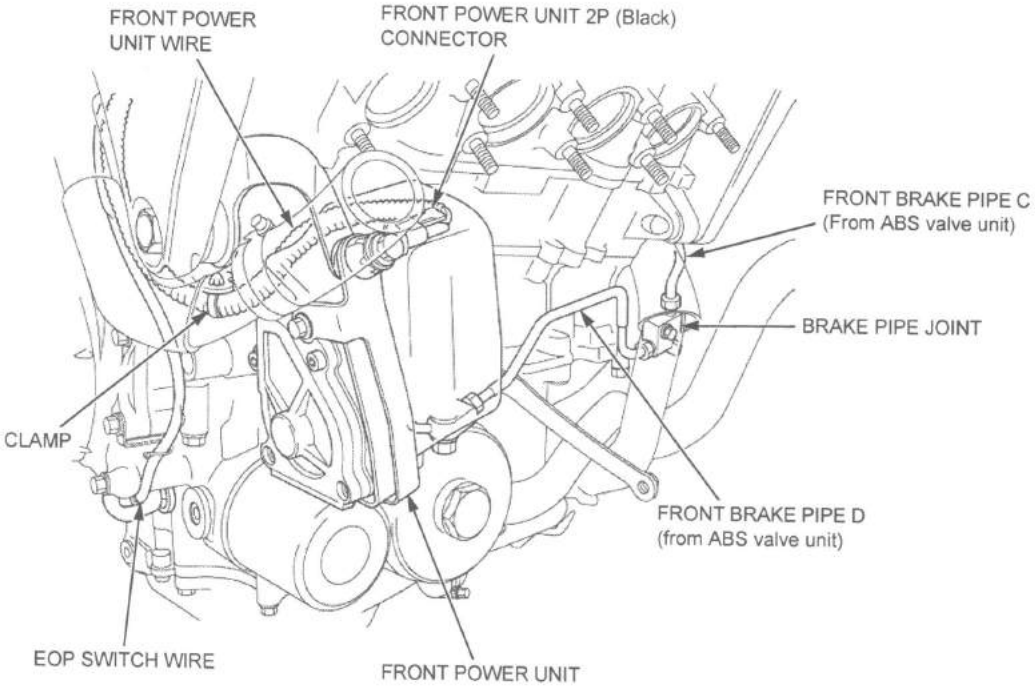


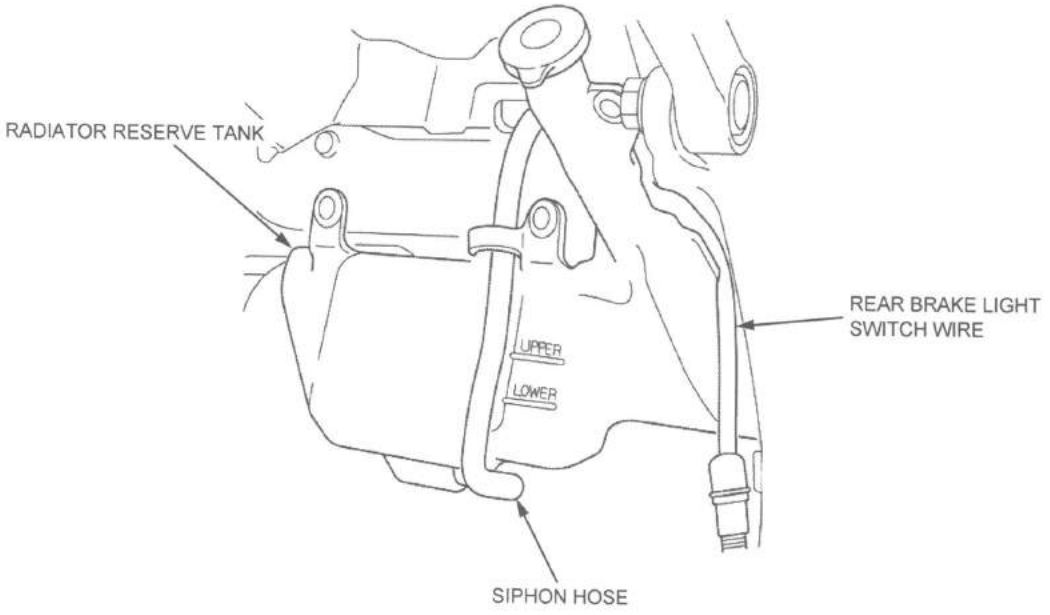
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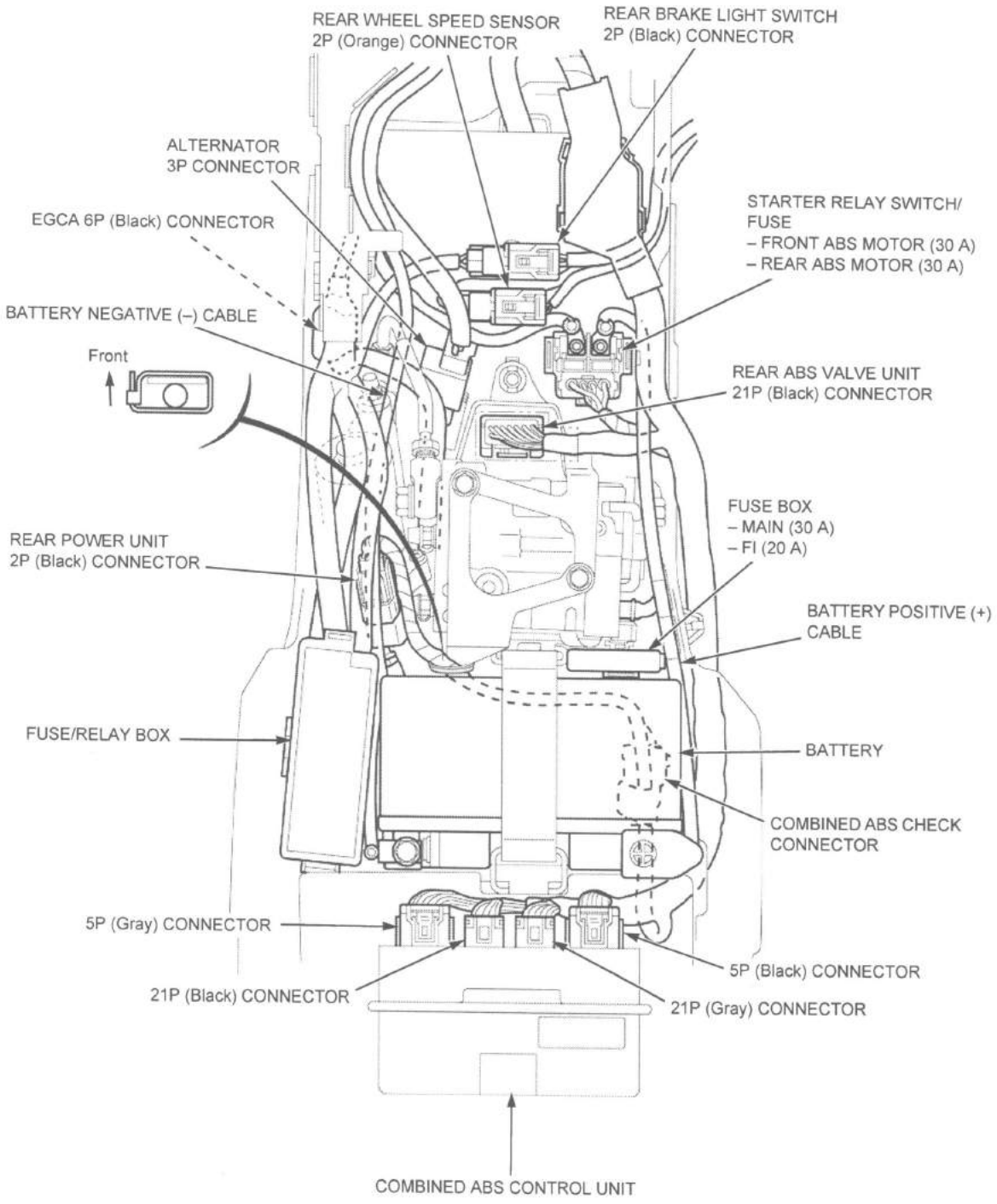


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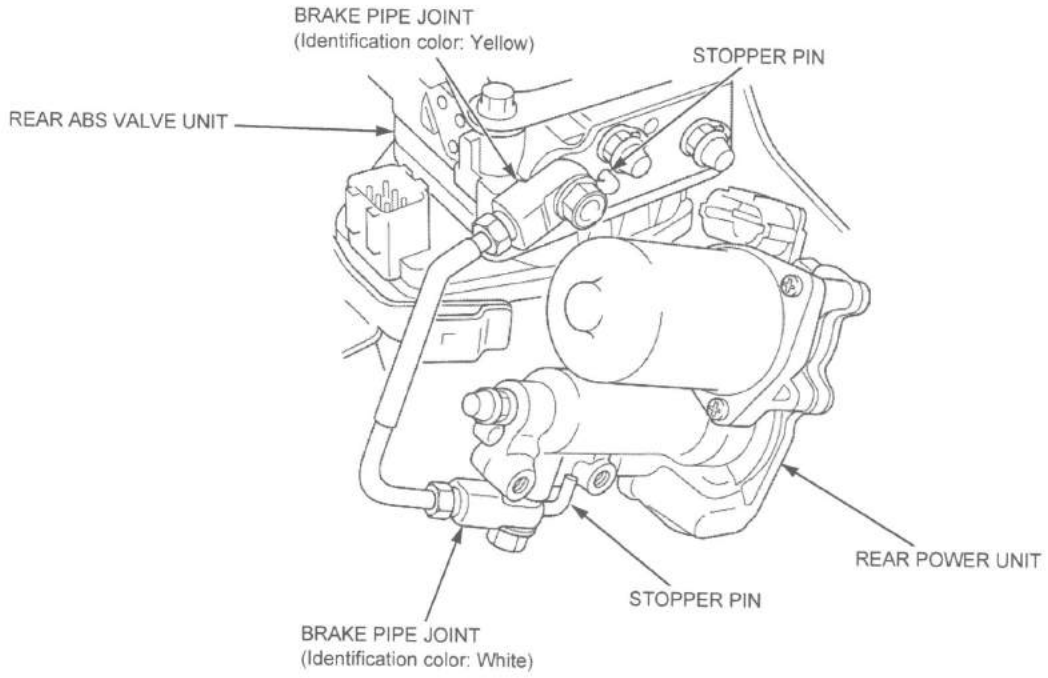


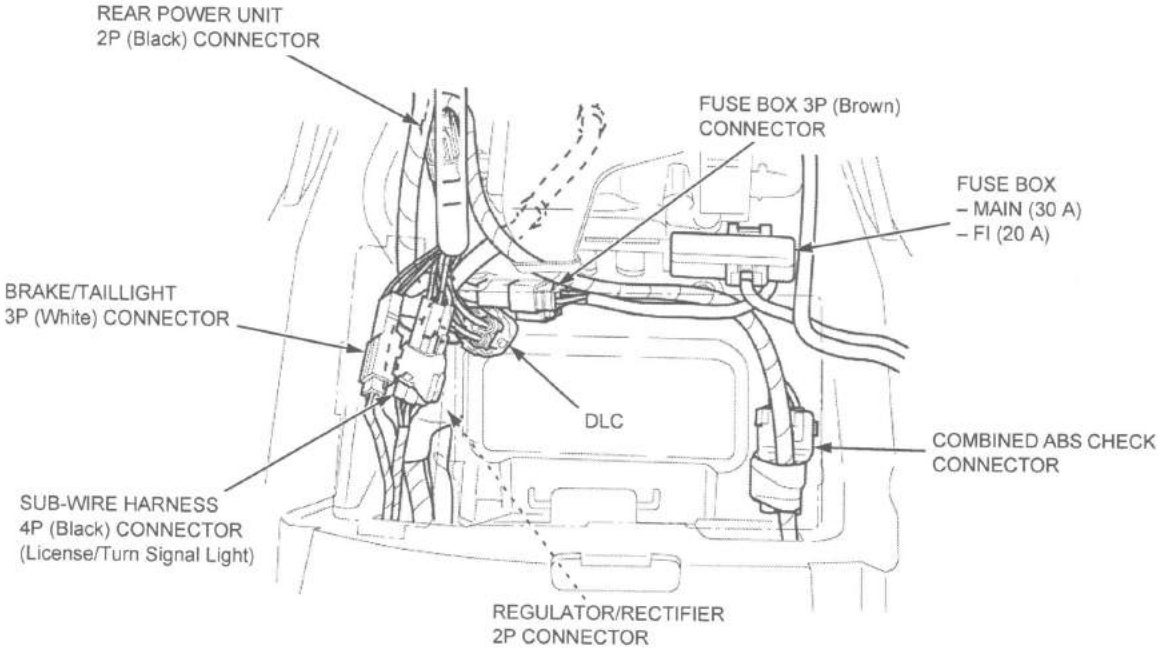


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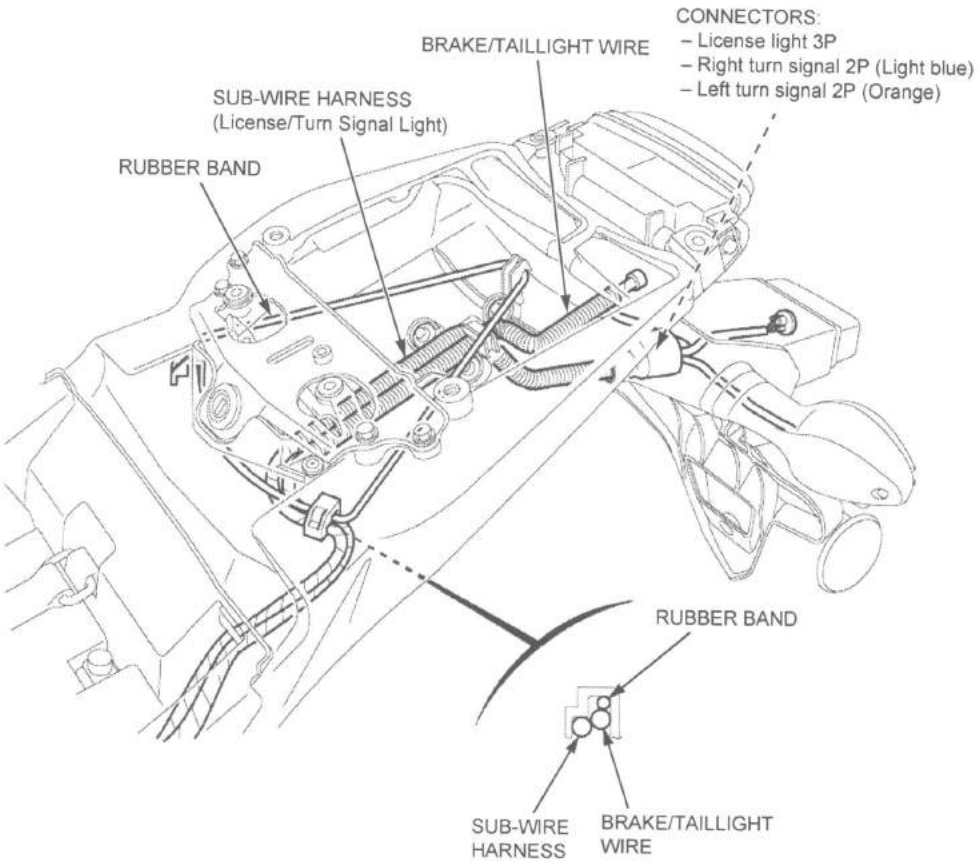


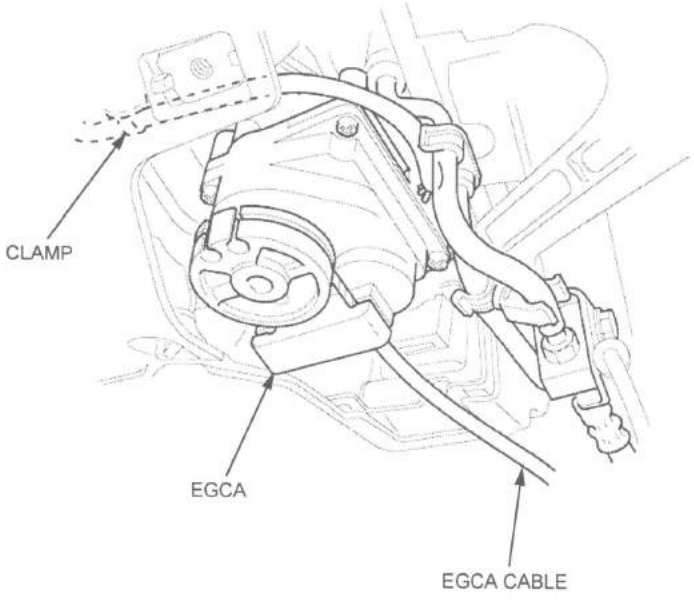
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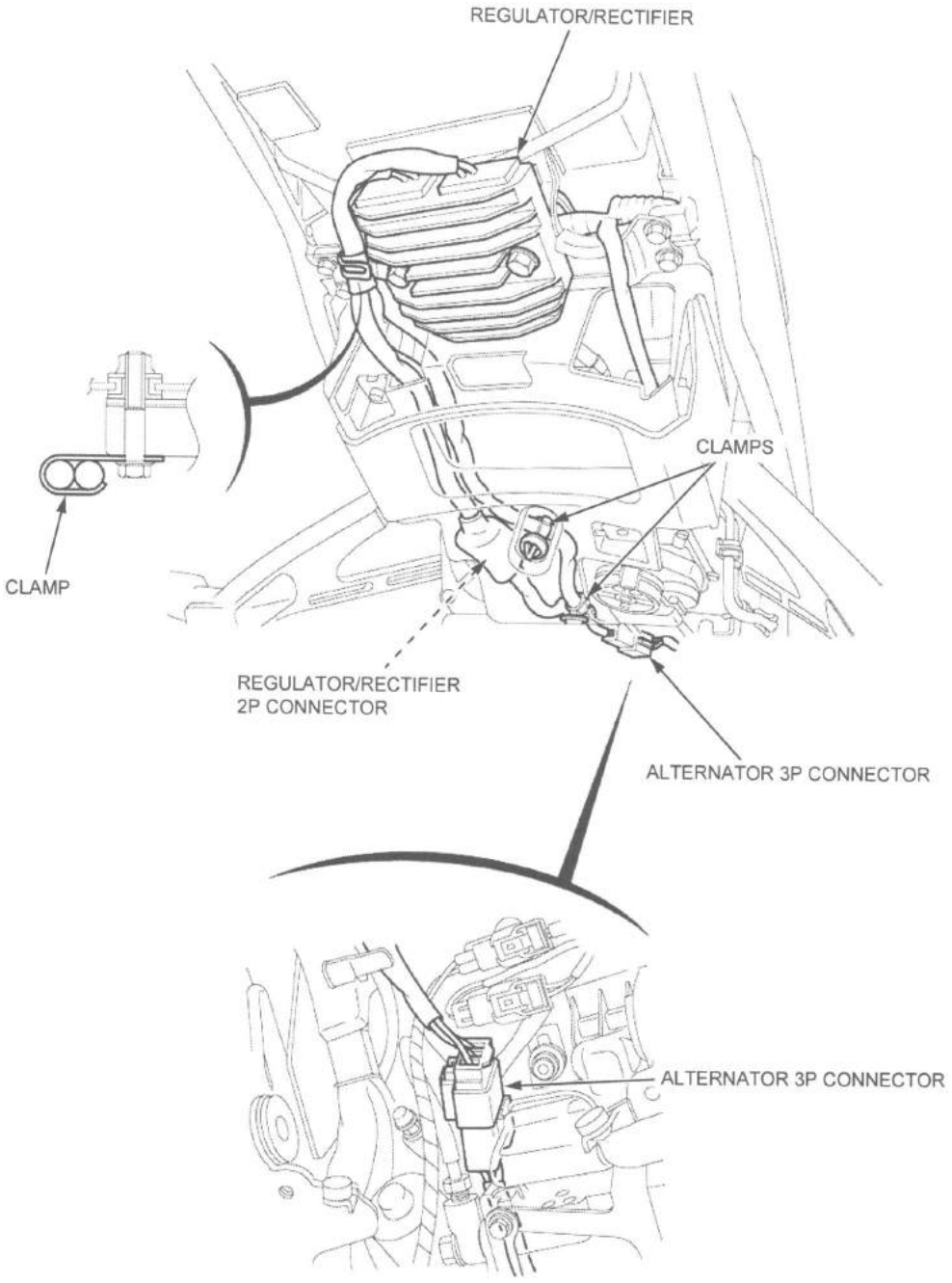


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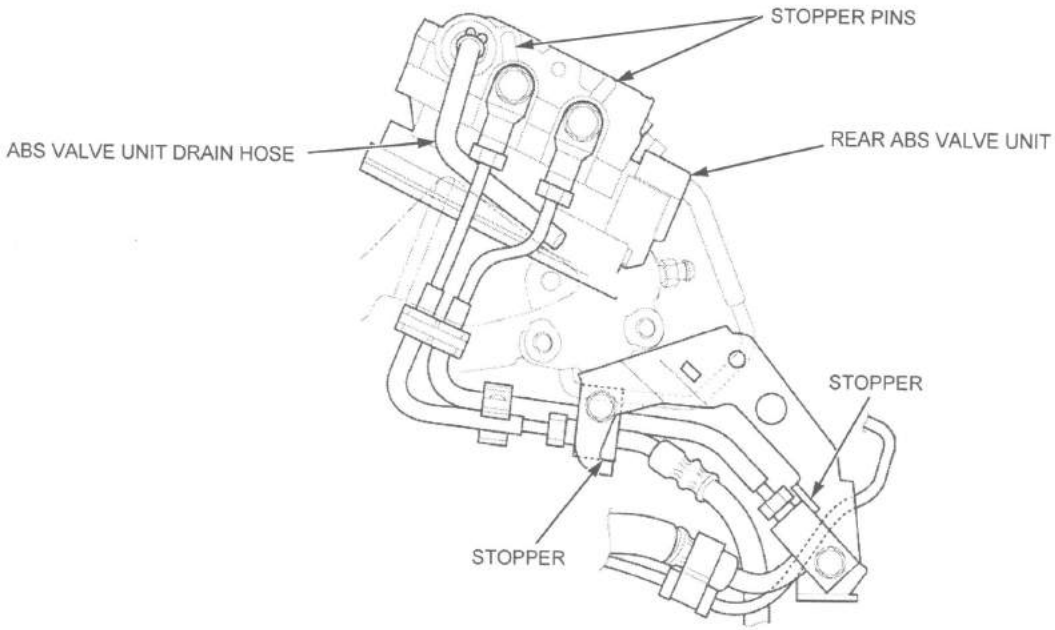


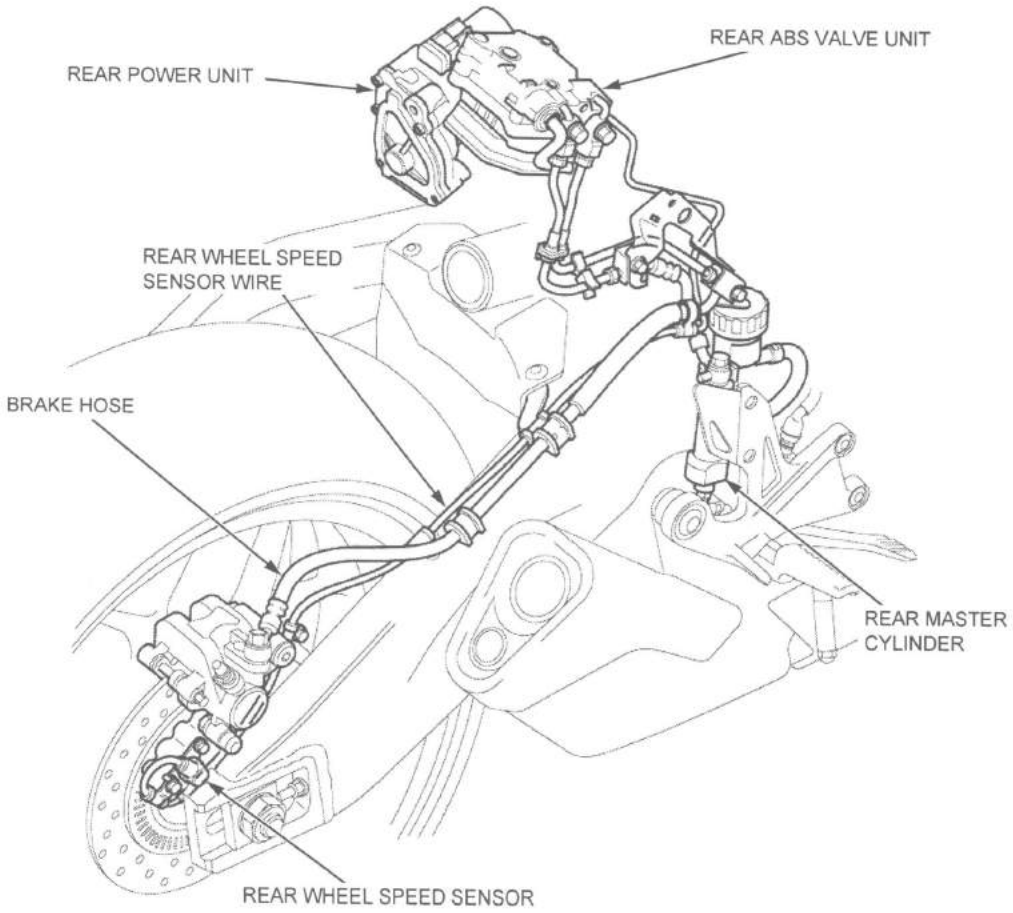


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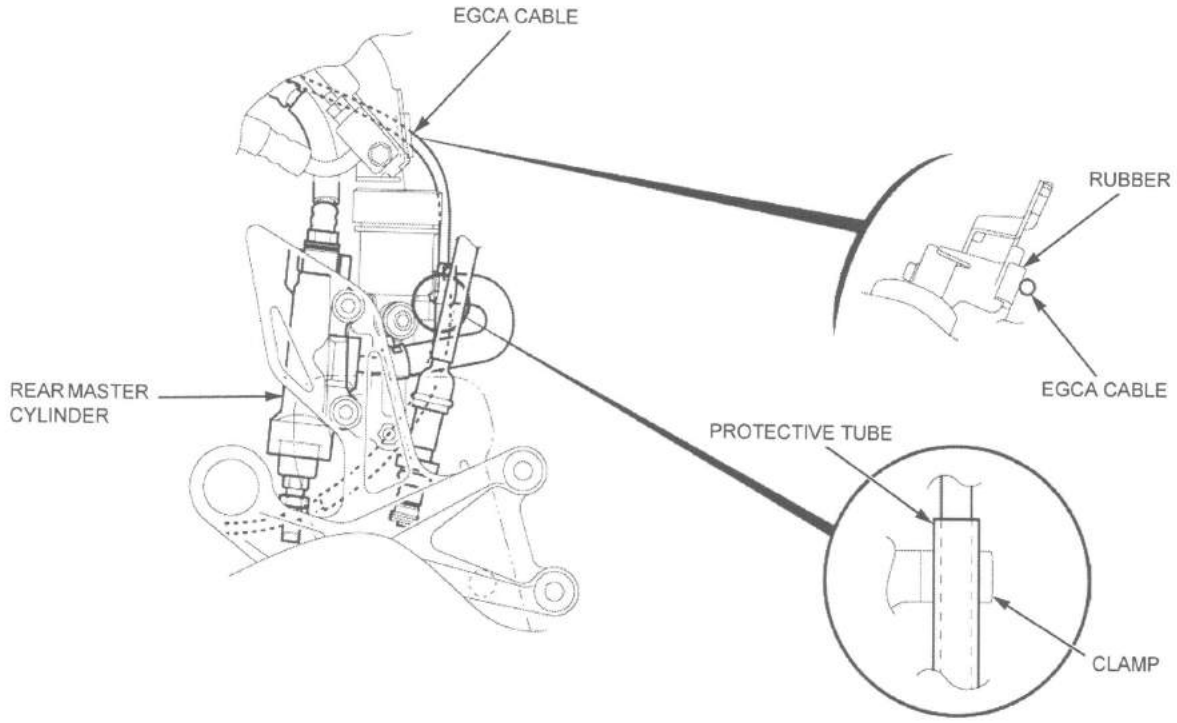


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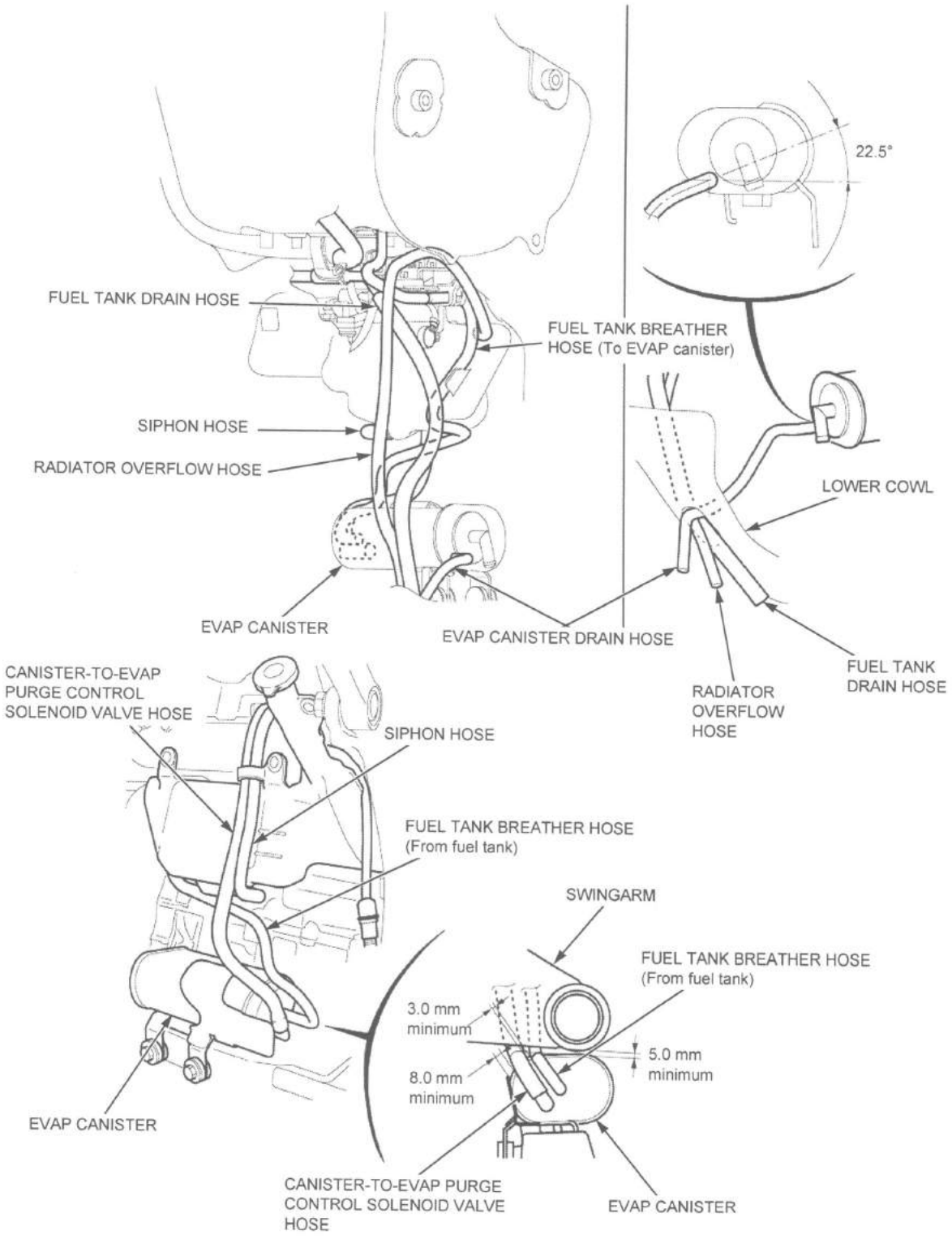


After '11 ABS type:



After '11 ABS type:

(AC) type:



EMISSION CONTROL SYSTEMS

EXHAUST EMISSION REQUIREMENT

The U.S. Environmental Protection Agency (EPA), California Air Resources Board (CARB) and Environment Canada require manufacturers to certify that their motorcycles comply with applicable emissions standards during their useful life, when operated and maintained according to the instructions provided.

NOISE EMISSION REQUIREMENT

The EPA also requires that motorcycles built after January 1, 1983 comply with applicable noise emission standards for one year or 3,730 miles (6,000 km) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided.

WARRANTY COMPLIANCE

Compliance with the terms of the Distributor's Limited Warranty for Honda Motorcycle Emission Control Systems is necessary in order to keep the emissions system warranty in effect.

SOURCE OF EMISSIONS

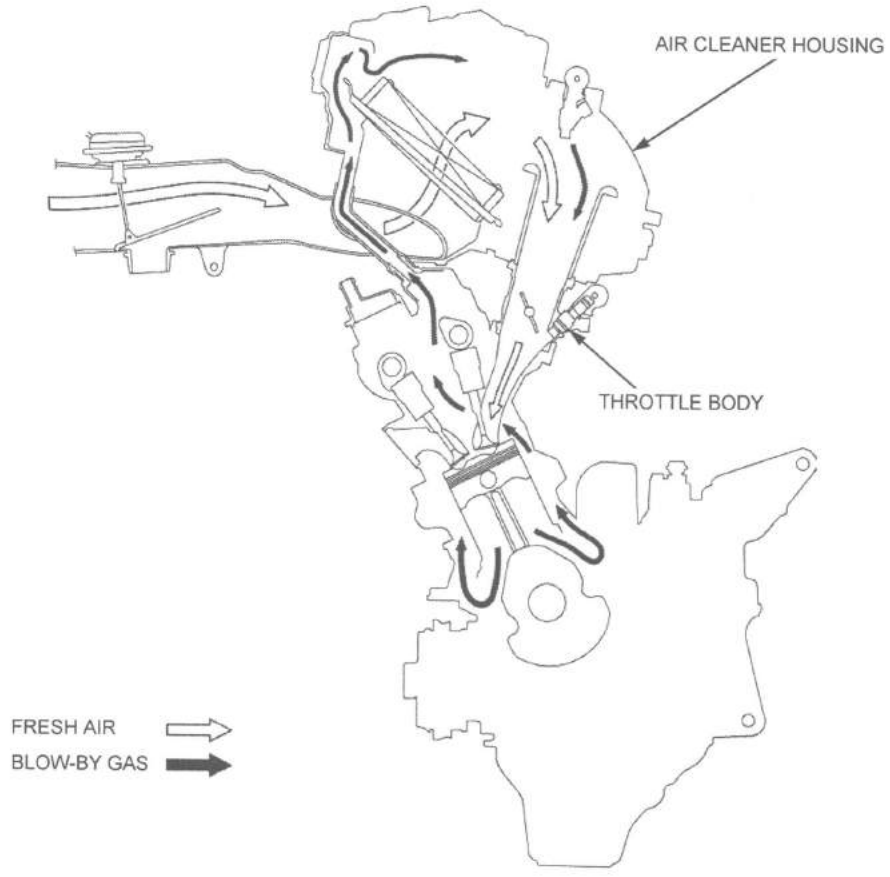
The combustion process produce emissions such as carbon monoxide (CO), oxides of nitrogen (NOx), and hydrocarbons (HC). The control of hydrocarbons and oxides of nitrogen is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic. Uncontrolled fuel evaporation also releases hydrocarbons to the atmosphere.

Honda Motor Co., Ltd. utilizes various system to reduce carbon monoxide, oxides of nitrogen, and hydrocarbons.

CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere.

Blow-by gas is returned to the combustion chamber through the air cleaner housing and throttle body.



EXHAUST EMISSION CONTROL SYSTEM

The exhaust emission control system is composed of a pulse secondary air supply system, a three-way catalytic converter, and PGM-FI system.

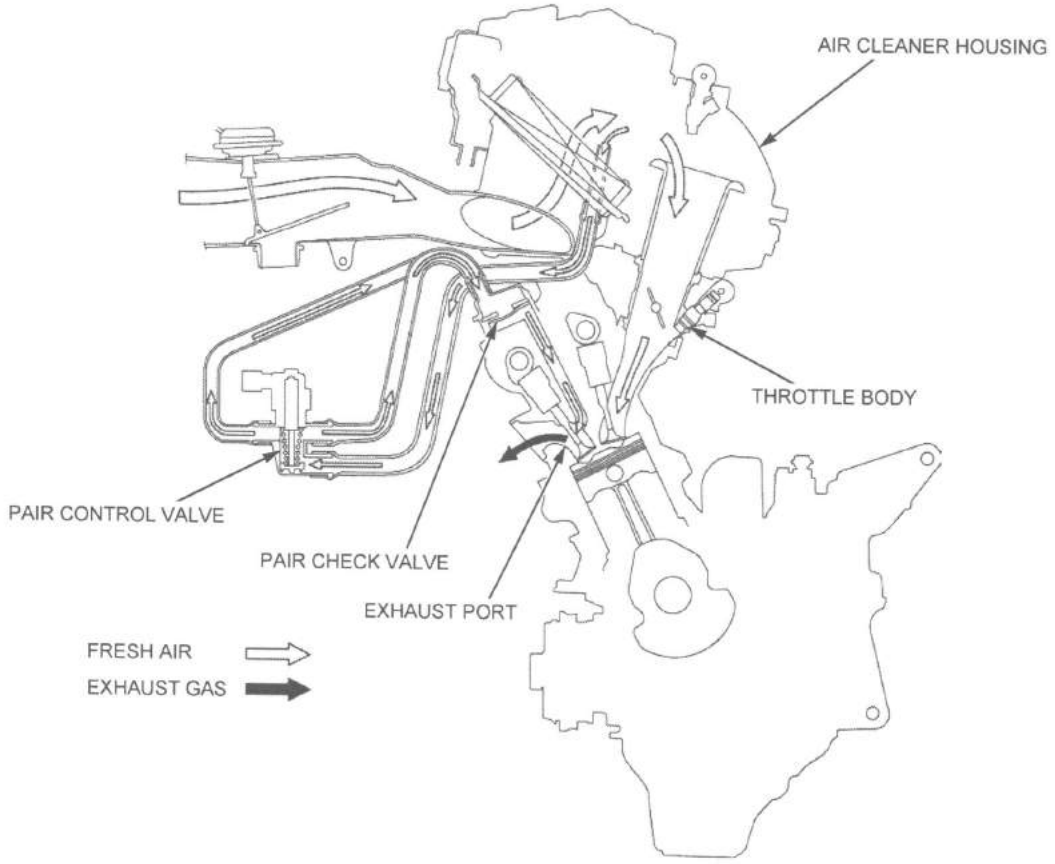
SECONDARY AIR SUPPLY SYSTEM

The pulse secondary air supply system introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port by the function of the PAIR control valve.

This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

The reed valve prevents reverse air flow through the system. The PAIR control valve is operated by the solenoid valve. The solenoid valve is controlled by the PGM-FI unit, and the fresh air passage is opened/closed according to running conditions (ECT/ IAT/TP/MAP sensor and engine revolution).

No adjustments to the secondary air supply system should be made, although periodic inspection of the components is recommended.



3-WAY CATALYTIC CONVERTER

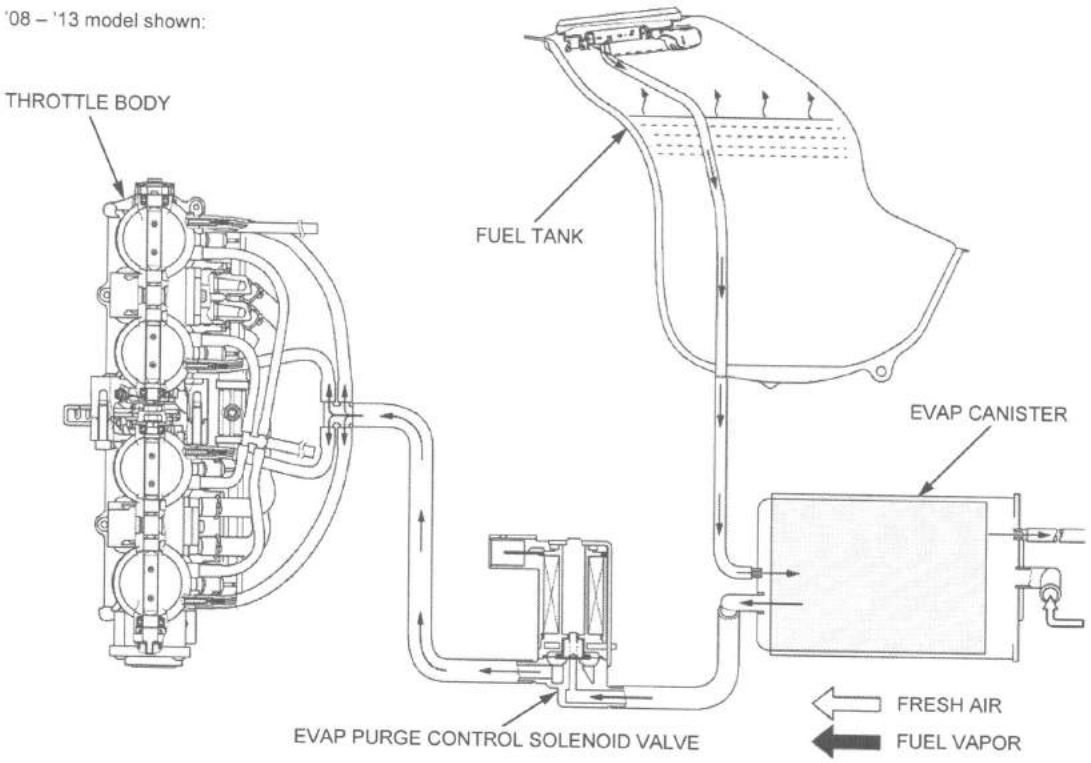
This motorcycle is equipped with a 3-way catalytic converter.

The 3-way catalytic converter is in the exhaust system. Through chemical reactions, it converts HC and CO in the engine's exhaust to carbon dioxide (CO_2) and water vapor.

EVAPORATIVE EMISSION CONTROL SYSTEM ((AC) TYPE)

This model complies with California Air Resources Board (CARB) evaporative emission requirement. Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is absorbed and stored while the engine is stopped. When the engine is running and the evaporative emission (EVAP) purge control solenoid valve is open, fuel vapor in the EVAP canister is drawn into the engine through the throttle body.

'08 – '13 model shown:



NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: U.S. Federal law prohibits, and Canadian provincial law may prohibit, the following acts or the causing there of: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any vehicle for the purpose of noise control prior to its sale or delivery to the ultimate customer or while it is in use; (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

1. Removal of, or puncturing of the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Removing or disabling any emissions compliance component, or replacing any compliance component with a non-compliant component.

FUEL PERMEATION EMISSION CONTROL SYSTEM

This motorcycle complies with the Fuel Permeation Emission Control regulations of the U.S. Environmental Protection Agency (EPA), California Air Resources Board (CARB), and Environment Canada (EC). The fuel tank, fuel hoses, and fuel vapor charge hoses used on this motorcycle incorporate fuel permeation control technologies. Tampering with the fuel tank, fuel hoses, or fuel vapor charge hoses to reduce or defeat the effectiveness of the fuel permeation technologies is prohibited by federal regulations.

2. TECHNICAL FEATURES

EXHAUST SYSTEM 2-2

CMP SENSOR 2-5

FAN MOTOR CONTROL SYSTEM 2-6

CLUTCH SYSTEM 2-7

COMBINED ABS
(Anti-lock Brake System) 2-13

FUEL FILL CAP BREATHER
(After '13 model) 2-20

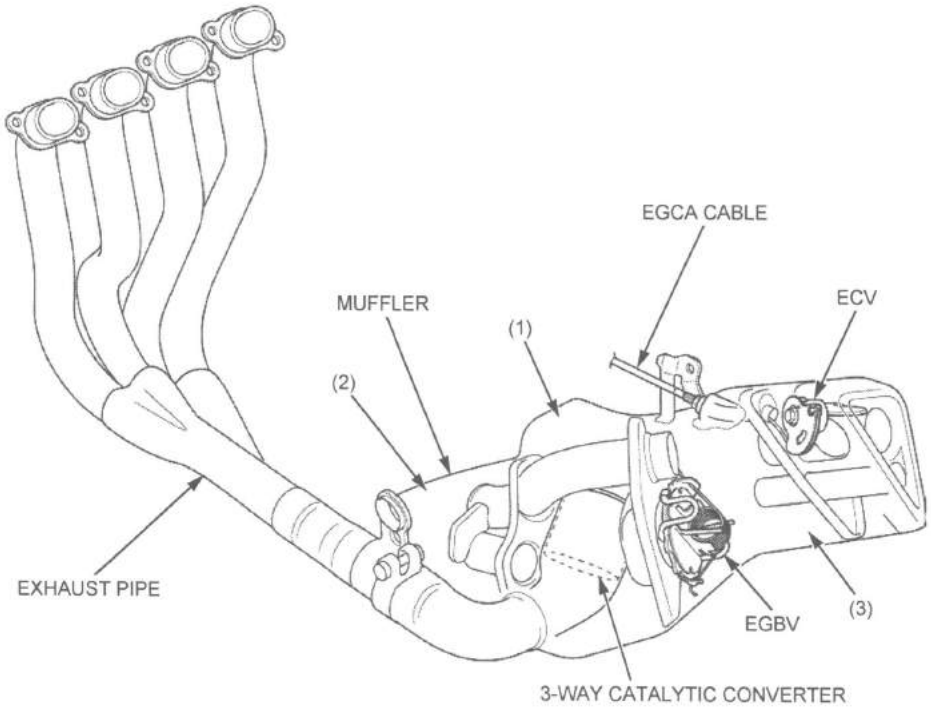
EXHAUST SYSTEM

SUMMARY

This motorcycle is equipped with ECV and EGBV that provide high performance and improved driveability.

Each component of exhaust system is located as follows:

- EXHAUST PIPE
- MUFFLER
  - The muffler is segmented into three chambers, (1), (2) and (3).
  - The 3-way catalytic converter is located in chamber (1).
  - The EGBV is located between chambers (1) and (3).
  - The ECV is located in chamber (3).



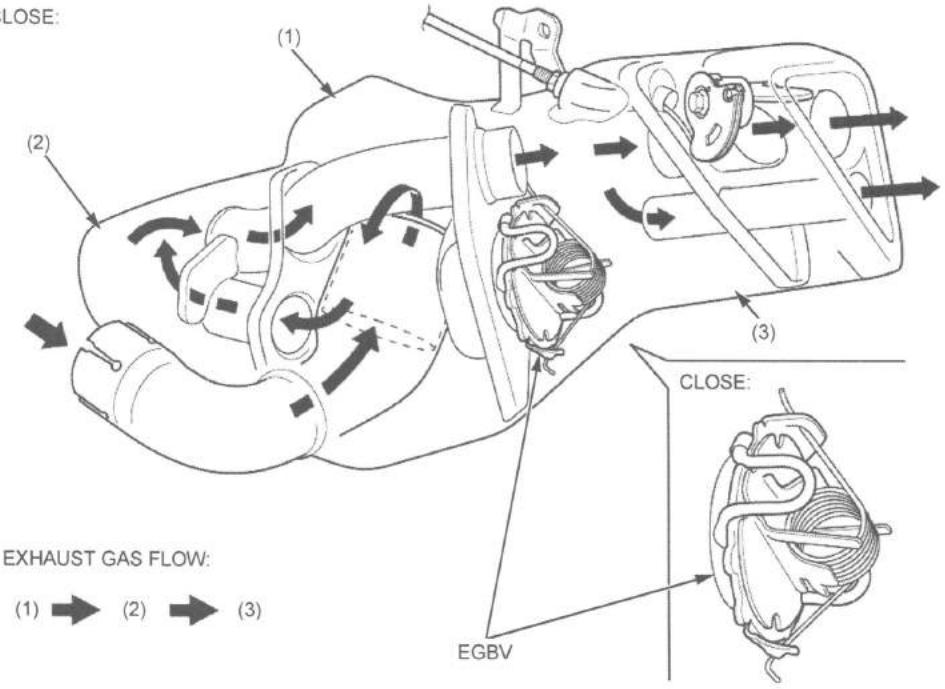
EGBV (Exhaust Gas Bypass Valve)

The EGBV is located between chambers (1) and (3) in the muffler as shown.

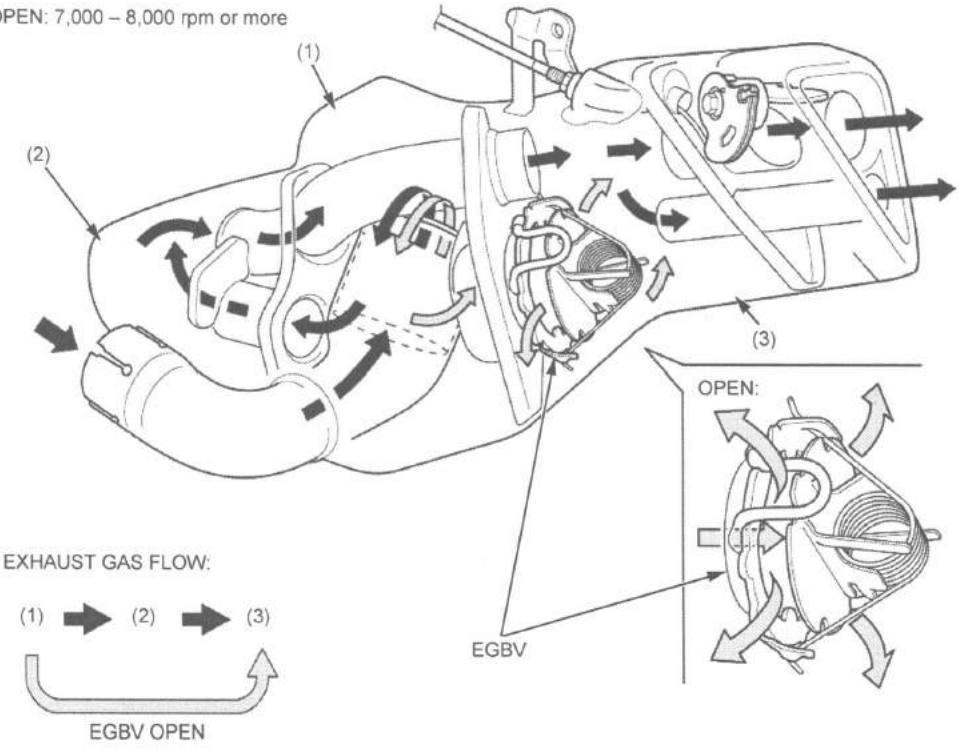
This system consists of the bypass valve and spring.

The EGBV operates with the differential pressure for exhaust gas between chamber (1) and (3) when the engine rpm is in 7,000 – 8,000 rpm or more.

EGBV CLOSE:



EGBV OPEN: 7,000 – 8,000 rpm or more



ECV (Exhaust Control Valve)

This system consists of the ECV, EGCA and a single cable.

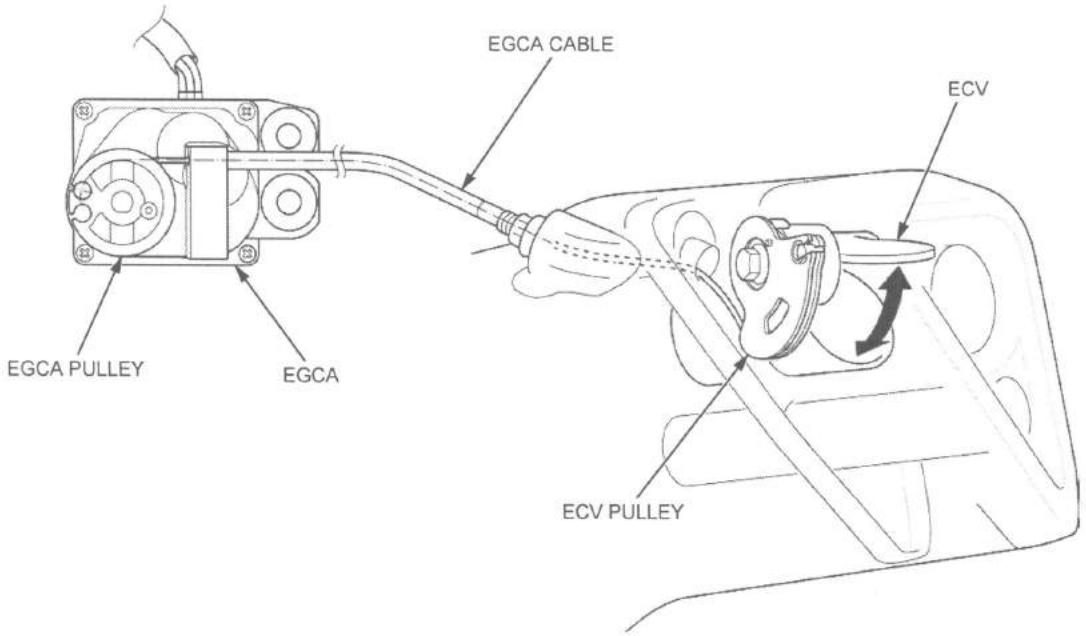
The ECV locates in the end of the muffler tail, and controls the exhaust gas outflow to close the tail pipe.

The ECV is controlled by the EGCA through the cable.

The ECM sends a signal to control the EGCA when the engine rpm is 3,000 – 6,000 rpm.

NOTE:

- It is necessary to inspect the ECV condition and cable adjustment in accordance with the maintenance schedule (page 4-4).
- The ECV and pulley can not be disassembled.



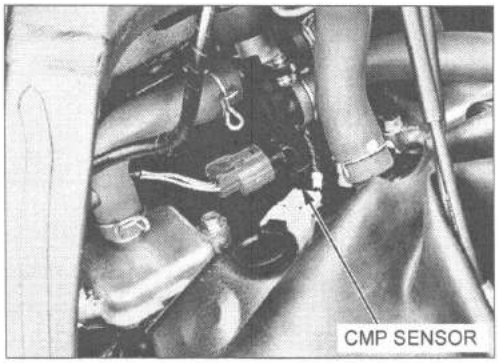
CMP SENSOR

SUMMARY

The CMP sensor is located on the center of the cylinder head cover and detects the position of the camshaft.

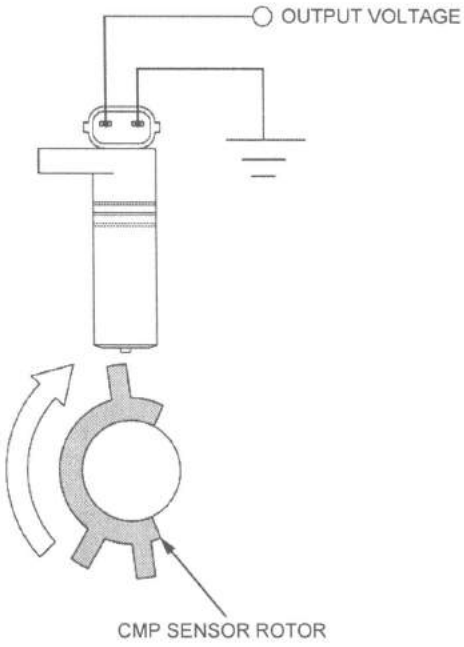
The pick up type CMP sensor comprises a permanent magnet and a coil, and changes in the output voltage are in proportion to the rotational speed of the camshaft.

The HALL IC type CMP sensor used on this motorcycle comprises a permanent magnet, a HALL element, and the input voltage that is supplied. The output voltage is not proportional to the rotational speed of the camshaft but is constant.
The detection range of this type of CMP sensor is much wider than the pick up type.



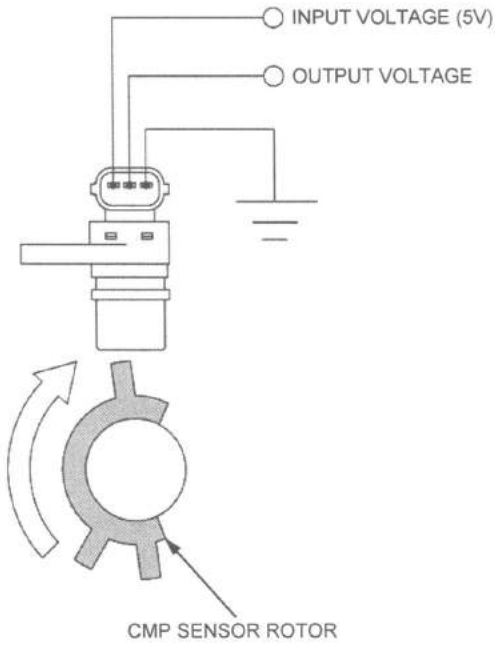
Pick up type CMP sensor:

The output voltage is proportional to the rotational speed of the camshaft.



HALL IC type CMP sensor:

The output voltage is constant.

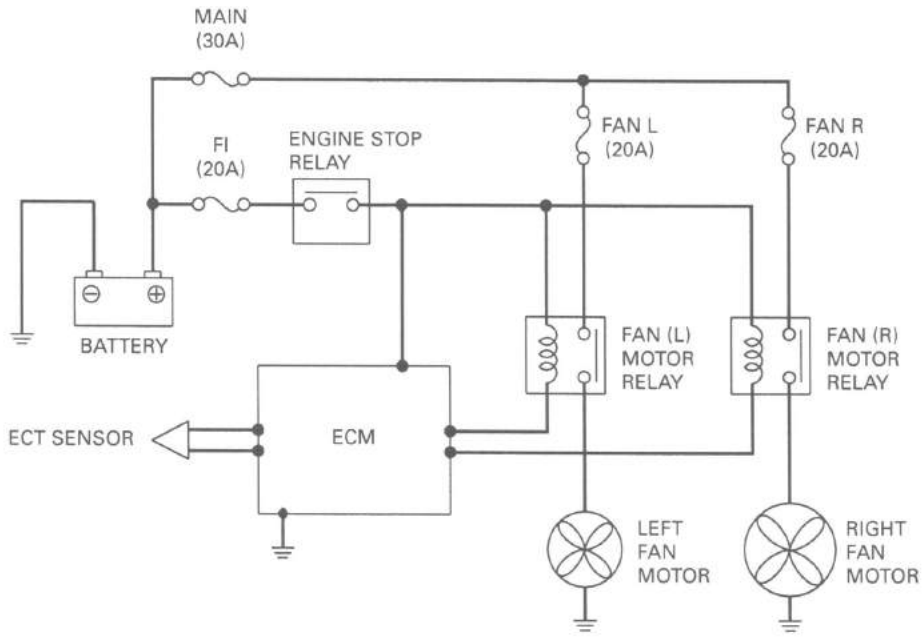


FAN MOTOR CONTROL SYSTEM

This motorcycle is equipped with right and left fan motors.

The system consists of the right fan motor, fan (R) motor relay, left fan motor, and fan (L) motor relay.

Each fan motor is independently controlled by the ECM according to the engine coolant temperature.



OPERATING TEMPERATURE:

Right fan motor: 102.6°C (217°F)

Left fan motor: 106.2°C (223°F)

- When an abnormality of the ECT sensor and its circuit is detected, the ECM operates both fan motors.

CLUTCH SYSTEM

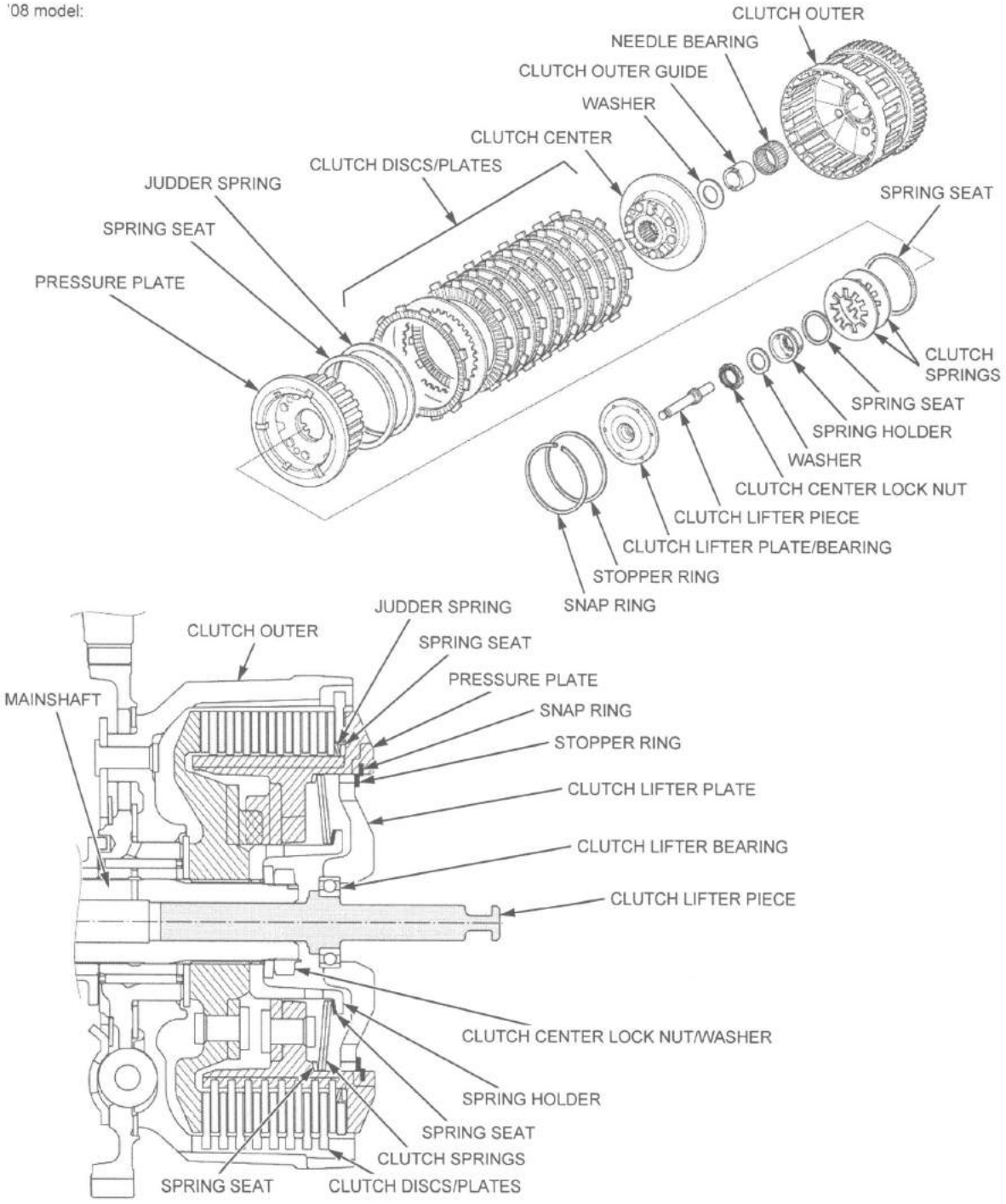
SUMMARY

This clutch has an assist and back torque limiter function.

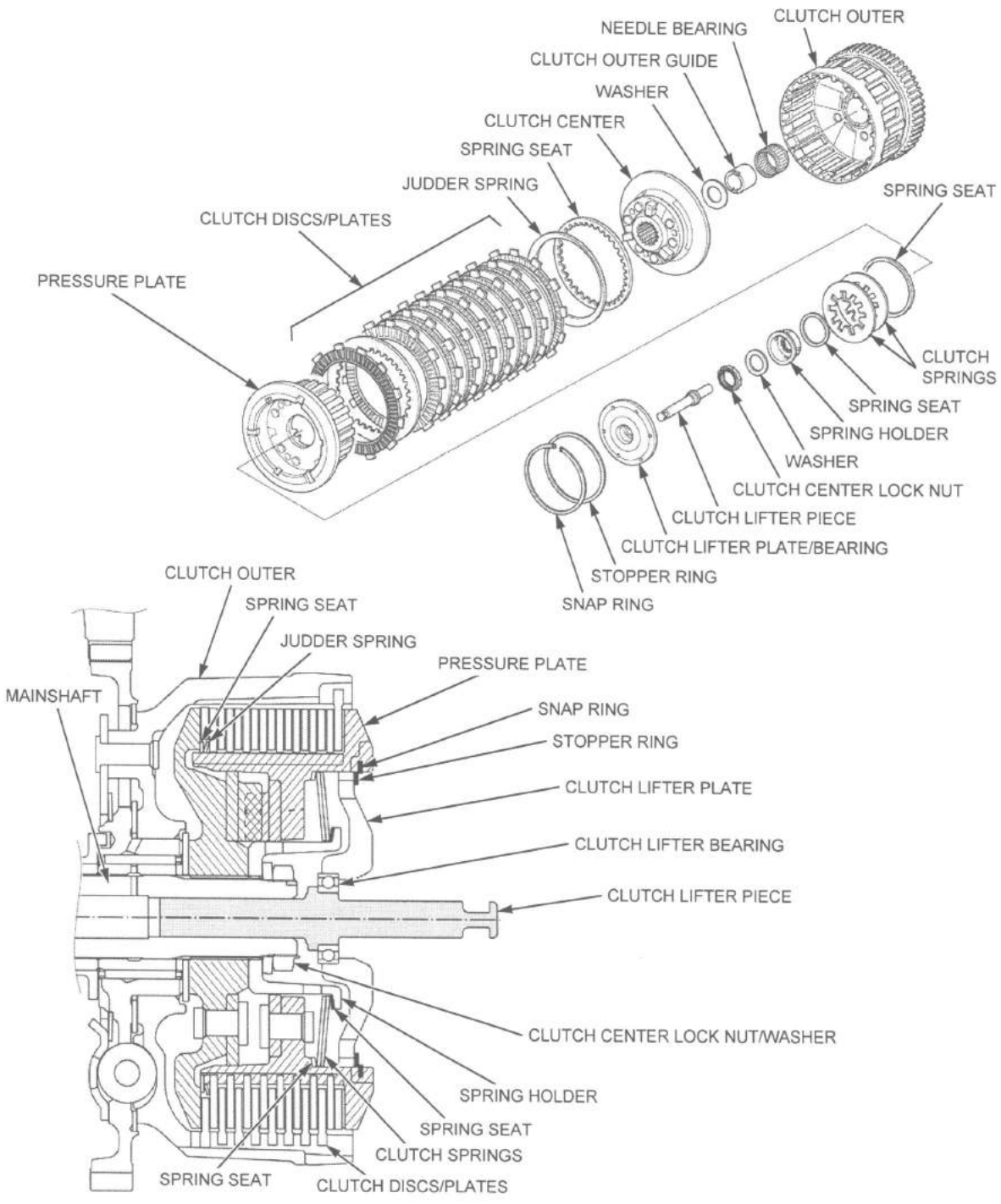
The clutch spring is a diaphragm type.

COMPONENT LOCATION

'08 model:



After '08 model:



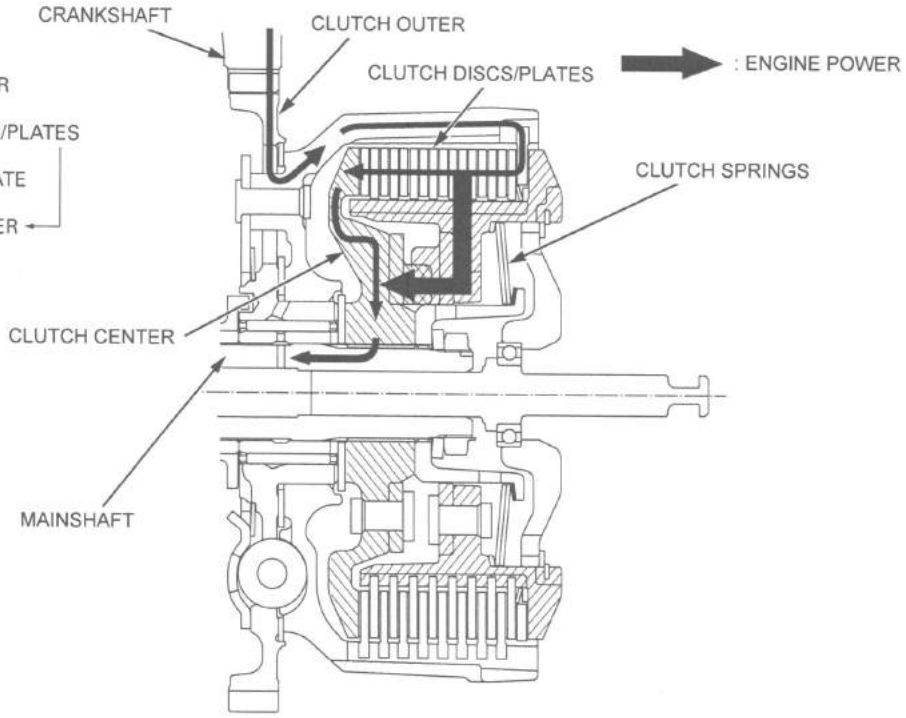
CLUTCH MECHANISM

OPERATION

When the clutch lever is released, the engine power is transmitted from the crankshaft to mainshaft as follows:

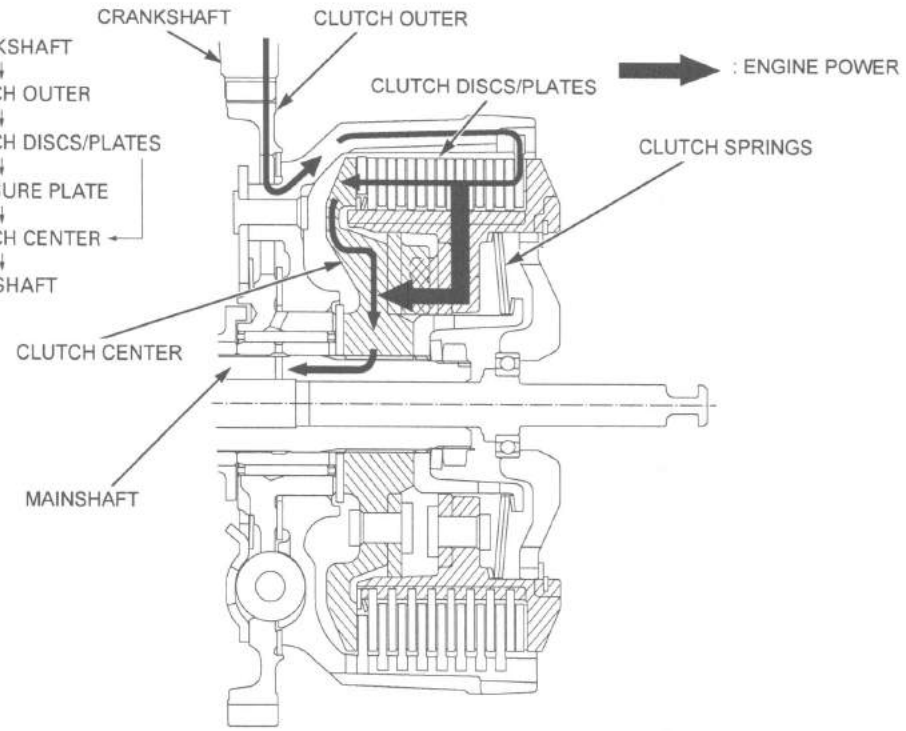
'08 model:

CRANKSHAFT
↓
CLUTCH OUTER
↓
CLUTCH DISCS/PLATES
↓
PRESSURE PLATE
↓
CLUTCH CENTER
↓
MAINSHAFT



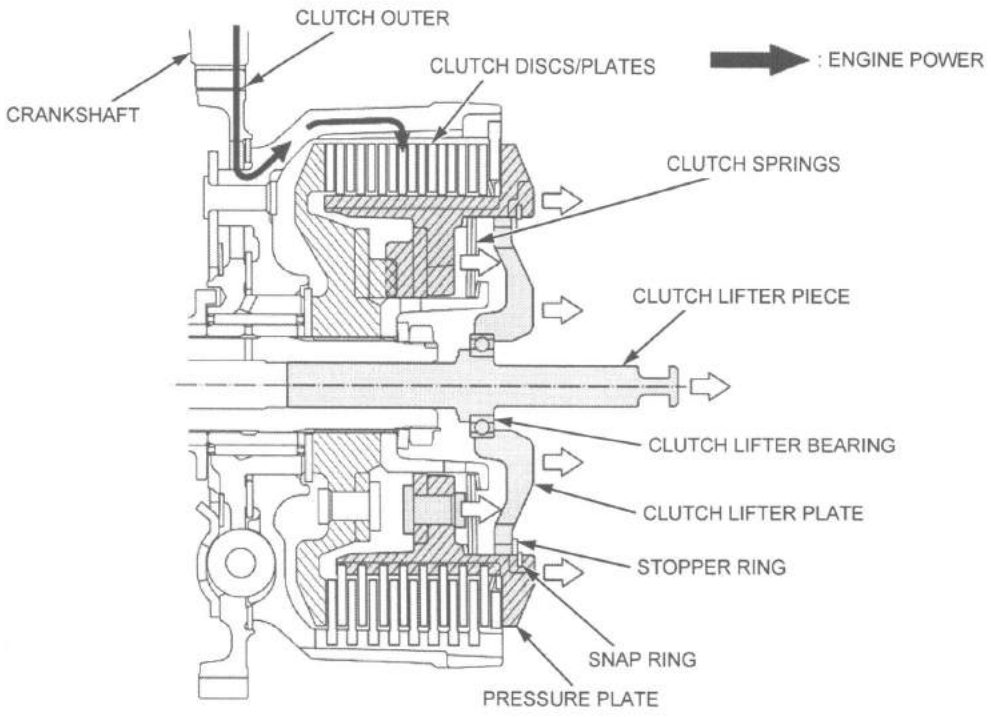
After '08 model:

CRANKSHAFT
↓
CLUTCH OUTER
↓
CLUTCH DISCS/PLATES
↓
PRESSURE PLATE
↓
CLUTCH CENTER
↓
MAINSHAFT

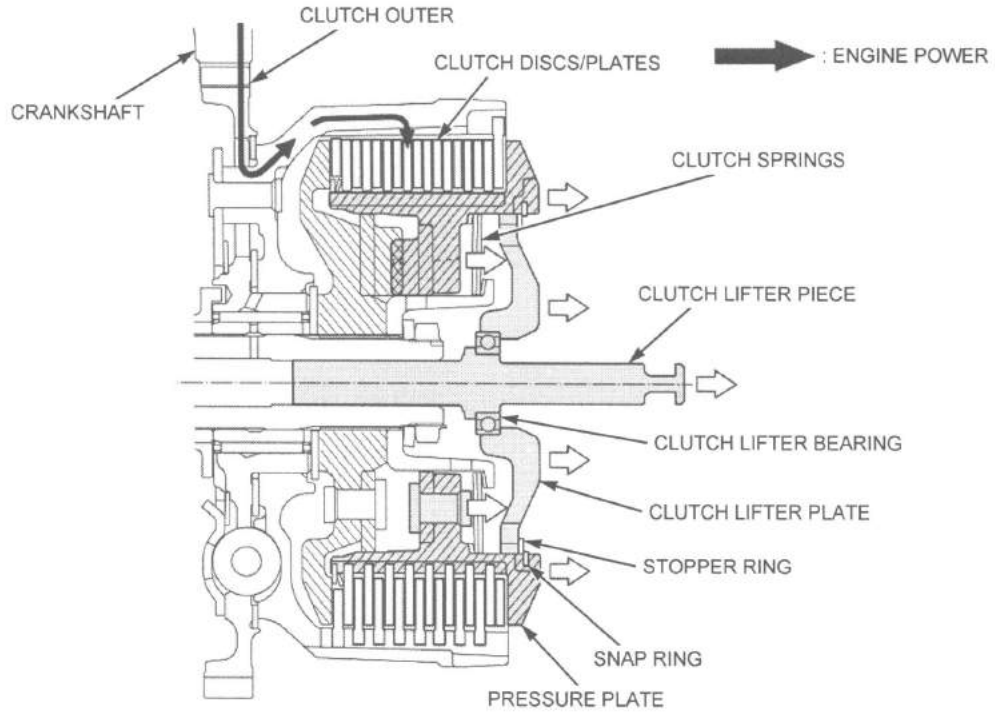


When the clutch lever is applied, the pressure plate is lifted off the clutch discs and the engine power is cut from the crankshaft to the mainshaft.

'08 model:



After '08 model:

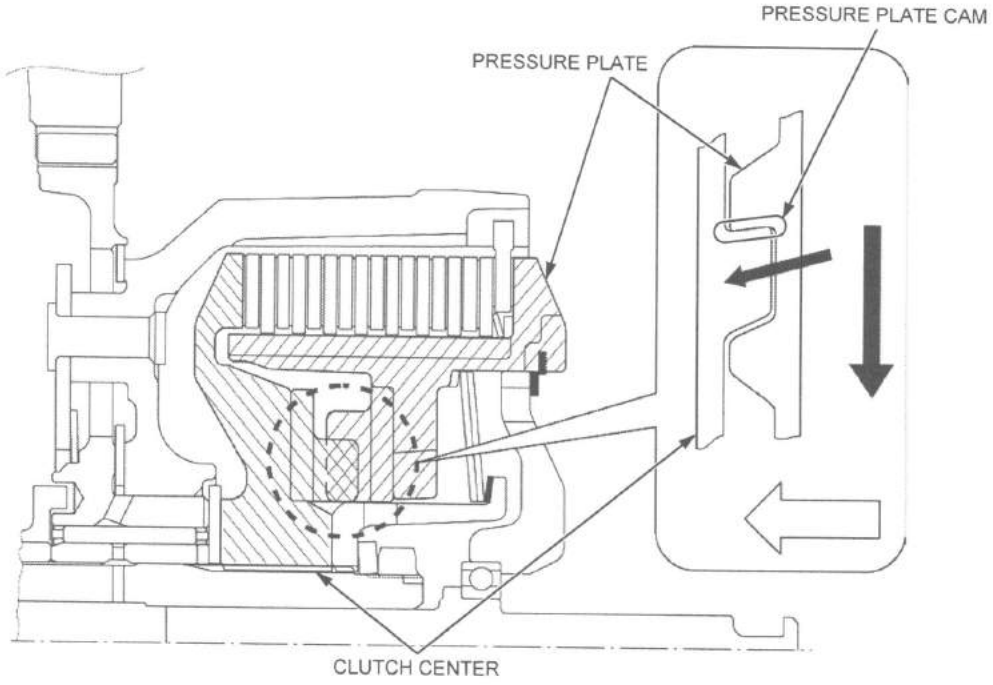


CLUTCH ASSIST

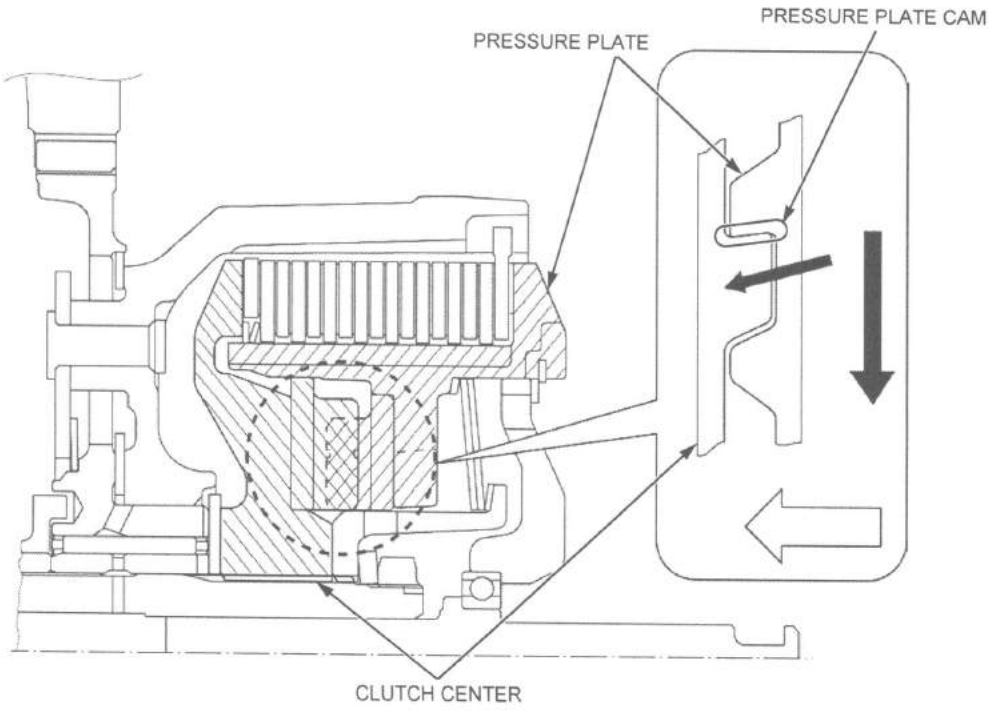
When the motorcycle is accelerating, the pressure plate moves in the direction of the clutch center, causing the pressure plate cams to apply improved compression force against the clutch discs and plates.

When the motorcycle is accelerating:

'08 model:



After '08 model:



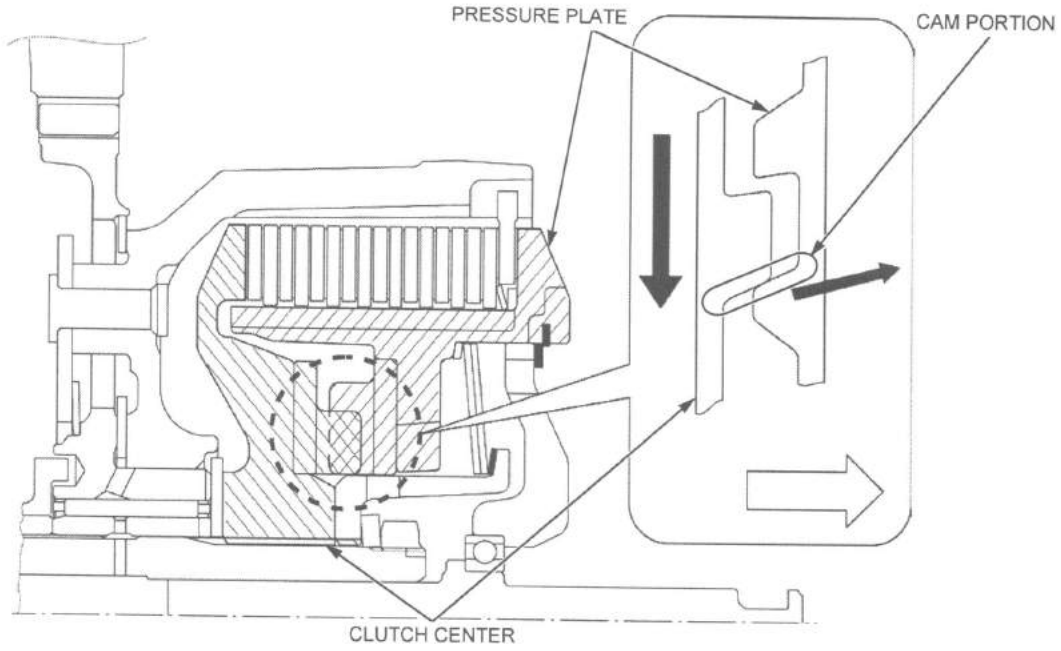
BACK TORQUE LIMITER

When the motorcycle is decelerating, the pressure plate moves away from the clutch center, causing the pressure plate cams to reduce the compression force against the clutch discs and plates.

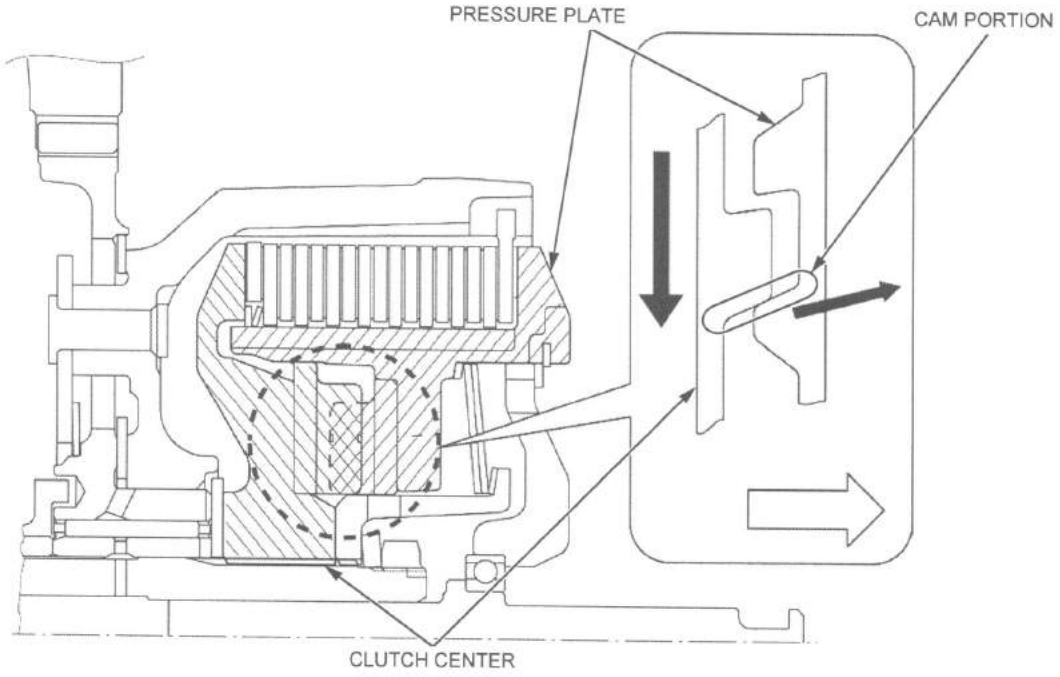
As a result, the clutch slips, and the reduced engine braking prevents the rear wheel from locking up.

When the motorcycle is decelerating

'08 model:



After '08 model:



- The specified engine oil (MA) should be used to maintain the performance of the clutch.

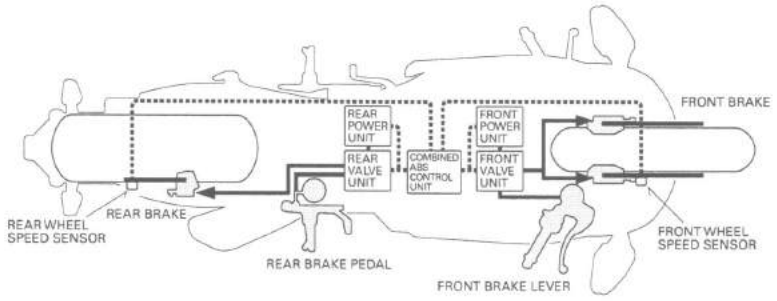
COMBINED ABS (Anti-lock Brake System)

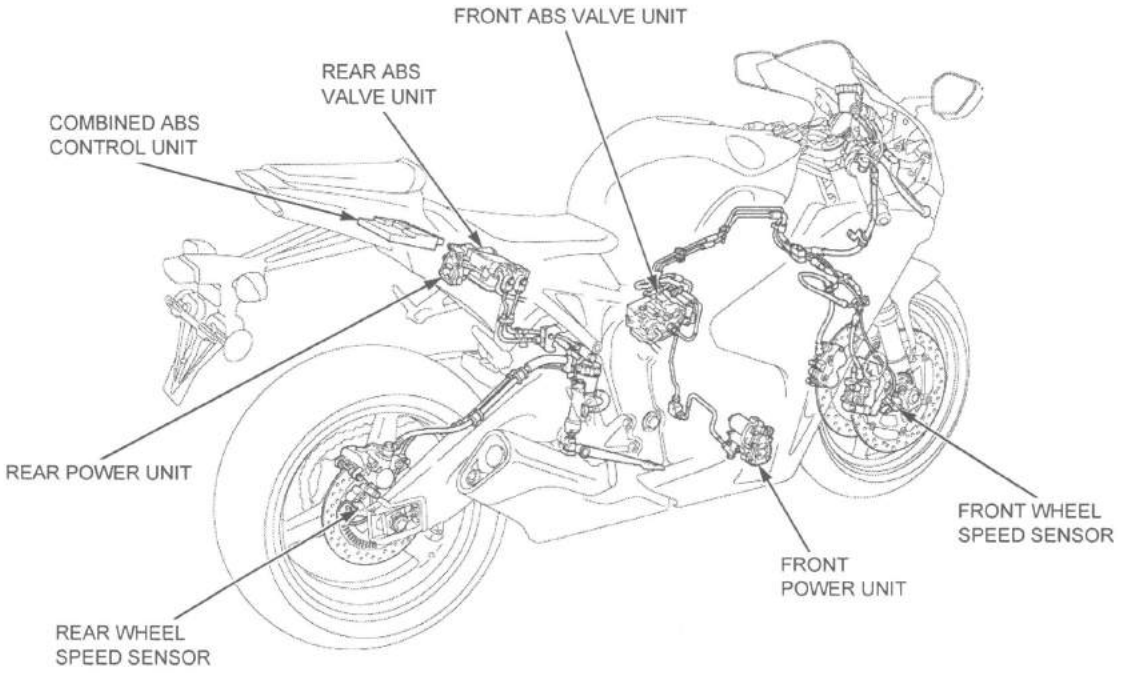
SUMMARY

Combined ABS electronically controls both the synchronization of the front and rear brakes and also the ABS. This ensures the best braking distribution and control, and as a result improves control and stability.

The Combined ABS greatly differs from standard or other braking systems in that it incorporates brake-by-wire control. The Combined ABS control unit receives input from the brakes' master cylinders and both wheels' speed sensors and sends signals to the system's power units to apply the optimum braking force.

The system also monitors both the slip ratio of the front and rear wheels and the brake system input pressure to apply the correct ABS function when required.





CONSTRUCTION

ABS valve unit

Each ABS valve unit includes three pressure sensors that detect hydraulic fluid pressure and send the information to the Combined ABS control unit.
The ABS valve units also include three solenoid valves that are controlled by the control unit and direct the flow of the fluid.

- **Solenoid valve (1):**
  This solenoid valve directs the hydraulic fluid from the master cylinder (input side) to the stroke simulator.
  This solenoid valve closes when the ignition switch is OFF.
  To adjust the hydraulic pressure of the stroke simulator, a one-way valve is used.
- **Solenoid valve (2):**
  This solenoid valve directs the hydraulic fluid from the power unit to brake caliper (output side).
  This solenoid valve closes when the ignition switch is OFF.
  To adjust the hydraulic pressure of the power unit, a one-way valve is used.
- **Solenoid valve (3):**
  This solenoid valve directs the hydraulic fluid from the master cylinder (input side) to the brake caliper (output side).
  This solenoid valve opens when the ignition switch is OFF.
- **Pressure sensor (1):**
  This pressure sensor detects the hydraulic fluid pressure at the master cylinder (input side).
- **Pressure sensor (2):**
  This pressure sensor detects the hydraulic fluid pressure for the fail-safe system at the input side passage.
- **Pressure sensor (3):**
  This pressure sensor detects the hydraulic fluid pressure between the power unit to the brake caliper (output side).
- **Stroke simulator:**
  The stroke simulator absorbs the hydraulic fluid pressure when the brake lever or pedal is applied.

Power unit

The power unit adjusts and modifies the output hydraulic fluid pressure in proportion to the input pressure from the master cylinder and information from the Combined ABS control unit.

It does so by controlling the hydraulic fluid pressure with a control motor that operates a piston via a ball screw.

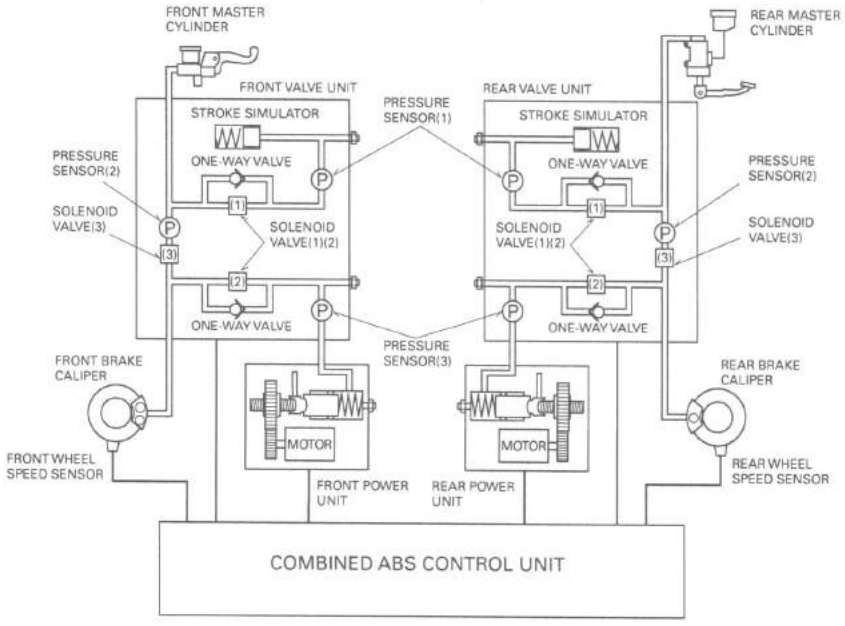
The power unit is utilized for all braking functions including the operation of the ABS and combined braking.

Combined ABS control unit

The Combined ABS control unit receives input from each pressure sensor and wheel speed sensor, and then controls each solenoid valve and power unit to deliver the best braking performance.

Pulser ring/wheel speed sensor

The pulser ring and wheel speed sensor send wheel speed information to the Combined ABS control unit.



BRAKE OPERATION

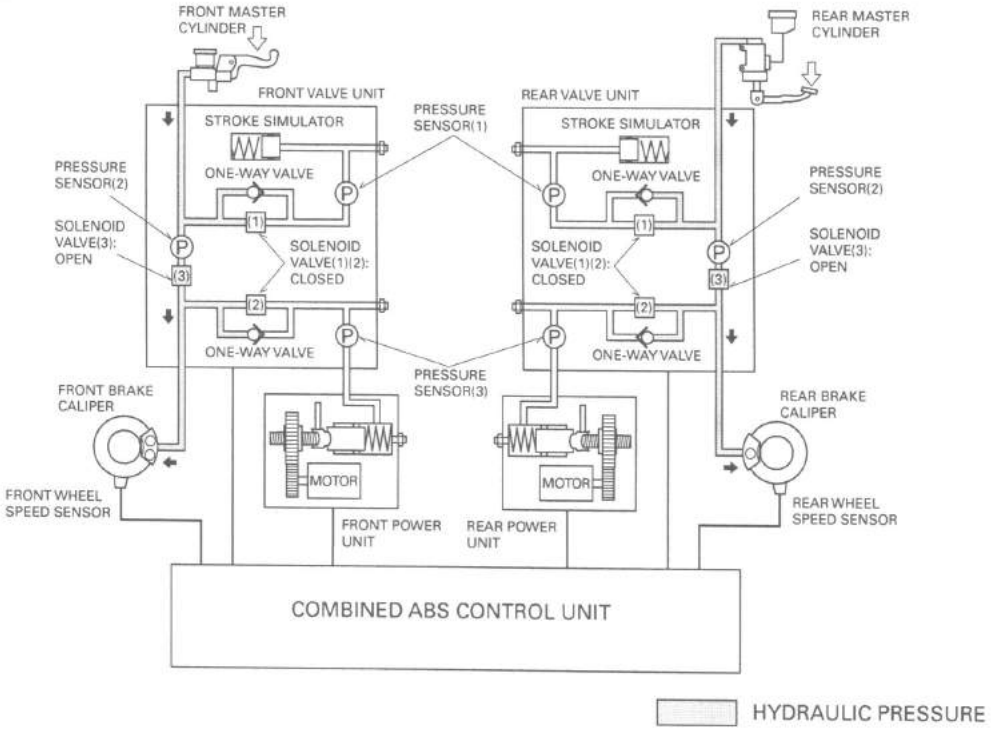
WHEN THE COMBINED ABS FUNCTION DOES NOT OPERATE

The Combined ABS function doesn't operate when the ignition switch is turned OFF or the motorcycle runs at 6 km/h (4 mph) or less.

During these circumstances, neither the input side brake line nor the output side brake line are intercepted and the brake system works in a conventional way.

The input hydraulic pressure from the master cylinder passes through the ABS valve unit, and is transmitted directly to the brake caliper.

SOLENOID VALVE	OPEN/CLOSED
(1)	CLOSED
(2)	CLOSED
(3)	OPEN



COMBINED ABS OPERATION

When the vehicle operates at speeds above 6 km/h (4 mph), the solenoid valve (1) opens and the Combined ABS enters the standby mode. During standby, whenever the brake lever or pedal is operated and the input hydraulic fluid pressure reaches 50 kPa, the solenoid valve (3) closes and valve (2) opens and the system enters the operational mode.

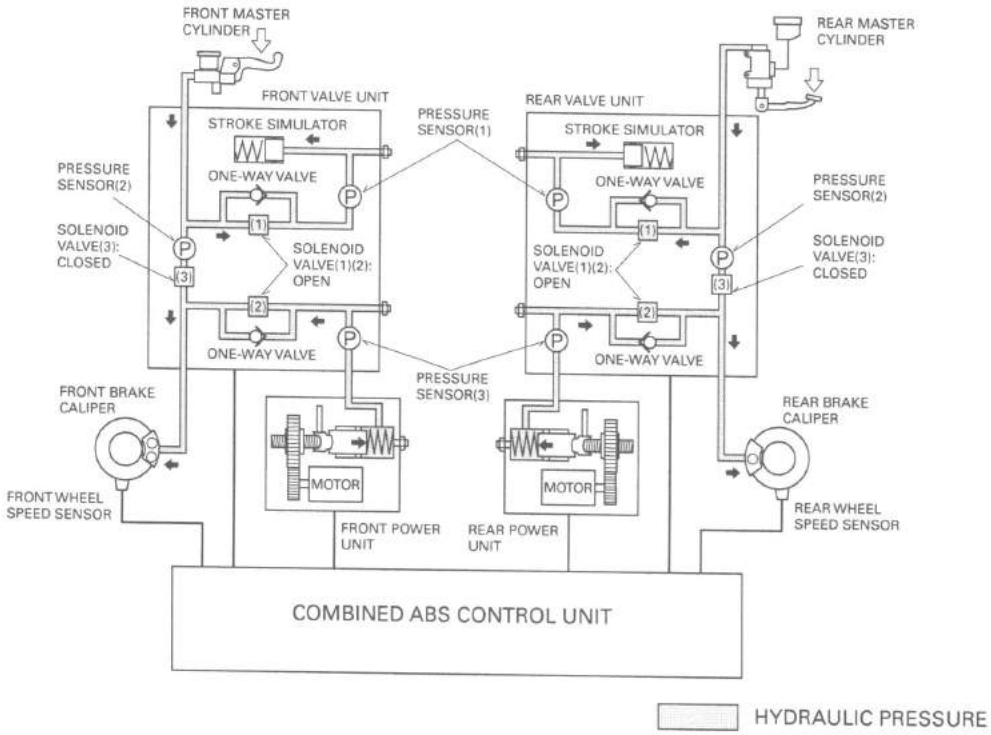
In operational mode, the Combined ABS control unit reads the input hydraulic fluid pressure from the pressure sensor (3) and applies the appropriate output pressure to the brake caliper.

SOLENOID VALVE	OPEN/CLOSED
(1)	OPEN
(2)	OPEN
(3)	CLOSED

The pressure caused by the flow of hydraulic fluid through the solenoid valve (1) when the lever or pedal is operated is absorbed by the stroke simulator in proportion to the force applied.

The power unit operates and applies hydraulic fluid pressure to the brake caliper through the solenoid valve (2).

When the brake lever or pedal is released, the systems reverts to the standby mode with the solenoid valve (3) open and valve (2) closed.



ABS FUNCTION

When the ABS operation is determined to be necessary from the slip ratio of the wheel and the input hydraulic pressure after the system operates, the combined ABS control unit drives the power unit motor in the opposite direction.

The power of the hydraulic pressure on the output side is relieved.

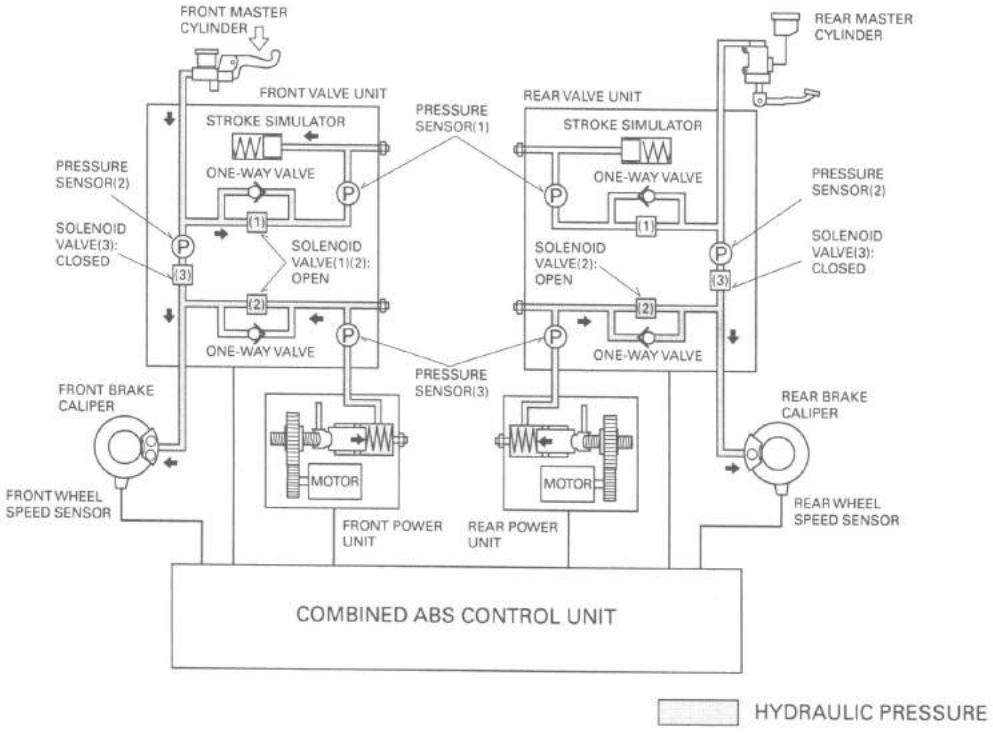
As a result, the braking effort of the brake caliper is adjusted.

COMBINED BRAKE FUNCTION

When only the front brake lever or rear brake pedal are operated, or when both brakes are applied heavily, the combined brake function operates.

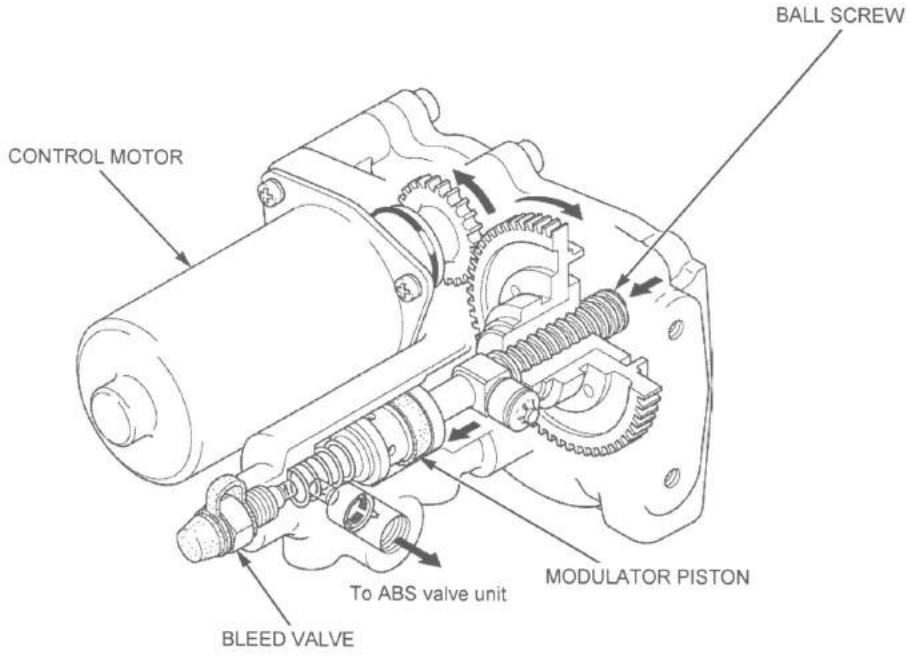
When this occurs, the Combined ABS control unit operates the power units to adjust the hydraulic fluid pressure, and therefore to appropriately distribute the braking force between the front and rear brake calipers. This results in optimum braking force and helps to stabilize the motorcycle.

Example: When only the front brake is operated.



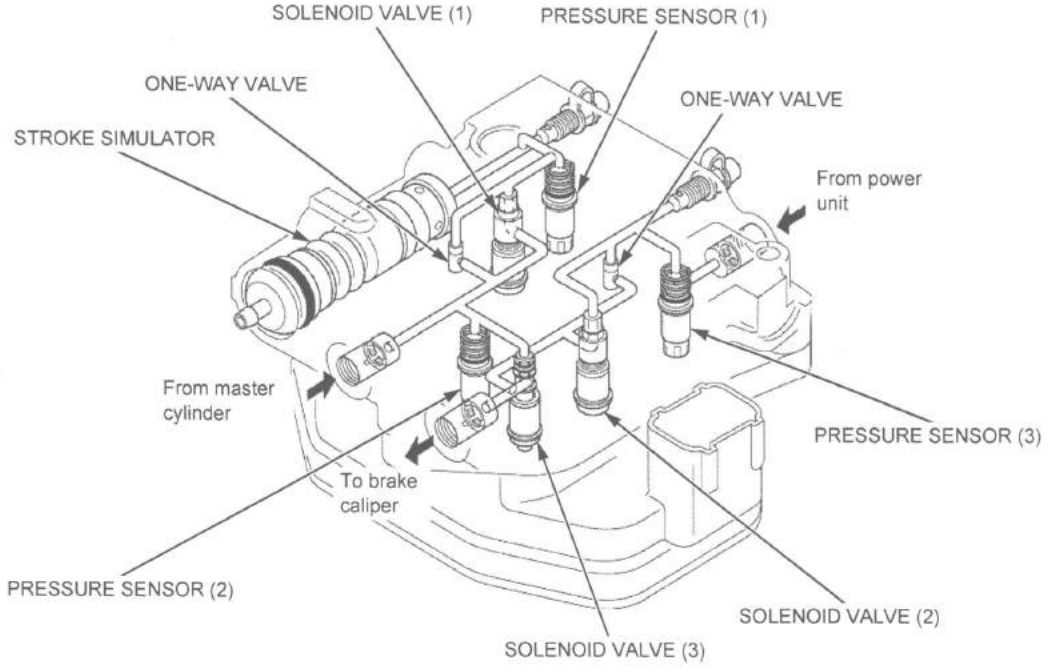
POWER UNIT

The power unit consists of a control motor, modulator piston, and ball screw.



ABS VALVE UNIT

The ABS valve unit consists of the solenoid valves (1), (2), and (3), pressure sensor (1), (2), and (3), stroke simulator, and two one-way valves.



FAIL-SAFE/SELF-DIAGNOSIS FUNCTION

The Combined ABS includes constant self monitoring, self diagnostic, and fail safe functions.
If any abnormality is detected, the control unit stops Combined ABS braking assistance and the braking system converts to working in a conventional way.
Any abnormality will cause the ABS indicator to illuminate and the control unit to record a Diagnostic Trouble Code (DTC). The DTC can be used to troubleshoot the cause of the abnormality.

The ABS indicator illuminates when the ignition is switched ON. Until the motorcycle is ridden over 6 km/h (4 mph), the system performs the pre-start self-diagnosis procedure.

If the system is working correctly the ABS indicator will turn off, however, the system will continue to monitor itself.

If at any time an abnormality is detected, the ABS indicator light will begin blinking or illuminate continuously.

- The Combined ABS indicator might blink in the following cases. Correct the faulty part.
  - Incorrect tire pressure.
  - Tires not recommended for the motorcycle were installed (incorrect tire size).
  - Deformation of the wheel or tire.
- The Combined ABS indicator might blink while riding under the following conditions. Indicating a temporary failure. Clear the DTC and perform the pre-start self-diagnosis. The Combined ABS is normal if the indicator goes off. Ask the rider for the riding conditions in detail when the motorcycle is brought in for inspection.
  - The motorcycle has continuously run on bumpy roads.
  - When riding, the front wheel leaves the ground for a long time (wheelie).
  - Only either the front or rear wheel rotates.
  - The ABS operates continuously.
  - After riding (after the pre-start self-diagnosis), the engine was kept running and the rear wheel turning (for more than 30 seconds).
  - The Combined ABS control unit is disrupted by extremely powerful radio waves (electromagnetic interference).

SERVICE INFORMATION

- Before riding, confirm correct brake operation by applying the brake lever/pedal after air bleeding or brake component servicing.
- Due to the various components of the Combined ABS, including the valve and power units and solenoids, the brake fluid passages are very complex. This complexity requires that together with normal brake line air bleeding procedures, the valve and power units must also be bled.
  The air bleeding procedures for the Combined ABS are very involved and include many steps. All the steps must be followed exactly and completely for proper bleeding. Always perform a brake inspection and test ride after bleeding.
- Due to the by-wire nature of the Combined ABS, it may be difficult to feel if air is still in the system. For this reason it is important to perform a brake test and test ride after brake system servicing.

FUEL FILL CAP BREATHER (After '13 model)

The fuel tank breather function of this model is controlled by the two one-way valves (positive and negative pressure valves) in the fuel fill cap as a substitute for a conventional vapor-liquid separator in the fuel tank.

COMPONENT FUNCTION

VALVES
Regulate the internal pressure of the fuel tank (they are closed with the spring pressure until each specified pressure). In addition, spilling fuel to the outside is reduced when a fall-down has occurred.

BREATHER SEAL
The connecting section of the fuel fill cap and tank of the breather passage is prevented from leaking.

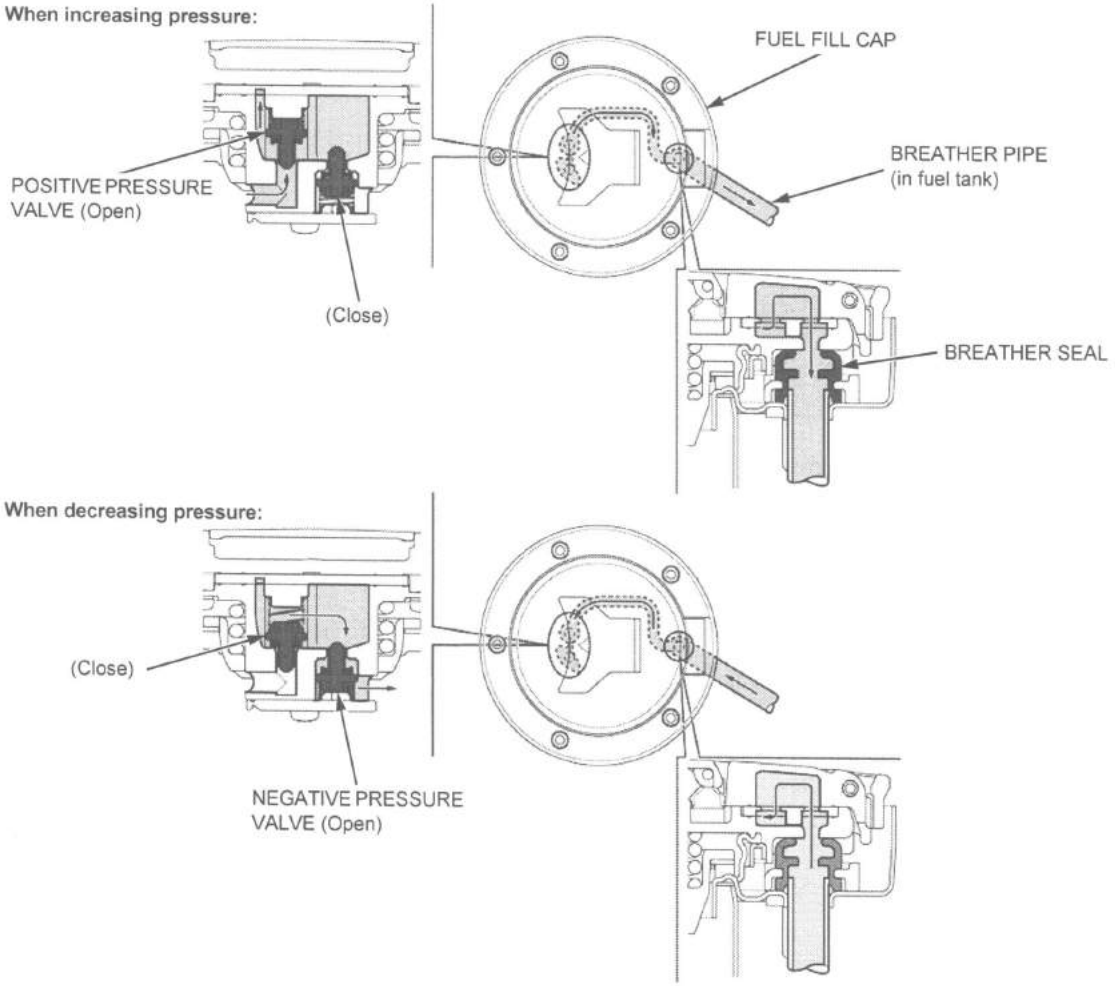
VALVE OPERATION

POSITIVE PRESSURE VALVE:

When the tank internal pressure increases by fuel vapor, the positive pressure valve opens to release excess pressure out of the tank.

NEGATIVE PRESSURE VALVE:

When the tank internal pressure decreases (fuel consumption etc.), the negative pressure valve opens and introduces air ((AC) type; including stored fuel vapor in the EVAP canister) into the tank to keep the internal pressure constant.



- A pressure release can be heard when opening the fuel cap, but this is not blockage of the passage. If checking for clogs in the fuel tank side passage is necessary, apply air pressure to the breather hose end while opening the fuel fill cap.
- Always replace the breather seal with a new one when the fuel fill cap is removed for service.
- Check the breather seal for deterioration, cracks, or damage in accordance with the maintenance schedule "Evaporative Emission Control System ((AC) type)" (page 4-5 and 4-6).

3. FRAME/BODY PANELS/EXHAUST SYSTEM

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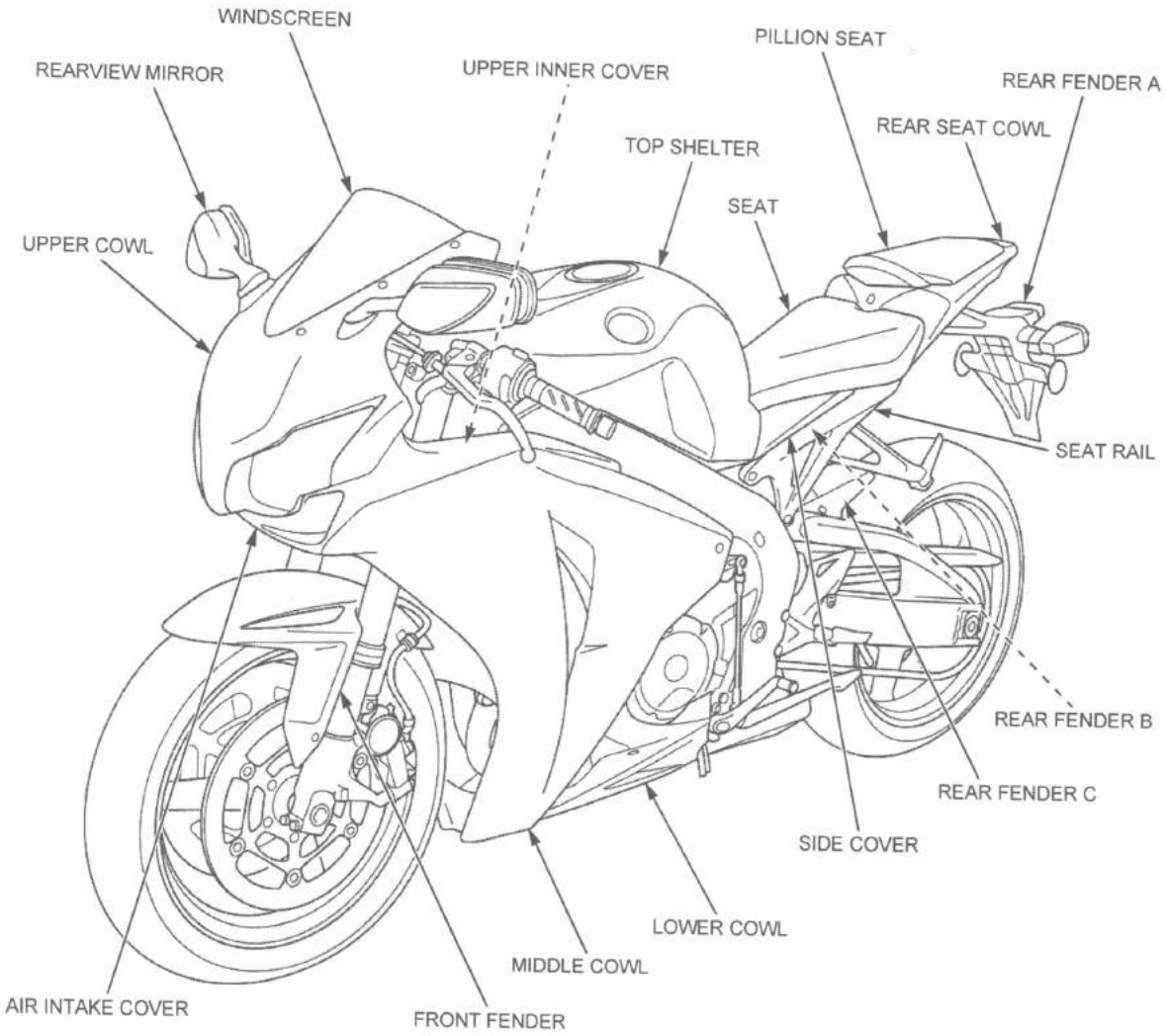
MUFFLER 3-53

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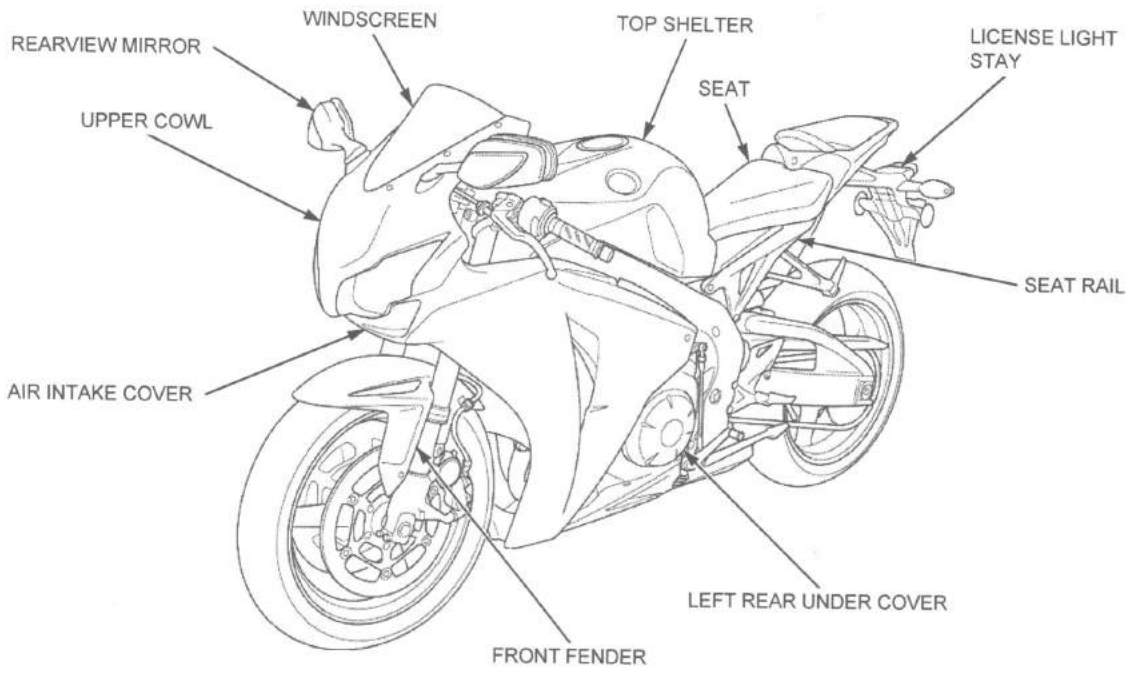
BODY PANEL LOCATIONS

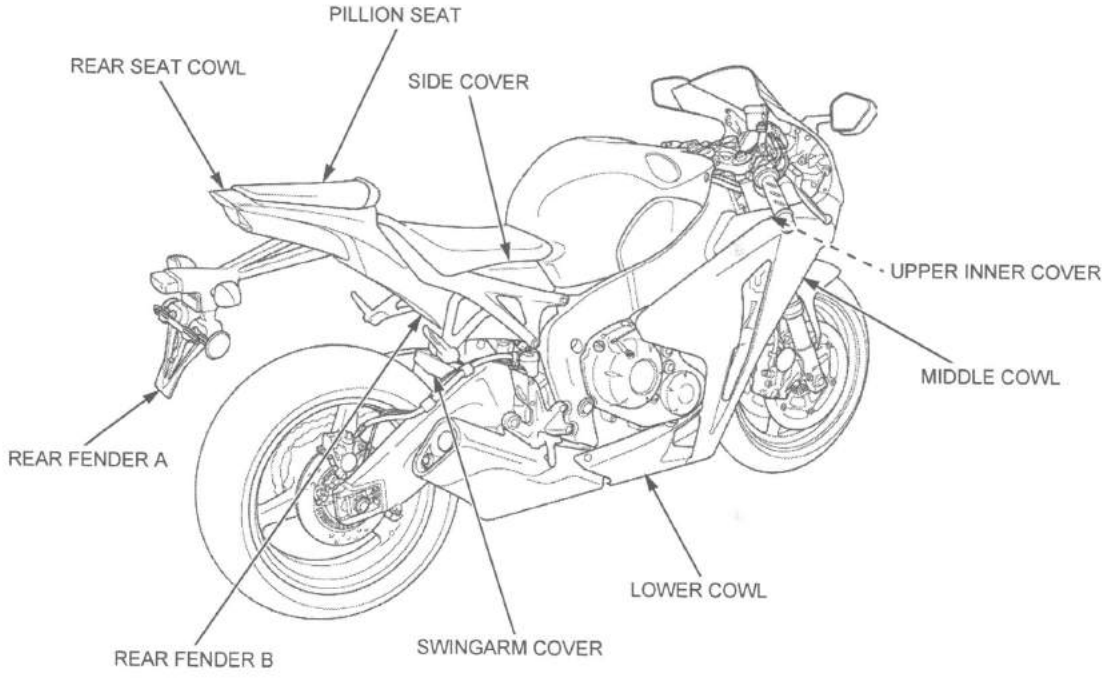
'08 – '11 model

STANDARD type:



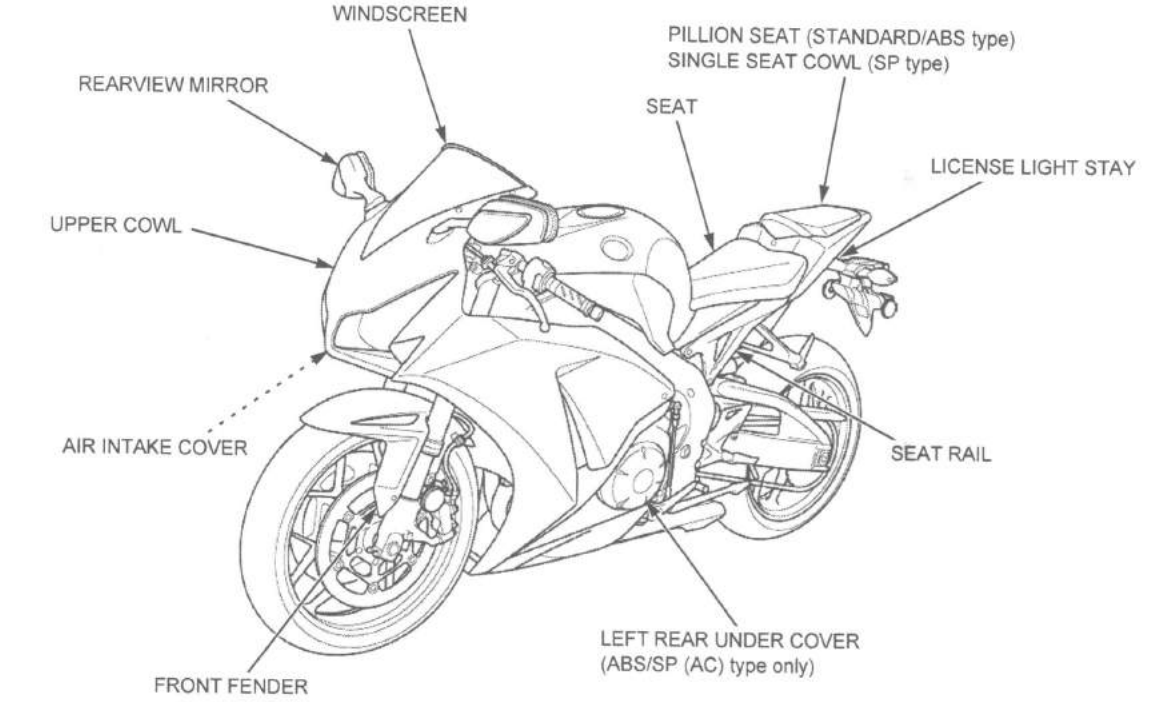
ABS type:

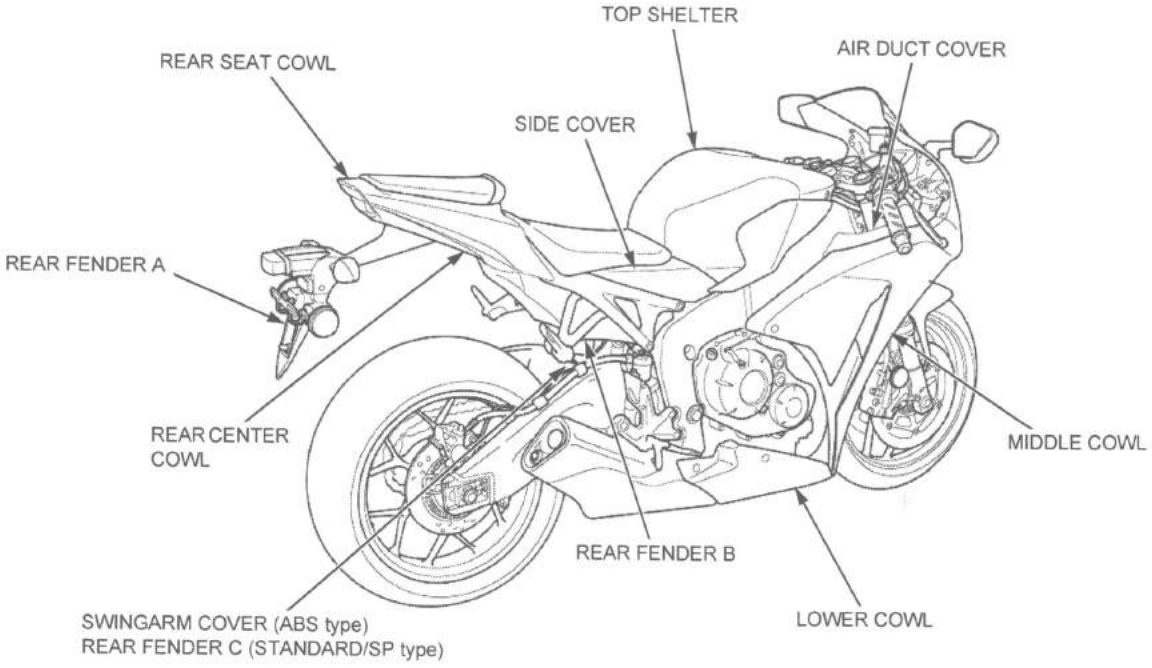

WINDSCREEN
TOP SHELTER
REARVIEW MIRROR
LICENSE LIGHT STAY
SEAT
UPPER COWL
SEAT RAIL
AIR INTAKE COVER
LEFT REAR UNDER COVER
FRONT FENDER


PILLION SEAT
REAR SEAT COWL
SIDE COVER
UPPER INNER COVER
MIDDLE COWL
REAR FENDER A
LOWER COWL
REAR FENDER B
SWINGARM COVER

After '11 model

ABS type shown:





SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the body panels, exhaust system, and seat rail.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.
- Always replace the exhaust pipe gaskets with new ones after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust clamps first, then tighten the mounting fasteners.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Windscreen mounting bolt	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Front brake hose clamp nut	10 N·m (1.0 kgf·m, 7 lbf·ft)
Front brake hose 3-way joint bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Front fender mounting screw	12 N·m (1.2 kgf·m, 9 lbf·ft)
Seat rail mounting nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Seat rail mounting bolt	44 N·m (4.5 kgf·m, 32 lbf·ft)
Center cross plate mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Exhaust pipe joint nut	12 N·m (1.2 kgf·m, 9 lbf·ft)
Exhaust pipe stud bolt	See page 3-65
Main step bracket mounting bolt	37 N·m (3.8 kgf·m, 27 lbf·ft)
Pillion step bracket mounting bolt (STANDARD/ABS type)	27 N·m (2.8 kgf·m, 20 lbf·ft)
Lower cowl mounting screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Lower cowl mounting special screw	10 N·m (1.0 kgf·m, 7 lbf·ft)
Bank angle sensor mounting screw	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)
Vacuum chamber stay mounting screw	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)
Air duct resonator mounting screw ('08 – '11 model)	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)
Air duct mounting screw ('08 – '11 model)	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)
Air duct mounting screw (After '11 model)	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)
Air duct cover mounting screw ('08 – '11 model)	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Air duct cover mounting screw (After '11 model)	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)
Rearview mirror mounting nut	10 N·m (1.0 kgf·m, 7 lbf·ft)
Rearview mirror front cover screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
Heat guard mounting screw	10 N·m (1.0 kgf·m, 7 lbf·ft)
Muffler cover mounting screw (After '09 model)	10 N·m (1.0 kgf·m, 7 lbf·ft)
Muffler rear cap mounting bolt	5.3 N·m (0.5 kgf·m, 3.9 lbf·ft)
Middle cowl mounting screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Seat mounting special screw	4.3 N·m (0.4 kgf·m, 3.2 lbf·ft)
Muffler band bolt	17 N·m (1.7 kgf·m, 13 lbf·ft)
Front reflector mounting nut	1.8 N·m (0.2 kgf·m, 1.3 lbf·ft)
Rear side reflector mounting nut	1.8 N·m (0.2 kgf·m, 1.3 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

Poor performance
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

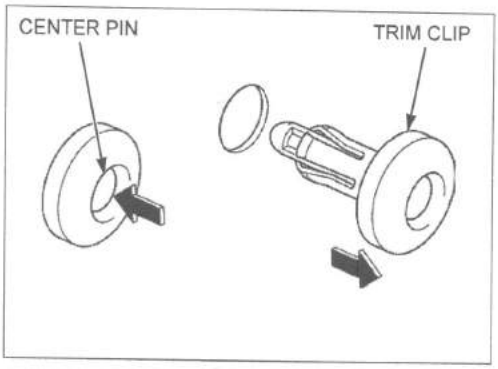
TRIM CLIPS

TRIM CLIP 1

REMOVAL

Push the center of the trim clip pin.

Remove the trim clip.

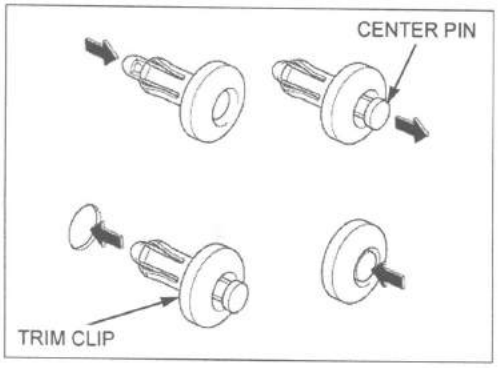


INSTALLATION

Raise the center pin by pushing the center pin back.

Install the trim clip.

Push the center pin until the pin is flush with the outer casing.



TRIM CLIP 2

REMOVAL

Push the center of the trim clip pin.

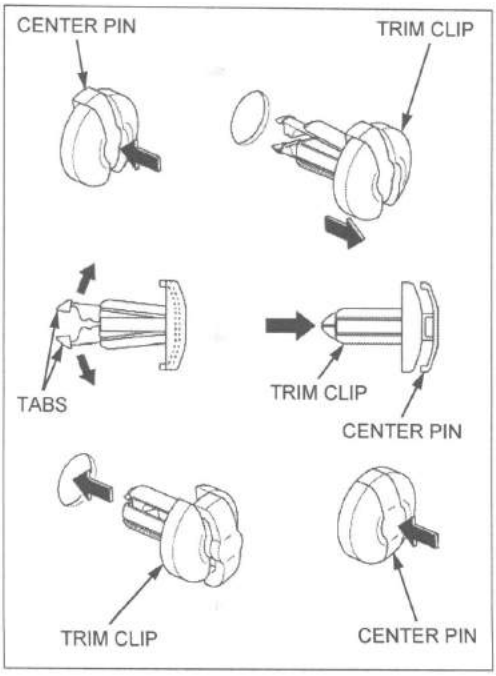
Remove the trim clip.

INSTALLATION

Raise the center pin by pushing the retaining tabs back.

Install the trim clip.

Push the center pin until the pin is flush with the outer casing.

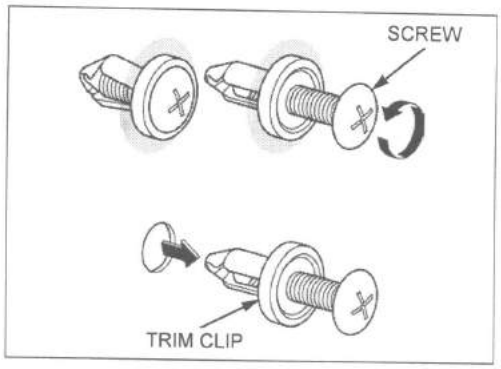


TRIM CLIP 3

REMOVAL

Loosen the center screw.

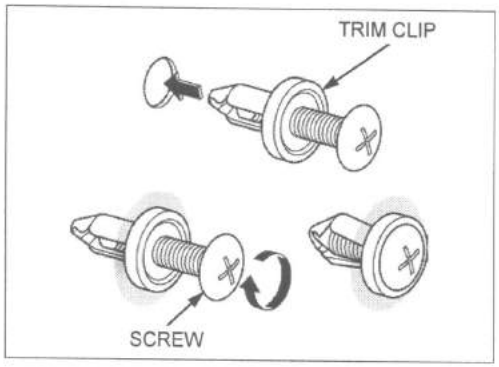
Remove the trim clip.



INSTALLATION

Install the trim clip.

Tighten the center screw until the screw is flush with the outer casing.



SEAT/SIDE COVER

REMOVAL/INSTALLATION

'08 – '11 model

Release the side cover bosses from the frame grommets then remove the side covers.

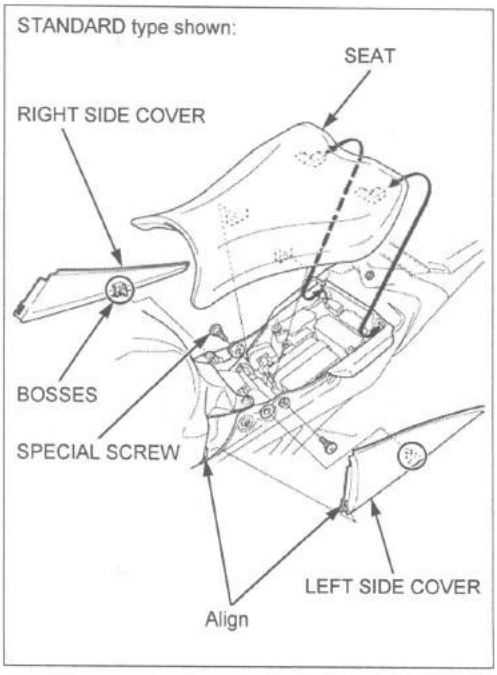
Remove the special screws and move the seat forward to remove it.

Installation is in the reverse order of removal.

TORQUE:

Seat mounting special screw:
4.3 N·m (0.4 kgf·m, 3.2 lbf·ft)

- Align the side cover groove with the top shelter tab.
- Align the side cover boss with the frame grommet.



After '11 model

Be careful not to damage the slit of the side cover.

Release the side cover boss from the frame grommet, free the front portion (slit) from the tab of the top shelter, and remove the side cover.

Perform the same procedure for the other side cover.

Remove the two special screws and move the seat forward to remove it.

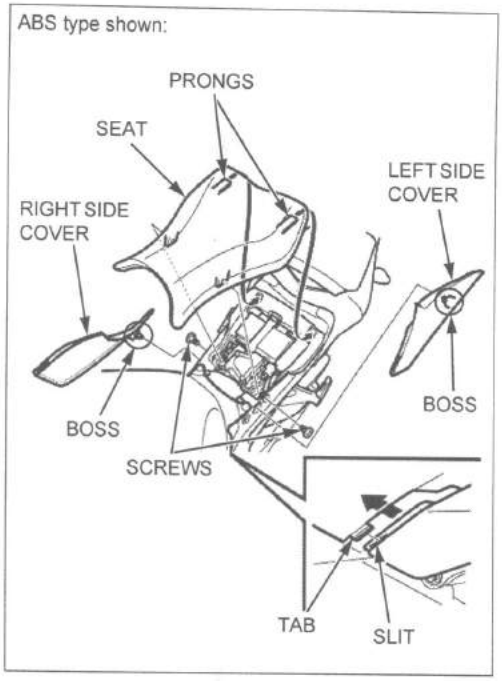
Installation is in the reverse order of removal.

NOTE:

- Insert the prongs on the seat into the slots and align the screw holes in the seat and frame properly to avoid cross-threading when tightening the screws.

TORQUE:

Seat mounting special screw:
4.3 N·m (0.4 kgf·m, 3.2 lbf·ft)



PILLION SEAT/SEAT STRAP (STANDARD/ABS type)

REMOVAL/INSTALLATION

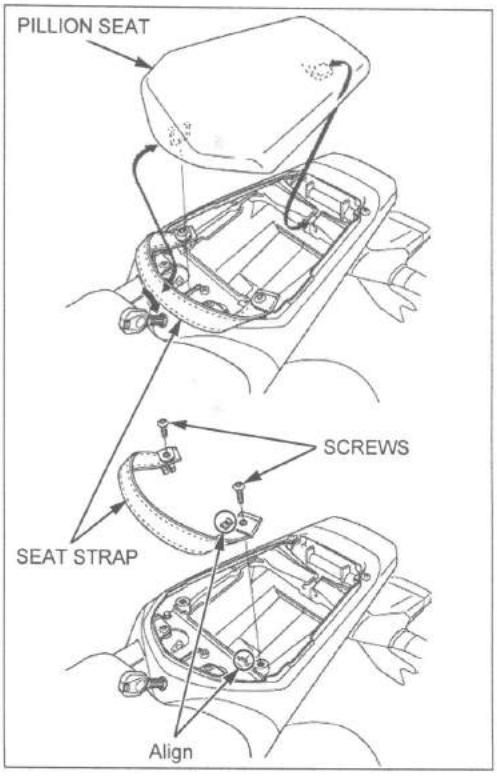
Unlock the pillion seat lock using the ignition key.
Move the seat strap forward and remove the pillion seat by pulling it forward.

Remove the screws and seat strap.

Install the seat strap and tighten the screws securely.

Install the pillion seat in the reverse order of removal and push it down to lock.

- Align the seat strap mounting plate groove with the seat catch tab.

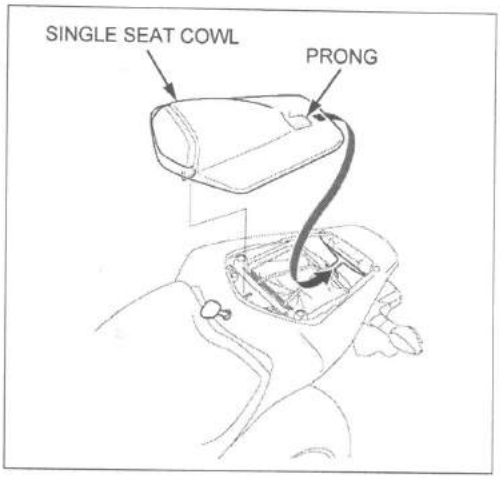


SINGLE SEAT COWL (SP type)

REMOVAL/INSTALLATION

Unhook the seat cowl lock using the ignition key.
Remove the single seat cowl by pulling it forward.

Install the seat cowl by inserting the prong into the slot and push it down to lock.



TOP SHELTER

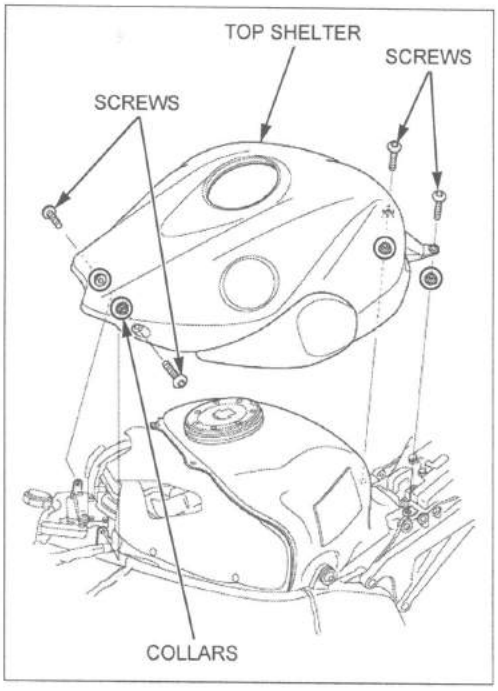
REMOVAL/INSTALLATION

Remove the seat (page 3-7).

Remove the screws, top shelter, and collars.

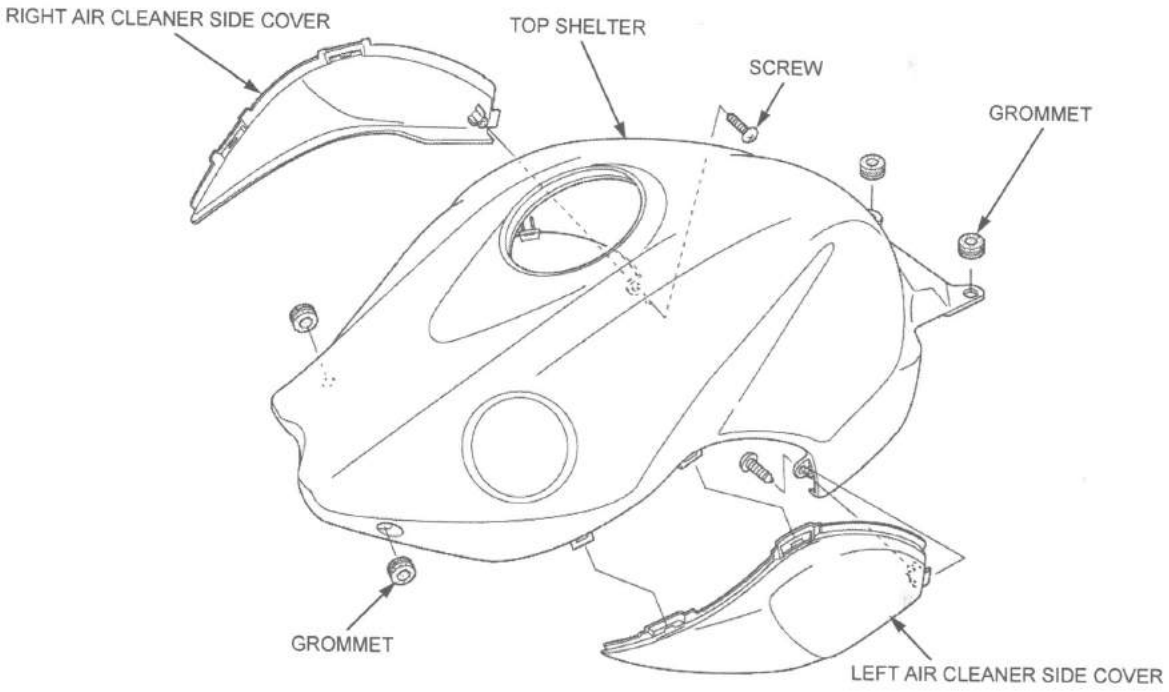
Be careful not to lose the collars.

Installation is in the reverse order of removal.

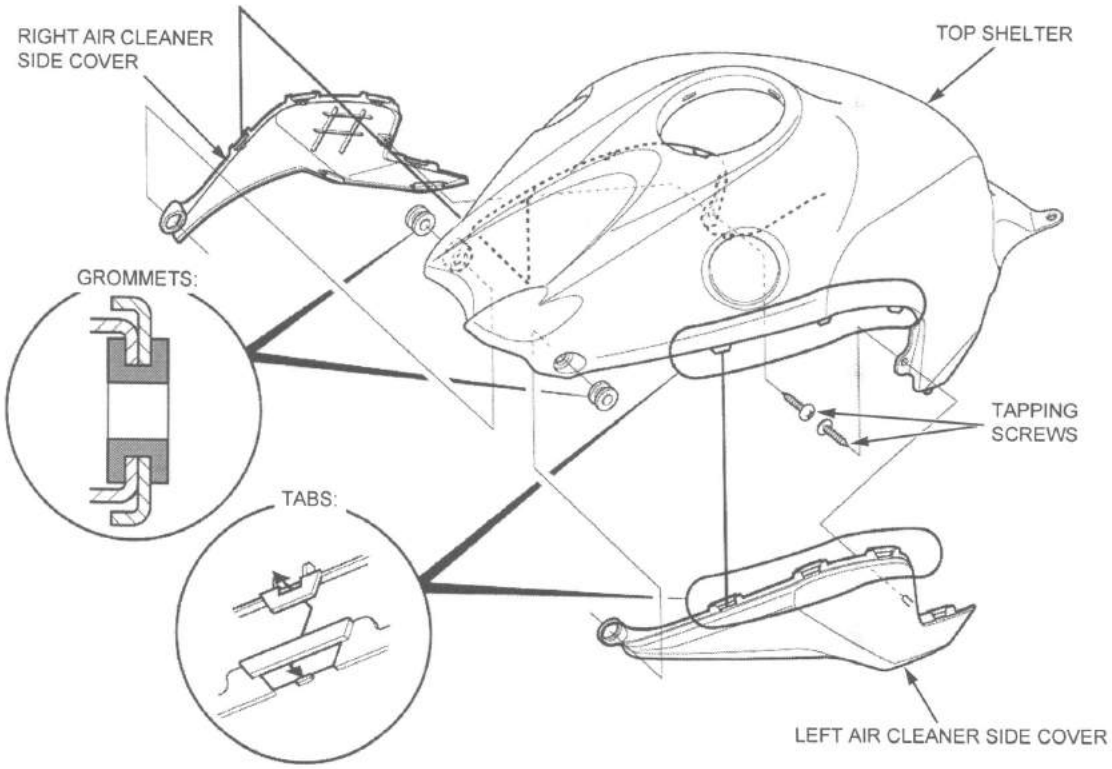


DISASSEMBLY/ASSEMBLY

'08 – '11 model



After '11 model



REAR SEAT COWL

REMOVAL ('08 – '11 model)

• Be careful not to damage the rear seat cowl.

Remove the following:

– Seat (page 3-7)
– Pillion seat (page 3-8)

Remove the rear seat cowl mounting screws.

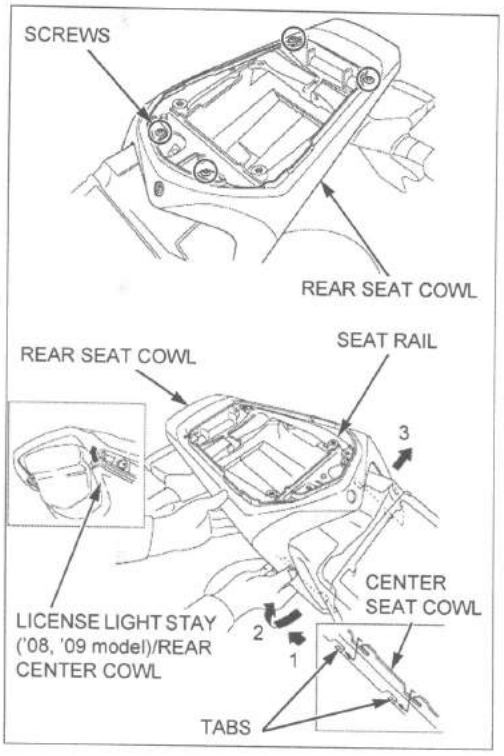
Remove the rear seat cowl as follows:

1. Move the rear seat cowl rearward.
2. Unhook the right side tabs of the rear seat cowl from the center seat cowl.
   Release the right side rear end of the rear seat cowl from the license light stay ('08, '09 model)/rear center cowl.

NOTE:

Be careful not to damage the rear seat cowl when it through the seat rail.

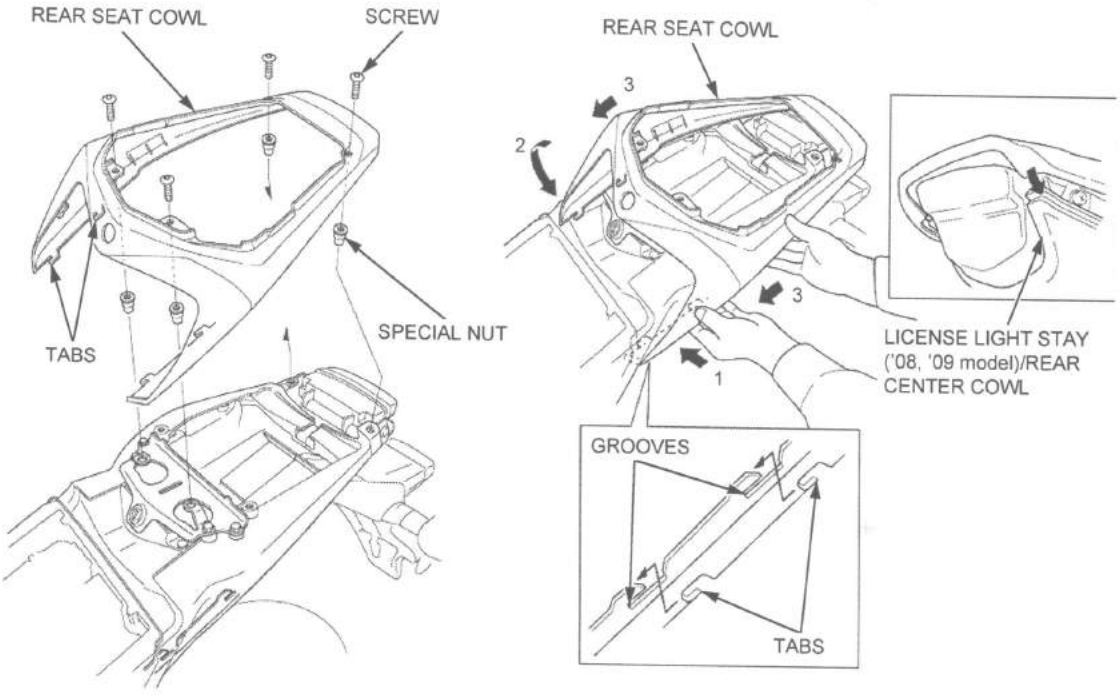
3. Unhook the left side tabs of the rear seat cowl from the center seat cowl.
   Release the left side rear end of the rear seat cowl from the license light stay ('08, '09 model)/rear center cowl.



INSTALLATION ('08 – '11 model)

Install the rear seat cowl as follows:

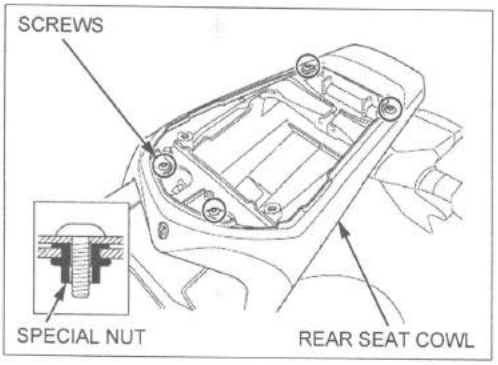
1. Insert the left side tabs to the center seat cowl grooves while setting the left side rear end of the rear seat cowl with the license light stay ('08, '09 model)/rear center cowl securely.
2. Insert the right side tabs to the center seat cowl grooves while setting the right side rear end of the rear seat cowl with the license light stay ('08, '09 model)/rear center cowl securely.
3. Move the rear seat cowl forward securely and install the screws.



Tighten the rear seat cowl mounting screws securely.

Install the following:

- Pillion seat (page 3-8)
- Seat (page 3-7)



REMOVAL/INSTALLATION (After '11 model)

Remove the following:

- Seat (page 3-7)
- STANDARD/ABS type:
  Pillion seat/seat strap (page 3-8)
- SP type:
  Single seat cowl (page 3-9)

Remove the four mounting screws and slide the seat cowl rearward.

Release either the left or right tab from the center seat cowl.

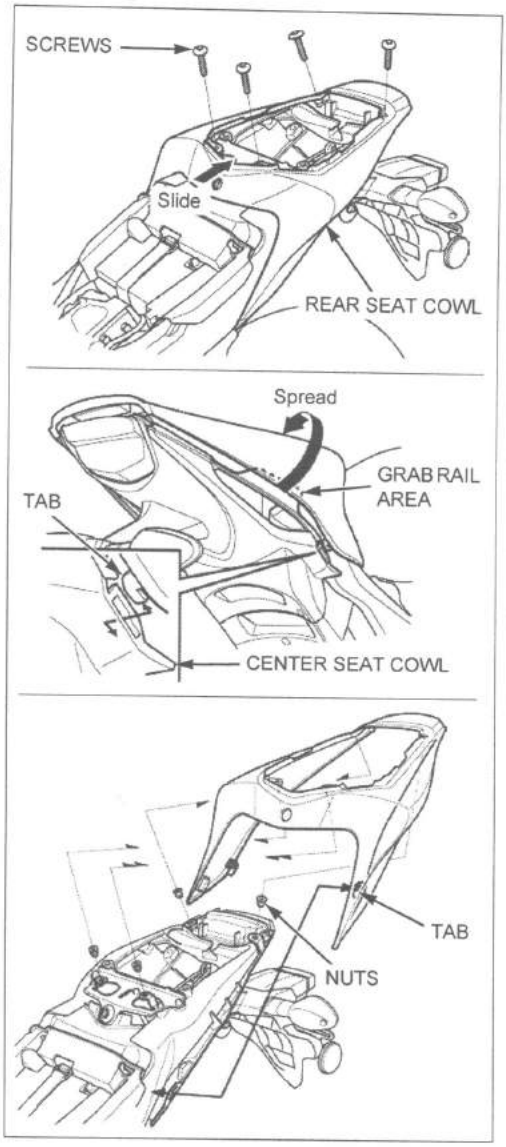
Take care not to scratch the seat cowl.

Spread the lower side of the seat cowl and raise it to clear the grab rail area of the center seat cowl.

Carefully release the other tab and remove the seat cowl.

Remove the special nuts in the frame if necessary.

Installation is in the reverse order of removal.



AIR INTAKE COVER

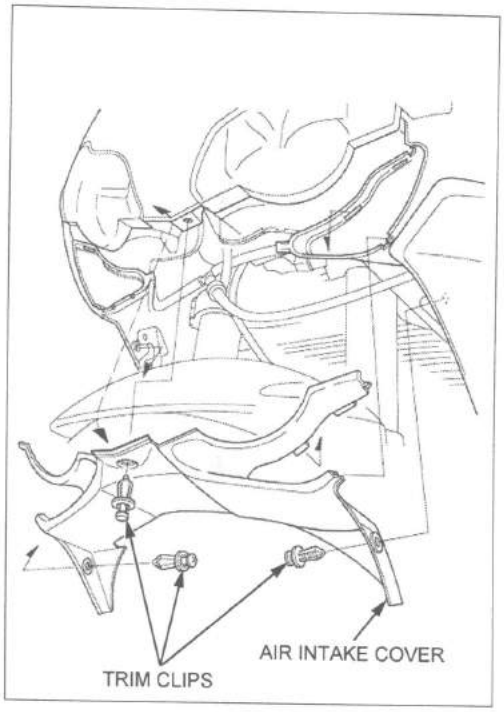
REMOVAL/INSTALLATION

'08 –'11 model

Remove the trim clips and air intake cover.

Be careful not to damage the tabs.

Installation is in the reverse order of removal.



After '11 model

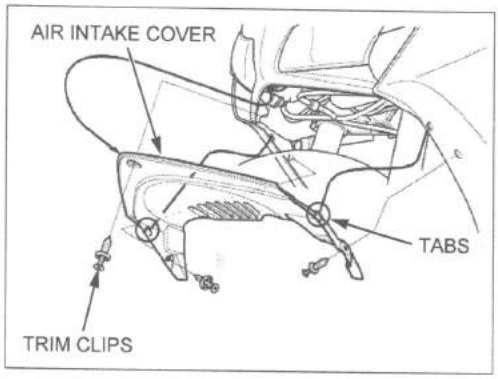
Remove the three trim clips.

Release the two tabs from the inner middle cowl and remove the air intake cover.

Installation is in the reverse order of removal.

NOTE:

- Align the mating areas of the intake cover and cowls properly.



UPPER INNER COVER ('08 – '11 model)

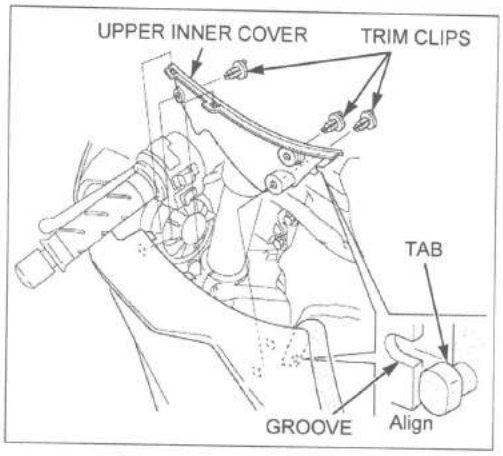
REMOVAL/INSTALLATION

Remove the trim clips.

Release the groove from the rubber tab and remove the upper inner cover.

Be careful not to damage the tabs.

Installation is in the reverse order of removal.



AIR DUCT COVER (After '11 model)

REMOVAL/INSTALLATION

Remove the screw and two tapping screws from the duct cover.

Remove the screw securing the rear end of the middle cowl.

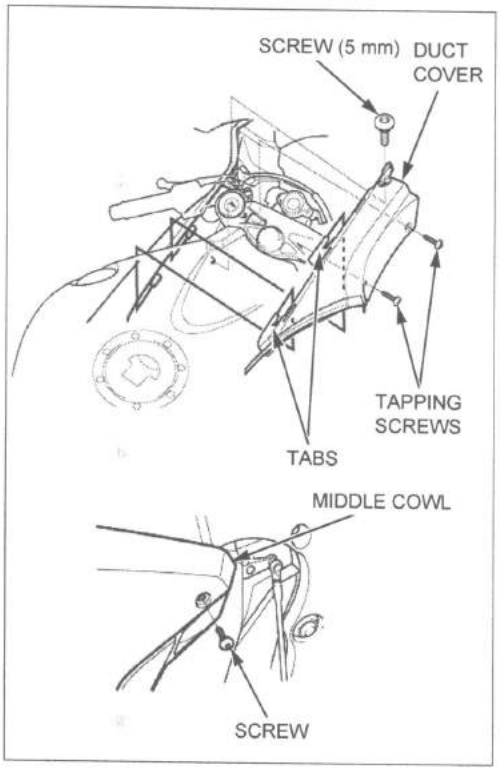
Slide the air duct cover rearward to release the two tabs from the middle cowl while spreading the cowl outward slightly and remove the duct cover.

Installation is in the reverse order of removal.

TORQUE:

Middle cowl mounting screw:
1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)

Duct cover mounting screw (5 mm):
5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)



LOWER COWL

REMOVAL/INSTALLATION

'08 – '11 model

Release the hoses from the lower cowl.

Be careful not to damage the tabs and grooves.

Remove the screws and special screws.

Release the front side grooves from the middle cowl tabs.

Slide the lower cowl rearward and remove the lower cowl downward.

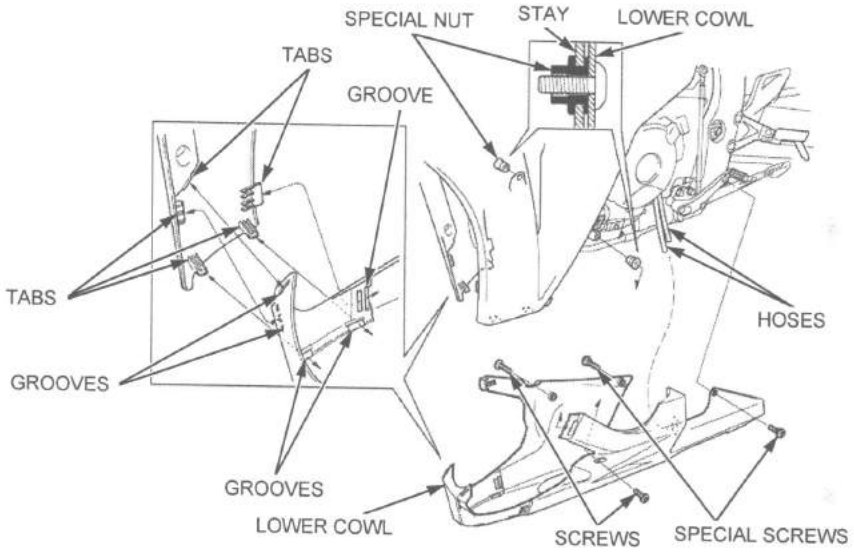
Remove the special nuts from the stays.

Installation is in the reverse order of removal.

TORQUE:

Lower cowl mounting screw:
1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)

Lower cowl mounting special screw:
10 N·m (1.0 kgf·m, 7 lbf·ft)



After '11 model

Release the hoses from the lower cowl.

Support the rear portion of the lower cowl and remove the four screws.

Be careful not to break the middle cowl tabs.

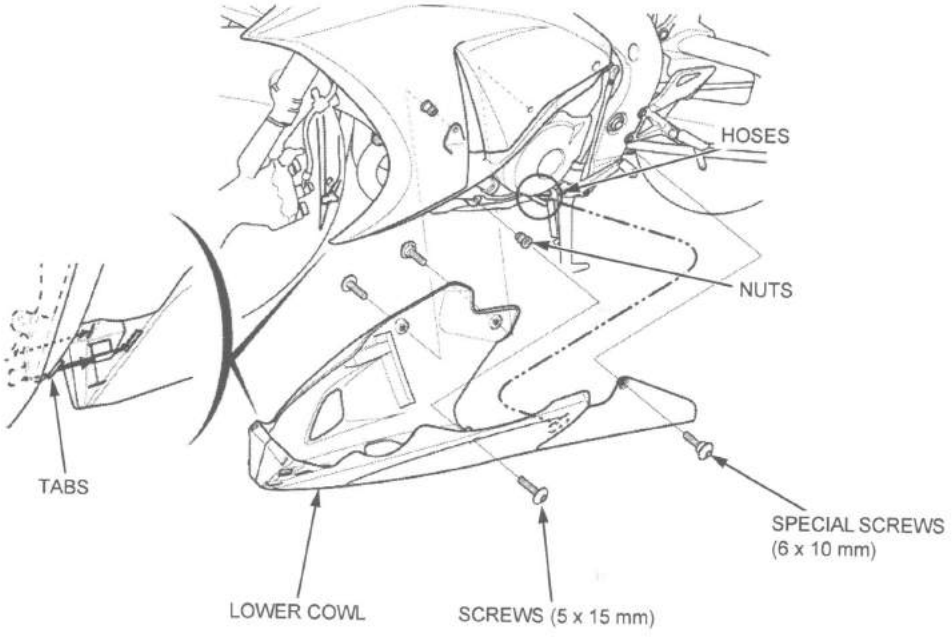
Release either the left or right three tabs on the middle cowl while sliding the lower cowl rearward, then remove the lower cowl from the other side tabs.

Remove the special nuts from the stays if necessary.

Installation is in the reverse order of removal.

TORQUE:

Lower cowl mounting screw (front):
1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Lower cowl mounting special screw (rear):
10 N·m (1.0 kgf·m, 7 lbf·ft)



MIDDLE COWL

REMOVAL ('08 – '11 model)

Remove the following:

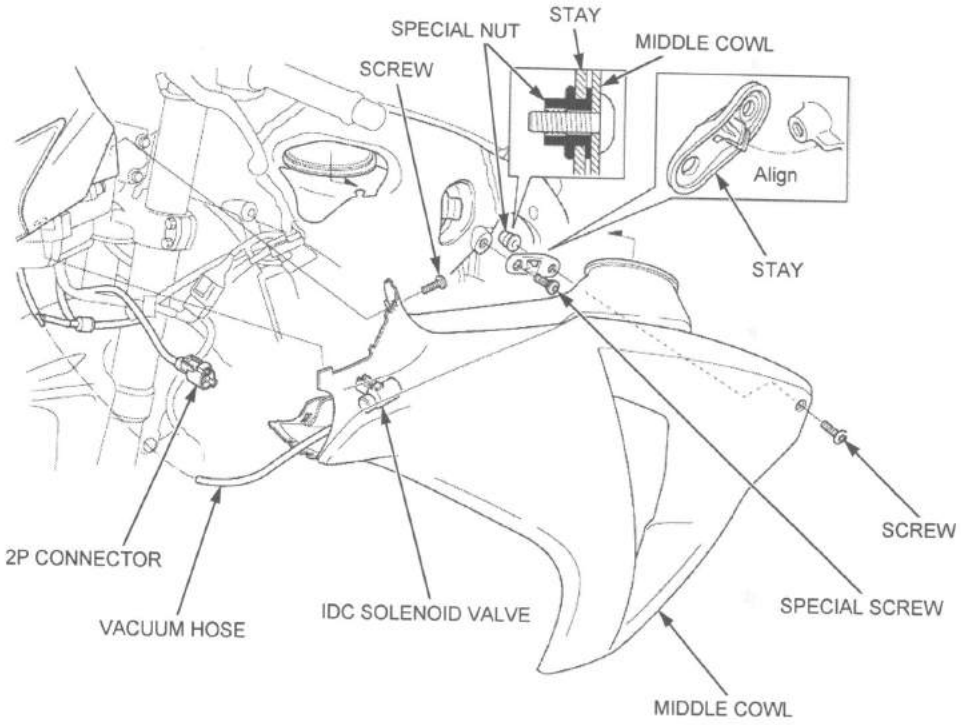
- Lower cowl (page 3-16)
- Air intake cover (page 3-14)
- Upper inner cover (page 3-15)

Be careful not to damage the tabs.

Remove the screws and middle cowl.

Disconnect the IDC solenoid valve 2P (Gray) connector and vacuum hose.

Remove the special screw, middle cowl stay, and special nut if necessary.



INSTALLATION ('08 – '11 model)

If the middle cowl stay was removed, align the stay's groove with the frame tab and tighten the special screw securely.

Connect the IDC solenoid valve 2P (Gray) connector and vacuum hose.

Connect the intake air duct to the air cleaner housing securely.

Align the tabs in the middle cowl with the slots in the upper cowl.

Install the middle cowl and tighten the screws to the specified torque.

TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)

Correctly route the wires (page 1-25). Be careful not to pinch the wires.

Install the following:

- Upper inner cover (page 3-15)
- Air intake cover (page 3-14)
- Lower cowl (page 3-16)

REMOVAL (After '11 model)

Remove the following:

- Air intake cover (page 3-14)
- Air duct cover (page 3-15)

Remove the trim clip from the inside of the middle cowl.

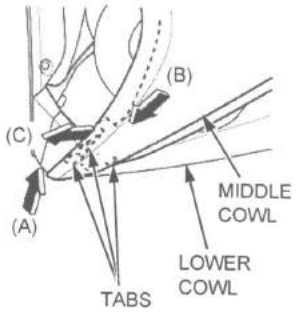
Be careful not to break the tabs.

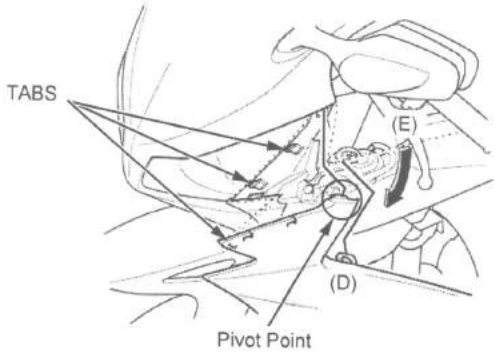
While supporting the bottom of the lower cowl (A), and holding the lower side of the middle cowl down (B) to avoid damaging the retaining tabs, disconnect the lower tabs of the middle cowl by sliding it forward (C).

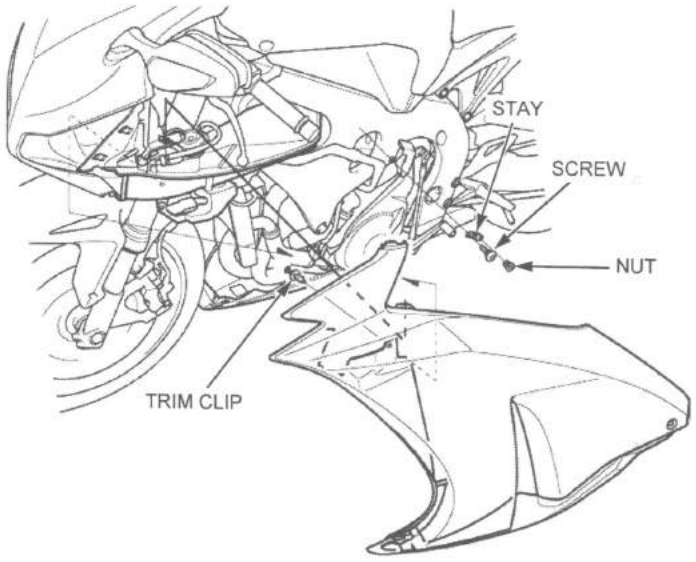
Be careful not to scratch the cowls.

Release the stay off of the headlight housing (D), then turn the middle cowl downward (E) as a pivot point of the upper end to release the front tabs and remove the middle cowl.

Remove the screw and cowl stay if necessary.







INSTALLATION (After '11 model)

Install the cowl stay, aligning the groove with the frame tab and tighten the special screw if it was removed.

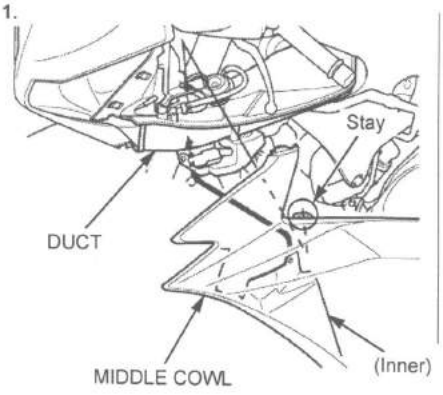
Do not spread open the cowl more than necessary.

1. Install the middle cowl over the intake air duct while spreading the inner side of the middle cowl slightly, then position the stay onto the headlight housing.
2. Raise the upper cowl end and place the upper tab A of the middle cowl under the upper cowl.
3. Align the slit in the inner middle cowl with the upper cowl tab B and set all the front side tabs C properly by sliding the middle cowl rearward.
4. Insert the three lower tabs D into the slits in the lower cowl in a straight line while supporting the bottom of the lower cowl, being careful not to damage the tabs.

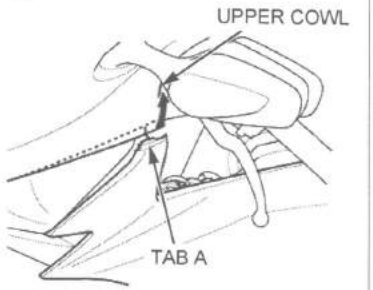
Make sure the mating areas of the middle cowl are aligned with the air duct and upper cowl properly as shown, and install the trim clip.

Install the following.
- Air duct cover (page 3-15)
- Air intake cover (page 3-14)

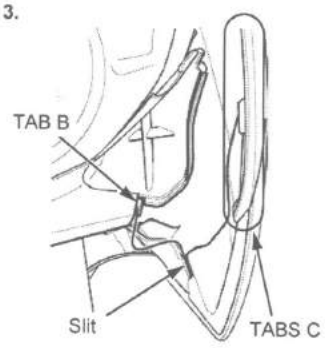
1.



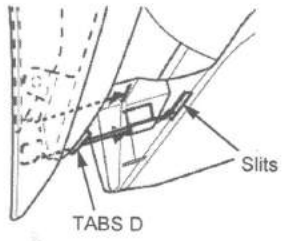
2.

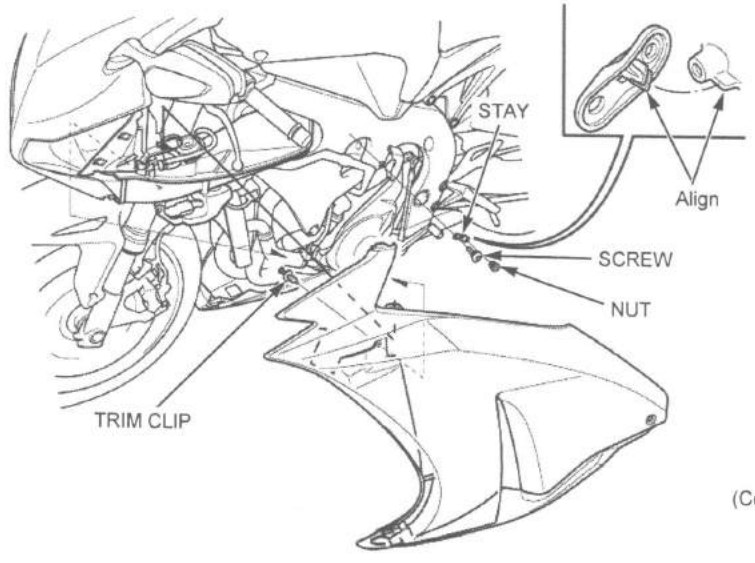


3.

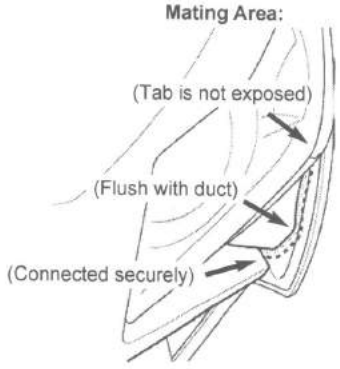


4.



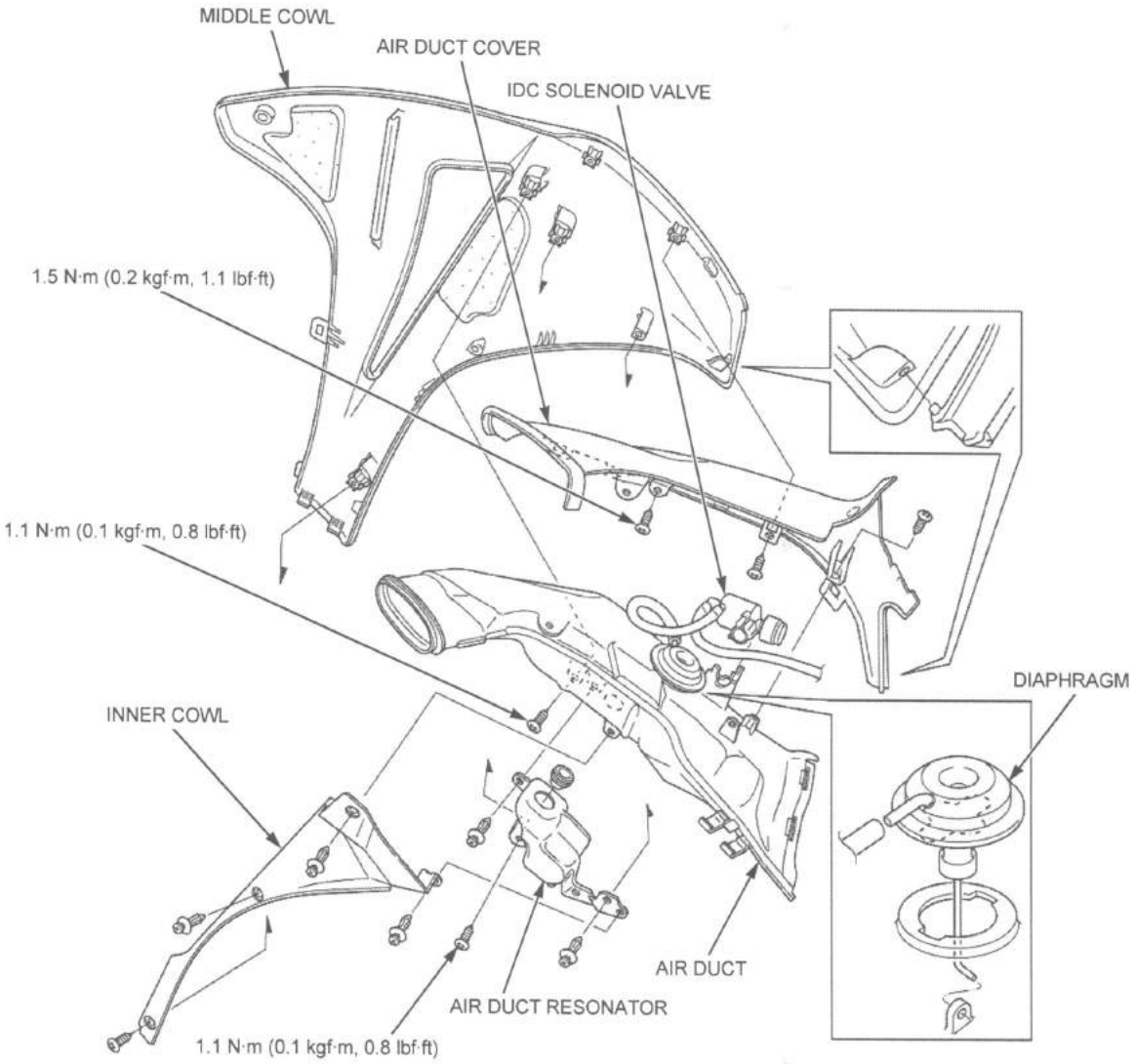


Mating Area:

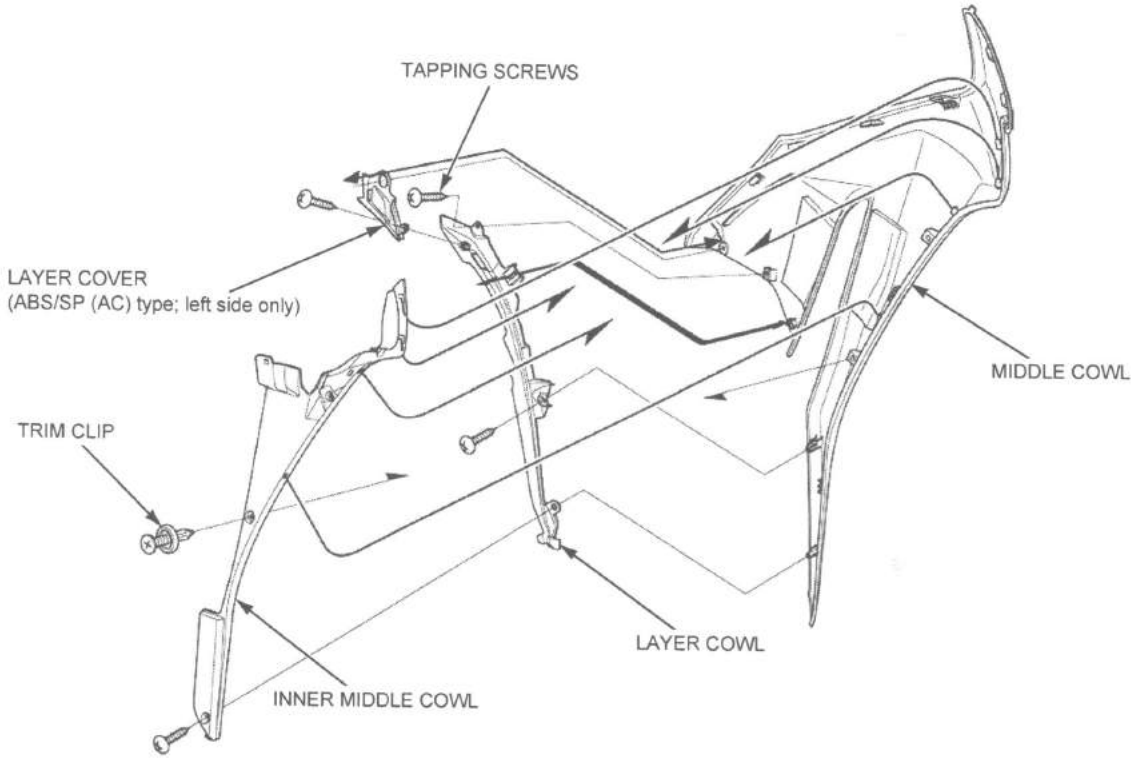


DISASSEMBLY/ASSEMBLY

'08 – '11 model



After '11 model



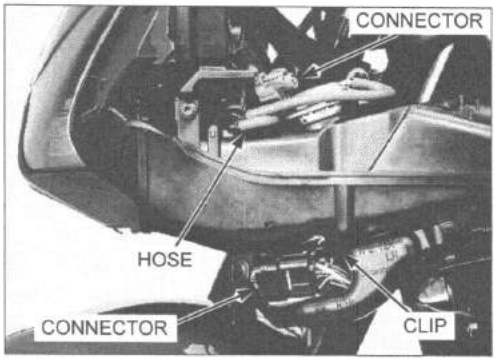
INTAKE AIR DUCT (After '11 model)

REMOVAL/INSTALLATION

Remove the middle cowl (page 3-19).

Disconnect the 2P (Gray) connector and vacuum hose from the IDC solenoid valve.

Remove the harness clip and the 20P (Black) connector out of the resonator on the left duct.



Release the following from the wire guide of the duct.

- vacuum hose(s)
- solenoid wire
- headlight wire
- sub-wire harness (left duct)

Remove the screw.

Release the tab on the headlight housing and the boss from the frame, and remove the air duct.

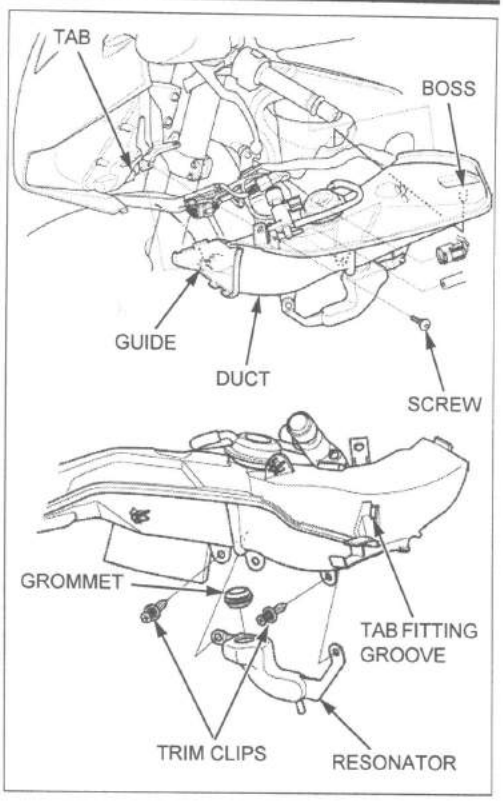
Remove the two trim clips and resonator if necessary.

Installation is in the reverse order of removal.

NOTE:

- Make sure the mating area of the duct is aligned with the headlight housing, before tightening the screw.

TORQUE: Screw: 5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)



LEFT REAR UNDER COVER (ABS/SP (AC) type)

REMOVAL/INSTALLATION

Remove the left middle cowl (page 3-18).

Remove the bolt and gearshift arm.

Remove the special screws. Release the cover flange off of the hook (After '11 model) and the boss from the grommet, then remove the left rear under cover.

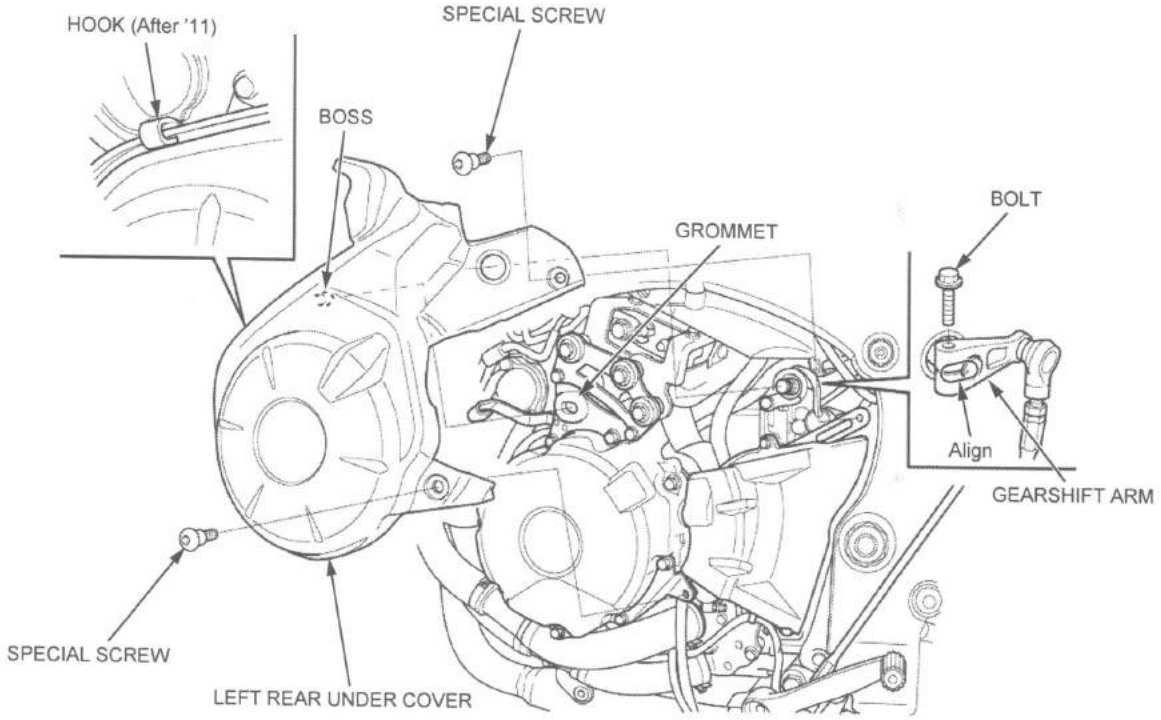
Install the left rear under cover while aligning its boss with the grommet, then tighten the special screws securely.

Install the gearshift arm to the gearshift spindle, aligning the arm slit with the punch mark on the gearshift spindle.

Tighten the gearshift arm pinch bolt securely.

Install the left middle cowl (page 3-18).

ABS type shown:



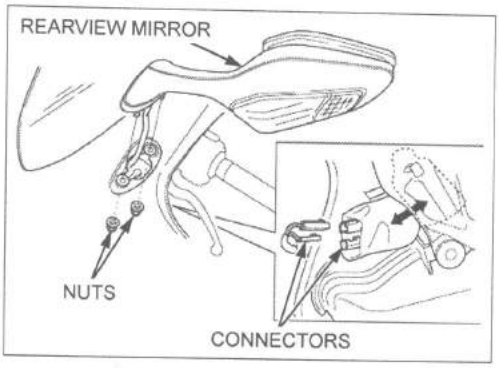
REARVIEW MIRROR/WINDSCREEN

REMOVAL/INSTALLATION

'08 – '11 model

Disconnect the position light and turn signal 2P connectors.

Remove the nuts and rearview mirror.



Remove the bolts, plastic washers, rubber washers, windscreen and special nuts.

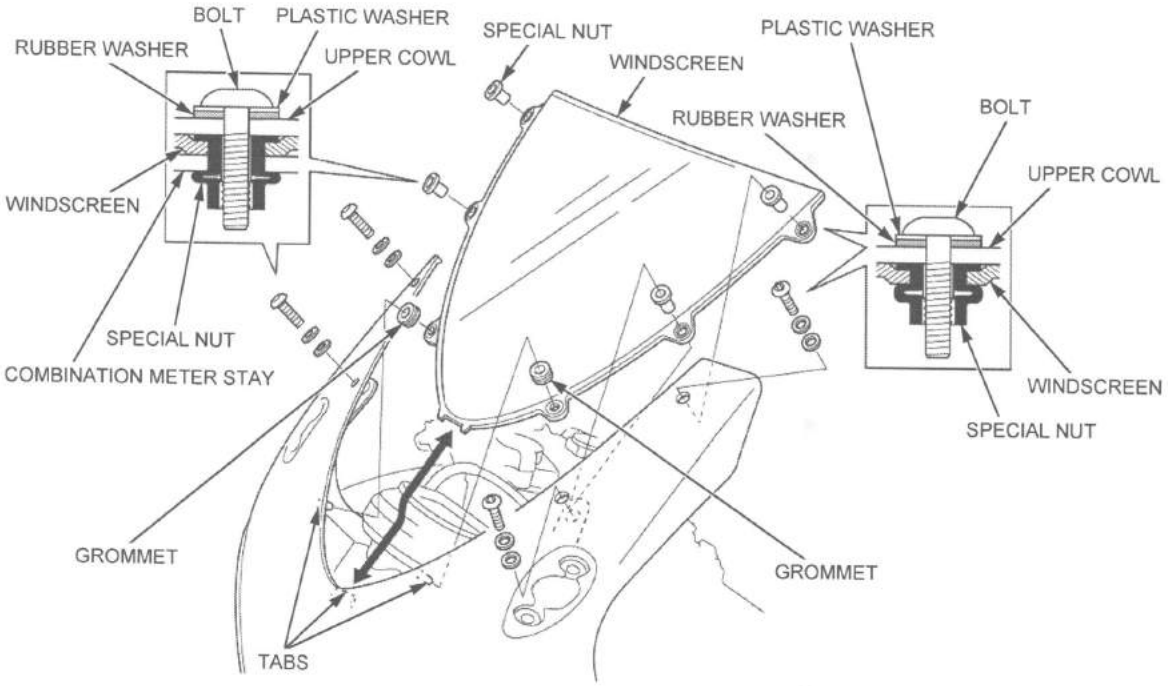
Installation is in the reverse order of removal.

TORQUE:

Windscreen mounting bolt:
1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)

Rearview mirror mounting nut:
10 N·m (1.0 kgf·m, 7 lbf·ft)

- Align the front side two grommets with the upper cowl tabs.
- Route the rearview mirror wires before installing the windscreen.



After '11 model

Pull the connector boot out of the stay and disconnect the position light 1P and turn signal light 2P connectors.

Do not hang the mirror by the turn signal/position light wire.

Remove the nuts and washers and pull the wire out of the stay carefully to remove the rearview mirror.

Perform the same procedure for the other side mirror.

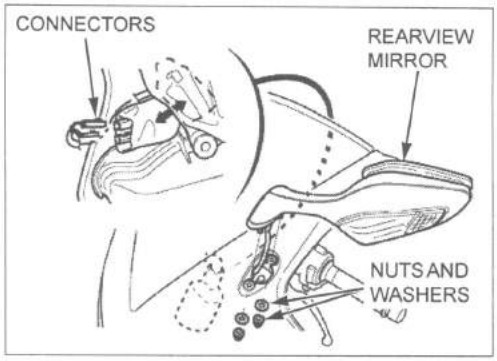
Remove the four bolts, plastic washers, and rubber washers.

Take care not to scratch the windscreen surface.

Slightly press both ends of the windscreen inward and remove it.

Remove the four special nuts and two grommets from the windscreen.

Installation is in the reverse order of removal.



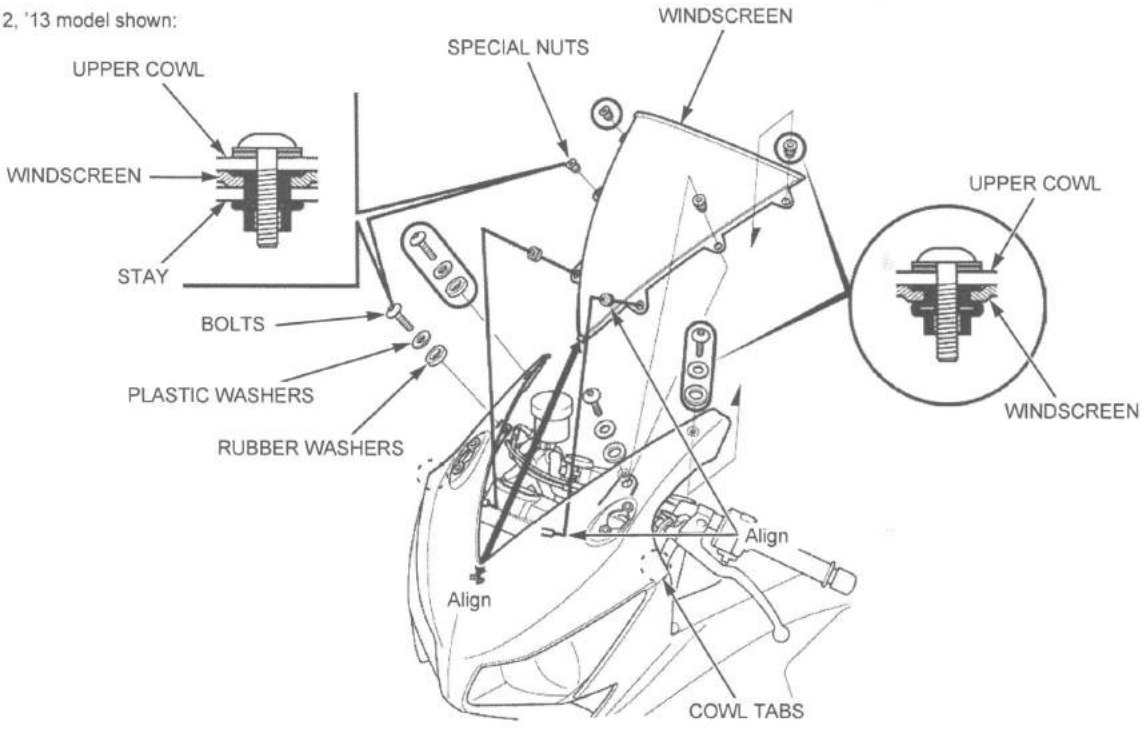
NOTE:

- Align the windscreen tab with the cowl groove and the two grommets with the cowl bosses.
- Route the turn signal/position light wires through the stay before installing the windscreen, being careful not to break the tabs on the upper cowl.

TORQUE:

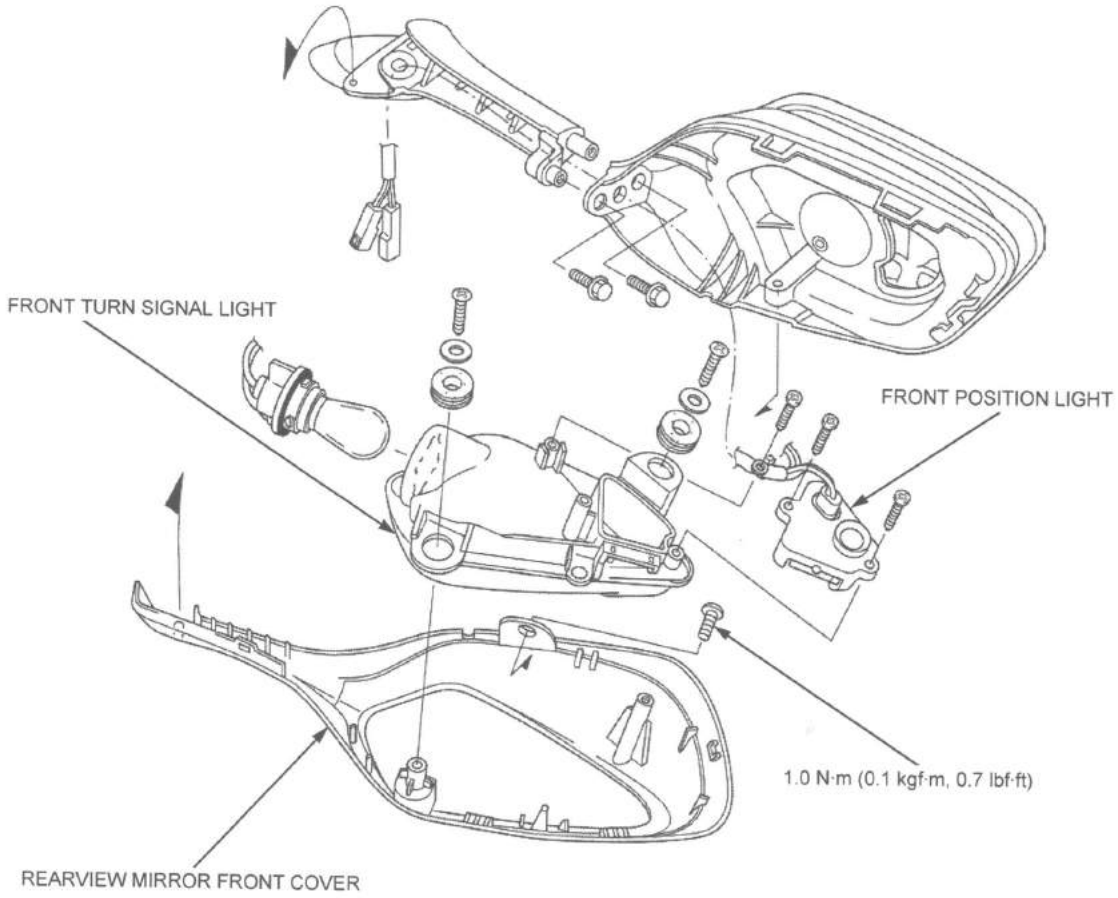
Windscreen mounting bolt:
1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Rearview mirror mounting nut:
10 N·m (1.0 kgf·m, 7 lbf·ft)

'12, '13 model shown:



REARVIEW MIRROR DISASSEMBLY/ ASSEMBLY

- For rearview mirror front cover removal (page 21-8).



UPPER COWL

REMOVAL/INSTALLATION

'08 – '11 model

Remove the following:

- Middle cowls (page 3-18)
- Upper inner covers (page 3-15)
- Rearview mirrors (page 3-25)
- Windscreen (page 3-25)

Disconnect the sub harness 20P (Black) and 8P (Black) connectors.

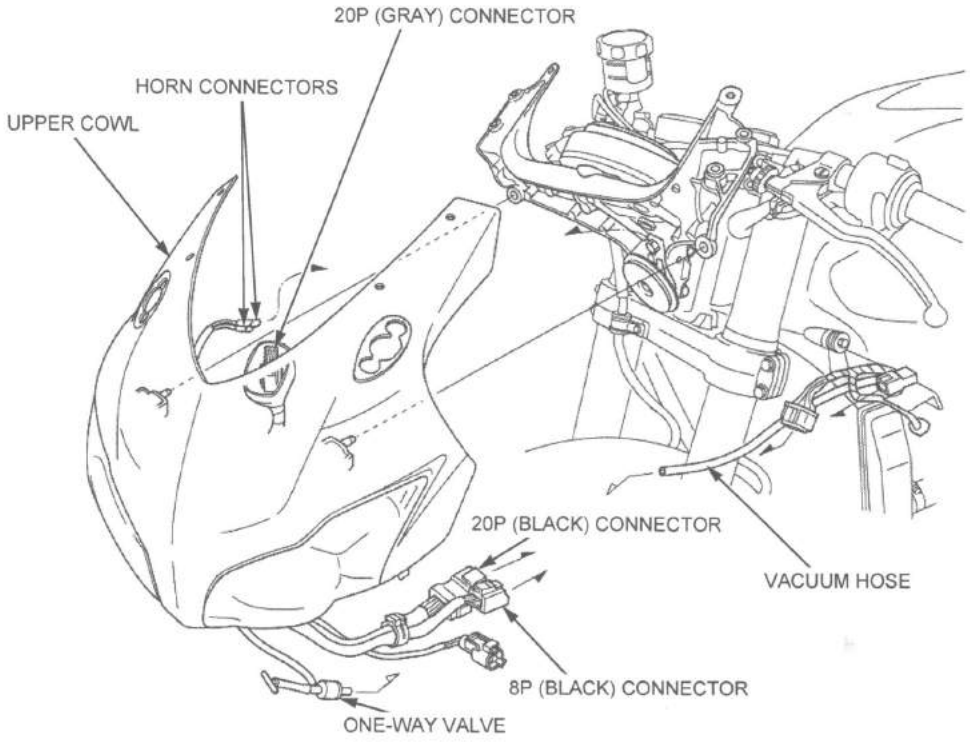
Disconnect the vacuum hose from the one-way valve.

Remove the upper cowl from the frame grommets.

Disconnect the horn connectors and combination meter 20P (Gray) connector.

Correctly route the wires (page 1-25).

Installation is in the reverse order of removal.



After '11 model

Remove the following:

- Middle cowls (page 3-19)
- Intake air duct (page 3-22)

Disconnect the sub-wire harness 8P (Black), 8P (Gray) and 20P (Black) connectors.

Disconnect the vacuum hose (that goes to the chamber on the headlight housing) from the one-way valve.

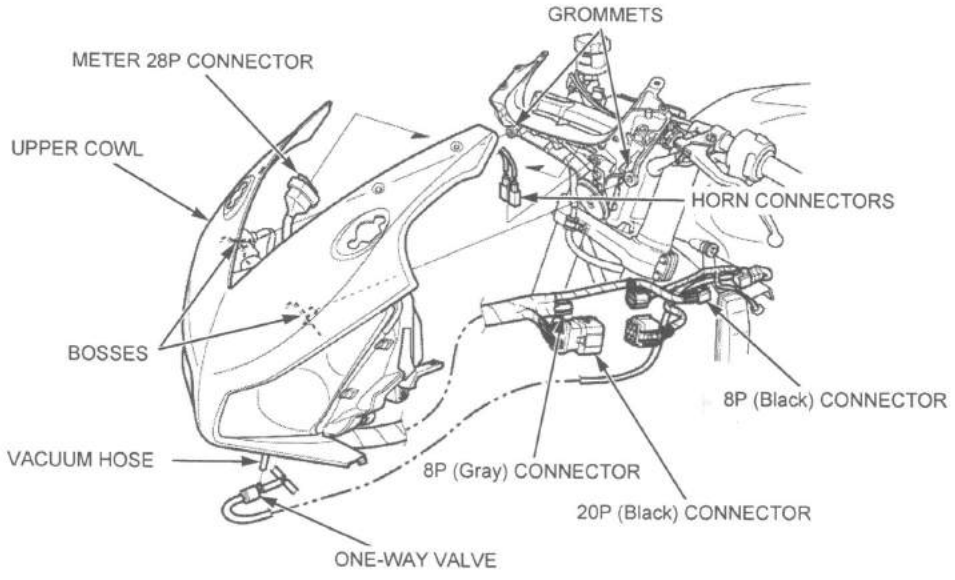
Cover the front fender with clean shop towels to prevent the upper cowl from falling onto the fender.

Remove the rearview mirrors and windscreen (page 3-25).

Release the two cowl bosses off of the stay grommets and disconnect the meter 28P (Gray) and horn connectors to remove the upper cowl.

Route the wires properly (page 1-66).

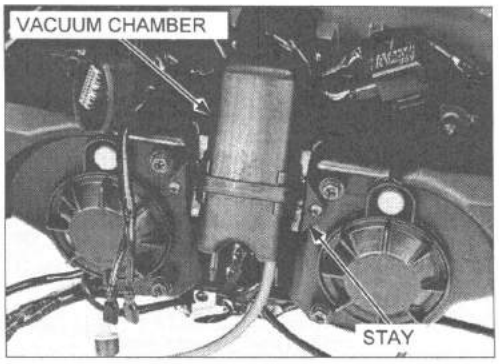
Installation is in the reverse order of removal.



DISASSEMBLY

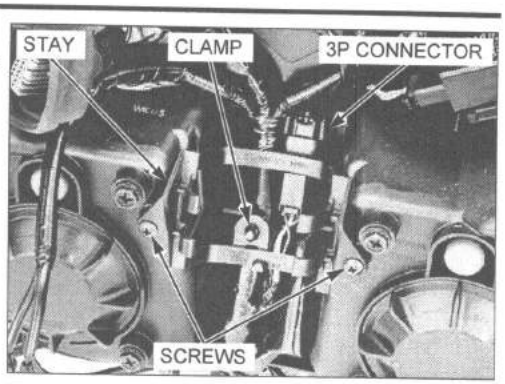
'08 – '11 model

Remove the vacuum chamber from the vacuum chamber stay.



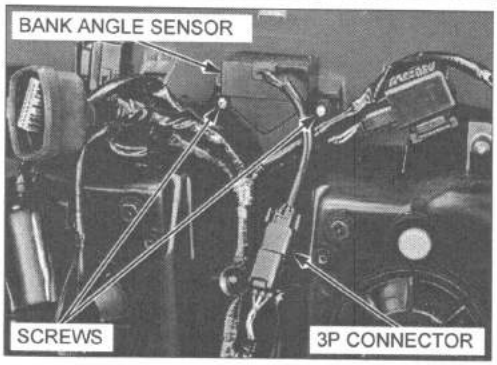
Remove the screws and vacuum chamber stay.

Release the bank angle sensor 3P (Black) connector and wire clamp from the vacuum chamber stay.

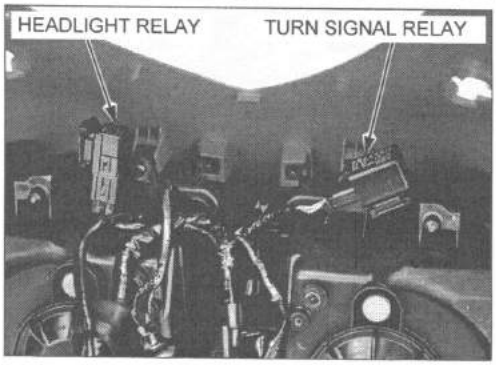


Disconnect the bank angle sensor 3P (Black) connector.

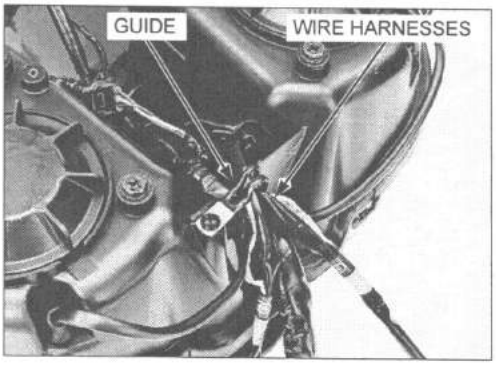
Remove the screws and bank angle sensor.



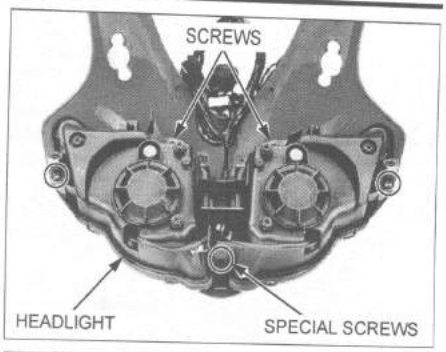
Remove the headlight and turn signal relay.



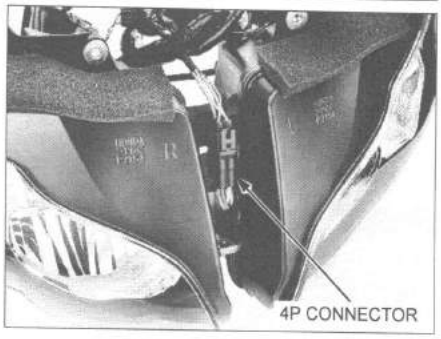
Release the wire harnesses from the wire guide.



Remove the screws, special screws, and headlight from the upper cowl.



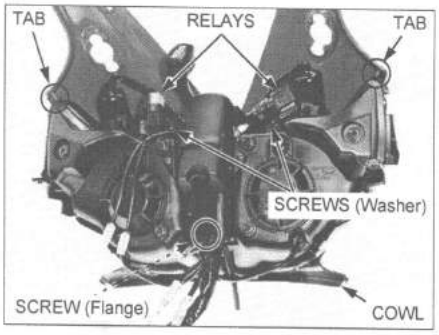
Remove the headlight 4P (Black) connector from the headlight.



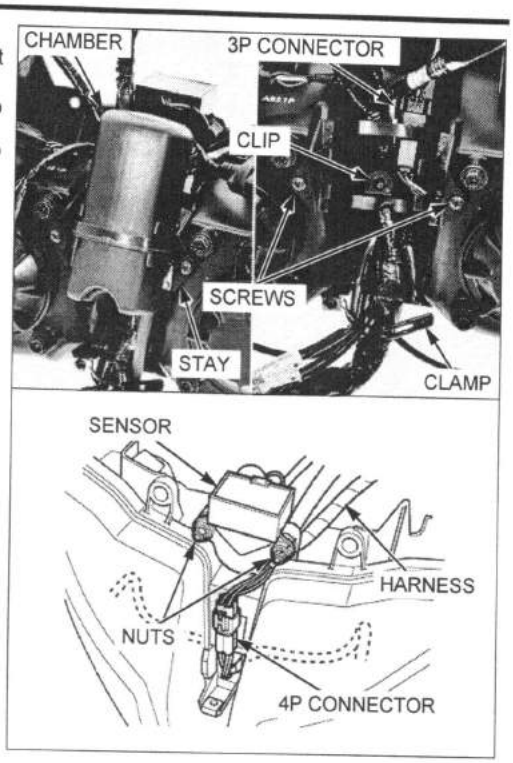
After '11 model

Remove the following:

- turn signal and headlight relays (from the headlight housing)
- flange screw and two washer screws
- upper cowl (by releasing the two tabs)

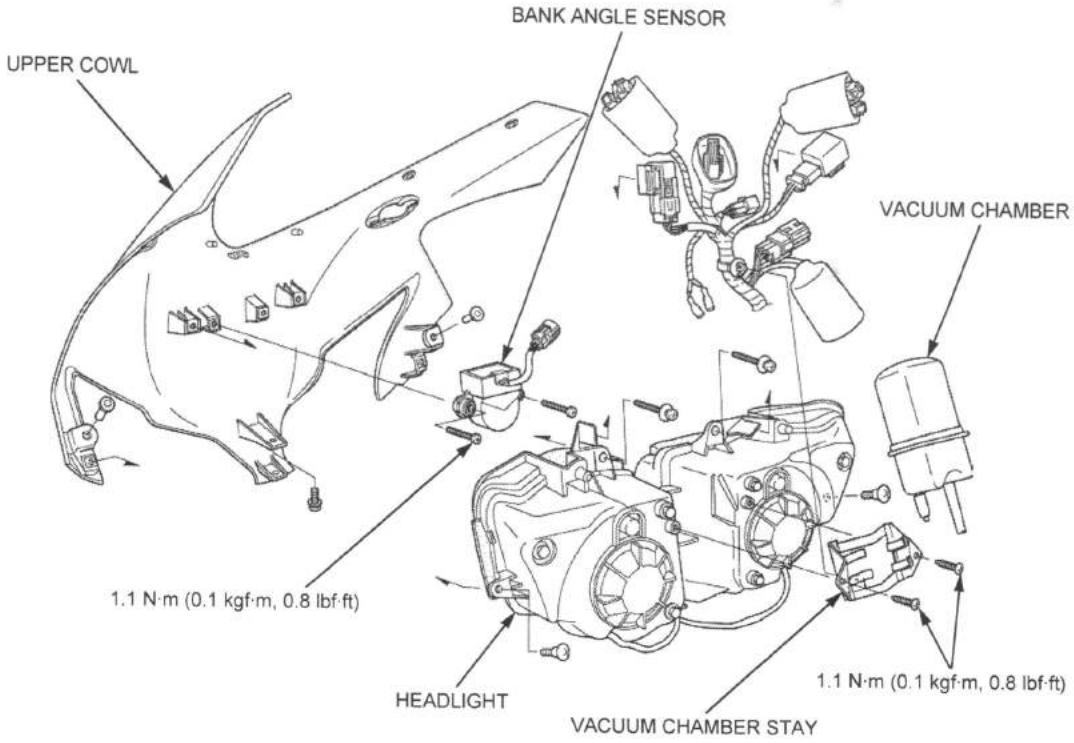


- vacuum chamber (from the stay)
- two tapping screws and stay (from the headlight housing)
- angle sensor 3P (Black) connector and wire clip (to remove the stay)
- two nuts and bank angle sensor (disconnect the 3P connector)
- headlight 4P (Black) connector
- sub-wire harness (from the clamp)

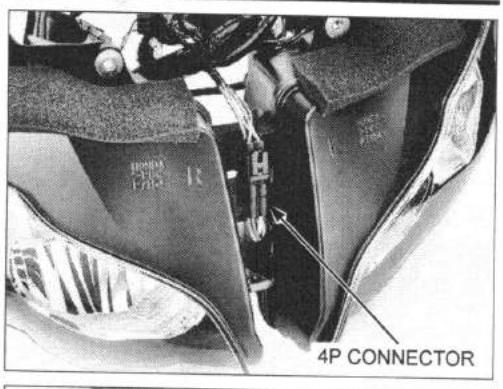


ASSEMBLY

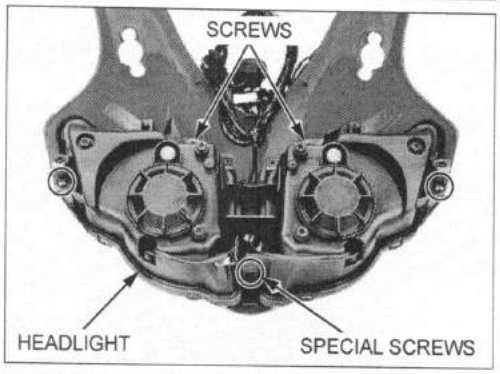
'08 – '11 model



Install the headlight 4P (Black) connector to the headlight.

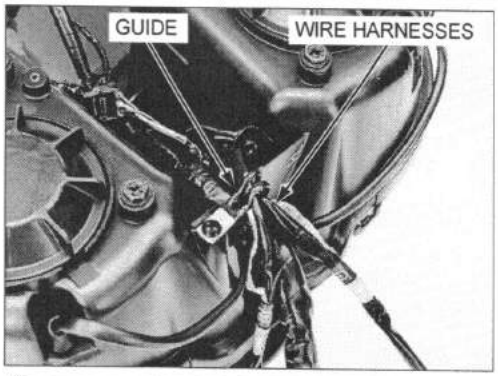


Install the headlight to the upper cowl and tighten the screws and special screws securely.

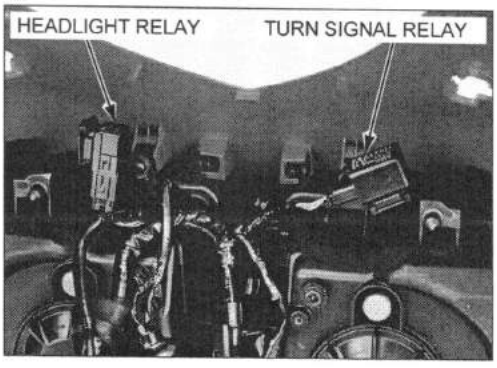


Correctly route the wires (page 1-25).

Install the wire harnesses to the wire guide.



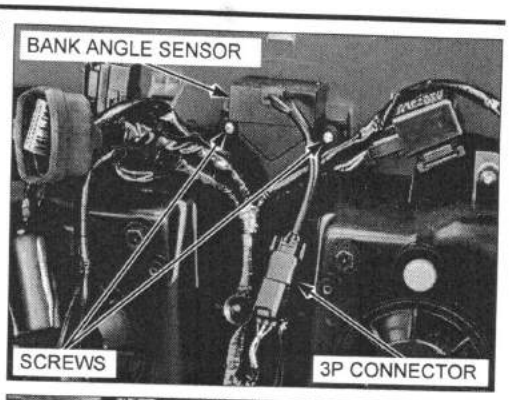
Install the headlight and turn signal relay.



Install the bank angle sensor and tighten the screws to the specified torque.

TORQUE: 1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

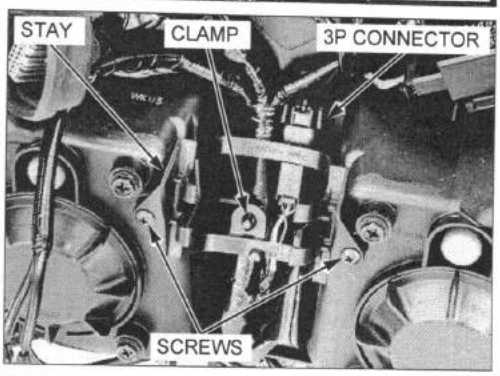
Connect the bank angle sensor 3P (Black) connector.



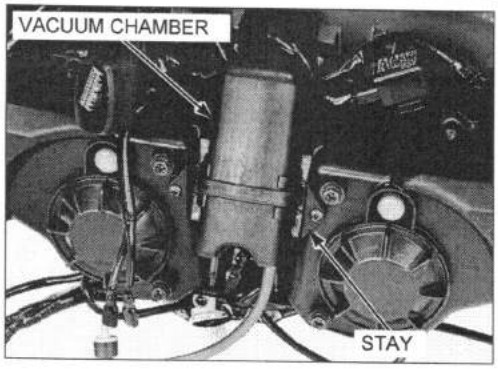
Install the bank angle sensor 3P (Black) connector and wire clamp to the vacuum chamber stay.

Install the vacuum chamber stay and tighten the screws to the specified torque.

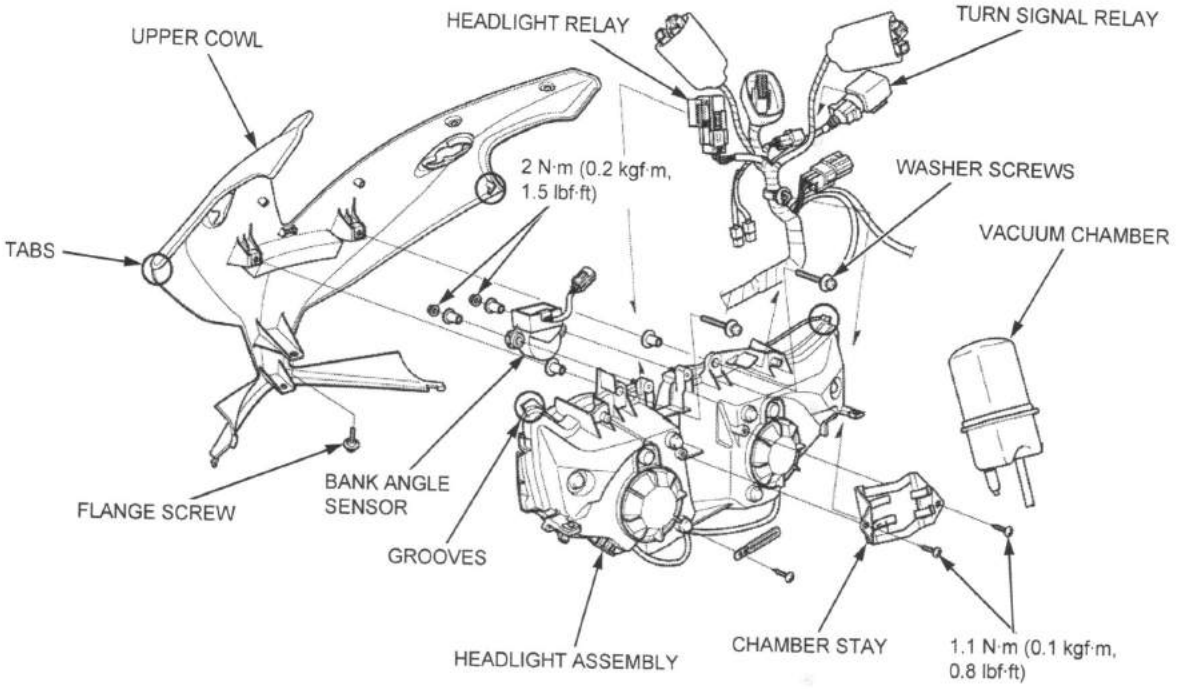
TORQUE: 1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)



Install the vacuum chamber to the vacuum chamber stay securely.



After '11 model



Route the wires properly (page 1-66).

Place the sub-wire harness between the headlights and connect the 4P (Black) connector.

Install the bank angle sensor with the two nuts.

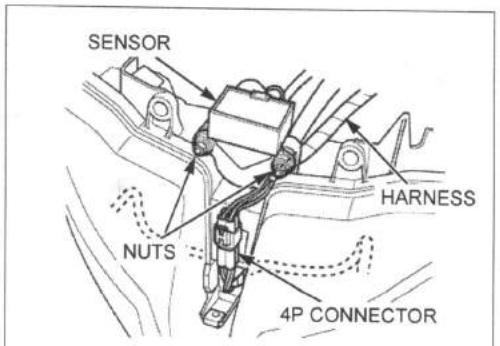
TORQUE: 2 N·m (0.2 kgf·m, 1.5 lbf·ft)

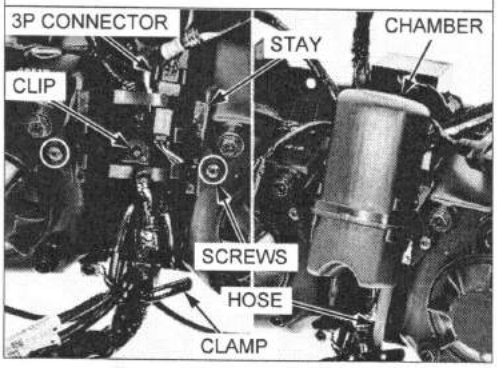
Connect the 3P (Black) connector.

Install the wire clip and 3P connector onto the chamber stay and install it with the two tapping screws.

TORQUE: 1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

Install the vacuum chamber into the stay and secure the wires and vacuum hose with the clamp.

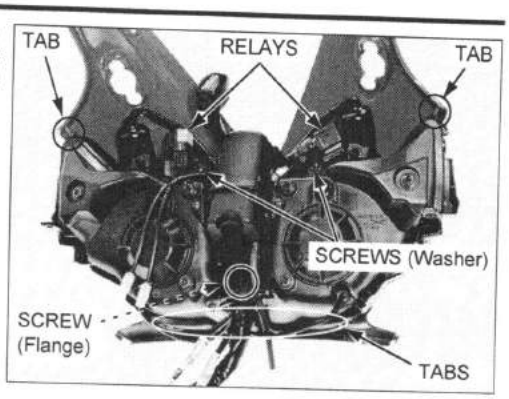




Place the upper cowl onto the headlight housing by aligning the four lower grooves with the tabs of the housing and set the two upper tabs into the grooves to secure the cowl.

Install the three screws and tighten them.

Install the turn signal and headlight relays onto the stays.



FRONT FENDER

REMOVAL/INSTALLATION (STANDARD/SP type)

Remove the front brake hose 3-way joint bolt and hose clamp nut.

Remove the screws, grommets, front fender, collars, and reflectors from the fork legs.

NOTE:

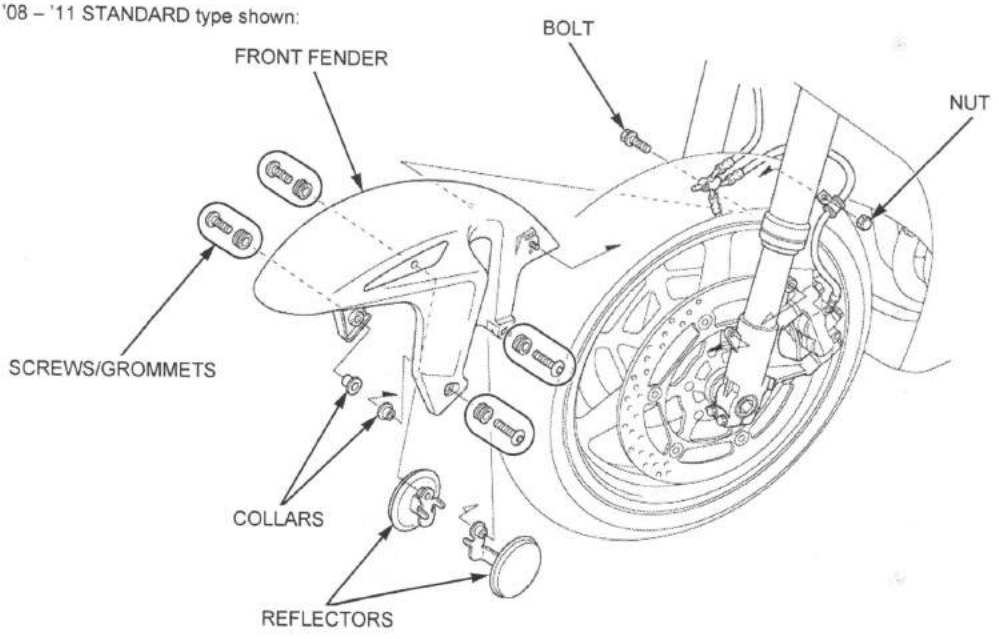
- Pull the front fender up and then pull it forward between the fork legs.
- Be careful not to damage the fork legs.

Installation is in the reverse order of removal.

TORQUE:

Front fender mounting screw:
12 N·m (1.2 kgf·m, 9 lbf·ft)
Front brake hose clamp nut:
10 N·m (1.0 kgf·m, 7 lbf·ft)
Front brake hose 3-way joint bolt:
10 N·m (1.0 kgf·m, 7 lbf·ft)

'08 – '11 STANDARD type shown:



REMOVAL/INSTALLATION (ABS type)

Remove the front brake hose 3-way joint bolt, front wheel speed sensor wire clamp, and hose clamp nut.

Remove the screws, grommets, front fender, reflectors and collars from the fork legs.

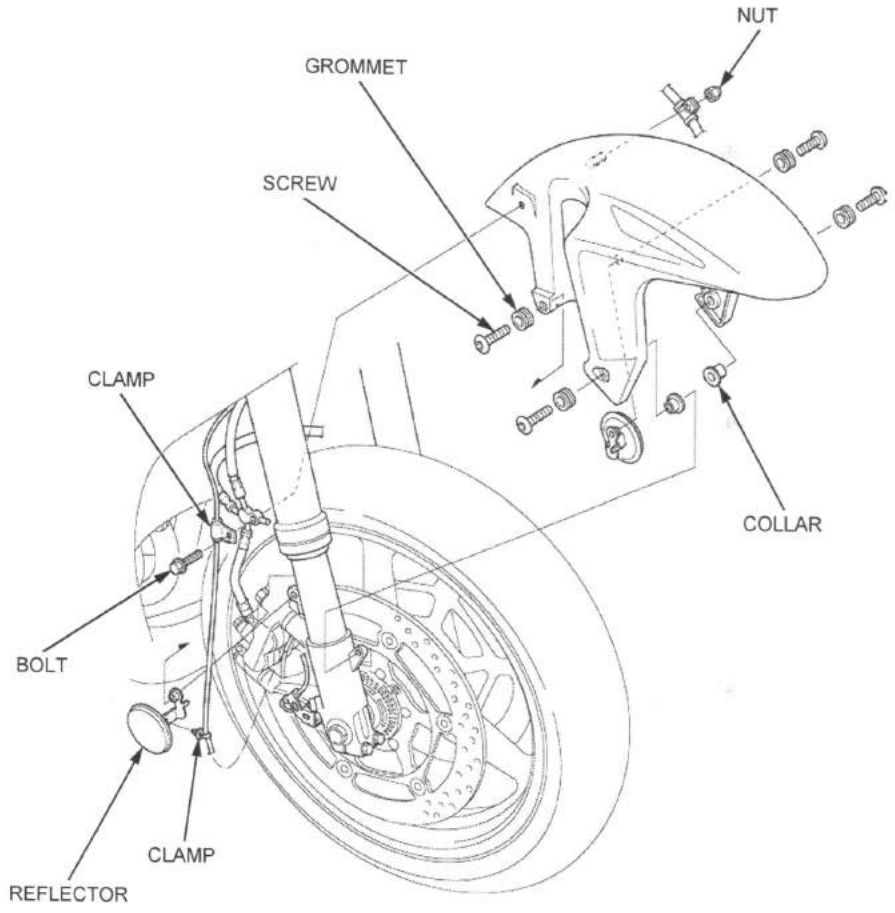
NOTE:

- Pull the front fender up and then pull it forward between the fork legs.
- Be careful not to damage the fork legs.

Installation is in the reverse order of removal.

TORQUE:

Front fender mounting screw:
12 N·m (1.2 kgf·m, 9 lbf·ft)
Front brake hose clamp nut:
10 N·m (1.0 kgf·m, 7 lbf·ft)
Front brake hose 3-way joint bolt:
10 N·m (1.0 kgf·m, 7 lbf·ft)



REAR FENDER A

REMOVAL/INSTALLATION

Remove the nuts, bolts, and number plate bracket.

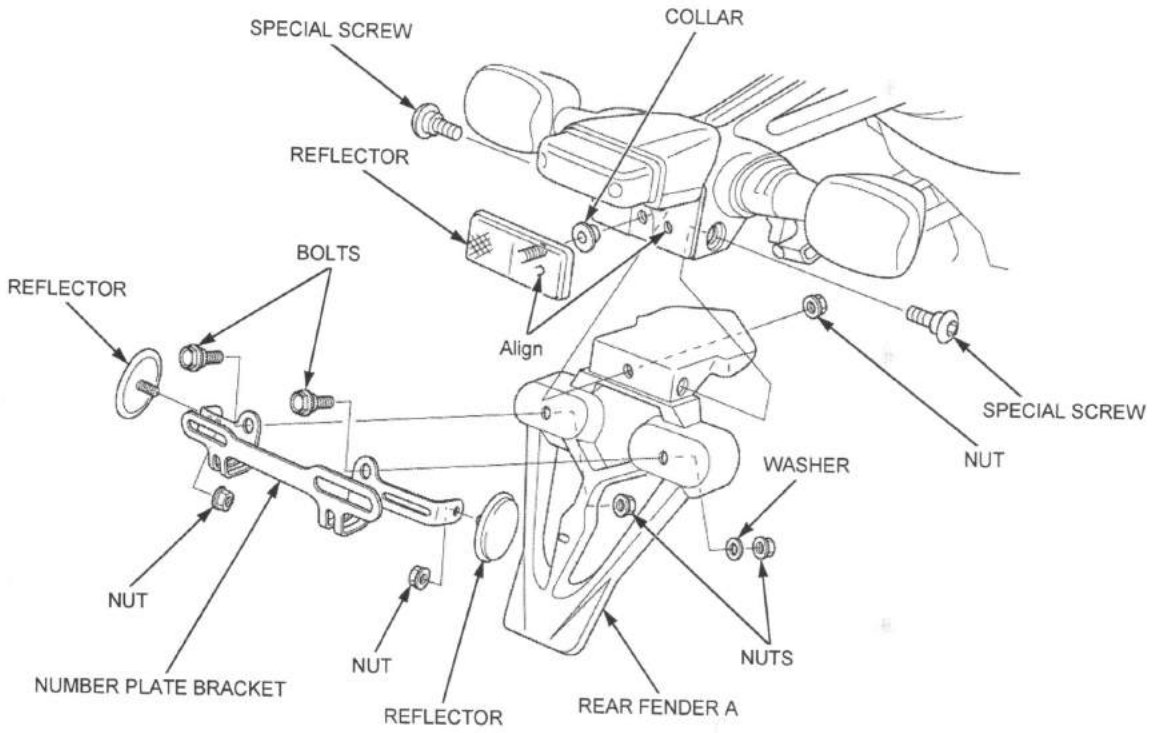
Remove the nuts and reflectors from the number plate bracket.

Remove the special screws.

Remove the nut, reflector, collar, and rear fender A.

Installation is in the reverse order of removal.

- Align the reflector tab with the license light stay hole.



REAR FENDER B

REMOVAL/INSTALLATION (STANDARD/SP type)

Remove the following:

- Rear seat cowl (page 3-11)
- Fuel tank (page 6-60)
- Battery (page 18-7)
- Regulator/rectifier (page 18-11)
- Starter relay switch (page 20-19)
- EGCA (page 6-89)

Disconnect the brake/tail light 3P (Natural) and sub harness 4P (Black) connectors.

Remove the fuse/relay box from the rear fender B.

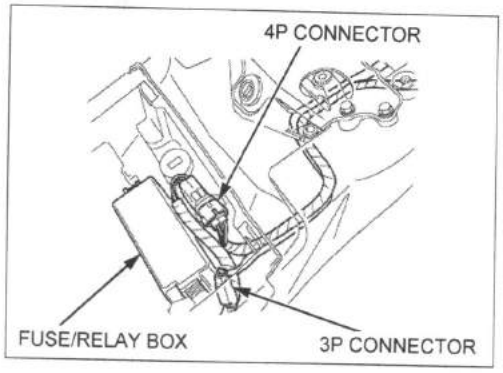
Remove the bolts and pillion seat catch.
Remove the bolt and ground terminals.

Disconnect the siphon hose.

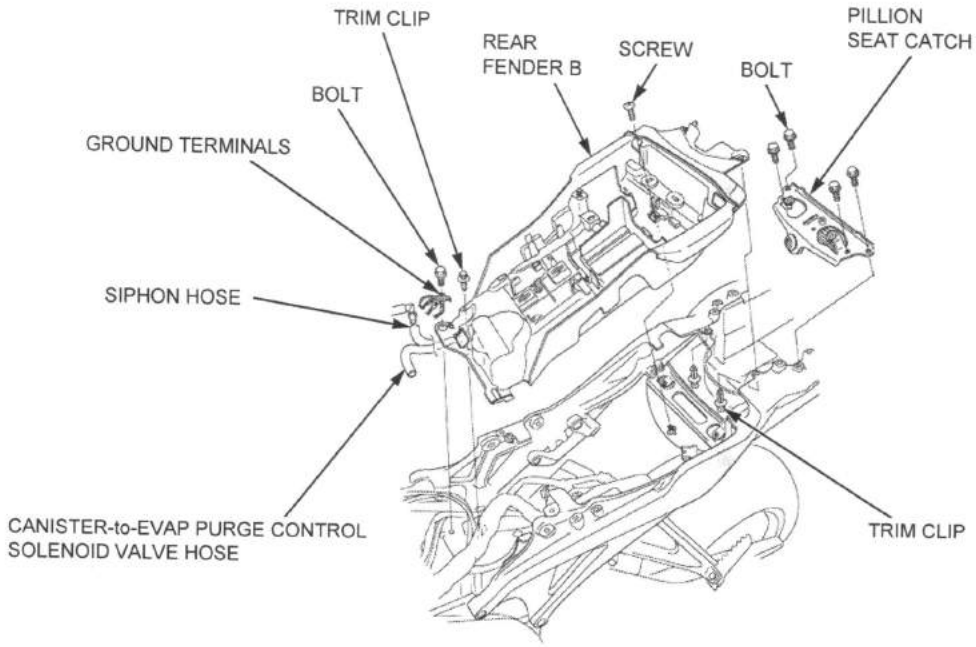
(AC) type: Disconnect the canister-to-EVAP purge control solenoid valve hose.

Remove the trim clips, screw, and rear fender B.

Correctly route the wires (page 1-25). Installation is in the reverse order of removal.



'08 – '11 STANDARD type shown:

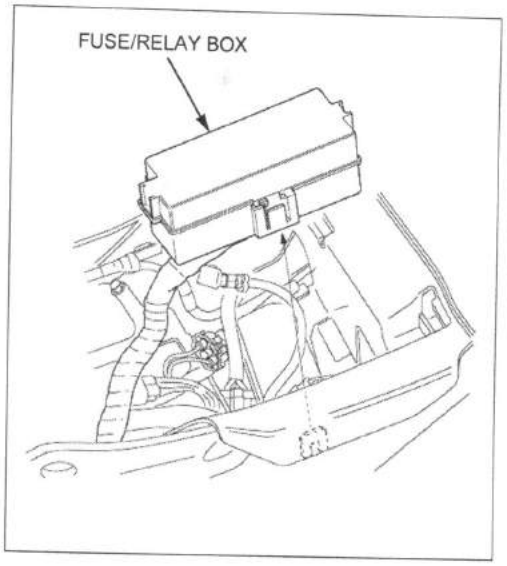


REMOVAL/INSTALLATION (ABS type)

Remove the following:

- Rear seat cowl (page 3-11)
- Fuel tank (page 6-60)
- Battery (page 18-7)
- Regulator/rectifier (page 18-11)
- Starter relay switch (page 20-19)
- EGCA (page 6-90)
- Rear ABS valve unit/power unit (page 17-63)
- Combined ABS control unit (page 17-50)

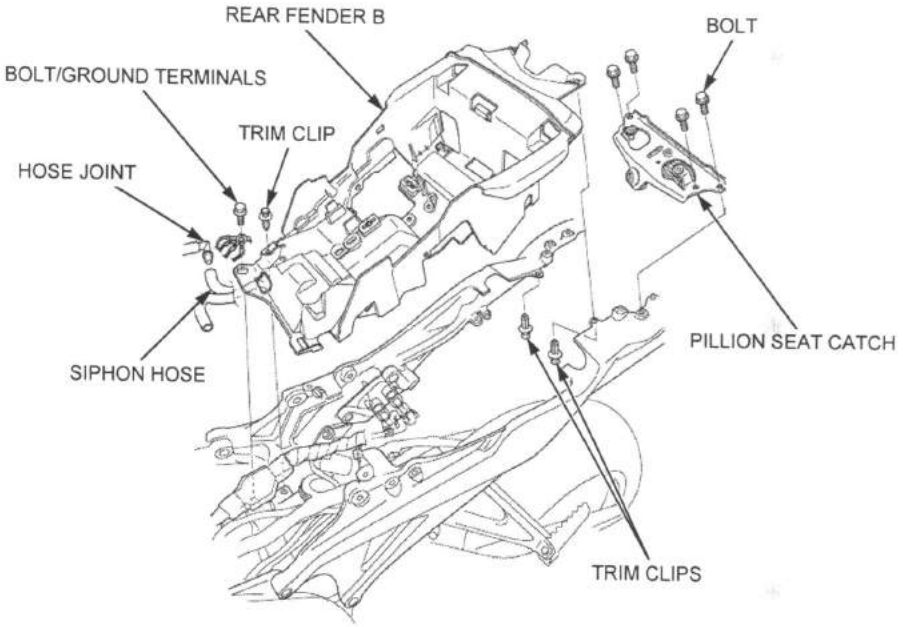
Remove the fuse/relay box from the rear fender B.



Remove the bolts and pillion seat catch.
Remove the bolt and ground terminals.
Disconnect the siphon hose from the hose joint.
Remove the trim clips, screw, and rear fender B.

Route the wires properly (page 1-25).

Installation is in the reverse order of removal.



REAR FENDER C (STANDARD/SP type)

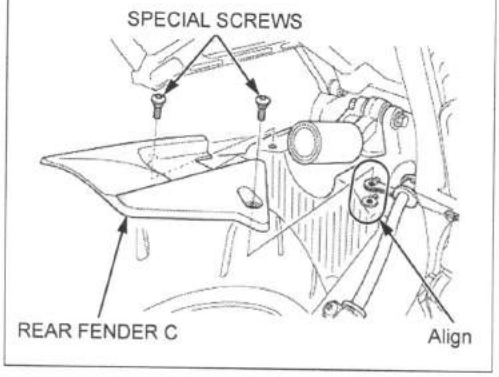
REMOVAL/INSTALLATION

Remove the special screws, rear fender C, and brake hose guide from the swingarm.

Install the brake hose clamp by aligning its tab to the swingarm hole.

Install the rear fender C and tighten the special screws securely.

'08 – '11 STANDARD type shown:



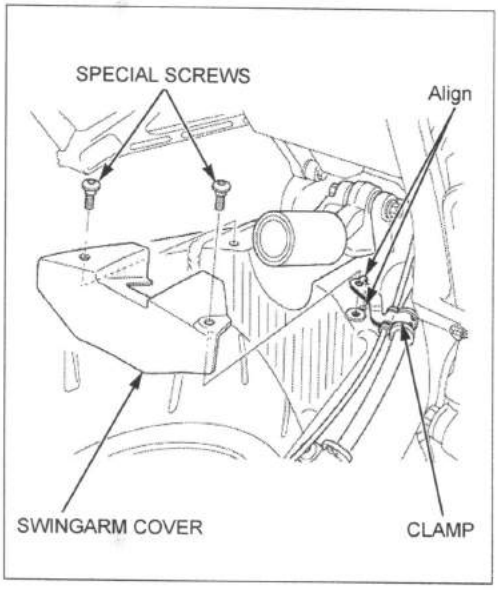
SWINGARM COVER (ABS type)

REMOVAL/INSTALLATION

Remove the special screws, swingarm cover, and brake hose clamp from the swingarm.

Install the brake hose clamp by aligning its tab to the swingarm hole.

Install the swingarm cover and tighten the special screws securely.



LICENSE LIGHT STAY ('08, '09 model)

REMOVAL/INSTALLATION

STANDARD type: Remove the rear fender B (page 3-39).

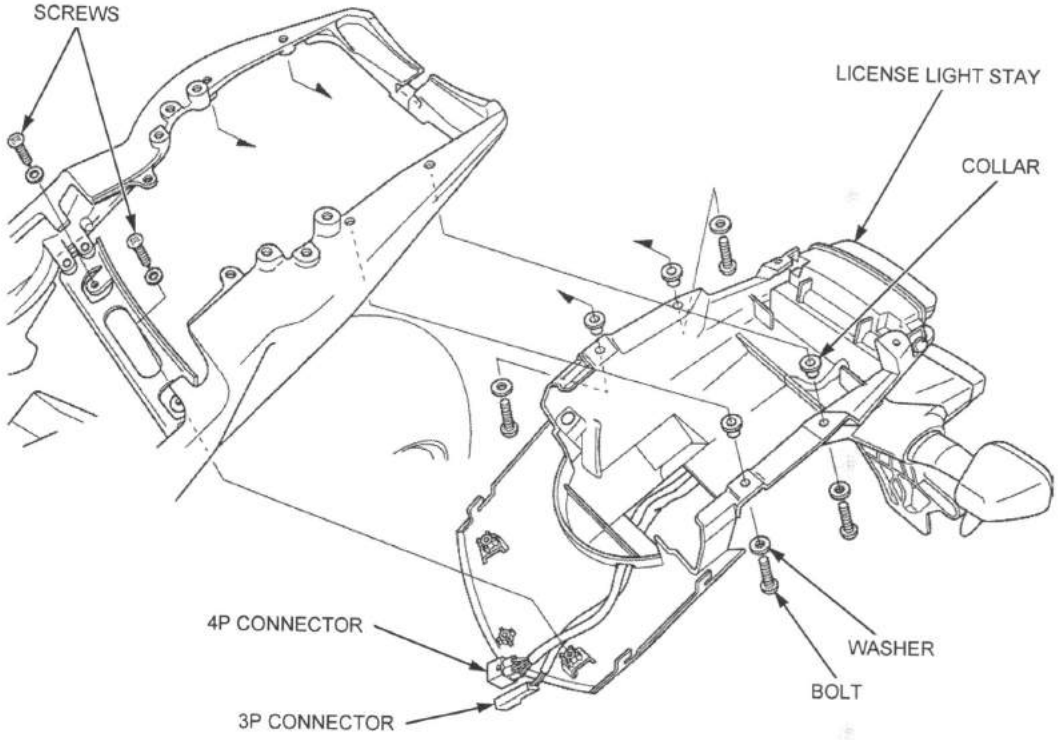
ABS type: Remove the following:

- Rear seat cowl (page 3-11)
- Fuse/relay box (page 6-90)

ABS type: Disconnect the brake/tail light 3P (Natural) and sub harness 4P (Black) connectors.

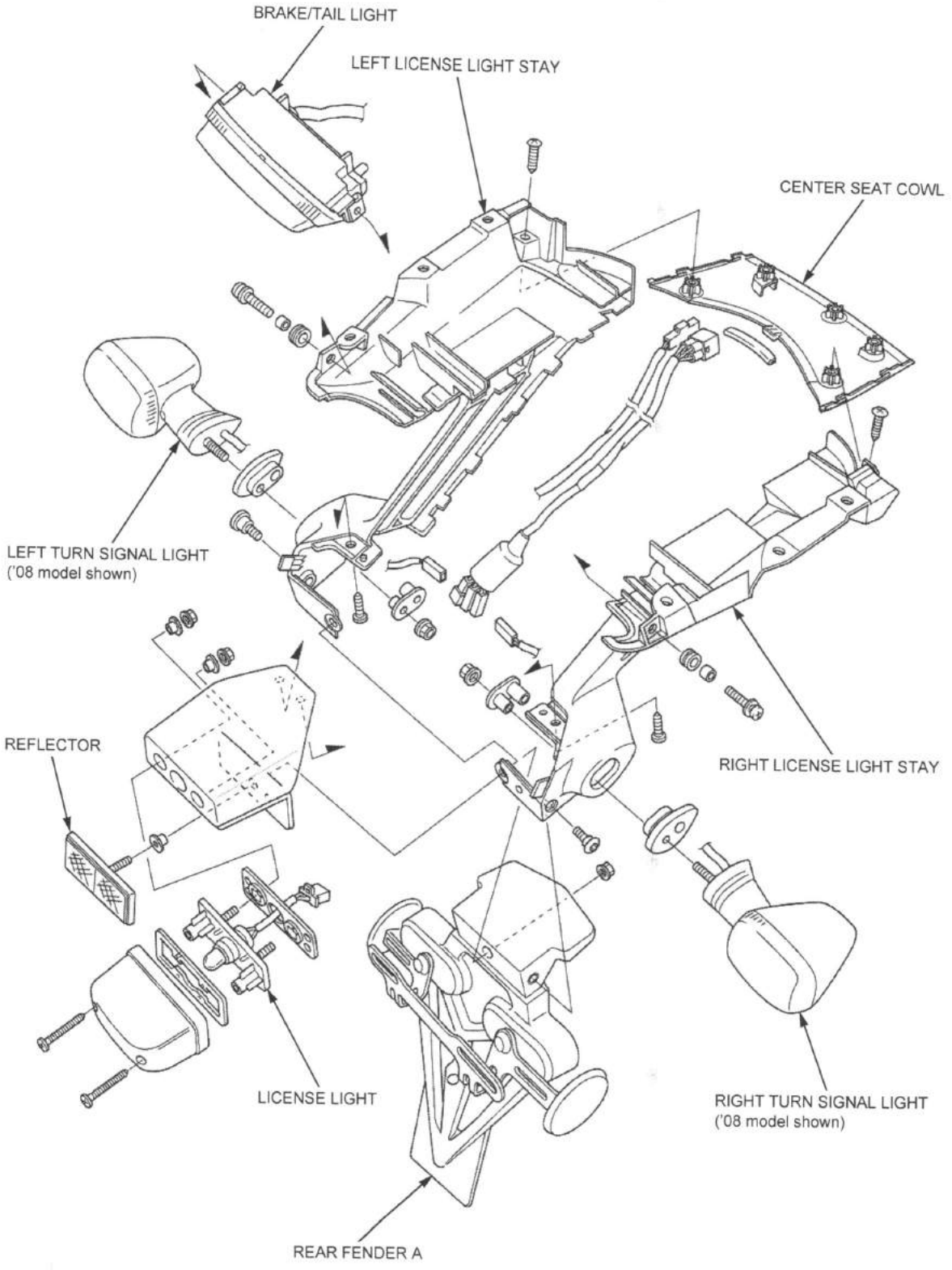
Remove the screws, bolts, washers, collars, and license light stay assembly rearward.

Installation is in the reverse order of removal.

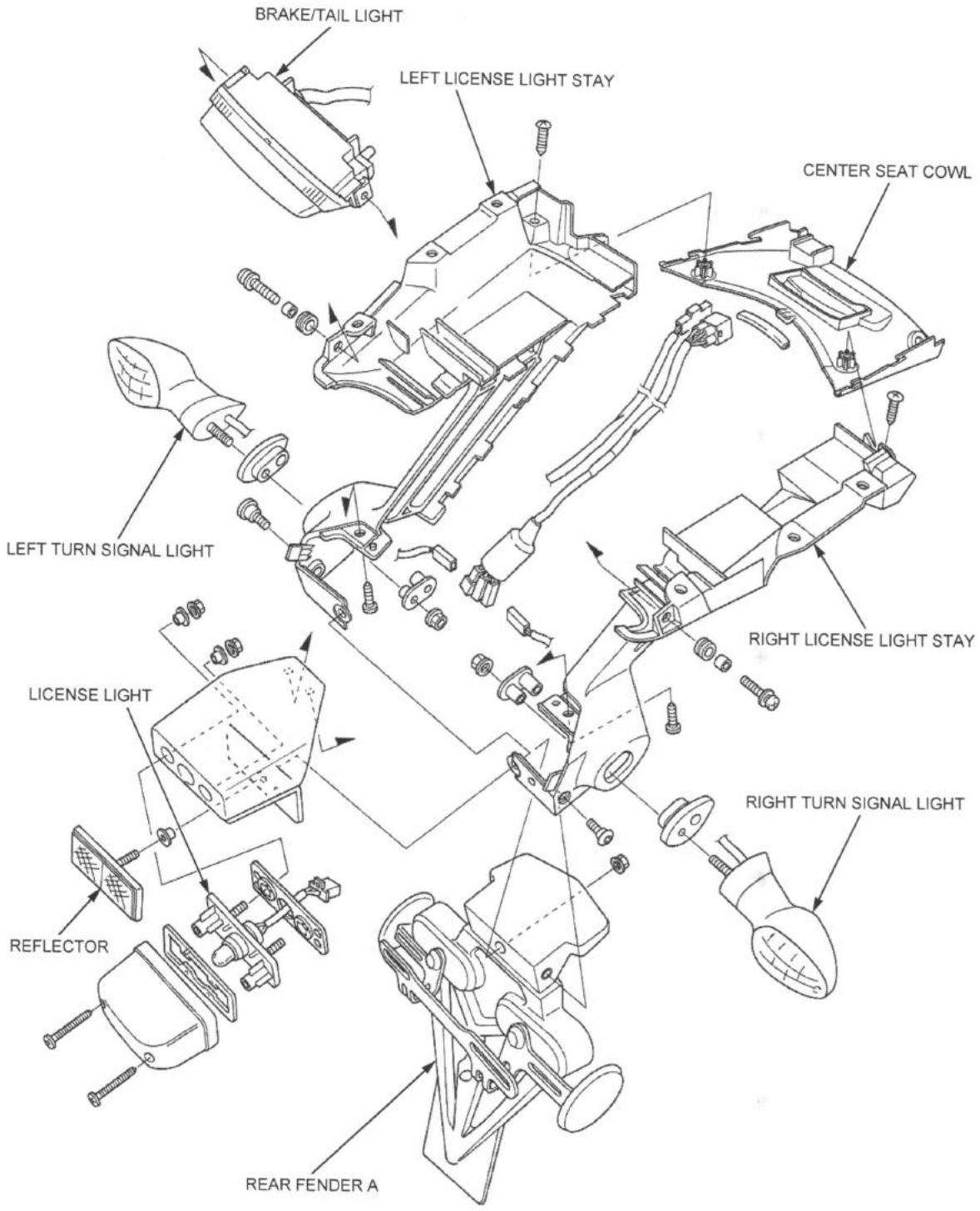


DISASSEMBLY/ASSEMBLY

STANDARD type:



ABS type:


BRAKE/TAIL LIGHT
LEFT LICENSE LIGHT STAY
CENTER SEAT COWL
LEFT TURN SIGNAL LIGHT
RIGHT LICENSE LIGHT STAY
LICENSE LIGHT
RIGHT TURN SIGNAL LIGHT
REFLECTOR
REAR FENDER A

LICENSE LIGHT STAY (After '09 model)

REMOVAL/INSTALLATION

NOTE:

- For removal/installation of the after '11 ABS type, see Rear Center Cowl (page 3-51).

Remove the following:

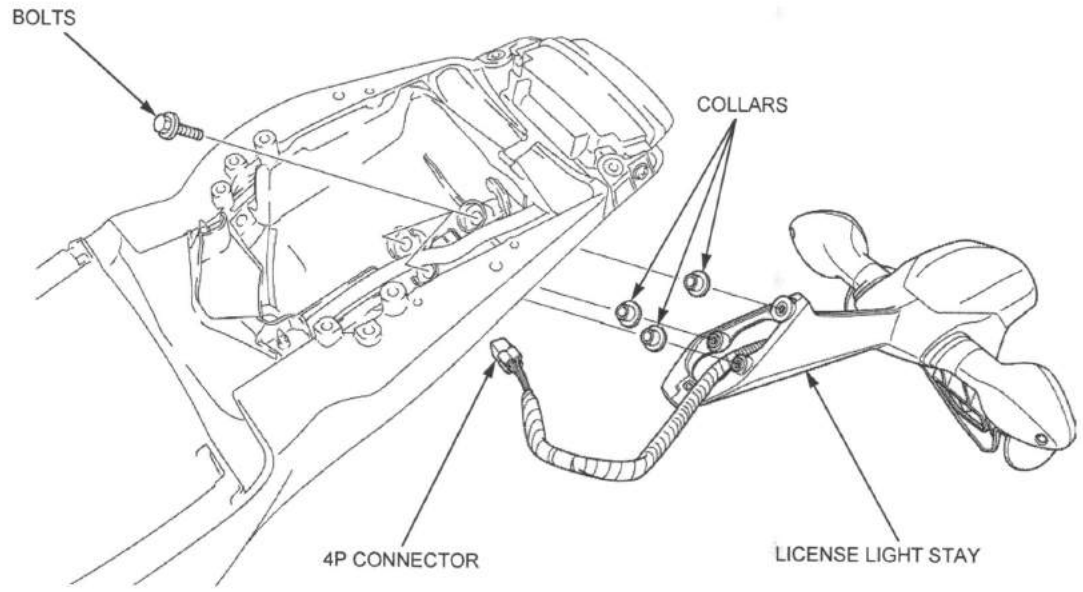
- Seat (page 3-7)
- STANDARD/ABS type: Pillion seat (page 3-8)
- SP type: Single seat cowl (page 3-9)

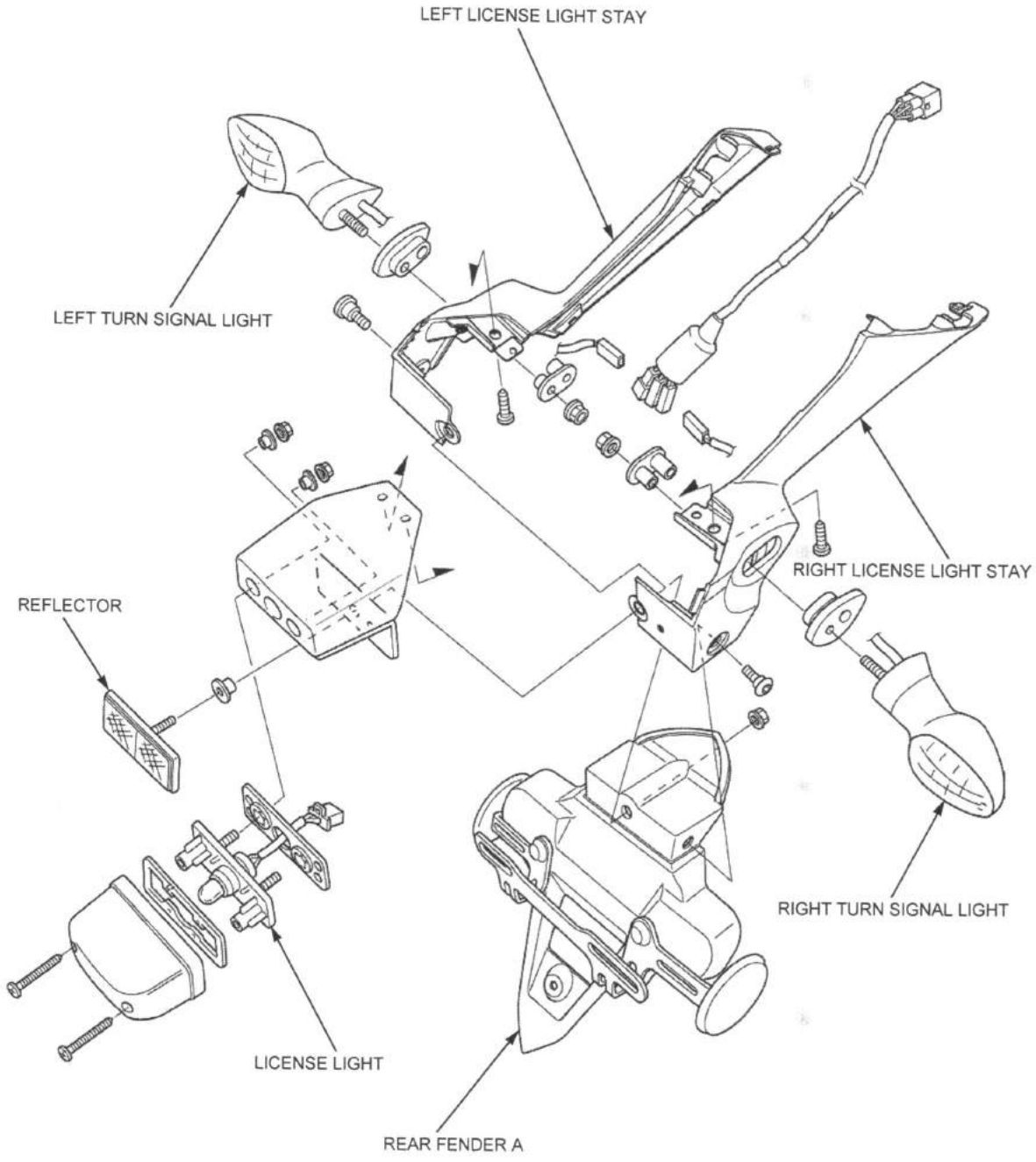
Disconnect the license/turn signal light 4P (Black) connector.

Remove the bolts, collars, and license light stay assembly.

Correctly route the wire (page 1-25).

Installation is in the reverse order of removal.




LEFT LICENSE LIGHT STAY
LEFT TURN SIGNAL LIGHT
RIGHT LICENSE LIGHT STAY
REFLECTOR
RIGHT TURN SIGNAL LIGHT
LICENSE LIGHT
REAR FENDER A

REAR CENTER COWL (After '09 model)

REMOVAL/INSTALLATION

'10, '11 model

STANDARD type: Remove the following:

- License light stay (page 3-45)
- Rear fender B (page 3-39)

ABS type: Remove the following:

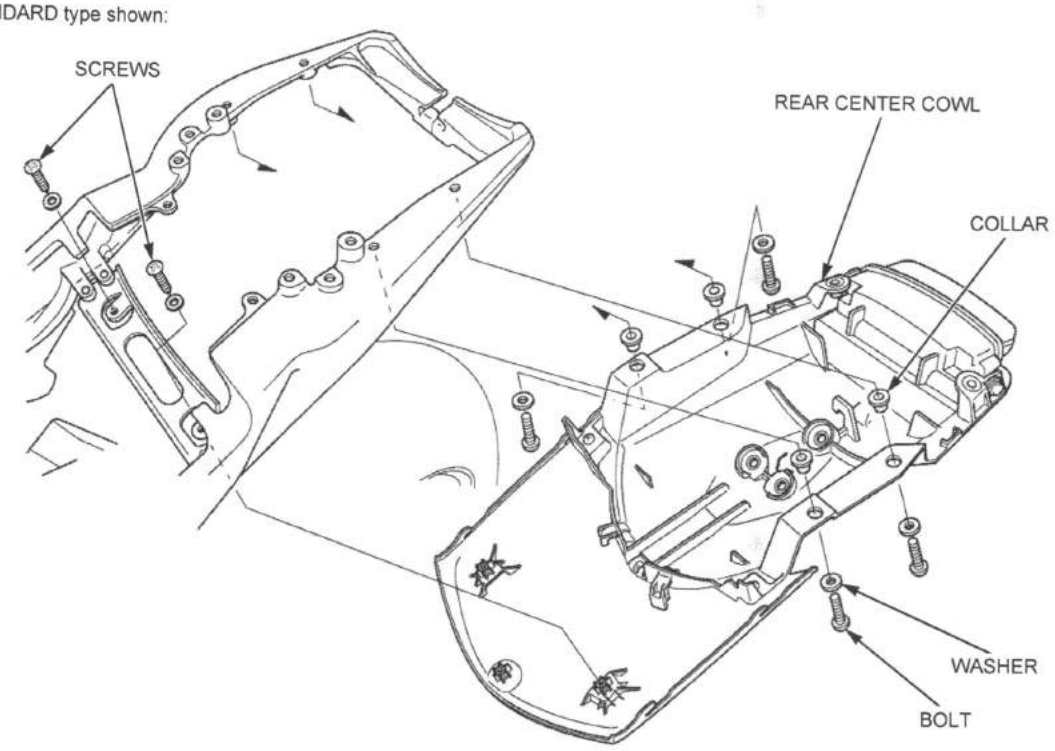
- Rear seat cowl (page 3-11)
- Fuse/relay box (page 6-90)
- License light stay (page 3-45)

ABS type: Disconnect the brake/tail light 3P (Natural) connector.

Remove the screws, bolts, washers, collars, and rear center cowl assembly.

Correctly route the wire (page 1-25). Installation is in the reverse order of removal.

STANDARD type shown:



After '11 STANDARD/SP type

Remove the following:

- Rear seat cowl (page 3-13)
- License light stay (page 3-45)

Disconnect the brake/taillight 3P (White) connector.

Remove the fuse/relay box.

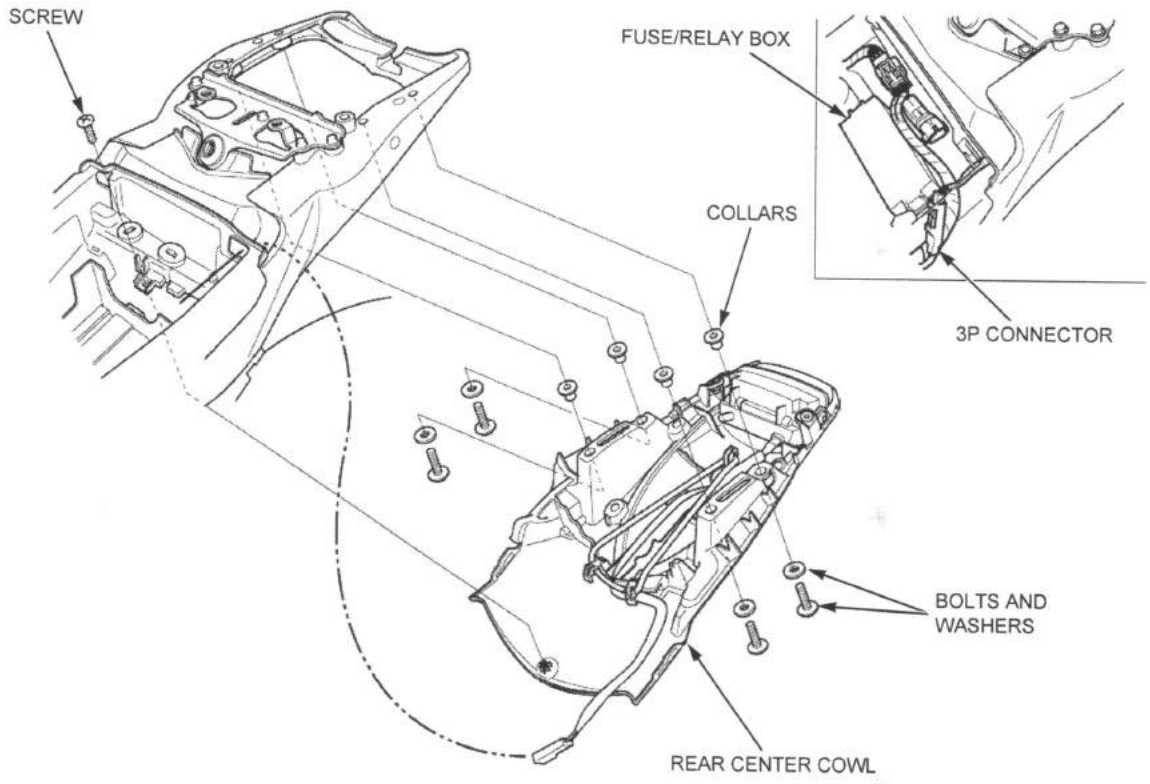
Remove the tapping screw located under the fuse/relay box.

Remove the four bolts and washers while supporting the cowl.
Release the wire out of the rear fender B and remove the rear center cowl assembly.

Remove the setting collars.

Installation is in the reverse order of removal.

STANDARD type shown:



After '11 ABS type

Remove the rear seat cowl (page 3-11).

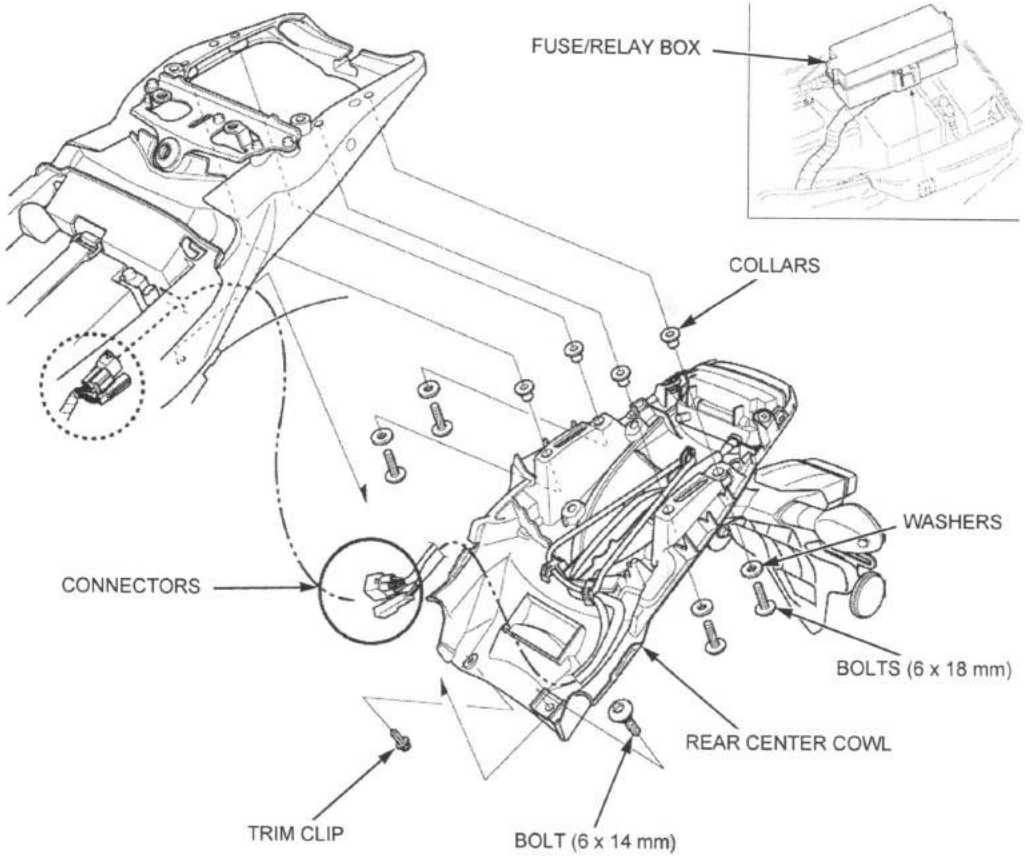
Remove the fuse/relay box.
Disconnect the 3P (White) and 4P (Black) connectors (that goes to the brake/taillight and turn signal lights).

Remove the trim clip and the bolt located under the fuse/relay box.

Remove the four bolts and washers while supporting the cowl.
Release the wires out of the rear fender B and remove the rear center cowl assembly.

Remove the setting collars.

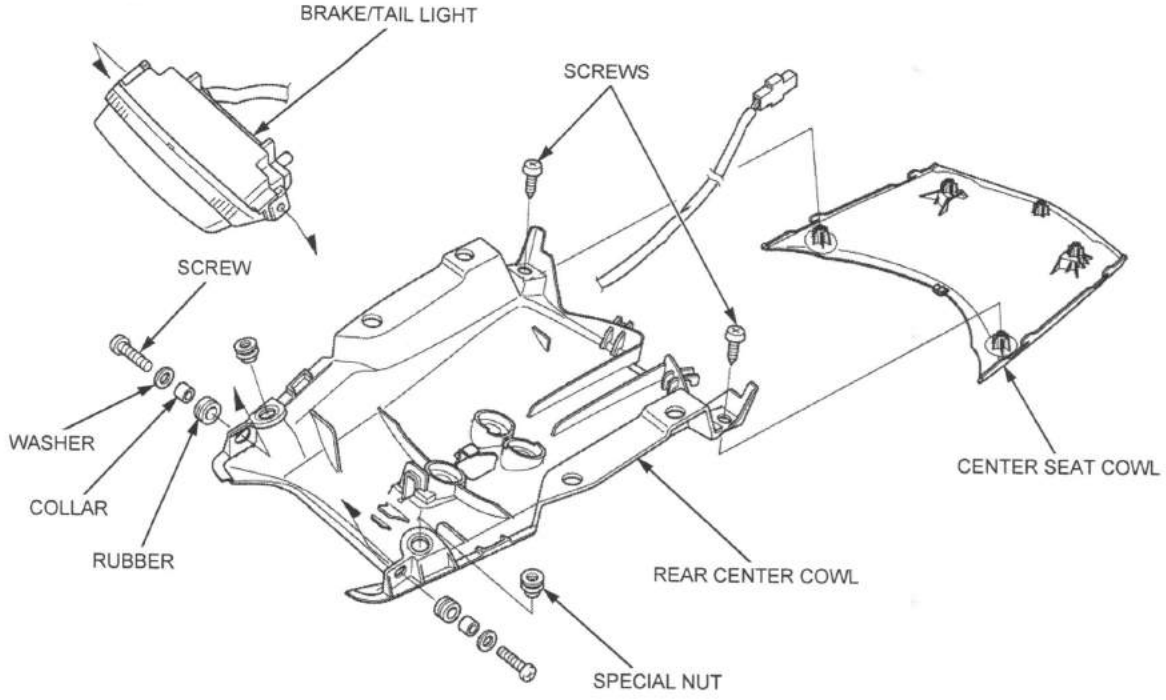
Installation is in the reverse order of removal.



DISASSEMBLY/ASSEMBLY

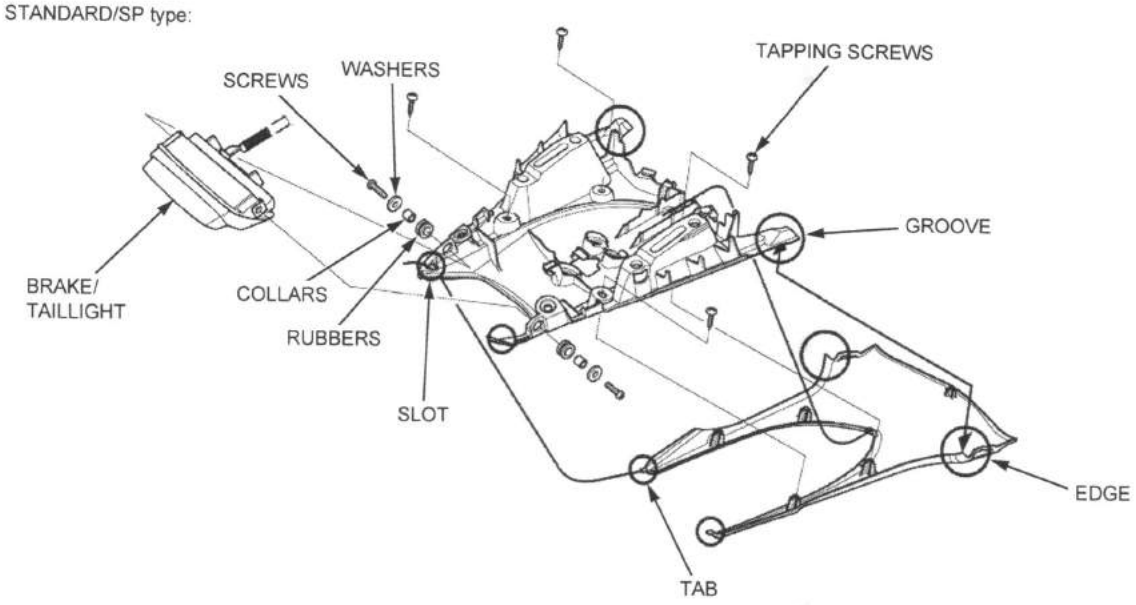
'08 – '11 model

STANDARD type shown:

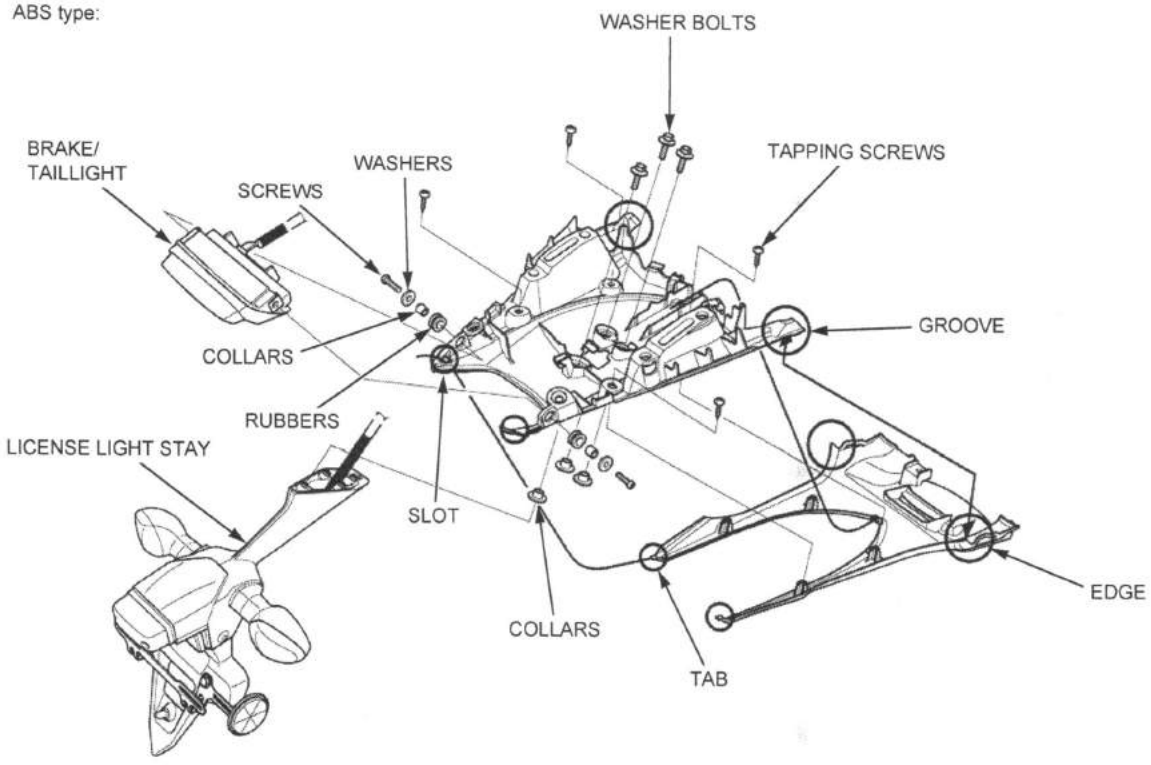


After '11 model

STANDARD/SP type:



ABS type:



SEAT RAIL

REMOVAL/INSTALLATION (STANDARD/SP type)

'08, '09 model: Remove the following:

- Rear fender B (page 3-39)
- License light stay (page 3-42)

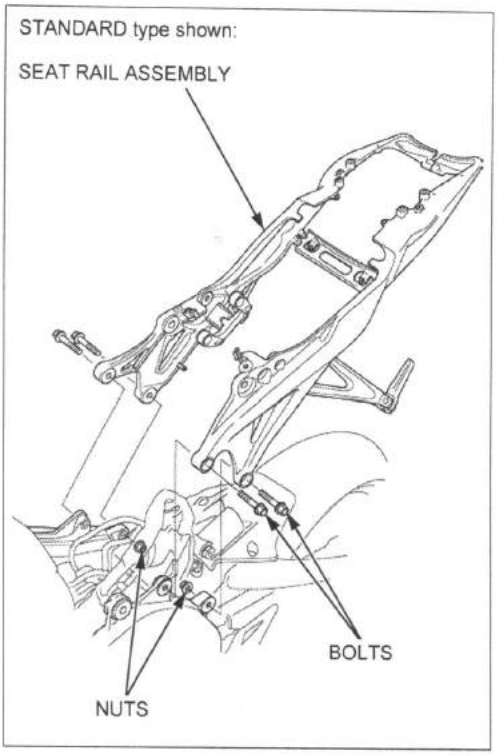
After '09 model: Remove the rear center cowl (page 3-47).

Remove the nuts, bolts, and seat rail.

Installation is in the reverse order of removal.

TORQUE:

Seat rail mounting nut:
54 N·m (5.5 kgf·m, 40 lbf·ft)
Seat rail mounting bolt:
44 N·m (4.5 kgf·m, 32 lbf·ft)



REMOVAL/INSTALLATION (ABS type)

Remove the rear fender B (page 3-40).

Remove the nuts, bolts, and seat rail.

Installation is in the reverse order of removal.

TORQUE:

Seat rail mounting nut:
54 N·m (5.5 kgf·m, 40 lbf·ft)
Seat rail mounting bolt:
44 N·m (4.5 kgf·m, 32 lbf·ft)



MUFFLER

REMOVAL

'08 – '11 model: Remove the lower cowl (page 3-16).

After '11 model: STANDARD/SP type: Remove the following:

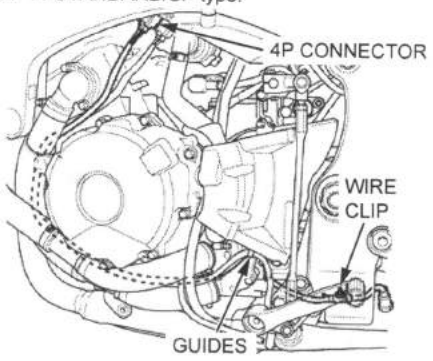
- lower cowl (page 3-17)
- left middle cowl (page 3-19)

ABS type: Lift and support the fuel tank (page 4-7).

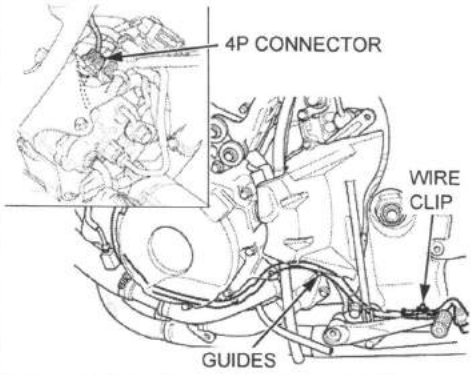
Release the wire clip on the O_2 sensor wire from the frame and the wire from the wire guides on the drive sprocket cover.

Disconnect the O_2 sensor 4P (Black) connector and its wire out of the frame.

After '11 STANDARD/SP type:

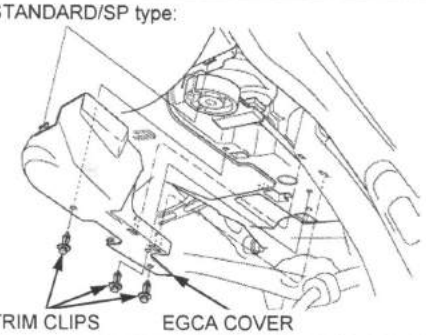


After '11 ABS type:

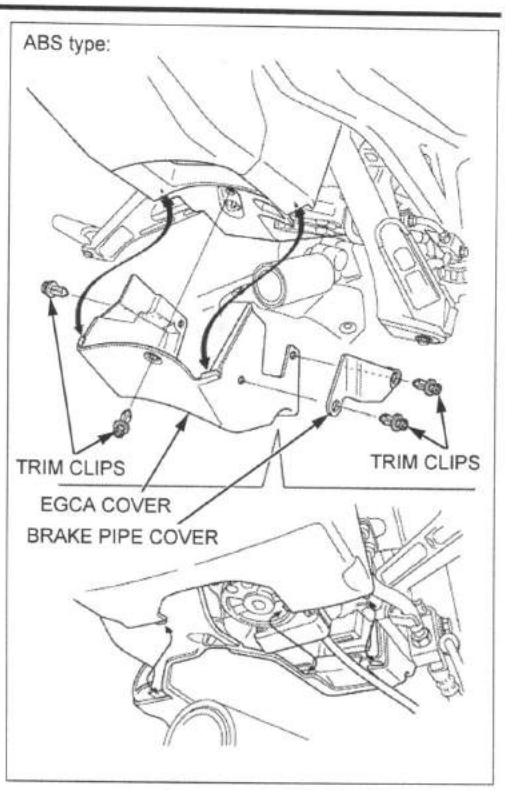


STANDARD/SP type: Remove the trim clips and EGCA cover.

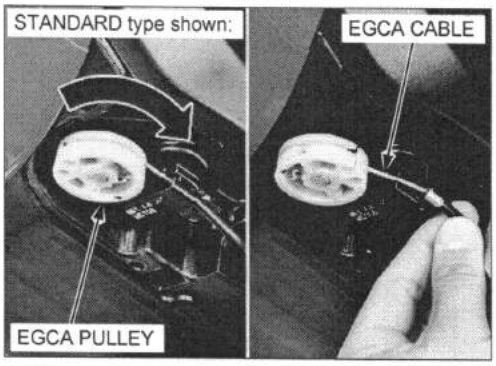
STANDARD/SP type:



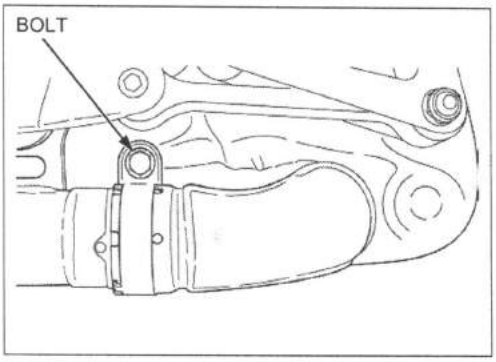
ABS type: Remove the trim clips, brake pipe cover, and EGCA cover.



Turn the EGCA pulley clockwise and disconnect the EGCA cable from the EGCA pulley.



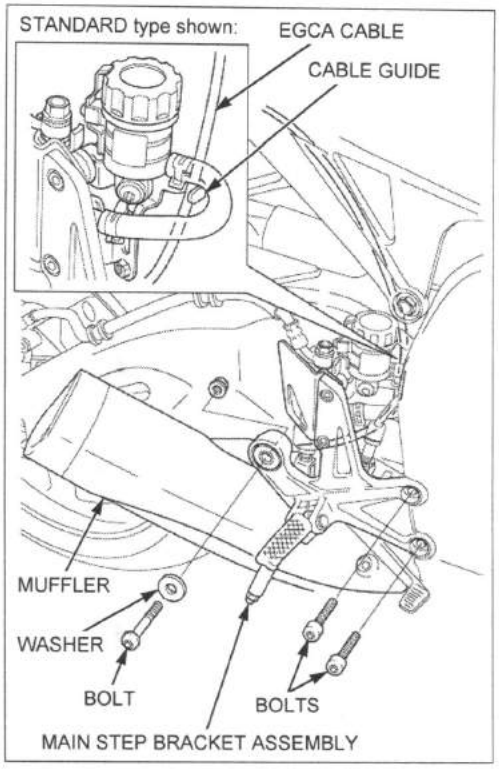
Loosen the muffler band bolt.



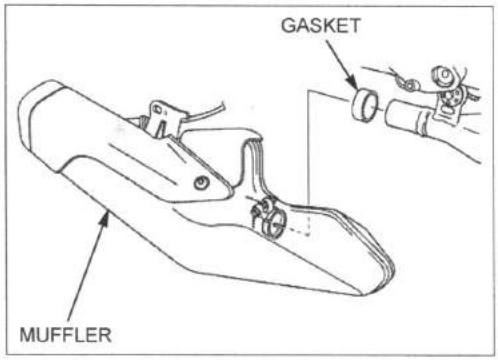
While holding the muffler, remove the muffler mounting nut, bolt, and washer.

Release the EGCA cable from the cable guide.

Remove the bolts and right main step bracket assembly.



Remove the muffler and gasket from the exhaust pipe.

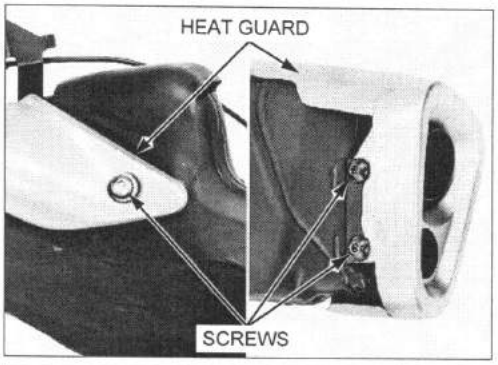


DISASSEMBLY

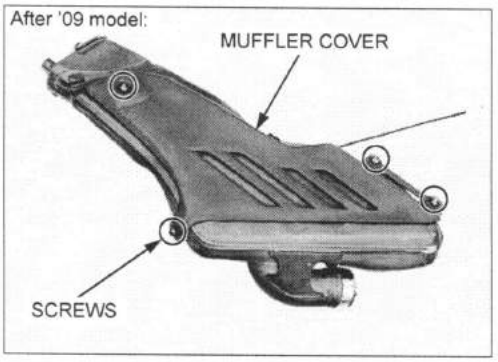
NOTE:

After '11 model:
- For O_2 sensor removal, see Fuel System (page 6-99).

Remove the screws and heat guard.

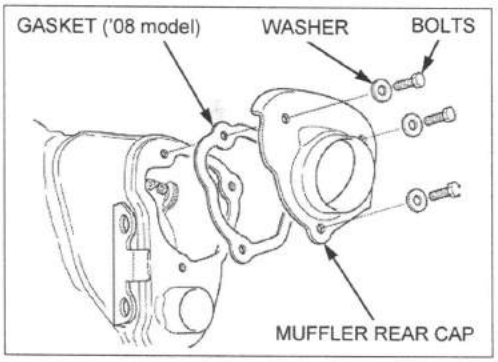


After '09 model: Remove the screws and Muffler cover.

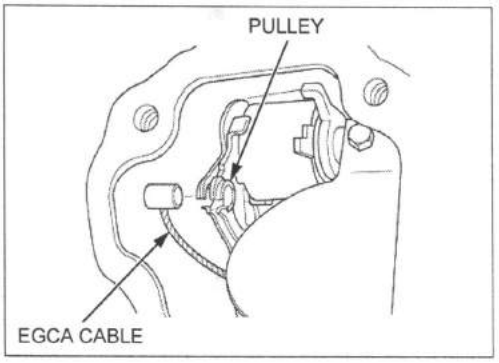


Remove the following:

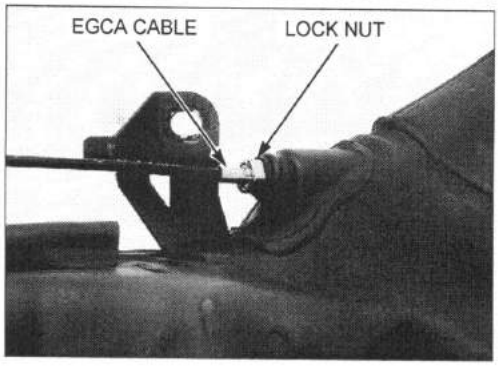
- Bolts
- Washers
- Muffler rear cap
- Gasket ('08 model)



Disconnect the EGCA cable from the ECV pulley.



Loosen the lock nut and disconnect the EGCA cable from the muffler.

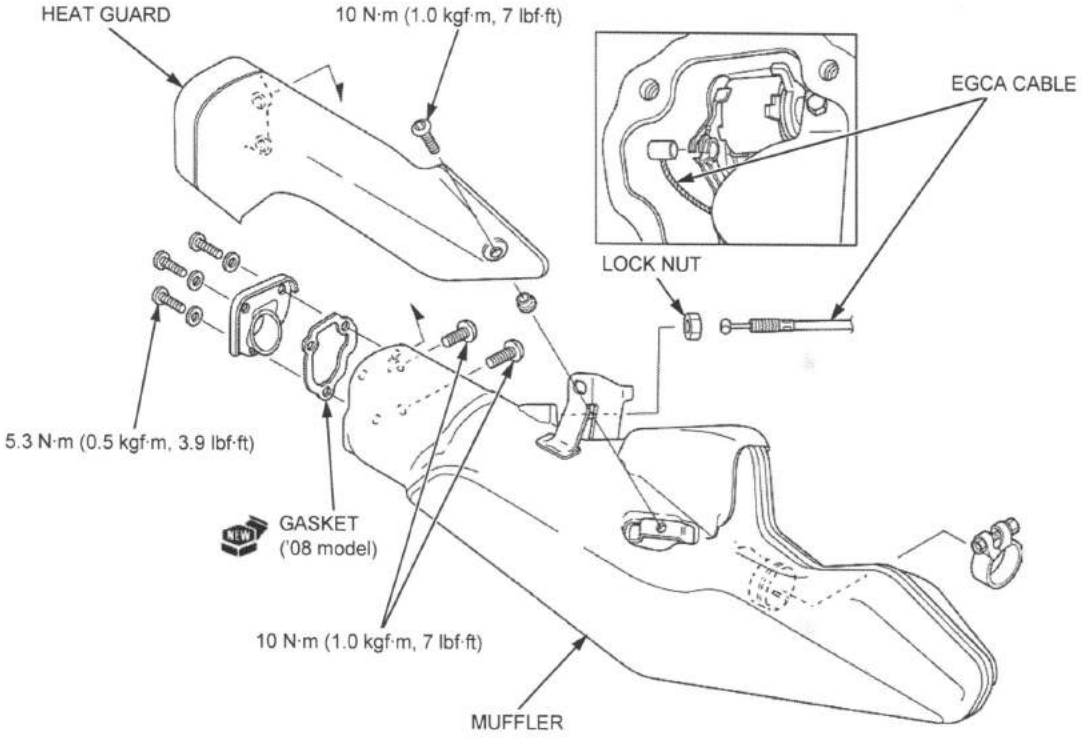


ASSEMBLY

NOTE:

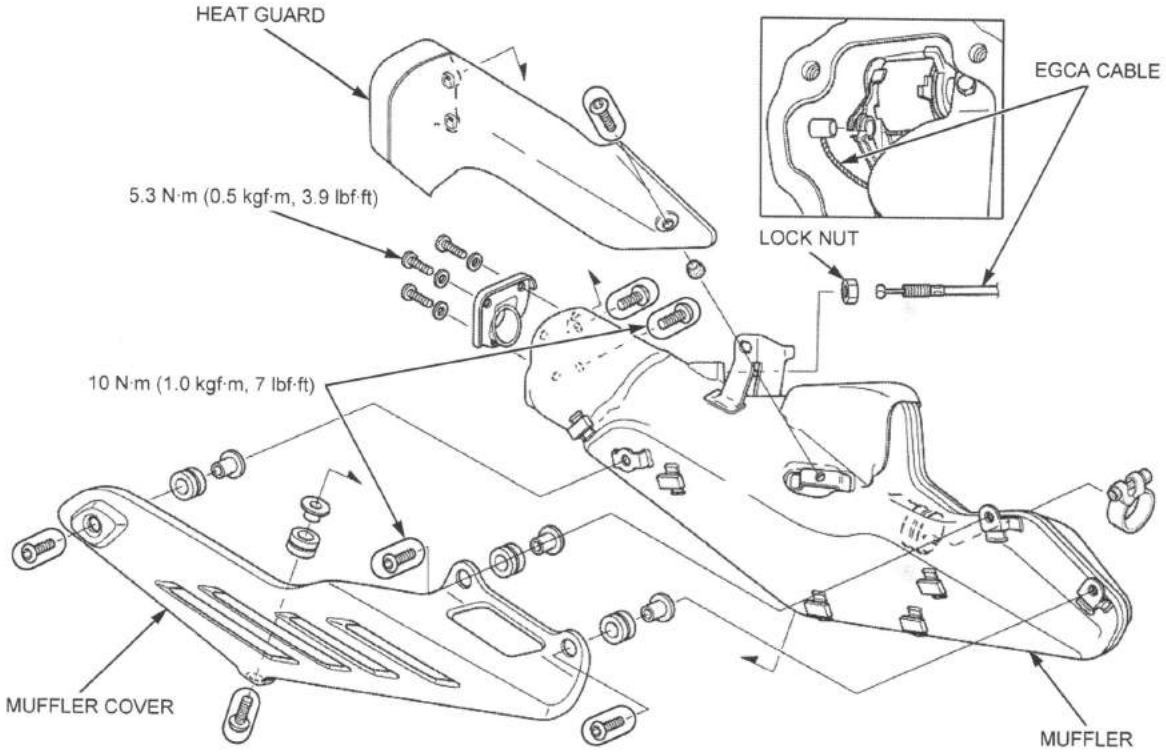
After '11 model:
- For O_2 sensor installation, see Fuel System (page 6-99).

'08, '09 model:

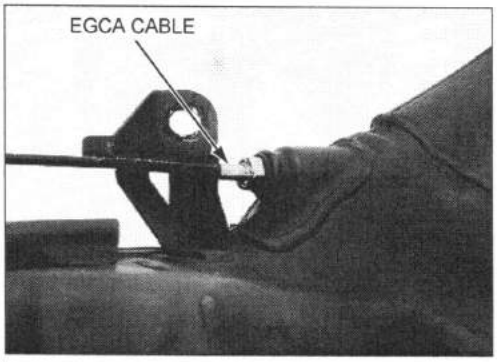


After '09 model:

'10, '11 model shown:



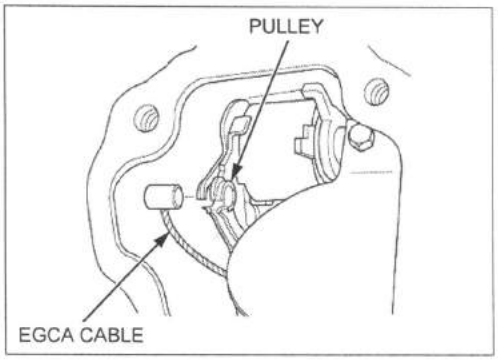
Insert the EGCA cable into the muffler.



Connect the EGCA cable to the ECV pulley securely.

Check the EGCA cable length.

- STANDARD/SP type (page 4-29)
- ABS type (page 4-31)

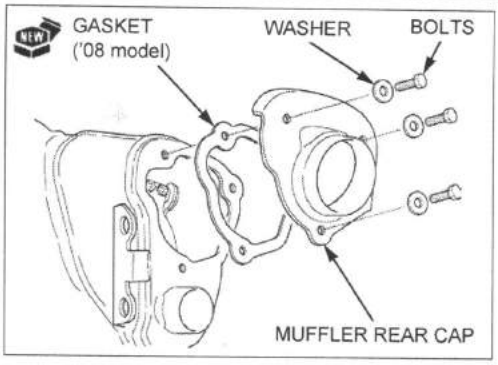


'08 model: Install a new gasket.

Install the muffler rear cap.

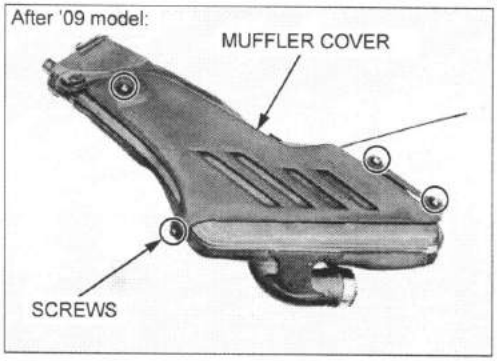
Install the washers and tighten the bolts to the specified torque.

TORQUE: 5.3 N·m (0.5 kgf·m, 3.9 lbf·ft)



After '09 model: Install the muffler cover and tighten the screws to the specified torque.

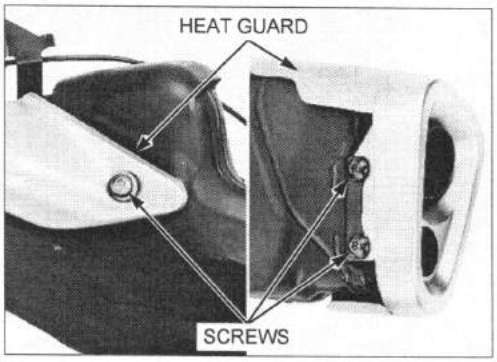
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Install the heat guard and tighten the screws to the specified torque.

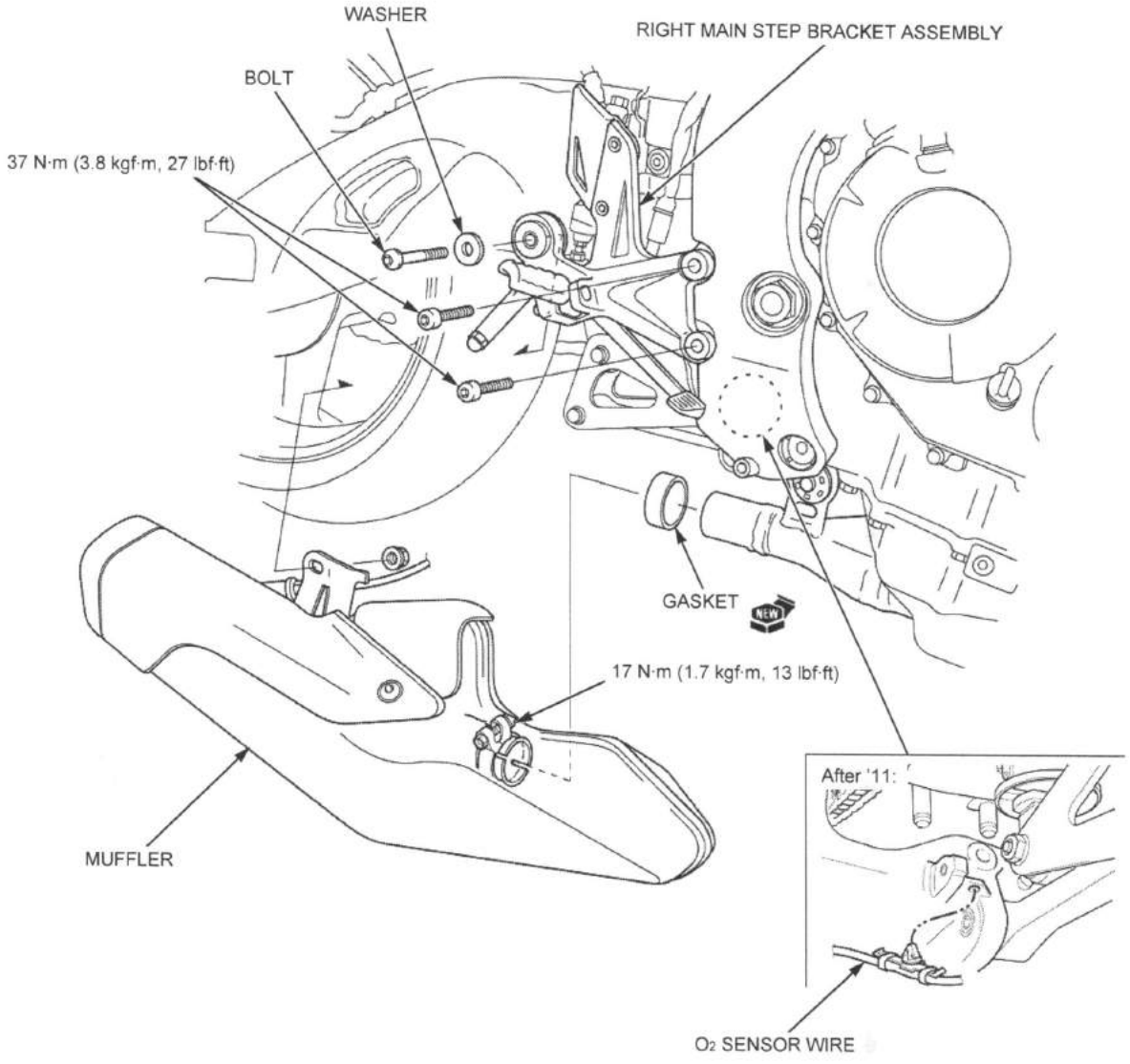
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the muffler (page 3-60).

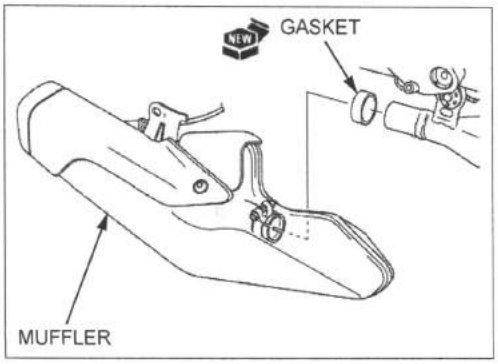


INSTALLATION

'08, '09 model shown:



Install a new gasket and the muffler to the exhaust pipe.

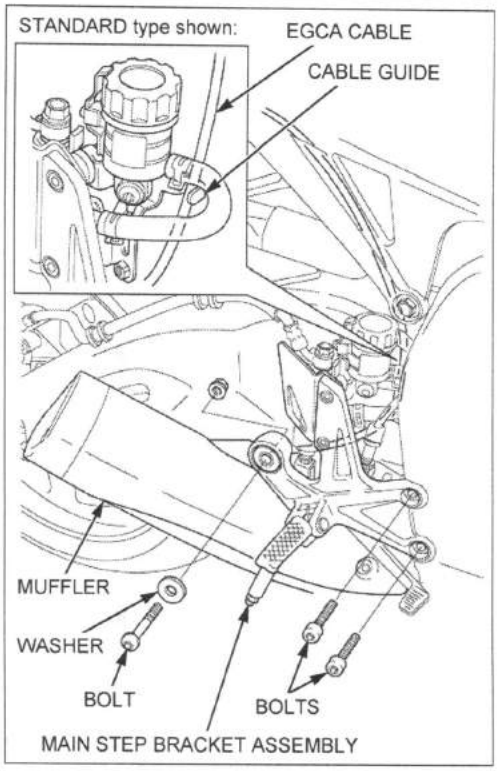


Raise the muffler into position while routing the EGCA cable to the cable guide.

While holding the muffler, install the right main step bracket assembly and tighten the bolts to the specified torque.

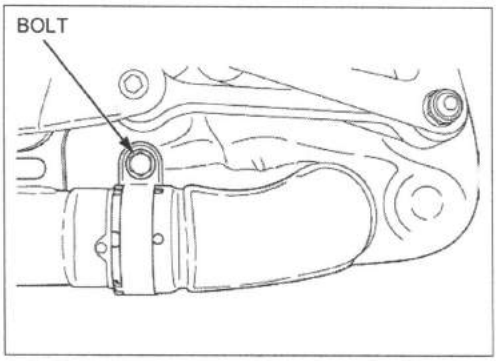
TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)

Loosely install the muffler mounting bolt, washer, and nut.

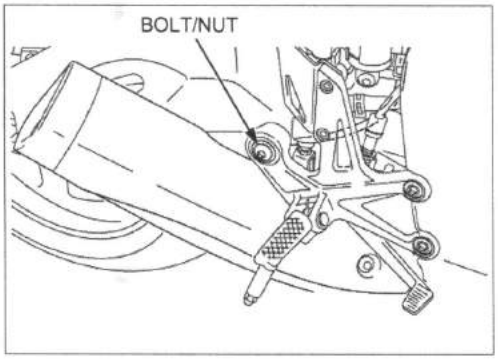


Tighten the muffler band bolt to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 13 lbf·ft)

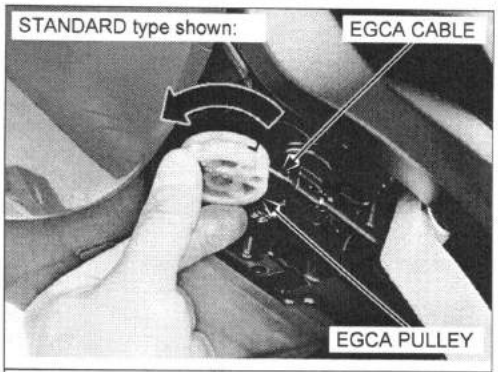


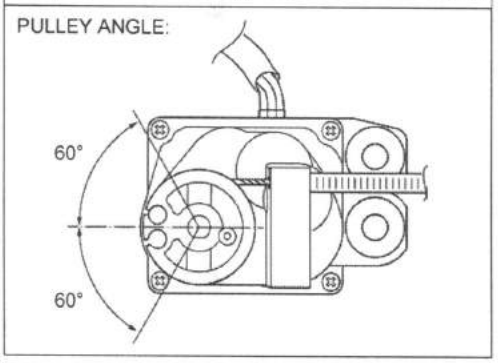
Tighten the muffler mounting nut securely while holding the bolt.



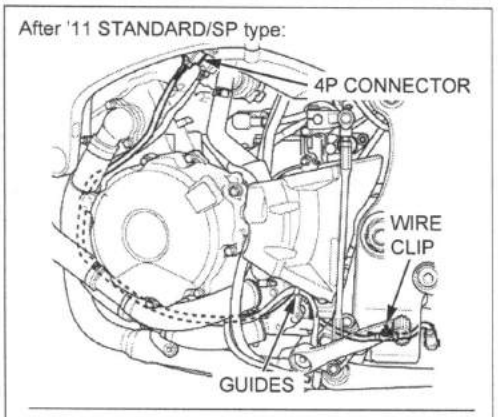
Connect the EGCA cable to the EGCA pulley.

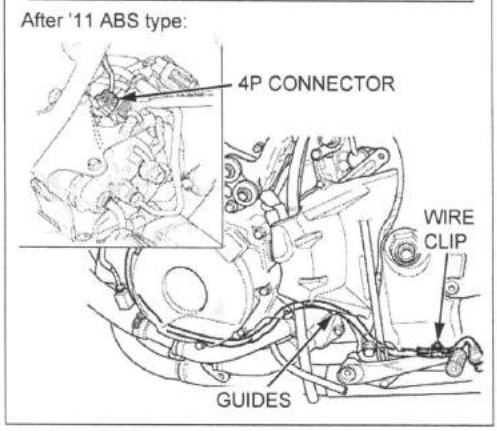
Turn the EGCA pulley counterclockwise to the specified angle as shown.





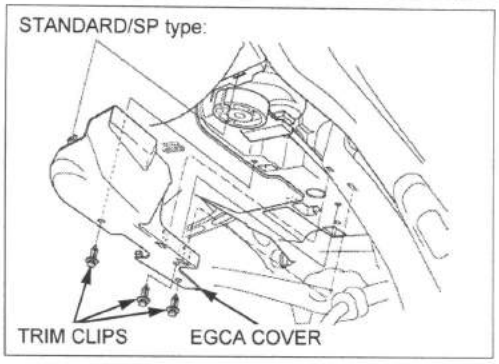
After '11 model: Route the O_2 sensor wire properly and connect the 4P (Black) connector (page 1-66).





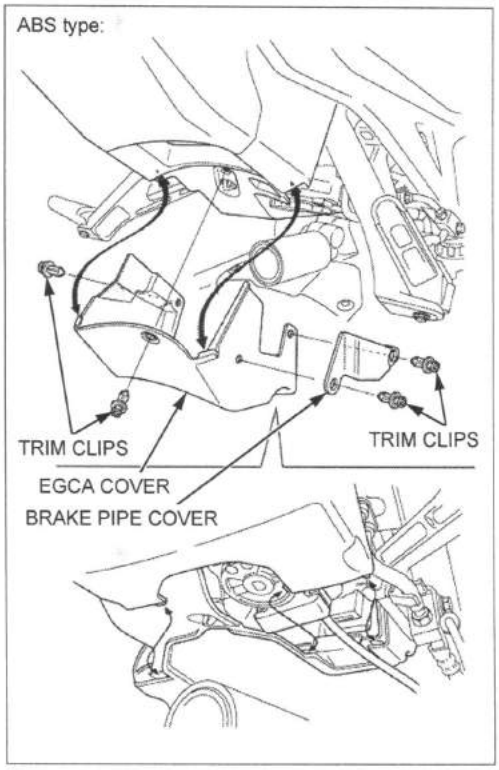
STANDARD/SP type: Check the EGCA and ECV operation (page 4-26).

Install the EGCA cover and trim clips securely.



ABS type: Check the EGCA and ECV operation (page 4-26).

Install the EGCA cover and brake pipe cover then install trim clips securely.



'08 – '11 model: Install the lower cowl (page 3-16).

After '11 model: STANDARD/SP type: Install the following:

- left middle cowl (page 3-20)
- lower cowl (page 3-17)

ABS type: Remove the support and close the fuel tank (page 4-9).

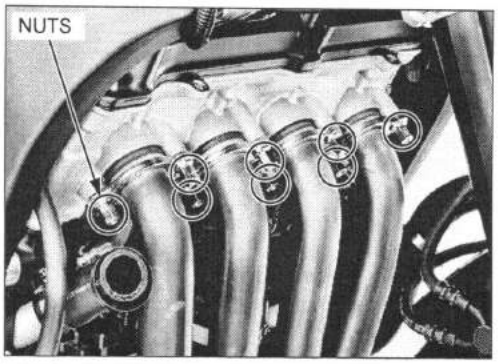
EXHAUST PIPE

REMOVAL

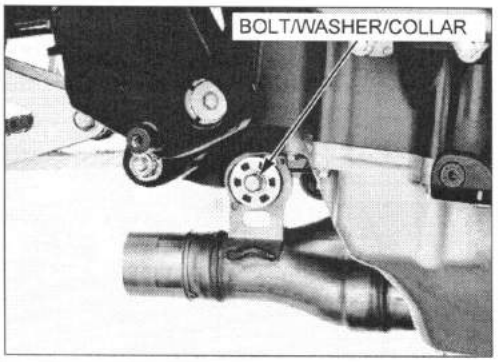
Remove the following:

- Muffler (page 3-53)
- Radiator (page 7-11)

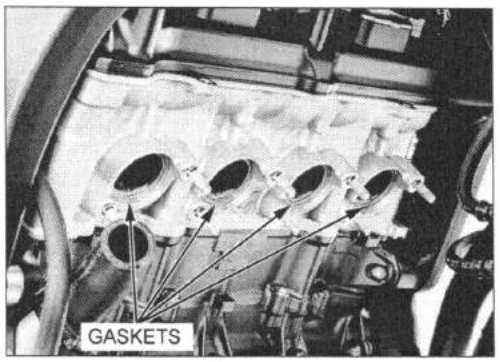
Remove the exhaust pipe joint nuts.



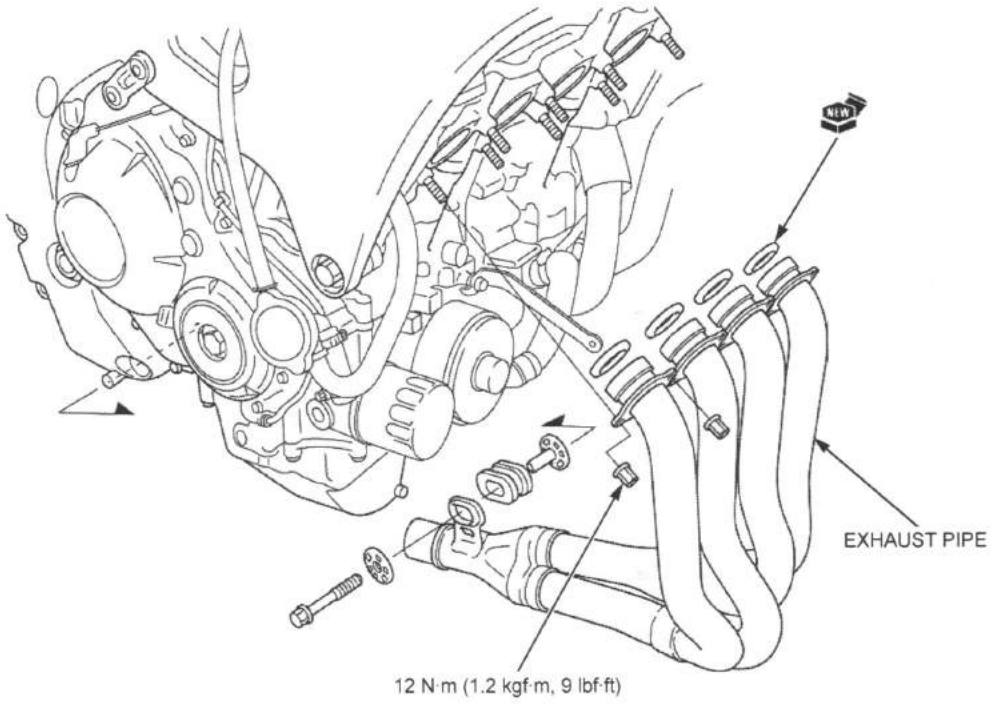
Remove the bolt, washer, collar, and exhaust pipe.



Remove the exhaust pipe gaskets.

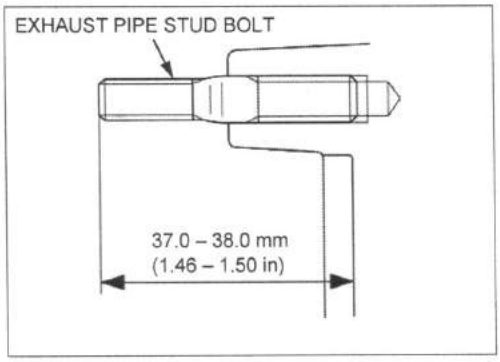


INSTALLATION



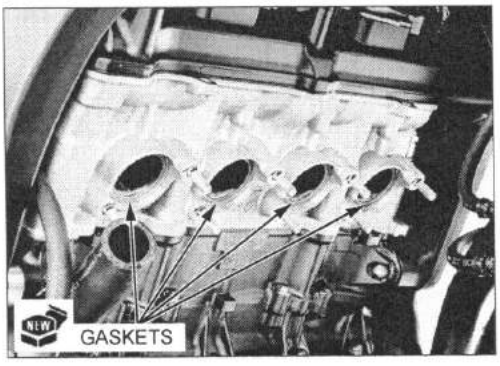
Check that the exhaust pipe stud bolt protrusion from the exhaust port is at the specified length as shown and adjust if necessary.

SPECIFIED LENGTH: 37.0 – 38.0 mm (1.46 – 1.50 in)

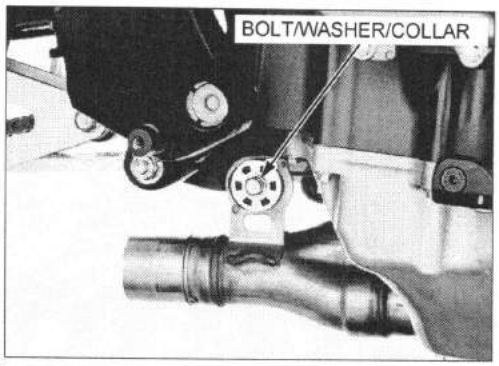


Always replace the exhaust pipe gaskets with new ones.

Install new exhaust pipe gaskets onto the exhaust ports of the cylinder head.

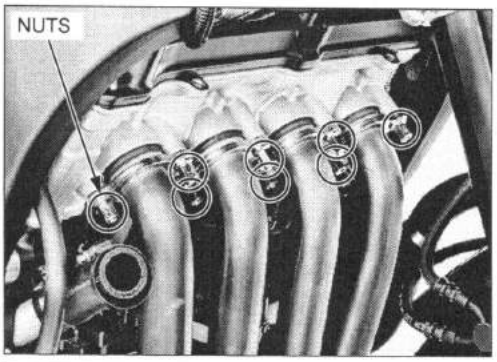


Loosely install the exhaust pipe, collar, and mounting bolt/washer.



Tighten the exhaust pipe joint nuts to the specified torque.

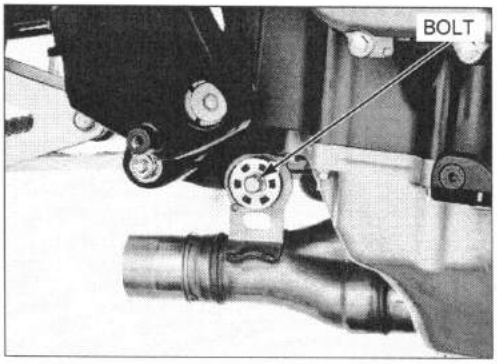
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Tighten the exhaust pipe mounting bolt securely.

Install the following:

- Radiator (page 7-21)
- Muffler (page 3-60)



4. MAINTENANCE

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BRAKE SYSTEM ····· 4-39
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WHEELS/TIRES ····· 4-47
STEERING HEAD BEARINGS ····· 4-48

SERVICE INFORMATION

GENERAL

- Place the motorcycle on level ground before starting any work.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.

