

# 1. GENERAL INFORMATION

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## GENERAL INFORMATION

### 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 scooter.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the scooter. 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 1-18).
9. Do not bend or twist cables. Damaged control cables will not operate smoothly and may stick or bind.

### ABBREVIATION

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

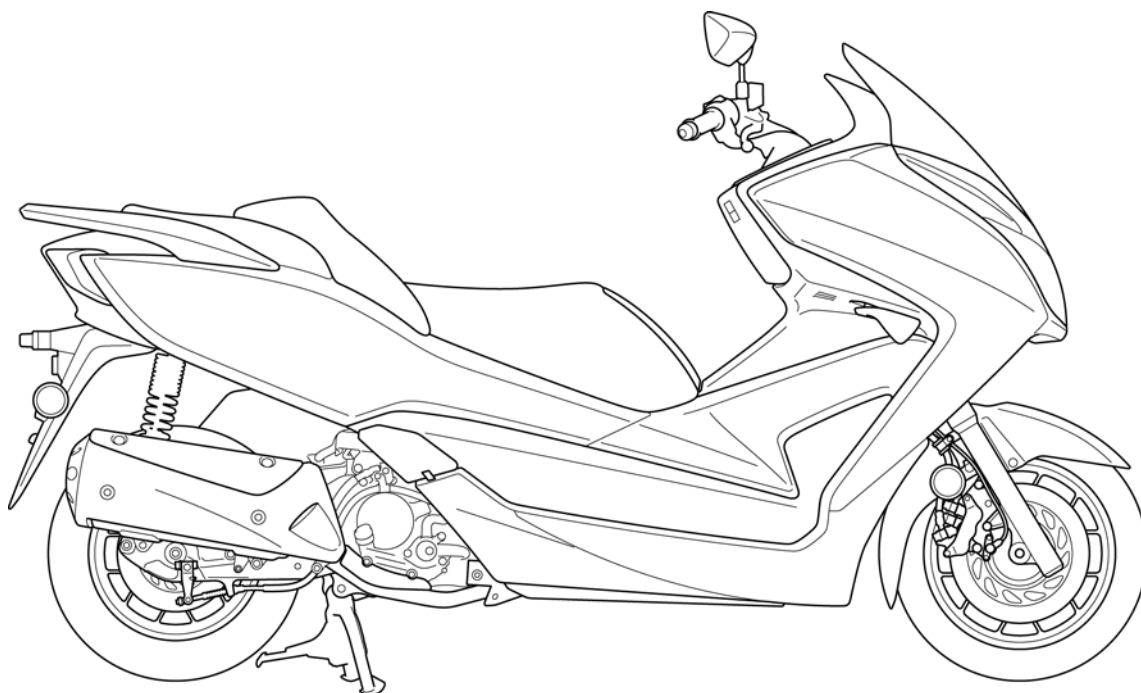
Abbrev. term	Full term
ABS	Anti-lock Brake System
CBS	Combined Brake System
CKP sensor	Crankshaft Position sensor
DLC	Data Link Connector
DTC	Diagnostic Trouble Code
ECM	Engine Control Module
ECT sensor	Engine Coolant Temperature sensor
EEPROM	Electrically Erasable Programmable Read Only Memory
EVAP	Evaporative Emission
EOP switch	Engine Oil Pressure switch
IACV	Idle Air Control Valve
IAT sensor	Intake Air Temperature sensor
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
AC	50-State, meets California
CM	Canada

## MODEL IDENTIFICATION

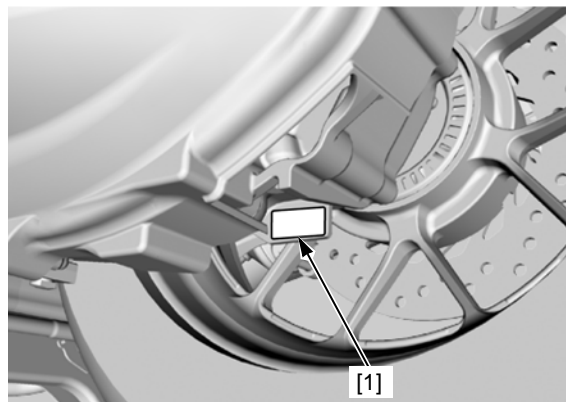


## SERIAL NUMBERS/LABELS

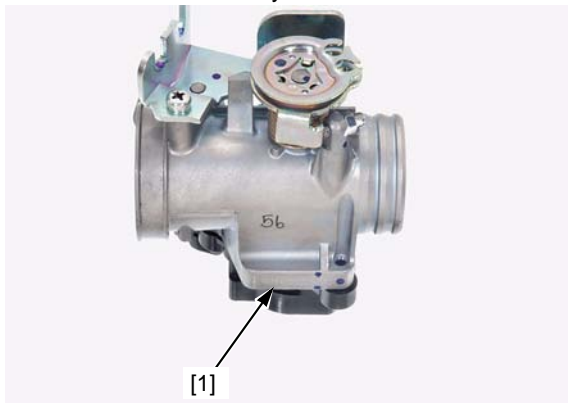
The Vehicle Identification Number (V.I.N.) [1] is stamped on the rear of the frame inside the luggage box as shown.



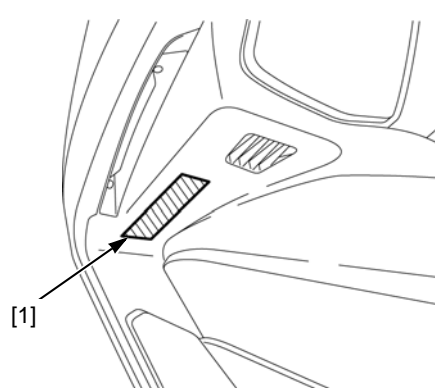
The engine serial number [1] is stamped on the final reduction case as shown.



The throttle body identification number [1] is stamped on the lower side of the throttle body.

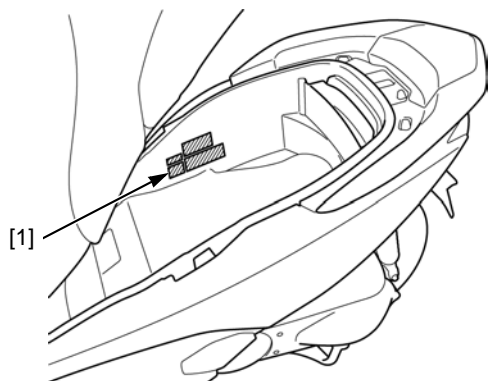


The Safety Certification Label [1] is located on the left side of the inner cover as shown.

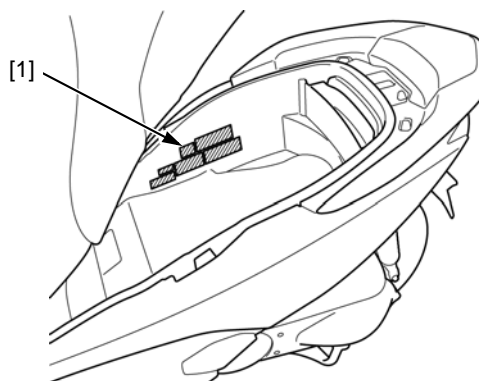


## GENERAL INFORMATION

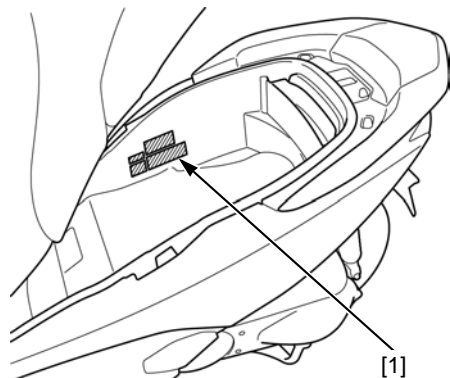
The color label (AC type) [1] is attached on the luggage box as shown. When ordering color-coded parts, always specify the designated color code.



The color label (CM type) [1] is attached on the luggage box as shown. When ordering color-coded parts, always specify the designated color code.

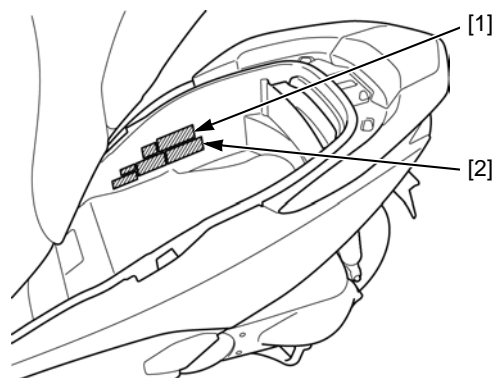


The Emission Control Information Label (AC type) [1] is located on the right side of the luggage box as shown.



The Emission Control Information Label (CM type) is located on the right side of the luggage box as shown.

- French [1]
- English [2]





# SPECIFICATIONS

## GENERAL SPECIFICATIONS

ITEM		SPECIFICATION
DIMENSIONS	Overall length	2,166 mm (85.3 in)
	Overall width	753 mm (29.6 in)
	Overall height	1,189 mm (46.8 in)
	Wheelbase	1,546 mm (60.9 in)
	Seat height	716 mm (28.2 in)
	Ground clearance	139 mm (5.5 in)
	Curb weight	STD type: 192 kg (422 lbs) ABS type: 194 kg (428 lbs)
	Maximum weight capacity	163 kg (359 lbs)
FRAME	Frame type	Back bone type
	Front suspension	Telescopic fork
	Front wheel travel	95 mm (3.7 in)
	Rear suspension	Unit swing
	Rear wheel travel	98 mm (3.9 in)
	Front tire size	120/70-14M/C 55P
	Rear tire size	140/70-13M/C 61P
	Front tire brand	SCOOTSMART (DUNLOP)
	Rear tire brand	SCOOTSMART G (DUNLOP)
	Front brake	Hydraulic single disc
	Rear brake	Hydraulic single disc
	Caster angle	27.0°
	Trail length	89 mm (3.5 in)
	Fuel tank capacity	11.5 liters (3.04 US gal, 2.53 Imp gal)
ENGINE	Cylinder arrangement	Single cylinder inclined 81° from vertical
	Bore and stroke	72.0 x 68.6 mm (2.83 x 2.70 in)
	Displacement	279 cm <sup>3</sup> (17.0 cu-in)
	Compression ratio	10.5 : 1
	Valve train	Chain driven OHC with rocker arms
	Intake valve	opens 0° TDC at 1.0 mm (0.04 in) lift closes 30° ABDC at 1.0 mm (0.04 in) lift
	Exhaust valve	opens 35° BBDC at 1.0 mm (0.04 in) lift closes 5° BTDC at 1.0 mm (0.04 in) lift
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Viscous paper element
	Engine dry weight	41.4 kg (91.3 lbs)
FUEL SYSTEM	Type	PGM-FI (Programmed Fuel Injection)
	Throttle bore	34 mm (1.3 in)
DRIVE TRAIN	Clutch system	Automatic centrifugal clutch, dry
	Final reduction	7.537 (44/18 x 37/12)
	Gear ratio	2.350 – 0.800
ELECTRICAL	Ignition system	Full transistorized ignition
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	FET shorted, triple phase full-wave rectification
	Lighting system	Battery

## GENERAL INFORMATION

### PGM-FI SYSTEM SPECIFICATIONS

ITEM	SPECIFICATIONS
Fuel injector resistance (20°C/68°F)	11.4 – 12.6 $\Omega$

### IGNITION SYSTEM SPECIFICATIONS

ITEM	SPECIFICATIONS
Spark plug	LMAR8A-9 (NGK)
Spark plug gap	0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil primary peak voltage	100 V minimum
CKP sensor peak voltage	0.7 V minimum
Ignition timing ("F" mark)	10° BTDC at idle

### ELECTRIC STARTER SPECIFICATION

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	11.8 – 12.3 mm (0.46 – 0.48 in)	6.5 mm (0.26 in)

### FUEL SYSTEM SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQBHA
Idle speed	1,500 $\pm$ 100 rpm
Throttle grip freeplay	2 – 6 mm (0.1 – 0.2 in)
Fuel pressure at idle	294 kPa (3.0 kgf/cm <sup>2</sup> , 43 psi)
Fuel pump flow	114 cm <sup>3</sup> (3.9 US oz, 4.0 Imp oz) minimum/10 seconds
PAIR control solenoid valve resistance (20°C/68°F)	20 – 24 $\Omega$
EVAP purge control solenoid valve resistance (20°C/68°F) (AC type only)	30 – 34 $\Omega$

### LUBRICATION SYSTEM SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	1.2 liters (1.3 US qt, 1.1 Imp qt)	–
	After filter change	1.4 liters (1.5 US qt, 1.2 Imp qt)	–
	After disassembly	1.7 liters (1.8 US qt, 1.5 Imp qt)	–
Recommended oil		Pro Honda HP4M (with molybdenum additives) 4-stroke oil (U.S.A. & Canada) or equivalent motorcycle oil API service classification: SG or higher (except oils labeled as energy conserving on the circular API service label) JASO T903 standard: MB Viscosity: SAE 10W-30	–
Oil pressure at EOP switch		530 kPa (5.4 kgf/cm <sup>2</sup> , 77 psi) at 5,000 rpm/(80°C/176°F)	–
Oil pump rotor	Tip clearance	0.15 mm (0.006 in)	0.20 mm (0.008 in)
	Body clearance	0.15 – 0.22 mm (0.006 – 0.009 in)	0.35 mm (0.014 in)
	Side clearance	0.02 – 0.09 mm (0.001 – 0.004 in)	0.12 mm (0.005 in)

## COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	1.35 liters (0.357 US gal, 0.297 Imp gal)
	Reserve tank	0.15 liter (0.040 US gal, 0.033 Imp gal)
Radiator cap relief pressure		107.9 kPa (1.10 kgf/cm <sup>2</sup> , 16 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	4.5 mm (0.18 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

## CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,569 kPa (16.0 kgf/cm <sup>2</sup> , 228 psi) at 450 rpm	–
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	–
		EX	0.22 ± 0.03 (0.009 ± 0.001)	–
Camshaft	Cam lobe height	IN	39.285 – 39.525 (1.5467 – 1.5561)	39.255 (1.5455)
		EX	36.994 – 37.234 (1.4565 – 1.4659)	36.964 (1.4553)
Rocker arm, Rocker arm shaft	Rocker arm shaft O.D.	IN/EX	12.966 – 12.984 (0.5105 – 0.5112)	12.91 (0.508)
	Rocker arm I.D.	IN/EX	13.000 – 13.018 (0.5118 – 0.5125)	13.10 (0.516)
	Arm to shaft clearance	IN/EX	0.016 – 0.052 (0.0006 – 0.0020)	0.08 (0.003)
Valve stem O.D.		IN	4.475 – 4.490 (0.1762 – 0.1768)	4.465 (0.1758)
		EX	4.465 – 4.480 (0.1758 – 0.1764)	4.455 (0.1754)
Valve guide I.D.		IN/EX	4.500 – 4.512 (0.1772 – 0.1776)	4.54 (0.179)
Valve stem-to valve guide clearance		IN	0.010 – 0.037 (0.0004 – 0.0015)	0.08 (0.003)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.09 (0.004)
Valve guide projection above cylinder head		IN	11.20 – 11.50 (0.441 – 0.453)	–
		EX	12.20 – 12.50 (0.480 – 0.492)	–
Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		IN/EX	37.09 (1.460)	35.6 (1.40)
Cylinder head warpage			–	0.05 (0.002)

## CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		72.000 – 72.010 (2.8346 – 2.8350)	72.045 (2.8364)
	Out-of-round		–	0.05 (0.002)
Piston	Piston O.D.		71.97 – 71.99 (2.833 – 2.834) at 10 (0.4) from bottom	71.90 (2.831)
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.03 (0.670)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)	16.98 (0.669)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.50 (0.020)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.00 (0.039)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.080 (0.0032)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.065 (0.0026)
Cylinder to piston clearance			0.010 – 0.040 (0.0004 – 0.0016)	0.10 (0.004)
Connecting rod small end I.D.			17.010 – 17.028 (0.6697 – 0.6704)	17.06 (0.672)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)

## GENERAL INFORMATION

### DRIVE PULLEY/DRIVEN PULLEY/CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch	Clutch outer I.D.	135.0 – 135.2 (5.31 – 5.32)	135.5 (5.33)
	Lining thickness	4.0 (0.16)	1.0 (0.04)
Drive belt width		26.7 (1.05)	25.7 (1.01)
Movable drive face	Bushing I.D.	30.024 – 30.057 (1.1820 – 1.1833)	30.08 (1.184)
	Boss O.D.	29.995 – 30.031 (1.1809 – 1.1823)	29.98 (1.180)
	Weight roller O.D.	22.92 – 23.08 (0.902 – 0.909)	22.5 (0.89)
Driven pulley	Face spring free length	109.6 (4.31)	106.0 (4.17)
	Driven face O.D.	39.965 – 39.985 (1.5734 – 1.5742)	39.94 (1.572)
	Movable driven face I.D.	40.000 – 40.025 (1.5748 – 1.5758)	40.06 (1.577)

### FINAL REDUCTION SPECIFICATIONS

ITEM		SPECIFICATIONS
Final reduction oil capacity	After draining	0.28 liter (0.30 US qt, 0.25 Imp qt)
	After disassembly	0.30 liter (0.32 US qt, 0.26 Imp qt)
Recommended final reduction oil		Pro Honda HP4M (with molybdenum additives) 4-stroke oil (U.S.A. & Canada) or equivalent motorcycle oil API service classification: SG or higher (except oils labeled as energy conserving on the circular API service label) JASO T903 standard: MB Viscosity: SAE 10W-30

### ALTERNATOR/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear boss	O.D.	45.660 – 45.673 (1.7976 – 1.7981)	45.615 (1.7959)
	I.D.	25.026 – 25.045 (0.9853 – 0.9860)	25.100 (0.9882)
Starter clutch outer I.D.		62.319 – 62.345 (2.4535 – 2.4545)	62.395 (2.4565)

### CRANKCASE/CRANKSHAFT SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Crankcase	Main journal I.D.	45.000 – 45.012 (1.7717 – 1.7721)	45.060 (1.7740)
Connecting rod	Side clearance	0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
Crankshaft	Runout	–	0.10 (0.004)
	Main journal O.D.	39.982 – 40.000 (1.5741 – 1.5748)	39.976 (1.5739)
	Main journal oil clearance	0.020 – 0.038 (0.0008 – 0.0015)	0.07 (0.003)
Crankpin bearing oil clearance		0.030 – 0.052 (0.0012 – 0.0020)	0.07 (0.003)

## FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lbs) load	175 kPa (1.8 kgf/cm <sup>2</sup> , 25 psi)	—
	Up to maximum weight capacity	175 kPa (1.8 kgf/cm <sup>2</sup> , 25 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	70 g (2.5 oz) maximum
Fork	Spring free length	324.2 (12.76)	317.7 (12.51)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8 (10 W)	—
	Fluid level	78 (3.1)	—
	Fluid capacity	204 ± 2.5 cm <sup>3</sup> (6.9 ± 0.08 US oz, 7.2 ± 0.09 Imp oz)	—

## REAR WHEEL/PARKING BRAKE/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lbs) load	200 kPa (2.0 kgf/cm <sup>2</sup> , 29 psi)	—
	Up to maximum weight capacity	225 kPa (2.3 kgf/cm <sup>2</sup> , 33 psi)	—
Wheel Rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	70 g (2.5 oz) maximum
Shock absorber spring adjuster standard position		3rd groove	—
Parking brake	Drum I.D.	95.0 – 95.2 (3.74 – 3.75)	95.5 (3.76)
	Brake shoe thickness	2.8 – 3.0 (0.11 – 0.12)	2.0 (0.08)
	Lever stroke	5 – 8 notches	—

## HYDRAULIC BRAKE SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		DOT 4	—
	Brake disc thickness		4.8 – 5.2 (0.19 – 0.20)	4.0 (0.16)
	Brake disc warpage		—	0.3 (0.01)
	Master cylinder I.D.		11.000 – 11.043 (0.4331 – 0.4348)	11.055 (0.4352)
	Master piston O.D.		10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
	Caliper cylinder I.D.	Upper	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
		Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
		Lower	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
	Caliper piston O.D.	Upper	26.918 – 26.968 (1.0598 – 1.0617)	26.91 (1.059)
		Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.56 (0.888)
		Lower	26.918 – 26.968 (1.0598 – 1.0617)	26.91 (1.059)
Rear	Specified brake fluid		DOT 4	—
	Brake disc thickness		5.8 – 6.2 (0.23 – 0.24)	5.0 (0.20)
	Brake disc warpage		—	0.3 (0.01)
	Master cylinder I.D.		12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O.D.		12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.		38.180 – 38.230 (1.5031 – 1.5051)	38.24 (1.506)
	Caliper piston O.D.		38.098 – 38.148 (1.4999 – 1.5019)	38.09 (1.500)

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### BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM				SPECIFICATIONS	
Battery	Type			YTZ12S or FTZ12S	
	Capacity		YTZ12S	12 V – 11 Ah	
			FTZ12S	12 V – 10 Ah	
	Current leakage			0.1 mA max.	
	Voltage (20°C/68°F)	Fully charged	YTZ12S	13.0 – 13.2 V	
			FTZ12S	Above 12.8 V	
		Needs charge	YTZ12S	Below 12.4 V	
			FTZ12S	Below 12.3 V	
	Charging current		Normal	1.1 A/5 – 10 h	
Quick			5.5 A/1.0 h		
Alternator	Capacity			0.380 kW/5,000 rpm	
Alternator Charging coil resistance (20°C/68°F)				0.1 – 0.5 Ω	

### LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulb	Headlight (high/low beam)		12 V - 35/35 W x 2
	License light		12 V - 5 W
	Tail light		12 V - 5 W x 2
	Brake light		12 V - 16 W x 2
	Rear turn signal light		12 V - 21 W x 2
	Front turn signal/Position light		12 V - 21/5 W x 2
	Instrument light		LED
	High beam indicator		LED
	Turn signal indicator		LED
	PGM-FI malfunction indicator		LED
	ABS indicator		LED
	Engine oil pressure indicator		LED
	Engine oil change indicator		LED
Fuse	Main fuse		30 A
	Sub-fuse	STD type	30 A x 1, 15 A x 2, 10 A x 5, 5 A x 2
		ABS type	30 A x 3, 15 A x 2, 10 A x 5, 5 A x 3
Fuel level sensor resistance		Full	8 – 12 Ω
		Empty	265 – 275 Ω

## 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 (include SH flange bolt)	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 (include NSHF) and nut	12 (1.2, 9)
10 mm bolt and nut	34 (3.5, 25)	8 mm flange bolt and nut	27 (2.8, 20)
12 mm bolt and nut	54 (5.5, 40)	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 listed above.

#### FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front fender mounting bolt	4	6	12 (1.2, 9)	
Front side reflector nut	2	6	1.5 (0.2, 1.1)	U-nut
Exhaust pipe joint nut	2	8	29 (3.0, 21)	
Exhaust pipe band bolt	1	8	22 (2.2, 16)	
Muffler mounting bolt	3	10	49 (5.0, 36)	
Muffler protector special screw	7	5	5.2 (0.5, 3.8)	
Protector setting screw	1	5	4.2 (0.4, 3.1)	
Tail cap setting screw	2	5	5.2 (0.5, 3.8)	
Exhaust pipe stud bolt	2	8	9.0 (0.9, 6.6)	See page 2-26
Sidestand pivot bolt	1	10	10 (1.0, 7)	
Sidestand pivot nut	1	10	30 (3.1, 22)	U-nut
Parking brake lever nut (AC type only)	1	8	30 (3.1, 22)	U-nut
Pocket lid hook mounting screw	1	4	1.0 (0.1, 0.7)	
Left crankcase outer cover socket bolt	3	6	10 (1.0, 7)	
Seat hinge nut	4	6	10 (1.0, 7)	
Seat hinge under cover screw A	1	5	4.2 (0.4, 3.1)	
Seat hinge under cover screw B	2	5	1.6 (0.2, 1.2)	
Reflector nut	1	5	1.5 (0.2, 1.1)	U-nut
License light nut	2	5	4.3 (0.4, 3.2)	U-nut
Headlight/front turn signal light mounting screw	6	5	4.2 (0.4, 3.1)	
Rear side reflector nut	2	6	1.5 (0.2, 1.1)	U-nut
Front turn signal light mounting screw	4	5	1.2 (0.1, 0.9)	

## GENERAL INFORMATION

### MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Throttle cable adjusting/lock nut	1/2	10	8.5 (0.9, 6.3)	
Spark plug	1	10	16 (1.6, 12)	
Timing hole cap	1	14	6.0 (0.6, 4.4)	Apply engine oil to the threads.
Engine oil drain bolt	1	12	25 (2.5, 18)	Apply engine oil to the threads and seating surface.
Oil filter cartridge	1	20	26 (2.7, 19)	Apply engine oil to the threads.
Oil filter boss	1	20	—	See page 3-11 Apply locking agent to the crankcase side threads.
Belt case air cleaner housing socket bolt	3	6	10 (1.0, 7)	
Final drive oil check bolt	1	8	13 (1.3, 10)	
Final drive oil filler bolt	1	8	13 (1.3, 10)	
Final drive oil drain bolt	1	8	13 (1.3, 10)	
Air cleaner housing cover tapping screw	7	5	1.1 (0.1, 0.8)	
Air cleaner element tapping screw	3	5	1.1 (0.1, 0.8)	

### PGM-FI SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Sensor unit mounting torx screw	3	5	3.4 (0.3, 2.5)	
ECT sensor	1	12	25 (2.5, 18)	
O <sub>2</sub> sensor	1	12	25 (2.5, 18)	

### ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter motor cable terminal nut	1	6	10 (1.0, 7)	
Starter motor cover bolt	2	5	4.9 (0.5, 3.6)	
Starter motor negative brush screw	1	5	3.7 (0.4, 2.7)	

### FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel pump retainer nut	4	6	12 (1.2, 9)	For tightening sequence (page 7-11)
Injector mounting bolt	2	6	12 (1.2, 9)	
Air cleaner housing washer bolt	3	6	11 (1.1, 8)	
Throttle body insulator band screw	2	5	5.0 (0.5, 3.7)	
IACV setting plate torx screw	2	4	2.1 (0.2, 1.5)	
Sensor unit mounting torx screw	3	5	3.4 (0.3, 2.5)	
Throttle cable bracket screw	1	5	3.4 (0.3, 2.5)	
Throttle body wire clamp plate screw	1	5	3.4 (0.3, 2.5)	

### LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
EOP switch	1	PT 1/8	12 (1.2, 9)	See page 8-5 Apply sealant to the threads.
EOP switch terminal screw	1	4	1.9 (0.2, 1.4)	
Oil pump cover screw	1	3	2.0 (0.2, 1.5)	
Oil pump driven sprocket bolt	1	6	12 (1.2, 9)	Apply oil to the threads and seating surface. Left-hand threads



**COOLING SYSTEM**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Water pump impeller	1	7	12 (1.2, 9)	Left-hand threads
Cooling fan motor mounting washer bolt	2	6	8.5 (0.9, 6.3)	
Fan motor mounting screw	3	4	2.7 (0.3, 2.0)	
Cooling fan nut	1	3	1.0 (0.1, 0.7)	Apply locking agent to the fan motor side threads.

**CYLINDER HEAD/VALVES**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head bolt/washer	4	9	38 (3.9, 28)	Apply oil to the threads and seating surface.
Cam stopper plate bolt	1	6	12 (1.2, 9)	See page 10-9 Apply locking agent to the threads.
Cam sprocket bolt	2	6	16 (1.6, 12)	See page 10-6 Apply locking agent to the threads.
Timing hole cap	1	14	6.0 (0.6, 4.4)	Apply engine oil to the threads and seating surface.
Cam chain tensioner lifter sealing bolt	1	11	22 (2.2, 16)	
Cylinder head cover bolt	2	6	10 (1.0, 7)	

**DRIVE PULLEY/DRIVEN PULLEY/CLUTCH**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch/driven pulley nut	1	30	79 (8.1, 58)	
Clutch outer nut	1	12	74 (7.5, 55)	
Drive pulley face bolt	1	10	83 (8.5, 61)	Apply oil to the threads and seating surface. UBS bolt

**FINAL REDUCTION**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Final reduction case bolt	7	8	24 (2.4, 18)	

**ALTERNATOR/STARTER CLUTCH**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter clutch outer socket bolt	6	6	23 (2.3, 17)	See page 14-9 Apply locking agent to the threads.
Flywheel bolt	1	10	103 (10.5, 76)	Apply oil to the threads and seating surface. UBS bolt

**CRANKCASE/CRANKSHAFT**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankpin bearing cap nut	2	8	33 (3.4, 24)	Apply oil to the threads and seating surface.
Cam chain tensioner pivot bolt	1	6	12 (1.2, 9)	

## GENERAL INFORMATION

### ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Frame pivot nut	1	12	78 (8.0, 58)	U-nut
Engine pivot nut	1	12	59 (6.0, 44)	U-nut
Engine hanger bracket nut	1	12	64 (6.5, 47)	U-nut
Swing rod nut (Upper)	1	10	39 (4.0, 29)	U-nut
Swing rod nut (Lower)	1	10	64 (6.5, 47)	U-nut
Rear shock absorber lower mounting bolt	2	10	39 (4.0, 29)	
Rear brake caliper mounting bolt	2	8	30 (3.1, 22)	ALOC bolt; replace with a new one.

### FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Steering stem lock nut	1	26	74 (7.5, 55)	
Steering stem adjusting nut	1	26	—	See page 17-25
Fork pinch bolt	4	10	69 (7.0, 51)	
Front fender mounting bolt	4	6	12 (1.2, 9)	
Fork socket bolt	2	8	20 (2.0, 15)	Apply locking agent to the threads.
Handle upper holder bolt	4	8	27 (2.8, 20)	
Handle lower holder nut	2	10	39 (4.0, 29)	U-nut
Handlebar post bolt	2	12	128 (13.1, 94)	ALOC bolt; replace with a new one.
Front brake disc socket bolt	6	8	42 (4.3, 31)	ALOC bolt; replace with a new one.
Front pulser ring torx bolt (ABS type only)	3	5	7.0 (0.7, 5.2)	ALOC bolt; replace with a new one.
Front axle bolt	1	16	69 (7.0, 51)	
Front axle pinch bolt (left side only)	1	8	22 (2.2, 16)	
Front brake caliper mounting bolt	2	8	30 (3.1, 22)	ALOC bolt; replace with a new one.
Rearview mirror lock nut	2	10	34 (3.5, 25)	Left-hand threads
Rearview mirror adapter bolt	2	10	34 (3.5, 25)	

### REAR WHEEL/PARKING BRAKE/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Swingarm mounting bolt	2	10	49 (5.0, 36)	
Rear axle nut	1	16	118 (12.0, 87)	U-nut Apply oil to the threads.
Rear brake disc socket bolt	4	8	42 (4.3, 31)	ALOC bolt; replace with a new one.
Rear pulser ring torx bolt (ABS type only)	4	5	7.0 (0.7, 5.2)	ALOC bolt; replace with a new one.
Rear shock absorber upper/lower mounting bolt	4	10	39 (4.0, 29)	
Rear brake caliper mounting bolt	2	8	30 (3.1, 22)	ALOC bolt; replace with a new one.
Parking brake arm bolt (AC type only)	1	6	10 (1.0, 7)	

**HYDRAULIC BRAKE SYSTEM**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Caliper bleed valve	3	8	5.4 (0.6, 4.0)	
Front caliper pad pin	1	10	17 (1.7, 13)	
Master cylinder reservoir cap screw	4	4	1.5 (0.2, 1.1)	
Brake hose oil bolt	5	10	34 (3.5, 25)	
Brake pipe joint nut	2	10	14 (1.4, 10)	Apply brake fluid to the threads.
Brake lever pivot bolt	2	6	1.0 (0.1, 0.7)	
Brake lever pivot nut	2	6	6.0 (0.6, 4.4)	
Brake light switch screw	1	4	1.2 (0.1, 0.9)	
Brake light/inhibitor switch screw	2	4	1.2 (0.1, 0.9)	
Master cylinder holder bolt	4	6	12 (1.2, 9)	
Front brake caliper mounting bolt	2	8	30 (3.1, 22)	ALOC bolt; replace with a new one.
Rear brake caliper mounting bolt	2	8	30 (3.1, 22)	ALOC bolt; replace with a new one.
Front caliper pin bolt	1	8	22 (2.2, 16)	Apply locking agent to the threads.
Front caliper bracket pin bolt	1	8	12 (1.2, 9)	Apply locking agent to the threads.
Rear caliper bolt	1	8	22 (2.2, 16)	ALOC bolt; replace with a new one.
Rear caliper pin bolt	1	8	22 (2.2, 16)	Apply locking agent to the threads.

**ANTI-LOCK BRAKE SYSTEM**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake pipe joint nut	6	10	14 (1.4, 10)	Apply brake fluid to the threads.
Speed sensor protector socket bolt A	3	6	10 (1.0, 7)	ALOC bolt; replace with a new one.
Speed sensor protector socket bolt B	1	6	10 (1.0, 7)	ALOC bolt; replace with a new one.

**LIGHTS/METERS/SWITCHES**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Sidestand switch bolt	1	6	10 (1.0, 7)	ALOC bolt; replace with a new one.
Speed sensor protector socket bolt A	3	6	10 (1.0, 7)	ALOC bolt; replace with a new one.
Speed sensor protector socket bolt B	1	6	10 (1.0, 7)	ALOC bolt; replace with a new one.
EOP switch terminal screw	1	4	1.9 (0.2, 1.4)	
Combination meter mounting screw	4	5	1.1 (0.1, 0.8)	
License light cover screw	2	4	1.0 (0.1, 0.7)	
Opener cover screw	2	4	1.1 (0.1, 0.8)	
Parking brake switch screw (AC type only)	1	3	1.5 (0.2, 1.1)	

## GENERAL INFORMATION

# LUBRICATION & SEAL POINTS

## ENGINE

MATERIAL	LOCATION	REMARKS
Liquid sealant (ThreeBond 1207B or 1215 or equivalent)	Final reduction case mating surface	See page 13-10
	Crankcase mating surface	See page 15-14
Liquid sealant (ThreeBond 1211 or Shin-Etsu Silicone KE45T or equivalent)	Cylinder head semi-circular cut-out	See page 10-5
Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	Water pump shaft journal	
	Water pump shaft thrust washer sliding surface	
	Camshaft cam lobes and bearing	
	Rocker arm shaft sliding surface	
	Rocker arm roller sliding area	
	Valve stem (valve guide sliding surface)	
	Piston pin outer surface	
	Connecting rod small end inner surface	
	Crankpin bearing sliding surface	
	Starter driven gear inner surface (crankshaft sliding area)	
	Crankshaft thrust surface	
	Crankshaft journal	
	Oil filter cartridge O-ring	
Engine oil	Injector seal ring	
	Oil pump rotors and shaft sliding surface	
	Oil pump drive chain	
	Cam sprocket teeth	
	Cam chain	
	Piston pin hole inner surface, rings, ring groove and sliding surface	
	Piston and cylinder wall	
	Final reduction gear teeth and journals	
	Starter sprag clutch outer surface	
	Starter driven gear boss outer surface and gear teeth	
	Starter reduction gear teeth and sliding surface	
	Starter reduction gear shaft outer surface	
	Timing sprocket teeth	
	Oil pump driven sprocket teeth	
	Starter motor pinion gear teeth	
	Each bearing rotating area	
	Each O-ring	
Molybdenum disulfide paste (SUMICO MOLYPASTE 500 or equivalent)	Engine mounting bushing groove	Fill up 0.5 – 0.7 g (0.018 – 0.025 oz)
Molybdenum disulfide grease	Engine mounting bushing O-ring	
Molybdenum disulfide paste (SUMICO MOLYPASTE 300 or 500 or equivalent)	Drive shaft bearing collar groove	Fill up
Grease (Shell ALVANIA R3 or SHIN-NIHON POWERNOC WB3 or IDEMITSU AUTOREX B or equivalent)	Driven face boss inner surface	Fill up 5 – 7 g (0.18 – 0.25 oz)
	Movable driven face guide grooves (guide pin areas)	Fill up 4 – 5 g (0.14 – 0.18 oz)
Multi-purpose grease	Driven face ball and needle bearing	
	Each oil seal lips	
	Final gear shaft outer surface (swingarm bearing fitting area)	
	Final gear shaft groove	Apply 0.03 – 0.04 g (0.0011 – 0.0014 oz)
Locking agent (ThreeBond 2415 or 1322N or Loctite DL-200 or 648 or equivalent)	Starter driven gear guide bolt threads	See page 14-10
Degreasing	Flywheel tapered area	
	Water pump shaft (mechanical seal area)	
	Drive/driven pulley face and drive belt	

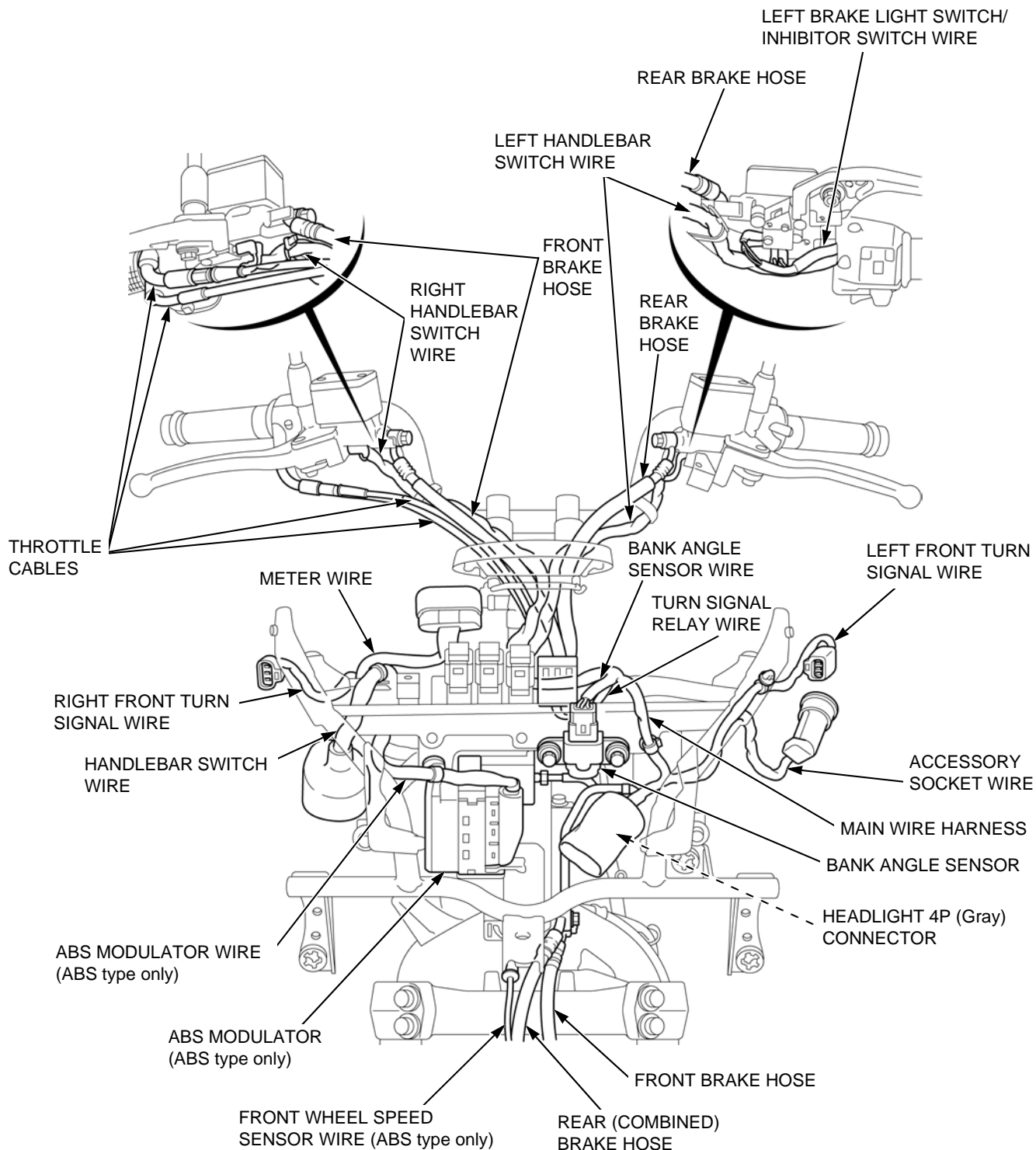
FRAME

MATERIAL	LOCATION	REMARKS
Engine oil	Each O-ring	
Multi-purpose grease	Sidestand pivot sliding area	
	Centerstand pivot inside	Apply 3.0 g (0.11 oz) minimum
	Centerstand shaft sliding surface	
	Throttle pipe flange groove and cable end	Apply 0.1 – 0.2 g (0.004 – 0.007 oz)
	Front axle outer surface	
	Front wheel dust seal lips	
	Swingarm dust seal lips	
	Passenger footpeg contact area	
	Anchor pin sliding surface (AC type only)	Apply 0.03 – 0.05 g (0.001 – 0.002 oz)
	Brake cam sliding surface (AC type only)	Apply 0.06 – 0.1 g (0.002 – 0.004 oz)
	Brake cam dust seal lips (AC type only)	
Molybdenum disulfide grease	Engine hanger bracket B needle bearing rolling area	
	Engine hanger bracket B dust seal lips	
	Engine hanger bracket B inner collar outer surface	
Kyodo Yushi EXCELITE EP2, Shell ALVANIA EP2 or equivalent	Steering head bearings	Apply 3 – 5 g (0.1 – 0.2 oz) each
	Steering head dust seal lips	
Silicone grease	Brake master cylinder piston boot inner surface	
	Brake lever contacting area with piston	Apply 0.1 g (0.004 oz)
	Brake lever pivot sliding area	Apply 0.1 g (0.004 oz)
	Pad pin stopper ring outer surface	
	Brake caliper dust seal	
	Brake caliper pin sliding area and boot	Apply 0.4 g (0.01 oz) minimum
	Brake caliper bracket pin sliding area and boot	Apply 0.4 g (0.01 oz) minimum
DOT 4 brake fluid	Master cylinder piston outer surface and cup	
	Caliper piston whole surface	
	Caliper piston seal whole surface	
Fork fluid	Fork dust seal and oil seal lips	
	Spring seat O-ring	
Honda Bond A, Honda Handgrip Cement (U.S.A. only), Loctite 495 or equivalent	Handlebar grip rubber inside	Spreading bonded area to be 80% min of contact area.

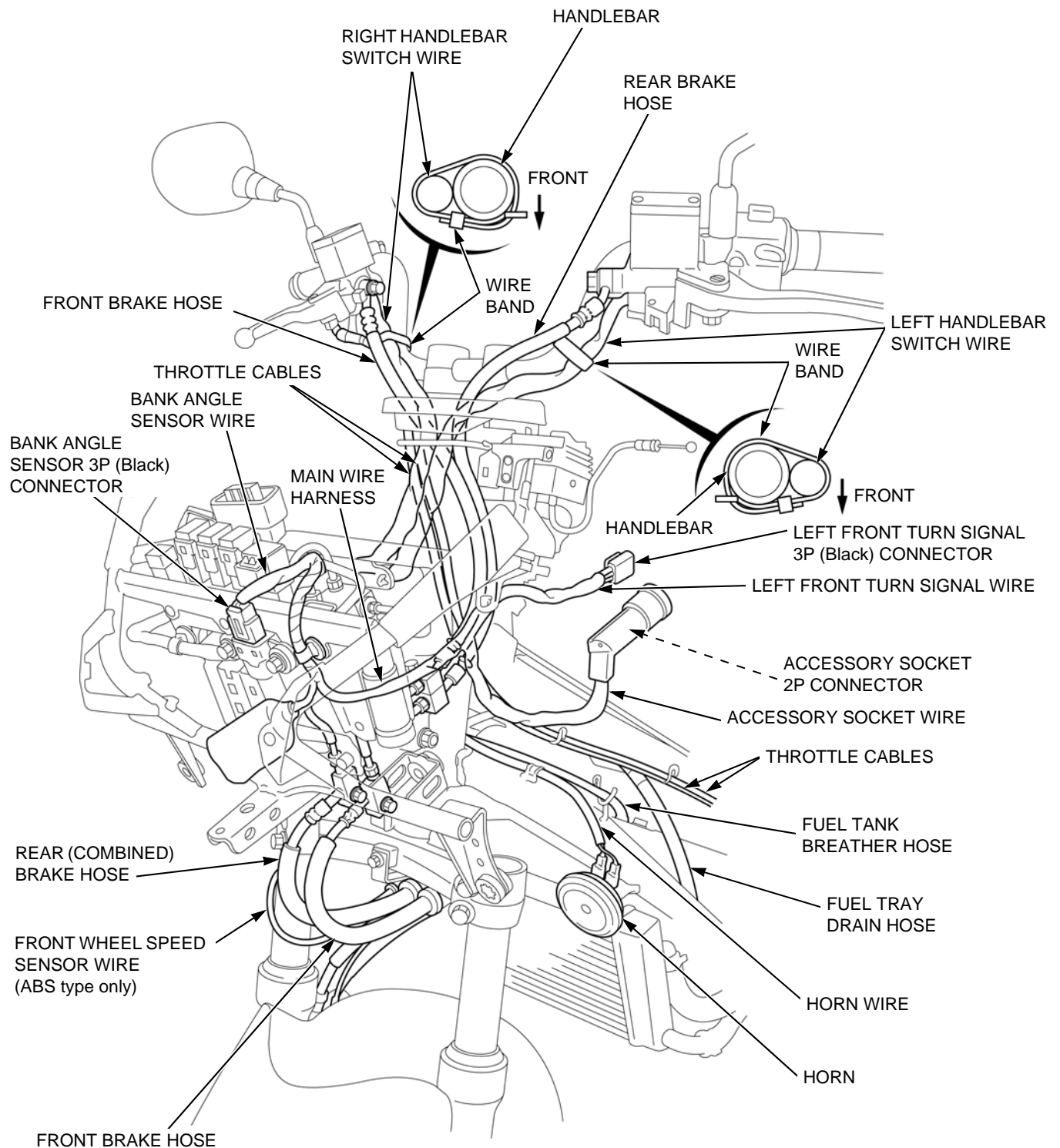
## GENERAL INFORMATION

# CABLE & HARNESS ROUTING

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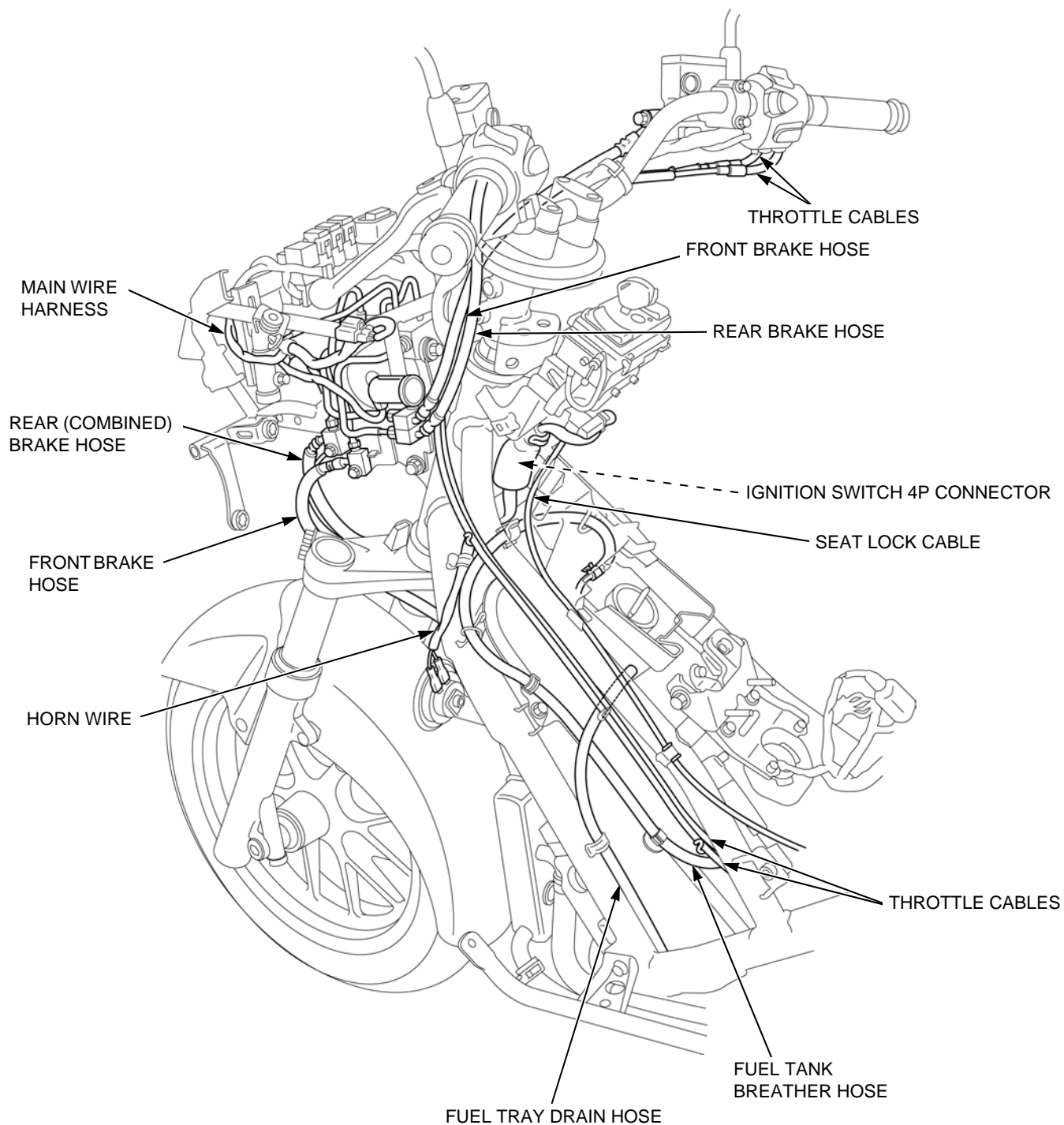


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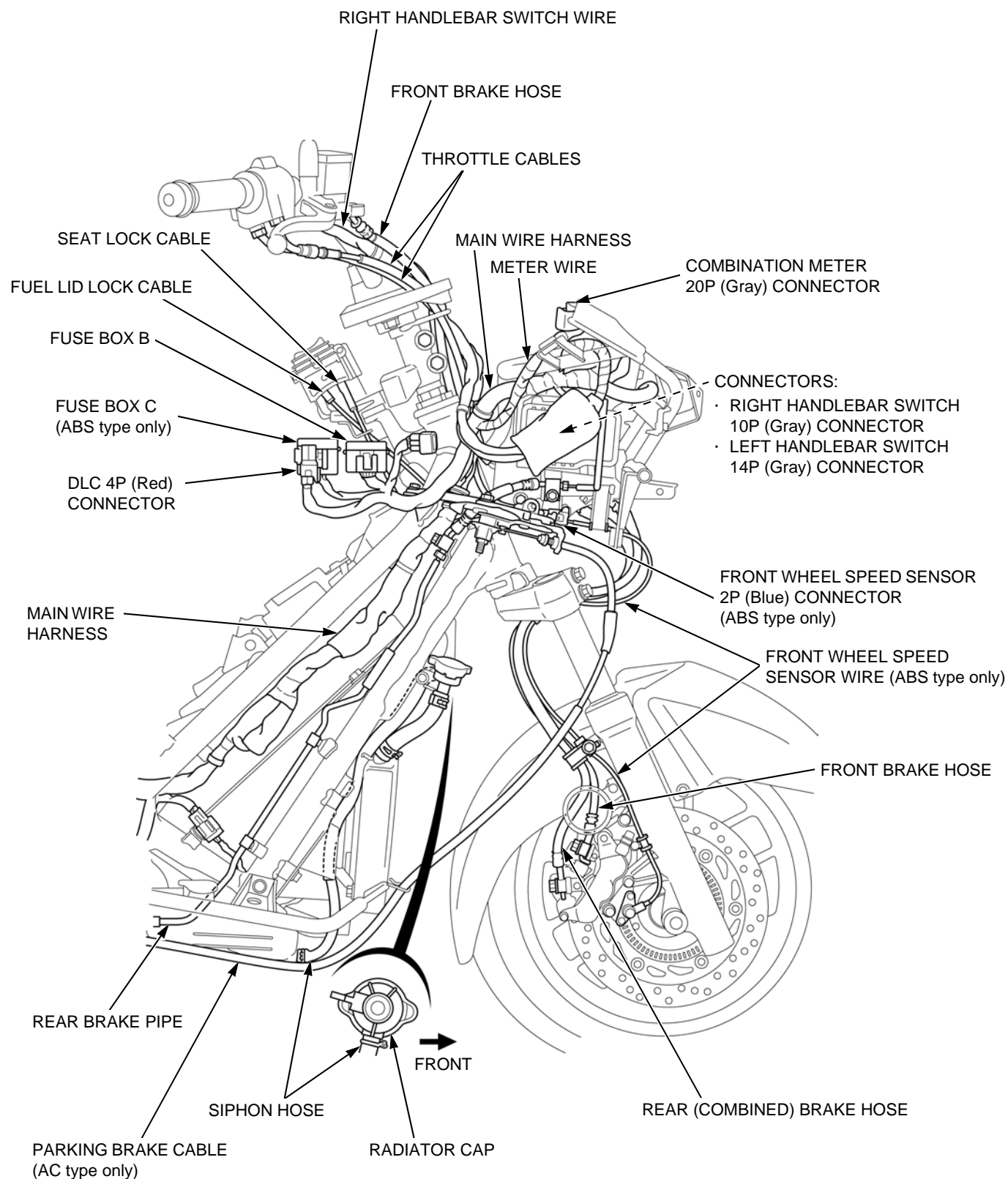
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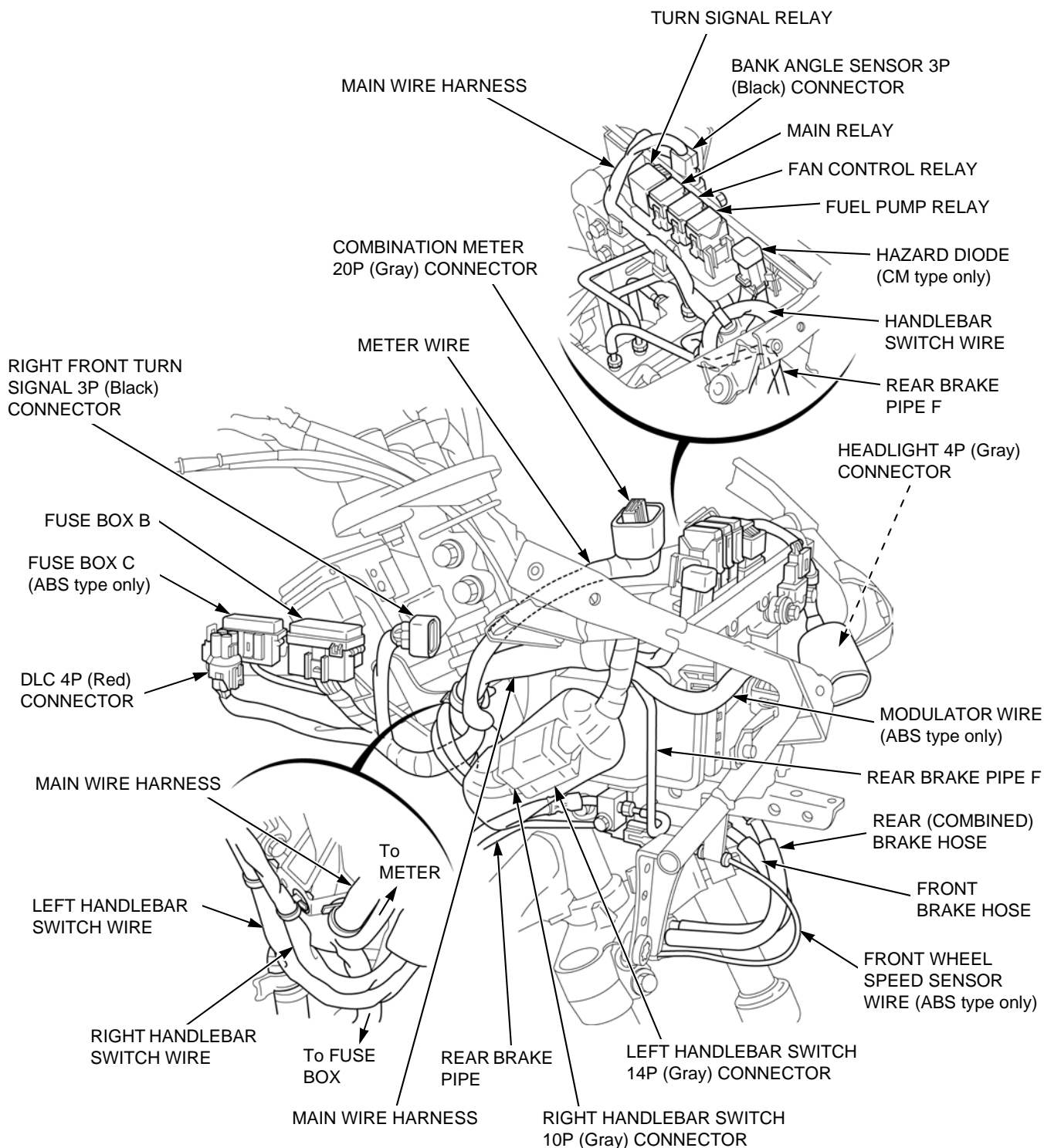


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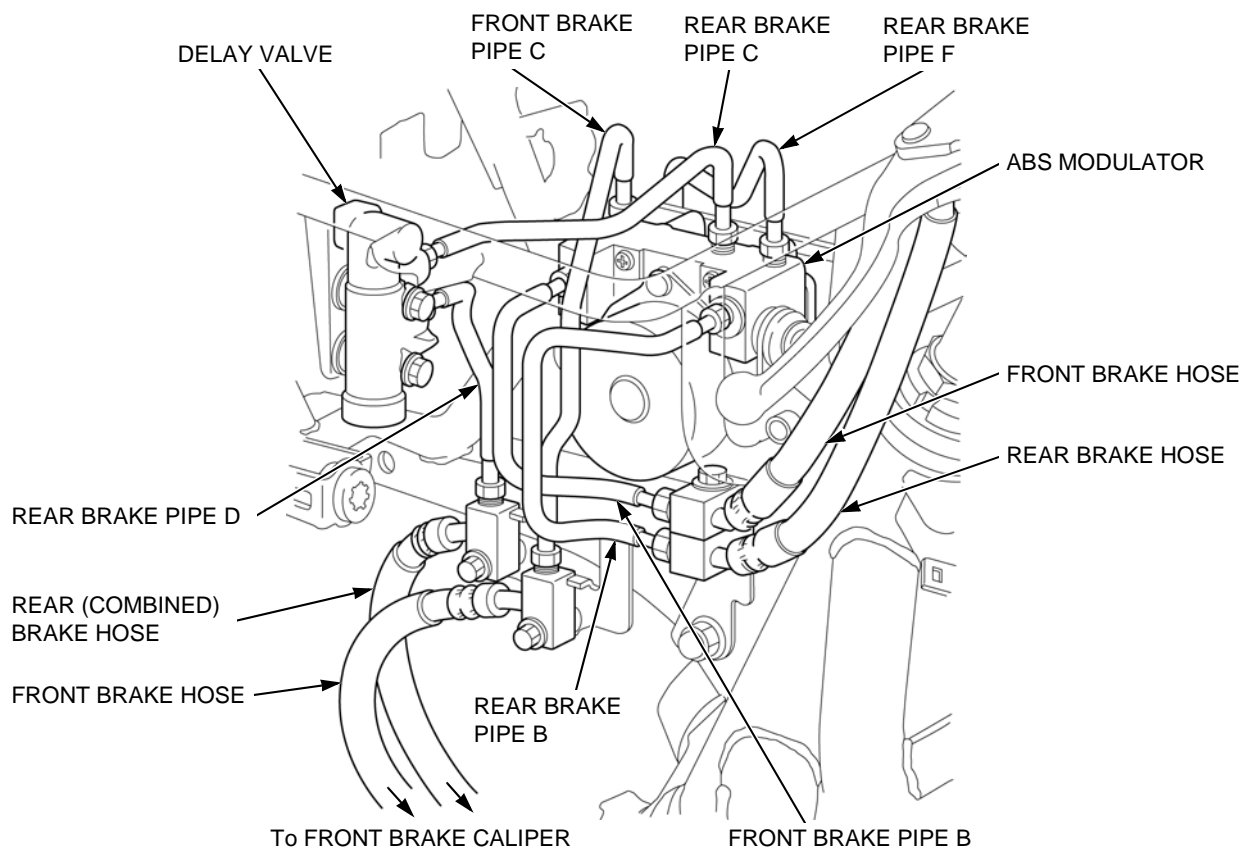


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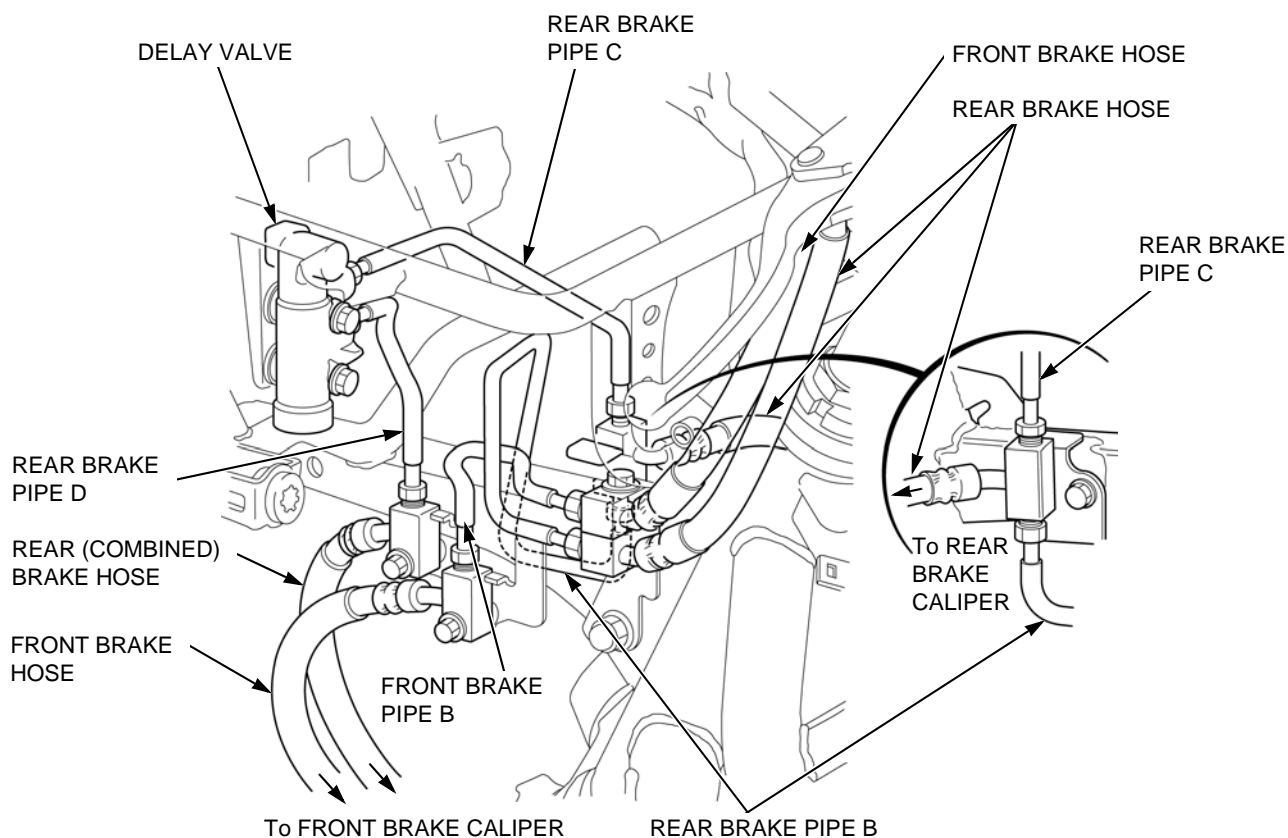
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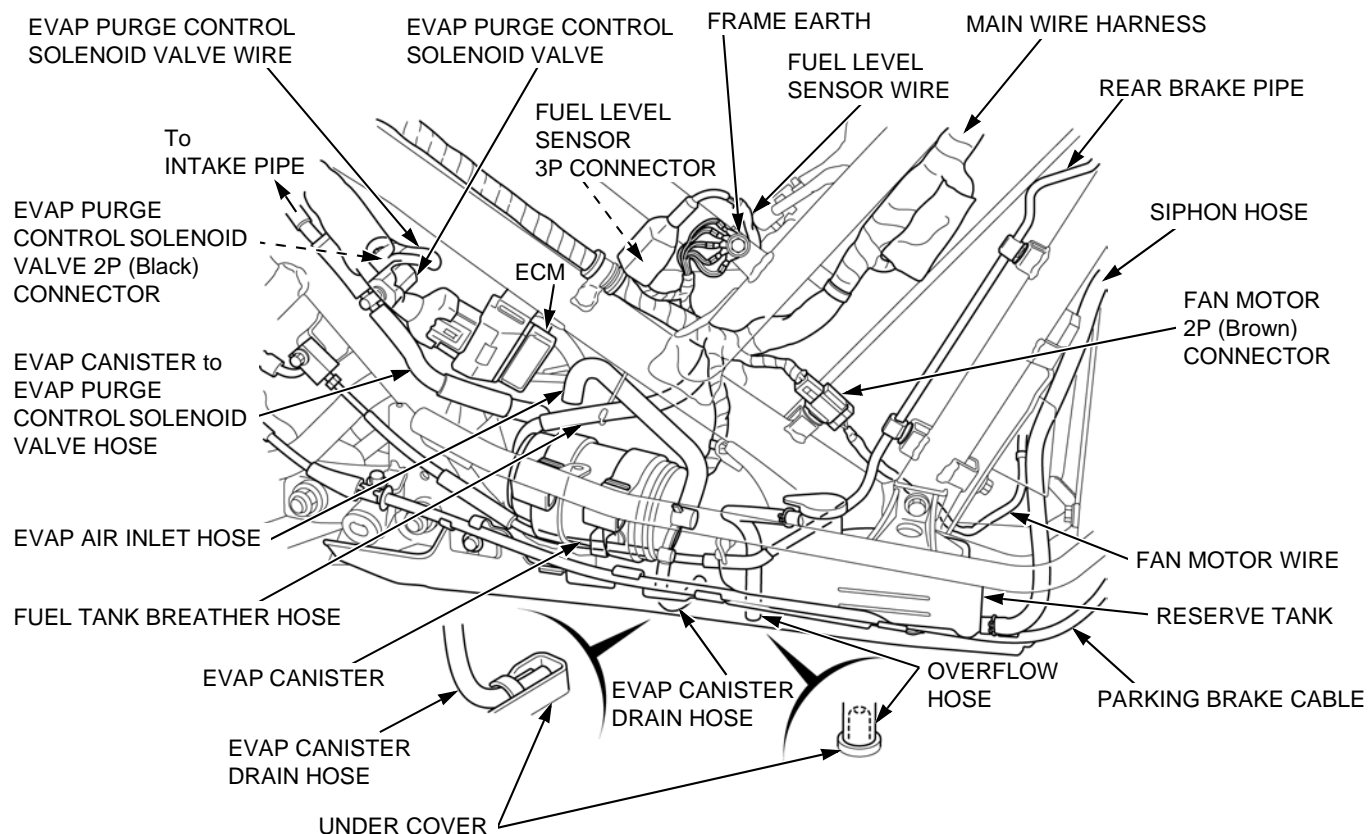


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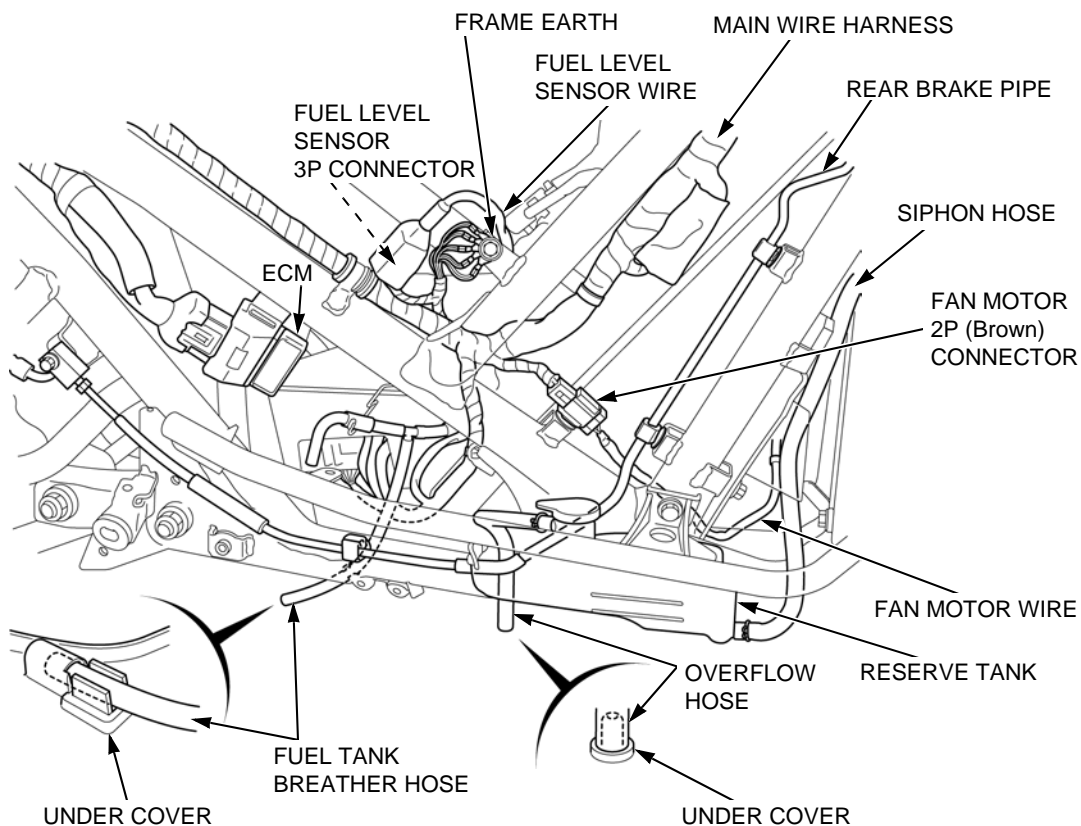


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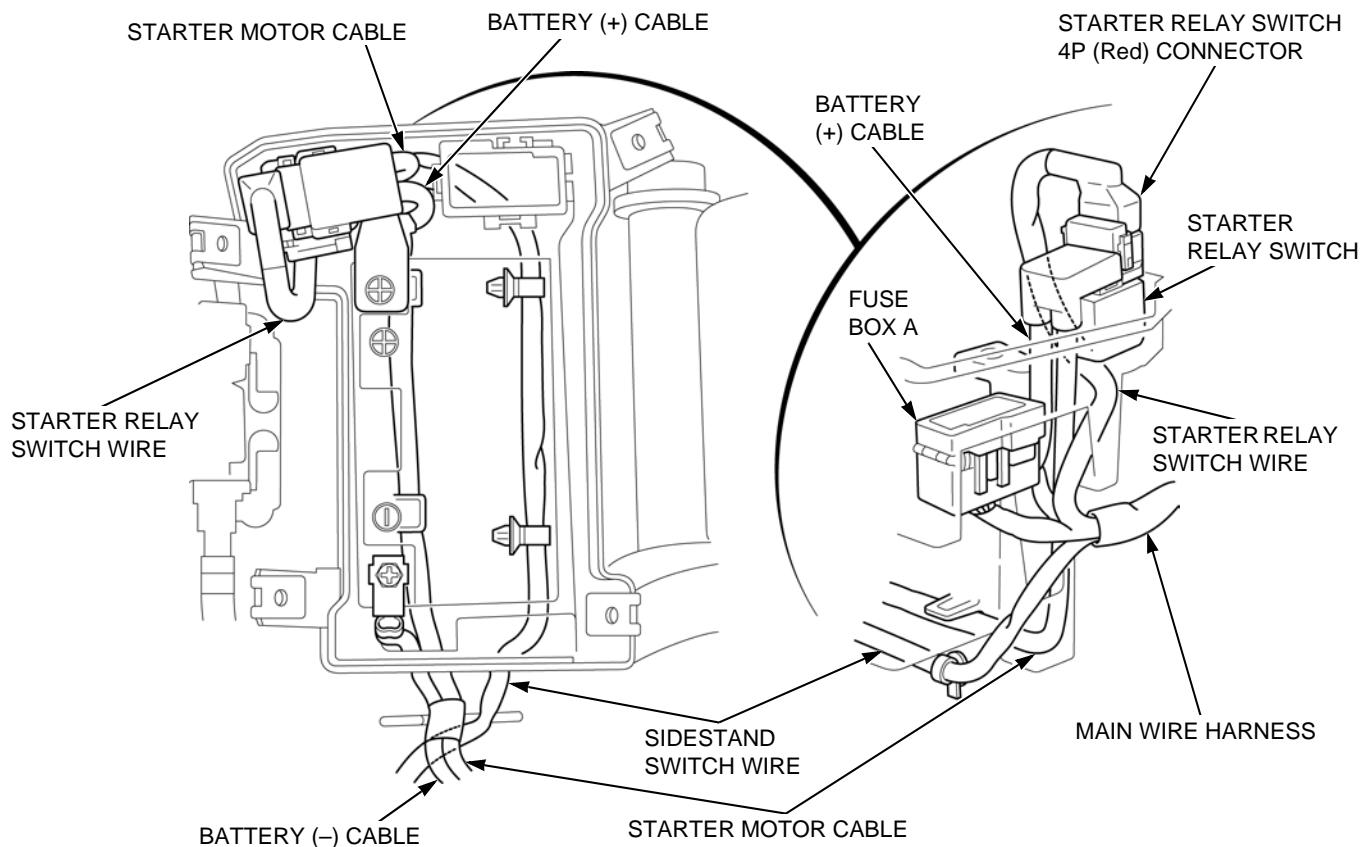
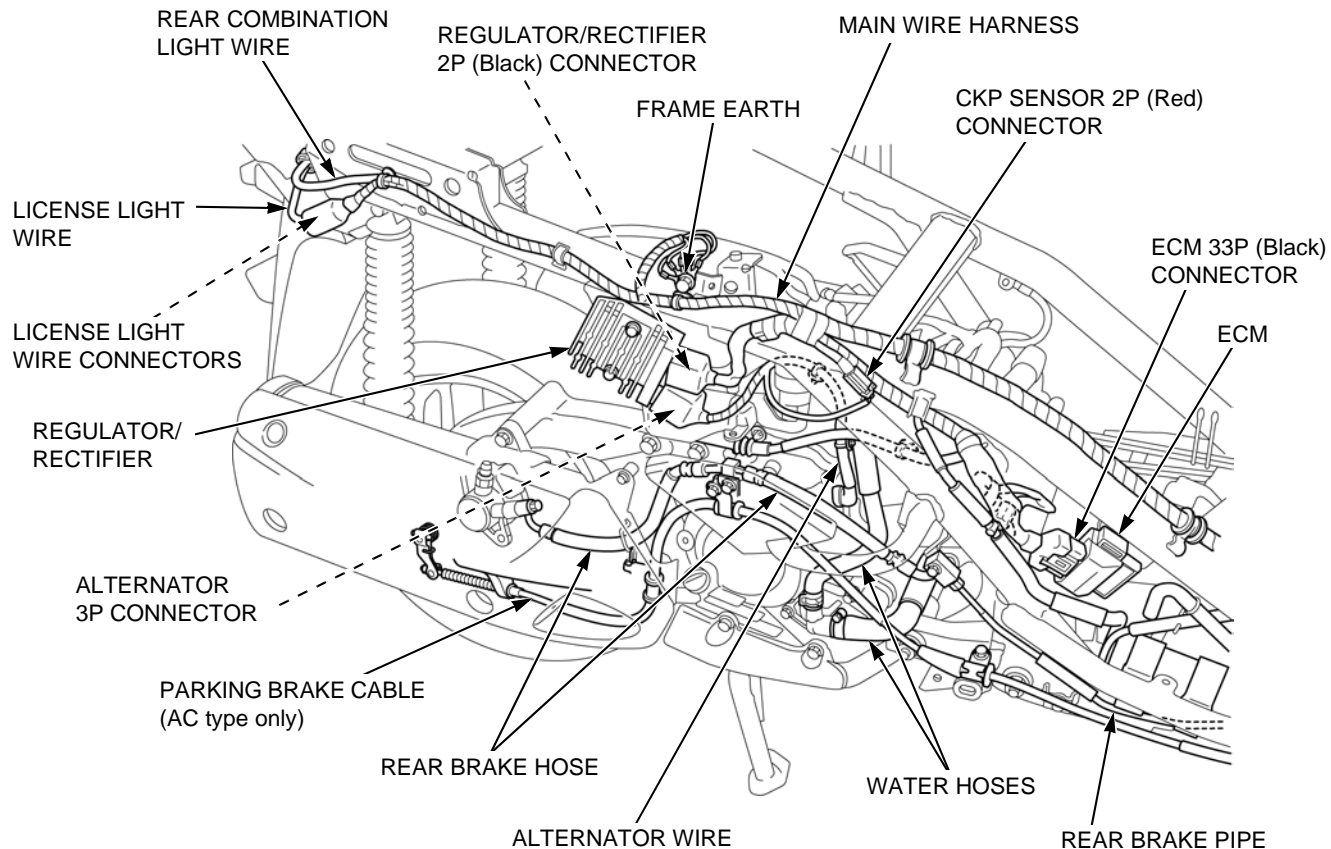
### AC type:



### CM type:

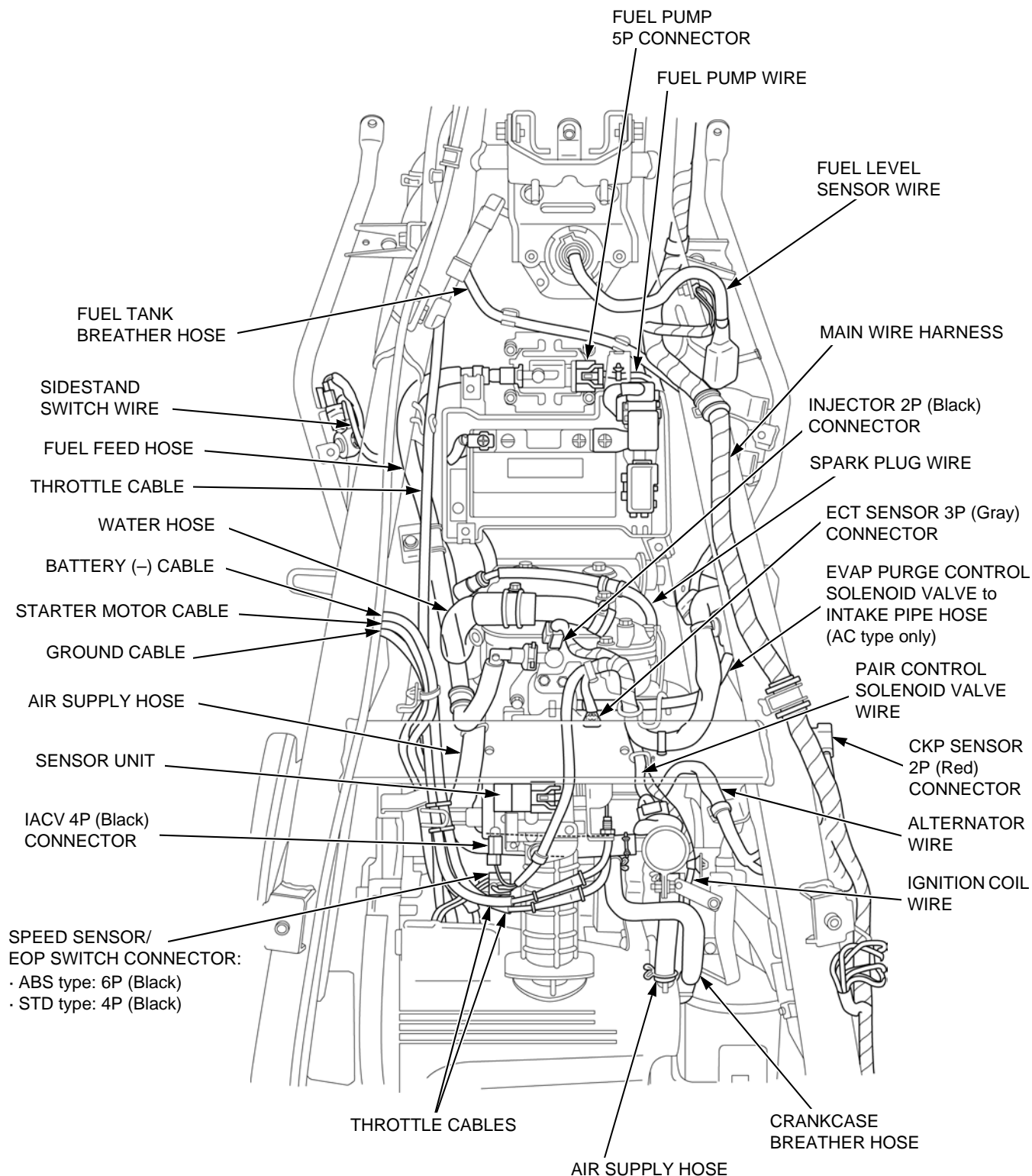


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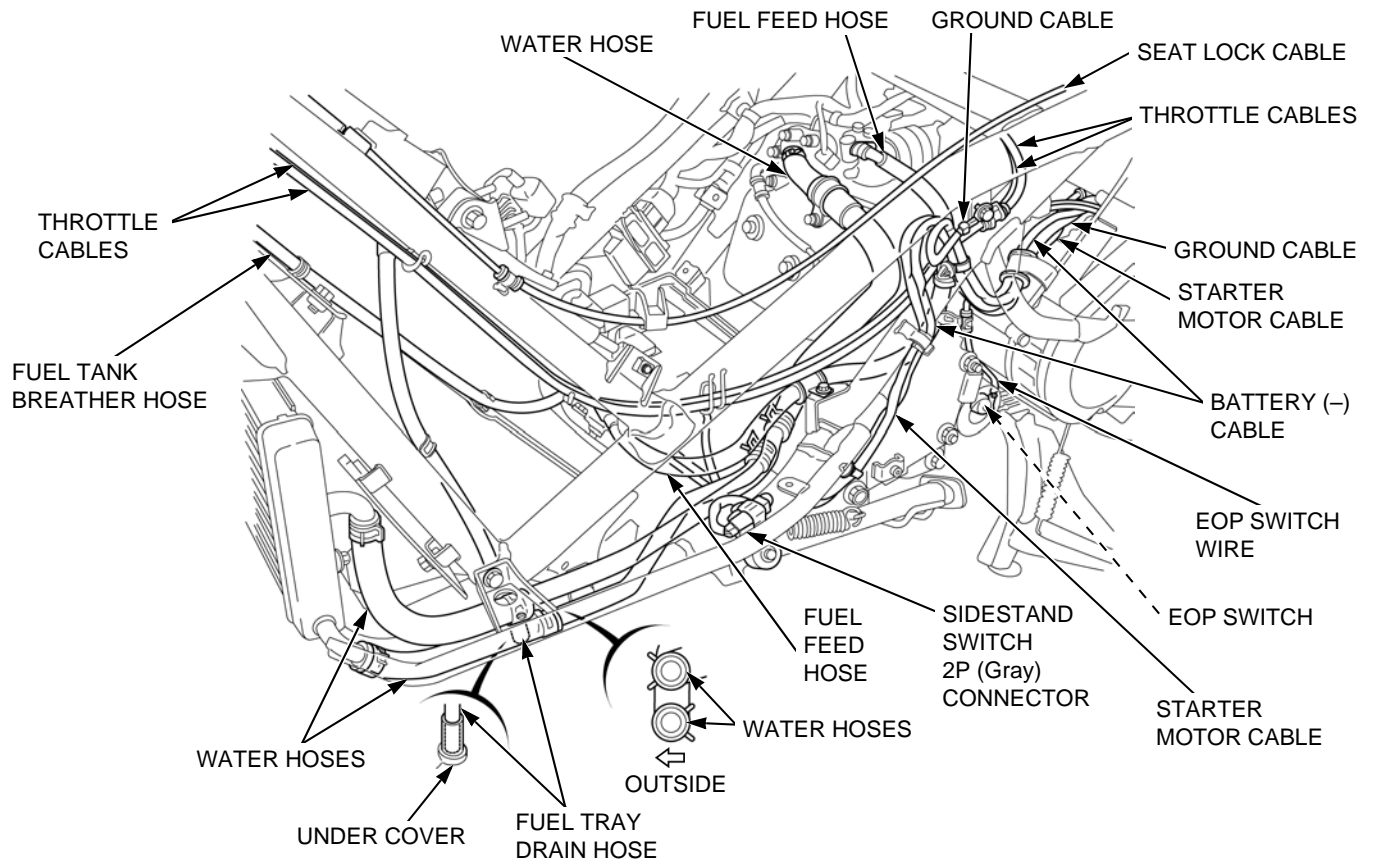


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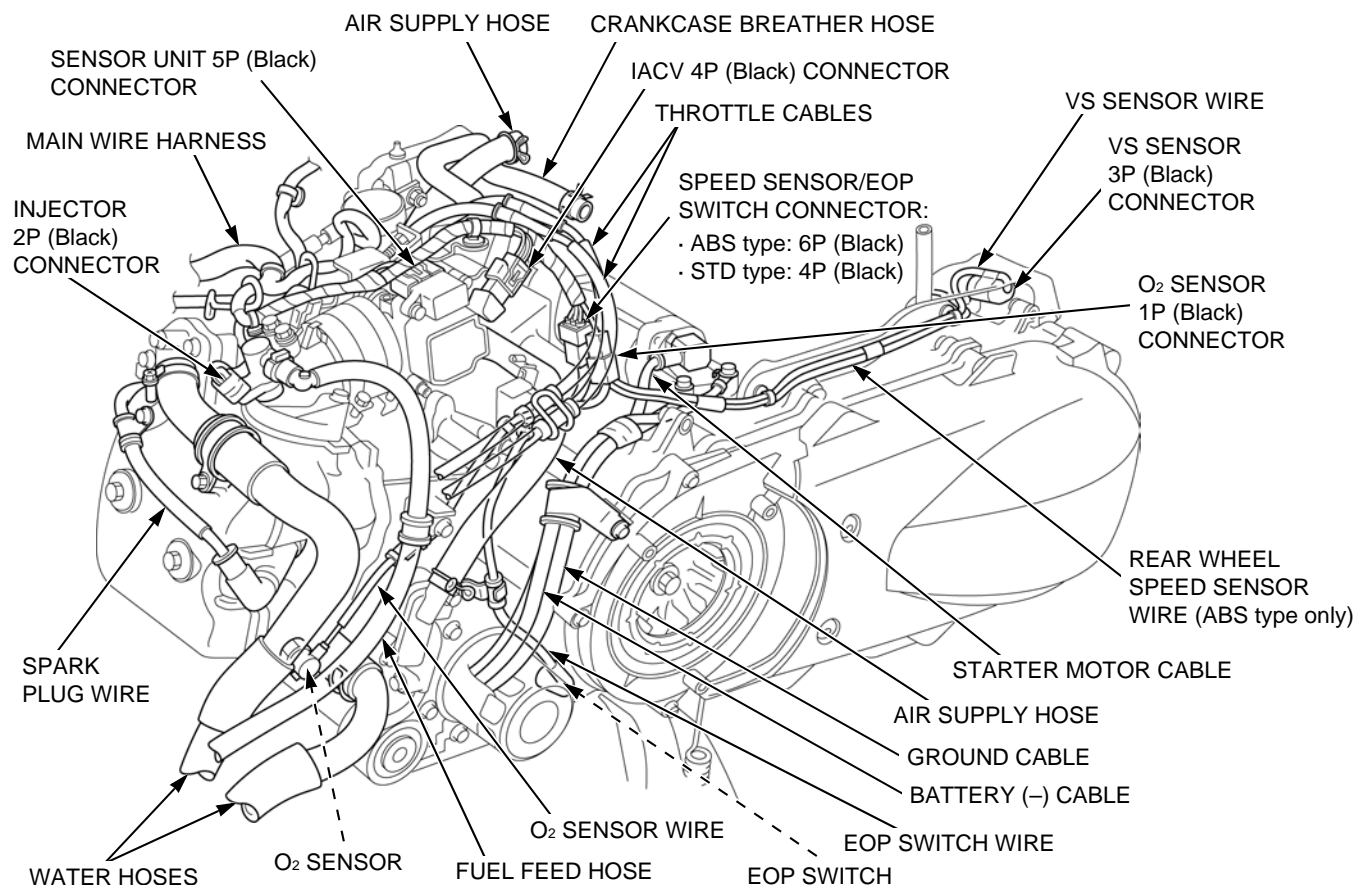
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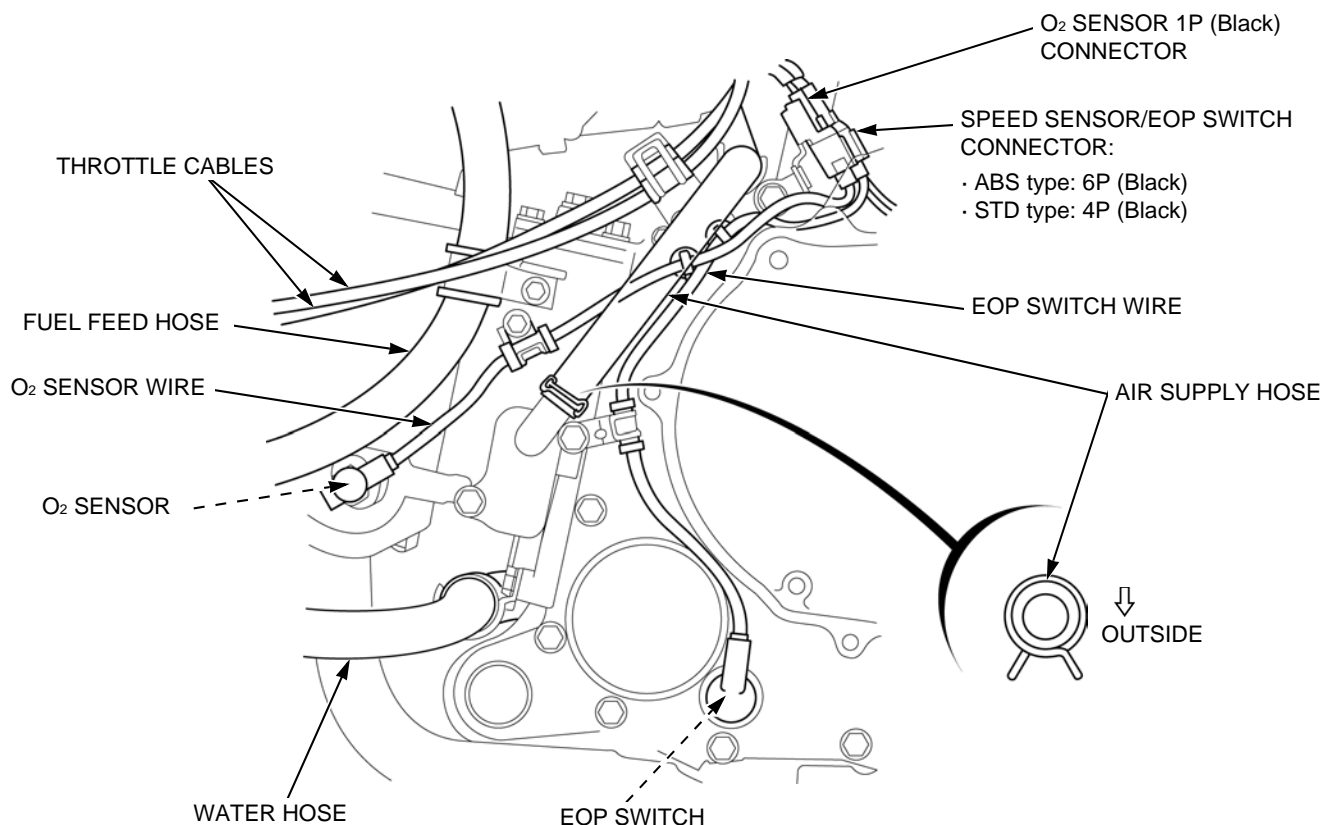


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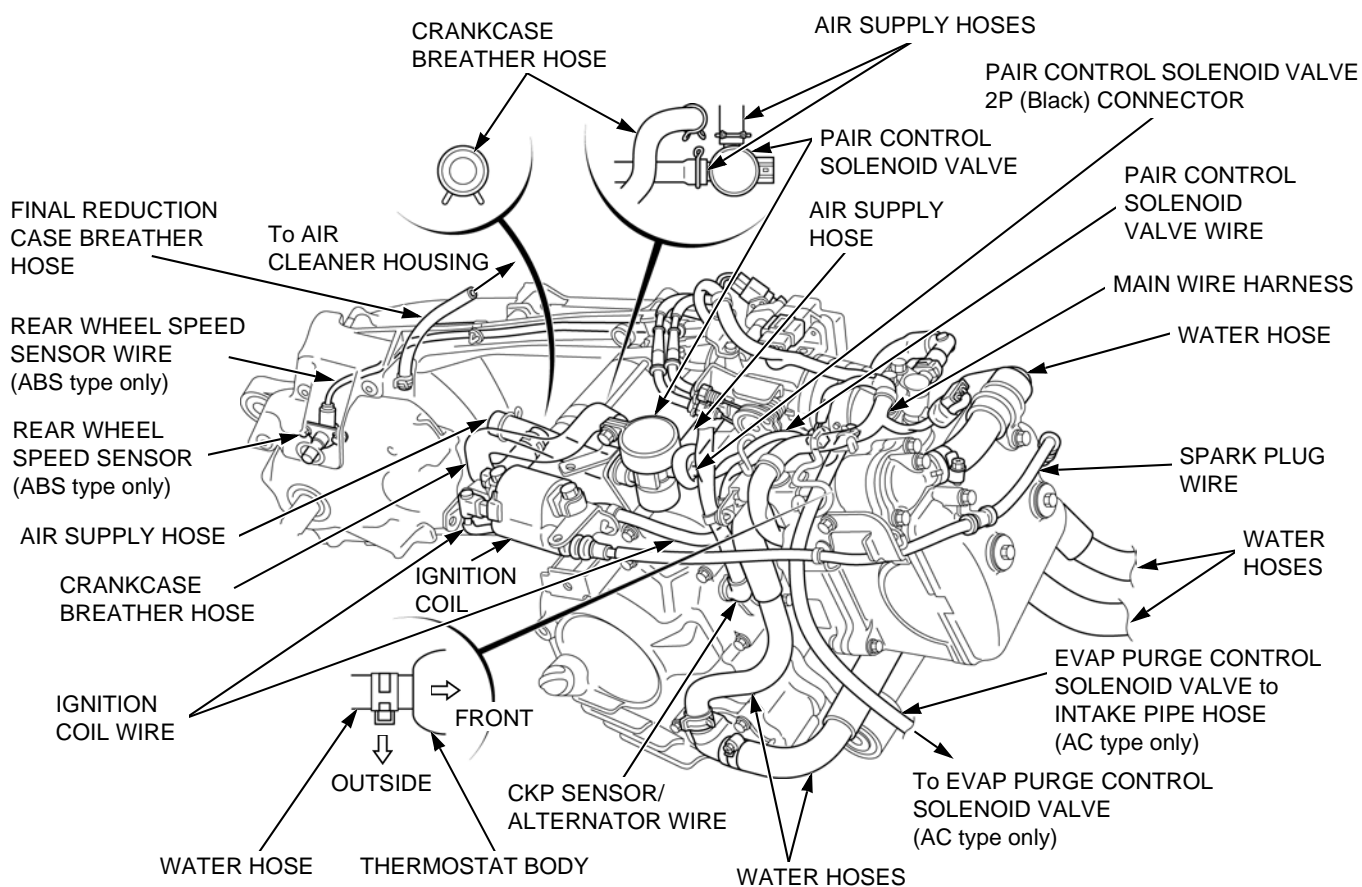


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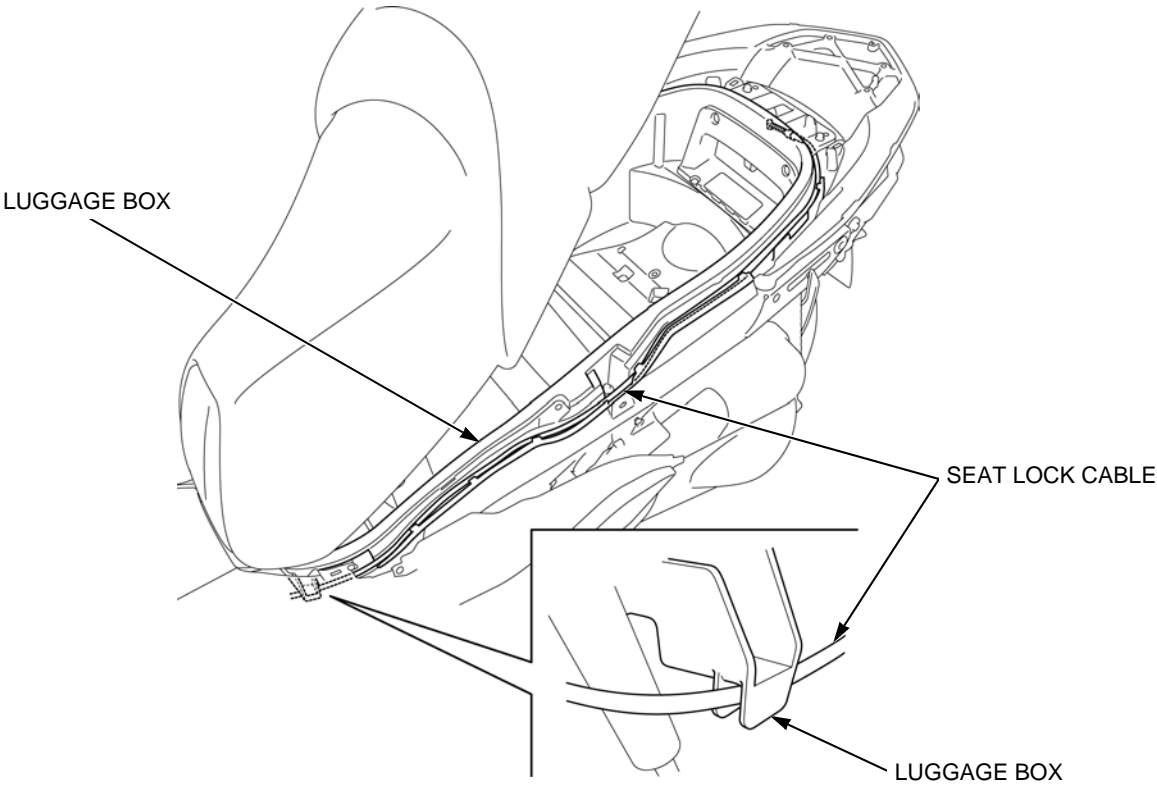
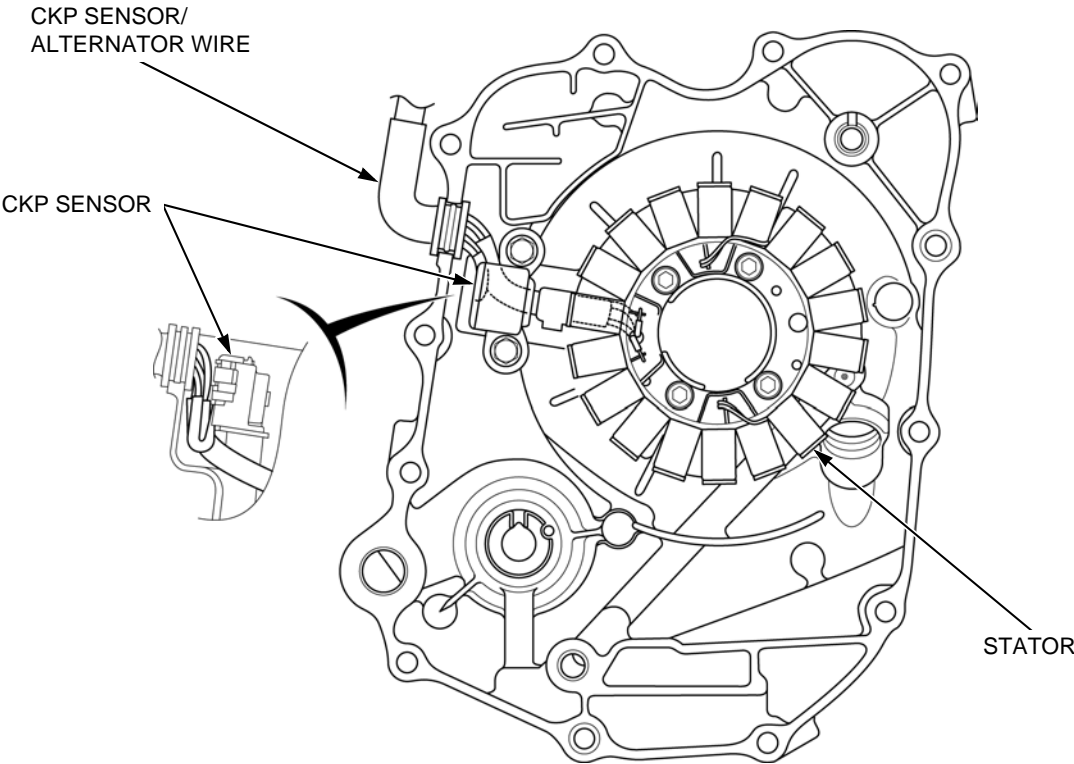
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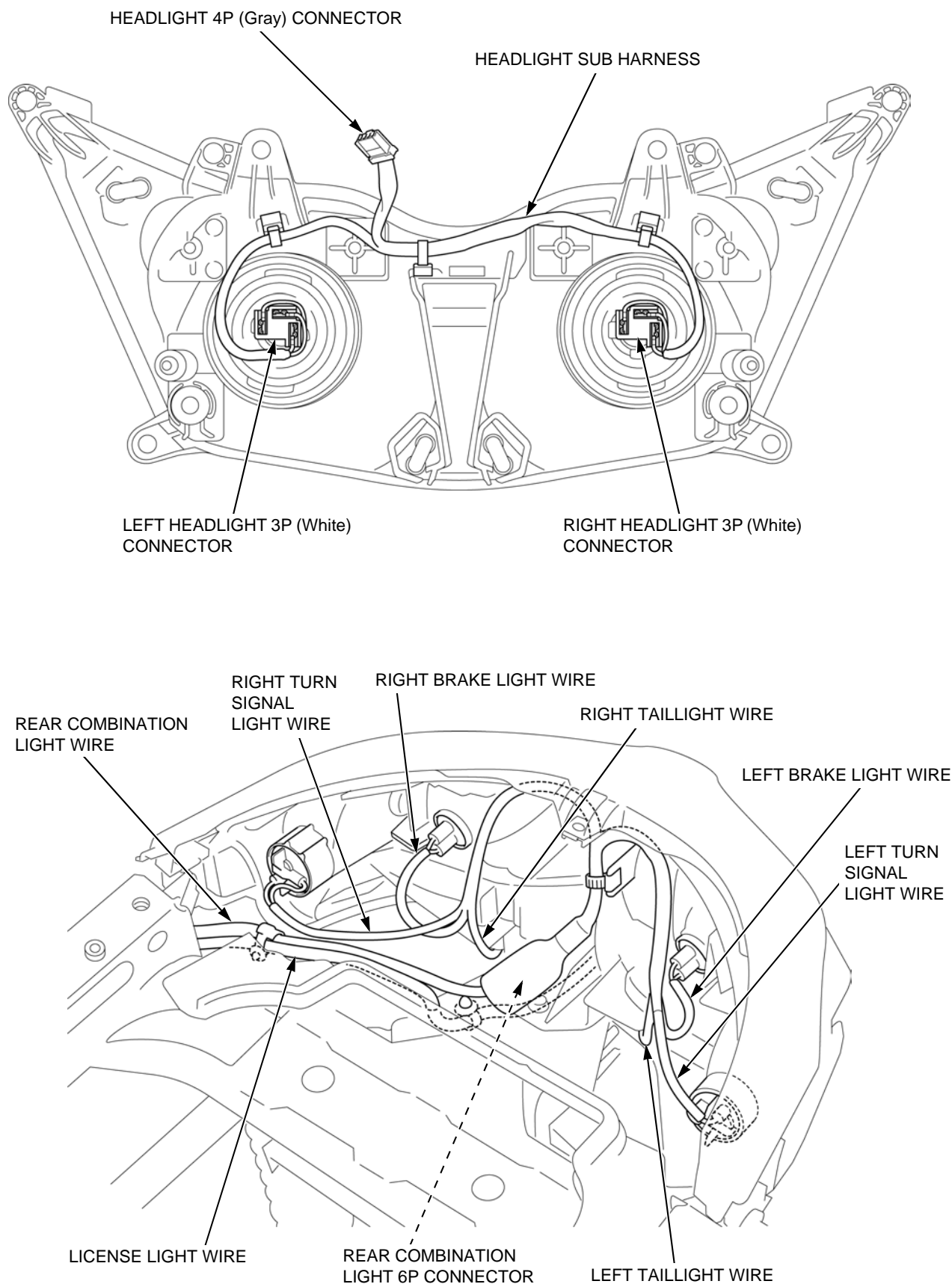






## GENERAL INFORMATION

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## EMISSION CONTROL SYSTEMS

### EXHAUST EMISSION REQUIREMENT

The U.S. Environmental Protection Agency (EPA), California Air Resources Board (CARB) and Transport Canada require manufacturers to certify that their motorcycles comply with applicable exhaust 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.