SPECIFICATIONS

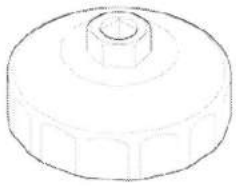
ITEM			SPECIFICATIONS
Throttle grip freeplay		'08 – '13	2 – 6 mm (0.08 – 0.24 in)
		After '13	2 – 4 mm (0.08 – 0.16 in)
Spark plug	NGK		IMR9E-9HES
	DENSO		VUH27ES
Spark plug gap			0.80 – 0.90 mm (0.031 – 0.035 in)
Valve clearance	IN		0.16 ± 0.03 mm (0.006 ± 0.001 in)
	EX		0.30 ± 0.03 mm (0.012 ± 0.001 in)
Engine oil capacity	After draining		2.8 liters (3.0 US qt, 2.5 Imp qt)
	After oil filter change		3.0 liters (3.2 US qt, 2.6 Imp qt)
Recommended engine oil			Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Recommended antifreeze			Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate free corrosion inhibitors
Drive chain	Size/link	DID	DID 50VA11-120ZB/116
		RK	RK 50HFOZ6-120LJFZ/116
	Slack		25 – 35 mm (1.0 – 1.4 in)
Recommended brake fluid			DOT 4
Clutch lever freeplay			10 – 20 mm (0.4 – 0.8 in)
Tire size		Front	120/70 ZR 17 M/C (58W)
		Rear	190/50 ZR 17 M/C (73W)
Tire brand (STANDARD/ABS type)	Front	'08 – '11	BT015F RADIAL F (Bridgestone), Qualifier PTK (Dunlop)
		After '11	S20F G (Bridgestone), Qualifier II K (Dunlop)
	Rear	'08 – '11	BT015R RADIAL F (Bridgestone), Qualifier NK (Dunlop)
		After '11	S20R G (Bridgestone), Qualifier II K (Dunlop)
Tire brand (SP type)	Front		DIABLO SUPERCORSA SP (PIRELLI)
	Rear		DIABLO SUPERCORSA SP (PIRELLI)
Cold tire pressure (STANDARD/ABS type)	Up to maximum weight capacity	Front	250 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	290 kPa (2.90 kgf/cm^2, 42 psi)
	Up to 90 kg (200 lbs) load	Front	250 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	290 kPa (2.90 kgf/cm^2, 42 psi)
Cold tire pressure (SP type)	Up to maximum weight capacity	Front	250 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	290 kPa (2.90 kgf/cm^2, 42 psi)
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads.
Oil drain bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Oil filter cartridge	26 N·m (2.7 kgf·m, 19 lbf·ft)	Apply oil to the threads and O-ring.
Rear axle nut (STANDARD/ABS type)	113 N·m (11.5 kgf·m, 83 lbf·ft)	U-nut
Rear axle nut (SP type)	124 N·m (12.6 kgf·m, 91 lbf·ft)	U-nut
Drive sprocket bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Driven sprocket nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	U-nut
Rear master cylinder push rod lock nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Fuel tank mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Air cleaner element mounting screw	0.8 N·m (0.1 kgf·m, 0.6 lbf·ft)	
Sidestand pivot bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Sidestand pivot nut	29 N·m (3.0 kgf·m, 21 lbf·ft)	
ECM setting plate screw	0.8 N·m (0.1 kgf·m, 0.6 lbf·ft)	
Throttle cable adjuster lock nut	5.5 N·m (0.6 kgf·m, 4.1 lbf·ft)	
EGCA cable lock nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	

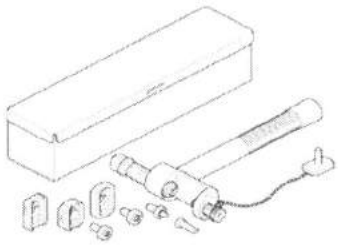
TOOLS

Oil filter wrench
07HAA-PJ70101



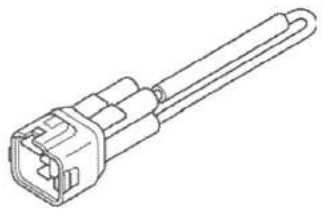
or 07AMA-MFJA100 (U.S.A. only)

Drive chain tool set
07HMH-MR10103

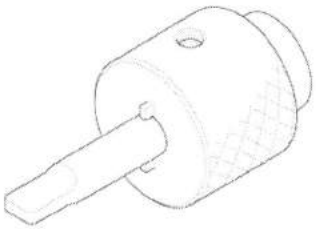


or 07HMH-MR1010C (U.S.A. only)

SCS Service connector
070PZ-ZY30100

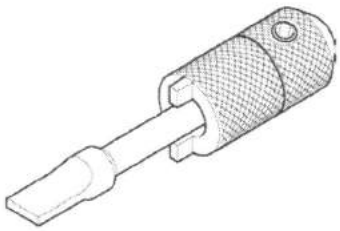


Cam chain tensioner holder
070MG-0010100



(Not available in U.S.A.)

Cam chain tensioner holder
07AMG-MFJA100 (U.S.A. only)



MAINTENANCE SCHEDULE

'08 – '11 model

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean. R: Replace. A: Adjust. L: Lubricate.

The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult a dealer.

		ITEMS	FREQUENCY WHICHEVER COMES FIRST	ODOMETER READING (NOTE 1)								REFER TO PAGE
				x 1,000 mi	0.6	4	8	12	16	20	24	
				x 100 km	10	64	128	192	256	320	384	
EMISSION RELATED ITEMS	*	FUEL LINE					I		I		I	4-7
	*	THROTTLE OPERATION					I		I		I	4-11
	*	AIR CLEANER	NOTE2					I			I	4-12
	*	SPARK PLUGS			EVERY 16,000 mi (25,600 km): I, EVERY 32,000 mi (51,200 km): R							4-13
	*	VALVE CLEARANCE							I			4-15
		ENGINE OIL			INITIAL = 600 mi (1,000 km) or 1 month: R, REGULAR = EVERY 8,000 mi (12,800 km) or 12 months: R							4-20
		ENGINE OIL FILTER			R		R		R		R	4-20
		RADIATOR COOLANT	NOTE4				I		I		R	4-23
	*	COOLING SYSTEM					I		I		I	4-23
	*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	4-24
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE3					I			I	4-25
	**	EGCA CABLE			EVERY 16,000 mi (25,600 km): I							4-26
NON-EMISSION RELATED ITEMS		DRIVE CHAIN			EVERY 500 mi (800 km): I, L							4-32
		BRAKE FLUID	NOTE4			I	I	R	I	I	R	4-37
		BRAKE PADS WEAR				I	I	I	I	I	I	4-38
		BRAKE SYSTEM			I		I		I		I	4-39
	*	BRAKE LIGHT SWITCH					I		I		I	4-40
	*	HEADLIGHT AIM					I		I		I	4-40
		CLUTCH SYSTEM			I	I	I	I	I	I	I	4-40
		SIDESTAND					I		I		I	4-41
	*	SUSPENSION					I		I		I	4-41
	*	NUTS, BOLTS, FASTENERS			I		I		I		I	4-47
	**	WHEELS/TIRES					I		I		I	4-47
	**	STEERING HEAD BEARINGS			I		I		I		I	4-48

* Should be serviced by a dealer, unless the owner has proper tools and service data and is mechanically qualified.
** In the interest of safety, we recommend these items be serviced only by a dealer.

NOTES:

1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. (AC) type only.
4. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

After '11 model STANDARD/ABS type

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean. R: Replace. A: Adjust. L: Lubricate.

The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult a dealer.

		ITEMS	NOTE	FREQUENCY (NOTE 1)								Refer to Page
				x 1,000 mi	0.6	4	8	12	16	20	24	
				x 1,000 km	1.0	6.4	12.8	19.2	25.6	32.0	38.4	
EMISSION RELATED ITEMS	*	FUEL LINE					I		I		I	4-7
	*	THROTTLE OPERATION					I		I		I	4-11
	*	AIR CLEANER	NOTE2					I			I	4-12
	*	SPARK PLUG			EVERY 25,600 km (16,000 mi): I, EVERY 51,200 km (32,000 mi): R							4-13
	*	VALVE CLEARANCE							I			4-15
		ENGINE OIL			INITIAL = 1,000 km (600 mi) or 1 month: R, REGULAR = EVERY 12,800 km (8,000 mi) or 12 months: R							4-20
		ENGINE OIL FILTER			R		R		R		R	4-20
	*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	6-75
		RADIATOR COOLANT	NOTE4				I		I		R	4-23
	*	COOLING SYSTEM					I		I		I	4-23
	*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	4-24
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE3					I			I	4-25
	**	EGCA CABLE			EVERY 25,600 km (16,000 mi): I							4-26
NON-EMISSION RELATED ITEMS		DRIVE CHAIN			EVERY 800 km (500 mi): I, L							4-32
		BRAKE FLUID	NOTE4			I	I	R	I	I	R	4-37
		BRAKE PADS WEAR				I	I	I	I	I	I	4-38
		BRAKE SYSTEM			I		I		I		I	4-39
		BRAKE LIGHT SWITCH					I		I		I	4-40
		HEADLIGHT AIM					I		I		I	4-40
		CLUTCH SYSTEM			I	I	I	I	I	I	I	4-40
		SIDESTAND					I		I		I	4-41
	*	SUSPENSION					I		I		I	4-41
	*	NUTS, BOLTS, FASTENERS			I		I		I		I	4-47
	**	WHEELS/TIRES					I		I		I	4-47
	**	STEERING HEAD BEARINGS			I		I		I		I	4-48

* Should be serviced by a dealer, unless the owner has proper tools and service data and is mechanically qualified.

** In the interest of safety, we recommend these items be serviced only by a dealer.

NOTES:

1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. (AC) type only.
4. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

SP type

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean. R: Replace. A: Adjust. L: Lubricate.

The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult a dealer.

		ITEMS	NOTE	FREQUENCY (NOTE 1)								Refer to Page
				x 1,000 mi	0.6	4	8	12	16	20	24	
				x 1,000 km	1.0	6.4	12.8	19.2	25.6	32.0	38.4	
EMISSION RELATED ITEMS	*	FUEL LINE					I		I		I	4-7
	*	THROTTLE OPERATION					I		I		I	4-11
	*	AIR CLEANER	NOTE2					I			I	4-12
	*	SPARK PLUG			EVERY 25,600 km (16,000 mi): I, EVERY 51,200 km (32,000 mi): R							4-13
	*	VALVE CLEARANCE							I			4-15
		ENGINE OIL			INITIAL = 1,000 km (600 mi) or 1 month: R, REGULAR = EVERY 12,800 km (8,000 mi) or 12 months: R							4-20
		ENGINE OIL FILTER			R		R		R		R	4-20
	*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	6-75
		RADIATOR COOLANT	NOTE4				I		I		R	4-23
	*	COOLING SYSTEM					I		I		I	4-23
	*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	4-24
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE3					I			I	4-25
	**	EGCA CABLE			EVERY 25,600 km (16,000 mi): I							4-26
NON-EMISSION RELATED ITEMS		DRIVE CHAIN			EVERY 800 km (500 mi): I, L							4-32
		BRAKE FLUID	NOTE4			I	I	R	I	I	R	4-37
		BRAKE PADS WEAR				I	I	I	I	I	I	4-38
		BRAKE SYSTEM			I		I		I		I	4-39
		BRAKE LIGHT SWITCH					I		I		I	4-40
		HEADLIGHT AIM					I		I		I	4-40
		CLUTCH SYSTEM			I	I	I	I	I	I	I	4-40
		SIDESTAND					I		I		I	4-41
	*	SUSPENSION					I		I		I	4-41
	*	FRONT FORK OIL			EVERY 30,000 km (18,000 mi) or 36 months: R							–
	*	NUTS, BOLTS, FASTENERS			I		I		I		I	4-47
	**	WHEELS/TIRES					I		I		I	4-47
	**	STEERING HEAD BEARINGS			I		I		I		I	4-48

* Should be serviced by a dealer, unless the owner has proper tools and service data and is mechanically qualified.
** In the interest of safety, we recommend these items be serviced only by a dealer.

NOTES:

1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. (AC) type only.
4. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

FUEL LINE

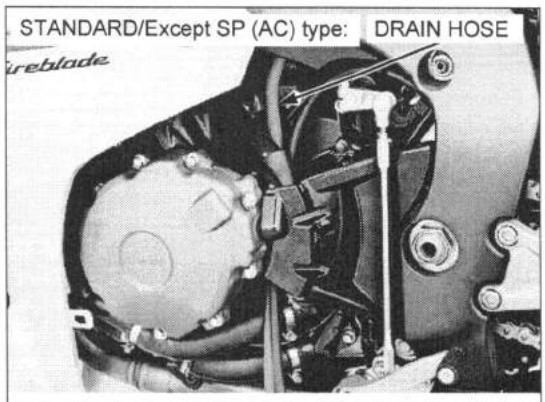
FUEL TANK LIFTING

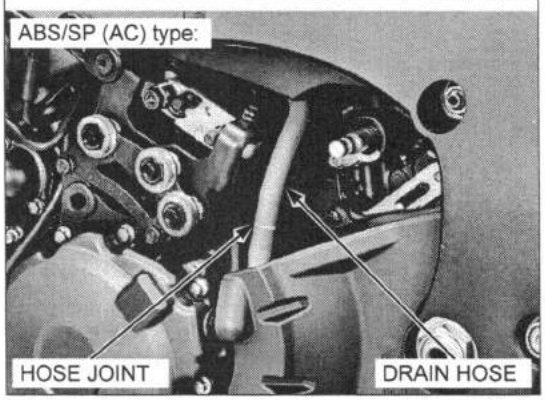
Remove the top shelter (page 3-9).

ABS/SP (AC) type: Remove the left rear under cover (page 3-24).

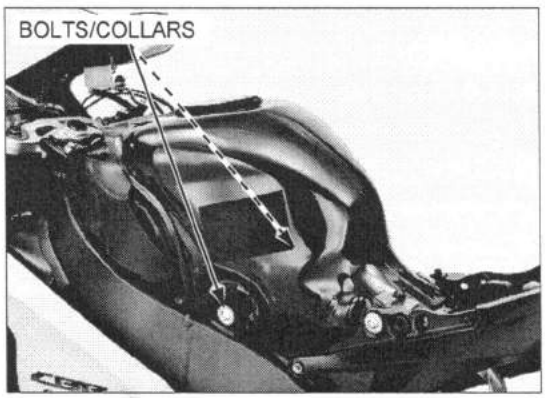
STANDARD/Except SP (AC) type: Release the fuel tank drain hose.

ABS/ SP (AC) type: Disconnect the fuel tank drain hose from the hose joint.



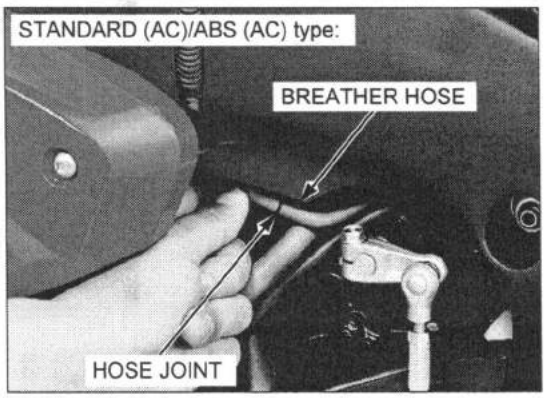


Remove the fuel tank mounting bolts and collars.

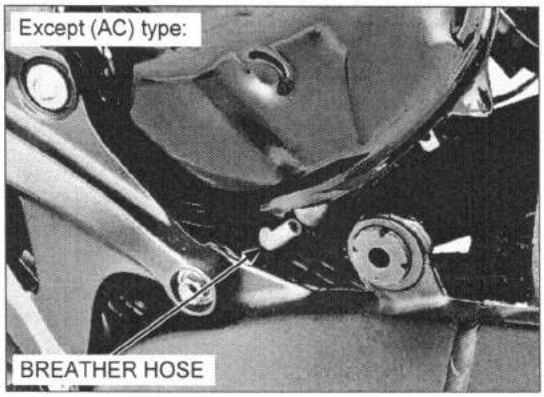


STANDARD (AC)/ ABS (AC) type: Disconnect the fuel tank breather hose at hose joint.

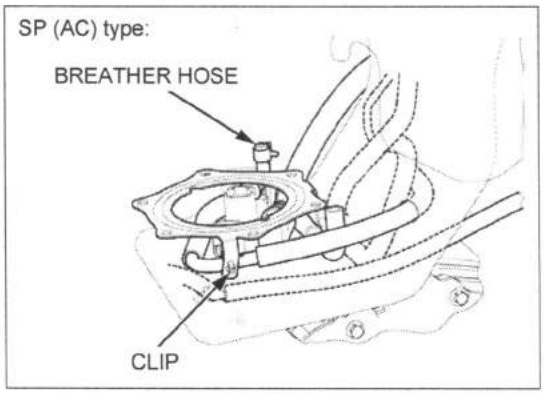
Lift the fuel tank front end.



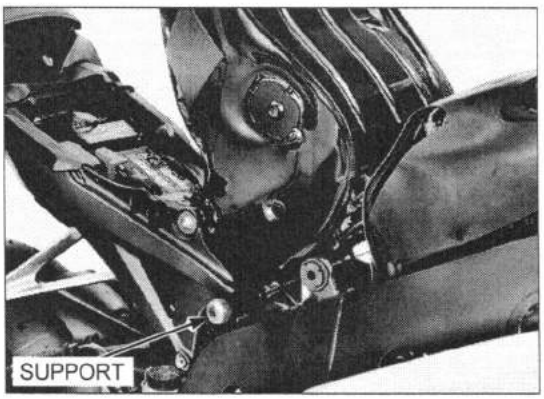
Except (AC) type: Lift the fuel tank front end and release from the fuel tank hole.



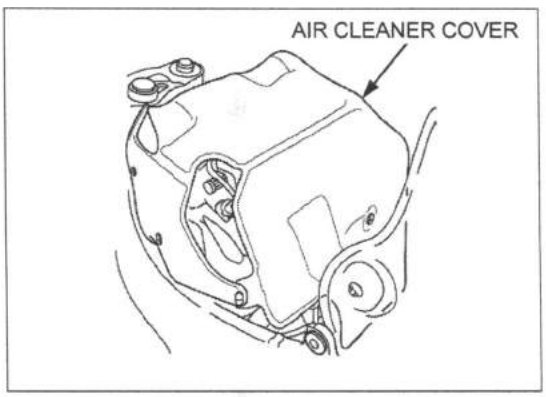
SP (AC) type: Lift the fuel tank front end, release the hose clip from the stay and disconnect the fuel tank breather hose.



Insert a suitable support into the holes and support the fuel tank as shown.

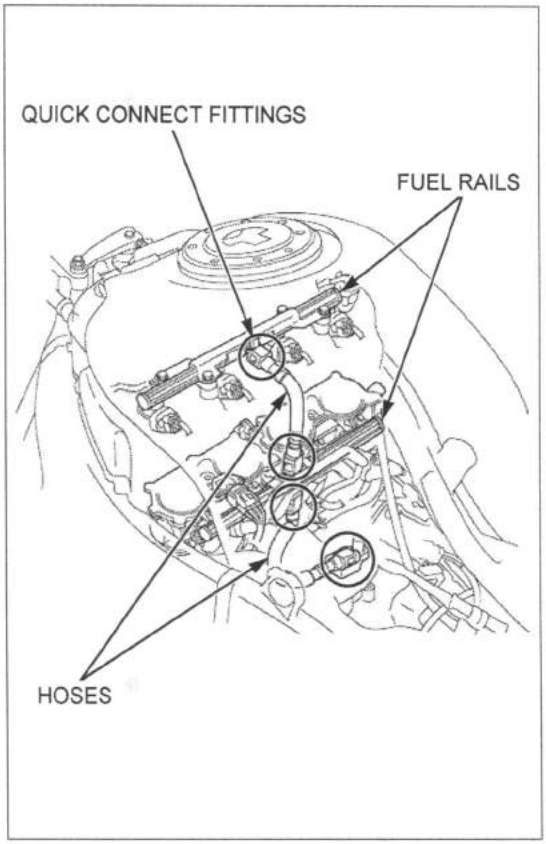


Remove the air cleaner cover.



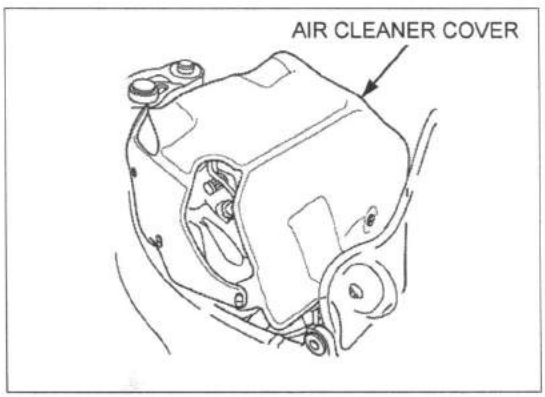
INSPECTION

Check the fuel lines for deterioration, damage, or leakage. Replace the fuel line if necessary.
Check the fuel rails and quick connect fittings for damage or leakage. Replace them if necessary.
Check the fuel pump mounting area for leakage.
Replace the fuel pump packing if necessary (page 6-56).
Check the primary/secondary fuel injectors for damage or leakage. Replace them if necessary.

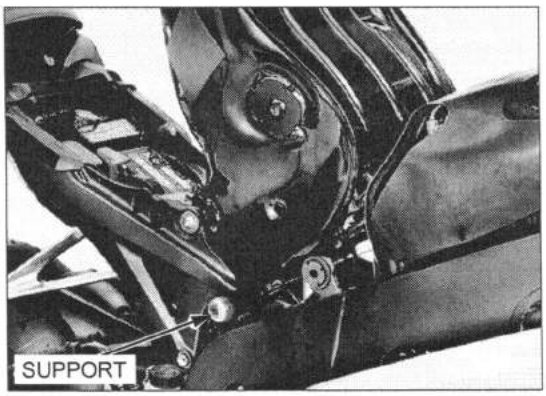


FUEL TANK LOWERING

Install the air cleaner cover securely.



Hold the fuel tank and remove the support.



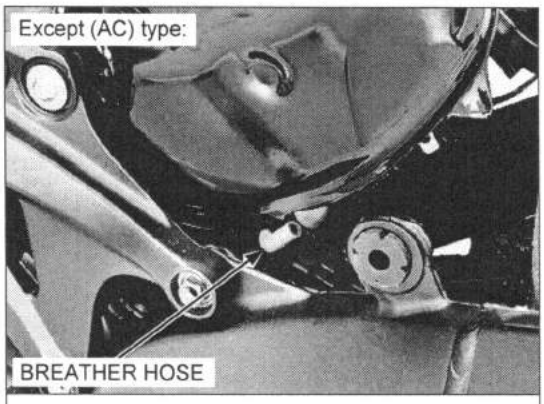
Except (AC) type: Hold the fuel tank and route the breather hose securely.

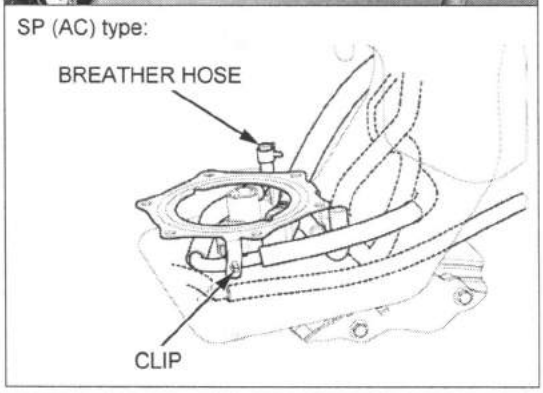
SP (AC) type: Connect the breather hose to the fuel tank and install the hose clip.

Route the drain hose so it doesn't kink or bind. Lower the fuel tank, while properly routing the drain hose.

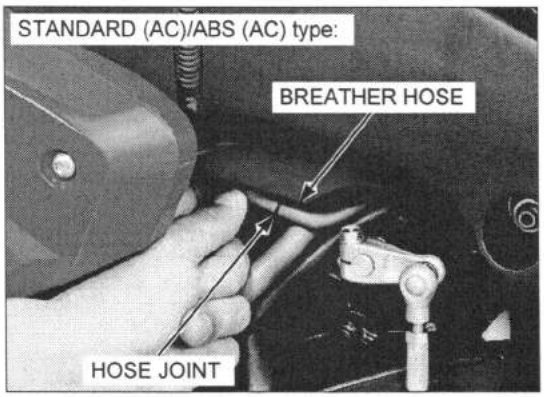
NOTE:

- Correctly route the drain hose (page 1-25).
- Be careful not to damage the harness and hose.
- After installing the fuel tank, make sure the drain and fuel hoses are not kinked or bound.





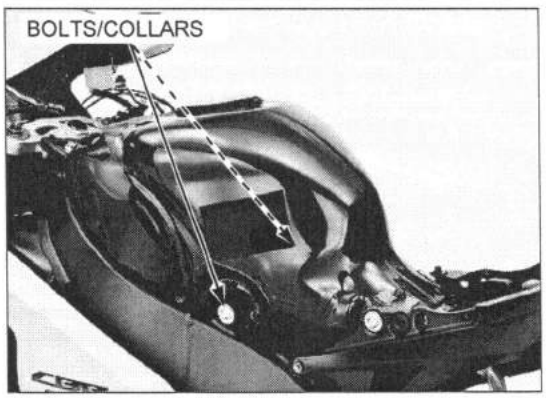
STANDARD (AC)/ ABS (AC) type: Connect the fuel tank breather hose to the hose joint securely.



Install the collars and fuel tank mounting bolts.

Tighten the bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

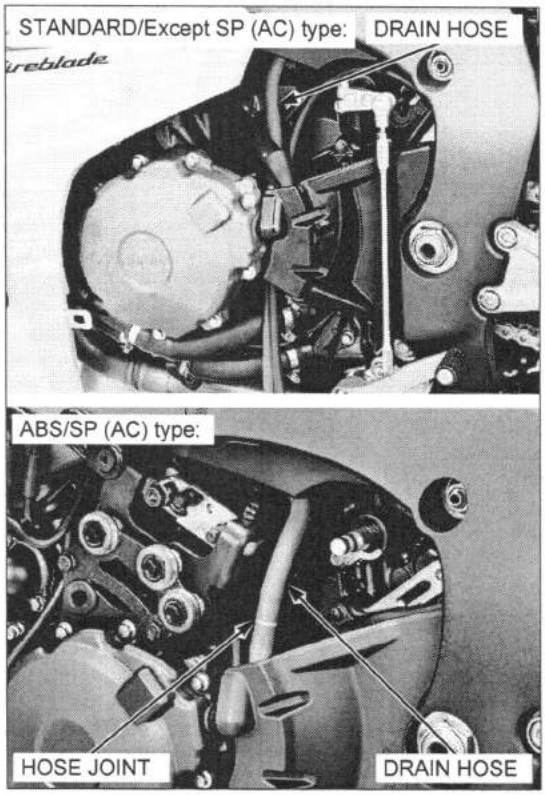


ABS/ SP (AC) type: Connect the fuel tank drain hose to the hose joint.

Route the fuel tank drain hose properly (page 1-25).

Install the top shelter (page 3-9).

ABS/SP (AC) type: Install the left rear under cover (page 3-24).



THROTTLE OPERATION

Check for smooth operation of the throttle and that it returns automatically to the fully closed position from any open position and from any steering position.
Check the throttle cables and replace them if they are deteriorated, kinked, or damaged.
If throttle operation is not smooth, lubricate the throttle cables.

Measure the freeplay at the throttle grip flange.

FREEPLAY:
'08 – '13 model:
2 – 6 mm (0.08 – 0.24 in)
After '13 model:
2 – 4 mm (0.08 – 0.16 in)



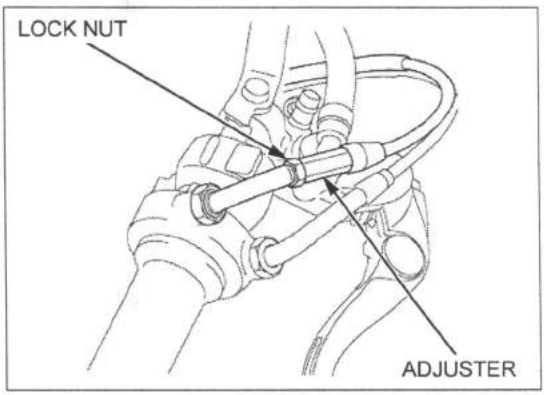
Throttle grip freeplay can be adjusted at either end of the throttle cable.

Minor adjustment is made with the upper adjuster.
Adjust the freeplay by loosening the lock nut and turning the adjuster.

After adjustment, tighten the lock nut securely.

Recheck the throttle operation.

If the adjuster cannot be reached the correct freeplay, turn the adjuster all the way in and then turn it out one turn.



Major adjustment is made with the lower adjuster.

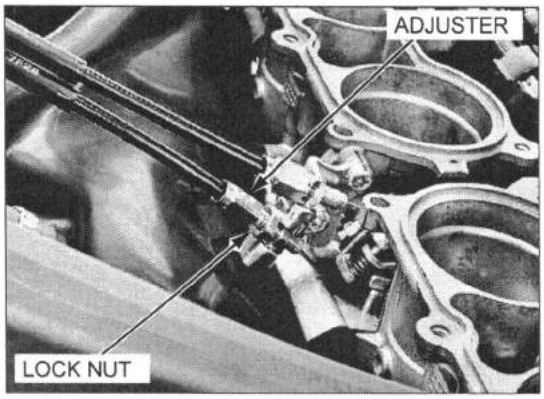
Remove the air cleaner housing (page 6-62).

Adjust the freeplay by loosening the lock nut and turning the adjuster.
After adjustment, tighten the lock nut to the specified torque.

TORQUE: 5.5 N·m (0.6 kgf·m, 4.1 lbf·ft)

Recheck the throttle operation.
Replace any damaged parts if necessary.

Install the removed parts in the reverse order of removal.

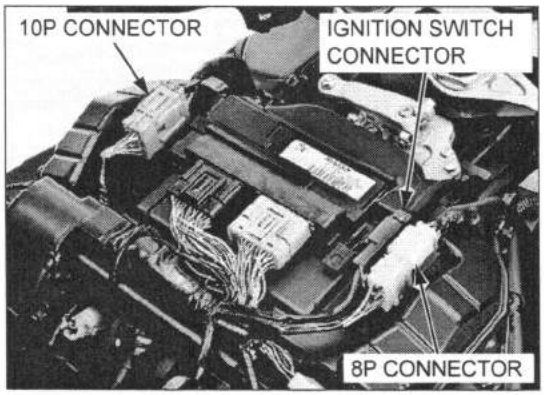


AIR CLEANER

Lift and support the fuel tank (page 4-7).

Disconnect the following:

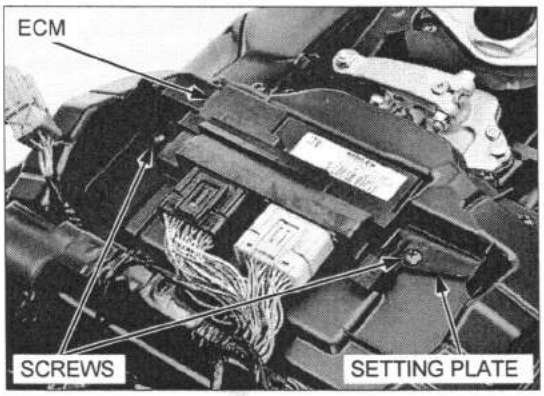
- Left handlebar switch 10P (Blue) connector
- Right handlebar switch 8P (White) connector
- Ignition switch connector
  STANDARD/SP type: 2P (Brown)
  ABS type: 3P (Brown)



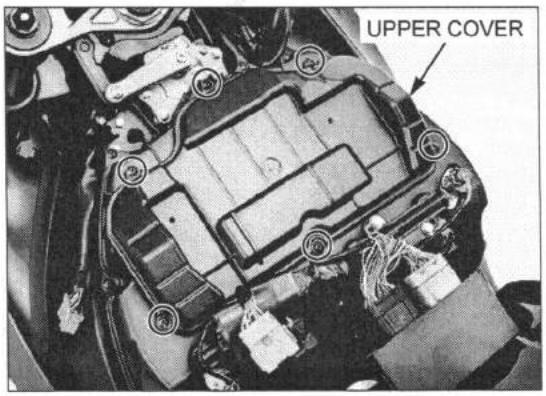
Remove the screws and ECM setting plate.

Be careful not to damage the ECM and wires.

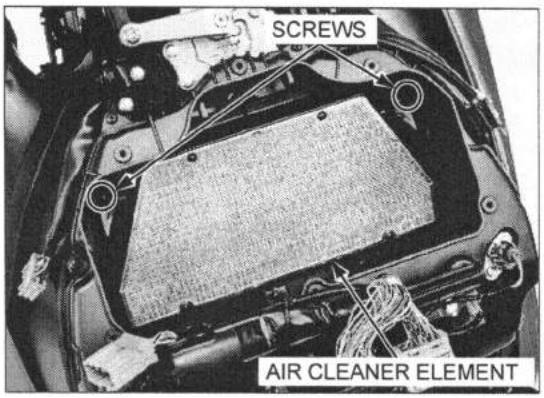
Pull up the ECM with connectors connected.



Remove the screws and air cleaner housing upper cover.



Loosen the screws and remove the air cleaner element as shown.



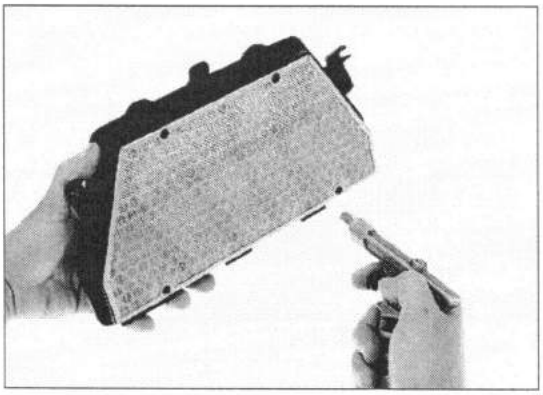
Clean the air cleaner element using compressed air from the throttle body side any time it is excessively dirty.

Installation is in the reverse order of removal.

TORQUE:

Air cleaner element mounting screw:
0.8 N·m (0.1 kgf·m, 0.6 lbf·ft)

ECM setting plate screw:
0.8 N·m (0.1 kgf·m, 0.6 lbf·ft)



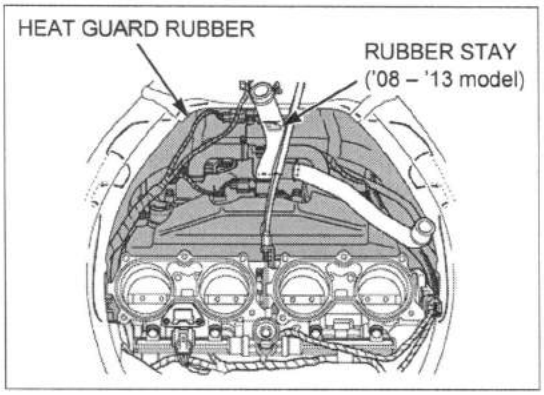
SPARK PLUG

REMOVAL

Remove the following:

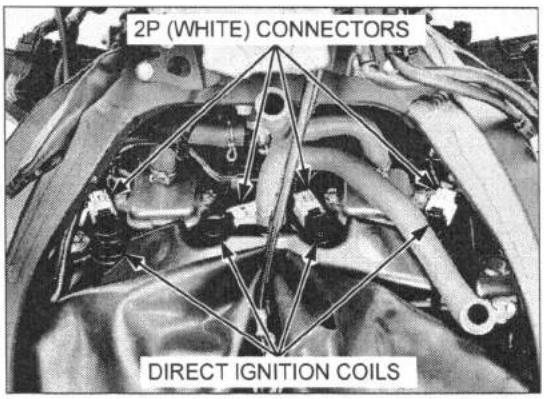
- Air cleaner housing (page 6-62)
- Middle cowl (page 3-18)

Pull up the front of the heat guard rubber to access the direct ignition coil.



Disconnect the direct ignition coil 2P (White) connectors.

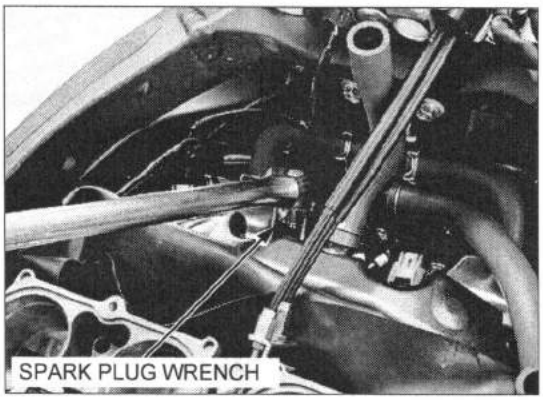
Remove the direct ignition coils from the spark plugs.



Clean around the spark plug bases with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.

Remove the spark plug using the equipped spark plug wrench or an equivalent.

Inspect or replace as described in the maintenance schedule (page 4-4).



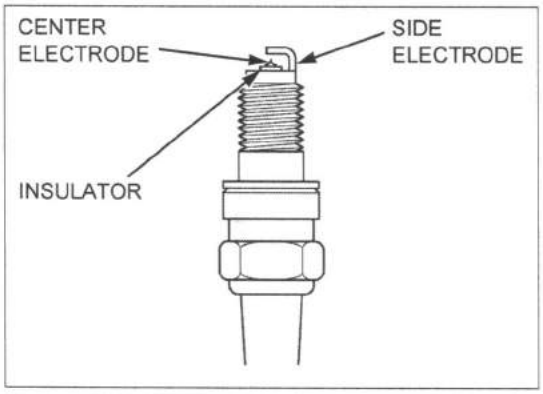
INSPECTION

Check the following and replace if necessary (recommended spark plug: page 4-14)

- Insulator for damage
- Electrodes for wear
- Burning condition, coloration

This motorcycle's spark plugs are equipped with an iridium center electrode. Replace spark plugs if their electrodes are contaminated.

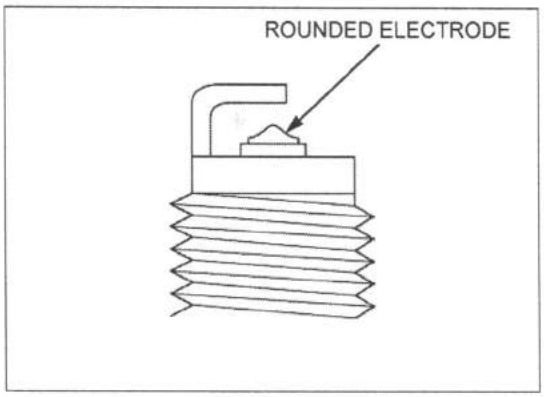
If the electrodes are contaminated with accumulated objects or dirt, replace the spark plug.



Always use the specified spark plugs on this motorcycle.

Replace the plug if the center electrode is rounded as shown in the illustration.

SPECIFIED SPARK PLUG:
NGK: IMR9E-9HES
DENSO: VUH27ES



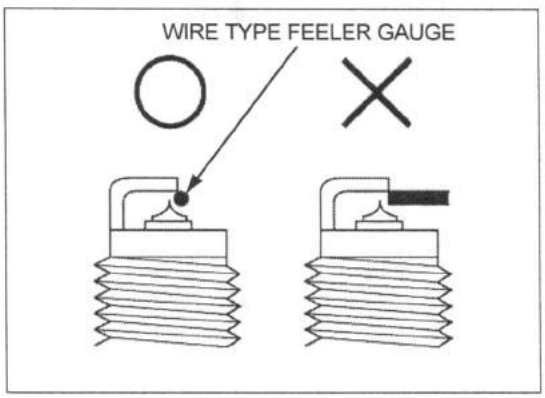
To prevent damaging the iridium center electrode, use a wire type feeler gauge to check the spark plug gap.

Check the spark plug gap between the center and side electrodes with a wire type feeler gauge.

Make sure that a 1.0 mm (0.04 in) plug gauge does not insert between the gap.

Do not adjust the spark plug gap. If the gap is out of specification, replace with a new one.

If the gauge can be inserted into the gap, replace the plug with a new one.

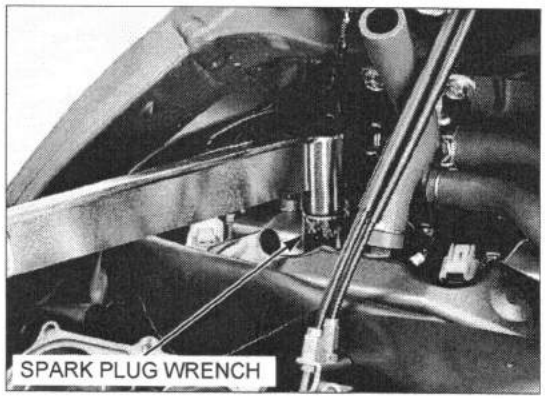


INSTALLATION

Install and hand tighten the spark plug to the cylinder head, then tighten the spark plug to the specified torque.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

Install the removed parts in the reverse order of removal.



VALVE CLEARANCE

INSPECTION

NOTE:

After valve clearance inspection, check the engine idle speed (page 6-75).

Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).

Remove the cylinder head cover (page 9-7).

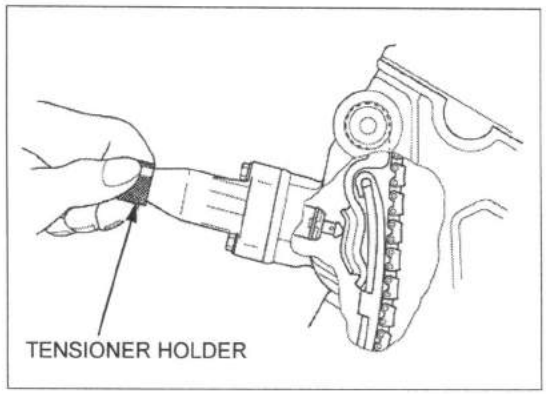
Remove the bolt and sealing washer from the cam chain tensioner.



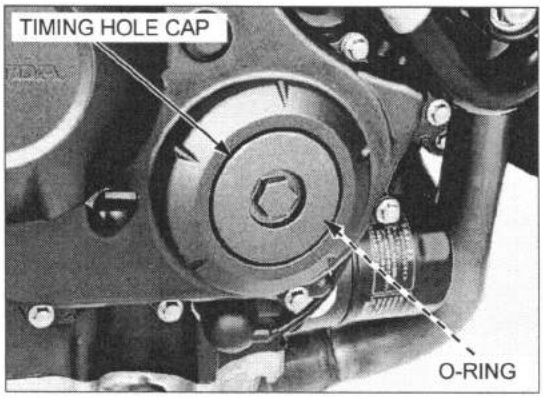
Turn the tensioner shaft fully in (clockwise) and secure it using the special tool.

TOOL:

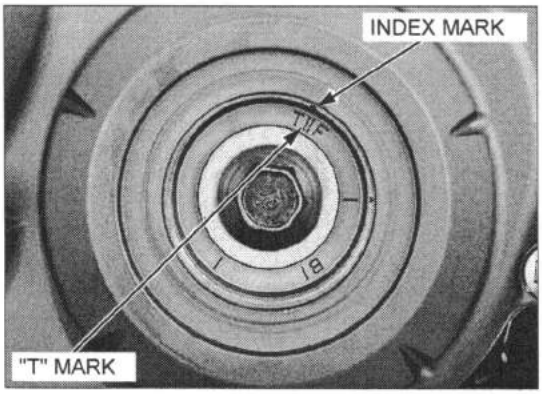
Cam chain tensioner holder	**070MG-0010100 (Not available in U.S.A.) or 07AMG-MFJA100 (U.S.A. only)**



Remove the timing hole cap and O-ring.

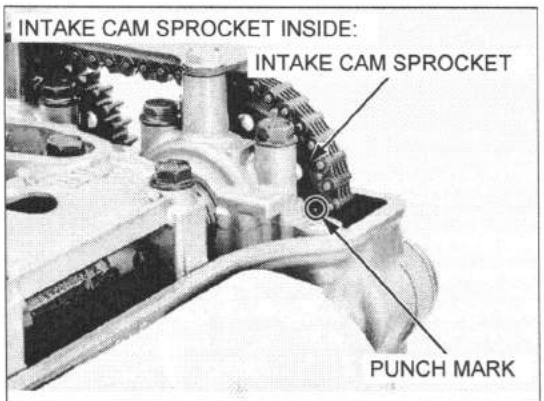


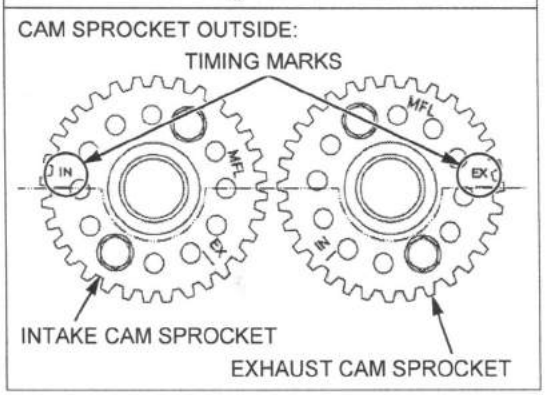
Turn the crankshaft clockwise, align the "T" mark with the index mark on the right crankcase cover.



- The inside punch mark of the intake cam sprocket must be flush with the cylinder head upper surface.
- The cam sprocket outside timing marks ("IN" and "EX") must be flush with the cylinder head upper surface and facing outward as shown.

If the timing marks on the cam sprockets are facing inward, turn the crankshaft clockwise one full turn (360) and realign the timing marks with the cylinder head surface so they are facing outward.





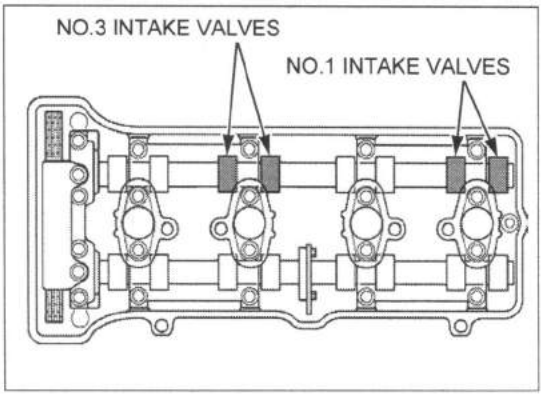
Insert the feeler gauge between the valve lifter and cam lobe.

Record the clearance for each valve for reference in shim selection if adjustment is required.

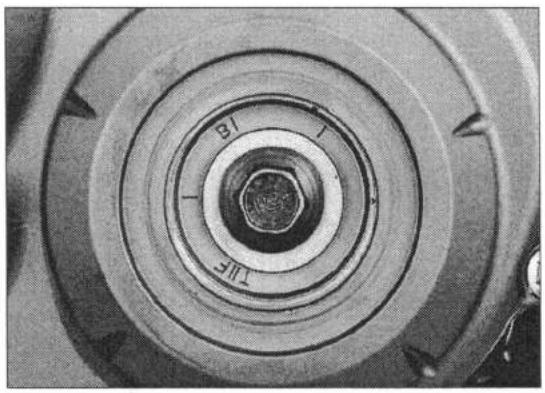
Check the valve clearance for the No.1 and No.3 cylinder intake valves using a feeler gauge.

VALVE CLEARANCE:

IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)



Turn the crankshaft clockwise 1/2 turn (180°).

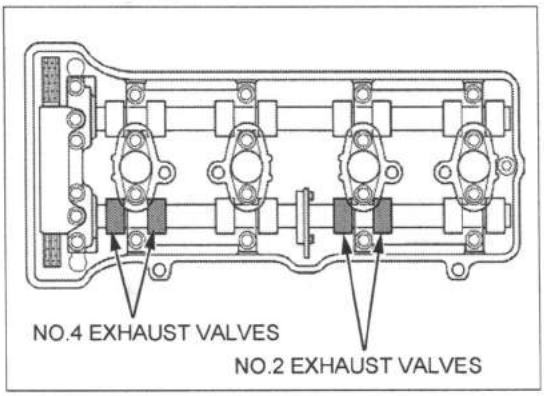


Record the clearance for each valve for reference in shim selection if adjustment is required.

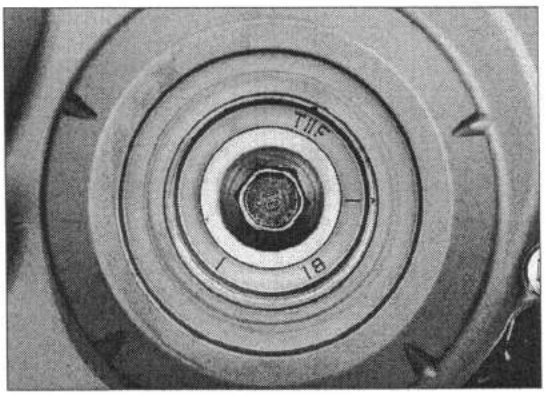
Check the valve clearance for the No.2 and No.4 cylinder exhaust valves using a feeler gauge.

VALVE CLEARANCE:

EX: 0.30 ± 0.03 mm (0.012 ± 0.001 in)



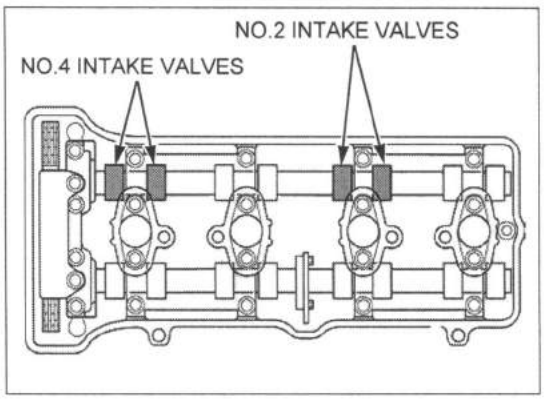
Turn the crankshaft clockwise 1/2 turn (180°), align the "T" mark with the index mark on the right crankcase cover.



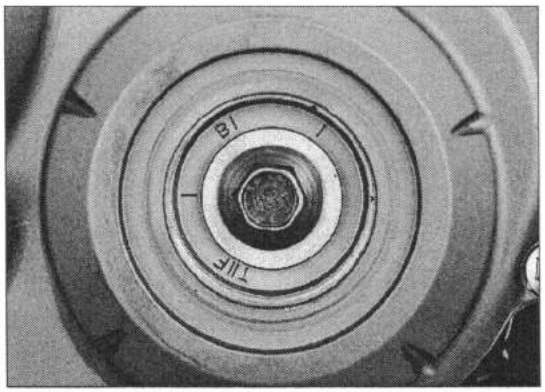
Record the clearance for each valve for reference in shim selection if adjustment is required.

Check the valve clearance for the No.2 and No.4 cylinder intake valves using feeler gauge.

VALVE CLEARANCE:
IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)



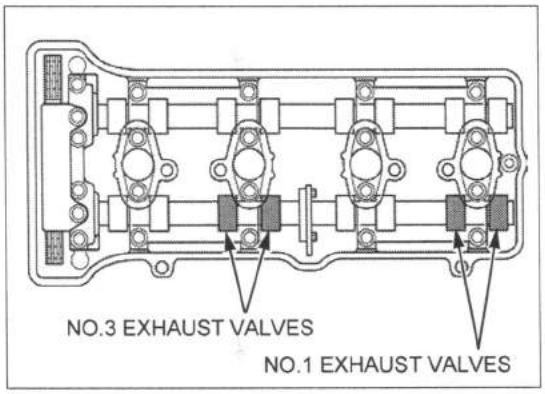
Turn the crankshaft clockwise 1/2 turn (180°).



Record the clearance for each valve for reference in shim selection if adjustment is required.

Check the valve clearance for the No.1 and No.3 cylinder exhaust valves using a feeler gauge.

VALVE CLEARANCE:
EX: 0.30 ± 0.03 mm (0.012 ± 0.001 in)



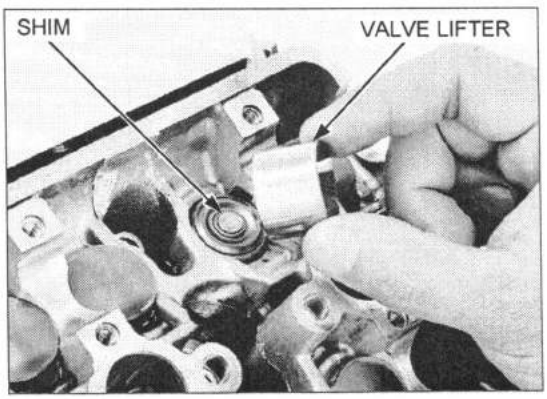
ADJUSTMENT

NOTE:
Use Honda Genuine Parts shims specific to this model for replacement. In case of wrong shims usage, the intake valve titanium surface may be damaged.

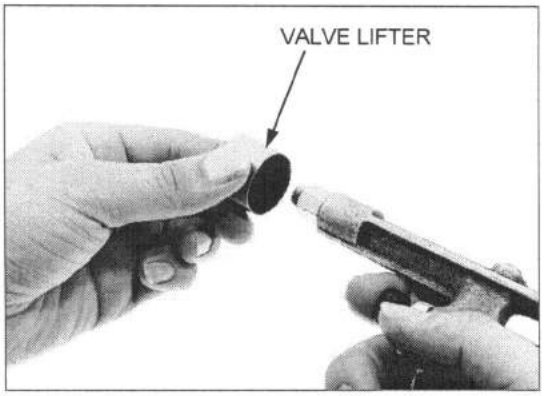
Remove the camshafts (page 9-9).

Remove the valve lifters and shims.

- The shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with tweezers or a magnet.



Clean the valve shim contact area in the valve lifter with compressed air.

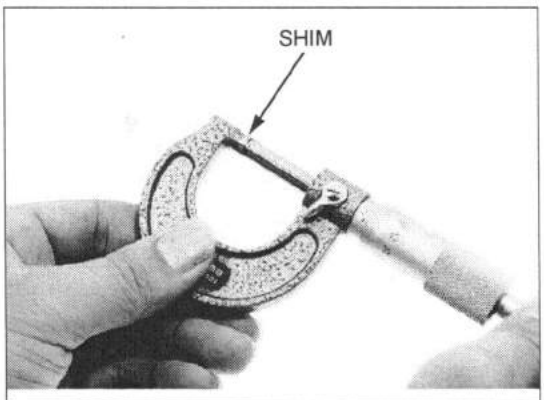


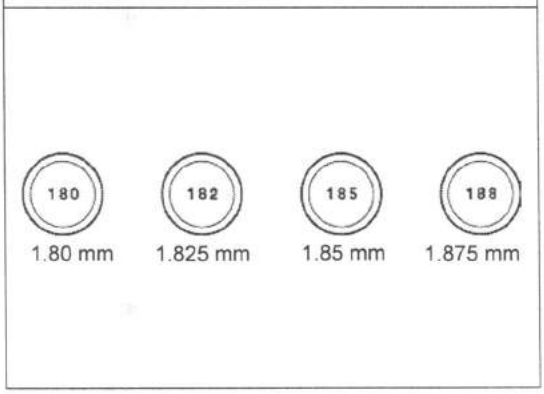
Sixty-five different thickness shims are available from the thinnest 1.200 mm thickness shim to the thickest 2.800 mm thickness shim in increments of 0.025 mm.

Measure the shim thickness and record it.

Calculate the new shim thickness using the equation below.
A = (B – C) + D
A: New shim thickness
B: Recorded valve clearance
C: Specified valve clearance
D: Old shim thickness

- Make sure of the correct shim thickness by measuring the shim by micrometer.
- Reface the valve seat if carbon deposit result in a calculated dimension of over 2.800 mm.



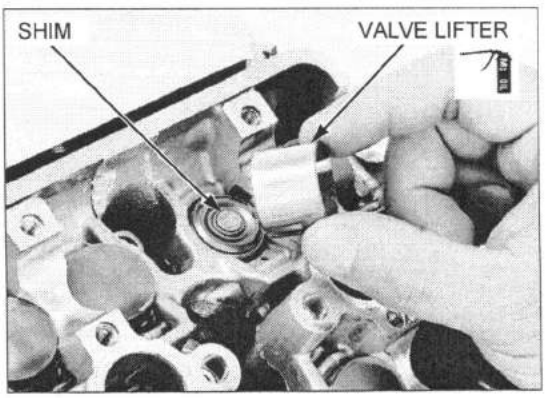


Install the shims and valve lifters in their original locations.

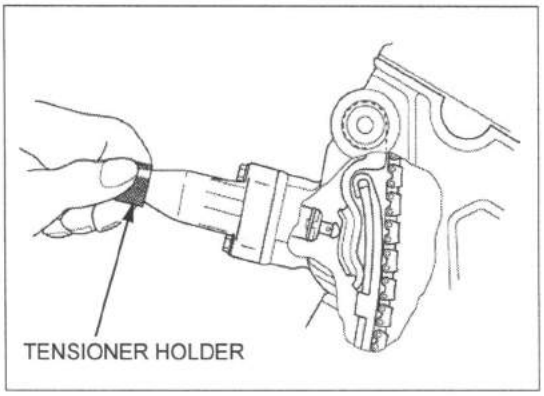
Install the newly selected shim on the valve spring retainer.
Apply molybdenum disulfide oil to the valve lifters sliding surface.
Install the valve lifters into the valve lifter holes.

Install the camshafts (page 9-30).

Rotate the camshafts by rotating the crankshaft clockwise several times.
Recheck the valve clearance.



Remove the tensioner holder.



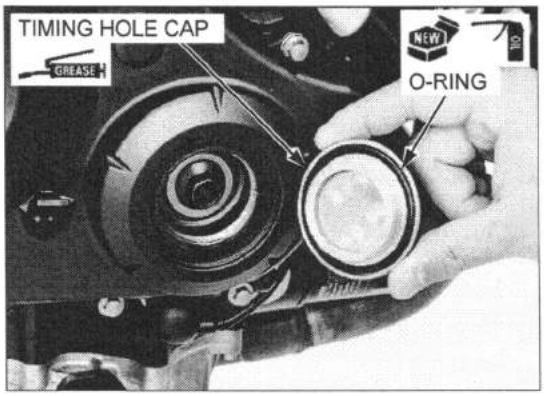
Install a new sealing washer and tighten the bolt securely.



Apply oil to a new O-ring and install it to the timing hole cap.
Apply grease to the timing hole cap threads.
Tighten the timing hole cap to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the removed parts in the reverse order of removal.

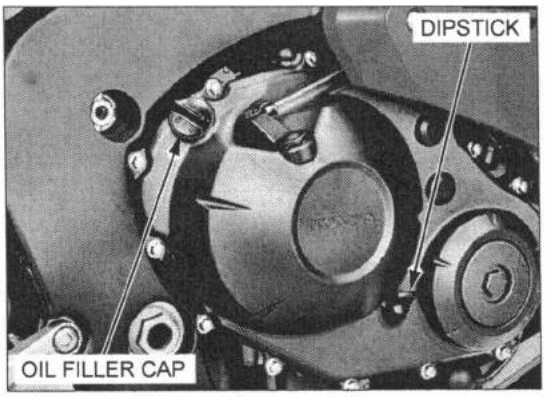


ENGINE OIL/OIL FILTER

OIL LEVEL INSPECTION

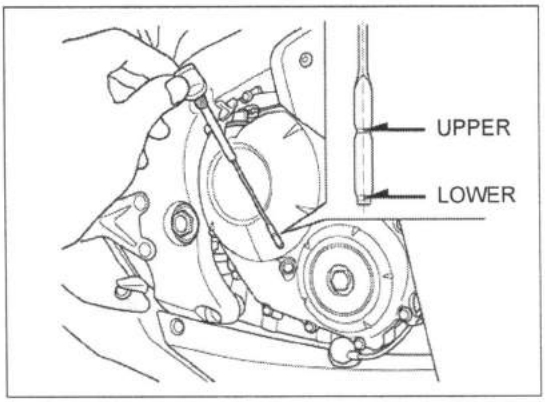
Start the engine and let it idle for 3 – 5 minutes.
Stop the engine and wait 2 – 3 minutes.
Hold the motorcycle in an upright position.

Remove the dipstick and wipe the oil with a clean cloth.



Insert the dipstick without screwing it in, remove it and check the oil level.

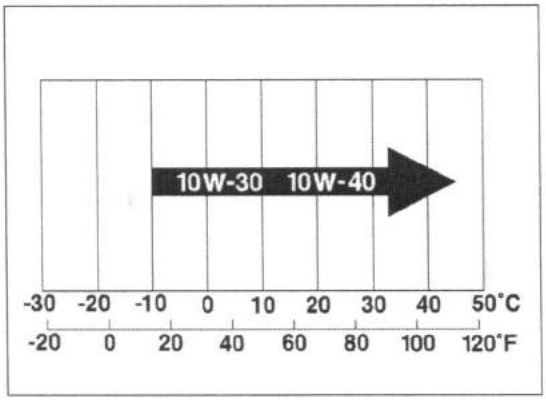
If the oil level is below or near the lower level line on the dipstick, remove the oil filler cap and add the recommended engine oil to the upper level line through the oil filler hole.



Other viscosities of oil may be used depending upon the average temperature in your riding area. Use the chart as a guide.

RECOMMENDED ENGINE OIL:
Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil
API service classification: SG or Higher
JASO T 903 standard: MA
Viscosity: SAE 10W-30

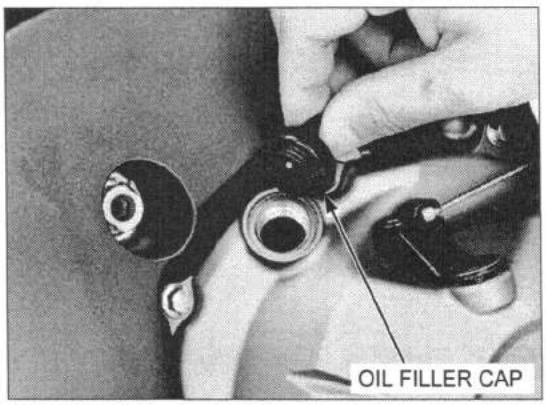
Reinstall the oil filler cap and dipstick.



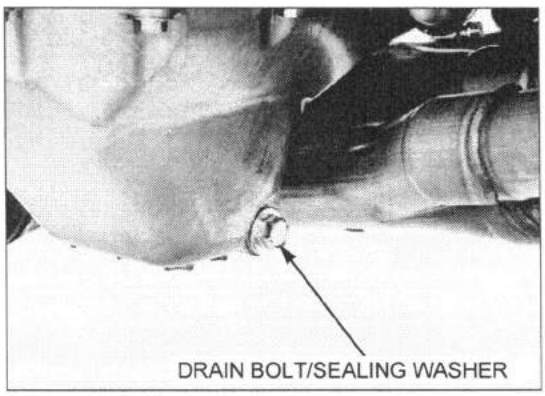
ENGINE OIL & FILTER CHANGE

Remove the right middle cowl (page 3-18).

Remove the oil filler cap.

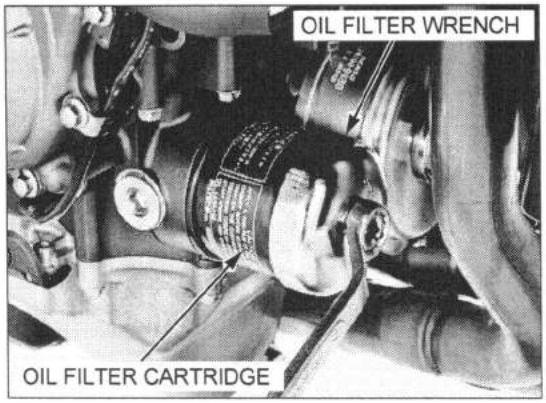


Remove the drain bolt and sealing washer, drain the oil completely.



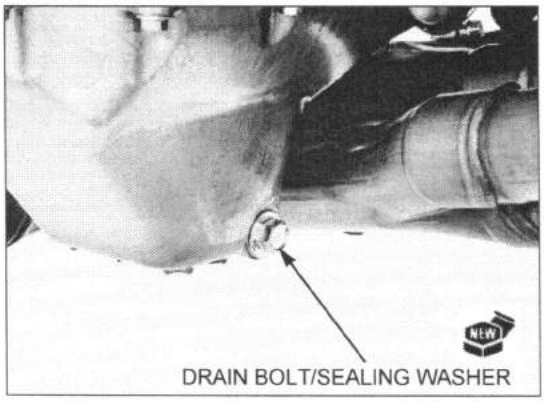
Remove the oil filter cartridge using the special tool.

TOOL:
Oil filter wrench **07HAA-PJ70101 or 07AMA-MFJA100 (U.S.A. only)**



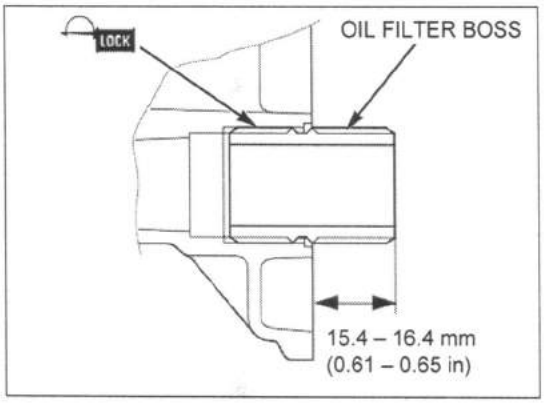
Install a new sealing washer onto the drain bolt. Tighten the drain bolt to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

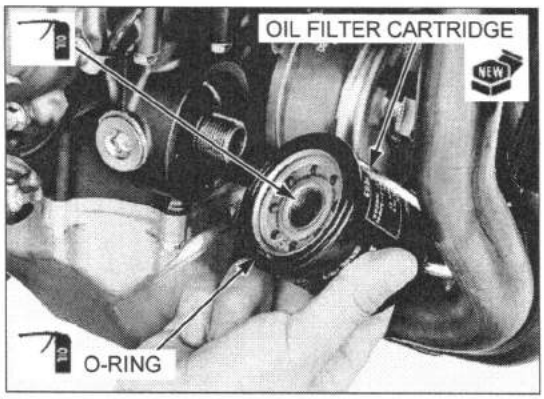


Check that the oil filter boss protrusion from the crankcase is at the specified length as shown.

SPECIFIED LENGTH: 15.4 – 16.4 mm (0.61 – 0.65 in)



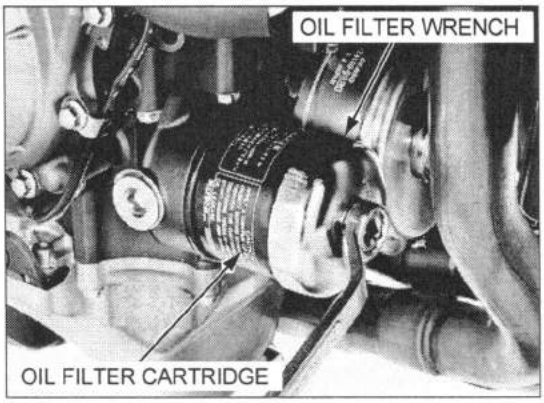
Apply oil to new oil filter cartridge threads and O-ring.



Install the oil filter cartridge and tighten it to the specified torque.

TOOL:
Oil filter wrench — **07HAA-PJ70101 or 07AMA-MFJA100 (U.S.A. only)**

TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)



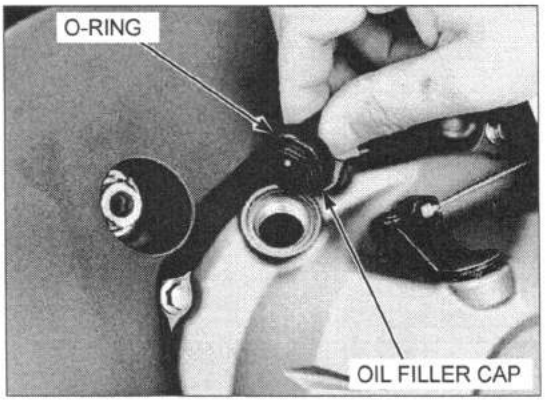
Fill the crankcase with recommended engine oil.

ENGINE OIL CAPACITY:
2.8 liters (3.0 US qt, 2.5 Imp qt) after draining
3.0 liters (3.2 US qt, 2.6 Imp qt) after oil filter change

Check that the O-ring on the oil filler cap is in good condition, and replace it if necessary.
Install the oil filler cap.

Check the oil level (page 4-20).
Check that there are no oil leaks.

Install the right middle cowl (page 3-18).



RADIATOR COOLANT

Check the coolant level of the reserve tank with the engine running at normal operating temperature.

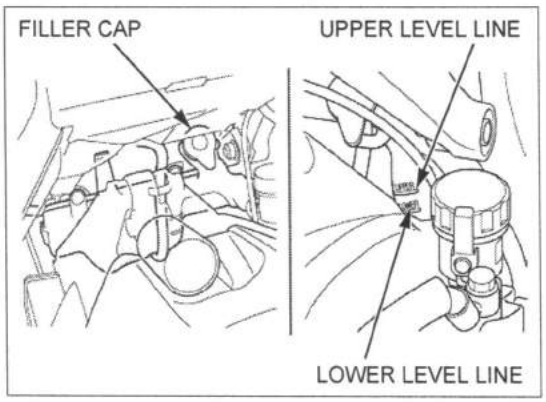
The level should be between the "UPPER" and "LOWER" level lines.

If necessary, add recommended coolant.

RECOMMENDED ANTIFREEZE:
Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate free corrosion inhibitors

Remove the reserve tank filler cap and fill to the "UPPER" level line with 1:1 mixture of distilled water and antifreeze.

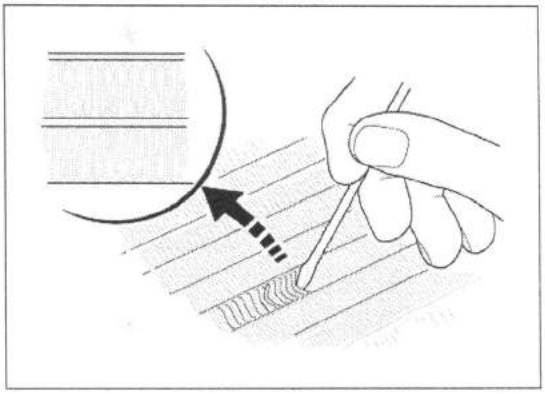
Reinstall the filler cap.



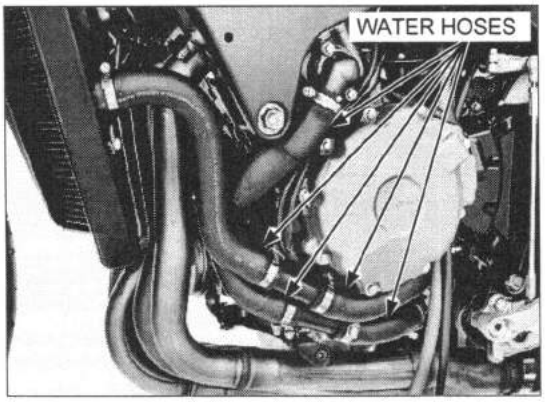
COOLING SYSTEM

Remove the middle cowls (page 3-18).

Check the radiator air passages for clogging or damage.
Straighten bent fins with a small blade screwdriver and remove insects, mud, or other obstructions with compressed air or low water pressure.
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.

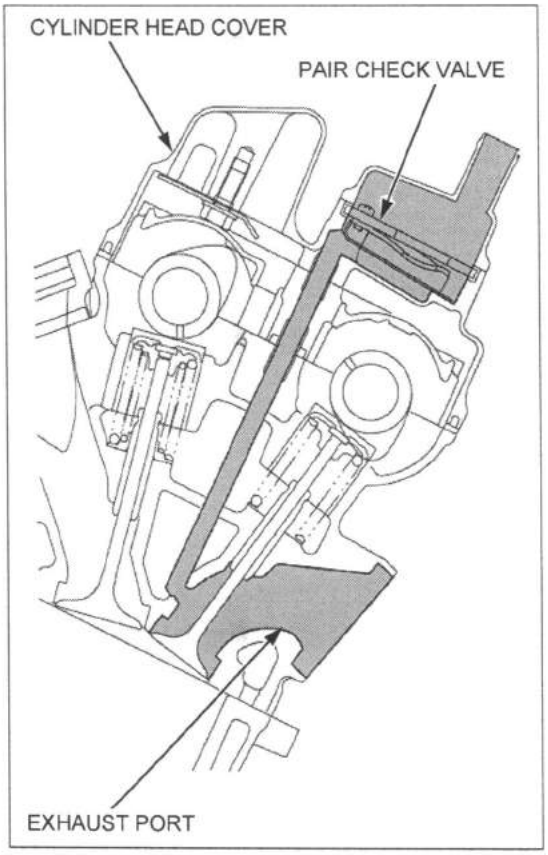


Inspect the water hoses for cracks or deterioration, and replace them if necessary.
Check the tightness of all hose clamps and fasteners.



SECONDARY AIR SUPPLY SYSTEM

- This model is equipped with a built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head cover.
- The secondary air supply system introduces filtered air into the exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system. This charged secondary air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.

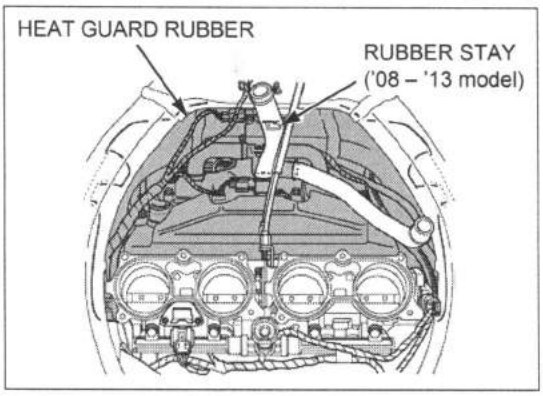


Remove the air cleaner housing (page 6-62).

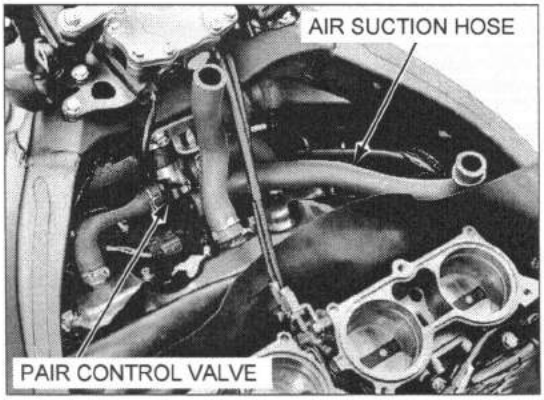
Pull up the front of the heat guard rubber.

If the hoses show any signs of heat damage, inspect the PAIR check valves for damage (page 9-8).

Check the PAIR hoses between the PAIR control solenoid valve and cylinder head cover for deterioration, damage, or loose connections. Make sure that the hoses are not cracked.

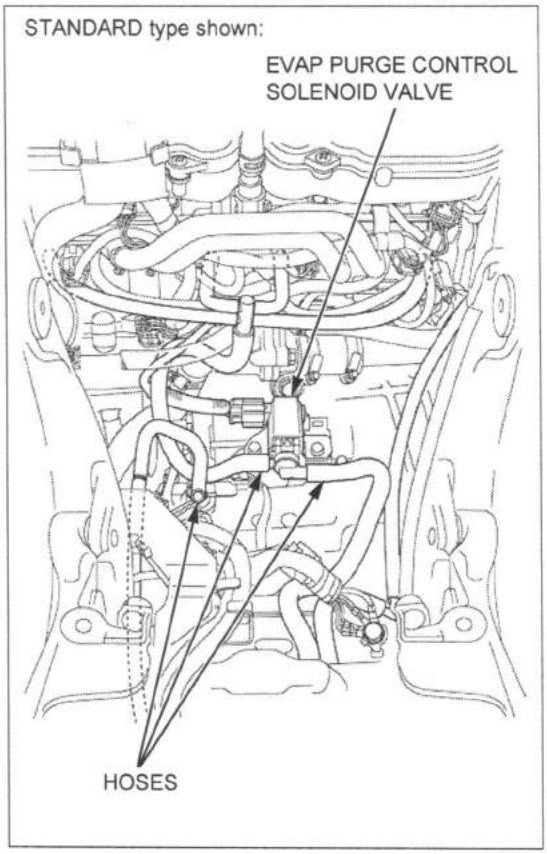


Check the air suction hose between the air cleaner housing and PAIR control solenoid valve for deterioration, damage, or loose connections.
Check that the hoses are not kinked, pinched, or cracked.



EVAPORATIVE EMISSION CONTROL SYSTEM ((AC) TYPE)

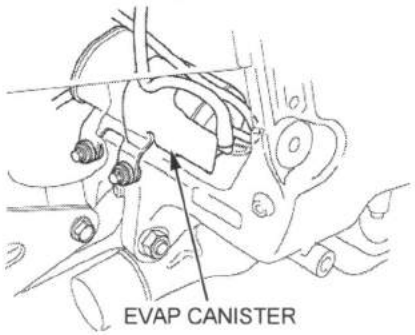
Check the hoses between the fuel tank, EVAP canister, and EVAP purge control solenoid valve for deterioration, damage, or loose connection.



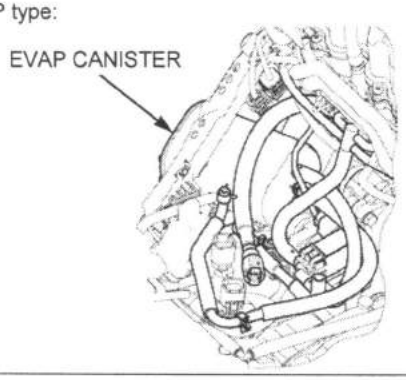
Check the EVAP canister for clacks or other damage.

Refer to the Cable & Harness Routing for hose connections (page 1-25).

STANDARD/ABS type:



SP type:

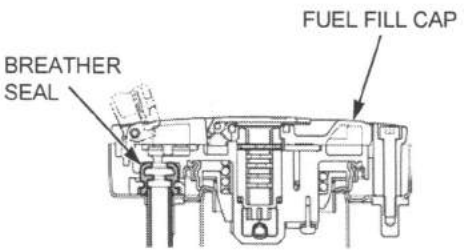


After '13 model: Open the fuel fill cap.

Check the breather seal in the fuel fill cap for deterioration, cracks, or damage. Replace it if necessary.

NOTE:

- Always replace the breather seal with a new one when the fuel fill cap is removed for service.



EGCA CABLE

OPERATING INSPECTION

Clear any DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

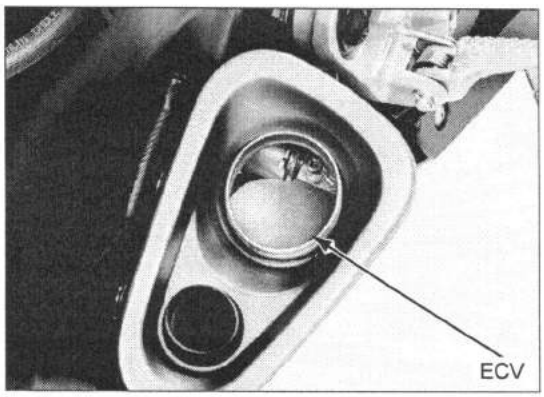
Start the engine.

Stop the engine and check that the ECV is closed fully.

If the ECV is closed fully, it is normal.

If the ECV is not closed fully, adjust the EGCA cable.

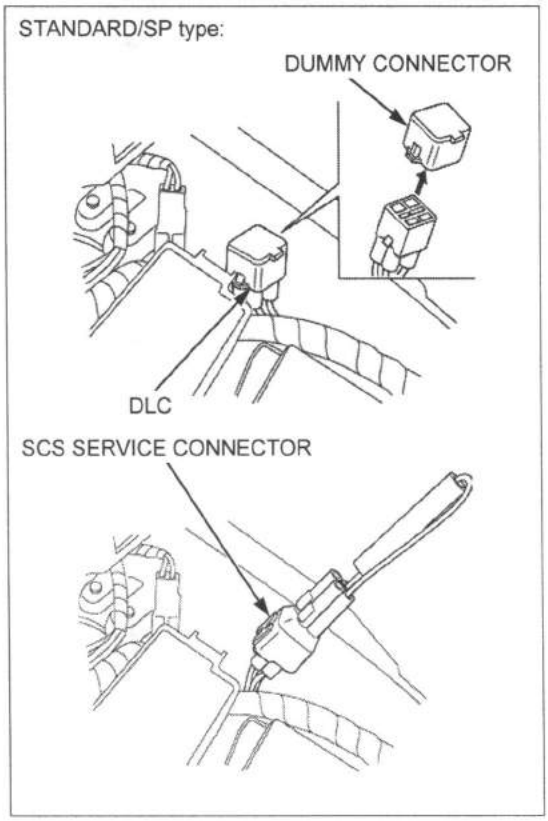
- STANDARD/SP type (page 4-28)
- ABS type (page 4-30)



STANDARD/ SP type: Remove the seat (page 3-7).

Remove the dummy connector and short the DLC terminals using the special tool.

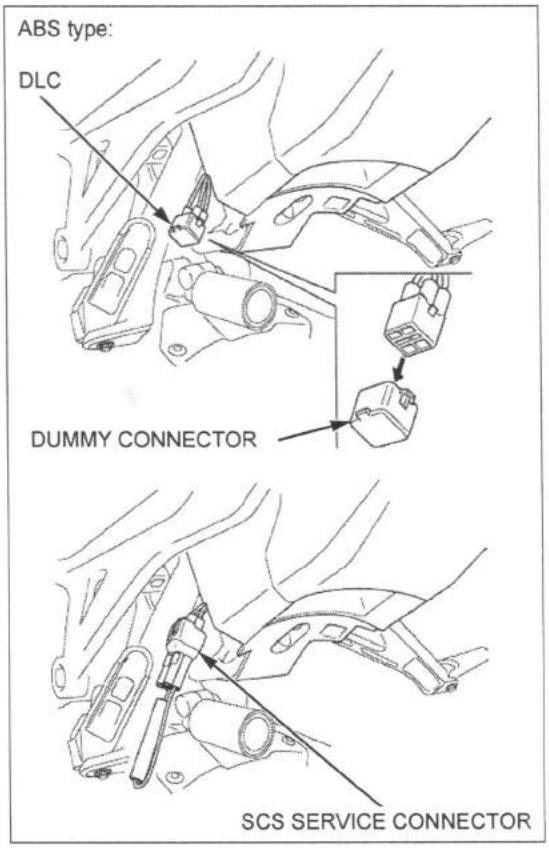
TOOL:
SCS Service connector 070PZ-ZY30100



ABS type: Remove the EGCA cover (page 3-54).

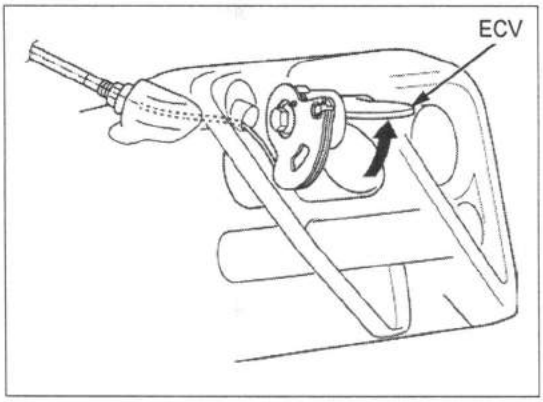
Remove the dummy connector and short the DLC terminals using the special tool.

TOOL:
SCS Service connector 070PZ-ZY30100



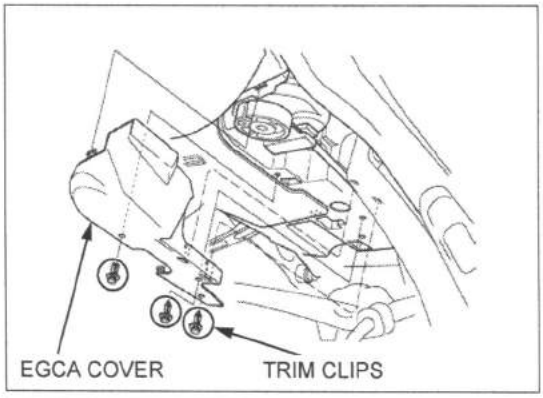
Turn the ignition switch ON and engine stop switch "○".

If the ECV opens fully, it is normal.



CABLE INSPECTION/ADJUSTMENT (STANDARD/SP type)

Remove the trim clips and EGCA cover.



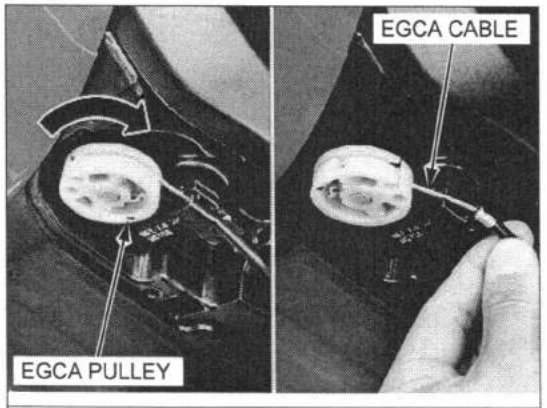
Turn the EGCA pulley clockwise and disconnect the EGCA cable from the EGCA pulley.

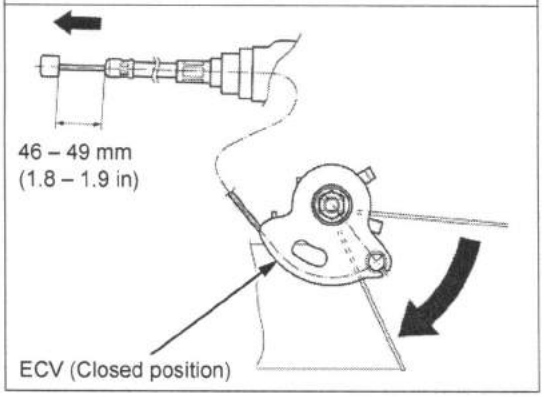
Check the EGCA cable length with the ECV in the closed position.

- Check the length of the EGCA cable with the ECV in the closed position while pulling the EGCA cable.

STANDARD LENGTH: 46 – 49 mm (1.8 – 1.9 in)

If the cable length is out of the specification, adjust the cable length as follows:





Remove the muffler (page 3-53).

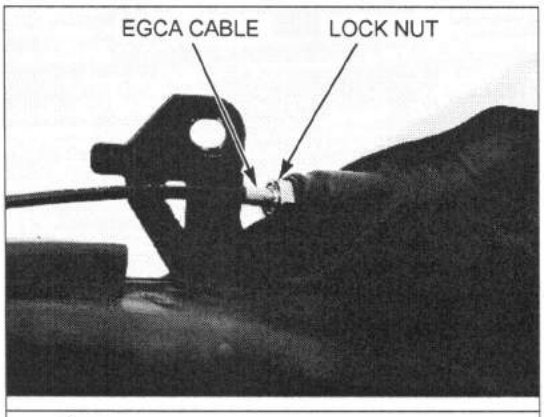
Loosen the lock nut and adjust the EGCA cable length with the ECV in the closed position.

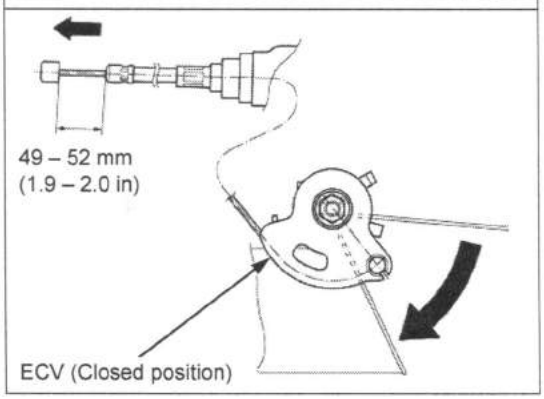
- Keep the EGCA cable straight when adjusting the cable length.
- Check the length of the EGCA cable with the ECV in the closed position while pulling the EGCA cable.

STANDARD LENGTH: 49 – 52 mm (1.9 – 2.0 in)

Tighten the EGCA cable lock nut to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



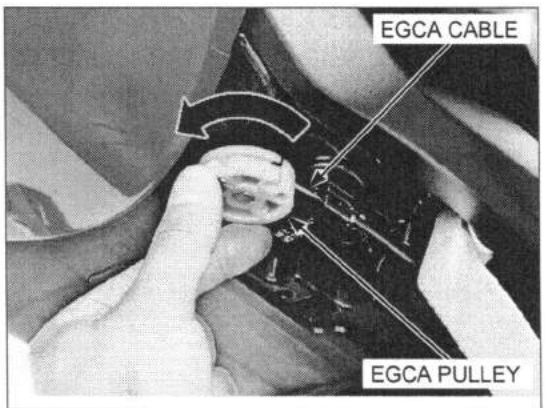


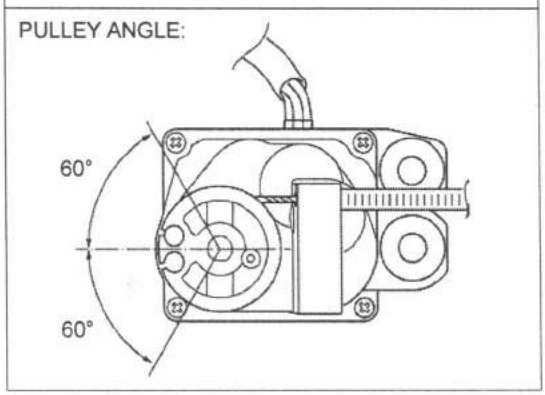
Install the muffler (page 3-60).

Connect the EGCA cable to the EGCA pulley.

Turn the EGCA pulley counterclockwise to the specified angle as shown.

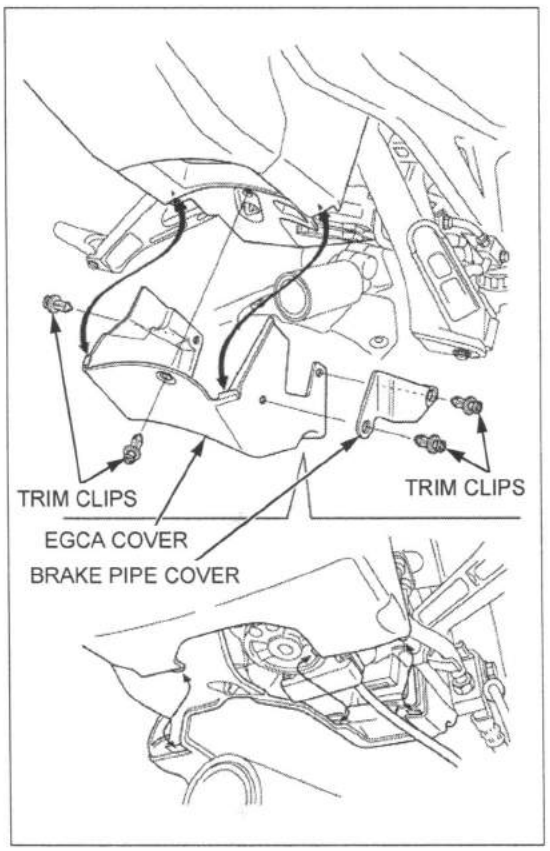
Installation is in the reverse order of removal.





CABLE INSPECTION/ADJUSTMENT (ABS type)

Remove the trim clips, brake pipe cover, and EGCA cover.



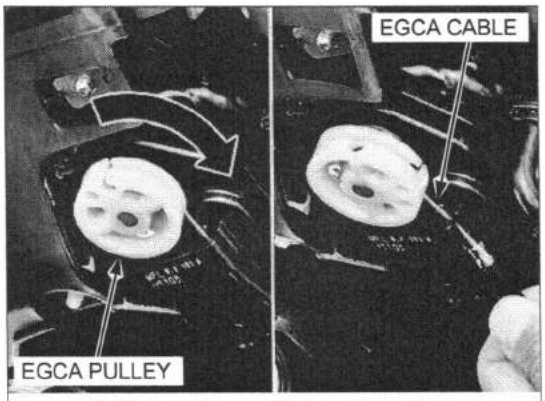
Turn the EGCA pulley clockwise and disconnect the EGCA cable from the EGCA pulley.

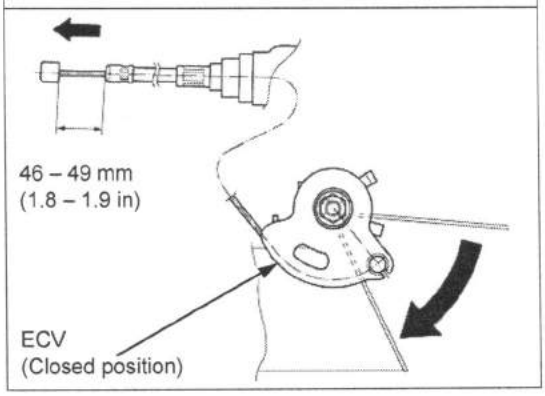
Check the EGCA cable length with the ECV in the closed position.

- Check the length of the EGCA cable with the ECV closed position while pulling the EGCA cable.

STANDARD LENGTH: 46 – 49 mm (1.8 – 1.9 in)

If the cable length is out of the specification, adjust the cable length as follows:





Remove the muffler (page 3-53).

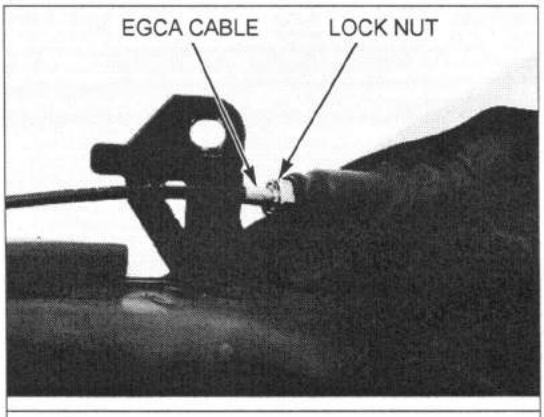
Loosen the lock nut and adjust the EGCA cable length with the ECV in the closed position.

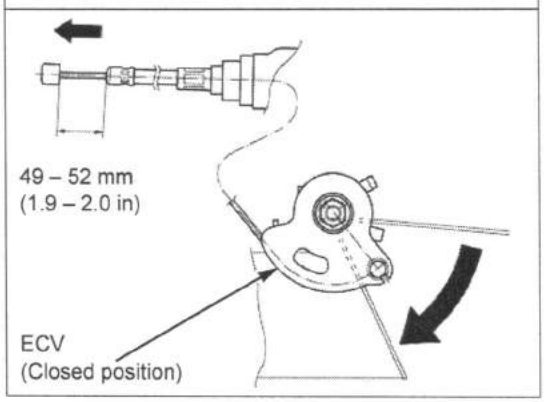
- Keep the EGCA cable straight when adjust the cable length.
- Check the length of the EGCA cable with the ECV in the closed position while pulling the EGCA cable.

STANDARD LENGTH: 49 – 52 mm (1.9 – 2.0 in)

Tighten the EGCA cable lock nut to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)





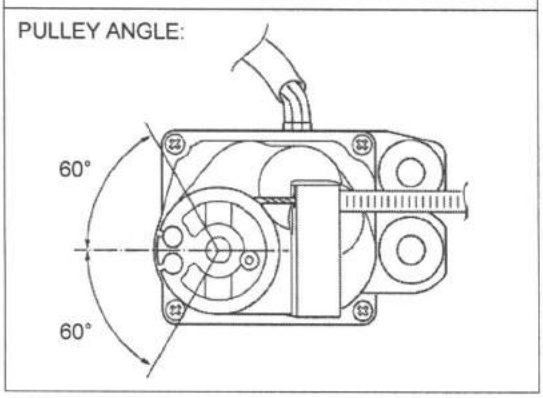
Install the muffler (page 3-60).

Connect the EGCA cable to the EGCA pulley.

Turn the EGCA pulley counterclockwise to the specified angle as shown.

Installation is in the reverse order of removal.





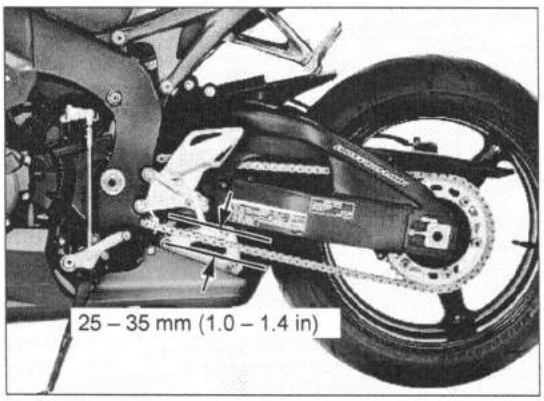
DRIVE CHAIN

DRIVE CHAIN SLACK INSPECTION

Turn the ignition switch OFF, place the motorcycle on its sidestand, and shift the transmission into neutral.

Check the slack in the drive chain lower run midway between the sprockets.

DRIVE CHAIN SLACK: 25 – 35 mm (1.0 – 1.4 in)



NOTICE

Excessive chain slack, 50 mm (2.0 in) or more, may damage the frame.

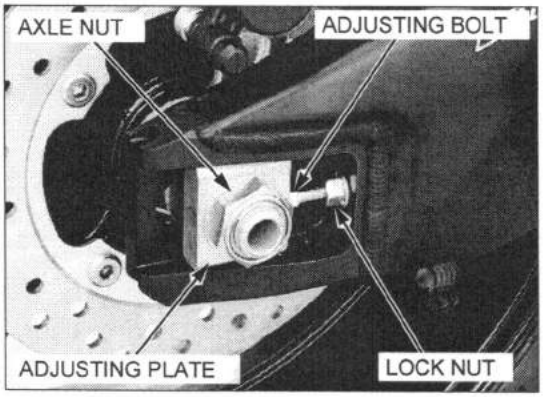
⚠WARNING

Amputation hazard. Never inspect or adjust the drive chain while the engine is running.

Lubricate the drive chain with Pro Honda HP Chain Lube or an equivalent chain lubricant designed specifically for use on O-ring chains. Wipe off the excess oil or chain lubricant.

ADJUSTMENT

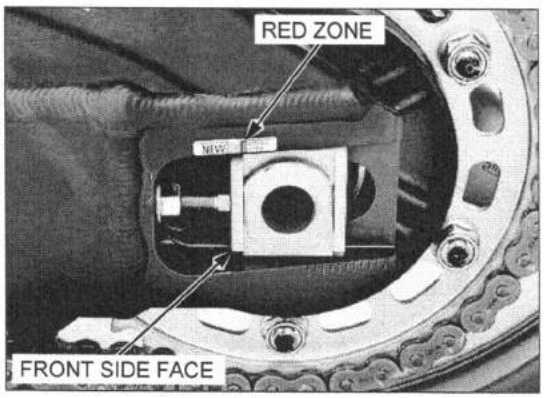
Loosen the rear axle nut.
Loosen the lock nuts and turn the adjusting bolts until the correct drive chain slack is obtained.
Make sure the rear side face of both adjusting plates are aligned with the same swingarm index mark.
Tighten the rear axle nut to the specified torque.



TORQUE:
STANDARD/ABS type:
113 N·m (11.5 kgf·m, 83 lbf·ft)
SP type:
124 N·m (12.6 kgf·m, 91 lbf·ft)

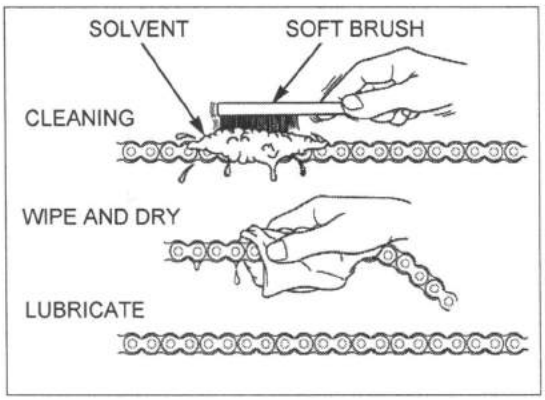
Hold the adjusting bolts and tighten the lock nuts.

Recheck the drive chain slack and free wheel rotation.
Check the drive chain wear indicator label attached on the left swingarm.
If the drive chain adjusting plate front side face reaches red zone of the indicator label, replace the drive chain with a new one (page 4-35).

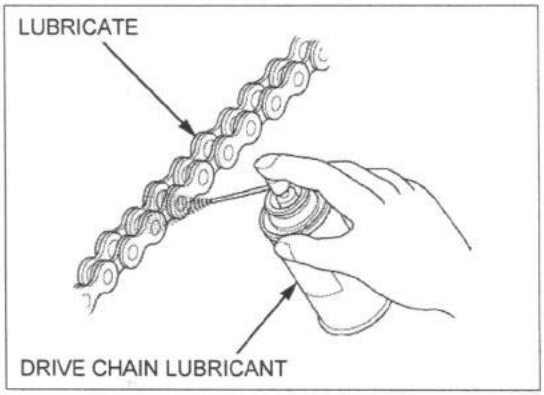


CLEANING AND LUBRICATION

Clean the chain with non-flammable or high flash point solvent and wipe it dry.
Be sure the chain has dried completely before lubricating.
Inspect the drive chain for possible damage or wear.
Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.
Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.
Inspect and replace sprocket as necessary.



Lubricate the drive chain with Pro Honda HP Chain Lube or an equivalent chain lubricant designed specifically for use on O-ring chains. Wipe off the excess oil or chain lubricant.

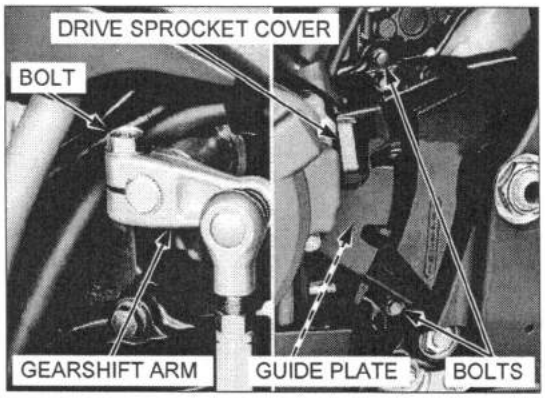


SPROCKET INSPECTION

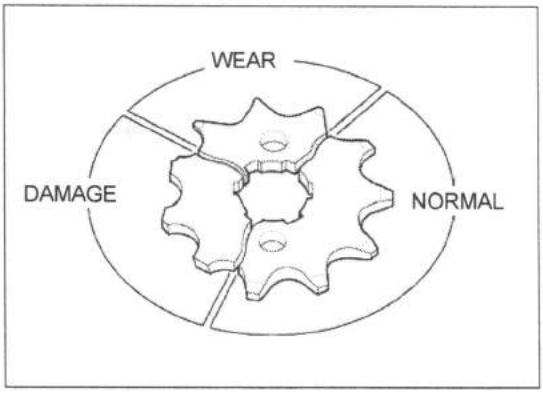
ABS/SP (AC) type: Remove the left rear under cover (page 3-24).

STANDARD/Except SP (AC) type: Remove the bolt and disconnect the gearshift arm from the gearshift spindle.

Remove the bolts, drive sprocket cover, and guide plate.

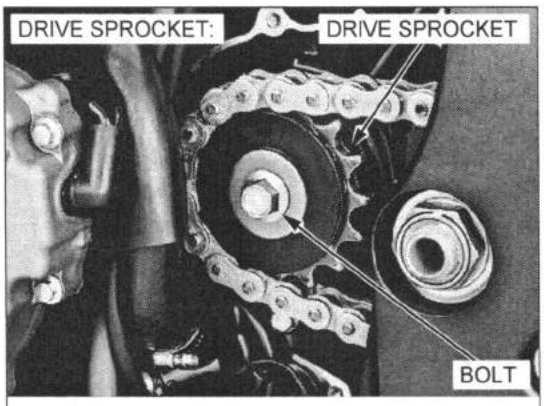


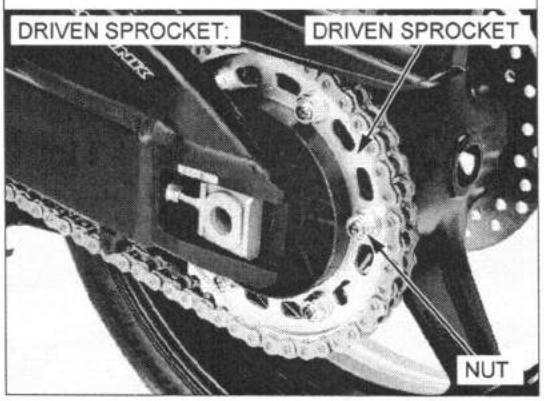
Inspect the drive and driven sprocket teeth for wear or damage, replace if necessary.
Never use a new drive chain on worn sprockets.
Both chain and sprockets must be in good condition, or the new replacement chain will wear rapidly.



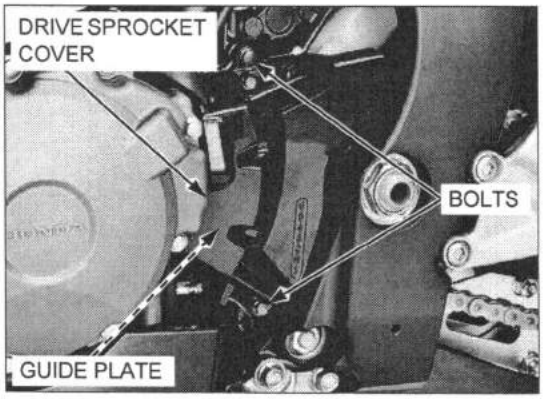
Check the attaching bolts and nuts on the drive and driven sprockets.
If any are loose, torque them.

TORQUE:
Drive sprocket bolt: 54 N·m (5.5 kgf·m, 40 lbf·ft)
Driven sprocket nut: 64 N·m (6.5 kgf·m, 47 lbf·ft)



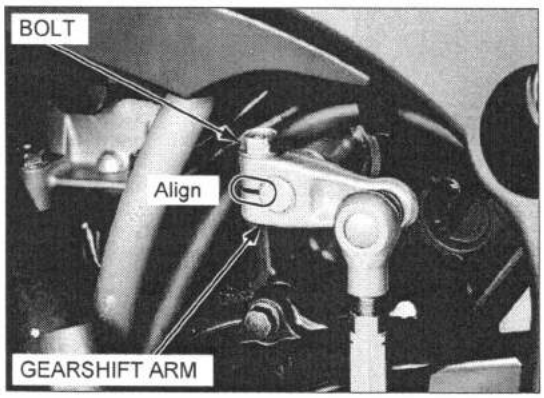


Install the guide plate and drive sprocket cover and tighten the bolts securely.



ABS/SP (AC) type: Install the left rear under cover (page 3-24).

STANDARD/Except SP (AC) type: Install the gearshift arm to the gearshift spindle, aligning the arm slit with the punch mark on the gearshift spindle.
Install and tighten the pinch bolt.



REPLACEMENT

This motorcycle uses a drive chain with a staked master link.

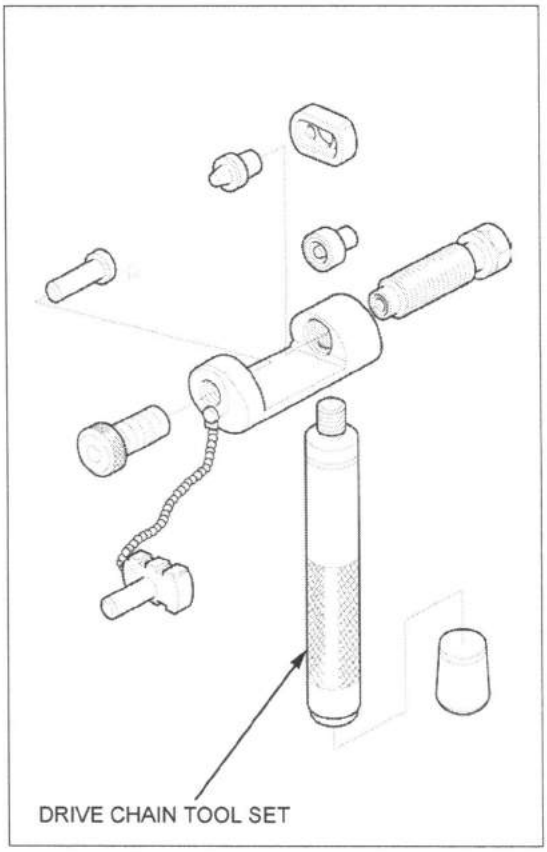
Loosen the drive chain (page 4-32).

When using the special tool, follow the manufacturer's instruction.

Assemble the special tool as shown.

TOOL:

Drive chain tool set	**07HMH-MR10103 or 07HMH-MR1010C (U.S.A. only)**

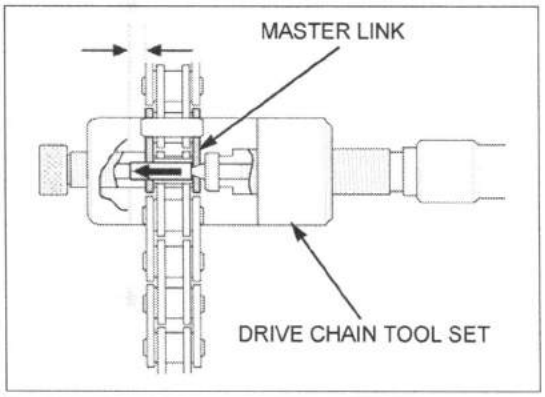


Locate the crimped pin ends of the master link from the outside of the chain and remove the link with the drive chain tool set.

TOOL:

Drive chain tool set	**07HMH-MR10103 or 07HMH-MR1010C (U.S.A. only)**

Remove the drive chain.

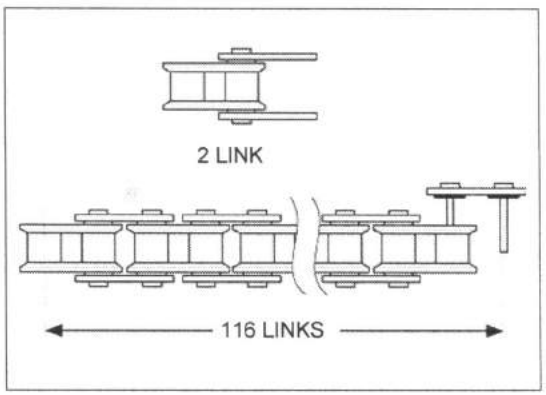


Include the master link when you count the drive chain links.

Remove the excess drive chain links from the new drive chain with the drive chain tool set.

STANDARD LINKS: 116 LINKS

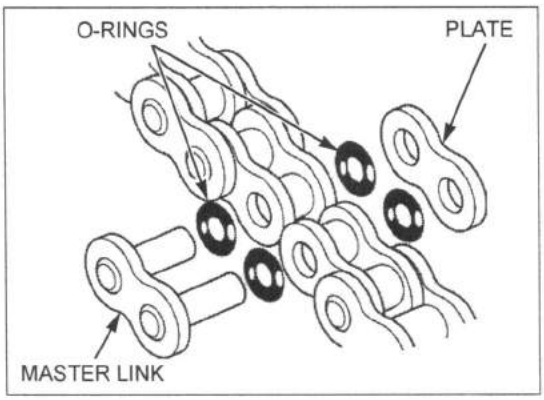
REPLACEMENT CHAIN
DID: DID 50VA11-120ZB
RK: RK 50HFOZ6-120LJFZ



- Never reuse the old drive chain, master link, master link plate, or O-rings.

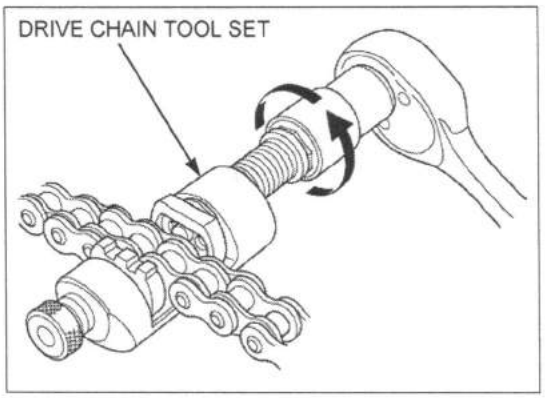
Insert the master link from the inside of the drive chain, and install the plate with the identification mark facing the outside.

Assemble the new master link, O-rings and plate.



Assemble and set the drive chain tool set.

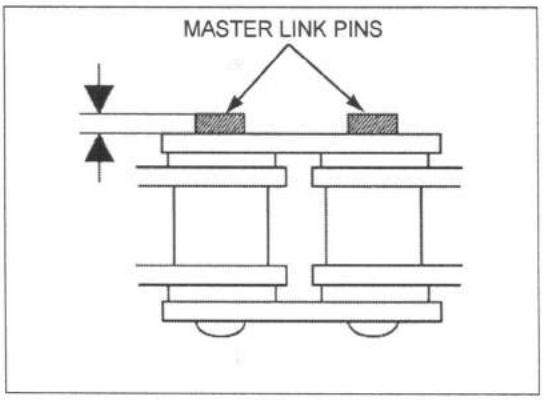
TOOL:
Drive chain tool set **07HMH-MR10103 or 07HMH-MR1010C (U.S.A. only)**



Make sure that the master link pins are installed properly.
Measure the master link pin length projected from the plate.

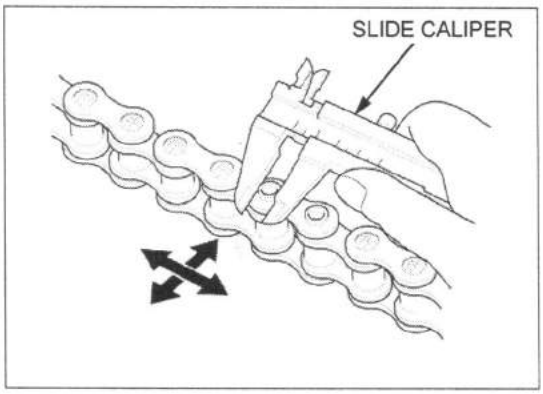
STANDARD LENGTH:
1.2 – 1.4 mm (0.05 – 0.06 in)

Stake the master link pins.



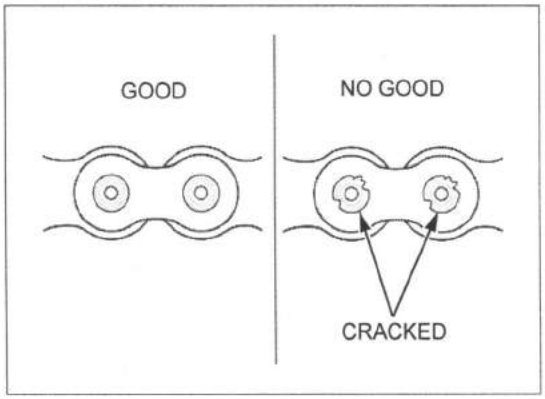
Make sure that the pins are staked properly by measuring the diameter of the staked area using a caliper.

DIAMETER OF THE STAKED AREA:
5.50 – 5.80 mm (0.217– 0.228 in)



A drive chain with a clip-type master link must not be used.

After staking, check the staked area of the master link for cracks.
If there is any cracking, replace the master link, O-rings, and plate.



BRAKE FLUID

NOTICE

Spilled fluid can damage painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reserve tank.

When the fluid level is low, check the brake pads for wear (page 4-38). A low fluid level may be due to wear of the brake pads.
If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low fluid level.
If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 4-39).

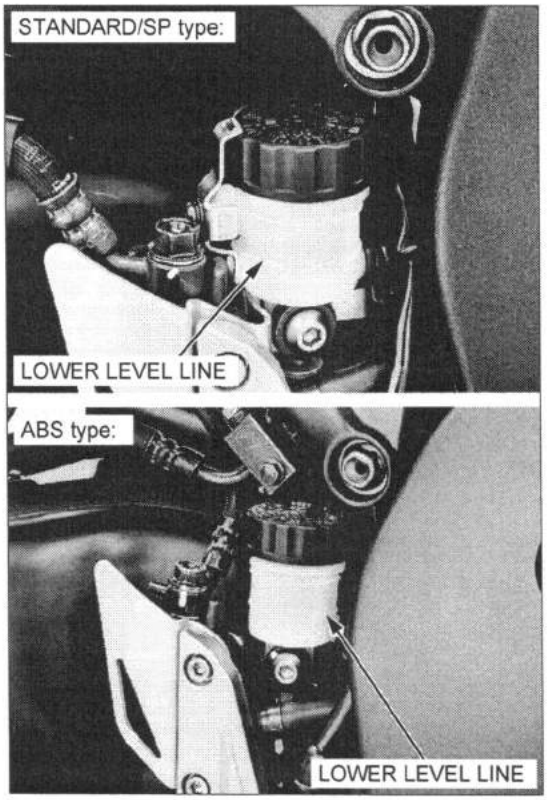
FRONT BRAKE

Turn the handlebar so that the reserve tank is level and check the front brake fluid level.
If the level is near the lower level line, check the brake pad wear (page 4-38).



REAR BRAKE

Place the motorcycle on a level surface and support it an upright position.
Check the rear brake fluid level.
If the level is near the lower level line, check the brake pad wear (page 4-38).

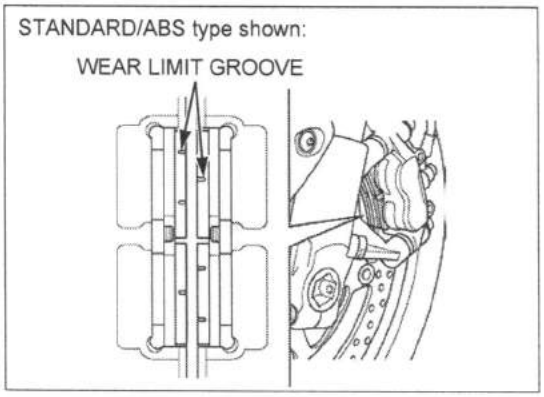


BRAKE PADS WEAR

FRONT BRAKE PADS

Check the brake pads for wear.
Replace the brake pads if either pad is worn to the bottom of wear limit groove.

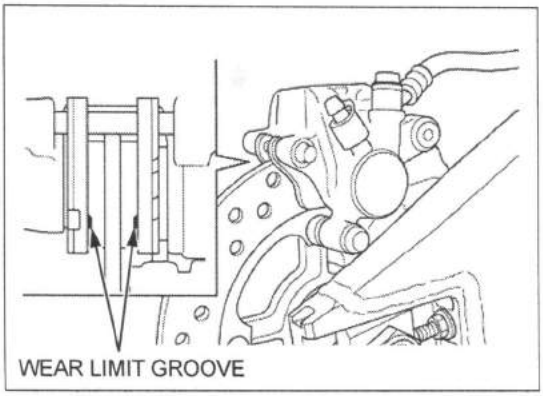
For brake pad replacement (page 16-73).



REAR BRAKE PADS

Check the brake pads for wear.
Replace the brake pads if either pad is worn to the bottom of wear limit groove.

For brake pad replacement (page 16-76).



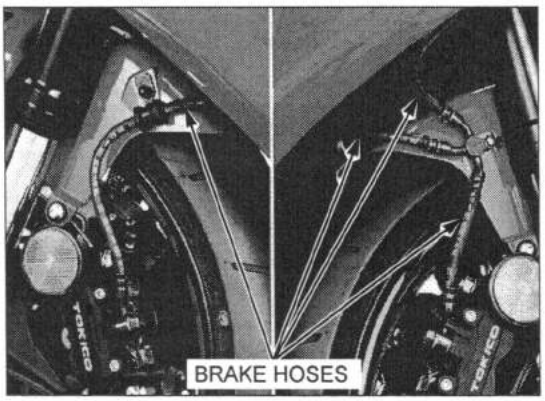
BRAKE SYSTEM

INSPECTION

Firmly apply the brake lever or pedal, and check that no air has entered the system.
If the lever or pedal feels soft or spongy when operated, bleed the air from the system.

- STANDARD/SP type (page 16-9)
- '09 – '13 model ABS type (page 16-13)
- After '13 model ABS type (page 16-47)

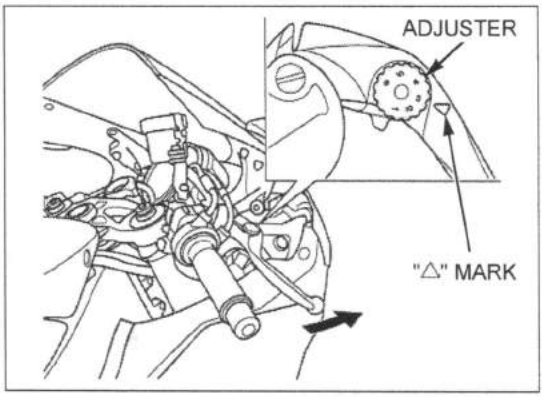
Inspect the brake hose and fittings for deterioration, cracks, or signs of leakage.
Tighten any loose fittings.
Replace hoses and fittings as required.



BRAKE LEVER ADJUSTMENT

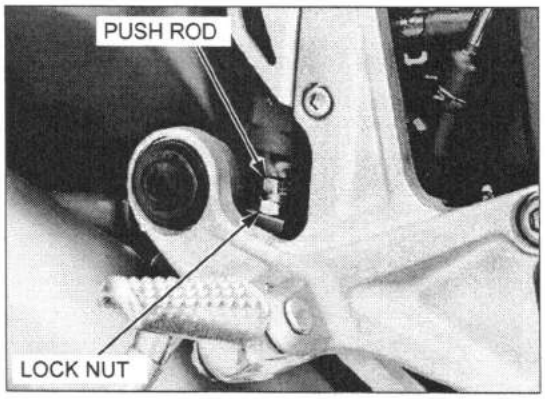
Align the "△" mark on the brake lever with the index number on the adjuster.

The distance between the brake lever and the grip can be adjusted by turning the adjuster.



BRAKE PEDAL HEIGHT ADJUSTMENT

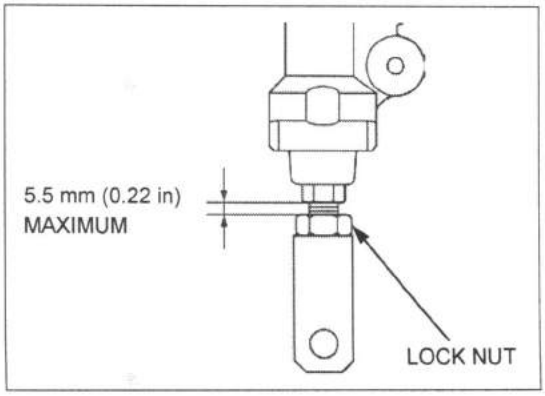
Loosen the lock nut and turn the push rod until the correct pedal height is obtained.



- When adjusting the push rod length, do not extend it more than 5.5 mm (0.22 in).

After adjustment, tighten the lock nut to the specified torque.

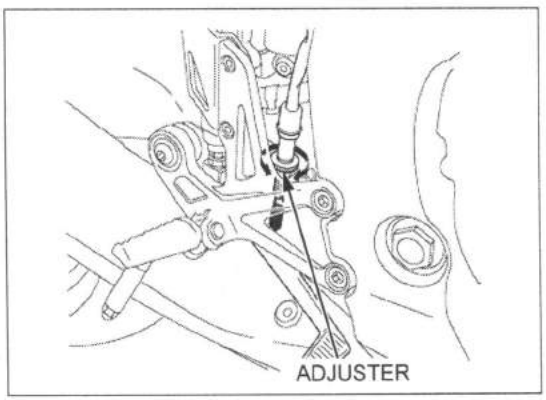
TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



BRAKE LIGHT SWITCH

The front brake light switch does not require adjustment.

Adjust the brake light switch so that the brake light comes on just prior to the brake actually being engaged.
If the light fails to come on, adjust the switch so that the light comes on at the proper time.
Hold the switch body and turn the adjuster. Do not turn the switch body.



HEADLIGHT AIM

Place the motorcycle on a level surface.

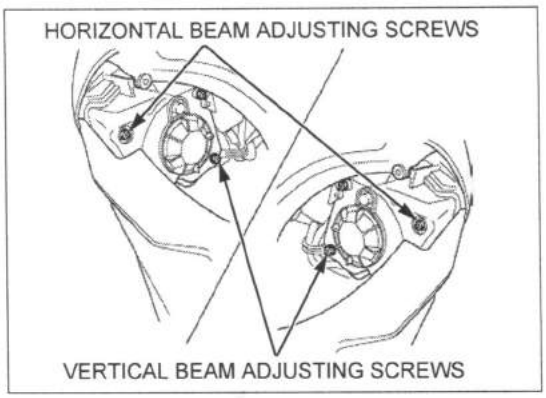
Adjust the headlight aim as specified by local laws and regulations.

Adjust the headlight aim vertically by turning the vertical beam adjusting screw.
A clockwise rotation moves the beam down and counterclockwise rotation moves the beam up.

Adjust the headlight aim horizontally by turning the horizontal beam adjusting screw.

Left Headlight: A clockwise rotation moves the beam toward the left and counterclockwise rotation moves the beam toward the right side of the rider.

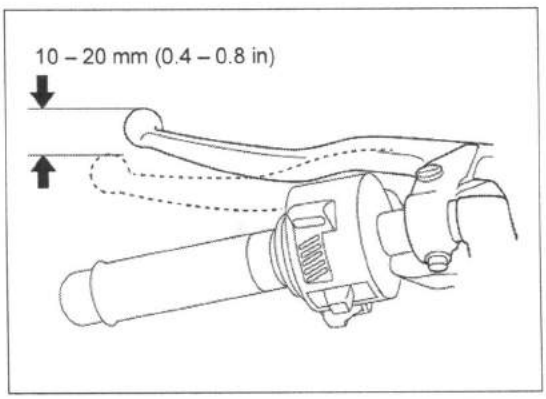
Right Headlight: A clockwise rotation moves the beam toward the right and counterclockwise rotation moves the beam toward the left side of the rider.



CLUTCH SYSTEM

Measure the clutch lever freeplay at the end of the clutch lever.

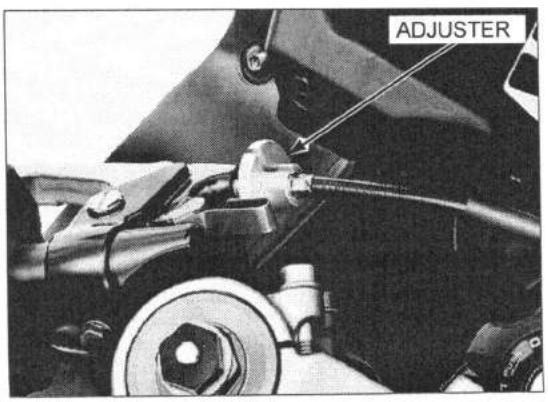
FREEPLAY:10 – 20 mm (0.4 – 0.8 in)



The adjuster may be damaged if it is positioned too far out, leaving minimal thread engagement.

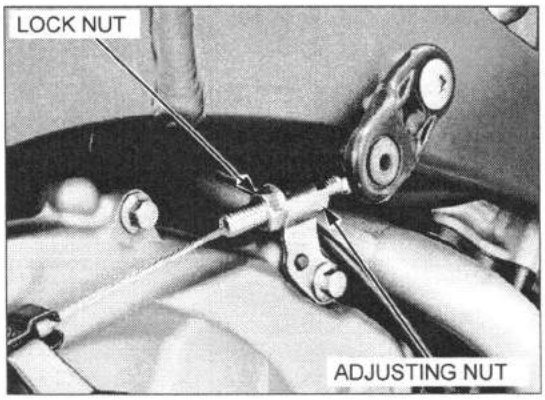
Minor adjustment is made with the upper adjuster at the clutch lever.
Turn the adjuster.

If the adjuster is threaded out near its limit and the correct freeplay cannot be obtained, turn the adjuster all the way in and back out one turn.
Make a major adjustment as described as follows:



Major adjustment is performed at the clutch lifter lever.
Loosen the lock nut and turn the adjusting nut to adjust the freeplay.
Tighten the lock nut while holding the adjusting nut.

If proper freeplay cannot be obtained, or the clutch slips during test ride, disassemble and inspect the clutch (page 10-7).



SIDESTAND

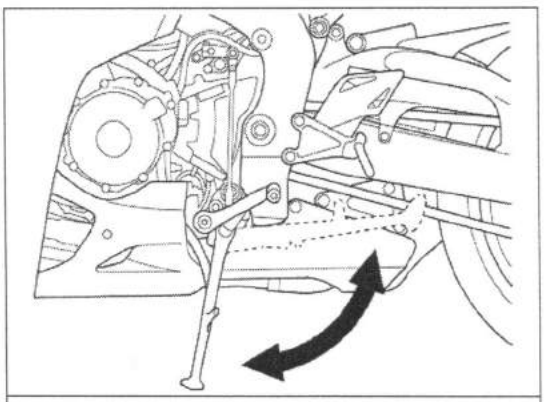
Check the sidestand spring for damage or loss of tension.
Check the sidestand for movement and lubricate the sidestand pivot if necessary.

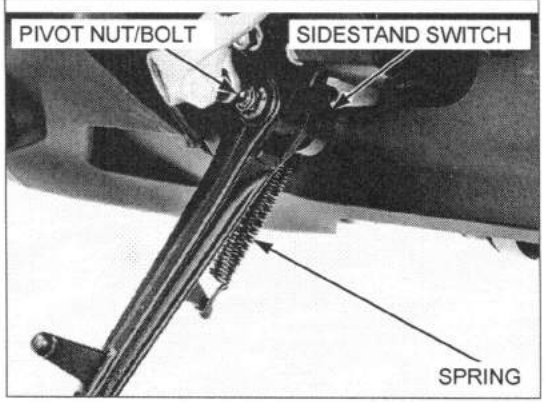
TORQUE:
Sidestand pivot bolt: 10 N·m (1.0 kgf·m, 7 lbf·ft)
Sidestand pivot nut: 29 N·m (3.0 kgf·m, 21 lbf·ft)

Check the sidestand ignition cut-off system:

- Sit astride the motorcycle and raise the sidestand.
- Start the engine with the transmission in neutral, then, with the clutch lever fully squeezed, shift the transmission into gear.
- Move the sidestand full down.
- The engine should stop as the sidestand is lowered.

If there is a problem with the system, check the sidestand switch (page 21-30).





SUSPENSION

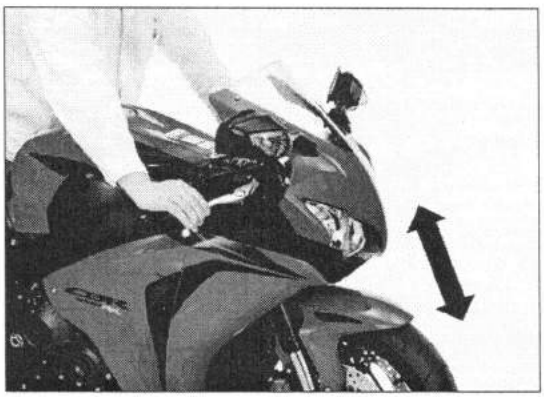
FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brakes and compressing the front suspension several times.
Check the entire assembly for signs of leaks, damage, or loose fasteners.

Loose, worn or damaged suspension parts impair motorcycles stability and control.

Replace damaged components that cannot be repaired.
Tighten all nuts and bolts.

For fork service (page 14-31).



FRONT SUSPENSION ADJUSTMENT

SPRING PRE-LOAD ADJUSTER

STANDARD/ABS type

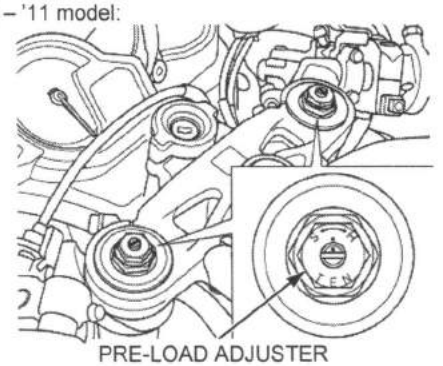
Spring pre-load can be adjusted by turning the adjuster.

TURN CLOCKWISE:
Increase the spring pre-load
TURN COUNTERCLOCKWISE:
Decrease the spring pre-load

'08 – '11 model: **PRE-LOAD ADJUSTER ADJUSTABLE RANGE:**
15 turns
PRE-LOAD ADJUSTER STANDARD POSITION:
6 turns clockwise from minimum

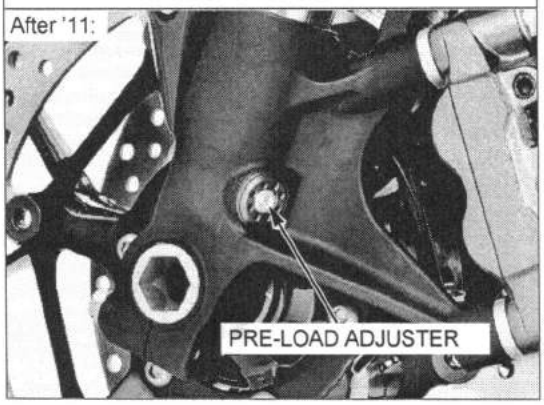
After '11 model: **PRE-LOAD ADJUSTER ADJUSTABLE RANGE:**
15 turns
PRE-LOAD ADJUSTER STANDARD POSITION:
7-1/2 turns clockwise from minimum

'08 – '11 model:



PRE-LOAD ADJUSTER

After '11:

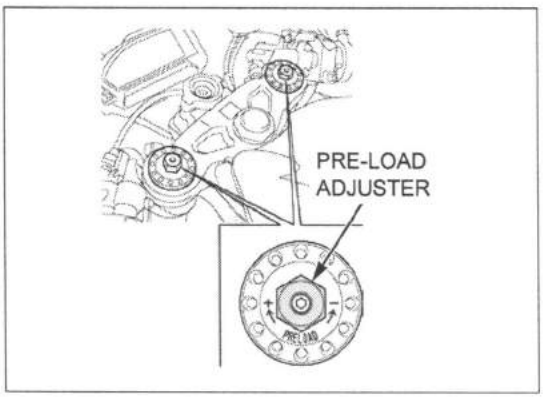


SP type

Spring pre-load can be adjusted by turning the adjuster.

TURN CLOCKWISE:
Increase the spring pre-load
TURN COUNTERCLOCKWISE:
Decrease the spring pre-load

PRE-LOAD ADJUSTER ADJUSTABLE RANGE:
15 turns
PRE-LOAD ADJUSTER STANDARD POSITION:
6 turns clockwise from minimum



COMPRESSION AND REBOUND DAMPING ADJUSTERS

NOTICE

Do not turn the adjusters more than the given positions or the adjusters may be damaged.

- All damping adjustments are referenced from the fully hard position.

STANDARD/ABS type

To adjust both sides equally, set the right and left damping adjusters to the same position.

The compression and rebound damping can be adjusted by turning the adjusters.

DIRECTION H: Increase the damping force (harder)
DIRECTION S: Decrease the damping force (softer)

Turn the compression adjuster clockwise until it stops (fully hard position), then turn the adjuster counterclockwise.

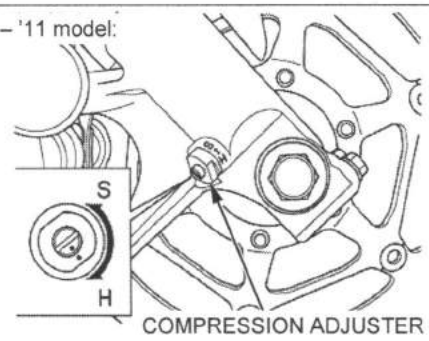
'08 – '11 model:

COMPRESSION ADJUSTER ADJUSTABLE RANGE:
3 turns
COMPRESSION ADJUSTER STANDARD POSITION:
STANDARD type:
2 turns out from fully hard
ABS type:
2-1/4 turns out from fully hard

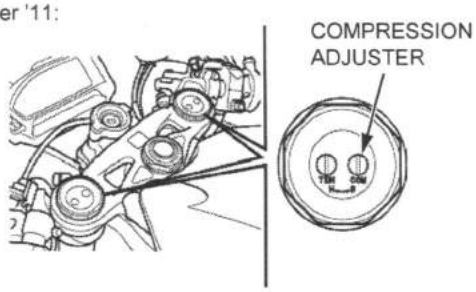
After '11 model:

COMPRESSION ADJUSTER ADJUSTABLE RANGE:
7 turns
COMPRESSION ADJUSTER STANDARD POSITION:
5-1/2 turns out from fully hard

'08 – '11 model:



After '11:



Turn the rebound adjuster clockwise until it stops (fully hard position), then turn the adjuster counterclockwise.

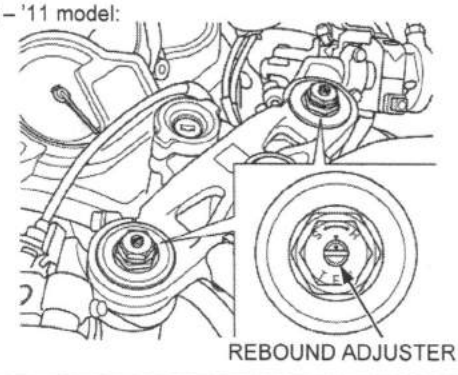
'08 – '11 model:

REBOUND ADJUSTER ADJUSTABLE RANGE:
3 turns
REBOUND ADJUSTER STANDARD POSITION:
2-1/4 turns out from fully hard

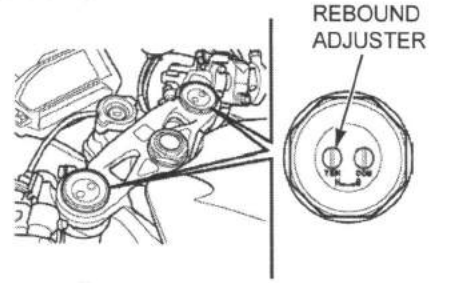
After '11 model:

REBOUND ADJUSTER ADJUSTABLE RANGE:
5-1/2 turns
REBOUND ADJUSTER STANDARD POSITION:
'12, '13 model:
4-3/4 turns out from fully hard
After '13 model:
4-1/2 turns out from fully hard

'08 – '11 model:



After '11:



SP type

Each damping adjustment can be performed at only one-side adjuster.

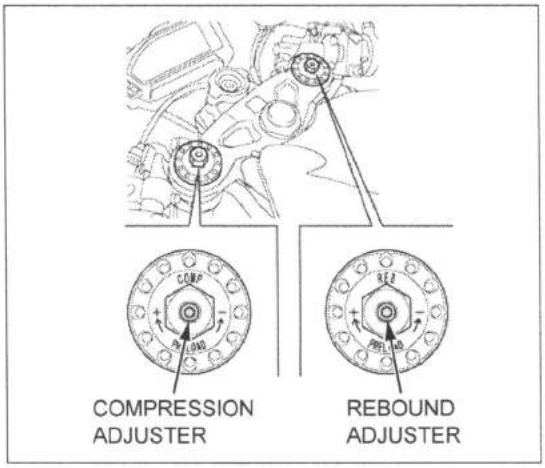
- Compression adjuster; on left fork cap ("COMP")
- Rebound adjuster; on right fork cap ("REB")

DIRECTION +: Increase the damping force (harder)
DIRECTION –: Decrease the damping force (softer)

Turn the adjuster clockwise until it stops (fully hard position), then turn the adjuster counterclockwise.

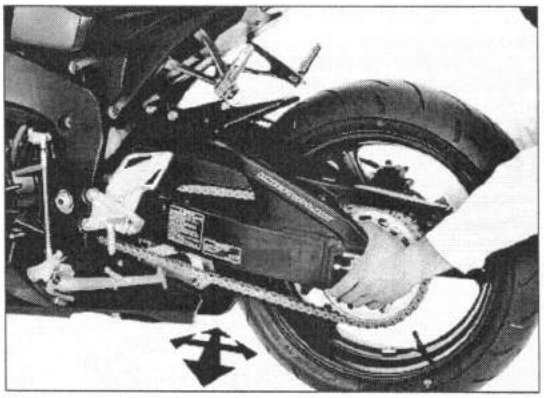
COMPRESSION ADJUSTER ADJUSTABLE RANGE:
22 clicks
COMPRESSION ADJUSTER STANDARD POSITION:
12 clicks from fully hard

REBOUND ADJUSTER ADJUSTABLE RANGE:
22 clicks
REBOUND ADJUSTER STANDARD POSITION:
12 clicks from fully hard



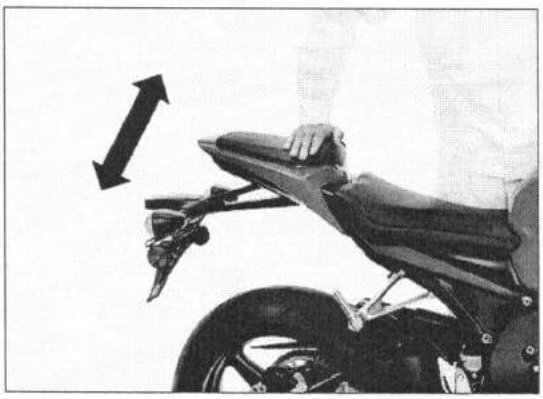
REAR SUSPENSION INSPECTION

Support the motorcycle securely and raise the rear wheel off the ground.
Check for worn swingarm bearings by grabbing the rear end of the swingarm and attempting to move the swingarm side to side.
Replace the bearings if any looseness is felt.



Check the action of the shock absorber by compressing it several times.
Check the entire shock absorber assembly for signs of leaks, damage, or loose fasteners.
Replace damaged components that cannot be repaired.
Tighten all nuts and bolts.

For shock absorber service (page 15-20).



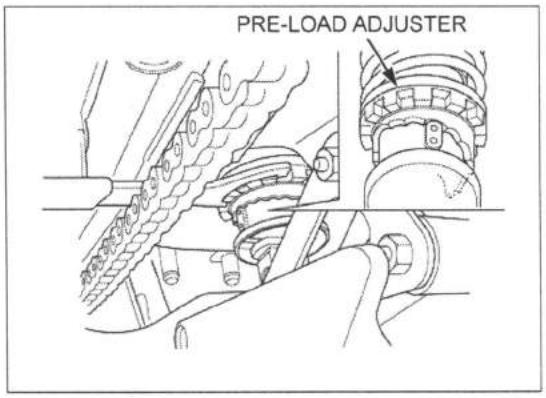
REAR SUSPENSION ADJUSTMENT

SPRING PRE-LOAD ADJUSTER

STANDARD/ABS type

Spring pre-load can be adjusted by turning the adjuster.

PRE-LOAD ADJUSTER ADJUSTABLE RANGE:
10 positions
PRE-LOAD ADJUSTER STANDARD POSITION:
4 position from minimum

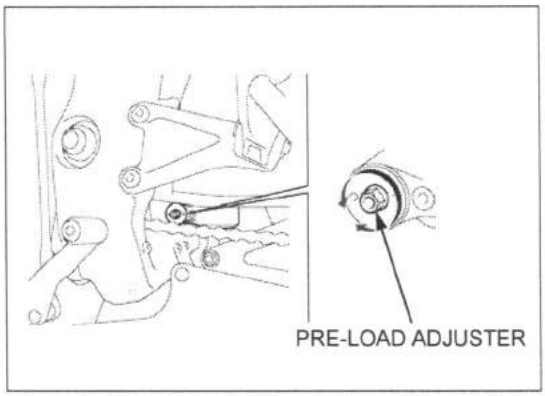


SP type

Spring pre-load can be adjusted by turning the adjuster.

TURN CLOCKWISE:
Increase the spring pre-load
TURN COUNTERCLOCKWISE:
Decrease the spring pre-load

PRE-LOAD ADJUSTER ADJUSTABLE RANGE:
16 turns
PRE-LOAD ADJUSTER STANDARD POSITION:
6 turns from maximum



COMPRESSION AND REBOUND DAMPING ADJUSTERS

NOTICE

Do not turn the adjusters more than the given positions or the adjusters may be damaged.

- All damping adjustments are referenced from the fully hard position.

STANDARD/ABS type

The compression and rebound damping can be adjusted by turning the adjusters.

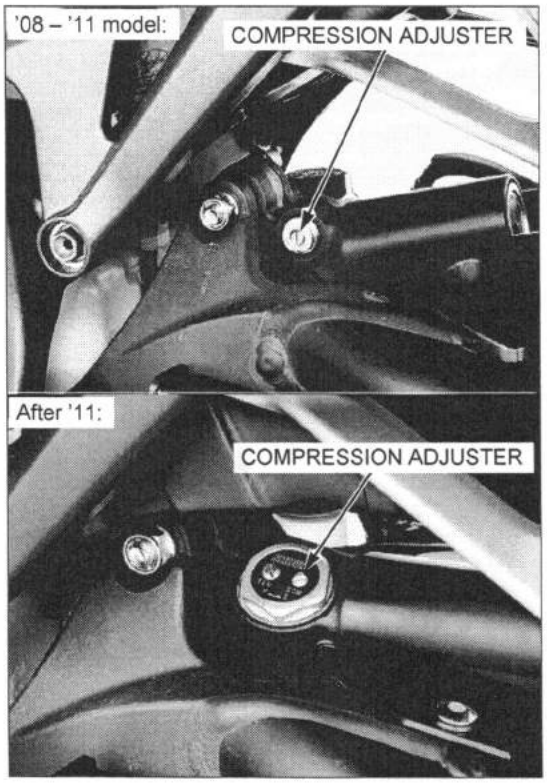
DIRECTION H: Increase the damping force (harder)
DIRECTION S: Decrease the damping force (softer)

Turn the compression adjuster clockwise until it stops (fully hard position), then turn the adjuster counterclockwise.

COMPRESSION ADJUSTER ADJUSTABLE RANGE:
3 turns

'08 – '11 model: **COMPRESSION ADJUSTER STANDARD POSITION:**
STANDARD type:
'08, '09 model:
2 turns out from fully hard
'10, '11 model:
2-1/2 turns out from fully hard
ABS type:
2-1/2 turns out from fully hard

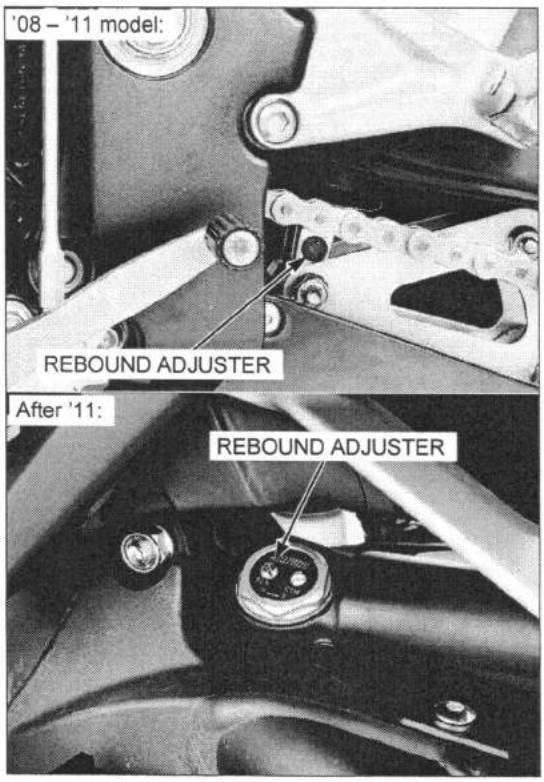
After '11 model: **COMPRESSION ADJUSTER ADJUSTABLE RANGE:**
4-1/2 turns
COMPRESSION ADJUSTER STANDARD POSITION:
'12, '13 model:
2-3/4 turns out from fully hard
After '13 model:
2 turns out from fully hard



Turn the rebound adjuster clockwise until it stops (fully hard position), then turn the adjuster counterclockwise.

'08 – '11 model: **REBOUND ADJUSTER ADJUSTABLE RANGE:**
3 turns
REBOUND ADJUSTER STANDARD POSITION:
2-1/4 turns out from fully hard

After '11 model: **REBOUND ADJUSTER ADJUSTABLE RANGE:**
4 turns
REBOUND ADJUSTER STANDARD POSITION:
2-1/2 turns out from fully hard



SP type

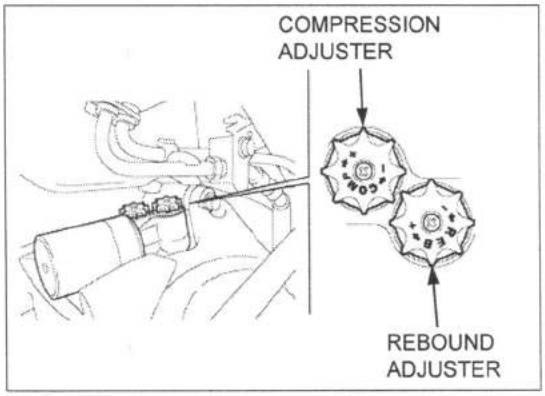
The compression and rebound damping can be adjusted by turning the adjusters.

DIRECTION +: Increase the damping force
DIRECTION –: Decrease the damping force

Turn the adjuster clockwise until it stops (fully hard position), then turn the adjuster counterclockwise.

COMPRESSION ADJUSTER ADJUSTABLE RANGE:
22 clicks
COMPRESSION ADJUSTER STANDARD POSITION:
15 clicks from fully hard

REBOUND ADJUSTER ADJUSTABLE RANGE:
22 clicks
REBOUND ADJUSTER STANDARD POSITION:
16 clicks from fully hard



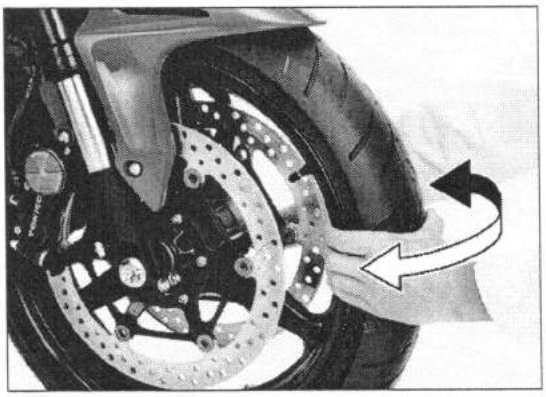
NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-17).
Check that all safety clips, hose clamps, and cable stays are in place and properly secured.

WHEELS/TIRES

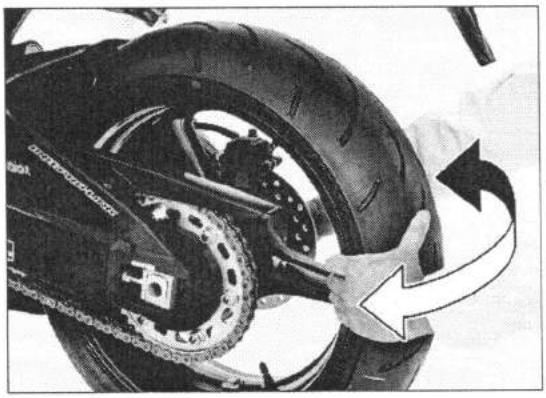
Support the motorcycle securely and raise the front wheel off the ground.
Hold the front fork leg and move the front wheel sideways with force to see if the wheel bearings are worn.

For front wheel service (page 14-19).

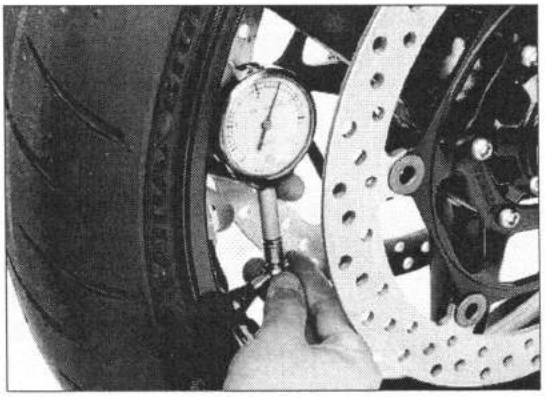


Support the motorcycle securely and raise the rear wheel off the ground.
Hold the swingarm and move the rear wheel sideways with force to see if the wheel bearings are worn.

For rear wheel service (page 15-8).



Tire pressure should be checked when the tires are COLD.

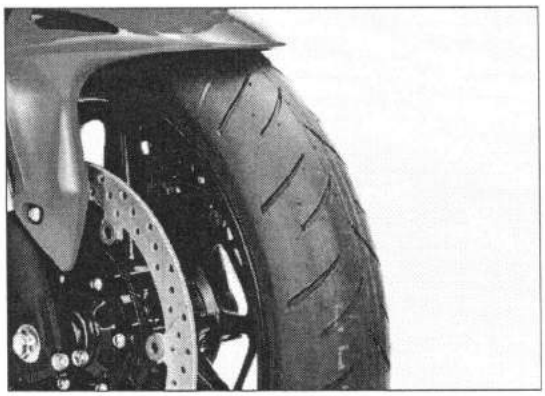


RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

		FRONT	REAR
Tire pressure kPa (kgf/cm², psi)		250 (2.50, 36)	290 (2.90, 42)
Tire size		120/70 ZR 17 M/C (58W)	190/50 ZR 17 M/C (73W)
Tire brand (STANDARD/ ABS type)	'08 – '11	BT015F RADIAL F (Bridgestone), Qualifier PTK (Dunlop)	BT015R RADIAL F (Bridgestone), Qualifier NK (Dunlop)
	After '11	S20F G (Bridgestone), Qualifier II K (Dunlop)	S20R G (Bridgestone), Qualifier II K (Dunlop)
Tire brand (SP type)		DIABLO SUPER-CORSA SP (PIRELLI)	DIABLO SUPER-CORSA SP (PIRELLI)

Check the tires for cuts, embedded nails, or other damage.

Measure the tread depth at the center of the tires. Replace the tires when the tread depth reaches the following limits.



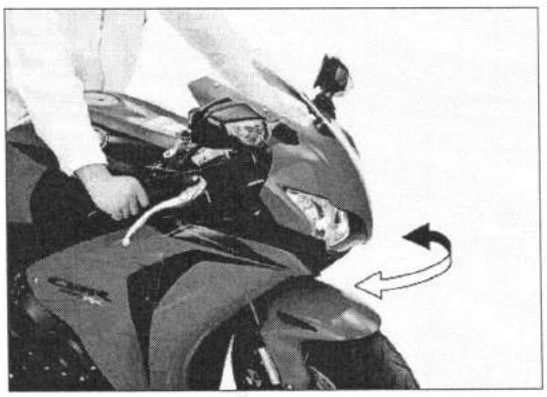
MINIMUM TIRE TREAD DEPTH:
FRONT: 1.5 mm (0.06 in)
REAR: 2.0 mm (0.08 in)

STEERING HEAD BEARINGS

Check that the control cables do not interfere with handlebar rotation.

Support the motorcycle securely and raise the front wheel off the ground.

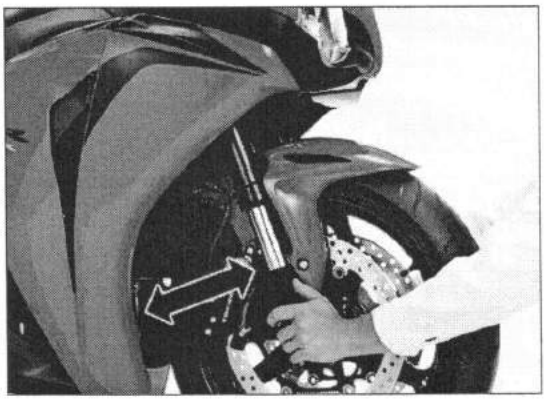
Check that the handlebar moves freely from side to side.



If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 14-53).

Check for worn steering head bearings by grabbing the front fork leg and attempting to move the front fork side to side.

Replace the bearings if any looseness is noted.



5. LUBRICATION SYSTEM

5

LUBRICATION SYSTEM DIAGRAM 5-2

SERVICE INFORMATION 5-3

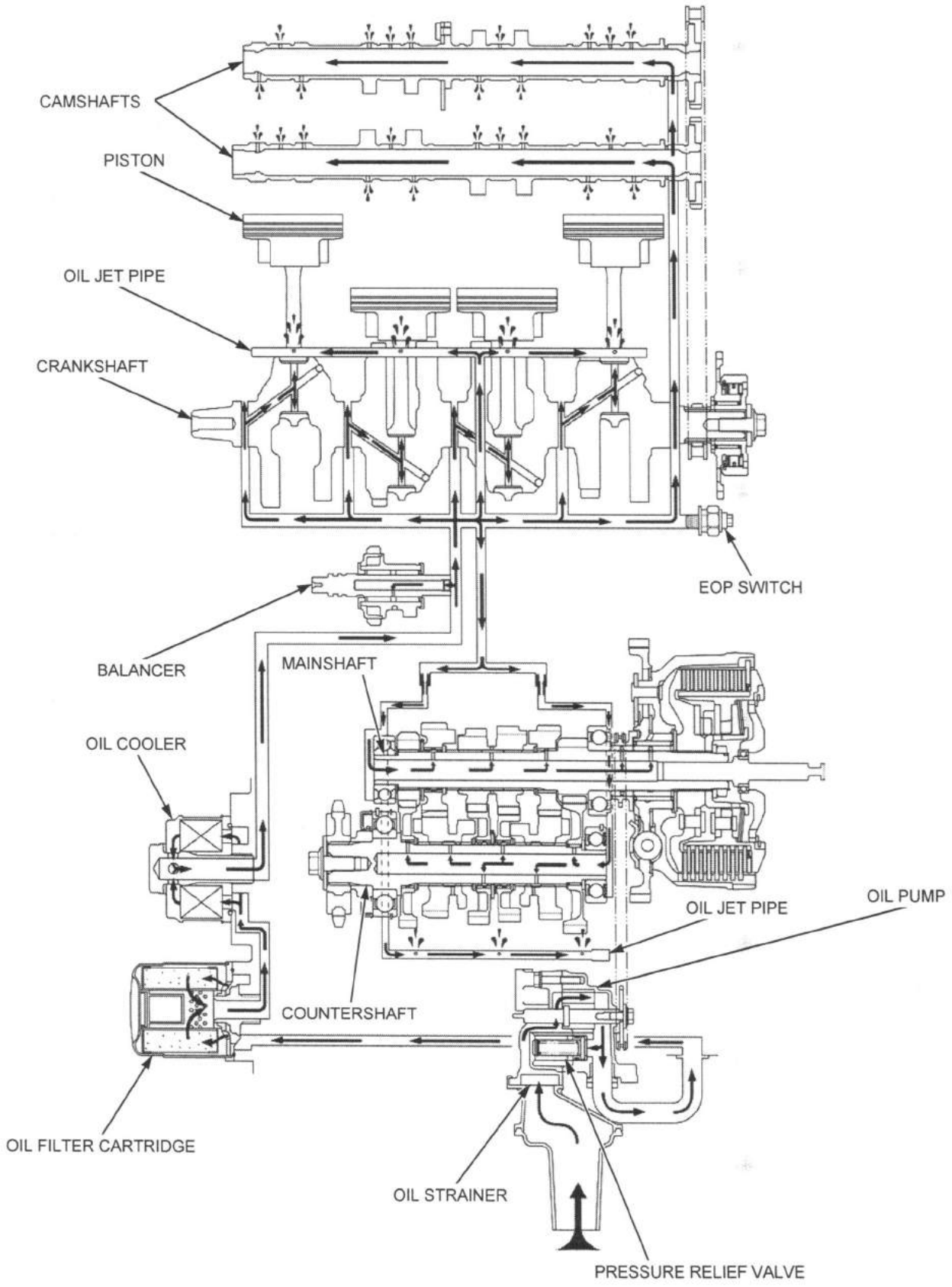
TROUBLESHOOTING 5-4

OIL PRESSURE INSPECTION 5-5

OIL PUMP 5-5

OIL COOLER 5-13

LUBRICATION SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠CAUTION

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

- This section covers service of the oil pump and oil cooler.
- The oil pump can be serviced with the engine installed in the frame.
- The service procedures in this section must be performed with the engine oil drained.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks and that oil pressure is correct.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	2.8 liters (3.0 US qt, 2.5 Imp qt)	–
	After oil filter change	3.0 liters (3.2 US qt, 2.6 Imp qt)	–
	After disassembly	3.7 liters (3.9 US qt, 3.3 Imp qt)	–
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	–
Oil pressure at EOP switch		590 kPa (6.0 kgf/cm², 86 psi) at 6,000 rpm/(80°C/176°F)	–
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.04 – 0.09 (0.002 – 0.004)	0.17 (0.007)

TORQUE VALUES

Oil pump assembly bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply locking agent to the threads.
Oil cooler bolt	59 N·m (6.0 kgf·m, 44 lbf·ft)	
Oil pipe mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.

TOOLS

Oil pressure gauge set 07506-3000001	Oil pressure gauge attachment 07406-0030000
	
or equivalent commercially available	or equivalent commercially available

TROUBLESHOOTING

Oil level too low
- Oil consumption
- External oil leak
- Worn piston rings
- Improperly installed piston rings
- Worn cylinders
- Worn valve stem seals
- Worn valve guide

Low oil pressure
- Oil level low
- Clogged oil strainer
- Internal oil leak
- Incorrect oil being used

No oil pressure
- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive chain
- Broken oil pump drive or driven sprocket
- Damaged oil pump
- Internal oil leak

High oil pressure
- Oil pressure relief valve stuck closed
- Clogged oil filter, oil cooler gallery, or metering orifice
- Incorrect oil being used

Oil contamination
- Oil or filter not changed often enough
- Worn piston rings

Oil emulsification
- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water

OIL PRESSURE INSPECTION

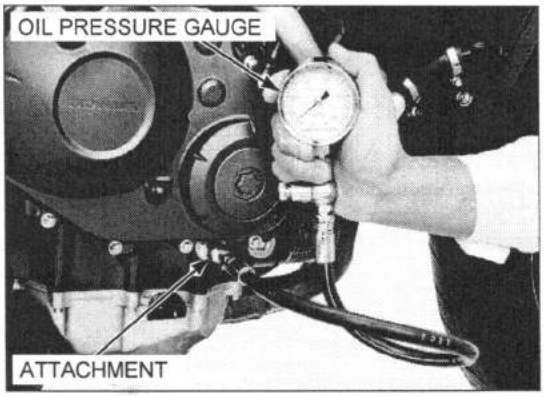
If the oil pressure indicator remains on while the engine is running, check the indicator system (page 21-21) before checking the oil pressure.

Remove the EOP switch (page 21-23).

Install the oil pressure gauge attachment to the switch base.
Connect the oil pressure gauge to the oil pressure gauge attachment.

TOOLS:

Oil pressure gauge set	**07506-3000001 or equivalent commercially available**
Oil pressure gauge attachment	**07406-0030000 or equivalent commercially available**



Check the engine oil level (page 4-20).

Warm the engine to normal operating temperature (approximately 80 C/176 F) and increase the engine speed to 6,000 rpm and read the oil pressure.

Standard:
590 kPa (6.0 kgf/cm^2, 86 psi) at 6,000 rpm/ (80 C/176 F)

Stop the engine and remove the tools.

Install the EOP switch (page 21-23).

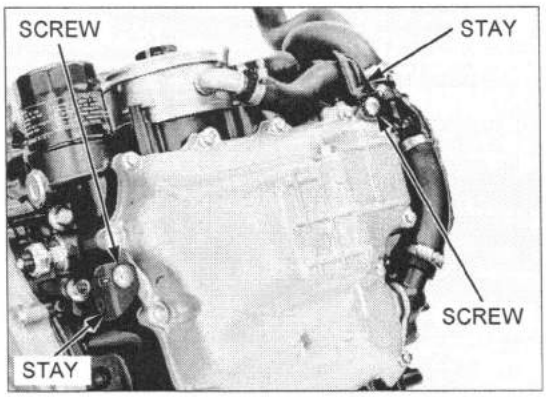
OIL PUMP

REMOVAL

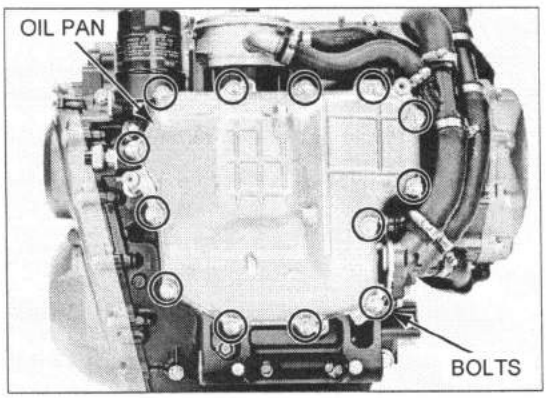
Drain the engine oil (page 4-21).

Remove the exhaust pipe (page 3-64).

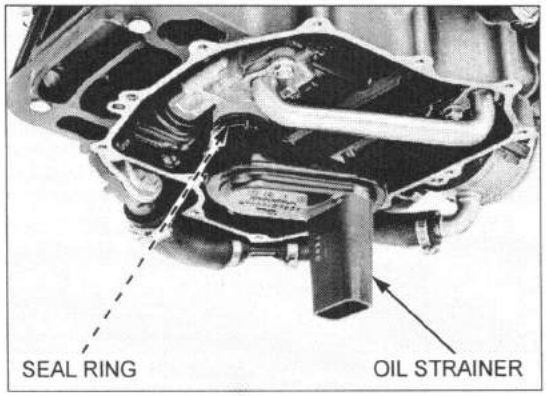
Remove the screws and lower cowl stays.



Remove the bolts and oil pan.

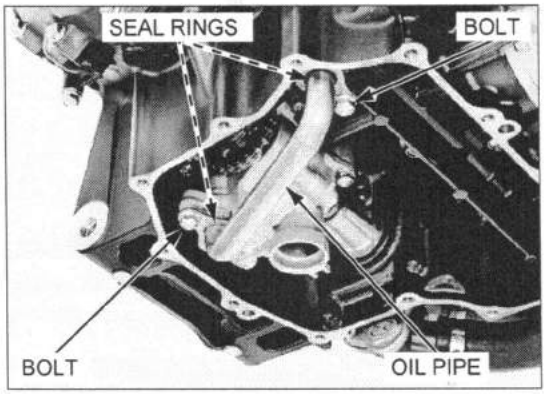


Remove the oil strainer and seal ring.

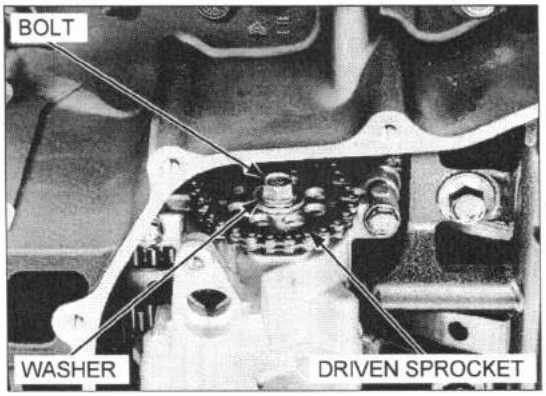


Remove the bolts, oil pipe and seal rings.

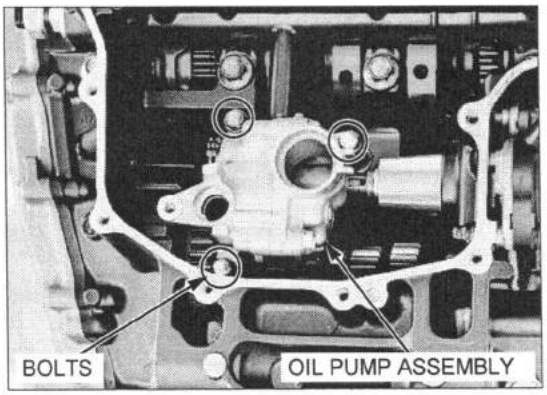
Clean the oil pipe in solvent thoroughly and check for damage.



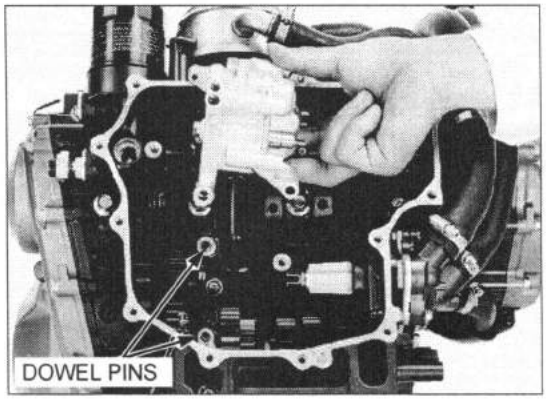
Remove the bolt, washer, and oil pump driven sprocket.



Remove the bolts and oil pump assembly.

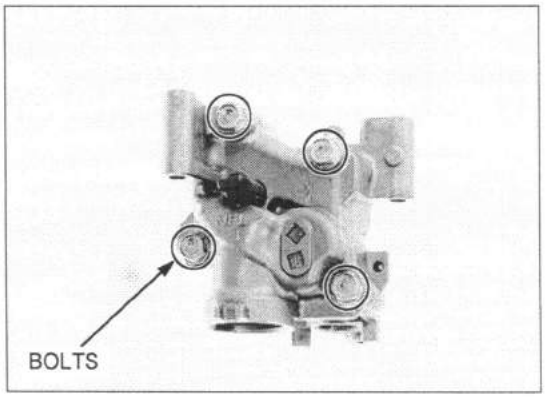


Remove the dowel pins.

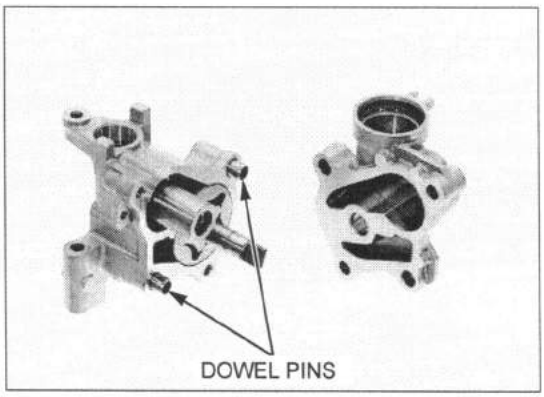


DISASSEMBLY

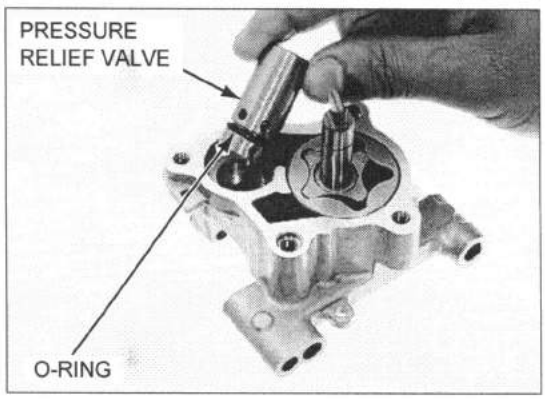
Remove the bolts and separate the oil pump assembly.



Remove the dowel pins.



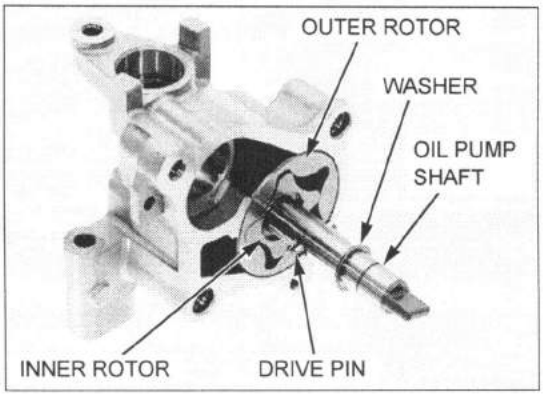
Remove the pressure relief valve and O-ring.



Remove the following:

- Oil pump shaft
- Thrust washer
- Drive pin
- Outer rotor
- Inner rotor

Clean all disassembled parts in solvent thoroughly.



INSPECTION

Pressure relief valve

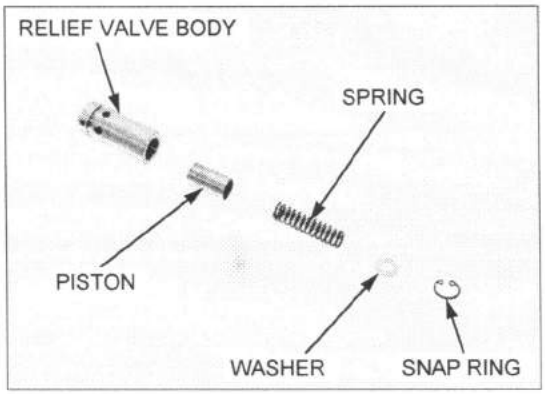
Check the operation of the pressure relief valve by pushing on the piston.

Disassemble the pressure relief valve by removing the snap ring.

Inspect the piston for wear, unsmooth movement, or damage.

Inspect the spring for fatigue or damage.

Assemble the pressure relief valve in the reverse order of disassembly.



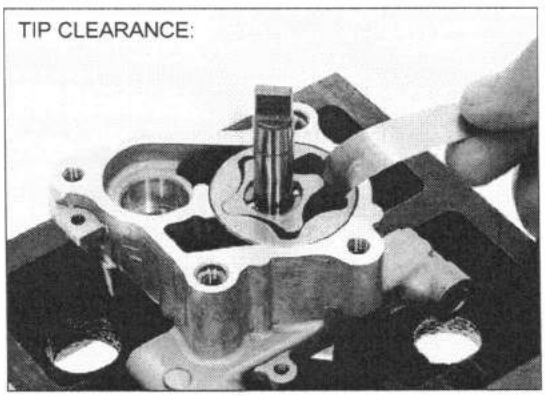
Oil pump

- If any portion of the oil pump is worn beyond the service limit, replace the oil pump as an assembly.

Temporarily install the outer and inner rotors into the oil pump body.
Temporarily install the drive pin and oil pump shaft.

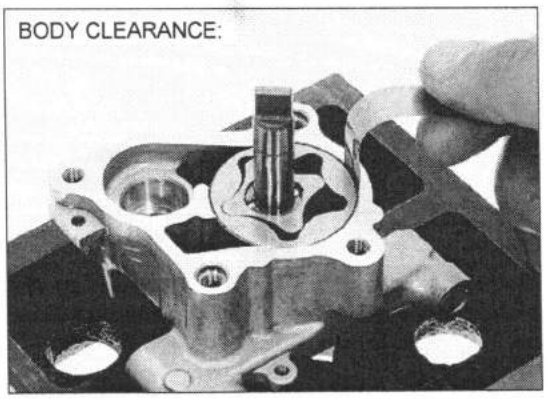
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



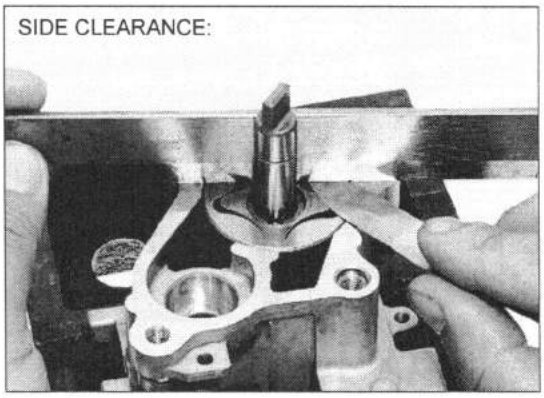
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)



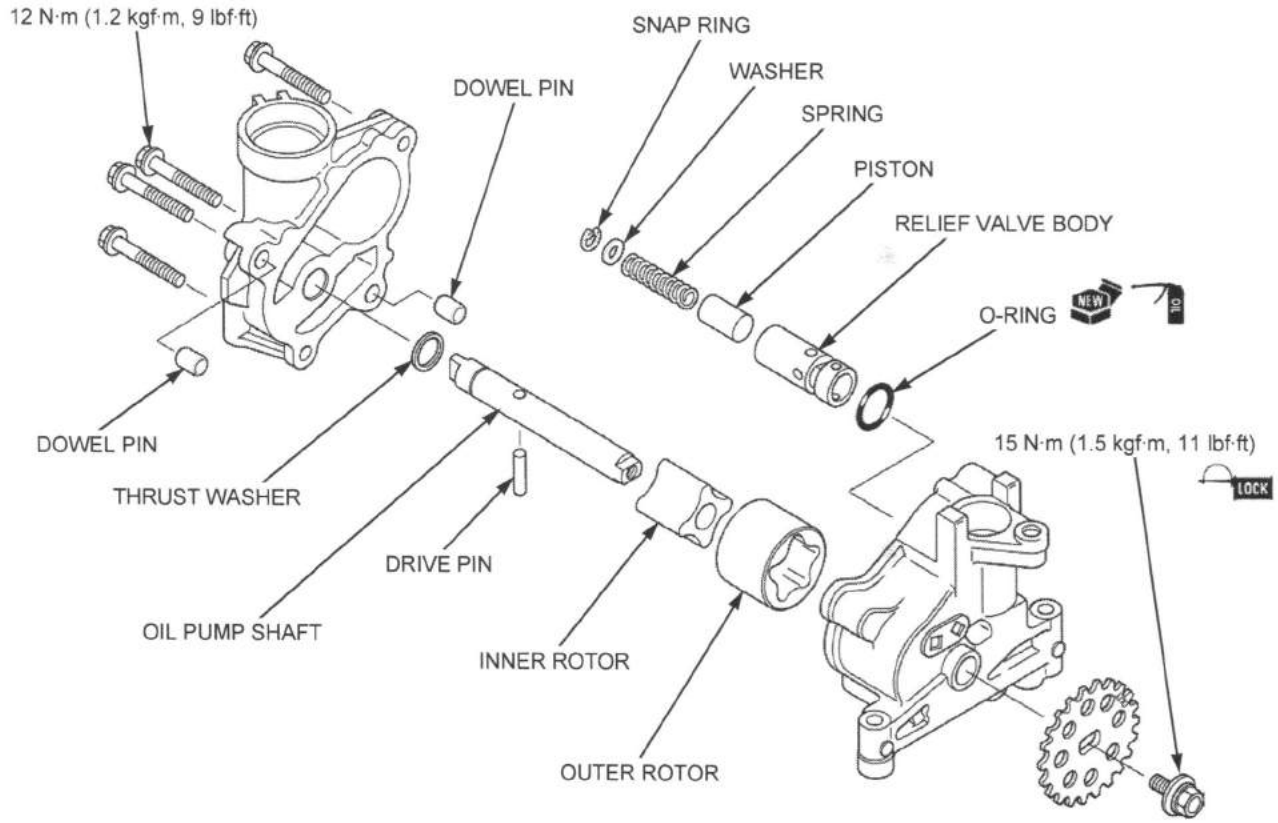
Measure the side clearance using a straight edge and feeler gauge.

SERVICE LIMIT: 0.17 mm (0.007 in)



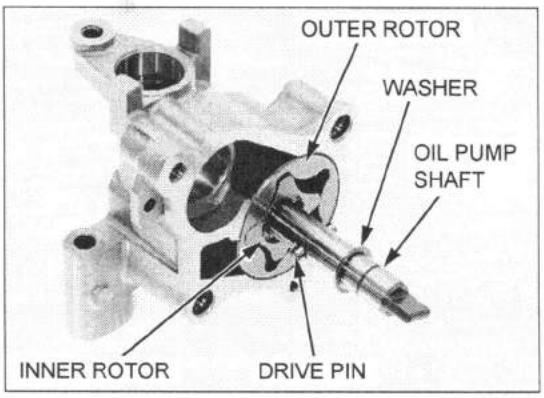
ASSEMBLY

Dip all parts in clean engine oil.



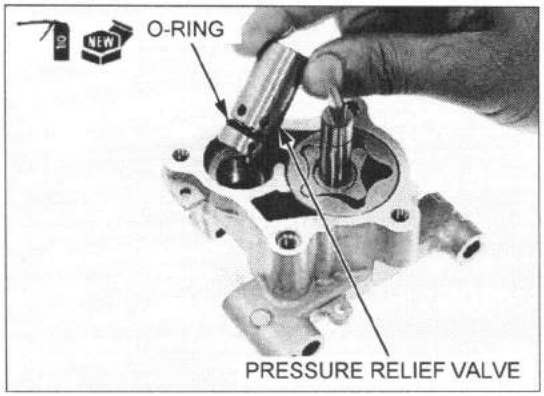
Install the outer rotor into the oil pump body.
Install the inner rotor into the outer rotor with its drive pin groove facing the drive pin.
Install the oil pump shaft through the inner rotor and oil pump body.

Install the drive pin into the oil pump shaft hole and align it with the inner rotor groove.
Install the thrust washer.

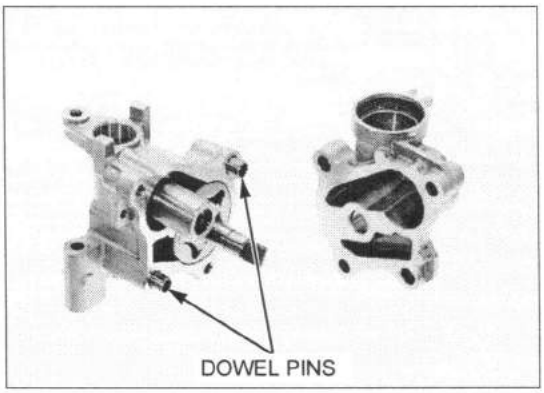


Apply oil to a new O-ring and install it to the pressure relief valve.

Install the pressure relief valve to the oil pump body.

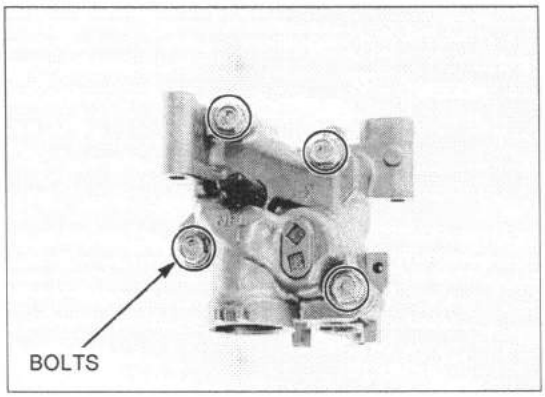


Install the dowel pins to the oil pump body.



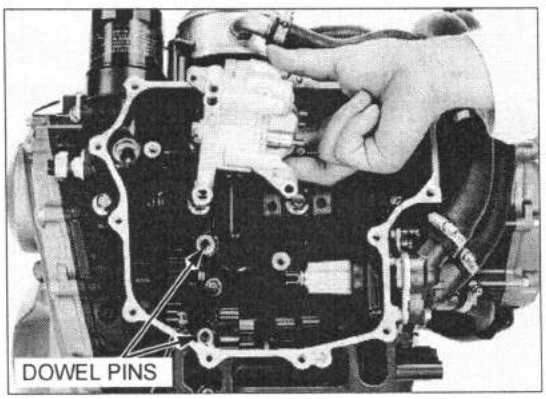
Assemble the oil pump and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

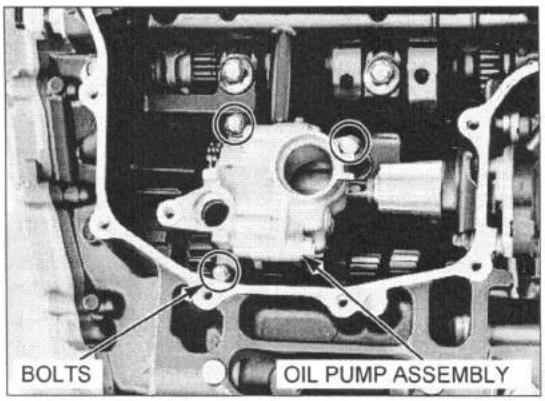


INSTALLATION

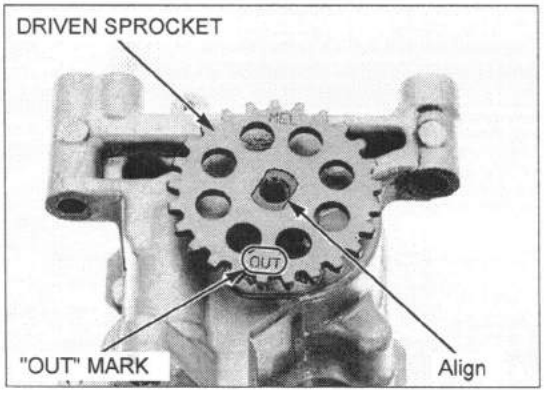
Install the dowel pins to the crankcase.



Install the oil pump assembly and tighten the bolts securely.



Install the driven sprocket with its "OUT" mark facing out by aligning the flat surfaces.

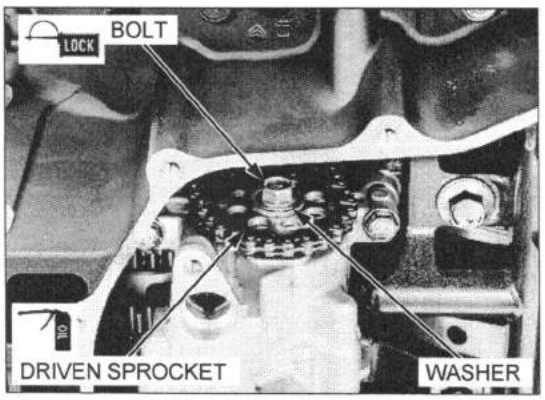


Apply locking agent to the oil pump driven sprocket bolt threads (page 1-23).

Tighten the driven sprocket bolt/washer to the specified torque.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Apply oil to the oil pump driven sprocket.

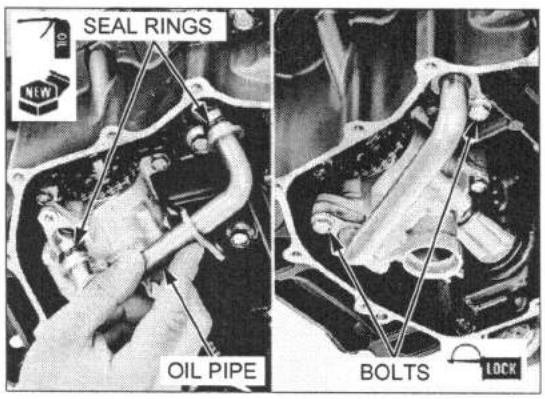


Apply oil to new seal rings and install them to the oil pipe.

Apply locking agent to the oil pipe mounting bolt threads (page 1-23).

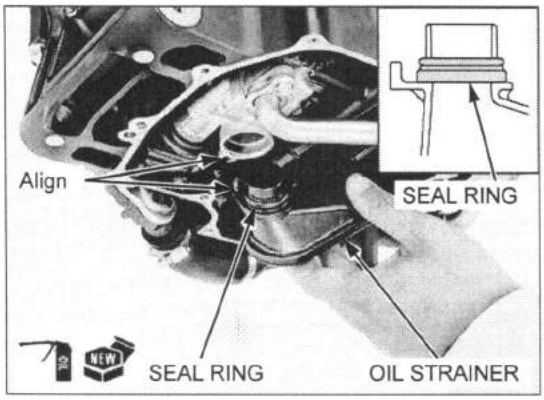
Install the oil pipe and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Apply oil to a new seal ring and install it to the oil strainer as shown.

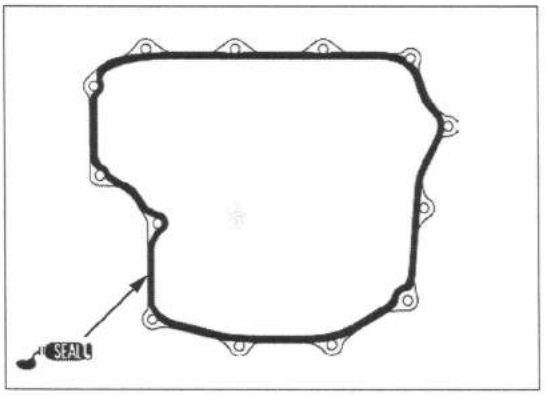
Install the oil strainer by aligning its boss to the crankcase groove.



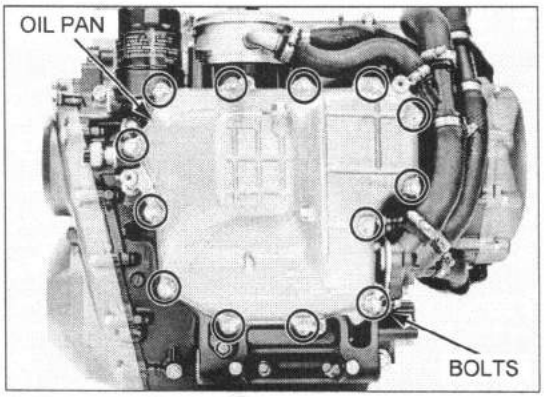
Clean the oil pan mating surface thoroughly.

Do not apply more sealant than is necessary.

Apply sealant (TB 1207B or equivalent) to the mating surface.



Install the oil pan and tighten the bolts in a crisscross pattern in two or three steps.

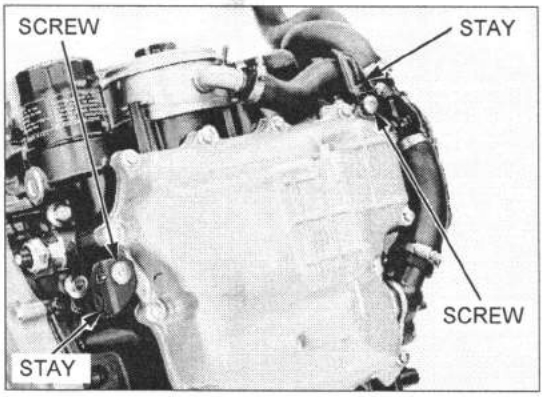


Install the lower cowl stays and tighten the screws securely.

Install the exhaust pipe (page 3-65).

Fill the crankcase with the recommended oil (page 4-20).

Start the engine and check that there are no oil leaks.

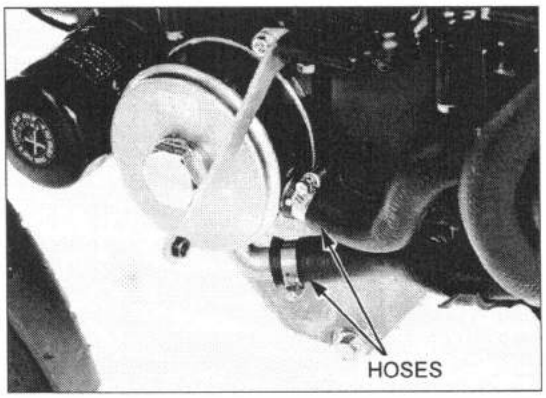


OIL COOLER

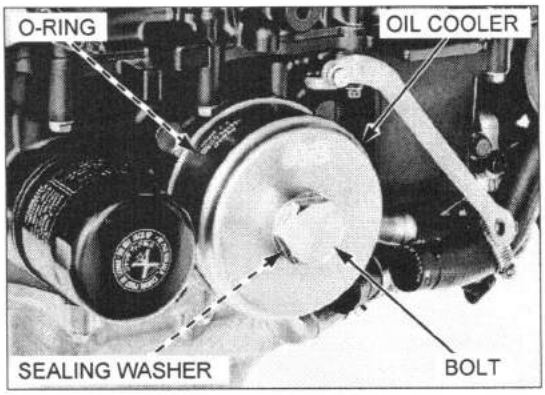
REMOVAL

Drain the engine oil (page 4-21).
Drain the coolant (page 7-7).
Remove the exhaust pipe (page 3-64).

Loosen the hose clamp screws and disconnect the water hoses from the oil cooler.

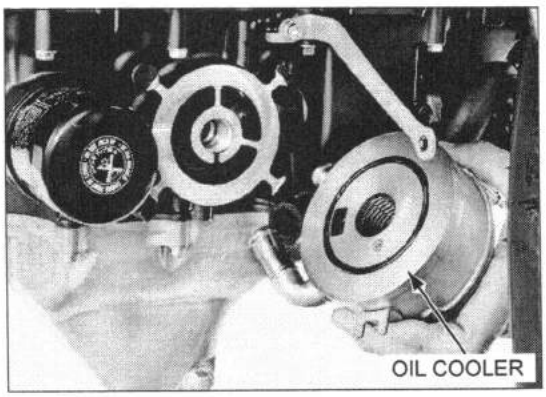


Remove the bolt, sealing washer, oil cooler, and O-ring.



INSPECTION

Check the oil cooler for damage.



INSTALLATION

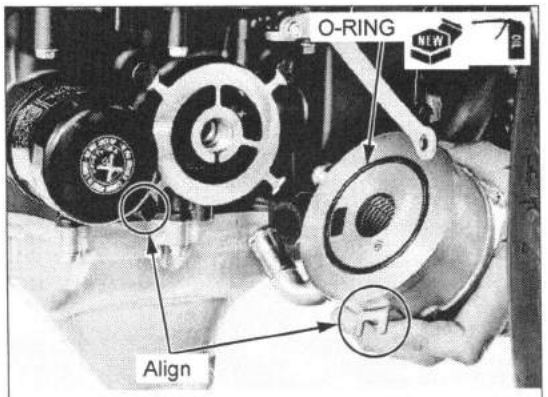
'08 – '11 model

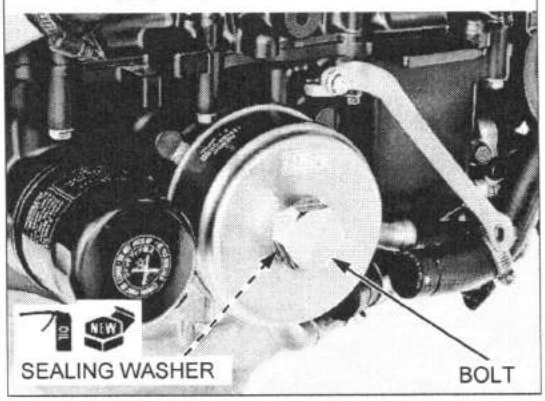
Apply oil to a new O-ring and install it into the oil cooler groove.

Apply oil to a new sealing washer seating surface.

Install the oil cooler to the crankcase by aligning the oil cooler groove with the crankcase boss.

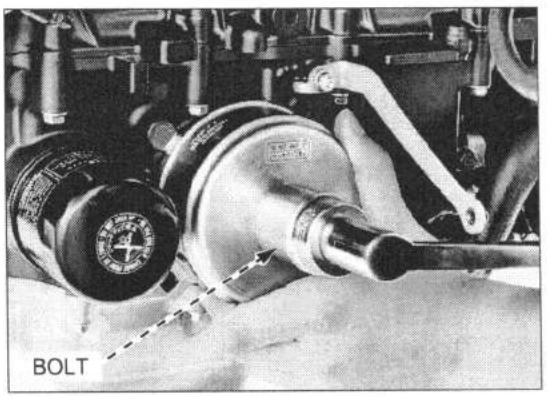
Install the sealing washer and oil cooler bolt.





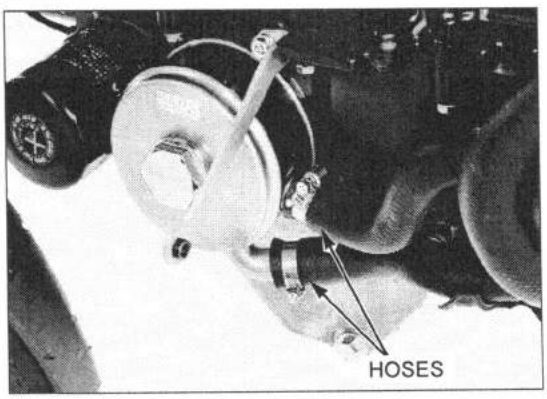
Hold the oil cooler with your hand and tighten the bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)



Connect the water hoses and tighten the hose clamp screws securely (page 1-22).

Fill the crankcase with the recommended oil (page 4-20).
Install the exhaust pipe (page 3-65).
Fill the cooling system and bleed any air (page 7-7).
Check for coolant and oil leaks.



After '11 model

Apply oil to a new O-ring and install it into the oil cooler groove.

Apply oil to the seating surface of a new sealing washer.

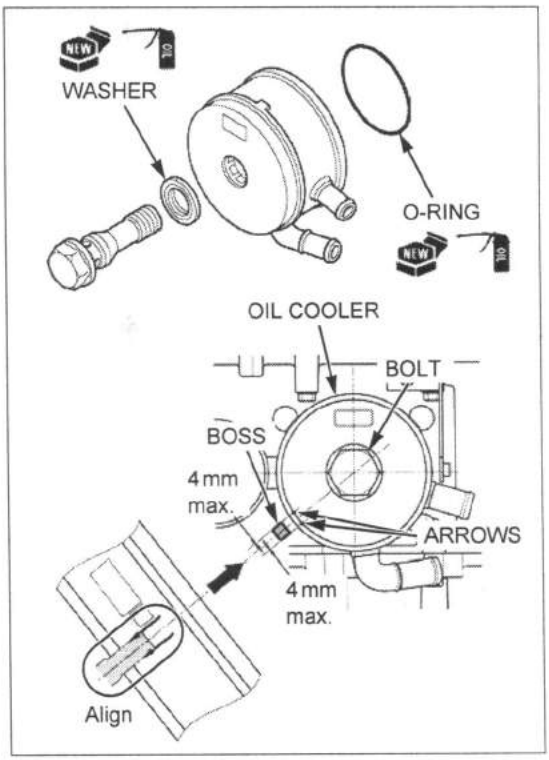
Do not stagger the arrows more than 4 mm (0.2 in).

Place the oil cooler onto the crankcase by aligning the arrows with the edges of the crankcase boss. Install the oil cooler bolt with the sealing washer and temporarily tighten it.

Hold the oil cooler with your hand securely to prevent misalignment of the arrow position and tighten the bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)

Make sure the arrows are in alignment with the boss.

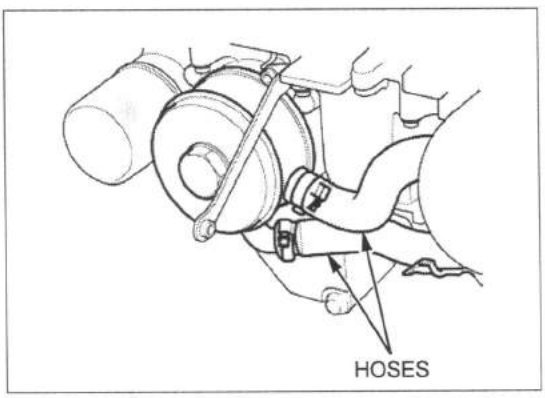


Connect the water hoses and tighten the hose clamp screws (page 1-66).

Install the exhaust pipe (page 3-65).

Fill the crankcase with the recommended oil (page 4-20).
Fill the cooling system and bleed any air (page 7-7).

Check for coolant and oil leaks.



6. FUEL SYSTEM (PGM-FI)

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BANK ANGLE SENSOR ····· 6-80

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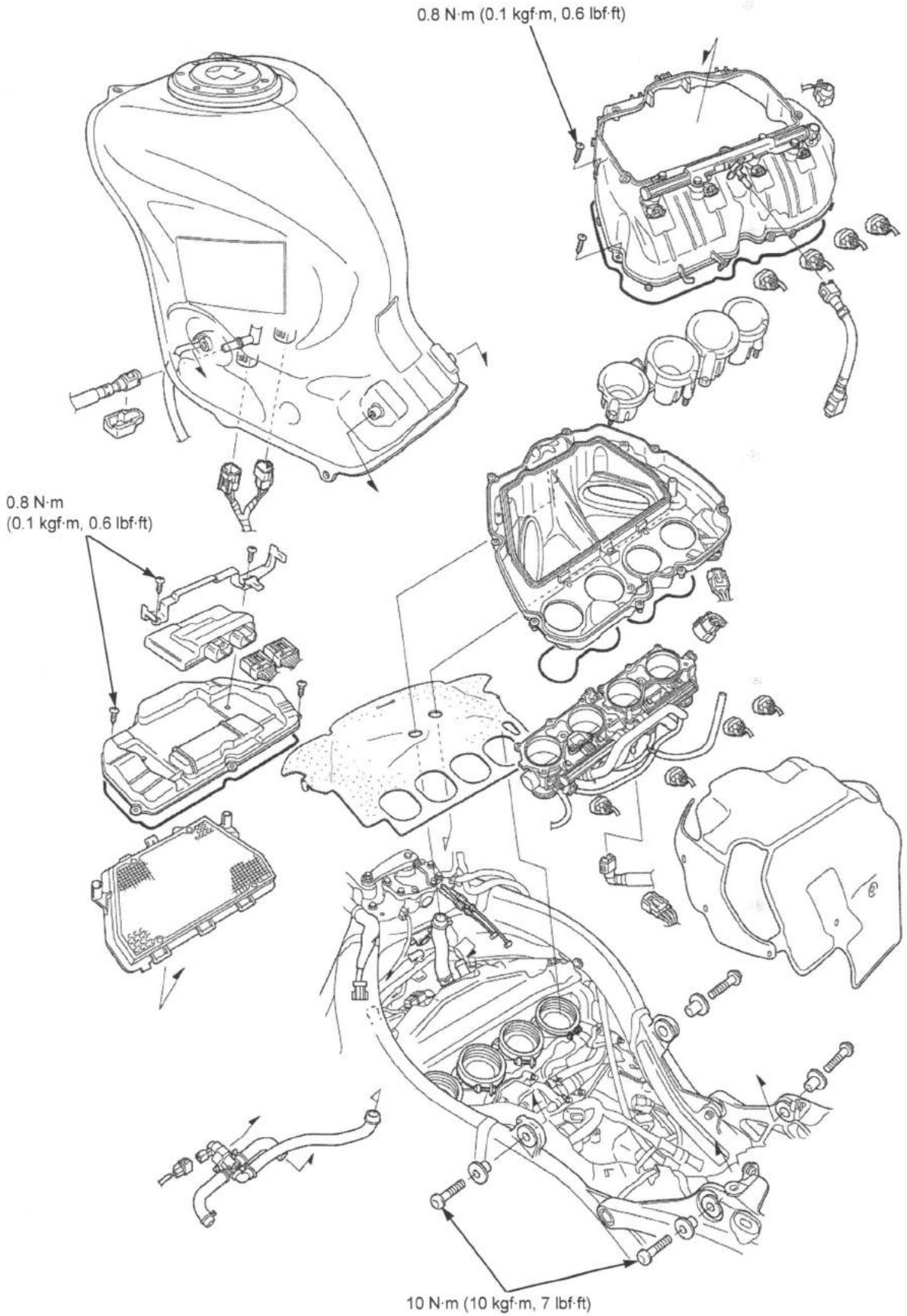
EGCA ····· 6-89

INTAKE AIR DUCT CONTROL ····· 6-92

EVAP PURGE CONTROL SOLENOID VALVE/CANISTER ((AC) TYPE) ····· 6-95

O_2 SENSOR (After '11 model) ····· 6-99

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Be sure to relieve the fuel pressure while the engine is OFF.
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel rail on the throttle body while removing or installing the throttle body.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Prevent dirt and debris from entering the engine, clean the throttle bore and fuel hose with compressed air.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- For fuel reserve sensor inspection (page 21-23).
- Before disconnecting the fuel hose, relieve fuel pressure from the system by disconnecting the quick connect fitting (page 6-50).
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle valve and idle control failure.

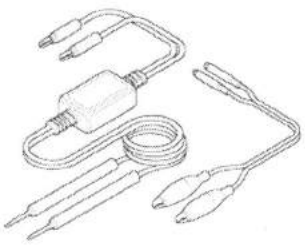
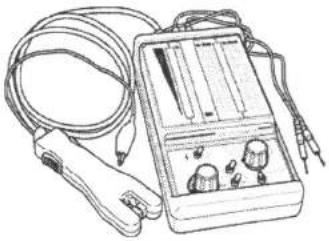
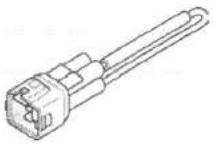
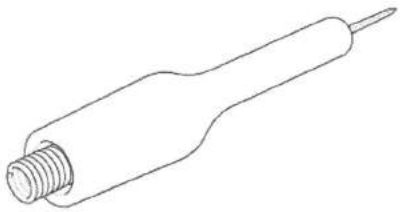
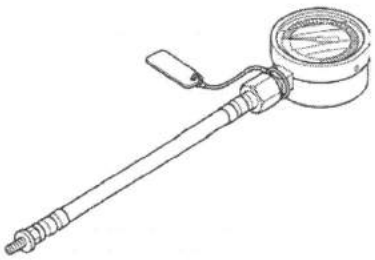
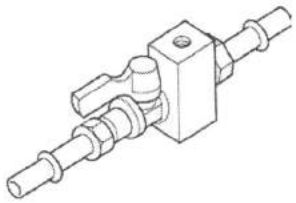
SPECIFICATIONS

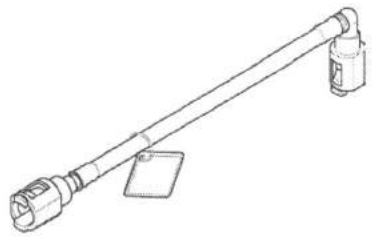
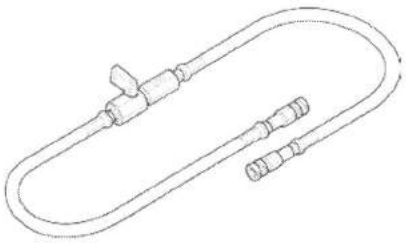
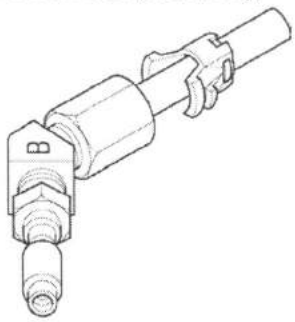
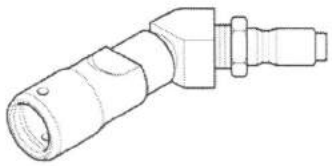
ITEM		SPECIFICATIONS
Throttle body identification number	Except (AC) type	GQ23C
	(AC) type	GQ23B
Idle speed		1,200 ± 100 rpm
Throttle grip freeplay	'08 – '13 model	2 – 6 mm (0.08 – 0.24 in)
	After '13 model	2 – 4 mm (0.08 – 0.16 in)
IAT sensor resistance (at 20 C/68 F)		1 – 4 k
Fuel injector resistance (at 20°C /68°F)	Primary fuel injector	11 – 13
	Secondary fuel injector	11 – 13
PAIR control solenoid valve resistance (at 20 C/68 F)		23 – 27
IDC solenoid valve resistance (at 20 C/68 F)		28 – 32
EVAP purge control solenoid valve resistance (at 20°C/68°F)		30 – 34
O_2 sensor heater resistance (at 20°C/68°F)		5 – 20
CKP sensor peak voltage (at 20 C/68 F)		0.7 V minimum
Fuel pressure at idle		343 kPa (3.5 kgf/cm^2, 50 psi)
Fuel pump flow (at 12 V)		167 cm^3 (5.6 US oz, 5.9 Imp oz) minimum/10 seconds

TORQUE VALUES

ECT sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)
Primary fuel rail mounting bolt	5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)
Fuel tank mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Fuel pump mounting nut	12 N·m (1.2 kgf·m, 9 lbf·ft) For tightening sequence (page 6-58)
Bank angle sensor mounting screw ('08 – '11 model)	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)
Bank angle sensor mounting nut (After '11 model)	2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)
IDC solenoid valve screw (After '11 model)	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)
IACV setting plate torx screw	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)
Knock sensor mounting bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
IAT sensor mounting screw	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)
MAP sensor mounting screw	5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)
ECM setting plate screw	0.8 N·m (0.1 kgf·m, 0.6 lbf·ft)
Air cleaner housing screw	0.8 N·m (0.1 kgf·m, 0.6 lbf·ft)
Heat guard mounting screw	10 N·m (1.0 kgf·m, 7 lbf·ft)
Throttle cable adjuster lock nut	5.5 N·m (0.6 kgf·m, 4.1 lbf·ft)
EVAP canister mounting bolt (STANDARD (AC)/ ABS (AC) type)	8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)
Shock absorber mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)
O_2 sensor (After '11 model)	24.5 N·m (2.5 kgf·m, 18 lbf·ft)

TOOLS

Peak voltage adaptor 07HGJ-0020100 (Not available in U.S.A.)  with commercially available digital multimeter (impedance 10 M /DCV minimum)	IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) 	SCS Service connector 070PZ-ZY30100 
Test probe (2 required) 07ZAJ-RDJA110 	Fuel pressure gauge, 0 – 100 psi 07406-0040004  or 07406-00400B or 07406-00400C (U.S.A. only)	Pressure gauge manifold 07ZAJ-S5A0111  (Not available in U.S.A.)

Hose attachment, 8 mm/9 mm 07ZAJ-S7C0100  (Not available in U.S.A.)	Hose attachment, 9 mm/9 mm 07ZAJ-S5A0120  (Not available in U.S.A.)	Attachment joint, 8 mm/9 mm 07ZAJ-S7C0200  (Not available in U.S.A.)
Pressure manifold hose 07AMJ-HW3A100 (U.S.A. only) 	Adaptor, male 07AAJ-S6MA300 (U.S.A. only) 	Adaptor, female 07AAJ-S6MA500 (U.S.A. only) 

PGM-FI SYMPTOM TROUBLESHOOTING

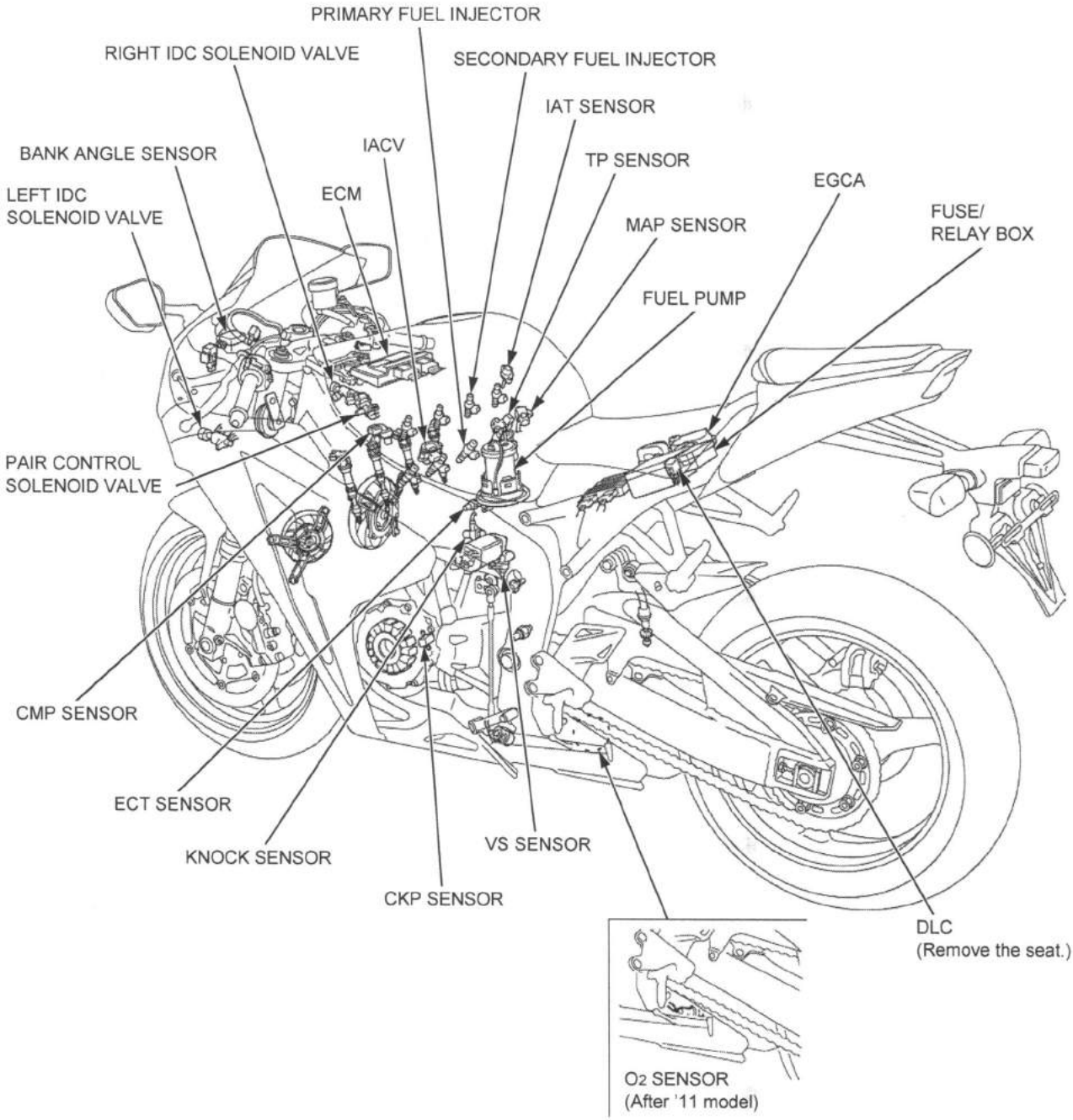
When the motorcycle has one of these symptoms, check the DTC or MIL blinking, refer to the DTC index (page 6-19) and begin the appropriate troubleshooting procedure. If there are no DTC/MIL blinking stored in the ECM memory, do the diagnostic procedure for the symptom, in sequence listed below, until you find the cause.

Symptom	Diagnosis procedure	Also check for
Engine cranks but won't start (No DTC and MIL blinking)	1. Crank the starter for more than 10 seconds and check the DTC and execute the troubleshooting according to the DTC. – STANDARD/SP type (page 6-16) – ABS type (page 6-17) 2. Inspect the fuel supply system (page 6-50).	• No fuel to fuel injector – Clogged fuel strainer screen – Pinched or clogged fuel hose – Pinched or clogged fuel tank breather hose – Faulty fuel pump – Faulty fuel pump circuits • Intake air leak • Contaminated/deteriorated fuel • Faulty fuel injector • IACV stuck closed • Faulty ignition system • Faulty CKP sensor • Faulty CMP sensor
Engine cranks but won't start (No fuel pump operation sound when the turning the ignition ON)	1. ECM power/ground circuits malfunction (page 6-84) 2. Inspect the fuel supply system (page 6-50).	• Open circuit in the power input and/or ground wire of the ECM • Faulty bank angle sensor or related circuit • Faulty engine stop relay or related circuit • Faulty engine stop switch or related circuit • Blown fuse (BANK ANGLE 10 A) • Blown fuse (FI 20 A)
Engine stalls, hard to start, rough idling	1. Check the idle speed. 2. Check the IACV. 3. Inspect the fuel supply system (page 6-50). 4. Inspect the battery charging system (page 18-8).	• Restricted fuel hose • Contaminated/deteriorated fuel • Intake air leak • Faulty IACV • Restricted fuel tank breather hose • Faulty ignition system • Faulty battery charging system
Afterburn when engine braking is used	Check the PAIR system (page 6-86).	• Faulty PAIR system – Faulty PAIR control solenoid valve – Faulty PAIR check valve – Clogged hose of the PAIR system • Faulty ignition system
Backfiring or misfiring during acceleration	Check the ignition system.	• Faulty ignition system
Poor performance (driveability) and poor fuel economy	1. Inspect the fuel supply system (page 6-50). 2. Inspect the air cleaner element (page 4-12).	• Pinched or clogged fuel hose • Faulty pressure regulator • Faulty fuel injector • Faulty ignition system • Clogged air cleaner element • Faulty MAP sensor • Pinched or clogged MAP sensor hose
Idle speed is below specifications or fast idle too low (No DTC and MIL blinking)	1. Check the idle speed. 2. Check the IACV.	• IACV stuck closed • Faulty fuel supply system • Faulty ignition system
Idle speed is above specifications or fast idle too high (No DTC and MIL blinking)	1. Check the idle speed. 2. Check the throttle operation and freeplay 3. Check the IACV.	• IACV stuck opened • Faulty ignition system • Intake air leak • Engine top end problem • Air cleaner condition
MIL stays ON but no DTCs set, or MIL never comes ON at all	Troubleshoot the MIL circuit (page 6-49).	• Faulty MIL circuit
MIL stays ON at all (No DTC set)	Inspect the DLC circuit.	• Short circuit in the DLC related wire

PGM-FI SYSTEM LOCATION

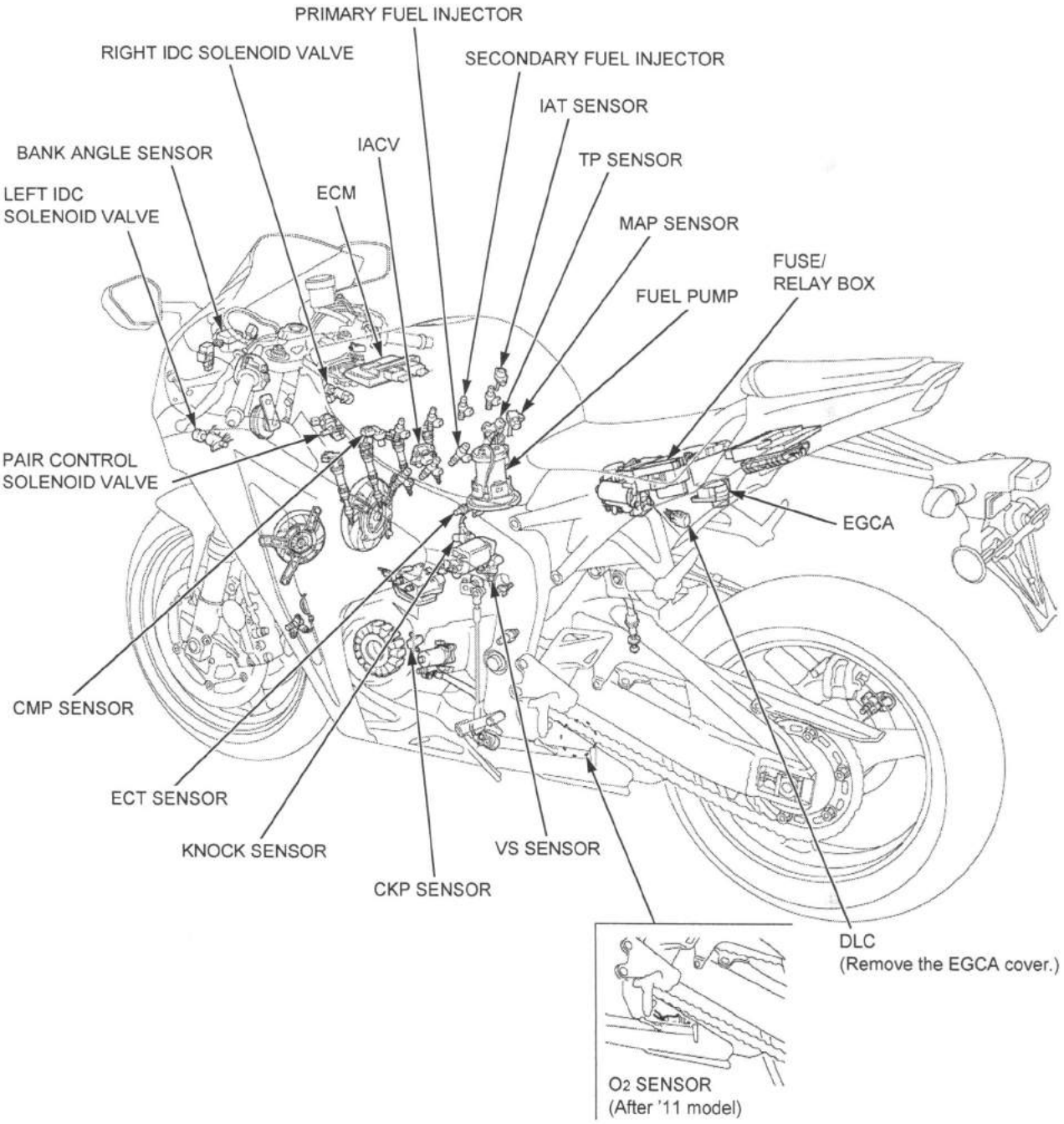
STANDARD/SP type:

'08 – '11 model STANDARD type shown:



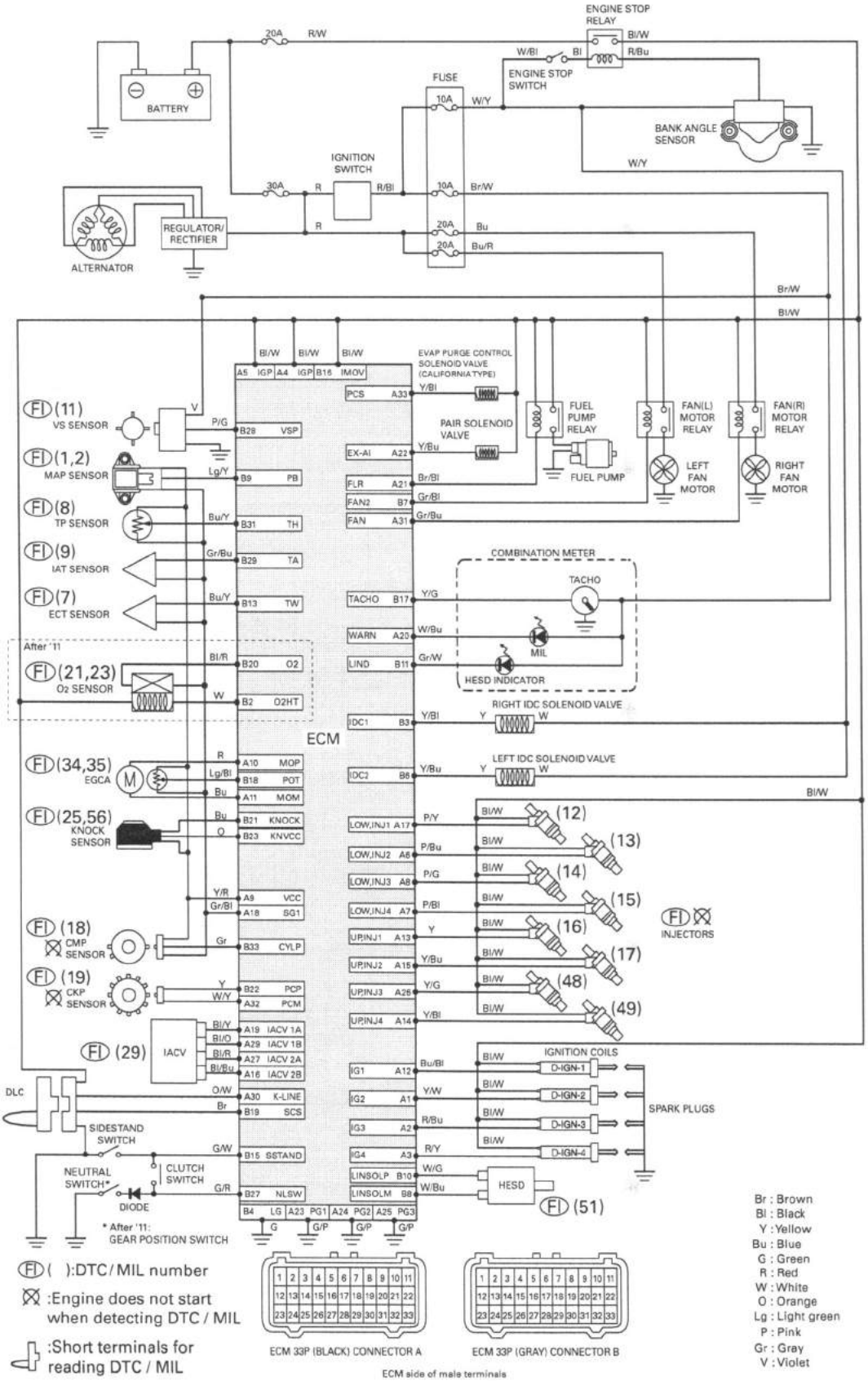
ABS type:

'09 – '11 model shown:

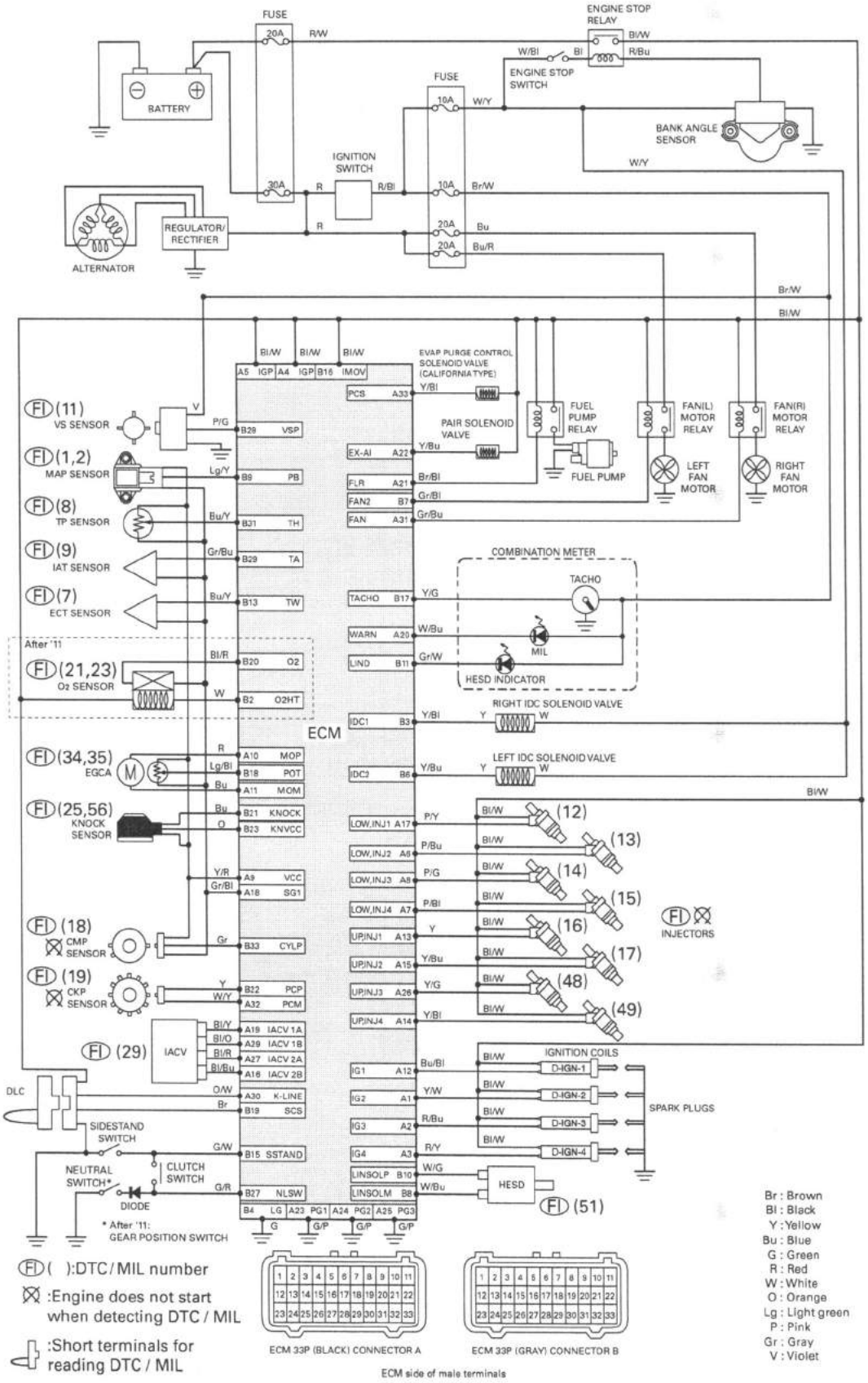


PGM-FI SYSTEM DIAGRAM

STANDARD/SP type:

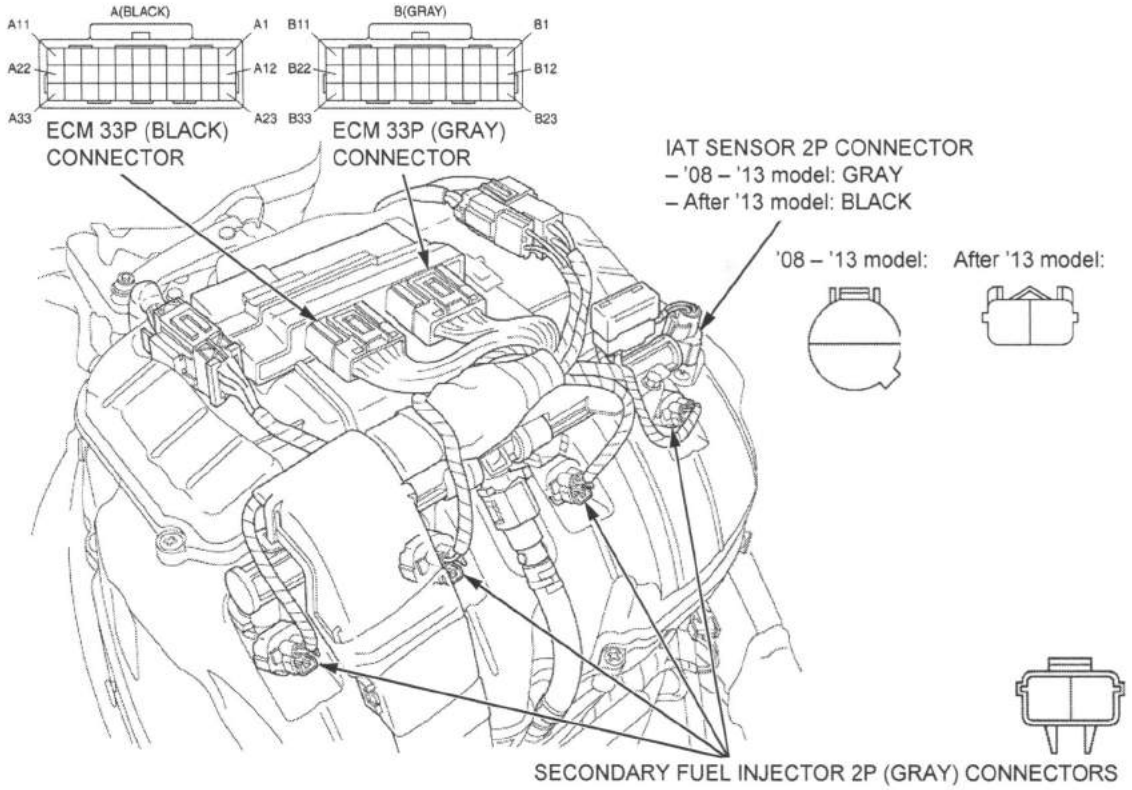


ABS type:

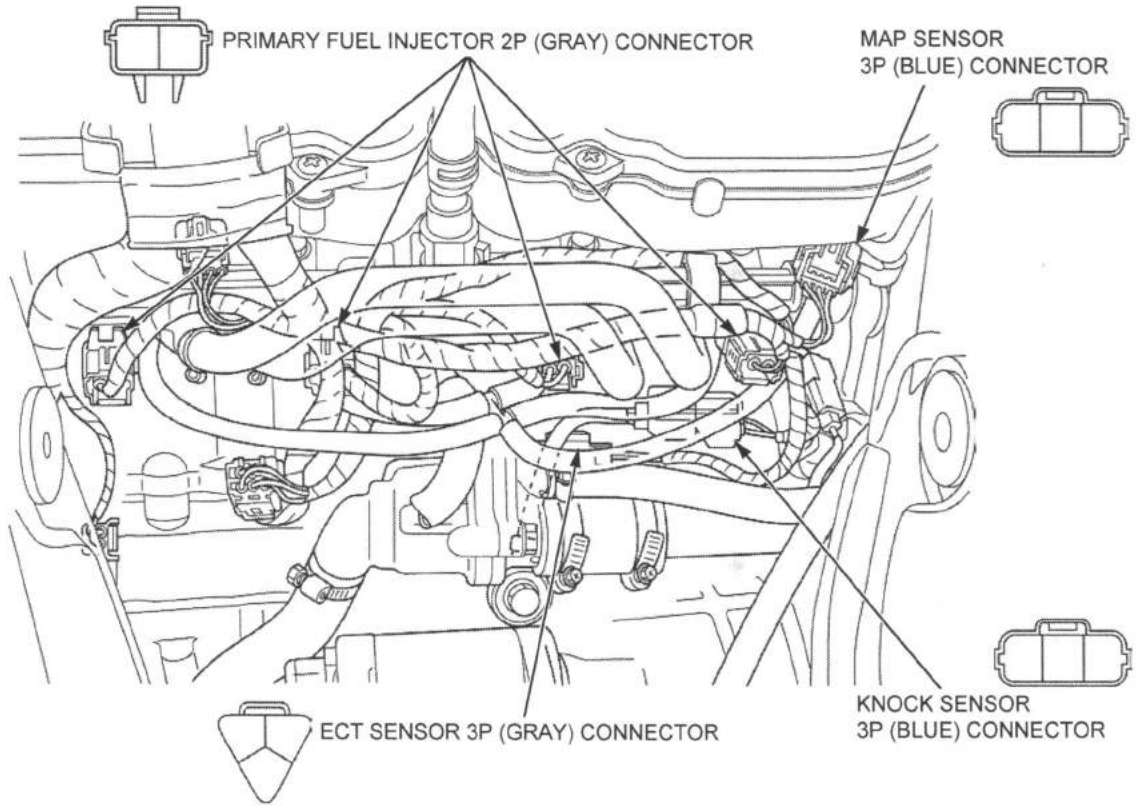

FUSE
20A
R/W
ENGINE STOP RELAY
Bl/W
R/Bu
W/Bl
Bl
ENGINE STOP SWITCH
BATTERY
FUSE
10A
W/Y
BANK ANGLE SENSOR
W/Y
IGNITION SWITCH
30A
R
R/Bl
10A
Br/W
REGULATOR/ RECTIFIER
R
20A
Bu
20A
Bu/R
ALTERNATOR
Br/W
Bl/W
Bl/W
Bl/W
Bl/W
A5 IGP A4 IGP B16 IMOV
EVAP PURGE CONTROL SOLENOID VALVE (CALIFORNIA TYPE)
PCS A33
Y/Bl
FUEL PUMP RELAY
FAN(L) MOTOR RELAY
FAN(R) MOTOR RELAY
PAIR SOLENOID VALVE
EX-Al A22
Y/Bu
FUEL PUMP
LEFT FAN MOTOR
RIGHT FAN MOTOR
FLR A21
Br/Bl
FAN2 B7
Gr/Bl
FAN A31
Gr/Bu
FI (11) VS SENSOR
V
P/G
B28 VSP
FI (1,2) MAP SENSOR
Lg/Y
B9 PB
FI (8) TP SENSOR
Bu/Y
B21 TH
FI (9) IAT SENSOR
Gr/Bu
B29 TA
FI (7) ECT SENSOR
Bu/Y
B13 TW
COMBINATION METER
TACHO
TACHO B17
Y/G
WARN A20
W/Bu
MIL
LIND B11
Gr/W
HESD INDICATOR
After '11
Bl/R
B20 O2
FI (21,23) O2 SENSOR
W
B2 O2HT
ECM
IDC1 B3
Y/Bl
RIGHT IDC SOLENOID VALVE
Y
W
FI (34,35) EGCA
R
A10 MOP
Lg/Bl
B18 POT
Bu
A11 MOM
IDC2 B6
Y/Bu
LEFT IDC SOLENOID VALVE
Y
W
Bl/W
FI (25,56) KNOCK SENSOR
Bu
B21 KNOCK
O
B23 KNVCC
LOW,INJ1 A17
P/Y
(12)
LOW,INJ2 A8
P/Bu
(13)
LOW,INJ3 A8
P/G
(14)
LOW,INJ4 A7
P/Bl
(15)
Y/R
A9 VCC
Gr/Bl
A18 SG1
UP,INJ1 A13
Y
(16)
FI INJECTORS
FI (18) CMP SENSOR
Gr
B33 CYLP
UP,INJ2 A15
Y/Bu
(17)
FI (19) CKP SENSOR
Y
B32 PCP
W/Y
A32 PCM
UP,INJ3 A26
Y/G
(48)
UP,INJ4 A14
Y/Bl
(49)
IGNITION COILS
Bl/Y
A19 IACV 1A
Bl/O
A29 IACV 1B
FI (29) IACV
Bl/R
A27 IACV 2A
Bl/Bu
A16 IACV 2B
IG1 A12
Bu/Bl
D-IGN-1
IG2 A1
Y/W
D-IGN-2
IG3 A2
R/Bu
D-IGN-3
IG4 A3
R/Y
D-IGN-4
SPARK PLUGS
DLC
O/W
A30 K-LINE
Br
B19 SCS
SIDESTAND SWITCH
G/W
B15 SSTAND
NEUTRAL SWITCH*
CLUTCH SWITCH
DIODE
G/R
B27 NLSW
LINSOLP B10
W/G
LINSOLM B8
W/Bu
HESD
FI (51)
B4 LG A23 PG1 A24 PG2 A25 PG3
G G/P G/P G/P
* After '11: GEAR POSITION SWITCH
FI ( ):DTC/MIL number
:Engine does not start when detecting DTC / MIL
:Short terminals for reading DTC / MIL
ECM 33P (BLACK) CONNECTOR A
ECM 33P (GRAY) CONNECTOR B
ECM side of male terminals
Br : Brown
Bl : Black
Y : Yellow
Bu : Blue
G : Green
R : Red
W : White
O : Orange
Lg : Light green
P : Pink
Gr : Gray
V : Violet

CONNECTOR LOCATION

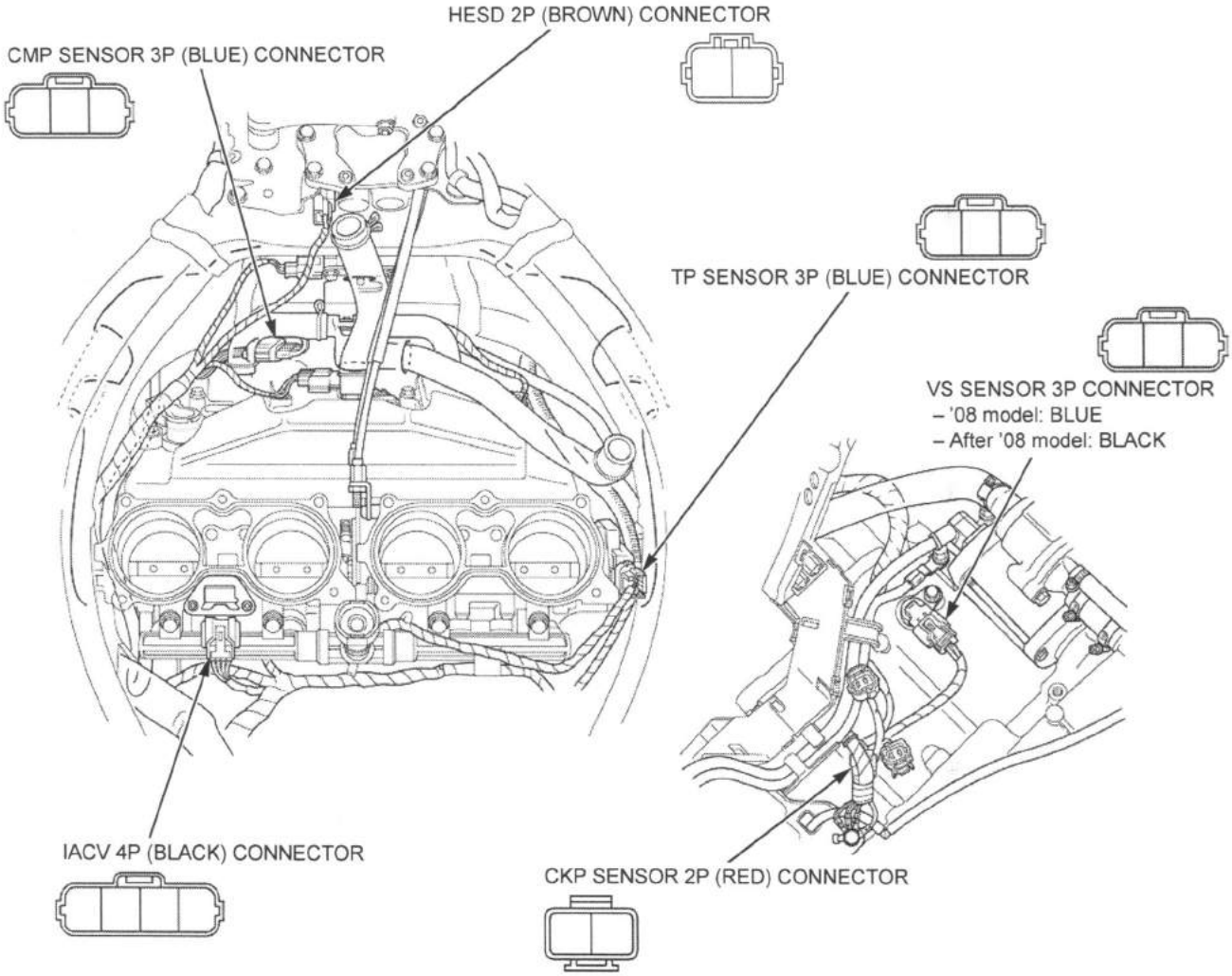
NOTE: Lift and support the fuel tank (page 4-7).



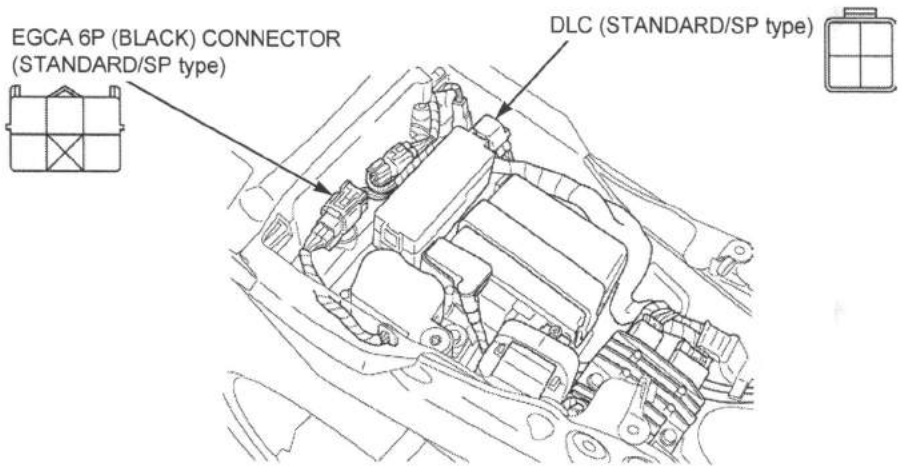
NOTE: Lift and support the fuel tank (page 4-7).

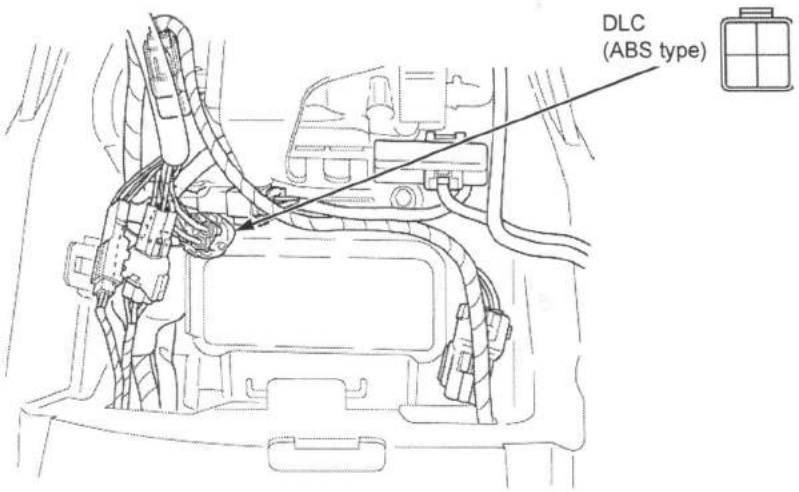


NOTE: Remove the air cleaner housing (page 6-62).

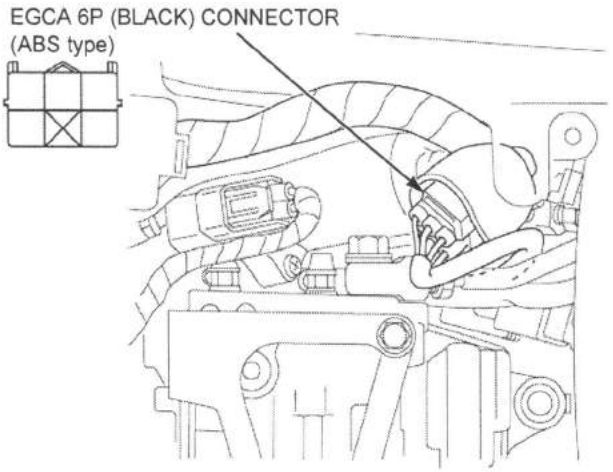


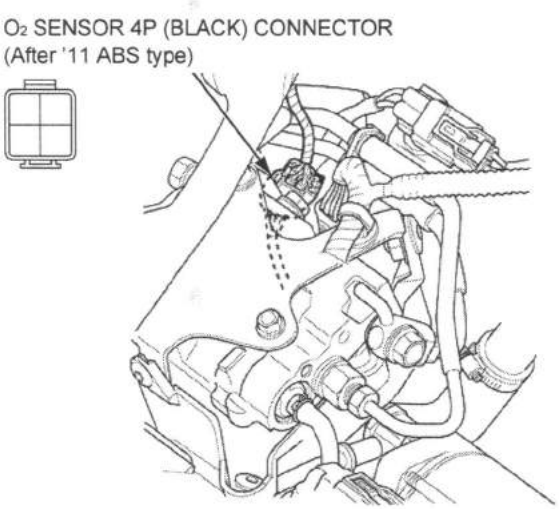
NOTE: Remove the seat (page 3-7).



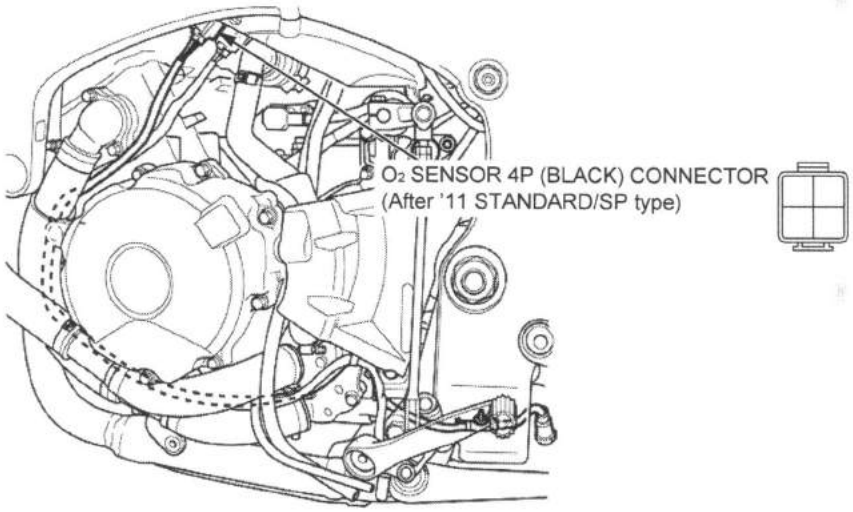


NOTE: Lift and support the fuel tank (page 4-7).





NOTE: Remove the middle cowl (page 3-18).



PGM-FI TROUBLESHOOTING INFORMATION

GENERAL TROUBLESHOOTING

Intermittent Failure

The term "intermittent failure" means a system may have had a failure, but it checks OK now. If the MIL does not come on, check for poor contact or loose pins at all connectors related to the circuit that of the troubleshooting. If the MIL was on, but then went out, the original problem may be intermittent.

Opens and Shorts

"Opens" and "Shorts" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something will not work at all. With ECMs this can mean something may work, but not the way it's supposed to.

If the MIL has come on

Refer to DTC READOUT.

- STANDARD/SP type (page 6-16)
- ABS type (page 6-17)

If the MIL did not stay on

If the MIL did not stay on, but there is a driveability problem, do the SYMPTOM TROUBLESHOOTING (page 6-6).

SYSTEM DESCRIPTION

SELF-DIAGNOSIS SYSTEM

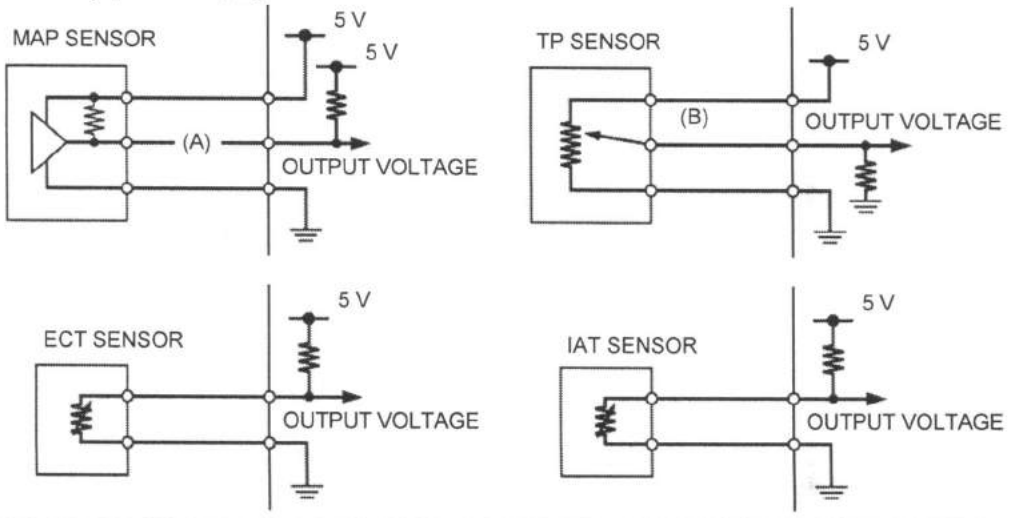
The PGM-FI system is equipped with the self-diagnostic system. When any abnormality occurs in the system, the ECM turns on the MIL and stores a DTC in its erasable memory.

FAIL-SAFE FUNCTION

The PGM-FI system is provided with a fail-safe function to secure a minimum running capability even when there is trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is maintained by pre-programmed values in the simulated program map. When any abnormality is detected in the fuel injector(s), CKP sensor and/or CMP sensor, the fail-safe function stops the engine to protect it from damage.

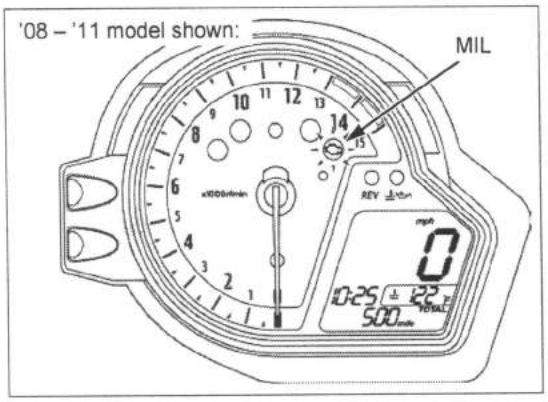
DTC (Diagnostic Trouble Code)

- The DTC is composed of a main code and a sub code and it is displayed as a hyphenated number when retrieved from the ECM with the MCS.
  The digits in front of the hyphen are the main code, they indicate the component of function failure.
  The digits behind the hyphen are the sub code, they detail the specific symptom of the component or function failure.
  For example, in the case of the TP sensor:
  - DTC 08 – 1 = (TP sensor voltage) – (lower than the specified value)
  - DTC 08 – 2 = (TP sensor voltage) – (higher than the specified value).
- The MAP, ECT, TP and IAT sensor diagnosis will be made according to the voltage output of the affected sensor.
  If a failure occurs, the ECM determines the Function Failure, compares the sensor voltage output to the standard value, and then outputs the corresponding DTC to the MCS.
  For example:
  - If the output voltage line (A) on the MAP sensor is opened, the ECM detects the output voltage is about 5 V, then the DTC 1-2 (MAP sensor circuit high voltage) will be displayed.
  - If the input voltage line (B) on the TP sensor is opened, the ECM detects the output voltage is 0 V, then the DTC 8-1 (TP sensor circuit low voltage) will be displayed.



MIL Blink Pattern

- If the MCS is not available, DTC can be read from the ECM memory by the MIL blink pattern.
- The number of MIL blinks is the equivalent to the main code of the DTC (the sub code cannot be displayed by the MIL).
- The MIL will blink the current DTC, in case the ECM detects the problem at present, when the ignition switch ON or idling with the sidestand down. The MIL will stay ON when the engine speed is over 5,000 rpm or with the sidestand up.
- The MIL has two types of blinks, a long blink and short blink. The long blinking lasts for 1.3 seconds, the short blinking lasts for 0.5 seconds. One long blink is the equivalent of ten short blinks. For example, when two long blinks are followed by five short blinks, the MIL is 25 (two long blinks = 20 blinks, plus five short blinks).
- When the ECM stores more than one DTC, the MIL will indicate them by blinking in the order from the lowest number to highest number.



MIL Check

When the ignition switch is turned ON and engine stop switch "⟳", the MIL will stay on for a few seconds, then go off. If the MIL does not come on, troubleshoot the MIL circuit (page 6-49).

CURRENT DTC/FREEZE DTC

The DTC is indicated in two ways according to the failure status.

- In the case that the ECM detects a problem at present, the MIL will come on and will start to blink the DTC when the sidestand is lowered.
- In the case that the ECM does not detect any problem at present but has a problem stored in its memory, the MIL will not light and blink. To retrieve the past problem code, readout the freeze DTC by following the DTC readout procedure.

MCS INFORMATION (STANDARD/SP type)

- The MCS can readout the DTC, freeze data, current data and other ECM condition.

How to connect MCS

Remove the seat (page 3-7).

Turn the ignition switch OFF.

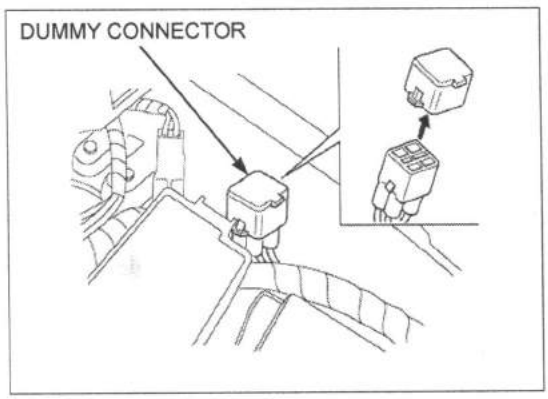
Remove the dummy connector from the DLC.

Connect the MCS to the DLC.

Turn the ignition switch ON, check the DTC and freeze data.

NOTE:

- Freeze data indicates the engine conditions when the first malfunction was detected.



MCS INFORMATION (ABS type)

- The MCS can readout the DTC, freeze data, current data and other ECM conditions.

How to connect MCS

Remove the EGCA cover (page 3-54).

Turn the ignition switch OFF.

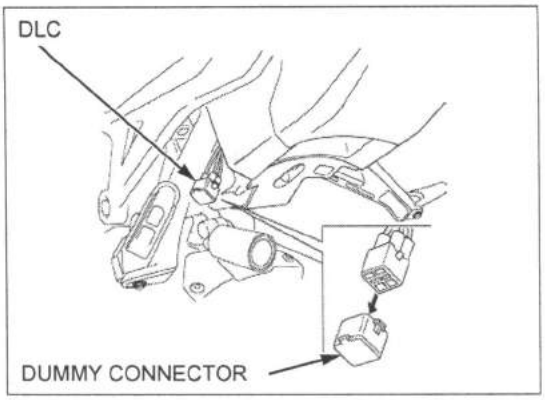
Remove the dummy connector from the DLC.

Connect the MCS to the DLC.

Turn the ignition switch ON, check the DTC and freeze data.

NOTE:

- Freeze data indicates the engine conditions when the first malfunction was detected.



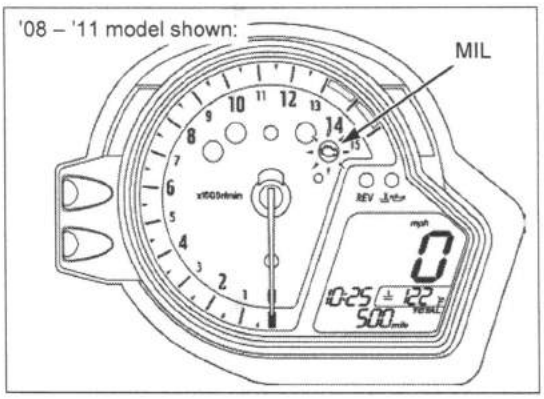
DTC READOUT (STANDARD/SP type)

Start the engine and check the MIL.

- If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blinks.
- When the ignition switch is turned ON, the MIL will stay on for a few seconds, then go off.

If the MIL stays on or blinks, connect the MCS to the DLC (page 6-15), read the DTC, freeze data and follow the troubleshooting index (page 6-19).

To read the DTC with the MIL blinking, refer to the following procedure.



Reading DTC with the MIL

Turn the ignition switch OFF.

Remove the seat (page 3-7).

Remove the dummy connector and short the DLC terminals using the special tool.

Connection: Brown – Green

TOOL:

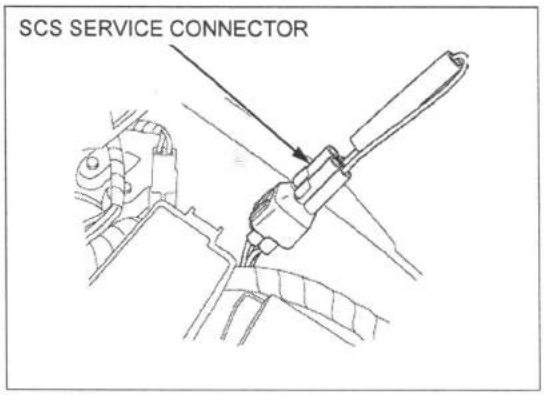
SCS Service connector	**070PZ-ZY30100**

Make sure the engine stop switch is turned to "".

Turn the ignition switch ON, and note the MIL blinks, and refer to the troubleshooting index (page 6-19).

NOTE:

If the ECM has any DTC in its memory, the MIL will start blinking.



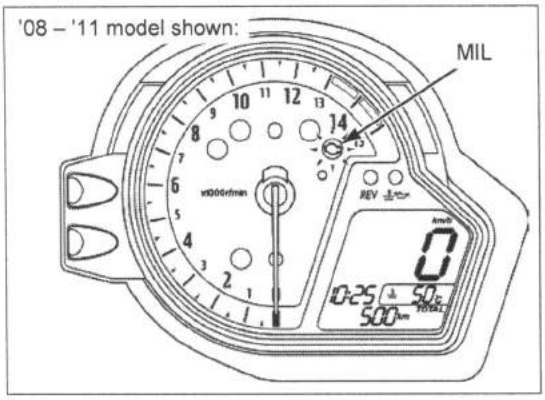
DTC READOUT (ABS type)

Start the engine and check the MIL.

- If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blinks.
- When the ignition switch is turned ON, the MIL will stay on for a few seconds, then go off.

If the MIL stays on or blinks, connect the MCS to the DLC (page 6-16), read the DTC, freeze data and follow the troubleshooting index (page 6-19).

To read the DTC with the MIL blinking, refer to the following procedure.



Reading DTC with the MIL

Turn the ignition switch OFF.

Remove the EGCA cover (page 3-54).

Remove the dummy connector and short the DLC terminals using the special tool.

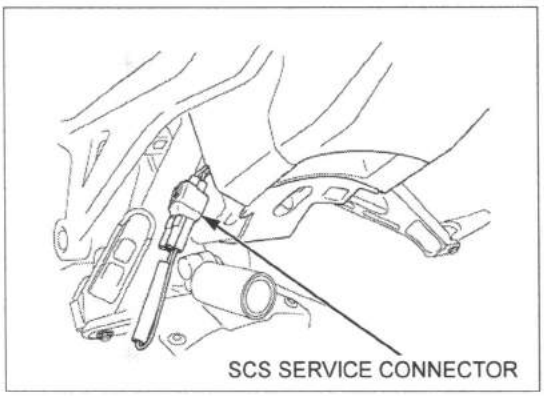
Connection: Brown – Green

TOOL:
SCS Service connector 070PZ-ZY30100

Make sure the engine stop switch is turned to "".

Turn the ignition switch ON, read, note the MIL blinks and refer to the troubleshooting index (page 6-19).

NOTE:
If the ECM has any DTC in its memory, the MIL will start blinking.



CLEARING DTC (STANDARD/SP type)

NOTE:
- The stored DTC can not be erased by simply disconnecting the battery negative cable.

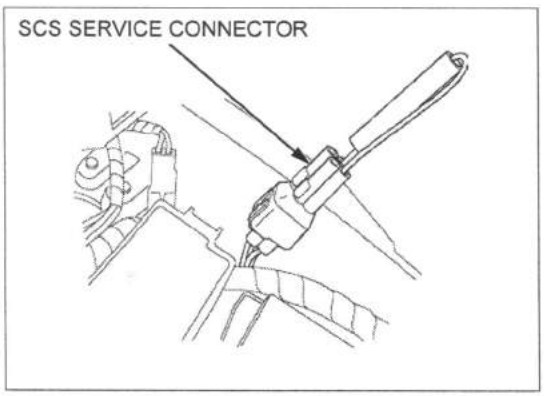
Clear the DTC with the MCS while the engine is stopped.

How to clear the DTC with SCS service connector

1. Remove the seat (page 3-7).
2. Turn the ignition switch OFF.
3. Make sure the engine stop switch is turned to "".
   Remove the dummy connector and short the Brown and Green wire terminals of the DLC using the special tool.

   Connection: Brown – Green

   TOOL:
   SCS Service connector 070PZ-ZY30100
4. Turn the ignition switch ON.
5. Remove the special tool from the DLC.
6. The MIL will light for approximately 5 seconds. While the MIL lights, short the DLC terminals again with the special tool. The self-diagnostic memory is erased if the malfunction indicator goes off and starts blinking.



NOTE:
- The DLC must be jumped while the MIL is illuminated. If not, the MIL will not start blinking.
- Note that the self-diagnostic memory cannot be erased if the ignition switch is turned OFF before the MIL starts blinking.

CLEARING DTC (ABS type)

NOTE:

- The stored DTC can not be erased by simply disconnecting the battery negative cable.

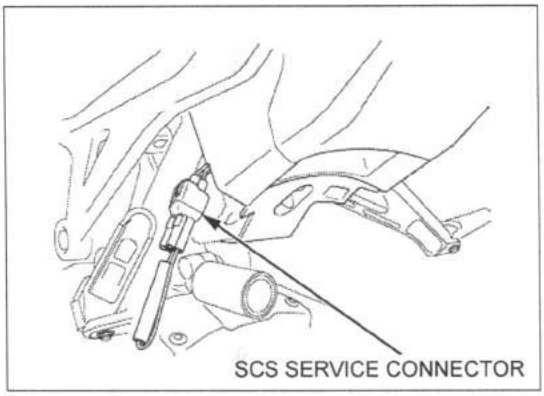
Clear the DTC with the MCS while the engine is stopped.

How to clear the DTC with SCS service connector

1. Remove the EGCA cover (page 3-54).
2. Turn the ignition switch OFF.
3. Make sure the engine stop switch is turned to "⟳".
   Remove the dummy connector and short the Brown and Green wire terminals of the DLC using the special tool.

   Connection: Brown – Green

   TOOL:
   SCS Service connector **070PZ-ZY30100**
4. Turn the ignition switch ON.
5. Remove the special tool from the DLC.
6. The MIL will light for approximately 5 seconds. While the MIL lights, short the DLC terminals again with the special tool. The self-diagnostic memory is erased if the malfunction indicator goes off and starts blinking.



NOTE:

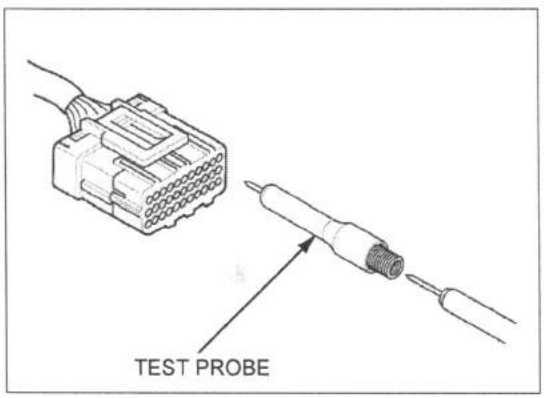
- The DLC must be jumped while the MIL is illuminated. If not, the MIL will not start blinking.
- Note that the self-diagnostic memory cannot be erased if the ignition switch is turned OFF before the MIL starts blinking.

CIRCUIT INSPECTION

INSPECTION AT ECM CONNECTOR

- Always clean around and keep any foreign material away from the ECM connector before disconnecting it.
- A faulty PGM-FI system is often related to poorly connected or corroded connections. Check those connections before proceeding.
- In testing at ECM connector (wire harness side) terminal, always use the test probe. Insert the test probe into the connector terminal, then attach the digital multimeter probe to the test probe.

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**



DTC INDEX

NOTE:

- If the MCS is not used, perform all of the inspection on the corresponding main code (digits in front of hyphen) of the DTC.

'08 – '11 model

DTC	Function Failure	Symptom/Fail-safe function	Refer to page
1-1	MAP sensor circuit low voltage (less than 0.2 V) • MAP sensor or its circuit malfunction	• Engine operates normally	6-23
1-2	MAP sensor circuit high voltage (more than 3.9 V) • Loose or poor contact of the MAP sensor connector • MAP sensor or its circuit malfunction	• Engine operates normally	6-24
2-1	MAP sensor performance problem • Loose or poor connection of the MAP sensor vacuum hose • MAP sensor malfunction	• Engine operates normally	6-25
7-1	ECT sensor circuit low voltage (less than 0.07 V) • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 90°C/194°F • Cooling fan turns on	6-26
7-2	ECT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the ECT sensor connector • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 90°C/194°F • Cooling fan turns on	6-27
8-1	TP sensor circuit low voltage (less than 0.3 V) • Loose or poor contact of the TP sensor connector • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-program value: 0°	6-28
8-2	TP sensor circuit high voltage (more than 4.93 V) • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-program value: 0°	6-30
9-1	IAT sensor circuit low voltage (less than 0.07 V) • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 25°C/77°F	6-31
9-2	IAT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the IAT sensor connector • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 25°C/77°F	6-31
11-1	VS sensor no signal • Loose or poor contact of the VS sensor connector • VS sensor or its circuit malfunction	• Engine operates normally	6-32
12-1	No. 1 primary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • fuel injector or its circuit malfunction	• Engine does not start • fuel injectors, fuel pump and ignition shut down	6-34
13-1	No. 2 primary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
14-1	No. 3 primary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injector, fuel pump and ignition shut down	6-36
15-1	No. 4 primary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
16-1	No. 1 secondary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
17-1	No. 2 secondary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
18-1	CMP sensor no signal • Loose or poor contact of the CMP sensor connector • CMP sensor or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
19-1	CKP sensor no signal • Loose or poor contact of the CKP sensor connector • CKP sensor or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-37

DTC	Function Failure	Symptom/Fail-safe function	Refer to page
25-2	Knock sensor circuit malfunction • Loose or poor contact of the Knock sensor connector • Knock sensor or its circuit malfunction	• Engine operates normally	6-41
25-3	Knock sensor circuit malfunction • Knock sensor or its circuit malfunction	• Engine operates normally	6-42
29-1	IACV circuit malfunction • Loose or poor contact of the IACV connector • IACV or its circuit malfunction	• Engine stalls, hard to start, rough idling	6-43
33-2*	ECM EEPROM malfunction	• Engine operates normally	6-45
34-1	ECV POT low voltage malfunction • Loose or poor contact of the EGCA connector • ECV or its circuit malfunction	• Engine operates normally	6-45
34-2	ECV POT high voltage malfunction • ECV or its circuit malfunction	• Engine operates normally	6-47
35-1	EGCA malfunction • Loose or poor contact of the EGCA connector • ECV or its circuit malfunction • EGCA lock	• Engine operates normally	6-48
48-1	No. 3 secondary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
49-1	No. 4 secondary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
51-1	HESD linear solenoid malfunction • Loose or poor contact of the HESD solenoid connector • HESD solenoid or its circuit	• Engine operates normally • HESD does not function	14-11
56-1	Knock sensor IC malfunction • Knock sensor or its circuit malfunction	• Engine operates normally	6-49

* The MIL does not blink (DTC can be readout/erased only by MCS)

After '11 model

DTC	Function Failure	Symptom/Fail-safe function	Refer to page
1-1	MAP sensor circuit low voltage (less than 0.2 V) • MAP sensor or its circuit malfunction	• Engine operates normally	6-23
1-2	MAP sensor circuit high voltage (more than 3.9 V) • Loose or poor contact of the MAP sensor connector • MAP sensor or its circuit malfunction	• Engine operates normally	6-24
2-1	MAP sensor performance problem • Loose or poor connection of the MAP sensor vacuum hose • MAP sensor malfunction	• Engine operates normally	6-25
7-1	ECT sensor circuit low voltage (less than 0.07 V) • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 90°C/194°F • Cooling fan turns on	6-26
7-2	ECT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the ECT sensor connector • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 90°C/194°F • Cooling fan turns on	6-27
8-1	TP sensor circuit low voltage (less than 0.3 V) • Loose or poor contact of the TP sensor connector • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-program value: 0°	6-28
8-2	TP sensor circuit high voltage (more than 4.93 V) • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-program value: 0°	6-30
9-1	IAT sensor circuit low voltage (less than 0.07 V) • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 25°C/77°F	6-31
9-2	IAT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the IAT sensor connector • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 25°C/77°F	6-31
11-1	VS sensor no signal • Loose or poor contact of the VS sensor connector • VS sensor or its circuit malfunction	• Engine operates normally	6-32
12-1	No. 1 primary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-34
13-1	No. 2 primary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
14-1	No. 3 primary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
15-1	No. 4 primary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
16-1	No. 1 secondary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
17-1	No. 2 secondary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
18-1	CMP sensor no signal • Loose or poor contact of the CMP sensor connector • CMP sensor or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
19-1	CKP sensor no signal • Loose or poor contact of the CKP sensor connector • CKP sensor or its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-37
21-1	O_2 sensor malfunction • Loose or poor contact of the O_2 sensor connector • O_2 sensor or its circuit malfunction	• Engine operates normally	6-38
23-1	O_2 sensor heater circuit malfunction • Loose or poor contact of the O_2 sensor heater connector • O_2 sensor heater or its circuit malfunction	• Engine operates normally	6-39

DTC	Function Failure	Symptom/Fail-safe function	Refer to page
25-2	Knock sensor circuit malfunction • Loose or poor contact of the Knock sensor connector • Knock sensor or its circuit malfunction	• Engine operates normally	6-41
29-1	IACV circuit malfunction • Loose or poor contact of the IACV connector • IACV or its circuit malfunction	• Engine stalls, hard to start, rough idling	6-43
34-1	ECV POT low voltage malfunction • Loose or poor contact of the EGCA connector • ECV or its circuit malfunction	• Engine operates normally	6-45
34-2	ECV POT high voltage malfunction • ECV or its circuit malfunction	• Engine operates normally	6-47
35-1	EGCA malfunction • Loose or poor contact of the EGCA connector • ECV or its circuit malfunction • EGCA lock	• Engine operates normally	6-48
48-1	No. 3 secondary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
49-1	No. 4 secondary fuel injector circuit malfunction • Loose or poor contact of the fuel injector connector • Fuel injector its circuit malfunction	• Engine does not start • Fuel injectors, fuel pump and ignition shut down	6-36
51-1	HESD linear solenoid malfunction • Loose or poor contact of the HESD solenoid connector • HESD solenoid or its circuit	• Engine operates normally • HESD does not function	14-11
56-1	Knock sensor IC malfunction • Knock sensor or its circuit malfunction	• Engine operates normally	6-49

DTC TROUBLESHOOTING

DTC 1-1 (MAP SENSOR LOW VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the MAP sensor 3P (Blue) connector and ECM 33P connectors, then recheck the DTC.

1. **MAP Sensor System Inspection**

   Turn the ignition switch ON and engine stop switch "".
   Check the MAP sensor with the MCS.

   Is about 0 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. **MAP Sensor Input Voltage Inspection**

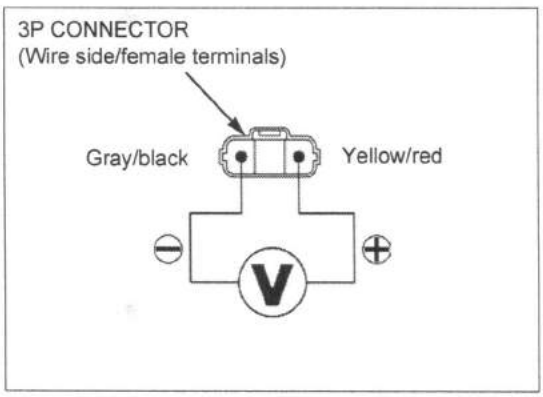
   Turn the ignition switch OFF.
   Disconnect the MAP sensor 3P (Blue) connector.

   Turn the ignition switch ON and engine stop switch "".
   Measure the voltage at the wire side.
   Connection: Yellow/red (+) – Gray/black (–)

   Is the voltage within 4.75 – 5.25 V?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.



3. **MAP Sensor Input Line Inspection**

   Turn the ignition switch OFF.
   Disconnect the ECM 33P (Black) connector.

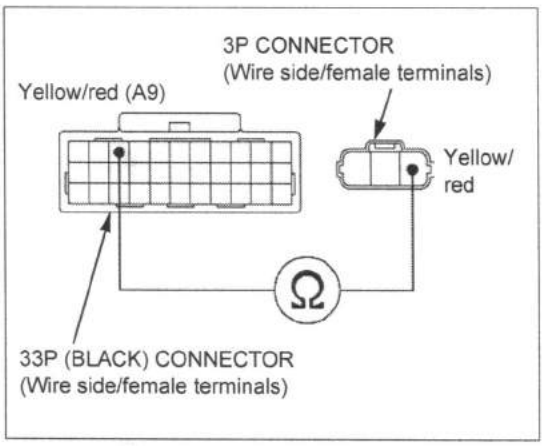
   Check for continuity at the Yellow/red wire between the MAP sensor 3P (Blue) connector and ECM 33P (Black) connector.
   Connection: A9 – Yellow/red

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – Replace the ECM with a known good one and recheck.

   NO – Open circuit in Yellow/red wire



4. **MAP Sensor Output Line Short Circuit Inspection**

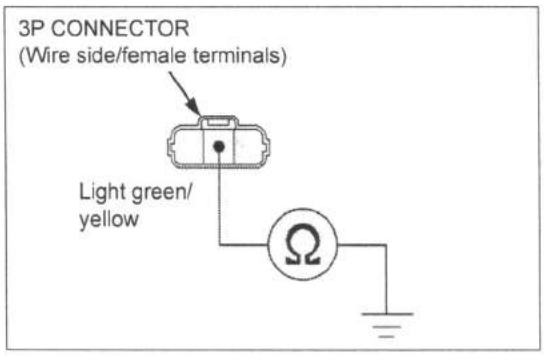
Check for continuity between the MAP sensor 3P (Blue) connector at the wire side and ground.

Connection: Light green/yellow – Ground

Is there continuity?

YES – Short circuit in Light green/yellow wire

NO – GO TO STEP 5.



5. **MAP Sensor Inspection**

Replace the MAP sensor with a known good one (page 6-79).
Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Turn the ignition switch ON and engine stop switch "⟳".

Check the MAP sensor with the MCS.

Is DTC 1-1 indicated?

YES – Replace the ECM with a known good one and recheck.

NO – Faulty original MAP sensor

DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the MAP sensor 3P (Blue) connector and ECM 33P connectors, then recheck the DTC.

1. **MAP Sensor System Inspection 1**

Turn the ignition switch ON and engine stop switch "⟳".

Check the MAP sensor with the MCS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. **MAP Sensor System Inspection 2**

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P (Blue) connector. Connect the MAP sensor 3P (Blue) connector terminals at the wire side with a jumper wire.

- Always use an appropriate jumper wire to prevent damage to the connector terminals.

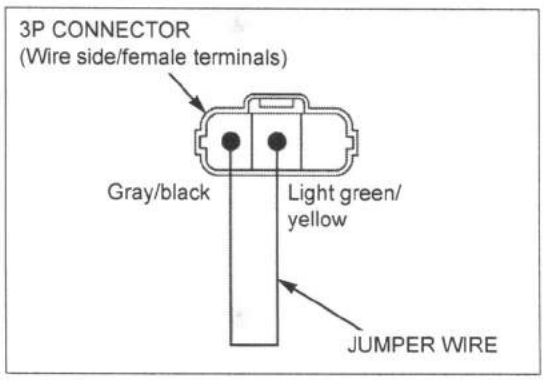
Connection: Light green/yellow – Gray/black

Turn the ignition switch ON and engine stop switch "⟳".
Check the MAP sensor with the MCS.

Is about 0 V indicated?

YES – Faulty MAP sensor

NO – GO TO STEP 3.



3. **MAP Sensor Input Voltage Inspection**

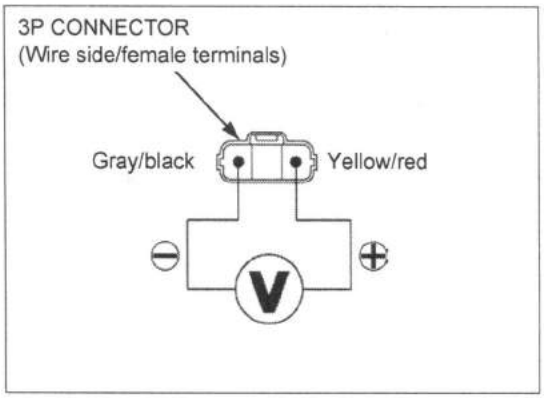
Turn the ignition switch OFF.
Remove the jumper wire.

Turn the ignition switch ON and engine stop switch "ON".
Measure the voltage at the wire side.
Connection: Yellow/red (+) – Gray/black (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – • Open circuit in Yellow/red wire
• Open circuit in Gray/black wire



4. **MAP Sensor Output Line Open Circuit Inspection**

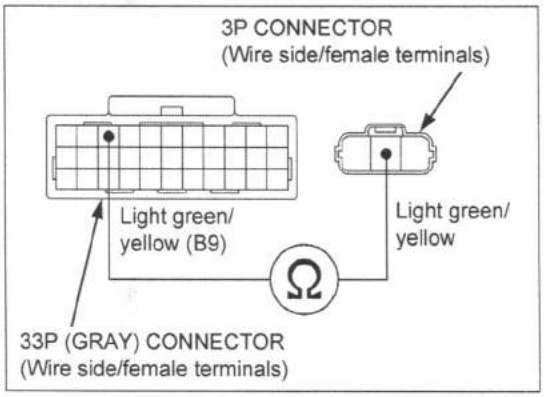
Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector.
Check for continuity at the Light green/yellow wire between the MAP sensor 3P (Blue) connector and ECM 33P (Gray) connector.
Connection: B9 – Light green/yellow

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – Replace the ECM with a known good one and recheck.

NO – Open circuit in Light green/yellow wire



DTC 2-1 (MAP SENSOR)

• Before starting the inspection, check for loose or poor contact on the MAP sensor 3P (Blue) connector and ECM 33P connectors, then recheck the DTC.

1. **MAP Sensor System Inspection**

Turn the ignition switch ON and engine stop switch "ON".

Start the engine and check the MAP sensor with the MCS at idle speed.

Has the reading changed?

YES – Intermittent failure

NO – GO TO STEP 2.

2. **Manifold Absolute Pressure Test**

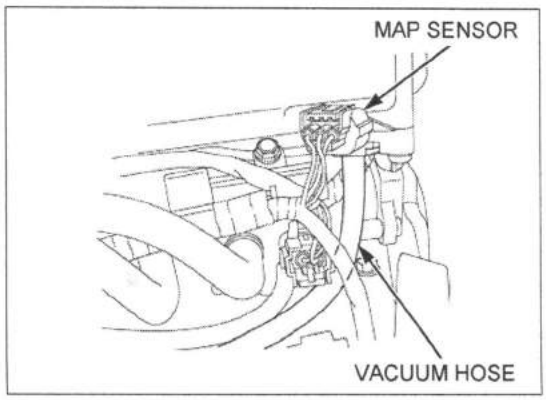
Turn the ignition switch OFF.

Check for connection and installation of the MAP sensor vacuum hose.

Is the MAP sensor vacuum hose connection correct?

YES – GO TO STEP 3.

NO – Correct the hose installation.



3. **MAP Sensor System Inspection**

Replace the MAP sensor with a known good one (page 6-79).
Turn the ignition switch ON and engine stop switch "⟳".

Start the engine and check the MAP sensor with the MCS at idle speed.

Has the reading changed?

YES – Faulty original MAP sensor

NO – Replace the ECM with a known good one and recheck.

DTC 7-1 (ECT SENSOR LOW VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the ECT sensor 3P (Gray) connector and ECM 33P connectors, then recheck the DTC.

1. **ECT Sensor System Inspection**

Turn the ignition switch ON and engine stop switch "⟳".

Check the ECT sensor with the MCS.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. **ECT Sensor Inspection**

Turn the ignition switch OFF.
Disconnect the ECT sensor 3P (Gray) connector.

Turn the ignition switch ON and engine stop switch "⟳".
Check the ECT sensor with the MCS.

Is about 0 V indicated?

YES – GO TO STEP 4.

NO – GO TO STEP 3.

3. **ECT Sensor Resistance Inspection**

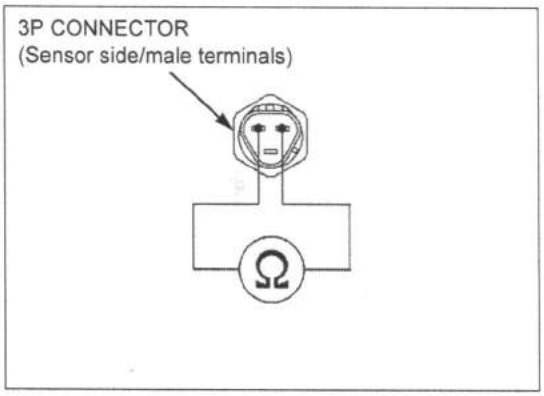
Measure the resistance at the ECT sensor terminals.

Connection: Blue/yellow – Gray/black
Standard: 2.3 – 2.6 k (20°C/68°F)
(Sensor side terminals)

Is the resistance within 2.3 – 2.6 k ?

YES – Replace the ECM with a known good one and recheck.

NO – Faulty ECT sensor



4. **ECT Sensor Output Line Short Circuit Inspection**

   Turn the ignition switch OFF.

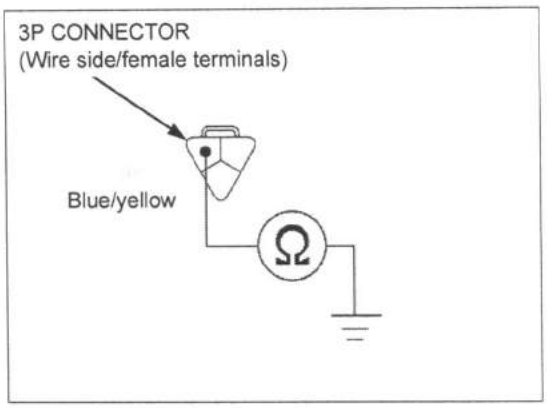
   Check for continuity between the ECT sensor 3P (Gray) connector at the wire side and ground.

   Connection: Blue/yellow – Ground

   Is there continuity?

   YES – Short circuit in Blue/yellow wire

   NO – Replace the ECM with a known good one and recheck.



DTC 7-2 (ECT SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the ECT sensor 3P (Gray) connector and ECM 33P connectors, then recheck the DTC.

1. **ECT Sensor System Inspection**

   Turn the ignition switch ON and engine stop switch "⟳".

   Check the ECT sensor with the MCS.

   Is about 5 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. **ECT Sensor Inspection**

   Turn the ignition switch OFF.

   Disconnect the ECT sensor 3P (Gray) connector. Connect the ECT sensor 3P (Gray) connector terminals with a jumper wire.

   - Always use an appropriate jumper wire to prevent damage to the connector terminals.

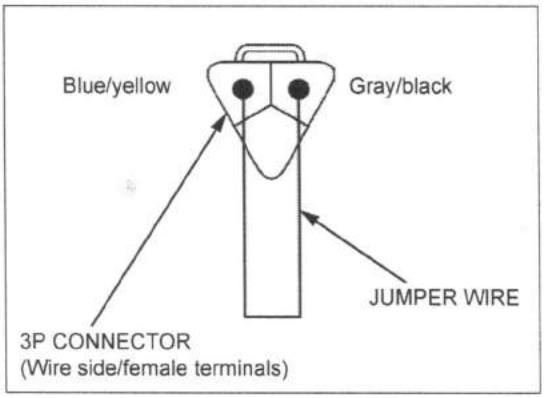
   Connection: Blue/yellow – Gray/black

   Turn the ignition switch ON and engine stop switch "⟳".
   Check the ECT sensor with the MCS.

   Is about 0 V indicated?

   YES – Replace the ECT sensor (page 6-79).

   NO – GO TO STEP 3.



3. **ECT Sensor Output Line Inspection**

Turn the ignition switch OFF.
Remove the jumper wire.

Disconnect the ECM 33P connectors.
Check for continuity at the Blue/yellow and Gray/black wires between the ECT sensor 3P (Gray) connector and ECM 33P connectors.

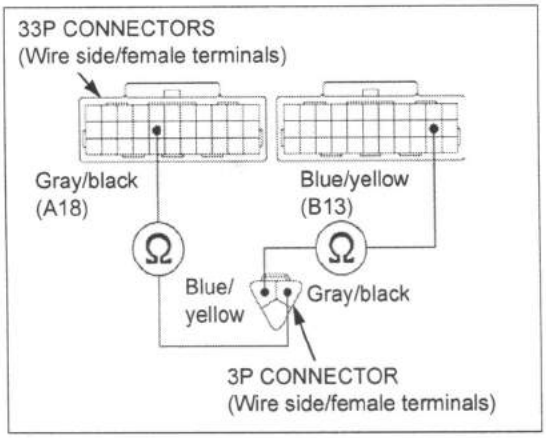
Connection: B13 – Blue/yellow
A18 – Gray/black

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – Replace the ECM with a known good one and recheck.

NO – • Open circuit in Blue/yellow wire
• Open circuit in Gray/black wire



DTC 8-1 (TP SENSOR LOW VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the TP sensor 3P (Blue) connector and ECM 33P connectors, then recheck the DTC.

1. **TP Sensor System Inspection**

Turn the ignition switch ON and engine stop switch "⟳".

Check the TP sensor with the MCS when the throttle is fully closed.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – GO TO STEP 2.

2. **TP Sensor Inspection**

Check that the TP sensor voltage increases continuously when moving the throttle from fully closed to fully opened using the data list menu of the MCS.

Does the voltage increase continuously?

YES – Intermittent failure

NO – Faulty TP sensor

3. **TP Sensor Input Voltage Inspection**

Turn the ignition switch OFF.
Disconnect the TP sensor 3P (Blue) connector.

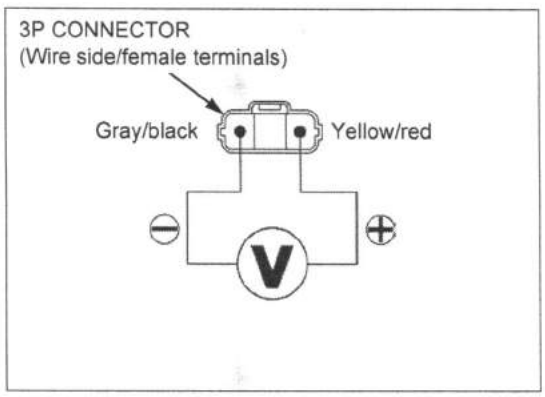
Turn the ignition switch ON and engine stop switch "⟳".
Measure the voltage at the wire side.

Connection: Yellow/red (+) – Gray/black (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 5.

NO – GO TO STEP 4.



4. TP Sensor Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector.
Check for continuity at the Yellow/red wire between the TP sensor 3P (Blue) connector and ECM 33P (Black) connector.

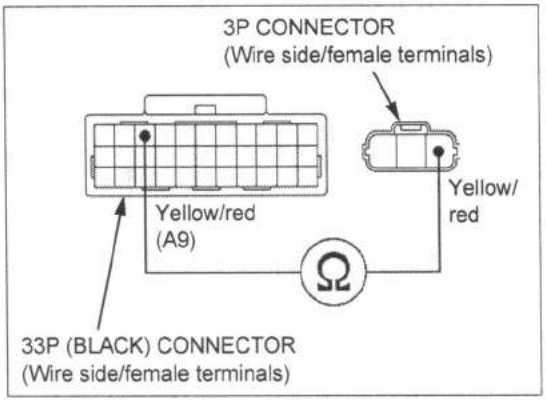
Connection: A9 – Yellow/red

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – Replace the ECM with a known good one and recheck.

NO – Open circuit in Yellow/red wire



5. TP Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector.
Check for continuity at the Blue/yellow wire between the TP sensor 3P (Blue) connector and ECM 33P (Gray) connector.

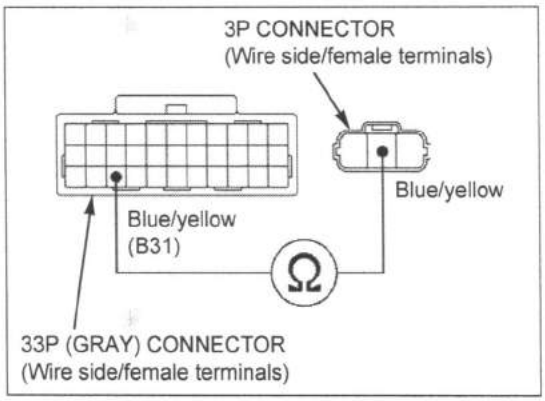
Connection: B31 – Blue/yellow

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – GO TO STEP 6.

NO – Open circuit in Blue/yellow wire



6. TP Sensor Output Line Short Circuit Inspection

Disconnect the TP sensor 3P (Blue) connector.

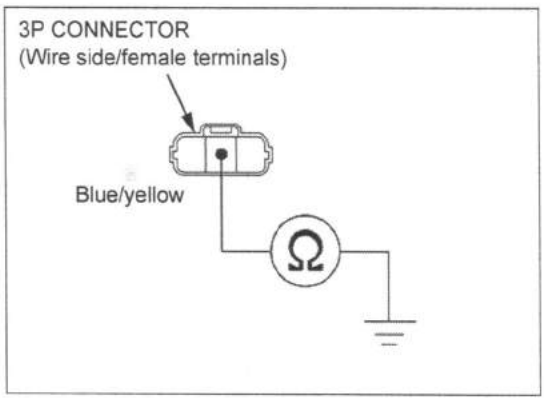
Check for continuity between the TP sensor 3P (Blue) connector of the wire side and ground.

Connection: Blue/yellow – Ground

Is there continuity?

YES – Short circuit in Blue/yellow wire

NO – GO TO STEP 7.



7. TP Sensor Inspection

Replace the throttle body (page 6-67).
Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Turn the ignition switch ON and engine stop switch "⟳".

Check the TP sensor with the MCS.

Is DTC 8-1 indicated?

YES – Replace the ECM with a known good one and recheck.

NO – Faulty original TP sensor

DTC 8-2 (TP SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the TP sensor 3P (Blue) connector and ECM 33P connectors, then recheck the DTC.

1. TP Sensor System Inspection

Turn the ignition switch ON and engine stop switch "".

Check the TP sensor with the MCS.

Is about 5 V indicated?

YES – GO TO STEP 3.

NO – GO TO STEP 2.

2. TP Sensor Inspection

Check that the TP sensor voltage increases continuously when moving the throttle from fully closed to fully opened using the data list menu of the MCS.

Does the voltage increase continuously?

YES – Intermittent failure

NO – Faulty TP sensor

3. TP Sensor Resistance Inspection

Turn the ignition switch OFF.

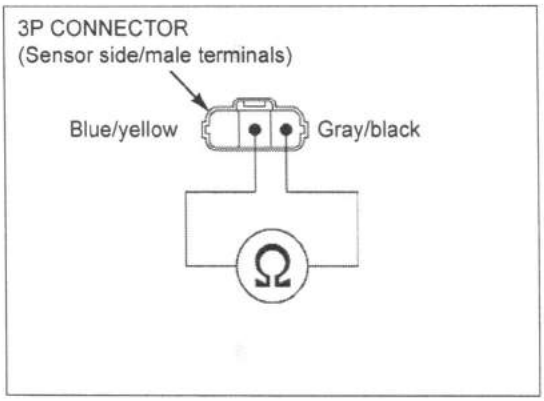
Disconnect the TP sensor 3P (Blue) connector. Measure the resistance at the TP sensor side.

Connection: Blue/yellow – Gray/black (Sensor side terminals)

Is the resistance within 0.5 – 1.5 k ?

YES – GO TO STEP 4.

NO – Faulty TP sensor



4. TP Sensor Input Voltage Inspection

Turn the ignition switch ON and engine stop switch "".

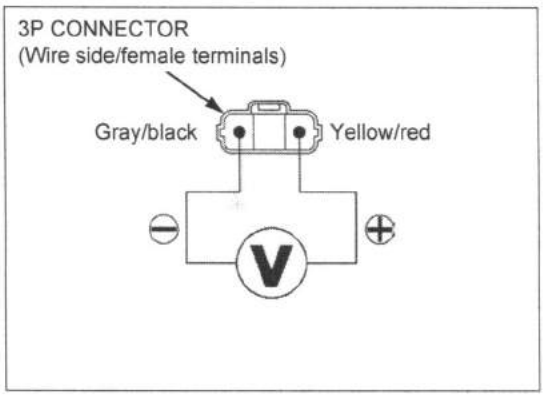
Measure the voltage at the wire side.

Connection: Yellow/red (+) – Gray/black (–)

Is the voltage within 4.75 – 5.25 V?

YES – Replace the ECM with a known good one and recheck.

NO – Open circuit in Gray/black wire



DTC 9-1 (IAT SENSOR LOW VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the IAT sensor 2P connector and ECM 33P connectors, then recheck the DTC.
- IAT sensor connector:
  – '08 – '13 model; 2P (Gray)
  – After '13 model; 2P (Black)

1. IAT Sensor System Inspection

Turn the ignition switch ON and engine stop switch "".

Check the IAT sensor with the MCS.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. IAT Sensor Inspection

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P connector.

Turn the ignition switch ON and engine stop switch "".
Check the IAT sensor with the MCS.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – Faulty IAT sensor

3. IAT Sensor Output Line Short Circuit Inspection

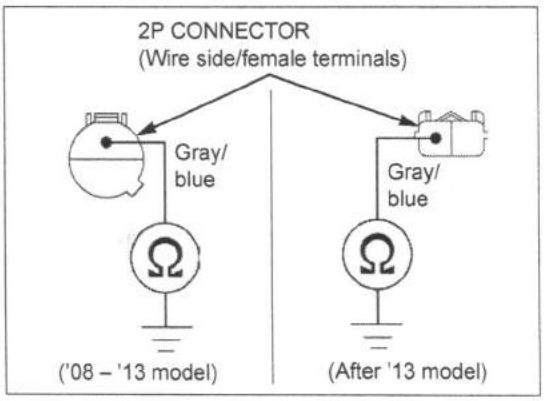
Turn the ignition switch OFF.
Check for continuity between the IAT sensor 2P connector at the wire side and ground.

Connection: Gray/blue – Ground

Is there continuity?

YES – Short circuit in Gray/blue wire

NO – Replace the ECM with a known good one and recheck.



DTC 9-2 (IAT SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the IAT sensor 2P connector and ECM 33P connectors, then recheck the DTC.
- IAT sensor connector:
  – '08 – '13 model; 2P (Gray)
  – After '13 model; 2P (Black)

1. IAT Sensor System Inspection

Turn the ignition switch ON and engine stop switch "".

Check the IAT sensor with the MCS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. IAT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.
Connect the IAT sensor 2P connector terminals with a jumper wire.

- Always use an appropriate jumper wire to prevent damage to the connector terminals.

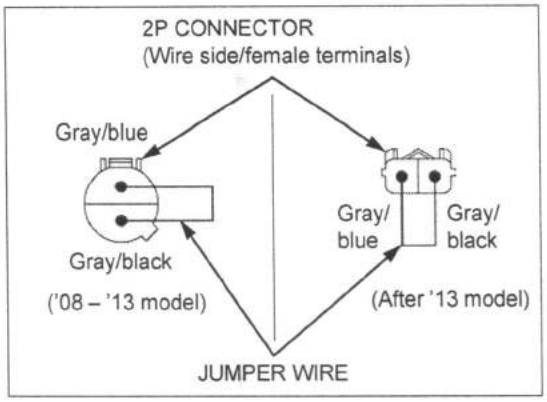
Connection: Gray/blue – Gray/black

Turn the ignition switch ON and engine stop switch "".
Check the IAT sensor with the MCS.

Is about 0 V indicated?

YES – Faulty IAT sensor

NO – GO TO STEP 3.



3. IAT Sensor Line Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P connectors.
Check for continuity at the Gray/blue and Gray/black wire between the IAT sensor 2P connector and ECM 33P connectors.

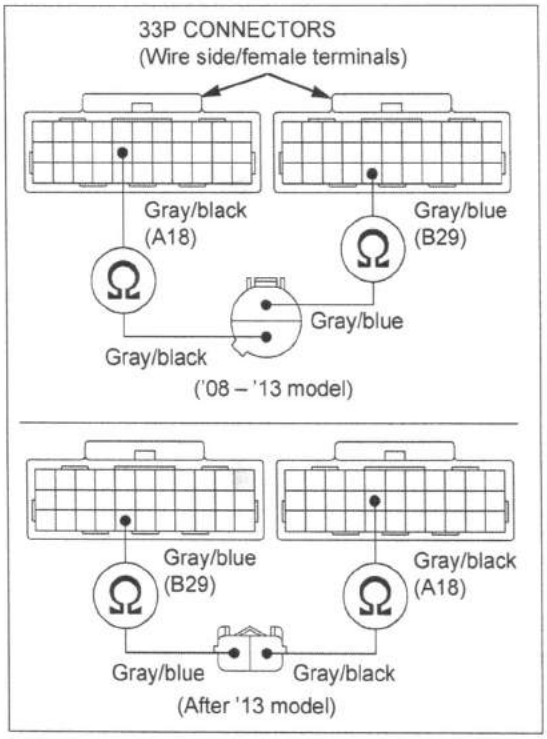
Connection: B29 – Gray/blue
A18 – Gray/black

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – Replace the ECM with a known good one and recheck.

NO – • Open circuit in Gray/blue wire
• Open circuit in Gray/black wire



DTC 11-1 (VS SENSOR)

- Before starting the inspection, check for loose or poor contact on the VS sensor 3P connector and ECM 33P connectors, then recheck the DTC.

1. VS Sensor System Inspection

Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Test ride the motorcycle.
Stop the engine.

Turn the ignition switch ON and engine stop switch "".
Check the VS sensor with the MCS.

Is DTC 11-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. Combination Meter Inspection

Check for operation of speedometer.

Does the speedometer operate normally?

YES – Open or short circuit in Pink/green wire

NO – GO TO STEP 3.

3. VS Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the VS sensor 3P connector.

Turn the ignition switch ON and engine stop switch "○".

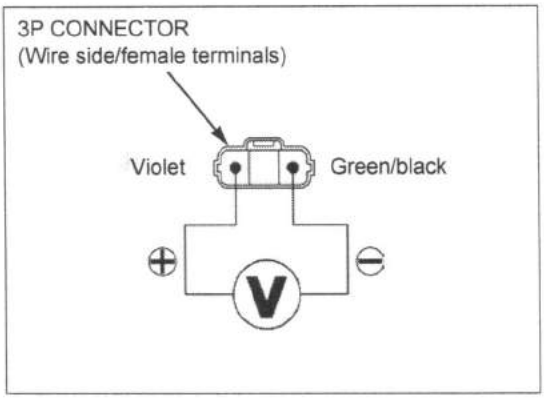
Measure the voltage at the wire harness side.

Connection: Violet (+) – Green/black (–)

Is the voltage within 9.5 – 10.5 V?

YES – GO TO STEP 4.

NO – • Open circuit in Violet wire
• Open circuit in Green/black wire



4. VS Sensor Signal Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector.

Check for continuity between the ECM 33P (Gray) connector and VS sensor 3P connector.

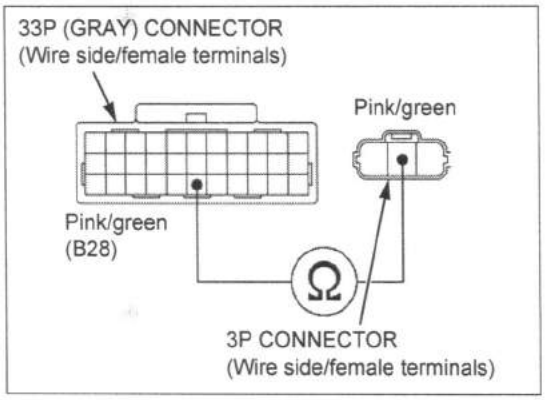
Connection: B28 – Pink/green

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – Open circuit in Pink/green wire

NO – GO TO STEP 5.



5. VS Sensor Signal Line Short Circuit Inspection

Turn the ignition switch OFF.
Connect the ECM 33P (Gray) connector.

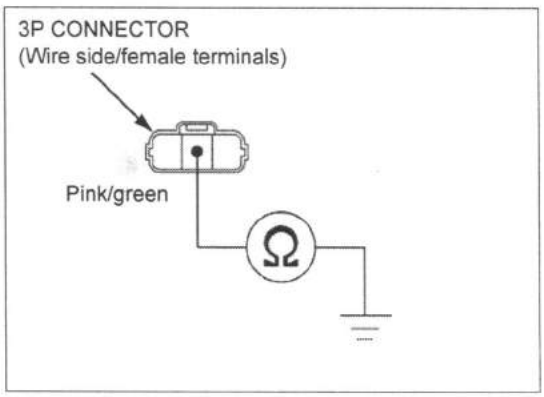
Check for continuity between the VS sensor 3P connector at the wire side and ground.

Connection: Pink/green – Ground

Is there continuity?

YES – Short circuit in Pink/green wire

NO – Inspect VS sensor (page 21-15).



DTC 12-1 (No. 1 PRIMARY FUEL INJECTOR)

- Before starting the inspection, check for loose or poor contact on the fuel injector 2P (Gray) connectors and ECM 33P connectors, then recheck the DTC.

DTC	FUEL INJECTOR	POWER INPUT LINE	SIGNAL LINE	SIGNAL AT ECM
12-1	No. 1 Primary	Black/white	Pink/yellow	A17
13-1	No. 2 Primary	Black/white	Pink/blue	A6
14-1	No. 3 Primary	Black/white	Pink/green	A8
15-1	No. 4 Primary	Black/white	Pink/black	A7
16-1	No. 1 Secondary	Black/white	Yellow	A13
17-1	No. 2 Secondary	Black/white	Yellow/blue	A15
48-1	No. 3 Secondary	Black/white	Yellow/green	A26
49-1	No. 4 Secondary	Black/white	Yellow/black	A14

1. Fuel injector System Inspection

Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Start the engine and check the fuel injector with the MCS.

Is DTC 12-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. Fuel injector Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the fuel injector 2P (Gray) connector. Turn the ignition switch ON and engine stop switch "⟳".

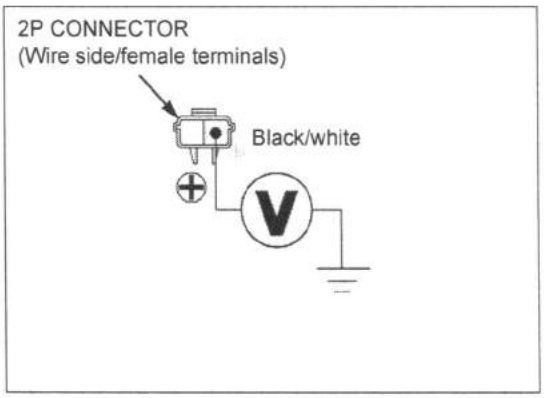
Measure the voltage between the fuel injector 2P (Gray) connector of the wire side and ground.

Connection: Black/white (+) – Ground (–)

Is there battery voltage?

YES – GO TO STEP 3.

NO – Open circuit in Black/white wire



3. Fuel injector Resistance Inspection

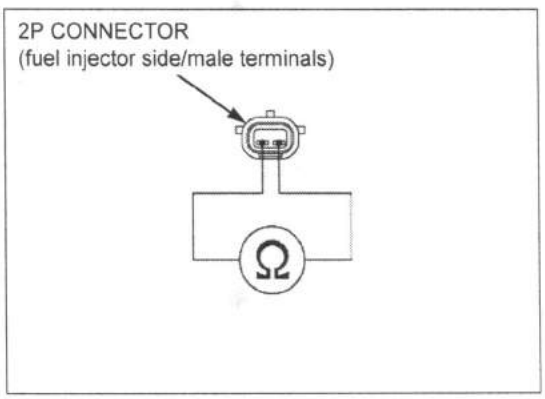
Turn the ignition switch OFF.

Measure the resistance of the fuel injector 2P connector terminals.

Is the resistance within 11 – 13 (20°C/68°F)?

YES – GO TO STEP 4.

NO – Faulty fuel injector



4. Fuel injector Signal Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector.
Check for continuity between the ECM 33P (Black) connector and fuel injector 2P (Gray) connector.

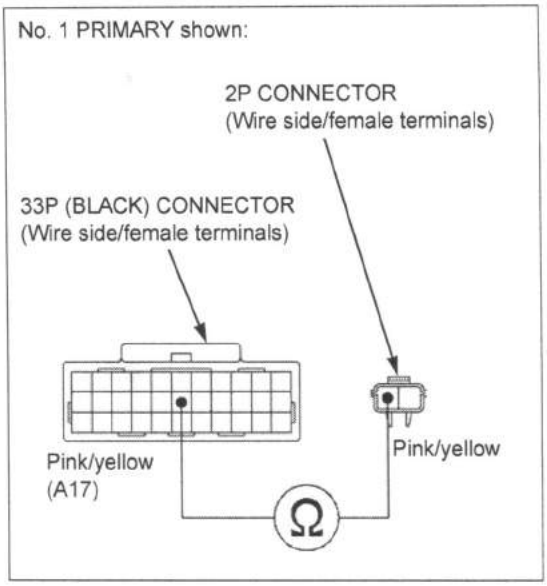
Connection: SIGNAL LINE – SIGNAL AT ECM

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in SIGNAL LINE wire



5. Fuel injector Signal Line Short Circuit Inspection

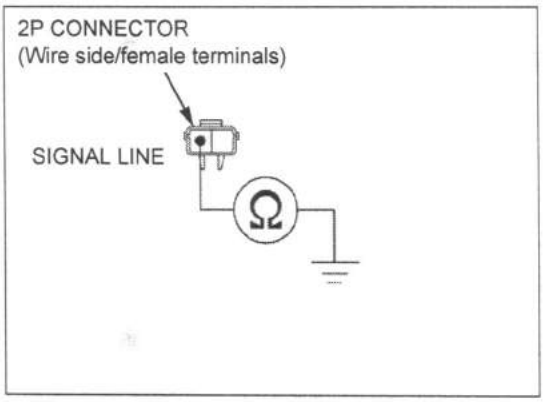
Connect the ECM 33P (Black) connector.
Check for continuity between the fuel injector 2P (Gray) connector at the wire side and ground.

Connection: SIGNAL LINE – Ground

Is there continuity?

YES – • Short circuit in SIGNAL LINE wire
• Faulty fuel injector

NO – Replace the ECM with a known good one and recheck.



DTC 13-1 (No. 2 PRIMARY FUEL INJECTOR)

See page 6-34

DTC 14-1 (No. 3 PRIMARY FUEL INJECTOR)

See page 6-34

DTC 15-1 (No. 4 PRIMARY FUEL INJECTOR)

See page 6-34

DTC 16-1 (No. 1 SECONDARY FUEL INJECTOR)

See page 6-34

DTC 17-1 (No. 2 SECONDARY FUEL INJECTOR)

See page 6-34

DTC 48-1 (No. 3 SECONDARY FUEL INJECTOR)

See page 6-34

DTC 49-1 (No. 4 SECONDARY FUEL INJECTOR)

See page 6-34

DTC 18-1 (CMP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CMP sensor 3P (Blue) connector and ECM 33P connectors, then recheck the DTC.

1. **CMP Sensor System Inspection 1**

   Clear the DTCs.

   - STANDARD/SP type (page 6-17)
   - ABS type (page 6-18)

   Crank the engine for ten seconds or more.

   Is DTC 18-1 indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. **CMP Sensor System Inspection 2**

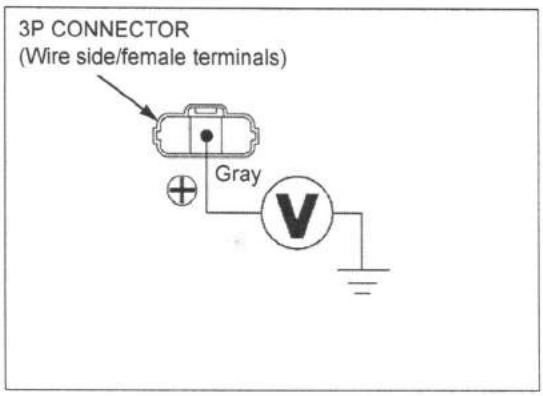
   Turn the ignition switch OFF.
   Disconnect the CMP sensor 3P (Blue) connector.

   Turn the ignition switch ON and engine stop switch "⟳".
   Measure the voltage at the wire side.
   Connection: Gray (+) – Ground (–)

   Is the voltage within 4.75 – 5.25 V?

   YES – GO TO STEP 3.

   NO – GO TO STEP 4.



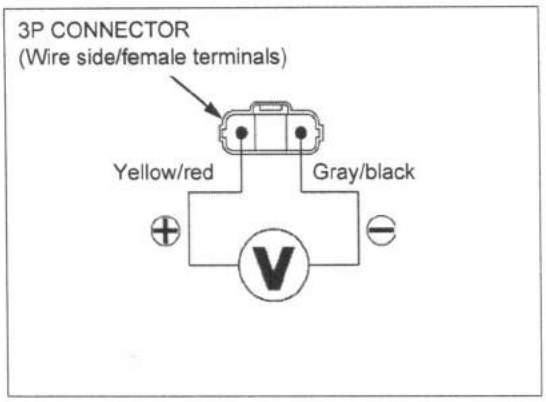
3. **CMP Sensor Input Voltage Inspection**

Measure the voltage at the wire side.
Connection: Yellow/red (+) – Gray/black (–)

Is the voltage within 4.75 – 5.25 V?

YES – Faulty CMP sensor

NO – • Open circuit in Yellow/red wire
• Open circuit in Gray/black wire



4. **CMP Sensor signal line open Circuit Inspection**

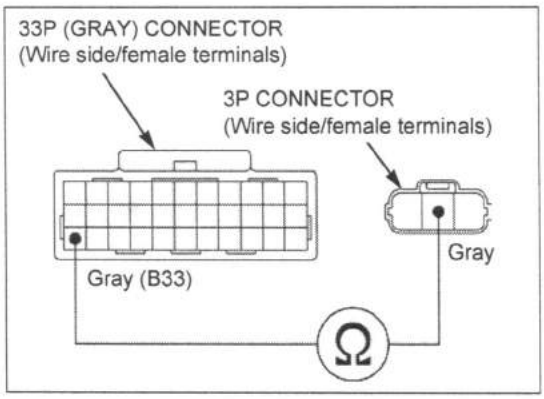
Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector.

Check for continuity at the Gray wire between the CMP sensor 3P (Blue) connector and ECM 33P (Gray) connector.
Connection: B33 – Gray

Is there continuity?

YES – Replace the ECM with a known good one and recheck.

NO – Open circuit in Gray wire



DTC 19-1 (CKP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CKP sensor 2P (Red) connector and ECM 33P connectors, then recheck the DTC.

1. **CKP Sensor Peak Voltage Inspection**

Turn the ignition switch OFF.
Disconnect the CKP sensor 2P (Red) connector.

Turn the ignition switch ON.
Crank the engine and measure the CKP sensor peak voltage at the CKP sensor 2P (Red) connector.

Connection: Yellow (+) – White/yellow (–)
(Sensor side terminals)

TOOL:

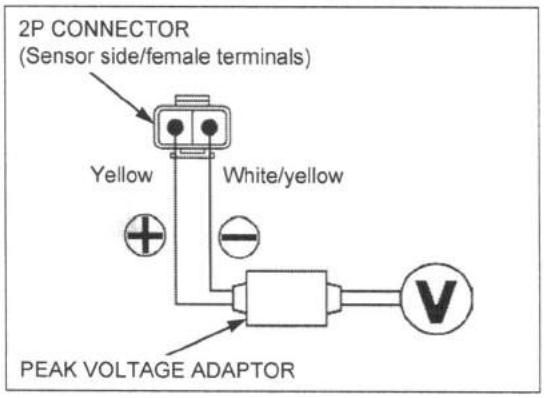
IgnitionMate peak voltage tester	**MTP07-0286 (U.S.A. only) or**
Peak voltage adaptor	**07HGJ-0020100 (Not available in U.S.A.)**

with commercially available digital multimeter (impedance 10 M /DCV minimum)

Is the voltage more than 0.7 V (20°C/68°F)?

YES – GO TO STEP 2.

NO – Faulty CKP sensor



2. CKP sensor Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P connectors.

Check for continuity at the Yellow and White/yellow wire between the CKP sensor 2P (Red) connector and ECM 33P connectors.

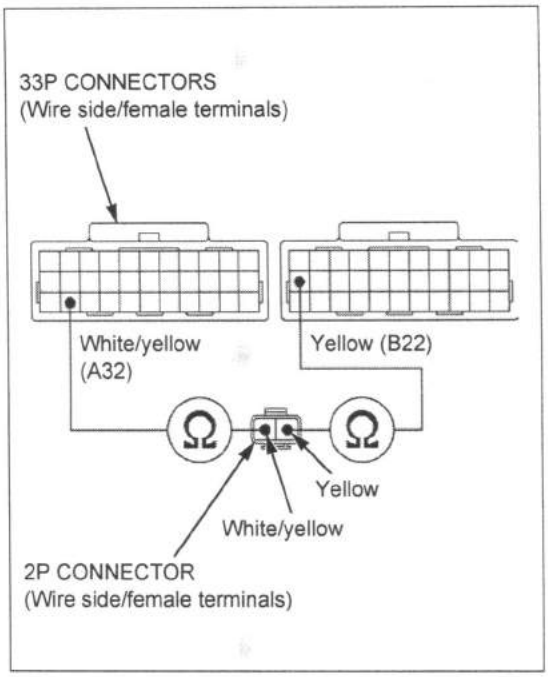
Connection: B22 – Yellow
A32 – White/yellow

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – Short circuit in Yellow wire

NO – • Open circuit in Yellow wire
• Open circuit in White/yellow wire



DTC 21-1 (O_2 SENSOR)

- Before starting the inspection, check for loose or poor contact on the O_2 sensor 4P (Black) connector and ECM 33P connectors, then recheck the DTC.

1. O_2 Sensor System Inspection

Warm the engine until the coolant temperature is 80°C (176°F).

Check the O_2 sensor with the MCS.

Standard: 0.1 V – 0.3 V

Is the voltage as specified?

YES – Check the fuel pressure (page 6-53). If the system is correct, GO TO STEP 4.

NO – GO TO STEP 2.

2. O_2 Sensor Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the O_2 sensor 4P (Black) connector and ECM 33P connectors.

Check the continuities between the ECM 33P connectors and O_2 sensor 4P (Black) connector.

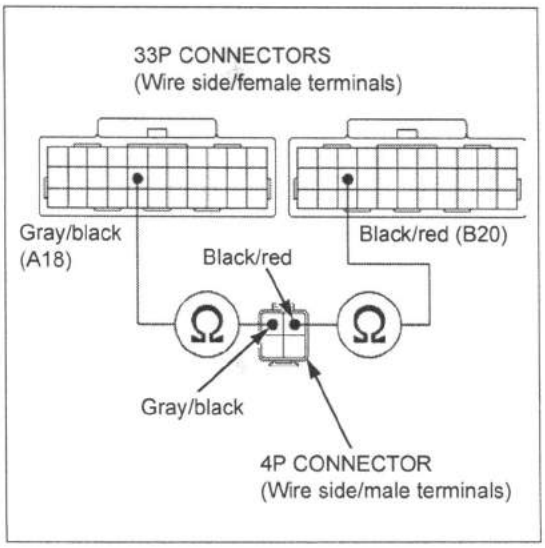
Connection: B20 – Black/red
A18 – Gray/black

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – GO TO STEP 3.

NO – • Open circuit in Black/red wire
• Open circuit in Gray/black wire



3. **O_2 Sensor System Short Circuit Inspection**

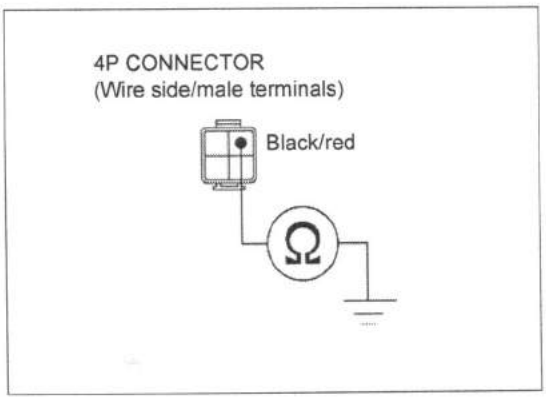
Check for continuity between the O_2 sensor 4P (Black) connector and ground.

Connection: Black/red – Ground

Is there continuity?

YES – Short circuit in Black/red wire

NO – GO TO STEP 4.



4. **O_2 Sensor Inspection**

Connect the ECM 33P connectors.
Replace the O_2 sensor with a known good one (page 6-99).

Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Turn the ignition switch ON and engine stop switch "○".
Warm the engine until the coolant temperature is 80°C (176°F).

Check the O_2 sensor with the MCS.

Is DTC 21-1 indicated?

YES – Replace the ECM with a known good one and recheck.

NO – Faulty original O_2 sensor

DTC 23-1 (O_2 SENSOR HEATER)

- Before starting the inspection, check for loose or poor contact on the O_2 sensor 4P (Black) connector and ECM 33P connectors, then recheck the DTC.

1. **O_2 Sensor System Inspection**

Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Start the engine and check the O_2 sensor heater with the MCS.

Is DTC 23-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. O_2 Sensor Heater Resistance Inspection

Turn the ignition switch OFF.

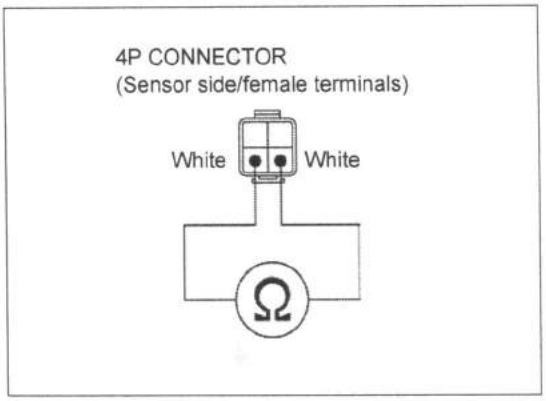
Disconnect the O_2 sensor 4P (Black) connector and measure the resistance at the sensor side connector.

Connection: White – White (Sensor side terminals)

Is the resistance within 5 – 20 (20°C/68°F)?

YES – GO TO STEP 3.

NO – Faulty O_2 sensor



3. O_2 Sensor Heater Input Voltage Inspection

Turn the ignition switch ON and engine stop switch "○".

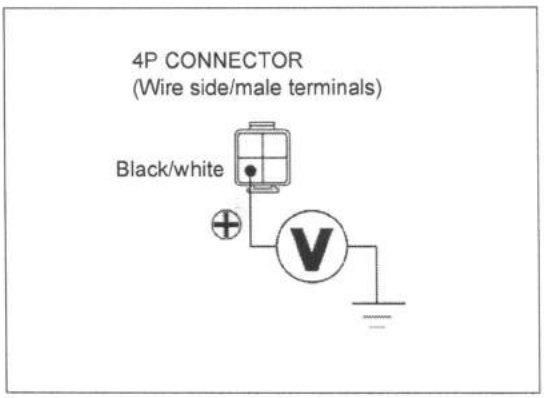
Measure the voltage between the O_2 sensor 4P (Black) connector of the wire side and ground.

Connection: Black/ white (+) – Ground (–)

Is there battery voltage?

YES – GO TO STEP 4.

NO – Open circuit in Black/White wire



4. O_2 Sensor Heater Open Circuit Inspection

Disconnect the ECM 33P (Gray) connector.
Check for continuity between the ECM 33P (Gray) connector and O_2 sensor 4P (Black) connector.

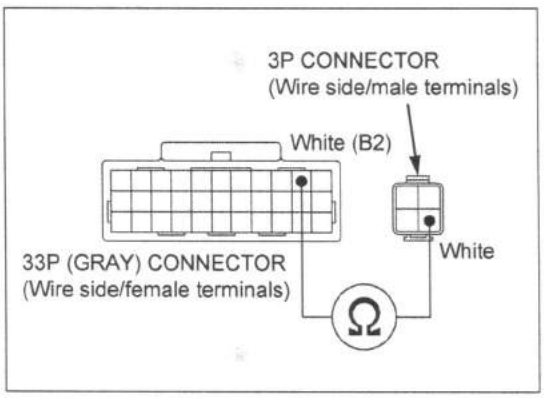
Connection: B2 – White

TOOL:
Test probe (2 required) 07ZAJ-RDJA110

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in White wire



5. O_2 Sensor Heater Short Circuit Inspection

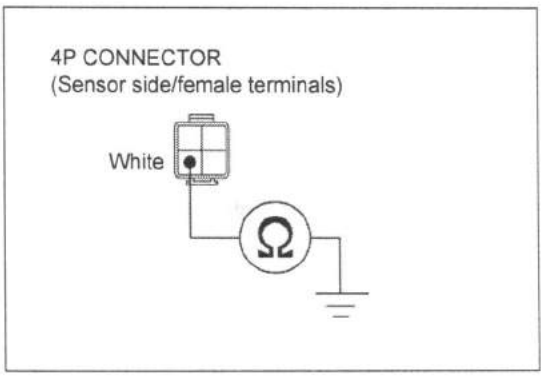
Check for continuity between the O_2 sensor 4P (Black) connector and ground.

Connection: White – Ground

Is there continuity?

YES – Faulty O_2 sensor

NO – Replace the ECM with a known good one and recheck.



DTC 25-2 (KNOCK SENSOR NO INPUT VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the Knock sensor 3P (Blue) connector and ECM 33P connectors, then recheck the DTC.

1. **Knock Sensor System Inspection**

   Clear the DTCs.

   – STANDARD/SP type (page 6-17)
   – ABS type (page 6-18)

   Place the motorcycle on its sidestand.
   Start the engine and recheck the Knock sensor with the MCS.

   Is DTC 25-2 indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. **Knock Sensor Input Voltage Inspection**

   Turn the ignition switch OFF.
   Disconnect the Knock sensor 3P (Blue) connector.

   Turn the ignition switch ON and engine stop switch "○".

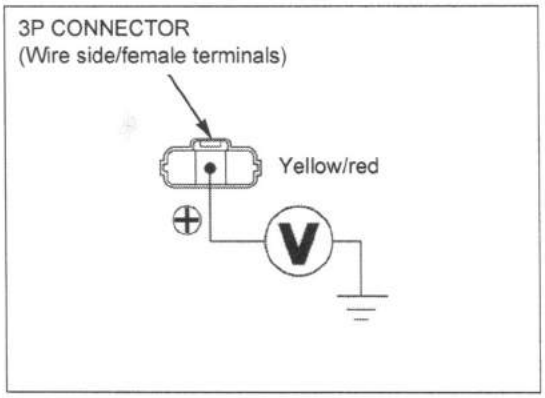
   Measure the voltage at the wire side.

   Connection: Yellow/red (+) – Ground (–)

   Is the voltage within 4.75 – 5.25 V?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.



3. **Knock Sensor Input Line Inspection**

   Turn the ignition switch OFF.
   Disconnect the ECM 33P (Black) connector.

   Check for continuity at the Yellow/red wire between the Knock sensor 3P (Blue) connector and ECM 33P (Black) connector.

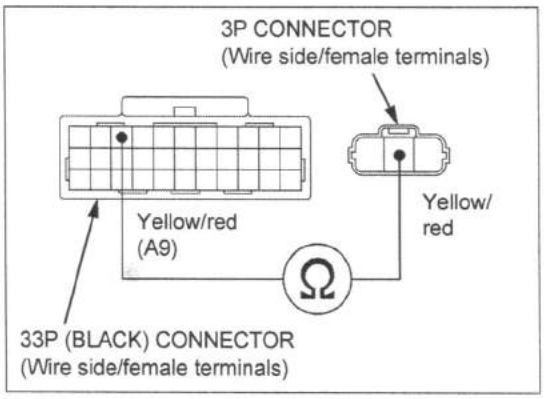
   Connection: A9 – Yellow/red

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – Replace the ECM with a known good one and recheck.

   NO – Open circuit in Yellow/red wire



4. Open Circuit Detection Line Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector.

Check for continuity between the Knock sensor 3P (Blue) connector and ECM 33P (Gray) connector.

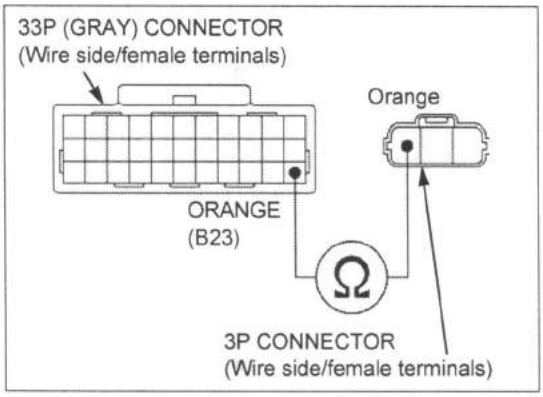
Connection: B23 – Orange

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Orange wire



5. Knock Sensor Inspection

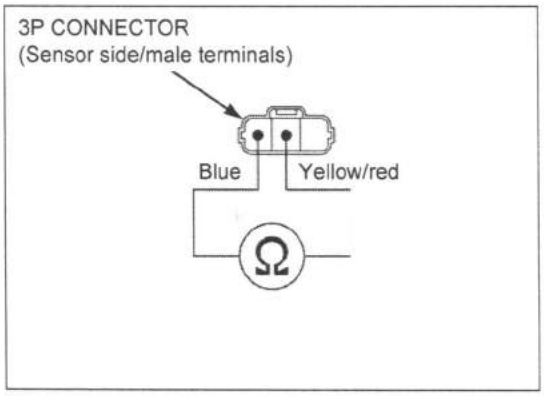
Check for continuity at the Knock sensor 3P (Blue) connector terminals.

Connection: Yellow/red – Blue
(Sensor side terminals)

Is there continuity?

YES – Replace the ECM with a known good one and recheck.

NO – Faulty Knock sensor



DTC 25-3 (KNOCK SENSOR LOW VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the Knock sensor 3P (Blue) connector and ECM 33P connectors, then recheck the DTC.

1. Knock Sensor System Inspection

Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Place the motorcycle on its sidestand.
Start the engine and recheck the Knock sensor with the MCS.

Is DTC 25-3 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. **Knock Sensor Output Line Short Circuit Inspection 1**

Turn the ignition switch OFF.

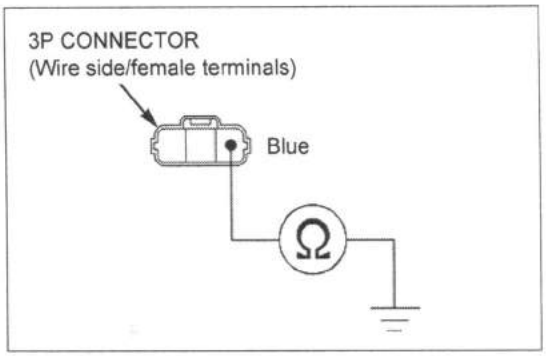
Disconnect the Knock sensor 3P (Blue) connector. Check for continuity at the Blue wire between the Knock sensor 3P (Blue) connector of the wire side and ground.

Connection: Blue – Ground

Is there continuity?

YES – Short circuit in blue wire

NO – GO TO STEP 3.



3. **Knock Sensor Output Line Short Circuit Inspection 2**

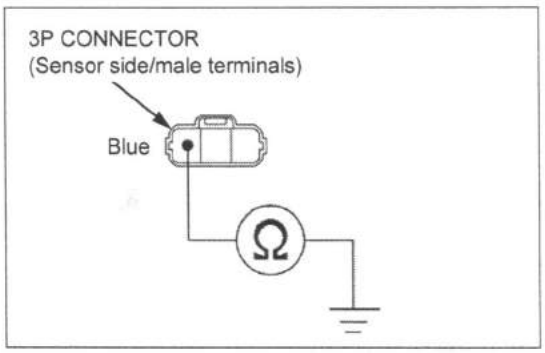
Check for continuity between the Knock sensor 3P (Blue) connector of the sensor side and ground.

Connection: Blue – Ground

Is there continuity?

YES – Faulty Knock sensor

NO – Replace the ECM with a known good one and recheck.



DTC 29-1 (IACV)

- Before starting the inspection, check for loose or poor contact on the IACV 4P (Black) connector and ECM 33P connectors, then recheck the DTC.

1. **Recheck DTC**

Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Start the engine and check the IACV with the MCS.

Is DTC 29-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. IACV Short Circuit Inspection

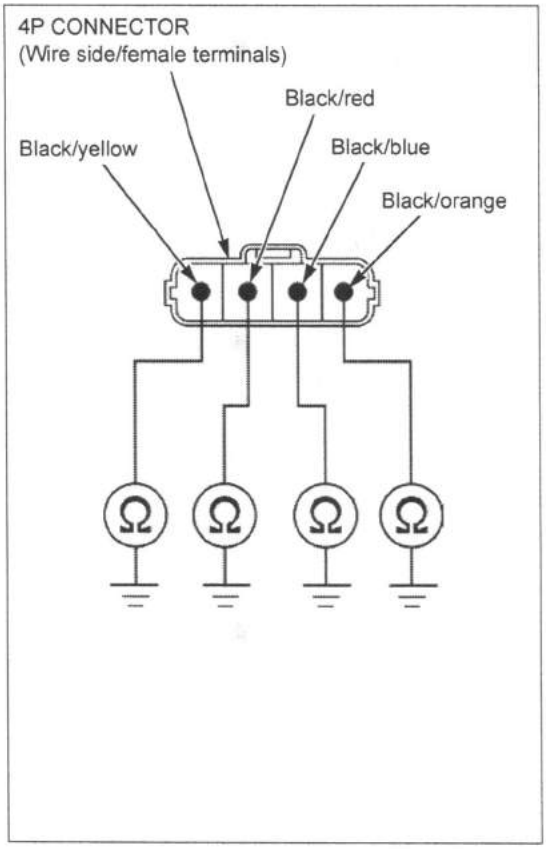
Turn the ignition switch OFF.
Disconnect the IACV 4P (Black) connector.
Check for continuity between the IACV 4P (Black) connector at the wire side and ground.

Connection: Black/blue – Ground
Black/orange – Ground
Black/yellow – Ground
Black/red – Ground

Is there continuity?

YES – • Short circuit in Black/blue or Black/orange wire
• Short circuit in Black/yellow or Black/red wire

NO – GO TO STEP 3.



3. IACV Circuit Continuity Inspection

Disconnect the IACV 4P (Black) connector.
Check for continuity between the ECM 33P (Black) connector and IACV 4P (Black) connector.

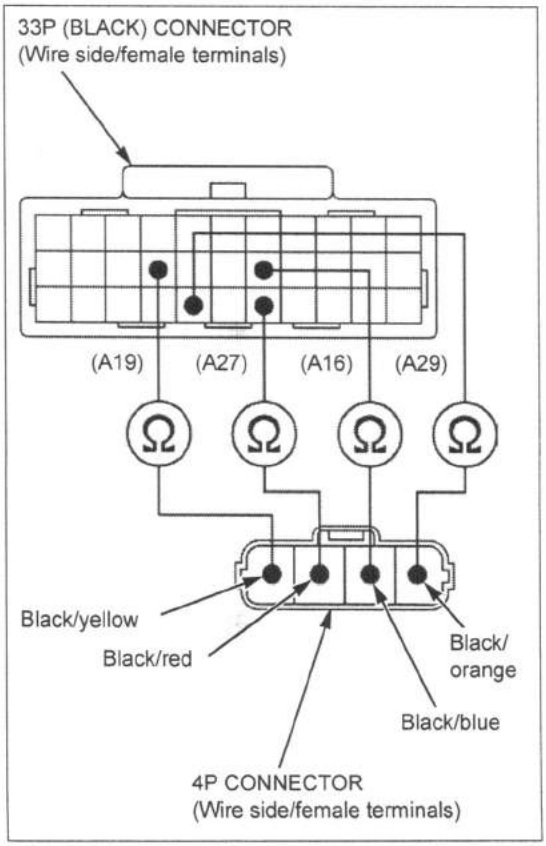
Connection: A16 – Black/blue
A29 – Black/orange
A19 – Black/yellow
A27 – Black/red

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – GO TO STEP 4.

NO – • Open circuit in Black/blue or Black/orange wire
• Open circuit in Black/yellow or Black/red wire



4. **IACV Resistance Inspection**

Measure the resistance at the IACV motor side.

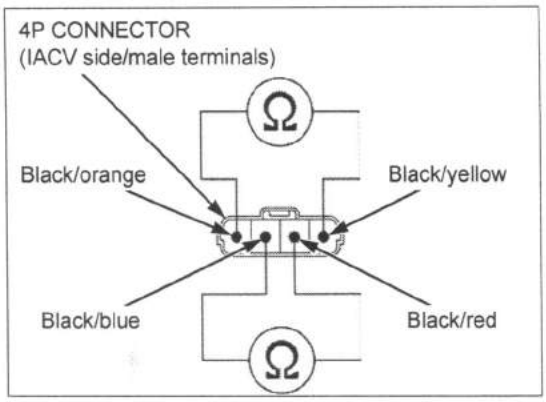
Connection: Black/yellow – Black/orange
Black/red – Black/blue
(IACV side terminals)

Standard: 99 – 121 (20°C/68°F)

Is the resistance within 99 – 121 (20°C/68°F)?

YES – Replace the ECM with a known good one and recheck.

NO – Faulty IACV



DTC 33-2 (EEPROM)

1. **Recheck DTC**

Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Turn the ignition switch ON and engine stop switch "⟳".

Recheck the ECM EEPROM.

Is DTC 33-2 indicated?

YES – Replace the ECM with a known good one and recheck.

NO – Intermittent failure

DTC 34-1 (ECV POT LOW VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the EGCA 6P (Black) connector and ECM 33P connectors, then recheck the DTC.

1. **ECV POT System Inspection**

Turn the ignition switch ON and engine stop switch "⟳".

Check the ECV POT with the MCS.

Is the indicated voltage within 0.6 – 2.2 V?

YES – Intermittent failure

NO – GO TO STEP 2.

2. **ECV POT Input Voltage Inspection**

Turn the ignition switch OFF.
Disconnect the EGCA 6P (Black) connector.

Turn the ignition switch ON and engine stop switch "⟳".

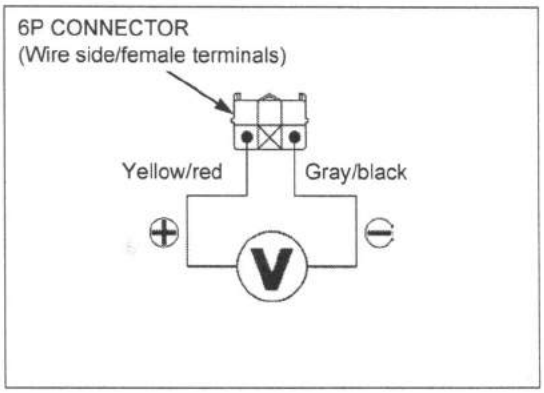
Measure the voltage at the wire side.

Connection: Yellow/red (+) – Gray/black (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



3. **ECV POT Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector.
Check for continuity between the EGCA 6P (Black) connector and ECM 33P (Black) connector.

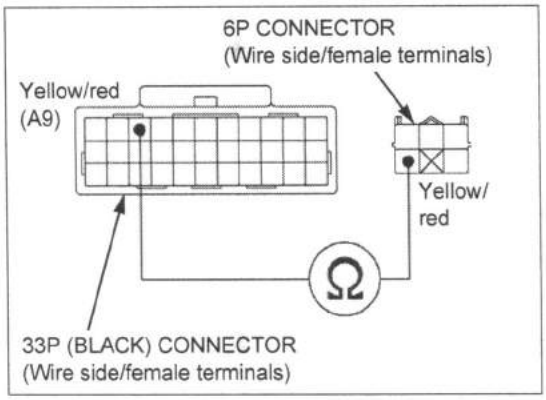
Connection: A9 – Yellow/red

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – Replace the ECM with a known good one and recheck.

NO – Open circuit in Yellow/red wire



4. **ECV POT Output Line Open Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the ECM 33P (Gray) connector.
Check for continuity at the Light green/black wire between the EGCA 6P (Black) connector and ECM 33P (Gray) connector.

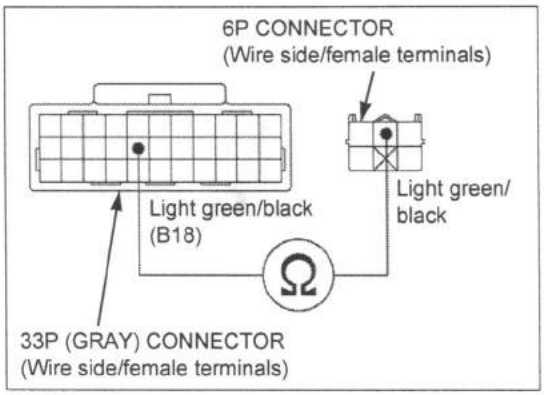
Connection: B18 – Light green/black

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Light green/black wire



5. **ECV POT Output Line Short Circuit Inspection**

Connect the ECM 33P connectors.

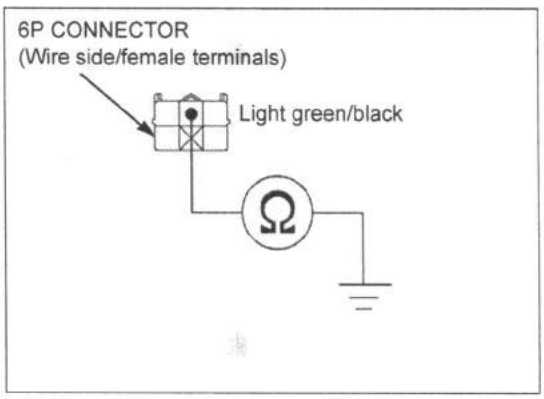
Check for continuity between the EGCA 6P (Black) connector at the wire side and ground.

Connection: Light green/black – Ground

Is there continuity?

YES – Short circuit in Light green/black wire

NO – GO TO STEP 6.



6. **ECV POT Inspection**

Replace the EGCA with a known good one.
Clear the DTCs.

- STANDARD/SP type (page 6-17)
- ABS type (page 6-18)

Turn the ignition switch ON and engine stop switch "⟳".

Check the ECV POT with the MCS.

Is DTC 34-1 indicated?

YES – Replace the ECM with a known good one and recheck.

NO – Faulty original EGCA

DTC 34-2 (ECV POT HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the EGCA 6P (Black) connector and ECM 33P connectors, then recheck the DTC.

1. ECV POT System Inspection

Turn the ignition switch ON and engine stop switch "⟳".

Check the ECV POT with the MCS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure
• Loose or poor contact on the EGCA 6P (Natural) connector

2. ECV POT Resistance Inspection

Turn the ignition switch OFF.

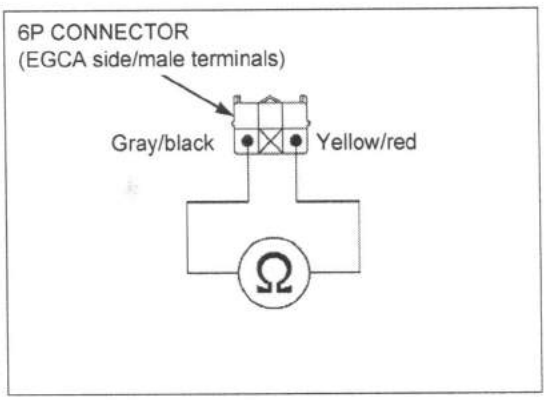
Disconnect the EGCA 6P (Black) connector.
Measure the resistance at the ECV POT side.

Connection: Yellow/red – Gray/black (EGCA side terminals)

Is the resistance within 3.5 – 6.5 k (20°C/68°F)?

YES – GO TO STEP 3.

NO – Faulty EGCA



3. ECV POT Input Voltage Inspection

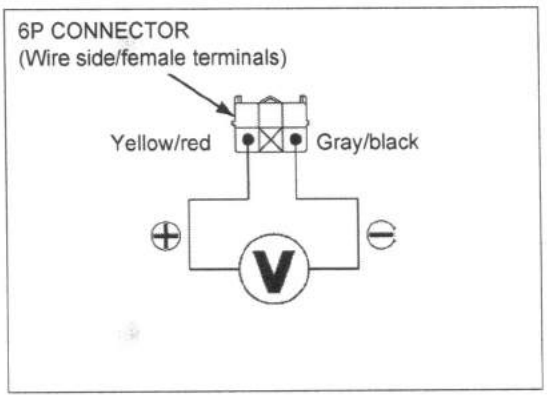
Turn the ignition switch ON and engine stop switch "⟳".
Measure the voltage at the wire side.

Connection: Yellow/red (+) – Gray/black (–)

Is the voltage within 4.75 – 4.25 V?

YES – Replace the ECM with a known good one and recheck.

NO – Open circuit in Gray/black wire



DTC 35-1 (EGCA LOCK)

- Before starting the inspection, check for loose or poor contact on the EGCA 6P (Black) connector and ECM 33P connectors, then recheck the MIL blinking.

1. EGCA Operating Inspection

Disconnect the EGCA cable from the EGCA pulley (page 6-89).
Turn the ignition switch ON.
Check the EGCA pulley rotation when shorting the DLC with the SCS service connector (page 4-26).

Does the EGCA pulley operate correctly?

YES – • Check the EGCA cable binding, sticking or lock.
• Check the ECV at muffler side.

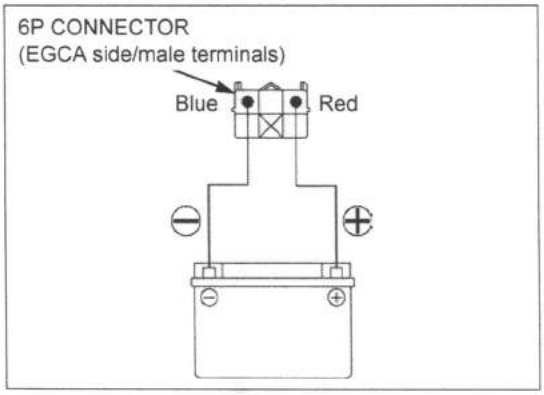
NO – GO TO STEP 2.

2. EGCA Inspection

Turn the ignition switch OFF.
Remove the EGCA (page 6-89).

Connect a 12 V battery to the EGCA 6P (Black) connector terminals and check the EGCA function.

Connection: Red (+) – Blue (–)
(EGCA side terminals)



Does the EGCA operate normally?

YES – GO TO STEP 3.

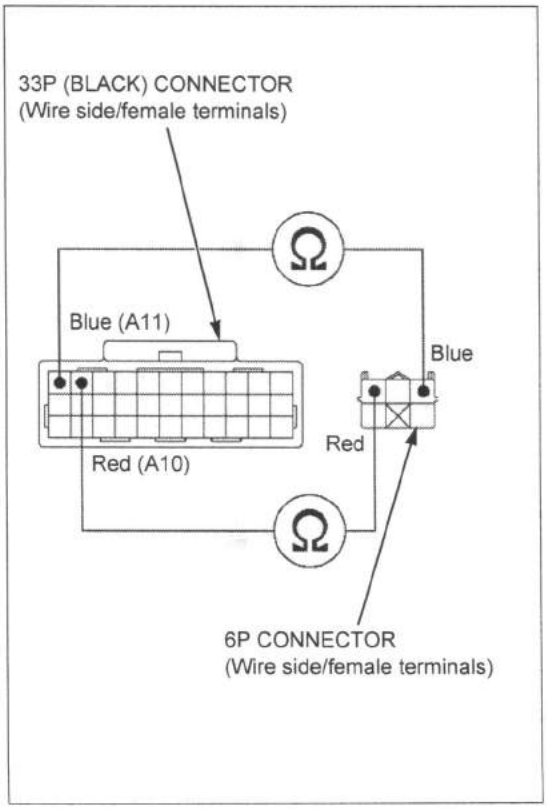
NO – Faulty EGCA

3. ECM Output Line Inspection

Disconnect the ECM 33P (Black) connector.
Check for continuity at the Red and Blue wires between the EGCA 6P (Black) connector and ECM 33P (Black) connector.

Connection: Red – A10
Blue – A11

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**



Is there continuity?

YES – Replace the ECM with a known good one and recheck.

NO – • Open circuit in Red wire
• Open circuit in Blue wire

DTC 56-1 (KNOCK SENSOR IC)

1. **Knock Sensor System Inspection**

   Clear the DTCs.

   – STANDARD/SP type (page 6-17)
   – ABS type (page 6-18)

   Place the motorcycle on its sidestand.
   Start the engine and recheck the Knock sensor with the MCS.

   Is DTC 56-1 indicated?

   YES – Replace the ECM with a known good one and recheck.

   NO – Intermittent failure

MIL CIRCUIT TROUBLESHOOTING

If the engine can be started but the MIL does not come on when the ignition switch is ON and engine stop switch "", check as follows:

- If they do not function, check the combination meter power input line (page 21-11).
- If they function properly, check as follows:

Turn the ignition switch OFF, disconnect the ECM 33P (Black) connector.

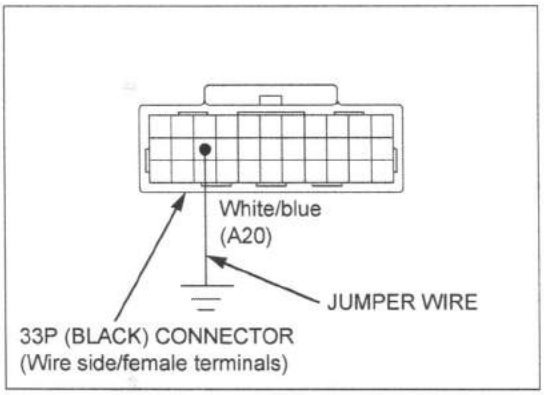
Ground the White/blue wire terminal of the wire side connector with a jumper wire.

- Always use an appropriate jumper wire to prevent damage to the connector terminals.

TOOL:
Test probe **07ZAJ-RDJA110**

Turn the ignition switch ON, the MIL should come on.

– If the MIL comes on, replace the ECM.
– If the MIL does not come on, check for open circuit in the White/blue wire between the combination meter and ECM.
If the wire is OK, replace the combination meter (page 21-13).



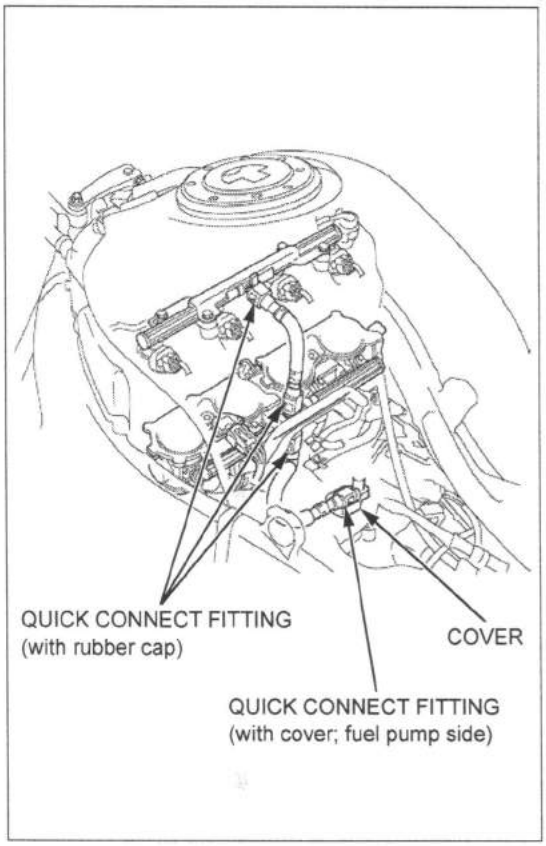
FUEL LINE INSPECTION

QUICK CONNECT FITTING LOCATION

The quick connect fittings are located as shown.

NOTE:

The quick connect fitting cover is only installed on the fuel pump side joint. The rubber caps are installed in the other quick connect fittings.



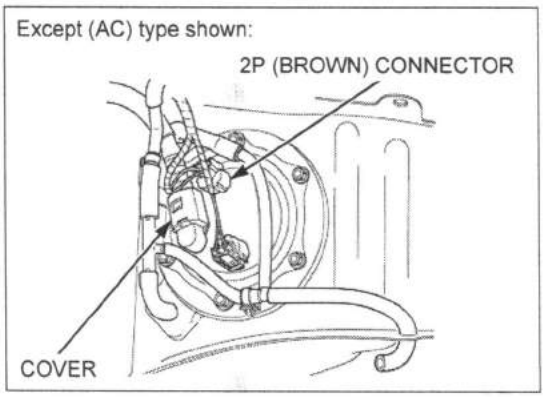
FUEL PRESSURE RELIEVING/QUICK CONNECT FITTING REMOVAL

- Before disconnecting the fuel hose, relieve pressure from the system as follows.

1. Turn the ignition switch OFF.

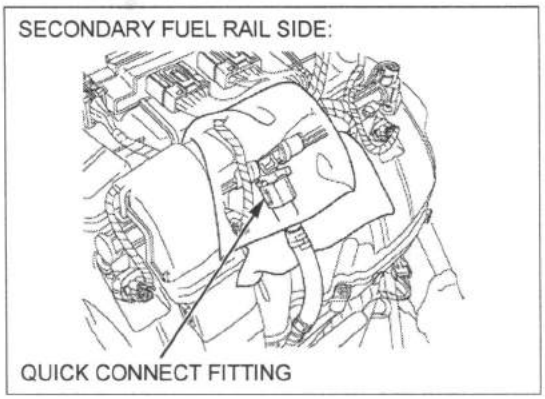
   Lift and support the fuel tank (page 4-7).

   Remove the quick connect fitting cover (fuel pump side only).
2. Disconnect the fuel pump 2P (Brown) connector.
3. Start the engine and let it idle until the engine stalls.
4. Turn the ignition switch OFF.
5. Disconnect the battery negative (–) cable (page 18-7).



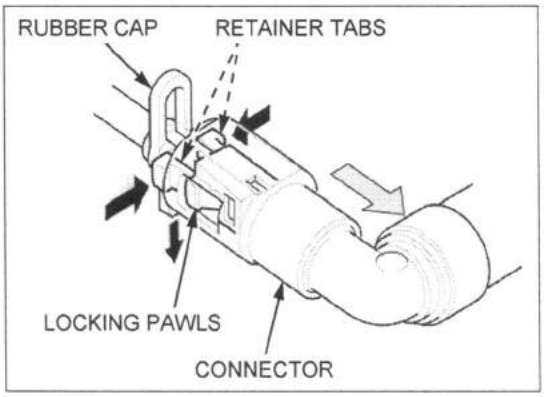
6. Check the fuel quick connect fitting for dirt and clean if necessary.

   Place a shop towel over the quick connect fitting.

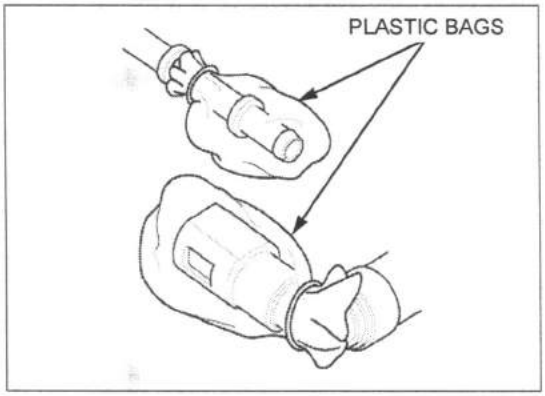


7. Pull and release the rubber cap from the retainer.
8. Hold the connector with one hand and squeeze the retainer tabs with the other hand to release them from the locking pawls.
   Pull the connector off, then remove the rubber cap and retainer from the fuel joint.

- Absorb the remaining fuel in the fuel hose from flowing out with a shop towel.
- Be careful not to damage the hose or other parts.
- Do not use tools.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.



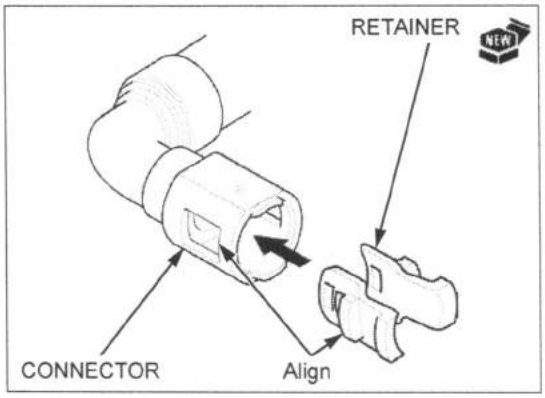
9. To prevent damage and keep foreign matter out, cover the disconnected connector and fuel joint with plastic bags.



QUICK CONNECT FITTING INSTALLATION

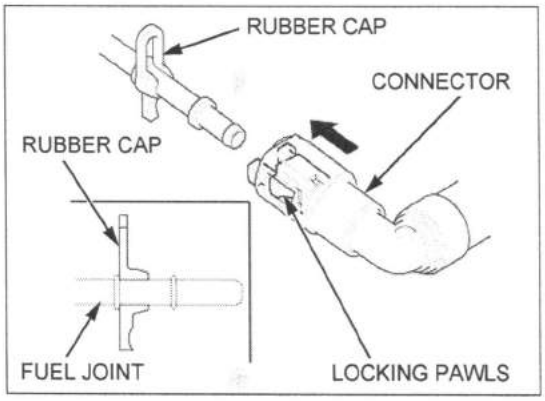
- Always replace the retainer of the quick connect fitting when the fuel hose is disconnected.
- If the rubber cap is damaged or cut, replace it with a new one.
- Do not bend or twist the fuel hose.
- If any retainer needs replacing, use the same manufacturer's retainer as the one being removed (The various manufacturers feature different retainer specification).

1. Insert a new retainer into the connector.
   - Align the retainer locking pawls with the connector grooves.

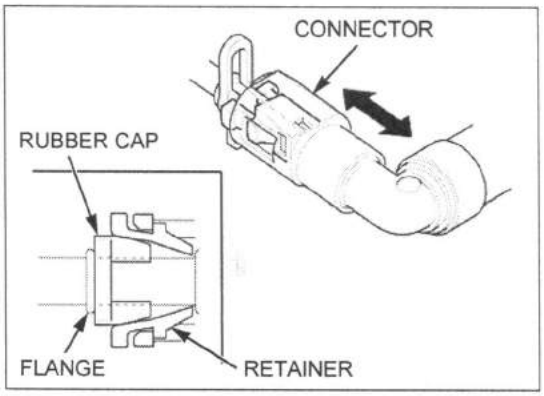


2. Install the rubber cap and seat it onto the fuel joint as shown.
   Align the quick connect fitting with the fuel joint. Then press the quick connect fitting onto the pipe until both retainer pawls lock with a "click".

   If it is hard to connect, put a small amount of engine oil on the pipe end.



3. Make sure the connection is secure and that the pawls are firmly locked into place; check visually and by pulling the connector.
4. Make sure the rubber cap is in place (between the flange and retainer tab).



5. Connect the fuel pump 2P (Brown) connector.

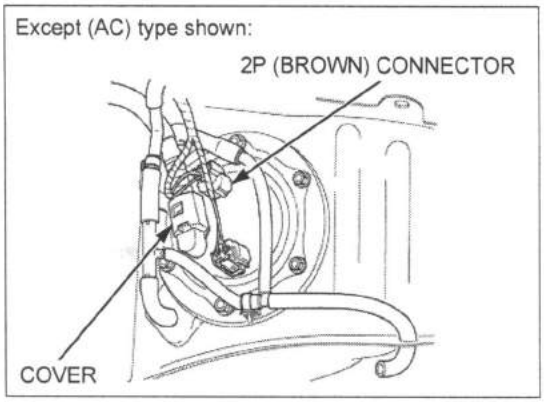
   Install the quick connect fitting cover (fuel pump side only).

6. Connect the battery negative (–) cable to the battery (page 18-7).

7. Turn the ignition switch ON and engine stop switch "⟳".

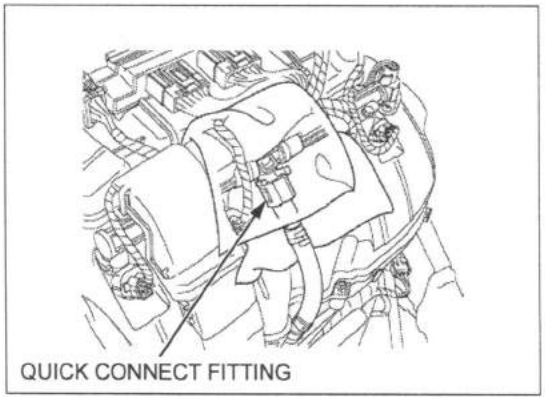
   The fuel pump will run for about 2 seconds and fuel pressure will rise.
   Repeat 2 or 3 times, and check that there is no leakage in the fuel supply system.

   Remove the support and close the fuel tank (page 4-9).



FUEL PRESSURE TEST

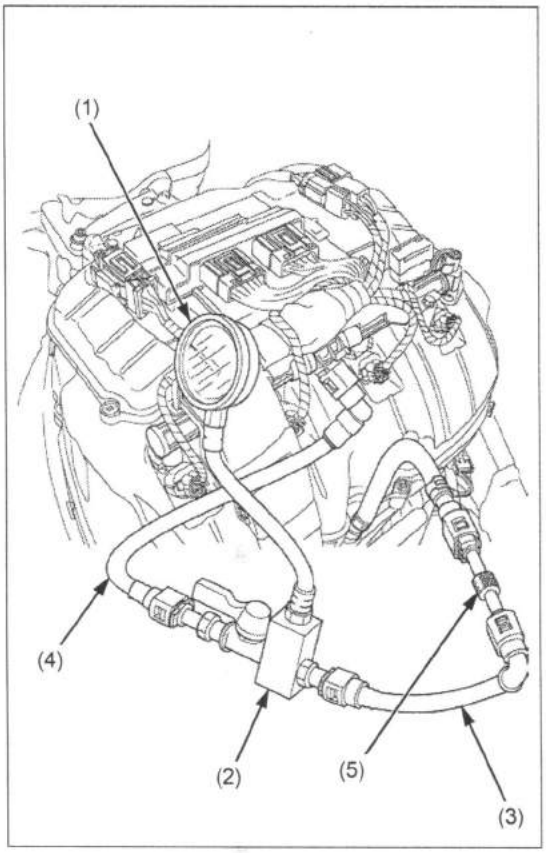
Relieve the fuel pressure and disconnect the quick connect fitting from the secondary fuel rail (page 6-50).



Attach the fuel pressure gauge, hoses, attachment joint, and manifold.

TOOLS:

(1): Fuel pressure gauge, 0 – 100 psi	**07406-0040004**
(2): Pressure gauge manifold	**07ZAJ-S5A0111**
(3): Hose attachment, 9 mm/9 mm	**07ZAJ-S5A0120**
(4): Hose attachment, 8 mm/9 mm	**07ZAJ-S7C0100**
(5): Attachment joint, 8 mm/9 mm	**07ZAJ-S7C0200**
U.S.A. TOOLS:	
Fuel pressure gauge	**07406-004000B or 07406-004000C**
Pressure manifold hose	**07AMJ-HW3A100**
Adaptor, male	**07AAJ-S6MA300**
Adaptor, female	**07AAJ-S6MA500**



Temporarily connect the battery negative (–) cable to the battery (page 18-7).
Connect the fuel pump 2P (Brown) connector.
Start the engine and let it idle.
Read the fuel pressure.

Standard: 343 kPa (3.5 kgf/cm², 50 psi)

If the fuel pressure is higher than specified, replace the fuel pump assembly (faulty fuel pump or fuel pressure regulator).
If the fuel pressure is lower than specified, inspect the following:

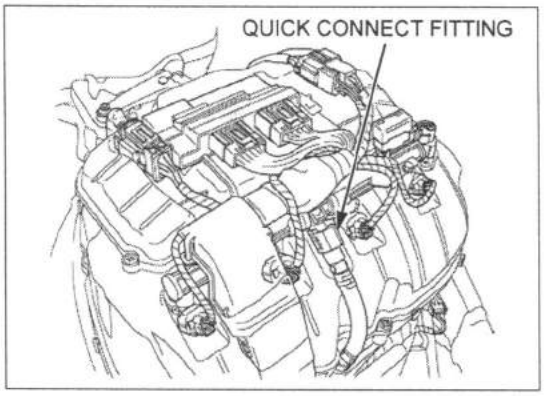
- Fuel line leaking
- Pinched or clogged fuel hose or fuel tank breather hose
- Fuel pump (page 6-56)
- Clogged fuel strainer screen (Assembly of the fuel pump: page 6-57)

Wrap a shop towel around the attachment to soak up any spilled fuel.

After inspection, relieve the fuel pressure by disconnecting the quick connect fitting (page 6-50).

Remove the fuel pressure gauge, hose attachments, attachment joint, and manifold.

Connect the quick connect fitting (page 6-52).

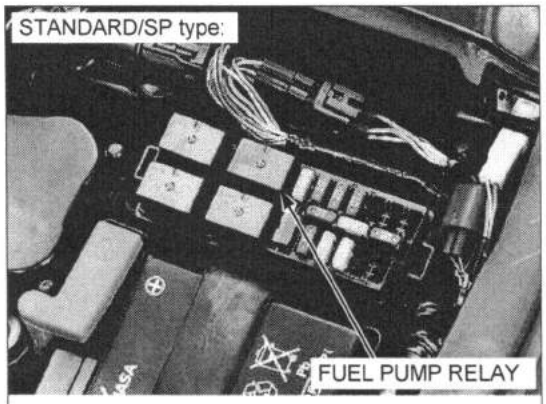


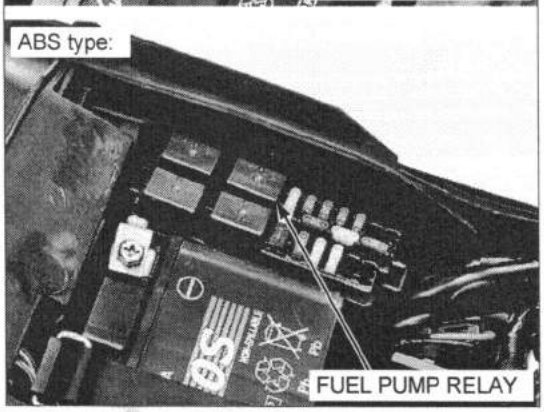
FUEL FLOW INSPECTION

Remove the seat (page 3-7).

Turn the ignition switch OFF.

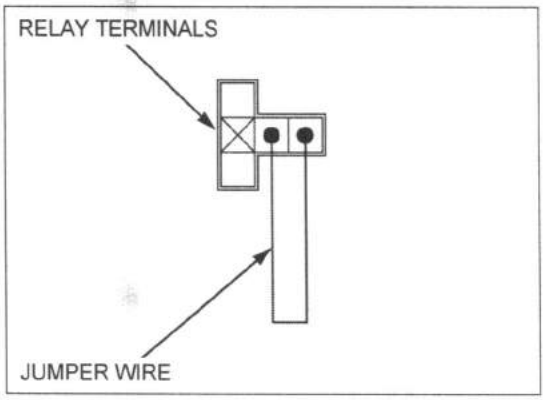
Open the fuse/relay box and remove the fuel pump relay.





Jump the Brown and Black/white wire terminals using a jumper wire as shown.

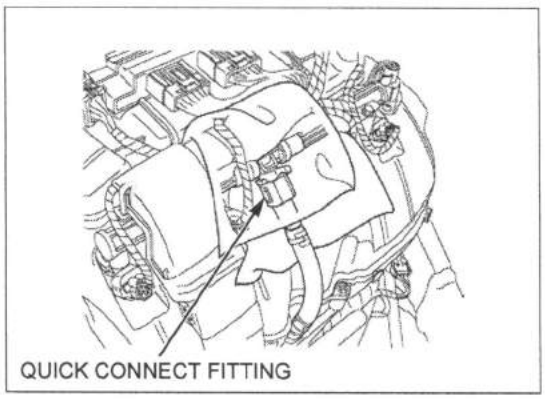
- Always use an appropriate jumper wire to prevent damage to the connector terminals.



Disconnect the quick connect fitting from the secondary fuel rail (page 6-50).

- Place an approved gasoline container and drain the gasoline.
- Wipe off spilled gasoline.

Connect the fuel pump 2P (Brown) connector.
Connect the battery negative (–) cable (page 18-7).



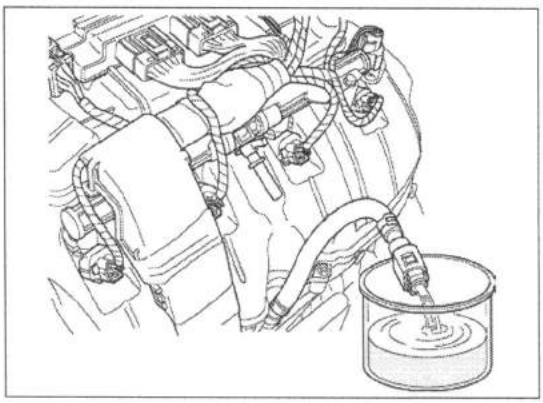
Turn the ignition switch ON and engine stop switch "○" for 10 seconds.
Measure the amount of fuel flow.

Amount of fuel flow:
167 cm³ (5.6 US oz, 5.9 Imp oz) minimum/10 seconds at 12 V

If the fuel flow is less than specified, inspect the following:

- Pinched or clogged fuel hose
- Fuel pump unit (page 6-56)

Connect the quick connect fitting (page 6-52).



FUEL PUMP UNIT

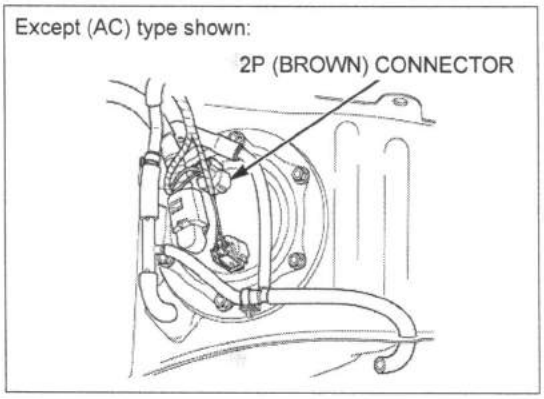
INSPECTION

Turn the ignition switch ON and engine stop switch "○" then confirm that the fuel pump operates for a few seconds.
If the fuel pump does not operate, inspect as follows:

Turn the ignition switch OFF.

Lift and support the fuel tank (page 4-7).

Disconnect the fuel pump unit 2P (Brown) connector.



Turn the ignition switch ON and engine stop switch "○", measure the voltage between the terminals on the wire side.

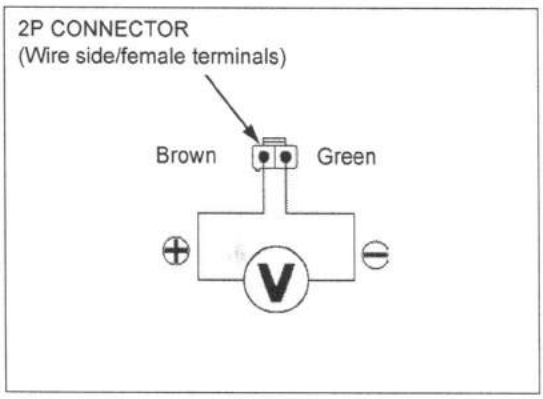
Connection: Brown (+) – Green (–)

There should be battery voltage for a few seconds.

If there is battery voltage for a few seconds, replace the fuel pump unit.

If there is no battery voltage, inspect the following:

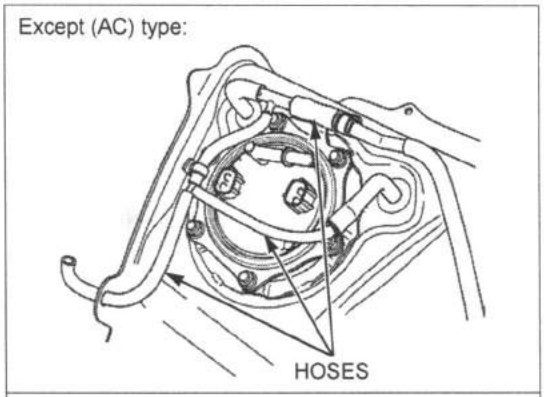
- Main fuse (30 A)
- Sub fuse (FI 20 A)
- Sub fuse (BANK ANGLE 10 A)
- Engine stop switch (page 21-25)
- Ignition switch (page 21-24)
- Fuel pump relay (page 6-59)
- Engine stop relay (page 6-83)
- Bank angle sensor (page 6-80)
- ECM (page 6-84)

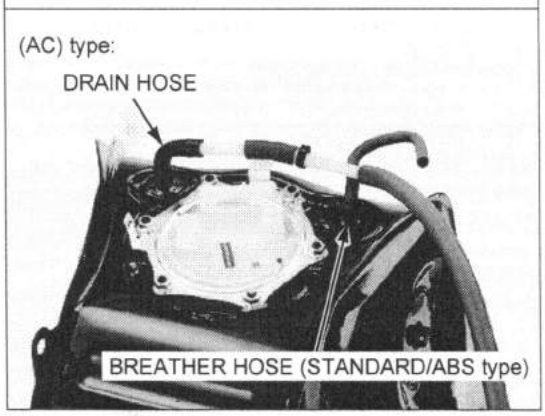


REMOVAL

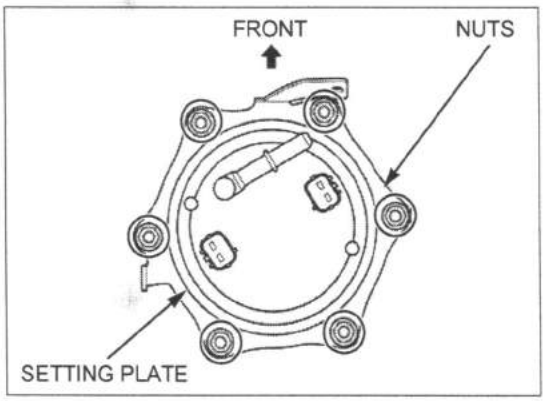
Remove the fuel tank (page 6-60).

Disconnect the breather and drain hoses from the fuel tank.



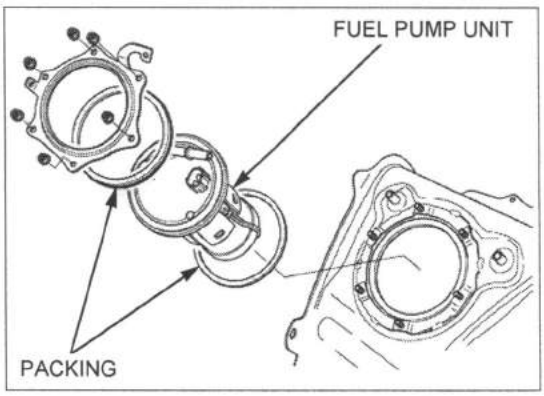


Remove the fuel pump unit mounting nuts and setting plate.



Be careful not to damage the pump wire and fuel level gauge.

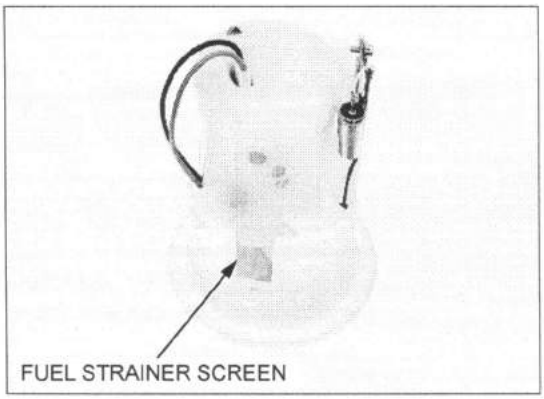
Remove the fuel pump unit and packing.



INSPECTION

Check the fuel pump unit for wear or damage, replace it if necessary.

Clean the fuel strainer screen with non-flammable or high flash point solvent.



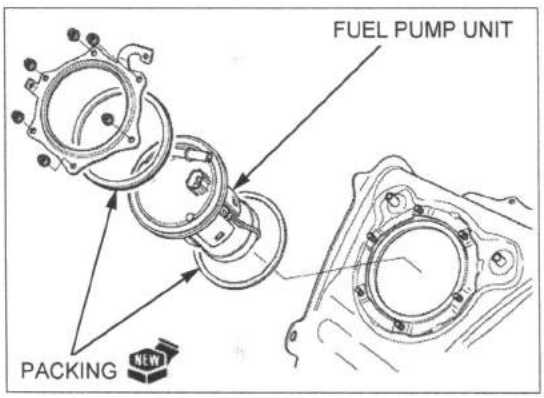
INSTALLATION

Always replace the old packing with new packing.

Place new packing onto the fuel pump unit.

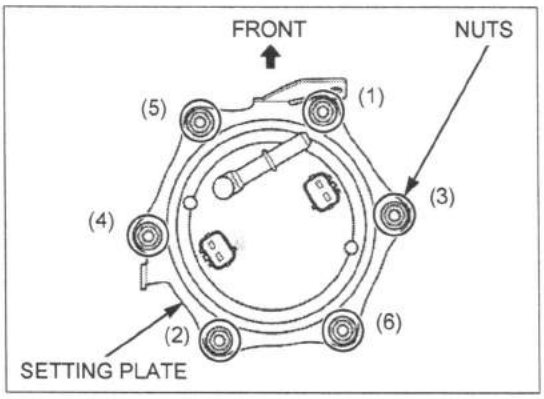
Be careful not to damage the pump wire and fuel level gauge.

Install the fuel pump unit to the fuel tank.



Install the setting plate and tighten the fuel pump mounting nuts to the specified torque in the specified sequence as shown.

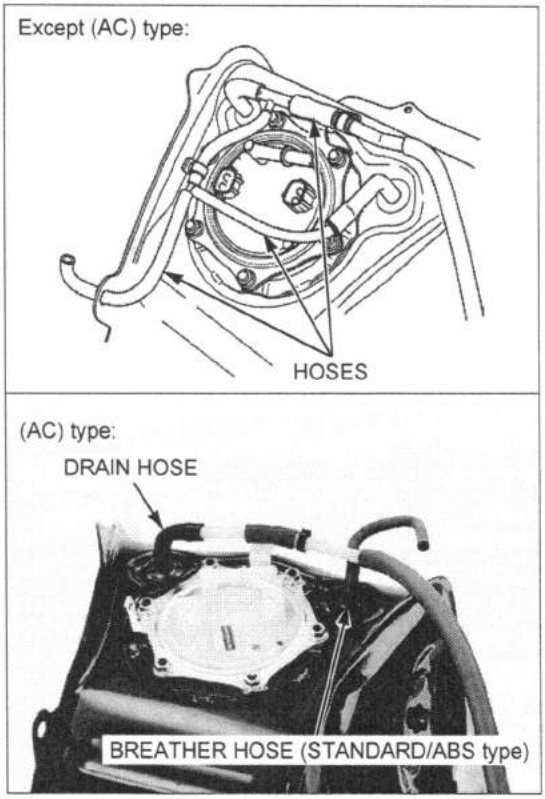
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Correctly route the hoses (page 1-25).

Connect the breather and drain hoses to the fuel tank securely.

Install the fuel tank (page 6-61).



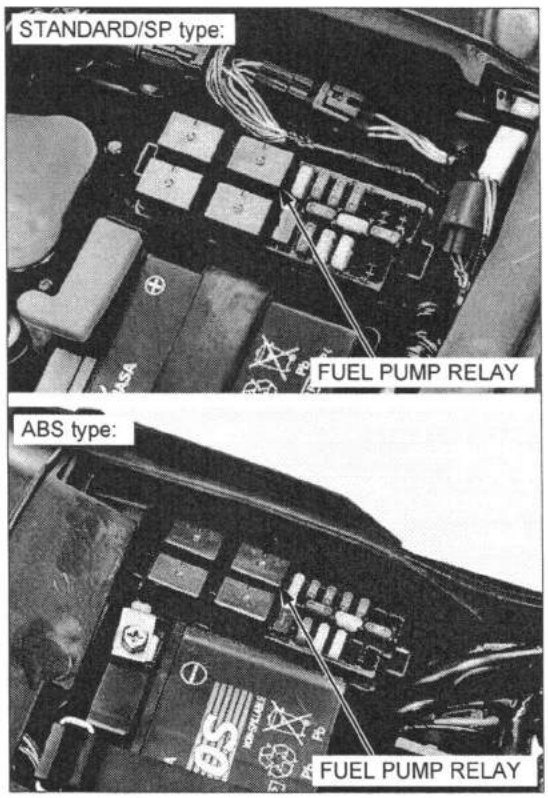
FUEL PUMP RELAY

INSPECTION

Remove the seat (page 3-7).

Turn the ignition switch OFF.

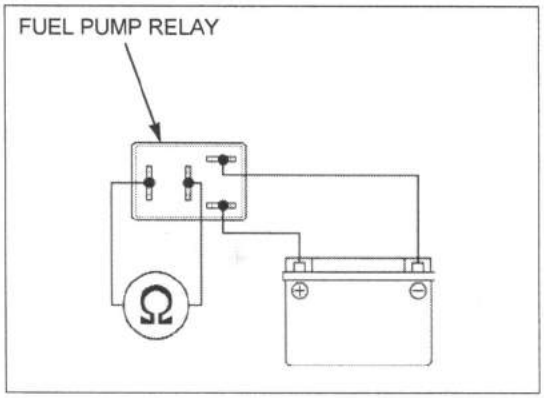
Open the fuse/relay box and remove the fuel pump relay.



Connect an ohmmeter to the fuel pump relay terminals.

Connect a 12 V battery to the following fuel pump relay terminals.

There should be continuity only when the 12 V battery is connected. If there is no continuity when the 12 V battery is connected, replace the fuel pump relay.

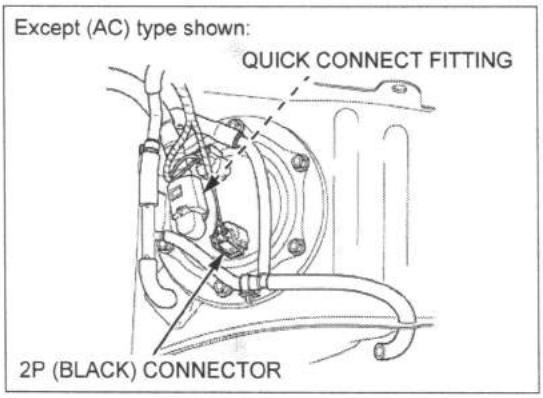


FUEL TANK

REMOVAL

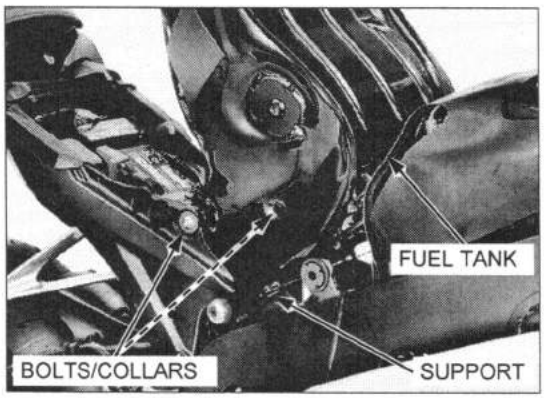
Relieve the fuel pressure (page 6-50) and disconnect the quick connect fitting from the fuel tank.

Disconnect the fuel reserve sensor 2P (Black) connector.

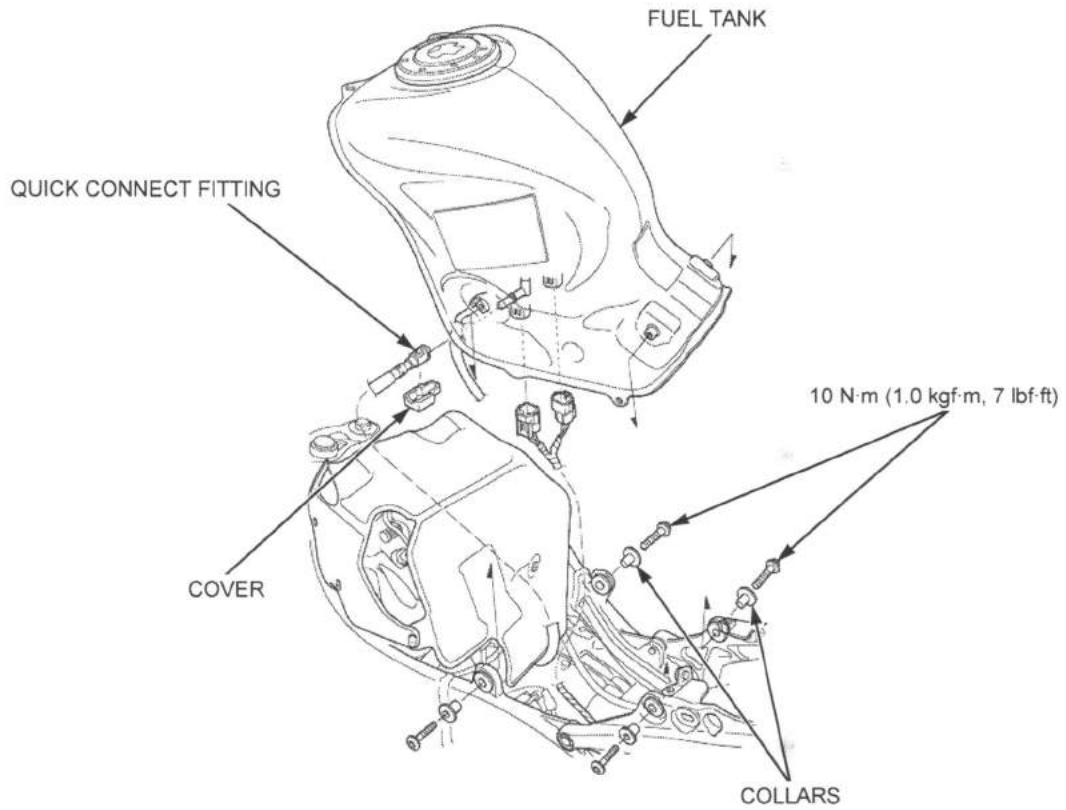


Remove the support, fuel tank pivot bolts, collars and fuel tank.

For fuel pump unit removal (page 6-57).

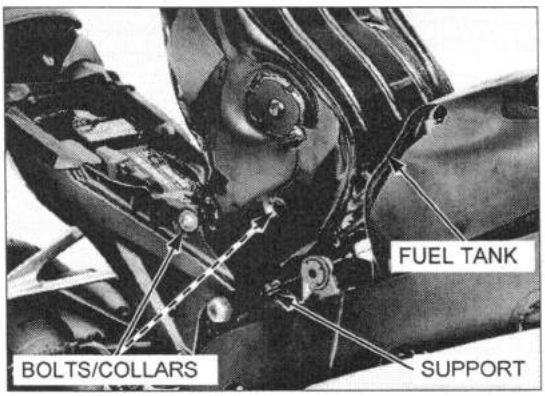


INSTALLATION



Install the fuel tank, collars, support, and pivot bolts into the frame and tighten the bolts to the specified torque.

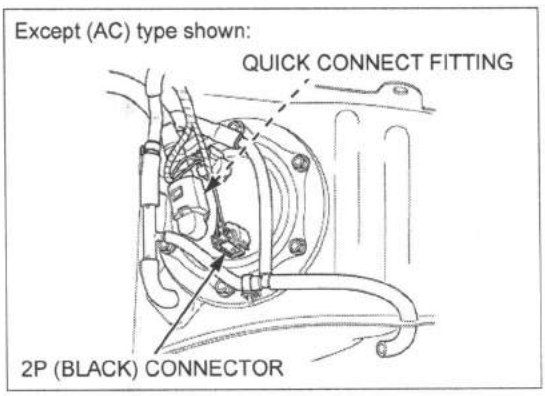
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Correctly route the hoses (page 1-25).

Connect the fuel reserve sensor 2P (Black) connector.

Connect the quick connect fitting (page 6-52).



AIR CLEANER HOUSING

REMOVAL

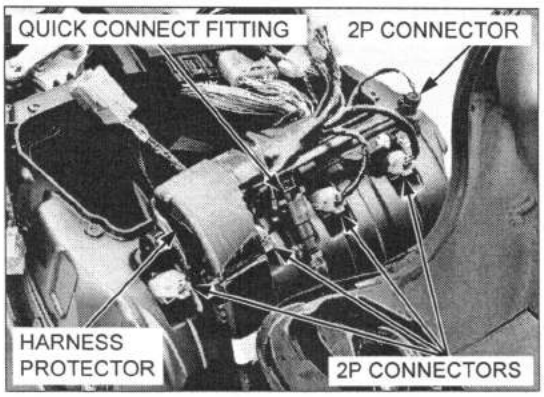
- For MAP sensor removal/installation (page 6-79)
- For secondary fuel injector removal/installation (page 6-65)

Remove the air cleaner element (page 4-12).

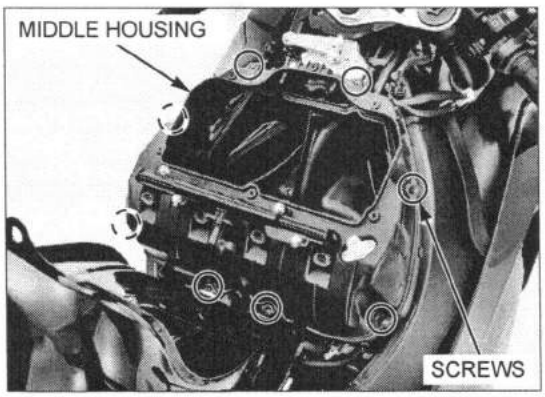
Relieve the fuel pressure and disconnect the quick connect fitting from the secondary fuel rail (page 6-50).

Disconnect the secondary fuel injector 2P (Gray) and IAT sensor 2P (Gray; '08 – '13 model/Black; After '13 model) connectors.

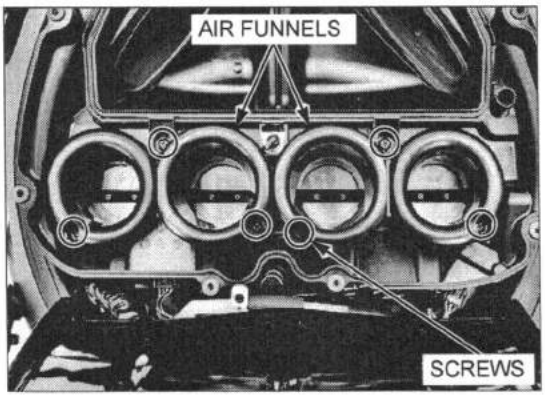
Move the wire harness and harness protector out of the way.



Remove the screws and middle housing.



Remove the screws and air funnels.

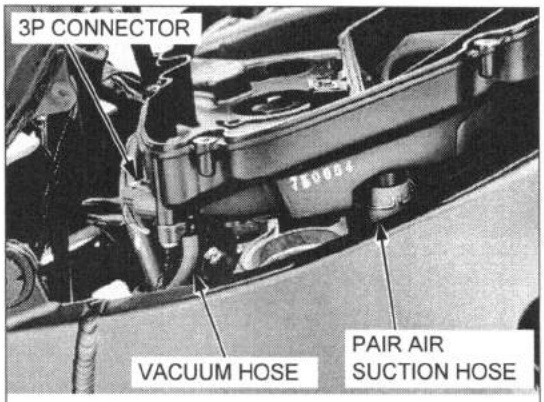


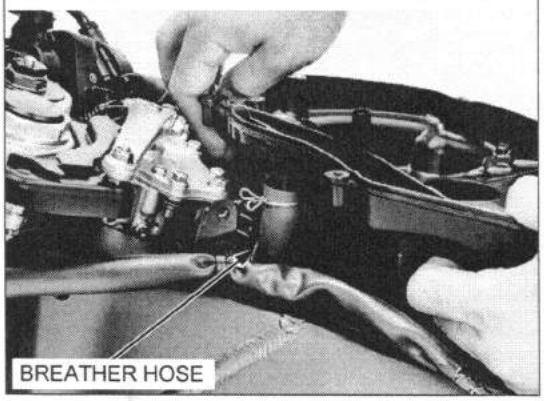
Right side: Disconnect the MAP sensor 3P (Blue) connector and vacuum hose.

Disconnect the PAIR air suction hose from the lower housing.

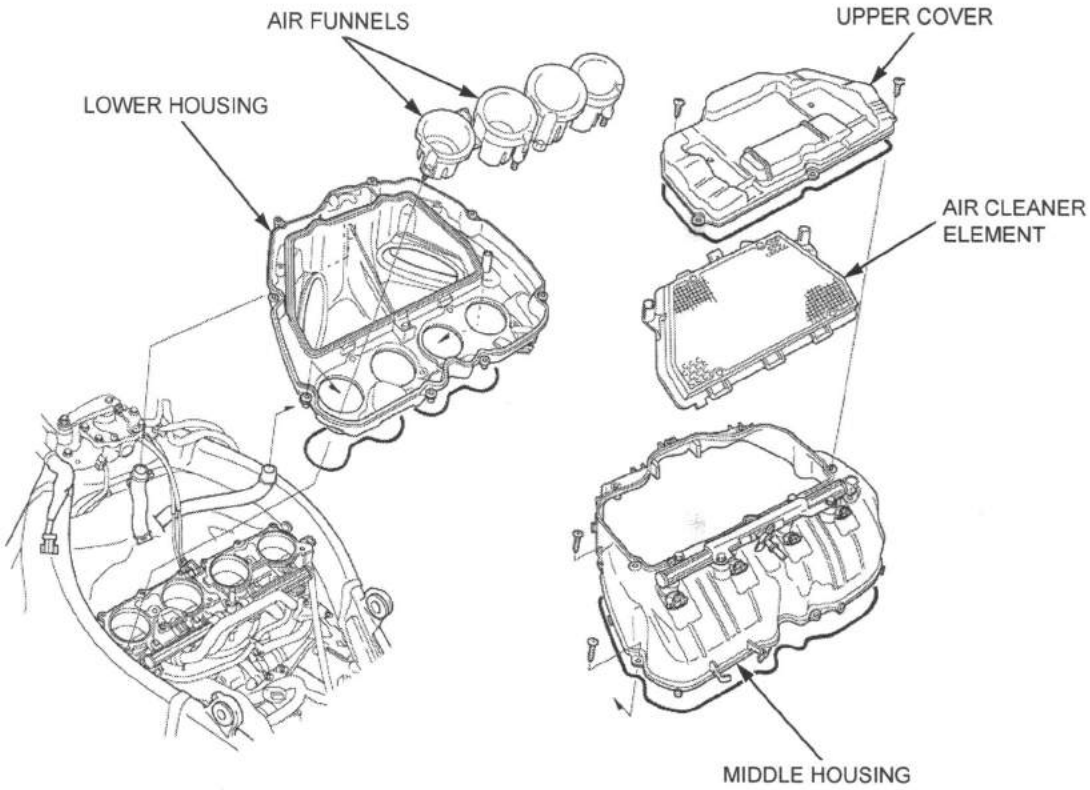
Front side: Disconnect the crankcase breather hose from the lower housing.

- Be careful not to allow dirt into the intake port.





INSTALLATION

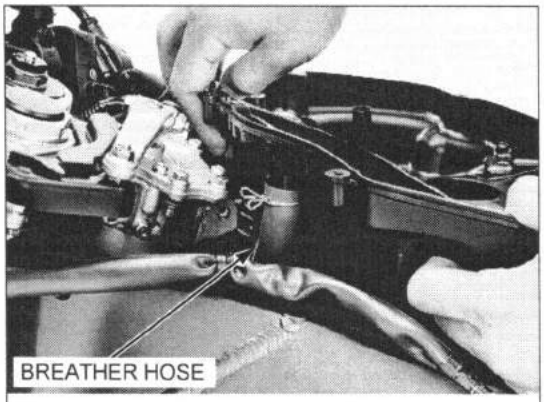


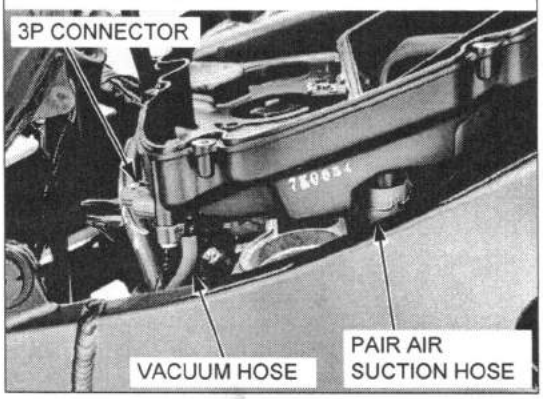
Front side: Connect the crankcase breather hose to the lower housing.

Right side: Connect the PAIR air suction hose to the lower housing.

Connect the MAP sensor 3P (Blue) connector and vacuum hose.

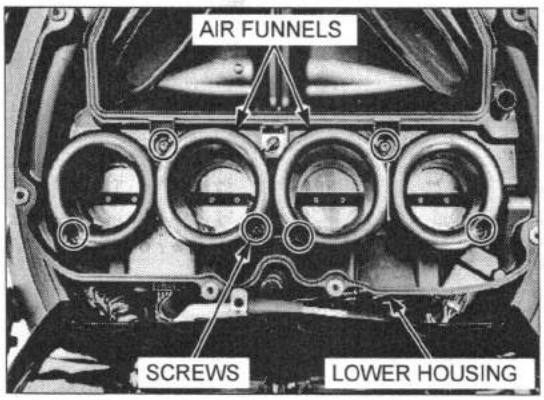
Be careful not to allow dirt into the intake port. Install the lower housing onto the throttle body.





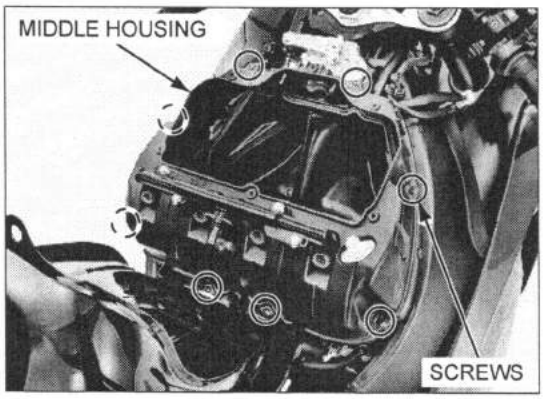
Install the air funnels onto the lower housing ensuring that the taller funnels are located on the two inner throttle bodies.

Install and tighten the air funnel/lower housing mounting screws securely.



Correctly route the wires (page 1-25). Install the middle housing and tighten the screws to the specified torque.

TORQUE: 0.8 N·m (0.1 kgf·m, 0.6 lbf·ft)

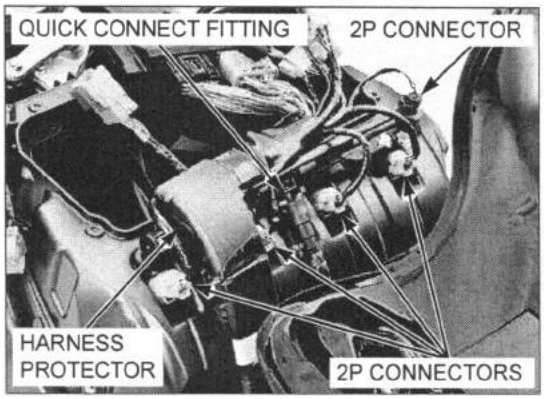


Connect the harness protector to the middle housing and secondary fuel injector plate.

Connect the secondary fuel injector 2P (Gray) and IAT sensor 2P (Gray; '08 – '13 model/Black; After '13 model) connectors.

Connect the quick connect fitting to the secondary fuel rail (page 6-52).

Install the air cleaner element (page 4-12).



SECONDARY FUEL INJECTOR

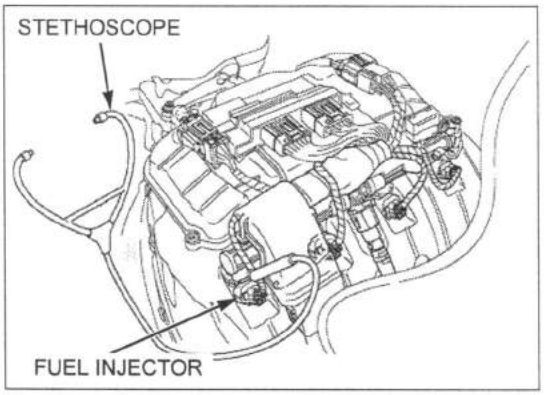
INSPECTION

Lift and support the fuel tank (page 4-7).

Start the engine and let it idle.
Confirm the fuel injector operating sounds with a sounding rod or stethoscope.

NOTE:
The secondary fuel injectors operate with following conditions.

- Engine speed is over 5,000 rpm.
- Throttle opening is over 10°.



REMOVAL

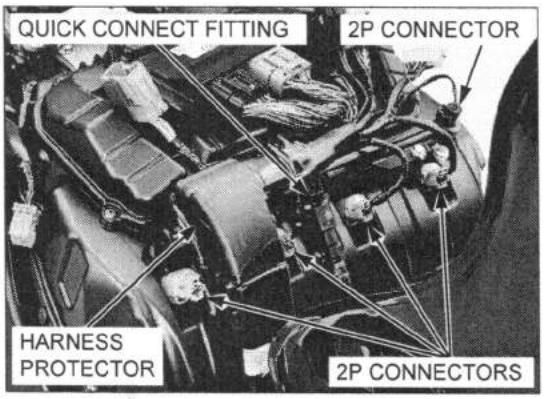
Lift and support the fuel tank (page 4-7).

Relieve the fuel pressure and disconnect the quick connect fitting from the secondary fuel rail (page 6-50).

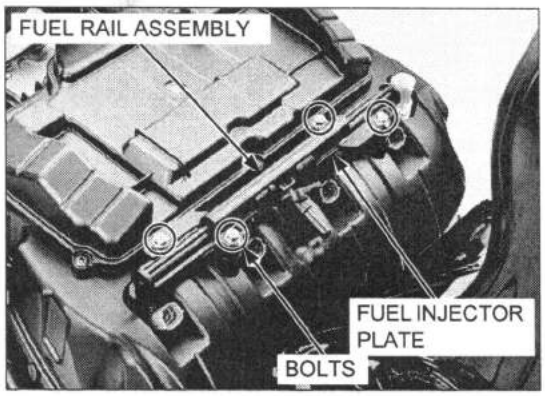
Remove the ECM setting plate (page 6-84).

Disconnect the secondary fuel injector 2P (Gray) and IAT sensor 2P (Gray; '08 – '13 model/Black; After '13 model) connectors.

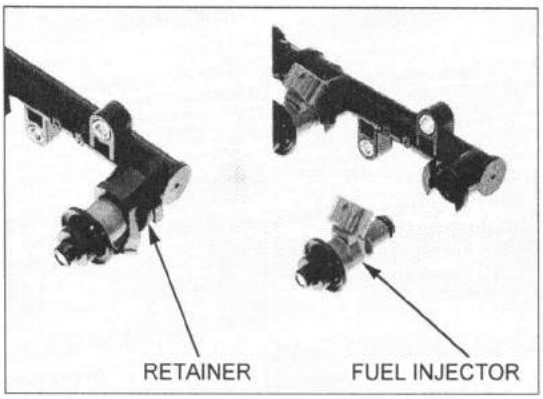
Move the wire harness and harness protector out of the way.



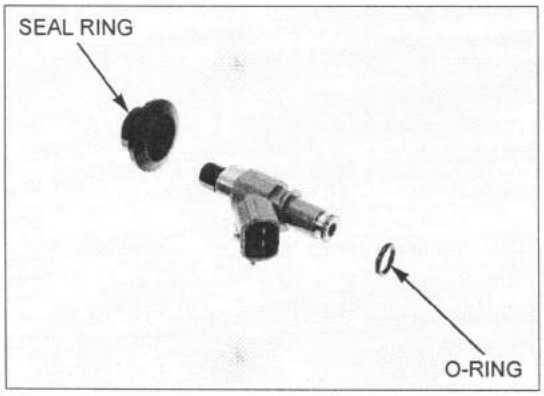
Remove the bolts, fuel injector plate, and fuel rail assembly from the air cleaner housing.



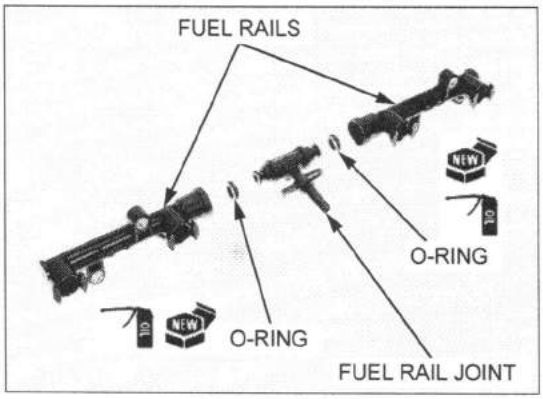
Remove the retainers and fuel injectors from the fuel rail.



Remove the O-ring and seal ring.



Remove the fuel rails and O-rings from the fuel rail joint.



INSTALLATION

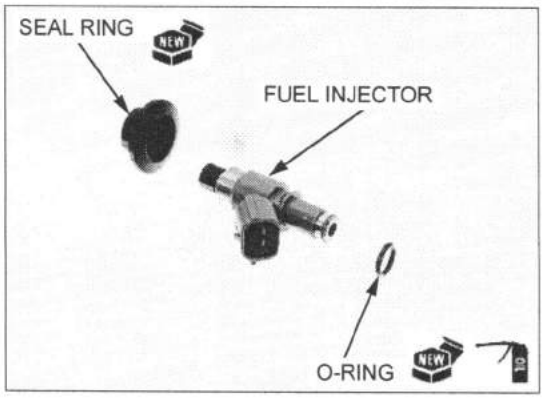
Apply oil to new O-rings and install them to the fuel rail joint.

Install the fuel rails to the fuel rail joint.

Apply oil to a new O-ring and install it to the fuel injector, being careful not to damage the O-ring.

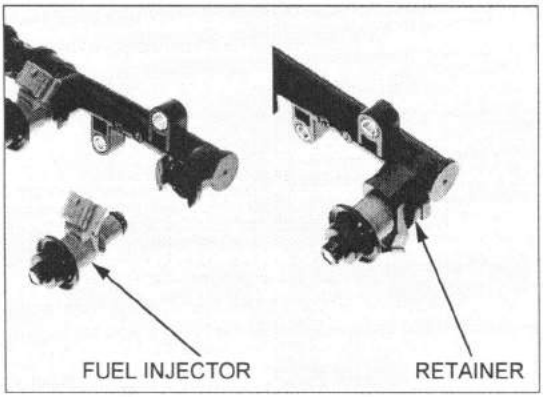
Replace the seal ring and O-ring with new ones as a set.

Install a new seal ring to the fuel injector.

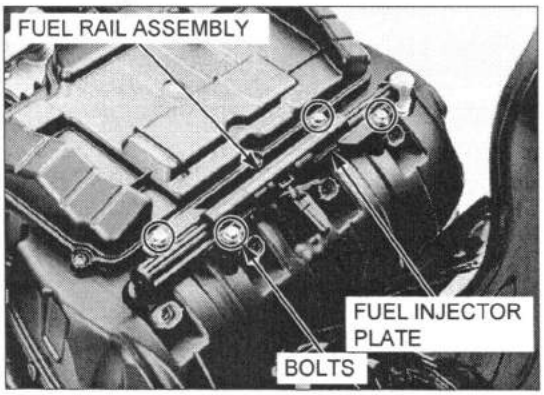


Install the fuel injectors to the fuel rail, being careful not to damage the O-rings.

Install the retainers securely.



Install the fuel rail assembly, fuel injector plate and tighten the bolts securely.



Correctly route the wire (page 1-25).

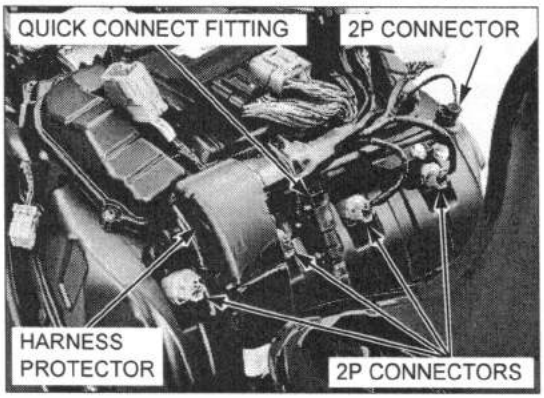
Connect the harness protector to the middle housing and secondary fuel injector plate.

Connect the secondary fuel injector 2P (Gray) and IAT sensor 2P (Gray; '08 – '13 model/Black; After '13 model) connectors.

Install the ECM and setting plate (page 6-84).

Connect the quick connect fitting to the secondary fuel rail (page 6-52).

Remove the support and close the fuel tank (page 4-9).



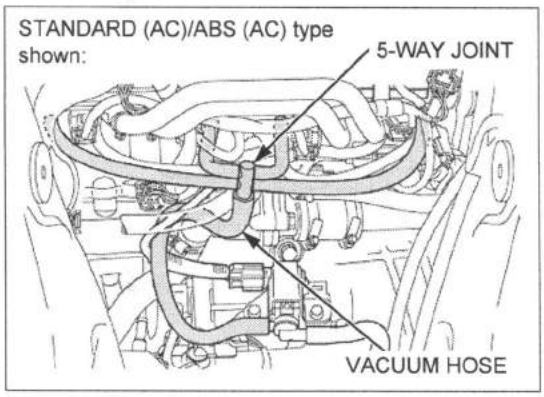
THROTTLE BODY

REMOVAL

Remove the following:

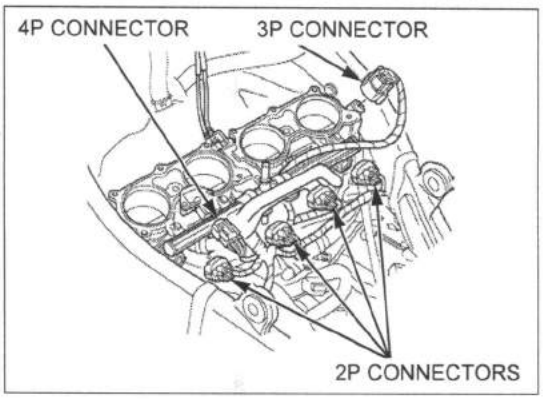
- Middle cowls (page 3-18)
- Air cleaner housing (page 6-62)

(AC) type: Disconnect the vacuum hose from the 5-way joint.



Disconnect the following:

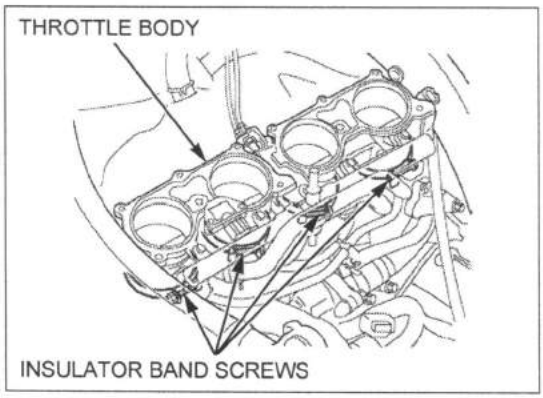
- IACV 4P (Black) connector
- TP sensor 3P (Blue) connector
- Primary fuel injector 2P (Gray) connectors



Loosen the insulator band screws using a long type phillips screwdriver.

When removing the throttle body, do not hold it by the fuel rail.

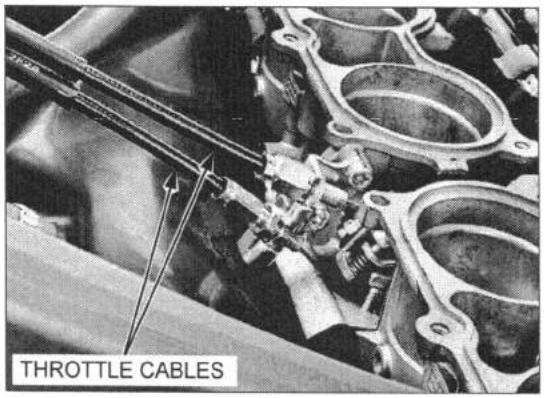
Remove the throttle body from the cylinder head.



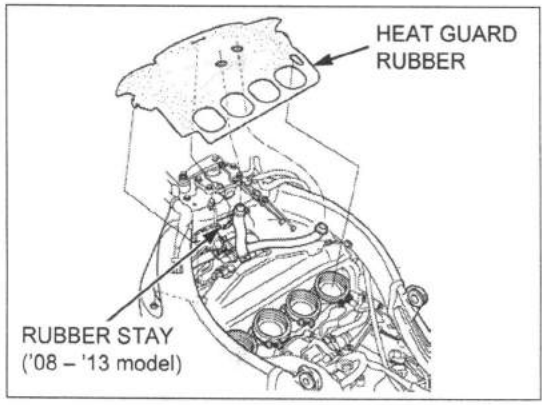
Do not snap the throttle valve from fully open to fully closed after the throttle cable has been removed. It may cause incorrect idle operation.

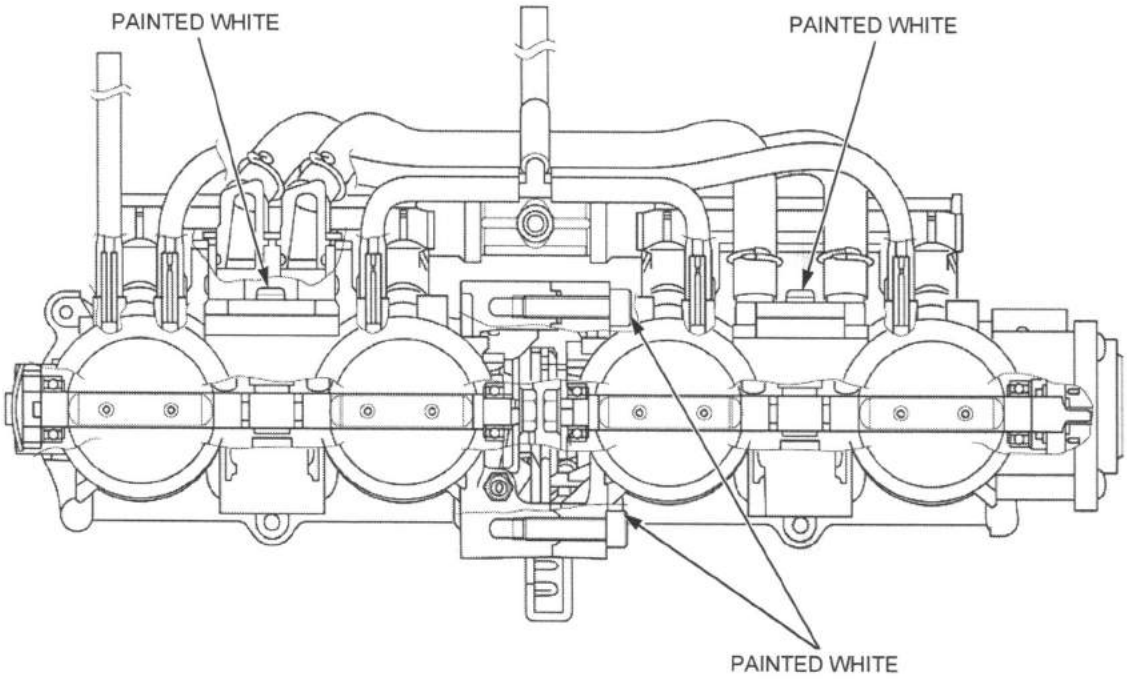
Loosen the lock nut, adjusting nuts and disconnect the throttle cables from the throttle drum.

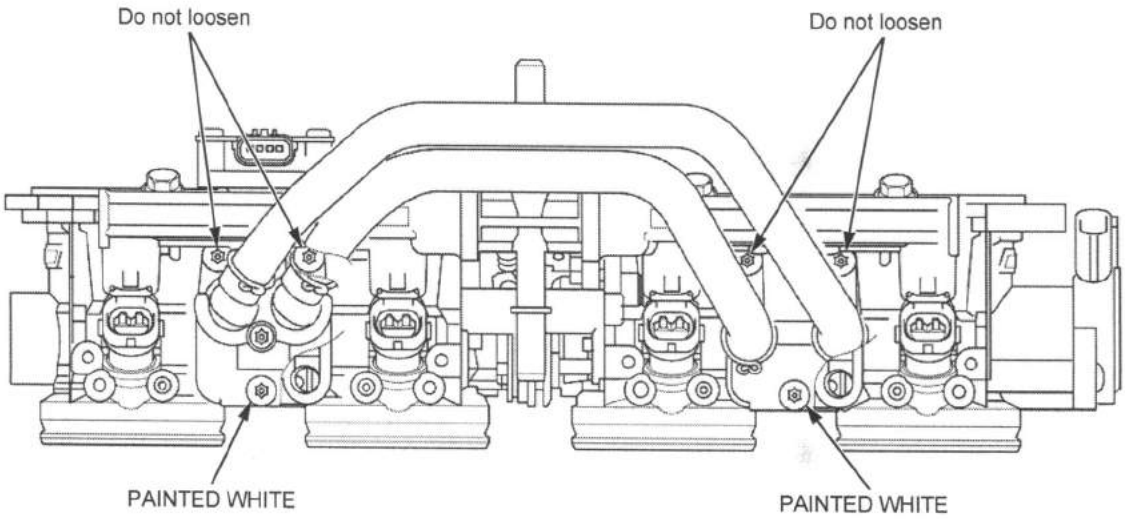
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed. If debris is allowed to enter the ports the engine may be damaged.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle valve and idle control failure.

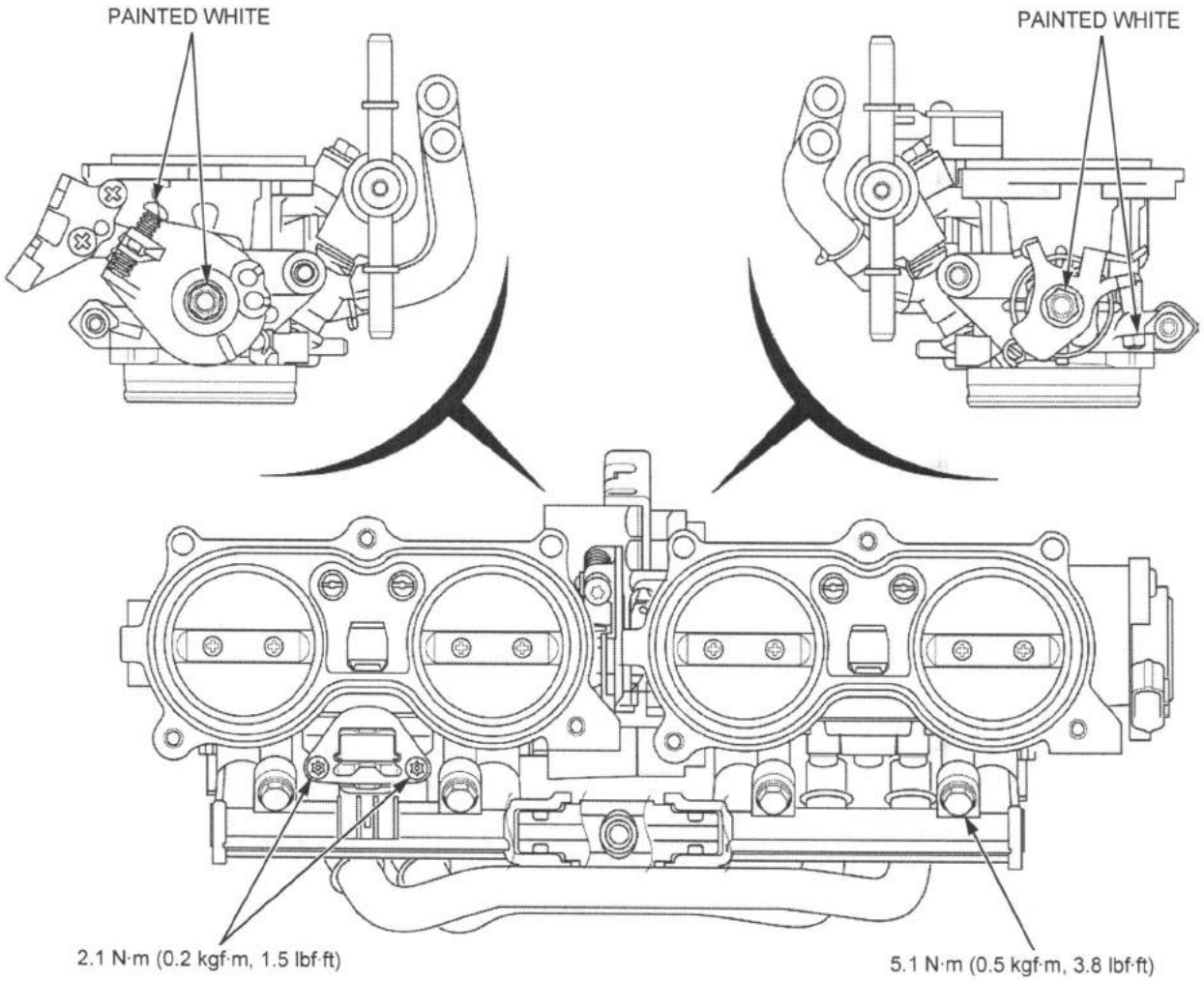


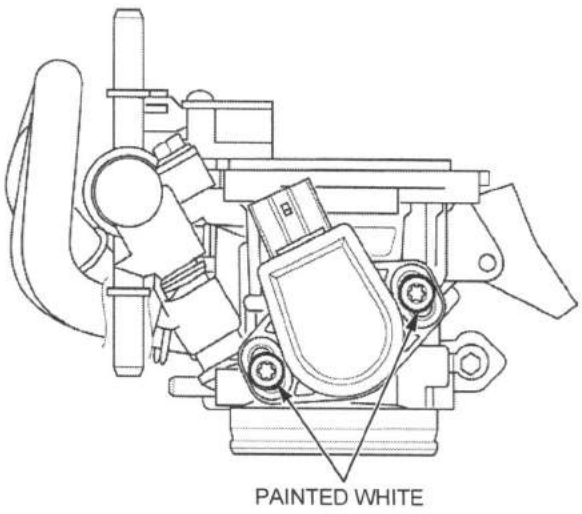
Remove the heat guard rubber from the insulator.



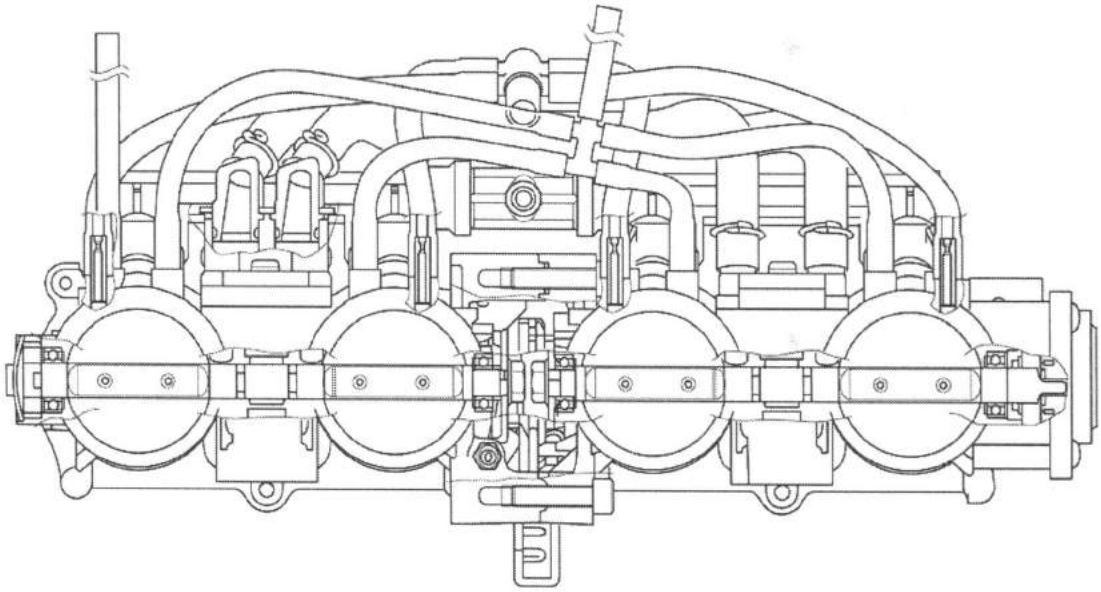

PAINTED WHITE
PAINTED WHITE
PAINTED WHITE


Do not loosen
Do not loosen
PAINTED WHITE
PAINTED WHITE


PAINTED WHITE
PAINTED WHITE
2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)
5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)

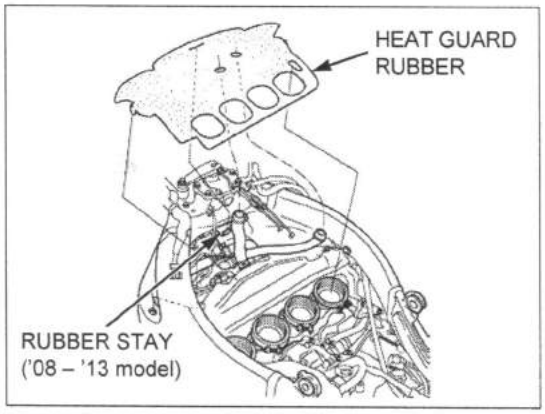

PAINTED WHITE

THROTTLE BODY VACUUM HOSE ROUTING ((AC) TYPE)



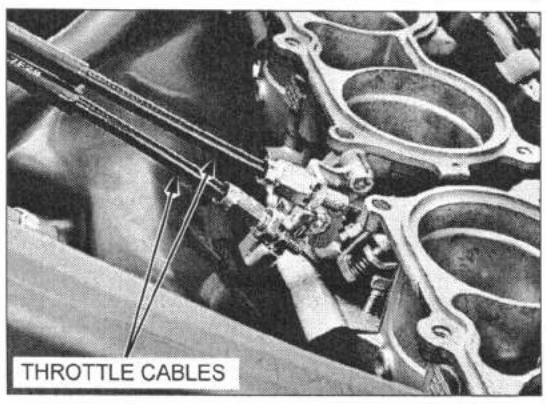
INSTALLATION

Install the heat guard rubber to the insulator securely.



Correctly route the throttle cables (page 1-25).

Connect the throttle cable ends to the throttle drum.



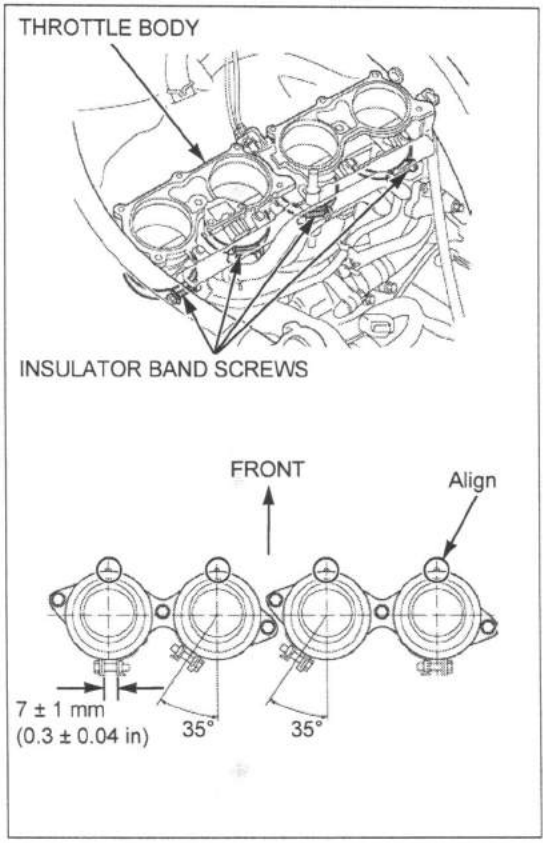
Before installing the throttle body, make sure the insulator band's screws are positioned correctly as shown in the illustration.

When installing the throttle body do not hold it by the fuel rail.

Install the throttle body onto the cylinder head.

Tighten the engine side insulator band so that the insulator band distance is 7 ± 1 mm (0.3 ± 0.04 in).

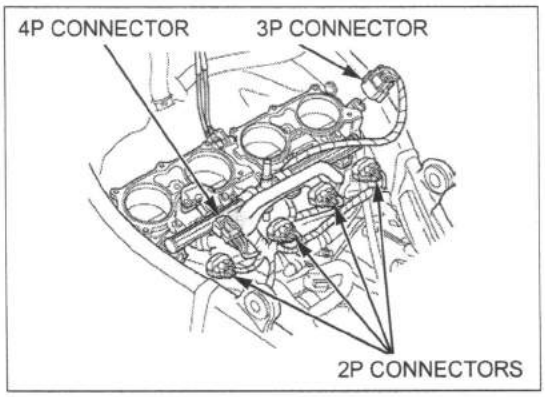
- Align the insulator band hole with the insulator boss.



Correctly route the wires (page 1-25).

Connect the following:

- Primary fuel injector 2P (Gray) connectors
- TP sensor 3P (Blue) connector
- IACV 4P (Black) connector



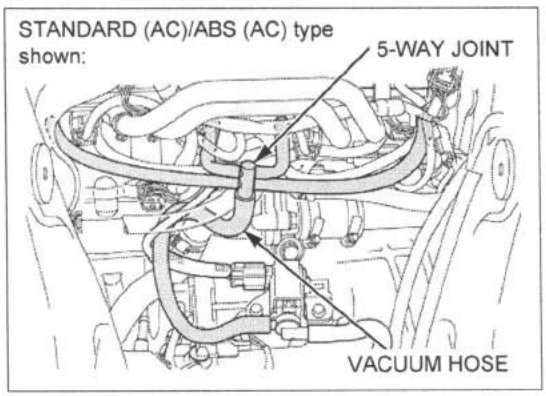
(AC) type:

Connect the vacuum hose to the 5-way joint securely.

Adjust the throttle grip freeplay (page 4-11).

Install the following:

- Air cleaner housing (page 6-63)
- Middle cowls (page 3-18)

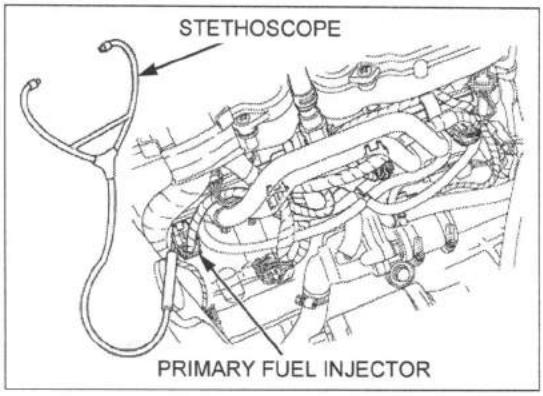


PRIMARY FUEL INJECTOR

INSPECTION

Lift and support the fuel tank (page 4-7).

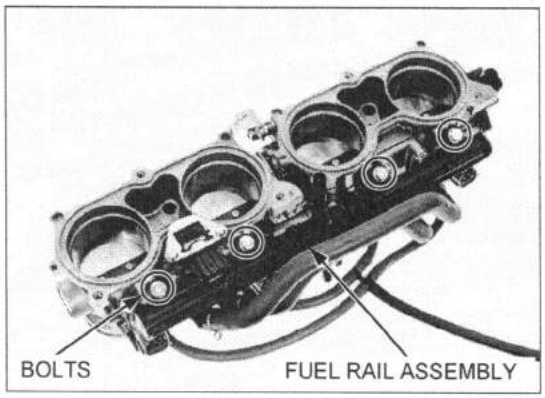
Start the engine and let it idle.
Confirm the fuel injector operating sounds with a sounding rod or stethoscope.



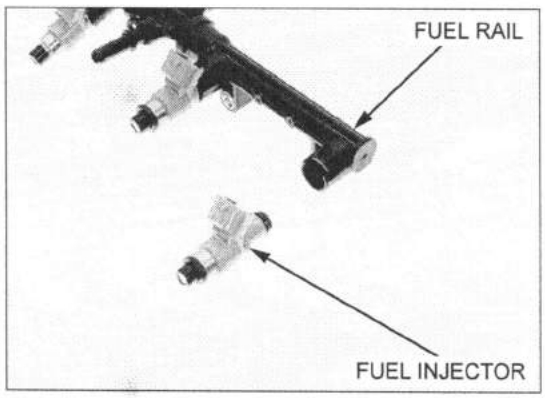
REMOVAL

Remove the throttle body (page 6-67).

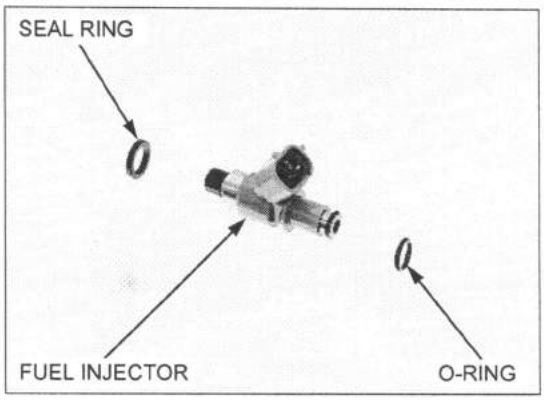
Remove the bolts and fuel rail assembly.



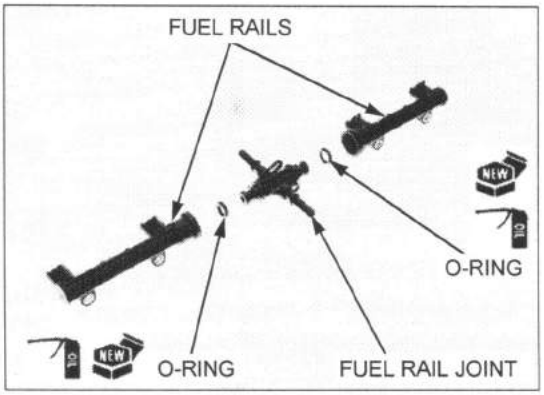
Remove the fuel injectors from the fuel rail.



Remove the seal ring and O-ring.



Remove the fuel rails and O-rings from the fuel rail joint.



INSTALLATION

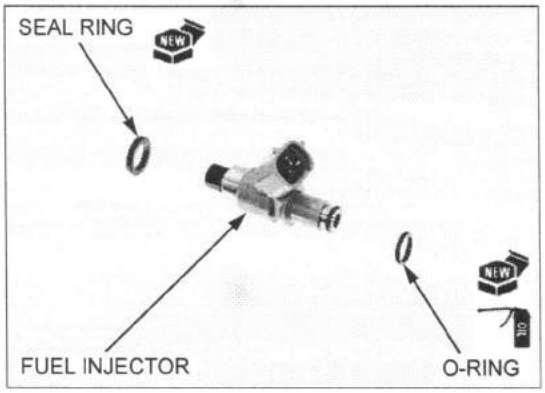
Apply oil to new O-rings and install them to the fuel rail joint.

Install the fuel rails to the fuel rail joint.

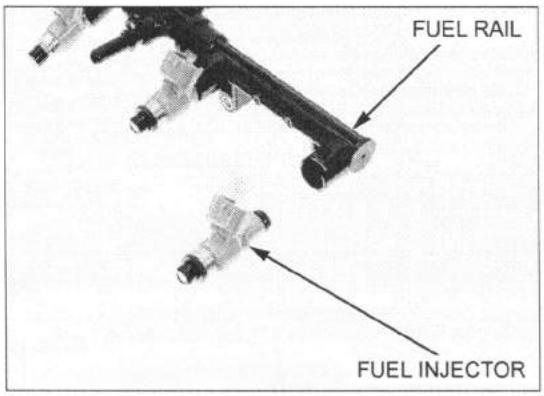
Apply oil to a new O-ring and install it to the fuel injector, being careful not to damage the O-ring.

Replace the seal ring and O-ring with new ones as a set.

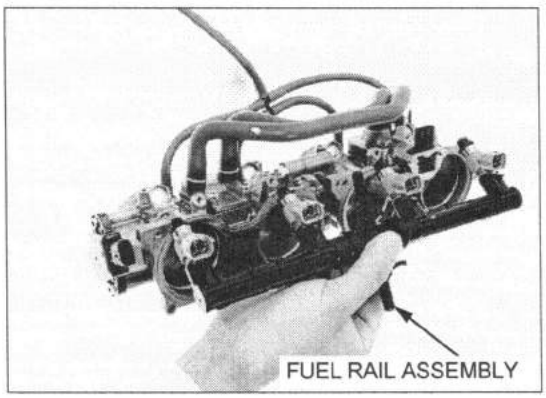
Install a new seal ring to the fuel injector.



Install the fuel injectors to the fuel rail, being careful not to damage the O-ring.



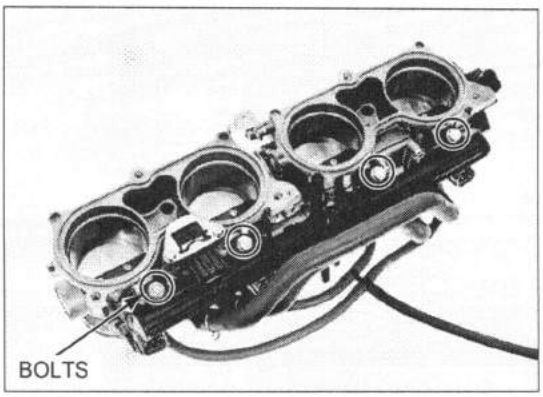
Install the fuel rail assembly onto the throttle body, being careful not to damage the seal rings.



Tighten the fuel rail mounting bolts to the specified torque.

TORQUE: 5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)

Install the throttle body (page 6-71).



ENGINE IDLE SPEED

IDLE SPEED INSPECTION

- Inspect the idle speed after all other engine maintenance items have been performed and are within specifications.
- Before checking the idle speed, inspect the following items.
  - No DTC and MIL blinking
  - Spark plug condition (page 4-13)
  - Air cleaner condition (page 4-12)
- The engine must be warm for accurate idle speed inspection.
- This system eliminates the need for manual idle speed adjustment compared to previous designs.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

Lift and support the fuel tank (page 4-7).

Start the engine and warm it up to coolant temperature 80°C (176°F).
Stop the engine and connect a tachometer according to the tachometer manufacturer's operating instructions.
Start the engine and let it idle. Check the idle speed.

ENGINE IDLE SPEED: 1,200 ± 100 rpm

If the idle speed is out of specification, check the following:

- Throttle operation and throttle grip freeplay (page 4-11)
- Intake air leak or engine top-end problem (page 9-6)
- IACV operation (page 6-76)

IACV

INSPECTION

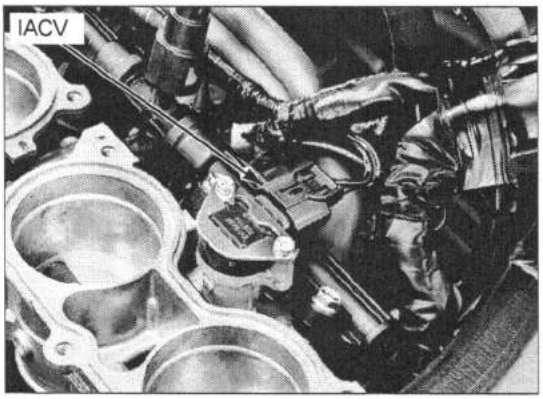
The IACV is installed on the throttle body and is operated by the step motor. When the ignition switch is turned ON, the IACV operates for a few seconds.

Check the step motor operating (beep) sound with the ignition switch turned ON.

NOTE:

The IACV operation can be checked visually as follows:

- Remove the IACV (page 6-76). Connect the 4P (Black) connector to the IACV, then turn the ignition switch ON.

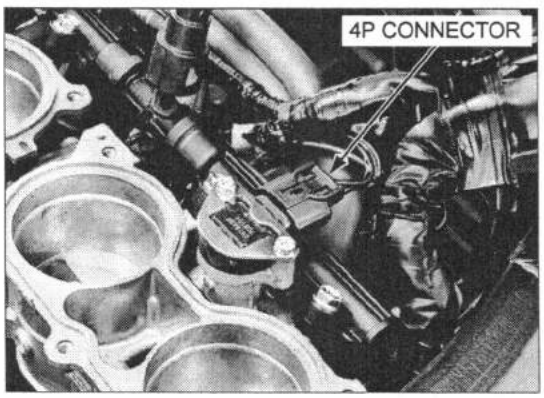


REMOVAL

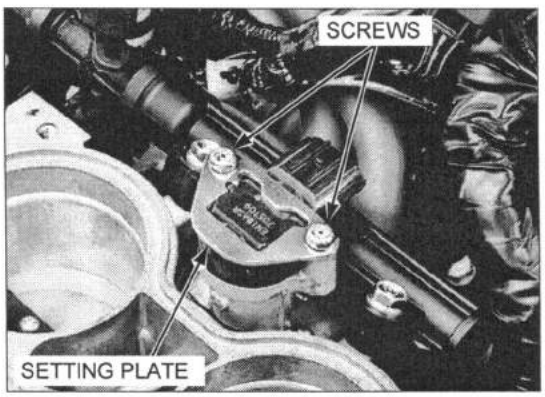
- Always clean the throttle body before the IACV removal to prevent dirt and debris from entering the IACV passage.

Remove the air cleaner housing (page 6-62).

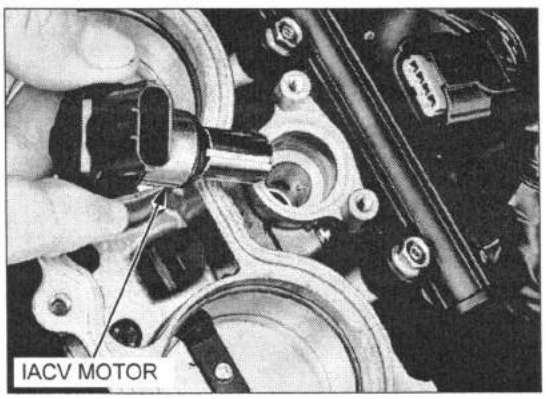
Disconnect the IACV 4P (Black) connector.



Remove the torx screws and setting plate.

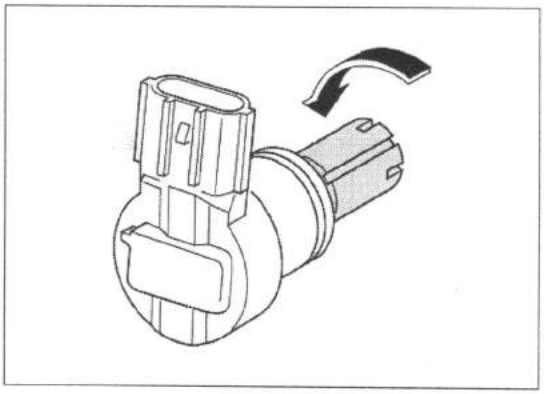


Remove the IACV motor.

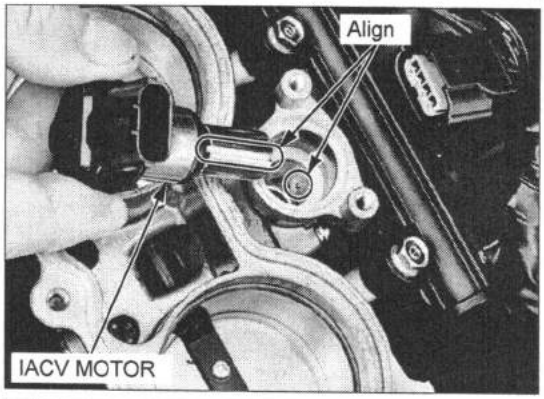


INSTALLATION

Turn the slide valve clockwise until lightly seated on IACV.



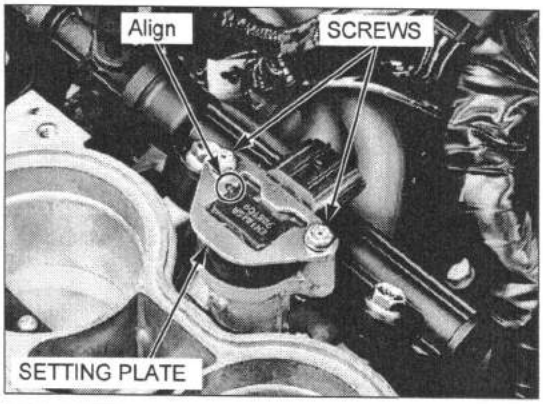
Install the IACV motor, aligning slide valve groove with the pin.



Install the setting plate while aligning the cut-out with the lug on the IACV motor.

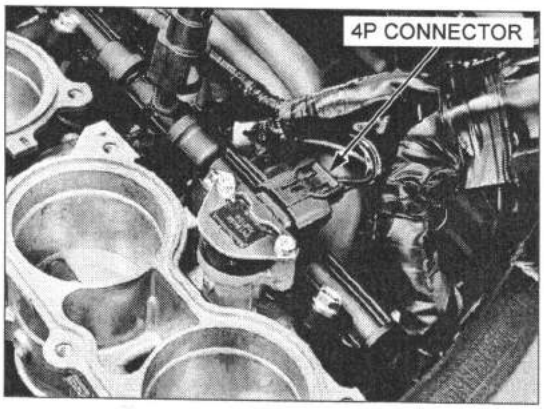
Install the torx screws and tighten them to the specified torque.

TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)



Connect the IACV 4P (Black) connector.

Install the air cleaner housing (page 6-63).



KNOCK SENSOR

REMOVAL/INSTALLATION

Remove the thermostat housing (page 7-8).

Disconnect the knock sensor 3P (Blue) connector.

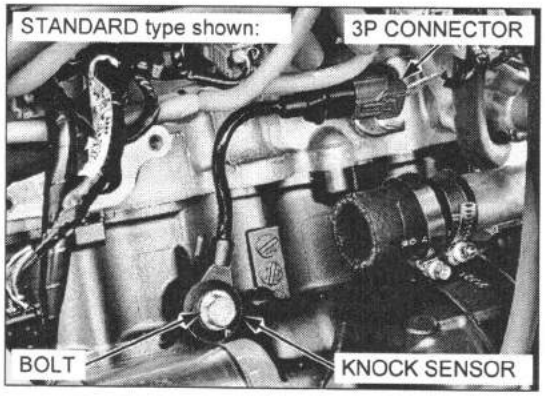
Remove the bolt and knock sensor.

Correctly route the wire (page 1-25).

Installation is in the reverse order of removal.

TORQUE:

Knock sensor mounting bolt:
22 N·m (2.2 kgf·m, 16 lbf·ft)



MAP SENSOR

OUTPUT VOLTAGE INSPECTION

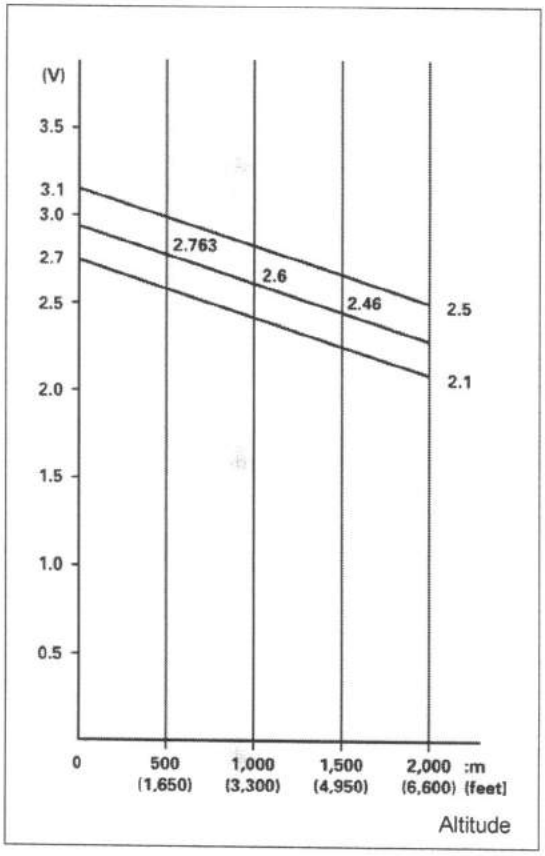
Connect the MCS.

- STANDARD/SP type (page 6-15)
- ABS type (page 6-16)

View the voltage with the MCS.

Standard: 2.7 – 3.1 V

The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,013 hPa).
The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmospheric pressure.
Check the altitude and be sure that the measured voltage falls within the specified value.



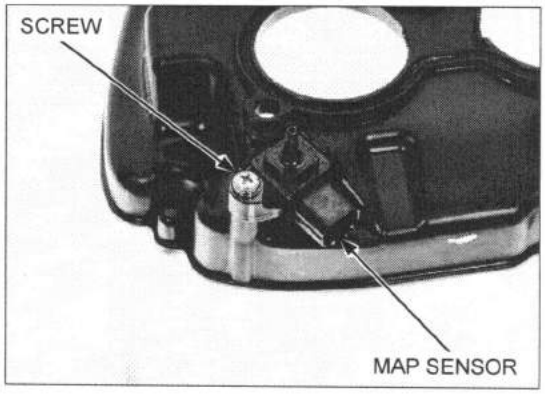
REMOVAL/INSTALLATION

Remove the air cleaner housing (page 6-62).

Remove the screw and MAP sensor from the air cleaner housing.

Install the removed parts in the reverse order of removal.

TORQUE:
MAP sensor mounting screw:
5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)



IAT SENSOR

REMOVAL/INSTALLATION

Lift and support the fuel tank (page 4-7).

'08 – '13 model: Disconnect the IAT sensor 2P (Gray) connector.

After '13 model: Disconnect the IAT sensor 2P (Black) connector.

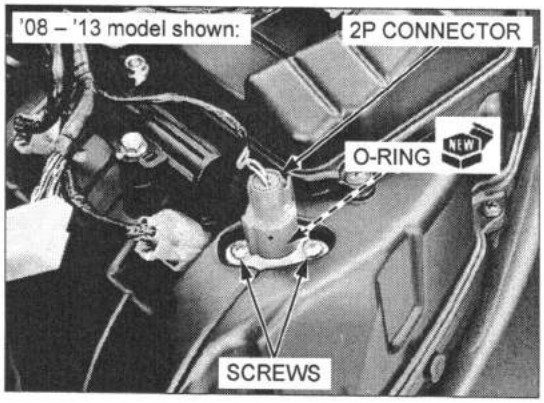
Remove the screws and IAT sensor from the air cleaner housing cover.

Remove the O-ring.

Installation is in the reverse order of removal.

NOTE:
- Replace the O-ring with a new one.

TORQUE:
IAT sensor mounting screw:
1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

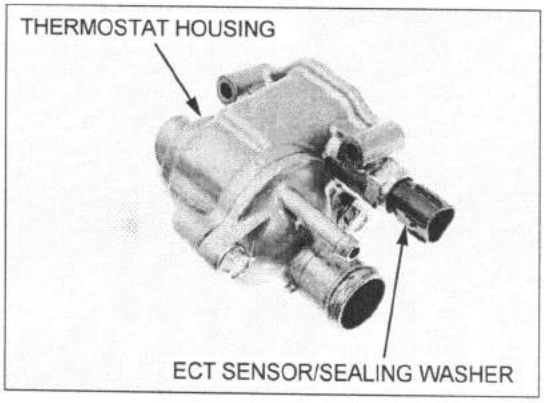


ECT SENSOR

REMOVAL

Remove the thermostat housing (page 7-8).

Remove the ECT sensor and sealing washer.



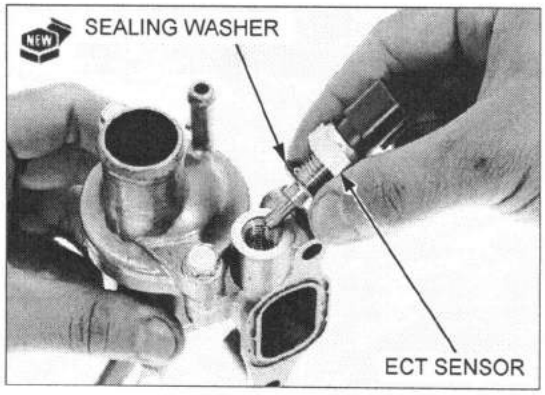
INSTALLATION

Always replace the sealing washer with a new one.

Install a new sealing washer and ECT sensor.
Tighten the ECT sensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Install the thermostat housing (page 7-10).



CMP SENSOR

REMOVAL/INSTALLATION

Remove the air cleaner housing (page 6-62).

Disconnect the CMP sensor 3P (Blue) connector.

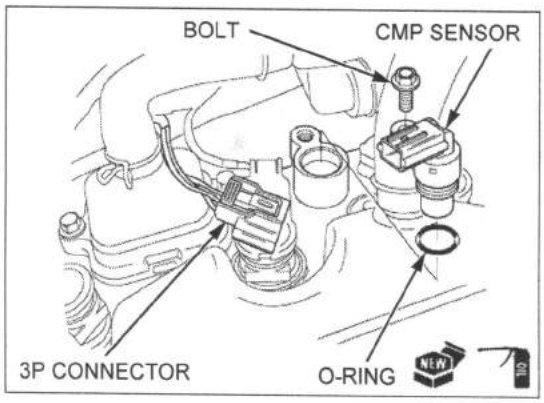
Remove the bolt, CMP sensor, and O-ring from the cylinder head cover.

Apply oil to a new O-ring and install it onto the CMP sensor.
Install the CMP sensor on to the cylinder head.

Tighten the bolt securely.

Connect the CMP sensor 3P (Blue) connector.

Install the air cleaner housing (page 6-63).



BANK ANGLE SENSOR

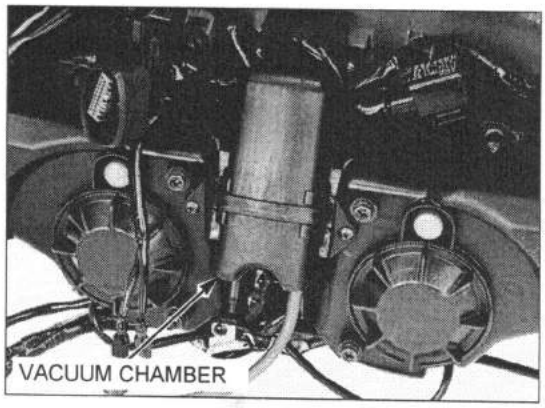
NOTE:

- For After '11 model, refer to disassembly/assembly procedures of the Upper Cowl (page 3-31).

REMOVAL/INSTALLATION ('08 – '11 model)

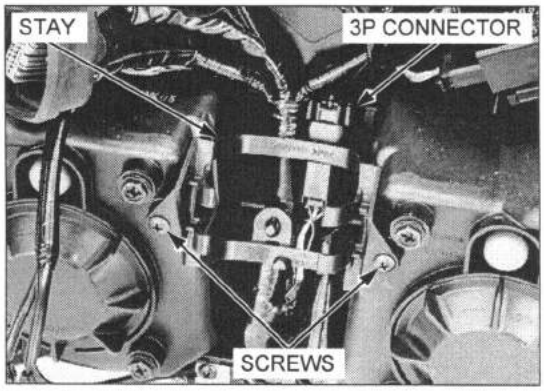
Remove the upper cowl (page 3-28).

Remove the vacuum chamber.



Remove the screws and vacuum chamber stay.

Remove the bank angle sensor 3P (Black) connector from the stay.

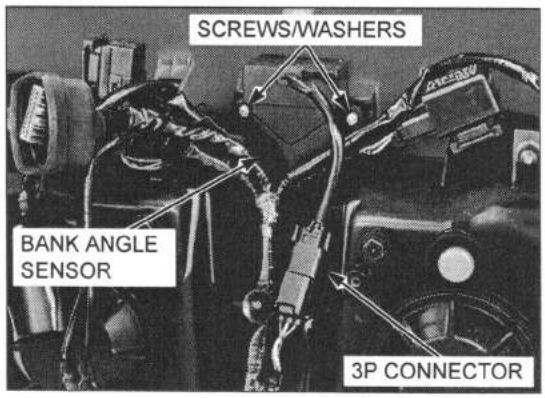


Disconnect the bank angle sensor 3P (Black) connector.

Remove the screws, washers, and bank angle sensor from the front cowl.

Installation is in the reverse order of removal.

TORQUE:
Bank angle sensor mounting screw:
1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

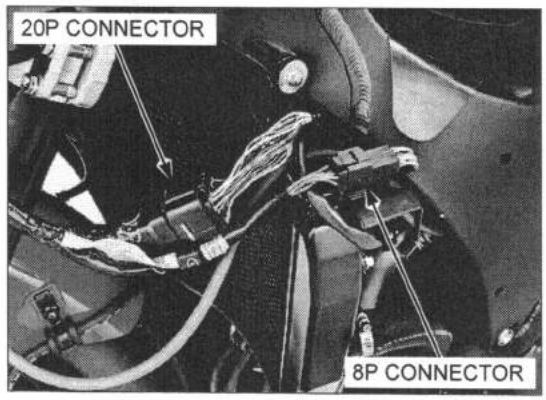


INSPECTION

System inspection

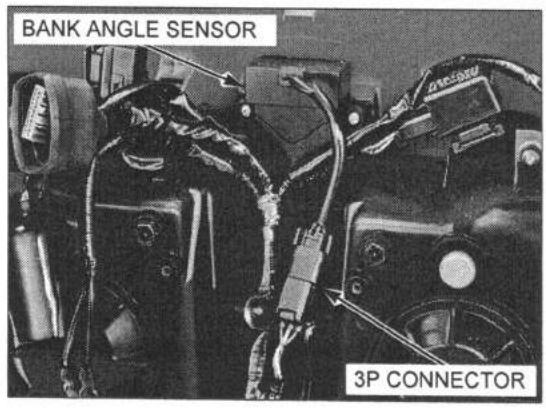
'08 – '11 model: Support the upper cowl securely.

Remove the upper cowl (page 3-28) with the sub-wire harness 20P (Black) and 8P (Black) connectors connected.



'08 – '11 model: Remove the bank angle sensor (page 6-80) with the 3P (Black) connector connected.

After '11 model: Remove the bank angle sensor (page 3-31).
Connect the bank angle sensor to the vehicle via the front sub-wire harness.



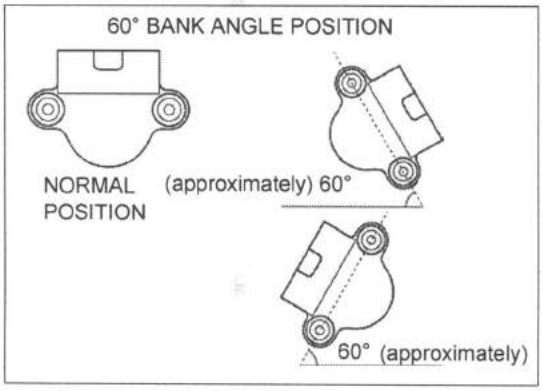
Place the bank angle sensor horizontally (normal position) as shown and turn the ignition switch ON and engine stop switch "".

The bank angle sensor is normal if the engine stop relay clicks and power supply is closed.

Incline the bank angle sensor approximately 60° to the left or right with the ignition switch ON and engine stop switch "".
The bank angle sensor is normal if the engine stop relay clicks and power supply is open.

If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON.

If the engine stop relay does not click, inspect the bank angle sensor line as follows:



Input line inspection

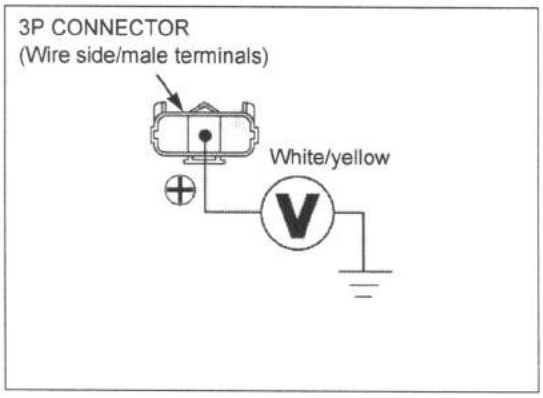
Disconnect the bank angle sensor 3P (Black) connector (page 6-80).

Connect the sub-wire harness 20P (Black) and 8P (Black) connectors (page 3-28).

Turn the ignition switch ON.

Measure the voltage between the bank angle sensor 3P (Black) connector at the wire side and ground.

Connection: White/yellow (+) – Ground (–)



There should be battery voltage.

If there is no battery voltage, inspect the following:

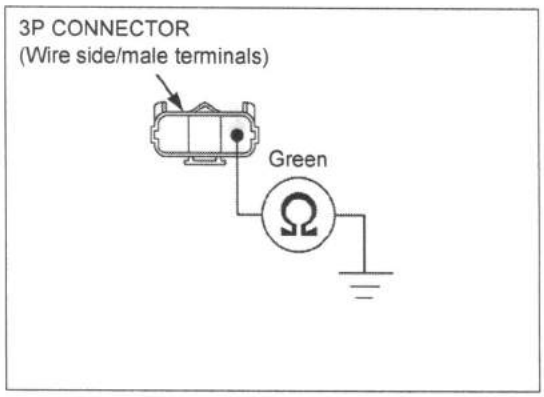
- Battery (page 18-7)
- Main fuse (30 A)
- Sub fuse (10 A)
  ('08 – '11 model: BANK ANGLE)
  (After '11 model: START)
- Ignition switch (page 21-24)
- Wire harness open circuit

Ground line inspection

Turn the ignition switch OFF.

Check for continuity between the bank angle sensor 3P (Black) connector at the wire side and ground.

Connection: Green – Ground



There should be continuity.

If there is no continuity, inspect the Green wire open circuit.

Engine stop relay coil line inspection

Turn the ignition switch ON and engine stop switch "".

Measure the voltage between the bank angle sensor 3P (Black) connector at the wire side and ground.

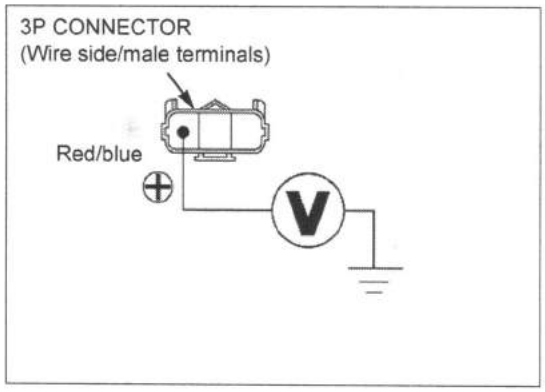
Connection: Red/blue (+) – Ground (–)

There should be battery voltage.

If there is no battery voltage, inspect the following:

- Red/blue wire open circuit
- Engine stop switch (page 21-25)
- Engine stop relay (page 6-83)

If all items are normal, replace the bank angle sensor with a known good one and recheck.



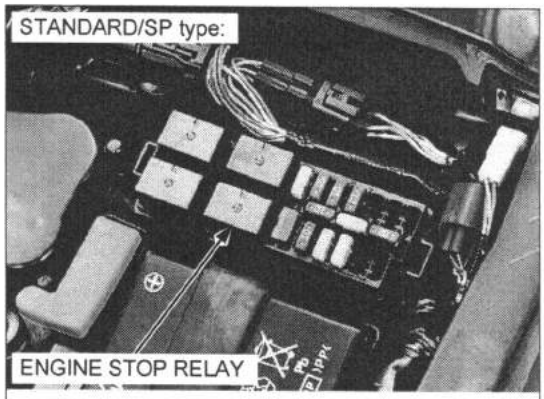
ENGINE STOP RELAY

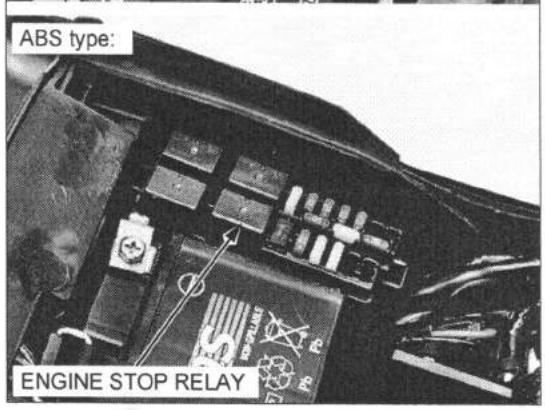
INSPECTION

Remove the seat (page 3-7).

Turn the ignition switch OFF.

Open the fuse/relay box and remove the engine stop relay.

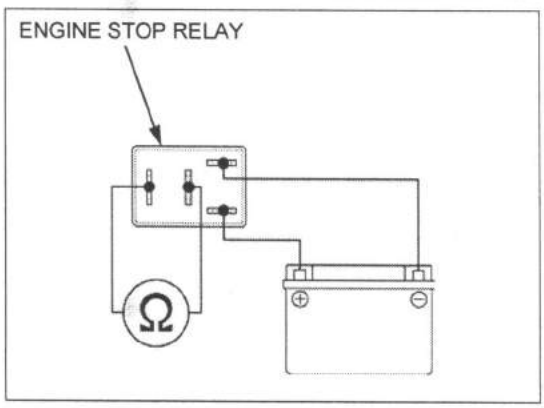




Connect an ohmmeter to the engine stop relay connector terminals.

Connect a 12 V battery to the following engine stop relay connector terminals.

There should be continuity only when the 12 V battery is connected.
If there is no continuity when the 12 V battery is connected, replace the engine stop relay.



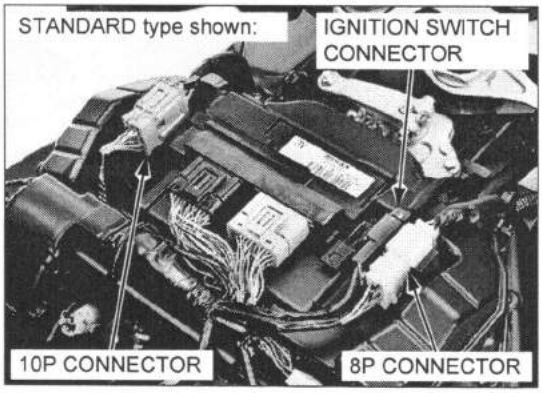
ECM

REMOVAL/INSTALLATION

Lift and support the fuel tank (page 4-7).

Disconnect the following:

- Left handlebar switch 10P (Blue) connector
- Right handlebar switch 8P (White) connector
- Ignition switch connector
  STANDARD/SP type: 2P (Brown)
  ABS type: 3P (Brown)



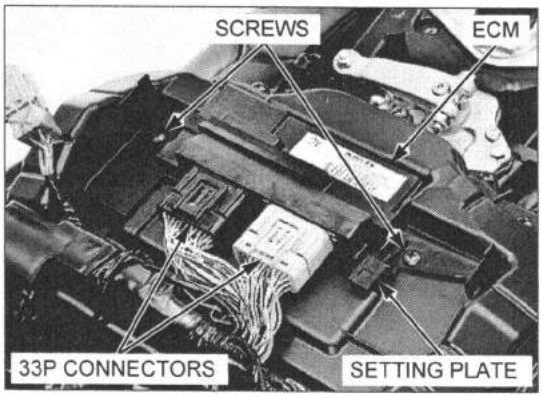
Remove the screws, setting plate, and ECM.

Disconnect the ECM 33P (Black) and 33P (Gray) connectors.

Remove the ECM.

Installation is in the reverse order of removal.

TORQUE:
ECM setting plate screw:
0.8 N·m (0.1 kgf·m, 0.6 lbf·ft)



POWER/GROUND LINE INSPECTION

ENGINE DOES NOT START (MIL DOES NOT BLINK)

1. ECM Power Input Voltage Inspection

Disconnect the ECM 33P connectors (page 6-84).

Turn the ignition switch ON and engine stop switch "".

Measure the voltage at the ECM 33P (Black) connector terminals and ground.

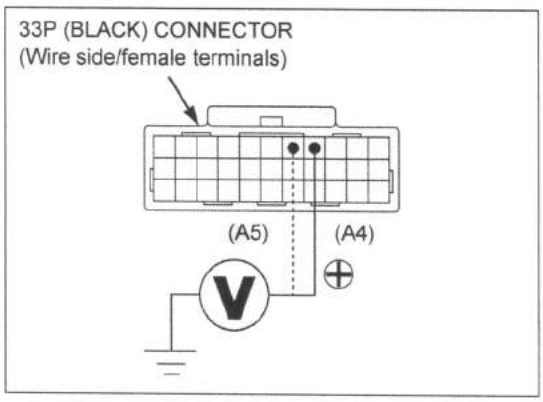
Connection: A4 (+) – Ground (–)
A5 (+) – Ground (–)

TOOL:
Test probe **07ZAJ-RDJA110**

Is there battery voltage?

YES – GO TO STEP 2.

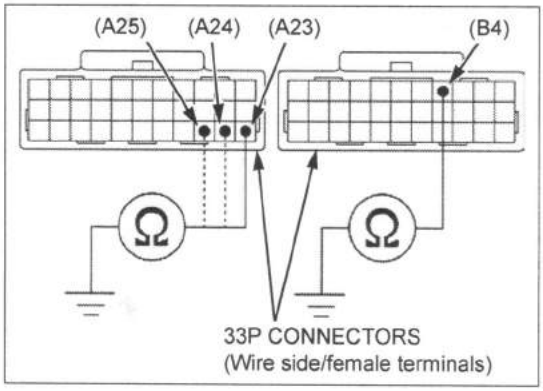
NO – GO TO STEP 3.



2. ECM Ground Line Inspection

Turn the ignition switch OFF.
Check for continuity between the ECM 33P connector terminals and ground.

Connection: B4 – Ground
A23 – Ground
A24 – Ground
A25 – Ground



TOOL:
Test probe **07ZAJ-RDJA110**

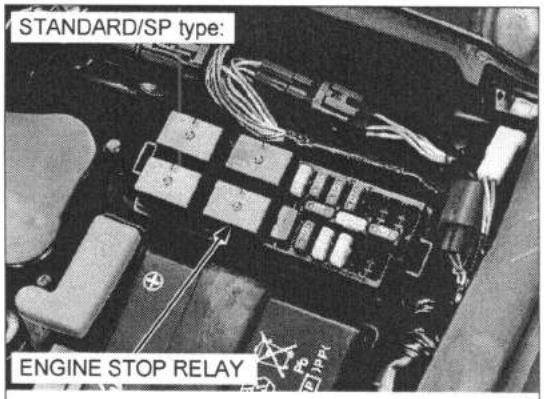
Is there continuity?

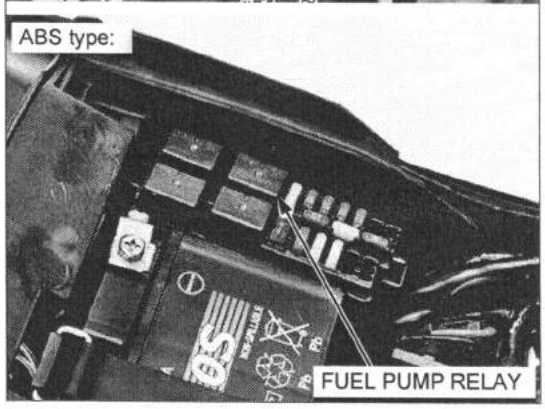
YES – Replace the ECM with a known good one and recheck.

NO – Open circuit in Ground line

3. Engine Stop Relay Inspection 1

Turn the ignition switch OFF.
Open the fuse/relay box and remove the engine stop relay.





Turn the ignition switch OFF.

Turn the ignition switch ON and engine stop switch "⟳".

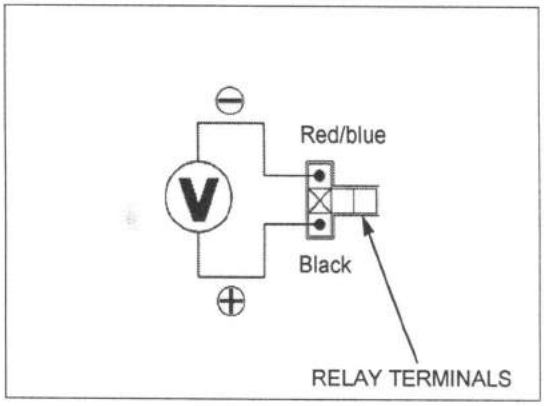
Measure the voltage at the engine stop relay terminals.

Connection: Black (+) – Red/blue (–)

Is there battery voltage?

YES – GO TO STEP 4.

NO – • Inspect the bank angle sensor (page 6-80).
• Inspect the engine stop switch (page 21-25).
• Blown fuse (BANK ANGLE 10 A)



4. **Engine Stop Relay Inspection 2**

Turn the ignition switch OFF.
Jump the engine stop relay connector terminals.

- Always use an appropriate jumper wire to prevent damage to the connector terminals.

Connection: Red/white – Black/white

Measure the voltage at the ECM connector terminals and ground.

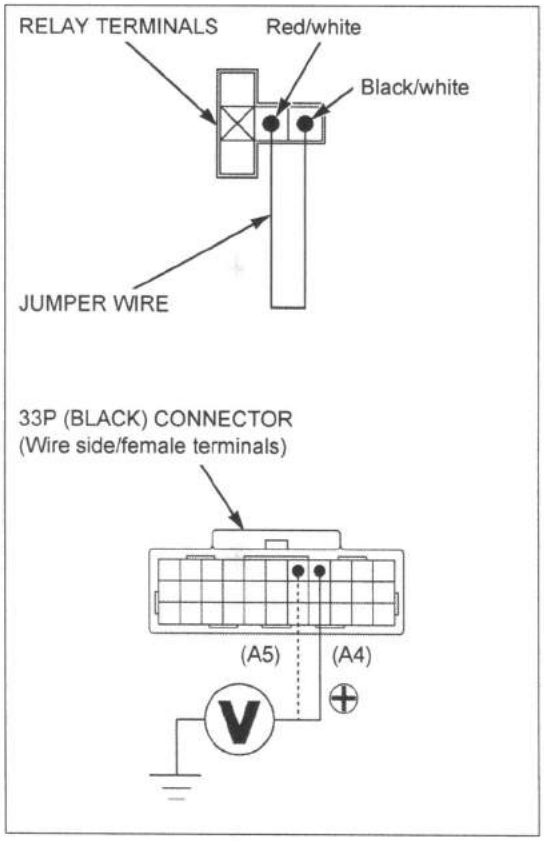
Connection: A4 (+) – Ground (–)
A5 (+) – Ground (–)

TOOL:
Test probe **07ZAJ-RDJA110**

Is there battery voltage?

YES – Inspect the engine stop relay (page 6-83).

NO – • Open circuit in power input line (Black/white or Red/white) between the battery and ECM
• Blown Fuse (FI 20 A)



SECONDARY AIR SUPPLY SYSTEM

SYSTEM INSPECTION

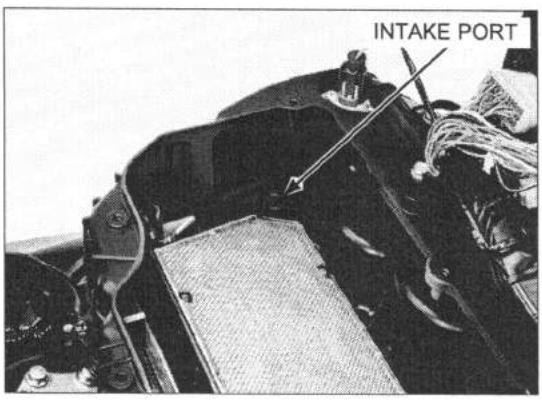
Start the engine and warm it up until the coolant temperature is 80°C (176°F).

Stop the engine.

Remove the air cleaner upper cover (page 4-12).

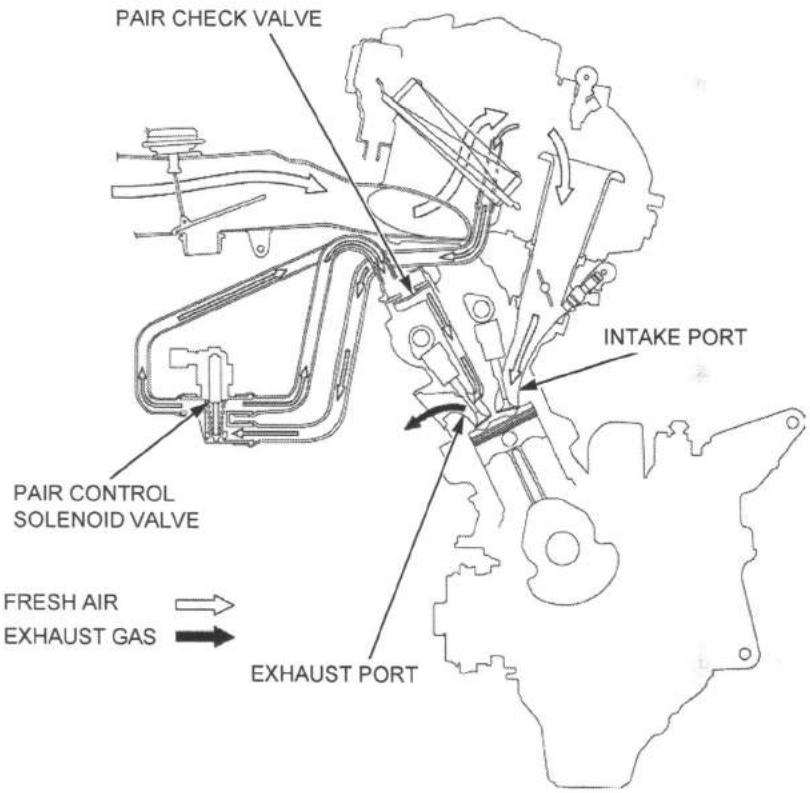
Check that the secondary air intake port is clean and free of carbon deposits.

Check the PAIR check valves if the port for carbon fouling (page 9-8).



Start the engine and open the throttle slightly to be certain that air is sucked in through the air intake port.

If the air is not drawn in, check the air suction hoses for clogs and PAIR control solenoid valve.

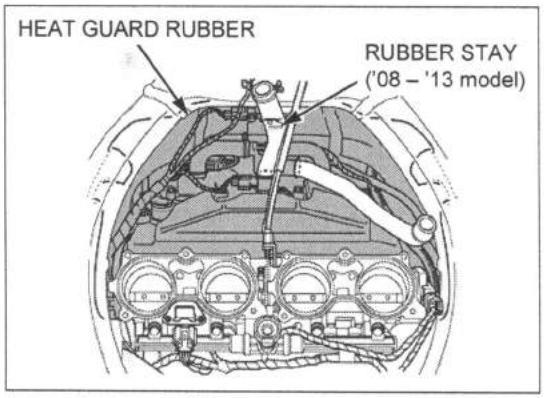


PAIR CONTROL SOLENOID VALVE

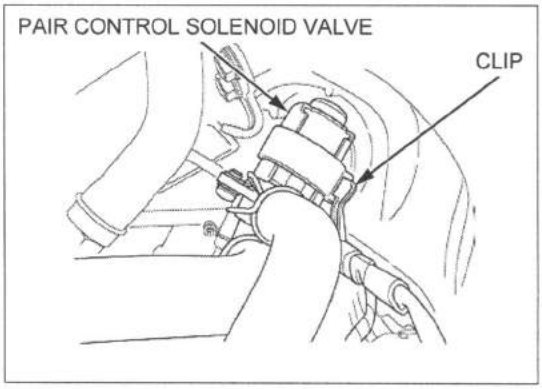
REMOVAL/INSTALLATION

Remove the air cleaner housing (page 6-62).

Pull up the front of the heat guard rubber.

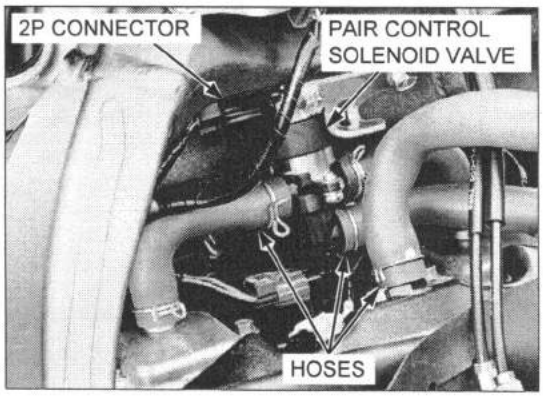


Remove the direct ignition coil wire harness clip from the PAIR control solenoid valve.



Disconnect the PAIR control solenoid valve 2P (Black) connector.
Disconnect the PAIR air suction hoses.

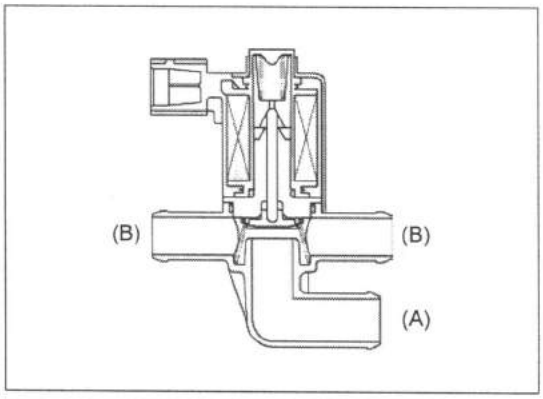
Installation is in the reverse order of removal.



INSPECTION

Remove the PAIR control solenoid valve.

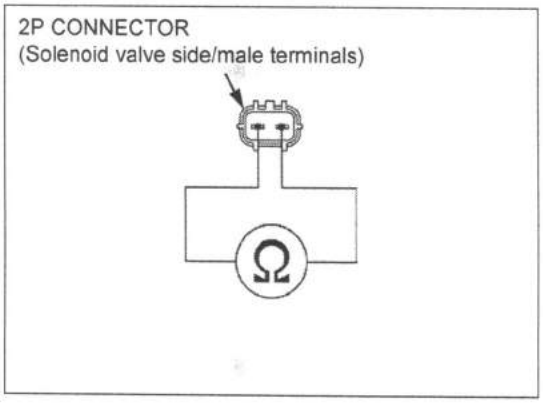
Check that air does not flow (A) to (B) when a 12 V battery is connected to the PAIR control solenoid valve terminals. Air should flow (A) to (B) when there is no voltage applied to the PAIR valve terminals.



Check the resistance between the terminals of the PAIR control solenoid valve.

Standard: 23 – 27 (20 C/68 F)

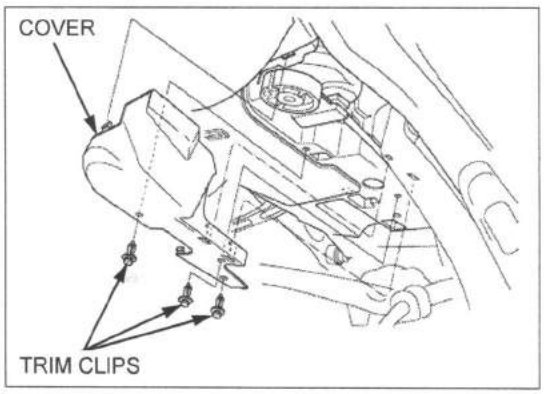
If the resistance is out of specification, replace the PAIR control solenoid valve.



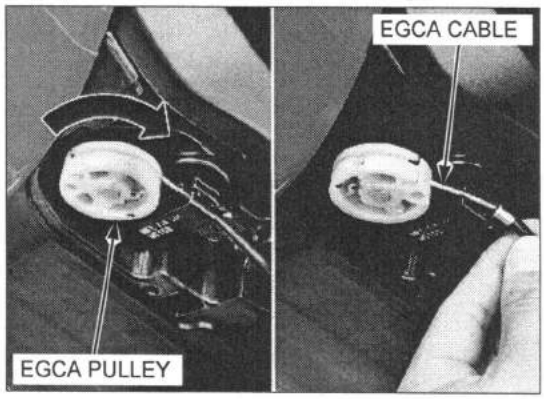
EGCA

REMOVAL/INSTALLATION (STANDARD/SP type)

Remove the trim clips and EGCA cover.

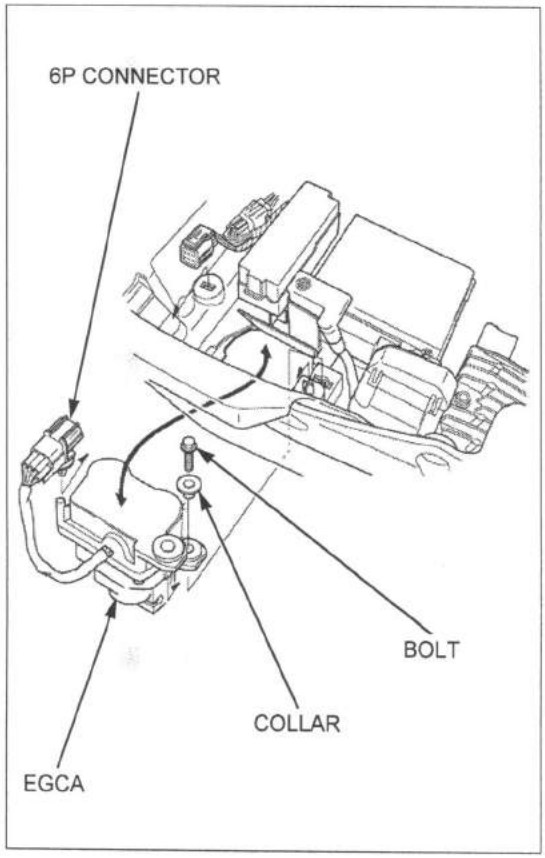


Turn the EGCA pulley clockwise and disconnect the EGCA cable from the EGCA pulley.



Disconnect the EGCA 6P (Black) connector.
Remove the bolt, collar and EGCA.

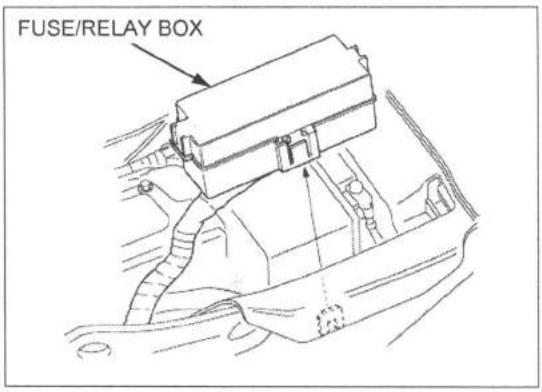
Installation is in the reverse order of removal.



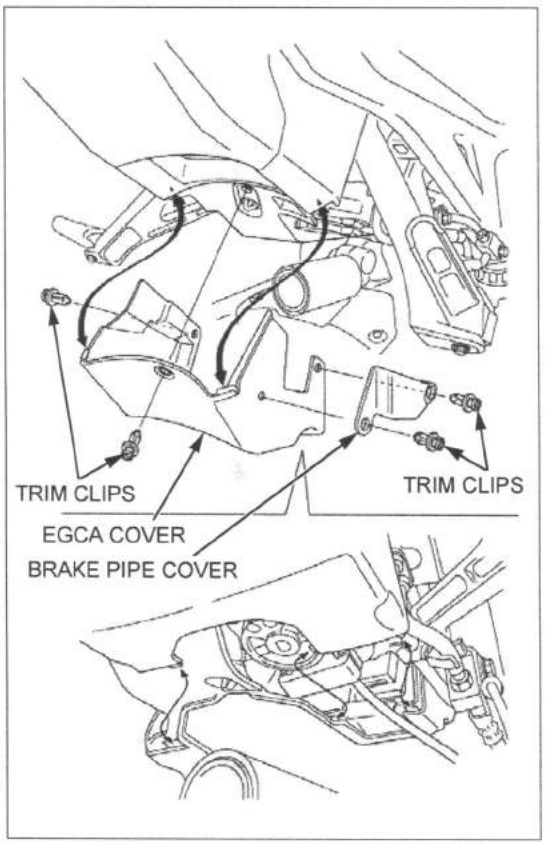
REMOVAL/INSTALLATION (ABS type)

Lift and support the fuel tank (page 4-7).

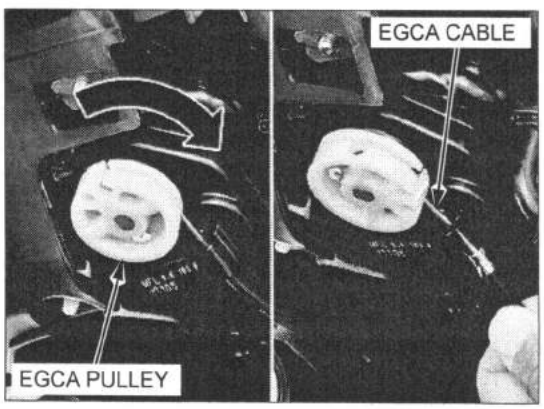
Remove the fuse/relay box.



Remove the trim clips, brake pipe cover, and EGCA cover.

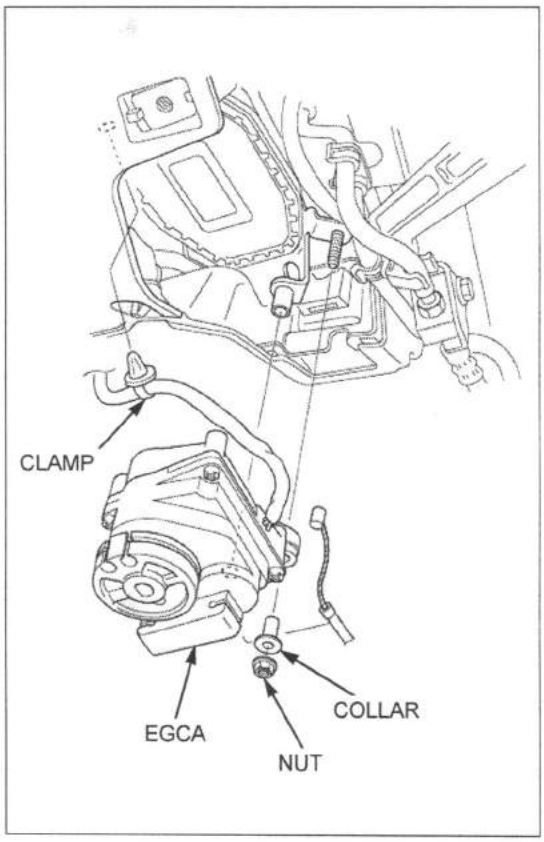


Turn the EGCA pulley clockwise and disconnect the EGCA cable from the EGCA pulley.



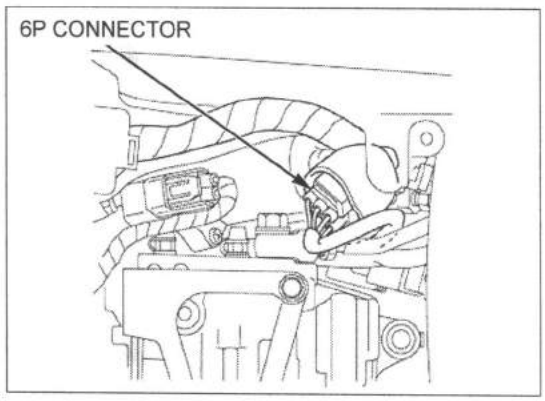
Release the EGCA wire clamp.

Remove the nut, collar, and EGCA.



Disconnect the EGCA 6P (Black) connector.

Installation is in the reverse order of removal.

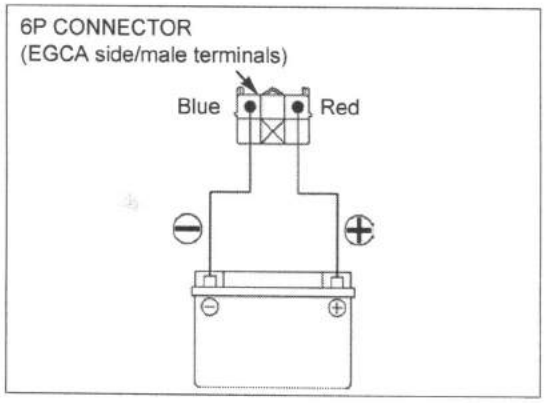


INSPECTION

Connect a 12 V battery to the EGCA 6P (Black) connector terminals and check that the EGCA operation.

Connection: Red (+) – Blue (–)
(EGCA side terminals)

If the EGCA does not turn, replace it with a new one.

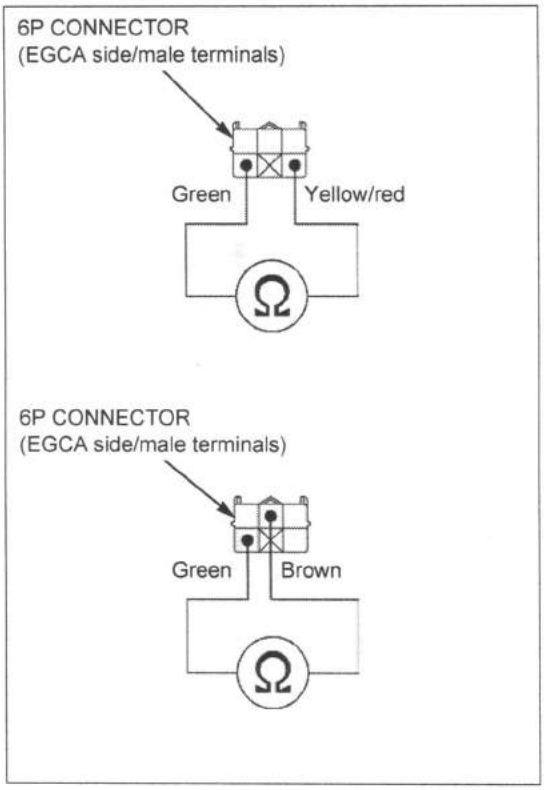


Measure the resistance between the EGCA 6P (Black) connector terminals.

Connection: Yellow/red – Green
Standard: 3.5 – 6.5 k

Connection: Brown – Green
Standard: 0 – 5 k

If the resistance is out of range, replace the EGCA.



INTAKE AIR DUCT CONTROL

INTAKE AIR DUCT VALVE DIAPHRAGM

INSPECTION

'08 – '11 model: Remove the intake air duct from the middle cowl (page 3-21).

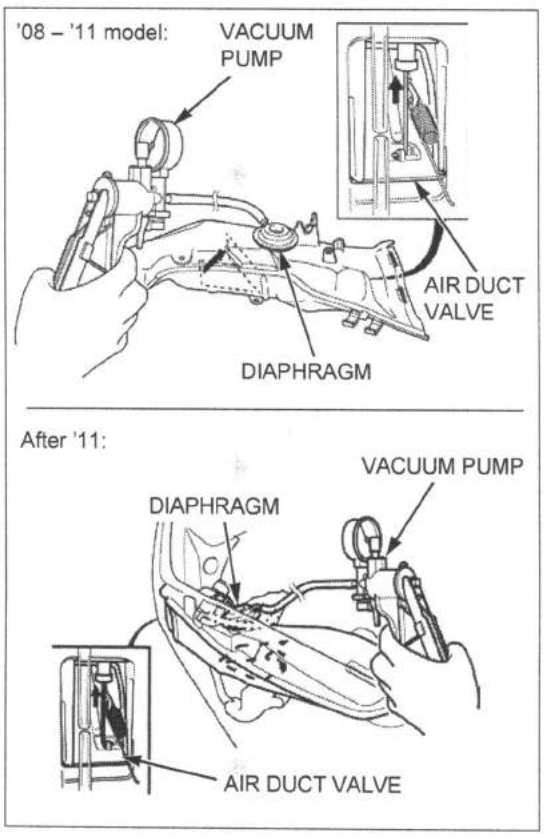
After '11 model: Remove the air duct cover (page 3-15).

Disconnect the vacuum hose from the diaphragm.

Connect a vacuum pump to the diaphragm and apply specified vacuum.

SPECIFIED VACUUM: 250 mm Hg (9.8 in Hg)

The vacuum should hold and the air duct valve should remain open.



REMOVAL/INSTALLATION (After '11 model)

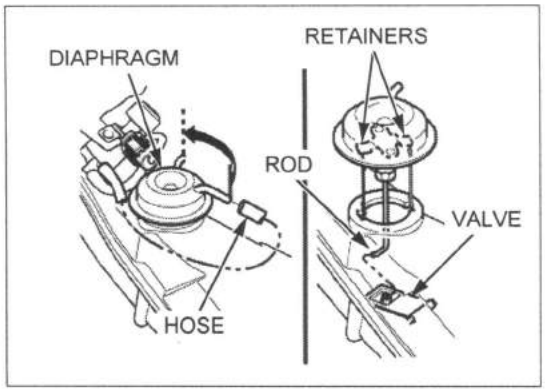
Remove the middle cowl (page 3-18).

Disconnect the vacuum hose.

Turn the diaphragm counterclockwise while holding down it to release the retainers from the duct.

Disconnect the rod from the valve and remove the diaphragm.

Installation is in the reverse order of removal.



NOTE:

- When connecting the rod, insert the rod into the valve from the inside.
- Set the diaphragm so its hose joint is facing the duct elbow (rearward).

IDC SOLENOID VALVE

REMOVAL/INSTALLATION

'08 – '11 model: Refer to Disassembly/Assembly of Middle Cowl (page 3-21).

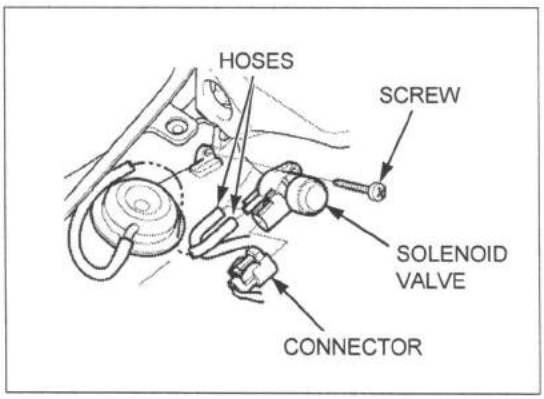
After '11 model: Remove the air duct cover (page 3-15).

Disconnect the 2P (Gray) connector.

Remove the tapping screw and solenoid valve from the air duct.

Disconnect the vacuum hoses to remove the IDC solenoid valve.

Route the hoses and wire properly (page 1-66). Installation is in the reverse order of removal.

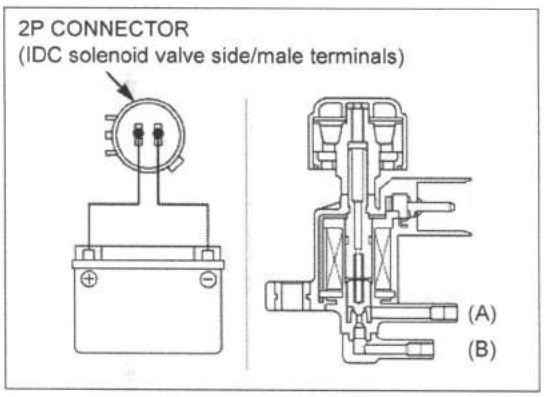


TORQUE: Screw: 1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

INSPECTION

Check that air flows (A) to (B) only when a 12 V battery is connected to the IDC solenoid valve terminal.

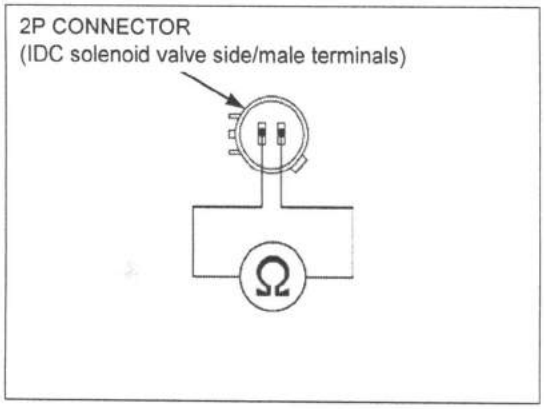
Connection: White terminal (+) – Yellow terminal (–)



Check the resistance between the terminals of the IDC solenoid valve.

STANDARD: 28 – 32 (20 C/68 F)

If the resistance is out of specification, replace the IDC solenoid valve.



ONE-WAY VALVE

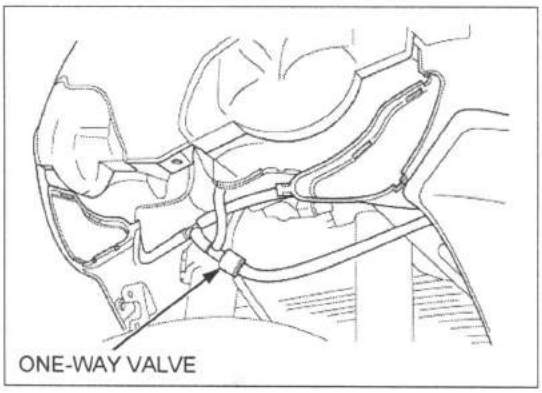
REMOVAL/INSTALLATION

Remove the air intake cover (page 3-14).

Remove the one-way valve by disconnecting the vacuum hoses.

Correctly route the vacuum hoses (page 1-25).

Installation is in the reverse order of removal.

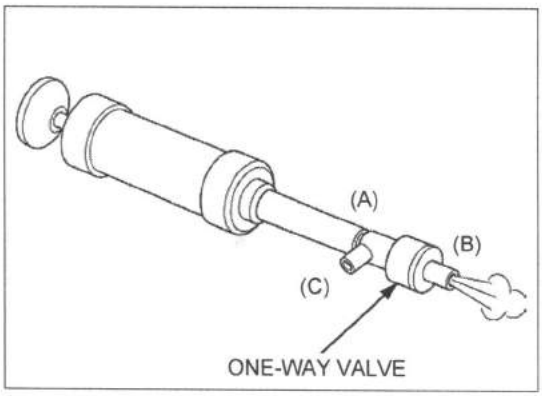


INSPECTION

Check the one-way valve operation as follows:

- Air should flow (A) to (B)
- Air should flow (A) to (C)
- Air should not flow (B) to (A)
- Air should not flow (B) to (C)

If the operation is incorrect, replace the one-way valve.



VACUUM CHAMBER

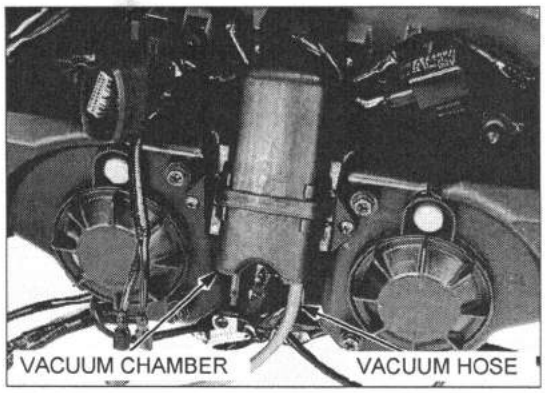
REMOVAL/INSTALLATION

Remove the upper cowl (page 3-28).

Remove the vacuum chamber from the stay.

Disconnect the vacuum hose from the vacuum chamber.

Installation is in the reverse order of removal.



INSPECTION

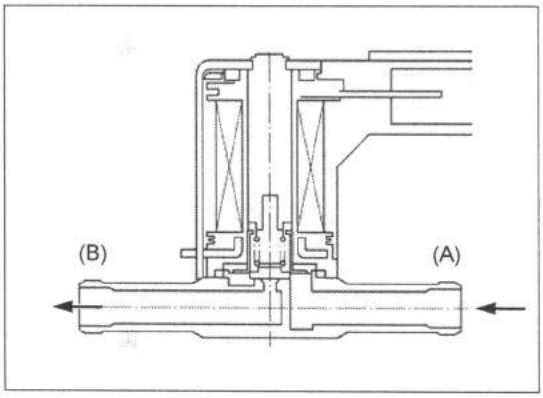
Check the vacuum chamber for damage and scratches, replace if necessary.

EVAP PURGE CONTROL SOLENOID VALVE/CANISTER ((AC) TYPE)

INSPECTION

Remove the EVAP purge control solenoid valve (page 6-96).

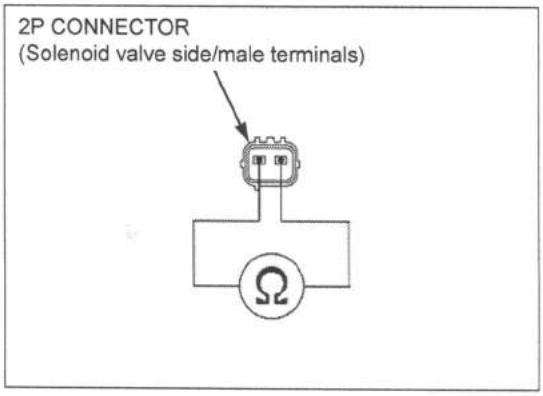
Check that air does not flow (A) to (B) when a 12V battery is connected to the EVAP purge control solenoid valve terminals.



Check the resistance between the terminals of the EVAP purge control solenoid valve.

STANDARD: 30 – 34 (20 C/68 F)

If the resistance is out of specification, replace the EVAP purge control solenoid valve.



REMOVAL/INSTALLATION

STANDARD/ABS type

Lift and support the fuel tank (page 4-7).

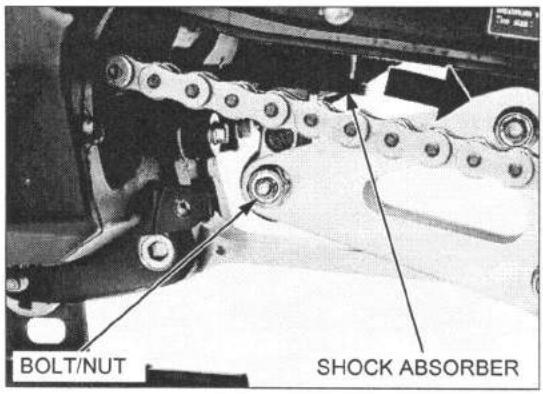
Support the motorcycle and raise the rear wheel off the ground.

Remove the muffler (page 3-53).

Support the rear wheel securely.

Remove the shock absorber lower mounting nut and bolt.

Move the shock absorber rearward.



Disconnect the following:

- EVAP purge control solenoid valve-to-throttle body hose
- EVAP purge control solenoid valve 2P (Black) connector
- Fuel tank breather hose (to fuel tank)
- Canister-to-EVAP purge control solenoid valve hose
- EVAP canister drain hose

Remove the bolts, washers, grommets, collars, and EVAP canister.

Remove the bolts, EVAP purge control solenoid valve, bracket, collars, and grommets.

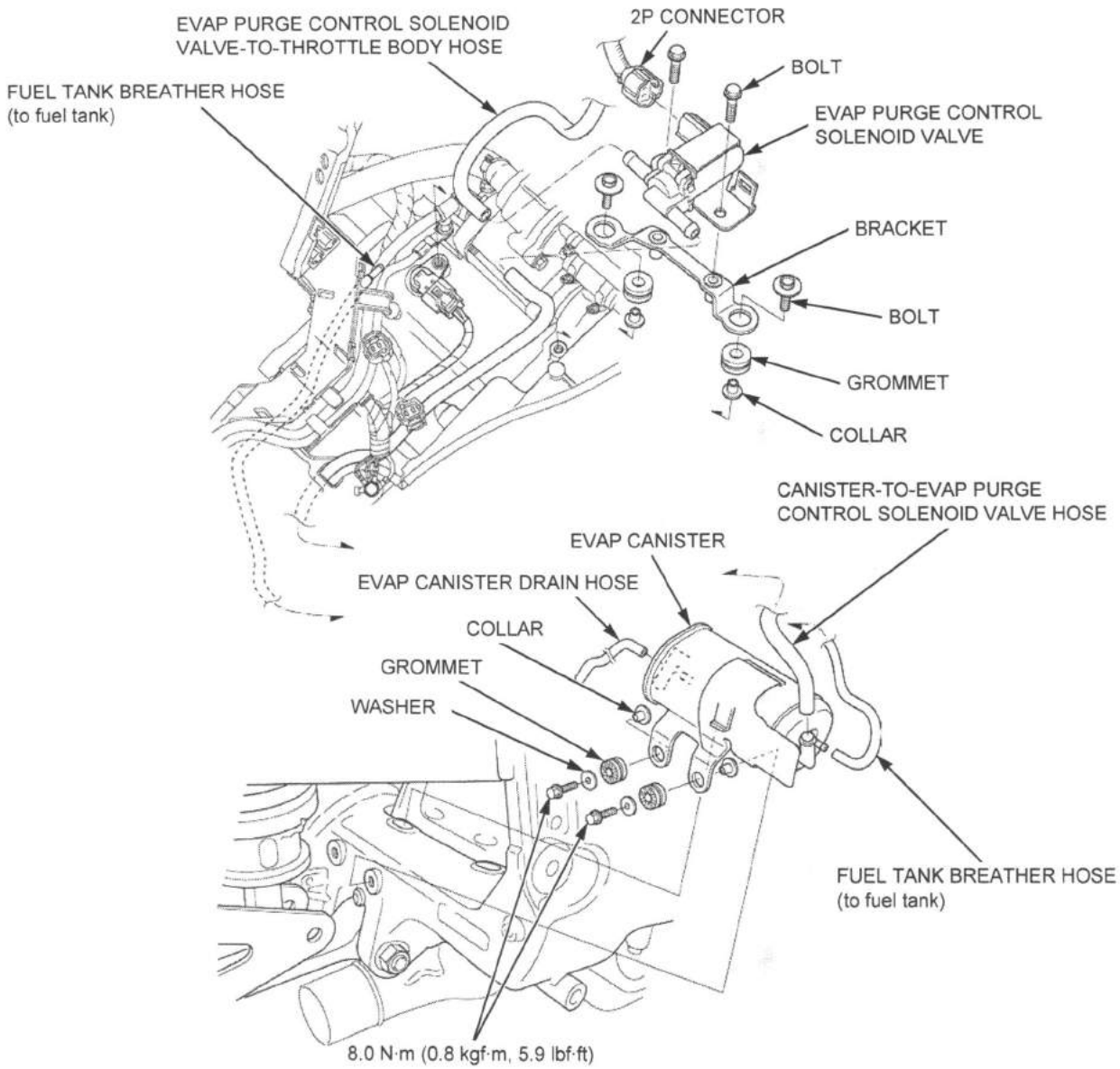
Correctly route the hoses (page 1-25).

Installation is in the reverse order of removal.

TORQUE:

Canister mounting bolt:
8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)

Shock absorber mounting nut:
44 N·m (4.5 kgf·m, 32 lbf·ft)


EVAP PURGE CONTROL SOLENOID VALVE-TO-THROTTLE BODY HOSE
2P CONNECTOR
BOLT
FUEL TANK BREATHER HOSE (to fuel tank)
EVAP PURGE CONTROL SOLENOID VALVE
BRACKET
BOLT
GROMMET
COLLAR
CANISTER-TO-EVAP PURGE CONTROL SOLENOID VALVE HOSE
EVAP CANISTER
EVAP CANISTER DRAIN HOSE
COLLAR
GROMMET
WASHER
FUEL TANK BREATHER HOSE (to fuel tank)
8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)

SP type

Lift and support the fuel tank (page 4-7).

Remove the left middle cowl (page 3-24).

Disconnect the following from the EVAP canister:

- EVAP canister drain hose
- EVAP canister-to-EVAP purge control solenoid valve hose
- Fuel tank breather hose

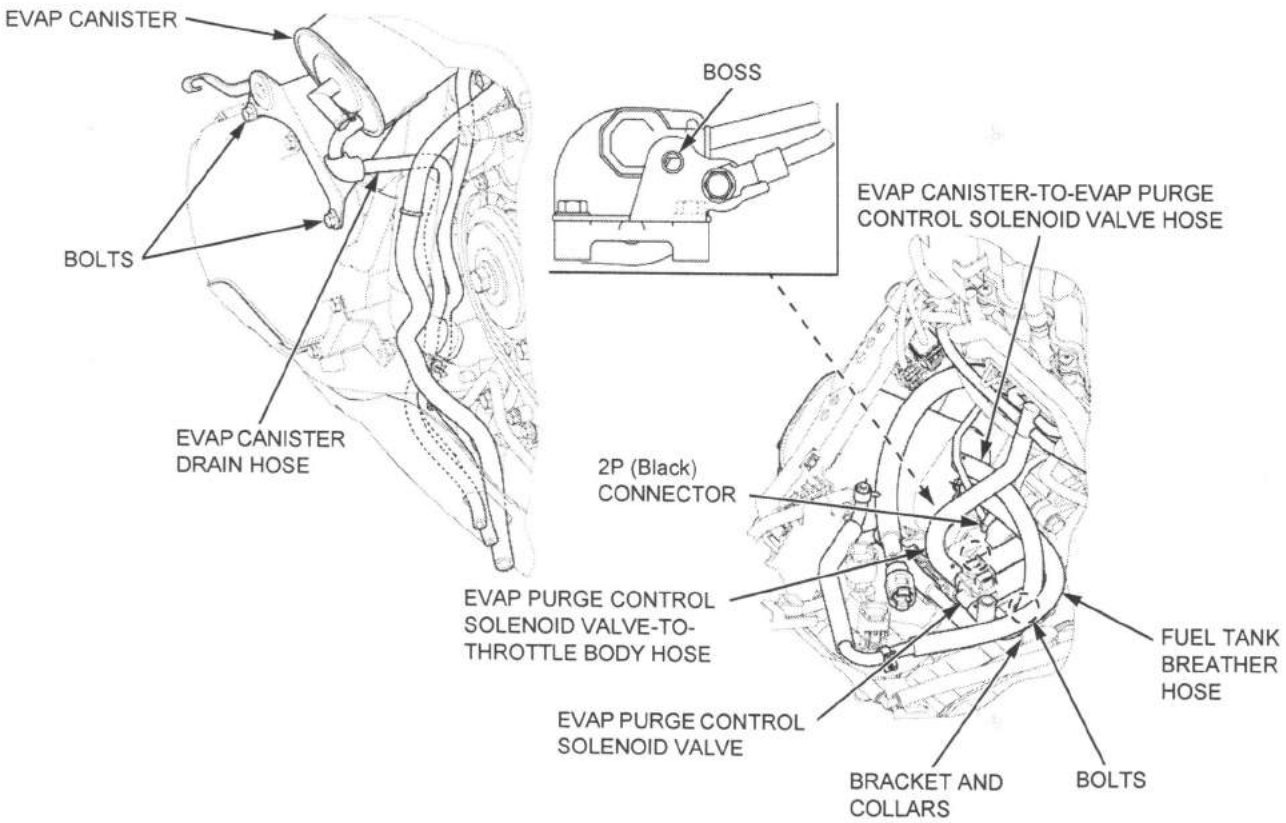
Remove the bolts and the EVAP canister from the stay boss on the starter motor.

Disconnect the following from the EVAP purge control solenoid valve.

- EVAP purge control solenoid valve 2P (Black) connector
- EVAP purge control solenoid valve-to-throttle body hose

Remove the bolts, EVAP purge control solenoid valve, bracket, and collars.

Installation is in the reverse order of removal.



O_2 SENSOR (After '11 model)

REPLACEMENT

NOTE:

- Handle the O_2 sensor with care.
- Do not get grease, oil, or other materials in the O_2 sensor air hole, or it may be damaged.
- Do not service the O_2 sensor while it is hot.

STANDARD/ SP type: Remove the following.

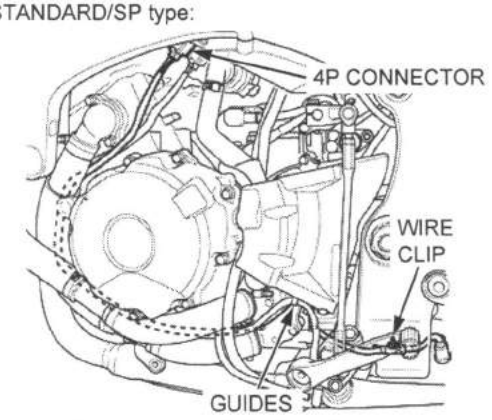
- lower cowl (page 3-16)
- left middle cowl (page 3-18)

ABS type: Lift and support the fuel tank (page 4-7).

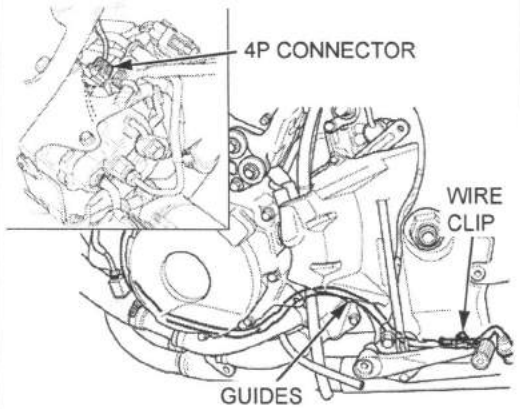
Disconnect the O_2 sensor 4P (Black) connector.

Remove the wire clip from the frame.

STANDARD/SP type:



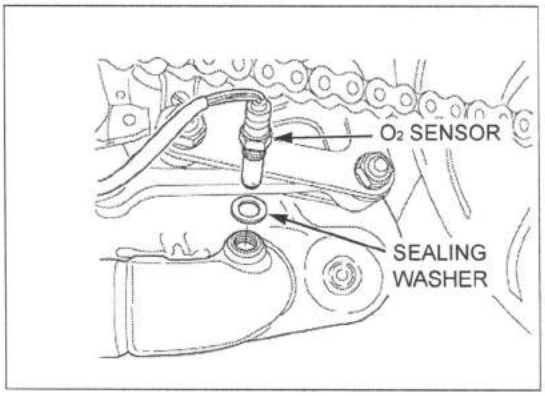
ABS type:



Be careful not to damage the sensor wire. Remove the O_2 sensor and sealing washer.

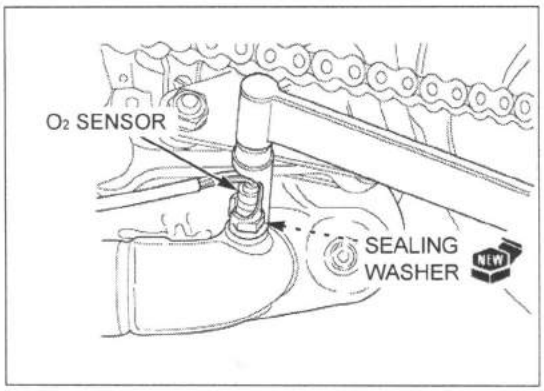
NOTE:

- Do not use an impact wrench while removing or installing the O_2 sensor, or it may be damaged.



Install a new sealing washer and O_2 sensor, and tighten it.

TORQUE: 24.5 N·m (2.5 kgf·m, 18 lbf·ft)



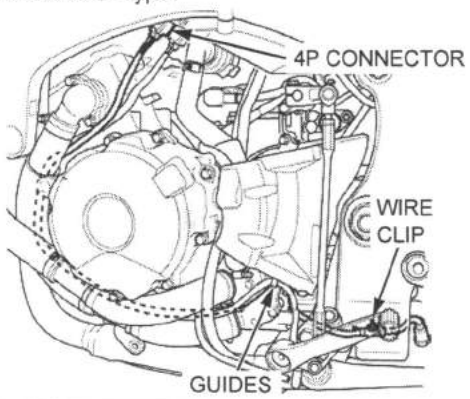
Route the O_2 sensor wire properly and connect the 4P (Black) connector (page 1-66).

STANDARD/ SP type: Install the following.

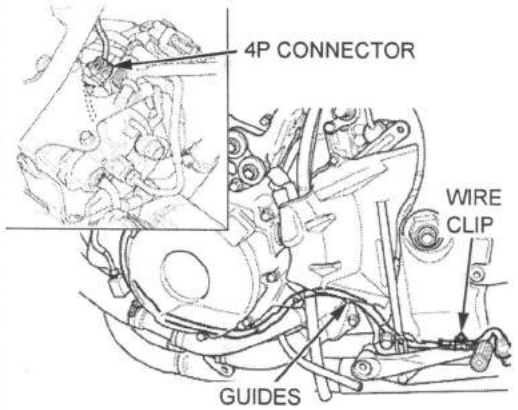
- left middle cowl (page 3-20)
- lower cowl (page 3-17)

ABS type: Remove the support and close the fuel tank (page 4-9).

STANDARD/SP type:



ABS type:



7. COOLING SYSTEM

SYSTEM FLOW PATTERN 7-2

SERVICE INFORMATION 7-3

TROUBLESHOOTING 7-4

SYSTEM TESTING 7-5

COOLANT REPLACEMENT 7-6

THERMOSTAT 7-8

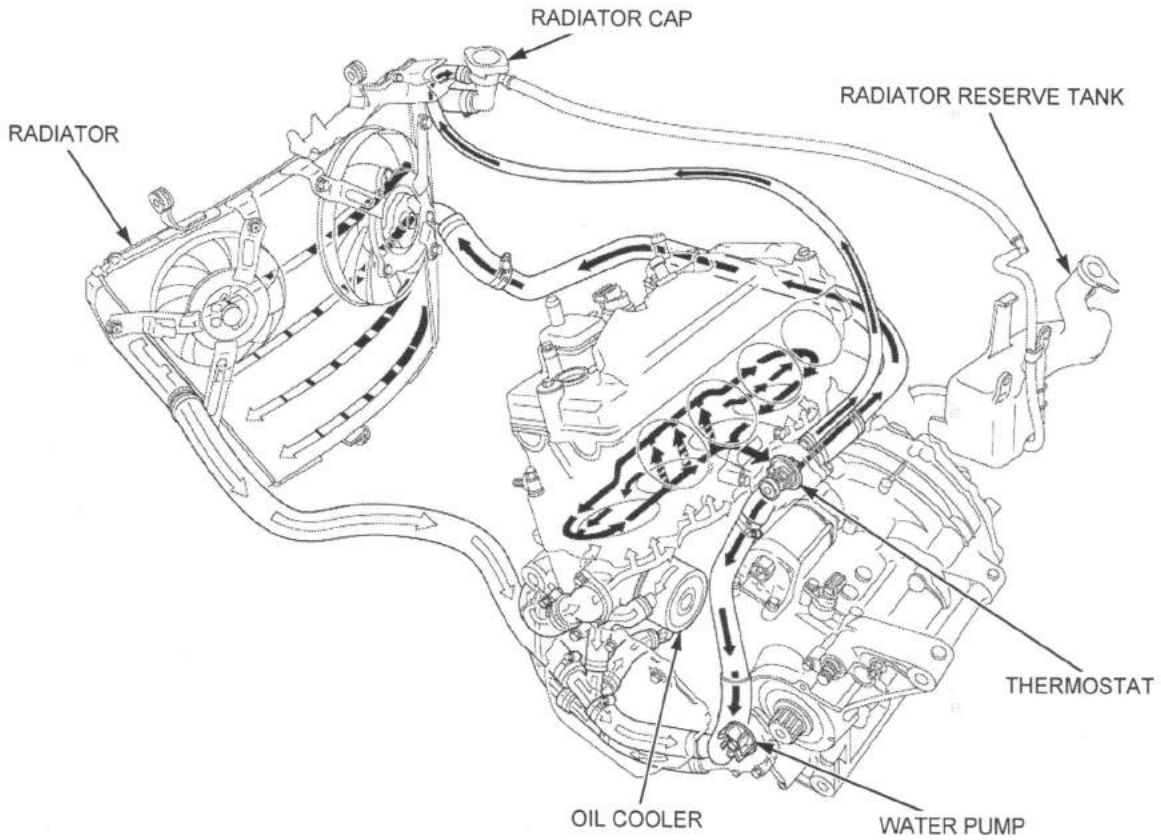
RADIATOR/COOLING FAN 7-11

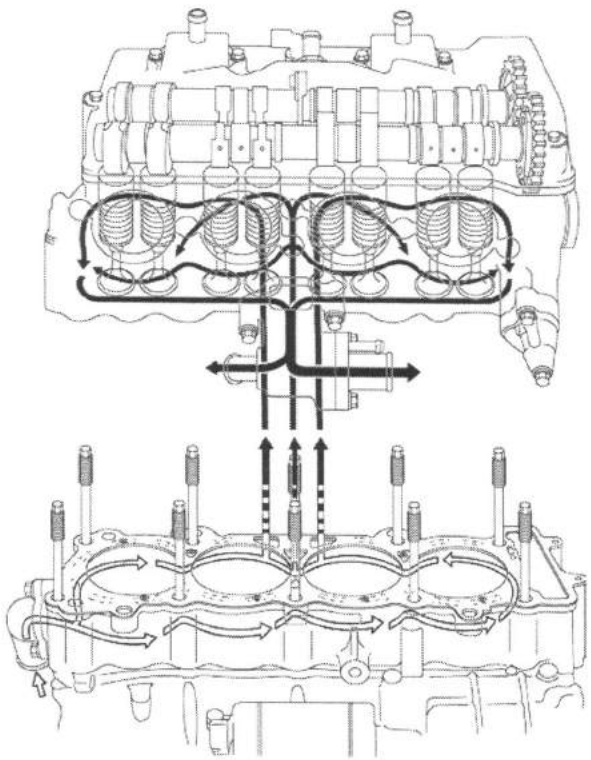
WATER PUMP 7-25

RADIATOR RESERVE TANK 7-28

FAN MOTOR RELAY 7-28

SYSTEM FLOW PATTERN





SERVICE INFORMATION

GENERAL

⚠WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you.
Always let the engine and radiator cool down before removing the radiator cap.

NOTICE

Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine installed in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- For ECT sensor inspection (page 21-21).
- For ECT sensor remove/installation (page 6-79).

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	3.0 liters (3.2 US qt, 2.6 Imp qt)
	Reserve tank	0.34 liter (0.36 US qt, 0.30 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm^2, 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate free corrosion inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

TORQUE VALUES

Water pump assembly bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
Water pump drain bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
Thermostat housing cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
Fan motor shroud mounting bolt	8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)	
Left fan motor mounting screw	2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)	
Left cooling fan mounting nut	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	Apply locking agent to the threads.
Right fan motor mounting nut	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)	
Right cooling fan mounting nut	2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)	Apply locking agent to the threads.
Hose clamp screw (output side)	1.7 N·m (0.2 kgf·m, 1.3 lbf·ft)	

TROUBLESHOOTING

Engine temperature too high
- Faulty engine coolant temperature meter or ECT sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passage blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan motor relay
- Faulty water pump

Engine temperature too low
- Faulty temperature gauge or ECT sensor
- Thermostat stuck open
- Faulty fan motor relay

Coolant leak
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose

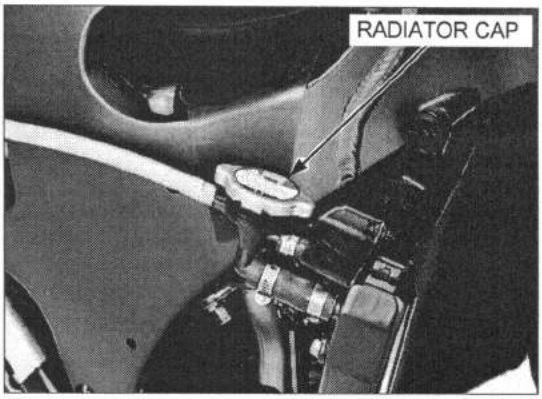
SYSTEM TESTING

COOLANT (HYDROMETER TEST)

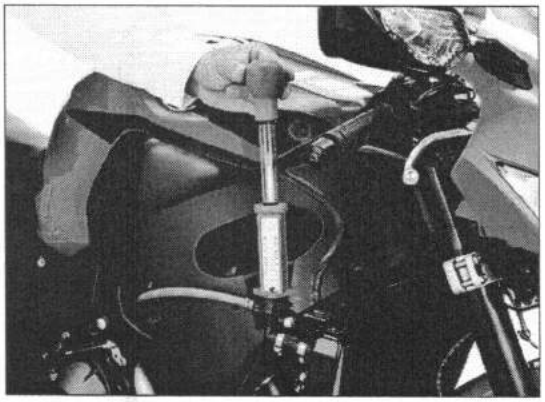
Remove the right middle cowl (page 3-18).

Always let the engine and radiator cool down before removing the radiator cap.

Remove the radiator cap.



Test the coolant gravity using a hydrometer (see the Coolant Gravity Chart below).
For maximum corrosion protection, a 1:1 solution of ethylene glycol and distilled water is recommended (page 7-6).
Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

		Coolant temperature °C (°F)										
		0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
Coolant ratio%	5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
	10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
	15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
	20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
	25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
	30	1.053	1.052	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
	35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
	40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
	45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
	50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
	55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
	60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

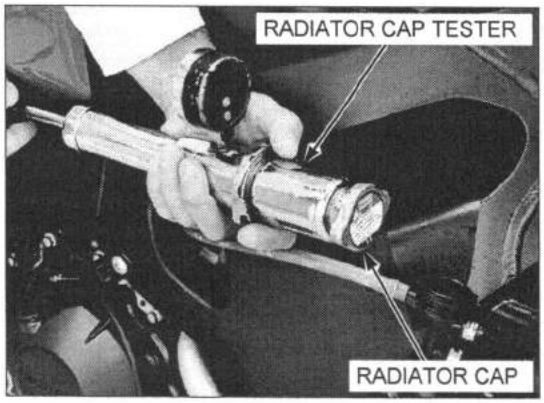
RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap (page 7-5).

Before installing the cap in the tester, wet the sealing surfaces.

Pressure test the radiator cap.
Replace the radiator cap if it does not hold pressure or if relief pressure is too high or too low.
It must hold specified pressure for at least 6 seconds.

RADIATOR CAP RELIEF PRESSURE:
108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)

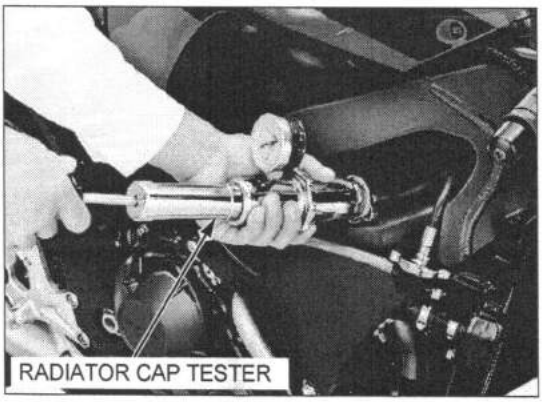


Pressure the radiator, engine and hoses, and check for leaks.

NOTICE

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

Repair or replace components if the system will not hold specified pressure for at least 6 seconds.



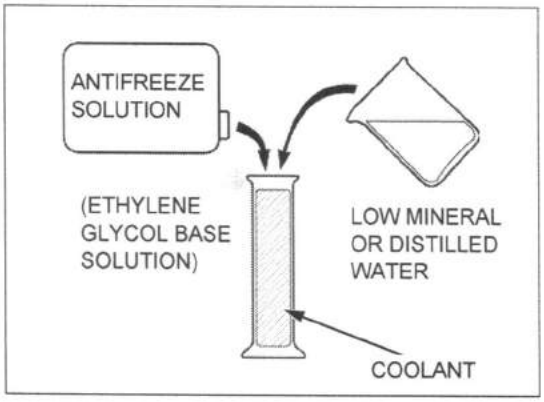
COOLANT REPLACEMENT

PREPARATION

- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

RECOMMENDED ANTIFREEZE:
Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate free corrosion inhibitors

RECOMMENDED MIXTURE:
1:1 (mixture with distilled water)

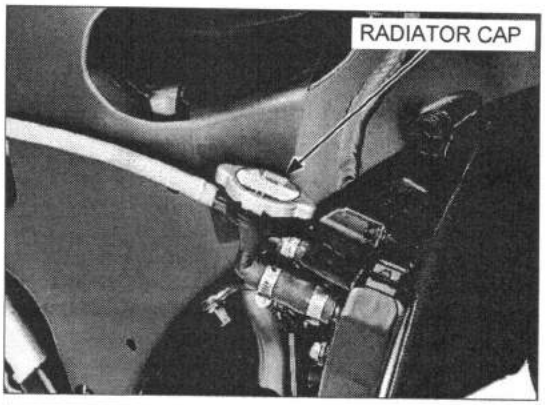


REPLACEMENT/AIR BLEEDING

- For radiator reserve tank removal/installation (page 7-28).

When filling the system or reserve tank with coolant checking the coolant level, place the motorcycle in an upright position on a flat, level surface.

Remove the radiator cap (page 7-5).

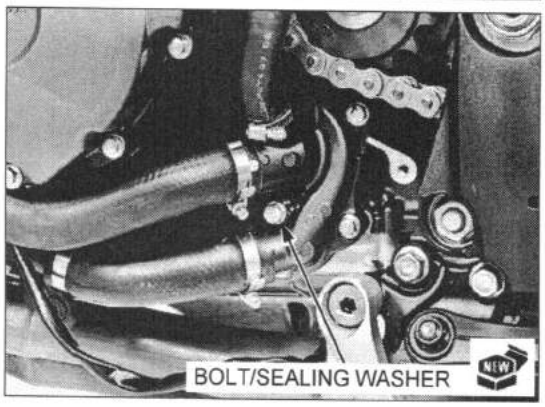


Drain the coolant while the engine is cold.

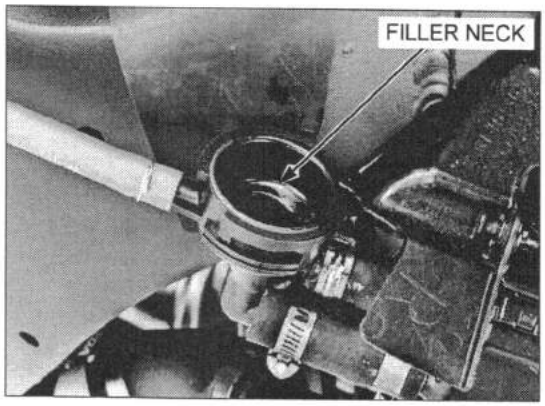
Remove the water pump drain bolt, sealing washer, and drain the coolant.

Reinstall the drain bolt with a new sealing washer. Tighten the water pump drain bolt to the specified torque.

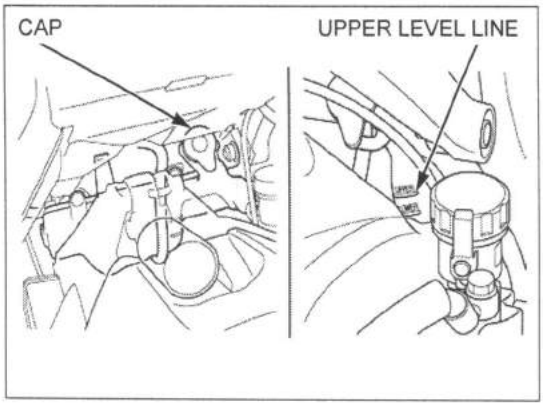
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Fill the system with the recommended coolant through the filler opening up to filler neck.



Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.



Bleed air from the system as follows:

1. Shift the transmission into neutral. Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle three or four times to bleed air from the system.
3. Stop the engine and add coolant up to the filler neck if necessary. Install the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.

Install the radiator reserve tank cap.

After installation, check that there are no coolant leaks.

Install the removed parts in the reverse order of removal.

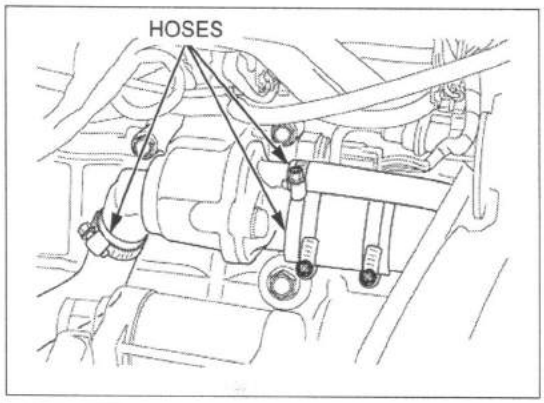
THERMOSTAT

- For ECT sensor removal/installation (page 6-79).

REMOVAL

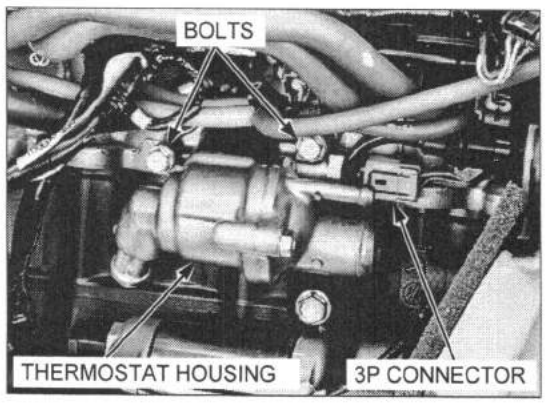
Drain the coolant (page 7-7).
Lift and support the fuel tank (page 4-7).

Loosen the hose clamp screws and disconnect the water hoses from the thermostat housing.

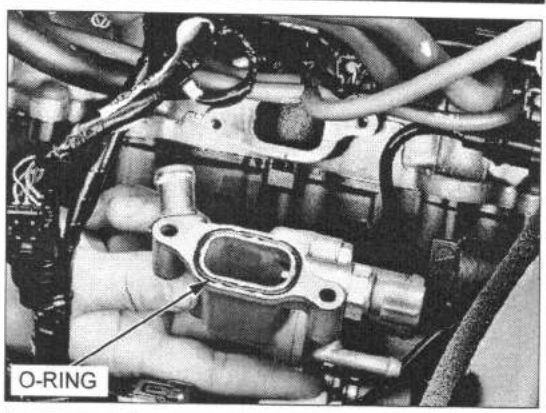


Disconnect the ECT sensor 3P (Gray) connector.

Remove the bolts and thermostat housing.

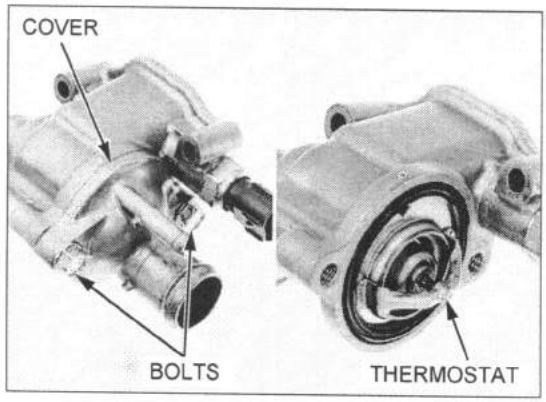


Remove the O-ring from the thermostat housing groove.



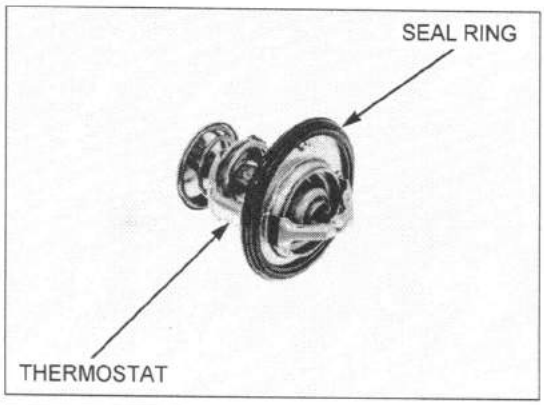
Remove the bolts and thermostat housing cover.

Remove the thermostat from the housing.



INSPECTION

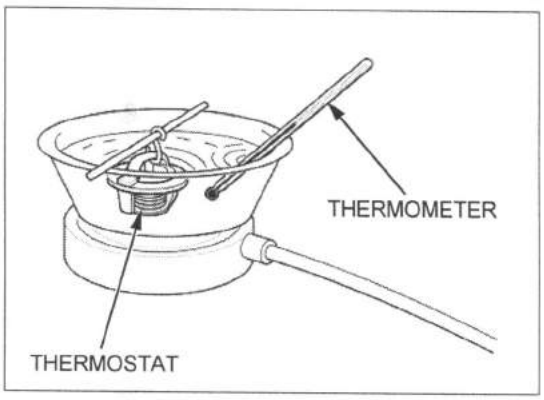
Visually inspect the thermostat for damage.
Check for damage of the seal ring.



Wear insulated gloves and adequate eye protection.
Keep flammable materials away from the electric heating element.

Do not let the thermostat or thermometer touch the pan, or you will get false reading.

Heat the water with an electric heating element to operating temperature for 5 minutes.
Suspend the thermostat in heated water to check its operation.



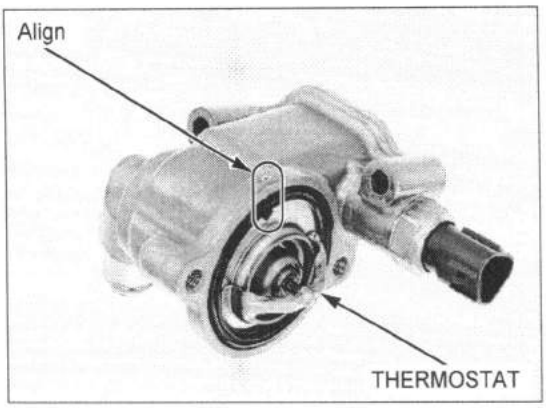
Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

THERMOSTAT BEGIN TO OPEN:
80 – 84°C (176 – 183°F)

VALVE LIFT:
8 mm (0.3 in) minimum at 95°C (203°F)

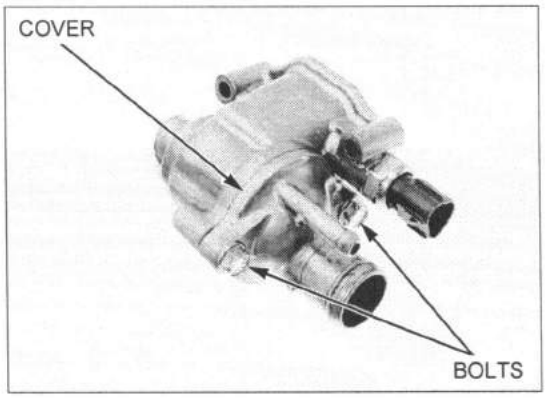
INSTALLATION

Install the thermostat into the housing by aligning the thermostat air bleed hole with the housing "O" mark.

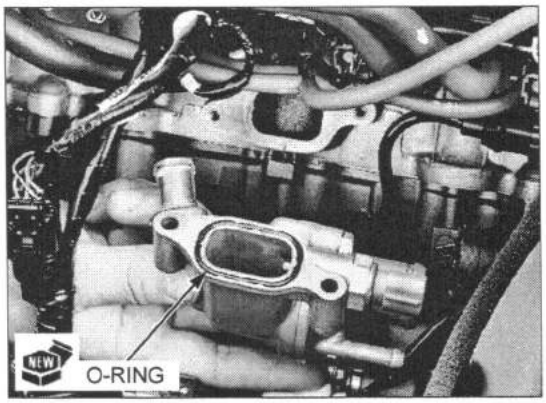


Install the thermostat housing cover and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

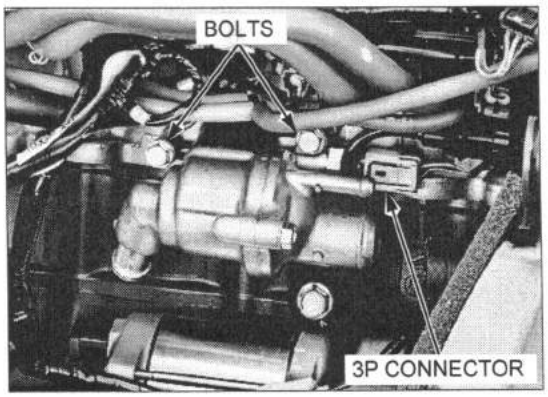


Install a new O-ring to the thermostat housing groove.



Install the thermostat housing to the cylinder head and tighten the bolts securely.

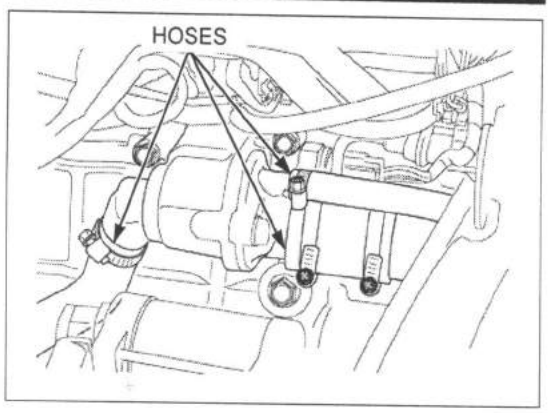
Connect the ECT sensor 3P (Gray) connector.



Connect the water hoses and tighten the hose clamp screws securely (page 1-22).

Fill the system with the recommended coolant and bleed any air (page 7-6).

Remove the support and close the fuel tank (page 4-9).



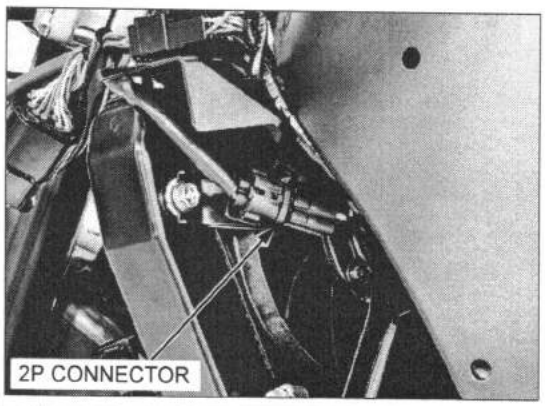
RADIATOR/COOLING FAN

REMOVAL (STANDARD/SP type)

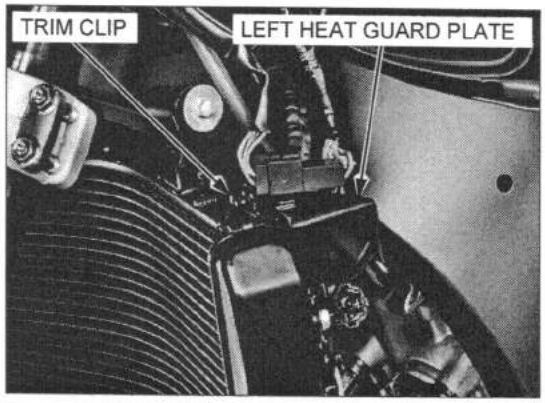
Remove the middle cowls (page 3-18).

Drain the coolant (page 7-7).

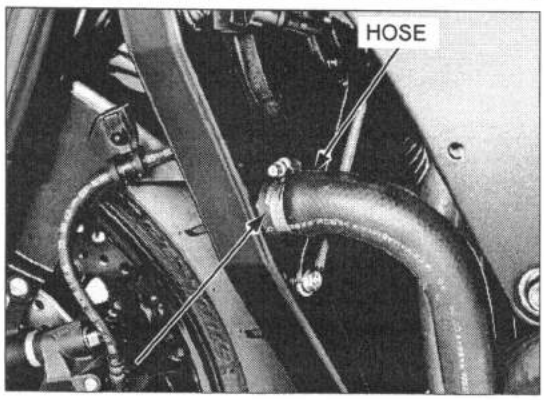
Disconnect the left fan motor 2P (Black) connector.



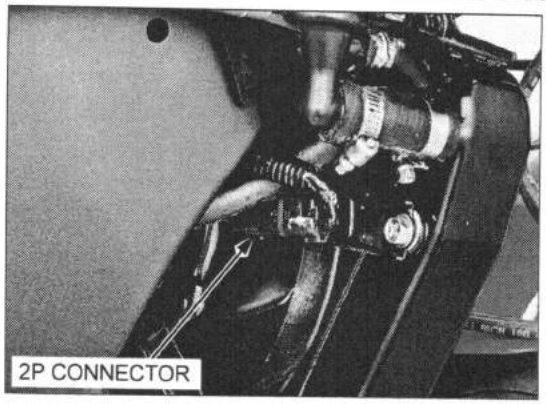
Remove the trim clip and left heat guard plate.



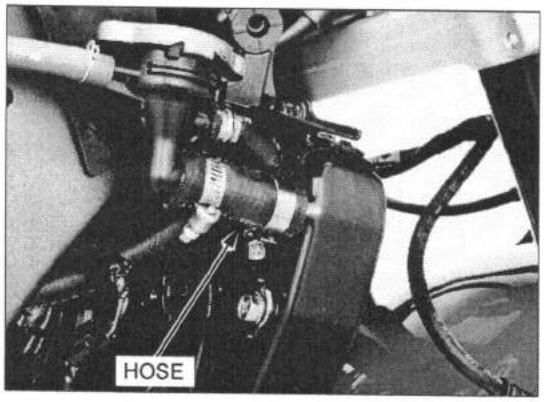
Loosen the hose clamp screw and disconnect the left radiator hose.



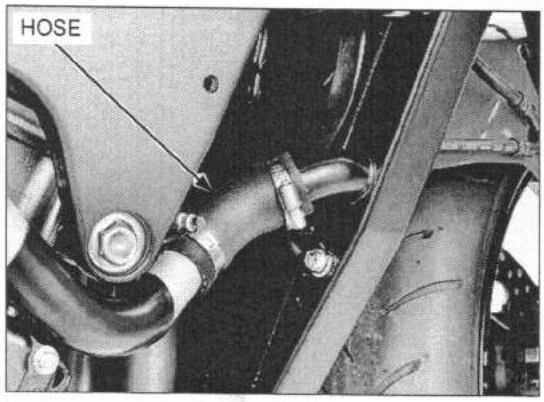
Disconnect the right fan motor 2P (Black) connector.



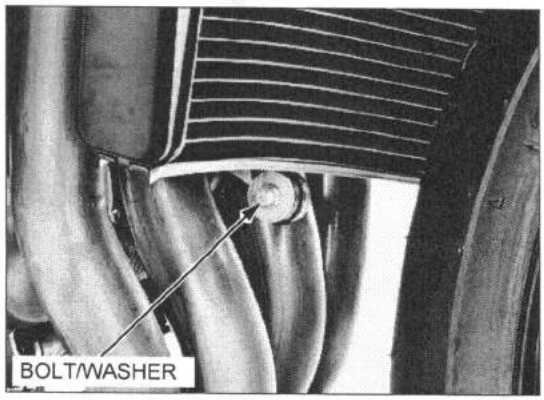
Loosen the hose clamp screw and disconnect the water hose.



Loosen the hose clamp screw and disconnect the right radiator hose.



Remove the radiator lower mounting bolt and washer.

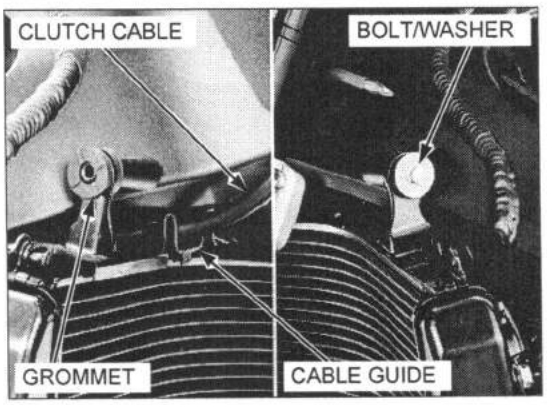


Remove the radiator upper mounting bolt and washer.

Be careful not to damage the radiator fins.

Release the radiator upper grommet from the frame boss to remove the radiator.

Release the clutch cable from the cable guide of the right heat guard plate.

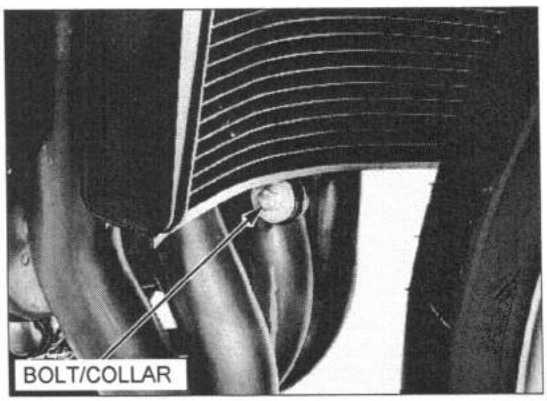


REMOVAL (ABS type)

Remove the middle cowls (page 3-18).

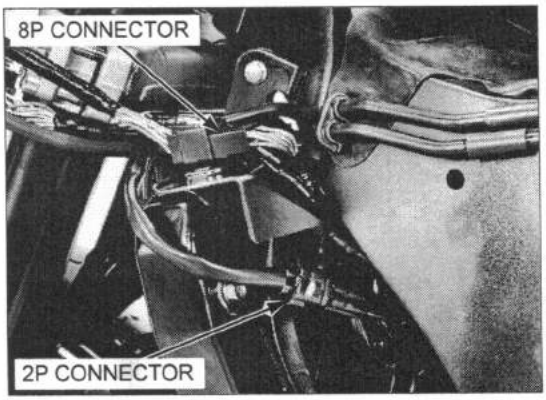
Drain the coolant (page 7-7).

Remove the radiator lower mounting bolt and collar.

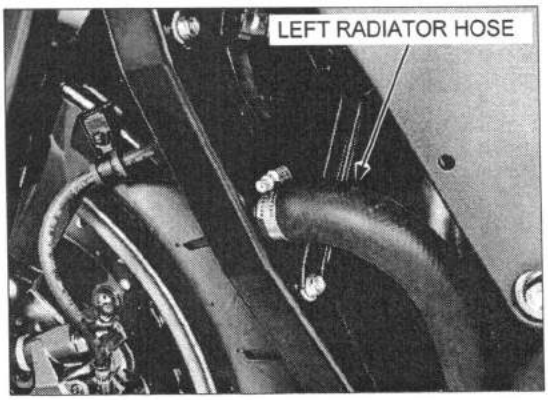


Disconnect the left fan motor 2P (Black) connector.

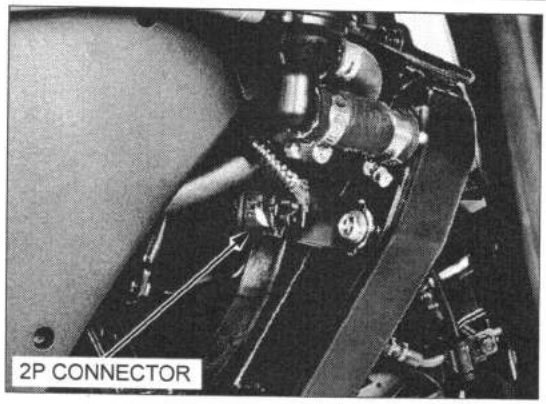
Remove the sub harness 8P (Black) connector from the left heat guard plate.



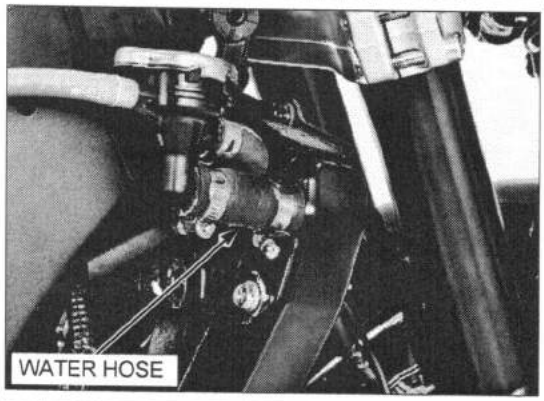
Loosen the hose clamp screw and disconnect the left radiator hose.



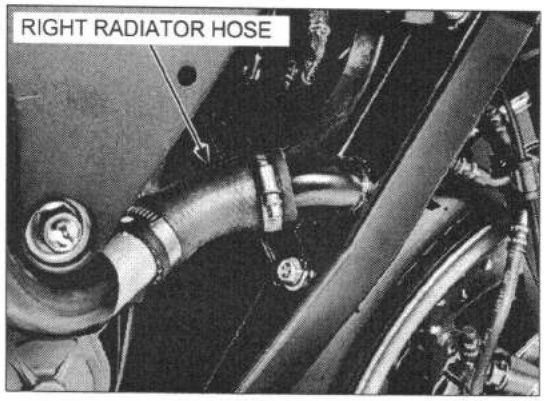
Disconnect the right fan motor 2P (Black) connector.



Loosen the hose clamp screw and disconnect the water hose.

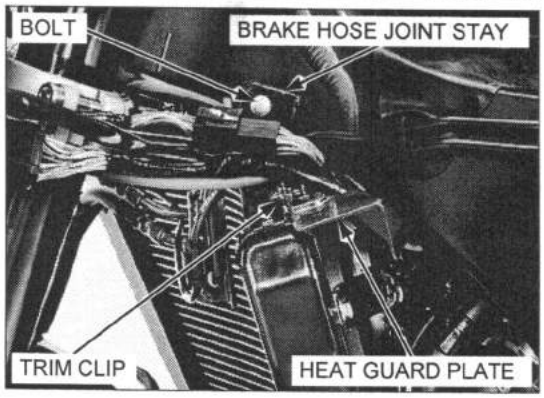


Loosen the hose clamp screw and disconnect the right radiator hose.



Remove the radiator upper mounting bolt and brake hose joint stay.

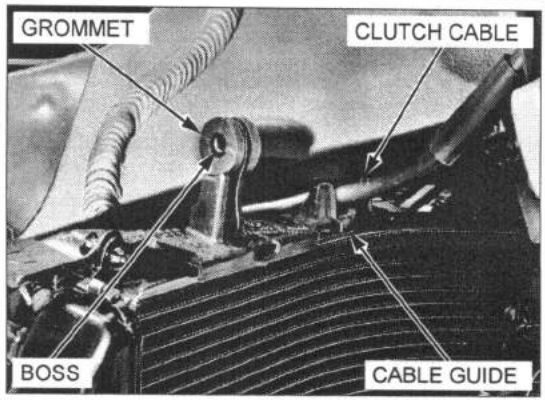
Remove the trim clip and left heat guard plate.



Be careful not to damage the radiator fins.

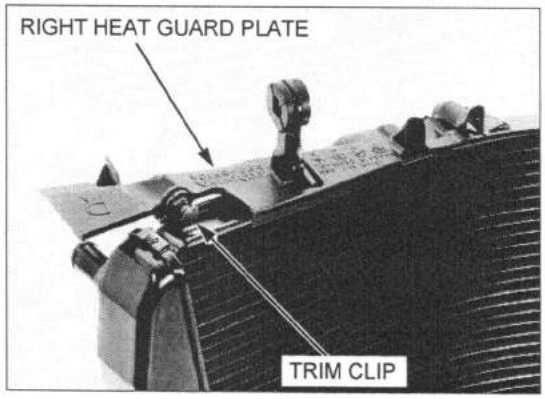
Release the radiator upper grommet from the frame boss to remove the radiator.

Release the clutch cable from the cable guide of the right heat guard plate.



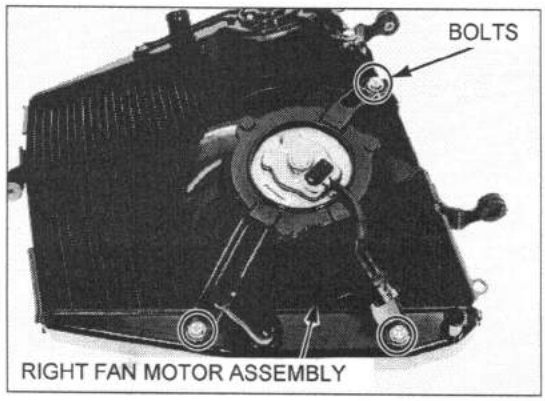
DISASSEMBLY

Remove the trim clip and right heat guard plate from the radiator.

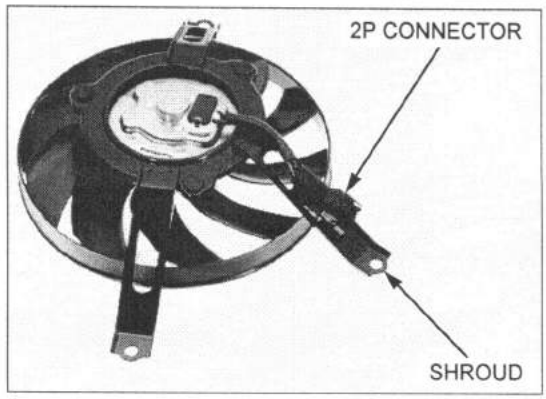


Right fan motor

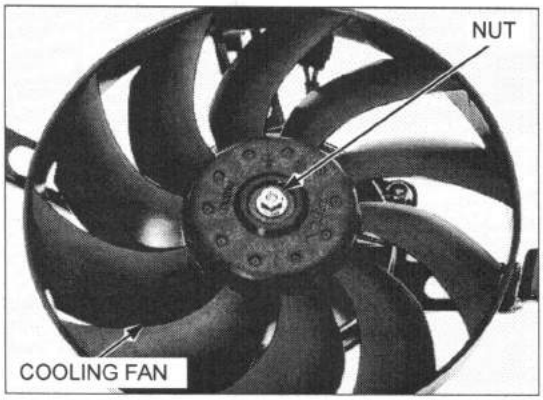
Remove the bolts and right fan motor assembly from the radiator.



Release the right fan motor 2P (Black) connector from the shroud.

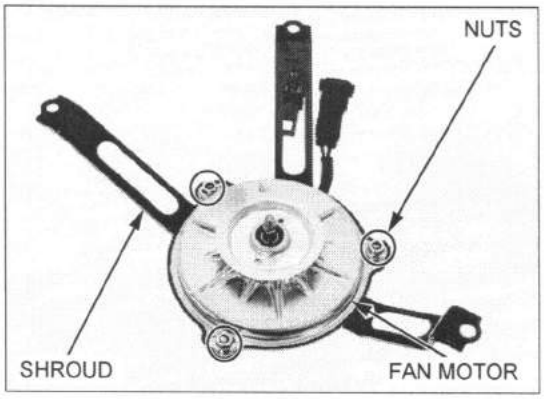


Remove the nut and right cooling fan.



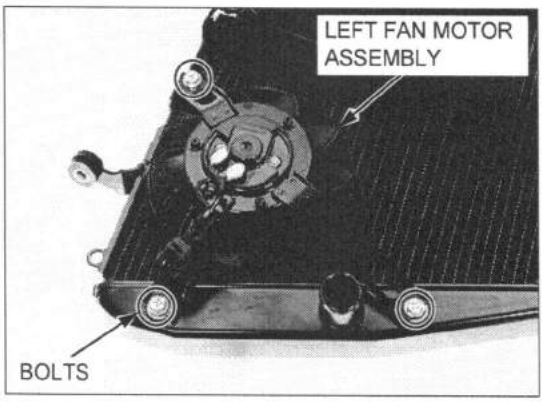
Remove the nuts and right fan motor from the shroud.

For fan motor relay information (page 7-28).

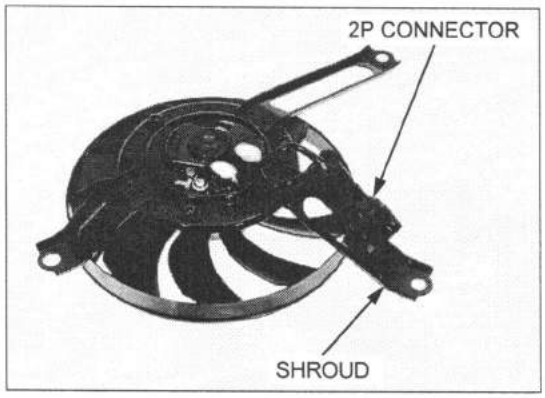


Left fan motor

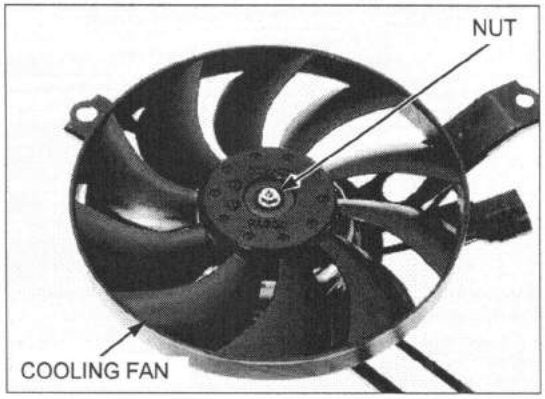
Remove the bolts and left fan motor assembly from the radiator.



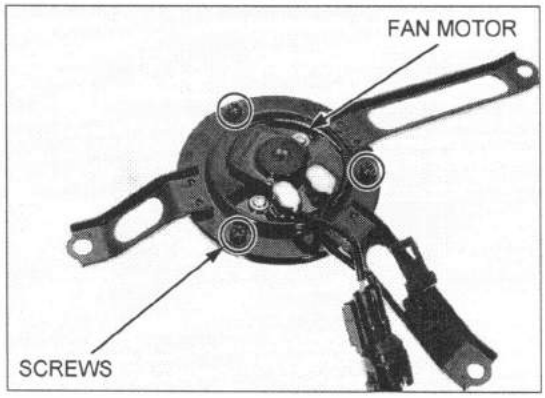
Release the left fan motor 2P (Black) connector from the shroud.



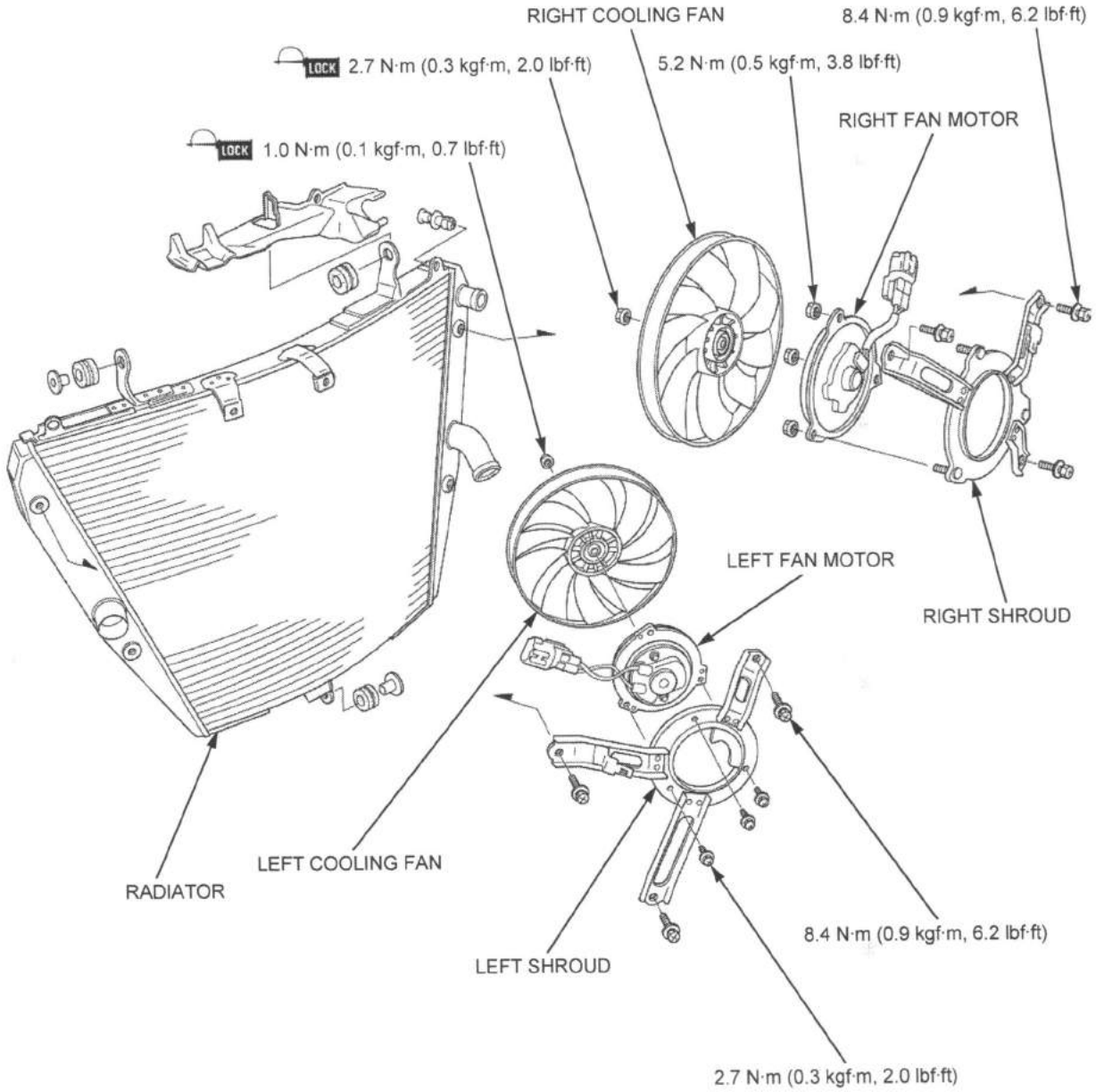
Remove the nut and left cooling fan.



Remove the screws and left fan motor from the shroud.



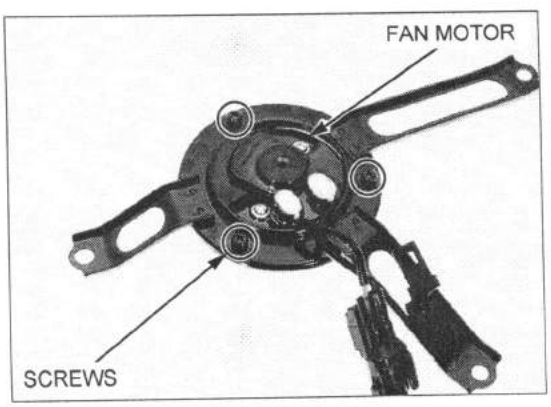
ASSEMBLY



Left fan motor

Install the left fan motor onto the shroud and tighten the screws to the specified torque.

TORQUE: 2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)

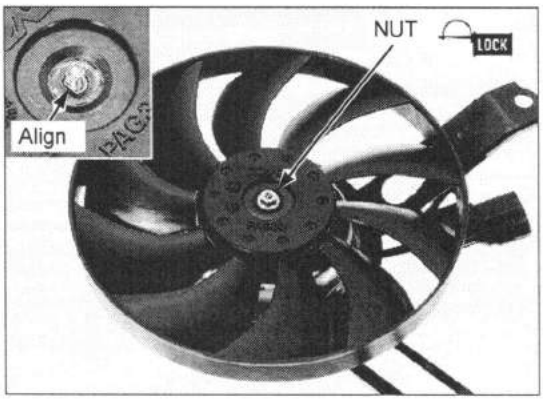


Install the left cooling fan to the fan motor shaft by aligning the flat surfaces.

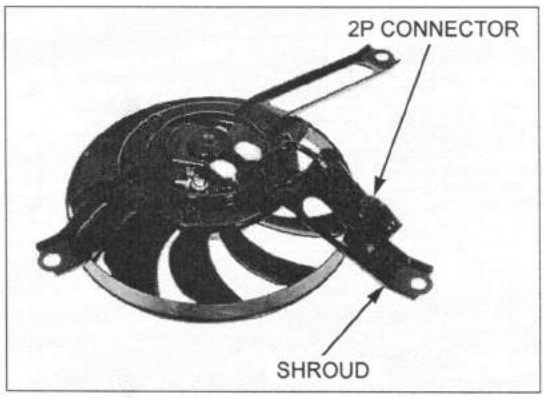
Apply locking agent to the left cooling fan mounting nut threads.

Tighten the nut to the specified torque.

TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

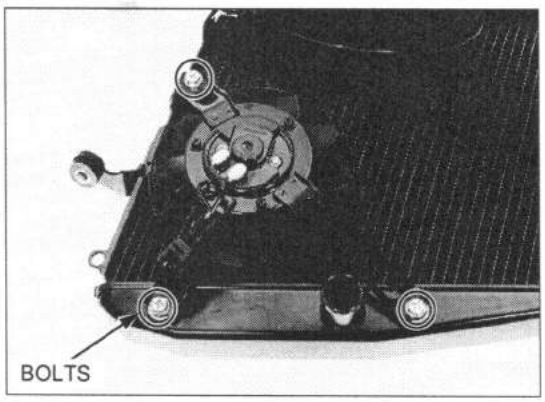


Install the left fan motor 2P (Black) connector onto the shroud.



Install the left fan motor assembly onto the radiator. Tighten the bolts to the specified torque.

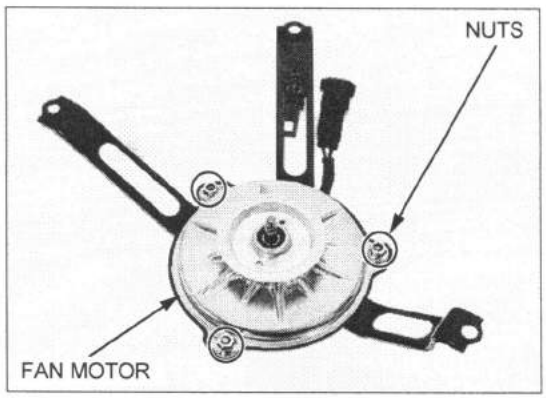
TORQUE: 8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)



Right fan motor

Install the right fan motor onto the shroud and tighten the nuts to the specified torque.

TORQUE: 5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)

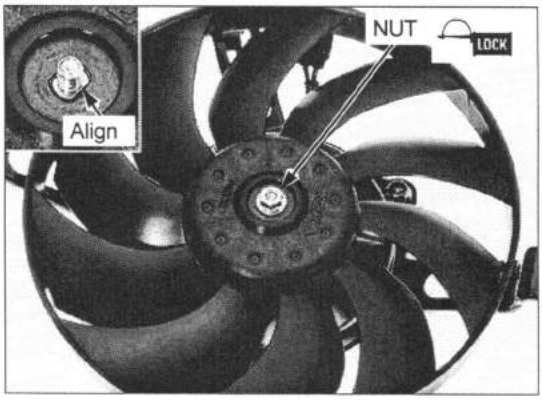


Install the right cooling fan to the fan motor shaft by aligning the flat surfaces.

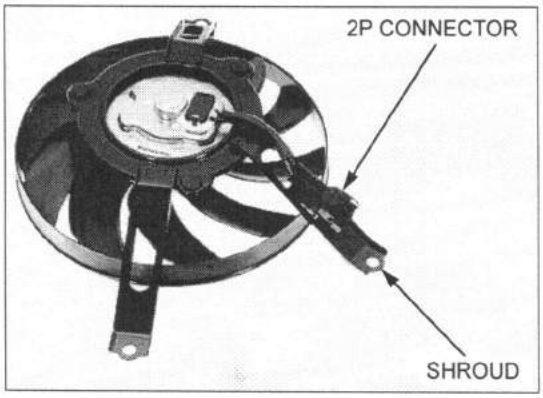
Apply locking agent to the right cooling fan mounting nut threads.

Tighten the nut to the specified torque.

TORQUE: 2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)

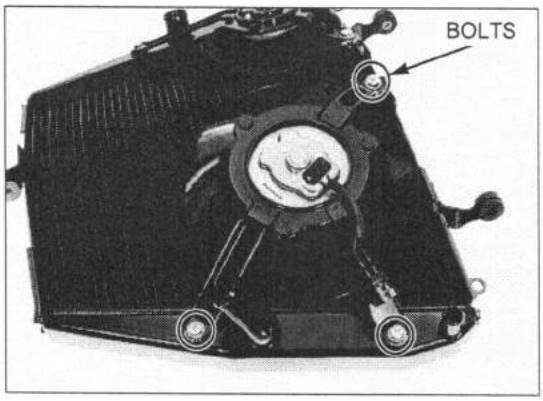


Install the right fan motor 2P (Black) connector onto the shroud.

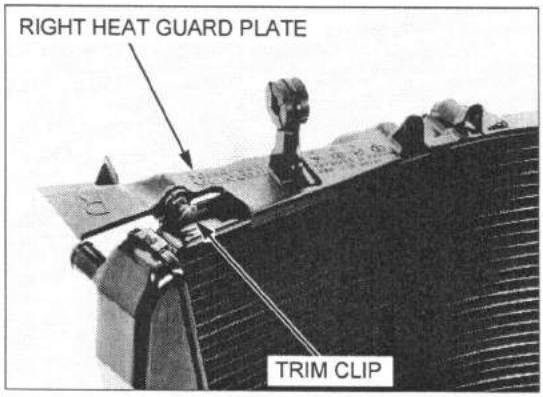


Install the right fan motor assembly onto the radiator. Tighten the bolts to the specified torque.

TORQUE: 8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)



Install the right heat guard plate and trim clip onto the radiator right side.



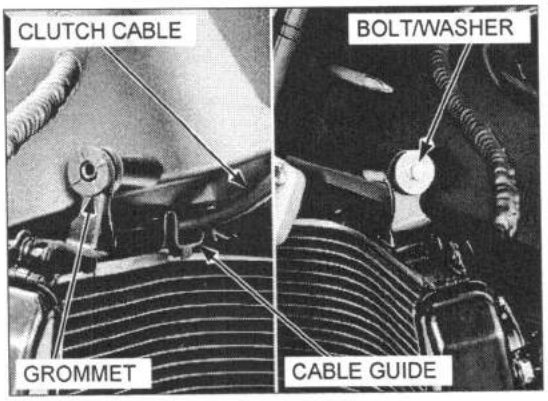
INSTALLATION (STANDARD/SP type)

Be careful not to damage the radiator fins.

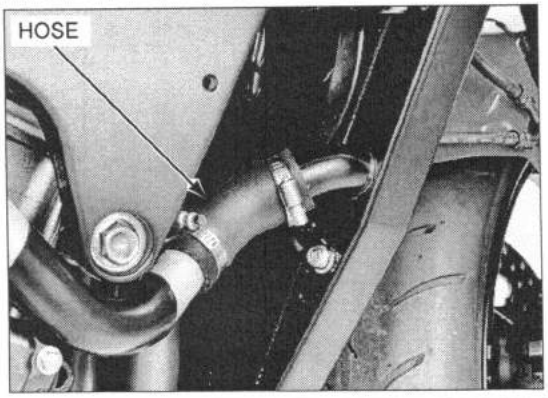
Install the radiator assembly, aligning its upper grommet with the frame boss.

Route the clutch cable to the cable guide of the right heat guard plate.

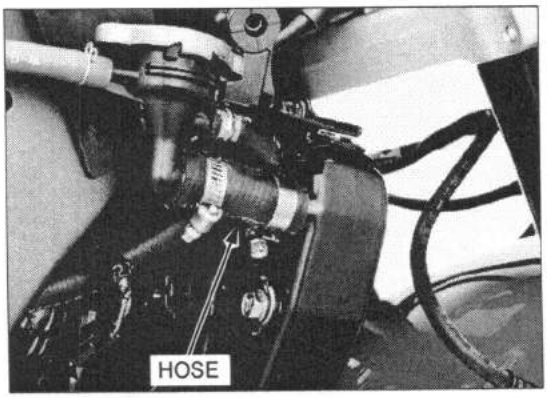
Install the upper mounting bolt and washer, then tighten the bolt securely.



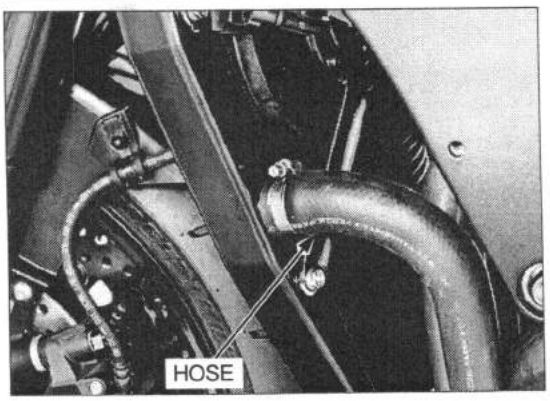
Connect the right radiator hose and tighten the hose clamp screw securely (page 1-22).



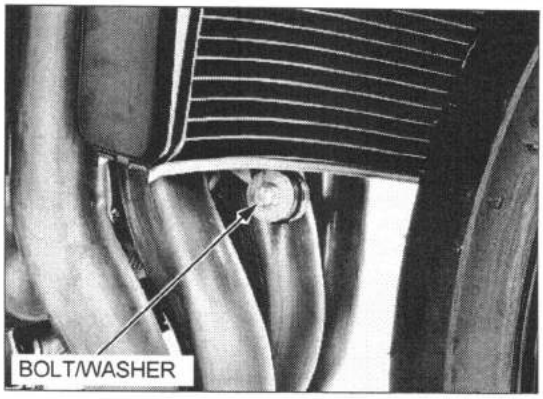
Connect the water hose and tighten the hose clamp screw securely (page 1-22).



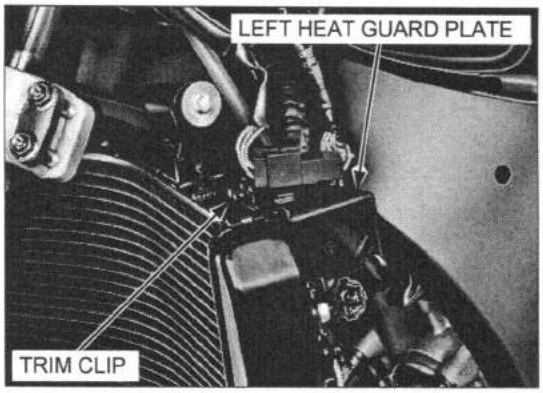
Connect the left radiator hose and tighten the hose clamp screw securely (page 1-22).



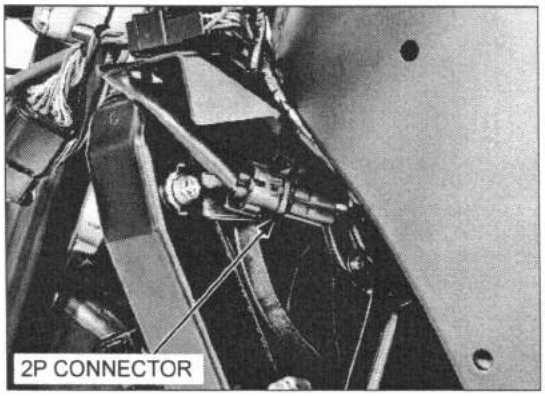
Install the washer and radiator lower mounting bolt. Tighten the bolt securely.



Install the left heat guard plate and trim clip securely.



Connect the left fan motor 2P (Black) connector.

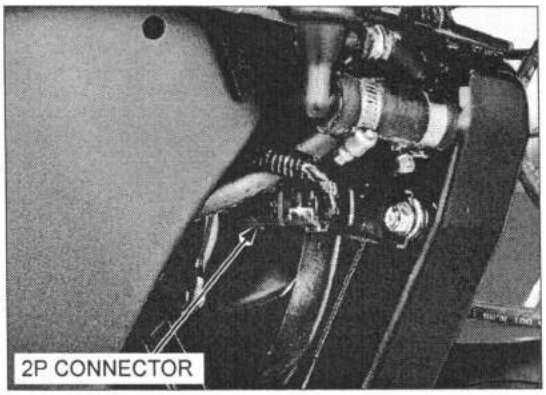


Connect the right fan motor 2P (Black) connector.

Fill the system with the recommended coolant and bleed any air (page 7-6).

Install the middle cowls (page 3-18).

Start the engine and check for coolant leaks.

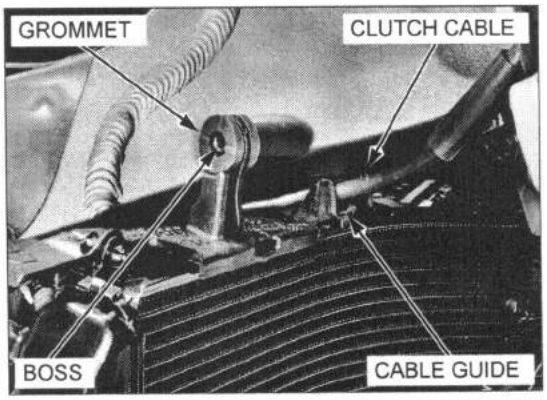


INSTALLATION (ABS type)

Be careful not to damage the radiator fins.

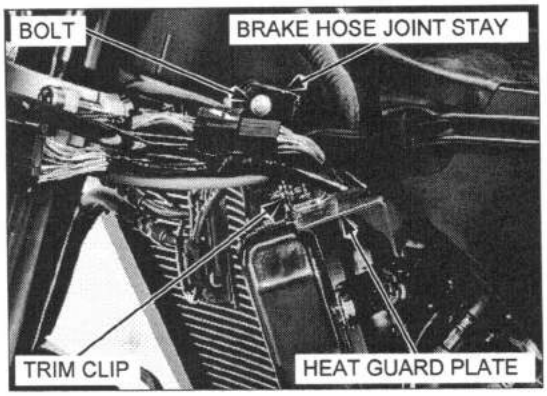
Install the radiator assembly, aligning its upper grommet with the frame boss.

Route the clutch cable to the cable guide of the right heat guard plate.

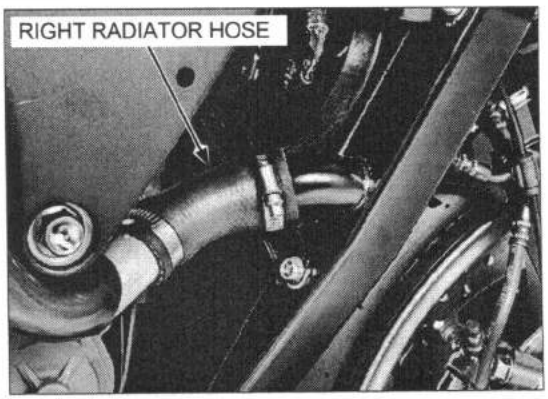


Install the left heat guard plate and trim clip securely.

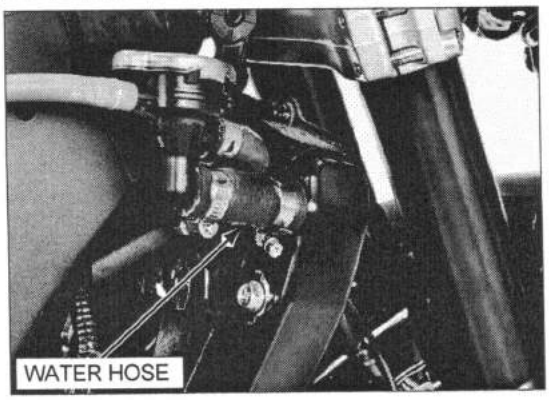
Install the brake hose joint stay, and tighten the radiator upper mounting bolt securely.



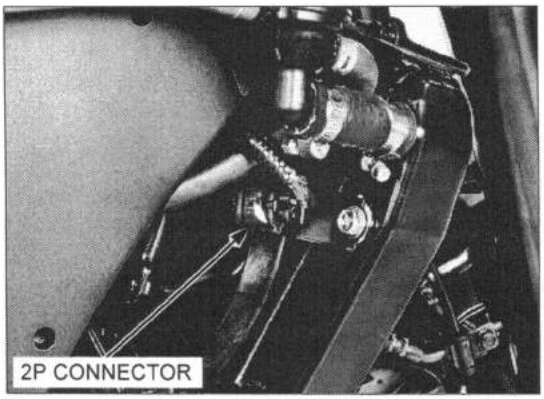
Connect the right radiator hose and tighten the hose clamp screw securely (page 1-22).



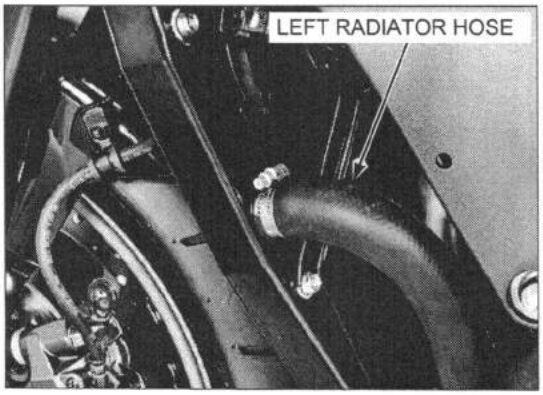
Connect the water hose and tighten the hose clamp screw securely (page 1-22).



Connect the right fan motor 2P (Black) connector.

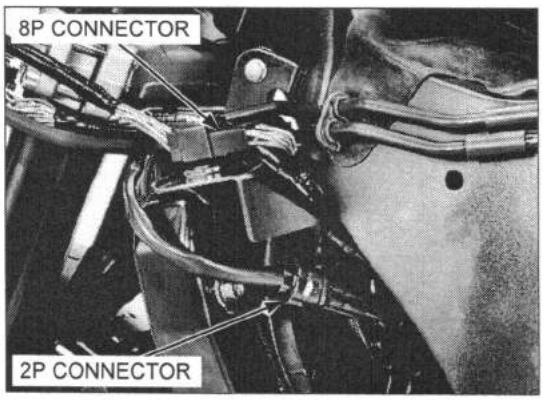


Connect the left radiator hose and tighten the hose clamp screw securely (page 1-22).



Install the sub harness 8P (Black) connector onto the left heat guard plate.

Connect the left fan motor 2P (Black) connector.

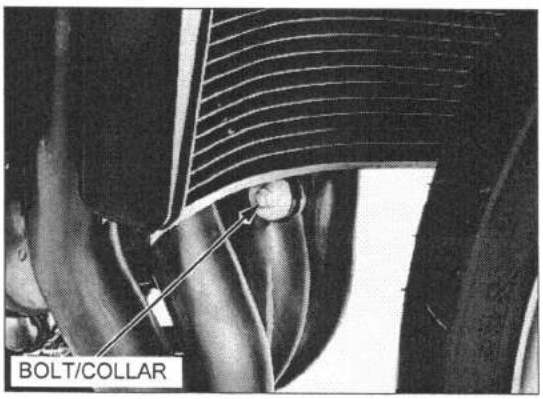


Install the collar and tighten the bolt securely.

Fill the system with the recommended coolant and bleed any air (page 7-6).

Start the engine and check for coolant leaks.

Install the middle cowls (page 3-18).



WATER PUMP

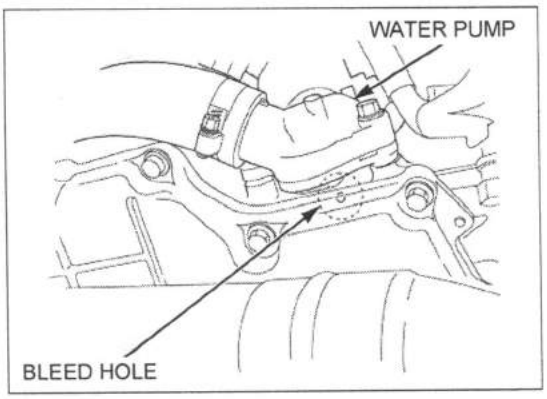
MECHANICAL SEAL INSPECTION

Remove the lower cowl (page 3-16).

Check the bleed hole of the water pump for signs of coolant leakage.

- A small amount of coolant weeping from the bleed hole is normal.
- Make sure that there is not continuous coolant leakage from the bleed hole while operating the engine.

Replace the water pump as an assembly if necessary.



REMOVAL

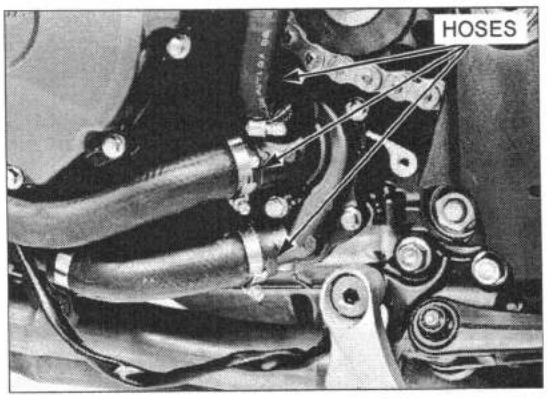
Remove the following:

- Lower cowl (page 3-16)
- Gearshift arm (page 10-31)
- Drive sprocket cover (page 4-33)

Drain the coolant (page 7-7).

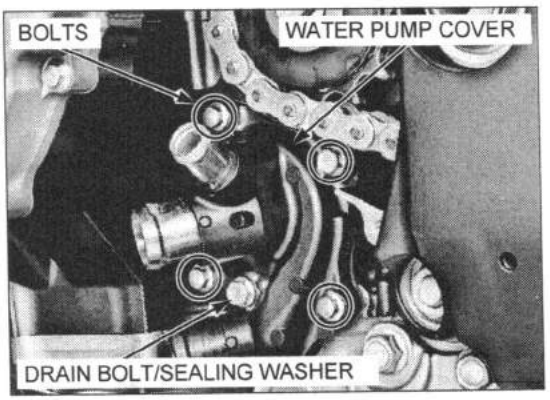
Note the position of the hose clamps. They must be reinstalled in the same position.

Loosen the hose clamp screws and disconnect the water hoses.



Remove the water pump drain bolt and sealing washer.

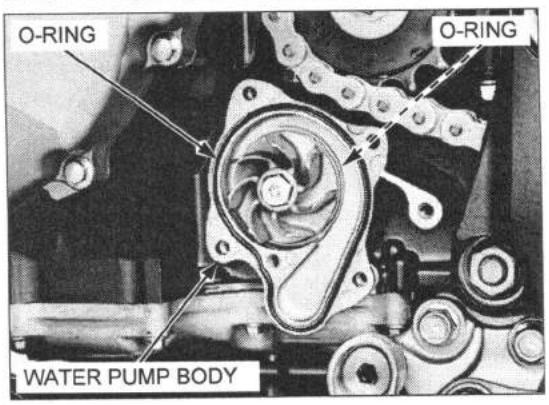
Remove the bolts and water pump cover.



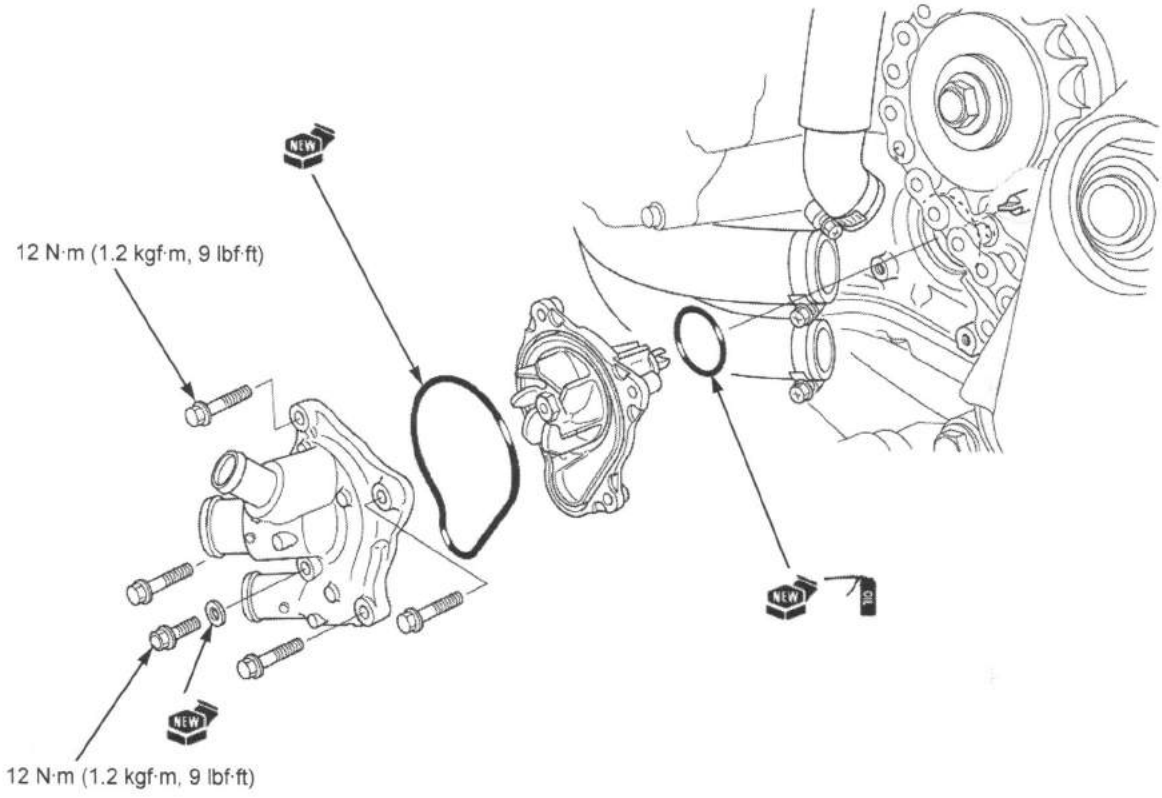
Remove the O-ring from the water pump body.

Do not disassemble the water pump body.

Remove the water pump body and O-ring from the crankcase.

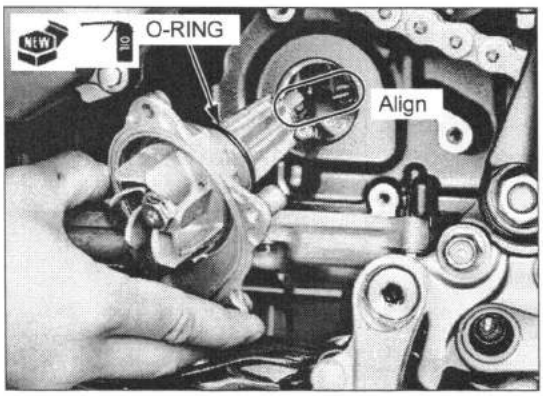


INSTALLATION

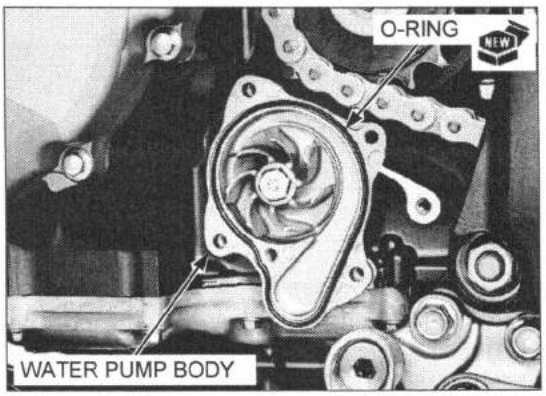


Apply oil to a new O-ring and install it onto the stepped portion of the water pump body.

Install the water pump body into the crankcase while aligning the water pump shaft groove with the oil pump shaft end by turning the water pump impeller.

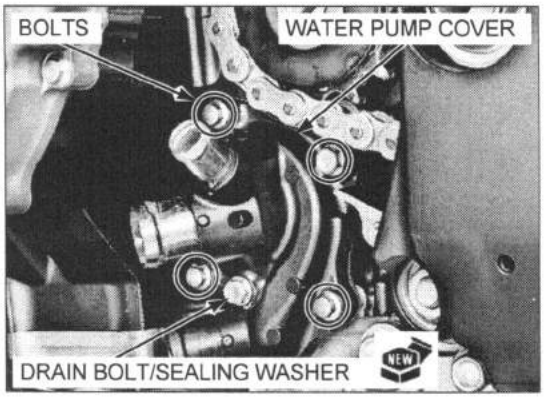


Install a new O-ring to the groove in the water pump body.



Install the water pump cover, bolts, new sealing washer, and water pump drain bolt.
Tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Reinstall the hose clamps in their original positions.

Connect the water hoses.

- Note the shape of the hose clamp.
  - Input side hose clamp: large housing
  - Output side hose clamp: small housing

Tighten the output side hose clamp screw to the specified torque.

TORQUE: 1.7 N·m (0.2 kgf·m, 1.3 lbf·ft)

Check the hose clamp depth as shown.

STANDARD: 0.1 – 1 mm (0 – 0.04 in)

If the hose clamp depth is out of the specification, replace the water hose with a new one.

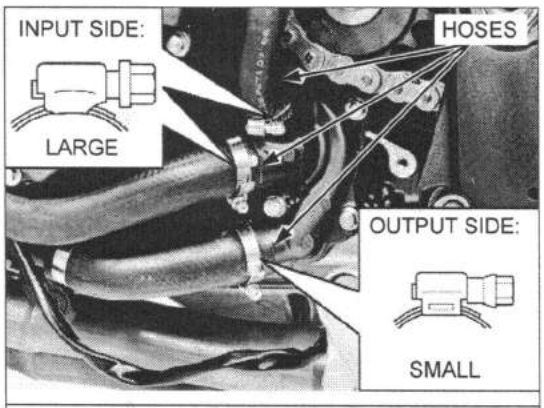
Tighten the input side hose clamp screws securely (page 1-22).

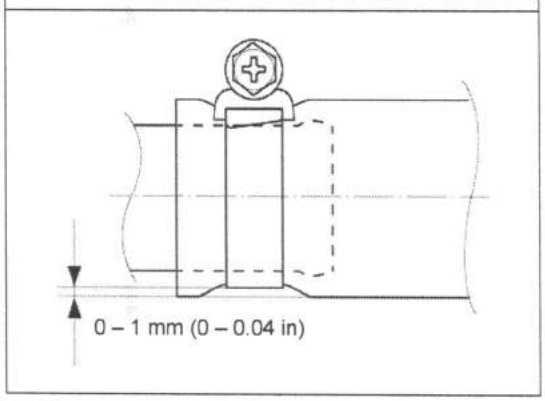
Install the following:

- Drive sprocket cover (page 4-34)
- Gearshift arm (page 10-34)
- Lower cowl (page 3-16)

Fill the system with the recommended coolant (page 7-6).

Start the engine and check for coolant and oil leaks.





When the shown hose clamps (output side) are removed, tighten the hose clamp screw as follows:

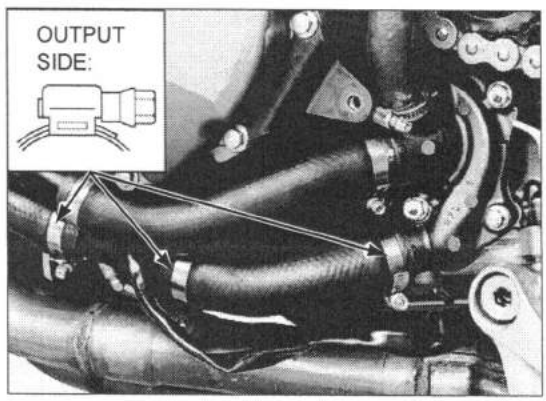
1. Tighten the hose clamp screw to the specified torque.

   TORQUE: 1.7 N·m (0.2 kgf·m, 1.3 lbf·ft)

2. Check the hose clamp depth.

   STANDARD: 0 – 1 mm (0 – 0.04 in)

   If the hose clamp depth is out of the specification, replace the water hose with a new one.



RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

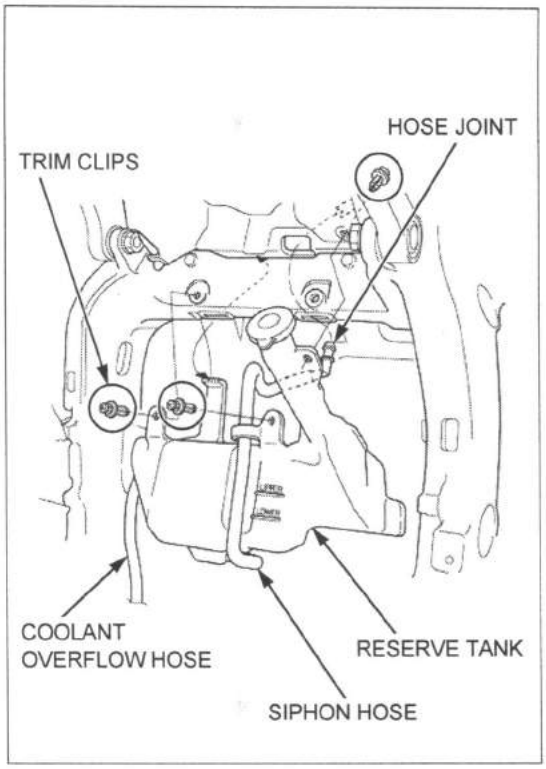
Lift and support the fuel tank (page 4-7).

Remove the swingarm (page 15-25).

Remove the trim clips and radiator reserve tank.

Disconnect the siphon hose from the hose joint and drain the coolant from the reserve tank.
Disconnect the coolant overflow hose from the reserve tank.

Installation is in the reverse order of removal.



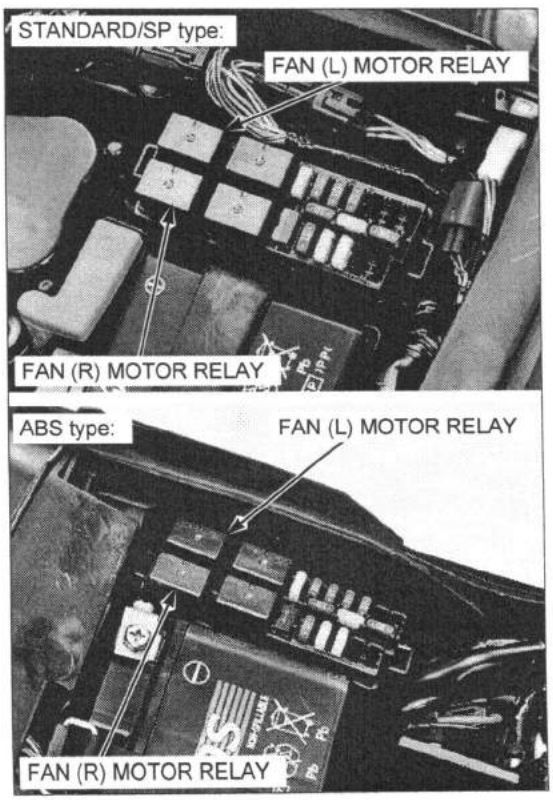
FAN MOTOR RELAY

INSPECTION

Remove the seat (page 3-7).

Turn the ignition switch OFF.

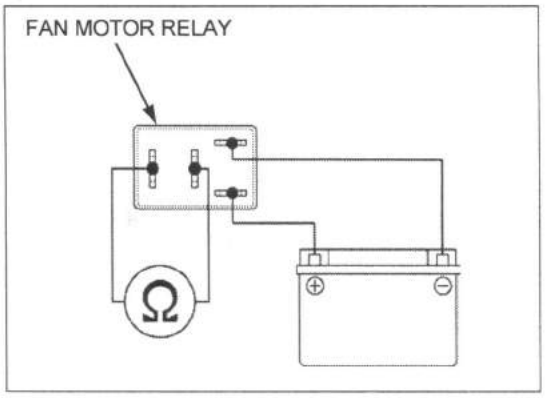
Open the fuse/relay box and remove the fan motor relay.



Connect an ohmmeter to the fan motor relay connector terminals.

Connect a 12 V battery to the following fan motor relay connector terminals as shown.

There should be continuity only when the 12 V battery is connected.
If there is no continuity only when the 12 V battery is connected, replace the fan motor relay.



8. ENGINE REMOVAL/INSTALLATION

COMPONENT LOCATION 8-2

SERVICE INFORMATION 8-4

ENGINE REMOVAL (STANDARD/SP type) 8-5

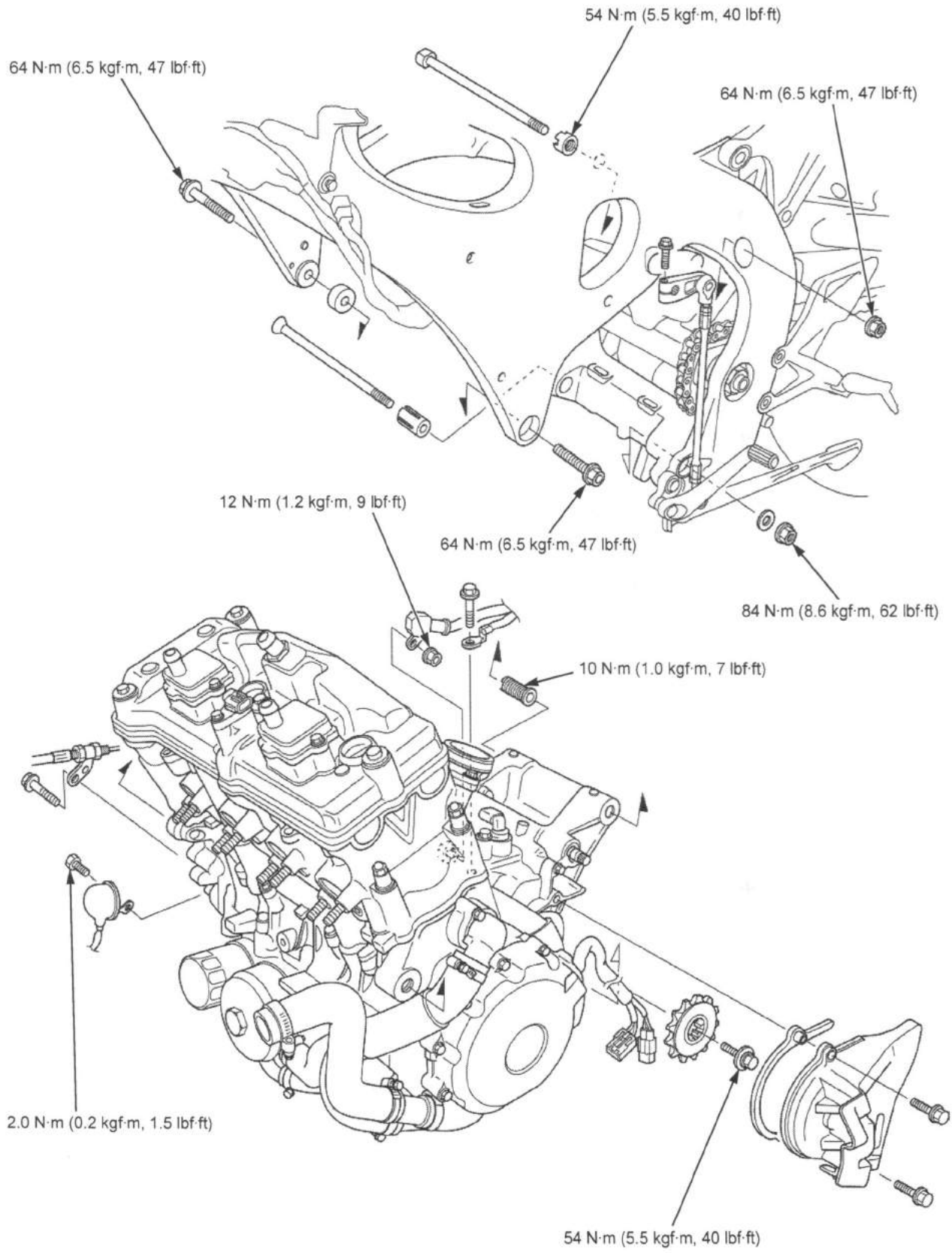
ENGINE REMOVAL (ABS type) 8-9

ENGINE INSTALLATION (STANDARD/SP type) 8-14

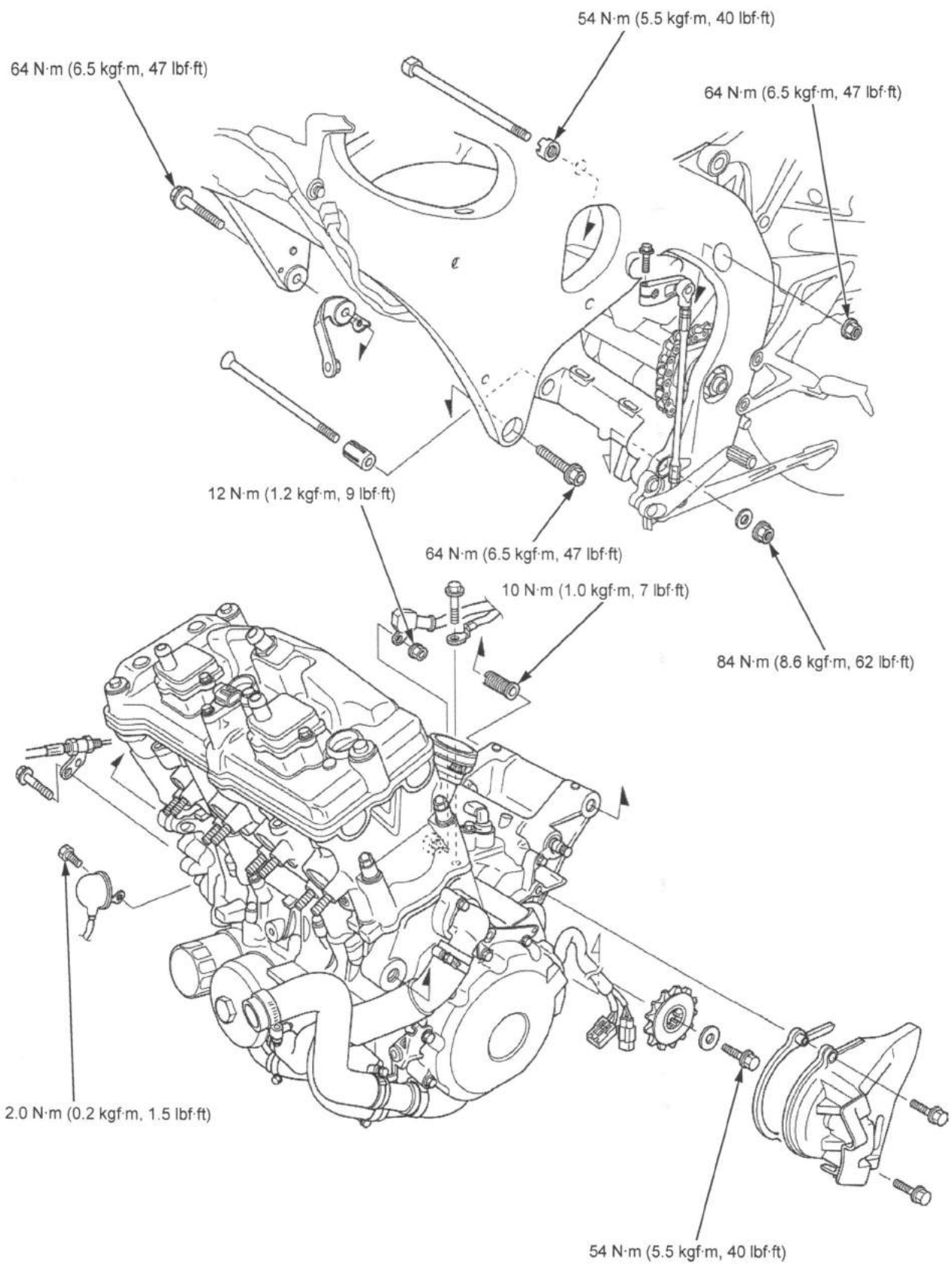
ENGINE INSTALLATION (ABS type) 8-21

COMPONENT LOCATION

STANDARD/SP type:



ABS type:


54 N·m (5.5 kgf·m, 40 lbf·ft)
64 N·m (6.5 kgf·m, 47 lbf·ft)
64 N·m (6.5 kgf·m, 47 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
64 N·m (6.5 kgf·m, 47 lbf·ft)
10 N·m (1.0 kgf·m, 7 lbf·ft)
84 N·m (8.6 kgf·m, 62 lbf·ft)
2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)
54 N·m (5.5 kgf·m, 40 lbf·ft)

SERVICE INFORMATION

GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- Do not use the oil filter and oil cooler as a jacking point.
- When using the lock nut wrench for the engine hanger lock nut, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not overtighten the lock nut. The specification later in the text gives both actual and indicated.
- The following components can be serviced with the engine installed in the frame.
  - Alternator
    - –STANDARD/SP type (page 11-4)
    - –ABS type (page 11-5)
  - Clutch (page 10-7)
  - Camshaft (page 9-9)
  - Gearshift linkage (page 10-31)
  - Oil cooler (page 5-13)
  - Oil pump (page 5-5)
  - Water pump (page 7-25)
- The following components require engine removal for service.
  - Cylinder head (page 9-14)
  - Crankshaft (page 13-5)
  - Piston/cylinder (page 13-14)
  - Shift fork/shift drum/transmission (page 12-6)
  - Balancer (page 12-16)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you make a mistake with the torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.

SERVICE DATA

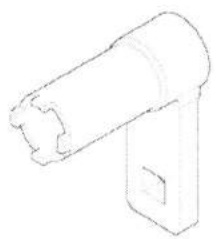
ITEM		SPECIFICATIONS
Engine dry weight	('08, '09 model)	62.5 kg (137.8 lbs)
	(After '09 model)	62.7 kg (138.2 lbs)
Engine oil capacity (After disassembly)		3.7 liters (3.9 US qt, 3.3 Imp qt)
Coolant capacity (Radiator and engine)		3.0 liters (3.2 US qt, 2.6 Imp qt)

TORQUE VALUES

Front engine hanger bolt	64 N·m (6.5 kgf·m, 47 lbf·ft)
Upper engine hanger adjusting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Upper engine hanger lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Upper engine hanger nut	64 N·m (6.5 kgf·m, 47 lbf·ft)
Lower engine hanger nut	84 N·m (8.6 kgf·m, 62 lbf·ft)
Drive sprocket bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)
Starter motor terminal nut	12 N·m (1.2 kgf·m, 9 lbf·ft)
EOP switch wire terminal bolt	2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

TOOL

Lock nut wrench, 20 mm
07VMA-MBB0101



ENGINE REMOVAL (STANDARD/SP type)

Remove the following:

- Lower cowl (page 3-16)
- Middle cowls (page 3-18)
- Exhaust pipe (page 3-64)
- Radiator (page 7-11)
- Fuel tank (page 6-60)
- Drive sprocket cover (page 4-33)
- Throttle body (page 6-67)
- PAIR control solenoid valve (page 6-87)
- Direct ignition coils (page 4-13)
- SP (AC) type: EVAP canister (page 6-98)

• With the ignition switch OFF, disconnect the battery negative (–) cable (page 18-7).

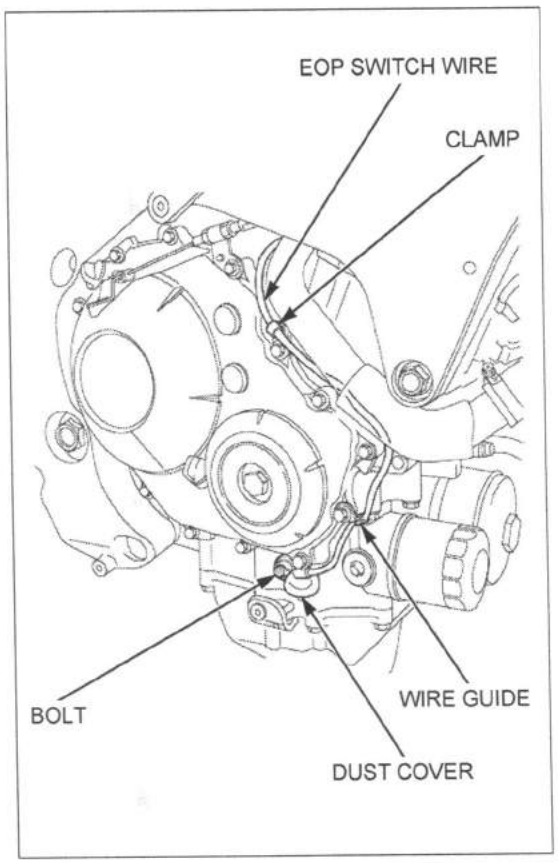
Drain the engine oil (page 4-21)

Fully slacken the drive chain (page 4-32).

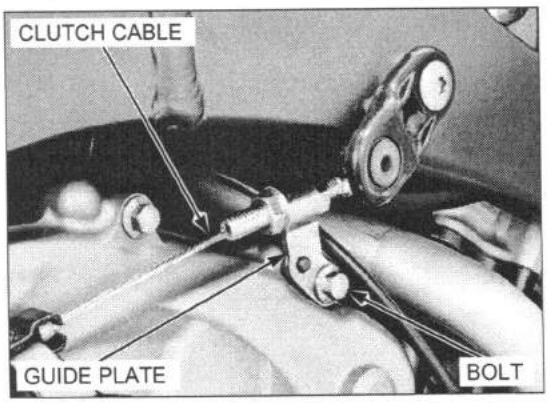
Remove the dust cover, bolt, and disconnect the EOP switch wire.

Release the EOP switch wire from the wire guide.

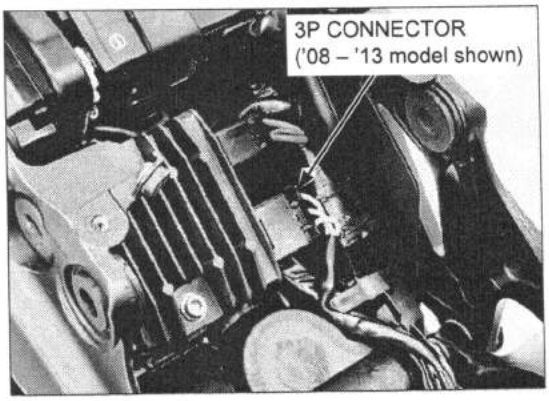
Remove the EOP switch wire clamp.



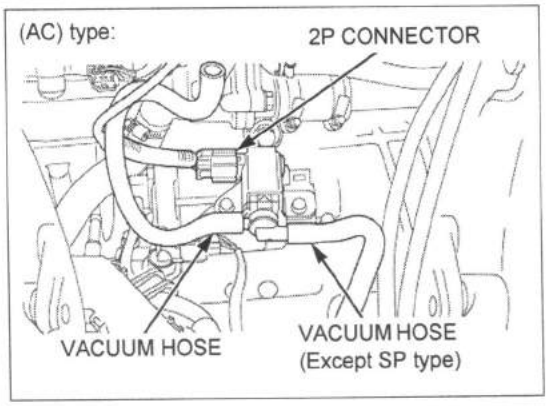
Remove the bolt and clutch cable guide plate, then disconnect the clutch cable end from the clutch lifter lever.



Disconnect the alternator 3P (Black) connector.

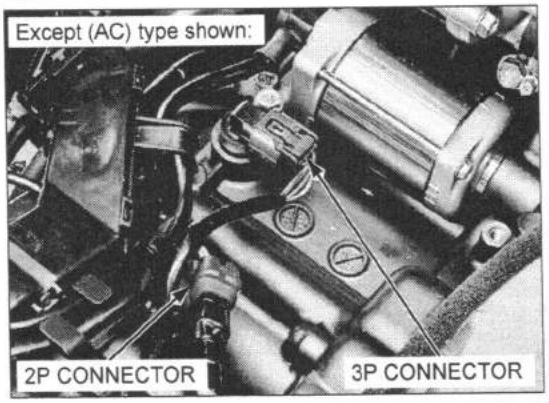


(AC) type: Disconnect the EVAP purge control solenoid valve 2P (Black) connector and vacuum hose(s).

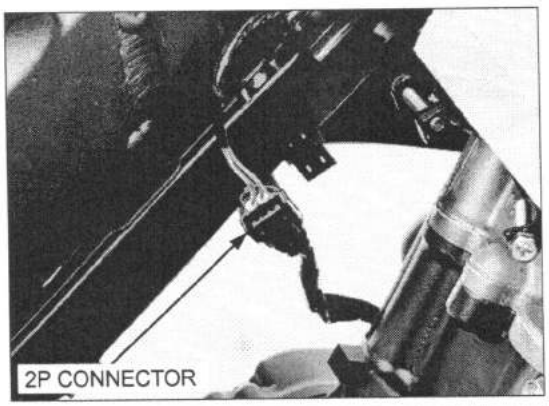


Disconnect the VS sensor 3P ('08 model: Blue, After '08 model: Black) and CKP sensor 2P (Red) connectors.

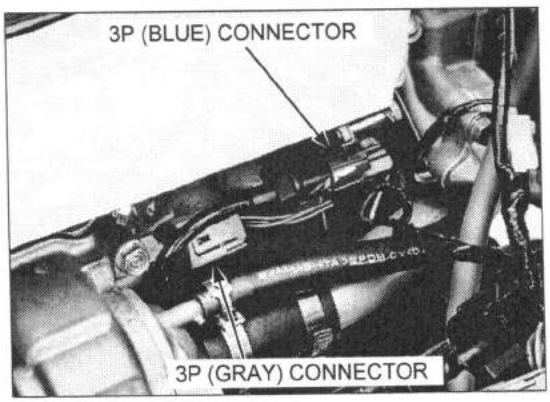
Disconnect the gear position switch 8P (Black) connector (After '11 model) (page 1-76).



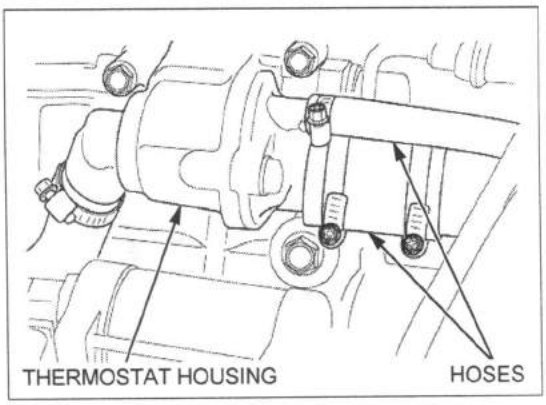
Disconnect the sidestand switch 2P (Black) connector.



Disconnect the knock sensor 3P (Blue) and ECT sensor 3P (Gray) connectors.

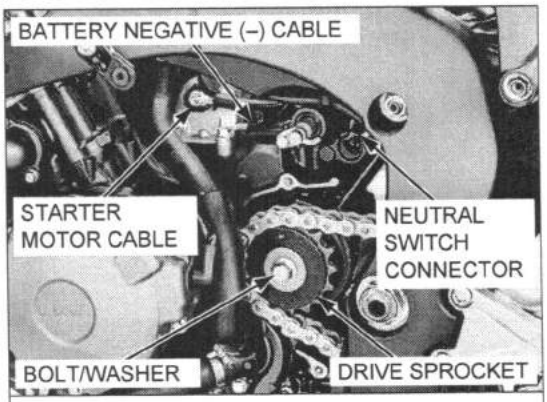


Disconnect the water hoses from the thermostat housing.

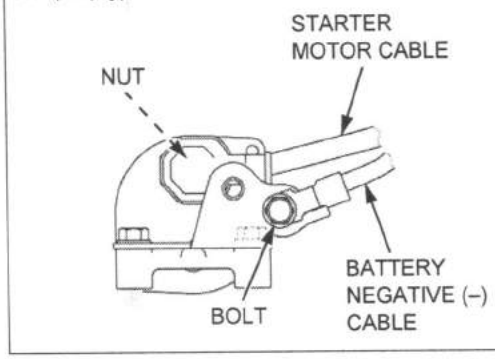


Remove the bolt, washer, and drive sprocket.

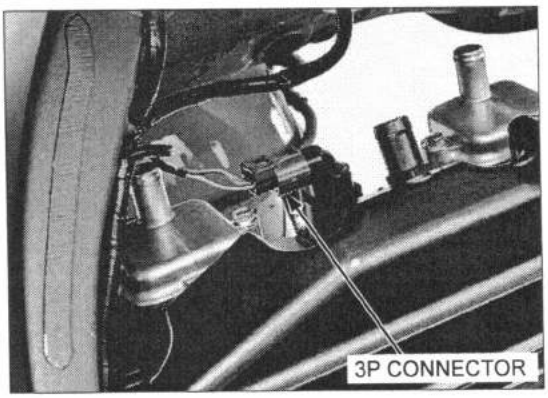
Remove the bolt and disconnect the battery negative (–) cable.
Remove the nut and disconnect the starter motor cable.
Disconnect the neutral switch connector ('08 – '11 model).



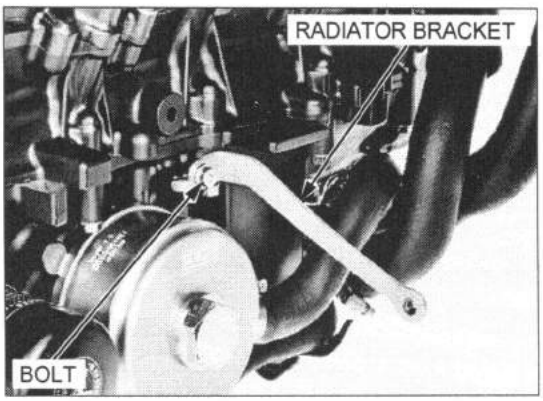
SP (AC) type:



Disconnect the CMP sensor 3P (Blue) connector.



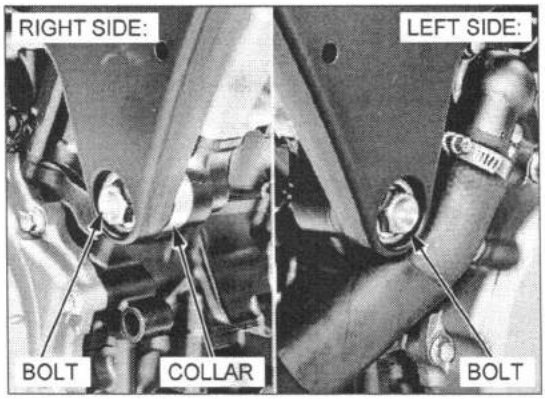
Remove the bolt and radiator bracket.



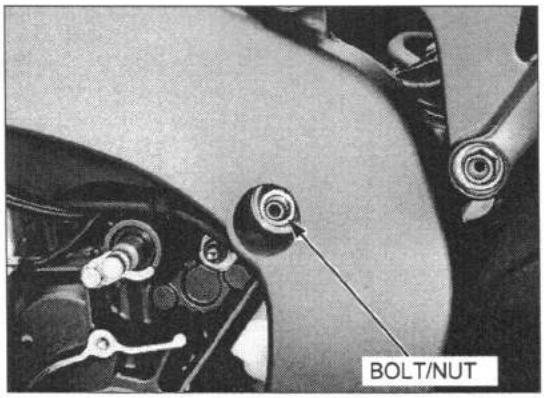
Support the engine using a jack or other adjustable support.

Remove the right front engine hanger bolt and collar.

Remove the left front engine hanger bolt.



Remove the upper engine hanger nut while holding the engine hanger bolt.

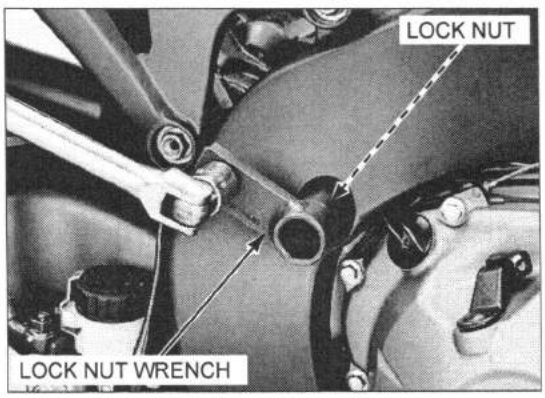


Do not remove the upper engine hanger lock nut yet.

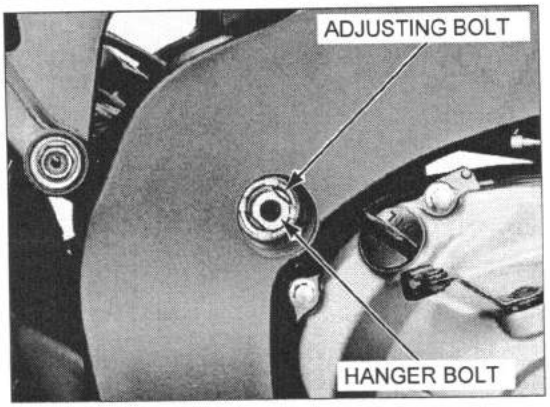
Loosen the upper engine hanger lock nut using the special tool.

TOOL:

Lock nut wrench, 20 mm **07VMA-MBB0101**



Turn the upper engine hanger adjusting bolt counterclockwise fully by turning the upper engine hanger bolt.



Remove the lower engine hanger nut and washer while holding the engine hanger bolt.

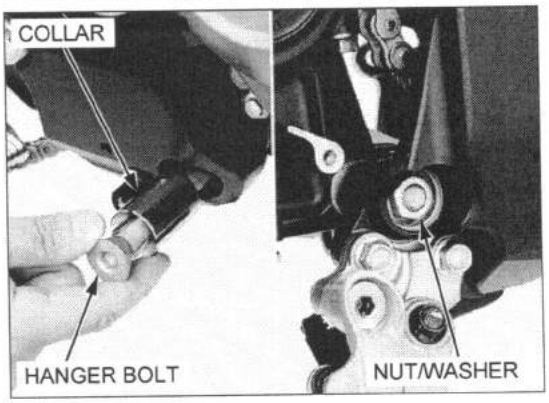
Support the engine using a jack or other adjustable support to ease removal of the engine hanger bolts.

Remove the following:

- Lower engine hanger bolt and collar
- Upper engine hanger bolt

Carefully lower the adjustable support, then remove the engine from the frame.

Remove the upper engine hanger lock nut and adjusting bolt.



ENGINE REMOVAL (ABS type)

Remove the following:

- Lower cowl (page 3-16)
- Middle cowls (page 3-18)
- Radiator (page 7-13)
- Exhaust pipe (page 3-64)
- Front ABS valve unit (page 17-50)
- Front power unit (page 17-57)
- Fuel tank (page 6-60)
- Drive sprocket cover (page 4-33)
- Throttle body (page 6-67)
- PAIR control solenoid valve (page 6-87)
- Direct ignition coils (page 4-13)

• With the ignition switch OFF, disconnect the battery negative (–) cable (page 18-7).

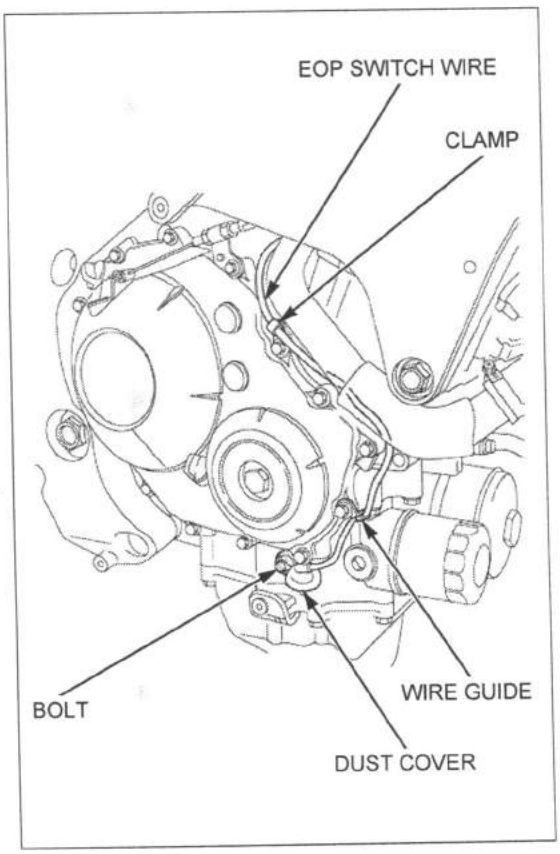
Drain the engine oil (page 4-21).

Fully slacken the drive chain (page 4-32).

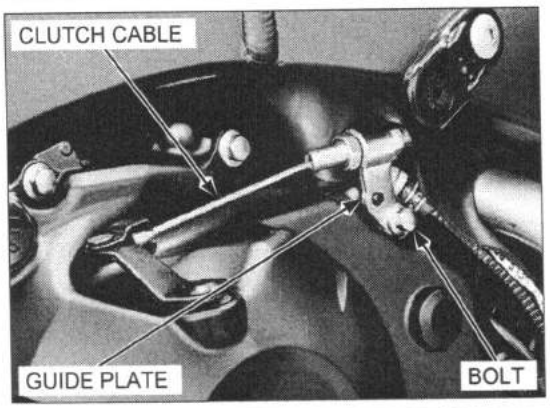
Remove the dust cover, bolt, and disconnect the EOP switch wire.

Release the EOP switch wire from the wire guide.

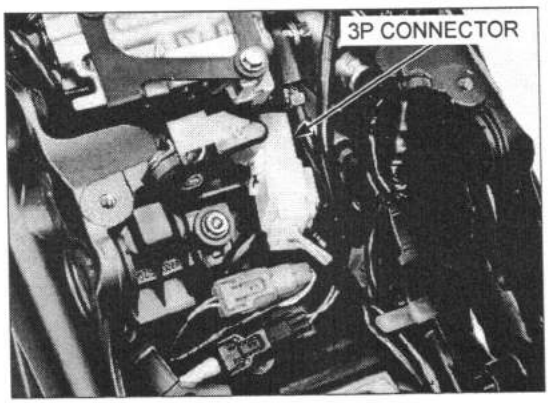
Remove the EOP switch wire clamp.



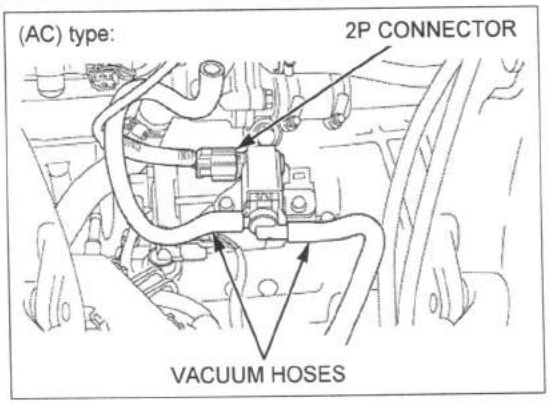
Remove the bolt and clutch cable guide plate, then disconnect the clutch cable end from the clutch lifter lever.



Disconnect the alternator 3P (Natural) connector.



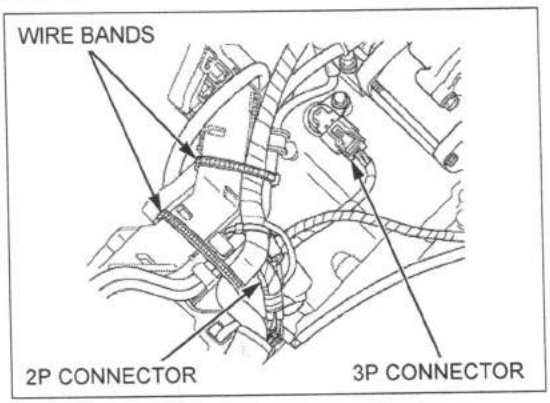
(AC) type: Disconnect the EVAP purge control solenoid valve 2P (Black) connector and vacuum hoses.



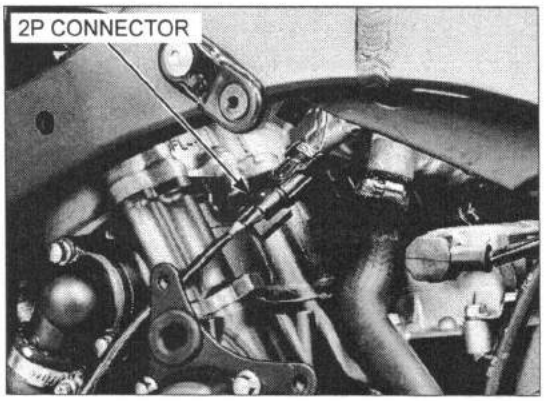
Remove the wire bands.

Disconnect the VS sensor 3P (Black) and CKP sensor 2P (Red) connectors.

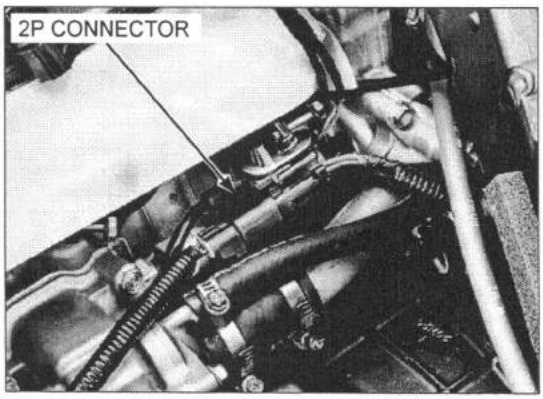
Disconnect the gear position switch 8P (Black) connector (After '11 model) (page 1-98).



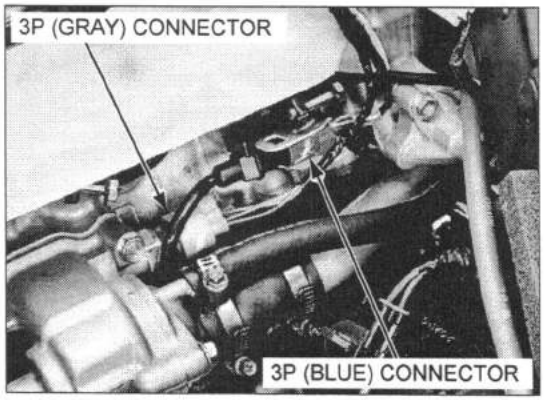
Disconnect the sidestand switch 2P (Black) connector.



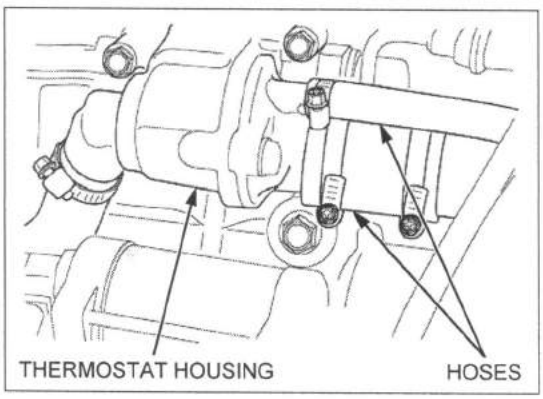
Remove the front power unit wire 2P (Black) connector.



Disconnect the knock sensor 3P (Blue) and ECT sensor 3P (Gray) connectors.

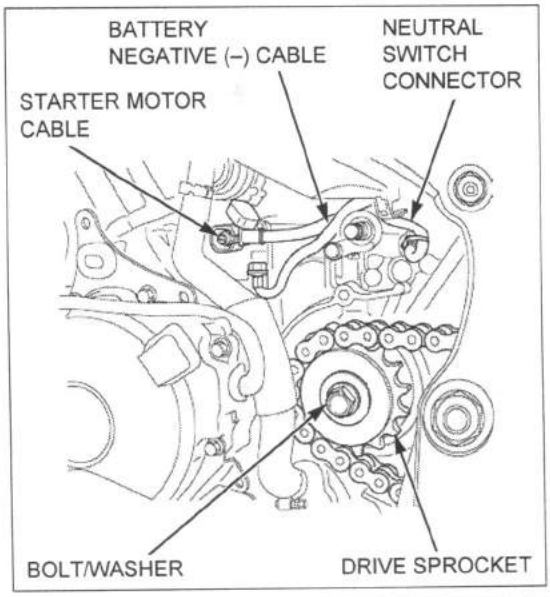


Disconnect the water hoses from the thermostat housing.