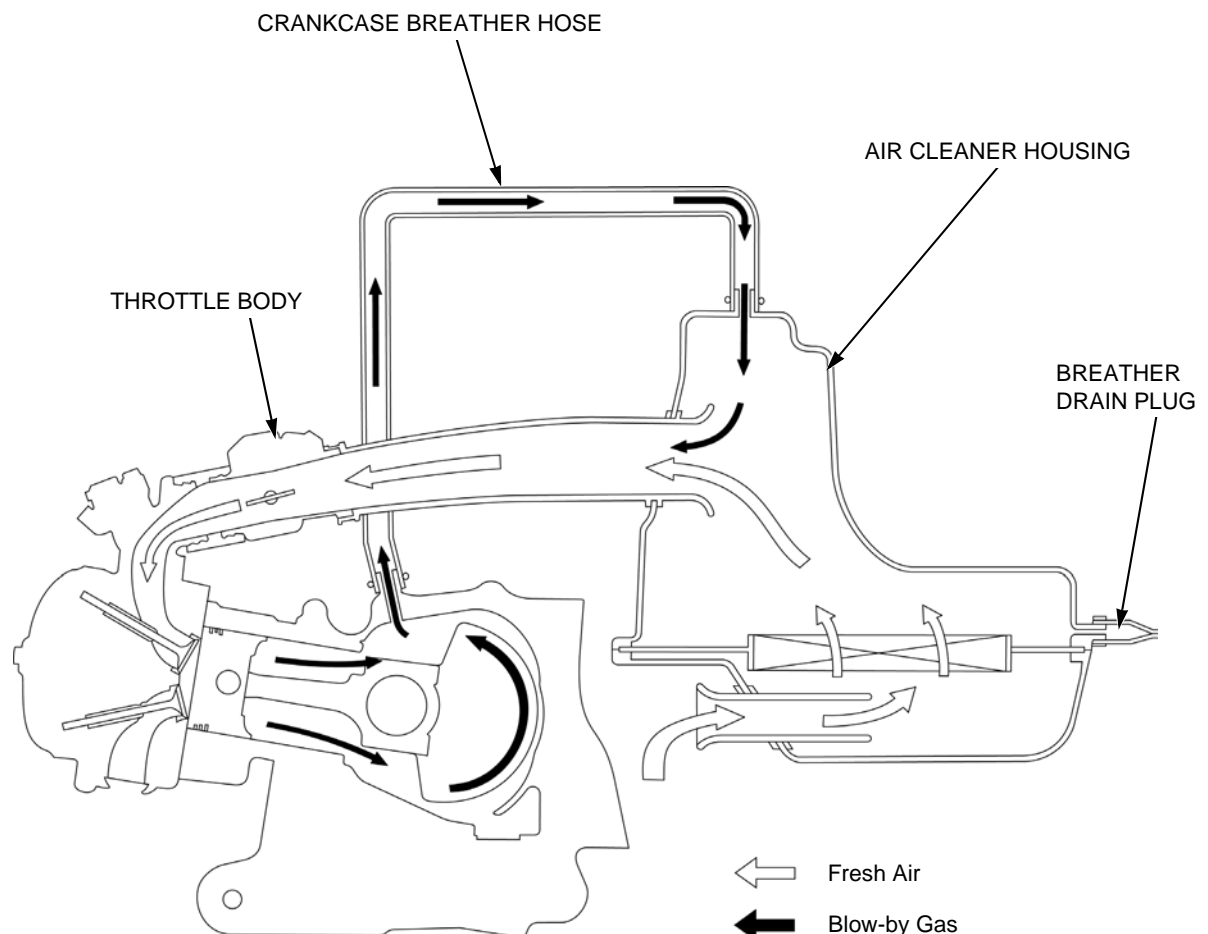
### SOURCE OF EMISSIONS

The combustion process produces carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>) and hydrocarbons (HC). Control of oxides of nitrogen and hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subject 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 systems (page 1-32) 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.



## GENERAL INFORMATION

### 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.

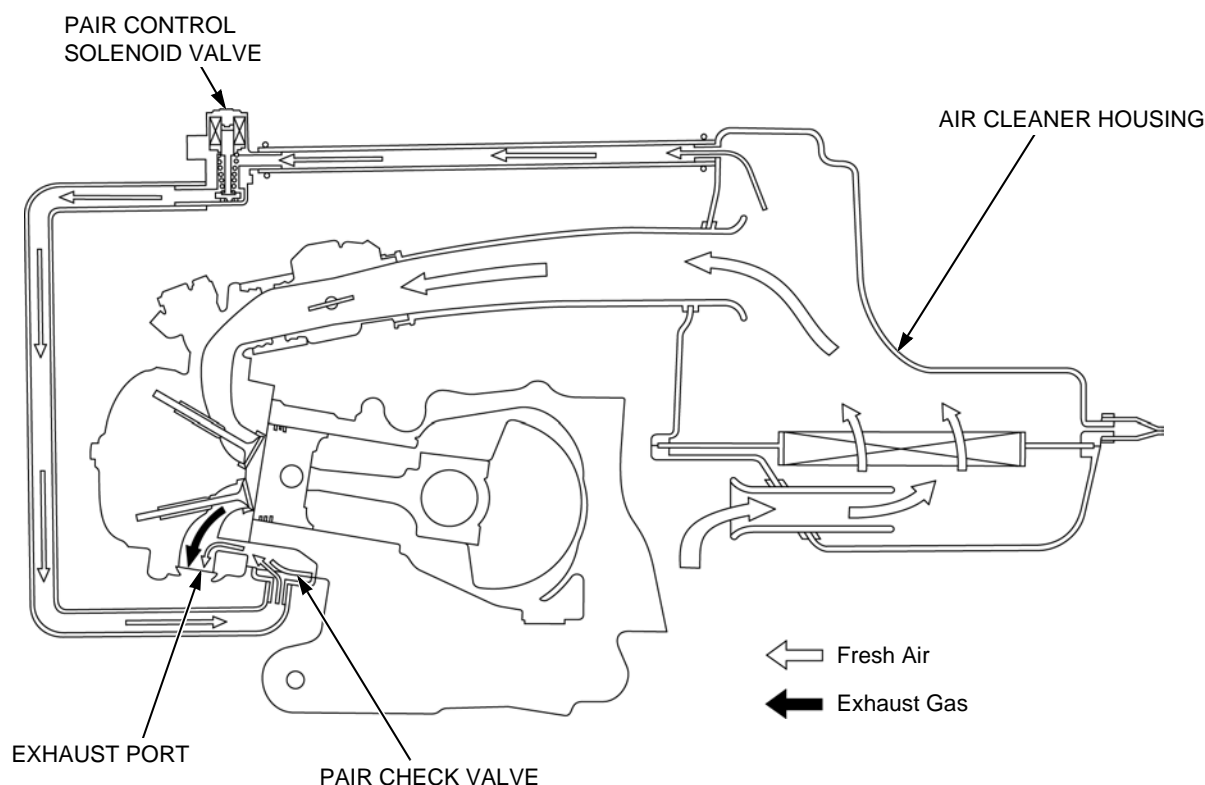
#### SECONDARY AIR SUPPLY SYSTEM

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 condition (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.



#### THREE-WAY CATALYTIC CONVERTER

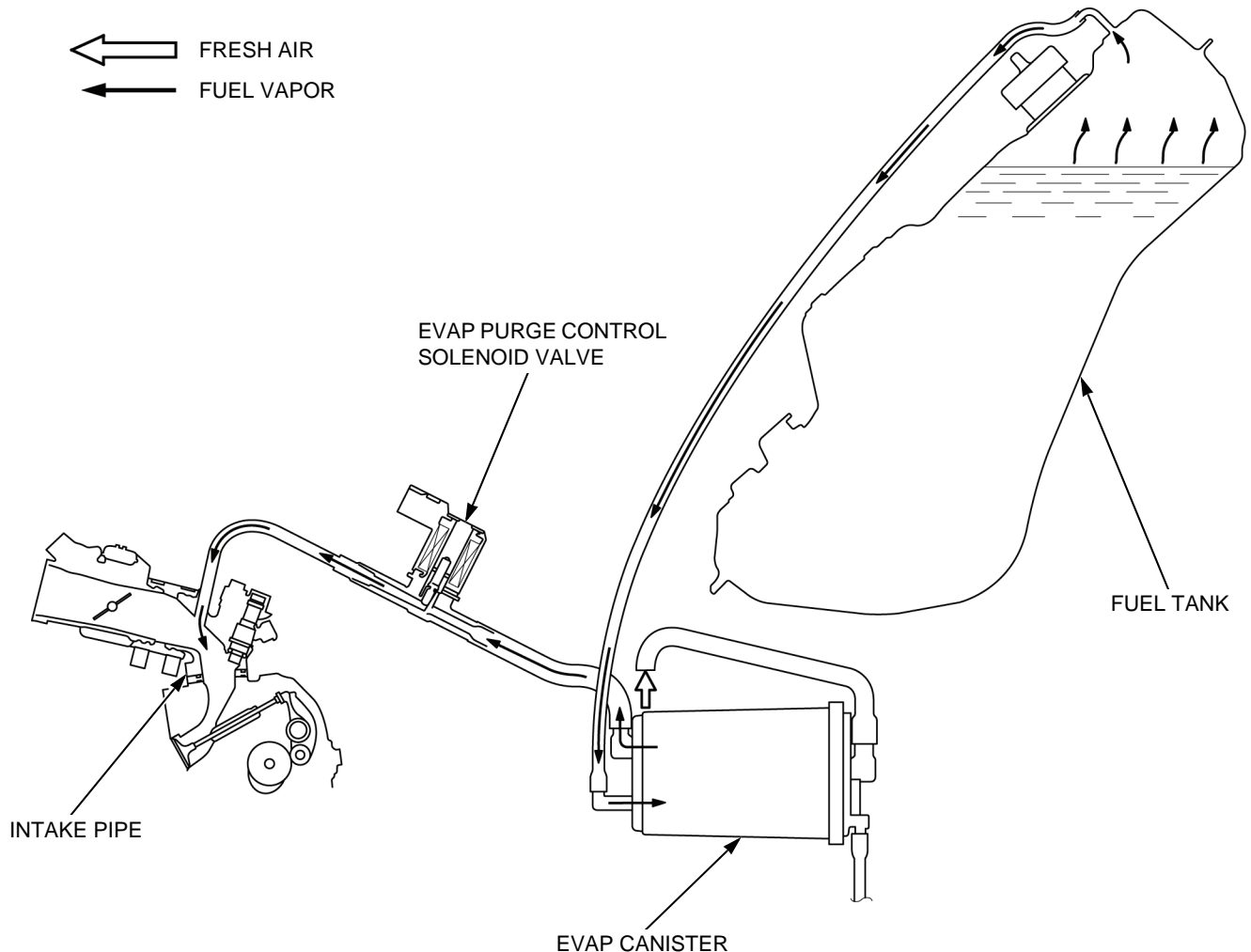
This scooter is equipped with a three-way catalytic converter.

The three-way catalytic converter is in the exhaust system. Through chemical reactions, it converts HC, CO and NO<sub>x</sub> in the engine's exhaust to carbon dioxide (CO<sub>2</sub>), nitrogen (N<sub>2</sub>), and water vapor.

No adjustment to these systems should be made although periodic inspection of the components is recommended.

**EVAPORATIVE EMISSION CONTROL SYSTEM (AC TYPE ONLY)**

This model complies with CARB evaporative emission requirements. Fuel vapor from the fuel tank is routed into the EVAP canister where it is absorbed and stored while the engine is stopped. When the engine is running and the EVAP purge control solenoid valve is open, fuel vapor in the EVAP canister is drawn into the intake pipe.

**NOISE EMISSION CONTROL SYSTEM**

**TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED:** U.S. Federal law prohibits, or Canadian provincial law may prohibit the following acts or the causing thereof: (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 scooter 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 scooter 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), the California Air Resources Board (CARB), and Environment Canada (EC). The fuel tank, fuel hoses, and fuel vapor charge hoses used on this scooter 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.

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## MEMO

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## 2. FRAME/BODY PANELS/EXHAUST SYSTEM

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# SERVICE INFORMATION

## GENERAL

- This section covers removal and installation of the body panels and exhaust system.
- When installing the covers, make sure the mating areas are aligned properly before tightening the fasteners.
- Always replace the exhaust pipe gasket after removing the exhaust system.
- When installing the exhaust system, loosely install all of the fasteners. Always tighten the exhaust joint first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

## TROUBLESHOOTING

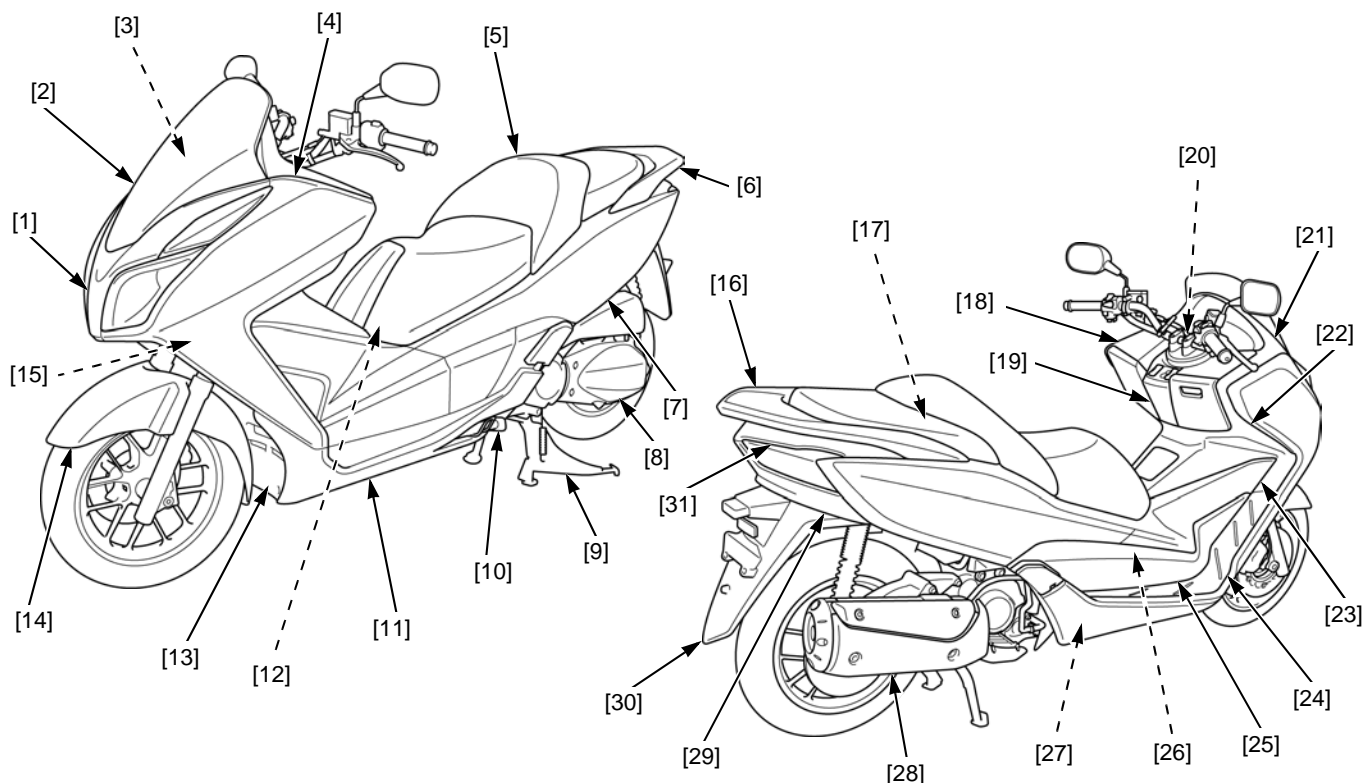
### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

### Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

## BODY PANEL LOCATIONS



[1] Screen garnish (page 2-4)

[2] Meter visor (page 2-4)

[3] Front meter panel (page 2-4)

[4] Front cover (page 2-10)

[5] Seat (page 2-15)

[6] Rear spoiler (page 2-22)

[7] Side body cover (page 2-14)

[8] Left crankcase outer cover (page 2-20)

[9] Centerstand (page 2-27)

[10] Sidestand (page 2-27)

[11] Floor skirt (page 2-6)

[12] Opener damper (page 2-16)

[13] Front lower cover (page 2-5)

[14] Front fender (page 2-9)

[15] Front center cover (page 2-5)

[16] Rear spoiler cover (page 2-20)

[17] Luggage box (page 2-21)

[18] Front panel (page 2-12)

[19] Handle post cover (page 2-12)

[20] Front handle cover (page 2-13)

[21] Meter panel (page 2-13)

[22] Inner cover (page 2-17)

[23] Front side body cover (page 2-14)

[24] Floor mat (page 2-5)

[25] Floor step (page 2-15)

[26] Battery box (page 2-24)

[27] Under cover (page 2-8)

[28] Exhaust pipe/muffler (page 2-25)

[29] Rear body lower cover (page 2-23)

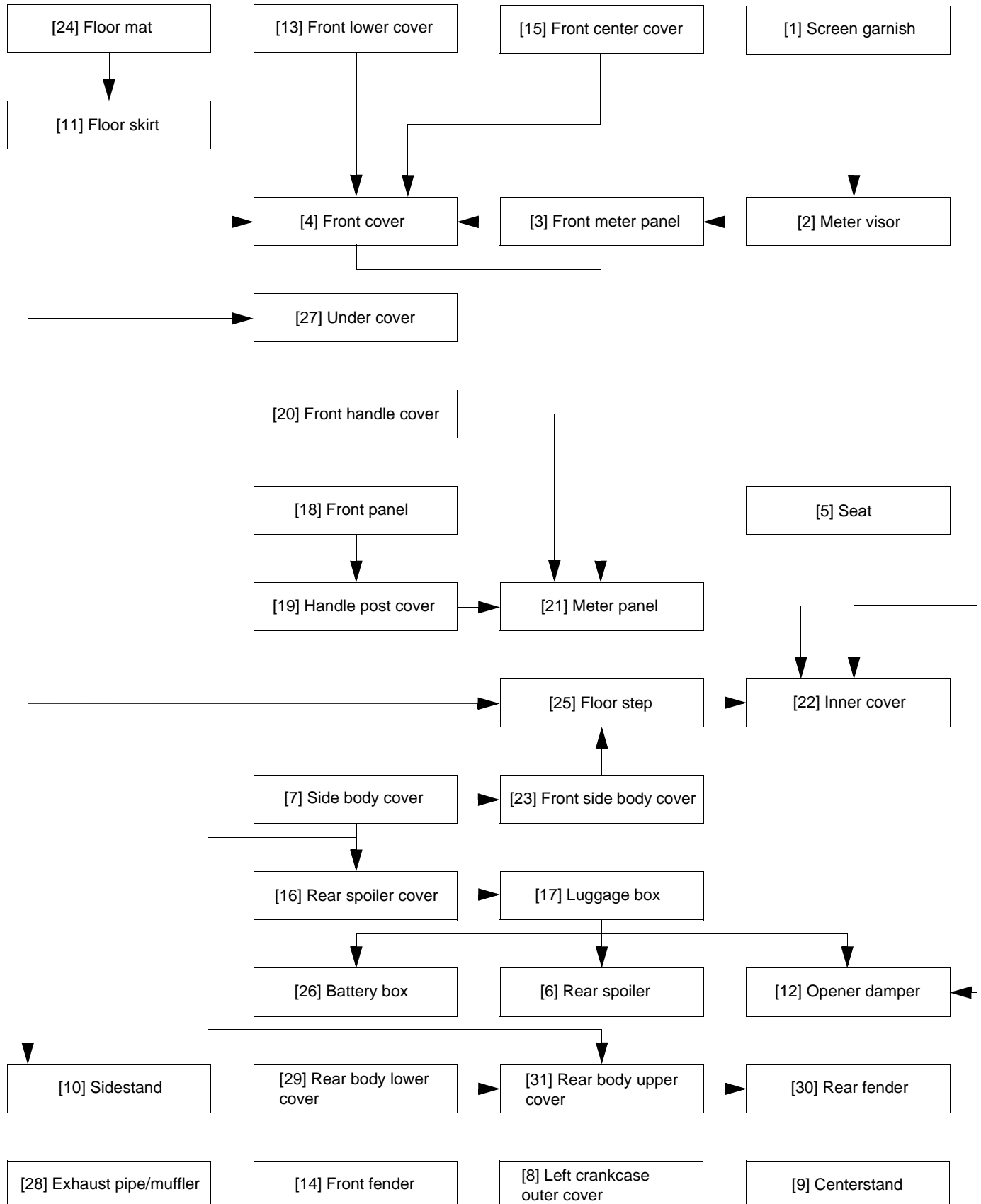
[30] Rear fender (page 2-23)

[31] Rear body upper cover (page 2-22)



## BODY PANEL REMOVAL CHART

- This chart shows removal order of frame covers by means of arrow.



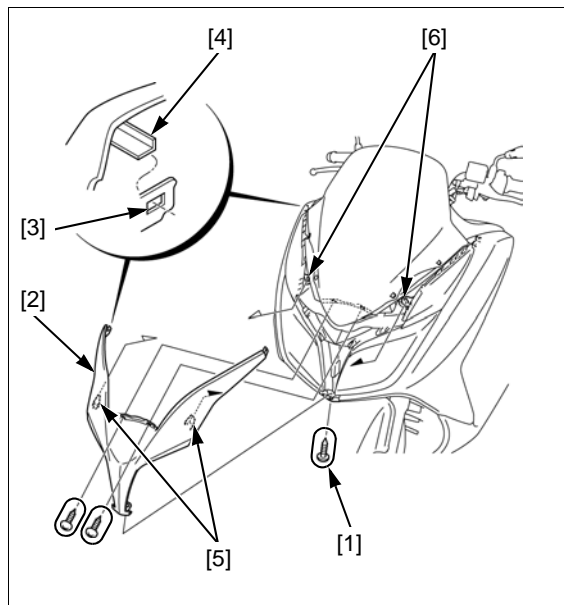
### SCREEN GARNISH

Remove the screws [1].

Remove the screen garnish [2] by releasing the following:

- Holes [3] of the screen garnish from the tabs [4] of the front cover
- Snap fit clips [5] of the screen garnish from the holes [6] of the turn signal light

Installation is in the reverse order of removal.

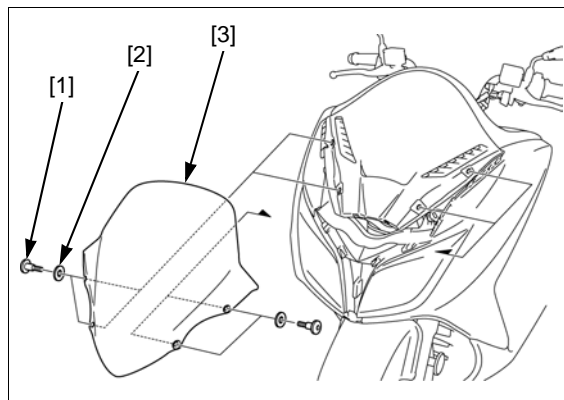


### METER VISOR

Remove the screen garnish (page 2-4).

Remove the socket bolts [1], washers [2] and meter visor [3].

Installation is in the reverse order of removal.

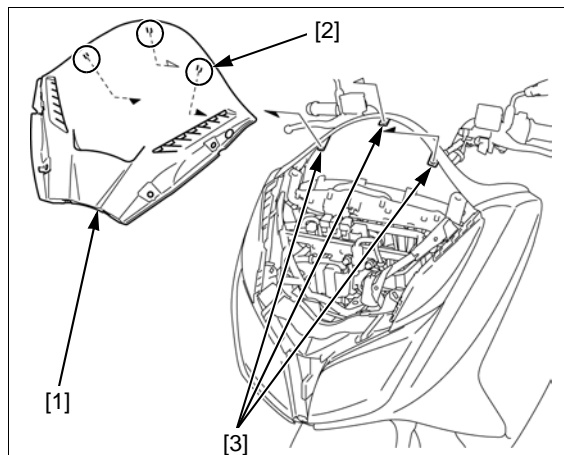


### FRONT METER PANEL

Remove the meter visor (page 2-4).

Remove the front meter panel [1] by releasing the tabs [2] from the holes [3] of the meter panel.

Installation is in the reverse order of removal.

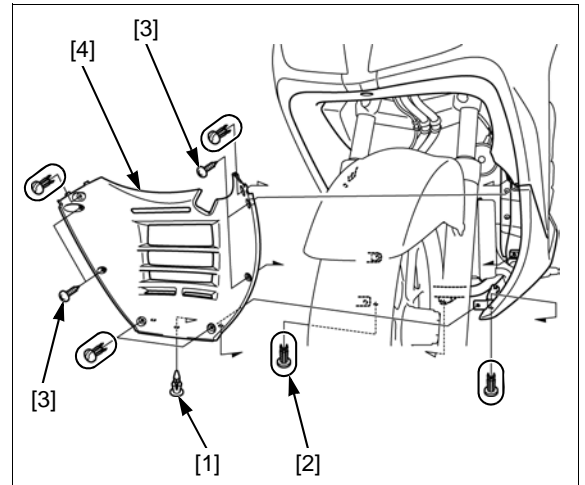


## FRONT LOWER COVER

Remove the following:

- Trim clip A [1]
- Trim clips B [2]
- Screws [3]
- Front lower cover [4]

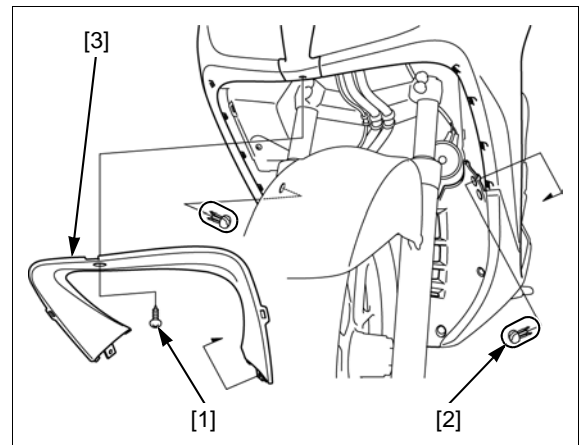
Installation is in the reverse order of removal.



## FRONT CENTER COVER

Remove the screw [1], trim clips [2] and front center cover [3].

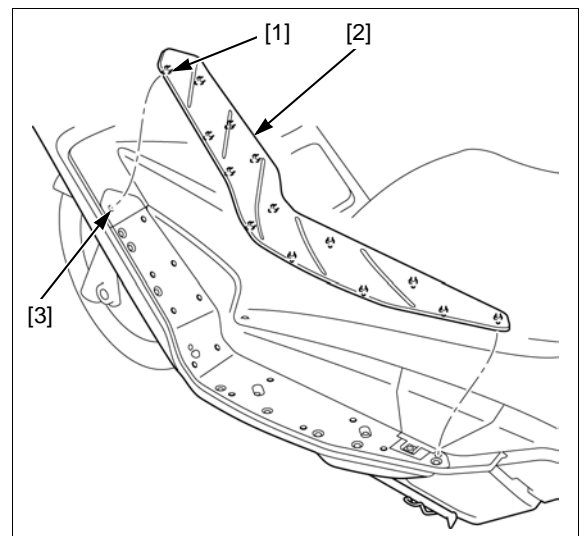
Installation is in the reverse order of removal.



## FLOOR MAT

Release the bosses [1] on the reverse side of the floor mat [2] and remove the floor mat.

Install the floor mat by aligning the bosses on the reverse side of the floor mat and holes [3] of the floor step.



## FLOOR SKIRT

### REMOVAL/INSTALLATION

#### LEFT FLOOR SKIRT

Remove the floor mat (page 2-5).

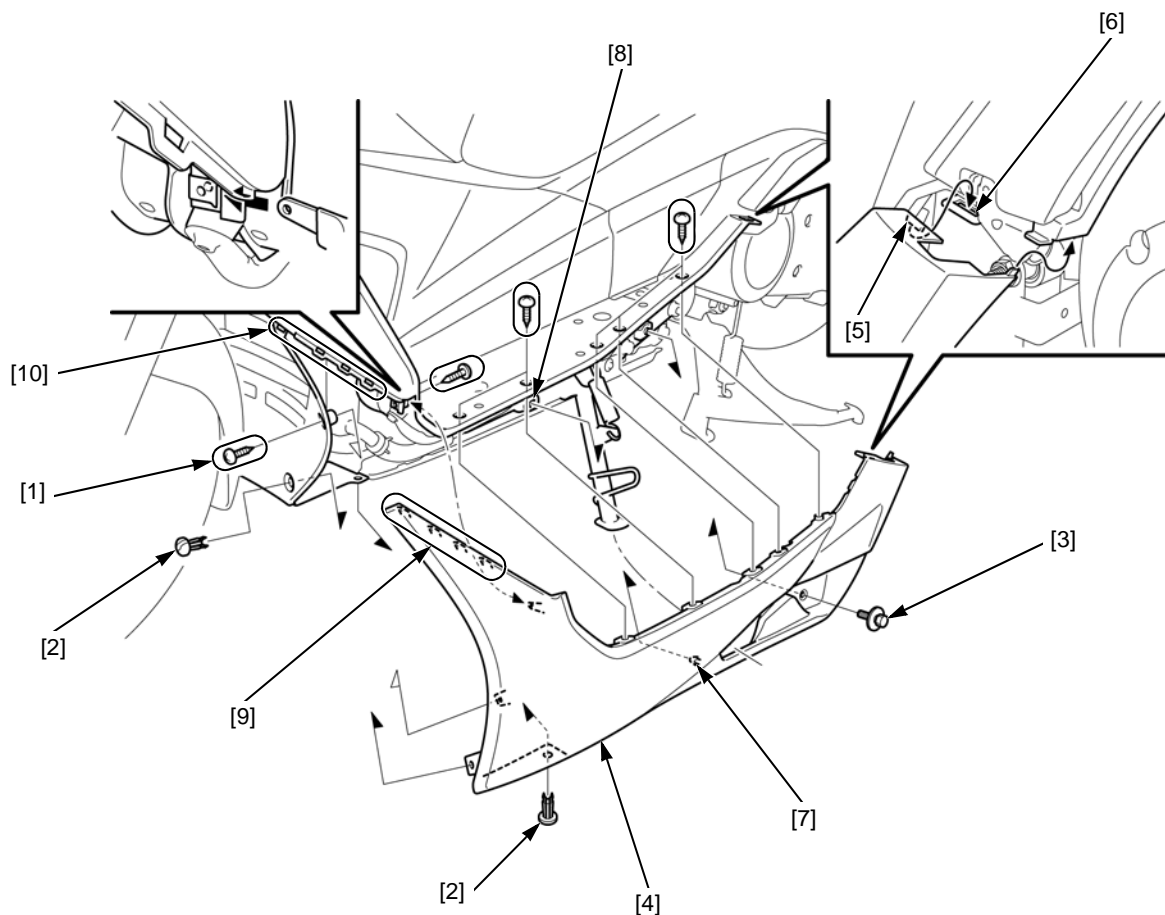
Support the scooter on its centerstand.

Remove the screws [1], trim clips [2] and bolt [3].

Remove the left floor skirt [4] by releasing the following:

- Rear end hook [5] of the left floor skirt from the slot [6] of the floor step
- Boss [7] of the left floor skirt from the grommet [8] of the frame
- Tabs [9] of the left floor skirt from the holes [10] of the front cover and front lower cover

Installation is in the reverse order of removal.



### RIGHT FLOOR SKIRT

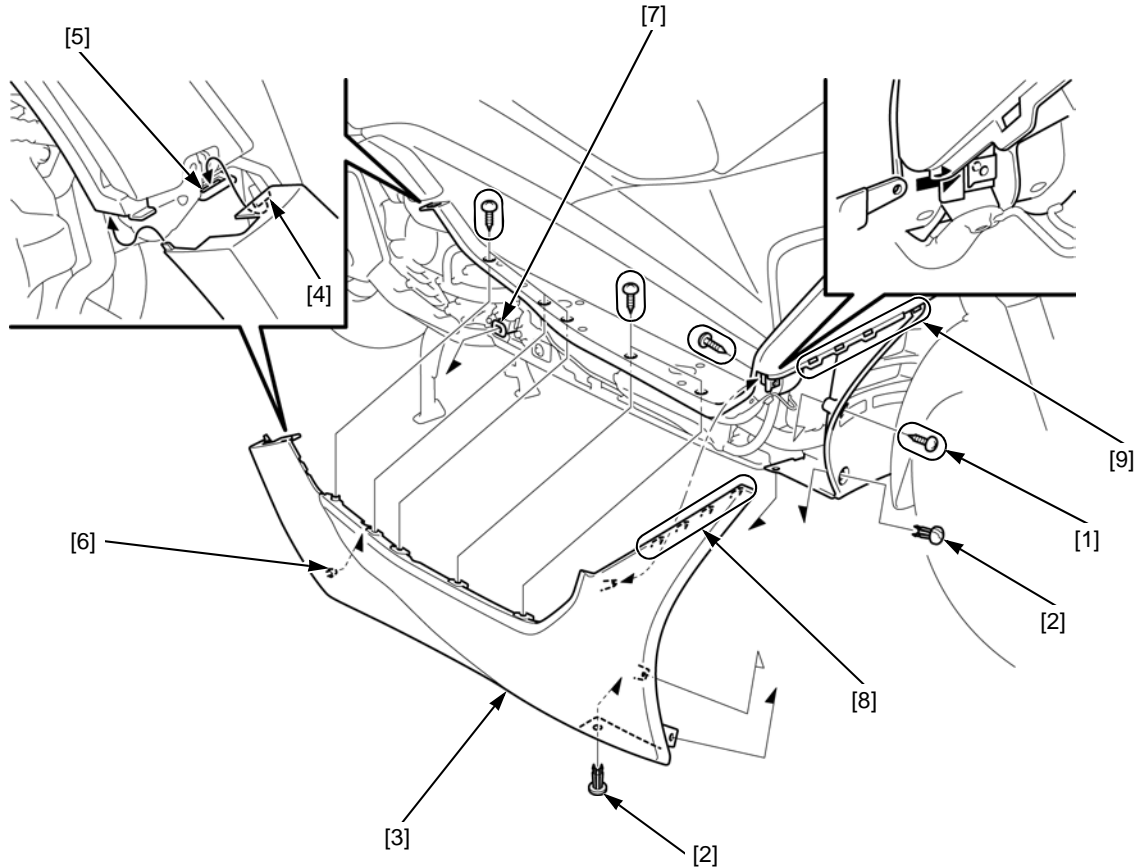
Remove the floor mat (page 2-5).

Remove the screws [1] and trim clips [2].

Remove the right floor skirt [3] by releasing the following:

- Rear end hook [4] of the right floor skirt from the slot [5] of the floor step
- Boss [6] of the right floor skirt from the grommet [7] of the frame
- Tabs [8] of the left floor skirt from the holes [9] of the front cover and front lower cover

Installation is in the reverse order of removal.



### DISASSEMBLY/ASSEMBLY

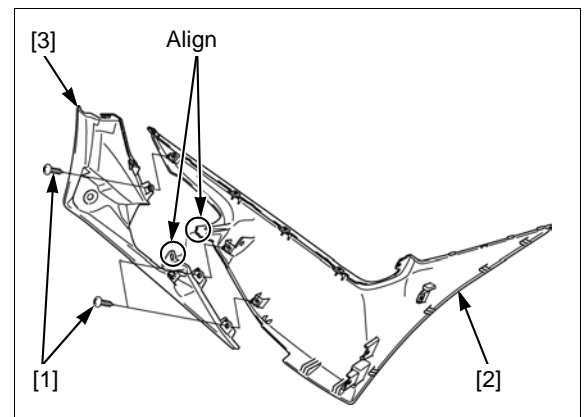
Remove the floor skirt (page 2-6).

Remove the screws [1].

Separate the upper skirt [2] and lower skirt [3].

Assembly is in the reverse order of disassembly.

- Align the tab of the upper skirt with slot of the lower skirt.



### UNDER COVER

#### AC TYPE

Remove the floor skirts (page 2-6).

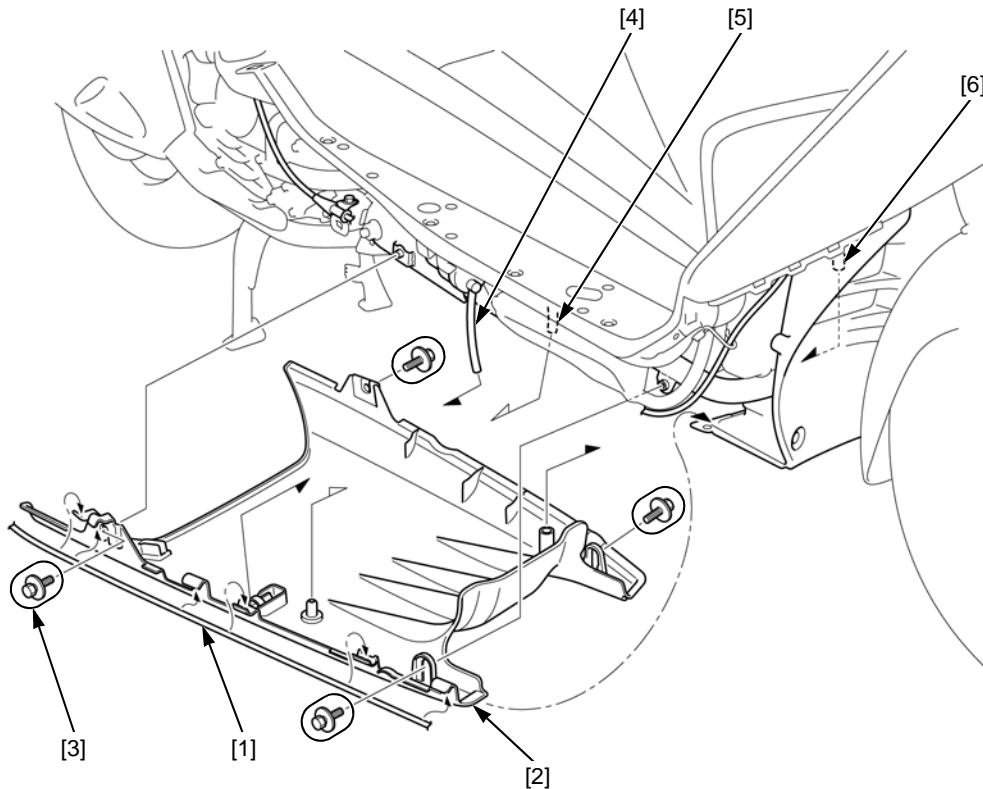
Release the parking brake cable [1] from the tubs of the under cover [2].

Remove the bolts [3].

Remove the under cover by disconnecting the fuel tank breather hose [4], overflow hose [5] and fuel tray drain hose [6].

Installation is in the reverse order of removal.

- Route the hoses and parking brake cable properly (page 1-18).



## CM TYPE

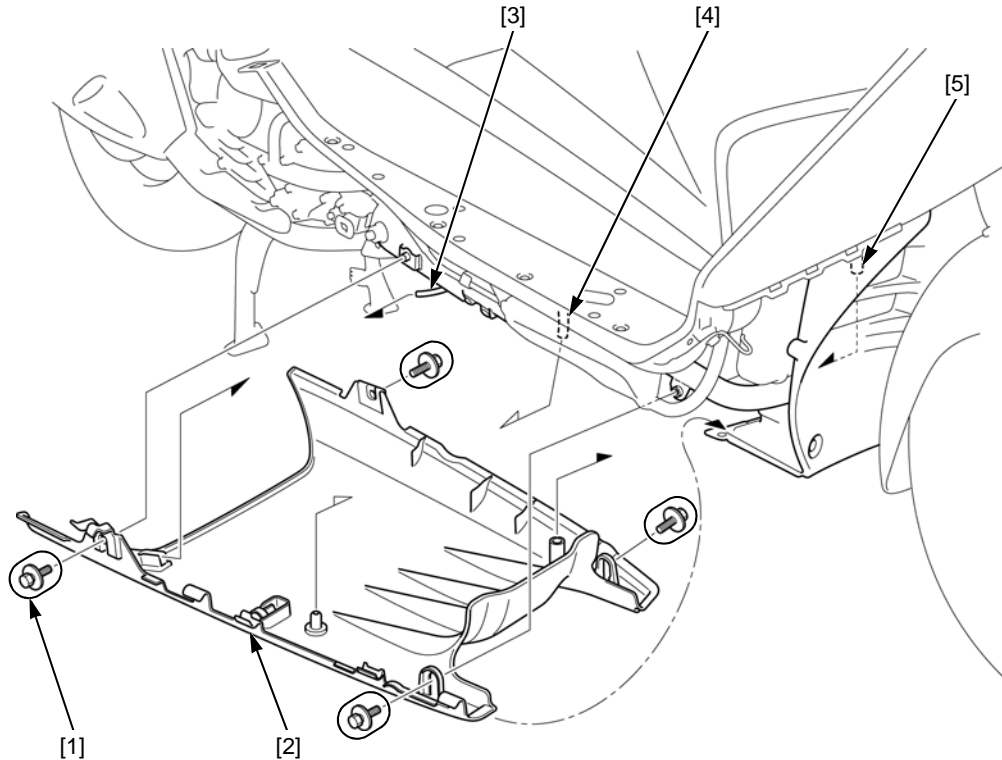
Remove the floor skirts (page 2-6).

Remove the bolts [1].

Remove the under cover [2] by disconnecting the fuel tank breather hose [3], overflow hose [4] and fuel tray drain hose [5].

Installation is in the reverse order of removal.

- Route the hoses properly (page 1-18).



## FRONT FENDER

Remove the following:

- Front fender mounting bolts (short) [1]
- Collars [2]
- Front fender mounting bolts (long) [3]
- Front side reflector [4]/stay [5]
- Nut/collars [6]
- Front fender [7]

Remove the front side reflector nut [8] and front side reflector from the stay.

Installation is in the reverse order of removal.

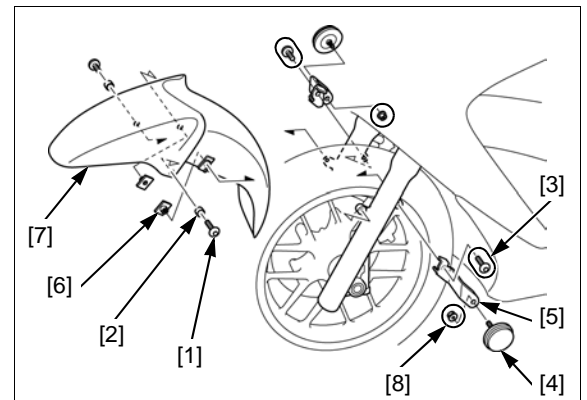
### TORQUE:

**Front side reflector nut:**

**1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**

**Front fender mounting bolt:**

**12 N·m (1.2 kgf·m, 9 lbf·ft)**



## FRONT COVER

### REMOVAL/INSTALLATION

Remove the following:

- Front lower cover (page 2-5)
- Front center cover (page 2-5)
- Front meter panel (page 2-4)
- Floor skirt (page 2-6)

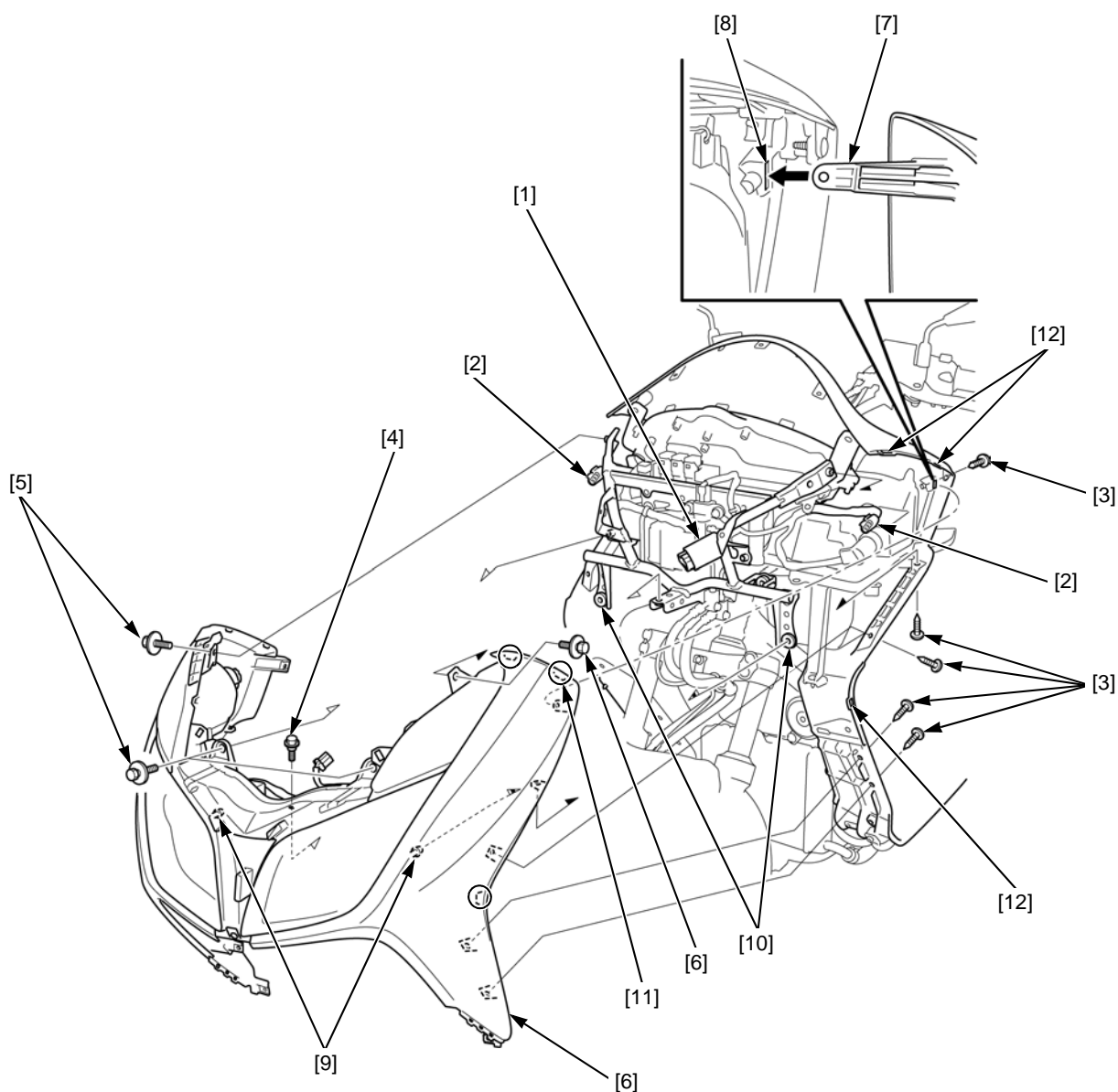
Disconnect the headlight 4P (Gray) connector [1] and front turn signal light 3P (Black) connectors [2].

Remove the screws [3], bolt A [4] and bolts B [5].

Remove the front cover [6] by releasing the following:

- Left side tab [7] of the front cover from the slot [8] of the inner cover
- Bosses [9] of the front cover from the grommets [10] of the sub frame
- Tabs [11] of the front cover from the slits [12] of the meter panel and inner cover

Installation is in the reverse order of removal.





## DISASSEMBLY/ASSEMBLY

Remove the front cover (page 2-10).

Remove the headlight/front turn signal light mounting screws [1] and headlight/turn signal light [2].

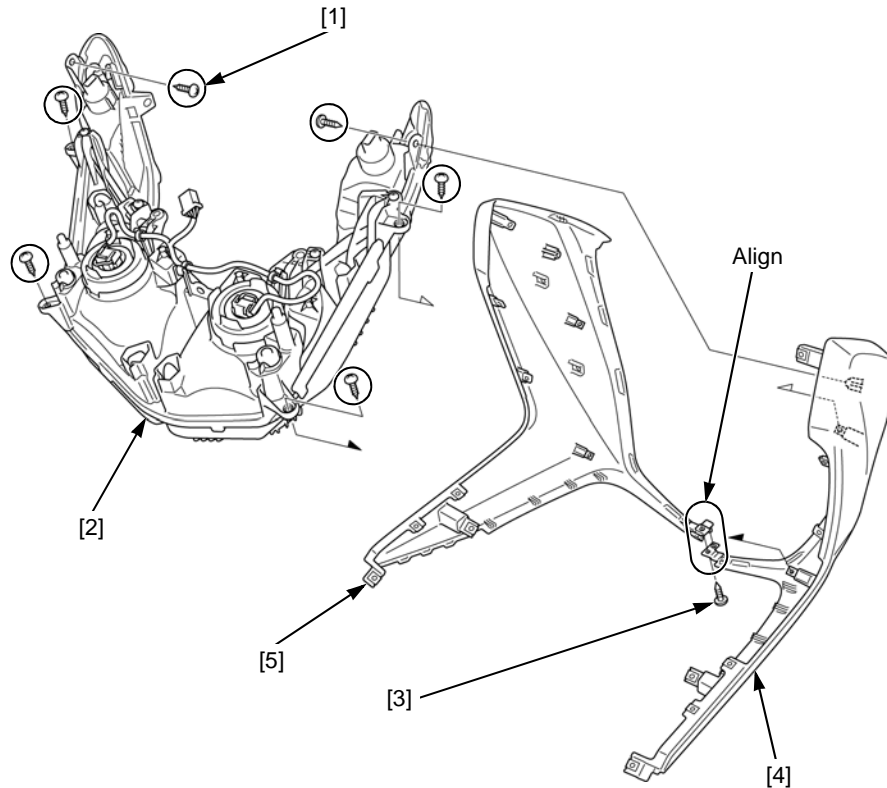
Remove the screw [3] and separate the right front cover [4] and left front cover [5].

Assembly is in the reverse order of disassembly.

- Align the tab of the left front cover and hole of the right front cover.

### TORQUE:

**Headlight/front turn signal light mounting screw:**  
**4.2 N·m (0.4 kgf-m, 3.1 lbf-ft)**



## HEADLIGHT/FRONT TURN SIGNAL LIGHT

Disconnect the headlight 3P (White) connectors [1] and remove the headlight sub harness [2] by releasing the wire clamps [3].

Remove the following:

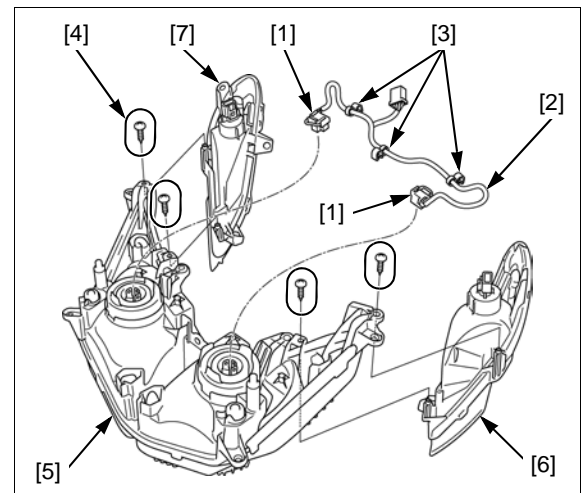
- Screws [4]
- Headlight unit [5]
- Front right turn signal light [6]
- Front left turn signal light [7]

Installation is in the reverse order of removal.

- Route the headlight sub harness properly (page 1-18).

### TORQUE:

**Front turn signal light mounting screw:**  
**1.2 N·m (0.1 kgf-m, 0.9 lbf-ft)**



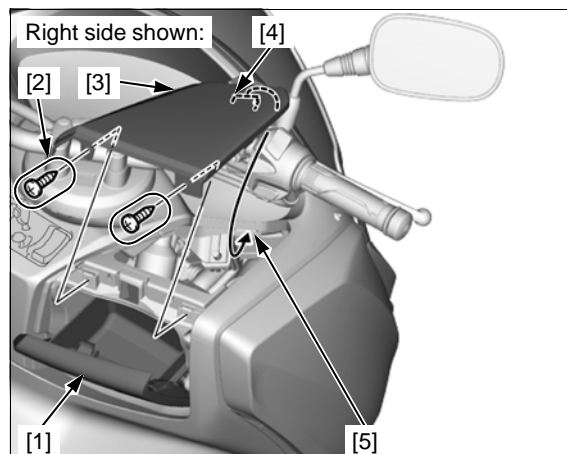
### FRONT PANEL

Open the lid [1].

Remove the screws [2].

Remove the front panel [3] by releasing the tab [4] from the slit [5] of the meter panel.

Installation is in the reverse order of removal.



### HANDLE POST COVER

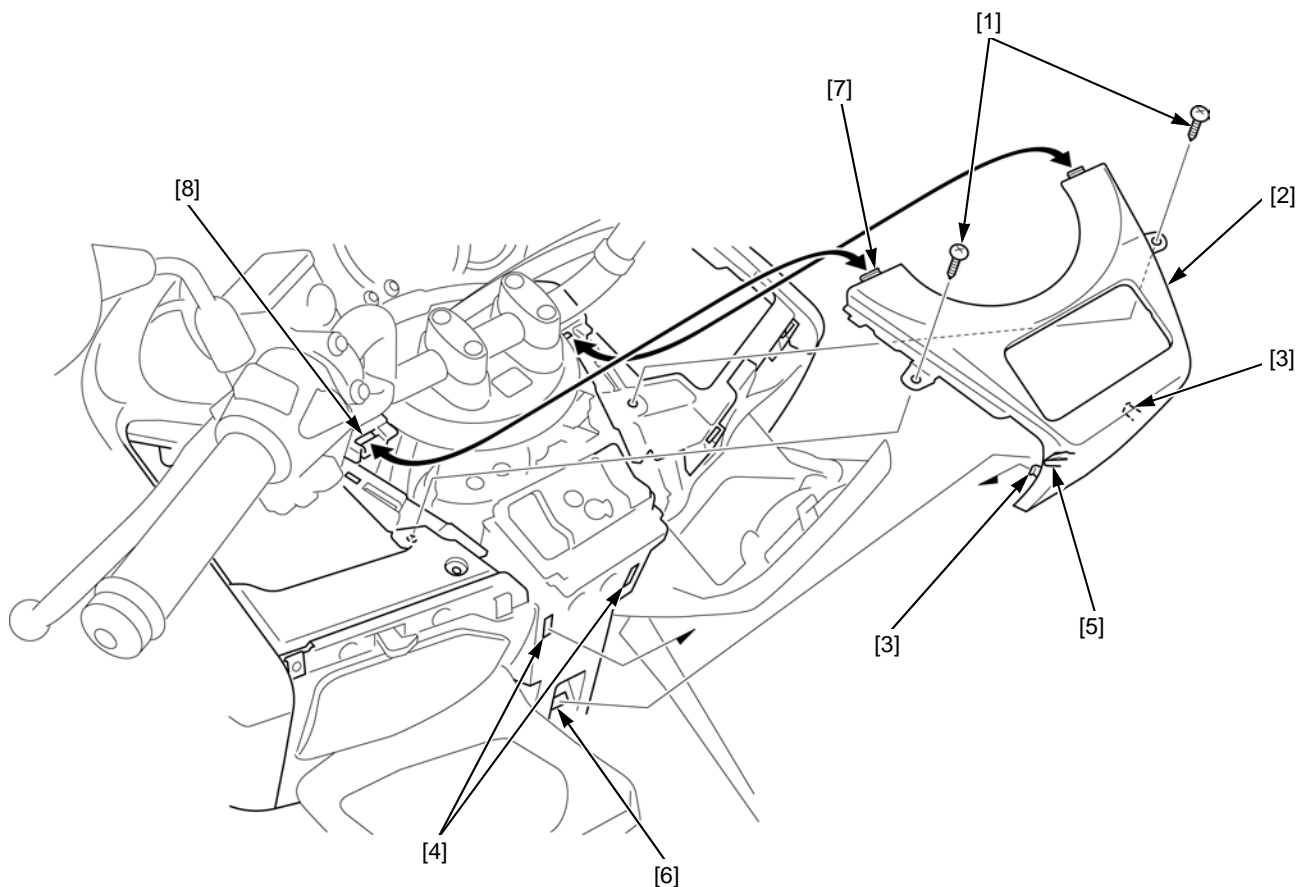
Remove the front panel (page 2-12).

Remove the screws [1].

Remove the handle post cover [2] by releasing the following:

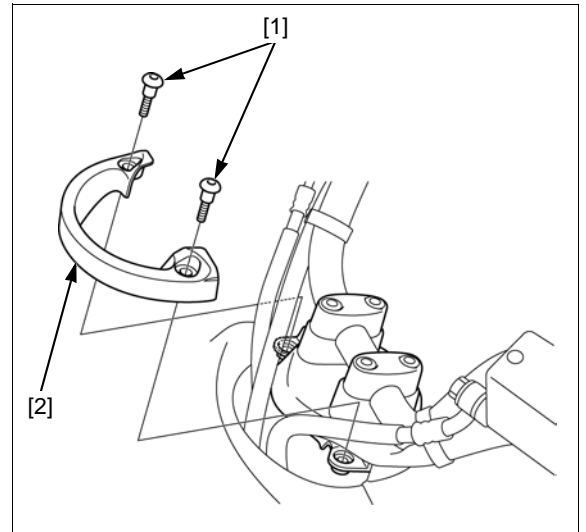
- Tabs [3] of the handle post cover from the slits [4] of the inner cover
- Snap fit clip [5] of the front handle cover from the slit [6] of the inner cover
- Tabs [7] of the handle post cover from the holes [8] of the meter panel

Installation is in the reverse order of removal.



## FRONT HANDLE COVER

Remove the socket bolts [1] and front handle cover [2].  
Installation is in the reverse order of removal.



## METER PANEL

Remove the following:

- Front cover (page 2-10)
- Front handle cover (page 2-13)
- Handle post cover (page 2-12)

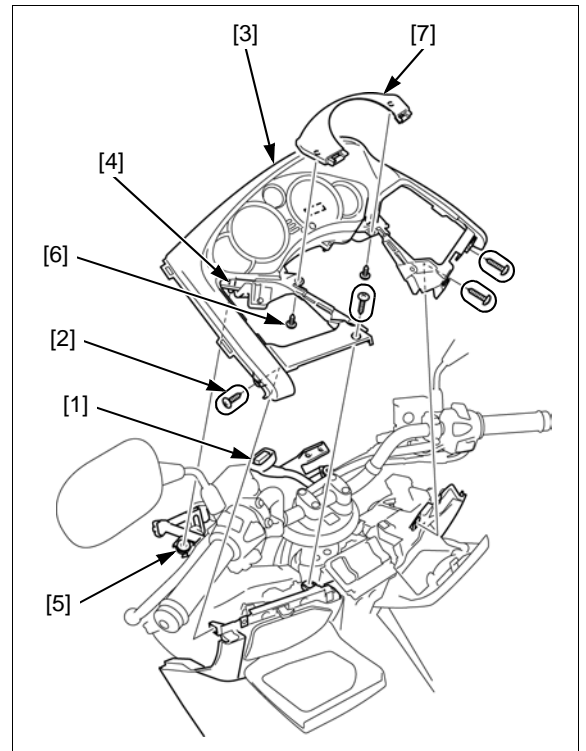
Disconnect the combination meter 20P (Gray) connector [1].

Remove the screws [2].

Remove the meter panel [3] by releasing the bosses [4] from the grommets [5] of the sub frame.

Remove the screws [6] and meter panel cover [7].

Installation is in the reverse order of removal.



### SIDE BODY COVER

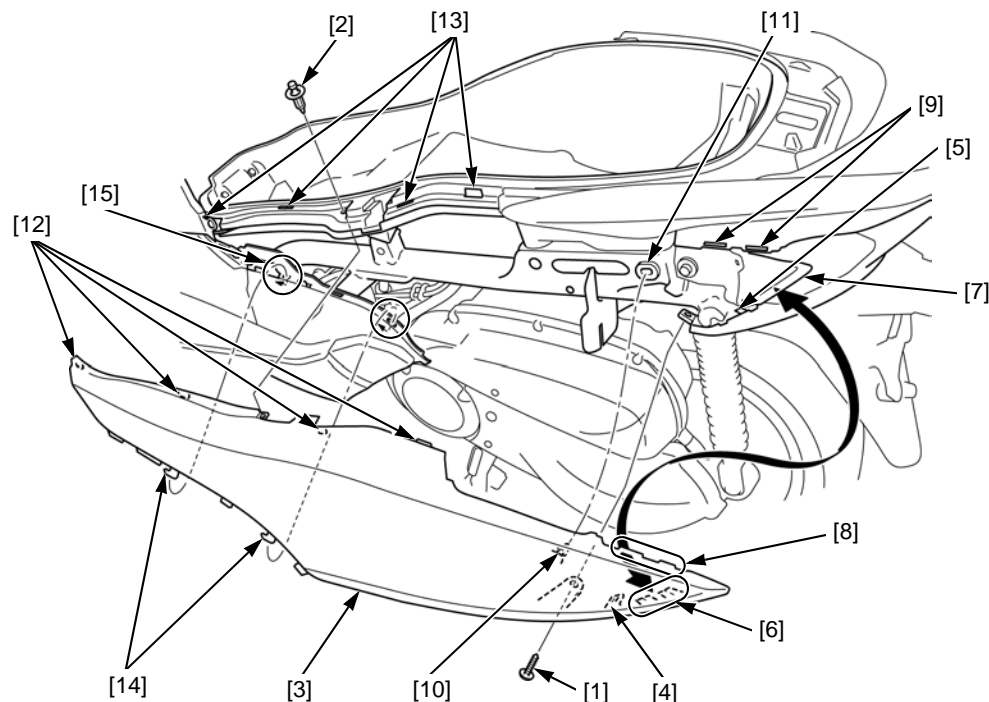
Open the seat.

Remove the screw [1] and trim clip [2].

Remove the side body cover [3] by releasing the following:

- Slit [4] of the side body cover from the tab [5] of the rear body lower cover
- Tabs [6] of the side body cover from the groove [7] of the rear combination light
- Tabs [8] of the side body cover from the slits [9] of the rear body upper cover
- Boss [10] of the side body cover from the grommet [11] of the frame
- Tabs [12] of the side body cover from the slits [13] of the luggage box and front side body cover
- Hooks [14] of the side body cover from the slits [15] of the floor step

Installation is in the reverse order of removal.



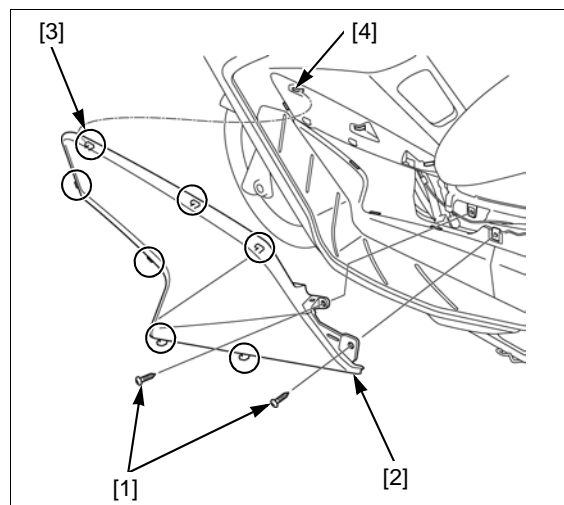
### FRONT SIDE BODY COVER

Remove the side body cover (page 2-14).

Remove the screws [1].

Remove the front side body cover [2] by releasing the hooks [3] from the slits [4] of the inner cover and floor step.

Installation is in the reverse order of removal.



## FLOOR STEP

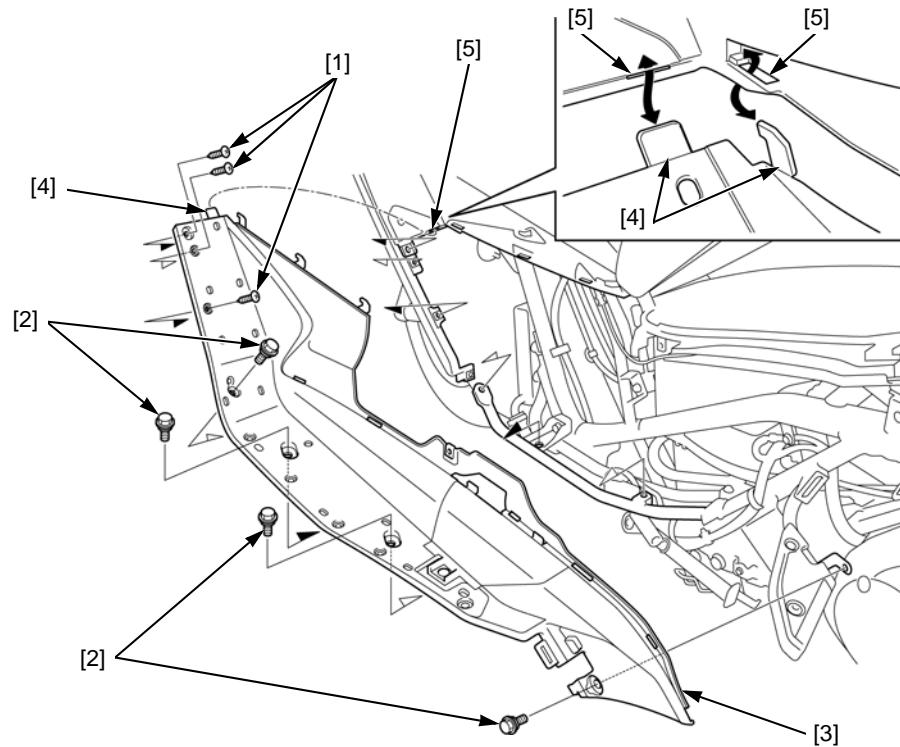
Remove the following:

- Floor skirt (page 2-6)
- Front side body cover (page 2-14)

Remove the screws [1] and bolts [2].

Remove the floor step [3] by releasing the tabs [4] from the slits [5] of the inner cover.

Installation is in the reverse order of removal.



## SEAT

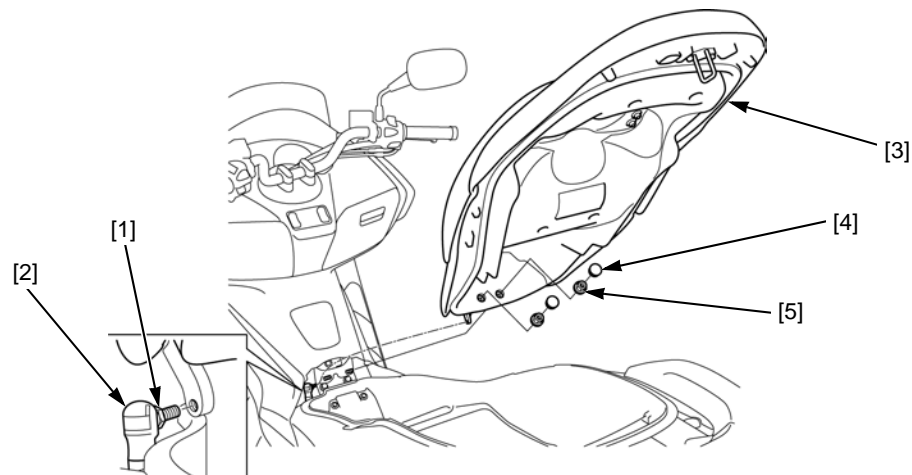
### REMOVAL/INSTALLATION

Open the seat.

Remove the joint [1] and the opener damper [2] from the seat [3].

Remove caps [4], nuts [5] and seat.

Installation is in the reverse order of removal.



### DISASSEMBLY/ASSEMBLY

Remove the seat (page 2-15).

Remove the seat hinge under cover screw A [1], seat hinge under cover screws B [2] and the seat hinge cover A [3] from the seat A [4].

If necessary, remove the seal rubber [5] from the seat A.

Remove the caps [6], nuts [7], seat hinge covers B [8] and seat hinge [9].

Remove the nuts [10], washers [11] and seat B [12].

Assembly is in the reverse order of disassembly.

#### TORQUE:

**Seat hinge under cover screw A:**

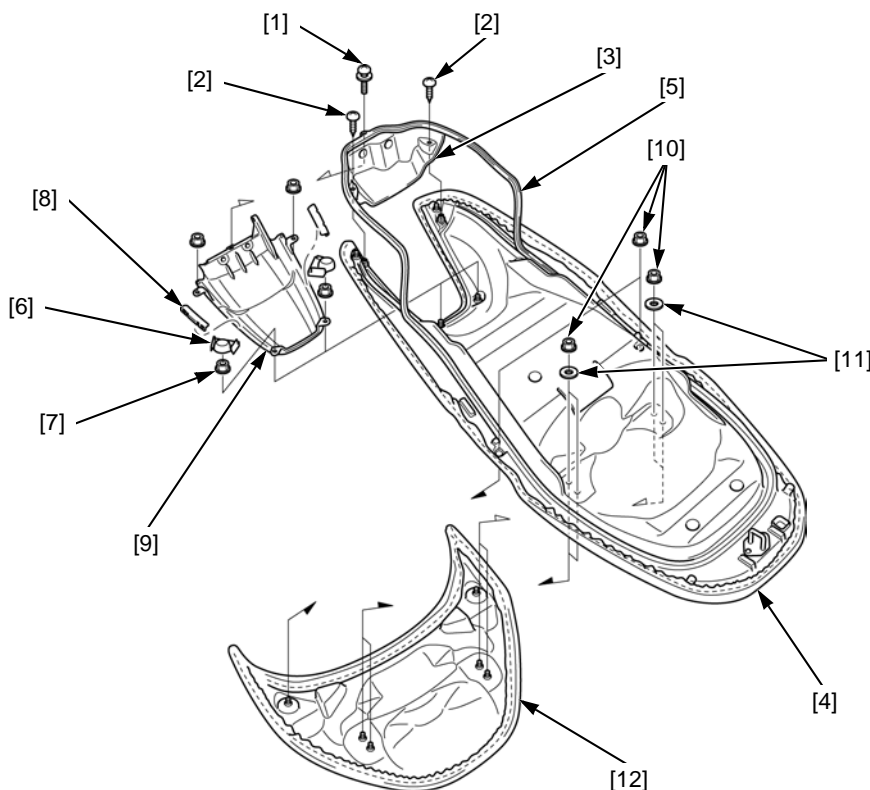
**4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)**

**Seat hinge under cover screw B:**

**1.6 N·m (0.2 kgf·m, 1.2 lbf·ft)**

**Seat hinge nut:**

**10 N·m (1.0 kgf·m, 7 lbf·ft)**



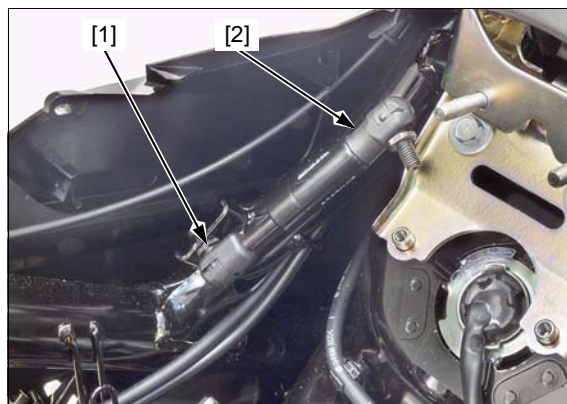
### OPENER DAMPER

Remove the following:

- Seat (page 2-15)
- Luggage box (page 2-21)

Remove the joint [1] and opener damper [2] from the frame.

Installation is in the reverse order of removal.



## INNER COVER

### REMOVAL/INSTALLATION

Remove the following:

- Floor step (page 2-15)
- Meter panel (page 2-13)
- Seat (page 2-15)

*AC type only:* Remove the nut [1] and parking brake lever [2].

Release the following from the inner cover [3].

- Fuse box B [4]
- Fuse box C (ABS type only) [5]
- DLC [6]
- Pocket lid lock cable [7]

Disconnect the accessory socket 2P connector [8].

Remove the screws [9] and bolts [10].

Remove the inner cover by releasing the boss [11] from the grommet [12] of the sub frame.

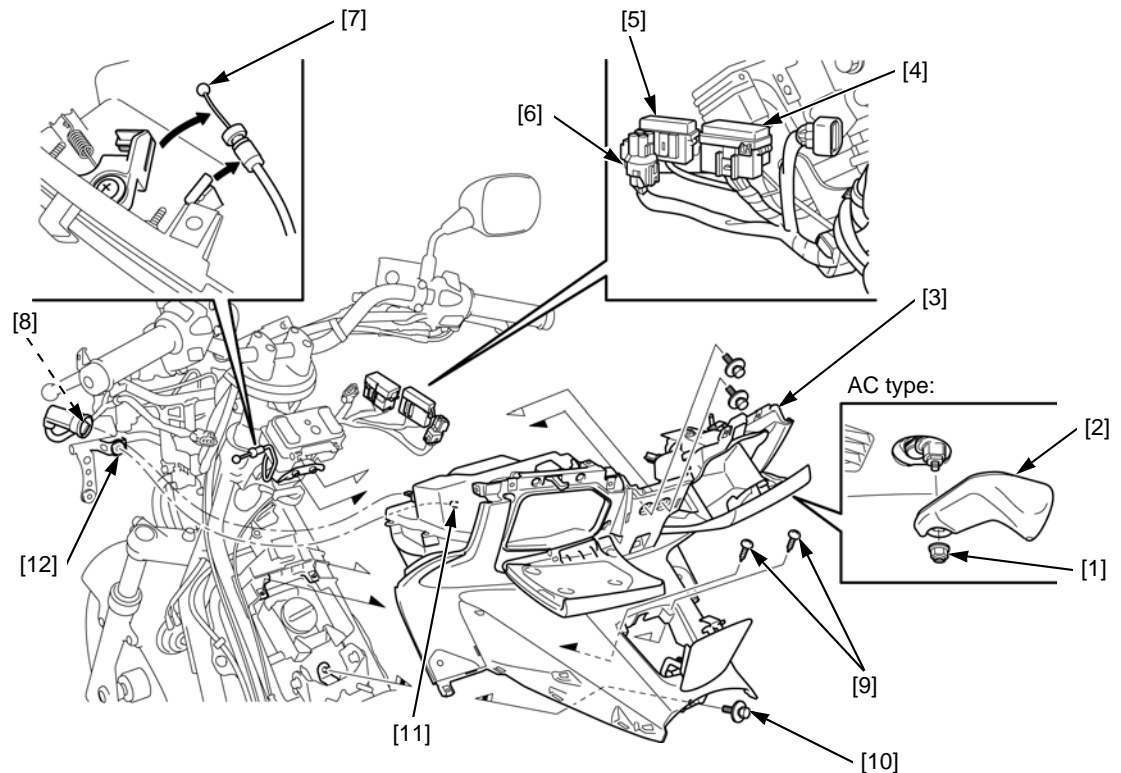
Installation is in the reverse order of removal.

- Route the cables and wire harness properly (page 1-18).

### TORQUE:

**Parking brake lever nut (AC type only):**

**30 N·m (3.1 kgf·m, 22 lbf·ft)**



### DISASSEMBLY/ASSEMBLY

Remove the inner cover (page 2-17).

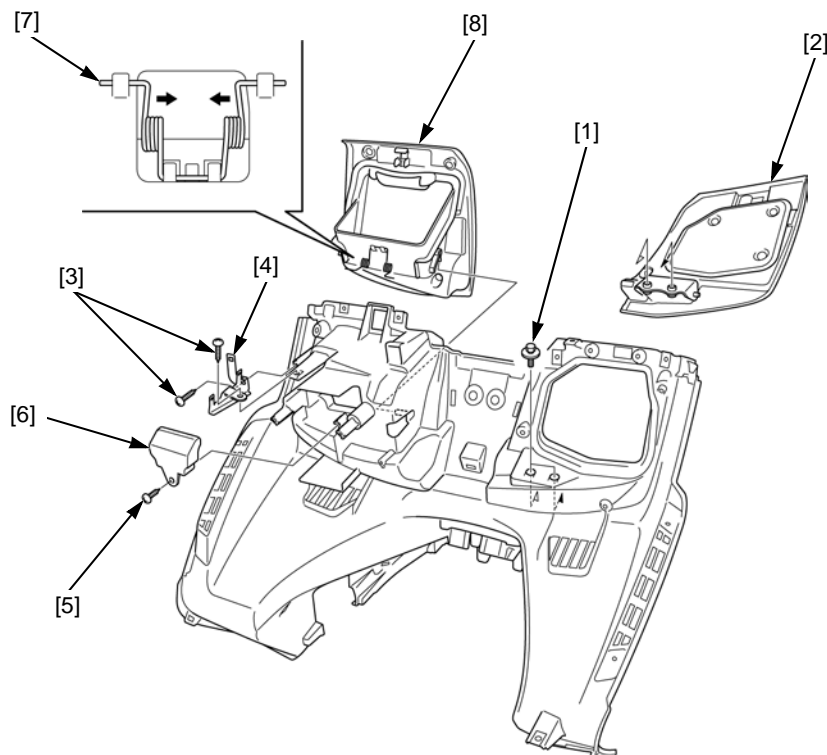
Remove the inner pocket (page 2-18).

Remove the bolts [1] and pocket lid assembly [2].

Remove the screws A [3] and stay [4].

Remove the screw B [5] and spring cover [6].

Release the spring [7] from the inner cover and remove the right lid assembly [8].



### INNER POCKET

Remove the screws A [1] and upper/lower inner pocket assembly.

Remove the screws B [2] and lower inner pocket [3] from the upper inner pocket [4].

Remove the following from the upper inner pocket.

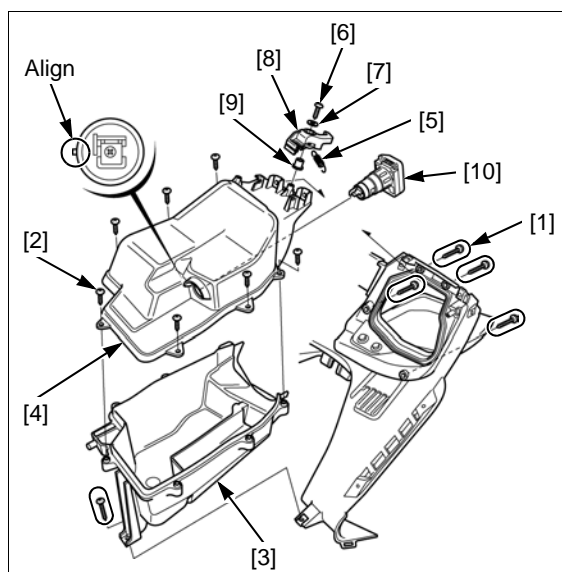
- Spring [5]
- Pocket lid hook mounting screw [6]
- Washer [7]
- Pocket lid hook [8]
- Collar [9]
- Accessory socket [10]

Assembly is in the reverse order of disassembly.

- When assembling the lid hook, tighten the pocket lid hook mounting screw to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

- When assembling the accessory socket, align the accessory socket tab with the upper inner pocket groove.



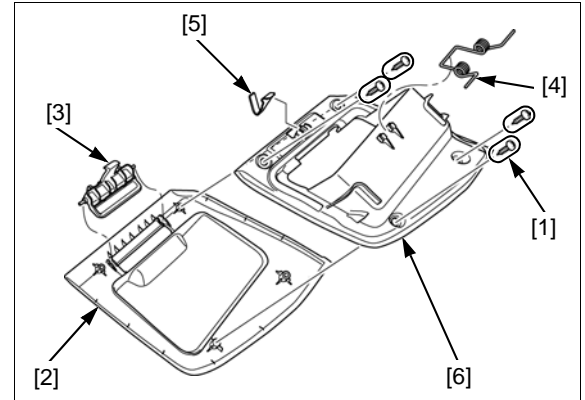


## RIGHT LID

Remove the screws [1], right outer lid [2] and knob [3].

Remove the lid spring [4] and knob spring [5] from the right inner lid [6].

Assembly is in the reverse order of disassembly.



## POCKET LID

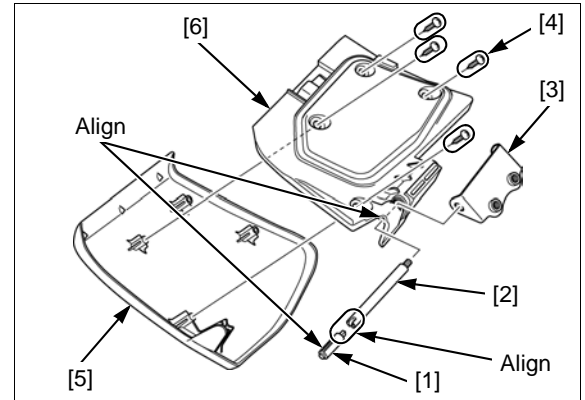
Remove the shaft stopper [1], lid shaft [2] and pocket lid hinge [3].

Remove the screws [4] and left outer [5]/inner [6] lid.

Assembly is in the reverse order of disassembly.

When assembling the pocket lid, align the following:

- Lid shaft groove with the shaft stopper tab.
- Left inner lid groove with the shaft stopper tab.



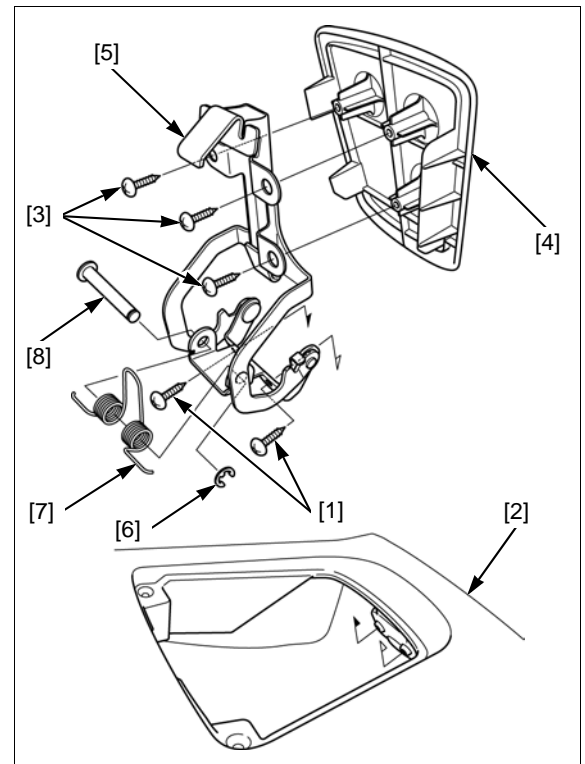
## FUEL LID

Remove the screws [1] and fuel lid assembly from the inner cover [2].

Remove the screws [3] and fuel lid cover [4] from the fuel lid hinge [5].

Remove the E-clip [6], spring [7] and pin [8] from the fuel lid hinge.

Assembly is in the reverse order of disassembly.



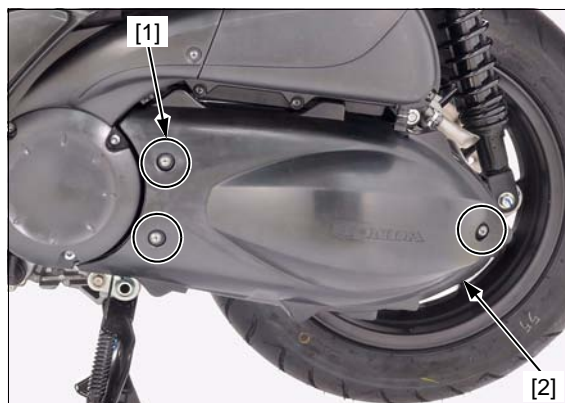
### LEFT CRANKCASE OUTER COVER

Remove the socket bolts [1] and left crankcase outer cover [2].

Installation is in the reverse order of removal.

#### TORQUE:

**Left crankcase outer cover socket bolt:**  
**10 N·m (1.0 kgf·m, 7 lbf·ft)**



### REAR SPOILER COVER

Remove the side body cover (page 2-14).

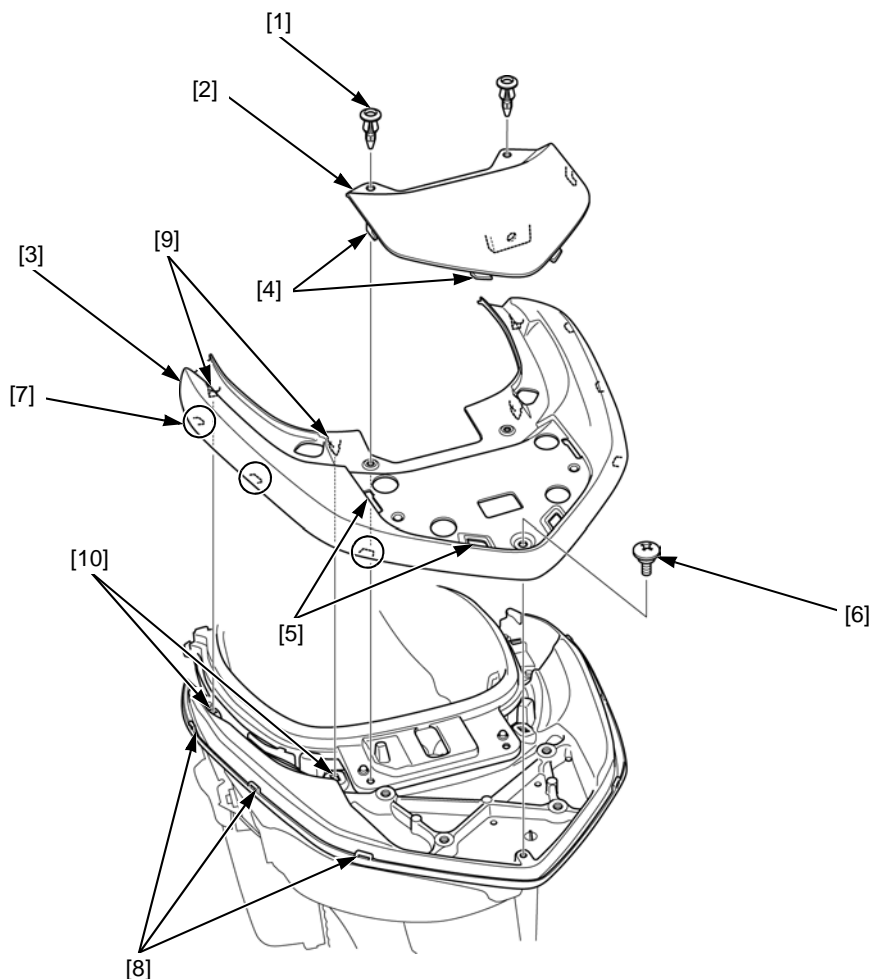
Remove the trim clips [1] and rear spoiler upper cover [2] from the rear spoiler cover [3] by releasing the tabs [4] of the rear spoiler upper cover from the slits [5] of the rear spoiler cover.

Remove the screw [6].

Remove the rear spoiler cover by releasing the following:

- Tabs [7] of the rear spoiler cover from the slits [8] of the rear spoiler
- Snap fit clips [9] of the rear spoiler cover from the slits [10] of the rear spoiler

Installation is in the reverse order of removal.



# LUGGAGE BOX

Remove the following:

- Rear spoiler cover (page 2-20)
- Battery lid (page 21-5)

Remove the document compartment [1], trim clips [2] and tool box [3].

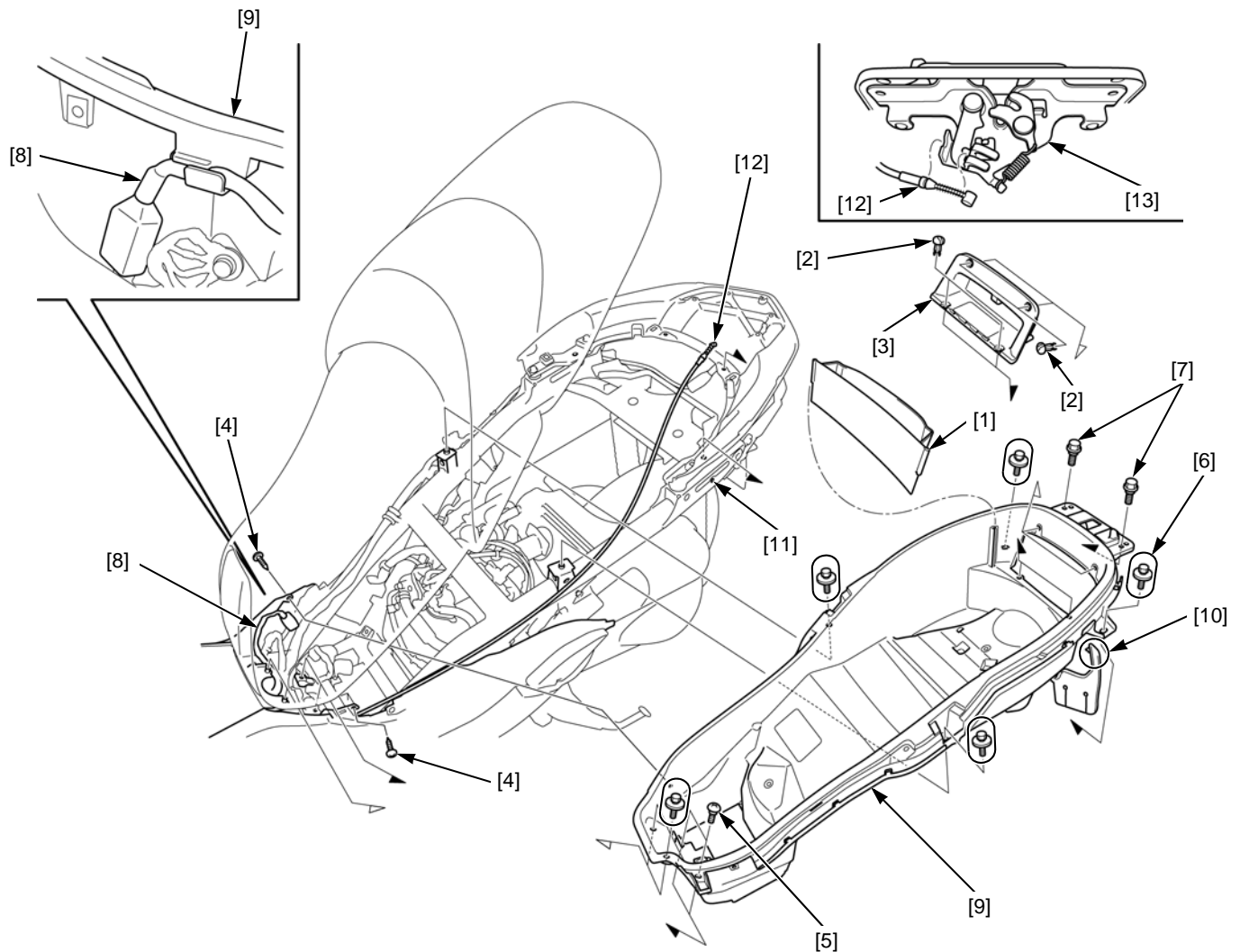
Remove the screws A [4], screws B [5], bolts A [6] and bolts B [7].

Remove the luggage box by releasing the following:

- Fuel level sensor wire [8] from the luggage box [9].
- Boss [10] of the mud guard from the hole [11] of the frame
- Seat lock cable [12] from the seat lock [13] and luggage box
- Do not bend or twist the seat lock cable.

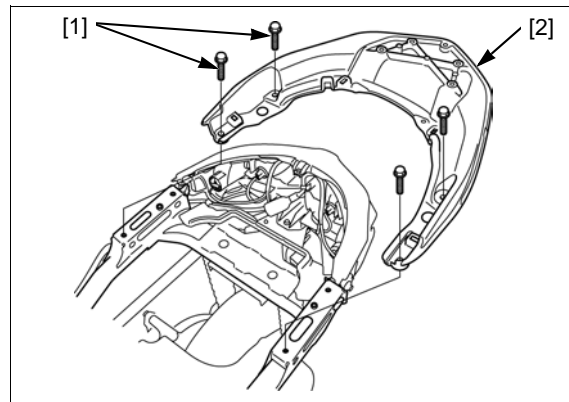
Installation is in the reverse order of removal.

- Route the seat lock cable properly (page 1-18).



### REAR SPOILER

Remove the luggage box (page 2-21).  
Remove the bolts [1] and rear spoiler [2].  
Installation is in the reverse order of removal.



### REAR BODY UPPER COVER

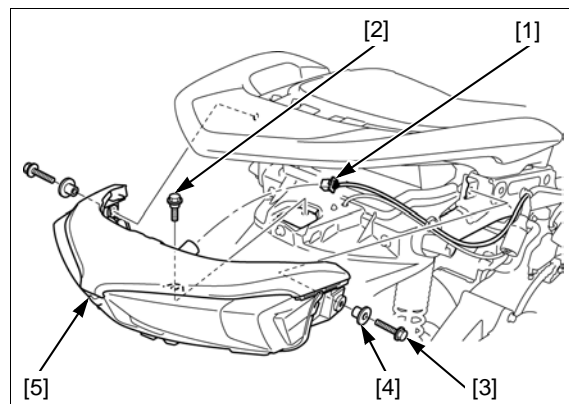
Remove the following:

- Side body cover (page 2-14)
- Rear body lower cover (page 2-23)

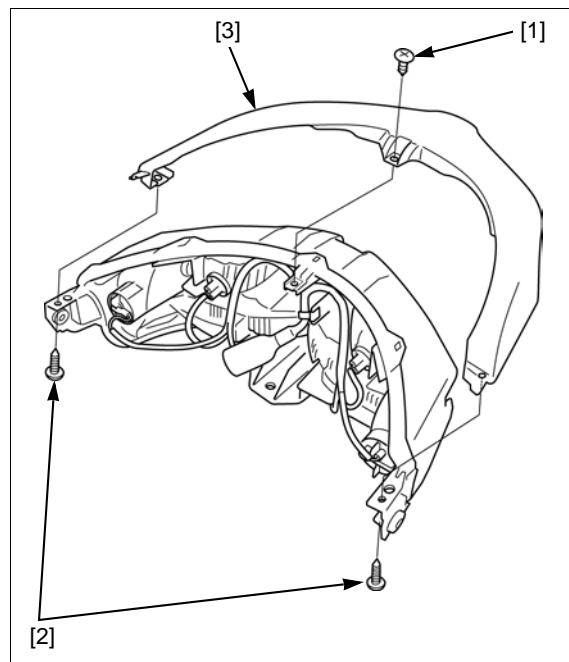
Disconnect the rear combination light 6P connector [1].

Remove the following:

- Bolt A [2]
- Bolts B [3]
- Collars [4]
- Rear combination light assembly [5]



Remove the screw A [1], screws B [2] and rear body upper cover [3].  
Installation is in the reverse order of removal.



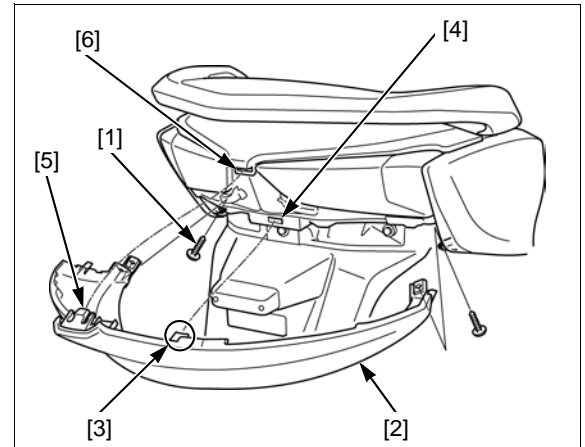
## REAR BODY LOWER COVER

Remove the screws [1].

Remove the rear body lower cover [2] by releasing the following:

- Snap fit clip [3] of the rear body lower cover from the hole [4] of the rear combination light
- Tab [5] of the rear body lower cover from the hole [6] of the rear body upper cover

Installation is in the reverse order of removal.



## REAR FENDER

### REMOVAL/INSTALLATION

Remove the rear combination light assembly (page 2-22).

Disconnect the license light wire connectors [1].

Release the rear combination light wire [2] and license light wire [3] from the wire clamp [4].

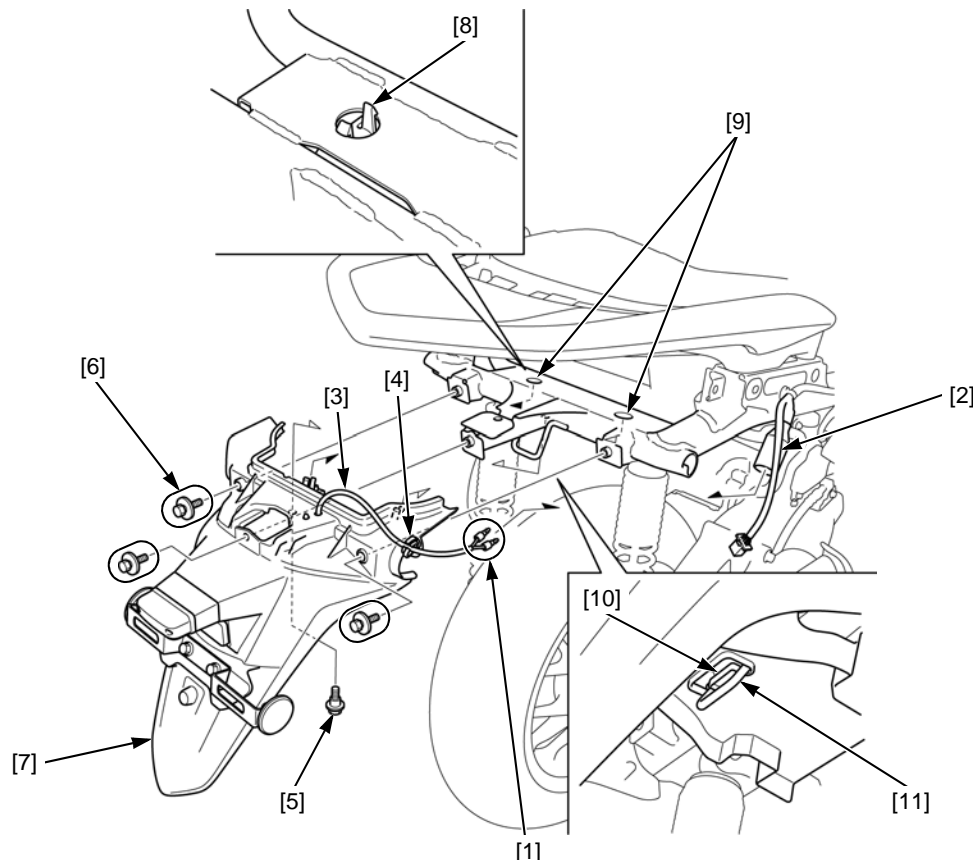
Remove the bolt A [5] and bolts B [6].

Remove the rear fender [7] by releasing the following:

- Tabs [8] of the rear fender from the holes [9] of the frame
- Tab [10] of the rear fender from the hook [11] of the frame

Installation is in the reverse order of removal.

- Route the rear combination light wire and license light wire properly (page 1-18).



### DISASSEMBLY/ASSEMBLY

Remove the rear fender (page 2-23).

Remove the screw [1] and rear fender B [2].

Release the license light wire clamp [3] from the rear fender A [4].

Remove the screws [5] and license light [6]/license light bracket [7].

Remove the license light nuts [8] and license light from the license light bracket.

Remove the nut [9] and reflector [10].

Remove the bolts [11], nuts [12], collars [13] and license bracket [14].

Remove the rear side reflector nuts [15] and rear side reflectors [16] from the license bracket.

Assembly is in the reverse order of disassembly.

#### TORQUE:

**License light nut:**

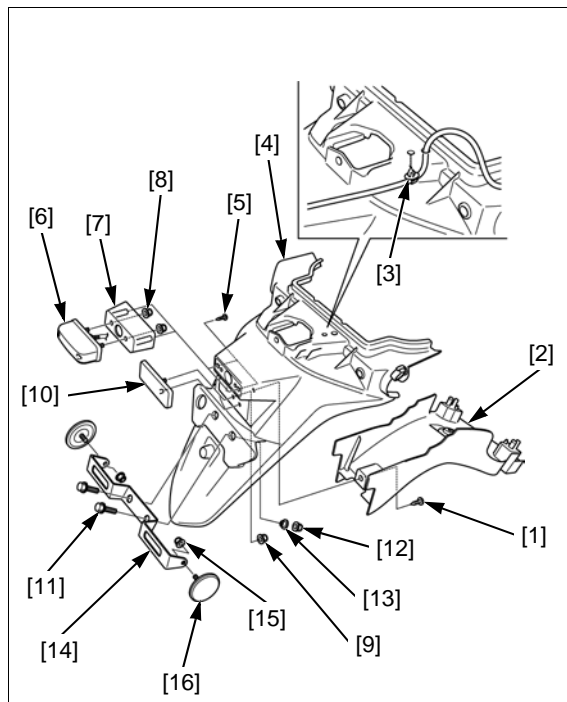
**4.3 N·m (0.4 kgf·m, 3.2 lbf·ft)**

**Reflector nut:**

**1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**

**Rear side reflector nut:**

**1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**



## BATTERY BOX

Remove the following:

- Luggage box (page 2-21)
- Battery (page 21-5)

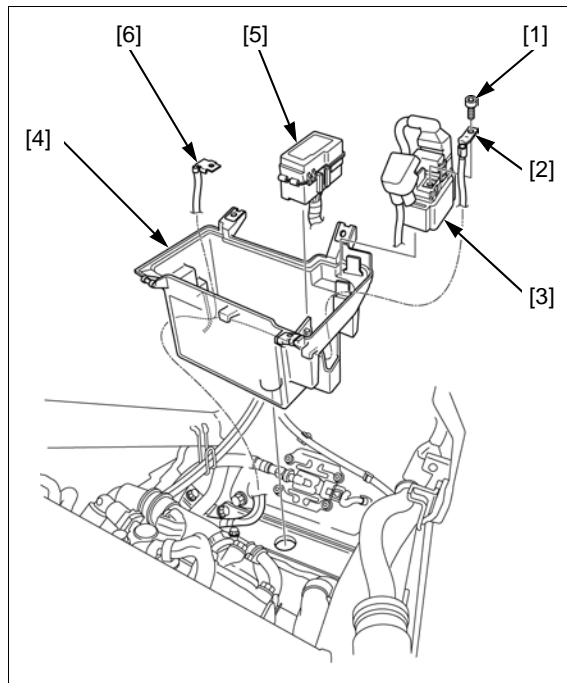
Remove the socket bolt [1] and starter motor cable [2] from the starter relay switch [3].

Remove the following from the battery box [4]:

- Starter relay switch
- Fuse box A [5]
- Starter motor cable
- Battery (-) cable [6]

Installation is in the reverse order of removal.

- Route the cables and wire harness properly (page 1-18).

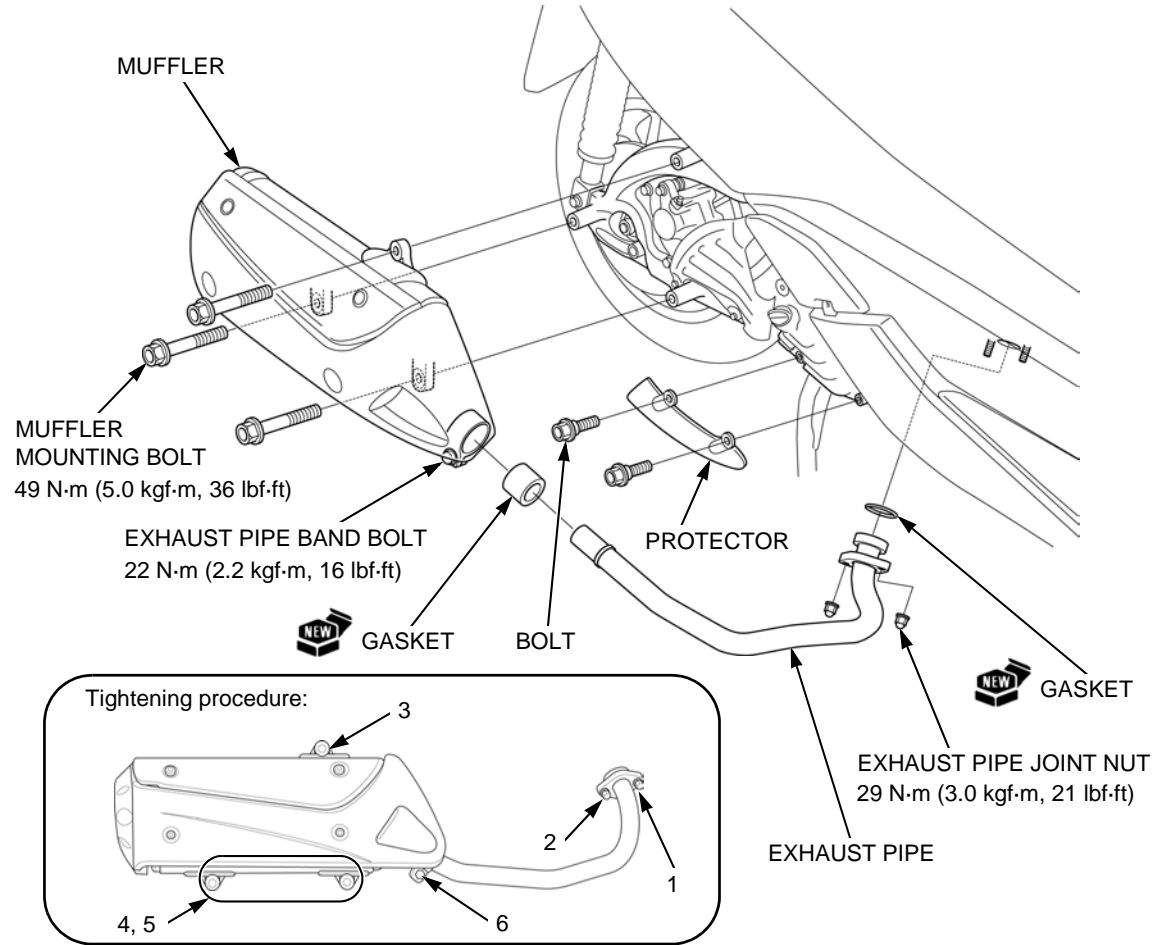


## EXHAUST PIPE/MUFFLER

### REMOVAL/INSTALLATION

Remove and install the exhaust pipe/muffler as shown in the illustration.

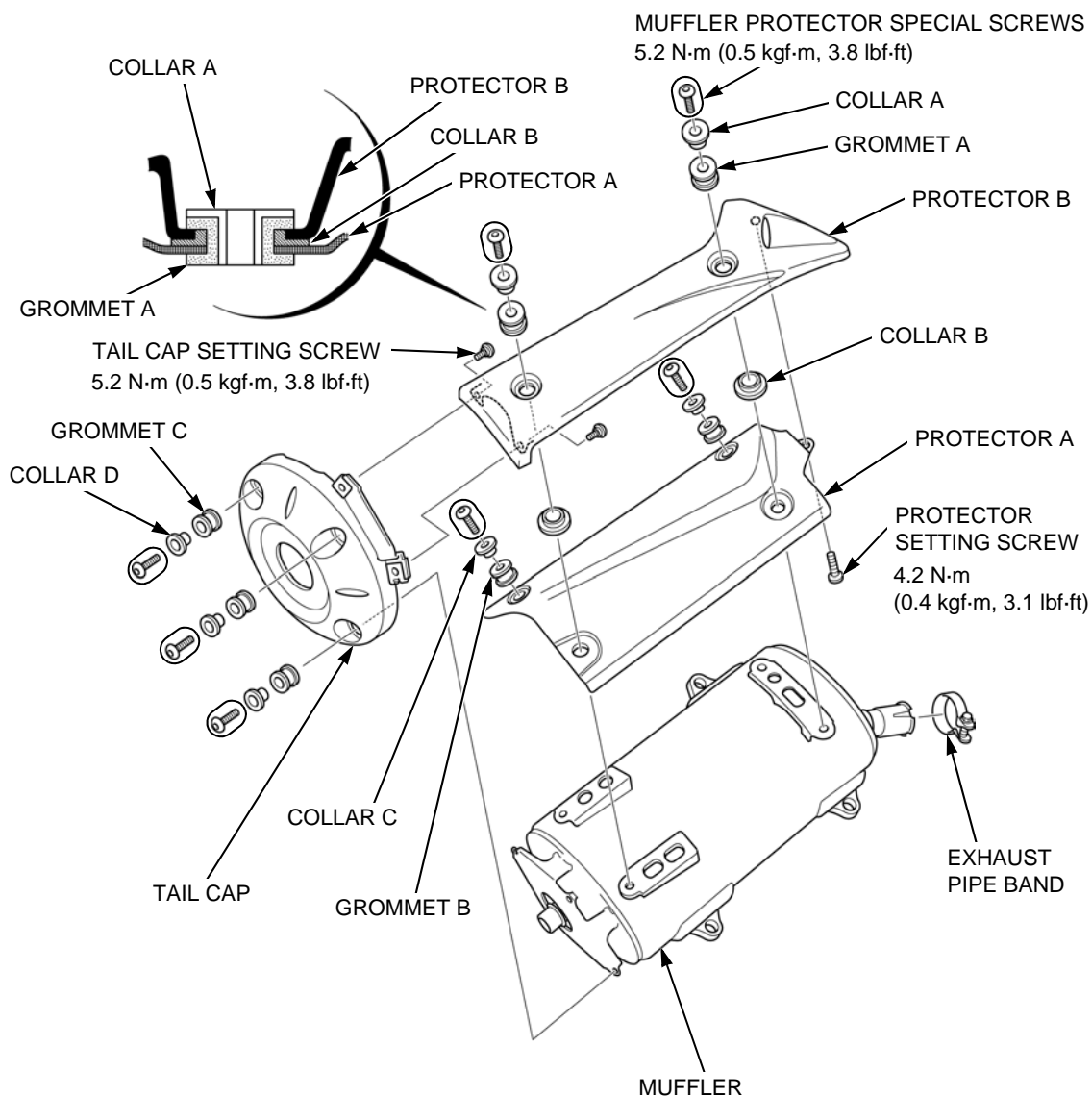
Installation is in the reverse order of removal.



### DISASSEMBLY/ASSEMBLY

Remove the muffler (page 2-25).

Disassemble and assemble the muffler as shown in the illustration.



### STUD BOLT REPLACEMENT

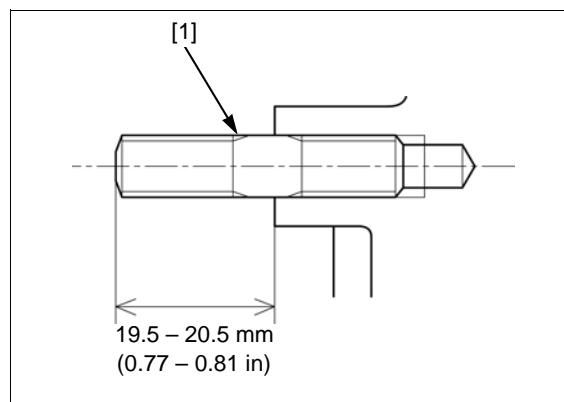
Remove the exhaust pipe (page 2-25).

Thread two nuts onto the stud bolt [1] and tighten them together, and use a wrench on them to turn the stud bolt out.

Install and tighten new stud bolts to the specified torque.

**TORQUE: 9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)**

After installation, check that the length from the bolt head to the cylinder head surface is within specification.





## SIDESTAND

Remove the following:

- Left floor skirt (page 2-6)
- Sidestand switch (page 22-20)

Support the scooter on its centerstand.

Unhook the return spring [1].

Remove the sidestand pivot nut [2], sidestand pivot bolt [3] and sidestand [4].

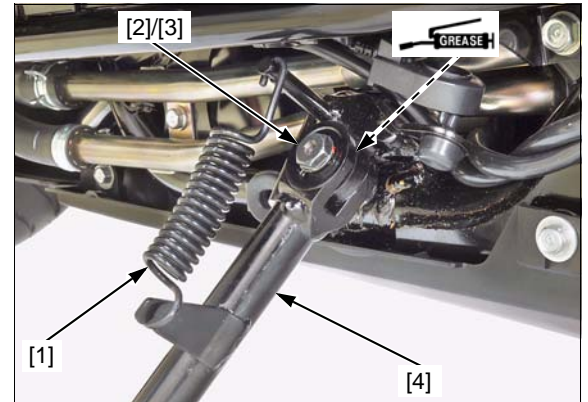
Installation is in the reverse order of removal.

- At installation, apply grease to the pivot sliding area.

### TORQUE:

**Sidestand pivot bolt:** 10 N·m (1.0 kgf·m, 7 lbf·ft)

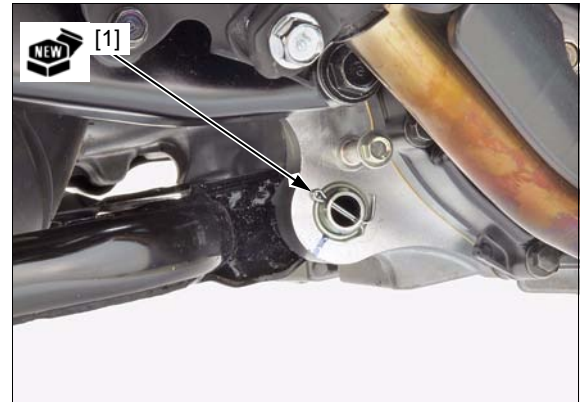
**Sidestand pivot nut:** 30 N·m (3.1 kgf·m, 22 lbf·ft)



## CENTERSTAND

Retract the centerstand and support the scooter securely.

Remove the cotter pin [1] from the right side.

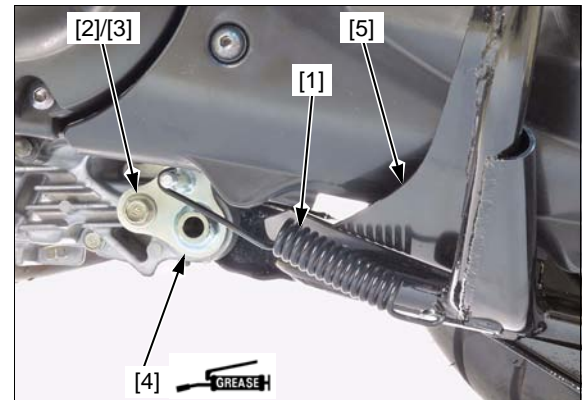


Remove the following from the left side:

- Spring [1]
- Mounting bolt [2]
- Mounting collar [3]
- Pivot shaft [4]
- Centerstand [5]

Installation is in the reverse order of removal.

- Apply grease to the centerstand shaft sliding surface and pivot inside (page 1-17).
- Always replace the cotter pin with a new one.



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## MEMO

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## MAINTENANCE

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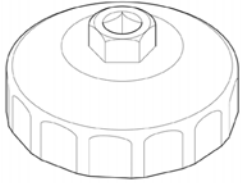
# SERVICE INFORMATION

### GENERAL

- Place the scooter on a 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.

### TOOL

Oil Filter Wrench  
07HAA-PJ70101



or 07AAA-PLCA100 (U.S.A. only)

# MAINTENANCE SCHEDULE

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 NOTE	ODOMETER READING (NOTE 1)								REFER TO PAGE
				x 1,000 mi x 1,000 km	0.6 1.0	4 6.4	8 12.8	12 19.2	16 25.6	20 32.0	24 38.4	
EMISSION RELATED ITEMS	*	FUEL LINE					I		I		I	3-4
	*	THROTTLE OPERATION					I		I		I	3-4
		AIR CLEANER	NOTE 2					R			R	3-5
		CRANKCASE BREATHER	NOTE 3			C	C	C	C	C	C	3-5
		SPARK PLUG				I	R	I	R	I	R	3-6
	*	VALVE CLEARANCE							I			3-7
		ENGINE OIL			INITIAL = 600 mi (1,000 km) or 1 month: R REGULAR = EVERY 8,000 mi (12,800 km) or 12 months: R							3-9
		ENGINE OIL FILTER			R		R		R		R	3-11
	*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-12
		RADIATOR COOLANT	NOTE 5				I		I		R	3-12
	*	COOLING SYSTEM					I		I		I	3-13
NON-EMISSION RELATED ITEMS	*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-13
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4					I			I	3-14
	*	DRIVE BELT					I		R		I	3-14
		BELT CASE AIR CLEANER				C	C	C	C	C	C	3-14
		FINAL DRIVE OIL	NOTE 6									3-15
		BRAKE FLUID	NOTE 5			I	I	R	I	I	R	3-16
		BRAKE PADS WEAR				I	I	I	I	I	I	3-16
		BRAKE SYSTEM			I		I		I		I	3-17
	*	BRAKE LOCK OPERATION				I	I	I	I	I	I	3-18
		HEADLIGHT AIM					I		I		I	3-18
	**	CLUTCH SHOES WEAR				I	I	I	I	I	I	3-18
		SIDESTAND					I		I		I	3-19
	*	SUSPENSION					I		I		I	3-19
	*	NUTS, BOLTS, FASTENERS			I		I		I		I	3-19
	**	WHEELS/TIRES					I		I		I	3-20
	**	STEERING HEAD BEARINGS			I		I		I		I	3-20

\* 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:

- At higher odometer readings, repeat at the frequency interval established here.
- Service more frequently when riding in unusually wet or dusty areas.
- Service more frequently when riding in rain or at full throttle.
- 50 state (meets California)
- Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
- Replace every 2 years, Replacement requires mechanical skill.

## MAINTENANCE

### FUEL LINE

Remove the luggage box (page 2-21).

Check the fuel feed hose [1] between the fuel pump [2] and injector [3] for deterioration, damage or leakage. Replace the fuel feed hose if necessary (page 7-5).

Also, check the fuel feed hose fittings for damage or looseness.



### THROTTLE OPERATION

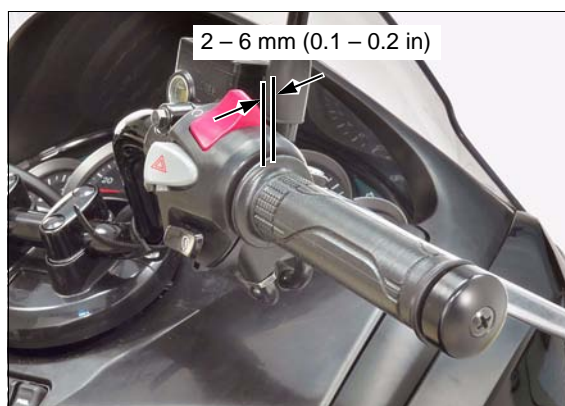
Check for any deterioration or damage to the throttle cable. Check the throttle grip for smooth operation. Check that the throttle opens and automatically closes in all steering positions.

If the throttle grip does not return properly, overhaul and lubricate the throttle grip housing.

If the throttle grip still does not return properly, replace the throttle cable.

With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change. If idle speed increases, check the throttle grip freeplay and the throttle cable connection.

Measure the throttle grip freeplay at the throttle grip flange.



#### **FREEPLAY: 2 – 6 mm (0.1 – 0.2 in)**

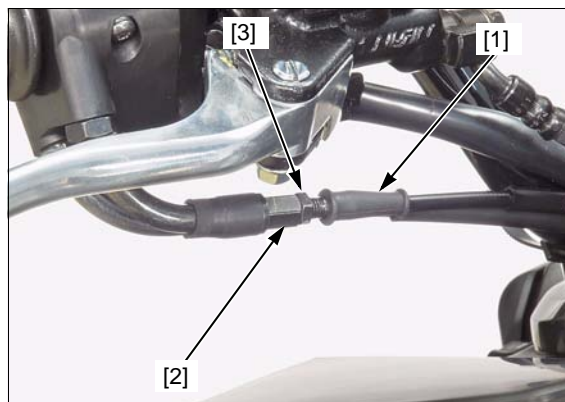
Minor adjustments are made with the upper adjuster.

Slide the rubber boot [1] off the adjuster [2].

Loosen the lock nut [3], turn the adjuster as required and tighten the lock nut.

Install the rubber boot securely.

After adjustment, recheck the throttle operation.



Major adjustments are made with the lower adjuster on the throttle body.

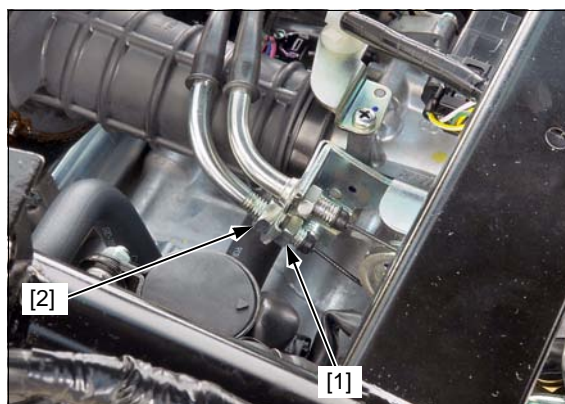
Remove the luggage box (page 2-21).

Loosen the lock nut [1], turn the adjusting nut [2] as required and tighten the lock nut to specified torque.

#### **TORQUE: 8.5 N·m (0.9 kgf·m, 6.3 lbf·ft)**

After adjustment, recheck the throttle operation.

Install the luggage box (page 2-21).

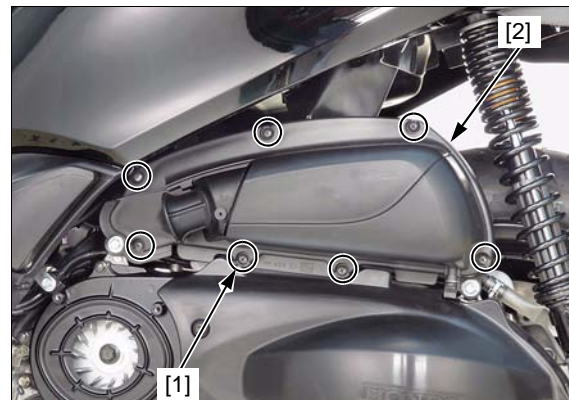


## AIR CLEANER

- The viscous paper element type air cleaner cannot be cleaned because the element contains a dust adhesive.
- If the scooter is used in unusually wet or dusty areas, more frequent inspections are required.

Remove the belt case air cleaner housing (page 3-14).

Remove the screws [1] and air cleaner housing cover [2].



Remove the screws [1] and air cleaner element [2].

Replace the air cleaner element in accordance with the maintenance schedule (page 3-3) or any time it is excessively dirty or damaged.

Clean the inside of the air cleaner housing and cover.

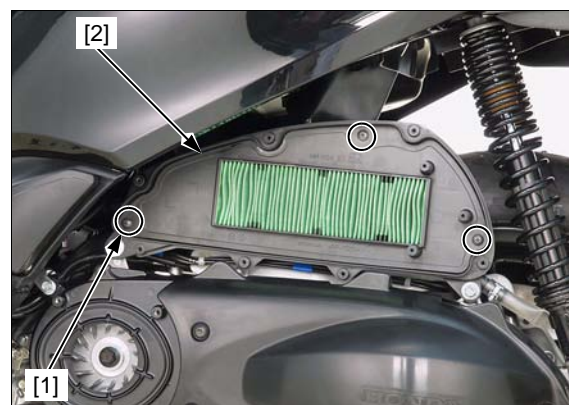
- Check that the condition of the packing, and replace them if necessary.

Install the air cleaner element and housing cover.

Install and tighten the screws to the specified torque.

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

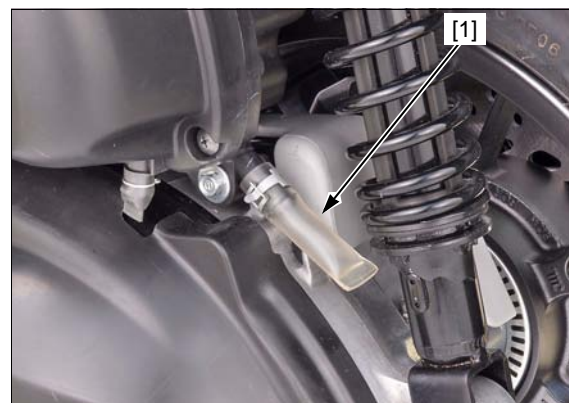
Install the belt case air cleaner housing (page 3-14).



## CRANKCASE BREATHER

- Service more frequently when ridden in rain, at full throttle, or after the scooter is washed or overturned. Service if the deposit level can be seen in the transparent section of the drain plug.

Remove the crankcase breather drain plug [1] and drain the deposits into a suitable container, then reinstall it securely.



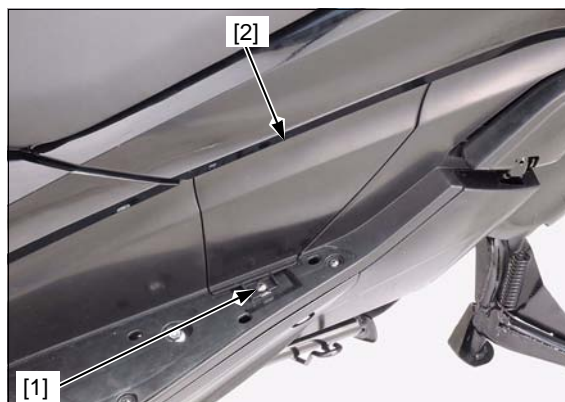


# SPARK PLUG

## REMOVAL/INSTALLATION

Remove the left floor mat (page 2-5).

Remove the screw [1] and maintenance lid [2].



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

Disconnect the spark plug cap [1] and remove the spark plug [2].

Inspect or replace the spark plug as described in the maintenance schedule (page 3-3).

### SPECIFIED SPARK PLUG:

**NGK: LMAR8A-9**

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

**TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)**

Connect the spark plug cap by aligning the hole of the spark plug cap with the tab of the cylinder head cover.

Install the removed parts in the reverse order of removal.



## INSPECTION

Check the following and replace if necessary.

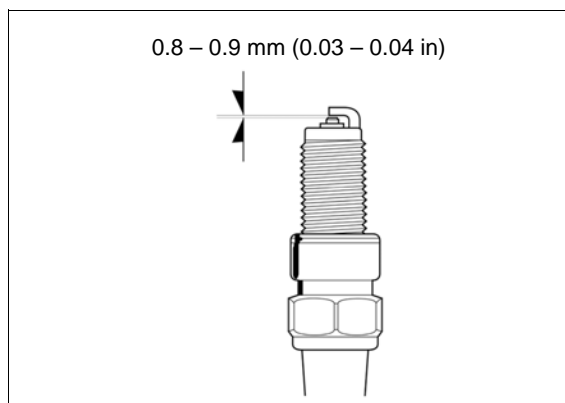
- Insulator for cracks or damage
- Center electrode and side electrodes for wear
- Burning condition, coloration

Clean the spark plug electrodes with a wire brush or special plug cleaner.

Measure the spark gap between the center and side electrodes with a feeler gauge.

**SPARK PLUG GAP: 0.8 – 0.9 mm (0.03 – 0.04 in)**

If necessary, adjust the gap by bending the side electrode carefully.





# VALVE CLEARANCE

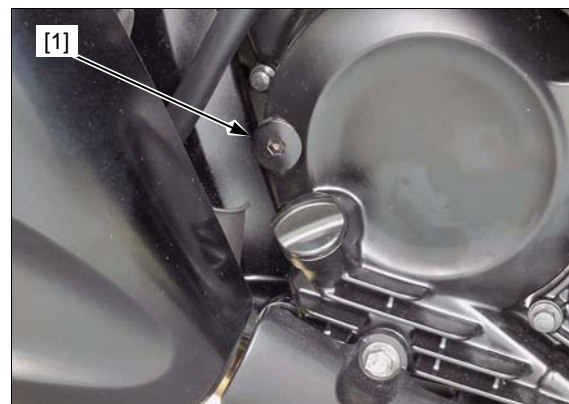
## INSPECTION

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

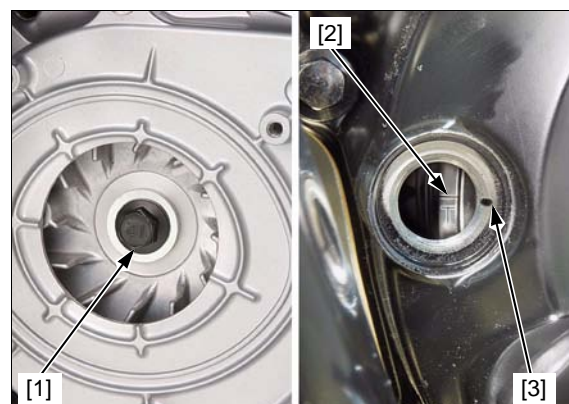
Remove the following:

- Cylinder head cover (page 10-5)
- Belt case air cleaner housing (page 3-14)

Remove the timing hole cap [1] from the right crankcase cover.

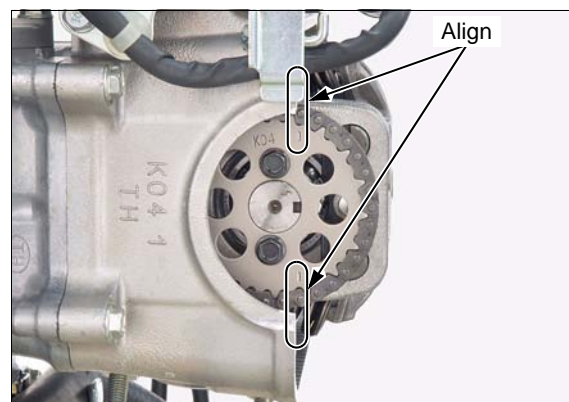


Rotate the drive pulley (crankshaft) [1] counterclockwise and align the "T" mark [2] on the flywheel with the index mark [3] in the crankcase cover.



The index line on the cam sprocket must be flush with the cylinder head surface as shown.

If the index line on the cam sprocket is not flush with the cylinder head surface, rotate the crankshaft one full turn (360°) and align the "T" mark again.

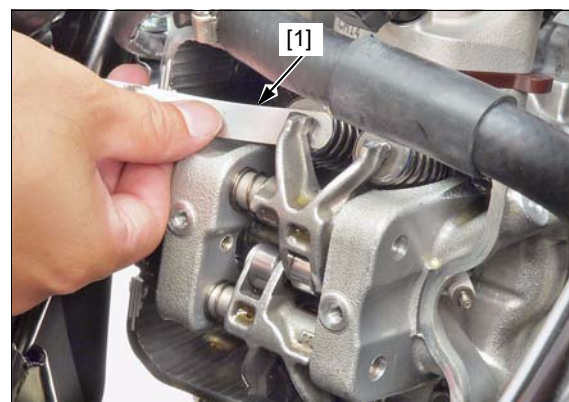


Check the clearances of each valve by inserting the feeler gauge [1] between the rocker arm and shim.

## VALVE CLEARANCE:

**IN:**  $0.16 \pm 0.03$  mm ( $0.006 \pm 0.001$  in)

**EX:**  $0.22 \pm 0.03$  mm ( $0.009 \pm 0.001$  in)

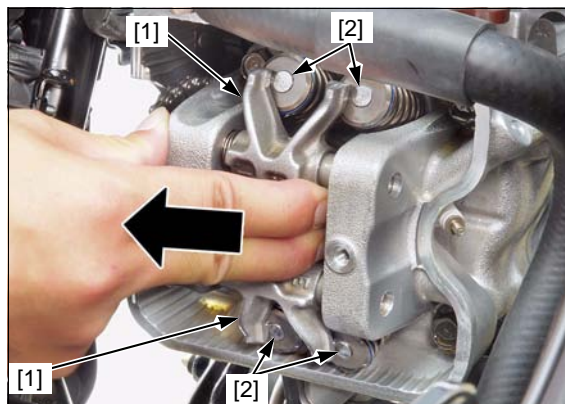


## MAINTENANCE

Slide the rocker arm [1] to the spring side and remove the shims [2].

- Do not allow the shims to fall into the crankcase.
- Mark all shims to ensure correct reassembly in their original locations.
- The shims can be easily removed with a tweezers or magnet.

Clean the valve and shim contact area with compressed air.



Measure the shim [1] thickness and record it.



*Sixty-nine different thickness shims are available from the thinnest 1.200 mm thickness shim to the thickest 2.900 mm thickness shim in intervals of 0.025 mm.*

Calculate the new shim thickness using the equation below.

$$A = (B - C) + D$$

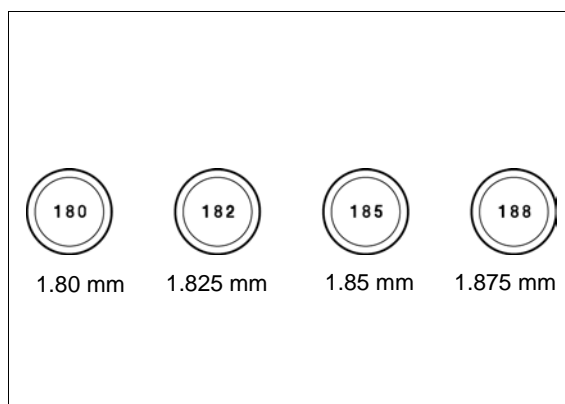
A: New shim thickness

B: Recorded valve clearance

C: Specified valve clearance

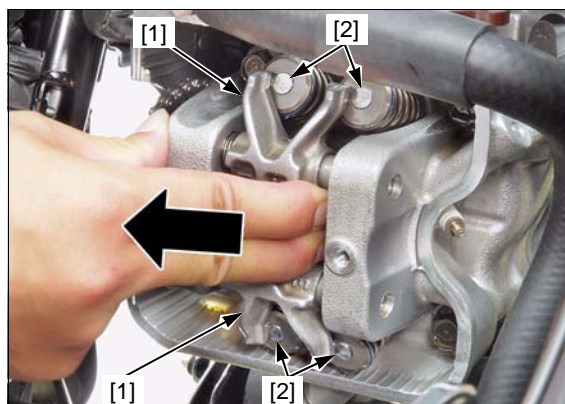
D: Old shim thickness

- Make sure of the correct shim thickness by measuring the shim with a micrometer.
- Reface the valve seat if carbon deposits result in a calculated dimension of over 2.900 mm.



Slide the rocker arm [1] to the spring side and install the newly selected shims [2] on the valve spring retainer.

Rotate the camshafts by rotating the drive pulley (crankshaft) counterclockwise several times. Recheck the valve clearance.



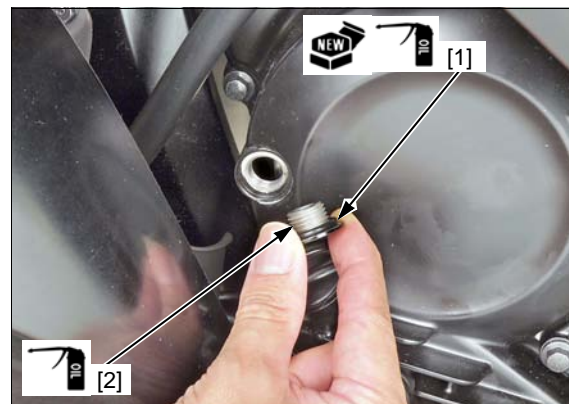
Apply engine oil to a new O-ring [1].  
Apply engine oil to the timing hole cap [2] threads and seating surface.

Install the timing hole cap and tighten it to the specified torque.

**TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)**

Install the following:

- Belt case air cleaner housing (page 3-14)
- Cylinder head cover (page 10-5)



## ENGINE OIL

### OIL LEVEL CHECK

Place the scooter on its centerstand on a level surface.

Start the engine and let it idle for 3 – 5 minutes.  
Stop the engine and wait for 2 – 3 minutes.

Remove the oil filler cap/dipstick [1] and wipe the oil from the dipstick with a clean cloth.

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

The level should be between the upper [2] and lower [3] level lines on the dipstick.

If the oil level is below or near the lower level line, add the recommended oil to the upper level line.

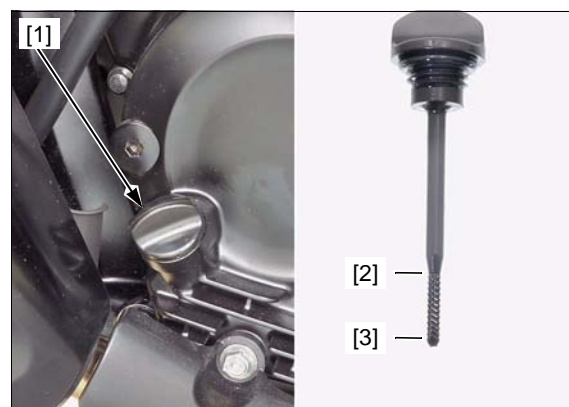
### RECOMMENDED ENGINE OIL:

**Pro Honda HP4M (with molybdenum additives)  
4-stroke oil (U.S.A. & Canada) or equivalent  
motorcycle oil**

**API service classification: SG or higher  
(except oils labeled as energy conserving on the  
circular API service label)**

**JASO T903 standard: MB**

**Viscosity: SAE 10W-30**



Make sure the O-ring [1] is in good condition, and replace if necessary.

Apply engine oil to the O-ring and install the oil filler cap/dipstick [2].





### OIL CHANGE

Place the scooter on its centerstand on a level surface.

Remove the oil filler cap/dipstick [1].



Remove the oil drain bolt [1] and sealing washer [2], then drain the engine oil completely.

Replace the sealing washer with a new one.

Apply engine oil to the oil drain bolt threads and seating surface.

Install and tighten the oil drain bolt to the specified torque.

**TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)**

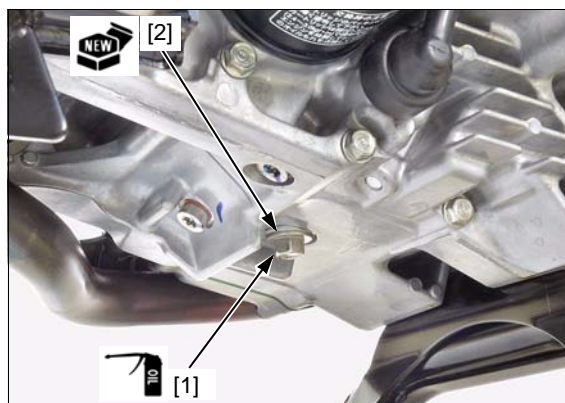
Fill the crankcase with recommended engine oil (page 3-9).

#### OIL CAPACITY:

**1.2 liters (1.3 US qt, 1.1 Imp qt) after draining**

**1.4 liters (1.5 US qt, 1.2 Imp qt) after oil filter change**

**1.7 liters (1.8 US qt, 1.5 Imp qt) after disassembly**



Install the oil filler cap/dipstick.

Check the oil level (page 3-9).

Make sure there are no oil leaks.

### OIL CHANGE INDICATOR

- Oil change indicator lights when the distance reaches about 600 mile (1,000 km) for the first time and every 8,000 mile (12,800 km) after resetting the indicator.

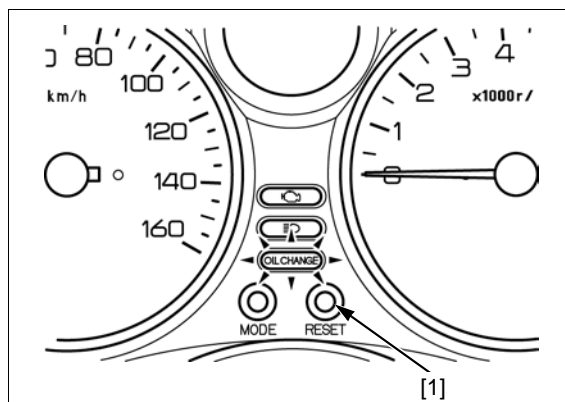
Reset the oil change indicator after each oil change.

To reset the oil change indicator, press and hold the "RESET" button [1] while turning the ignition switch to the ON position, and keep hold "RESET" button for more than 3 seconds.

The indicator will disappear.

If the oil is changed before the oil change indicator appears, be sure to reset the oil change indicator after changing the oil.

The indicator will appear for 2 seconds, then disappear. This means the indicator is reset.



# ENGINE OIL FILTER

## FILTER CHANGE

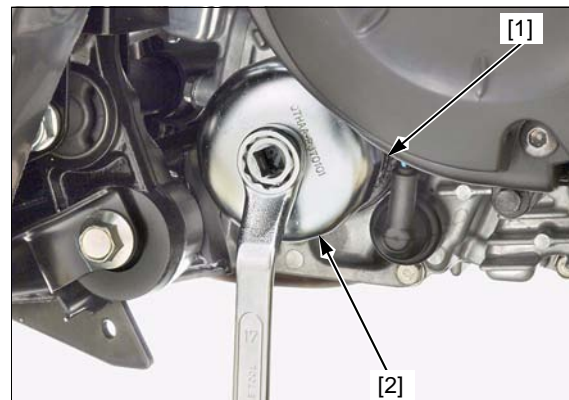
Drain the engine oil (page 3-10).

Remove and discard the oil filter cartridge [1] using the special tool.

**TOOL:**

**Oil Filter Wrench [2]**

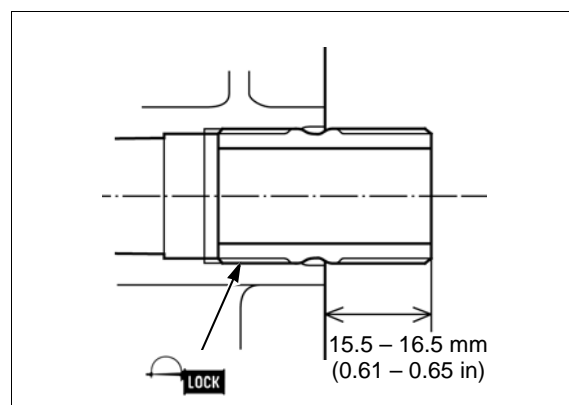
**07HAA-PJ70101 or  
07AAA-PLCA100  
(U.S.A. only)**



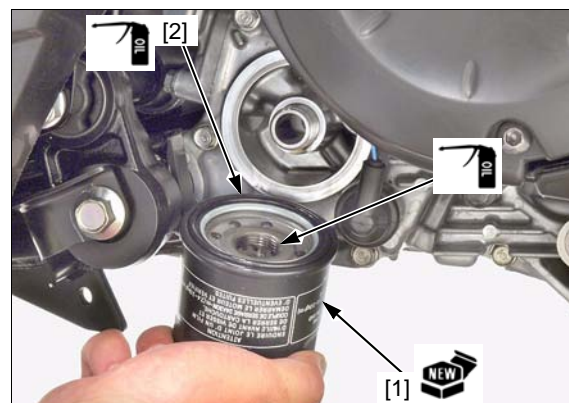
Check that the oil filter boss protrusion from the crankcase is specified length as shown.

**SPECIFIED LENGTH: 15.5 – 16.5 mm (0.61 – 0.65 in)**

- If the oil filter boss is removed, clean and apply locking agent to the oil filter boss threads (coating width:  $6.5 \pm 1.0$  mm ( $0.26 \pm 0.04$  in) from its tip).



Apply engine oil to new oil filter cartridge [1] threads and O-ring [2].



Install the oil filter cartridge [1] and tighten it to the specified torque.

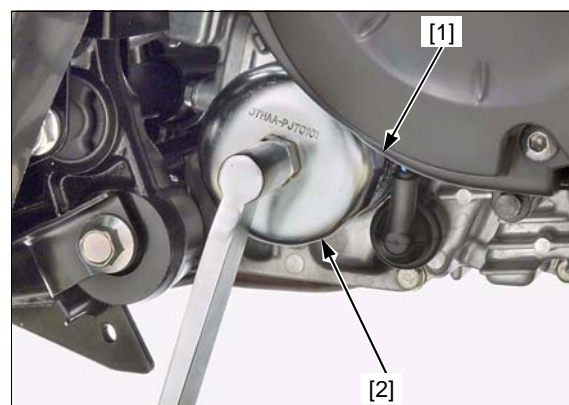
**TOOL:**

**Oil Filter Wrench [2]**

**07HAA-PJ70101 or  
07AAA-PLCA100  
(U.S.A. only)**

**TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)**

Fill the crankcase with recommended engine oil (page 3-9).



### ENGINE IDLE SPEED

- 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 MIL blinking
  - Spark plug condition (page 3-6)
  - Secondary air supply system condition (page 3-13)
  - Crankcase breather system condition (page 3-5)
  - Air cleaner element condition (page 3-5)
- The engine must be warm for accurate idle speed inspection.
- This system eliminates the need for manual idle speed adjustment compared to previous designs.

Start the engine and let it idle.  
Check the idle speed.

**IDLE SPEED: 1,500 ± 100 rpm**

If the idle speed is out of the specification, check the following:

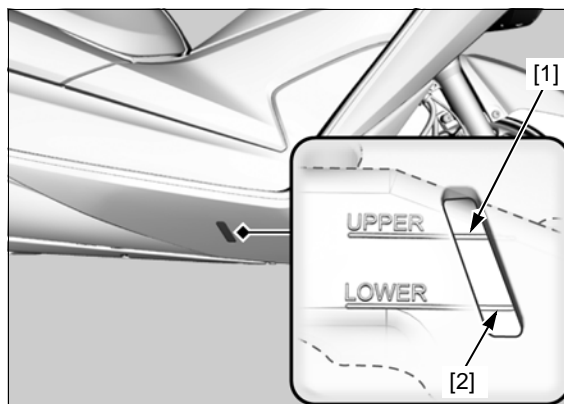
- Intake air leak or engine top-end problem (page 10-3)
- Throttle operation and freeplay (page 3-4)
- IACV operation (page 7-24)

### RADIATOR COOLANT

Place the scooter on its centerstand on a level surface.

With the engine running at normal operating temperature, check the coolant level of the reserve tank.

The level should be between the “UPPER” [1] and “LOWER” [2] level lines.



If the level is low, fill the tank as follows:

Remove the floor mat (page 2-5).

Remove the reserve tank maintenance lid [1].

Remove the reserve tank cap [2] and fill the tank to the upper level line with a 1:1 mixture of distilled water and antifreeze.

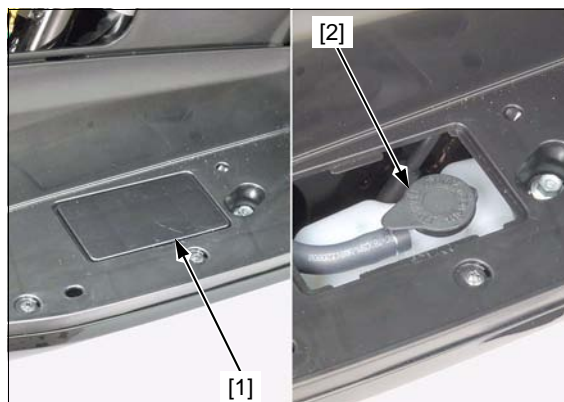
#### RECOMMENDED ANTIFREEZE:

**Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors**

Check to see if there are any coolant leaks when the coolant level decreases very rapidly.

If the reserve tank becomes completely empty, there is a possibility of air in the cooling system.

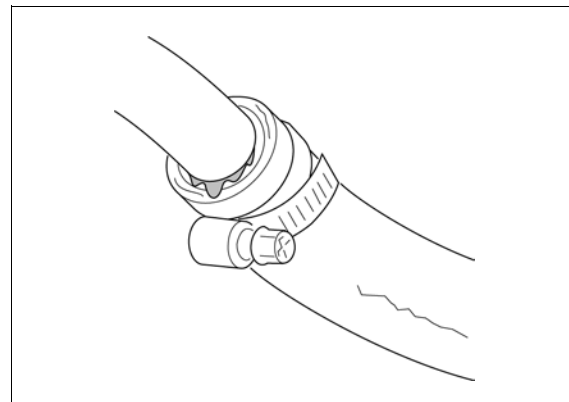
Be sure to remove all air from the cooling system (page 9-5).



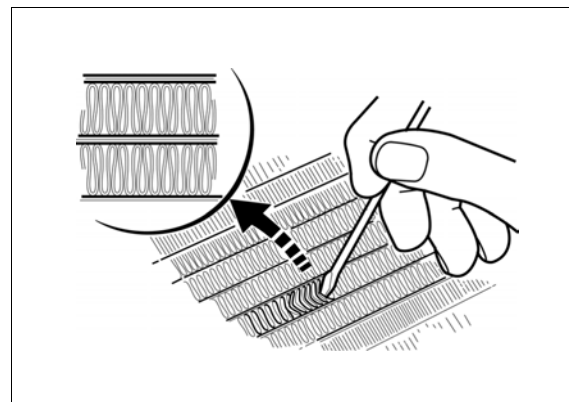
## COOLING SYSTEM

Inspect the water hoses for cracks or deterioration, and replace them if necessary.

Check the tightness of all water hose band screws (page 14-5).



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



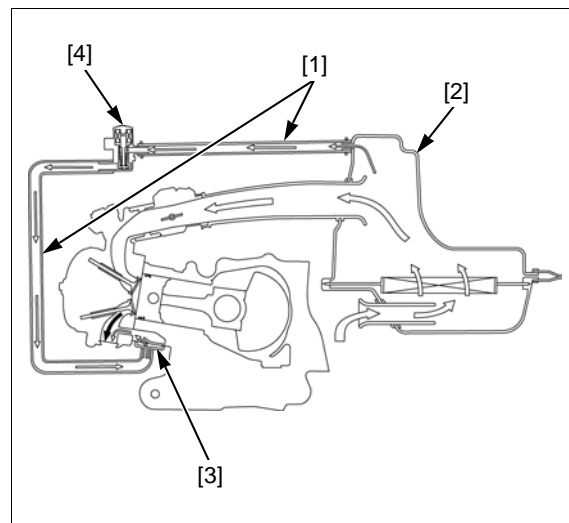
## SECONDARY AIR SUPPLY SYSTEM

Remove the luggage box (page 2-21).

Check the air supply hoses [1] between the air cleaner housing [2] and PAIR check valve [3] through PAIR control solenoid valve [4] for cracks, deterioration, damage or loose connections.

If the air supply hoses show any signs of heat damage, inspect the PAIR check valve (page 7-27).

For secondary air supply system inspection (page 7-26).



## MAINTENANCE

### EVAPORATIVE EMISSION CONTROL SYSTEM (AC TYPE ONLY)

Remove the right floor step (page 2-15).

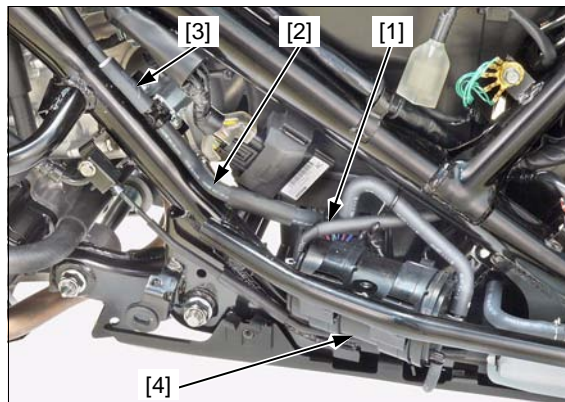
Check the hoses for deterioration, damage or loose connection.

- Fuel tank breather hose [1]
- EVAP canister to EVAP purge control solenoid valve hose [2]
- EVAP purge control solenoid valve to intake pipe hose [3]

Check the EVAP canister [4] for cracks or other damage.

Refer to the cable and harness routing for hose connections (page 1-18).

Install the right floor step (page 2-15).



### DRIVE BELT

Remove the drive belt (page 12-9).

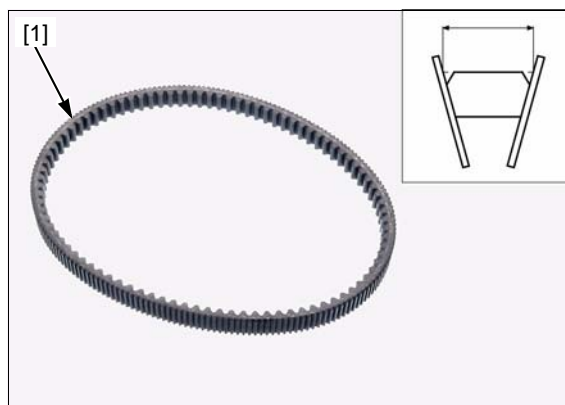
Check the drive belt [1] for cracks, separation or abnormal or excessive wear.

Measure the drive belt width.

**SERVICE LIMIT: 25.7 mm (1.01 in)**

If necessary replace the drive belt.

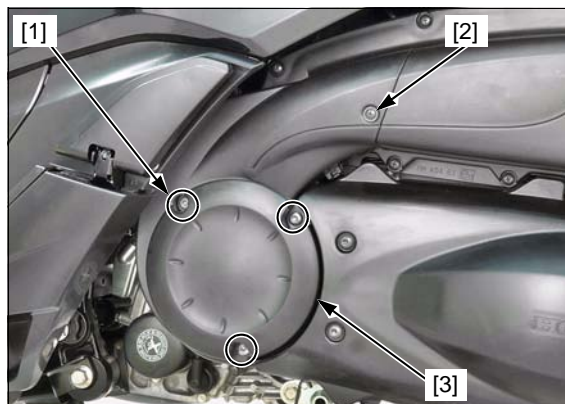
Install the drive belt (page 12-17).



### BELT CASE AIR CLEANER

Remove the belt case cleaner housing socket bolts [1] and screw [2].

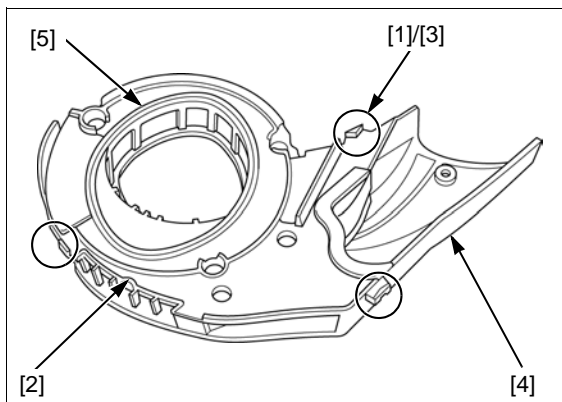
Remove the belt case air cleaner housing [3] from the left crankcase cover.





Release the three tabs [1] of the air cleaner base cover [2] from the slots [3] of the air cleaner base [4].  
Remove the air cleaner base cover from the air cleaner base.

Check that the O-ring [5] of the air cleaner base cover is in good condition, and replace if necessary.



Remove the air cleaner element [1] from the air cleaner base core.

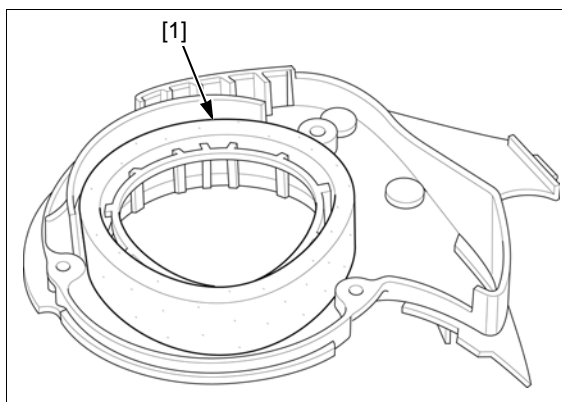
*Do not apply oil to the element.*

Wash the element in non-flammable or high flash point solvent.  
Squeeze out the solvent and let it dry thoroughly, then install it onto the base core.

Install the belt case air cleaner housing in the reverse order of removal.

#### TORQUE:

**Belt case air cleaner housing socket bolt:**  
**10 N·m (1.0 kgf·m, 7 lbf·ft)**



## FINAL DRIVE OIL

### OIL LEVEL CHECK

Remove the left crankcase outer cover (page 2-20).

Place the scooter on its centerstand on a level surface.

Remove the oil check bolt [1] and sealing washer [2].  
Check whether the oil flows out from the check bolt hole.

If the oil level is low (oil does not flow out), add the recommended oil as follows:

Remove the oil filler bolt [3] and sealing washer [4].

Pour the recommended oil through the oil filler hole until oil flows out from the check bolt hole.

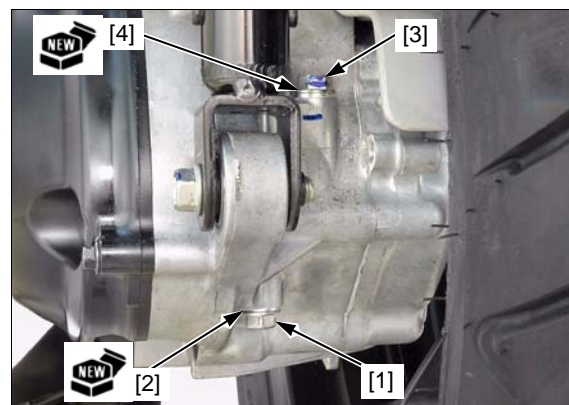
#### RECOMMENDED ENGINE OIL:

**Pro Honda HP4M (with molybdenum additives)**  
**4-stroke oil (U.S.A. & Canada) or equivalent**  
**motorcycle oil**

**API service classification: SG or higher**  
**(except oils labeled as energy conserving on the**  
**circular API service label)**

**JASO T903 standard: MB**

**Viscosity: SAE 10W-30**



*Be careful not to misplace the check bolt and filler bolt.*

Install the check bolt (M8 x 25) with a new sealing washer and tighten it to the specified torque.

**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**

Install the filler bolt (M8 x 12) with a new sealing washer and tighten it to the specified torque.

**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**

Install the left crankcase outer cover (page 2-20).

## MAINTENANCE

### OIL CHANGE

Remove the oil check bolt [1], drain bolt [2] and sealing washers [3], then slowly turn the rear wheel and drain the oil.

*Be careful not to misplace the check bolt and drain bolt.*

After the oil is completely drained, install the drain bolt (M8 x 12) with a new sealing washer and tighten it to the specified torque.

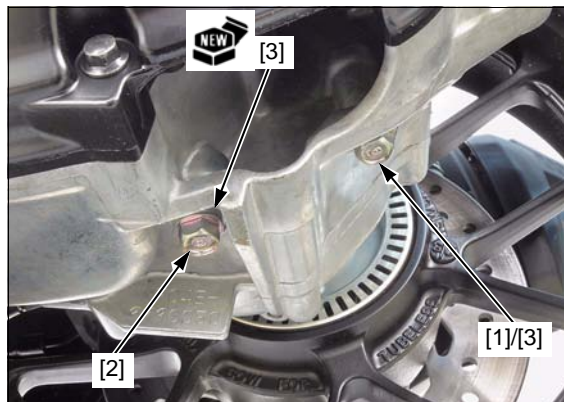
**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**

Fill the final reduction case with recommended oil up to the correct level (page 3-15).

#### OIL CAPACITY:

**0.28 liter (0.30 US qt, 0.25 Imp qt) after draining**

**0.30 liter (0.32 US qt, 0.26 Imp qt) after disassembly**



## BRAKE FLUID

### NOTICE

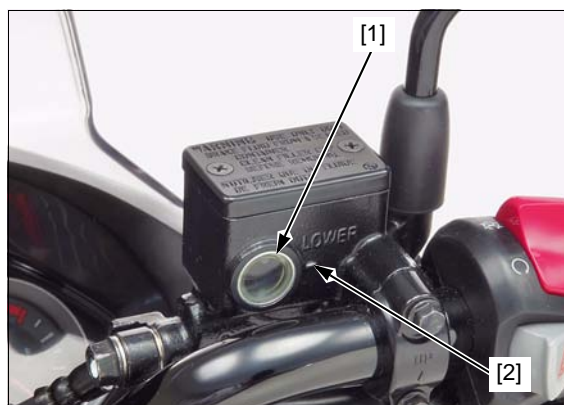
*Spilling fluid can damage painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

- 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 reservoir.
- When the fluid level of the master cylinder is low, check the brake pads for wear (page 3-16).
- 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, this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-17).

Turn the handlebar so that the reservoir is level and check the brake reservoir fluid level through the sight glass [1].

If the fluid level is near the "LOWER" level mark [2], fill the reservoir with DOT 4 brake fluid.

- Front (page 19-6)
- Rear (page 19-7)



## BRAKE PADS WEAR

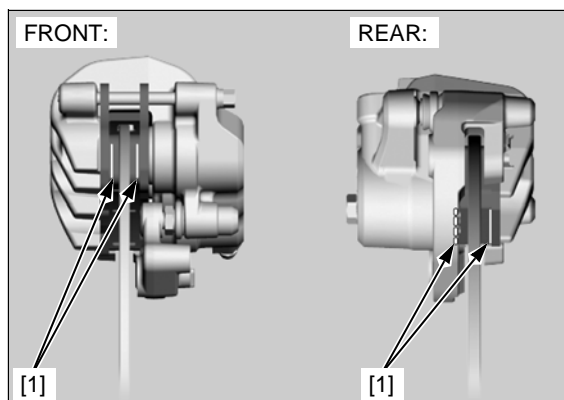
Check the brake pads for wear.

*Always replace the brake pads as a set to assure even disc pressure.*

Replace the brake pads if either pad reaches the bottom of wear limit grooves [1].

Refer to brake pad replacement.

- Front (page 19-9)
- Rear (page 19-10)



# BRAKE SYSTEM

## HYDRAULIC SYSTEM INSPECTION

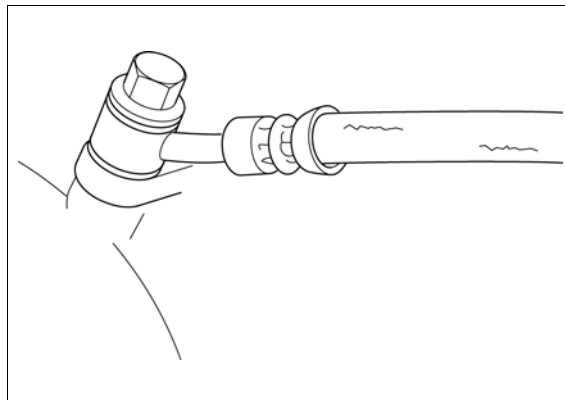
Firmly apply the brake lever, and check that no air has entered the system.

If the lever feels soft or spongy when operated, bleed the air from the system (page 19-5).

Inspect the brake hose and fittings for deterioration, cracks, damage or signs of leakage.

Tighten any loose fittings.

Replace hose and fittings as required.



## COMBINED BRAKE SYSTEM INSPECTION

This model is equipped with a Combined Brake System.

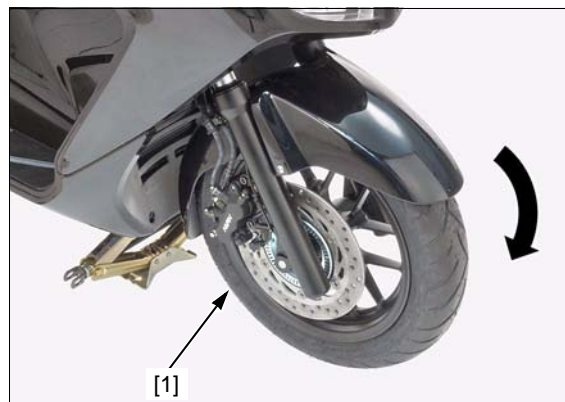
Check the rear brake operation as follows:

Place the scooter on its centerstand.

Jack up the scooter to raise the front wheel [1] off the ground.

Apply the left brake lever [2].

Make sure that the front wheel does not turn while the left brake lever is applied.



### BRAKE LOCK OPERATION (AC TYPE ONLY)

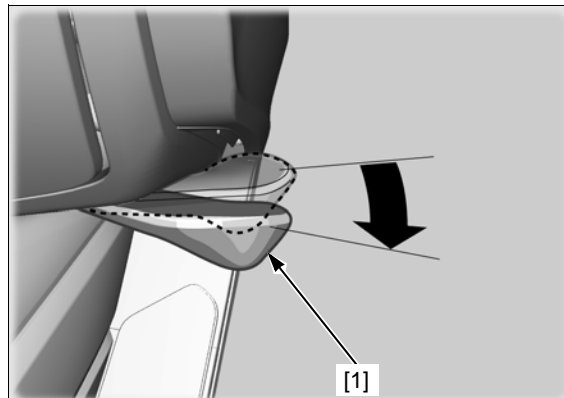
#### INSPECTION

Release the parking brake lever [1] lock.

Pull the parking brake lever slowly and check its stroke.

**STANDARD: 5 – 8 notches**

If the lever stroke is out of specification, adjust the parking brake lever operation (page 18-11).

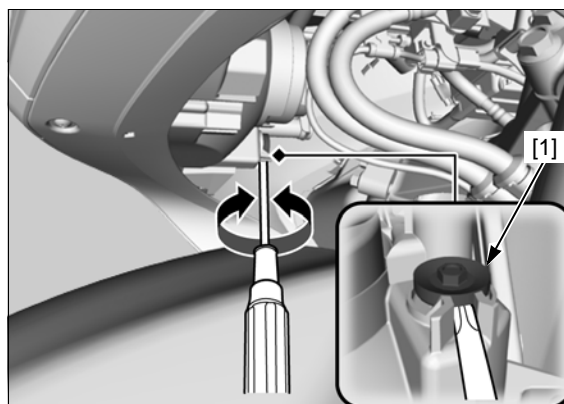


### HEADLIGHT AIM

Support the scooter upright on a level surface.

*Adjust the headlight beam as specified by local laws and regulations.*

Adjust the headlight beam vertically by turning the adjusting screw [1].



### CLUTCH SHOES WEAR

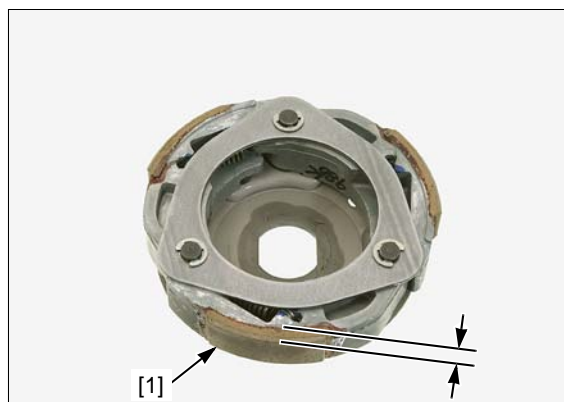
Remove the clutch assembly (page 12-9).

Check the clutch shoe lining [1] for wear or damage. Measure the thickness of each shoe.

**SERVICE LIMIT: 1.0 mm (0.04 in)**

Replace the clutch shoe linings if the measurement is less than the service limit (page 12-10).

Install the clutch assembly (page 12-17).



## SIDESTAND

Support the scooter on its centerstand.

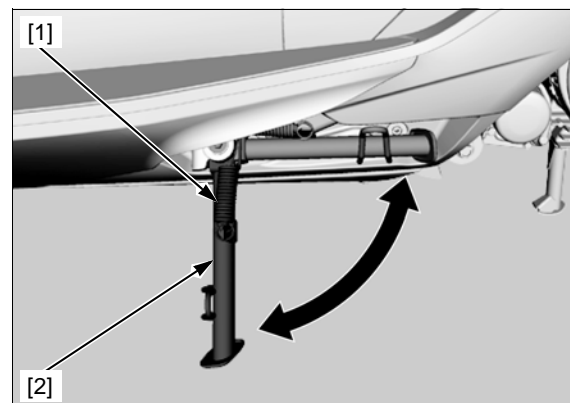
Check the sidestand spring [1] for damage or loss of tension.

Check the sidestand [2] for freedom of movement and lubricate the sidestand pivot if necessary.

Check the sidestand ignition cut-off system:

- Start the engine.
- Fully lower the sidestand while running the engine.
- The engine should stop as the sidestand is lowered.

If there is a problem with the system, check the sidestand switch (page 22-20).



## SUSPENSION

### FRONT

Check the action of the front suspension by operating the front brake and compressing it several times.

Check the entire assembly for damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all fasteners.

For fork service (page 17-8).

### REAR

Check the action of the shock absorber by compressing it several times.

Check the entire shock absorber assembly for damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all fasteners.

For rear shock absorber service (page 18-13).

Raise the rear wheel off the ground by supporting the scooter.

Check for worn engine hanger bushings by grabbing the engine and attempting to move the wheel side to side.

## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-11).

Check that all cotter pins, safety clips, hose clamps and cable stays are in place and properly secured.

### WHEELS/TIRES

Support the scooter on its centerstand.

Jack up the scooter to rise the front wheel off the ground.

Hold the fork leg and move the front wheel sideways with force to see if the wheel bearings are worn.

For front wheel service (page 17-6).

Support the scooter on its centerstand and raise the rear wheel off the ground.

Hold the engine and move the rear wheel sideways with force to see if the final bearings or swingarm bearing are worn.

For rear wheel service (page 18-5).

Turn the wheel and check that it rotates smoothly with no unusual noises.

If any abnormal conditions are suspected, check the final reduction (page 13-5).

Check the tire pressure with a tire pressure gauge when the tires are cold.

- Front tire (page 1-9)
- Rear tire (page 1-9)

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

Check the front and rear wheels for trueness.

Measure the tread depth at the center of the tires.

Replace the tires when the tread depth reaches the service limits.

- Front tire (page 1-9)
- Rear tire (page 1-9)

### STEERING HEAD BEARINGS

Support the scooter with its centerstand and raise the front wheel off the ground.

Check that the handlebar moves freely from side to side. Make sure the control cables do not interfere with the handlebar rotation.

Check for steering stem bearings by grabbing the fork legs and attempting to move the fork forward to backward.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 17-22).

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SERVICE INFORMATION

GENERAL

- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- Use a digital tester for PGM-FI system inspection.
- Refer to following components information
  - Fuel level sensor inspection (page 22-13).
  - TP sensor reset procedure (page 7-16)
- The following color codes are used throughout this section.

Bu = Blue

G = Green

O = Orange

R = Red

Y = Yellow

Bl = Black

Gr = Gray

Lg = Light Green

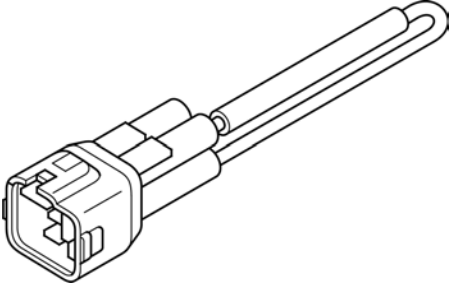
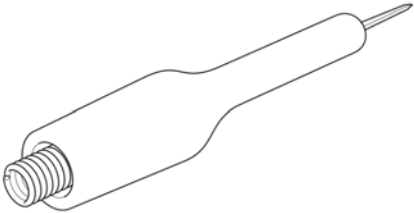
P = Pink

W = White

Br = Brown

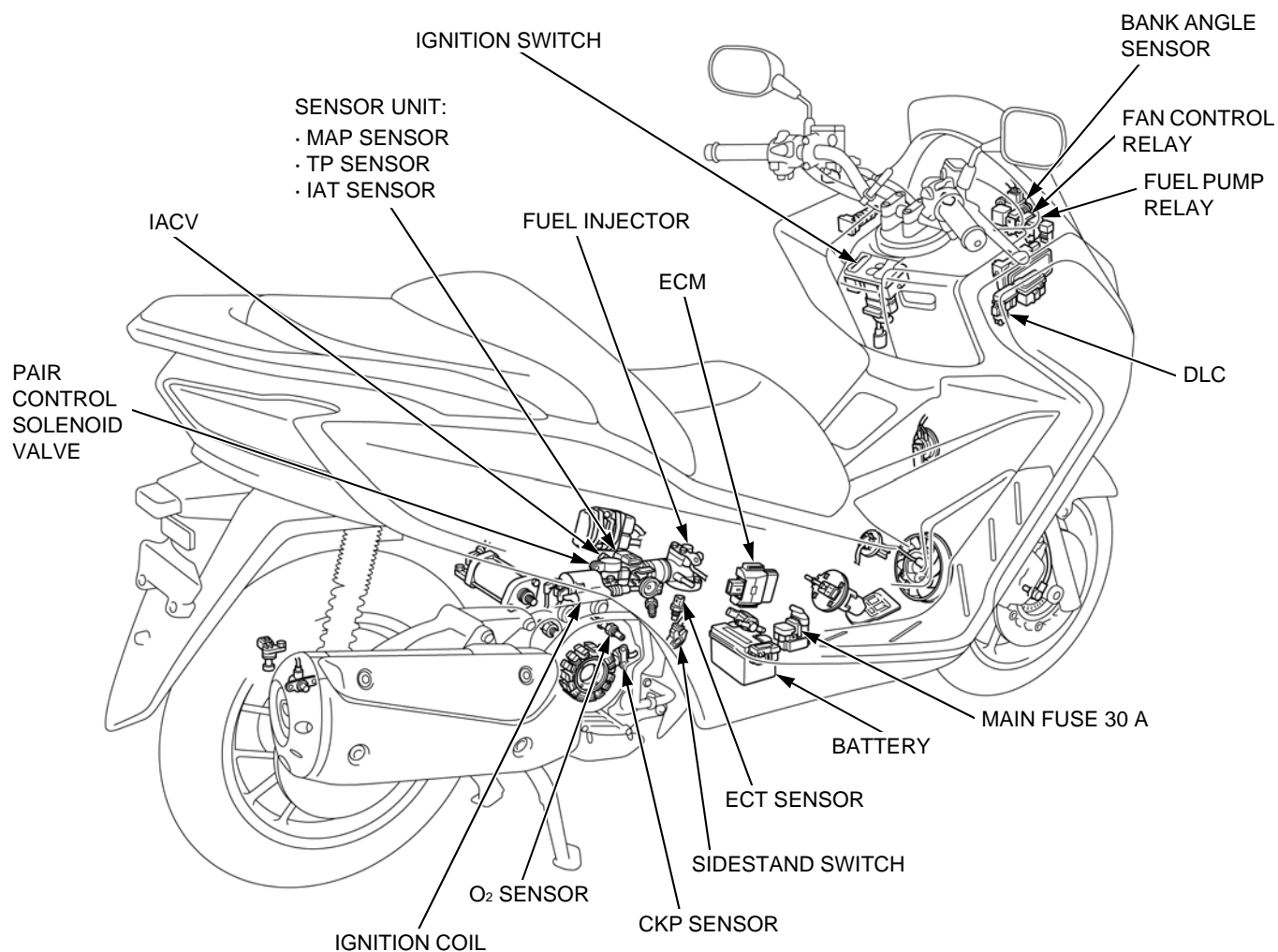
Lb = Light blue

TOOLS

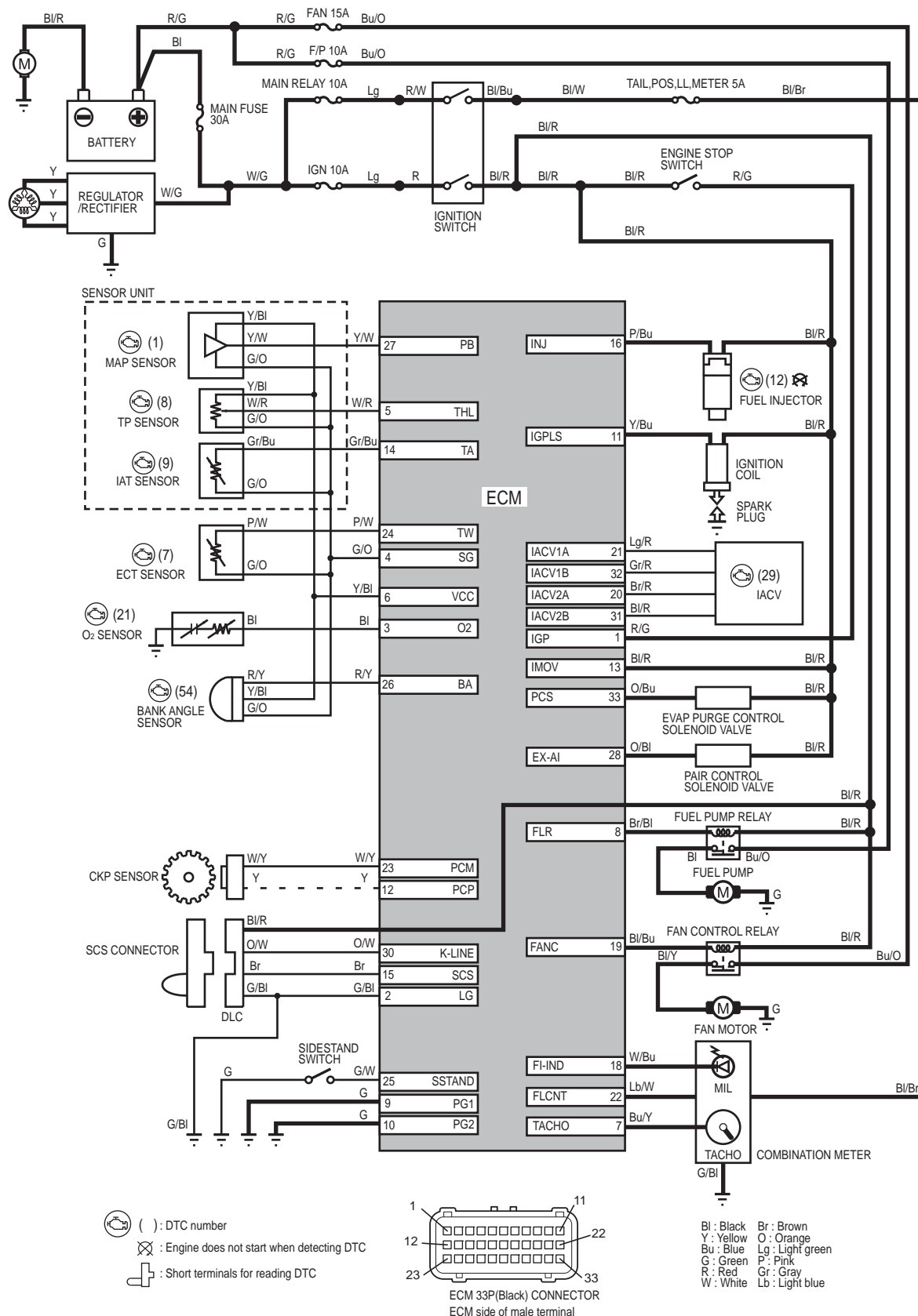
<div>SCS Service Connector</div> <div>070PZ-ZY30100</div> <div></div>	<div>Pin Probe Male (2 pack)</div> <div>07ZAJ-RDJA110</div> <div></div>
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## PGM-FI SYSTEM LOCATION



## PGM-FI SYSTEM DIAGRAM



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## 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 you are 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 sometimes mean something works, but not the way it's supposed to.

#### If the MIL has come on

Refer to DTC READOUT (page 4-6).

#### 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 4-8).

### SYSTEM DESCRIPTION

#### SELF-DIAGNOSIS SYSTEM

The PGM-FI system is equipped with a 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-programed value in the simulated program map. When any abnormality is detected in the injector and/or CKP sensor and/or short of the sensor unit power line, the fail-safe function stops the engine to protect it from damage.

#### 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 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 1,900 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 "O", the MIL will stay on for a few seconds, then go off. If the MIL does not come on, inspect the MIL circuit (page 4-29).

#### CURRENT DTC/FREEZE DTC

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

- In case the ECM detects the problem at present, the MIL will come on will start to blink its DTC. It is possible to read the MIL blink pattern as the current DTC.
- In case the ECM does not detect any problem at present but has a problem stored in its memory, the MIL will not light and blink. If it is necessary to retrieve the past problem, read the freeze DTC by following the DTC readout procedure (page 4-6).

## PGM-FI SYSTEM

### MCS INFORMATION

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

#### How to connect the MCS

Turn the ignition switch to OFF.

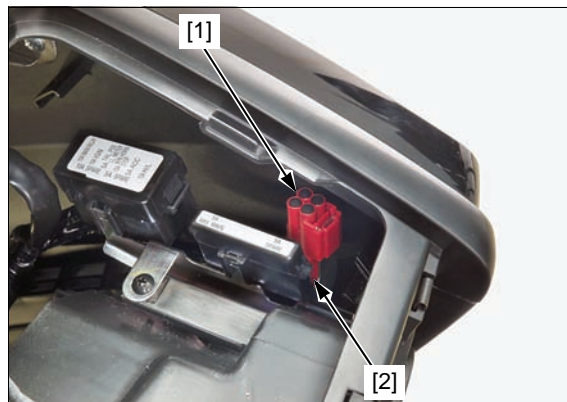
Remove the right front panel (page 2-12).

Remove the dummy connector [1] from the DLC [2].

Connect the MCS to the DLC.

Turn the ignition switch ON and engine stop switch "O", check the DTC and freeze data.

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



### DTC READOUT

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 4-6), read the DTC, freeze data and follow the troubleshooting index (page 4-9).

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 right front panel (page 2-12).

Remove the dummy connector [1] and short DLC terminals using the special tool.

#### TOOL:

**SCS Service Connector [2]      070PZ-ZY30100**

Turn the ignition switch ON, read, note the MIL blinks and refer to the troubleshooting index (page 4-9).

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



## ERASING DTC

Connect the MCS to the DLC (page 4-6).

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

To erase the DTC without MCS, refer to the following procedure.

### How to erase the DTC with SCS connector

1. Remove the right front panel (page 2-12).
2. Turn the ignition switch OFF.
3. Remove the dummy connector [1] and short the wire terminals of the DLC using the special tool.

#### TOOL:

**SCS Service Connector [2] 070PZ-ZY30100**

4. Turn the ignition switch to ON and engine stop switch "Q".
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.
  - The DLC must be jumped while the MIL lights. 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.



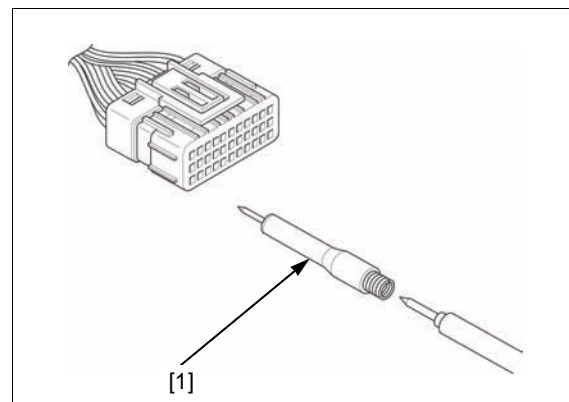
## CIRCUIT INSPECTION

### 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 terminals. 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:

**Pin Probe Male (2 pack) [1] 07ZAJ-RDJA110**



## PGM-FI SYMPTOM TROUBLESHOOTING

When the scooter has one of these symptoms, check the DTC or MIL blinking, refer to the DTC index (page 4-9) 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 cause.

Symptom	Diagnosis procedure	Also check for
Engine cranks but won't start (No fuel pump operation sound when turning the ignition switch ON)	<ol style="list-style-type: none"> <li>1. ECM power/ground circuits malfunction (page 4-30)</li> <li>2. Inspect the fuel supply system (page 7-9)</li> </ol>	<ul style="list-style-type: none"> <li>• Faulty sensor unit or related circuit</li> <li>• Faulty ECM</li> </ul>
Engine cranks but won't start (No DTC and MIL blinking)	<ol style="list-style-type: none"> <li>1. Crank the starter for more than 10 seconds and check the DTC and execute the troubleshooting according to the DTC (page 4-9).</li> <li>2. Inspect the IACV (page 7-24).</li> <li>3. Inspect the ignition system (page 5-5).</li> <li>4. Check the spark plug condition (page 3-6)</li> <li>5. Check the cylinder compression (page 10-5)</li> </ol>	<ul style="list-style-type: none"> <li>• No fuel to injector <ul style="list-style-type: none"> <li>– Clogged fuel filter</li> <li>– Pinched or clogged fuel feed hose</li> <li>– Pinched or clogged fuel tank breather hose</li> <li>– Faulty fuel pump</li> <li>– Faulty fuel pump circuits</li> </ul> </li> <li>• Intake air leak</li> <li>• Contaminated/deteriorated or no fuel</li> <li>• Faulty injector</li> </ul>
Engine stalls, hard to start, rough idling	<ol style="list-style-type: none"> <li>1. Inspect the engine idle speed (page 3-12).</li> <li>2. Inspect the IACV (page 7-24).</li> <li>3. Inspect the fuel supply system (page 7-9).</li> <li>4. Inspect the battery charging system (page 21-6).</li> <li>5. Inspect the ignition system (page 5-5).</li> </ol>	<ul style="list-style-type: none"> <li>• Restricted fuel feed hose</li> <li>• Contaminated/deteriorated fuel</li> <li>• Intake air leak</li> <li>• Faulty MAP sensor</li> <li>• Restricted fuel tank breather hose</li> </ul>
Afterburn when engine braking is used	<ol style="list-style-type: none"> <li>1. Inspect the PAIR system (page 7-26).</li> <li>2. Inspect the ignition system (page 5-5).</li> </ol>	
Backfiring or misfiring during acceleration	Inspect the ignition system (page 5-5).	
Poor performance (driveability) and poor fuel economy	<ol style="list-style-type: none"> <li>1. Inspect the fuel supply system (page 7-9).</li> <li>2. Inspect the air cleaner element (page 3-5).</li> <li>3. Inspect the ignition system (page 5-5).</li> </ol>	<ul style="list-style-type: none"> <li>• Faulty pressure regulator (fuel pump)</li> <li>• Faulty injector</li> <li>• Faulty MAP sensor</li> </ul>
Idle speed is below specifications or fast idle too low (No MIL blinking)	<ol style="list-style-type: none"> <li>1. Inspect the engine idle speed (page 3-12).</li> <li>2. Inspect the IACV (page 7-24).</li> <li>3. Inspect the ignition system (page 5-5).</li> </ol>	
Idle speed is above specifications or fast idle too high (No MIL blinking)	<ol style="list-style-type: none"> <li>1. Inspect the engine idle speed (page 3-12).</li> <li>2. Inspect the throttle operation and freeplay (page 3-4).</li> <li>3. Inspect the IACV (page 7-24).</li> <li>4. Inspect the ignition system (page 5-5).</li> </ol>	<ul style="list-style-type: none"> <li>• Intake air leak</li> <li>• Engine top-end problem</li> <li>• Air cleaner element condition</li> </ul>
MIL never comes ON at all	Inspect the MIL circuit (page 4-29).	
MIL stays ON (No DTC set)	Inspect the DLC circuit (page 4-29)	

## DTC INDEX

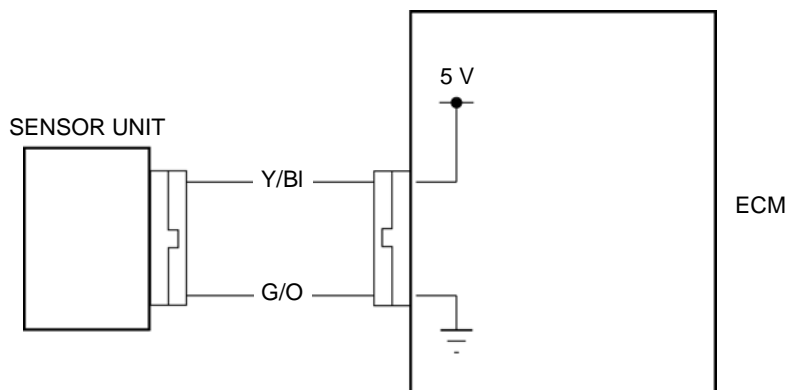
- If not using the MCS, perform all inspections according to the relevant main code.

DTC	Function Failure	Symptom/Fail-safe function	Refer to
1-1	MAP sensor circuit low voltage (less than 0.195 V) • MAP sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Engine operates normally</li> <li>• Fail-safe value: 63 kPa (0.6 kgf/cm<sup>2</sup>, 9 psi)</li> </ul>	4-11
1-2	MAP sensor circuit high voltage (more than 3.848 V) • Loose or poor contact of the sensor unit connector • MAP sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Engine operates normally</li> <li>• Fail-safe value: 63 kPa (0.6 kgf/cm<sup>2</sup>, 9 psi)</li> </ul>	4-12
7-1	ECT sensor circuit low voltage (less than 0.078 V) • ECT sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Hard start at a low temperature</li> <li>• Fail-safe value: 79.79°C (176°F)</li> </ul>	4-14
7-2	ECT sensor circuit high voltage (more than 4.922 V) • Loose or poor contact of the sensor unit connector • ECT sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Hard start at a low temperature</li> <li>• Fail-safe value: 79.79°C (176°F)</li> </ul>	4-15
8-1	TP sensor circuit low voltage (less than 0.215 V) • Loose or poor contact of the sensor unit connector • TP sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Poor engine acceleration</li> <li>• Fail-safe value: 0°</li> </ul>	4-16
8-2	TP sensor circuit high voltage (more than 4.922 V) • TP sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Poor engine acceleration</li> <li>• Fail-safe value: 0°</li> </ul>	4-17
9-1	IAT sensor circuit low voltage (less than 0.078 V) • IAT sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Engine operates normally</li> <li>• Fail-safe value: 34.8°C (95°F)</li> </ul>	4-19
9-2	IAT sensor circuit high voltage (more than 4.922 V) • Loose or poor contact of the sensor unit connector • IAT sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Engine operates normally</li> <li>• Fail-safe value: 34.8°C (95°F)</li> </ul>	4-19
12-1	Injector malfunction • Loose or poor contact of the injector connector • Injector or its circuit malfunction	<ul style="list-style-type: none"> <li>• Engine does not start</li> <li>• Injector, fuel pump and ignition shut down</li> </ul>	4-20
21-1	O <sub>2</sub> sensor malfunction • Loose or poor contact of the O <sub>2</sub> sensor connector • O <sub>2</sub> sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Engine operates normally</li> </ul>	4-22
29-1	IACV malfunction • Loose or poor contact of the IACV connector • IACV or its circuit malfunction	<ul style="list-style-type: none"> <li>• Rough idling</li> </ul>	4-24
33-2	EEPROM in ECM malfunction • Faulty ECM	<ul style="list-style-type: none"> <li>• Engine operates normally</li> <li>• Does not hold the self diagnosis data</li> </ul>	4-25
54-1	Bank angle sensor circuit low voltage (less than 0.352 V) • Bank angle sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Engine operates normally</li> <li>• Engine stop function does not operate</li> </ul>	4-26
54-2	Bank angle sensor circuit high voltage (more than 4.531 V) • Loose or poor contact of the bank angle sensor connector • Bank angle sensor or its circuit malfunction	<ul style="list-style-type: none"> <li>• Engine operates normally</li> <li>• Engine stop function does not operate</li> </ul>	4-27

# SENSOR UNIT POWER LINE INSPECTION

## BEFORE DTC TROUBLESHOOTING

- When the DTC displays 1-1, 1-2, 8-1, 8-2, 9-1 and 9-2, check the following before DTC troubleshooting.
- Before starting the inspection, check for loose or poor contact on the sensor unit 5P (Black) connector and ECM 33P (Black) connector.



### Probable cause

- Open circuit in Yellow/black wire between the sensor unit and ECM
- Open circuit in Green/orange wire between the sensor unit and ECM
- Faulty ECM

## 1. Sensor Unit Power Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector [1] (page 4-34).

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

Measure the voltage at the wire harness side.

### CONNECTION:

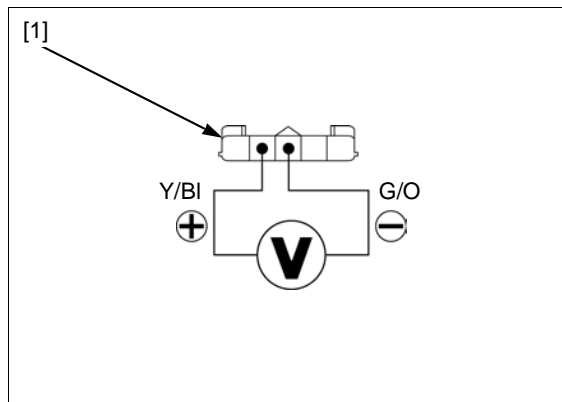
Yellow/black (+) – Green/orange (–)

**STANDARD: 4.75 – 5.25 V**

**If the voltage within 4.75 – 5.25 V?**

**YES** – Turn the ignition switch OFF. Connect the sensor unit 5P (Black) connector and start the DTC troubleshooting (page 4-11).

**NO** – GO TO STEP 2.





## 2. Sensor Unit Input Voltage Line/Ground Line Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector [1] (page 4-31).

Check for continuity between the ECM 33P (Black) connector and sensor unit 5P (Black) connector [2] of the wire harness side.

**CONNECTION:** Yellow/black – Yellow/black  
Green/orange – Green/orange

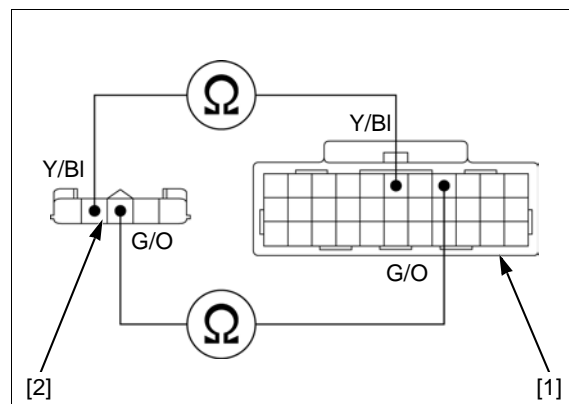
**TOOL:**

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

**Is there continuity?**

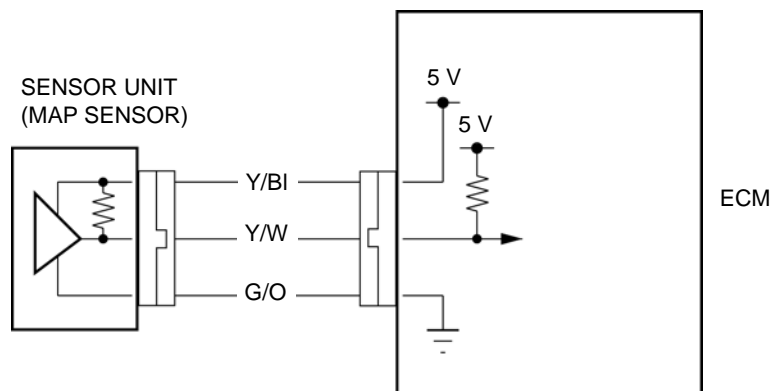
**YES** – Replace the ECM with a known good one and recheck.

**NO** – • Open circuit in Yellow/black wire  
• Open circuit in Green/orange wire



## DTC TROUBLESHOOTING

### DTC 1 (MAP SENSOR)



Probable cause

- Open or short circuit in Yellow/white wire between the sensor unit and ECM
- Faulty sensor unit
- Faulty ECM

### DTC 1-1 (MAP SENSOR LOW VOLTAGE)

#### 1. MAP Sensor System Inspection

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

Check the MAP sensor with the MCS.

**Is about 0 V indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

#### 2. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page 4-10).

**Is the sensor unit power line normal?**

**YES** – GO TO STEP 3.

**NO** – Replace or repair the abnormal circuit.

### 3. MAP Sensor Output line Inspection

Turn the ignition switch OFF.

Connect the ECM 33P (Black) connector.  
Disconnect the sensor unit 5P (Black) connector [1].

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

Measure the voltage at the sensor unit 5P (Black) connector of the wire harness side.

**CONNECTION:**

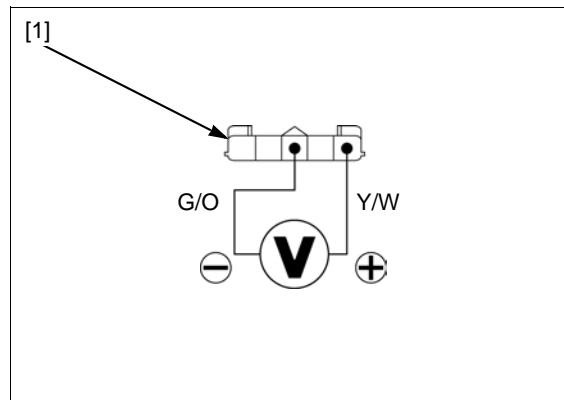
**Yellow/white (+) – Green/orange (-)**

**STANDARD: 4.75 – 5.25 V**

**Is the voltage within 4.75 – 5.25 V?**

**YES** – GO TO STEP 5.

**NO** – GO TO STEP 4.



### 4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector.

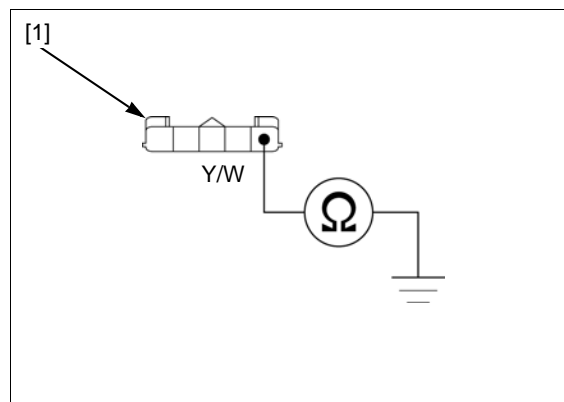
Check for continuity between the sensor unit 5P (Black) connector [1] terminal of the wire harness side and ground.

**CONNECTION: Yellow/white – Ground**

**Is there continuity?**

**YES** – Short circuit in Yellow/white wire

**NO** – GO TO STEP 5.



### 5. MAP Sensor Inspection

Replace the sensor unit with a known good one (page 4-34).

Connect the sensor unit 5P (Black) and ECM 33P (Black) connectors.

Erase the DTCs (page 4-7).

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

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 sensor unit (MAP sensor)

### DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

#### 1. MAP Sensor System Inspection

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

Check the MAP sensor with the MCS.

**Is about 5 V indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

## 2. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page 4-10).

**Is the sensor unit power line normal?**

**YES** – GO TO STEP 3.

**NO** – Replace or repair the abnormal circuit.

## 3. MAP Sensor Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector [1].

Connect the MAP sensor terminals at the wire harness side with a jumper wire [2].

**CONNECTION: Yellow/white – Green/orange**

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

Check the MAP sensor with the MCS.

**Is about 0 V indicated?**

**YES** – Replace the sensor unit with a known good one, and recheck (Faulty MAP sensor)

**NO** – GO TO STEP 4.

## 4. MAP Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector [1].

Check for continuity between the sensor unit 5P (Black) connector [2] and ECM 33P (Black) connector of the wire harness side.

**CONNECTION: Yellow/white – Yellow/white**

**STANDARD: Continuity**

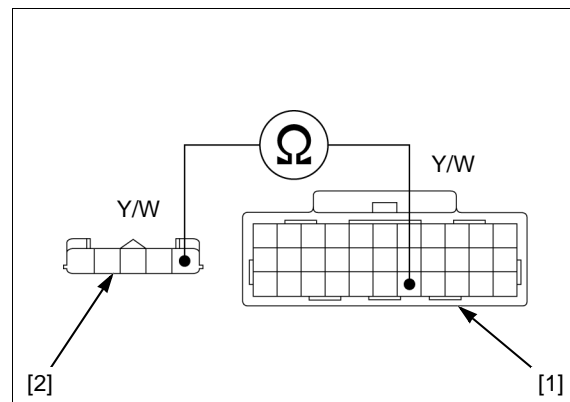
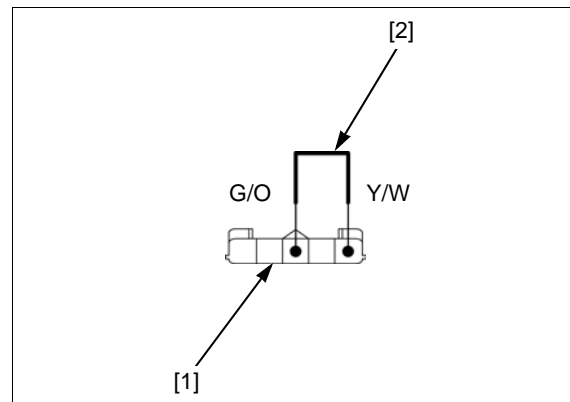
**TOOL:**

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

**Is there continuity?**

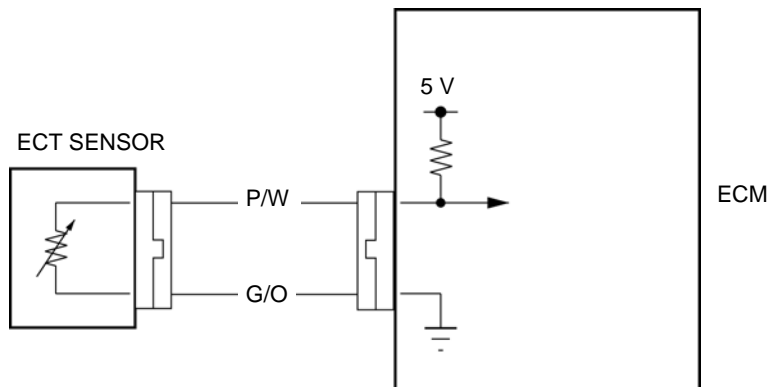
**YES** – Replace the ECM with a known good one, and recheck

**NO** – Open circuit in the Yellow/white wire



### DTC 7 (ECT SENSOR)

- Before starting the inspection, check for loose or poor contact on the ECT sensor 3P (Gray) connector and ECM 33P (Black) connector, then recheck the DTC.



#### Probable cause

- Open or short circuit in Pink/white wire between the ECT sensor and ECM
- Open circuit in Green/orange wire between the ECT sensor and ECM
- Faulty ECT sensor
- Faulty ECM

### DTC 7-1 (ECT SENSOR LOW VOLTAGE)

#### 1. ECT Sensor System Inspection

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

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 (page 4-33).

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

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**

Turn the ignition switch OFF.

Measure the resistance at the sensor side of the ECT sensor 3P (Gray) connector [1] terminals.

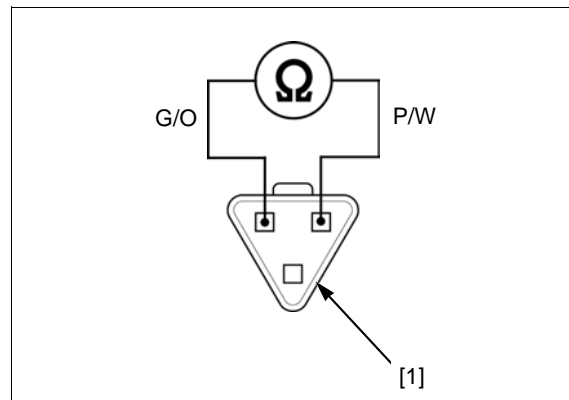
**CONNECTION: Pink/white – Green/orange**

**STANDARD: 2.3 – 2.6 k $\Omega$  (20°C/68°F)**

**Is the resistance within 2.3 – 2.6 k $\Omega$ ?**

**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.

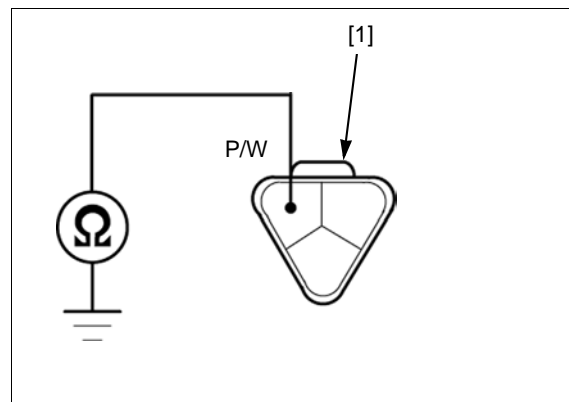
Check for continuity between the ECT sensor 3P (Gray) connector [1] terminal of the wire harness side and ground with ECM 33P (Black) connector disconnected.

**CONNECTION: Pink/white – ground**

**Is there continuity?**

**YES** – Short circuit in Pink/white wire

**NO** – Replace the ECM with a known good one, and recheck

**DTC 7-2 (ECT SENSOR HIGH VOLTAGE)****1. ECT Sensor System Inspection**

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

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 [1] (page 4-33).

Connect the ECT sensor 3P (Gray) connector terminals with a jumper wire [2].

**CONNECTION: Pink/white – Green/orange**

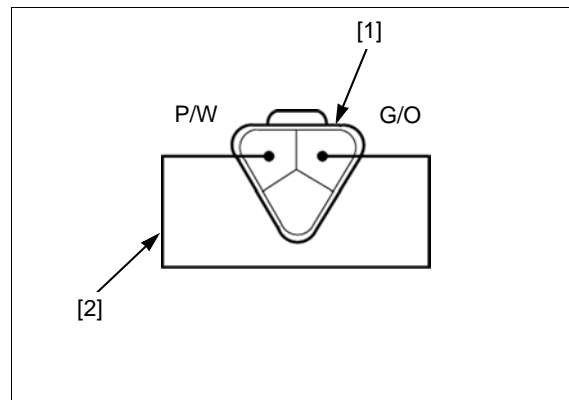
Turn the ignition switch ON and engine stop switch "O".

Check the ECT sensor with the MCS.

**Is about 0 V indicated?**

**YES** – Faulty ECT sensor

**NO** – GO TO STEP 3.



## 3. ECT Sensor Output/ground Line Inspection

Turn the ignition switch OFF.  
Disconnect the jumper wire.

Disconnect the ECM 33P (Black) connector [1]  
(page 4-31).

Check the continuity between the ECT 3P (Gray)  
sensor connector [2] and ECM 33P (Black)  
connector of the wire harness side.

**CONNECTION:** Pink/white – Pink/white  
Green/orange – Green/orange

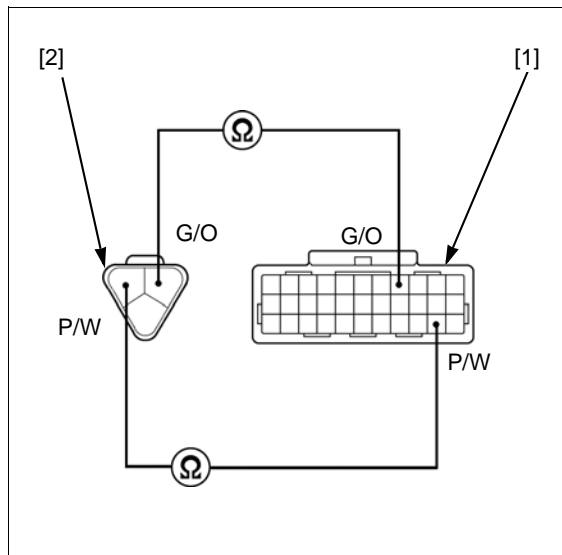
### TOOL:

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

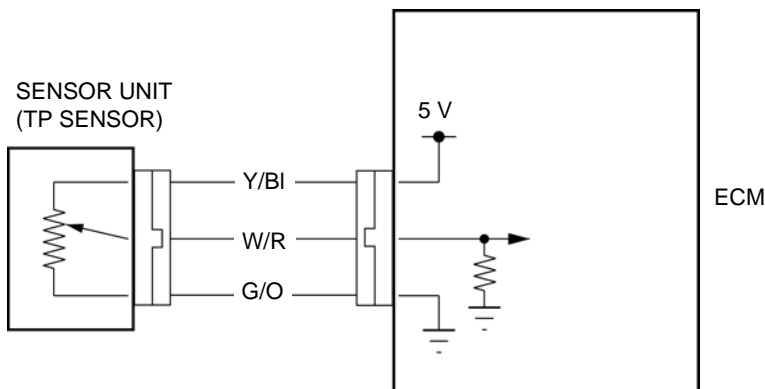
### Are there continuity?

**YES** – Replace the ECM with a known good one,  
and recheck

**NO** – • Open circuit in Pink/white wire  
• Open circuit in Green/orange wire



## DTC 8 (TP SENSOR)



### Probable cause

- Open or short circuit in White/red wire between the sensor unit and ECM
- Faulty sensor unit
- Faulty ECM

## DTC 8-1 (TP SENSOR LOW VOLTAGE)

### 1. TP Sensor System Inspection

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

Check the TP sensor with the MCS when the throttle  
is fully closed.

### Is about 0 V indicated?

**YES** – Intermittent failure

**NO** – GO TO STEP 2.

### 2. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page  
4-10).

### Is the sensor unit power line normal?

**YES** – GO TO STEP 3.

**NO** – Replace or repair the abnormal circuit.

### 3. TP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector [1].

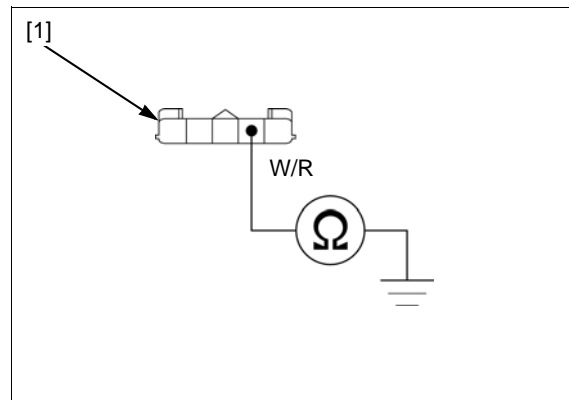
Check for continuity between the sensor unit 5P (Black) connector of the wire harness side and ground with ECM 33P (Black) connector disconnected.

**CONNECTION: White/red – Ground**

**Is there continuity?**

**YES** – Short circuit in White/red wire

**NO** – GO TO STEP 4.



### 4. TP Sensor Output Line Open Circuit Inspection

Check for continuity between the ECM 33P (Black) connector [1] and sensor unit 5P (Black) connector [2] of the wire harness side.

**CONNECTION: White/red – White/red**

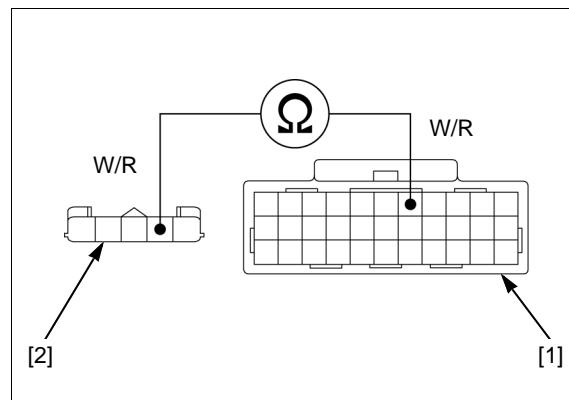
**TOOL:**

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

**Is there continuity?**

**YES** – GO TO STEP 5.

**NO** – Open circuit in White/red wire



### 5. TP Sensor Inspection

Replace the sensor unit with a known good one (page 4-34).

Connect the sensor unit 5P (Black) and ECM 33P (Black) connectors.

Erase the DTCs (page 4-7).

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

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 sensor unit (TP sensor)

### DTC 8-2 (TP SENSOR HIGH VOLTAGE)

#### 1. TP Sensor System Inspection

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

Check the TP sensor with the MCS with the throttle fully closed.

**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** – Replace the sensor unit with a known good one, and recheck (Faulty TP sensor)

## 3. TP Sensor Resistance Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector [1]. Measure the resistance at the sensor unit side.

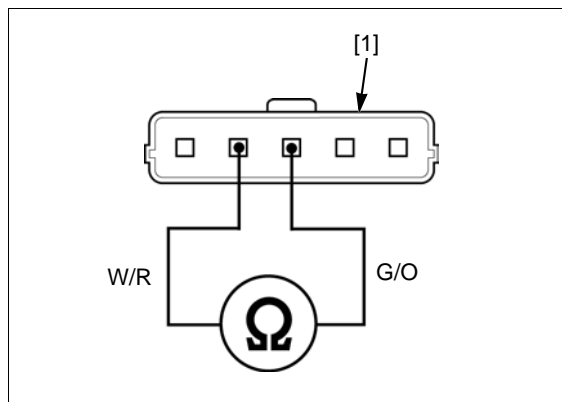
**CONNECTION: White/red – Green/orange**

**STANDARD: 0.5 – 0.7 k $\Omega$  (20°C/68°F)**

**Is the resistance within 0.5 – 0.7 k $\Omega$ ?**

**YES** – GO TO STEP 4.

**NO** – Replace the sensor unit with a known good one, and recheck (Faulty TP sensor)



## 4. TP Sensor Ground line Inspection

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

Measure the voltage at the sensor unit 5P (Black) connector [1] of the wire harness side.