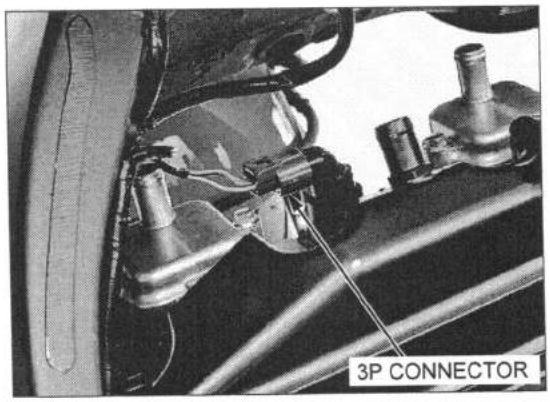


Remove the bolt, washer and drive sprocket.

Remove the bolt and disconnect the battery negative (–) cable.
Remove the nut and disconnect the starter motor cable.
Disconnect the neutral switch connector ('09 – '11 model).



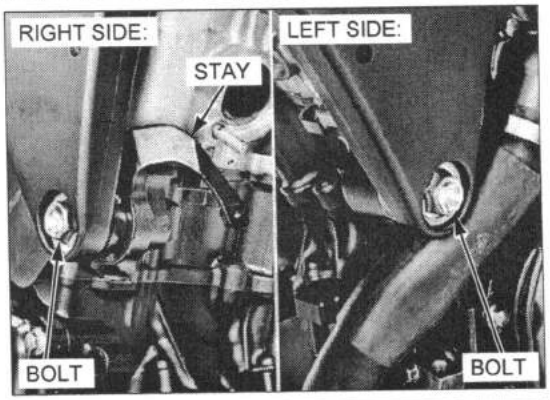
Disconnect the CMP sensor 3P (Blue) connector.



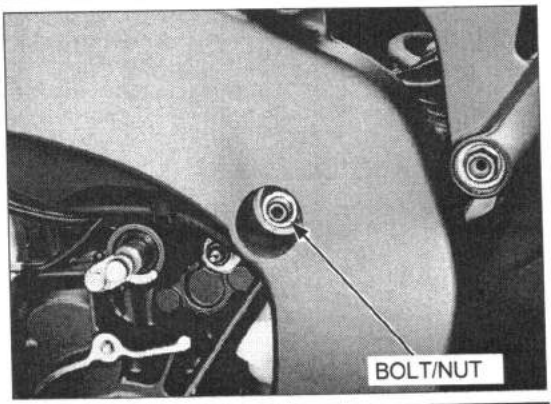
Support the engine using a jack or other adjustable support.

Remove the right front engine hanger bolt and front power unit stay.

Remove the left front engine hanger bolt.



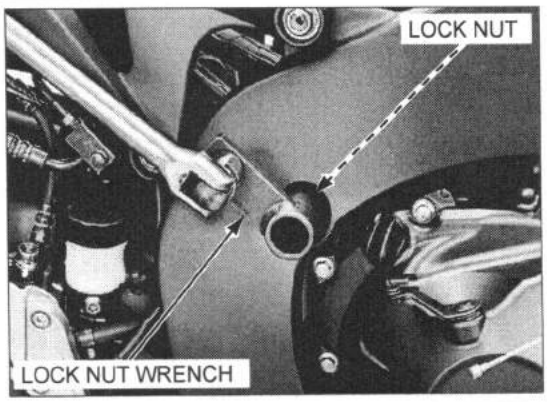
Remove the upper engine hanger nut while holding the engine hanger bolt.



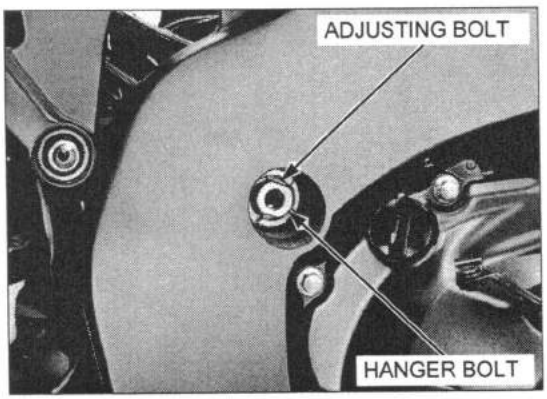
Do not remove the upper engine hanger lock nut yet.

Loosen the upper engine hanger lock nut using the special tool.

TOOL:
Lock nut wrench, 20 mm **07VMA-MBB0101**



Turn the upper engine hanger adjusting bolt counterclockwise fully by turning the upper engine hanger bolt.



Remove the lower engine hanger nut and washer while holding the engine hanger bolt.

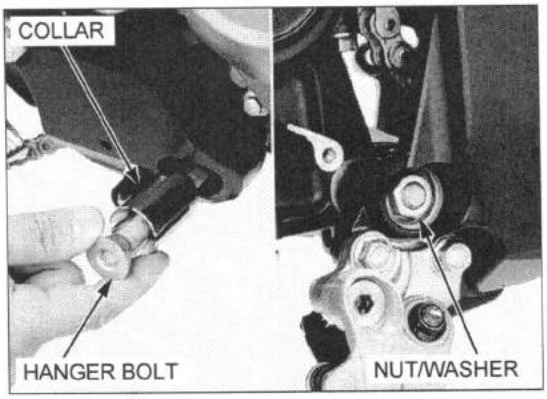
Support the engine using a jack or other adjustable support to ease removal of the engine hanger bolts.

Remove the following:

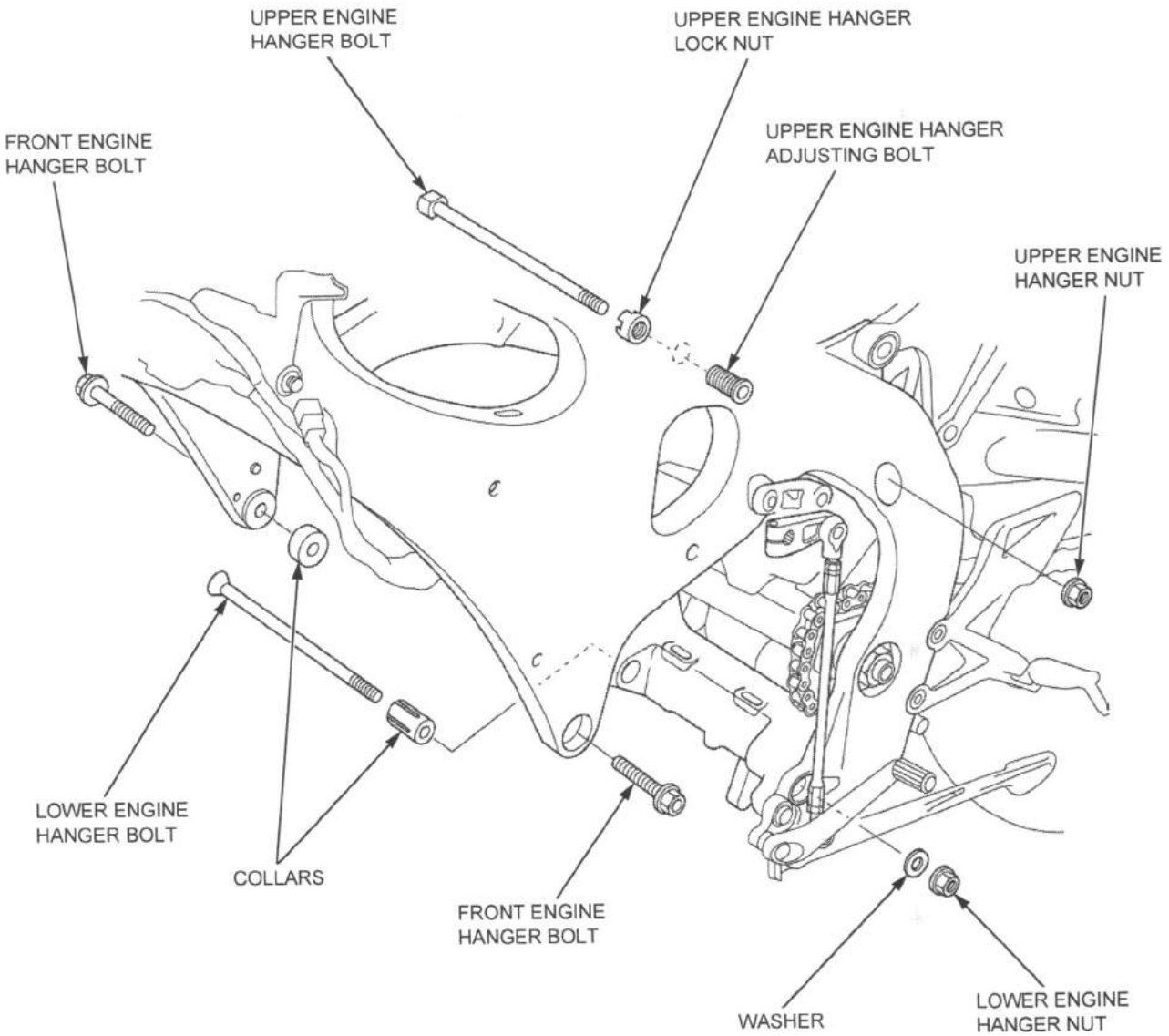
- Lower engine hanger bolt and collar
- Upper engine hanger bolt

Carefully lower the adjustable support, then remove the engine from the frame.

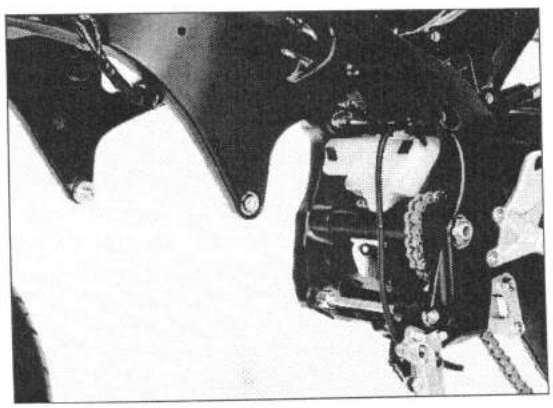
Remove the upper engine hanger lock nut and adjusting bolt.



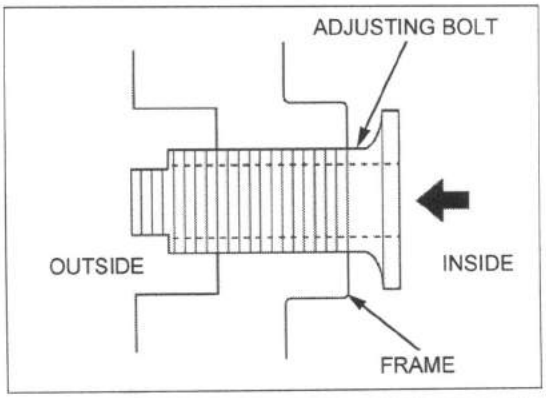
ENGINE INSTALLATION (STANDARD/SP type)



- Note the direction of the hanger bolts/collars.
- When tightening the lock nut with the lock nut wrench, refer to the torque wrench reading information in "SERVICE INFORMATION" (page 8-4).
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- Correctly route the wires, hoses and cables (page 1-25).
- Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence described on the following pages. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the specified sequence.

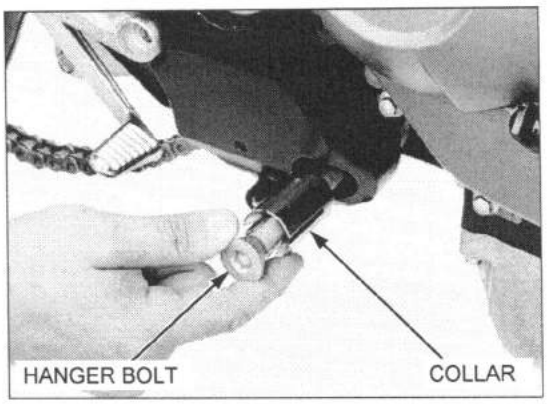


Install the upper engine hanger adjusting bolt fully from the inside of the frame.



Carefully install the engine into the frame.

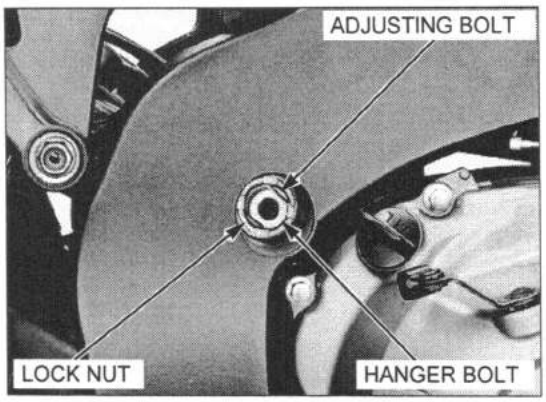
Install the collar and lower engine hanger bolt from the right side.



Install the upper engine hanger bolt from the right side.

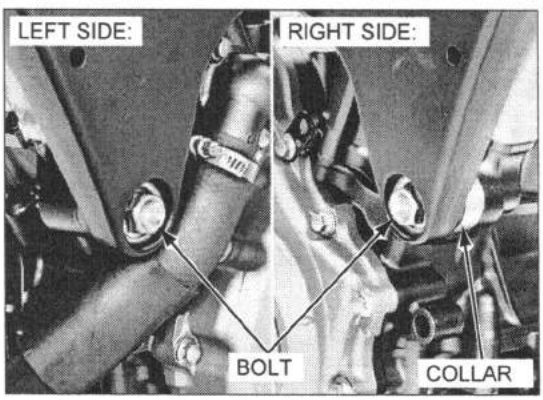
Align the straight portions of the engine hanger bolt head with the adjusting bolt bosses.

Loosely install the upper engine hanger lock nut.



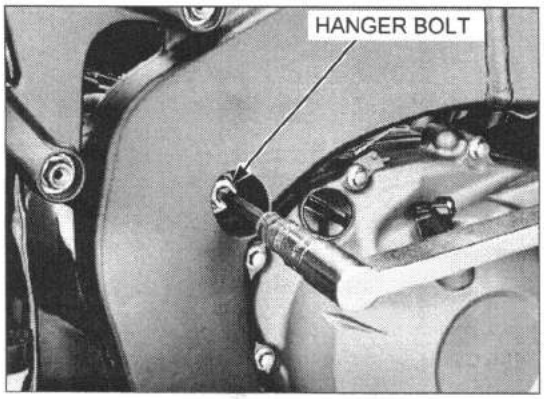
Loosely install the left front engine hanger bolt.

Loosely install the collar and right front engine hanger bolt.



Tighten the upper engine hanger adjusting bolt to the specified torque by turning the upper engine hanger bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

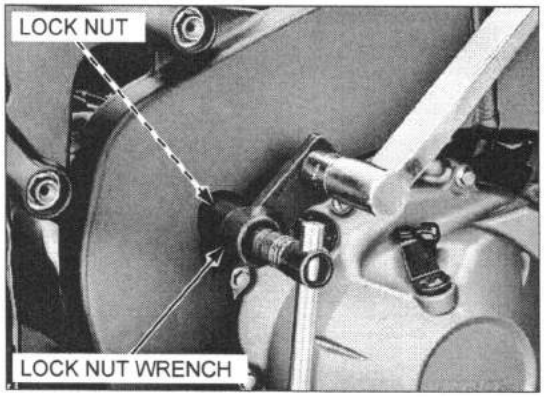


Install the upper engine hanger lock nut.
Hold the adjusting bolt by holding the hanger bolt and tighten the lock nut to the indicated below torque.

TOOL:
Lock nut wrench, 20 mm 07VMA-MBB0101

TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)

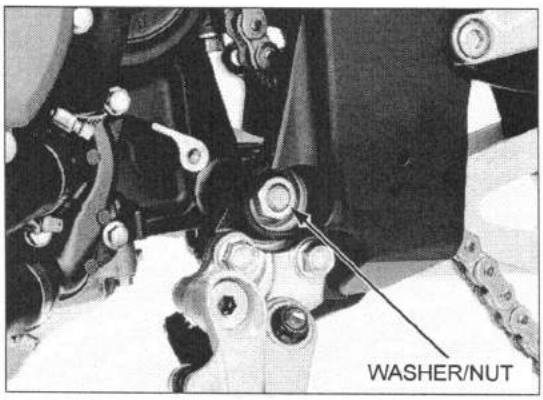
NOTE:
Using the special tool, the torque setting above gives actual torque value (page 8-4).



Install the washer and lower engine hanger nut.

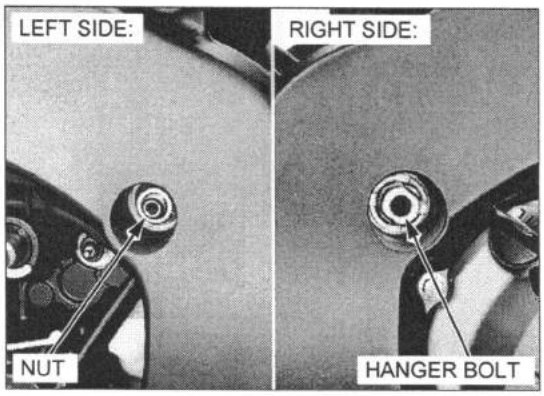
Tighten the lower engine hanger nut to the specified torque while holding the hanger bolt.

TORQUE: 84 N·m (8.6 kgf·m, 62 lbf·ft)



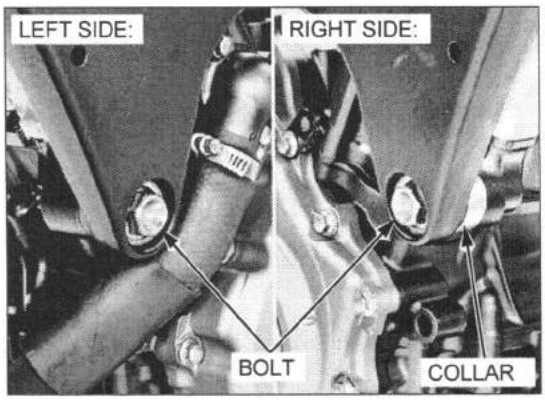
Tighten the upper engine hanger nut to the specified torque while holding the hanger bolt.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

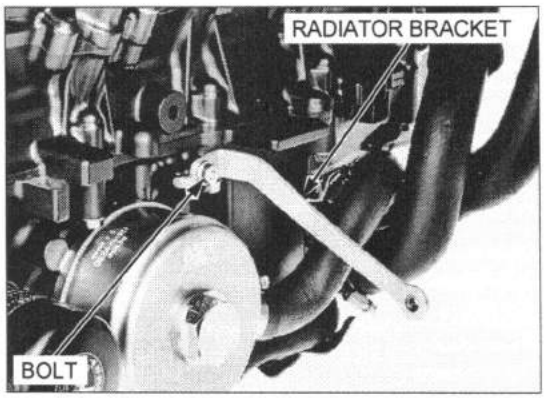


Tighten the front engine hanger bolt to the specified torque.

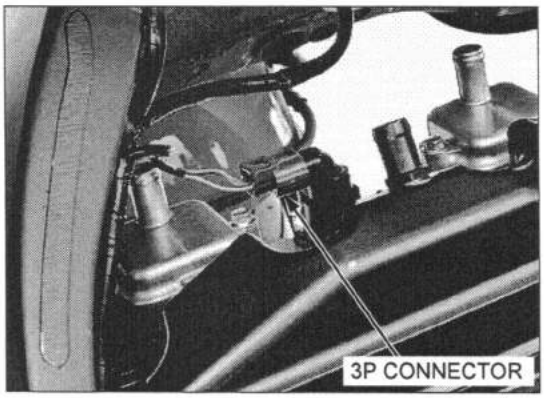
TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



Install the radiator bracket as shown and tighten the bolt securely.



Connect the CMP sensor 3P (Blue) connector.



Correctly route the wires (page 1-25).

Install the battery negative (–) cable and tighten the bolt securely.

Connect the stater motor cable and tighten the nut to the specified torque.

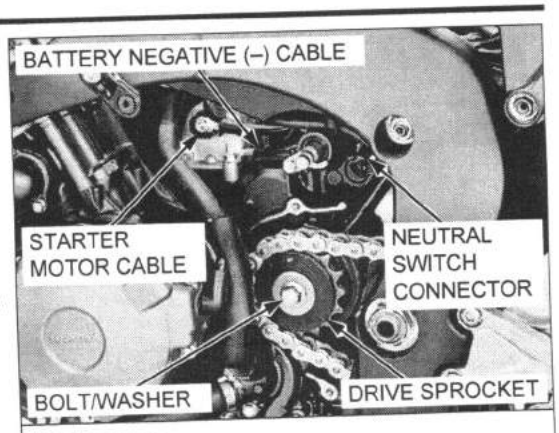
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the neutral switch connector ('08 – '11 model).

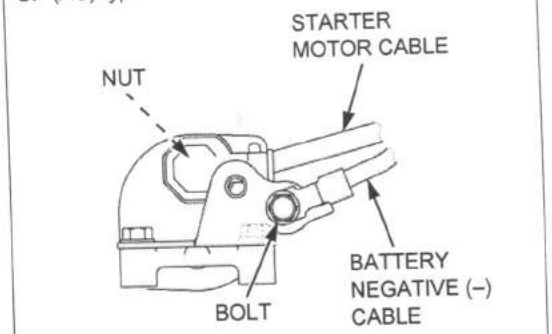
Install the drive sprocket with its marks facing out.

Install the washer and drive sprocket bolt, then tighten the bolt to the specified torque.

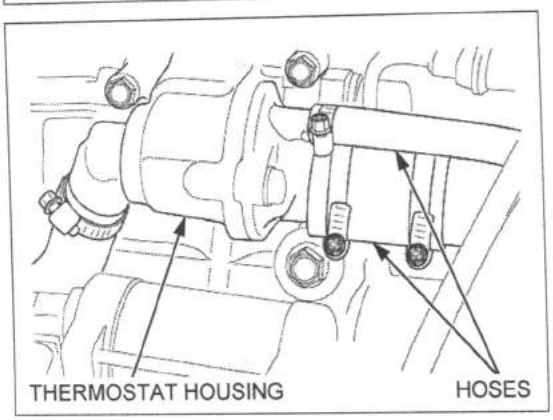
TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



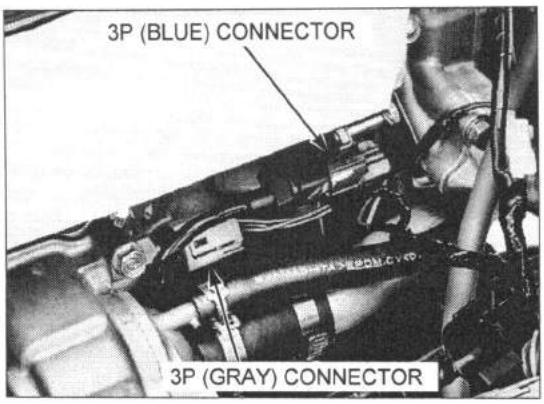
SP (AC) type:



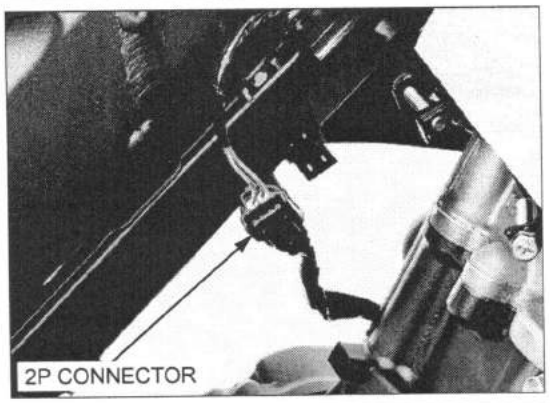
Connect the water hoses to the thermostat housing securely (page 1-22).



Connect the knock sensor 3P (Blue) and ECT sensor 3P (Gray) connectors.

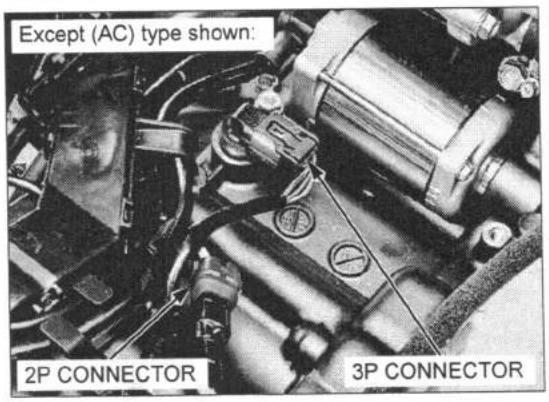


Connect the sidestand switch 2P (Black) connector.

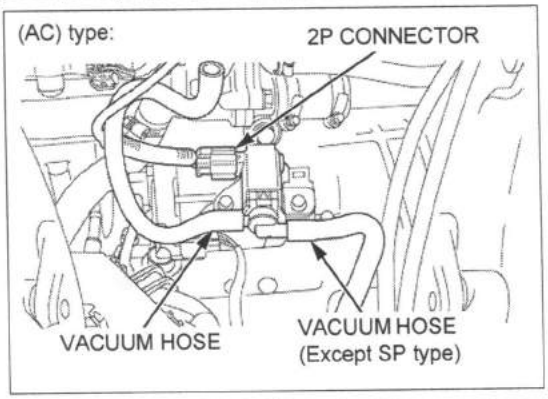


Connect the VS sensor 3P ('08 model: Blue, After '08 model: Black) and CKP sensor 2P (Red) connectors.

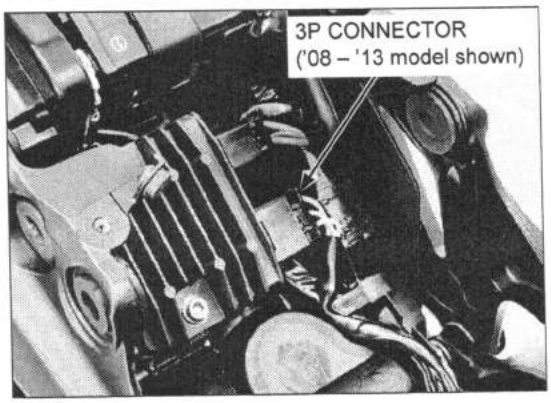
Connect the gear position switch 8P (Black) connector (After '11 model) (page 1-76).



(AC) type: Connect the EVAP purge control solenoid valve 2P (Black) connector and vacuum hose(s).

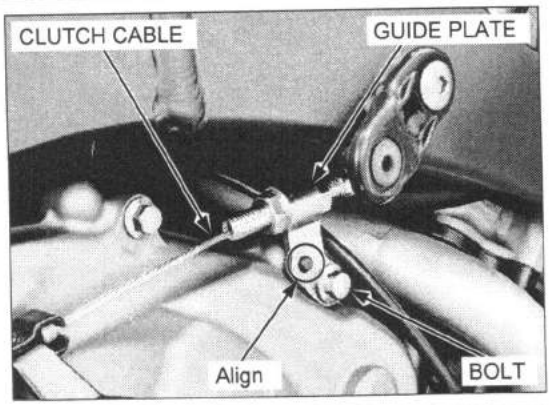


Connect the alternator 3P (Black) connector.



Connect the clutch cable to the clutch lifter lever.

Install the clutch cable guide plate by aligning its hole with the right crankcase cover boss and tighten the bolt securely.



Install the EOP switch wire clamp.

Route the EOP switch wire to the wire guide.

Connect the EOP switch wire terminal and tighten the bolt to the specified torque.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Install the dust cover.

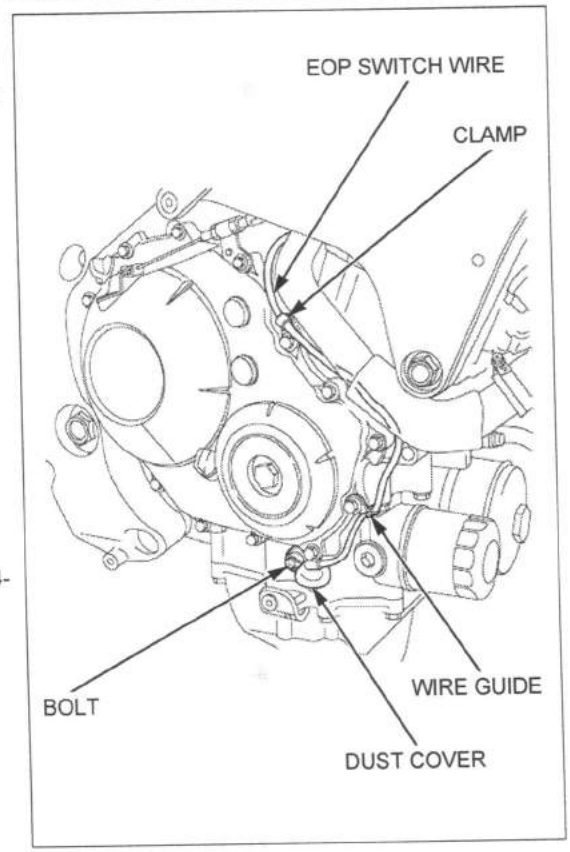
Install the following:

- SP (AC) type: EVAP canister (page 6-98)
- Direct ignition coils (page 4-13)
- PAIR control solenoid valve (page 6-87)
- Throttle body (page 6-71)
- Drive sprocket cover (page 4-34)
- Fuel tank (page 6-61)
- Radiator (page 7-21)
- Exhaust pipe (page 3-65)

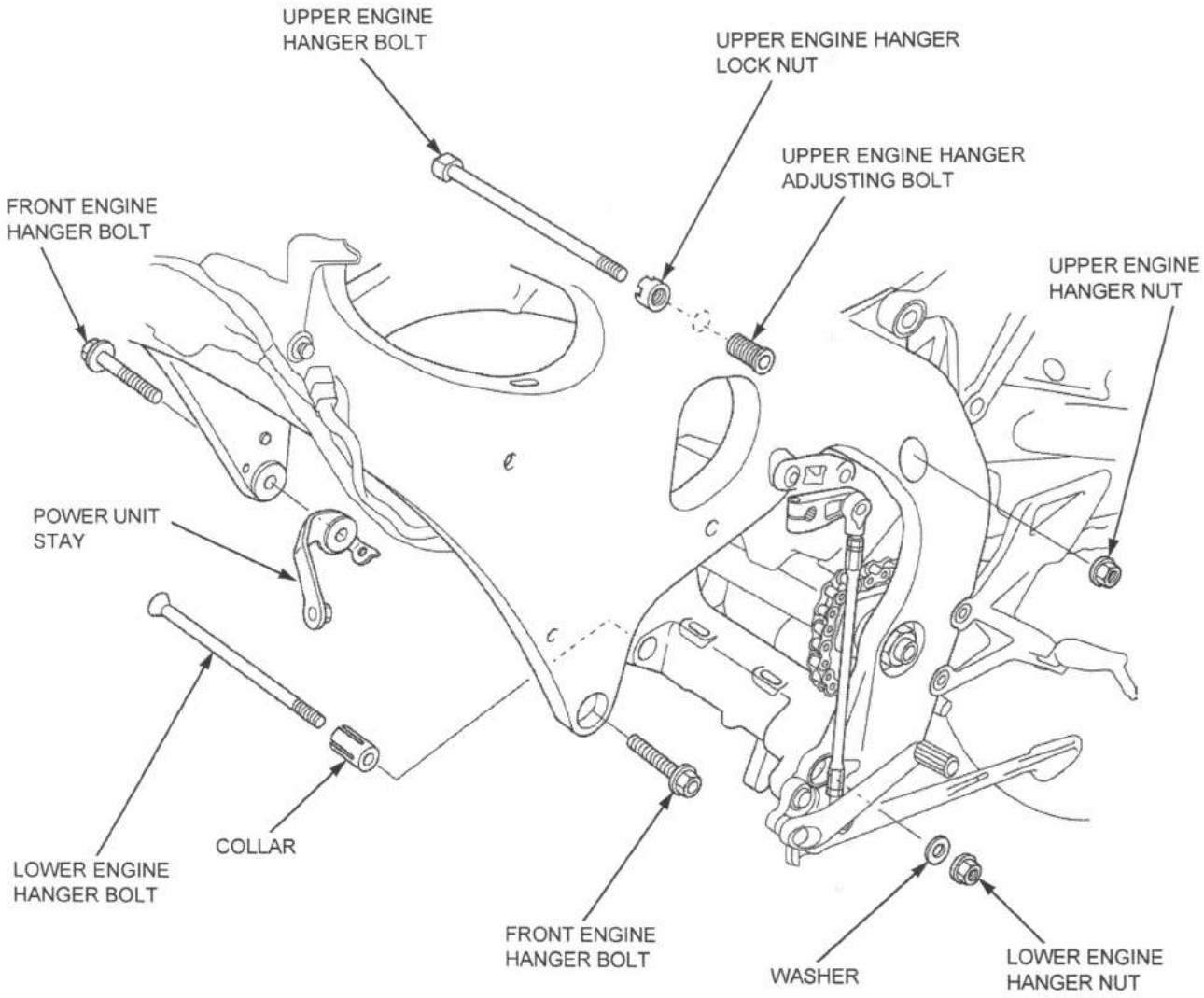
Connect the battery negative (–) cable (page 18-7).
Adjust the drive chain slack (page 4-32).
Check the clutch lever freeplay (page 4-40).
Fill the crankcase with the recommended oil (page 4-20).
Fill the cooling system and bleed any air (page 7-7).
Check the exhaust system for leaks.
Check for coolant leaks.

Install the following:

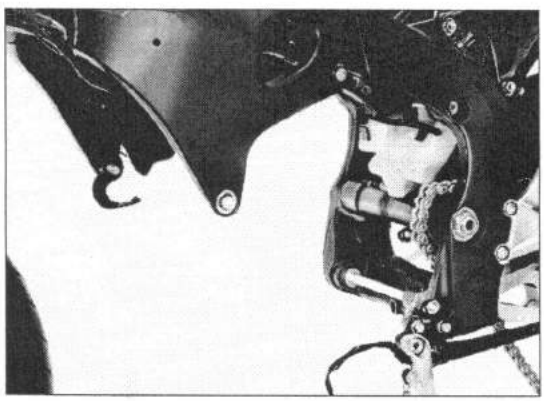
- Middle cowls (page 3-18)
- Lower cowl (page 3-16)



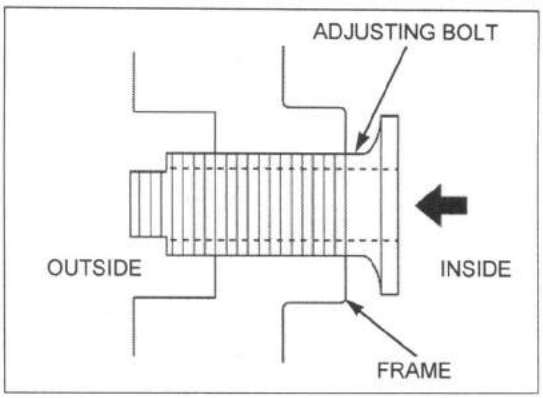
ENGINE INSTALLATION (ABS type)



- Note the direction of the hanger bolts/collar.
- When tightening the lock nut with the lock nut wrench, refer to the torque wrench reading information in "SERVICE INFORMATION" (page 8-4).
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- Correctly route the wires, hoses and cables (page 1-25).
- Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence described on the following pages. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the specified sequence.

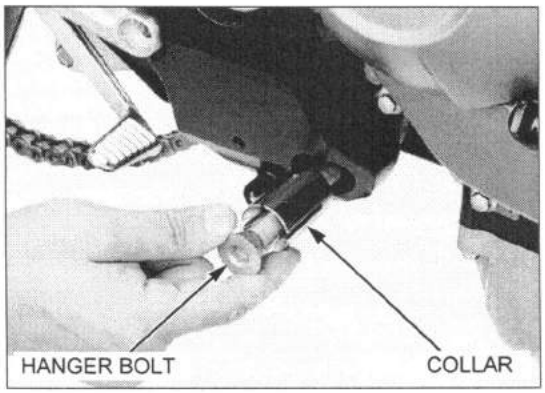


Install the upper engine hanger adjusting bolt fully from the inside of the frame.



Carefully install the engine into the frame.

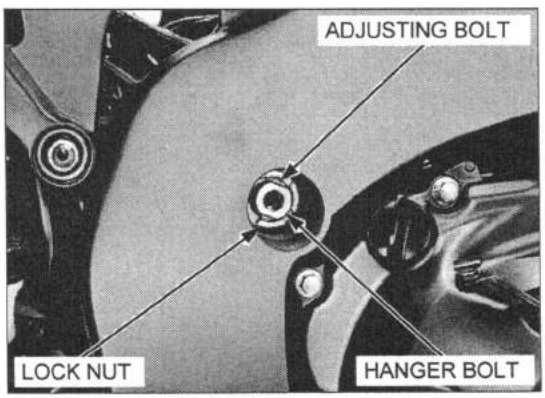
Install the collar and lower engine hanger bolt from the right side.



Install the upper engine hanger bolt from the right side.

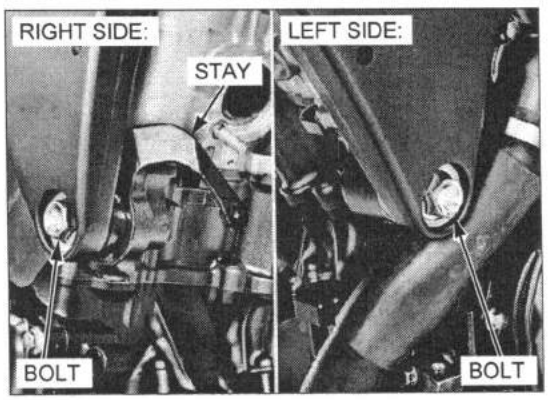
Align the straight portions of the engine hanger bolt head with the adjusting bolt bosses.

Loosely install the upper engine hanger lock nut.



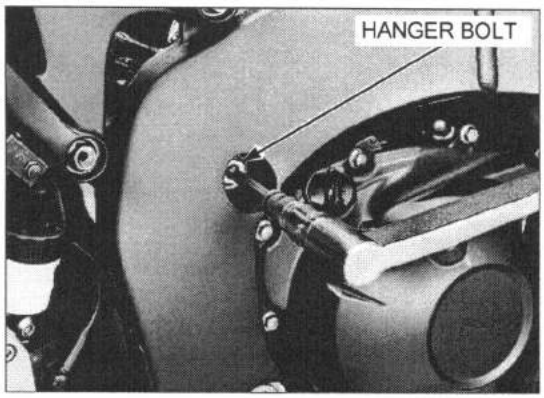
Loosely install the left front engine hanger bolt.

Loosely install the front power unit stay and right front engine hanger bolt.



Tighten the upper engine hanger adjusting bolt to the specified torque by turning the upper engine hanger bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

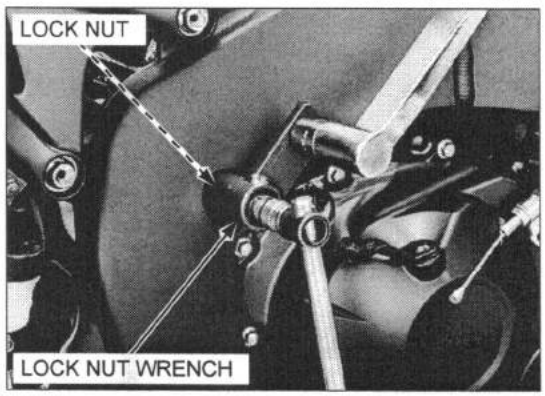


Install the upper engine hanger lock nut.
Hold the adjusting bolt by holding the hanger bolt and tighten the lock nut to the indicated below torque.

TOOL:
Lock nut wrench, 20 mm 07VMA-MBB0101

TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)

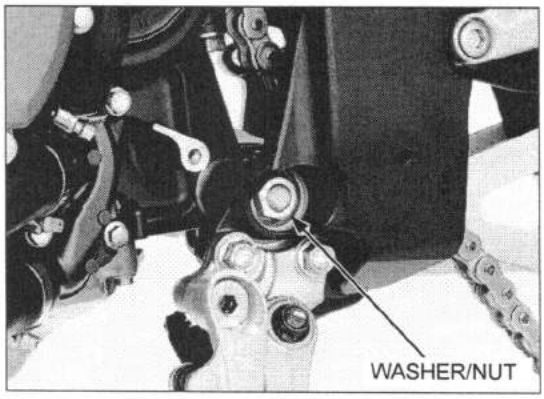
NOTE:
Using the special tool, the torque setting above gives actual torque value (page 8-4).



Install the washer and lower engine hanger nut.

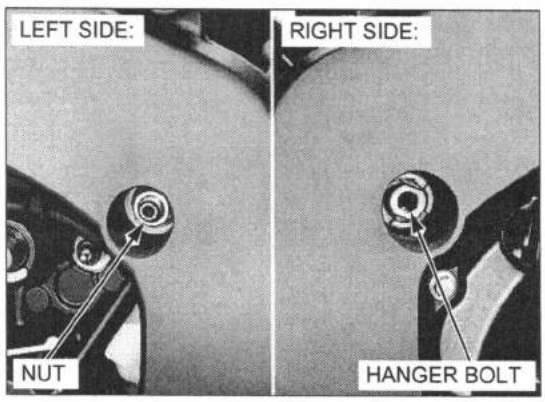
Tighten the lower engine hanger nut to the specified torque while holding the hanger bolt.

TORQUE: 84 N·m (8.6 kgf·m, 62 lbf·ft)



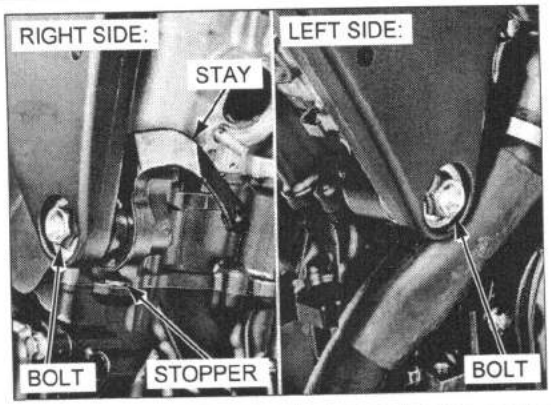
Tighten the upper engine hanger nut to the specified torque while holding the hanger bolt.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

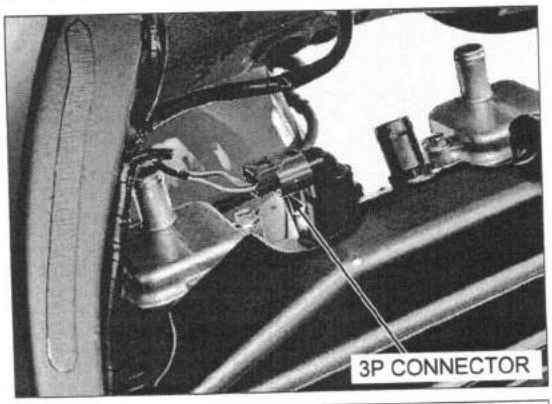


Push the front power unit stay lower stopper to the engine, then tighten the front engine hanger bolts to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



Connect the CMP sensor 3P (Blue) connector.



Route the wires properly (page 1-25).

Install the battery negative (–) cable and tighten the bolt securely.

Connect the stater motor cable and tighten the nut to the specified torque.

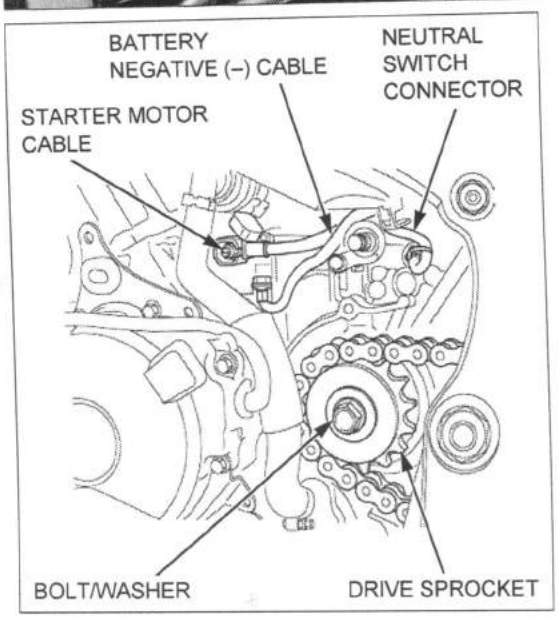
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the neutral switch connector ('09 – '11 model).

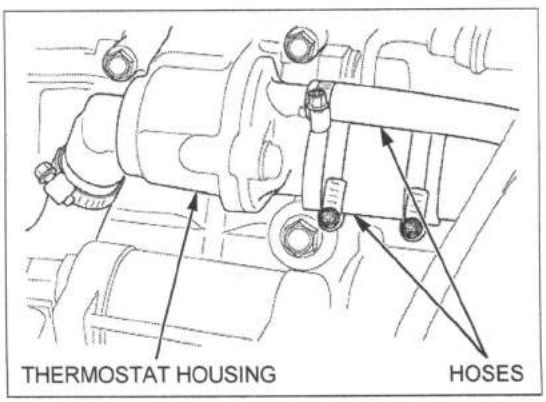
Install the drive sprocket with its marks facing out.

Install the washer and drive sprocket bolt, then tighten the bolt to the specified torque.

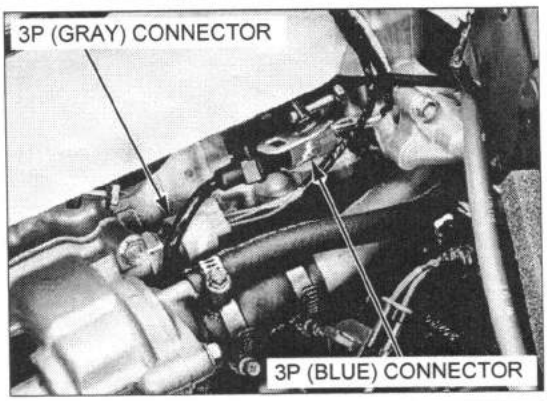
TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



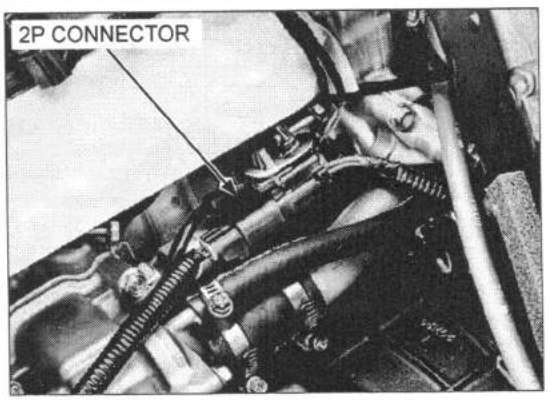
Connect the water hoses to the thermostat housing securely (page 1-22).



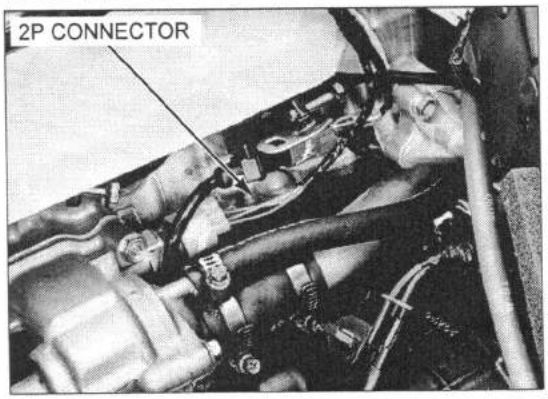
Connect the knock sensor 3P (Blue) and ECT sensor 3P (Gray) connectors.



Install the front ABS valve unit wire 2P (Black) connector to the stay.



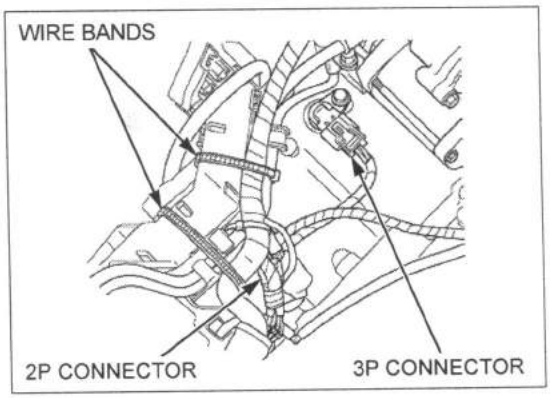
Connect the sidestand switch 2P (Black) connector.



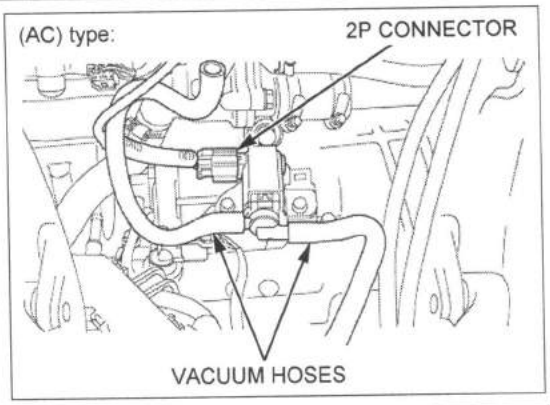
Connect the VS sensor 3P (Black) and CKP sensor 2P (Red) connectors.

Install the wire band securely.

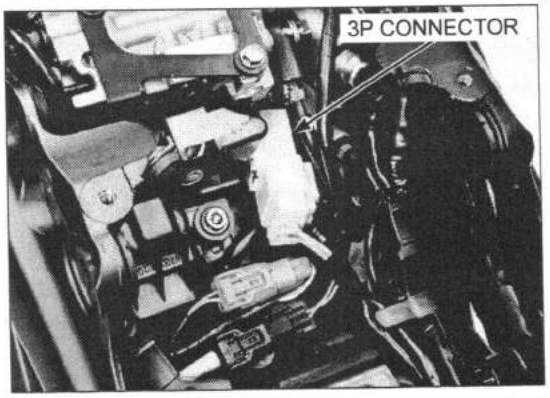
Connect the gear position switch 8P (Black) connector (After '11 model) (page 1-98).



(AC) type: Connect the EVAP purge control solenoid valve 2P (Black) connector and vacuum hoses.

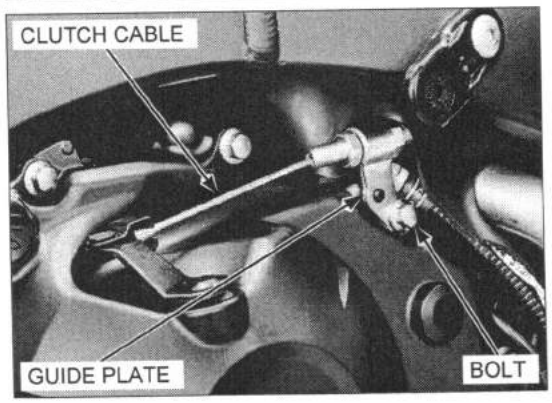


Connect the alternator 3P (Natural) connector.



Connect the clutch cable to the clutch lifter lever.

Install the clutch cable guide plate by aligning its hole with the right crankcase cover boss and tighten the bolt securely.



Install the EOP switch wire clamp.

Route the EOP switch wire to the wire guide.

Connect the EOP switch wire terminal and tighten the bolt to the specified torque.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Install the dust cover.

Install the following:

- Direct ignition coils (page 4-13)
- PAIR control solenoid valve (page 6-87)
- Throttle body (page 6-71)
- Drive sprocket cover (page 4-34)
- Front power unit (page 17-50)
- Front ABS valve unit (page 17-57)

Connect the battery negative (–) cable (page 18-7).

Fill and bleed the front Combined ABS hydraulic system.

- '09 – '13 model (page 16-23)
- After '13 model (page 16-57)

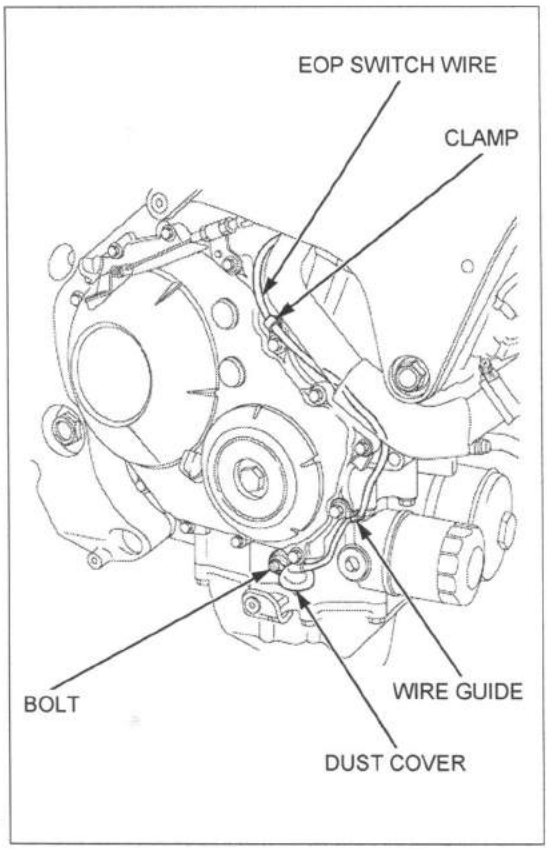
Install the following:

- Exhaust pipe (page 3-65)
- Muffler (page 3-60)
- Radiator (page 7-23)
- Fuel tank (page 6-61)

Adjust the drive chain slack (page 4-32).
Check the clutch lever freeplay (page 4-40).
Fill the crankcase with the recommended oil (page 4-20).
Fill the cooling system and bleed any air (page 7-7).
Check the exhaust system for leaks.
Check for coolant leaks.

Install the following:

- Middle cowls (page 3-18)
- Lower cowl (page 3-16)



9. CYLINDER HEAD/VALVES

COMPONENT LOCATION ····· 9-2

SERVICE INFORMATION ····· 9-3

TROUBLESHOOTING ····· 9-6

CYLINDER COMPRESSION TEST ····· 9-7

CYLINDER HEAD COVER REMOVAL ····· 9-7

CYLINDER HEAD COVER DISASSEMBLY ····· 9-8

CAMSHAFT REMOVAL ····· 9-9

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VALVE SEAT INSPECTION/ REFACING ····· 9-21

CYLINDER HEAD ASSEMBLY ····· 9-24

CYLINDER HEAD INSTALLATION ····· 9-26

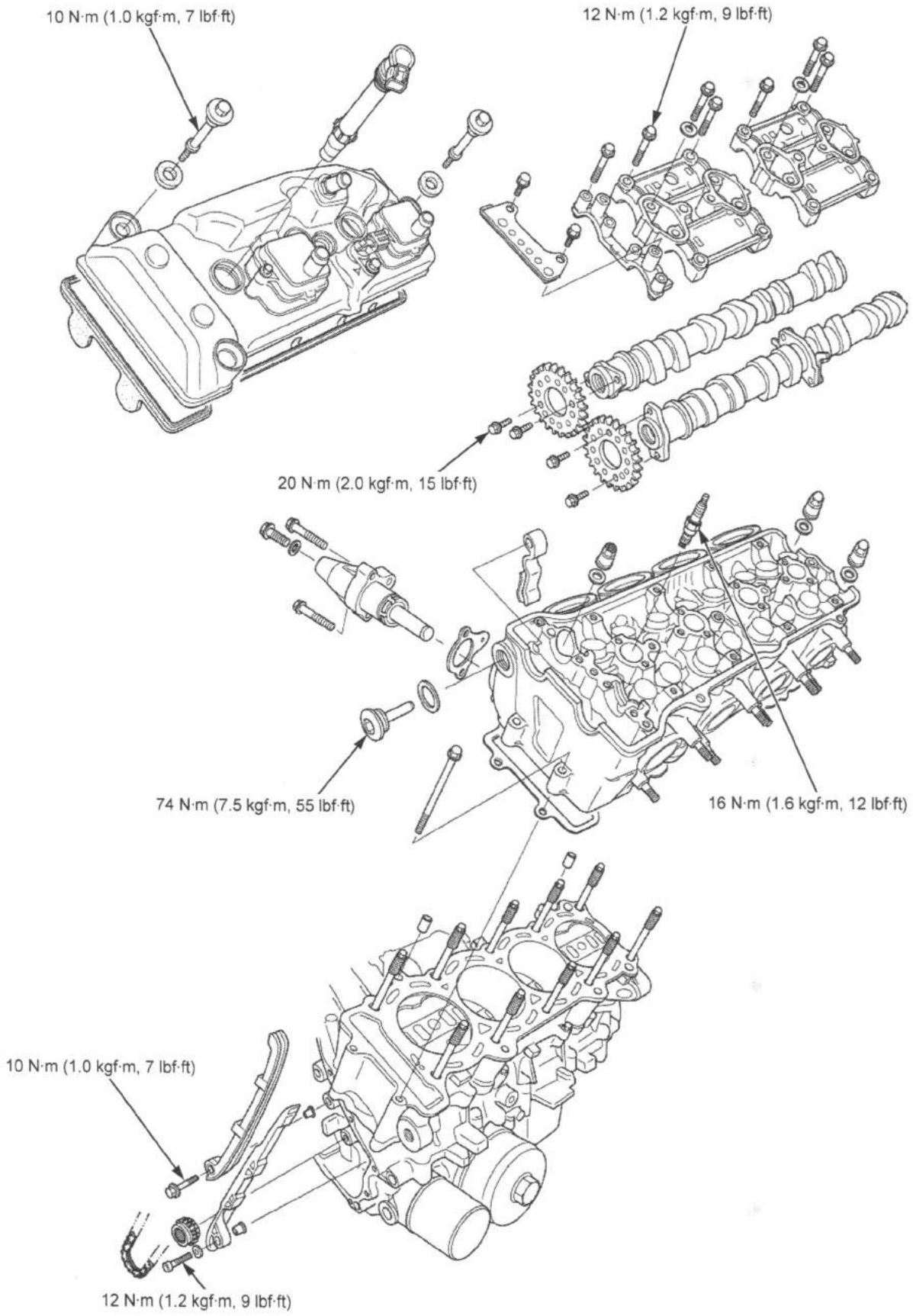
CAMSHAFT INSTALLATION ····· 9-30

CYLINDER HEAD COVER ASSEMBLY ···· 9-34

CYLINDER HEAD COVER INSTALLATION ····· 9-35

CAM CHAIN TENSIONER LIFTER ····· 9-37

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, valves and camshaft.
- The camshaft services can be done with the engine installed in the frame. The cylinder head service requires engine removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.
- For CMP sensor removal/installation (page 6-80).

SPECIFICATIONS

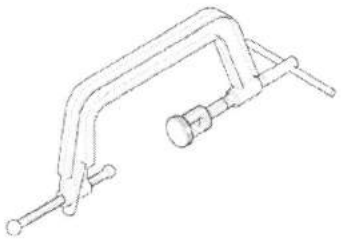
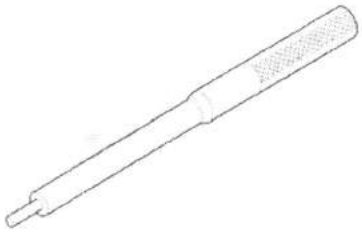
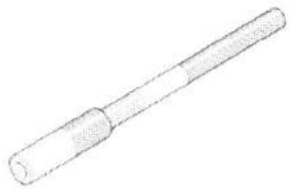
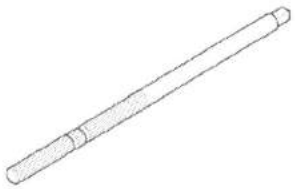
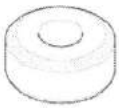
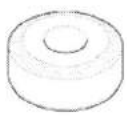
Unit: mm (in)

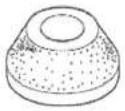
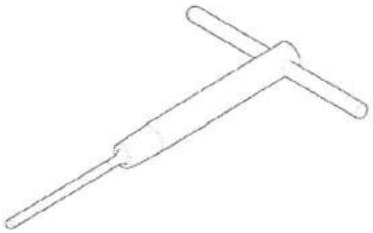
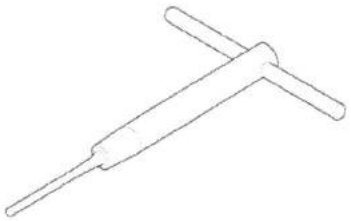
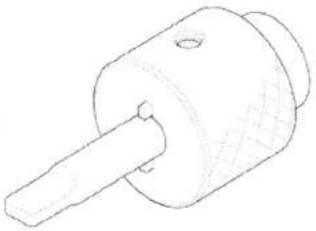
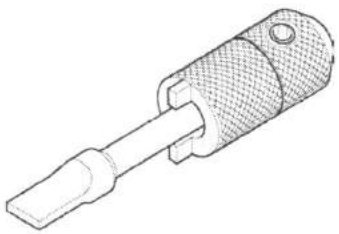
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,196 kPa (12.2 kgf/cm², 174 psi) at 210 rpm	–
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	–
		EX	0.30 ± 0.03 (0.012 ± 0.001)	–
Camshaft	Cam lobe height	IN	37.34 – 37.58 (1.470 – 1.480)	37.32 (1.469)
		EX	36.58 – 36.82 (1.440 – 1.450)	36.56 (1.439)
	Runout		–	0.05 (0.002)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Valve lifter	Valve lifter O.D.	IN/EX	25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.	IN/EX	26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.	IN	4.475 – 4.490 (0.1762 – 0.1768)	4.465 (0.1758)
		EX	3.965 – 3.980 (0.1561 – 0.1567)	3.955 (0.1557)
	Valve guide I.D.	IN	4.500 – 4.512 (0.1772 – 0.1776)	4.54 (0.179)
		EX	4.000 – 4.012 (0.1575 – 0.1580)	4.04 (0.159)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN	15.1 – 15.4 (0.59 – 0.61)	–
		EX	15.7 – 16.0 (0.62 – 0.63)	–
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	IN	Inner	35.25 (1.388)	34.5 (1.36)
		Outer	38.93 (1.533)	38.2 (1.50)
	EX		39.68 (1.562)	38.9 (1.53)
Cylinder head warpage			–	0.10 (0.004)

TORQUE VALUES

Cylinder head nut	–	See page 9-29
Camshaft holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply oil to the threads and seating surface.
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
PAIR check valve cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Cam sprocket bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads.
CMP sensor rotor bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Cam chain tensioner A pivot bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Cam chain tensioner B pivot bolt	74 N·m (7.5 kgf·m, 55 lbf·ft)	
Cam chain guide A bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Insulator mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Breather plate mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Cylinder stud bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	

TOOLS

Compression gauge attachment 07RMJ-MY50100  or equivalent commercially available	Valve spring compressor 07757-0010000 	Valve spring compressor attachment 07959-KM30101 
Tappet hole protector 07HMG-MR70002 How to make tool (page 9-16)	Valve guide driver (IN) 07HMD-ML00101 	Valve guide driver (EX) 07JMD-KY20100 
Valve guide driver 07743-0020000  (Not available in U.S.A.)	Valve guide reamer, 4.508 mm (IN) 07HMH-ML00101  or 07HMH-ML0010B (U.S.A. only)	Valve guide reamer, 4.008 mm (EX) 07MMH-MV90100  or 07MMH-MV9010A (U.S.A. only)
Valve seat cutter, 33 mm (45° IN) 07780-0010800  or equivalent commercially available	Valve seat cutter, 24.5 mm (45° EX) 07780-0010100  or equivalent commercially available	Flat cutter, 33 mm (32° IN) 07780-0012900  or equivalent commercially available

Flat cutter, 25 mm (32° EX) 07780-0012000  or equivalent commercially available	Interior cutter, 34 mm (60° IN) 07780-0014700  or equivalent commercially available	Interior cutter, 26 mm (60° EX) 07780-0014500  or equivalent commercially available
Cutter holder, 4.5 mm (IN) 07781-0010600  or equivalent commercially available	Cutter holder, 4.0 mm (EX) 07781-0010500  or equivalent commercially available	Cam chain tensioner holder 070MG-0010100  (Not available in U.S.A.)
Cam chain tensioner holder 07AMG-MFJA100 (U.S.A. only) 		

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod or stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for a seized piston ring (page 13-16).

Compression too low, hard starting or poor performance at low speed

- Valves:
  - Incorrect valve clearance adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head:
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Worn cylinder, piston or piston rings (page 13-16)

Compression too high, overheating or knocking

- Excessive carbon build-up on piston crown or on combustion chamber

Excessive smoke

- Cylinder head:
  - Worn valve stem or valve guide
  - Damaged stem seal
- Worn cylinder, piston or piston rings (page 13-16)

Excessive noise

- Cylinder head:
  - Incorrect valve clearance adjustment
  - Sticking valve or broken valve spring
  - Damaged or worn camshaft
  - Loose or worn cam chain
  - Worn or damaged cam chain
  - Worn or damaged cam chain tensioner
  - Worn cam sprocket teeth
- Worn cylinder, piston or piston rings (page 13-16)

Rough idle

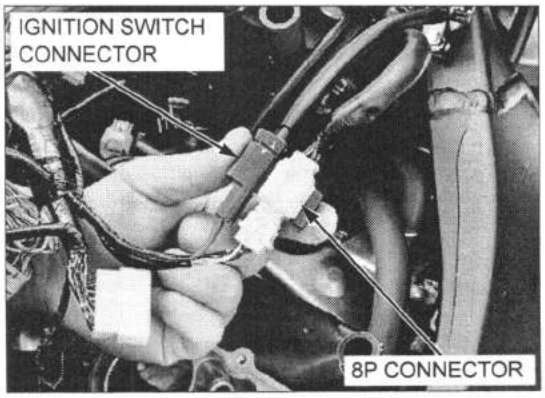
- Low cylinder compression

CYLINDER COMPRESSION TEST

Warm the engine to normal operating temperature. Stop the engine and remove the all direct ignition coil/ spark plug caps and spark plugs (page 4-13).

Connect the following:

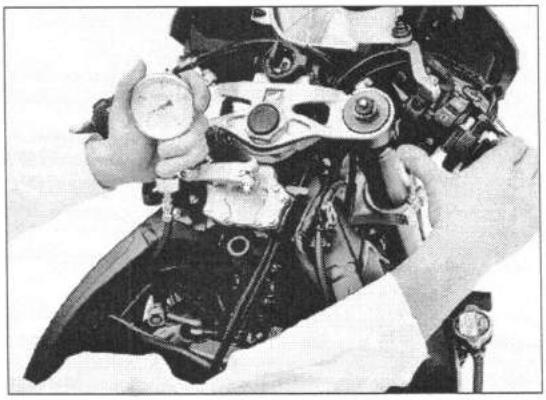
- Ignition switch connector
  - STANDARD/SP type: 2P (Brown)
  - ABS type: 3P (Brown)
- Right handlebar switch 8P (White) connector



Install a compression gauge into the spark plug hole.

TOOL:

Compression gauge attachment	**07RMJ-MY50100 or equivalent commercially available**



Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.

The maximum reading is usually reached within 4 – 7 seconds.

Standard:
1,196 kPa (12.2 kgf/cm², 174 psi) at 210 rpm

Low compression can be caused by:

- Blown cylinder head gasket
- Improper valve clearance adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head

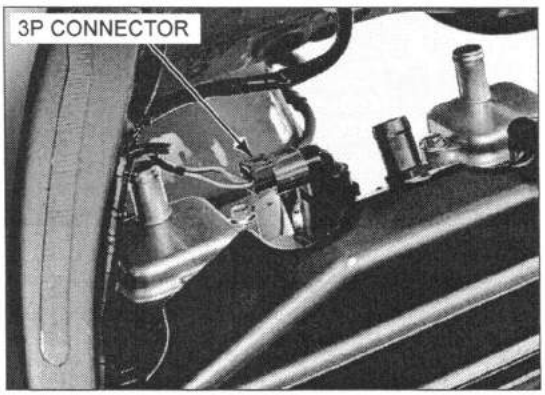
CYLINDER HEAD COVER REMOVAL

- For CMP sensor removal/installation (page 6-80).

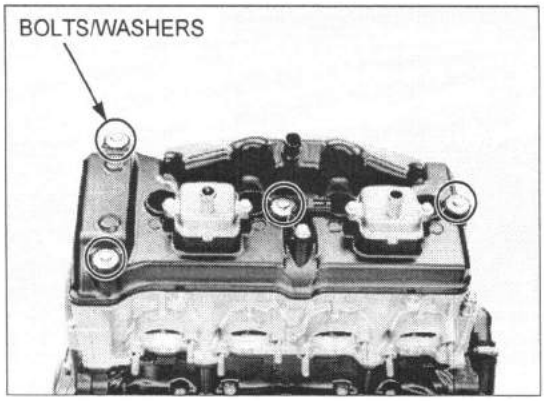
Remove the following:

- Radiator
  - STANDARD/SP type (page 7-11)
  - ABS type (page 7-13)
- Air cleaner housing (page 6-62)
- PAIR control solenoid valve (page 6-87)
- Direct ignition coils (page 4-13)

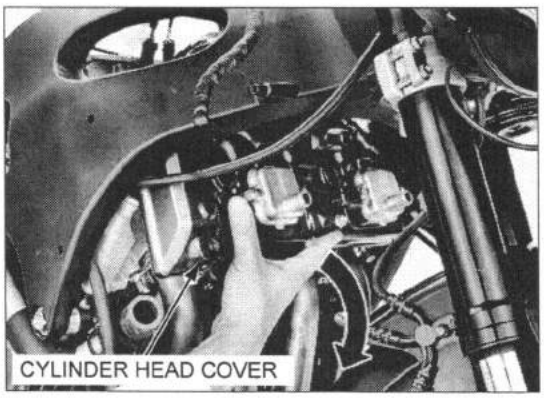
Disconnect the CMP sensor 3P (Blue) connector.



Remove the cylinder head cover bolts and washers.



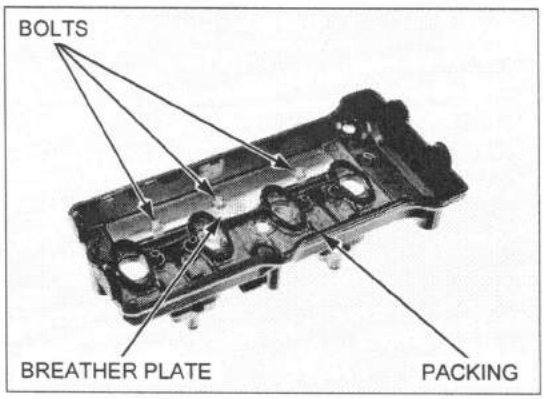
Remove the cylinder head cover from the cylinder head.



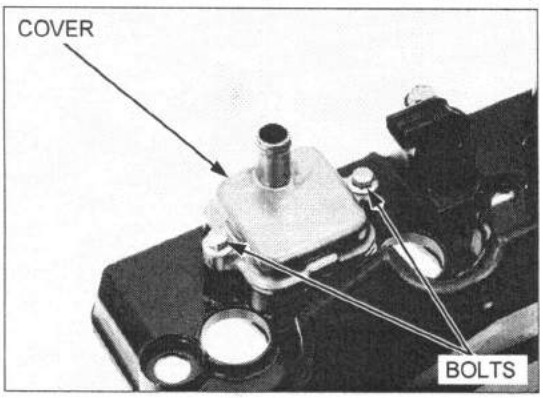
CYLINDER HEAD COVER DISASSEMBLY

Remove the cylinder head cover packing.

Remove the bolts and breather plate.

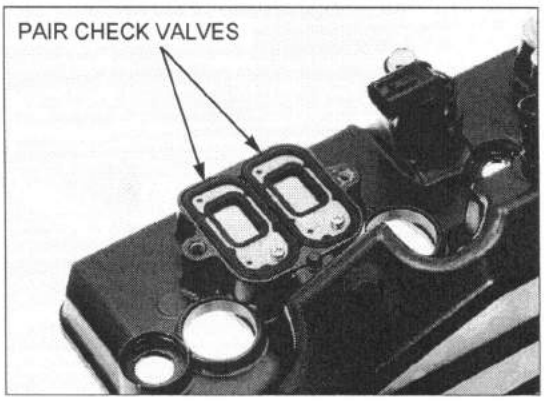


Remove the bolts and PAIR check valve cover.

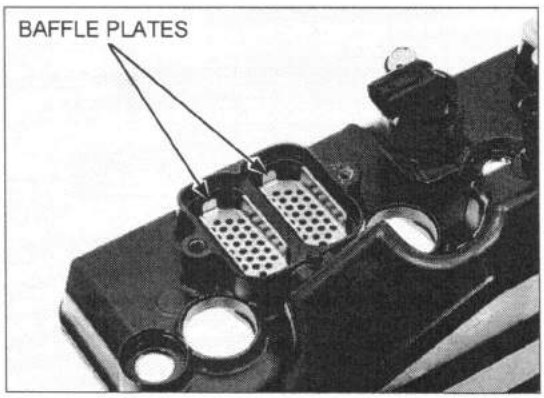


Remove the PAIR check valves from the cylinder head cover.

Check the PAIR check valve for wear or damage, replace if necessary.



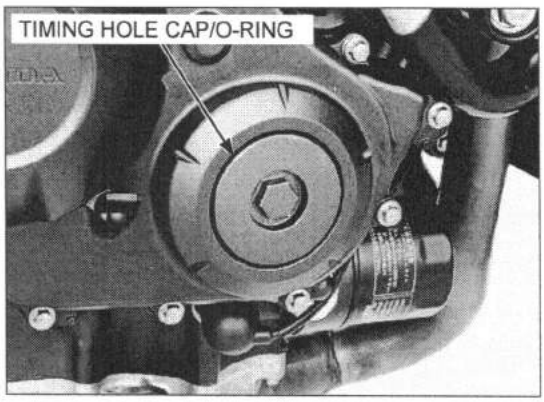
Remove the baffle plates from the cylinder head cover.



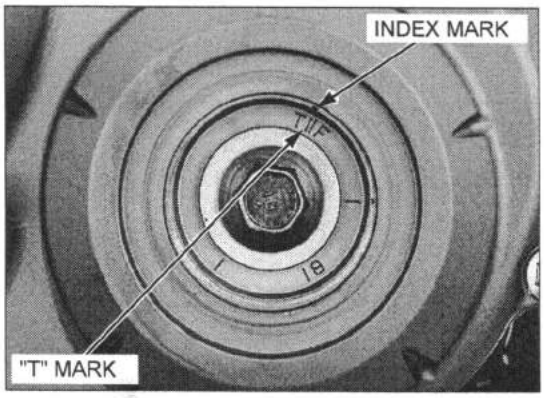
CAMSHAFT REMOVAL

Remove the cylinder head cover (page 9-7).

Remove the timing hole cap and O-ring.

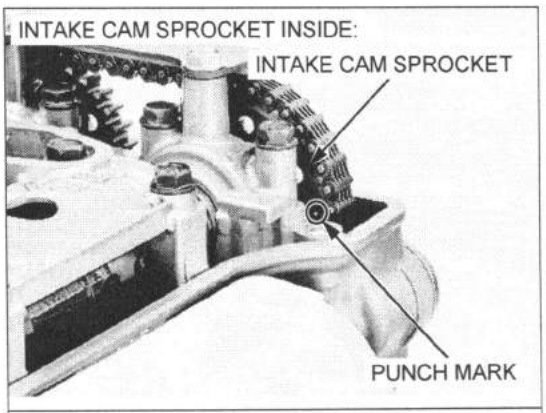


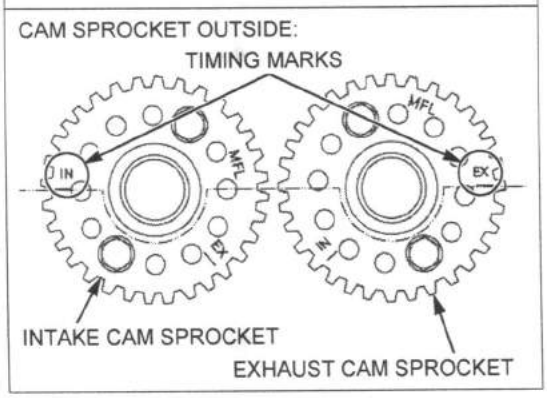
Turn the crankshaft clockwise and align the "T" mark with the index mark on the right crankcase cover.



- The inside punch mark of the intake cam sprocket must be flush with the cylinder head upper surface.
- The cam sprocket outside timing marks ("IN" and "EX") must be flush with the cylinder head upper surface and facing outward as shown.

If the timing marks on the cam sprockets are facing inward, turn the crankshaft clockwise one full turn (360) and realign the timing marks with the cylinder head surface so they are facing outward.





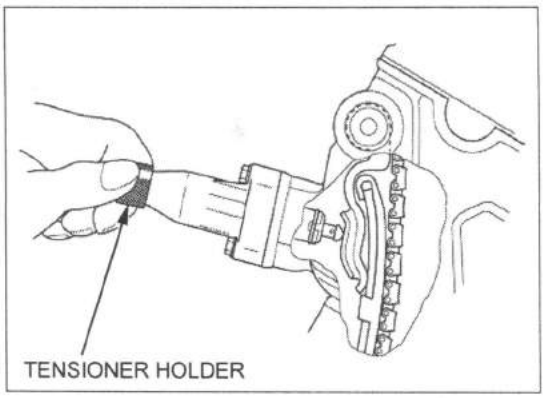
Remove the cam chain tensioner lifter bolt and sealing washer.



Turn the tensioner lifter shaft fully in (clockwise) and secure it using the tensioner holder to prevent damaging the cam chain.

TOOL:

Cam chain tensioner holder	**070MG-0010100 (Not available in U.S.A.) or 07AMG-MFJA100 (U.S.A. only)**



Remove the cam sprocket bolts from the intake and exhaust camshafts.

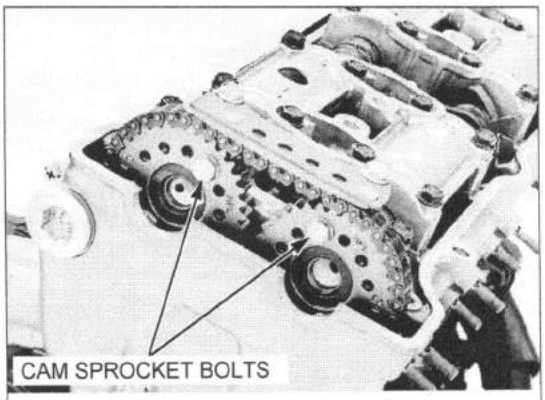
Turn the crankshaft clockwise one full turn (360°), remove the other cam sprocket bolts from the camshafts.

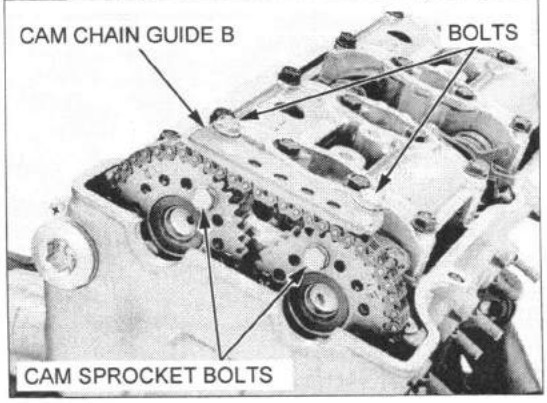
NOTE:

Be careful not to drop the cam sprocket bolts and cam sprocket into the crankcase.

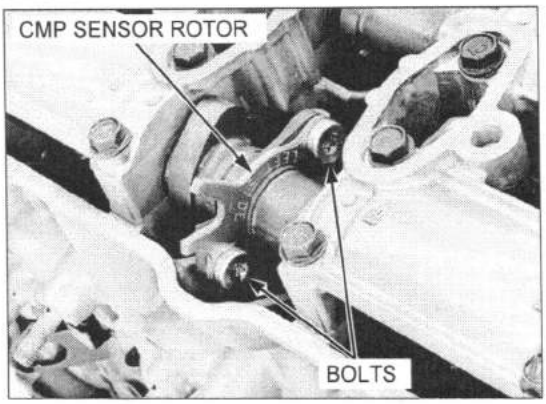
Remove the bolts and cam chain guide B.

Remove the cam sprockets from the camshafts.





If you plan to replace the camshaft and/or CMP sensor rotor, loosen the CMP sensor rotor bolts.



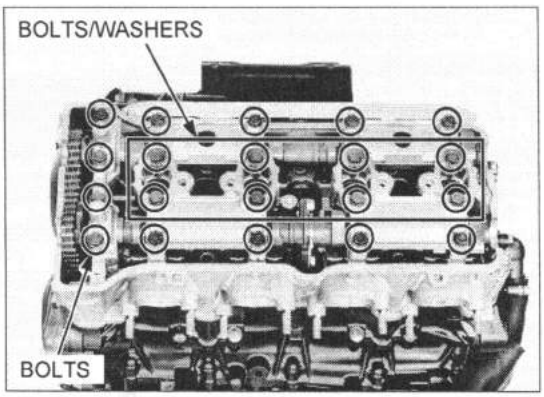
Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.

Loosen and remove the camshaft holder bolts/washers, then remove the camshaft holders and camshafts.

NOTE:

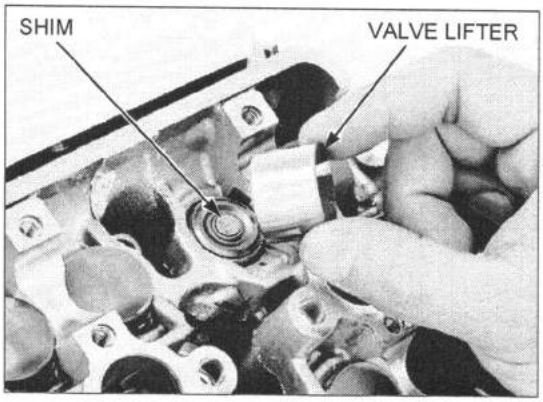
From outside to inside, loosen the bolts in a crisscross pattern in several steps or the camshaft holder might break.

Do not forcibly remove the dowel pins from the camshaft holders.



Remove the valve lifters and shims.

- Be careful not to damage the valve lifter bore.
- The shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with tweezers or a magnet.



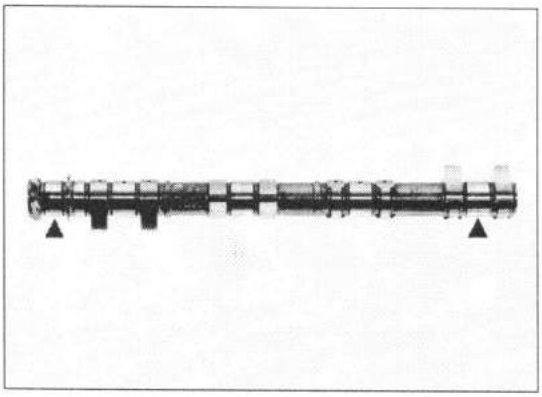
INSPECTION

CAMSHAFT

Check the cam and journal surfaces of the camshaft for scoring, scratches, or evidence of insufficient lubrication.
Check the oil holes in the camshaft for clogging.

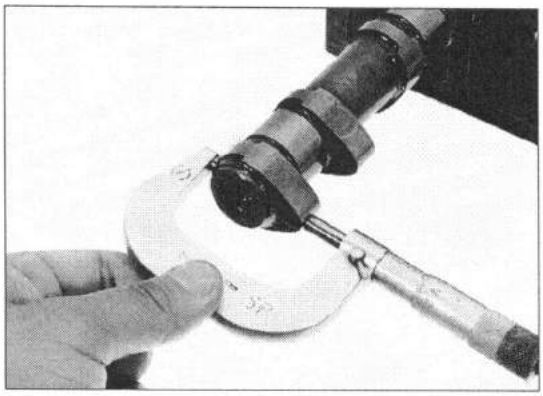
Support both sides of the camshaft (at journals) with V-blocks and check the camshaft runout with a dial gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)



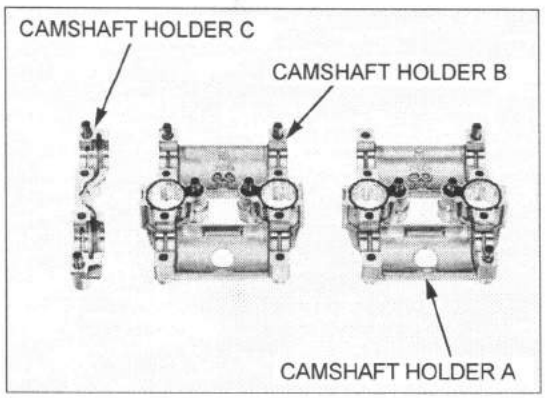
Using a micrometer, measure each cam lobe height.

SERVICE LIMITS:
IN: 37.32 mm (1.469 in)
EX: 36.56 mm (1.439 in)



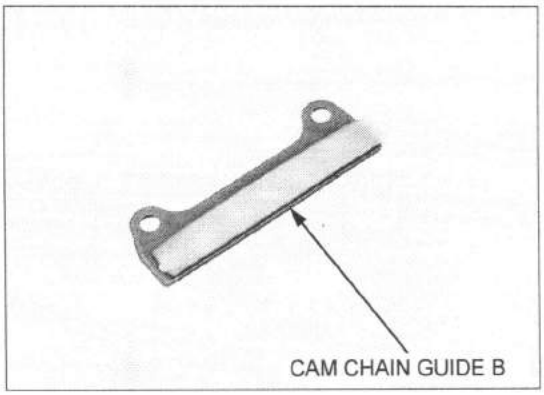
CAMSHAFT HOLDERS

Inspect the bearing surface of each camshaft holder for scoring, scratches, or evidence of insufficient lubrication.
Inspect the oil orifices of the holders for clogging.



CAM CHAIN GUIDE B

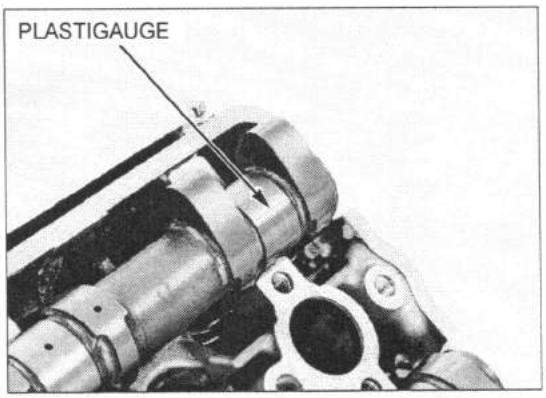
Inspect the cam chain slipper surface of the cam chain guide B for wear or damage.



CAMSHAFT OIL CLEARANCE

Do not rotate the camshaft when using plastigauge.

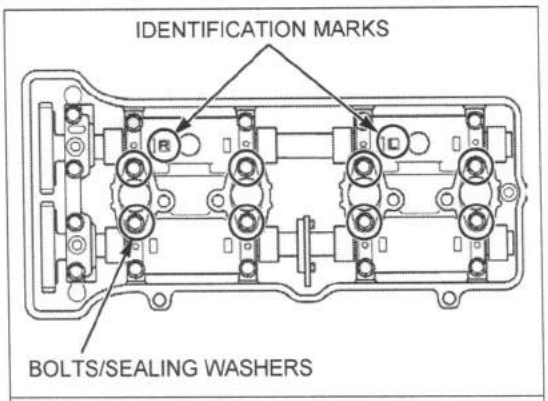
Wipe any oil from the journals of the camshaft, cylinder head, and camshaft holders.
Lay a strip of plastigauge lengthwise on top of each camshaft journal.



Be sure the dowel pins in the camshaft holder align the holes in the cylinder head.

Install each camshaft holder to the correct locations with the identification marks.

- No mark: right camshaft holder
- "R" mark: center camshaft holder
- "L" mark: left camshaft holder



Apply oil to the threads and seating surfaces of the camshaft holder bolts.

Install the holder bolts with the eight sealing washers.

Finger tighten the bolts.

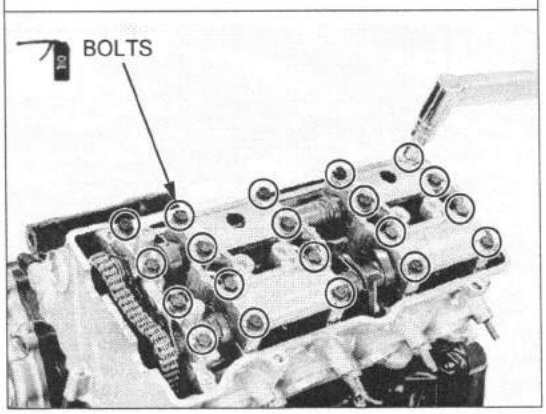
Gradually tighten the camshaft holder bolts until the camshaft holders lightly contact the cylinder head surface.

NOTICE

Failure to tighten the camshaft holder in a crisscross pattern might cause a camshaft holder to break.

Tighten all camshaft holder bolts in the numerical order cast on the camshaft holders.

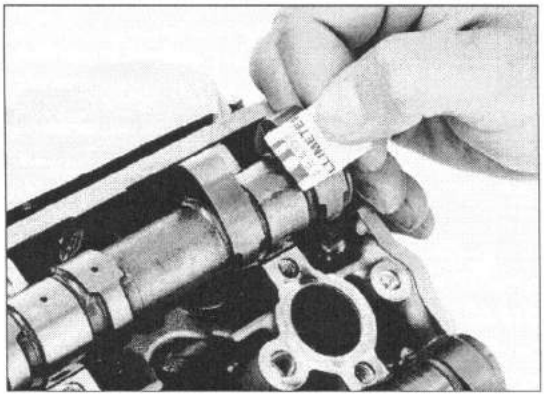
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Remove the camshaft holders and measure the width of each plastigauge.
The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

When the service limits are exceeded, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.

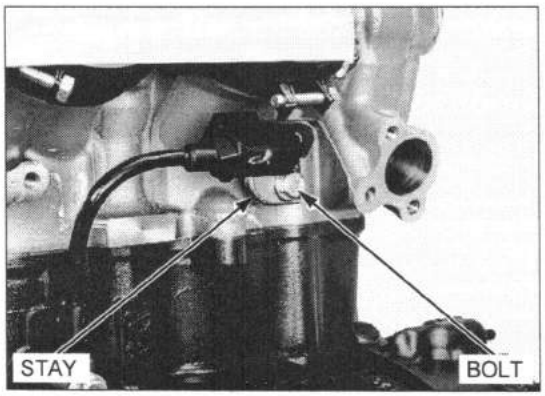


CYLINDER HEAD REMOVAL

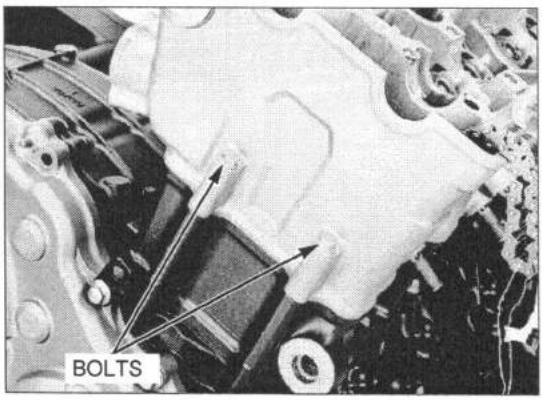
Remove the following:

- Engine
  - STANDARD/SP type (page 8-5)
  - ABS type (page 8-9)
- Thermostat housing (page 7-8)
- Cam chain tensioner lifter (page 9-37)
- Camshaft (page 9-9)

Remove the bolt and knock sensor connector stay.



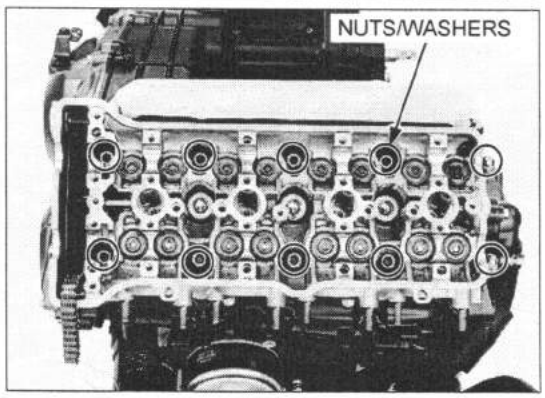
Remove the bolts.



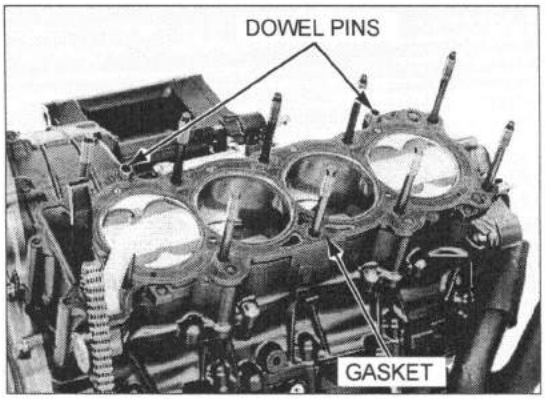
Loosen the nuts in a crisscross pattern in two or three steps.

Remove the cylinder head nuts and washers.

Remove the cylinder head.



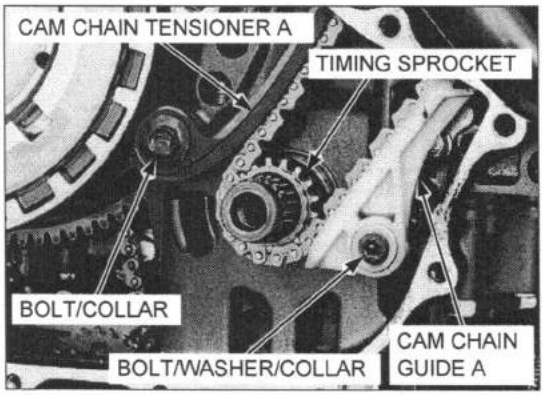
Remove the gasket and dowel pins.



Remove the following:

- Right crankcase cover (page 10-5)
- Starter clutch (page 10-26)

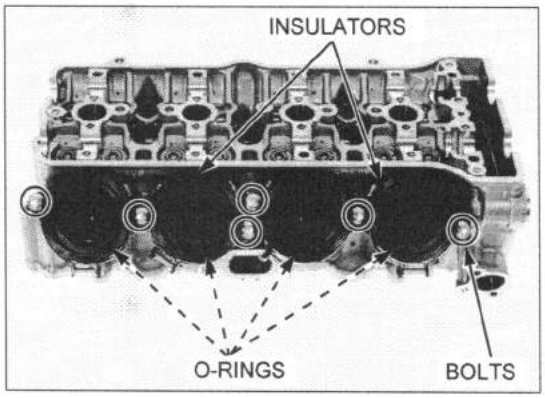
Remove the bolt, cam chain tensioner A, and collar.
Remove the bolt, washer, cam chain guide A, and collar.
Remove the cam chain and timing sprocket from the crankshaft.



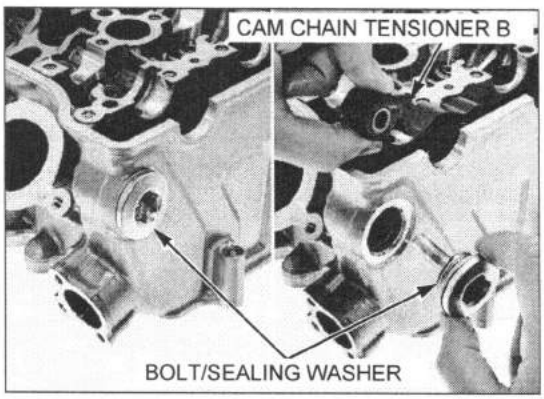
CYLINDER HEAD DISASSEMBLY

Remove the cylinder head (page 9-14).

Remove the bolts, insulators, and O-rings.



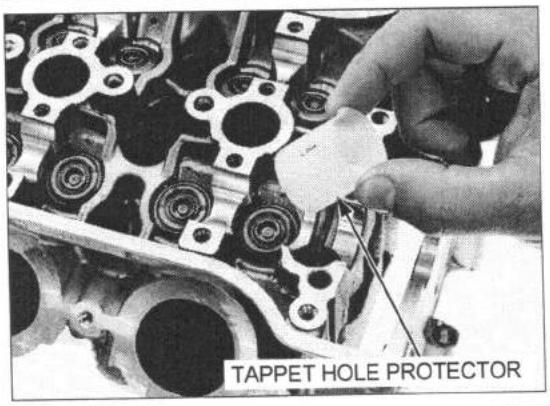
Remove the bolt, sealing washer, and cam chain tensioner B from the cylinder head.



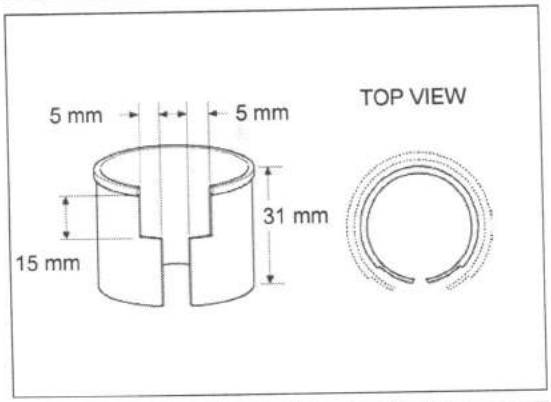
Remove the spark plugs from the cylinder head.

Install the tappet hole protector into the valve lifter bore.

TOOL:
Tappet hole protector **07HMG-MR70002**



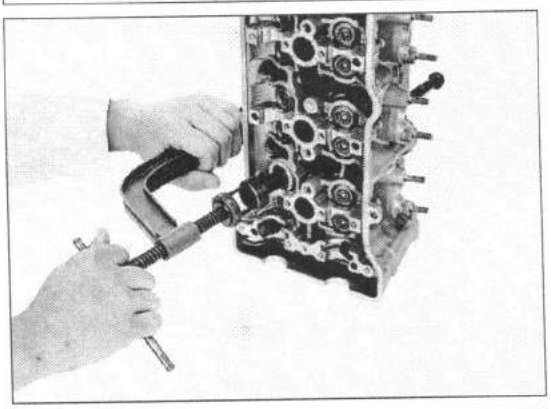
An equivalent tool can easily be made from a plastic 35 mm film container as shown.



To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

Remove the valve spring cotters using the special tools as shown.

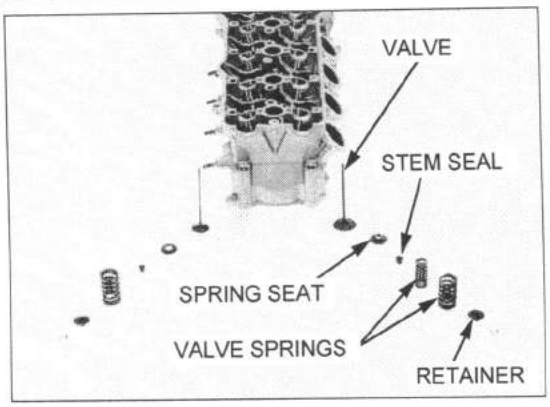
TOOLS:
Valve spring compressor **07757-0010000**
Valve spring compressor attachment **07959-KM30101**



Mark all parts during disassembly so they can be placed back in their original locations.

Remove the following:

- Spring retainer
- Inner/outer valve springs (IN)
- Valve spring (EX)
- Valve
- Stem seal
- Valve spring seat

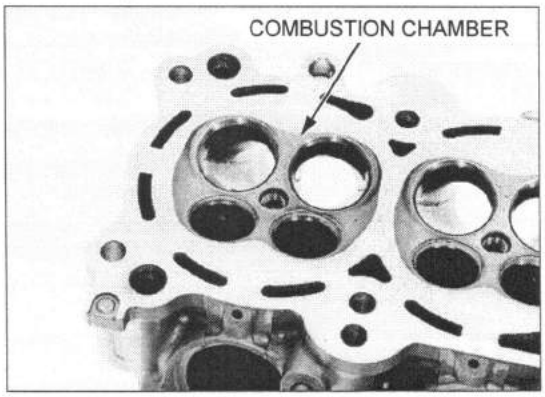


CYLINDER HEAD INSPECTION

CYLINDER HEAD

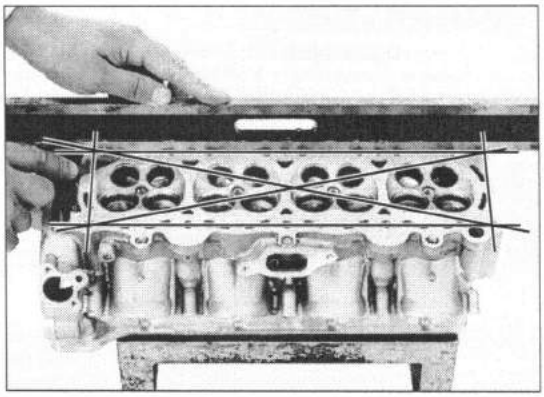
Avoid damaging the gasket surface.

Remove carbon deposits from the combustion chambers.
Check the spark plug hole and valve areas for cracks.



Check the cylinder head for warpage with a straight edge and feeler gauge.

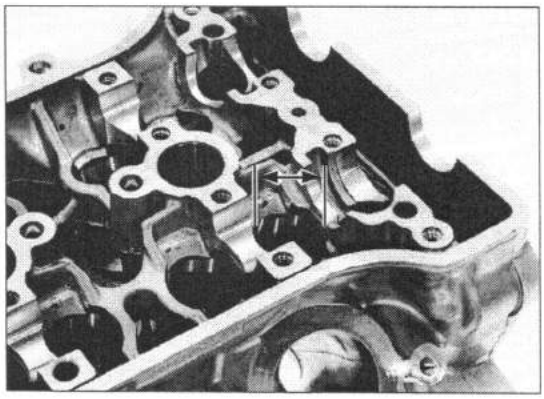
SERVICE LIMIT: 0.10 mm (0.004 in)



VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.
Measure each valve lifter bore I.D.

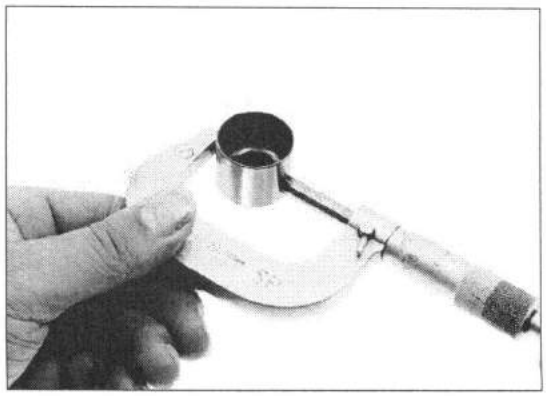
SERVICE LIMITS:
IN/EX: 26.04 mm (1.025 in)



VALVE LIFTER

Inspect each valve lifter for scratches or abnormal wear.
Measure the each valve lifter O.D.

SERVICE LIMITS:
IN/EX: 25.97 mm (1.022 in)



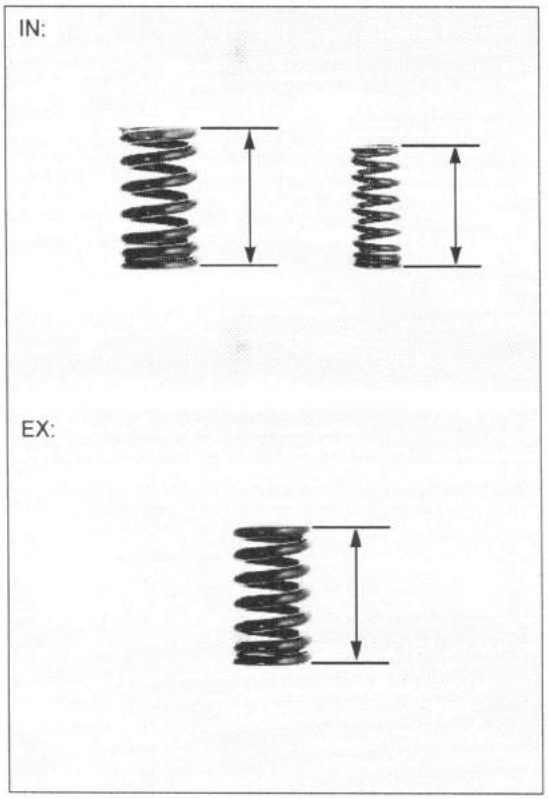
VALVE SPRING

Measure the free length of the inner and outer valve springs.

SERVICE LIMITS:

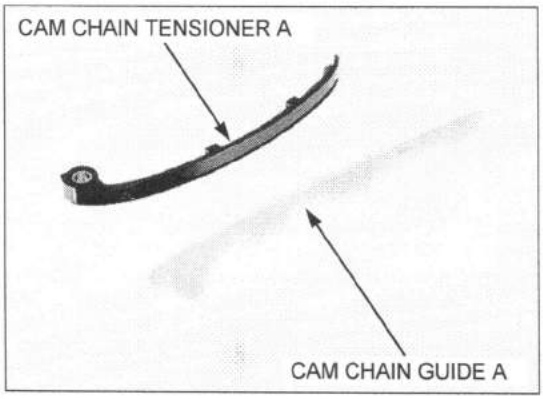
IN: Inner: 34.5 mm (1.36 in)
Outer: 38.2 mm (1.50 in)
EX: 38.9 mm (1.53 in)

Replace the springs if they are shorter than the service limits.

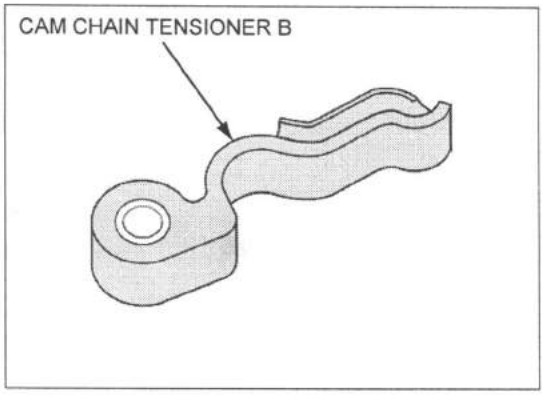


CAM CHAIN TENSIONER/CAM CHAIN GUIDE

Inspect the cam chain tensioner A and cam chain guide A for excessive wear or damage, replace them if necessary.

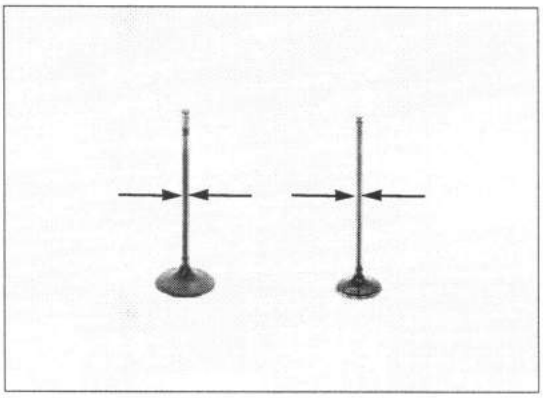


Inspect the cam chain tensioner B for excessive wear or damage, replace it if necessary.



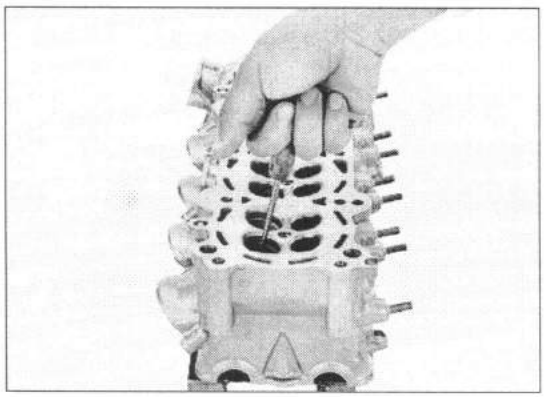
VALVE/VALVE GUIDE

Check that the valve moves smoothly in the guide.
Inspect each valve for bending, burning, or abnormal stem wear.
Measure and record each valve stem O.D.



SERVICE LIMITS:
IN: 4.465 mm (0.1758 in)
EX: 3.955 mm (0.1557 in)

Ream the guides to remove any carbon deposits before checking clearances.
Insert the reamer from the combustion chamber side of the cylinder head and always rotate the reamer clockwise.



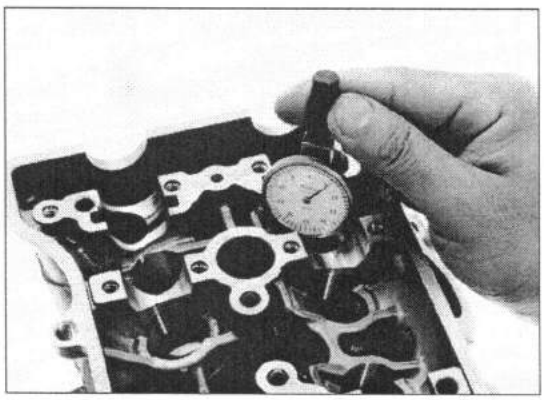
TOOLS:
Valve guide reamer

IN (4.508 mm):	**07HMH-ML00101**
EX (4.008 mm):	**07MMH-MV90100**

U.S.A. TOOLS:
Valve guide reamer

IN (4.5 mm):	**07HMH-ML0010B**
EX (4.0 mm):	**07MMH-MV9010A**

Measure and record each valve guide I.D.



SERVICE LIMITS:
IN: 4.54 mm (0.179 in)
EX: 4.04 mm (0.159 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

SERVICE LIMITS:
IN: 0.075 mm (0.0030 in)
EX: 0.085 mm (0.0033 in)

Reface the valve seats whenever the valve guides are replaced (page 9-22).

If the stem-to-guide clearance is out of standard, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance exceeds the service limit with the new guides, replace the valves and guides.

VALVE GUIDE REPLACEMENT

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.

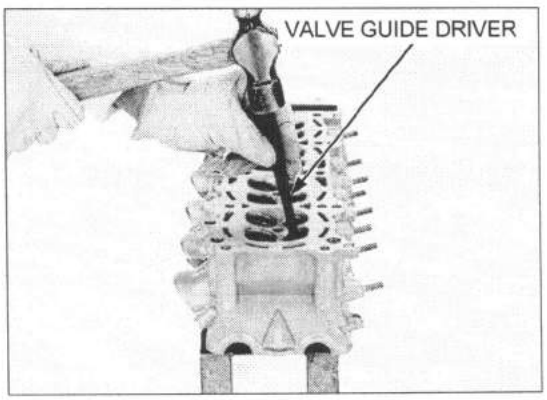
Do not use a torch to heat the cylinder head; it may cause warping.

Heat the cylinder head to 100 – 150°C (212 – 302°F) with a hot plate or oven.
To avoid burns, wear heavy gloves when handling the heated cylinder head.

Support the cylinder head and drive out the valve guides from combustion chamber side of the cylinder head.

TOOLS:
Valve guide driver

IN:	**07HMD-ML00101**
EX:	**07JMD-KY20100**

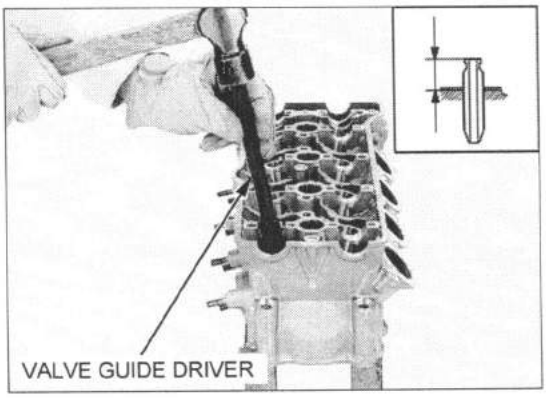


Drive in the valve guides to the specified depth from the top of the cylinder head.

SPECIFIED DEPTH:
IN: 15.1 – 15.4 mm (0.59 – 0.61 in)
EX: 15.7 – 16.0 mm (0.62 – 0.63 in)

TOOL:

Valve guide driver	**07743-0020000 (Not available in U.S.A.)**



NOTE:
U.S.A. only use the existing valve guide driver and install the guide to the specified height.

Let the cylinder head cool to room temperature.

Use cutting oil on the reamer during this operation.

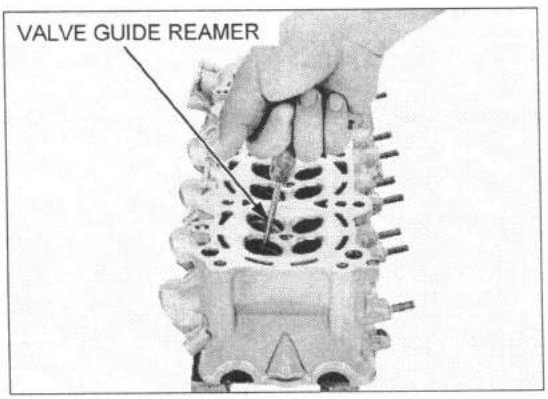
Ream new valve guides after installation.
Insert the reamer from the combustion chamber side of the head and also always rotate the reamer clockwise.

TOOLS:
Valve guide reamer

IN (4.508 mm):	**07HMH-ML00101**
EX (4.008 mm):	**07MMH-MV90100**

U.S.A. TOOLS:
Valve guide reamer

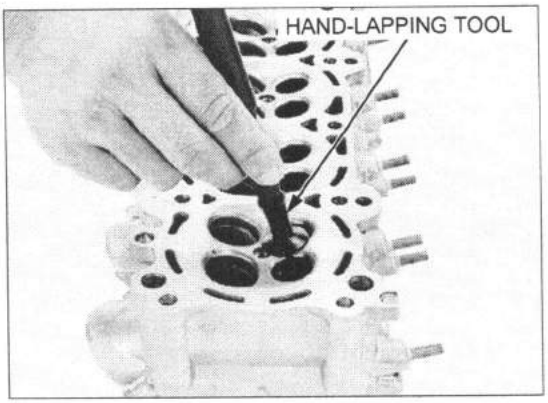
IN (4.5 mm):	**07HMH-ML0010B**
EX (4.0 mm):	**07MMH-MV9010A**



Clean the cylinder head thoroughly to remove any metal particles.
Reface the valve seat (page 9-22).

VALVE SEAT INSPECTION/REFACING

Clean the intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue to the valve seats.
Tap the valves and seats using a rubber hose or other hand-lapping tool.

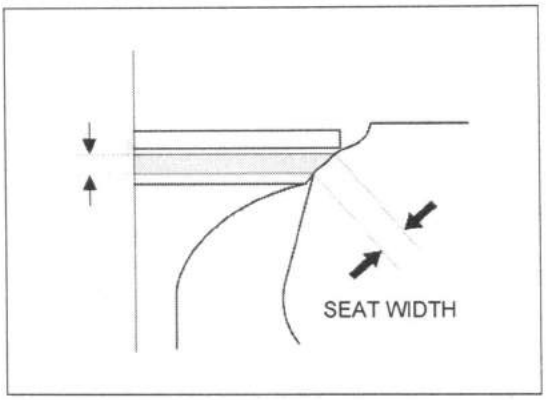


Remove the valve and inspect the valve seat face.
The valve seat contact should be within the specified width and even all around the circumference.

Standard:
IN/EX: 0.90 – 1.10 mm (0.035 – 0.043 in)
SERVICE LIMIT:
IN/EX: 1.5 mm (0.06 in)

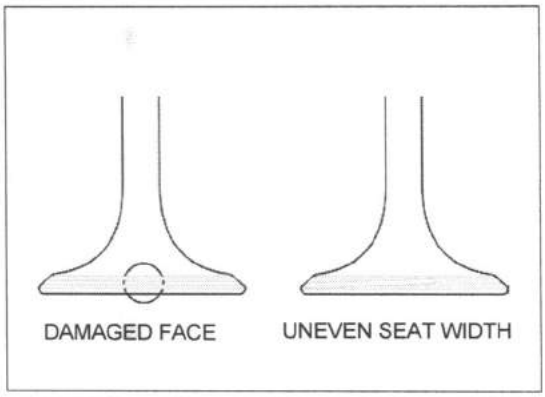
NOTE:
- When the service limits are exceed, replace the intake valve and recheck the valve seat width.

If the seat width is not within specification, reface the valve seat (page 9-22).



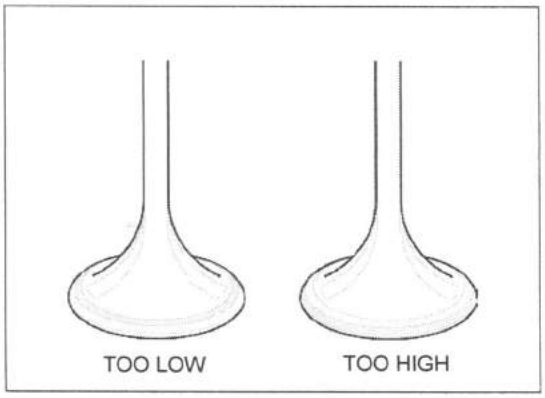
Inspect the valve seat face for:

- Uneven seat width:
  – Replace the valve and reface the valve seat.
- Damaged face:
  – Replace the valve and reface the valve seat.



The valves cannot be ground. If a valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

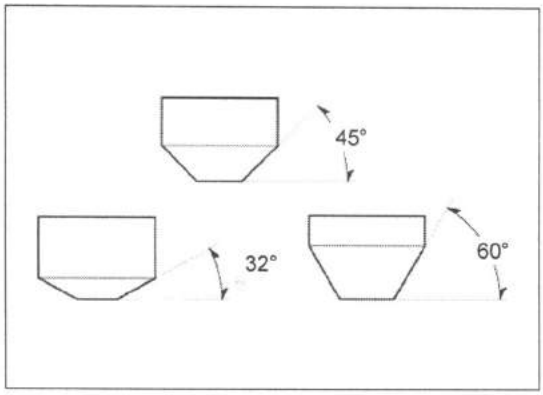
- Contact area (too high or too low)
  – Reface the valve seat.



VALVE SEAT REFACING

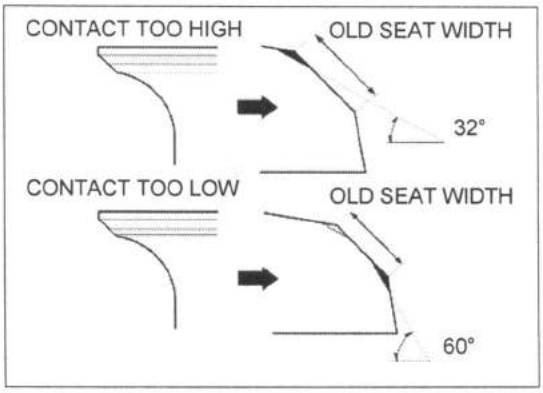
Follow the refacing manufacturer's operating instructions.

Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



Reface the seat with a 45° cutter whenever a valve guide is replaced.

Use a 45° cutter to remove any roughness or irregularities from the seat.

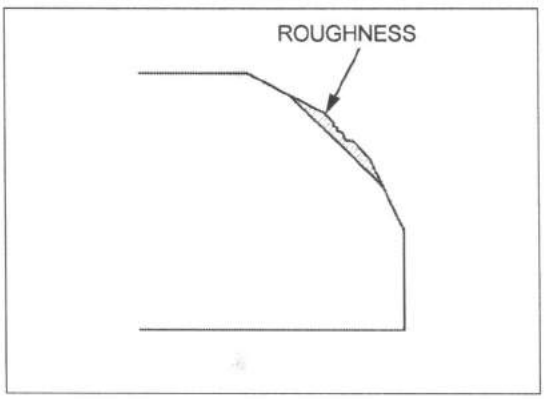
TOOLS:

Valve seat cutter

IN (33 mm):	**07780-0010800**
EX (24.5 mm):	**07780-0010100**
	or equivalent commercially available

Cutter holder

IN (4.5 mm):	**07781-0010600**
EX (4.0 mm):	**07781-0010500**
	or equivalent commercially available



Use a 32° cutter to remove the top 1/4 of the existing valve seat material.

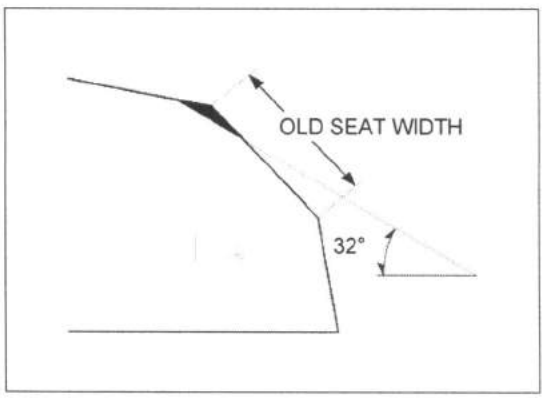
TOOLS:

Flat cutter

IN (33 mm):	**07780-0012900**
EX (25 mm):	**07780-0012000**
	or equivalent commercially available

Cutter holder

IN (4.5 mm):	**07781-0010600**
EX (4.0 mm):	**07781-0010500**
	or equivalent commercially available



Use a 60° cutter to remove the bottom 1/4 of the old seat.

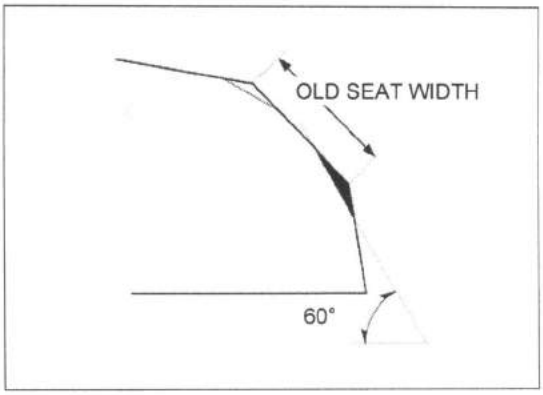
TOOLS:

Interior cutter

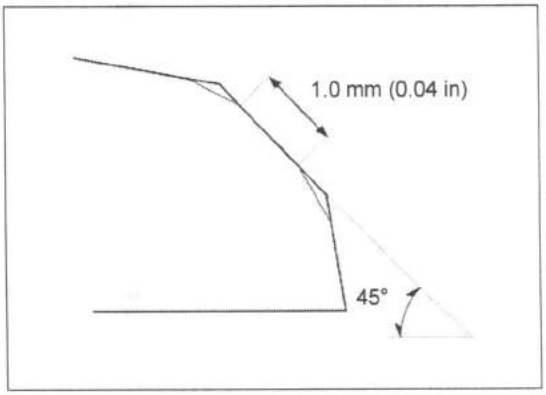
IN (34 mm):	**07780-0014700**
EX (26 mm):	**07780-0014500**
	or equivalent commercially available

Cutter holder

IN (4.5 mm):	**07781-0010600**
EX (4.0 mm):	**07781-0010500**
	or equivalent commercially available



Using a 45° seat cutter, cut the seat to the proper width. Make sure that all pitting and irregularities are removed. Refinish if necessary.



INTAKE SIDE:

After refacing, wash the cylinder head and valves.

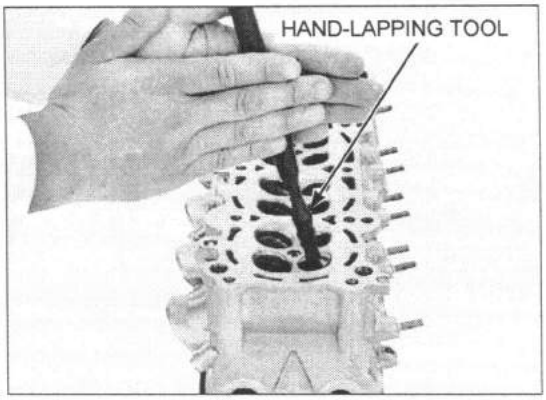
NOTICE

- *Do not lap the intake valves. They are titanium and have a thin oxide coating. Lapping will damage this coating.*
- *Replace the intake valve with new ones.*

EXHAUST SIDE:

After cutting the exhaust seat, apply lapping compound to the exhaust valve face, and lap the exhaust valve using light pressure.

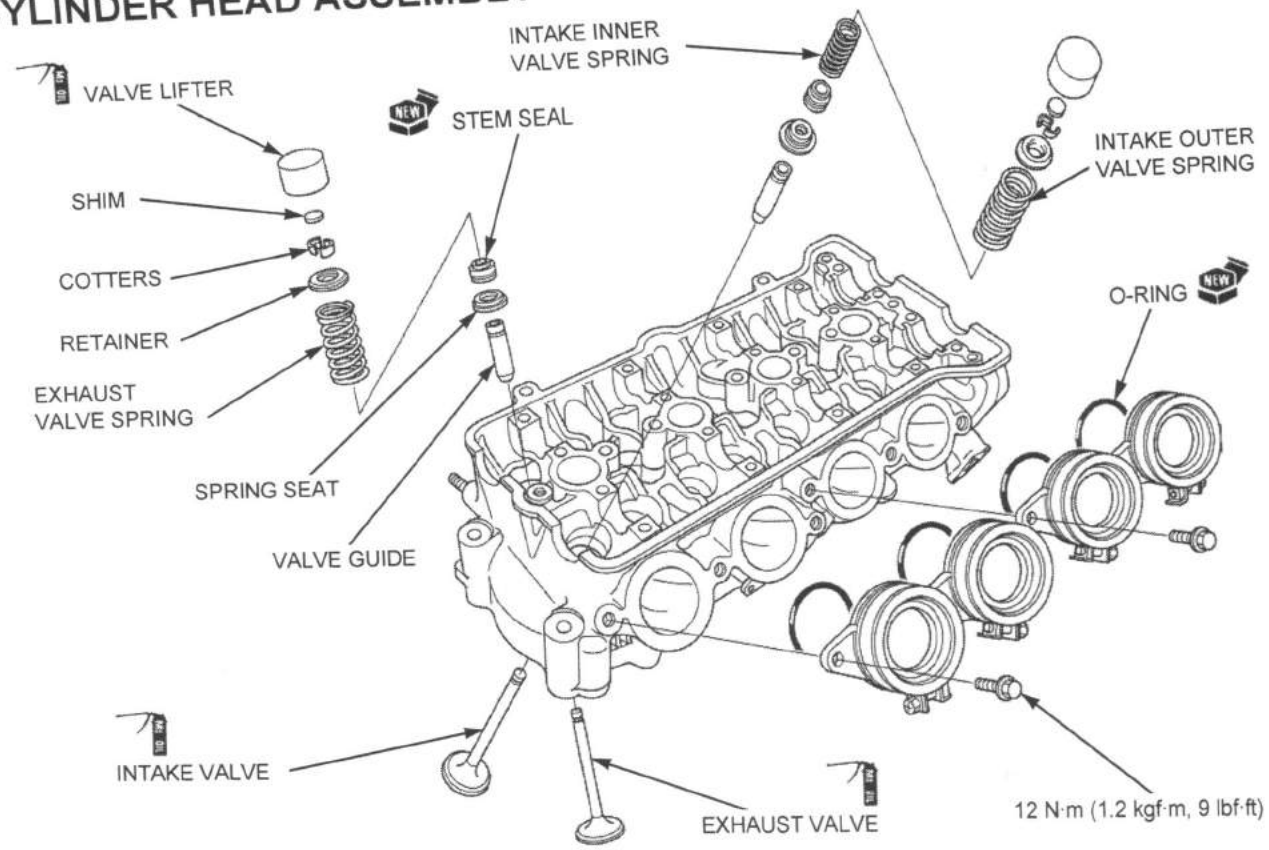
After lapping, wash all residual compound off the cylinder head and valve.



NOTICE

- *Excessive lapping pressure may deform or damage the seat.*
- *Change the angle of lapping tool frequently to prevent uneven seat wear.*
- *Do not allow any lapping compound to enter the guides.*

CYLINDER HEAD ASSEMBLY

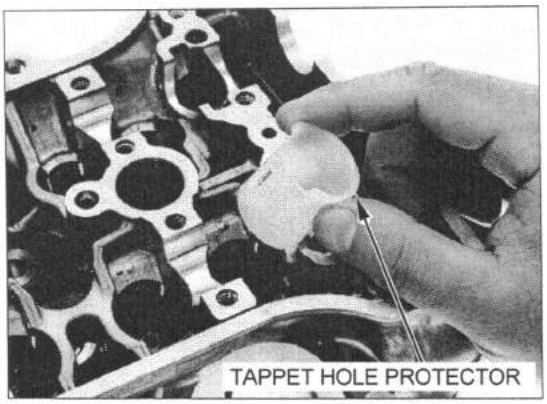


Blow through all oil passages in the cylinder head with compressed air.

Install the tappet hole protector into the valve lifter bore.

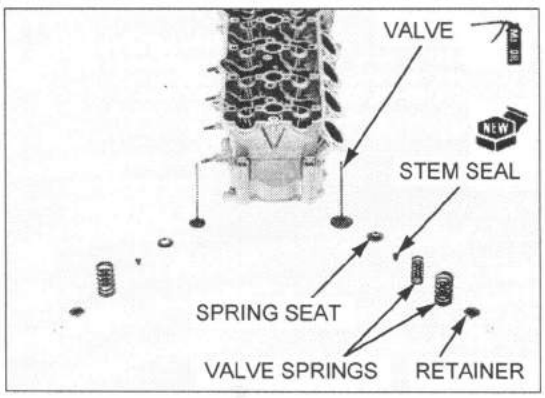
TOOL:
Tappet hole protector **07HMG-MR70002**

Make your own tool, See page 9-16.



Install the valve spring seats.
Install new stem seals.

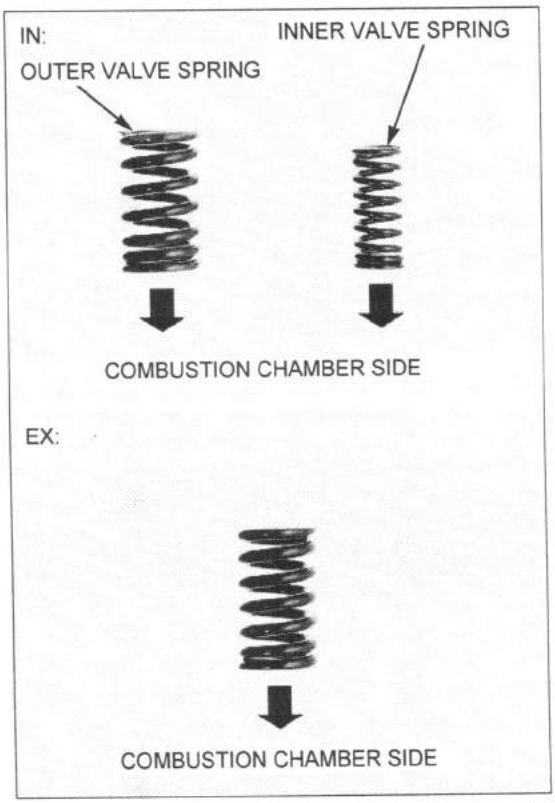
Lubricate the valve stems with molybdenum oil solution. Insert the valve into the valve guide while turning it slowly to avoid damage to the stem seal.



Install the valve springs with the tightly wound coils facing the combustion chamber.

- The valve springs have paint marks
  - IN (inner): Pink
  - IN (outer): Gray
  - EX: Yellow

Install the valve spring retainer.



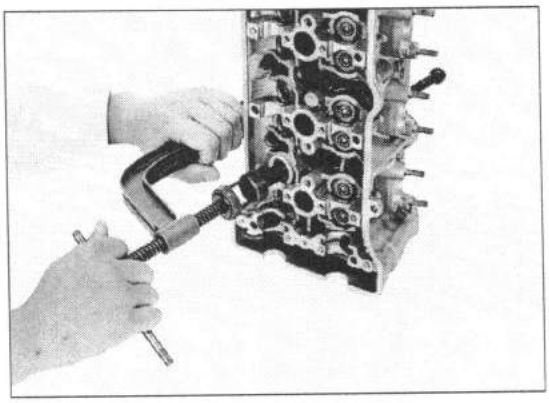
Grease the cotters to ease installation.

Install the valve cotters using the special tool as shown.

NOTE:
To prevent loss of tension, do not compress the valve spring more than necessary.

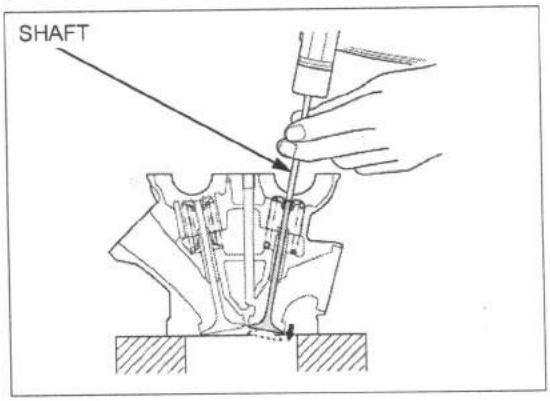
TOOLS:

Valve spring compressor	**07757-0010000**
Valve spring compressor attachment	**07959-KM30101**



Support the cylinder head above the work bench surface to prevent possible valve damage.

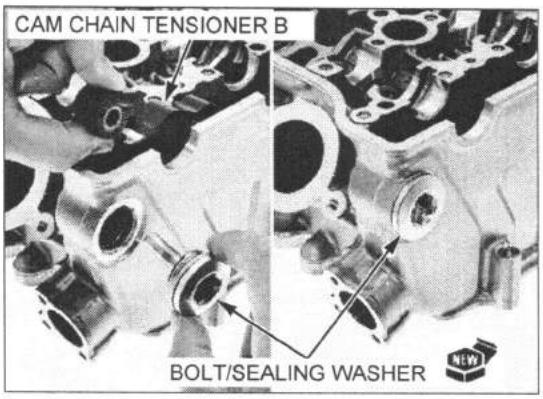
Tap the valve stems gently with hammer and shaft as shown to seat the cotters firmly.



Install a new sealing washer, bolt, and cam chain tensioner B as shown.

Tighten the cam chain tensioner B pivot bolt to the specified torque.

TORQUE: 74 N·m (7.5 kgf·m, 55 lbf·ft)

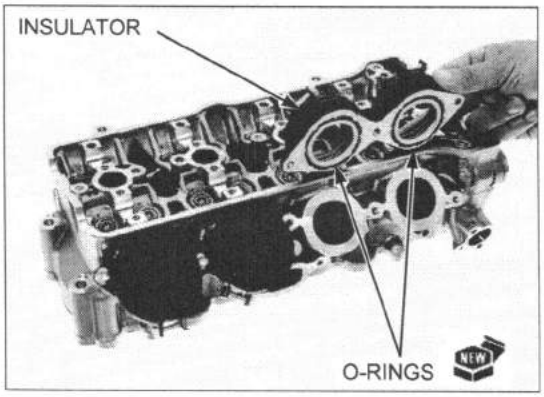


Install new O-rings to the insulator grooves.

Install the insulators to the cylinder head and tighten the bolts to the specified torque.

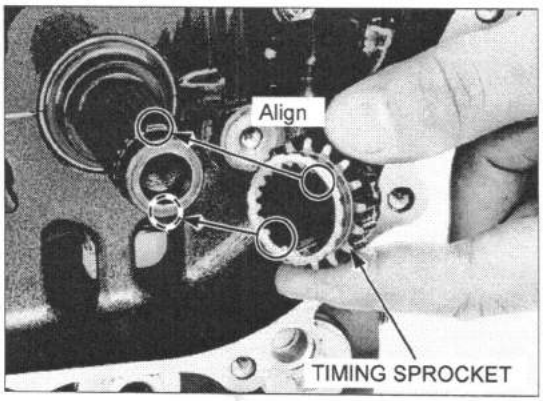
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

For spark plug installation (page 4-15).



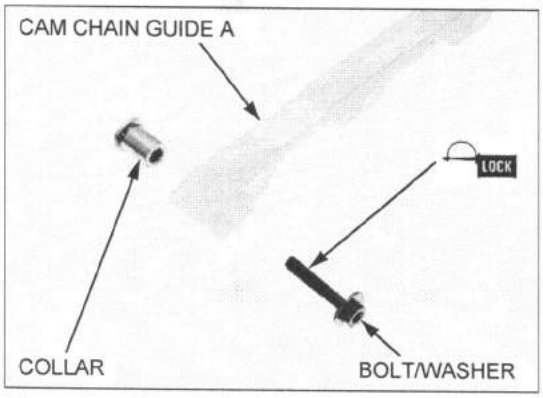
CYLINDER HEAD INSTALLATION

Install the timing sprocket by aligning the wide teeth between the crankshaft and sprocket.



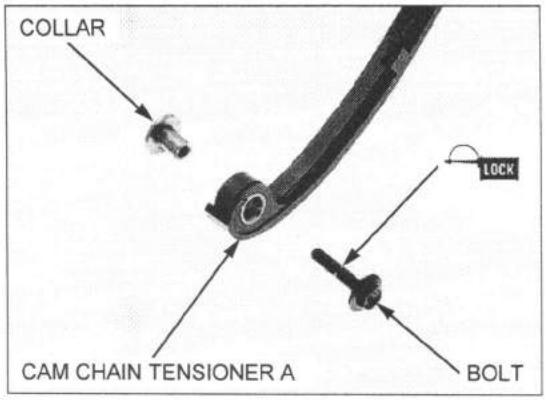
Install the collar to the cam chain guide A.

Apply locking agent to the cam chain guide A bolt threads.



Install the collar to the cam chain tensioner A.

Apply locking agent to the cam chain tensioner A pivot bolt threads (page 1-23).



Install the cam chain.

Install the cam chain guide A, washer, and tighten the bolt to the specified torque.

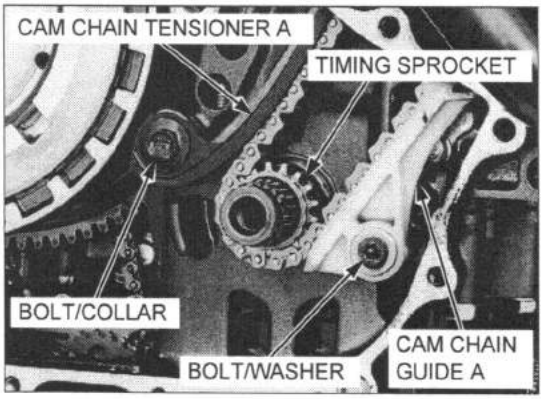
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the cam chain tensioner A and tighten the bolt to the specified torque.

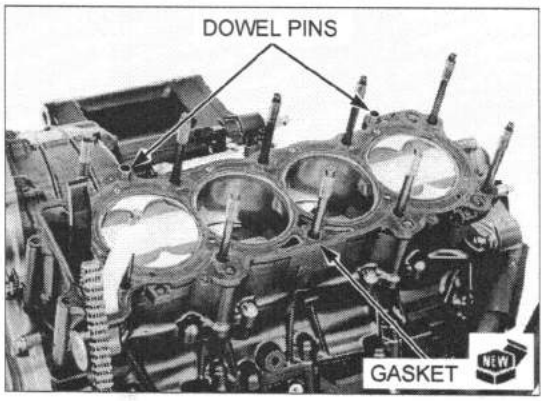
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the following:

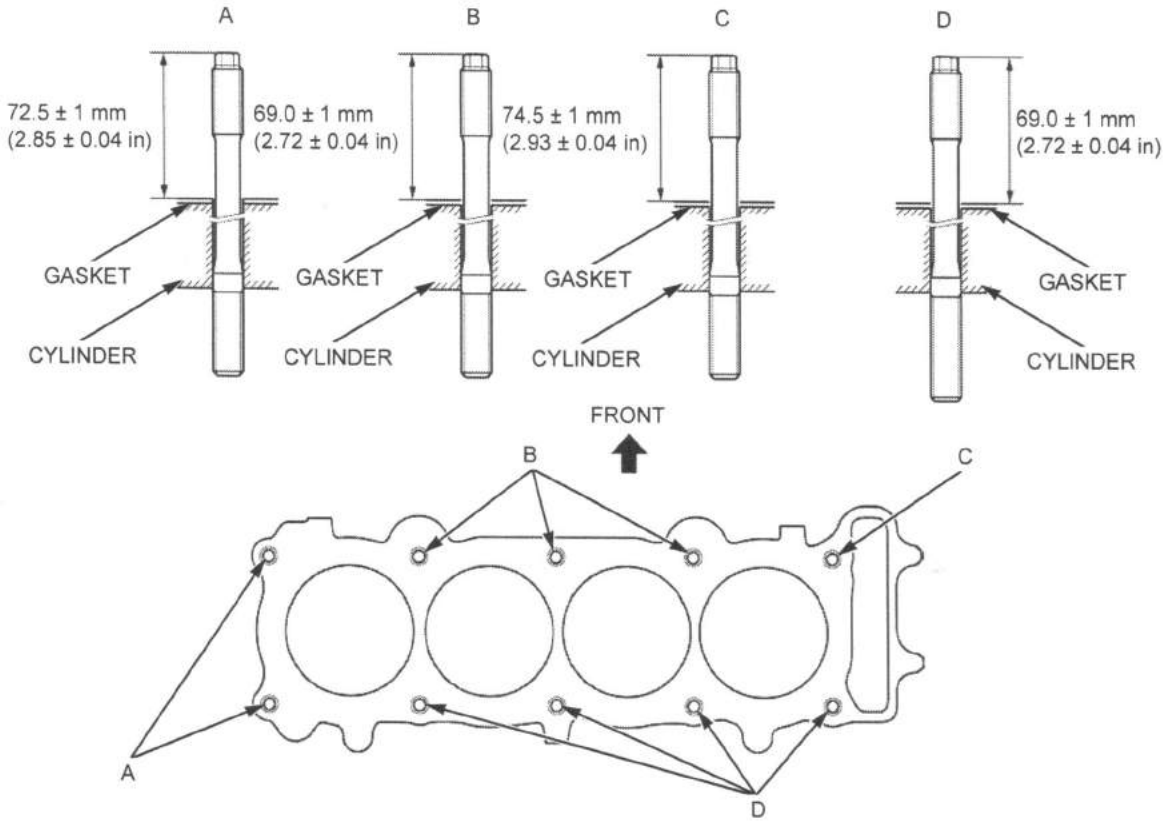
- Starter clutch (page 10-30)
- Right crankcase cover (page 10-34)



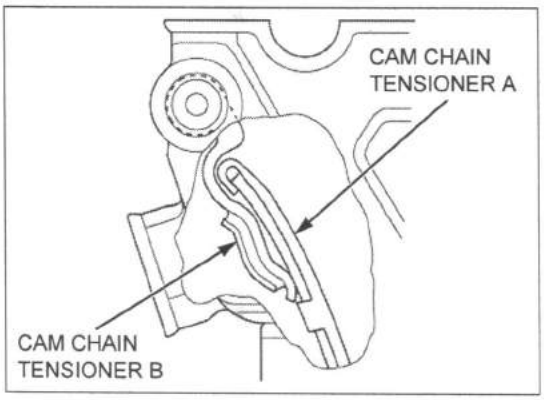
Install the dowel pins and a new cylinder head gasket as shown.



Check that the cylinder stud bolt height from the bolt head to cylinder gasket surface is within specification.



Install the cylinder head onto the cylinder block while aligning the cam chain tensioner A and B as shown.



Apply oil to the stud bolt threads.

Apply oil to the washers and install them.

Apply oil to the cylinder head nut threads and seating surface and install them.

Tighten the cylinder head nuts as follows:

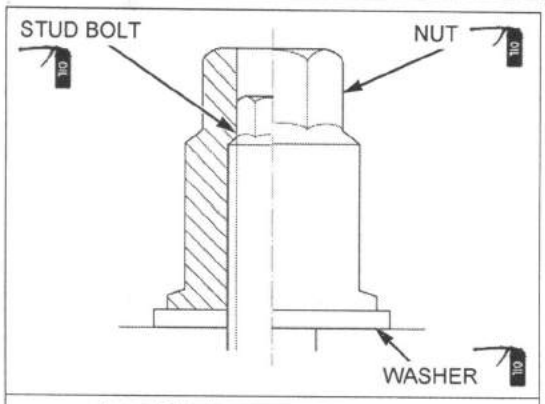
1. Tighten the cylinder head nuts to the specified torque in the specified sequence as shown.

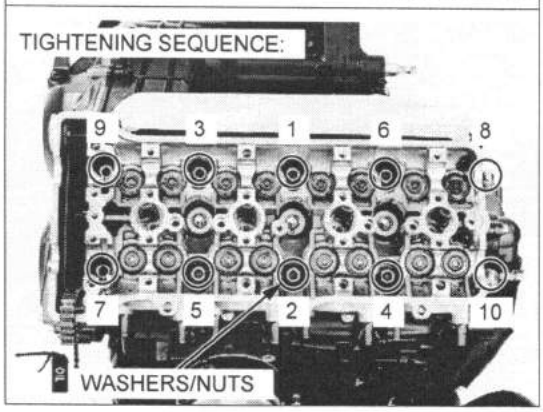
   TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

2. Further tighten the cylinder head nuts to the specified torque in the specified sequence as shown.

   Further tighten the cylinder head nuts 135°.

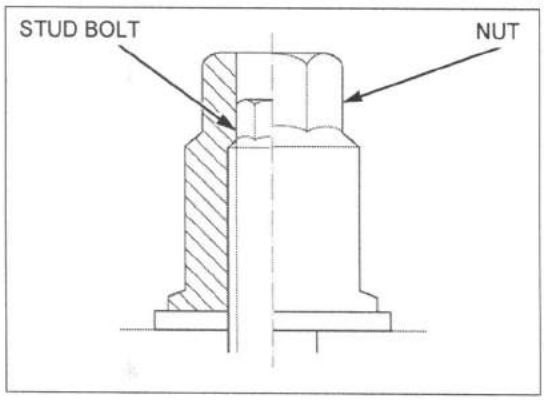
   TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft) + 135°





3. Loosen the cylinder head nuts in a crisscross pattern in two or three steps and remove them.
4. Tighten the stud bolts to the specified torque.

   TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)



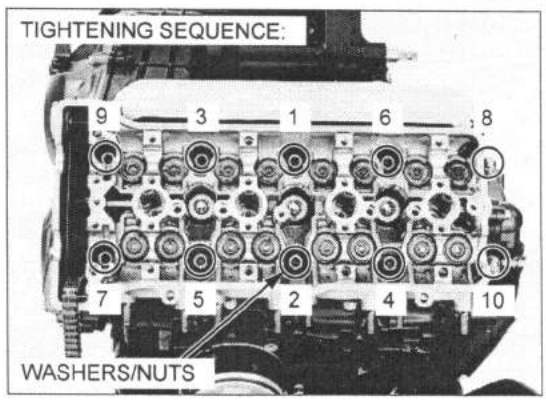
5. Tighten the cylinder head nuts to the specified torque in the specified sequence as shown.

   TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

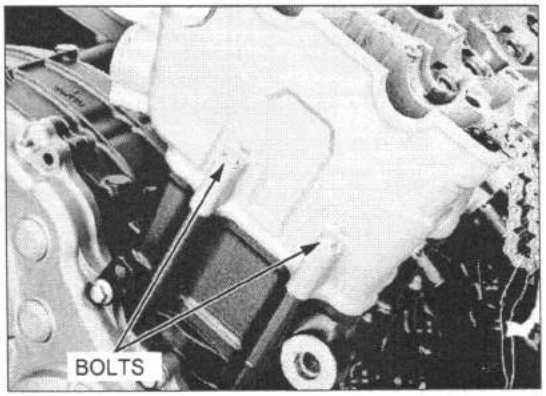
6. Further tighten the cylinder head nuts to the specified torque in the specified sequence as shown.

   Further tighten the cylinder head nuts 135°.

   TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft) + 135°



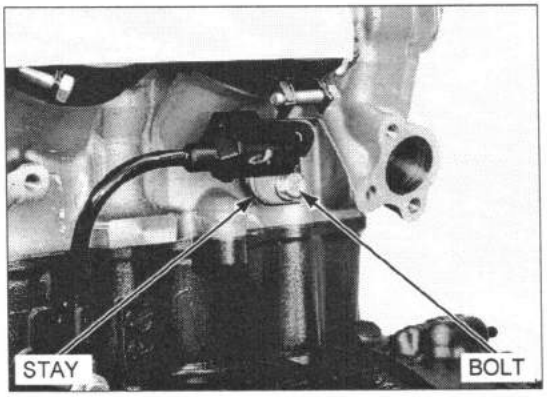
Tighten the bolts securely.



Install the knock sensor connector stay and tighten the bolt securely.

Install the following:

- Camshaft (page 9-30)
- Cam chain tensioner lifter (page 9-37)
- Thermostat housing (page 7-10)

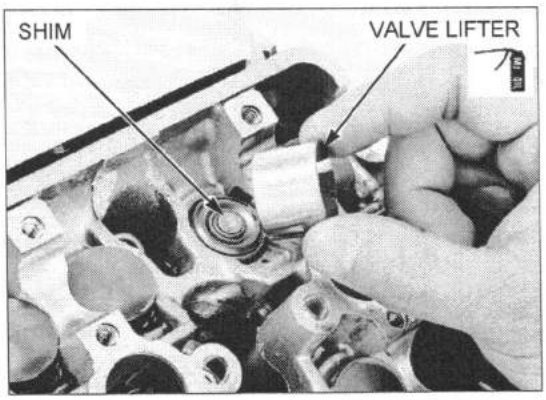


CAMSHAFT INSTALLATION

Apply molybdenum oil solution to the sliding surface of each valve lifter.

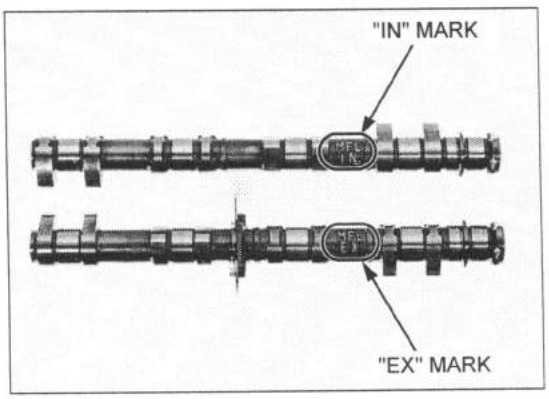
Install the shims and valve lifters in their original locations.

Install the shims and valve lifters to the cylinder head.



Each camshaft has an identification mark.

- "IN": Intake camshaft
- "EX": Exhaust camshaft

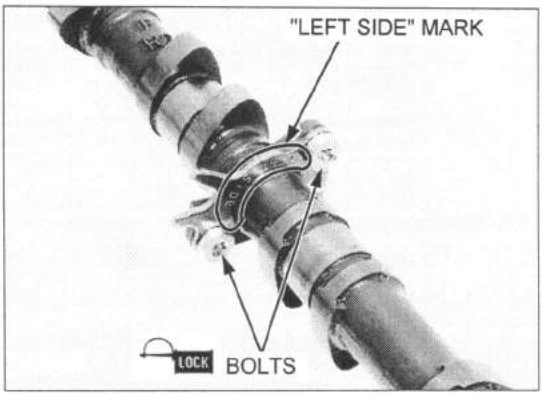


Exhaust camshaft only:

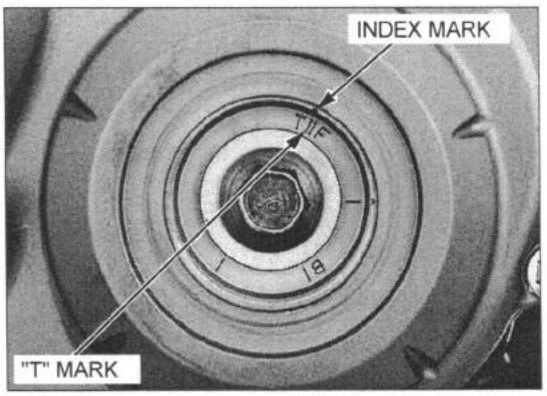
Apply locking agent to the CMP sensor rotor bolt threads.

Install the CMP sensor rotor with the "LEFT SIDE" mark facing left side as shown.

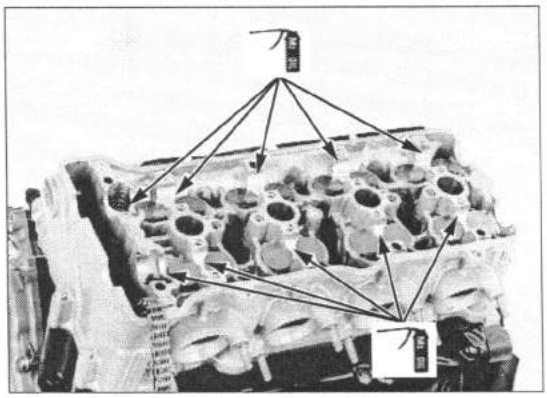
Install the CMP sensor rotor and bolts.



Turn the crankshaft clockwise and align the "T" mark with the index mark on the right crankcase cover.



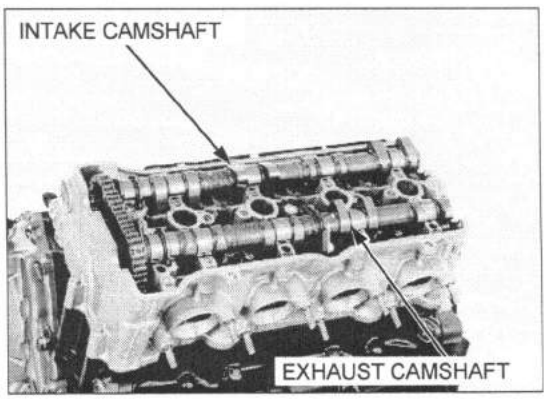
Apply molybdenum oil solution to the camshaft journal of the cylinder head.



Install the intake and exhaust camshafts.

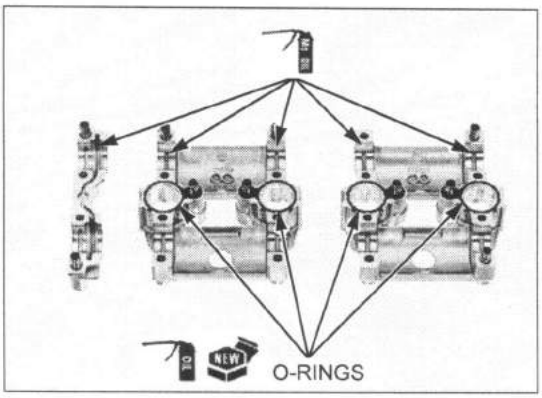
Each camshaft has an identification mark.

- "IN": Intake camshaft
- "EX": Exhaust camshaft



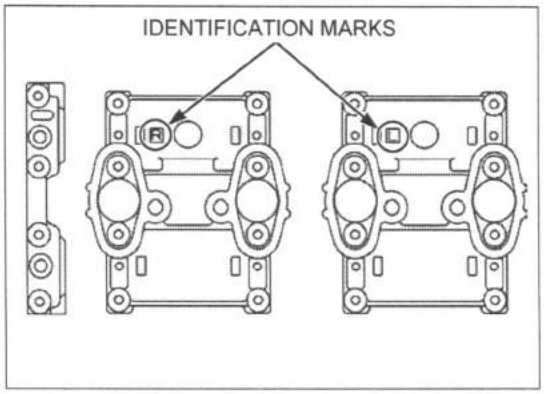
Coat new O-rings with oil and install them into the grooves in the camshaft holders.

Apply molybdenum oil solution to the camshaft journals of the camshaft holders.



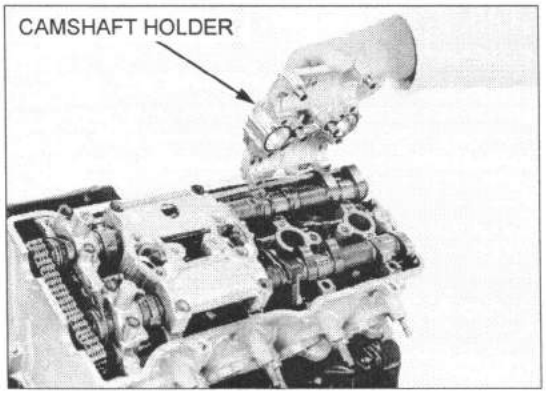
Note the correct locations with the identification marks as shown.

- No mark: right camshaft holder
- "R" mark: center camshaft holder
- "L" mark: left camshaft holder



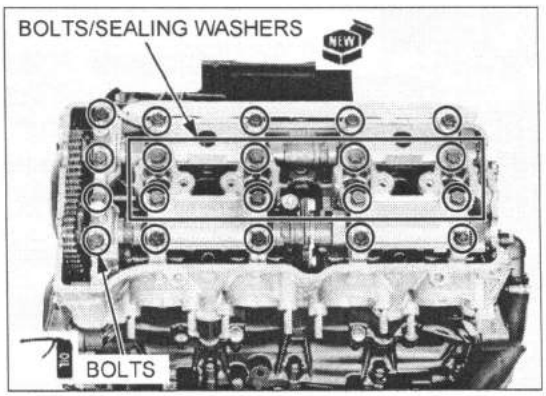
Be sure to align the dowel pins in the camshaft holder with the holes in the cylinder head.

Install each camshaft holder onto the camshafts.



Apply oil to the threads and seating surfaces of the camshaft holder bolts.
Install the twenty holder bolts with new eight sealing washers as shown.

Finger tighten the bolts.



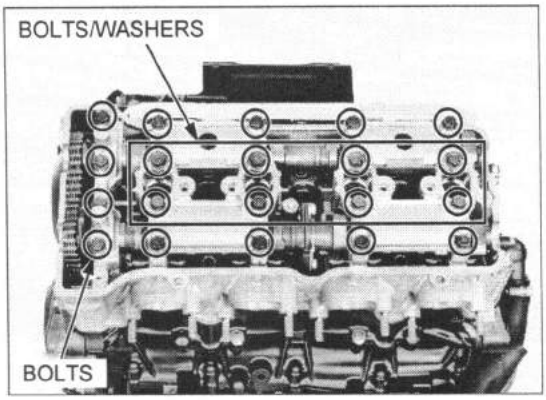
Gradually tighten the camshaft holder bolts until the camshaft holders lightly contact the cylinder head surface.

NOTICE

Failure to tighten the camshaft holder in a crisscross pattern might cause a camshaft holder to break.

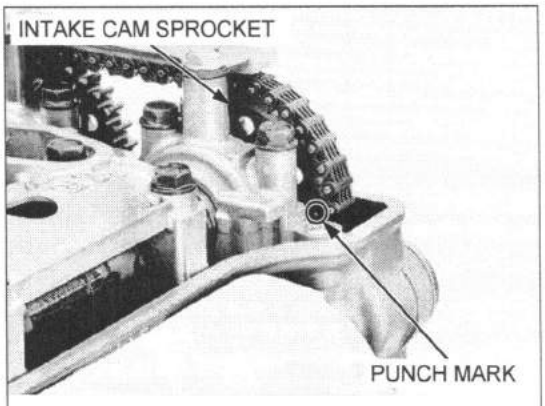
Tighten all camshaft holder bolts in the numerical order cast on the camshaft holders.

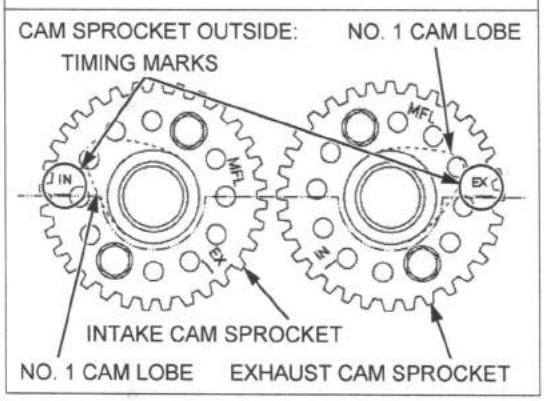
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the cam sprockets to the camshaft.

- The inside punch mark of the intake cam sprocket must be flush with the cylinder head upper surface.
- The cam sprocket outside timing marks ("IN" and "EX") must be flush with the cylinder head upper surface and facing outward as shown.
- Install the cam sprockets with the No. 1 cam lobes facing up and out as shown.





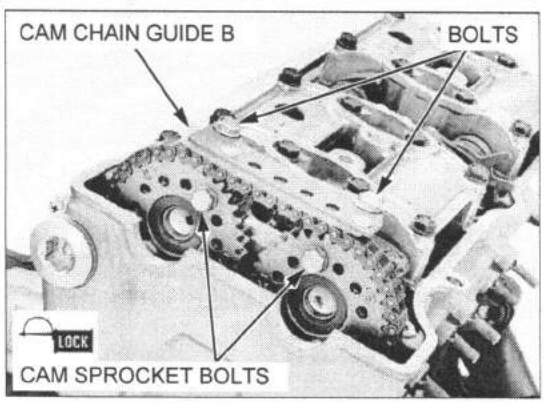
Apply locking agent to the cam sprocket bolt threads.

Tighten the cam sprocket bolts to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)

Turn the crankshaft clockwise one full turn (360°) and tighten the other cam sprocket bolts.

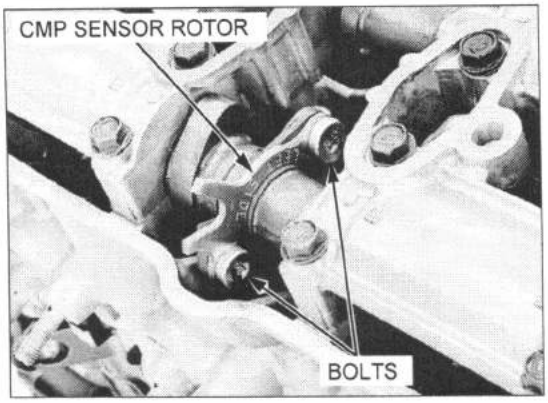
Install the cam chain guide B and tighten the bolts.



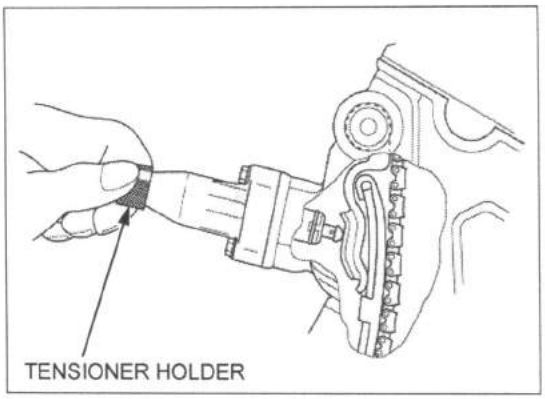
In case the CMP sensor rotor was removed, tighten the CMP sensor rotor bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Turn the crankshaft clockwise one full turn (360°) and tighten the other CMP sensor rotor bolt.



Remove the tensioner holder from the cam chain tensioner lifter.



Install a new sealing washer and tighten the bolt securely.

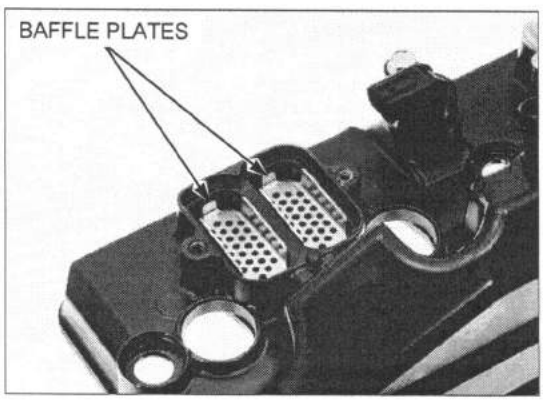
Recheck the valve timing.

Install the cylinder head cover (page 9-35).

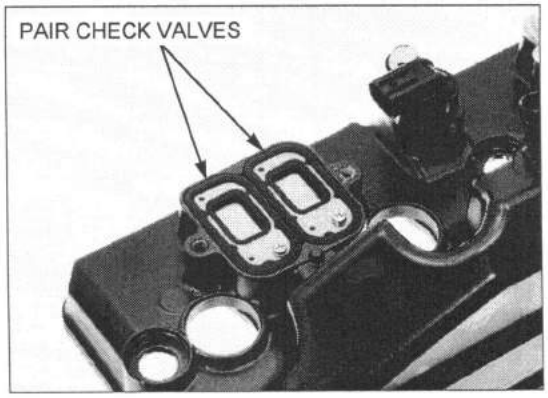


CYLINDER HEAD COVER ASSEMBLY

Install the PAIR check valve baffle plates into the cylinder head cover.



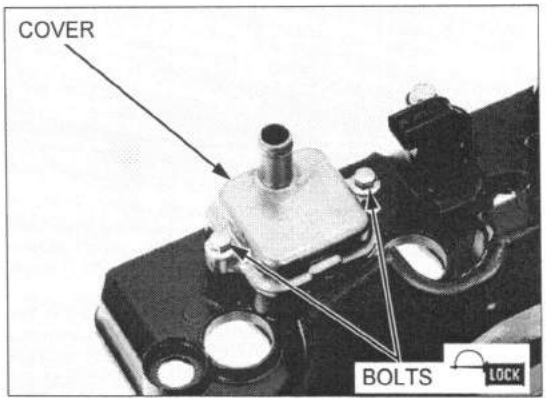
Install the PAIR check valves into the cylinder head cover.



Apply locking agent to the PAIR check valve cover bolt threads.

Install the PAIR check valve cover and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



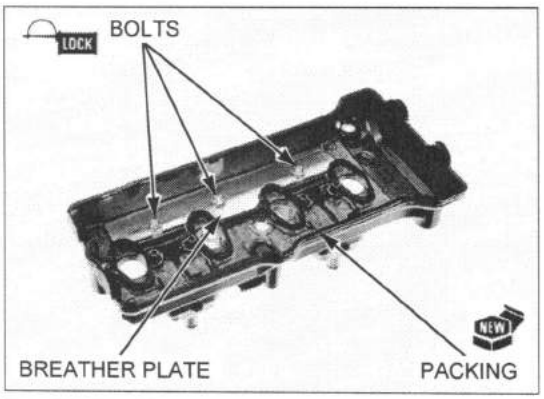
CYLINDER HEAD COVER INSTALLATION

Apply locking agent to the breather plate mounting bolt threads.

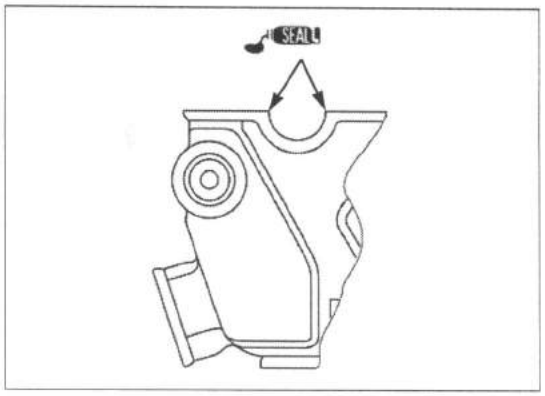
Install the breather plate and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

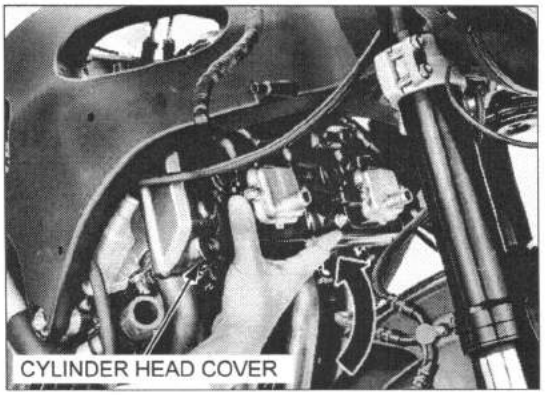
Install a new cylinder head packing into the groove of the cylinder head cover.



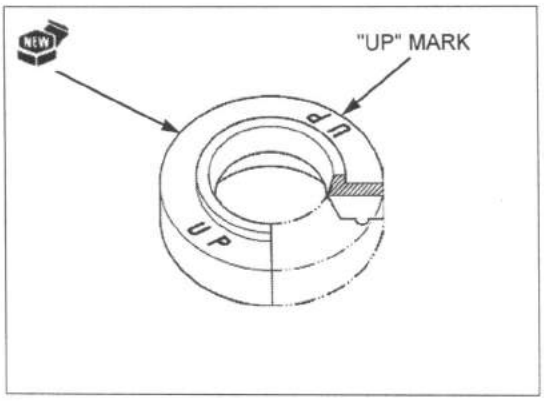
Apply sealant to the cylinder head semi-circular cut-outs as shown.



Install the cylinder head cover onto the cylinder head.

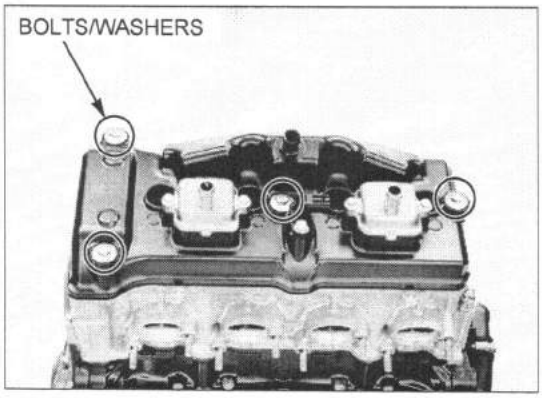


Install new washers to the cylinder head cover with their "UP" mark facing up.



Install and tighten the cylinder head cover bolts to the specified torque.

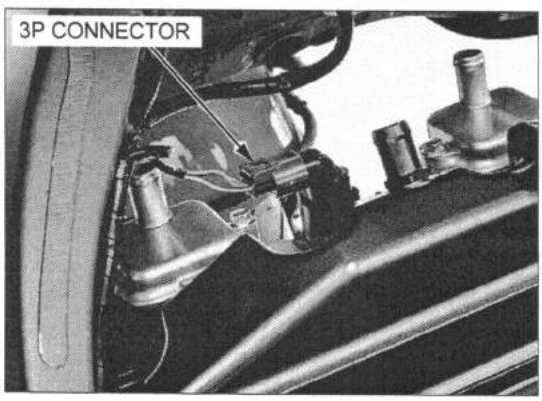
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Connect the CMP sensor 3P (Blue) connector.

Install the following:

- Direct ignition coils (page 4-15)
- PAIR control solenoid valve (page 6-87)
- Air cleaner housing (page 6-63)
- Radiator
  - STANDARD/SP type (page 7-21)
  - ABS type (page 7-23)

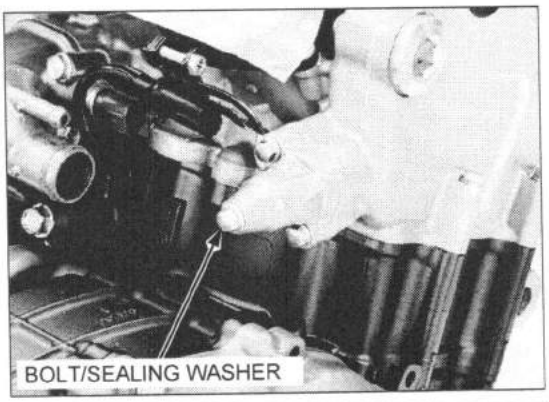


CAM CHAIN TENSIONER LIFTER

REMOVAL

Lift and support the fuel tank (page 4-7).

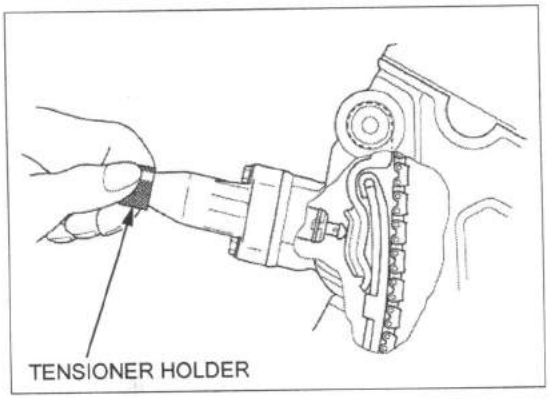
Remove the cam chain tensioner bolt and sealing washer.



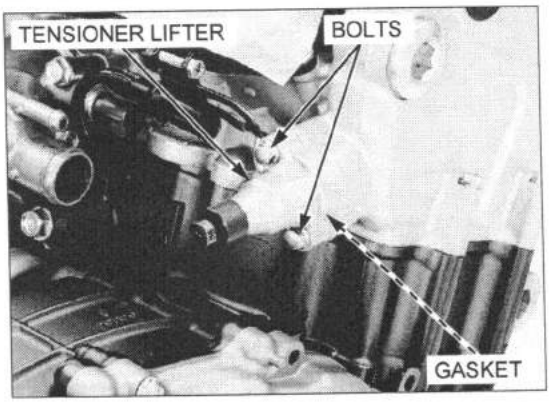
Turn the tensioner shaft fully in (clockwise) and secure it using the tensioner holder to prevent damaging the cam chain.

TOOL:

Cam chain tensioner holder	**070MG-0010100 (Not available in U.S.A.) or 07AMG-MFJA100 (U.S.A. only)**



Remove the bolts, cam chain tensioner lifter, and gasket.

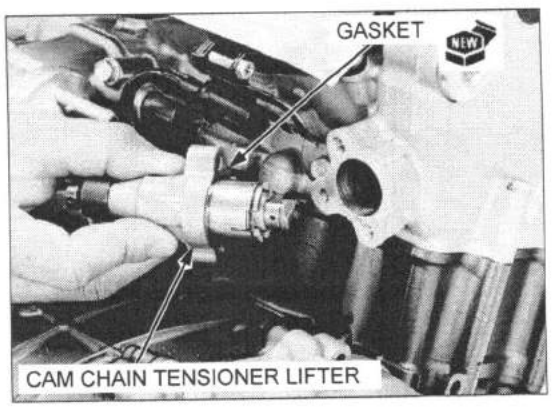


INSTALLATION

Note the installation direction of the gasket.

Install a new gasket onto the cam chain tensioner lifter.

Install the cam chain tensioner lifter into the cylinder head.

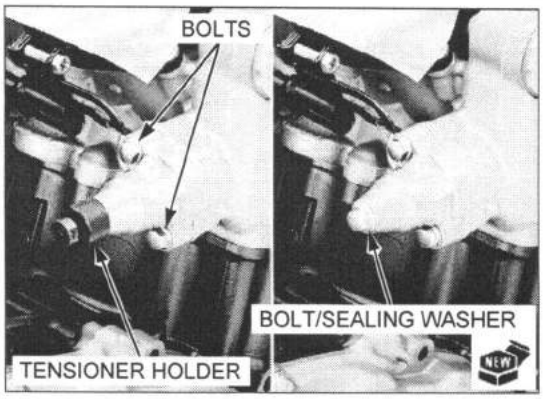


Install and tighten the bolts securely.

Remove the tensioner holder.

Install a new sealing washer and tighten the sealing bolt securely.

Remove the support and close the fuel tank (page 4-9).



10. CLUTCH/STARTER CLUTCH/GEARSHIFT LINKAGE

COMPONENT LOCATION 10-2

SERVICE INFORMATION 10-3

TROUBLESHOOTING 10-4

RIGHT CRANKCASE COVER REMOVAL 10-5

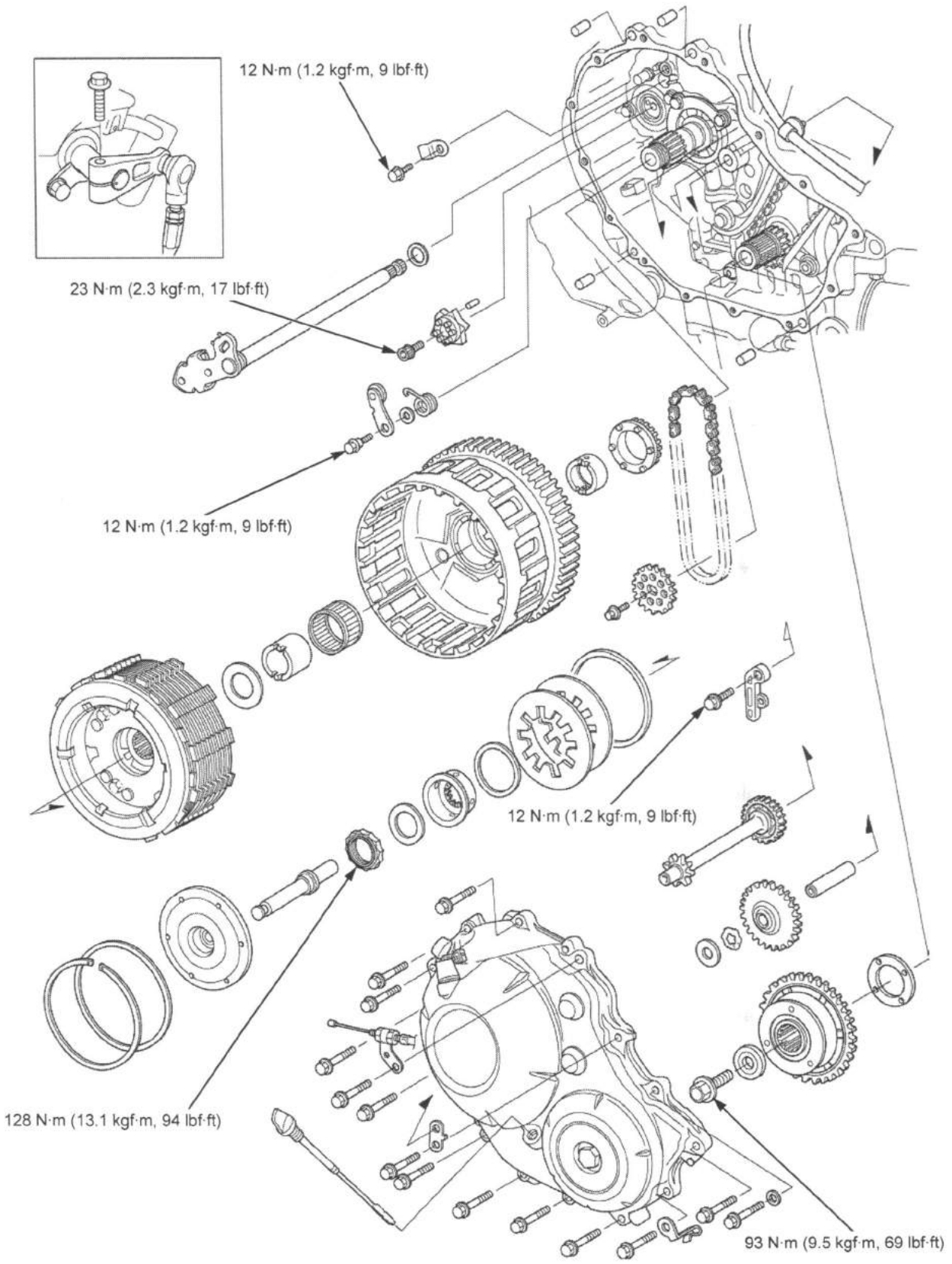
CLUTCH 10-7

STARTER CLUTCH 10-26

GEARSHIFT LINKAGE 10-31

RIGHT CRANKCASE COVER INSTALLATION 10-34

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the clutch, starter clutch and gearshift linkage. All service can be done with the engine installed in the frame.
- Engine oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the engine oil level before servicing the clutch system.
- The primary drive gear and clutch outer guide inserts are select fit and identified by codes. Select replacement bearings from the code tables (page 10-19).

SPECIFICATIONS

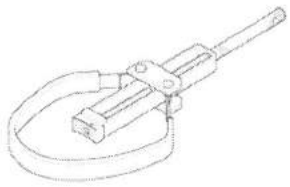
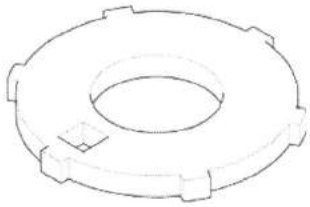
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever freeplay			10 – 20 (0.4 – 0.8)	–
Clutch	Spring free height		5.70 (0.224)	4.7 (0.19)
	Disc thickness	Disc A	3.72 – 3.88 (0.146 – 0.153)	3.6 (0.14)
		Disc B	3.22 – 3.38 (0.127 – 0.133)	3.1 (0.12)
		Disc C	3.22 – 3.38 (0.127 – 0.133)	3.1 (0.12)
	Plate warpage		–	0.30 (0.012)
Clutch outer guide ('08 model)	A (Without O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	35.004 – 35.012 (1.3781 – 1.3784)	34.994 (1.3777)
	B (With O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	34.996 – 35.004 (1.3778 – 1.3781)	34.986 (1.3774)
Clutch outer guide (After '08 model)	A (Two O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	35.007 – 35.012 (1.3782 – 1.3784)	35.004 (1.3781)
	B (Three O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	35.001 – 35.007 (1.3780 – 1.3782)	34.998 (1.3779)
	C (Four O.D. code mark)	I.D.	27.993 – 28.003 (1.1021 – 1.1025)	28.012 (1.1028)
		O.D.	34.996 – 35.001 (1.3778 – 1.3780)	34.993 (1.3777)
Primary driven gear I.D. ('08 model)		White	41.008 – 41.016 (1.6145 – 1.6148)	41.026 (1.6152)
		Black	41.000 – 41.008 (1.6142 – 1.6145)	41.018 (1.6149)
Primary driven gear I.D. (After '08 model)		Blue	41.011 – 41.016 (1.6146 – 1.6148)	41.019 (1.6149)
		Yellow	41.005 – 41.011 (1.6144 – 1.6146)	41.014 (1.6147)
		Green	41.000 – 41.005 (1.6142 – 1.6144)	41.008 (1.6145)
Oil pump drive sprocket guide		I.D.	28.000 – 28.021 (1.1024 – 1.1032)	28.030 (1.1035)
		O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Oil pump drive sprocket I.D.			35.025 – 35.145 (1.3789 – 1.3837)	35.155 (1.3841)
Mainshaft O.D. at clutch outer guide			27.980 – 27.990 (1.1016 – 1.1020)	27.96 (1.101)
Mainshaft O.D. at oil pump drive sprocket guide			27.980 – 27.990 (1.1016 – 1.1020)	27.96 (1.101)
Starter driven gear boss O.D.			45.657 – 45.673 (1.7975 – 1.7981)	45.642 (1.7969)

TORQUE VALUES

Clutch center lock nut	128 N·m (13.1 kgf·m, 94 lbf·ft)	Apply oil to the threads and seating surface. Stake the nut.
Oil pump drive chain guide mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Shift drum center bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	ALOC bolt; replace with a new one.
Shift drum stopper arm pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Starter clutch mounting bolt	93 N·m (9.5 kgf·m, 69 lbf·ft)	Apply oil to the threads and seating surface.
Gearshift spindle setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads.

TOOLS

Flywheel holder 07725-0040001	Clutch holder 070MB-MFL0100
	 or 070MB-MFLA100 (U.S.A. only)

TROUBLESHOOTING

Clutch lever is too hard to pull in
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

Clutch slips when accelerating
- Worn clutch disc
- Weak clutch springs
- Engine oil mixed with molybdenum or graphite additive

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Clutch plate warped
- Loose clutch center lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

Hard to shift
- Improper clutch operation
- Improper oil viscosity
- Bent shift fork
- Bent shift fork shaft (page 12-8)
- Bent fork claw (page 12-8)
- Damaged gearshift cam
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

Transmission jumps out of gear
- Worn shift drum stopper arm
- Weak or broken shift drum stopper arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged gearshift cam
- Damaged or bent shift forks (page 12-8)
- Worn gear engagement dogs or slots (page 12-9)

Gearshift pedal will not return
- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

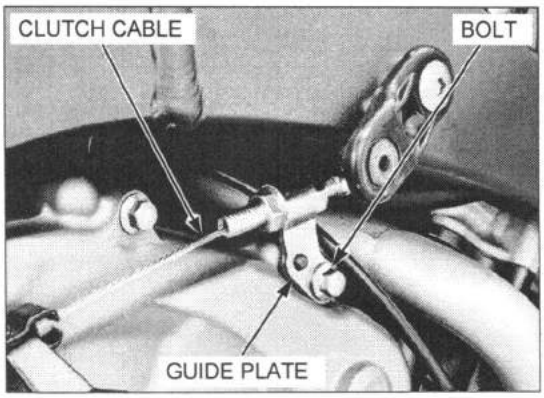
Engine does not turn
- Faulty starter clutch
- Damaged reduction gear/shaft
- Damaged idle gear/shaft

RIGHT CRANKCASE COVER REMOVAL

Remove the following:

- Right middle cowl (page 3-18)
- Oil level dipstick (page 4-20)

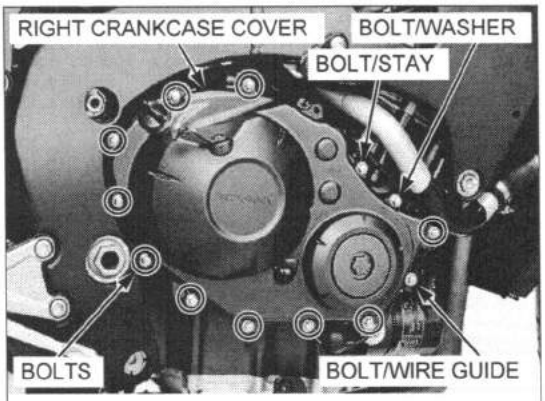
Remove the bolt and clutch cable guide plate, then disconnect the clutch cable end from the clutch lifter lever.

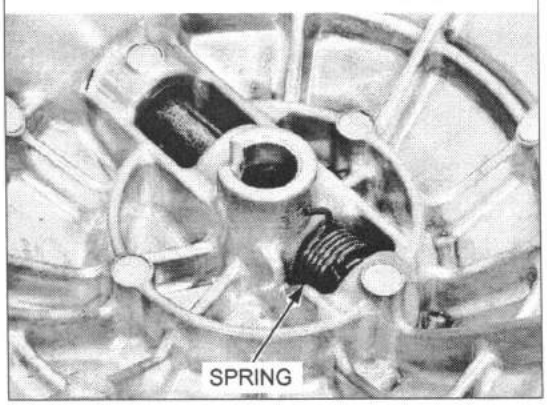


Loosen the right crankcase cover bolts crisscross pattern in two or three steps.
Remove the bolts, sealing washer, stay and wire guide.

Be careful not to drop the clutch lifter lever return spring into the oil pan when removing the right crankcase cover.

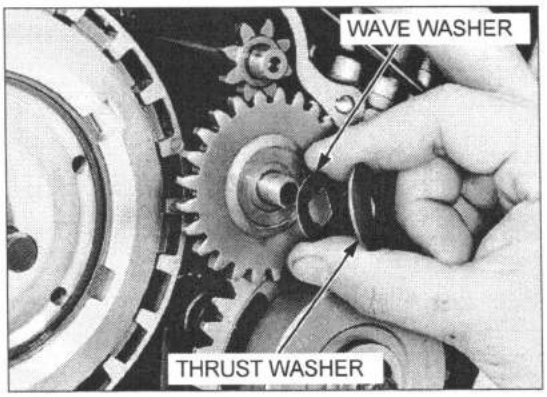
Remove the right crankcase cover while turning the clutch lifter lever counterclockwise to disengage the lifter lever spindle from the lifter piece.





Be careful not to drop the thrust/ wave washers into the oil pan.

Remove the thrust washer and wave washer from the starter idle gear shaft.

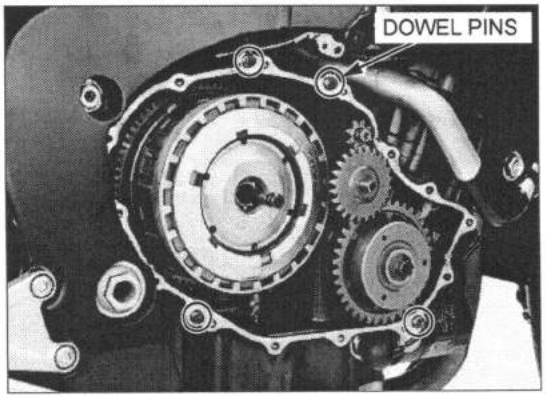


Remove the four dowel pins.

Clean off any sealant from the right crankcase cover mating surfaces.

NOTE:

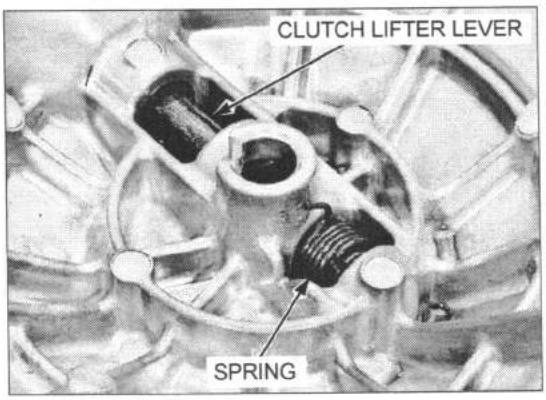
Do not turn the crankshaft counterclockwise after removing the right crankcase cover to prevent the starter reduction gear from being damaged.



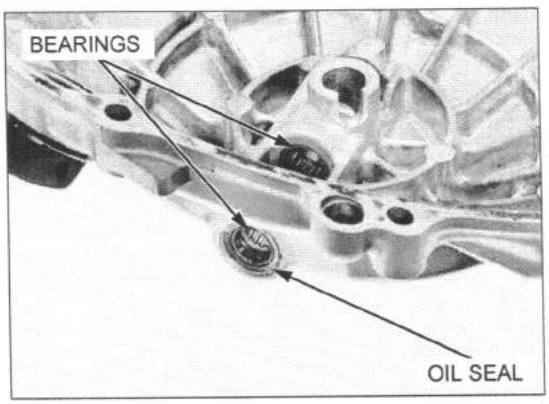
CLUTCH LIFTER LEVER

Remove the clutch lifter lever and return spring from the right crankcase cover.

Check the lifter lever spindle for wear or damage.
Check the return spring for fatigue or damage.

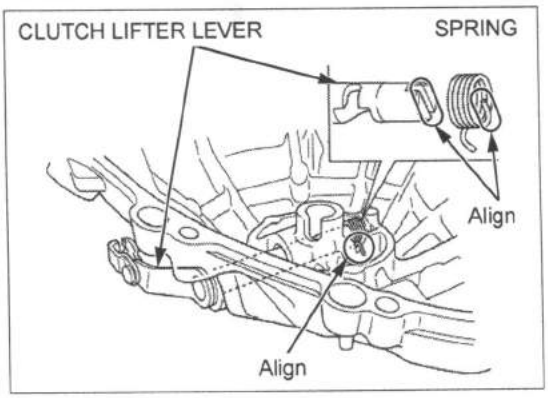


Check the oil seal and needle bearings for wear or damage.



Install the clutch lifter lever and return spring to the right crankcase cover as shown.

- Align the return spring end with the clutch lifter lever groove.
- Align the return spring hook with the right crankcase cover groove.

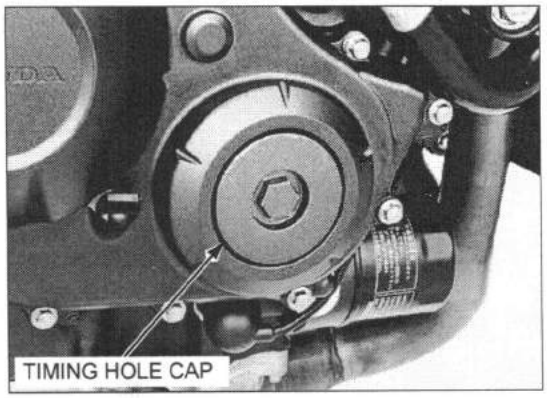


CLUTCH

REMOVAL

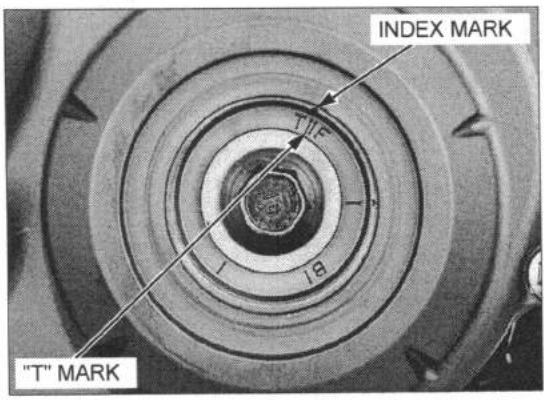
Remove the right middle cowl (page 3-18).

Remove the timing hole cap.

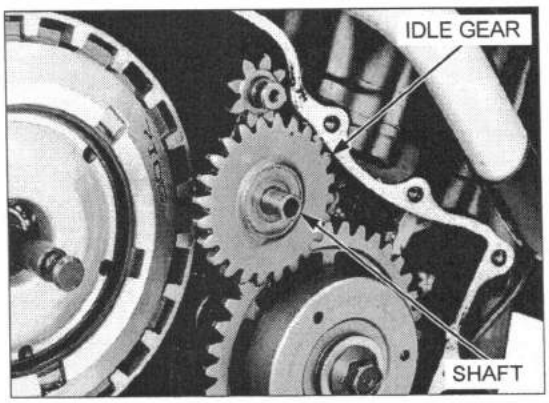


To ease removal of the clutch outer, turn the crankshaft clockwise and align the "T" mark with the index mark on the right crankcase cover.

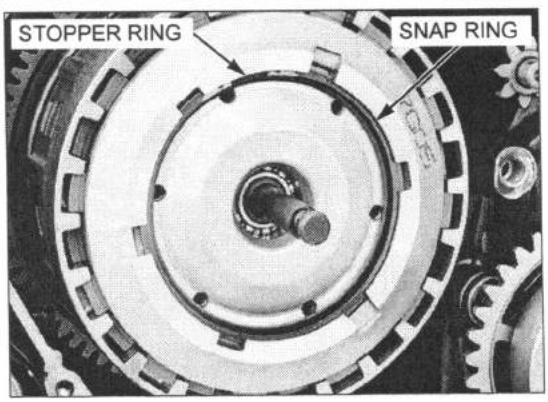
Remove the right crankcase cover (page 10-5).



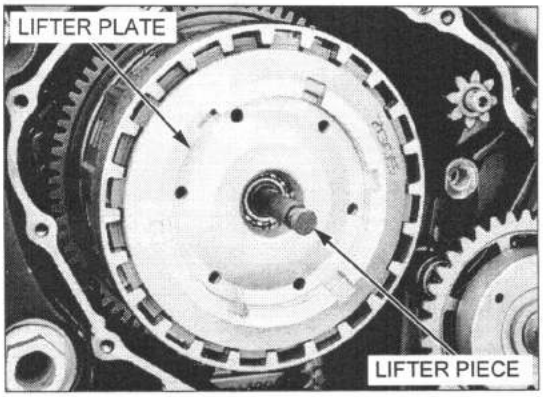
Remove the starter idle gear and shaft.



Remove the snap ring and stopper ring.

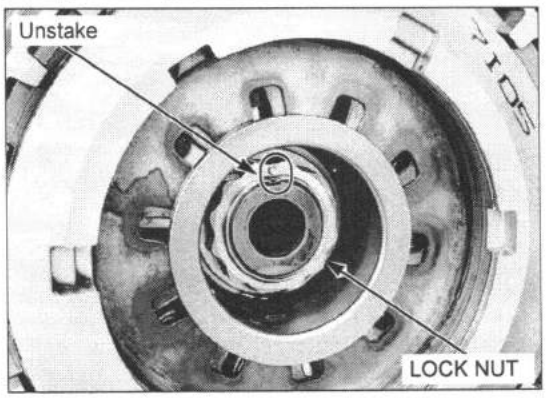


Remove the clutch lifter piece and lifter plate.



Be careful not to damage the mainshaft threads.

Unstake the clutch center lock nut.



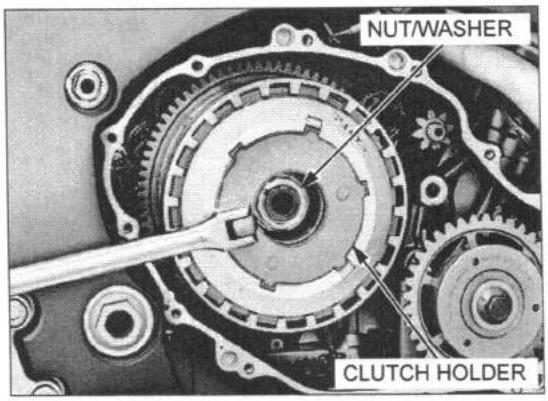
Hold the pressure plate with the special tool.

Remove the clutch center lock nut and washer.

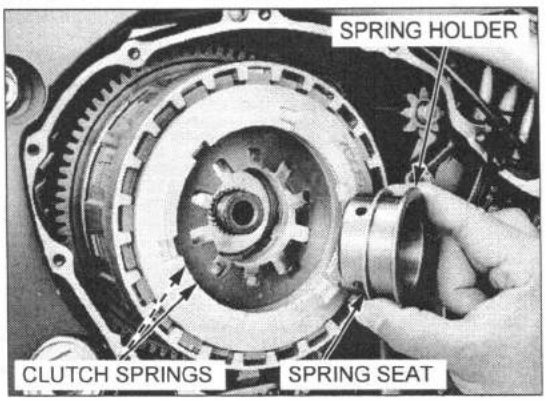
TOOL:

Clutch holder	**070MB-MFL0100 or 070MB-MFLA100 (U.S.A. only)**

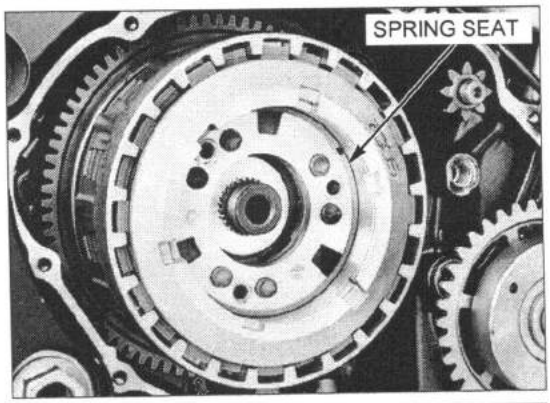
Discard the lock nut.



Remove the clutch spring holder, spring seat, and two clutch springs.



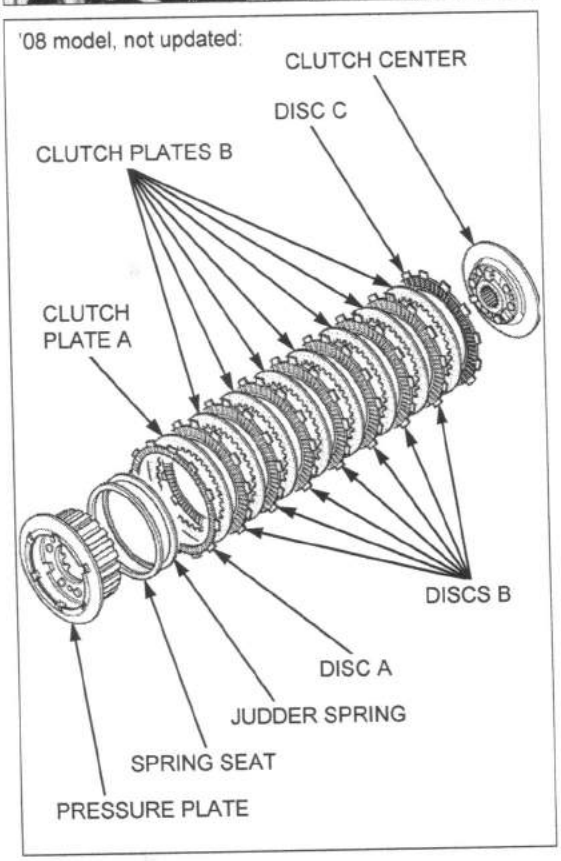
Remove the spring seat.



'08 model, not updated:

Remove the following:

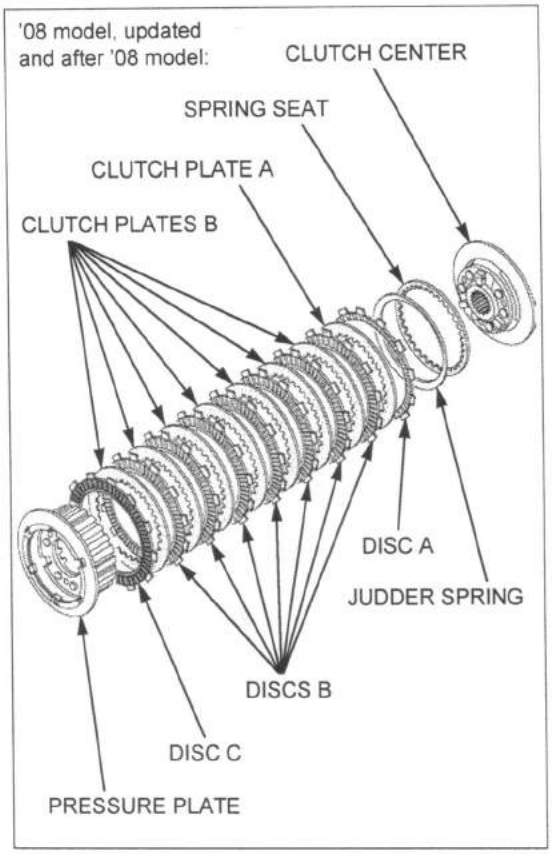
- Pressure plate
- Spring seat
- Judder spring
- Clutch disc A
- Clutch plate A
- Seven clutch discs B
- Seven clutch plates B
- Clutch disc C
- Clutch center



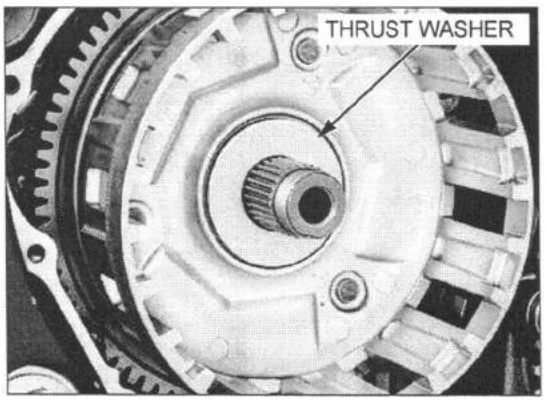
'08 model, updated and after '08 model:

Remove the following:

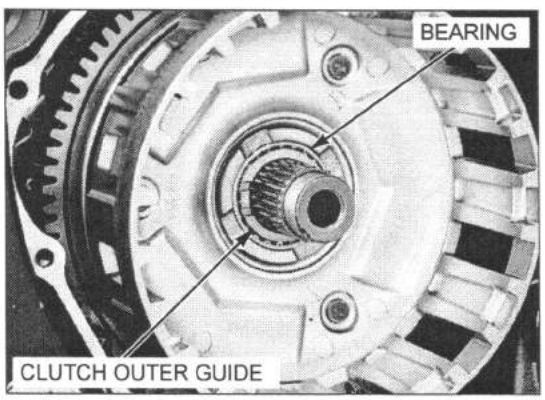
- Pressure plate
- Clutch disc C
- Seven clutch plates B
- Seven clutch discs B
- Clutch plate A
- Clutch disc A
- Judder spring
- Spring seat
- Clutch center



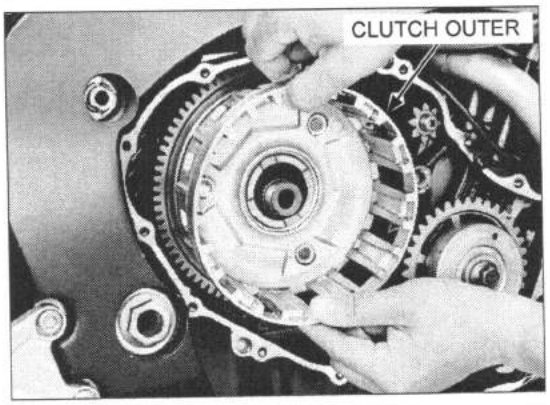
Remove the thrust washer.



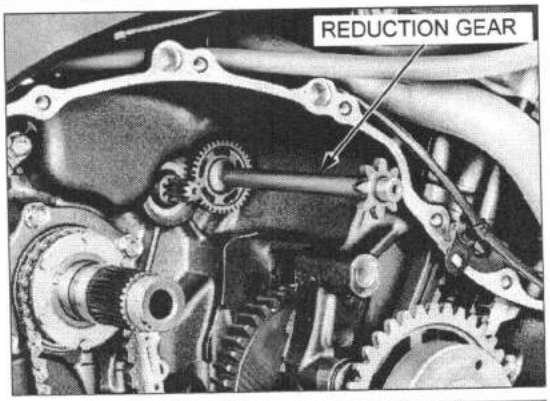
Remove the clutch outer guide and needle bearing.



Remove the clutch outer.

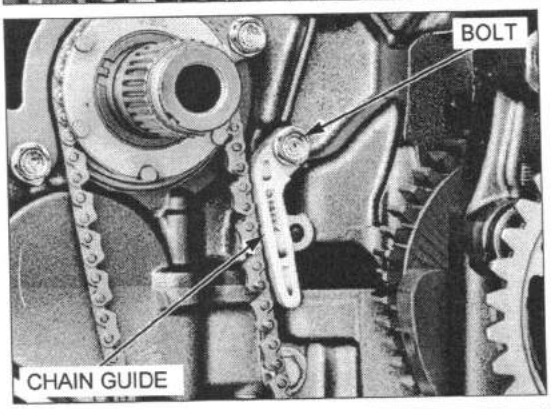


Remove the starter reduction gear from the crankcase.

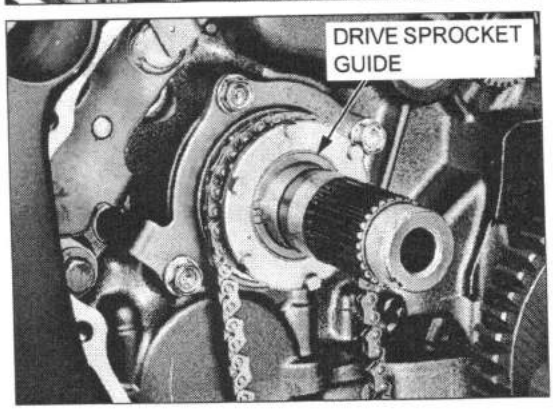


Be careful not to drop the parts into the oil pan.

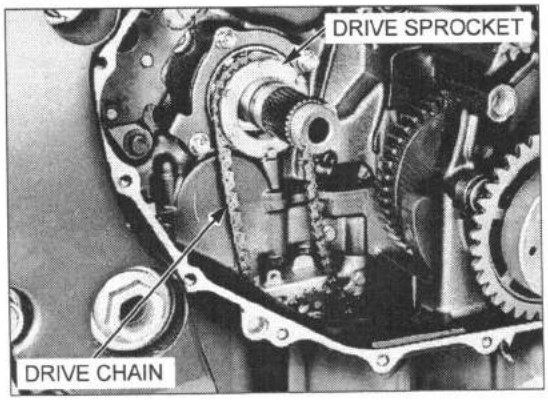
Remove the bolt and oil pump drive chain guide.



Remove the oil pump drive sprocket guide.



Remove the oil pump drive sprocket and chain.

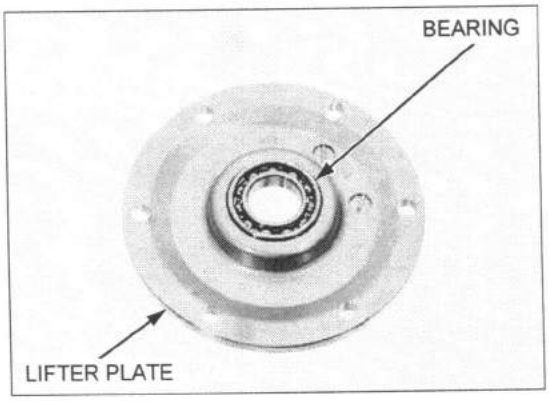


INSPECTION

Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger. The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the clutch lifter plate.

Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the pressure plate.



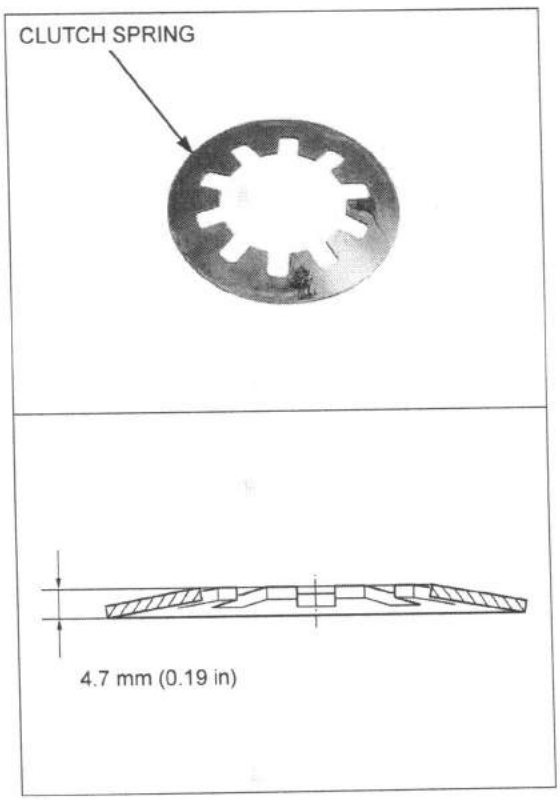
Clutch spring

Replace the clutch springs as a set.

Check the clutch spring distortion.

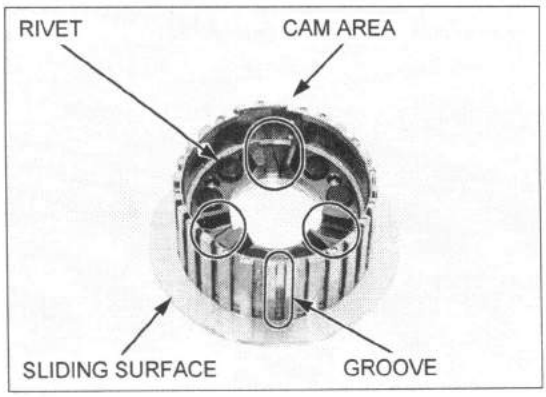
Measure the height of the clutch spring.

SERVICE LIMIT: 4.7 mm (0.19 in)



Pressure plate

Check the grooves for wear or damage.
Check the cam area for wear or damage.
Check the clutch disc sliding surface for wear or damage.
Check the six rivets for loosening.
Replace the pressure plate if necessary.



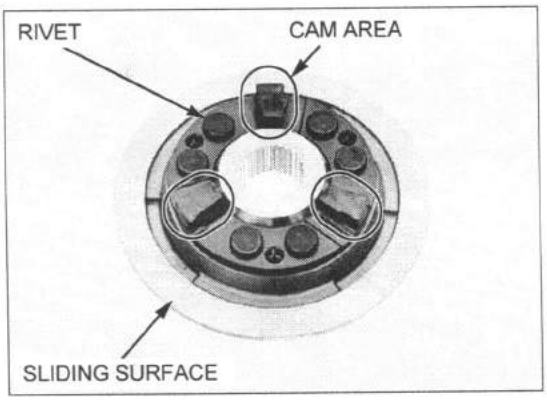
Clutch center

Check the cam area for wear or damage.

Check the clutch disc sliding surface for wear or damage.

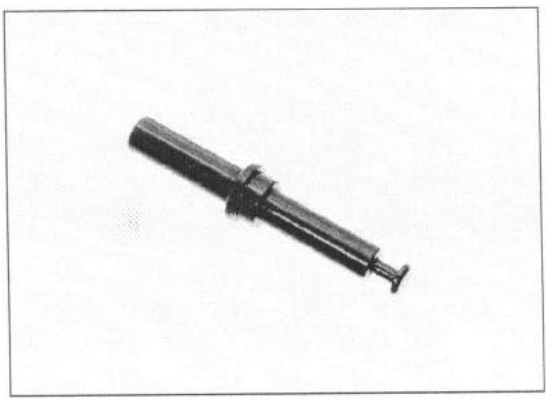
Check the six rivets for loosening.

Replace the clutch center if necessary.



Clutch lifter piece

Check the clutch lifter piece for wear or damage.



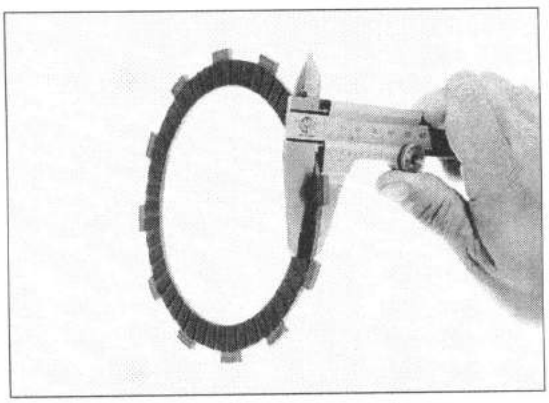
Clutch disc

Replace the clutch discs and plates as a set.

Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of each disc.

SERVICE LIMITS:
Disc A: 3.6 mm (0.14 in)
Disc B: 3.1 mm (0.12 in)
Disc C: 3.1 mm (0.12 in)

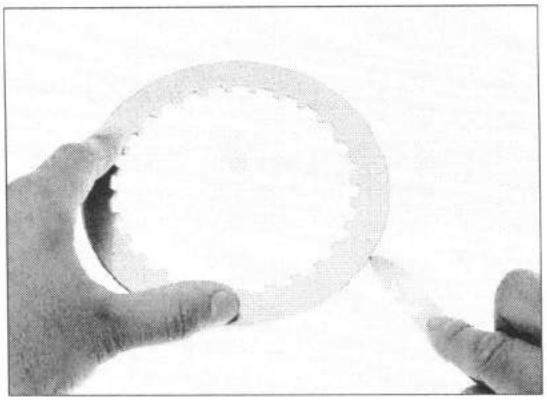


Clutch plate

Replace the clutch discs and plates as a set.

Check the plates for discoloration.
Check the plate warpage on a surface plate using a feeler gauge.

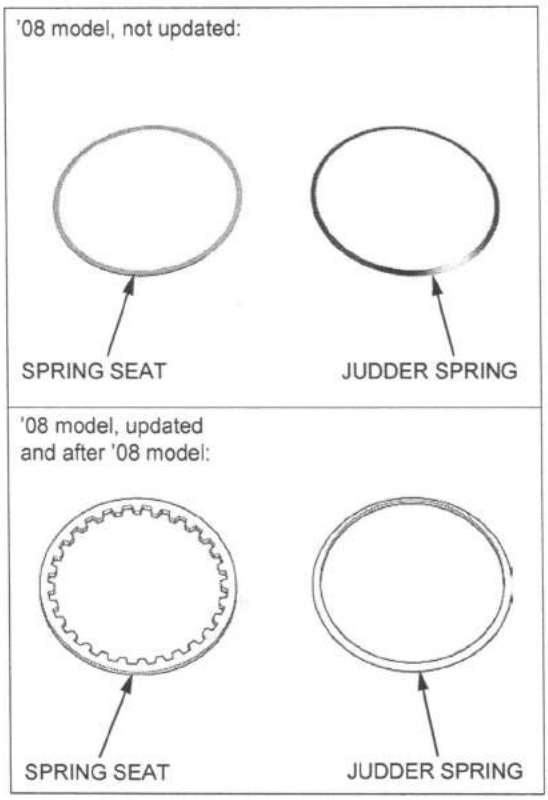
SERVICE LIMIT: 0.30 mm (0.012 in)



Judder spring/spring seat

Check the judder spring and spring seat for deformation, warpage or damage; replace them if necessary.

- A damaged or warped spring seat will cause the judder spring to be pressed unevenly.
- A damaged judder spring causes weak contact between the discs and plates or uneven disc/plate contact.



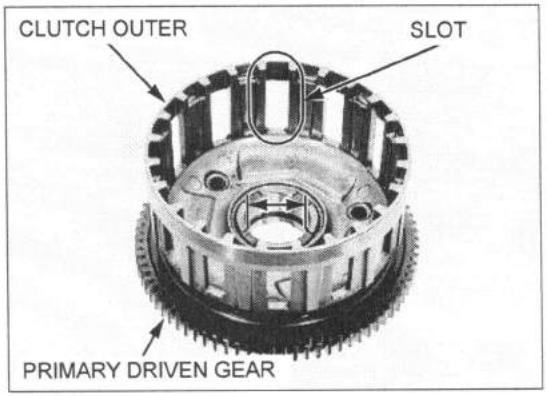
Clutch outer/primary driven gear

Check the slots of the clutch outer for damage or wear caused by the clutch discs.

Check the primary driven gear for abnormal wear or damage.

Measure the I.D. of the primary driven gear.

SERVICE LIMITS:
'08 model:
White: 41.026 mm (1.6152 in)
Black: 41.018 mm (1.6149 in)
After '08 model:
Blue: 41.019 mm (1.6149 in)
Yellow: 41.014 mm (1.6147 in)
Green: 41.008 mm (1.6145 in)



Replace the clutch outer assembly if necessary.

- When the clutch outer assembly is replaced, be sure to select the needle bearing according to the selective fit table (page 10-19).

Clutch outer guide/needle bearing

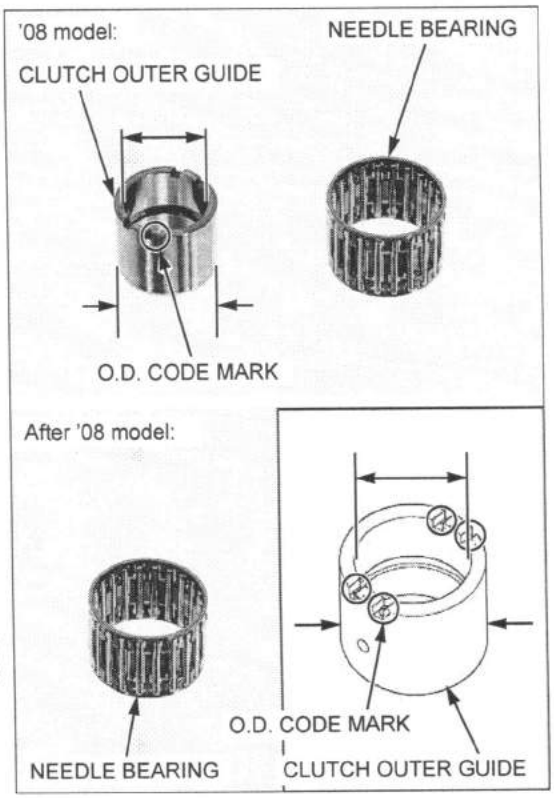
Measure the O.D. and I.D. of the clutch outer guide.

SERVICE LIMITS ('08 model):
A (without O.D. code mark):
O.D.: 34.994 mm (1.3777 in)
I.D.: 28.012 mm (1.1028 in)
B (with O.D. code mark):
O.D.: 34.986 mm (1.3774 in)
I.D.: 28.012 mm (1.1028 in)

SERVICE LIMITS (After '08 model):
A (two O.D. code mark)
O.D.: 35.004 mm (1.3781 in)
I.D.: 28.012 mm (1.1028 in)
B (three O.D. code mark)
O.D.: 34.998 mm (1.3779 in)
I.D.: 28.012 mm (1.1028 in)
C (four O.D. code mark)
O.D.: 34.993 mm (1.3777 in)
I.D.: 28.012 mm (1.1028 in)

Check the needle bearing turns smoothly and quietly. Replace the bearing if necessary.

- When the clutch outer guide and/or needle bearing is replaced, be sure to select the needle bearing according to the selective fit table (page 10-19).

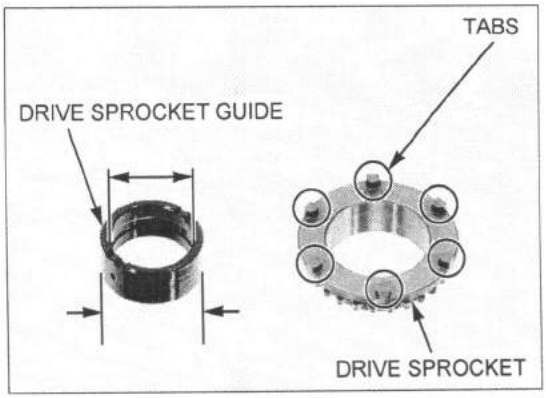


Oil pump drive sprocket/guide

Measure the O.D. and I.D. of the oil pump drive sprocket guide.

SERVICE LIMITS:
O.D.: 34.965 mm (1.3766 in)
I.D.: 28.030 mm (1.1035 in)

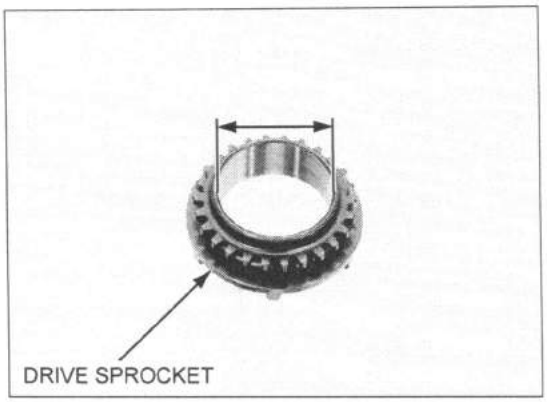
Check the oil pump drive sprocket tabs for wear or damage.



Check the oil pump drive sprocket for abnormal wear or damage.

Measure the I.D. of the oil pump drive sprocket.

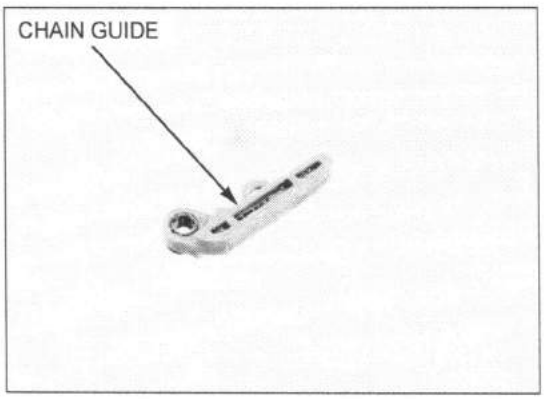
SERVICE LIMIT: 35.155 mm (1.3841 in)



Oil pump drive chain guide

Check the oil pump drive chain guide for wear or damage.

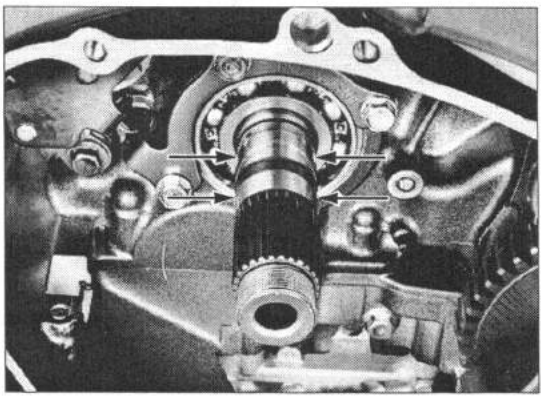
Replace them if necessary.



Mainshaft

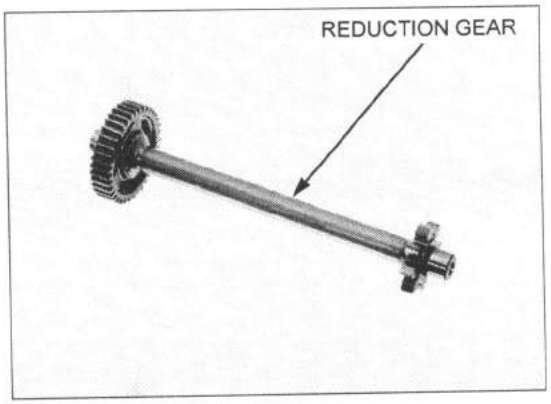
Measure the mainshaft O.D. at clutch outer guide and oil pump drive sprocket guide sliding surfaces.

SERVICE LIMIT: 27.96 mm (1.101 in)



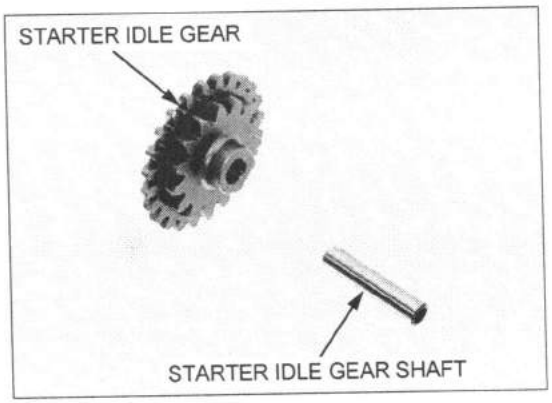
Starter reduction gear

Check the starter reduction gear for wear or damage and replace it if necessary.



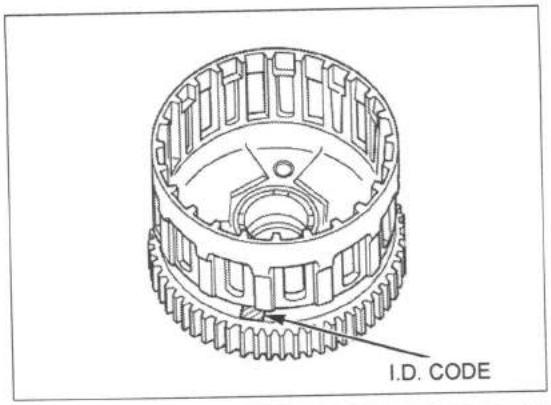
Starter idle gear/idle gear shaft

Check the starter idle gear and shaft for wear or damage, replace them if necessary.

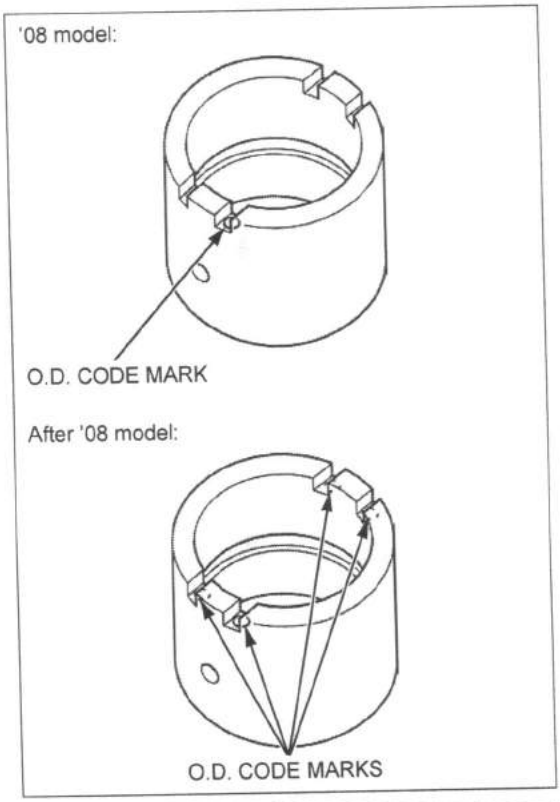


NEEDLE BEARING SELECTION

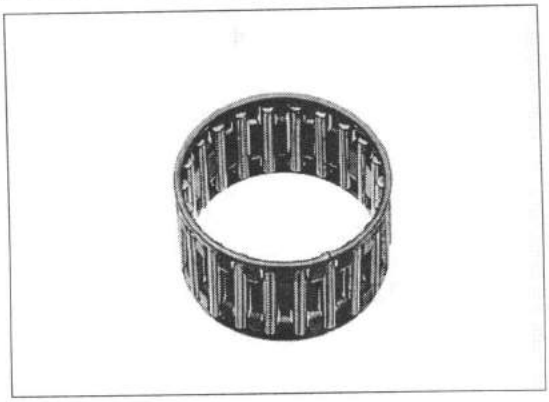
The primary driven gear has I.D. code paint.



The clutch outer guide has O.D. code mark as shown.



Cross-reference the primary driven gear and clutch outer guide codes to determine the replacement needle bearing.
Refer to the selection table below for bearing selection.



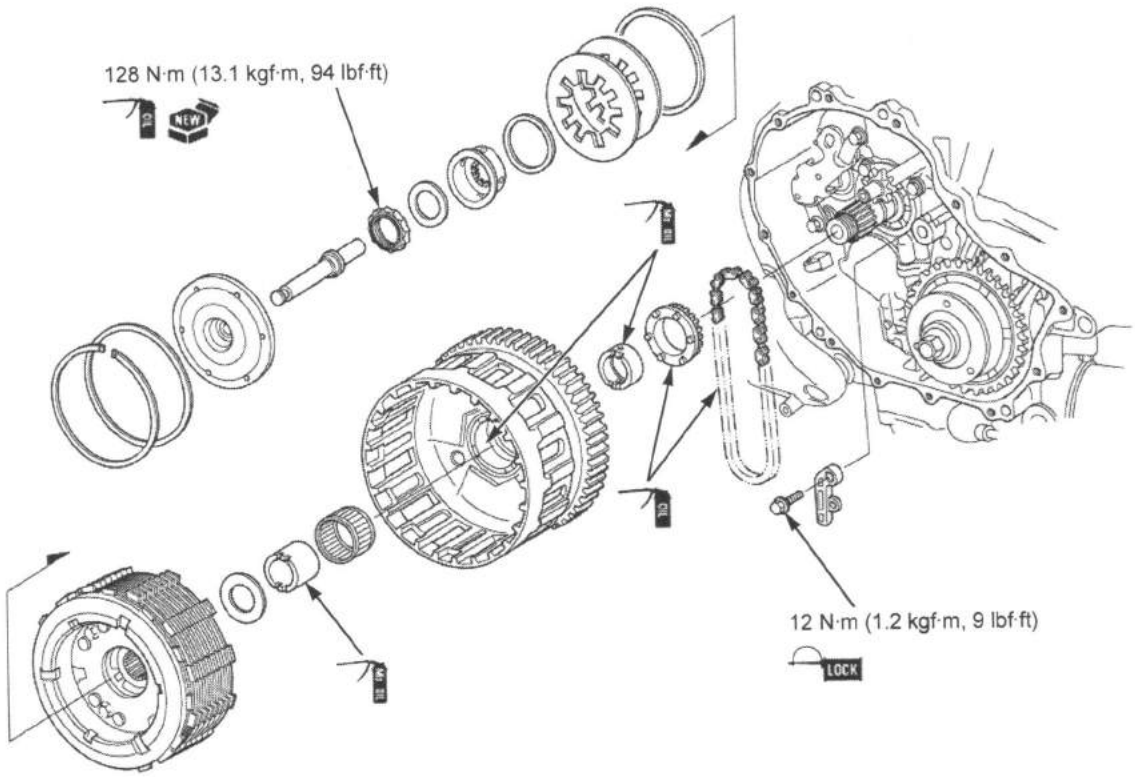
NEEDLE BEARING SELECTION TABLE ('08 model):

			CLUTCH OUTER GUIDE O.D. CODE MARK	
			GUIDE A (Without O.D. code)	GUIDE B (With O.D. code)
			35.004 – 35.012 mm (1.3781 – 1.3784 in)	34.996 – 35.004 mm (1.3778 – 1.3781 in)
PRIMARY DRIVEN GEAR I.D. CODE PAINT	White	41.008 – 41.016 mm (1.6145 – 1.6148 in)	NEEDLE BEARING B	NEEDLE BEARING A
	Black	41.000 – 41.008 mm (1.6142 – 1.6145 in)	NEEDLE BEARING C	NEEDLE BEARING B

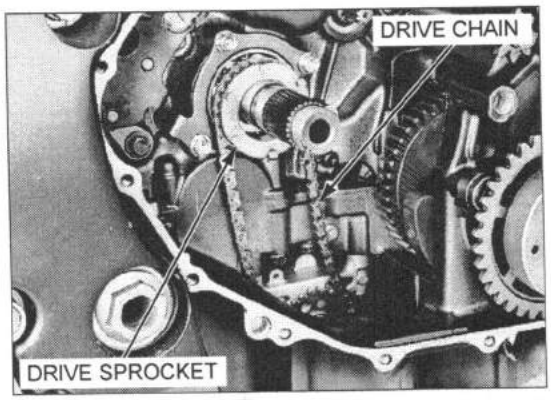
NEEDLE BEARING SELECTION TABLE (After '08 model):

			CLUTCH OUTER GUIDE O.D. CODE MARK		
			GUIDE A (two O.D. code)	GUIDE B (three O.D. code)	GUIDE C (four O.D. code)
			35.007 – 35.012 mm (1.3782 – 1.3784 in)	35.001 – 35.007 mm (1.3780 – 1.3782 in)	34.996 – 35.001 mm (1.3778 – 1.3780 in)
PRIMARY DRIVEN GEAR I.D. CODE PAINT	Blue	41.011 – 41.016 mm (1.6146 – 1.6148 in)	NEEDLE BEARING B	NEEDLE BEARING A	–
	Yellow	41.005 – 41.011 mm (1.6144 – 1.6146 in)	NEEDLE BEARING C	NEEDLE BEARING B	NEEDLE BEARING A
	Green	41.000 – 41.005 mm (1.6142 – 1.6144 in)	–	NEEDLE BEARING C	NEEDLE BEARING B

INSTALLATION

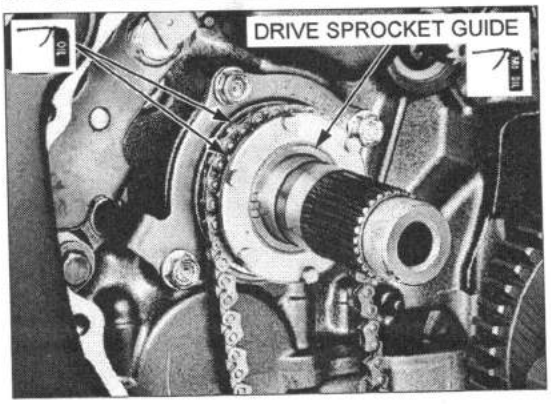


Install the oil pump drive sprocket and drive chain.



Apply molybdenum oil solution to the oil pump drive sprocket guide sliding surface and install it to the mainshaft.

Apply oil to the oil pump drive sprocket teeth and drive chain.

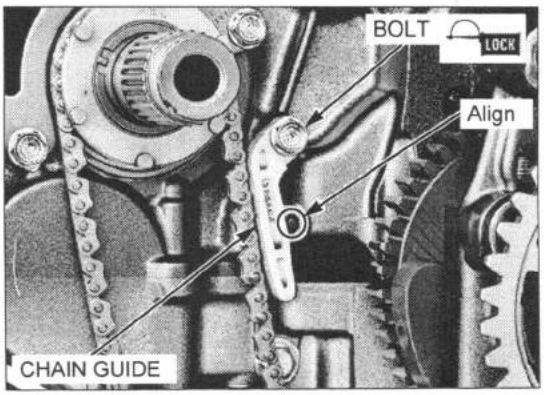


Be careful not to drop the parts into the oil pan.

Apply locking agent to the oil pump drive chain guide mounting bolt threads (page 1-23).

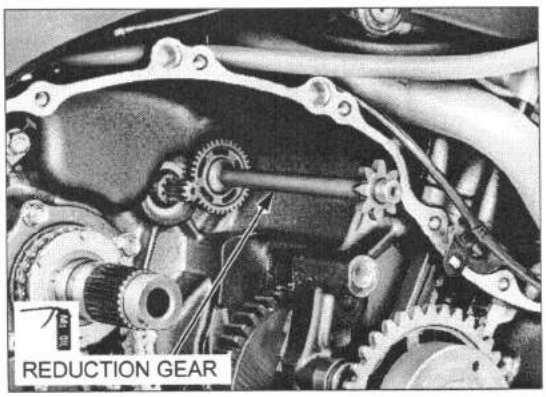
Install the oil pump drive chain guide by aligning its hole with the crankcase tab and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Apply molybdenum oil solution to the starter reduction gear sliding surface.

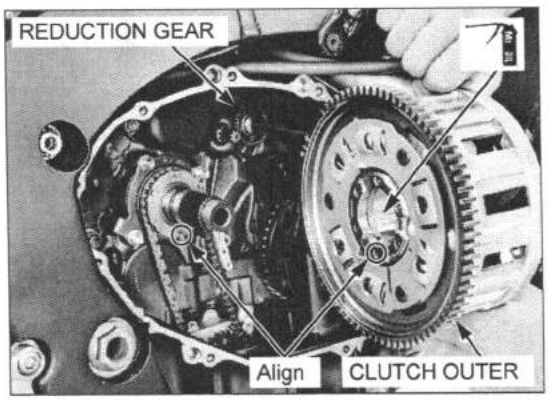
Install the starter reduction gear into the crankcase.



Apply molybdenum oil solution to the clutch outer sliding surface.

Make sure the starter reduction gear is installed into the crankcase before installing the clutch outer.

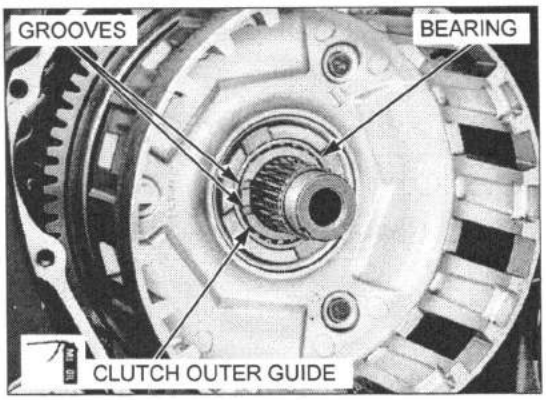
Install the clutch outer by aligning the tabs of the oil pump drive sprocket with the holes of the clutch outer.



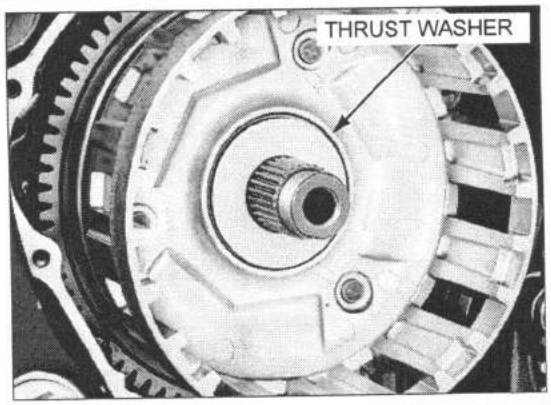
Apply molybdenum oil solution to the clutch outer guide sliding surface.

Install the clutch outer guide with its grooves facing out.

Install the clutch outer guide and needle bearing onto the mainshaft.



Install the thrust washer.



'08 model, not updated: Replace the clutch discs and plates as a set using after '08 model parts.

Coat the clutch discs and plates with clean engine oil.

Install the spring seat, judder spring, clutch disc A (larger I.D. disc), clutch plate A, seven clutch discs B, seven clutch plates B, and clutch disc C onto the pressure plate as shown.

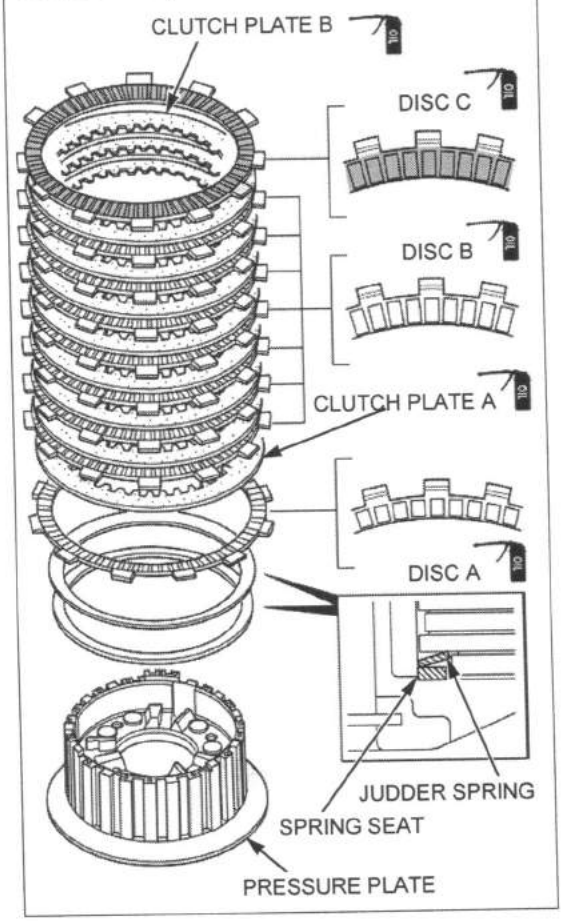
IDENTIFICATION OF CLUTCH DISC:

- Clutch disc A: Black paint (larger I.D. disc)
- Clutch disc B: Blue paint
- Clutch disc C: Green paint

IDENTIFICATION OF CLUTCH PLATE:

- Clutch plate A: Gray (judder spring side)
- Clutch plate B: Silver (other clutch plate)

'08 model, not updated:



'08 model, updated and after '08 model: Replace the clutch discs and plates as a set.

Coat the clutch discs and plates with clean engine oil.

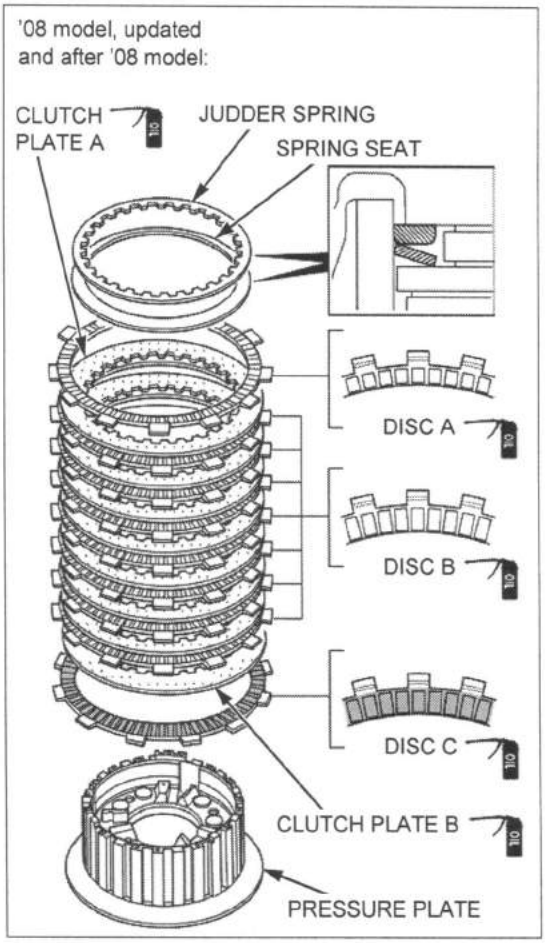
Install the clutch disc C, seven clutch plates B, seven clutch discs B, clutch plate A, clutch disc A (larger I.D. disc), judder spring, and spring seat onto the pressure plate as shown.

IDENTIFICATION OF CLUTCH DISC:

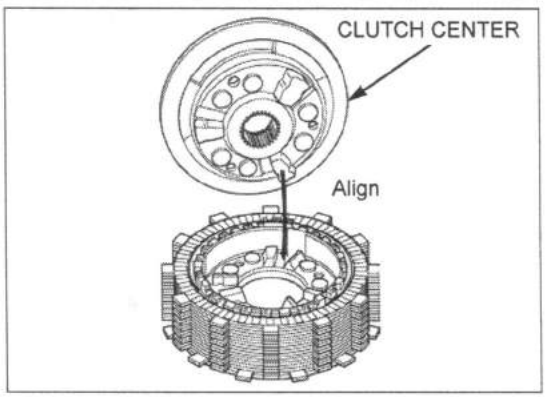
- Clutch disc A: No paint (larger I.D. disc)
- Clutch disc B: Blue paint
- Clutch disc C: Green paint

IDENTIFICATION OF CLUTCH PLATE:

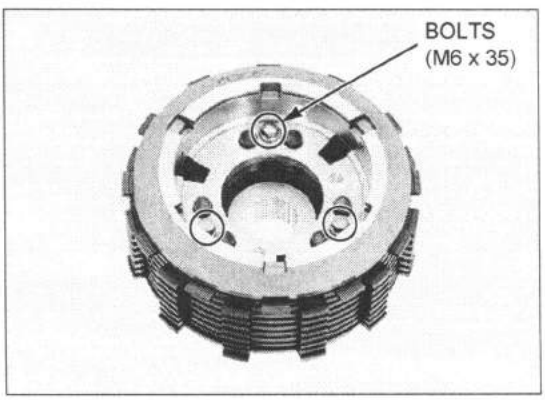
- Clutch plate A: Gray (judder spring side)
- Clutch plate B: Silver (other clutch plate)



Install the clutch center by aligning each cam areas as shown.

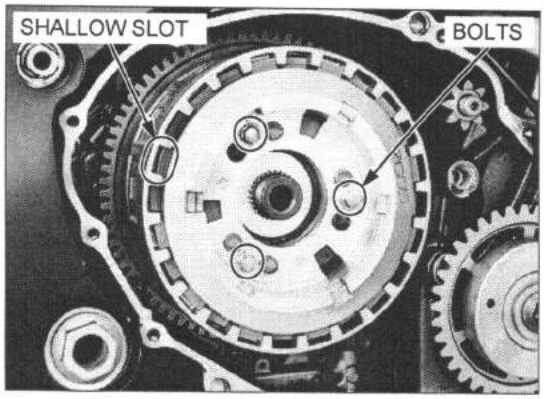


Loosely install the setting bolts (M6 x 35) as shown.

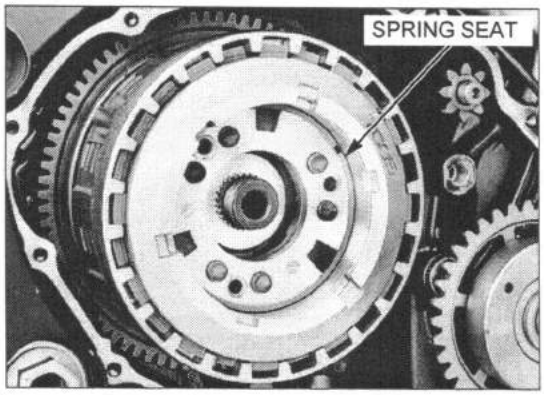


Install the clutch disc assembly by aligning its tabs of outside clutch disc A into the clutch outer shallow slots.

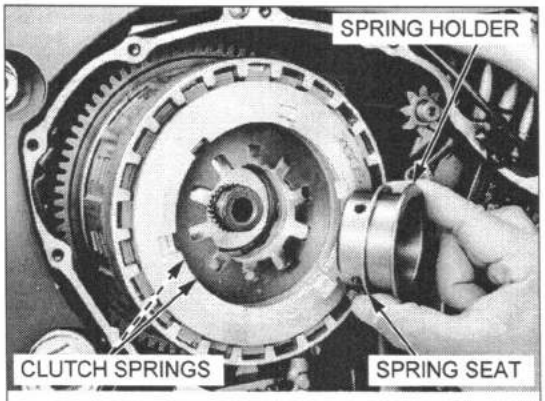
Remove the setting bolts.

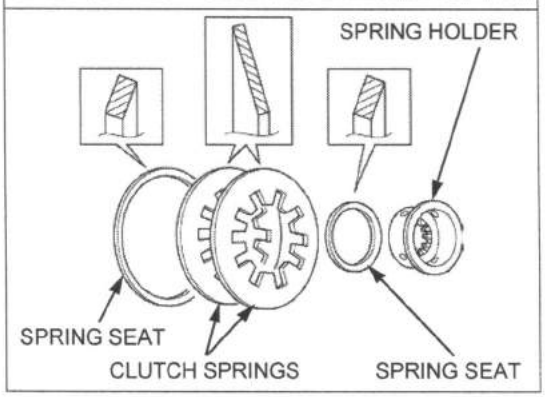


Install the spring seat.



Install the two clutch springs, spring seat, and spring holder.





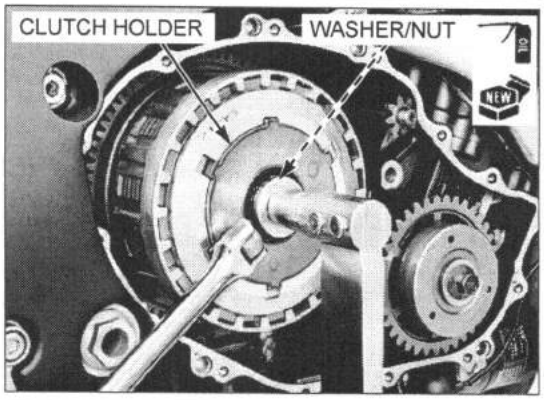
Apply oil to a new clutch center lock nut threads and seating surface then install it to the mainshaft.

Hold the pressure plate with the special tool and tighten the lock nut to the specified torque.

TOOL:

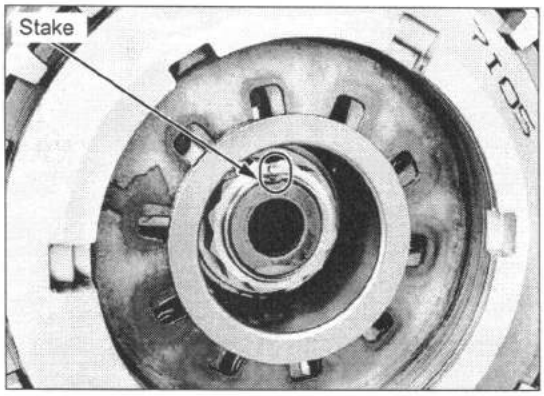
Clutch holder	**070MB-MFL0100 or 070MB-MFLA100 (U.S.A. only)**

TORQUE: 128 N·m (13.1 kgf·m, 94 lbf·ft)



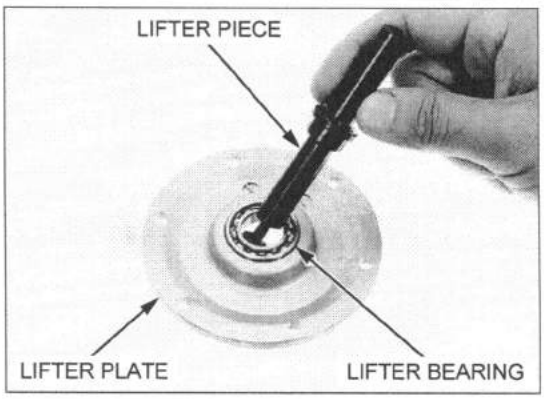
Be careful not to damage the mainshaft threads.

Stake the lock nut into the mainshaft groove with a punch.

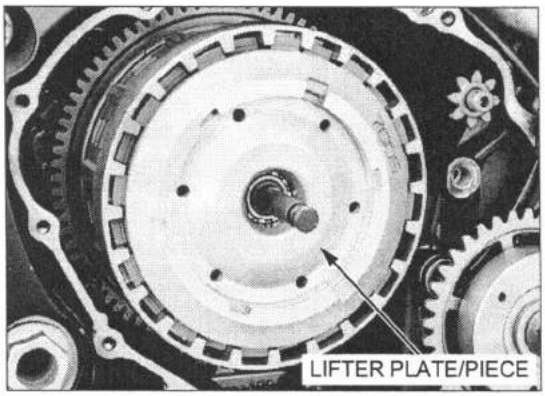


Install the lifter bearing into the lifter plate.

Install the clutch lifter piece into the lifter bearing.

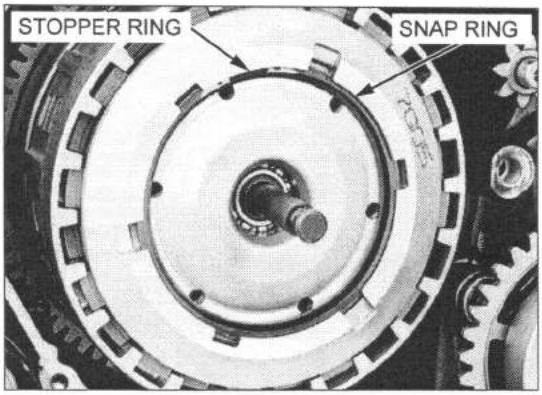


Install the lifter plate/piece.



After installing the snap ring, always rotate it in its groove to be sure it is fully seated.

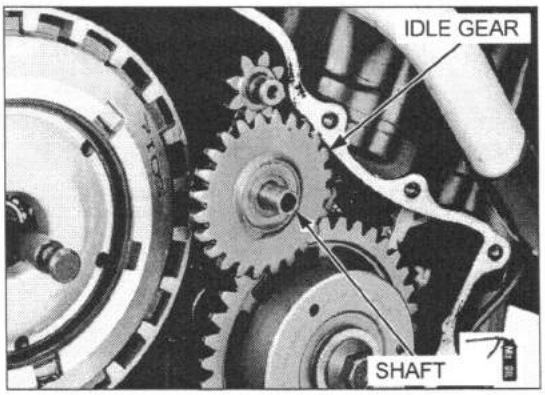
Install the stopper ring and snap ring securely.



Apply molybdenum oil solution to the starter idle gear shaft sliding surface.

Install the starter idle gear and shaft.

Install the right crankcase cover (page 10-34).



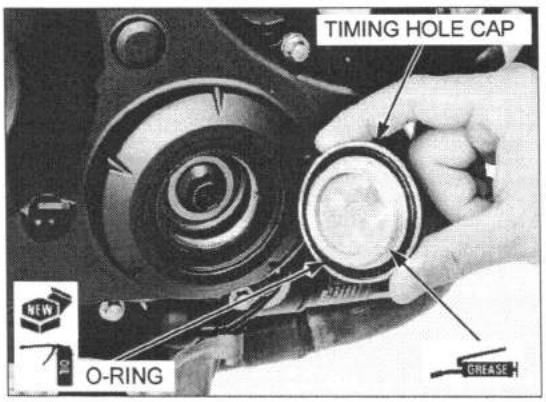
Apply oil to a new O-ring and install it to the timing hole cap.

Apply grease to the timing hole cap threads.

Tighten the timing hole cap to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the right middle cowl (page 3-18).



STARTER CLUTCH

REMOVAL

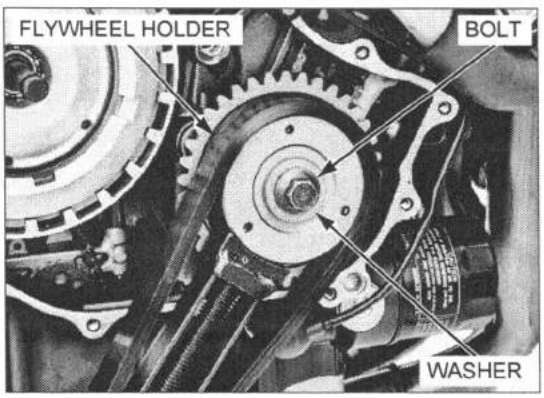
Remove the right crankcase cover (page 10-5).

Hold the starter clutch outer with the special tool.

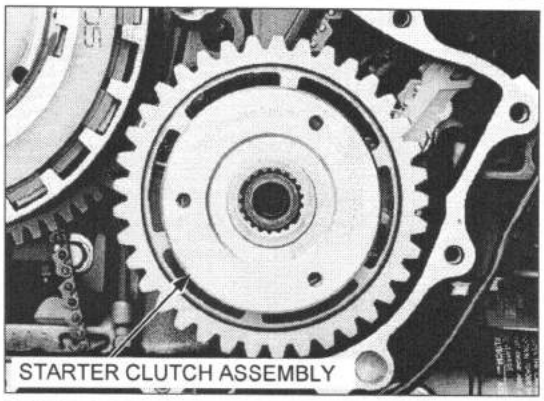
TOOL:

Flywheel holder	**07725-0040001**

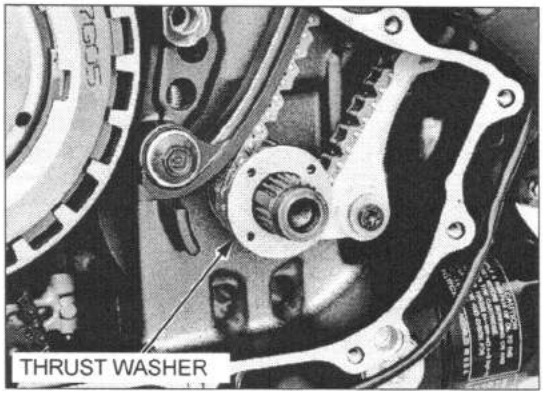
Remove the starter clutch mounting bolt, washer, and flywheel holder.



Remove the starter clutch assembly.

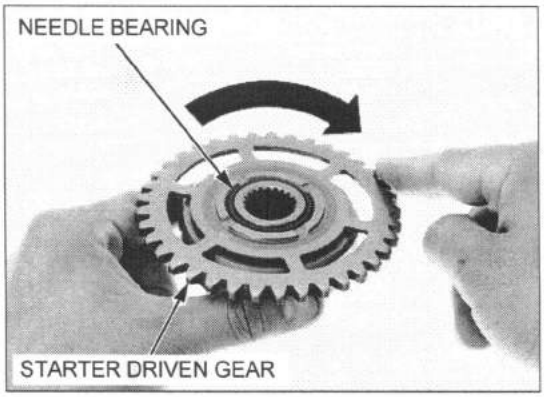


Remove the thrust washer.



INSPECTION

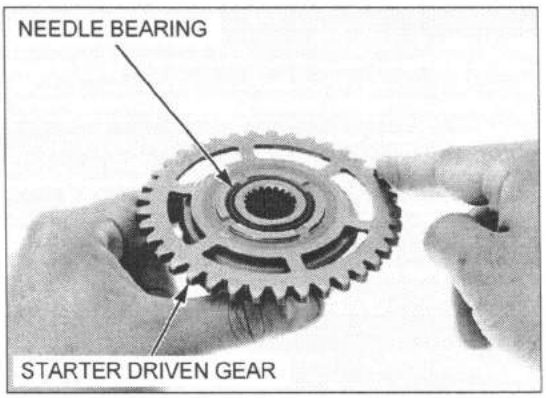
Check the operation of the one-way clutch by turning the driven gear.
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.



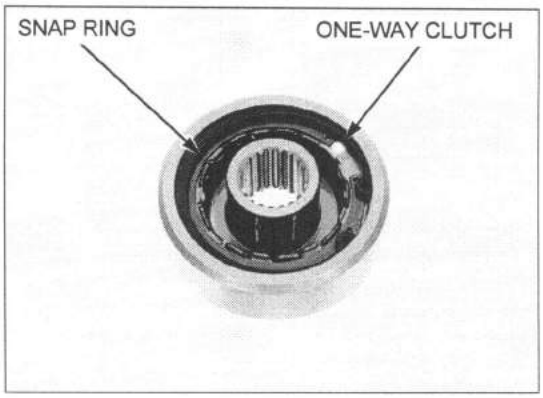
DISASSEMBLY

Remove the starter driven gear by turning it clockwise.

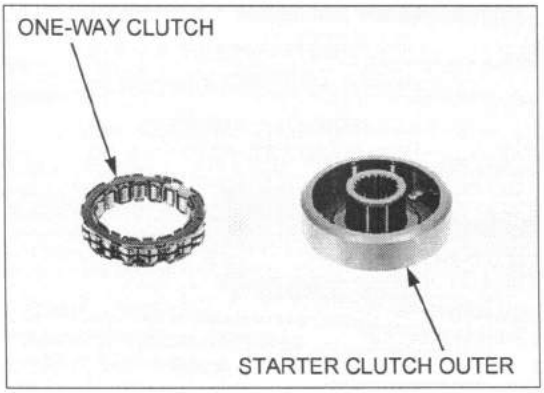
Remove the needle bearing.



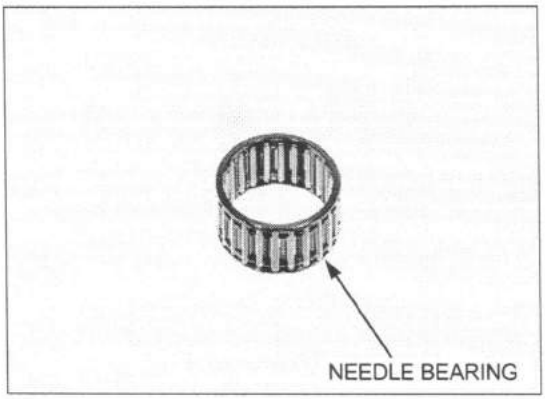
Remove the snap ring and one-way clutch.



Check the starter clutch outer inner surface and one-way clutch for abnormal wear or damage and replace them if necessary.



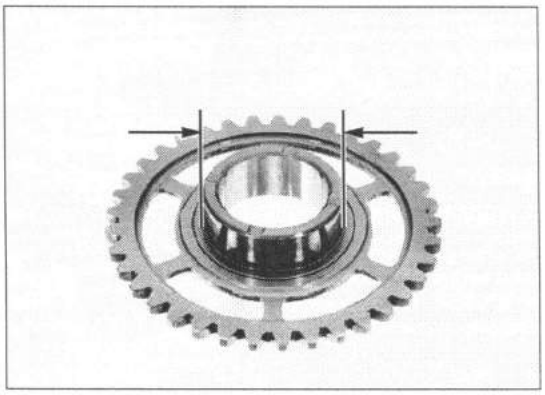
Check the needle bearing for abnormal wear or damage.
Replace it if necessary.



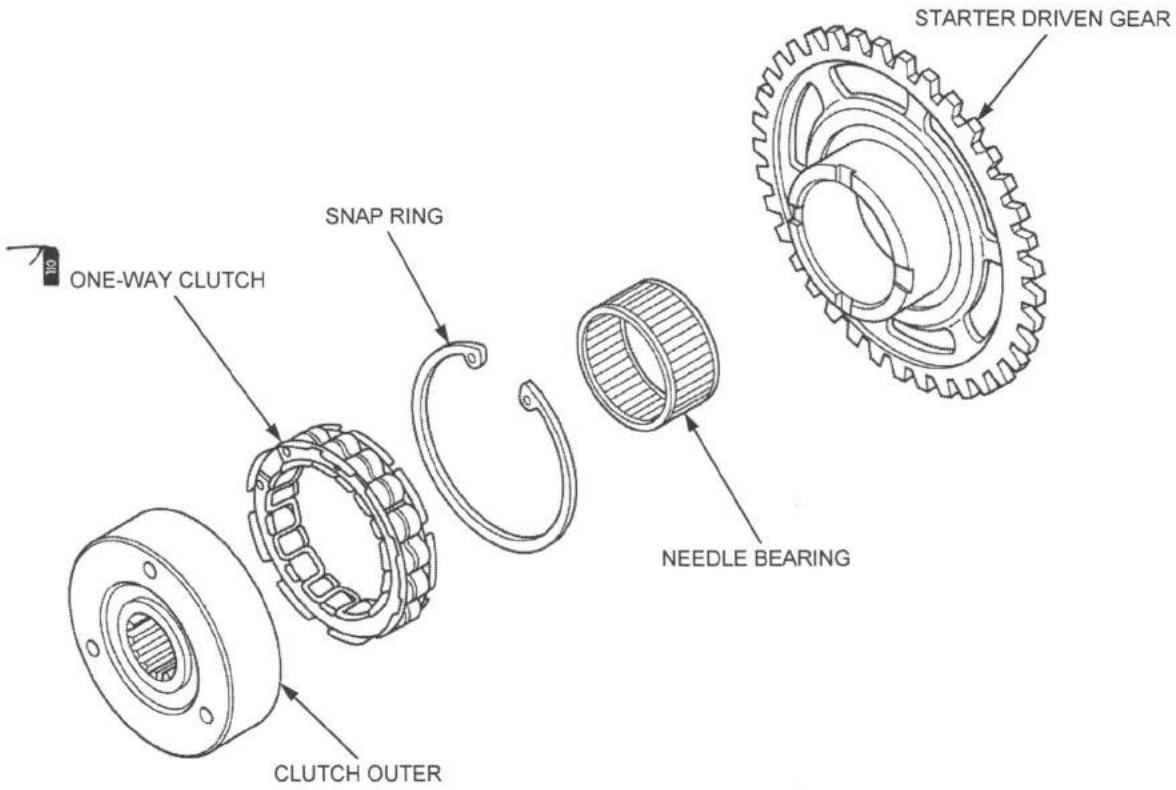
Check the starter driven gear for abnormal wear or damage.

Measure the starter driven gear boss O.D.

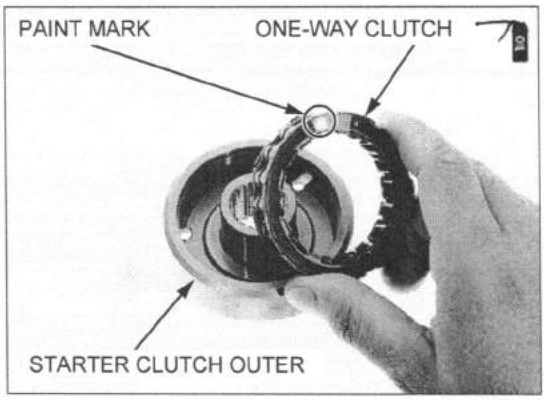
SERVICE LIMIT: 45.642 mm (1.7969 in)



ASSEMBLY

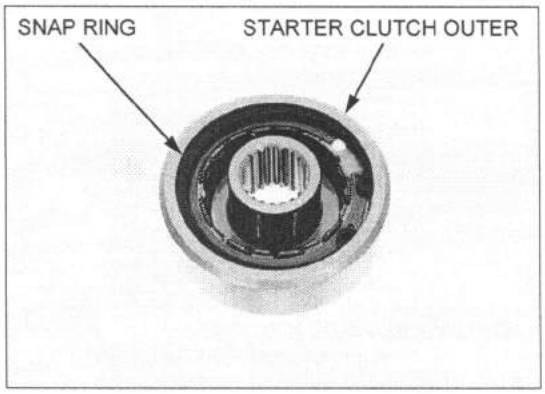


Apply oil to the one-way clutch sliding surface.
Install the one-way clutch into the starter clutch outer with its paint mark facing out.



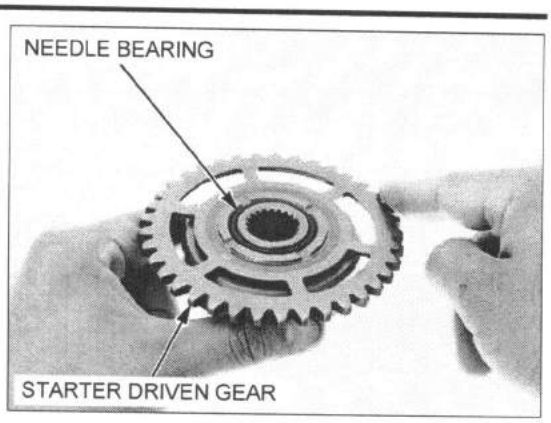
After installing the snap ring, always rotate it in its groove to be sure it is fully seated.

Install the snap ring into the starter clutch outer groove securely.



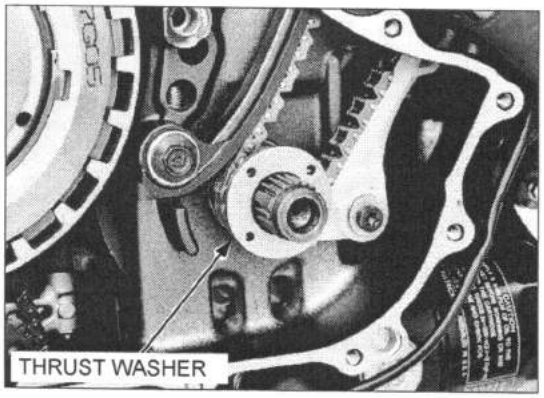
Install the starter driven gear and needle bearing into the starter clutch outer while turning the starter driven gear clockwise.

Recheck the one-way clutch operation (page 10-27).

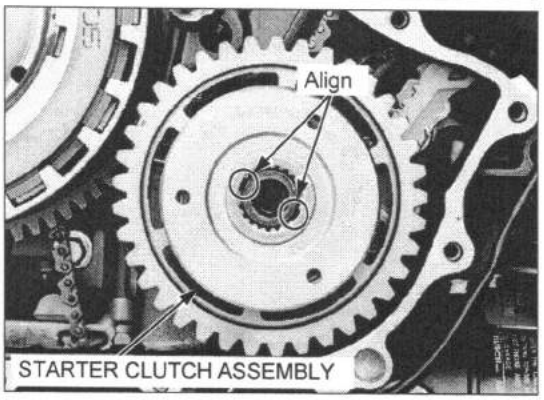


INSTALLATION

Install the thrust washer to the crankshaft.



Install the starter clutch assembly to the crankshaft while aligning the wide teeth of the crankshaft with the starter clutch assembly.



Apply oil to the starter clutch mounting bolt threads and seating surface.

Install the washer and starter clutch mounting bolt.

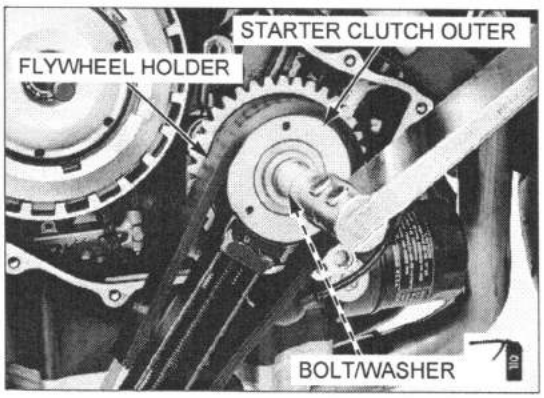
Hold the starter clutch outer with the special tool.

TOOL:

Flywheel holder	**07725-0040001**

Tighten the starter clutch mounting bolt to the specified torque.

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)



GEARSHIFT LINKAGE

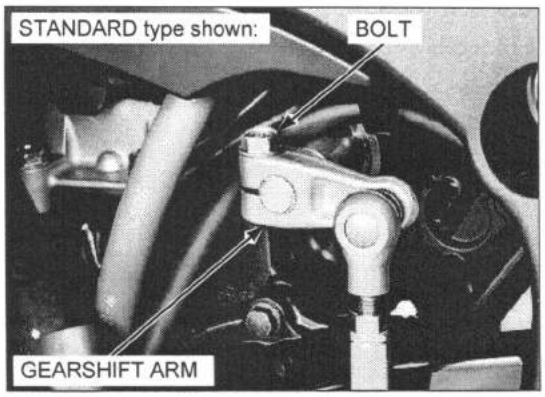
REMOVAL

Remove the following:

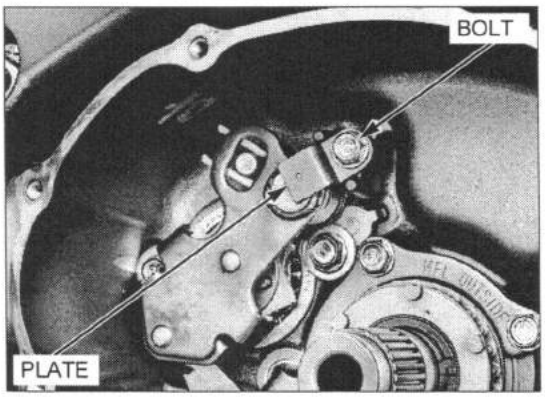
- Right crankcase cover (page 10-5)
- Clutch (page 10-7)

ABS/SP (AC) type: Remove the left rear under cover (page 3-24).

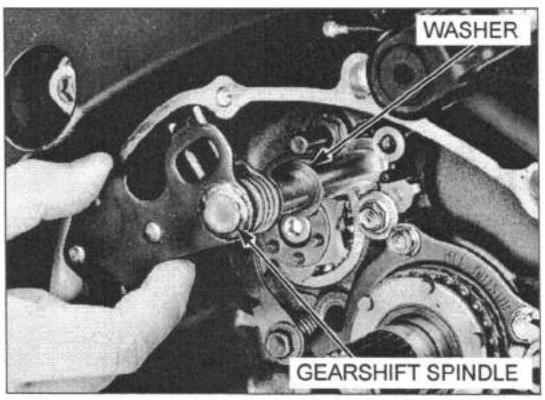
STANDARD/Except SP (AC) type: Remove the bolt and disconnect the gearshift arm from the gearshift spindle.



Remove the bolt and setting plate.



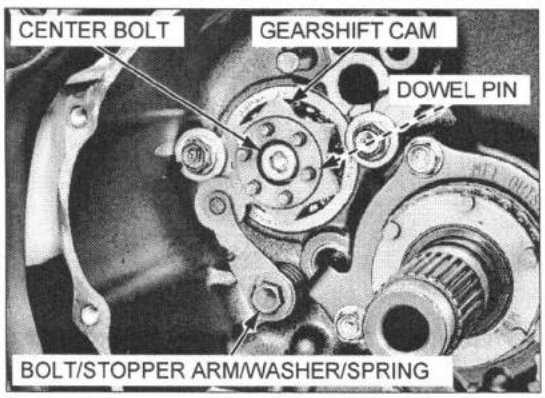
Pull the gearshift spindle and thrust washer out of the crankcase.



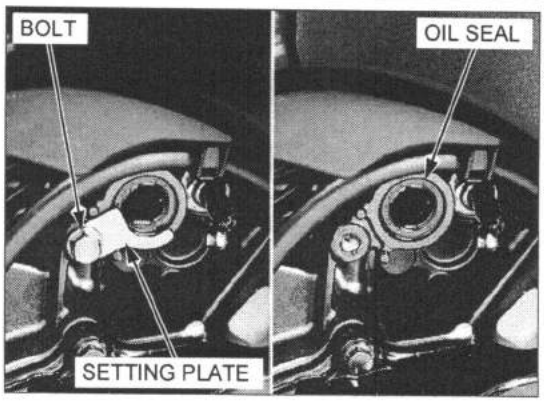
Be careful not to drop parts into the oil pan.

Remove the following:

- Stopper arm pivot bolt
- Stopper arm
- Washer
- Return spring
- Shift drum center bolt
- Gearshift cam
- Dowel pin

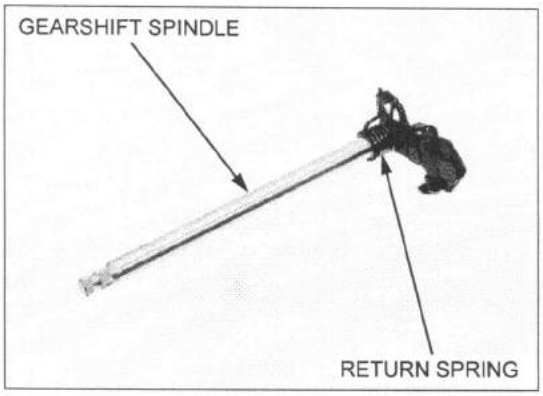


Remove the bolt, setting plate, and oil seal.



INSPECTION

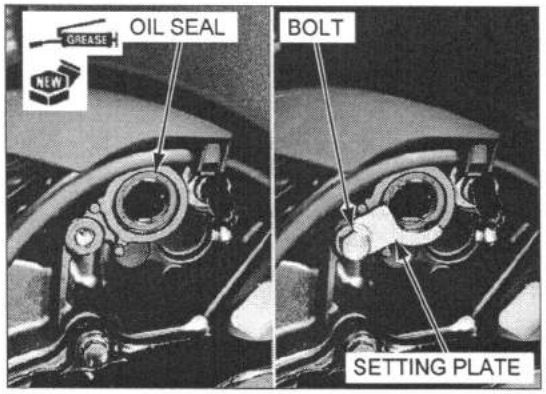
Check the gearshift spindle for wear, damage, or bending.
Check the return spring for fatigue or damage.



INSTALLATION

Apply grease to a new oil seal lips, then install it into the crankcase securely.

Install the setting plate and tighten the bolt securely.



Apply locking agent to the shift drum stopper arm pivot bolt threads (page 1-23).

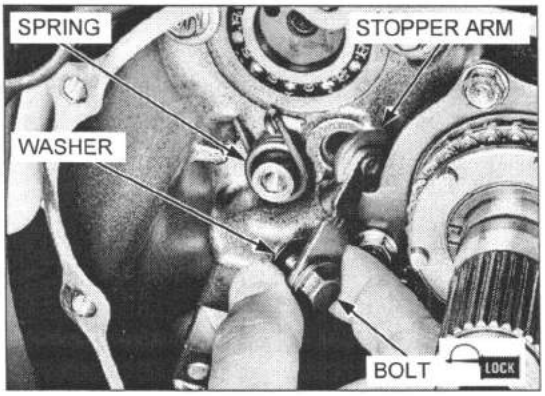
Be careful not to drop parts into the oil pan.

Install the following:

- Return spring
- Washer
- Stopper arm
- Stopper arm pivot bolt

Tighten the stopper arm pivot bolt to the specified torque.

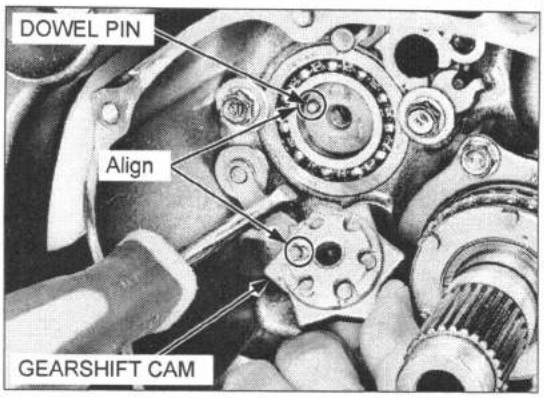
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the dowel pin onto the shift drum.

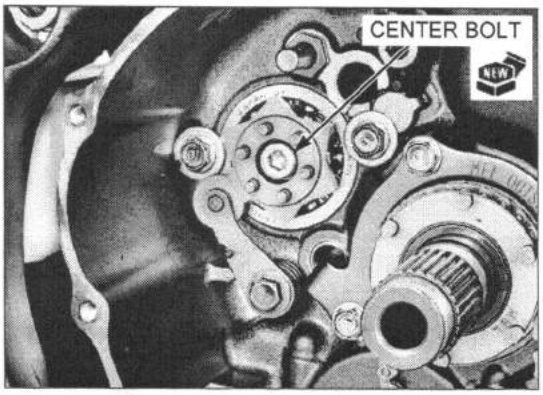
Align the dowel pin on the shift drum with the wide groove on the gearshift cam.

Install the gearshift cam while holding the stopper arm using a screwdriver as shown.

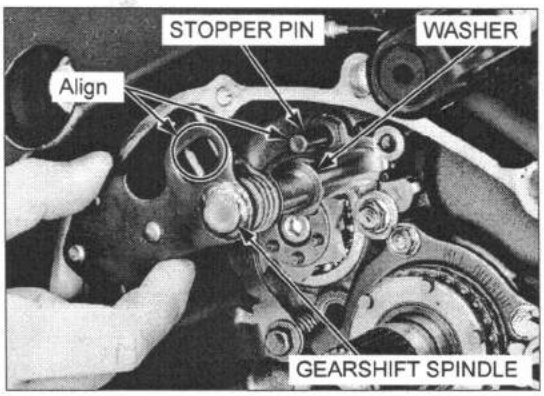


Tighten a new shift drum center bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

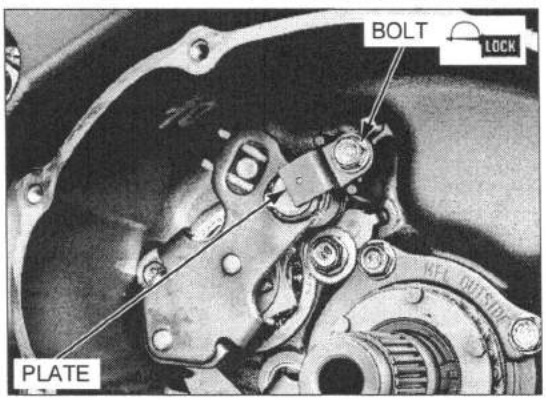


Install the thrust washer and gearshift spindle into the crankcase while aligning the spring ends with the stopper pin.

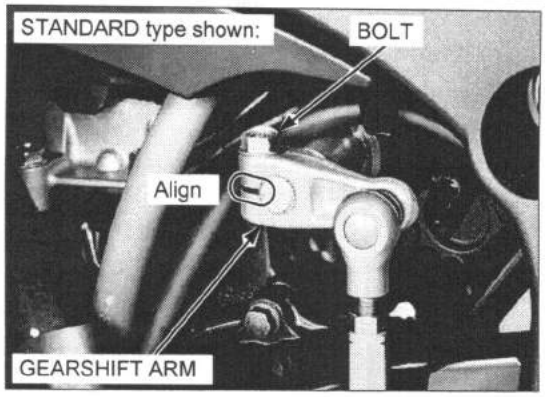


Apply locking agent to the setting plate bolt threads (page 1-23).
Install the setting plate and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



STANDARD/Except SP (AC) type: Install the gearshift arm to the gearshift spindle, aligning the arm slit with the punch mark on the gearshift spindle.
Install and tighten the pinch bolt.



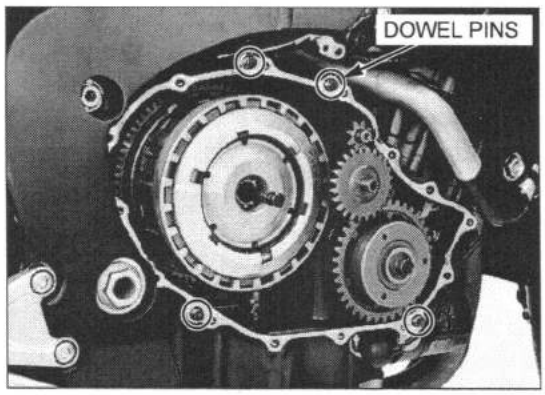
ABS/SP (AC) type: Install the left rear under cover (page 3-24).

Install the following:

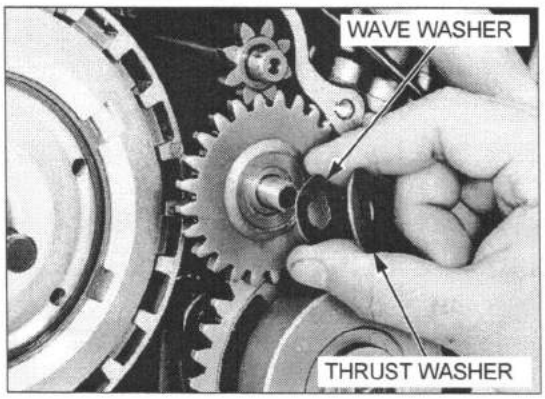
- Clutch (page 10-20)
- Right crankcase cover (page 10-34)

RIGHT CRANKCASE COVER INSTALLATION

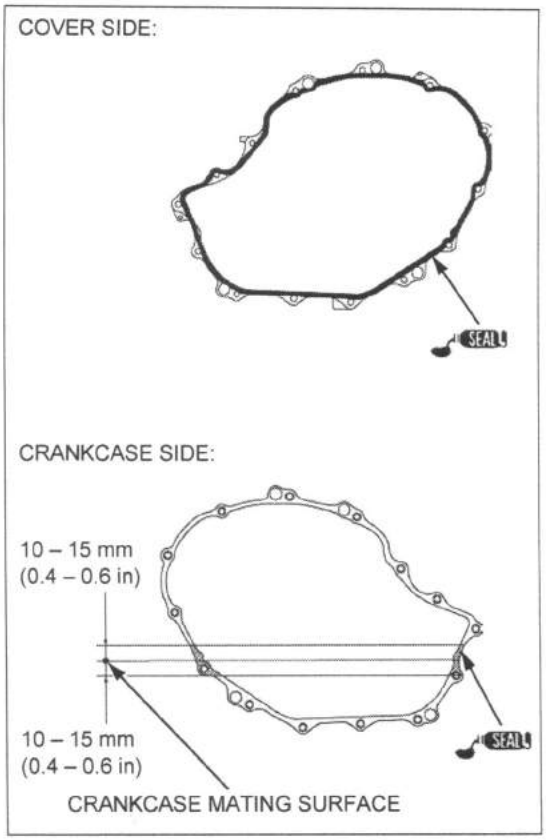
Install the four dowel pins.



Install the wave washer and thrust washer onto the starter idle gear.



Apply sealant (TB 1207B or equivalent) to the mating surface of the right crankcase cover as shown.



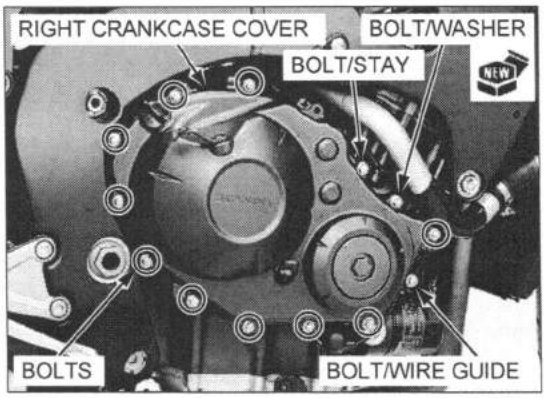
Be careful not to drop the clutch lifter lever return spring into the oil pan.

Install the right crankcase cover while turning the lifter lever clockwise to engage the lifter lever spindle groove with the lifter piece flange.

Correctly route the EOP switch wire (page 1-25).

Install the stay, wire guide, new sealing washer, and right crankcase cover bolts.

Tighten the right crankcase cover bolts crisscross pattern in two or three steps.



Connect the clutch cable to the clutch lifter lever.

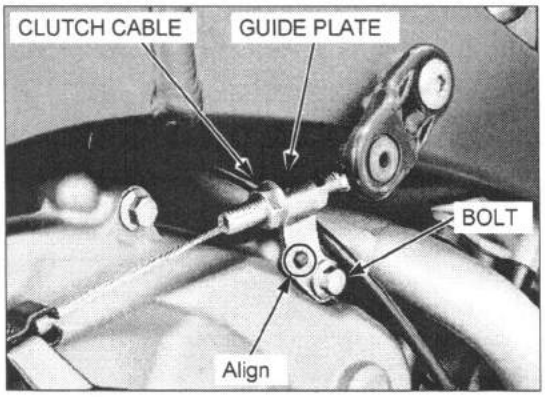
Install the clutch cable guide plate by aligning its hole with the right crankcase cover boss and tighten the bolt securely.

Install the oil level dipstick (page 4-20).

Check that there are no oil leaks.

Install the right middle cowl (page 3-18).

Adjust the clutch lever freeplay (page 4-40).



11. ALTERNATOR

COMPONENT LOCATION 11-2

SERVICE INFORMATION 11-3

ALTERNATOR COVER REMOVAL (STANDARD/SP type) 11-4

ALTERNATOR COVER REMOVAL (ABS type) 11-5

STATOR 11-7

FLYWHEEL 11-8

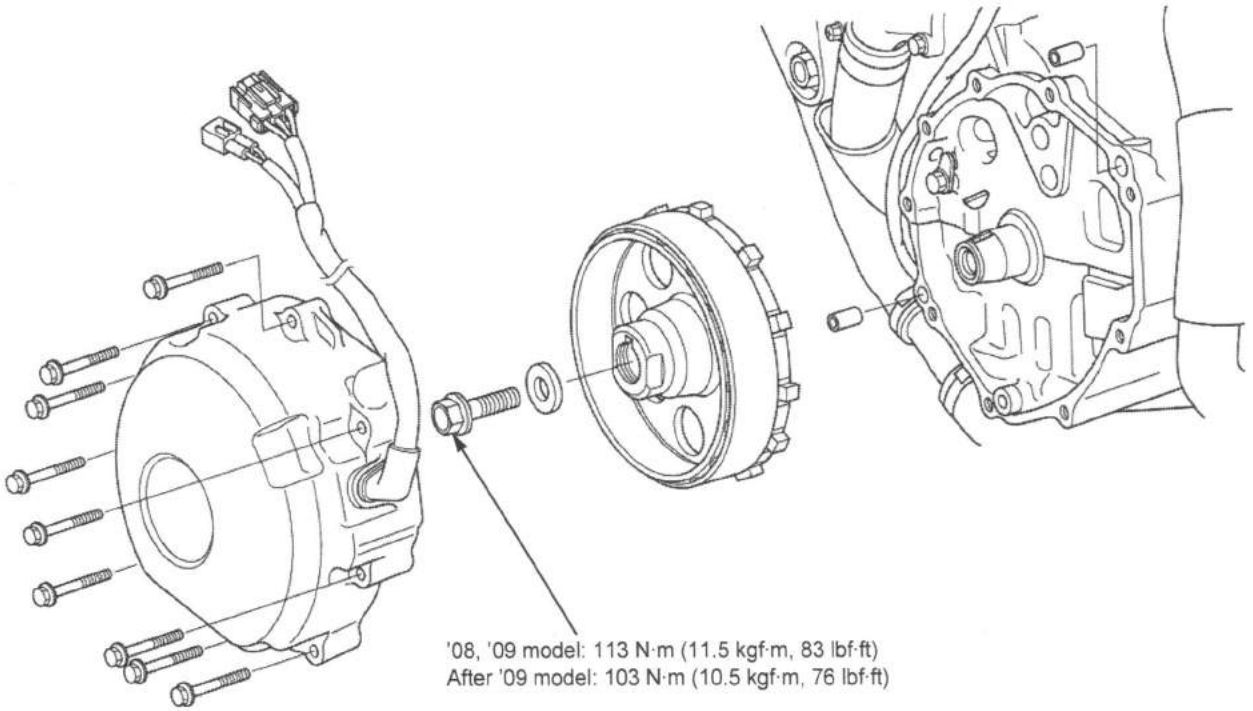
ALTERNATOR COVER INSTALLATION (STANDARD/SP type) 11-10

ALTERNATOR COVER INSTALLATION (ABS type) 11-12

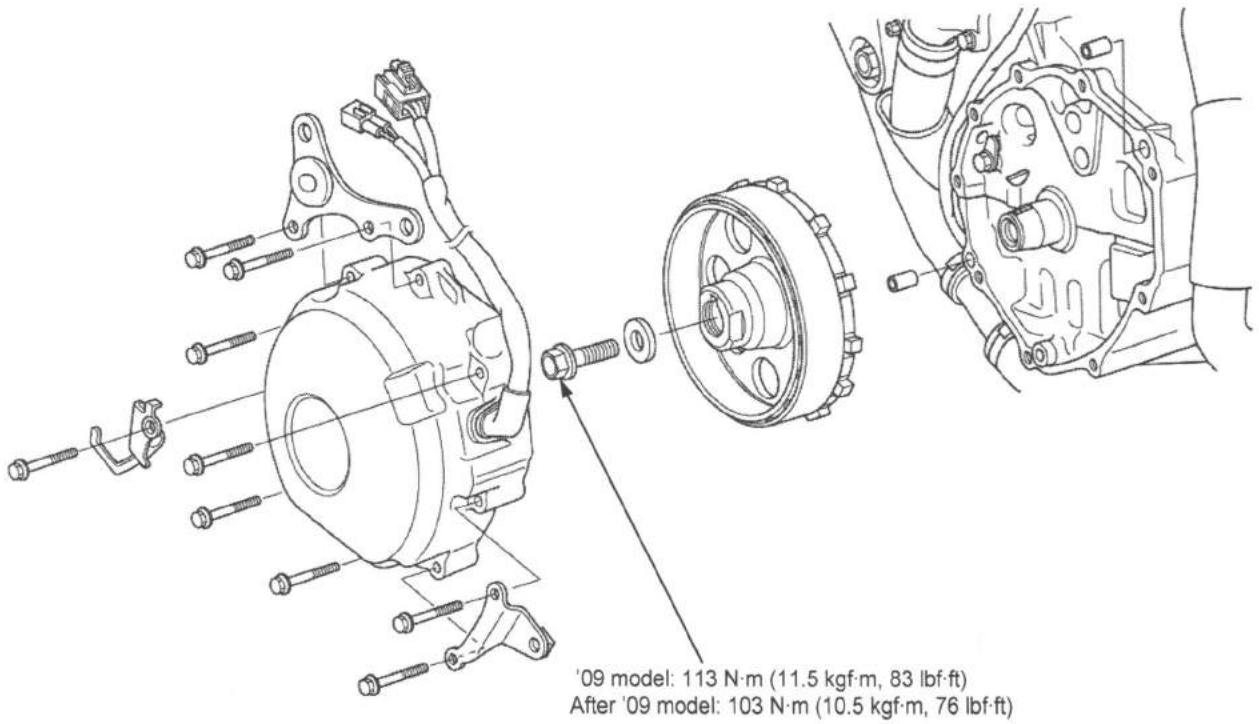
COMPONENT LOCATION

STANDARD/SP type:

Except SP (AC) type shown:



ABS type:



SERVICE INFORMATION

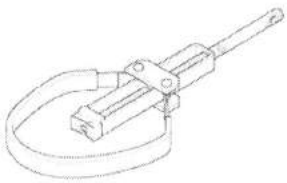
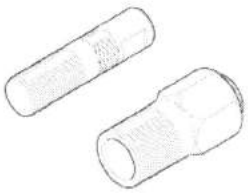
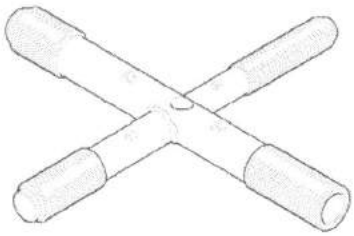
GENERAL

- This section covers service of the stator and flywheel. All service can be done with the engine installed in the frame.
- For stator inspection (page 18-9).

TORQUE VALUES

Stator mounting bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	
Flywheel bolt	('08, '09 model)	113 N·m (11.5 kgf·m, 83 lbf·ft)	Apply oil to the threads and seating surface.
	(After '09 model)	103 N·m (10.5 kgf·m, 76 lbf·ft)	Apply oil to the threads and seating surface.

TOOLS

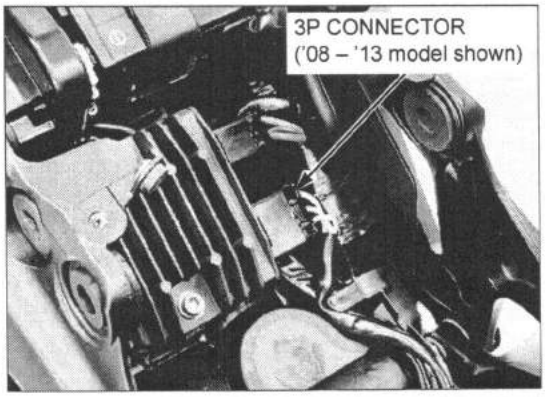
Flywheel holder 07725-0040001	Outside screw puller 07933-4250000	Rotor puller 07733-0020001
		 or 07933-3950000 (U.S.A. only)

ALTERNATOR COVER REMOVAL (STANDARD/SP type)

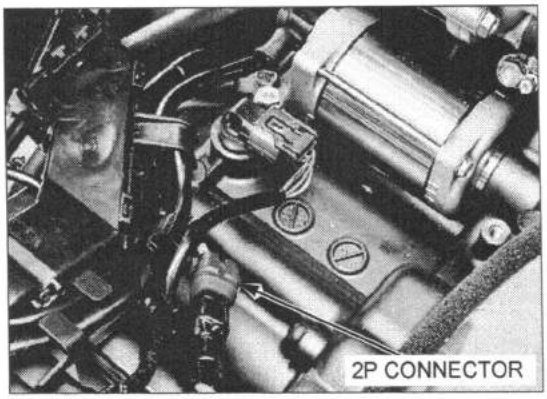
Remove the following:

- Fuel tank (page 6-60)
- Left middle cowl (page 3-18)
- Drive sprocket cover (page 4-33)

Disconnect the alternator 3P (Black) connector.



Disconnect the CKP sensor 2P (Red) connector.

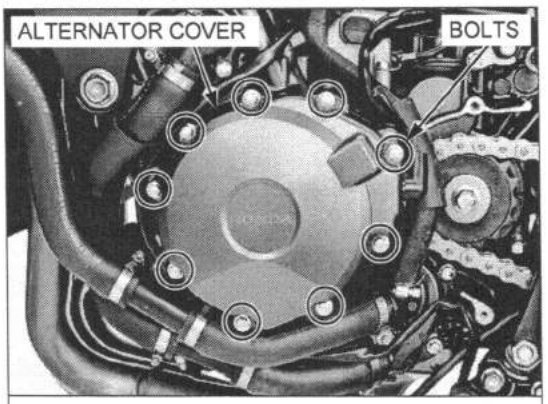


The alternator cover (stator) is magnetically attracted to the flywheel, be careful during removal.

Set an oil pan under the engine as oil will run out when the alternator cover is removed.

After installation, add the recommended oil to the specified level.

Remove the bolts and alternator cover.

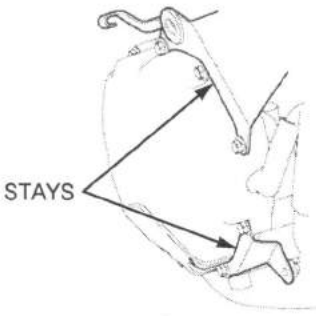


SP (AC) type:

Remove the EVAP canister (page 6-98).

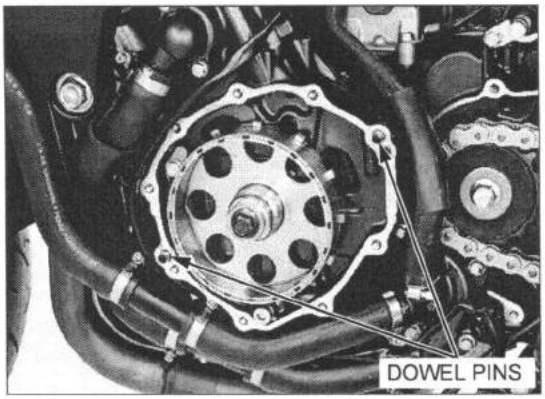
Remove the bolts, stays, and alternator cover.

SP (AC) type:



Remove the dowel pins.

Clean off any sealant from the alternator cover mating surfaces.

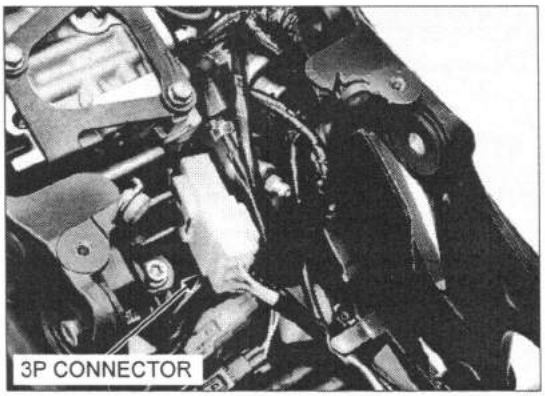


ALTERNATOR COVER REMOVAL (ABS type)

Remove the following:

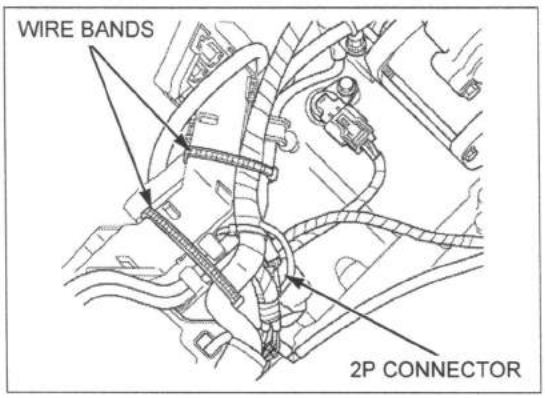
- Fuel tank (page 6-60)
- Left middle cowl (page 3-18)
- Drive sprocket cover (page 4-33)

Disconnect the alternator 3P (Natural) connector.

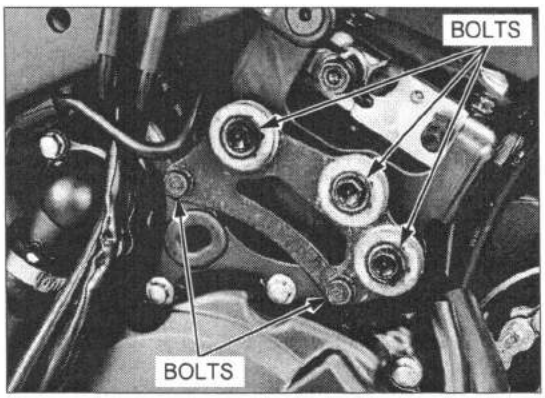


Remove the wire bands.

Disconnect the CKP sensor 2P (Red) connector.

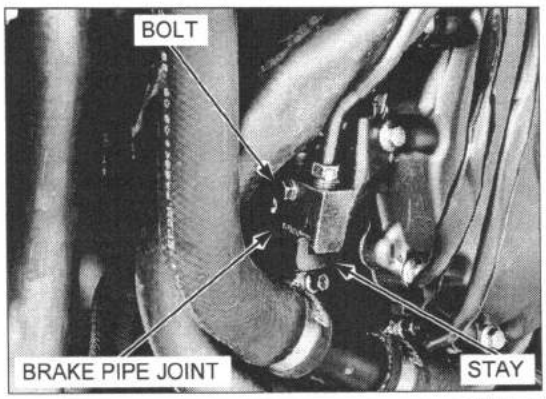


Remove the bolts and ABS valve unit stay B.



Remove the bolt and brake pipe joint from the stay.

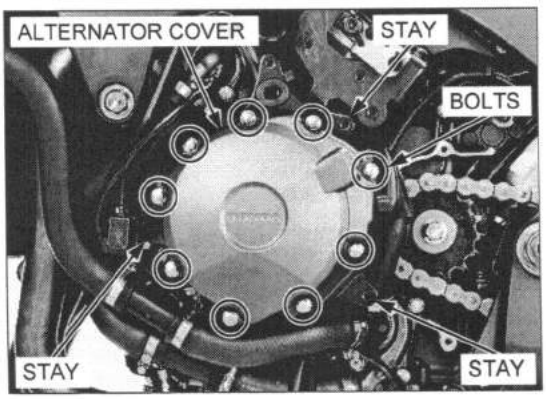
- Do not loosen the brake pipe joint nut.



The alternator cover (stator) is magnetically attracted to the flywheel, be careful during removal.

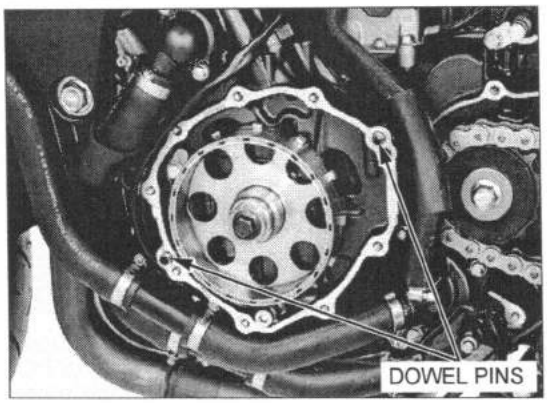
Remove the bolts, stays, and alternator cover.

- Engine oil will run out when the alternator cover is removed. Set a oil pan under the engine and add the recommended oil to the specified level after installation.



Remove the dowel pins.

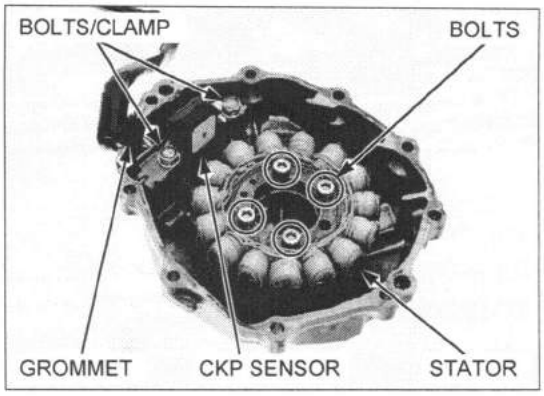
Clean off any sealant from the alternator cover mating surfaces.



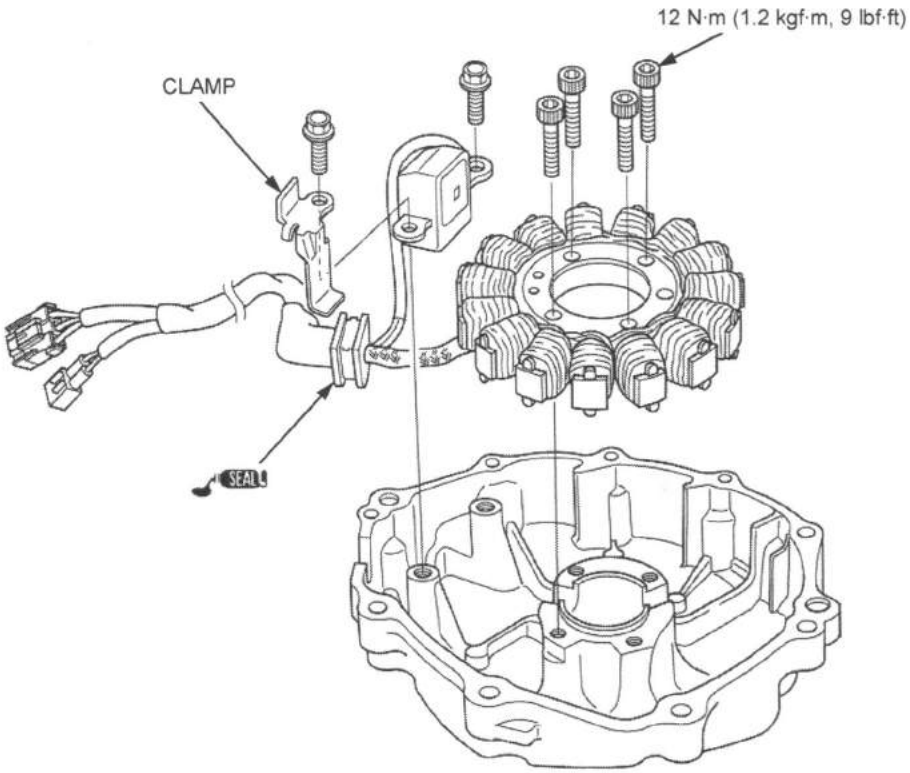
STATOR

REMOVAL

Remove the grommet, bolts, wire clamp, and CKP sensor.
Remove the bolts and stator.



INSTALLATION



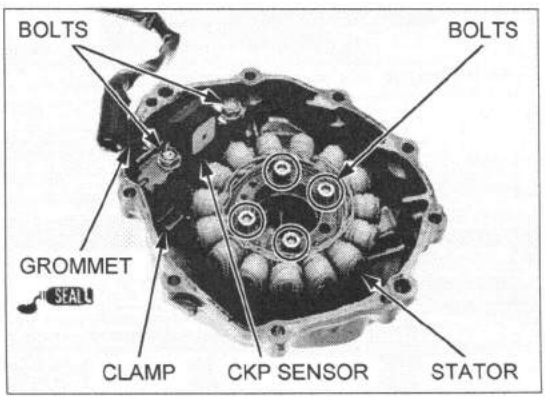
Install the stator to the alternator cover.

Tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the CKP sensor, wire clamp, and tighten the bolts securely.

Apply sealant to the wire grommet, then install it into the alternator cover groove securely.



FLYWHEEL

REMOVAL

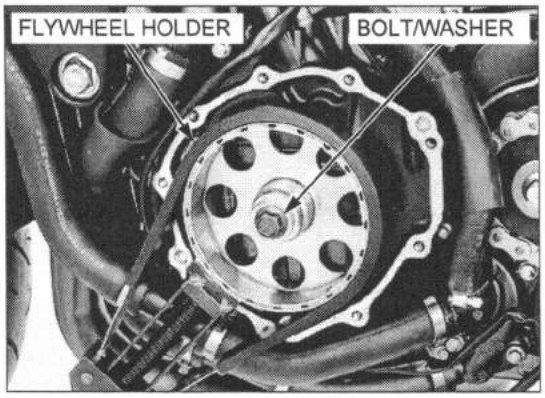
Remove the alternator cover.

- STANDARD/SP type (page 11-4)
- ABS type (page 11-5)

Hold the flywheel using the special tool and remove the flywheel bolt.

TOOL:
Flywheel holder **07725-0040001**

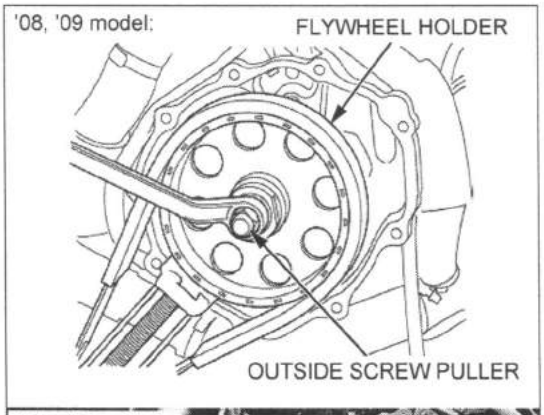
Remove the washer.

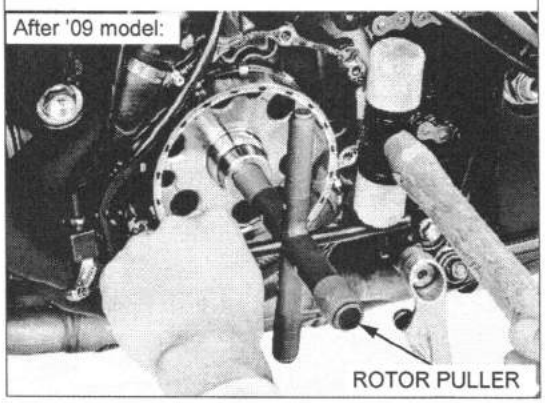


Remove the flywheel using the special tool.

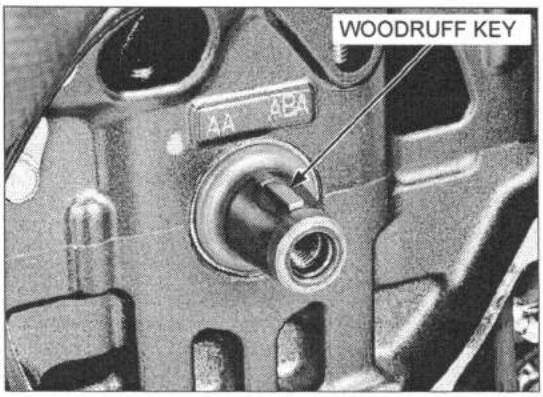
'08, '09 model:
TOOLS:
Flywheel holder **07725-0040001**
Outside screw puller **07933-4250000**
(Use only M18 x 1.5 puller)

After '09 model:
TOOLS:
Rotor puller **07733-0020001 or 07933-3950000 (U.S.A. only)**





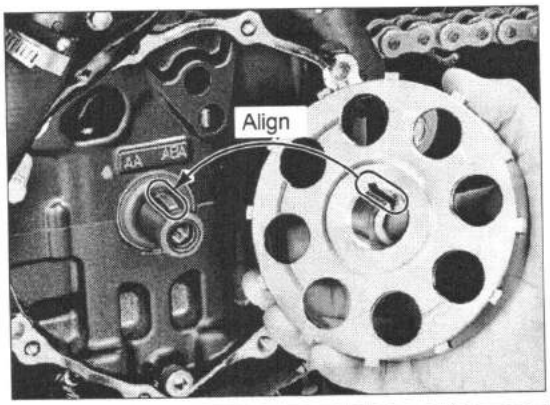
Remove the woodruff key from the crankshaft.



INSTALLATION

Clean any oil from the tapered area of the crankshaft and flywheel thoroughly.

Install the flywheel to the crankshaft by aligning the flywheel groove with the woodruff key.



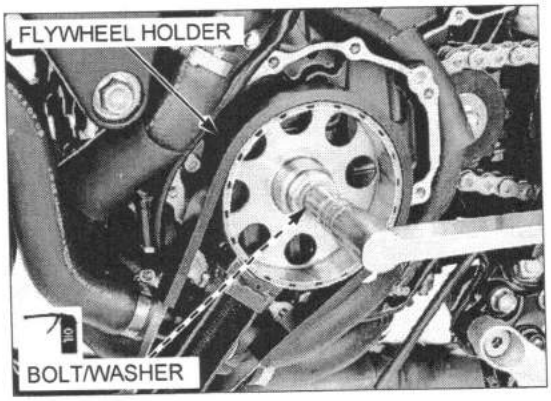
Apply oil to the flywheel bolt threads and seating surface.
Install the washer and flywheel bolt.

Hold the flywheel using the special tool and tighten the bolt to the specified torque.

TOOL:
Flywheel holder **07725-0040001**

'08, '09 model: **TORQUE: 113 N·m (11.5 kgf·m, 83 lbf·ft)**

After '09 model: **TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)**

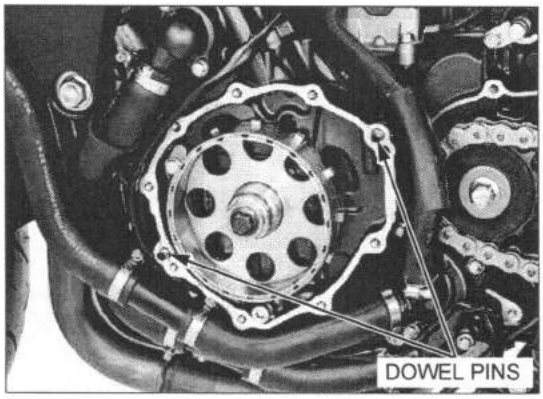


Install the alternator cover.

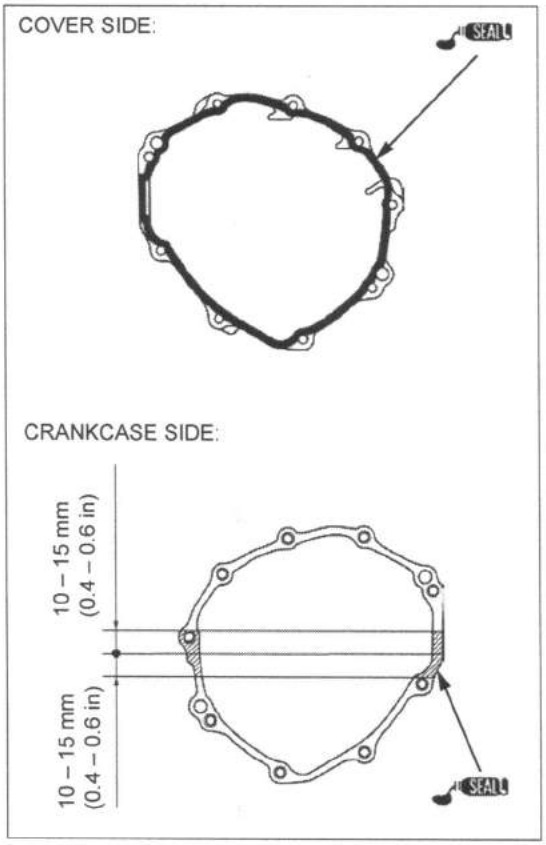
- STANDARD/SP type (page 11-10)
- ABS type (page 11-12)

ALTERNATOR COVER INSTALLATION (STANDARD/SP type)

Install the dowel pins.

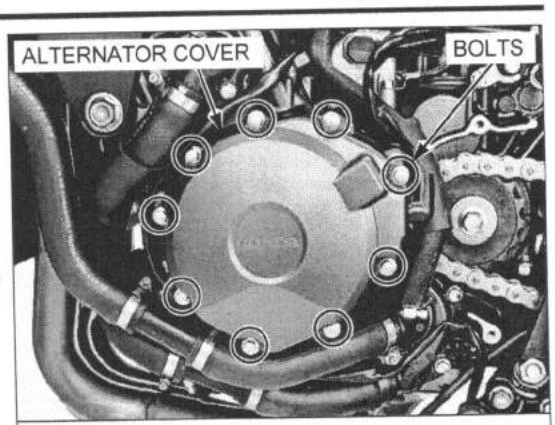


Apply sealant (TB 1207B or equivalent) to the mating surface of the alternator cover.



The alternator cover (stator) is magnetically attracted to the flywheel, be careful during installation.

Install the alternator cover and bolts.



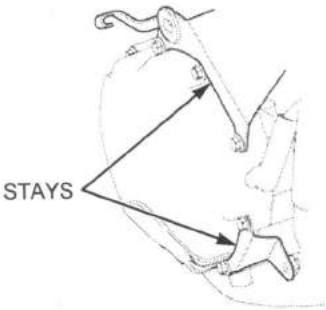
SP (AC) type:

Install the alternator cover, stays, and bolt.

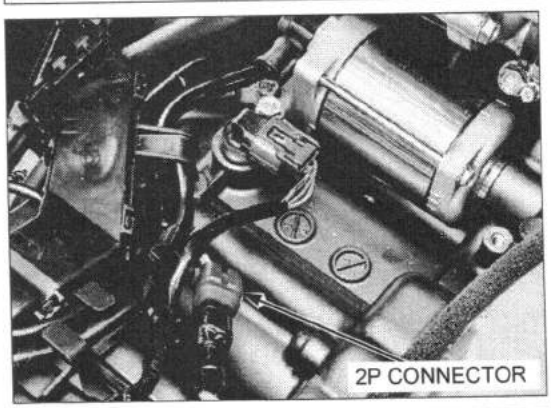
Install the EVAP canister (page 6-98).

Tighten the bolts in a crisscross pattern in two or three steps securely.

SP (AC) type:



Connect the CKP sensor 2P (Red) connector.



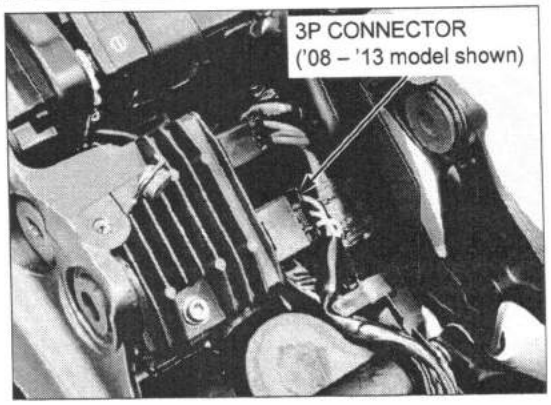
Connect the alternator 3P (Black) connector.

Install the following:

- Drive sprocket cover (page 4-34)
- Left middle cowl (page 3-18)
- Fuel tank (page 6-61)

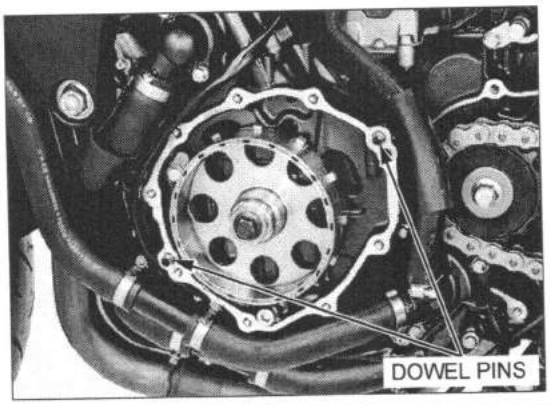
After installation, add the recommended engine oil to the specified level.

Check the engine oil level (page 4-20).

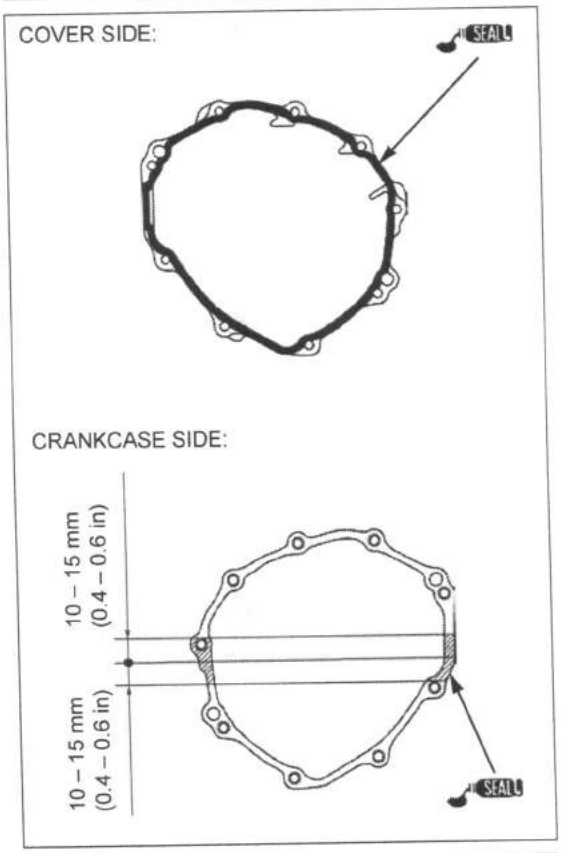


ALTERNATOR COVER INSTALLATION (ABS type)

Install the dowel pins.



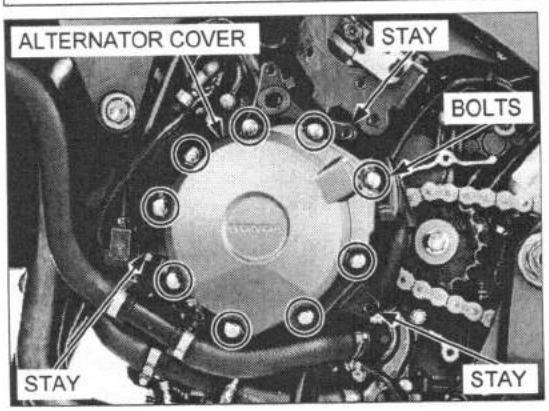
Apply sealant (TB 1207B or equivalent) to the mating surface of the alternator cover.



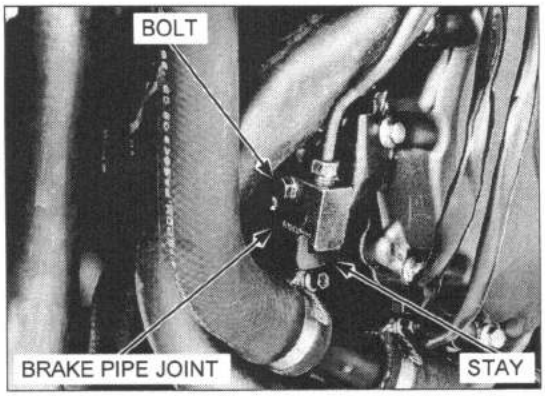
The alternator cover (stator) is magnetically attracted to the flywheel, be careful during installation.

Install the alternator cover, stays, and bolts.

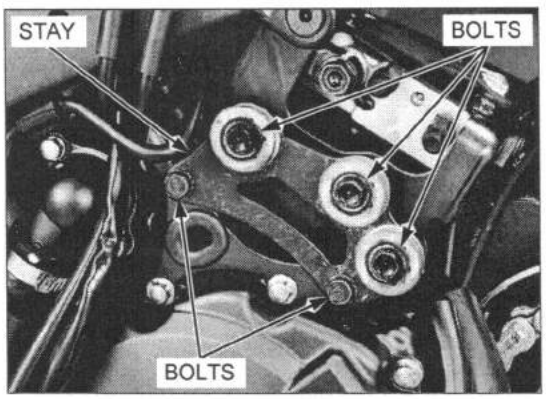
Tighten the bolts in a crisscross pattern in two or three steps securely.



Install the brake pipe joint to the stay and tighten the bolts securely.

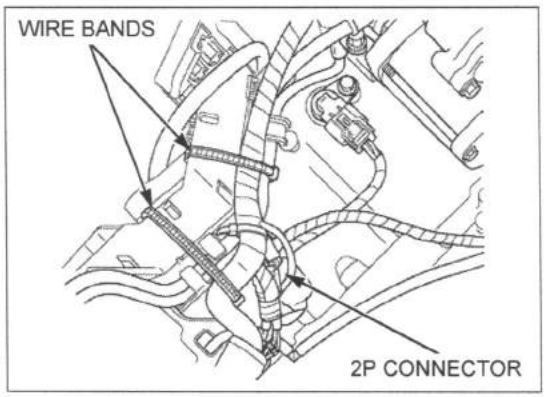


Install the ABS valve unit stay B and tighten the bolts securely.



Connect the CKP sensor 2P (Red) connector.

Install the wire bands securely.



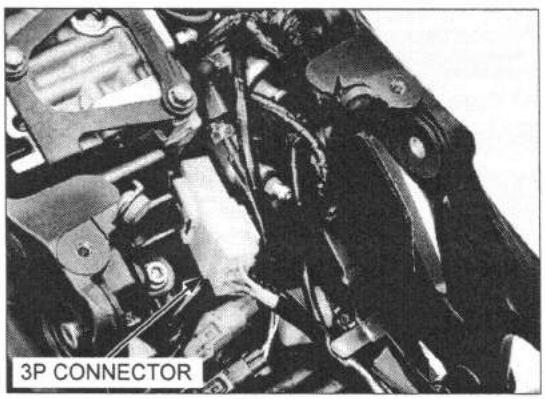
Connect the alternator 3P (Natural) connector.

Install the following:

- Drive sprocket cover (page 4-34)
- Left middle cowl (page 3-18)
- Fuel tank (page 6-61)

After installation, add the recommended engine oil to the specified level.

Check the engine oil level (page 4-20).



12. CRANKCASE/TRANSMISSION/BALANCER

COMPONENT LOCATION 12-2

SERVICE INFORMATION 12-3

TROUBLESHOOTING 12-4

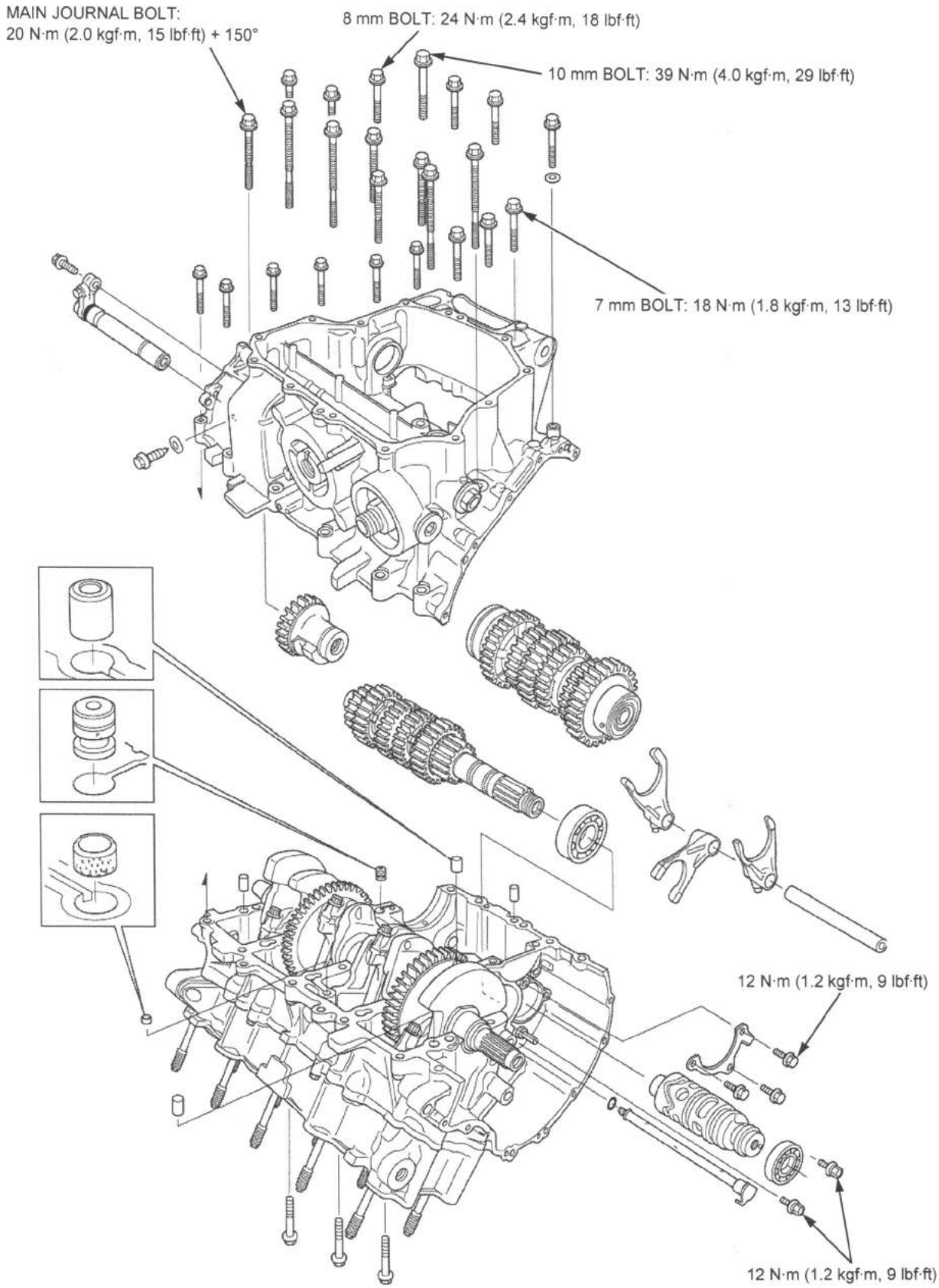
CRANKCASE SEPARATION 12-5

SHIFT FORK/SHIFT DRUM/ TRANSMISSION 12-6

BALANCER 12-16

CRANKCASE ASSEMBLY 12-22

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
  - Transmission
  - Crankshaft (page 13-5)
  - Piston (page 13-14)
  - Balancer (page 12-16)
  - Cylinder (page 13-14)
- The following components must be removed before separating the crankcase:
  - Engine
    –STANDARD/SP type (page 8-5)
    –ABS type (page 8-9)
  - Clutch (page 10-7)/gearshift linkage (page 10-31)
  - Starter clutch (page 10-26)
  - Flywheel (page 11-8)
  - Cylinder head (page 9-14)
  - Oil pump (page 5-5)/oil filter (page 4-21)/oil cooler (page 5-13)
  - Starter motor (page 20-10)
  - Water pump (page 7-25)
  - EOP switch (page 21-23)
  - EVAP purge control solenoid valve ((AC) type only) (page 6-96)
  - VS sensor (page 21-17)
  - Neutral switch ('08 – '11 model) (page 21-28)
  - Gear position switch (After '11 model) (page 21-29)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with a plastigauge. Incorrect oil clearance can cause major engine damage.

SPECIFICATIONS

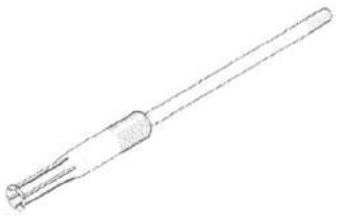
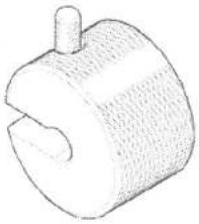
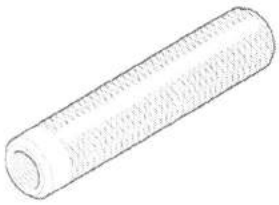
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Shift fork	I.D.		14.000 – 14.018 (0.5512 – 0.5519)	14.03 (0.552)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
Shift fork shaft O.D.			13.957 – 13.975 (0.5495 – 0.5502)	13.95 (0.549)
Transmission	Gear I.D.	M5, M6	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
		C1	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C2, C3, C4	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Gear busing O.D.	M5	30.955 – 30.980 (1.2187 – 1.2197)	30.935 (1.2179)
		M6	30.950 – 30.975 (1.2185 – 1.2195)	30.930 (1.2177)
		C2	32.955 – 32.980 (1.2974 – 1.2984)	32.935 (1.2967)
		C3, C4	32.950 – 32.975 (1.2972 – 1.2982)	32.930 (1.2965)
	Gear-to-bushing clearance	M5, C2	0.020 – 0.070 (0.0008 – 0.0028)	0.10 (0.004)
		M6, C3, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Gear bushing I.D.	M5	27.985 – 28.006 (1.1018 – 1.1026)	28.016 (1.1030)
		C2	29.985 – 30.006 (1.1530 – 1.1813)	30.021 (1.1819)
	Mainshaft O.D.	at M5	27.967 – 27.980 (1.1011 – 1.1016)	27.957 (1.1007)
	Countershaft O.D.	at C2	29.967 – 29.980 (1.1798 – 1.1803)	29.960 (1.1795)
	Bushing to shaft clearance	M5, C2	0.005 – 0.039 (0.0002 – 0.0015)	0.06 (0.002)

TORQUE VALUES

Mainshaft bearing set plate bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Shift drum bearing set bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Crankcase	(7 mm bolt)	18 N·m (1.8 kgf·m, 13 lbf·ft)	
	(8 mm bolt)	24 N·m (2.4 kgf·m, 18 lbf·ft)	
	(10 mm bolt)	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Main journal bolt		20 N·m (2.0 kgf·m, 15 lbf·ft) + 150°	See page 12-23 Replace with a new one.

TOOLS

Bearing remover set, 20 mm 07936-3710600 	Remover weight 07741-0010201  or 07936-371020A (U.S.A. only)	Remover handle 07936-3710100 
Driver 07949-3710001 	Attachment, 42 x 47 mm 07746-0010300 	Pilot, 20 mm 07746-0040500 

TROUBLESHOOTING

Hard to shift
- Improper clutch operation
- Incorrect engine oil weight
- Bent shift fork
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum groove
- Bent gearshift spindle (page 10-32)

Transmission jumps out of gear
- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Broken shift drum stopper arm spring
- Worn or bent shift forks
- Broken gearshift spindle return spring (page 10-32)

Excessive engine noise
- Worn or damaged transmission gear
- Worn or damaged transmission bearings
- Worn or damaged main journal bearings
- Worn or damaged crankpin bearings
- Worn or damaged connecting rod small end
- Worn or damaged balancer shaft bearings
- Improper balancer installation

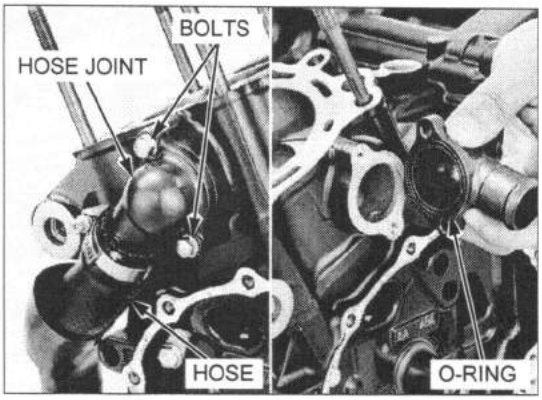
Engine vibration
- Excessive crankshaft runout
- Improper balancer timing

CRANKCASE SEPARATION

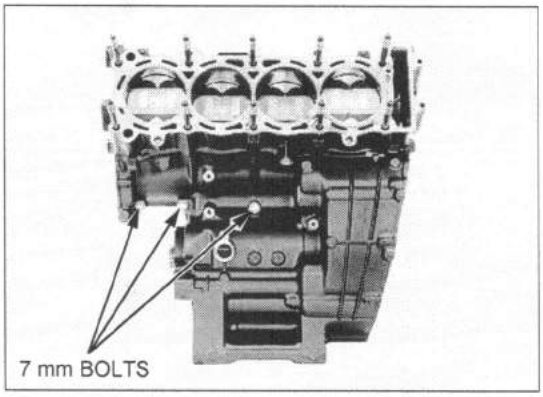
For Service Information for removal of necessary parts before separating the crankcase (page 12-3).

Loosen the hose clamp screw and disconnect the water hose.

Remove the bolts, water hose joint, and O-ring.

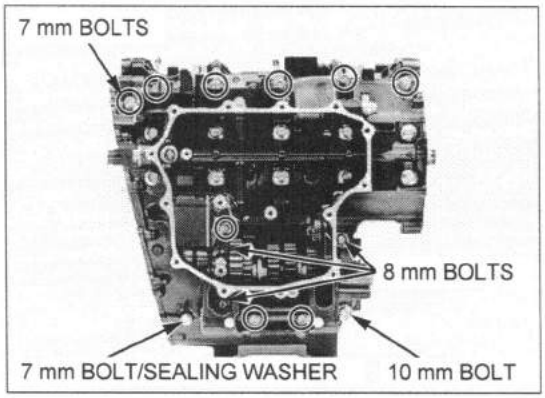


Remove the 7 mm bolts.



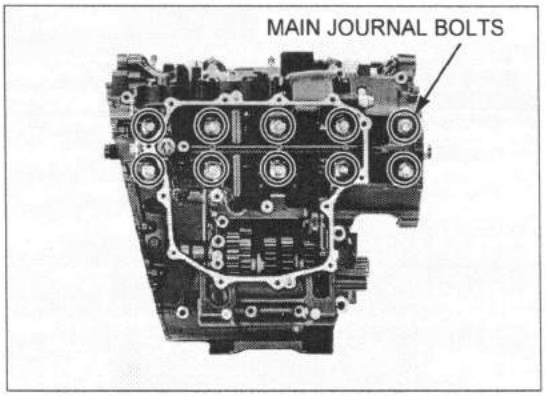
Be careful not to bend the stud bolts.

Place the engine upside down.
Loosen the bolts in a crisscross pattern in two or three steps.
Remove the 7 mm bolts, sealing washer, 8 mm bolts, and 10 mm bolt.



Loosen the main journal bolts in a crisscross pattern in two or three steps.
Remove the bolts.

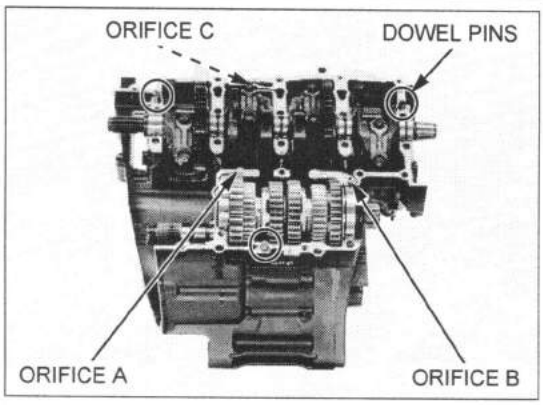
Separate the lower crankcase from the upper crankcase.



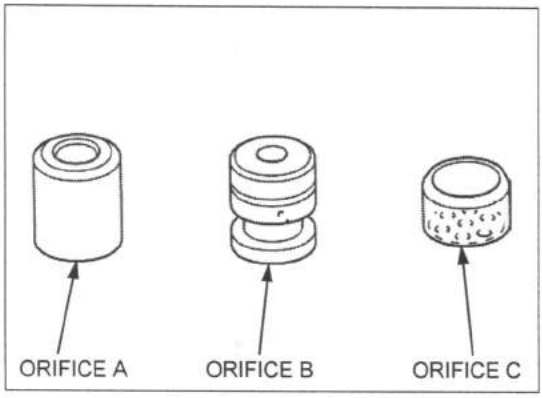
Remove the dowel pins and oil orifices.

Clean any sealant off from the crankcase mating surface.

Clean the oil orifices in solvent thoroughly.



Check the oil orifices for clogs and replace them if necessary.



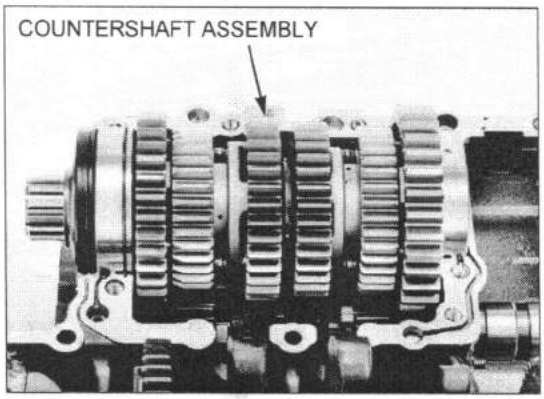
SHIFT FORK/SHIFT DRUM/ TRANSMISSION

REMOVAL/DISASSEMBLY

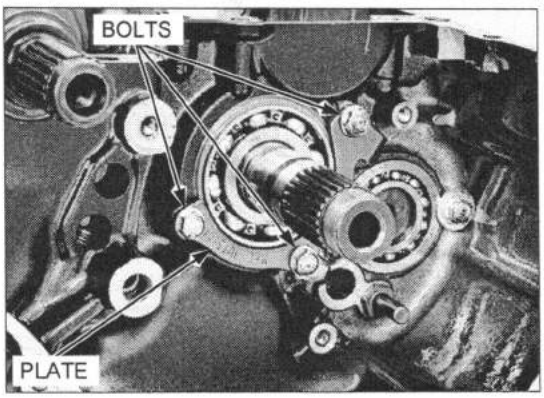
Separate the crankcase halves (page 12-5).

Remove the countershaft assembly.

Disassemble the countershaft assembly.
Clean all disassembled parts in solvent thoroughly.

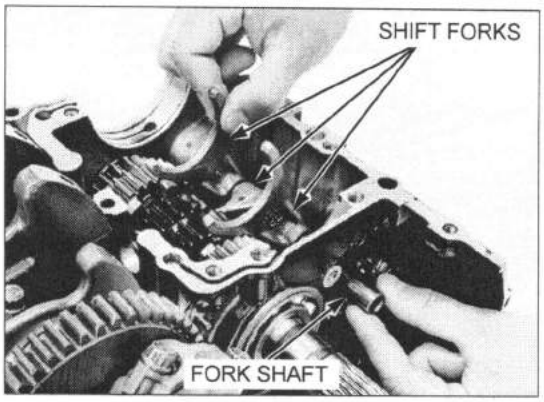


Remove the mainshaft bearing set plate bolts and mainshaft bearing set plate.

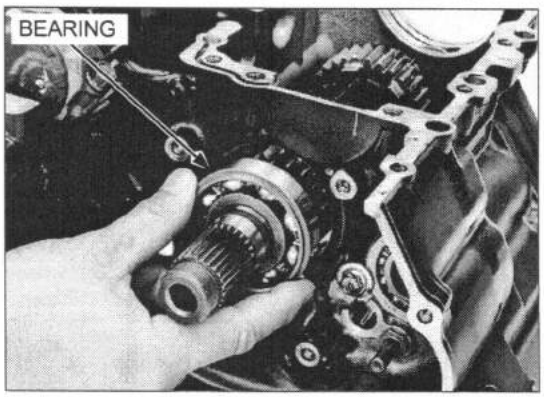


Remove the fork shaft and shift forks.

- Mark all shift forks direction to ensure correct reassembly in their original locations.



Remove the mainshaft bearing from the crankcase.



Remove the mainshaft assembly.

Disassemble the mainshaft assembly.

The washer on the end of the mainshaft has a flat inside edge that fits inside the groove in the mainshaft.

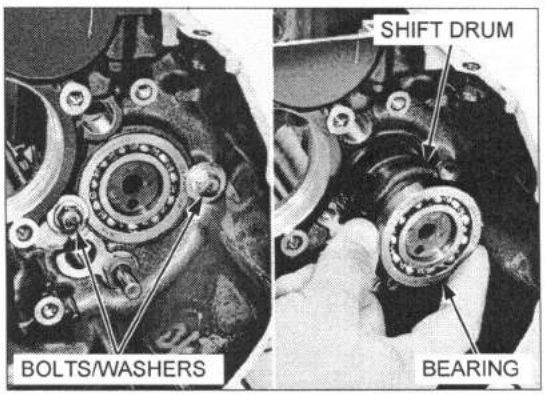
The washer must be pried off, however, care must be taken not to bend or damage the washer.

Clean all disassembled parts in solvent thoroughly.



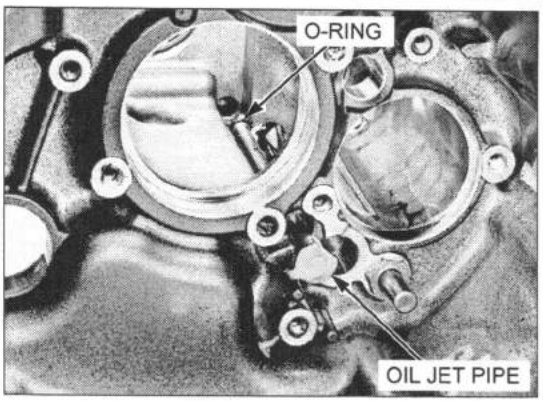
Remove the bolts and washers.

Remove the bearing and shift drum.



Remove the oil jet pipe and O-ring.

Clean the oil jet pipe in solvent thoroughly.



SHIFT DRUM/SHIFT FORK INSPECTION

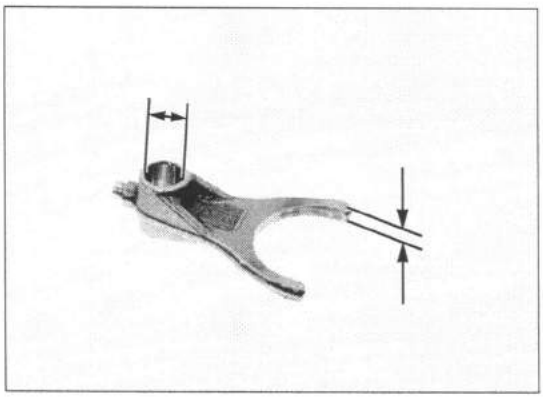
Check the shift fork guide pin for abnormal wear or damage.

Measure the shift fork I.D.

SERVICE LIMIT: 14.03 mm (0.552 in)

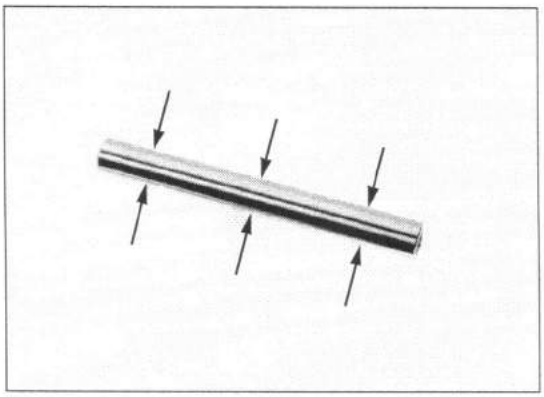
Measure the shift fork claw thickness.

SERVICE LIMIT: 5.9 mm (0.23 in)



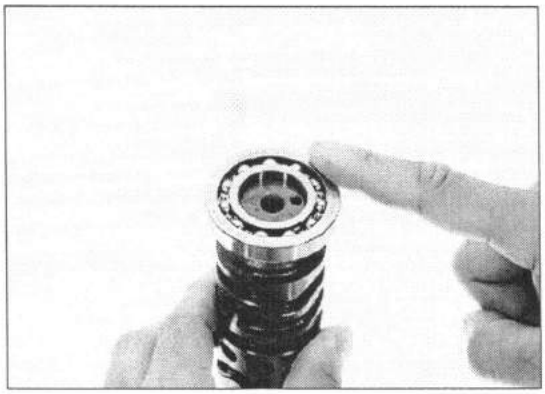
Measure the shift fork shaft O.D.

SERVICE LIMIT: 13.95 mm (0.549 in)



Inspect the shift drum guide grooves for abnormal wear or damage.

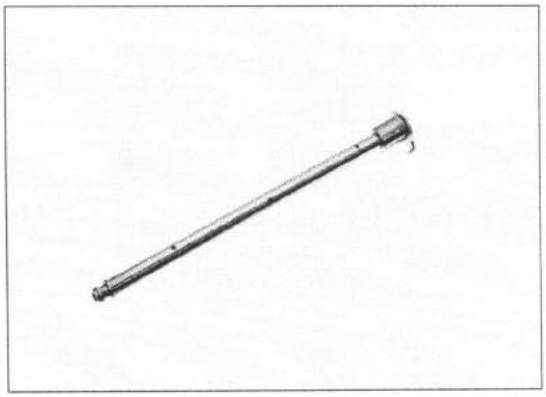
Turn the outer race of the shift drum bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the inner race of the bearing fits tightly on the shift drum.
Replace the bearing if the outer race does not turn smoothly, quietly, or if the inner race fits loosely on the shift drum.



OIL JET PIPE INSPECTION

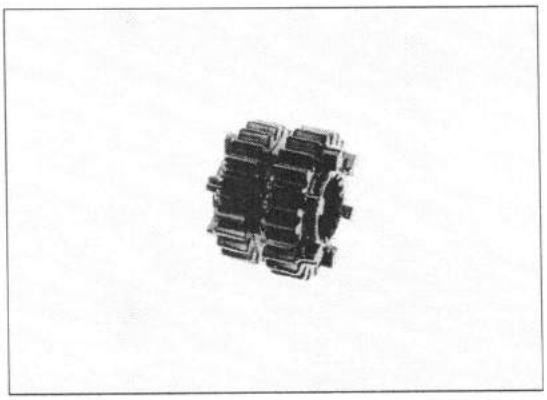
Check the oil jet pipe for clogs, bending, or damage.

Replace it if necessary.



TRANSMISSION INSPECTION

Check the shifter groove and gear dogs of each gear for abnormal wear or damage.



Check the dog holes and teeth for abnormal wear or damage.

Measure the I.D. of each gear.

SERVICE LIMITS:

M5, M6:	**31.04 mm (1.222 in)**
C1:	**28.04 mm (1.104 in)**
C2, C3, C4:	**33.04 mm (1.301 in)**

Measure the O.D. of each gear bushing.

SERVICE LIMITS:

M5:	**30.935 mm (1.2179 in)**
M6:	**30.930 mm (1.2177 in)**
C2:	**32.935 mm (1.2967 in)**
C3, C4:	**32.930 mm (1.2965 in)**

Measure the I.D. of each gear bushing.

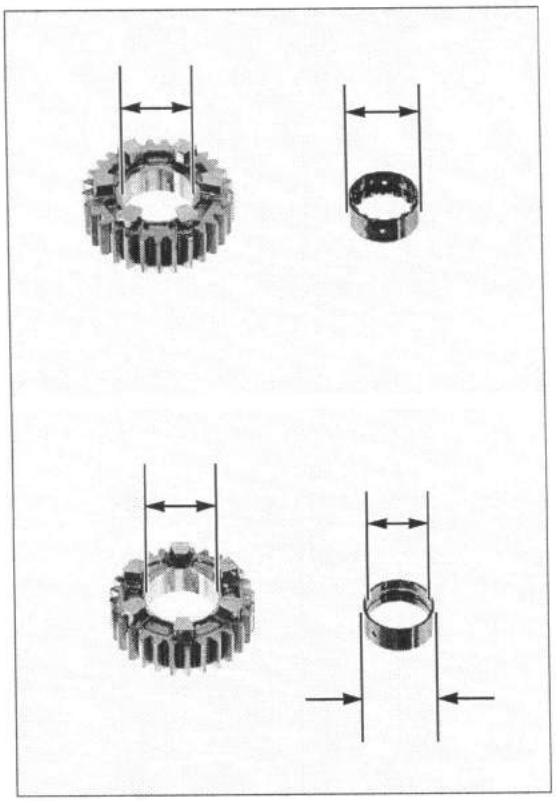
SERVICE LIMITS:

M5: 28.016 mm (1.1030 in)
C2: 30.021 mm (1.1819 in)

Calculate the gear-to-bushing clearance.

SERVICE LIMITS:

M5, C2:	**0.10 mm (0.004 in)**
M6, C3, C4:	**0.11 mm (0.004 in)**



Check the mainshaft and countershaft for abnormal wear or damage.

Measure the mainshaft O.D. at the M5 gear.

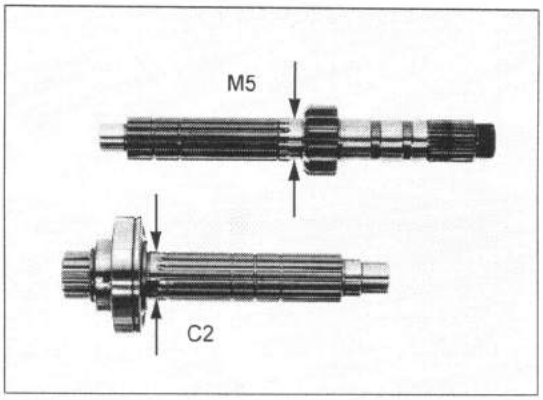
SERVICE LIMIT: 27.957 mm (1.1007 in)

Measure the countershaft O.D. at the C2 gear.

SERVICE LIMIT: 29.960 mm (1.1795 in)

Calculate the gear bushing-to-shaft clearance.

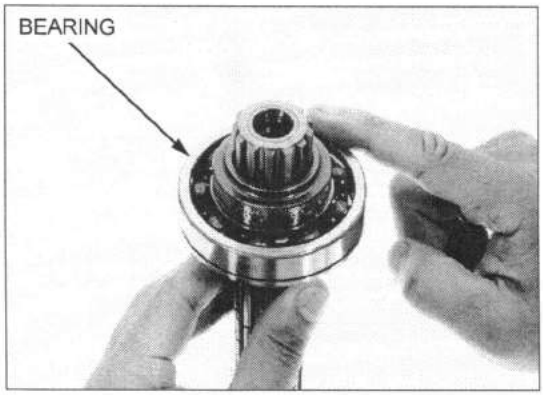
SERVICE LIMITS:
M5: 0.06 mm (0.002 in)
C2: 0.06 mm (0.002 in)



Countershaft bearing

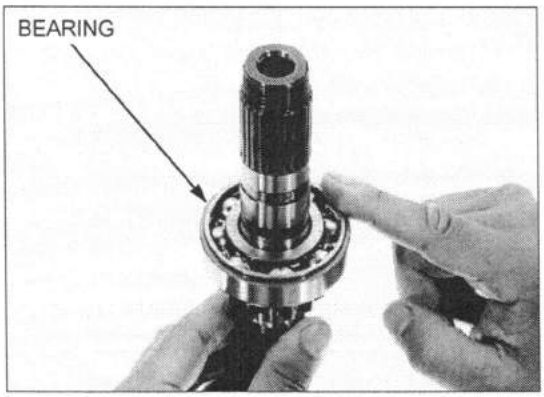
Turn the outer race of countershaft bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the bearing inner race fits tightly on the countershaft.
Replace the countershaft, collar, and bearing as an assembly, if the outer race does not turn smoothly, quietly, or if the inner race fits loosely on the countershaft.

- The countershaft bearing cannot be replaced. If the countershaft bearing is faulty, replace the countershaft as an assembly.

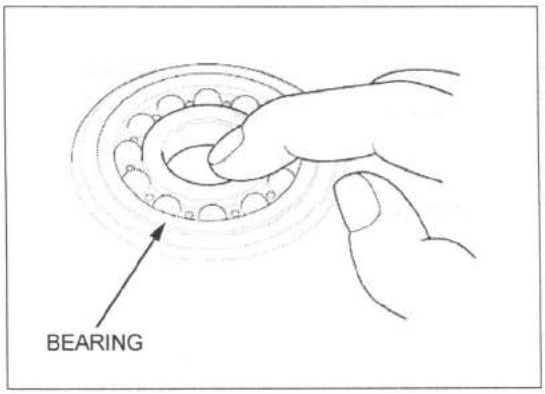


Mainshaft bearing

Temporarily install the right mainshaft bearing onto the mainshaft.
Turn the outer race of the right mainshaft bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the inner race of the bearing fits tightly on the mainshaft.
Replace the bearing if the outer race does not turn smoothly, quietly, or if the inner race fits loosely on the mainshaft.



Turn the inner race of the left mainshaft bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the crankcase.
Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the crankcase.



MAINSHAFT BEARING REPLACEMENT

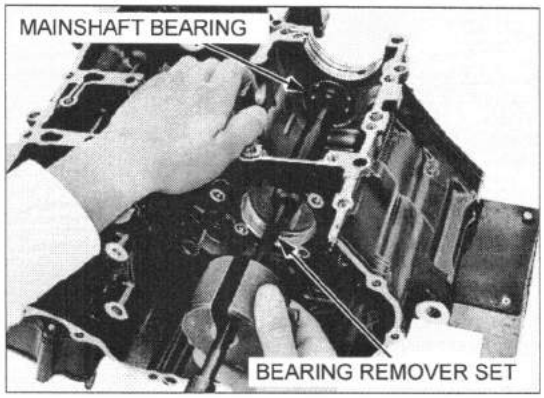
Remove the following:

- Crankshaft (page 13-5)
- Countershaft (page 12-6)
- Mainshaft (page 12-6)

Remove the mainshaft bearing using the special tools as shown.

TOOLS:

Bearing remover set, 20 mm	**07936-3710600**
Remover weight	**07741-0010201 or 07936-371020A (U.S.A. only)**
Remover handle	**07936-3710100**

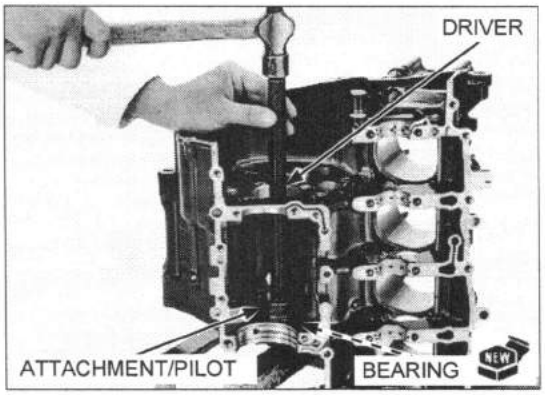


Drive in a new bearing squarely with the marks facing toward the inside of the crankcase.

Drive a new bearing into the left crankcase using the special tools.

TOOLS:

Driver	**07949-3710001**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**



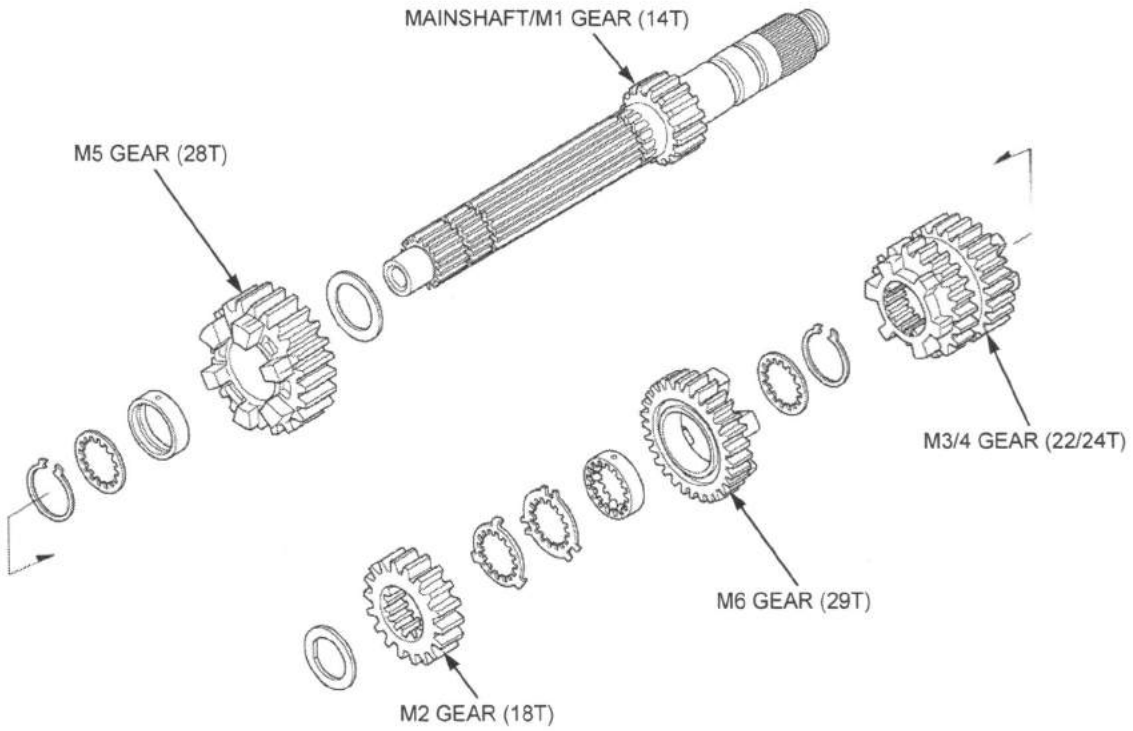
TRANSMISSION ASSEMBLY

Apply engine oil to the gear teeth, sliding surface, and bushings.

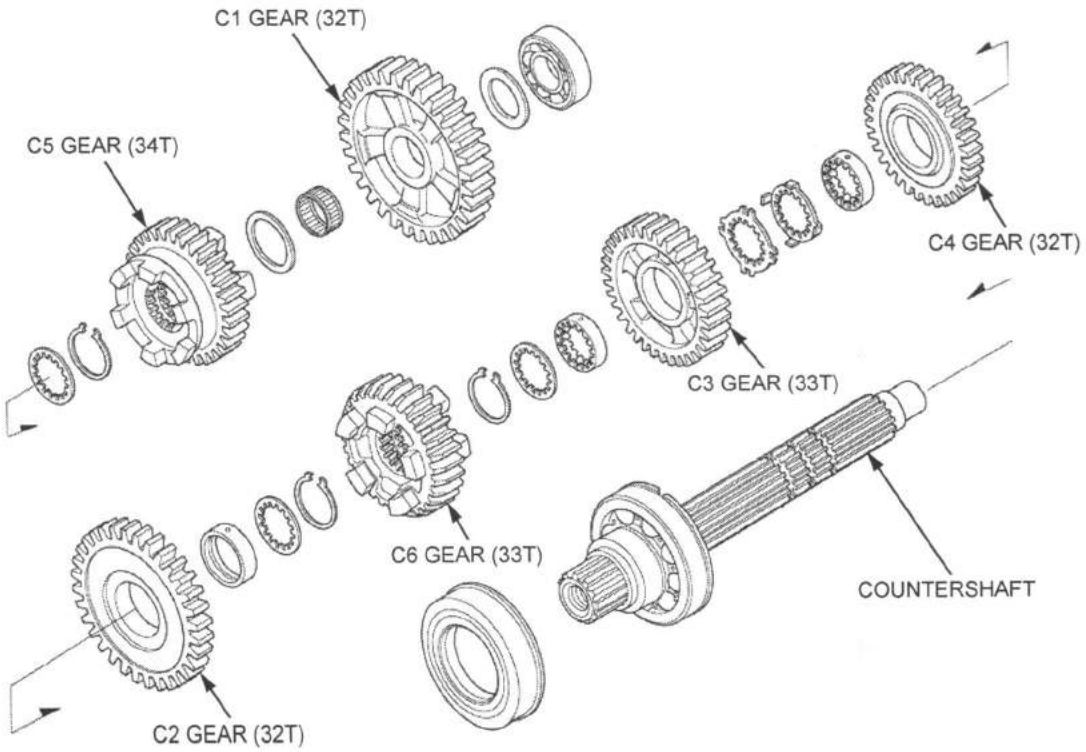
Apply molybdenum oil solution to the shift fork grooves.

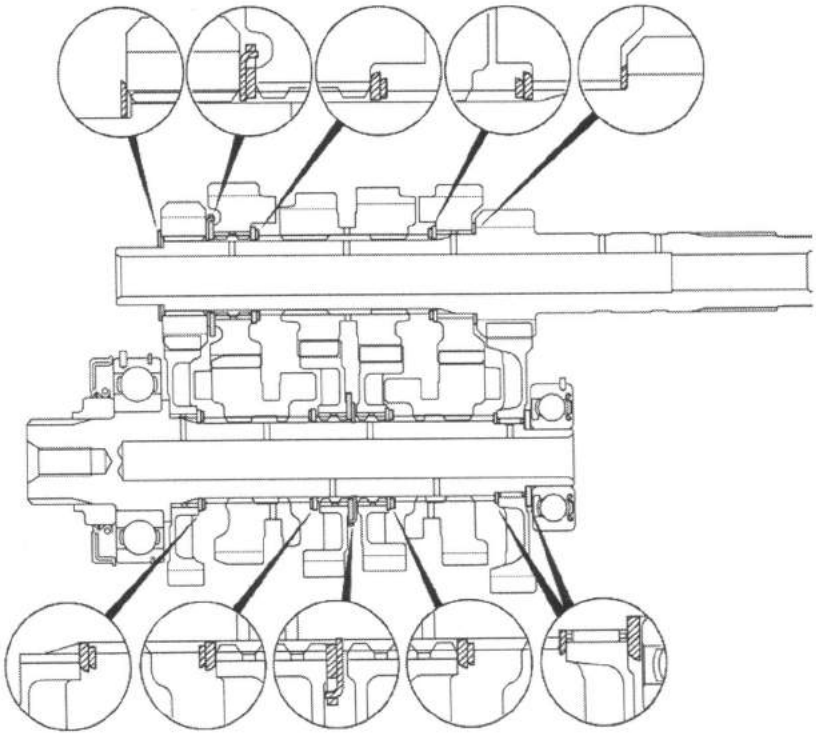
Assemble the mainshaft and countershaft.

MAINSHAFT:



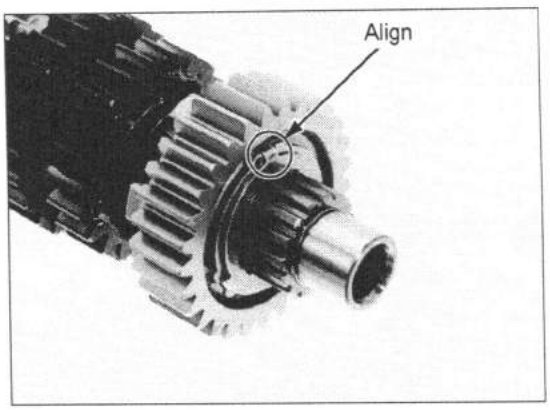
COUNTERSHAFT:



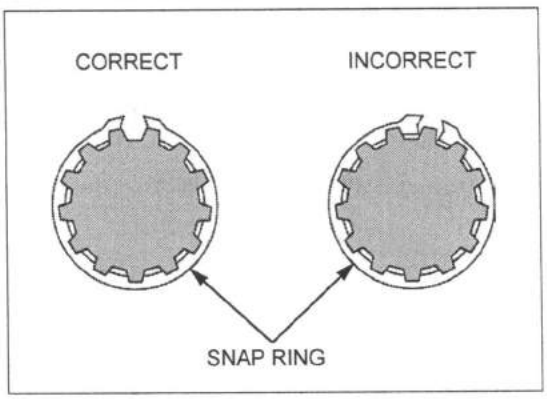


Assemble the transmission gears and shafts.

- Coat each gear with clean engine oil and check for smooth movement.
- Align the lock washer tabs with the spline washer grooves.



- Always install the thrust washers and snap rings with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap rings so that the end gap aligns with the groove of the splines.
- Make sure that the snap rings are fully seated in the shaft groove after installing them.

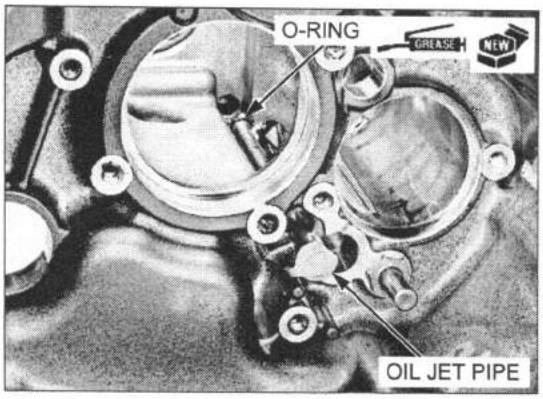


INSTALLATION

Be careful not to damage a new O-ring.

Apply grease to a new O-ring and install it to the oil jet pipe.

Install the oil jet pipe into the upper crankcase by aligning its tab with the crankcase groove.

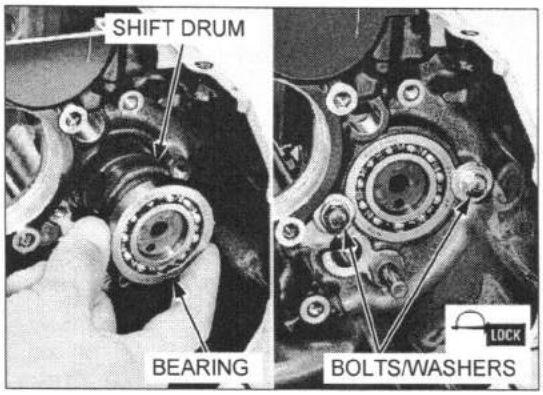


Install the shift drum and bearing into the crankcase.

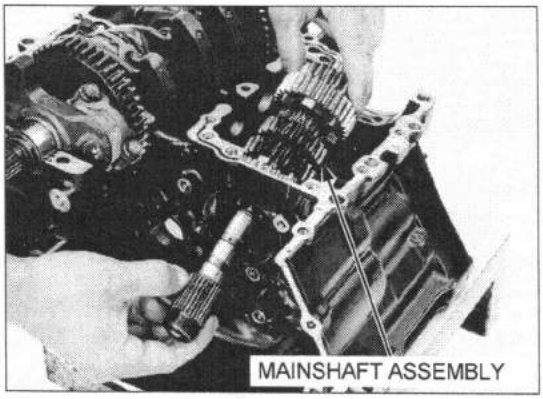
Apply locking agent to the shift drum bearing set bolt threads (page 1-23).

Install the bolts/washers and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

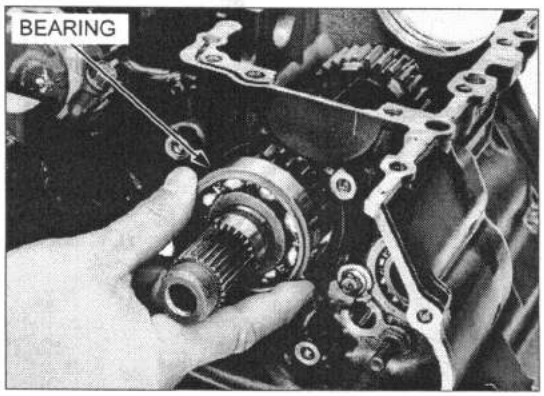


Install the mainshaft assembly into the crankcase.



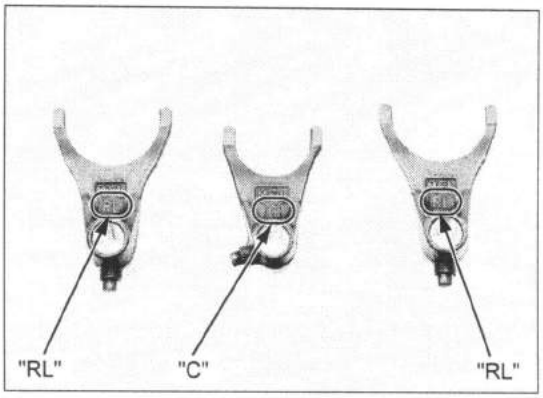
Install the bearing into the crankcase with the marked side facing out.

Install the mainshaft bearing into the crankcase.



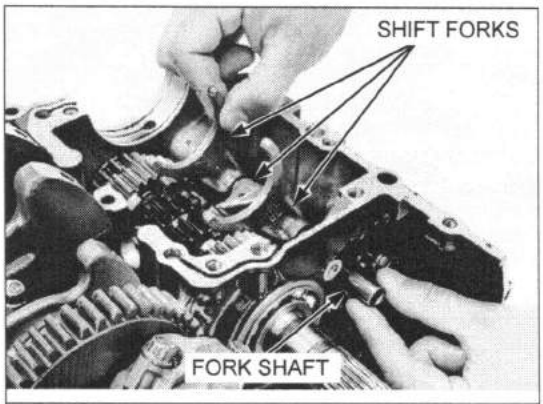
The shift forks have the following identification marks:

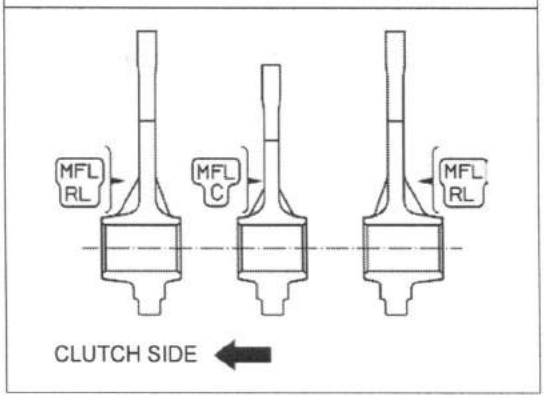
- "RL" for right/left
- "C" for center



Install the shift forks into the shift drum guide grooves and insert the fork shaft.

- Face the shift fork marks as follows:
  - "RL" marks to the outside
  - "C" mark to the right side (clutch side)
- The "C" shift fork claw aligns the gear shifter groove.



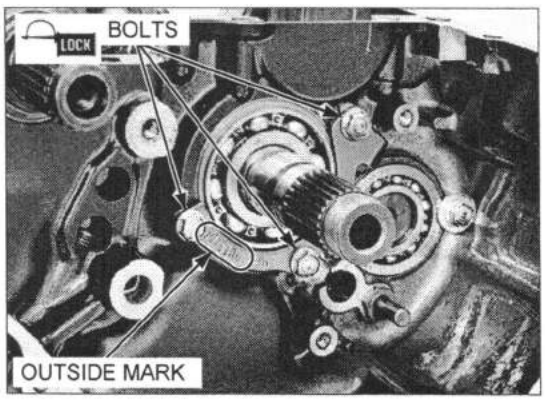


Apply locking agent to the mainshaft bearing set plate bolt threads (page 1-23).

Install the mainshaft bearing set plate with its OUTSIDE mark facing out.

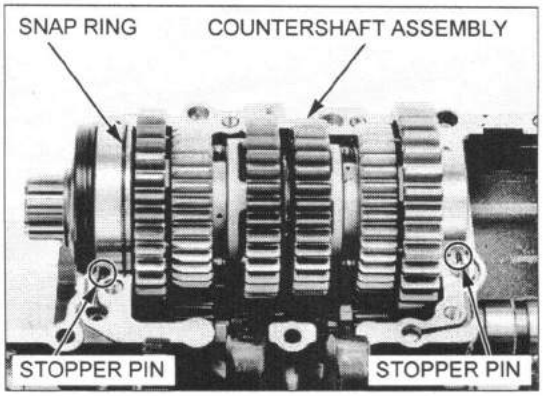
Tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the countershaft assembly by aligning the countershaft bearing snap ring with the crankcase groove.

Also align the countershaft bearing stopper pins with the groove in the crankcase.



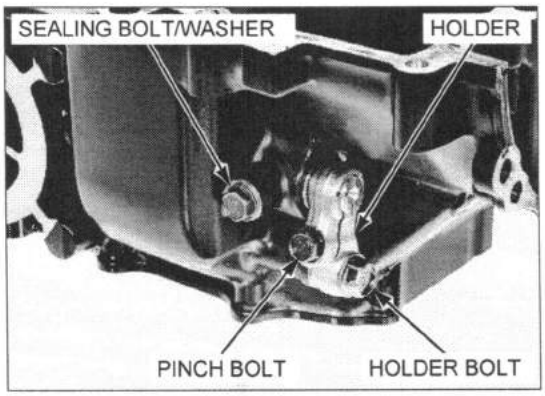
BALANCER

REMOVAL

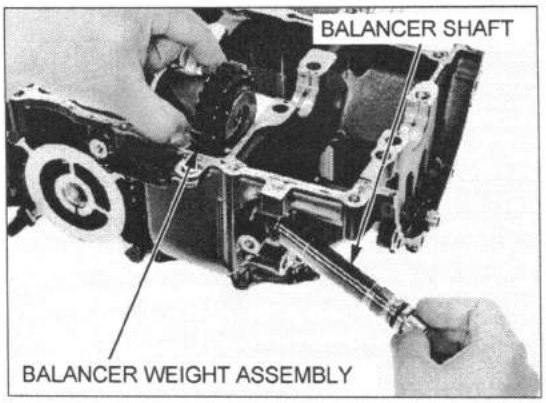
Separate the crankcase halves (page 12-5).

Loosen the balancer shaft pinch bolt.
Remove the bolt and balancer shaft holder.

Remove the sealing bolt and washer.

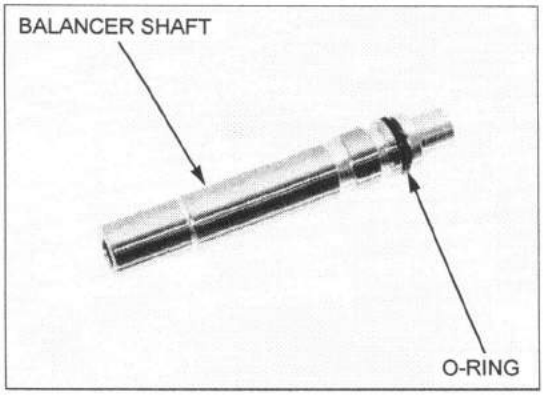


Pull the balancer shaft out and remove the balancer weight assembly from the lower crankcase.

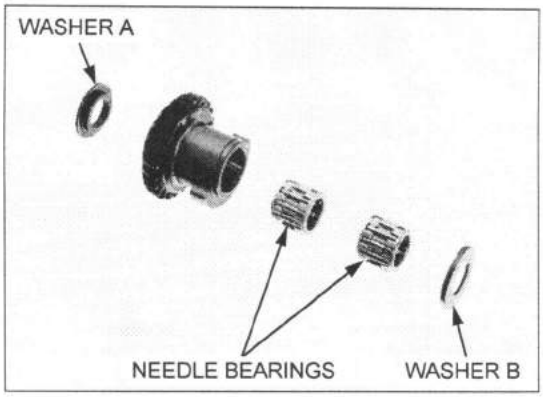


DISASSEMBLY

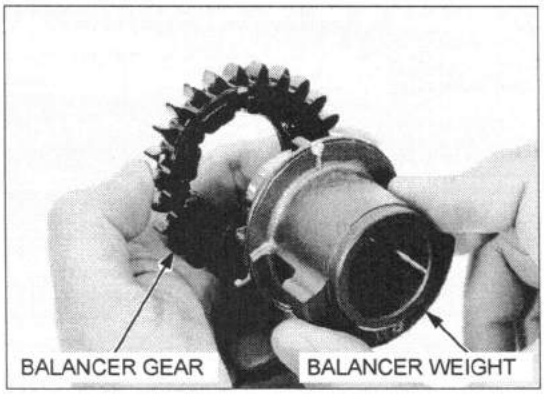
Remove the O-ring from the balancer shaft.



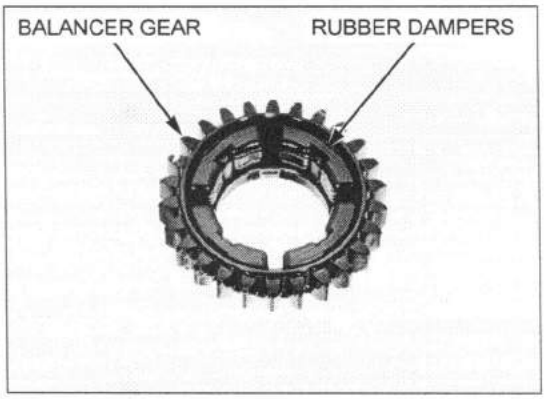
Remove the washers and needle bearings from the balancer weight assembly.



Remove the balancer gear assembly from the balancer weight.



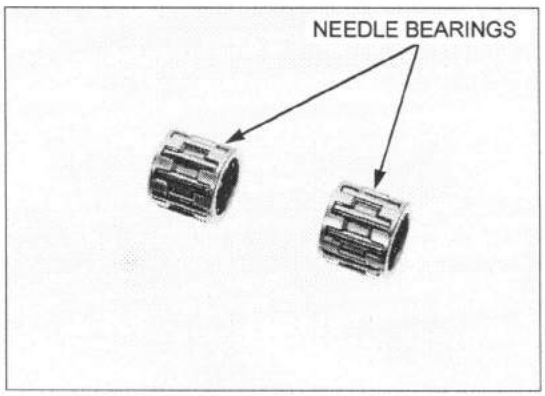
Remove the rubber dampers from the balancer gear.



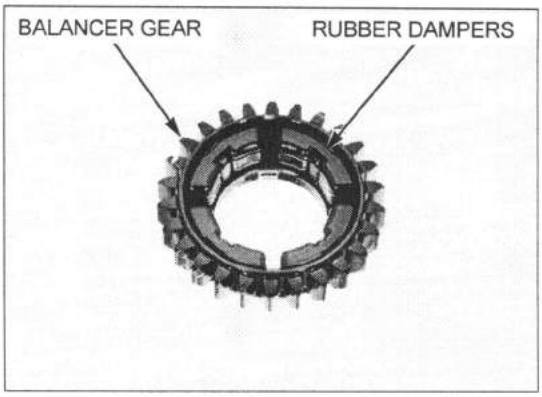
INSPECTION

Replace the balancer weight, balancer shaft, needle bearing as a set.

Check each needle bearing for wear or damage, replace if necessary.



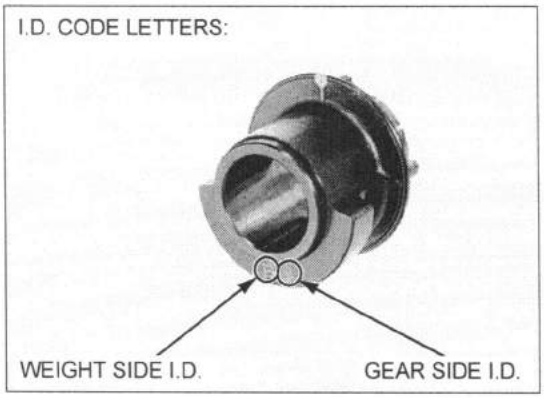
Check the balancer weight and gear for wear or damage.
Check the rubber dampers for fatigue or damage, replace if necessary.



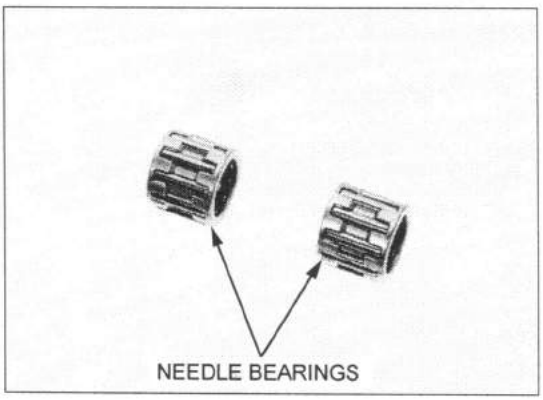
BALANCER BEARING SELECTION

The balancer weight and needle bearings are select fitted.

The balancer weight has two I.D. code letters as shown. The marking identify each I.D. of the balancer weight as shown.



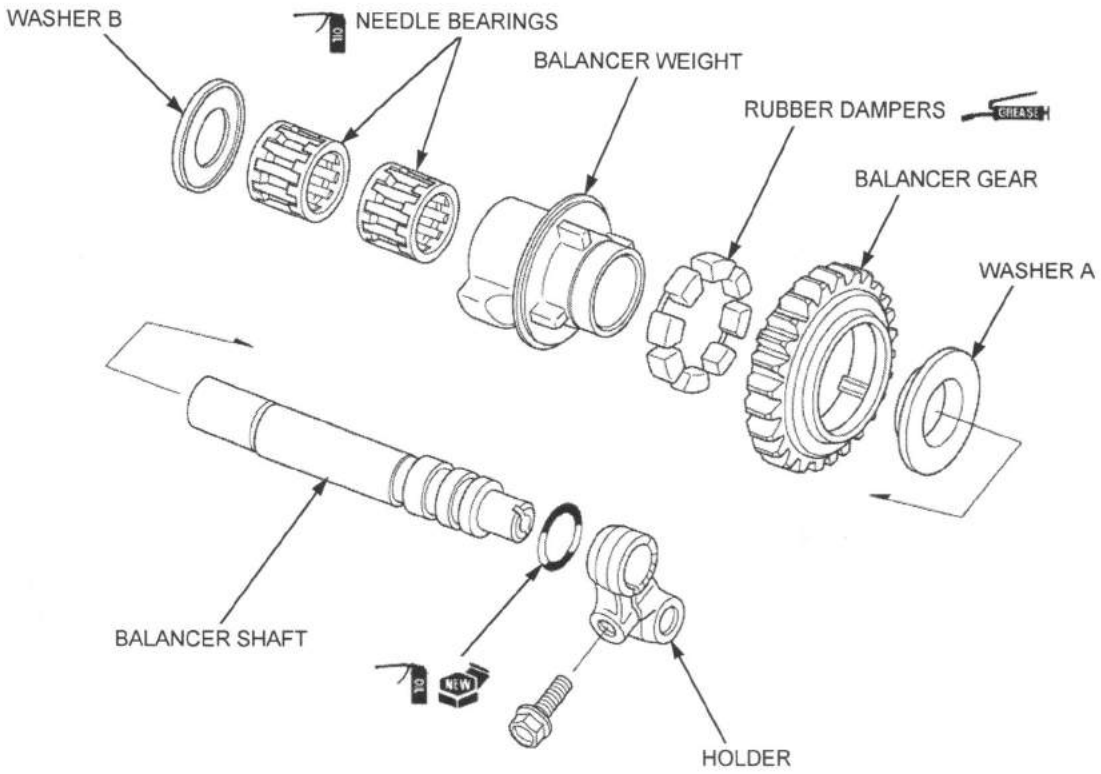
Reference the balancer weight I.D. code letters to determine the replacement bearing color.
Refer to the selection table below for bearing selection.



BALANCER BEARING SELECTION TABLE:

		BALANCER WEIGHT I.D. CODE		
		A	B	C
		26.996 – 27.000 mm (1.0628 – 1.0630 in)	26.991 – 26.996 mm (1.0626 – 1.0628 in)	26.987 – 26.991 mm (1.0625 – 1.0626 in)
BALANCER SHAFT	17.990 – 17.996 mm (0.7083 – 0.7085 in)	Blue	White	Green

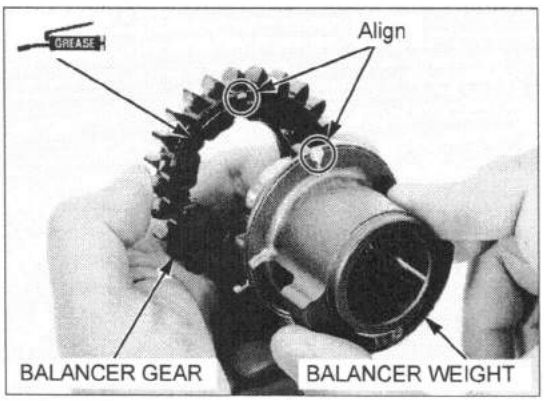
ASSEMBLY



Apply grease to the damper rubber fitting area.

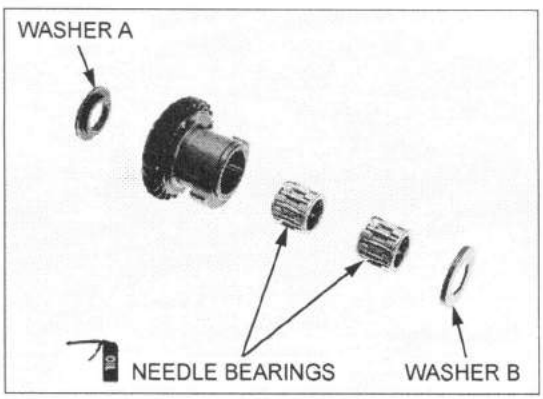
Install the damper rubbers into the balancer gear.

Assemble the balancer gear and weight while aligning the marks.

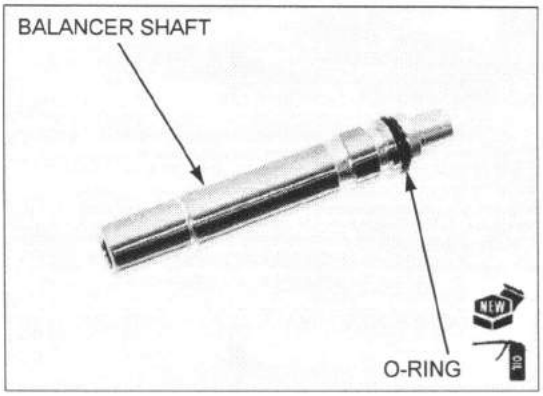


Apply oil to the needle bearing and install them into the balancer weight.

Install the washer A and B as shown.



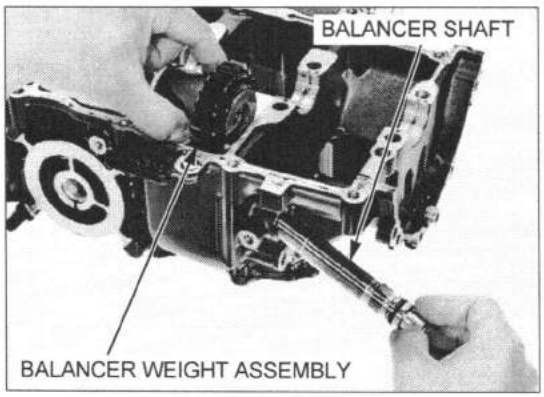
Apply oil to a new O-ring and install it to the balancer shaft groove.



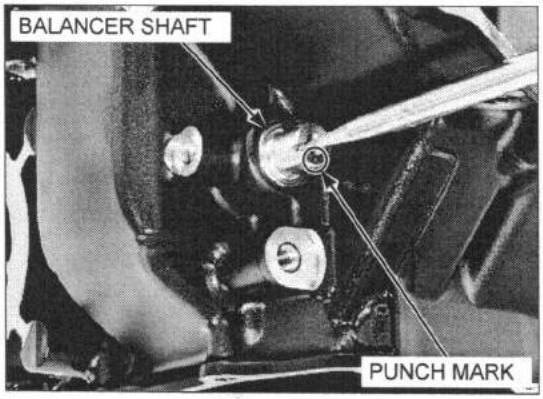
INSTALLATION

Install the balancer weight into the lower crankcase.

Install the balancer shaft.



Turn the balancer shaft and position the punch mark on the shaft facing down.



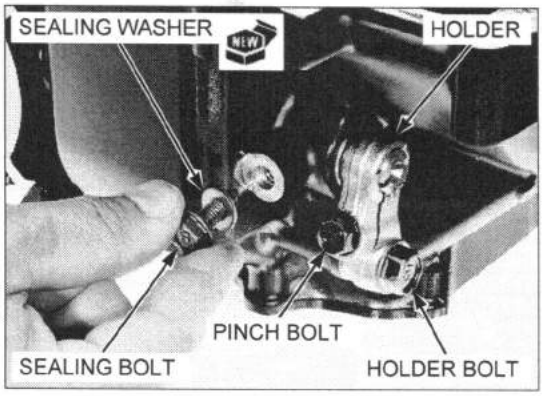
Install the balancer shaft holder.

Install the balancer holder bolt and balancer holder pinch bolt.

Install a new sealing washer and sealing bolt.

Assemble the crankcase halves (page 12-22).

Adjust the backlash (page 12-21).



BALANCER GEAR BACKLASH ADJUSTMENT

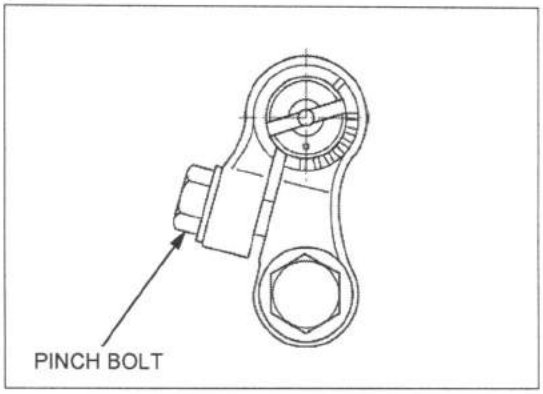
INITIAL BACKLASH ADJUSTMENT

Install the engine into the frame.

- STANDARD/SP type (page 8-14)
- ABS type (page 8-21)

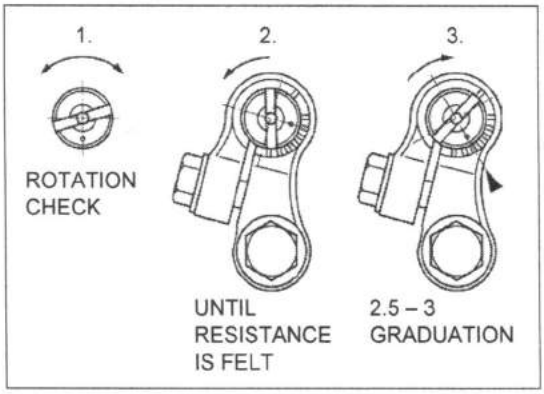
Adjust the backlash while the engine is cold (below 35°C/ 95°F) and while it is not running.

Loosen the balancer shaft holder pinch bolt.



Excessive force can cause balancer gear, bearing and shaft damage. Do not turn the shaft more than necessary.

1. Check the balancer shaft for smooth rotation by turning it clockwise and counterclockwise until it can not turn.
2. Turn the balancer shaft counterclockwise until resistance is felt.
3. Then back it off 2.5 – 3 graduation using the slot as a measure.



FINAL BACKLASH ADJUSTMENT

Warm up the engine and let it idle.

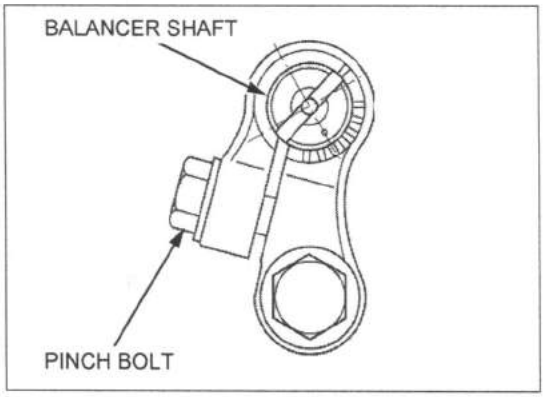
If the balancer gear noises are excessive, adjust the balancer backlash as follows:

Turn the balancer gear shaft counterclockwise until the gears begin to make a "whining" noise. Then turn the gear shaft clockwise until the gear "whining" noise disappears.

Tighten the balancer shaft pinch bolt.

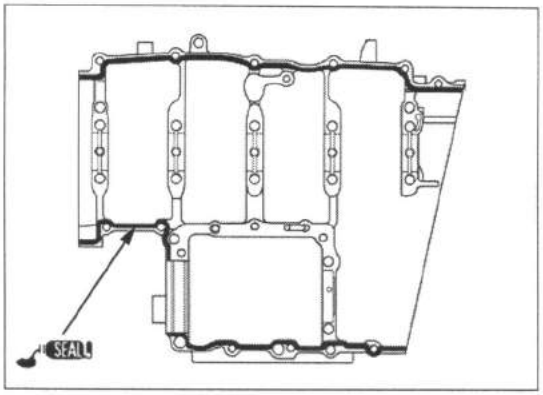
After all gear backlash adjustments are done, snap the throttle and make sure the gear noises are not excessive.

If the gear "whine" noise is excessive, the backlash is too small.
If the gear "rattling" noise is excessive, the backlash is excessive.

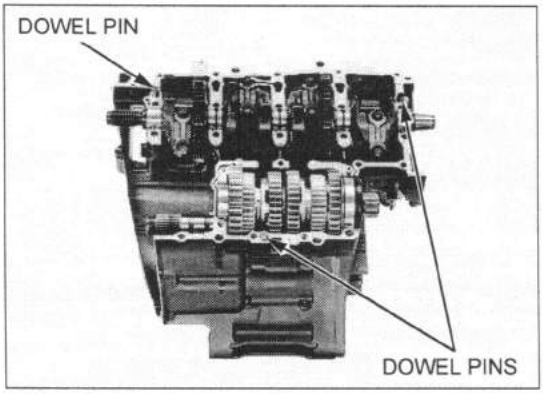


CRANKCASE ASSEMBLY

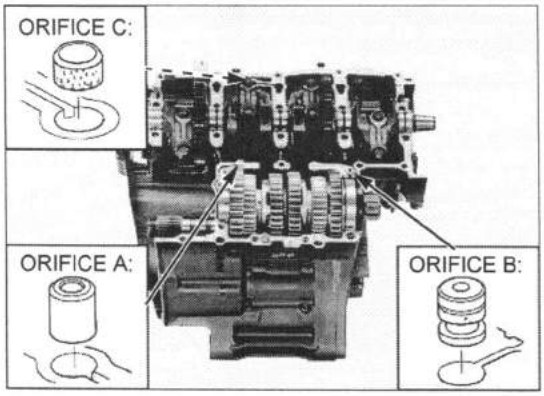
Apply a light, but thorough, coating of liquid sealant (TB 1207B or equivalent) to the crankcase mating surface. Do not apply sealant to the crankcase 8 mm bolt (main journal bolt) area and the oil passage area as shown.



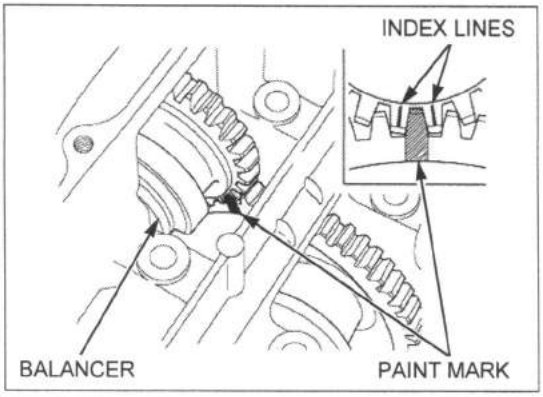
Install the dowel pins.



Install the oil orifices in the upper crankcase.

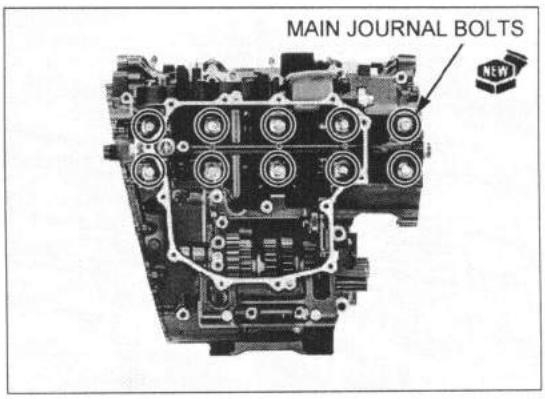


Install the lower crankcase onto the upper crankcase while aligning the crankshaft balancer drive gear white paint mark with between the balancer gear index lines as shown.



- Tighten the crankcase main journal bolts using the tightening method described below.
- Do not reuse the crankcase main journal bolts, because the correct axial tension will not be obtained.
- The crankcase main journal bolts are pre-coated with an oil additive for axial tension stability. Do not remove, the oil additive from the new main journal bolts surface.

Install new crankcase main journal bolts.
Loosely install all the crankcase bolts/sealing washer.



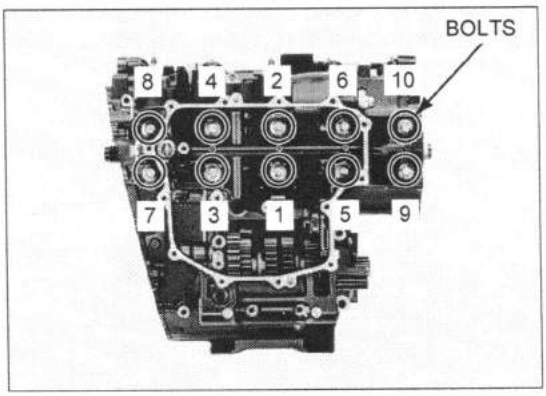
TIGHTENINNG METHOD:

Make sure the upper and lower crankcase are seated securely.

Tighten the crankcase main journal bolts in numerical order as shown in the illustration in two or three steps to the specified torque.

Further tighten the crankcase main journal bolts 150°.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft) + 150°



Tighten the 10 mm bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

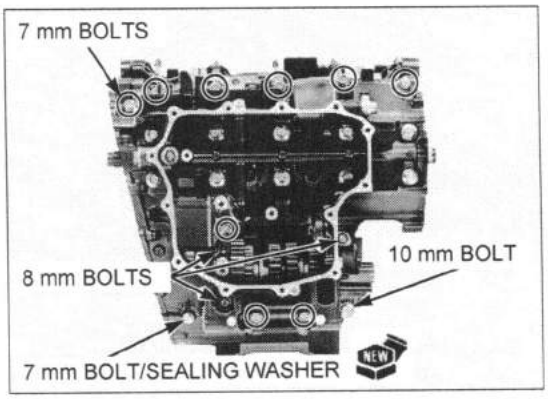
Tighten the 8 mm bolt to the specified torque.

TORQUE: 24 N·m (2.4 kgf·m, 18 lbf·ft)

The sealing washer locations are indicated on the upper crankcase with a "△" mark.

From the inside to outside, tighten the 7 mm bolts/new sealing washer to the specified torque.

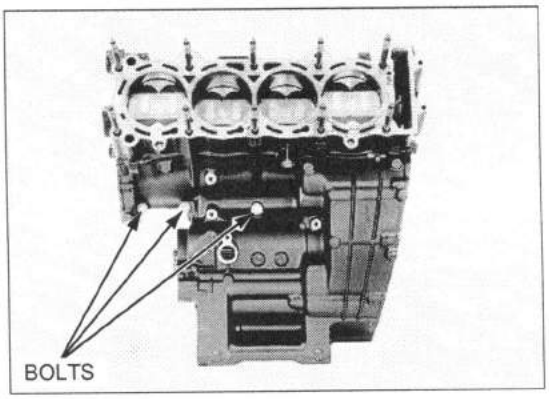
TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



Place the engine with the lower side facing down.

Install the 7 mm bolts and tighten to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

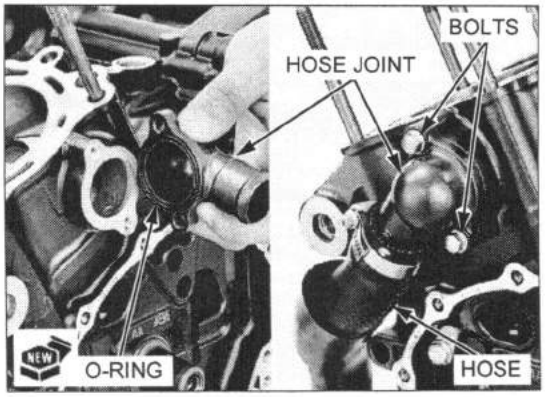


Install a new O-ring into the groove of the water hose joint.
Install the water hose joint to the cylinder block.

Tighten the bolts securely.

Connect the water hose and tighten the hose clamp screw (page 1-22).

Install the removed parts in the reverse order of removal.



13. CRANKSHAFT/PISTON/CYLINDER

COMPONENT LOCATION 13-2

SERVICE INFORMATION 13-3

TROUBLESHOOTING 13-4

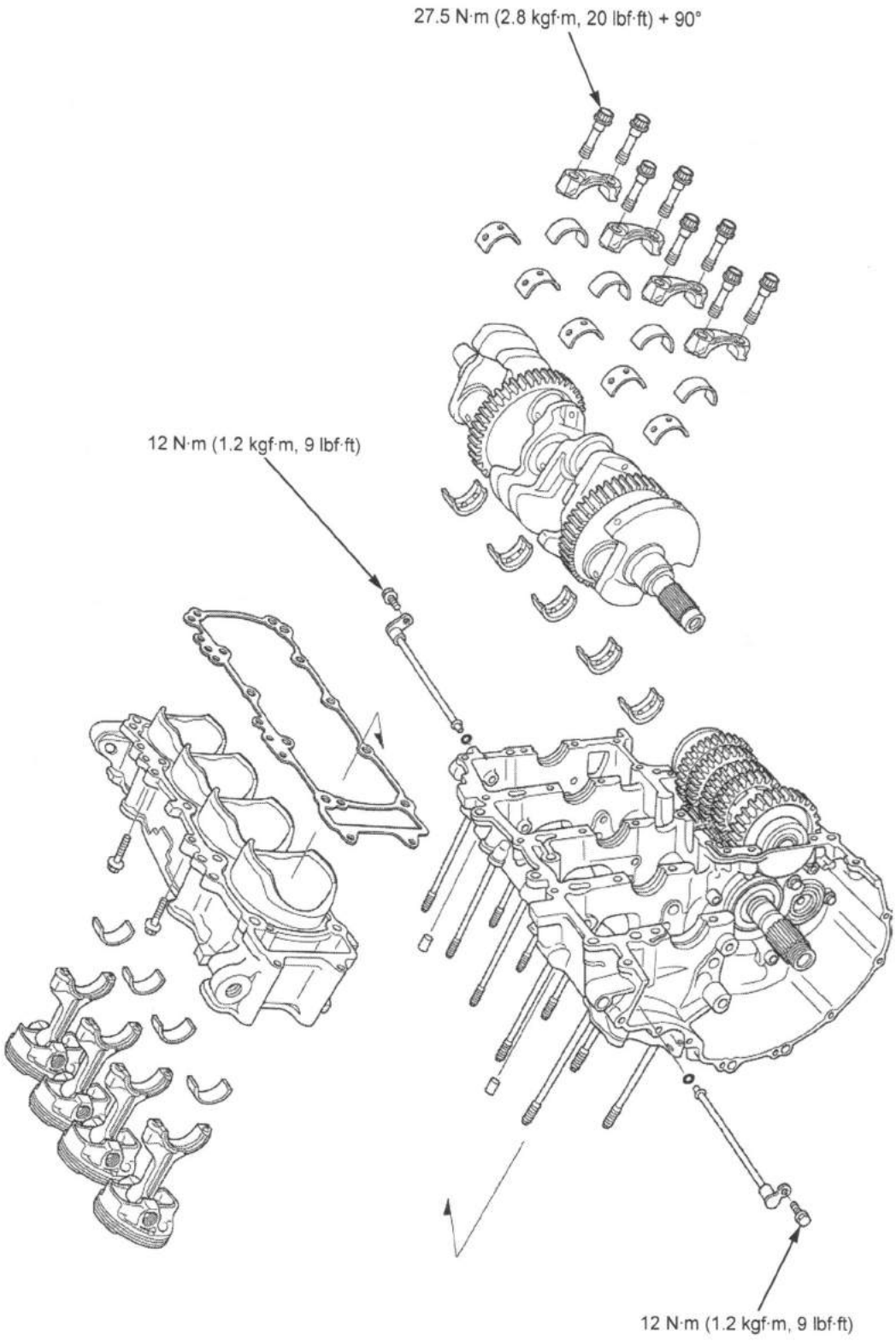
CRANKSHAFT 13-5

MAIN JOURNAL BEARING 13-9

CRANKPIN BEARING 13-12

PISTON/CYLINDER 13-14

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
  - Crankshaft (page 13-5)
  - Piston (page 13-14)
  - Cylinder (page 13-14)
- Mark and store the connecting rods, bearing caps, and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with a plastigauge. Incorrect oil clearance can cause major engine damage.
- Clean the oil passages in the upper crankcase with compressed air before installing the pistons.
- Separate the crankcase halves (page 12-5) when removing the piston.
- For knock sensor removal/installation (page 6-78).

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.15 – 0.30 (0.006 – 0.012)	0.35 (0.014)
	Crankpin bearing oil clearance		0.030 – 0.052 (0.0012 – 0.0020)	0.06 (0.002)
	Main journal bearing oil clearance		0.019 – 0.037 (0.0007 – 0.0015)	0.05 (0.002)
	Runout		–	0.05 (0.002)
Piston, piston rings	Piston O.D. at 5 mm (0.2 in) from bottom		75.965 – 75.985 (2.9907 – 2.9915)	75.895 (2.9880)
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.030 (0.6705)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)	16.980 (0.6685)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.22 – 0.32 (0.009 – 0.126)	0.52 (0.020)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.74 (0.029)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.00 (0.040)
	Piston ring-to-ring groove clearance	Top	0.040 – 0.080 (0.0016 – 0.0032)	0.120 (0.0050)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.075 (0.0030)
Cylinder	I.D.		76.000 – 76.015 (2.9921 – 2.9927)	76.025 (2.9931)
	Out-of-round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.10 (0.004)
Cylinder-to-piston clearance			0.015 – 0.050 (0.0006 – 0.0020)	0.10 (0.004)
Connecting rod small end I.D.			17.030 – 17.042 (0.6705 – 0.6709)	17.048 (0.6712)
Connecting rod-to-piston pin clearance			0.030 – 0.048 (0.0012 – 0.0019)	0.07 (0.003)

TORQUE VALUES

Crankpin bearing cap bolt		
(new)	27.5 N·m (2.8 kgf·m, 20 lbf·ft) + 90°	Apply oil to the threads and seating surface.
(retightening)	21.6 N·m (2.2 kgf·m, 16 lbf·ft) + 90°	Apply oil to the threads and seating surface.
Main journal bolt	20 N·m (2.0 kgf·m, 15 lbf·ft) + 150°	See page 13-10 Replace with a new one.
Oil jet pipe mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.

TROUBLESHOOTING

Cylinder compression is too low, hard to starting or poor performance at low speed
- Leaking cylinder head gasket
- Worn, stuck, or broken piston ring
- Worn or damaged cylinder and piston

Cylinder compression too high, overheating or knocking
- Excessive carbon built-up on piston head or combustion chamber

Excessive smoke
- Worn cylinder, piston, or piston ring
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston, or piston rings
- Worn main journal bearings
- Worn crankpin bearings

Engine vibration
- Excessive crankshaft runout
- Improper balancer timing

CRANKSHAFT

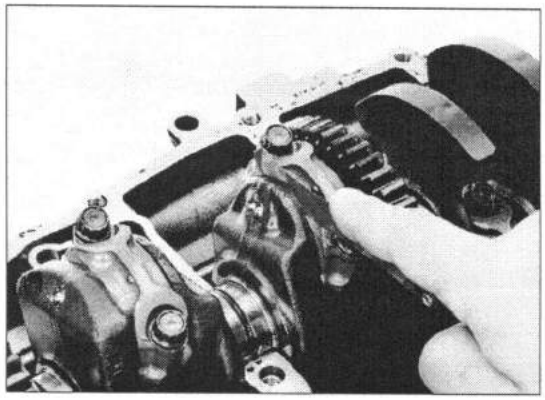
Separate the crankcase halves (page 12-5).

SIDE CLEARANCE INSPECTION

Measure the connecting rod side clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)

If the clearance exceeds the service limit, replace the connecting rod.
Recheck and if still out of limit, replace the crankshaft.



REMOVAL

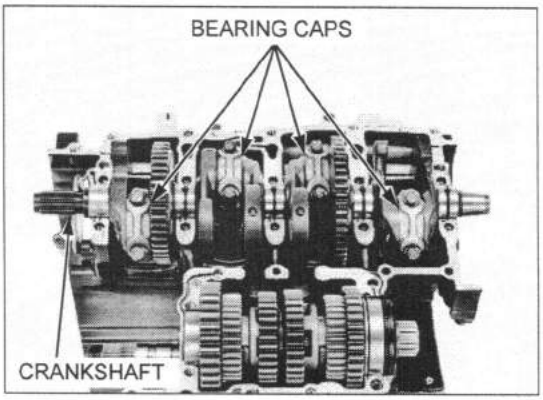
NOTICE

- *Before removal, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod.*
- *Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.*

Mark the bearing caps and bearings as you remove them to indicate the correct cylinder for reassembly.

Remove the crankpin bearing cap bolts and bearing caps.

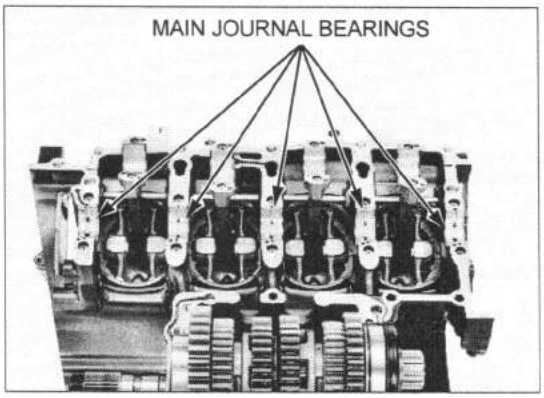
Remove the crankshaft.



Remove the main journal bearings from both crankcase halves.

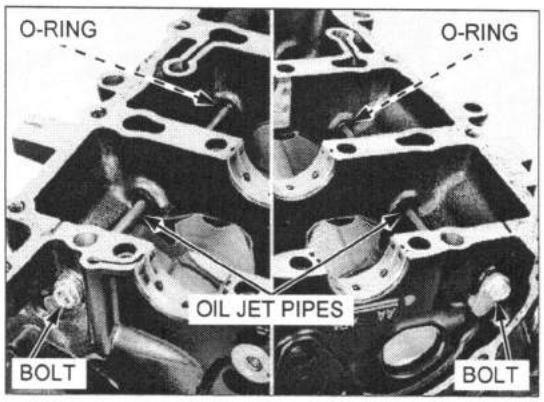
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.



Remove the bolts, oil jet pipes, and O-rings from the upper crankcase.

Clean the oil jet pipes in solvent thoroughly.

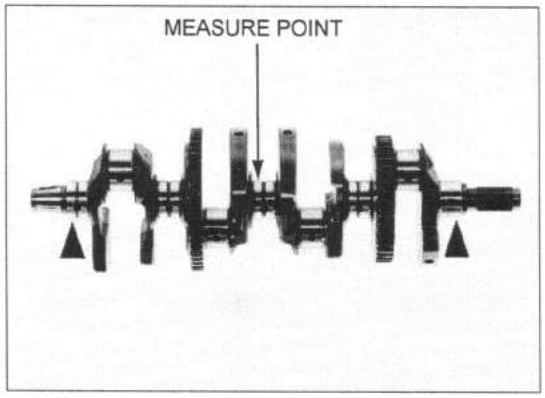


INSPECTION

Support the crankshaft at both end journals.
Set a dial gauge on the center main journal of the crankshaft.
Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.05 mm (0.002 in)

Check the primary drive gear and balancer drive gear teeth for abnormal wear or damage.

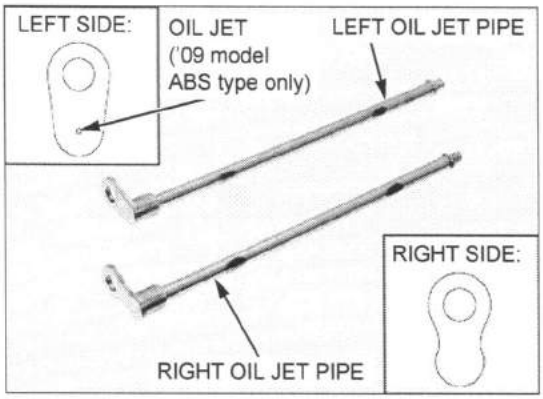


Inspect the oil jet pipes for clogs, bending, or damage.

Replace them if necessary.

'09 model ABS type only:

- The left side oil jet pipe end has a oil jet.

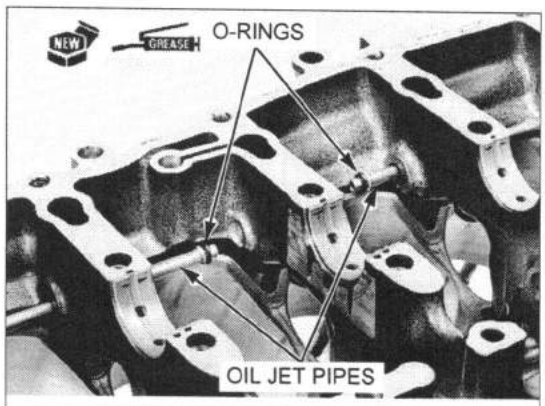


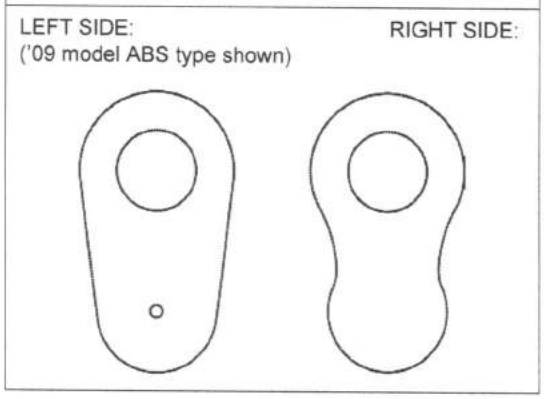
INSTALLATION

Apply grease to new O-rings and install them to the oil jet pipes.

Be careful not to damage the O-rings.

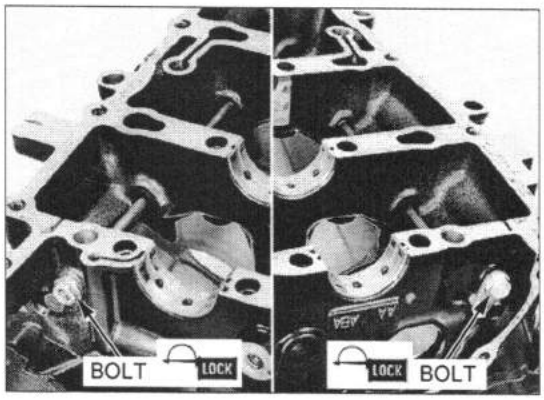
Install the oil jet pipes into the upper crankcase as shown.





Apply locking agent to the oil jet pipe mounting bolt threads (page 1-23) and tighten them to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



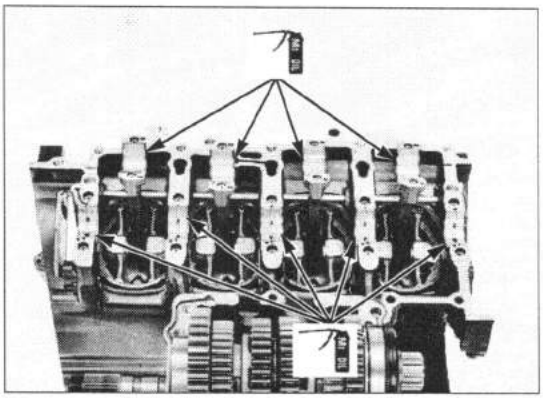
Apply molybdenum oil solution to the main journal bearing sliding surfaces on the upper crankcase and crankpin bearing sliding surfaces on the connecting rods.

The bearing tabs should be aligned with the grooves in the crankcase and crankpin.

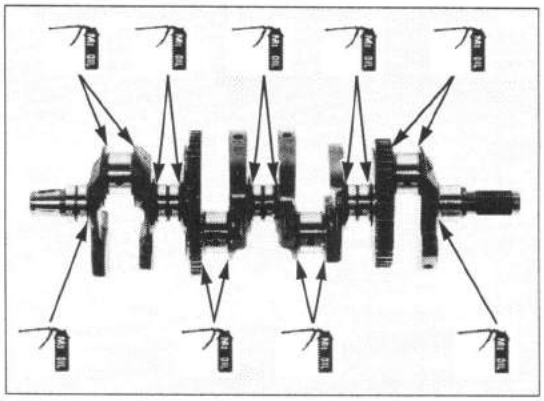
Install the main journal bearings into their original locations.

NOTICE

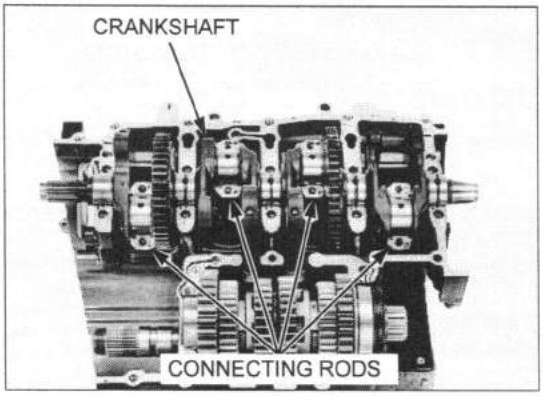
Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.



Apply molybdenum oil solution to the thrust surfaces of the crankshaft as shown.

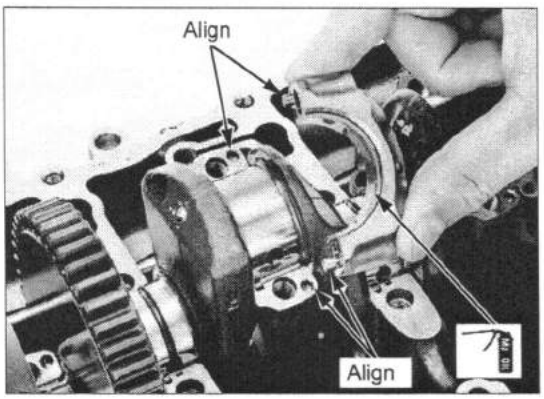


Install the crankshaft onto the upper crankcase.
Set the connecting rods onto the crankpins.



Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the crankpin bearing caps.

Install the crankpin bearing caps, aligning the dowel pins with the holes in the connecting rods.
Be sure each part is installed in its original position, as noted during removal.



TIGHTENING METHOD:

The crankpin bearing cap bolts cannot be reused. Once the bolts have been loosened replace them with new ones.

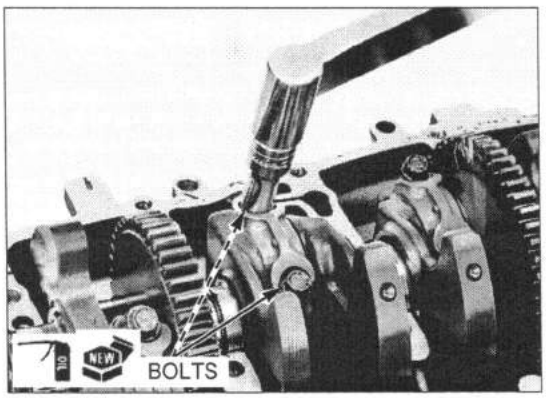
Apply oil to new crankpin bearing cap bolt threads and seating surfaces, and install them.

Tighten the bolts in two or three steps alternately to the specified torque.

Further tighten the bolts 90°.

TORQUE: 27.5 N·m (2.8 kgf·m, 20 lbf·ft) + 90°

Assemble the crankcase halves (page 12-22).



MAIN JOURNAL BEARING

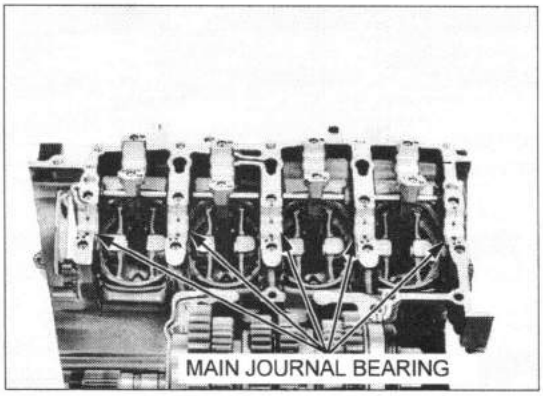
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Remove the crankshaft (page 13-5).

BEARING INSPECTION

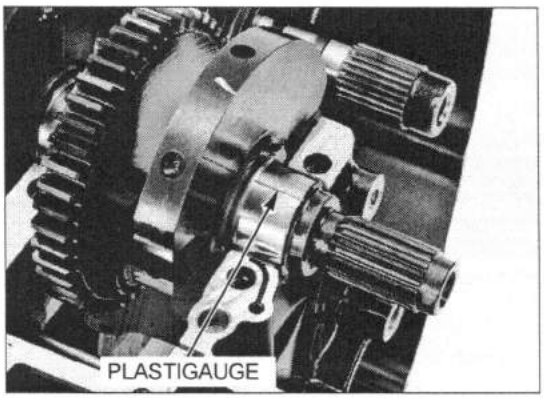
Inspect the main journal bearing inserts on the upper and lower crankcase halves for unusual wear or peeling.
Check the bearing tabs for damage.



OIL CLEARANCE INSPECTION

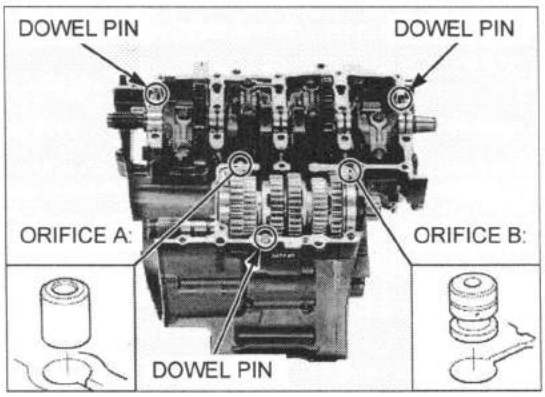
Clean off any oil from the bearing inserts and main journals.
Install the crankshaft onto the upper crankcase.
Put a strip of plastigauge lengthwise on each main journal, avoiding the oil hole.

- Do not rotate the crankshaft during inspection.



Install the dowel pins and oil orifices onto the upper crankcase.

Install the lower crankcase onto the upper crankcase.



TIGHTENING METHOD:

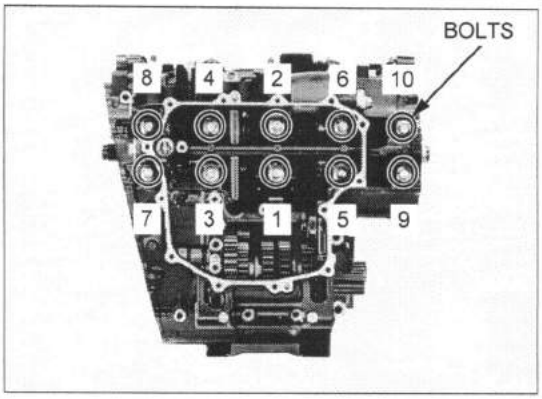
Install the crankcase main journal bolts.
Make sure the upper and lower crankcase are seated securely.

Tighten the crankcase main journal bolts as follows:

Tighten the crankcase main journal bolts in numerical order in the illustration in two or three steps to the specified torque.

Further tighten the crankcase main journal bolts 150°.

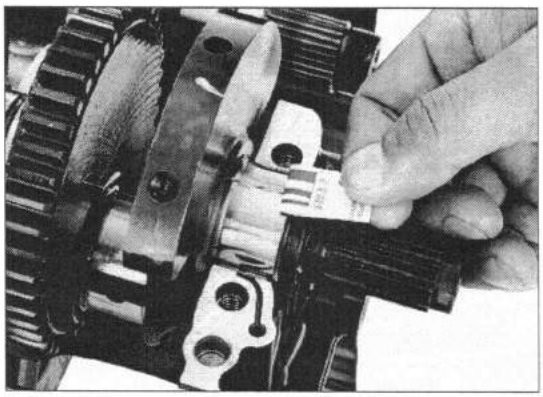
TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft) + 150°



Remove the crankcase main journal bolts and lower crankcase, measure the compressed plastigauge at its widest point on each main journal to determine the oil clearance.

SERVICE LIMIT: 0.05 mm (0.002 in)

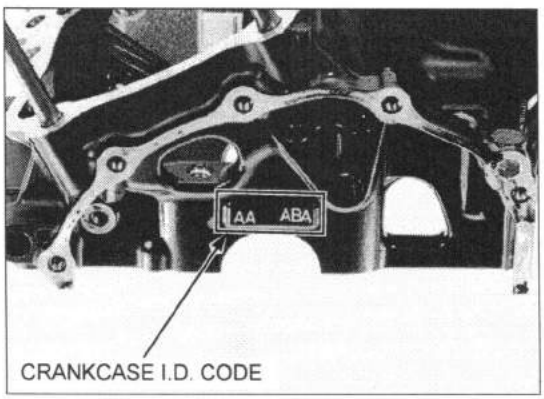
If the oil clearance exceeds the service limit, select a replacement bearing.



BEARING SELECTION

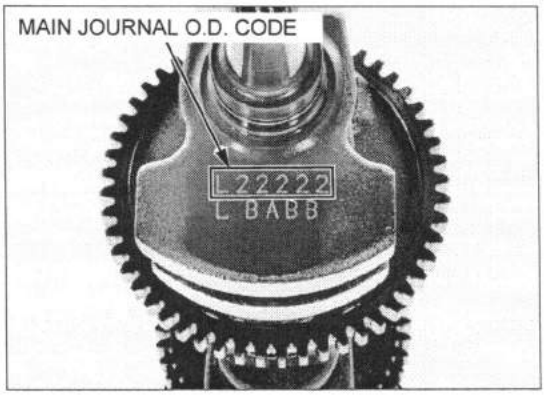
Letters (A, B or C) on the left side of upper crankcase are bearing support I.D. codes from left to right.

Record the crankcase bearing support I.D. codes on the left side of the upper crankcase, as shown.



Numbers (1, 2 or 3) on the crank weight are the main journal O.D. codes from left to right.

Record the corresponding main journal O.D. code numbers from the crank weight.



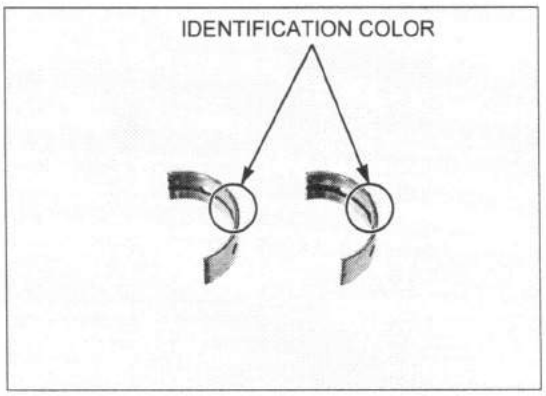
Cross reference the main journal and bearing support codes to determine the replacement bearing color code.

MAIN JOURNAL BEARING SELECTION TABLE:

			BEARING SUPPORT I.D. CODE		
			A	B	C
			37.000 – 37.006 mm (1.4567 – 1.4569 in)	37.006 – 37.012 mm (1.4569 – 1.4572 in)	37.012 – 37.018 mm (1.4572 – 1.4574 in)
MAIN JOURNAL O.D. CODE	1	34.000 – 34.006 mm (1.3386 – 1.3388 in)	Red	Pink	Yellow
	2	33.994 – 34.000 mm (1.3383 – 1.3386 in)	Pink	Yellow	Green
	3	33.988 – 33.994 mm (1.3381 – 1.3383 in)	Yellow	Green	Brown

BEARING THICKNESS:

Brown: **Thickest**
Green:
Yellow: ↕
Pink:
Red: **Thinnest**

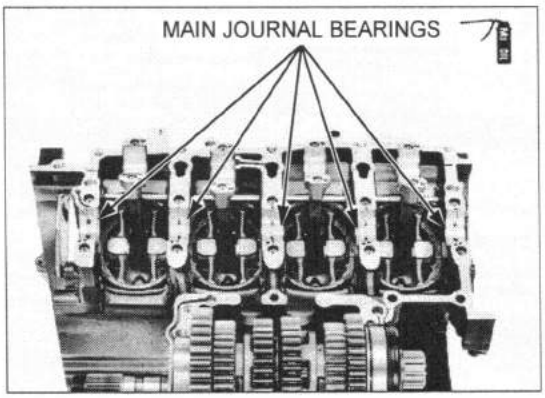


NOTICE

After selecting new bearings, recheck the clearance with plastigauge. Incorrect clearance can cause severe engine damage.

BEARING INSTALLATION

Clean the bearing outer surfaces and crankcase bearing supports.
Apply molybdenum oil solution to the main journal bearing sliding surfaces on the upper crankcase.
Install the main journal bearing inserts onto the crankcase bearing supports, aligning each tab with each groove.



CRANKPIN BEARING

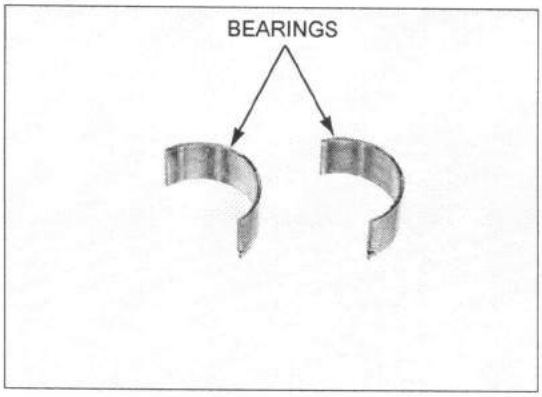
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Remove the crankshaft (page 13-5).

BEARING INSPECTION

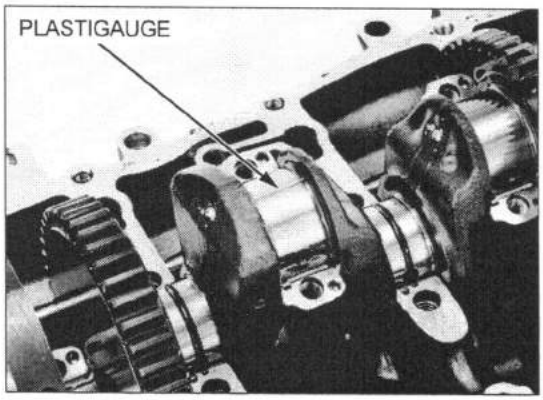
Check the bearing inserts for unusual wear or peeling.
Check the bearing tabs for damage.



OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and crankpins.
Carefully install the crankshaft onto the upper crankcase.
Set the connecting rods onto the crankpins.
Put a strip of plastigauge lengthwise on each crankpin avoiding the oil hole.

- Do not rotate the crankshaft during inspection.



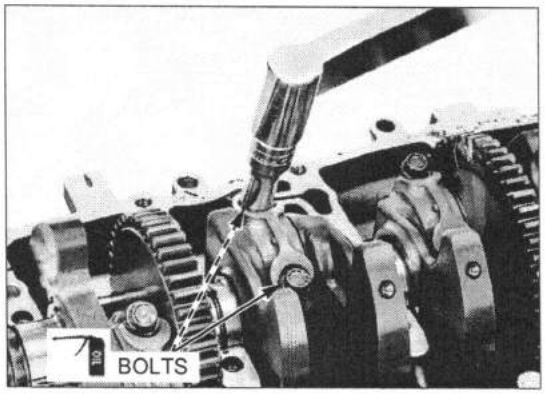
Carefully install the crankpin bearing caps, aligning the dowel pins with the holes in the connecting rods.

Use the removed crankpin bearing cap bolts when checking the oil clearance.

Apply oil to the crankpin bearing cap bolt threads and seating surfaces and install the bolts.
Tighten the bolts in two or three steps alternately to the specified torque.

Further tighten the bolts 90°.

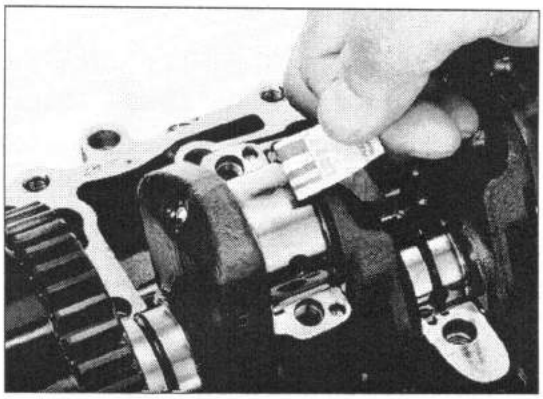
TORQUE: 21.6 N·m (2.2 kgf·m, 16 lbf·ft) + 90°



Remove the bearing caps and measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)

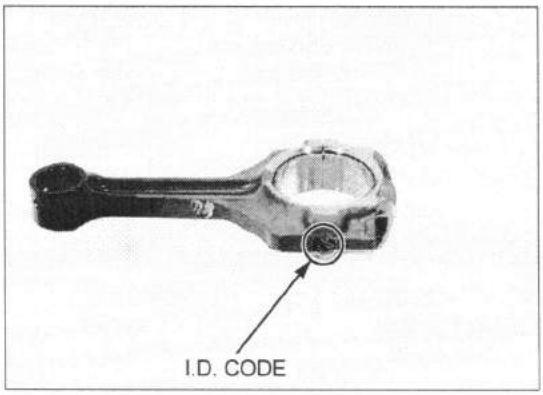
If the oil clearance exceeds the service limit, select the correct replacement bearings.



BEARING SELECTION

Numbers (1, 2 or 3) on the connecting rods are the connecting rod I.D. codes.

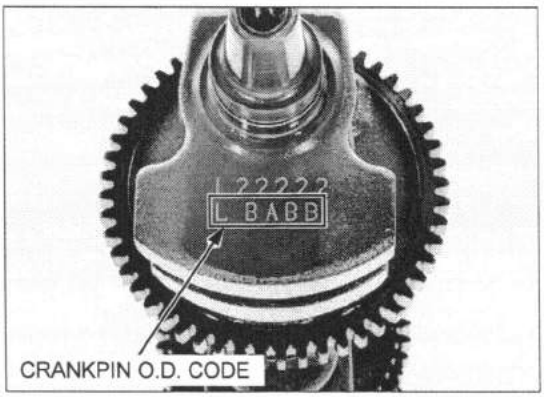
Record the connecting rod I.D. code number (1, 2 or 3) or measure the I.D. with the crankpin bearing cap installed without bearing inserts.



Letters (A, B or C) on the crank weight are the crankpin O.D. codes from left to right.

If you are replacing the crankshaft, record the corresponding crankpin O.D. code letter (A, B or C).

If you are reusing the crankshaft, measure the crankpin O.D. with a micrometer.



Cross-reference the connecting rod and crankpin codes to determine the replacement bearing color code.

CRANKPIN BEARING SELECTION TABLE:

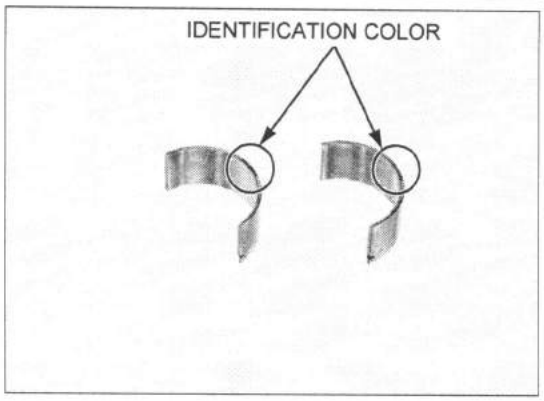
			CONNECTING ROD I.D. CODE		
			1	2	3
			39.500 – 39.506 mm (1.5551 – 1.5554 in)	39.506 – 39.512 mm (1.5554 – 1.5556 in)	39.512 – 39.518 mm (1.5556 – 1.5558 in)
CRANKPIN O.D. CODE	A	36.497 – 36.503 mm (1.4369 – 1.4371 in)	Yellow	Green	Brown
	B	36.491 – 36.497 mm (1.4367 – 1.4369 in)	Green	Brown	Black
	C	36.485 – 36.491 mm (1.4364 – 1.4367 in)	Brown	Black	Blue

BEARING THICKNESS:

Blue:	**Thickest**
Black:	
Brown:	↕
Green:	
Yellow:	**Thinnest**

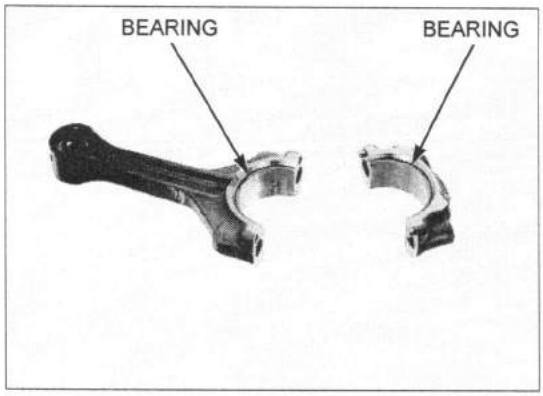
NOTICE

After selecting new bearings, recheck the clearance with plastigauge. Incorrect clearance can cause severe engine damage.



BEARING INSTALLATION

Clean the bearing outer surfaces, crankpin bearing cap, and connecting rod.
Install the crankpin bearing inserts onto the bearing cap and connecting rod, aligning each tab with each groove.



PISTON/CYLINDER

NOTE:

SP type: • If the connecting rod assembly is to be replaced with a new one, it must be replaced with a set of four (i.e. same weight range).

PISTON/CONNECTING ROD/ CYLINDER REMOVAL

NOTICE

- *Before piston removal, place a clean shop towel around the connecting rod to prevent damaging the cylinder.*
- *Do not try to remove the piston/connecting rod assembly from bottom of the cylinder; the assembly will get stuck in the gap between the cylinder liner and the upper crankcase.*
- *Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.*

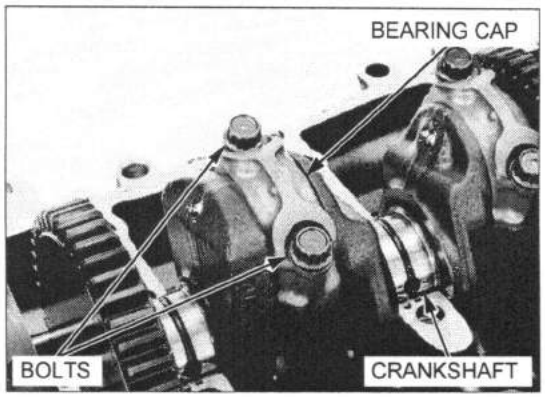
Separate the crankcase halves (page 12-5).

Mark all parts as you remove them to indicate the correct cylinder for reassembly.

Remove the bolts and crankpin bearing caps.

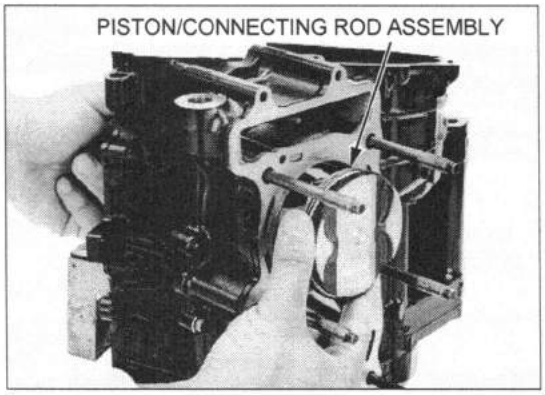
Remove the following:

- Crankshaft (page 13-5)
- Countershaft (page 12-6)

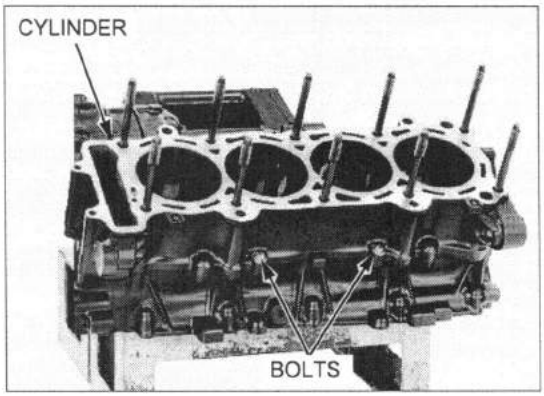


Do not try to remove the connecting rod/ piston assembly from the bottom of the cylinder; the assembly will get stuck when the oil ring expands in the gap between the cylinder liner and the upper crankcase.

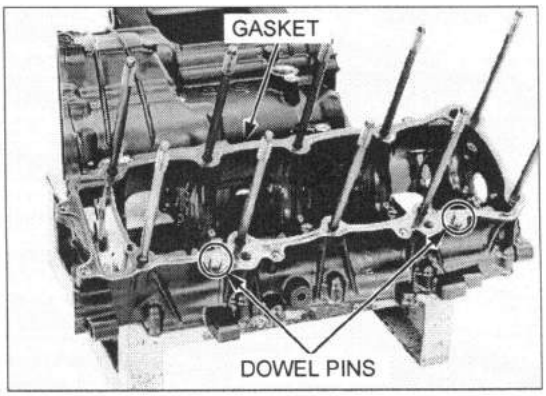
Remove the piston/connecting rod assembly from the top of the cylinder.



Remove the bolts and cylinder.

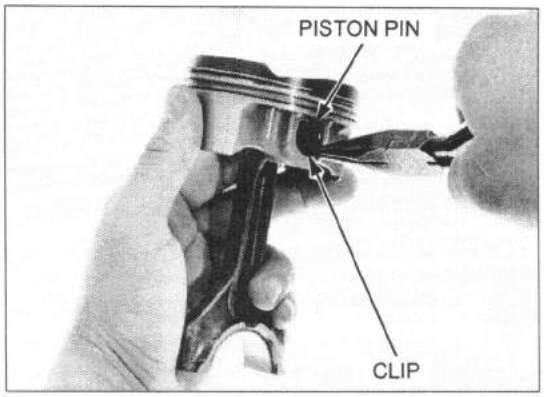


Remove the gasket and dowel pins.



PISTON REMOVAL

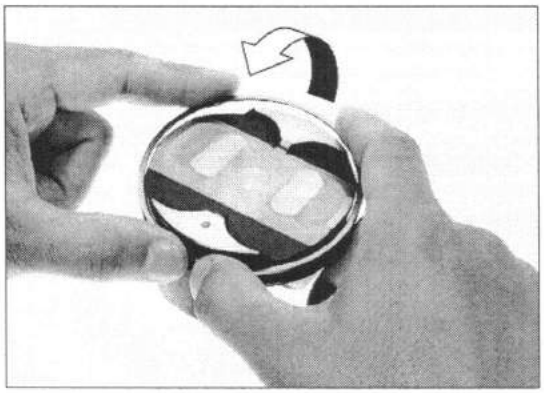
Remove the piston pin clip with pliers.
Push the piston pin out of the piston and connecting rod, and remove the piston.



PISTON DISASSEMBLY

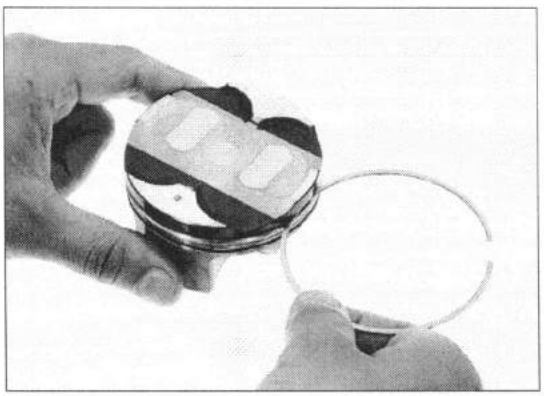
Be careful not to damage the piston ring by spreading the ends too far.

Spread each piston ring ends and remove them by lifting up at a point opposite the gap.



Never use a wire brush; it will scratch the groove.

Clean carbon deposits from the piston ring grooves with a ring that will be discarded.

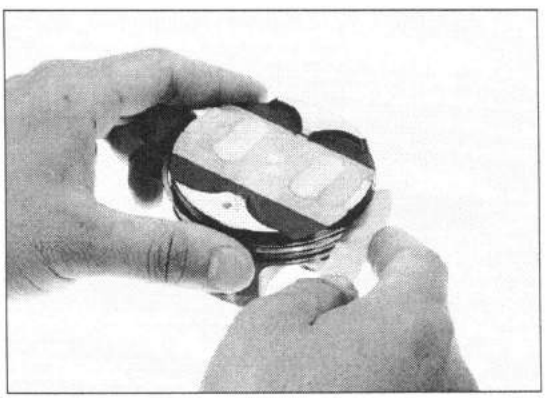


PISTON INSPECTION

Inspect the piston rings for free movement by rotating them in their grooves. The rings should be able to move freely without catching.

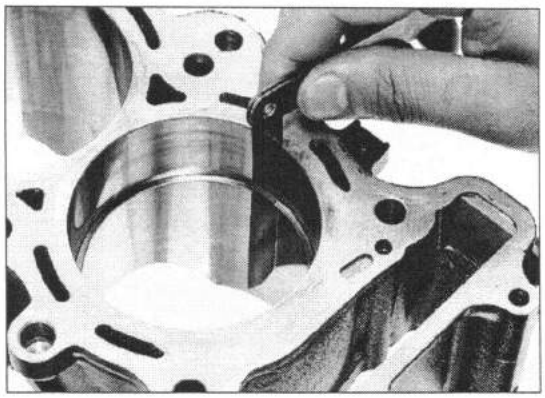
Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

SERVICE LIMITS:
Top: 0.120 mm (0.0050 in)
Second: 0.075 mm (0.0030 in)



Push the rings into the cylinder with the top of the piston to be sure they are squarely positioned in the cylinder.

Insert the piston ring squarely into the top of the cylinder and measure the ring end gap.

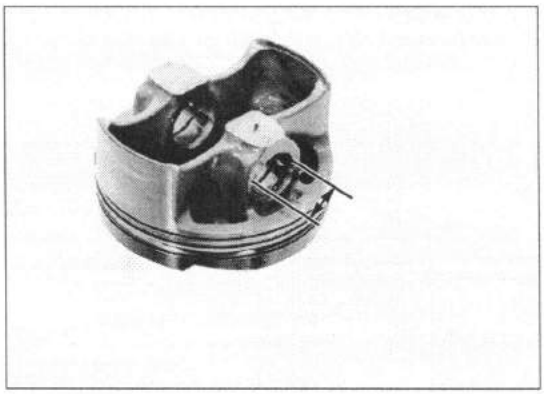


SERVICE LIMITS:

Top:	**0.52 mm (0.020 in)**
Second:	**0.74 mm (0.029 in)**
Oil (side rail):	**1.00 mm (0.040 in)**

Measure the piston pin bore I.D.

SERVICE LIMIT: 17.030 mm (0.6705 in)

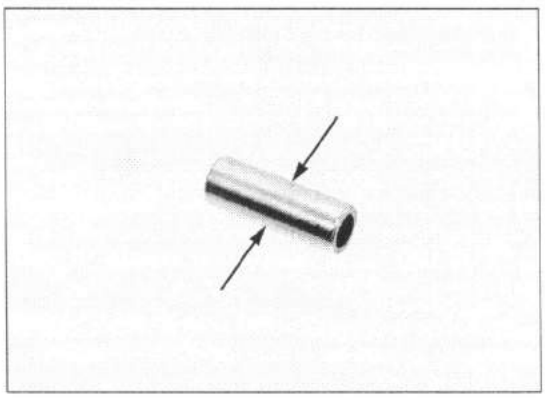


Measure the O.D. of the piston pin.

SERVICE LIMIT: 16.980 mm (0.6685 in)

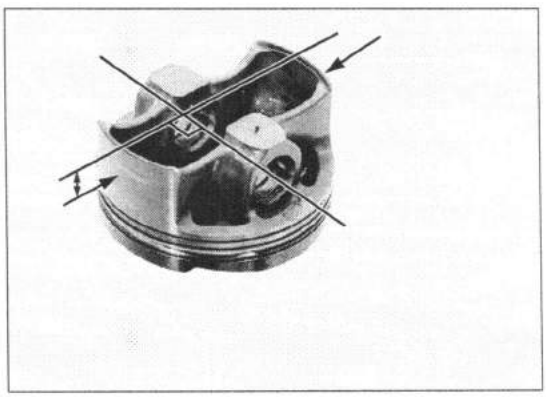
Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)



Measure the diameter of the piston at 5 mm (0.2 in) from the bottom and 90° to the piston pin hole.

SERVICE LIMIT: 75.895 mm (2.9880 in)



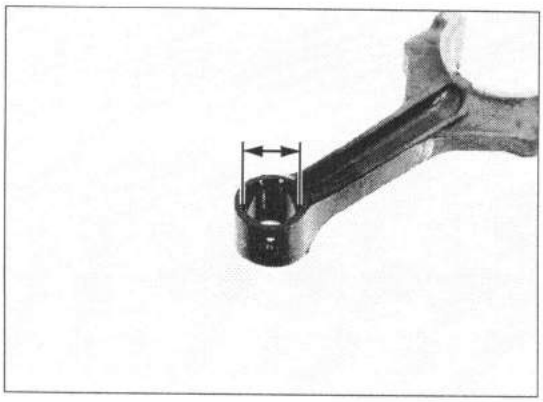
CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

SERVICE LIMIT: 17.048 mm (0.6712 in)

Calculate the connecting rod-to-piston pin clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)



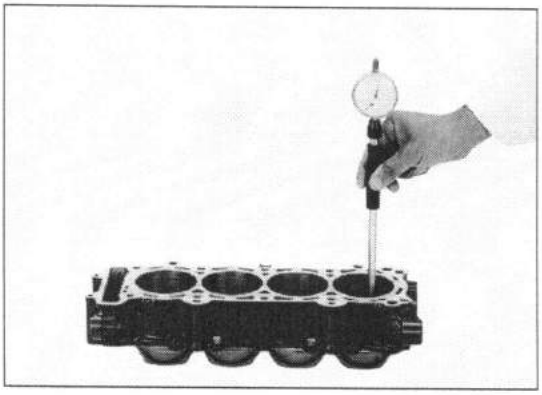
CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D. in X and Y axis at three levels. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 76.025 mm (2.9931 in)

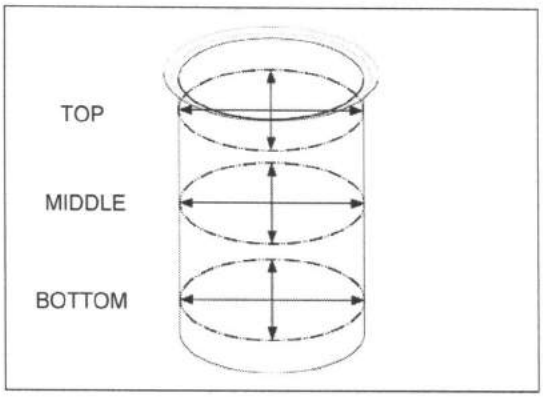
Calculate the cylinder to piston clearance.
Take a maximum reading to determine the clearance.
For piston O.D. measurement (page 13-17).

SERVICE LIMIT: 0.10 mm (0.004 in)



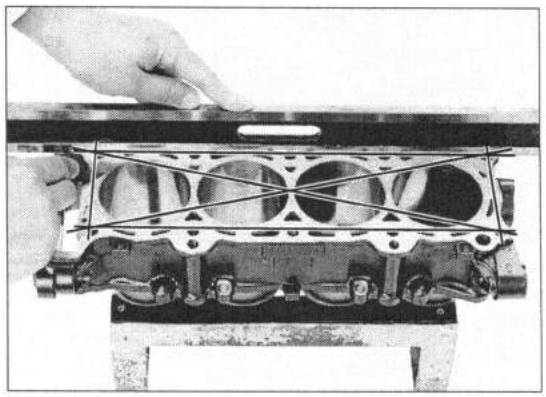
Calculate the taper and out-of-round at three levels in X and Y axis. Take the maximum reading to determine them.

SERVICE LIMITS:
Taper: 0.10 mm (0.004 in)
Out-of-round: 0.10 mm (0.004 in)



Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.10 mm (0.004 in)



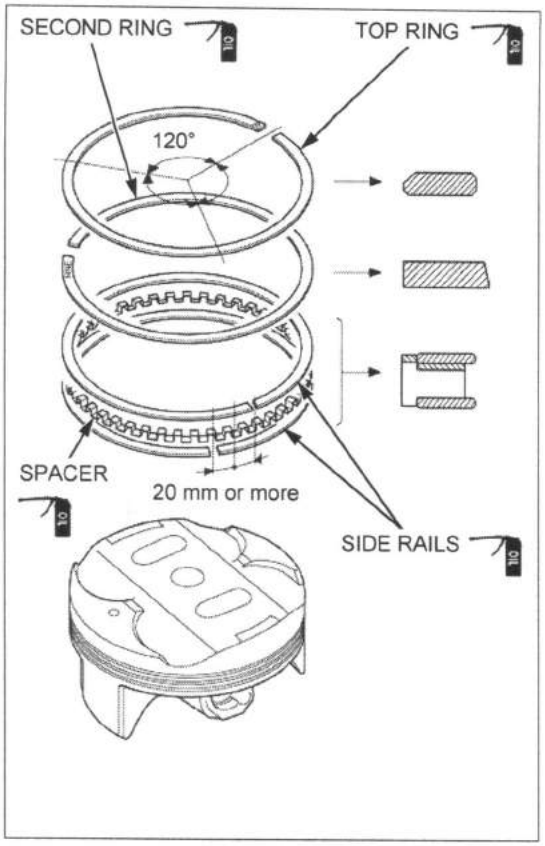
PISTON ASSEMBLY

Clean the piston ring grooves thoroughly and install the piston rings.

- Apply oil to the piston rings.
- Do not damage the piston and piston rings during installation.
- Install the piston rings with the markings (R: top ring, RNE: second ring) facing up.
- To install the oil ring, install the spacer first, then install the side rails.

Stagger the piston ring end gaps 120 apart from each other.
Stagger the side rail end gaps as shown.

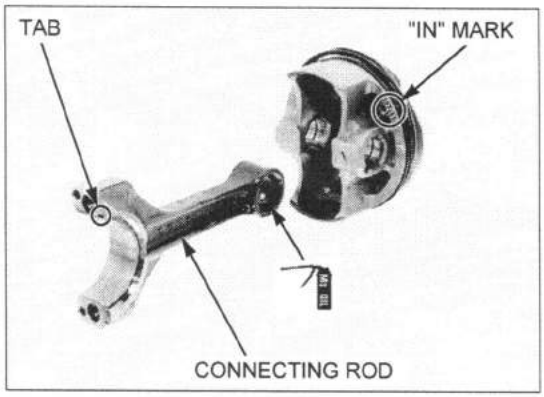
After installation, the rings should rotate freely in the ring grooves.



PISTON INSTALLATION

Apply molybdenum oil solution to the connecting rod small end inner surfaces and piston pin sliding surfaces.

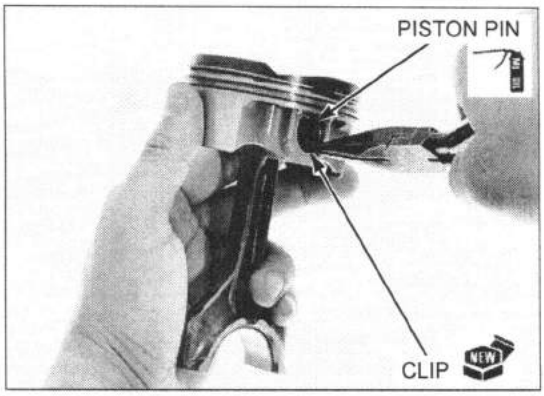
Assemble the piston and connecting rod with the journal bearing tab facing to the piston "IN" mark.



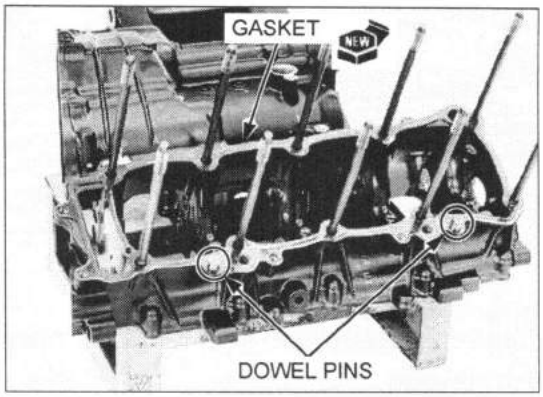
Apply molybdenum oil solution to the piston pin sliding surface.

Install the piston pin and secure it using new piston pin clips.

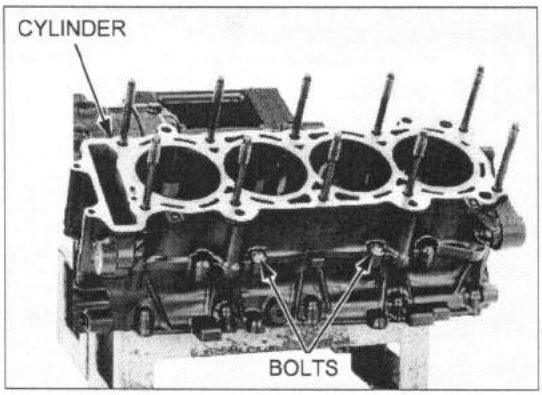
- Make sure that the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cut-out.



Install the dowel pins and new gasket.



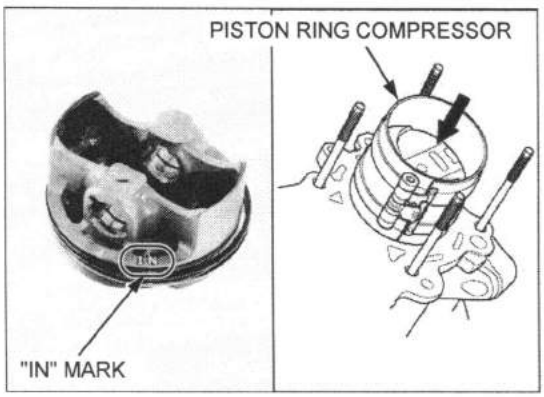
Install the cylinder and tighten the bolt securely.



Coat the cylinder walls, pistons, and piston rings with engine oil.

Install the piston/connecting rod assembly with the piston "IN" mark facing the intake side.

Install the piston/connecting rod assemblies into the cylinders using a commercially available piston ring compressor tool.
When reusing the connecting rods, they must be installed in their original locations.



NOTICE

- *While installing the piston, be careful not to damage the top surface of the cylinder, especially around the cylinder bore.*
- *Be careful not to damage the cylinder and crankpin with the connecting rod.*

Make sure the piston ring compressor tool sits flush on the top surface of the cylinder.

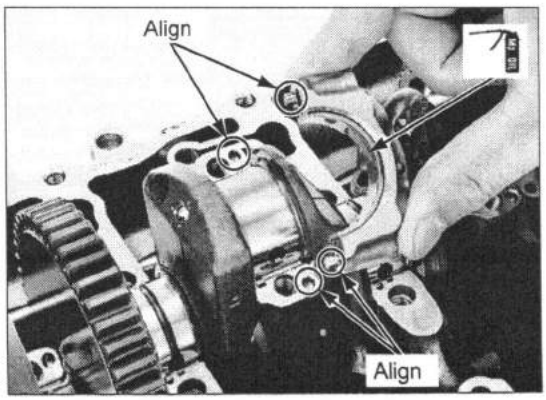
Use the handle of a plastic hammer or equivalent tool to tap the piston into the cylinder.

Install the following:

- Crankshaft (page 13-7)
- Countershaft (page 12-16)

Apply molybdenum oil solution to the crankpin bearing sliding surface on the bearing caps.

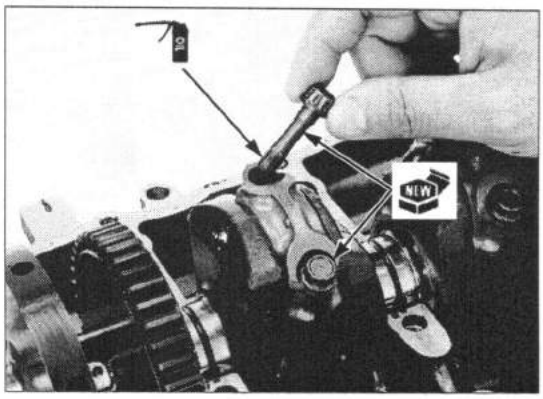
Install the crankpin bearing caps, aligning the dowel pins with the holes in the connecting rods.



TIGHTENING METHOD:

The crankpin bearing cap bolts cannot be reused. Once the bolts have been loosened replace them with new ones.

Apply oil to new crankpin bearing cap bolt threads and seating surfaces, and install the bolts.

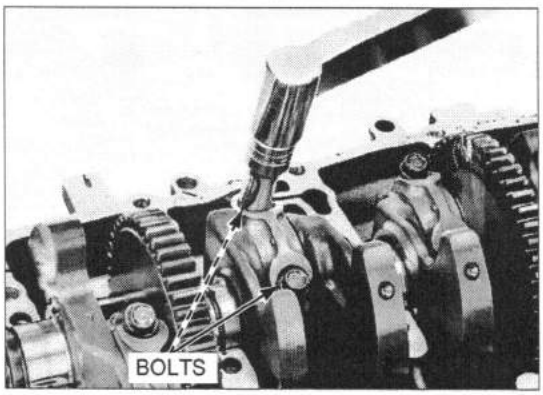


Tighten the bolts in two or three steps alternately to the specified torque.

Further tighten the bolts 90°.

TORQUE: 27.5 N·m (2.8 kgf·m, 20 lbf·ft) + 90°

Assemble the crankcase halves (page 12-22).



14. FRONT WHEEL/SUSPENSION/STEERING

COMPONENT LOCATION 14-2

SERVICE INFORMATION 14-4

TROUBLESHOOTING 14-9

HESD TROUBLESHOOTING 14-10

HANDLEBARS 14-12

FRONT WHEEL 14-19

FORK ('08 – '11 model) 14-31

FORK (After '11 model STANDARD/ABS type) 14-42

FORK (SP type) 14-51

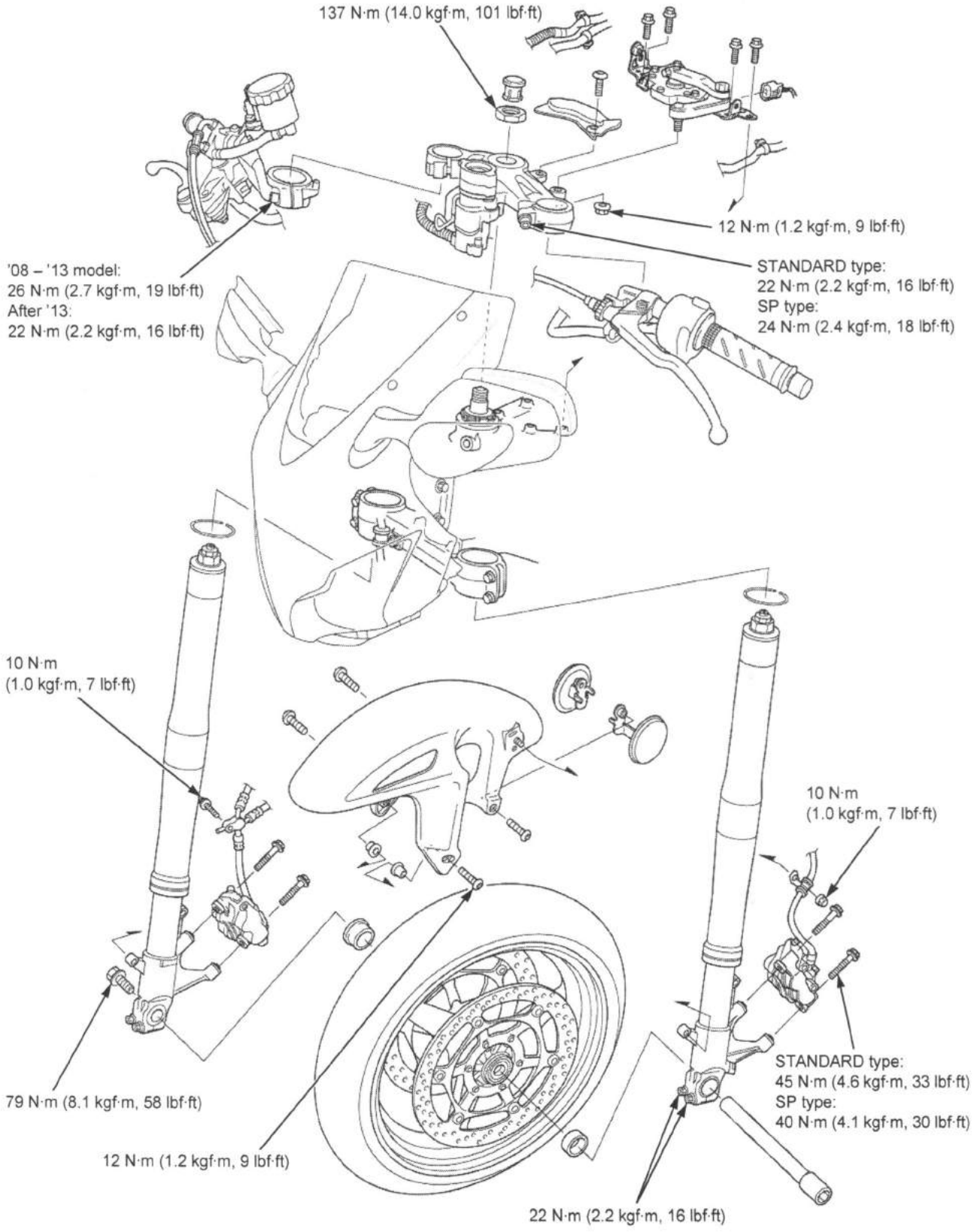
HESD 14-52

STEERING STEM 14-53

COMPONENT LOCATION

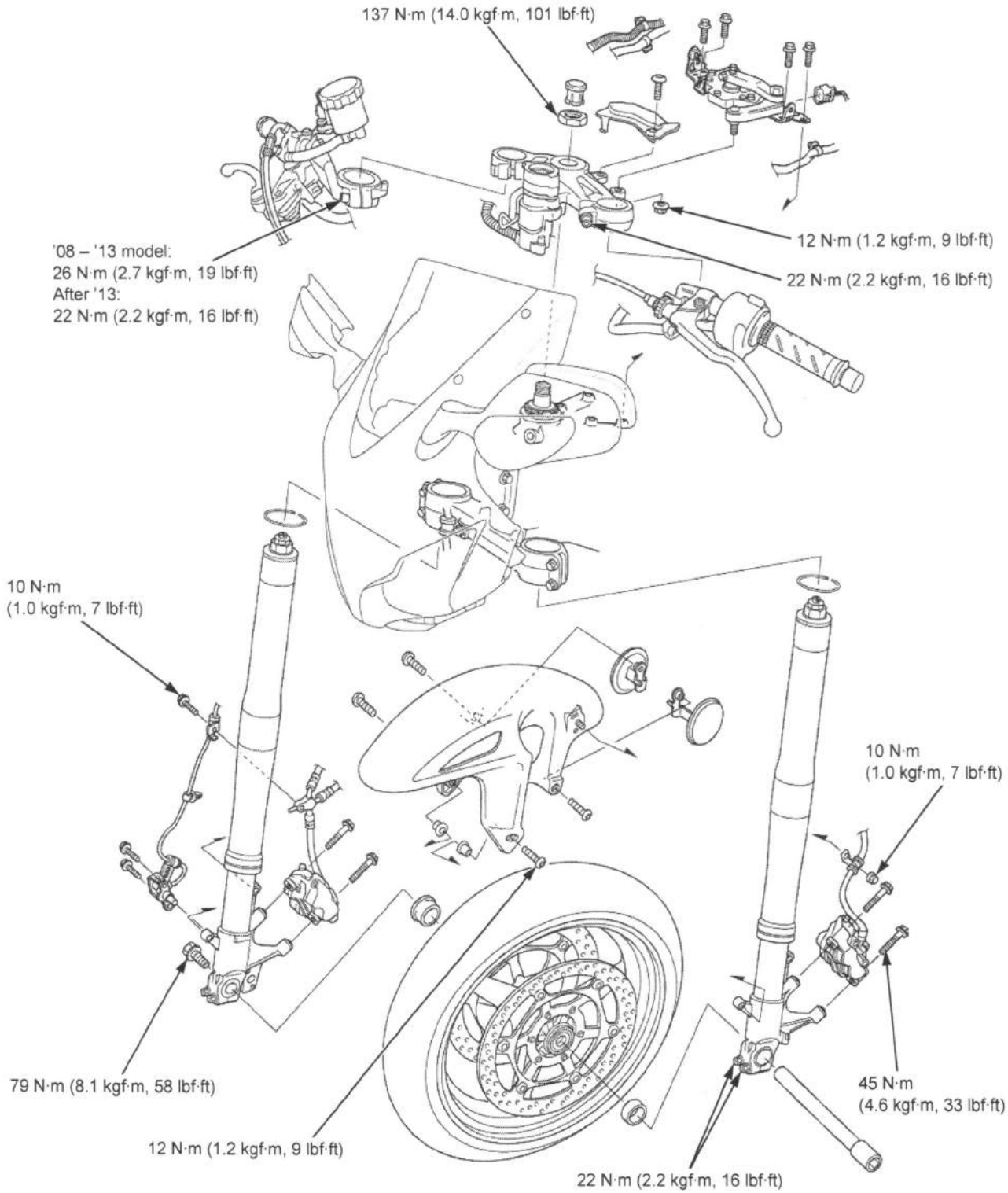
STANDARD/SP type:

'08 – '11 model STANDARD type shown:



ABS type:

'09 – '11 model shown:



SERVICE INFORMATION

GENERAL

- When servicing the front wheel, fork or steering stem, support the motorcycle using a safety stand or hoist.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the front wheel installation, check the brake operation by applying the brake lever.
- For brake system information (page 16-6).
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICATION".
- SP type: Do not disassemble the fork assembly. U.S.A. only: For shock service, refer to SL #73 *Third Party Service Information*.

SPECIFICATIONS

STANDARD/ABS type

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
HESD linear solenoid resistance (at 20°C/68°F)			10 – 15	–
Minimum tire tread depth			–	1.5 (0.06)
Cold tire pressure	Up to maximum weight capacity		250 kPa (2.50 kgf/cm^2, 36 psi)	–
	Up to 90 kg (200 lbs) load		250 kPa (2.50 kgf/cm^2, 36 psi)	–
Axle runout			–	0.2 (0.01)
Wheel rim runout	Radial		–	2.0 (0.08)
	Axial		–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Fork ('08 – '11 model)	Spring free length		234.0 (9.21)	229.3 (9.03)
	Tube runout		–	0.20 (0.008)
	Recommended fork fluid		Pro Honda Suspension Fluid SS-47 (10 W)	–
	Fluid level		93 (3.7)	–
	Fluid capacity		517 ± 2.5 cm^3 (17.5 ± 0.08 US oz, 18.2 ± 0.09 Imp oz)	–
	Pre-load adjuster initial setting		6 turns from minimum	–
	Rebound damping adjuster initial setting		2-1/4 turns out from full hard	–
	Compression damping adjuster initial setting	STANDARD type	2 turns out from full hard	–
		ABS type	2-1/4 turns out from full hard	–
Fork (After '11 model)	Spring free length		229.5 (9.04)	224.9 (8.85)
	Tube runout		–	0.20 (0.008
	Recommended fork fluid		Pro Honda Suspension Fluid SS-47 (10 W)	–
	Fluid level		84 (3.5)	–
	Fluid capacity		515 ± 2.5 cm^3 (17.4 ± 0.08 US oz, 18.1 ± 0.09 Imp oz)	–
	Pre-load adjuster initial setting		7-1/2 turns from minimum	–
	Rebound damping adjuster initial setting	'12, '13 model	4-3/4 turns out from full hard	–
		After '13 model	4-1/2 turns out from full hard	–
	Compression damping adjuster initial setting		5-1/2 turns out from full hard	–
Steering head bearing pre-load			12 – 17 N (1.2 – 1.7 kgf)	–

SP type

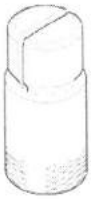
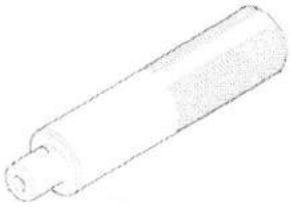
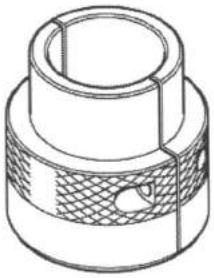
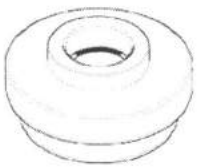
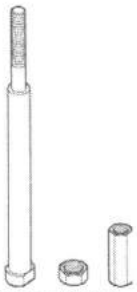
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
HESD linear solenoid resistance (at 20°C/68°F)			10 – 15	–
Minimum tire tread depth			–	1.5 (0.06)
Cold tire pressure	Up to maximum weight capacity		250 kPa (2.50 kgf/cm^2, 36 psi)	–
Axle runout			–	0.2 (0.01)
Wheel rim runout		Radial	–	2.0 (0.08)
		Axial	–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Fork	Pre-load adjuster initial setting		6 turns from minimum	–
	Rebound damping adjuster initial setting		12 clicks from full hard	–
	Compression damping adjuster initial setting		12 clicks from full hard	–
Steering head bearing pre-load			12 – 17 N (1.2 – 1.7 kgf)	–

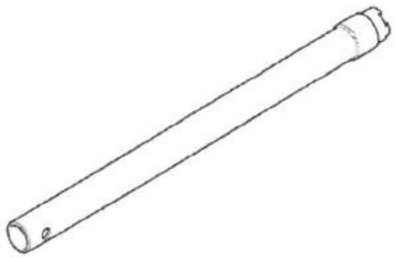
TORQUE VALUES

Handlebar weight mounting screw		10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC screw; replace with a new one.
Front brake disc bolt		20 N·m (2.0 kgf·m, 15 lbf·ft)	ALOC bolt; replace with a new one.
Front axle bolt		79 N·m (8.1 kgf·m, 58 lbf·ft)	
Front axle holder bolt		22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork socket bolt ('08 – '11 model)		34 N·m (3.5 kgf·m, 25 lbf·ft)	Apply locking agent to the threads.
Fork bolt ('08 – '11 model)		34 N·m (3.5 kgf·m, 25 lbf·ft)	
Fork piston rod nut (After '11 model STANDARD/ABS type)		27.5 N·m (2.8 kgf·m, 20 lbf·ft)	
Fork rod guide case (After '11 model STANDARD/ABS type)		90 N·m (9.2 kgf·m, 66 lbf·ft)	
Fork cap (After '11 model STANDARD/ABS type)		35 N·m (3.6 kgf·m, 26 lbf·ft)	
Handlebar pinch bolt	('08 – '13 model)	26 N·m (2.7 kgf·m, 19 lbf·ft)	
	(After '13 model)	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Top bridge pinch bolt	(STANDARD/ABS type)	22 N·m (2.2 kgf·m, 16 lbf·ft)	
	(SP type)	24 N·m (2.4 kgf·m, 18 lbf·ft)	
Bottom bridge pinch bolt		27 N·m (2.8 kgf·m, 20 lbf·ft)	
Steering stem adjusting nut		–	See page 14-59
Steering stem adjusting lock nut		–	See page 14-59
Steering stem nut		137 N·m (14.0 kgf·m, 101 lbf·ft)	
Front brake hose clamp bolt		9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)	
Front brake hose clamp nut		10 N·m (1.0 kgf·m, 7 lbf·ft)	
Front brake hose 3-way joint bolt		10 N·m (1.0 kgf·m, 7 lbf·ft)	
Front master cylinder holder bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper mounting bolt	(STANDARD/ABS type)	45 N·m (4.6 kgf·m, 33 lbf·ft)	ALOC bolt; replace with a new one.
	(SP type)	40 N·m (4.1 kgf·m, 30 lbf·ft)	ALOC bolt; replace with a new one.
Second arm nut		12 N·m (1.2 kgf·m, 9 lbf·ft)	U-nut
HESD mounting bolt		10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt; replace with a new one.
Right handlebar switch housing screw		0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Fork damper rod lock nut ('08 – '11 model)		20 N·m (2.0 kgf·m, 15 lbf·ft)	
Front fender mounting screw		12 N·m (1.2 kgf·m, 9 lbf·ft)	
HESD torque arm nut		12.5 N·m (1.3 kgf·m, 9.2 lbf·ft)	U-nut
Front pulser ring mounting bolt (ABS type)		7 N·m (0.7 kgf·m, 5.2 lbf·ft)	ALOC bolt; replace with a new one.

TOOLS

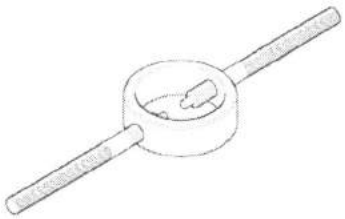
Bearing remover shaft 07GGD-0010100 	Bearing remover head, 25 mm 07746-0050800 	Driver 07749-0010000 
Attachment, 42 x 47 mm 07746-0010300 	Pilot, 25 mm 07746-0040600 	Fork seal driver, 43 mm 07YMD-MCF0100  or 07NMD-KZ3010A (U.S.A. only)
Steering stem socket 07HMA-MR70100 	Driver attachment (2 required) 07NMF-MT70120  (Not available in U.S.A.)	Driver shaft assembly 07946-KM90301  (Not available in U.S.A.)
Bearing remover 07NMF-MT70110  (Not available in U.S.A.)	Assembly base 07946-KM90600  (Not available in U.S.A.)	Attachment, 35.2 mm I.D. 07947-KA20200  (Not available in U.S.A.)

Fork damper holder
07YMB-MCF0101
('08 – '11 model)



or 07YMB-MCFA100 (U.S.A. only)

Spring collar holder
070MF-MBZC110
('08 – '11 model)



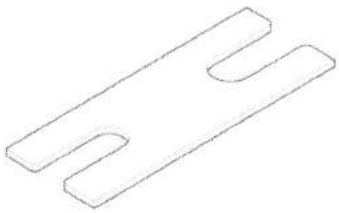
NOTE:
This tool is a part of fork damper install set (P/N 070MF-MBZC100)
(Not available in U.S.A.)

Damper rod holder
070MF-MBZC120
('08 – '11 model)



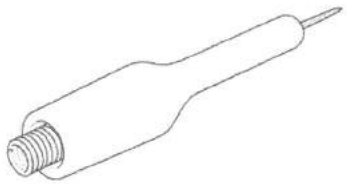
NOTE:
This tool is a part of fork damper install set (P/N 070MF-MBZC100)
(Not available in U.S.A.) or
070MF-MBZA120 (U.S.A. only)

Stopper plate
070MF-MBZC130
('08 – '11 model)

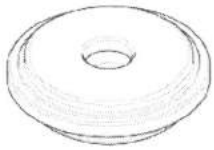


NOTE:
This tool is a part of fork damper install set (P/N 070MF-MBZC100)
(Not available in U.S.A.)

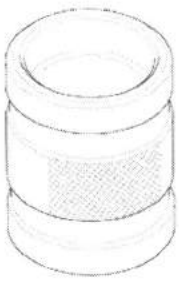
Test probe (2 required)
07ZAJ-RDJA110



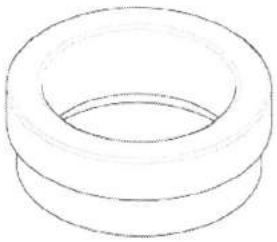
Main bearing driver attachment
07946-ME90200



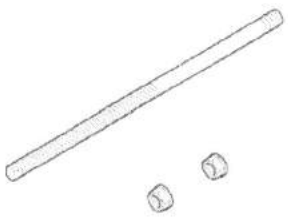
Fork seal driver weight
07947-KA50100



Oil seal driver
07965-MA60000



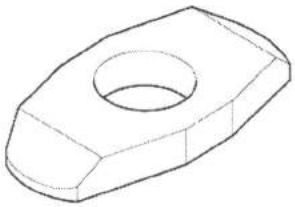
Installer shaft
07VMF-KZ30200



Installer attachment (2 required)
07VMF-MAT0200



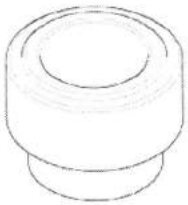
Remover attachment
07AMF-MELA200 (U.S.A. only)



Fork rod stopper
07AMB-KZ3A100 (U.S.A. only)
('08 – '11 model)



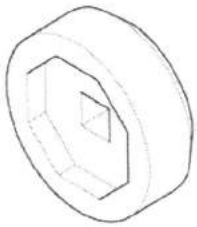
Attachment, 35 mm I.D.
07746-0030400



Fork spring compressor
07AMC-MFJA100 (U.S.A. only)
('08 – '11 model)

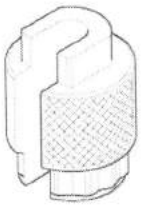


Fork cap wrench
070MA-MGP0100
(After '11 model STANDARD/ABS type)



Fork cap socket, 45 mm
07AMA-MGPA100 (U.S.A. only)

Rod guide case wrench
070MB-MGP0100
(After '11 model STANDARD/ABS type)



Rod Guide Case Wrench
070MB-MGPA100 (U.S.A. only)

TROUBLESHOOTING

NOTE:

If there is any problem with steering, remove the HESD (page 14-52) and inspect the condition of the steering parts. Check the HESD by using the Function Test (page 14-10) if no faulty steering parts are found.

Hard steering
- Faulty HESD
- Steering stem adjusting nut too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure

Steers to one side or does not track straight
- Faulty HESD
- Damaged or loose steering head bearings
- Bent forks
- Bent axle
- Bent frame
- Worn or damaged wheel bearings
- Worn or damaged swingarm pivot bearings

Front wheel wobbling
- Bent rim
- Worn or damaged front wheel bearings
- Faulty tire
- Unbalanced front tire and wheel

Front wheel turns hard
- Faulty front wheel bearings
- Bent front axle
- Front brake drag

Soft suspension
- Insufficient fluid in fork
- Incorrect fork fluid weight
- Weak fork springs
- Insufficient tire pressure

Hard suspension
- Bent fork tubes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

Front suspension noise
- Insufficient fluid in fork
- Loose fork fasteners

HESD TROUBLESHOOTING

- The HESD system is equipped with a Self-Diagnostic System that is linked to the PGM-FI system (page 6-14). If the MIL blinks, follow the Self-Diagnostic Procedures to remedy the problem (Refer to DTC troubleshooting: page 6-23).
  The HESD system is also equipped with a Function Test Mode to check the HESD under maximum damping characteristics. If there is any abnormal condition in the HESD system without MIL blinking, follow the HESD function test and check the HESD function.
- The HESD system includes a fail-safe function to allow a minimum running capability even when there are problems with the system. When any abnormality is detected by the self-diagnosis function, the ECM stops the HESD system control by shutting off the current supply to the linear solenoid, the HESD will operate under minimum damping characteristics accordingly.
- For PGM-FI system diagram.
  – STANDARD/SP type (page 6-9)
  – ABS type (page 6-10)
- For MCS information.
  – STANDARD/SP type (page 6-15)
  – ABS type (page 6-16)
- For DTC readout.
  – STANDARD/SP type (page 6-16)
  – ABS type (page 6-17)
- For DTC index (page 6-19).
- A faulty HESD system is often related to poorly connected or corroded connectors. Check those connections before proceeding.

HESD FUNCTION TEST

NOTE:

- The HESD system is also equipped with a Function Test Mode so that a technician can compare the minimum with maximum damping characteristics without riding. The HESD system is set to minimum damping at no vehicle speed under normal conditions. By using the Function Test Mode, the ECM operates the linear solenoid with maximum current so the HESD system is temporarily set to maximum damping.
- It is not possible to use the HESD Function Test Mode when any problem exists.
- Before performing the HESD function test, remove the HESD (page 14-52) and check the following.
  – Steering head bearing pre-load (page 14-61)
  – Wear or damage of steering head bearing (page 4-48)
  – HESD-to-steering linkage

HESD FUNCTION TEST PROCEDURE

- Support the motorcycle using a hoist or equivalent and raise the front wheel off the ground.
- Before function test, check the steering feel for minimum damping characteristics by moving the handlebars right and left quickly several times. When conducting the test, move the handlebar in the same way.

Perform the HESD function test as follows:

1. Lower the sidestand (sidestand switch OFF).
2. Shift the transmission into any gear other than neutral.
3. Open the throttle grip fully.
4. Turn the ignition switch ON while keeping the state of 1 – 3.

   The HESD indicator starts blinking and the HESD system enters the Function Test Mode for 10 seconds.

   Make sure that the damping characteristics (force) changes, by means of comparing the minimum damping characteristics before Function Test with the maximum damping characteristics under the Function Test.

   If the HESD damping characteristics (force) in Function Test Mode does not change at all, replace the HESD with a new one (page 14-52).

DTC TROUBLESHOOTING

DTC	Causes	Symptoms	Refer to
11-1	• Loose or poor contact on VS sensor connector • VS sensor or its circuit malfunction	• Engine operates normally • HESD does not function – ECM does not control the linear solenoid – Minimum damping characteristics	6-32
51-1	• Loose or poor contact of the HESD solenoid connector • HESD solenoid or its circuit malfunction	• Engine operates normally • HESD does not function – ECM does not control the linear solenoid – Minimum damping characteristics	14-11

DTC 51-1 (LINEAR SOLENOID)

Before starting the inspection, check for loose or poor contact on the linear solenoid connector and recheck the DTC.

1. Linear Solenoid Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector.
Measure the resistance at the ECM 33P (Gray) connector terminals at the wire side.

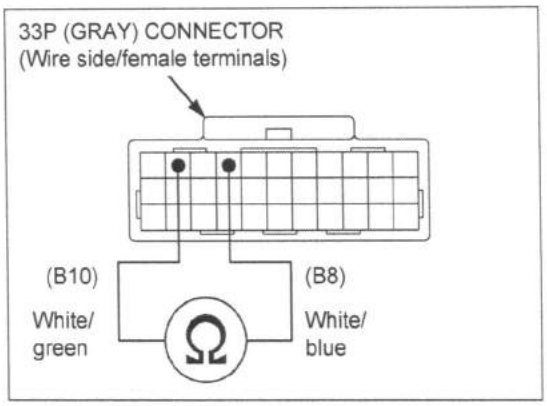
Connection: B8 – B10

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is the resistance within 10 – 15 (20°C/68°F)?

YES – GO TO STEP 3.

NO – GO TO STEP 2.



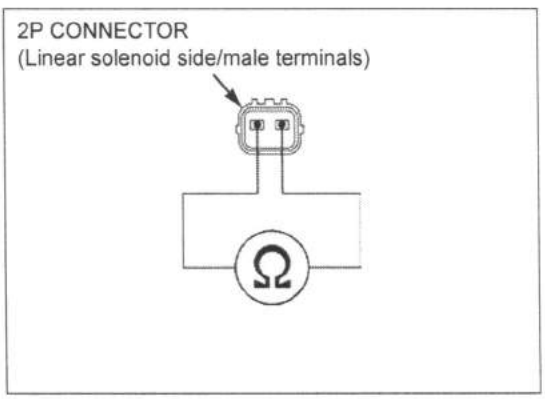
2. Linear Solenoid Resistance Inspection

Remove the HESD (page 14-52).
Measure the resistance at the linear solenoid terminals.

Is the resistance within 10 – 15 (20°C/68°F)?

YES – Open circuit in White/green or White/blue wire

NO – Faulty linear solenoid



3. **Linear Solenoid Short Circuit Inspection**

Check for continuity between the ECM 33P (Gray) connector terminals at the wire side and ground.

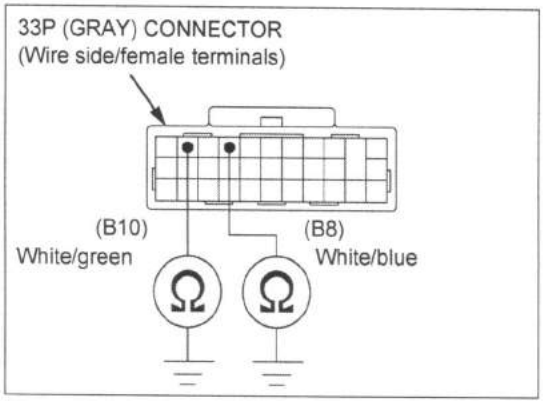
Connection: B8 – Ground
B10 – Ground

TOOL:
Test probe **07ZAJ-RDJA110**

Is there continuity?

YES – Short circuit in White/green or White/blue wire

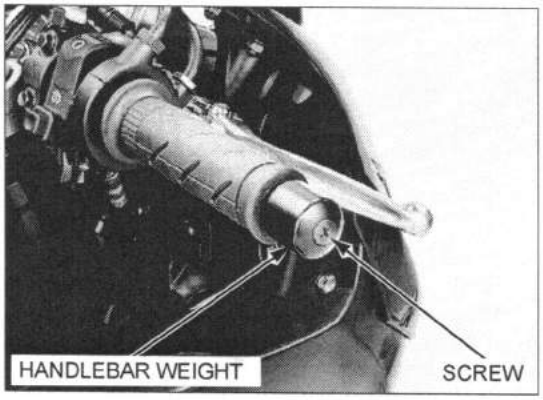
NO – Replace the ECM with a known good one and recheck.



HANDLEBARS

REMOVAL

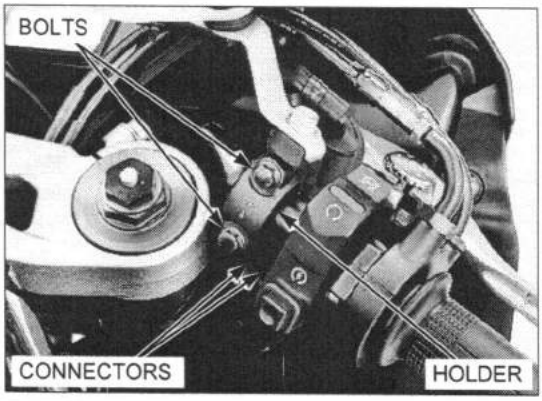
Remove the screw and right handlebar weight.



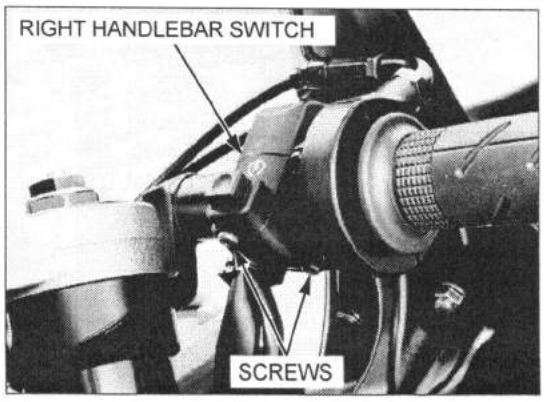
Disconnect the front brake light switch wire connectors from the switch.

Keep the brake master cylinder reserve tank upright to prevent air from entering the hydraulic system.

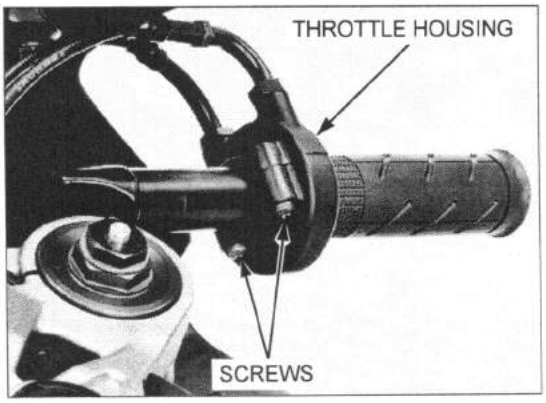
Remove the bolts, holder, and master cylinder assembly.



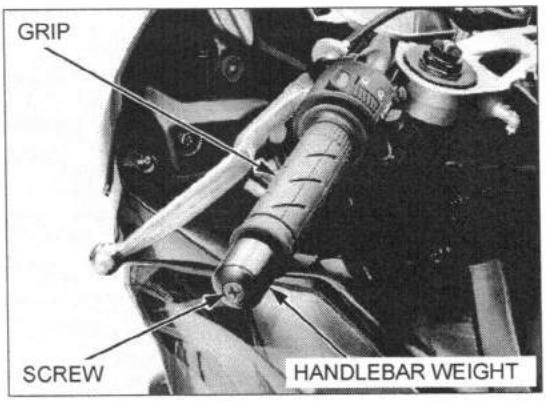
Remove the screws and right handlebar switch.



Remove the screws and separate the throttle housing.

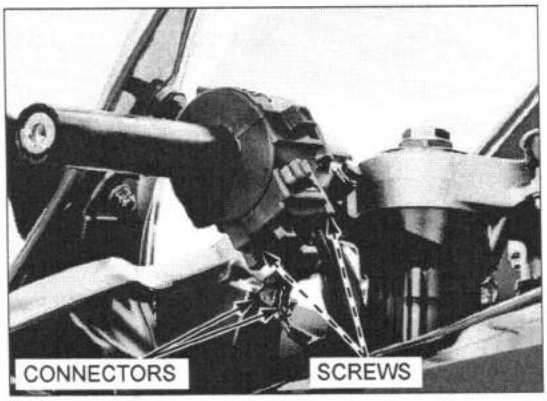


Remove the screw, left handlebar weight, and grip from the handlebar.

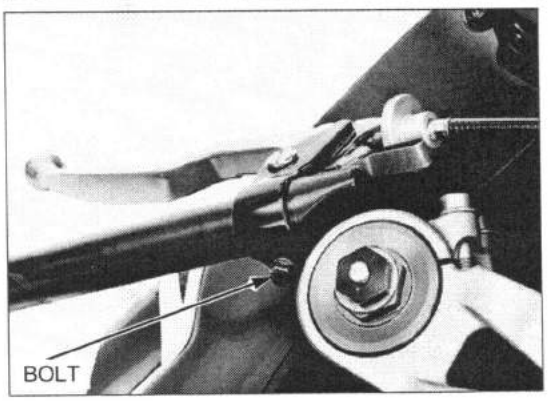


Disconnect the clutch switch connectors from the clutch switch.

Remove the screws and left handlebar switch housing.

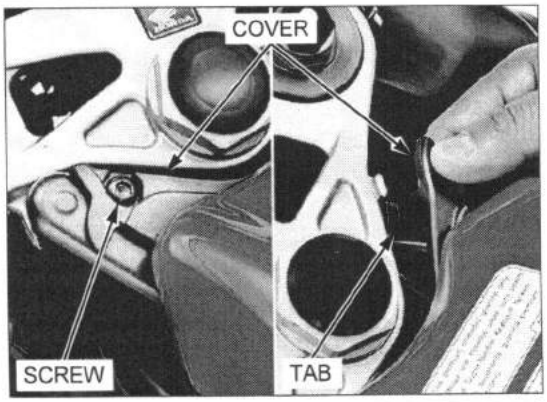


Loosen the clutch lever bracket pinch bolt.

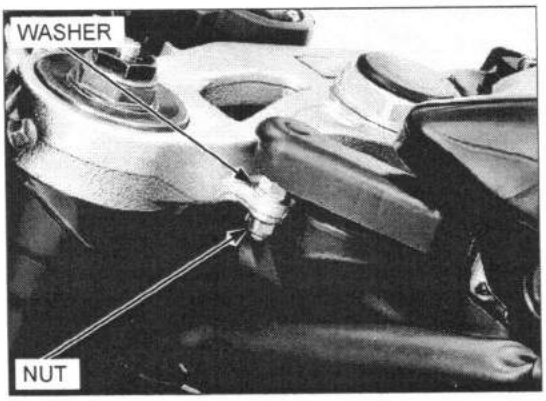


Be careful not to damage the tab.

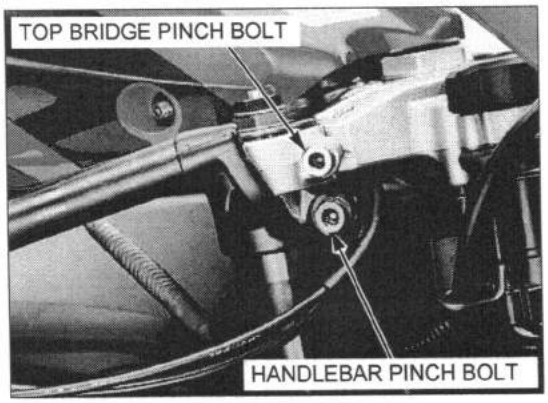
Remove the screw and steering damper cover.



Remove the nut and disconnect the second arm from the top bridge.
Remove the washer from the second arm.

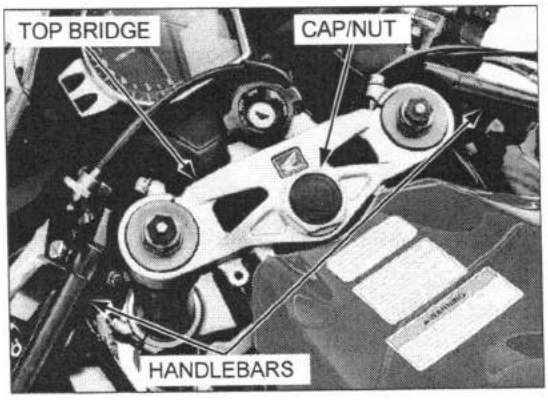


Loosen the top bridge and handlebar pinch bolts.



Remove the cap, steering stem nut, and top bridge with the ignition switch wire connector connected.

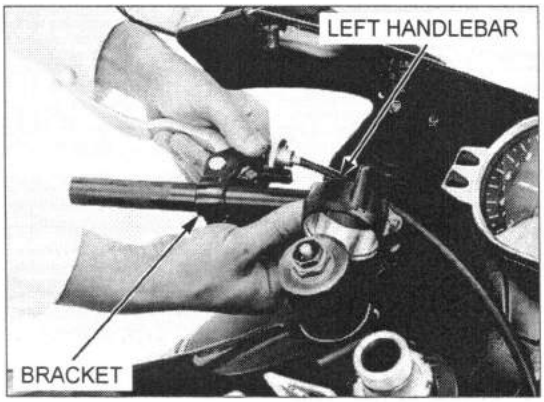
Remove the handlebars from the fork sliders.
Remove the clutch lever bracket and throttle pipe from the handlebars.



INSTALLATION

Install the clutch lever bracket to the left handlebar.

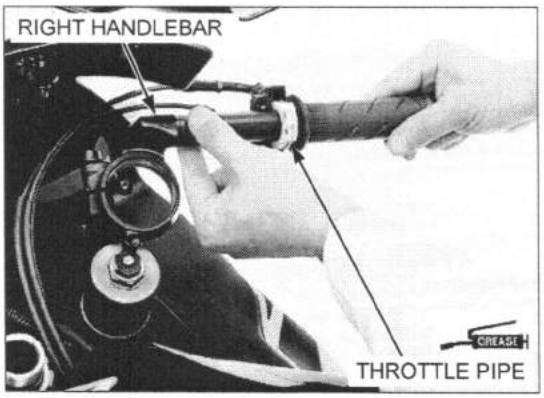
Install the left handlebar onto the left fork slider.



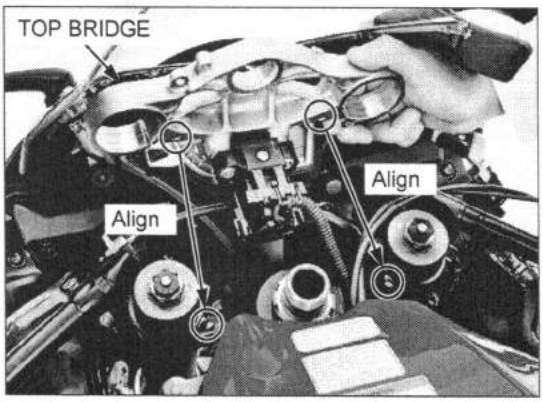
Apply grease to the throttle cable groove of the throttle pipe.

Install the throttle pipe to the right handlebar.

Install the right handlebar onto the right fork slider.



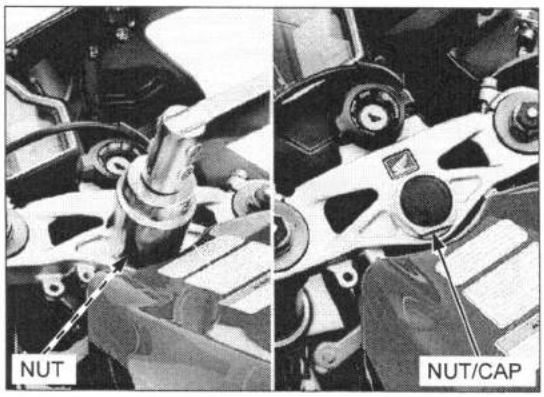
Install the top bridge while aligning its holes with the handlebar stopper pins.



Tighten the steering stem nut to the specified torque.

TORQUE: 137 N·m (14.0 kgf·m, 101 lbf·ft)

Install the steering stem cap.

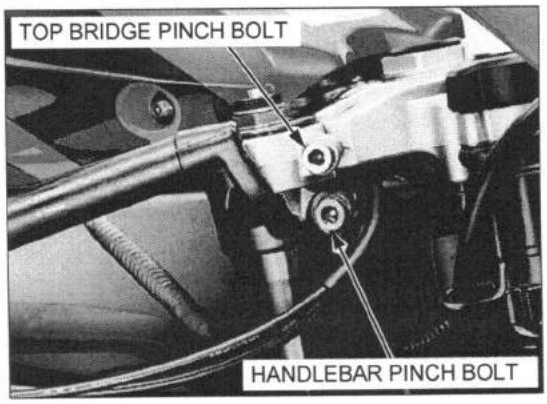


Tighten the top bridge pinch bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the handlebar pinch bolts to the specified torque.

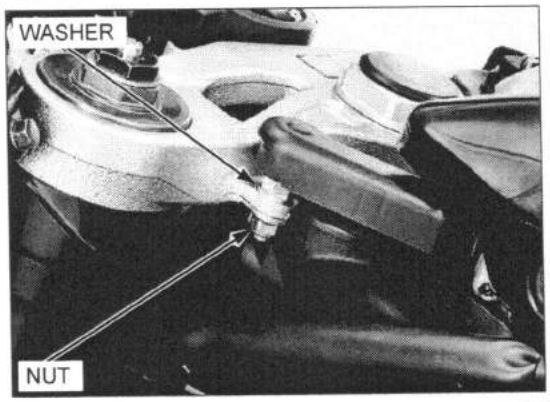
TORQUE:
'08 – '13 model:
26 N·m (2.7 kgf·m, 19 lbf·ft)
After '13 model:
22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the washer to the second arm joint and connect the second arm to the top bridge.

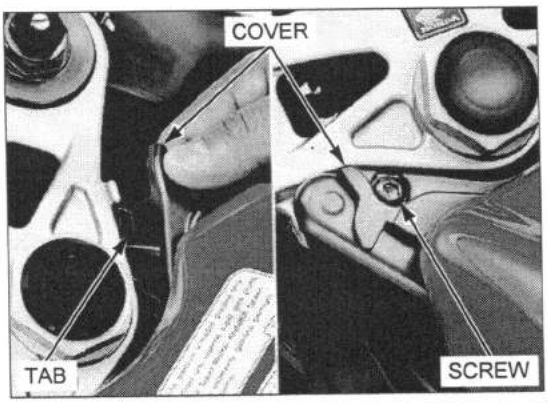
Tighten the nut to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



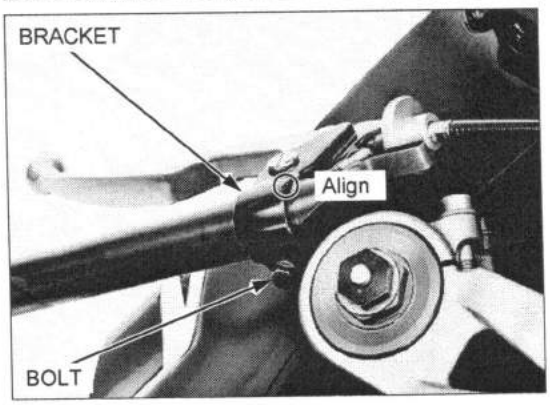
Be careful not to damage the tab.

Install the steering damper cover to the top bridge and tighten the screw securely.



Align the punch marks on the left handlebar and clutch lever bracket.

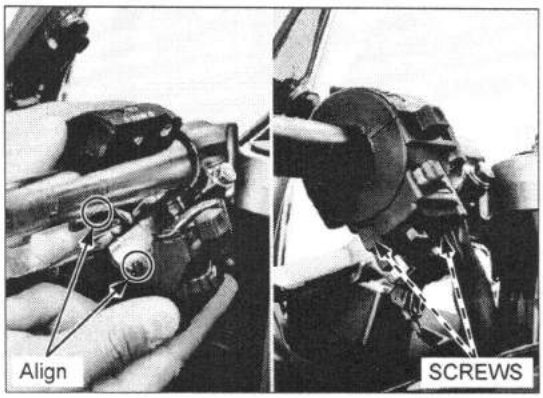
Tighten the clutch lever bracket pinch bolt securely.



Install the left handlebar switch housing aligning its pin with the hole in the handlebar.

Tighten the forward screw first, then the rear screw.

Connect the clutch switch connectors securely.

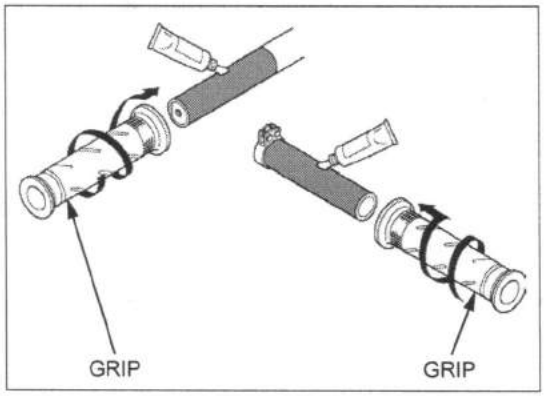


Apply Pro Honda Handgrip Cement or equivalent adhesive to the inner surface of the grip and to the clean surfaces of the left handlebar and throttle grip.

Wait 3 – 5 minutes and install the grip.

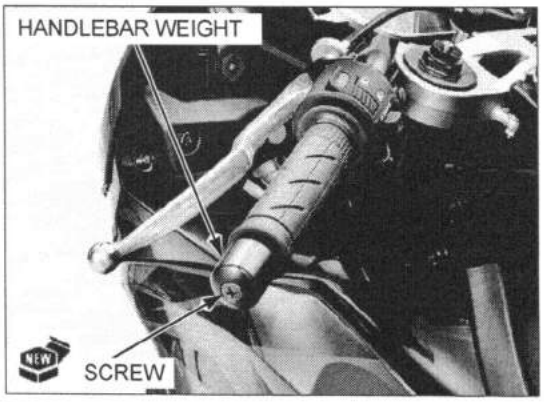
Allow the adhesive to dry for an hour before using.

Rotate the grip for even application of the adhesive.



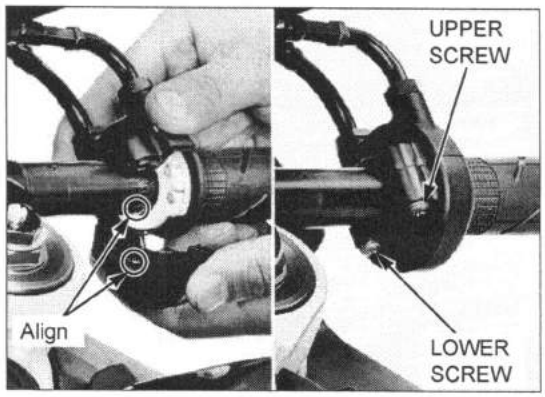
Install the left handlebar weight and tighten a new screw to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Install the throttle housing by aligning its pin with the hole on the handlebar.

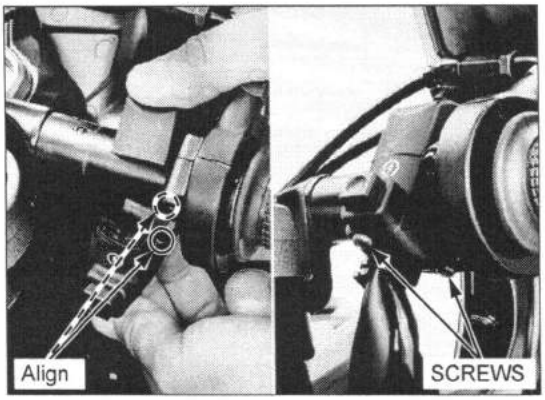
Tighten the upper screw first, then the lower screw.



Install the right handlebar switch housing by aligning its locating pin with the hole in the handlebar.

Tighten the forward screw first, then the rear screw to the specified torque.

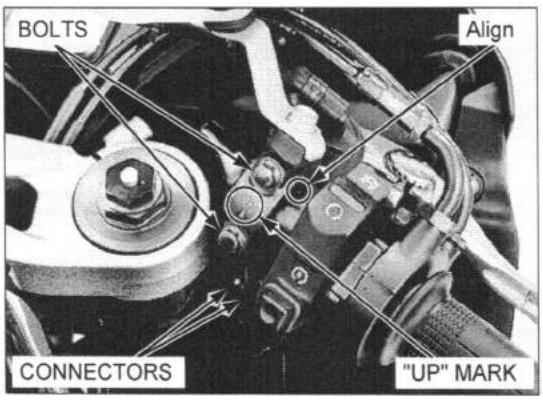
TORQUE: 0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)



Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.
Install the master cylinder holder with its "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

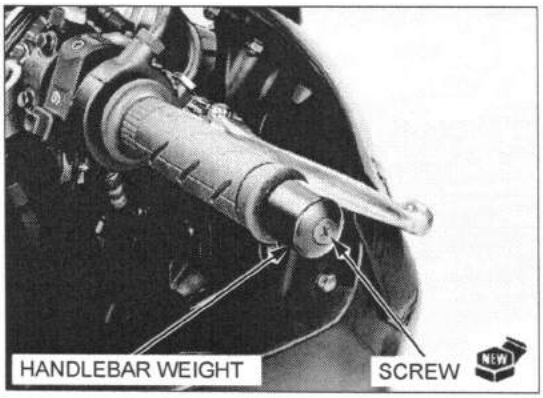
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the front brake switch wire connectors.



Install the right handlebar weight and tighten a new screw to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

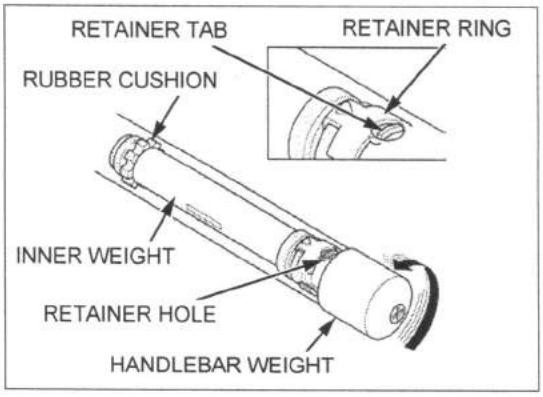


HANDLEBAR WEIGHT REPLACEMENT

Remove the left grip and throttle pipe from the handlebar.
Straighten the weight retainer tab by the screwdriver or punch.

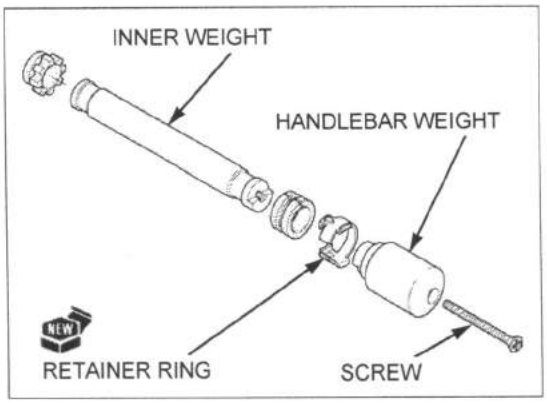
Apply lubricant spray through the tab locking hole to the rubber for easy removal.

Temporarily install the handlebar weight and screw, then remove the inner weight by turning the handlebar weight.

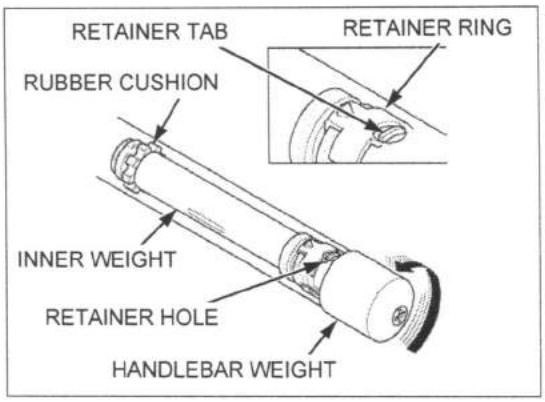


Remove the handlebar weight from the inner weight.
Discard the retainer ring.

Install a new retainer ring onto the inner weight.
Install the left grip and throttle pipe onto the handlebars.
Install the handlebar weight onto the inner weight while aligning the bosses and grooves each other.
Install a new mounting screw.



Insert the handlebar weight assembly into the handlebar.
Turn the handlebar weight and hook the retainer ring tab with the hole in the handlebar.



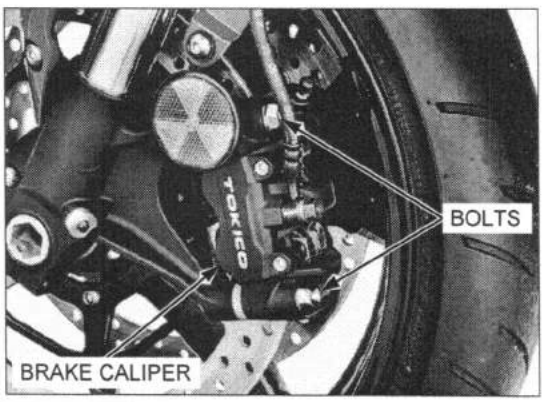
FRONT WHEEL

REMOVAL (STANDARD/SP type)

Remove the bolts and brake calipers.

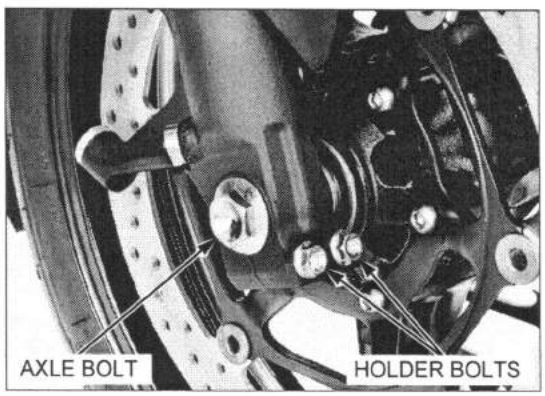
Do not operate the brake lever after the brake caliper is removed.

Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.

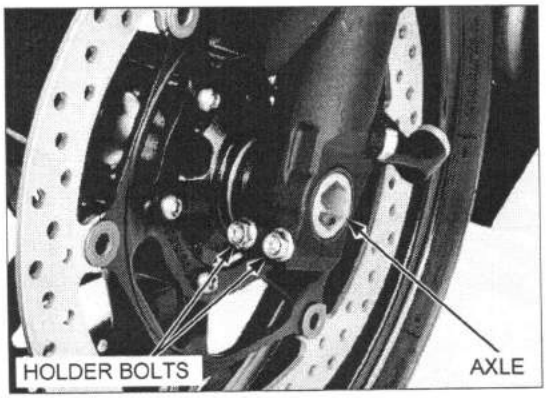


Loosen the right axle holder bolts.
Remove the axle bolt.

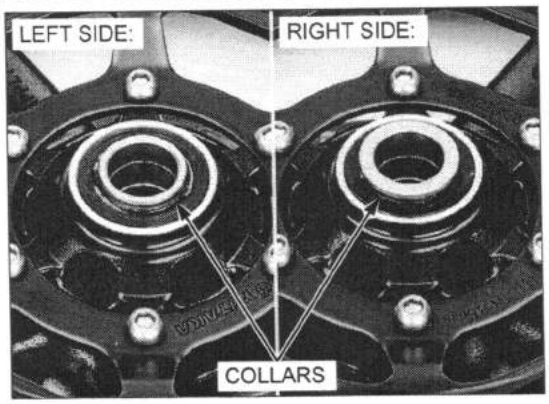
Support the motorcycle securely and raise the front wheel off the ground using a safety stand or a hoist.



Loosen the left axle holder bolts.
Remove the axle and front wheel.

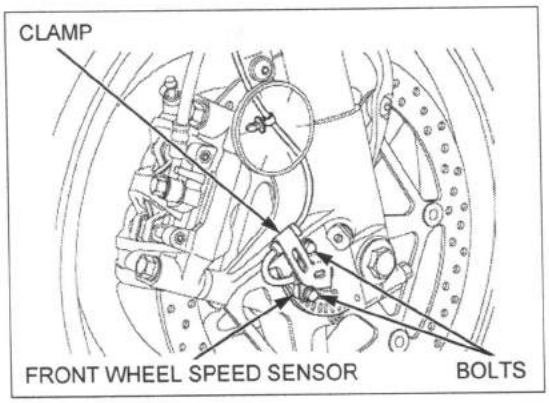


Remove the right and left side collars.



REMOVAL (ABS type)

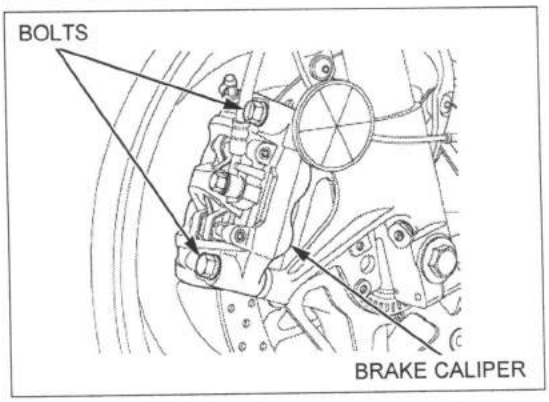
Remove the bolts, wire clamp, and front wheel speed sensor.



Remove the bolts and brake calipers.

Do not operate the brake lever after the brake caliper is removed.

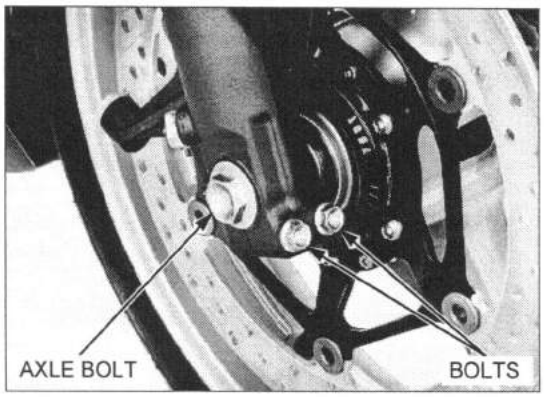
Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.



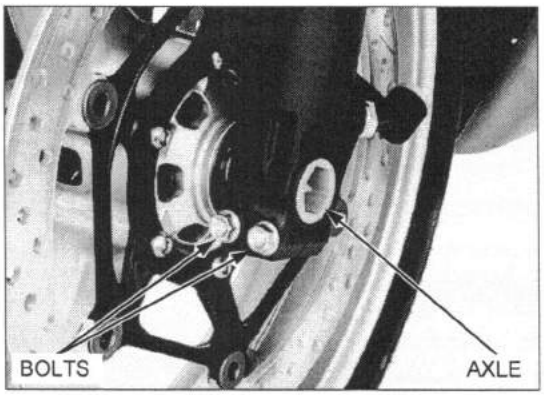
Be careful not to damage the pulser ring.

Loosen the right axle holder bolts.
Remove the axle bolt.

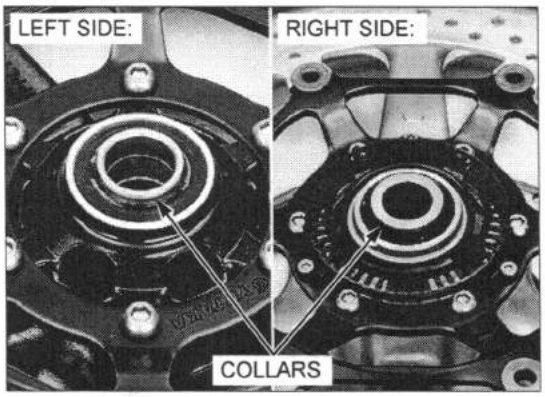
Support the motorcycle securely and raise the front wheel off the ground using a safety stand or a hoist.



Loosen the left axle holder bolts.
Remove the axle and front wheel.



Remove the right and left side collars.

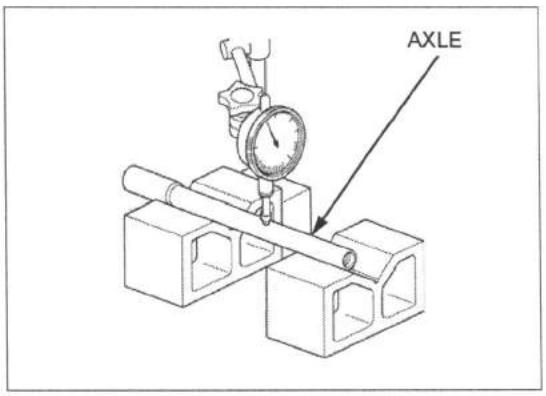


INSPECTION

Axle

Set the axle on V-blocks and measure the runout.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)



Wheel bearing

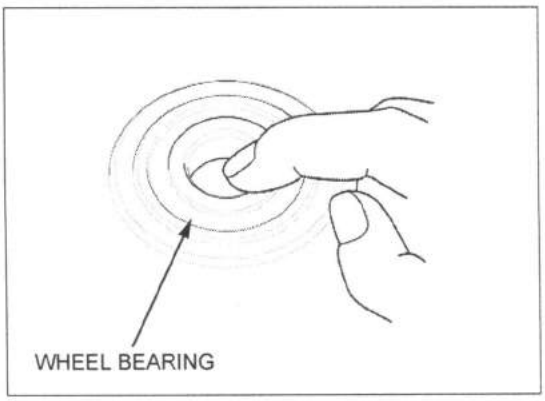
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the outer race of the bearing fits tightly in the hub.

Replace the bearings in pairs.

Replace the bearings if the inner race does not turn smoothly, quietly, or if the outer race fit loosely in the hub.

Replace the wheel bearings, if necessary.

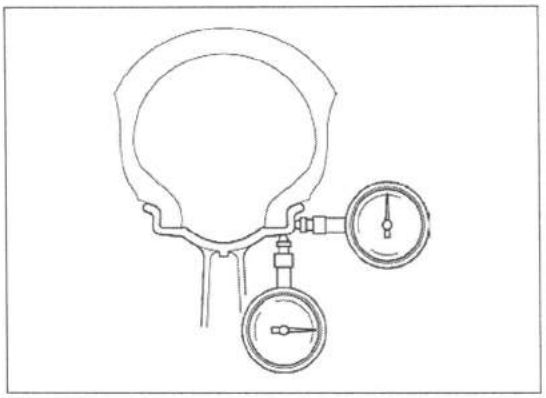
- STANDARD/SP type (page 14-24)
- ABS type (page 14-24)



Wheel rim runout

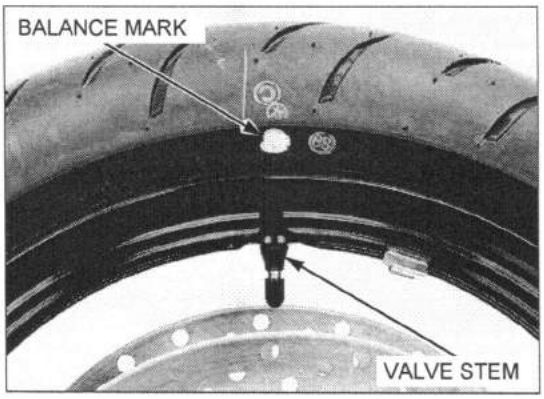
Check the rim runout by placing the wheel in a truing stand.
Spin the wheel by hand and read the runout using a dial indicator.

SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

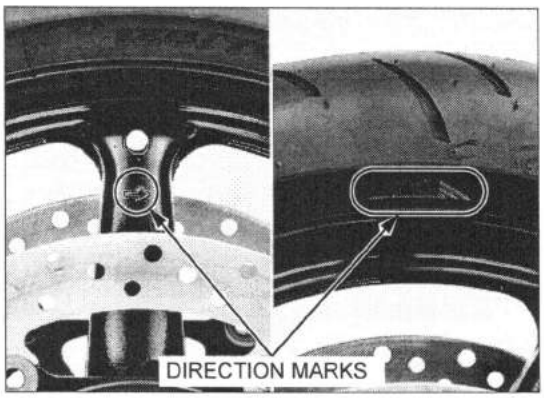


Wheel balance ('08 '11)

- Wheel balance directly affects the stability, handling, and overall safety of the motorcycle. Always check balance whenever the tire has been removed from the rim.
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

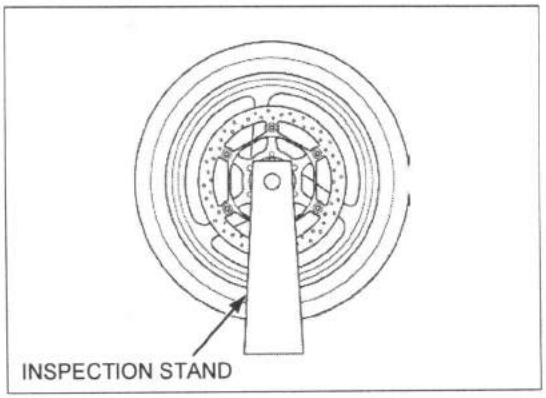


Note the rotating direction marks on the wheel and tire, and upon tire installation, always fit the tire so the marks face the same direction.



Remove the dust seals from the wheel.
Mount the wheel, tire, and brake discs assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not stop consistently in the same position.

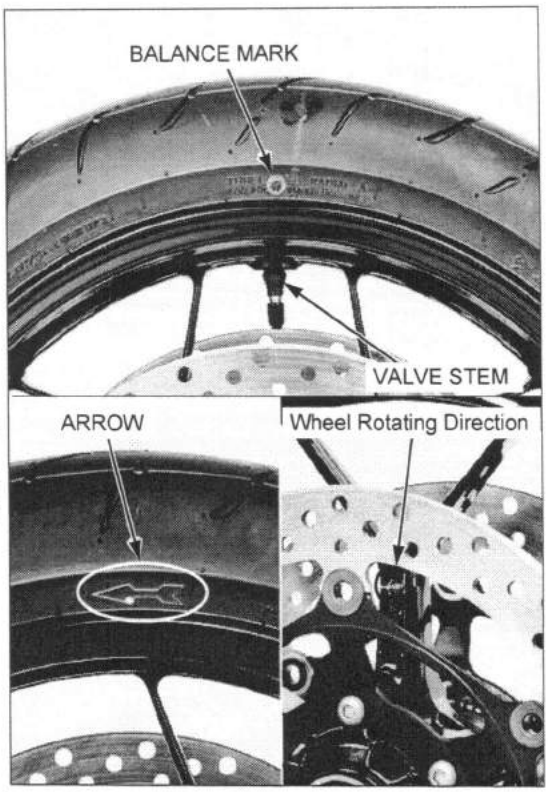
To balance the wheel, install the wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.



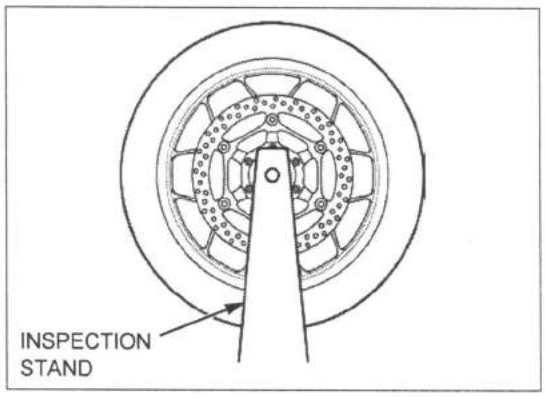
Wheel balance (After '11 model)

NOTE:

- Wheel balance directly affects the stability, handling, and overall safety of the motorcycle. Always check balance whenever the tire has been removed from the rim.
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.
- Mount the tire with the arrow mark facing in the direction of rotation.
- Stick-type balance weights should be used on this motorcycle. Use Honda Genuine balance weights.
  - Before installing the weights, remove any adhesive from the rim thoroughly and clean the area where new weights are to be placed with degreasing agent. Take care not to scratch the rim surface.
  - Do not touch the adhesive surface of the weight with your bare hands when installing.
  - The balance weights are always replaced with new ones whenever they are removed. Do not reuse them.



Mount the wheel, tire and brake discs assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not stop consistently in the same position.

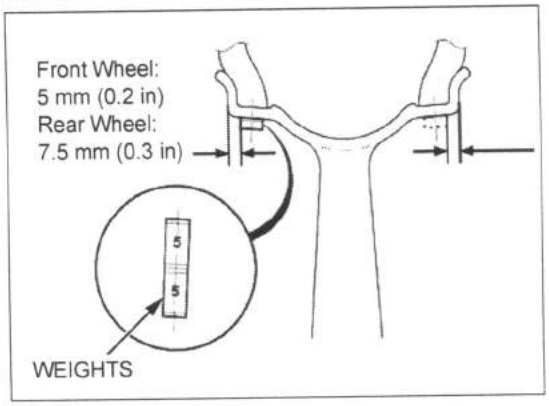


To balance the wheel, install the wheel weights on the highest side of the rim, on the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.
Do not add more than 60 g to the wheel.

Press the weights by your hands firmly and make sure they do not come off the rim.

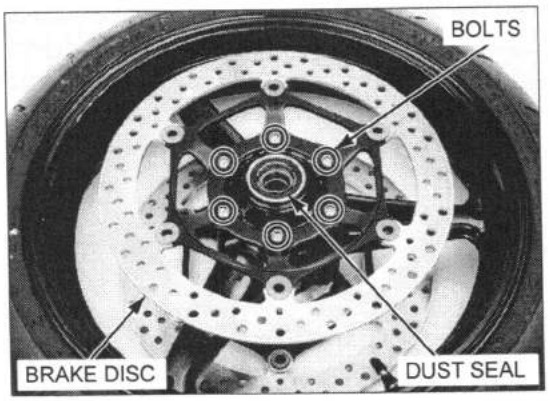
NOTE:

- The weights are attached to the position at 5 mm (front)/7.5 mm (rear) from the side surface of the rim in the direction as shown.
- If the weight exceeds 10 g, install same amount of the balance weights on the right and left symmetrical position.



DISASSEMBLY (STANDARD/SP type)

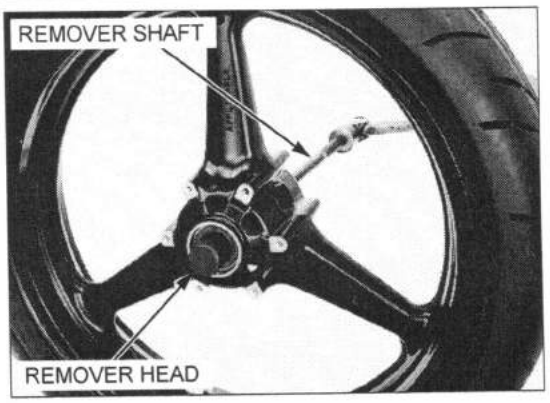
Remove the bolts and brake discs.
Remove the dust seals.



Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

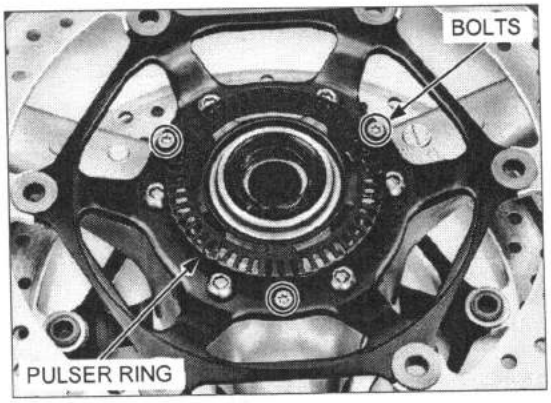
TOOLS:

Bearing remover head, 25 mm	**07746-0050800**
Bearing remover shaft	**07GGD-0010100**

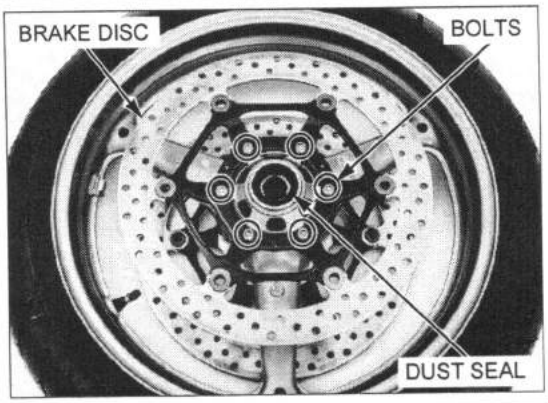


DISASSEMBLY (ABS type)

Remove the bolts and pulser ring.



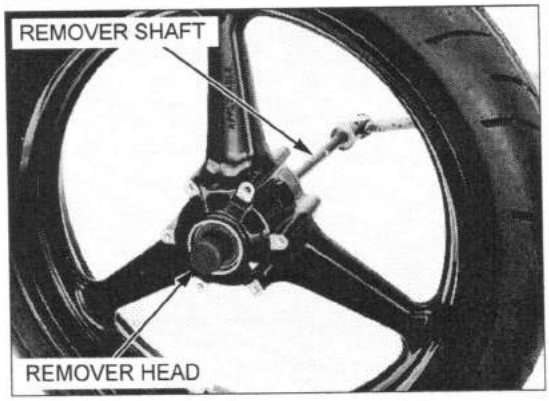
Remove the bolts and brake discs.
Remove the dust seals.



Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

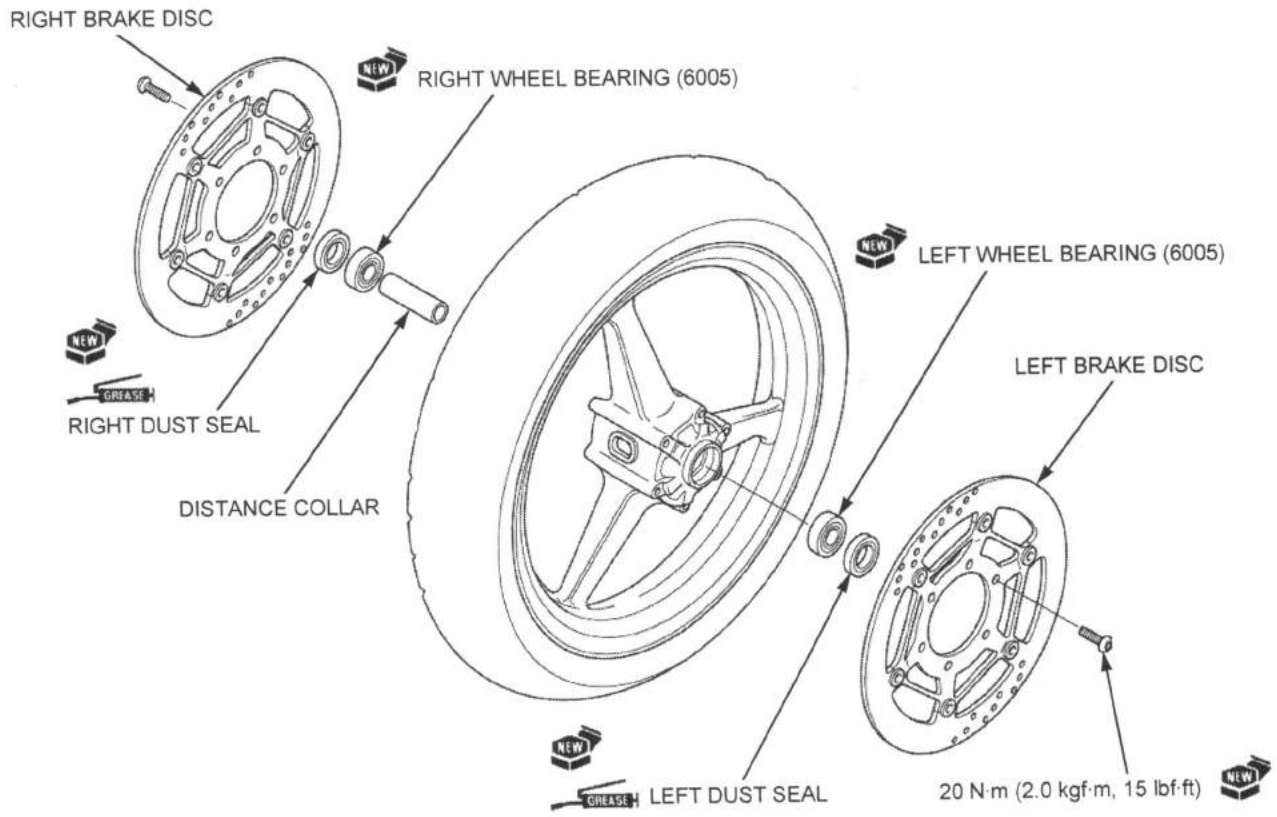
TOOLS:

Bearing remover head, 25 mm	**07746-0050800**
Bearing remover shaft	**07GGD-0010100**



ASSEMBLY (STANDARD/SP type)

'08 – '11 model STANDARD type shown:

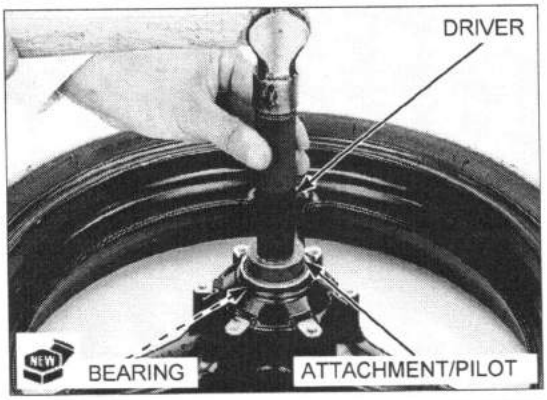


Never install the old bearings. Once the bearings have been removed, the bearings must be replaced with new ones.

Drive in a new right bearing squarely with its marked side facing up until it is fully seated.
Install the distance collar, then drive in a new left bearing squarely with its marked side facing up until it is seated to the distance collar using the special tools.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**

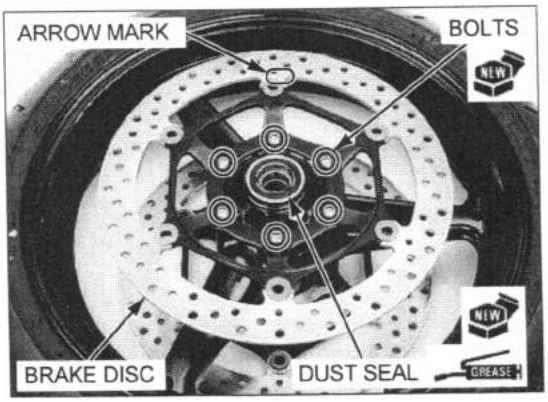


Check the spokes on the wheel for the direction mark.

Install the brake discs with the arrow mark facing in the direction of rotation.
Install new disc bolts and tighten them in a crisscross pattern in two or three steps.

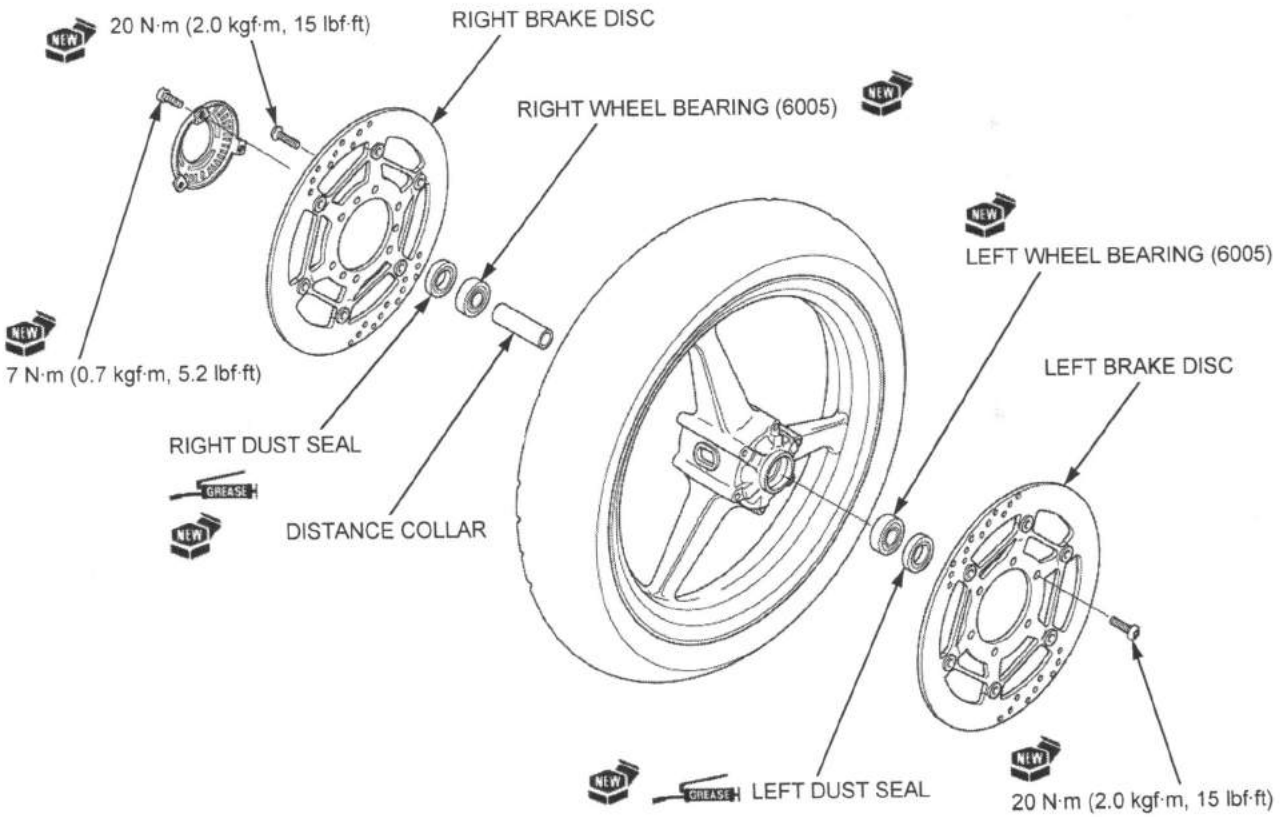
TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)

Apply grease to new dust seal lips, then install them into the wheel hub.



ASSEMBLY (ABS type)

'09 – '11 model shown:

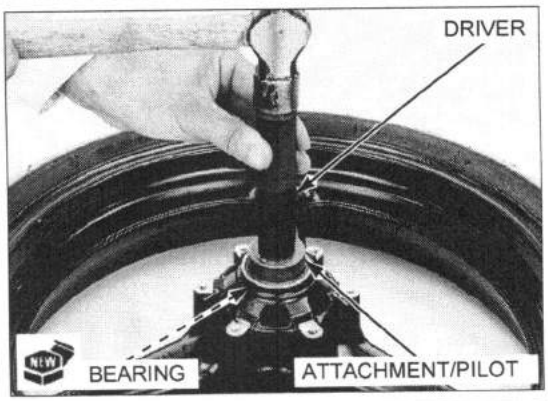


Never install the old bearings. Once the bearings have been removed, the bearings must be replaced with new ones.

Drive in a new right bearing squarely with its marked side facing up until it is fully seated.
Install the distance collar, then drive in a new left bearing squarely with its marked side facing up until it is seated to the distance collar using the special tools.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**

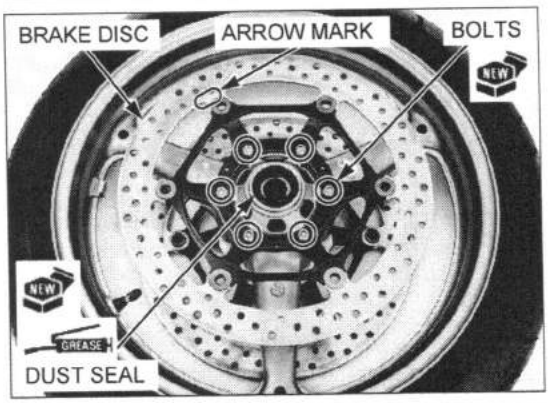


Check the spokes on the wheel for the direction mark.

Install the brake discs with the arrow mark facing in the direction of rotation.
Install new disc bolts and tighten them in a crisscross pattern in two or three steps.

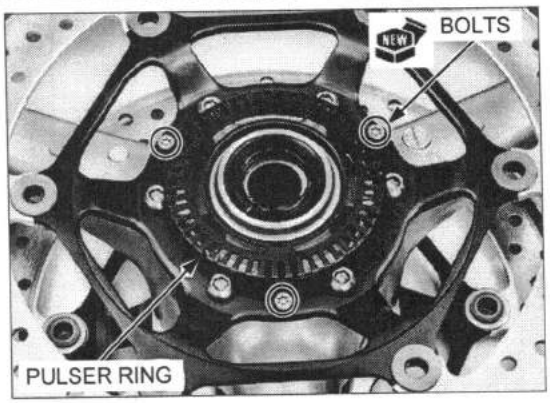
TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)

Apply grease to new dust seal lips, then install them into the wheel hub.



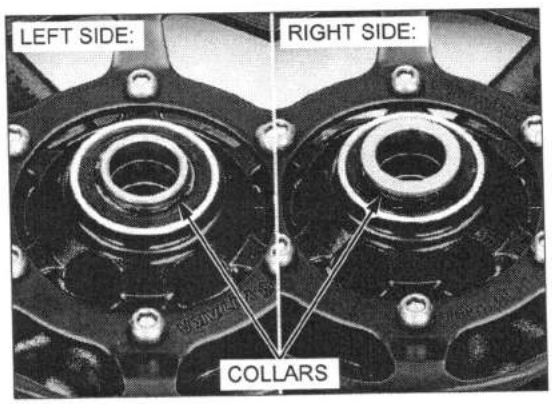
Install the pulser ring and tighten new bolts to the specified torque.

TORQUE: 7 N·m (0.7 kgf·m, 5.2 lbf·ft)



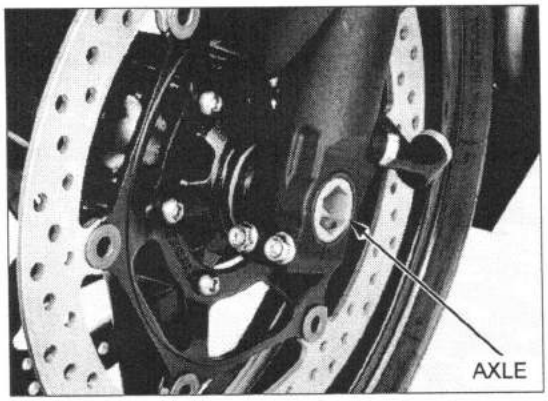
INSTALLATION (STANDARD/SP type)

Install the right and left side collars.



Install the front wheel between the fork legs.

Apply a thin layer of grease to the front axle surface.
Install the front axle from the left side.

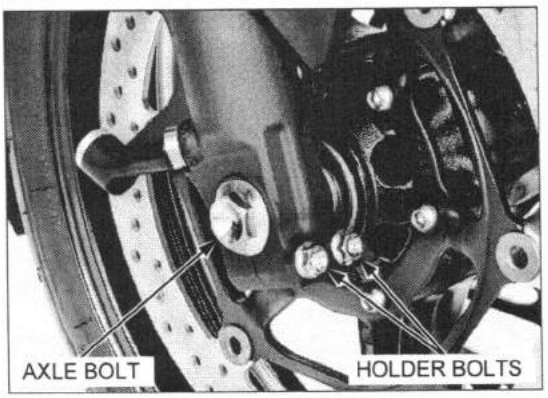


Hold the axle and tighten the axle bolt to the specified torque.

TORQUE: 79 N·m (8.1 kgf·m, 58 lbf·ft)

Tighten the right axle holder bolts to the specified torque.

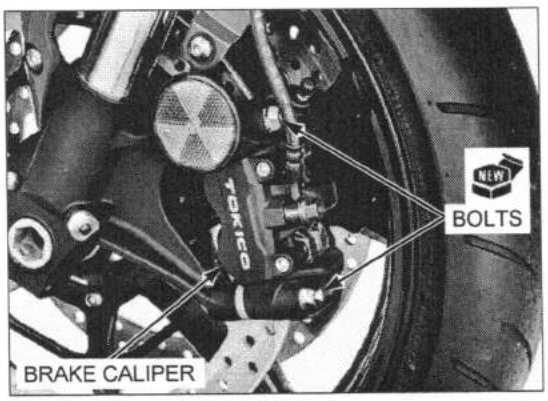
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Be careful not to damage the brake pads.

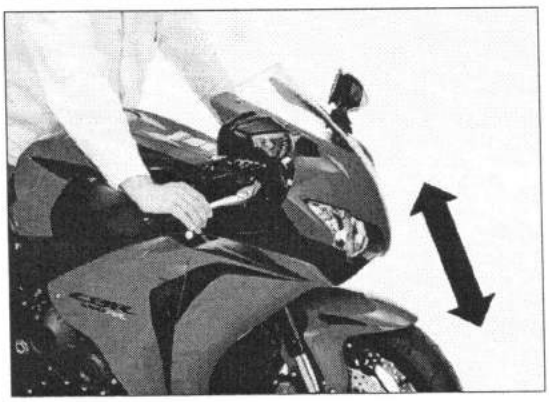
Install both brake calipers and tighten new mounting bolts to the specified torque.

TORQUE:
STANDARD type:
45 N·m (4.6 kgf·m, 33 lbf·ft)
SP type:
40 N·m (4.1 kgf·m, 30 lbf·ft)



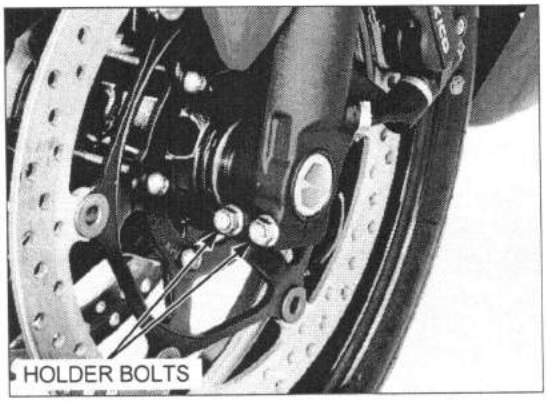
Check the brake operation by applying the brake lever.

With the front brake applied, pump the fork up and down several times to seat the axle.



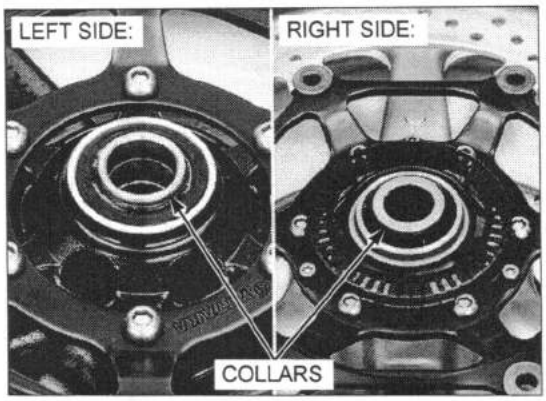
Tighten the left axle holder bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



INSTALLATION (ABS type)

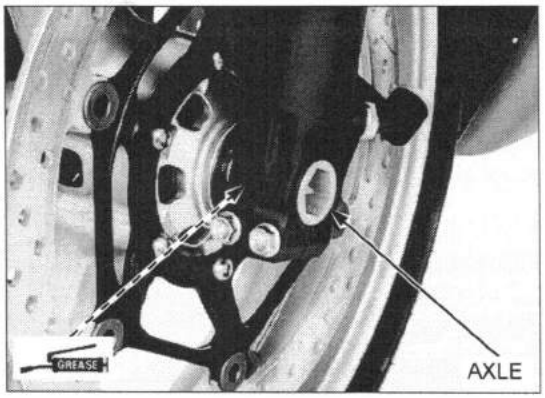
Install the right and left side collars.



Be careful not to damage the pulser ring.

Install the front wheel between the fork legs.

Apply a thin layer of grease to the front axle surface.
Install the front axle from the left side.



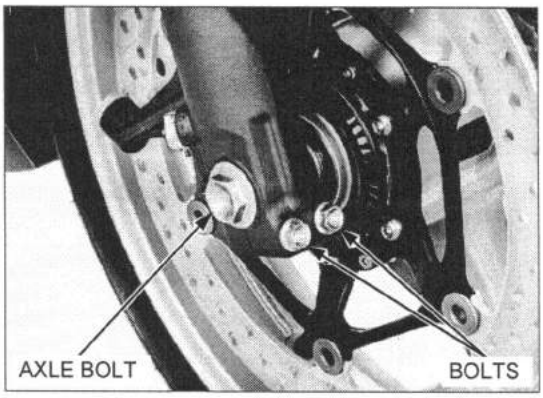
Hold the axle and tighten the axle bolt to the specified torque.

TORQUE: 79 N·m (8.1 kgf·m, 58 lbf·ft)

Be careful not to damage the pulser ring.

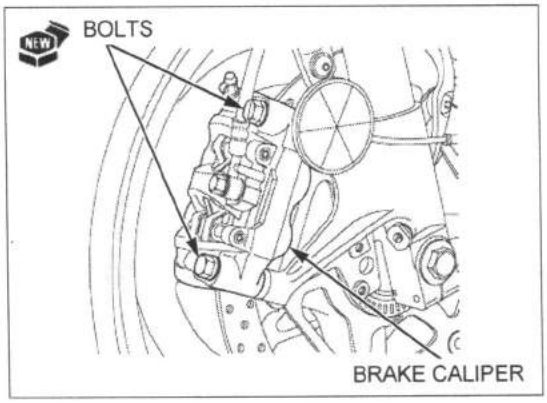
Tighten the right axle holder bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



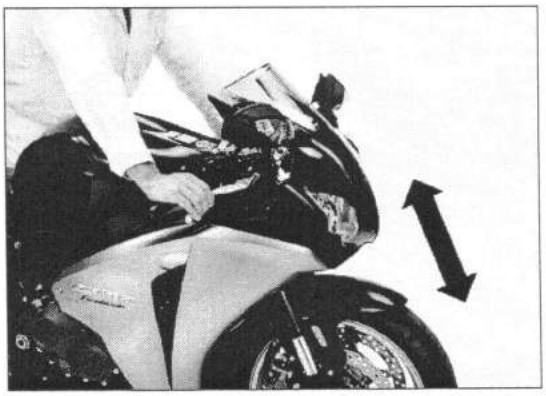
Install both brake calipers and tighten new mounting bolts to the specified torque.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)



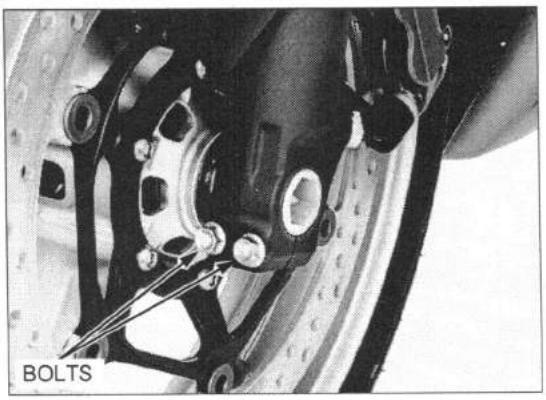
Check the brake operation by applying the brake lever.

With the front brake applied, pump the fork up and down several times to seat the axle.



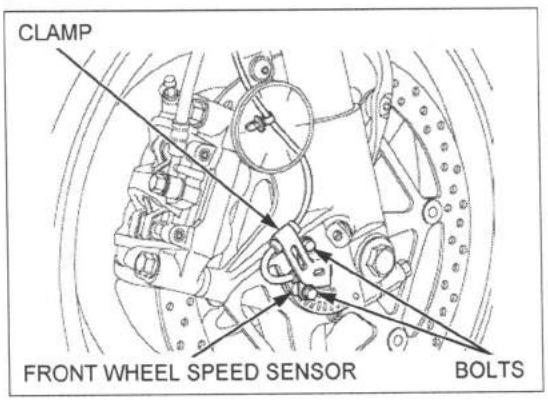
Tighten the left axle holder bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the front wheel speed sensor, wire clamp, and tighten the bolts securely.

Check the air gap between the front wheel speed sensor and pulser ring (page 17-47).



FORK ('08 '11 model)

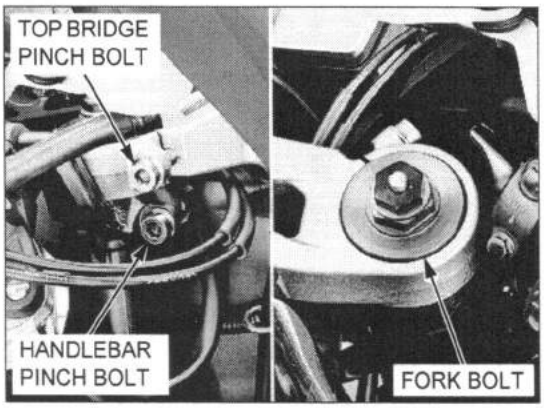
REMOVAL

Remove the following:

- Front wheel
  - STANDARD type (page 14-19)
  - ABS type (page 14-20)
- Front fender (page 3-36)

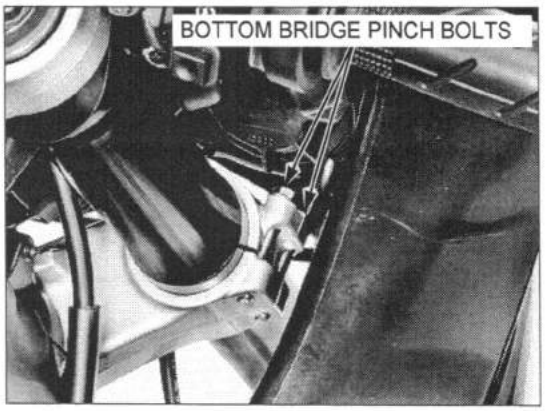
Loosen the handlebar pinch bolt and top bridge pinch bolt.

If the fork leg will be disassembled, loosen the fork bolt but do not remove yet.

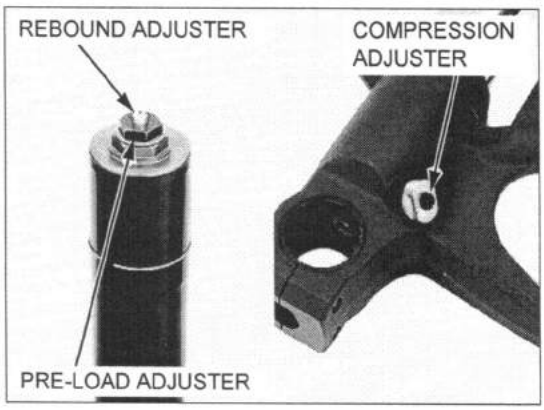


Keep the front brake master cylinder reserve tank upright.

While holding the fork leg, loosen the fork bottom bridge pinch bolts and remove the fork slider from the handlebar and fork bridges.

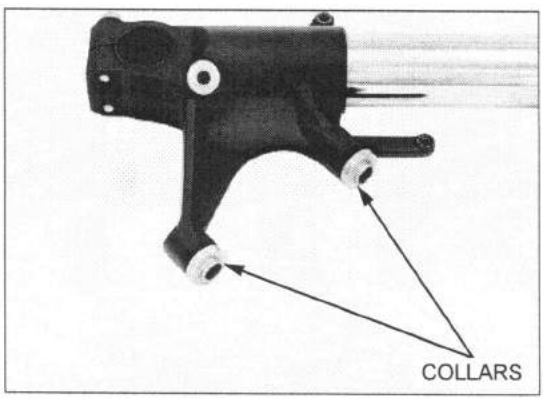


When disassembling the fork leg, turn the pre-load, rebound and compression damping adjusters counterclockwise to the softest position (be sure to record the number of turns from the starting position).



DISASSEMBLY

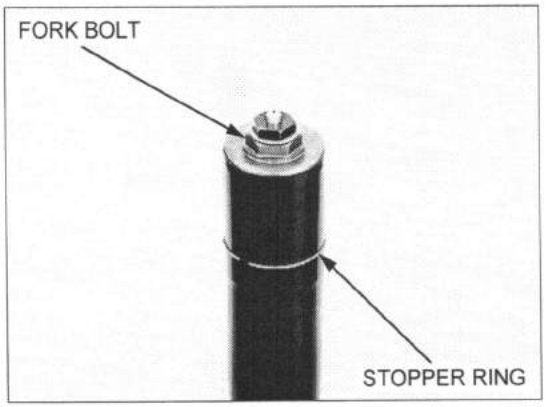
Remove the collars.



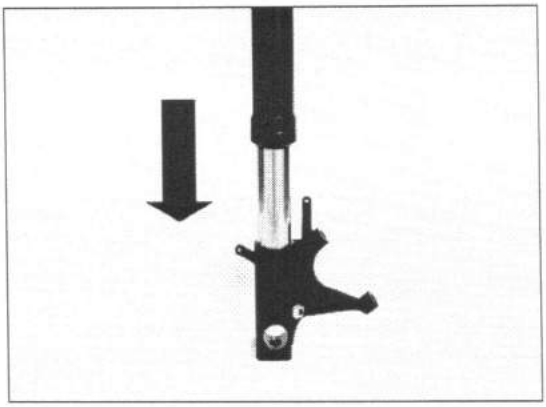
Be careful not to scratch the fork slider.

Remove the handlebar stopper ring.

Unscrew the fork bolt from the fork slider.



Push the fork slider slowly down and gently seat the dust seal onto the axle holder.



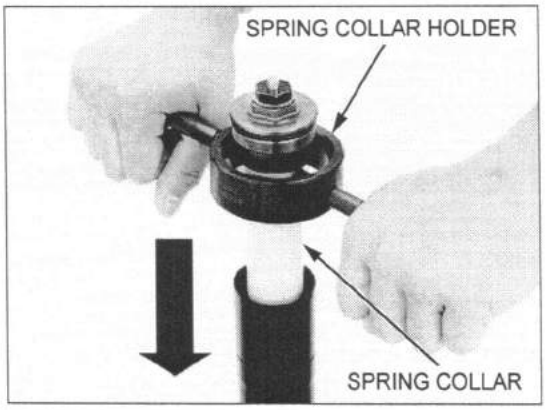
Except U.S.A. tool: Be careful not to damage the spring collar holes.

Attach the spring collar holder to the spring collar holes.

TOOL:

Spring collar holder	**070MF-MBZC110 (Not available in U.S.A.)**

Compress the spring collar with the spring collar holder.



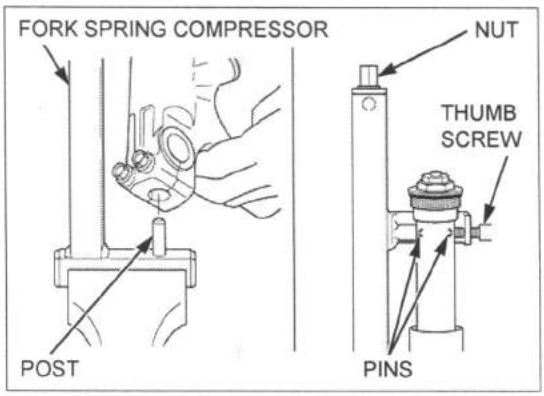
U.S.A. tool:

Attach the fork leg to the fork spring compressor post as shown.

TOOL:

Fork spring compressor	**07AMC-MFJA100 (U.S.A. only)**

Align the spring collar holes with the pins.
To hold the spring collar, tighten the thumb screw securely.
Tighten the nut and compress the fork.

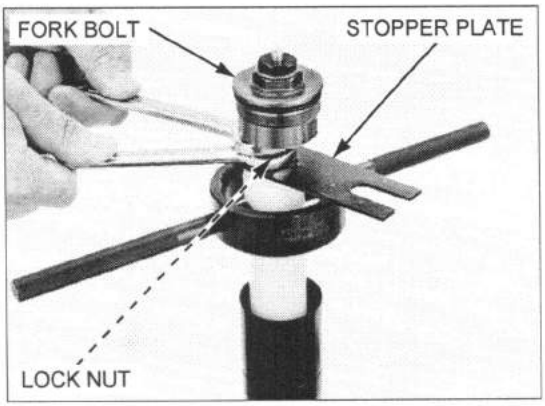


Insert the stopper plate between the lock nut and spring seat stopper.

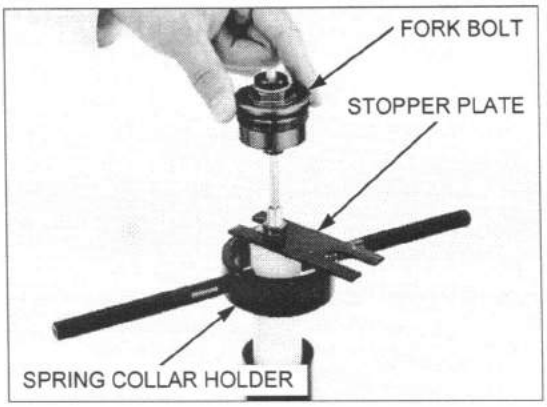
TOOL:

Stopper plate	**070MF-MBZC130 (Not available in U.S.A.) or**
Fork rod stopper	**07AMB-KZ3A100 (U.S.A. only)**

Loosen the lock nut while holding the fork bolt.

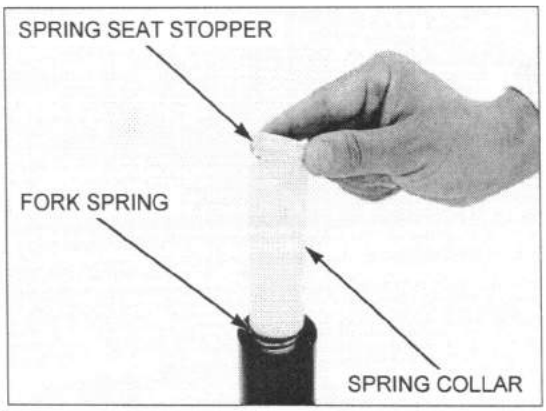


Remove the fork bolt.
Remove the stopper plate and spring collar holder.



Remove the following:

- Spring seat stopper
- Spring collar
- Fork spring



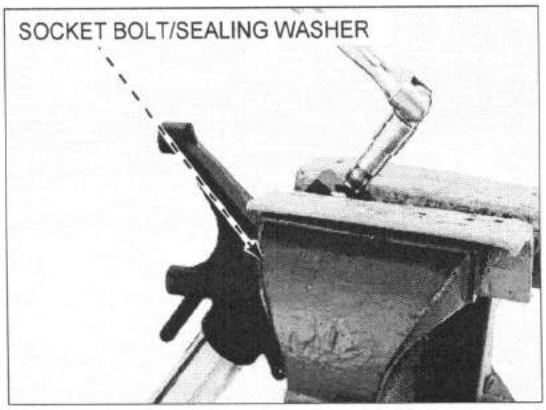
Pour out the fork fluid by pumping the fork tube several times.
Pour out the fork fluid from the fork damper by pumping the damper rod several times.



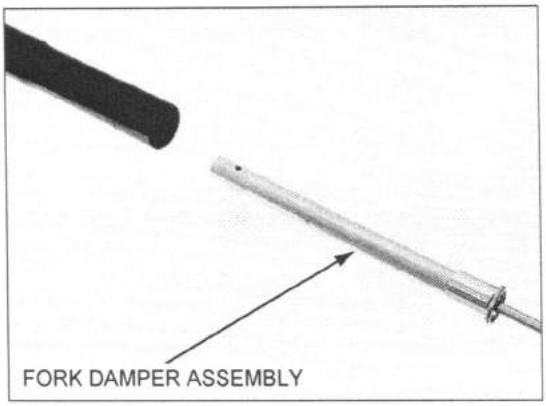
Hold the axle holder in a vise with soft jaws or a shop towel.
Hold the fork damper with the special tool, then remove the fork socket bolt and sealing washer.

TOOL:

Fork damper holder	**07YMB-MCF0101 or 07YMB-MCFA100 (U.S.A. only)**



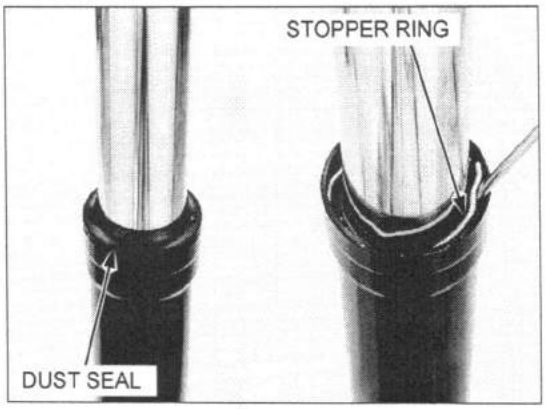
Remove the fork damper assembly from the fork tube.



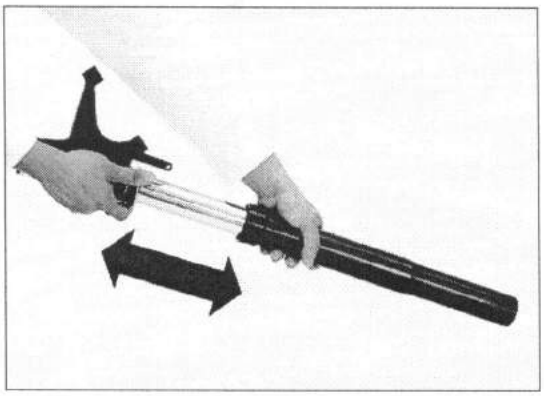
Remove the dust seal.

Do not scratch the fork tube sliding surface.

Remove the oil seal stopper ring.

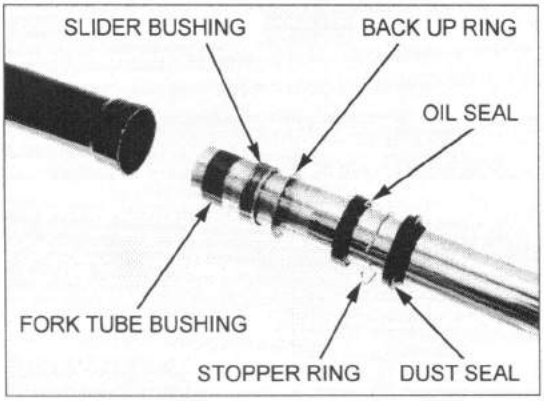


Pull the fork tube out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork tube separates from the fork slider.
The slider bushing will be forced out by the fork tube bushing.



Remove the following:

- Fork tube bushing
- Slider bushing
- Back up ring
- Oil seal
- Stopper ring
- Dust seal

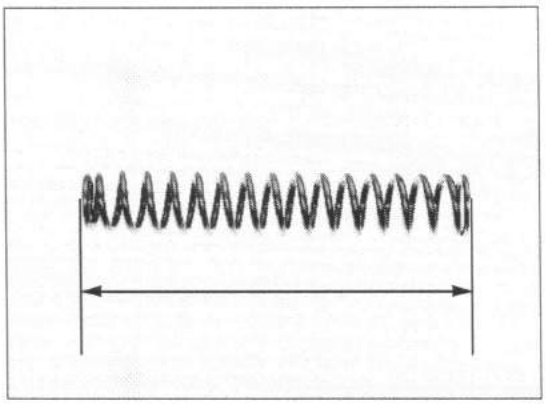


INSPECTION

Fork spring

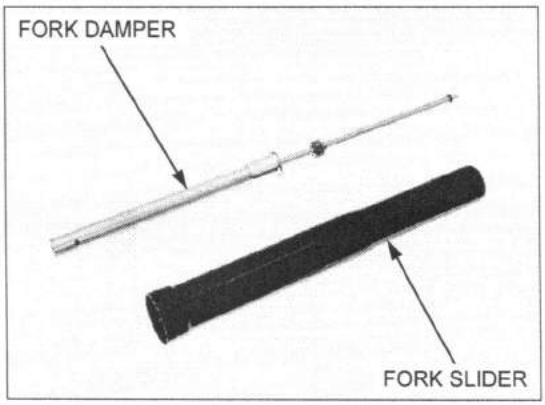
Measure the fork spring free length.

SERVICE LIMIT: 229.3 mm (9.03 in)

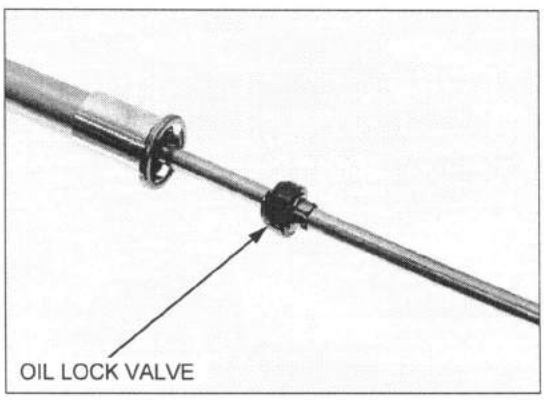


Fork tube/slider/damper

Check the fork slider for damage or deformation.
Check the fork damper for bend or damage.
Replace any components which are damaged.

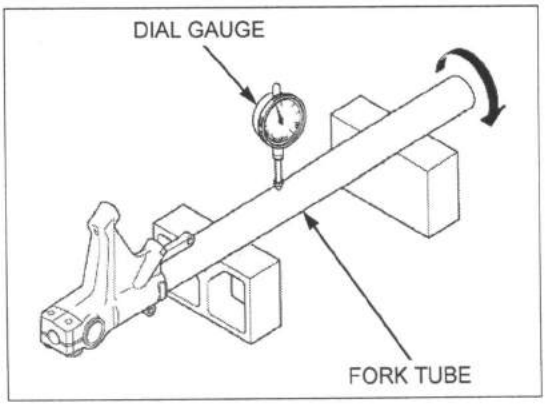


Check the oil lock valve for wear or damage.
Replace the fork damper assembly if any components are damaged.



Check the fork tube for score marks, scratches, or excessive or abnormal wear.
Place the fork tube on V-blocks and measure the runout.
Actual runout is 1/2 the total indicator reading.

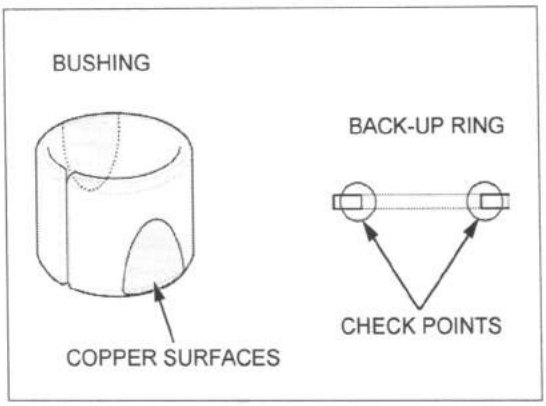
SERVICE LIMIT: 0.20 mm (0.008 in)



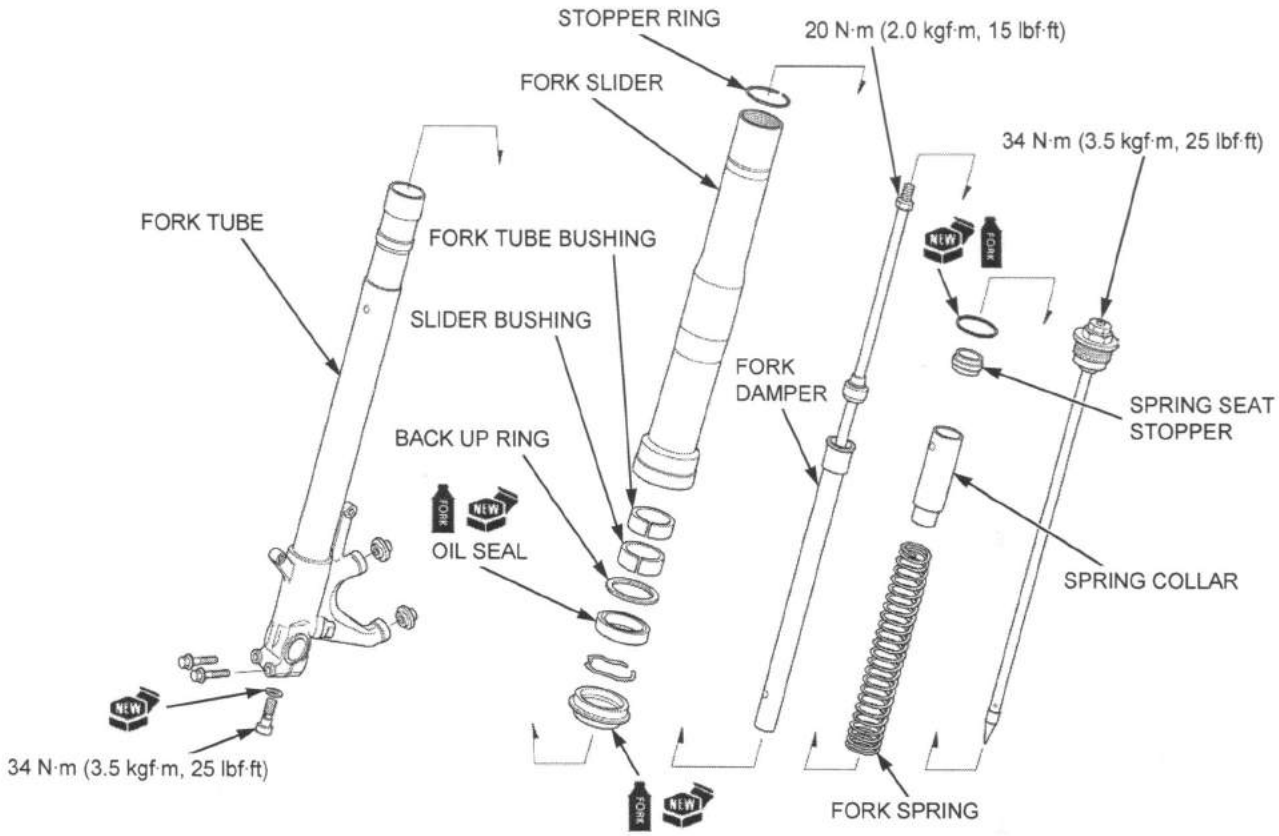
Fork tube bushing/back up ring

Visually inspect the slider and fork tube bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

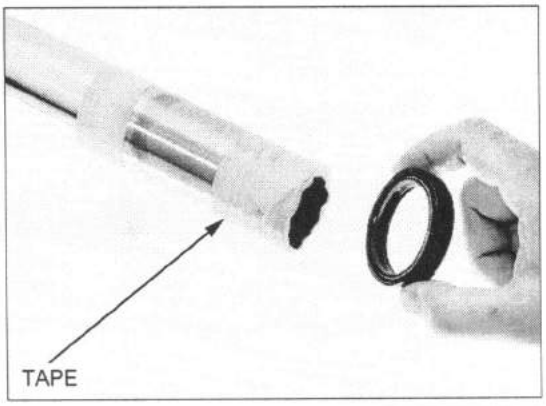
Check the back-up ring; replace it if there is any distortion at the points shown.



ASSEMBLY



- Before assembly, wash all parts with a high flash or non-flammable solvent and blow them dry.
- When installing the fork dust seal and oil seal, wrap the edge and groove of the fork tube with tape.



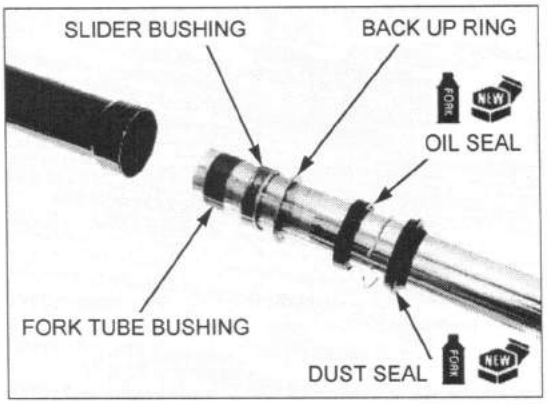
Apply fork fluid to new dust seal and oil seal lips.

Install the oil seal with its marked side facing toward the axle holder.

Install the dust seal, stopper ring and oil seal.

Remove any burrs from the slider bushing mating surface, being careful not to peel off the coating.

Install the back up ring, slider bushing, and fork tube bushing.
Install the fork tube into the fork slider.

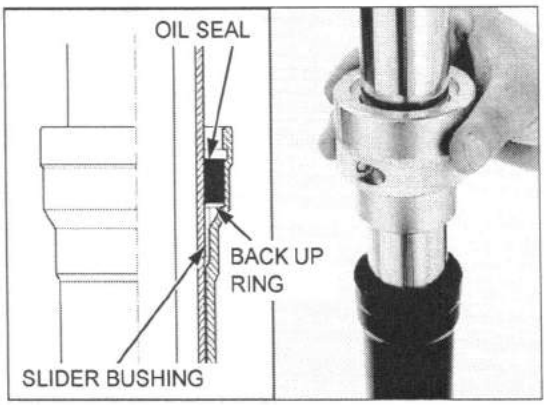


See illustration for correct seating.

Drive the oil seal in using the special tool.

TOOLS:

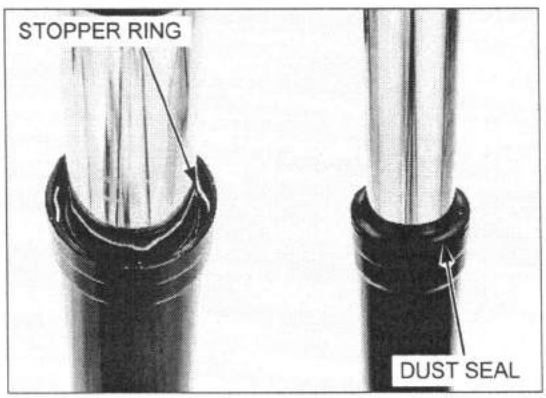
Fork seal driver, 43 mm	**07YMD-MCF0100 or 07NMD-KZ3010A (U.S.A. only)**



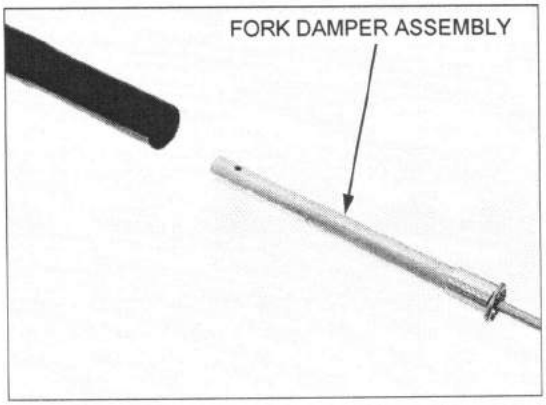
Do not scratch the fork tube sliding surface.

Install the stopper ring into the fork slider groove securely.

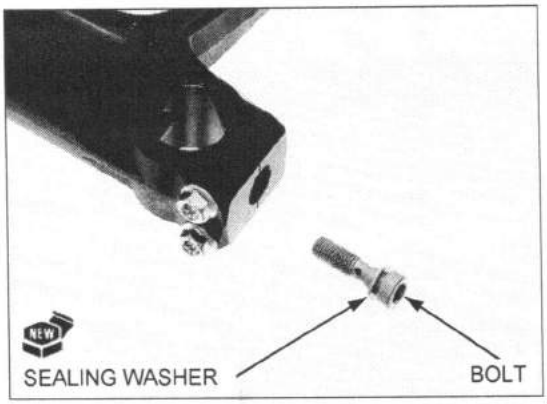
Install the dust seal into the fork slider.



Install the fork damper assembly into the fork tube.



Install the socket bolt with a new sealing washer.

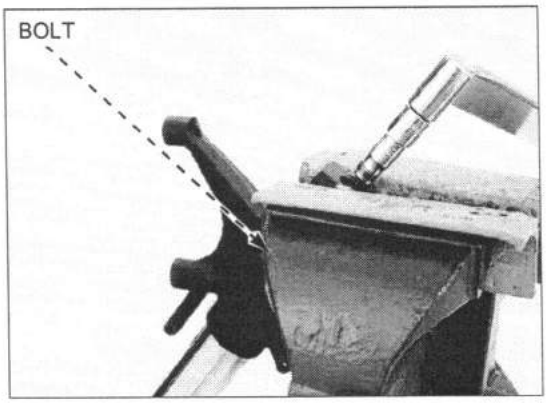


Hold the axle holder in a vise with soft jaws or a shop towel.
Hold the fork damper with the special tool, then tighten the fork socket bolt to the specified torque.

TOOL:

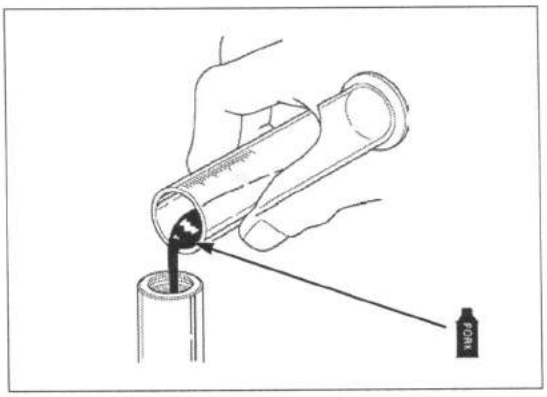
Fork damper holder	**07YMB-MCF0101 or 07YMB-MCFA100 (U.S.A. only)**

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



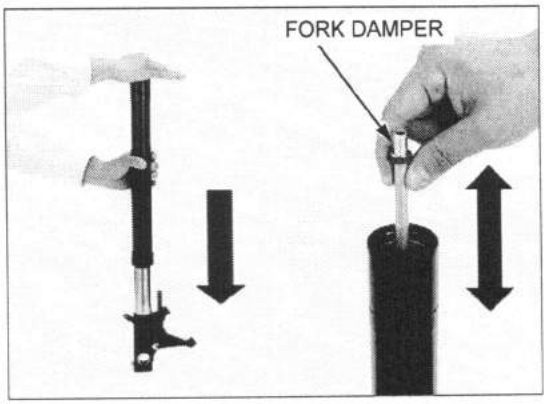
Pour the specified amount of recommended fork fluid into the fork tube.

RECOMMENDED FORK FLUID:
Pro Honda Suspension Fluid SS-47 (10W)
FORK FLUID CAPACITY:
517 ± 2.5 cm³ (17.5 ± 0.08 US oz, 18.2 ± 0.09 Imp oz)



Bleed the air from the fork leg as follows:

1. Extend the fork, cover the top of the fork slider with your hand and compress the fork leg slowly.
2. Remove your hand and extend the fork slowly. Repeat above procedure 2 or 3 times.
3. Pump the fork damper rod slowly 8 – 10 times.

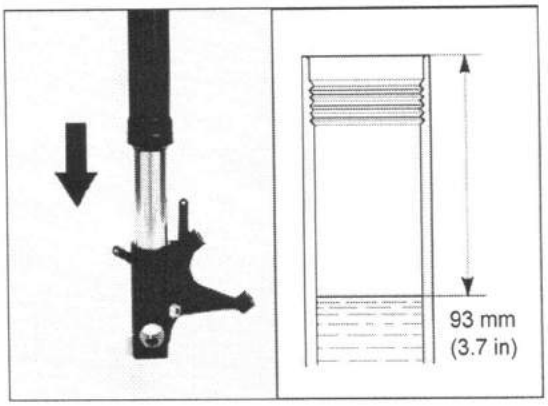


Slowly push the fork slider, and gently seat the dust seal onto the axle holder and leave it for 5 minutes.

Be sure the oil level is the same in the both forks.

After the oil level stabilizes, measure the oil level from the top of the fork slider.

FORK FLUID LEVEL: 93 mm (3.7 in)



Install the fork spring into the fork slider with the tapered end facing up.

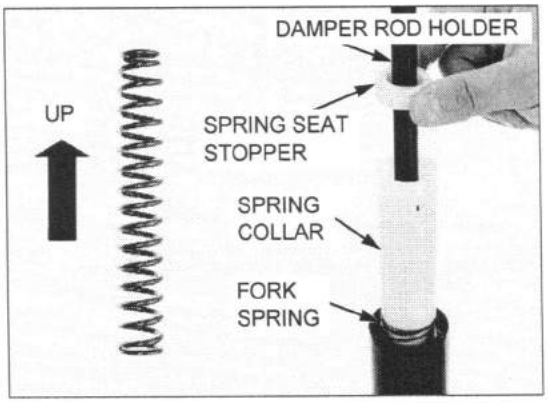
Install the damper rod holder to the fork damper rod.

TOOL:

Damper rod holder	**070MF-MBZC120 (Not available in U.S.A.) or 070MF-MBZA120**

Fully extend the damper rod.

Install the spring collar and spring seat stopper.



Except U.S.A. tool: Attach the spring collar holder to the spring collar holes.

TOOL:

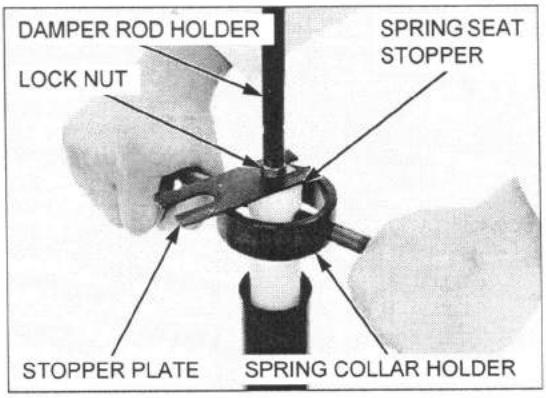
Spring collar holder	**070MF-MBZC110 (Not available in U.S.A.)**

While pulling the damper rod holder up, compress the spring collar with the spring collar holder.
Insert the stopper plate between the lock nut and spring seat stopper.

TOOL:

Stopper plate	**070MF-MBZC130 (Not available in U.S.A.)**

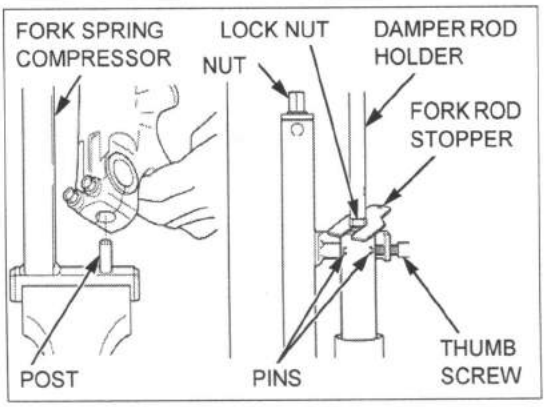
Remove the damper rod holder.



U.S.A. tool: Attach the fork leg to the fork spring compressor post as shown.

TOOL:

Fork spring compressor	**07AMC-MFJA100 (U.S.A. only)**



Align the spring collar holes with the pins.
To hold the spring collar, tighten the thumb screw securely.
While pulling the damper rod holder up, tighten the nut to compress the fork spring.

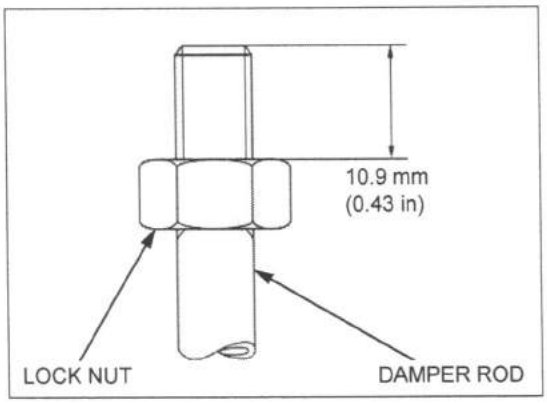
Insert the fork rod stopper between the lock nut and spring seat stopper, then remove the damper rod holder.

TOOL:

Fork rod stopper	**07AMB-KZ3A100 (U.S.A. only)**

Check the length between the lock nut end and damper rod end.

STANDARD: 10.9 mm (0.43 in)



NOTE:
When installing the fork bolt, turn the rebound adjuster counterclockwise to the softest position.

Apply fork fluid to a new O-ring and install it to the fork bolt.

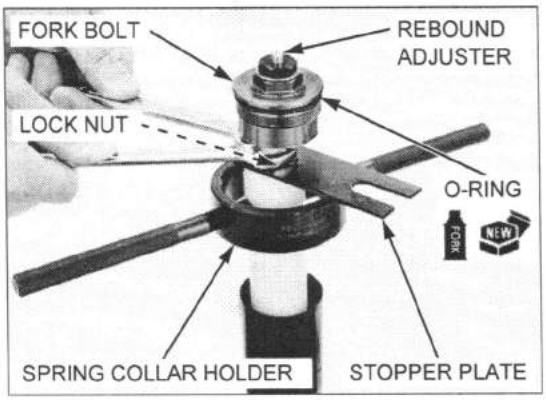
Tighten the fork bolt after installing the fork slider into the fork bridges.

Install the fork bolt to the fork damper.

Tighten the lock nut to the specified torque with holding the fork bolt.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)

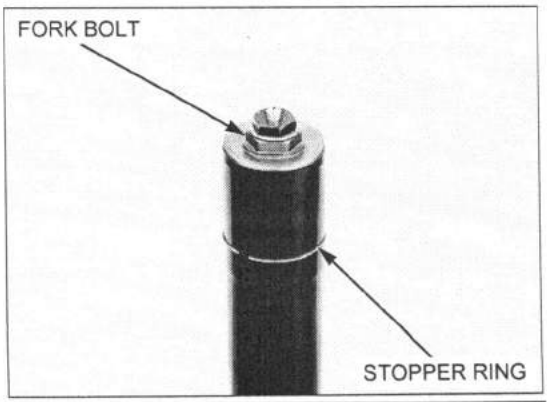
Remove the stopper plate and spring collar holder.



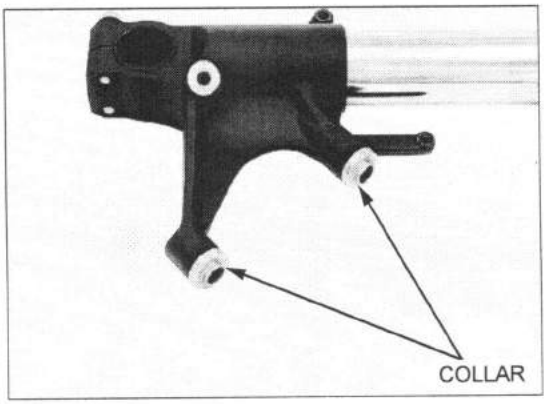
Tighten the fork bolt after installing the fork.

Install the fork bolt to the fork slider.

Install the handlebar stopper ring.

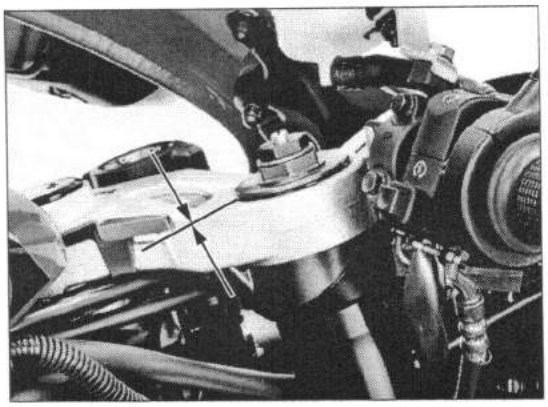


Install the collars securely.



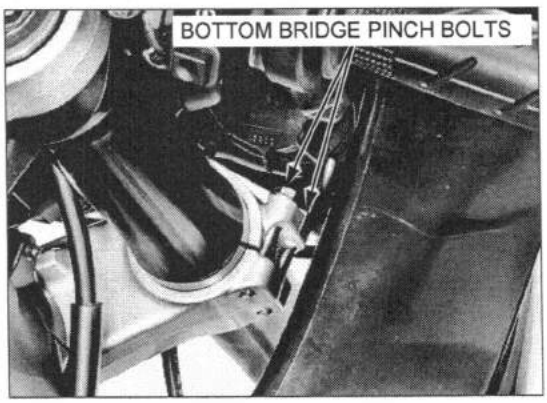
INSTALLATION

Return the pre-load, rebound, and compression damping adjusters to the original positions as noted during disassembly.
Install the fork leg through the bottom bridge, handlebar, and top bridge.
Position the top of the fork slider flush with the upper surface of the top bridge as shown.



Tighten the bottom bridge pinch bolts to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



If the fork bolt is loosened, tighten it to the specified torque.

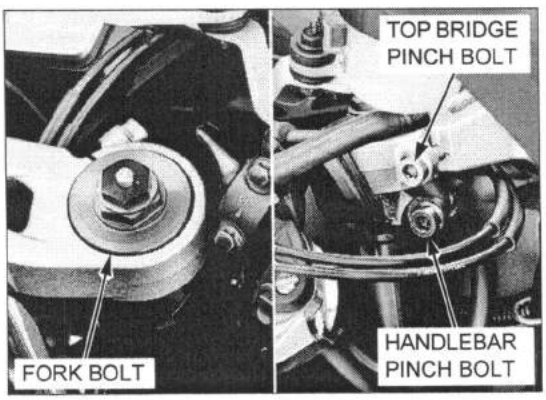
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Tighten the top bridge pinch bolt to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the handlebar pinch bolt to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)



Install the following:

- Front fender (page 3-36)
- Front wheel
  - STANDARD type (page 14-27)
  - ABS type (page 14-29)

FORK (After '11 model STANDARD/ ABS type)

REMOVAL

Remove the following:

- intake air duct (page 3-22)
- front wheel
  STANDARD type (page 14-19)
  ABS type (page 14-20)
- front fender (page 3-36)

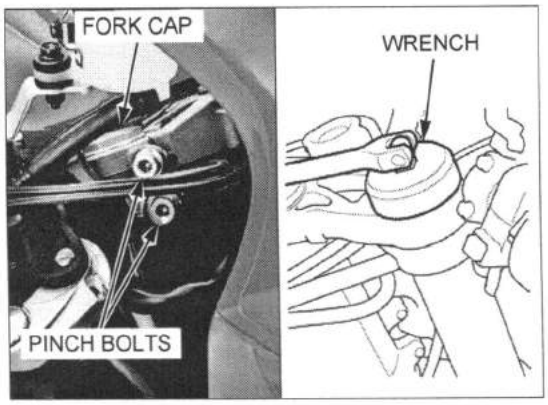
Loosen the pinch bolts of the handlebar and top bridge.

Take care not to scratch the cap head.

When the fork leg will be disassembled, loosen the fork cap, but do not remove it yet.

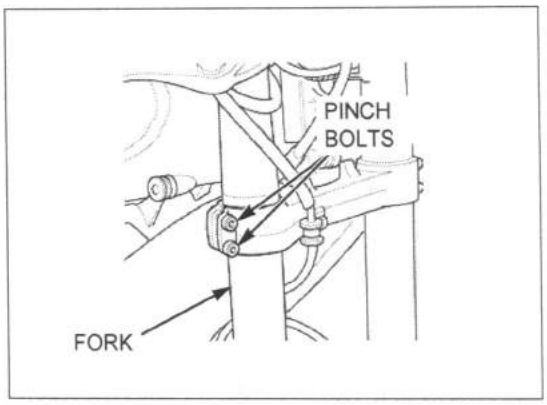
TOOL:

Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**



Keep the master cylinder reserve tank upright to prevent air from entering the hydraulic system.

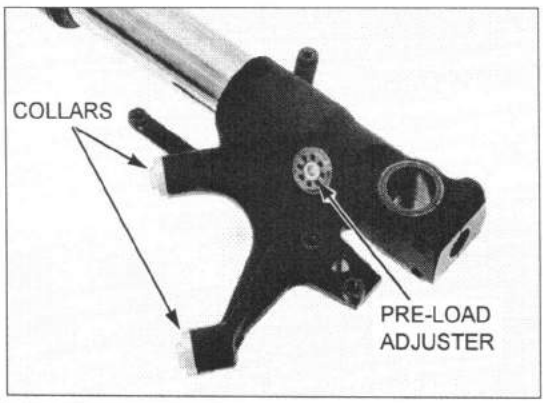
While holding the fork leg, loosen the bottom bridge pinch bolts. Pull the fork leg down and remove it out of the fork bridges.



DISASSEMBLY

Turn the spring pre-load adjuster counterclockwise to the softest position (be sure to record the number of turns from the starting position).

Remove the collars.



Remove the stopper ring being careful not to scratch the outer tube.

Do not clamp the tube too tight or it could get damaged.

Place the outer tube in a vise with soft jaws or shop towels.

Take care not to scratch the cap head.

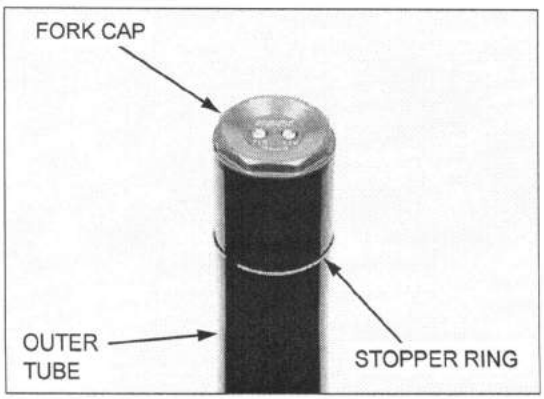
Loosen the fork cap and remove it from the outer tube.

TOOL:

Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**

Lower the outer tube slowly and rest it onto the axle holder.

Remove the O-ring from the fork cap.



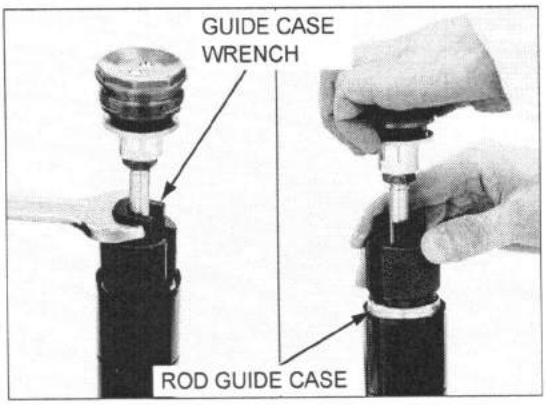
Hold the axle holder on the slide pipe in a vise with soft jaws or shop towels.

Loosen the rod guide case using the special tool.

The piston rod assembly is under spring pressure; hold the fork cap securely when removing.

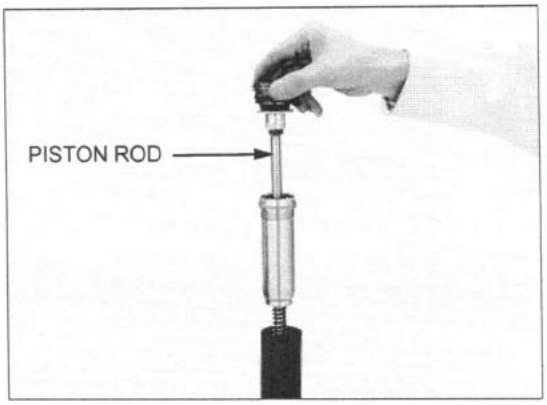
Remove the rod guide case from the slide pipe by turning the tool by hand.

TOOL:
Rod guide case wrench 070MB-MGP0100 or 070MB-MGPA100 (U.S.A. only)

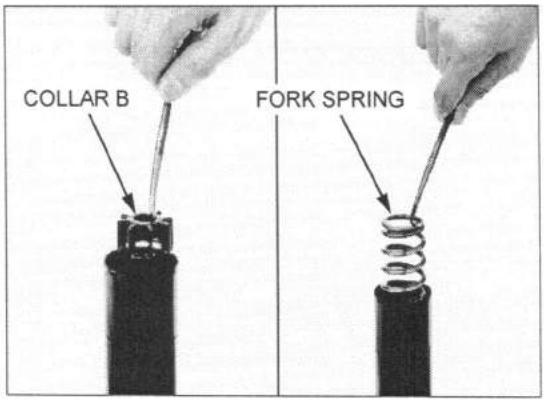


Remove the following:

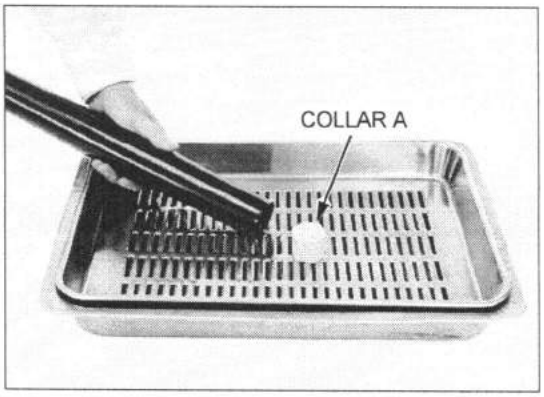
- piston rod assembly



- spring collar B
- fork spring

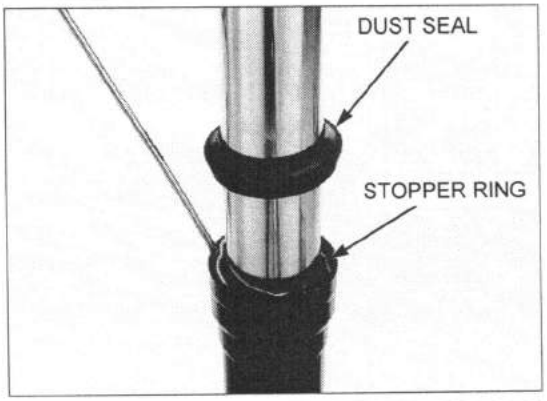


- spring collar A (pour out the fork fluid by pumping the slide pipe up and down several times)

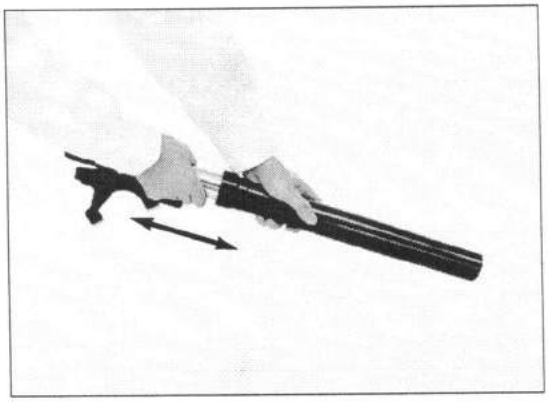


Be careful not to scratch the slide pipe.

– dust seal
– stopper ring

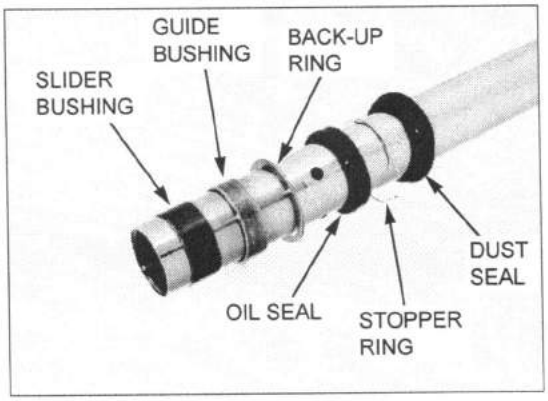


Using quick successive motions, pull the slide pipe out of the outer tube.



Remove the following from the slide pipe:

– slider bushing
– guide bushing
– back-up ring
– oil seal
– stopper ring
– dust seal

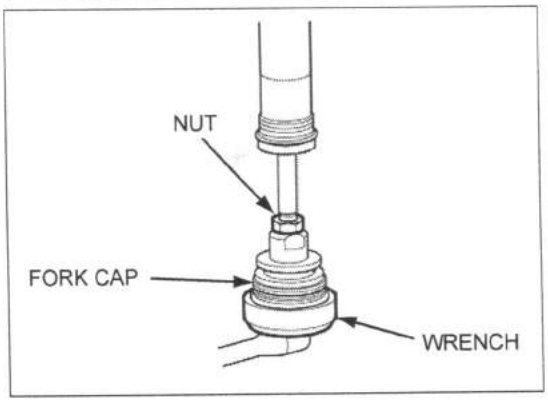


Take care not to scratch the cap head.

Loosen the piston rod nut while holding the fork cap with the special tool.

TOOL:
Fork cap wrench **070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**

Remove the fork cap.

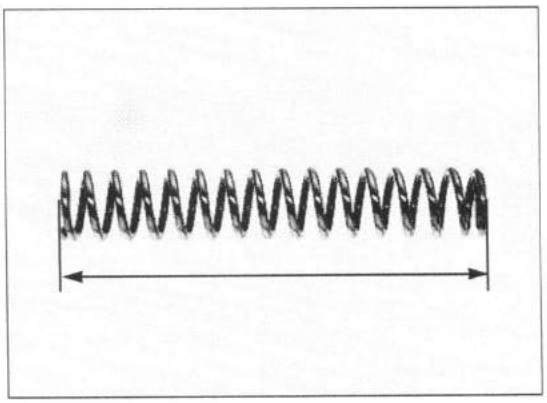


INSPECTION

Fork Spring

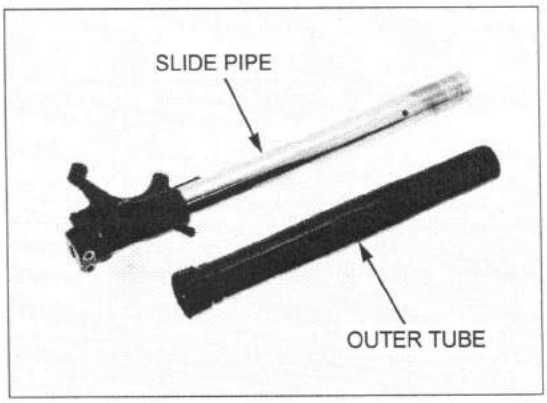
Measure the fork spring free length.

SERVICE LIMIT: 224.9 mm (8.85 in)



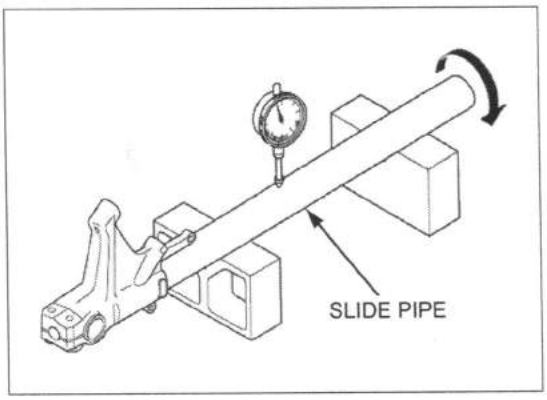
Outer Tube/Slide Pipe

Check the outer tube for damage or deformation.
Check the slide pipe for score marks, scratches, or excessive or abnormal wear.



Set the slide pipe in V-blocks and measure the runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

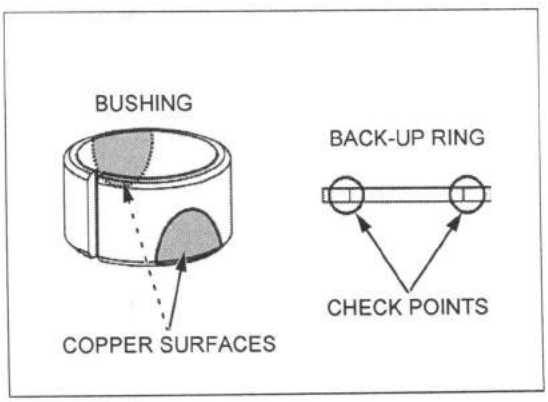
SERVICE LIMIT: 0.20 mm (0.008 in)



Bushing/Back-up Ring

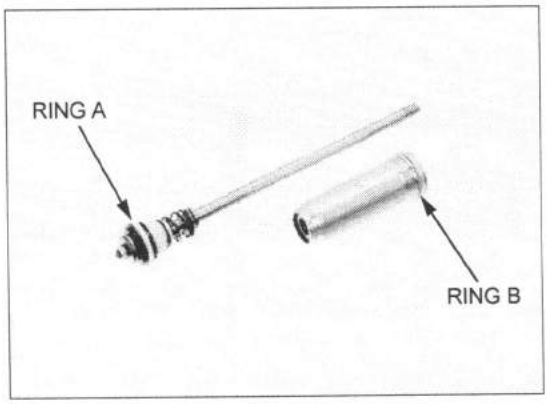
Visually inspect the guide and slider bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.

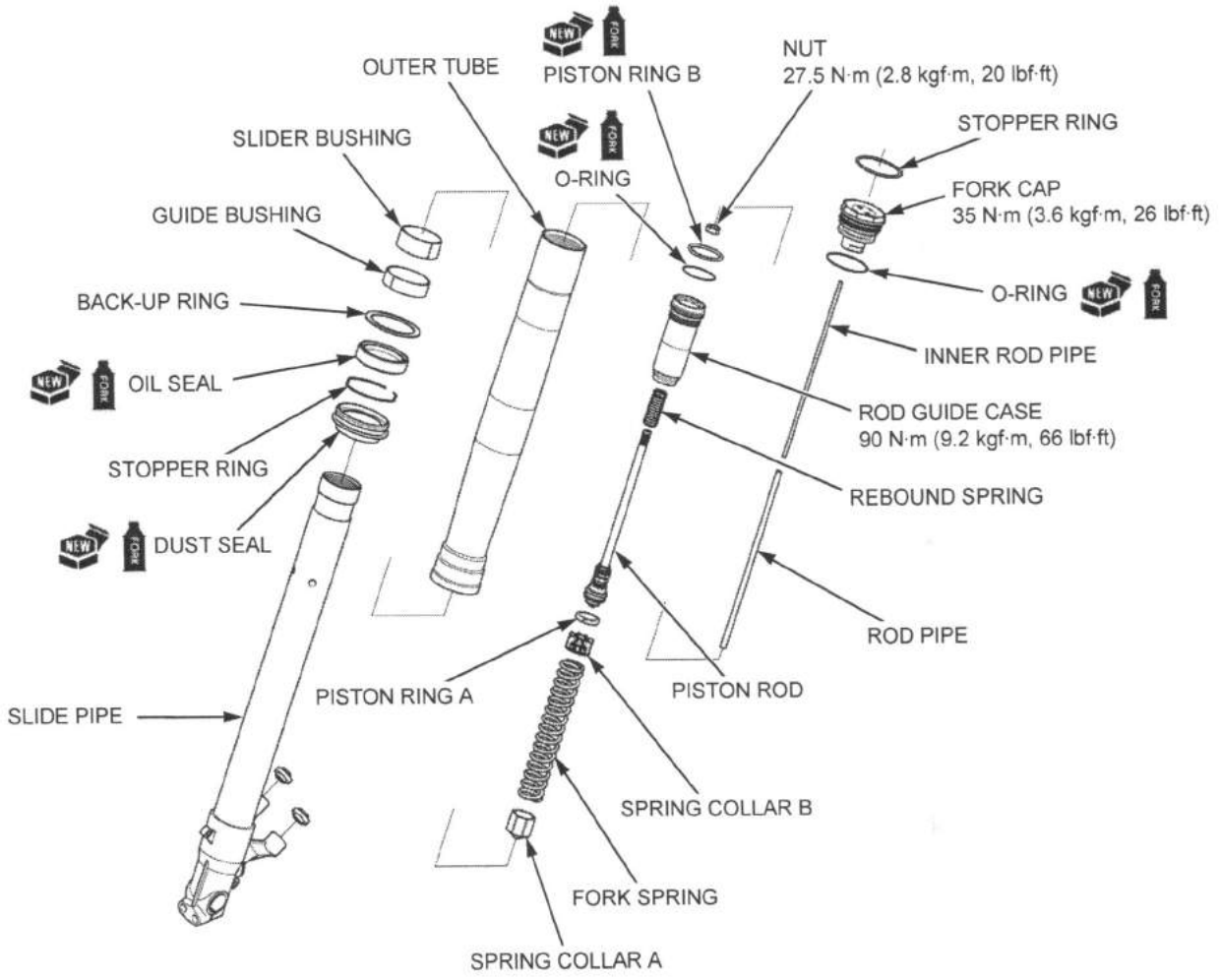


Piston Ring

Check the piston rings for wear or damage.



ASSEMBLY



Assemble the piston rod and rod guide case.

Install the fork cap onto the piston rod and screw it until the cap just touches the rod end.

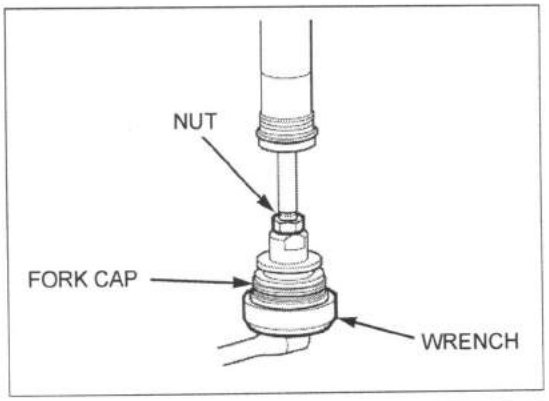
Take care not to scratch the cap head.

Hold the fork cap with the special tool and tighten the rod nut.

TOOL:

Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**

TORQUE: 27.5 N·m (2.8 kgf·m, 20 lbf·ft)



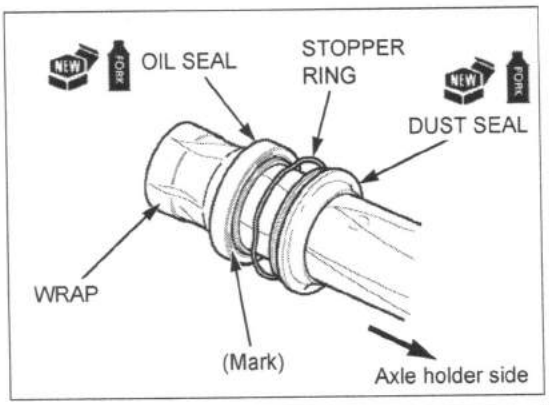
Cover the slide pipe end with a plastic wrap or equivalent to avoid damaging the seals on the edges.

Apply fork fluid to the lips of new dust and oil seals.

Install the following onto the slide pipe:

- dust seal
- stopper ring
- oil seal (with the marked side facing the axle holder)

Remove the plastic wrap.



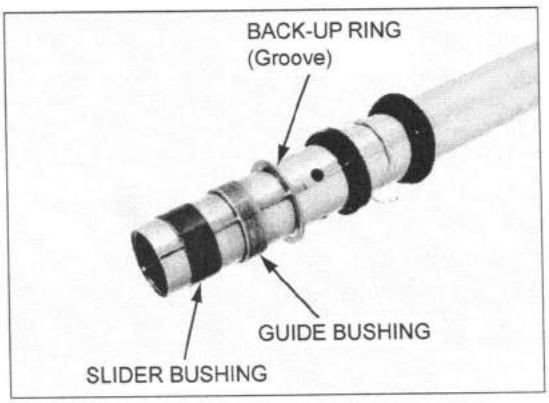
NOTE:

- Remove the burrs from the slider bushing mating surface, being careful not to peel off the coating.

Be careful not to damage the coating on the bushing. Do not spread open the bushing more than necessary.

- back-up ring (with the groove facing the outer tube)
- guide bushing
- slider bushing

Install the slide pipe into the outer tube.

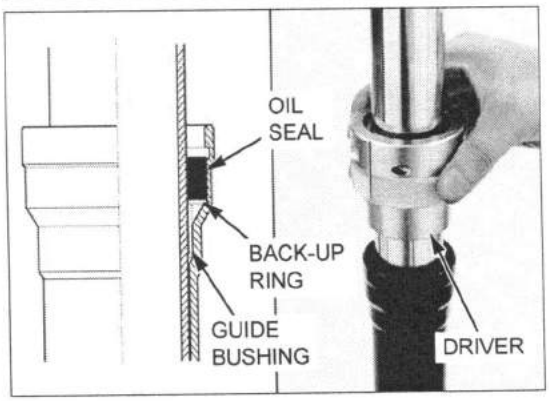


Drive the guide bushing into place together with the back-up ring using the special tool.

TOOL:

Fork seal driver, 43 mm	**07YMD-MCF0100 or 07NMD-KZ3010A (U.S.A. only)**

Drive the oil seal until the stopper ring groove is visible using the same tool.



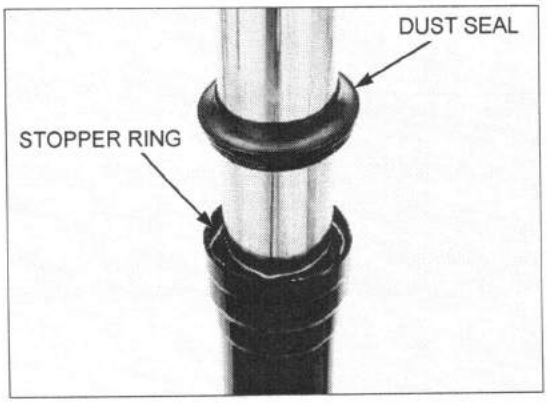
Do not scratch the fork tube sliding surface.

Install the stopper ring into the groove in the outer tube.

NOTE:

- Make sure the stopper ring is securely set in the groove.

Install the dust seal securely.

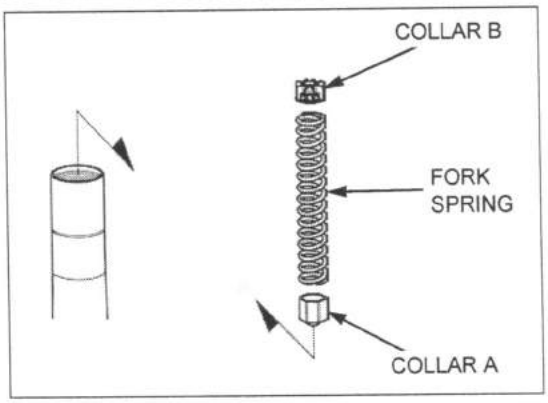


Lower the outer tube and rest it onto the axle holder.

Note the installation direction of the collars.

Insert the following into the slide pipe:

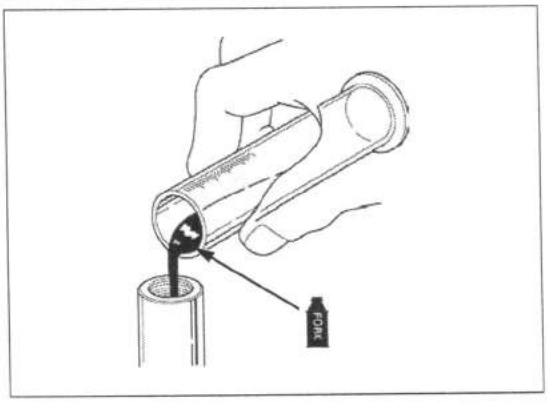
- spring collar A (with the round side facing down)
- fork spring
- spring collar B (with the flange side facing down)



After installing the piston rod assembly, pour the total amount of fluid as described in the later step.

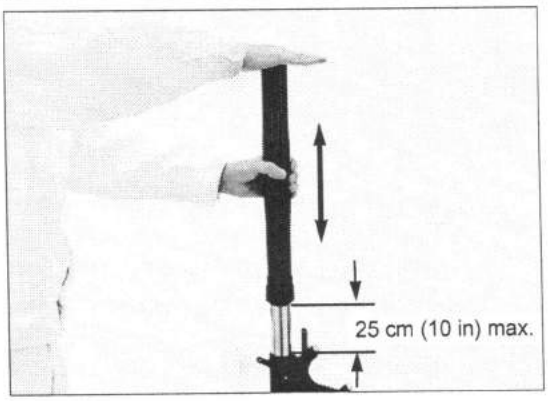
Pour the recommended fork fluid up to the side holes in the slide pipe with the fork leg compressed.

RECOMMENDED FORK FLUID:
Pro Honda Suspension Fluid SS-47 (10W)
FORK FLUID CAPACITY:
515 ± 2.5 cm³ (17.4 ± 0.08 US oz, 18.1 ± 0.09 Imp oz)



Do not extend the outer tube more than 25 cm (10 in) from the axle holder. The fork fluid will spill out of the side holes in the slide pipe.

Slowly pump the outer tube 8 10 times to remove any trapped air completely.

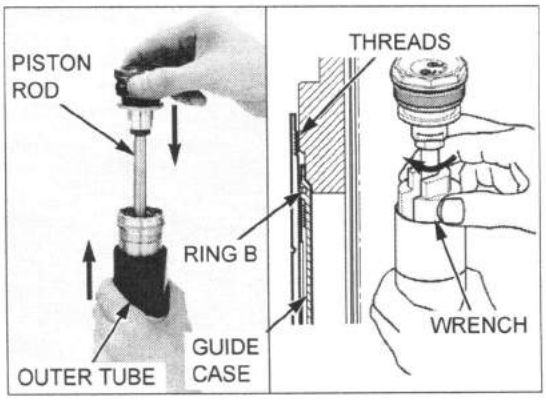


Be careful not to damage the piston ring B on the rod guide case on the edge or threads.

Insert the piston rod assembly into the slide pipe while extending the outer tube with the fork cap held down.

Using the special tool, screw the rod guide case by hand to install it into the slide pipe with the outer tube lifted up.

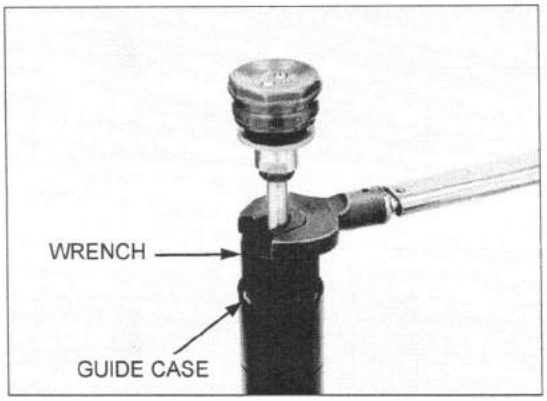
TOOL:
Rod guide case wrench 070MB-MGP0100 or 070MB-MGPA100 (U.S.A. only)



Hold the axle holder on the slide pipe in a vise with soft jaws or shop towels.

Tighten the rod guide case to the specified torque.

TORQUE: 90 N·m (9.2 kgf·m, 66 lbf·ft)



Fill the rod guide case with the remaining fork fluid.

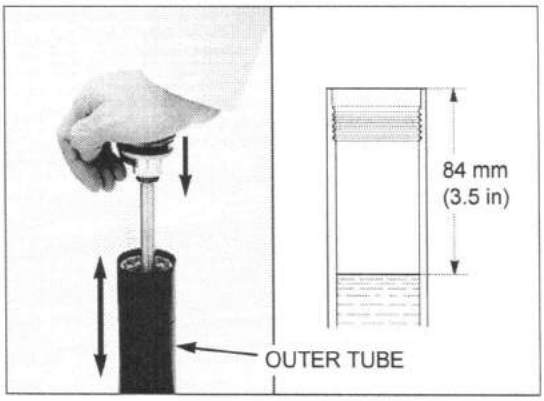
RECOMMENDED FORK FLUID:
Pro Honda Suspension Fluid SS-47 (10W)

Hold the fork cap down, then pump the outer tube several times to remove any trapped air completely.

Compress the outer tube fully and measure the fluid level from the top of the outer tube by supporting the fork leg vertically.

FORK FLUID LEVEL: 84 mm (3.5 in)

Adjust the fluid level as required.



Do not clamp the tube too tight or it could get damaged.

Place the outer tube in a vise with soft jaws or shop towels.

Coat a new O-ring with fork fluid and install it into the fork cap groove.

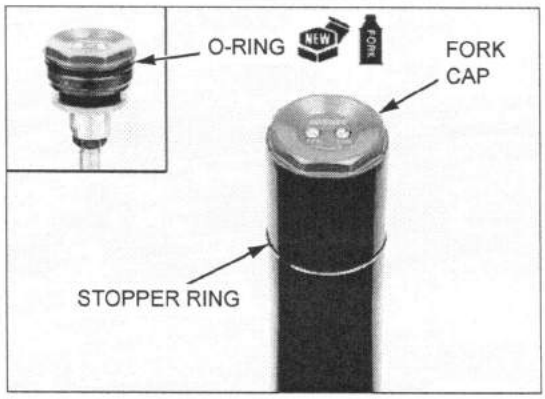
Take care not to scratch the cap head.

Install the fork cap into the outer tube and tighten it.

TOOL:
Fork cap wrench 070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)

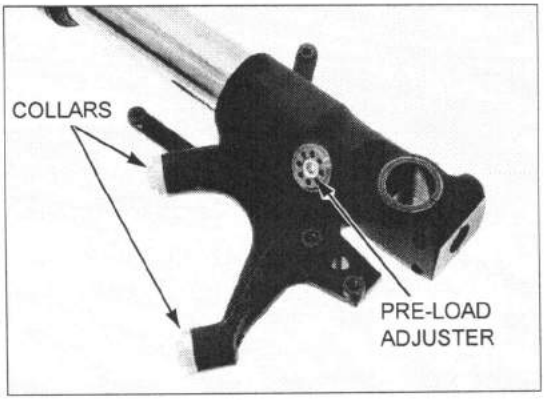
TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)

Install the stopper ring into the outer tube groove.



Install the collars.

Return the pre-load adjuster to the original position as noted before disassembly.



INSTALLATION

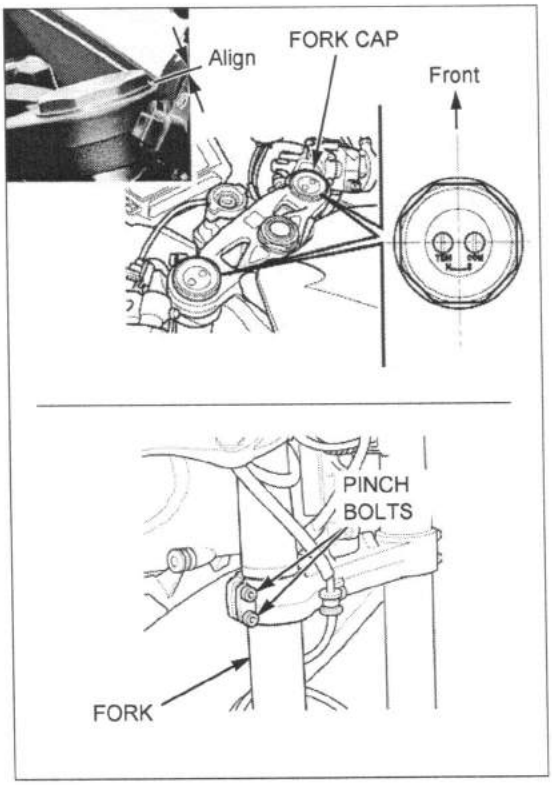
Route the wires, cables and hose properly (page 1-66).

Install the fork leg into the bottom bridge, handlebar, and top bridge.

Align the top of the outer tube with the upper surface of the top bridge and parallel the adjusters on the fork cap to the top bridge (rider can read characters) as shown, then tighten the bottom bridge pinch bolt to determine the fork position.

Tighten the bottom bridge pinch bolts to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

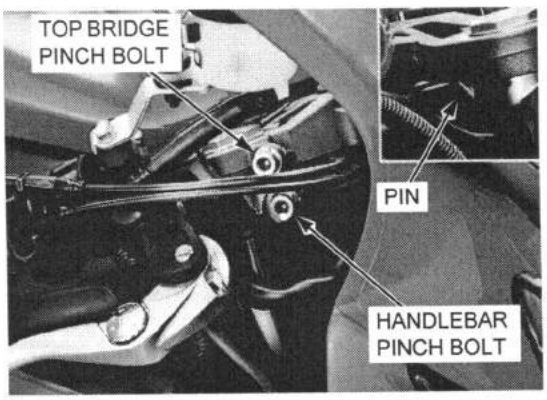


Tighten the top bridge pinch bolt.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Be sure to align the handlebar stopper pin with the hole in the top bridge. Tighten the handlebar pinch bolt while seating the handlebar against the bridge.

TORQUE:
'12, '13 model:
26 N·m (2.7 kgf·m, 19 lbf·ft)
After '13 model:
22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the following:

- front fender (page 3-36)
- front wheel
  STANDARD type (page 14-27)
  ABS type (page 14-29)
- intake air duct (page 3-22)

FORK (SP type)

NOTE:

- Do not disassemble the fork assembly. U.S.A. only: For shock service, refer to SL #73 *Third Party Service Information*.

REMOVAL

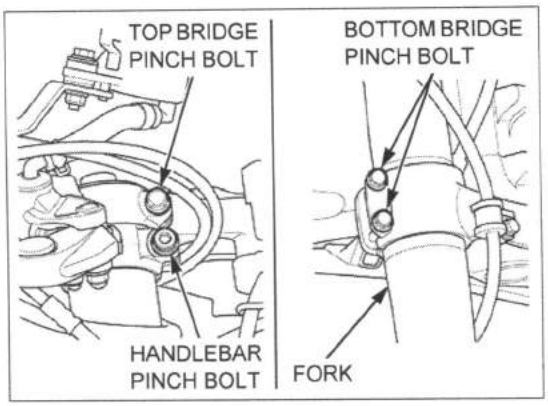
Remove the following:

- intake air duct (page 3-22)
- front wheel (page 14-19)
- front fender (page 3-36)

Loosen the pinch bolts of the handlebar and top bridge.

Keep the master cylinder reserve tank upright to prevent air from entering the hydraulic system.

While holding the fork leg, loosen the bottom bridge pinch bolts. Pull the fork leg down and remove it out of the fork bridges.



INSTALLATION

Be sure the stopper ring is installed in the outer tube groove.

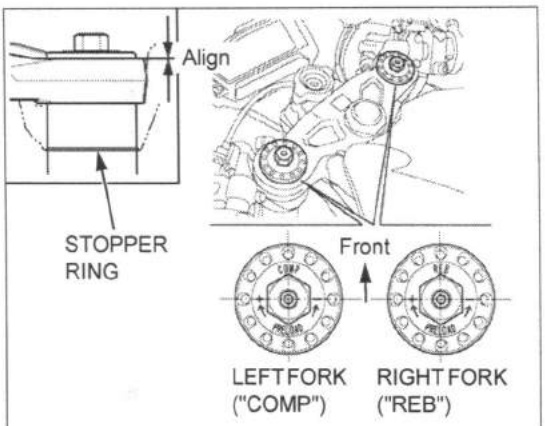
Route the wires, cables and hose properly (page 1-66).

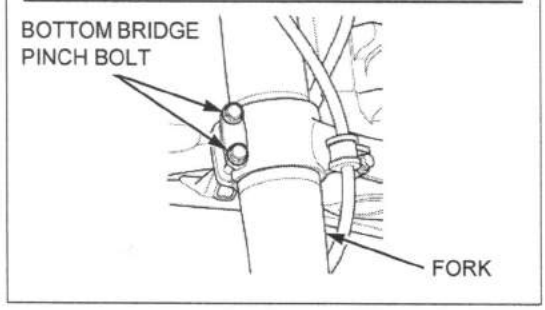
Install the fork leg into the bottom bridge, handlebar, and top bridge.

Align the top of the outer tube with the upper surface of the top bridge and parallel the marks "+" and "–" on the fork cap to the top bridge (rider can read characters) as shown, then tighten the bottom bridge pinch bolt to determine the fork position.

Tighten the bottom bridge pinch bolts to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)





Tighten the top bridge pinch bolt.