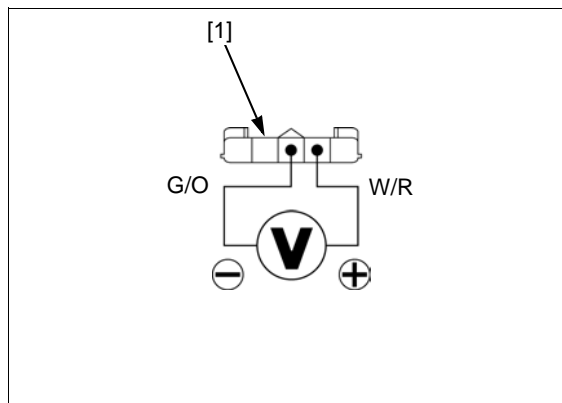
**CONNECTION: White/red (+) – Green/orange (–)**

**STANDARD: 4.75 – 5.25 V**

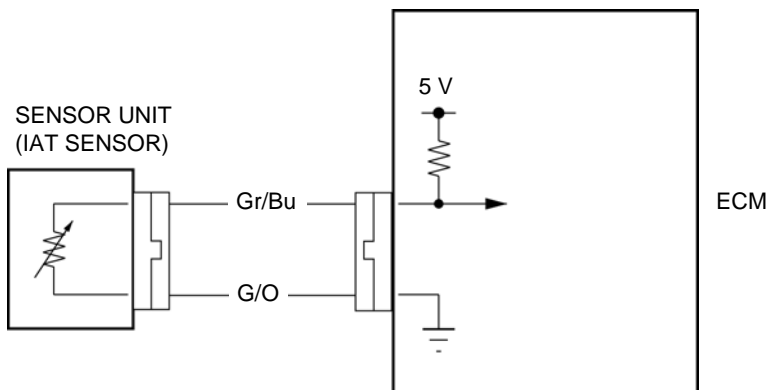
**Is the voltage within 4.75 – 5.25 V?**

**YES** – Replace the ECM with a known good one, and recheck

**NO** – Open circuit in White/red wire



## DTC 9 (IAT SENSOR)



Probable cause

- Open or short circuit in Gray/blue wire between the sensor unit and ECM
- Faulty sensor unit
- Faulty ECM



**DTC 9-1 (IAT SENSOR LOW VOLTAGE)****1. IAT Sensor System Inspection**

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

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 sensor unit 5P (Black) connector.

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

Check the IAT sensor with the MCS.

**Is about 0 V indicated?**

**YES** – GO TO STEP 3.

**NO** – Faulty sensor unit (IAT sensor)

**3. IAT Sensor Output Line Short Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector [1].

Check for continuity between the ECM 33P (Black) connector of the wire harness side and ground with sensor unit connector disconnected.

**CONNECTION: Gray/blue – Ground**

**STANDARD: No continuity**

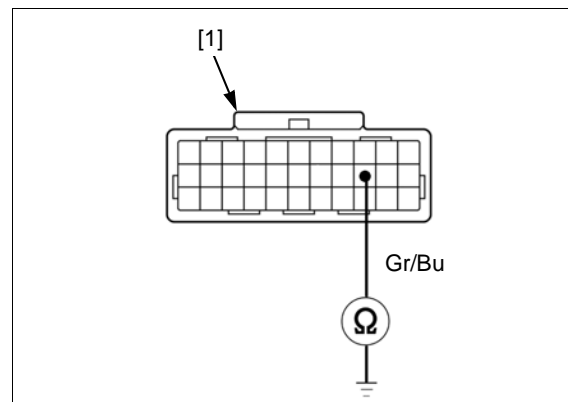
**TOOL:**

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

**Is there continuity?**

**YES** – Short circuit in the Gray/blue wire

**NO** – Replace the ECM with a known good one, and recheck

**DTC 9-2 (IAT SENSOR HIGH VOLTAGE)****1. IAT Sensor System Inspection**

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

Check the IAT sensor with the MCS.

**Is about 5 V indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

**2. Sensor Unit Power Line Inspection**

Check the sensor unit power line inspection (page 4-10).

**Is the sensor unit power line normal?**

**YES** – GO TO STEP 3.

**NO** – Replace or repair the abnormal circuit.

## 3. IAT Sensor Output Voltage Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector [1].

Connect the sensor unit terminals at the wire harness side with a jumper wire [2].

**CONNECTION: Gray/blue – Green/orange**

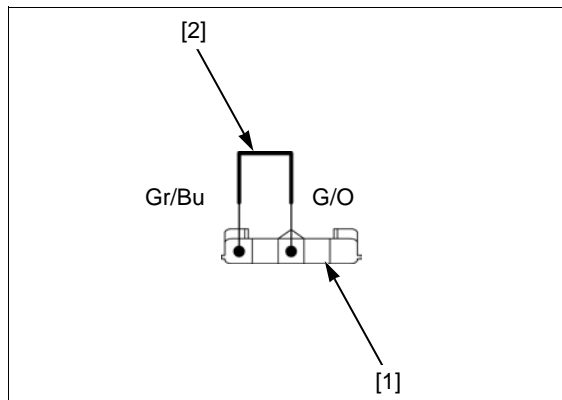
Turn the ignition switch ON and engine stop switch "O".

Check the IAT sensor with the MCS.

**Is about 0 V indicated?**

**YES** – Replace the sensor unit with a known good one, and recheck. (Faulty IAT sensor)

**NO** – GO TO STEP 4.



## 4. IAT Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the jumper wire.

Disconnect the ECM 33P (Black) connector [1].

Check for continuity between the sensor unit 5P (Black) connector [2] and ECM 33P (Black) connector of the wire harness side.

**CONNECTION: Gray/blue – Gray/blue**

**STANDARD: Continuity**

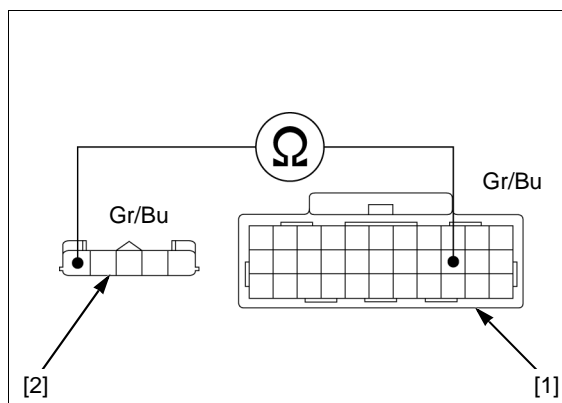
**TOOL:**

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

**Is there continuity?**

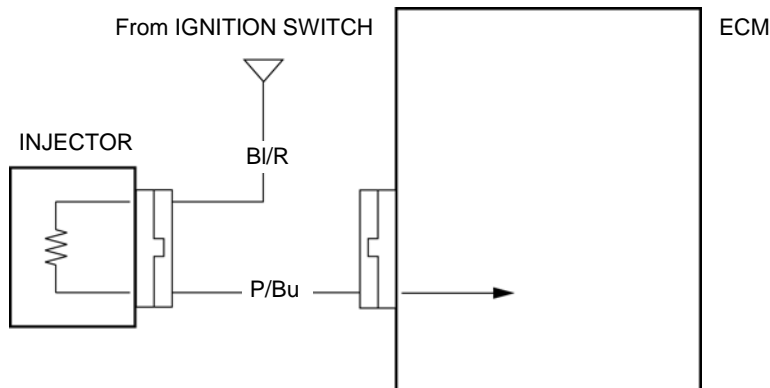
**YES** – Replace the ECM with a known good one, and recheck

**NO** – Open circuit in the Gray/blue wire



## DTC 12 (INJECTOR)

- Before starting the inspection, check for loose or poor contact on the injector 2P (Black) connector and ECM 33P (Black) connector, then recheck the DTC.



Probable cause

- Open circuit in Black/red wire between the ignition switch and injector
- Open or short circuit in Pink/blue wire between the injector and ECM
- Faulty injector
- Faulty ECM

## DTC 12-1 (INJECTOR)

### 1. Injector System Inspection

Erase the DTCs (page 4-7).

Start the engine and check the injector with the MCS.

**Is the DTC 12-1 indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

### 2. Injector Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the injector 2P (Black) connector [1] (page 7-18).

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

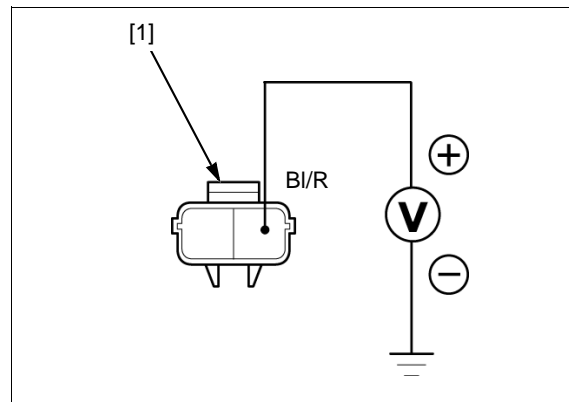
Measure the voltage between the injector 2P (Black) connector of the wire harness side and ground.

**CONNECTION: Black/red (+) – Ground (–)**

**Does the battery voltage exist?**

**YES** – GO TO STEP 3.

**NO** – Open circuit in Black/red wire



### 3. Injector Resistance Inspection

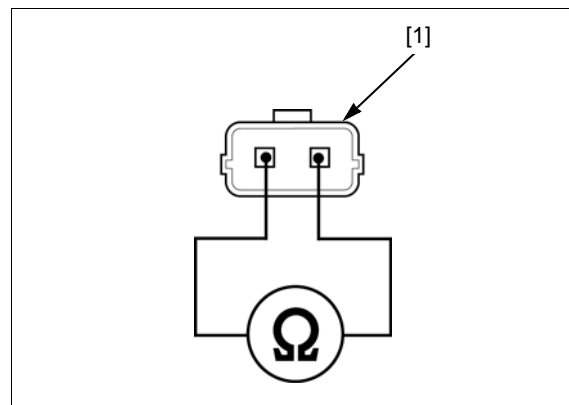
Turn the ignition switch OFF.

Measure the resistance at the injector side of the injector 2P (Black) connector [1] terminals.

**Is the resistance within 11.4 – 12.6  $\Omega$  (20°C/68°F)?**

**YES** – GO TO STEP 4.

**NO** – Faulty injector



### 4. Injector Signal Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector [1] (page 4-31).

Check the continuity between the injector 2P (Black) connector [2] and ECM 33P (Black) connector of the wire harness side.

**CONNECTION: Pink/blue – Pink/blue**

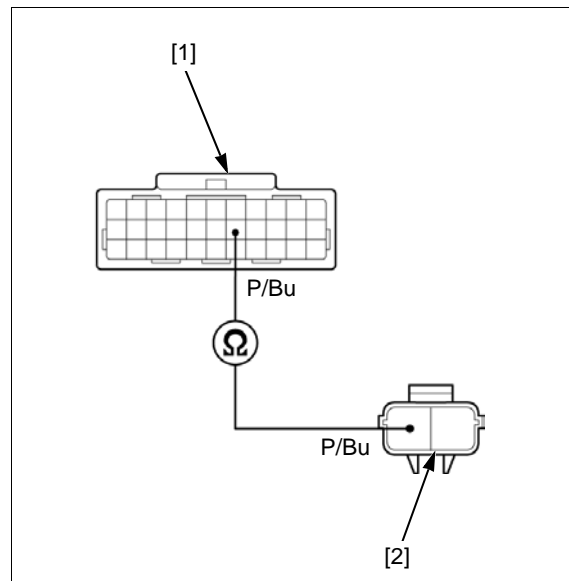
**TOOL:**

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

**Is there continuity?**

**YES** – GO TO STEP 5.

**NO** – Open circuit in Pink/blue wire



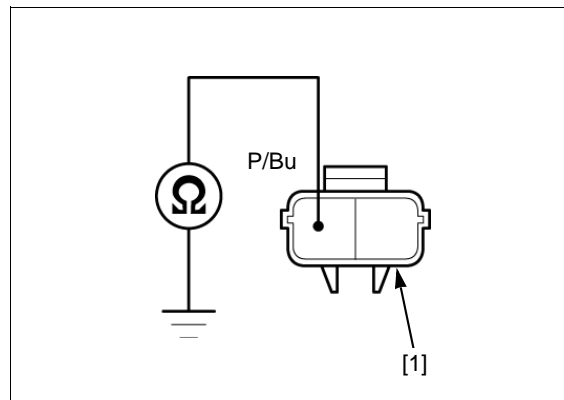
### 5. Injector Signal Line Short Circuit Inspection

Check for continuity between the injector 2P (Black) connector [1] and ground with the ECM 33P (Black) connector disconnected.

**CONNECTION: Pink/blue – Ground**

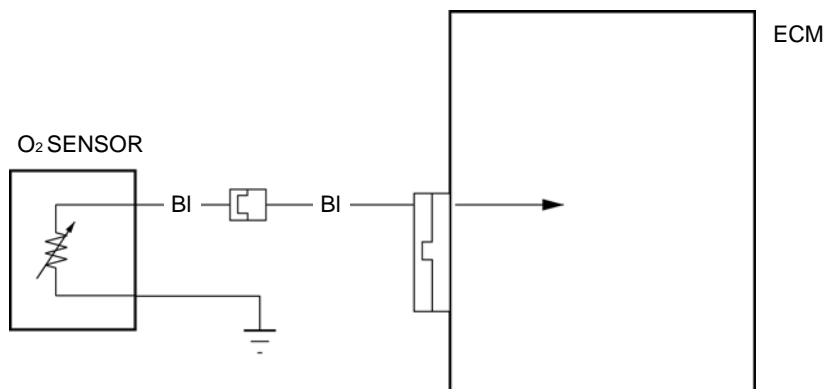
**Is there continuity?**

- YES** – Short circuit in Pink/blue wire
- NO** – Replace the ECM with a known good one, and recheck



### DTC 21 (O<sub>2</sub> SENSOR)

- Before starting the inspection, check for loose or poor contact on the O<sub>2</sub> sensor 1P (Black) connector and ECM 33P (Black) connector, then recheck the DTC.



Probable cause

- Open or short circuit in Black wire between the O<sub>2</sub> sensor and ECM
- Faulty O<sub>2</sub> sensor
- Faulty ECM

### DTC 21-1 (O<sub>2</sub> Sensor)

#### 1. O<sub>2</sub> Sensor System Inspection

Start the engine and warm up the engine up to coolant temperature is 80°C/176°F.

Test-ride the scooter and check the O<sub>2</sub> sensor with the MCS.

**Is the DTC 21-1 indicated?**

- YES** – GO TO STEP 2.
- NO** – Intermittent failure

**2. O<sub>2</sub> Sensor Short Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector (page 4-31).

Disconnect the O<sub>2</sub> sensor cap [1] (page 4-33).

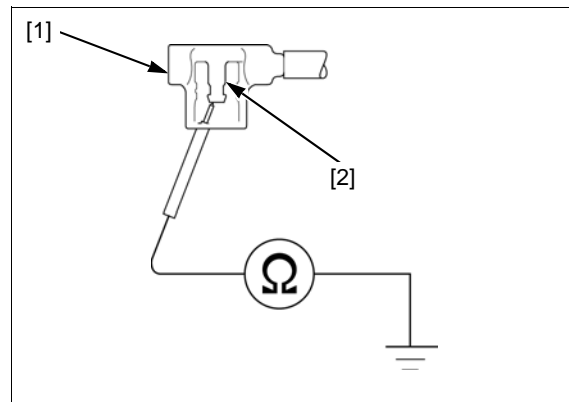
Check for continuity between the O<sub>2</sub> sensor cap terminal [2] and ground.

**CONNECTION: O<sub>2</sub> sensor cap terminal – Ground**

**Is there continuity?**

**YES** – Short circuit in Black wire

**NO** – GO TO STEP 3.

**3. O<sub>2</sub> Sensor Open Circuit Inspection**

Check for continuity between the ECM 33P (Black) connector [1] and O<sub>2</sub> sensor cap terminal [2] of the wire side.

**CONNECTION:**

**O<sub>2</sub> sensor cap terminal – Black**

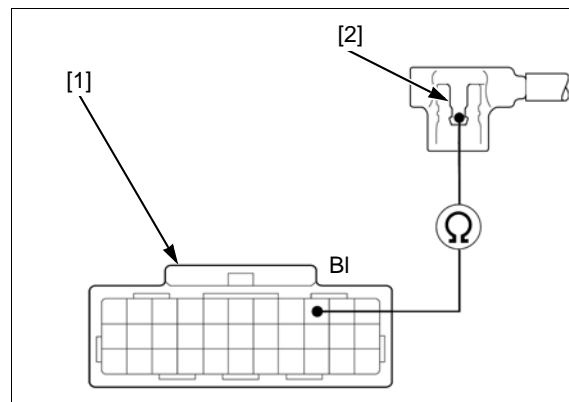
**TOOL:**

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

**Is there continuity?**

**YES** – GO TO STEP 4.

**NO** – Open circuit in Black wire

**4. O<sub>2</sub> Sensor Inspection**

Replace the O<sub>2</sub> sensor with a known good one (page 4-33).

Connect the ECM 33P (Black) connector.

Start the engine and warm up the engine up to coolant temperature is 80°C/176°F.

Test-ride the scooter and recheck the O<sub>2</sub> sensor with the MCS.

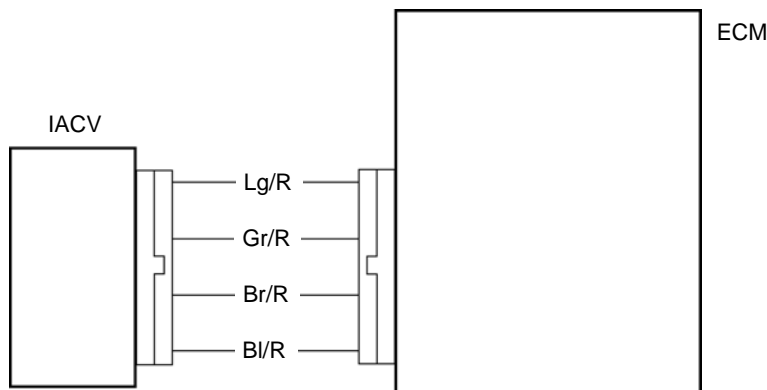
**Is the DTC 21-1 indicated?**

**YES** – Replace the ECM with a known good one and recheck.

**NO** – Faulty original O<sub>2</sub> sensor

## DTC 29 (IACV)

- Before starting the inspection, check for loose or poor contact on the IACV 4P (Black) connector and ECM 33P (Black) connector, then recheck the DTC.



Probable cause

- Open or short circuit in wires (Light green/red, Gray/red, Brown/red, Black/red) between the IACV and ECM
- Faulty IACV
- Faulty ECM

## DTC 29-1 (IACV)

### 1. IACV System Inspection

Erase the DTCs (page 4-7).  
Start the engine and check the IACV with the MCS.

**Is the 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 [1] (page 7-24).

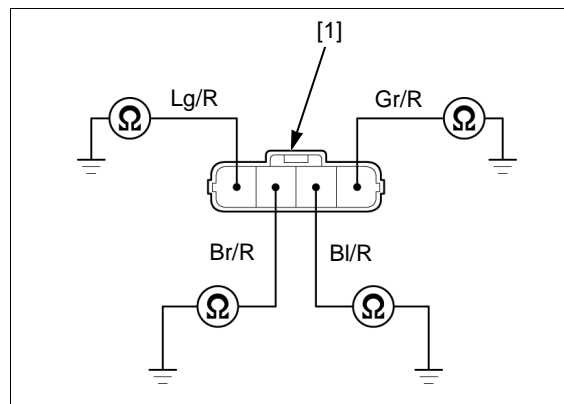
Check for continuity between the IACV 4P (Black) connector of the wire harness side and ground.

**CONNECTION:** Light green/red – Ground  
Brown/red – Ground  
Black/red – Ground  
Gray/red – Ground

**Are there continuities?**

**YES** – • Short circuit in Light green/red or Brown/red wire  
• Short circuit in Gray/red or Black/red wire

**NO** – GO TO STEP 3.



### 3. IACV Circuit Continuity Inspection

Disconnect the ECM 33P (Black) connector [1] (page 4-31).

Check the continuity between the ECM 33P (Black) connector terminals and the IACV 4P (Black) connector [2] terminals of the wire harness side.

**CONNECTION:** Light green/red – Light green/red  
Brown/red – Brown/red  
Gray/red – Gray/red  
Black/red – Black/red

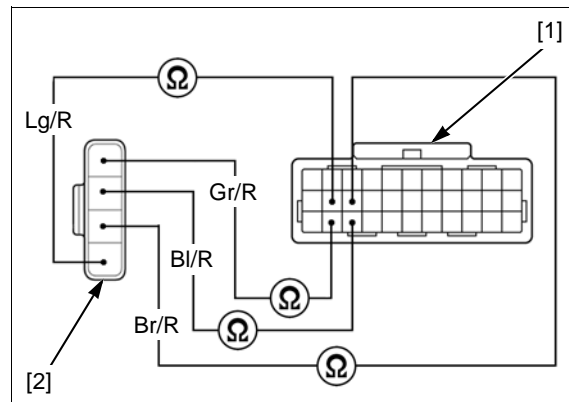
**TOOL:**

Pin Probe Male (2 pack) 07ZAJ-RDJA110

*Are there continuity?*

**YES** – GO TO STEP 4.

**NO** – • Open circuit in Light green/red or Brown/red wire  
• Open circuit in Gray/red or Black/red wire



### 4. IACV Resistance Inspection

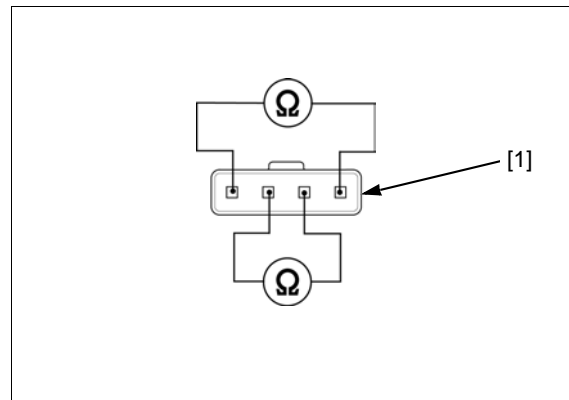
Measure the resistance at the IACV 4P (Black) connector [1] terminals of the IACV side.

**STANDARD:** 110 – 150 Ω (20°C/68°F)

*Is the resistance within 110 – 150 Ω (20°C/68°F)?*

**YES** – GO TO STEP 5.

**NO** – Faulty IACV. Replace the IACV with a known good one, and recheck.



### 5. IACV Short Circuit Inspection

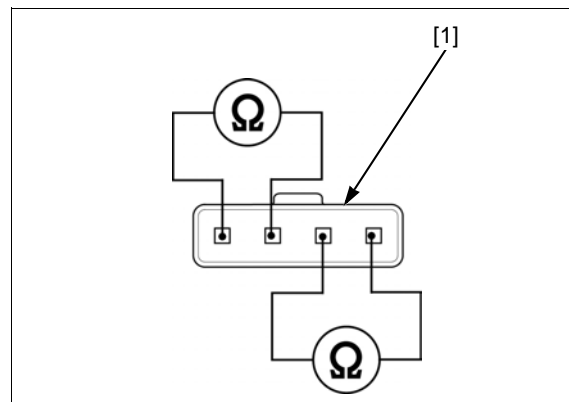
Check for continuity at the IACV 4P (Black) connector [1] terminals of the IACV side.

**STANDARD:** No continuity

*Is there continuity?*

**YES** – Faulty IACV. Replace the IACV with a known good one, and recheck.

**NO** – Replace the ECM with a known good one, and recheck



## DTC 33-2 (EEPROM)

### 1. Recheck DTC

Erase the DTCs (page 4-7).

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

Recheck the ECM EEPROM.

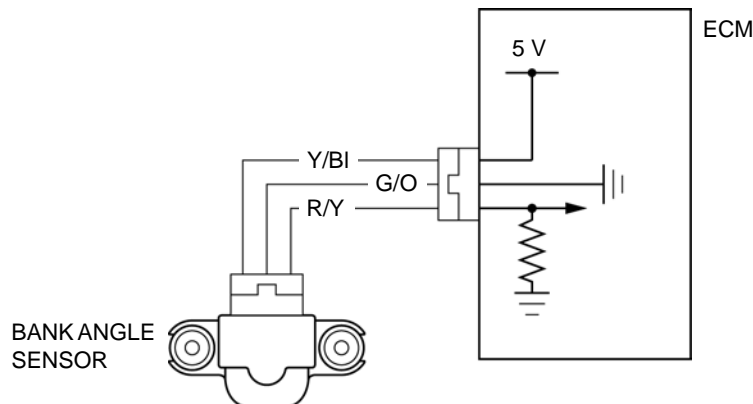
*Is the DTC 33-2 indicated?*

**YES** – Replace the ECM with known good one, and recheck

**NO** – Intermittent failure

## DTC 54 (BANK ANGLE SENSOR)

- Before starting the inspection, check for loose or poor contact on the bank angle sensor 3P (Black) connector and ECM 33P (Black) connector, then recheck the DTC.



### Probable cause

- Open or short circuit in Red/yellow wire between the bank angle sensor and ECM
- Open or short circuit in Yellow/black wire between the bank angle sensor and ECM
- Open circuit in Green/orange wire between the bank angle sensor and ECM
- Faulty bank angle sensor
- Faulty ECM

## DTC 54-1 (BANK ANGLE SENSOR LOW VOLTAGE)

### 1. Bank Angle Sensor System Inspection

Erase the DTCs (page 4-7).

Turn the ignition switch ON and engine stop switch "O", check the bank angle sensor with the MCS.

**Is the DTC 54-1 indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

### 2. Bank Angle Sensor Power Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the bank angle sensor 3P (Black) connector [1] (page 4-31).

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

Measure the voltage at the bank angle sensor connector of the wire harness side.

#### CONNECTION:

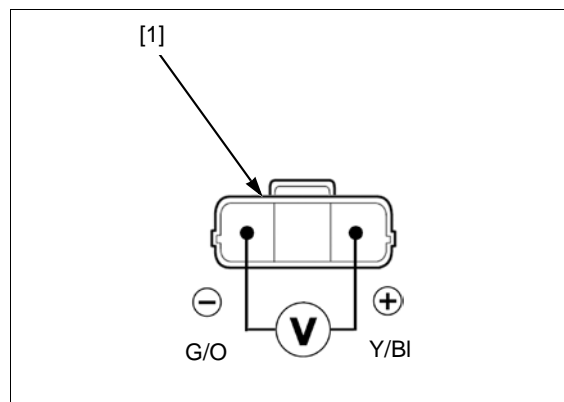
Yellow/black (+) – Green/orange (–)

**STANDARD: 4.75 – 5.25 V**

**Is the voltage within 4.75 – 5.25 V?**

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.





### 3. Bank Angle Sensor Input Voltage Line Short Circuit Inspection

Turn the ignition switch OFF.

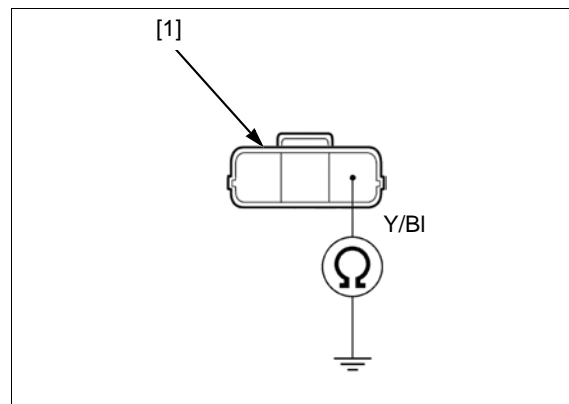
Check the continuity between the bank angle sensor 3P (Black) connector [1] terminals of the wire harness side and ground.

**CONNECTION: Yellow/black – Ground**

**Is there continuity?**

**YES** – Short circuit in Yellow/black wire

**NO** – Replace the ECM with a known good one, and recheck



### 4. Bank Angle Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

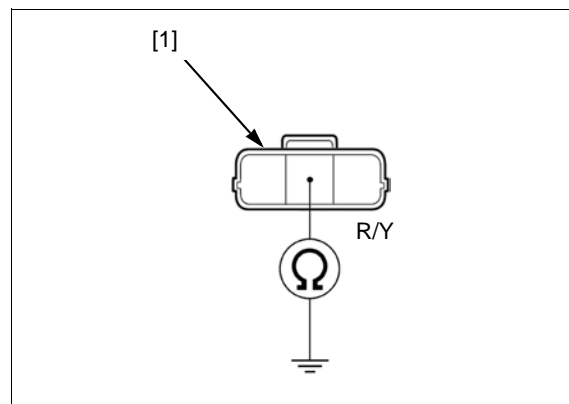
Check the continuity between the bank angle sensor 3P (Black) connector [1] terminals of the wire harness side and ground.

**CONNECTION: Red/yellow – Ground**

**Is there continuity?**

**YES** – Short circuit in Red/yellow wire

**NO** – GO TO STEP 5.



### 5. Bank Angle Sensor Inspection

Replace the bank angle sensor with a known good one (page 4-31).

Erase the DTCs (page 4-7).

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

Turn the ignition switch ON and engine stop switch "Q", check the bank angle sensor with the MCS.

**Is DTC 54-1 indicated?**

**YES** – Replace the ECM with a known good one, and recheck

**NO** – Faulty original bank angle sensor.

### DTC 54-2 (BANK ANGLE SENSOR HIGH VOLTAGE)

#### 1. Bank Angle Sensor System Inspection

Erase the DTCs (page 4-7).

Turn the ignition switch ON and engine stop switch "Q", check the bank angle sensor with the MCS.

**Is the DTC 54-2 indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

## 2. Bank Angle Sensor Power Input Voltage Inspection

Turn the ignition switch OFF.  
Disconnect the bank angle sensor 3P (Black) connector [1] (page 4-31).

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

Measure the voltage at the bank angle sensor connector of the wire harness side.

### CONNECTION:

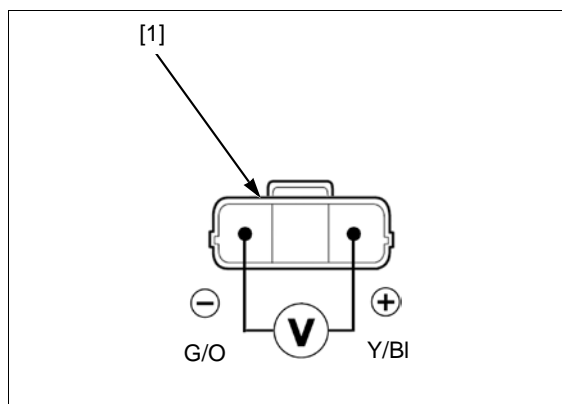
Yellow/black (+) – Green/orange (–)

**STANDARD: 4.75 – 5.25 V**

**Is the voltage within 4.75 – 5.25 V?**

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.



## 3. Bank Angle Sensor Input Voltage Line Open Circuit Inspection

Turn the ignition switch OFF.  
Disconnect the ECM 33P (Black) connector [1] (page 4-31).

Check the continuity between the bank angle sensor 3P (Black) connector [2] and ECM 33P (Black) connector of the wire harness side.

**CONNECTION: Yellow/black – Yellow/black  
Green/orange – Green/orange**

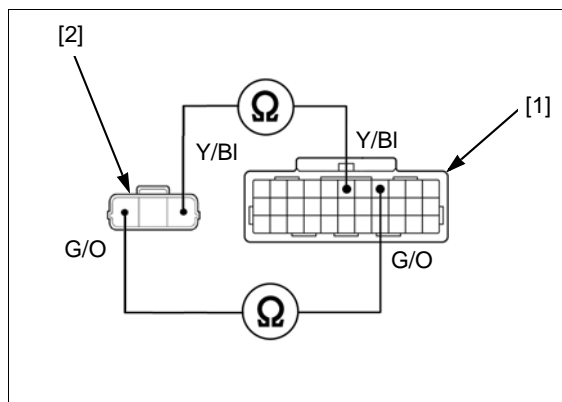
### TOOL:

Pin Probe Male (2 pack) 07ZAJ-RDJA110

**Is there continuity?**

**YES** – Replace the ECM with a known good one, and recheck

**NO** – • Open circuit in Yellow/black wire  
• Open circuit in Green/orange wire



## 4. Bank Angle Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.  
Disconnect the ECM 33P (Black) connector [1] (page 4-31).

Check the continuity between the bank angle sensor 3P (Black) connector [2] and ECM 33P (Black) connector of the wire harness side.

**CONNECTION: Red/yellow – Red/yellow**

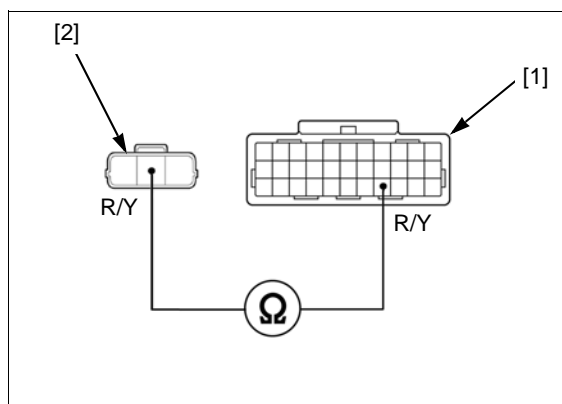
### TOOL:

Pin Probe Male (2 pack) 07ZAJ-RDJA110

**Is there continuity?**

**YES** – Inspect the bank angle sensor (page 4-32).

**NO** – Open circuit in Red/yellow wire



## MIL CIRCUIT INSPECTION

- Before starting the inspection, check the combination meter power input line (page 22-6).

### When The Ignition Switch ON, The MIL Does Not Come On

If the engine can be started but the MIL does not come on when the ignition switch is turned ON and engine stop switch "O", check as follows:

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector (page 4-31).

Ground the ECM 33P (Black) connector [1] terminal of the wire harness side connector with a jumper wire [2].

**CONNECTION: White/blue – Ground**

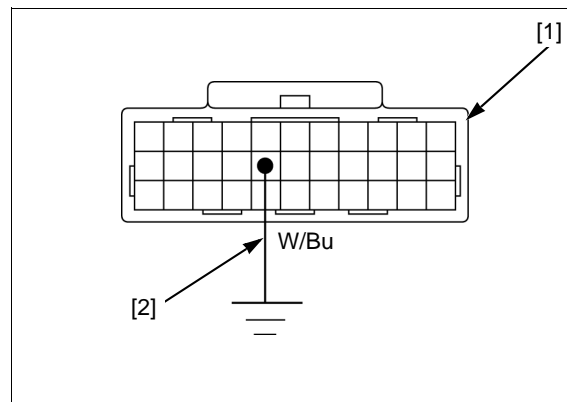
**TOOL:**

**Pin Probe Male (2 pack)**

**07ZAJ-RDJA110**

Turn the ignition switch ON, the MIL should come on.

- If the MIL comes on, replace the ECM with a known good one, and recheck.
- 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 printed circuit board (page 22-9).



### When The Ignition Switch ON, The MIL Does Not Go Off Within A Few Seconds (Engine starts)

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector (page 4-31).

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

- If the MIL comes on, check for short circuit in the White/blue wire between the combination meter and ECM.  
If the White/blue wire is OK, replace the ECM with a known good one and recheck.
- If the MIL turns off, check the following.

Check for continuity between the ECM 33P (Black) connector [1] and ground.

**CONNECTION: Brown – Ground**

**STANDARD: No continuity**

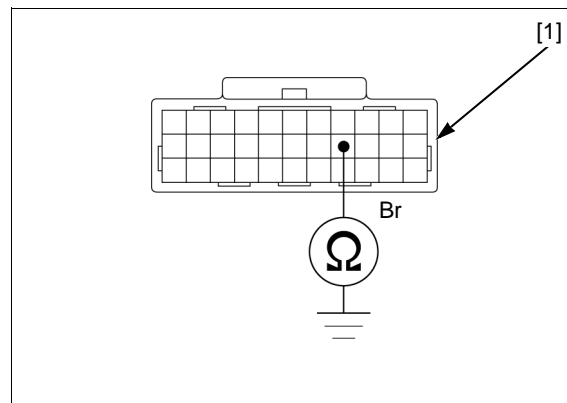
**TOOL:**

**Pin Probe Male (2 pack)**

**07ZAJ-RDJA110**

If there is continuity, check for short circuit in the Brown wire between the DLC and ECM.

If there is no continuity, replace the ECM with a known good one and recheck.



# ECM

## ECM POWER/GROUND LINE INSPECTION

- Before starting the inspection, check for loose or poor contact on the ECM 33P (Black) connector and recheck the MIL blinking.

### ENGINE DOES NOT START (MIL does not blink)

#### 1. ECM Power Input Voltage Inspection

Disconnect the ECM 33P (Black) connector (page 4-31).

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

Measure the voltage at the ECM 33P (Black) connector [1] of the wire harness side and ground.

**CONNECTION: Red/green (+) – Ground (–)**

**STANDARD: Battery voltage**

**TOOL:**

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

***Does the standard voltage exist?***

**YES** – GO TO STEP 2.

- NO** –
- Open circuit in Red/green wire
  - Open circuit in Black/red wire between the ignition switch and engine stop switch
  - Faulty ignition switch
  - Blown main fuse 30 A
  - Blown sub fuse 10 A (IGN)
  - Faulty engine stop switch

#### 2. Sensor Unit Power Line Inspection

Turn the ignition switch OFF.

Check for continuity between the ECM 33P (Black) connector [1] of the wire harness side and ground.

**CONNECTION: Yellow/black – Ground**

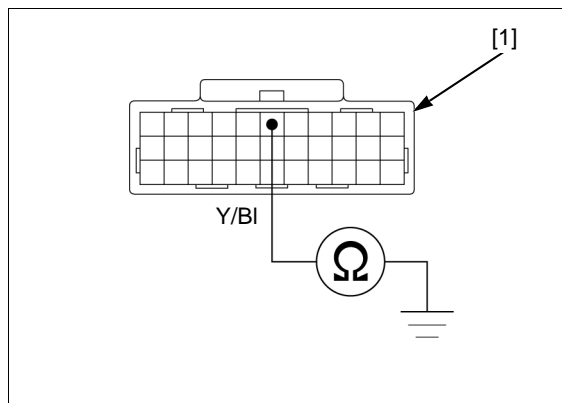
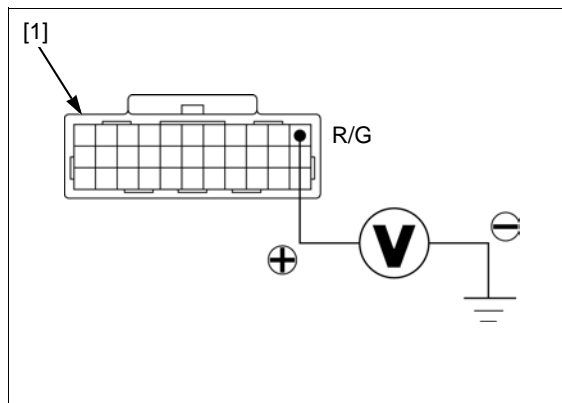
**TOOL:**

**Pin Probe Male (2 pack) 07ZAJ-RDJA110**

***Is there continuity?***

**YES** – Short circuit in Yellow/black wire

**NO** – GO TO STEP 3.



### 3. ECM Ground Line Inspection

Turn the ignition switch OFF.

Check for continuity between the ECM 33P (Black) connector [1] of the wire harness side and ground.

**CONNECTION:** Green/black – Ground  
 Green – Ground  
 Green – Ground

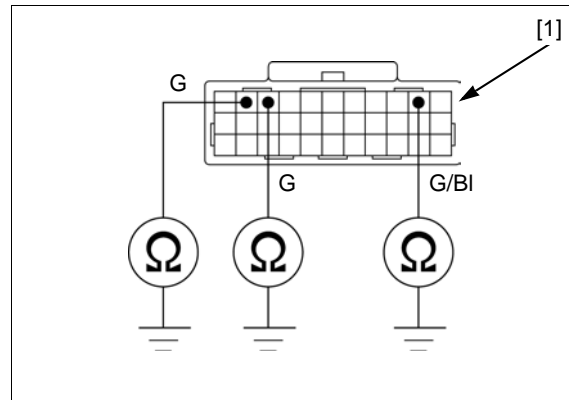
**TOOL:**

Pin Probe Male (2 pack) 07ZAJ-RDJA110

*Is there continuity?*

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – • Open circuit in Green/black wire  
 • Open circuit in Green wires



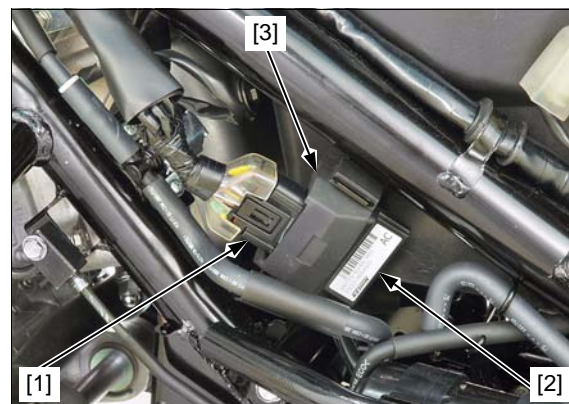
### REMOVAL/INSTALLATION

Turn the ignition switch OFF.

Remove the right floor step (page 2-15).

Disconnect the ECM 33P (Black) connector [1].  
 Remove the ECM [2] from the rubber holder [3].

Installation is in the reverse order of removal.



## BANK ANGLE SENSOR

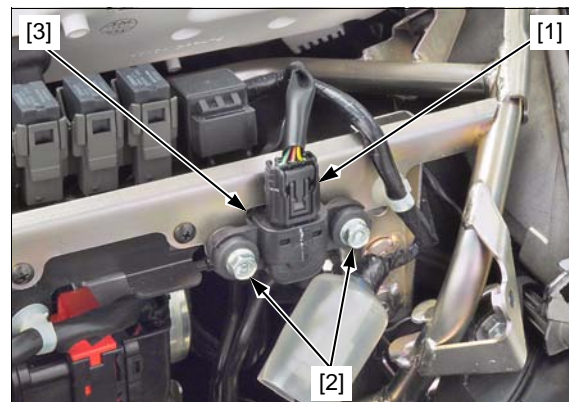
### REMOVAL

Turn the ignition switch OFF.

Remove the front meter panel (page 2-4).

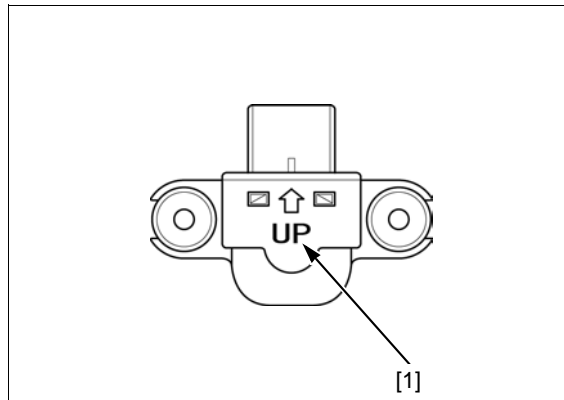
Disconnect the bank angle sensor 3P (Black) connector [1].

Remove the bolts [2] and bank angle sensor [3].



### INSTALLATION

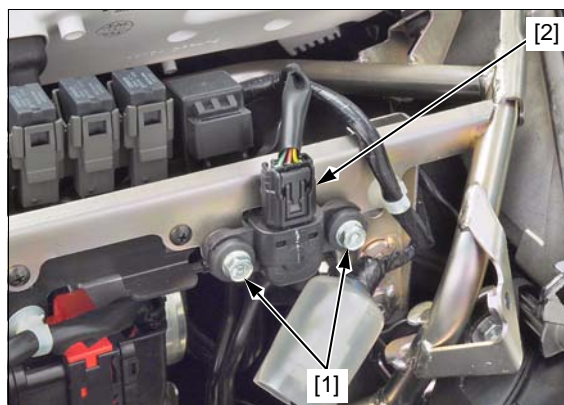
Install the bank angle sensor with its "UP" mark [1] facing up and rearward.



Install and tighten the bolts [1].

Connect the bank angle sensor 3P (Black) connector [2].

Install the front meter panel (page 2-4).



### SYSTEM INSPECTION

Remove the bank angle sensor (page 4-31).

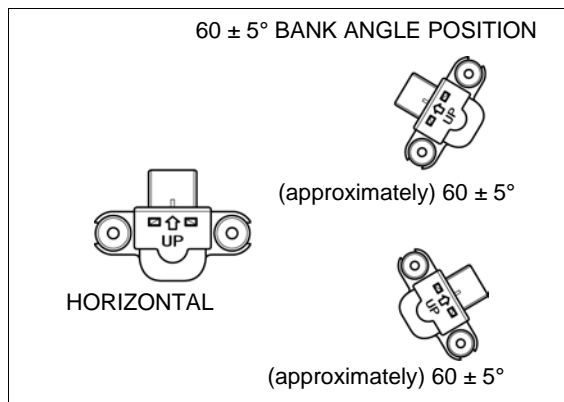
Connect the bank angle sensor 3P (Black) connector.

Place the bank angle sensor horizontal as shown.

Start the engine.

Incline the bank angle sensor  $60 \pm 5^\circ$  both to the left and right.

The bank angle sensor is normal if the engine stops if inclined in both directions.



## ECT SENSOR

### REMOVAL/INSTALLATION

Drain the coolant (page 9-5).

Remove the luggage box (page 2-21).

*Remove the ECT sensor while the engine is cold.*

Disconnect the ECT sensor 3P (Gray) connector [1] from the sensor.

Remove the ECT sensor [2] and sealing washer [3].

Install a new sealing washer and ECT sensor.

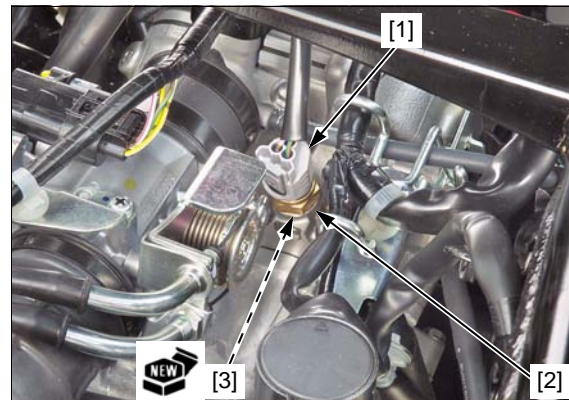
Tighten the ECT sensor to the specified torque.

**TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)**

Connect the ECT sensor 3P (Gray) connector.

Fill the cooling system with recommended coolant (page 9-5).

Install the luggage box (page 2-21).



## O<sub>2</sub> SENSOR

### NOTICE

- If the O<sub>2</sub> sensor air hole or inside of the O<sub>2</sub> sensor cap get the grease, oil, water or other materials, replace it with a new one and do not reuse.
- Do not apply any cleaning agent to the inside of O<sub>2</sub> sensor cap when cleaning it.
- The O<sub>2</sub> sensor may be damaged if dropped. Replace it with a new one, if dropped.

### REMOVAL/INSTALLATION

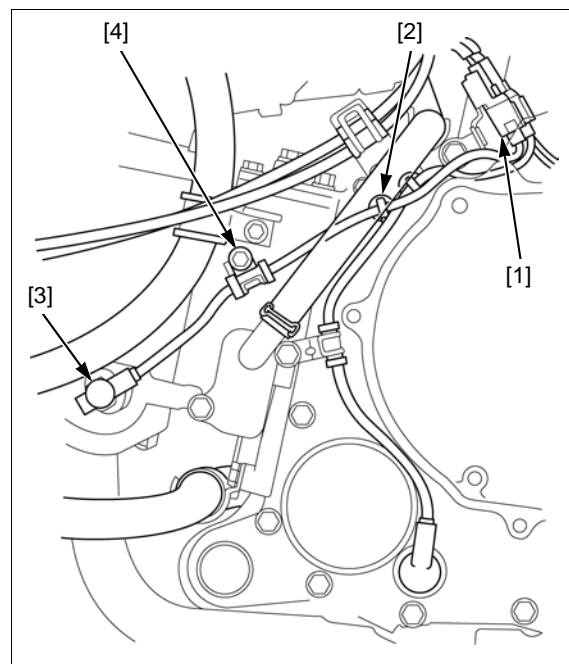
- Handle the O<sub>2</sub> sensor with care.
- Do not service the O<sub>2</sub> sensor while it is hot.
- Do not use an impact wrench while removing or installing the O<sub>2</sub> sensor, or it may be damaged.

Remove the luggage box (page 2-21).

Disconnect the O<sub>2</sub> sensor 1P (Black) connector [1] and release the wire clamp [2].

Remove the following:

- O<sub>2</sub> sensor cap [3]
- Bolt/clamp [4]





## PGM-FI SYSTEM

Remove the O<sub>2</sub> sensor [1] from the cylinder head.  
Installation is in the reverse order of removal.

### TORQUE:

O<sub>2</sub> sensor: 25 N·m (2.5 kgf·m, 18 lbf·ft)

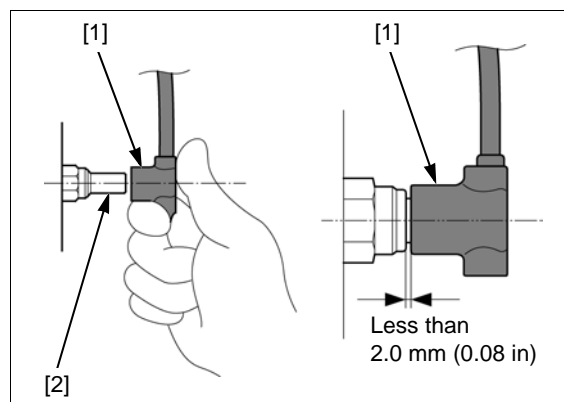


Connect the O<sub>2</sub> sensor cap [1] to the O<sub>2</sub> sensor [2] by pushing it straight as shown.

### NOTICE

- Be careful not to tilt the O<sub>2</sub> sensor cap when connecting the cap to the O<sub>2</sub> sensor.
- Make sure that the gap between the O<sub>2</sub> sensor and sensor cap is less than 2.0 mm (0.08 in).

Route the wire properly (page 1-18).

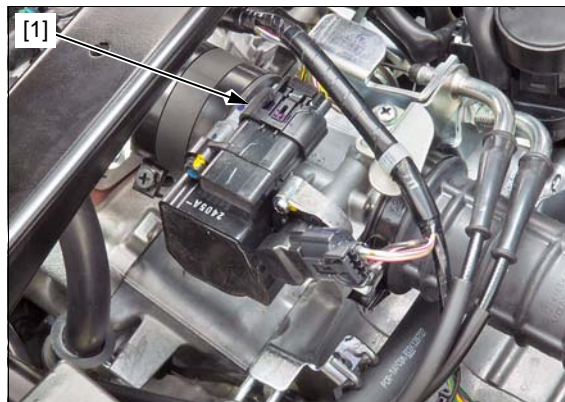


## SENSOR UNIT

### REMOVAL

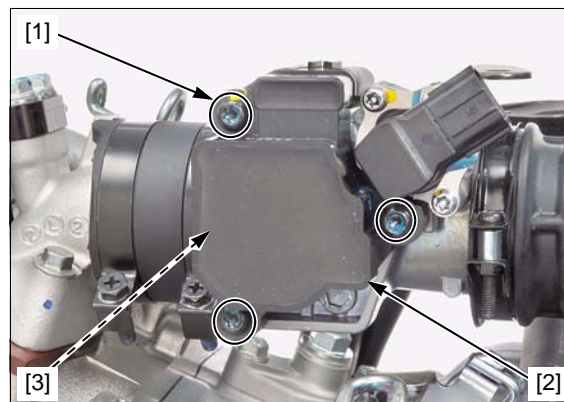
Remove the luggage box (page 2-21).

Disconnect the sensor unit 5P (Black) connector [1].



Remove the following:

- Torx screws [1]
- Sensor unit [2]
- O-ring [3]





## INSTALLATION

Install a new O-ring [1] to the throttle body [2].

- Install the O-ring to the throttle body properly. If the O-ring is not installed properly, air will leak and engine idle speed will be unstable.

Install the sensor unit [3] to the throttle body by aligning the clip of the TP sensor and boss of the throttle valve.

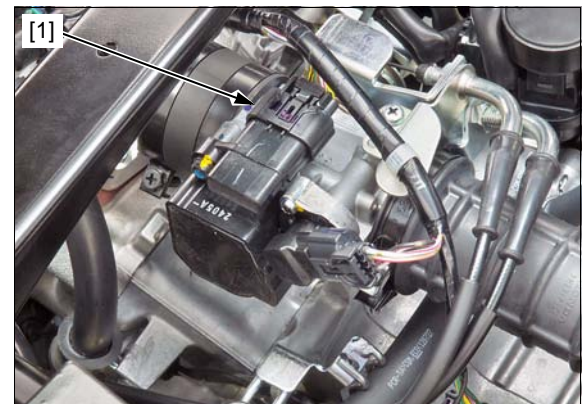
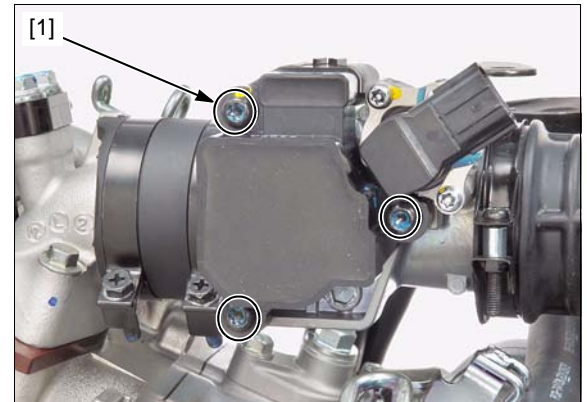
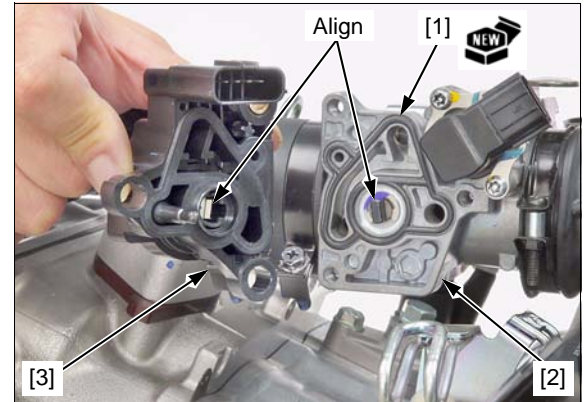
- Light pressure is sufficient to assemble the sensor unit and throttle body in their correct position. If you cannot assemble them easily, the clip may be misaligned. Do not attempt to force them together and make sure that the clip is aligned.
- Perform the TP sensor reset procedure (page 7-16) after installing the sensor unit.

Install and tighten the torx screws [1] to the specified torque.

**TORQUE: 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)**

Connect the sensor unit 5P (Black) connector [1].

Install the luggage box (page 2-21).



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## MEMO

---

SERVICE INFORMATION .....	5-2	IGNITION SYSTEM INSPECTION .....	5-5
TROUBLESHOOTING .....	5-3	IGNITION COIL .....	5-7
SYSTEM LOCATION .....	5-4	IGNITION TIMING .....	5-8
SYSTEM DIAGRAM .....	5-4		

## IGNITION SYSTEM

# SERVICE INFORMATION

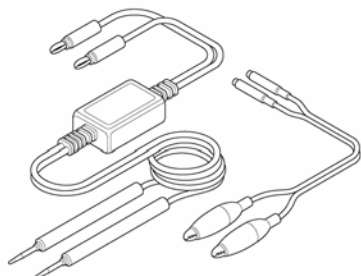
## GENERAL

### NOTICE

- The ECM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ECM. Always turn the ignition switch to OFF before servicing.
- Use a spark plug of the correct heat range. Using a 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 turned to ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting table (page 5-3).
- This scooter's Ignition Control Module (ICM) is built into the ECM.
- The ignition timing cannot 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.
- Refer to following components informations:
  - Ignition switch (page 22-17)
  - Engine stop switch (page 22-18)
  - Bank angle sensor (page 4-31)
  - CKP sensor (page 14-6)

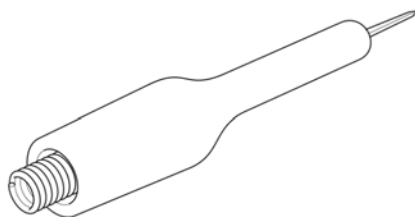
## TOOLS

Peak Voltage Adaptor  
07HGJ-0020100  
(Not available in U.S.A.)

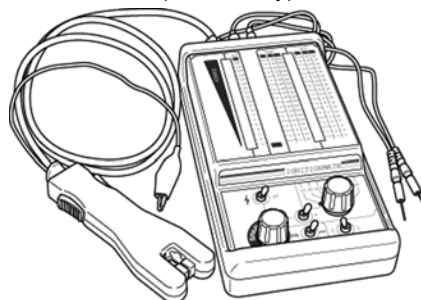


with commercially available digital  
multimeter (impedance 10 M $\Omega$ /DCV  
minimum)

Pin Probe Male (2 pack)  
07ZAJ-RDJA110



IgnitionMate peak voltage tester  
MTP07-0286 (U.S.A. only)



## TROUBLESHOOTING

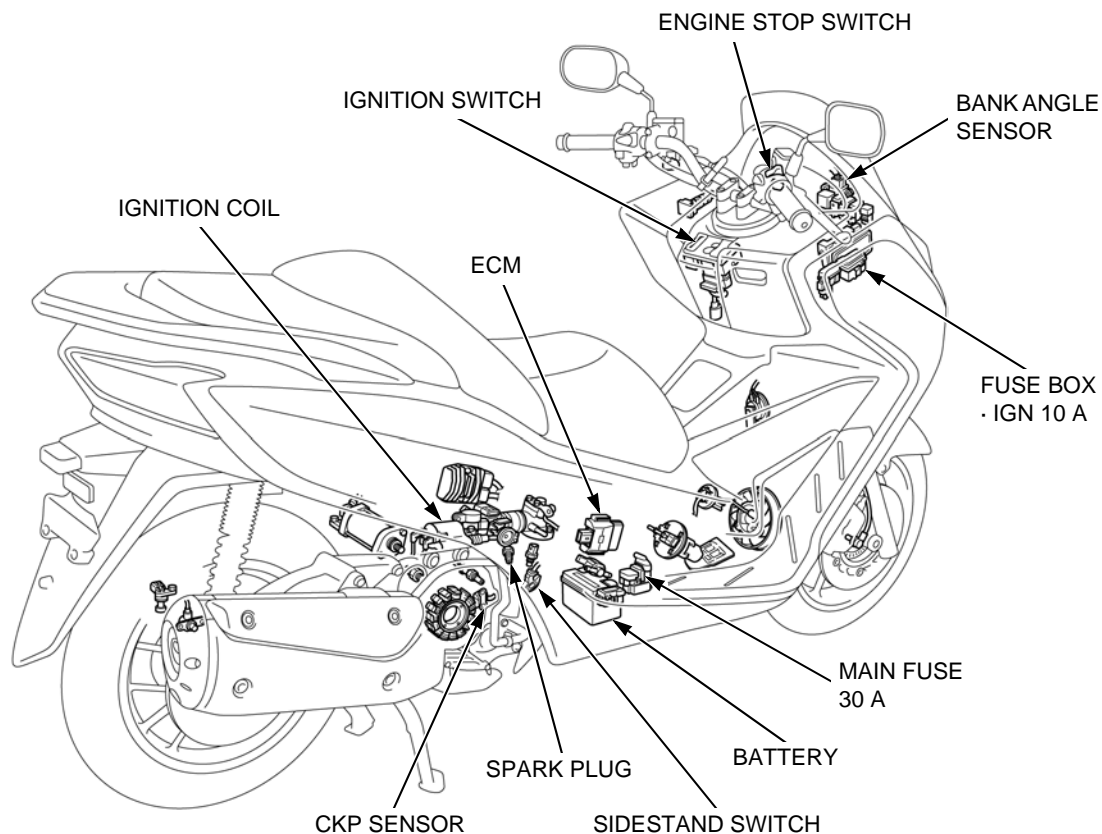
- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water got into the spark plug cap (leaking the ignition coil secondary voltage)
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned ON (The engine is not cranked by the starter motor).

### NO SPARK AT PLUG

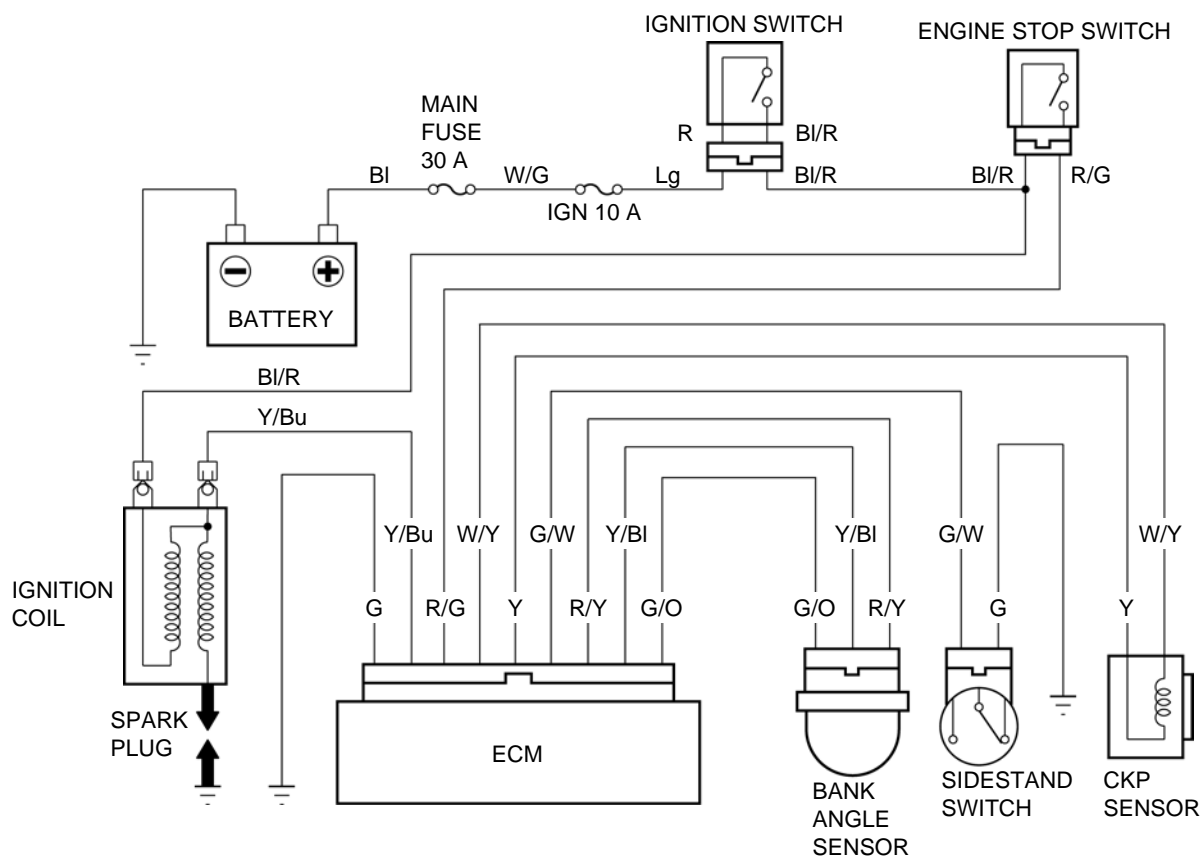
Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition switch turned ON (Other electrical components are normal)	1. An open circuit in Black/red wire between the ignition coil and ignition switch. 2. Loose or poor contact of the ignition coil primary wire terminal, or an open circuit in primary coil. 3. Faulty ECM (when the initial voltage is normal with the ECM connector disconnected).
	Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Cranking speed is too slow. (Battery is undercharged.) 3. No voltage between the Red/green (+) and body ground (–) at the ECM connector or loose ECM connector. 4. An open circuit or loose connection in Green wire of the ECM. 5. An open circuit or loose connection in Yellow/blue wire between the ignition coil and ECM. 6. Short circuit in the ignition primary coil. 7. Faulty sidestand switch. 8. Loose or poor connection or an open circuit in sidestand switch related circuit. 9. Faulty CKP sensor (measure the peak voltage). 10. Faulty ECM (when above No.1 – 9 are normal).
	Initial voltage is normal, but no peak voltage while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ECM (when above No.1 and 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sample 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 ignition coil. 5. Faulty ECM (when above No.1 – 4 are normal).
	Initial and peak voltage are normal, but no spark jumps at plug.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil.
CKP sensor	Peak voltage low	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 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 (when above No. 1 – 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty CKP sensor.

## IGNITION SYSTEM

### SYSTEM LOCATION



### SYSTEM DIAGRAM



## IGNITION SYSTEM INSPECTION

- If there is no spark at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use a commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum).
- The display value differs depending upon the internal impedance of the multimeter.
- If the peak voltage tester (U.S.A. only) is used, follow the manufacturer's instructions.

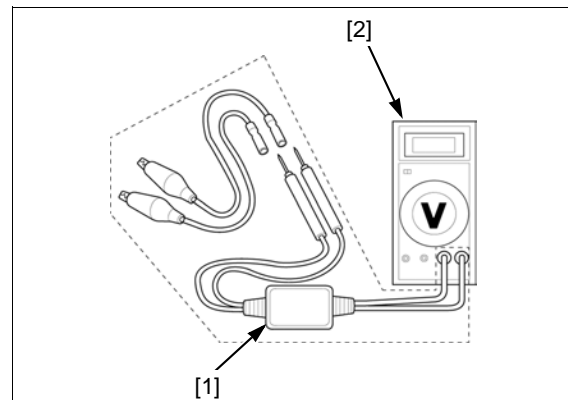
Connect the peak voltage adapter [1] to the digital multimeter [2], or use the peak voltage tester.

### TOOLS:

**IgnitionMate peak voltage tester MTP07-0286**  
(U.S.A. only) or  
**07HGJ-0020100**  
(Not available in  
U.S.A.)

**Peak Voltage Adaptor**

**with commercially available digital multimeter**  
(impedance 10 M $\Omega$ /DCV minimum)



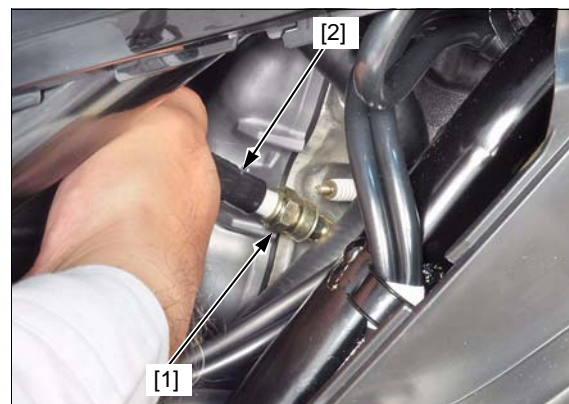
## IGNITION COIL PRIMARY PEAK VOLTAGE

- Check all system connections before this inspection. Poor connections connectors can cause incorrect readings.
- Check cylinder compression and check that the spark plug is installed correctly.

Remove the maintenance lid (page 3-6).

Disconnect the spark plug cap (page 3-6).

Connect a known good spark plug [1] to the spark plug cap [2] and ground it to the cylinder as done in a spark test.



## IGNITION SYSTEM

With the ignition coil primary wire connected, connect the Imrie diagnostic tester or peak voltage adaptor probes to the ignition coil primary terminal [1] and ground.

### 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 MΩ/DCV minimum)

**CONNECTION:** Yellow/blue (+) – Ground (–)

Turn the ignition switch ON with the engine stop switch at "C".

Measure the initial voltage at this time.

**STANDARD:** Battery voltage

If the initial voltage cannot be measured, check each item in the troubleshooting chart (page 5-3).

Retract the sidestand.

Turn the ignition switch ON and squeeze the left brake lever fully.

Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

**PEAK VOLTAGE:** 100 V minimum

If the peak voltage is abnormal, check each item in the troubleshooting chart (page 5-3).



## CKP SENSOR PEAK VOLTAGE

- Check cylinder compression and check that the spark plug is installed correctly.

Remove the right floor step (page 2-15).

Turn the ignition switch OFF.

Disconnect the ECM 33P (Black) connector (page 4-31).

Connect the Imrie diagnostic tester or peak voltage adaptor probes to the ECM 33P (Black) connector [1] terminals of the wire harness side.

### TOOLS:

**IgnitionMate peak voltage tester** MTP07-0286  
(U.S.A. only) or  
**Peak Voltage Adaptor [2]** 07HGJ-0020100  
(Not available in  
U.S.A.)

with commercially available digital multimeter  
(impedance 10 MΩ/DCV minimum)

**Pin Probe Male (2 pack)** 07ZAJ-RDJA110

**CONNECTION:** Yellow (+) – White/yellow (–)

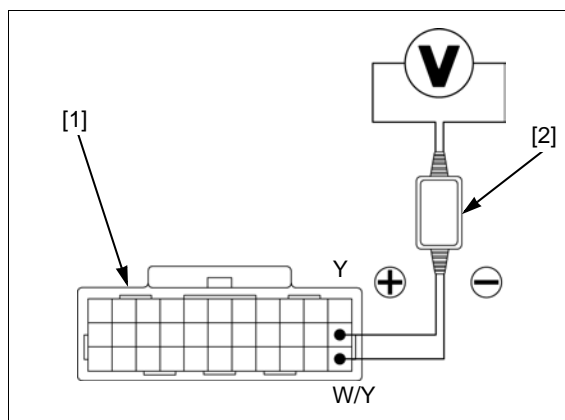
Retract the sidestand.

Turn the ignition switch ON with the engine stop switch at "C" and squeeze the left brake lever fully.

Crank the engine with the starter motor and measure the CKP sensor peak voltage.

**PEAK VOLTAGE:** 0.7 V minimum

If the peak voltage measured at the ECM 33P (Black) connector is abnormal, measure the peak voltage at the CKP sensor 2P (Red) connector.





Turn the ignition switch OFF.

Disconnect the CKP sensor 2P (Red) connector [1].

Connect the Imrie diagnostic tester or peak voltage adaptor probes to the CKP sensor side connector terminals.

In the same manner as at the ECM 33P (Black) connector, measure the peak voltage and compare it to the voltage measured at the ECM 33P (Black) connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the CKP sensor is normal, the wire harness has an open or short circuit, or loose connection.
- If both peak voltages are abnormal, check each item in the troubleshooting chart (page 5-3).

For CKP sensor replacement (page 14-6).

Install the removed parts in the reverse order of removal.



## SIDESTAND SWITCH LINE

Remove the left floor skirt (page 2-6).

Turn the ignition switch OFF.

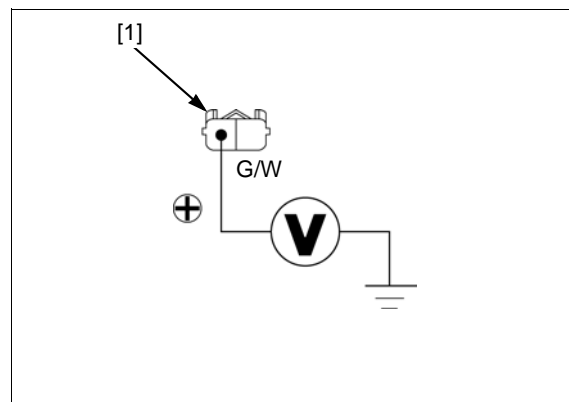
Disconnect the sidestand switch 2P (Gray) connector [1] (page 22-20).

Turn the ignition switch ON and measure the voltage between the sidestand switch 2P (Gray) connector of the wire harness side and ground.

**CONNECTION: Green/white – Ground**

**STANDARD: 4.75 – 5.25 V**

If the standard voltage does not appear, check for open circuit in Green/white wire.



## IGNITION COIL

### REMOVAL/INSTALLATION

Remove the luggage box (page 2-21).

Disconnect the spark plug cap [1].

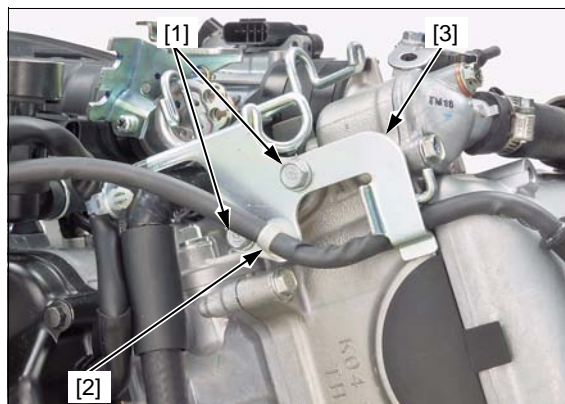
Remove the spark plug wire clamp bolt [2].



## IGNITION SYSTEM

Remove the bolts [1].

Disconnect the spark plug wire clamp [2] from the stay [3].

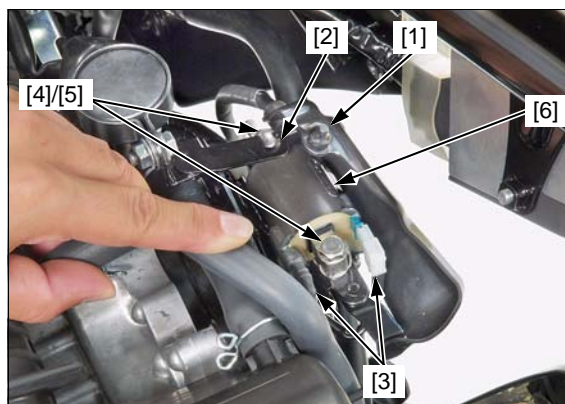


Release the ignition coil cover boss [1] from the slit [2] of the stay.

Disconnect the ignition coil wire connectors [3].

Remove the bolts [4], set plates [5] and ignition coil [6].

Installation is in the reverse order of removal.



## IGNITION TIMING

Start the engine and warm it up to normal operating temperature.

Stop the engine and remove the timing hole cap.

Connect the timing light [1] to the spark plug wire.

Start the engine and let it idle.

**IDLE SPEED: 1,500 ± 100 rpm**

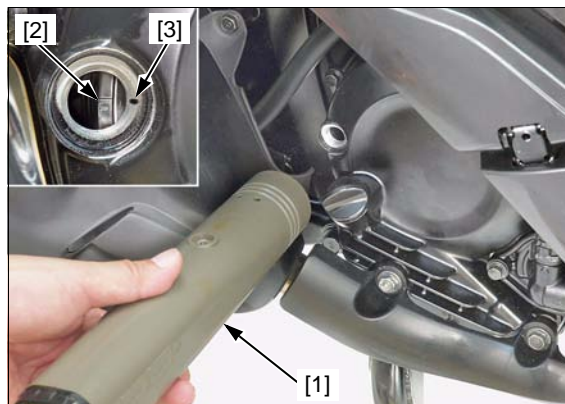
The ignition timing is correct if the "F" mark [2] on the flywheel aligns with the index mark [3] on the right crankcase cover.

Apply engine oil to a new O-ring.

Apply engine oil to the timing hole cap threads and seating surface.

Install the timing hole cap and tighten it to the specified torque.

**TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)**



# 6. ELECTRIC STARTER

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SERVICE INFORMATION .....	6-2	SYSTEM DIAGRAM .....	6-3
TROUBLESHOOTING .....	6-2	STARTER MOTOR .....	6-4
SYSTEM LOCATION .....	6-3	STARTER RELAY SWITCH .....	6-8

# SERVICE INFORMATION

## GENERAL

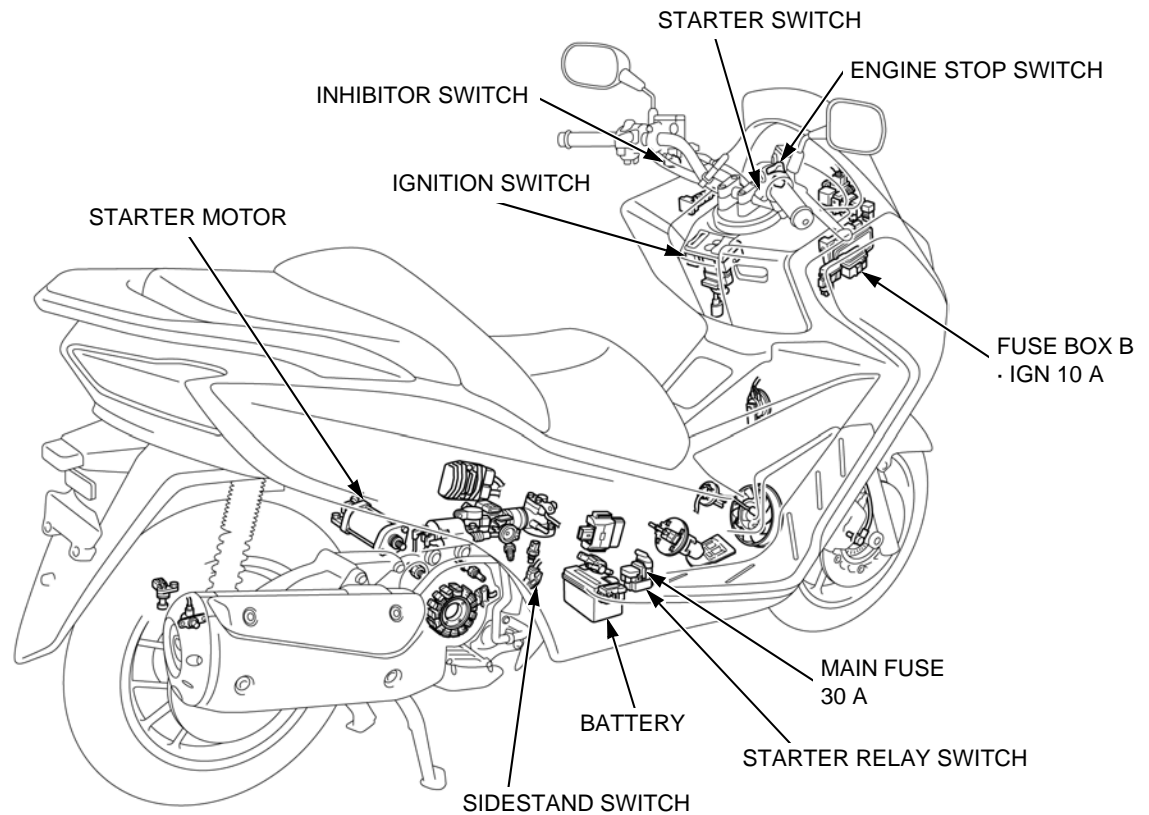
### NOTICE

- *If the 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 to OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting (page 6-2).
- For starter clutch servicing (page 14-7).
- Inspect the following:
  - Inhibitor switch (page 22-18)
  - Starter switch (page 22-18)
  - Sidestand switch (page 22-20)
  - Ignition switch (page 22-17)
  - Engine stop switch (page 22-18)

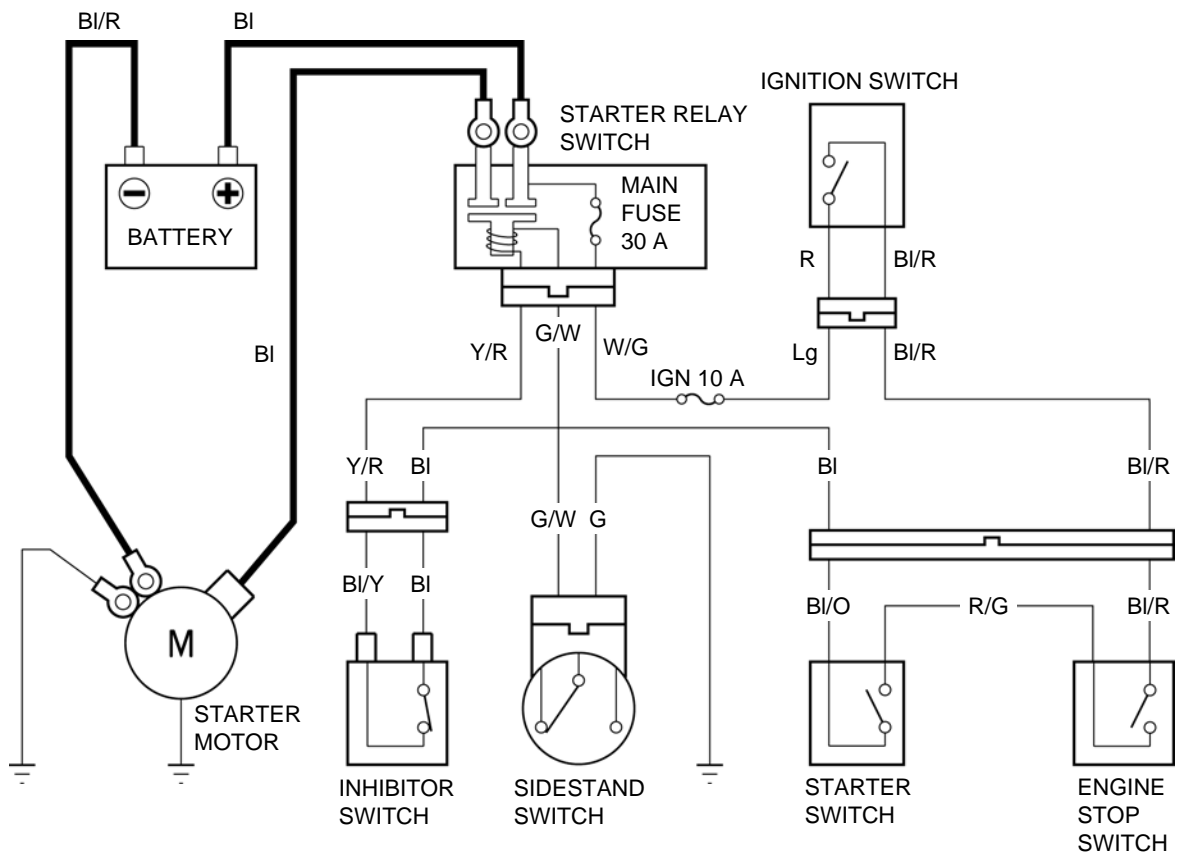
## TROUBLESHOOTING

Unusual condition		Probable cause (Check in numerical order)
Starter motor	Starter motor does not turn	1. Loose or poor contact on related connectors and terminals 2. Blown fuse 3. Weak battery 4. Faulty starter relay switch 5. Faulty starter motor 6. Faulty engine stop switch 7. Faulty sidestand switch 8. Faulty inhibitor switch 9. Loose connection, open or short circuit in starter motor cable 10. Open circuit in starter relay switch ground circuit 11. Open or short circuit in starter relay switch power circuit 12. Loose contact or open circuit in related wires
	Starter motor turns slowly	1. Low battery voltage 2. Poorly connected battery terminal cable 3. Poorly connected starter motor cable 4. Faulty starter motor 5. Poorly connected battery (–) cable
	Starter motor turns, but engine does not turn	1. Faulty starter clutch assembly 2. Damaged or faulty starter driven gear 3. Damaged or faulty starter reduction gear 4. Damaged or faulty starter motor pinion gear
	Starter relay switch "Clicks", but engine does not turn over	1. Crankshaft does not turn due to engine problems

## SYSTEM LOCATION



## SYSTEM DIAGRAM



# STARTER MOTOR

### REMOVAL/INSTALLATION

Disconnect the battery (-) cable (page 21-5).

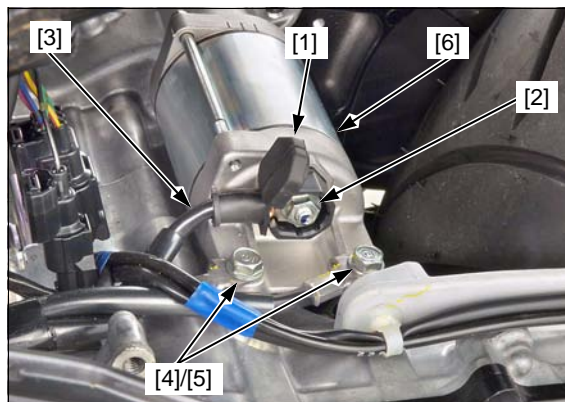
Remove the air cleaner housing (page 7-13).

Open the rubber cap [1] and remove the terminal nut [2].

Disconnect the starter motor cable [3].

Remove the mounting bolts [4] and ground cables [5].

Remove the starter motor [6] from the crankcase.



Remove the O-ring [1] from the starter motor.

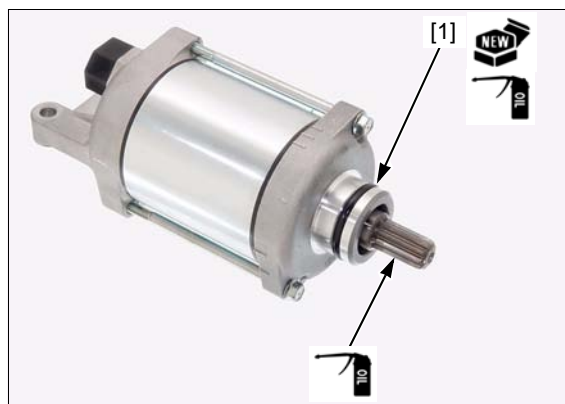
*Route the cable properly (page 1-18).*

Installation is in the reverse order of removal.

- Apply engine oil to a new O-ring.
- Apply engine oil to the starter motor pinion gear teeth.

### TORQUE:

**Starter motor cable terminal nut:**  
**10 N·m (1.0 kgf·m, 7 lbf·ft)**

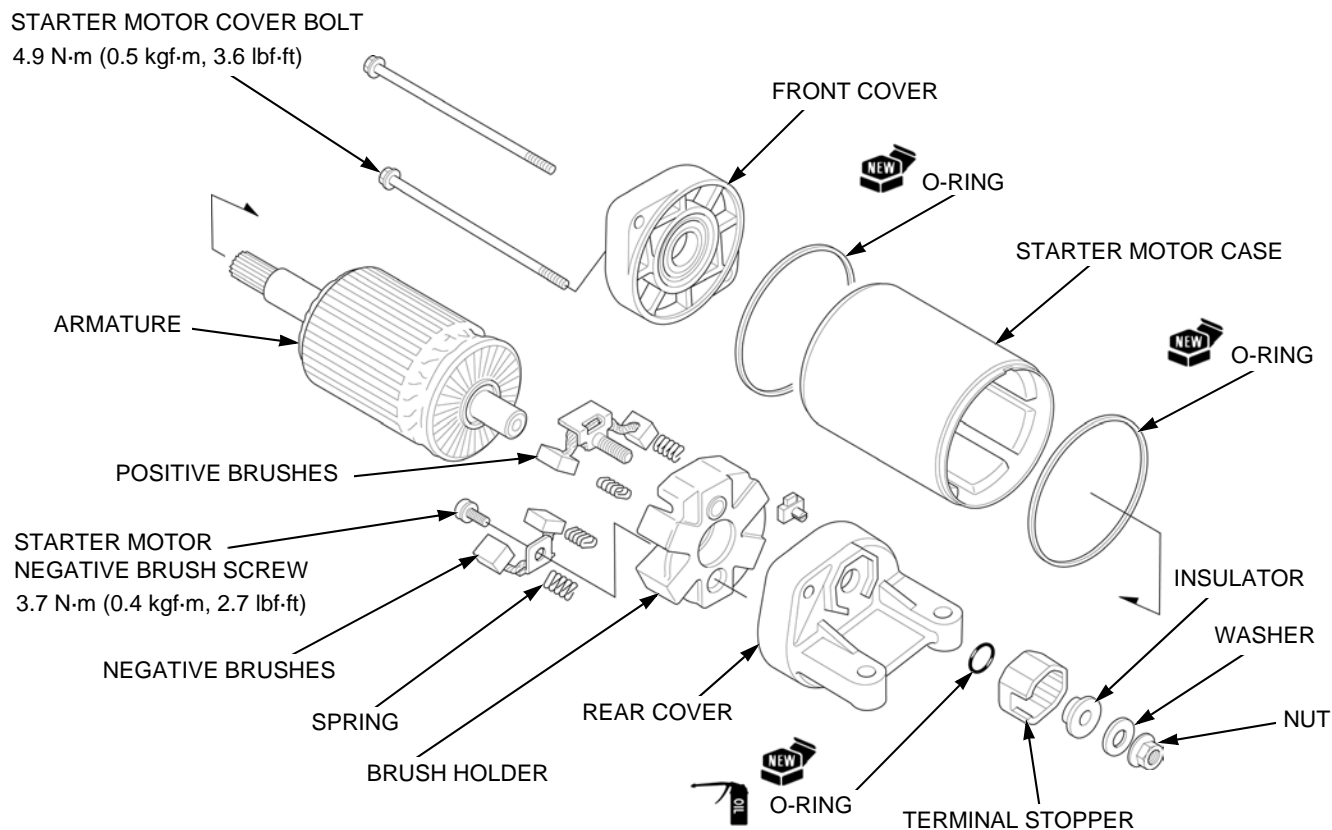


**DISASSEMBLY/ASSEMBLY**

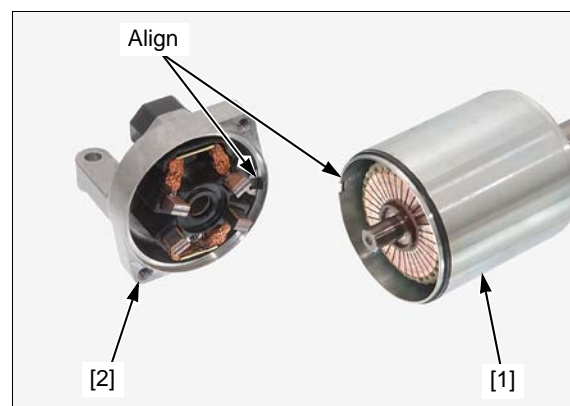
Disassemble and assemble the starter motor as following illustration.

**NOTICE**

*The coil may be damaged if the magnet pulls the armature against the motor case.*



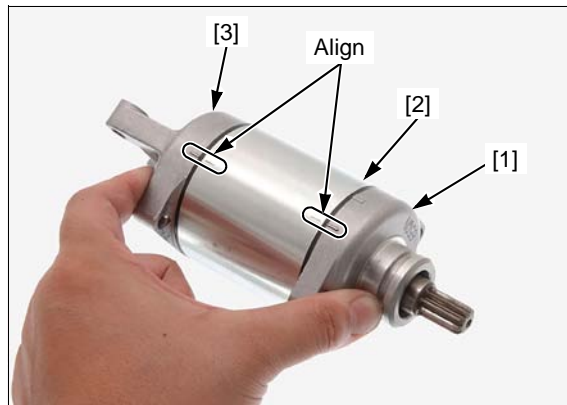
- Install the starter motor case [1] by aligning the starter motor case groove with the stopper on the rear cover assembly [2].





## ELECTRIC STARTER

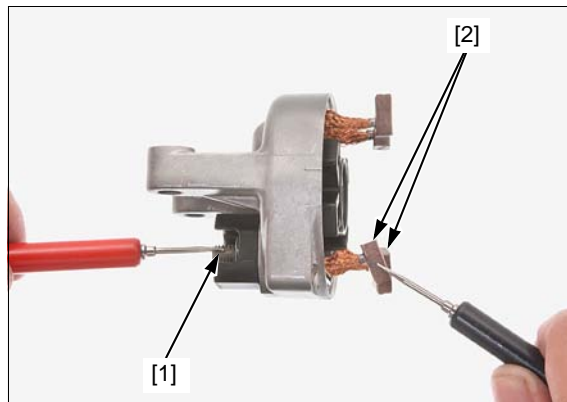
- Align the index marks on the front cover [1], starter motor case [2] and rear cover [3].



### INSPECTION

Check for continuity between the starter motor cable terminal [1] and positive brushes [2].

There should be continuity.

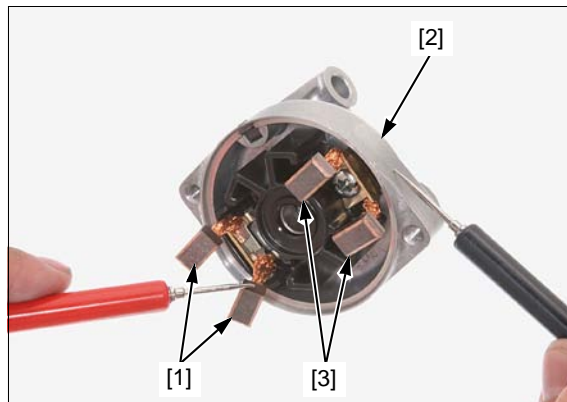


Check for continuity between the positive brushes [1] and rear cover [2].

There should be no continuity.

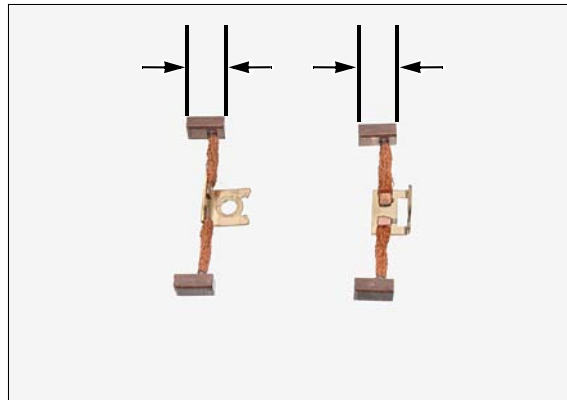
Check for continuity between the positive and negative brushes [3].

There should be no continuity.



Measure each brush length.

**SERVICE LIMIT: 6.5 mm (0.26 in)**





*Do not use emery or sand paper on the commutator.*

Check the commutator for damage or abnormal wear.

Check the commutator bar for discoloration.

Clean the metallic debris off between commutator bars.

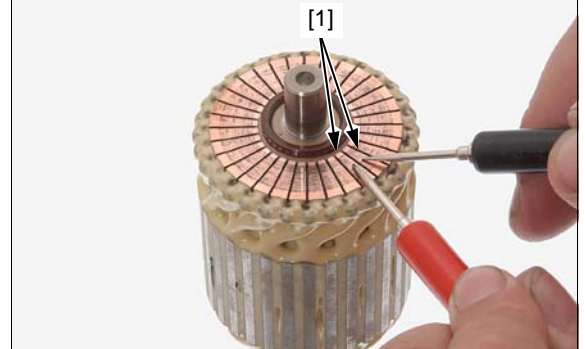
Replace the starter motor assembly with a new one if necessary.



Check for continuity between pairs of commutator bars [1].

There should be continuity.

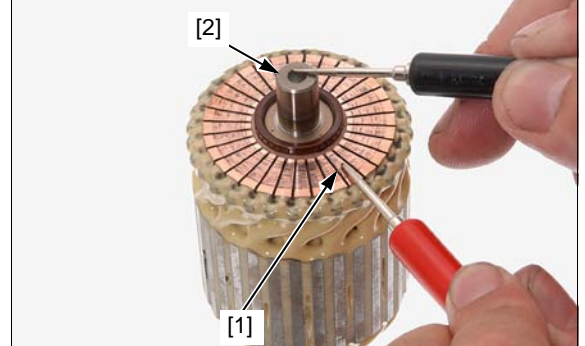
CONTINUITY:



Check for continuity between each individual commutator bar [1] and the armature shaft [2].

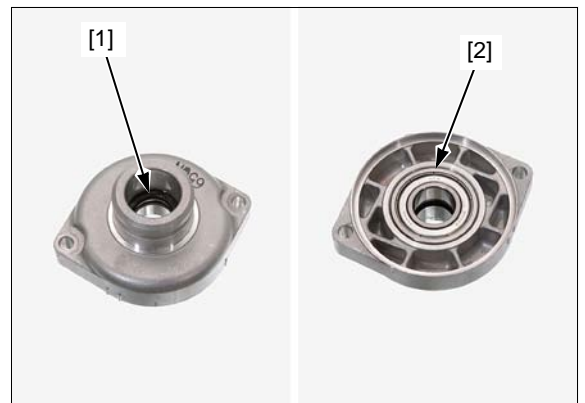
There should be no continuity.

NO CONTINUITY:



Check the dust seal [1] and ball bearing [2] for wear or damage.

Check the ball bearing rotates smoothly.



## ELECTRIC STARTER

Check the bushing [1] of the rear cover [2] for wear or damage.



## STARTER RELAY SWITCH

### OPERATION INSPECTION

Remove the battery lid (page 21-5).

Retract the sidestand.

Turn the ignition switch ON with the engine stop switch at "O".

Squeeze the left brake lever fully and push the starter switch.

The coil is normal if the starter relay switch [1] clicks.

If you do not hear the starter relay switch "CLICK", inspect the starter relay switch and its circuits using the procedure below.



### GROUND LINE

Remove the battery lid (page 21-5).

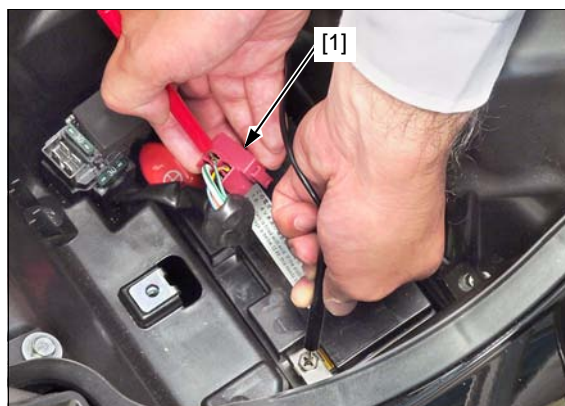
Turn the ignition switch OFF.

Disconnect the starter relay switch 4P (Red) connector [1].

Check for continuity between the wire harness side connector terminal and ground.

**CONNECTION: Green/white – Ground**

There should be continuity with the sidestand retracted.



### RELAY COIL POWER INPUT LINE

Remove the battery lid (page 21-5).

Connect the starter relay switch 4P (Red) connector [1].

Turn the engine stop switch "O".

Measure the voltage between the starter relay switch 4P (Red) connector terminal and ground with the ignition switch turned ON.

**CONNECTION: Yellow/red (+) – Ground (-)**

There should be battery voltage only when the left brake lever is squeezed, the sidestand is retracted, and the starter switch is pushed.

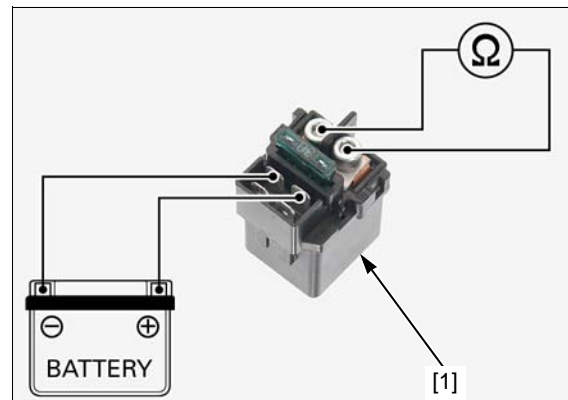


**CONTINUITY INSPECTION**

Remove the starter relay switch [1] (page 6-9).

Connect a 12 V battery to the starter relay switch as shown.

There should be continuity between the cable terminals when the battery is connected, and not continuity when the battery is disconnected.

**REMOVAL/INSTALLATION**

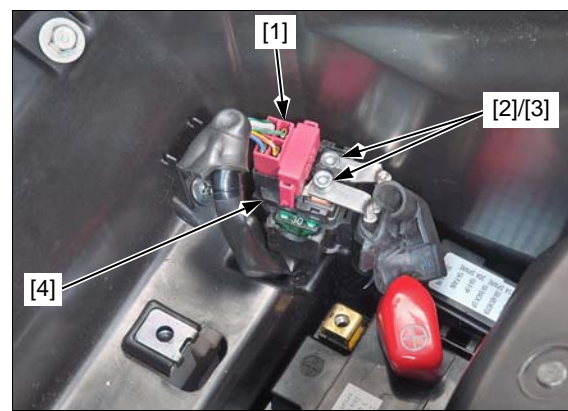
Remove the battery lid (page 21-5).

Remove the bolt and disconnect the battery (-) cable from the battery.

Disconnect the starter relay switch 4P (Red) connector [1].

Remove the bolts [2], cables [3] and starter relay switch [4].

Installation is in the reverse order of removal.



---

## MEMO

---

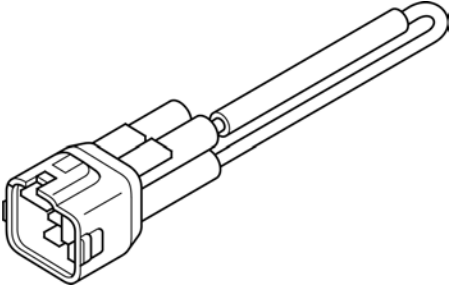
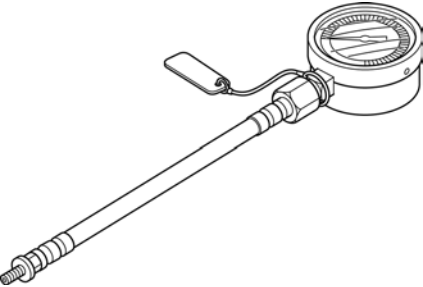
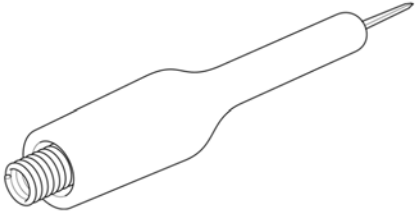
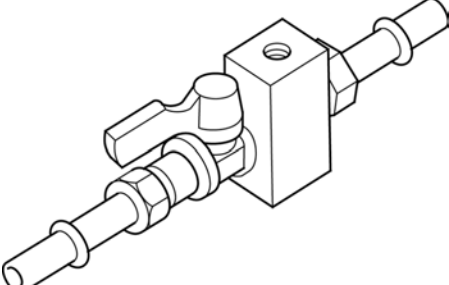
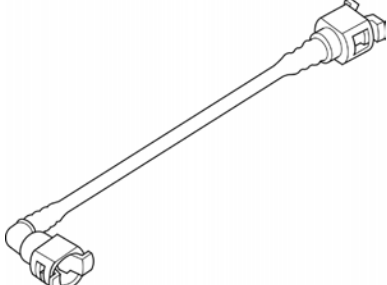
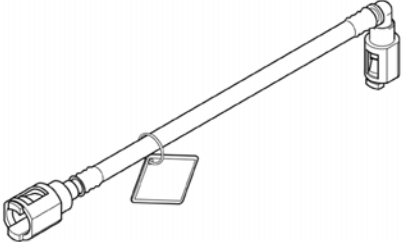
SERVICE INFORMATION .....	7-2	INJECTOR .....	7-18
COMPONENT LOCATION .....	7-4	INTAKE PIPE .....	7-20
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FUEL PUMP .....	7-9	IACV .....	7-24
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AIR CLEANER HOUSING .....	7-13	EVAP PURGE CONTROL SOLENOID VALVE/ EVAP CANISTER (AC TYPE ONLY) .....	7-28
THROTTLE BODY .....	7-14		


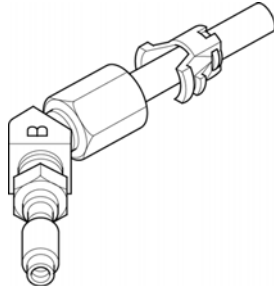
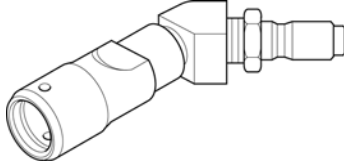
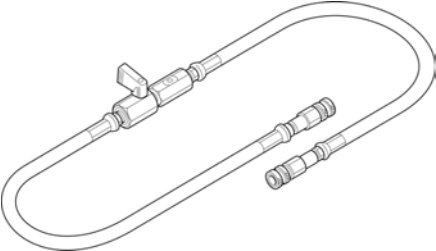
## SERVICE INFORMATION

### GENERAL

- 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.
- Before disconnecting the fuel feed hose, relieve fuel pressure from the system by starting the engine with the fuel pump connector disconnected (page 7-5).
- 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.
- Do not apply commercially available carburetor cleaners to the inside of the throttle bore.
- 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 intake manifold port with tape or a clean cloth to keep dirt and debris from entering the engine after the throttle body has been removed.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Prevent dirt and debris from entering the throttle bore and air passages after the throttle body has been removed. Clean them using compressed air if necessary.
- 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 nut of the throttle body. Loosening or tightening it can cause incorrect throttle valve operation.
- Always replace the packing when the fuel pump is removed.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- When disassembling the fuel system parts, note the location of the O-rings. Replace them with new ones upon re-assembly.
- Use a digital tester for PGM-FI system inspection.
- Refer to the fuel level sensor inspection (page 22-13).

### TOOLS

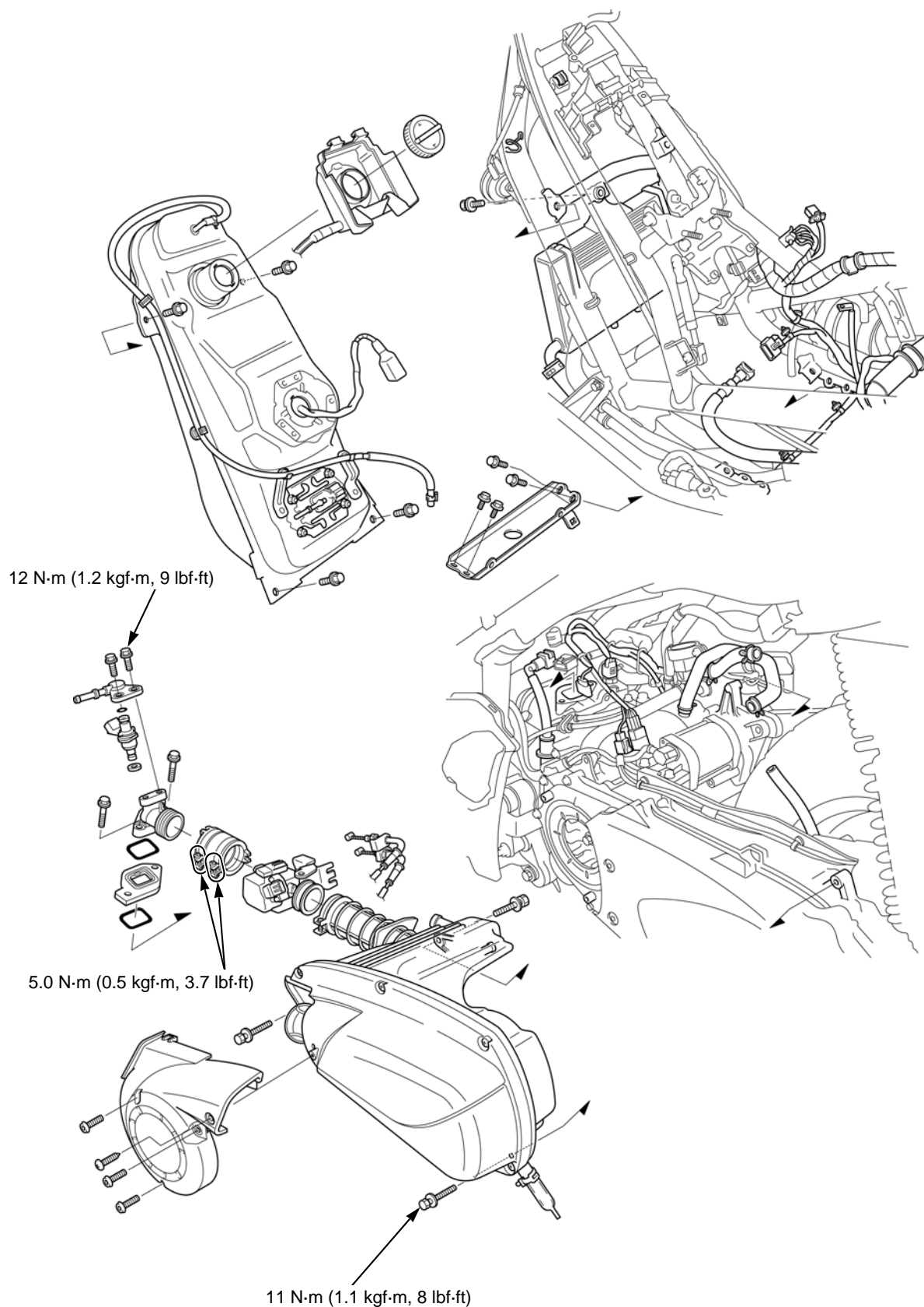
<p>SCS Service Connector 070PZ-ZY30100</p> 	<p>Fuel Pressure Gauge 0 – 100 psi 07406-0040004</p>  <p>or 07406-004000B (U.S.A. only) or 07406-004000C (U.S.A. only)</p>	<p>Pin Probe Male (2 pack) 07ZAJ-RDJA110</p> 
<p>Manifold 07ZAJ-S5A0111</p>  <p>(Not available in U.S.A.)</p>	<p>Hose Fuel Attachment A 07ZAJ-S5A0120</p>  <p>(Not available in U.S.A.)</p>	<p>Hose Fuel Attachment B 07ZAJ-S5A0130</p>  <p>(Not available in U.S.A.)</p>

<p>Joint Fuel Attachment B 07ZAJ-S5A0150</p>  <p>(Not available in U.S.A.)</p>	<p>Adaptor, male 07AAJ-S6MA300 (U.S.A. only)</p> 	<p>Adaptor, female 07AAJ-S6MA500 (U.S.A. only)</p> 
<p>Pressure manifold hose 07AMJ-HW1A100 (U.S.A. only)</p> 		

## FUEL SYSTEM

# COMPONENT LOCATION

AC type shown:





## FUEL LINE INSPECTION

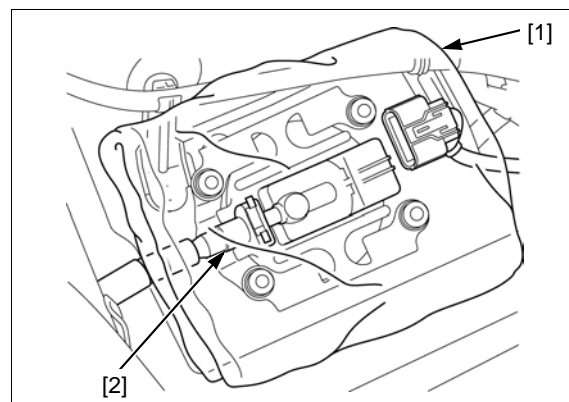
### FUEL PRESSURE RELIEVING

- Before disconnecting fuel feed hose, relieve pressure from the system as following procedures.
1. Turn the ignition switch OFF.  
Remove the luggage box (page 2-21).  
Disconnect the fuel pump 5P connector [1].
  2. Start the engine, and let it idle until the engine stalls.
  3. Turn the ignition switch OFF.
  4. Disconnect the battery (-) cable.

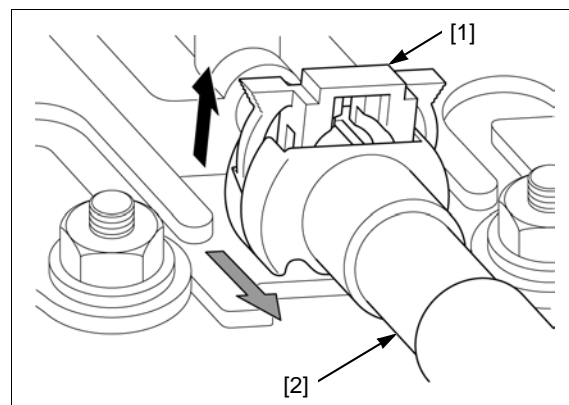


### QUICK CONNECT FITTING REMOVAL

- The fuel pump side and injector side service procedures are the same.
  - Do not bend or twist fuel feed hose.
1. Relieve the fuel pressure (page 7-5).  
Place a shop towel [1] over the quick connect fitting [2].

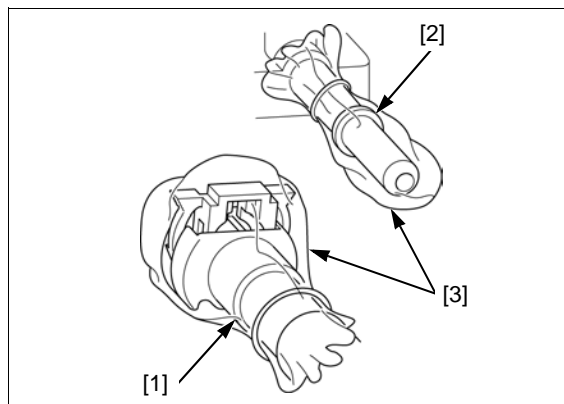


2. Pull up the retainer [1] and then pull the connector [2] off.
  - Collect the remaining fuel in the fuel feed hose from flowing out by using a shop towel.
  - Be careful not to damage the hose or other parts.



## FUEL SYSTEM

3. To prevent damage and keep foreign matter out, cover the disconnected connector [1] and pipe [2] end with the plastic bags [3].

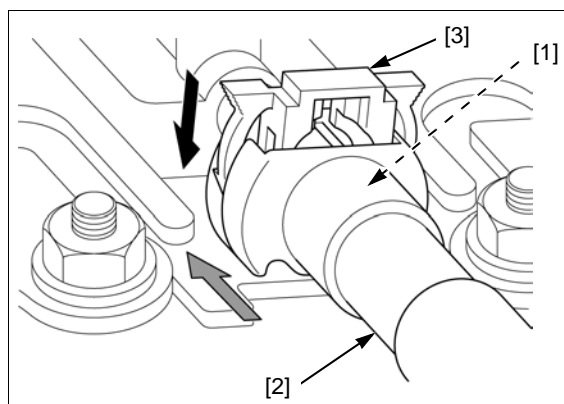


### QUICK CONNECT FITTING INSTALLATION

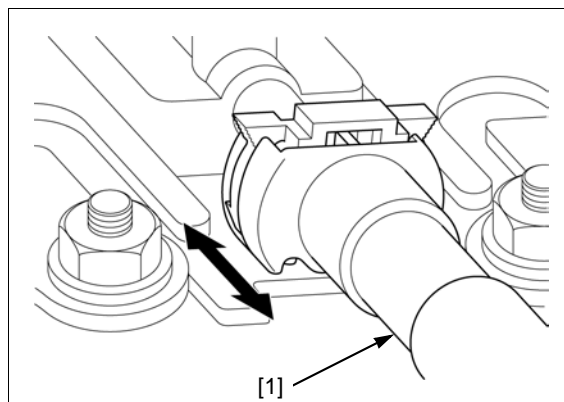
- Do not bend or twist fuel feed hose.

1. Clean around the pipe [1].

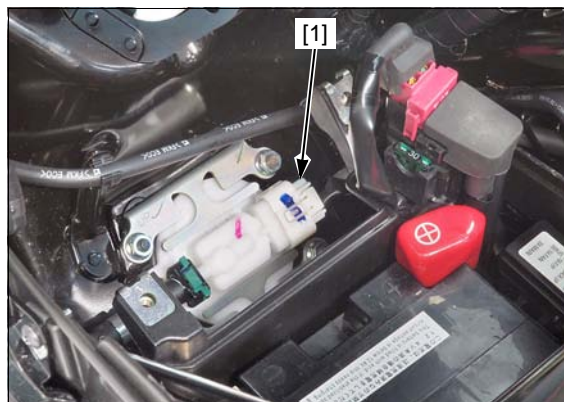
Set the connector [2] on the pipe [1] securely. Then press the retainer [3] until both retainer tabs lock with a "CLICK".



2. Make sure the connection is secure; check visually and by pulling the connector [1].



3. Connect the fuel pump 5P connector [1].  
Connect the battery (-) cable.
4. Turn the ignition switch ON and engine stop switch "Q".
  - Do not start the engine.  
The fuel pump will run for about 2 seconds, and fuel pressure will rise.
5. Repeat the step 4, several times, and check that there is no leakage in the fuel supply system.
6. Turn the ignition switch OFF.  
Install the luggage box (page 2-21).



## FUEL PRESSURE TEST

Relieve the fuel pressure and disconnect the quick connect fitting (page 7-5).

Connect the fuel pump 5P connector [1].

Attach the fuel pressure gauge set and pressure gauge.

### TOOLS:

<b>Fuel Pressure Gauge Set [2]</b>	<b>07406-0040004</b>
<b>Manifold [3]</b>	<b>07ZAJ-S5A0111</b> (Not available in U.S.A.)
<b>Hose Fuel Attachment A [4]</b>	<b>07ZAJ-S5A0120</b> (Not available in U.S.A.)
<b>Hose Fuel Attachment B [5]</b>	<b>07ZAJ-S5A0130</b> (Not available in U.S.A.)
<b>Joint Fuel Attachment B [6]</b>	<b>07ZAJ-S5A0150</b> (Not available in U.S.A.)

### TOOLS (U.S.A.):

<b>Fuel Pressure Gauge 0 – 100 psi</b>	<b>07406-004000B or 07406-004000C</b>
<b>Adaptor, male</b>	<b>07AAJ-S6MA300</b>
<b>Adaptor, female</b>	<b>07AAJ-S6MA500</b>
<b>Pressure manifold hose</b>	<b>07AMJ-HW1A100</b>

Connect the battery (–) cable [7].

Start the engine and let it idle.

Read the fuel pressure.

**STANDARD: 294 kPa (3.0 kgf/cm<sup>2</sup>, 43 psi)**

If the fuel pressure is higher than specified, replace the fuel pump assembly.

If the fuel pressure is lower than specified, inspect the following:

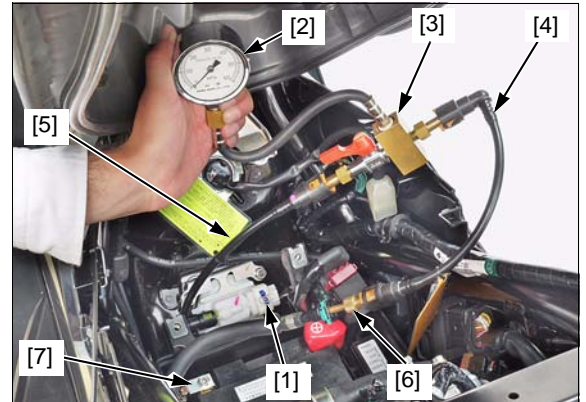
- Fuel line leaking
- Fuel pump (page 7-9)
- Clogged fuel filter (Assembly of the fuel pump)

After inspection, disconnect the fuel pump 5P connector, and relieve the fuel pressure by starting the engine and let it idle until it stalls.

*Wrap a shop towel around the attachment to soak up any spilled fuel.*

Remove the fuel pressure gauge, attachment and manifold from the fuel pump.

Connect the quick connect fitting (page 7-5).



### FUEL FLOW INSPECTION

Relieve the fuel pressure and disconnect the quick connect fitting (page 7-5).

Turn the ignition switch OFF.

Connect the fuel pump 5P connector.

Connect the fuel attachment hose to the fuel pump joint.

#### TOOL:

**Hose Fuel Attachment B [1]**      **07ZAJ-S5A0130**  
(Not available in U.S.A.)

#### TOOLS (U.S.A.):

**Adaptor, female**      **07AAJ-S6MA500**  
**Pressure manifold hose**      **07AMJ-HW1A100**

*Wipe off spilled out gasoline.*

Place the end of the hose into an approved gasoline container.

Connect the battery (–) cable.

Turn the ignition switch ON and measure the amount of fuel flow.

- The fuel pump operates for 2 seconds. Repeat 5 times to obtain the total required measuring time.

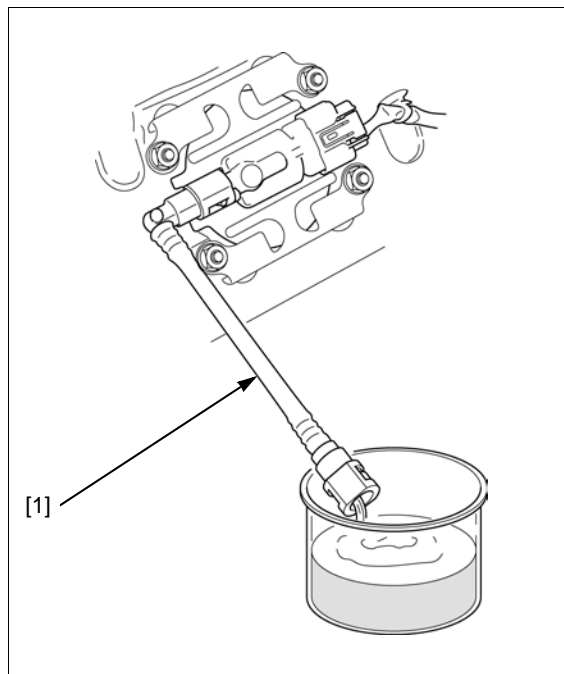
#### Amount of fuel pump flow:

**114 cm<sup>3</sup> (3.9 US oz, 4.0 Imp oz) minimum/  
10 seconds**

If the fuel flow is less than specified, inspect the following:

- Fuel pump (page 7-9)
- Clogged fuel filter (on the fuel pump assembly)

Connect the quick connect fitting (page 7-6).



## FUEL PUMP

### SYSTEM INSPECTION

Turn the ignition switch ON with the engine stop switch at "O", and 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.

Remove the luggage box (page 2-21).

Disconnect the fuel pump 5P connector [1].

Turn the ignition switch ON and measure the voltage at the terminals of the wire harness side.

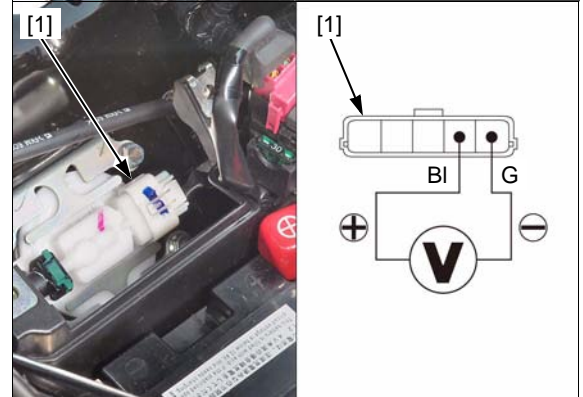
**CONNECTION: Black (+) – Green (–)**

There should be battery voltage for a few seconds.

If there is battery voltage, replace the fuel pump.

If there is no battery voltage, inspect the following:

- Open circuit in Green wire between the fuel pump and ground
- Fuel pump relay (page 7-22)
- Sub fuse 10 A (F/P)
- Sub fuse 10 A (IGN)
- Main fuse 30 A
- Ignition switch (page 22-17)
- ECM (page 4-30)
- Open circuit in Light green wire between the ignition switch and fuse box B
- Open circuit in White/green wire between the fuse box B and starter relay switch



### REMOVAL

Relieve the fuel pressure and disconnect the quick connect fitting (page 7-5).

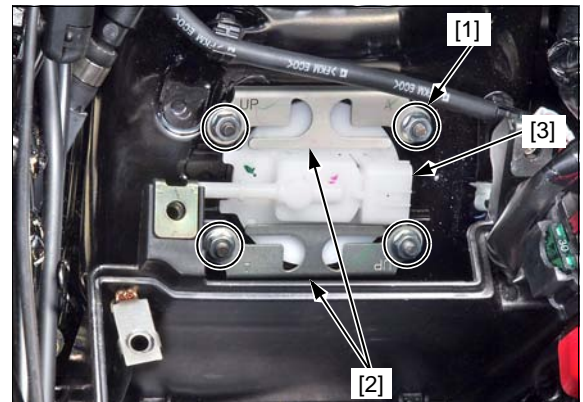
Remove the battery (page 21-5).

Clean around the fuel pump.

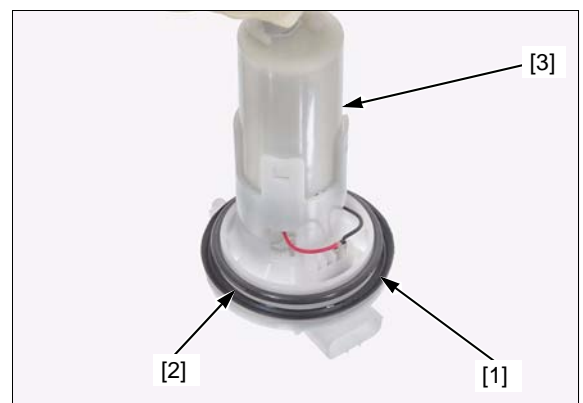
Loosen the nuts [1] in a crisscross pattern in several steps.

Remove the nuts and retainers [2].

Remove the fuel pump unit [3] from the fuel tank while bending the fuel filter.



Remove the dust seal [1] and O-ring [2] from the fuel pump unit [3].



#### **\*\*NOTE\*\***

See important additional information for pump installation at the end of this chapter

## FUEL SYSTEM

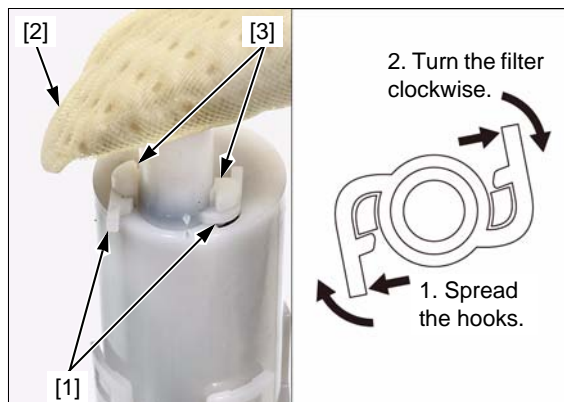
### INSPECTION

Check the fuel pump unit [1] for wear or damage.  
Check the fuel filter [2] for clogging or damage.  
Replace the fuel filter unit if necessary (page 7-10).



### FUEL FILTER REPLACEMENT

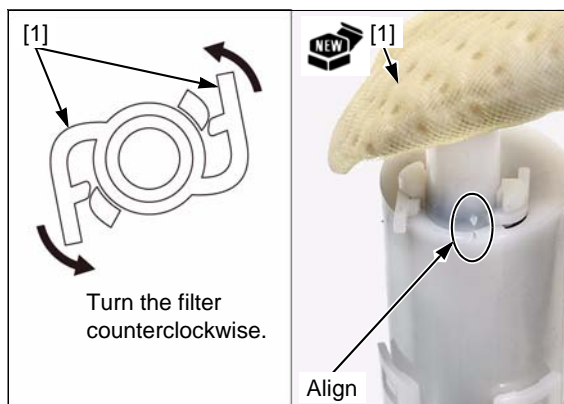
Remove the fuel pump unit (page 7-9).  
Release the hooks [1] of the fuel filter [2] from the stoppers [3] by slightly spreading the hooks, then turn the filter clockwise.  
Pull up the filter and remove it from the fuel pump unit.



Remove the O-ring [1].  
Apply a small amount of engine oil to a new O-ring and install it.



Install a new fuel filter [1], and turn it counterclockwise until the filter mark aligns with the pump mark.  
Install the fuel pump (page 7-11).





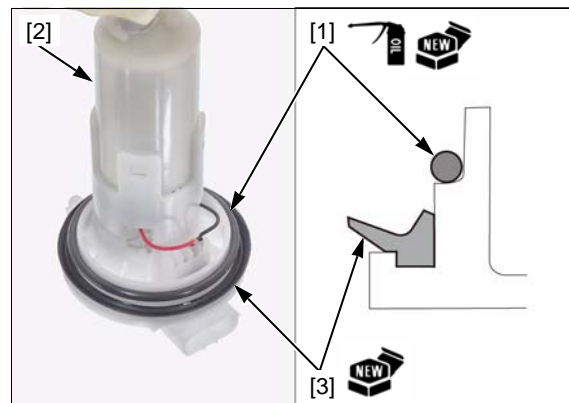
## INSTALLATION

*Always replace the O-ring and dust seal with new ones.*

*Be careful not to pinch the dirt and debris between the fuel pump unit, O-ring and dust seal.*

Apply 1 g (0.04 oz) maximum of engine oil to a new O-ring [1] and install it onto the fuel pump unit [2].

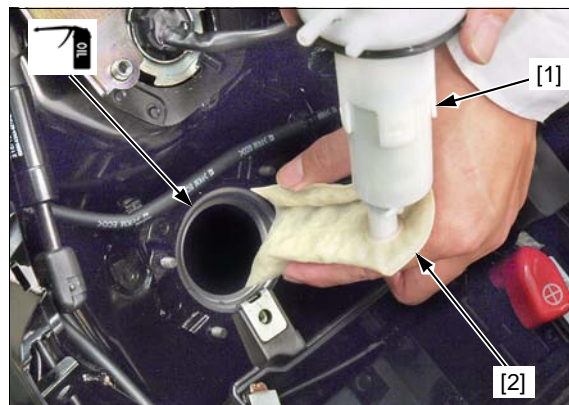
Install a new dust seal [3] in the correct direction as shown.



Apply a small amount of engine oil to the O-ring and dust seal seating area of the fuel tank.

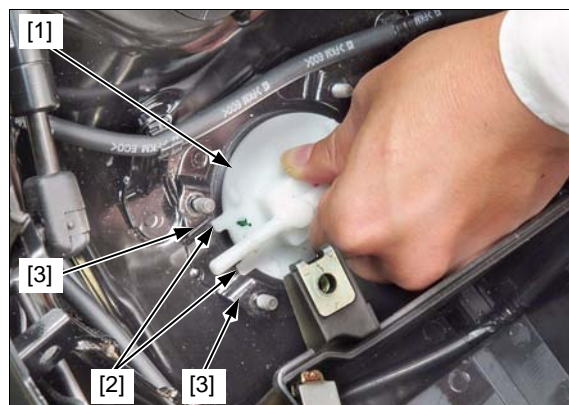
Insert the fuel pump unit [1] into the fuel tank while bending the fuel filter [2] as shown.

- Be careful not to damage the filter.



Push the fuel pump unit [1] into the fuel tank so that the pump tabs [2] are positioned between the ribs [3] of the fuel tank as shown.

- Make sure the dust seal is installed properly.

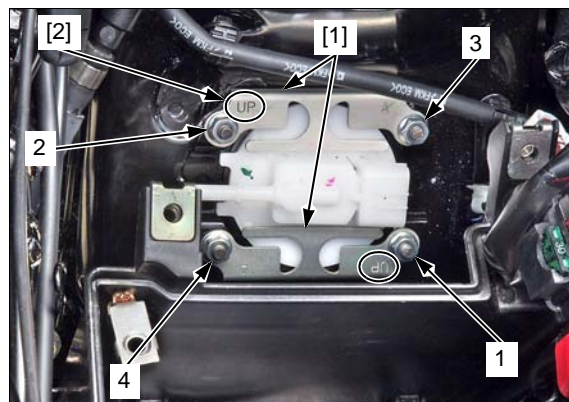


Install the retainers [1] with their "UP" marks [2] facing up while pushing down the fuel pump unit.

Install and tighten the fuel pump retainer nuts to the specified torque in the specified sequence as shown.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Connect the quick connect fitting (page 7-6).



# FUEL TANK

### REMOVAL/INSTALLATION

Relieve the fuel pressure and disconnect the quick connect fitting (page 7-5).

Remove the following:

- Inner cover (page 2-17)
- Under cover (page 2-8)
- Battery box (page 2-24)

Remove the bolt [1] and release the radiator [2] from the frame.

Remove the fuel tank cap [3] and fuel tray/fuel tray drain hose [4].

Disconnect the fuel level sensor 3P connector [5].

*AC type only:* Disconnect the fuel tank breather hose [6] from the EVAP canister [7].

Release the following:

- Fuel pump wire clamp [8] from the fuel tank
- Sidestand switch wire clamps [9] from the frame plate [10]
- Fuel tank breather hose from the hose clamps [11] of the frame

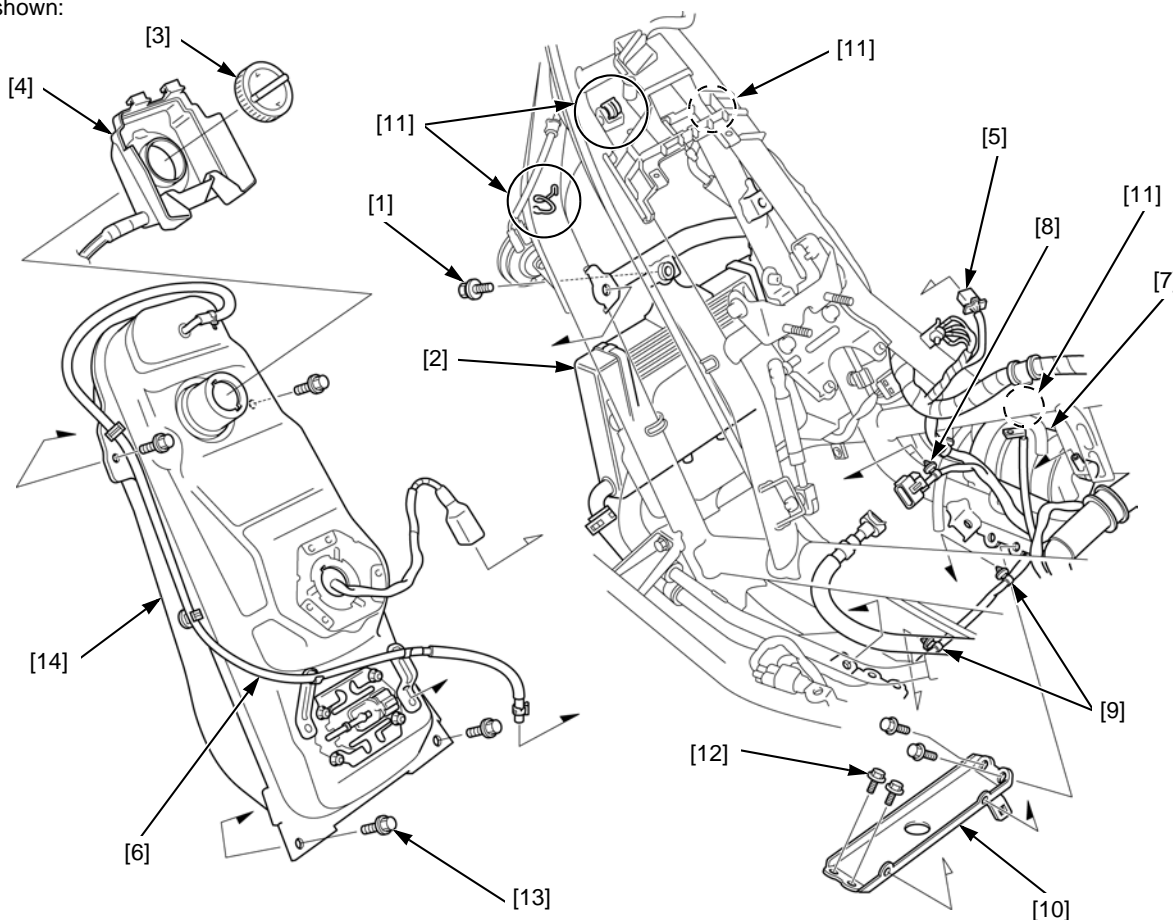
Remove the bolts [12] and frame plate.

Remove the bolts [13] and fuel tank [14].

Installation is in the reverse order of removal.

- Route the wire and hose properly (page 1-18).
- Connect the quick connect fitting (page 7-6).

AC type shown:





## AIR CLEANER HOUSING

### REMOVAL/INSTALLATION

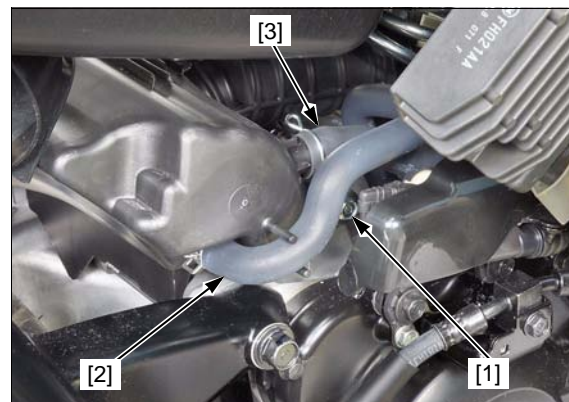
Remove the following:

- Side body cover (page 2-14)
- Belt case air cleaner housing (page 3-14)

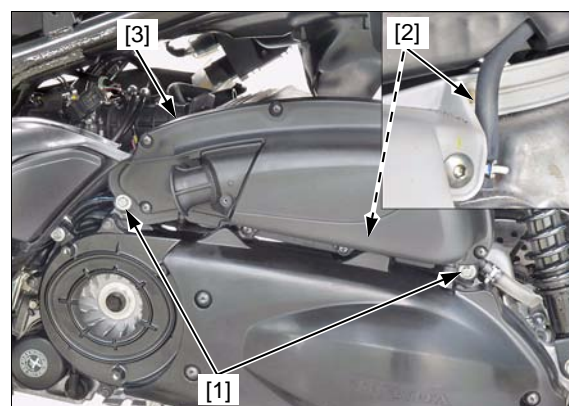
Remove the air cleaner housing washer bolt [1].

Disconnect the following hoses from the air cleaner housing:

- Crankcase breather hose [2]
- Air supply hose [3]



Remove the air cleaner housing washer bolts [1] and disconnect the final reduction case breather hose [2] from the air cleaner housing [3].



Loosen the connecting hose band screw [1] and remove the air cleaner housing.

*Route the hoses properly (page 1-18).*

Installation is in the reverse order of removal.

#### TORQUE:

**Air cleaner housing washer bolt:**  
**11 N·m (1.1 kgf·m, 8 lbf·ft)**

- Tighten the connecting hose band screw until the band ends seats the collar [2].



# THROTTLE BODY

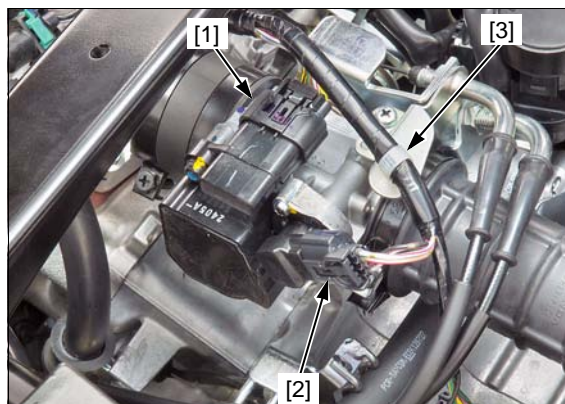
## REMOVAL

- If the sensor unit has been removed, perform the TP sensor reset procedure (page 7-16).

Remove the luggage box (page 2-21).

Disconnect the sensor unit 5P (Black) connector [1] and IACV 4P (Black) connector [2].

Release the main wire harness clamp [3] from the throttle body.

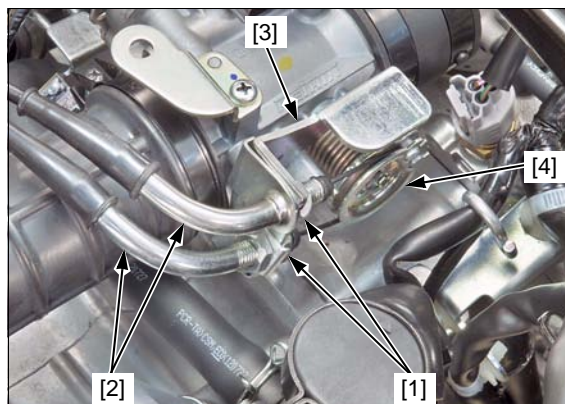


Loosen the throttle cable lock nuts [1].

*Be careful not to damage the threads of throttle cable.*

Release the throttle cables [2] from the throttle cable bracket [3].

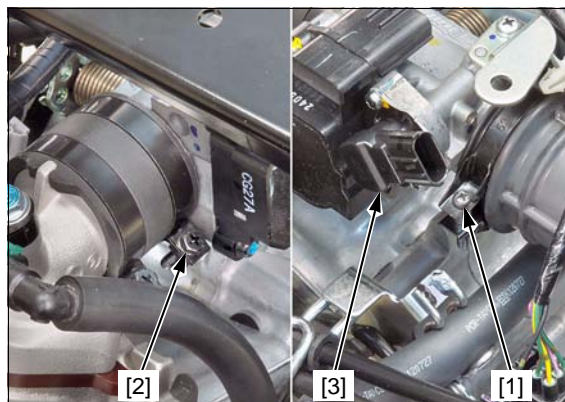
Disconnect the throttle cables from the throttle drum [4].



Loosen the connecting hose band screw [1] and insulator band screw [2].

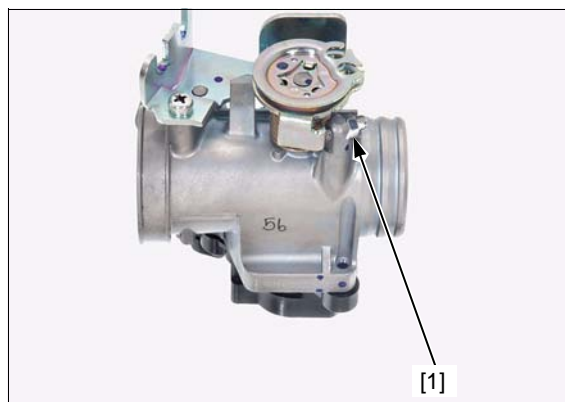
Remove the throttle body [3].

- Seal the intake manifold port with a shop towel or cover it with a piece of tape to prevent any foreign material from dropping into the engine.



## DISASSEMBLY/ASSEMBLY

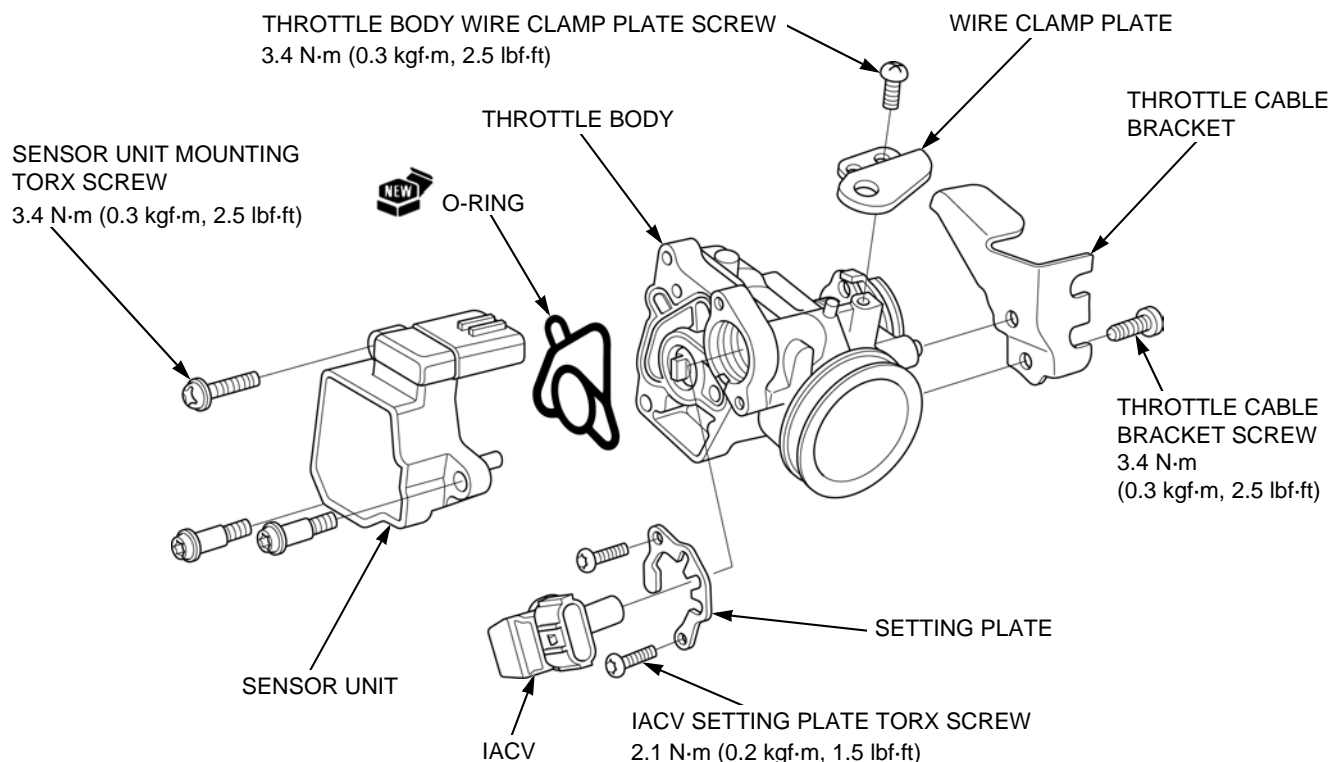
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Do not loosen or tighten the white painted nut [1] of the throttle drum. Loosening or tightening it can cause throttle body malfunction.



Disassemble and assemble the throttle body as show in the illustration.

- For sensor unit removal/installation (page 4-34).
- For IACV removal/installation (page 7-24).

Installation is in the reverse order of removal.



## CLEANING

Remove the throttle body (page 7-14).

Remove the sensor unit (page 4-34).

Remove the IACV (page 7-24).

Blow open each air passage in the throttle body with the compressed air.

- Do not use high pressure air or bring the nozzle too close to the throttle body.
- Cleaning the air passages and sensor hole with a piece of wire will damage the throttle body.



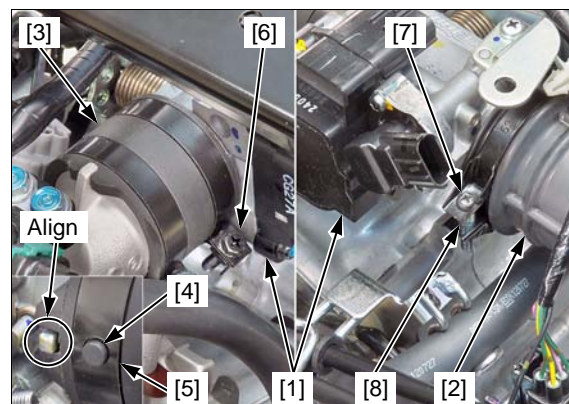
## INSTALLATION

Install the throttle body [1] between the connecting hose [2] and insulator B [3] by aligning the throttle body tab with insulator B groove.

Align the tab [4] of the insulator B and the hole of the insulator band [5], then tighten the insulator band screw [6] to the specified torque.

**TORQUE: 5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)**

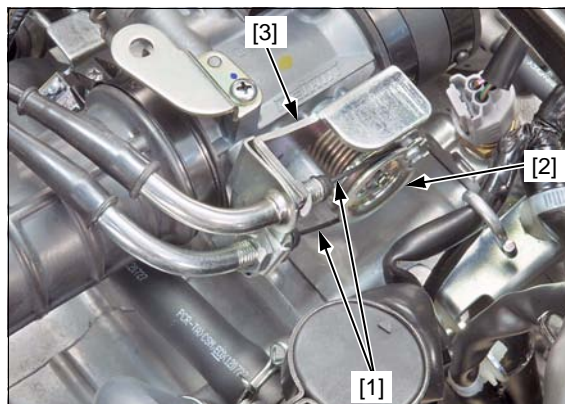
Tighten the connecting hose band screw [7] until the band ends seats the collar [8].





## FUEL SYSTEM

*Be careful not to damage the threads of throttle cable.* Connect the throttle cables [1] to the throttle drum [2] and set them onto the throttle cable bracket [3], then adjust the throttle grip freeplay (page 3-4).

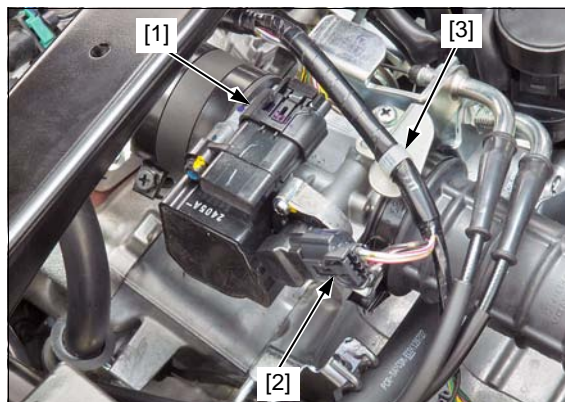


Connect the sensor unit 5P (Black) connector [1] and IACV 4P (Black) connector [2].

Set the main wire harness clamp [3] to the throttle body.

Install the luggage box (page 2-21).

If the sensor unit has been removed, perform the TP sensor reset procedure (page 7-16).



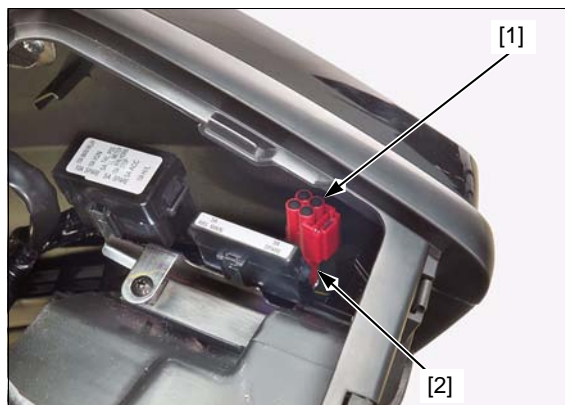
### TP SENSOR RESET PROCEDURE

- Make sure that DTC is not stored in ECM. If the DTC is stored in ECM, TP sensor reset mode won't start. Reset the TP sensor as follows:

Remove the following:

- Luggage box (page 2-21)
- Right front panel (page 2-12)

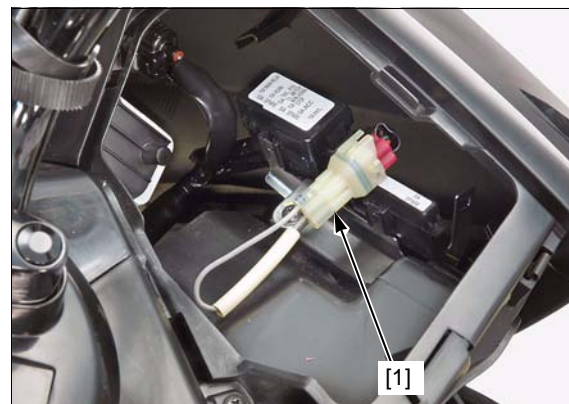
1. Erase the DTC (page 4-7).
2. Turn the ignition switch OFF.
3. Remove the dummy connector [1] from the DLC [2].



4. Connect the special tool to the DLC to short the DLC terminals.

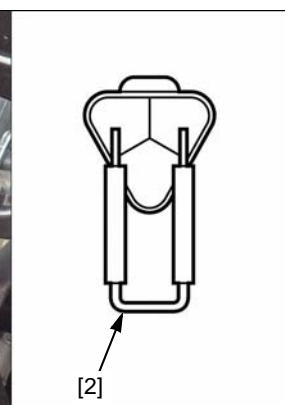
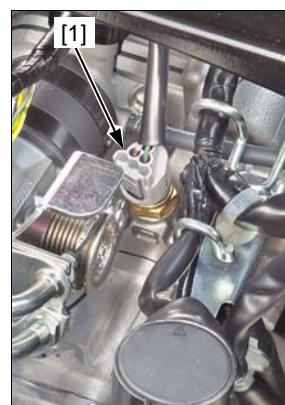
**TOOL:**

**SCS Service Connector [1] 070PZ-ZY30100**



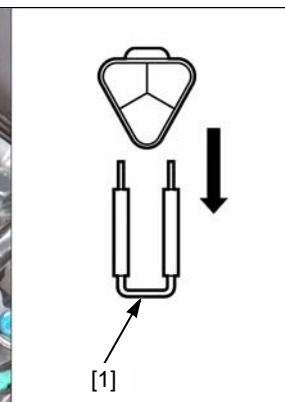
5. Disconnect the ECT sensor 3P (Gray) connector [1].  
Short the ECT sensor 3P (Gray) connector terminals of the wire harness side with a jumper wire [2].

**CONNECTION: Pink/white – Green/orange**



6. Turn the ignition switch ON with the engine stop switch at "C", then MIL will start blinking.

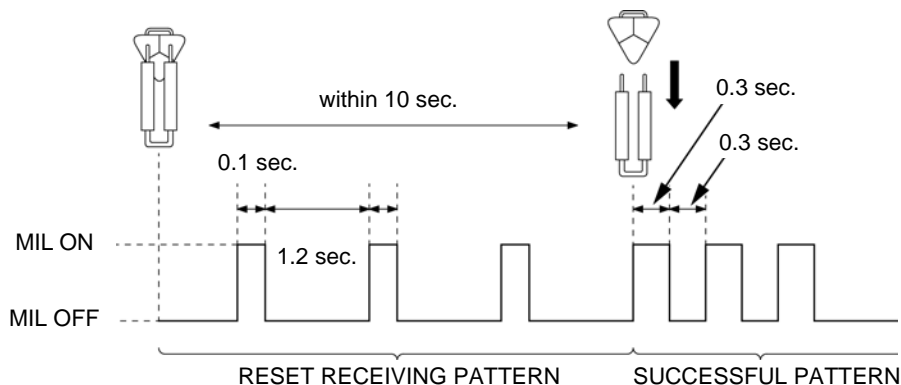
Disconnect the jumper wire [1] from the ECT sensor 3P (Gray) connector [2] while the MIL blinking (within 10 seconds).



## FUEL SYSTEM

7. After disconnection of the jumper wire, the MIL will start short blinking.  
Check if the MIL blinks.

If the MIL begins short blink (0.3 seconds), the TP sensor is reset successfully.



If the MIL remains ON, the TP sensor is not reset, repeat the reset procedure from step 1.

8. Turn the ignition switch OFF.
9. Connect the ECT sensor 3P (Gray) connector [1].
10. Disconnect the SCS connector from the DLC.
11. Install the dummy connector to the DLC.
12. Support the scooter with its centerstand.

Warm up the engine about ten minutes.

Connect the tachometer and check the idle speed.

**IDLE SPEED: 1,500 ± 100 rpm**

If the idle speed is out of the specification, check the following:

- Throttle operation and throttle grip freeplay (page 3-4)
- Intake air leak
- IACV operation (page 7-24)



## INJECTOR

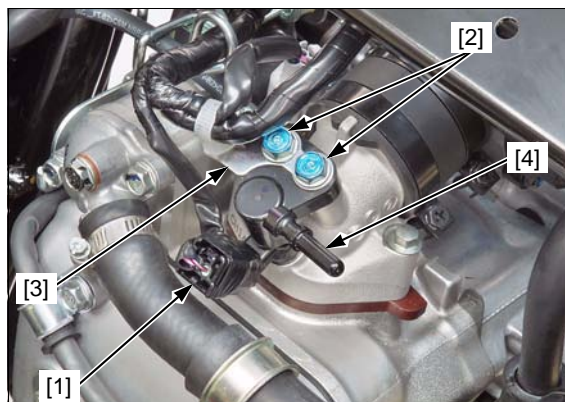
### REMOVAL

Relieve the fuel pressure and disconnect the quick connect fitting (page 7-5).

Disconnect the injector 2P (Black) connector [1].

Remove the bolts [2], main wire harness stay [3] and fuel feed pipe/injector [4].

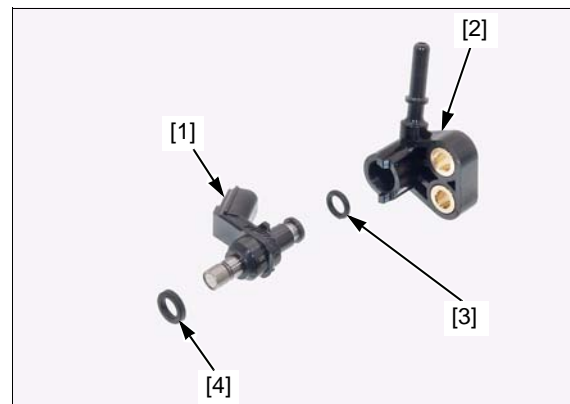
Seal the injector port with a shop towel or cover it with a piece of tape to prevent any foreign material from dropping into the engine.



Remove the following from the injector [1]:

- Fuel feed pipe [2]
- O-ring [3]
- Seal ring [4]

To prevent damage and keep foreign matter out, cover the disconnected connector and pipe end with the plastic bags.



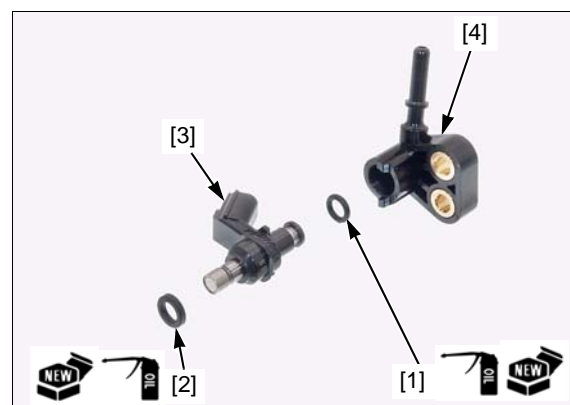
## INSTALLATION

Coat a new O-ring [1] and seal ring [2] with engine oil.

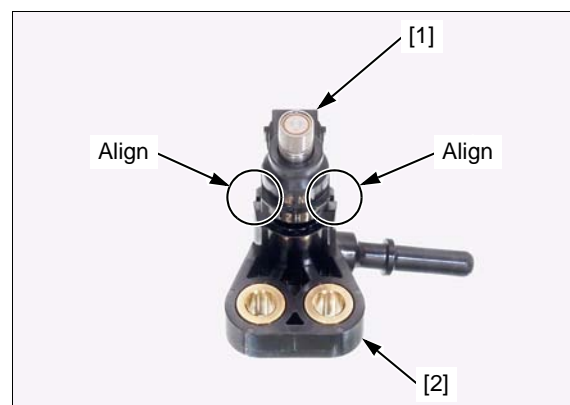
Install the O-ring and seal ring to the injector [3].

- Replace the O-ring and seal ring with new ones as a set.
- Be careful not to damage the O-ring and seal ring.

Install the injector to the fuel feed pipe [4].



Install the injector [1] into the fuel feed pipe [2], being careful not to damage the O-ring by aligning the lug of the fuel feed pipe with the connector of the injector as shown.



Install the fuel feed pipe/injector [1] to the intake pipe.

### NOTICE

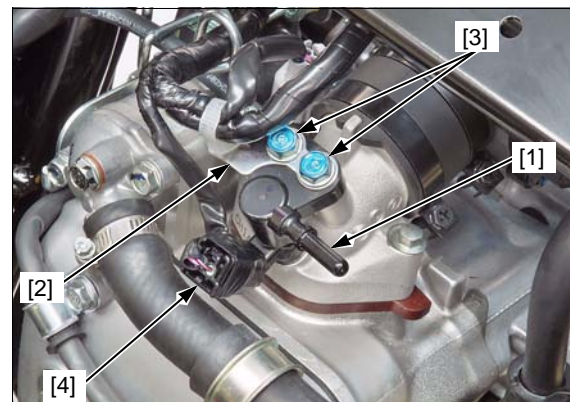
*Be careful not to allow dirt and debris to trap between the intake pipe and seal ring.*

Set the main wire harness stay [2], then install and tighten the bolts [3] to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Connect the injector 2P (Black) connector [4].

Connect the quick connect fitting to the injector (page 7-6).





### INTAKE PIPE

#### REMOVAL

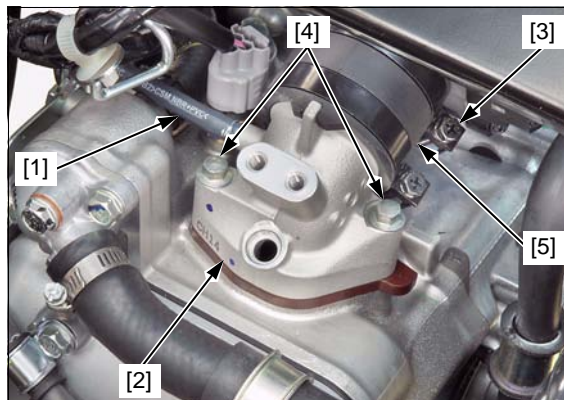
Remove the injector (page 7-18).

*AC type only:* Disconnect the EVAP purge control solenoid valve to insulator hose [1] from the intake pipe [2].

Loosen the insulator band screw [3].

Remove the following:

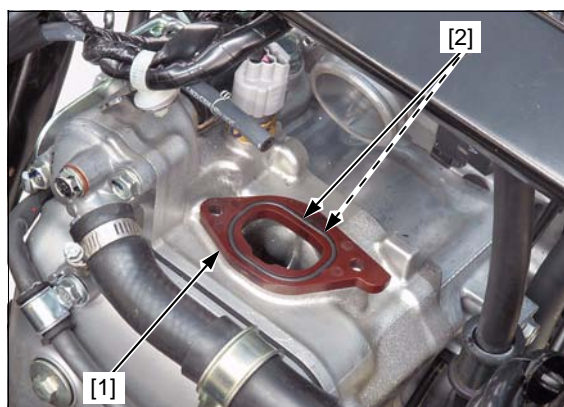
- Intake pipe mounting bolts [4]
- Intake pipe/insulator B [5]



Remove the insulator A [1] and O-rings [2].

Seal the cylinder head intake port with a shop towel or cover it with a piece of tape to prevent any foreign material from dropping into the engine.

- Seal the intake manifold port with a shop towel or cover it with a piece of tape to prevent any foreign material from dropping into the engine.



Loosen the insulator band screw [1] and remove the insulator B [2].

AC type shown:



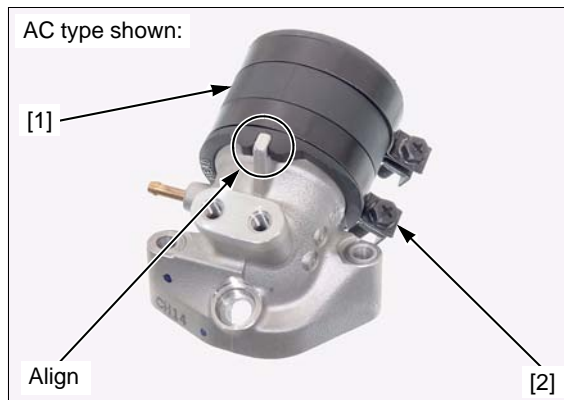
#### INSTALLATION

Install the insulator B [1] by aligning the intake pipe tab and insulator B groove.

Tighten the insulator band screw [2] to the specified torque.

**TORQUE: 5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)**

AC type shown:

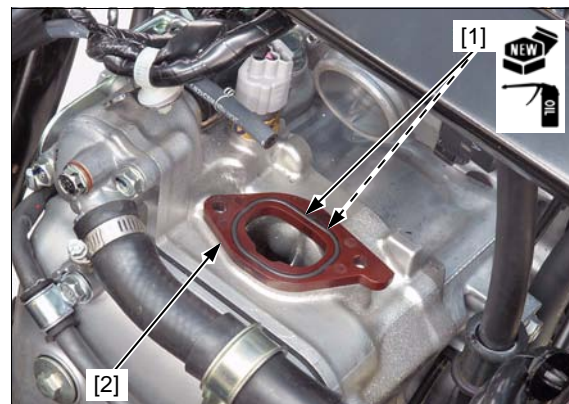




Apply engine oil to new O-rings [1].

Install the O-rings to the grooves in the insulator A [2].

Set the insulator A as shown.



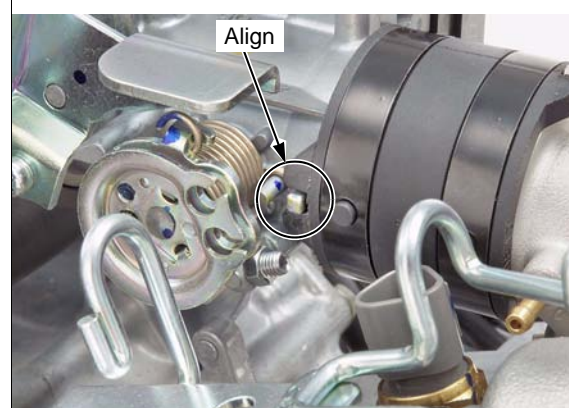
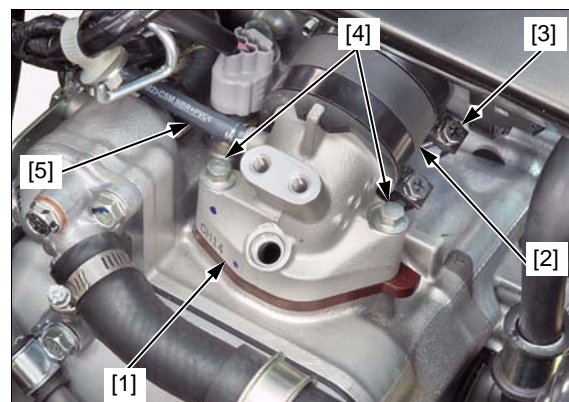
Install the intake pipe [1]/insulator B [2] by aligning the throttle body tab and insulator B groove. Tighten the insulator band screw [3] to the specified torque.

**TORQUE: 5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)**

Install and tighten the bolts [4].

*AC type only:* Connect the EVAP purge control solenoid valve to insulator hose [5].

Install the injector (page 7-19).



# FUEL PUMP RELAY

### OPERATION INSPECTION

Remove the front meter panel (page 2-4).

Turn the ignition switch ON with the engine stop switch at "O".

The fuel pump relay coil is normal if the fuel pump relay [1] clicks.

If you hear the fuel pump relay "CLICK", but fuel pump does not operate for a few seconds, inspect the following:

- Fuel pump relay function test (page 7-22)
- Fuel pump relay switch line inspection (page 7-23)
- If the above inspections are normal, replace the fuel pump with a new one, and recheck.

If you do not hear the relay "CLICK", inspect the following:

- Fuel pump relay coil line inspection (page 7-23)
- Fuel pump relay function test (page 7-22)
- if the above inspections are normal, Inspect the ECM power/ground line (page 4-30).



### FUNCTION TEST

Turn the ignition switch OFF.

Remove the fuel pump relay [1] (page 7-24).

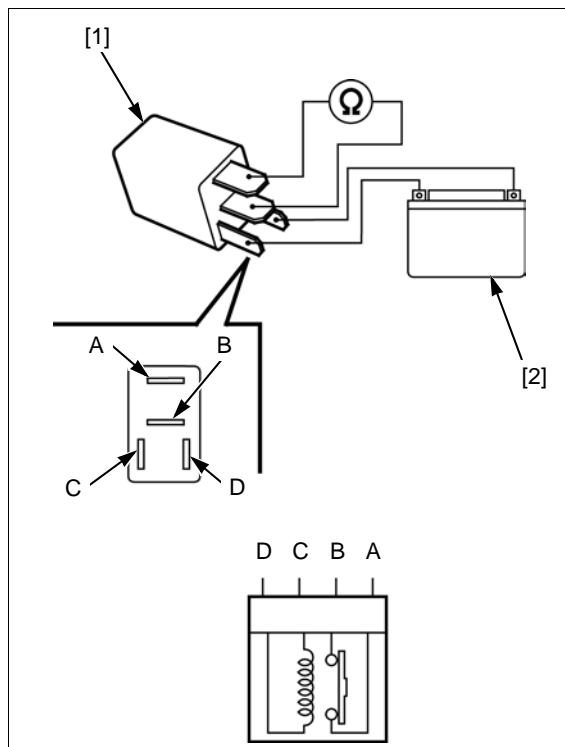
Connect the ohmmeter to the switching side relay terminals.

#### CONNECTION: A – B

Connect the 12 V battery [2] to the coil side relay terminals.

#### CONNECTION: C (+) – D (–)

There should be continuity between the relay terminals while the battery is connected, and no continuity when the battery is disconnected.



## SWITCH LINE INSPECTION

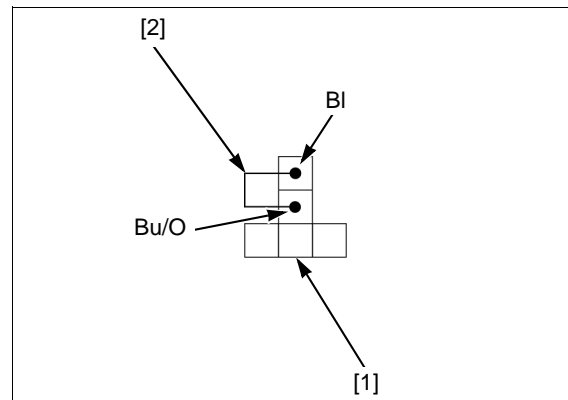
Turn the ignition switch OFF.

Disconnect the fuel pump 5P connector (page 7-5).

Remove the fuel pump relay (page 7-24).

Short the relay connector [1] terminals of the wire harness side with a jumper wire [2].

**CONNECTION: Black – Blue/orange**



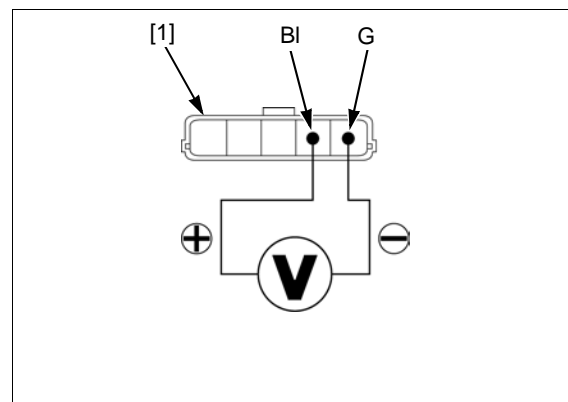
Measure the voltage at the fuel pump 5P connector [1] of the wire harness side.

**CONNECTION: Black (+) – Green (–)**

If the battery voltage appears, the fuel pump relay switch line is normal.

If the battery voltage does not appear, inspect the following:

- Open circuit in Blue/orange wire between the fuse box A and fuel pump relay
- Open circuit in Black wire between the fuel pump relay and fuel pump
- Open circuit in Green wire between the fuel pump 5P connector and ground.



## COIL LINE INSPECTION

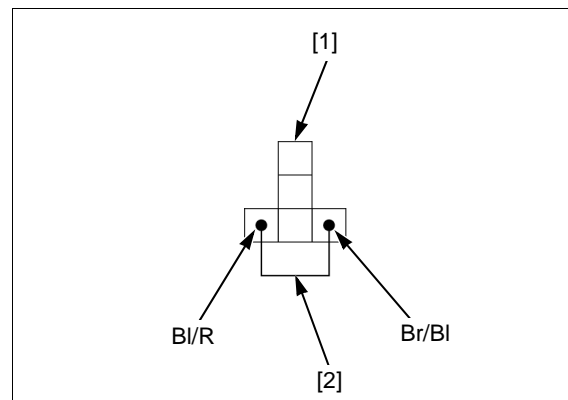
- Check the ignition switch before starting the inspection (page 22-17).

Turn the ignition switch OFF.

Remove the fuel pump relay (page 7-24).

Short the relay connector [1] terminals of the wire harness side with a jumper wire [2].

**CONNECTION: Black/red – Brown/black**



## FUEL SYSTEM

Disconnect the ECM 33P (Black) connector (page 4-31).

Turn the ignition switch ON.

Measure the voltage between the ECM 33P (Black) connector [1] of the wire harness side and ground.

**CONNECTION: Brown/black (+) – Ground (–)**

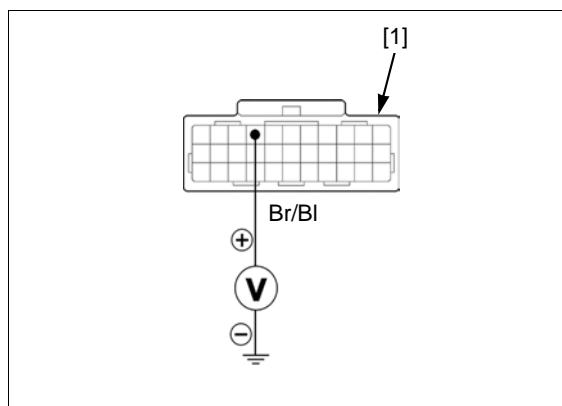
**TOOL:**

**Pin Probe Male (2 pack)                      07ZAJ-RDJA110**

If the battery voltage appears, the fuel relay coil line is normal.

If the battery voltage does not appear, inspect the following:

- Open circuit in Black/red wire between the ignition switch and fuel pump relay
- Open circuit in Brown/black wire between the fuel pump relay and ECM



## REMOVAL/INSTALLATION

Remove the front meter panel (page 2-4).

Remove the fuel pump relay [1] from the relay connector.

Installation is in the reverse order of removal.



## IACV

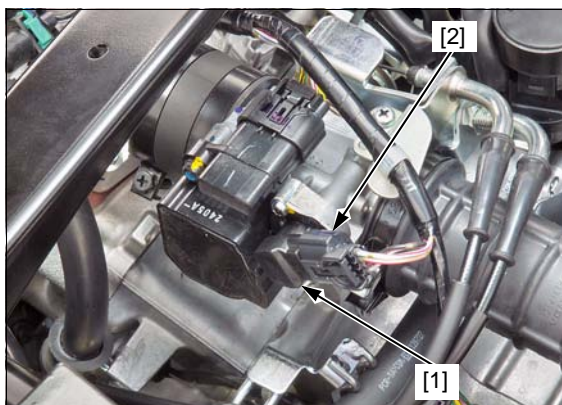
### REMOVAL/INSPECTION

Remove the luggage box (page 2-21).

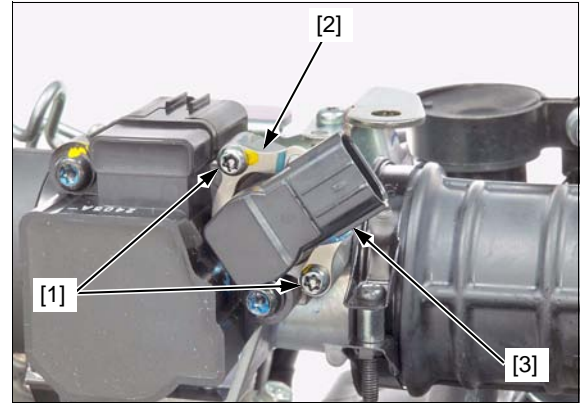
The IACV [1] is installed on the throttle body and is operated by the step motor. When the ignition switch is turned "ON", the IACV operates for a few seconds.

Check the step motor operating (beep) sound with the ignition switch turned ON and engine stop switch "O".

Disconnect the IACV 4P (Black) connector [2].



Remove the IACV setting plate torx screws [1], setting plate [2] and IACV [3].

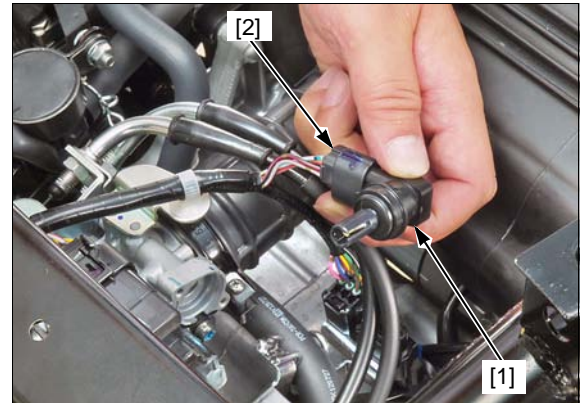


Check the IACV [1] for wear or damage.

The IACV operation can be checked visually as follows:

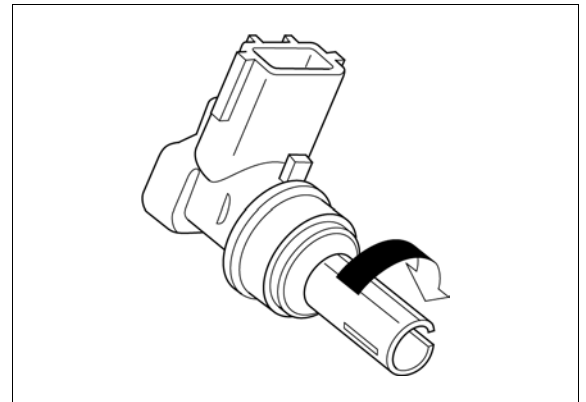
1. Connect the IACV 4P (Black) connector [2].
2. Turn ignition switch ON and engine stop switch "O", check the IACV operation.

Disconnect the IACV 4P (Black) connector.

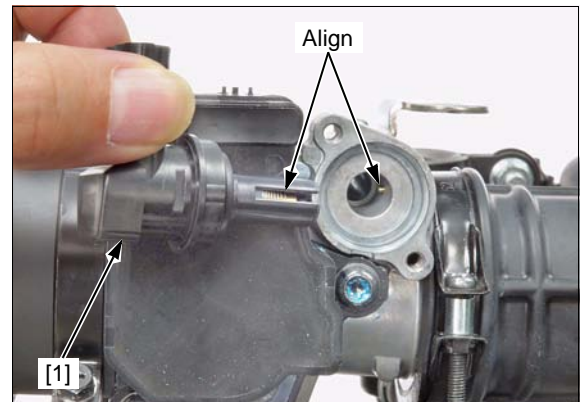


## INSTALLATION

Turn the slide valve clockwise until lightly seated on IACV.



Install the IACV [1] by aligning its groove with the slide valve housing pin.



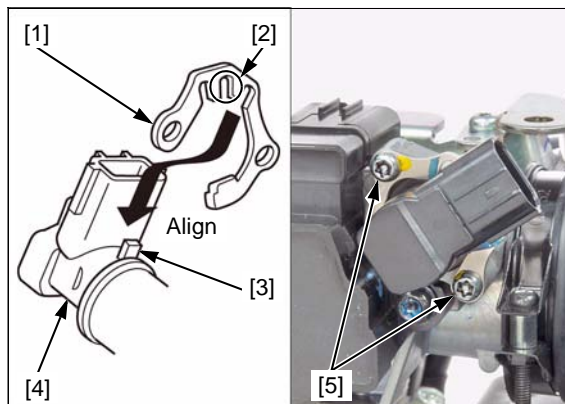


## FUEL SYSTEM

Install the setting plate [1] while aligning its cut-out [2] with the tab [3] on the IACV [4].

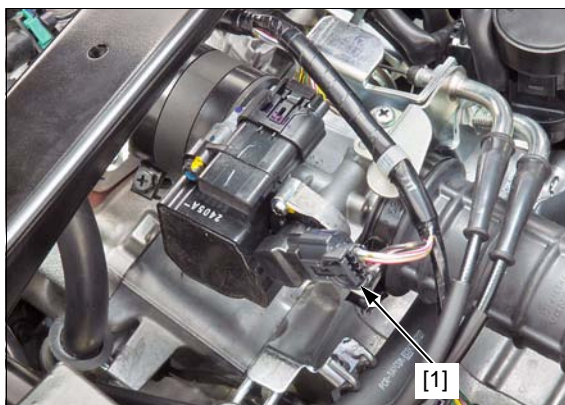
Install and tighten the IACV setting plate torx screws [5] to the specified torque.

**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**



Connect the IACV 4P (Black) connector [1].

Install the luggage box (page 2-21).



## SECONDARY AIR SUPPLY SYSTEM

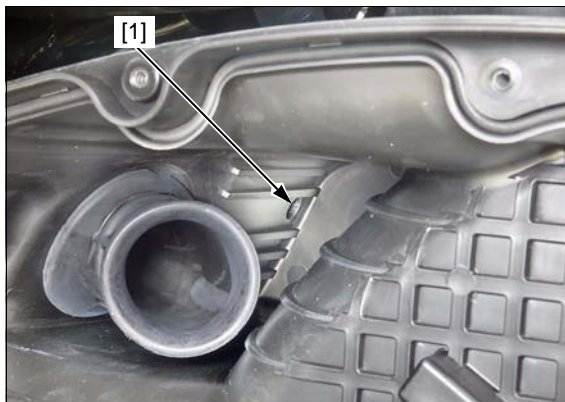
### SYSTEM INSPECTION

Support the scooter with its centerstand.  
Warm up the engine about ten minutes.  
Stop the engine.

Remove the air cleaner element (page 3-5).

Check that the air supply hose port [1] of air cleaner is clean and free of carbon deposits.

If the port is carbon fouled, check the PAIR check valve (page 7-27).



### PAIR CONTROL SOLENOID VALVE

#### REMOVAL/INSTALLATION

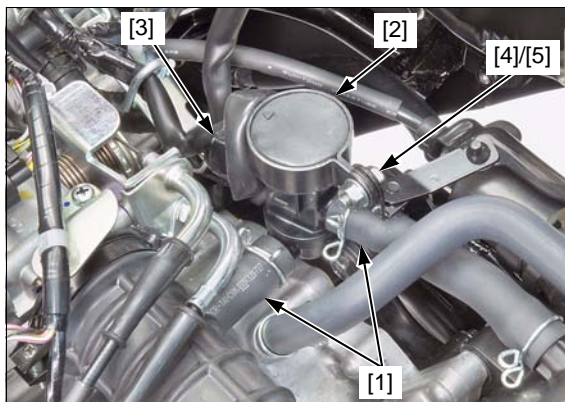
Remove the luggage box (page 2-21).

Disconnect the air supply hoses [1] from the solenoid valve [2].

Disconnect the PAIR control solenoid valve 2P (Black) connector [3].

Remove the bolt [4], nut [5] and solenoid valve from stay.

Installation is in the reverse order of removal.

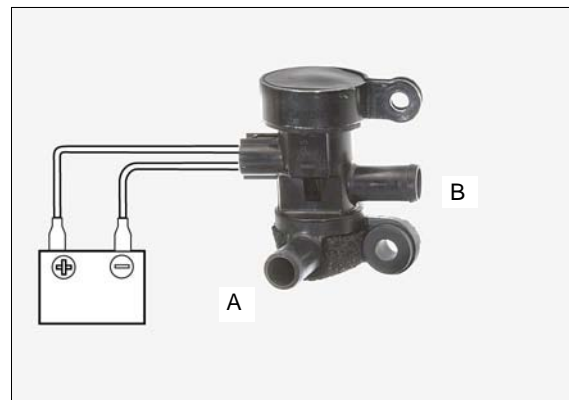


### INSPECTION

Check air flow from A to B. Air should flow.

Connect the 12 V battery to the solenoid valve side 2P connector terminals.

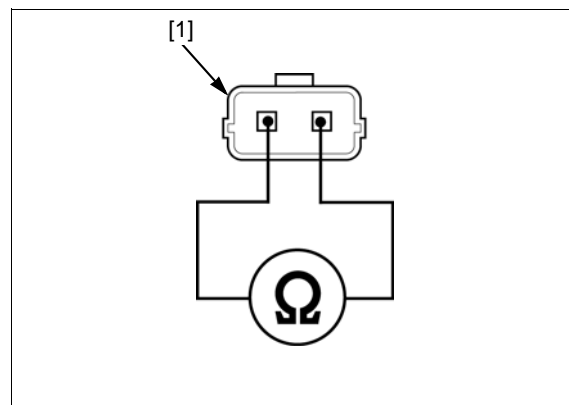
Air should not flow from A to B when the battery is connected.



Measure the resistance between the solenoid valve side 2P connector [1] terminals.

**STANDARD: 20 – 24  $\Omega$  (20°C/68°F)**

If it is out of the standard, replace the PAIR control solenoid valve.

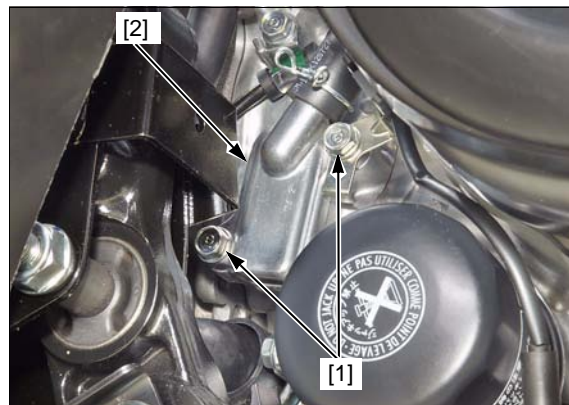


### PAIR CHECK VALVE

#### INSPECTION

Remove the luggage box (page 2-21).

Remove the bolts [1] and PAIR check valve cover [2].



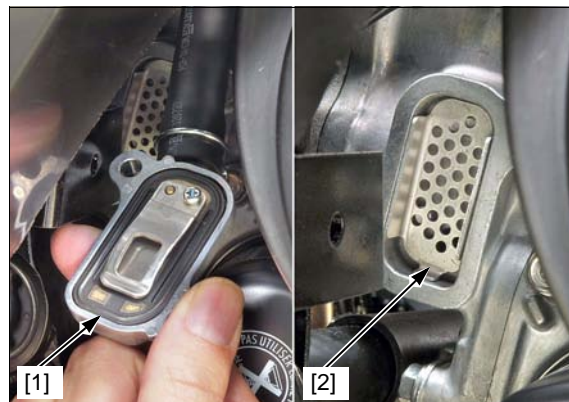
Remove the check valve [1] and setting plate [2] from the cylinder.

Check the reed valve for damage or fatigue. Replace if necessary.

Replace the PAIR check valve if the rubber seat is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.

Installation is in the reverse order of removal.

- Install the setting plate as shown.



# EVAP PURGE CONTROL SOLENOID VALVE/EVAP CANISTER (AC TYPE ONLY)

## REMOVAL/INSTALLATION

### EVAP PURGE CONTROL SOLENOID VALVE

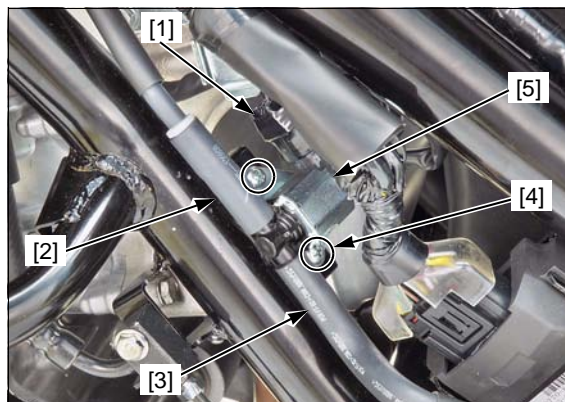
Remove the right floor step (page 2-15).

Disconnect the following:

- EVAP purge control solenoid valve 2P (Black) connector [1]
- EVAP purge control solenoid valve to intake pipe hose [2]
- EVAP canister to EVAP purge control solenoid valve hose [3]

Remove the screws [4] and EVAP purge control solenoid valve [5].

Installation is in the reverse order of removal.



### EVAP CANISTER

Remove the right floor step.

Disconnect the following:

- EVAP canister to EVAP purge control solenoid valve hose [1]
- Fuel tank breather hose [2]

Release the EVAP air inlet hose [3] from the clamp [4].

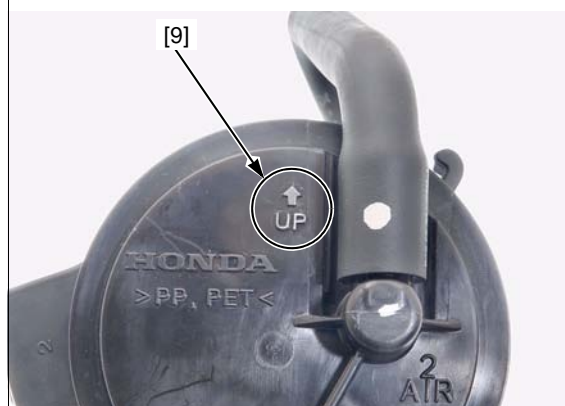
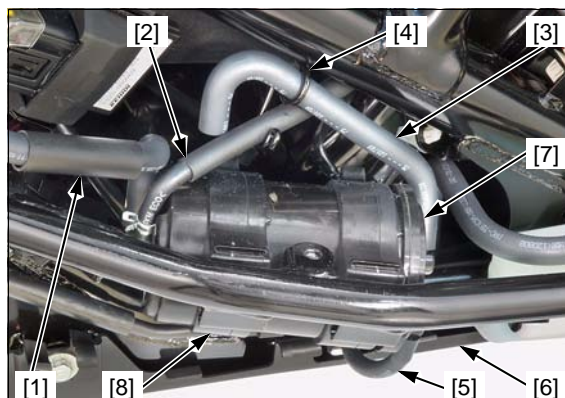
Release the EVAP canister drain hose [5] from the under cover [6].

Remove the EVAP canister [7] from the frame.

If necessary, remove the EVAP air inlet hose, EVAP canister drain hose and rubbers [8] from the EVAP canister.

Installation is in the reverse order of removal.

- Install the EVAP canister with its arrow mark [9] facing up.
- Route the hoses properly (page 1-18).





**INSPECTION**

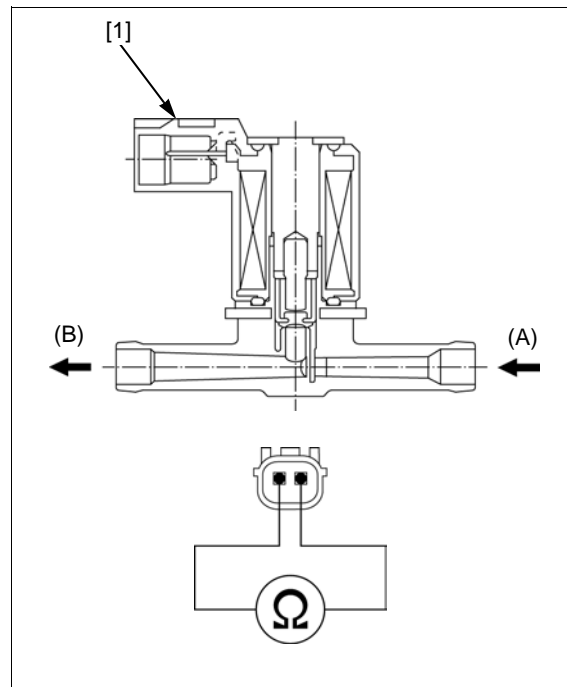
Remove the EVAP purge control solenoid valve [1] (page 7-28).

Check that air should flow A to B, only when a 12 V battery is connected to the EVAP purge control solenoid valve terminals.

Check the resistance between the terminals of the EVAP purge control solenoid valve.

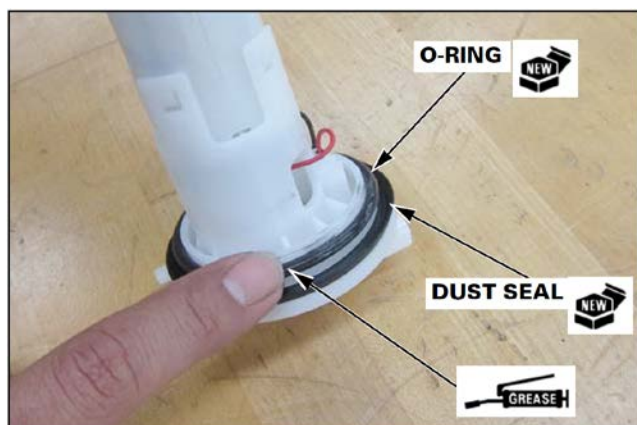
**STANDARD: 30 – 34  $\Omega$  (20°C/68°F)**

If the resistance is out of specification, replace the EVAP purge control solenoid valve.

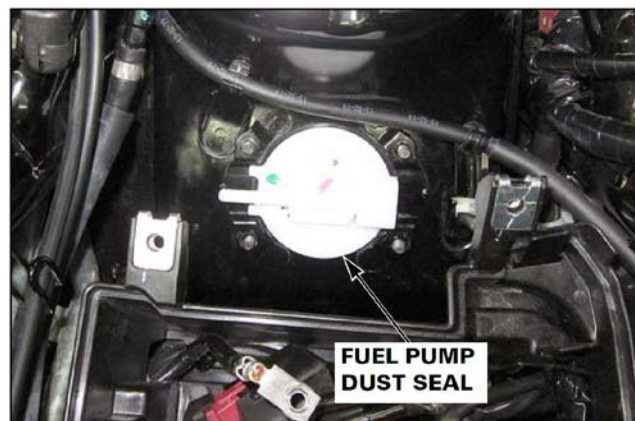


### NSS300/A (Forza) Fuel Pump Replacement tips.

- Prior to removing the original fuel pump, place a large drain pan under the fuel tank area of the scooter.
- When draining the fuel tank with a fluid evacuator, use a small hose (3/8 in O.D.) to remove all the fuel from the fuel tank. Do not use a large hose as the fuel level sensor may be damaged by the hose.
- Apply a very thin layer of multi-purpose grease to the bottom and outer edge of the new O-ring to allow it to slip evenly into the channel on the fuel tank during installation.



- Center the pump assembly over the fuel tank opening and gently align it with the opening until the dust seal is perfectly square with the tank face and centered with the opening.
- Firmly push the fuel pump into the opening until it bottoms evenly all around the base. Release the fuel pump.



- ❖ If the fuel pump stays seated into the fuel tank, it is properly installed. Install the retainers and nuts, and then tighten the fuel pump retainer nuts to the specified torque and in the sequence shown in the Service Manual.
- ❖ If the fuel pump pops out or does not seat correctly, the O-ring has buckled and slipped out of the tank groove. Remove the pump and then place the O-ring back up onto the shoulder of the fuel pump. Continue inserting the pump until it seats into the fuel tank squarely.

Verify the installation by adding fuel to the fuel tank and inspect for fuel leaks. If the fuel pump flange leaks, perform the installation again and test until the pump flange seals the fuel tank.

- If there are no leaks, continue the fuel pump installation as shown in the Service Manual.

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## MEMO

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# 8. LUBRICATION SYSTEM

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SERVICE INFORMATION .....	8-2	OIL STRAINER .....	8-6
TROUBLESHOOTING .....	8-3	OIL PRESSURE RELIEF VALVE .....	8-6
LUBRICATION SYSTEM DIAGRAM .....	8-4	REED VALVE .....	8-7
OIL PRESSURE CHECK .....	8-5	OIL PUMP .....	8-8

# SERVICE INFORMATION

## GENERAL

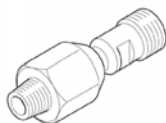
### ⚠ CAUTION

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.

- The oil pump can be serviced with the engine installed in the frame.
- 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.
- For engine oil level check (page 3-9).
- For engine oil information (page 3-10).
- For engine oil filter change information (page 3-11).
- For oil pressure indicator inspection (page 22-16).
- After the oil pump has been installed, check that there are no oil leaks and that oil pressure is correct.

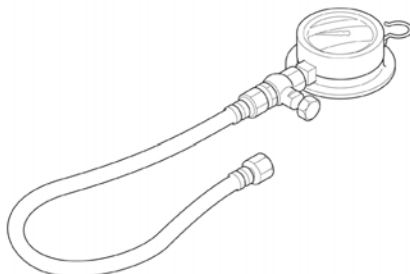
## TOOLS

Oil Pressure Gauge Attachment  
07406-0030000



or AT77 (Snap-on) or equivalent  
commercially available in U.S.A.

Oil Pressure Gauge  
07506-3000001



or equivalent commercially available in  
U.S.A.

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## TROUBLESHOOTING

### Engine oil level too low, high oil consumption

- Oil consumption
- External oil leak
- Worn piston rings or incorrect piston ring installation (page 11-5)
- Worn cylinder (page 11-4)
- Worn valve guide or stem seal (page 10-12)

### Low oil pressure

- Oil level low
- Clogged oil strainer
- Faulty oil pump
- 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 and driven sprocket
- Damaged oil pump
- Internal oil leak

### High oil pressure

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

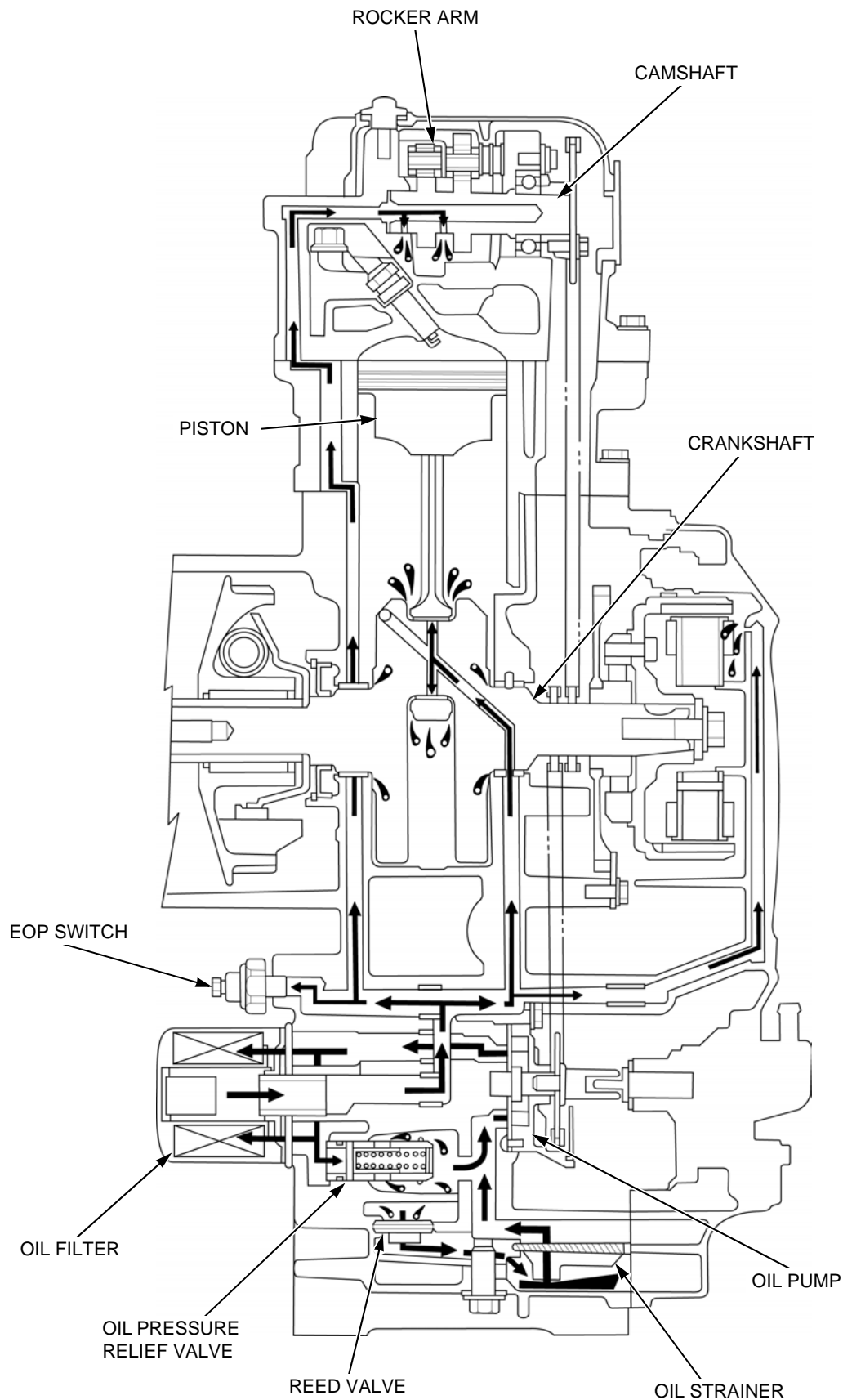
### Oil contamination

- Oil or filter not changed often enough
- Faulty cylinder head gasket
- Worn piston rings or incorrect piston ring installation (page 11-5)
- Worn valve guide or stem seal (page 10-12)

### Oil emulsification

- Blown cylinder head gasket
- Worn or damaged water pump mechanical seal
- Water entry

## LUBRICATION SYSTEM DIAGRAM

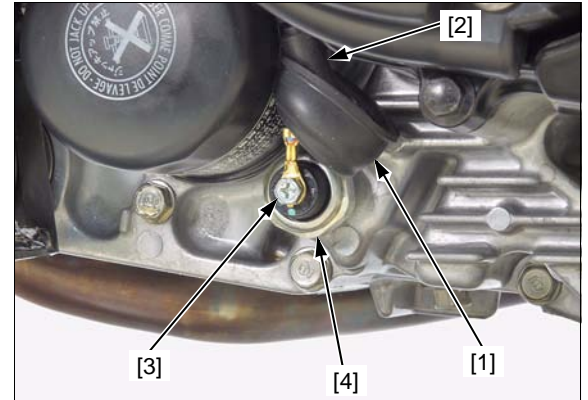


## OIL PRESSURE CHECK

If the engine is cold, the pressure reading will be abnormally high. Warm up the engine to normal operating temperature before starting this test. Stop the engine.

Slide the rubber cap [1] off and disconnect the EOP switch wire [2] by removing the terminal screw [3].

Remove the EOP switch [4].



Connect an oil pressure gauge attachment [1] and gauge [2] to the pressure switch hole.

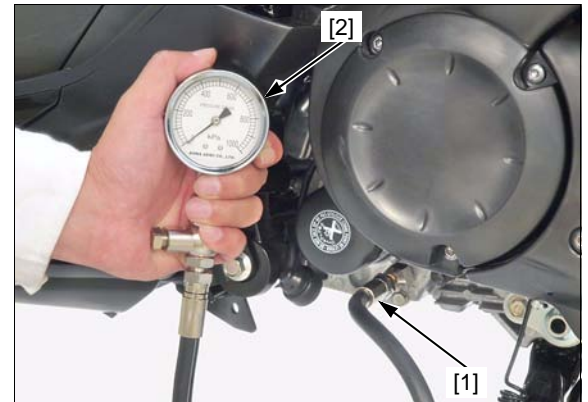
### TOOLS:

**Oil Pressure Gauge**

**07506-3000001 or equivalent commercially available in U.S.A.**

**Oil Pressure Gauge Attachment**

**07406-0030000 or AT77 (Snap-on) or equivalent commercially available in U.S.A.**



Check the oil level and add the recommended oil if necessary (page 3-9).

Start the engine and check the oil pressure at 5,000 rpm.

### OIL PRESSURE:

**530 kPa (5.4 kgf/cm<sup>2</sup>, 77 psi) at 5,000 rpm (80°C/176°F)**

Stop the engine.

*Do not apply sealant to the thread head 3 – 4 mm (0.1 – 0.2 in).*

Apply sealant to the EOP switch threads [1] as shown and tighten it to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

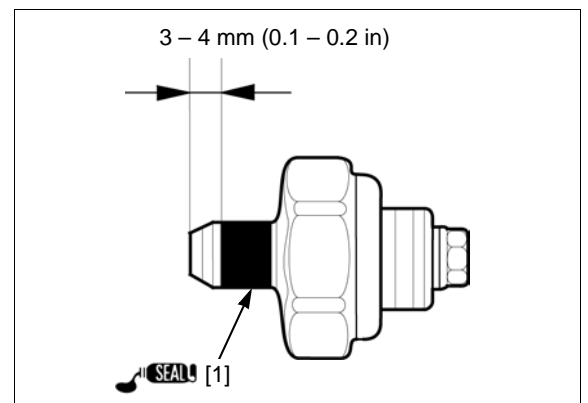
Connect the EOP switch wire and tighten the terminal screw to the specified torque.

**TORQUE: 1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)**

Install the rubber cap.

Start the engine.

Check that the oil pressure indicator turns off after 1 or 2 seconds. If the oil pressure indicator stays on, stop the engine immediately and determine the cause (page 22-16).





### OIL STRAINER

#### REMOVAL/INSTALLATION

Remove the right crankcase cover (page 14-4).

Remove the oil strainer [1] and screen mesh [2].

Clean the screen mesh with non-flammable or high flash point solvent and wipe it dry.

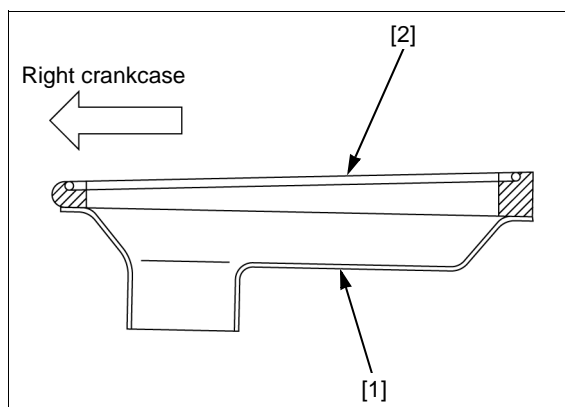
Check the screen mesh for damage or clogs.



Install the oil strainer [1] and screen mesh [2] into the right crankcase as shown.

Install the right crankcase cover (page 14-5).

Fill the engine with the recommended oil (page 3-9).



### OIL PRESSURE RELIEF VALVE

#### REMOVAL/INSTALLATION

Separate the crankcase (page 15-4).

Remove the oil pressure relief valve [1] and O-ring [2] from the left crankcase.

Coat a new O-ring with engine oil and install it to the oil pressure relief valve.

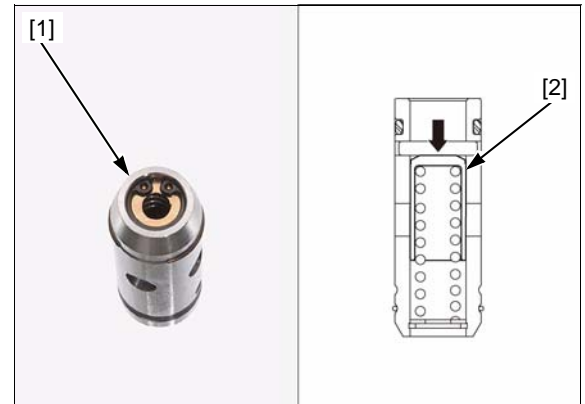
Install the oil pressure relief valve into the left crankcase.

Assemble the crankcase (page 15-14).



## DISASSEMBLY/INSPECTION/ASSEMBLY

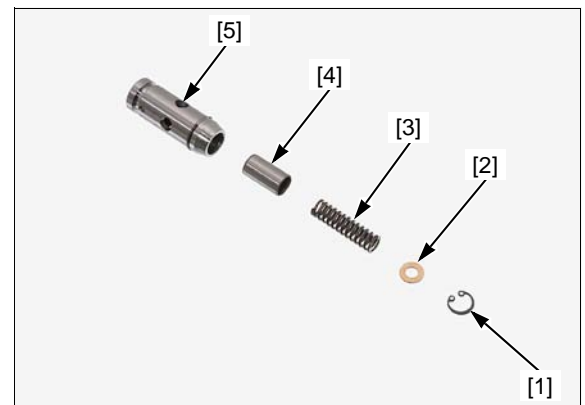
Check the operation of the oil pressure relief valve [1] by pushing on the piston [2].



*The snap ring is under spring pressure. Use care when removing it and wear eye and face protection.*

Remove the snap ring [1], washer [2], spring [3] and piston [4] from the oil pressure relief valve body [5].

Check the piston for wear, sticking or damage.  
Check the spring for fatigue or damage.  
Check the relief valve for clogging or damage.



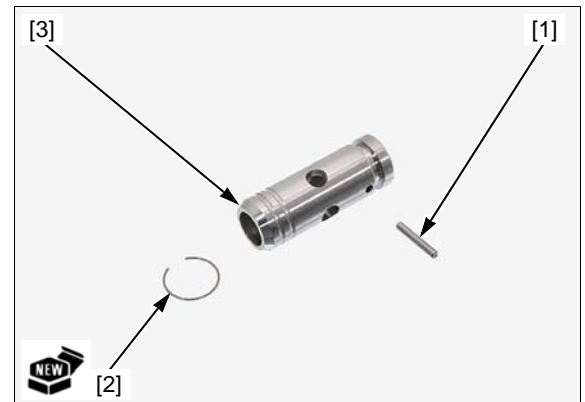
Remove the pin [1] and clip [2] from the relief valve [3].

Check the pin and clip for bend or wear.

Once the clip is removed from the relief valve, replace it with a new one.

Clean all parts and assemble the relief valve in the reverse order of disassembly.

- Install the snap ring with the chamfered edge facing the thrust load side.
- Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap ring is seated in the groove.



## REED VALVE

### REMOVAL/INSPECTION/INSTALLATION

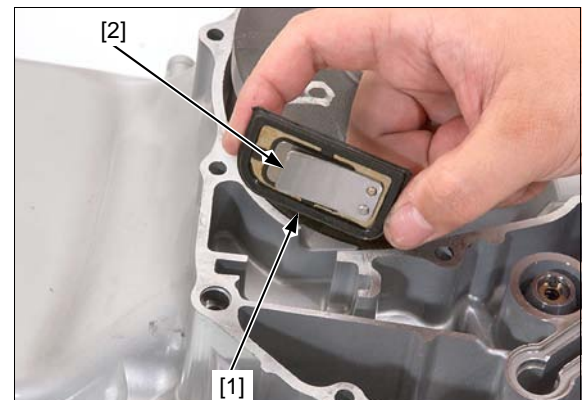
Separate the crankcase (page 15-4).

Remove the reed valve [1] from the left crankcase.

Check the reed valve for wear or damage.

Install the reed valve into the left crankcase with its valve plate [2] facing the bottom of crankcase.

Assemble the crankcase halves (page 15-14).



### OIL PUMP

#### REMOVAL

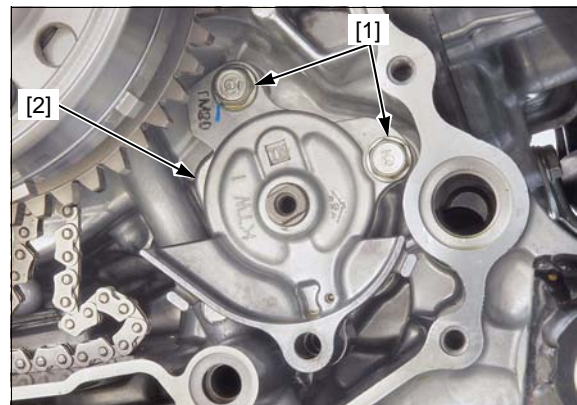
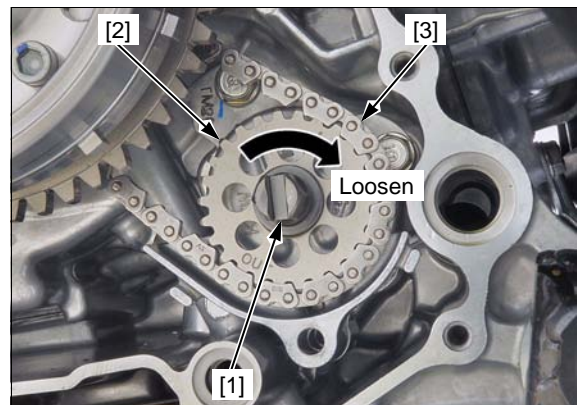
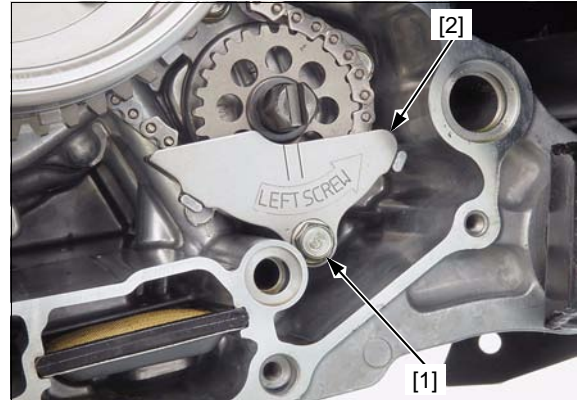
Remove the right crankcase cover (page 14-4).