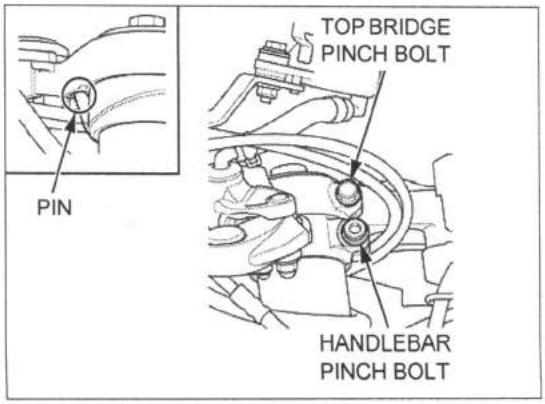
TORQUE: 24 N·m (2.4 kgf·m, 18 lbf·ft)

Be sure to align the handlebar stopper pin with the hole in the top bridge. Tighten the handlebar pinch bolt while seating the handlebar against the bridge.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Install the following:

- front fender (page 3-36)
- front wheel (page 14-27)
- intake air duct (page 3-22)



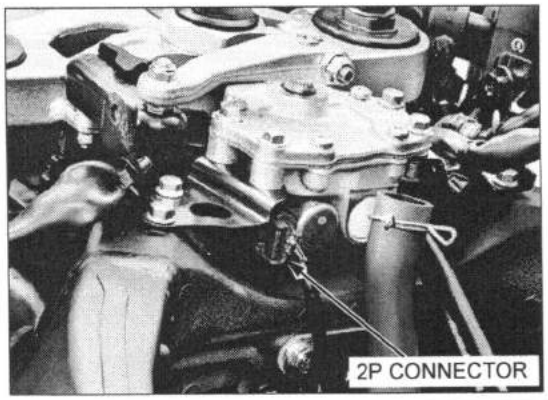
HESD

REMOVAL

Remove the air cleaner housing (page 6-62).

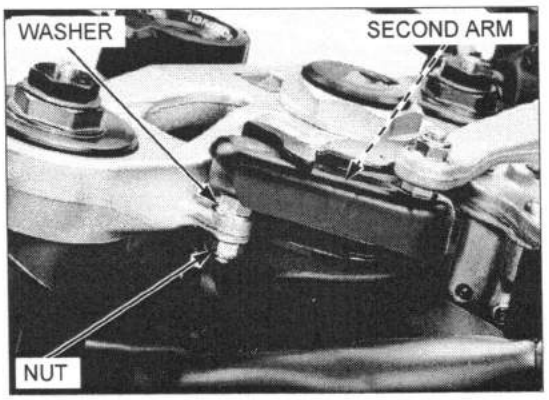
Turn the ignition switch OFF.

Disconnect the HESD 2P (Brown) connector.

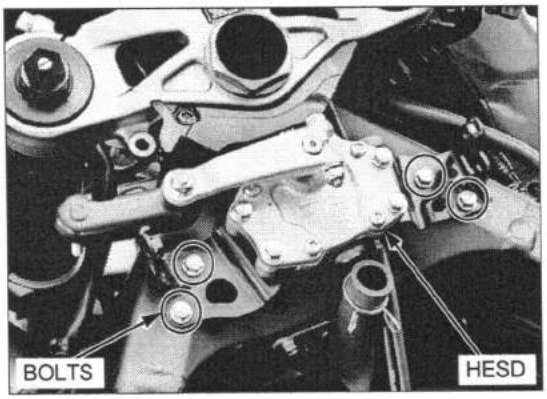


Remove the nut and disconnect the second arm from the top bridge.

Remove the washer from the second arm joint.



Remove the bolts and HESD from the frame.



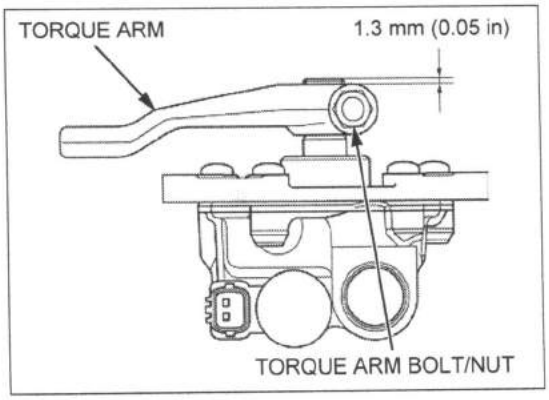
INSTALLATION

If the torque arm is removed, install it to the specified height as shown.

STANDARD: 1.3 mm (0.05 in)

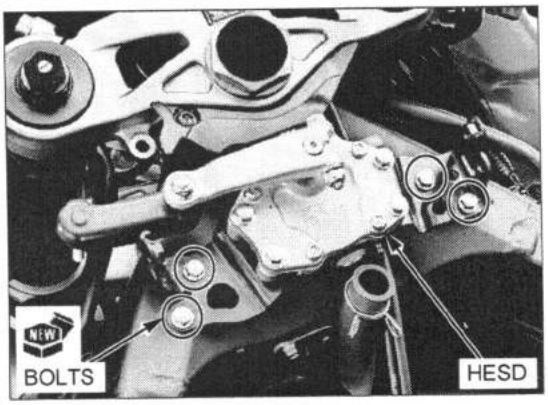
Install the torque arm bolt and tighten the nut to the specified torque.

TORQUE: 12.5 N·m (1.3 kgf·m, 9.2 lbf·ft)



Install the HESD onto the frame and tighten new bolts to the specified torque.

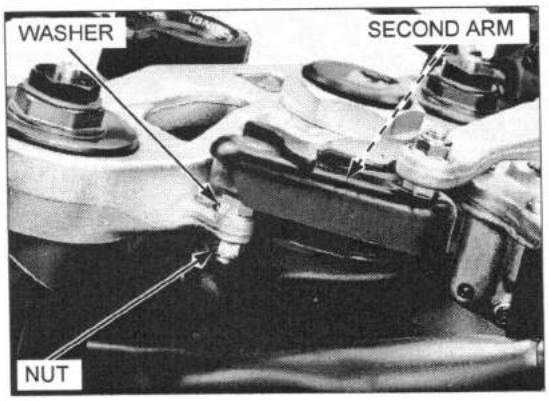
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Install the washer to the second arm joint.

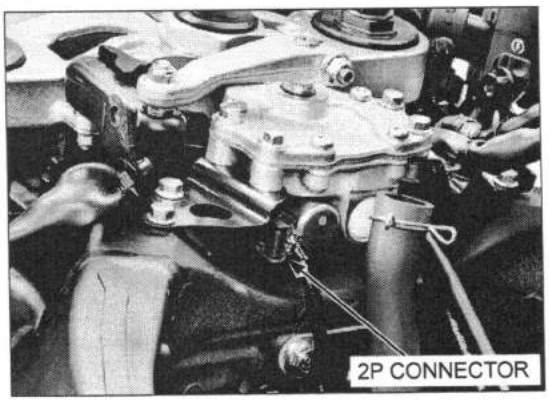
Connect the second arm to the top bridge and tighten the nut to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the HESD 2P (Brown) connector to the steering damper securely.

Install the air cleaner housing (page 6-63).



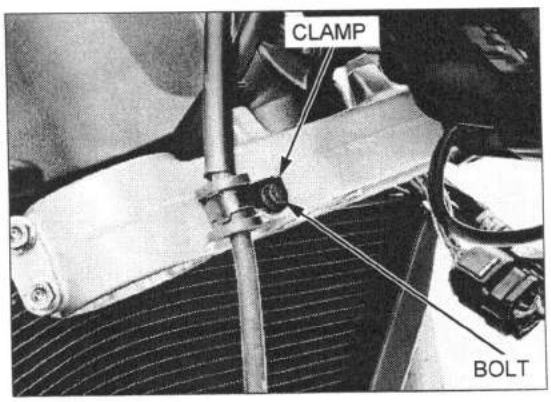
STEERING STEM

REMOVAL

Remove the following:

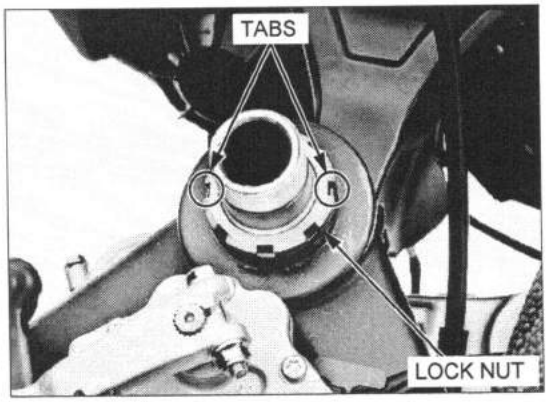
- Front forks (page 14-31)
- Handlebars (page 14-12)

Remove the bolt and brake hose clamp.



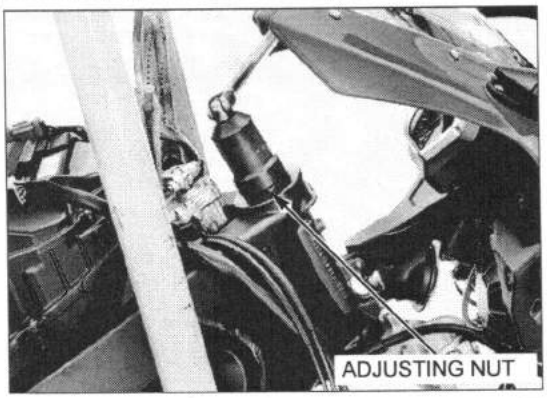
Straighten the lock washer tabs.

Remove the lock nut and lock washer.



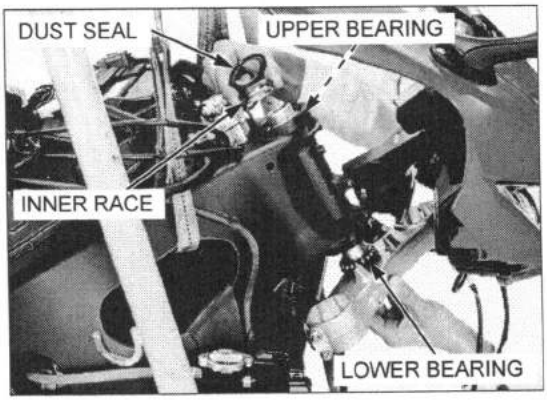
Remove the steering stem adjusting nut using the special tool.

TOOL:
Steering stem socket 07HMA-MR70100



Remove the following:

- Dust seal
- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing



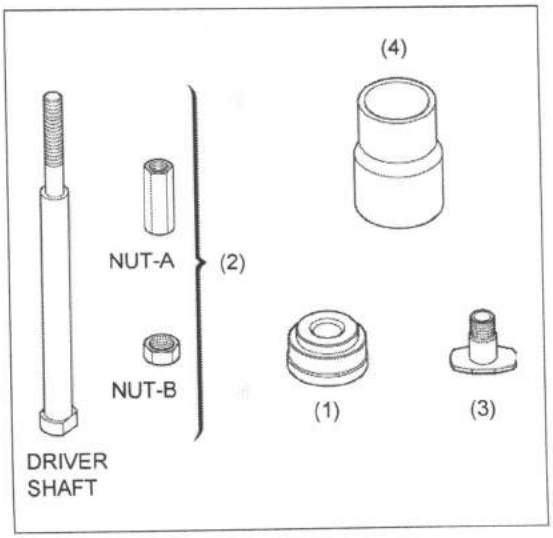
BEARING REPLACEMENT

Always replace the bearings and races as a set.

Replace the races using the special tools as described in the following procedure.

Except U.S.A.:

TOOLS: (Not available in U.S.A.)
(1) Driver attachment (2 required) 07NMF-MT70120
(2) Driver shaft assembly 07946-KM90301
(3) Bearing remover 07NMF-MT70110
(4) Assembly base 07946-KM90600

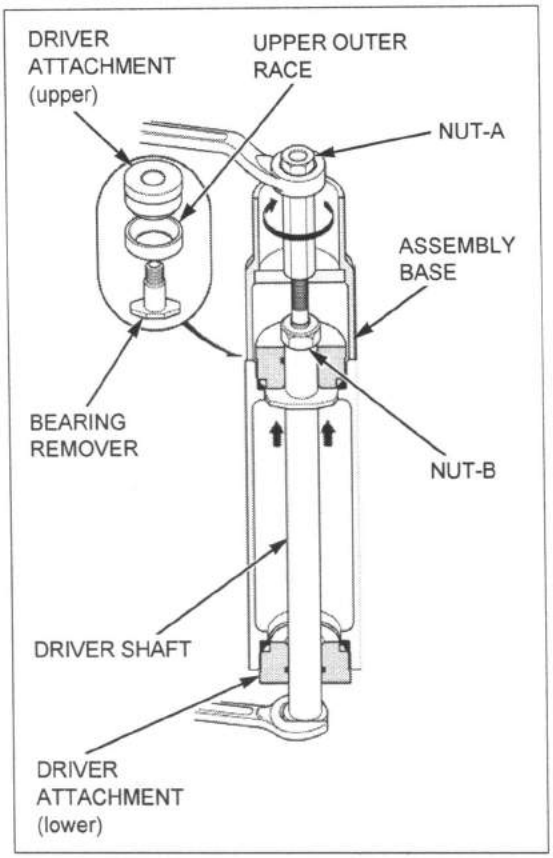


Note the installation direction of the assembly base; the large I.D. side facing the upper attachment.

Install the special tools into the steering head as shown.

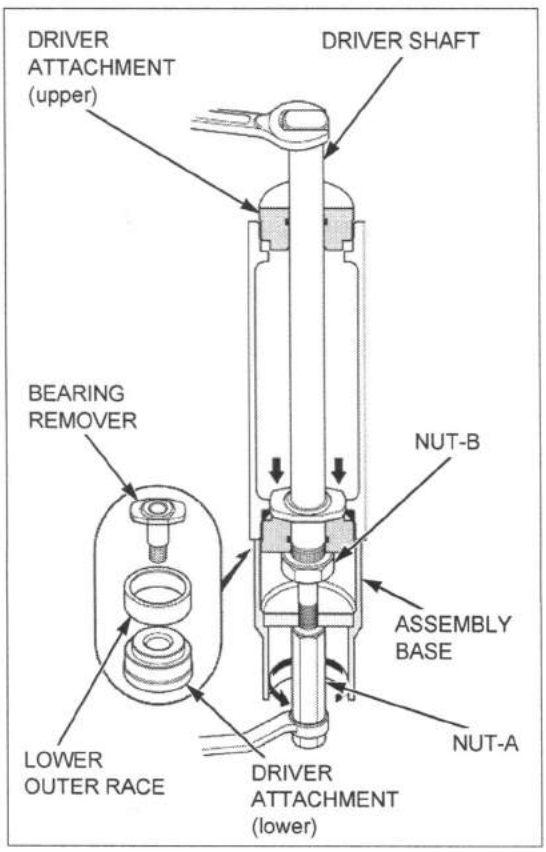
Align the bearing remover with the grooves in the steering head.
Lightly tighten the nut-B with a wrench.

Holding the driver shaft with a wrench, turn the nut-A gradually to remove the upper outer race.



Note the installation direction of the assembly base; the large I.D. side facing the lower attachment.

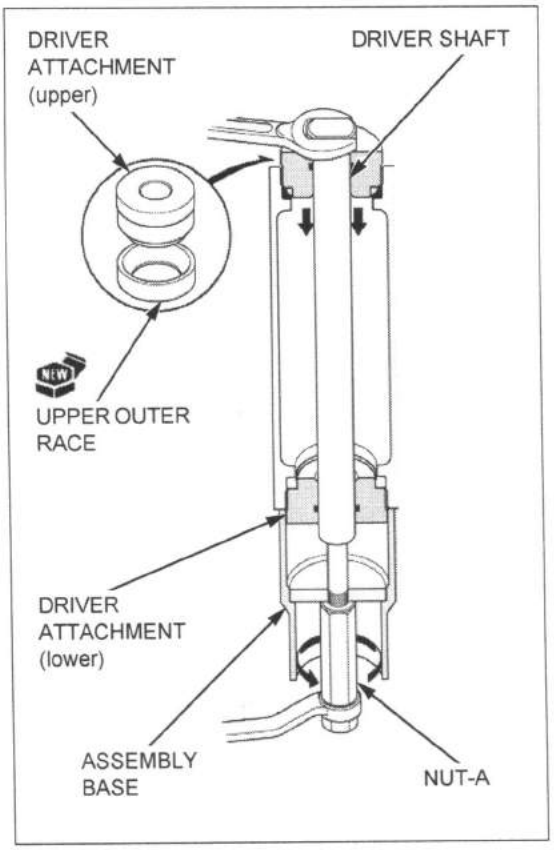
Install the special tools into the steering head as shown and remove the lower outer race using the same procedure as for the upper outer race.



Remove any burrs from the outer race installation surface of the steering head.

Note the installation direction of the assembly base; the large I.D. side facing the lower attachment.

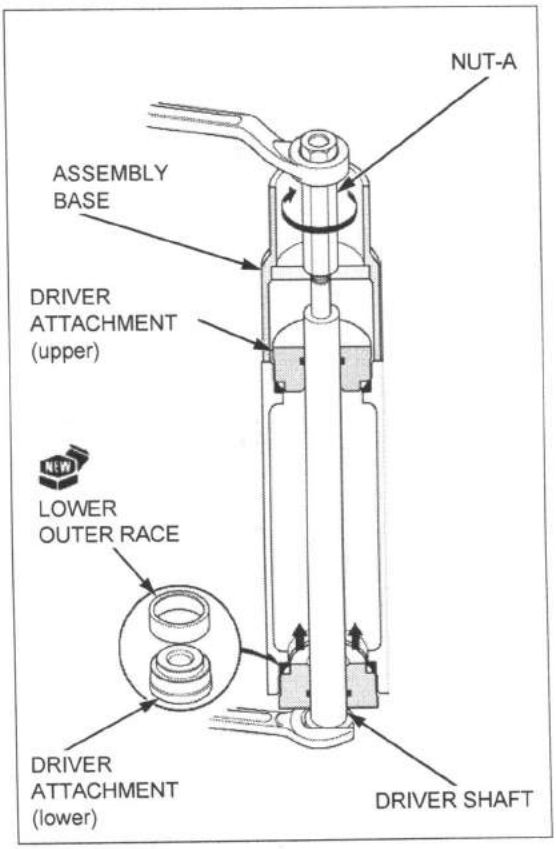
Install a new upper outer race with the special tools as shown.
Hold the driver shaft with a wrench and turn the nut-A gradually until upper outer race is fully seated.



Remove any burrs from the outer race installation surface of the steering head.

Note the installation direction of the assembly base; the large I.D. side facing the upper attachment.

Install a new lower outer race with the special tools as shown.
Hold the driver shaft with a wrench and turn the nut-A gradually until lower outer race is fully seated.

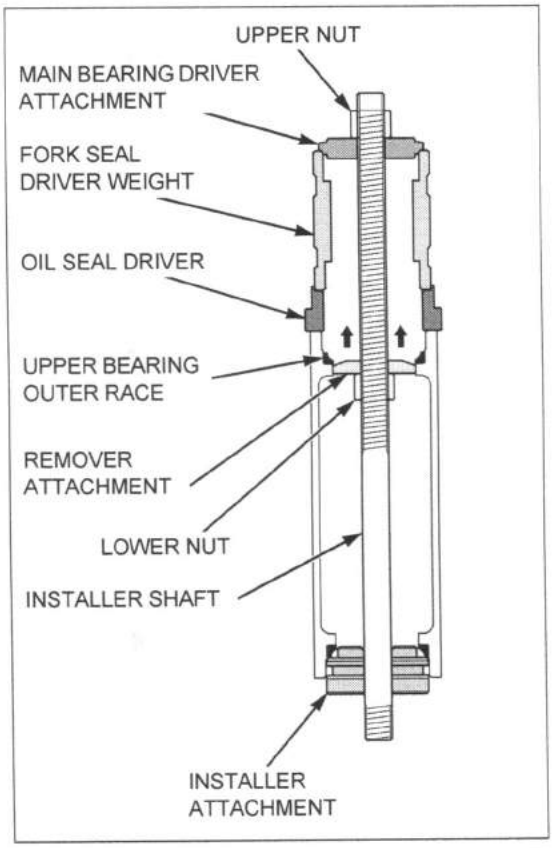


U.S.A. only:

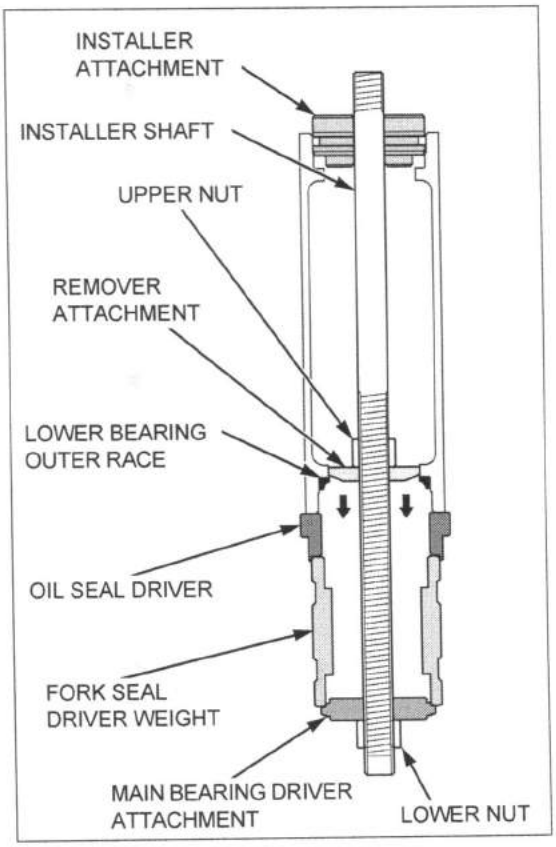
TOOLS:

Main bearing driver attachment	07946-ME90200
Fork seal driver weight	07947-KA50100
Oil seal driver	07965-MA60000
Installer shaft	07VMF-KZ30200
Installer attachment (2 required)	07VMF-MAT0200
Remover attachment	07AMF-MELA200 (U.S.A. only)

Install the special tools into the steering head as shown. Align the remover attachment with the grooves in the steering head.
While holding the installer shaft with the wrench, turn the upper nut gradually to remove the upper bearing outer race.

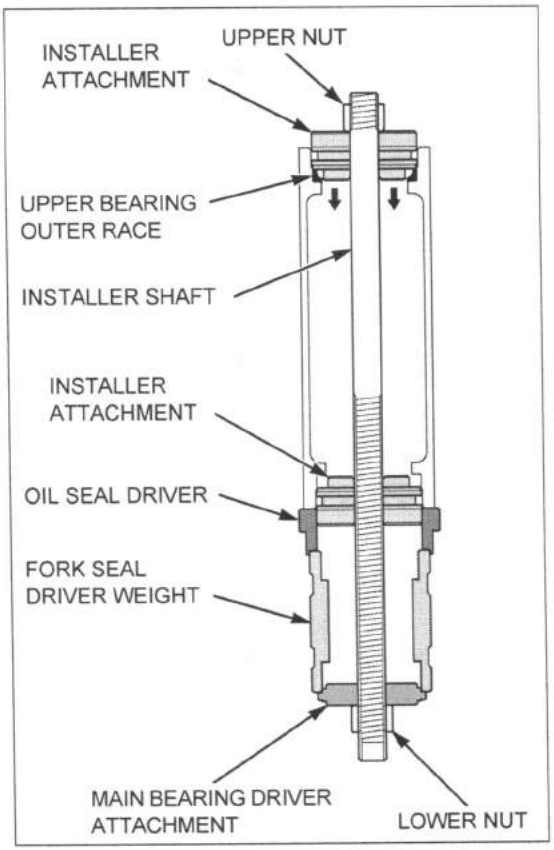


Install the special tools into the steering head as shown. Align the remover attachment with the grooves in the steering head.
While holding the installer shaft with a wrench, turn the lower nut gradually to remove the lower bearing outer race.



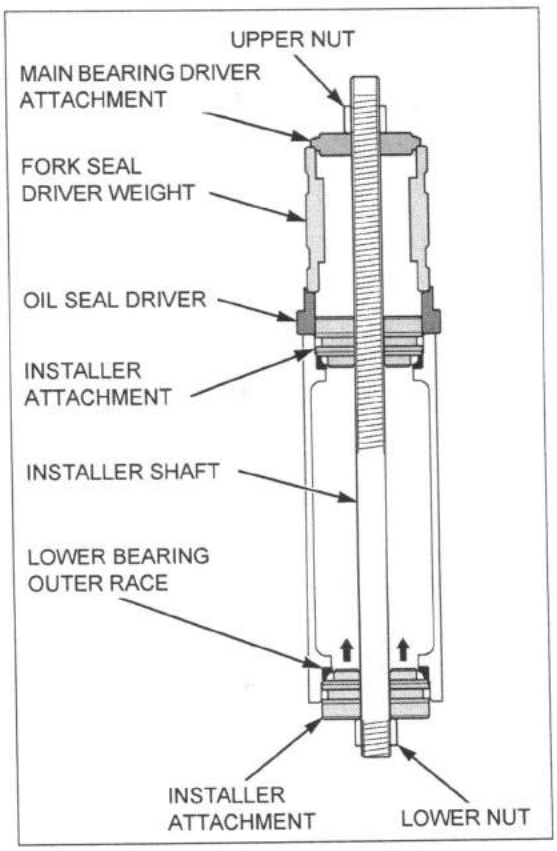
Remove any burrs from the outer race installation surface of the steering head.

Install a new upper bearing outer race with the special tools as shown.
While holding the installer shaft with a wrench, turn the lower nut gradually until the race is fully seated.



Remove any burrs from the outer race installation surface of the steering head.

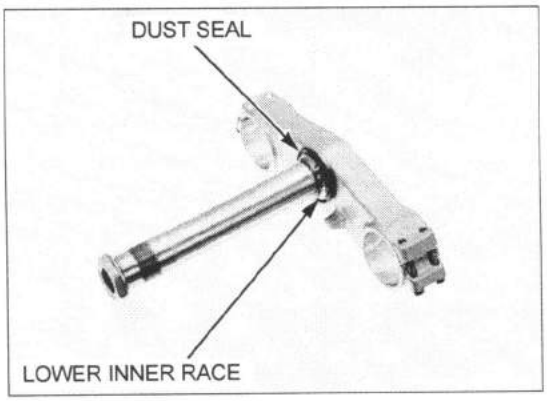
Install a new lower bearing outer race with the special tools as shown.
While holding the installer shaft with the wrench, turn the upper nut gradually until the race is fully seated.



LOWER INNER RACE REPLACEMENT

Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

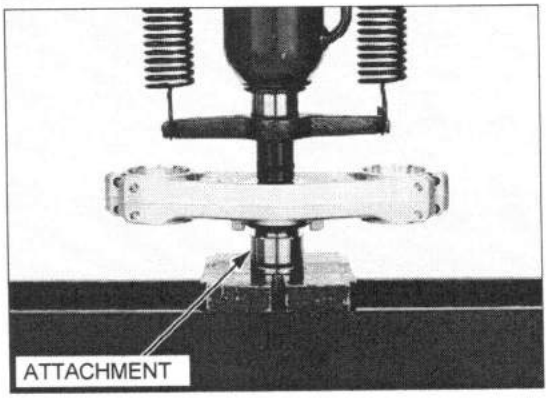
Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem. Remove the dust seal.



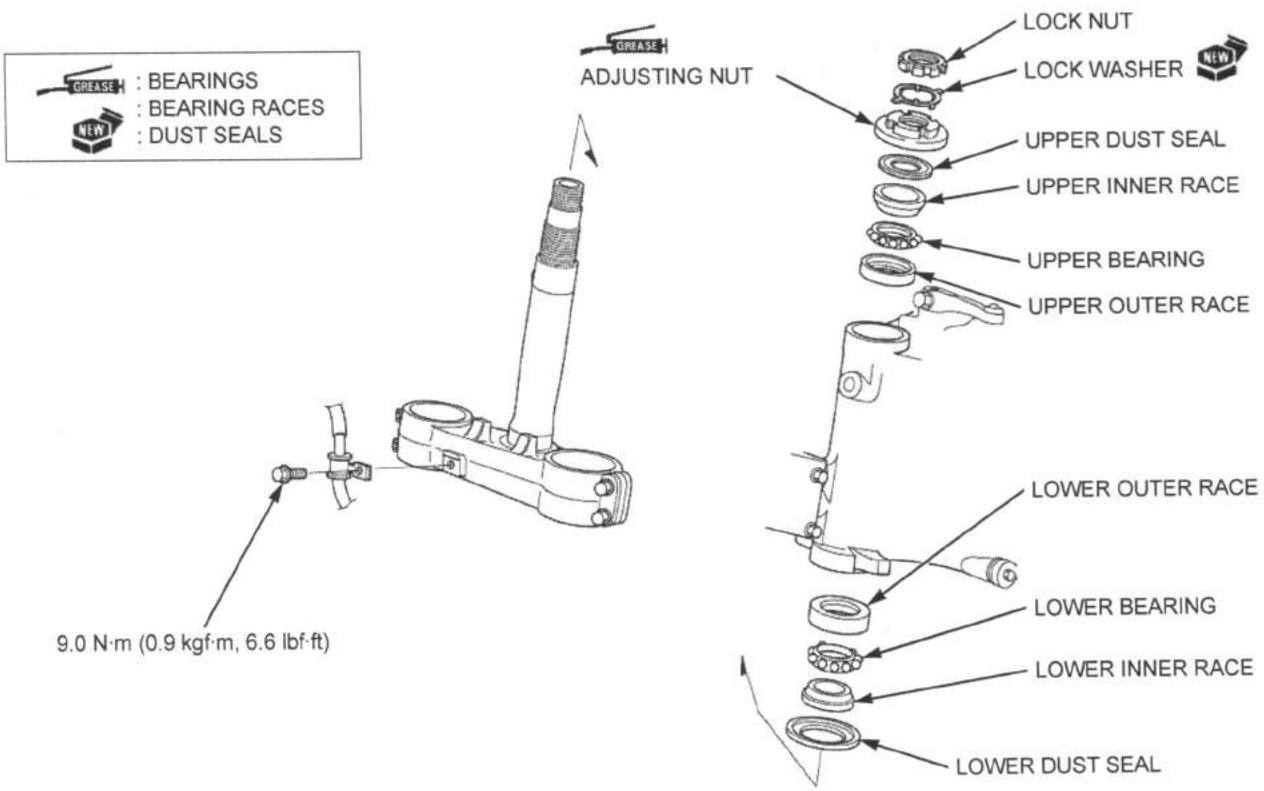
Apply the specified grease (page 1-23) to a new dust seal lips and install it over the steering stem.
Install a new lower bearing inner race using the special tool and a hydraulic press.

TOOL:

Attachment, 35.2 mm I.D.	**07947-KA20200 (Not available in U.S.A.) or**
Attachment, 35 mm I.D.	**07746-0030400**



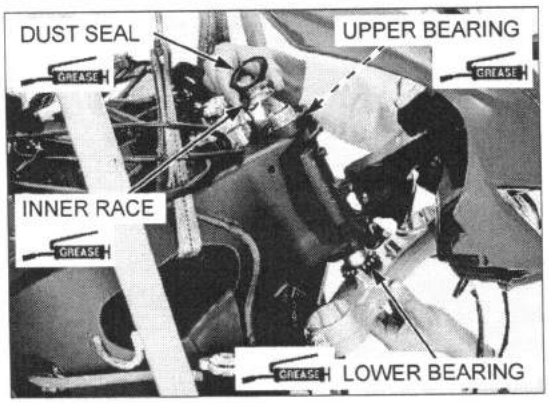
INSTALLATION



Apply the specified grease (page 1-23) to the upper and lower bearings and bearing races.

Install the lower bearing onto the steering stem.
Insert the steering stem into the steering head pipe.

Install the upper bearing, inner race, and dust seal.

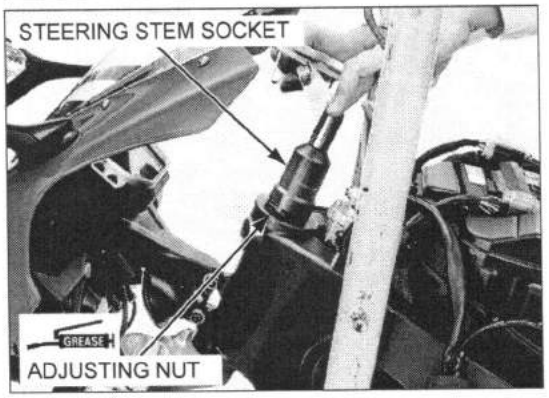


Apply the specified grease to the steering stem adjusting nut threads (page 1-23).

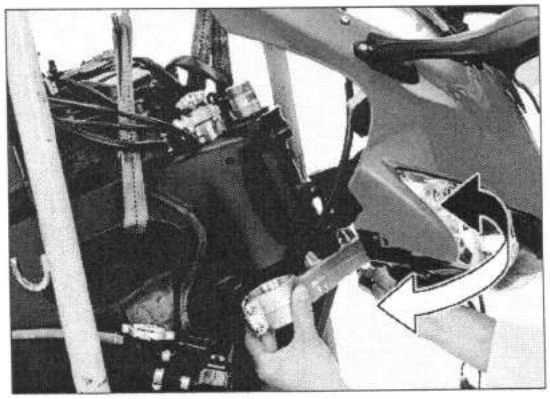
Tighten the steering stem adjusting nut to the initial torque.

TOOL:
Steering stem socket **07HMA-MR70100**

TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)



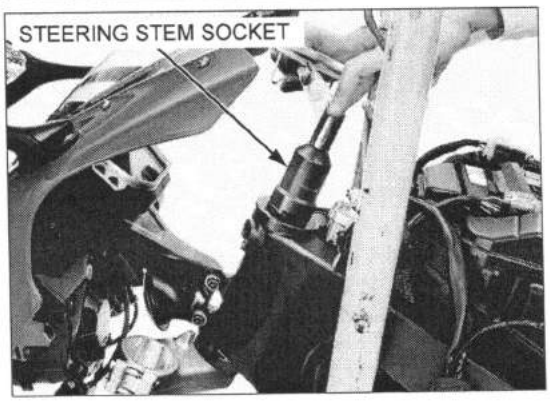
Move the steering stem right and left, lock-to-lock, five times to seat the bearings.



Retighten the steering stem adjusting nut to the specified torque.

TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)

Recheck that the steering stem moves smoothly without play or binding.

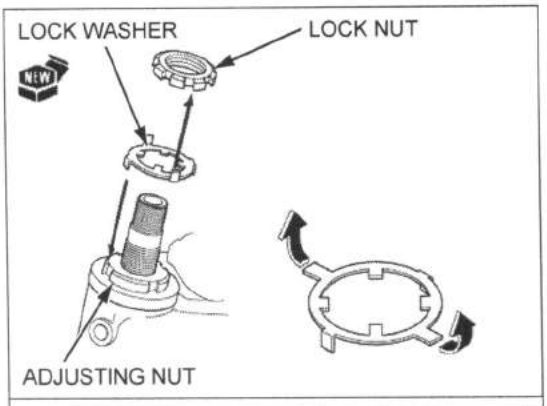


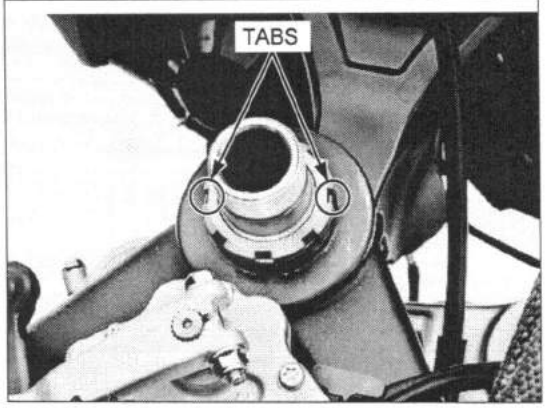
Install a new lock washer onto the steering stem.

Align the tabs of the lock washer with the grooves in the adjusting nut.

Install and finger tighten the lock nut.
Hold the adjusting nut and further tighten the lock nut within 1/4 turn (90°) enough to align its grooves with the lock washer tabs.

Bend the lock washer tabs up into the lock nut grooves.

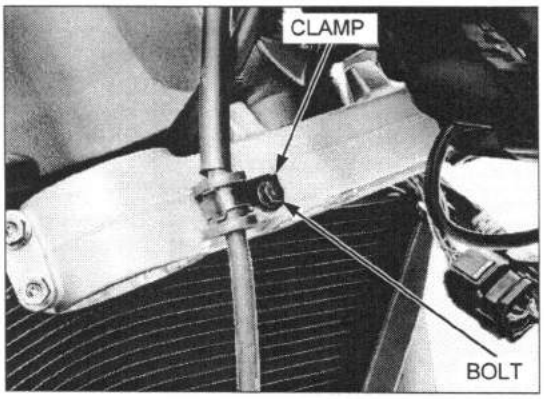




Correctly route the brake hose (page 1-25).

Install the front brake hose clamp and tighten the bolt to the specified torque.

TORQUE: 9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)



Install the following:

- Front forks (page 14-41)
- Handlebars (page 14-15)

After installation, move the steering stem right and left several times.

Make sure that the steering stem moves smoothly, without play or binding.

STEERING HEAD BEARING PRE-LOAD

Disconnect the second arm (page 14-52).

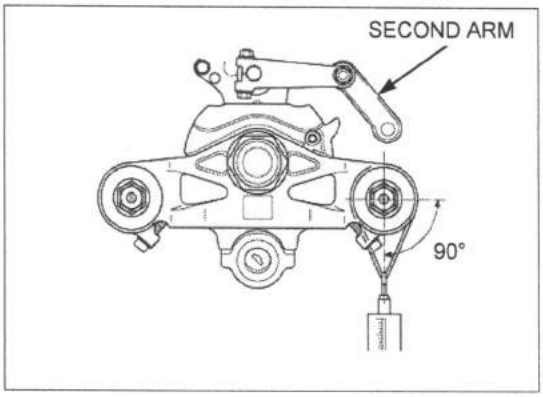
Jack up the motorcycle to raise the front wheel off the ground.

Position the steering stem to the straight ahead position.

Make sure that there is no cable or wire harness interference.

Hook a spring scale to the fork slider and measure the steering head bearing pre-load.

Standard: 12 – 17 N (1.2 – 1.7 kgf)



If the readings do not fall within the standard value, adjust the steering stem adjusting nut (page 14-53).

15. REAR WHEEL/SUSPENSION

COMPONENT LOCATION 15-2

SERVICE INFORMATION 15-5

TROUBLESHOOTING 15-7

REAR WHEEL 15-8

SUSPENSION LINKAGE 15-18

SHOCK ABSORBER (STANDARD/ABS type) 15-20

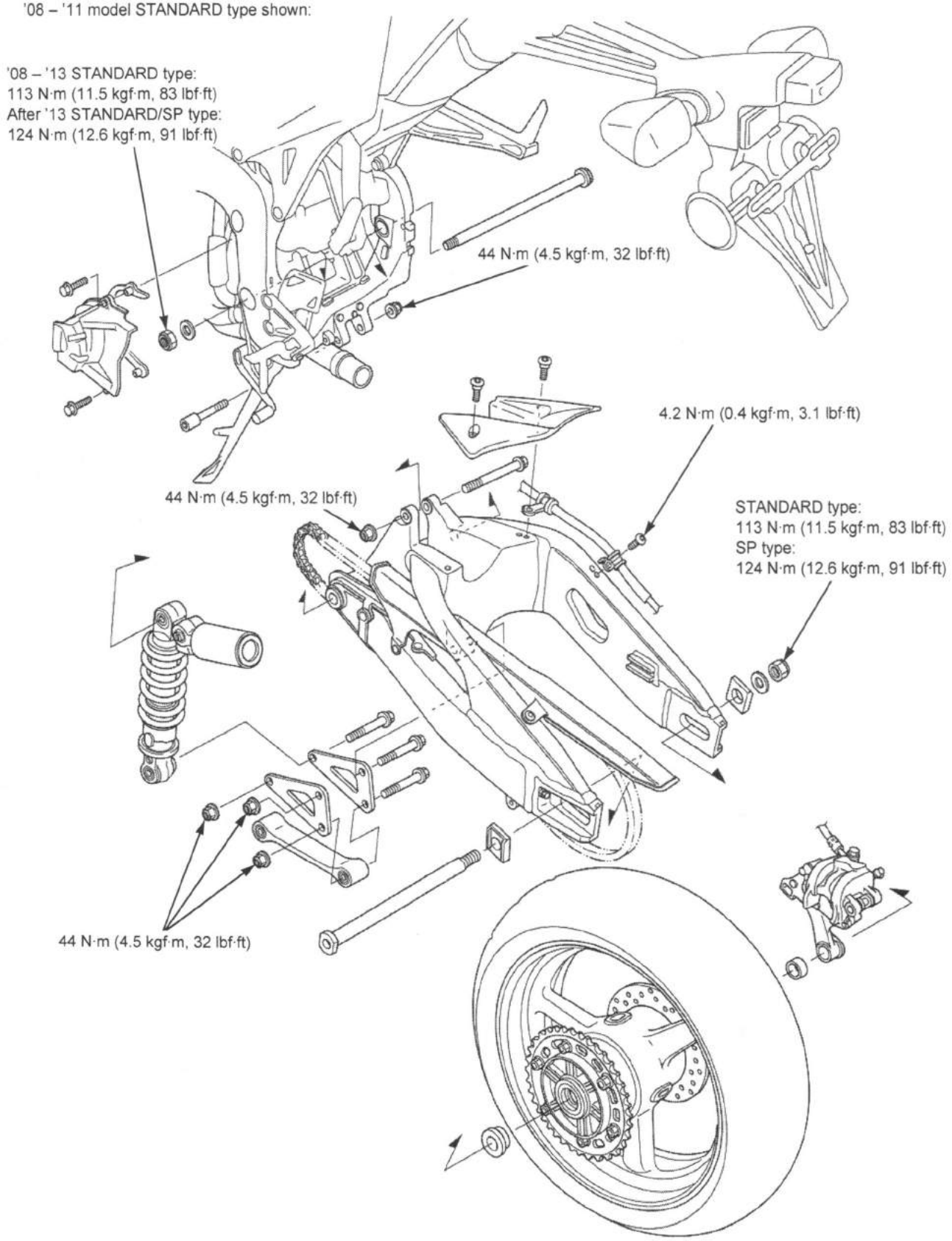
SHOCK ABSORBER (SP type) 15-24

SWINGARM 15-24

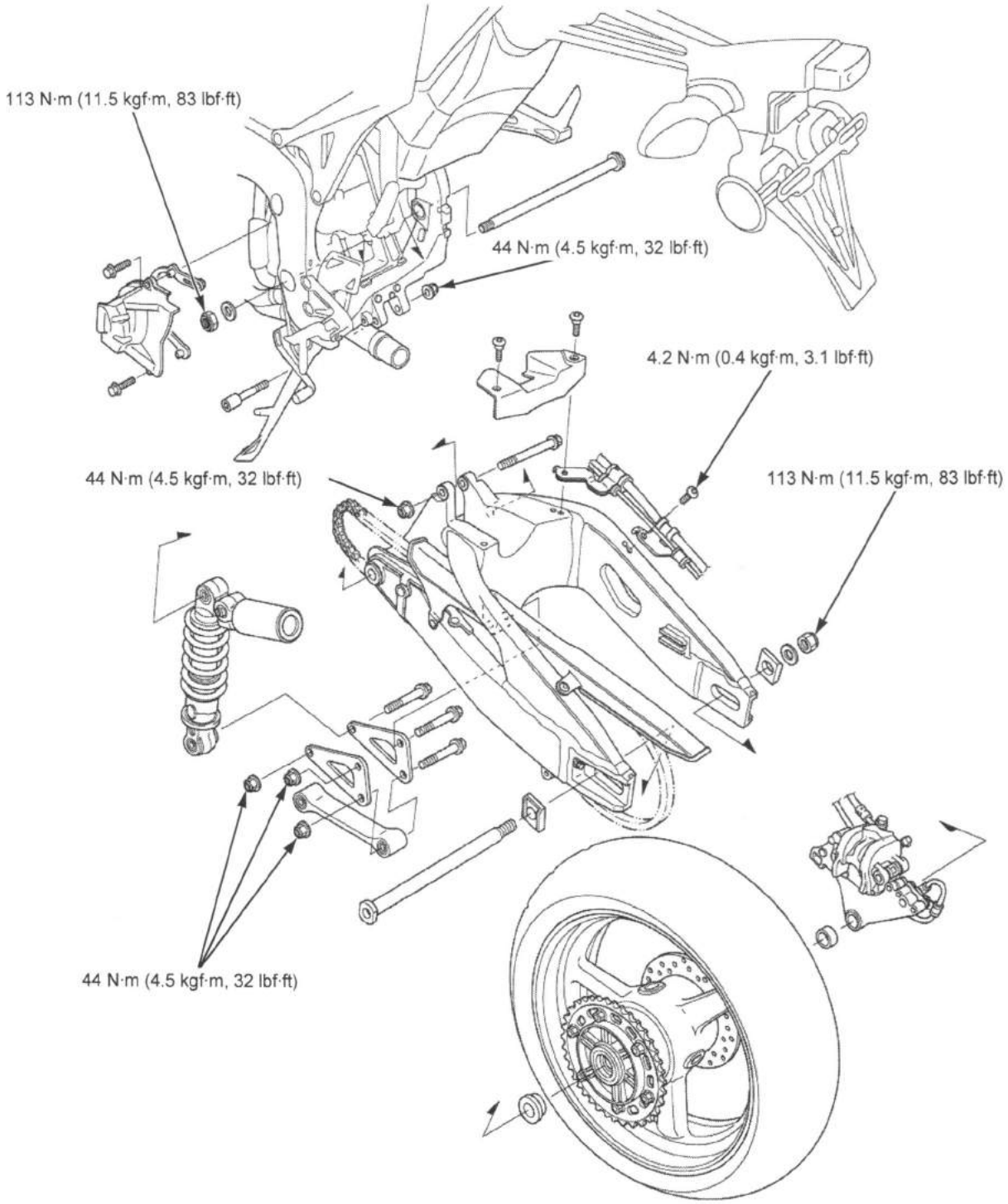
COMPONENT LOCATION

STANDARD/SP type:

'08 – '11 model STANDARD type shown:

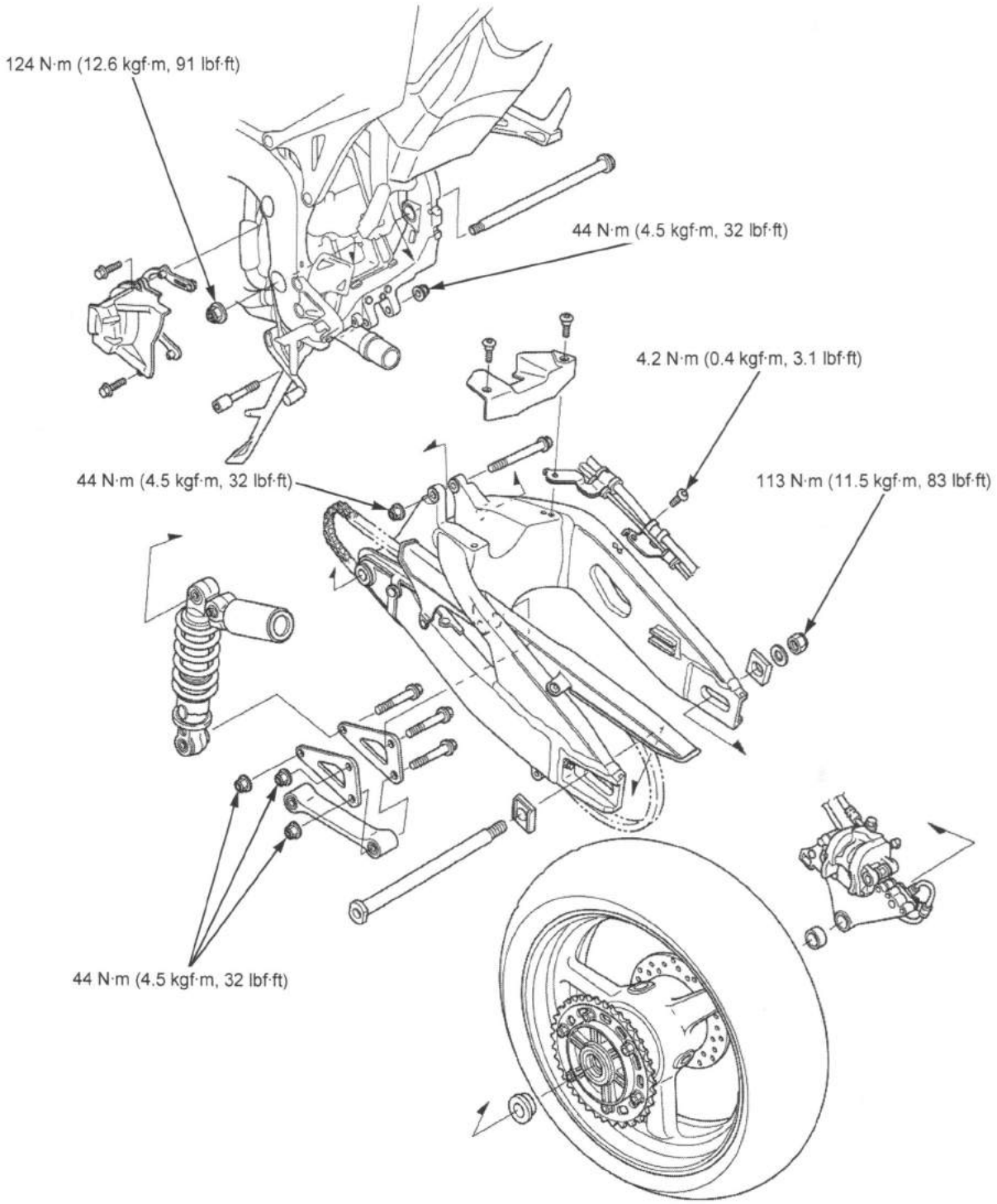


ABS type ('09 model):



ABS type (After '09 model):

'10, '11 model shown:



SERVICE INFORMATION

GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the rear wheel installation, check the brake operation by applying the brake pedal.
- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- STANDARD/ABS type: Before disposal of the shock absorber, release the nitrogen (page 15-23).
- SP type: Do not disassemble the shock absorber. U.S.A. only: For shock service, refer to SL #73 *Third Party Service Information*.
- When servicing the rear wheel and suspension, support the motorcycle using a safety stand or hoist.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICATION".
- Use Honda Genuine replacement bolts and nuts for all suspension pivot and mounting point.
- For brake system information (page 16-6).

SPECIFICATIONS

STANDARD/ABS type

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			–	2.0 (0.08)
Cold tire pressure	Up to maximum weight capacity		290 kPa (2.90 kgf/cm², 42 psi)	–
	Up to 90 kg (200 lbs) load		290 kPa (2.90 kgf/cm², 42 psi)	–
Axle runout			–	0.2 (0.01)
Wheel rim runout	Radial		–	2.0 (0.08)
	Axial		–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Drive chain	Size/link	DID	DID 50VA11-120ZB/116	–
		RK	RK 50HFOZ6-120LJFZ/116	–
	Slack		25 – 35 (1.0 – 1.4)	–
Shock absorber	Spring pre-load adjuster standard position		4 position from minimum	–
	Rebound damping adjuster initial setting	'08 – '11 model	2-1/4 turns out from full hard	–
		After '11 model	2-1/2 turns out from full hard	–
	Compression damping adjuster initial setting	STANDARD type ('08, '09 model)	2 turns out from full hard	–
		ABS type ('09 model)	2-1/2 turns out from full hard	–
		'10, '11 model	2-1/2 turns out from full hard	–
		'12, '13 model	2-3/4 turns out from full hard	–
		After '13 model	2 turns out from full hard	–

SP type

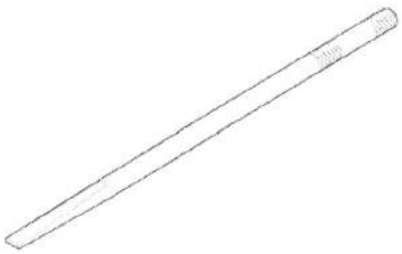
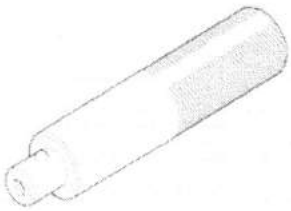
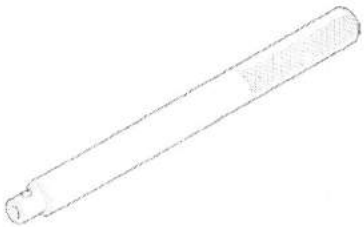
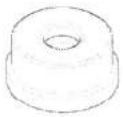
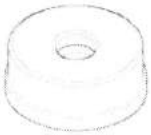
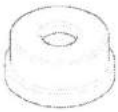
Unit: mm (in)

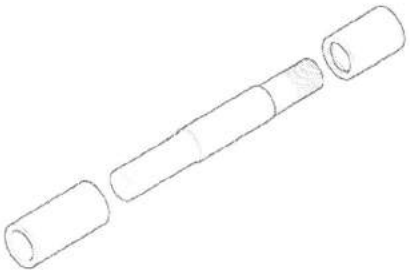
ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			–	2.0 (0.08)
Cold tire pressure	Up to maximum weight capacity		290 kPa (2.90 kgf/cm², 42 psi)	–
Axle runout			–	0.2 (0.01)
Wheel rim runout	Radial		–	2.0 (0.08)
	Axial		–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Drive chain	Size/link	DID	DID 50VA11-120ZB/116	–
		RK	RK 50HFOZ6-120LJFZ/116	–
	Slack		25 – 35 (1.0 – 1.4)	–
Shock absorber	Spring pre-load adjuster standard position		6 turns from maximum	–
	Rebound damping adjuster initial setting		16 clicks from full hard	–
	Compression damping adjuster initial setting		15 clicks from full hard	–

TORQUE VALUES

Rear brake disc bolt		42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt; replace with a new one.
Driven sprocket nut		64 N·m (6.5 kgf·m, 47 lbf·ft)	U-nut
Rear axle nut	(STANDARD/ABS type)	113 N·m (11.5 kgf·m, 83 lbf·ft)	U-nut
	(SP type)	124 N·m (12.6 kgf·m, 91 lbf·ft)	U-nut
Shock absorber mounting nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Shock link nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Shock arm-to-swingarm nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Drive chain slider bolt		9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)	ALOC bolt; replace with a new one.
Drive chain case bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	
Swingarm pivot nut	('08 – '13 model STANDARD/ '09 model ABS type)	113 N·m (11.5 kgf·m, 83 lbf·ft)	U-nut
	(After '13 model STANDARD/ After '09 model ABS/ SP type)	124 N·m (12.6 kgf·m, 91 lbf·ft)	U-nut
Rear brake hose clamp screw		4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	
Rear pulser ring mounting bolt (ABS type)		7 N·m (0.7 kgf·m, 5.2 lbf·ft)	ALOC bolt; replace with a new one.

TOOLS

Bearing remover shaft 07GGD-0010100 	Bearing remover head, 25 mm 07746-0050800 	Driver 07749-0010000 
Driver 07949-3710001 	Attachment, 42 x 47 mm 07746-0010300 	Attachment, 52 x 55 mm 07746-0010400 
Attachment, 22 x 24 mm 07746-0010800 	Attachment, 40 x 42 mm 07746-0010900 	Attachment, 28 x 30 mm 07946-1870100 

Attachment, 32 x 35 mm 07746-0010100 	Pilot, 17 mm 07746-0040400 	Pilot, 25 mm 07746-0040600 
Attachment, 30 mm I.D. 07746-0030300 	Bearing driver 07GMD-KT80100 	

TROUBLESHOOTING

Soft suspension
- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Insufficient tire pressure

Hard suspension
- Incorrect suspension adjustment
- Damaged rear suspension pivot bearings
- Bent damper rod
- Bent swingarm pivot
- Tire pressure too high

Rear wheel wobbling
- Bent rim
- Worn or damaged rear wheel bearings
- Faulty rear tire
- Unbalanced rear tire and wheel
- Insufficient rear tire pressure
- Faulty swingarm pivot bearings

Rear wheel turns hard
- Faulty rear wheel bearings
- Bent rear axle
- Rear brake drag
- Drive chain too tight

Rear suspension noise
- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

Steers to one side or does not track straight
- Bent rear axle
- Axle alignment/chain adjustment not equal on both sides

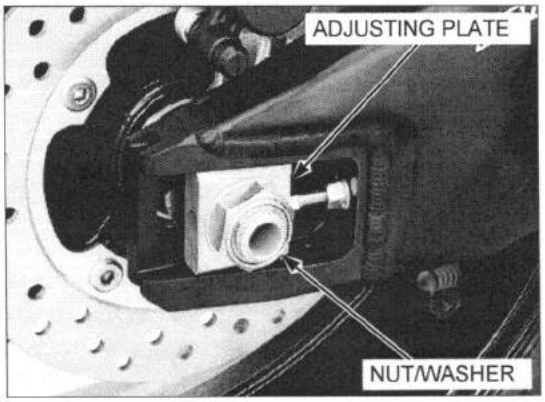
REAR WHEEL

REMOVAL

Support the motorcycle securely and raise the rear wheel off the ground using a hoist or safety stand.

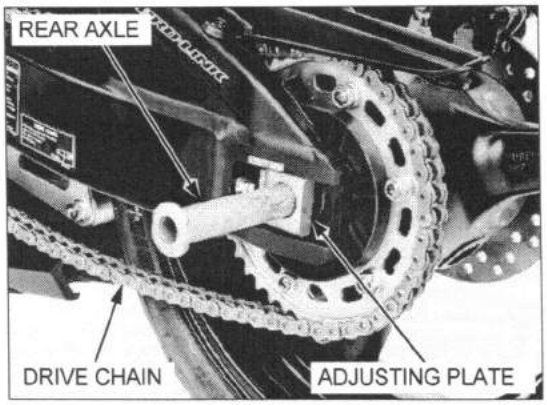
Fully slacken the drive chain (page 4-32).

Remove the rear axle nut, washer, and adjusting plate.



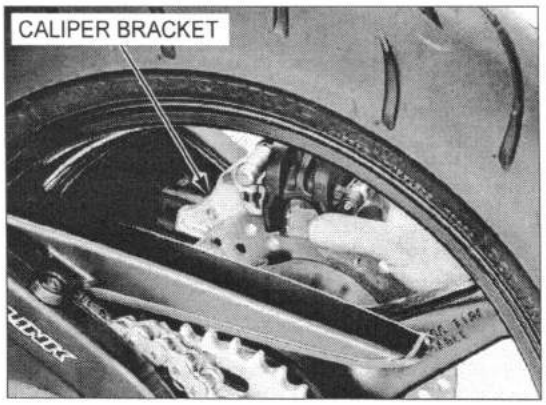
Push the rear wheel forward.
Remove the rear axle and adjusting plate.

Remove the drive chain from the driven sprocket.

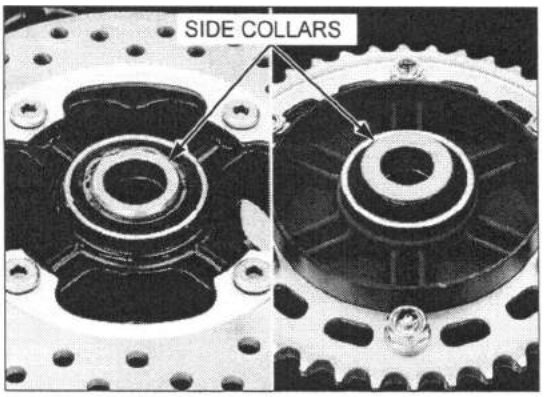


Do not hang the caliper by the brake hose. Do not twist the brake hose. Do not operate the brake pedal after removing the rear wheel.

Remove the rear brake caliper bracket and rear wheel.

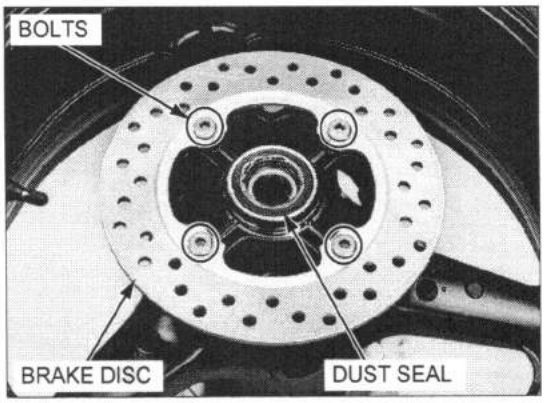


Remove the side collars.



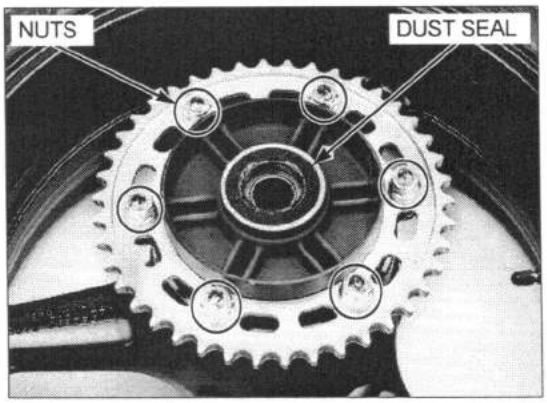
DISASSEMBLY (STANDARD/SP type)

Remove the bolts and brake disc.
Remove the dust seal.

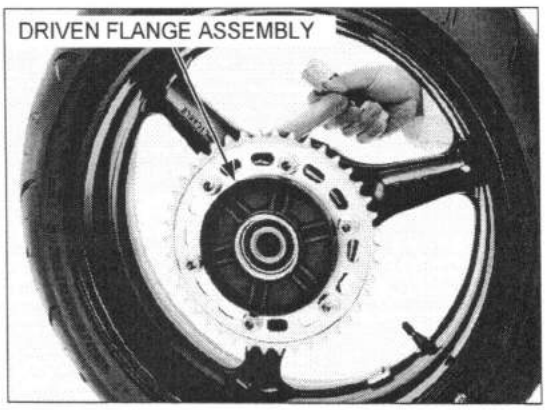


If you replace the driven sprocket, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.

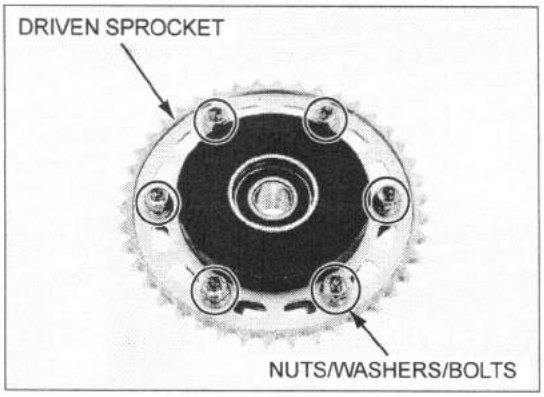
Remove the dust seal.



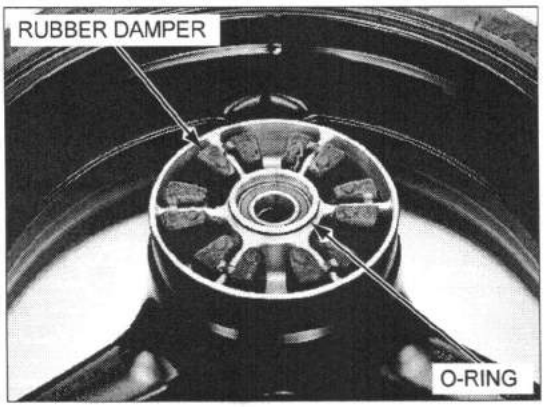
Remove the driven flange assembly from the left wheel hub.



To remove the driven sprocket, remove the nuts, washers, driven sprocket, and bolts.

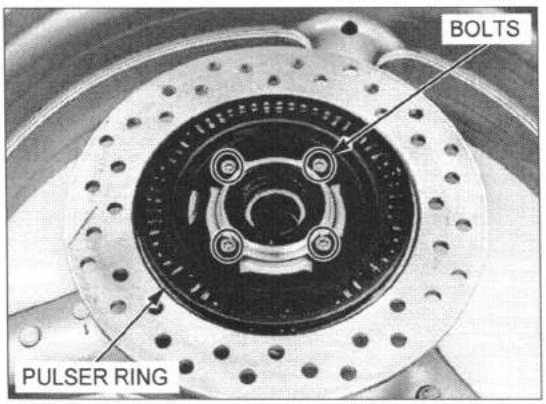


Remove the wheel rubber dampers.
Remove the O-ring.

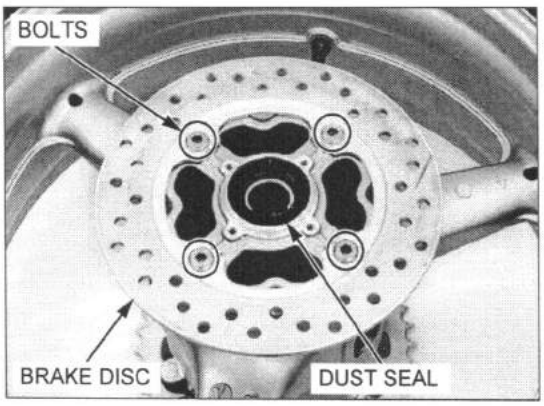


DISASSEMBLY (ABS type)

Remove the bolts and pulser ring.

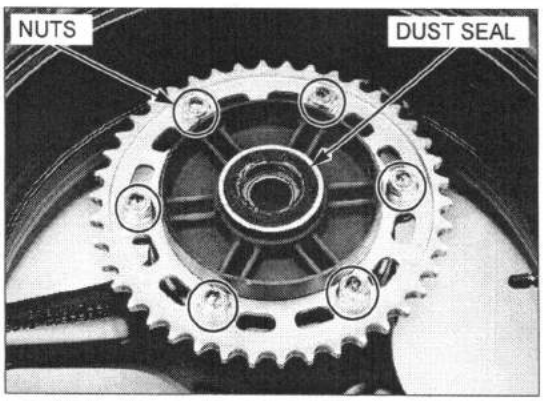


Remove the bolts and brake disc.
Remove the dust seal.

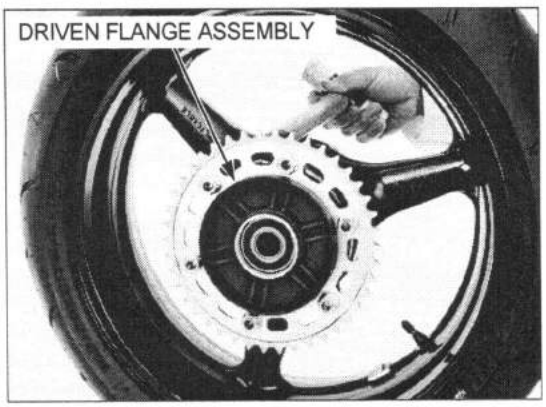


If you replace the driven sprocket, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.

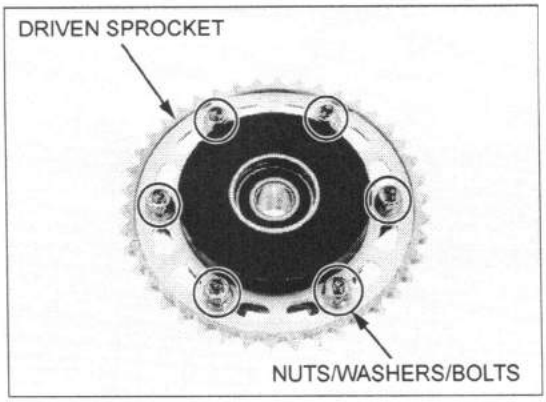
Remove the dust seal.



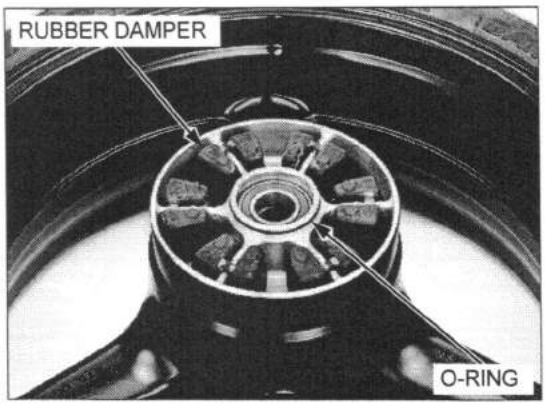
Remove the driven flange assembly from the left wheel hub.



To remove the driven sprocket, remove the nuts, washers, driven sprocket, and bolts.



Remove the wheel rubber dampers.
Remove the O-ring.



INSPECTION

Axle

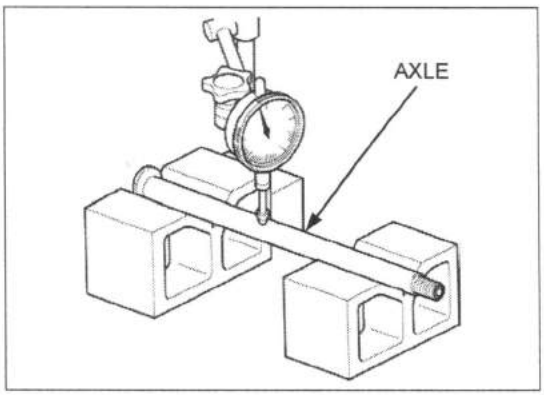
Place the axle on V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)

Wheel balance

For wheel balance servicing (page 14-22).

- When checking wheel balance, install the brake disc onto the wheel.
  - STANDARD/SP type (page 15-14)
  - ABS type (page 15-16)

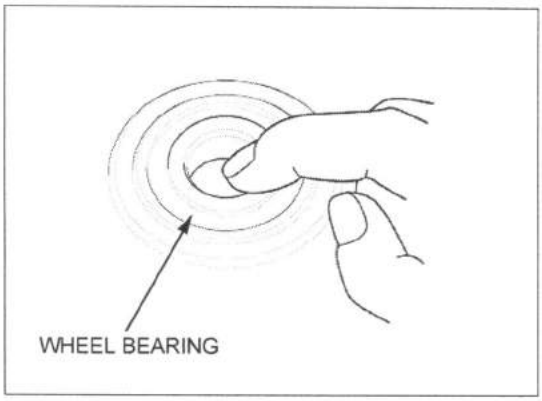


Wheel/driven flange bearings

Turn the inner race of each bearing with your finger.
The bearings should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the hub or driven flange.

Replace the wheel bearings in pairs.

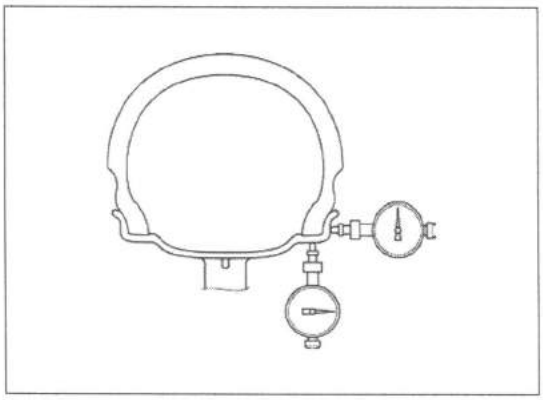
Replace the bearings if the inner races does not turn smoothly, quietly, or if the outer race fit loosely in the hub or driven flange.



Wheel rim runout

Check the rim runout by placing the wheel in a truing stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

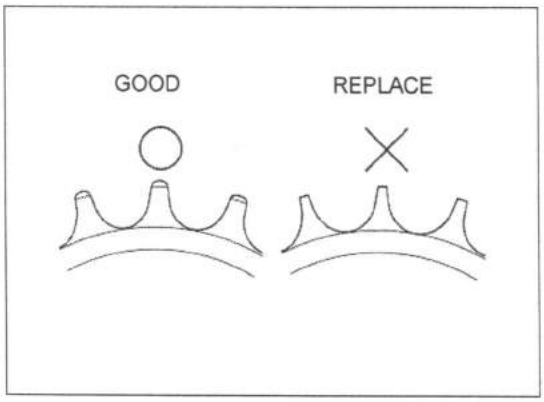
SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)



Driven sprocket

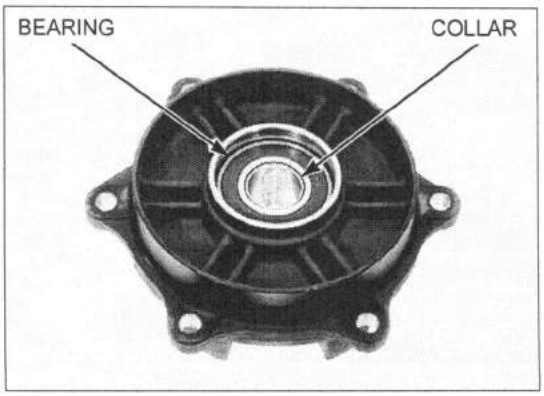
Check the condition of the final driven sprocket teeth.
Replace the sprocket if worn or damaged.

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.

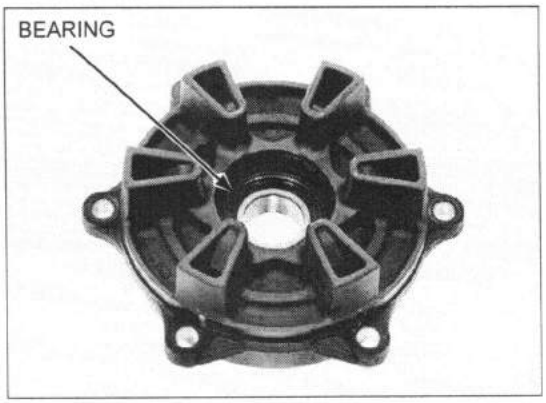


DRIVEN FLANGE BEARING REPLACEMENT

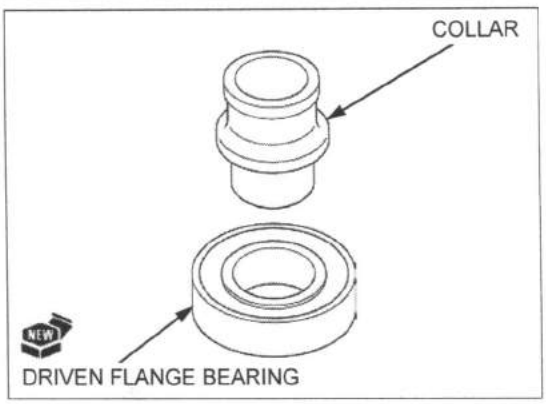
Press the collar out of the driven flange bearing.



Press the bearing out of the driven flange.



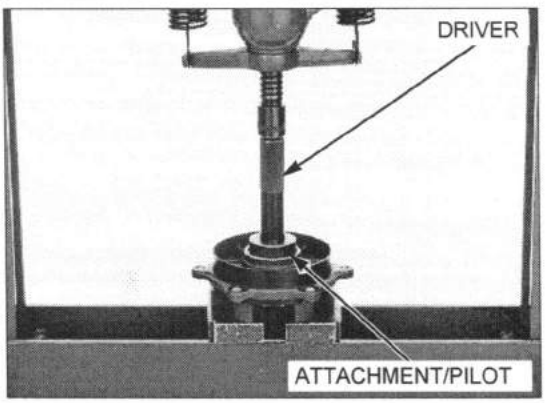
Press the driven flange collar into new driven flange bearing until it is fully seated.



Press the driven flange bearing/collar into the driven flange until it is fully seated using the special tools.

TOOLS:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**
Pilot, 25 mm	**07746-0040600**

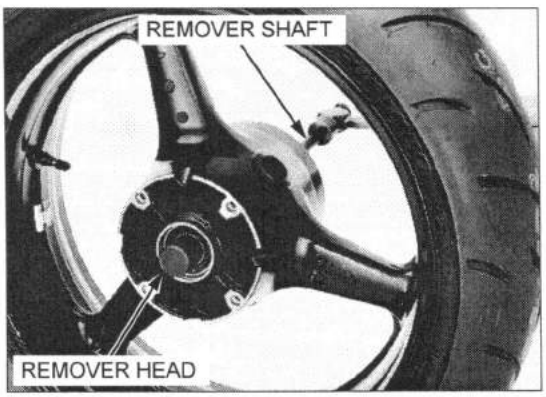


WHEEL BEARING REPLACEMENT

Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover head, 25 mm	**07746-0050800**
Bearing remover shaft	**07GGD-0010100**

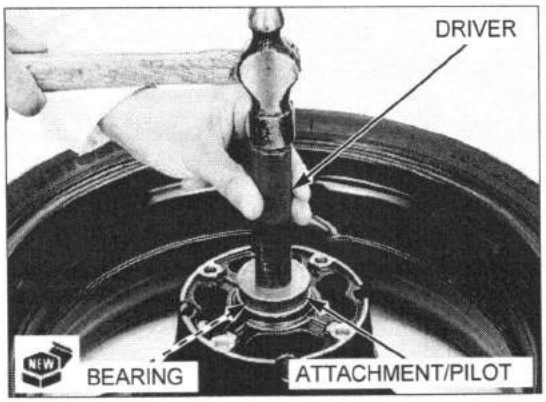


Never install the old bearing, once the bearings have been removed, the bearings must be replaced with new ones.

Drive in a new right bearing squarely with its marked side facing up until it is fully seated.

TOOLS:

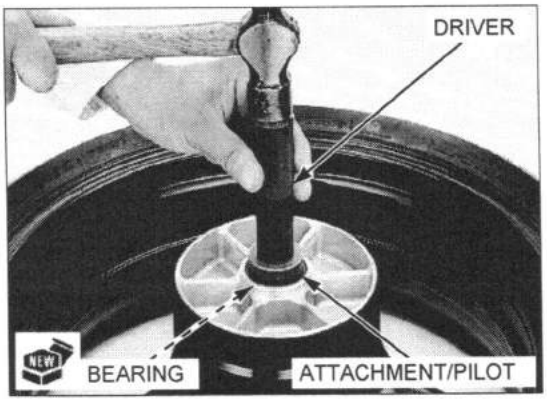
Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**
Pilot, 25 mm	**07746-0040600**



Install the distance collar.
Drive in a new left bearing squarely with its marked side facing up until it is seated to the distance collar.

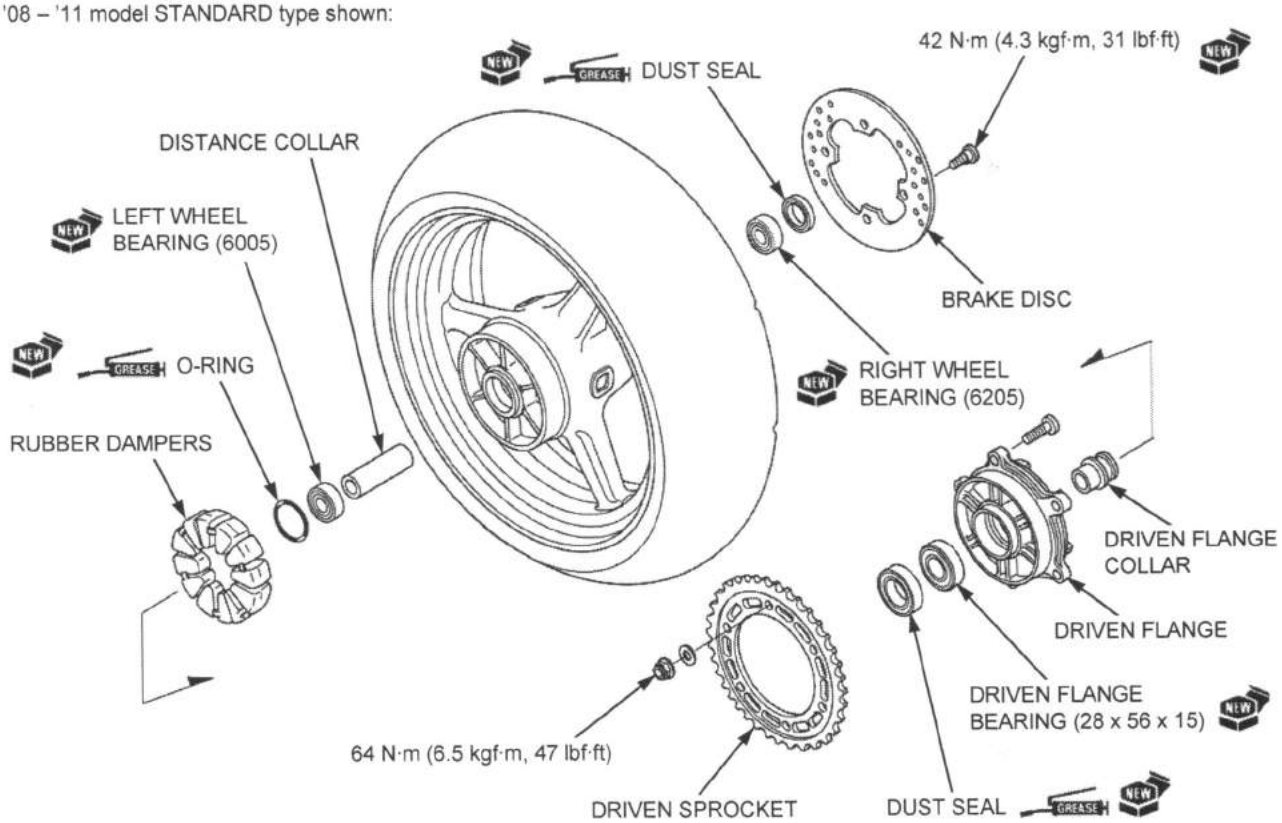
TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**

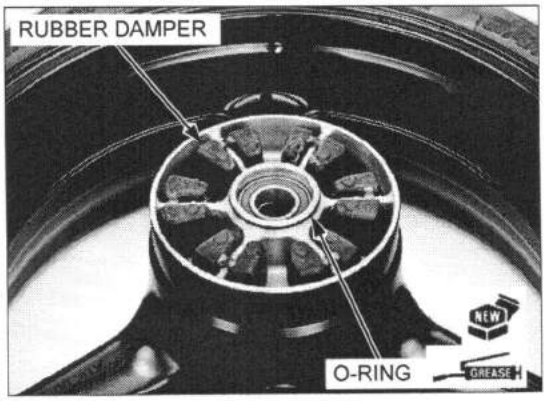


ASSEMBLY (STANDARD/SP type)

'08 – '11 model STANDARD type shown:



Install the rubber dampers into the wheel hub.
Apply grease to a new O-ring and install it into the groove of the wheel hub.



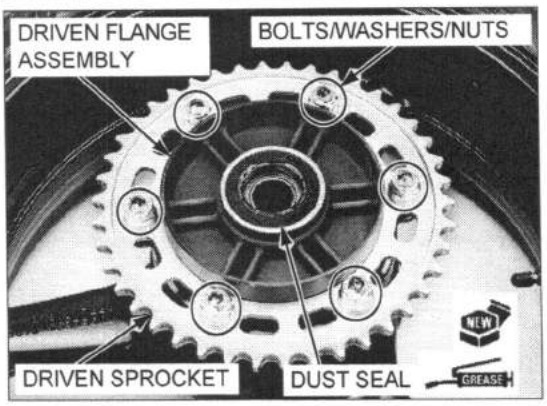
Install the driven flange assembly into the left wheel hub.

If the driven sprocket is removed, install the driven sprocket bolts, sprocket, washers, and nuts onto the driven flange.

If the driven sprocket is removed, tighten the driven sprocket nuts to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

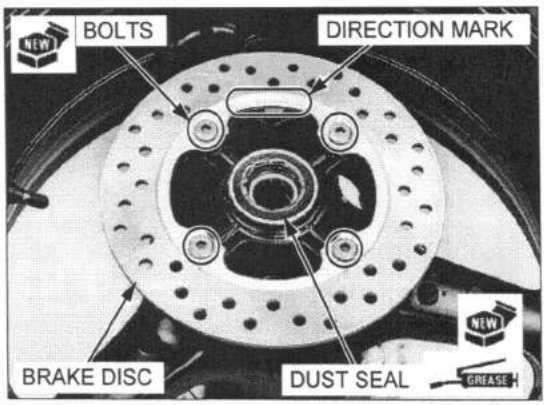
Apply grease to a new dust seal lips, then install it into the driven flange.



Install the brake disc with its rotating direction mark facing out.
Tighten new brake disc bolts to the specified torque.

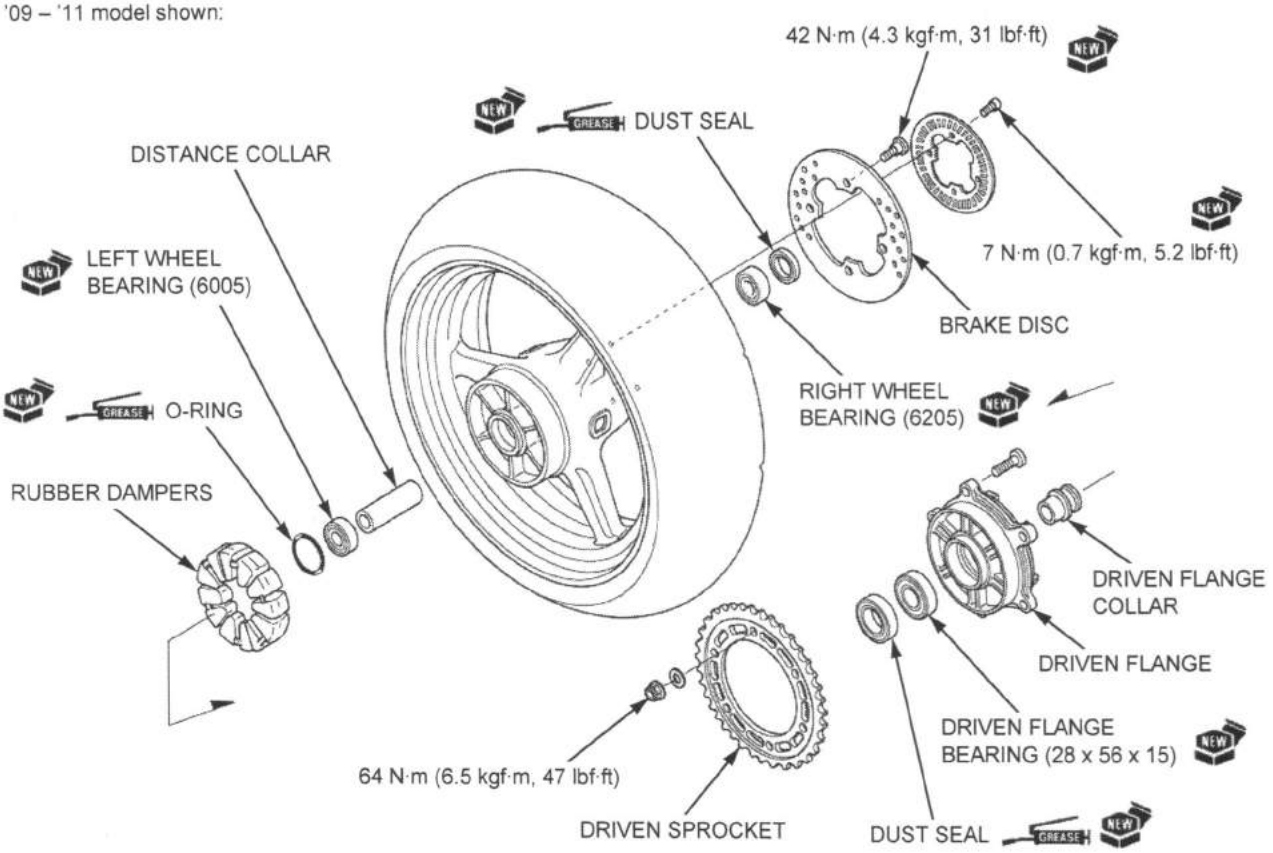
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

Apply grease to a new dust seal lip, then install it into the wheel hub.

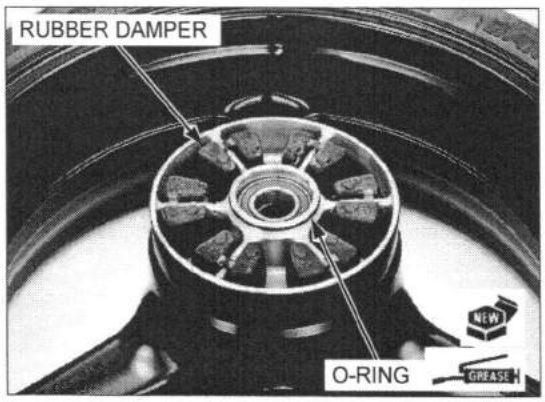


ASSEMBLY (ABS type)

'09 – '11 model shown:



Install the rubber dampers into the wheel hub.
Apply grease to a new O-ring and install it into the groove of the wheel hub.



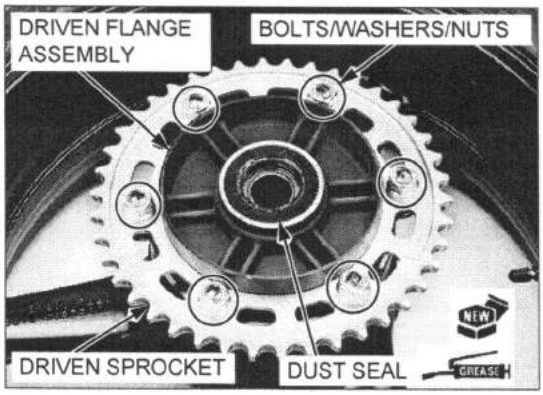
Install the driven flange assembly into the left wheel hub.

If the driven sprocket is removed, install the driven sprocket bolts, sprocket, washers, and nuts onto the driven flange.

If the driven sprocket is removed, tighten the driven sprocket nuts to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

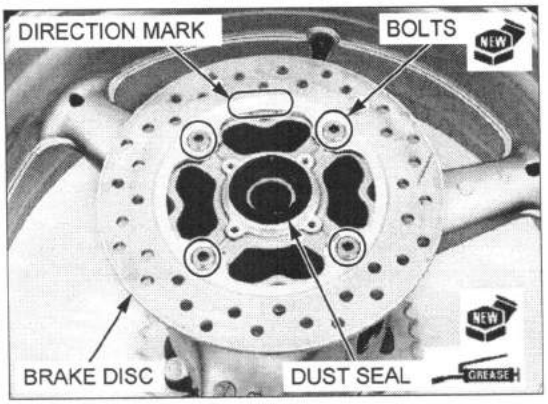
Apply grease to a new dust seal lips, then install it into the driven flange.



Install the brake disc with its rotating direction mark facing out.
Tighten new brake disc bolts to the specified torque.

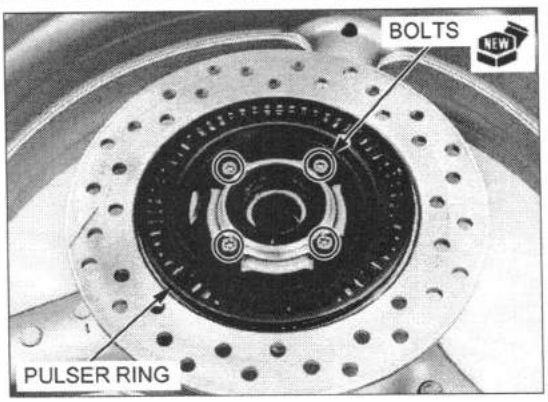
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

Apply grease to a new dust seal lip, then install it into the wheel hub.



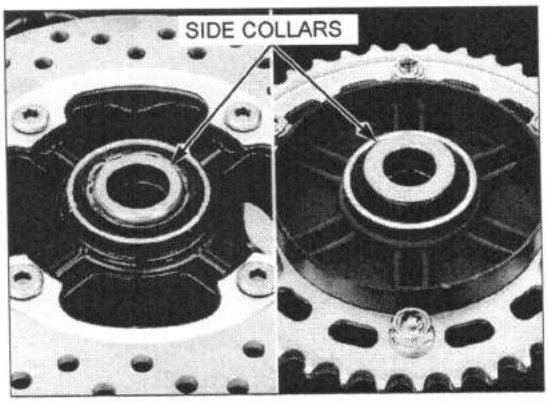
Install the pulser ring and tighten new bolts to the specified torque.

TORQUE: 7 N·m (0.7 kgf·m, 5.2 lbf·ft)



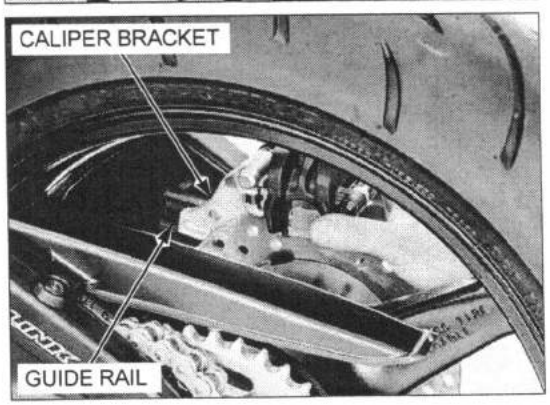
INSTALLATION

Install the side collars.



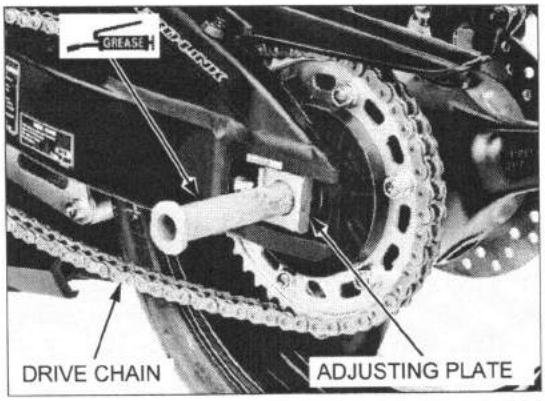
Be careful not to damage the brake pads.

Install the rear brake caliper bracket onto the guide rail of the swingarm while placing the rear wheel into the swingarm.



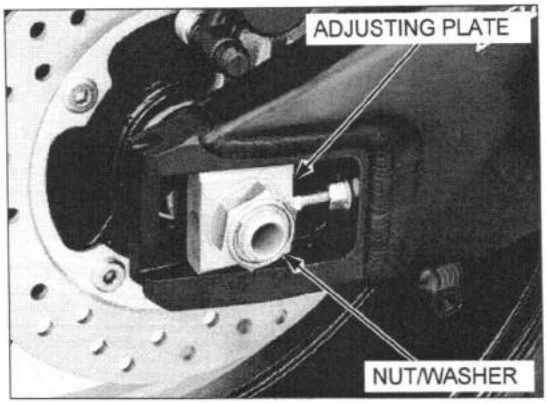
Install the drive chain over the driven sprocket.

Apply a thin coat of grease to the rear axle surface. Install the adjusting plate and rear axle from the left side.



Install the adjusting plate, washer, and rear axle nut.

Adjust the drive chain slack (page 4-32).



SUSPENSION LINKAGE

REMOVAL

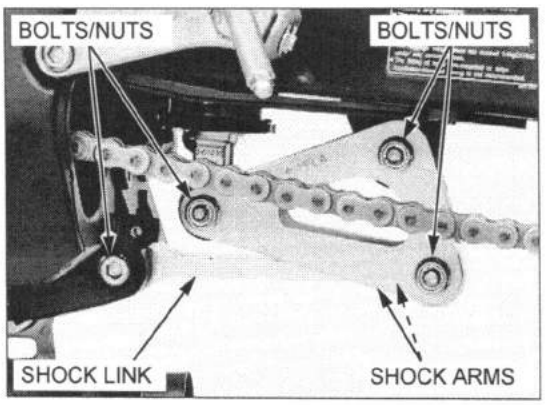
Remove the muffler (page 3-53).

Support the motorcycle using a hoist or equivalent, and raise the rear wheel off the ground.

Support the rear wheel securely.

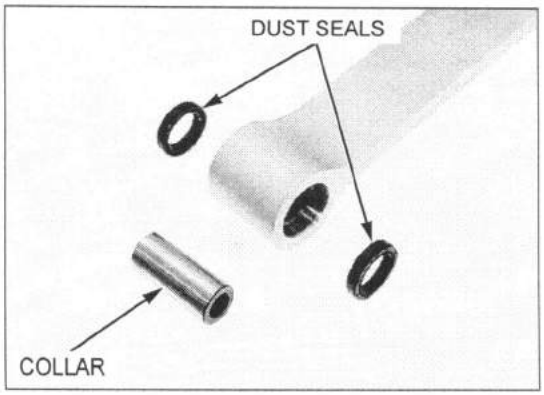
Remove the following:

- Bolts/nuts
- Shock link
- Shock arms



SHOCK LINK BEARING REPLACEMENT

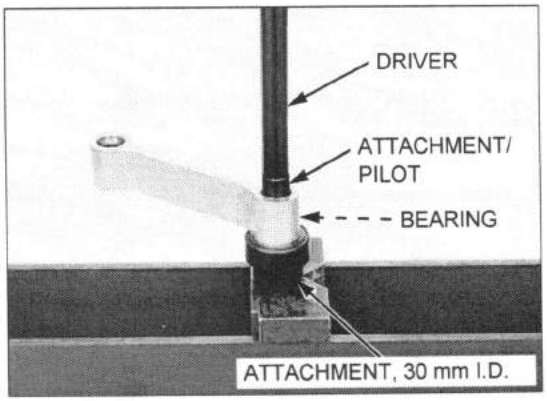
Remove the pivot collar and dust seals.



Press the needle bearings out of the shock link using the special tools.

TOOLS:

Driver	**07949-3710001**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 17 mm	**07746-0040400**
Attachment, 30 mm I.D.	**07746-0030300**



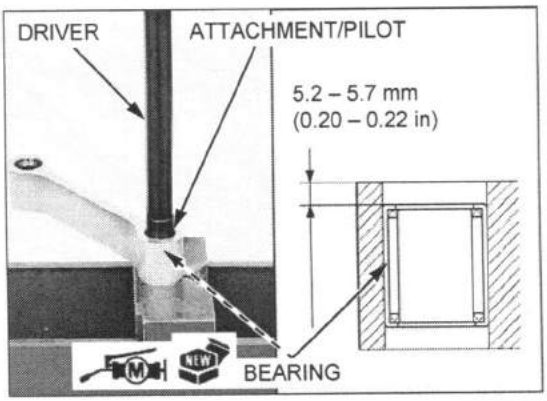
Pack new needle bearings with molybdenum disulfide grease.

Press the needle bearing into the shock link with the marked side facing up.

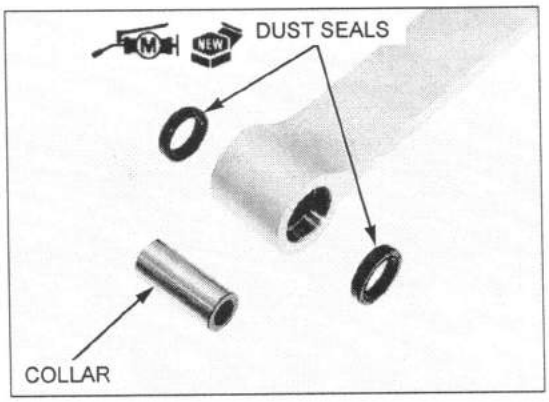
Press the needle bearings into the shock link so that the needle bearing surface is 5.2 – 5.7 mm (0.20 – 0.22 in) below the end of the shock link using the special tools.

TOOLS:

Driver	**07949-3710001**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 17 mm	**07746-0040400**



Apply molybdenum disulfide grease to new dust seal lips, then install the dust seals and collar into the shock link.



INSTALLATION

Support the rear wheel securely.

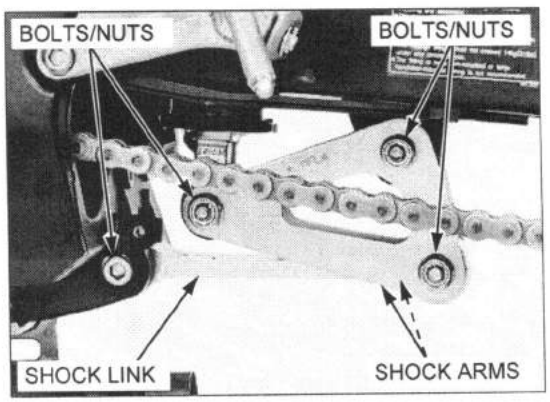
Loosely install the following:

- Shock arms
- Shock link
- Bolts/nuts

Tighten the nuts to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)

Install the muffler (page 3-60).



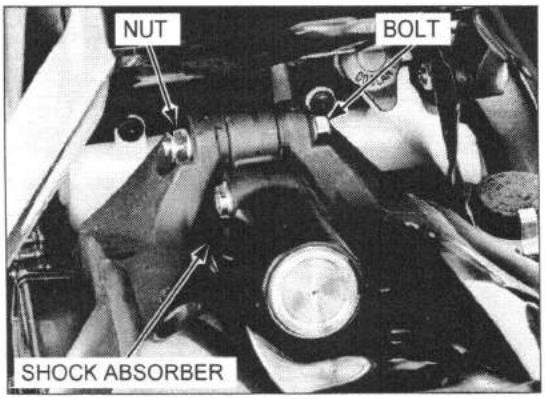
SHOCK ABSORBER (STANDARD/ABS type)

REMOVAL

Remove the following:

- Shock link (page 15-18)
- Shock arms (page 15-18)

Remove the shock absorber upper mounting nut and bolt, then remove the shock absorber downward.



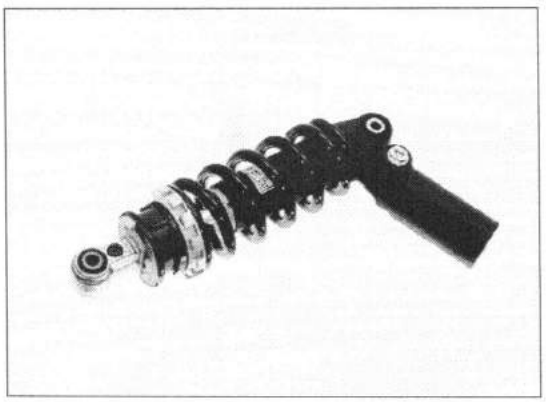
INSPECTION

Visually inspect the shock absorber for damage.

Check the following:

- Damper rod for bends or damage
- Damper unit for deformation or oil leaks

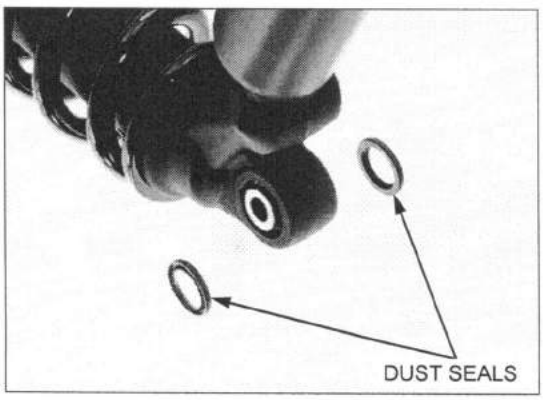
Inspect all the other parts for wear or damage.
If necessary, replace the shock absorber as an assembly.



BEARING REPLACEMENT

UPPER BEARING

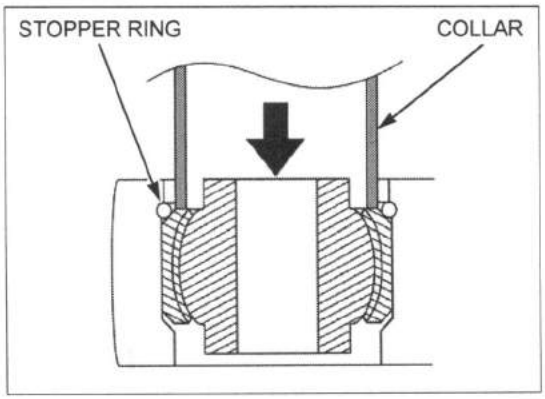
Remove the dust seals.



Press the spherical bearing to get the clearance necessary to remove the stopper ring using the special tool.

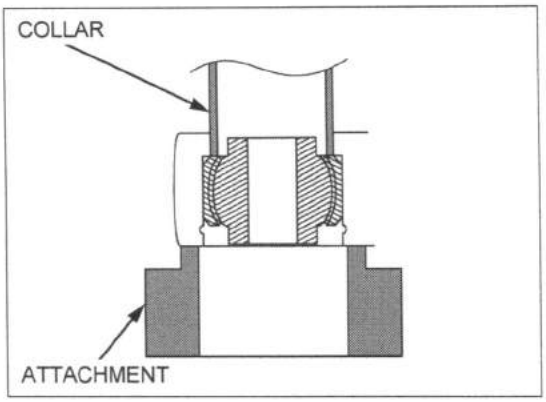
TOOL:
Bearing driver **07GMD-KT80100**
(Use only 17 mm collar)

Remove the stopper ring.



Press the spherical bearing out of the upper mount using the special tools.

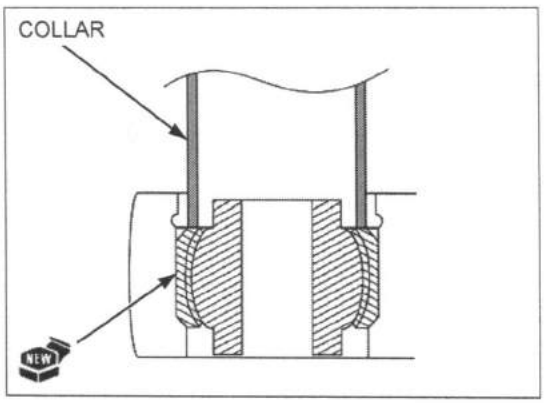
TOOLS:
Bearing driver **07GMD-KT80100**
(Use only 17 mm collar)
Attachment, 30 mm I.D. **07746-0030300**



Drive the bearing in evenly; do not allow it to tilt.

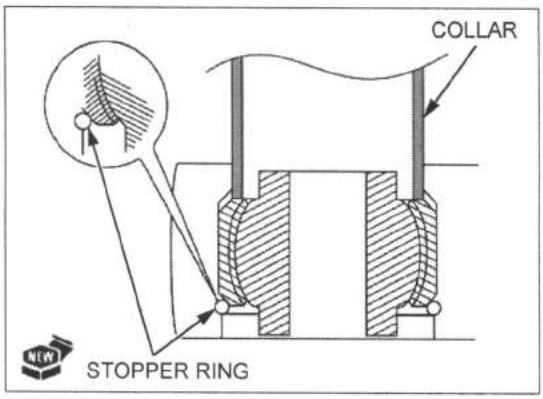
Press a new spherical bearing into the upper mount using the special tool.

TOOL:
Bearing driver **07GMD-KT80100**
(Use only 17 mm collar)



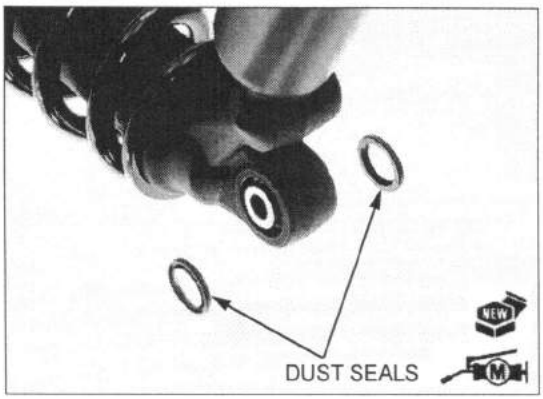
Install a new stopper ring into the groove of the upper mount securely.
Press the spherical bearing into the upper mount using the special tool until it seats against the stopper ring.

TOOL:
Bearing driver **07GMD-KT80100**
(Use only 17 mm collar)



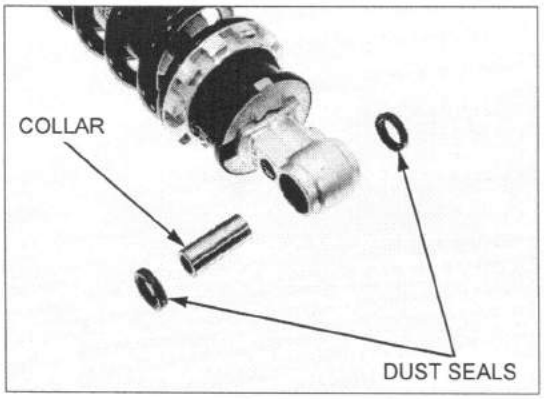
The left dust seal O.D. is larger than right dust seal O.D.

Apply molybdenum disulfide grease to new dust seal lips and install them.



LOWER BEARING

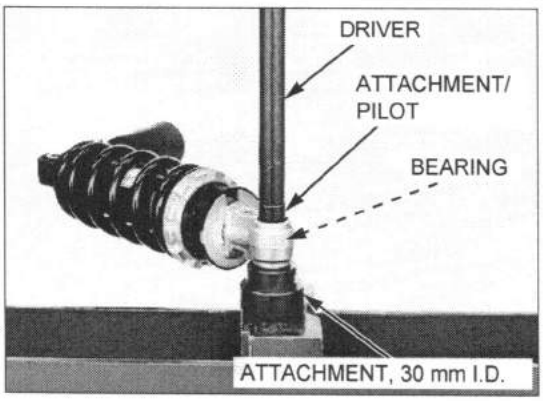
Remove the dust seals and collar.



Press the needle bearing out of the lower mount using the special tools.

TOOLS:

Driver	**07949-3710001**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 17 mm	**07746-0040400**
Attachment, 30 mm I.D.	**07746-0030300**

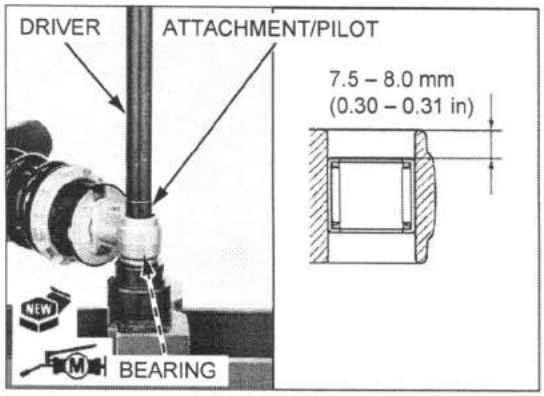


Pack a new needle bearing with molybdenum disulfide grease.

Press the needle bearing into the lower mount so that the needle bearing surface is 7.5 – 8.0 mm (0.30 – 0.31 in) below the end of the lower mount surface using the special tools.

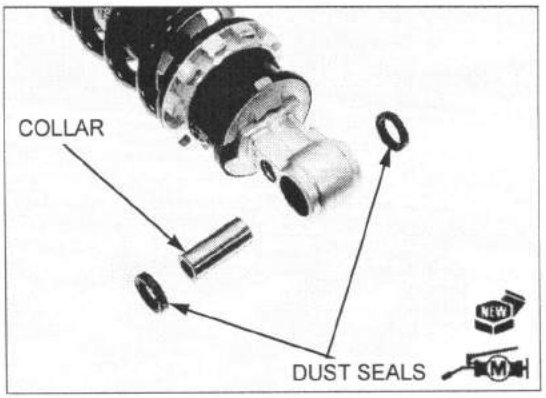
TOOLS:

Driver	**07949-3710001**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 17 mm	**07746-0040400**
Attachment, 30 mm I.D.	**07746-0030300**



Apply molybdenum disulfide grease to new dust seal lips.

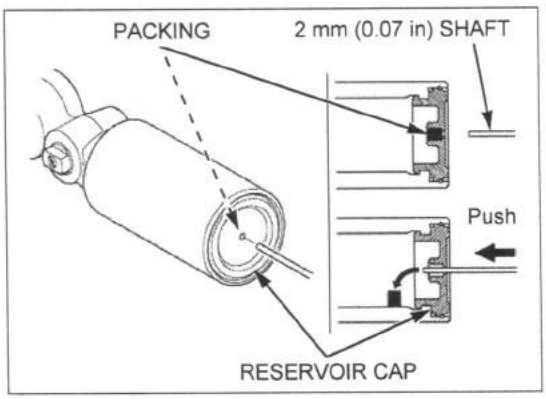
Install the collar and new dust seals.



SHOCK ABSORBER DISPOSAL PROCEDURE

Release the nitrogen from the reservoir by pushing and dislodging the reservoir packing with a 2 mm (0.07 in) shaft.

- Put on safety glasses.
- Before disposal of the shock absorber, release the nitrogen from the reservoir.



INSTALLATION

Support the rear wheel securely.

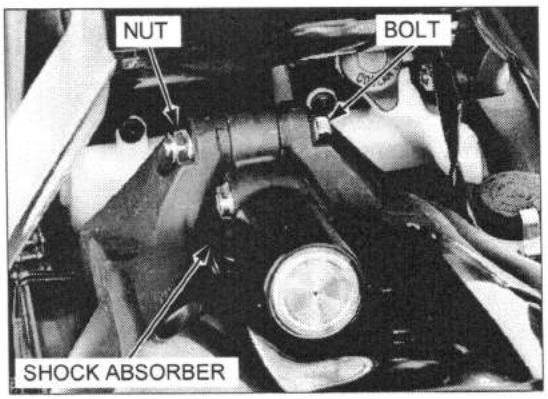
Position the shock absorber with the compression damping adjuster facing left.

Install the upper mounting bolt.
Tighten the upper mounting nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)

Install the following:

- Shock arms (page 15-19)
- Shock link (page 15-19)



SHOCK ABSORBER (SP type)

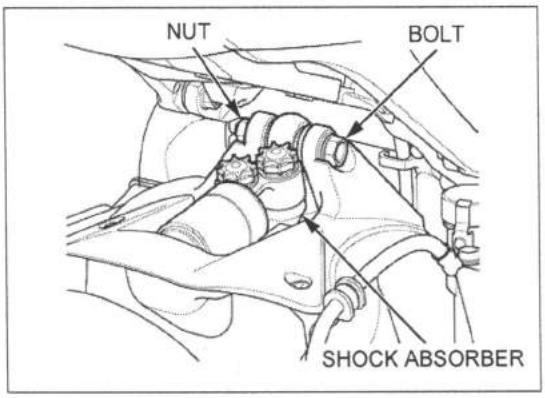
NOTE:

- Do not disassemble the shock absorber. U.S.A. only: For shock service, refer to SL #73 *Third Party Service Information*.

REMOVAL

Remove the shock link and shock arms (page 15-18).

Remove the shock absorber upper mounting nut and bolt, then remove the shock absorber downward.



INSPECTION

Visually inspect the shock absorber for damage.

Check the following:

- Damper rod for bends or damage
- Damper unit for deformation or oil leaks

Inspect all the other parts for wear or damage.

INSTALLATION

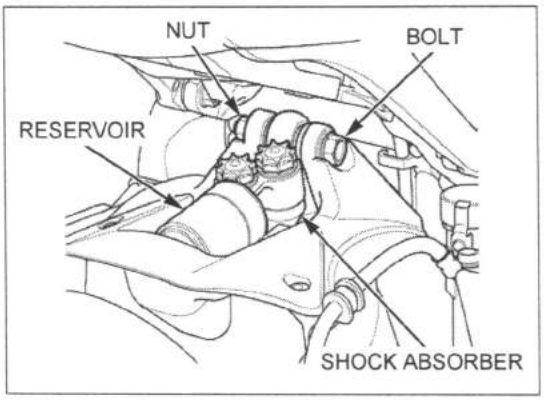
Support the rear wheel securely.

Set the shock absorber with the reservoir facing the rear side.

Install the upper mounting bolt from the right side. Install the nut and tighten it to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)

Install the shock arms and shock link (page 15-19).

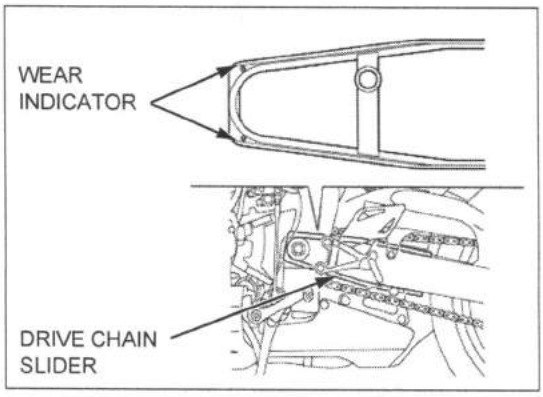


SWINGARM

DRIVE CHAIN SLIDER INSPECTION

Inspect the drive chain slider for excessive wear or damage.

If it is worn to the wear indicator, replace the drive chain slider (page 15-26).



REMOVAL

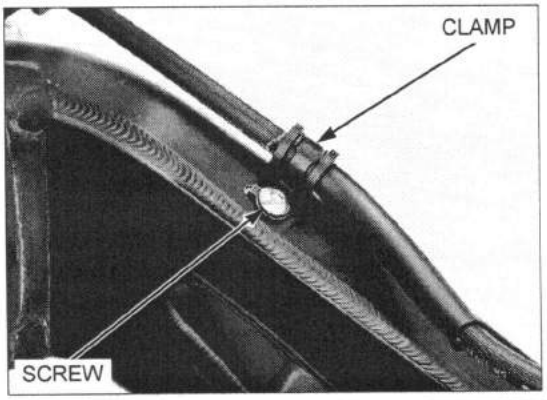
Remove the following:

- Drive sprocket cover (page 4-33)
- Rear wheel (page 15-8)
- Shock absorber (page 15-20)

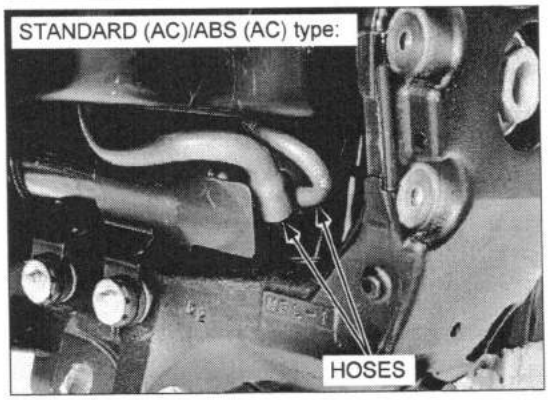
STANDARD/ SP type: Remove the rear fender C (page 3-41).

ABS type: Remove the swingarm cover (page 3-41).

Remove the screw and brake hose clamp.

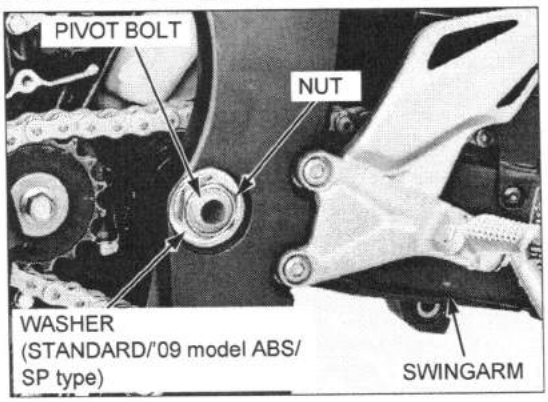


STANDARD (AC)/ ABS (AC) type: Disconnect the EVAP canister hoses.



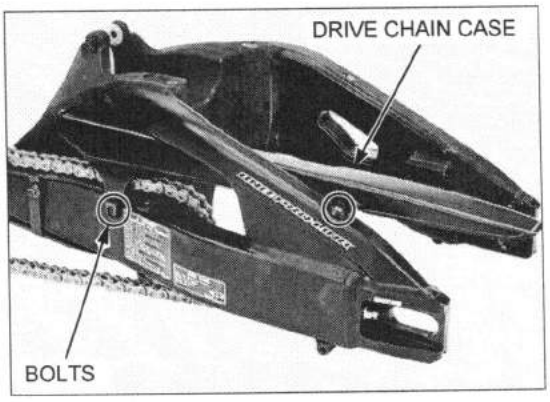
STANDARD/'09 model ABS/ SP type: Remove the nut, washer, pivot bolt, and swingarm.

After '09 model ABS type: Remove the nut, pivot bolt, and swingarm.



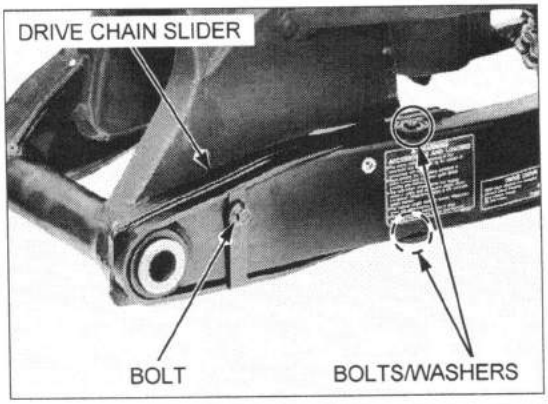
DISASSEMBLY/INSPECTION

Remove the bolts and drive chain case.



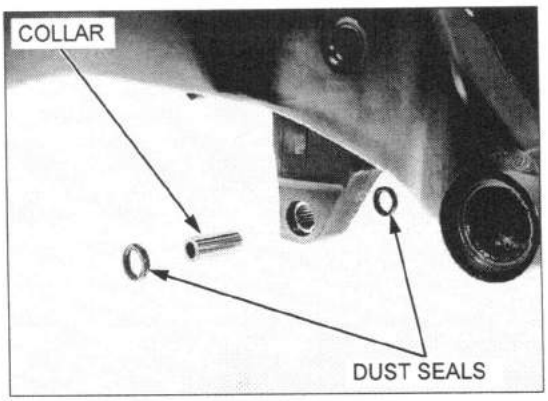
Remove the bolts, washers and drive chain slider.

Check the drive chain slider for wear or damage.



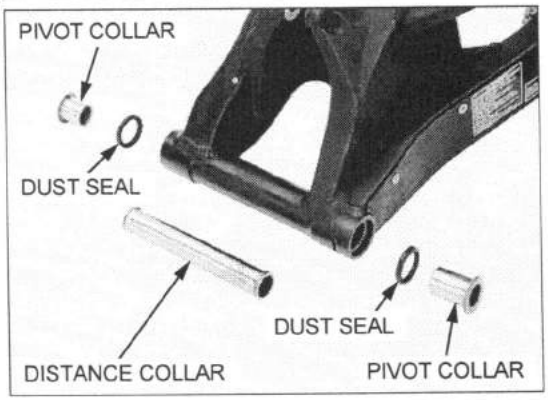
Remove the collar and dust seals from the swingarm.

Check the collar for wear or damage.



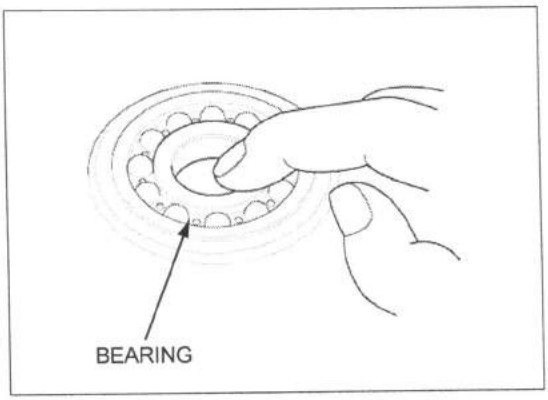
Remove the pivot collars, dust seals, and distance collar from the swingarm pivot.

Check the pivot collars for wear or damage.



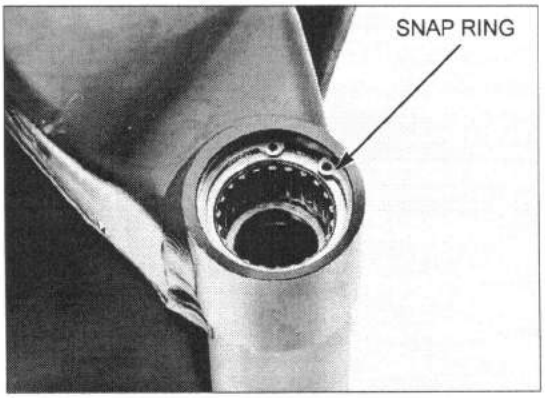
Turn the inner race of right side pivot ball bearing with your finger.
The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the swingarm pivot.

Remove and discard the bearing if the inner races does not turn smoothly and quietly, or if they fit loosely in the swingarm pivot.



Pivot bearing replacement

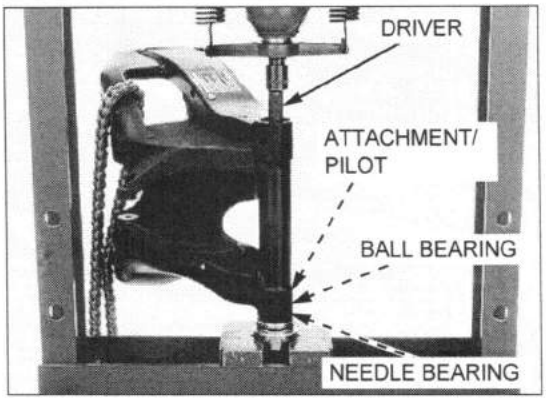
Right side: Remove the snap ring from the swingarm right side pivot.



Right side: Press the right pivot needle and ball bearings out of the swingarm pivot using the special tools.

TOOLS:

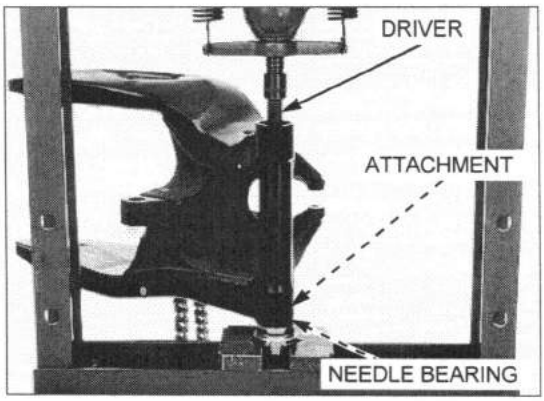
Driver	**07949-3710001**
Attachment, 28 x 30 mm	**07946-1870100**
Pilot, 25 mm	**07746-0040600**



Left side: Press the left pivot needle bearing out of the swingarm pivot using the special tools.

TOOLS:

Driver	**07949-3710001**
Attachment, 32 x 35 mm	**07746-0010100**



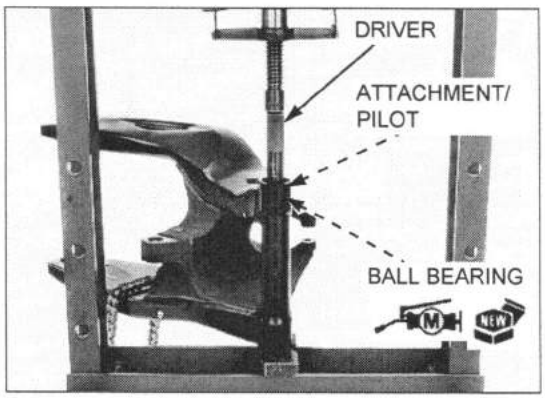
Right side: Pack a new ball bearing with molybdenum disulfide grease.

Press the ball bearing into the swingarm with the marked side facing out.

Press the ball bearing into the swingarm right pivot until it is fully seated using the special tools.

TOOLS:

Driver	**07749-0010000**
Attachment, 40 x 42 mm	**07746-0010900**
Pilot, 25 mm	**07746-0040600**



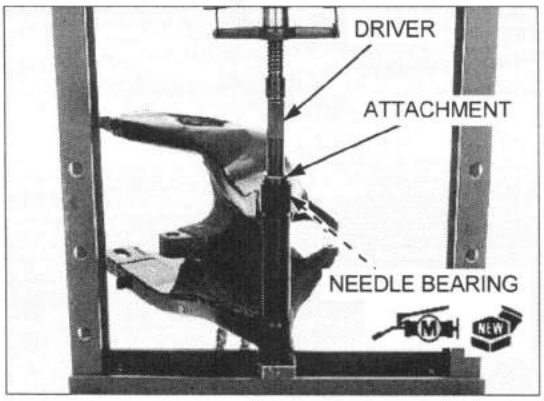
Right side: Pack a new needle bearing with molybdenum disulfide grease.

Press the needle bearing into the swingarm with the marked side facing out.

Press the needle bearing into the swingarm right pivot until it seats to the ball bearing using the special tools.

TOOLS:

Driver	**07749-0010000**
Attachment, 40 x 42 mm	**07746-0010900**



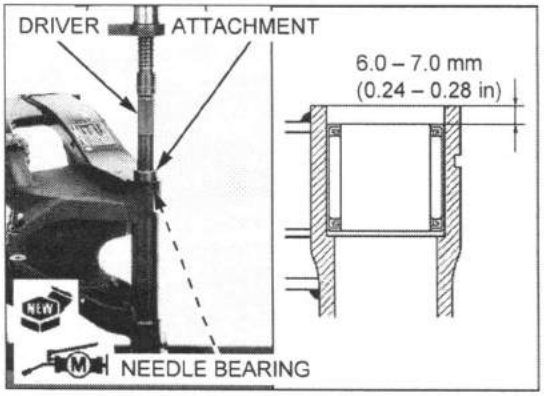
Left side: Pack a new needle bearing with molybdenum disulfide grease.

Press the needle bearing into the swingarm with the marked side facing out.

Press the needle bearing into the swingarm left pivot so that the needle bearing surface is 6.0 – 7.0 mm (0.24 – 0.28 in) below the end of the swingarm pivot surface using the special tools.

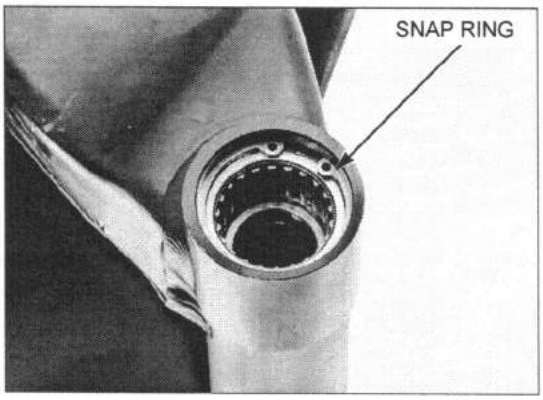
TOOLS:

Driver	**07749-0010000**
Attachment, 40 x 42 mm	**07746-0010900**



Right side: After installing a snap ring, always rotate it in its groove to be sure it is fully seated.

Install the snap ring into the groove securely.

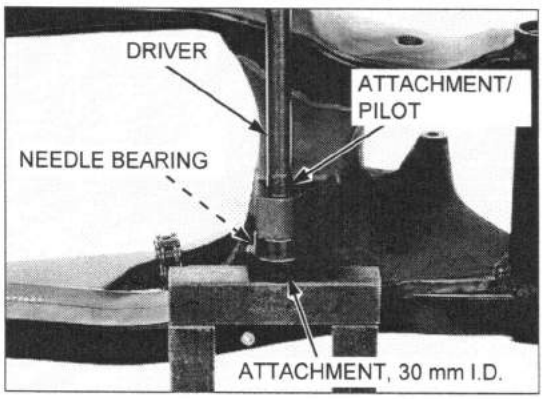


SHOCK ARM-TO-SWINGARM BEARING REPLACEMENT

Press the needle bearing out of the swingarm using the special tools.

TOOLS:

Driver	**07949-3710001**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 17 mm	**07746-0040400**
Attachment, 30 mm I.D.	**07746-0030300**



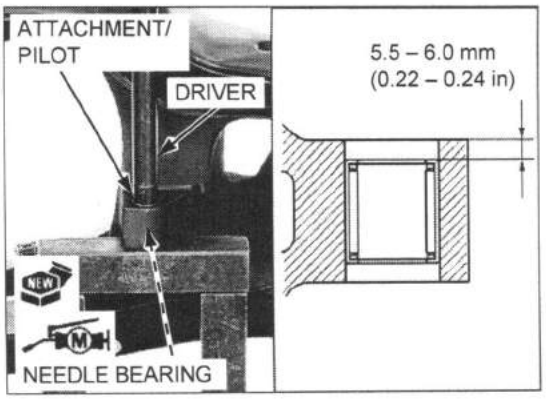
Pack a new needle bearing with molybdenum disulfide grease.

Press the needle bearing into the swingarm with the marked side facing up.

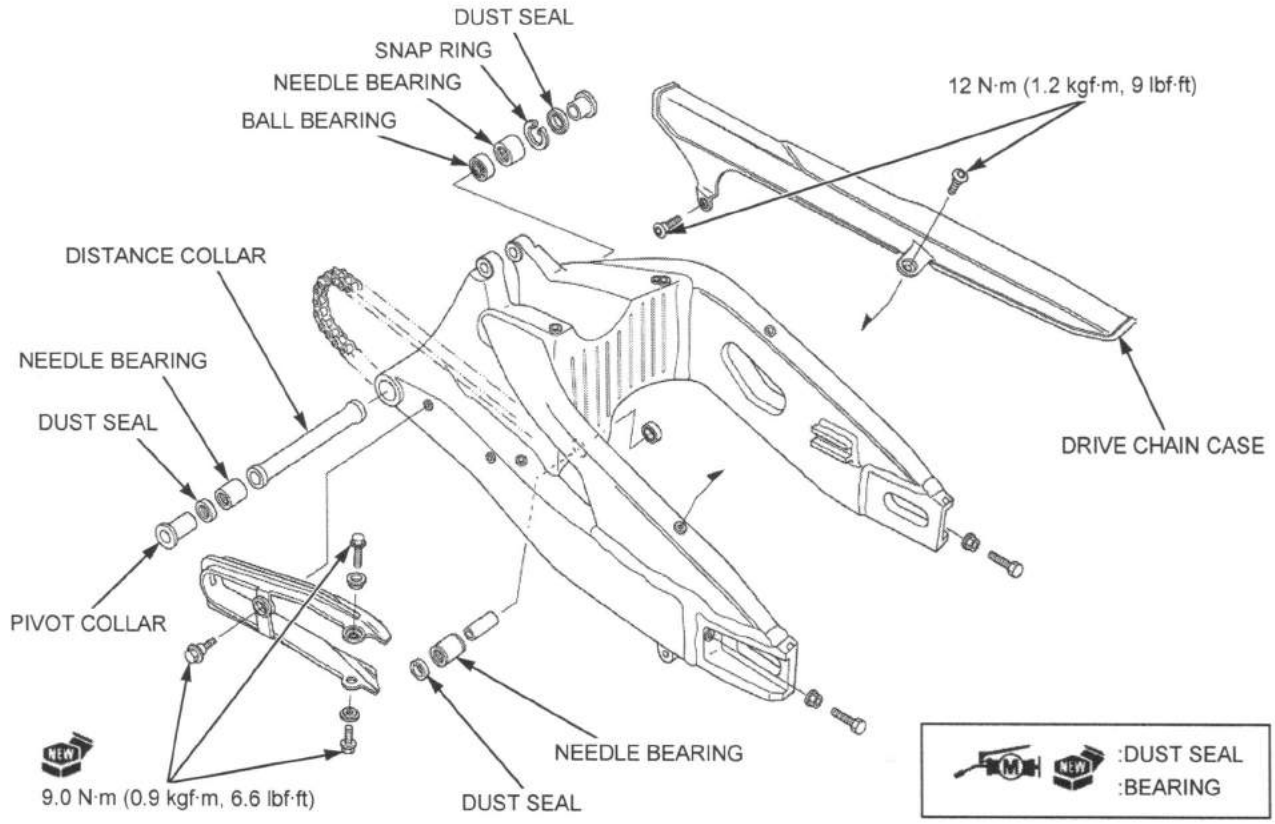
Press the needle bearing into the swingarm so that the needle bearing surface is 5.5 – 6.0 mm (0.22 – 0.24 in) below the end of the swingarm using the special tools.

TOOLS:

Driver	**07949-3710001**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 17 mm	**07746-0040400**

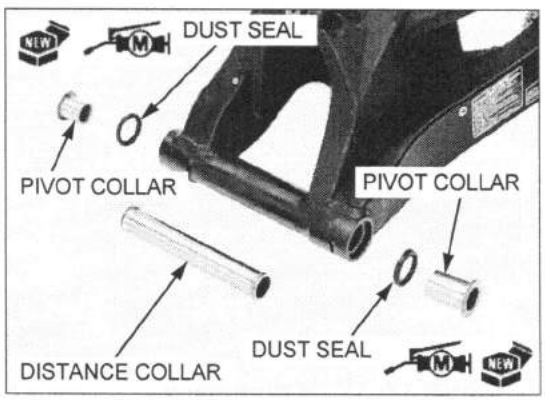


ASSEMBLY

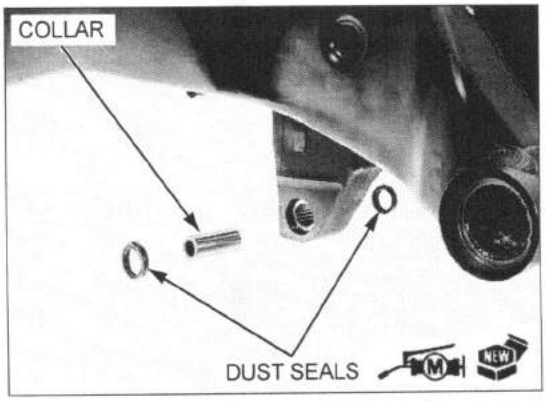


Apply molybdenum disulfide grease to new dust seal lips.

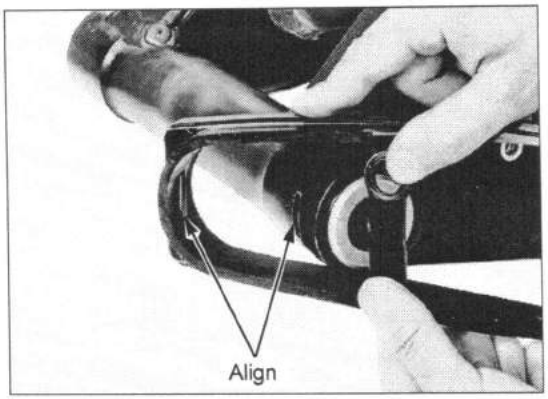
Install the distance collar, dust seals, and pivot collars to the swingarm.



Apply molybdenum disulfide grease to new dust seal lips, then install the dust seals and collar into the swingarm.



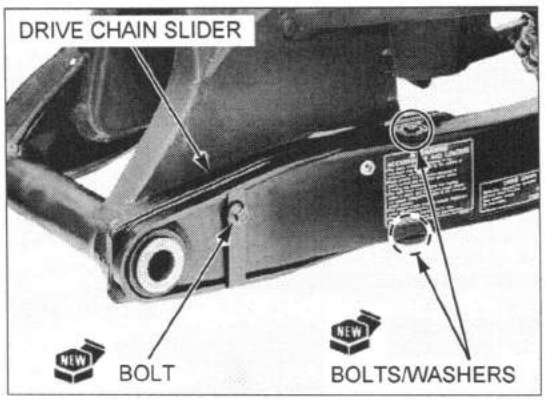
Install the drive chain slider aligning its tab with the groove on the swingarm.



Install a new drive chain slider mounting bolts and washers.

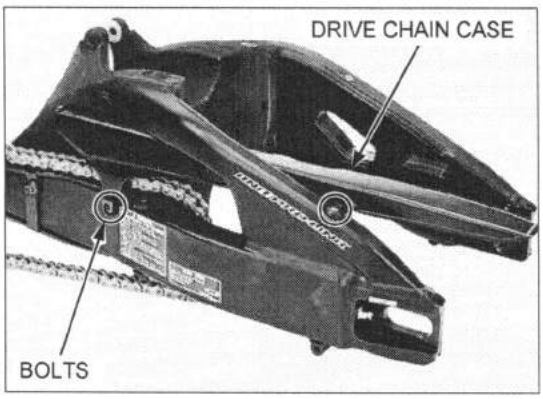
Tighten the bolts to the specified torque.

TORQUE: 9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)



Install the drive chain case and tighten the bolts to the specified torque.

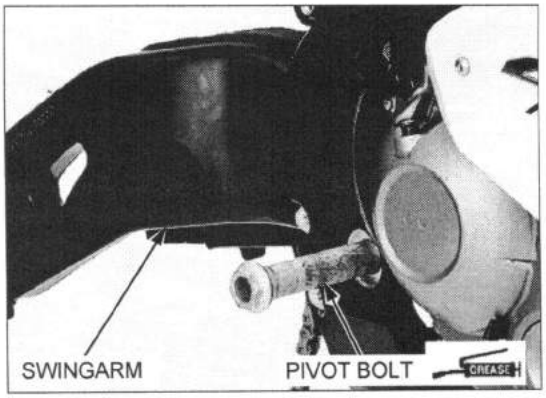
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



INSTALLATION

Apply a thin coat of grease to the swingarm pivot bolt sliding surface.

Install the swingarm and pivot bolt to the frame.

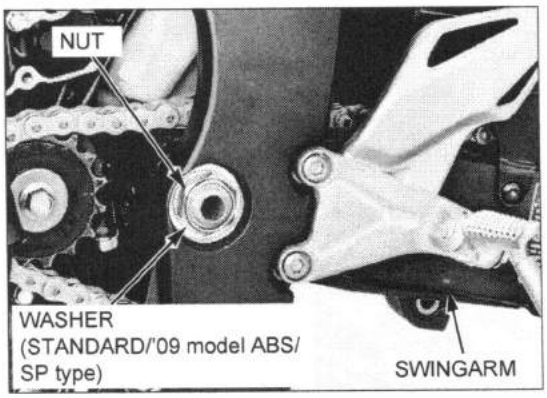


STANDARD/'09 model ABS/ SP type: Install the washer and swingarm pivot nut.

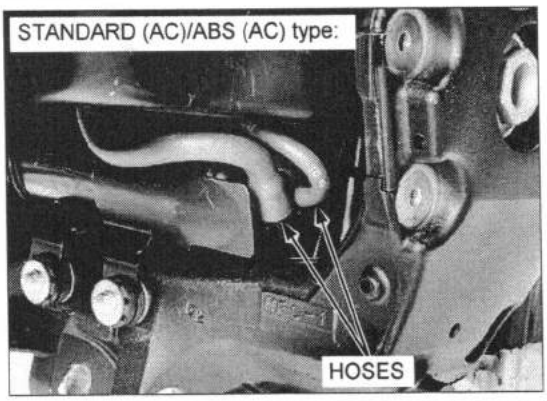
After '09 model ABS type: Install the swingarm pivot nut.

Tighten the nut to the specified torque.

TORQUE:
'08 – '13 model STANDARD/'09 model ABS type:
113 N·m (11.5 kgf·m, 83 lbf·ft)
After '13 model STANDARD/After '09 model ABS/ SP type:
124 N·m (12.6 kgf·m, 91 lbf·ft)



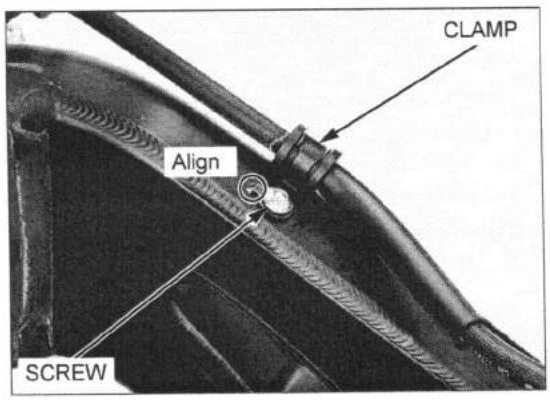
STANDARD (AC)/ ABS (AC) type: Connect the EVAP canister hoses.



Install the brake hose clamp by aligning its tab to the swingarm hole.

Tighten the special screw to the specified torque.

TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)



STANDARD/ SP type: Install the rear fender C (page 3-41).

ABS type: Install the swingarm cover (page 3-41).

Install the following:

- Shock absorber (page 15-23)
- Rear wheel (page 15-17)
- Drive sprocket cover (page 4-34)

16. HYDRAULIC BRAKE

COMPONENT LOCATION 16-2

SERVICE INFORMATION 16-6

TROUBLESHOOTING 16-8

BRAKE FLUID REPLACEMENT/AIR BLEEDING (STANDARD/SP type & ABS type NORMAL BRAKE LINE) 16-9

BRAKE FLUID REPLACEMENT/AIR BLEEDING ('09 – '13 model ABS type) ... 16-13

BRAKE FLUID REPLACEMENT/AIR BLEEDING (After '13 model ABS type) .. 16-47

BRAKE PAD/DISC 16-73

FRONT MASTER CYLINDER 16-78

REAR MASTER CYLINDER 16-84

FRONT BRAKE CALIPERS (STANDARD/ABS type) 16-93

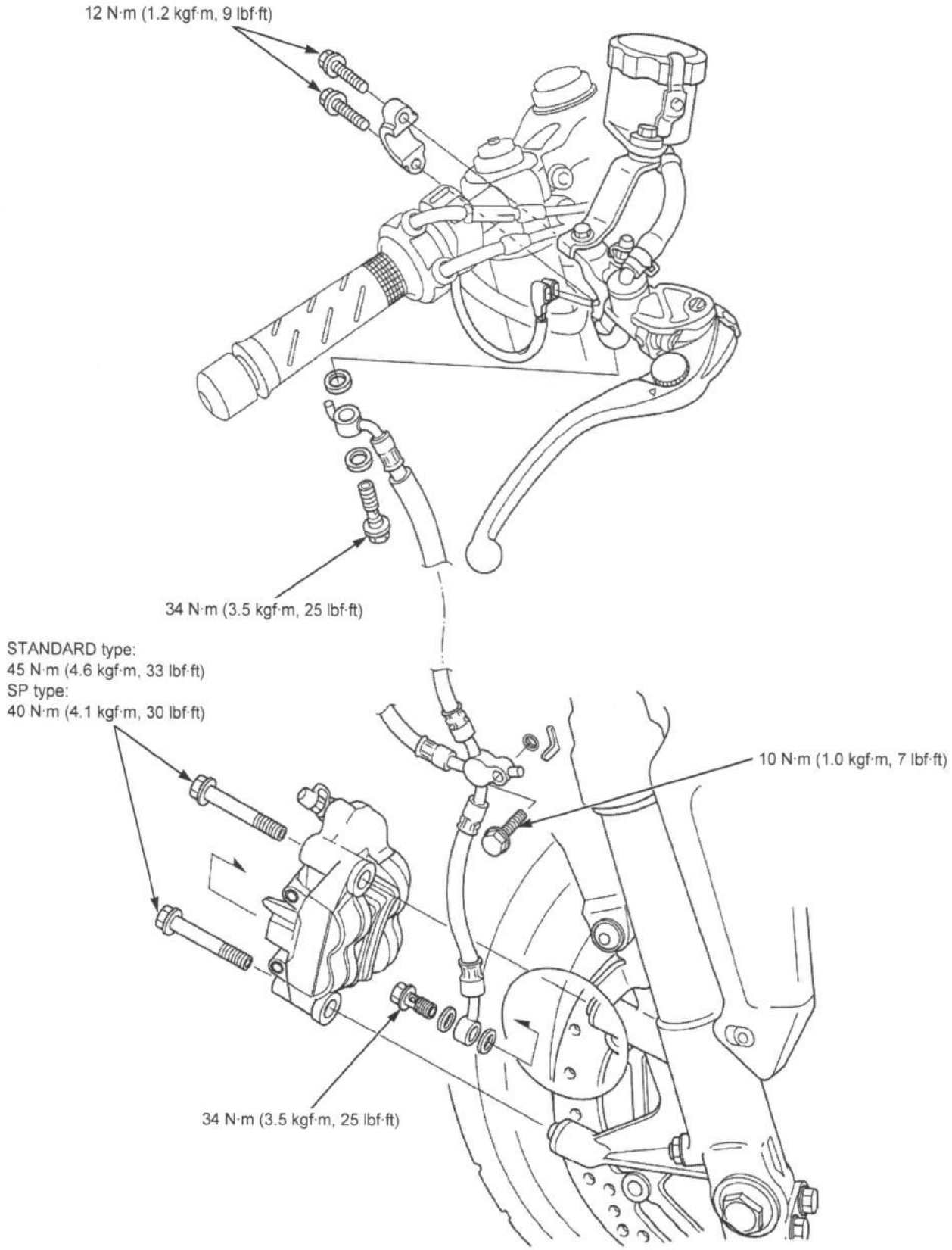
FRONT BRAKE CALIPERS (SP type) 16-96

REAR BRAKE CALIPER 16-98

COMPONENT LOCATION

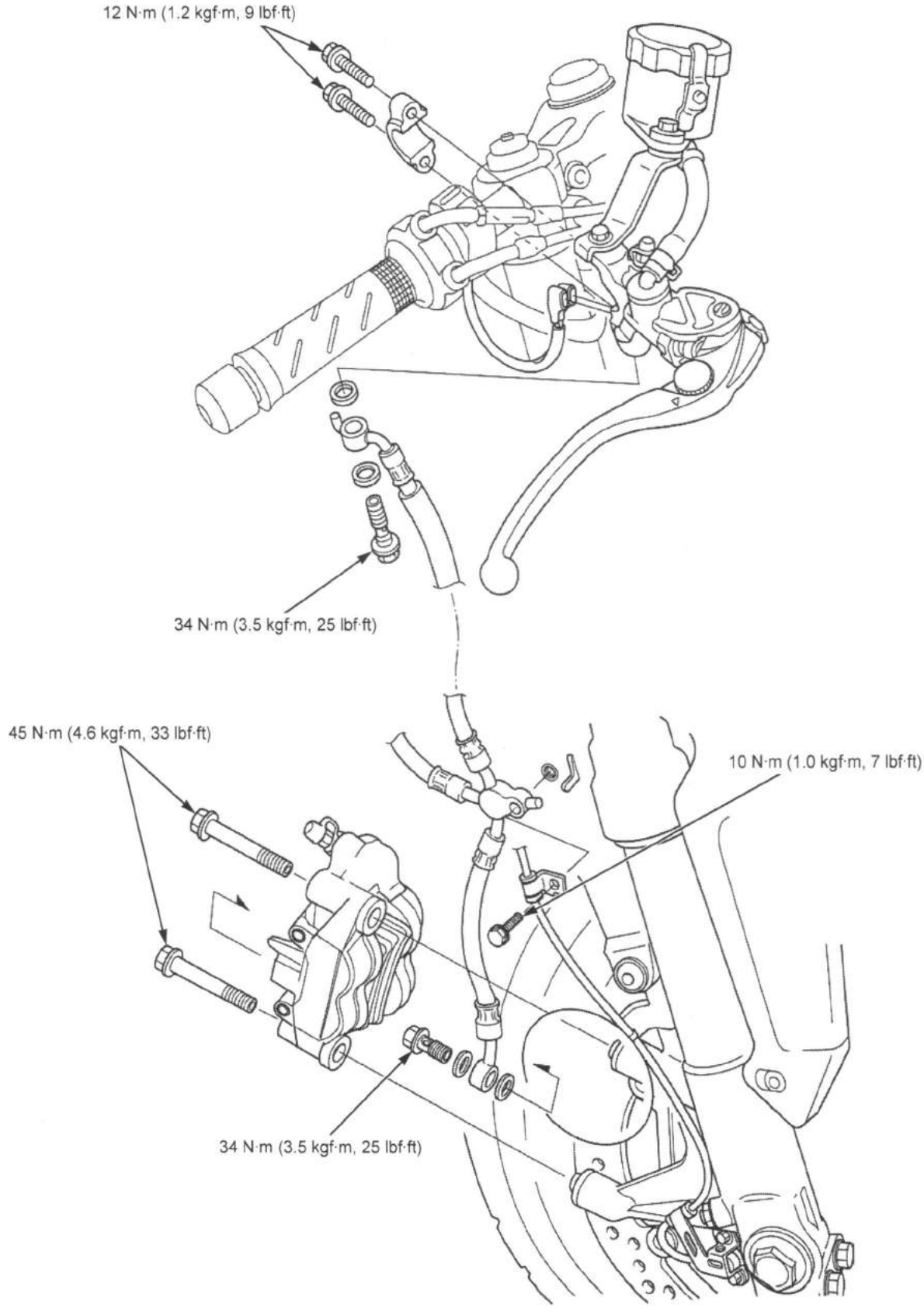
FRONT (STANDARD/SP type):

'08 – '11 model STANDARD type shown:

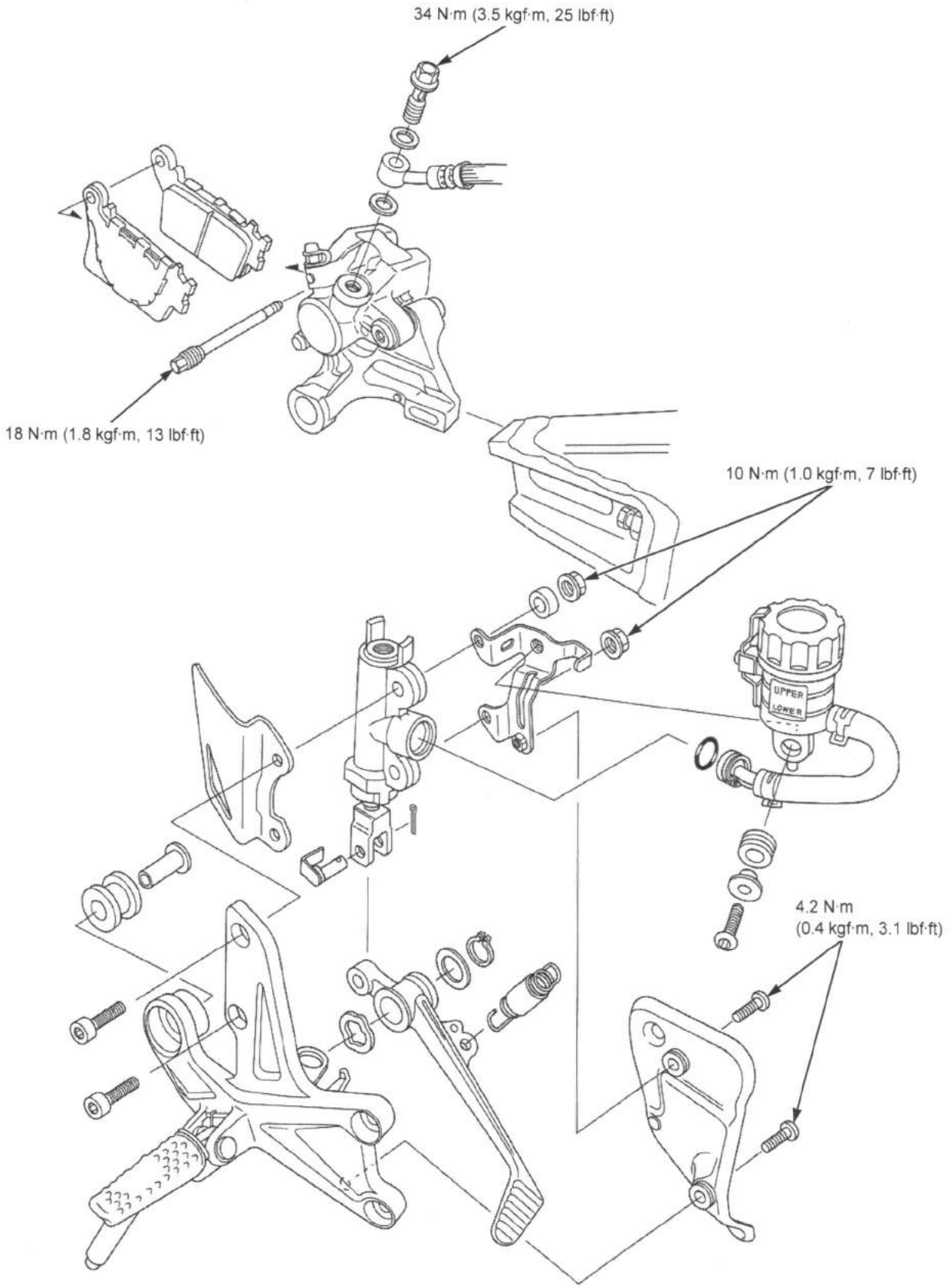


FRONT (ABS type):

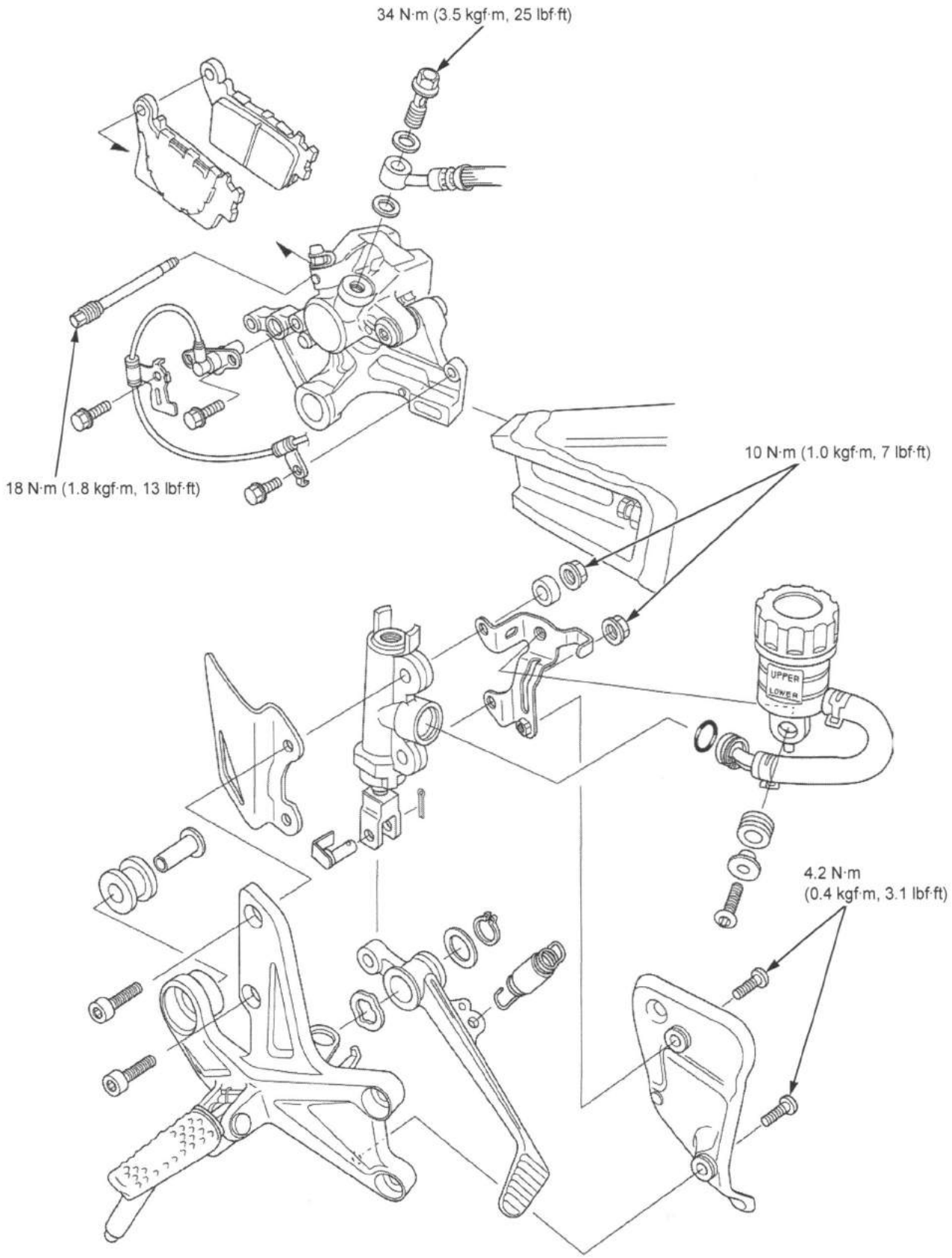
'09 – '11 model shown:



REAR (STANDARD/SP type):



REAR (ABS type):



SERVICE INFORMATION

GENERAL

⚠CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

NOTICE

Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reserve tank cap; make sure the reserve tank is horizontal first.

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Never allow contaminants (dirt, water, etc.) to get into an open reserve tank.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid; they may not be compatible.
- Always check brake operation before riding the motorcycle (STANDARD/SP type).
- Check the brake system by applying the brake lever or pedal after the air bleeding (STANDARD/SP type).
- Always refer to the COMBINED ABS AIR BLEEDING INFORMATION for ABS type before the brake fluid filling/air bleeding procedure (ABS type).
  – '09 – '13 model (page 16-13)
  – After '13 model (page 16-47)
- Make sure the brake operation by applying the brake lever/pedal after the air bleeding or brake component servicing, before riding (ABS type).

SPECIFICATIONS

Unit: mm (in)

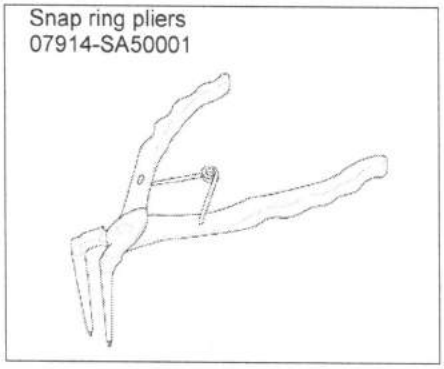
ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		DOT 4	–
	Brake disc thickness		4.4 – 4.6 (0.17 – 0.18)	3.5 (0.14)
	Brake disc runout		–	0.20 (0.008)
	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.503 (0.6891)
	Master piston O.D.		17.321 – 17.367 (0.6819 – 0.6837)	17.321 (0.6819)
	Caliper cylinder I.D. (STANDARD/ABS type)	A	32.080 – 32.130 (1.2630 – 1.2650)	32.130 (1.2650)
		B	30.280 – 30.330 (1.1921 – 1.1941)	30.330 (1.1941)
	Caliper piston O.D. (STANDARD/ABS type)	A	31.967 – 32.000 (1.2585 – 1.2598)	31.967 (1.2585)
		B	30.167 – 30.200 (1.1877 – 1.1890)	30.167 (1.1877)
Rear	Specified brake fluid		DOT 4	–
	Brake disc thickness		4.8 – 5.2 (0.19 – 0.20)	4.0 (0.16)
	Brake disc runout		–	0.30 (0.012)
	Master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.043 (0.5529)
	Master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.957 (0.5495)
	Caliper cylinder I.D.		30.230 – 30.280 (1.1902 – 1.1921)	30.280 (1.1921)
	Caliper piston O.D.		30.082 – 30.115 (1.1843 – 1.1856)	30.082 (1.1843)

TORQUE VALUES

Reserve tank stopper plate screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Brake lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	Apply silicon grease to the sliding surface.
Brake lever pivot nut	6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Front brake light switch screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper mounting bolt		
(STANDARD/ABS type)	45 N·m (4.6 kgf·m, 33 lbf·ft)	ALOC bolt; replace with a new one.
(SP type)	40 N·m (4.1 kgf·m, 30 lbf·ft)	ALOC bolt; replace with a new one.
Rear master cylinder push rod lock nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Rear master cylinder mounting nut	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Front brake reserve tank stay bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper pad pin	15 N·m (1.5 kgf·m, 11 lbf·ft)	
Rear brake caliper pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Front brake hose 3-way joint bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Front master cylinder bleed valve	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)	
Front brake caliper bleed valve		
(STANDARD/ABS type)	8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)	
(SP type)	13 N·m (1.3 kgf·m, 10 lbf·ft)	
Rear brake caliper bleed valve	6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Main step bracket mounting bolt	37 N·m (3.8 kgf·m, 27 lbf·ft)	
Heat guard mounting screw	4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	
ABS valve unit bleed valve (ABS type)	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)	
Power unit bleed valve (ABS type)	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)	

TOOL

Snap ring pliers
07914-SA50001



TROUBLESHOOTING

Brake lever/pedal soft or spongy
- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly (rear)
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

Brake lever/pedal hard
- Sticking/worn caliper piston
- Caliper not sliding properly (rear)
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal
- Sticking rear brake pedal sliding surface

Brake drags
- Contaminated brake pad/disc
- Misaligned wheel
- Warped/deformed brake disc
- Caliper not sliding properly (rear)
- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Sticking master cylinder piston
- Sticking rear brake pedal sliding surface

BRAKE FLUID REPLACEMENT/AIR BLEEDING (STANDARD/SP type & ABS type NORMAL BRAKE LINE)

NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

- Do not allow foreign material to enter the system when filling the reserve tank.

BRAKE FLUID DRAINING

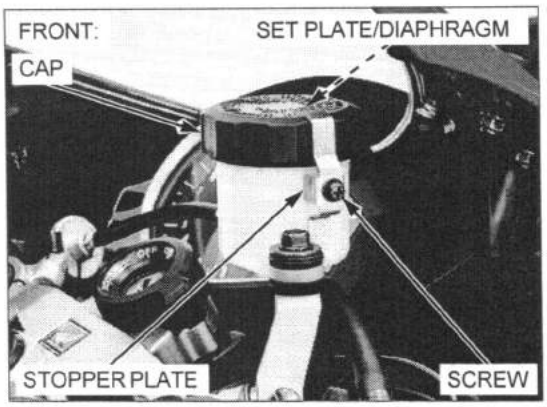
NOTE:

ABS type:
- Drain the system until sufficient amount of the fluid flows out from the bleed valve(s). Draining out the fluid completely will cause air to get into the system. In the fluid filling/air bleeding procedure, fill new brake fluid to drain the remaining fluid so that any air does not get into the system.
  - '09 – '13 model ABS type (page 16-13)
  - After '13 model ABS type (page 16-47)

Front: Turn the handlebar until the reserve tank is parallel to the ground before removing the reserve tank cap.

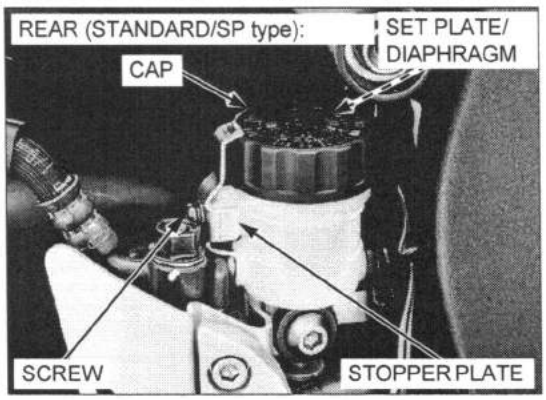
Remove the screw, stopper plate, and reserve tank cap.

Remove the set plate and diaphragm.



Rear (STANDARD/SP type): Remove the screws, stopper plate, and reserve tank cap.

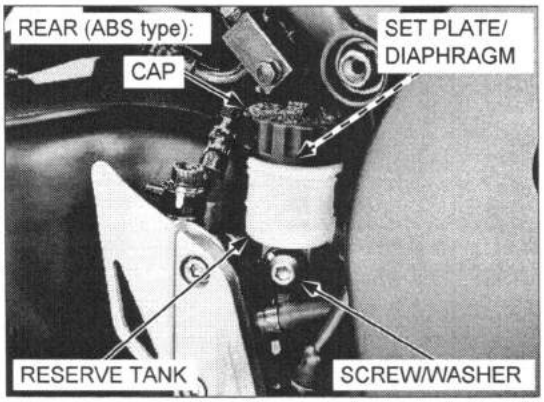
Remove the set plate and diaphragm.



Rear (ABS type): Remove the screws, washer, and reserve tank.

Remove the reserve tank cap, set plate, and diagram.

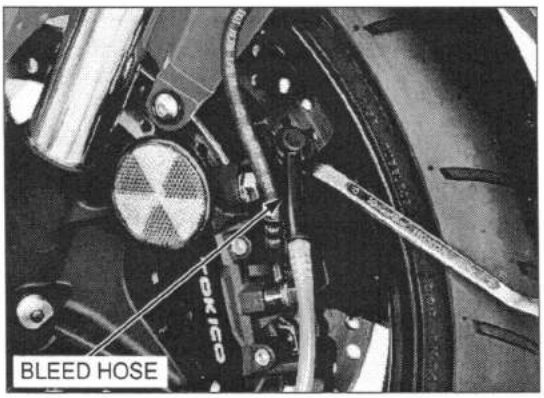
Temporally install the reserve tank, washer, and tighten the screw securely.



Connect a bleed hose to the caliper bleed valve.

Loosen the bleed valve and pump the brake lever or pedal.

Stop pumping the lever or pedal when no more fluid flows out of the bleed valve.



BRAKE FLUID FILLING/AIR BLEEDING

NOTE:

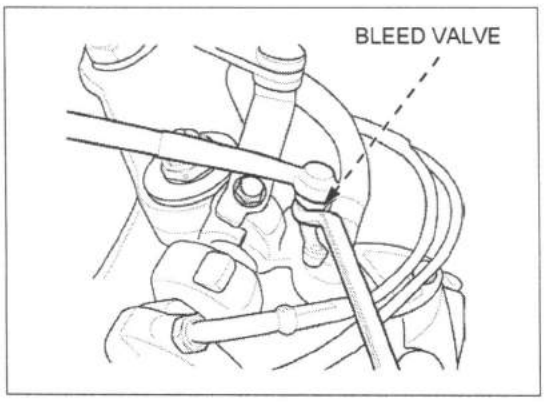
- For ABS type, this procedure is used as part of the air bleeding.

Fill the reserve tank with DOT 4 brake fluid from a sealed container.

NOTE:

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. They are not compatible.

Connect a commercially available brake bleeder to the master cylinder bleed valve.



Operate the brake bleeder and loosen the bleed valve.

If not using an automatic refill system, add brake fluid when the fluid level in the reserve tank is low.

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Repeat above procedure until air bubbles do not appear in the bleed hose.

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the master cylinder bleed valve.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Connect a commercially available brake bleeder to the caliper bleed valve.

Operate the brake bleeder and loosen the bleed valve.

If not using an automatic refill system, add brake fluid when the fluid level in the reserve tank is low.

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

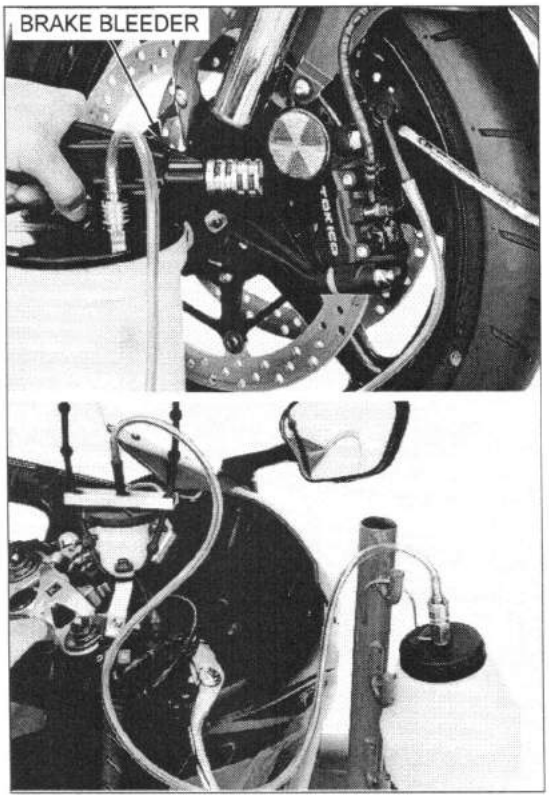
Perform the bleeding procedure until the system is completely flushed/bled.

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

For the front brake, close the bleed valve and perform air bleeding for the other side bleed valve.

Operate the brake lever or pedal. If it still feels spongy, bleed the system again.

TORQUE:
Front brake caliper bleed valve:
STANDARD/ABS type:
8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)
SP type:
13 N·m (1.3 kgf·m, 10 lbf·ft)
Rear brake caliper bleed valve:
6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



If the brake bleeder is not available, perform the following procedures:
Connect a clear bleed hose to the bleed valve.
Pressurize the system with the brake lever or pedal until there are no air bubbles in the fluid flowing out of the reserve tank small hole and lever or pedal resistance is felt.

1. Squeeze the brake lever or push the brake pedal, open the bleed valve 1/2 turn and then close the valve.

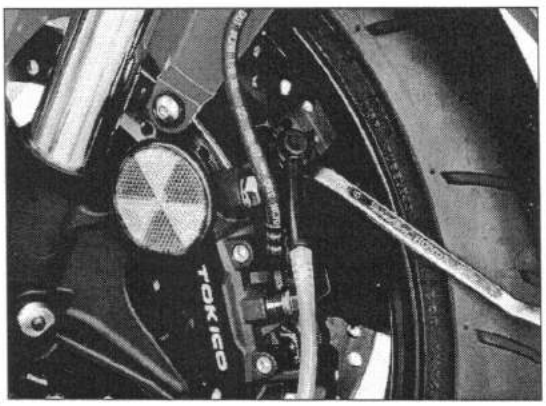
NOTE:
- Do not release the brake lever or pedal until the bleed valve has been closed.

2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until bubbles cease to appear in the fluid coming out of the bleed valve.

Tighten the bleed valve to the specified torque.

TORQUE:
Front master cylinder bleed valve:
5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)
Front brake caliper bleed valve:
STANDARD/ABS type:
8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)
SP type:
13 N·m (1.3 kgf·m, 10 lbf·ft)
Rear brake caliper bleed valve:
6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



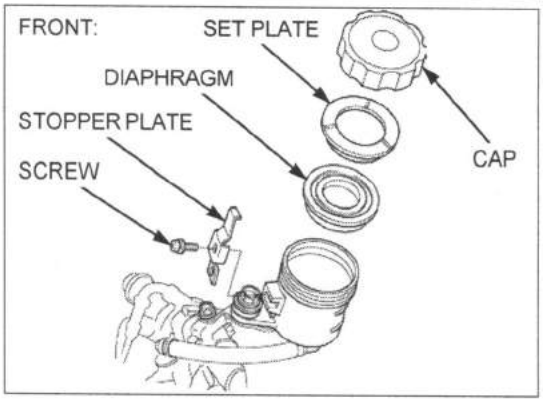
Front: Perform air bleeding for the other side bleed valve.

Fill each reserve tank to the upper level with DOT 4 brake fluid from a sealed container.

Reinstall the diaphragm and set plate.

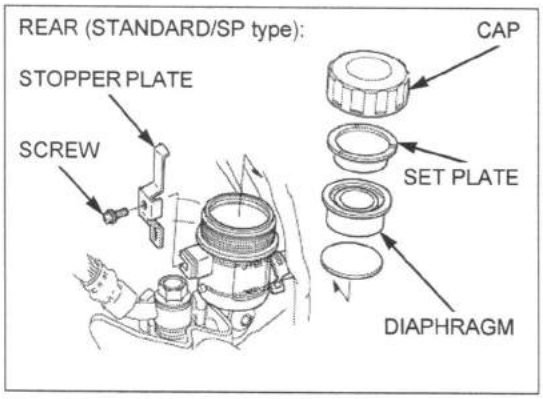
Front: Install the reserve tank cap, stopper plate, and tighten the screw to the specified torque.

TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)



Rear (STANDARD/ SP type): Install the reserve tank cap, stopper plate, and tighten the screw to the specified torque.

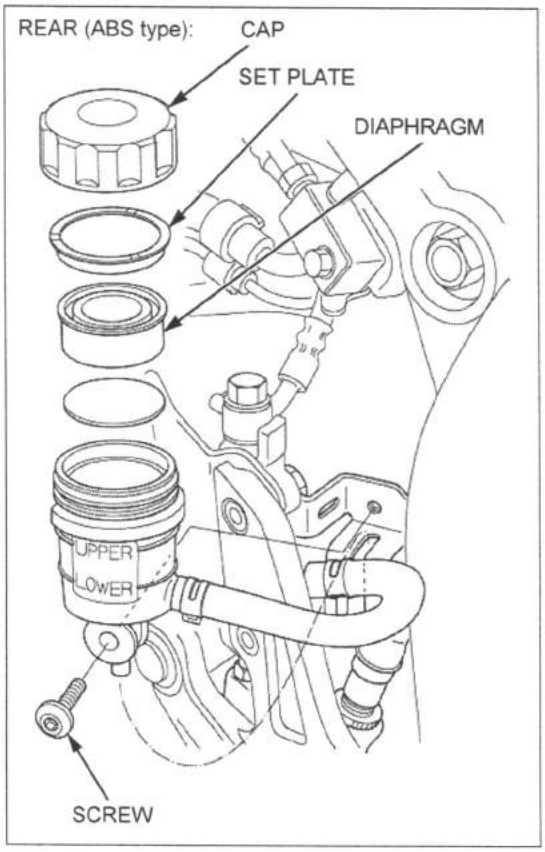
TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)



Rear (ABS type): Remove the screw and reserve tank.

Install the diaphragm, set plate, and reserve tank cap securely.

Install the reserve tank aligning its tab to the stay groove and tighten the screw securely.



BRAKE FLUID REPLACEMENT/AIR BLEEDING ('09 – '13 model ABS type)

NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

- Do not allow foreign material to enter the system when filling the reservoir.
- The brake fluid filling/air bleeding procedure of the ABS type is different from the standard model. Always refer to the COMBINED ABS AIR BLEEDING INFORMATION (page 16-13) for ABS type before the brake fluid filling/air bleeding procedure.

BRAKE FLUID DRAINING

NOTE:

- Refer to conventional brake system for the draining procedure (page 16-9).
  However, drain the system until sufficient amount of the fluid flows out from the bleed valve(s). Draining out the fluid completely will cause getting any air into the system.
  In the fluid filling/air bleeding procedure, fill new brake fluid to drain the remaining fluid so that any air does not get into the system.

COMBINED ABS AIR BLEEDING INFORMATION

- Before performing the air bleeding, be sure to support the motorcycle in an upright position using a safety stand or equivalent. Supporting with the sidestand will be impossible to bleed the air completely.
- Due to the various components of the Combined ABS, including the valve and power units and solenoids, the brake fluid passages are very complex. This complexity requires that together with normal brake line air bleeding procedures, the valve and power units must also be bled.
  The air bleeding procedures for the Combined ABS are very involved and include many steps. All the steps must be followed exactly and completely for proper bleeding. Always perform a brake inspection and test ride after bleeding.
- Due to the by-wire nature of the Combined ABS, it may be difficult to feel if air is still in the system. For this reason it is important to perform a brake test and test ride after brake system servicing.
- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system. If any air gets into the system during air bleeding, perform the air bleeding from the beginning.
- The air bleeding mode is activated by operation of the brake lever and pedal in a specific sequence. If the correct sequence is not followed, the procedure cannot be completed properly. Refer to the air bleeding procedure before starting the air bleeding and always check the Combined ABS indicator and an activation sound of the valve/power unit.

AIR BLEEDING OPERATION

The brake fluid filling/air bleeding procedures are different depending on the case of brake components disassembly.

- If there is any air in the normal brake line, there is a possibility that there is any air in the ABS valve unit line. Perform the ABS valve unit line air bleeding if any removal or disassembly of the normal brake line component has been done.
  – Front ABS valve unit line air bleeding (page 16-18)
  – Rear ABS valve unit line air bleeding (page 16-32)
- When the brake fluid is to be replaced, or if the ABS valve unit is removed, even though the power unit is not removed, there is a possibility that air could get in the power unit line. Perform the both ABS valve unit and power unit line air bleeding.
  – Front ABS valve unit/power unit line air bleeding (page 16-23)
  – Rear ABS valve unit/power unit line air bleeding (page 16-38)

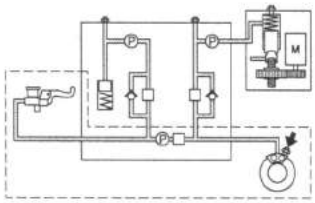
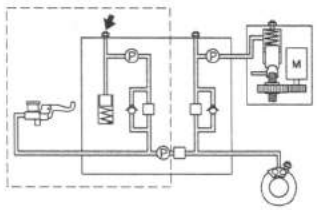
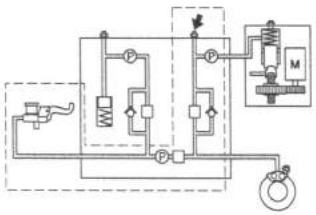
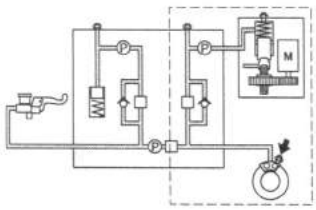
Refer to each procedure summary (page 16-14) before starting the air bleeding, and refer to the air bleeding procedure in the each brake fluid filling/bleeding.

BRAKE FLUID FILLING/AIR BLEEDING PROCEDURE SUMMARY

FRONT ABS VALVE UNIT LINE AIR BLEEDING

Remove the following:

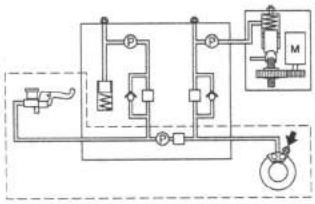
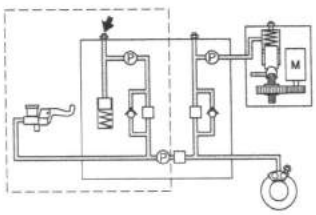
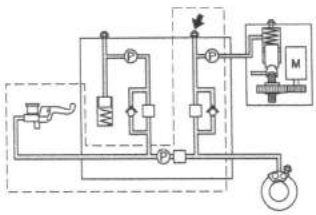
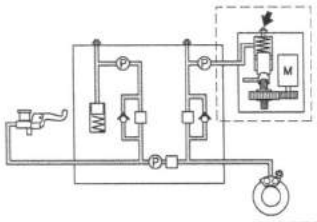
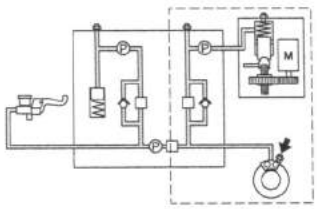
- Seat (page 3-7), EGCA cover (page 3-54) Left rear under cover (page 3-24), Fuse (H/LIGHT START 20 A, STOP/HORN WINK RLY 10 A)

PROCESS	STEP	AIR BLEEDING LINE
1. Normal brake line air bleeding	1-1. Air bleeding at caliper bleed valve (page 16-9)	
2. Air bleeding mode activation	2-1. Combined ABS check connector terminal short (page 16-19) 2-2. Air bleeding mode activation	
3. ABS valve unit line air bleeding	3-1. Air bleeding at ABS valve unit simulator side bleed valve (page 16-20)	
	3-2. Air bleeding at ABS valve unit power unit side bleed valve (page 16-20)	
4. One-way valve air bleeding (with motor activation)	4-1. Power unit activation (pressurization) (page 16-21) 4-2. Air bleeding at caliper bleed valve 4-3. Power unit activation (depressurization)	
5. Complete the inspection	5-1. Jumper wire removal 5-2. Pre-ride inspection and test ride for brake system (page 16-23)	

FRONT ABS VALVE UNIT/POWER UNIT LINE AIR BLEEDING

Remove the following:

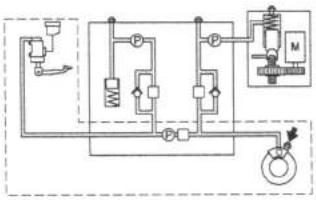
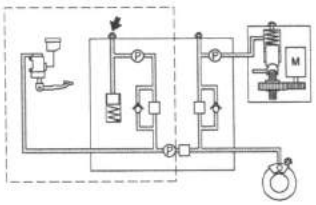
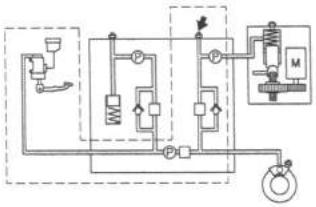
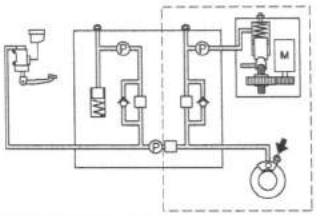
- Seat (page 3-7), Radiator (page 7-13), Front power unit heat guard (page 17-57), Left rear under cover (page 3-24), Fuse (H/LIGHT START 20 A, STOP/HORN WINK RLY 10 A)

PROCESS	STEP	AIR BLEEDING LINE
1. Normal brake line air bleeding	1-1. Air bleeding at caliper bleed valve (page 16-9)	
2. Air bleeding mode activation	2-1. Combined ABS check connector terminal short (page 16-25) 2-2. Air bleeding mode activation	
3. ABS valve unit line air bleeding	3-1. Air bleeding at valve unit simulator side bleed valve (page 16-26)	
	3-2. Air bleeding at ABS valve unit power unit side bleed valve (page 16-26)	
4. Power unit line air bleeding	4-1. Air bleeding at power unit bleed valve (page 16-27)	
5. ABS valve unit line air bleeding	5-1. Air bleeding at ABS valve unit power unit side bleed valve (page 16-27)	same as 3-2
6. One-way valve air bleeding (with motor activation)	6-1. Power unit activation (pressurization) (page 16-28) 6-2. Air bleeding at caliper bleed valve 6-3. Power unit activation (depressurization)	
7. Air bleeding mode activation	7-1. Air bleeding mode activation (page 16-30)	same as 2-2
8. Power unit line air bleeding	8-1. Air bleeding at power unit bleed valve (page 16-31)	same as 4-1
9. ABS valve unit line air bleeding	9-1. Air bleeding at ABS valve unit power unit side bleed valve (page 16-31)	same as 3-2
10. Complete the inspection	10-1. Jumper wire removal 10-2. Pre-ride inspection and test ride for brake system (page 16-32)	

REAR ABS VALVE UNIT LINE AIR BLEEDING

Remove the following:

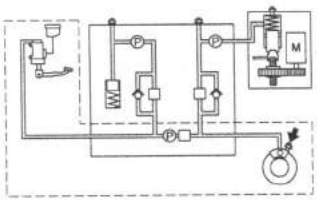
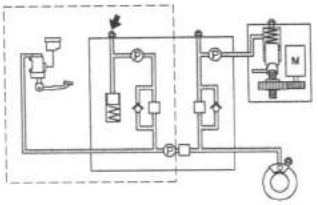
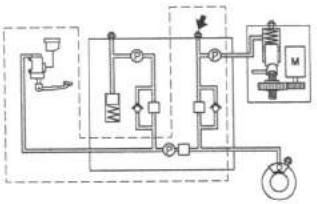
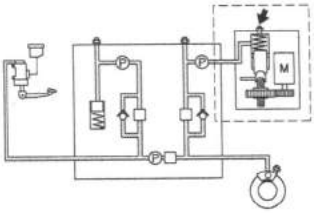
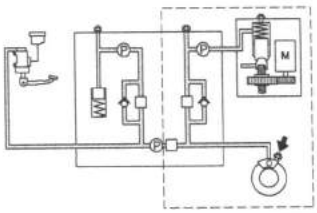
- Seat (page 3-7), Fuse (H/LIGHT START 20 A, STOP/HORN WINK RLY 10 A)

PROCESS	STEP	AIR BLEEDING LINE
1. Normal brake line air bleeding	1-1. Air bleeding at caliper bleed valve (page 16-9)	
2. Air bleeding mode activation	2-1. Combined ABS check connector terminal short (page 16-34) 2-2. Air bleeding mode activation	
3. ABS valve unit line air bleeding	3-1. Air bleeding at ABS valve unit simulator side bleed valve (page 16-35)	
	3-2. Air bleeding at ABS valve unit power unit side bleed valve (page 16-35)	
4. One-way valve air bleeding (with motor activation)	4-1. Power unit activation (pressurization) (page 16-36) 4-2. Air bleeding at caliper bleed valve 4-3. Power unit activation (depressurization)	
5. Complete the inspection	5-1. Jumper wire removal 5-2. Pre-ride inspection and test ride for brake system (page 16-38)	

REAR ABS VALVE UNIT/POWER UNIT LINE AIR BLEEDING

Remove the following:

- Fuel tank (page 6-60), Fuse (H/LIGHT START 20 A, STOP/HORN WINK RLY 10 A)

PROCESS	STEP	AIR BLEEDING LINE
1. Normal brake line air bleeding	1-1. Air bleeding at caliper bleed valve (page 16-9)	
2. Air bleeding mode activation	2-1. Combined ABS check connector terminal short (page 16-40) 2-2. Air bleeding mode activation	
3. ABS valve unit line air bleeding	3-1. Air bleeding at ABS valve unit simulator side bleed valve (page 16-41)	
	3-2. Air bleeding at ABS valve unit power unit side bleed valve (page 16-41)	
4. Power unit line air bleeding	4-1. Air bleeding at power unit bleed valve (page 16-42)	
5. ABS valve unit line air bleeding	5-1. Air bleeding at ABS valve unit power unit side bleed valve (page 16-42)	same as 3-2
6. One-way valve air bleeding (with motor activation)	6-1. Power unit activation (pressurization) (page 16-43) 6-2. Air bleeding at caliper bleed valve 6-3. Power unit activation (depressurization)	
7. Air bleeding mode activation	7-1. Air bleeding mode activation (page 16-45)	same as 2-2
8. Power unit line air bleeding	8-1. Air bleeding at power unit bleed valve (page 16-45)	same as 4-1
9. ABS valve unit line air bleeding	9-1. Air bleeding at ABS valve unit power unit side bleed valve (page 16-46)	same as 3-2
10. Complete the inspection	10-1. Jumper wire connector removal 10-2. Pre-ride inspection and test ride for brake system (page 16-46)	

FRONT ABS VALVE UNIT LINE AIR BLEEDING

NOTICE

Before Combined ABS line brake fluid air bleeding, check the battery condition (page 18-7).

NOTE:

- Do not turn the ignition switch OFF or disconnect the jumper wire during the air bleeding as this could cause the Combined ABS to malfunction.
  Once started, if the air bleeding procedure is not completed, re-start the air bleeding from the beginning.
- Always use an appropriate jumper wire to prevent damage to the connector terminals.

1. Normal brake line air bleeding

Remove the following:

- Seat (page 3-7)
- EGCA cover (page 3-54)
- Left rear under cover (page 3-24)

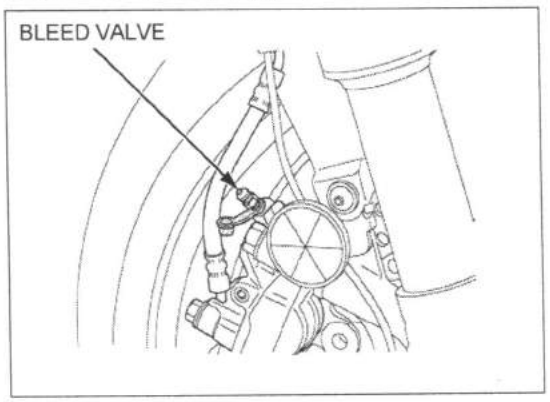
Open the fuse/relay box and remove the following fuse.

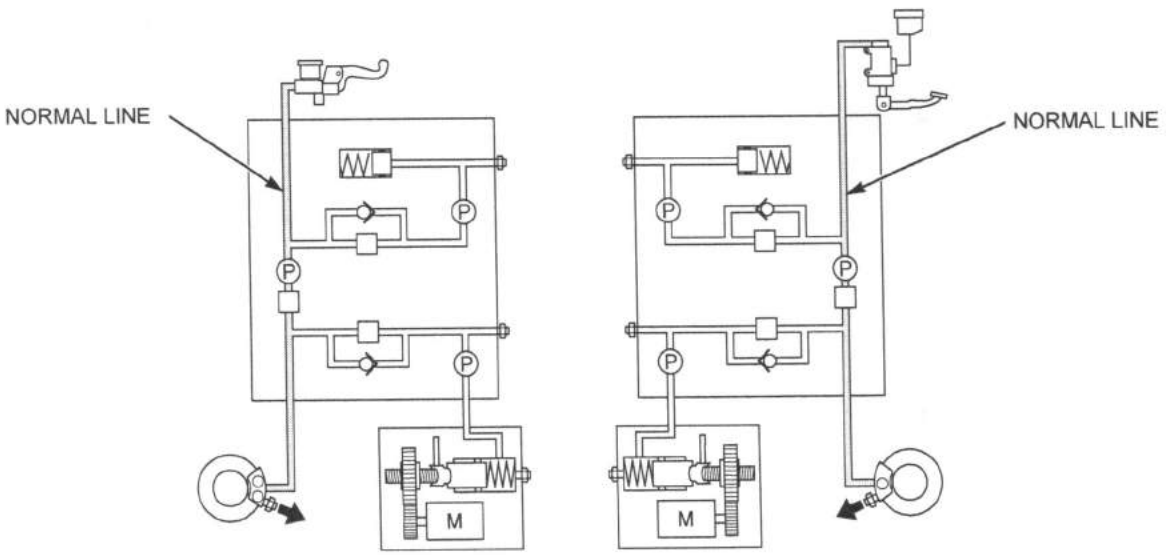
- H/LIGHT START 20 A
- STOP/HORN WINK RLY 10 A

Support the motorcycle in an upright position using a safety stand or equivalent.



Bleed the air from the front and rear normal hydraulic system (page 16-10).





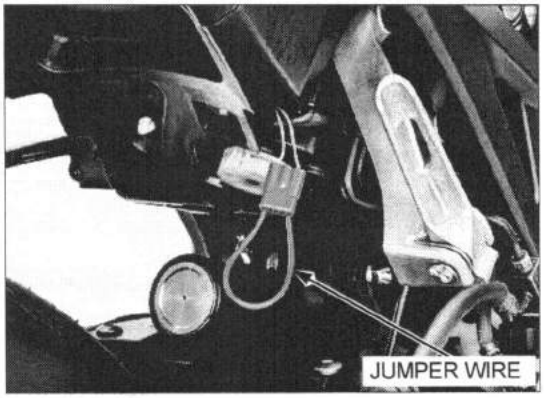
2. Air bleeding mode activation

Turn the ignition switch OFF.
Remove the dummy connector and short the Combined ABS check connector terminals with a jumper wire.

Connection: Brown – Green

Switch to the front Combined ABS line air bleeding mode as follows.

- Perform the following procedure within five seconds.



1. Turn the ignition switch ON while applying the rear brake pedal.

(Combined ABS indicator: ON)

2. Release the rear brake pedal.

(Combined ABS indicator: OFF)

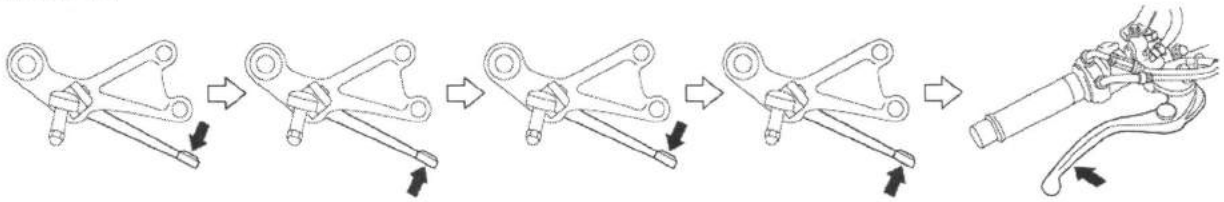
3. Reapply the rear brake pedal.

(Combined ABS indicator: ON)

4. Release the rear brake pedal.

(Combined ABS indicator: OFF)

5. Apply the front brake lever.



The motorcycle will now be in the front Combined ABS line air bleeding mode, and the Combined ABS indicator will start blinking.

- If the indicator does not start blinking, turn off the ignition switch and try the above procedure again.

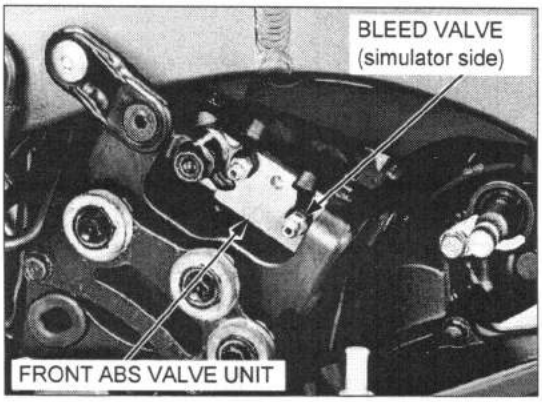
3. ABS valve unit line air bleeding

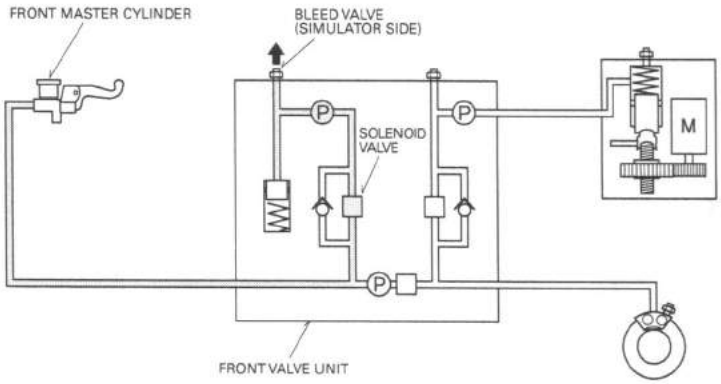
Bleed the air from the simulator side bleed valve of the front ABS valve unit.

Perform the bleeding until the system is completely flushed/bled.

Tighten the ABS valve unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



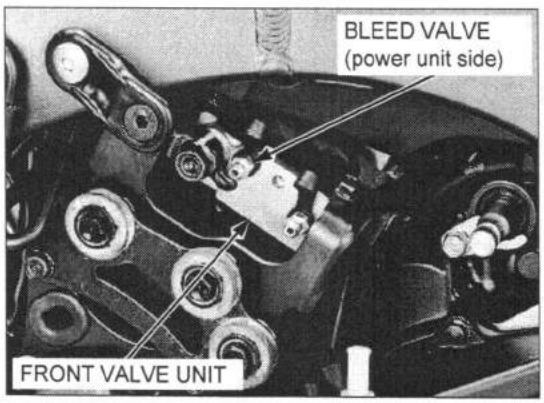


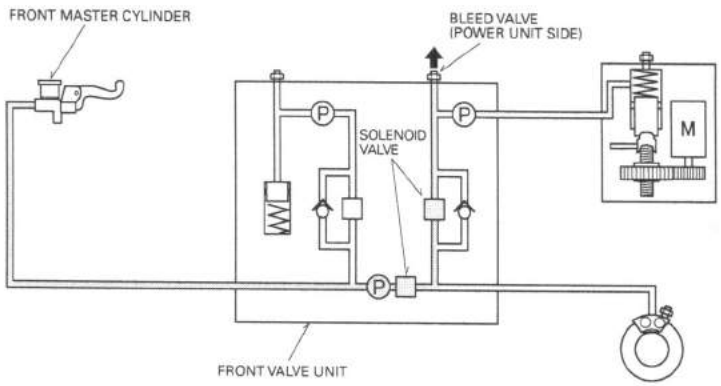
Bleed the air from the power unit side bleed valve of the front ABS valve unit.

Perform the bleeding until the system is completely flushed/bled.

Tighten the ABS valve unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)





4. One-way valve air bleeding (with motor activation)

The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking two times.

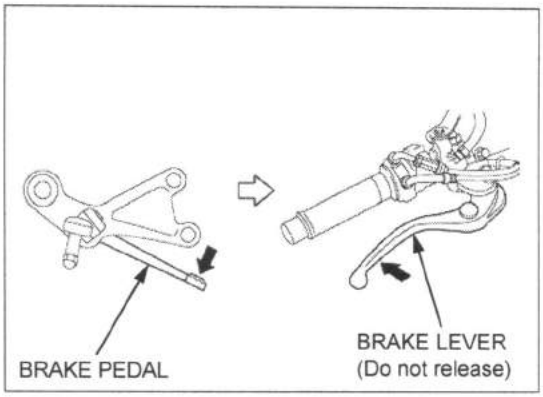
Apply the rear brake pedal.

Squeeze and hold the front brake lever to operate the stroke simulator in the ABS valve unit.

Release the rear brake pedal.

NOTE:

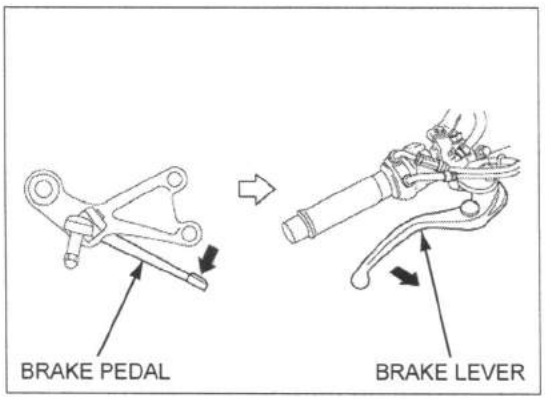
Don't release the front brake lever.



The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking three times.

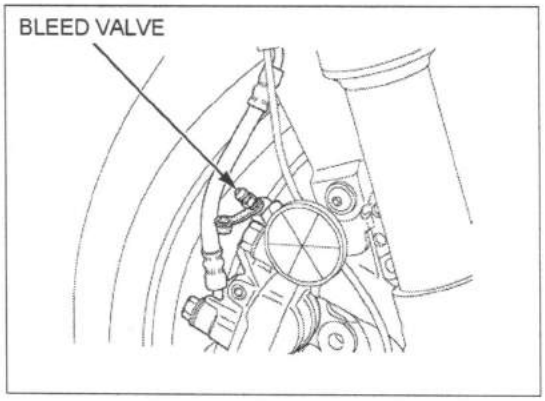
Apply the rear brake pedal.

Release the front brake lever.



Connect a clear bleed hose to the front brake caliper bleed valve.

Loosen the front brake caliper bleed valve.



The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking four times.

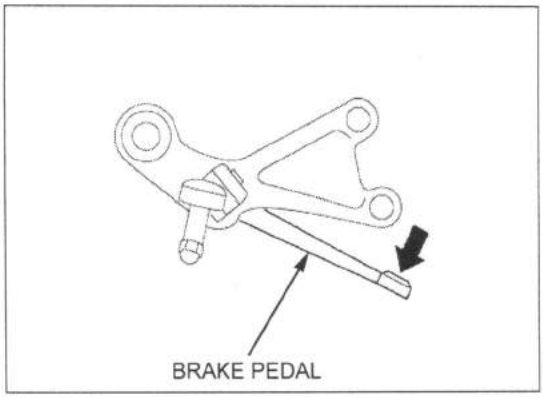
Apply the rear brake pedal to operate the power unit motor pressurization.

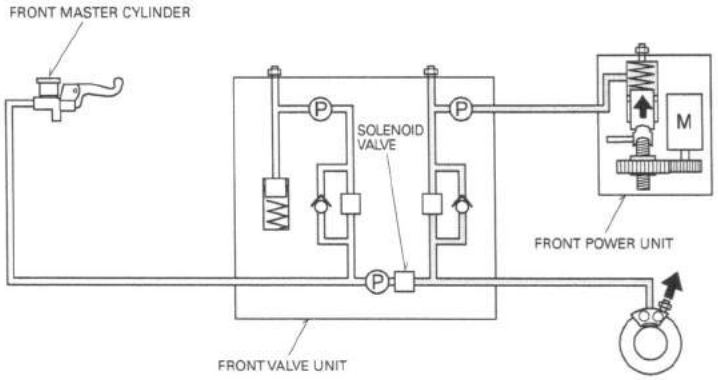
After the power unit motor operation, close the front brake caliper bleed valve.

NOTE:

If the air bleeding process is suspended incompletely, perform the following procedures and re-start the air bleeding from the beginning.

- Turn the ignition switch OFF and disconnect the jumper wire.
- Turn the ignition switch ON and wait for initial operation (about five seconds), then turn the ignition switch OFF.
- Repeat above procedure five times to clear the detecting malfunction.



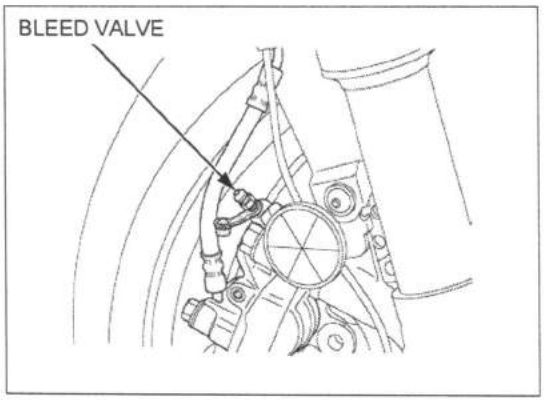


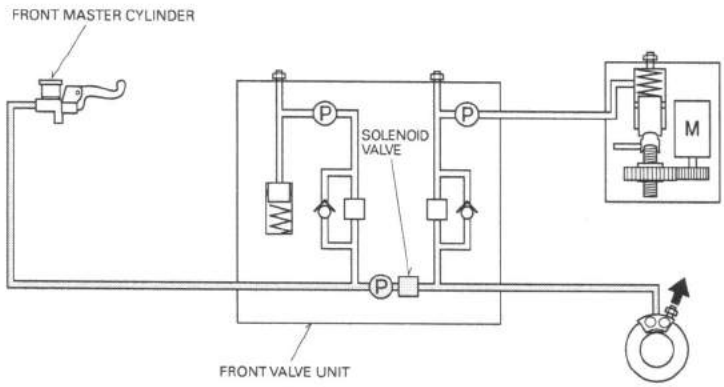
Bleed the air from the right side brake caliper bleed valve.

Perform the bleeding until the system is completely flushed/bled.

Tighten the caliper bleed valves to the specified torque.

TORQUE: 8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)

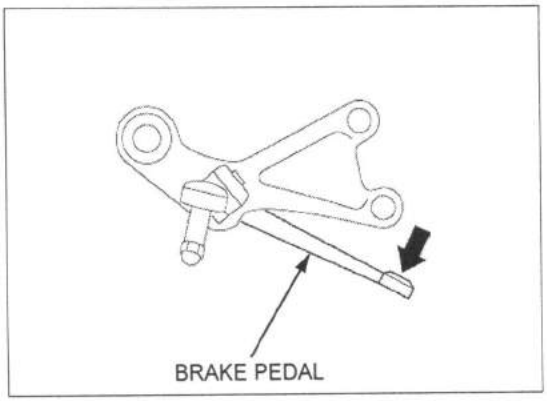




The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking five times.

Apply the rear brake pedal.

- After blinking five times, check that the Combined ABS indicator changes to long blinking.



5. Completion inspection

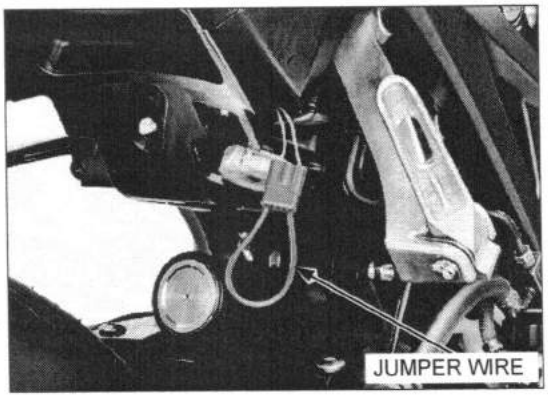
Turn the ignition switch OFF and disconnect the jumper wire.

Fill the reservoir to the upper level with DOT 4 brake fluid from a sealed container.

Reinstall the diaphragm and set plate.

Install the reservoir cap, stopper plate, and tighten the screw to the specified torque.

TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)



Install the removed parts in the reverse order of removal.

Perform the pre-start self-diagnosis and check the Combined ABS indicator (page 17-7).

Check that the brake operates normally with good response during the test-ride.

FRONT ABS VALVE UNIT/POWER UNIT LINE AIR BLEEDING

NOTICE

Before Combined ABS line brake fluid air bleeding, check the battery condition (page 18-7).

NOTE:

- Do not turn the ignition switch OFF or disconnect the jumper wire during the air bleeding as this could cause the Combined ABS to malfunction.
  Once started, if the air bleeding procedure is not completed, re-start the air bleeding from the beginning.

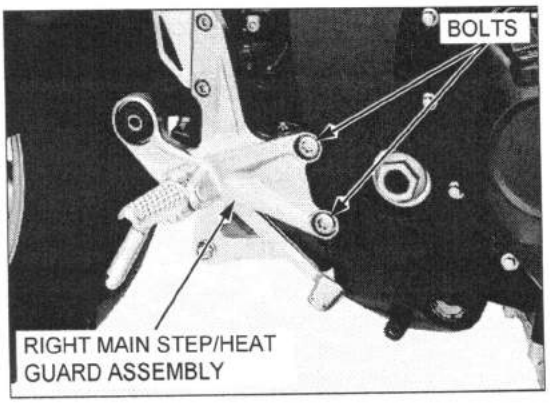
1. Normal brake line air bleeding

Remove the following:

- Seat (page 3-7)
- EGCA cover (page 3-54)
- Front power unit heat guard (page 17-57)
- Left rear under cover (page 3-24)

Temporarily install the right main step/heat guard assembly and tighten the main step mounting bolts to the specified torque.

TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)



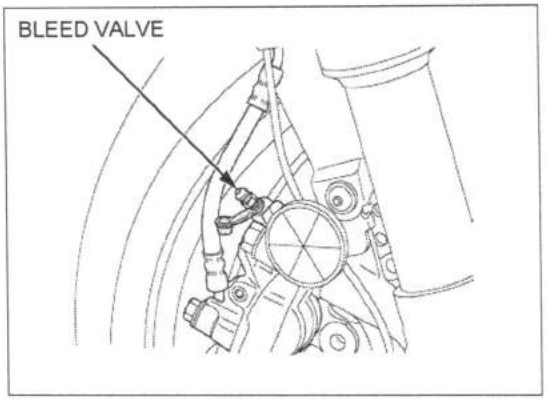
Open the fuse/relay box and remove the following fuse.

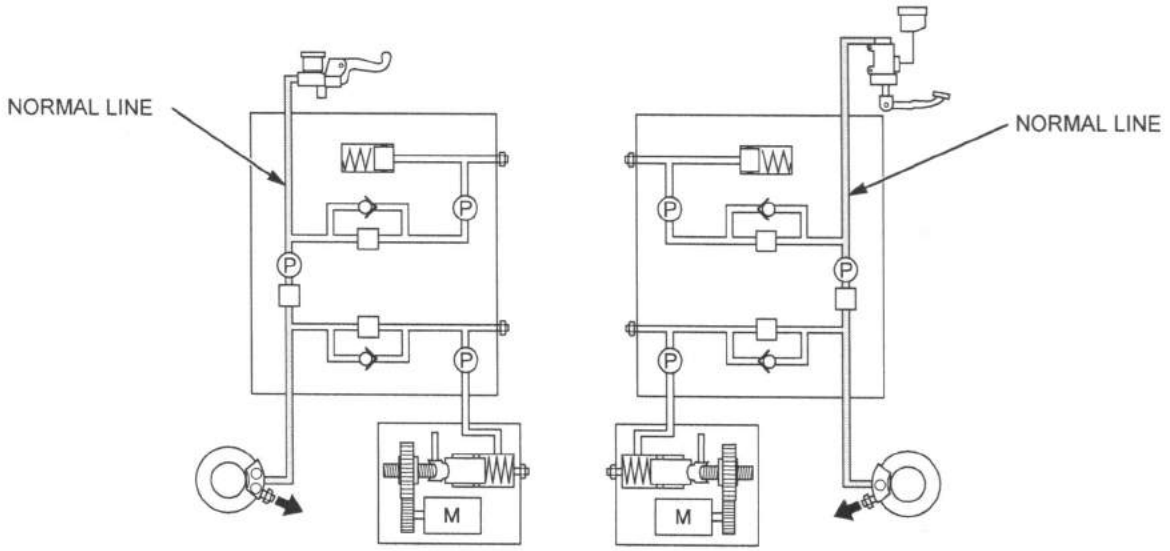
- H/LIGHT START 20 A
- STOP/HORN WINK RLY 10 A

Support the motorcycle in an upright position using a safety stand or equivalent.



Bleed the air from the front and rear normal hydraulic system (page 16-10).





2. Air bleeding mode activation

Turn the ignition switch OFF.

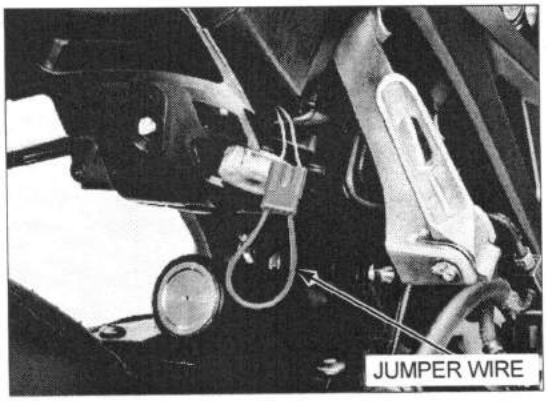
Always use an appropriate jumper wire to prevent damage to the connector terminals.

Remove the dummy connector and short the Combined ABS check connector terminals with a jumper wire.

Connection: Brown – Green

Switch to the front Combined ABS line air bleeding mode as follows.

- Perform the following procedure within five seconds.



1. Turn the ignition switch ON while applying the rear brake pedal.

(Combined ABS indicator: ON)

2. Release the rear brake pedal.

(Combined ABS indicator: OFF)

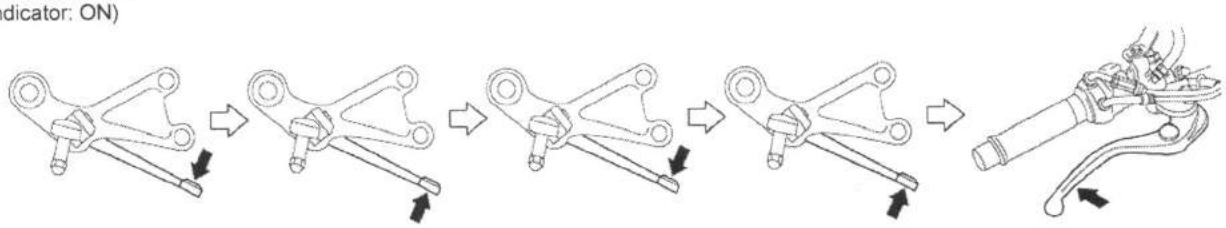
3. Reapply the rear brake pedal.

(Combined ABS indicator: ON)

4. Release the rear brake pedal.

(Combined ABS indicator: OFF)

5. Apply the front brake lever.



The motorcycle will now be in the front Combined ABS line air bleeding mode, and the Combined ABS indicator will start blinking.

- If the indicator does not start blinking, turn off the ignition switch and try the above procedure again.

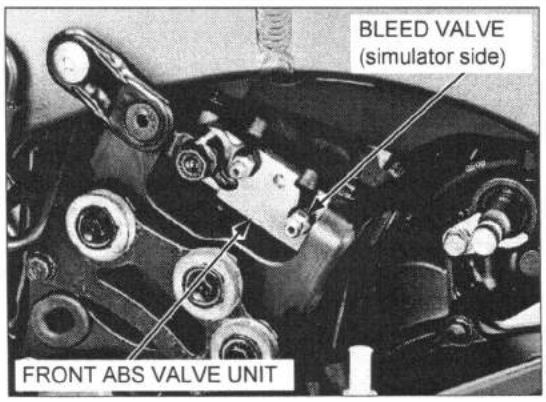
3. ABS valve unit line air bleeding

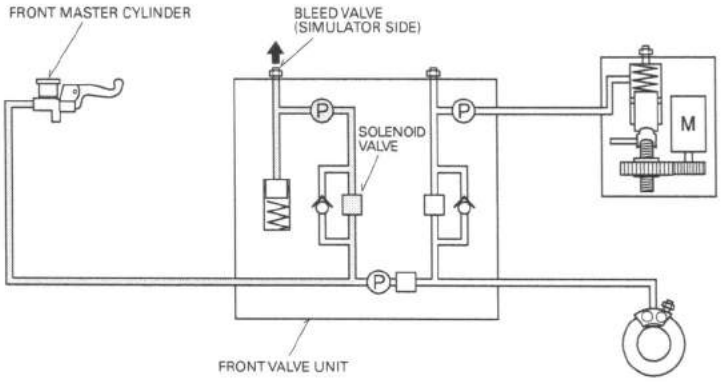
Bleed the air from the simulator side bleed valve of the front ABS valve unit.

Perform the bleeding until the system is completely flushed/bled.

Tighten the ABS valve unit bleed valve to the specified torque.

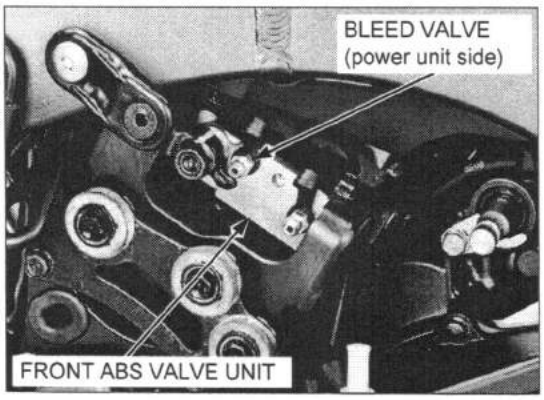
TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

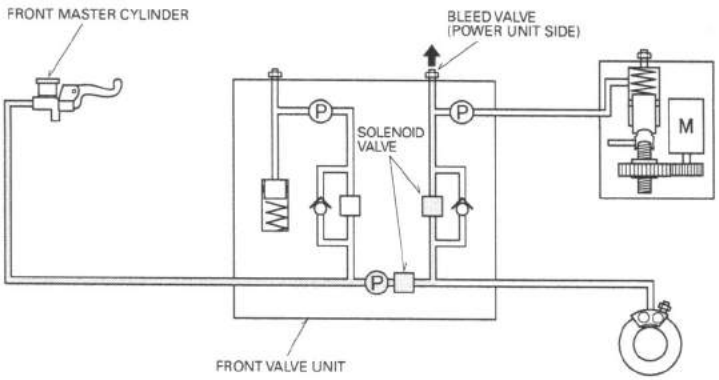




Bleed the air from the power unit side bleed valve of the front ABS valve unit.

Perform the bleeding until the system is completely flushed/bled.

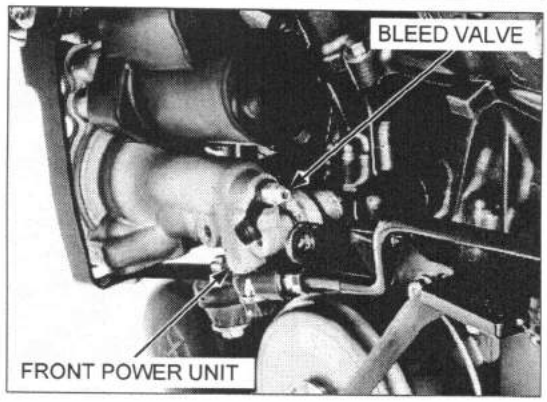


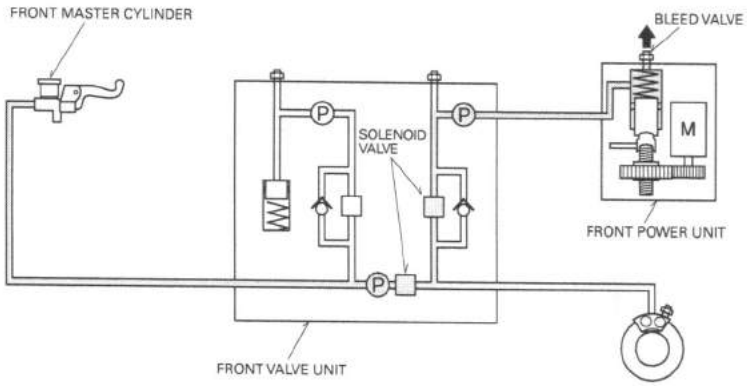


4. Power unit line air bleeding

Bleed the air from the power unit bleed valve.

Perform the bleeding until the system is completely flushed/bled.

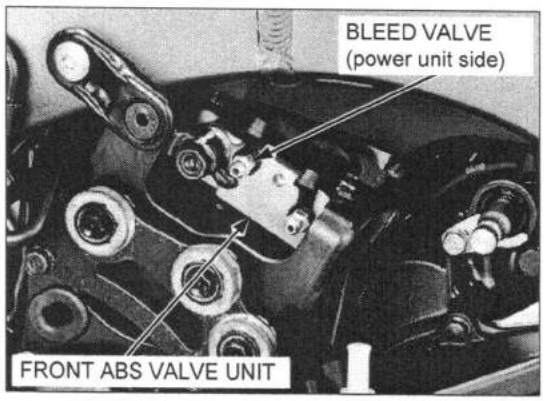


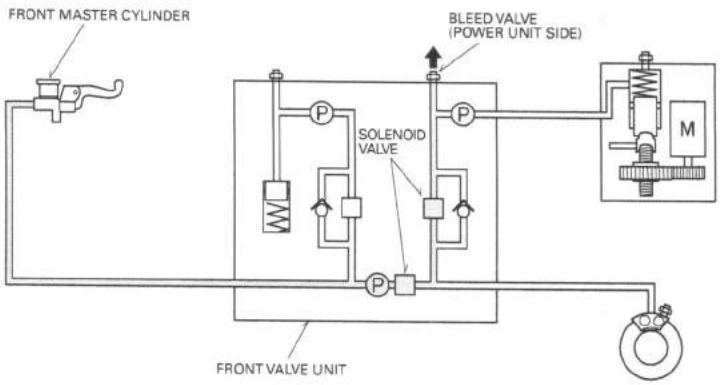


5. ABS valve unit line air bleeding

Bleed the air from the power unit side bleed valve of the front ABS valve unit.

Perform the bleeding until the system is completely flushed/bled.





6. One-way valve air bleeding (with motor activation)

The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking two times.

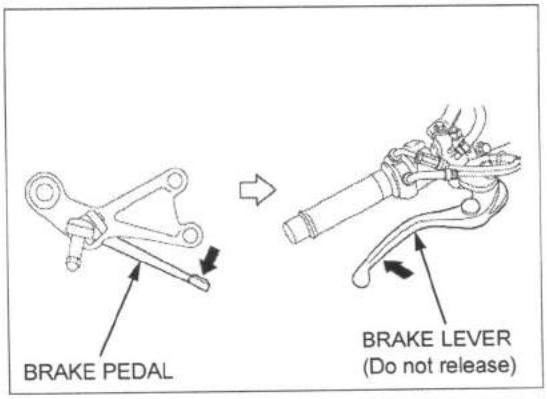
Apply the rear brake pedal.

Squeeze and hold the front brake lever to operate the stroke simulator in the ABS valve unit.

Release the rear brake pedal.

NOTE:

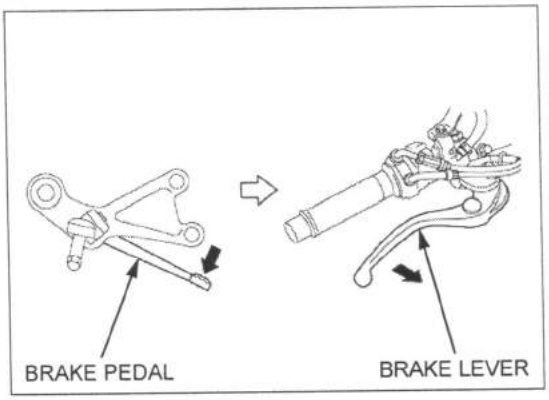
Don't release the front brake lever.



The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking three times.

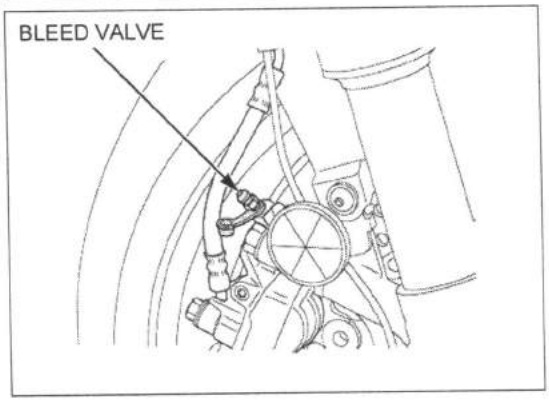
Apply the rear brake pedal.

Release the front brake lever.



Connect a clear bleed hose to the front brake caliper bleed valve.

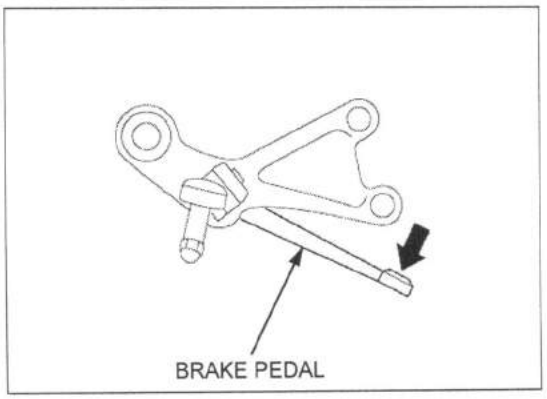
Loosen the front brake caliper bleed valve.



The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking four times.

Apply the rear brake pedal to operate the power unit motor pressurization.

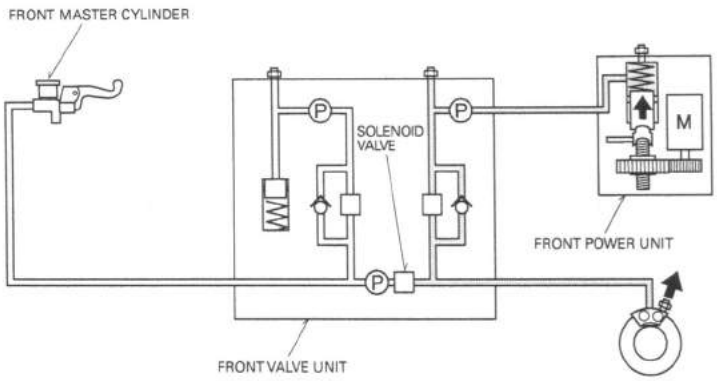
After the power unit motor operation, close the front brake caliper bleed valve.



NOTE:

If the air bleeding process is suspended incompletely, perform the following procedures and re-start the air bleeding from the beginning.

- Turn the ignition switch OFF and disconnect the jumper wire.
- Turn the ignition switch ON and wait for initial operation (about five seconds), then turn the ignition switch OFF.
- Repeat above procedure five times to clear the detecting malfunction.

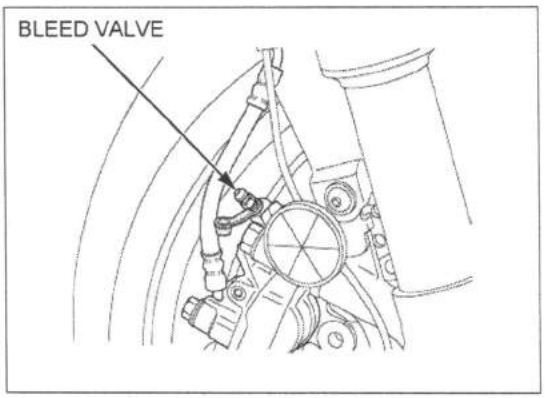


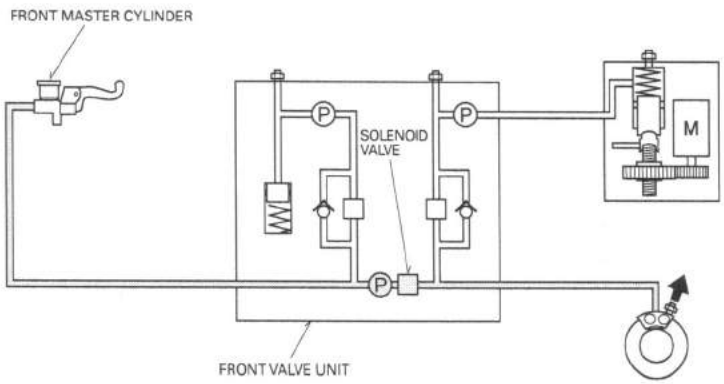
Bleed the air from the right side brake caliper bleed valve.

Perform the bleeding until the system is completely flushed/bled.

Tighten the caliper bleed valves to the specified torque.

TORQUE: 8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)





7. Air bleeding mode activation

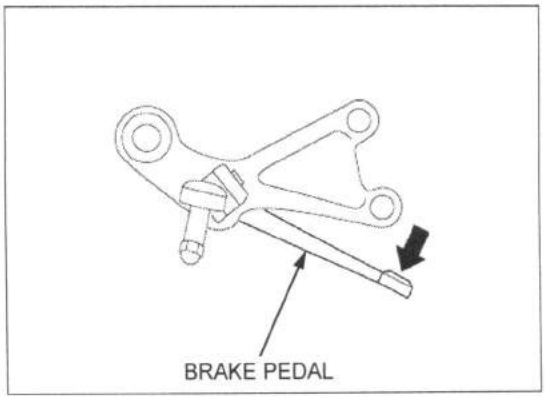
The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking five times.

Apply the rear brake pedal.

- After blinking five times, check that the Combined ABS indicator changes to long blinking.

Turn the ignition switch OFF and restart the following procedure.

- Perform the following procedure within five seconds.



1. Turn the ignition switch ON while applying the rear brake pedal.

(Combined ABS indicator: ON)

2. Release the rear brake pedal.

(Combined ABS indicator: OFF)

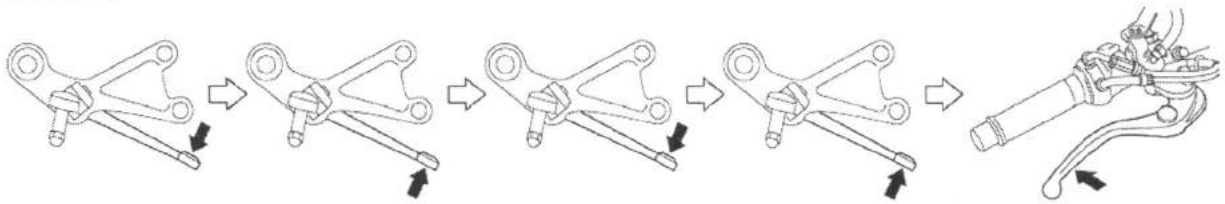
3. Reapply the rear brake pedal.

(Combined ABS indicator: ON)

4. Release the rear brake pedal.

(Combined ABS indicator: OFF)

5. Apply the front brake lever.



The motorcycle will now be in the front Combined ABS line air bleeding mode, and the Combined ABS indicator will start blinking.

- If the indicator does not start blinking, turn off the ignition switch and try the above procedure again.

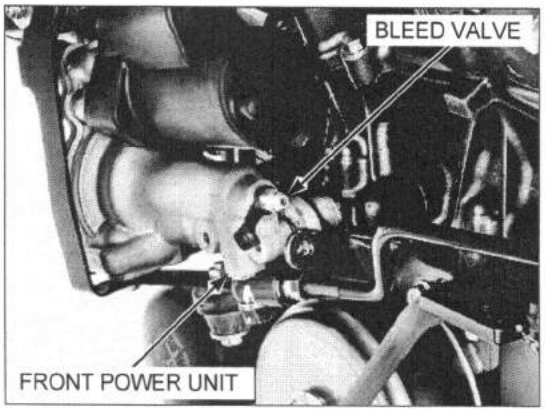
8. Power unit line air bleeding

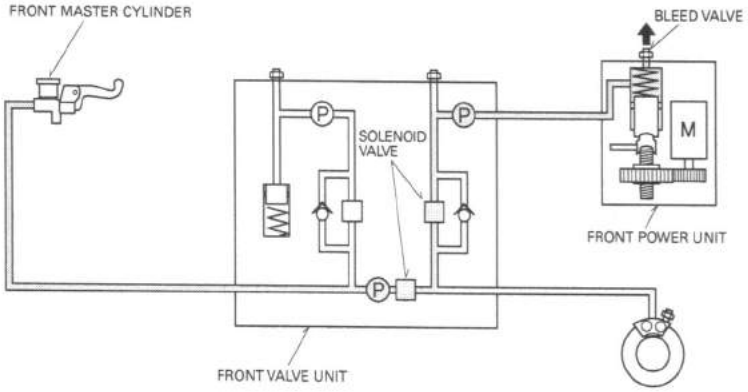
Bleed the air from the power unit bleed valve.

Perform the bleeding until the system is completely flushed/bled.

Tighten the power unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)





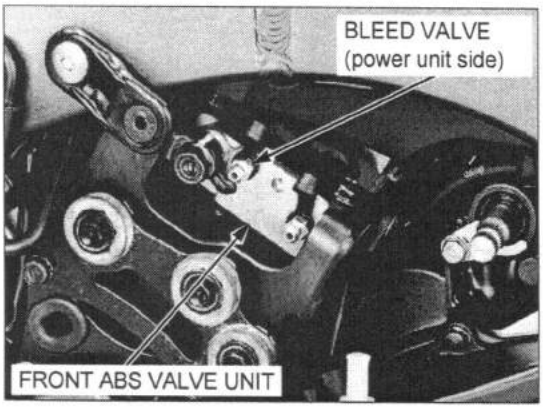
9. ABS valve unit line air bleeding

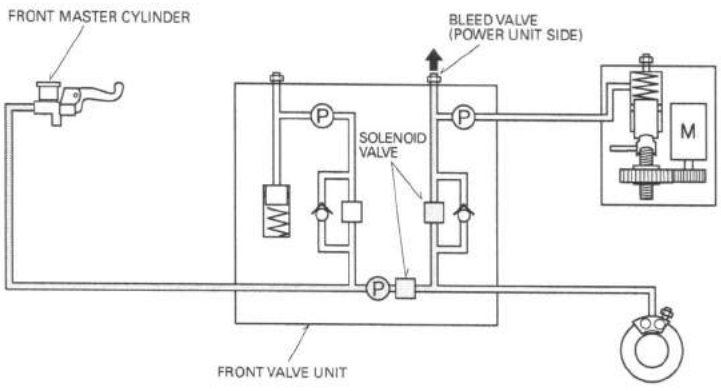
Bleed the air from the power unit side bleed valve of the front ABS valve unit.

Perform the bleeding until the system is completely flushed/bled.

Tighten the ABS valve unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)





10. Complete the inspection

Turn the ignition switch OFF and disconnect the jumper wire.

Fill the reservoir to the upper level with DOT 4 brake fluid from a sealed container.

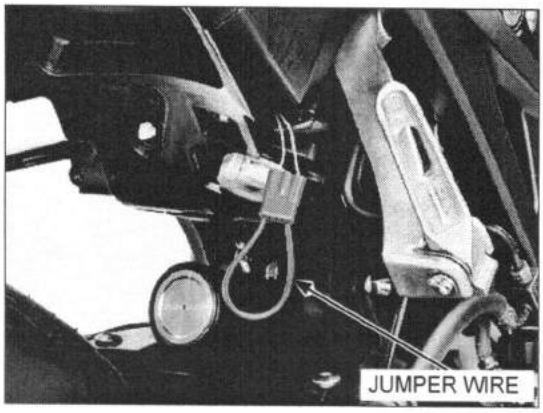
Reinstall the diaphragm and set plate.

Install the reservoir cap, stopper plate, and tighten the screw to the specified torque.

TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)

Install the removed parts in the reverse order of removal.

Perform the pre-start self-diagnosis and check the Combined ABS indicator (page 17-7).



Check that the brake operates normally with good response during the test-ride.

REAR ABS VALVE UNIT LINE AIR BLEEDING

NOTICE

Before Combined ABS line brake fluid air bleeding, check the battery condition (page 18-7).

NOTE:

- Do not turn the ignition switch OFF or disconnect the jumper wire during the air bleeding as this could cause the Combined ABS to malfunction.
  Once started, if the air bleeding procedure is not completed, re-start the air bleeding from the beginning.

1. Normal brake line air bleeding

Remove the seat (page 3-7).

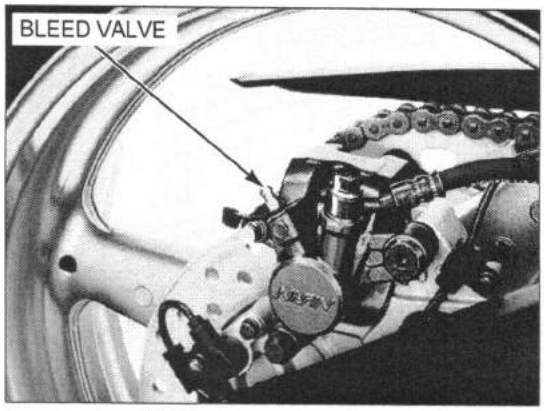
Open the fuse/relay box and remove the following fuse.

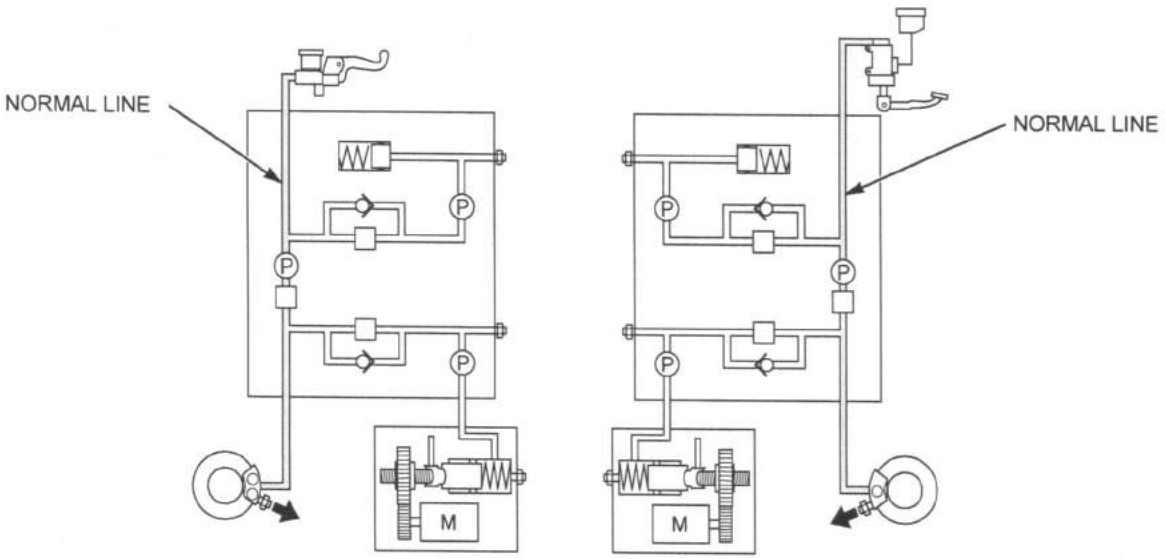
- H/LIGHT START 20 A
- STOP/HORN WINK RLY 10 A

Support the motorcycle in an upright position using a safety stand or equivalent.



Bleed the air from the front and rear normal hydraulic system (page 16-10).





2. Air bleeding mode activation

Turn the ignition switch OFF.

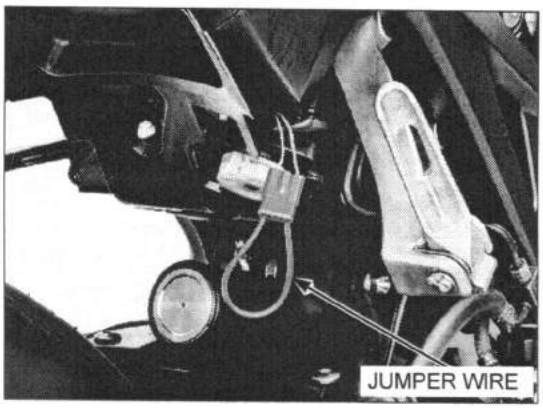
Always use an appropriate jumper wire to prevent damage to the connector terminals.

Remove the dummy connector and short the Combined ABS check connector terminals with a jumper wire.

Connection: Brown – Green

Switch to the rear Combined ABS line air bleeding mode as follows.

- Perform the following procedure within five seconds.



1. Turn the ignition switch ON while applying the rear brake pedal.

(Combined ABS indicator: ON)

2. Release the rear brake pedal.

(Combined ABS indicator: OFF)

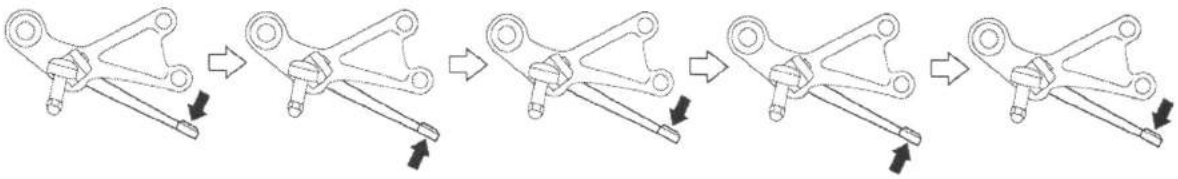
3. Reapply the rear brake pedal.

(Combined ABS indicator: ON)

4. Release the rear brake pedal.

(Combined ABS indicator: OFF)

5. Apply the rear brake pedal.



The motorcycle will now be in the rear Combined ABS line air bleeding mode, and the Combined ABS indicator will start blinking.

- If the indicator does not start blinking, turn off the ignition switch and try the above procedure again.

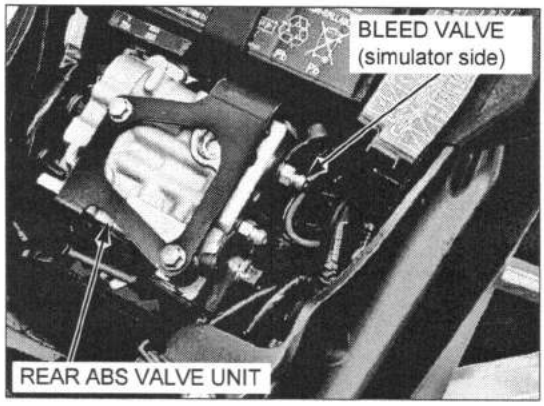
3. ABS valve unit line air bleeding

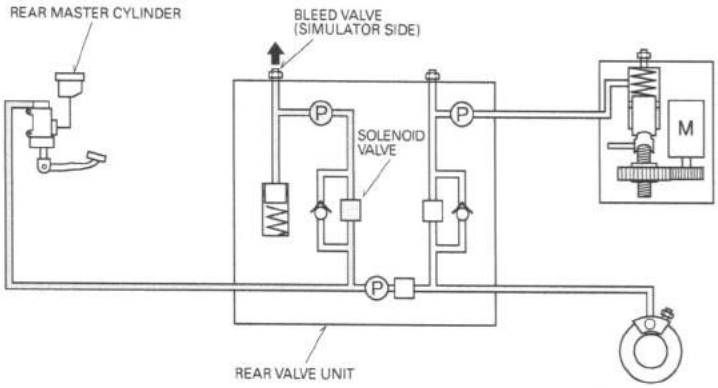
Bleed the air from the simulator side bleed valve of the rear ABS valve unit.

Perform the bleeding procedure until the system is completely flushed/bled.

Tighten the ABS valve unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



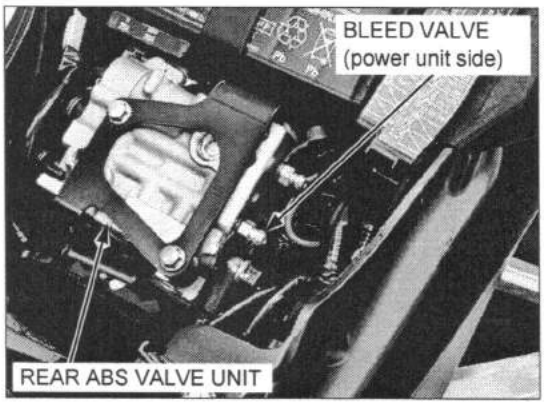


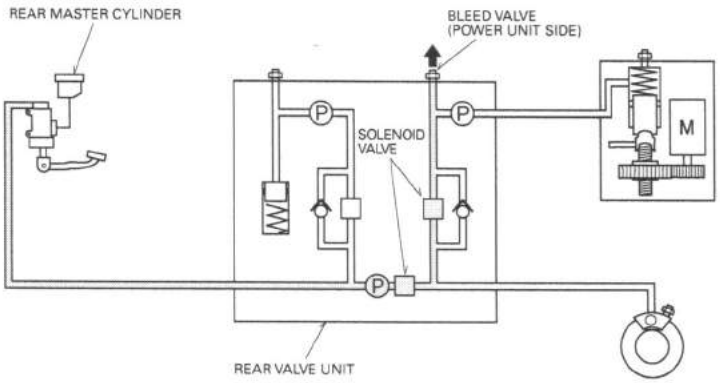
Bleed the air from the power unit side bleed valve of the rear ABS valve unit.

Perform the bleeding until the system is completely flushed/bled.

Tighten the ABS valve unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)





4. One-way valve air bleeding (with motor activation)

Squeeze the front brake lever.

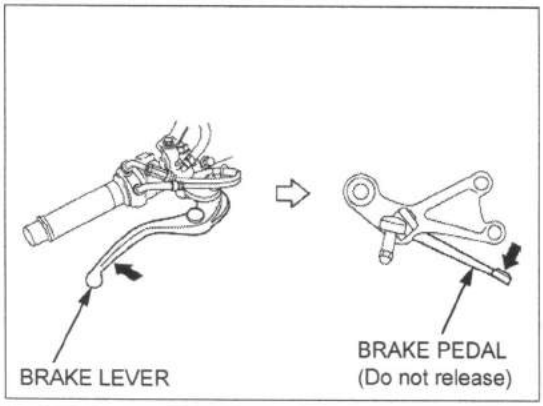
The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking two times.

Apply and hold the rear brake pedal to operate the stroke simulator in the ABS valve unit.

Release the front brake lever.

NOTE:

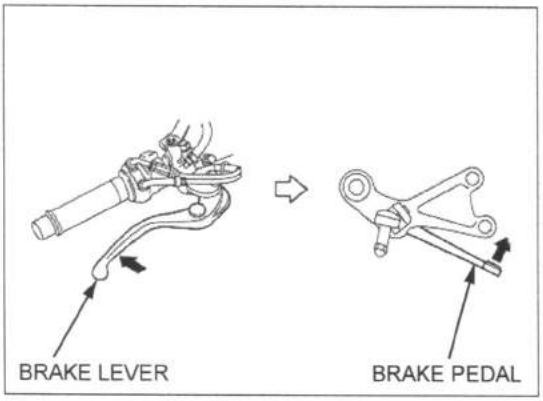
Don't release the rear brake pedal.



Squeeze the front brake lever.

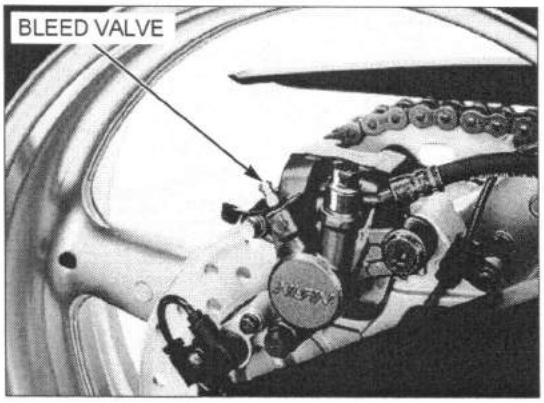
The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking three times.

Release the rear brake pedal.



Connect a clear bleed hose to the rear brake caliper bleed valve.

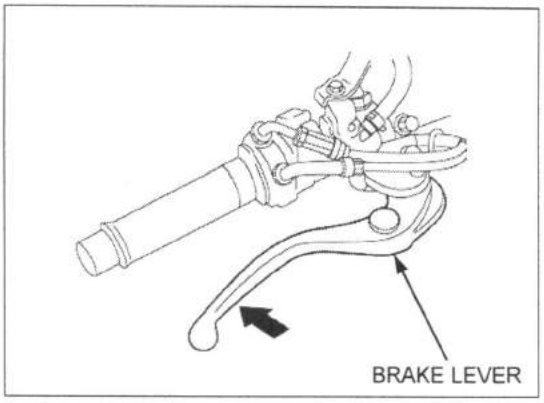
Loosen the rear brake caliper bleed valve.



The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking four times.

Squeeze the front brake lever to operate the power unit motor pressurization.

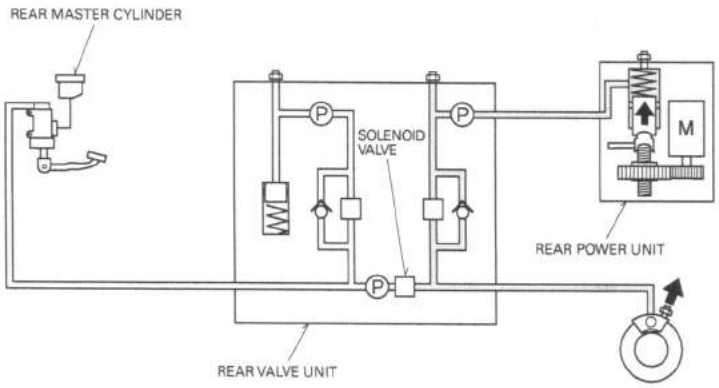
After the power unit motor operation, close the rear brake caliper bleed valve.



NOTE:

If the air bleeding process is suspended incompletely, perform the following procedures and re-start the air bleeding from the beginning.

- Turn the ignition switch OFF and disconnect the jumper wire.
- Turn the ignition switch ON and wait for initial operation (about five seconds), then turn the ignition switch OFF.
- Repeat above procedure five times to clear the detecting malfunction.

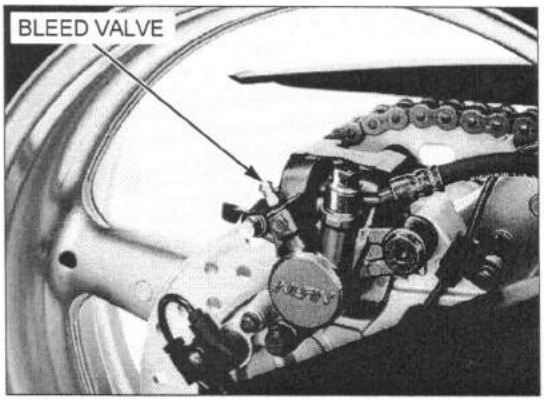


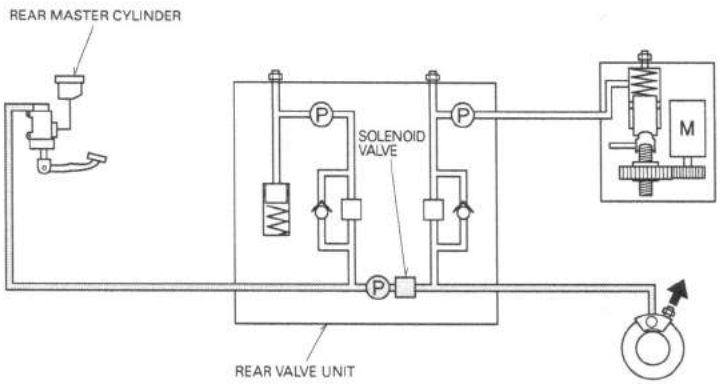
Bleed the air from the rear brake caliper bleed valve.

Perform the bleeding until the system is completely flushed/bled.

Tighten the caliper bleed valve to the specified torque.

TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

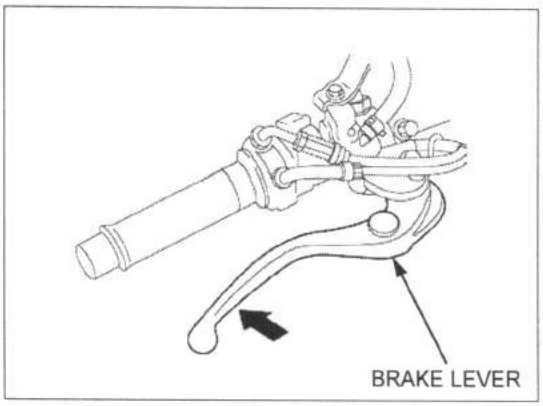




The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking five times.

Squeeze the front brake lever.

- After blinking five times, check that the Combined ABS indicator changes to long blinking.



5. Complete the inspection

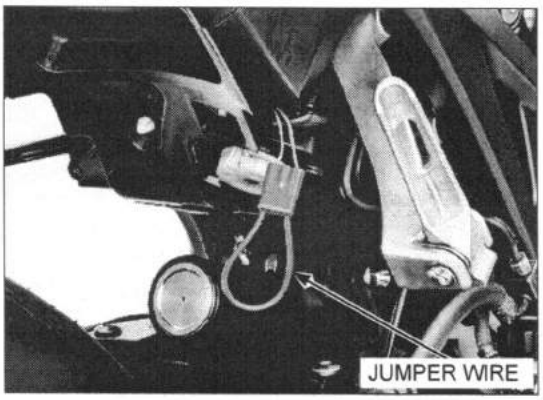
Turn the ignition switch OFF and disconnect the jumper wire.

Fill the reservoir to the upper level with DOT 4 brake fluid from a sealed container.

Install the removed parts in the reverse order of removal.

Perform the pre-start self-diagnosis and check the Combined ABS indicator (page 17-7).

Check that the brake operates normally with good response during the test-ride.



REAR ABS VALVE UNIT/POWER UNIT LINE AIR BLEEDING

NOTICE

Before Combined ABS line brake fluid air bleeding, check the battery condition (page 18-7).

NOTE:

- Do not turn the ignition switch OFF or disconnect the jumper wire during the air bleeding as this could cause the Combined ABS to malfunction.
  Once started, if the air bleeding procedure is not completed, re-start the air bleeding from the beginning.

1. Normal brake line air bleeding

Remove the fuel tank (page 6-60).

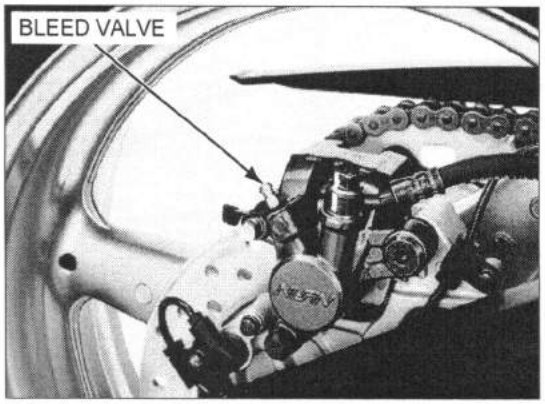
Open the fuse/relay box and remove the following fuse.

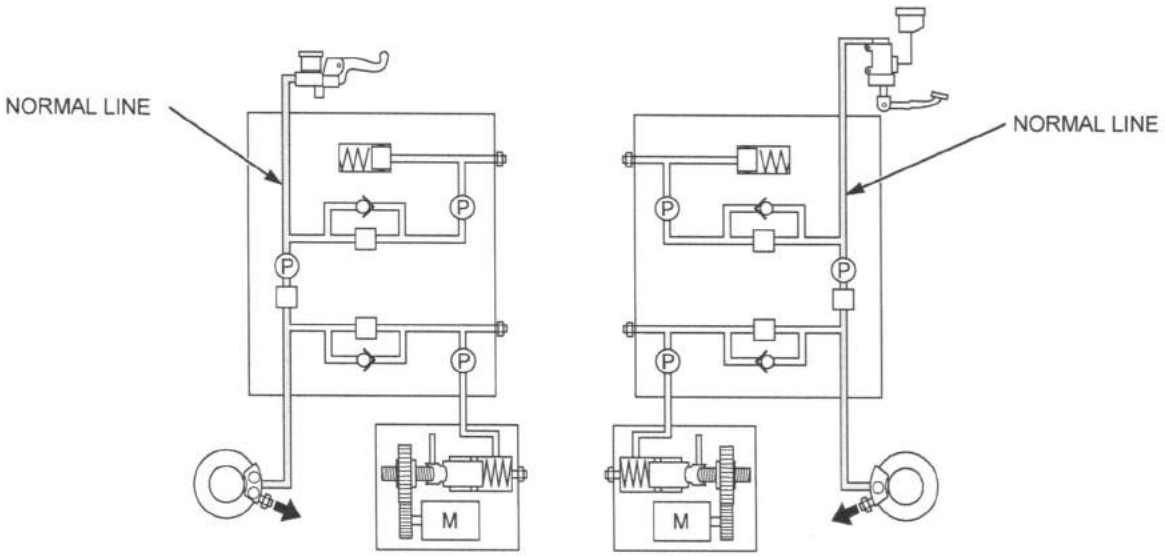
- H/LIGHT START 20 A
- STOP/HORN WINK RLY 10 A

Support the motorcycle in an upright position using a safety stand or equivalent.



Bleed the air from the front and rear normal hydraulic system (page 16-10).





2. Air bleeding mode activation

Turn the ignition switch OFF.

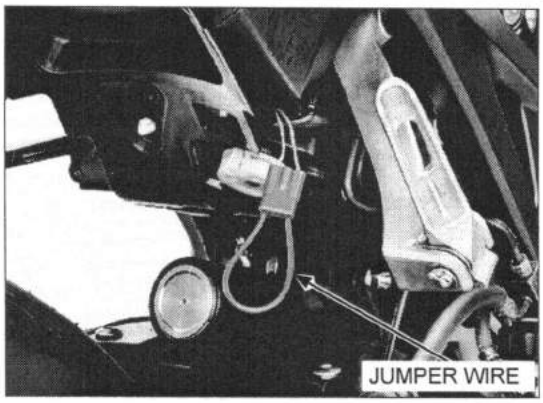
Always use an appropriate jumper wire to prevent damage to the connector terminals.

Remove the dummy connector and short the Combined ABS check connector terminals with a jumper wire.

Connection: Brown – Green

Switch to the rear Combined ABS line air bleeding mode as follows.

- Perform the following procedure within five seconds.



1. Turn the ignition switch ON while applying the rear brake pedal.

(Combined ABS indicator: ON)

2. Release the rear brake pedal.

(Combined ABS indicator: OFF)

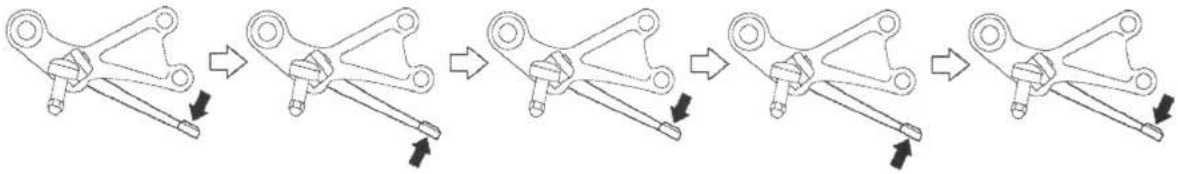
3. Reapply the rear brake pedal.

(Combined ABS indicator: ON)

4. Release the rear brake pedal.

(Combined ABS indicator: OFF)

5. Apply the rear brake pedal.



The motorcycle will now be in the rear Combined ABS line air bleeding mode, and the Combined ABS indicator will start blinking.

- If the indicator does not start blinking, turn off the ignition switch and try the above procedure again.

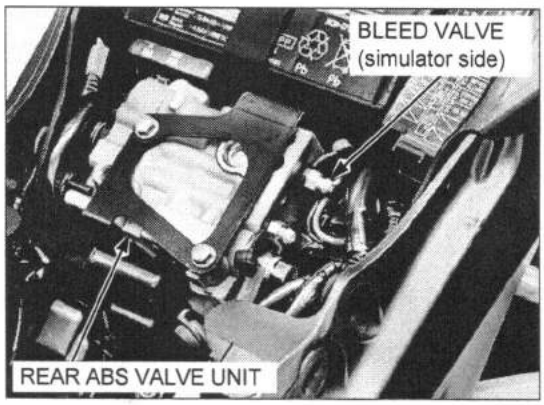
3. ABS valve unit line air bleeding

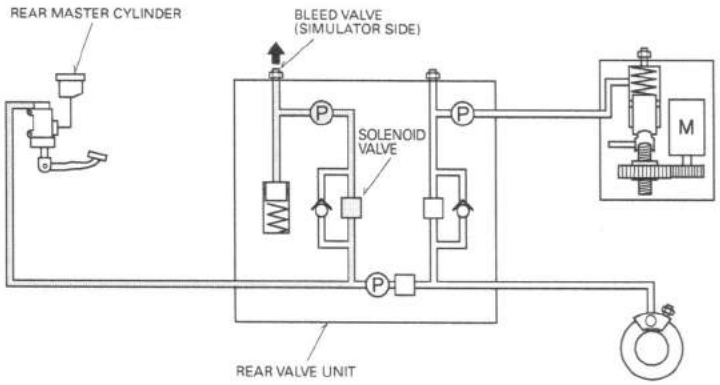
Bleed the air from the simulator side bleed valve of the rear ABS valve unit.

Perform the bleeding procedure until the system is completely flushed/bled.

Tighten the ABS valve unit bleed valve to the specified torque.

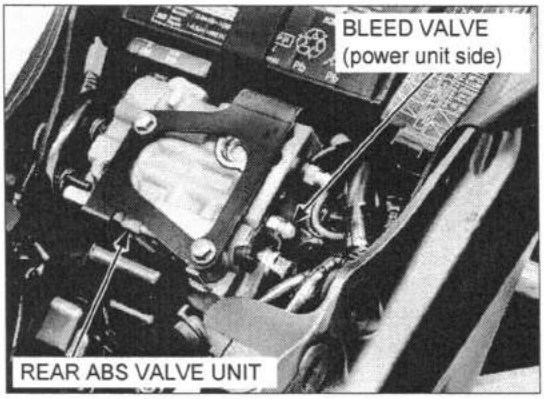
TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

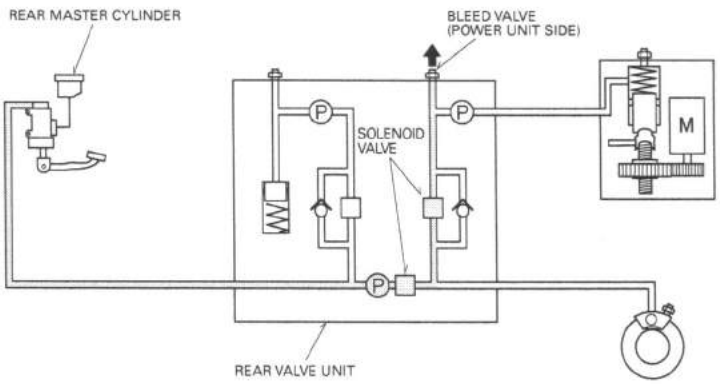




Bleed the air from the power unit side bleed valve of the rear ABS valve unit.

Perform the bleeding procedure until the system is completely flushed/bled.

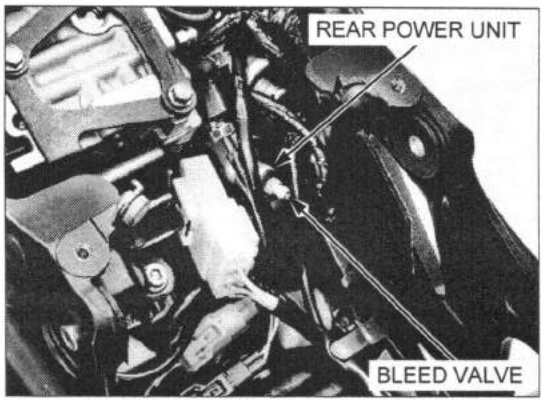


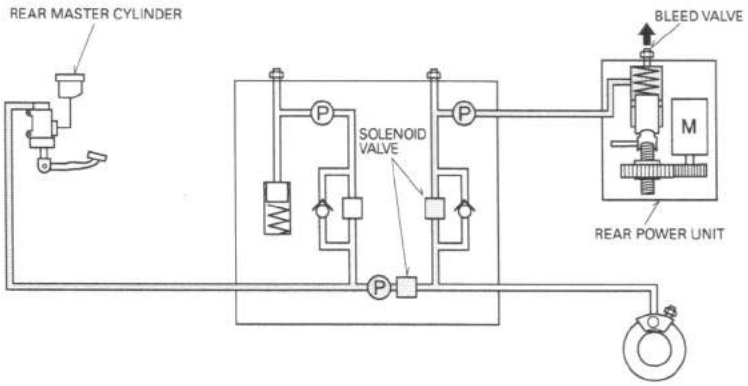


4. Power unit line air bleeding

Bleed the air from the power unit bleed valve.

Perform the bleeding procedure until the system is completely flushed/bled.

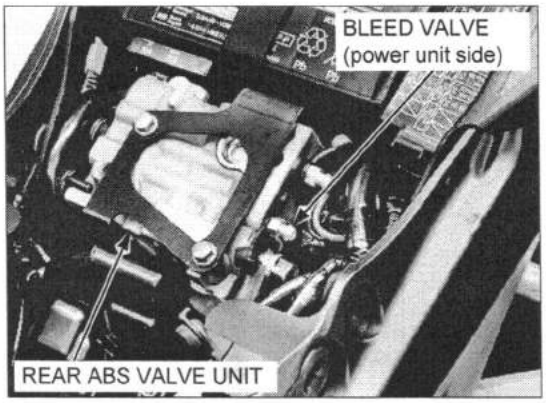


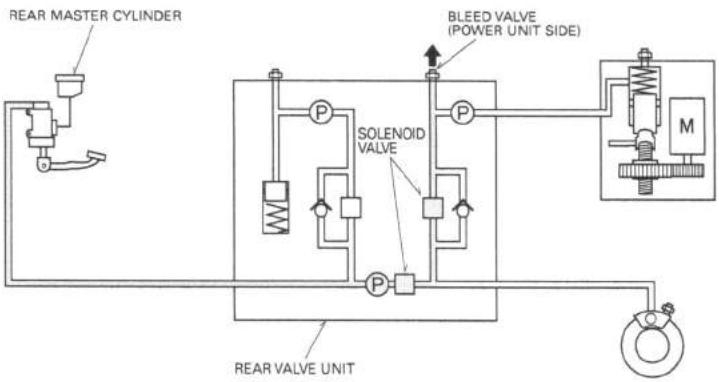


5. ABS valve unit line air bleeding

Bleed the air from the power unit side bleed valve of the rear ABS valve unit.

Perform the bleeding procedure until the system is completely flushed/bled.





6. One-way valve air bleeding (with motor activation)

The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking two times.

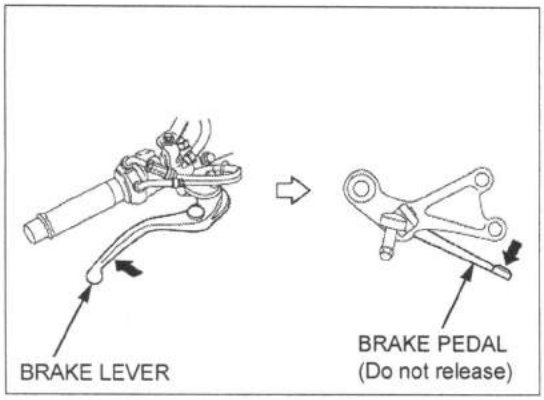
Squeeze the front brake lever.

Apply the rear brake pedal to operate the stroke simulator in the ABS valve unit.

Release the front brake lever.

NOTE:

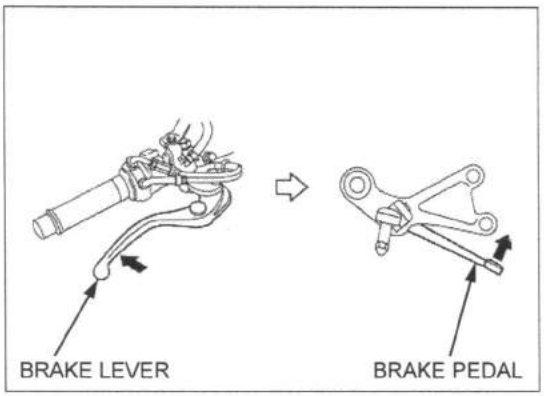
Don't release the rear brake pedal.



The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking three times.

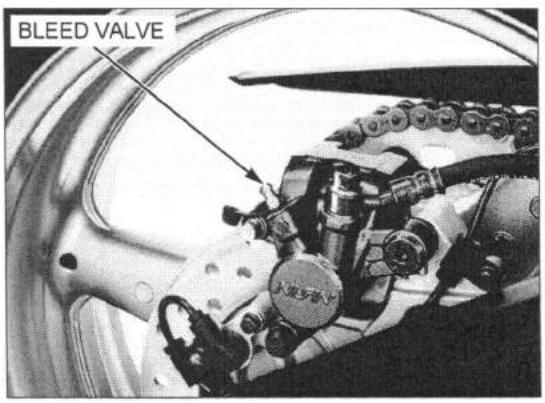
Squeeze the front brake lever.

Release the rear brake pedal.



Connect a clear bleed hose to the rear brake caliper bleed valve.

Loosen the rear brake caliper bleed valve.



The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking four times.

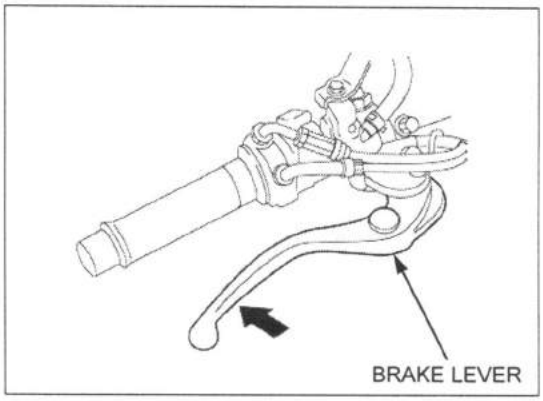
Squeeze the front brake lever to operate the power unit motor pressurization.

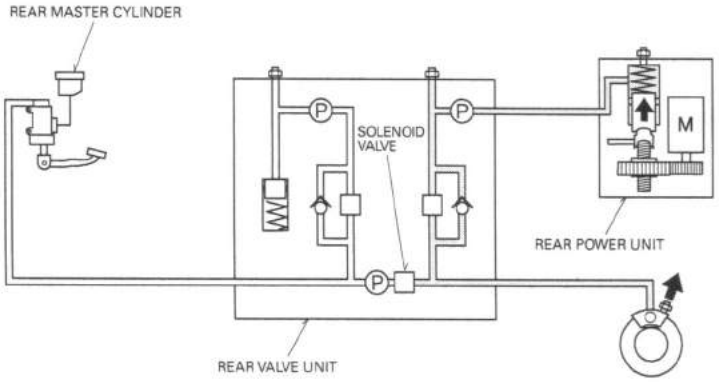
After the power unit motor operation, close the rear brake caliper bleed valve.

NOTE:

If the air bleeding process is suspended incompletely, perform the following procedures and re-start the air bleeding from the beginning.

- Turn the ignition switch OFF and disconnect the jumper wire.
- Turn the ignition switch ON and wait for initial operation (about five seconds), then turn the ignition switch OFF.
- Repeat above procedure five times to clear the detecting malfunction.





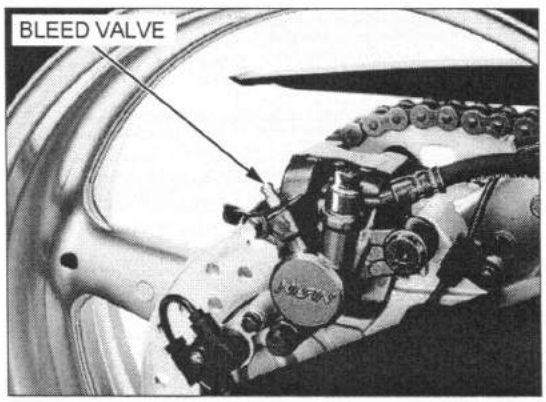
Bleed the air from the rear brake caliper bleed valve.

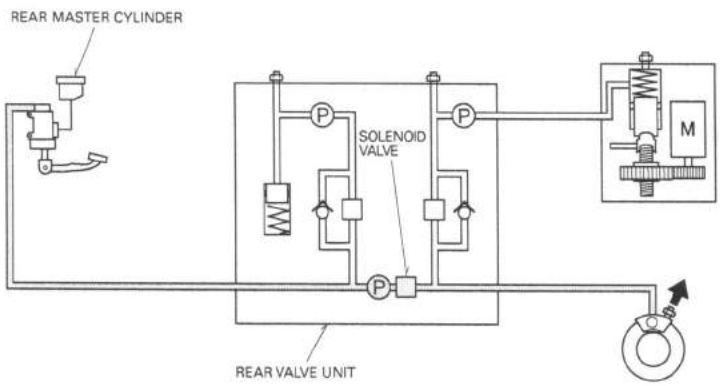
Perform the bleeding until the system is completely flushed/bled.

Operate the brake pedal. If it still feels spongy, bleed the system again.

Tighten the caliper bleed valve to the specified torque.

TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)





7. Air bleeding mode activation

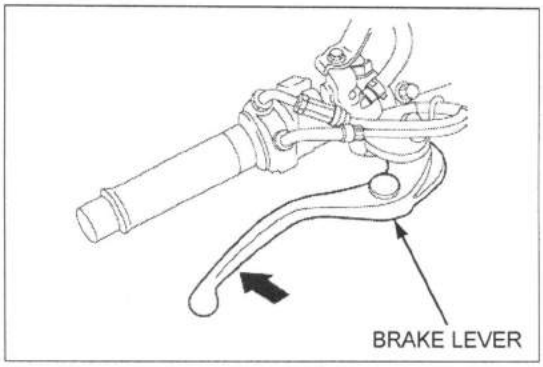
The system will then move to the next step in the procedure. The Combined ABS indicator will then begin blinking five times.

Squeeze the front brake lever.

- After blinking five times, check that the Combined ABS indicator changes to long blinking.

Turn the ignition switch OFF and restart the following procedure.

- Perform the following procedure within five seconds.



1. Turn the ignition switch ON while applying the rear brake pedal.

(Combined ABS indicator: ON)

2. Release the rear brake pedal.

(Combined ABS indicator: OFF)

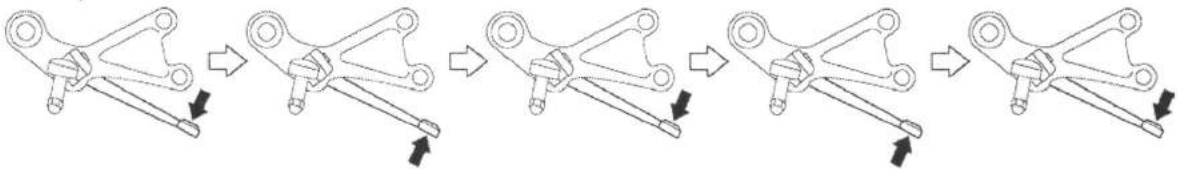
3. Reapply the rear brake pedal.

(Combined ABS indicator: ON)

4. Release the rear brake pedal.

(Combined ABS indicator: OFF)

5. Apply the rear brake pedal.



The motorcycle will now be in the rear Combined ABS line air bleeding mode, and the Combined ABS indicator will start blinking.

- If the indicator does not start blinking, turn off the ignition switch and try the above procedure again.

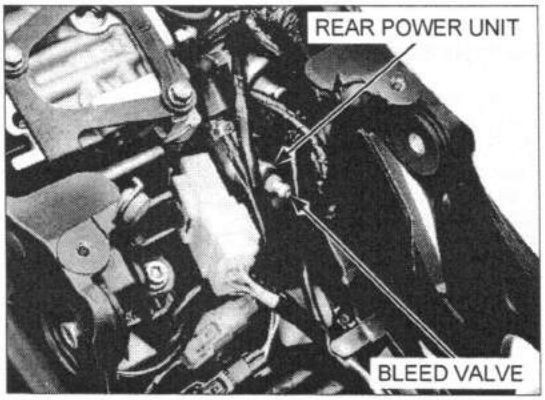
8. Power unit line air bleeding

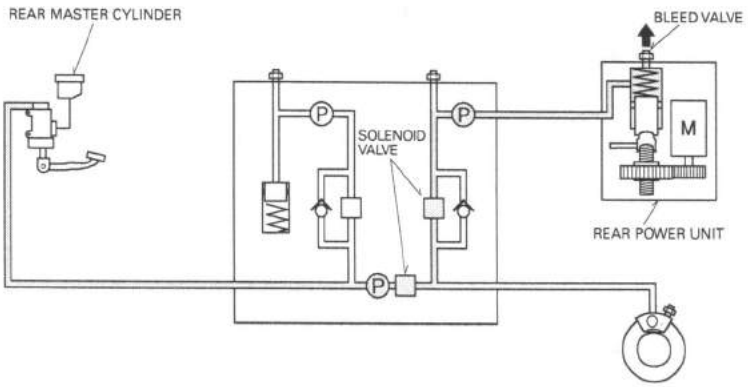
Bleed the air from the power unit bleed valve.

Perform the bleeding until the system is completely flushed/bled.

Tighten the power unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)





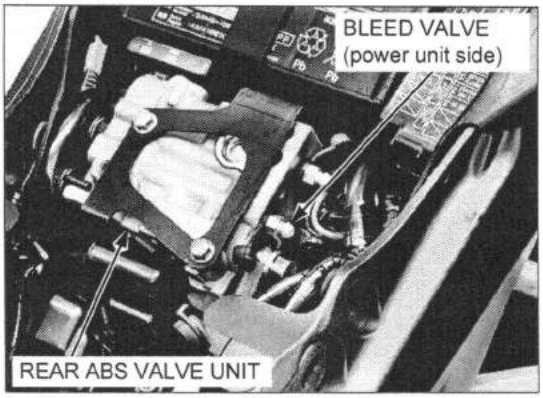
9. ABS valve unit line air bleeding

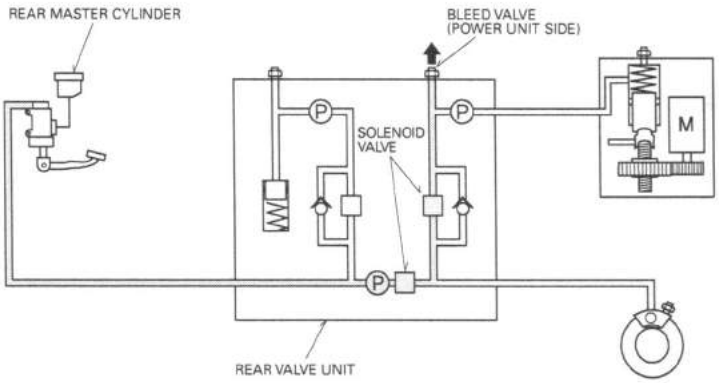
Bleed the air from the power unit side bleed valve of the rear ABS valve unit.

Perform the bleeding until the system is completely flushed/bled.

Tighten the ABS valve unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)





10. Completion inspection

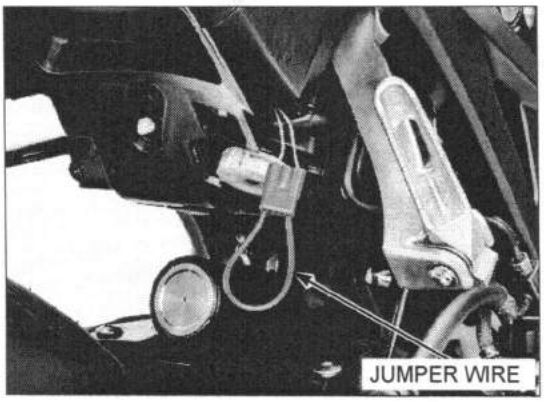
Turn the ignition switch OFF and disconnect the jumper wire.

Fill the reservoir to the upper level with DOT 4 brake fluid from a sealed container.

Install the removed parts in the reverse order of removal.

Perform the pre-start self-diagnosis and check the Combined ABS indicator (page 17-7).

Check that the brake operates normally with good response during the test-ride.



BRAKE FLUID REPLACEMENT/AIR BLEEDING (After '13 model ABS type)

NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

- Do not allow foreign material to enter the system when filling the reservoir.
- The brake fluid filling/air bleeding procedure of the ABS type is different from the conventional brake model. Always refer to the COMBINED ABS AIR BLEEDING INFORMATION (page 16-47) for ABS type before the brake fluid filling/air bleeding procedure.

BRAKE FLUID DRAINING

NOTE:

- Refer to conventional brake system for the draining procedure (page 16-9).
  However, drain the system until sufficient amount of the fluid flows out from the bleed valve(s). Draining out the fluid completely will cause getting any air into the system.
  In the fluid filling/air bleeding procedure, fill new brake fluid to drain the remaining fluid so that any air does not get into the system.

COMBINED ABS AIR BLEEDING INFORMATION

- Before performing the air bleeding, be sure to support the motorcycle in an upright position using a safety stand or equivalent. Supporting with the sidestand will be impossible to bleed the air completely.
- Due to the various components of the Combined ABS, including the valve and power units and solenoids, the brake fluid passages are very complex. This complexity requires that together with normal brake line air bleeding procedures, the valve and power units must also be bled.
  The air bleeding procedures for the Combined ABS are very involved and include many steps. All the steps must be followed exactly and completely for proper bleeding.
  Always perform a brake inspection and test-ride after bleeding.
- Due to the by-wire nature of the Combined ABS, it may be difficult to feel if air is still in the system.
  For this reason it is important to perform a brake test and test-ride after brake system servicing.
- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
  If any air gets into the system during air bleeding, perform the air bleeding from the beginning.
- The air bleeding mode is activated by operation of the brake lever and pedal in a specific sequence.
  If the correct sequence is not followed, the procedure cannot be completed properly.
  Refer to the air bleeding procedure before starting the air bleeding and always check the Combined ABS indicator and an activation sound of the valve/power unit.

AIR BLEEDING OPERATION

The brake fluid filling/air bleeding procedures are different depending on the case of brake components disassembly.

- If there is any air in the normal brake line, there is a possibility that there is any air in the ABS valve unit line. Perform the ABS valve unit line air bleeding if any removal or disassembly of the normal brake line component has been done.
  – Front ABS valve unit line air bleeding (page 16-52)
  – Rear ABS valve unit line air bleeding (page 16-63)
- When the brake fluid is to be replaced, or if the ABS valve unit is removed even though the power unit is not removed, there is a possibility that air could get in the power unit line. Perform the both ABS valve unit and power unit line air bleeding.
  – Front ABS valve unit/power unit line air bleeding (page 16-57)
  – Rear ABS valve unit/power unit line air bleeding (page 16-68)

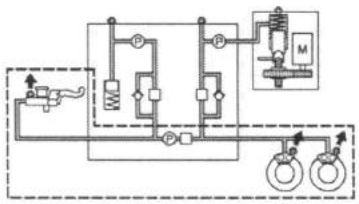
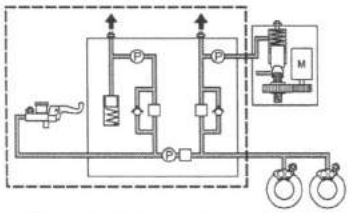
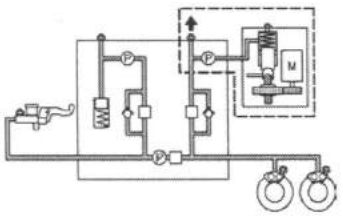
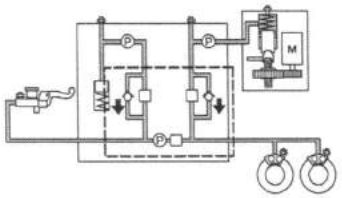
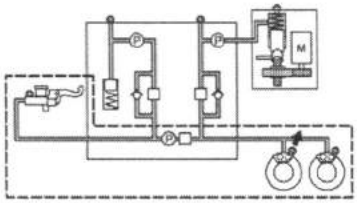
Refer to each procedure summary (page 16-48) before starting the air bleeding, and refer to the air bleeding procedure in the each brake fluid filling/bleeding.

BRAKE FLUID FILLING/AIR BLEEDING PROCEDURE SUMMARY

FRONT ABS VALVE UNIT LINE AIR BLEEDING

Removal/installation components:

- Seat (page 3-7)
- Left rear under cover (page 3-24)
- EGCA cover (page 6-90)
- Fuses (HEADLIGHT 20 A, STOP/HORN/WINK RLY 10 A)

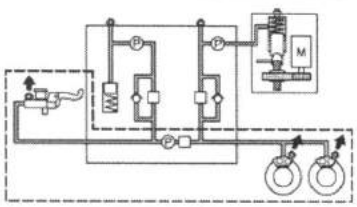
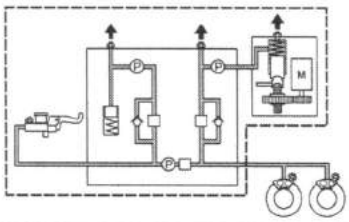
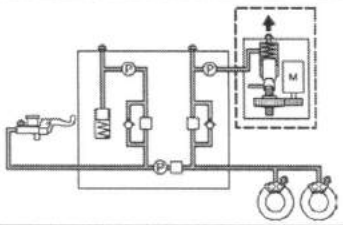
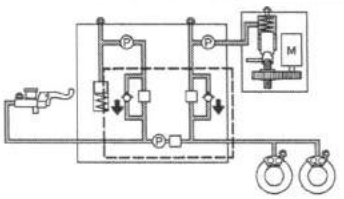
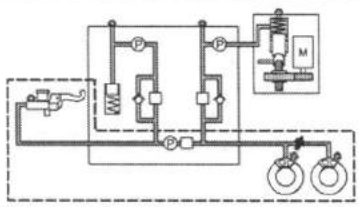
Procedure	Indicator	Description	Air Bleeding Line
1. Normal brake line air bleeding (page 16-52)	–	• Air bleeding at master cylinder and caliper bleed valves	
2. Combined ABS air bleeding mode activation (page 16-53)	–	• Air bleeding mode signal input	–
3. ABS valve unit line air bleeding (page 16-53)	Long blinking	• Air bleeding at following bleed valves 1. Valve unit bleed valve (simulator side) 2. Valve unit bleed valve (power unit side)	
4. Power unit line air bleeding (with Brake-by-Wire moving) (page 16-54)	Short blinking	• Air bleeding mode shifting • Air bleeding at valve unit bleed valve (power unit side)	
5. One-way valve air bleeding (with motor operation) (page 16-55)	Twice blinking	• Air bleeding mode shifting • Stroke simulator compressing	
	3 time blinking	• Stroke simulator and modulator piston pressurized motion • Air bleeding out of one-way valves (inside valve unit)	
6. Normal brake line air bleeding (page 16-56)	4 time blinking	• Air bleeding at right caliper bleed valve	
7. Power unit control motor operation (system finishes air bleeding mode) (page 16-56)	Go off*	• Air bleeding mode shifting • Modulator piston move back motion	–
8. Completion inspection (page 16-57)	–	• Test-ride for brake operation	–

* The indicator will be long twice blinking when the air bleeding mode is finished.

FRONT ABS VALVE UNIT/POWER UNIT LINE AIR BLEEDING

Removal/installation components:

- Seat (page 3-7)
- Left rear under cover (page 3-24)
- Front power unit heat guard (page 17-57)
- EGCA cover (page 6-90)
- Fuses (HEADLIGHT 20 A, STOP/HORN/WINK RLY 10 A)

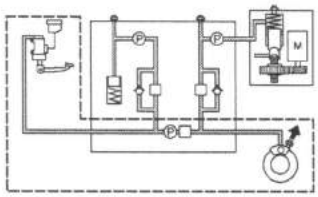
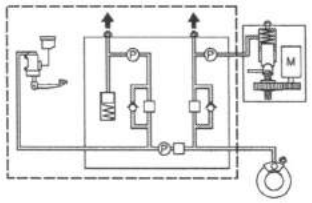
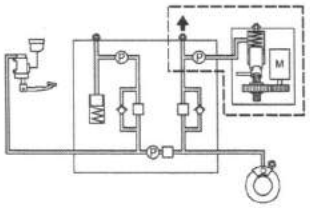
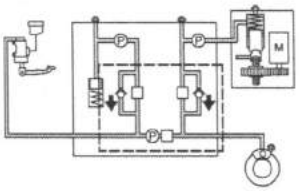
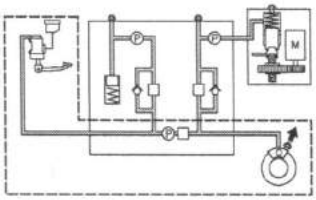
Procedure	Indicator	Description	Air Bleeding Line
1. Normal brake line air bleeding (page 16-58)	–	• Air bleeding at master cylinder and caliper bleed valves	
2. Combined ABS air bleeding mode activation (page 16-58)	–	• Air bleeding mode signal input	–
3. ABS valve unit/power unit line air bleeding (page 16-59)	Long blinking	• Air bleeding at following bleed valves 1. Valve unit bleed valve (simulator side) 2. Valve unit bleed valve (power unit side) 3. Power unit bleed valve	
4. Power unit internal air bleeding (with Brake-by-Wire moving) (page 16-60)	Short blinking	• Air bleeding mode shifting • Air bleeding at power unit bleed valve	
5. One-way valve air bleeding (with motor operation) (page 16-61)	Twice blinking	• Air bleeding mode shifting • Stroke simulator compressing	
	3 time blinking	• Stroke simulator and modulator piston pressurized motion • Air bleeding out of one-way valves (inside valve unit)	
6. Normal brake line air bleeding (page 16-62)	4 time blinking	• Air bleeding at right caliper bleed valve	
7. Power unit control motor operation (system finishes air bleeding mode) (page 16-62)	Go off*	• Air bleeding mode shifting • Modulator piston move back motion	–
8. Completion inspection (page 16-63)	–	• Test-ride for brake operation	–

* The indicator will be long twice blinking when the air bleeding mode is finished.

REAR ABS VALVE UNIT LINE AIR BLEEDING

Removal/installation components:

- Seat (page 3-7)
- EGCA cover (page 6-90)
- Fuses (HEADLIGHT 20 A, STOP/HORN/WINK RLY 10 A)

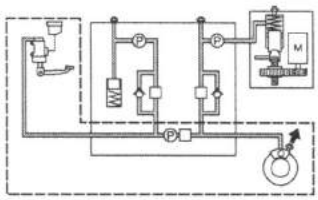
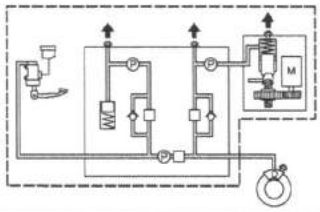
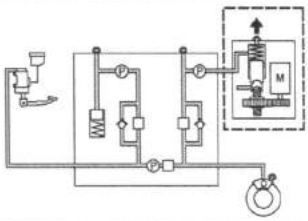
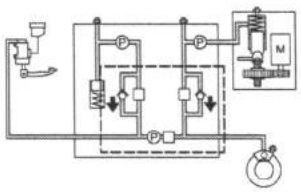
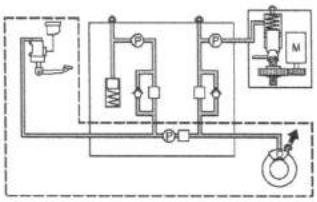
Procedure	Indicator	Description	Air Bleeding Line
1. Normal brake line air bleeding (page 16-63)	–	• Air bleeding at caliper bleed valve	
2. Combined ABS air bleeding mode activation (page 16-64)	–	• Air bleeding mode signal input	–
3. ABS valve unit line air bleeding (page 16-64)	Long blinking	• Air bleeding at following bleed valves 1. Valve unit bleed valve (simulator side) 2. Valve unit bleed valve (power unit side)	
4. Power unit line air bleeding (with Brake-by-Wire moving) (page 16-65)	Short blinking	• Air bleeding mode shifting • Air bleeding at valve unit bleed valve (power unit side)	
5. One-way valve air bleeding (with motor operation) (page 16-66)	Twice blinking	• Air bleeding mode shifting • Stroke simulator compressing	
	3 time blinking	• Stroke simulator and modulator piston pressurized motion • Air bleeding out of one-way valves (inside valve unit)	
6. Normal brake line air bleeding (page 16-67)	4 time blinking	• Air bleeding at caliper bleed valve	
7. Power unit control motor operation (system finishes air bleeding mode) (page 16-67)	Go off*	• Air bleeding mode shifting • Modulator piston move back motion	–
8. Completion inspection (page 16-68)	–	• Test-ride for brake operation	–

* The indicator will be long twice blinking when the air bleeding mode is finished.

REAR ABS VALVE UNIT/POWER UNIT LINE AIR BLEEDING

Removal/installation components:

- Fuel tank (page 6-60)
- EGCA cover (page 6-90)
- Fuses (HEADLIGHT 20 A, STOP/HORN/WINK RLY 10 A)

Procedure	Indicator	Description	Air Bleeding Line
1. Normal brake line air bleeding (page 16-68)	–	• Air bleeding at caliper bleed valve	
2. Combined ABS air bleeding mode activation (page 16-69)	–	• Air bleeding mode signal input	–
3. ABS valve unit/power unit line air bleeding (page 16-69)	Long blinking	• Air bleeding at following bleed valves 1. Valve unit bleed valve (simulator side) 2. Valve unit bleed valve (power unit side) 3. Power unit bleed valve	
4. Power unit internal air bleeding (with Brake-by-Wire moving) (page 16-70)	Short blinking	• Air bleeding mode shifting • Air bleeding at power unit bleed valve	
5. One-way valve air bleeding (with motor operation) (page 16-71)	Twice blinking	• Air bleeding mode shifting • Stroke simulator compressing	
	3 time blinking	• Stroke simulator and modulator piston pressurized motion • Air bleeding from one-way valves (inside the valve unit)	
6. Normal brake line air bleeding (page 16-72)	4 time blinking	• Air bleeding at caliper bleed valve	
7. Power unit control motor operation (system finishes air bleeding mode) (page 16-72)	Go off*	• Air bleeding mode shifting • Modulator piston move back motion	–
8. Completion inspection (page 16-73)	–	• Test-ride for brake operation	–

* The indicator will be long twice blinking when the air bleeding mode is finished.

FRONT ABS VALVE UNIT LINE AIR BLEEDING

NOTICE

Before Combined ABS line brake fluid air bleeding, check the battery condition (page 18-7).

NOTE:

- Do not turn the ignition switch OFF or disconnect the jumper wire during the air bleeding as this could cause the Combined ABS to malfunction.
  Once started, if the air bleeding procedure is not completed, re-start the air bleeding from the beginning.

Preparation

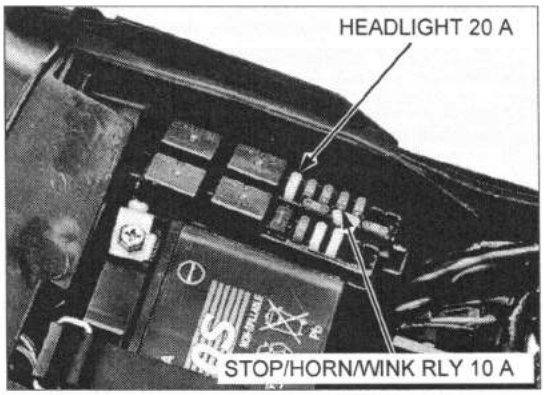
Remove the following:

- Seat (page 3-7)
- Left rear under cover (page 3-24)
- EGCA cover (page 6-90)

Open the fuse/relay box and remove the following fuses.

- HEADLIGHT 20 A
- STOP/HORN/WINK RLY 10 A

Support the motorcycle in an upright position using a safety stand or equivalent.



1. Normal brake line air bleeding

Fill and bleed the front hydraulic system (normal brake line) at the following bleed valves (page 16-10).

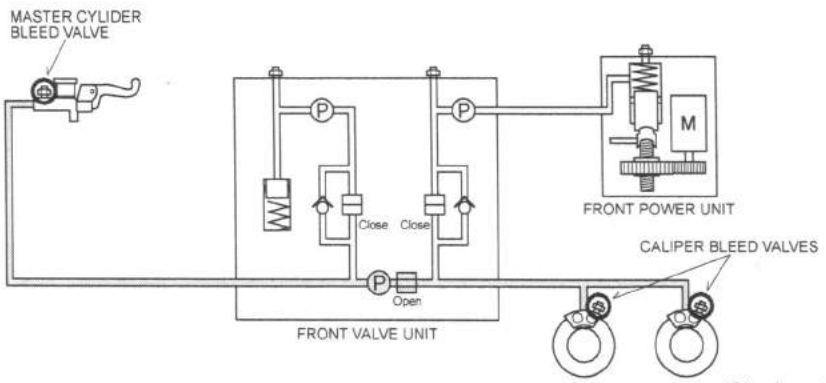
- front master cylinder bleed valve
- left and right front brake caliper bleed valves

Tighten the bleed valves on the master cylinder and left front brake caliper to the specified torque.

TORQUE:

Front master cylinder bleed valve:
5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Front brake caliper bleed valve:
8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)



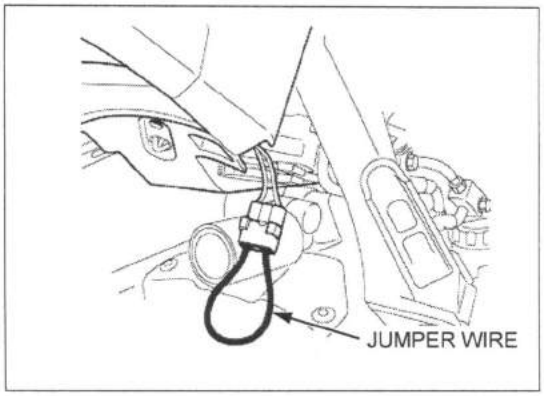
(Shadowed area: Fluid flow line)

2. Combined ABS air bleeding mode activation

Remove the dummy connector.

Short the Combined ABS check connector terminals with a jumper wire with the ignition switch turned OFF.

Connection: Brown – Green



Activate the front Combined ABS line air bleeding mode as follows.

NOTE:

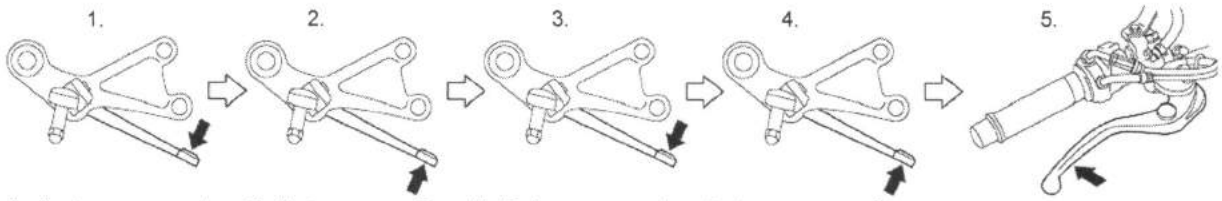
- Perform the following procedure within 5 seconds.

1. Turn the ignition switch ON while applying the brake pedal.
2. Release the brake pedal.
3. Apply the brake pedal.
4. Release the brake pedal.
5. Apply the brake lever to select the front Combined ABS line (it squeezes all the way), and release it.

The Combined ABS indicator will start long blinking.

The system will now be in the air bleeding mode, that is a state in which all the brake lines are connected by opening all the solenoid valves.

If the indicator does not start blinking, turn the ignition switch OFF and try the above procedure again.



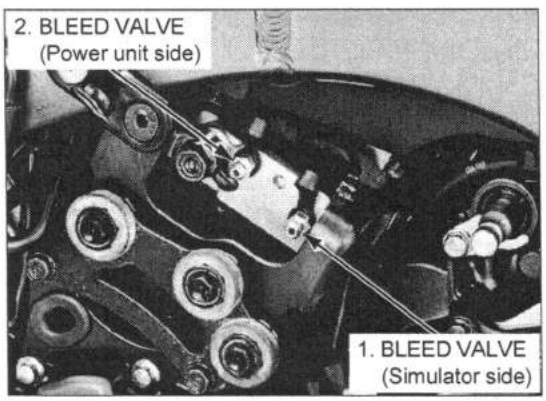
3. ABS valve unit line air bleeding

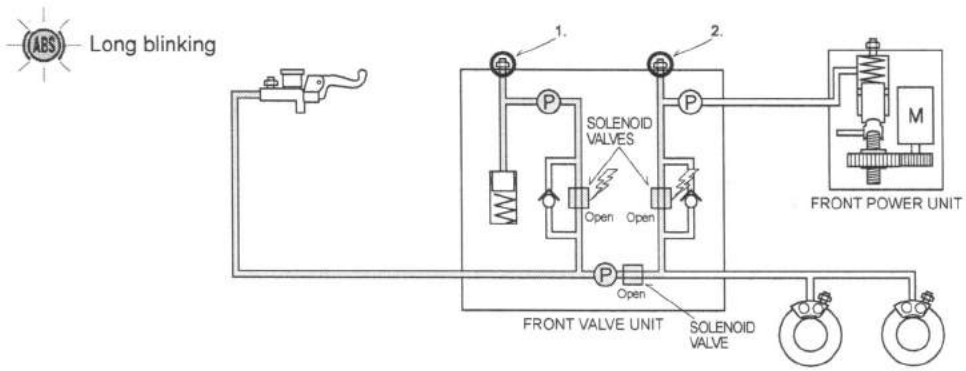
The Combined ABS indicator; long blinking:

In the same manner as in the conventional air bleeding procedure, bleed air at each bleed valve of the front ABS valve unit in the following sequence:

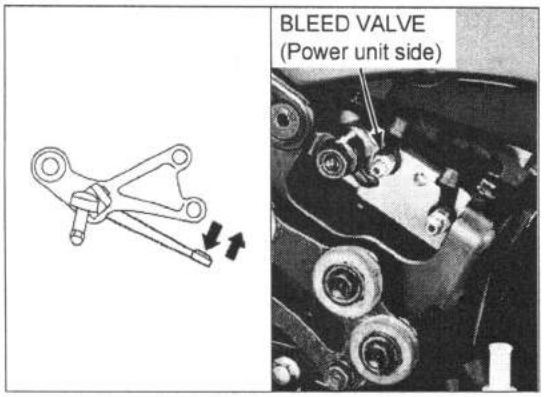
1. Valve unit bleed valve (simulator side)
2. Valve unit bleed valve (power unit side)

Perform the bleeding until the system is completely flushed/bled.





4. Power unit line air bleeding (with Brake-by-Wire moving)



The Combined ABS indicator will turn to short blinking after shifting the mode.

Apply the brake pedal once and release it (to shift the air bleeding mode).

NOTE:

- In this mode, the modulator piston in the power unit operates to pressure when squeezing the lever, and it returns when releasing the lever.
- Do not use a brake bleeder tool in this procedure.

Perform the following procedures (step 1 and 2) at least 3 times.

Do not loosen the bleed valve if the lever feels spongy.

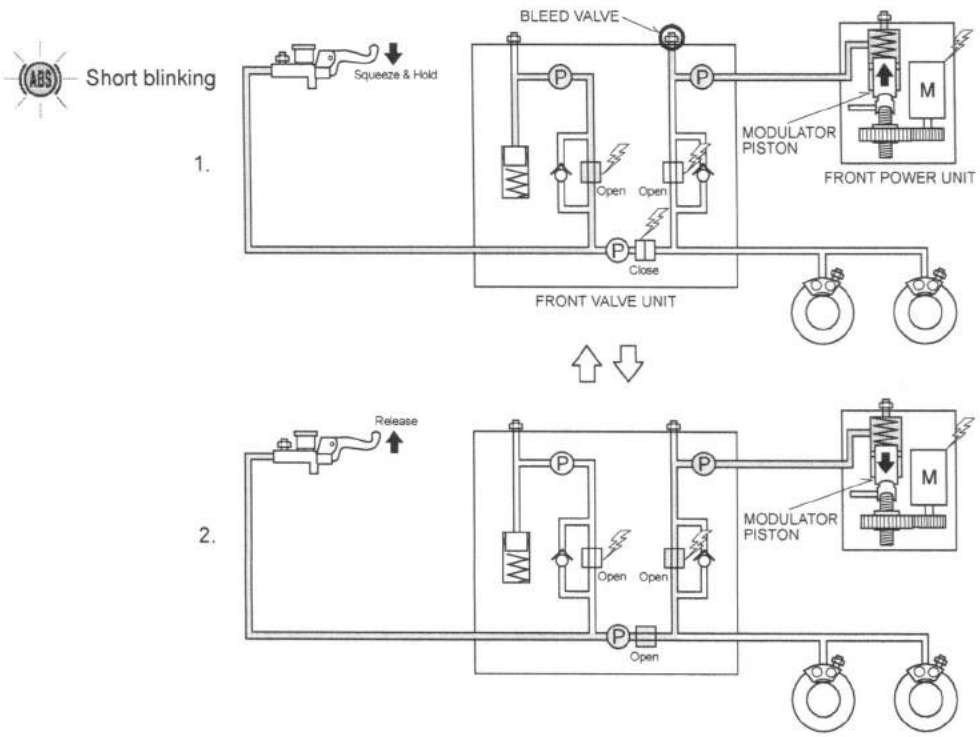
1. Squeeze the brake lever and hold it (check that it resistance is felt).
   The modulator piston moves forward to pressure the fluid at this time. Loosen the valve unit bleed valve (power unit side) 1/4 turn to flow out the fluid, then close it.
2. After closing the bleed valve, release the brake lever and wait for 7 seconds.
   The modulator piston moves backward to feed in the fluid.

NOTE:

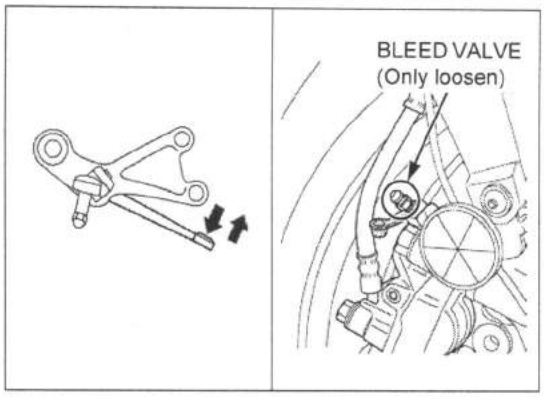
- The backward motion of the modulator piston requires 7 seconds. You do not operate the lever and bleed valve during this motion (i.e. motor operation). Also, make sure that 7 seconds have elapsed (feeding in motion is completed) before proceeding to the next procedure.
- When the lever feels spongy after performing step 2, the bleed valve must not be loosened because the modulator piston is still backward (feeding in). In this case, release the lever and wait 7 seconds, and try again.

Tighten the valve unit bleed valves to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



5. One-way valve air bleeding (with motor operation)



The Combined ABS indicator will turn to twice blinking after shifting the mode.

Apply the brake pedal once and release it (to shift the air bleeding mode).

Loosen the bleed valve on the right front brake caliper 1/4 turn.

The Combined ABS indicator will turn to 3 time blinking after shifting the mode.

Squeeze the brake lever strongly (to compress the stroke simulator in the valve unit, and to shift the air bleeding mode).

NOTE:

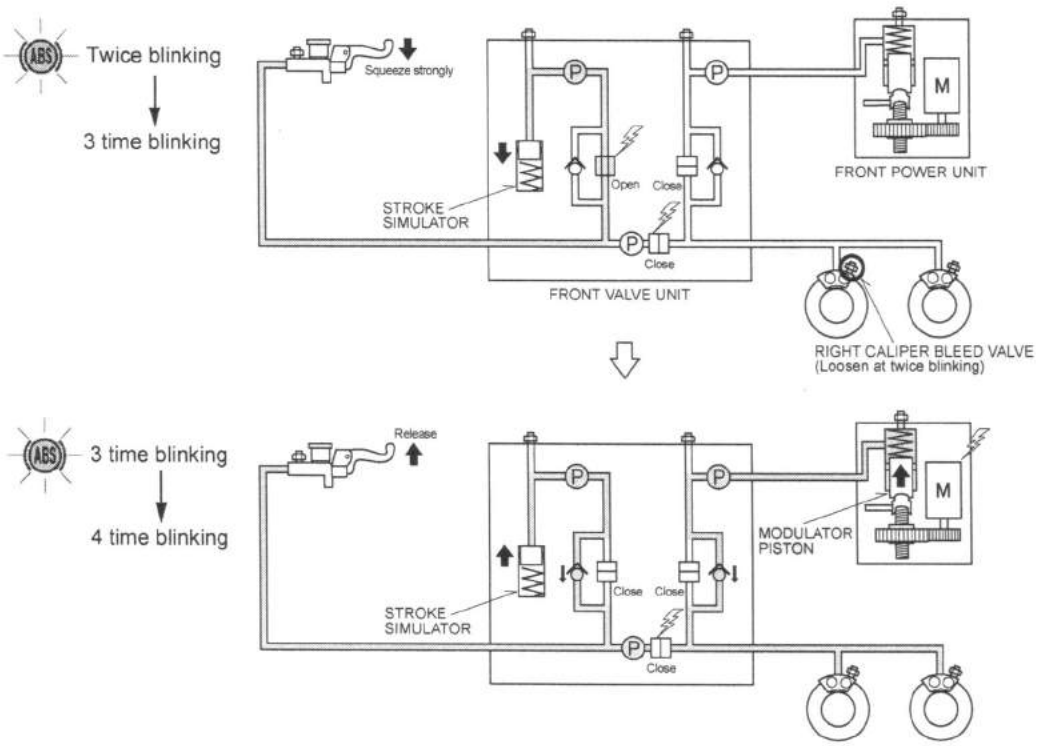
- Be sure to squeeze the lever strongly until the indicator is 3 time blinking. If not, the system will not shift the mode (not start 3 time blinking).

The indicator shows 3 time blinking and then release the brake lever.

NOTE:

The Combined ABS indicator will turn to 4 time blinking automatically after operating the motor.

- The stroke simulator and the modulator piston operate to pressure since releasing the lever. Thereby any trapped air around the one-way valves forces out to the normal brake line (caliper side).



6. Normal brake line air bleeding

The Combined ABS indicator; 4 time blinking:

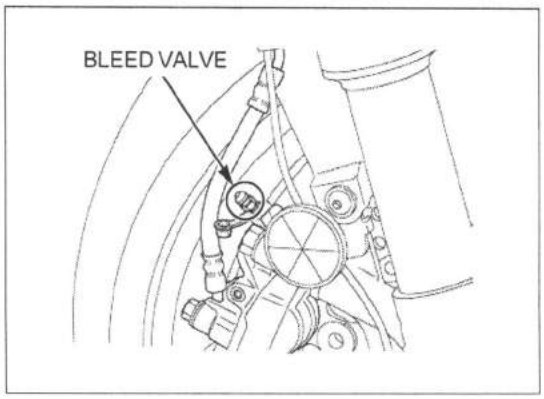
Bleed the normal brake line at the right front brake caliper bleed valve in the same manner as in the conventional air bleeding procedure.

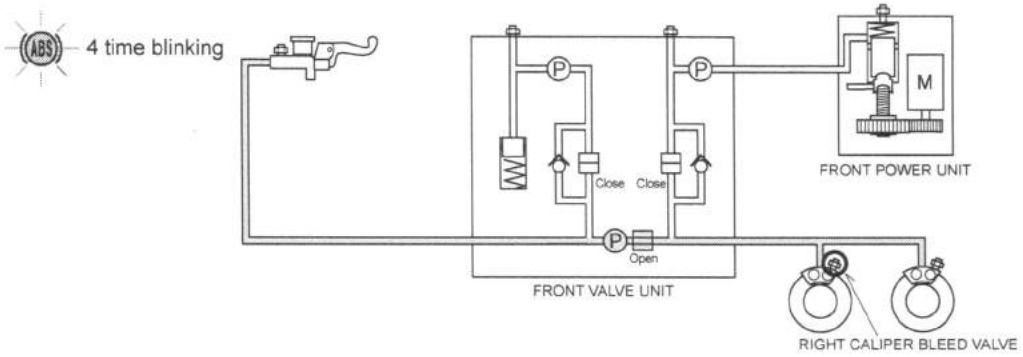
NOTE:

- The forced out air out of the one-way valves in the previous procedure is bleeding from the caliper bleed valve with this operation.

Tighten the caliper bleed valve to the specified torque.

TORQUE: 8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)





7. Power unit control motor operation (system finishes air bleeding mode)

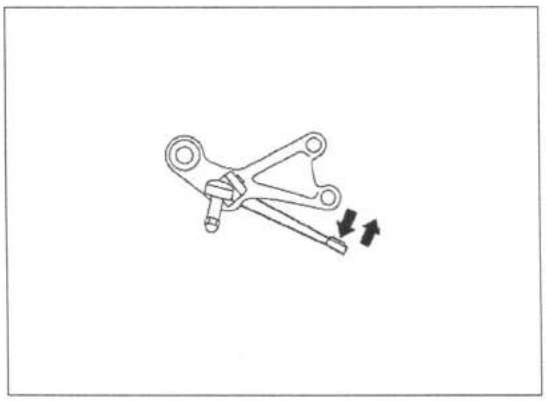
The Combined ABS indicator will go off after shifting the mode.

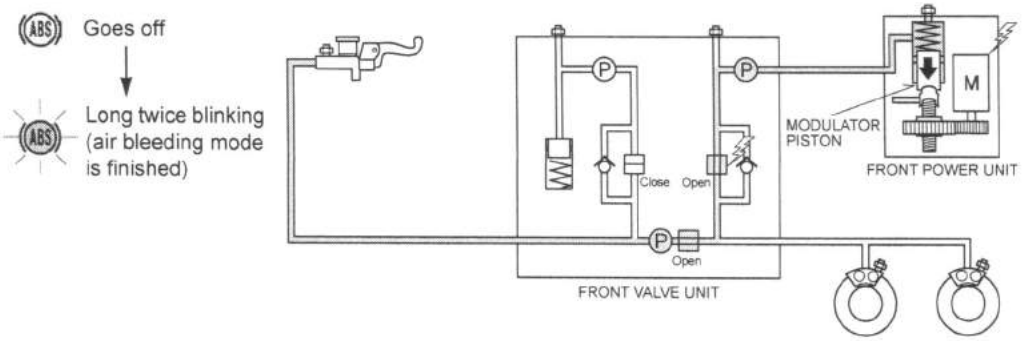
Be sure to tighten all the bleed valves (5 places), and apply the brake pedal once and release it (to shift the air bleeding mode).

The control motor operates to return the modulator piston in place with the brake fluid feeding in.

Then, the system stops and Combined ABS indicator blinks long twice repeatedly, indicating that the air bleeding mode is finished.

Turn the ignition switch OFF (to complete the air bleeding procedure).





8. Completion inspection

Remove the jumper wire.

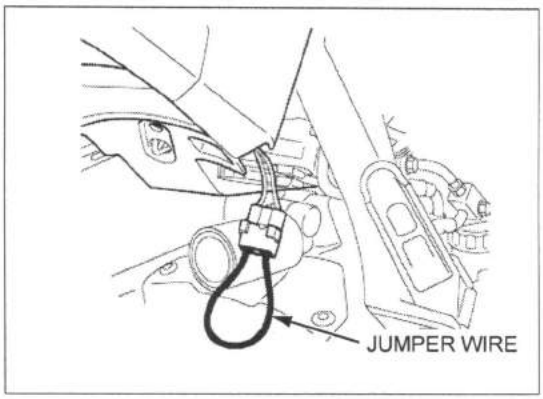
Fill the reserve tank to the upper level line with DOT 4 brake fluid from a sealed container.

Install the reserve tank cap, stopper plate and tighten the screw to the specified torque.

TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)

Install the removed parts in the reverse order of removal.

Perform the pre-start self-diagnosis to be sure that the Combined ABS indicator is operating normally (page 17-7).



Check that the brake operates normally with good response during the test-ride.

FRONT ABS VALVE UNIT/POWER UNIT LINE AIR BLEEDING

NOTICE

Before Combined ABS line brake fluid air bleeding, check the battery condition (page 18-7).

NOTE:

- Do not turn the ignition switch OFF or disconnect the jumper wire during the air bleeding as this could cause the Combined ABS to malfunction.
  Once started, if the air bleeding procedure is not completed, re-start the air bleeding from the beginning.

Preparation

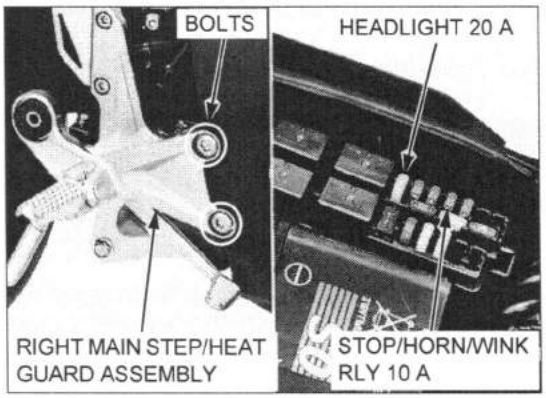
Remove the following:

- Seat (page 3-7)
- Left rear under cover (page 3-24)
- Front power unit heat guard (page 17-57)
- EGCA cover (page 6-90)

Keep the rear brake reservoir upright to prevent air from entering the hydraulic system.

Temporarily install the right main step/heat guard assembly and tighten the main step mounting bolts to the specified torque.

TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)



Open the fuse/relay box and remove the following fuses.

- HEADLIGHT 20 A
- STOP/HORN/WINK RLY 10 A

Support the motorcycle in an upright position using a safety stand or equivalent.

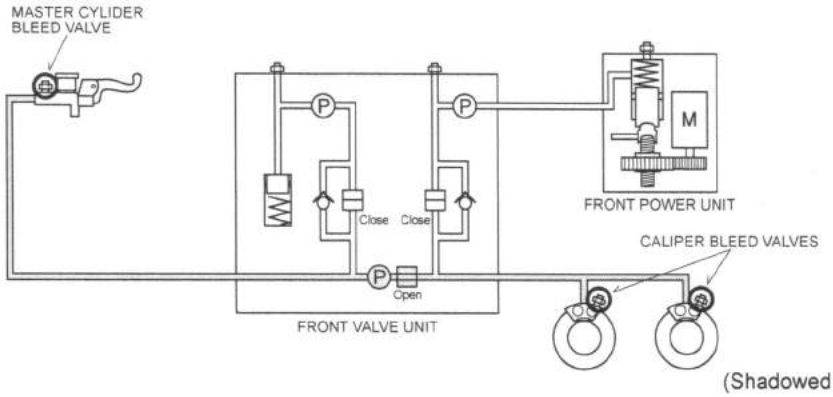
1. Normal brake line air bleeding

Fill and bleed the front hydraulic system (normal brake line) at the following bleed valves (page 16-10).

- front master cylinder bleed valve
- left and right front brake caliper bleed valves

Tighten the bleed valves on the master cylinder and left front brake caliper to the specified torque.

TORQUE:
Front master cylinder bleed valve:
5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)
Front brake caliper bleed valve:
8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)



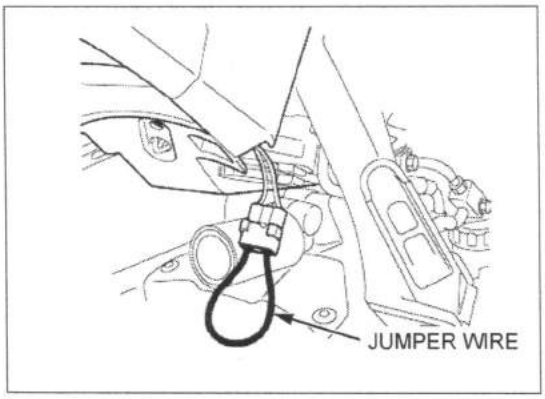
(Shadowed area: Fluid flow line)

2. Combined ABS air bleeding mode activation

Remove the dummy connector.