Remove the following:

- Bolt [1]
- Sprocket cover [2]

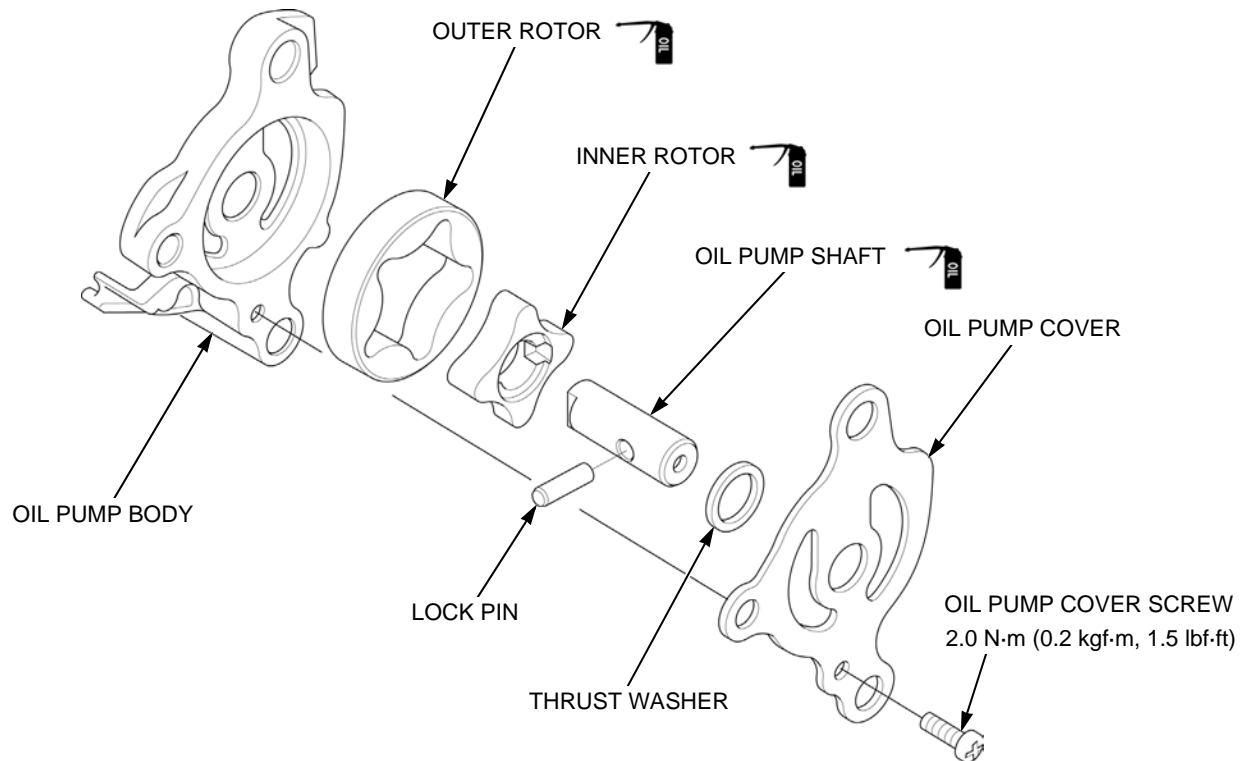
*The oil pump driven sprocket bolt has left-hand threads.*

- Oil pump driven sprocket bolt [1]
  - Driven sprocket [2]
  - Drive chain [3]
- 
- Bolts [1]
  - Oil pump assembly [2]



## DISASSEMBLY

After disassembly, wash all parts with a high flash point or non-flammable solvent.



## INSPECTION

Inspect the following parts for damage, abnormal wear, deformation or burning.

- Oil pump driven sprocket
- Oil pump shaft
- Lock pin
- Inner rotor
- Outer rotor
- Oil pump body
- Thrust washer
- Oil pump cover

Measure the oil pump clearances according to LUBRICATION SYSTEM SPECIFICATIONS (page 1-6).

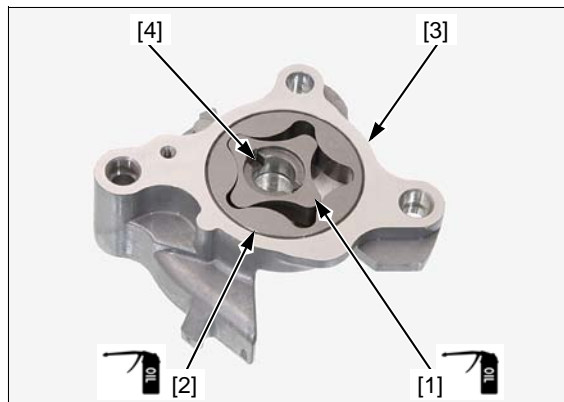
If any of the measurement is out of the service limit, replace the oil pump as an assembly.

## LUBRICATION SYSTEM

### ASSEMBLY

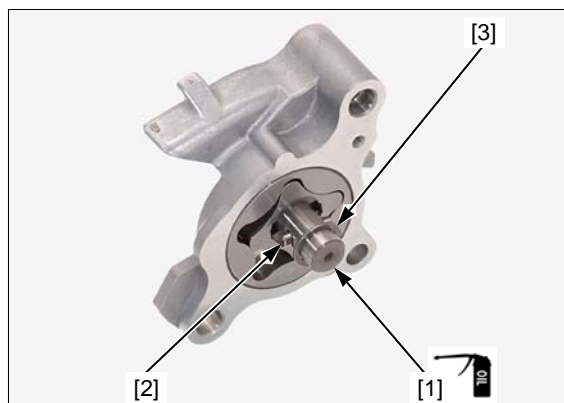
Apply engine oil to the inner [1] and outer rotor [2] sliding surface.

Install the outer rotor into the oil pump body [3].  
Install the inner rotor into the outer rotor with its lock pin groove [4] facing the oil pump cover.



Apply engine oil to the oil pump shaft [1] sliding surface and insert the lock pin [2] into the hole in the oil pump shaft.

Install the oil pump shaft through the inner rotor and oil pump body by align the lock pin with the groove in the inner rotor.  
Install the thrust washer [3].



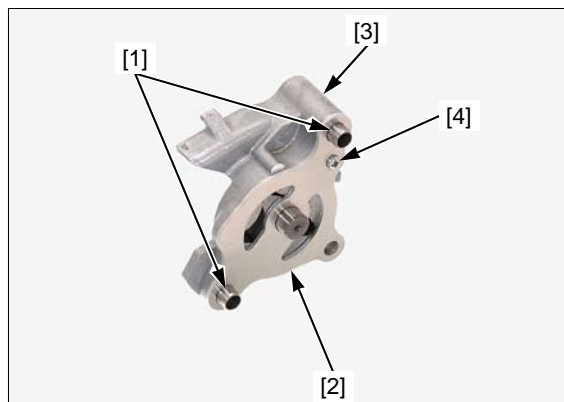
Install the dowel pins [1].

Install the oil pump cover [2] onto the oil pump body [3] by aligning the dowel pins on the body and hole of the cover.

Install and tighten the oil pump cover screw [4] to the specified torque.

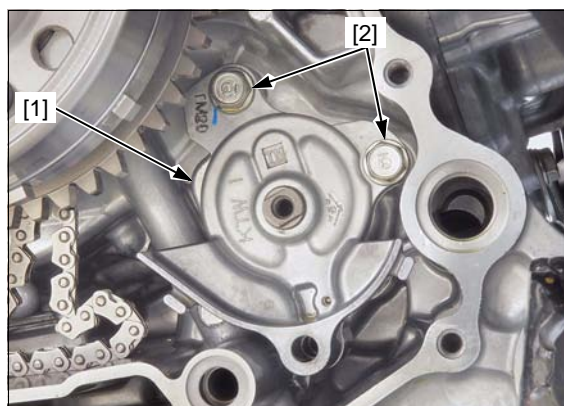
**TORQUE: 2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)**

Check that the oil pump shaft turns smoothly.



### INSTALLATION

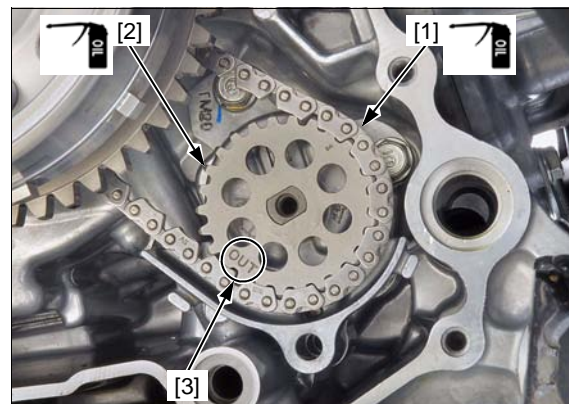
Install the oil pump assembly [1] onto the right crankcase by aligning the dowel pins with the bolt holes and tighten the bolts [2].





Apply engine oil to the drive chain [1] and the driven sprocket teeth [2].

Set the drive chain over the driven sprocket with its "OUT" mark [3] facing out, and install the sprocket and chain while aligning the flat surfaces of the sprocket and pump shaft.

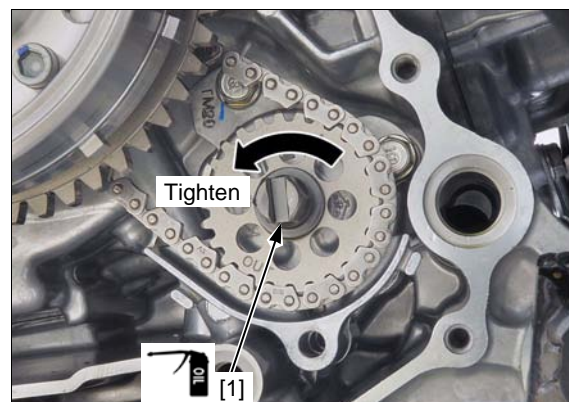


Apply engine oil to the threads and seating surface of the oil pump driven sprocket bolt [1].

*The oil pump driven sprocket bolt has left-hand threads.*

Install and tighten the oil pump driven sprocket bolt to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

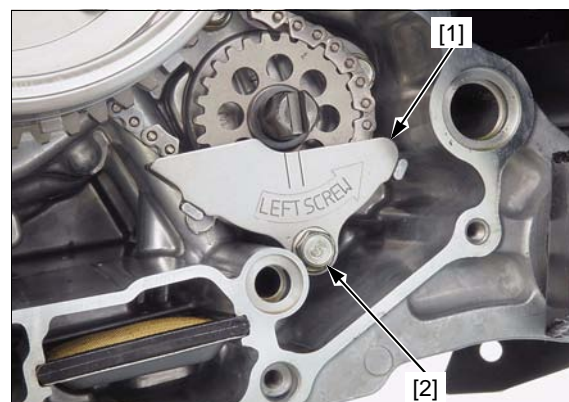


Install the sprocket cover [1] and tighten the bolt [2].

Install the right crankcase cover (page 14-5).

After installation, fill the crankcase with the recommended oil (page 3-9) and check that there are no oil leaks.

Check the oil pressure (page 8-5).



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## MEMO

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SERVICE INFORMATION .....	9-2	THERMOSTAT .....	9-7
TROUBLESHOOTING .....	9-3	WATER PUMP .....	9-8
SYSTEM FLOW PATTERN .....	9-4	RADIATOR .....	9-11
SYSTEM TESTING .....	9-5	RADIATOR RESERVE TANK .....	9-12
COOLANT REPLACEMENT .....	9-5	FAN CONTROL RELAY .....	9-13



SERVICE INFORMATION

GENERAL

 **WARNING**

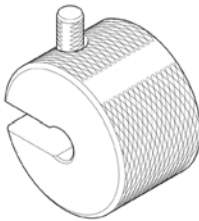

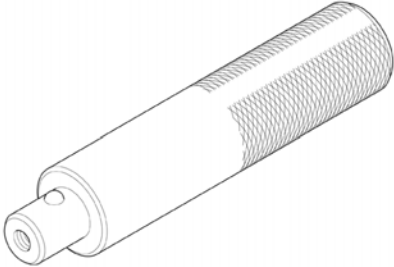
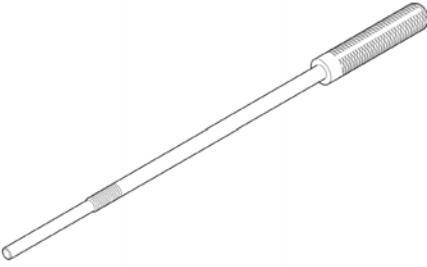
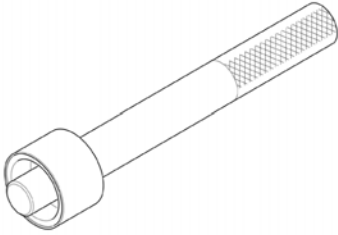
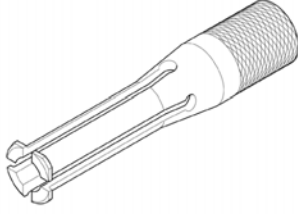
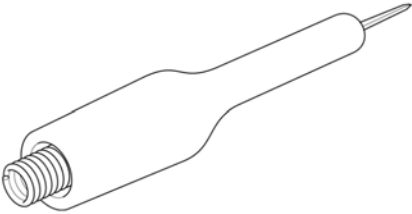
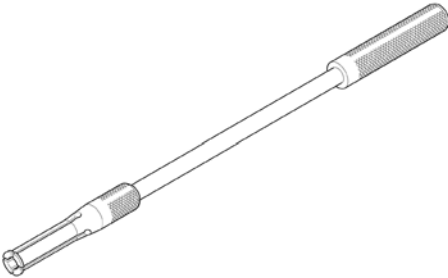
Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

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 in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- For coolant temperature gauge/ECT sensor information (page 22-15).

TOOLS

<div>Remover Weight 07741-0010201</div> <div></div> <div>or 07936-371020A (U.S.A. only) or 07936-3710200 (U.S.A. only)</div>	<div>Attachment, 24 x 26 mm 07746-0010700</div> <div></div>	<div>Driver 07749-0010000</div> <div></div>
<div>Remover Shaft, 15 mm 07936-KC10100</div> <div></div> <div>or 07YMC-001010A (U.S.A. only)</div>	<div>Oil Seal Driver 34 07PMD-KBP0100 (Not available in U.S.A.)</div> <div></div> <div>or 07PMD-KPBA100 used with 07965-415000A (U.S.A. only)</div>	<div>Bearing Remover Head 14 07WMC-KFG0100</div> <div></div> <div>or 07936-KC10200</div>
<div>Pin Probe Male (2 pack) 07ZAJ-RDJA110</div> <div></div>	<div>Bearing Remover Shaft, 15 mm 07936-KC10500</div> <div></div>	

## TROUBLESHOOTING

### Engine temperature too high

- Insufficient coolant
- Air in system
- Faulty radiator cap
- Thermostat stuck closed
- Passage blocked in radiator, hoses or water jacket
- Faulty water pump
- Faulty fan control relay
- Faulty cooling fan motor and/or its circuit
- Faulty ECT sensor and/or its circuit (page 22-15)

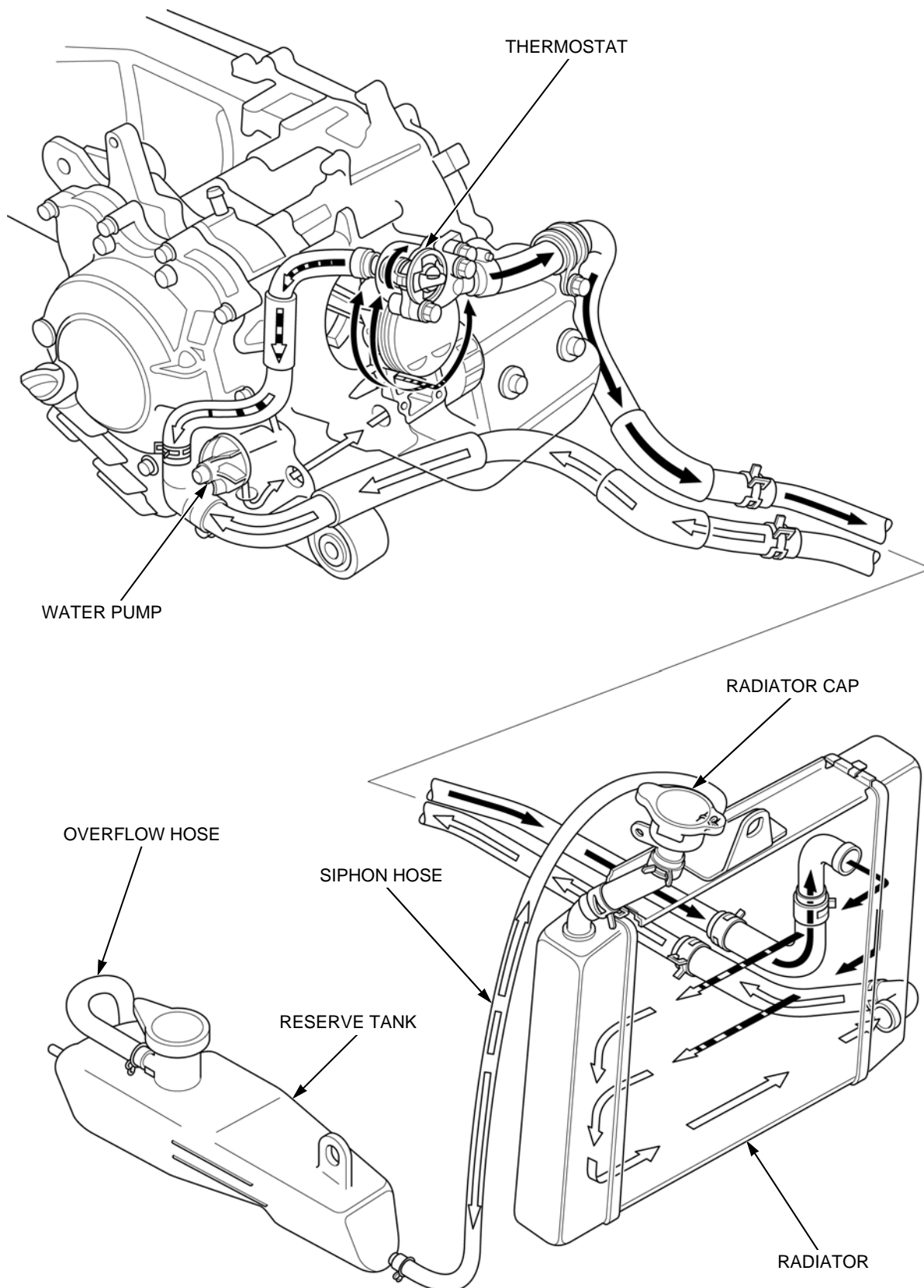
### Engine temperature too low

- Thermostat stuck open
- Faulty cooling fan motor and/or its circuit
- Faulty ECT sensor and/or its circuit (page 22-15)
- Faulty fan control relay

### Coolant leaks

- Faulty water pump mechanical seal
- Deteriorated O-rings
- Damaged or deteriorated seals and gaskets
- Faulty radiator cap
- Loose hose connection or clamp
- Damaged or deteriorated hoses

## SYSTEM FLOW PATTERN



## SYSTEM TESTING

### RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the following:

- Right side body cover (page 2-14)
- Right front side body cover (page 2-14)

Remove the radiator cap [1].



Wet the sealing surfaces of the radiator cap [1], then install it onto tester [2].

Pressurize the radiator cap using the tester. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold the specified pressure for at least 6 seconds.

#### RADIATOR CAP RELIEF PRESSURE:

**107.9 kPa (1.10 kgf/cm<sup>2</sup>, 16 psi)**

Pressure test the radiator, engine and hoses, and check for leaks.

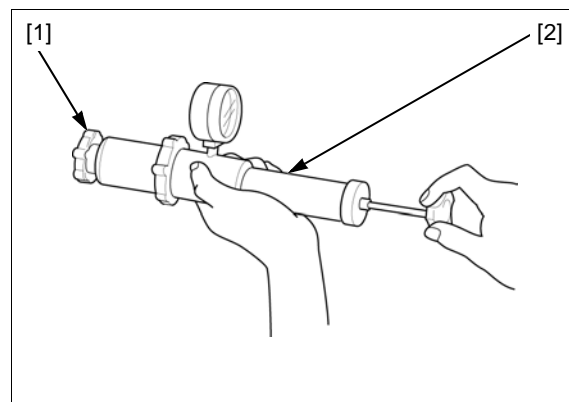
#### NOTICE

*Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm<sup>2</sup>, 20 psi).*

Repair or replace components if the system will not hold the specified pressure for at least 6 seconds.

Remove the tester and install the radiator cap.

Install the removed parts in the reverse order of removal.



## COOLANT REPLACEMENT

### REPLACEMENT/AIR BLEEDING

*The engine must be cool before servicing the cooling system.*

Place the scooter on its centerstand on a level surface.

Remove the following:

- Radiator cap (page 9-5)
- Floor mat (page 2-5)
- Left floor skirt (page 2-6)

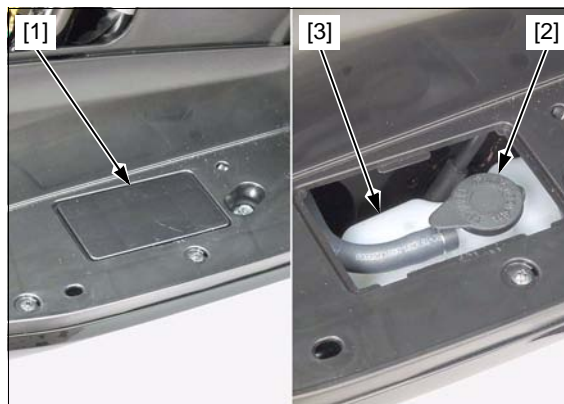
Drain the coolant from the system by removing the drain bolt [1] and sealing washer [2].



[1]/[2]

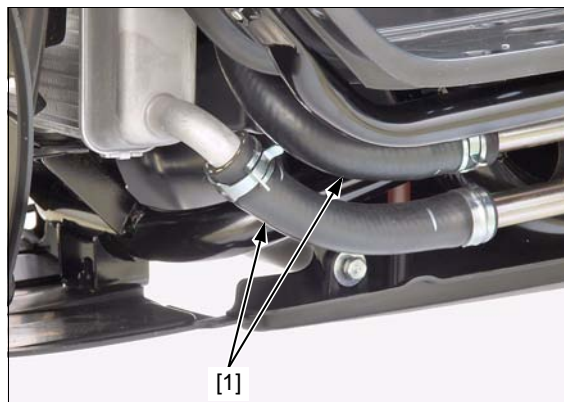
## COOLING SYSTEM

Remove the reserve tank maintenance lid [1].  
Remove the reserve tank cap [2].  
Pump out the coolant with a fluid evacuator to drain the reserve tank [3].



Disconnect the water hoses [1] and completely drain the residual coolant.

Connect the water hoses to the radiator.

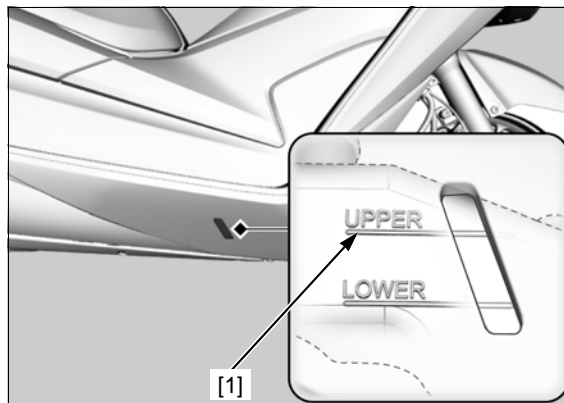


Install a new sealing washer [1] and drain bolt [2].  
Tighten the drain bolt securely.



Fill the coolant to the upper level line [1] of the reserve tank.

Install the tank cap and reserve tank maintenance lid.





Remove the air bleed maintenance lid [1] of the luggage box.  
Remove the air bleed bolt [2] and sealing washer [3].

*Place a shop towel under the thermostat housing.*

Fill the coolant from the filler neck [4] until the coolant starts dripping from the bolt hole.  
Stop filling and install the bolt with a new sealing washer.

Install the air bleed maintenance lid.

Fill the system with the recommended coolant through the filler opening up to the filler neck.

## RECOMMENDED ANTIFREEZE:

**Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors**

## RECOMMENDED MIXTURE:

**1:1 (mixture with distilled water)**

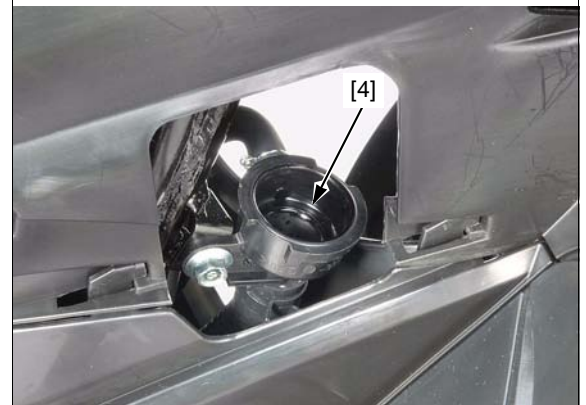
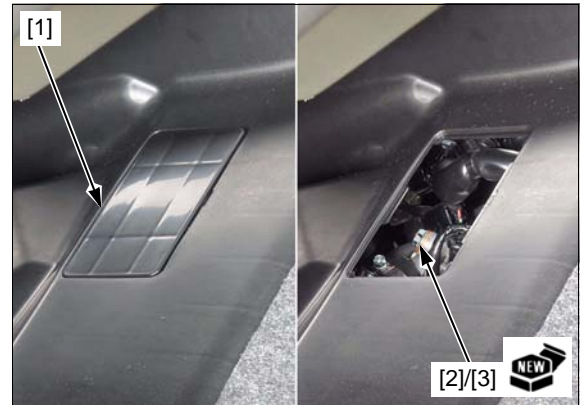
Bleed air from the system.

Start the engine and let it idle for 2 – 3 minutes.  
Snap the throttle 3 – 4 times to bleed air from the system.

Stop the engine and check the coolant level. If the coolant level is lower than the filler neck, add coolant up to the filler neck.

Install the following:

- Left floor skirt (page 2-6)
- Floor mat (page 2-5)
- Radiator cap (page 9-5)



# THERMOSTAT

## REMOVAL/INSTALLATION

Remove the luggage box (page 2-21).

Drain the coolant from the system (page 9-5).

Remove the following:

*Place a shop towel under the thermostat housing.*

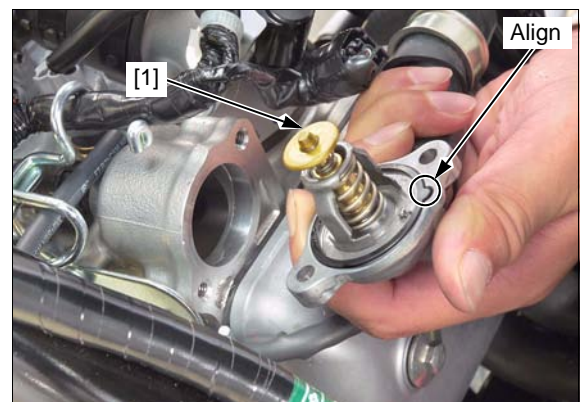
- Bolts [1]
- Thermostat cover [2]

- Thermostat [1]

Installation is in the reverse order of removal.

- When installing the thermostat, align the tab of the seal ring with the groove of the thermostat cover.

Fill and bleed the cooling system (page 9-5).



## COOLING SYSTEM

### INSPECTION

Remove the thermostat [1] (page 9-7).

Visually inspect the thermostat for damage.  
Check for damage of the seal ring [2] and replace if necessary.  
Replace the thermostat if the valve stays open at room temperature.



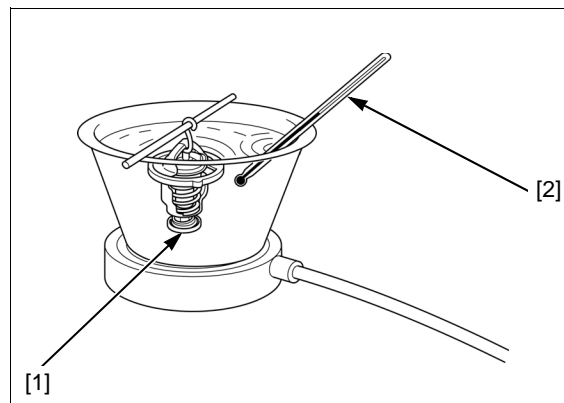
*Do not let the thermostat or thermometer [2] touch the pan, or you will get a false reading.*

Heat a container of water with an electric heating element for 5 minutes.  
Suspend the thermostat [1] in heated water to check its operation.

**THERMOSTAT BEGIN TO OPEN:**  
**80 – 84 °C (176 – 183°F)**

**VALVE LIFT:**  
**4.5 mm (0.18 in) minimum at 95 °C (203°F)**

Replace the thermostat if the valve opens at a temperature other than those specified.



## WATER PUMP

### MECHANICAL SEAL INSPECTION

Check the bleed hole [1] of the water pump for signs of coolant leakage.

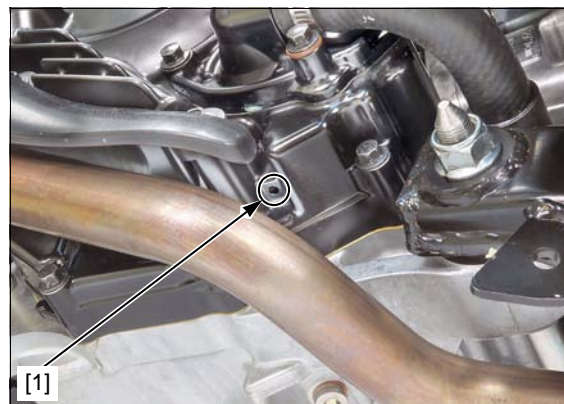
If water leaks through the bleed hole, replace the mechanical seal (page 9-9).

If oil leaks through the bleed hole, replace the oil seal (page 9-9).

Make sure that there are no continuous coolant leakage from the bleed hole while operating the engine.

**NOTE:**

A small amount of coolant weeping from the bleed hole is normal.

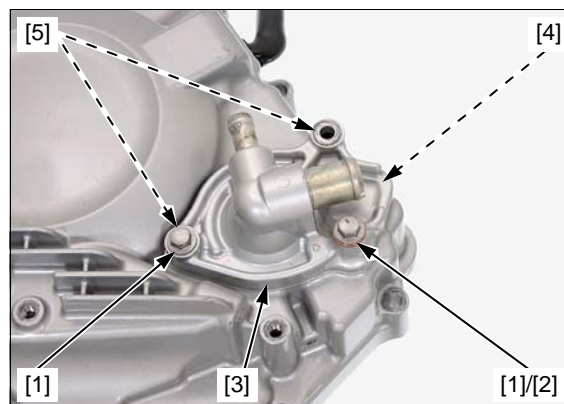


### REMOVAL

Remove the right crankcase cover (page 14-4).

Remove the following:

- Bolts [1]
- Sealing washer [2]
- Water pump cover [3]
- O-ring [4]
- Dowel pins [5]



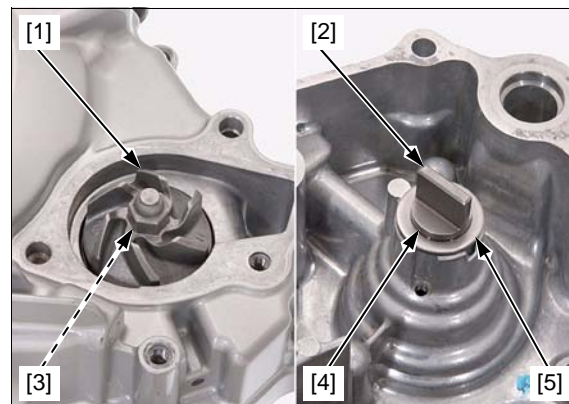
Turn the water pump impeller [1] with your finger. The pump shaft should turn smoothly and quietly. Replace the faulty part if the shaft does not turn smoothly or quietly.

*The impeller has left-hand threads. Take care not to damage the mating surface of the crankcase cover.*

Hold the pump shaft tab [2] securely and remove the impeller/washer [3].

Remove the pump shaft [4] and thrust washer [5] from the right crankcase cover.

Check the water pump shaft for wear or damage, replace if necessary.



## MECHANICAL SEAL REPLACEMENT

Remove the mechanical seal [1] using the special tools.

### TOOLS:

**Bearing Remover Head, 14 [2]** 07WMC-KFG0100 or 07936-KC10200

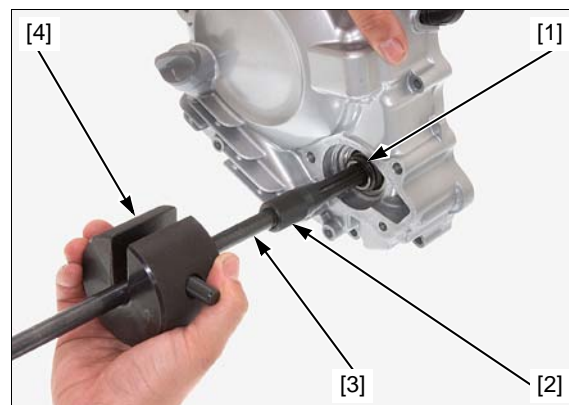
**Remover Shaft, 15 mm [3]** 07936-KC10100 or 07YMC-001010A (U.S.A. only)

**Remover Weight [4]** 07741-0010201

### TOOLS (U.S.A.):

**Bearing Remover Shaft, 15 mm** 07936-KC10500

**Remover Weight** 07936-371020A or 07936-3710200



Remove the oil seal [1].

Blow the inspection hole [2] in the crankcase cover with compressed air to clean it.

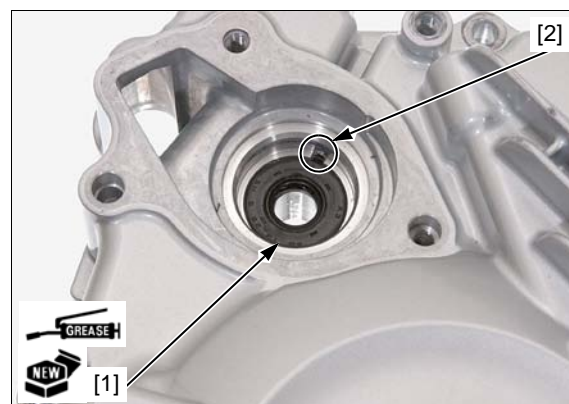
Apply grease to a new oil seal lips.

Install the oil seal with the marking facing up until it is fully seated.

### TOOLS:

**Driver** 07749-0010000

**Attachment, 24 x 26 mm** 07746-0010700



Drive a new mechanical seal [1] until it is fully seated.

### TOOL:

**Oil Seal Driver 34 [2]** 07PMD-KBP0100 (Not available in U.S.A.)

### TOOL (U.S.A.):

**Mechanical Seal Installer** 07PMD-KBPA100

**Mechanical Seal Installer Set** 07965-415000A





## COOLING SYSTEM

### INSTALLATION

Clean off any oil and grease from the pump shaft [1] thoroughly and apply molybdenum oil solution to the shaft journal [2] and thrust washer [3].

- Do not apply molybdenum oil solution to the mechanical seal sliding area.

*Install thrust washer with the chamfered (rolled) edge facing the pump shaft tab.*

Install the thrust washer [1] to the pump shaft [2].  
Install the pump shaft into the right crankcase cover.

*The impeller has left-hand threads. Take care not to damage the mating surface of the crankcase cover.*

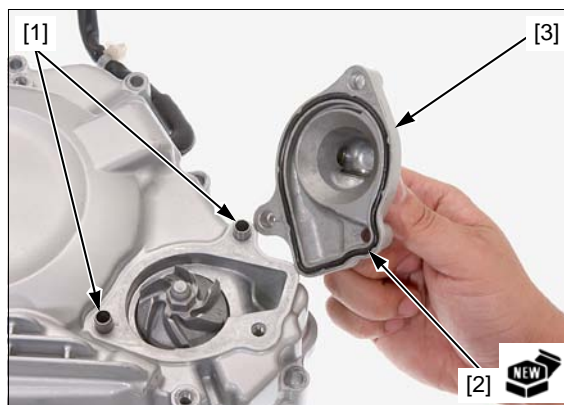
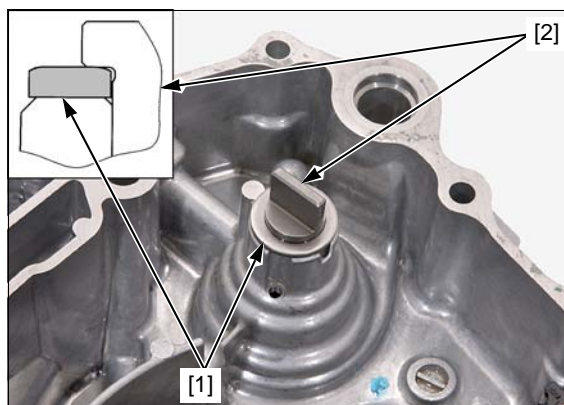
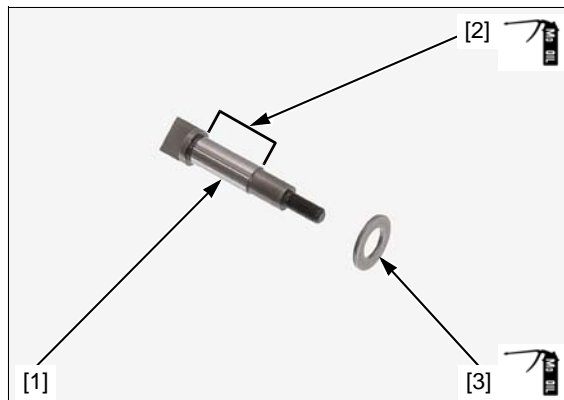
Install the washer [1] and impeller [2].  
Hold the pump shaft tab [3] and tighten the impeller.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Check the pump shaft for smooth rotation.

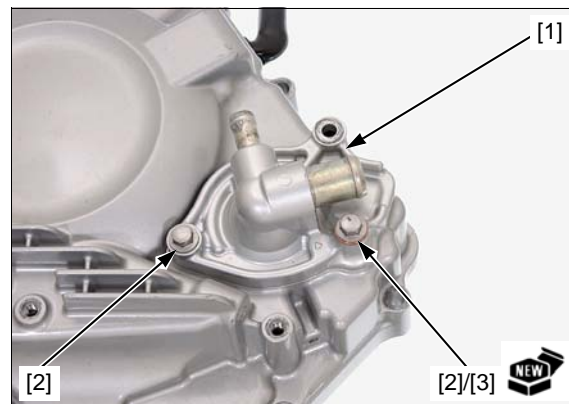
Install the dowel pins [1] to the right crankcase cover.

Install a new O-ring [2] to the water pump cover [3].



Install the water pump cover [1] to the right crankcase cover and tighten the bolts [2] with a new sealing washer [3].

Install the right crankcase cover (page 14-5).



## RADIATOR

### REMOVAL/INSTALLATION

Drain the coolant from the system (page 9-5).

Remove the following:

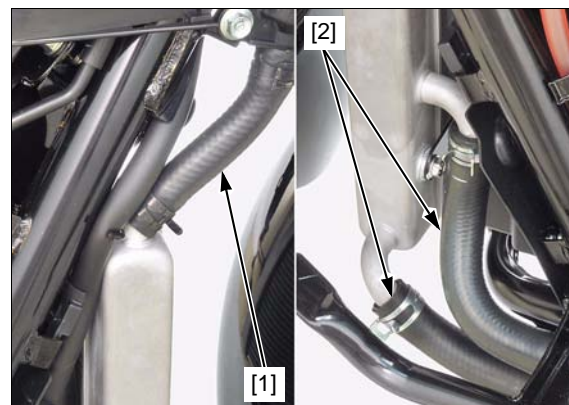
- Right floor skirt (page 2-7)
- Front lower cover (page 2-5)

Disconnect the fan motor 2P (Brown) connector [1].



Disconnect the water hose [1] from the radiator.

Disconnect the water hoses [2] from the radiator.



*Be careful not to damage the radiator fins.*

Remove the bolt [1], and radiator [2].

Installation is in the reverse order of removal.

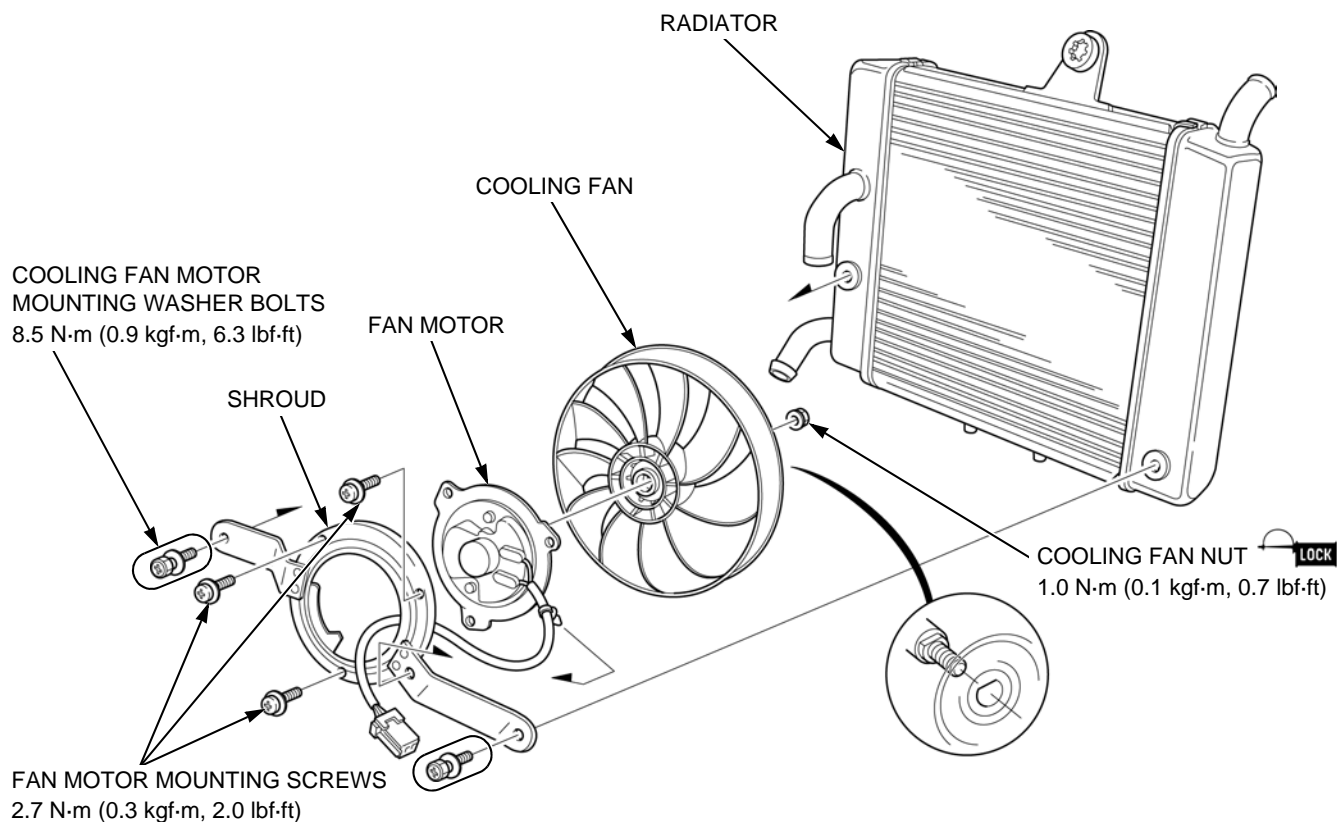
- Route the hoses properly (page 1-18).
- When installing the radiator, align the bosses [3] of the radiator with the grommets [4] of the frame.

Fill and bleed the cooling system (page 9-5).



## COOLING SYSTEM

### DISASSEMBLY/ASSEMBLY



## RADIATOR RESERVE TANK

Drain the coolant from the radiator reserve tank (page 9-5).

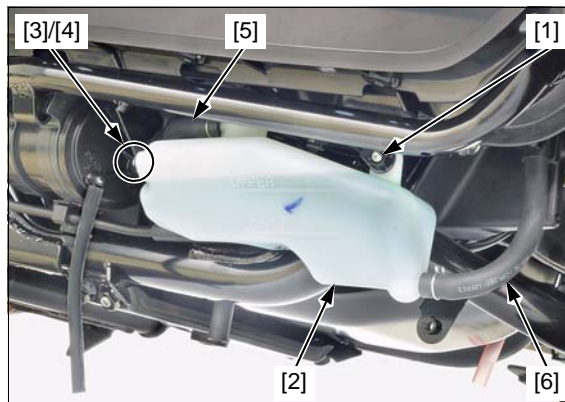
Remove the right floor skirt (page 2-7).

Remove the bolt [1] and reserve tank [2] by releasing the tab [3] of the reserve tank from the grommet [4] of the frame.

Disconnect the overflow hose [5] and siphon hose [6] from the reserve tank.

Installation is in the reverse order of removal.

- Fill the reserve tank with recommended coolant to the upper level line.



## FAN CONTROL RELAY

### OPERATION INSPECTION

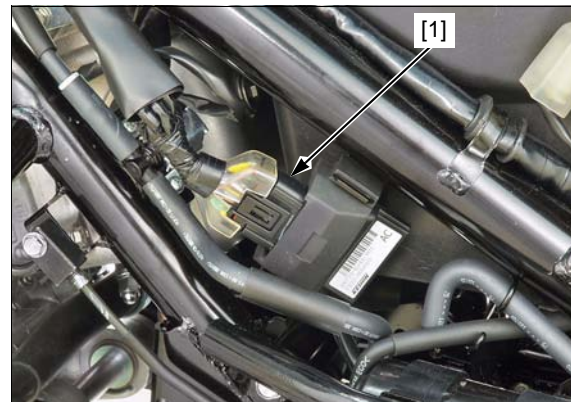
Turn the ignition switch OFF.

Remove the right floor step (page 2-15).

Disconnect the ECM 33P (Black) connector [1].

Turn the ignition switch ON and check the fan motor does stop.

- If the fan motor does not stop, check the following:
  - Short circuit in the Black/blue wire between the fan control relay and ECM.
  - Inspect the fan control relay function test (page 9-14)
- If the fan motor stops, replace the ECM with a known good one, and recheck.

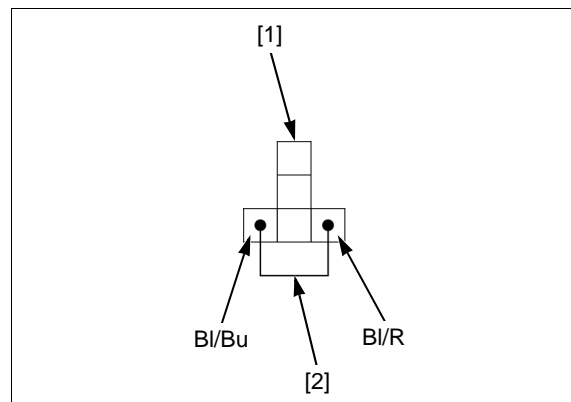


### COIL LINE INSPECTION

Remove the fan control relay (page 9-15).

Short the relay connector [1] terminals of the wire harness side with a jumper wire [2].

**CONNECTION: Black/red – Black/blue**



Remove the right floor step (page 2-15).

Disconnect the ECM 33P (Black) connector [1].

Turn the ignition switch ON.

Measure the voltage between the ECM connector of the wire harness side and ground.

**CONNECTION: Black/blue (+) – Ground (–)**

**TOOL:**

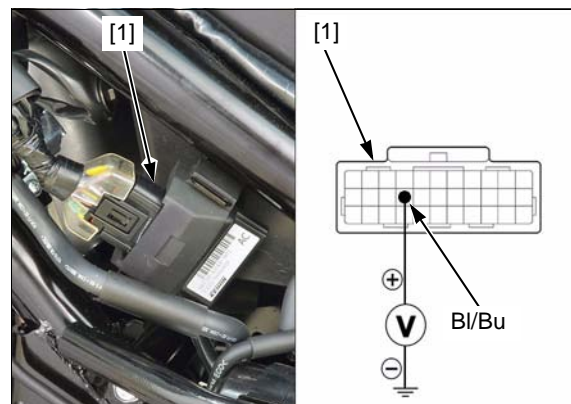
**Pin Probe Male (2 pack)**

**07ZAJ-RDJA110**

If the battery voltage appears, the fan control relay coil line is normal.

If the battery voltage does not appear, inspect the following:

- Open circuit in Black/red wire between the ignition switch and fan control relay
- Open circuit in Black/blue wire between the fan control relay and ECM
- Blown main fuse 30 A
- Blown sub fuse 10 A (IGN)
- Ignition switch (page 22-17)





### SWITCH LINE INSPECTION

Remove the fan control relay (page 9-15).

Short the relay connector [1] terminals of the wire harness side with a jumper wire [2].

**CONNECTION: Blue/orange – Black/yellow**

The cooling fan should turn.

- If the cooling fan turns, the fan control relay switch line is normal. Inspect the fan control relay function test (page 9-14).
- If the cooling fan does not turn, check as follows:

Remove the right floor step (page 2-15).

Disconnect the fan motor 2P (Brown) connector [3].

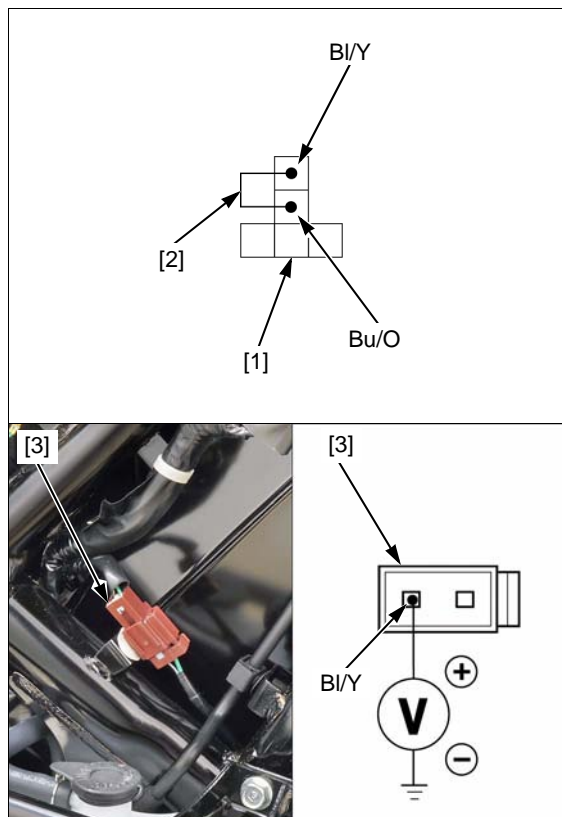
Measure the voltage between the fan motor 2P (Brown) connector of the wire harness side and ground.

**CONNECTION: Black/yellow (+) – Ground (-)**

If the battery voltage appears, check the ground line. If the ground line is normal, replace the cooling fan motor.

If the battery voltage does not appear, inspect the following:

- Blown sub fuse 15 A (FAN)
- Open circuit in Blue/orange wire between the fuse box A and fan control relay switch line side
- Open circuit in Black/yellow wire between the fan control relay and fan motor



### FUNCTION TEST

Remove the fan control relay [1] (page 9-15).

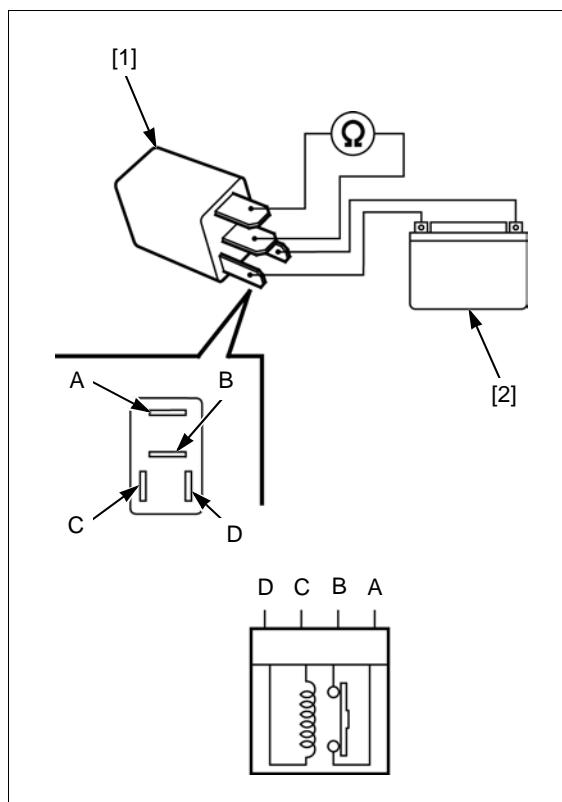
Connect an ohmmeter to the switching side relay terminals.

**CONNECTION: A – B**

Connect a 12 V battery [2] to the coil side relay terminals.

**CONNECTION: C (+) – D (-)**

There should be continuity when the battery is connected to the relay terminals and there should be no continuity when the battery is disconnected.



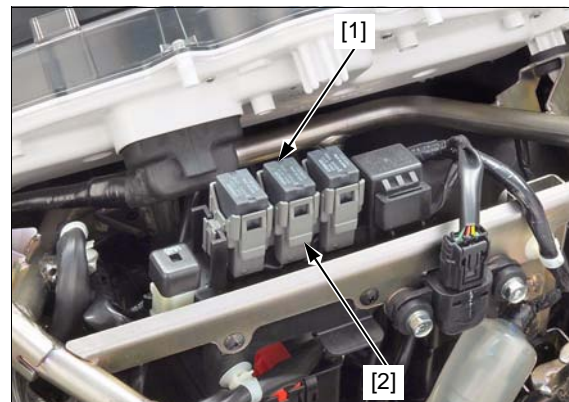
**REMOVAL/INSTALLATION**

Turn the ignition switch OFF.

Remove the front meter panel (page 2-4).

Remove the fan control relay [1] from the relay connector [2].

Installation is in the reverse order of removal.



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## MEMO

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# 10. CYLINDER HEAD/VALVES

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SERVICE INFORMATION .....	10-2	CAM SPROCKET .....	10-6
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CYLINDER COMPRESSION TEST .....	10-5	CAM SPROCKET/CAMSHAFT/ROCKER ARM INSPECTION .....	10-10
CYLINDER HEAD COVER .....	10-5	CYLINDER HEAD .....	10-11



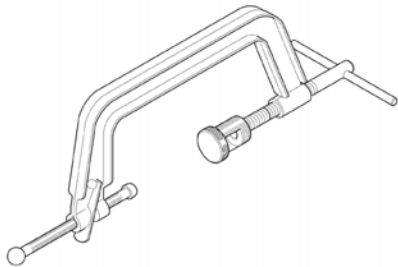






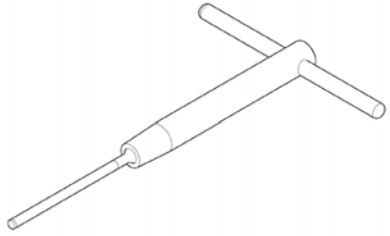
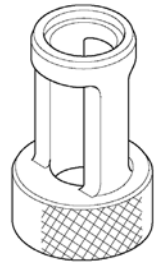
## CYLINDER HEAD/VALVES

# SERVICE INFORMATION

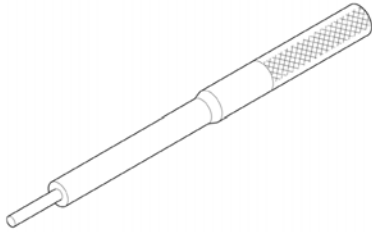
### GENERAL

- This section covers service of the rocker arms, camshaft, valves and cylinder head. The rocker arms service requires cylinder head removal, other parts can be serviced with the engine installed in the frame.
- 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.
- The rocker arm and camshaft lubricating oil is fed through the oil passage in the cylinder head. Clean the oil passage before assembling.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

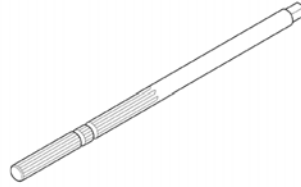
### TOOLS

Valve Spring Compressor Set 07757-0010000 	Seat Cutter 27.5 mm 07780-0010200   or equivalent commercially available in U.S.A.	Seat Cutter 24 mm 07780-0010600   or equivalent commercially available in U.S.A.
Flat Cutter 25 mm 07780-0012000   or equivalent commercially available in U.S.A.	Flat Cutter 29 mm 07780-0013400   or equivalent commercially available in U.S.A.	Interior Cutter 22 mm 07780-0014202   or equivalent commercially available in U.S.A.
Interior Cutter 26 mm 07780-0014500   or equivalent commercially available in U.S.A.	Cutter Holder 4.5 mm 07781-0010600   or equivalent commercially available in U.S.A.	Valve Spring Compressor Attachment 21 07959-KM30101 

Valve Guide Driver 4.3 x 8.5  
07HMD-ML00101



Valve Guide Reamer 4.508  
07HMH-ML00101



or 07HMH-ML0010B (U.S.A. only)

## TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test, or by tracing top-end noise 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.

### Compression too low, hard starting or poor performance at low speed

- Valves:
  - Incorrect valve adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
  - Valve stuck open
- Cylinder head:
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston problem (page 11-2)

### Compression too high, overheating or knocking

- Excessive carbon build-up on piston head or on combustion chamber

### Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (page 11-2)

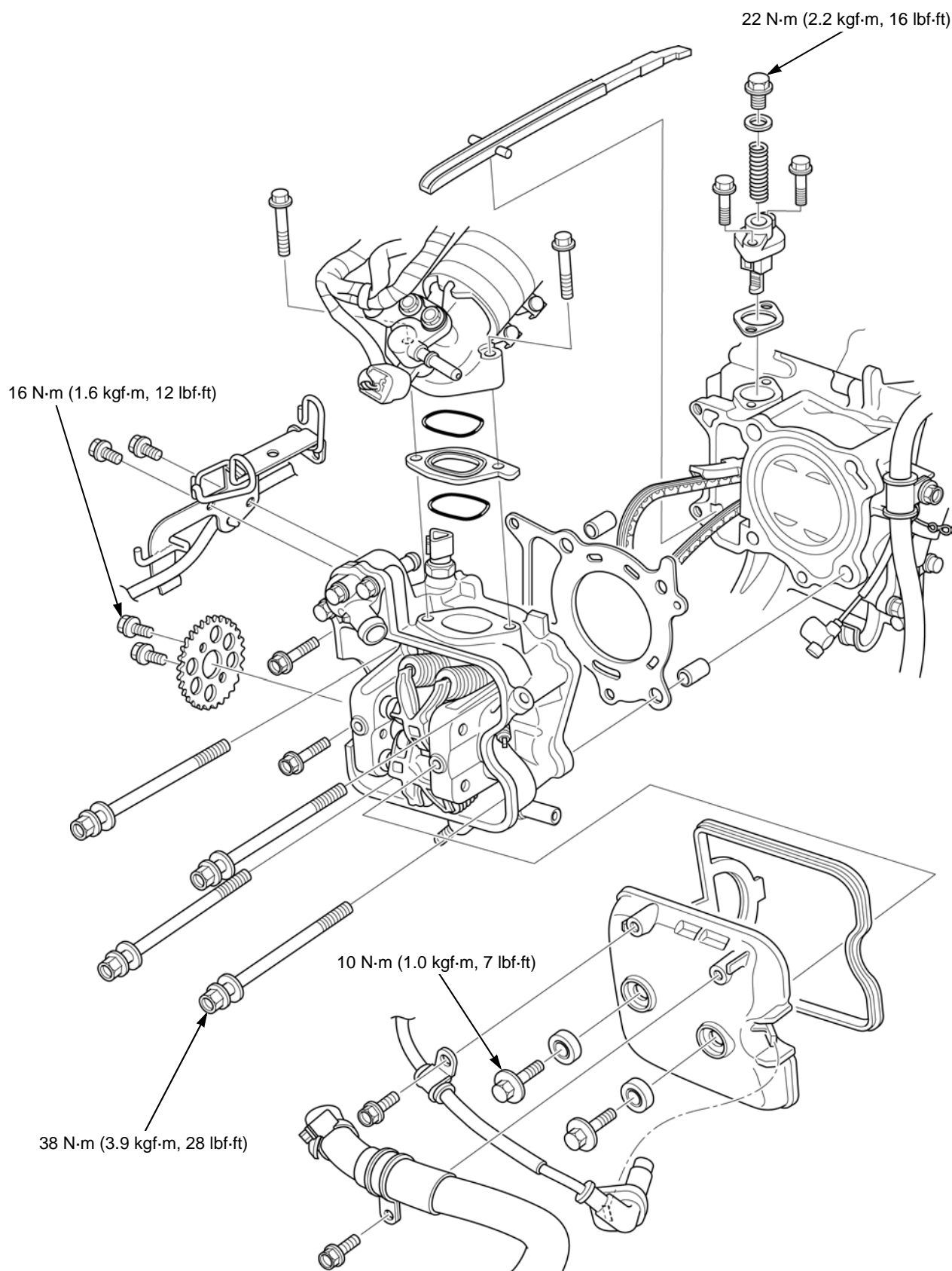
### Excessive noise

- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn cam chain
- Worn cam sprocket teeth
- Worn rocker arm and/or shaft
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (page 11-2)

### Rough idle

- Low cylinder compression

## COMPONENT LOCATION



## CYLINDER COMPRESSION TEST

Remove the maintenance lid (page 3-6).

Warm up the engine to normal operating temperature.

Stop the engine and remove the spark plug cap and spark plug (page 3-6).

Disconnect the fuel pump 3P connector (page 7-5).

Install a compression gauge [1] into the spark plug hole.

*To avoid  
discharging the  
battery, do not  
operate the starter  
motor for more than  
7 seconds.*

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.

### COMPRESSION PRESSURE:

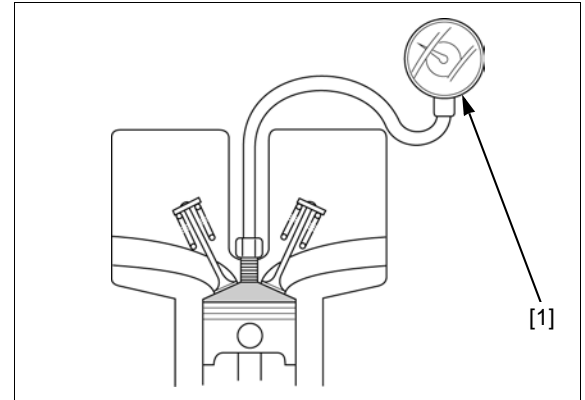
**1,569 kPa (16.0 kgf/cm<sup>2</sup>, 228 psi) at 450 rpm**

Low compression can be caused by:

- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

- Carbon deposits in the combustion chamber or on the piston head



## CYLINDER HEAD COVER

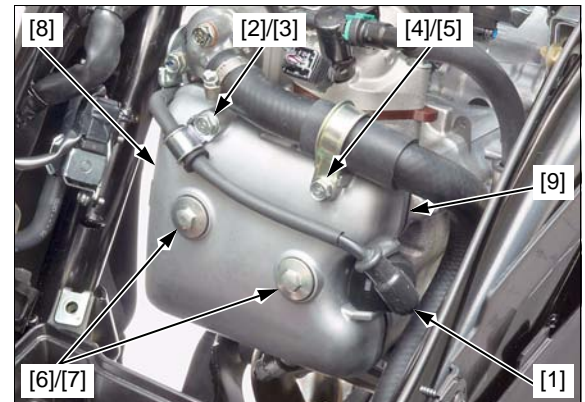
### REMOVAL

Remove the luggage box (page 2-21).

Disconnect the spark plug cap [1].

Remove the following:

- Bolt [2] and spark plug wire clamp [3]
- Bolt [4] and water hose clamp [5]
- Cover bolts [6] and special washers [7]
- Cylinder head cover [8]
- Rubber seal [9]

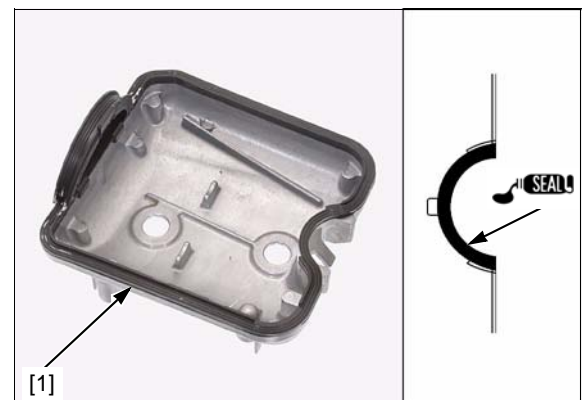


### INSTALLATION

Check that the rubber seal [1] is in good condition, replace it if necessary.

Install the rubber seal.

Apply liquid sealant (page 1-16) to the cylinder head semi-circular cut-out as shown.



## CYLINDER HEAD/VALVES

The "UP" marks [4] of the washer is facing the bolt head.

Install the head cover [1] and the cover bolts [2] with the special washers [3] by aligning each bolt tip with the bolt hole in the cylinder head.

Tighten the cylinder head cover bolts to the specified torque.

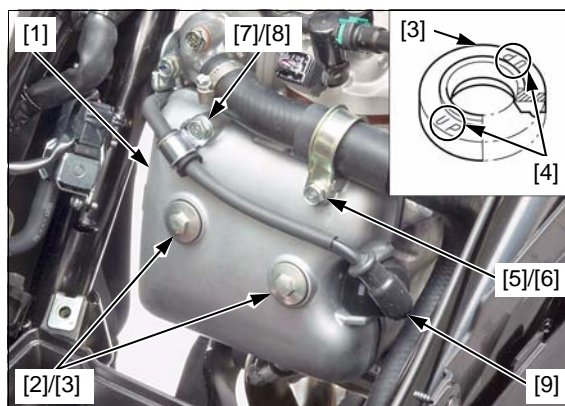
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the bolt [5] and water hose clamp [6].

Install the bolt [7] and spark plug wire clump [8].

Connect the spark plug cap [9] (page 3-6).

Install the luggage box (page 2-21).



## CAM SPROCKET

### REMOVAL

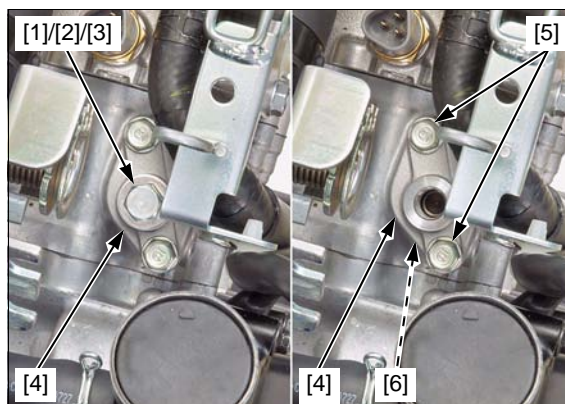
Remove the following:

- Cylinder head cover (page 10-5)
- Belt case air cleaner housing (page 3-14)

Make sure the piston is at TDC (Top Dead Center) on the compression stroke (page 3-7).

Remove the sealing bolt [1], sealing washer [2] and spring [3] from the cam chain tensioner lifter [4].

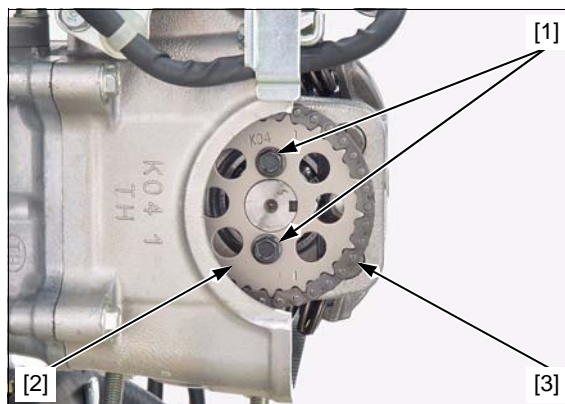
Remove the bolts [5] and cam chain tensioner lifter. Remove the gasket [6].



Place a shop towel into the cylinder head opening to prevent fasteners from falling into the crankcase.

Remove the cam sprocket bolts [1] while holding the drive pulley (crankshaft), and the cam sprocket [2] off of the camshaft.

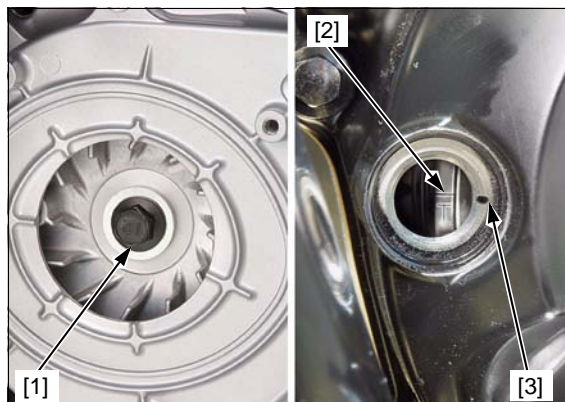
Remove the cam sprocket from the cam chain [3]. Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.



### INSTALLATION

Be careful not to jam the cam chain and timing sprocket on the crankshaft when rotating the crankshaft.

Rotate the drive pulley (crankshaft) [1] counterclockwise and align the "T" mark [2] on the flywheel with the index mark [3] in the right crankcase cover.



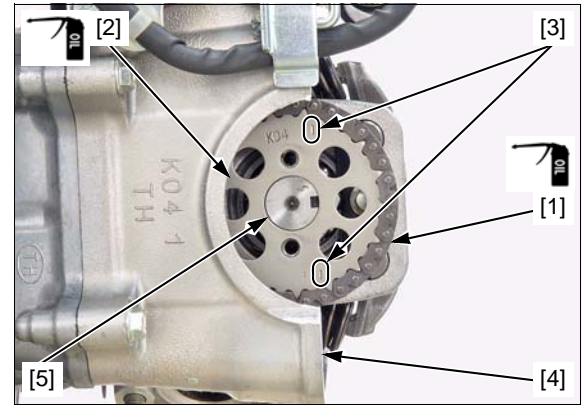


Make sure the lug of the camshaft face the cylinder head cover side (page 10-9).

Apply engine oil to the cam chain [1] and sprocket [2] teeth.

Install the cam sprocket onto the cam chain so that the index lines [3] on the cam sprocket are flush with the cylinder head surface [4].

Install the cam sprocket onto the camshaft [5].

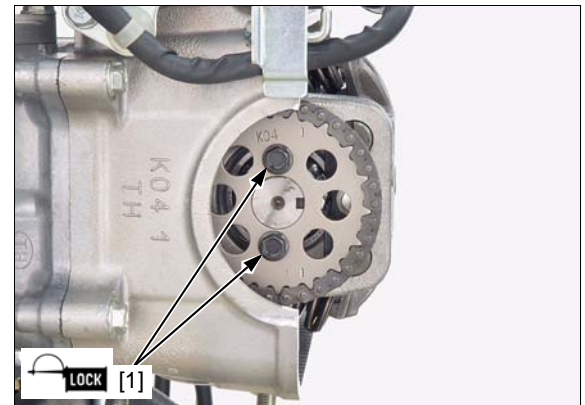


Cover the cylinder head with a shop towel to prevent sprocket bolt from falling into the crankcase.

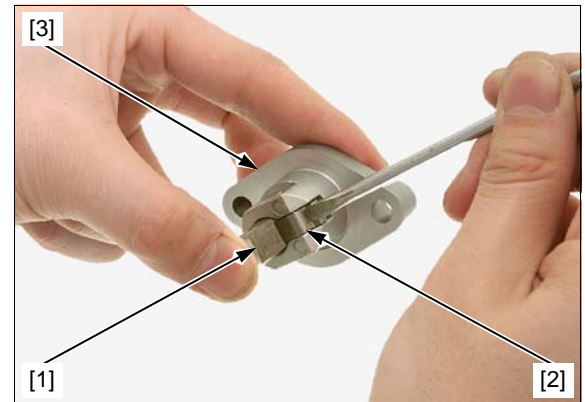
Clean and apply locking agent to the cam sprocket bolt [1] threads (coating width:  $6.5 \pm 1.0$  mm ( $0.26 \pm 0.04$  in), exclude end for 2.0 – 3.0 mm ( $0.08 - 0.12$  in)).

Align the bolt holes in the sprocket and camshaft. Install the sprocket bolts and tighten them while holding the drive pulley (crankshaft).

**TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)**

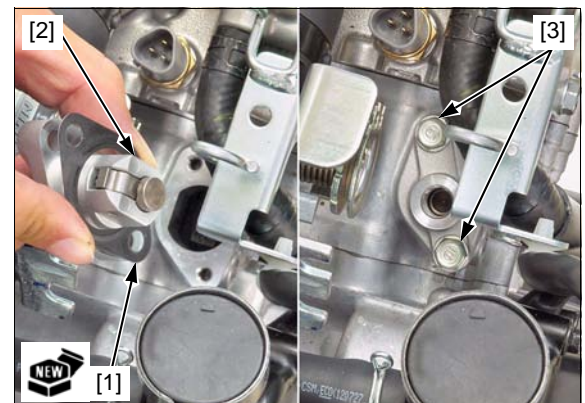


Retract the push rod [1] while pushing the tab [2] of the tensioner lifter [3] and release the tab to lock it.



Install a new gasket [1] and cam chain tensioner lifter [2] onto the cylinder head.

Install and tighten the bolts [3].

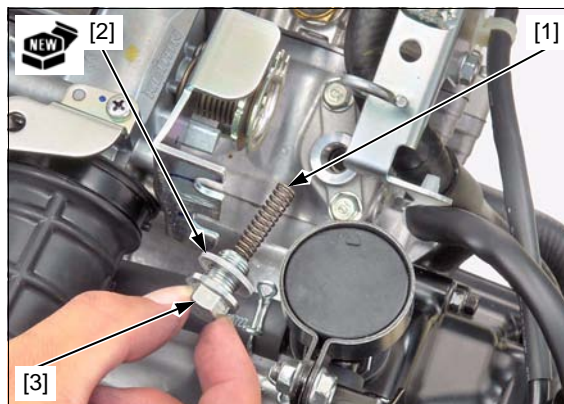


## CYLINDER HEAD/VALVES

Install the spring [1], new sealing washer [2] and sealing bolt [3].

Tighten the cam chain tensioner lifter sealing bolt to the specified torque.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Make sure that the index lines on the cam sprocket aligns with the upper surface of the cylinder head when the "T" mark on the flywheel is aligned with the index mark in the right crankcase cover.

Apply engine oil to the threads and seating surface of the timing hole cap [1].

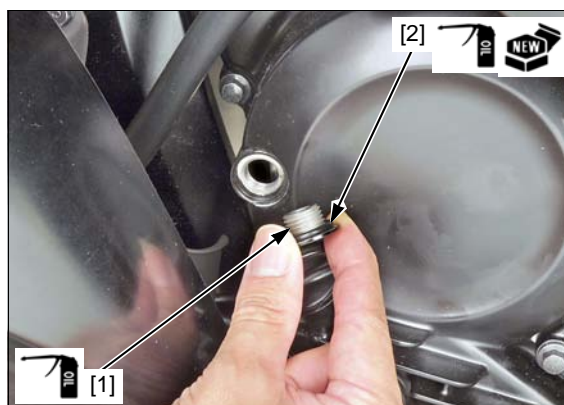
Coat a new O-ring [2] with engine oil and install it onto the timing hole cap.

Install the cap and tighten it to the specified torque.

**TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)**

Install the following:

- Belt case air cleaner housing (page 3-14)
- Cylinder head cover (page 10-5)



## CAMSHAFT

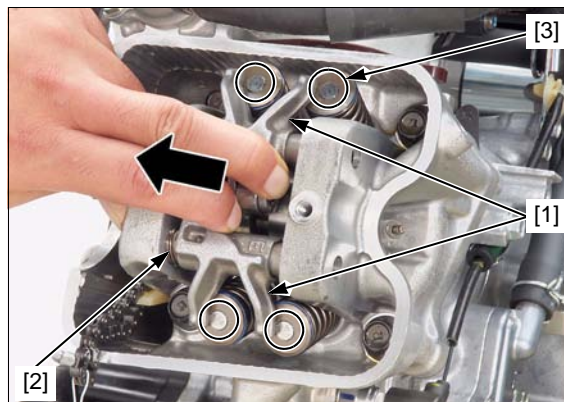
### REMOVAL

Remove the following:

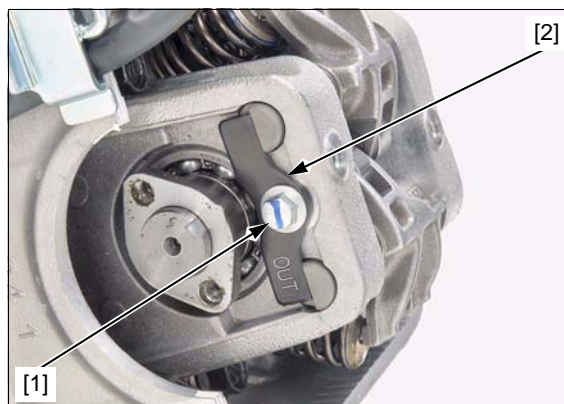
- Cylinder head cover (page 10-5)
- Cam sprocket (page 10-6)

Slide the rocker arms [1] to the spring [2] side and remove the shims [3].

- Do not allow the shims to fall into the crankcase.
- Mark all shims to ensure correct reassembly in their original locations.
- The shims can be easily removed with tweezers or a magnet.

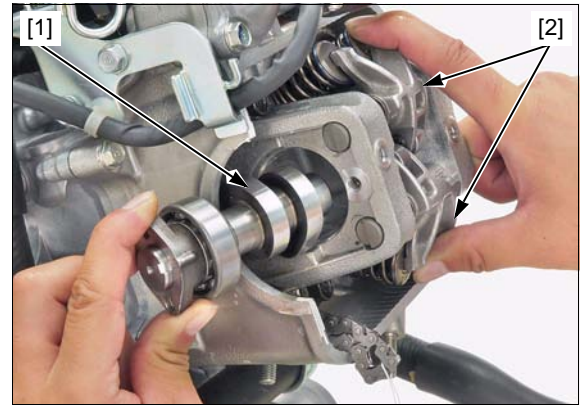


Remove the bolt [1] and stopper plate [2].





Remove the camshaft [1] while pressing down the valve side of the rocker arms [2].

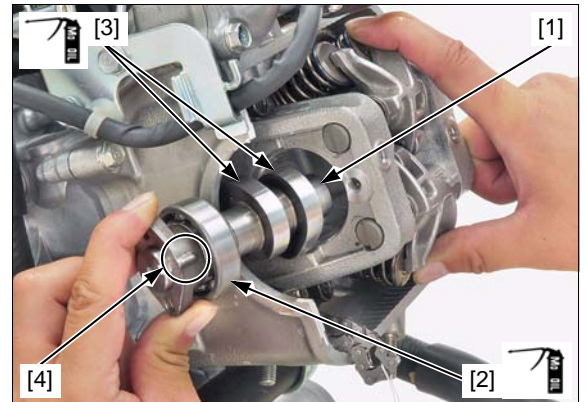


## INSTALLATION

Clean the camshaft bearing mating area.

Apply molybdenum oil solution to the camshaft [1] bearing [2] and cam lobes [3].

Install the camshaft with the lug [4] facing the cylinder head cover side while pressing down on the valve side of the rocker arm.



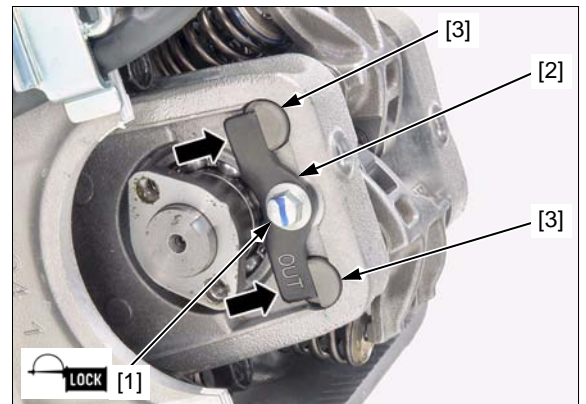
Clean and apply locking agent to the stopper plate bolt [1] threads (coating width:  $6.5 \pm 1.0$  mm ( $0.26 \pm 0.04$  in), exclude end for  $2.0 - 3.0$  mm ( $0.08 - 0.12$  in)).

Install the stopper plate [2] with its "OUT" mark facing out and stopper plate bolt to the cylinder head as shown.

Tighten the bolt to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

- Install the stopper plate while pushing up it against the rocker arm shafts [3] as shown.

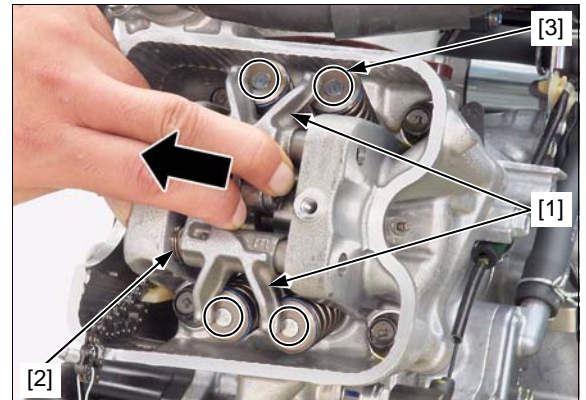


*Be careful not to let the shims fall into the crankcase.*

Slide the rocker arms [1] to the spring [2] side and install the shims [3] in their original locations on the valve retainers.

Install the following:

- Cam sprocket (page 10-6)
- Cylinder head cover (page 10-5)





### ROCKER ARM

#### REMOVAL/INSTALLATION

Remove the cylinder head (page 10-11).

Remove the bolt [1] and stopper plate [2].

Remove the rocker arm shafts [3], rocker arms [4] and springs [5].

*Do not exchange the intake and exhaust rocker arm shafts.*

Apply molybdenum oil solution to the sliding surface of the rocker arm rollers and shafts.

Clean the rocker arm shaft holes.

Install the rocker arm shafts, rocker arms and springs.

*Install the rocker arm shafts with the cut-out facing down.*

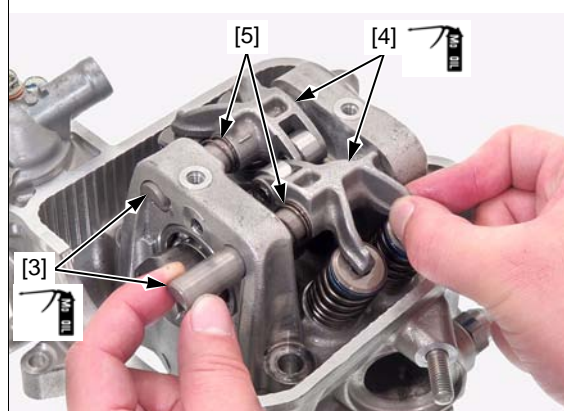
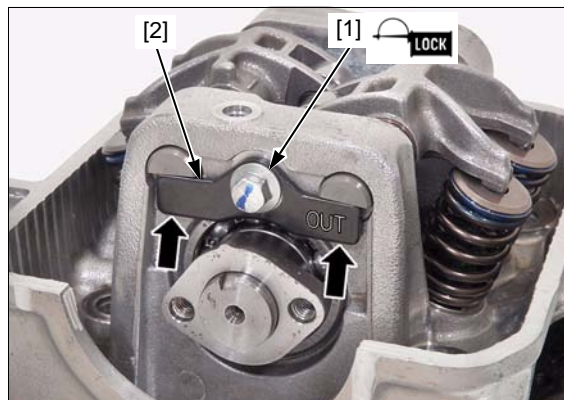
Clean and apply locking agent to the stopper plate bolt threads (coating width:  $6.5 \pm 1.0$  mm ( $0.26 \pm 0.04$  in), exclude end for 2.0 – 3.0 mm ( $0.08 - 0.12$  in)).

Install the stopper plate with its "OUT" mark facing out and stopper plate bolt to the cylinder head as shown.

Tighten the bolt to the specified torque.

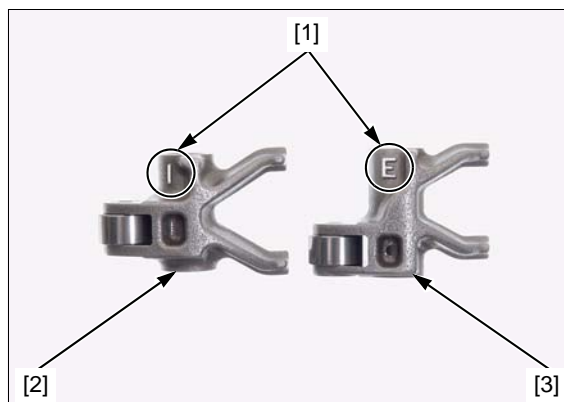
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

- Install the stopper plate while pushing up it against the rocker arm shafts as shown.



The rocker arms are identified by the stamped marks [1]:

- "I": Intake rocker arm [2]
- "E": Exhaust rocker arm [3]



### CAM SPROCKET/CAMSHAFT/ROCKER ARM INSPECTION

Inspect the following parts for damage, abnormal wear, deformation, burning or clogs in oil passages.

- Cam sprocket
- Camshaft
- Shims
- Rocker arm
- Rocker arm shaft
- Spring

Measure each part according to CYLINDER HEAD/ VALVES SPECIFICATIONS (page 1-7).

Replace any part if it is out of service limit.

## CYLINDER HEAD

### REMOVAL

Drain the coolant (page 9-5).  
Drain the engine oil (page 3-10).

Remove the following:

- Exhaust pipe/muffler (page 2-25)
- Shims (page 10-8)
- Cam sprocket (page 10-6)

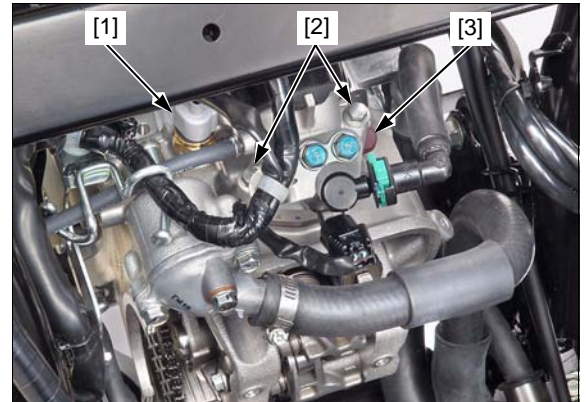
Remove the bolts [1] and stay [2].



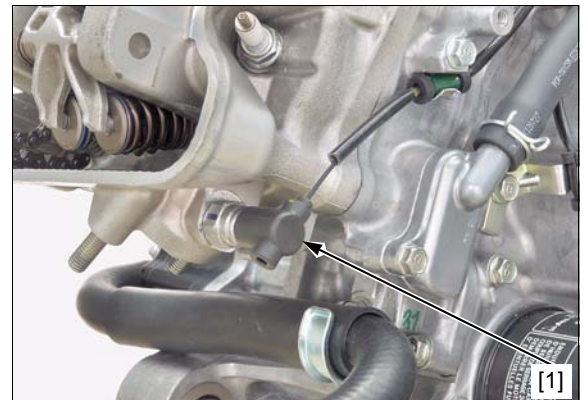
Disconnect the water hose [1].



Disconnect the ECT sensor 3P (Gray) connector [1].  
Remove the bolts [2] and insulator A [3].



Disconnect the O<sub>2</sub> sensor cap [1].



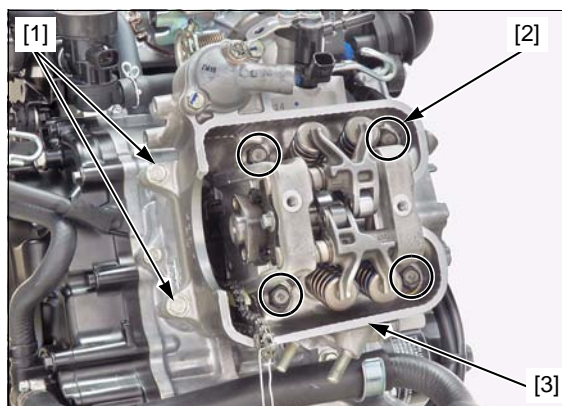
## CYLINDER HEAD/VALVES

Remove the bolts [1].

Loosen the bolt/washers [2] in a crisscross pattern in 2 or 3 steps.

*Do not strike the cylinder head too hard and do not damage the mating surface with a screwdriver.*

Remove the bolt/washers and cylinder head [3].



Remove the gasket [1] and dowel pins [2].

Remove the cam chain guide [3].



### DISASSEMBLY

Remove the following:

- Cylinder head (page 10-11)
- Camshaft (page 10-8)
- Rocker arm (page 10-10)
- ECT sensor (page 4-33)
- O<sub>2</sub> sensor (page 4-33)
- Spark plug (page 3-6)
- Thermostat (page 9-7)

*To prevent loss of tension, do not compress the valve springs more than necessary.*

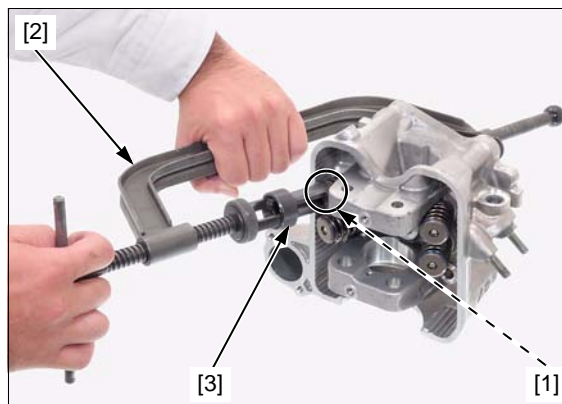
Remove the valve spring cotters [1] using the spring compressor.

#### TOOLS:

**Valve Spring Compressor Set [2] 07757-0010000**

**Valve Spring Compressor**

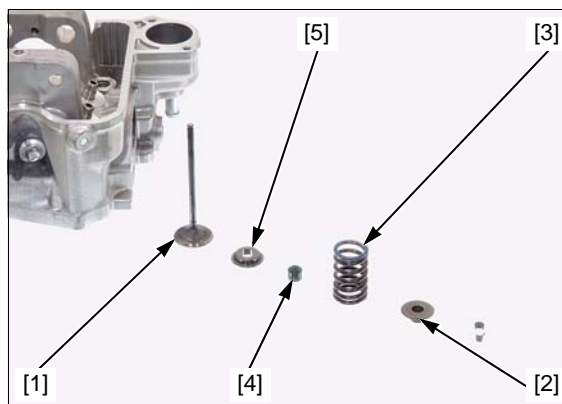
**Attachment 21 [3] 07959-KM30101**



*Mark all the parts so they can be placed back in their original locations.*

Remove the following:

- Valve [1]
- Spring retainer [2]
- Valve spring [3]
- Stem seal [4]
- Spring seat [5]





## INSPECTION

*Be careful not to damage the valve seat and gasket surfaces.*

Remove the carbon deposits from the combustion chamber [1].

Check the spark plug hole and valve areas for cracks.

Inspect the following parts for damage, abnormal wear, deformation, burning or clogs in oil passage.

- Cylinder head
- Valve
- Spring seat
- Stem seal
- Valve spring
- Spring retainer
- Spring cotter
- Cam chain guide
- Tensioner slider

Measure each part and clearance according to CYLINDER HEAD/VALVES SPECIFICATIONS (page 1-7).

Replace any part if it is out of service limit.



## VALVE GUIDE REPLACEMENT

Mark new valve guides at the specified height indicated below, using a marker.

Chill new valve guides in a freezer for about 1 hour.

*Be sure to wear heavy gloves to avoid burns when handling the heated cylinder head.*

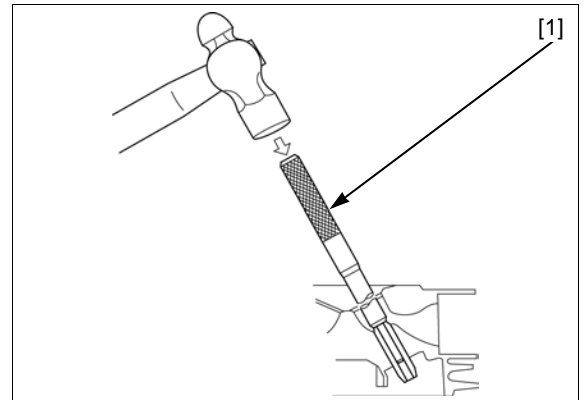
Heat the cylinder head to 130 – 140°C (266 – 284°F) with a hot plate or oven. Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature

- Using a torch to heat the cylinder head may cause warpage.

Support the cylinder head and drive the valve guides out of the cylinder head from the combustion chamber side.

**TOOL:**

**Valve Guide Driver 4.3 x 8.5 [1] 07HMD-ML00101**



Take out new valve guides [1] from the freezer.

While the cylinder head is still heated, drive new valve guides into the cylinder head from the camshaft side until the exposed height is the specified value (at the mark).

**TOOL:**

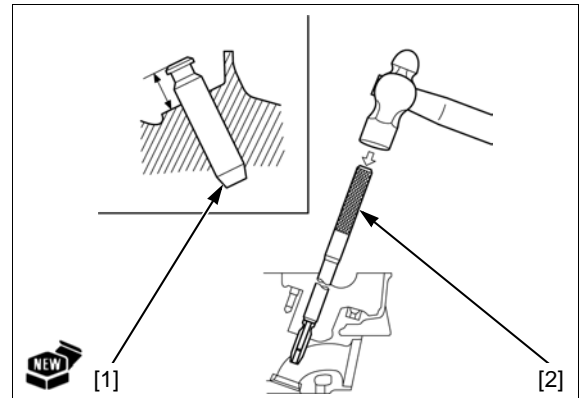
**Valve Guide Driver 4.3 x 8.5 [2] 07HMD-ML00101**

**VALVE GUIDE PROJECTION:**

**IN: 11.20 – 11.50 mm (0.441 – 0.453 in)**

**EX: 12.20 – 12.50 mm (0.480 – 0.492 in)**

Let the cylinder head cool to room temperature.



## CYLINDER HEAD/VALVES

*Use cutting oil on the reamer during this operation. Take care not to tilt or learn the reamer in the guide while reaming.*

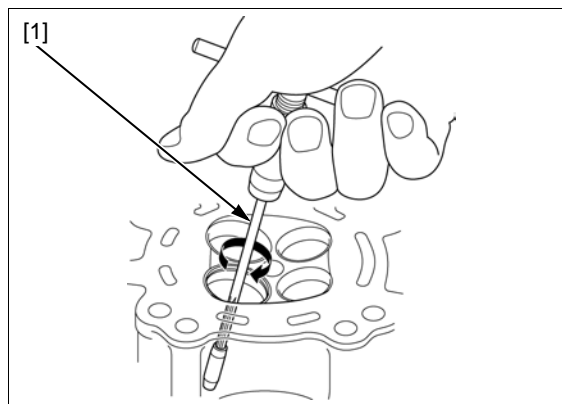
Ream the new valve guides.

Insert the reamer from the combustion chamber side of the cylinder head and always rotate the reamer clockwise.

### TOOL:

**Valve Guide Reamer 4.508 [1] 07HMH-ML00101 or 07HMH-ML0010B (U.S.A. only)**

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seats (page 10-14).



## VALVE SEAT INSPECTION/REFACING

### INSPECTION

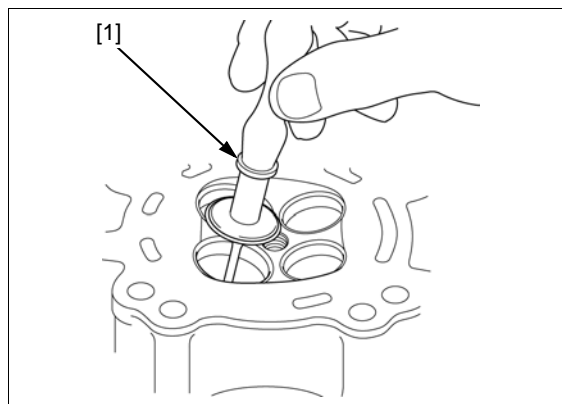
Clean the intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coat of Prussian Blue to the valve seats. Tap the valve against the valve seat several times using a hand lapping tool [1], without rotating the valve to make a clear pattern.

Remove the valve and inspect the valve seat face width.

Inspect the valve seat face for:

- Damaged face:
  - Replace the valve and reface the valve seat
- Uneven seat width:
  - Bent or collapsed valve stem; Replace the valve and reface the valve seat
- Contact area (too low or too high area):
  - Reface the valve seat



**REFACING**

Reface the valve seat using the following tools.

**TOOLS:**

**Cutter Holder 4.5 mm**

**07781-0010600 or equivalent commercially available in U.S.A.**

**Seat Cutter 27.5 mm**

**07780-0010200 or equivalent commercially available in U.S.A.**

**Seat Cutter 24 mm**

**07780-0010600 or equivalent commercially available in U.S.A.**

**Flat Cutter 29 mm**

**07780-0013400**

**Flat Cutter 25 mm**

**07780-0012000 or equivalent commercially available in U.S.A.**

**Interior Cutter 26 mm**

**07780-0014500 or equivalent commercially available in U.S.A.**

**Interior Cutter 22 mm**

**07780-0014202 or equivalent commercially available in U.S.A.**

**VALVE SEAT WIDTH:**

**STANDARD: 0.90 – 1.10 mm (0.035 – 0.043 in)**

**SERVICE LIMIT: 1.5 mm (0.06 in)**

**NOTE:**

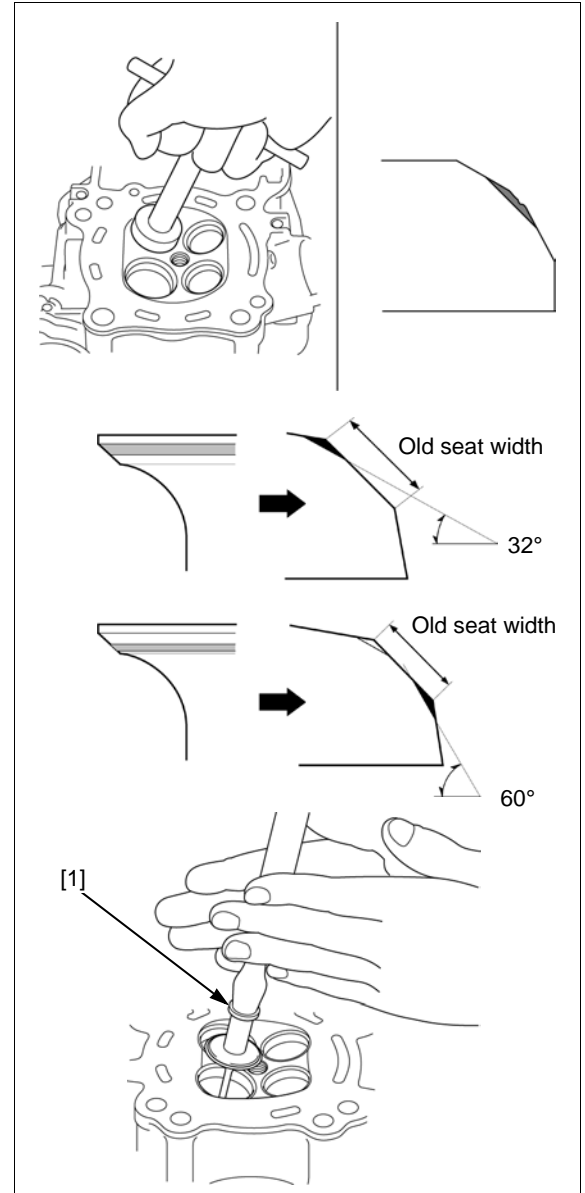
- Follow the refacer manufacturer's operating instructions.
- Be careful not to grind the seat more than necessary.

1. Use a 45° seat cutter, remove any roughness or irregularities from the seat.
2. Use a 32° flat cutter, remove the top 1/4 of the existing valve seat material.
3. Use a 60° interior cutter, remove the bottom 1/4 of the existing valve seat material.
4. Using a 45° seat cutter, cut the seat to the proper width.
5. After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

**NOTE:**

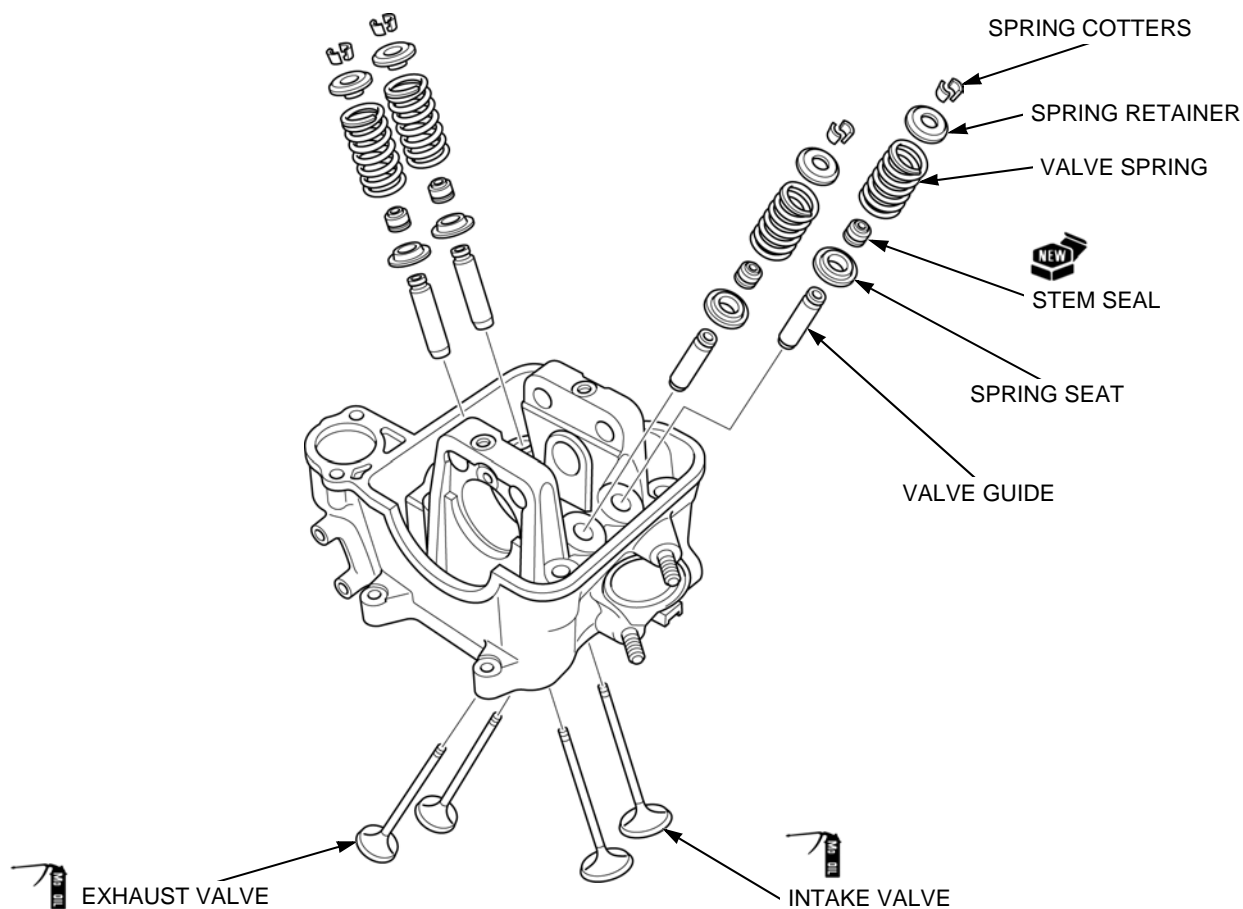
- Excessive lapping pressure may deform or damage the seat.
- Change the angle of hand lapping tool [1] frequently to prevent uneven seat wear.
- Do not allow lapping compound to enter the guides.

After lapping, wash any residual compound off the cylinder head and valve and recheck the seat contact.



## CYLINDER HEAD/VALVES

### ASSEMBLY



Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

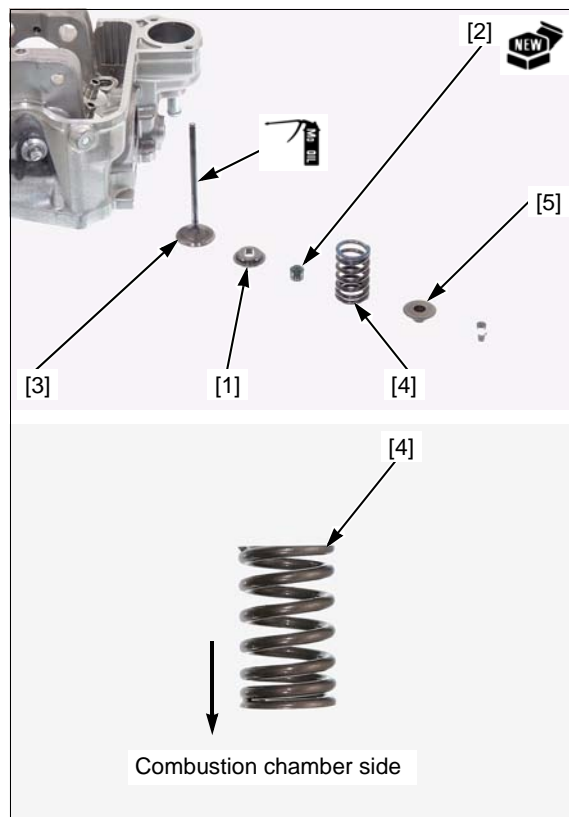
Install the spring seats [1] and new stem seals [2].

Lubricate the valve stem sliding surface with molybdenum oil solution.

Insert the valve [3] into the guide while turning it slowly to avoid damaging to the stem seal.

Install the valve spring [4] with the tightly wound coils facing the combustion chamber.

Install the spring retainer [5].



To prevent loss of tension, do not compress the valve springs more than necessary.

Install the valve spring cotters [1] using the valve spring compressor.

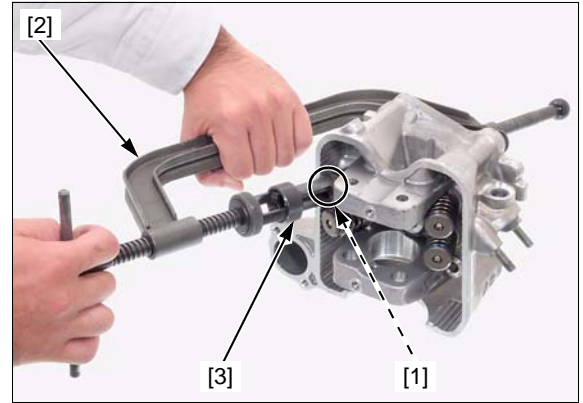
## TOOLS:

Valve Spring Compressor Set [2] 07757-0010000

Valve Spring Compressor

Attachment 21 [3]

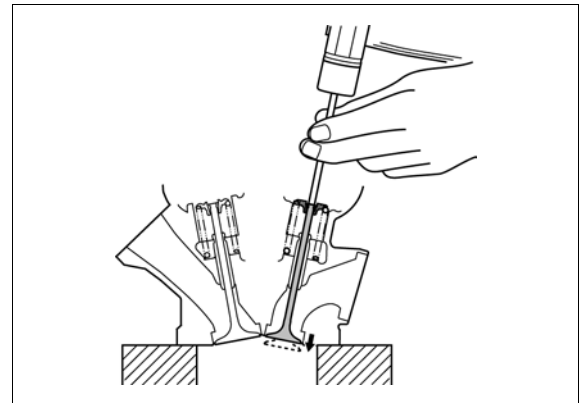
07959-KM30101



Support the cylinder head so the valve heads will not contact anything that cause damage.

Tap the valve stems gently with plastic hammer and shaft as shown to seat the cotters firmly.

Install the cylinder head (page 10-17).