Short the Combined ABS check connector terminals with a jumper wire with the ignition switch turned OFF.

Connection: Brown – Green



Activate the front Combined ABS line air bleeding mode as follows.

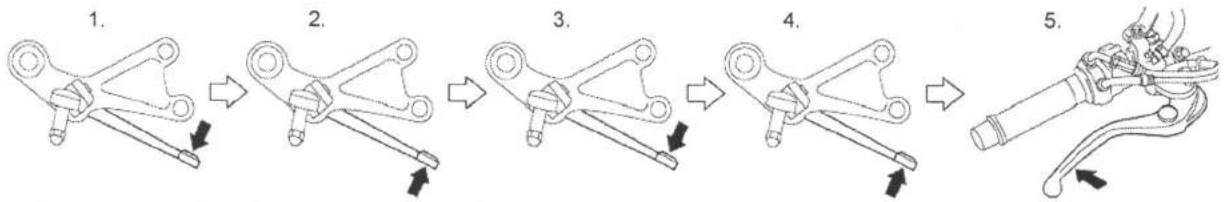
NOTE:
- Perform the following procedure within 5 seconds.

1. Turn the ignition switch ON while applying the brake pedal.
2. Release the brake pedal.
3. Apply the brake pedal.
4. Release the brake pedal.
5. Apply the brake lever to select the front Combined ABS line (it squeezes all the way), and release it.

The Combined ABS indicator will start long blinking.

The system will now be in the air bleeding mode, that is a state in which all the brake lines are connected by opening all the solenoid valves.

If the indicator does not start blinking, turn the ignition switch OFF and try the above procedure again.



3. ABS valve unit/power unit line air bleeding

The Combined ABS indicator; long blinking:

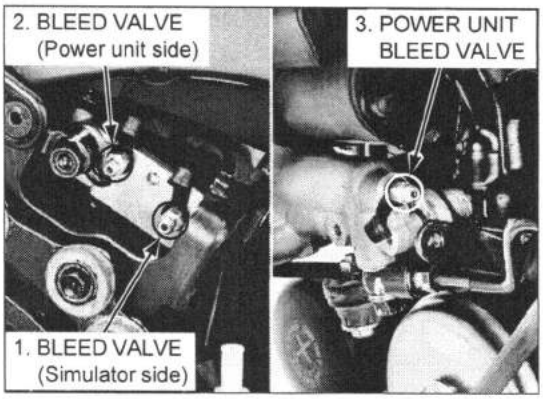
In the same manner as in the conventional air bleeding procedure, bleed air at each bleed valve in the following sequence:

1. Front ABS valve unit bleed valve (simulator side)
2. Front ABS valve unit bleed valve (power unit side)
3. Front power unit bleed valve

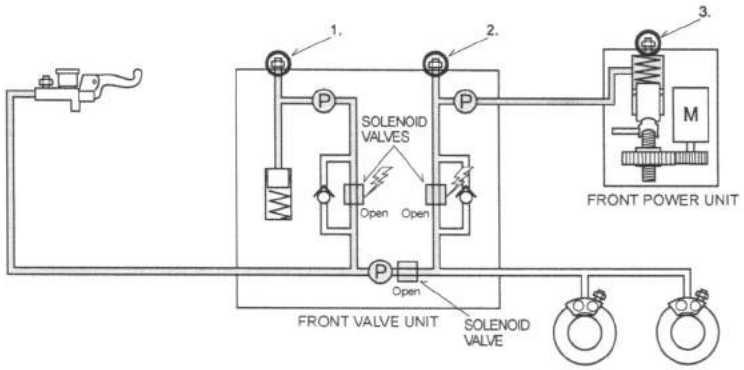
Perform the bleeding until the system is completely flushed/bled.

Tighten the bleed valves (1 and 2) on the valve unit to the specified torque.

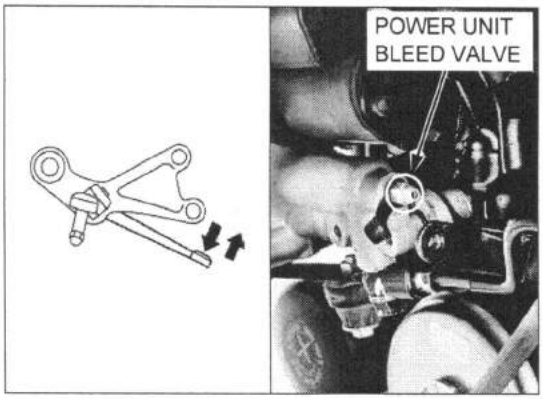
TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



Long blinking



4. Power unit internal air bleeding (with Brake-by-Wire moving)



The Combined ABS indicator will turn to short blinking after shifting the mode.

Apply the brake pedal once and release it (to shift the air bleeding mode).

NOTE:

- In this mode, the modulator piston in the power unit operates to pressure when squeezing the lever, and it returns when releasing the lever.
- Do not use a brake bleeder tool in this procedure.

Perform the following procedures (step 1 and 2) at least 3 times.

Do not loosen the bleed valve if the lever feels spongy.

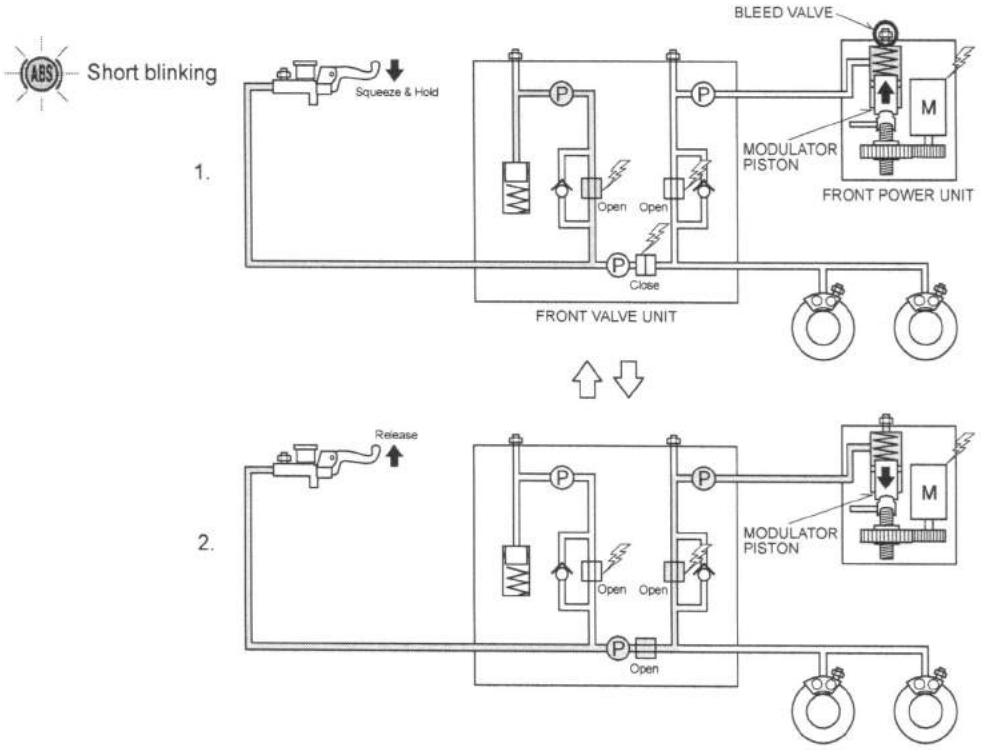
1. Squeeze the brake lever and hold it (check that it resistance is felt).
   The modulator piston moves forward to pressure the fluid at this time. Loosen the power unit bleed valve 1/4 turn to flow out the fluid, then close it.
2. After closing the bleed valve, release the brake lever and wait for 7 seconds.
   The modulator piston moves backward to feed in the fluid.

NOTE:

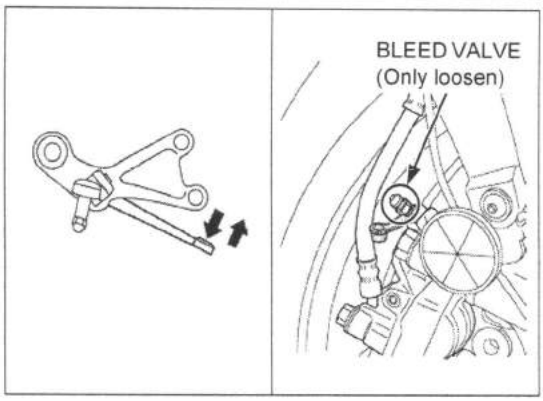
- The backward motion of the modulator piston requires 7 seconds. You do not operate the lever and bleed valve during this motion (i.e. motor operation). Also, make sure that 7 seconds have elapsed (feeding in motion is completed) before proceeding to the next procedure.
- When the lever feels spongy after performing step 2, the bleed valve must not be loosened because the modulator piston is still backward (feeding in). In this case, release the lever and wait 7 seconds, and try again.

Tighten the power unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



5. One-way valve air bleeding (with motor operation)



The Combined ABS indicator will turn to twice blinking after shifting the mode.

Apply the brake pedal once and release it (to shift the air bleeding mode).

Loosen the bleed valve on the right front brake caliper 1/4 turn.

The Combined ABS indicator will turn to 3 time blinking after shifting the mode.

Squeeze the brake lever strongly (to compress the stroke simulator in the valve unit, and to shift the air bleeding mode).

NOTE:

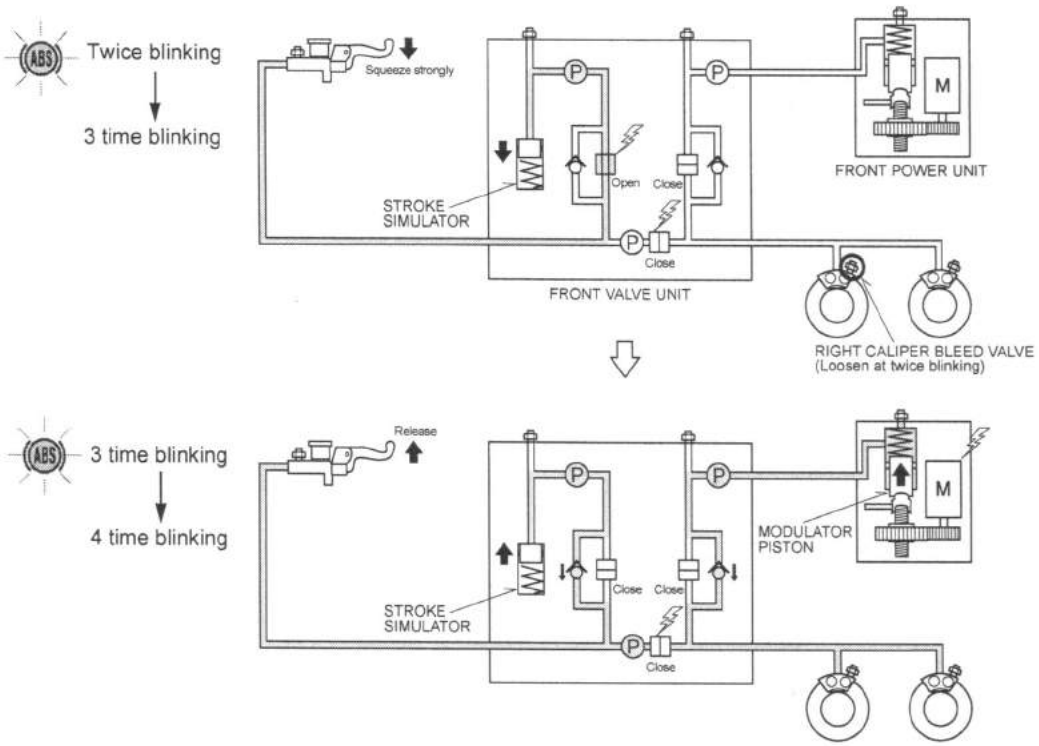
- Be sure to squeeze the lever strongly until the indicator is 3 time blinking. If not, the system will not shift the mode (not start 3 time blinking).

The indicator shows 3 time blinking and then release the brake lever.

NOTE:

The Combined ABS indicator will turn to 4 time blinking automatically after operating the motor.

- The stroke simulator and the modulator piston operate to pressure since releasing the lever. Thereby any trapped air around the one-way valves forces out to the normal brake line (caliper side).



6. Normal brake line air bleeding

The Combined ABS indicator; 4 time blinking:

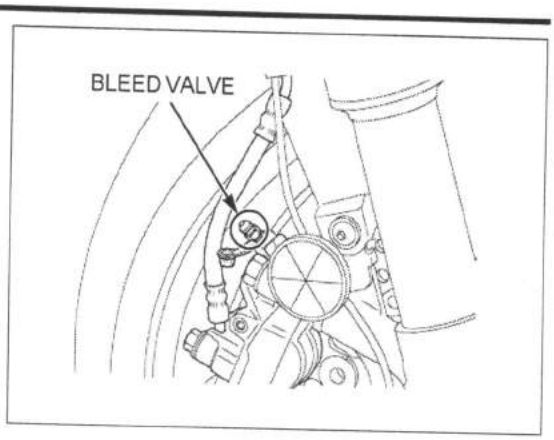
Bleed the normal brake line at the right front brake caliper bleed valve in the same manner as in the conventional air bleeding procedure.

NOTE:

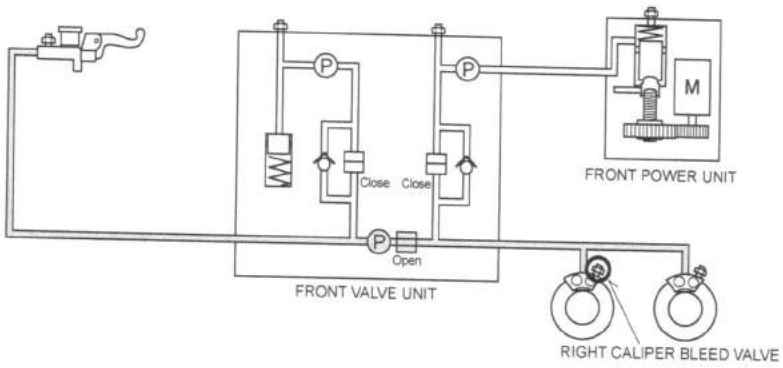
- The forced out air out of the one-way valves in the previous procedure is bleeding from the caliper bleed valve with this operation.

Tighten the caliper bleed valve to the specified torque.

TORQUE: 8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)



4 time blinking



7. Power unit control motor operation (system finishes air bleeding mode)

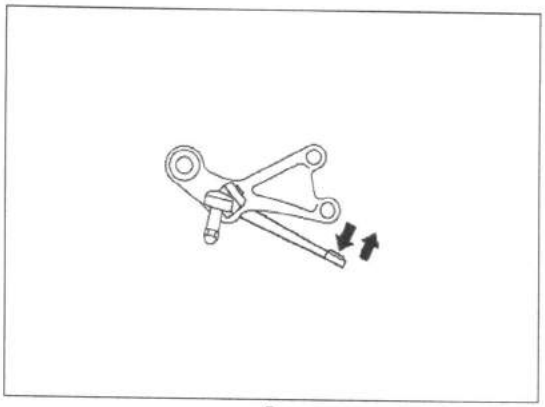
The Combined ABS indicator will go off after shifting the mode.

Be sure to tighten all the bleed valves (6 places), and apply the brake pedal once and release it (to shift the air bleeding mode).

The control motor operates to return the modulator piston in place with the brake fluid feeding in.

Then, the system stops and Combined ABS indicator blinks long twice repeatedly, indicating that the air bleeding mode is finished.

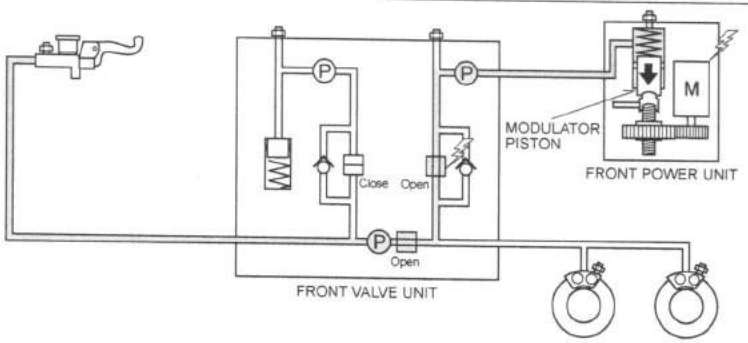
Turn the ignition switch OFF (to complete the air bleeding procedure).



Goes off

↓

Long twice blinking (air bleeding mode is finished)



8. Completion inspection

Remove the jumper wire.

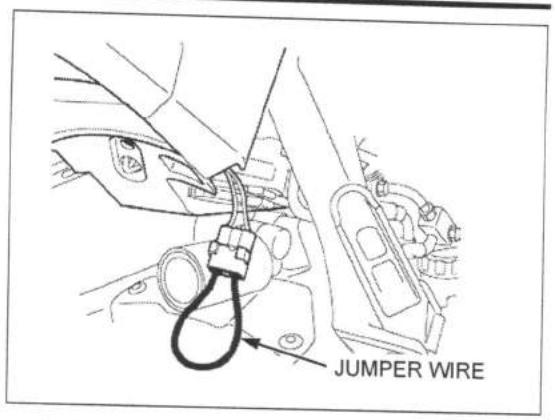
Fill the reserve tank to the upper level line with DOT 4 brake fluid from a sealed container.

Install the reserve tank cap, stopper plate and tighten the screw to the specified torque.

TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)

Install the removed parts in the reverse order of removal.

Perform the pre-start self-diagnosis to be sure that the Combined ABS indicator is operating normally (page 17-7).



Check that the brake operates normally with good response during the test-ride.

REAR ABS VALVE UNIT LINE AIR BLEEDING

NOTICE

Before Combined ABS line brake fluid air bleeding, check the battery condition (page 18-7).

NOTE:

- Do not turn the ignition switch OFF or disconnect the jumper wire during the air bleeding as this could cause the Combined ABS to malfunction.
  Once started, if the air bleeding procedure is not completed, re-start the air bleeding from the beginning.

Preparation

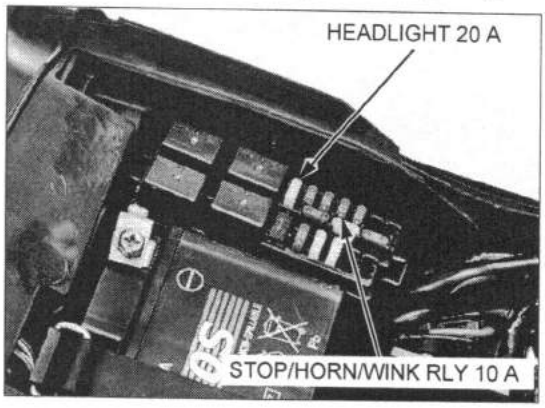
Remove the following;

- Seat (page 3-7)
- EGCA cover (page 6-90)

Open the fuse/relay box and remove the following fuses.

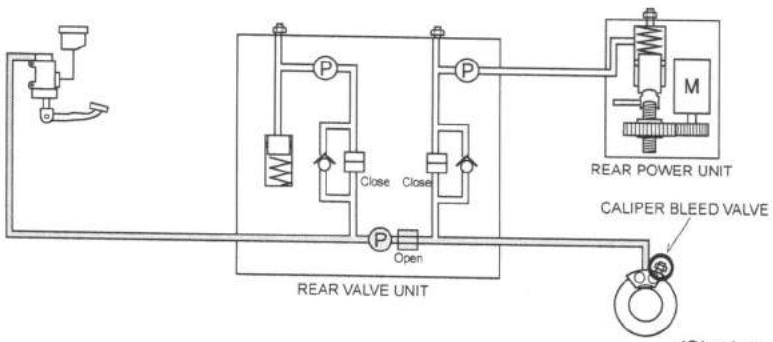
- HEADLIGHT 20 A
- STOP/HORN/WINK RLY 10 A

Support the motorcycle in an upright position using a safety stand or equivalent.



1. Normal brake line air bleeding

Fill and bleed the rear hydraulic system (normal brake line) at the rear brake caliper bleed valve (page 16-10).



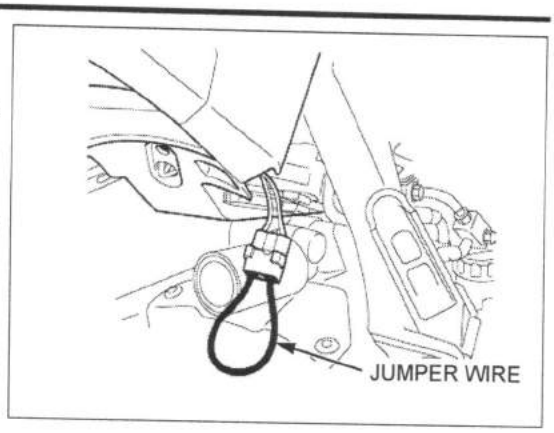
(Shadowed area: Fluid flow line)

2. Combined ABS air bleeding mode activation

Remove the dummy connector.

Short the Combined ABS check connector terminals with a jumper wire with the ignition switch turned OFF.

Connection: Brown – Green



Activate the rear Combined ABS line air bleeding mode as follows.

NOTE:

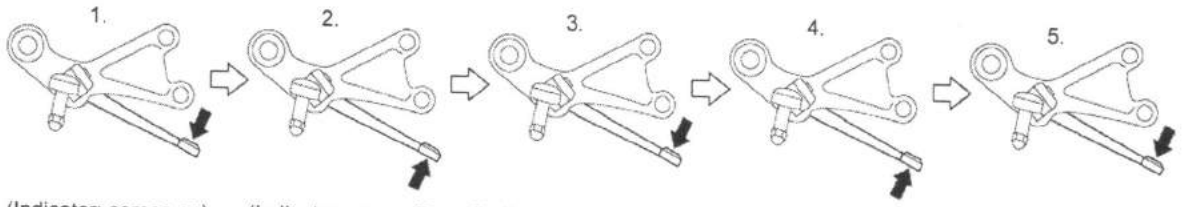
- Perform the following procedure within 5 seconds.

1. Turn the ignition switch ON while applying the brake pedal.
2. Release the brake pedal.
3. Apply the brake pedal.
4. Release the brake pedal.
5. Apply the brake pedal to select the rear Combined ABS line (it depresses all the way), and release it.

The Combined ABS indicator will start long blinking.

The system will now be in the air bleeding mode, that is a state in which all the brake lines are connected by opening all the solenoid valves.

If the indicator does not start blinking, turn the ignition switch OFF and try the above procedure again.



(Indicator: comes on) (Indicator: goes off) (Indicator: comes on) (Indicator: goes off) Indicator; long blinking

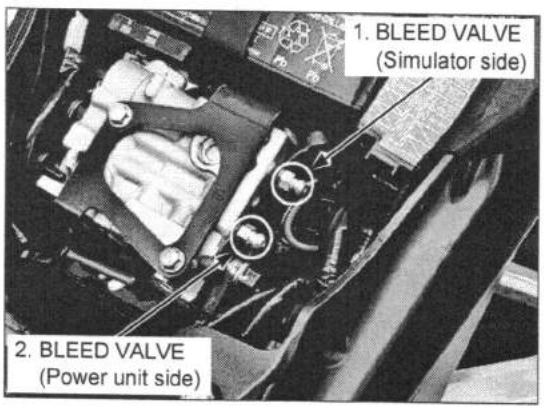
3. ABS valve unit line air bleeding

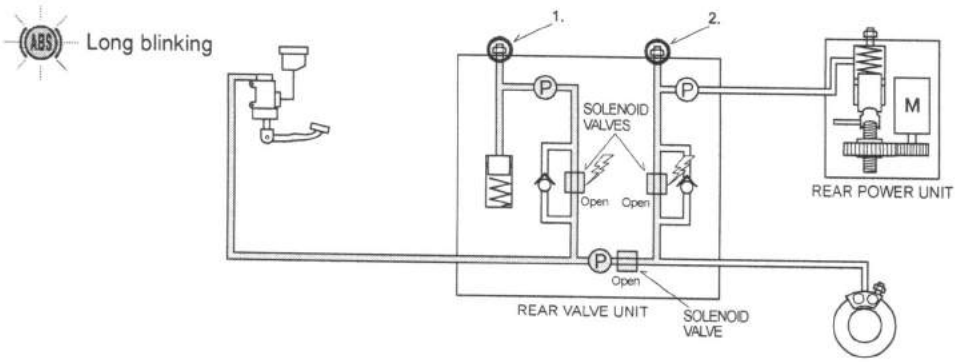
The Combined ABS indicator; long blinking:

In the same manner as in the conventional air bleeding procedure, bleed air at each bleed valve of the rear ABS valve unit in the following sequence:

1. Valve unit bleed valve (simulator side)
2. Valve unit bleed valve (power unit side)

Perform the bleeding until the system is completely flushed/bled.





4. Power unit line air bleeding (with Brake-by-Wire moving)

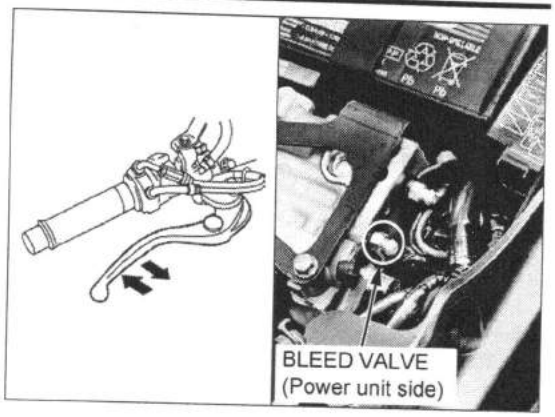
The Combined ABS indicator will turn to short blinking after shifting the mode.

Apply the brake lever once and release it (to shift the air bleeding mode).

NOTE:

- In this mode, the modulator piston in the power unit operates to pressure when depressing the pedal, and it returns when releasing the pedal.
- Do not use a brake bleeder tool in this procedure.

Perform the following procedures (step 1 and 2) at least 3 times.



Do not loosen the bleed valve if the pedal feels spongy.

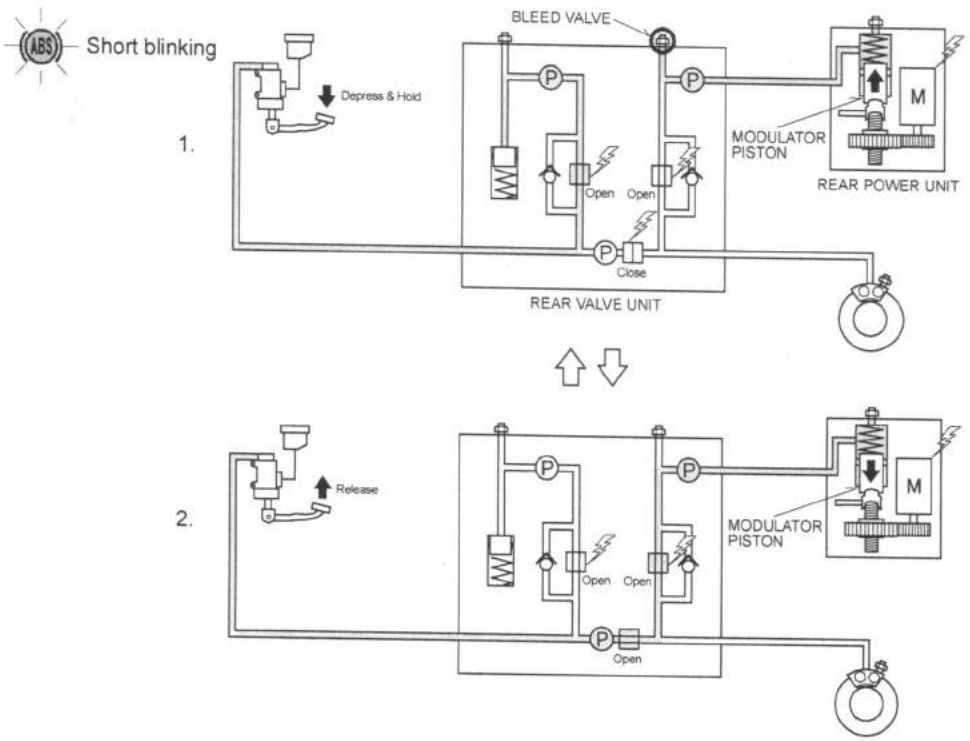
1. Depress the brake pedal and hold it (check that it resistance is felt).
   The modulator piston moves forward to pressure the fluid at this time. Loosen the valve unit bleed valve (power unit side) 1/4 turn to flow out the fluid, then close it.
2. After closing the bleed valve, release the brake pedal and wait for 7 seconds.
   The modulator piston moves backward to feed in the fluid.

NOTE:

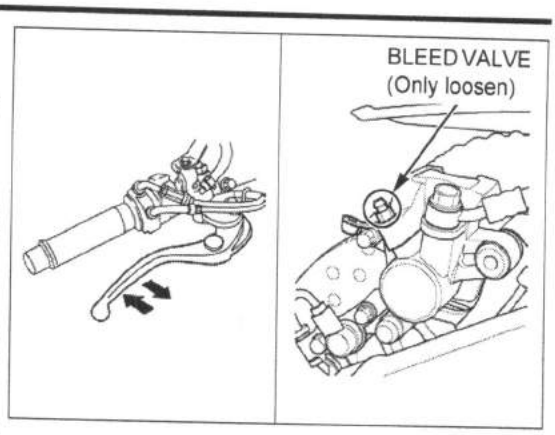
- The backward motion of the modulator piston requires 7 seconds. You do not operate the pedal and bleed valve during this motion (i.e. motor operation). Also, make sure that 7 seconds have elapsed (feeding in motion is completed) before proceeding to the next procedure.
- When the pedal feels spongy after performing step 2, the bleed valve must not be loosened because the modulator piston is still backward (feeding in). In this case, release the pedal and wait 7 seconds, and try again.

Tighten the valve unit bleed valves to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



5. One-way valve air bleeding (with motor operation)



The Combined ABS indicator will turn to twice blinking after shifting the mode.

Apply the brake lever once and release it (to shift the air bleeding mode).

Loosen the rear brake caliper bleed valve 1/4 turn.

The Combined ABS indicator will turn to 3 time blinking after shifting the mode.

Depress the brake pedal strongly (to compress the stroke simulator in the valve unit, and to shift the air bleeding mode).

NOTE:

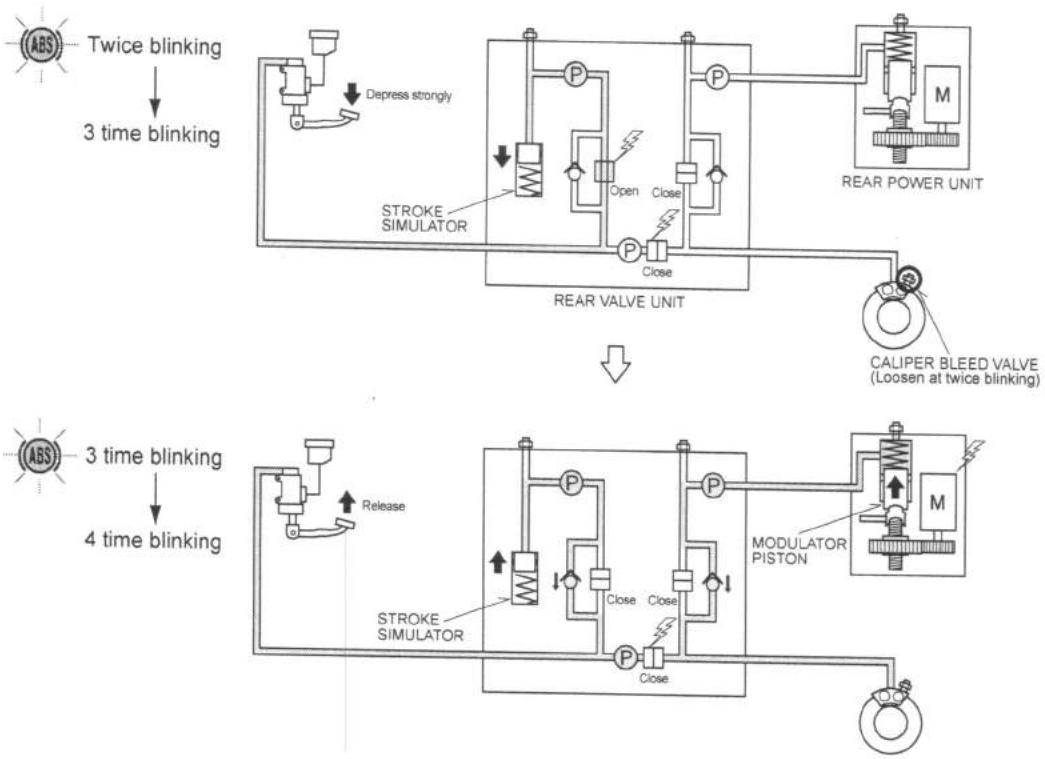
- Be sure to depress the pedal strongly until the indicator is 3 time blinking. If not, the system will not shift the mode (not start 3 time blinking).

The indicator shows 3 time blinking and then release the brake pedal.

NOTE:

The Combined ABS indicator will turn to 4 time blinking automatically after operating the motor.

- The stroke simulator and the modulator piston operate to pressure since releasing the pedal. Thereby any trapped air around the one-way valves forces out to the normal brake line (caliper side).



6. Normal brake line air bleeding

The Combined ABS indicator; 4 time blinking:

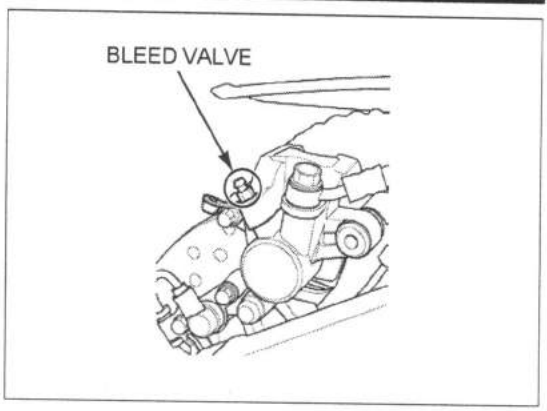
Bleed the normal brake line at the rear brake caliper bleed valve in the same manner as in the conventional air bleeding procedure.

NOTE:

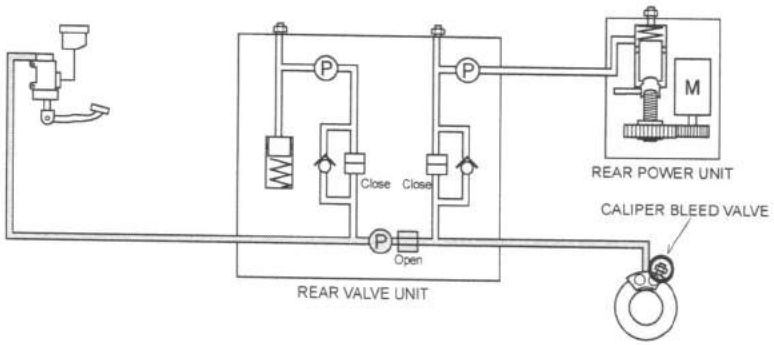
- The forced out air out of the one-way valves in the previous procedure is bleeding from the caliper bleed valve with this operation.

Tighten the caliper bleed valve to the specified torque.

TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



4 time blinking



7. Power unit control motor operation (system finishes air bleeding mode)

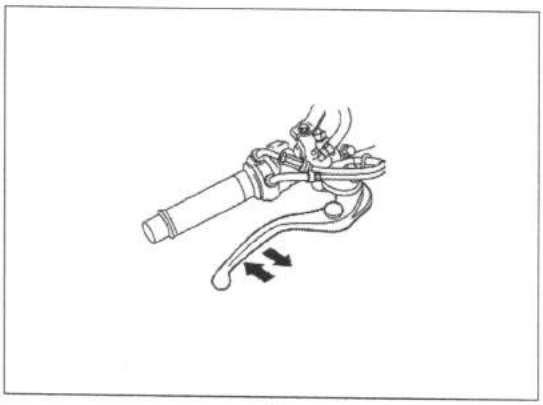
The Combined ABS indicator will go off after shifting the mode.

Be sure to tighten all the bleed valves (3 places), and apply the brake lever once and release it (to shift the air bleeding mode).

The control motor operates to return the modulator piston in place with the brake fluid feeding in.

Then, the system stops and Combined ABS indicator blinks long twice repeatedly, indicating that the air bleeding mode is finished.

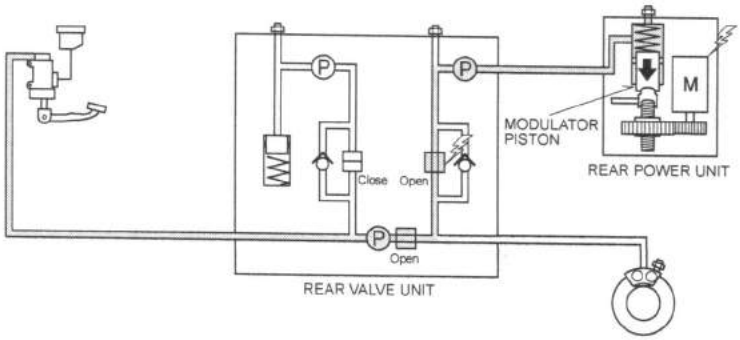
Turn the ignition switch OFF (to complete the air bleeding procedure).



Goes off

↓

Long twice blinking (air bleeding mode is finished)



8. Completion inspection

Remove the jumper wire.

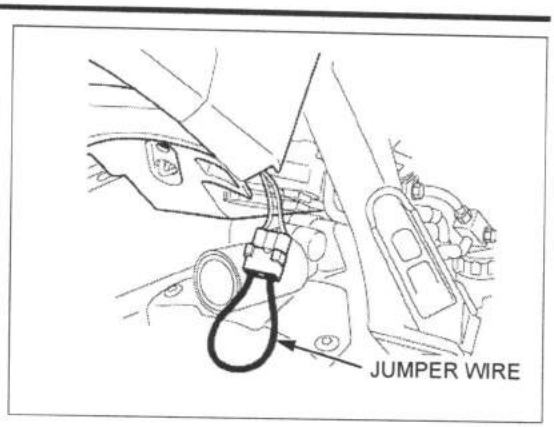
Fill the reserve tank to the upper level line with DOT 4 brake fluid from a sealed container.

Install the reserve tank cap (page 16-12).

Install the removed parts in the reverse order of removal.

Perform the pre-start self-diagnosis to be sure that the Combined ABS indicator is operating normally (page 17-7).

Check that the brake operates normally with good response during the test-ride.



REAR ABS VALVE UNIT/POWER UNIT LINE AIR BLEEDING

NOTICE

Before Combined ABS line brake fluid air bleeding, check the battery condition (page 18-7).

NOTE:

- Do not turn the ignition switch OFF or disconnect the jumper wire during the air bleeding as this could cause the Combined ABS to malfunction.
  Once started, if the air bleeding procedure is not completed, re-start the air bleeding from the beginning.

Preparation

Remove the following;

- Fuel tank (page 6-60)
- EGCA cover (page 6-90)

Open the fuse/relay box and remove the following fuses.

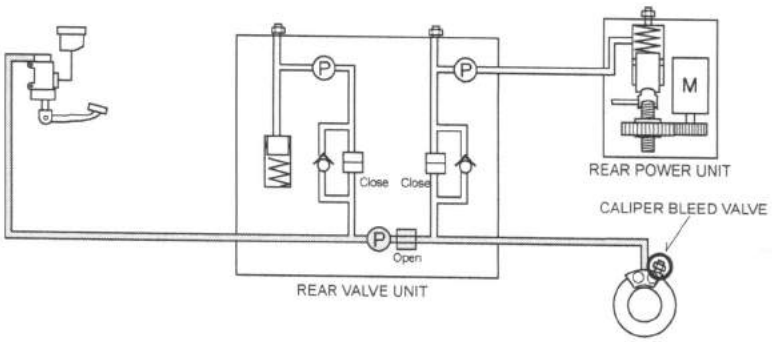
- HEADLIGHT 20 A
- STOP/HORN/WINK RLY 10 A

Support the motorcycle in an upright position using a safety stand or equivalent.



1. Normal brake line air bleeding

Fill and bleed the rear hydraulic system (normal brake line) at the rear brake caliper bleed valve (page 16-10).



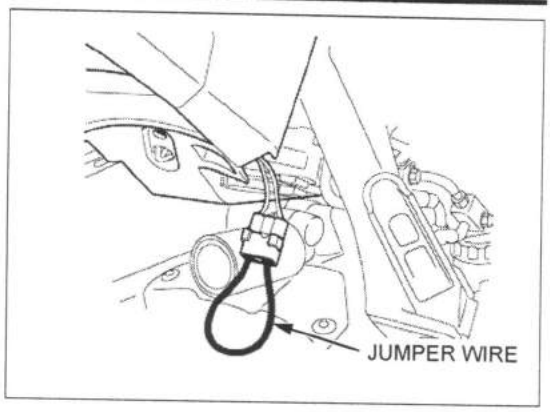
(Shadowed area: Fluid flow line)

2. Combined ABS air bleeding mode activation

Remove the dummy connector.

Short the Combined ABS check connector terminals with a jumper wire with the ignition switch turned OFF.

Connection: Brown – Green



Activate the rear Combined ABS line air bleeding mode as follows.

NOTE:

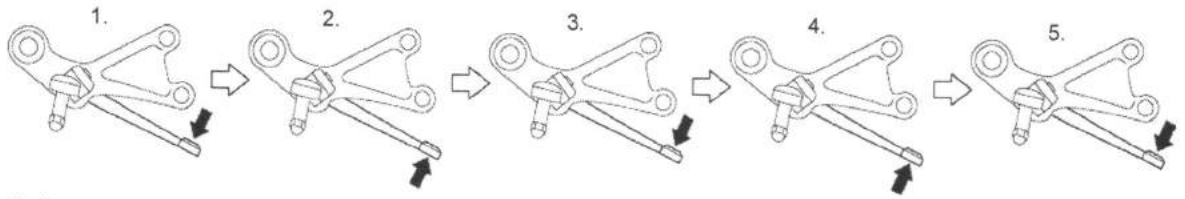
- Perform the following procedure within 5 seconds.

1. Turn the ignition switch ON while applying the brake pedal.
2. Release the brake pedal.
3. Apply the brake pedal.
4. Release the brake pedal.
5. Apply the brake pedal to select the rear Combined ABS line (it depresses all the way), and release it.

The Combined ABS indicator will start long blinking.

The system will now be in the air bleeding mode, that is a state in which all the brake lines are connected by opening all the solenoid valves.

If the indicator does not start blinking, turn the ignition switch OFF and try the above procedure again.



3. ABS valve unit/power unit line air bleeding

The Combined ABS indicator; long blinking:

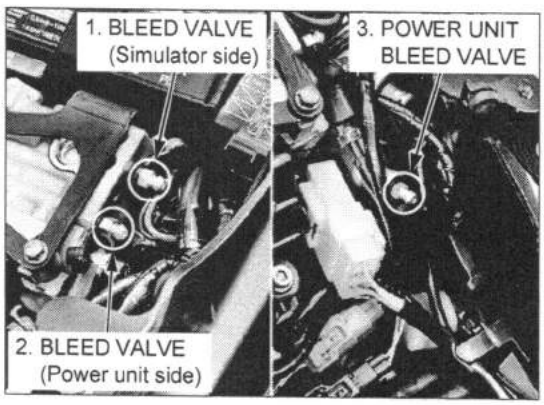
In the same manner as in the conventional air bleeding procedure, bleed air at each bleed valve in the following sequence:

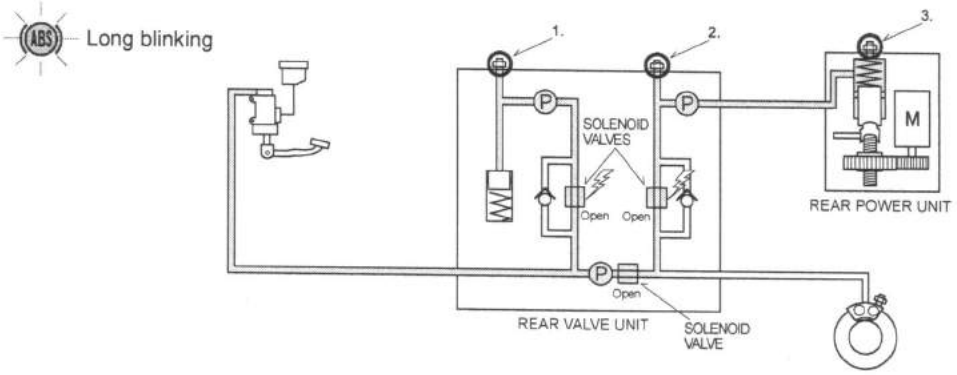
1. Rear ABS valve unit bleed valve (simulator side)
2. Rear ABS valve unit bleed valve (power unit side)
3. Rear power unit bleed valve

Perform the bleeding until the system is completely flushed/bled.

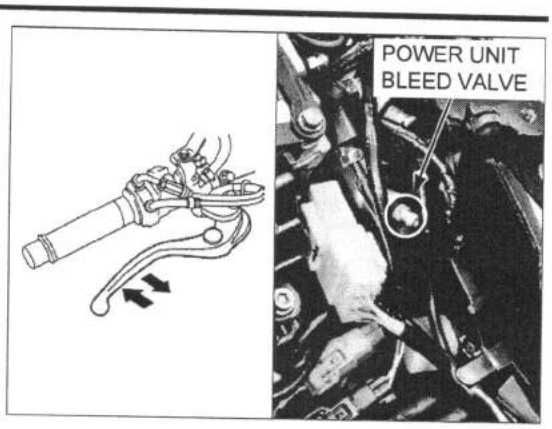
Tighten the bleed valves (1 and 2) on the valve unit to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)





4. Power unit internal air bleeding (with Brake-by-Wire moving)



The Combined ABS indicator will turn to short blinking after shifting the mode.

Apply the brake lever once and release it (to shift the air bleeding mode).

NOTE:

- In this mode, the modulator piston in the power unit operates to pressure when depressing the pedal, and it returns when releasing the pedal.
- Do not use a brake bleeder tool in this procedure.

Perform the following procedures (step 1 and 2) at least 3 times.

Do not loosen the bleed valve if the pedal feels spongy.

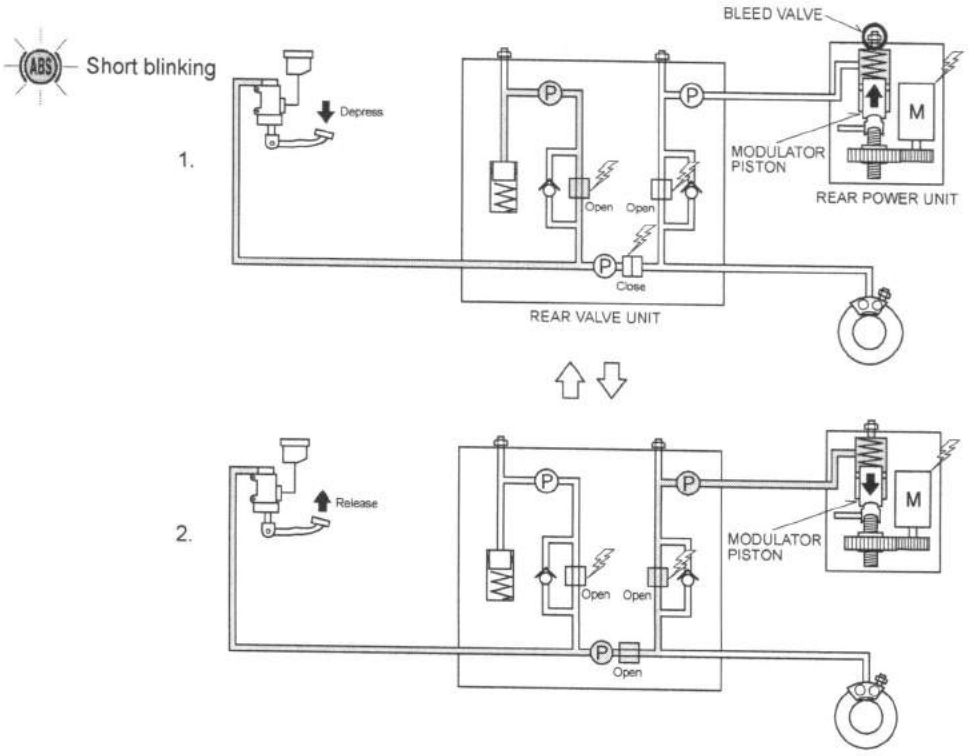
1. Depress the brake pedal and hold it (check that it resistance is felt).
   The modulator piston moves forward to pressure the fluid at this time. Loosen the power unit bleed valve 1/4 turn to flow out the fluid, then close it.
2. After closing the bleed valve, release the brake pedal and wait for 7 seconds.
   The modulator piston moves backward to feed in the fluid.

NOTE:

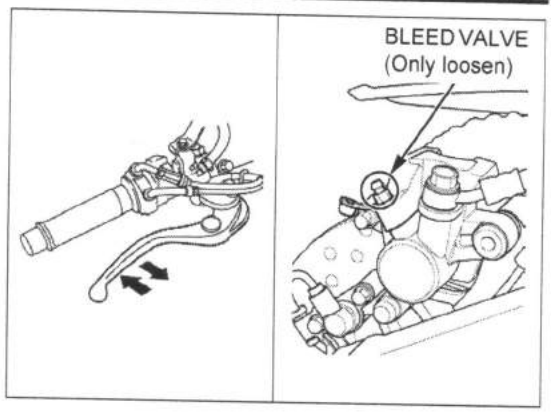
- The backward motion of the modulator piston requires 7 seconds. You do not operate the pedal and bleed valve during this motion (i.e. motor operation). Also, make sure that 7 seconds have elapsed (feeding in motion is completed) before proceeding to the next procedure.
- When the pedal feels spongy after performing step 2, the bleed valve must not be loosened because the modulator piston is still backward (feeding in). In this case, release the pedal and wait 7 seconds, and try again.

Tighten the power unit bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



5. One-way valve air bleeding (with motor operation)



The Combined ABS indicator will turn to twice blinking after shifting the mode.

Apply the brake lever once and release it (to shift the air bleeding mode).

Loosen the rear brake caliper bleed valve 1/4 turn.

The Combined ABS indicator will turn to 3 time blinking after shifting the mode.

Depress the brake pedal strongly (to compress the stroke simulator in the valve unit, and to shift the air bleeding mode).

NOTE:

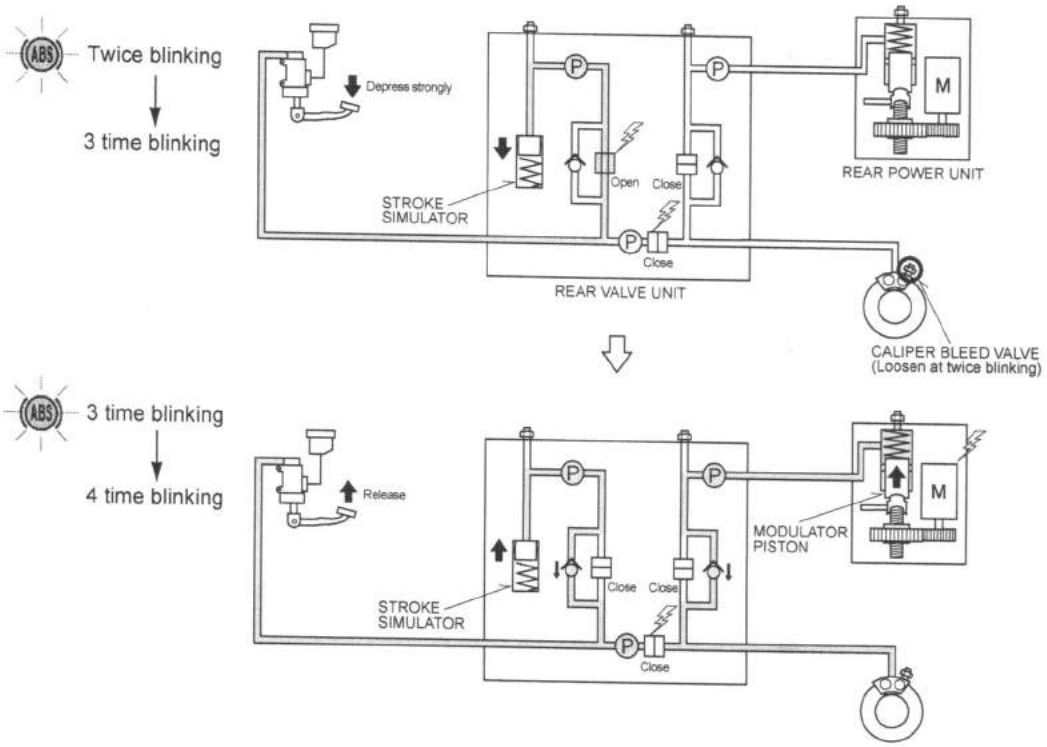
- Be sure to depress the pedal strongly until the indicator is 3 time blinking. If not, the system will not shift the mode (not start 3 time blinking).

The indicator shows 3 time blinking and then release the brake pedal.

NOTE:

The Combined ABS indicator will turn to 4 time blinking automatically after operating the motor.

- The stroke simulator and the modulator piston operate to pressure since releasing the pedal. Thereby any trapped air around the one-way valves forces out to the normal brake line (caliper side).



6. Normal brake line air bleeding

The Combined ABS indicator; 4 time blinking:

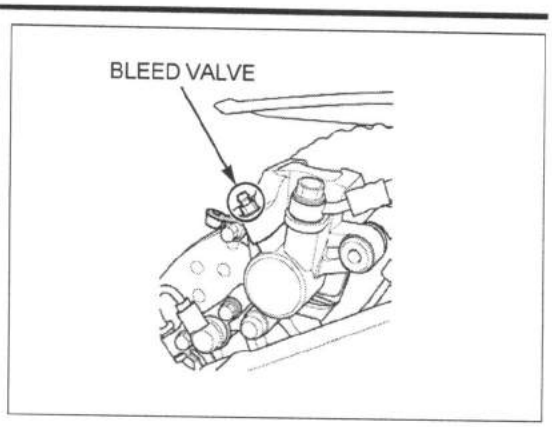
Bleed the normal brake line at the rear brake caliper bleed valve in the same manner as in the conventional air bleeding procedure.

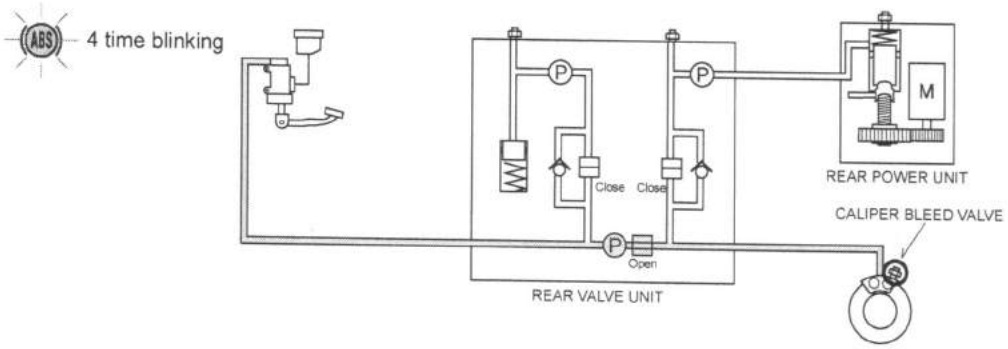
NOTE:

- The forced out air out of the one-way valves in the previous procedure is bleeding from the caliper bleed valve with this operation.

Tighten the caliper bleed valve to the specified torque.

TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)





7. Power unit control motor operation (system finishes air bleeding mode)

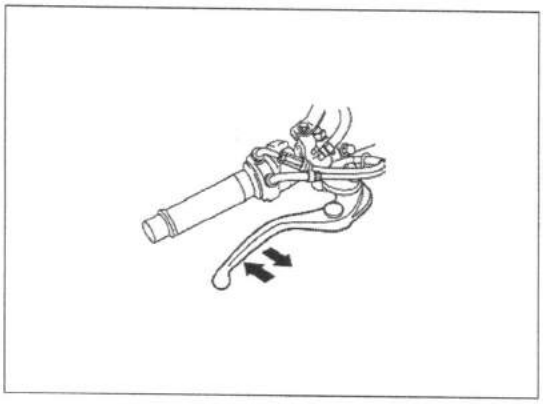
The Combined ABS indicator will go off after shifting the mode.

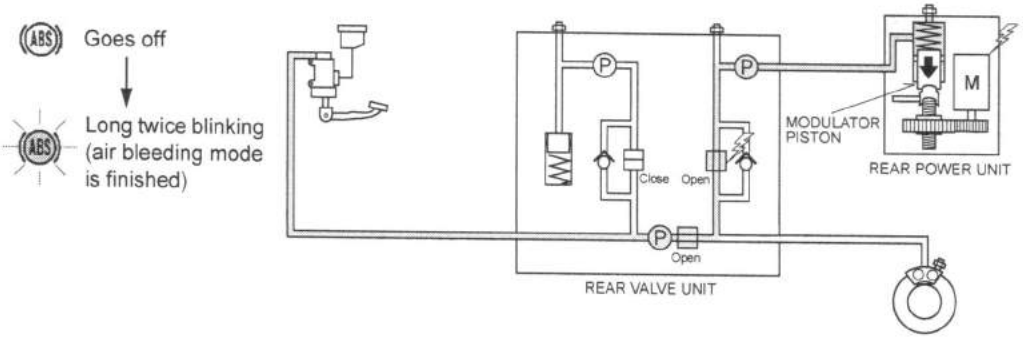
Be sure to tighten all the bleed valves (4 places), and apply the brake lever once and release it (to shift the air bleeding mode).

The control motor operates to return the modulator piston in place with the brake fluid feeding in.

Then, the system stops and Combined ABS indicator blinks long twice repeatedly, indicating that the air bleeding mode is finished.

Turn the ignition switch OFF (to complete the air bleeding procedure).





8. Completion inspection

Remove the jumper wire.

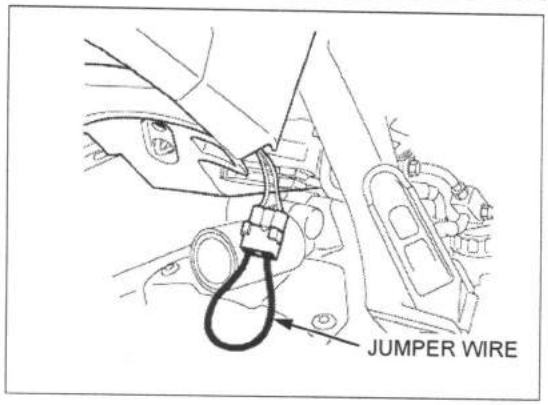
Fill the reserve tank to the upper level line with DOT 4 brake fluid from a sealed container.

Install the reserve tank cap (page 16-12).

Install the removed parts in the reverse order of removal.

Perform the pre-start self-diagnosis to be sure that the Combined ABS indicator is operating normally (page 17-7).

Check that the brake operates normally with good response during the test-ride.



BRAKE PAD/DISC

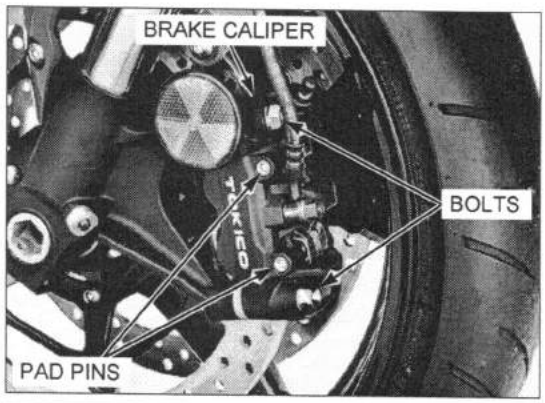
FRONT BRAKE PAD REPLACEMENT (STANDARD/ABS type)

While servicing the front and rear brake calipers, do not let them hang from the brake hose.

Loosen the pad pins.

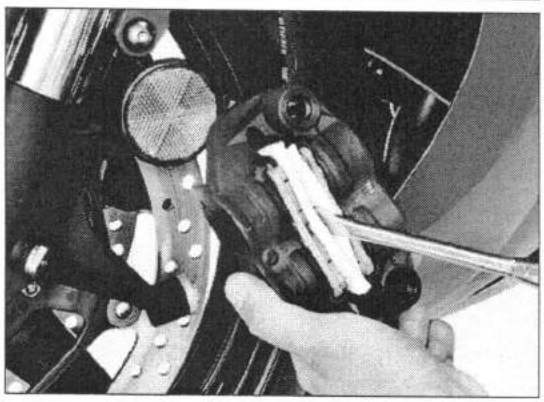
Remove the caliper mounting bolts and brake caliper.

Discard the brake caliper mounting bolts.

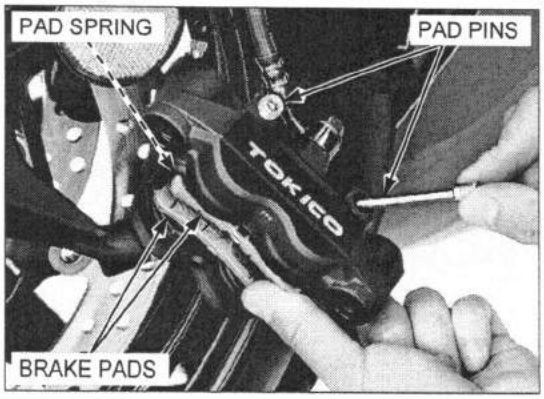


Check the brake fluid level in the brake master cylinder reserve tank, as this operation causes the level to rise.

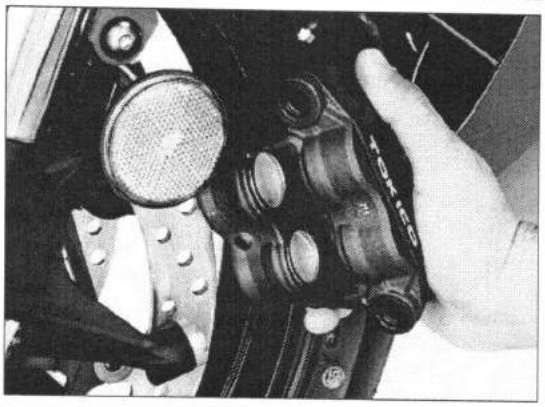
Push the caliper pistons all the way in to allow installation of new brake pads.



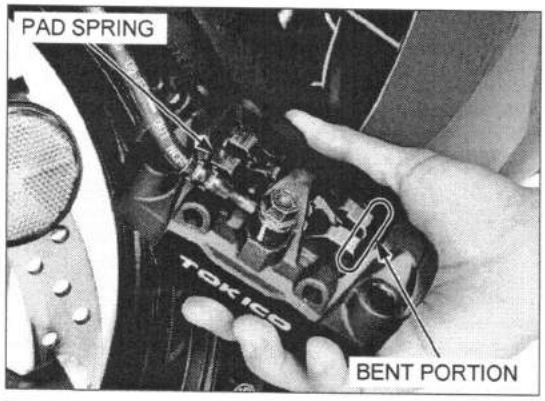
Remove the pad pins, pad spring and brake pads.



Clean the inside of the caliper especially around the caliper pistons.



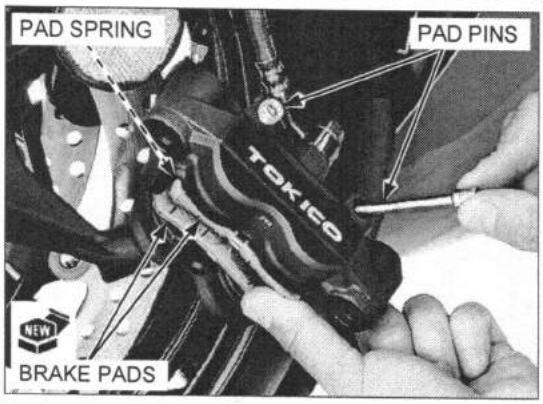
Install the pad spring with its bent portion side downward.



Always replace the brake pads in pairs to assure even disc pressure.

Install new brake pads to the brake caliper.

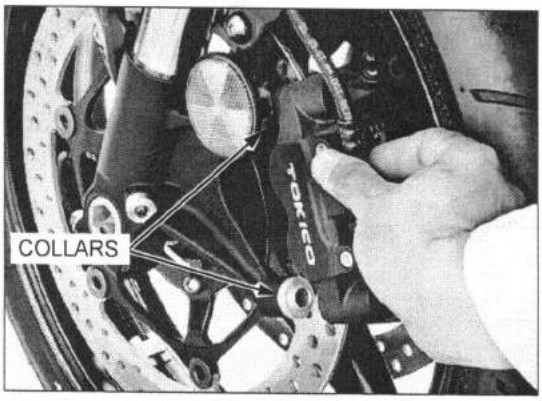
Install the pad pins while pushing in the brake pads against the pad spring.



Install the brake caliper to the fork leg so that the disc is positioned between the pads.

NOTE:

- Make sure that the collars are installed into the caliper bracket properly.
- Be careful not to damage the brake pads.



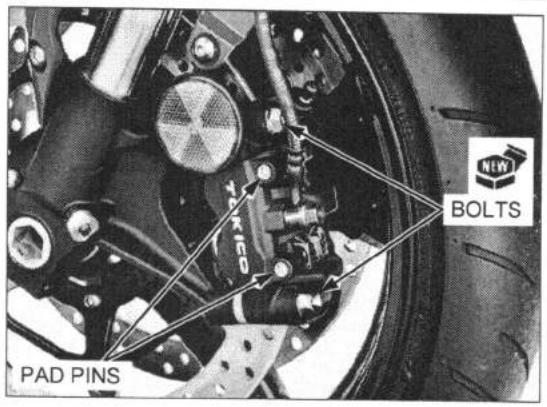
Tighten new brake caliper mounting bolts to the specified torque.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

Tighten the pad pins to the specified torque.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Check the brake operation by applying the brake lever.



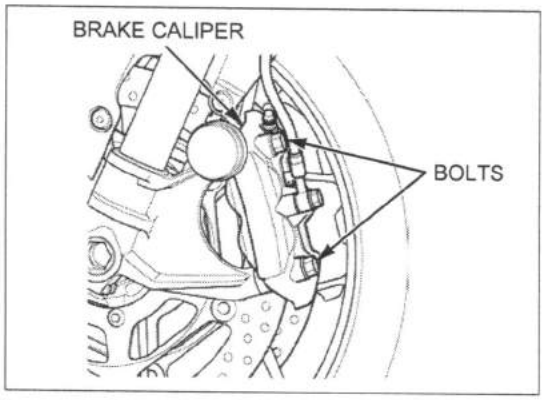
FRONT BRAKE PAD REPLACEMENT (SP type)

Remove the caliper mounting bolts and brake caliper.

Discard the mounting bolts.

Check the brake fluid level in the front master cylinder reserve tank as this operation causes the level to rise.

Push the caliper pistons all the way in to allow installation of new brake pads by pushing the bake pads with a screwdriver or equivalent.



Slide the brake pad inward and release the tabs to remove it.
Remove the other pad in the same way.

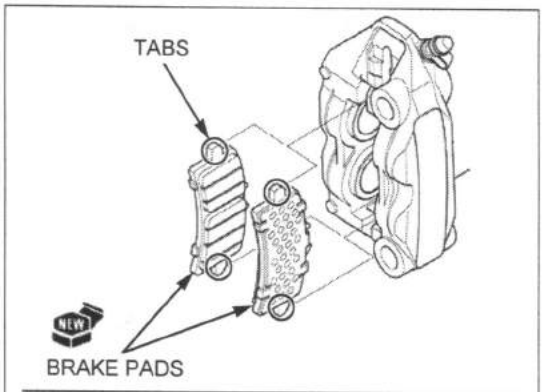
Remove the pad spring.

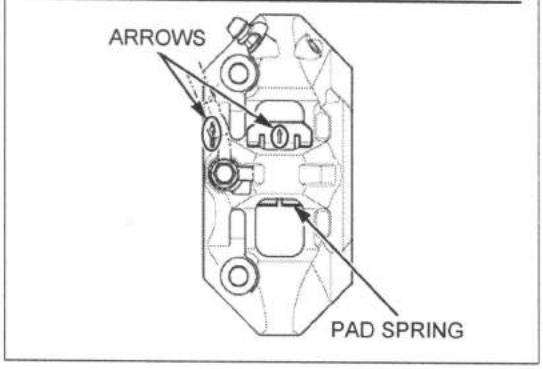
Clean the inside of the caliper body especially around the caliper pistons.

Set the pad spring with its arrow facing the same direction of the arrow on the caliper body as shown.

Always replace the brake pads in pairs to assure even disc pressure.

Install a new brake pad by setting the tabs into the grooves in the caliper body while pushing in the pad against the pad spring straight. Be sure to seat the pad on the caliper pistons.
Install another new pad in the same way.





Install the brake caliper onto the fork leg so that the disc is positioned between the pads.

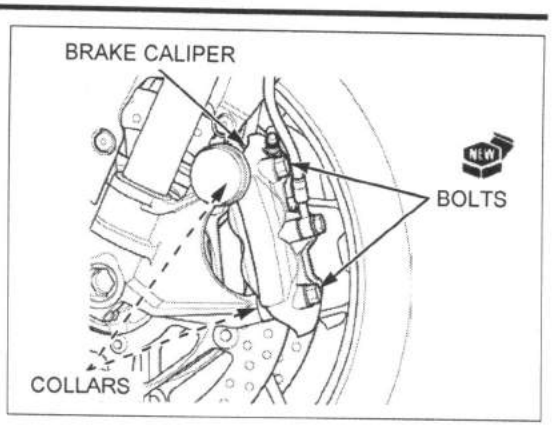
NOTE:

- Make sure that the collars are installed into the caliper body properly.
- Be careful not to damage the brake pads.

Install new mounting bolts and tighten them to the specified torque.

TORQUE: 40 N·m (4.1 kgf·m, 30 lbf·ft)

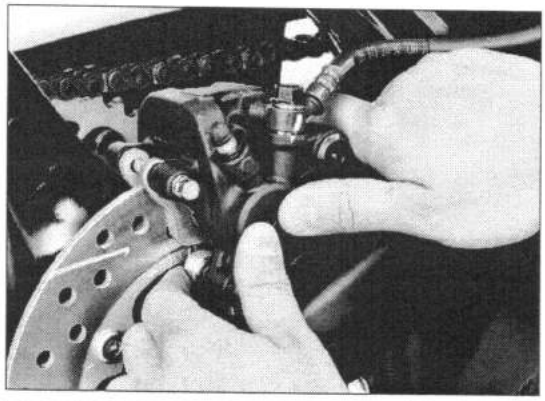
Check the brake operation by applying the brake lever.



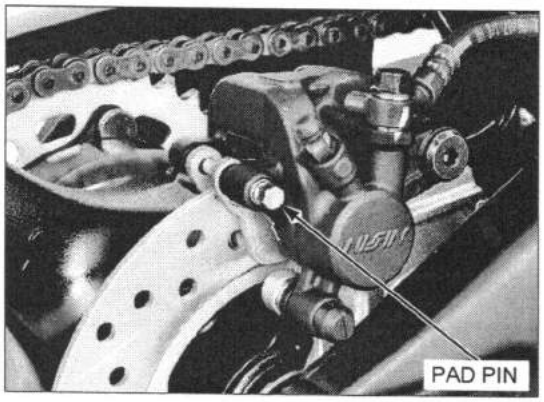
REAR BRAKE PAD REPLACEMENT

Check the brake fluid level in the brake master cylinder reserve tank, as this operation causes the level to rise.

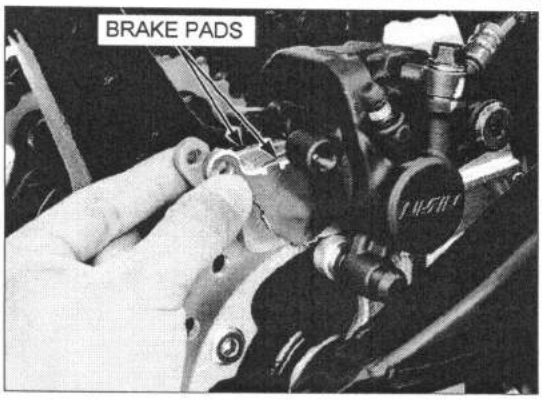
Push the caliper piston all the way in by pushing the caliper body inward to allow installation of new brake pads.



Remove the pad pin.



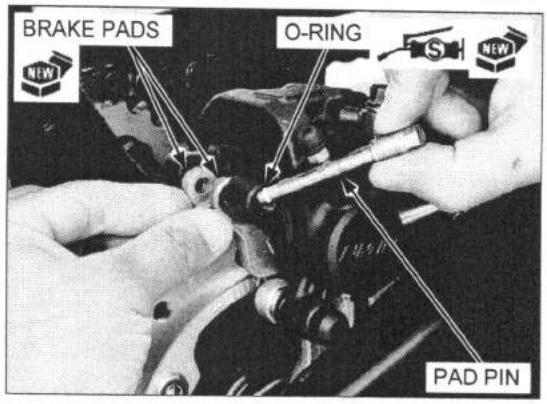
Remove the brake pads and clean the inside of the caliper especially around the caliper piston.



Apply silicone grease to a new O-ring and install it to the pad pin groove.

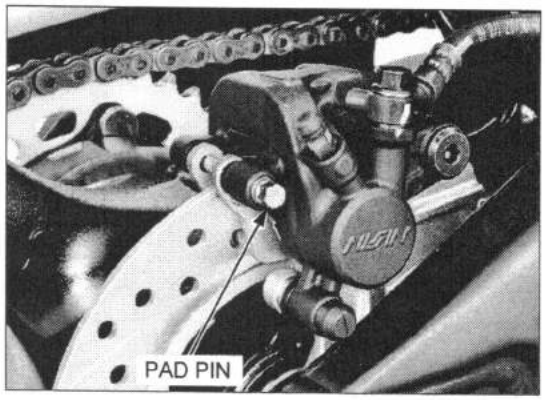
Always replace the brake pads in pairs to assure even disc pressure.

Make sure the pad spring is in place and install new brake pads securely.



Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



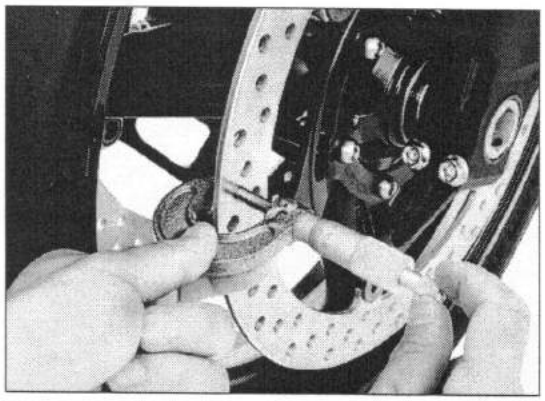
BRAKE DISC INSPECTION

Visually inspect the brake discs for damage or cracks.

Measure the brake disc thickness with a micrometer.

SERVICE LIMITS:
Front: 3.5 mm (0.14 in)
Rear: 4.0 mm (0.16 in)

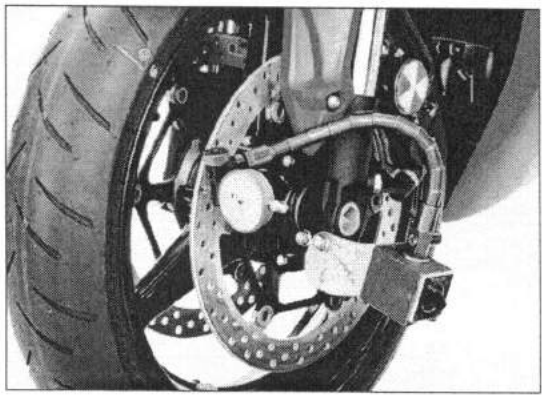
Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake disc runout with a dial indicator.

SERVICE LIMITS:
Front: 0.20 mm (0.008 in)
Rear: 0.30 mm (0.012 in)

Check the wheel bearings for excessive play (page 14-21) if the warpage exceeds the service limit.
If the wheel bearings are normal, replace the brake disc.



FRONT MASTER CYLINDER

NOTICE

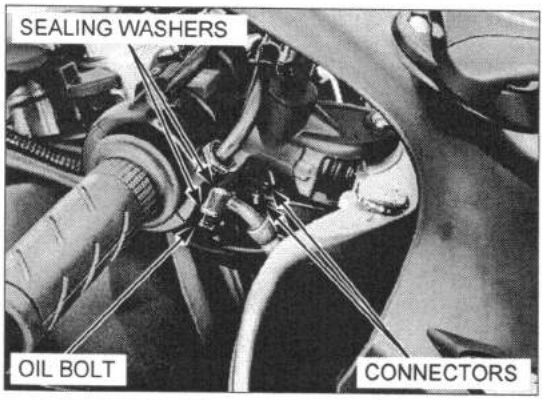
Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

REMOVAL

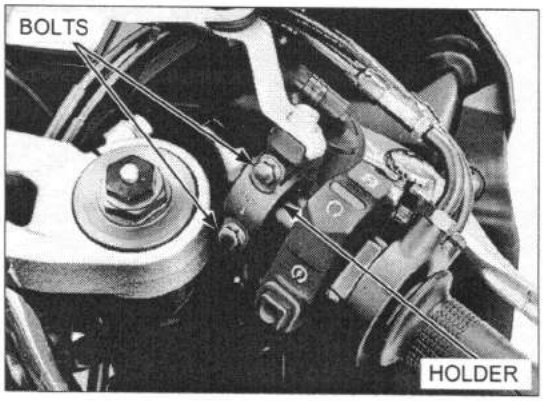
Drain the front hydraulic system (page 16-9).

Disconnect the brake light switch wire connectors.

Remove the brake hose oil bolt, sealing washers, and brake hose eyelet joint.



Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



DISASSEMBLY

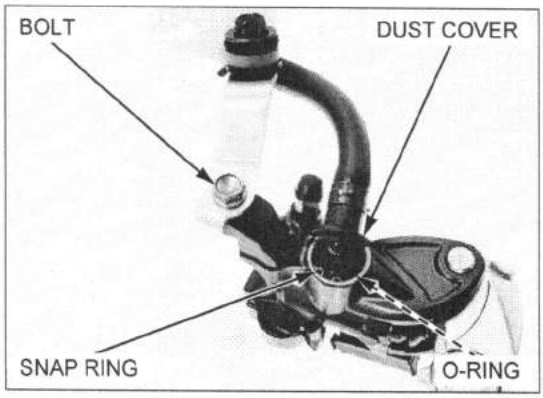
Remove the dust cover and snap ring.

TOOL:

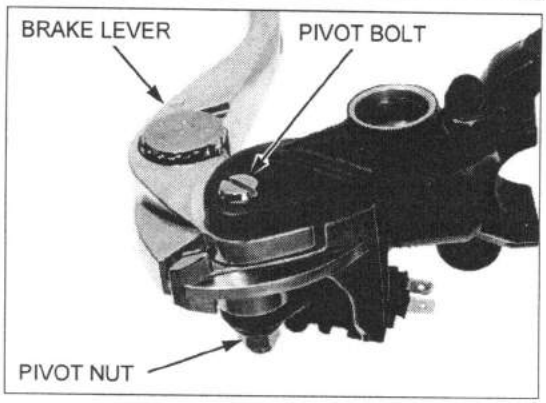
Snap ring pliers **07914-SA50001**

Remove the bolt and reserve tank from the master cylinder.

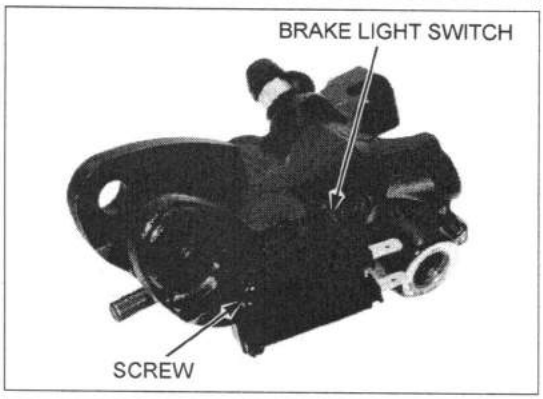
Remove the O-ring from the reserve tank hose joint.



Remove the pivot nut, bolt, and brake lever assembly.

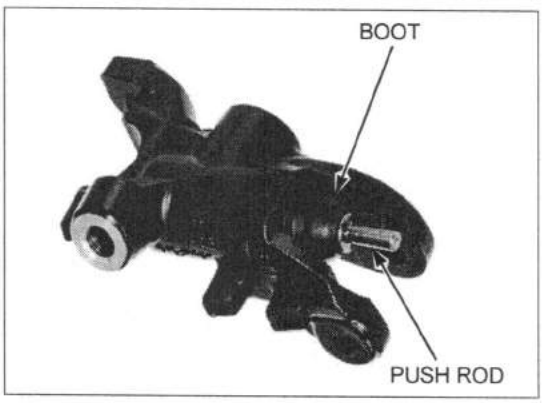


Remove the screw and brake light switch.



Be careful not to damage the boot.

Remove the boot and push rod.

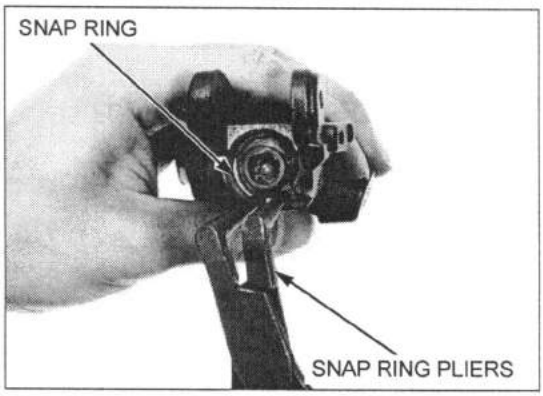


Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:

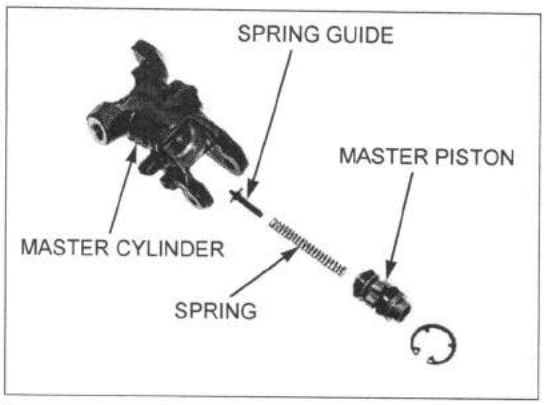
Snap ring pliers **07914-SA50001**

Remove the master piston, spring, and spring guide from the master cylinder body.



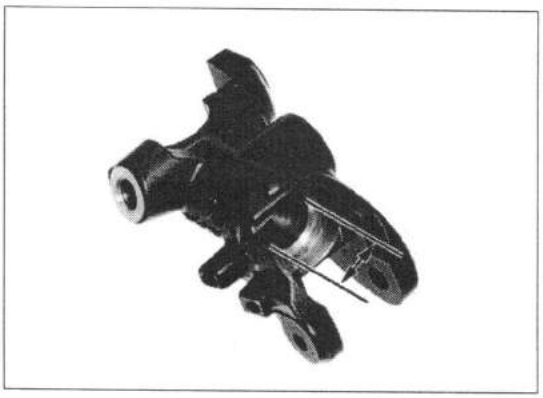
INSPECTION

Clean the inside of the cylinder and reserve tank with clean brake fluid.
Check the master cylinder and piston for abnormal scratches.
Check the spring for fatigue or damage.



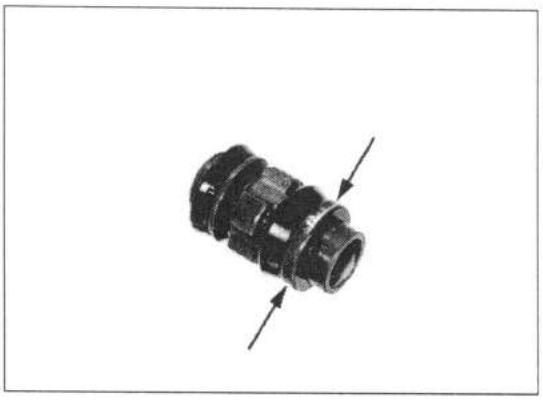
Measure the master cylinder I.D.

SERVICE LIMIT: 17.503 mm (0.6891 in)

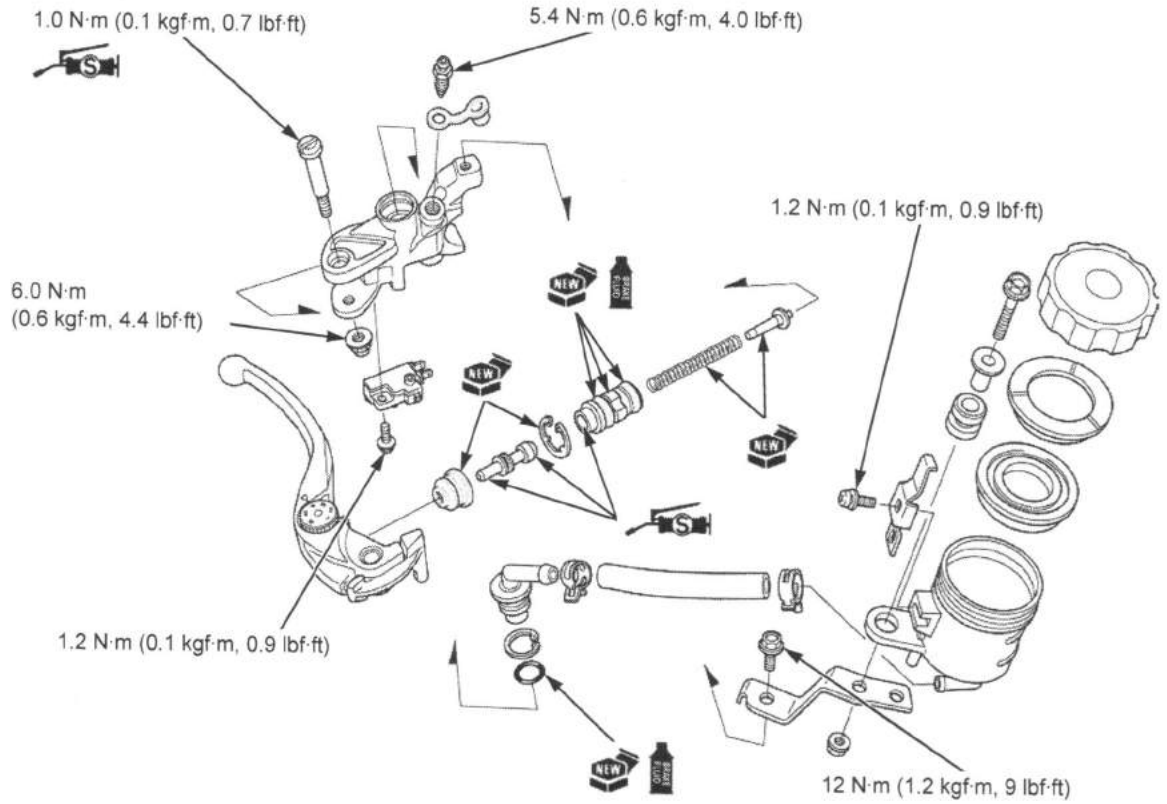


Measure the master cylinder piston O.D.

SERVICE LIMIT: 17.321 mm (0.6819 in)



ASSEMBLY



- Keep the piston, cups, spring, snap ring, and boot as a set; do not replace the parts individually.

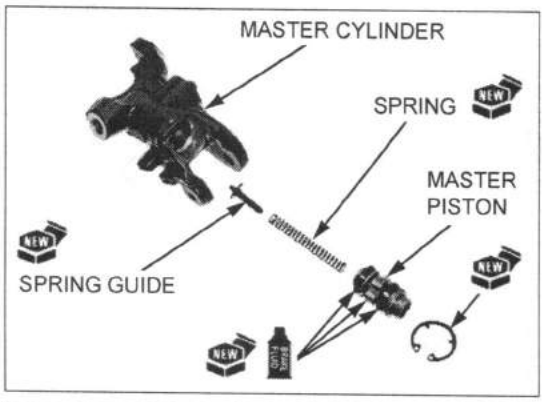
When installing the cups, do not allow the lips to turn inside out.

Coat new piston cups with clean brake fluid and install them to the master piston.

Coat the master piston and piston cups with clean brake fluid.

Install the spring guide into the spring as shown.

Install the spring guide/spring and master piston into the master cylinder.

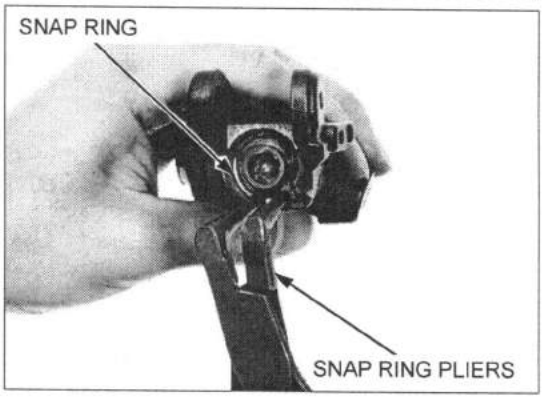


Be certain the snap ring is firmly seated in the groove.

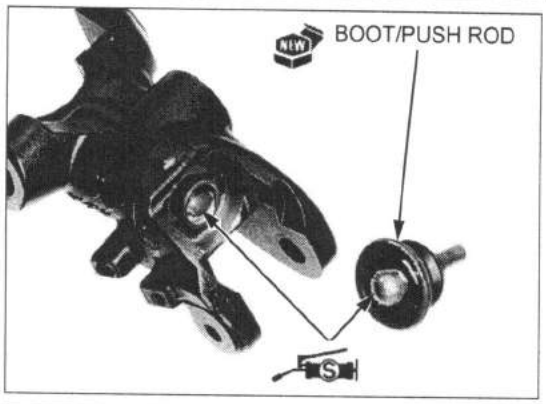
Install the snap ring with the special tool.

TOOL:

Snap ring pliers **07914-SA50001**



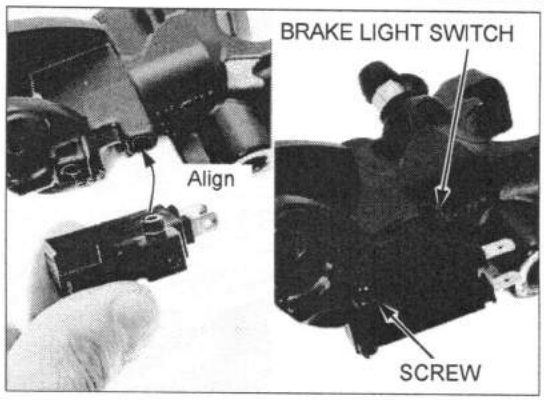
Apply silicone grease to contact surfaces of the push rod and master piston.
Install a new boot with the push rod.



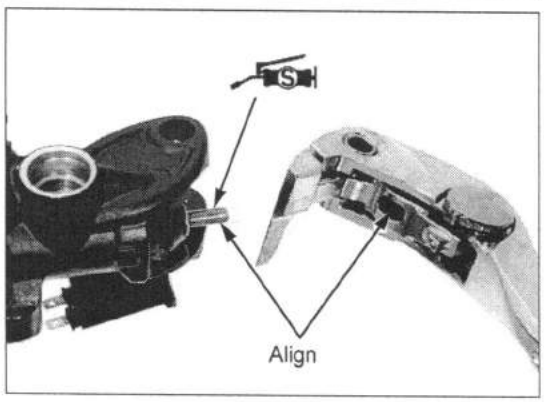
Install the brake light switch by aligning its boss with the hole.

Tighten the screw to the specified torque.

TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)



Apply silicone grease to push rod tip.
Install the brake lever by aligning the hole of the brake lever with the push rod.

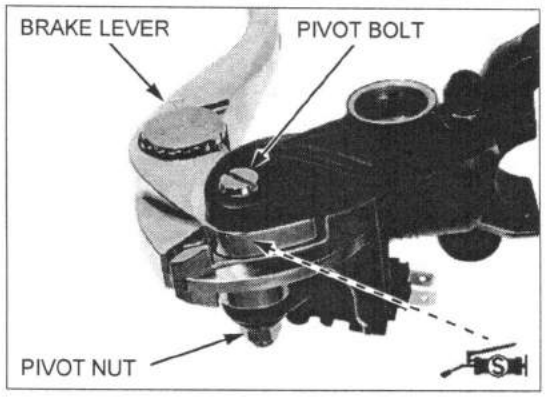


Apply silicone grease to the brake lever pivot bolt sliding surface.
Install the brake lever pivot bolt and nut.
Tighten the pivot bolt to the specified torque.

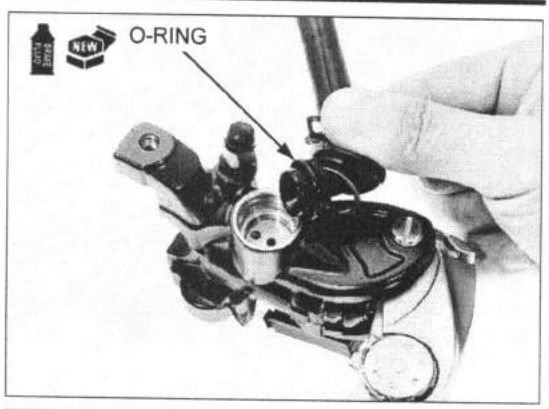
TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

Hold the pivot bolt and tighten the pivot nut to the specified torque.

TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



Apply brake fluid to a new O-ring and install it to the reserve tank hose joint.



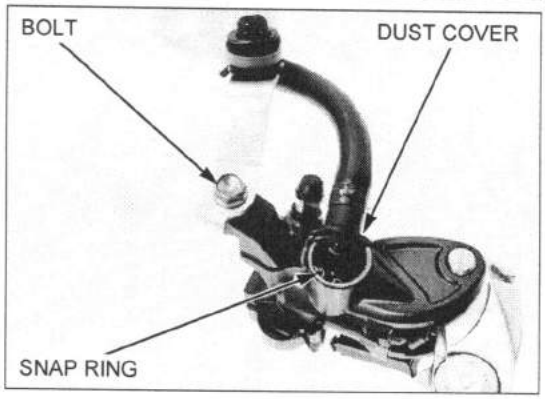
After installing a snap ring, always rotate it in its groove to be sure it is fully seated.

Install the reserve tank hose joint into the master cylinder and secure the joint with the snap ring.

TOOL:
Snap ring pliers **07914-SA50001**

Install the dust cover.
Install the reserve tank stay onto the master cylinder and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



INSTALLATION

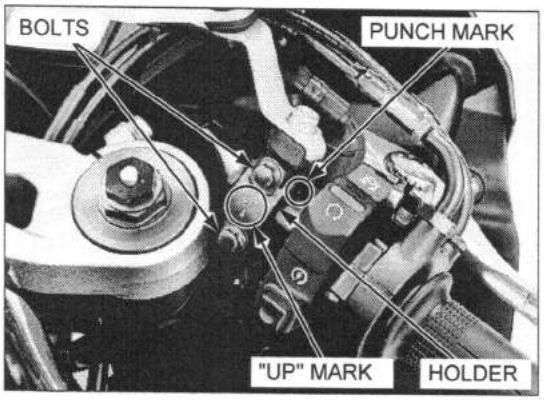
Install the master cylinder holder with its "UP" mark facing up.

Install the master cylinder assembly, master cylinder holder, and bolts.

Align the end of the master cylinder with the punch mark on the handlebar.

Tighten the upper bolt first, then the lower bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the brake hose eyelet joint with new sealing washers and oil bolt.

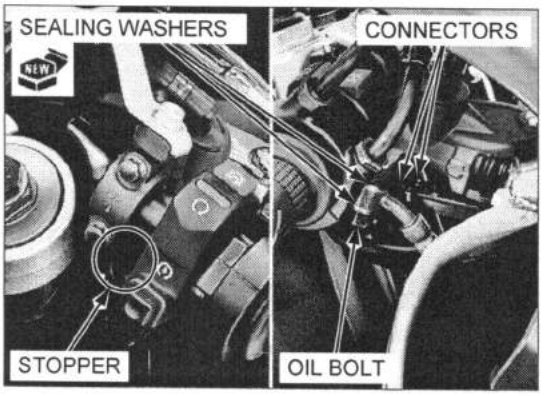
Push the eyelet joint against the stopper then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the brake light switch connectors.

Fill and bleed the hydraulic system.

- STANDARD/SP type (page 16-9)
- '09 – '13 model ABS type (page 16-18)
- After '13 model ABS type (page 16-52)



REAR MASTER CYLINDER

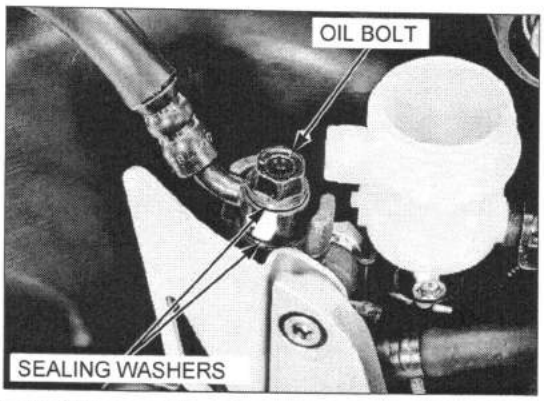
NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

REMOVAL

Drain the rear brake hydraulic system (page 16-9).

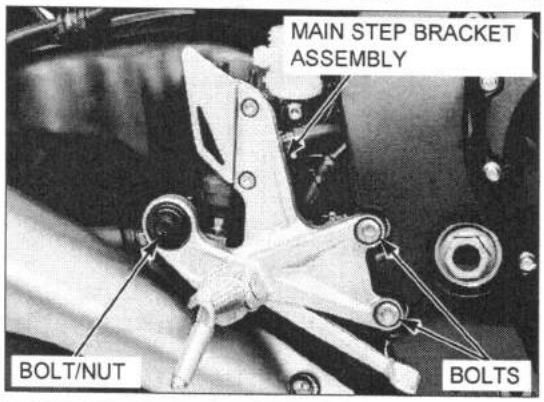
Remove the brake hose oil bolt, sealing washers, and brake hose eyelet joint.



Support the muffler securely.

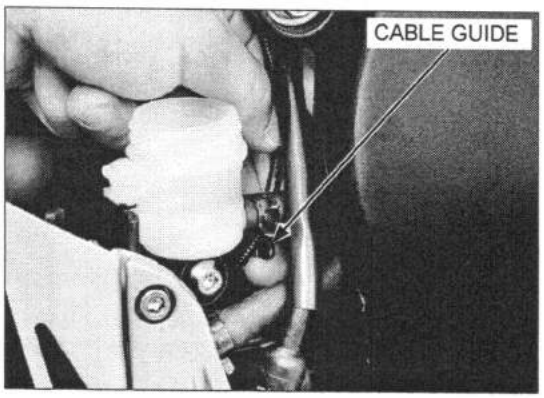
Remove the muffler mounting nut and bolt.

Remove the bolts and right main step bracket assembly from the frame.

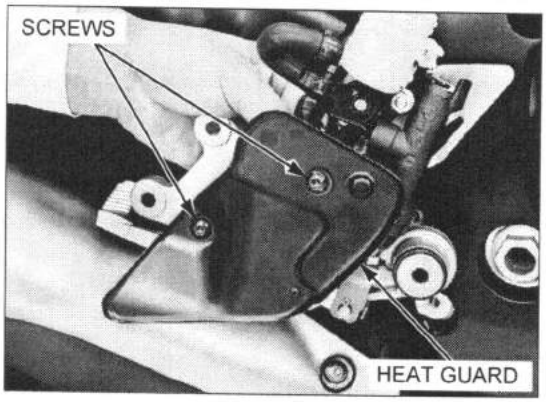


Be careful not to damage the EGCA cable.

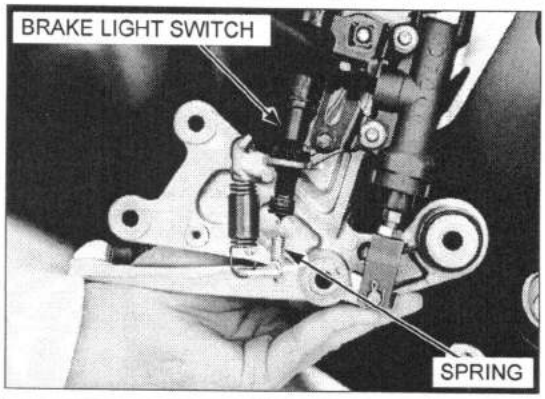
Release the EGCA cable from the cable guide.



Remove the screws and main step heat guard.

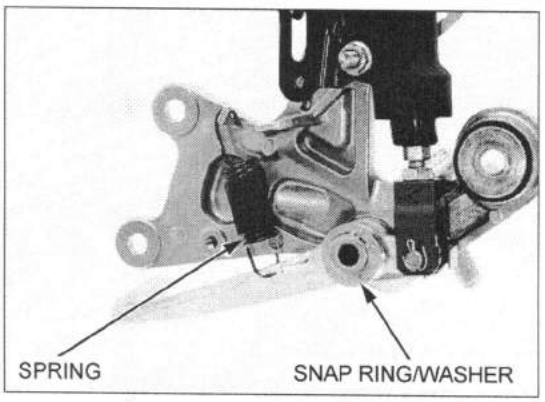


Disconnect the spring and remove the rear brake light switch.

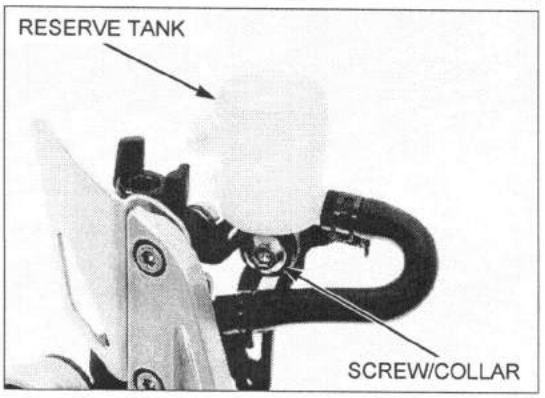


Remove the brake pedal return spring.

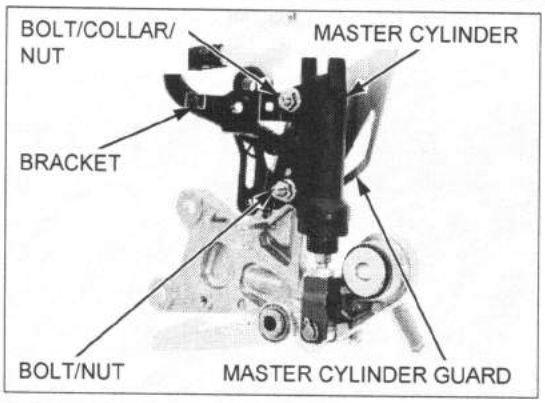
Remove the snap ring and washer from the brake pedal pivot.



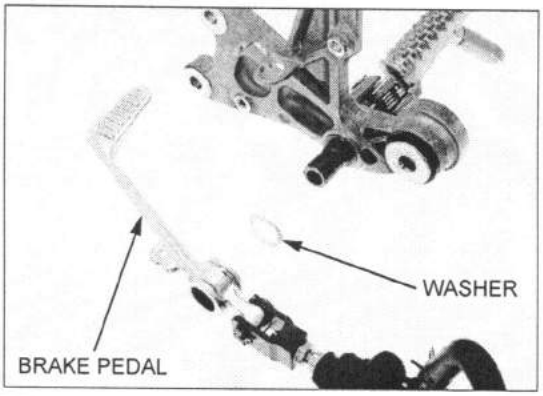
Remove the screw, collar, and reserve tank.



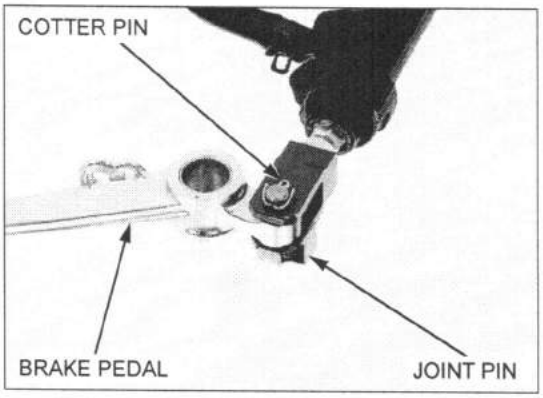
Remove the bolts, nuts, collar, master cylinder guard, reserve tank bracket, and rear master cylinder.



Remove the brake pedal and wave washer.

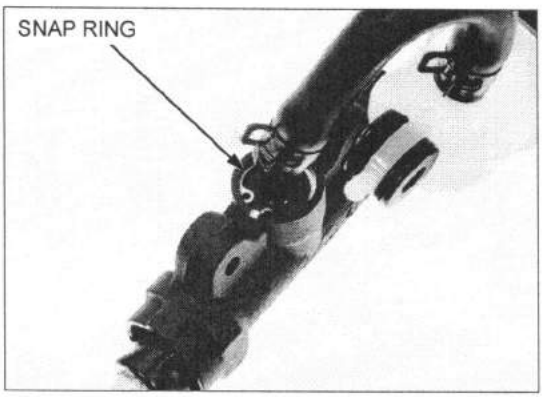


Remove the cotter pin, joint pin, and brake pedal from the rear master cylinder.



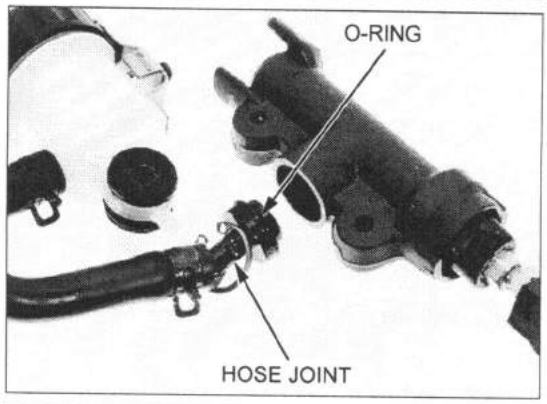
DISASSEMBLY

Remove the snap ring.



Disconnect the hose joint from the master cylinder.

Remove the O-ring from the hose joint.

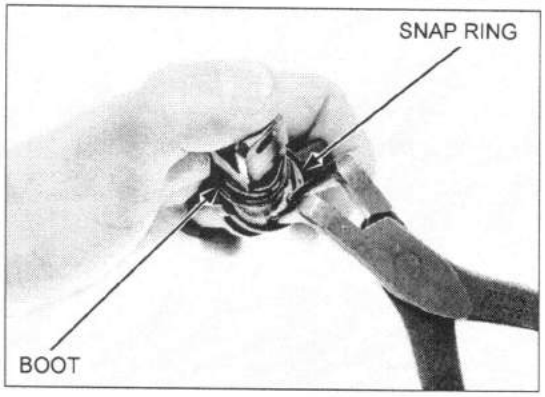


Be careful not to damage the boot.

Remove the boot from the master cylinder body.

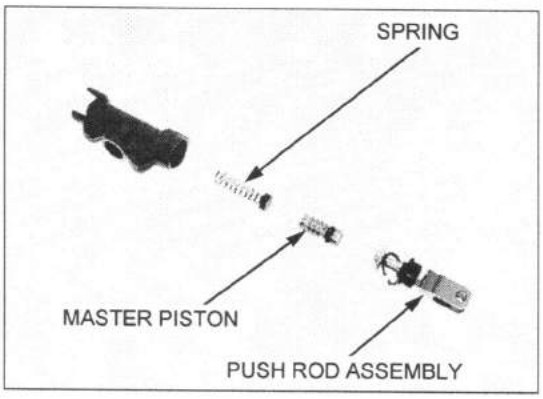
Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers **07914-SA50001**



Remove the push rod assembly, master piston, and spring.

Clean the inside of the cylinder with clean brake fluid.



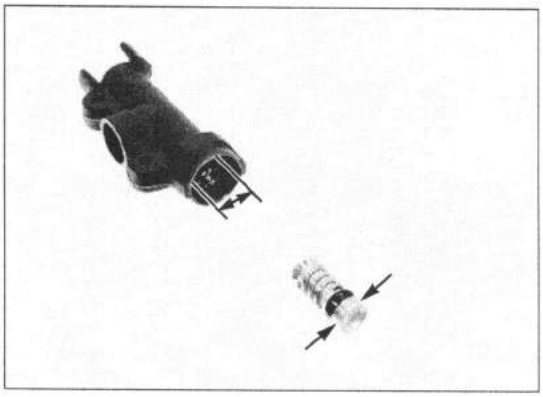
INSPECTION

Check the piston boot, primary cup, and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

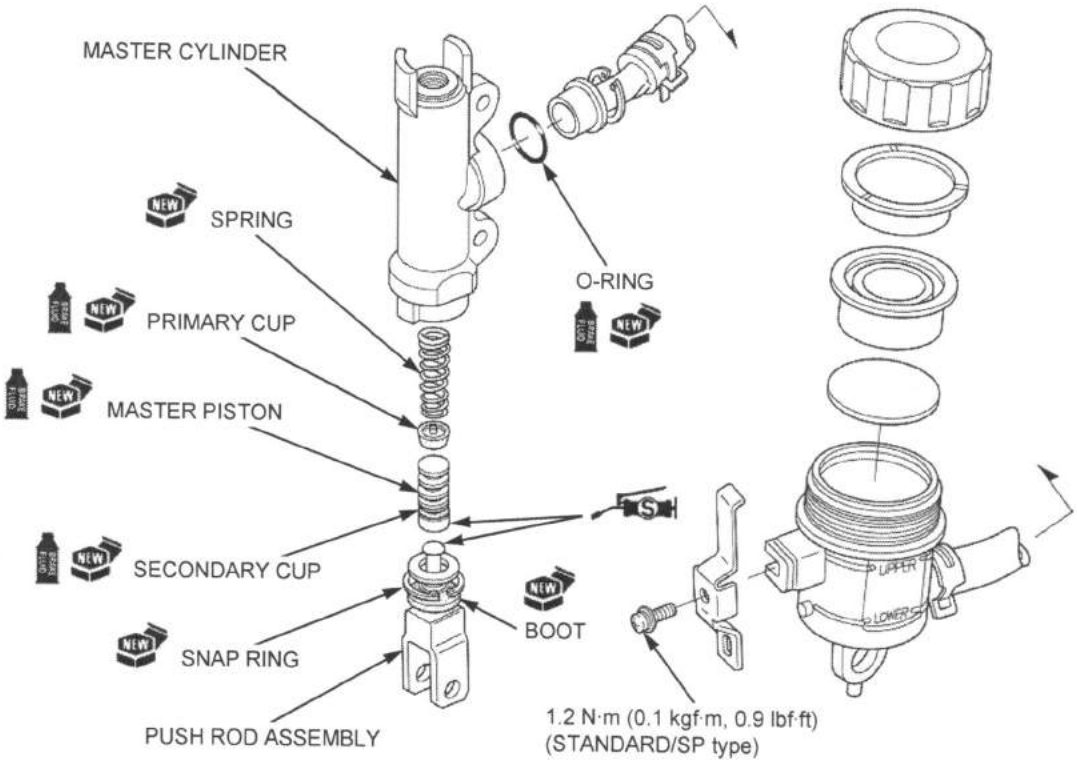
SERVICE LIMIT: 14.043 mm (0.5529 in)

Measure the master cylinder piston O.D.

SERVICE LIMIT: 13.957 mm (0.5495 in)



ASSEMBLY

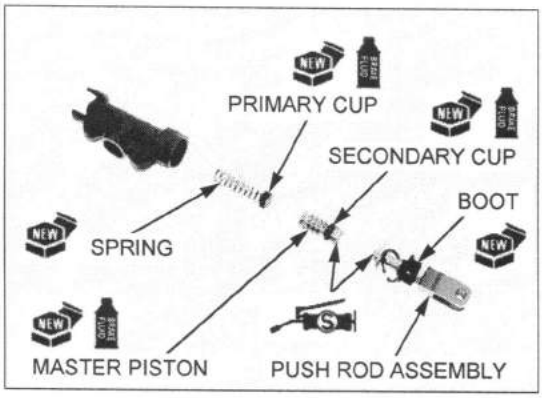


- Keep the piston, cups, spring, snap ring, and boot as a set; do not replace the parts individually.

Coat new piston cups and piston with clean brake fluid before assembly.

When installing the cup, do not allow the lips to turn inside out.

Install the spring to the master piston.
Install the secondary cup to the master piston.
Install the spring/primary cup and master piston assembly into the master cylinder.
Apply silicone grease to the piston contact area of the push rod.



Install the push rod assembly into the master cylinder.

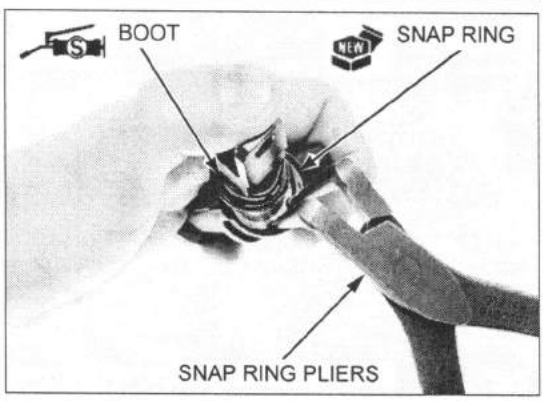
After installing the snap ring, always rotate it in its groove to be sure it is fully seated.

Install the snap ring with the special tool.

TOOL:

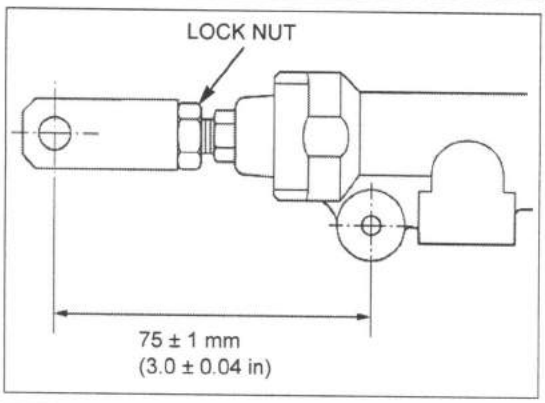
Snap ring pliers	**07914-SA50001**

Install the boot.

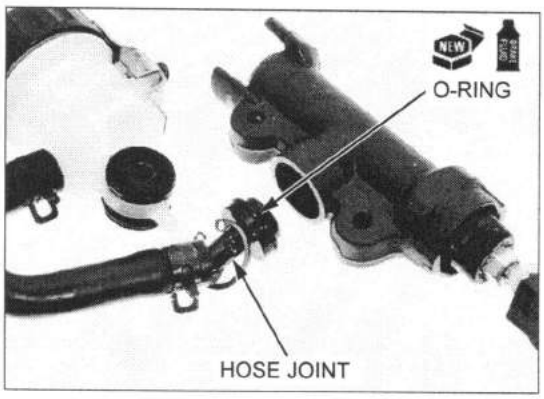


If the push rod is disassembled, adjust the push rod length so that the distance between the center of the master cylinder lower mounting bolt hole and joint pin hole is 75 ± 1 mm (3.0 ± 0.04 in). After adjustment, tighten the lock nut to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

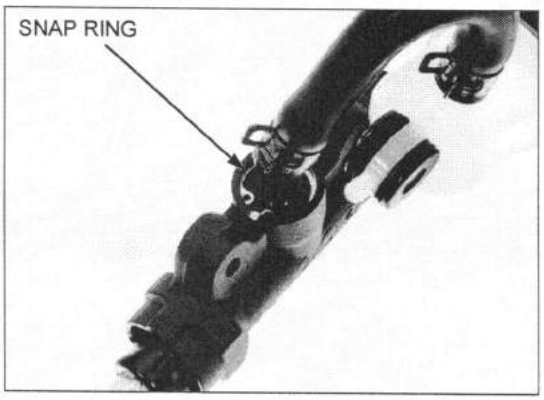


Apply brake fluid to a new O-ring and install it to the hose joint.
Connect the hose joint to the master cylinder.

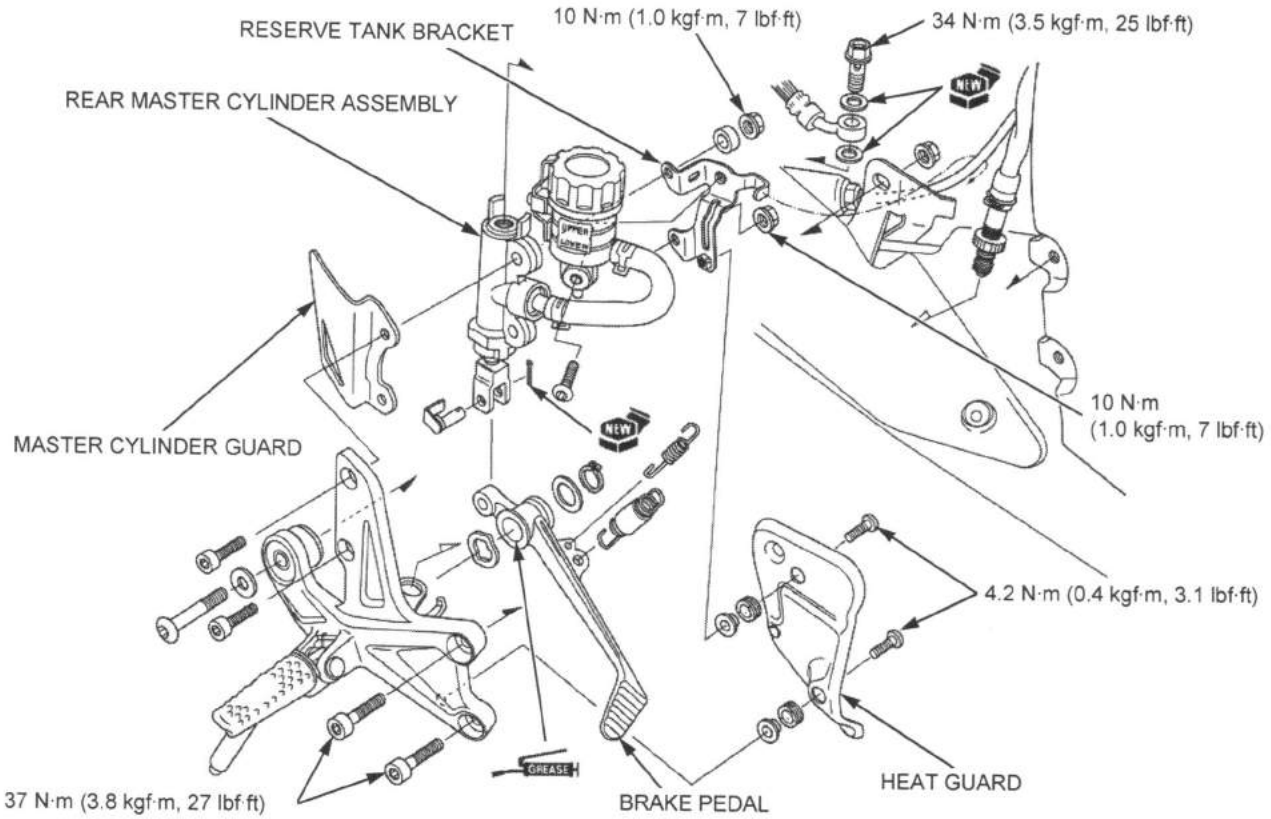


After installing the snap ring, always rotate it in its groove to be sure it is fully seated.

Install the snap ring securely.

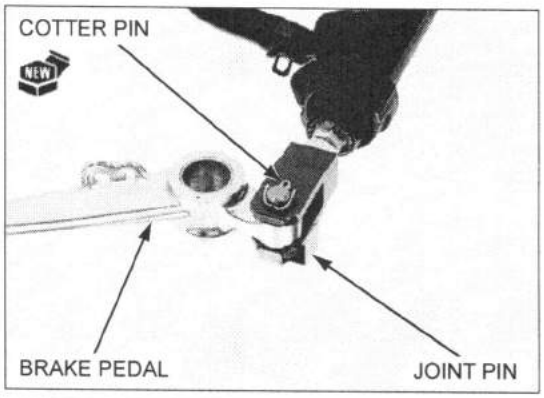


INSTALLATION



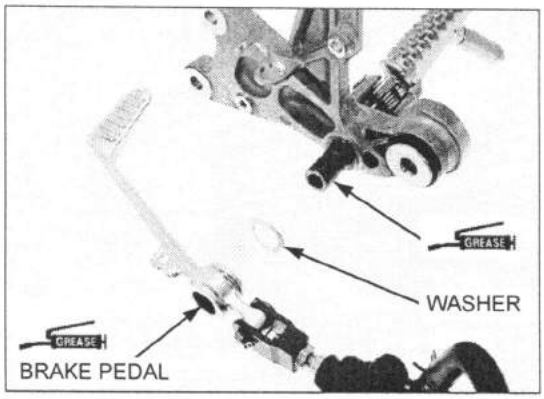
Install the brake pedal and joint pin.

Install a new cotter pin securely as shown.



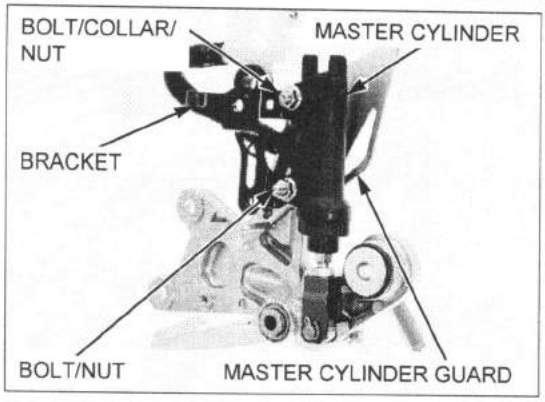
Apply grease to the rear brake pedal pivot sliding surface.

Install the wave washer and brake pedal.



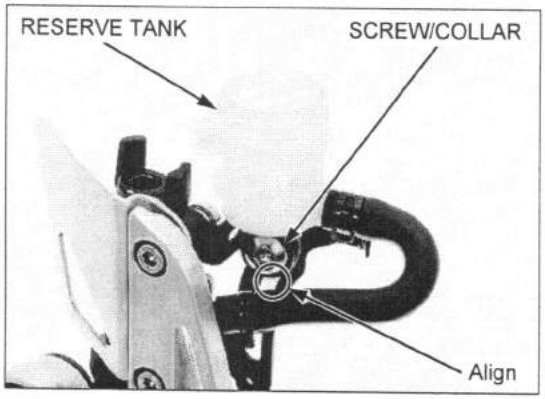
Install the master cylinder guard, rear master cylinder, reserve tank bracket, bolts, collar, and tighten the nuts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



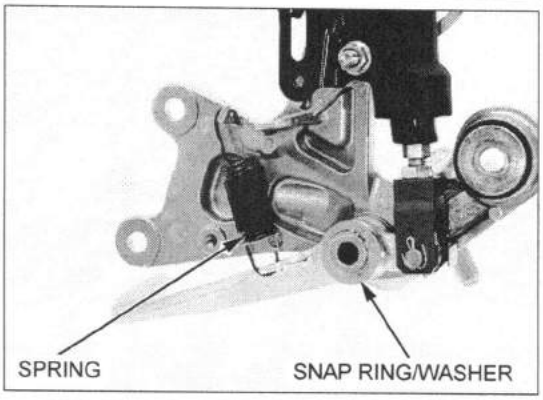
Align the reserve tank lower tab with the reserve tank bracket hole.

Install the reserve tank and tighten the screw with collar securely.

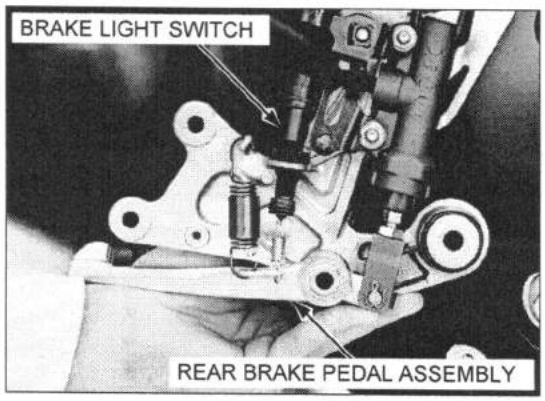


Install the washer and snap ring to the brake pedal pivot.

Install the rear brake pedal return spring securely.

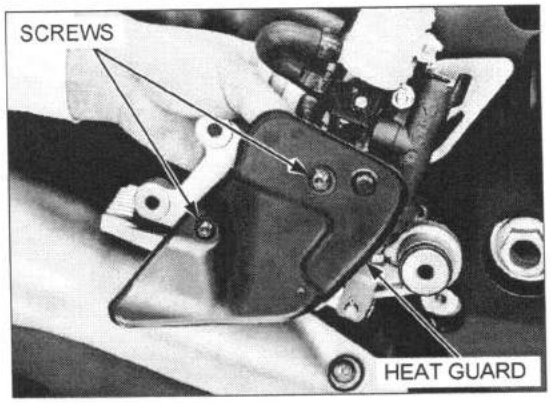


Install the rear brake light switch and connect the spring securely.

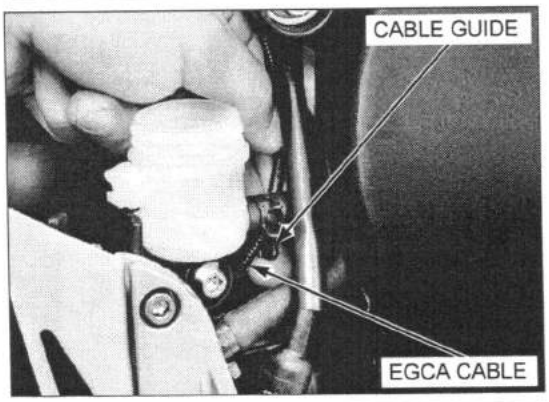


Install the main step heat guard and tighten the screws to the specified torque.

TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)



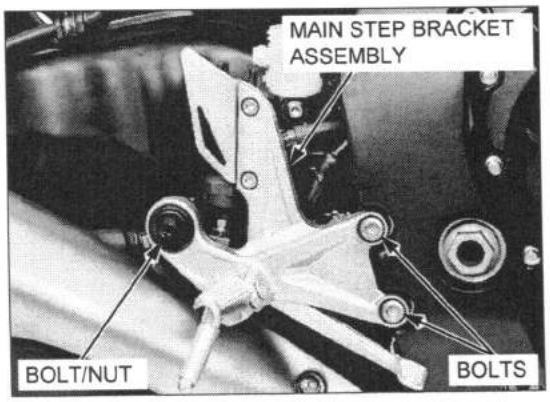
Route the EGCA cable to the cable guide.



Install the main step bracket assembly and tighten the bolts to the specified torque.

TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)

Install the muffler mounting bolt and tighten the nut securely.



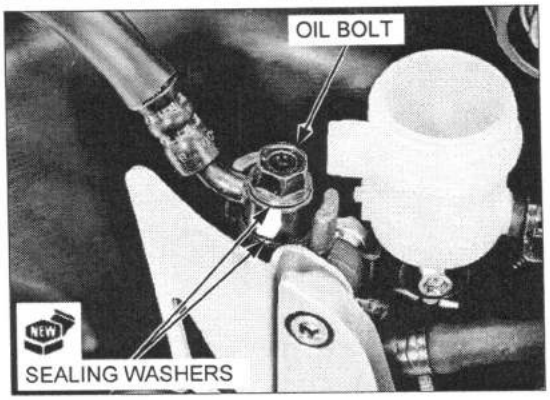
Install the brake hose with the oil bolt and new sealing washers.
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the hydraulic system.

- STANDARD/SP type (page 16-9)
- '09 – '13 model ABS type (page 16-32)
- After '13 model ABS type (page 16-63)

Adjust the rear brake pedal height (page 4-39).



FRONT BRAKE CALIPERS (STANDARD/ABS type)

NOTICE

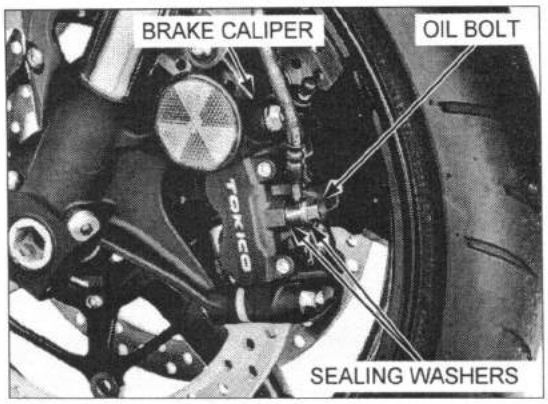
Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

REMOVAL

Drain the front brake hydraulic system (page 16-9).

Remove the brake hose oil bolt, sealing washers, and brake hose eyelet joint.

Remove the brake pads (page 16-73).



DISASSEMBLY

Place a shop towel between each piston.

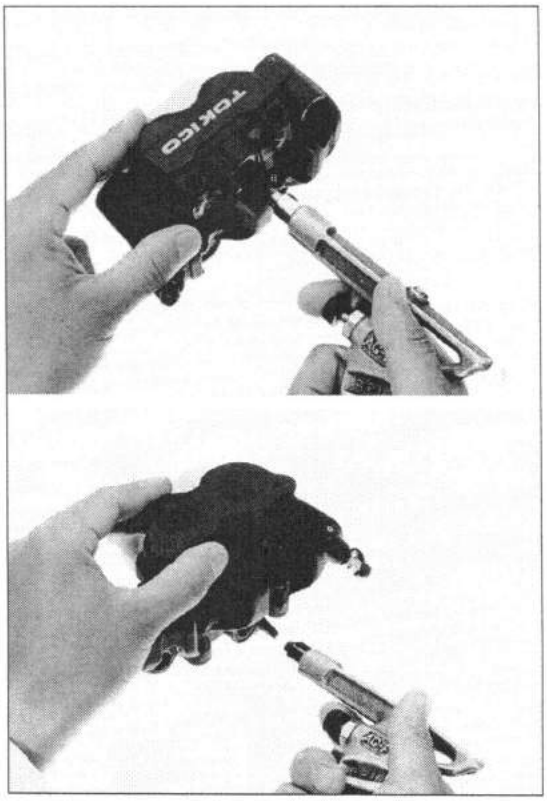
Apply short bursts of air pressure to the fluid inlet to remove the pistons.

Remove the following:

- Caliper pistons A
- Caliper pistons B

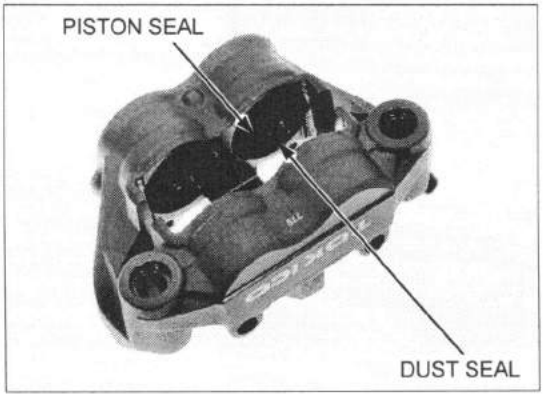
NOTE:

- Be careful not to damage each piston.
- Do not use high pressure air or bring the nozzle too close to the inlet.
- Mark the pistons to ensure correct reassembly.



Be careful not to damage the piston sliding surface.

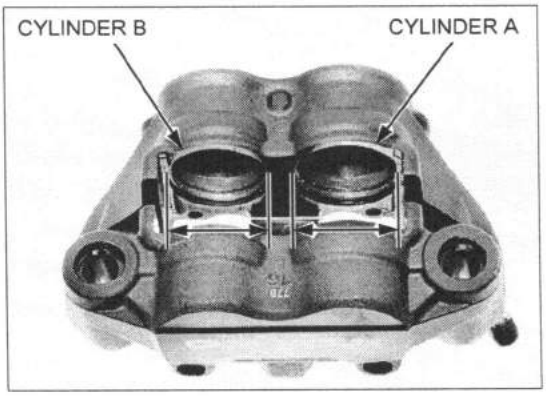
Push the dust seals and piston seals in and lift them out.
Clean the seal grooves with clean brake fluid.



INSPECTION

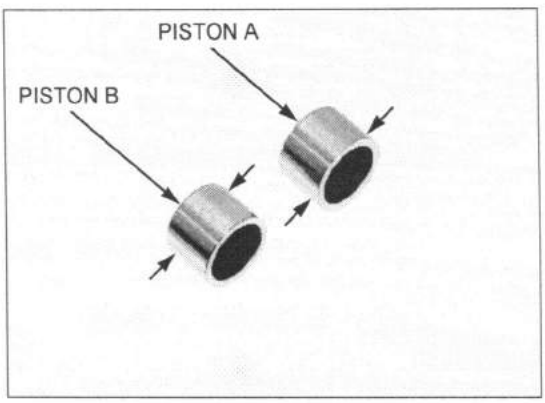
Check the caliper cylinder for scoring or other damage.
Measure the caliper cylinder I.D.

SERVICE LIMITS:
Cylinder A: 32.130 mm (1.2650 in)
Cylinder B: 30.330 mm (1.1941 in)

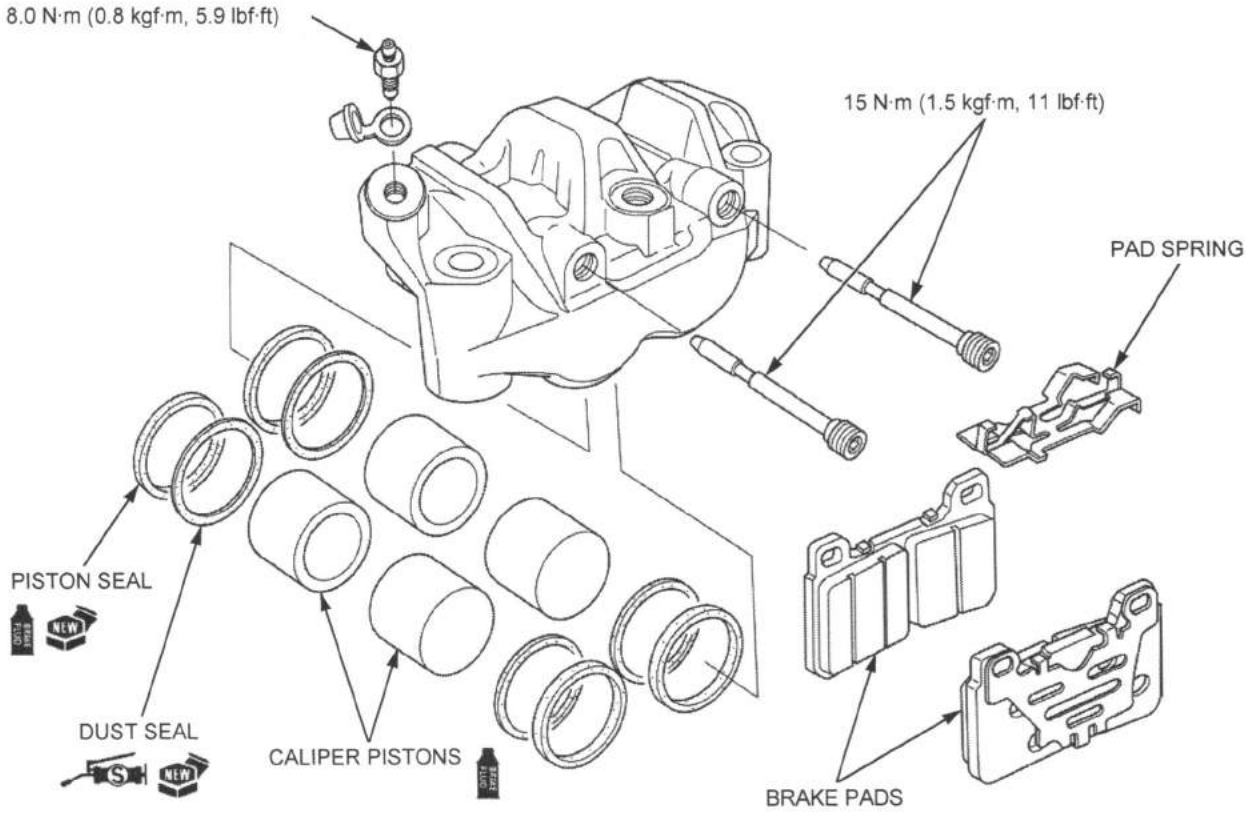


Check the caliper pistons for scratches, scoring, or other damage.
Measure the O.D. of each caliper piston.

SERVICE LIMITS:
Piston A: 31.967 mm (1.2585 in)
Piston B: 30.167 mm (1.1877 in)



ASSEMBLY

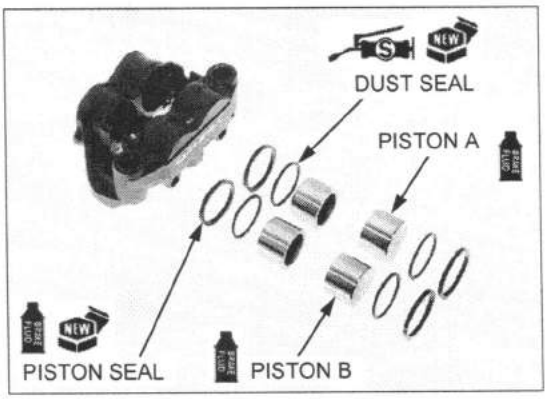


Coat new piston seals with clean brake fluid.
Coat new dust seals with silicone grease.

Install each piston seal, dust seal and caliper piston in their proper locations.

Install the piston and dust seals into the grooves of the caliper body.
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.

- Piston A: large O.D.
- Piston B: small O.D.



INSTALLATION

Install the brake pads (page 16-73).

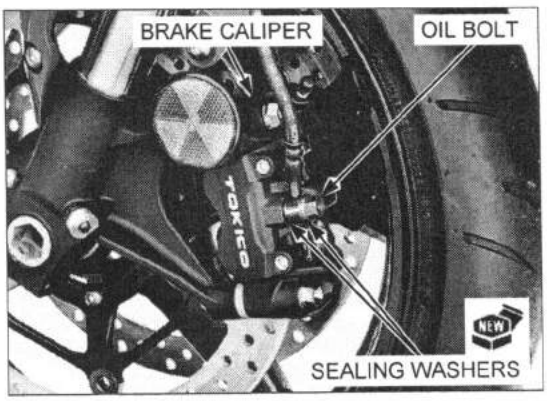
Install the brake hose eyelet joint to the caliper body with new sealing washers and oil bolt.

Push the brake hose eyelet joint to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the hydraulic system.

- STANDARD type (page 16-9)
- '09 – '13 model ABS type (page 16-18)
- After '13 model ABS type (page 16-52)



FRONT BRAKE CALIPERS (SP type)

NOTICE

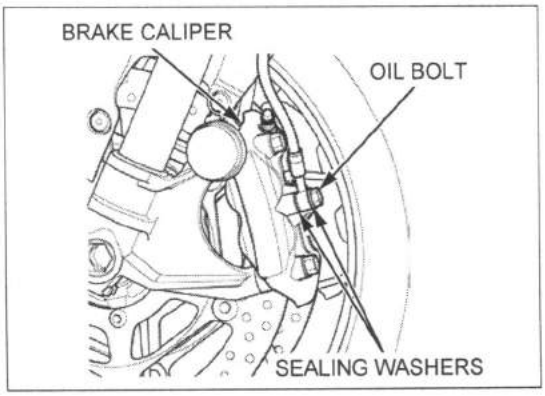
Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

REMOVAL

Drain the front brake hydraulic system (page 16-9).

Remove the brake hose oil bolt, sealing washers, and brake hose eyelet joint.

Remove the brake pads (page 16-75).



DISASSEMBLY/INSPECTION

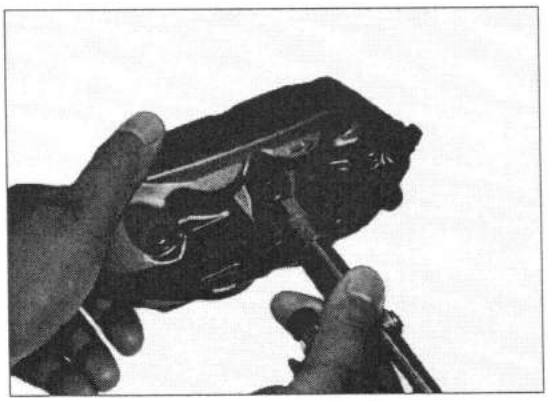
Place a piece of wood between the pistons.

Apply short bursts of air pressure to the fluid inlet to remove the pistons.

- Caliper pistons A (upper; 32 mm O.D.)
- Caliper pistons B (lower; 30 mm O.D.)

NOTE:

- Be careful not to damage each piston.
- Do not use high pressure air or bring the nozzle too close to the inlet.
- Mark the pistons to ensure correct reassembly.

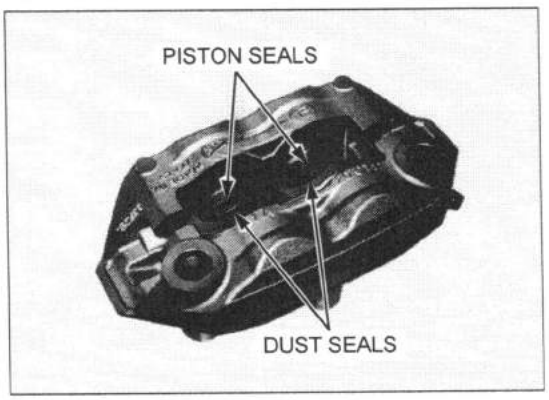


Be careful not to damage the piston sliding surface.

Push the dust seals and piston seals in and lift them out.

Clean the seal grooves with clean brake fluid.

Check the caliper cylinder and pistons for scoring or other damage.



ASSEMBLY

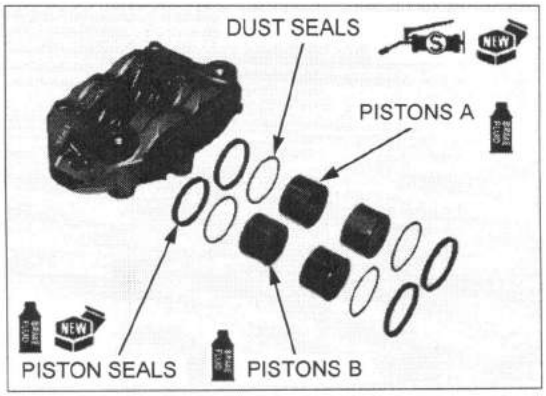
Coat new piston seals with clean brake fluid.
Coat new dust seals with silicone grease.

Install each piston seal, dust seal and caliper piston in their proper locations.

Install the piston and dust seals into the grooves of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.

- Caliper pistons A (upper; 32 mm O.D.)
- Caliper pistons B (lower; 30 mm O.D.)



INSTALLATION

Install the caliper with the arrow facing up.

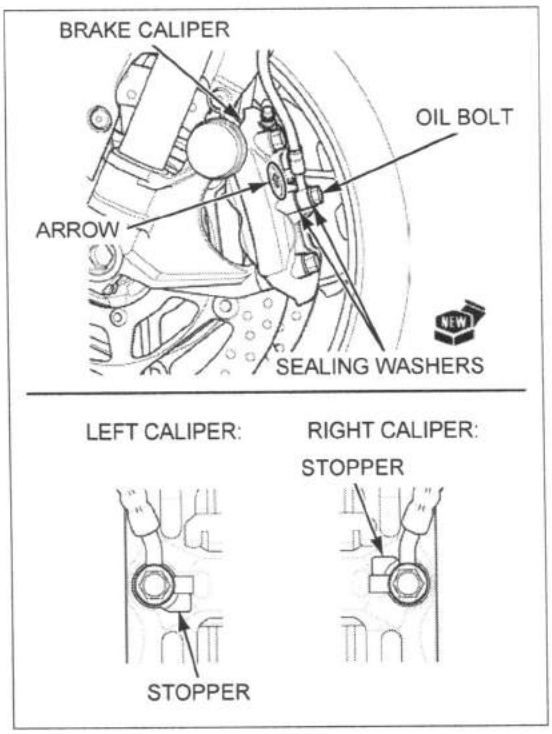
Install the brake pads (page 16-75).

Install the brake hose eyelet joint to the caliper body with new sealing washers and oil bolt.

Be sure to rest the stopper pin of the eyelet joint to the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the front hydraulic system (page 16-10).



REAR BRAKE CALIPER

NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

REMOVAL

Drain the rear brake hydraulic system (page 16-9).

Remove the rear brake pads (page 16-76).

ABS type: Remove the rear wheel speed sensor (page 17-48).

Remove the oil bolt, sealing washers, and brake hose eyelet joint.

Remove the rear wheel (page 15-8).



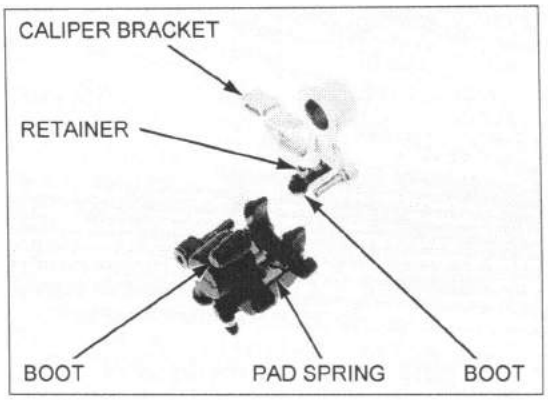
DISASSEMBLY

Remove the caliper bracket from the brake caliper.

Remove the pad spring from the caliper body.

Remove the retainer from the caliper bracket.

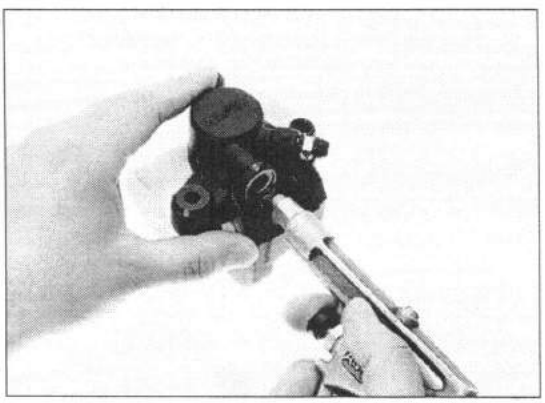
Remove the caliper pin boot and bracket pin boot.



Place a shop towel over the piston.

Do not use high pressure air or bring the nozzle too close to the inlet.

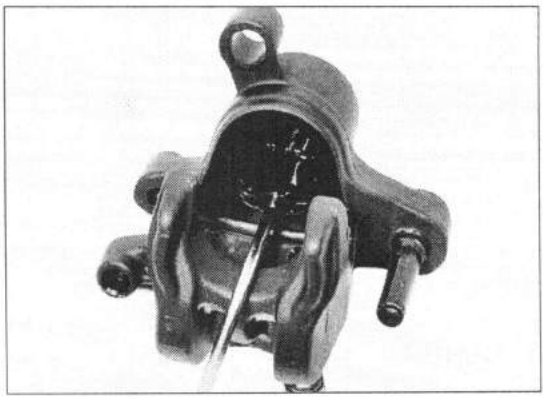
Position the caliper body with the piston down and apply short bursts of air pressure to the fluid inlet to remove the piston.



Be careful not to damage the piston sliding surface.

Push the dust seal and piston seal in and lift them out.

Clean the seal grooves with clean brake fluid.

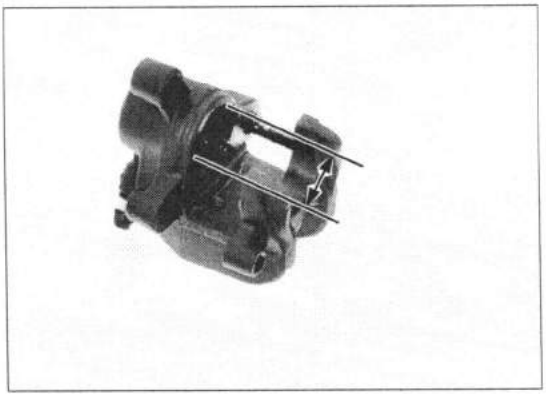


INSPECTION

Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

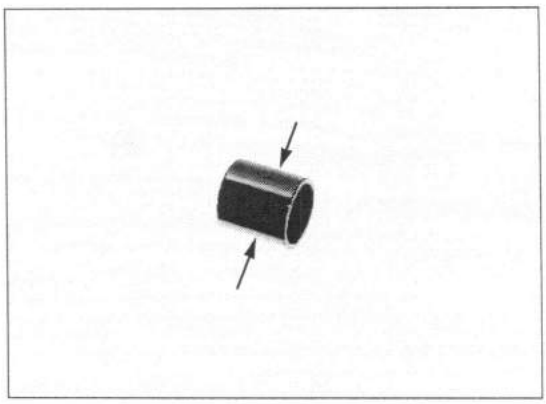
SERVICE LIMIT: 30.280 mm (1.1921 in)



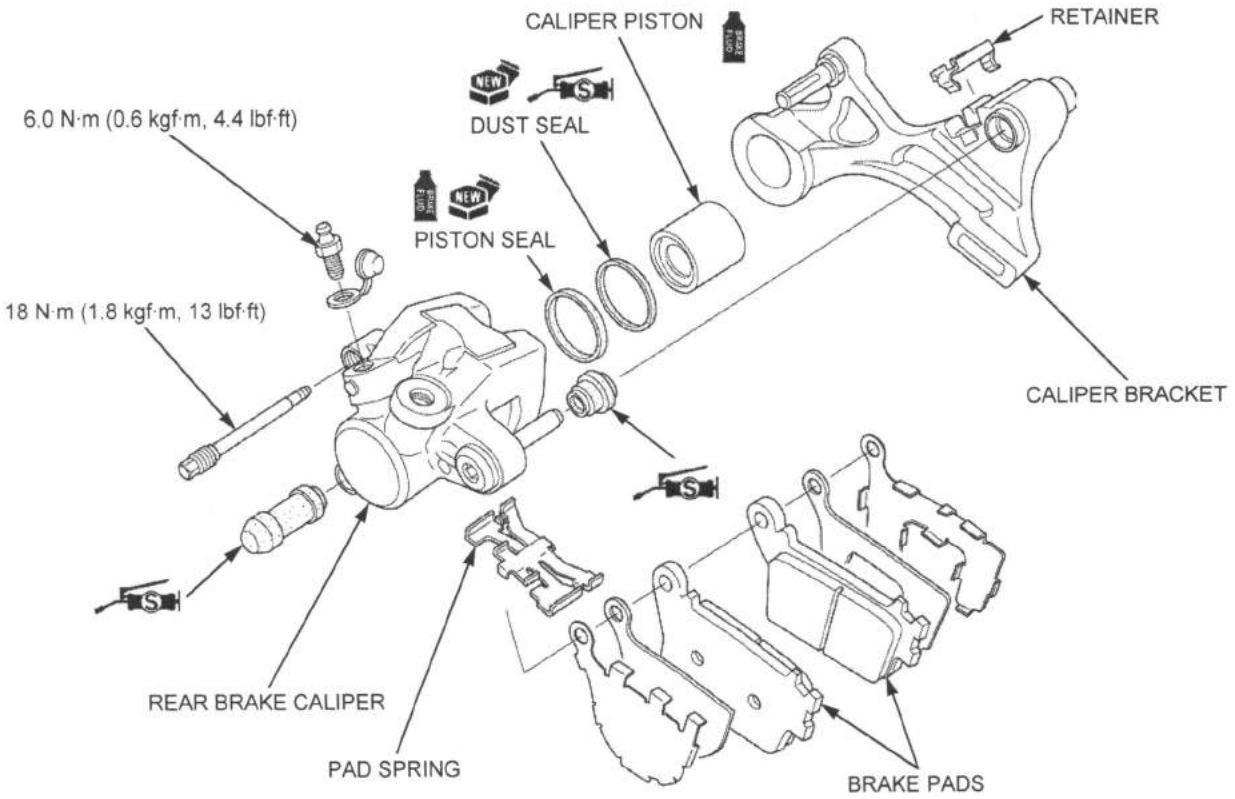
Check the caliper piston for scratches, scoring, or other damage.

Measure the caliper piston O.D.

SERVICE LIMIT: 30.082 mm (1.1843 in)



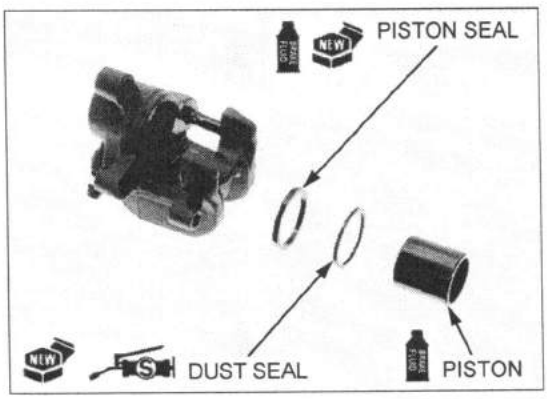
ASSEMBLY



Coat a new piston seal with clean brake fluid.
Coat a new dust seal with silicone grease.

Install the piston seal and dust seal into the groove of the caliper body.

Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with its open end toward the pad.



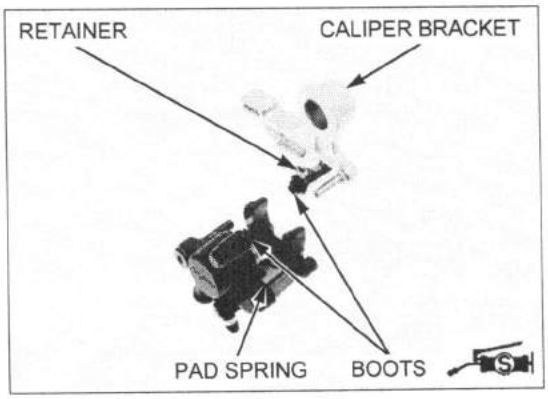
Install the retainer onto the caliper bracket.

Install the pad spring into the caliper body.

If boot is hard or deteriorated, replace it with a new one.

Apply silicone grease to the inside of the boot and its sliding surface.

Install the caliper bracket to the brake caliper.

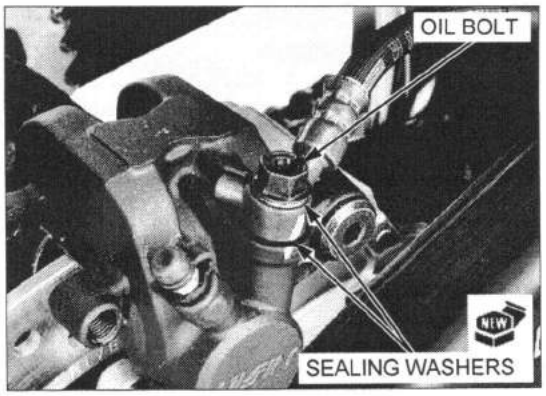


INSTALLATION

Install the rear wheel (page 15-17).

Install the brake hose eyelet joint to the caliper body with new sealing washers and oil bolt.
Push the brake hose eyelet joint to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



ABS type: Install the rear wheel speed sensor (page 17-48).

Install the rear brake pads (page 16-76).

Fill and bleed the hydraulic system.

- STANDARD/SP type (page 16-9)
- '09 – '13 model ABS type (page 16-32)
- After '13 model ABS type (page 16-63)

17. COMBINED ABS

COMPONENT LOCATION 17-2

SERVICE INFORMATION 17-3

COMBINED ABS SYSTEM DIAGRAM 17-4

COMBINED ABS CONNECTOR LOCATIONS 17-5

COMBINED ABS TROUBLESHOOTING INFORMATION 17-7

COMBINED ABS INDICATOR DIAGNOSTIC TROUBLE CODE (DTC) INDEX 17-11

COMBINED ABS INDICATOR CIRCUIT TROUBLESHOOTING 17-13

TROUBLESHOOTING 17-16

WHEEL SPEED SENSOR 17-47

COMBINED ABS CONTROL UNIT 17-50

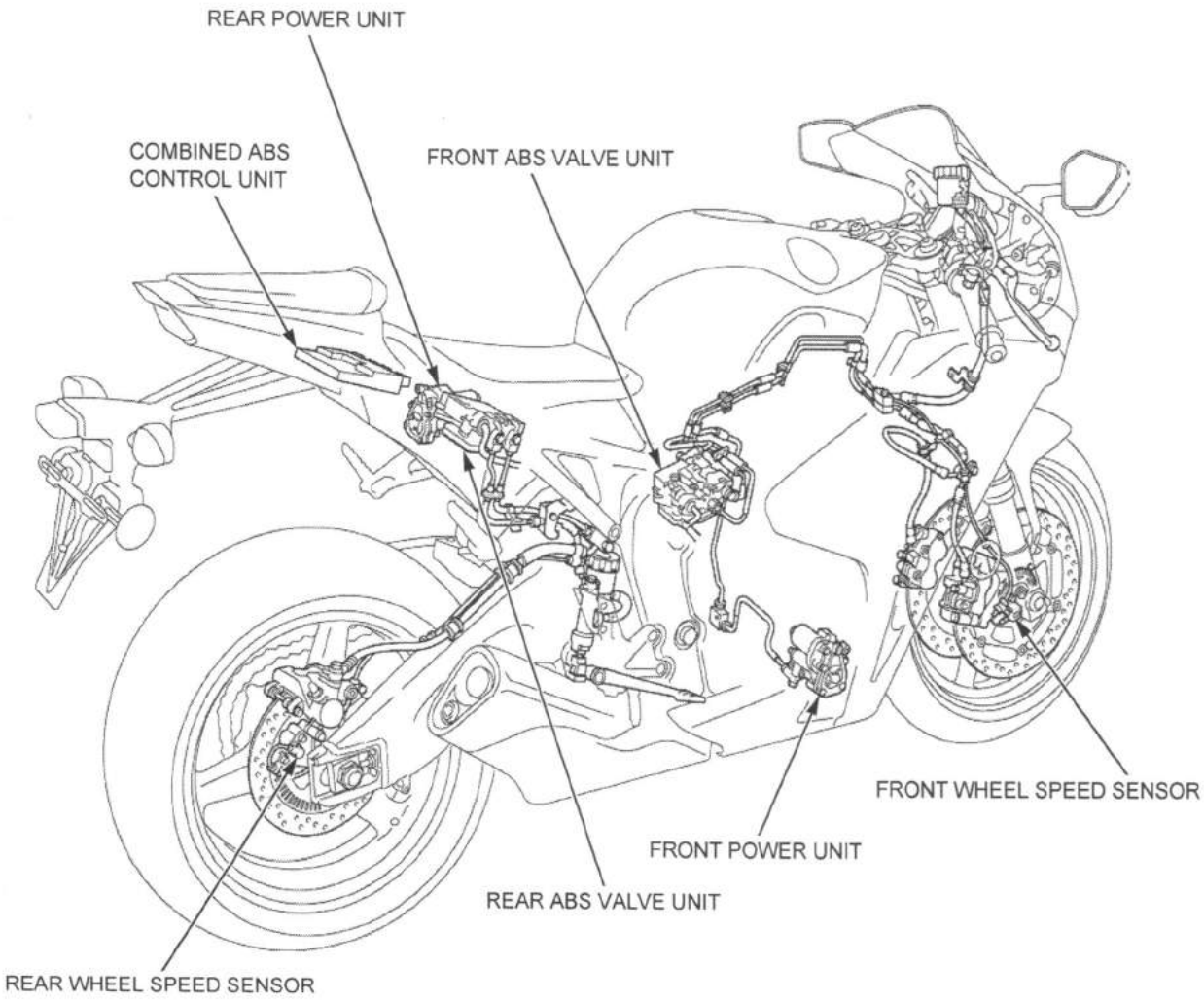
FRONT ABS VALVE UNIT 17-50

FRONT POWER UNIT 17-57

REAR ABS VALVE UNIT/ POWER UNIT 17-63

COMPONENT LOCATION

'09 – '11 model shown:



SERVICE INFORMATION

GENERAL

NOTICE

The Combined ABS control unit, ABS valve unit or power unit may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the Combined ABS control unit. Always turn the ignition switch to OFF before servicing.

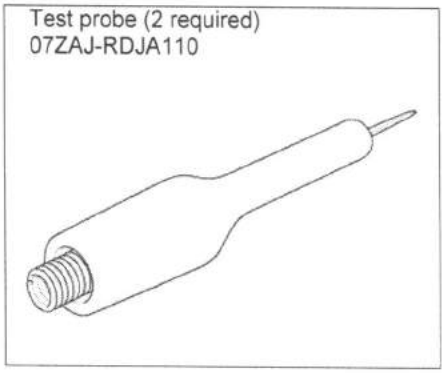
- This section covers service of the Combined ABS. For other service (conventional brake) of the brake system, see Hydraulic Brake section (page 16-6).
- When the Combined ABS control unit detects a problem, it stops the Combined ABS function and switches back to the conventional brake operation, and the Combined ABS indicator blinks or it stays on. Take care during the test ride.
- Troubles not resulting from a faulty Combined ABS (e.g., brake disc squeak, unevenly worn brake pad) cannot be recognized by the Combined ABS diagnosis system.
- Read "Combined ABS Troubleshooting Information" carefully, inspect and troubleshoot the Combined ABS according to the Diagnostic Troubleshooting. Observe each step of the procedures one by one. Write down the problem code and probable faulty part before starting diagnosis and troubleshooting.
- After troubleshooting, clear the problem code and perform the pre-start self-diagnosis to be sure that the Combined ABS indicator is operating normally.
- Do not disassemble the ABS valve unit or power unit. Replace them with new ones when they are faulty.
- When the wheel speed sensor and/or pulser ring is replaced, check the clearance (air gap) between both components.

TORQUE VALUES

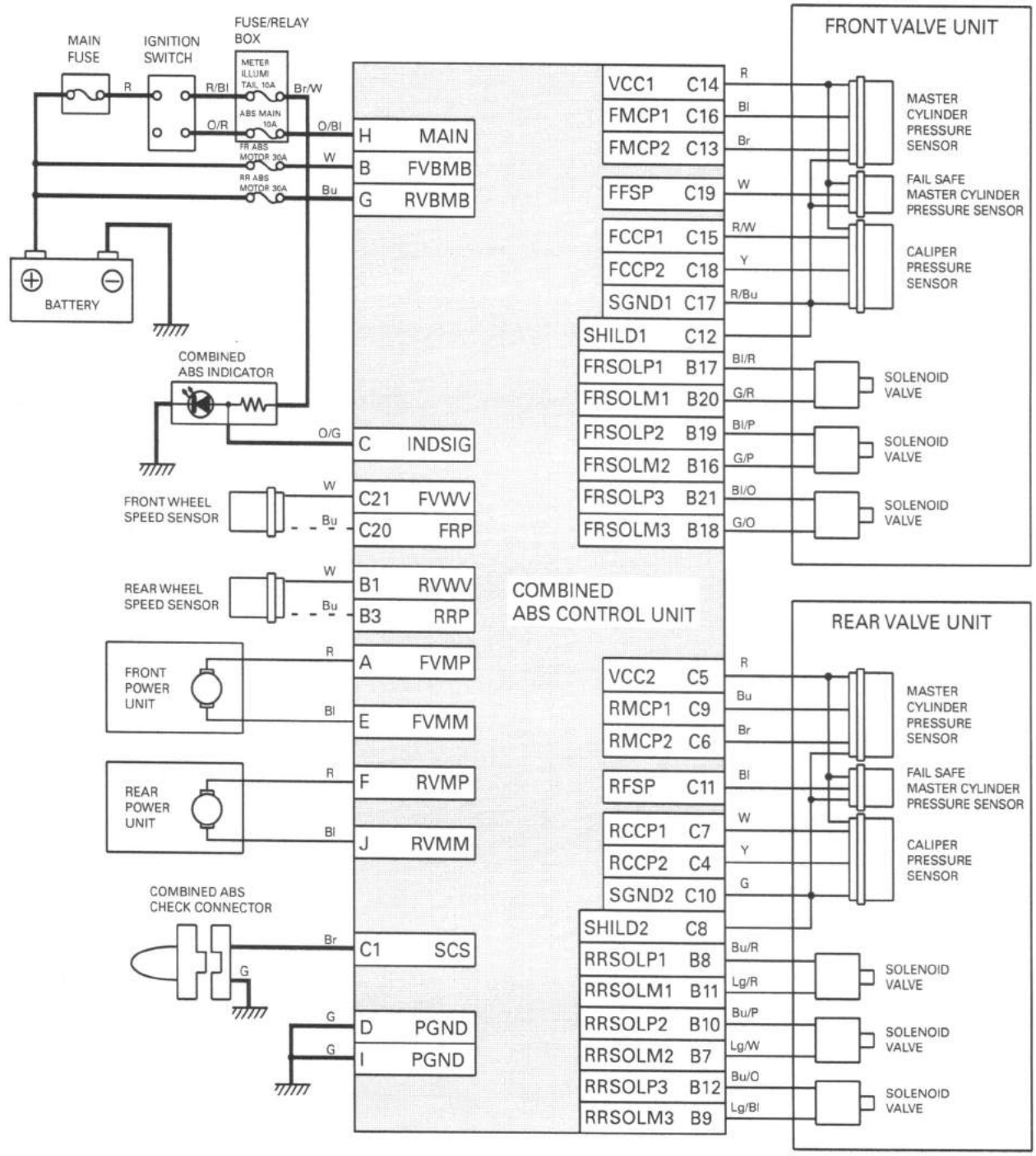
Brake pipe joint nut	14 N·m (1.4 kgf·m, 10 lbf·ft)	Apply brake fluid to the threads.
Brake pipe joint bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
ABS valve unit bleed valve	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)	
Power unit bleed valve	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)	

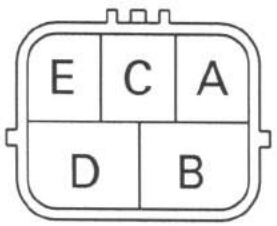
TOOL

Test probe (2 required)
07ZAJ-RDJA110

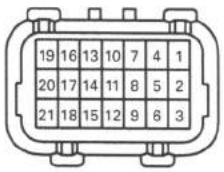


COMBINED ABS SYSTEM DIAGRAM

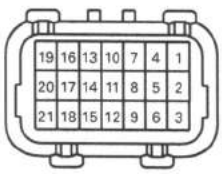




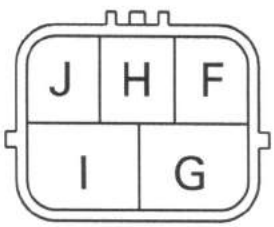
5P (BLACK) CONNECTOR A



21P (GRAY) CONNECTOR B



21P (BLACK) CONNECTOR C

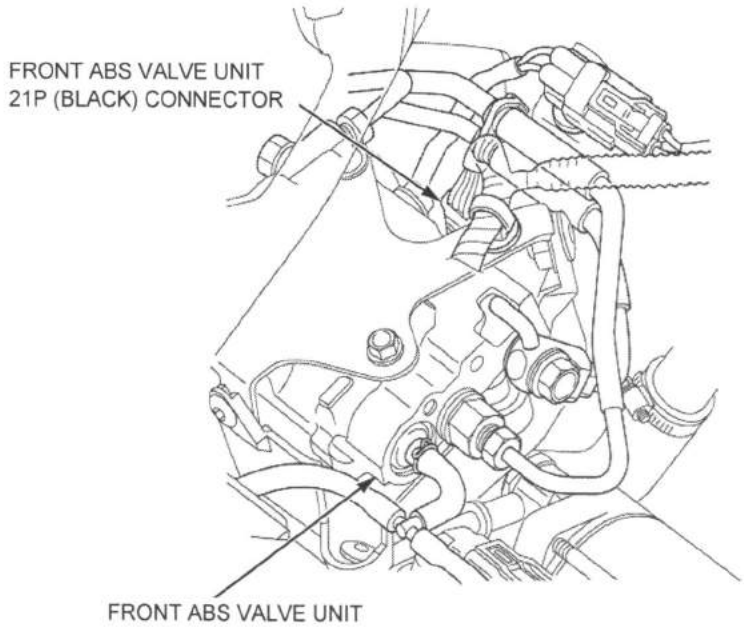


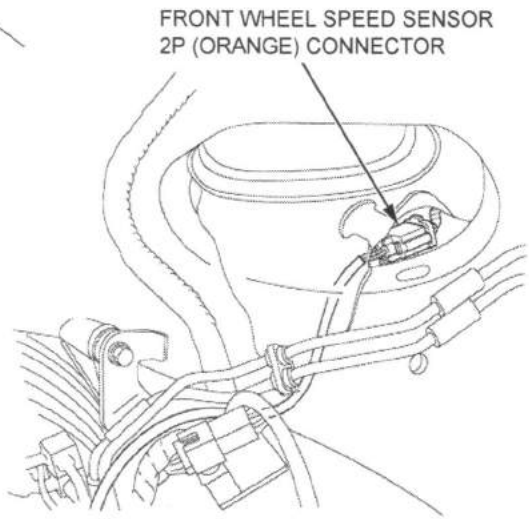
5P (GRAY) CONNECTOR D

Br : Brown
Bl : Black
Y : Yellow
Bu : Blue
G : Green
R : Red
W : White
O : Orange
Lg : Light green
P : Pink

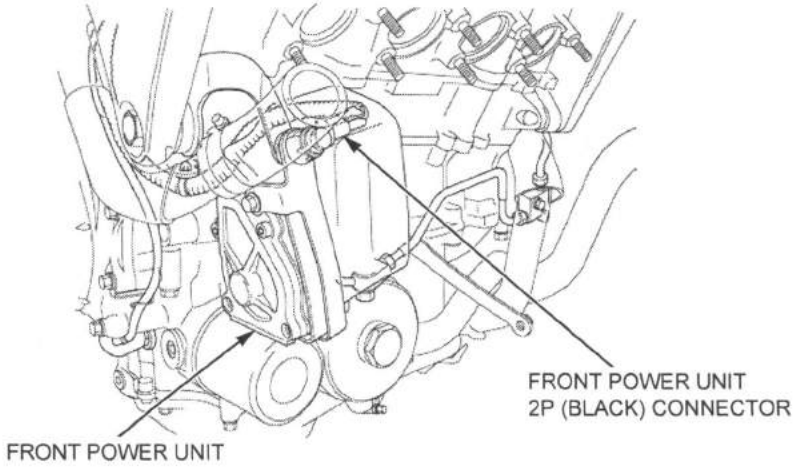
COMBINED ABS CONNECTOR LOCATIONS

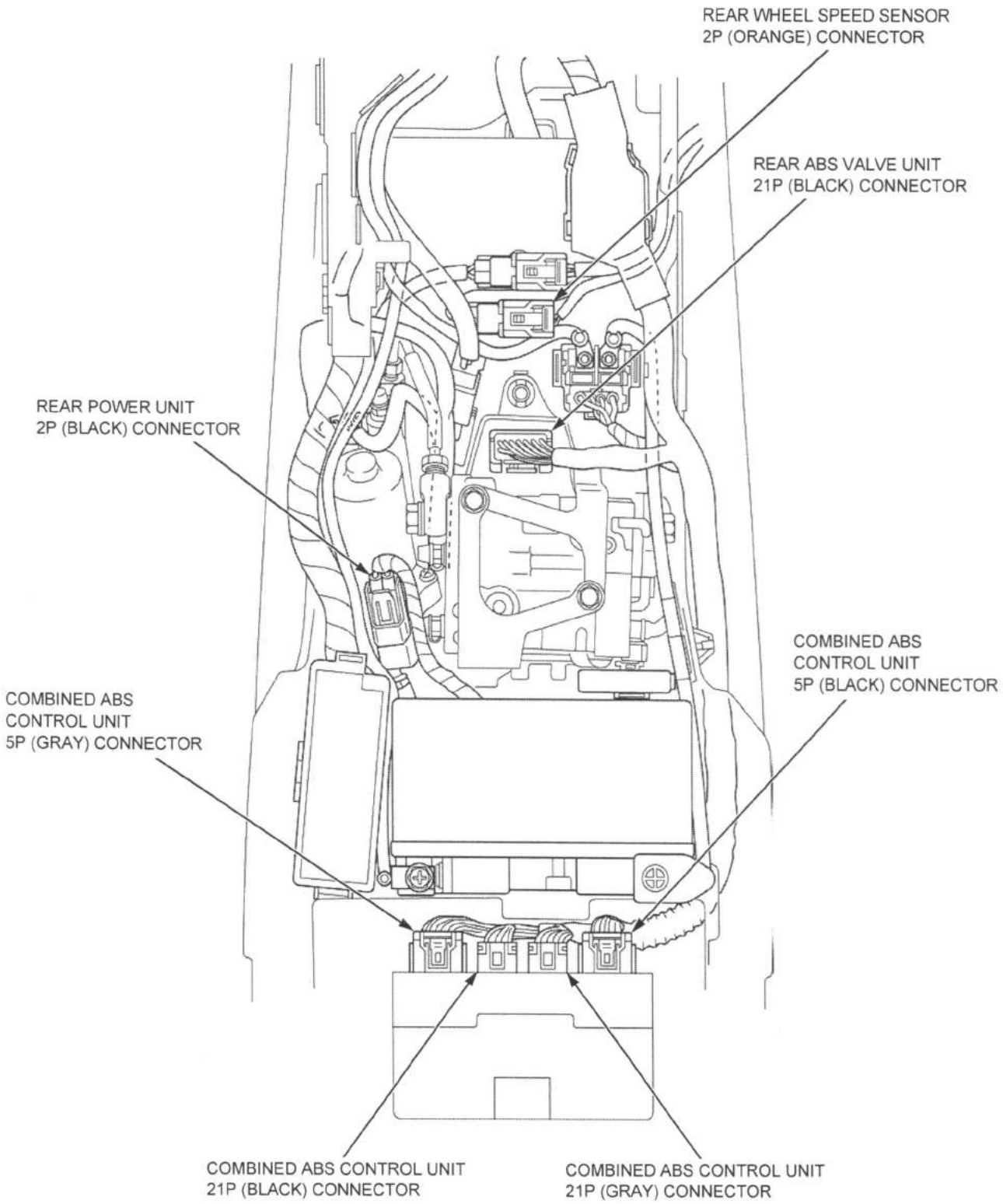
NOTE:
Lift and support the fuel tank (page 4-7).





NOTE:
Remove the exhaust pipe (page 3-64).




REAR WHEEL SPEED SENSOR
2P (ORANGE) CONNECTOR
REAR ABS VALVE UNIT
21P (BLACK) CONNECTOR
REAR POWER UNIT
2P (BLACK) CONNECTOR
COMBINED ABS
CONTROL UNIT
5P (BLACK) CONNECTOR
COMBINED ABS
CONTROL UNIT
5P (GRAY) CONNECTOR
COMBINED ABS CONTROL UNIT
21P (BLACK) CONNECTOR
COMBINED ABS CONTROL UNIT
21P (GRAY) CONNECTOR

COMBINED ABS TROUBLESHOOTING INFORMATION

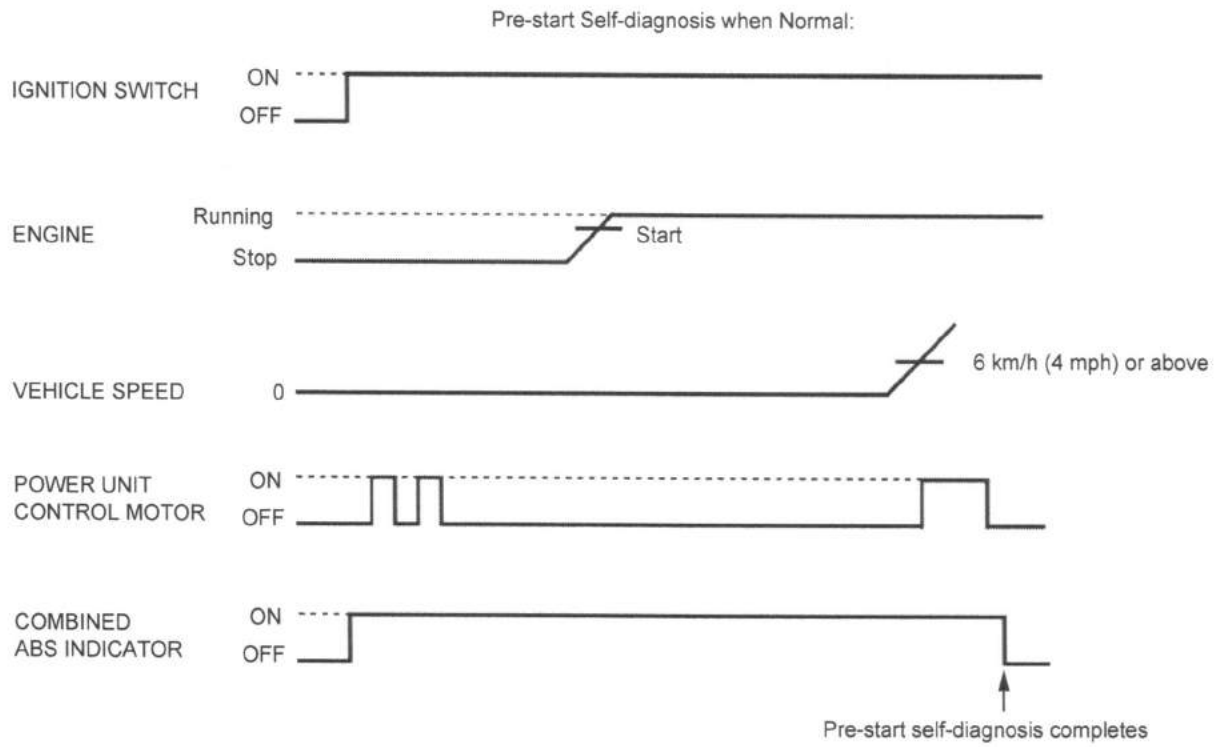
SYSTEM DESCRIPTION

SUMMARY OF COMBINED ABS PRE-START SELF-DIAGNOSIS SYSTEM

The Combined ABS pre-start self-diagnosis system diagnoses the electrical system as well as the operating status of the ABS valve unit and power unit. When there is any abnormality, the problem and associated part can be detected by reading the Diagnostic Trouble Code (DTC).

When the vehicle speed reaches approximately 6 km/h (4 mph) or more, a wheel speed sensor signal is sent to the Combined ABS control unit, then the Combined ABS pre-start self-diagnosis system operates the control motor (inside the power unit) and thus detects whether the system is operating normally.

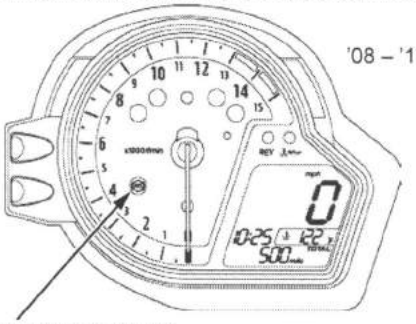
When the Combined ABS is normal, the Combined ABS indicator goes off indicating that the diagnosis is completed.
If a problem is detected, the Combined ABS indicator blinks or comes on and stays on to notify the rider of the problem. The system continues self-diagnosis whenever the motorcycle is running, and the indicator blinks when a problem is detected.
When the indicator blinks, the cause of the problem can be identified by retrieving the DTC by following the specified retrieval procedure (page 17-8).



PRE-START SELF-DIAGNOSIS PROCEDURE (Daily check)

1. Turn the ignition switch ON and engine stop switch "".
2. Make sure the Combined ABS indicator comes on.
3. Start the engine.
4. Ride the motorcycle and increase the vehicle speed to approximately 6 km/h (4 mph) (pre-start self-diagnosis completed).
5. The Combined ABS is normal if the Combined ABS indicator goes off.

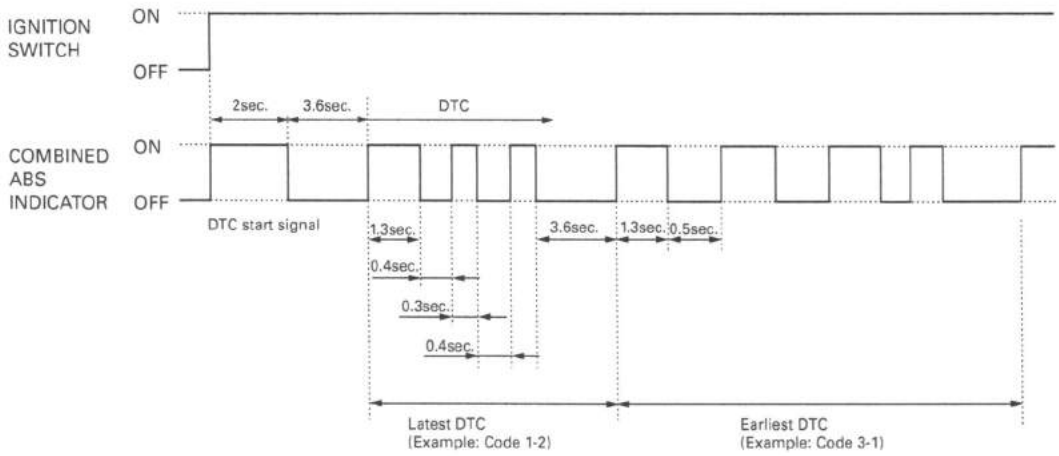
'08 – '11 model shown:



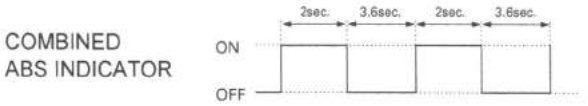
COMBINED ABS INDICATOR

DIAGNOSTIC TROUBLE CODE (DTC) INDICATION PATTERN

- The Combined ABS indicator indicates the DTC by blinking a specified number of times.
  The indicator has two types of blinking, a long blink and short blink. The long blink lasts for 1.3 seconds, the short blink lasts for 0.3 seconds. When one long blinks occur, and two short blinks, that DTC is 1 – 2 (one long blink = 1 blink, two short blinks = 2 blinks). Then, go to troubleshooting and see problem code 1 – 2.
- When the Combined ABS control unit stores two DTCs, the Combined ABS indicator shows the DTCs in the order from the latest to the earliest.



When the DTC is not stored:



DTC READOUT

NOTE:

- The DTC is not cleared by turning the ignition switch OFF while the DTC is being output. Note that turning the ignition switch ON again does not indicate the DTC. To show the DTC again, repeat the DTC retrieval procedures from the beginning. Do not apply the front or rear brake during retrieval.
- After diagnostic troubleshooting, clear the DTC (s) and perform the pre-start self-diagnosis to be sure that there is no problem in the Combined ABS indicator (indicator is operating normally).

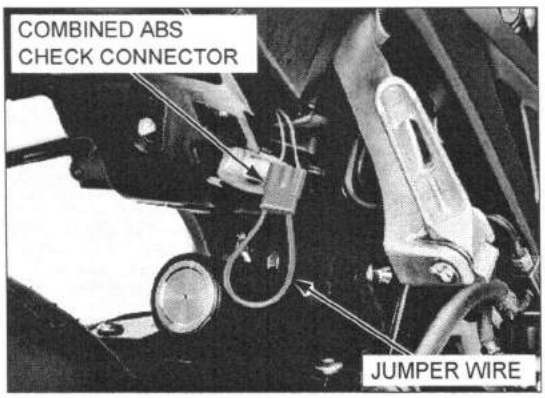
1. Remove the EGCA cover (page 3-54).

   Turn the ignition switch OFF.

   Always use an appropriate jumper wire to prevent damage to the connector terminals.

   Remove the dummy connector and short the Combined ABS check connector terminals with a jumper wire.

   Connection: Brown – Green

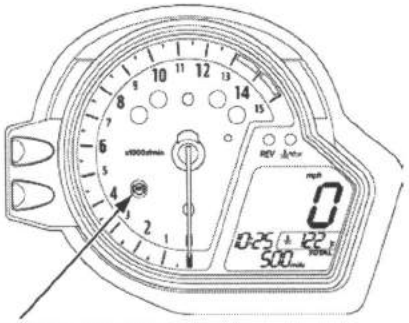


2. Turn the ignition switch ON.

   The Combined ABS indicator starts problem code indication.

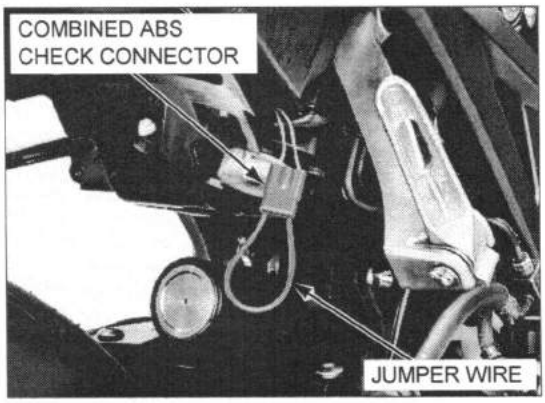
   Note how many times the Combined ABS indicator blinks, and determine the cause of the problem (page 17-11).

'08 – '11 model shown:



COMBINED ABS INDICATOR

3. Turn the ignition switch OFF and remove the jumper wire.

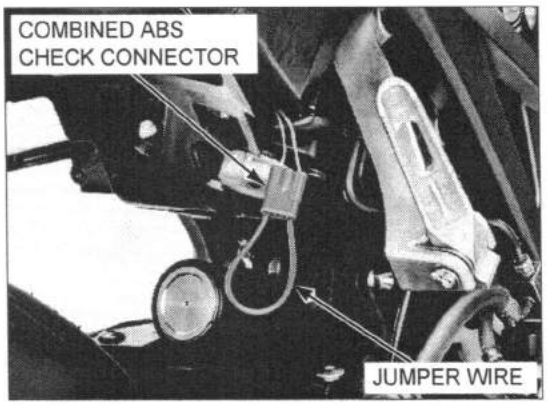


CLEARING DTC

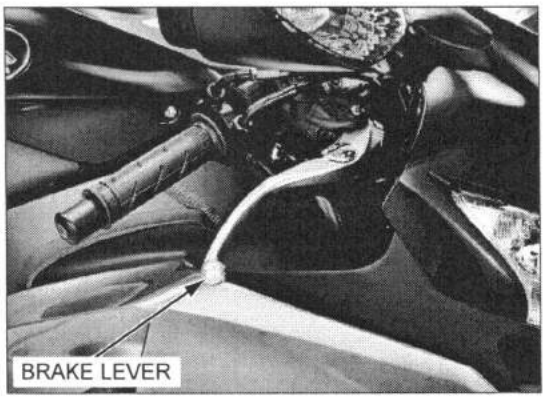
1. Remove the EGCA cover (page 3-54).

   Short the wire terminals of the Combined ABS check 3P (Red) connector with the ignition switch turned OFF in the same manner as retrieval.

   Connection: Brown – Green



2. Turn the ignition switch ON and engine stop switch "○" while squeezing the brake lever.
3. Release the brake lever immediately after the Combined ABS indicator is off. The Combined ABS indicator should come on.
4. Squeeze the brake lever immediately after the Combined ABS indicator is on. The Combined ABS indicator should go off.



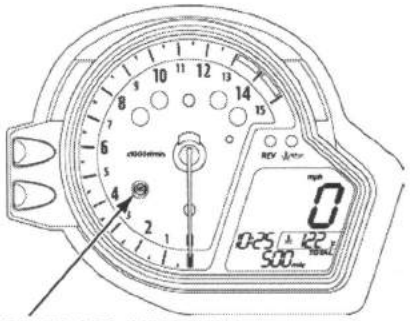
5. Release the brake lever immediately after the Combined ABS indicator goes off.
   When code clear is complete, the Combined ABS indicator blinks 2 times and stays on.

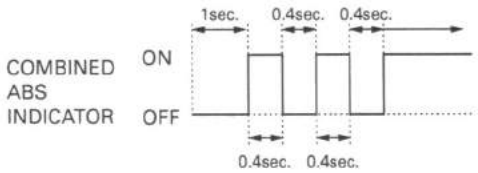
   If the Combined ABS indicator does not blink 2 times, the data has not been erased, so try again.

   If the Combined ABS indicator blinks 2 times and blinks, faulty Combined ABS system, go to Combined ABS troubleshooting (page 17-16).

6. Turn the ignition switch OFF and remove the jumper wire.

'08 – '11 model shown:





COMBINED ABS INDICATOR DIAGNOSTIC TROUBLE CODE (DTC) INDEX

NOTE:

- Before performing any Combined ABS troubleshooting, check the pre-start self-diagnosis (page 17-7).
- The Combined ABS indicator might blink in the following cases. Correct the faulty part.
  - Incorrect tire pressure.
  - Tires not recommended for the motorcycle were installed (incorrect tire size).
  - Deformation of the wheel or tire.
- The Combined ABS indicator might blink while riding under the following conditions. This is temporary failure. Clear the DTC and perform the pre-start self-diagnosis. The Combined ABS is normal if the indicator goes off. Ask the rider for the riding conditions in detail when the motorcycle is brought in for inspection.
  - The motorcycle has continuously run on bumpy roads.
  - When riding, the front wheel leaves the ground for a long time (wheelie).
  - Only either the front or rear wheel rotates.
  - The ABS operates continuously.
  - After riding (after the pre-start self-diagnosis), the engine was kept running and the rear wheel turning (for more than 30 seconds).
  - The Combined ABS control unit is disrupted by extremely powerful radio waves (electromagnetic interference).

DTC	Function Failure	Refer to
1-1	Front wheel speed sensor/sensor circuit/pulser ring malfunction	17-16
1-2	Rear wheel speed sensor/sensor circuit/pulser ring malfunction	17-18
1-3	Wheelie riding notice	17-19
1-4	Front wheel speed sensor/pulser ring malfunction	17-19
1-5	Rear wheel speed sensor/pulser ring malfunction	17-20
1-6	Front wheel speed sensor/pulser ring malfunction	17-21
1-7	Rear wheel speed sensor/pulser ring malfunction	17-22
1-8	Front wheel speed sensor/sensor circuit malfunction	17-24
1-9	Rear wheel speed sensor/sensor circuit malfunction	17-25
2-1	Battery voltage malfunction/blown fuse	17-26
2-2	Combined ABS control unit malfunction	17-46
2-3	Combined ABS control unit malfunction/Excessive supply of control unit power voltage from the outside	17-46
2-5	Combined ABS control unit malfunction (Pressure sensor input voltage malfunction)	17-46
3-1	Front master cylinder pressure sensor malfunction	17-26
3-2	Rear master cylinder pressure sensor malfunction	17-28
3-3	Front brake caliper pressure sensor malfunction	17-29
3-4	Rear brake caliper pressure sensor malfunction	17-30
3-5	Front master cylinder pressure sensor malfunction	17-31
3-6	Rear master cylinder pressure sensor malfunction	17-32
3-7	Front brake caliper pressure sensor malfunction	17-33
3-8	Rear brake caliper pressure sensor malfunction	17-34
3-9	Front master cylinder pressure sensor malfunction	17-35
3-10	Rear master cylinder pressure sensor malfunction	17-36
3-11	Front ABS valve unit/Combined ABS control unit malfunction	17-37
3-12	Rear ABS valve unit/Combined ABS control unit malfunction	17-37
4-1	Front ABS valve unit/Combined ABS control unit malfunction	17-37
4-2	Rear ABS valve unit/Combined ABS control unit malfunction	17-37
4-3	Front ABS valve unit malfunction	17-37
4-4	Rear ABS valve unit malfunction	17-37
4-5	Front ABS valve unit/Combined ABS control unit malfunction	17-37
4-6	Rear ABS valve unit/Combined ABS control unit malfunction	17-37
5-1	Front power unit malfunction/air bleeding incompletion	17-38
5-2	Rear power unit malfunction/air bleeding incompletion	17-38
5-3	Front power unit malfunction/air bleeding incompletion/front brake caliper piston malfunction	17-38
5-4	Rear power unit malfunction/air bleeding incompletion/rear brake caliper piston malfunction	17-39
5-5	Front brake is applied continuously from 0 km/h (0 mph) to 50 km/h (31 mph)	17-39
5-6	Rear brake is applied continuously from 0 km/h (0 mph) to 50 km/h (31 mph)	17-39
6-1	Front ABS valve unit solenoid malfunction	17-40
6-2		
6-3		

DTC	Function Failure	Refer to
6-4	Rear ABS valve unit solenoid malfunction	17-42
6-5		
6-6		
7-1	Front power unit drive circuit malfunction	17-44
7-2	Rear power unit drive circuit malfunction	17-45
7-3	Front power unit ground line short	17-46
7-4	Rear power unit ground line short	17-46
7-5	Front ABS valve unit solenoid malfunction	17-40
7-6	Rear ABS valve unit solenoid malfunction	17-42
8-1	Combined ABS control unit malfunction	17-46
8-2		
8-3		
8-4		
9-1		
9-2		
9-3		
10-1		
10-2		
10-3		
10-4		
10-5		
10-6		
10-7		
10-8		
10-9		
10-10		

COMBINED ABS INDICATOR CIRCUIT TROUBLESHOOTING

COMBINED ABS INDICATOR DOES NOT COME ON (when the ignition switch turned ON)

- Before starting the inspection, check for loose or poor contact on the combination meter 20P (Black) connector and Combined ABS control unit connectors.

1. **Combination Meter Power/ground Line Inspection**

   Check the combination meter power and ground lines (page 21-11).

   Are the wires normal?

   YES – GO TO STEP 2.

   NO – Open circuit in related wires

2. **Indicator Operation Inspection**

   Disconnect the Combined ABS control unit 5P (Black) connector.

   Turn the ignition switch ON and check the ABS indicator.

   Does the indicator come on?

   YES – Faulty Combined ABS control unit

   NO – GO TO STEP 3.

3. **Indicator Signal Line Short Circuit Inspection**

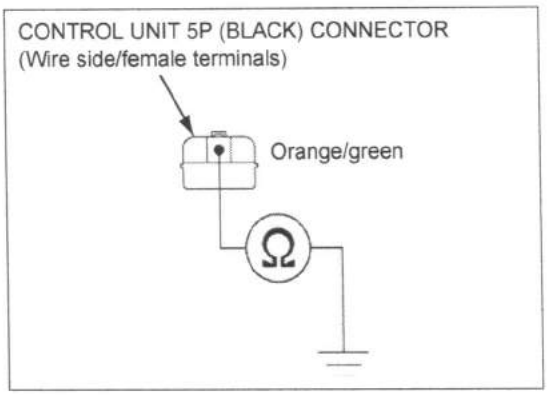
   Check for continuity between the Combined ABS control unit 5P (Black) connector at the wire side and ground.

   Connection: Orange/green – Ground

   Is there continuity?

   YES – Short circuit in Orange/green wire between the combination meter and Combined ABS control unit.

   NO – Faulty combination meter



COMBINED ABS INDICATOR STAYS ON (Indicator does not go off when the motorcycle is running and DTC is not indicated by the retrieval procedure)

- Before starting the inspection, check for loose or poor contact on the combination meter 20P (Black) connector and Combined ABS control unit connectors.

1. **Fuse Inspection**

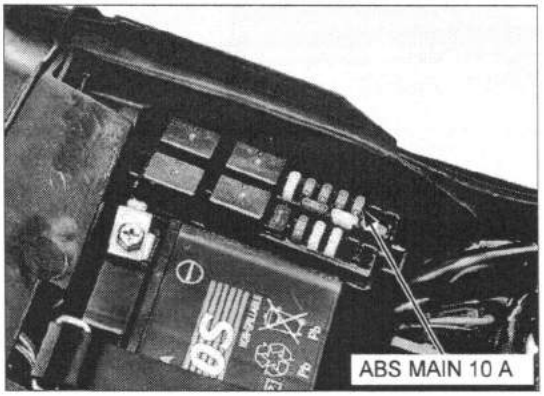
   Remove the seat (page 3-7).

   Open the fuse/relay box and check the ABS MAIN (10 A) fuse.

   Is the fuse blown?

   YES – GO TO STEP 2.

   NO – GO TO STEP 3.



2. **ABS Power Input Line Short Circuit Inspection**

   Remove the ABS MAIN (10 A) fuse.

   Disconnect the Combined ABS control unit 5P (Gray) connector.

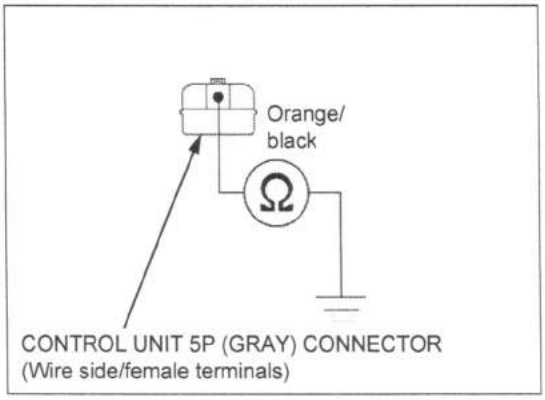
   Check for continuity between the Combined ABS control unit 5P (Gray) connector and ground.

   Connection: Orange/black – Ground

   Is there continuity?

   YES – Short circuit in Orange/black wire between the fuse/relay box and Combined ABS control unit.

   NO – Intermittent failure. Replace the ABS MAIN (10 A) fuse with a new one and recheck.



3. **ABS Power Input Line Open Circuit Inspection**

   Install the ABS MAIN (10 A) fuse.

   Disconnect the Combined ABS control unit 5P (Gray) connector.

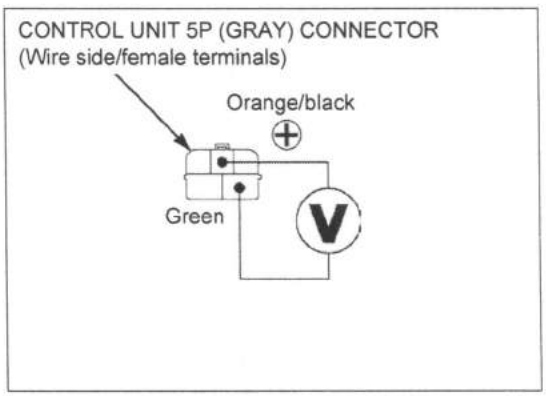
   Turn the ignition switch ON.
   Measure the voltage at the Combined ABS control unit 5P (Gray) connector.

   Connection: Orange/black (+) – Green (–)

   Is there battery voltage?

   YES – GO TO STEP 4.

   NO –
   - Open circuit in Orange/black wire
   - Open circuit in Green wire
   - Loose or poor contacts of related terminals



4. **Indicator Operation Inspection**

With the combination meter 20P (Black) connector connected, short the Orange/green wire terminal of the combination meter 20P (Black) connector and ground with a jumper wire.

- Always use an appropriate jumper wire to prevent damage to the connector terminals.

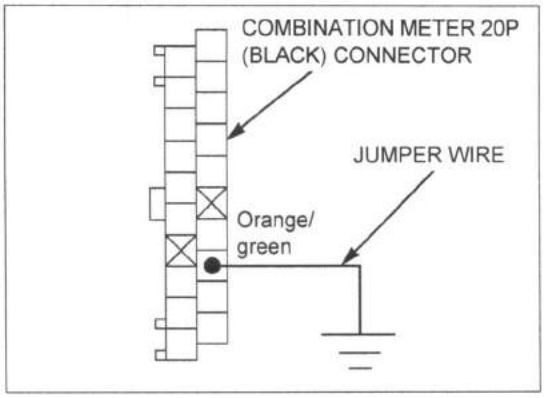
Connection: Orange/green – Ground

Check the Combined ABS indicator with the ignition switch ON.

Does the Combined ABS indicator go off?

YES – GO TO STEP 5.

NO – Faulty combination meter



5. **Indicator Signal Line Open Circuit Inspection 1**

Turn the ignition switch OFF.

Remove the jumper wire from the combination meter 20P (Black) connector.

Short the Orange/green wire terminal of the Combined ABS control unit 5P (Black) connector and ground with a jumper wire.

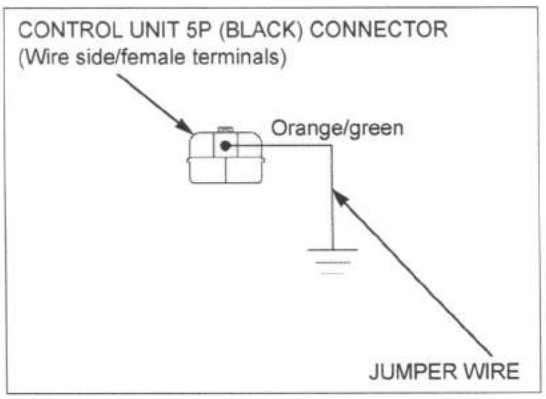
Connection: Orange/green – Ground

Check the Combined ABS indicator with the ignition switch ON.

Does the Combined ABS indicator go off?

YES – GO TO STEP 6.

NO – Open circuit in Orange/green wire.



6. **Indicator Signal Line Open Circuit Inspection 2**

Turn the ignition switch OFF.

Remove the jumper wire from the Combined ABS control unit 5P (Black) connector.

Short the Combined ABS control unit 5P (Black) connector terminals with a jumper wire.

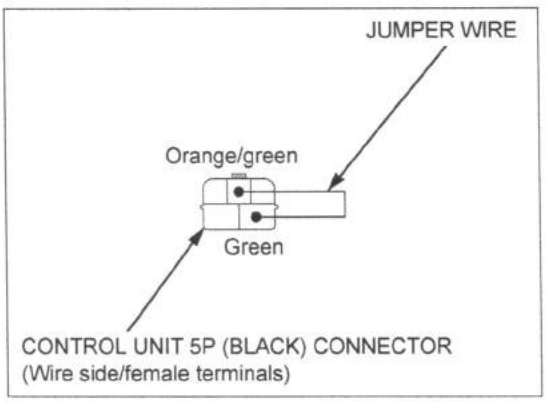
Connection: Orange/green – Green

Check the Combined ABS indicator with the ignition switch ON.

Does the Combined ABS indicator go off?

YES – Faulty Combined ABS control unit

NO – Open circuit in Green wire.



TROUBLESHOOTING

NOTICE

Be careful not to damage the wheel speed sensor and pulser ring when servicing.

NOTE:

- Perform inspection with the ignition switch turned OFF, unless otherwise specified.
- Use a fully charged battery. Do not diagnose with a charger connected to the battery.
- When the Combined ABS control unit, power unit, or ABS valve unit is detected to be faulty, recheck the wire harness and connector connections closely before replacing it.
- After troubleshooting, clear the DTC (page 17-9) and perform the pre-start self-diagnosis (page 17-7) to be sure that the Combined ABS indicator is operating normally.
- If the pulser ring or wheel speed sensor is replaced, perform the air gap inspection (page 17-47).

DTC 1-1: Front wheel speed sensor/ sensor circuit/pulser ring malfunction

- Before starting the inspection, check for loose or poor contact on the front wheel speed sensor 2P (Orange) connector and Combined ABS control unit connectors, then recheck again.

1. **Front Wheel Speed Sensor Air Gap Inspection**

   Raise the front wheel off the ground.

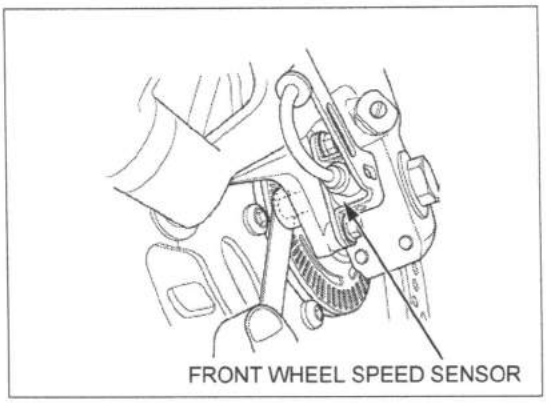
   Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
   It must be within specification.

   STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

   Is the air gap correct?

   YES – GO TO STEP 2.

   NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.



2. **Front Wheel Speed Sensor/Pulser Ring Condition Inspection**

   Inspect the area around the front wheel speed sensor.

   Check that there are no ferrous metal deposits or magnetic deposits between the front wheel speed sensor and pulser ring, and the pulser ring slots are not obstructed.

   Check if the pulser ring is loose.

   Check the pulser ring for deformation or damage (e.g., chipped teeth) and the front wheel speed sensor tip for damage.

   Are the front wheel speed sensor and pulser ring in good condition?

   YES – GO TO STEP 3.

   NO – Remove any deposits. Install properly or replace faulty part.

3. **Front Wheel Speed Sensor Line Short Circuit Inspection**

Disconnect the front wheel speed sensor 2P (Orange) and Combined ABS control unit 21P (Black) connectors.

Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

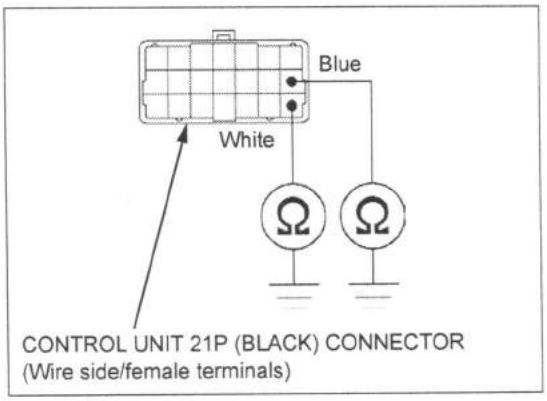
Connection: Blue – Ground
White – Ground

TOOL:
Test probe **07ZAJ-RDJA110**

Is there continuity?

YES – • Short circuit in Blue wire
• Short circuit in White wire

NO – GO TO STEP 4.



4. **Front Wheel Speed Sensor Line Open Circuit Inspection**

Check for continuity between the Combined ABS control unit 21P (Black) connector and front wheel speed sensor 2P (Orange) connector.

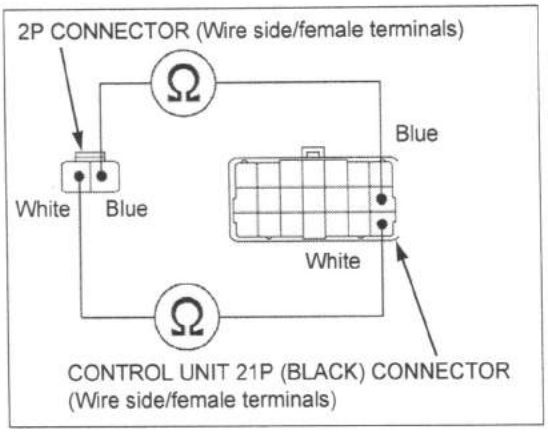
Connection: Blue – Blue
White – White

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – GO TO STEP 5.

NO – • Open circuit in Blue wire
• Open circuit in White wire



5. **Failure Reproduction With A New Wheel Speed Sensor**

Replace the front wheel speed sensor with a new one (page 17-47).
Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

Is the DTC indicated?

YES – Replace the Combined ABS control unit with a new one and recheck.

NO – Faulty original wheel speed sensor

DTC 1-2: Rear wheel speed sensor/ sensor circuit/pulser ring malfunction

- Before starting the inspection, check for loose or poor contact on the rear wheel speed sensor 2P (Orange) connector and Combined ABS control unit connectors, then recheck again.

1. **Rear Wheel Speed Sensor Air Gap Inspection**

   Raise the rear wheel off the ground.

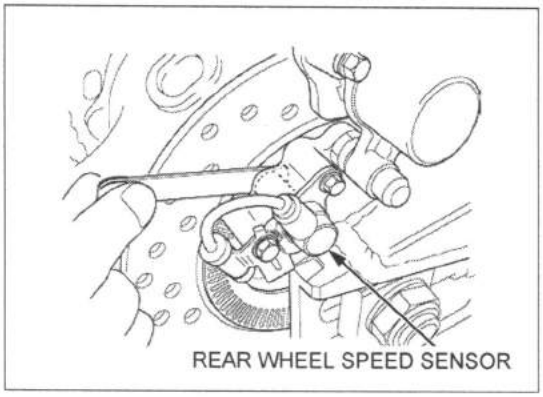
   Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
   It must be within specification.

   STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

   Is the air gap correct?

   YES – GO TO STEP 2.

   NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.


REAR WHEEL SPEED SENSOR

2. **Rear Wheel Speed Sensor/Pulser Ring Condition Inspection**

   Inspect the area around the rear wheel speed sensor.

   Check that there are no ferrous metal deposit or magnetic deposits between the rear wheel speed sensor and pulser ring, and the pulser ring slots are not obstructed.

   Check if the pulser ring is loose.

   Check the pulser ring for deformation or damage (e.g., chipped teeth) and the rear wheel speed sensor tip for damage.

   Are the rear wheel speed sensor and pulser ring in good condition?

   YES – GO TO STEP 3.

   NO – Remove any deposits. Install properly or replace faulty part.

3. **Rear Wheel Speed Sensor Line Short Circuit Inspection**

   Disconnect the rear wheel speed sensor 2P (Orange) and Combined ABS control unit 21P (Gray) connectors.

   Check for continuity between the Combined ABS control unit 21P (Gray) connector at the wire side and ground.

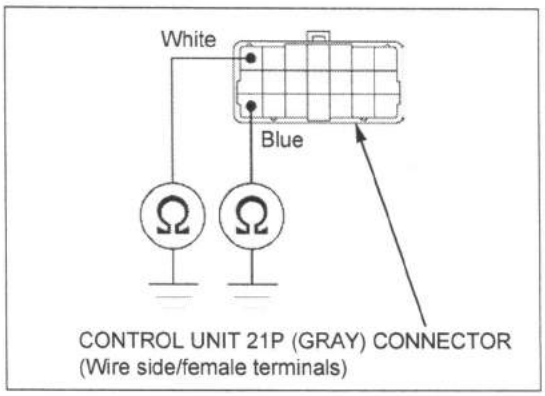
   Connection: Blue – Ground
   White – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – • Short circuit in Blue wire
   • Short circuit in White wire

   NO – GO TO STEP 4.



CONTROL UNIT 21P (GRAY) CONNECTOR
(Wire side/female terminals)

4. **Rear Wheel Speed Sensor Line Open Circuit Inspection**

Check for continuity between the Combined ABS control unit 21P (Gray) connector and rear wheel speed sensor 2P (Orange) connector.

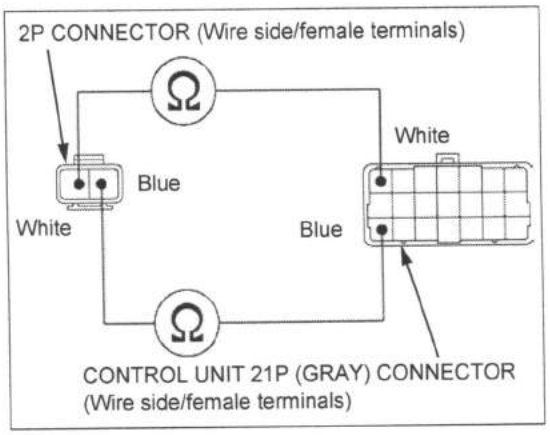
Connection: Blue – Blue
White – White

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – GO TO STEP 5.

NO – • Open circuit in Blue wire
• Open circuit in White wire



5. **Failure Reproduction With A New Wheel Speed Sensor**

Replace the rear wheel speed sensor with a new one (page 17-47).
Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

Is the DTC indicated?

YES – Replace the Combined ABS control unit with a new one and recheck.

NO – Faulty original wheel speed sensor

DTC 1-3: Wheelie riding notice

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

DTC 1-4: Front wheel speed sensor/ pulser ring malfunction

- Before starting the inspection, check for loose or poor contact on the front wheel speed sensor 2P (Orange) connector and Combined ABS control unit connectors, then recheck again.

1. **Front Wheel Speed Sensor Air Gap Inspection**

Raise the front wheel off the ground.

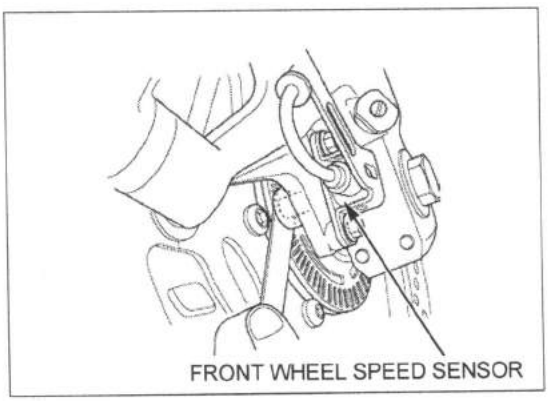
Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
It must be within specification.

STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

Is the air gap correct?

YES – GO TO STEP 2.

NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.



2. **Front Wheel Speed Sensor/Pulser Ring Condition Inspection**

   Inspect the area around the front wheel speed sensor.

   Check that there are no ferrous metal deposits or magnetic deposits between the front wheel speed sensor and pulser ring, and the pulser ring slots are not obstructed.

   Check if the pulser ring is loose.

   Check the pulser ring for deformation or damage (e.g., chipped teeth) and the front wheel speed sensor tip for damage.

   Are the front wheel speed sensor and pulser ring in good condition?

   YES – Replace the front wheel speed sensor.

   NO – Remove any deposits. Install properly or replace faulty part.

DTC 1-5: Rear wheel speed sensor/ pulser ring malfunction

- Before starting the inspection, check for loose or poor contact on the rear wheel speed sensor 2P (Orange) connector and Combined ABS control unit connectors, then recheck again.

1. **Rear Wheel Speed Sensor Air Gap Inspection**

   Raise the rear wheel off the ground.

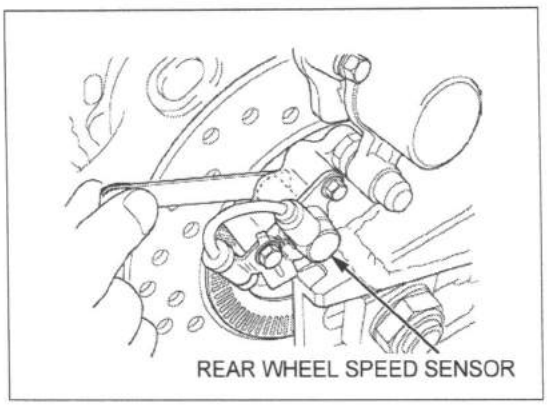
   Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
   It must be within specification.

   STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

   Is the air gap correct?

   YES – GO TO STEP 2.

   NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.



2. **Rear Wheel Speed Sensor/Pulser Ring Condition Inspection**

   Inspect the area around the rear wheel speed sensor.

   Check that there are no ferrous metal deposits or magnetic deposits between the rear wheel speed sensor and pulser ring, and the pulser ring slots are not obstructed.

   Check if the pulser ring is loose.

   Check the pulser ring for deformation or damage (e.g., chipped teeth) and the rear wheel speed sensor tip for damage.

   Are the rear wheel speed sensor and pulser ring in good condition?

   YES – Replace the rear wheel speed sensor.

   NO – Remove any deposits. Install properly or replace faulty part.

DTC 1-6: Front wheel speed sensor/ pulser ring malfunction

- Before starting the inspection, check for loose or poor contact on the front wheel speed sensor 2P (Orange) connector and Combined ABS control unit connectors, then recheck again.

1. **Front Wheel Speed Sensor Air Gap Inspection**

   Raise the front wheel off the ground.

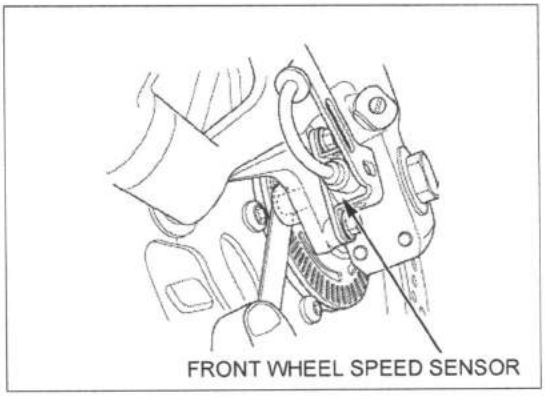
   Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
   It must be within specification.

   STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

   Is the air gap correct?

   YES – GO TO STEP 2.

   NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.



2. **Front Wheel Speed Sensor/Pulser Ring Condition Inspection**

   Inspect the area around the front wheel speed sensor.

   Check that there are no ferrous metal deposits or magnetic deposits between the front wheel speed sensor and pulser ring, and the pulser ring slots are not obstructed.

   Check if the pulser ring is loose.

   Check the pulser ring for deformation or damage (e.g., chipped teeth) and the front wheel speed sensor tip for damage.

   Are the front wheel speed sensor and pulser ring in good condition?

   YES – GO TO STEP 3.

   NO – Remove any deposits. Install properly or replace faulty part.

3. **Front Wheel Speed Sensor Line Short Circuit Inspection**

   Disconnect the front wheel speed sensor 2P (Orange) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

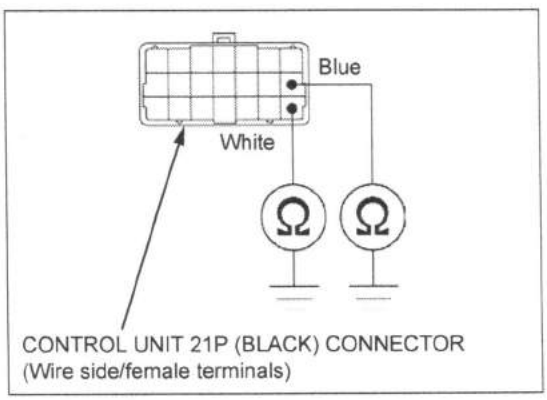
   Connection: Blue – Ground
   White – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – • Short circuit in Blue wire
   • Short circuit in White wire

   NO – GO TO STEP 4.



4. **Front Wheel Speed Sensor Line Open Circuit Inspection**

Check for continuity between the Combined ABS control unit 21P (Black) connector and front wheel speed sensor 2P (Orange) connector.

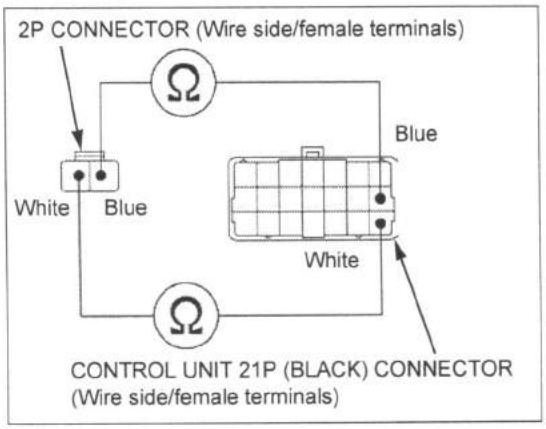
Connection: Blue – Blue
White – White

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**

Is there continuity?

YES – GO TO STEP 5.

NO – • Open circuit in Blue wire
• Open circuit in White wire



5. **Failure Reproduction With A New Wheel Speed Sensor**

Replace the front wheel speed sensor with a new one (page 17-47).
Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

Is the DTC indicated?

YES – Replace the Combined ABS control unit with a new one and recheck.

NO – Faulty original wheel speed sensor

DTC 1-7: Rear wheel speed sensor/ pulser ring malfunction

- Before starting the inspection, check for loose or poor contact on the rear wheel speed sensor 2P (Orange) connector and Combined ABS control unit connectors, then recheck again.

1. **Rear Wheel Speed Sensor Air Gap Inspection**

Raise the rear wheel off the ground.

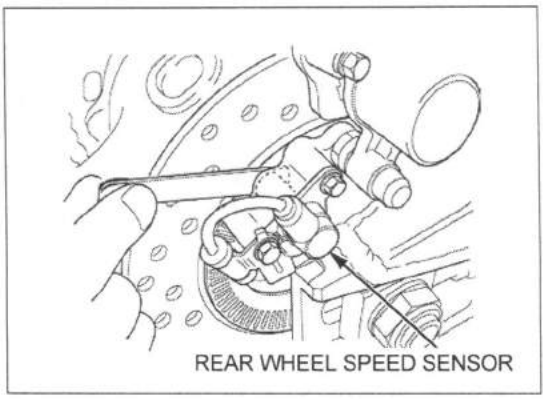
Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
It must be within specification.

STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

Is the air gap correct?

YES – GO TO STEP 2.

NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.



2. **Rear Wheel Speed Sensor/Pulser Ring Condition Inspection**

   Inspect the area around the rear wheel speed sensor.

   Check that there are no ferrous metal deposits or magnetic deposits between the rear wheel speed sensor and pulser ring, and the pulser ring slots are not obstructed.

   Check if the pulser ring is loose.

   Check the pulser ring for deformation or damage (e.g., chipped teeth) and the rear wheel speed sensor tip for damage.

   Are the rear wheel speed sensor and pulser ring in good condition?

   YES – GO TO STEP 3.

   NO – Remove any deposits. Install properly or replace faulty part.

3. **Rear Wheel Speed Sensor Line Short Circuit Inspection**

   Disconnect the rear wheel speed sensor 2P (Orange) and Combined ABS control unit 21P (Gray) connectors.

   Check for continuity between the Combined ABS control unit 21P (Gray) connector at the wire side and ground.

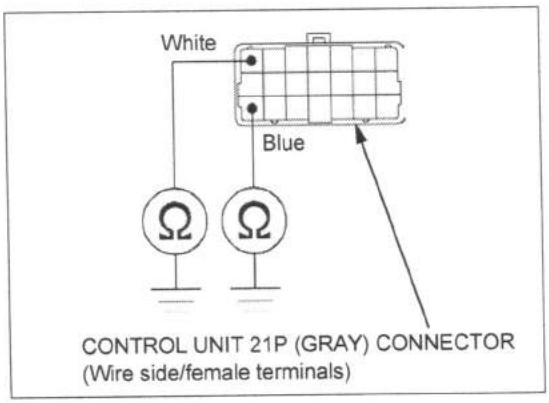
   Connection: Blue – Ground
   White – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – • Short circuit in Blue wire
   • Short circuit in White wire

   NO – GO TO STEP 4.



4. **Rear Wheel Speed Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Gray) connector and rear wheel speed sensor 2P (Orange) connector.

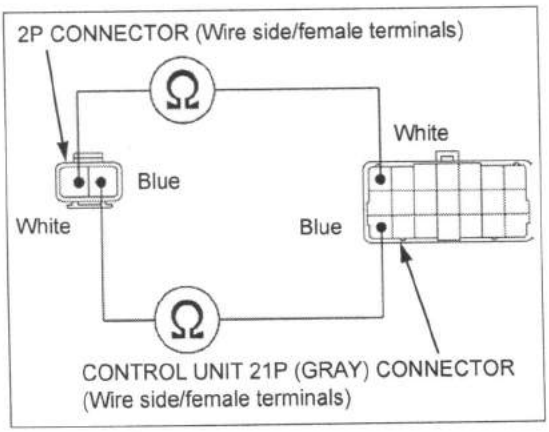
   Connection: Blue – Blue
   White – White

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 5.

   NO – • Open circuit in Blue wire
   • Open circuit in White wire



5. **Failure Reproduction With A New Wheel Speed Sensor**

   Replace the rear wheel speed sensor with a new one (page 17-47).
   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is the DTC indicated?

   YES – Replace the Combined ABS control unit with a new one and recheck.

   NO – Faulty original wheel speed sensor

DTC 1-8: Front wheel speed sensor/ sensor circuit malfunction

- Before starting the inspection, check for loose or poor contact on the front wheel speed sensor 2P (Orange) connector and Combined ABS control unit connectors, then recheck again.

1. **Front Wheel Speed Sensor Line Short Circuit Inspection**

   Disconnect the front wheel speed sensor 2P (Orange) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

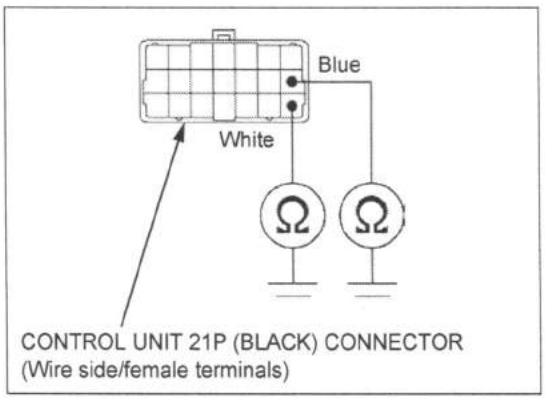
   Connection: Blue – Ground
   White – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – • Short circuit in Blue wire
   • Short circuit in White wire

   NO – GO TO STEP 2.



2. **Front Wheel Speed Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and front wheel speed sensor 2P (Orange) connector.

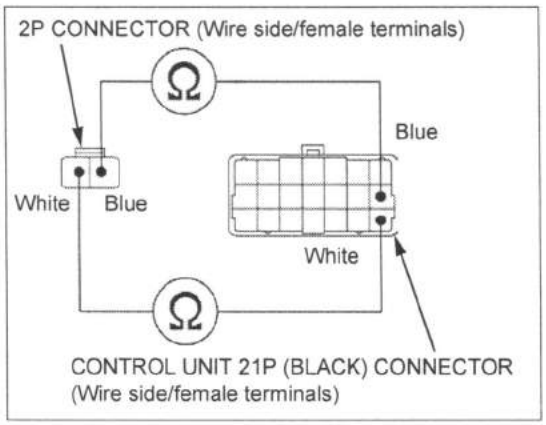
   Connection: Blue – Blue
   White – White

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – • Open circuit in Blue wire
   • Open circuit in White wire



3. **Failure Reproduction With A New Wheel Speed Sensor**

   Replace the front wheel speed sensor with a new one (page 17-47).
   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is the DTC indicated?

   YES – Replace the Combined ABS control unit with a new one and recheck.

   NO – Faulty original wheel speed sensor

DTC 1-9: Rear wheel speed sensor/ sensor circuit malfunction

- Before starting the inspection, check for loose or poor contact on the rear wheel speed sensor 2P (Orange) connector and Combined ABS control unit connectors, then recheck again.

1. **Rear Wheel Speed Sensor Line Short Circuit Inspection**

   Disconnect the rear wheel speed sensor 2P (Orange) and Combined ABS control unit 21P (Gray) connectors.

   Check for continuity between the Combined ABS control unit 21P (Gray) connector at the wire side and ground.

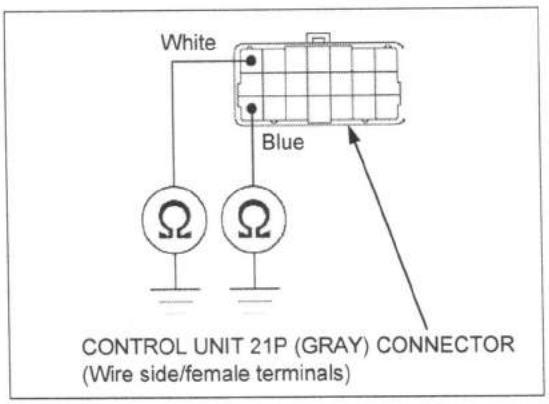
   Connection: Blue – Ground
   White – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – • Short circuit in Blue wire
   • Short circuit in White wire

   NO – GO TO STEP 2.



2. **Rear Wheel Speed Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Gray) connector and rear wheel speed sensor 2P (Orange) connector.

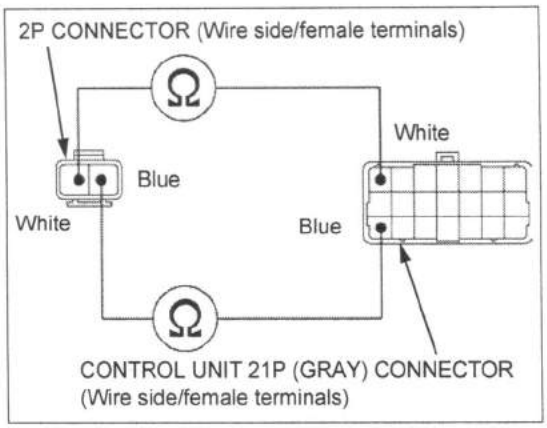
   Connection: Blue – Blue
   White – White

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – • Open circuit in Blue wire
   • Open circuit in White wire



3. **Failure Reproduction With A New Wheel Speed Sensor**

   Replace the rear wheel speed sensor with a new one (page 17-47).
   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is the DTC indicated?

   YES – Replace the Combined ABS control unit with a new one and recheck.

   NO – Faulty original wheel speed sensor

DTC 2-1: Battery voltage malfunction/ blown fuse

- Before starting the inspection, check for loose or poor contact on the Combined ABS control unit 5P connectors, then recheck again.

1. **Battery Voltage Inspection**

   Check the battery condition (page 18-7).

   Is the battery in good condition?

   YES – GO TO STEP 2.

   NO – Faulty original battery

2. **Fuse Condition Inspection**

   Check each ABS fuse condition.

   Is each fuse (ABS MAIN 10 A, FR ABS MOTOR 30 A and RR ABS MOTOR 30 A) in good condition?

   YES – • Open circuit in related wire
   • Loose or poor contacts of related terminals

   NO – Replace the fuse and recheck.

DTC 3-1: Front master cylinder pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the front ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Front Master Cylinder Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the front ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

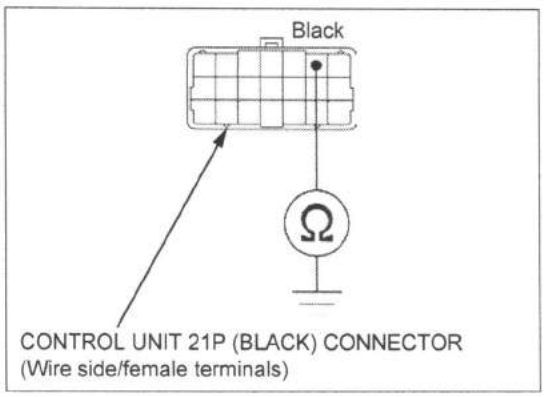
   Connection: Black – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – Short circuit in Black wire

   NO – GO TO STEP 2.



CONTROL UNIT 21P (BLACK) CONNECTOR
(Wire side/female terminals)

2. **Front Master Cylinder Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and front ABS valve unit 21P (Black) connector.

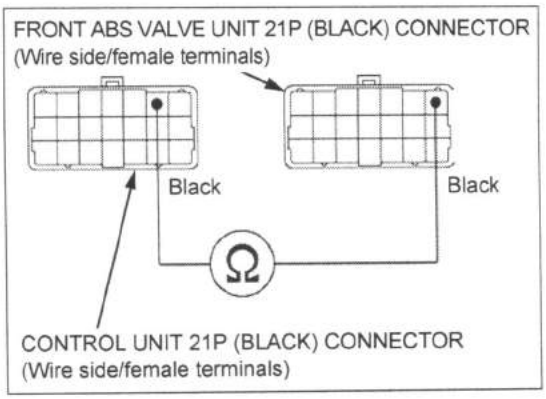
   Connection: Black – Black

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – Open circuit in Black wire



3. **Failure Reproduction With A New Front ABS valve unit**

   Replace the front ABS valve unit (page 17-50).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-1 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original front ABS valve unit

DTC 3-2: Rear master cylinder pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the rear ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Rear Master Cylinder Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the rear ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

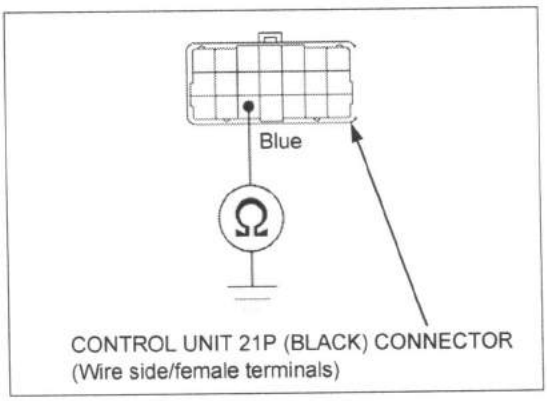
   Connection: Blue – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – Short circuit in Blue wire

   NO – GO TO STEP 2.



2. **Rear Master Cylinder Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and rear ABS valve unit 21P (Black) connector.

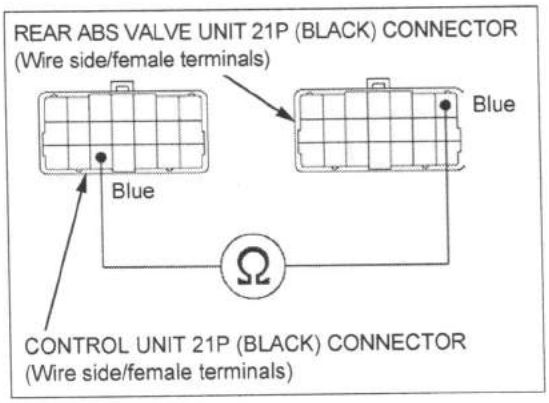
   Connection: Blue – Blue

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – Open circuit in Blue wire



3. **Failure Reproduction With A New Rear ABS valve unit**

   Replace the rear ABS valve unit (page 17-63).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-2 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original rear ABS valve unit

DTC 3-3: Front brake caliper pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the front ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Front Brake Caliper Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the front ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

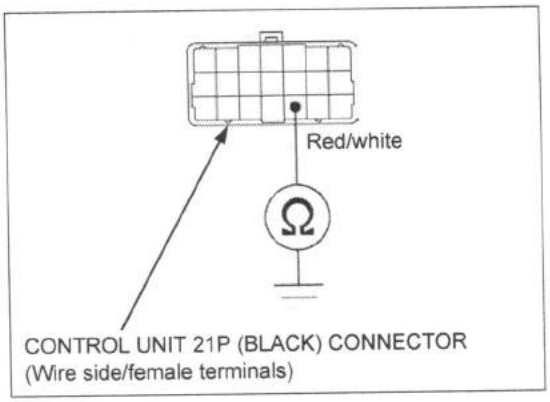
   Connection: Red/white – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – Short circuit in Red/white wire

   NO – GO TO STEP 2.



2. **Front Brake Caliper Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and front ABS valve unit 21P (Black) connector.

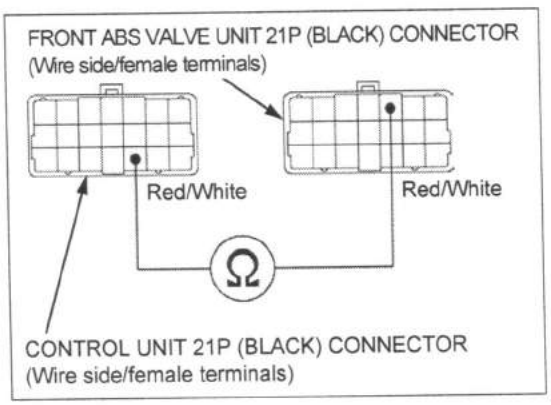
   Connection: Red/white – Red/white

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – Open circuit in Red/white wire



3. **Failure Reproduction With A New Front ABS valve unit**

   Replace the front ABS valve unit (page 17-50).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-3 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original front ABS valve unit

DTC 3-4: Rear brake caliper pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the rear ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Rear Brake Caliper Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the rear ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

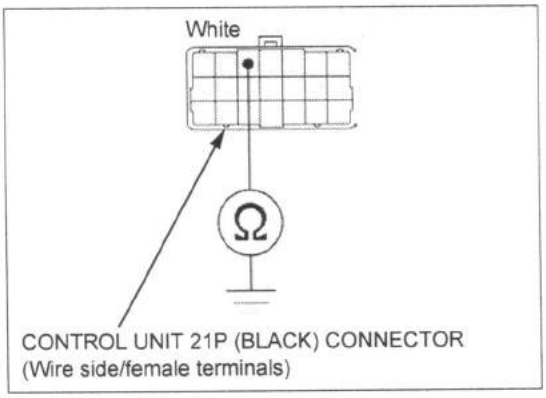
   Connection: White – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – Short circuit in White wire

   NO – GO TO STEP 2.



2. **Rear Brake Caliper Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and rear ABS valve unit 21P (Black) connector.

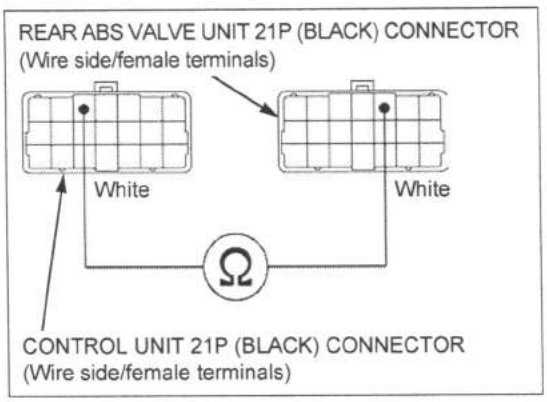
   Connection: White – White

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – Open circuit in White wire



3. **Failure Reproduction With A New Rear ABS valve unit**

   Replace the rear ABS valve unit (page 17-63).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-4 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original rear ABS valve unit

DTC 3-5: Front master cylinder pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the front ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Front Master Cylinder Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the front ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

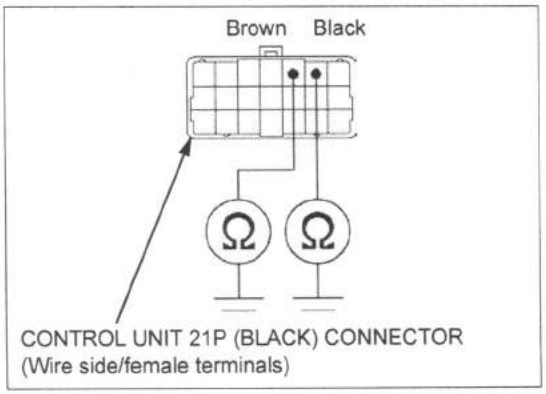
   Connection: Black – Ground
   Brown – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – • Short circuit in Black wire
   • Short circuit in Brown wire

   NO – GO TO STEP 2.



2. **Front Master Cylinder Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and front ABS valve unit 21P (Black) connector.

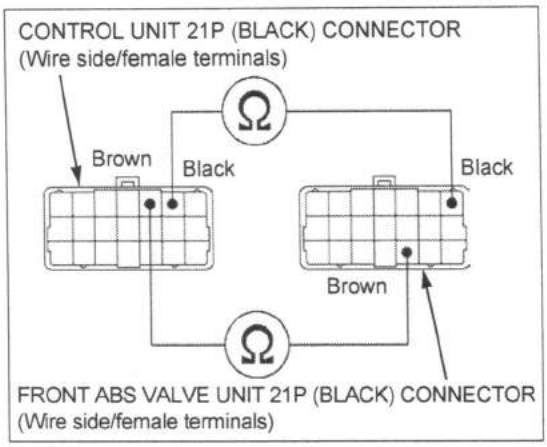
   Connection: Black – Black
   Brown – Brown

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – • Open circuit in Black wire
   • Open circuit in Brown wire



3. **Failure Reproduction With A New Front ABS valve unit**

   Replace the front ABS valve unit (page 17-50).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-5 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original front ABS valve unit

DTC 3-6: Rear master cylinder pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the rear ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Rear Master Cylinder Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the rear ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

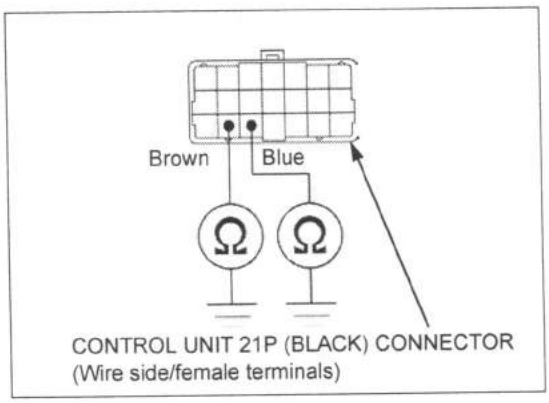
   Connection: Blue – Ground
   Brown – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – • Short circuit in Blue wire
   • Short circuit in Brown wire

   NO – GO TO STEP 2.



2. **Rear Master Cylinder Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and rear ABS valve unit 21P (Black) connector.

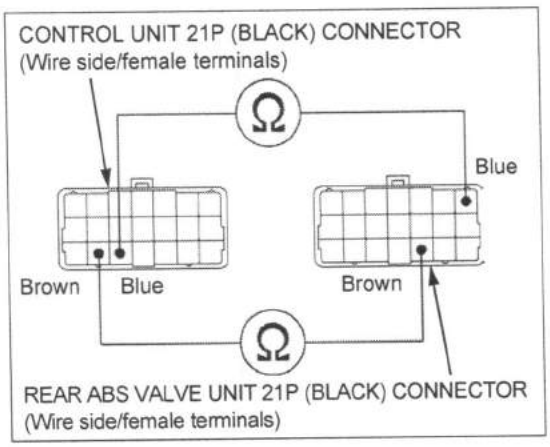
   Connection: Blue – Blue
   Brown – Brown

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – • Open circuit in Blue wire
   • Open circuit in Brown wire



3. **Failure Reproduction With A New Rear ABS valve unit**

   Replace the rear ABS valve unit (page 17-63).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-6 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original rear ABS valve unit

DTC 3-7: Front brake caliper pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the front ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Front Brake Caliper Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the front ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

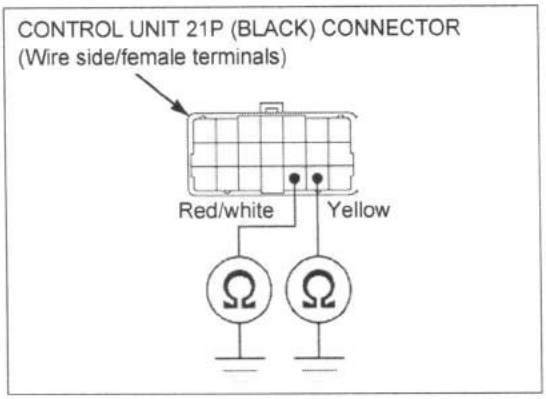
   Connection: Red/white – Ground
   Yellow – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – • Short circuit in Red/white wire
   • Short circuit in Yellow wire

   NO – GO TO STEP 2.



2. **Front Brake Caliper Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and front ABS valve unit 21P (Black) connector.

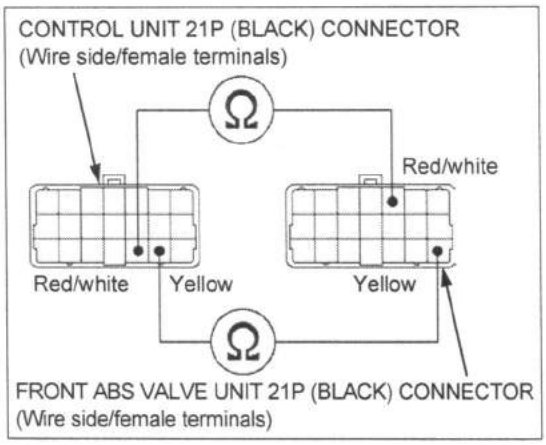
   Connection: Red/white – Red/white
   Yellow – Yellow

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – • Open circuit in Red/white wire
   • Open circuit in Yellow wire



3. **Failure Reproduction With A New Front ABS valve unit**

   Replace the front ABS valve unit (page 17-50).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-7 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original front ABS valve unit

DTC 3-8: Rear brake caliper pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the rear ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Rear Brake Caliper Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the rear ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

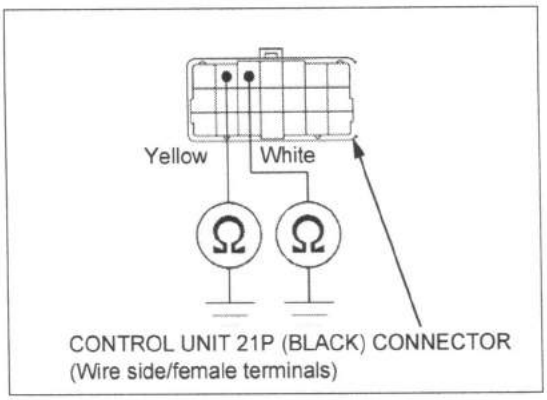
   Connection: White – Ground
   Yellow – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – • Short circuit in White wire
   • Short circuit in Yellow wire

   NO – GO TO STEP 2.



2. **Rear Brake Caliper Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and rear ABS valve unit 21P (Black) connector.

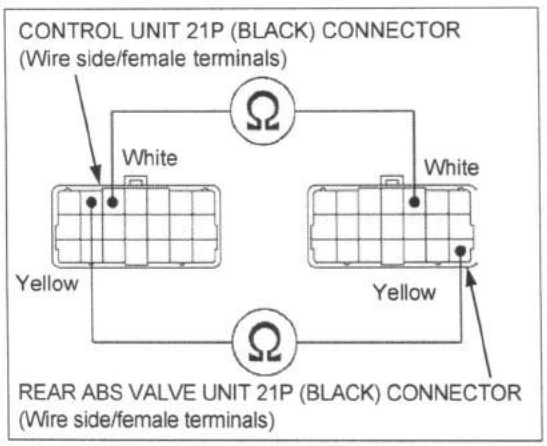
   Connection: White – White
   Yellow – Yellow

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – • Open circuit in White wire
   • Open circuit in Yellow wire



3. **Failure Reproduction With A New Rear ABS valve unit**

   Replace the rear ABS valve unit (page 17-63).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-8 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original rear ABS valve unit

DTC 3-9: Front master cylinder pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the front ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Front Master Cylinder Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the front ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

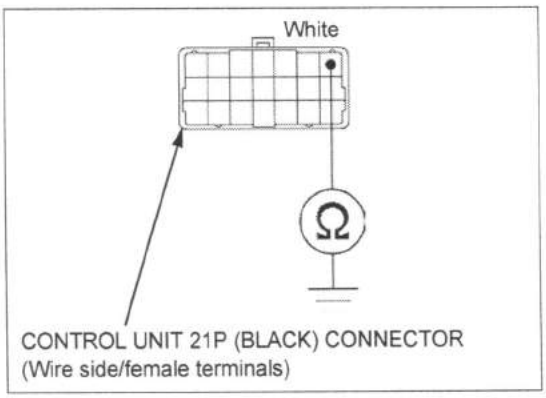
   Connection: White – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – Short circuit in White wire

   NO – GO TO STEP 2.



2. **Front Master Cylinder Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and front ABS valve unit 21P (Black) connector.

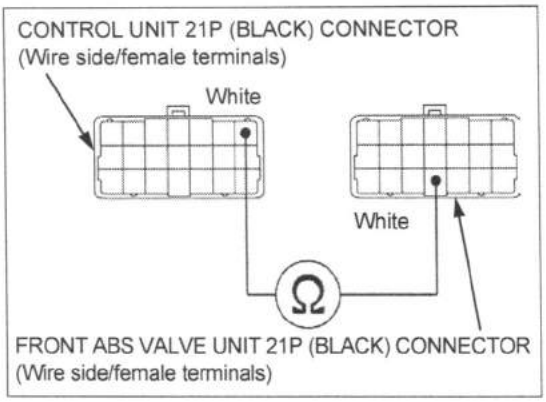
   Connection: White – White

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – Open circuit in White wire



3. **Failure Reproduction With A New Front ABS valve unit**

   Replace the front ABS valve unit (page 17-50).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-9 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original front ABS valve unit

DTC 3-10: Rear master cylinder pressure sensor malfunction

- Before starting the inspection, check for loose or poor contact on the rear ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Black) connector, then recheck again.

1. **Rear Master Cylinder Pressure Sensor Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the rear ABS valve unit 21P (Black) and Combined ABS control unit 21P (Black) connectors.

   Check for continuity between the Combined ABS control unit 21P (Black) connector at the wire side and ground.

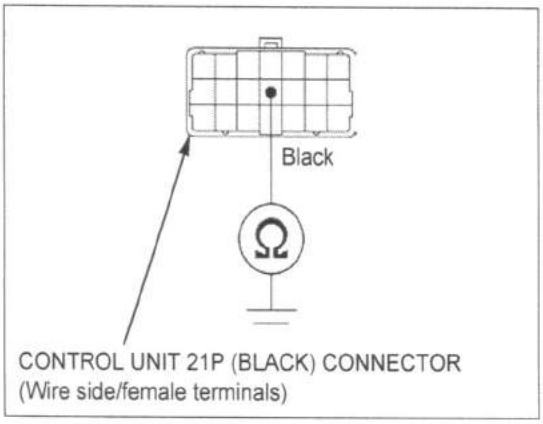
   Connection: Black – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**

   Is there continuity?

   YES – Short circuit in Black wire

   NO – GO TO STEP 2.



2. **Rear Master Cylinder Pressure Sensor Line Open Circuit Inspection**

   Check for continuity between the Combined ABS control unit 21P (Black) connector and rear ABS valve unit 21P (Black) connector.

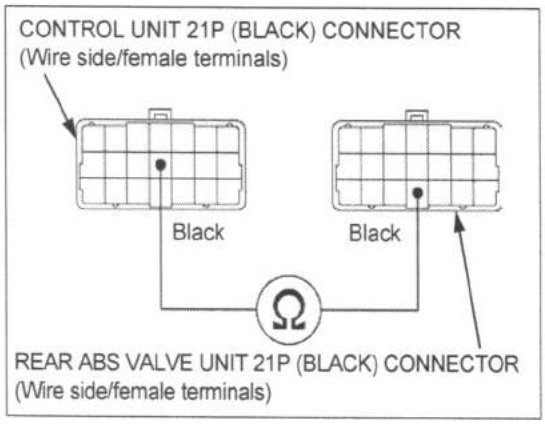
   Connection: Black – Black

   TOOL:
   Test probe (2 required) **07ZAJ-RDJA110**

   Is there continuity?

   YES – GO TO STEP 3.

   NO – Open circuit in Black wire



3. **Failure Reproduction With A New Rear ABS valve unit**

   Replace the rear ABS valve unit (page 17-63).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-10 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original rear ABS valve unit

DTC 3-11, 4-1 or 4-5: Front ABS valve unit/Combined ABS control unit malfunction

1. **Failure Reproduction With A New Front ABS valve unit**

   Replace the front ABS valve unit (page 17-50).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-11, 4-1 or 4-5 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original front ABS valve unit

DTC 3-12, 4-2 or 4-6: Rear ABS valve unit/Combined ABS control unit malfunction

1. **Failure Reproduction With A New Rear ABS valve unit**

   Replace the rear ABS valve unit (page 17-63).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

   Is 3-12, 4-2 or 4-6 indicated?

   YES – Replace the Combined ABS control unit (page 17-50) and recheck.

   NO – Faulty original rear ABS valve unit

DTC 4-3: Front ABS valve unit malfunction

Failure Reproduction With A New Front ABS valve unit

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the front ABS valve unit.

If the trouble code is indicated, replace the front ABS valve unit (page 17-50).

DTC 4-4: Rear ABS valve unit malfunction

Failure Reproduction With A New Rear ABS valve unit

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the rear ABS valve unit.

If the trouble code is indicated, replace the rear ABS valve unit (page 17-63).

DTC 5-1: Front power unit malfunction/ air bleeding incompletion

- Before starting the inspection, fill and bleed the front Combined ABS hydraulic system and recheck.
  - '09 – '13 model (page 16-23)
  - After '13 model (page 16-57)

1. **Failure Reproduction With A New Front Power Unit**

   Replace the front power unit (page 17-57).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and check the Combined ABS indicator.

   Is 5-1 indicated?

   YES – Replace the front ABS valve unit (page 17-50) and recheck.

   NO – Faulty original front power unit

DTC 5-2: Rear power unit malfunction/ air bleeding incompletion

- Before starting the inspection, fill and bleed the rear Combined ABS hydraulic system and recheck.
  - '09 – '13 model (page 16-38)
  - After '13 model (page 16-68)

1. **Failure Reproduction With A New Rear Power Unit**

   Replace the rear power unit (page 17-63).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and check the Combined ABS indicator.

   Is 5-2 indicated?

   YES – Replace the rear ABS valve unit (page 17-63) and recheck.

   NO – Faulty original rear power unit

DTC 5-3: Front power unit malfunction/ air bleeding incompletion/front brake caliper piston malfunction

- This malfunction may occur if there is low pressure due to a faulty installation of the brake caliper piston. If brake caliper pistons do not contact the brake pads securely, low pressure is detected during riding. Check the brake caliper piston and brake pads to ensure they are installed correct.
- Before starting the inspection, fill and bleed the front Combined ABS hydraulic system and recheck.
  - '09 – '13 model (page 16-23)
  - After '13 model (page 16-57)

1. **Failure Reproduction With A New Front Power Unit**

   Replace the front power unit (page 17-57).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and check the Combined ABS indicator.

   Is 5-3 indicated?

   YES – Replace the front ABS valve unit (page 17-50) and recheck.

   NO – Faulty original front power unit

DTC 5-4: Rear power unit malfunction/ air bleeding incompletion/rear brake caliper piston malfunction

- This malfunction may occur if there is low pressure due to a faulty installation of the brake caliper piston. If brake caliper pistons do not contact the brake pads securely, low pressure is detected during riding. Check the brake caliper piston and brake pads to ensure they are installed correct.
- Before starting the inspection, fill and bleed the rear Combined ABS hydraulic system and recheck.
  – '09 – '13 model (page 16-38)
  – After '13 model (page 16-68)

1. **Failure Reproduction With A New Rear Power Unit**

   Replace the rear power unit (page 17-63).

   Clear the DTCs (page 17-9).

   Perform the pre-start self-diagnosis and check the Combined ABS indicator.

   Is 5-4 indicated?

   YES – Replace the rear ABS valve unit (page 17-63) and recheck.

   NO – Faulty original rear power unit

DTC 5-5: Front brake is applied continuously from 0 km/h (0 mph) to 50 km/h (31 mph)

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

DTC 5-6: Rear brake is applied continuously from 0 km/h (0 mph) to 50 km/h (31 mph)

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

DTC 6-1, 6-2, 6-3 or 7-5: Front ABS valve unit solenoid malfunction

- Before starting the inspection, check for loose or poor contact on the front ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Gray) connector, then recheck again.

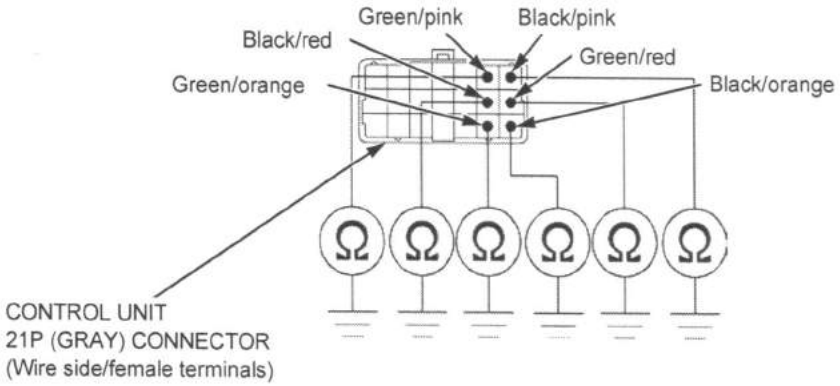
1. **Front Solenoid Valve Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the front ABS valve unit 21P (Black) and Combined ABS control unit 21P (Gray) connectors.

   Check for continuity between the Combined ABS control unit 21P (Gray) connector at the wire side and ground.

   Connection: Green/pink – Ground
   Black/red – Ground
   Green/orange – Ground
   Black/pink – Ground
   Green/red – Ground
   Black/orange – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**



   Is there continuity?

   YES – • Short circuit in Green/pink wire
   • Short circuit in Black/red wire
   • Short circuit in Green/orange wire
   • Short circuit in Black/pink wire
   • Short circuit in Green/red wire
   • Short circuit in Black/orange wire

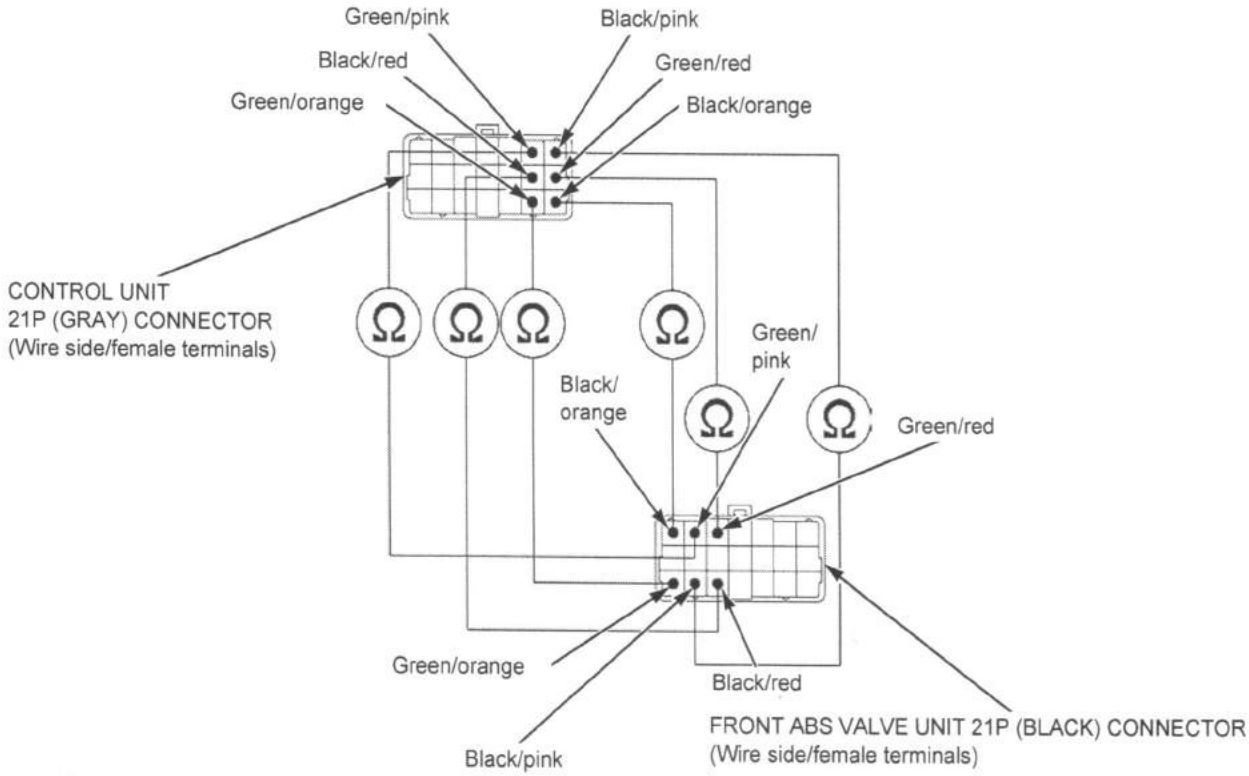
   NO – GO TO STEP 2.

2. **Front Solenoid Valve Line Open Circuit Inspection**

Check for continuity between the Combined ABS control unit 21P (Gray) connector and front ABS valve unit 21P (Black) connector.

Connection: Green/pink – Green/pink
Black/red – Black/red
Green/orange – Green/orange
Black/pink – Black/pink
Green/red – Green/red
Black/orange – Black/orange

TOOL:
Test probe (2 required) 07ZAJ-RDJA110



Is there continuity?

YES – GO TO STEP 3.

NO – • Open circuit in Green/pink wire
• Open circuit in Black/red wire
• Open circuit in Green/orange wire
• Open circuit in Black/pink wire
• Open circuit in Green/red wire
• Open circuit in Black/orange wire

3. **Failure Reproduction With A New Front ABS valve unit**

Replace the front ABS valve unit (page 17-50).

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

Is 6-1, 6-2, 6-3 or 7-5 indicated?

YES – Replace the Combined ABS control unit (page 17-50) and recheck.

NO – Faulty original front ABS valve unit

DTC 6-4, 6-5, 6-6 or 7-6: Rear ABS valve unit solenoid malfunction

- Before starting the inspection, check for loose or poor contact on the rear ABS valve unit 21P (Black) connector and Combined ABS control unit 21P (Gray) connector, then recheck again.

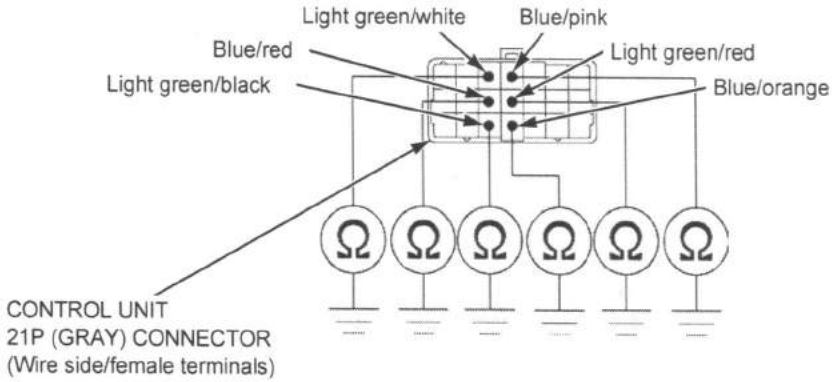
1. **Rear Solenoid Valve Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the rear ABS valve unit 21P (Black) and Combined ABS control unit 21P (Gray) connectors.

   Check for continuity between the Combined ABS control unit 21P (Gray) connector at the wire side and ground.

   Connection: Light green/white – Ground
   Blue/red – Ground
   Light green/black – Ground
   Blue/pink – Ground
   Light green/red – Ground
   Blue/orange – Ground

   TOOL:
   Test probe **07ZAJ-RDJA110**



   Is there continuity?

   YES – • Short circuit in Light green/white wire
   • Short circuit in Blue/red wire
   • Short circuit in Light green/black wire
   • Short circuit in Blue/pink wire
   • Short circuit in Light green/red wire
   • Short circuit in Blue/orange wire

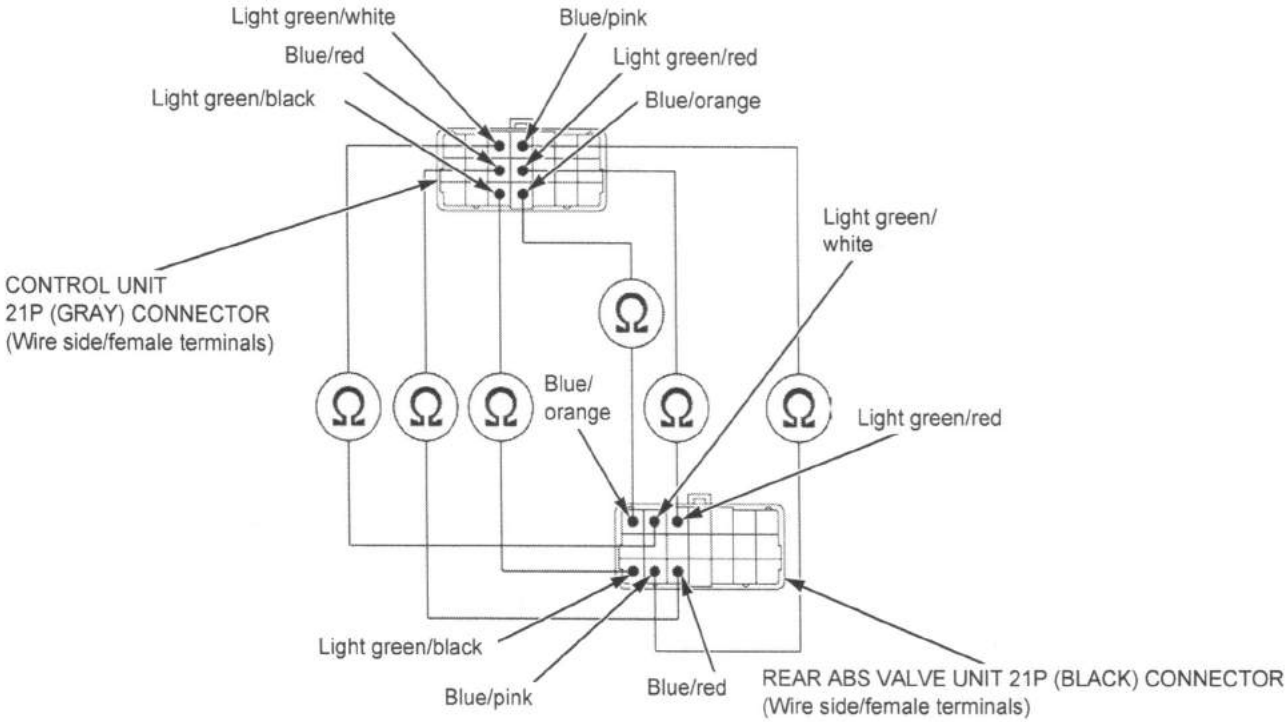
   NO – GO TO STEP 2.

2. **Rear Solenoid Valve Line Open Circuit Inspection**

Check for continuity between the Combined ABS control unit 21P (Gray) connector and rear ABS valve unit 21P (Black) connector.

Connection: Light green/white – Light green/white
Blue/red – Blue/red
Light green/black – Light green/black
Blue/pink – Blue/pink
Light green/red – Light green/red
Blue/orange – Blue/orange

TOOL:
Test probe (2 required) **07ZAJ-RDJA110**



Is there continuity?

YES – GO TO STEP 3.

NO – • Open circuit in Light green/white wire
• Open circuit in Blue/red wire
• Open circuit in Light green/black wire
• Open circuit in Blue/pink wire
• Open circuit in Light green/red wire
• Open circuit in Blue/orange wire

3. **Failure Reproduction With A New Rear ABS valve unit**

Replace the rear ABS valve unit (page 17-63).

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

Is 6-4, 6-5, 6-6 or 7-6 indicated?

YES – Replace the Combined ABS control unit (page 17-50) and recheck.

NO – Faulty original rear ABS valve unit

DTC 7-1: Front power unit drive circuit malfunction

- Before starting the inspection, check for loose or poor contact on the front power unit 2P (Black) connector and Combined ABS control unit 5P (Black) connector, and check for blown fuse (FR ABS MOTOR 30 A).

1. Front Power Unit Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the front power unit 2P (Black) and Combined ABS control unit 5P (Black) connectors.

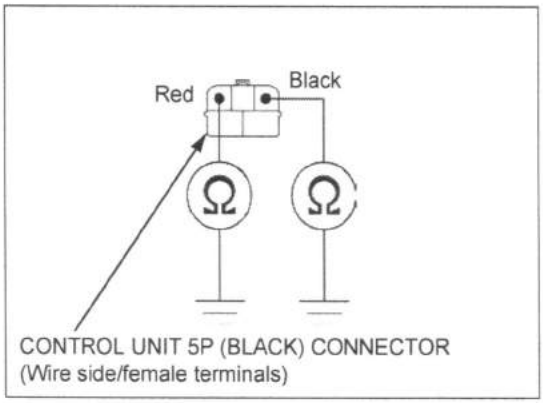
Check for continuity between the Combined ABS control unit 5P (Black) connector at the wire side and ground.

Connection: Red – Ground
Black – Ground

Is there continuity?

YES – • Short circuit in Red wire
• Short circuit in Black wire

NO – GO TO STEP 2.



2. Front Power Unit Line Open Circuit Inspection

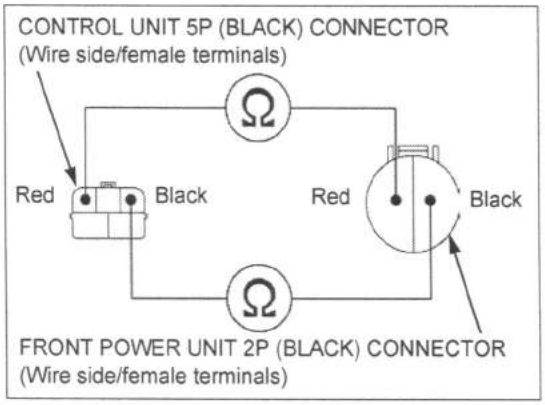
Check for continuity between the Combined ABS control unit 5P (Black) connector and front power unit 2P (Black) connector.

Connection: Red – Red
Black – Black

Is there continuity?

YES – GO TO STEP 3.

NO – • Open circuit in Red wire
• Open circuit in Black wire



3. Failure Reproduction With A New Combined ABS Control Unit

Replace the Combined ABS control unit (page 17-50).

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

Is 7-1 indicated?

YES – Replace the front power unit (page 17-50) and recheck.

NO – Faulty original Combined ABS control unit

DTC 7-2: Rear power unit drive circuit malfunction

- Before starting the inspection, check for loose or poor contact on the rear power unit 2P (Black) connector and Combined ABS control unit 5P (Gray) connector, and check for blown fuse (RR ABS MOTOR 30 A).

1. Rear Power Unit Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the rear power unit 2P (Black) and Combined ABS control unit 5P (Gray) connectors.

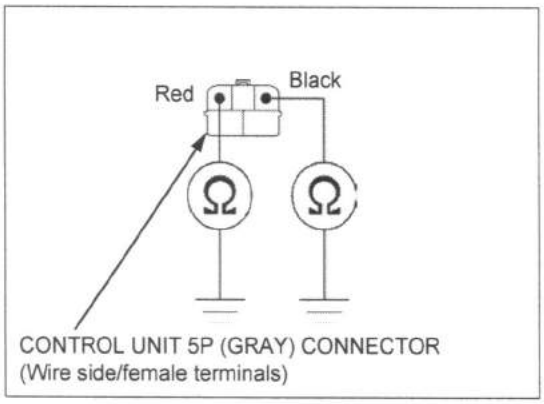
Check for continuity between the Combined ABS control unit 5P (Gray) connector at the wire side and ground.

Connection: Red – Ground
Black – Ground

Is there continuity?

YES – • Short circuit in Red wire
• Short circuit in Black wire

NO – GO TO STEP 2.



2. Rear Power Unit Line Open Circuit Inspection

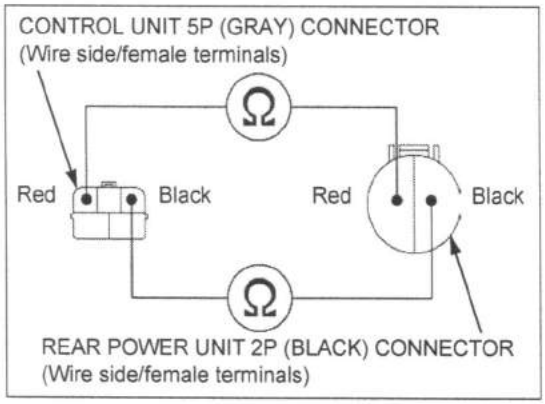
Check for continuity between the Combined ABS control unit 5P (Gray) connector and rear power unit 2P (Black) connector.

Connection: Red – Red
Black – Black

Is there continuity?

YES – GO TO STEP 3.

NO – • Open circuit in Red wire
• Open circuit in Black wire



3. Failure Reproduction With A New Combined ABS Control Unit

Replace the Combined ABS control unit (page 17-50).

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

Is 7-2 indicated?

YES – Replace the rear power unit (page 17-63) and recheck.

NO – Faulty original Combined ABS control unit

DTC 7-3: Front power unit ground line short

1. **Front Power Unit Ground Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the front power unit 2P (Black) connector.

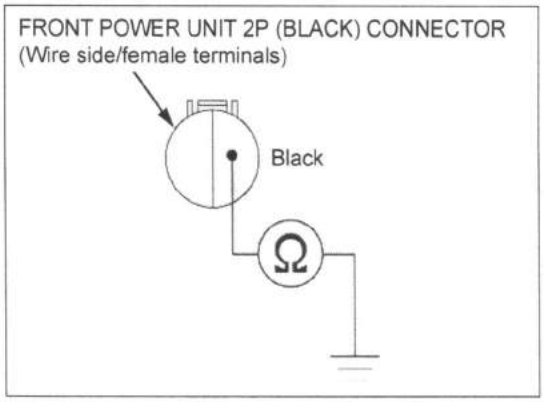
   Check for continuity between the front power unit 2P (Black) connector and ground.

   Connection: Black – Ground

   Is there continuity?

   YES – Short circuit in Black wire

   NO – Replace the Combined ABS control unit (page 17-50) and recheck.



DTC 7-4: Rear power unit ground line short

1. **Rear Power Unit Ground Line Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the rear power unit 2P (Black) connector.

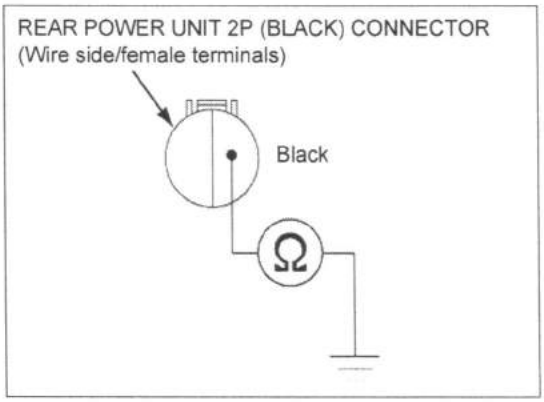
   Check for continuity between the rear power unit 2P (Black) connector and ground.

   Connection: Black – Ground

   Is there continuity?

   YES – Short circuit in Black wire

   NO – Replace the Combined ABS control unit (page 17-50), and recheck.



DTC 2-2, 2-3, 2-5, 8-1, 8-2, 8-3, 8-4, 9-1, 9-2, 9-3, 10-1, 10-2, 10-3, 10-4, 10-5, 10-6, 10-7, 10-8, 10-9 or 10-10: Combined ABS control unit

Failure Reproduction With A New Combined ABS Control Unit

Clear the DTCs (page 17-9).

Perform the pre-start self-diagnosis and recheck the Combined ABS indicator.

If the trouble code is indicated, replace the Combined ABS control unit (page 17-50).

WHEEL SPEED SENSOR

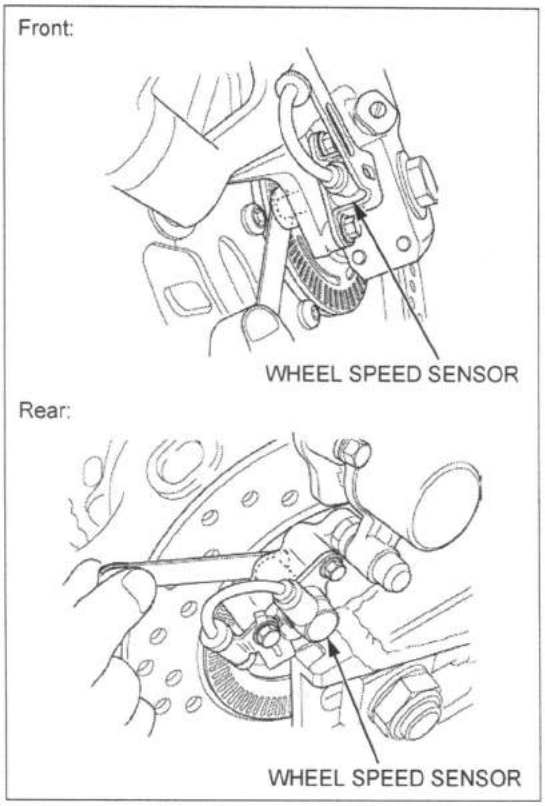
AIR GAP INSPECTION

Raise the wheel off the ground.

Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
It must be within specification.

STANDARD: Front/rear: 0.4 – 1.2 mm (0.02 – 0.05 in)

The sensor air gap cannot be adjusted. If it is not within specification, check each installation part for deformation, looseness, or damage.



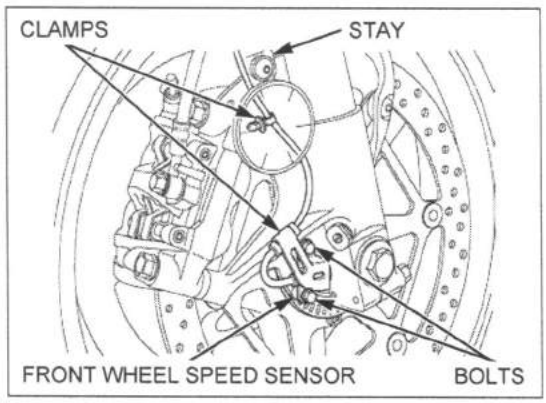
REMOVAL/INSTALLATION

FRONT

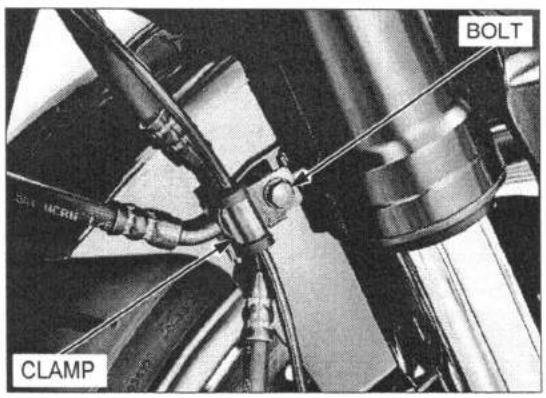
Remove the middle cowls (page 3-18).

Remove the bolts, wire clamp, and front wheel speed sensor.

Remove the wire clamp from the refractor stay.

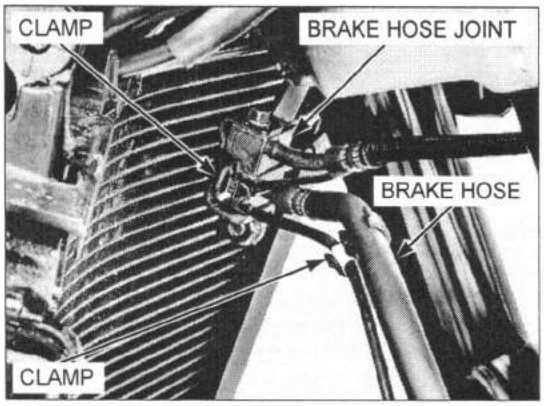


Remove the bolt and wire clamp.

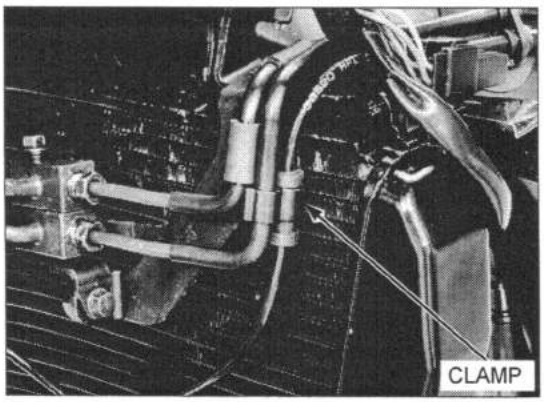


Remove the wire clamp from the front brake hose.

Remove the wire clamp from the brake hose joint.



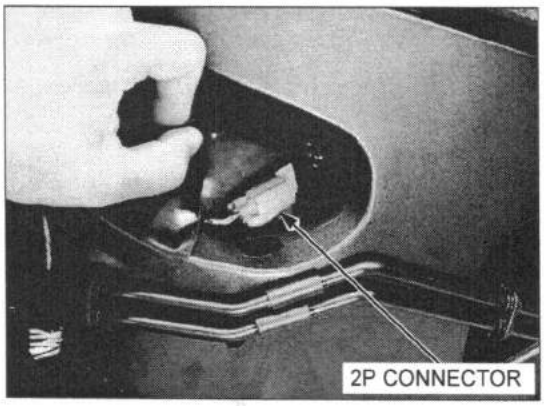
Remove the wire clamp from the brake pipe.



Disconnect the front wheel speed sensor 2P (Orange) connector.

Route the wire properly (page 1-25).

Installation is in the reverse order of removal.

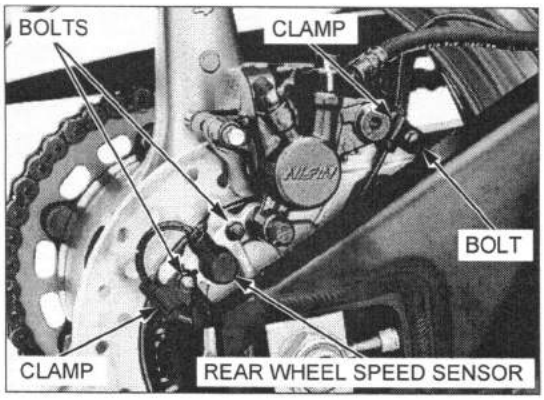


REAR

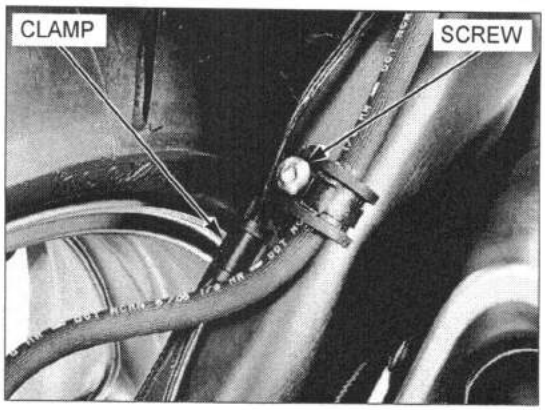
Remove the fuel tank (page 6-60).

Remove the bolts, wire clamp, and rear wheel speed sensor.

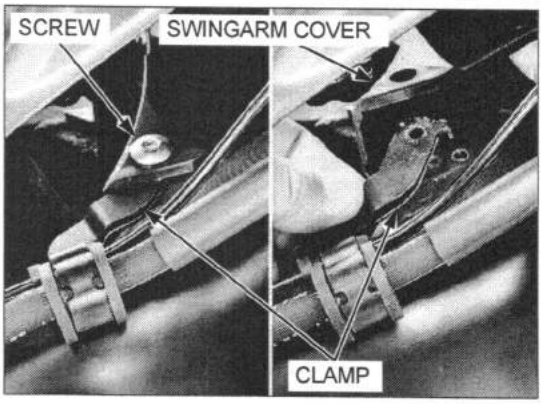
Remove the bolt and wire clamp.



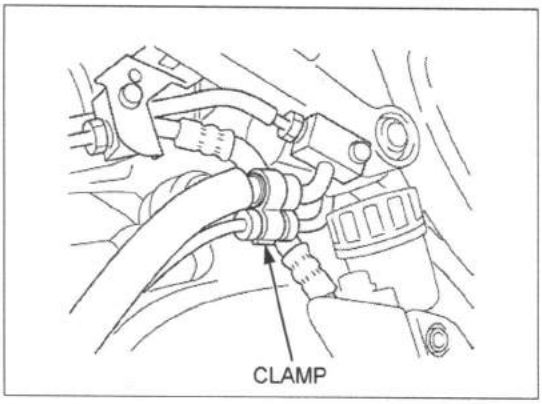
Remove the screw and wire clamp.



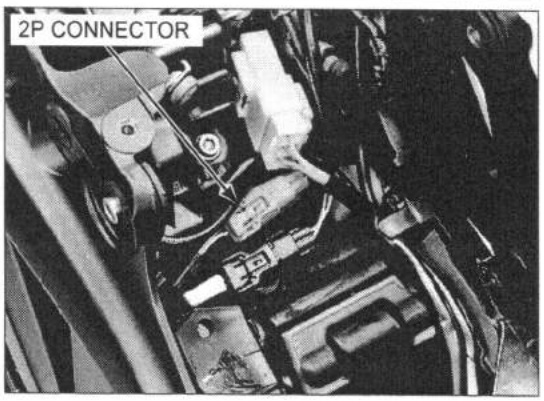
Remove the screw and lift the right end of the swingarm cover upward, then remove the clamp from the swingarm.



Remove the wire clamp.



Disconnect the rear wheel speed sensor 2P (Orange) connector.



Route the wire properly (page 1-25).

Installation is in the reverse order of removal.

- Align the wire clamp tabs with the swingarm hole.

COMBINED ABS CONTROL UNIT

REMOVAL/INSTALLATION

'09 model: Remove the following:

- Rear seat cowl (page 3-11)
- License light stay (page 3-42)

After '09 model: Remove the rear center cowl (page 3-47).

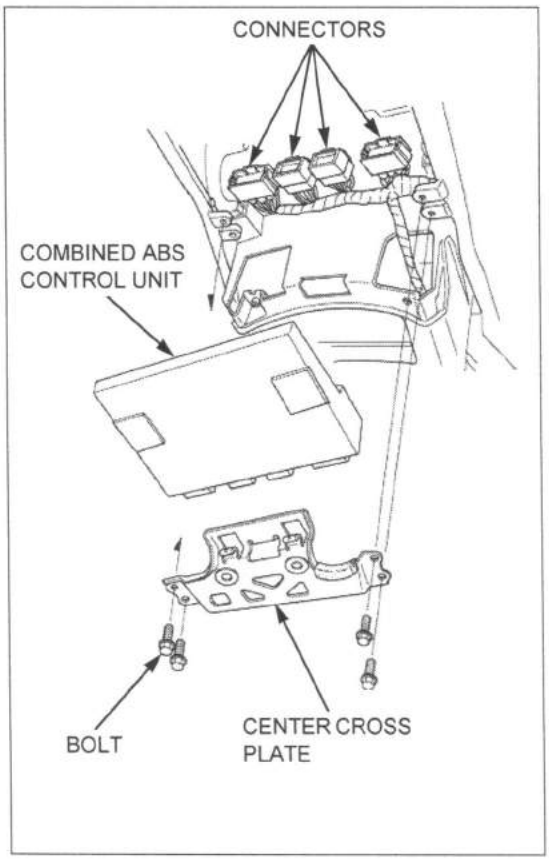
Remove the bolts and center cross plate assembly.

Disconnect the Combined ABS control unit 5P (Black), 21P (Gray), 21P (Black), and 5P (Gray) connectors.

Remove the Combined ABS control unit.

Installation is in the reverse order of removal.

TORQUE:
Center cross plate mounting bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)



FRONT ABS VALVE UNIT

REMOVAL

NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

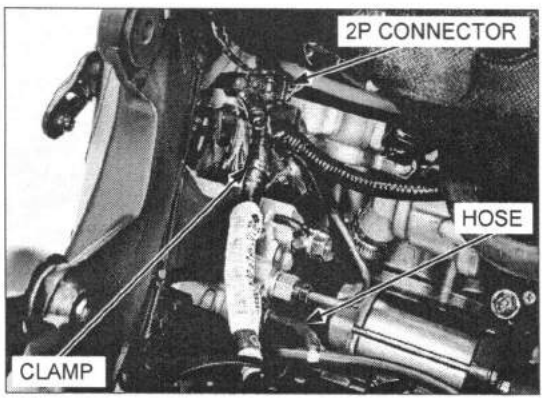
- Do not allow foreign material to enter the system when filling the reserve tank.

Lift and support the fuel tank (page 4-7)

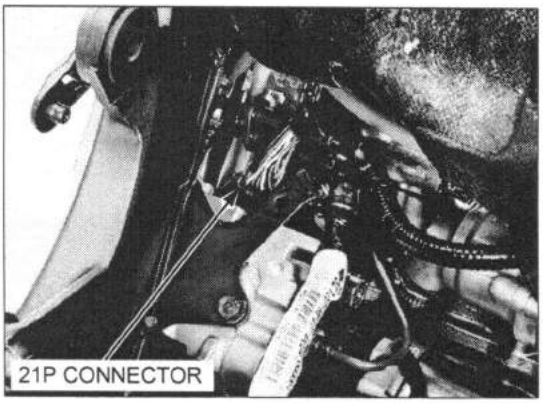
Drain the front hydraulic system (page 16-9).

Remove the sidestand switch 2P (Black) connector and wire clamp from the front ABS valve unit stay.

Disconnect the drain hose from the front ABS valve unit.

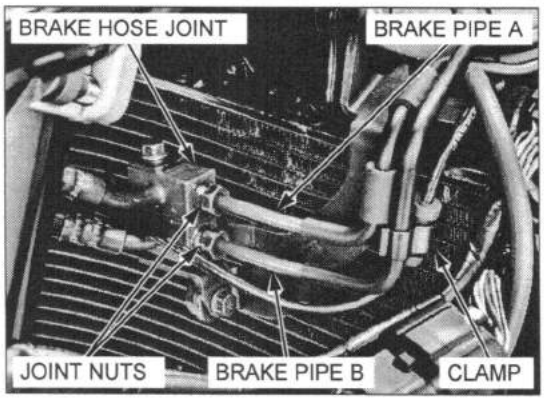


Disconnect the front ABS valve unit 21P (Black) connector.

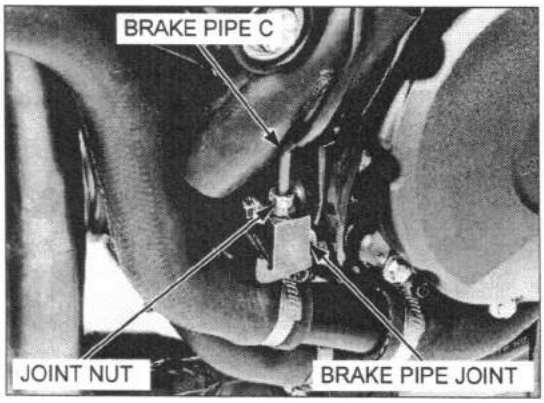


Remove the wire clamp from the brake pipe.

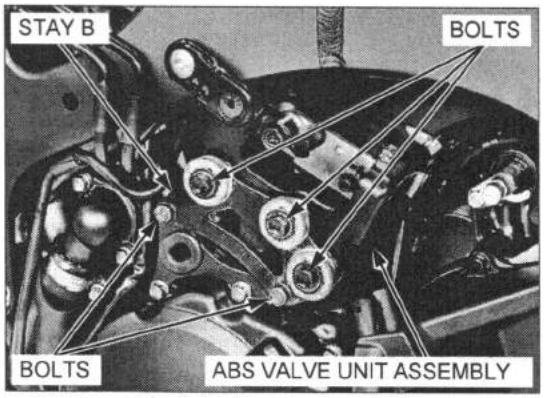
Hold the brake hose joint and loosen the joint nuts, then disconnect brake pipe A and B.



Hold the brake pipe joint and loosen the joint nut, then disconnect the brake pipe C.

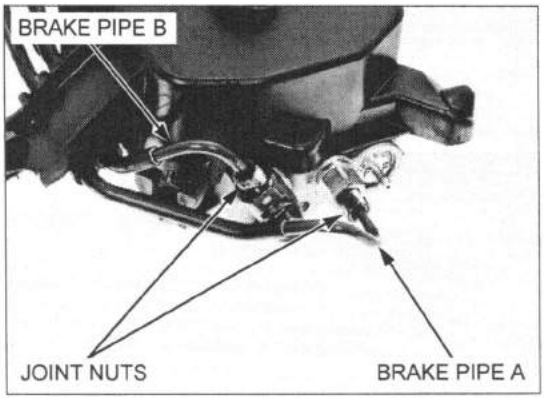


Remove the bolts, ABS valve unit stay B, and front ABS valve unit assembly.

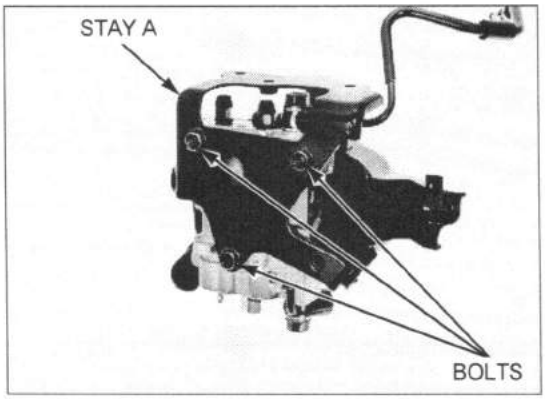


DISASSEMBLY

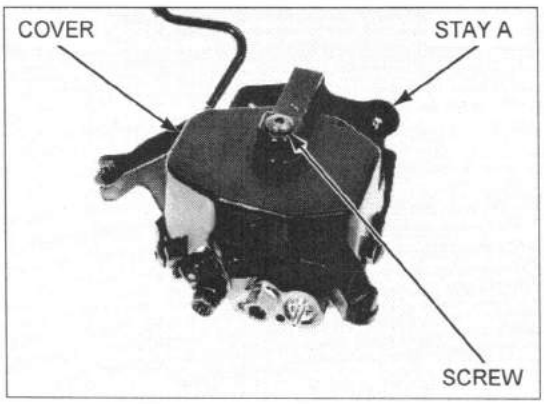
Loosen the joint nuts and disconnect the brake pipes from the front ABS valve unit.



Remove the front ABS valve unit stay A mounting bolts.

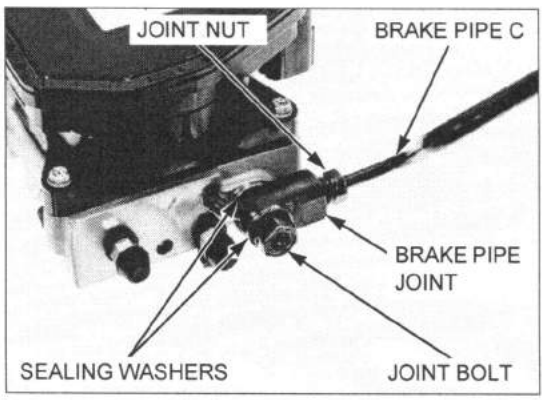


Remove the screw, rear ABS valve unit stay A, and cover.



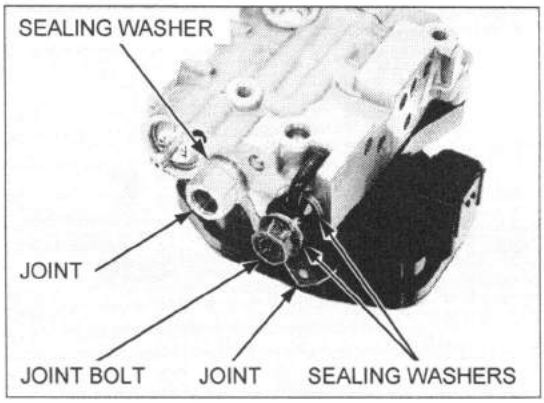
Loosen the brake pipe joint nut and disconnect the brake pipe C.

Remove the joint bolt, sealing washers, and brake pipe joint.

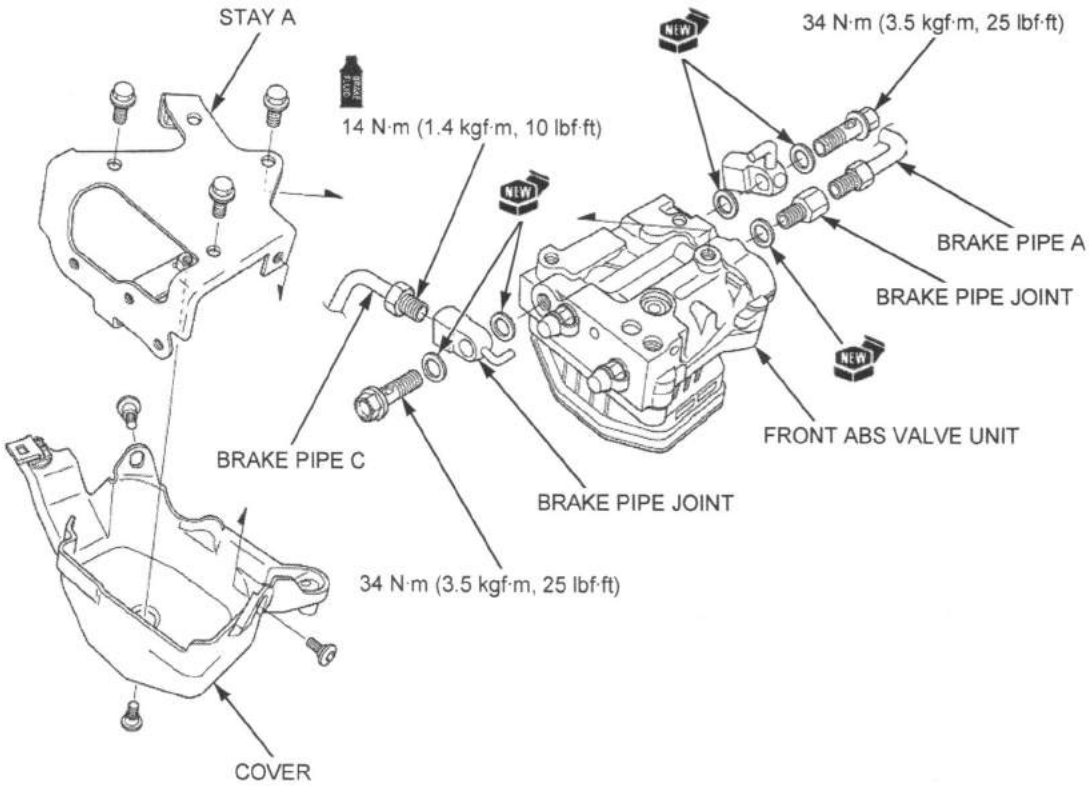


Remove the joint bolt, sealing washers, and brake pipe joint.

Remove the brake pipe joint and sealing washer.



ASSEMBLY



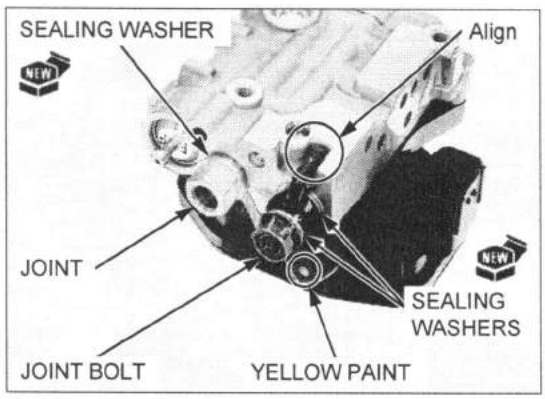
Install a new sealing washer and tighten the brake pipe joint securely.

Install new sealing washers, brake pipe joint, and joint bolt as shown.

Tighten the joint bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

- Brake pipe joint identification color: Yellow



Install new sealing washers, brake pipe joint, and joint bolt as shown.

Tighten the joint bolt to the specified torque.

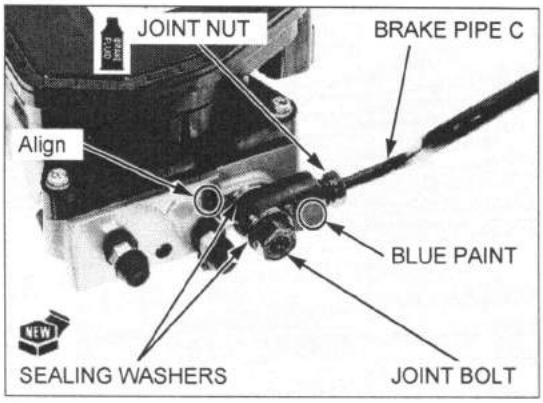
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

- Brake pipe joint identification color: Blue

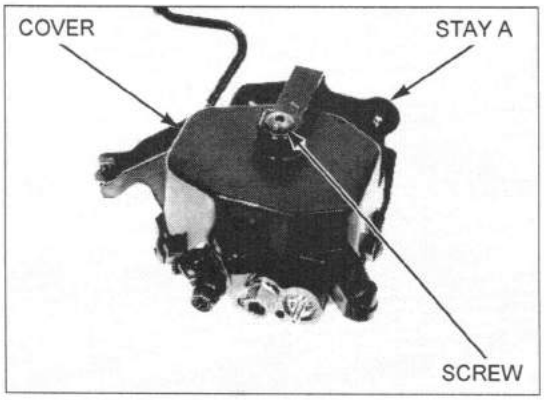
Apply brake fluid to the brake pipe joint nut threads.

Connect the front brake pipe C and loosely tighten the joint nut.

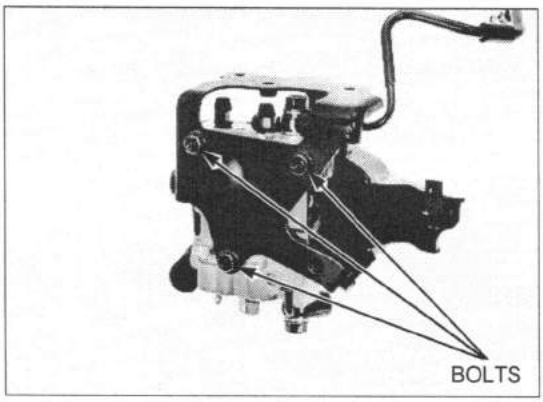
- Tighten the joint nut after installing the front ABS valve unit assembly.



Install the cover and rear ABS valve unit stay A and tighten the screw securely.



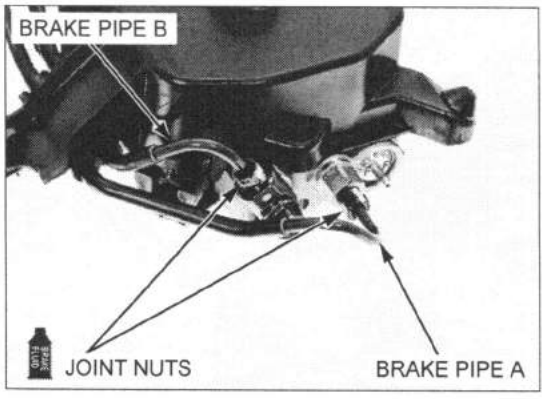
Tighten the rear ABS valve unit stay A mounting bolts securely.



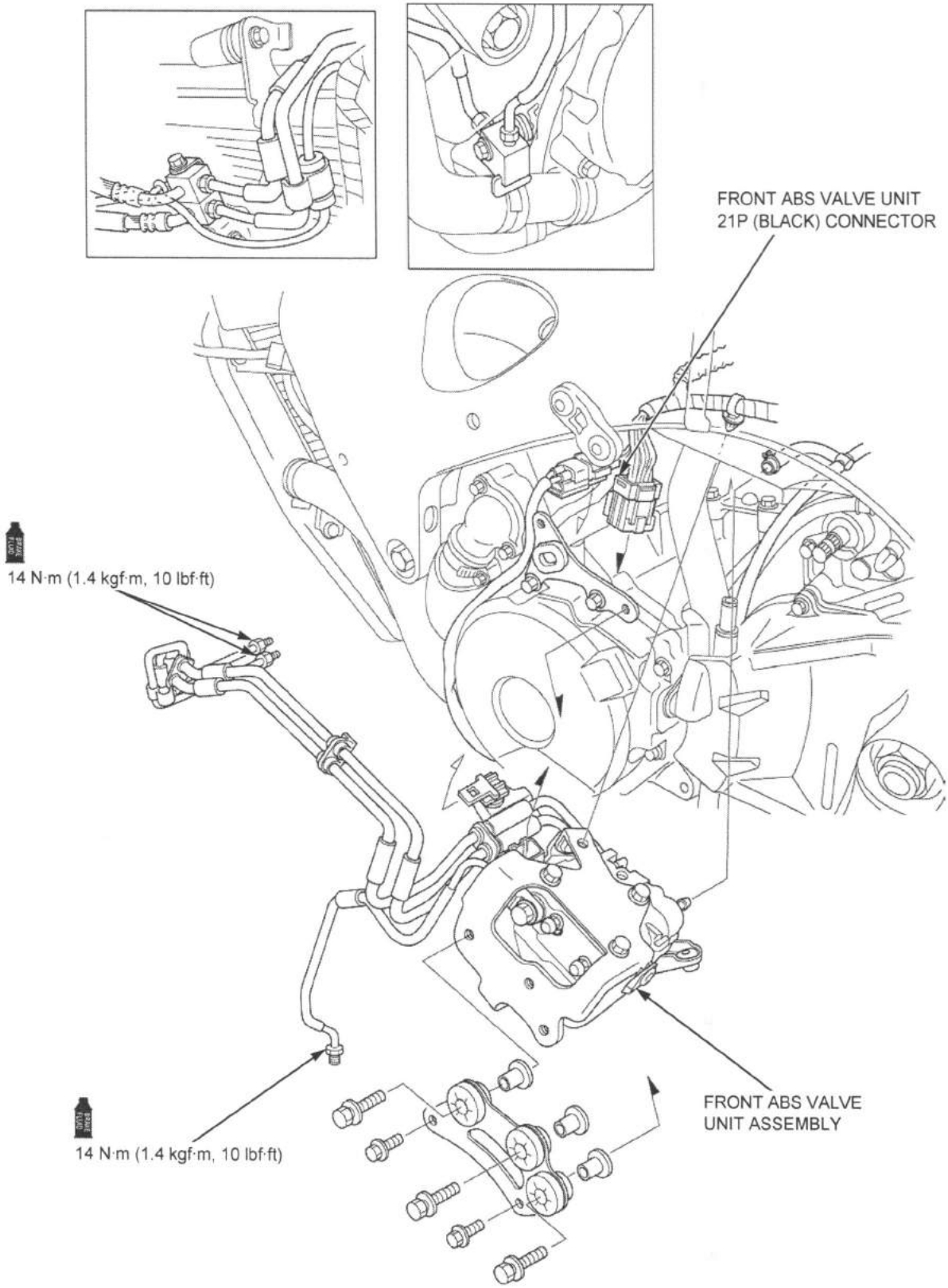
Apply brake fluid to the brake pipe joint nut threads.

Connect brake pipe A and B and loosely tighten the joint nuts.

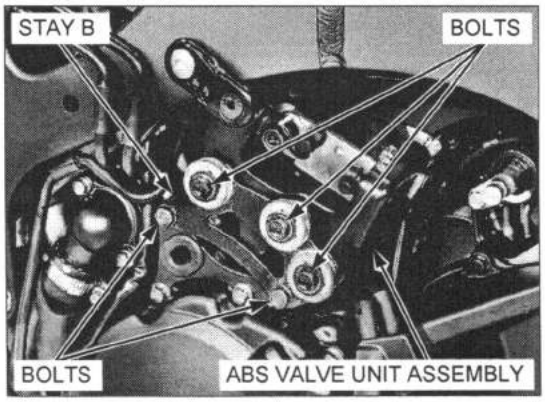
- Tighten the joint nut after installing the front ABS valve unit assembly.



INSTALLATION



Install the front ABS valve unit assembly and ABS valve unit stay B and tighten the bolts securely.



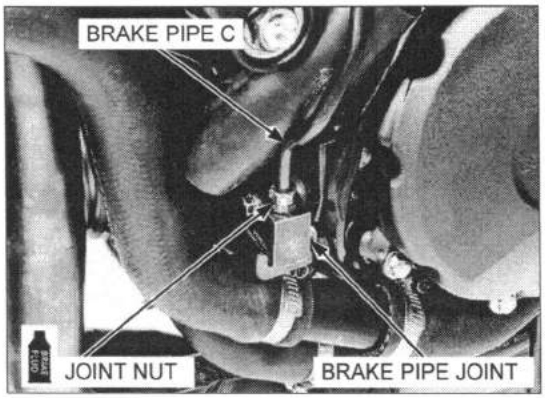
Apply brake fluid to the brake pipe joint nut threads.

Connect the brake pipe C and tighten the joint nut (joint side) to the specified torque while holding the brake pipe joint.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Tighten the brake pipe joint nuts (front ABS valve unit side) to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)



Apply brake fluid to the brake pipe joint nut threads.

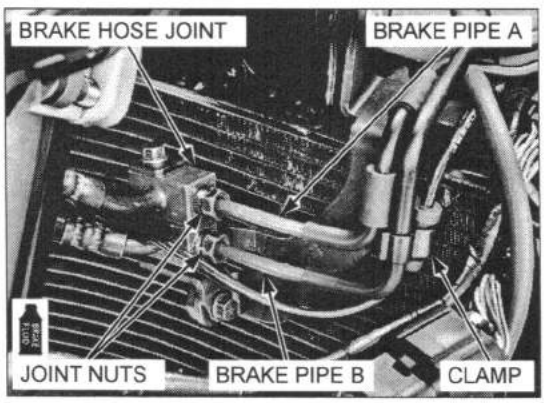
Connect brake pipe A and B and tighten the joint nuts (joint side) to the specified torque while holding the brake hose joint.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

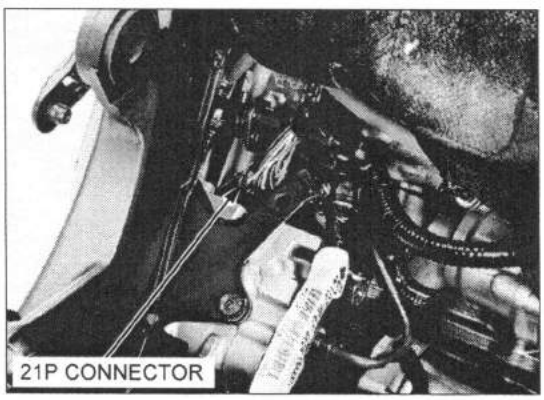
Install the wire clamp to the brake pipe securely.

Tighten the brake pipe joint nuts (front ABS valve unit side) to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)



Connect the front ABS valve unit 21P (Black) connector.



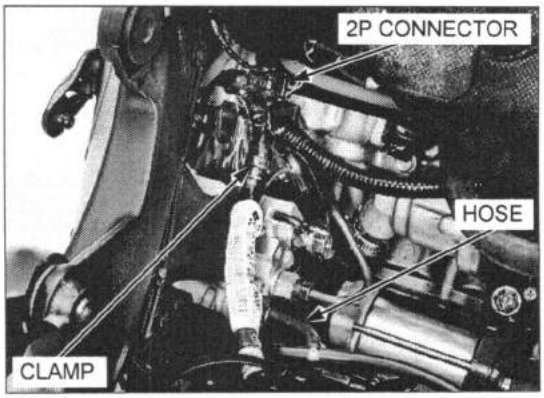
Install the sidestand switch 2P (Black) connector and wire clamp to the front ABS valve unit stay.

Connect the drain hose to the front ABS valve unit.

Fill and bleed the front Combined ABS hydraulic system.

- '09 – '13 model (page 16-23)
- After '13 model (page 16-57)

Remove the support and close the fuel tank (page 4-9).



FRONT POWER UNIT

REMOVAL

NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

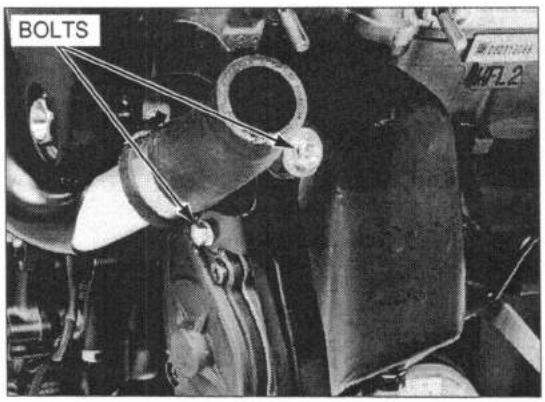
- Do not allow foreign material to enter the system when filling the reserve tank.

Remove the following:

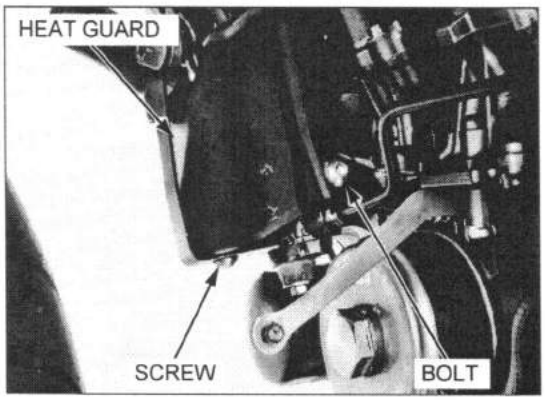
- Radiator (page 7-13)
- Exhaust pipe (page 3-64)

Drain the front hydraulic system (page 16-9).

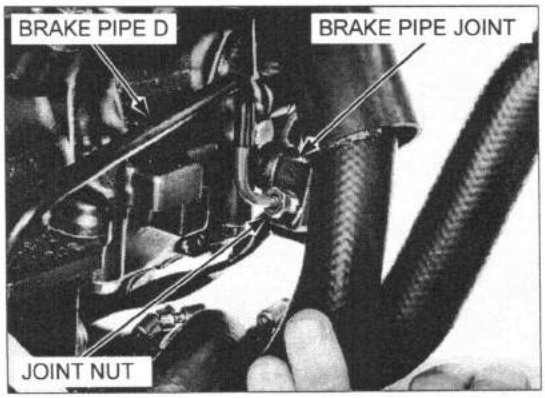
Remove the front power unit mounting bolts.



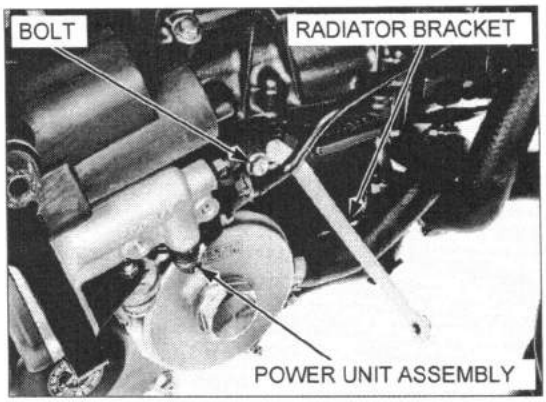
Remove the screw, bolt, and heat guard from the front power unit.



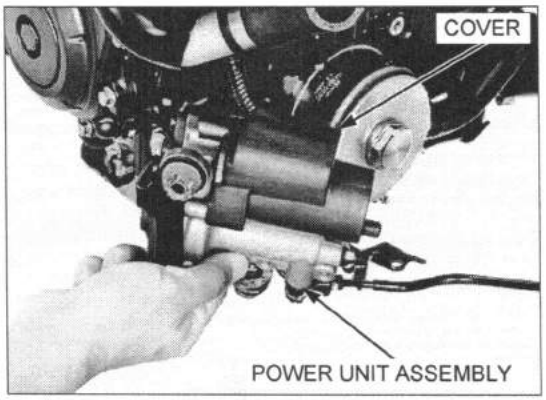
Hold the brake pipe joint and loosen the joint nut, then disconnect the brake pipe D.



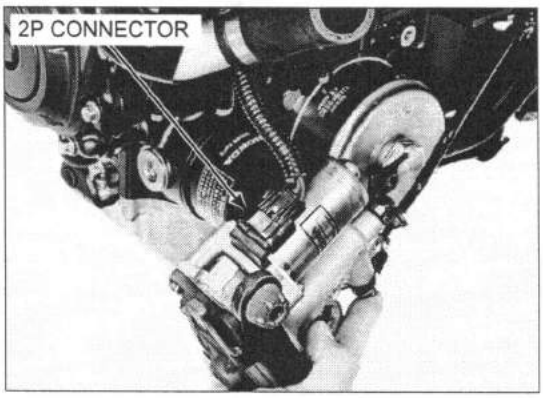
Remove the bolt, front power unit assembly, and radiator bracket.



Remove the rubber cover from the front power unit assembly.

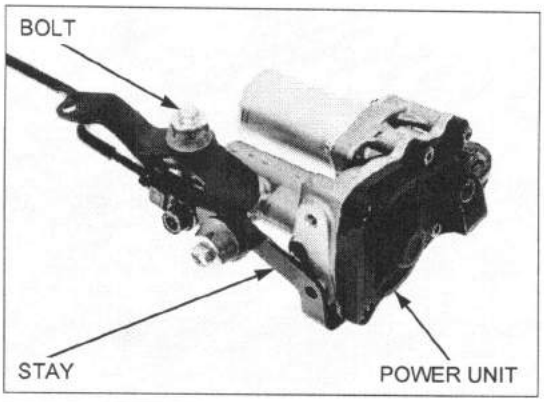


Disconnect the front power unit 2P (Black) connector and remove the front power unit assembly.



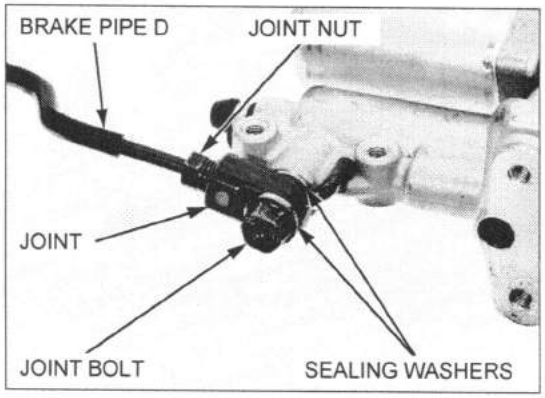
DISASSEMBLY

Remove the bolt and stay from the front power unit.

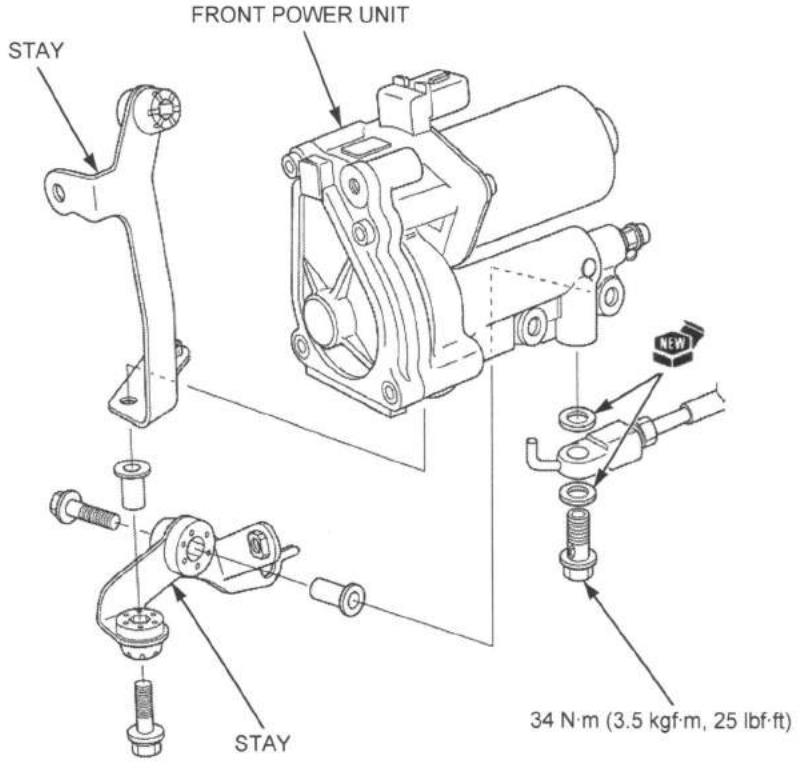


Loosen the brake pipe joint nut and disconnect brake pipe D.

Remove the joint bolt, sealing washers, and brake pipe joint.



ASSEMBLY



Install new sealing washers, brake pipe joint, and joint bolt as shown.

Tighten the joint bolt to the specified torque.