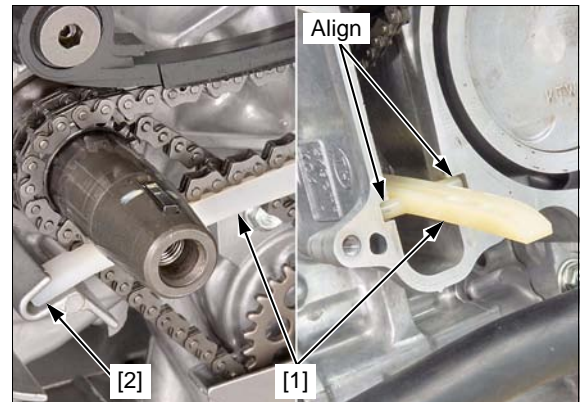


## INSTALLATION

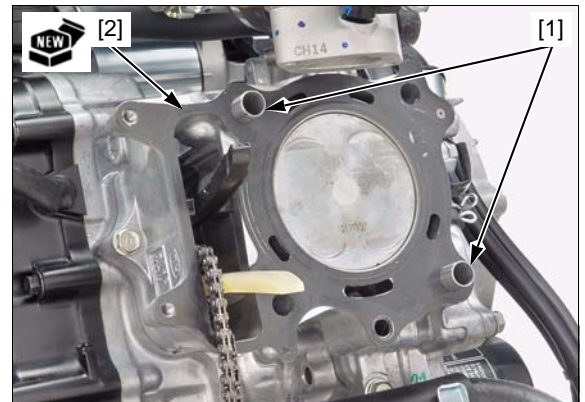
Be careful not to damage the mating surfaces.

Clean the mating surfaces of the cylinder head and cylinder thoroughly. Blow out the oil passage in the cylinder head with compressed air.

Install the tip of the cam chain guide [1] to the crankcase groove [2] by aligning it bosses with the grooves in the cylinder.



Install the dowel pins [1] and a new gasket [2].





## CYLINDER HEAD/VALVES

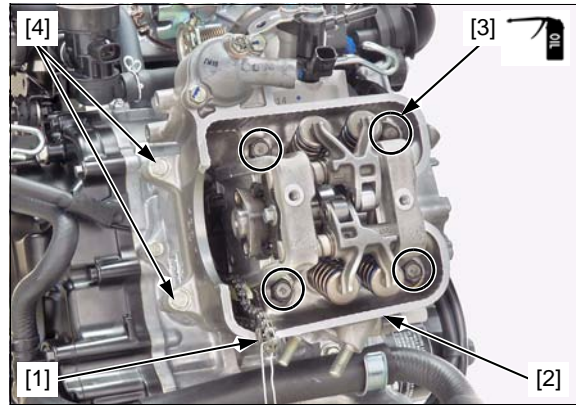
Route the cam chain [1] through the cylinder head [2] and install the cylinder head.

Apply engine oil to the threads and seating surfaces of the cylinder head bolt/washers [3].

Install the bolt/washers and tighten the bolts in a crisscross pattern in 2 or 3 steps to the specified torque.

**TORQUE: 38 N·m (3.9 kgf·m, 28 lbf·ft)**

Install the bolts [4] and tighten them.



Connect the ECT sensor 3P (Gray) connector [1].

Coat new O-rings [2] with engine oil and install them into both grooves in the insulator A [3].

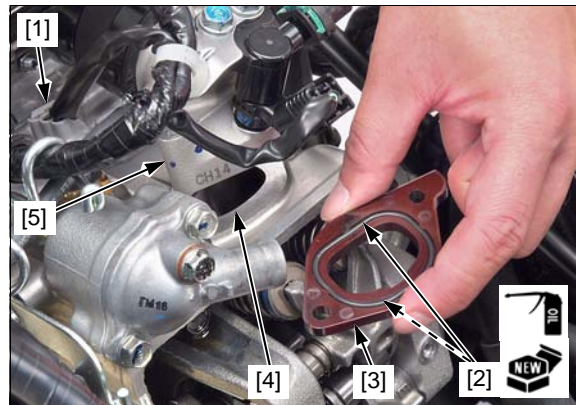
Place the insulator A between the cylinder head [4] and intake pipe [5].

Install the removed parts in the reverse order of removal.

- For O<sub>2</sub> sensor cap installation (page 4-33).

Fill the engine oil (page 3-10).

Fill and bleed the cooling system (page 9-5).



# 11. CYLINDER/PISTON

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SERVICE INFORMATION .....	11-2	COMPONENT LOCATION .....	11-3
TROUBLESHOOTING .....	11-2	CYLINDER/PISTON .....	11-4

# SERVICE INFORMATION

## GENERAL

- This section covers maintenance of the cylinder and piston.
- The cylinder and piston can be serviced with the engine installed in the frame.
- Be careful not to damage the mating surfaces when removing the cylinder.
- Take care not to damage the cylinder wall and piston.
- Clean the oil passage before installing the cylinder.

## TROUBLESHOOTING

### **Compression too low, hard starting or poor performance at low speed**

- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston
- Cylinder head/valve problem (page 10-3)

### **Compression too high, overheating or knocking**

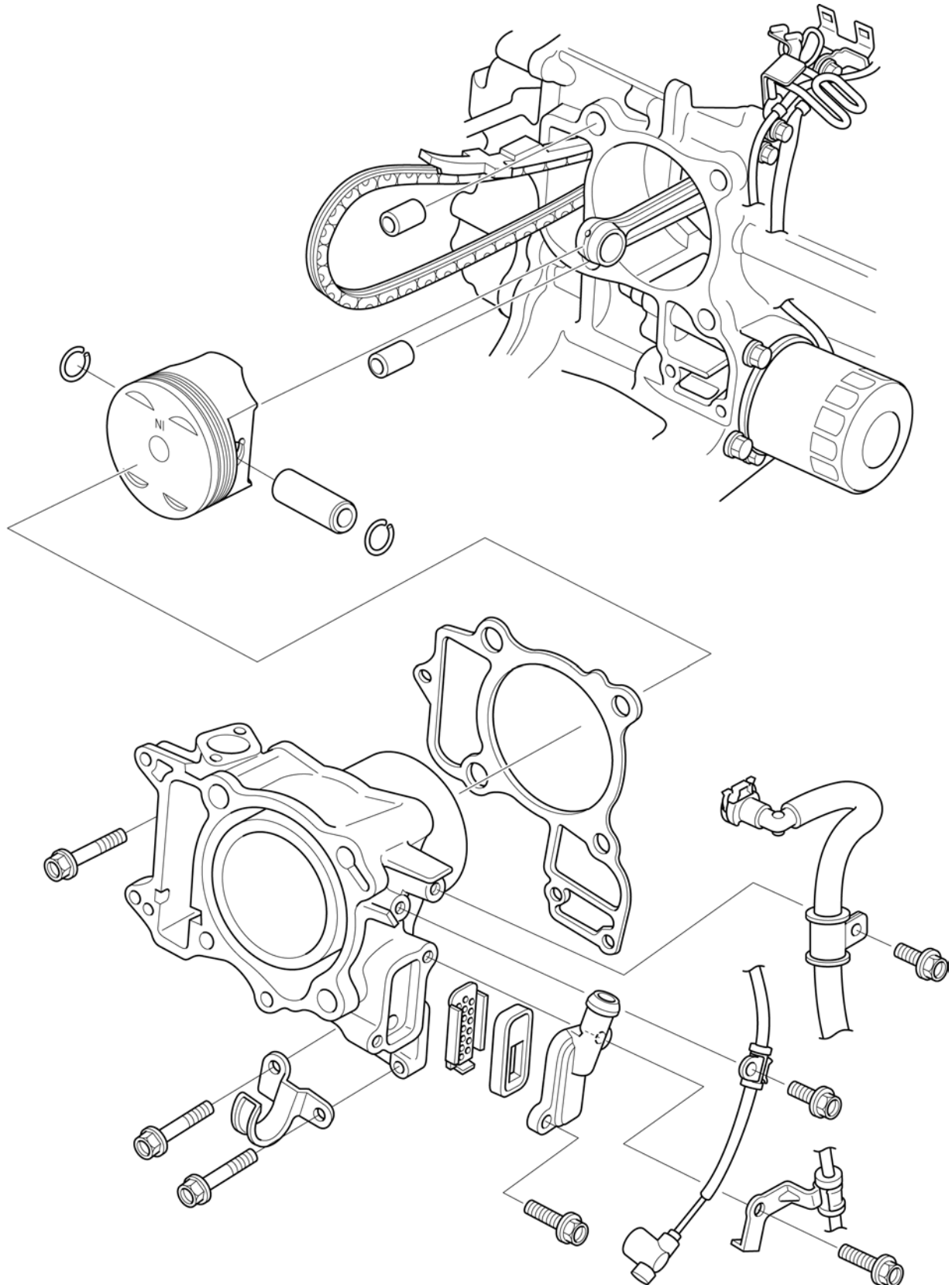
- Excessive carbon build-up on piston head or on combustion chamber

### **Excessive smoke**

- Worn cylinder, piston or piston ring
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall
- Cylinder head/valve problem (page 10-3)

### **Abnormal noise**

- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings

**COMPONENT LOCATION**

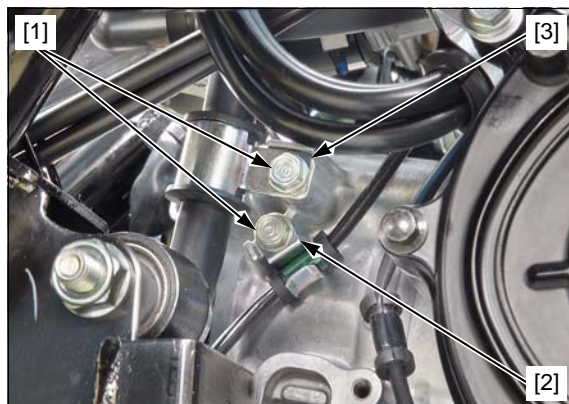
# CYLINDER/PISTON

### CYLINDER REMOVAL

Remove the following:

- Cylinder head (page 10-11)
- PAIR check valve (page 7-27)

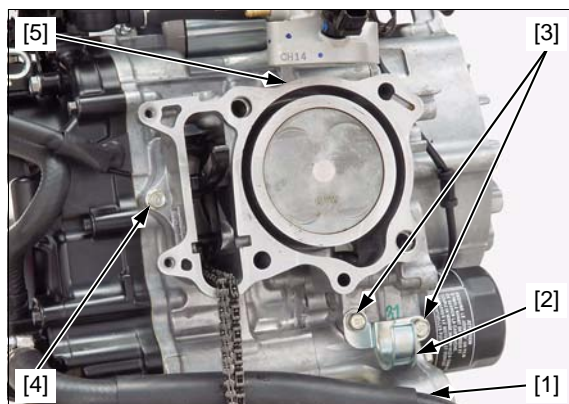
Remove the bolts [1], O<sub>2</sub> sensor wire clamp [2] and fuel feed hose clamp [3].



Release the water hose [1] from the clamp [2].

Remove the following:

- Bolts [3] and water hose clamp
- Bolt [4]
- Cylinder [5]



- Gasket [1]
- Dowel pins [2]

Clean off any gasket material from the cylinder mating surface.

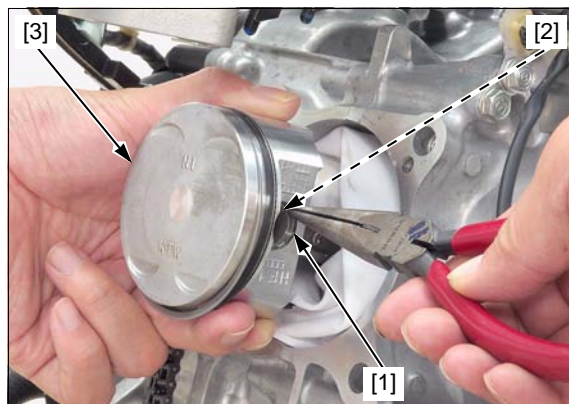


### PISTON REMOVAL

Remove the cylinder (page 11-4).

Place a clean shop towel over the crankcase to prevent the piston pin clip [1] from falling into the crankcase.

Remove the piston pin clips with pliers. Push the piston pin [2] out of the piston [3] and connecting rod, and remove the piston.

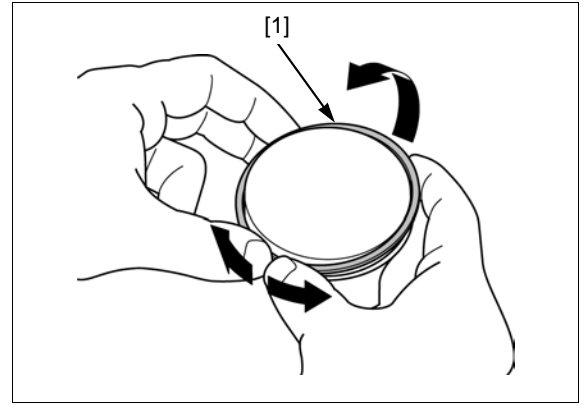


*Do not damage the piston ring by spreading the ends too far.*

*Never use a wire brush, it will scratch the groove.*

Spread each piston ring [1] and remove it by lifting up at a point opposite the gap.

Clean carbon deposits from the ring grooves with a ring that will be discarded.



## INSPECTION

Inspect the following parts for scratch, damage, abnormal wear, deformation, burning or clogs in oil passages.

- Cylinder
- Piston
- Piston rings
- Piston pin
- Connecting rod small end

Measure each part and calculate the clearance according to CYLINDER/PISTON SPECIFICATIONS (page 1-7).

Replace any part if it is out of service limit.

## PISTON INSTALLATION

Apply engine oil to the piston ring grooves.

Apply engine oil to the piston ring entire surface.

*Be careful not to damage the piston and rings.*

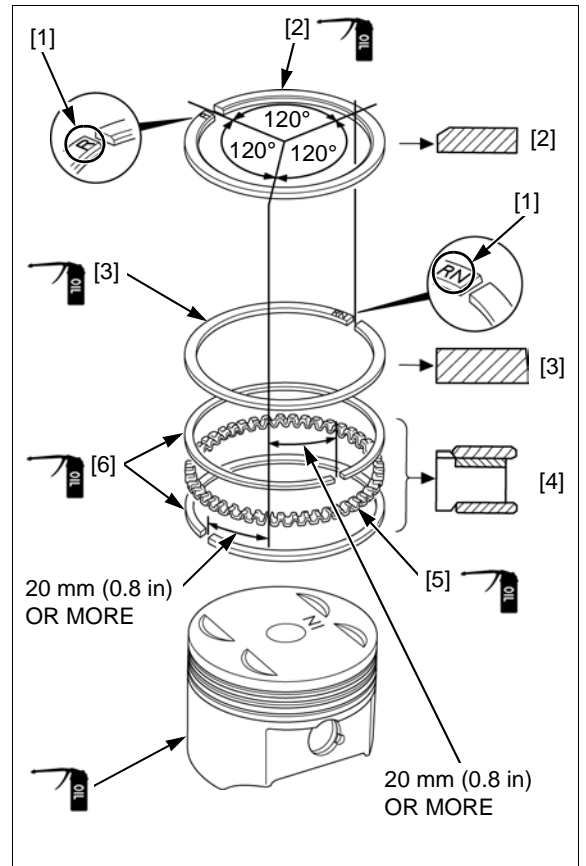
Carefully install the piston rings into the piston ring grooves with the markings [1] facing up.

- Do not confuse the top ring [2] and second ring [3].
- To install the oil ring [4], install the spacer [5] first, then install the side rails [6].

Stagger the piston ring end gaps 120° apart from each other.

Stagger the side rail end gaps as shown.

Apply engine oil to the piston pin hole inner surface and sliding surface.





## CYLINDER/PISTON

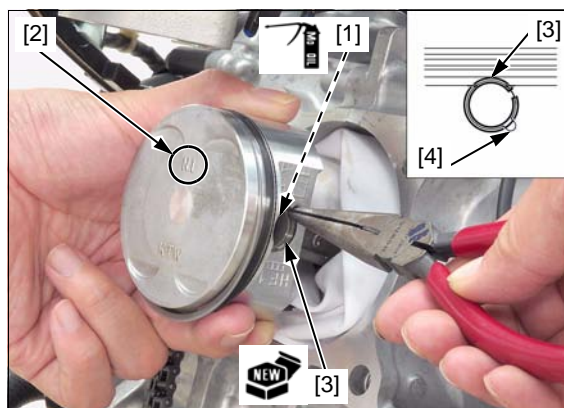
*Place a shop towel at the opening of the crankcase to prevent the piston pin clips from falling into the crankcase.*

Apply molybdenum oil solution to the connecting rod small end inner surface and piston pin [1] outer surface.

Install the piston with the "IN" mark [2] facing the intake side.

Install the piston pin and new piston pin clips [3].

- Make sure the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cut-out [4].



## CYLINDER INSTALLATION

*Be careful not to damage the mating surfaces.*

Clean the mating surfaces of the cylinder and crankcase thoroughly.

Blow out the oil passage in the cylinder with compressed air.

Install the dowel pins [1] and a new gasket [2].

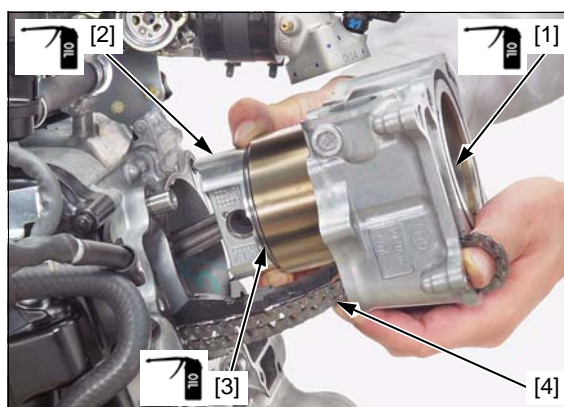


Apply engine oil to the cylinder [1] wall, piston [2] outer surface and piston rings [3].

*Be careful not to damage the piston rings and cylinder wall.*

Route the cam chain [4] through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.

Install the removed parts in the reverse order of removal.



# 12. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

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SERVICE INFORMATION .....	12-2	LEFT CRANKCASE COVER .....	12-5
TROUBLESHOOTING .....	12-3	DRIVE PULLEY .....	12-7
COMPONENT LOCATION .....	12-4	CLUTCH/DRIVEN PULLEY .....	12-9



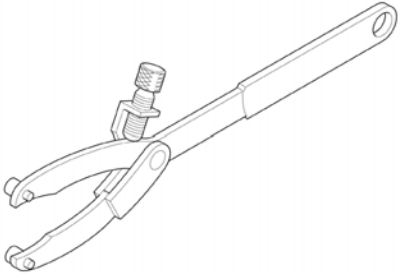
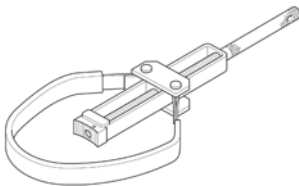
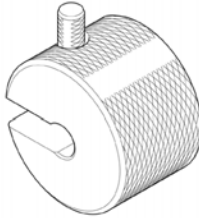




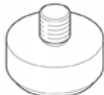
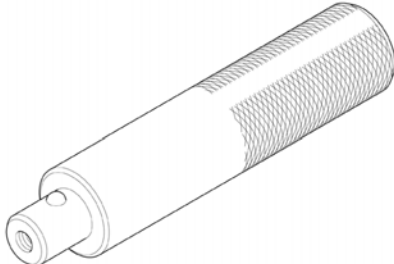
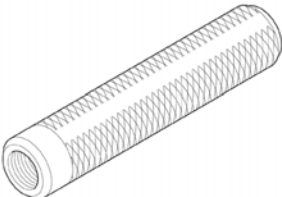
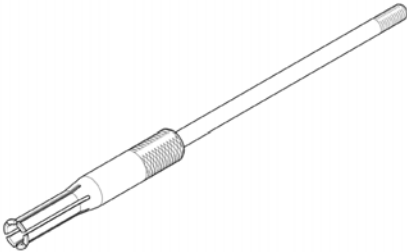
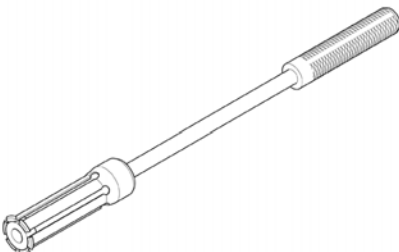
## DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

### SERVICE INFORMATION

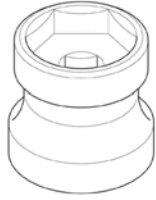
#### GENERAL

- This section covers maintenance of the drive pulley, driven pulley and clutch.
- These services can be done with the engine installed in the frame.
- Avoid getting grease and oil on the drive belt and drive/driven pulley faces in order to prevent belt slippage.
- Do not apply grease to the weight rollers.

#### TOOLS

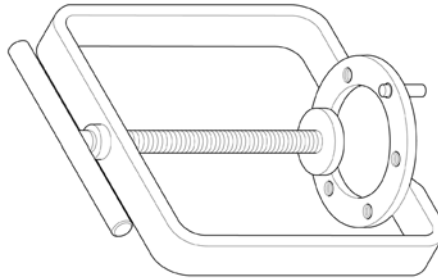
<p>Universal Holder 07725-0030000</p> 	<p>Flywheel Holder 07725-0040001</p> 	<p>Remover Weight 07741-0010201</p>  <p>or 07936-371020A (U.S.A. only) or 07936-3710200 (U.S.A. only)</p>
<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Pilot 20 mm 07746-0040500</p> 
<p>Pilot 25 mm 07746-0040600</p> 	<p>Pilot 28 mm 07746-0041100</p> 	<p>Driver 07749-0010000</p> 
<p>Remover Handle 07936-3710100</p> 	<p>Bearing Remover, 20 mm 07936-3710600</p> 	<p>Bearing Remover Shaft Set, 25 mm 07936-ZV10100</p>  <p>or 07936-ZV1010A (U.S.A. only)</p>

Socket Wrench 39 x 41  
07GMA-KS40100



or equivalent commercially available in  
U.S.A.

Compressor Clutch Spring  
07LME-GZ40201



or 07960-KM1000A (U.S.A. only)  
or 07960-KM1000B (U.S.A. only)

## TROUBLESHOOTING

### **Engine starts but scooter won't move**

- Worn drive belt
- Damaged ramp plate
- Worn or damaged clutch shoe
- Broken driven face spring

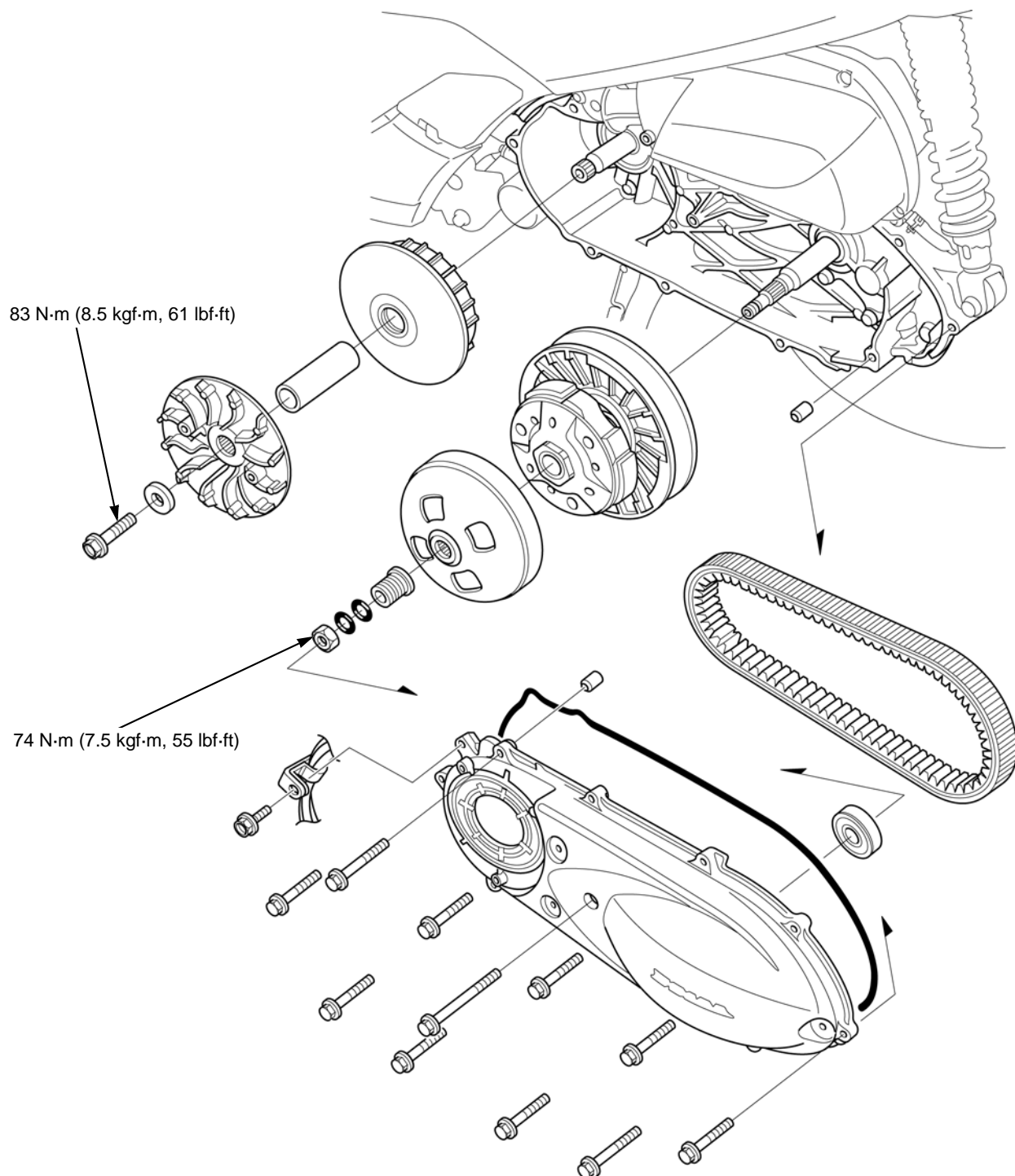
### **Engine stalls or scooter creeps**

- Broken clutch shoe spring

### **Poor performance at high speed or lack of power**

- Worn drive belt
- Weak driven face spring
- Worn weight rollers
- Contaminated pulley faces

**COMPONENT LOCATION**

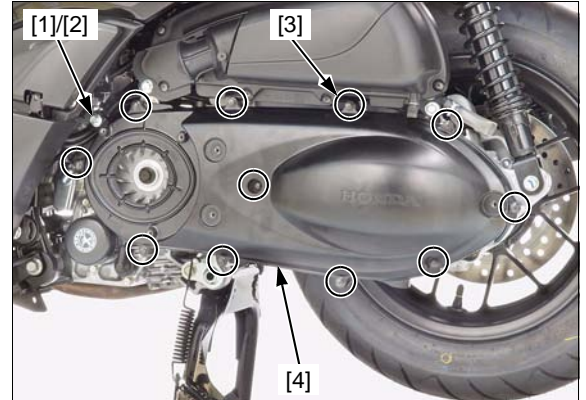


## LEFT CRANKCASE COVER

### REMOVAL/INSPECTION

Remove the following:

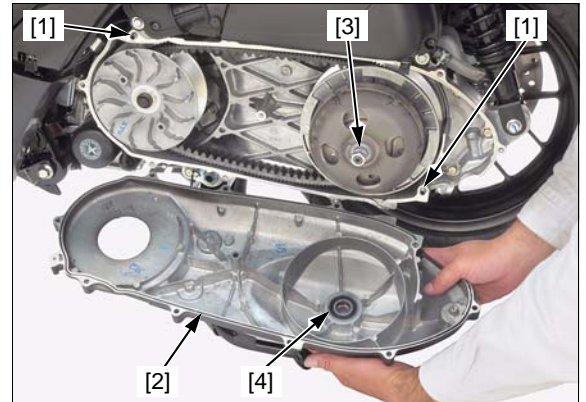
- Belt case air cleaner housing (page 3-14)
- Left crankcase outer cover (page 2-20)
- Bolt (10 mm head) [1] and wire clamp [2]
- Bolts (8 mm head) [3]
- Left crankcase cover [4]



- Dowel pins [1]
- Rubber seal [2]
- O-rings [3]

Inspect the drive shaft bearing [4] and replace it if necessary (page 12-5).

Check the rubber seal and replace it if necessary.



### DRIVE SHAFT BEARING REPLACEMENT

Remove the drive shaft bearing [1] from the left crankcase cover using the special tools.

#### TOOLS:

**Bearing Remover, 20 mm [2]**

**Remover Handle [3]**

**Remover Weight [4]**

**07936-3710600**

**07936-3710100**

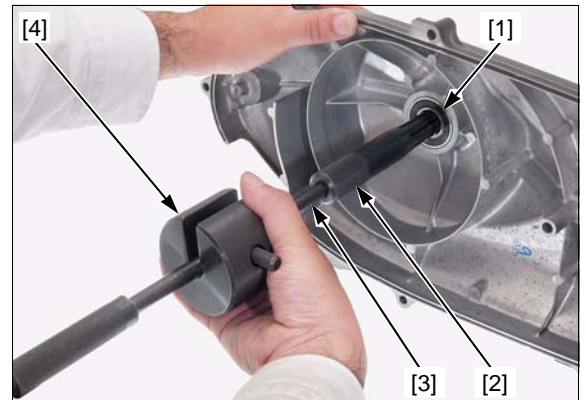
**07741-0010201 or**

**07936-371020A**

**(U.S.A. only) or**

**07936-3710200**

**(U.S.A. only)**



## DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

Drive a new bearing [1] into the left crankcase cover squarely until it is fully seated, using the special tools.

### TOOLS:

Driver [2]

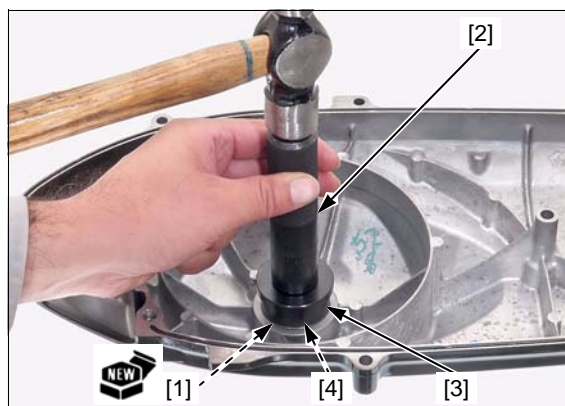
07749-0010000

Attachment, 42 x 47 mm [3]

07746-0010300

Pilot 20 mm [4]

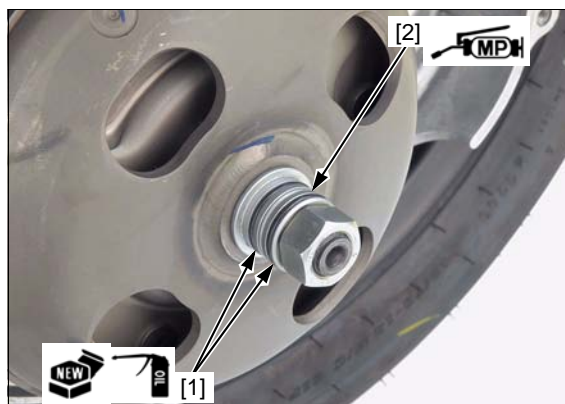
07746-0040500



## INSTALLATION

Coat new O-rings [1] with oil and install them to collar grooves.

Fill up the drive shaft bearing collar groove [2] with molybdenum disulfide paste.

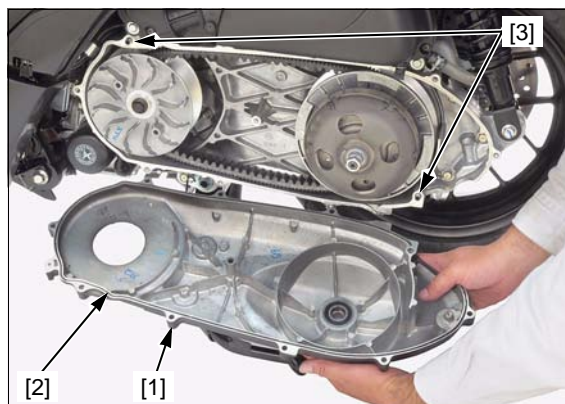


Clean the rubber seal groove in the left crankcase cover [1].

Install the rubber seal [2] onto the left crankcase cover.

Install the dowel pins [3] into the left crankcase.

Temporarily install the left crankcase cover and then remove it.

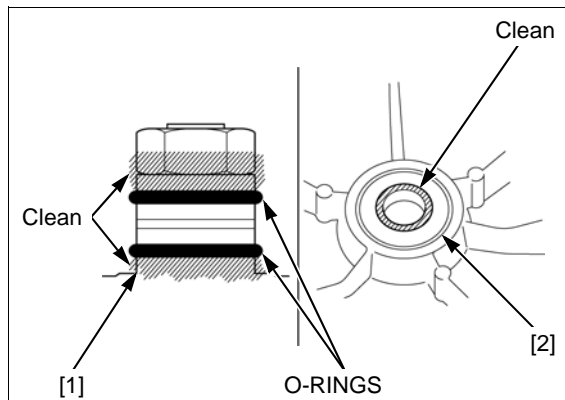


Check the hatched areas of drive shaft bearing collar [1] and bearing [2] as shown in the illustration for adhesion of the molybdenum disulfide paste.

If there is any paste on the hatched areas, wipe it off thoroughly.

### NOTICE

*Excess paste may adhere to the drive belt, drive pulley and driven pulley while riding.*





*Be careful not to damage the rubber seal.*

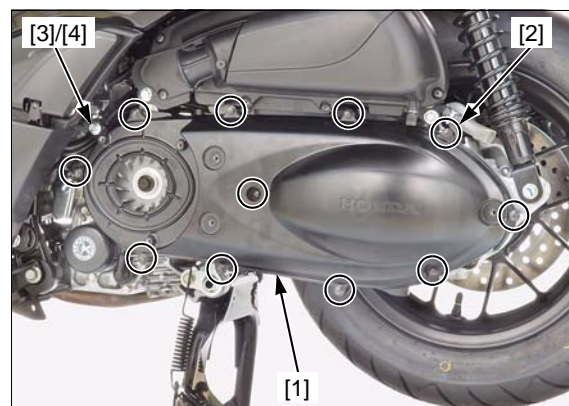
Install the left crankcase cover [1] onto the left crankcase by aligning the holes with the dowel pins.

Install the bolts (8 mm head) [2] and tighten them in a crisscross pattern in 2 or 3 steps.

Set the wire clamp [3] and tighten the bolt (10 mm head) [4].

Install the following:

- Left crankcase outer cover (page 2-20)
- Belt case air cleaner housing (page 3-14)



## DRIVE PULLEY

### REMOVAL

Remove the left crankcase cover (page 12-5).

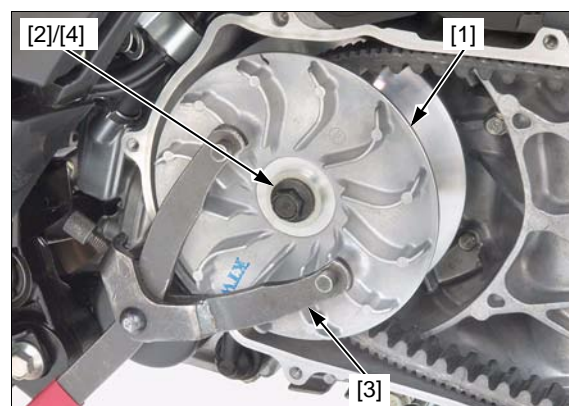
Hold the drive pulley face [1] with special tool and loosen the drive pulley face bolt [2].

**TOOL:**

**Universal Holder [3]**

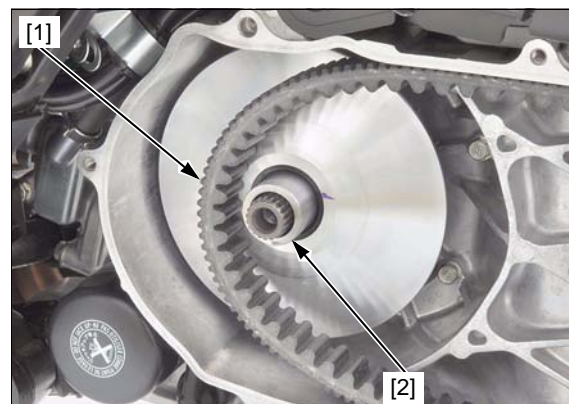
**07725-0030000**

Remove the bolt, washer [4] and drive pulley face.



*The drive belt removal requires clutch/driven pulley removal (page 12-9).*

Release the drive belt [1] from the drive face boss [2].



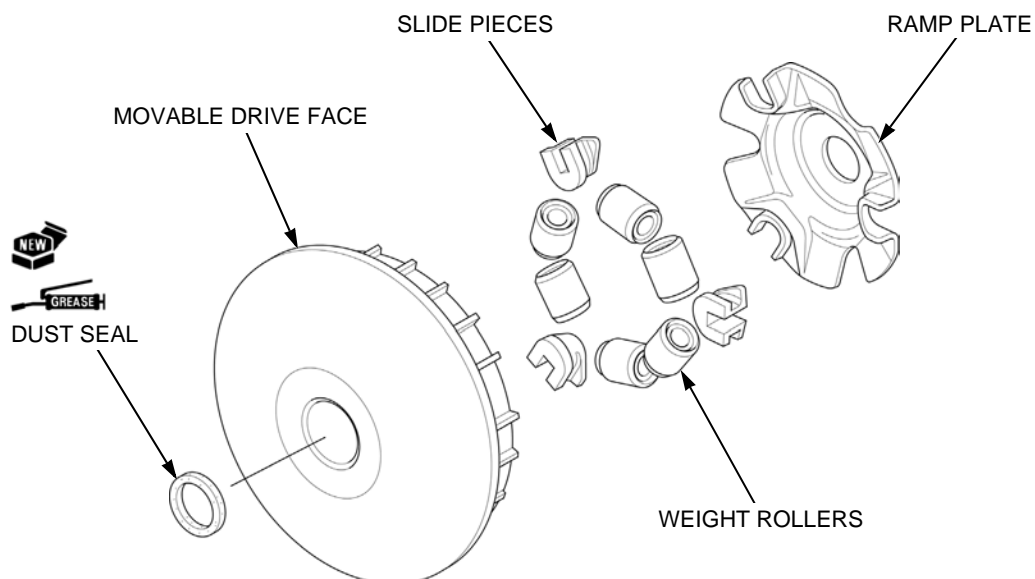
Remove the movable drive face assembly [1] while holding the back of the ramp plate.

Remove the drive face boss [2] from the movable drive face assembly.



## DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

### MOVABLE DRIVE FACE DISASSEMBLY/ASSEMBLY



### INSPECTION

Inspect the following parts for damage, abnormal wear, deformation and scratch.

Replace if necessary.

- Drive pulley face
- Movable drive face
- Drive face boss
- Ramp plate
- Slide pieces
- Weight rollers

Measure each part according to DRIVE PULLEY/  
DRIVEN PULLEY/CLUTCH SPECIFICATIONS (page  
1-8).

Replace any part if it is out of service limit.

### INSTALLATION

#### NOTICE

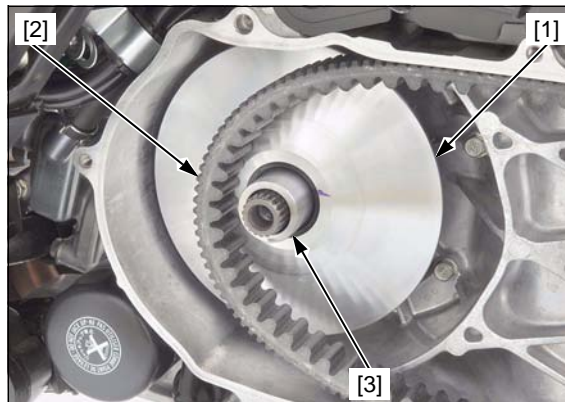
- *Avoid getting grease or oil on the drive belt and drive pulley faces in order to prevent belt slippage.*
- *Do not apply grease to the movable drive face and weight rollers.*

Clean any oil and grease from the movable drive face [1] and the drive belt [2].

Install the drive face boss [3] into the movable drive face assembly.

Install the movable drive face assembly onto the crankshaft while holding the ramp plate.

Install the drive belt onto the drive face boss.

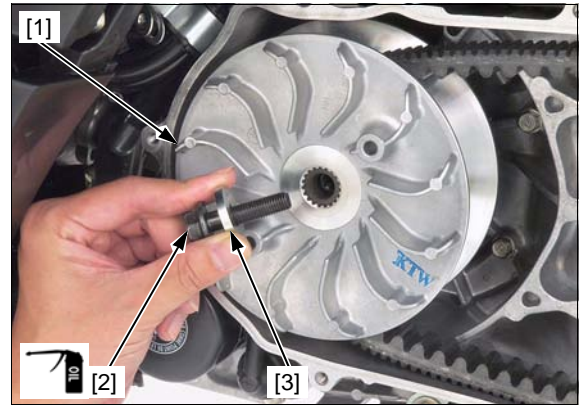


Clean any oil and grease from the drive pulley face [1].

Install the drive pulley face.

Apply engine oil to the threads and seating surface of the drive pulley face bolt [2].

Install the washer [3] and drive pulley face bolt.



Hold the drive pulley face [1] with the special tool and tighten the drive pulley face bolt [2] to the specified torque.

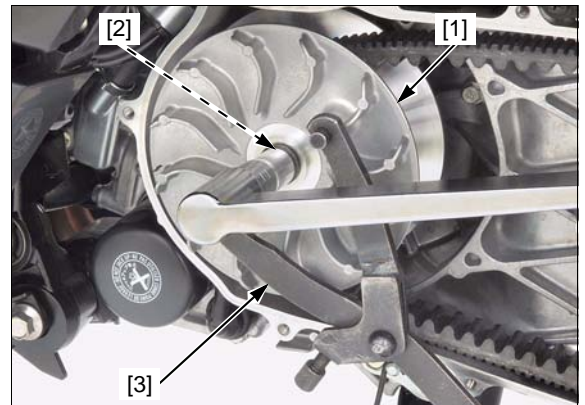
**TOOL:**

**Universal Holder [3]**

**07725-0030000**

**TORQUE: 83 N·m (8.5 kgf·m, 61 lbf·ft)**

Install the left crankcase cover (page 12-6).



## CLUTCH/DRIVEN PULLEY

### REMOVAL

Remove the drive pulley face (page 12-7).

Hold the clutch outer [1] with the special tool and loosen the clutch outer nut [2].

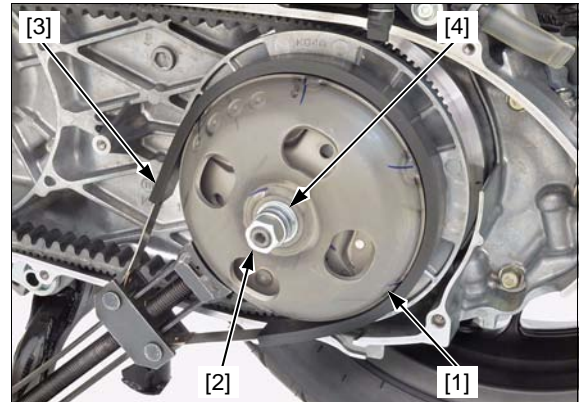
**TOOL:**

**Flywheel Holder [3]**

**07725-0040001**

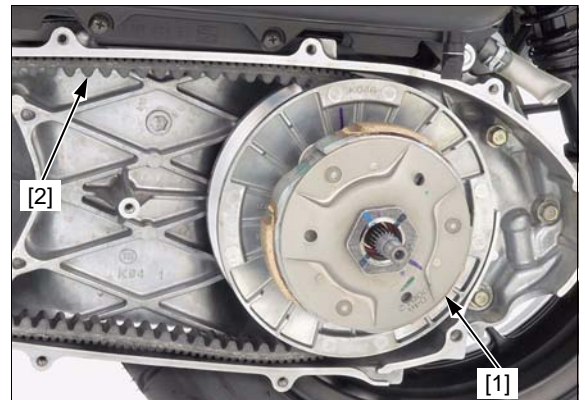
Remove the nut, drive shaft bearing collar [4] and clutch outer.

Remove the O-rings from the drive shaft bearing collar.



Remove the clutch/driven pulley assembly [1] with the drive belt [2] from the drive shaft.

Remove the drive belt from the driven pulley.





## DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

### DISASSEMBLY

#### CLUTCH/DRIVEN PULLEY

Set the clutch spring compressor [1] onto the clutch/driven pulley assembly [2] by aligning the bosses with the holes in the clutch.

*To prevent loss of tension, do not compress the clutch spring more than necessary to remove the clutch/driven pulley nut.*

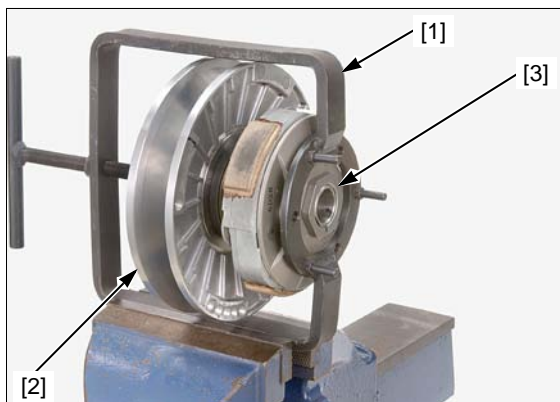
Hold the clutch spring compressor in a vise and remove the clutch/driven pulley nut [3] using the socket wrench.

#### TOOLS:

##### Compressor Clutch Spring

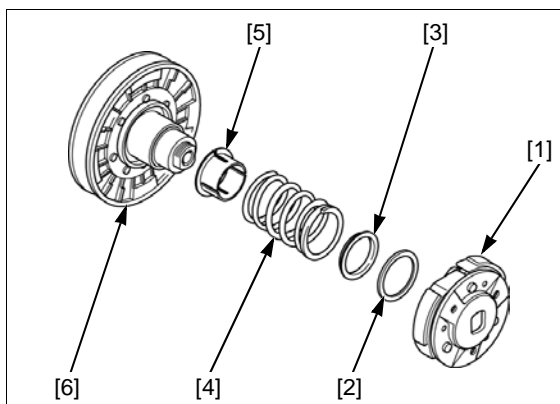
07LME-GZ40201 or  
07960-KM1000A  
(U.S.A. only) or  
07960-KM1000B  
(U.S.A. only)  
07GMA-KS40100 or  
equivalent  
commercially  
available in U.S.A.

##### Socket Wrench 39 x 41



Loosen the clutch spring compressor gradually and remove the following:

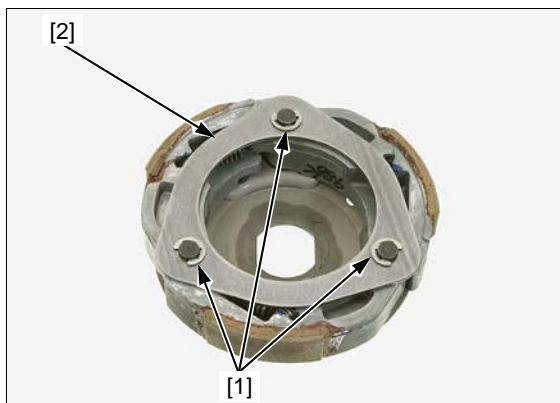
- Clutch assembly [1]
- Spring seat [2]
- Spring collar B [3]
- Driven face spring [4]
- Spring collar A [5]
- Driven pulley assembly [6]



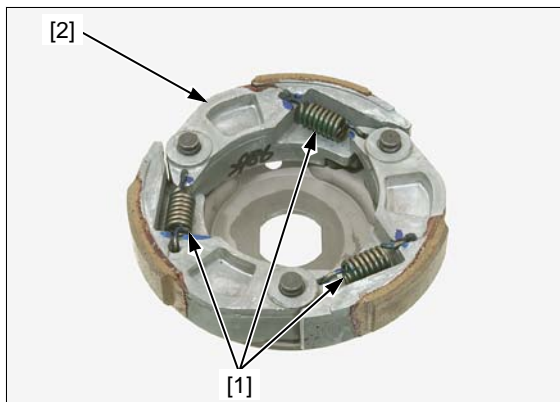
#### CLUTCH

Remove the following:

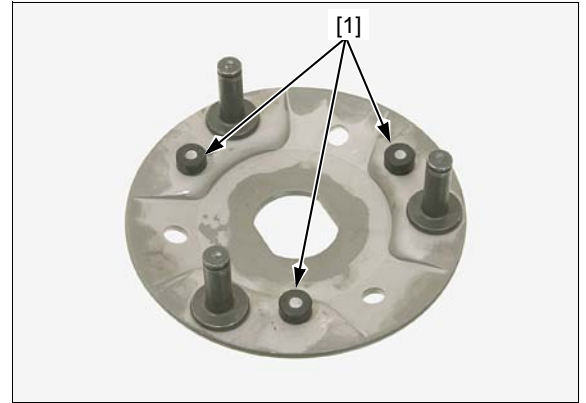
- E-clips [1]
- Side plate [2]



- Shoe springs [1]
- Clutch shoes [2]



- Rubber dampers [1]



### DRIVEN PULLEY

Remove the following:

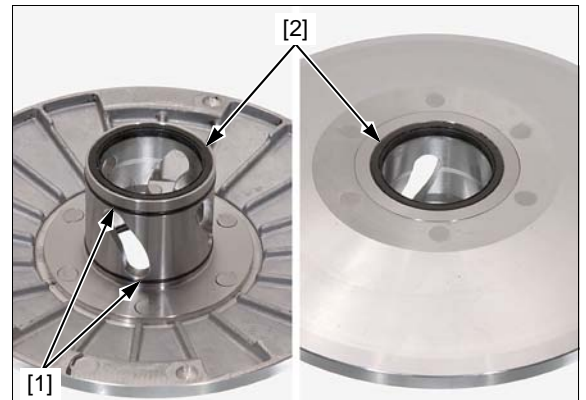
- Seal collar [1]



- Guide roller pins [1] and rollers [2]
- Movable driven face [3]



- O-rings [1]
- Oil seals [2]



### DRIVEN FACE BEARING REPLACEMENT

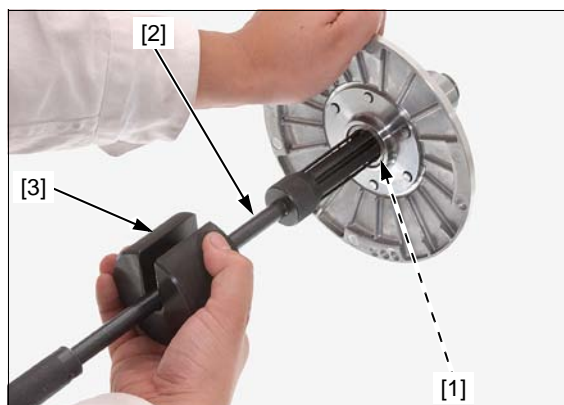
Remove the driven face needle bearing [1] using the special tools.

**TOOLS:**

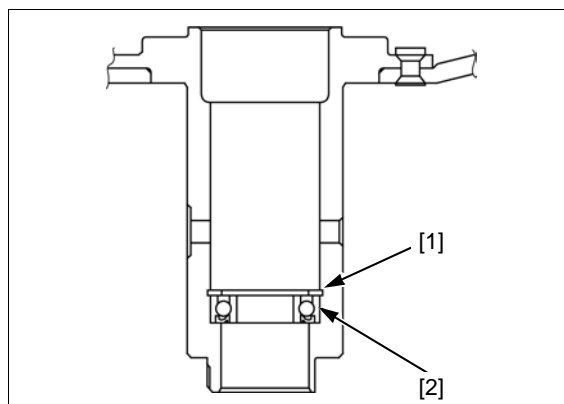
**Bearing Remover Shaft Set, 25 mm [2]**

**Remover Weight [3]**

**07936-ZV10100 or 07936-ZV1010A (U.S.A. only)**  
**07741-0010201 or 07936-371020A (U.S.A. only) or 07936-3710200 (U.S.A. only)**



Remove the snap ring [1] and drive out the ball bearing [2].



Pack new ball bearing [1] cavity with grease.

Drive the ball bearing into the driven face with the sealed side facing down until it is fully seated using the special tool.

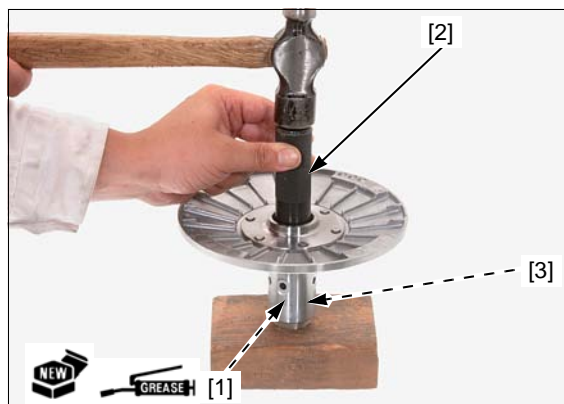
**TOOLS:**

**Driver [2]**

**Pilot 28 mm [3]**

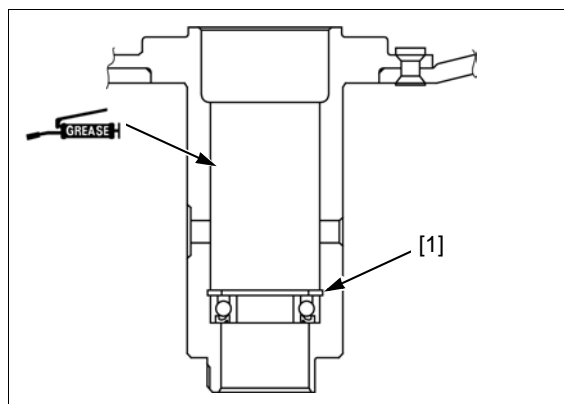
**07749-0010000**

**07746-0041100**



Install the snap ring [1] to the groove in the driven face securely.

Apply grease (5 – 7 g (0.18 – 0.25 oz)) to the driven face boss inner surface.



Apply grease to rollers of a new needle bearing [1].

Drive the needle bearing into the driven face squarely with the sealed side facing up so that the depth from the driven face surface is 0.8 mm (0.03 in) using the special tool.

### TOOLS:

**Driver [2]**

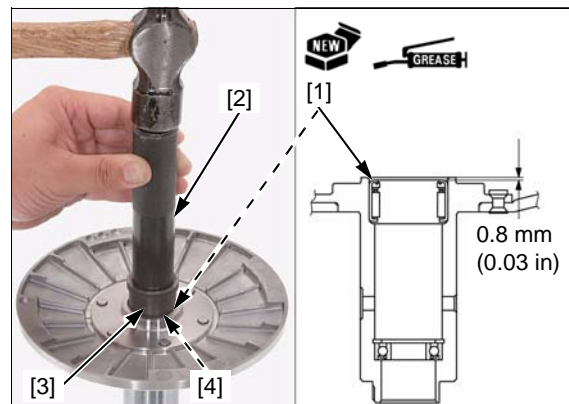
**07749-0010000**

**Attachment, 32 x 35 mm [3]**

**07746-0010100**

**Pilot 25 mm [4]**

**07746-0040600**



## INSPECTION

Inspect the following parts for damage, abnormal wear, deformation and scratch.

Replace if necessary.

- Drive belt
- Clutch outer
- Drive plate
- Rubber dampers
- Clutch shoes
- Shoe springs
- Side plate
- E-clips
- Spring seat
- Spring collar B
- Driven face spring
- Spring collar A
- Seal collar
- Movable driven face
- Driven face
- Guide roller pins
- Guide rollers

Measure each part according to DRIVE PULLEY/CLUTCH SPECIFICATIONS (page 1-8).

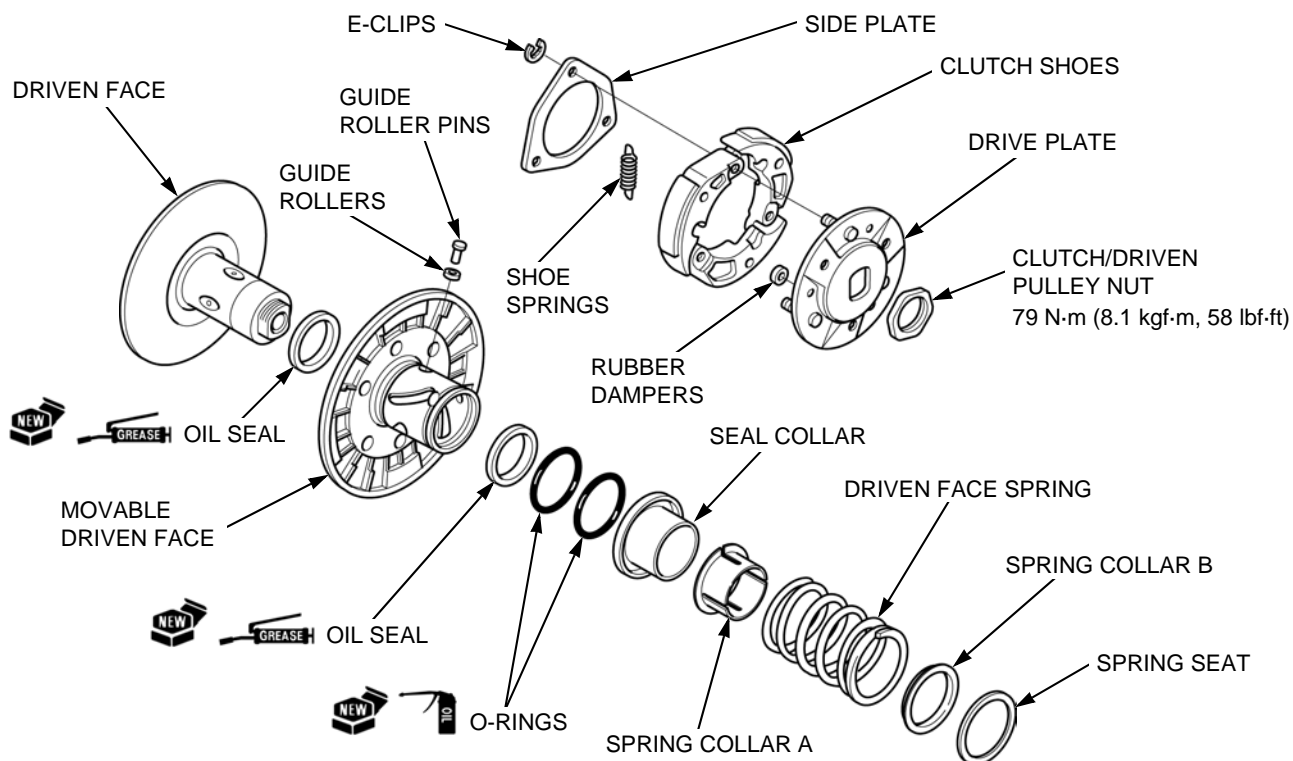
Replace any part if it is out of service limit.

## DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

### ASSEMBLY

#### NOTICE

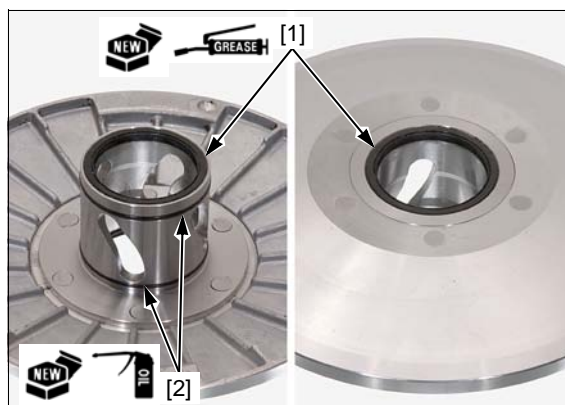
- Apply specified quantity of grease to the inside of the driven face and the guide grooves in the movable driven face.
- Avoid getting grease or oil on the clutch shoe linings and driven pulley faces. Discard contaminated clutch shoes and clean contaminated pulley faces with a high quality degreasing agent.



#### DRIVEN PULLEY

Apply grease to new oil seal [1] lips and outer surfaces, and install them into the movable driven face.

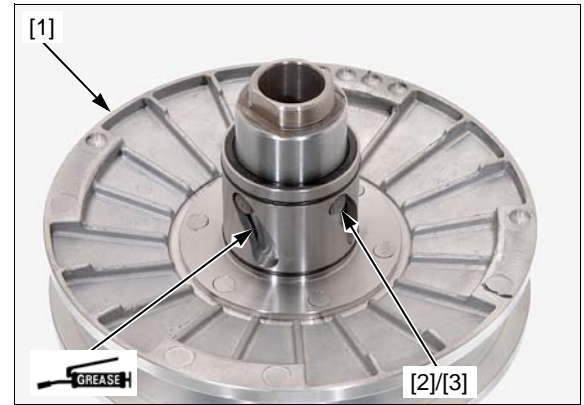
Coat new O-rings [2] with engine oil and install them into the movable driven face grooves.



Clean any oil and grease from the pulley face.

Install the movable driven face [1] onto the driven face.  
Install the rollers [2] and guide roller pins [3].

Apply grease (4 – 5 g (0.14 – 0.18 oz)) to the guide grooves.

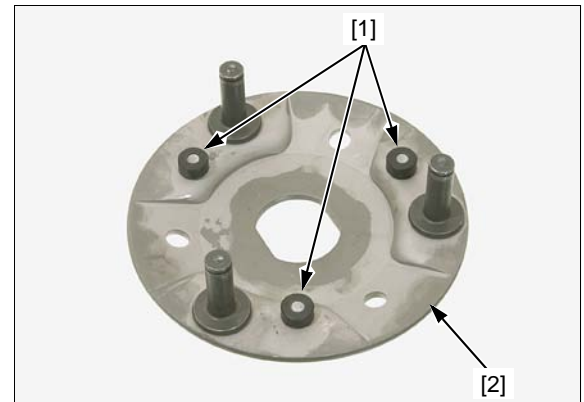


Install the seal collar [1] onto the driven pulley.  
Clean any oil and grease from the pulley face.

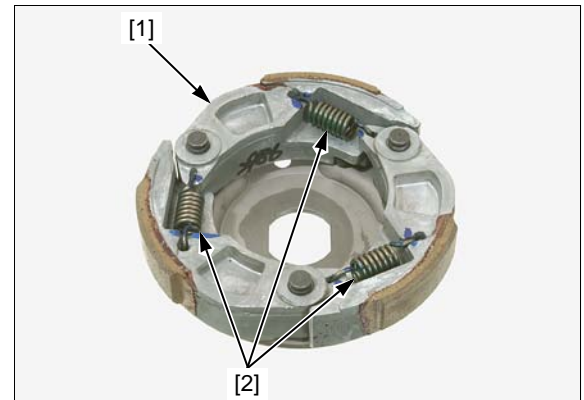


### CLUTCH

Install the rubber dampers [1] onto the drive plate [2].



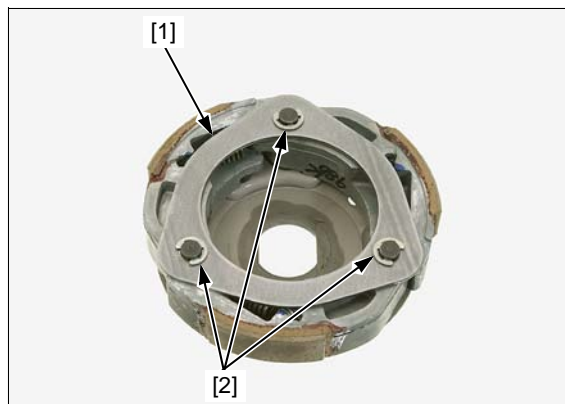
Install the clutch shoes [1] and shoe springs [2] onto the drive plate.





## DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

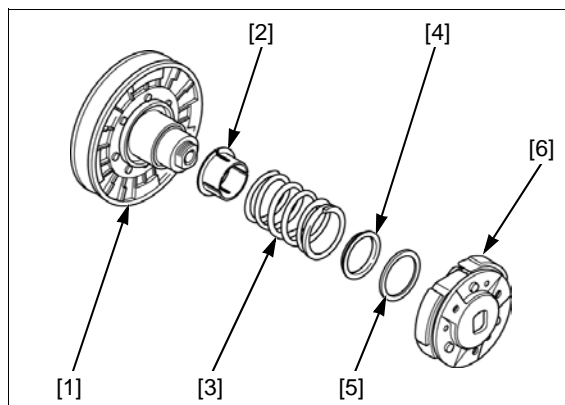
Install the clutch side plate [1] and secure it with the E-clips [2].



### CLUTCH/DRIVEN PULLEY

Assemble the following:

- Driven pulley assembly [1]
- Spring collar A [2]
- Driven face spring [3]
- Spring collar B [4]
- Spring seat [5]
- Clutch assembly [6]



Set the clutch spring compressor [1] over the clutch/driven pulley assembly [2] by aligning the bosses with the holes in the clutch.

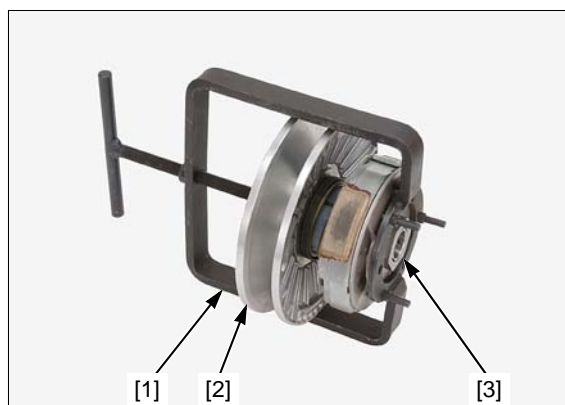
#### TOOL:

**Compressor Clutch Spring**

**07LME-GZ40201 or  
07960-KM1000A  
(U.S.A. only) or  
07960-KM1000B  
(U.S.A. only)**

*To prevent loss of tension, do not compress the clutch spring more than necessary to install the clutch/driven pulley nut.*

Compress the driven face spring while aligning the flat surfaces of the driven pulley and clutch. Install the clutch/driven pulley nut [3].



Hold the spring compressor [1] in a vice and tighten the clutch/driven pulley nut [2] using the special tool to the specified torque.

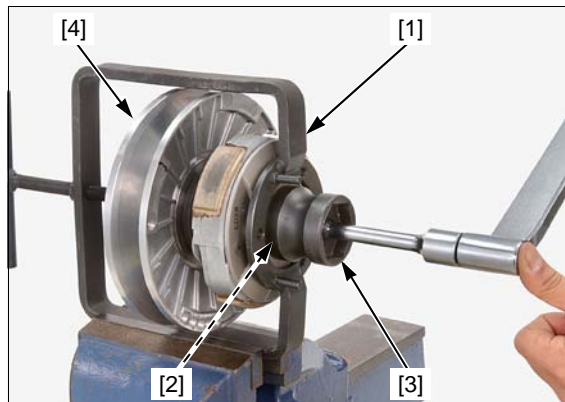
#### TOOL:

**Socket Wrench 39 x 41 [3]**

**07GMA-KS40100 or  
equivalent  
commercially  
available in U.S.A.**

**TORQUE: 79 N·m (8.1 kgf·m, 58 lbf·ft)**

Remove the clutch/driven pulley assembly [4] from the spring compressor.

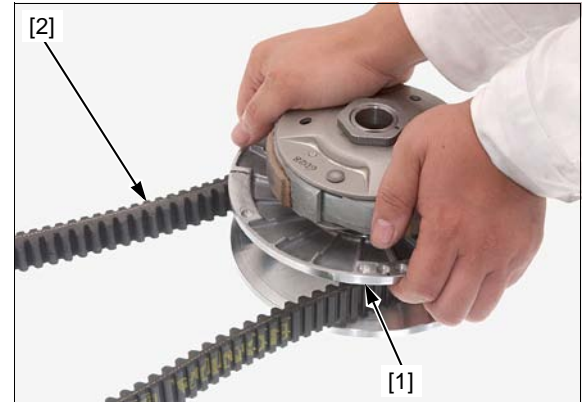




## INSTALLATION

Clean any oil and grease from the driven faces.

Spread the driven pulley width by compressing the driven face spring while turning the movable driven face [1] clockwise, and install the drive belt [2] into the driven pulley.



*Take care not to get grease of the driven face inner surface to the splines and threads of the drive shaft.*

Install the clutch/driven pulley assembly [1] onto the drive shaft, and the drive belt onto the drive face boss.



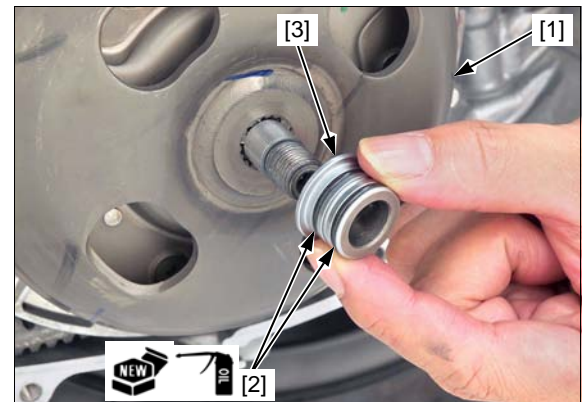
Clean any oil and grease from the clutch outer.

Install the clutch outer [1] onto the drive shaft by aligning the splines.

Apply engine oil to new O-rings [2].

Install O-rings to the drive shaft bearing collar [3] grooves.

Install the drive shaft bearing collar onto the drive shaft.



Install the clutch outer nut [1] onto the drive shaft.

Hold the clutch outer [2] with the special tool and tighten the clutch outer nut to the specified torque.

**TOOL:**

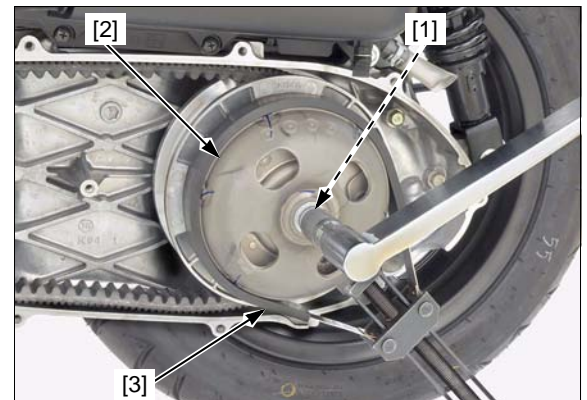
**Flywheel Holder [3]**

**07725-0040001**

**TORQUE: 74 N·m (7.5 kgf·m, 55 lbf·ft)**

Install the following:

- Drive pulley face (page 12-8)
- Left crankcase cover (page 12-6)
- Left crankcase outer cover (page 2-20)
- Belt case air cleaner housing (page 3-14)



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## MEMO

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# 13. FINAL REDUCTION

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SERVICE INFORMATION .....	13-2	COMPONENT LOCATION .....	13-4
TROUBLESHOOTING .....	13-3	FINAL REDUCTION .....	13-5

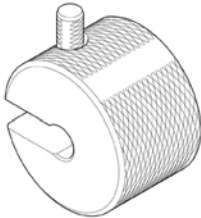
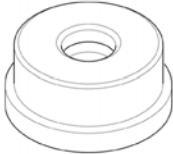
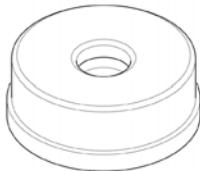





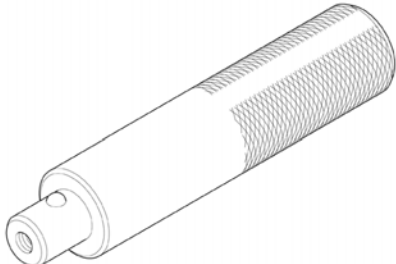
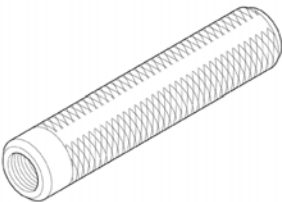
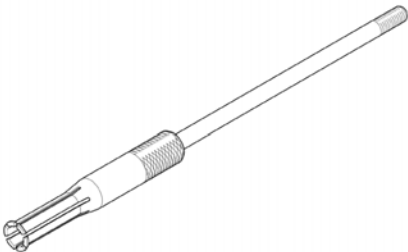
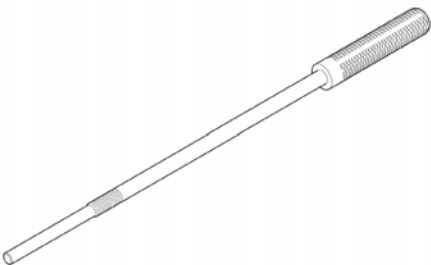
## FINAL REDUCTION

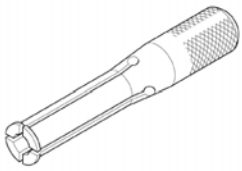
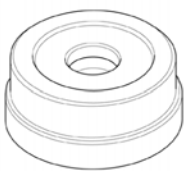
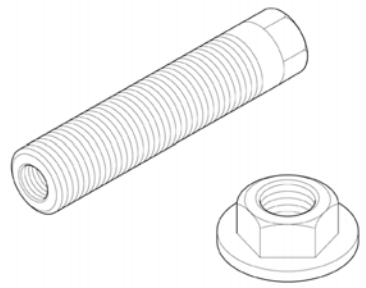
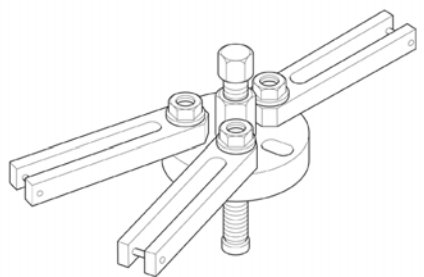
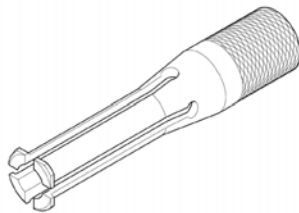
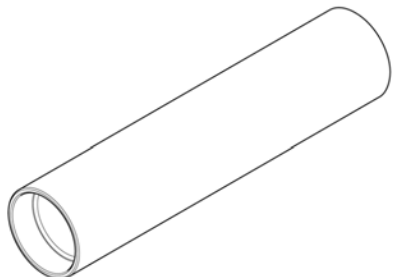
# SERVICE INFORMATION

### GENERAL

- The final reduction can be serviced with the engine installed in the frame.
- For final reduction oil level check and change (page 3-15).
- When installing the drive shaft, be sure to use the special tools; position the special tools against the bearing inner race and pull the drive shaft into the bearing until it is fully seated.

### TOOLS

<p>Remover Weight 07741-0010201</p>  <p>or 07936-371020A (U.S.A. only) or 07936-3710200 (U.S.A. only)</p>	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Attachment, 52 x 55 mm 07746-0010400</p> 
<p>Attachment, 22 x 24 mm 07746-0010800</p> 	<p>Pilot 15 mm 07746-0040300</p> 	<p>Pilot 20 mm 07746-0040500</p> 
<p>Pilot 25 mm 07746-0040600</p> 	<p>Pilot 14 mm 07746-0041200</p> 	<p>Driver 07749-0010000</p> 
<p>Remover Handle 07936-3710100</p> 	<p>Bearing Remover, 20 mm 07936-3710600</p> 	<p>Remover Shaft, 15 mm 07936-KC10100</p> 

<p>Remover Head, 15 mm 07936-KC10200</p> 	<p>Bearing Driver Attachment 48.2 x 51.5 07946-3290000</p> 	<p>Threaded Shaft 12 x 1.25 x 80L 07965-VM00200</p> 
<p>Case Housing/Driven Gear Puller 07SMC-0010001</p> 	<p>Bearing Remover Head 14 07WMC-KFG0100</p> 	<p>Collar 30.1 x 34 x 15 mm 07YMF-KPB0100</p> 

## TROUBLESHOOTING

### Engine does start but scooter won't move

- Damaged final reduction
- Seized final reduction
- Faulty drive pulley and driven pulley/clutch (page 12-3)

### Abnormal noise

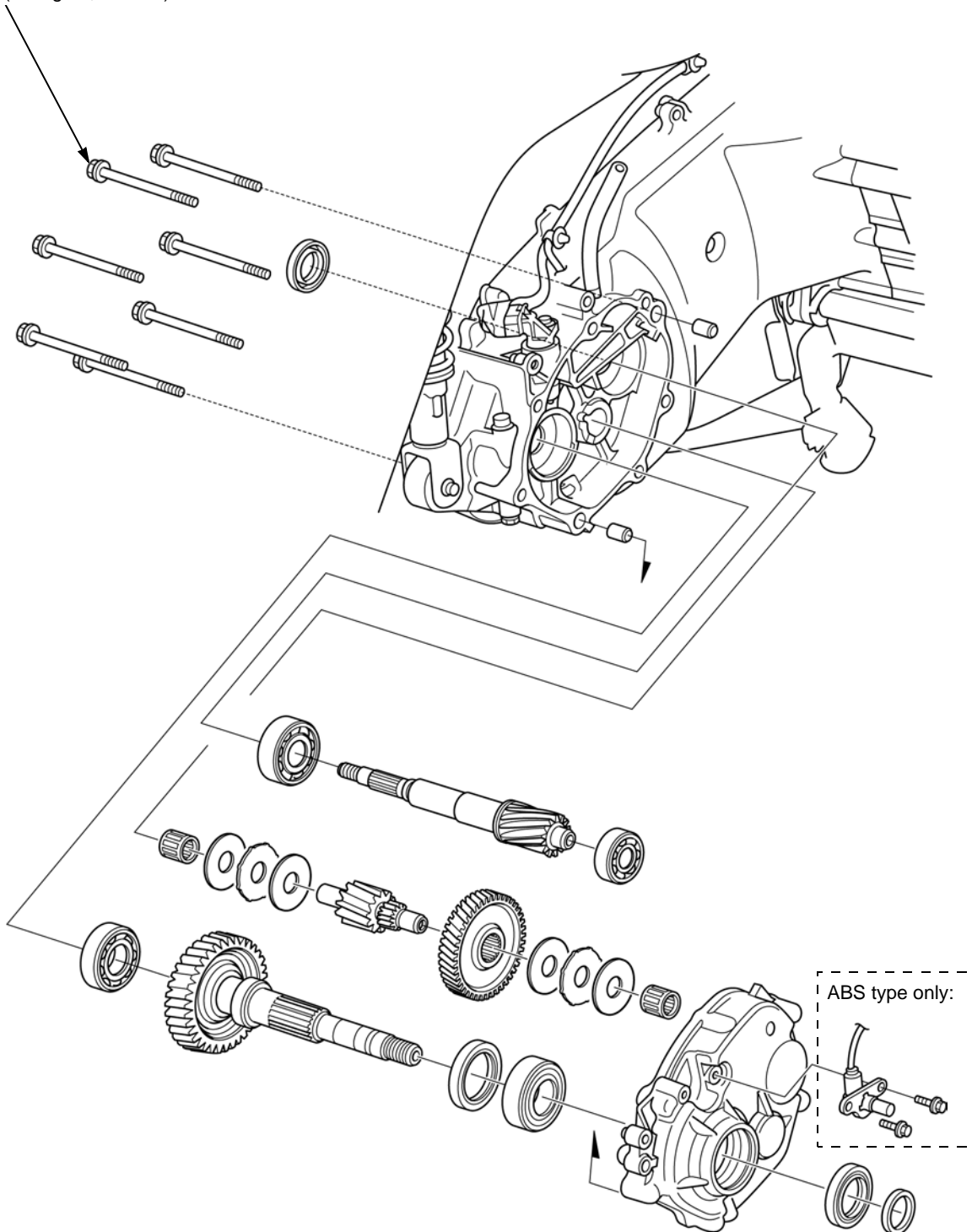
- Worn, seized or chipped gears
- Worn or damaged final reduction bearing

### Oil leak

- Oil level too high
- Worn or damaged oil seal
- Cracked crankcase and/or final reduction case

## COMPONENT LOCATION

24 N·m (2.4 kgf·m, 18 lbf·ft)



## FINAL REDUCTION

### DISASSEMBLY

Remove the following:

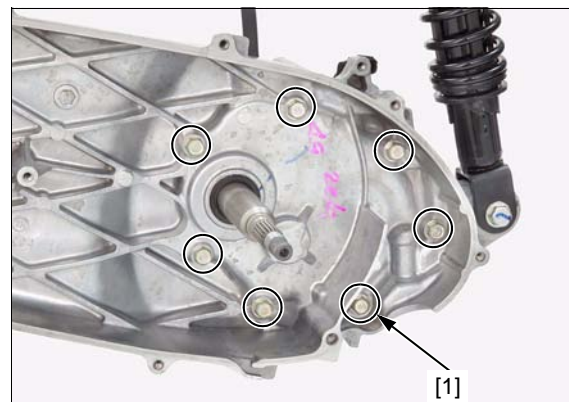
- Clutch/driven pulley (page 12-9)
- Sensor protector (page 20-21)

*ABS type only:* Remove the rear wheel speed sensor (page 20-21).

Drain the final drive oil (page 3-16).

Remove the following from the left crankcase:

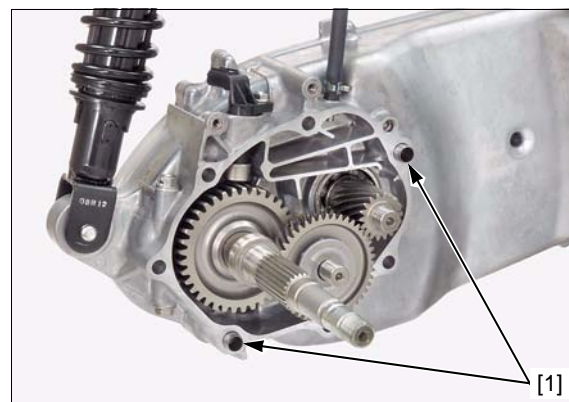
- Final reduction case bolts [1]



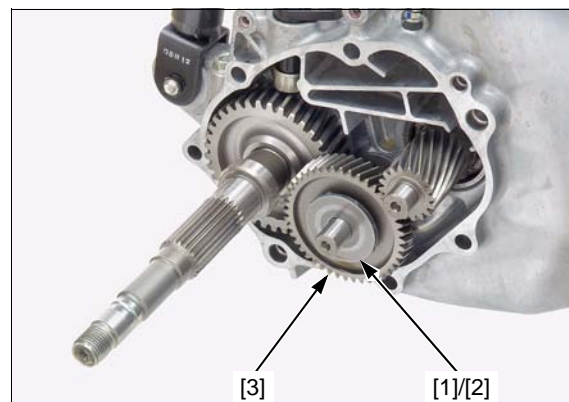
- Final reduction case [1]



- Dowel pins [1]



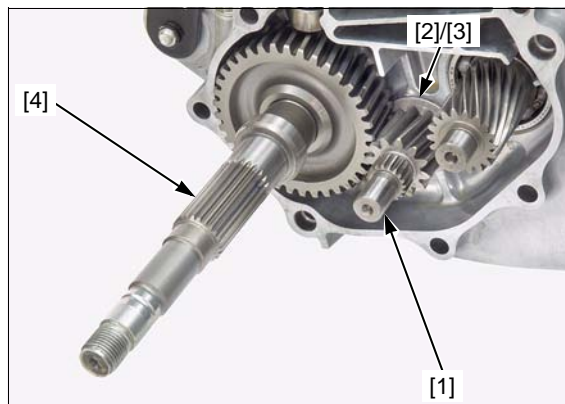
- Thrust washers [1]
- Center washer [2]
- Counter gear [3]





## FINAL REDUCTION

- Counter gear shaft [1]
- Thrust washers [2]
- Center washer [3]
- Final gear shaft [4]

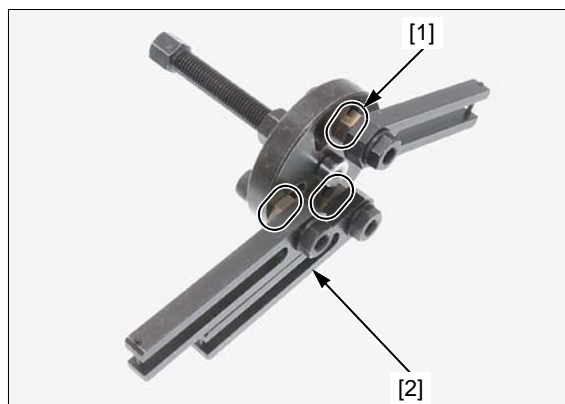


Install the three 10 mm nuts [1] to the special tool.

### TOOL:

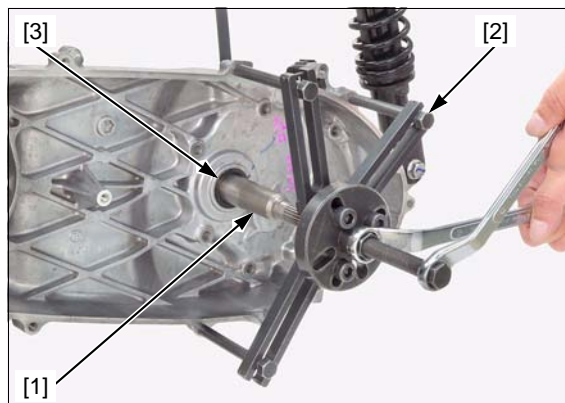
**Case Housing/Driven Gear  
Puller**

**07SMC-0010001**

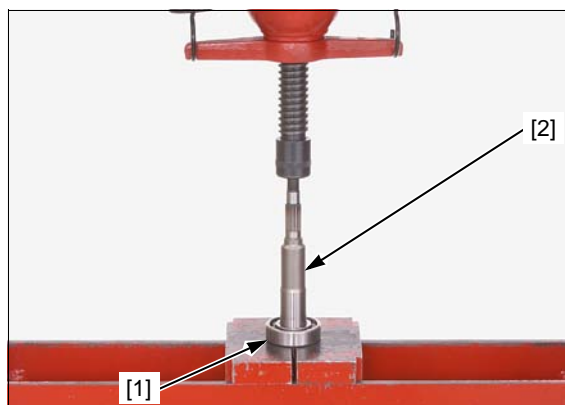


Remove the drive shaft [1] using the case housing/  
driven gear puller [2].

Remove the oil seal [3] from the crankcase.



If the drive shaft bearing [1] is left on the drive shaft [2],  
remove it using a hydraulic press.



## INSPECTION

Check the bearings, replace them if they do not turn smoothly or quietly.

Inspect the following parts for scratch, damage, abnormal wear, deformation. Replace if necessary.

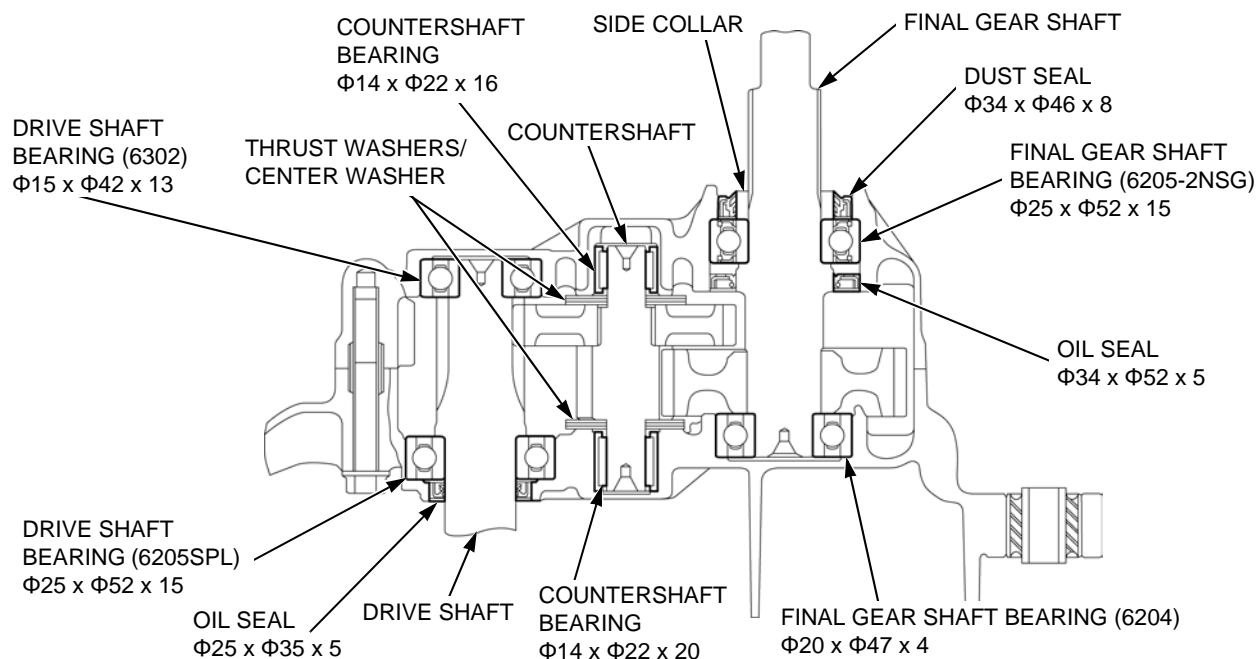
- Countershaft
- Counter gear
- Final gear shaft
- Thrust washers
- Center washer

## BEARING REPLACEMENT

### NOTICE

*Be careful not to damage the mating surfaces of the crankcase and final reduction case.*

Disassemble the final reduction (page 13-5).



## FINAL REDUCTION

### LEFT CRANKCASE

*Be careful not to damage the final reduction case mating surface.*

Remove the drive shaft bearing [1] if it remains in the crankcase.

Remove the countershaft and final gear shaft bearing using the special tools.

#### TOOLS:

##### Countershaft bearing [2]:

Bearing Remover Head 14 [3] 07WMC-KFG0100

Remover Shaft, 15 mm [4] 07936-KC10100

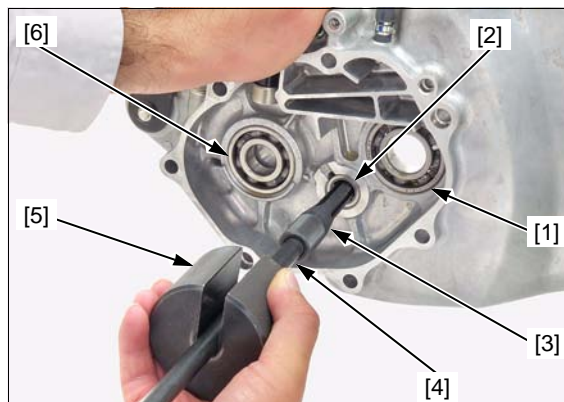
Remover Weight [5] 07741-0010201 or 07936-371020A (U.S.A. only) or 07936-3710200 (U.S.A. only)

##### Final gear shaft bearing [6]:

Bearing Remover, 20 mm 07936-3710600

Remover Handle 07936-3710100

Remover Weight 07741-0010201 or 07936-371020A (U.S.A. only) or 07936-3710200 (U.S.A. only)



Apply engine oil to new bearings [1] cavity.

Drive the bearings into the left crankcase with the marked sides facing the attachment until they are fully seated, using the special tools.

#### TOOLS:

##### Countershaft bearing:

Driver [2] 07749-0010000

Attachment, 22 x 24 mm [3] 07746-0010800

Pilot 14 mm [4] 07746-0041200

##### Final gear shaft bearing:

Driver [2] 07749-0010000

Attachment, 42 x 47 mm [3] 07746-0010300

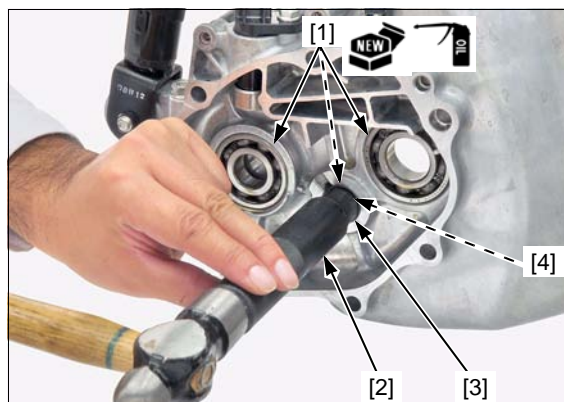
Pilot 20 mm [4] 07746-0040500

##### Drive shaft bearing:

Driver [2] 07749-0010000

Bearing Driver Attachment 48.2 x 51.5 [3] 07946-3290000

Pilot 25 mm [4] 07746-0040600



### FINAL REDUCTION CASE

Remove the side collar [1], final gear shaft dust seal [2] and oil seal [3] from the final reduction case.



Be careful not to damage the final reduction case mating surface.

Drive the final gear shaft bearing [1] out of the reduction case.

Remove the drive shaft and countershaft bearings using the special tools.

## TOOLS:

### Drive shaft bearing [2]:

Remover Head, 15 mm [3]

Remover Shaft, 15 mm [4]

Remover Weight [5]

07936-KC10200

07936-KC10100

07741-0010201 or

07936-371020A

(U.S.A. only) or

07936-3710200

(U.S.A. only)

### Countershaft bearing [6]:

Bearing Remover Head 14 [3]

Remover Shaft, 15 mm [4]

Remover Weight [5]

07WMC-KFG0100

07936-KC10100

07741-0010201 or

07936-371020A

(U.S.A. only) or

07936-3710200

(U.S.A. only)

Apply engine oil to new bearings [1] cavity.

Drive the bearings into the final reduction case with the marked side facing up until it is fully seated, using the special tools.

## TOOLS:

### Drive shaft bearing:

Driver [2]

Attachment, 42 x 47 mm [3]

Pilot 15 mm [4]

07749-0010000

07746-0010300

07746-0040300

### Countershaft bearing:

Driver [2]

Attachment, 22 x 24 mm [3]

Pilot 14 mm [4]

07749-0010000

07746-0010800

07746-0041200

### Final gear shaft bearing:

Driver [2]

Attachment, 52 x 55 mm [3]

Pilot 25 mm [4]

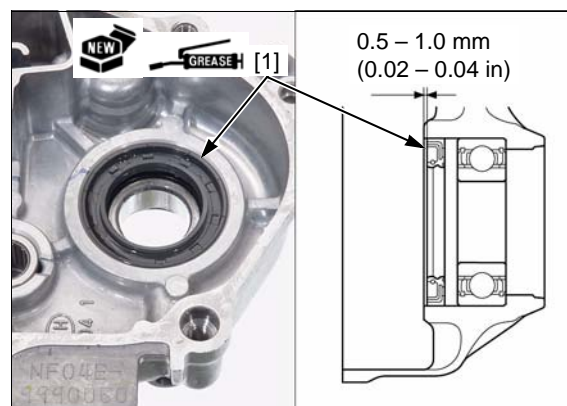
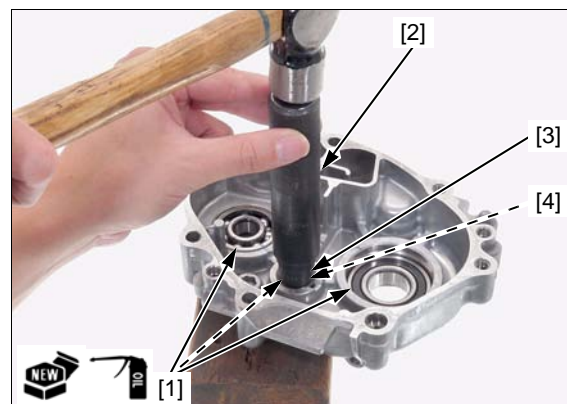
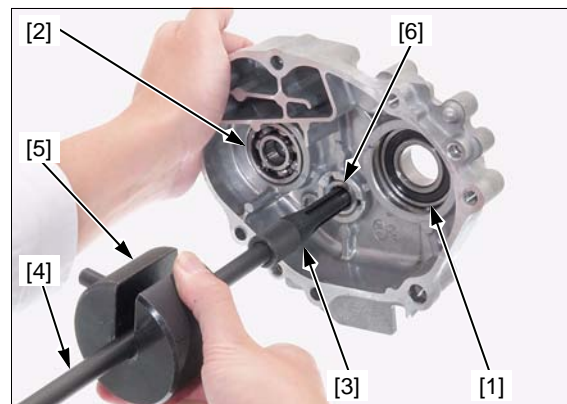
07749-0010000

07746-0010400

07746-0040600

Install a new final gear shaft oil seal [1] with the flat side facing down (bearing side) so that the depth from the final reduction case surface is 0.5 – 1.0 mm (0.02 – 0.04 in).

Apply grease to the final gear shaft oil seal lips.

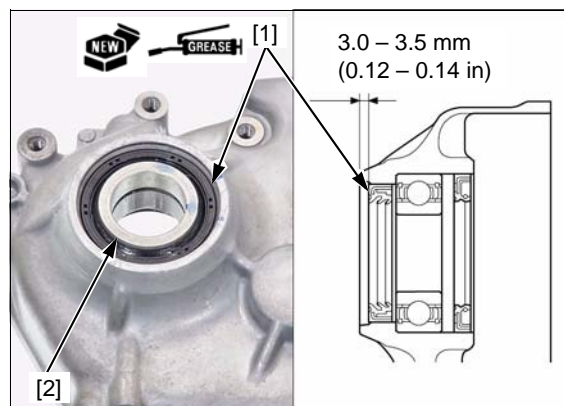


## FINAL REDUCTION

Install a new final gear shaft dust seal [1] so that the depth from the final reduction case surface is 3.0 – 3.5 mm (0.12 – 0.14 in).

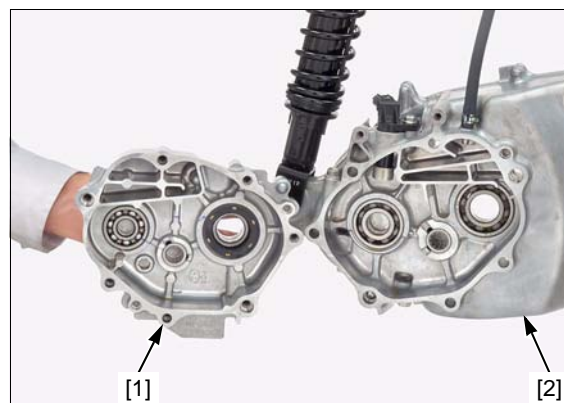
Apply grease to the final shaft dust seal lip.

Install the side collar [2] into the dust seal.



## ASSEMBLY

Clean the mating surfaces of the final reduction case [1] and left crankcase [2].



Install the drive shaft [1] into the drive shaft bearing [2]. Position the assembly collar [3] against the drive shaft bearing inner race and pull the drive shaft into the bearing until it is fully seated.

### TOOLS:

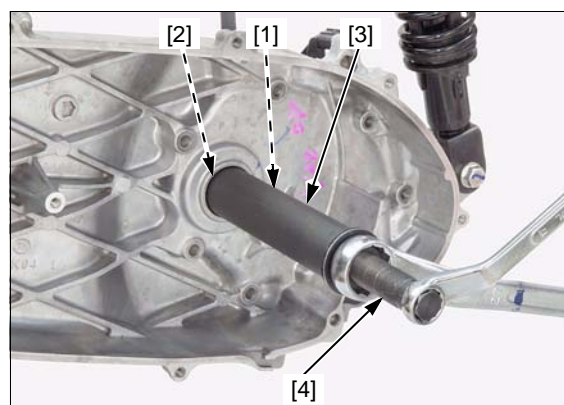
#### Threaded Shaft

12 x 1.25 x 80L [4]

Collar 30.1 x 34 x 15 mm

07965-VM00200

07YMF-KPB0100



Apply grease to a new drive shaft oil seal [1] lips.

Install the drive shaft oil seal in the left crankcase on the drive shaft so that the depth from the left crankcase surface is 0.5 – 1.0 mm (0.02 – 0.04 in), using special tools.

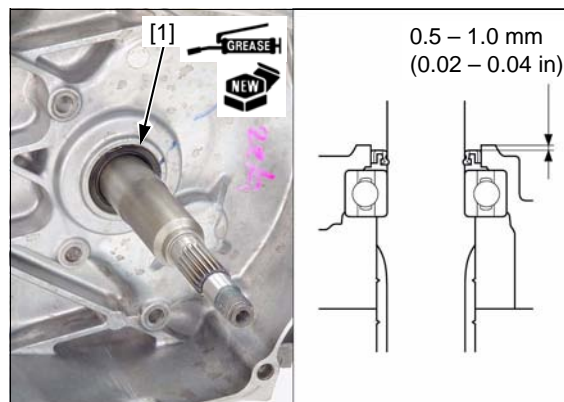
### TOOLS:

Threaded Shaft 12 x 1.25 x 80L

Collar 30.1 x 34 x 15 mm

07965-VM00200

07YMF-KPB0100



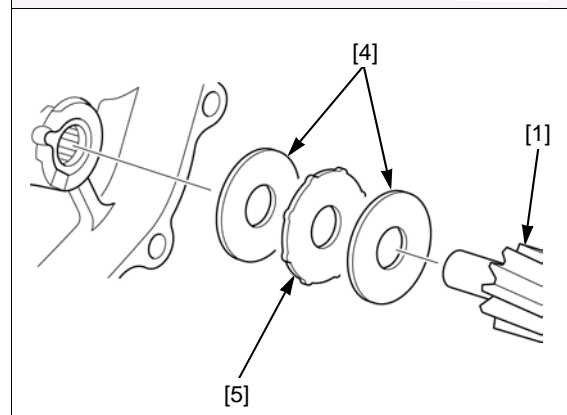
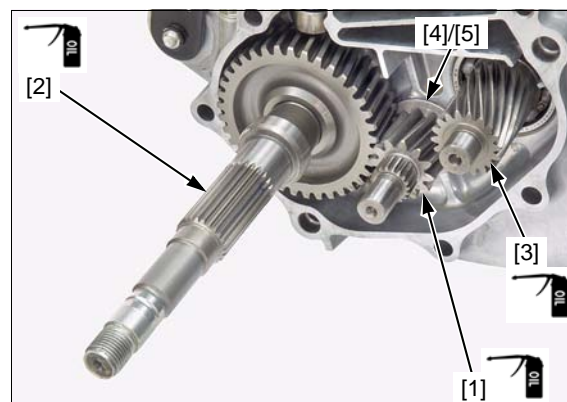


Apply engine oil to the counter gear shaft [1] and final gear shaft [2] teeth and journal.

Apply engine oil to the drive gear shaft [3] teeth.

Install the following:

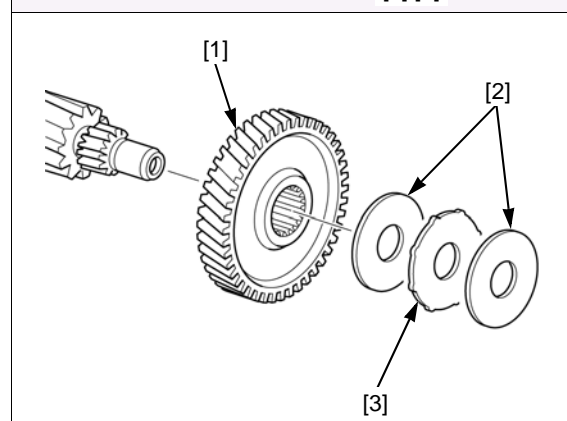
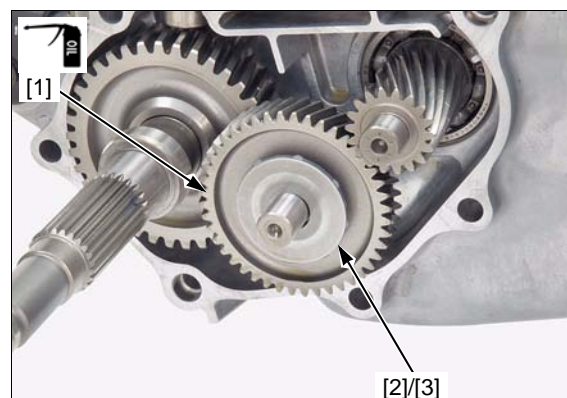
- Thrust washers [4]
- Center washer [5]
- Counter gear shaft
- Final gear shaft



Apply engine oil to the counter gear [1] teeth.

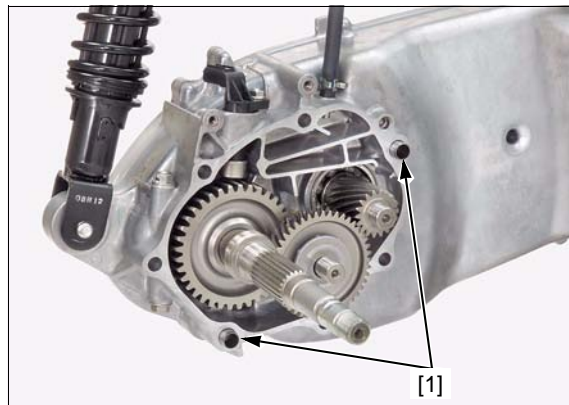
Install the following:

- Counter gear
- Thrust washers [2]
- Center washer [3]

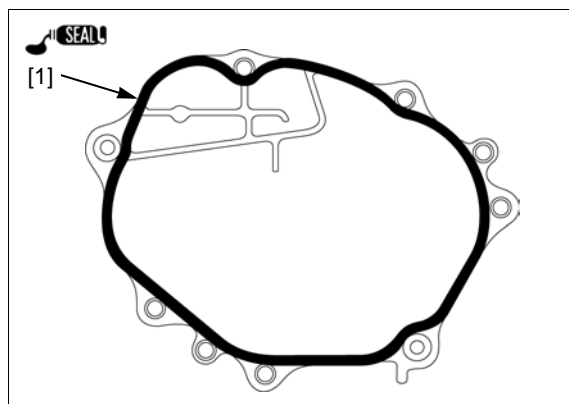


## FINAL REDUCTION

Install the dowel pins [1].



Apply sealant (page 1-16) to the final reduction case mating surface [1] as shown.



Install the final reduction case [1] to the left crankcase.



Install and tighten the final reduction case bolts [1] in a crisscross pattern in 2 or 3 steps to the specified torque.