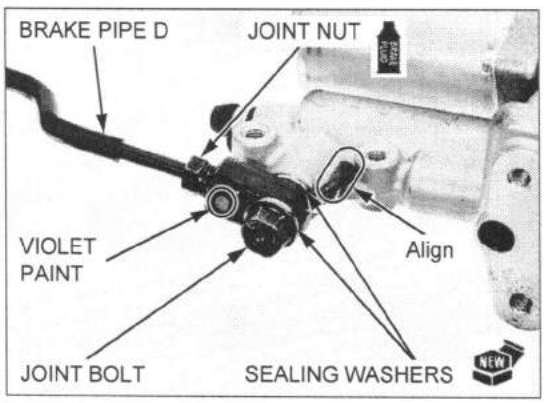
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

- Brake pipe joint identification color: Violet

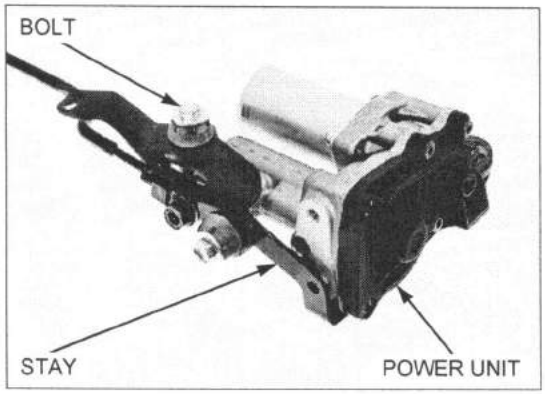
Apply brake fluid to the brake pipe joint nut threads.

Connect brake pipe D and loosely tighten the joint nut.

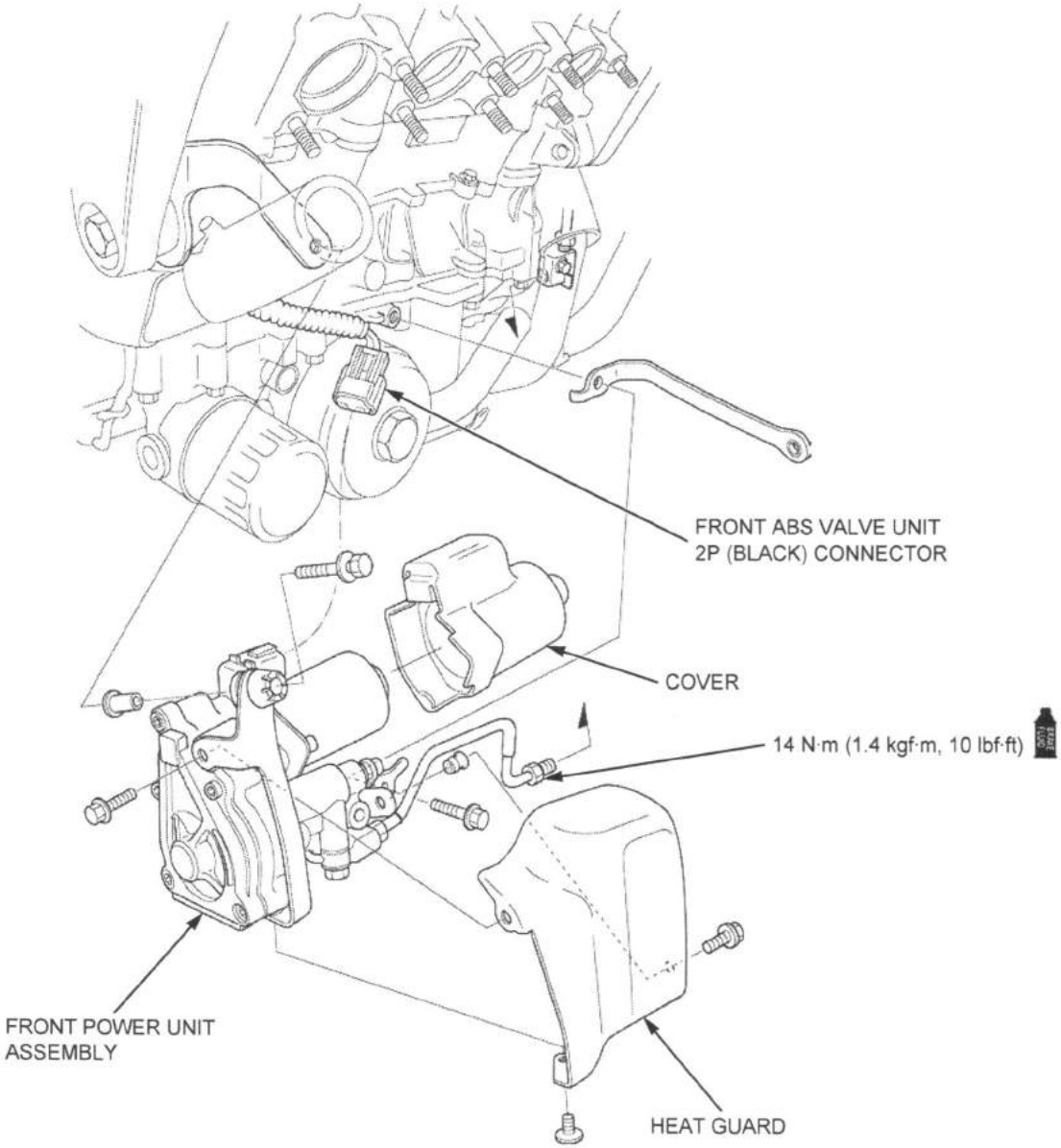
- Tighten the joint nut after installing the front ABS valve unit assembly.



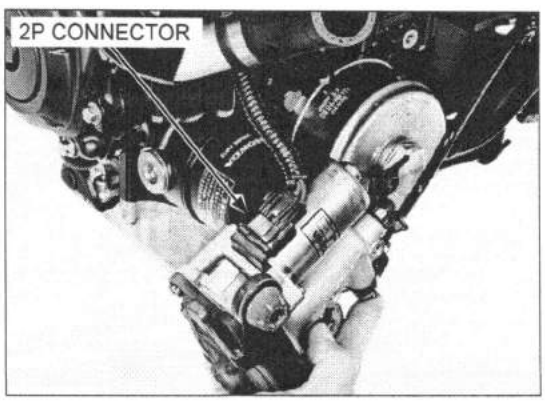
Install the stay to the front power unit and tighten the bolt securely.



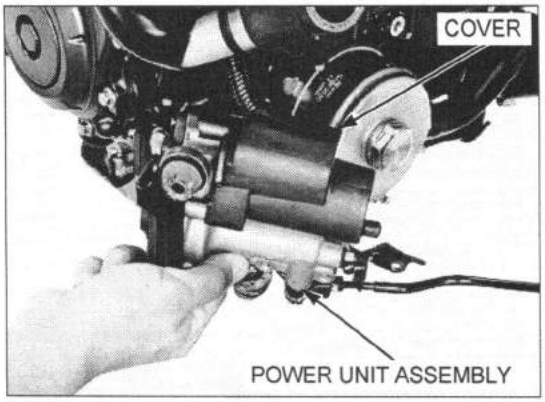
INSTALLATION



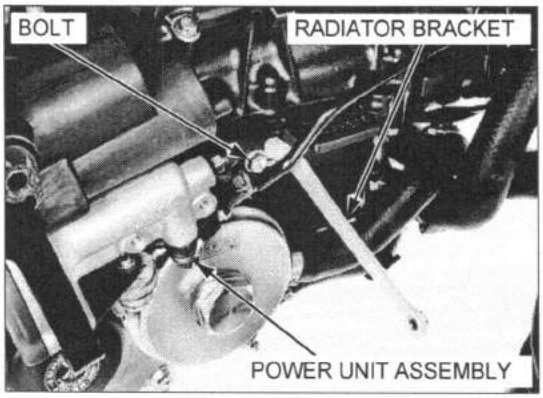
Connect the 2P (Black) connector to the power unit assembly.



Install the rubber cover over the power unit motor securely.



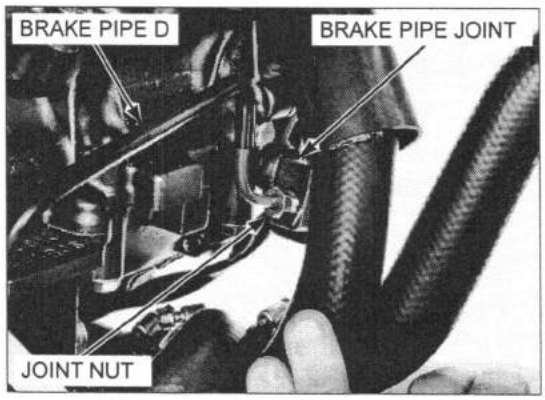
Install the radiator bracket and front power unit assembly and tighten the bolt securely.



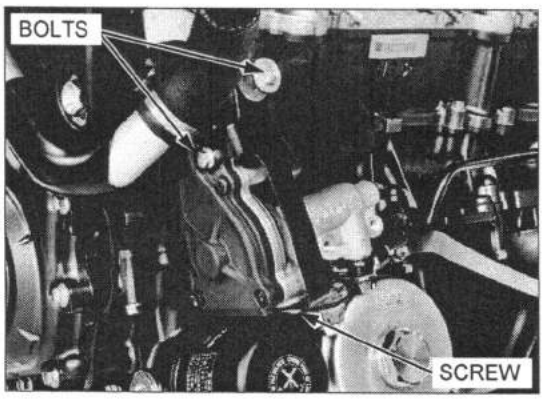
Apply brake fluid to the brake pipe joint nut threads.

Connect brake pipe D and tighten the joint nut (joint side) to the specified torque while holding the brake pipe joint.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)



Temporarily install the power unit mounting bolts and screw.



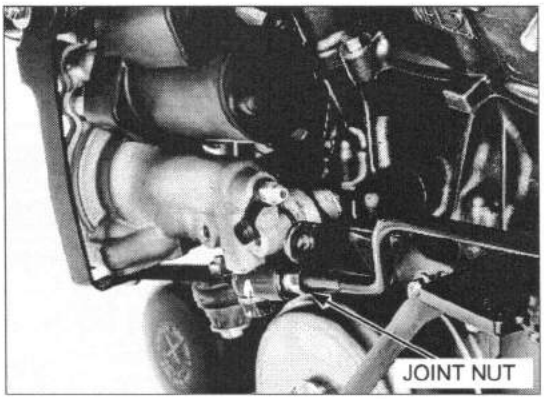
Tighten the brake pipe joint nut (front power unit side) to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Fill and bleed the front Combined ABS hydraulic system.

- '09 – '13 model (page 16-23)
- After '13 model (page 16-57)

Install the removed parts in the reverse order of removal.



REAR ABS VALVE UNIT/POWER UNIT

REMOVAL

NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

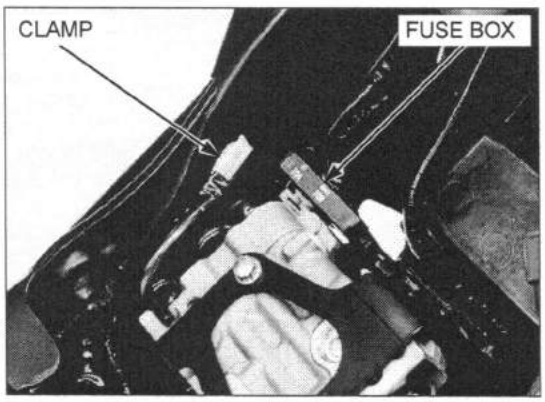
Remove the following:

- Fuel tank (page 6-60)
- EGCA (page 6-90)
- Battery (page 18-7)

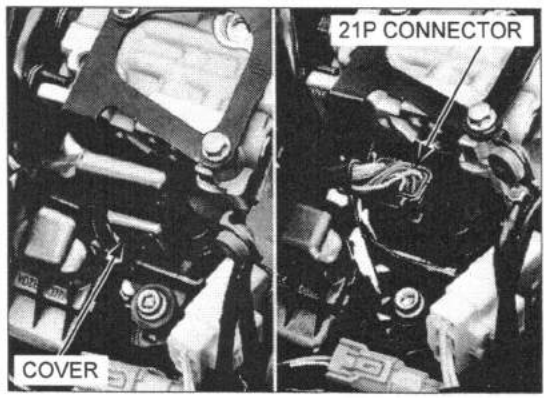
Drain the rear hydraulic system (page 16-9).

Remove the wire clamp from the rear fender B.

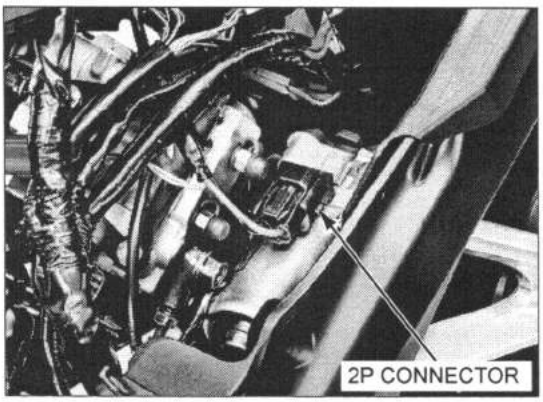
Remove the fuse box from the rear ABS valve unit stay.



Remove the cover and disconnect the rear ABS valve unit 21P (Black) connector.

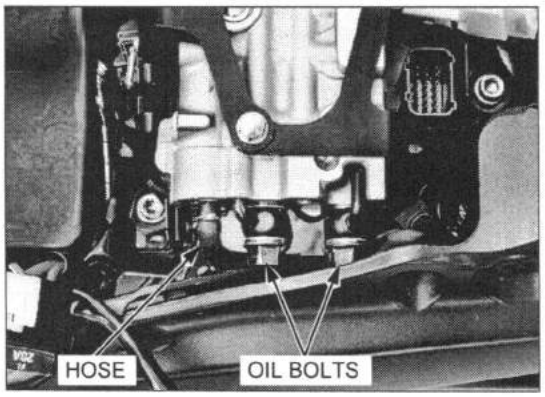


Disconnect the rear power unit 2P (Black) connector.

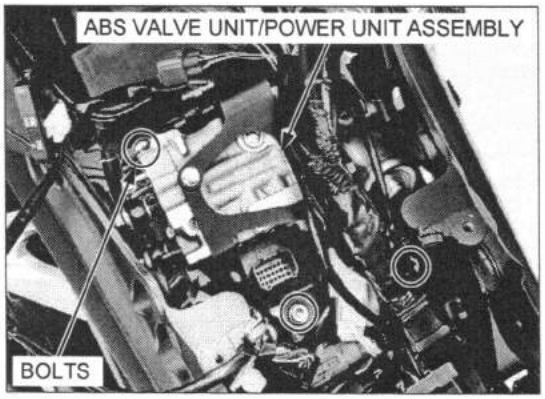


Disconnect the drain hose from the rear ABS valve unit.

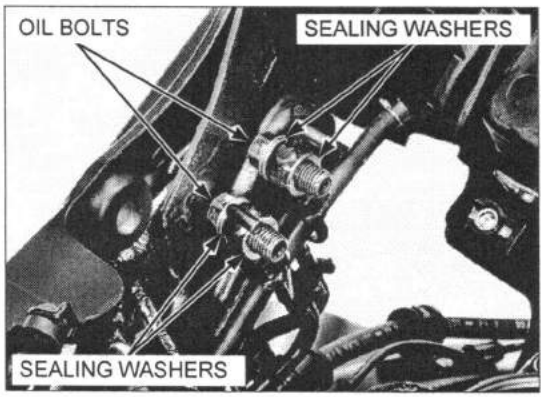
Loosen the oil bolts.



Remove the bolts and rear ABS valve unit/power unit assembly.

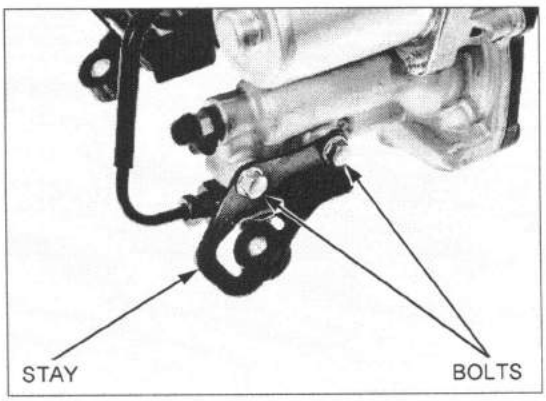


Remove the oil bolts and sealing washers from the brake pipes.



DISASSEMBLY

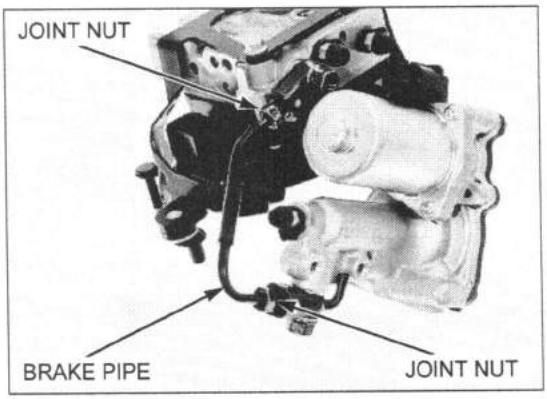
Remove the bolts and rear power unit stay.



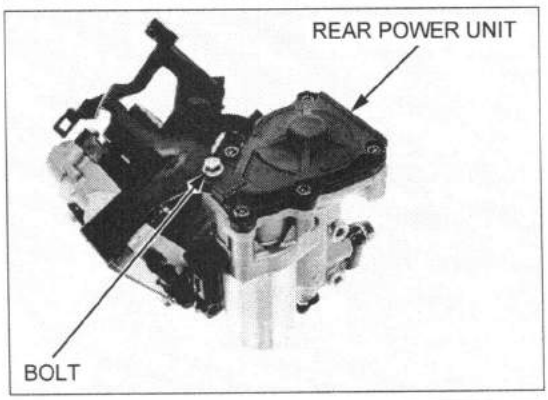
NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

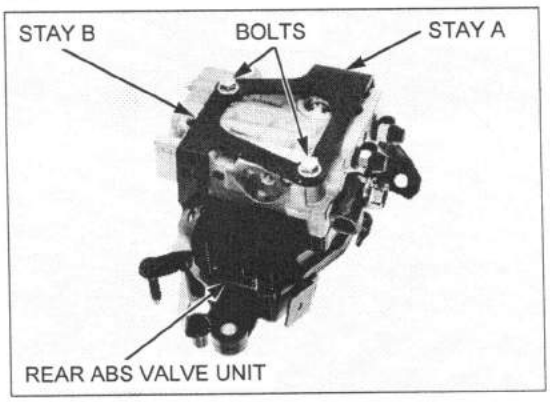
Loosen the brake pipe joint nuts and disconnect the brake pipe.



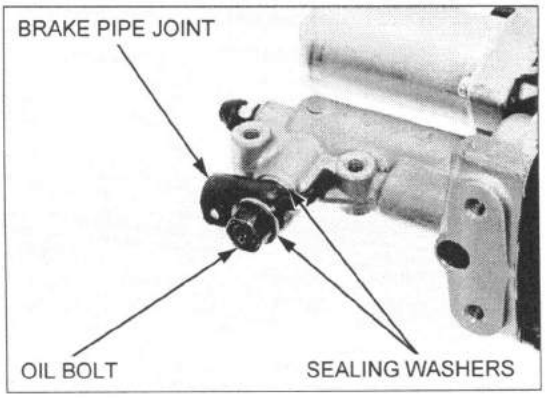
Remove the bolt and rear power unit from the ABS valve unit.



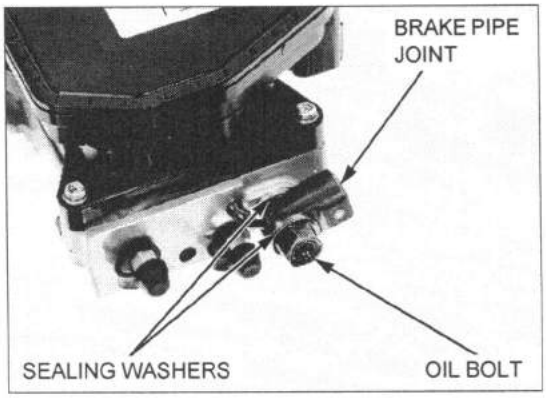
Remove the bolts, stay A, and stay B from the rear ABS valve unit.



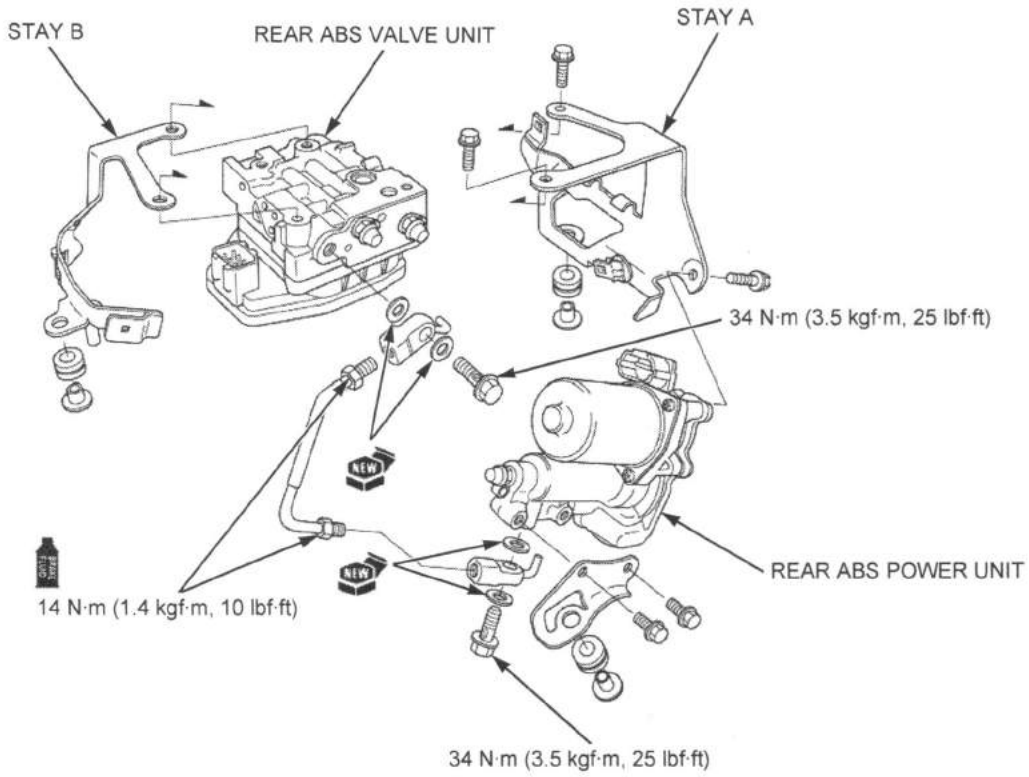
Remove the oil bolt, sealing washers, and brake pipe joint from the rear power unit.



Remove the oil bolt, sealing washers, and brake pipe joint from the rear ABS valve unit.



ASSEMBLY

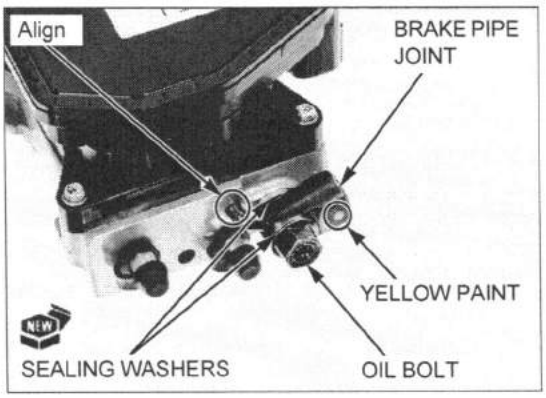


Install new sealing washers, brake pipe joint, and joint bolt as shown.

Tighten the joint bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

- Brake pipe joint identification color: Yellow

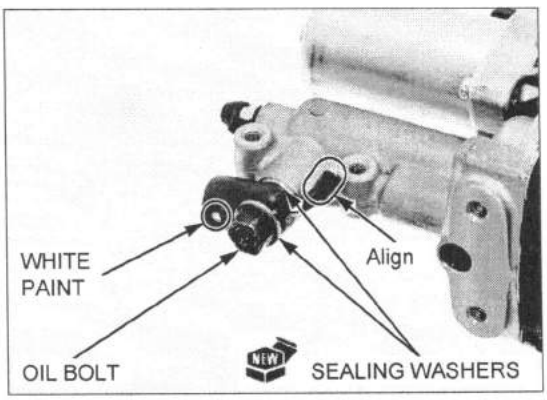


Install new sealing washers, brake pipe joint, and joint bolt as shown.

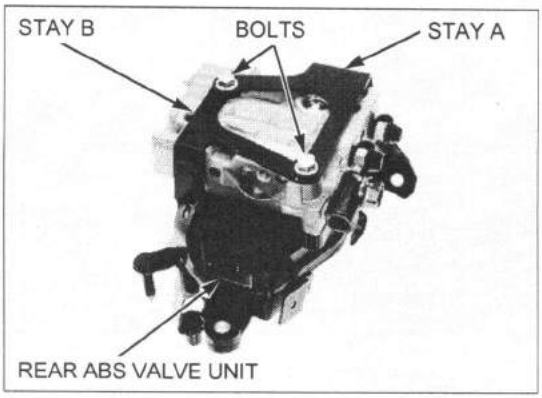
Tighten the joint bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

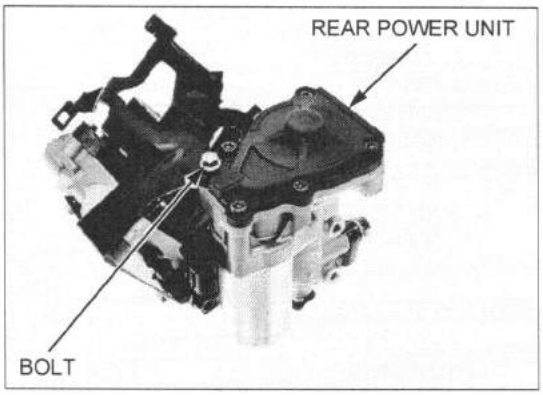
- Brake pipe joint identification color: White



Install stay B and stay A and tighten the bolts securely.



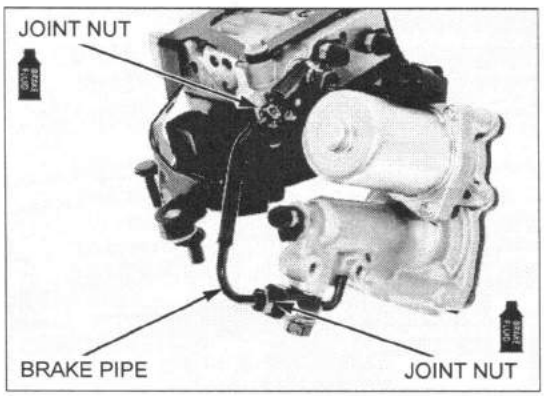
Install the rear power unit to the ABS valve unit and tighten the bolt securely.



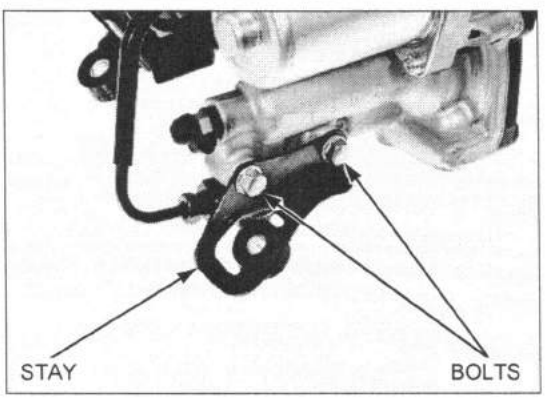
Apply brake fluid to the brake pipe joint nut threads.

Connect the brake pipe and tighten the joint nuts to the specified torque.

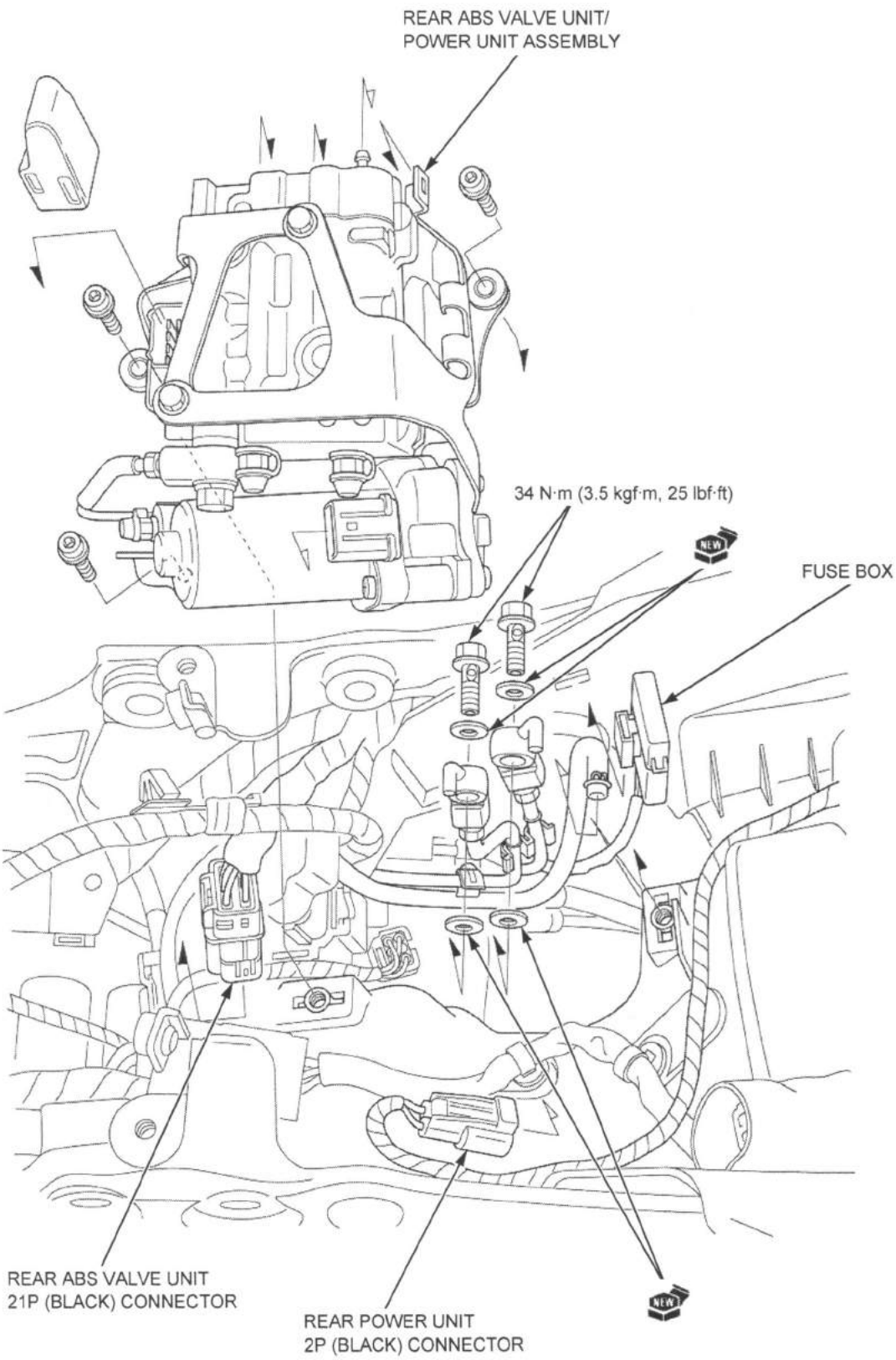
TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)



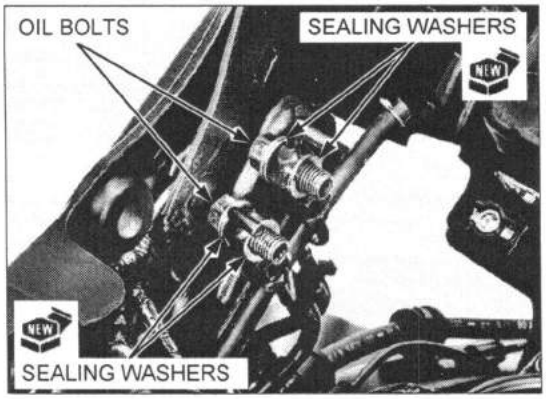
Install the rear power unit stay and tighten the bolts securely.



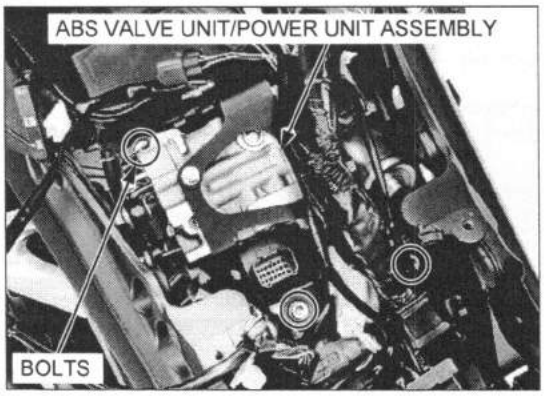
INSTALLATION



Install new sealing washers and oil bolts to the brake pipes in advance of installing the rear ABS valve unit/ power unit assembly.



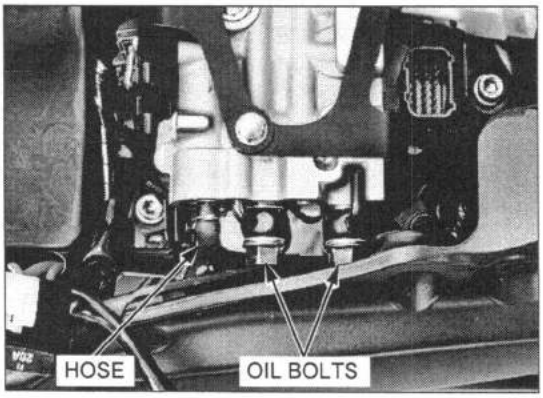
Install the rear ABS valve unit/power unit assembly and tighten the bolts securely.



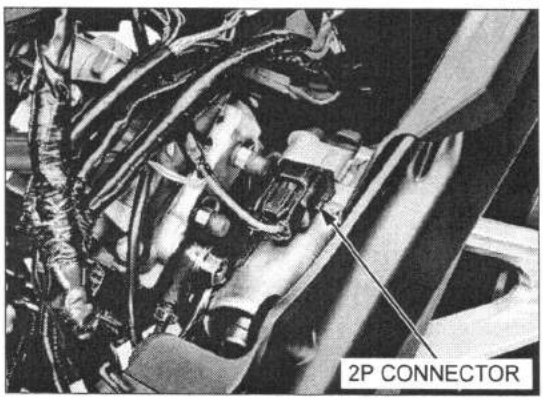
Tighten the brake pipe joint bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

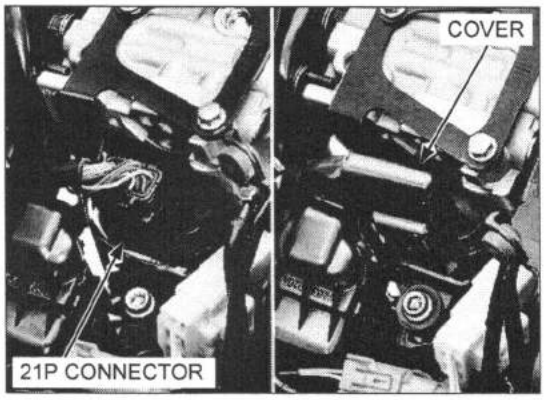
Connect the drain hose to the rear ABS valve unit.



Connect the rear power unit 2P (Black) connector.



Connect the rear ABS valve unit 21P (Black) connector and install the cover securely.



Install the fuse box to the rear ABS valve unit stay.

Install the wire clamp to the rear fender B securely.

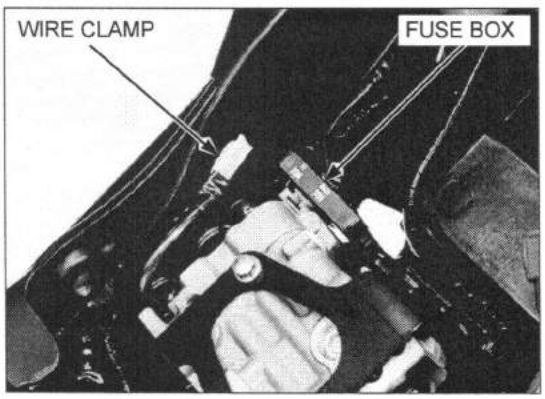
Install the following:

- EGCA (page 6-90)
- Battery (page 18-7)
- Fuel tank (page 6-61)

Fill and bleed the rear Combined ABS hydraulic system.

- '09 – '13 model (page 16-38)
- After '13 model (page 16-68)

Install the removed parts in the reverse order of removal.



18. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM 18-2

SERVICE INFORMATION 18-4

TROUBLESHOOTING 18-6

BATTERY 18-7

CHARGING SYSTEM INSPECTION 18-8

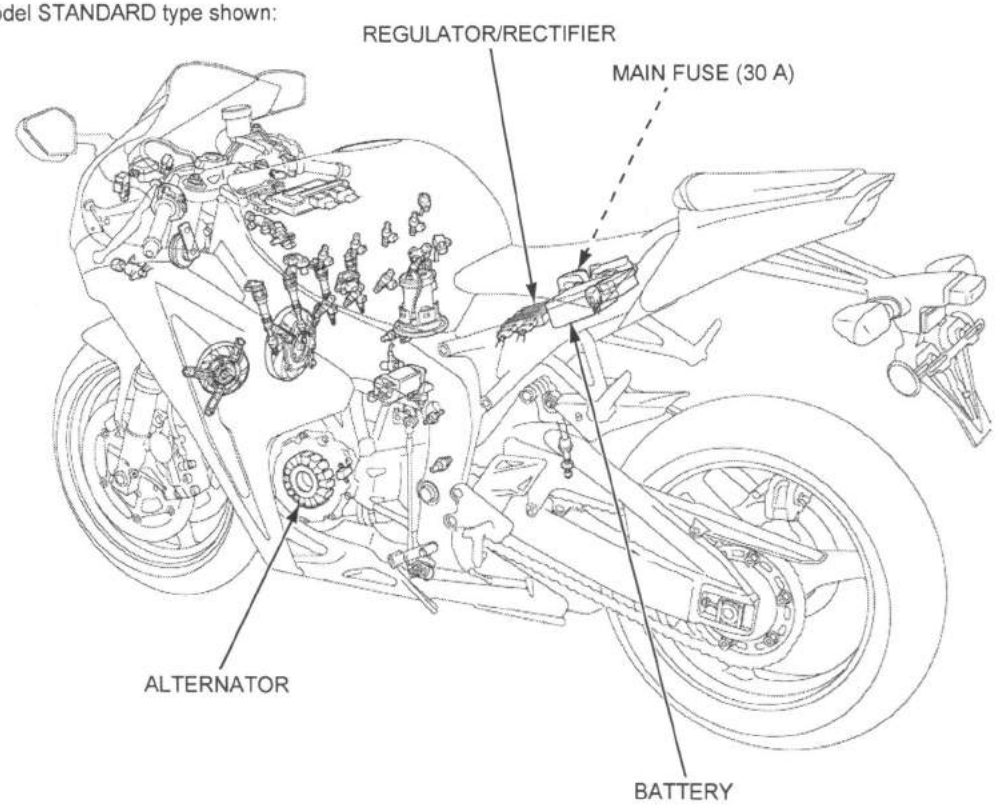
ALTERNATOR CHARGING COIL 18-9

REGULATOR/RECTIFIER 18-10

SYSTEM DIAGRAM

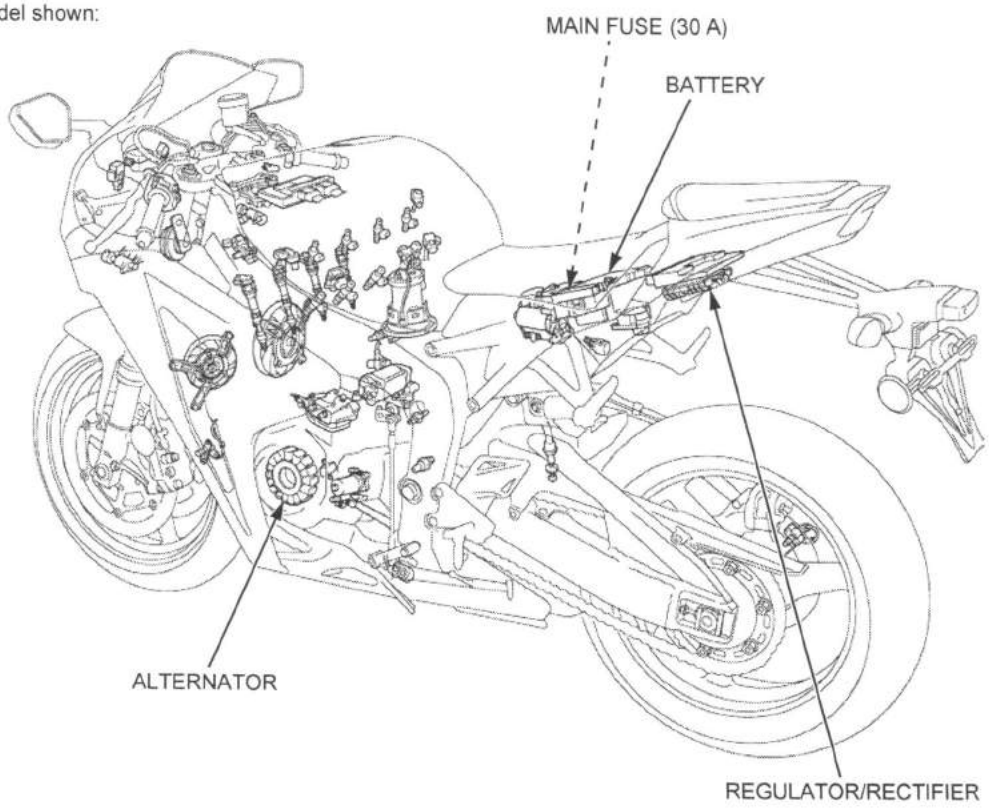
STANDARD/SP type:

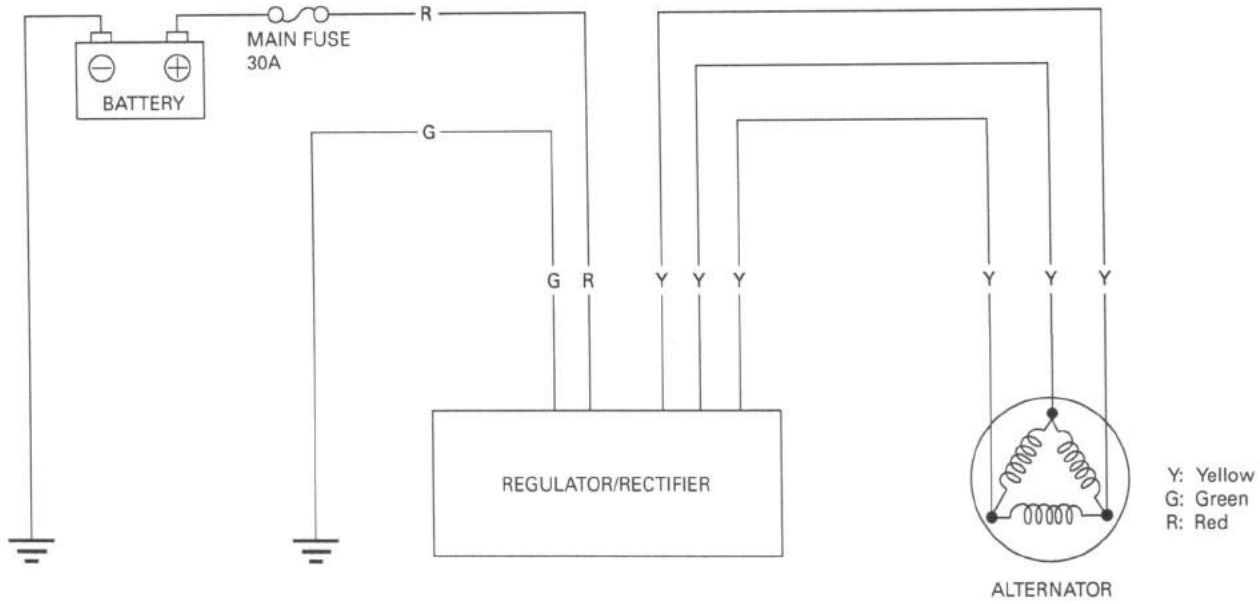
'08 – '11 model STANDARD type shown:



ABS type:

'09 – '11 model shown:




BATTERY
MAIN FUSE
30A
R
G
G R
Y Y Y
Y Y Y
REGULATOR/RECTIFIER
ALTERNATOR
Y: Yellow
G: Green
R: Red

SERVICE INFORMATION

GENERAL

⚠WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a call a physician immediately.

NOTICE

- *Always turn OFF the ignition switch before disconnecting any electrical component.*
- *Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.*

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for a long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight on for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 18-6).
- For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or charging time may damage the battery.
- For alternator removal.
  - STANDARD/SP type (page 11-4)
  - ABS type (page 11-5)

BATTERY CHARGING

- Turn power ON/OFF at the charger, not at the battery terminal.
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.
- Quick charging should only be done in an emergency; slow charging is preferred.

BATTERY TESTING

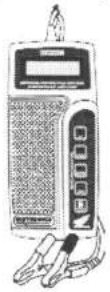
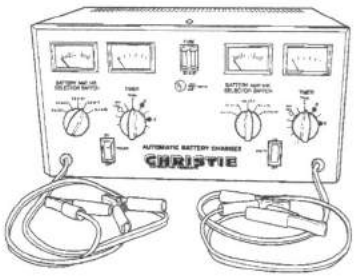
Refer to the instruction in the Operation Manual for the recommended battery tester for details about battery testing. The recommended battery tester puts a "load" on the battery so that the actual battery condition can be measured.

Recommended battery tester: Micro 404XL (U.S.A. only), BM-210 or equivalent

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Type	STANDARD/ SP type	YTZ7S
		ABS type	YTZ10S
	Capacity	STANDARD/ SP type	12 V – 6 Ah
		ABS type	12 V – 8.6 Ah
	Current leakage		2.0 mA max.
	Voltage (at 20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current (STANDARD/ SP type)	Normal	0.6 A/5 – 10 h
		Quick	3 A/1 h
	Charging current (ABS type)	Normal	0.9 A/5 – 10 h
		Quick	4.5 A/1 h
Alternator	Capacity	STANDARD type ('08, '09 model)	0.399 kW/5000 rpm
		ABS type ('09 model)	0.413 kW/5000 rpm
	Capacity (After '09 model)	STANDARD/ SP type	0.372 kW/5000 rpm
		ABS type	0.417 kW/5000 rpm
	Charging coil resistance (at 20°C/68°F)		0.1 – 1.0

TOOLS

Motorcycle battery analyzer Micro 404XL (U.S.A. only)	Christie battery charger MC1012/2T (U.S.A. only)
	

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. BATTERY TEST

Remove the battery (page 18-7).

Check the battery condition using the recommended battery tester.

Recommended battery tester: BM210 or BATTERY MATE or equivalent

Is the battery in good condition?

NO – Faulty battery

YES – GO TO STEP 2.

2. CURRENT LEAKAGE TEST

Install the battery (page 18-7).

Check the battery current leakage test (page 18-8).

Is the current leakage below 2.0 mA?

YES – GO TO STEP 4.

NO – GO TO STEP 3.

3. CURRENT LEAKAGE TEST WITHOUT REGULATOR/RECTIFIER CONNECTED

Disconnect the regulator/rectifier connector and recheck the battery current leakage.

Is the current leakage below 2.0 mA?

YES – Faulty regulator/rectifier

NO – • Shorted wire harness
• Faulty ignition switch

4. ALTERNATOR CHARGING COIL INSPECTION

Check the alternator charging coil (page 18-9).

Is the alternator charging coil resistance within 0.1 – 1.0 (20°C/68°F)?

NO – Faulty charging coil

YES – GO TO STEP 5.

5. CHARGING VOLTAGE INSPECTION

Measure and record the battery voltage using a digital multimeter (page 18-7).

Start the engine.

Measure the charging voltage (page 18-8).

Compare the measurement to result of the following calculation.

Standard:
Measured BV < Measured CV < 15.5 V
- **BV = Battery Voltage (page 18-7)**
- **CV = Charging Voltage (page 18-8)**

Is the measured charging voltage within the standard voltage?

YES – Faulty battery

NO – GO TO STEP 6.

6. REGULATOR/RECTIFIER SYSTEM INSPECTION

Check the voltage and resistance at the regulator/rectifier connector (page 18-10).

Are the results of checked voltage and resistance correct?

YES – Faulty regulator/rectifier

NO – • Open circuit in related wire
• Shorted wire harness
• Loose or poor contacts of related terminal

BATTERY

REMOVAL/INSTALLATION

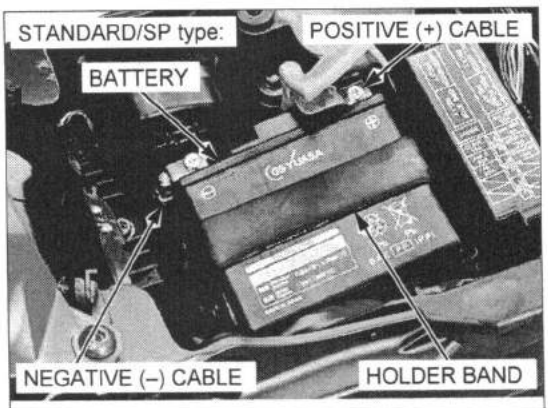
Always turn the ignition switch OFF before removing the battery.

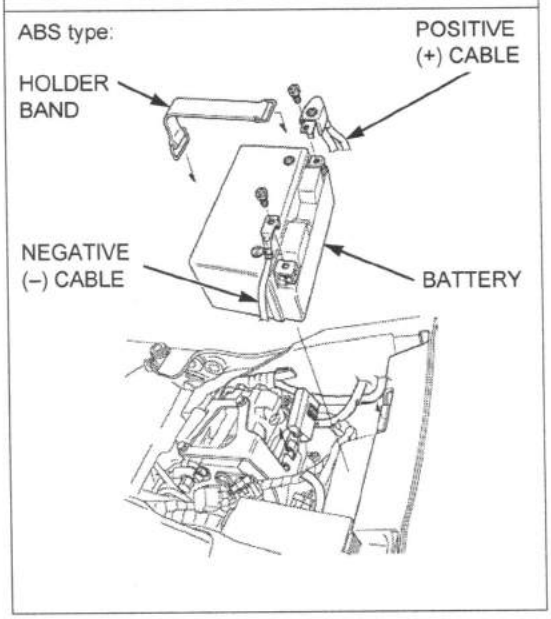
Remove the seat (page 3-7).

Disconnect the negative (–) cable and then the positive (+) cable.
Remove the battery holder band and battery.

Connect the positive terminal first and then the negative cable.

Install the battery in the reverse order of removal.



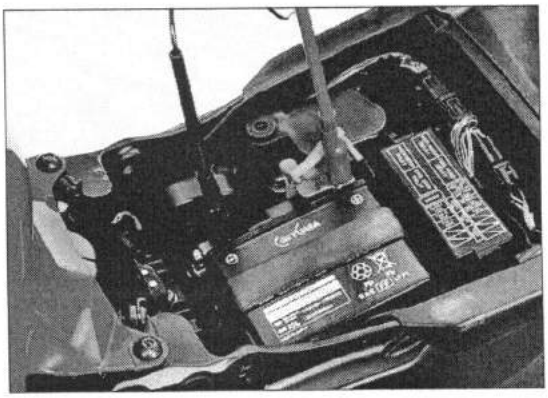


VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

VOLTAGE:
Fully charged: 13.0 – 13.2 V
Under charged: Below 12.4 V

TOOL:
Battery tester — **Micro 404XL (U.S.A. only), BM-210 or equivalent**



BATTERY TESTING

Remove the battery (page 18-7).

Refer to the instructions that are appropriate to the battery testing equipment available to you.

TOOL:
Battery tester — **Micro 404XL (U.S.A. only), BM210 or equivalent**

BATTERY CHARGING (U.S.A. only)

Remove the battery (page 18-7).

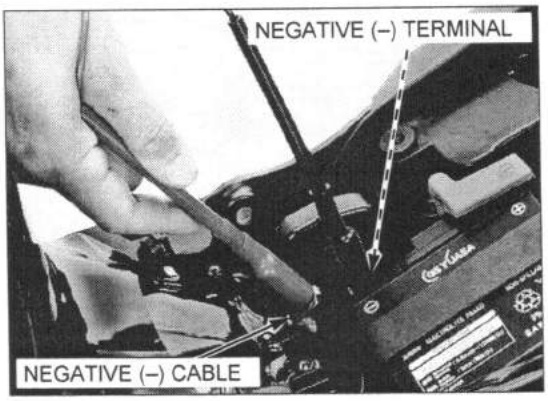
Refer to the instructions that are appropriate to the battery charging equipment available to you.

TOOL:
Christie battery charger MC1012/2T (U.S.A. only)

CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE INSPECTION

Remove the seat (page 3-7).



Turn the ignition switch OFF and disconnect the battery negative (–) cable from the battery.
Connect the ammeter (+) probe to the negative (–) cable and ammeter (–) probe to the battery (–) terminal.
With the ignition switch OFF, check for current leakage.

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

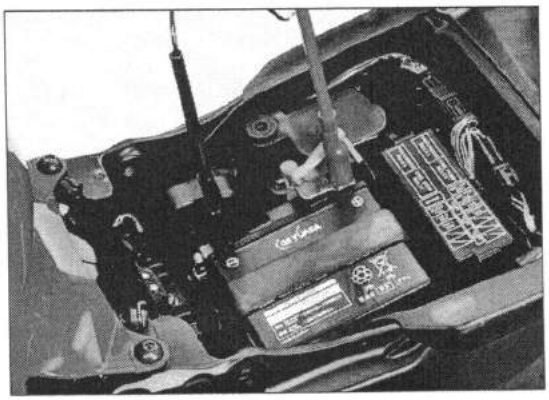
SPECIFIED CURRENT LEAKAGE: 2.0 mA max.

If current leakage exceeds the specified value, a short circuit is likely.
Locate the shorted circuit by disconnecting connections one by one and measuring the current.

CHARGING VOLTAGE INSPECTION

Be sure the battery is in good condition before performing this test.

Do not disconnect the battery or any cable in the charging system without first switching OFF the ignition switch. Failure to follow this precaution can damage the tester or electrical components.



Warm the engine to normal operating temperature.
Stop the engine, and connect the multimeter between the positive and negative terminals of the battery.

- To prevent a short, make absolutely certain which are the positive and negative terminals or cables.

Restart the engine.
With the headlight on Hi beam, measure the voltage on the multimeter with the engine running at 5,000 rpm.

Standard:
Measured BV < Measured CV < 15.5 V at 5,000 rpm
BV = Battery Voltage (page 18-7)
CV = Charging Voltage

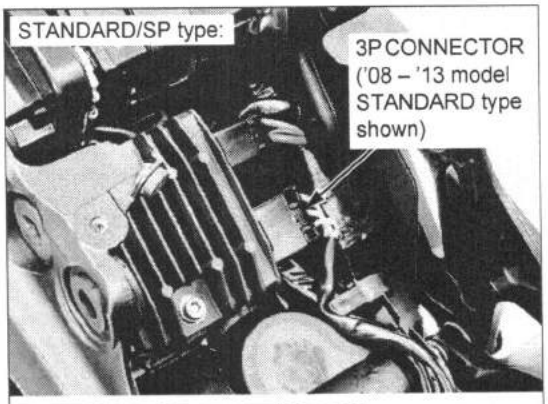
ALTERNATOR CHARGING COIL

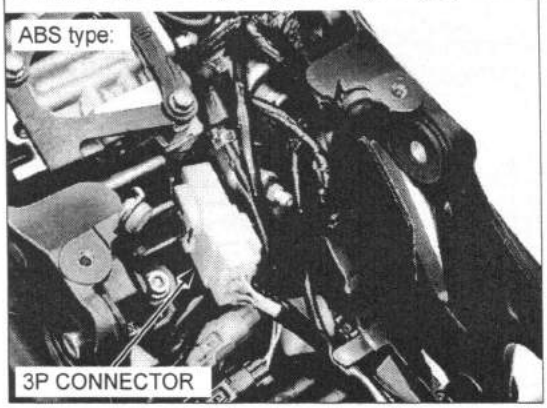
INSPECTION

Remove the fuel tank (page 6-60).

It is not necessary to remove the stator coil to conduct this test.

Disconnect the alternator 3P (STANDARD/SP type: Black, ABS type: Natural) connector.





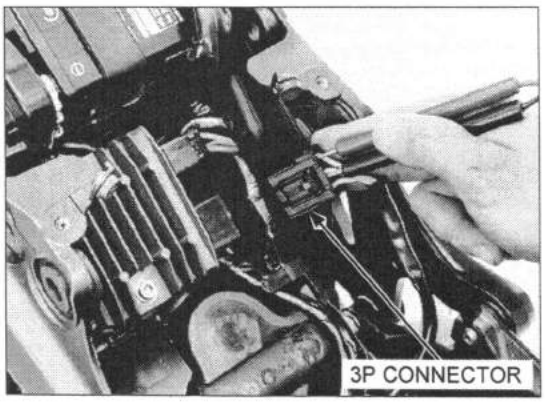
Measure the resistance between all Yellow wire terminals.

Standard: 0.1 – 1.0 (at 20 C/68 F)

Check for continuity between all Yellow wire terminals and ground.
There should be no continuity.

If readings are far beyond the standard, or if any wire has continuity to ground, replace the stator.

- For alternator removal.
  - STANDARD/SP type (page 11-4)
  - ABS type (page 11-5)

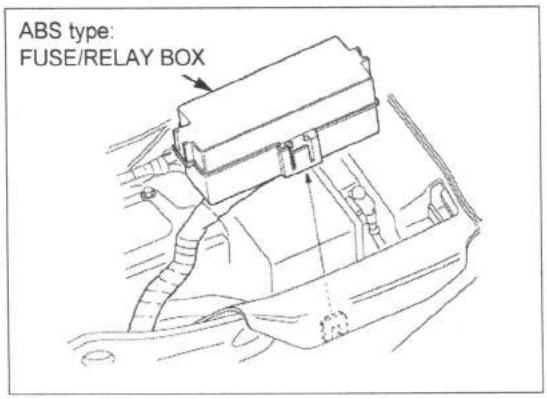


REGULATOR/RECTIFIER

SYSTEM INSPECTION

Remove the fuel tank (page 6-60).

ABS type: Remove the fuse/relay box.



It is not necessary to remove the stator coil to perform this test.

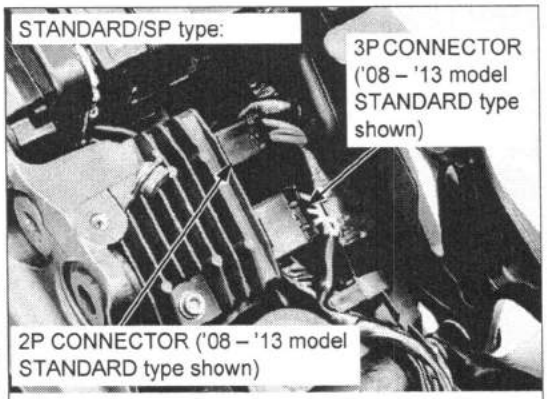
Disconnect the following connectors and check them for loose contact or corroded terminals.

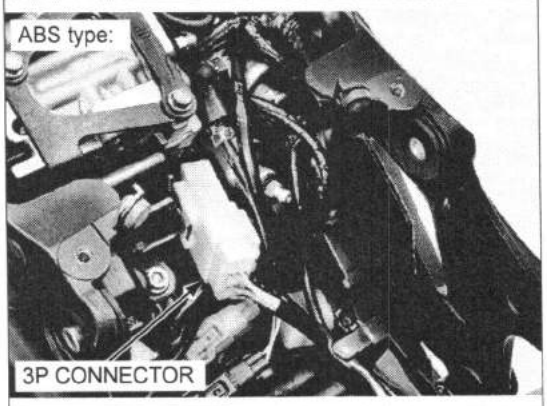
- regulator/rectifier 2P (STANDARD/SP type: Black, ABS type: Natural)
- alternator 3P (STANDARD/SP type: Black, ABS type: Natural)

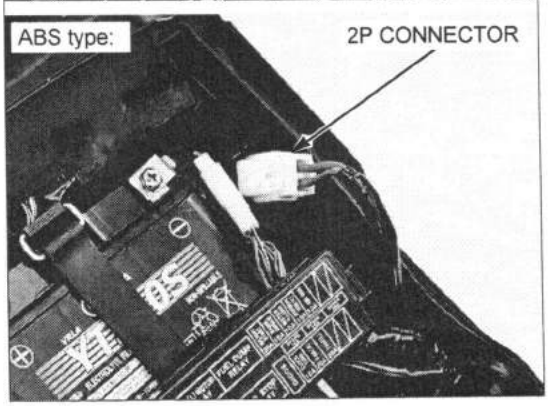
If the regulated voltage reading (page 18-8) is out of the specification, measure the voltage between connector terminals (wire side) as follows:

ITEM	TERMINAL	SPECIFICATION
Battery charging line	Red (+) and ground (–)	Battery voltage should appear
Charging coil line	Yellow and Yellow	0.1 – 1.0 at (20 C/68 F)
Ground line	Green and ground	Continuity should exist

If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.







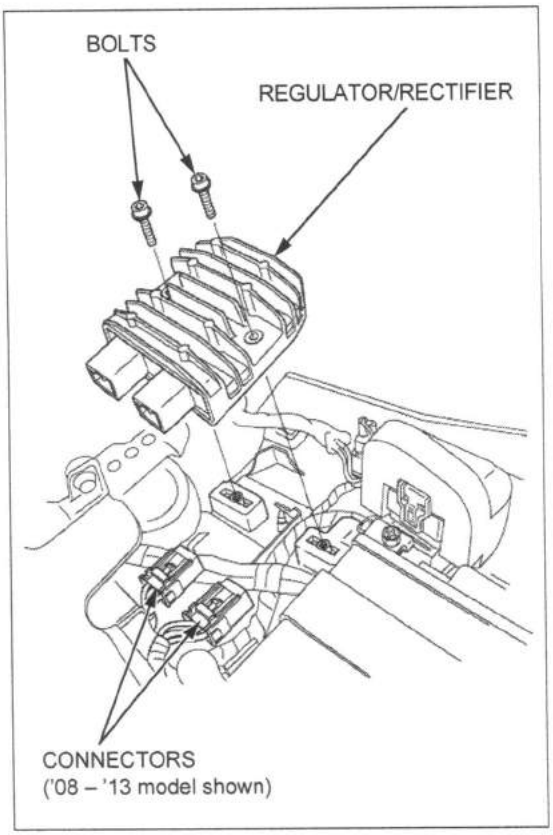
REMOVAL/INSTALLATION (STANDARD/SP type)

Remove the fuel tank (page 6-60).

Disconnect the alternator 3P (Black) connector.
Disconnect the regulator/rectifier 2P (Black) connector.

Remove the bolts and regulator/rectifier unit.

Installation is in the reverse order of removal.

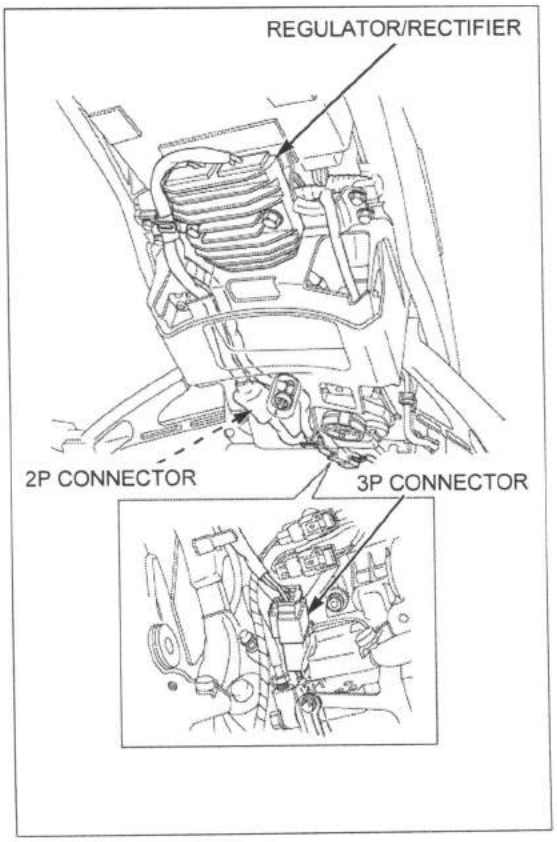


REMOVAL/INSTALLATION (ABS type)

Remove the following:

- Fuel tank (page 6-60)
- License light stay ('09 model) (page 3-42)
- Rear center cowl (After '09 model) (page 3-47)
- Battery (page 18-7)
- Fuse/relay box (page 18-10)
- EGCA cover (page 3-54)

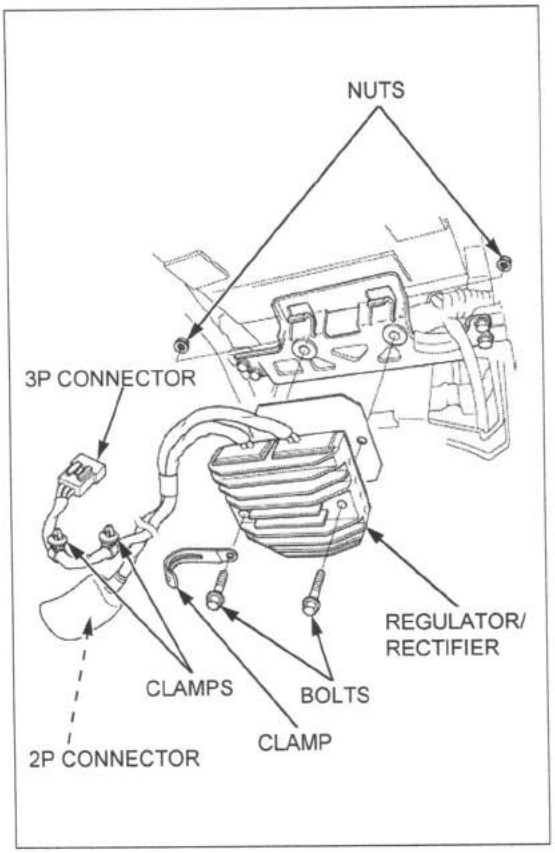
Disconnect the alternator 3P (Natural) connector.



Remove the wire clamps from the rear fender B.
Disconnect the regulator/rectifier 2P (Natural) connector.

Remove the nuts, bolts, clamp, and regulator/rectifier.

Installation is in the reverse order of removal.



19. IGNITION SYSTEM

SYSTEM DIAGRAM 19-2

SERVICE INFORMATION 19-4

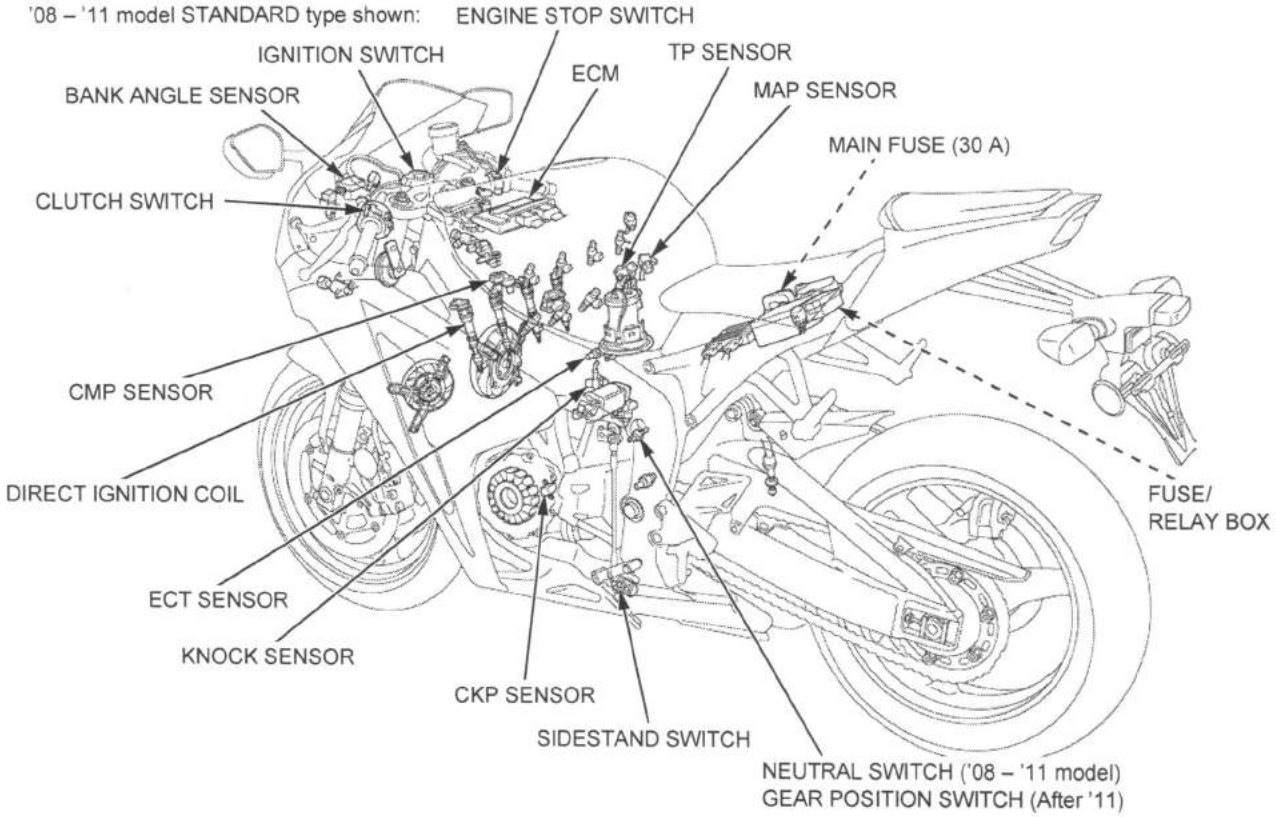
TROUBLESHOOTING 19-5

IGNITION SYSTEM INSPECTION 19-6

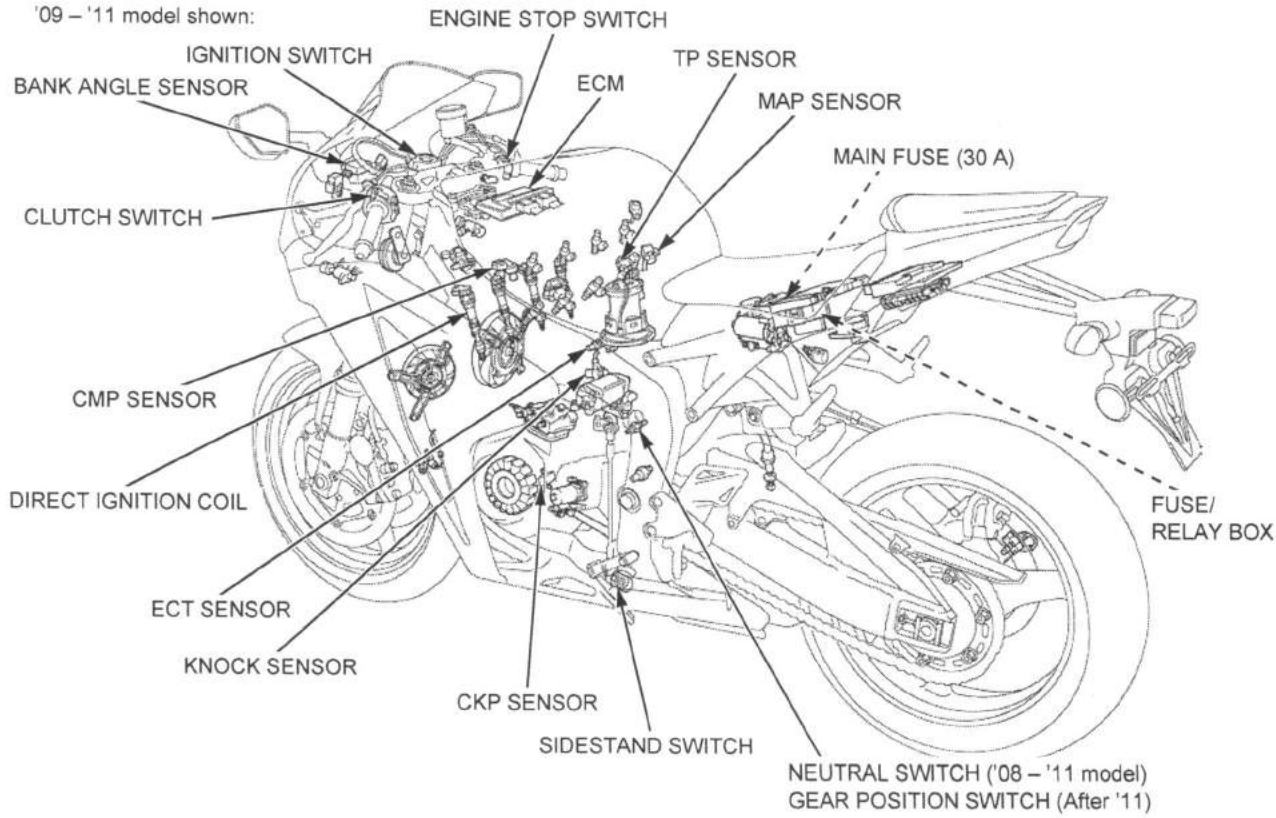
IGNITION TIMING 19-8

SYSTEM DIAGRAM

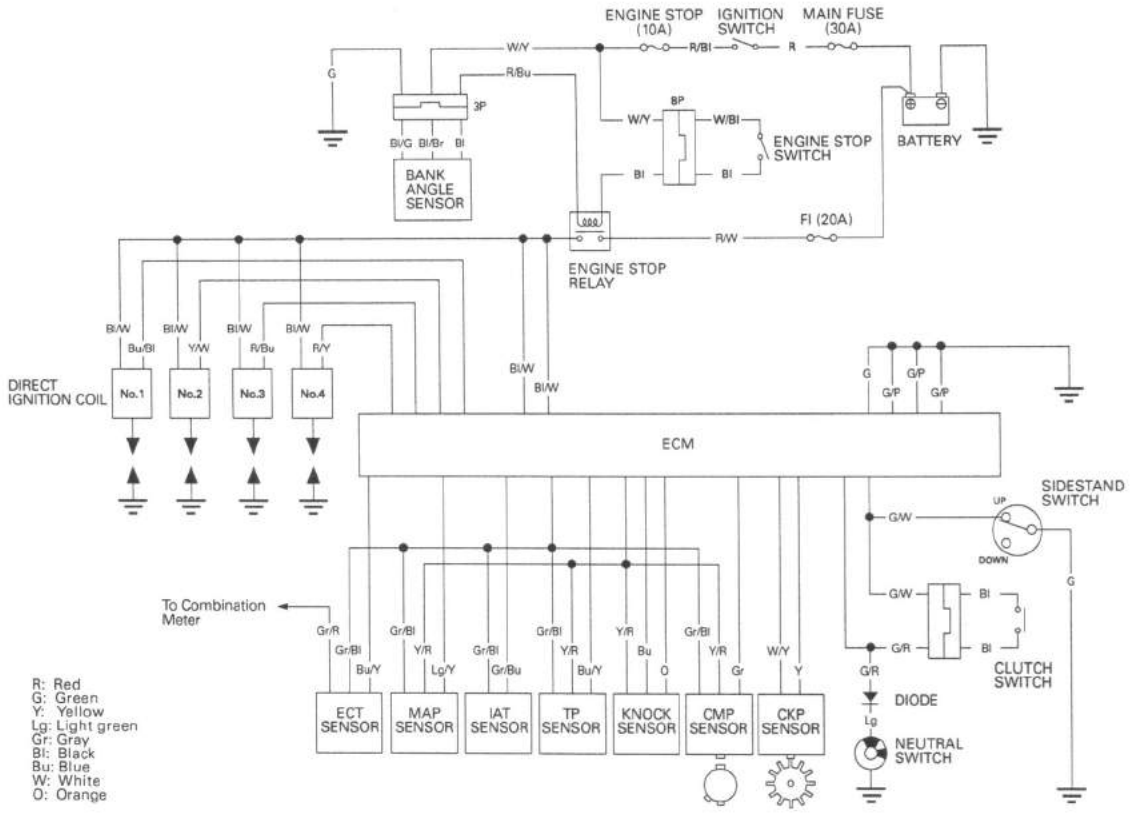
STANDARD/SP type:



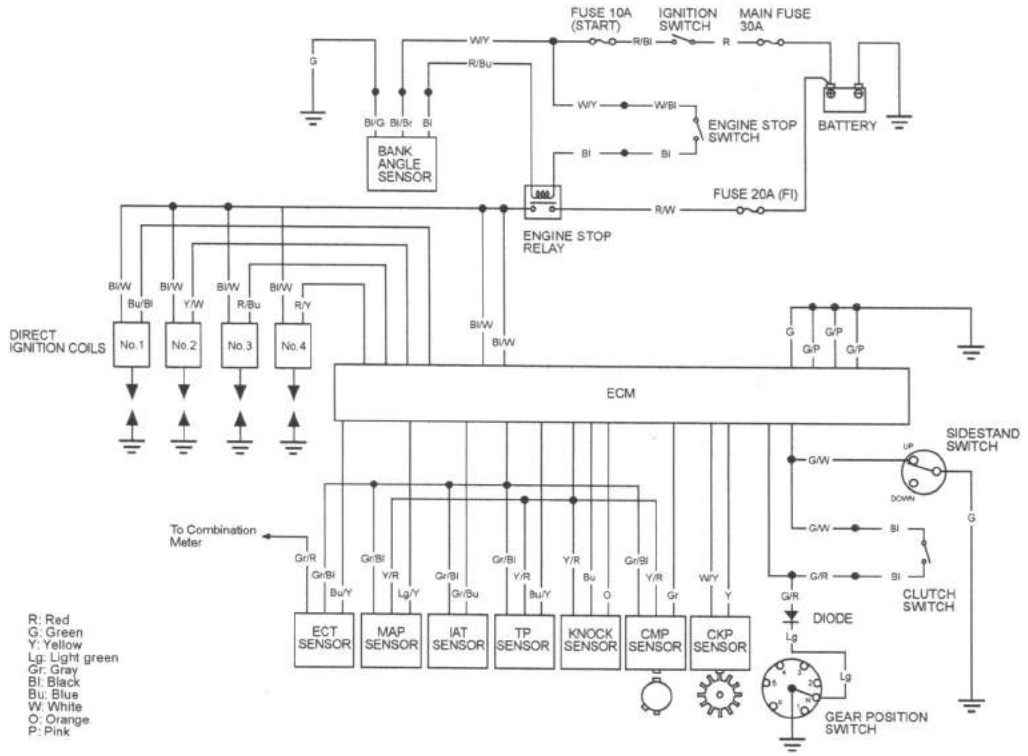
ABS type:



'08 –'11 model:



After '11 model:



SERVICE INFORMATION

GENERAL

NOTICE

- *The ECM may be damaged if dropped. Also if the connector is disconnected when current is flowing, the change in voltage may damage the module. Always turn off the ignition switch before servicing.*
- *Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.*
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence (page 19-5).
- This motorcycle's ICM is built into the ECM.
- The ignition timing does not normally need to be adjusted since the ECM is factory preset.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- This motorcycle features direct ignition coils, where the ignition coil and spark plug cap are integrated. There are four direct ignition coils.
- For PGM-FI troubleshooting information (page 6-14).
- The following components information
  - Ignition switch (page 21-24)
  - Sidestand switch (page 21-30)
  - Clutch switch (page 21-27)
  - Neutral switch ('08 – '11 model) (page 21-28)
  - Gear position switch (After '11 model) (page 21-29)
  - Engine stop switch (page 21-25)
  - Diode (page 20-23)
  - ECM (page 6-84)

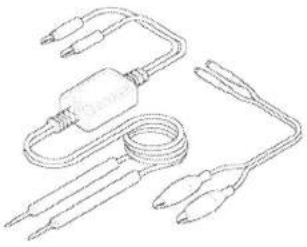
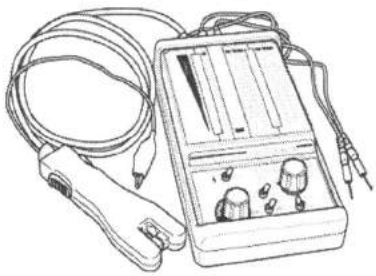
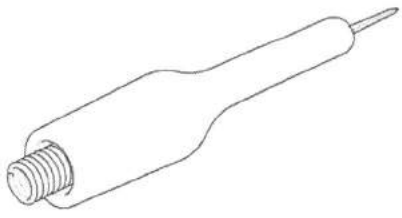
SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug (Iridium)	NGK	IMR9E-9HES
	DENSO	VUH27ES
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
CKP sensor peak voltage		0.7 V minimum
Ignition timing ("F" mark)		3.3° BTDC at idle

TORQUE VALUE

Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads.

TOOLS

Peak voltage adaptor 07HGJ-0020100 (Not available in U.S.A.)  with commercially available digital multimeter (impedance 10 M /DCV minimum)	IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) 	Test probe (2 required) 07ZAJ-RDJA110 

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose direct ignition coil and spark plug connection
  - Loose direct ignition coil connectors
  - Water got into the direct ignition coil (shorting the ignition coil secondary voltage)
- If there is no spark at one cylinder, temporarily exchange the direct ignition coil with the other good one and perform the spark test. If there is spark, the original direct ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is battery voltage with the ignition switch turned ON and engine stop switch turned "⟳" (The engine is not cranked by the starter motor).

No spark at all plugs

	Unusual condition	Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch ON and engine stop switch turned "⟳" (other electrical components are normal).	1. Faulty engine stop switch. 2. Loose or poor connect of the direct ignition coil primary wire terminal, or an open circuit in primary coil (Check at the ECM connector). 3. Faulty ECM (in case when the initial voltage is normal while disconnecting ECM connector).
	Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine.	1. Undercharged battery. 2. An open circuit or loose connection in ECM Green wire. 3. An open circuit or loose connection in Blue/black, Yellow/white, Red/blue and Red/yellow wires between the direct ignition coils and ECM. 4. Faulty sidestand switch, clutch switch, neutral switch ('08 – '11)/gear position switch (After '11) or diode. 5. An open circuit or loose connection in No. 4 related circuit wires. – Clutch switch line: Green/white and Green/red wires – Sidestand switch line: Green/white and Green wires – Neutral/Gear position switch line: Light green wire 6. Faulty CKP sensor (measure the peak voltage). 7. Faulty ECM (in case when above No. 1 – 6 are normal). 8. Faulty direct ignition coil.
	Initial voltage is normal, but does not spark.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty direct ignition coil (s). 3. Faulty CKP sensor. 4. Faulty CMP sensor.
CKP sensor	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 M /DCV. 2. Cranking speed is too low (battery under charged). 3. The sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty CKP sensor (in case when above No. 1 – 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty CKP sensor.

IGNITION SYSTEM INSPECTION

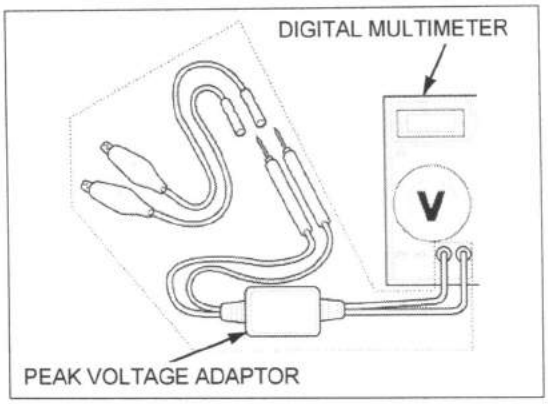
- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use the recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If the Imrie diagnostic tester (model 625) is used, follow the manufacturer's instruction.

Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

TOOL:

IgnitionMate peak voltage tester	**MTP07-0286 (U.S.A. only) or**
Peak voltage adaptor	**07HGJ-0020100 (Not available in U.S.A.)**

with commercially available digital multimeter (impedance 10 M /DCV minimum)



IGNITION COIL INITIAL VOLTAGE

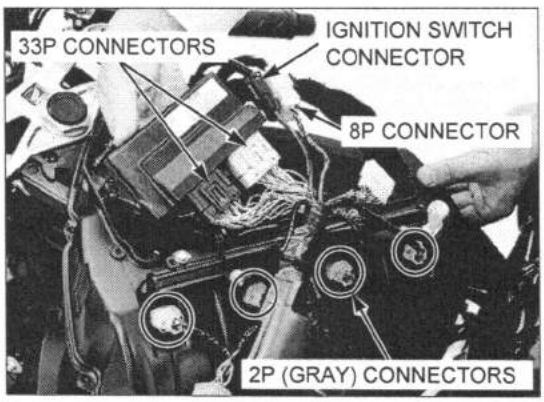
- Check all system connections before inspection. If the system is disconnected, incorrect initial voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Disconnect the direct ignition coils from the spark plugs (page 4-13).

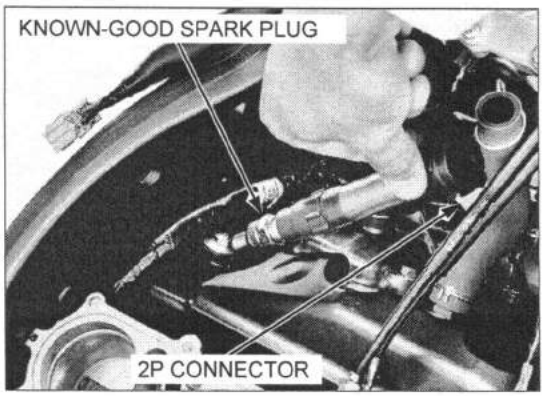
Connect the following:

- ECM 33P connectors
- Secondary injector 2P (Gray) connectors
- Ignition switch connector
  STANDARD/SP type: 2P (Brown)
  ABS type: 3P (Brown)
- Right handlebar switch 8P (White) connector

- Do not connect the fuel pump 2P (Brown) connector.



Connect the direct ignition coil 2P (White) connectors to the direct ignition coil.
Shift the transmission into neutral.
Connect a known-good spark plug to the direct ignition coil and ground the spark plug to the cylinder head as done in a spark test.

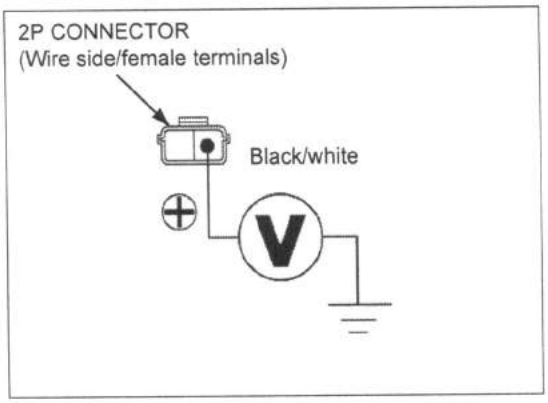


Disconnect the direct ignition coil 2P (White) connector.

Turn the ignition switch ON and engine stop switch "⟳".

Measure the initial voltage.

Connection: Black/white (+) – Ground (–)
Standard: Battery voltage

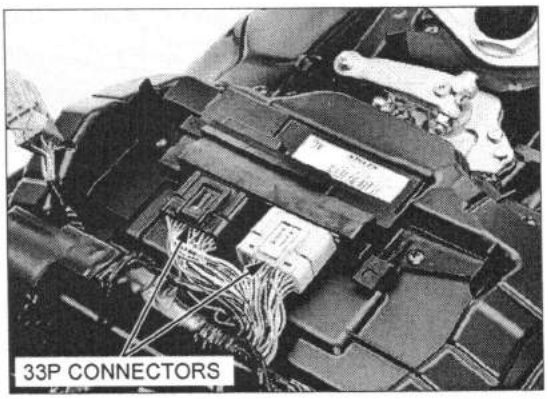


CKP SENSOR PEAK VOLTAGE

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Lift and support the fuel tank (page 4-7).

Disconnect the ECM 33P connectors from the ECM.



Connect the peak voltage tester or peak voltage adaptor probes to the connector terminal of the wire side.

TOOLS:

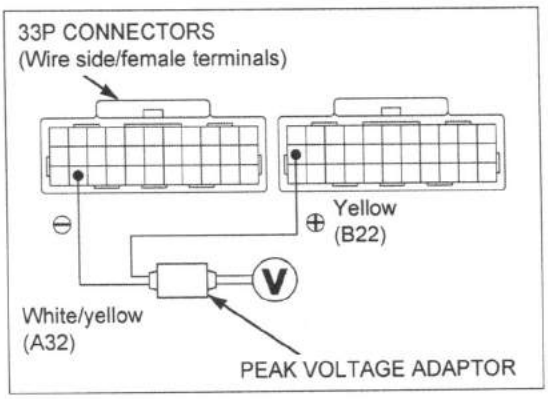
IgnitionMate peak voltage tester	**MTP07-0286 (U.S.A. only) or**
Peak voltage adaptor	**07HGJ-0020100 (Not available in U.S.A.)**
with commercially available digital multimeter (impedance 10 M /DCV minimum)	
Test probe (2 required)	**07ZAJ-RDJA110**

Connection: B22 (+) – A32 (–)

Crank the engine and read the peak voltage.

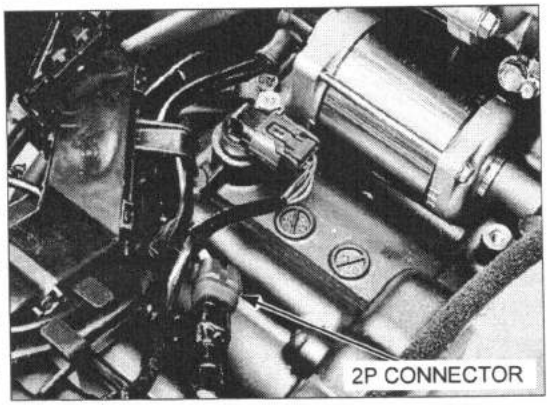
PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at ECM connector is abnormal, measure the peak voltage at the CKP sensor connector.



Disconnect the CKP sensor 2P (Red) connector and connect the tester probes to the terminal (Yellow and White/yellow).
In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

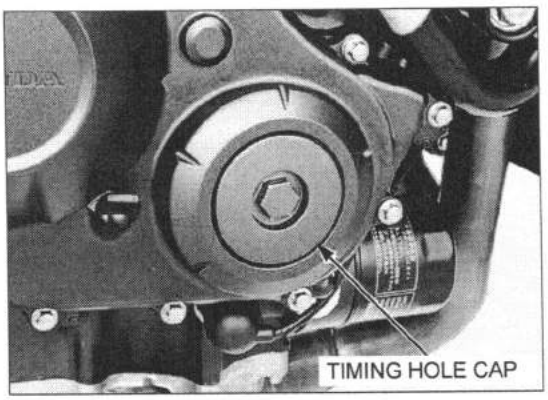
- If the peak voltage measured at the ECM is abnormal and the one measured at the CKP sensor is normal, check the 2P (Red) connector for loose connection and the wire harness for an open circuit or loose connection.
- If both peak voltage measured are abnormal, check each item in the troubleshooting chart (page 19-5). If all items are normal, the CKP sensor is faulty. For CKP sensor replacement (page 11-7).



IGNITION TIMING

Warm up the engine.

Stop the engine and remove the timing hole cap.

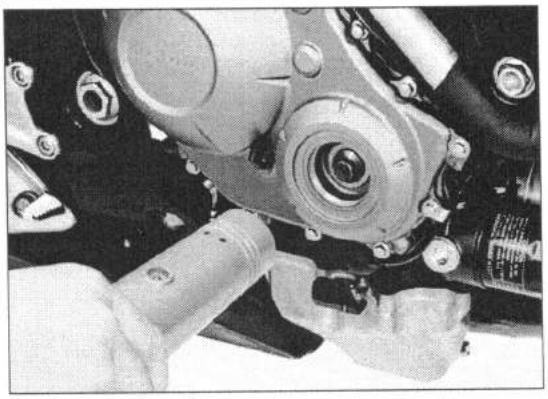


Read the instructions for timing light operation.

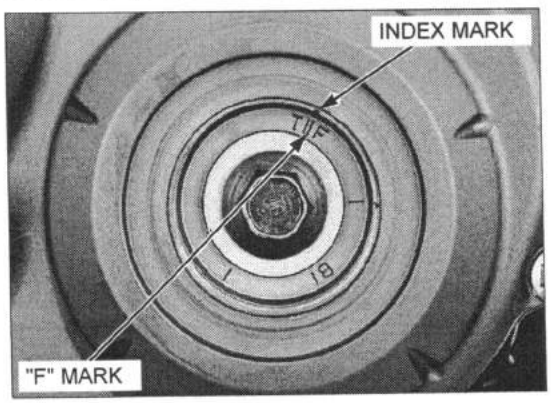
Connect the timing light to the No. 1 direct ignition coil connector wire.

Start the engine, let it idle and check the ignition timing.

IDLE SPEED: 1,200 ± 100 rpm



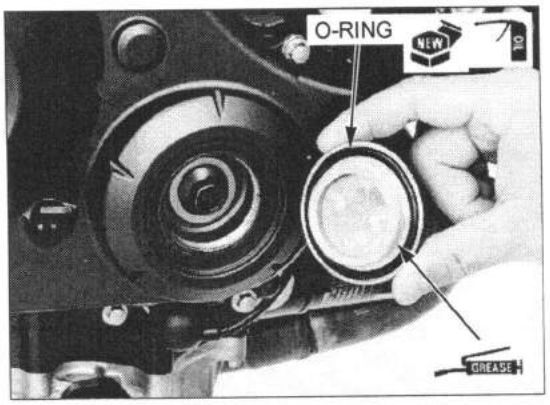
The ignition timing is correct if the index mark on the right crankcase cover aligns the "F" mark on the starter clutch outer as shown.



Apply oil to a new O-ring and install it to the timing hole cap.

Apply grease to the timing hole cap threads and tighten the timing hole cap to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



20. ELECTRIC STARTER

SYSTEM DIAGRAM 20-2

SERVICE INFORMATION 20-6

TROUBLESHOOTING 20-7

STARTER MOTOR 20-10

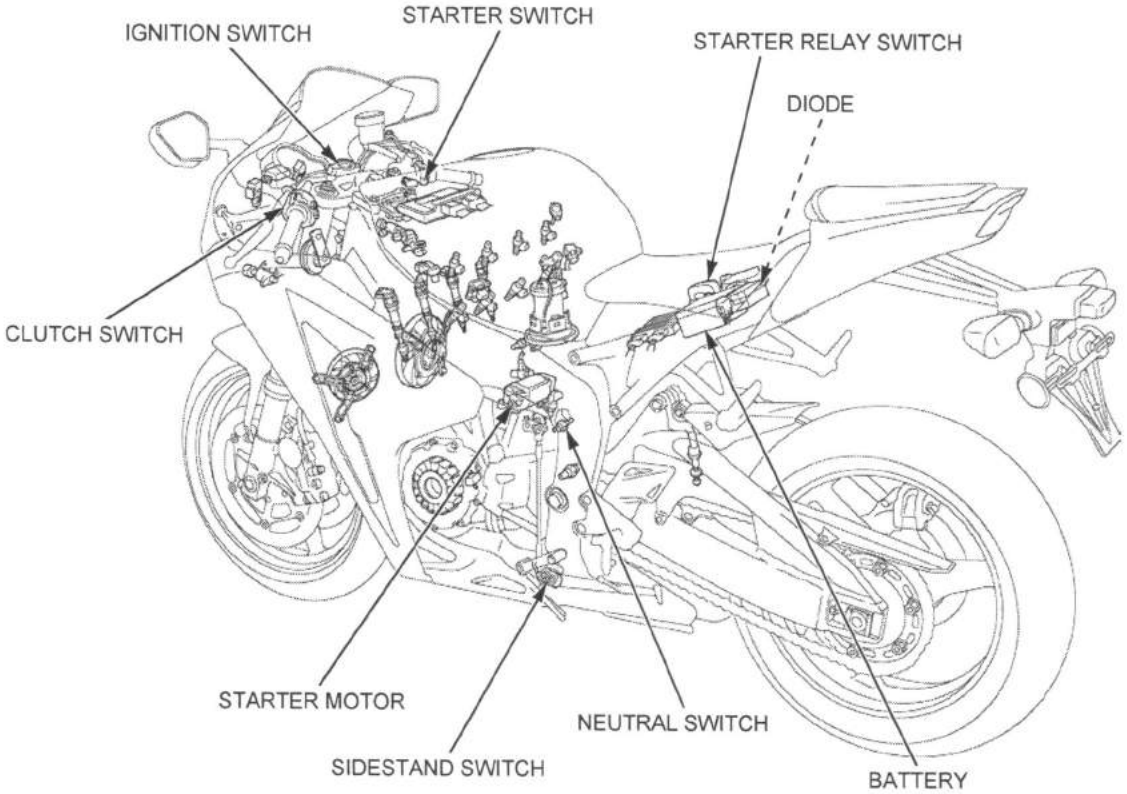
STARTER RELAY SWITCH 20-19

DIODE 20-23

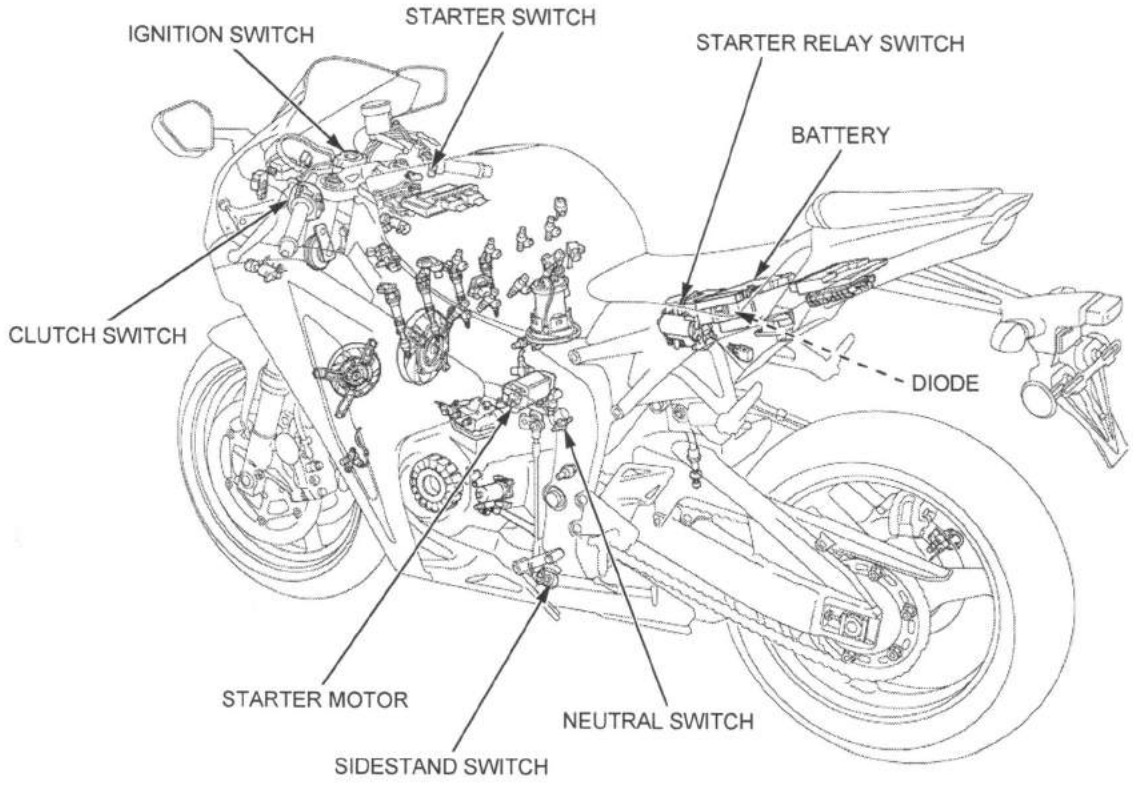
SYSTEM DIAGRAM

'08 – '11 model

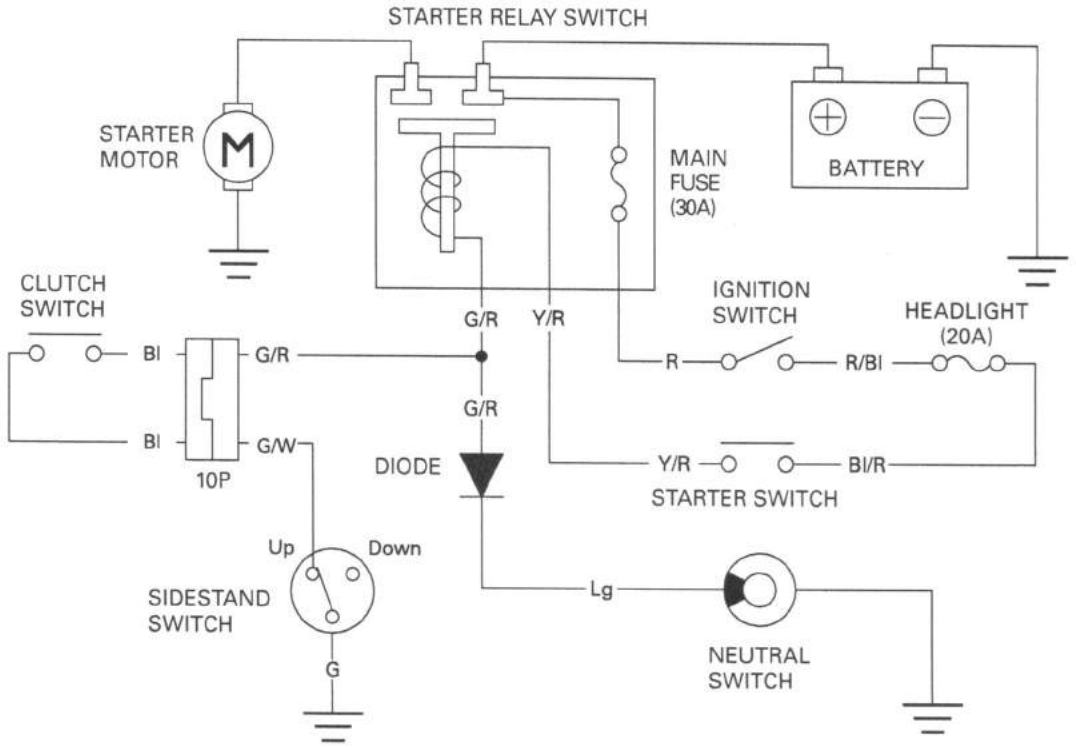
STANDARD type:



ABS type:

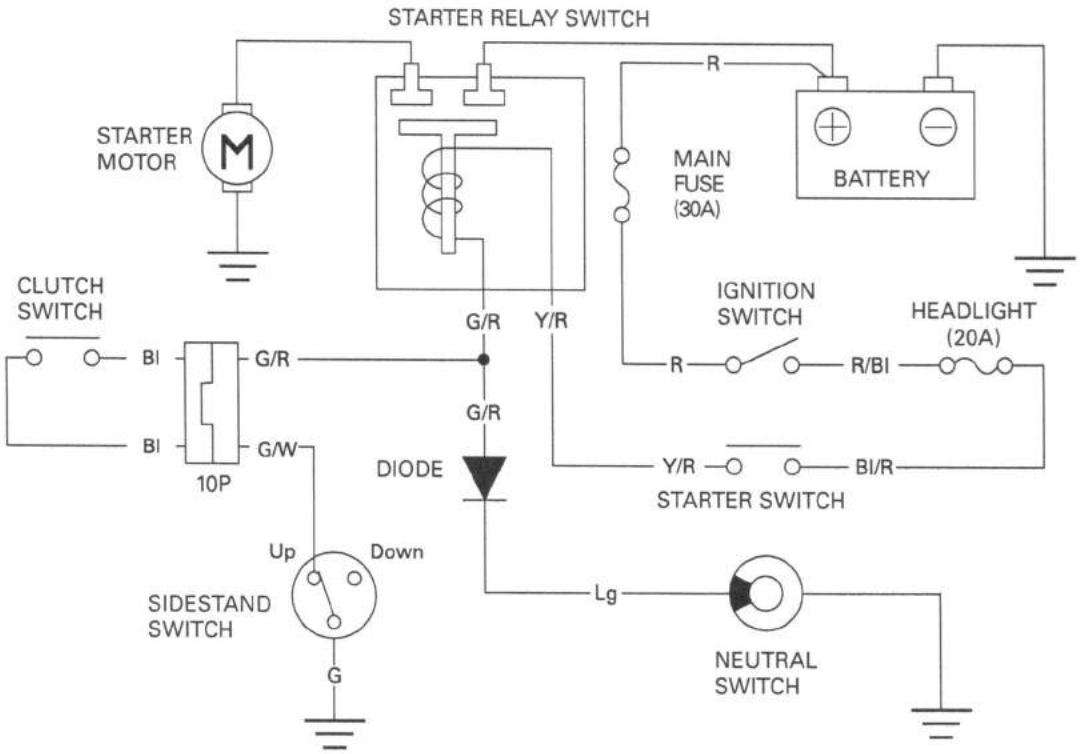


STANDARD type:



R: Red
W: White
Y: Yellow
G: Green
Bl: Black
Lg: Light green

ABS type:

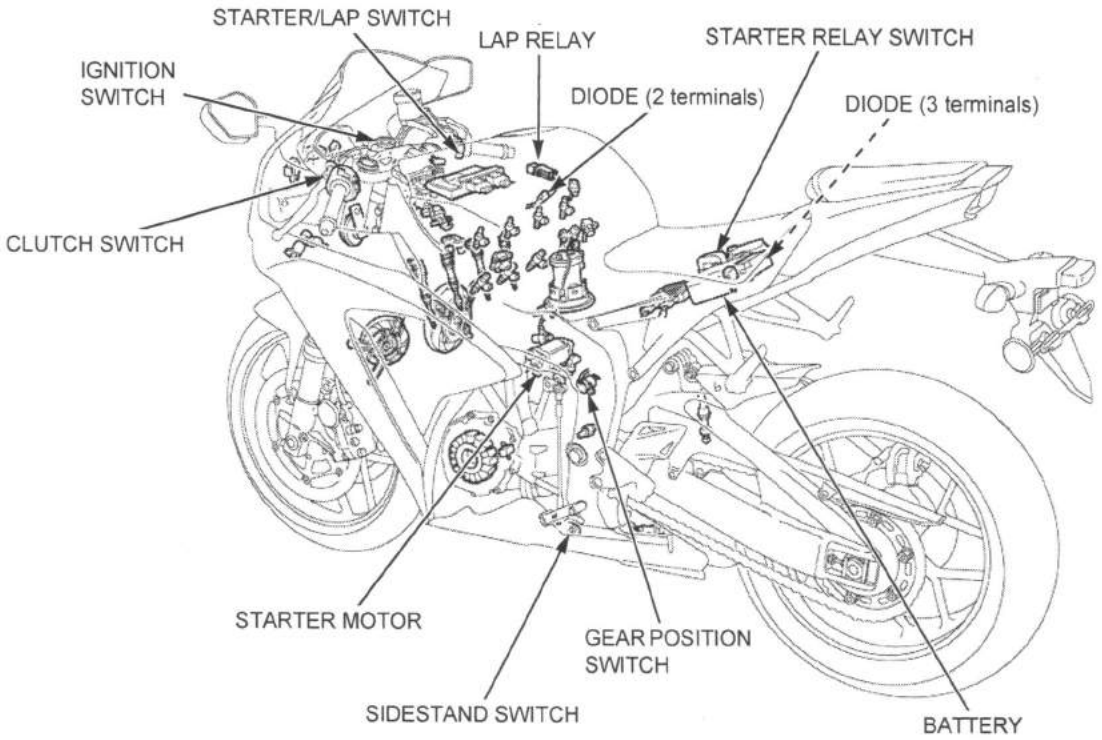


R: Red
W: White
Y: Yellow
G: Green
Bl: Black
Lg: Light green

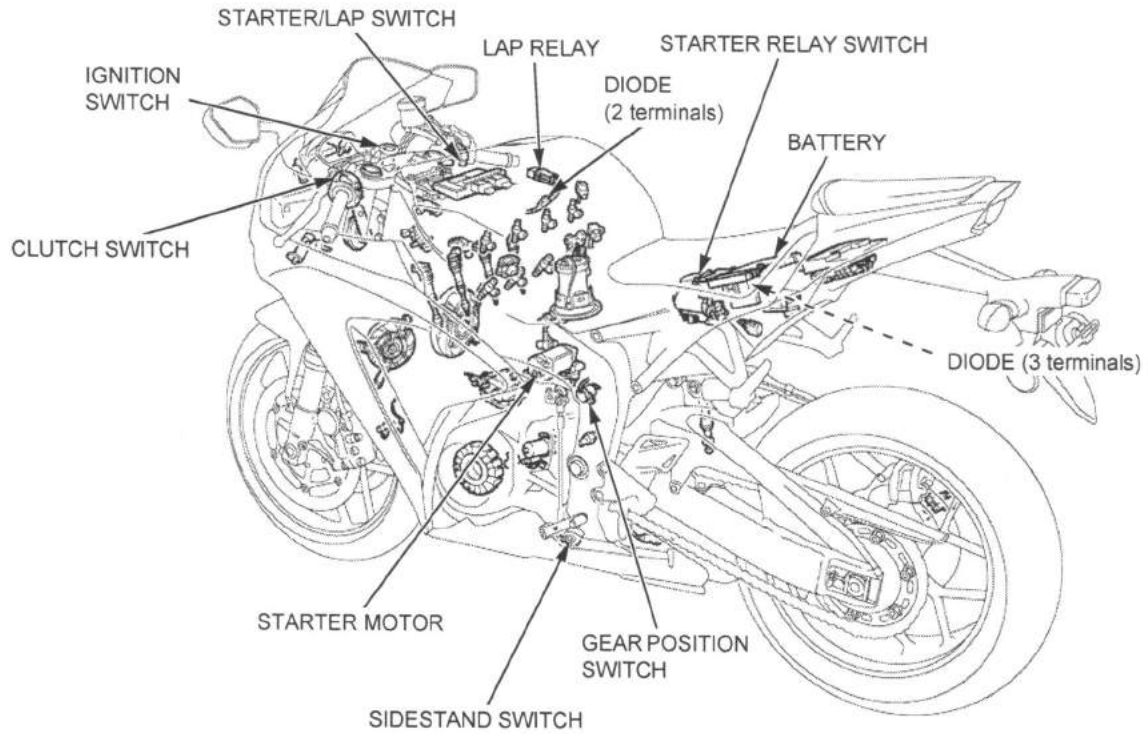
After '11 model

STANDARD/SP type:

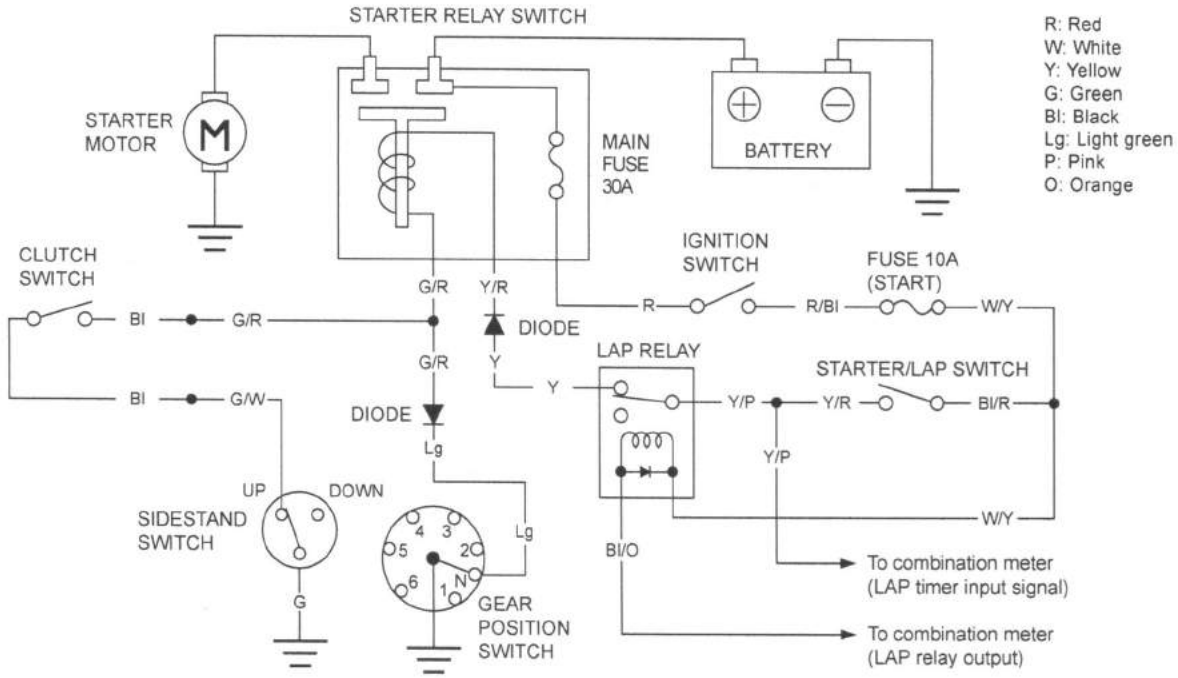
STANDARD type shown:



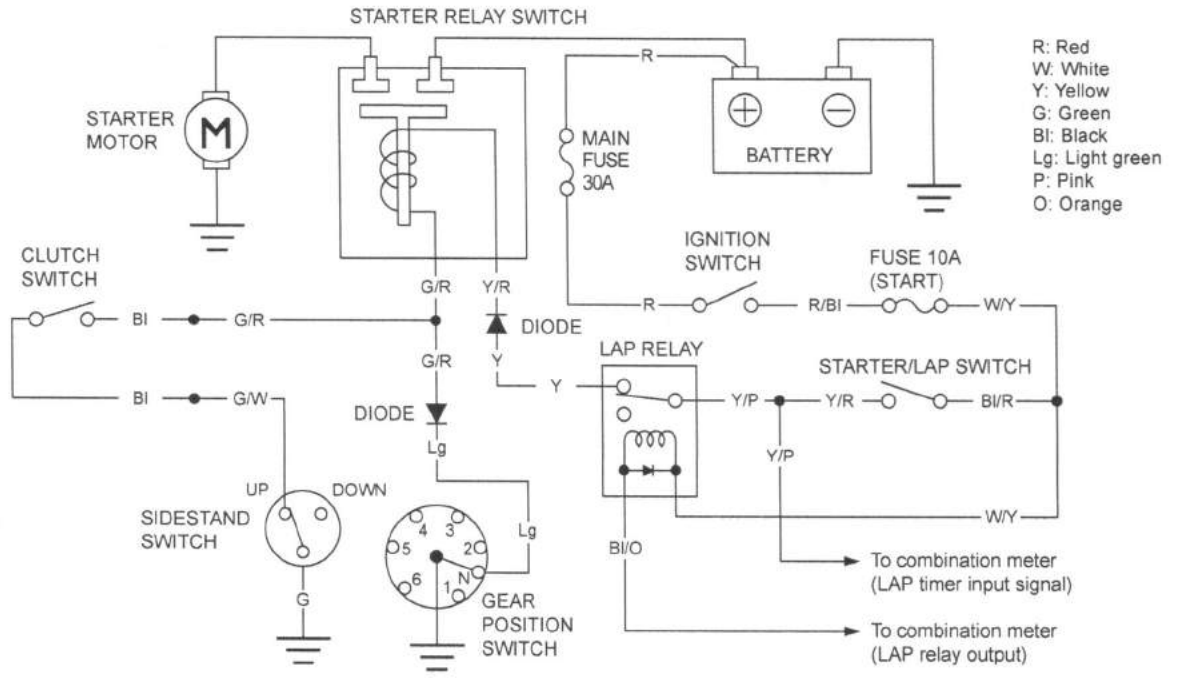
ABS type:



STANDARD/SP type:



ABS type:



SERVICE INFORMATION

GENERAL

NOTICE

If current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.

- Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 20-7).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- For the starter clutch servicing (page 10-26).
- Refer to the following components information.
  - Ignition switch (page 21-24)
  - Starter switch (page 21-25)
  - Neutral switch ('08 – '11 model) (page 21-28)
  - Gear position switch (After '11 model) (page 21-29)
  - Lap relay (After '11 model) (page 21-35)
  - Sidestand switch (page 21-30)
  - Clutch switch (page 21-27)

SPECIFICATION

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 (0.47)	6.5 (0.26)

TORQUE VALUES

Starter motor terminal nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Starter motor setting bolt	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	ALOC bolt; replace with a new one.
Negative brush mounting screw	3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)	

TROUBLESHOOTING

'08 – '11 model

Starter motor does not turn

1. **Fuse Inspection**

   Check for blown main fuse (30 A) or sub fuse (H/LIGHT START 20 A).

   Is the fuse blown?

   YES – Replace the fuse.

   NO – GO TO STEP 2.

2. **Battery Inspection**

   Make sure the battery is fully charged and in good condition.

   Is the battery in good condition?

   YES – GO TO STEP 3.

   NO – Replace the battery.

3. **Starter Relay Switch Operation**

   Check the starter relay switch operation.
   You should hear the relay "CLICK" when the starter switch button is depressed.

   Is there a "CLICK"?

   YES – GO TO STEP 4.

   NO – GO TO STEP 5.

4. **Starter Motor Inspection**

   Apply battery voltage to the starter motor directly and check the operation.

   Does the starter motor turn?

   YES – • Poorly connected starter motor cable
   • Faulty starter relay switch (page 20-19)

   NO – Faulty starter motor (page 20-10)

5. **Relay Coil Ground Wire Lines Inspection**

   Disconnect the starter relay switch connector, and check the relay coil ground wire lines as below for continuity:

   1. Green/red terminal – diode – neutral switch line (with the transmission in neutral and clutch lever released).
   2. Green/red terminal – clutch switch – sidestand switch line (in any gear except neutral, and with the clutch lever pulled in and sidestand up.

   Is there continuity?

   NO – • Faulty neutral switch (page 21-28)
   • Faulty diode (page 20-23)
   • Faulty clutch switch (page 21-27)
   • Faulty sidestand switch (page 21-30)
   • Loose or poor contact connector
   • Open circuit in wire harness

   YES – GO TO STEP 6.

6. **Starter Relay Line Inspection**

   With the ignition switch ON and starter switch pushed, check for continuity at the starter relay switch connector (between Red and Yellow/red).

   Is there continuity?

   NO – • Faulty ignition switch (page 21-24)
   • Faulty starter switch (page 21-25)
   • Loose or poor contact connector
   • Open circuit in wire harness

   YES – GO TO STEP 7.

7. **Starter Relay Switch Continuity Inspection**

   Check the function of the starter relay switch (page 20-19).

   Does the starter relay switch function properly?

   NO – Faulty starter relay switch

   YES – Loose or poor contact starter relay switch connector

The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the sidestand up and clutch lever pulled in.

1. **Clutch Switch Inspection**

   Check the clutch switch operation.

   Is the clutch switch operation normal?

   NO – Faulty clutch switch

   YES – GO TO STEP 2.

2. **Sidestand Switch Inspection**

   Check the sidestand switch operation.

   Is the sidestand switch operation normal?

   NO – Faulty sidestand switch (page 21-30)

   YES – • Open circuit in wire harness
   • Loose or poor contact connector

Starter motor turns engine slowly
- Low battery voltage
- Poorly connected battery cables
- Poorly connected starter motor cable
- Faulty starter motor

Starter motor turns, but engine does not turn
- Starter motor is running backwards
  – Case assembled improperly
  – Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear, driven gear, idle gear and/or reduction gear

Starter relay switch "CLICK", but engine does not turn over
- Crankshaft does not turn due to engine problems

After '11 model

NOTE:
- Make sure the battery is fully charged and in good condition.
- Check the ignition switch and its circuit if all systems do not function when the ignition switch is turned ON.
- Check for a blown main fuse (30 A) or sub-fuse (START; 10 A). (Check for a short circuit in the related wires if the fuse is blown again)
- The starter motor should operate with the following conditions.
  – transmission is in neural or
    clutch lever squeezed with sidestand retracted
  – ignition switch turned ON
  – starter/lap switch pushed
- This model is equipped with a lap timer. The starter switch is used for timer operation as well as for starting the engine. These two functions of the switch are changed automatically depending upon the mode of the combination meter. The change is made via the lap relay (page 21-35).
  The starter/lap switch functions as the lap timer switch when the combination meter is in lap time mode and with the engine running. The switch reverts to its primary starting function when the combination meter is displaying standard information or when the engine is stopped.

Starter motor does not turn

1. **Starter Relay Switch Operation Inspection**

   Check the operation of the starter relay switch as above starting conditions (page 20-20).

   Does the starter relay switch click?

   YES – GO TO STEP 2.

   NO – GO TO STEP 3.

2. **Starter Motor Inspection**

Apply battery voltage to the starter motor directly and check the operation. (A large amount of current flows, so do not use a thin wire)

Does the starter motor turn?

YES – • Poorly connected starter motor cable
• Faulty starter relay switch (page 20-22)

NO – Faulty starter motor (page 20-10)

3. **Relay Coil Ground Line Inspection**

Check the ground line of the starter relay switch (page 20-20).

Is the ground line normal?

NO – • Faulty gear position switch (page 21-29)
• Faulty clutch switch (page 21-27)
• Faulty sidestand switch (page 21-30)
• Faulty diode (3 terminals) (page 20-23)
• Loose or poor contact of the related connector terminal
Open circuit in the wire harness

YES – GO TO STEP 4.

4. **Relay Coil Power Input Line Inspection**

Check the power input line of the starter relay switch (page 20-21).

Is the input line normal?

NO – • Faulty starter/lap switch (page 21-25)
• Faulty diode (2 terminals) (page 20-23)
• Loose or poor contact of the related connector terminal
Open circuit in the wire harness
• Faulty lap timer circuit (page 20-21)

YES – GO TO STEP 5.

5. **Starter Relay Switch Continuity Inspection**

Check the function of the starter relay switch (page 20-22).

Does the starter relay switch function properly?

NO – Faulty starter relay switch

YES – Loose or poor contact starter relay switch connector terminal

Starter motor turns engine slowly
- Low battery voltage
- Poorly connected battery cables
- Poorly connected starter motor cable
- Faulty starter motor

Starter motor turns, but engine does not turn
- Starter motor is running backwards
  – Case assembled improperly
  – Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear, driven gear, idle gear and/or reduction gear

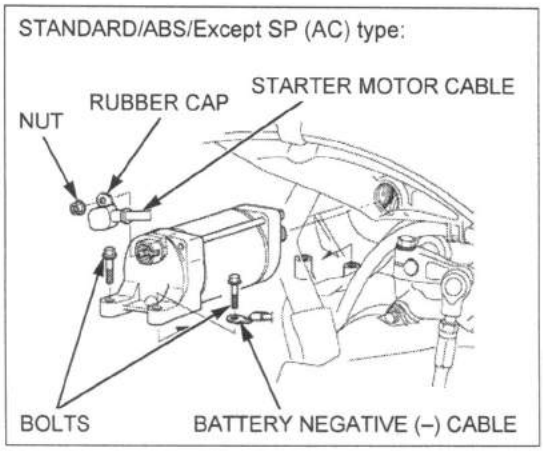
Starter relay switch "CLICK", but engine does not turn over
- Crankshaft does not turn due to engine problems

STARTER MOTOR

REMOVAL

- With the ignition switch OFF, disconnect the battery negative (–) cable before servicing the starter motor (page 18-7).

STANDARD/ABS/ Except SP (AC) type: Remove the left middle cowl (page 3-18).



ABS type only: Remove the front ABS valve unit (page 17-50).

Open the rubber cap, then remove the terminal nut and starter motor cable from the starter motor.

Remove the starter motor mounting bolts and disconnect the battery negative (–) cable.

Remove the starter motor from the crankcase.

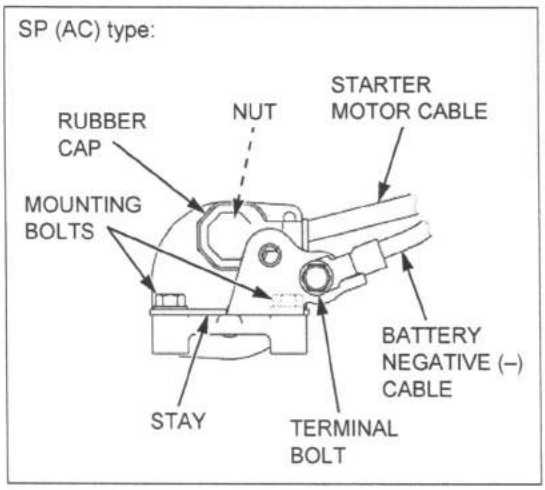
SP (AC) type: Remove the EVAP canister (page 6-98).

Remove the terminal bolt to disconnect the battery negative (–) cable.

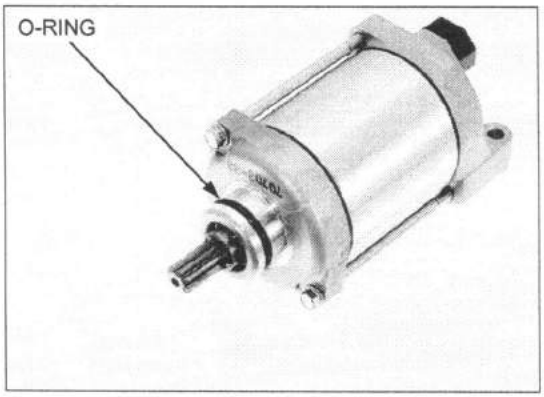
Open the rubber cap, then remove the terminal nut and starter motor cable from the starter motor.

Remove the starter motor mounting bolts and canister stay.

Remove the starter motor from the crankcase.

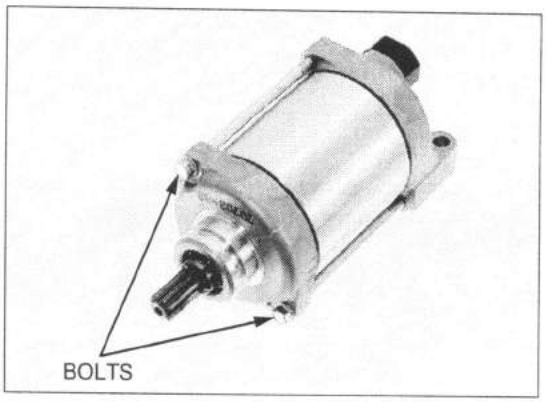


Remove the O-ring from the starter motor.

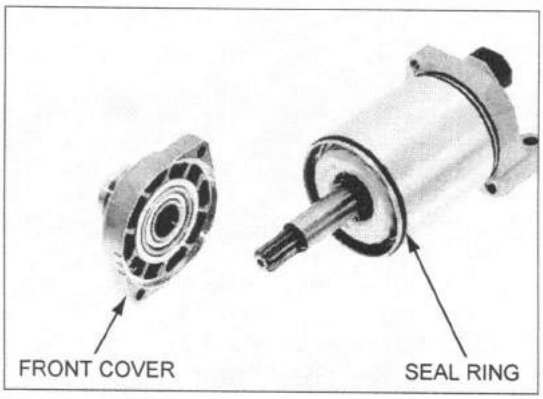


DISASSEMBLY/INSPECTION

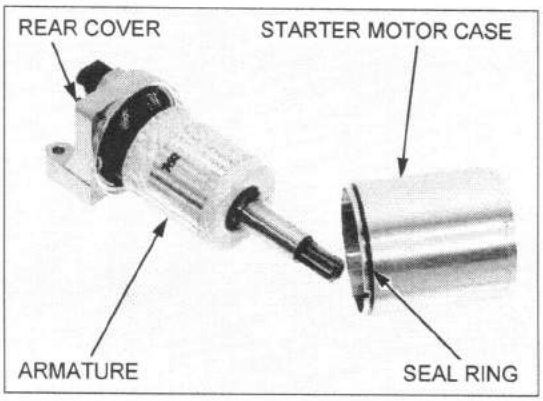
Remove the bolts.



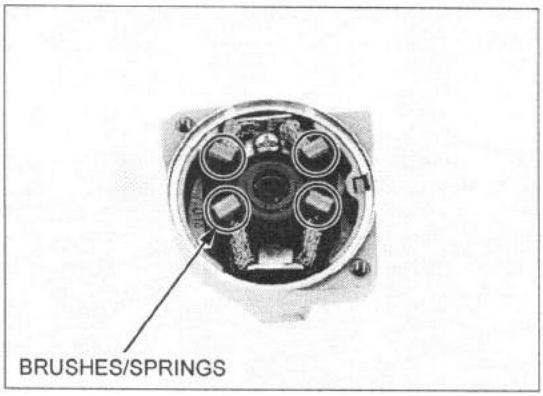
Remove the front cover and seal ring.



Remove the starter motor case, seal ring, and armature from the rear cover.

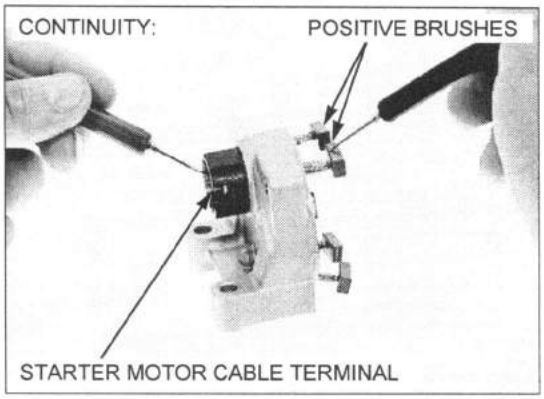


Remove the brushes and springs from the brush holder.



Check for continuity between the starter motor cable terminal and positive brushes.

There should be continuity.

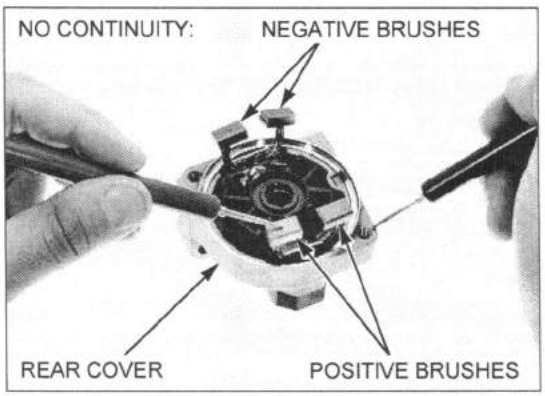


Check for continuity between positive brushes (terminal bolt side) and rear cover.

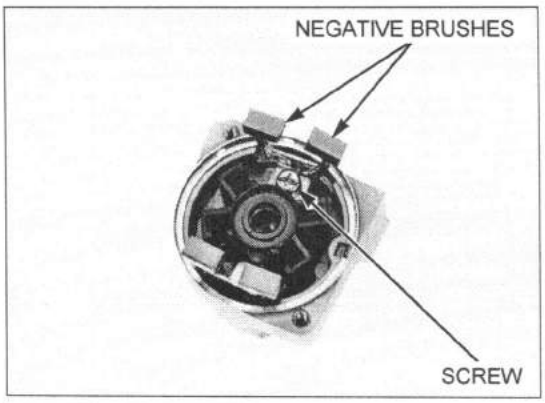
There should be no continuity.

Check for continuity between positive and negative brushes.

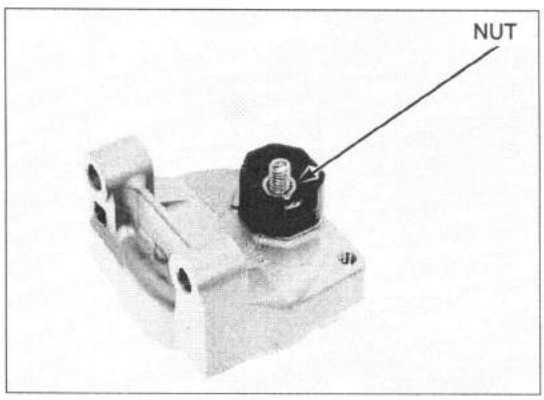
There should be no continuity.



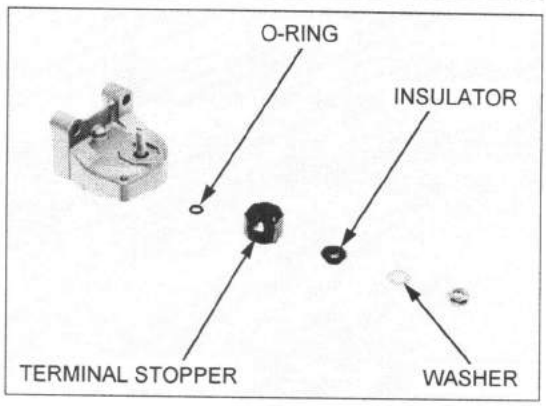
Remove the screw and negative brushes.



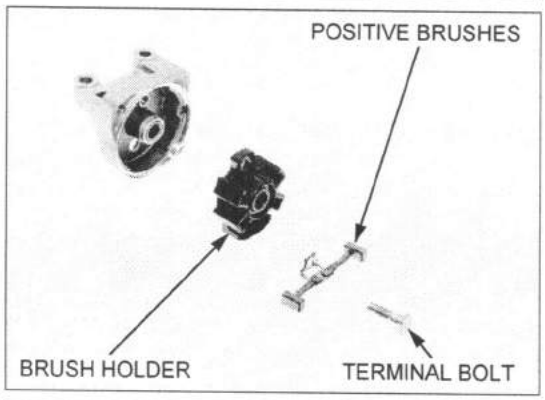
Remove the terminal nut.



Remove the washer, insulator, terminal stopper, and O-ring.

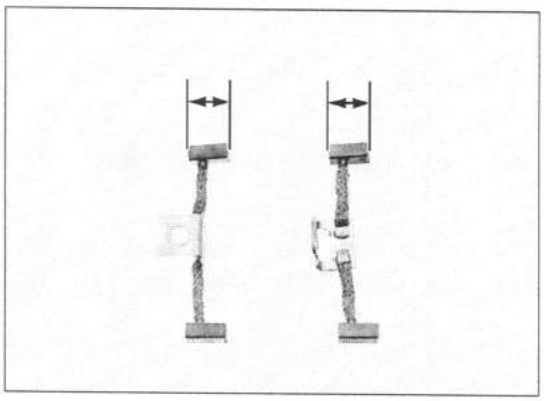


Remove the terminal bolt, positive brushes, and brush holder.



Measure each brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)

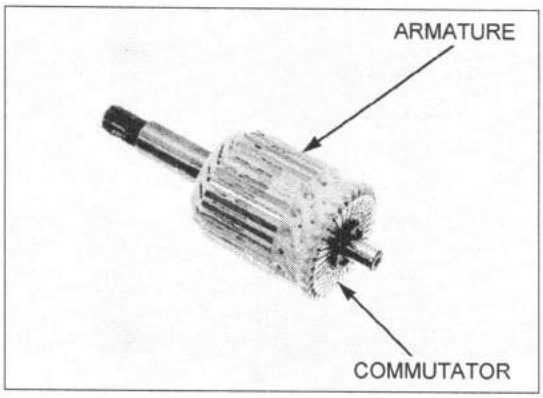


Check the commutator for damage or abnormal wear.

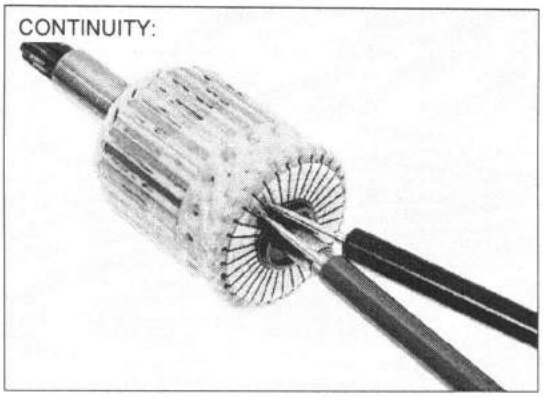
Do not use emery or sand paper on the commutator.

Check the commutator bar for discoloration.
Clean the metallic debris off between commutator bars.

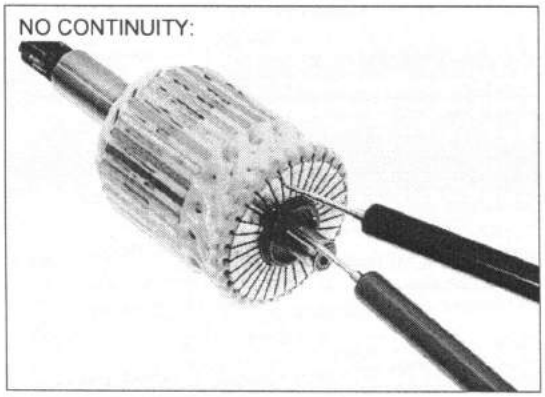
Replace the armature with a new one if necessary.



Check for continuity between pairs of commutator bars.
There should be continuity.

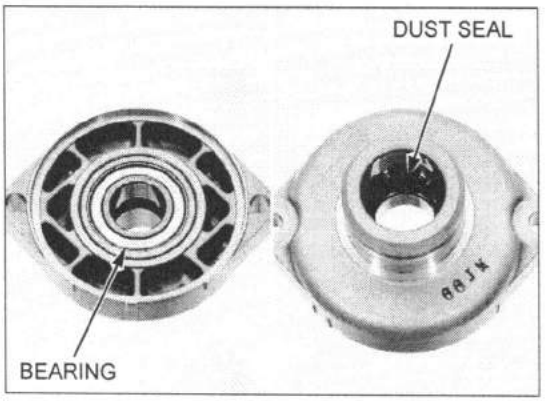


Check for continuity between each individual commutator bar and armature shaft.
There should be no continuity.

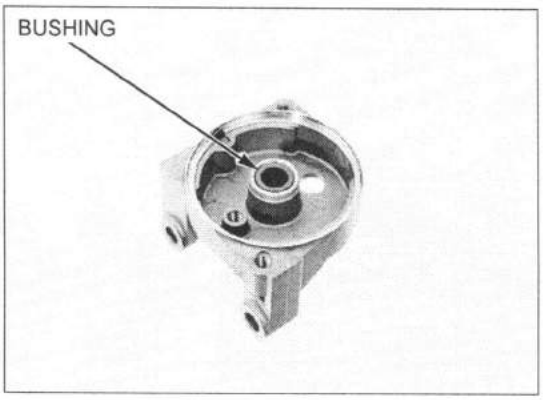


Check the dust seal for deterioration, wear, or damage.

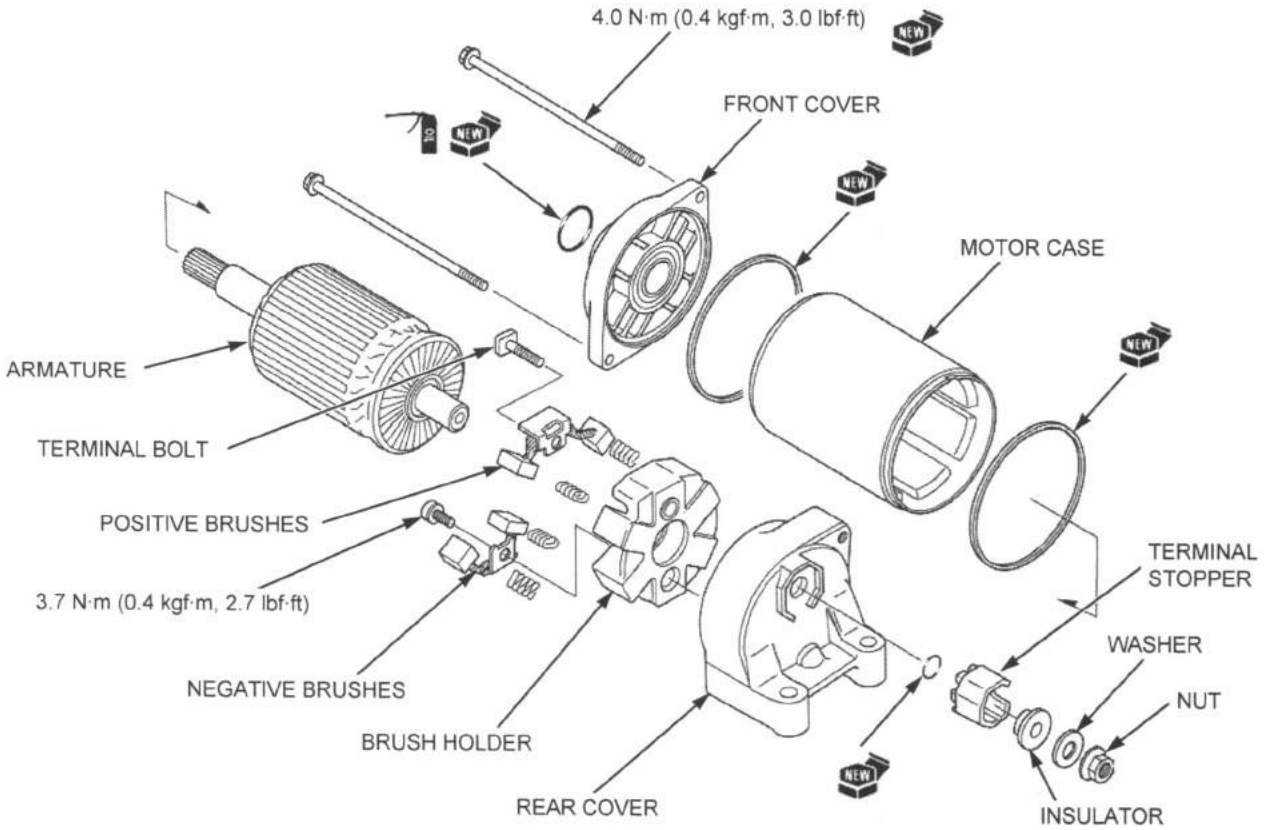
Turn the inner race of the starter motor bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the front cover.



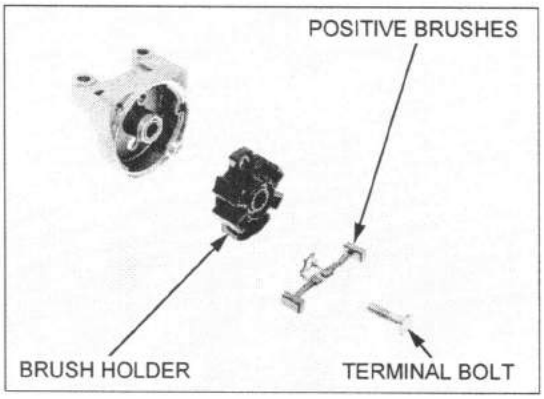
Check the bushing of the rear cover for wear or damage.



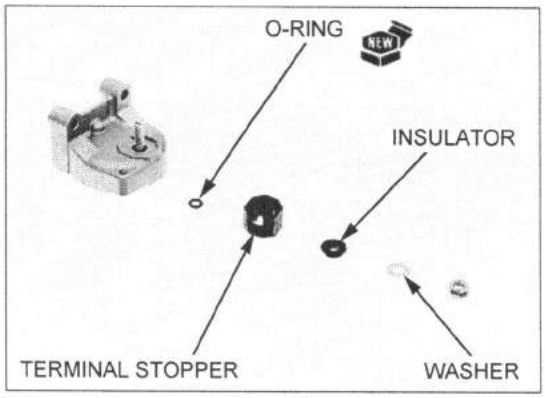
ASSEMBLY



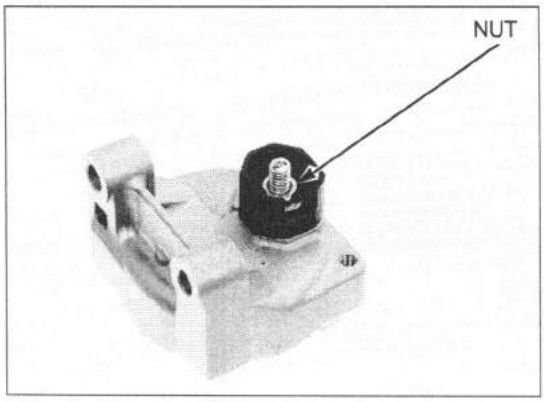
Install the brush holder, positive brushes, and terminal bolt.



Install a new O-ring, terminal stopper, insulator, and washer.

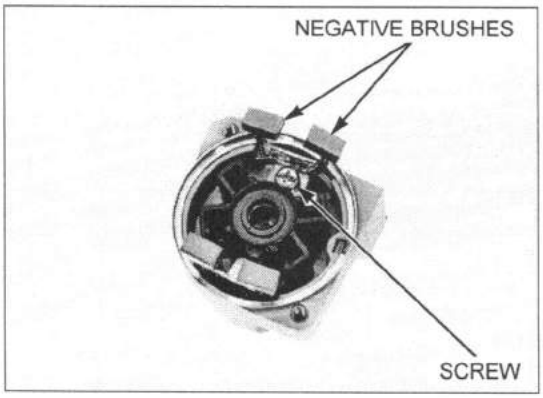


Tighten the terminal nut securely.

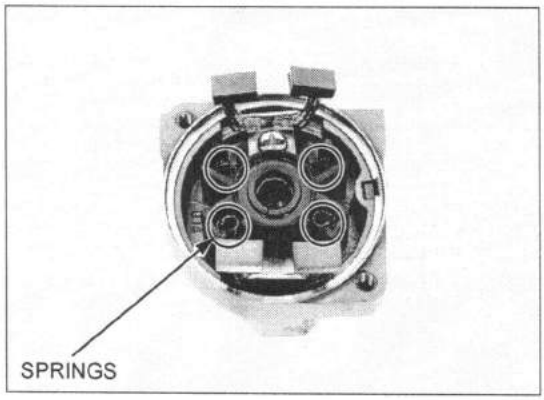


Install the negative brushes and tighten the screw to the specified torque.

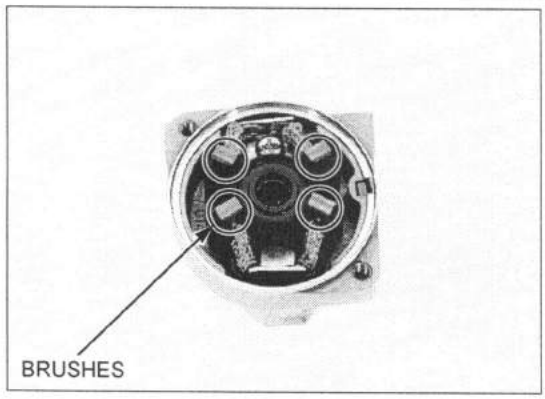
TORQUE: 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)



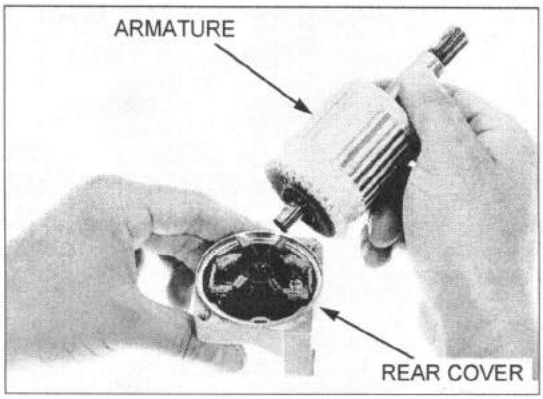
Install the brush springs to the brush holder.



Install the brushes to the brush holder.



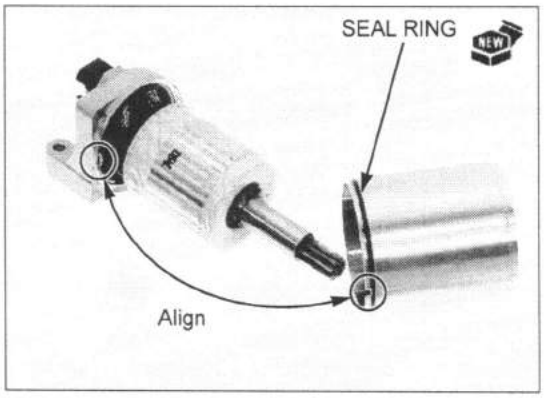
Install the armature to the rear cover.



Install a new seal ring to the starter motor case.
Install the starter motor case with its groove with the tab on the rear cover.

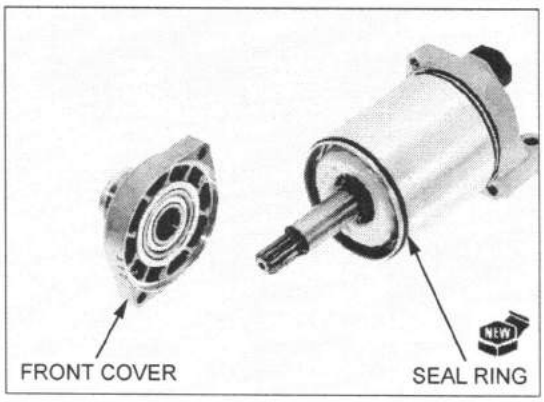
NOTICE

The coil may be damaged if the magnet pulls the armature against the case.

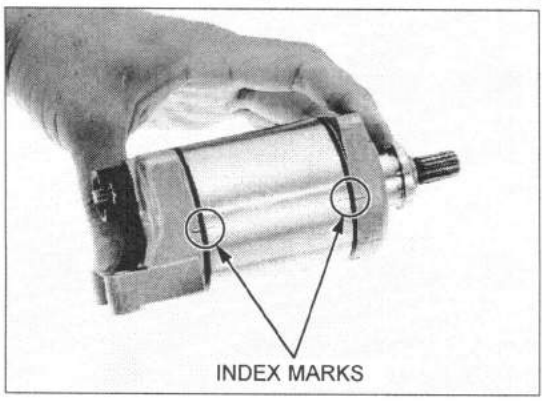


Install a new seal ring to the starter motor case.
Install the front cover to the starter motor case.

NOTE:
When installing the front cover, take care to prevent damaging the oil seal lip with the armature shaft.

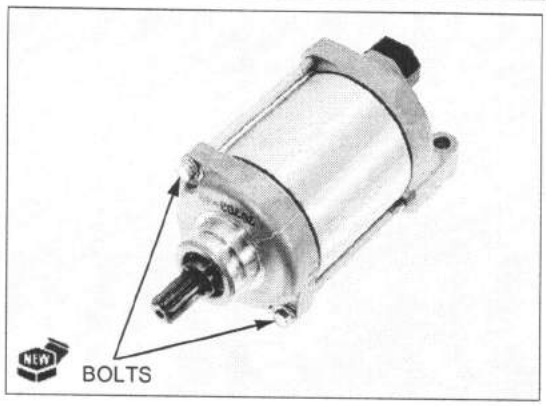


Align the index marks on the front cover, starter motor case, and rear cover.



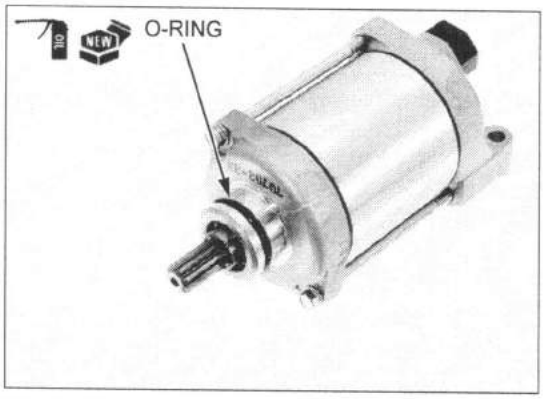
Install new bolts and tighten them to the specified torque.

TORQUE: 4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)



INSTALLATION

Apply oil to a new O-ring and install it to the starter motor groove.



STANDARD/ABS/ Except SP (AC) type: Install the starter motor into the crankcase.

Correctly route the cables (page 1-25). Install the battery negative (–) cable and mounting bolts, then tighten the bolts securely.
Install the starter motor cable, then tighten the terminal nut to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

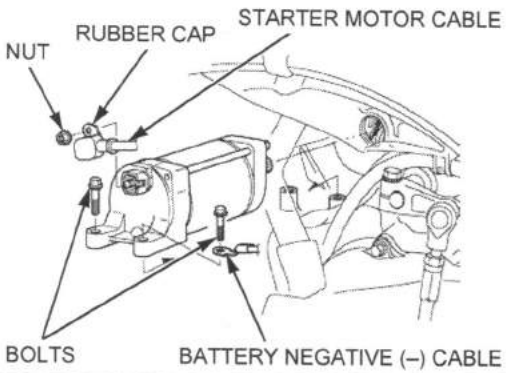
Install the rubber cap securely.

Connect the battery negative (–) cable (page 18-7).

ABS type only: Install the front ABS valve unit (page 17-55).

Install the left middle cowl (page 3-18).

STANDARD/ABS/Except SP (AC) type:



SP (AC) type: Install the starter motor into the crankcase.

Install the mounting bolts with the canister stay, then tighten them securely.

Correctly route the cables (page 1-66). Install the starter motor cable, then tighten the terminal nut to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

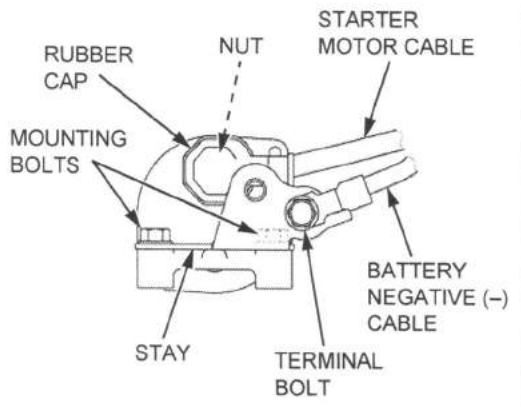
Install the rubber cap securely.

Install the battery negative (–) cable to the stay, then tighten the terminal bolt securely.

Connect the battery negative (–) cable (page 18-7).

Install the EVAP canister (page 6-98).

SP (AC) type:



STARTER RELAY SWITCH

REMOVAL/INSTALLATION (STANDARD/SP type)

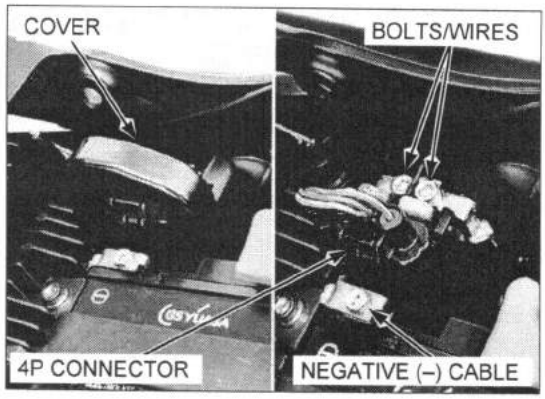
Remove the seat (page 3-7).

Turn the ignition switch OFF.

Remove the starter relay switch cover.

Disconnect the battery negative (–) cable (page 18-7).
Disconnect the starter relay switch 4P (Black) connector.
Remove the bolts and disconnect the starter relay switch wires.
Remove the starter relay switch.

Installation is in the reverse order of removal.



REMOVAL/INSTALLATION (ABS type)

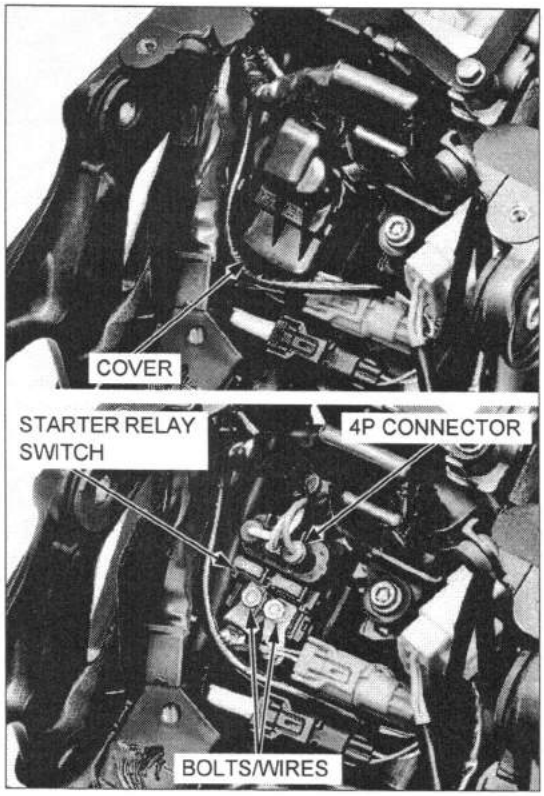
Remove the fuel tank (page 6-60).

Turn the ignition switch OFF.

Remove the starter relay switch cover.

Disconnect the battery negative (–) cable (page 18-7).
Disconnect the starter relay switch 4P (Black) connector.
Remove the bolts and disconnect the starter relay switch wires.
Remove the starter relay switch.

Installation is in the reverse order of removal.

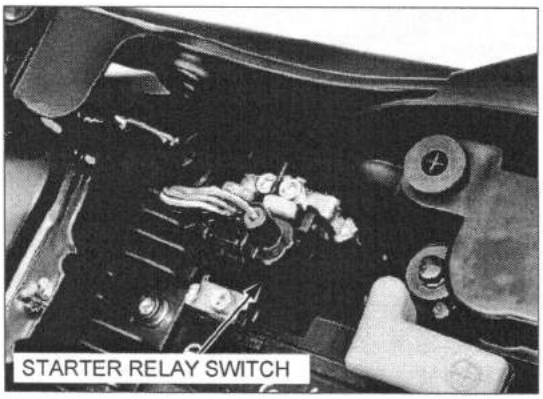


OPERATION INSPECTION (STANDARD/SP type)

Remove the seat (page 3-7).

Shift the transmission into neutral.
Turn the ignition switch ON and press the starter switch button.
The coil is normal if the starter relay switch clicks.

If you don't hear the switch "CLICK", inspect the relay switch using the procedure below.

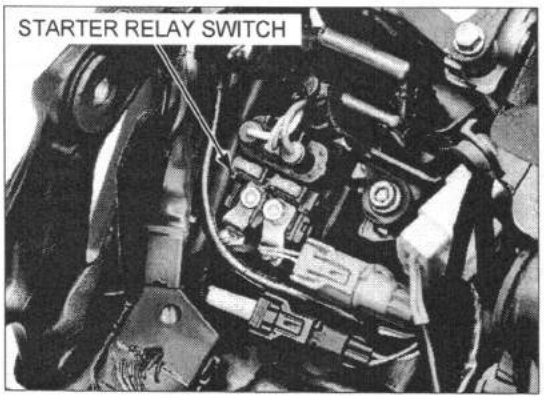


OPERATION INSPECTION (ABS type)

Remove the fuel tank (page 6-60).

Shift the transmission into neutral.
Turn the ignition switch ON and press the starter switch button.
The coil is normal if the starter relay switch clicks.

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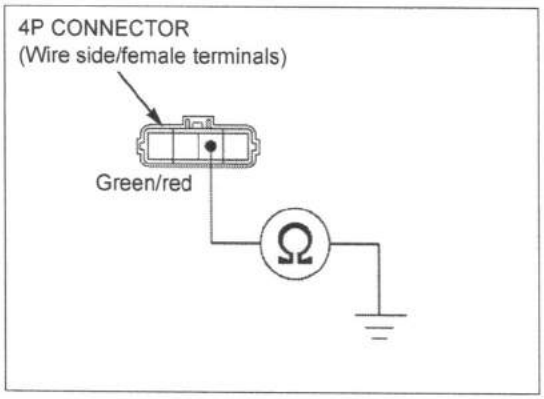


GROUND LINE INSPECTION

Disconnect the starter relay switch 4P (Black) connector.

Check for continuity between the Green/red terminal (ground line) and ground.

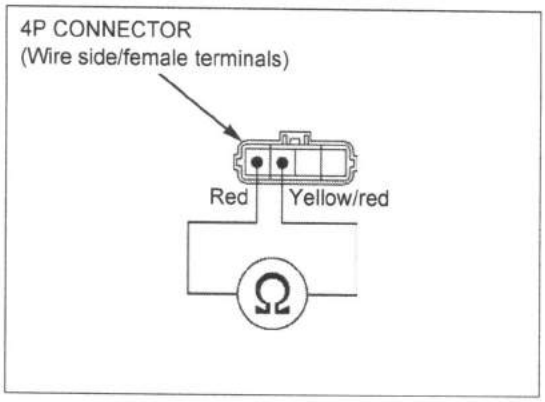
If there is continuity when the transmission is in neutral and clutch lever released or when the clutch lever pulled and the sidestand up, the ground circuit is normal (In neutral, there is a slight resistance due to the diode).



INPUT LINE INSPECTION ('08 – '11 STANDARD type)

Check for continuity between the Red terminal and Yellow/red terminal.

If there is continuity when the ignition switch ON and starter switch pushed, the input line is normal.



INPUT LINE INSPECTION ('08 – '11 ABS type)

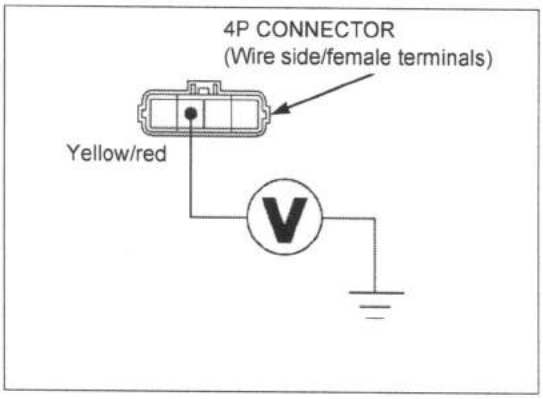
Measure the voltage between the Yellow/red terminal (input line) and ground.

Turn the ignition switch ON and press the starter switch button.

There should be battery voltage.

If there is no battery voltage, inspect the following.

- Main fuse (30 A)
- Battery (page 18-7)
- Sub fuse (H/LIGHT START 20 A)
- Ignition switch (page 21-24)
- Starter switch (page 21-25)
- Wire harness open circuit



INPUT LINE INSPECTION (After '11 model)

Disconnect the starter relay switch 4P connector.

- STANDARD/SP type (page 20-19)
- ABS type (page 20-19)

STANDARD/SP type: Check for continuity between the Red and Yellow/red terminals of the 4P connector.

There should be continuity when the ignition switch is ON and the starter/lap switch is pushed. (There is a slight resistance due to the diode)

ABS type: Turn the ignition switch ON. Measure the voltage between the Yellow/red terminal (+) and ground (–).

There should be battery voltage when the starter/lap switch pushed.

If the power input line is abnormal, check the following.

- starter/lap switch (page 21-25)
- diode (2 terminals) (page 20-23) and its wires
- lap timer circuit as follows

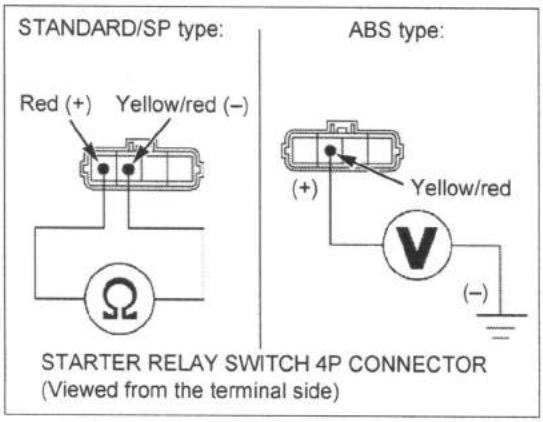
1. Lap Relay Inspection

Check the lap relay (page 21-35).

Is the relay normal?

NO – Faulty lap relay (stuck on).

YES – GO TO STEP 2.



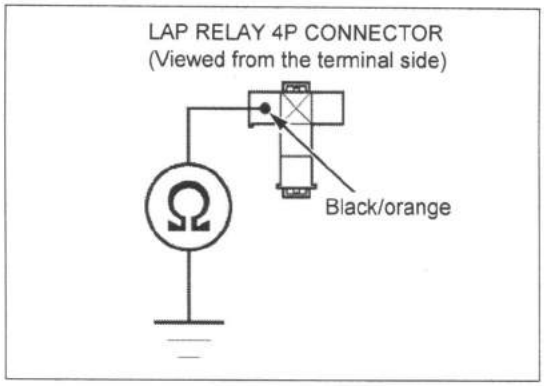
2. **Lap Relay Coil Output Line Short Circuit Inspection**

Check for continuity between the Black/orange wire terminal of the relay 4P connector and ground.

Is there continuity?

YES – Short circuit in Black/orange wire between the relay and combination meter.

NO – Replace the combination meter with a new one and recheck.



CONTINUITY INSPECTION

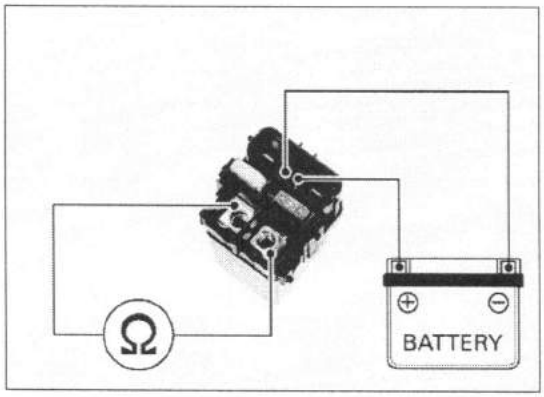
Remove the starter relay switch.

- STANDARD/SP type (page 20-19)
- ABS type (page 20-19)

Connect an ohmmeter to the starter relay switch large terminals.

Connect a fully charged 12 V battery positive (+) wire to the starter relay switch Yellow/red terminal and negative (–) wire to the Green/red terminal.

There should be continuity between the large terminals while the battery is connected, and no continuity when the battery is disconnected.



DIODE

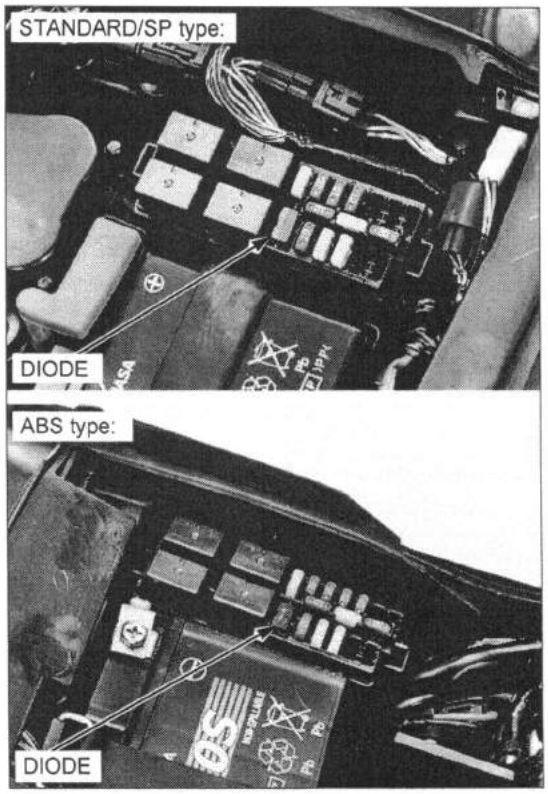
REMOVAL/INSTALLATION

3 terminals (All models)

Remove the seat (page 3-7).

Open the fuse/relay box and remove the diode.

Installation is in the reverse order of removal.

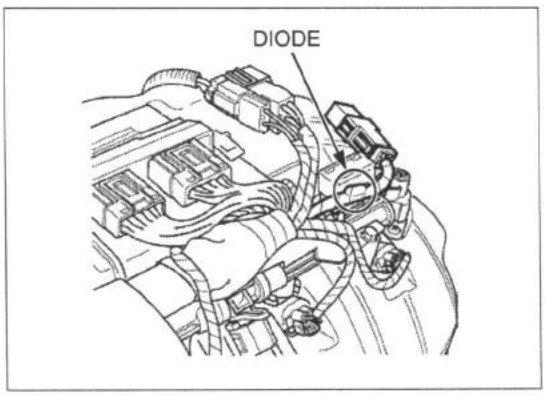


2 terminals (After '11 model)

Lift and support the fuel tank (page 4-7).

Remove the diode from the main wire harness (near the lap relay).

Installation is in the reverse order of removal.

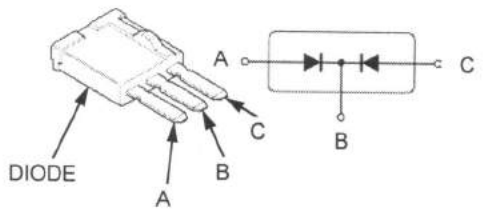


INSPECTION

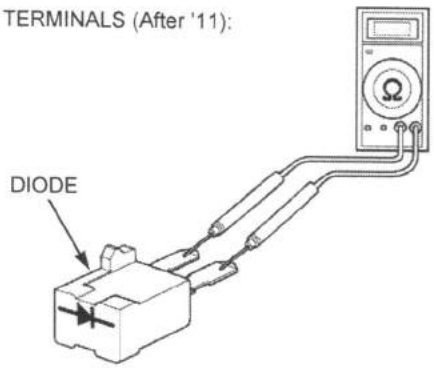
Check for continuity between the diode terminals.
When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.

3 TERMINALS:



2 TERMINALS (After '11):



21. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION 21-2

SERVICE INFORMATION 21-4

TROUBLESHOOTING 21-6

HEADLIGHT 21-7

TURN SIGNAL LIGHT 21-8

BRAKE/TAIL LIGHT 21-10

LICENSE LIGHT 21-10

COMBINATION METER 21-11

SPEEDOMETER/VS SENSOR 21-15

TACHOMETER 21-18

ECT SENSOR 21-21

EOP SWITCH 21-21

FUEL RESERVE SENSOR 21-23

IGNITION SWITCH 21-24

HANDLEBAR SWITCHES 21-25

BRAKE LIGHT SWITCH 21-26

CLUTCH SWITCH 21-27

NEUTRAL SWITCH ('08 – '11 model) 21-28

GEAR POSITION SWITCH
(After '11 model) 21-29

SIDESTAND SWITCH 21-30

HORN 21-31

TURN SIGNAL RELAY 21-32

HEADLIGHT RELAY 21-33

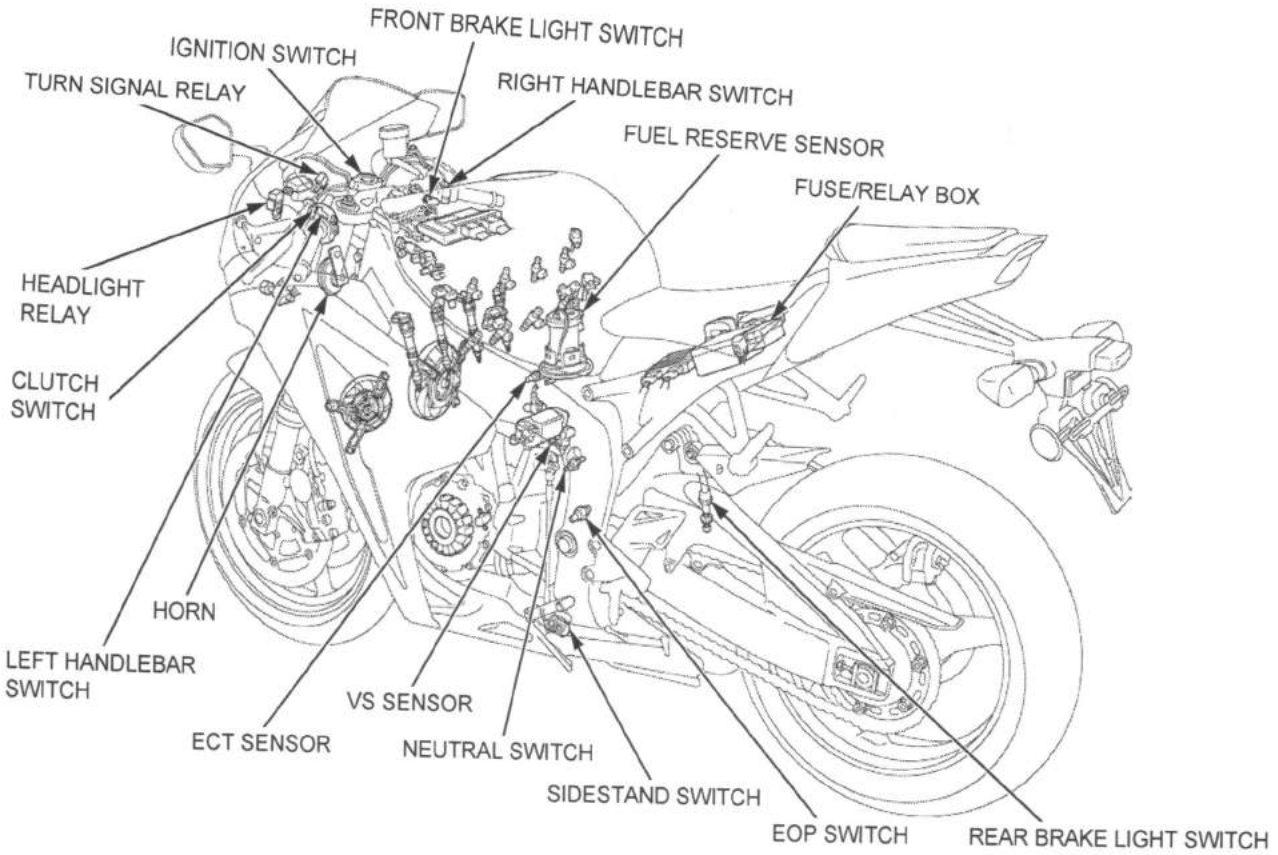
LAP TIMER (After '11 model) 21-33

LAP RELAY (After '11 model) 21-35

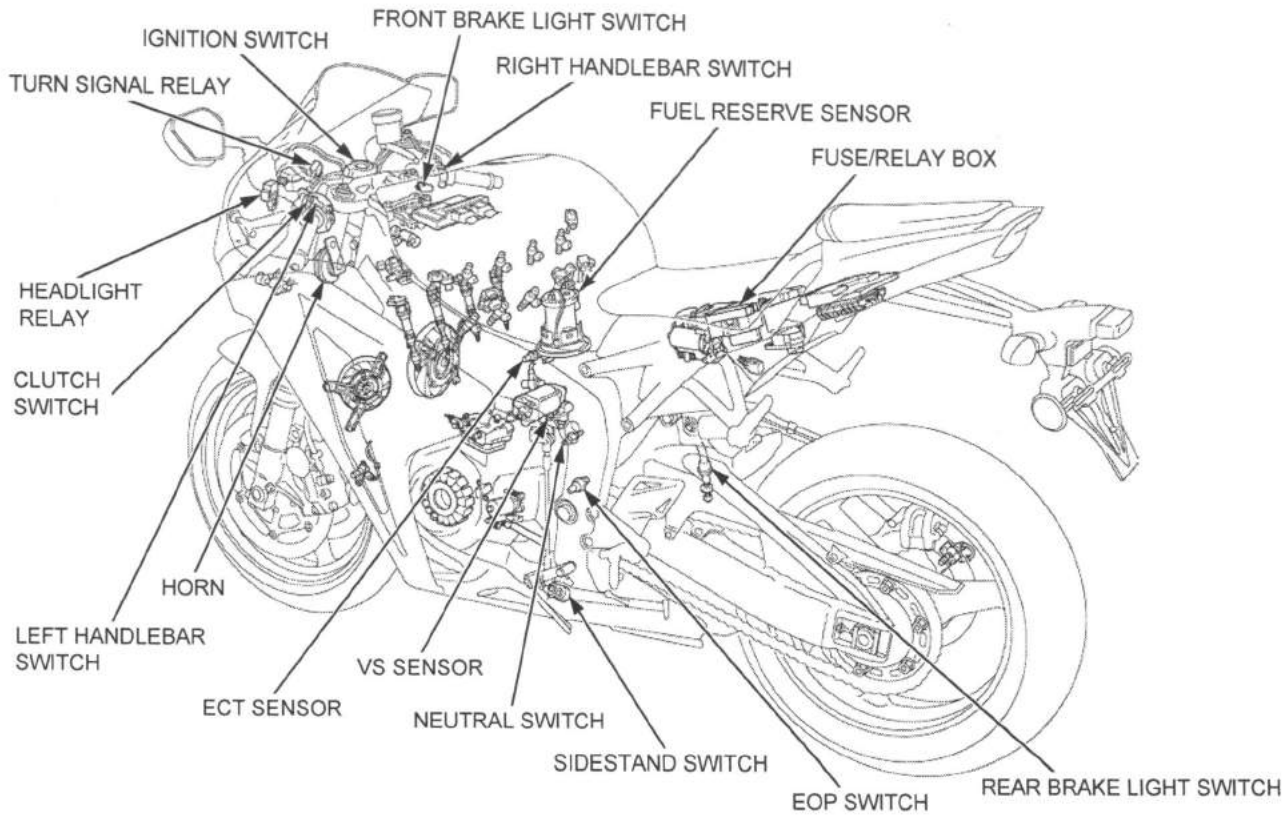
SYSTEM LOCATION

'08 – '11 model

STANDARD type:



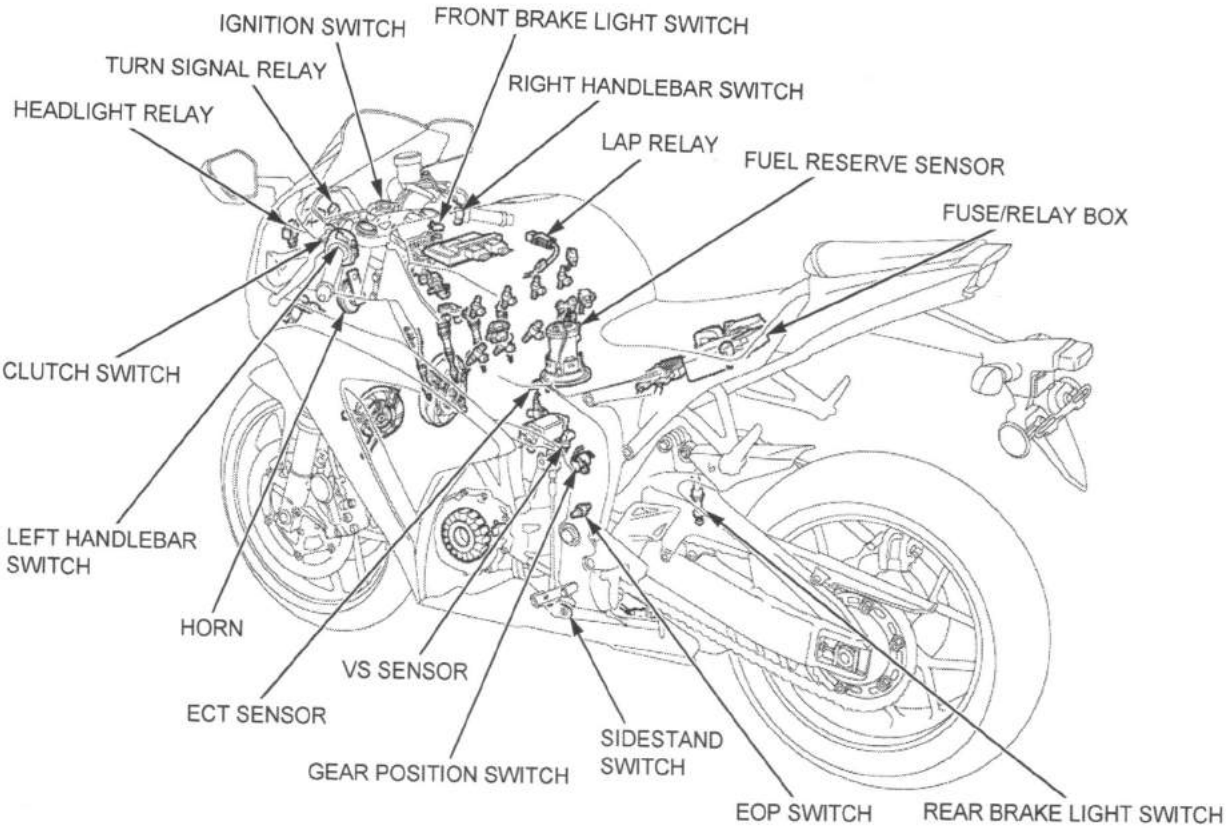
ABS type:



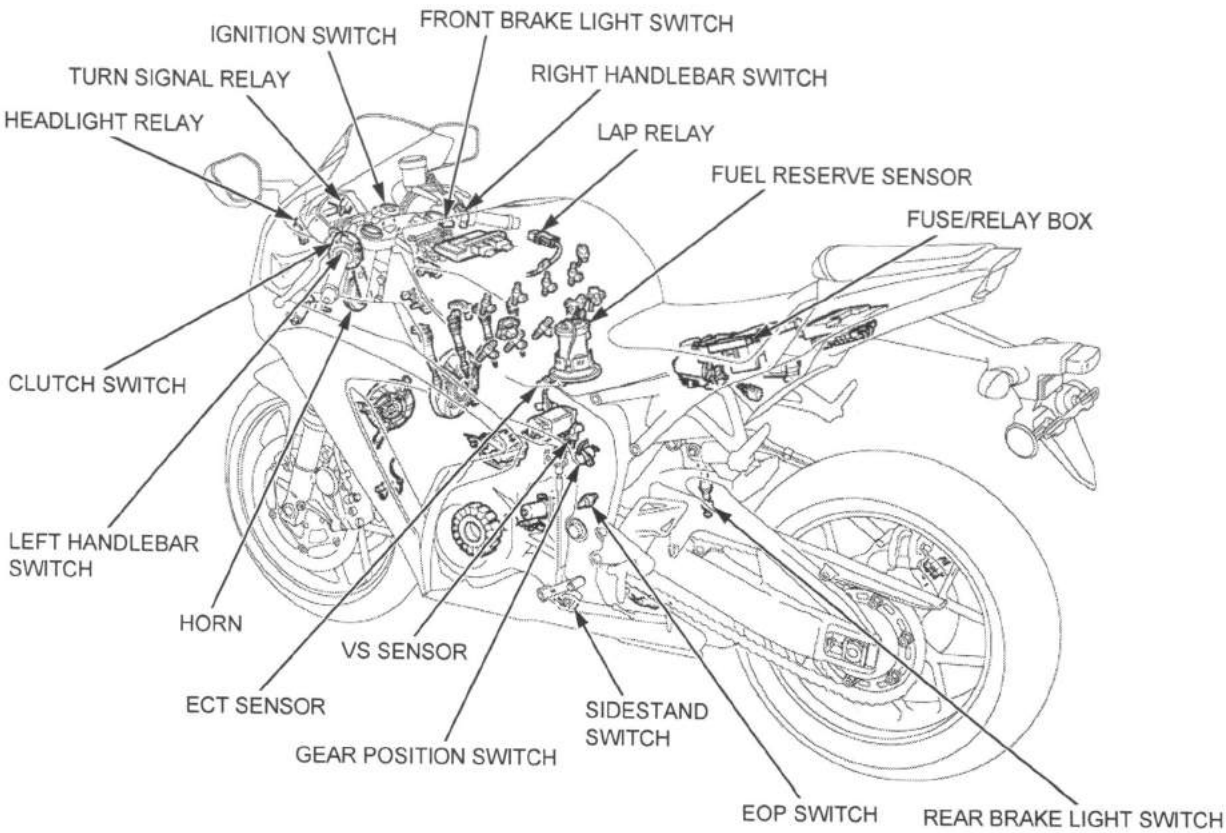
After '11 model

STANDARD/SP type:

STANDARD type shown:



ABS type:



SERVICE INFORMATION

GENERAL

NOTICE

- *A halogen headlight bulb becomes very hot while the headlight is on, and remains hot for a while after it is turned off. Be sure to let it cool down before servicing.*
- *Note the following when replacing the halogen headlight bulb.*
  - *Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to break.*
  - *If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent its early failure.*
- Use an electric heating element to heat the water/coolant mixture for the ECT sensor inspection. Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes are used throughout this section.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

- For headlight removal/installation (page 3-28).
- For front turn signal and position light removal/installation (page 3-25).
- For rear turn signal light removal/installation (page 21-9).
- For license light removal/installation (page 21-10).

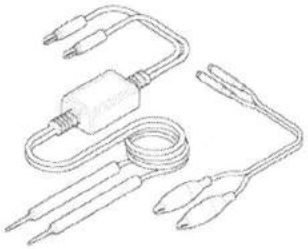
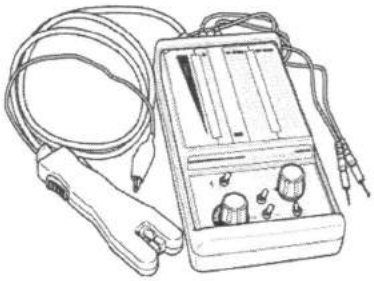
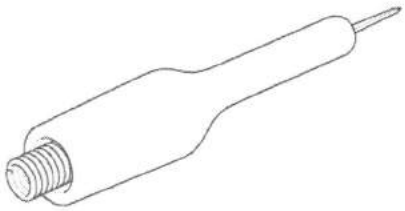
SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12 V – 55 W
		Lo	12 V – 55 W
	Position light		LED
	Brake/taillight		LED
	License light		12 V – 5 W
	Turn signal light		12 V – 21 W x 4
	Instrument light		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Neutral indicator		LED
	MIL		LED
	Low fuel indicator		LED
	REV indicator		LED
	HESD indicator		LED (After '11 model)
	Engine oil pressure/coolant temperature warning indicator ('08 – '11 model)		LED
	Low oil pressure indicator (After '11 model)		LED
	High coolant temperature indicator (After '11 model)		LED
	Combined ABS indicator (ABS type)		LED
Fuse	Main fuse		30 A
	Sub fuse		10 A x 4, 20 A x 3
	ABS fuse (ABS type)		30 A x 2, 10 A x 1
Tachometer peak voltage			10.5 V minimum
ECT sensor resistance		50°C (122°F)	6.8 – 7.4 k
		80°C (176°F)	2.1 – 2.7 k

TORQUE VALUES

Sidestand switch mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
EOP switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	ALOC bolt; replace with a new one. Apply sealant to the threads.
Neutral switch ('08 – '11 model)	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Combination meter screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
EOP switch wire terminal bolt	2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Clutch switch mounting screw	0.6 N·m (0.1 kgf·m, 0.4 lbf·ft)	ALOC screw; replace with a new one.
Ignition switch mounting bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)	Replace with a new one.
Rearview mirror front cover screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Combination meter stay mounting bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	

TOOLS

Peak voltage adaptor 07HGJ-0020100 (Not available in U.S.A.)  with commercially available digital multimeter (impedance 10 M /DCV minimum)	IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) 	Test probe (2 required) 07ZAJ-RDJA110 

TROUBLESHOOTING

VS SENSOR/SPEEDOMETER

The speedometer and odometer/trip meter indicates "– – – –".
Faulty EEPROM in ECM

The odometer/trip meter operates normally, but the speedometer does not operate
Faulty speedometer in combination meter

The speedometer operates normally, but the odometer/trip meter does not operate
Faulty odometer/trip meter in combination meter

The speedometer operates abnormally

1. **Fuse Inspection**

   Check for blown main fuse (30 A) or sub fuse (CLOCK 10 A).

   Is the fuse blown?

   YES – Replace the fuse.

   NO – GO TO STEP 2.

2. **Battery Inspection**

   Make sure the battery is fully charged and in good condition.

   Is the battery in good condition?

   YES – GO TO STEP 3.

   NO – Replace the battery.

3. **VS Sensor Power Input Voltage Inspection (VS Sensor Side)**

   Disconnect the VS sensor 3P ('08 model: Blue, After '08 model: Black) connector and measure the voltage at the VS sensor connector Violet terminal with the ignition switch ON.

   Is the Voltage more than 9.5 – 10.5 V (20°C/68°F)?

   NO – • Loose or poor contact of related terminals
   • Open circuit in Violet wires between the combination meter and VS sensor

   YES – GO TO STEP 4.

4. **VS Sensor Power Input Voltage Inspection (Combination Meter Side)**

   Connect the VS sensor 3P connector and check for loose or poor contact of the combination meter 20P (Gray) connector.

   With the ignition switch ON, and measure the voltage at bottom of the combination meter 20P (Gray) connector Violet terminal.

   Is the Voltage more than 9.5 – 10.5 V (20°C/68°F)?

   NO – • Loose or poor contact of related terminals
   • Faulty combination meter

   YES – GO TO STEP 5.

5. **VS Sensor Signal Line Inspection**

   With the ignition switch OFF, check for continuity of the Pink/green wire between the terminals of the VS sensor and speedometer.

   Is there continuity?

   NO – Open circuit in Pink/green wire

   YES – GO TO STEP 6.

6. **VS Sensor Signal Inspection**

   Support the motorcycle using a hoist or other support to raise the rear wheel off the ground.

   Measure the output voltage (sensor signal) at the speedometer with the ignition switch ON while slowly turning the rear wheel with your hand (page 21-15).

   Standard: Repeat 0 to 5 V

   Is the voltage as specified?

   NO – Faulty VS sensor

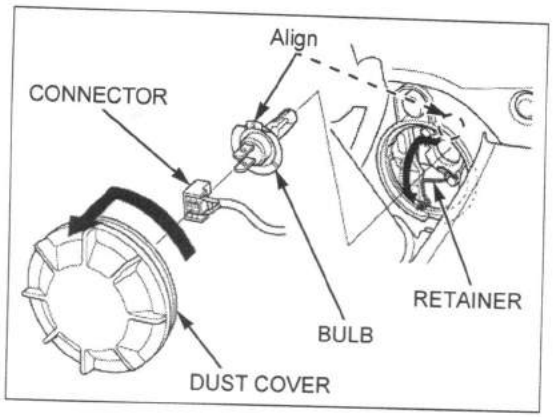
   YES – Faulty speedometer

HEADLIGHT

BULB REPLACEMENT

Turn the dust cover counterclockwise and remove it. Disconnect the headlight bulb connector.

Unhook the bulb retainer and remove the headlight bulb.



NOTICE

Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

Install a new headlight bulb aligning its tab with the groove in the headlight unit.

If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent early bulb failure.

Hook the bulb retainer securely.

Connect the headlight bulb connector.

Install the removed parts in the reverse order of removal.

INSPECTION (After '11 model)

NOTE:

- The power source for both the low and high beams of the headlight are supplied via the headlight relay and which is controlled by the combination meter.
- The headlights goes off while the starter/lap switch is pushed for starting.
- Check the following before troubleshooting:
  - bulbs
  - battery condition
  - fuse (HEADLIGHT; 20 A)
    Check for short circuit in related wires (Black/red) if the fuse is blown.

The headlights do not light with the ignition switch turned ON

1. **Relay Inspection**

   Check the headlight relay (page 21-33).

   Is the relay normal?

   YES – GO TO STEP 2.

   NO – Faulty headlight relay.

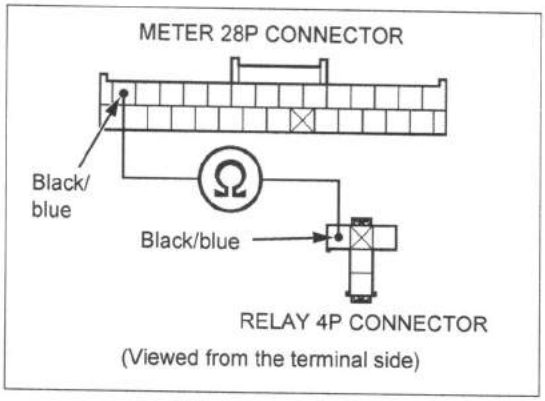
2. **Relay Signal Line Open Circuit Inspection**

   Check the Black/blue wire for continuity between the meter 28P and headlight relay 4P connectors.

   Is the there continuity?

   NO – Open circuit in the Black/blue wire.

   YES – GO TO STEP 3.



3. Relay Input Voltage Inspection

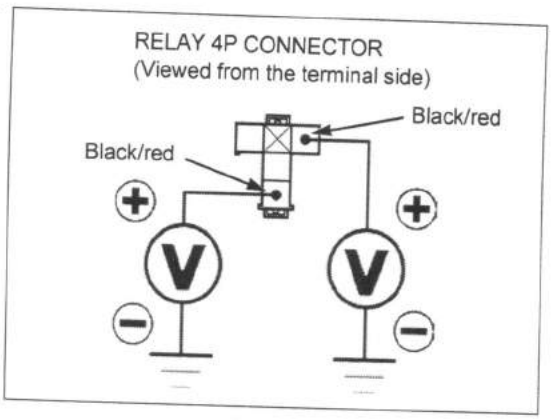
Support the upper cowl securely to avoid damaging the wire harness.

Connect the sub-wire harness 8P (Black) connector on the upper cowl.
Measure the voltage between each Black/red wire terminal (+) of the headlight relay 4P connector and ground (–) with the ignition switch turned ON.

Is there battery voltage?

NO – Open circuit in the Black/red wire(s).

YES – GO TO STEP 4.



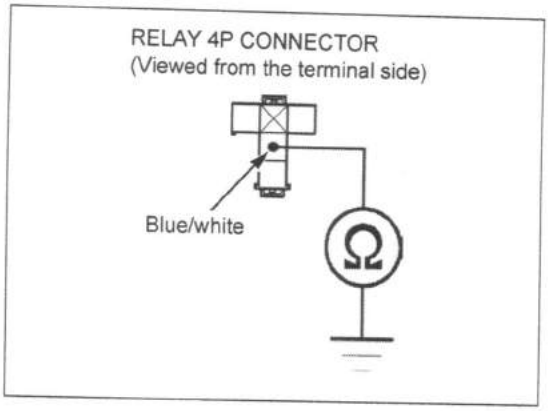
4. Headlight Input Line Open Circuit Inspection

Turn the ignition switch OFF.
Check for continuity between the Blue/white wire terminal of the relay 4P connector and ground with the bulbs installed.

Is there continuity?

NO – Open circuit in the Blue/white wire.

YES – Replace the combination meter with a new one and recheck.



The headlights stays on during engine starting

- Faulty headlight relay (stuck on) (page 21-33).
- Short circuit between the headlight relay and combination meter (Black/blue wire).
- Faulty combination meter.

TURN SIGNAL LIGHT

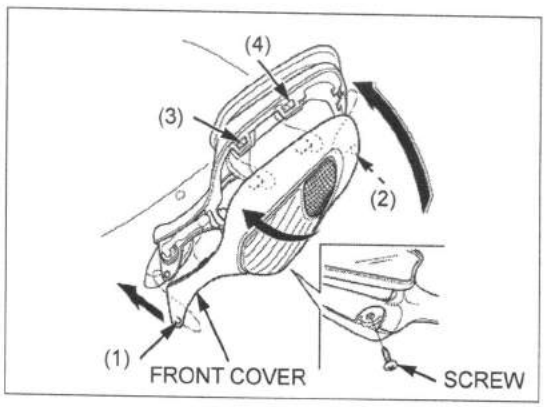
FRONT

BULB REPLACEMENT

Remove the screw and turn the rearview mirror to ease removal of the front cover as shown.

Be careful not to damage the tabs.

Release the front cover tabs in the specified sequence as shown and remove the front cover.



Turn the front turn signal bulb socket counterclockwise and remove it.

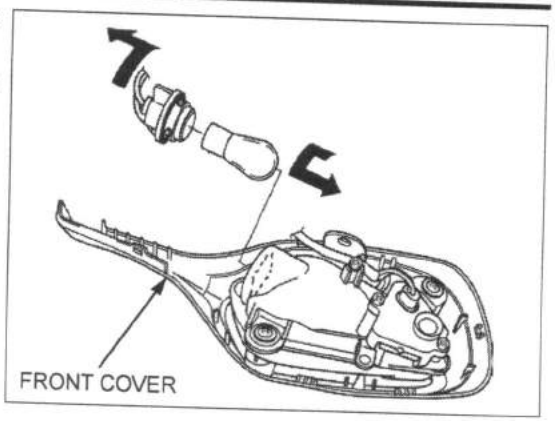
While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

Installation is in the reverse order of removal.

TORQUE:

Rearview mirror front cover screw:
1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

- For front turn signal light removal/installation (page 3-25).



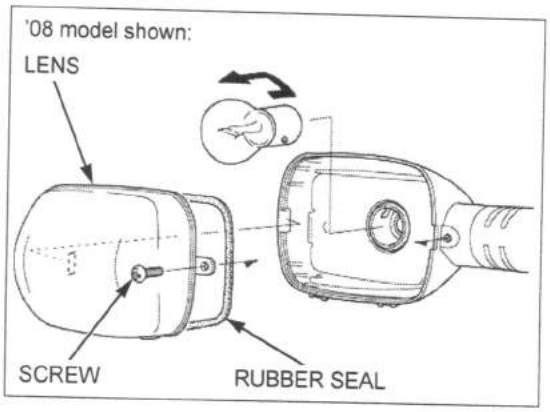
REAR

BULB REPLACEMENT

Remove the screw, turn signal lens, and rubber seal.

While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

Install the rubber seal and lens and tighten the screw securely.



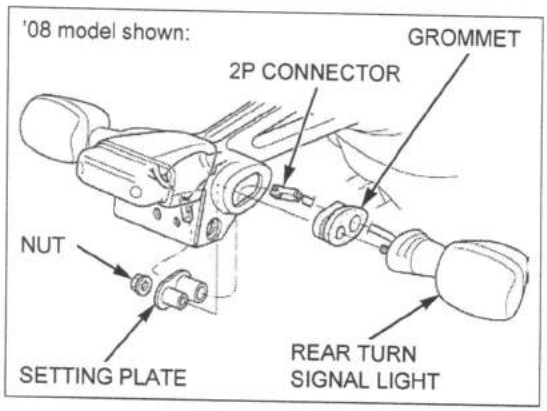
REMOVAL/INSTALLATION

Remove the rear fender A (page 3-38).

Disconnect the turn signal light 2P connector.

Remove the nut, rear turn signal light, setting plate, and grommet.

Installation is in the reverse order of removal.

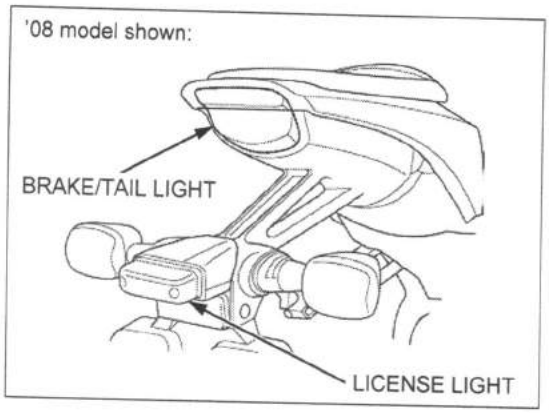


BRAKE/TAIL LIGHT

INSPECTION

Turn the ignition switch ON, and check the tail light operation.
Check that all the LEDs in the brake/tail light unit illuminate with the front brake lever and/or rear brake pedal applied.

If any LED does not turn on, replace the brake/tail light (page 3-42).



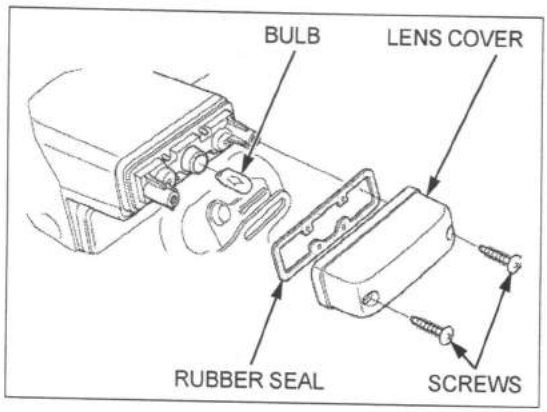
LICENSE LIGHT

BULB REPLACEMENT

Remove the screws, lens cover, and rubber seal.

Remove the bulb from the socket and replace it with a new one.

Install the rubber seal and lens cover and tighten the screws securely.



REMOVAL/INSTALLATION

Remove the rear fender A (page 3-38).

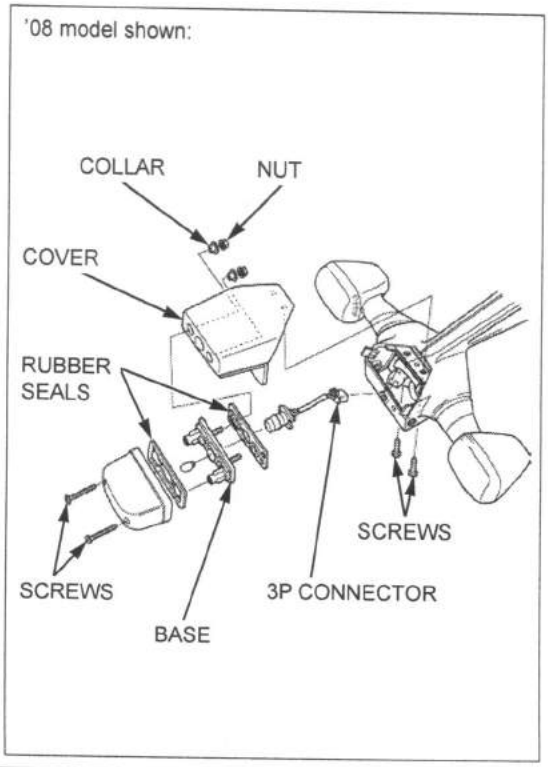
Disconnect the license light 3P (Natural) connector.

Remove the screws and license light cover assembly.

Remove the following:

- Nuts
- Collars
- Screws
- Lens cover
- Rubber seals
- License light base

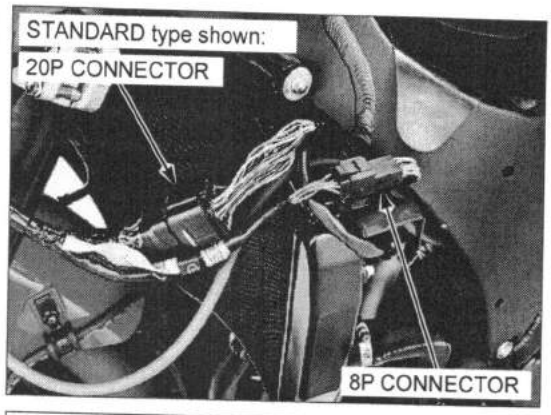
Installation is in the reverse order of removal.



COMBINATION METER

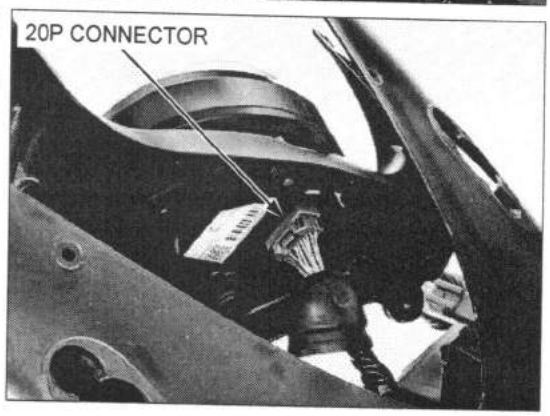
POWER/GROUND LINES INSPECTION ('08 – '11 model)

Remove the upper cowl (page 3-28) with the sub harness 20P (Black) and 8P (Black) connectors connected.



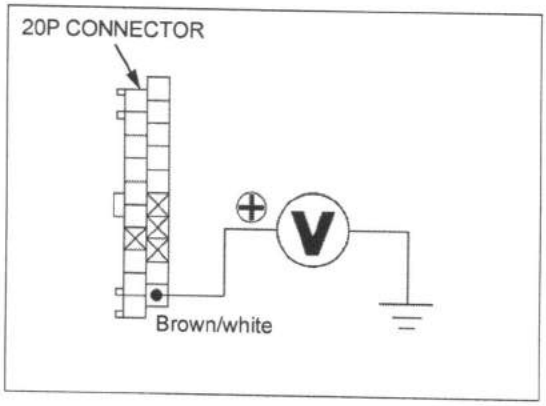
Disconnect the combination meter 20P (Gray) connector.

Check the following at the wire side connector terminals of the combination meter.



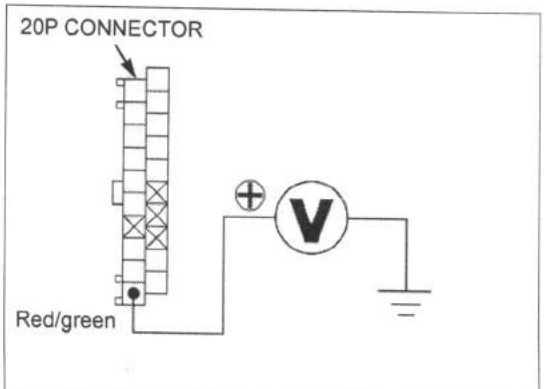
Power input line

Measure the voltage between the Brown/white wire terminal (+) and ground (–).
There should be battery voltage with the ignition switch ON.
If there is no voltage, check the fuse (METER ILL 10 A) and Brown/white wire for a loose connection or an open circuit.



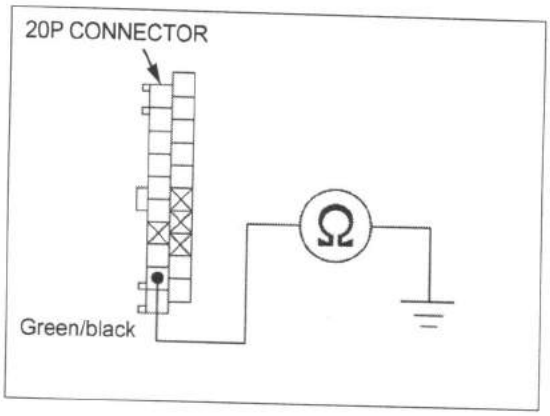
Backup line

Measure the voltage between the Red/green wire terminal (+) and ground (–).
There should be battery voltage.
If there is no voltage, check the fuse (CLOCK 10 A) and Red/green wire for a loose connection or an open circuit.



Ground line

Measure the continuity between the Green/black wire terminal and ground.
There should be continuity.
If there is no continuity, check for open circuit in Green/black wire.

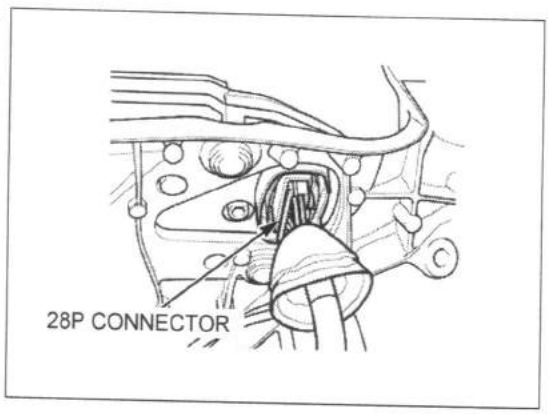


POWER/GROUND LINES INSPECTION (After '11 model)

Support the upper cowl securely to avoid damaging the wire harness.

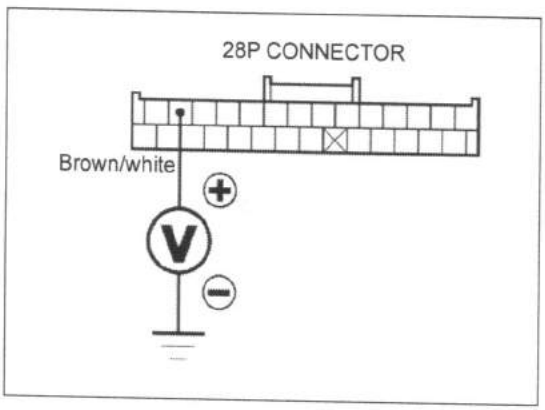
Remove the upper cowl from the stay with all the connector connected (page 3-29).

Disconnect the combination meter 28P (Gray) connector and check the following at the wire harness side connector terminals:



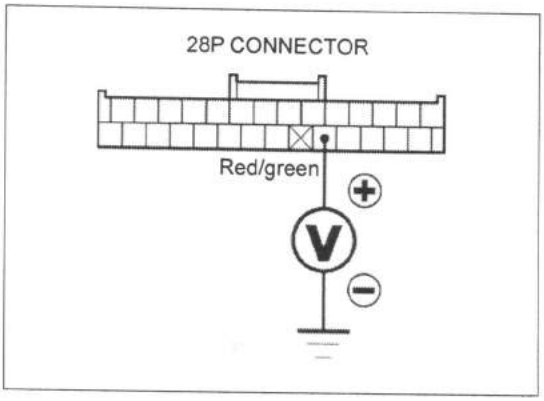
Power Input Line

Measure the voltage between the Brown/white wire terminal (+) and ground (–).
There should be battery voltage with the ignition switch turned ON.
If there is no voltage, check the fuse (METER ILLUMI 10 A) and Brown/white wire for a loose connection or an open circuit.



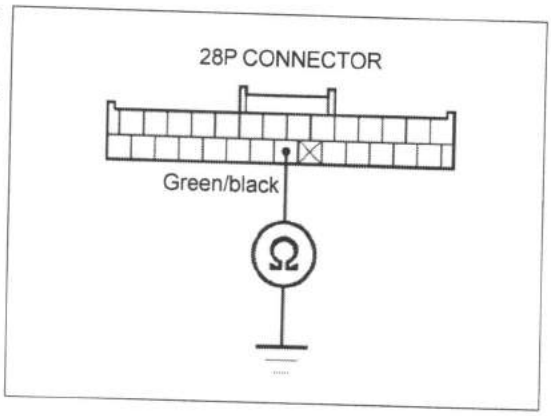
Back-up Line

Measure the voltage between the Red/green wire terminal (+) and ground (–).
There should be battery voltage at all times.
If there is no voltage, check the fuse (CLOCK 10 A) and Red/green wire for a loose connection or an open circuit.



Ground Line

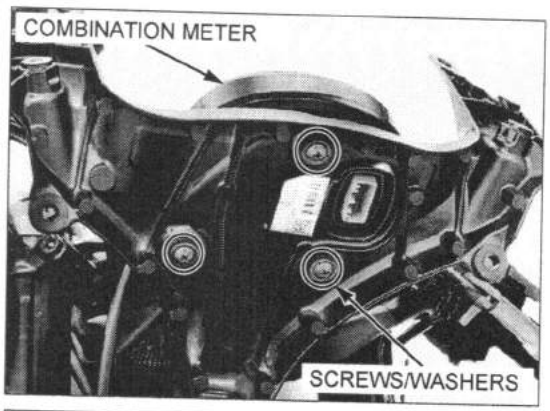
Check for continuity between the Green/black wire terminal and ground.
There should be continuity at all times.
If there is no continuity, check for open circuit in the Green/black wire.



REMOVAL/INSTALLATION

Remove the upper cowl (page 3-28).

Remove the screws, washers, and combination meter.

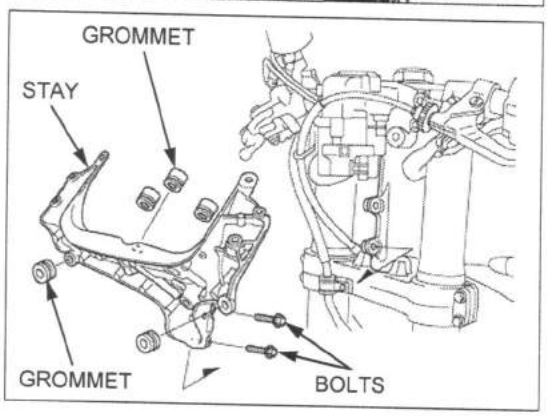


Remove the bolts, combination meter stay, and grommets.

Installation is in the reverse order of removal.

TORQUE:
Combination meter stay mounting bolt:
32 N·m (3.3 kgf·m, 24 lbf·ft)

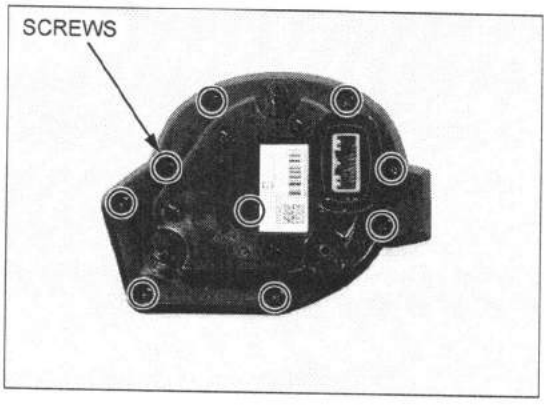
- For horn removal/installation (page 21-32).



DISASSEMBLY/ASSEMBLY

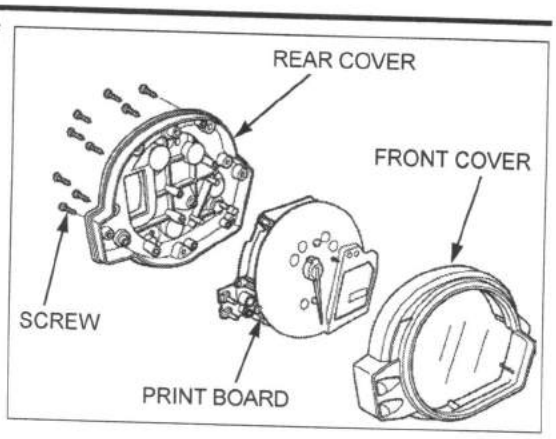
'08 – '11 model

Remove the screws and separate the front cover from the rear cover.



Assemble the combination meter in the reverse order of removal.

TORQUE:
Combination meter screw:
1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)



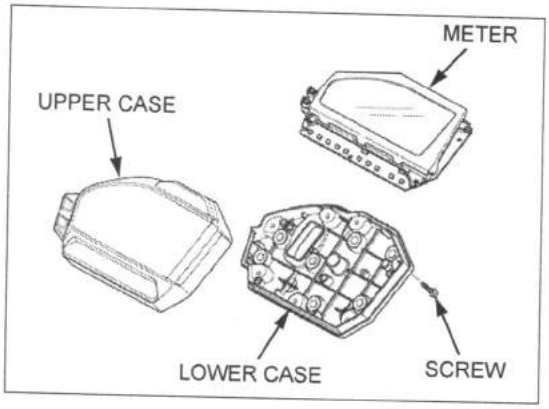
After '11 model

Remove the eight screws.

Place the meter assembly with the lower case down and remove the following:
- upper case
- combination meter (printed circuit board)

Assemble the meter in the reverse order of removal.

TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)



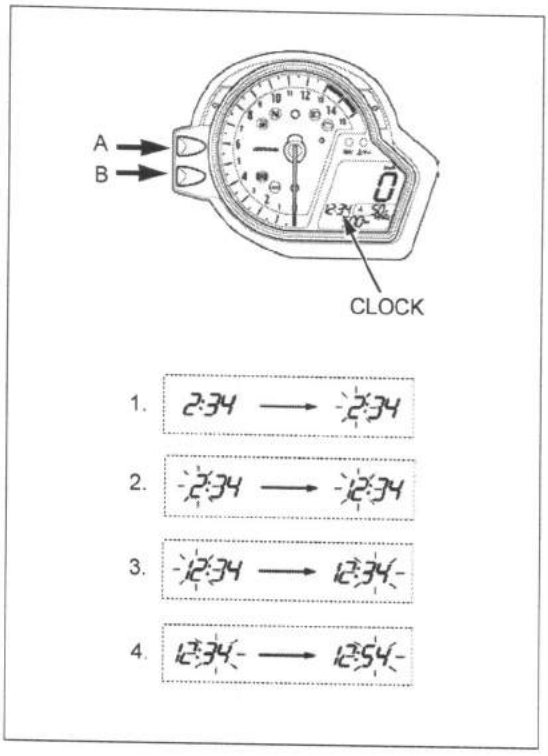
DIGITAL CLOCK SETTING PROCEDURE

'08 – '11 model

Turn the ignition switch ON.

The display will stop flashing automatically and the adjustment will be cancelled if the button is not pressed for about 30 seconds.

1. Press and hold the B button until the hour digits starts flashing.
2. Press the A button until the desired hour is displayed (press and hold to advance the hour faster).
3. Press the B button. The minute digits starts flashing.
4. Press the A button until the desired minute is displayed (press and hold to advance the minute faster).
   Press the B button. The clock is set (the time can also be set by turning the ignition switch OFF).

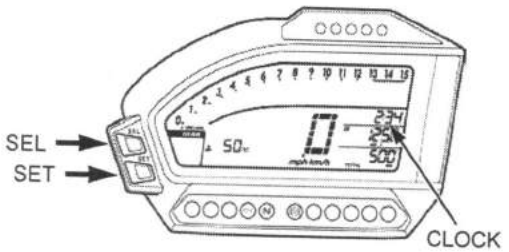


After '11 model

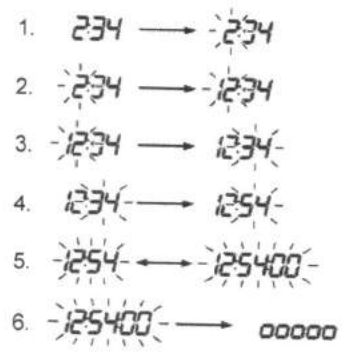
Turn the ignition switch ON.

The control is automatically switched from the setting mode to the ordinary display if the button is not pressed for about 30 seconds.

1. Press and hold the SEL and SET buttons until the hour digits starts flashing.
2. Press the SEL button until the desired hour is displayed (press and hold to advance the hour fast).
3. Press the SET button. The minute digits start flashing.
4. Press the SEL button until the desired minute is displayed (press and hold to advance the minute faster).
5. Press the SET button. The hour and minute digits starts flashing.
   If necessary, press the SEL button to select the second display.
6. Press the SET button. The clock is set, and then the display moves to the backlight brightness adjustment ("ooooo" is indicated).
   Turn the ignition switch OFF.



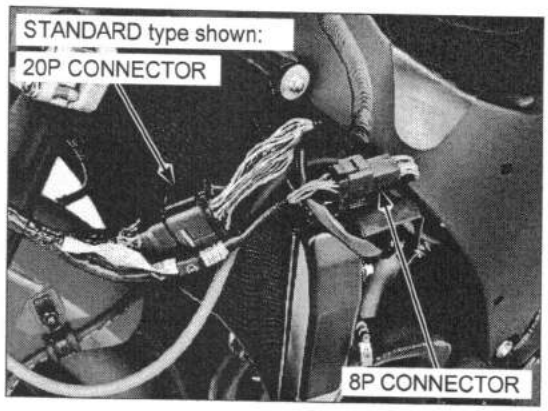
Clock setting display flow:



SPEEDOMETER/VS SENSOR

SYSTEM INSPECTION ('08 – '11 model)

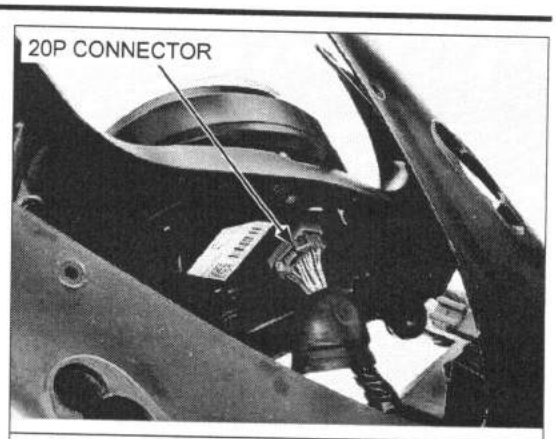
Remove the upper cowl (page 3-28) with the combination meter 20P (Gray), sub harness 20P (Black) and 8P (Black) connectors connected.

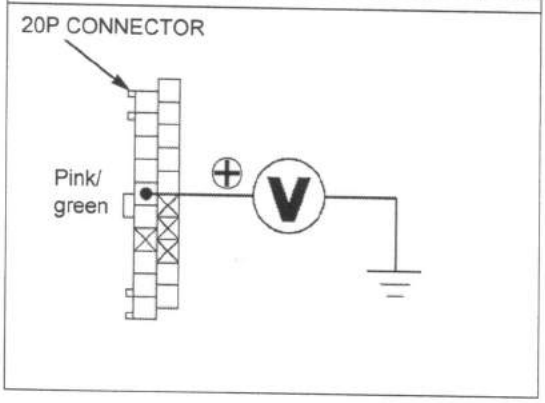


Check that the tachometer and coolant temperature meter function properly.

- Check for loose or poor contact terminals at the combination meter 20P (Gray) and sub harness 20P (Black) connectors.
- If they do not function, perform the power and ground line inspection of the combination meter (page 21-11).
- If they function, shift the transmission into neutral and turn the ignition switch ON.
  Measure the voltage between the Pink/green (+) and ground (–).
  Slowly turn the rear wheel by hand.
  There should be 0 to 5 V pulse voltage.

– If pulse voltage appears, replace the combination meter print circuit board.
– If pulse voltage does not appear, check for open or short circuit in Pink/green wire.
  If the Pink/green wire is OK, check the VS sensor (page 21-16).





VS SENSOR INSPECTION ('08 – '11 model)

Lift and support the fuel tank (page 4-7).

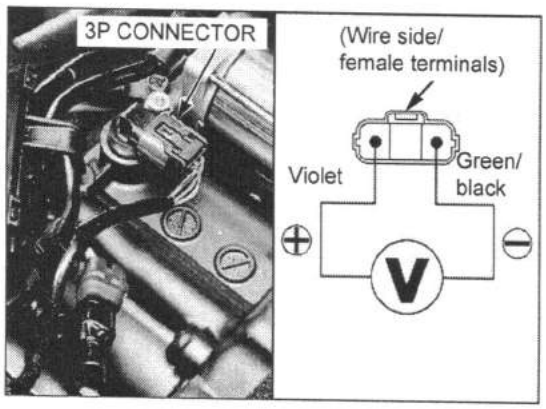
Disconnect the VS sensor 3P ('08 model: Blue, '09 – '11 model: Black) connector and check for loose or poor contact of the connector.

Turn the ignition switch ON and measure the voltage at the 3P ('08 model: Blue, '09 – '11 model: Black) connector at the wire side.

Connection: Violet (+) – Green/black (–)
Standard: 9.5 – 10.5 V

If there is no voltage, check the following:

– Violet wire open circuit
– Green/black wire open circuit
– Combination meter (page 21-11)



SYSTEM INSPECTION (After '11 model)

NOTE:

- Before performing this inspection, check that the ECM has stored the DTC 11-1 (page 6-14). If stored, follow the DTC troubleshooting.

Speedometer does not operate

1. Meter Function Inspection

Check that the tachometer and coolant temperature meter function.

Do they operate normally?

YES – GO TO STEP 2.

NO – Check the power/ground line (page 21-12).

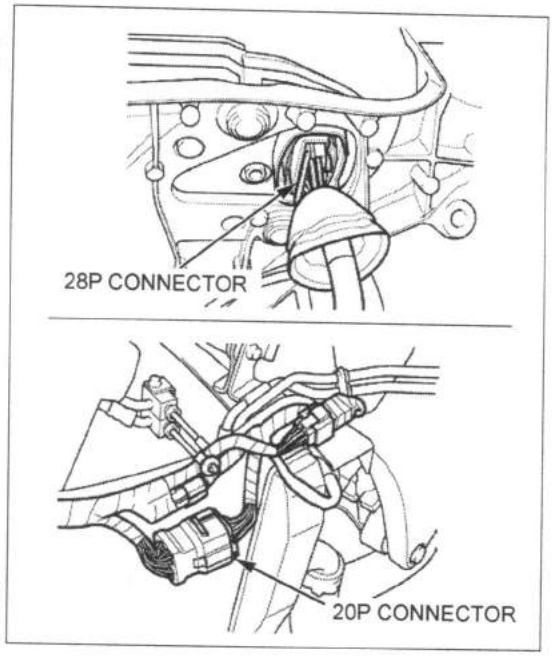
2. **Related Connector Check**

Remove the upper cowl (page 3-29).
Check for loose or poor contact terminals of the meter 28P (Gray) and sub-wire harness 20P (Black) connectors.

Are the connector terminals in good condition?

YES – GO TO STEP 3.

NO – Repair the faulty part.



3. **VS Sensor Pulse Inspection**

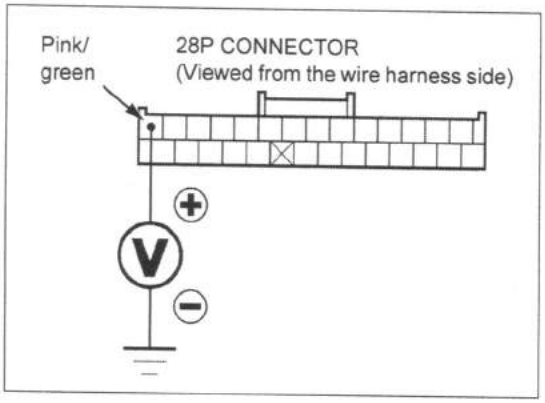
Support the upper cowl securely to avoid damaging the wire harness.

Connect all the sub-wire harness and meter connectors on the upper cowl.
Raise the rear wheel off the ground, shift the transmission into neutral and turn the ignition switch ON.
Measure the voltage between the Pink/green wire terminal (+) of the meter 28P connector and ground (–) while slowly turning the rear wheel by hand.

Is there 0 to 5 V pulse voltage?

YES – Replace the combination meter.

NO – Open or short circuit in Pink/green wire between the meter and VS sensor. If wire is OK, faulty VS sensor.



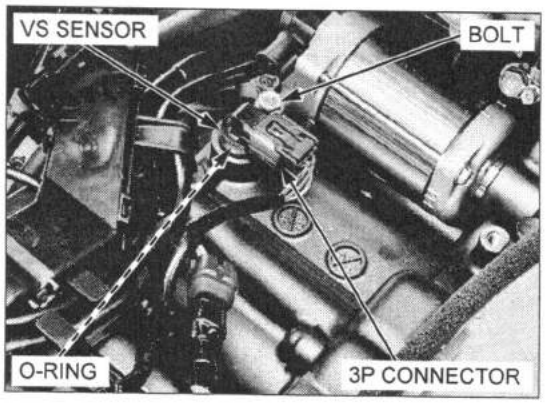
REMOVAL/INSTALLATION

Lift and support the fuel tank (page 4-7).

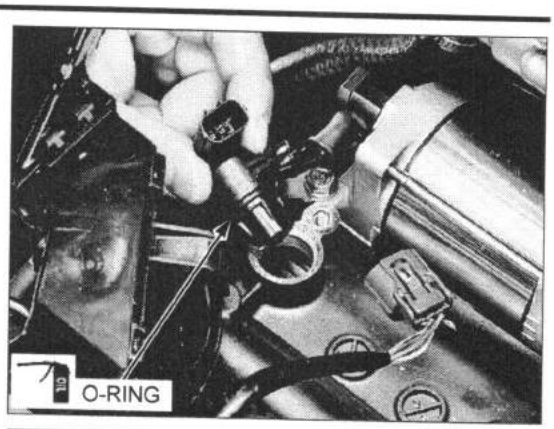
(AC) type: Remove the EVAP purge control solenoid valve (page 6-96).

Disconnect the VS sensor 3P ('08 model: Blue, After '08 model: Black) connector.

Remove the bolt, VS sensor and O-ring.



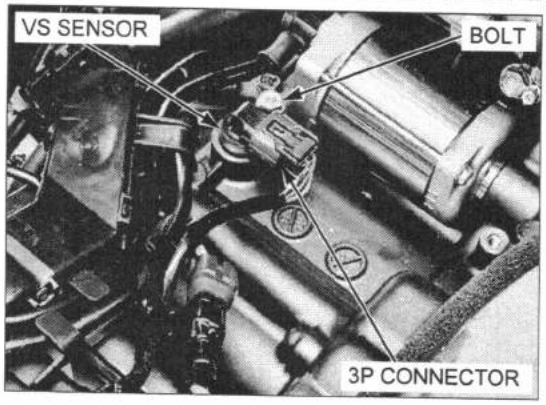
Apply oil to the O-ring and install it to the VS sensor. Install the VS sensor to the crankcase.



Tighten the VS sensor mounting bolt securely and connect the VS sensor 3P ('08 model: Blue, After '08 model: Black) connector.

(AC) type: Install the EVAP purge control solenoid valve (page 6-96).

Remove the support and close the fuel tank (page 4-9).



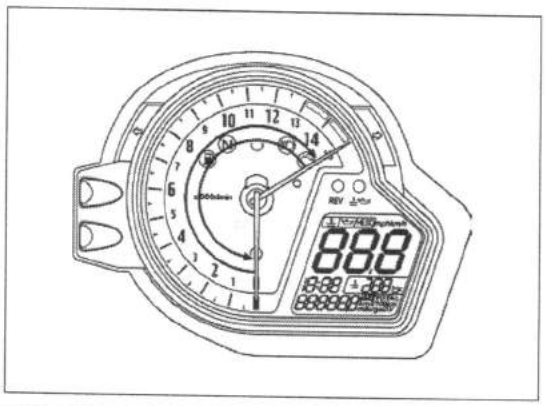
TACHOMETER

SYSTEM INSPECTION ('08 – '11 model)

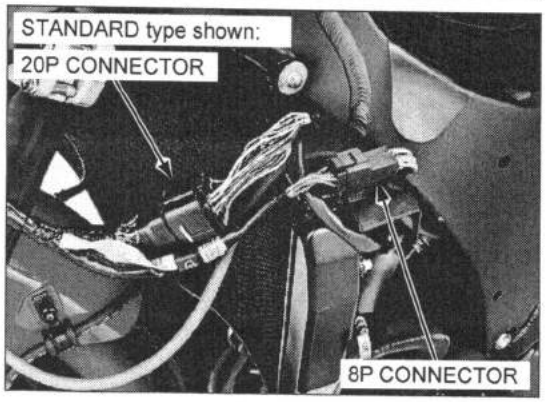
- Check for loose or poor contact terminals at the combination meter 20P (Gray) and sub harness 20P (Black) connectors.

Turn the ignition switch ON, check that the tachometer needle moves to full scale and then returns to zero.

If the needle does not show initial function, check the combination meter power input line (page 21-11).



Remove the upper cowl (page 3-28) with the combination meter 20P (Gray), sub harness 20P (Black) and 8P (Black) connectors connected.



Connect the peak voltage adaptor to the combination meter terminal and ground.

TOOL:

IgnitionMate peak voltage tester	**MTP07-0286 (U.S.A. only) or**
Peak voltage adaptor	**07HGJ-0020100 (Not available in U.S.A.)**

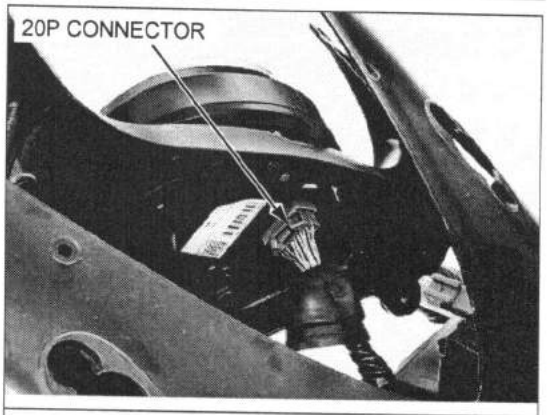
with commercially available digital multimeter (impedance 10 M /DCV minimum)

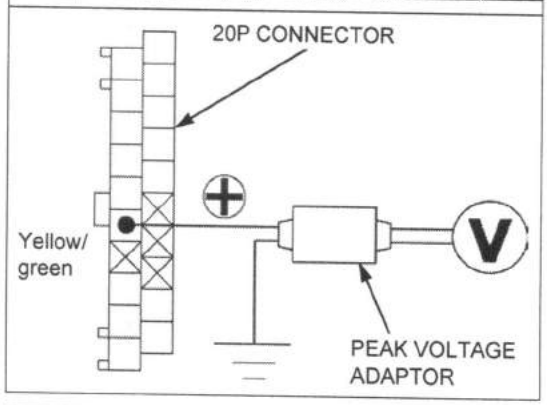
Connection: Yellow/green (+) – Ground (–)

Start the engine and measure the tachometer input peak voltage.

PEAK VOLTAGE: 10.5 V minimum

If the peak voltage is normal, replace the combination meter printed circuit board (page 21-13).
If the measured value is below 10.5 V, replace the ECM (page 6-84).





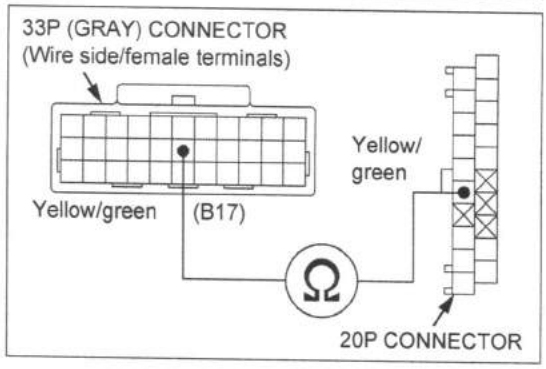
If the value is 0 V, check for continuity between the combination meter 20P (Gray) connector and ECM 33P (Gray) connector Yellow/green terminals.

TOOL:

Test probe (2 required)	**07ZAJ-RDJA110**

Connection: B17 – Yellow/green

If there is no continuity, check the wire harness and combination meter sub harness for an open circuit.
If there is continuity, replace the ECM (page 6-84).



SYSTEM INSPECTION (After '11 model)

Tachometer does not operate

1. Meter Function Inspection

Check that the speedometer and coolant temperature meter function.

Do they operate normally?

YES – GO TO STEP 2.

NO – Check the power/ground line (page 21-12).

2. Tachometer Signal Voltage Inspection

Support the upper cowl securely to avoid damaging the wire harness.

Remove the upper cowl from the stay with the front sub-wire harness connectors connected (page 3-29).
Connect the peak voltage tester or adaptor probes to the Yellow/green terminal (+) of the meter 28P connector terminal and ground (–).

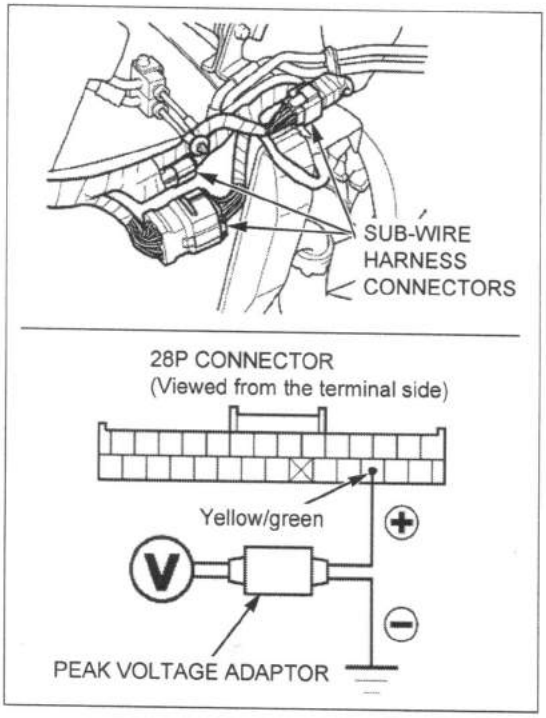
TOOL:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 M /DCV minimum)

Start the engine and measure the tachometer signal peak voltage.

Is there 10.5 V or more?

YES – Replace the combination meter.

NO – • Less than 10.5 V: Faulty ECM
• No voltage: GO TO STEP 3.



3. Signal Line Open Circuit Inspection

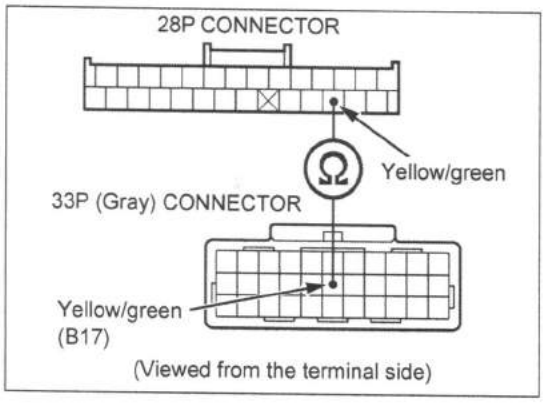
Disconnect the ECM 33P (Gray) connector (page 6-11).
Check the Yellow/green wire for continuity between the meter 28P connector and ECM 33P (Gray) connector terminals.

TOOL:
Test probe (2 required) 07ZAJ-RDJA110

Is there continuity?

YES – GO TO STEP 4.

NO – Open circuit in the Yellow/green wire.



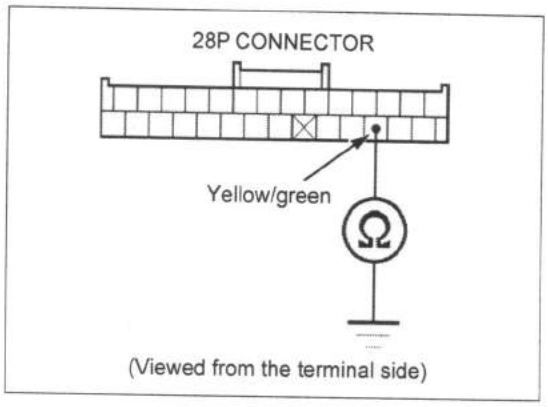
4. **Signal Line Short Circuit Inspection**

Check the Yellow/green wire for continuity between the meter 28P connector and ground.

Is there continuity?

YES – Short circuit in the Yellow/green wire.

NO – • Loose or poor contact of the related connector terminals.
• Replace the ECM with a known-good one and recheck.



ECT SENSOR

INSPECTION

Remove the ECT sensor (page 6-79).

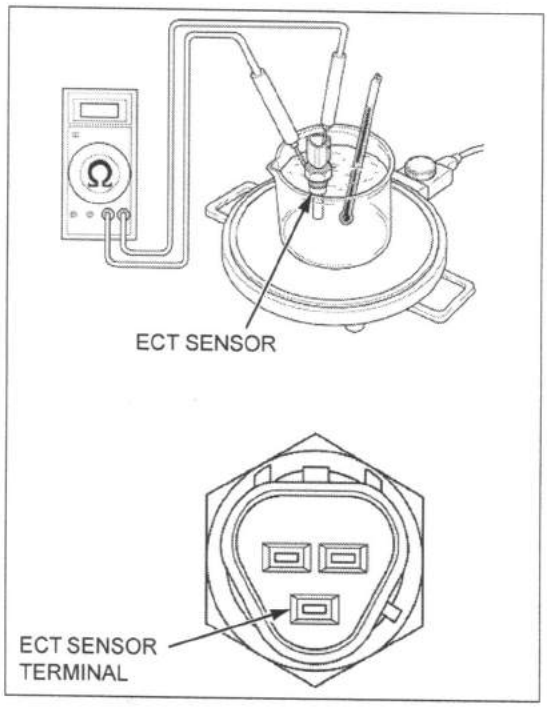
Suspend the ECT sensor in a pan of coolant (1:1 mixture) on an electric heating element and measure the resistance through the sensor as the coolant heats up.

- Soak the ECT sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT sensor touch the pan.

Replace the sensor if it is out of specification by more than 10% at any temperature listed.

Temperature	50 C (122 F)	80 C (176 F)
Resistance	6.8 – 7.4 k	2.1 – 2.7 k

Install the ECT sensor (page 6-80).

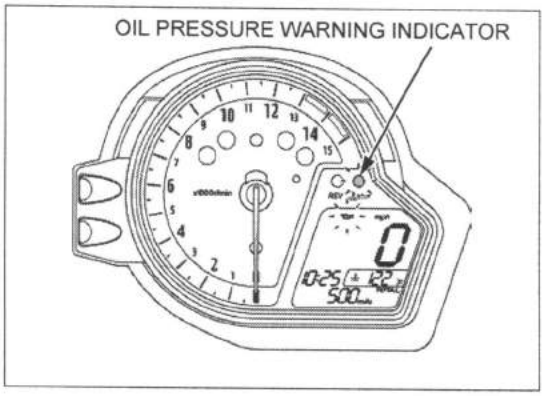


EOP SWITCH

INSPECTION ('08 – '11 model)

If the oil pressure warning indicator stays on while the engine is running, check the engine oil level before this inspection.

Make sure that the oil pressure warning indicator comes on with the ignition switch ON.



If the indicator does not come on, inspect as follows:

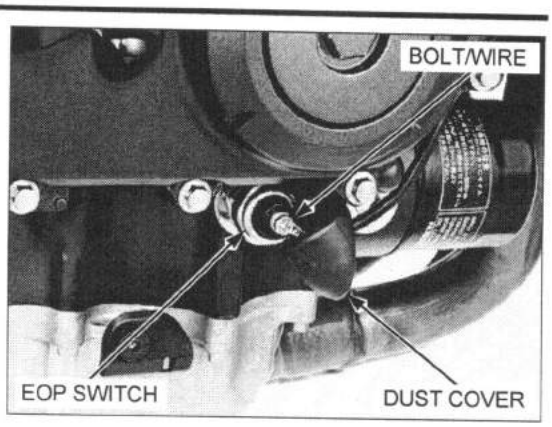
Remove the lower cowl (page 3-16).

Remove the dust cover, terminal bolt and wire.

Short the EOP switch wire to ground.
The engine oil pressure indicator comes on when the ignition switch is ON.
If the light does not come on, check the sub fuse (CLOCK 10 A) and wires for a loose connection or an open circuit.

Start the engine and make sure the indicator goes out.
If the indicator does not go out, check the oil pressure (page 5-5).
If the oil pressure is normal, replace the EOP switch (page 21-23).

Install the lower cowl (page 3-16).



INSPECTION (After '11 model)

NOTE:

- The oil pressure indicator should come on when the ignition switch is turned ON with the engine stopped and goes off while the engine is running in normal operating pressure.

Indicator does not come on when the ignition switch is turned ON

Remove the dust cover, and disconnect the switch wire by removing the terminal bolt (page 21-23).

Ground the wire terminal with a jumper wire.

Turn the ignition switch ON and check the oil pressure indicator. The indicator should come on.

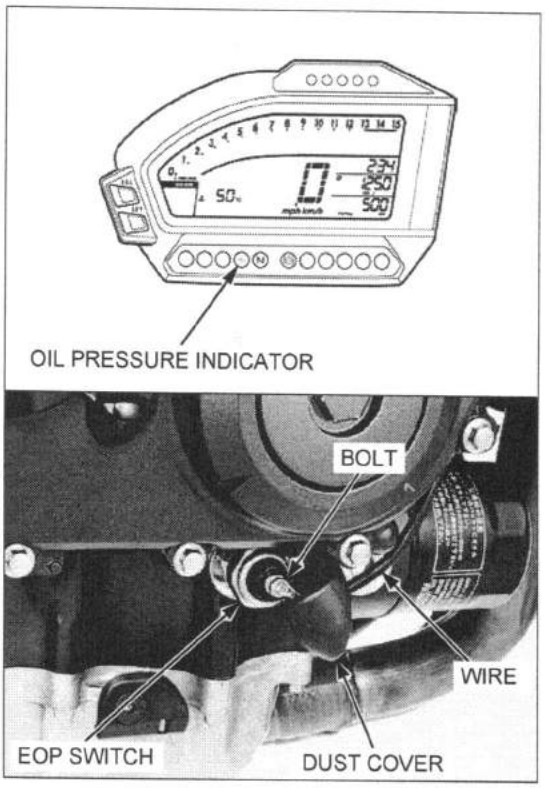
- If the indicator comes on, replace the EOP switch.
- If the indicator does not come on, check for an open circuit in the Black and Blue/red wires between the switch and combination meter. If wires are OK, replace the combination meter.

Indicator stays on while the engine is running

Check the engine oil pressure (page 5-5). If it is normal, inspect as follows.

Start the engine with the EOP switch wire disconnected and check the oil pressure indicator.

- If the indicator does not come on, replace the EOP switch.
- If the indicator stays on, check for a short circuit in the Black and Blue/red wires between the switch and combination meter. If wires are OK, replace the combination meter.

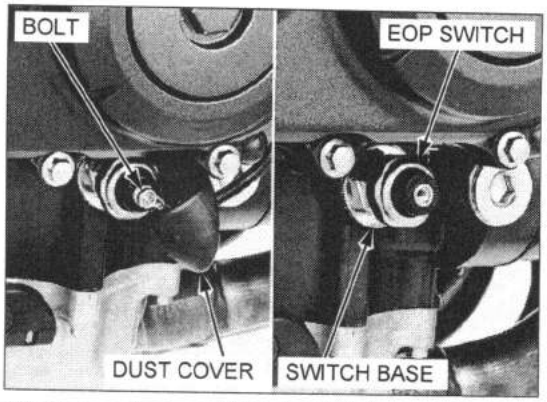


REMOVAL/INSTALLATION

Remove the lower cowl (page 3-16).

Remove the dust cover.

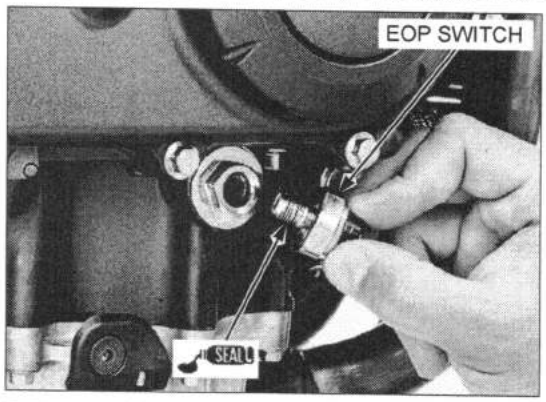
Remove the bolt and disconnect the EOP switch wire.
Remove the EOP switch while holding the switch base.



Apply sealant (TB 1207B or equivalent) to the EOP switch threads.

Tighten the EOP switch to the specified torque while holding the switch base.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the EOP switch wire terminal and tighten the bolt to the specified torque.

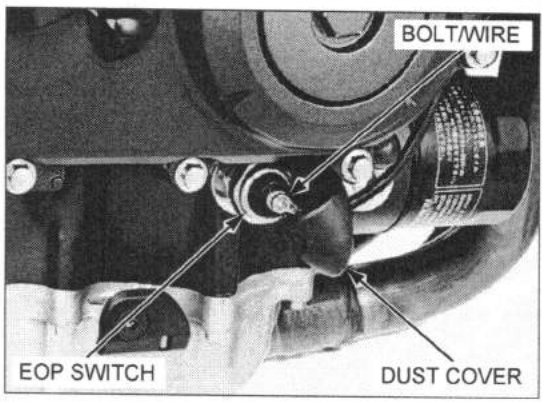
TORQUE: 2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Install the dust cover.

Start the engine and check that there are no oil leaks.

Check the engine oil level (page 4-20).

Install the lower cowl (page 3-16).



FUEL RESERVE SENSOR

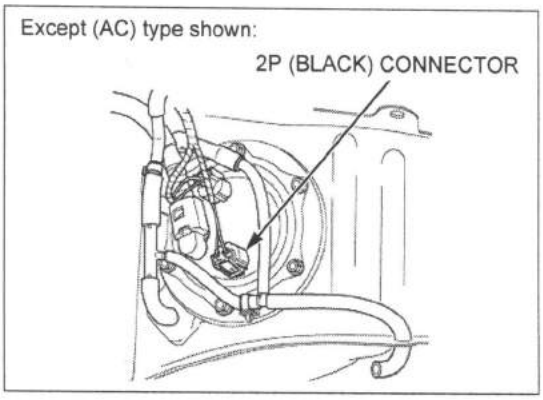
INSPECTION

Fuel reserve indicator does not go off

Lift and support the fuel tank (page 4-7).

Disconnect the fuel reserve sensor 2P (Black) connector.
Turn the ignition switch ON and check the fuel reserve indicator.

If the indicator goes off, replace the fuel pump unit (page 6-57).
If the indicator is still on, check for short circuit in Brown/black wire between the fuel reserve sensor 2P (Black) and combination meter 20P (Gray) connector.



Fuel reserve indicator does not come on

Before this inspection, perform the power and ground line inspection of the combination meter (page 21-11).

Disconnect the fuel reserve sensor 2P (Black) connector (page 21-23).

Always use an appropriate jumper wire to prevent damage to the connector terminals.

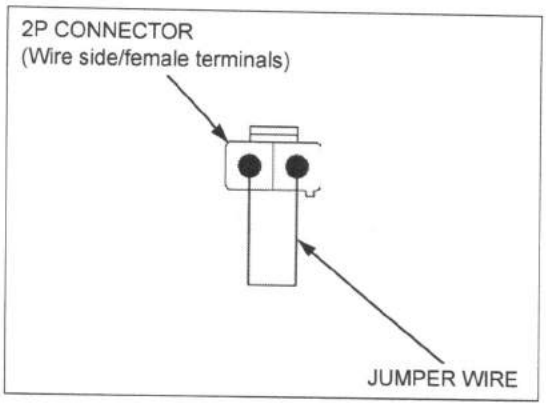
Connect the fuel reserve sensor 2P (Black) connector at the wire side with a jumper wire.

Connection: Brown/black – Green

Turn the ignition switch ON and check the indicator.

If the indicator comes on, replace the fuel pump unit (page 6-57).
If the indicator does not come on, check for open circuit in Brown/black wire between the fuel reserve sensor 2P (Black) and combination meter 20P (Gray) connector, green wire and ground.

If the wire harness is normal, replace the combination meter (page 21-13).



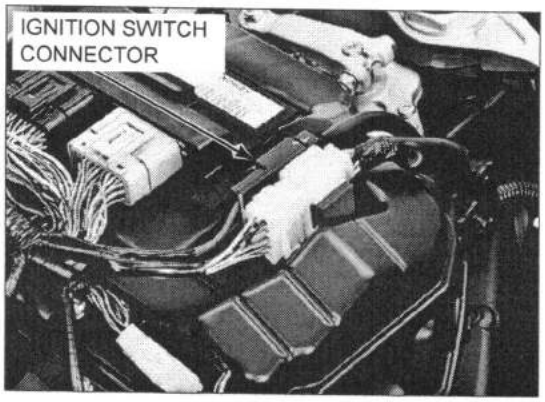
IGNITION SWITCH

INSPECTION

Lift and support the fuel tank (page 4-7).

Disconnect the ignition switch (STANDARD/SP type: 2P Brown, ABS type: 3P Brown) connector.

Check for continuity between the wire terminals of the ignition switch connector in each switch position.
Continuity should exist between the color coded wires as follow:



STANDARD/SP type:

	BAT1	IG	KEY
ON	○	○	KEY ON
OFF			KEY OFF
LOCK			KEY OFF LOCK PIN
COLOR	R	R/Bl	

ABS type:

	BAT1	IG	ABS IG	KEY
ON	○	○	○	KEY ON
OFF				KEY OFF
LOCK				KEY OFF LOCK PIN
COLOR	R	R/Bl	O/R	

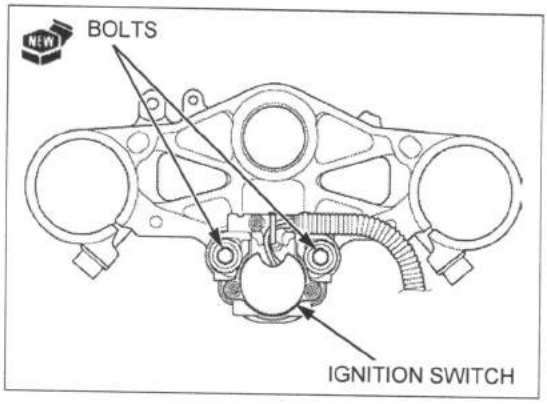
REMOVAL/INSTALLATION

Remove the top bridge (page 14-12).

Install the ignition switch to the top bridge.
Tighten new ignition switch mounting bolts to the specified torque.

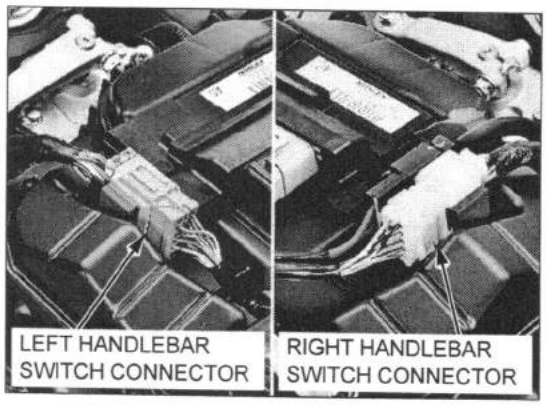
Installation is in the reverse order of removal.

TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)



HANDLEBAR SWITCHES

Lift and support the fuel tank (page 4-7).
Disconnect the handlebar switch connectors.



RIGHT SIDE

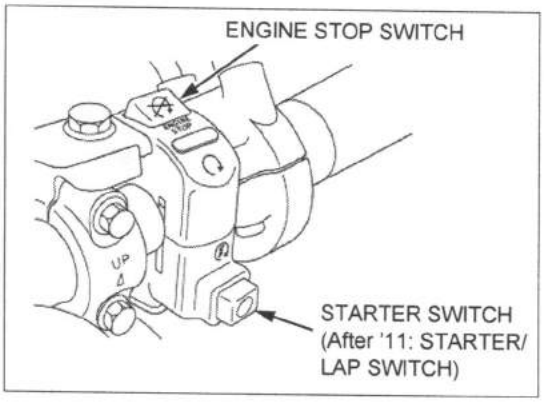
Check for continuity between the wire terminals of the handlebar switch connector.
Continuity should exist between the color coded wire terminals as follows:

ENGINE STOP SWITCH

	IG	BAT4
⊗		
⊖	○—○	
COLOR	Bl	W/Bl

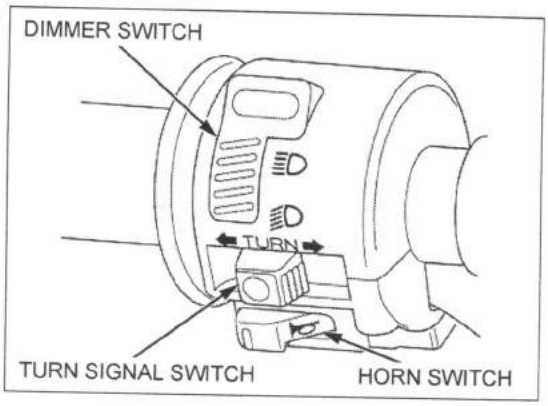
STARTER SWITCH

	BAT5	ST
FREE		
PUSH	○—○	
COLOR	Bl/R	Y/R



LEFT SIDE

Check for continuity between the wire terminals of the handlebar switch connector.
Continuity should exist between the color coded wire terminals as follows:



TURN SIGNAL SWITCH

	W	R	L
⇨	○—○		
N			
⇦	○		○
COLOR	Gr	Lb	O

HORN SWITCH

	Ho	BAT3
FREE		
PUSH	○—○	
COLOR	Bl/Gr	W/G

DIMMER SWITCH

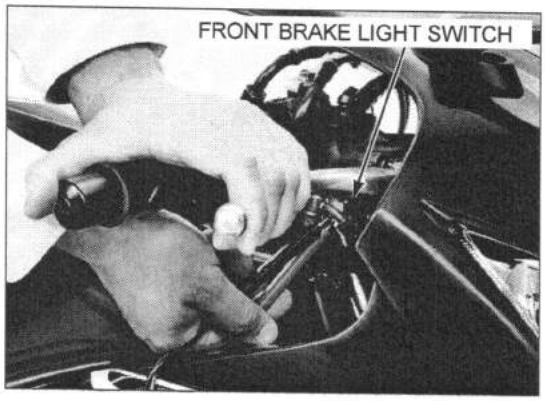
	HL	Lo	Hi
≡D			
(N)			
≡D	○		○
COLOR	Bu/W		Bu

BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors and check for continuity between the terminals.

There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.



REAR

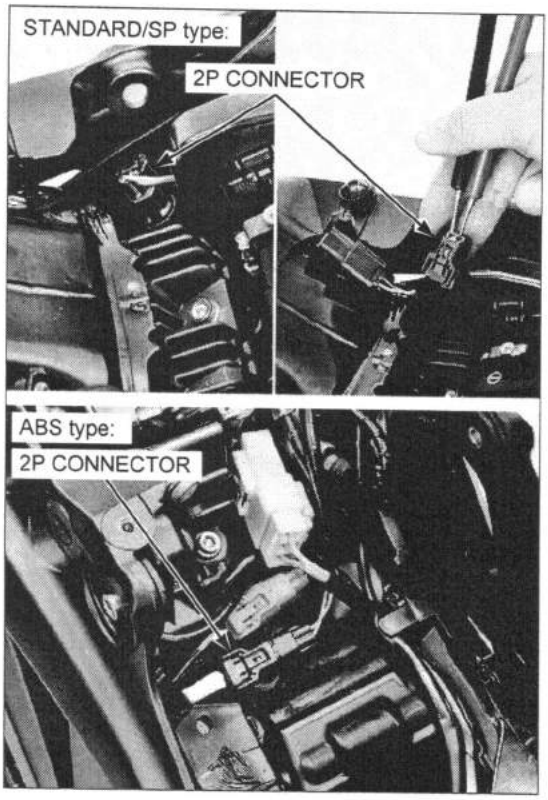
STANDARD/ SP type: Remove the seat (page 3-7).

ABS type: Remove the fuel tank (page 6-60).

Disconnect the rear brake light switch 2P (Black) connector.

Check for continuity between the terminals.

There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.

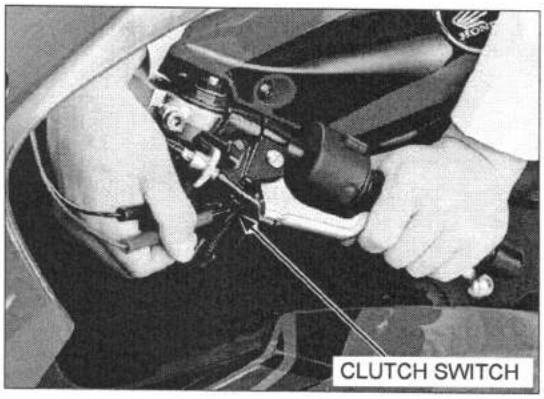


CLUTCH SWITCH

INSPECTION

Disconnect the clutch switch connectors.

There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever is released.



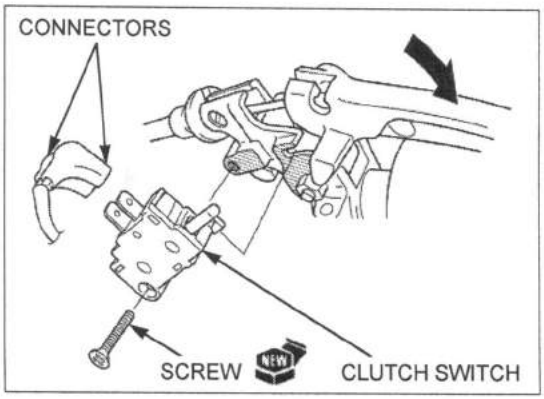
REMOVAL/INSTALLATION

Disconnect the clutch switch connectors.
Remove the clutch switch mounting screw.
Apply the clutch lever and remove the clutch switch.

Apply the clutch lever and install the clutch switch as shown.
Tighten a new clutch switch mounting screw to the specified torque.

TORQUE: 0.6 N·m (0.1 kgf·m, 0.4 lbf·ft)

Connect the clutch switch connectors.



NEUTRAL SWITCH ('08 – '11 model)

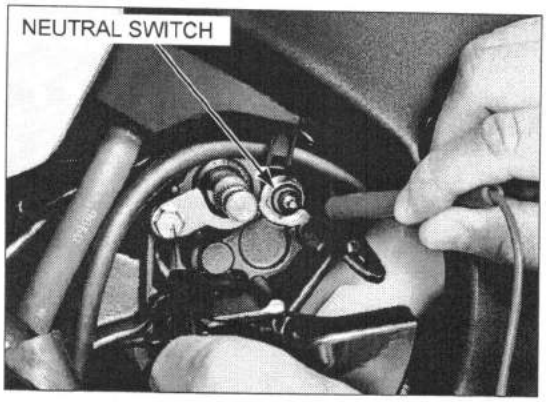
INSPECTION

ABS type: Remove the left rear under cover (page 3-24).

Disconnect the neutral switch connector from the switch.

Shift the transmission into neutral and check for continuity between the neutral switch terminal and ground.

There should be continuity with the transmission in neutral, and no continuity when the transmission is in gear.



REMOVAL/INSTALLATION

ABS type: Remove the left rear under cover (page 3-24).

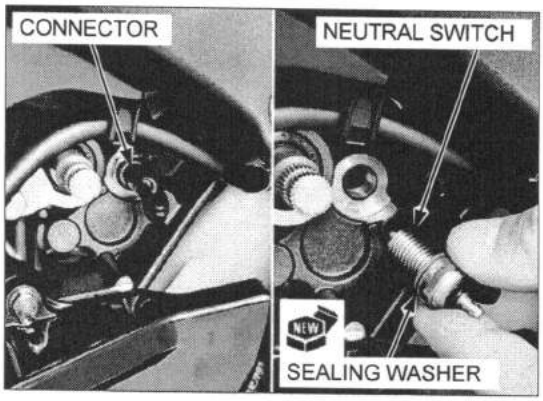
Disconnect the neutral switch connector.
Remove the neutral switch and sealing washer.

Install a new sealing washer and tighten the neutral switch to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the neutral switch connector securely.

ABS type: Install the left rear under cover (page 3-24).



GEAR POSITION SWITCH (After '11 model)

INSPECTION

NOTE:

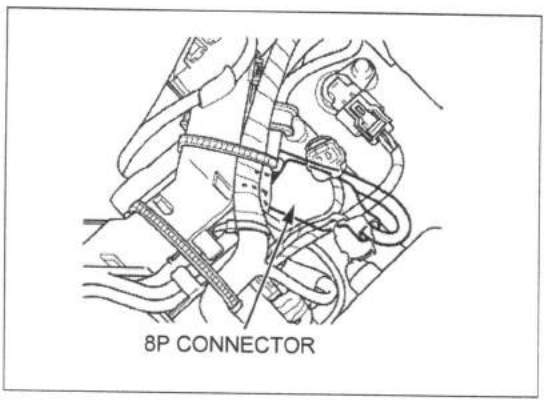
- When malfunction occurs in the gear position switch or its circuit, the gear position indicator blinks "–" constantly.

Remove the fuel tank (page 6-60).

Disconnect the gear position switch 8P (Black) connector in the connector boot.

Check for continuity at the switch side connector terminals.
There should be continuity in each gear position as follows.

Gear position	Connection
1st	Brown – ground
Neutral	Light green – ground
2nd	Red – ground
3rd	Black/yellow – ground
4th	Yellow – ground
5th	Black – ground
6th	Blue – ground



REMOVAL/INSTALLATION

Shift the transmission into neutral and remove the following (page 4-33).

- STANDARD/SP type: gearshift arm
- ABS type: drive sprocket cover and guide plate

Disconnect the gear position switch 8P (Black) connector (page 21-29).

Release the switch wire out of the frame.

Remove the bolt and the position switch. Remove the O-ring.

Coat a new O-ring with engine oil and install it into the switch groove.

Align the long end of the switch pin with the paint mark on the switch body (neutral position).

Take care not to damage the switch pin.

Be sure the transmission is in neutral and install the gear position switch.

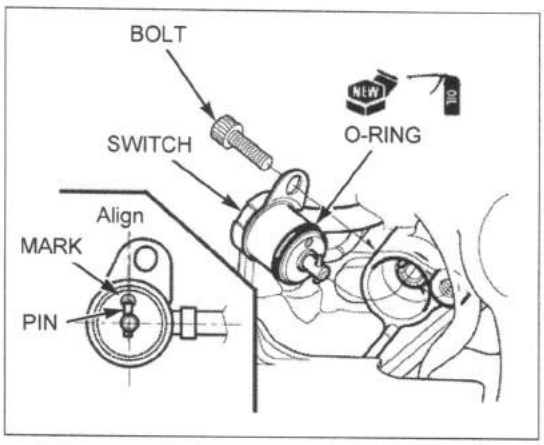
Install the bolt and tighten it.

Route the switch wire properly and connect the 8P connector (page 1-66).

Install the following.

- STANDARD/SP type: gearshift arm (page 4-34)
- ABS type: guide plate and drive sprocket cover (page 4-34)

Install the fuel tank (page 6-61).



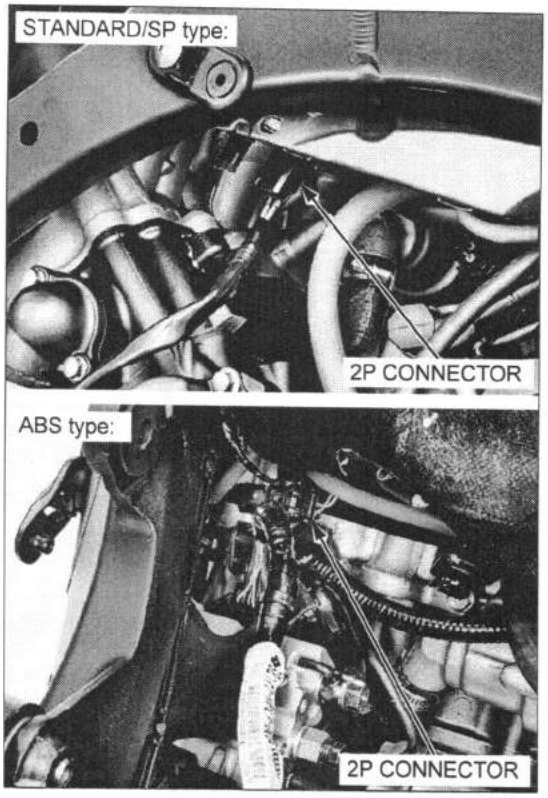
SIDESTAND SWITCH

INSPECTION

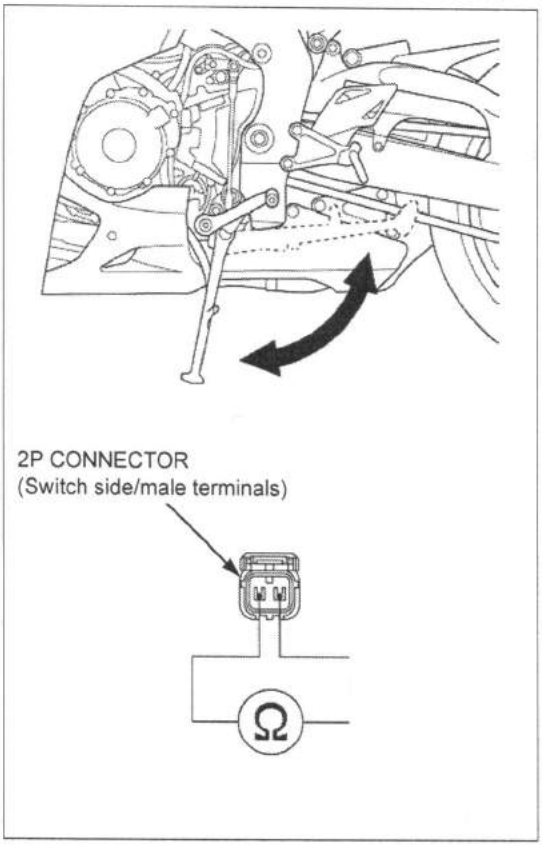
STANDARD/ SP type: Remove the left middle cowl (page 3-18).

ABS type: Lift and support the fuel tank (page 4-7).

Disconnect the sidestand switch 2P (Green) connector.



Check for continuity between the wire terminals of the sidestand switch 2P (Green) connector.
Continuity should exist only when the sidestand is up.

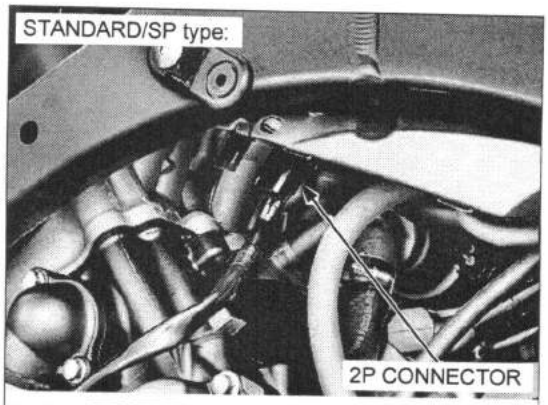


REMOVAL/INSTALLATION

STANDARD/ SP type: Remove the left middle cowl (page 3-18).

ABS type: Lift and support the fuel tank (page 4-7).

Disconnect the sidestand switch 2P (Black) connector.





Remove the bolt and sidestand switch.

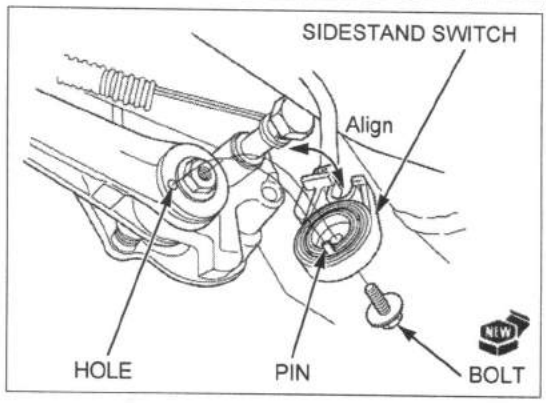
Correctly route the wire (page 1-25).

Installation is in the reverse order of removal.

Replace the sidestand switch mounting screw with a new one.

TORQUE:
Sidestand switch mounting bolt:
10 N·m (1.0 kgf·m, 7 lbf·ft)

- Align the sidestand switch pin with the hole.
- Align the sidestand switch groove with the return spring holding pin.

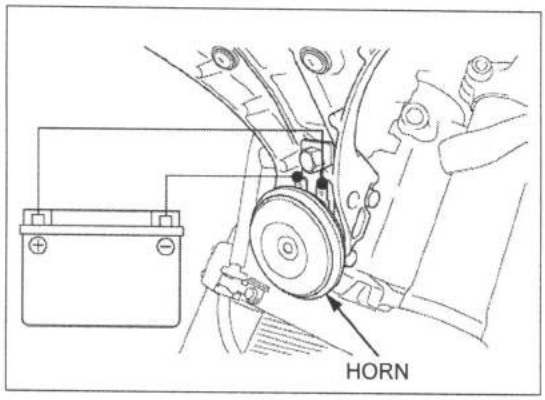


HORN

INSPECTION

Remove the upper cowl (page 3-28).

Connect a 12 V battery to the horn terminal directly.
The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



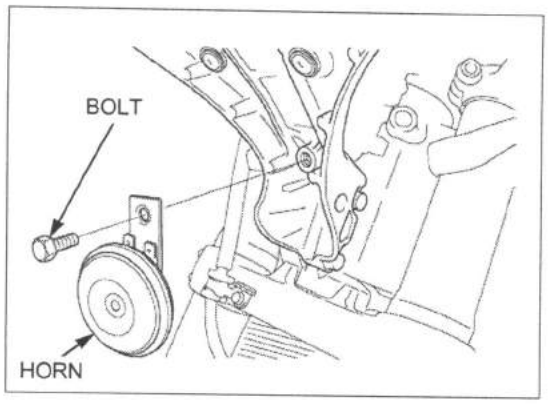
REMOVAL/INSTALLATION

Remove the upper cowl (page 3-28).

Remove the bolt and horn.

Correctly route the wire (page 1-25).

Installation is in the reverse order of removal.



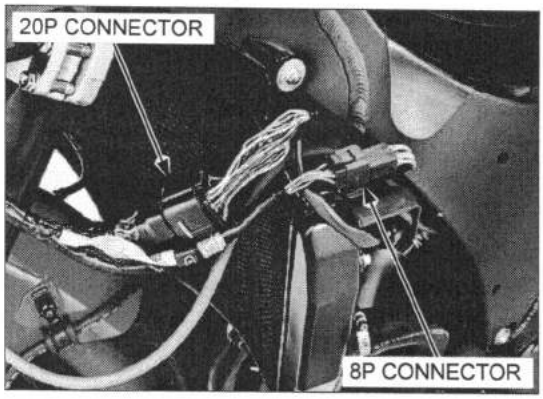
TURN SIGNAL RELAY

INSPECTION

1. Related Circuit Inspection

Support the upper cowl securely.

Remove the upper cowl (page 3-28) with sub harness 20P (Black) and 8P (Black) connectors connected.



Check the following:

- Burned bulb or non-specified wattage
- Blown fuse (MAIN 30 A, STOP/HORN 10 A)
- Ignition switch (page 21-24) and turn signal switch (page 21-26) function
- Loose or poor contact of the connector terminals

Are the above items in good condition?

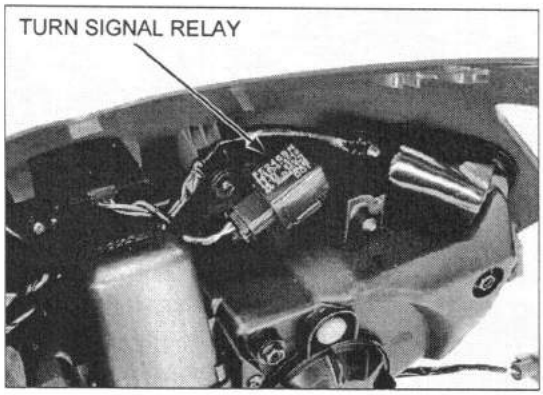
NO – Replace or repair the failed part(s).

YES – GO TO STEP 2.

2. Turn Signal Circuit Inspection

Remove the turn signal relay from the stay and disconnect the relay connector.
Short the connector terminals with a jumper wire.

Connection: White/green – Gray



Turn the ignition switch ON and check the turn signal light by operating the turn signal switch.

Do the lights come on?

YES – • '08 – '11 model: Faulty turn signal relay
• After '11 model: GO TO STEP 3.

NO – Open circuit in White/green or Gray wires

3. Relay Ground Circuit Inspection (After '11)

Check for continuity Green wire terminal of the relay connector and ground.

Is there continuity?

YES – Faulty turn signal relay

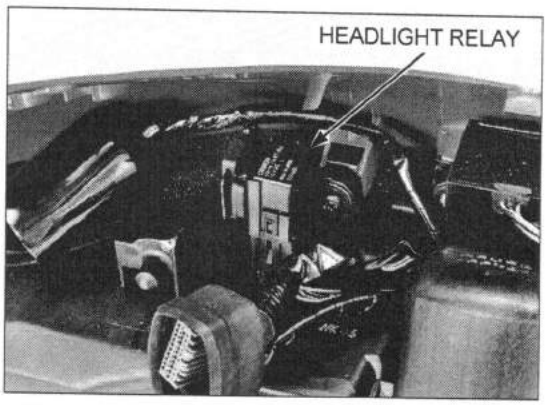
NO – Open circuit in Green wire

HEADLIGHT RELAY

INSPECTION

Remove the upper cowl (page 3-28).

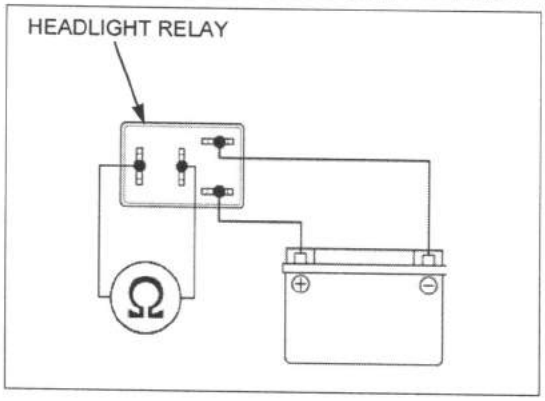
Remove the headlight relay.



Connect an ohmmeter to the headlight relay connector terminals.

Connect a 12 V battery to the following headlight relay connector terminals as shown.

There should be continuity only when the 12 V battery is connected.
If there is no continuity when the 12 V battery is connected, replace the headlight relay.



LAP TIMER (After '11 model)

INSPECTION

NOTE:

- The starter switch is used for timer operation as well as for starting the engine. These two functions of the switch are changed automatically depending upon the mode of the combination meter. The change is made via the lap relay.

Lap timer cannot be operated with the starter/lap switch

1. Switch Signal Input Voltage Inspection

Support the upper cowl securely to avoid damaging the wire harness.

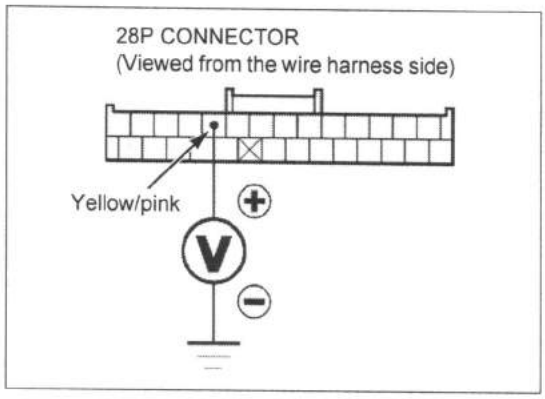
Remove the upper cowl from the stay with all the connector connected (page 3-29).
Start the engine. Turn the combination meter to the lap time mode (by pressing the SEL and SET buttons at the same time).
Measure the voltage between the Yellow/pink wire terminal (+) of the meter 28P (Gray) connector and ground (–) while operating the starter/lap switch.

- Switch released: Less than 6 V
- Switch pushed: 10 – 16 V

Are the voltages within the specified value?

YES – The input signal is OK. Check for loose or poor contact of the related connector terminals.

NO – GO TO STEP 2.



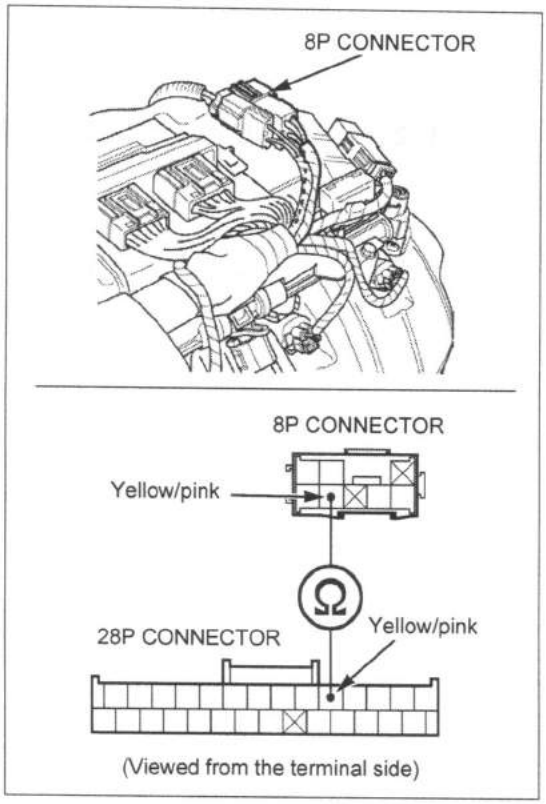
2. Switch Signal Input Line Continuity Inspection

Turn the ignition switch OFF.
Disconnect the right handlebar switch 8P (White) connector (page 21-25).
Disconnect the meter 28P connector.
Check the Yellow/pink wire for continuity between the wire harness side switch 8P and meter 28P connectors.

Is there continuity?

YES – Replace the combination meter with a new one and recheck.

NO – Open circuit in Yellow/pink wire between the starter/lap switch and combination meter.



Starter motor turns when pressing the starter/lap switch for lap timer operating with the engine running (Lap timer does not operate)

1. Lap Relay Inspection

Check the lap relay (page 21-35).

Is the relay normal?

NO – Faulty lap relay (stuck off).

YES – GO TO STEP 2.

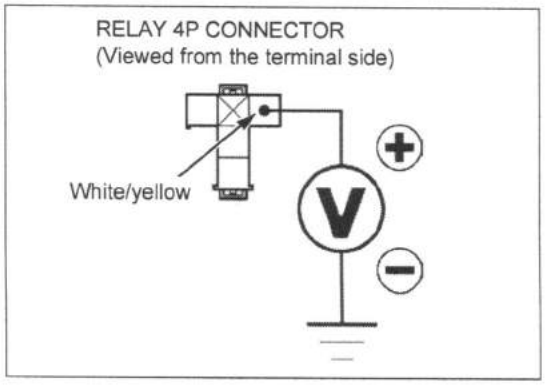
2. Lap Relay Coil Input Voltage Inspection

Turn the ignition switch ON.
Measure the voltage between the White/yellow wire terminal (+) of the lap relay 4P connector and ground (–).

Is there battery voltage?

YES – GO TO STEP 3.

NO – Open circuit in White/yellow wire between the fuse/relay box and relay.



3. Lap Relay Coil Output Voltage Inspection

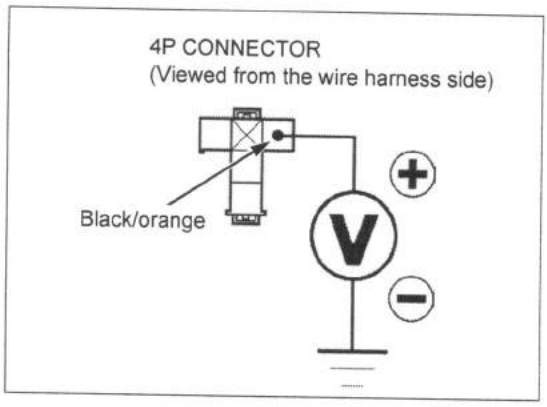
Install the lap relay onto the connector.
Start the engine.
Measure the voltage between the Black/orange wire terminal (+) of the lap relay 4P connector and ground (–) while operating the SEL and SET buttons at the same time.

- Ordinary mode: Less than 2 V
- Lap time mode: 10 – 16 V

Are the voltages within the specified value?

YES – The relay coil output voltage is OK. Check for loose or poor contact of the related connector terminals.

NO – GO TO STEP 4.



4. Lap Relay Coil Output Line Inspection

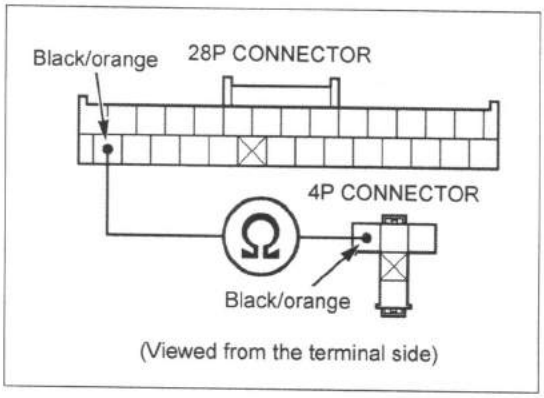
Support the upper cowl securely to avoid damaging the wire harness.

Turn the ignition switch OFF.
Remove the upper cowl from the stay with all the connector connected (page 3-29).
Disconnect the combination meter 28P (Gray) connector and remove the lap relay.
Check the Black/orange wire for continuity between the relay 4P and meter 28P connectors.

Is there continuity?

YES – Replace the combination meter with a new one and recheck.

NO – Open circuit in Black/orange wire between the lap relay and combination meter.



LAP RELAY (After '11 model)

INSPECTION

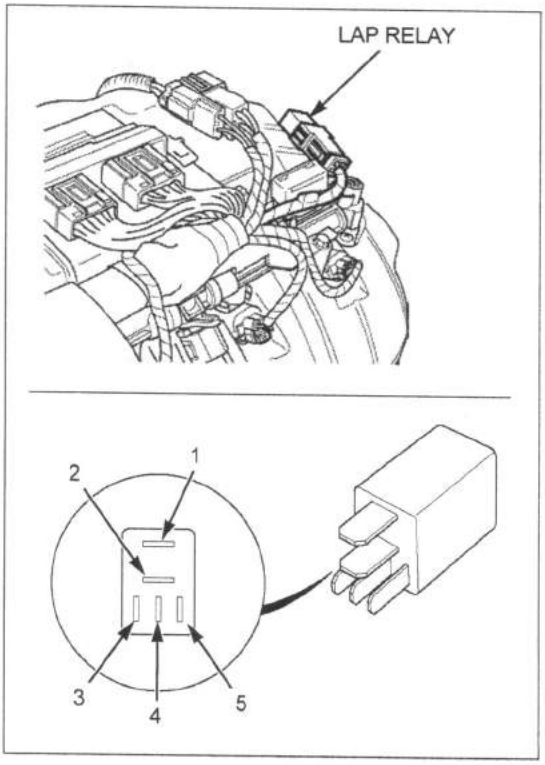
Remove the top shelter (page 3-9).

Remove the lap relay.

Check for continuity between the No. 1 and No. 2 terminals, and between No. 1 and No. 4 terminals.

Connect a fully charged 12 V battery (+) terminal to the relay No. 5 terminal and the (–) terminal to the No. 3 terminal.

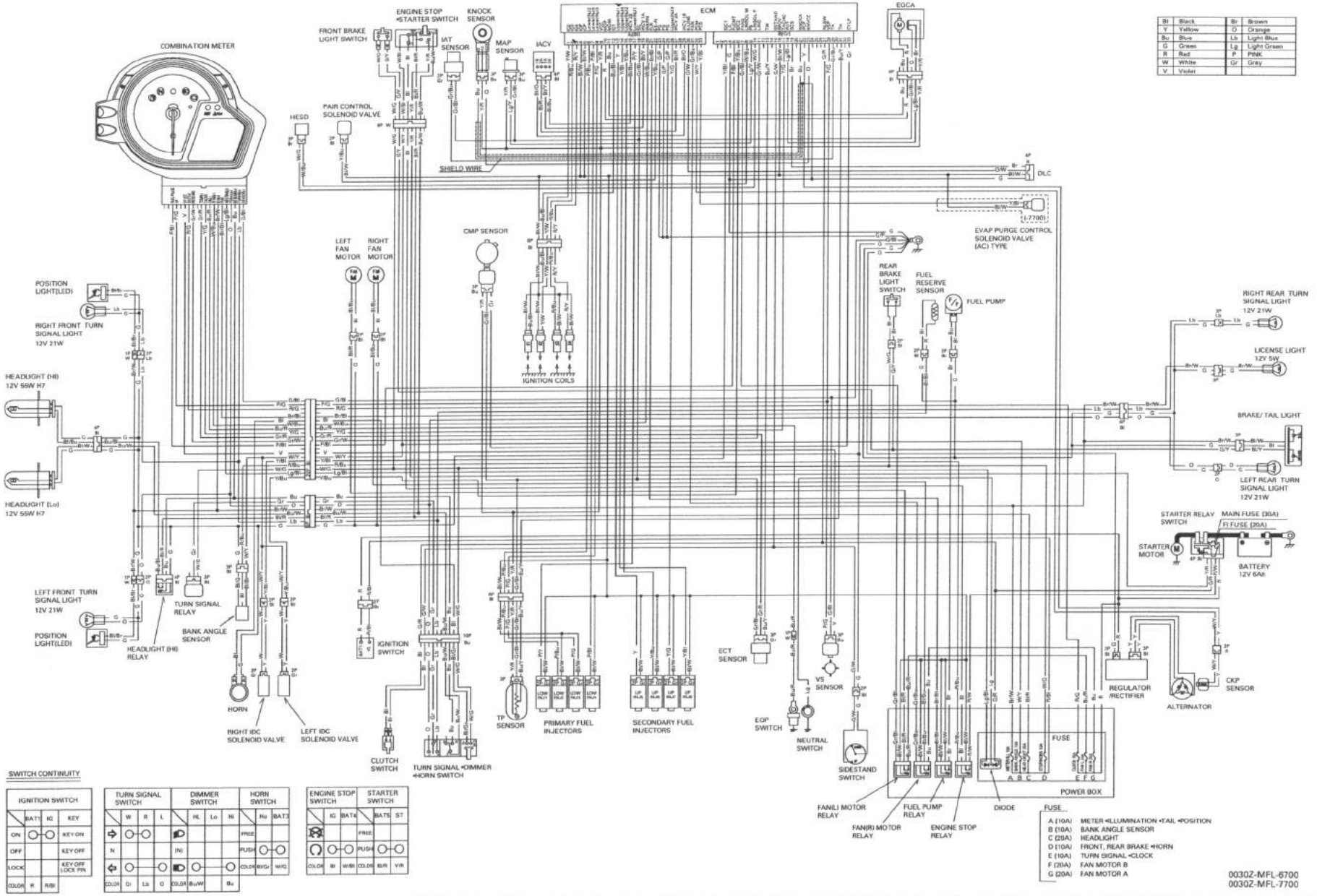
- There should be continuity between the No. 1 and No. 2 terminals while the battery is connected.
- There should be continuity between the No. 1 and No. 4 terminals when the battery is disconnected.



22. WIRING DIAGRAMS

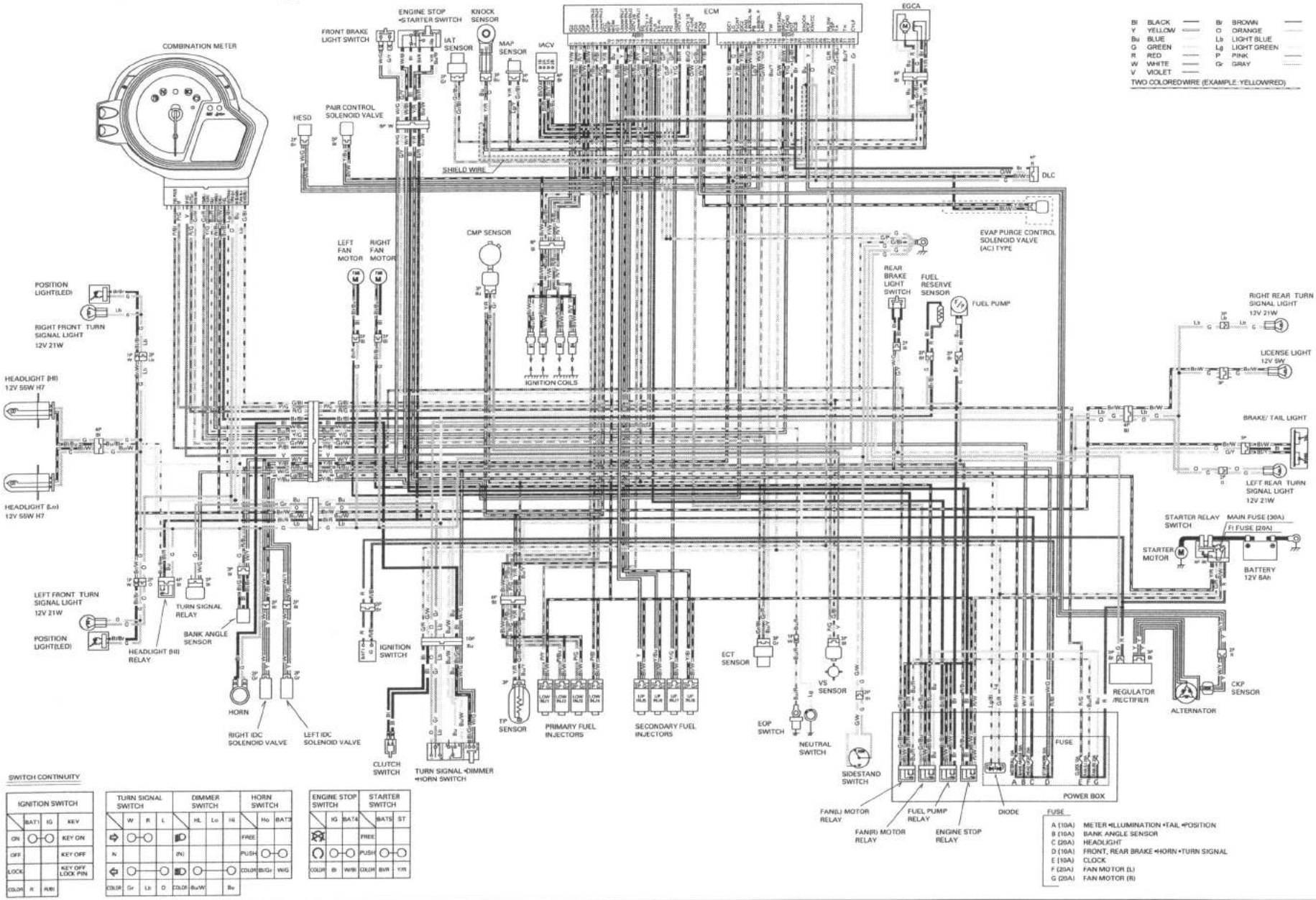
'08 model (STANDARD type)·····22-2
'09 – '11 model STANDARD type·····22-3
'09 – '11 model ABS type·····22-4
'12, '13 model STANDARD type·····22-5
'12, '13 model ABS type·····22-6
After '13 model STANDARD/SP type·····22-7
After '13 model ABS type·····22-8

'08 model (STANDARD type)

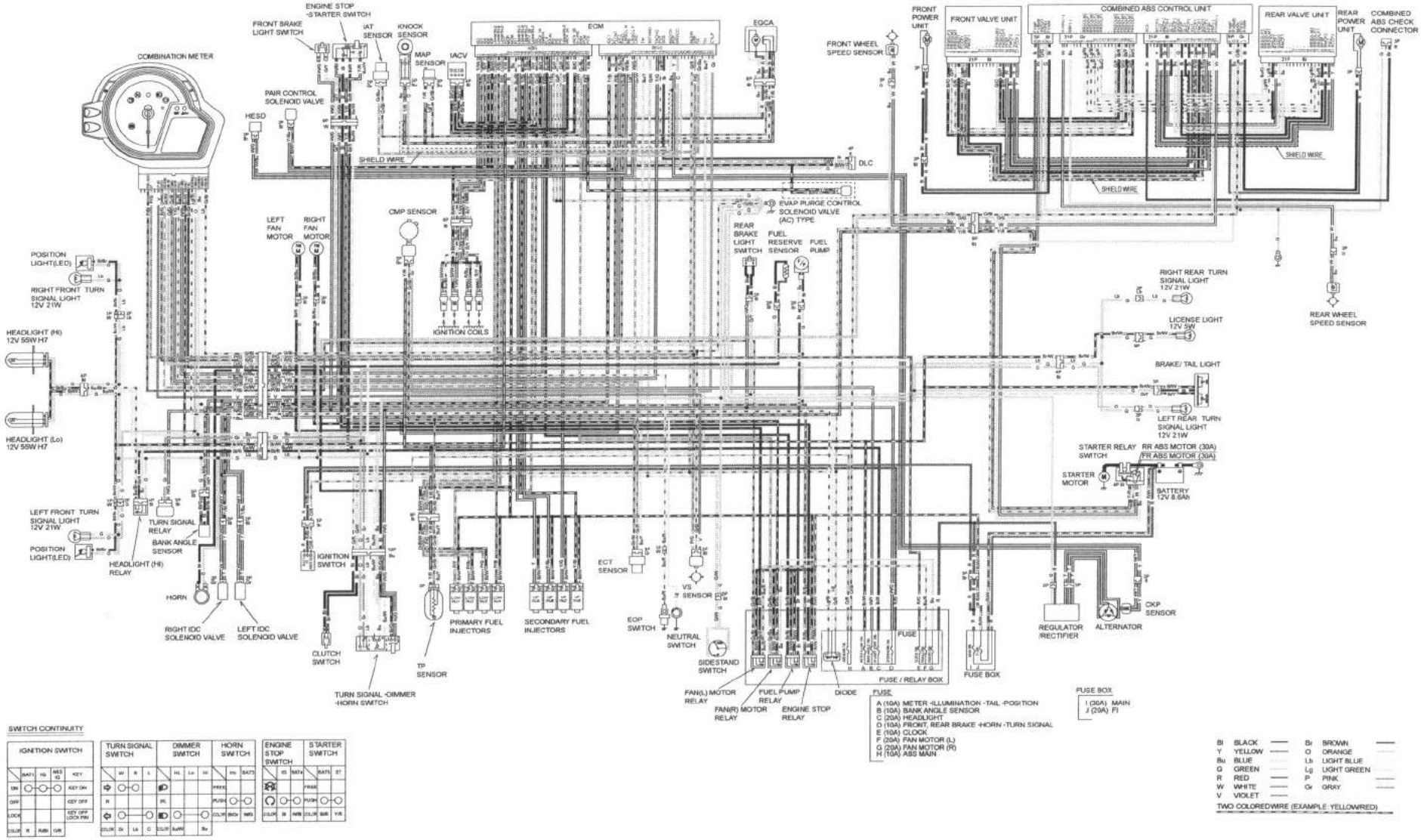


0030Z-MFL-6700
0030Z-MFL-7700

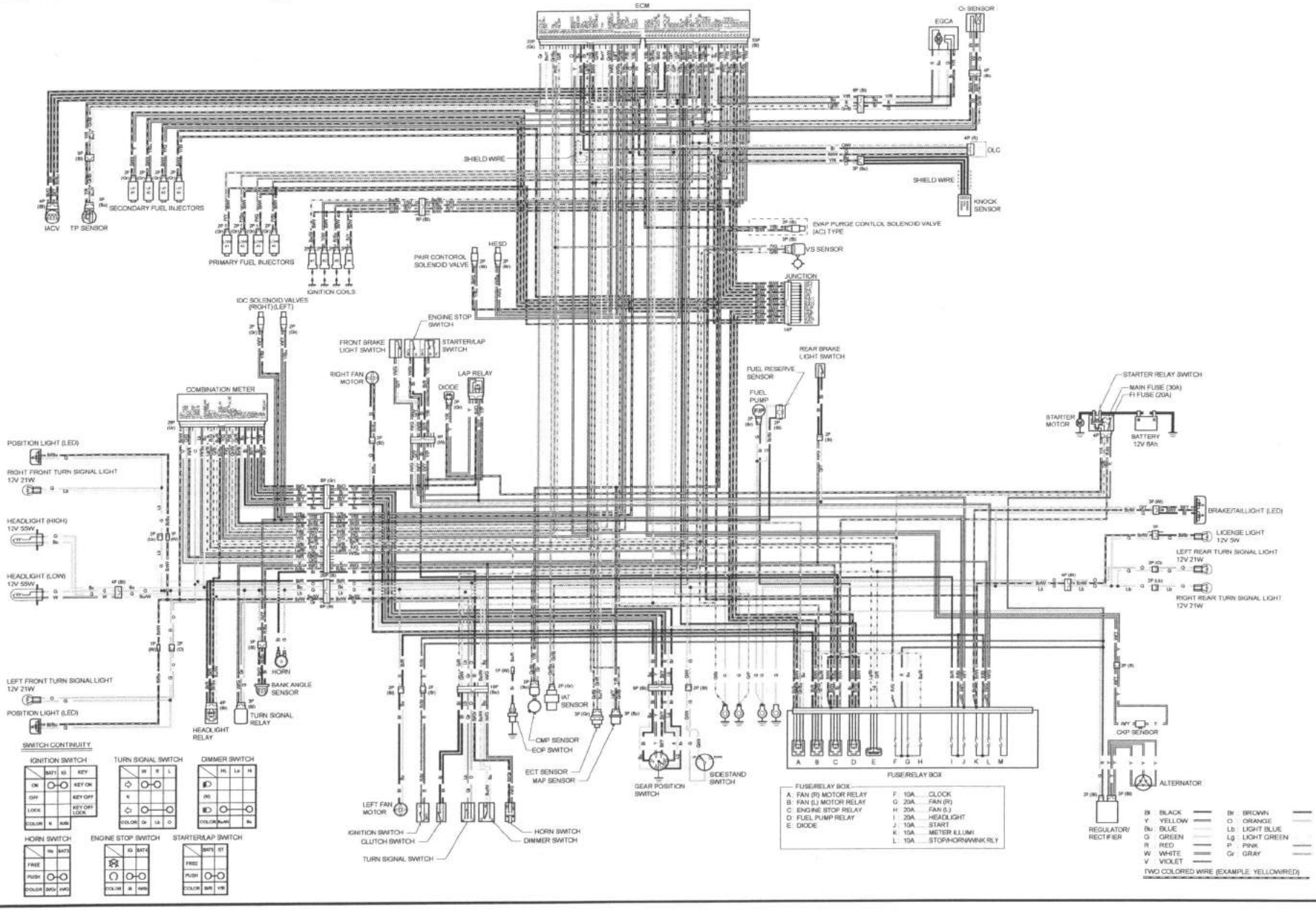
'09 – '11 model STANDARD type



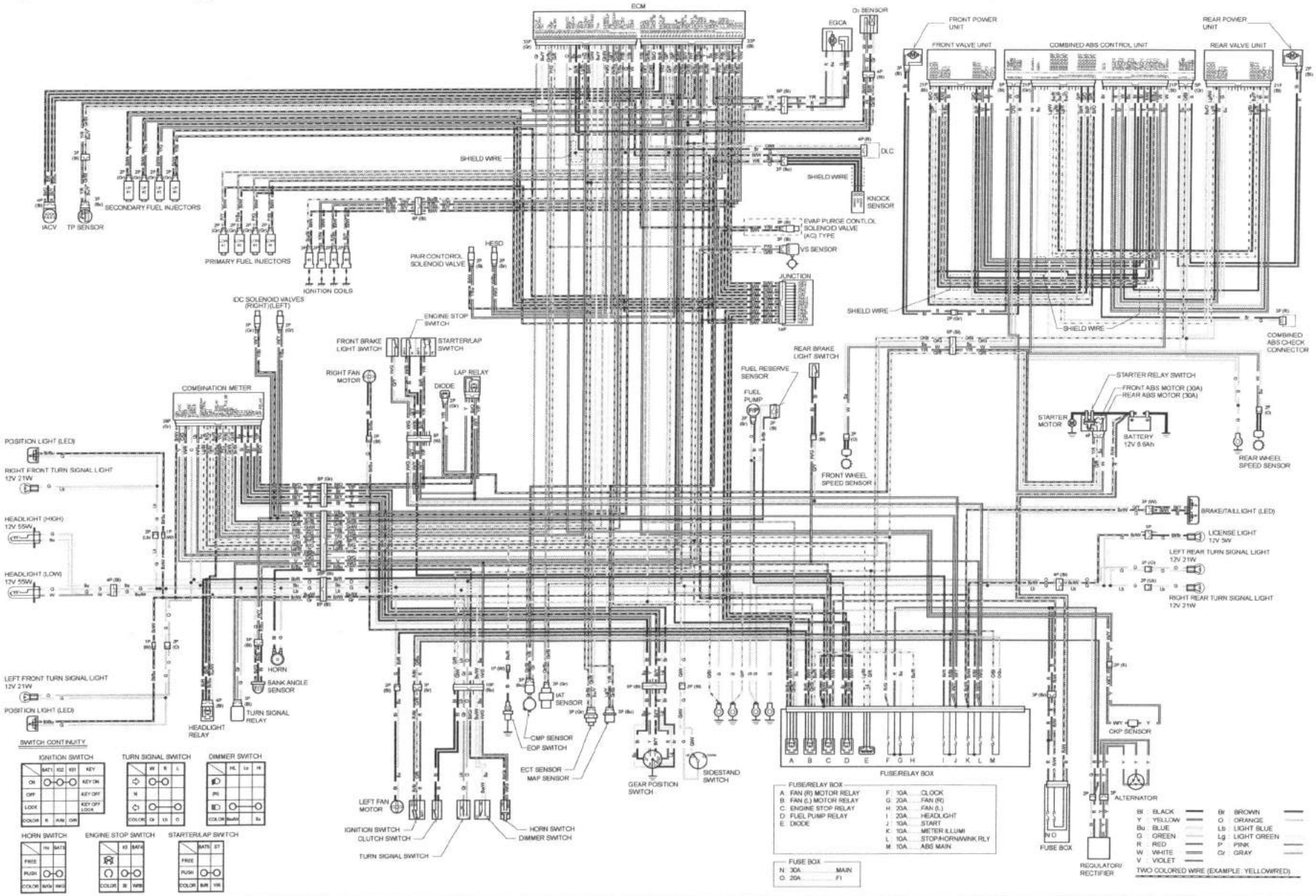
'09 – '11 model ABS type



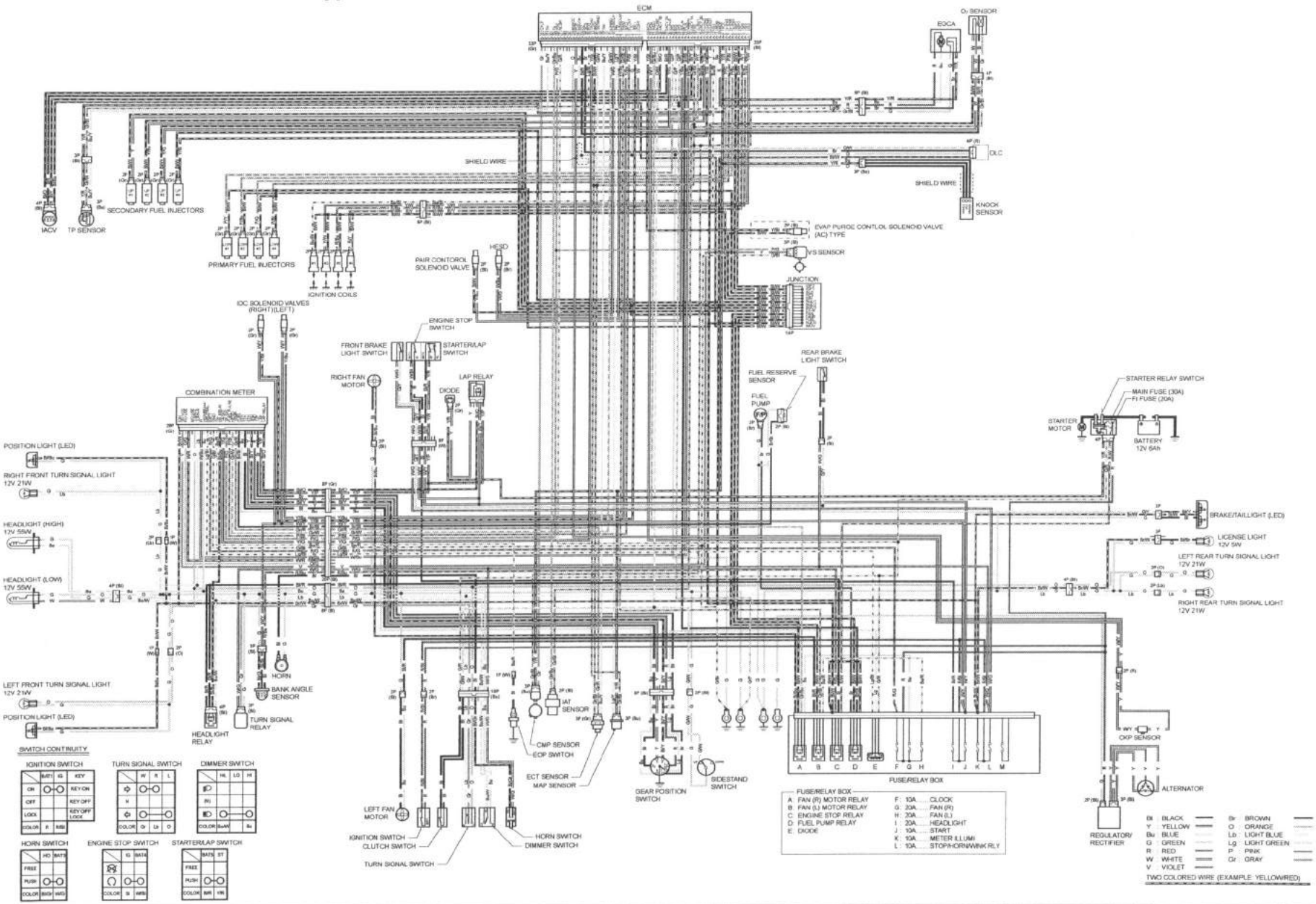
'12, '13 model STANDARD type



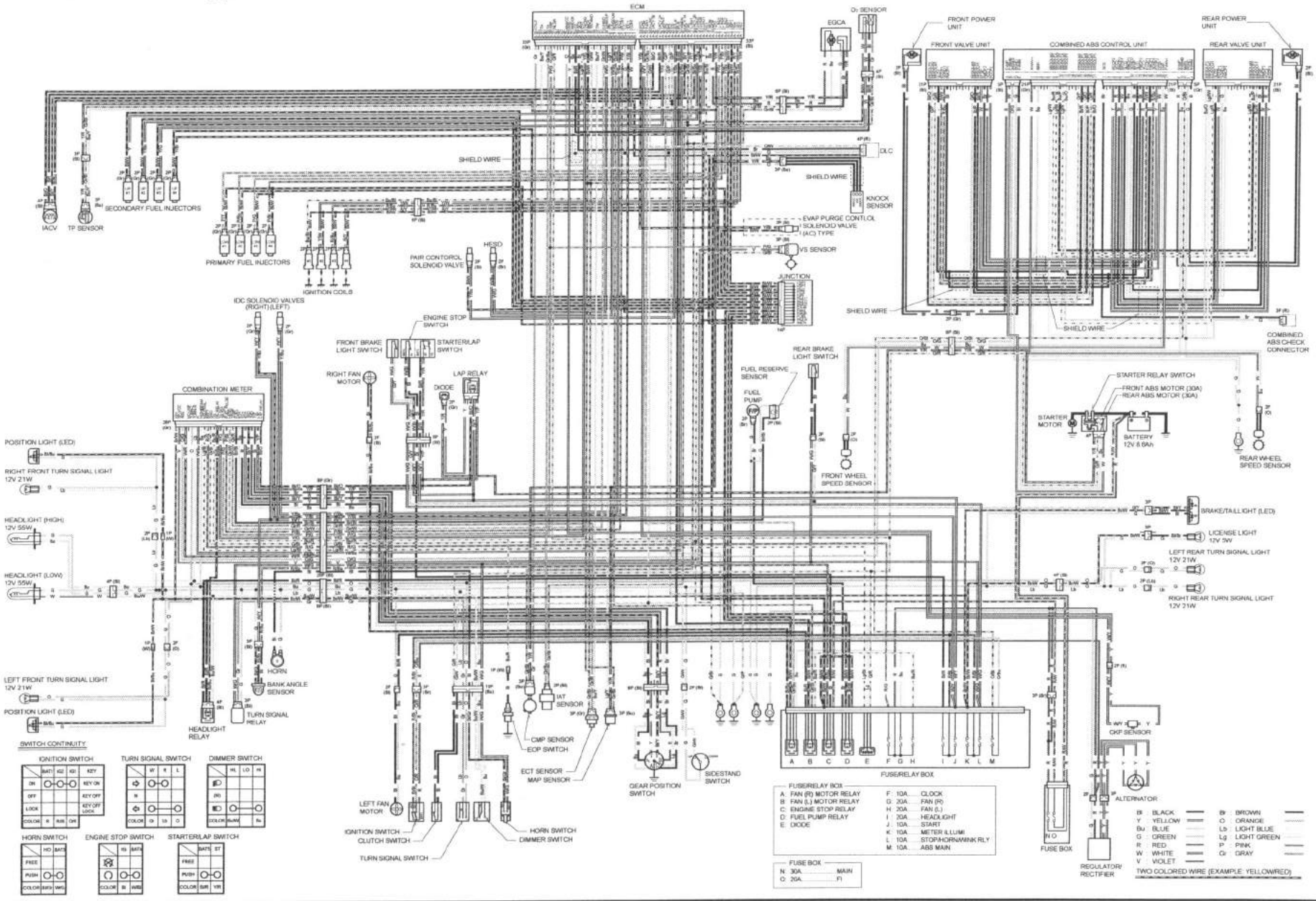
'12, '13 model ABS type



After '13 model STANDARD/SP type



After '13 model ABS type



23. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START 23-2

ENGINE LACKS POWER 23-3

POOR PERFORMANCE AT LOW AND IDLE SPEED 23-5

POOR PERFORMANCE AT HIGH SPEED 23-6

POOR HANDLING 23-6

ENGINE DOES NOT START OR IS HARD TO START

1. **Spark Plug Inspection**

   Remove and inspect the spark plugs.

   Are the spark plugs in good condition?

   NO – • Incorrect spark plug heat range
   • Incorrect spark plug gap
   • Dirty air cleaner

   YES – GO TO STEP 2.

2. **Spark Test**

   Perform the spark test.

   Are there good sparks?

   NO – • Faulty spark plug
   • Loose or disconnected ignition system wire
   • Faulty direct ignition coil
   • Broken or shorted direct ignition coil connector and wire
   • Faulty CKP sensor
   • Faulty engine stop switch
   • Faulty engine stop relay
   • Faulty battery
   • Faulty bank angle sensor
   • Faulty ECM

   YES – GO TO STEP 3.

3. **Fuel Pump Inspection**

   Check for operation of the fuel pump and inspect the fuel flow.

   Is the fuel pump unit normal?

   NO – Faulty fuel pump unit (page 6-56)

   YES – GO TO STEP 4.

4. **PGM-FI System Inspection**

   Check the PGM-FI system.

   Is the PGM-FI system normal?

   NO – Faulty PGM-FI system (page 6-14)

   YES – GO TO STEP 5.

5. **Cylinder compression Inspection**

   Test the cylinder compression.

   Is the compression specified?

   NO – • Valve stuck open
   • Worn cylinder and piston rings
   • Damaged cylinder head gasket
   • Seized valves
   • Improper valve timing

   YES – GO TO STEP 6.

6. **Engine Start Condition**

   Start by following normal procedure.

   Did the engine start but stops?

   YES – • Leaking insulator
   • Faulty IACV
   • Improper ignition timing (Faulty ECM, CKP sensor or CMP sensor)
   • Contaminated fuel

ENGINE LACKS POWER

1. **Drive Train Inspection**

   Raise wheel off the ground and spin by hand.

   Did the wheel spin freely?

   NO – • Brake dragging
   • Worn or damaged wheel bearings

   YES – GO TO STEP 2.

2. **Tire Pressure Inspection**

   Check the tire pressure.

   Is the tire pressure correct?

   NO – • Faulty tire valve
   • Punctured tire

   YES – GO TO STEP 3.

3. **Clutch Inspection**

   Accelerate rapidly, shift from first to second.

   Did the engine speed change accordingly when clutch is released?

   NO – • Clutch slipping
   • Worn clutch discs/plates
   • Warped clutch discs/plates
   • Weak clutch spring
   • Additive in engine oil

   YES – GO TO STEP 4.

4. **Engine Performance Inspection**

   Accelerate lightly.

   Did the Engine speed increase?

   NO – • Dirty air cleaner
   • Restricted fuel flow
   • Clogged muffler
   • Faulty IDC solenoid valve
   • Faulty ECV

   YES – GO TO STEP 5.

5. **Spark Plug Inspection**

   Remove and inspect spark plugs.

   Are the spark plugs in good condition?

   NO – • Plugs not serviced frequently enough
   • Incorrect spark plug heat range
   • Incorrect spark plug gap

   YES – GO TO STEP 6.

6. **Engine Oil Inspection**

   Check the oil level and condition.

   Is the engine oil in good condition?

   NO – • Oil level too high
   • Oil level too low
   • Contaminated oil

   YES – GO TO STEP 7.

7. **Ignition Timing Inspection**

   Check the ignition timing.

   Is the ignition timing as specified?

   NO – • Faulty ECM
   • Faulty CKP sensor
   • Faulty CMP sensor
   • Faulty knock sensor
   • Improper valve timing

   YES – GO TO STEP 8.

8. **Cylinder compression Inspection**

   Test the cylinder compression.

   Is the compression as specified?

   NO – • Valve clearance too small
   • Valve stuck open
   • Worn cylinder and piston rings
   • Damaged cylinder head gasket
   • Improper valve timing

   YES – GO TO STEP 9.

9. **Fuel Pump Inspection**

   Inspect the fuel flow.

   Is the fuel pump unit normal?

   NO – Faulty fuel pump unit (page 6-56)

   YES – GO TO STEP 10.

10. **PGM-FI System Inspection**

    Check the PGM-FI system.

    Is the PGM-FI system normal?

    NO – Faulty PGM-FI system (page 6-14)

    YES – GO TO STEP 11.

11. **lubrication Inspection**

    Remove cylinder head cover and inspect lubrication.

    Is the valve train lubricated properly?

    NO – • Faulty oil pump
    • Faulty pressure relief valve
    • Clogged oil strainer
    • Clogged oil passage

    YES – GO TO STEP 12.

12. **Over Heating Inspection**

    Check for engine over heating.

    Is the engine over heating?

    YES – • Coolant level too low
    • Fan motors not working
    • Thermostat stuck closed
    • Excessive carbon build-up in combustion chamber
    • Use of poor quality fuel
    • Wrong type of fuel
    • Clutch slipping
    • Faulty ECT sensor

    NO – GO TO STEP 13.

13. Engine Knocking Inspection

Accelerate or run at high speed.

Is the engine knocking?

YES – • Worn piston and cylinder
• Wrong type of fuel
• Excessive carbon build-up in combustion chamber
• Ignition timing too advance (Faulty ECM)
• Faulty CKP sensor
• Faulty CMP sensor
• Faulty knock sensor

NO – Engine does not knock

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. Spark Plug Inspection

Remove and inspect spark plugs.

Are the spark plugs in good condition?

NO – • Plugs not serviced frequently enough
• Incorrect spark plug heat range
• Incorrect spark plug gap

YES – GO TO STEP 2.

2. Ignition Timing Inspection

Check the ignition timing.

Is the ignition timing as specified?

NO – • Faulty ECM
• Faulty CKP sensor
• Faulty CMP sensor
• Faulty VS sensor
• Faulty knock sensor
• Improper valve timing

YES – GO TO STEP 3.

3. Fuel Pump Inspection

Inspect the fuel flow.

Is the fuel pump unit normal?

NO – Faulty fuel pump unit (page 6-56)

YES – GO TO STEP 4.

4. PGM-FI System Inspection

Check the PGM-FI system.

Is the PGM-FI system normal?

NO – Faulty PGM-FI system (page 6-14)

YES – GO TO STEP 5.

5. Intake Pipes Leaking Inspection

Check for leaks at the intake manifold pipes.

Are there leaks?

YES – • Loose insulator
• Damaged insulator

POOR PERFORMANCE AT HIGH SPEED

1. **Ignition Timing Inspection**

   Check the ignition timing.

   Is the ignition timing as specified?

   NO – • Faulty ECM
   • Faulty CKP sensor
   • Faulty CMP sensor
   • Faulty VS sensor
   • Faulty knock sensor
   • Improper valve timing

   YES – GO TO STEP 2.

2. **Fuel Pump Inspection**

   Inspect the fuel flow.

   Is the fuel pump unit operation normal?

   NO – Faulty fuel pump unit (page 6-56)

   YES – GO TO STEP 3.

3. **PGM-FI System Inspection**

   Check the PGM-FI system.

   Is the PGM-FI system normal?

   NO – Faulty PGM-FI system (page 6-14)

   YES – GO TO STEP 4.

4. **Valve Timing Inspection**

   Check the valve timing.

   Is the valve timing correct?

   NO – Camshafts not installed properly

   YES – GO TO STEP 5.

5. **Valve Spring Inspection**

   Check for the valve springs.

   Is the valve spring free length as specified?

   NO – Faulty valve springs

   YES – Not weak

POOR HANDLING

Steering is heavy
- Steering stem adjusting nut too tight
- Damaged steering head bearings
- Low tire pressure
- Faulty HESD

Either wheel is wobbling
- Excessive wheel bearing play
- Bent rim
- Swingarm pivot bearing excessively worn
- Bent frame

The motorcycle pulls to one side
- Front and rear wheel not aligned
- Faulty shock absorber
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

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