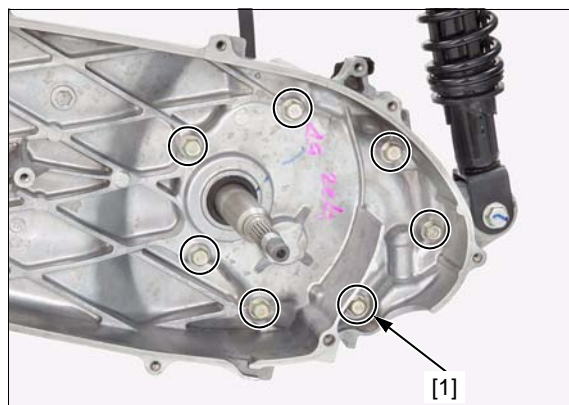
**TORQUE: 24 N·m (2.4 kgf·m, 18 lbf·ft)**

Fill the final reduction case with the recommended oil (page 3-15).

*ABS type only:* Install the rear wheel speed sensor (page 20-21).

Install the following:

- Sensor protector (page 20-21)
- Clutch/driven pulley (page 12-17)





# 14. ALTERNATOR/STARTER CLUTCH

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SERVICE INFORMATION .....	14-2	RIGHT CRANKCASE COVER .....	14-4
TROUBLESHOOTING .....	14-2	STATOR/CKP SENSOR .....	14-6
COMPONENT LOCATION .....	14-3	FLYWHEEL/STARTER CLUTCH .....	14-7

## ALTERNATOR/STARTER CLUTCH

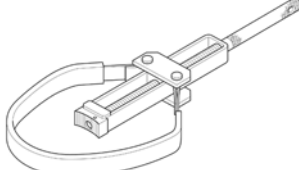
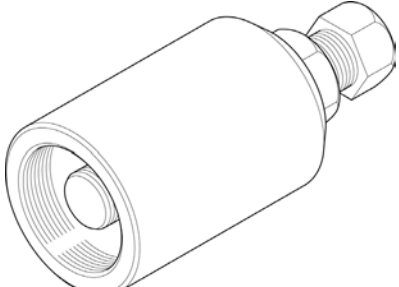
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### SERVICE INFORMATION

#### GENERAL

- This section covers the removal and installation of the flywheel, starter clutch and CKP sensor.
- These service can be done with the engine installed in the frame.
- For alternator inspection (page 21-6).
- For CKP sensor inspection (page 5-6).

#### TOOLS

<p>Flywheel Holder 07725-0040001</p>  A line drawing of a flywheel holder tool. It consists of a long, thin metal rod with a handle at one end and a clamping mechanism at the other. The clamping mechanism has two adjustable arms that can grip the flywheel.	<p>Flywheel Puller 07933-KM10001</p>  A line drawing of a flywheel puller tool. It is a cylindrical metal component with a threaded end that fits into the flywheel's central hole. The other end has a flange with a hexagonal bolt hole.
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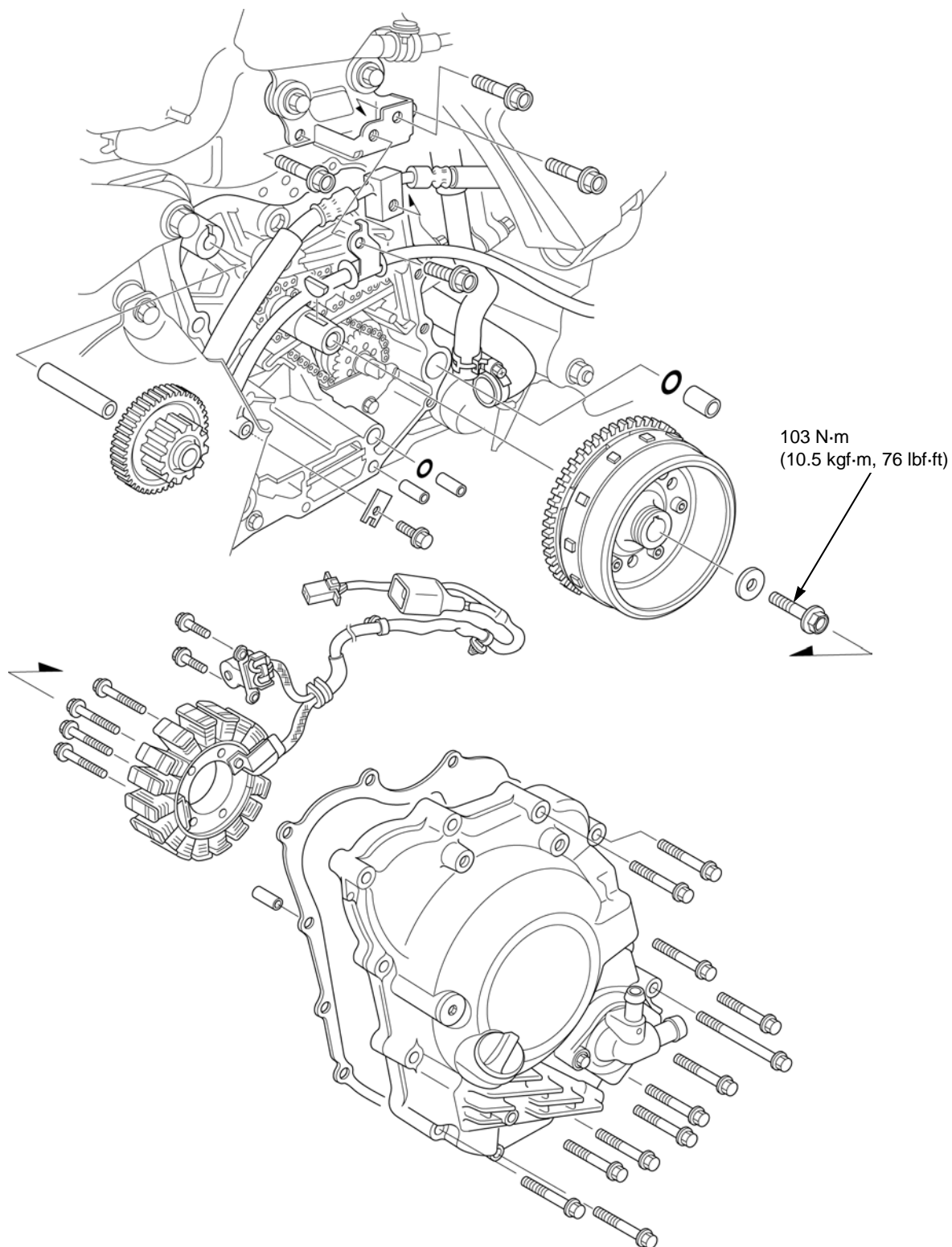
### TROUBLESHOOTING

#### Engine does not turn

- Faulty starter one-way clutch
- Damage starter reduction gear

**COMPONENT LOCATION**

AC type shown:



# RIGHT CRANKCASE COVER

### REMOVAL

Drain the engine oil (page 3-10).

Drain the coolant (page 9-5).

Remove the exhaust pipe/muffler (page 2-25).

Disconnect the alternator 3P (Black) connector [1] and CKP sensor 2P (Red) connector [2].



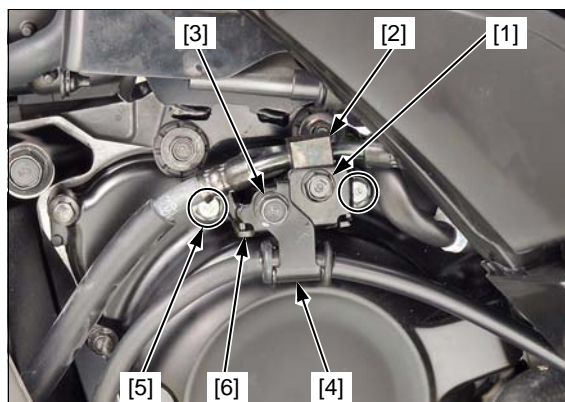
Remove the wire clamps [1].



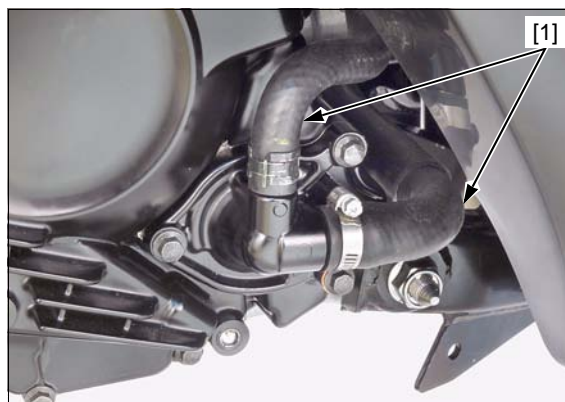
Remove the bolt [1] and release the brake hose [2] from the stay.

*AC type only:* Remove the bolt [3] and release the parking brake cable [4] from the stay.

Remove the bolts [5] and stay [6].

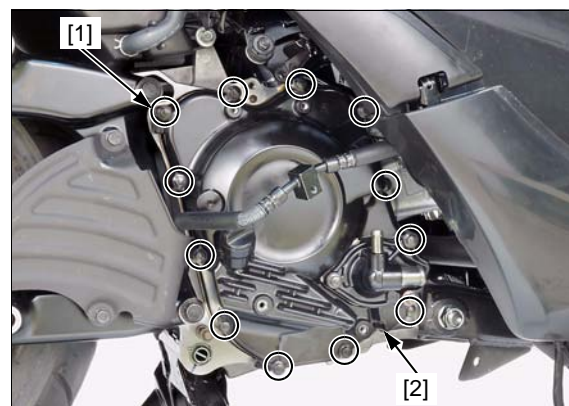


Disconnect the water hoses [1] from the water pump cover.



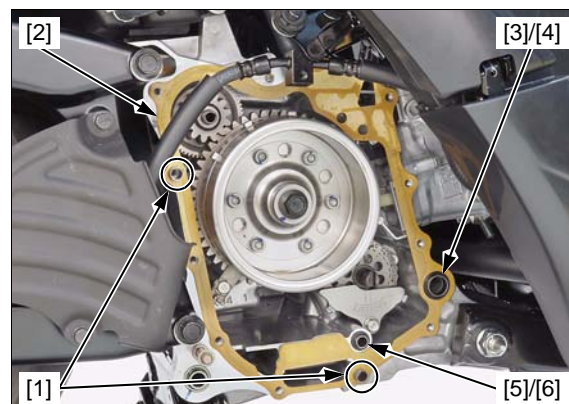
*The right crankcase cover (stator) is magnetically attracted to the flywheel, be careful during removal.*

Loosen the bolts [1] in a crisscross pattern in 2 or 3 steps, then remove the bolts and right crankcase cover [2].



Remove the following:

- Dowel pins [1]
- Gasket [2]
- Water joint collar [3] and O-ring [4]
- Oil joint collar [5] and O-ring [6]



## INSTALLATION

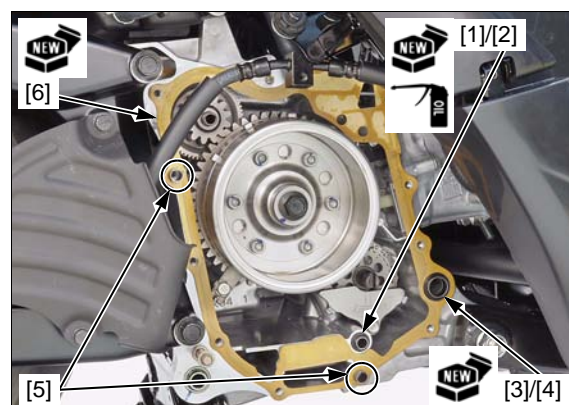
Clean the mating surfaces of the right crankcase cover and right crankcase.

Apply engine oil to a new O-ring [1] and install it to the oil joint collar [2].

Install a new O-ring [3] to the water joint collar [4].

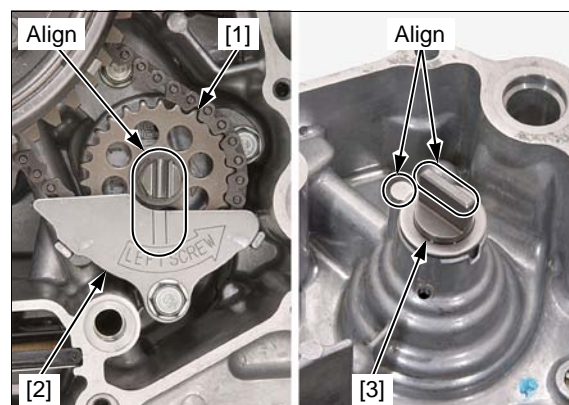
Install the water joint collar and oil joint collar.

Install the dowel pins [5] and a new gasket [6] to the crankcase.



Align the oil pump driven sprocket [1] bolt groove with the index mark of the driven sprocket cover [2].

Align the tabs of the right crankcase cover and water pump shaft [3] as shown.

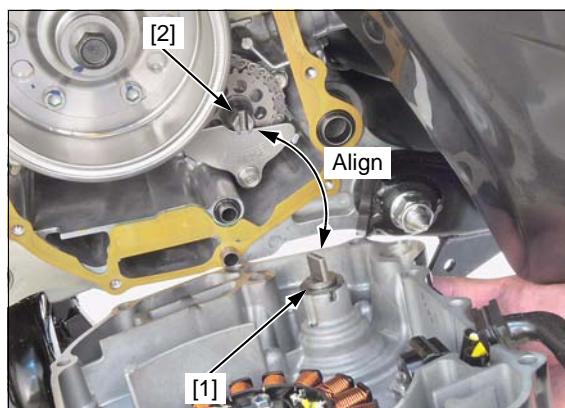




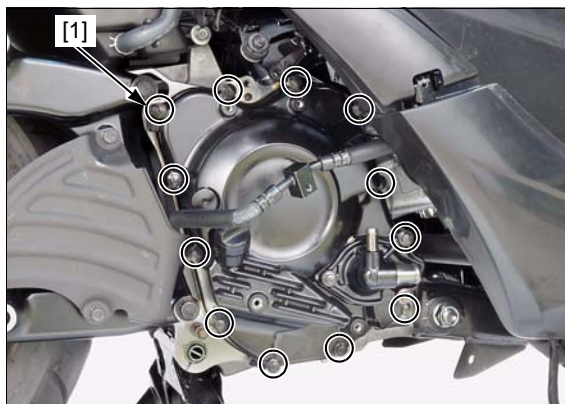
## ALTERNATOR/STARTER CLUTCH

*The alternator cover (stator) is magnetically attracted to the flywheel, be careful during installation.*

Install the right crankcase cover to the right crankcase by aligning the tab of the water pump shaft [1] with the groove of the oil pump driven sprocket bolt [2].



Install and tighten the bolts [1] in a crisscross pattern in 2 or 3 steps.



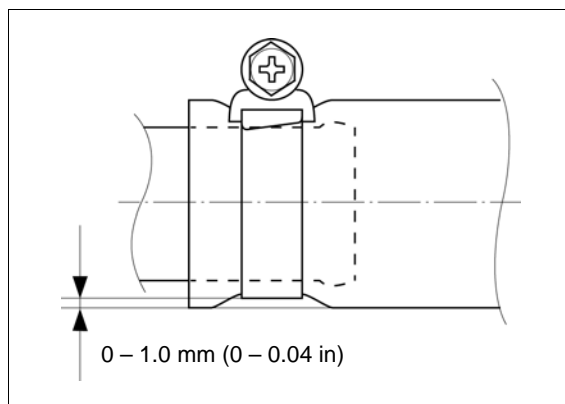
Install the removed parts in the reverse order of removal.

- Tighten the water hose band screw as shown.
- Route the wires properly (page 1-18).

Install the exhaust pipe/muffler (page 2-25).

Fill the crankcase with the recommended engine oil (page 3-9).

Fill the system with the recommended coolant and bleed any air (page 9-5).



## STATOR/CKP SENSOR

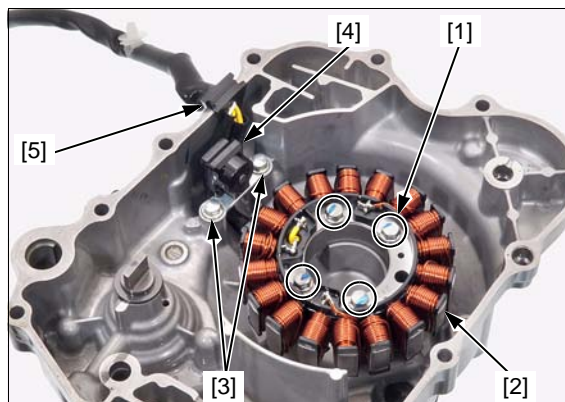
### REMOVAL/INSTALLATION

Remove the right crankcase cover (page 14-4).

Remove the following from the right crankcase cover:

- Bolts [1] and stator [2]
- Bolts [3] and CKP sensor [4]
- Wire grommet [5]

Installation is in the reverse order of removal.

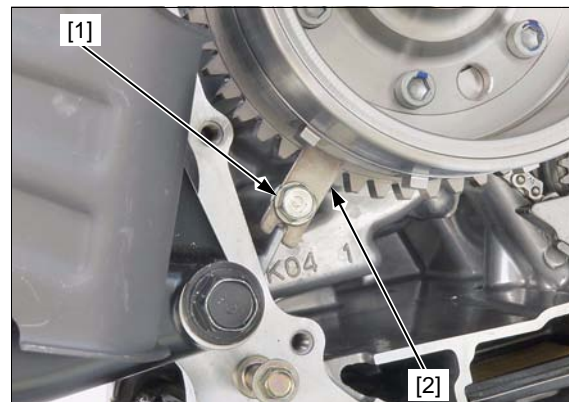


## FLYWHEEL/STARTER CLUTCH

### REMOVAL

Remove the right crankcase cover (page 14-4).

Remove the bolt [1] and starter driven gear guide [2].

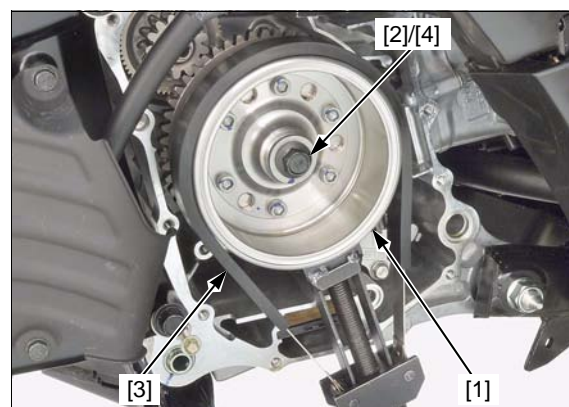


Hold the flywheel [1] with the special tool and loosen the flywheel bolt [2].

#### TOOL:

**FlyWheel Holder [3]** 07725-0040001

Remove the flywheel bolt and washer [4].

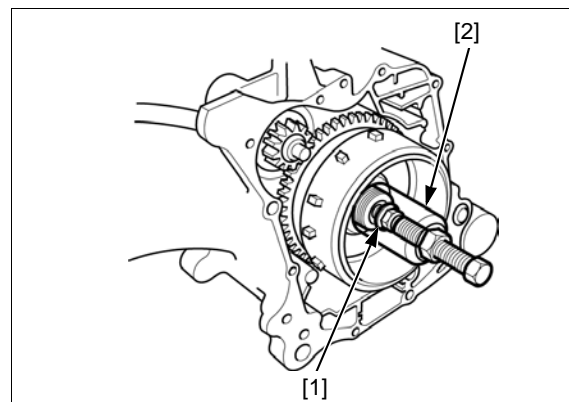


Screw the flywheel bolt [1] in until its threads are not visible, then install a special tool.

#### TOOL:

**Flywheel Puller [2]** 07933-KM10001

- Do not tighten the flywheel bolt.

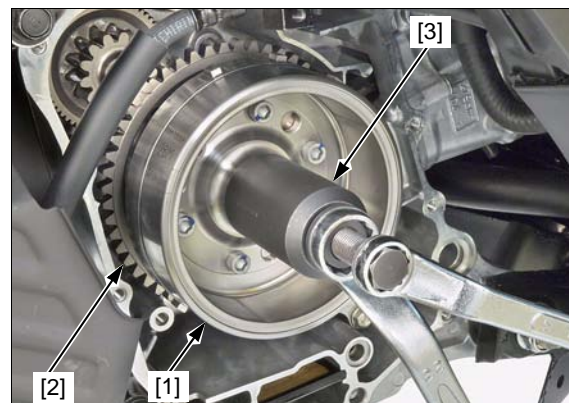


Remove the flywheel [1] and starter driven gear [2] from the crankcase using the special tool.

#### TOOL:

**Flywheel Puller [3]** 07933-KM10001

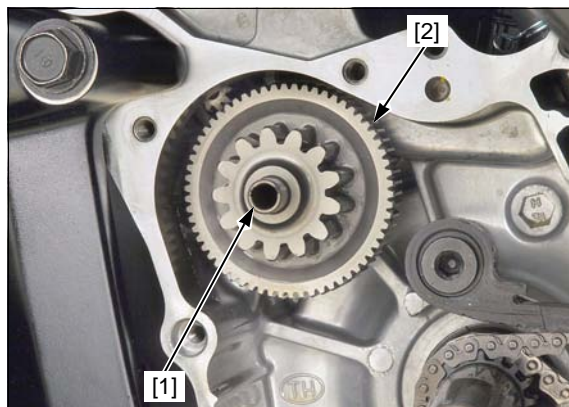
Remove the flywheel puller, bolt, flywheel and starter driven gear.



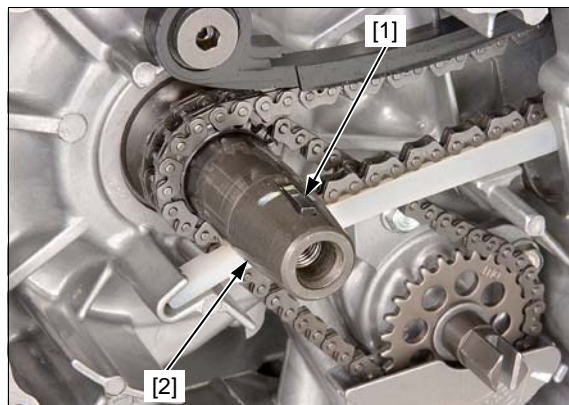


## ALTERNATOR/STARTER CLUTCH

Remove the starter reduction gear shaft [1] and reduction gear [2].



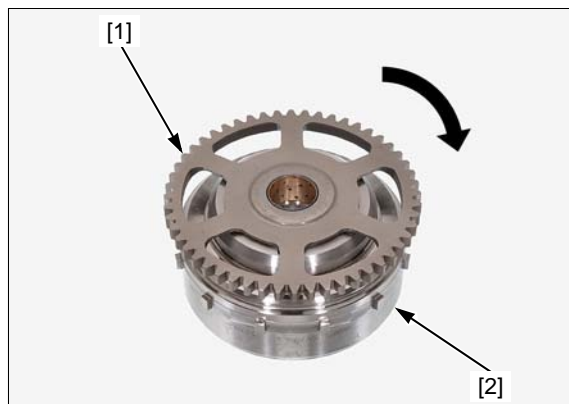
Remove the woodruff key [1] from the crankshaft [2].



### DISASSEMBLY

Check the operation of the sprag clutch by turning the starter driven gear [1]. You should be able to turn the starter driven gear clockwise smoothly, but the gear should not turn counterclockwise.

Remove the starter driven gear from the starter clutch on the flywheel [2] while turning it clockwise.

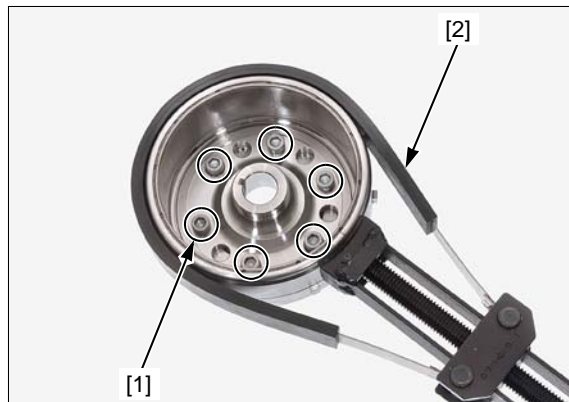


Hold the flywheel with the special tool and remove the starter clutch outer socket bolts [1].

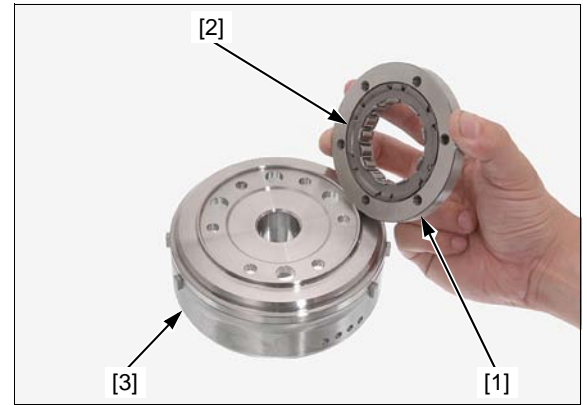
**TOOL:**

**Flywheel Holder [2]**

**07725-0040001**



Remove the starter clutch outer [1] and sprag clutch [2] from the flywheel [3].



### INSPECTION

Inspect the following parts for scratch, damage, abnormal wear and deformation. Replace if necessary.

- Flywheel
- Reduction gear
- Reduction gear shaft
- Woodruff key
- Starter driven gear
- Clutch outer
- Sprag clutch

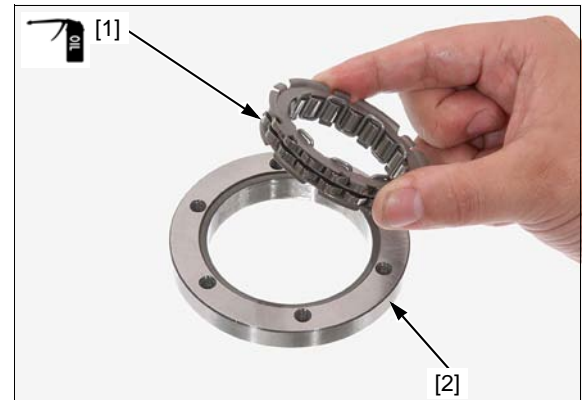
Measure each part according to ALTERNATOR/STARTER CLUTCH SPECIFICATIONS (page 1-8).

Replace any part if it is out of service limit.

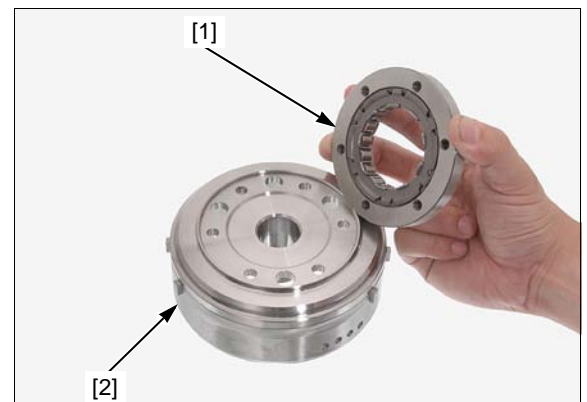
### ASSEMBLY

Apply engine oil to the sprag clutch [1] outer surface.

Install the sprag clutch into the starter clutch outer [2] as shown.



Install the starter clutch assembly [1] onto the flywheel [2].



## ALTERNATOR/STARTER CLUTCH

Clean the starter clutch outer socket bolt [1] threads, and apply locking agent to its threads (coating width:  $4.5 \pm 2.0$  mm ( $0.18 \pm 0.08$  in), exclude end for 2.0 – 4.0 mm ( $0.08 - 0.16$  in)).

Align the bolt holes on the starter clutch outer and flywheel.

Install the socket bolts.

Hold the flywheel with the special tool and tighten the starter clutch outer socket bolts to the specified torque.

### TOOL:

Flywheel Holder [2]

07725-0040001

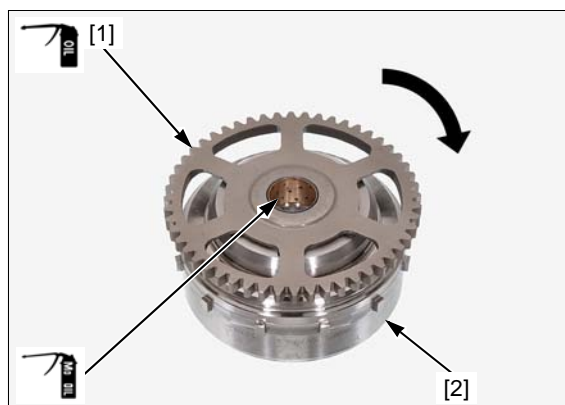
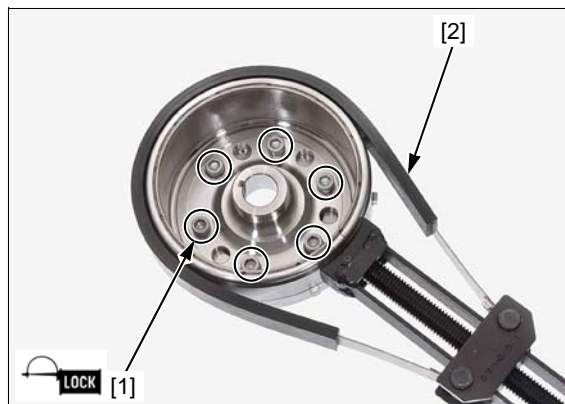
**TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)**

Apply molybdenum oil solution to the starter driven gear [1] inner surface.

Apply engine oil to the starter driven gear boss outer surface and gear teeth.

Install the starter driven gear into the starter clutch on the flywheel [2] while turning it clockwise.

Check that the starter driven gear turns clockwise smoothly and does not turn counterclockwise.



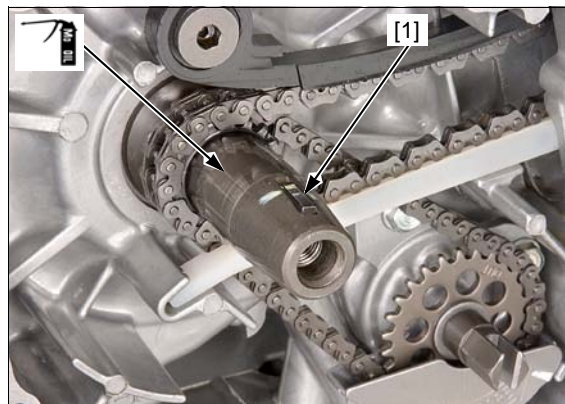
## INSTALLATION

Apply molybdenum oil solution to the starter driven gear sliding surface of the crankshaft.

Clean off any oil and grease from the tapered portion of the crankshaft (flywheel mating surface).

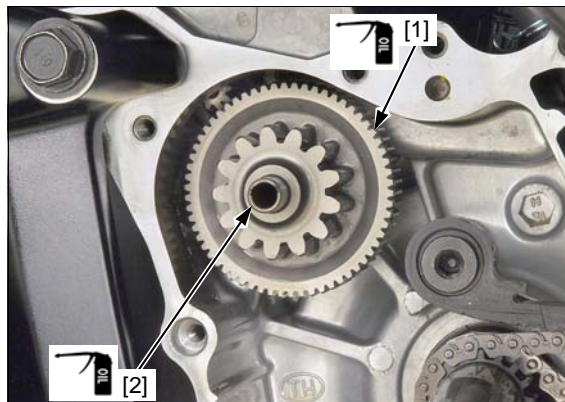
Install the woodruff key [1] to the crankshaft groove.

- When installing the woodruff key, be careful not to damage the key groove and crankshaft.



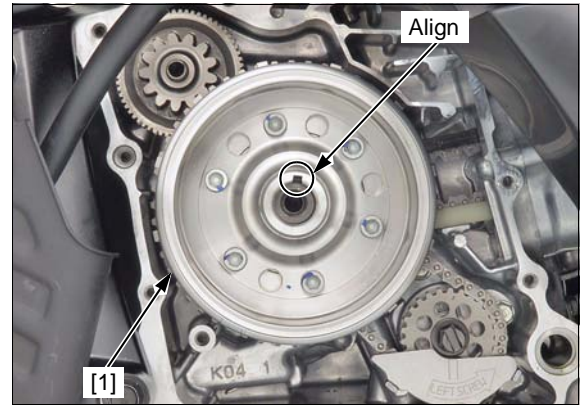
Apply engine oil to the starter reduction gear [1] teeth and shaft [2] outer surface.

Set the starter reduction gear properly and insert the shaft.



Clean any oil from the tapered portion of the flywheel [1].

Install the flywheel to the crankshaft by aligning its groove with the woodruff key.



Apply engine oil to the flywheel bolt [1] threads and seating surface.

Install the washer [2] and flywheel bolt.

Hold the flywheel with the special tool and tighten the bolt to the specified torque.

**TOOL:**

**Flywheel Holder [3]**

**07725-0040001**

**TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)**

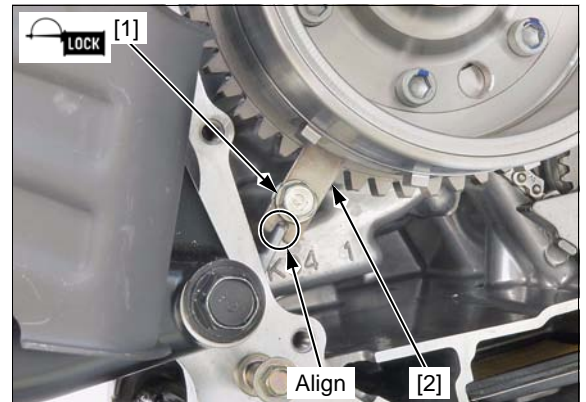


Clean the starter driven gear guide bolt [1] threads.

Apply locking agent to the bolt threads (coating width  $6.5 \pm 1.0$  mm ( $0.26 \pm 0.04$  in), exclude end for 2.0 – 3.0 mm ( $0.08 - 0.12$  in)).

Install the starter driven gear guide [2] by aligning its groove with the right crankcase tab. Install and tighten the bolt securely.

Install the right crankcase cover (page 14-5).



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## MEMO

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# 15. CRANKCASE/CRANKSHAFT

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SERVICE INFORMATION .....	15-2	CRANKSHAFT/CONNECTING ROD .....	15-5
TROUBLESHOOTING .....	15-2	CRANKPIN BEARING .....	15-7
COMPONENT LOCATION .....	15-3	MAIN JOURNAL BEARING .....	15-9
CRANKCASE SEPARATION .....	15-4	CRANKCASE ASSEMBLY .....	15-14



# SERVICE INFORMATION

## GENERAL

- This section covers the crankcase separation to service the crankshaft.
- The following parts must be removed before separating the crankcase.
  - Engine (page 16-4)
  - Cylinder head (page 10-11)
  - Cylinder and piston (page 11-4)
  - Rear wheel speed sensor (page 20-21)
  - Centerstand (page 2-27)
  - Starter motor (page 6-4)
  - Flywheel (page 14-7)
  - Oil pump (page 8-8)
  - Oil filter (page 3-11)
  - EOP switch (page 8-5)
  - Drive pulley (page 12-7)
  - Clutch/driven pulley (page 12-9)
- In addition to the parts listed above, remove the following parts when the left crankcase half must be replaced.
  - Oil pressure relief valve (page 8-6)
  - Reed valve (page 8-7)
  - Final reduction (page 13-5)
  - VS sensor (page 22-11)
- Be careful not to damage the crankcase mating surfaces when separating and assembling the crankcase halves.
- Clean all disassembled parts with clean solvent and dry them using compressed air before inspection.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces, Wipe off excess sealant thoroughly.

## TOOLS

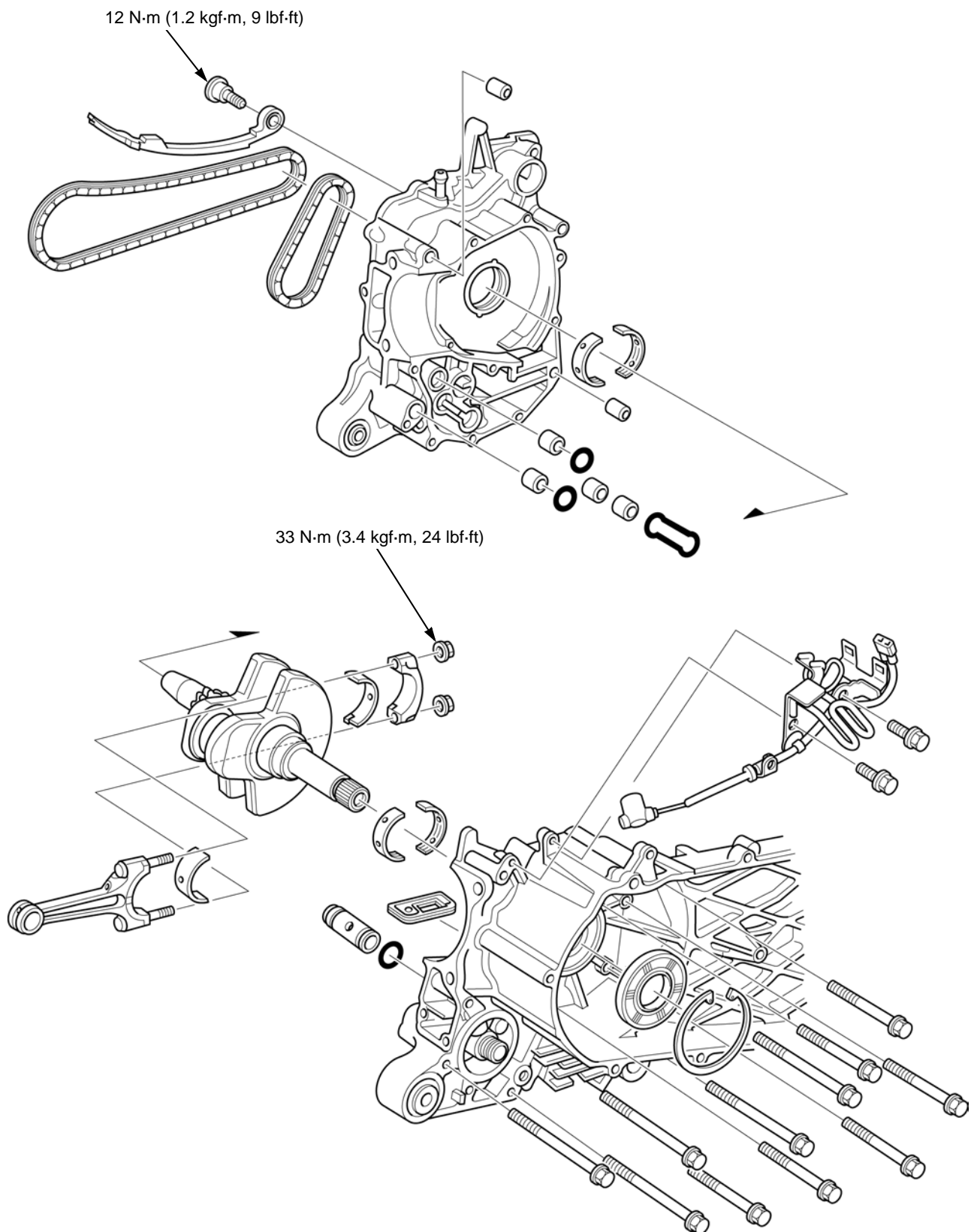
<p>Set Metal Installer 070MF-KTWR100</p> 	<p>Attachment, 62 x 68 mm 07746-0010500</p> 	<p>Driver 07749-0010000</p> 
<p>Base 48.4/56 07946-KM90600</p>  <p>Not available in U.S.A.</p>	<p>Collar 30.1 x 40/37 x 42.7 07965-VM00100</p> 	

# TROUBLESHOOTING

## Abnormal noise

- Worn crankshaft bearing
- Worn crankpin bearing
- Worn connecting rod small end



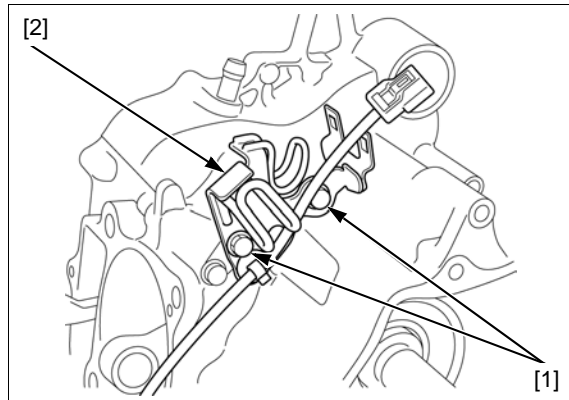
**COMPONENT LOCATION**

### CRANKCASE SEPARATION

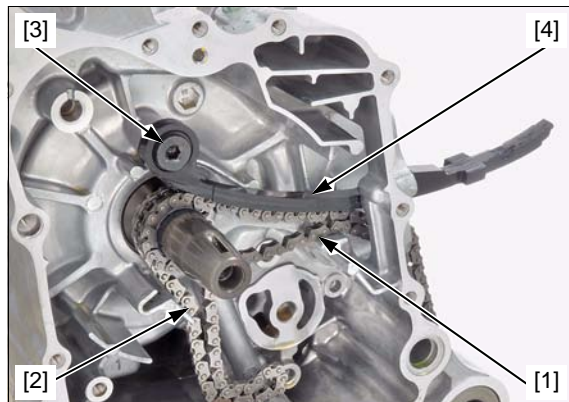
Remove the surrounding parts before separating the crankcase (page 15-2).

Remove the following:

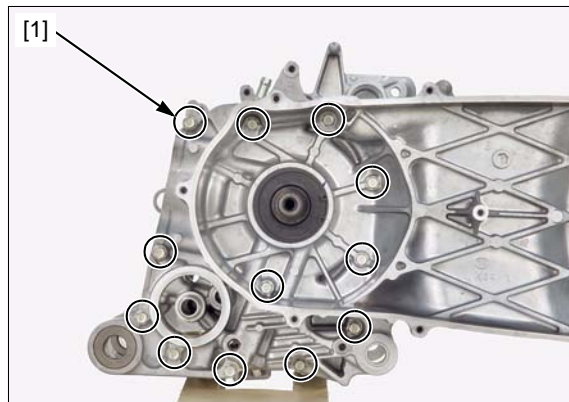
- Bolts [1]
- Stay [2]



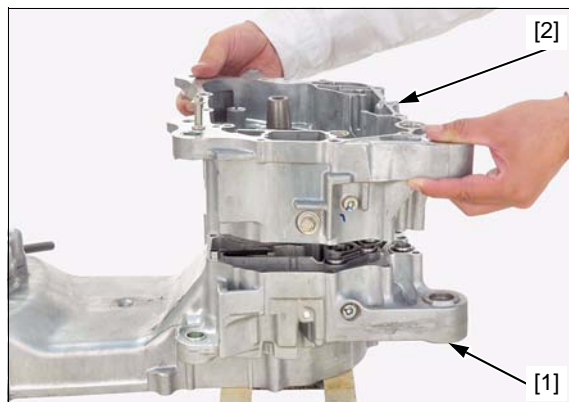
- Cam chain [1]
- Oil pump drive chain [2]
- Cam chain tensioner slider pivot bolt [3]
- Cam chain tensioner slider [4]



Loosen the crankcase bolts [1] in a crisscross pattern in 2 or 3 steps and remove them.

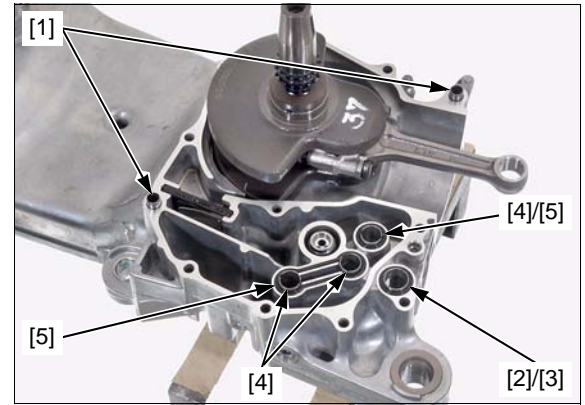


Place the crankcase with the left crankcase [1] down and separate the right crankcase [2] from the left crankcase.

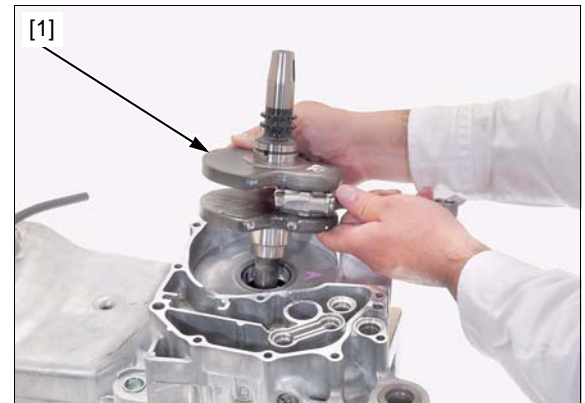


Remove the following:

- Dowel pins [1]
- Water joint collar [2] and O-ring [3]
- Oil joint collars [4] and O-rings [5]



- Crankshaft/connecting rod [1]



- Snap ring [1]
- Oil seal [2]



## CRANKSHAFT/CONNECTING ROD

### INSPECTION

Inspect the following parts for scratch, damage, abnormal wear and deformation. Replace if necessary.

- Crankshaft
- Connecting rod

Measure each part according to CRANKCASE/CRANKSHAFT SPECIFICATIONS (page 1-8).

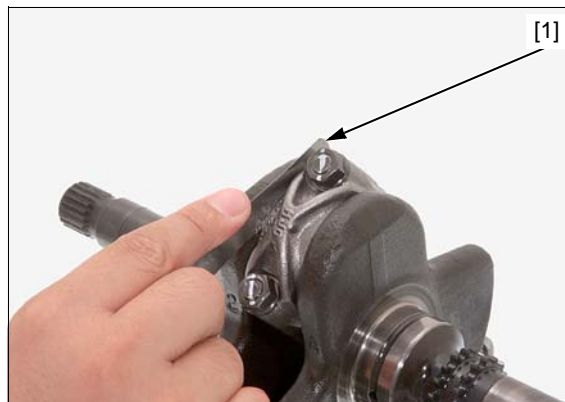
Replace any part if it is out of service limit.

### SIDE CLEARANCE INSPECTION

Remove the crankshaft/connecting rod (page 15-4).

Measure the connecting rod side clearance with the feeler gauge [1].

**SERVICE LIMIT: 0.40 mm (0.016 in)**



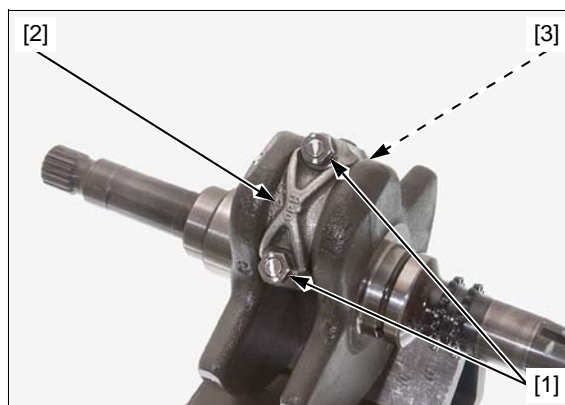
### CONNECTING ROD REMOVAL

*Tap the side of the cap lightly if bearing cap is hard to remove.*

*Be careful not to damage the main journal or crankpin bearing inserts.*

Remove the crankpin bearing cap nuts [1], bearing cap [2] and connecting rod [3] from the crankshaft.

For connecting rod small end inspection (page 11-5).

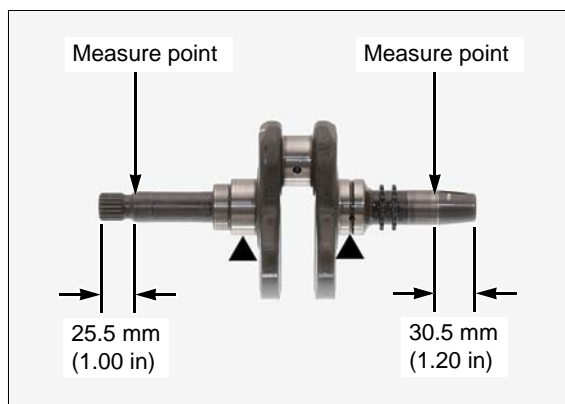


### CRANKSHAFT RUNOUT INSPECTION

Check the crankshaft journal surfaces for damage, discoloration or scratch.

Set the crankshaft on a stand or V-blocks and measure the runout at points as shown using a dial indicator.

**SERVICE LIMIT: 0.10 mm (0.004 in)**



### CONNECTING ROD INSTALLATION

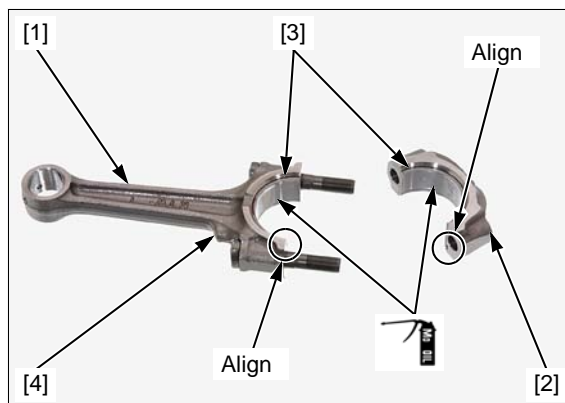
Wipe any oil from the connecting rod [1], cap [2] and crankpin bearing inserts [3].

Install the bearing inserts on the connecting rod and cap by aligning the tab with the groove.

Apply molybdenum oil solution to the sliding surfaces of the bearings.

Install the connecting rod and cap on the crankshaft by aligning the I.D. code on the rod and cap.

- Face the oil jet [4] to intake side of the engine.

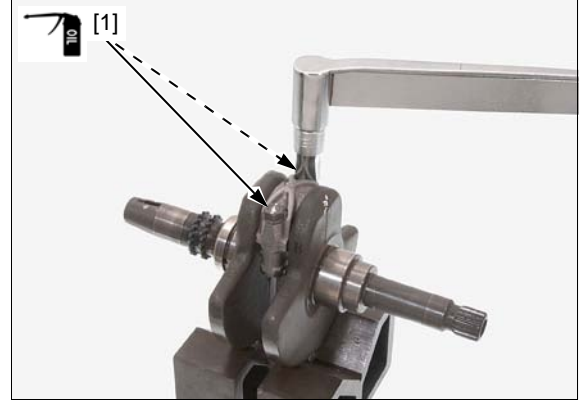


Apply engine oil to the crankpin bearing cap nuts [1] threads and seating surface.  
Install the nuts and tighten them to the specified torque in several steps.

**TORQUE: 33 N·m (3.4 kgf·m, 24 lbf·ft)**

After tightening the nuts, check that the connecting rod move freely without binding.

Install the crankshaft/connecting rod (page 15-14).



## CRANKPIN BEARING

### NOTICE

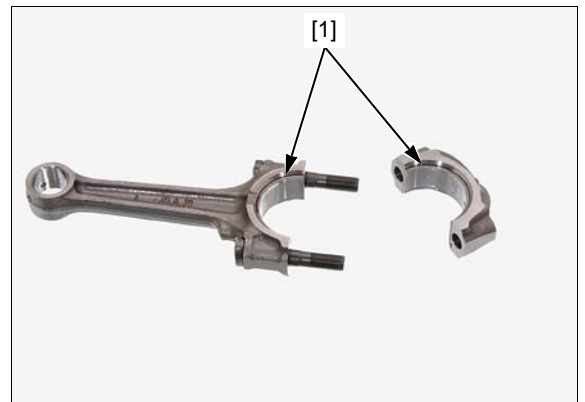
*Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.*

### BEARING INSPECTION

Remove the connecting rod (page 15-6).

Check the crankpin bearing inserts [1] for unusual wear, damage or peeling and replace them if necessary.

Select the replacement bearing (page 15-8).



### OIL CLEARANCE INSPECTION

Clean off any oil from the bearing insert and crankpin.

Put a strip of plastigauge [1] lengthwise on crankpin avoiding the oil hole.

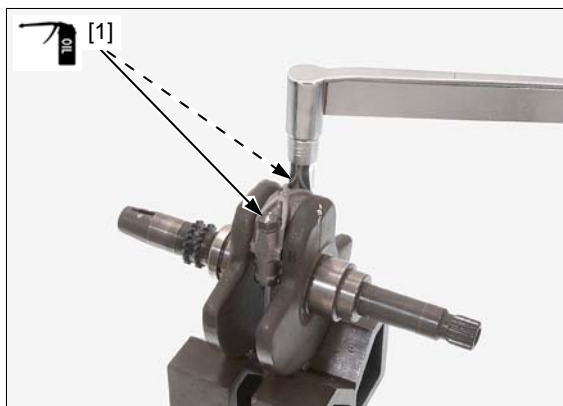
Carefully install the connecting rod and bearing cap on the crankpin.



## CRANKCASE/CRANKSHAFT

*Do not rotate the connecting rod during inspection.* Apply engine oil to the crankpin bearing cap nuts [1] threads and seating surface. Install the nuts and tighten them to the specified torque in several steps.

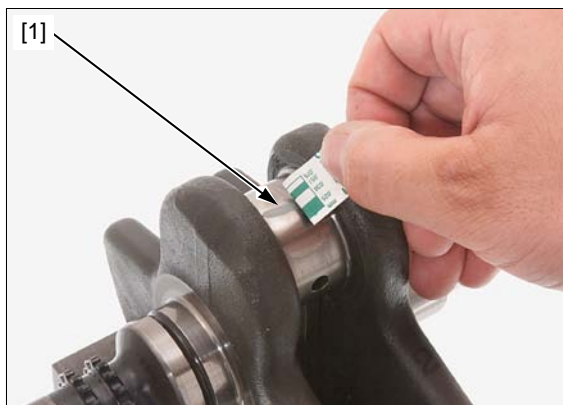
**TORQUE: 33 N·m (3.4 kgf·m, 24 lbf·ft)**



Remove the bearing cap and measure the compressed plastigauge [1] at its widest point on crankpin to determine oil clearance.

**SERVICE LIMIT: 0.07 mm (0.003 in)**

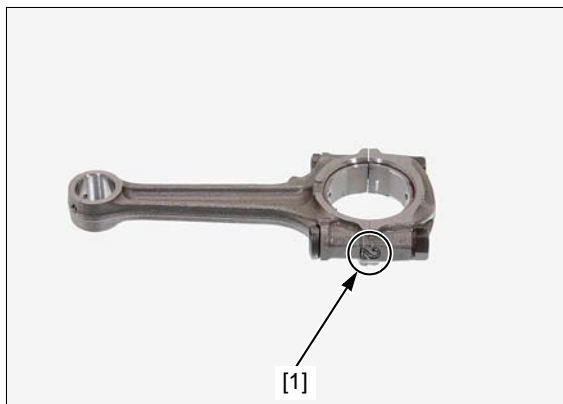
If the clearance exceeds the service limit, select the correct replacement bearing (page 15-8).



## BEARING SELECTION

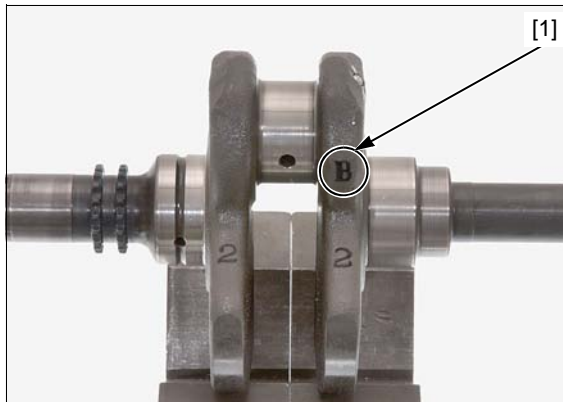
Record the connecting rod I.D. code number [1].

- Number 1, 2 or 3 on the connecting rod is the code for the connecting rod I.D.



Record the crankpin O.D. code letter [1].

- Letter A, B or C on the crank weight is the code for the crankpin O.D.





Cross reference the connecting rod and crankpin code to determine the replacement bearing color code [1].

**CRANKPIN BEARING SELECTION TABLE:**

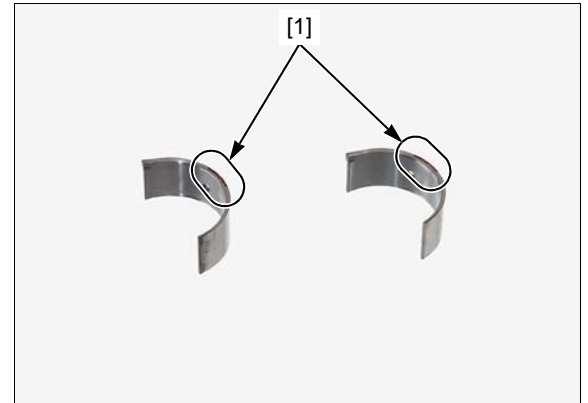
			CONNECTING ROD I.D. CODE		
			1	2	3
			39.000 – 39.006 mm (1.5354 – 1.5357 in)	39.006 – 39.012 mm (1.5357 – 1.5359 in)	39.012 – 39.018 mm (1.5359 – 1.5361 in)
CRANKPIN O.D. CODE	A	35.994 – 36.000 mm (1.4171 – 1.4173 in)	E (Yellow)	D (Green)	C (Brown)
	B	35.988 – 35.994 mm (1.4168 – 1.4171 in)	D (Green)	C (Brown)	B (Black)
	C	35.982 – 35.988 mm (1.4166 – 1.4168 in)	C (Brown)	B (Black)	A (Blue)

**BEARING THICKNESS:**

**A (Blue):** Thick  
**B (Black):** ↓  
**C (Brown):** Middle  
**D (Green):** ↓  
**E (Yellow):** Thin

**NOTICE**

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.



## MAIN JOURNAL BEARING

**NOTICE**

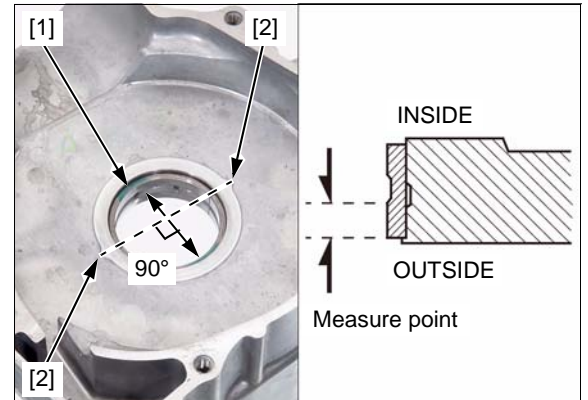
Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

**BEARING INSPECTION**

Remove the crankshaft (page 15-4).  
Clean off any oil from the bearings.

Check the bearings for unusual wear, damage or peeling and replace them if necessary.

Measure the main journal bearing [1] I.D. between the bearing groove and crankcase outer side end of the bearing, and at 90 degrees to the index marks [2].





## CRANKCASE/CRANKSHAFT

Clean off any oil from the crankshaft main journals.

Measure and record the crankshaft main journal O.D.

**SERVICE LIMIT: 39.976 mm (1.5739 in)**

Calculate the main journal oil clearance.

**SERVICE LIMIT: 0.07 mm (0.003 in)**

If the clearance exceeds the service limit, select the bearing.



## BEARING REMOVAL

Set a special tool and hydraulic press on the crankcase as shown.

### TOOLS:

**Collar 30.1 x 40/37 x 42.7 [1]**

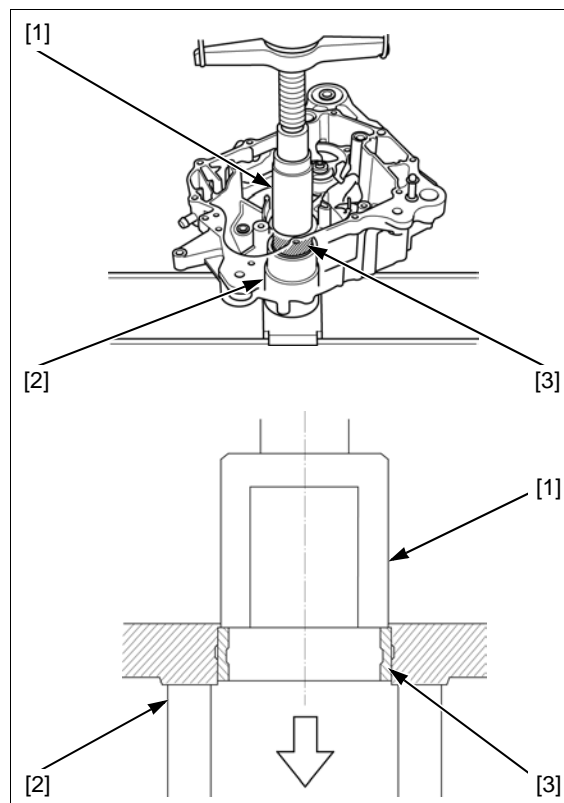
**07965-VM00100**

**Base 48.4/56 [2]**

**07946-KM90600**

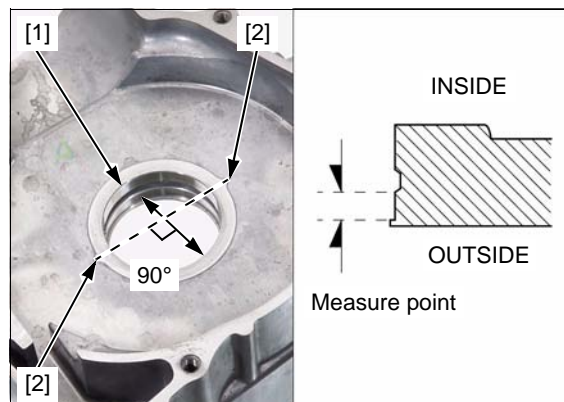
**(Not available in U.S.A.)**

Press the main journal bearing [3] out of the crankcase from the outside to the inside.



Measure and record the crankcase main journal [1] I.D. between the main journal groove and crankcase outer side end, and at 90 degrees to the index marks [2].

**SERVICE LIMIT: 45.060 mm (1.7740 in)**



## BEARING SELECTION

Depending upon the results of the above measurements there are four possible scenarios for main bearing selection:

- Crankshaft and crankcase are replaced
- Crankcase only is replaced
- Crankshaft only is replaced
- Main journal bearings only are replaced

Carefully refer to the following instructions and tables for main bearing selection.

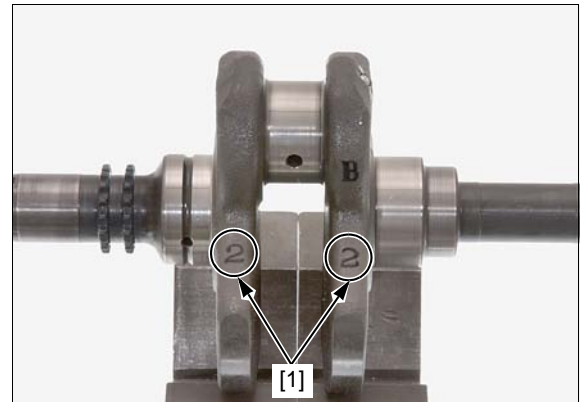
Record the bearing support I.D. code letter [1].

- Letters A or B on each crankcase is the code for the crankcase I.D.

Record the main journal O.D. code number [1].

- Letters 1, 2 or 3 on each crank weight is the code for crankshaft journal O.D.

Cross-reference the crankshaft and crankcase codes to determine the replacement bearing color.



In case the crankshaft and crankcase are replaced:					
			MAIN JOURNAL O.D. CODE		
			1	2	3
			39.994 – 40.000 mm (1.5746 – 1.5748 in)	39.988 – 39.994 mm (1.5743 – 1.5746 in)	39.982 – 39.988 mm (1.5741 – 1.5743 in)
BEARING SUPPORT I.D. CODE	A	45.000 – 45.006 mm (1.7717 – 1.7719 in)	D (Green)	C (Brown)	B (Black)
	B	45.006 – 45.012 mm (1.7719 – 1.7721 in)	C (Brown)	B (Black)	A (Blue)

In case the crankcase only is replaced:						
			MAIN JOURNAL O.D.			
			39.994 – 40.000 mm (1.5746 – 1.5748 in)	39.988 – 39.994 mm (1.5743 – 1.5746 in)	39.982 – 39.988 mm (1.5741 – 1.5743 in)	39.976 – 39.982 mm (1.5739 – 1.5741 in)
BEARING SUPPORT I.D. CODE	A	45.000 – 45.006 mm (1.7717 – 1.7719 in)	D (Green)	C (Brown)	B (Black)	A (Blue)
	B	45.006 – 45.012 mm (1.7719 – 1.7721 in)	C (Brown)	B (Black)	A (Blue)	A (Blue)

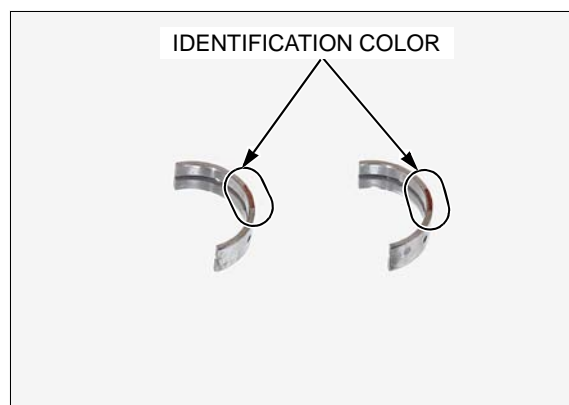
## CRANKCASE/CRANKSHAFT

In case the crankshaft only is replaced:				
		MAIN JOURNAL O.D. CODE		
		1	2	3
		39.994 – 40.000 mm (1.5746 – 1.5748 in)	39.988 – 39.994 mm (1.5743 – 1.5746 in)	39.982 – 39.988 mm (1.5741 – 1.5743 in)
BEARING SUPPORT I.D.	45.000 – 45.006 mm (1.7717 – 1.7719 in)	D (Green)	C (Brown)	B (Black)
	45.006 – 45.012 mm (1.7719 – 1.7721 in)	C (Brown)	B (Black)	A (Blue)
	45.012 – 45.024 mm (1.7721 – 1.7726 in)	B (Black)	A (Blue)	A (Blue)
	45.024 – 45.036 mm (1.7726 – 1.7731 in)	A (Blue)	O.S. H (Green-Green)	O.S. H (Green-Green)
	45.036 – 45.048 mm (1.7731 – 1.7735 in)	O.S. H (Green-Green)	O.S. G (Brown-Brown)	O.S. G (Brown-Brown)
	45.048 – 45.060 mm (1.7735 – 1.7740 in)	O.S. G (Brown-Brown)	O.S. F (Black-Black)	O.S. F (Black-Black)

In case of main journal bearing replacement only:					
		MAIN JOURNAL O.D.			
		39.994 – 40.000 mm (1.5746 – 1.5748 in)	39.988 – 39.994 mm (1.5743 – 1.5746 in)	39.982 – 39.988 mm (1.5741 – 1.5743 in)	39.976 – 39.982 mm (1.5739 – 1.5741 in)
BEARING SUPPORT I.D.	45.000 – 45.006 mm (1.7717 – 1.7719 in)	D (Green)	C (Brown)	B (Black)	A (Blue)
	45.006 – 45.012 mm (1.7719 – 1.7721 in)	C (Brown)	B (Black)	A (Blue)	A (Blue)
	45.012 – 45.024 mm (1.7721 – 1.7726 in)	B (Black)	A (Blue)	A (Blue)	O.S. H (Green-Green)
	45.024 – 45.036 mm (1.7726 – 1.7731 in)	A (Blue)	O.S. H (Green-Green)	O.S. H (Green-Green)	O.S. G (Brown-Brown)
	45.036 – 45.048 mm (1.7731 – 1.7735 in)	O.S. H (Green-Green)	O.S. G (Brown-Brown)	O.S. G (Brown-Brown)	O.S. F (Black-Black)
	45.048 – 45.060 mm (1.7735 – 1.7740 in)	O.S. G (Brown-Brown)	O.S. F (Black-Black)	O.S. F (Black-Black)	O.S. E (Blue-Blue)

### BEARING THICKNESS:

**O.S. E (Blue-Blue):** Thick  
**O.S. F (Black-Black):** ↑  
**O.S. G (Brown-Brown):** Middle  
**O.S. H (Green-Green):** ↓  
**A (Blue):** Thin  
**B (Black):**  
**C (Brown):**  
**D (Green):**



### NOTICE

- After selecting new bearings, recheck the clearance. Incorrect clearance can cause severe engine damage.

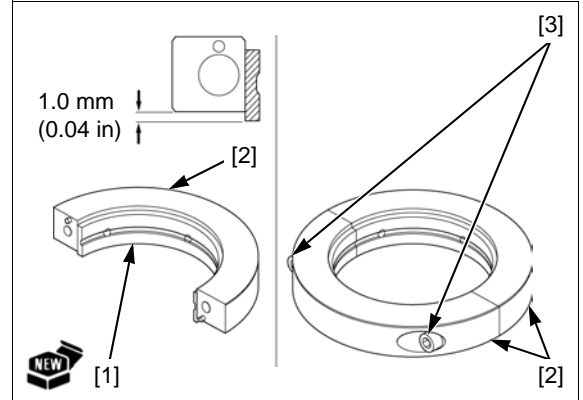
## BEARING INSTALLATION

Set a new bearing [1] onto the special tools so that the distance between the end of the tool and bearing is about 1.0 mm (0.04 in) on the inserting side.

### TOOL:

**Set Metal Installer [2] 070MF-KTWR100**

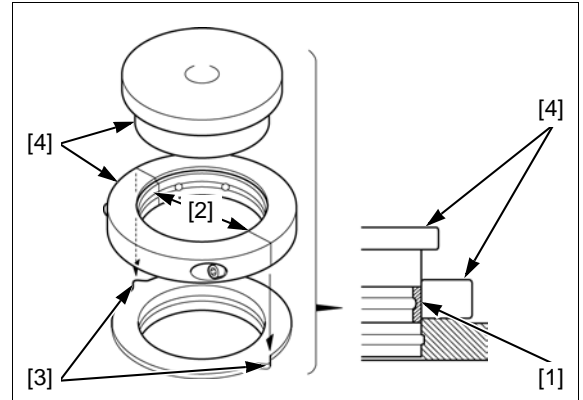
Tighten the bolts [3] in 2 or 3 steps.



Set the bearings [1] and special tools assembly on inside of the crankcase, fitting the bearing edge in the crankcase main journal. Align the mating lines [2] of the bearings with the index marks [3] on the crankcase as shown.

### TOOL:

**Set Metal Installer [4] 070MF-KTWR100**



Set the hydraulic press [1] and special tools as shown.

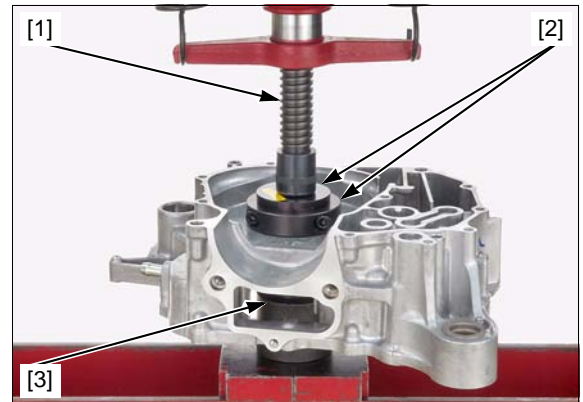
### TOOLS:

**Set Metal Installer [2]**

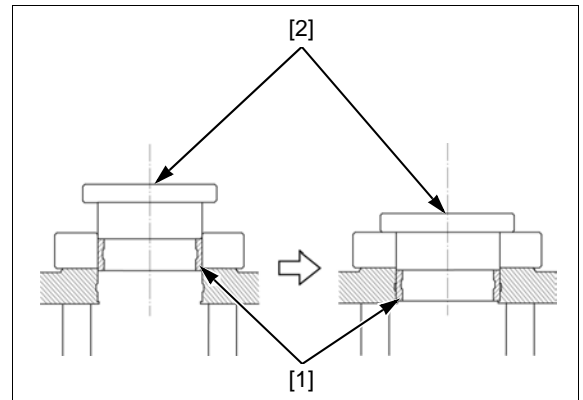
**Base 48.4/56 [3]**

**070MF-KTWR100**

**07946-KM90600**  
(Not available in U.S.A.)



Press the bearings [1] in the crankcase until the metal installer [2] flange is fully seated.

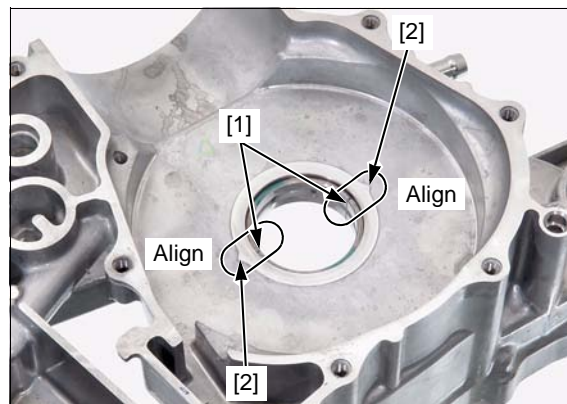


## CRANKCASE/CRANKSHAFT

Make sure the bearing mating lines [1] align with the index marks [2] on the crankcase.

Check the oil clearance (page 15-9).

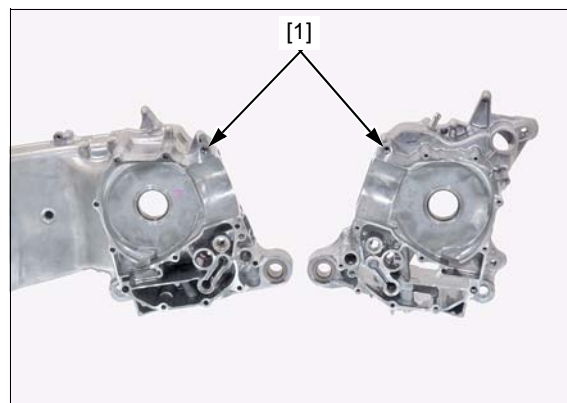
Install the crankshaft (page 15-14).



## CRANKCASE ASSEMBLY

*Be careful not to damage the crankcase mating surfaces.*

Clean the insides and mating surfaces [1] of the crankcases.  
Check for cracks or other damage.  
Dress any roughness or irregularities with an oil stone.



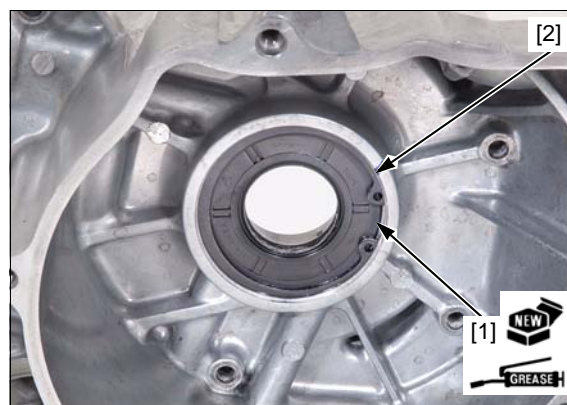
Apply grease to a new oil seal [1] lips.

Install the oil seal into the left crankcase until it is fully seated using the special tools.

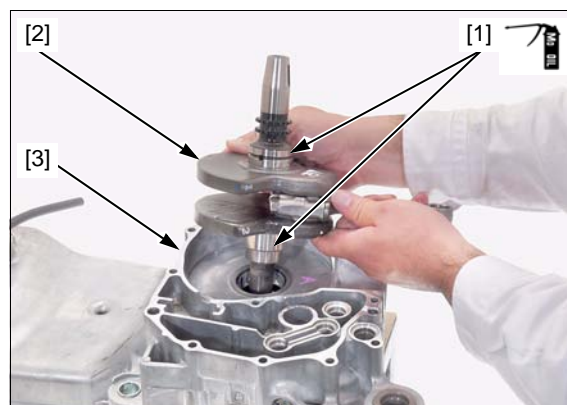
### TOOLS:

**Driver** 07749-0010000  
**Attachment, 62 x 68 mm** 07746-0010500

Install the snap ring [2] into the groove in the left crankcase securely.



Apply molybdenum oil solution to the crankshaft main journals [1] and install the crankshaft/connecting rod [2] into the left crankcase [3].

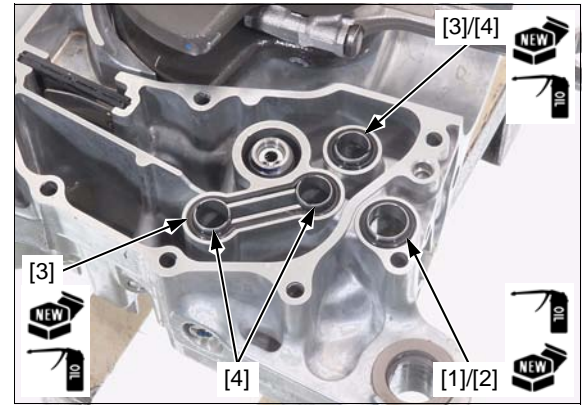




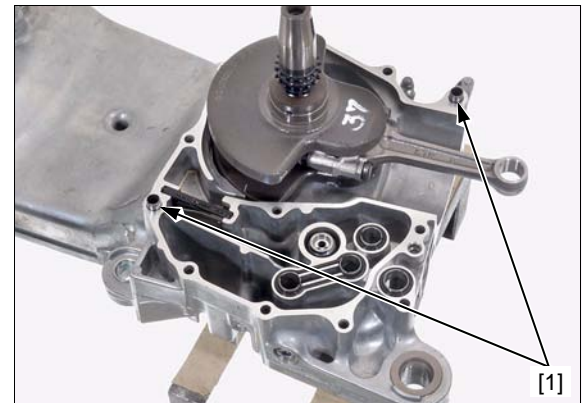
Apply engine oil to a new O-ring [1] and install it to the water joint collar [2].

Apply engine oil to new O-rings [3] and install them to the oil joint collars [4].

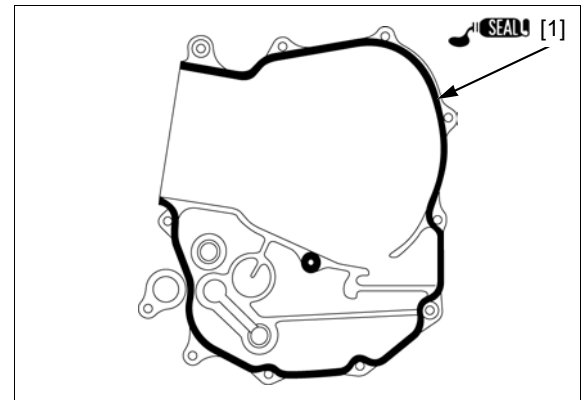
Install the water joint collar and oil joint collars.



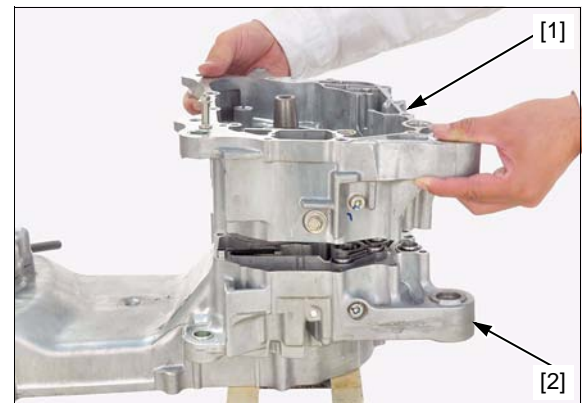
Install the dowel pins [1].



Apply sealant (page 1-16) to the right crankcase mating surface [1].

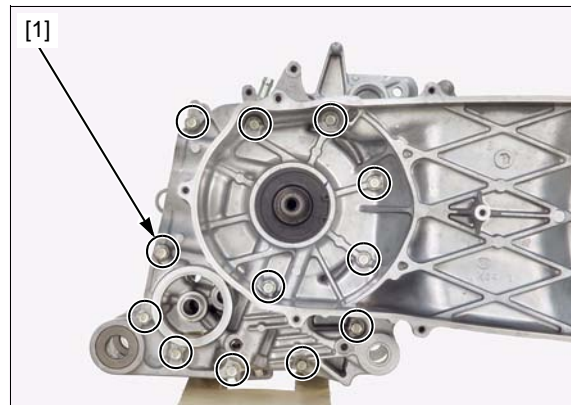


Install the right crankcase [1] on the left crankcase [2].



## CRANKCASE/CRANKSHAFT

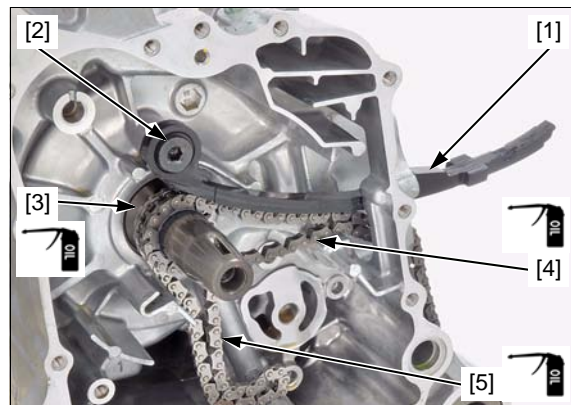
Install the crankcase bolts [1] and tighten them in a crisscross pattern in 2 or 3 steps.



Install the cam chain tensioner slider [1] and tighten the cam chain tensioner pivot bolt [2] to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Apply engine oil to the timing sprockets [3] teeth, cam chain [4] and oil pump drive chain [5] then install the cam chain and oil pump chain onto the timing sprockets.



*Route the hoses, cables and wire harness properly (page 1-18).*

Install the removed parts in the reverse order of removal.



# 16. ENGINE REMOVAL/INSTALLATION

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SERVICE INFORMATION .....	16-2	ENGINE REMOVAL .....	16-4
COMPONENT LOCATION .....	16-3	ENGINE INSTALLATION .....	16-9



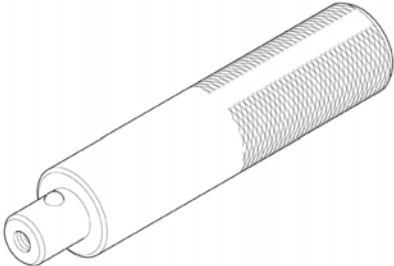
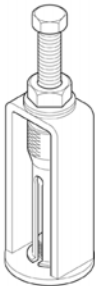
ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

GENERAL

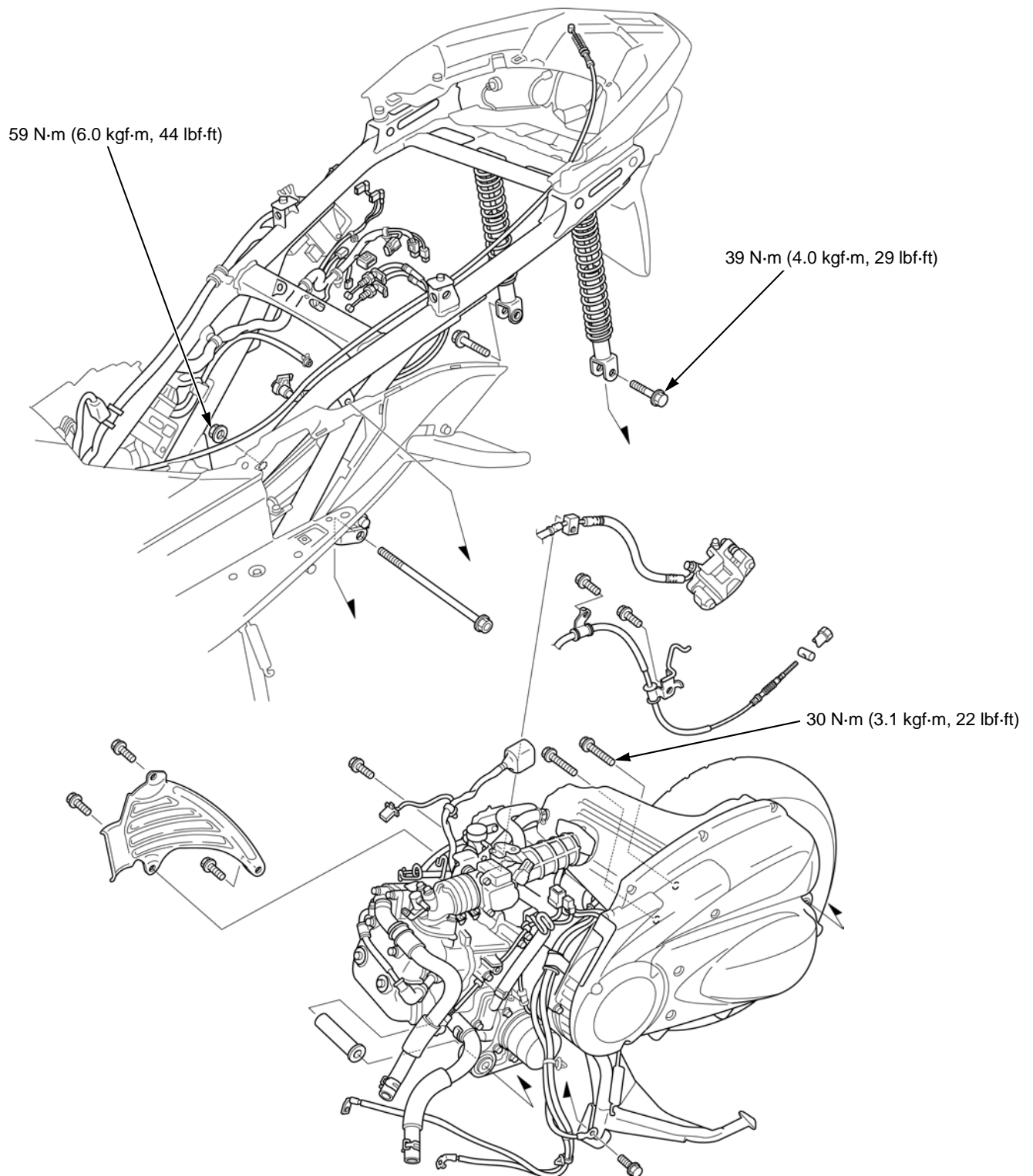
- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- A hoist or equivalent is required to support the frame when removing and installing the engine. Support the engine using a jack or other adjustable support to ease engine mounting bolt removal.
- Do not support the engine using the engine oil filter or it will be damaged.
- The crankcase and crankshaft require engine removal for service. Other components can be serviced with the engine installed in the frame.

TOOLS

<div>Attachment, 24 x 26 mm 07746-0010700</div> <div></div>	<div>Pilot 20 mm 07746-0040500</div> <div></div>	<div>Driver 07749-0010000</div> <div></div>
<div>Bearing Remover 20 07931-MA70000</div> <div></div>		

## COMPONENT LOCATION

AC type shown:



### ENGINE REMOVAL

Remove the following:

- Under cover (page 2-8)
- Battery box (page 2-24)
- Exhaust pipe/muffler (page 2-25)
- Brake hose protector (page 19-18)
- Maintenance lid (page 3-6)

Relieve the fuel pressure (page 7-5).

Drain the engine oil (page 3-10).

Drain the coolant (page 9-5).

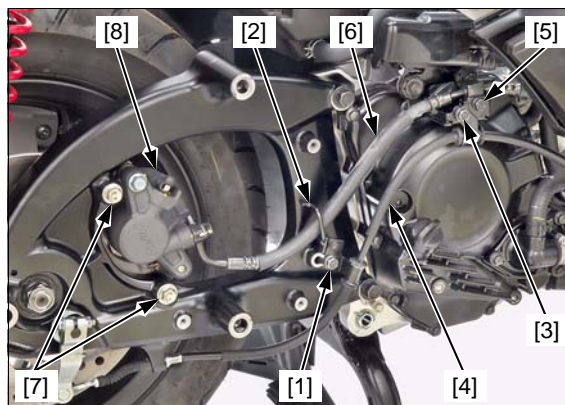
Remove the bolt [1] and brake hose guide [2].

*AC type only:* Remove the bolt [3] and parking brake cable [4].

Remove the bolt [5] and brake hose [6].

*Support the brake caliper so that it does not hang from the brake hose. Do not twist the brake hose.*

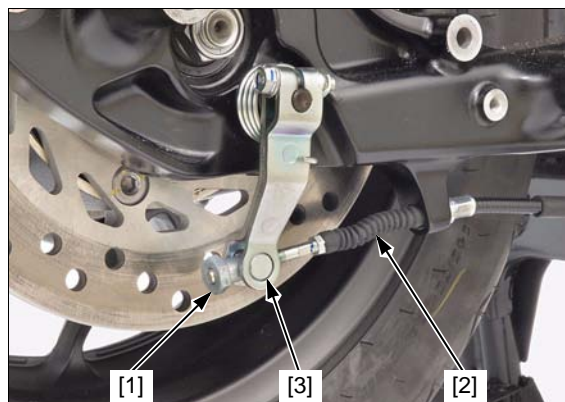
Remove the caliper mounting bolts [7] and rear brake caliper [8].



*AC type only:* Remove the adjusting nut [1].

Remove the parking brake cable [2] from the swingarm.

Remove the joint pin [3].



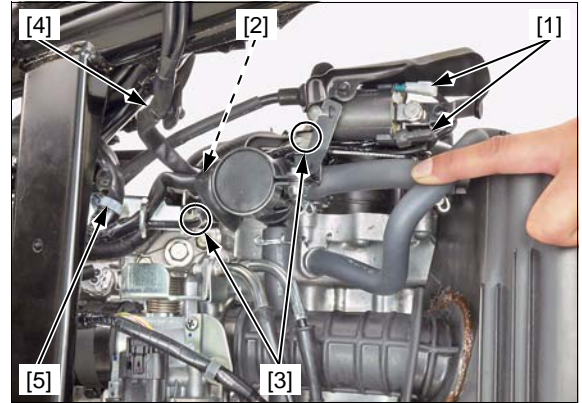
Disconnect the CKP sensor 2P (Red) connector [1] and alternator 3P (Black) connector [2].



Disconnect the ignition coil wire connectors [1] and PAIR control solenoid valve 2P (Black) connector [2].

Release the following:

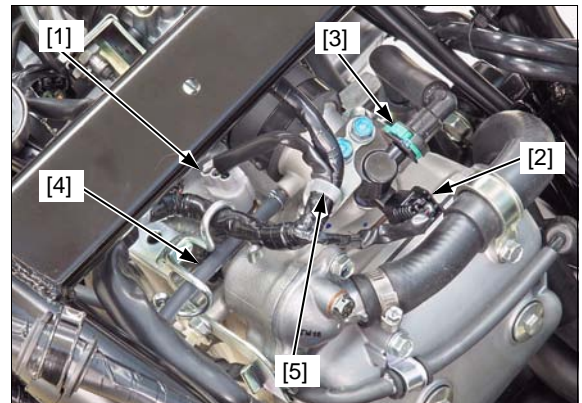
- Ignition coil wire clamps [3]
- Starter/CKP sensor wire clamp [4]
- Main wire harness clamp [5]



Disconnect the following:

- ECT sensor 3P (Gray) connector [1]
- Injector 2P (Black) connector [2]
- Quick connect fitting [3]
- EVAP purge control solenoid valve to intake pipe (AC type only) [4]

Release the main wire harness clamp [5].



Disconnect the following:

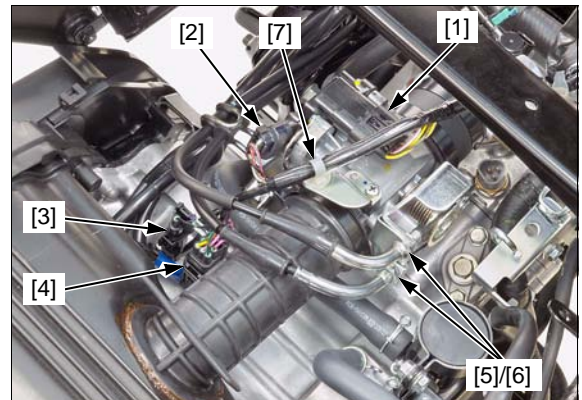
- Sensor unit 5P (Black) connector [1]
- IACV 4P (Black) connector [2]
- O<sub>2</sub> sensor 1P (Black) connector [3]
- VS sensor connector [4]
  - STD type: 4P (Black) connector
  - ABS type: 6P (Black) connector

*Be careful not to damage the threads of throttle cable.*

Loosen the throttle cable lock nuts [5] and release the throttle cables [6] from the throttle cable bracket.

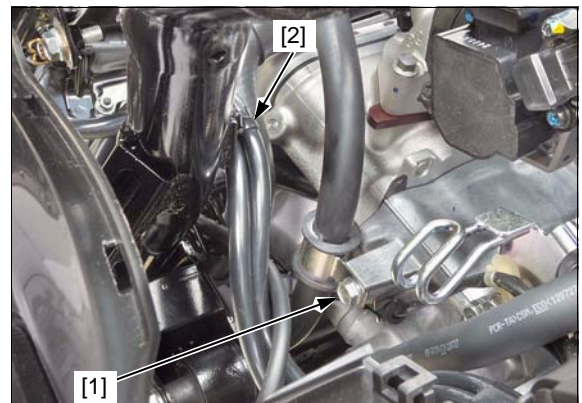
Disconnect the throttle cables from the throttle drum.

Release the main wire harness clamp [7].



Remove the hose clamp bolt [1].

Release the cable clamp [2].



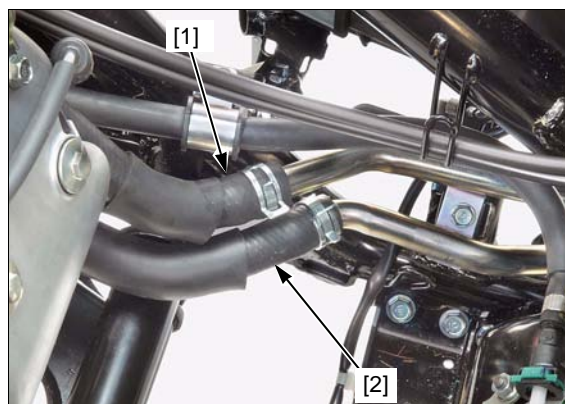


## ENGINE REMOVAL/INSTALLATION

Remove the bolt [1] and ground terminal [2].  
Release the cable clamps [3].



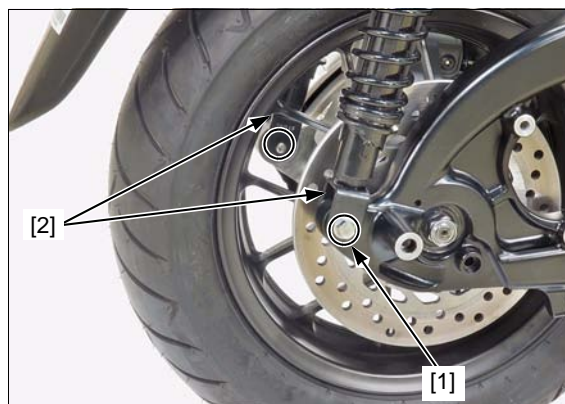
Disconnect the upper water hose [1] and lower water hose [2] from the water pipes.



Place a floor jack or other adjustable support under the engine and support it securely.

Support the frame securely with a hoist or equivalent.

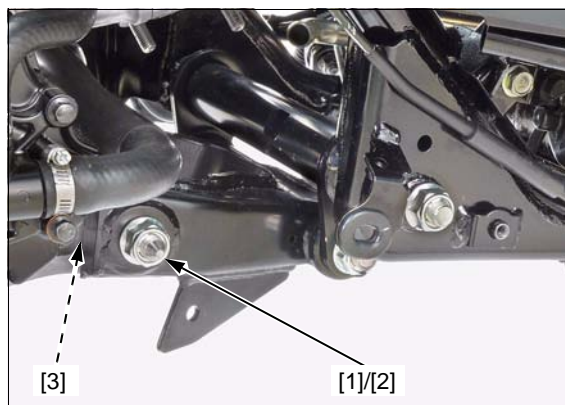
Remove the rear shock absorber lower mounting bolts [1] and release the rear shock absorber lower mounts [2].



Remove the engine pivot nut [1], bolt [2] and distance collar [3].

*The jack height must be adjusted to relieve stress for ease of bolt removal.*

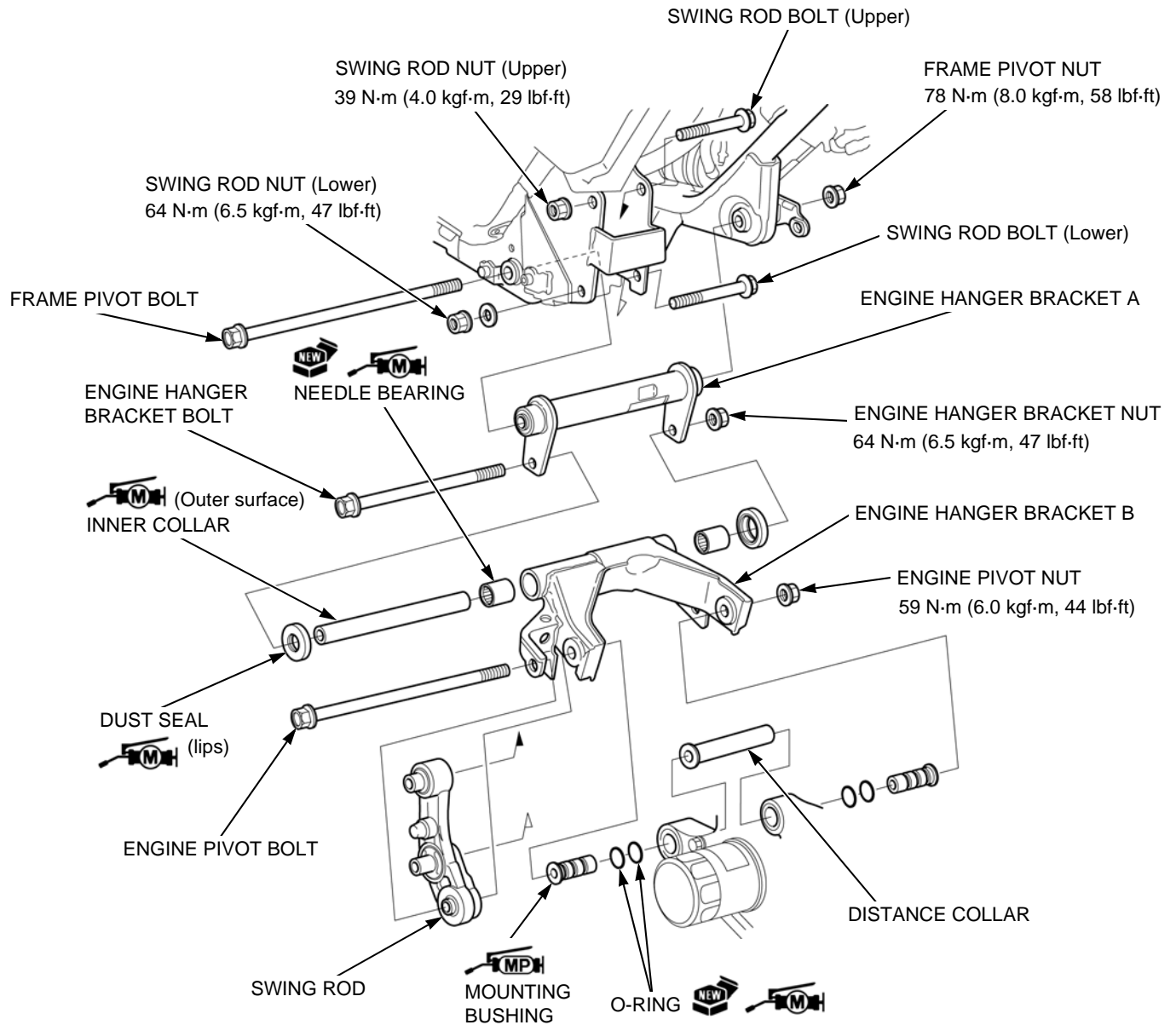
Make sure the wires and cables do not interfere with the engine components, and separate the frame from the engine.



## ENGINE BRACKET DISASSEMBLY/ ASSEMBLY

Disassemble and assemble the engine hanger bracket as shown in the installation.

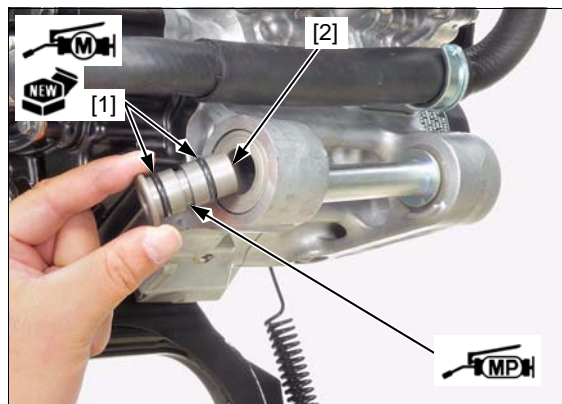
- Assemble the engine hanger bracket A and B first, and tighten the engine hanger bracket nut to the specified torque.
- Temporarily install the frame pivot blot/nut, engine pivot bolt/nut and swing rod bolts/nuts, and tighten them to the specified torque after installing the engine assembly.





## ENGINE REMOVAL/INSTALLATION

- Apply molybdenum disulfide grease to new O-rings [1] and install them to the engine mounting bushing [2] grooves.
- Apply molybdenum disulfide paste (0.5 – 0.7 g (0.018 – 0.025 oz)) (page 1-16) to the center groove of the engine mounting bushing.

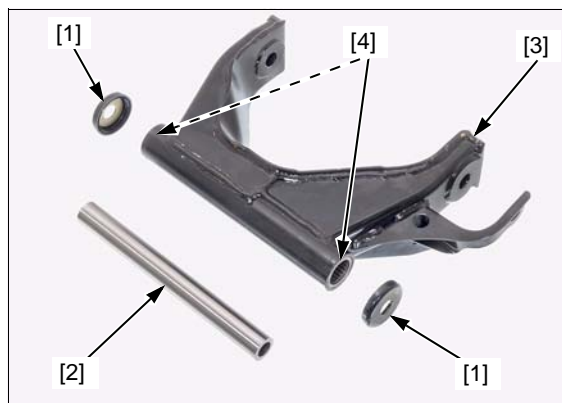


### INSPECTION

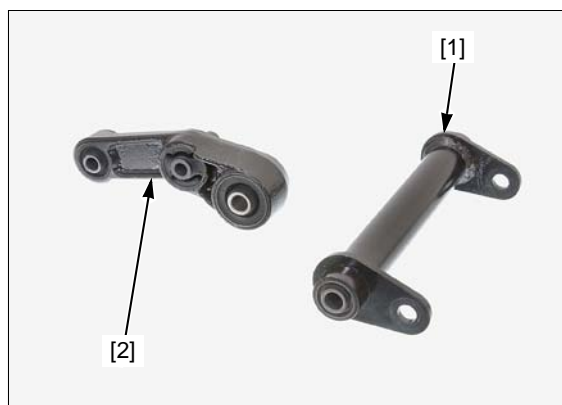
Remove the dust seals [1] and inner collar [2] from the engine hanger bracket B [3].

Check the needle bearings [4] in the engine hanger bracket B for wear or damage.

Also check that the bearing outer race fits tightly in the hanger bracket B.



Check the bushings in the engine hanger bracket A [1] and swing rod [2] for wear, deterioration or damage.



### BEARING REPLACEMENT

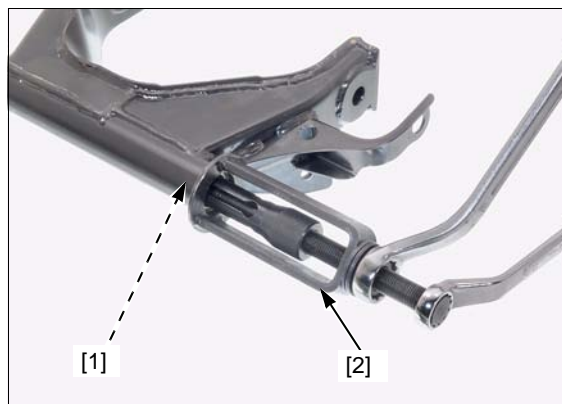
Remove the engine hanger bracket B (page 16-7).

Remove the engine hanger needle bearing [1] from the engine hanger bracket B using the special tool.

#### TOOL:

Bearing Remover 20 [2]

07931-MA70000

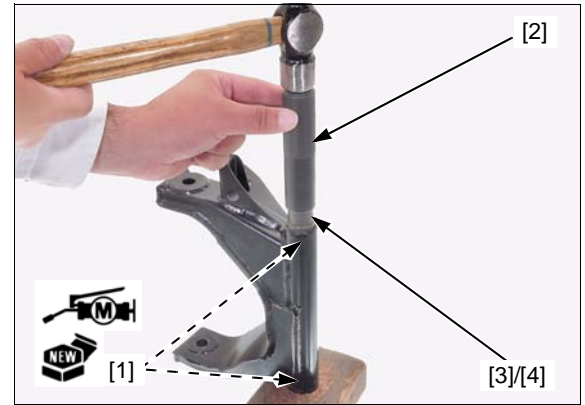


Pack new needle bearings [1] with molybdenum disulfide grease.

Drive the needle bearing into the engine hanger bracket B with the marked side facing up until it is fully seated, using the special tools.

## TOOLS:

<b>Driver [2]</b>	<b>07749-0010000</b>
<b>Attachment, 24 x 26 mm [3]</b>	<b>07746-0010700</b>
<b>Pilot 20 mm [4]</b>	<b>07746-0040500</b>



## ENGINE INSTALLATION

- Route the wires, hoses and cables properly (page 1-18).

*The jack height must be adjusted to relieve stress for ease of bolt installation.*

Swing the engine hanger bracket to align the engine pivot bolt hole with the swing rod bolt hole.

Align the engine mounting bushing hole with the engine pivot hole, using a jack or other adjustable support. Install the distance collar [1], engine pivot bolt [2] and nut [3].

- If engine hanger bracket is not removed, loosen the frame pivot nut [4].

Place a floor jack or other adjustable support under the engine and support it securely.

Install the rear shock absorbers [5] and rear shock absorber lower mounting bolts [6].

Tighten the bolts to the specified torque.

**TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)**

Retract the centerstand and set the rear wheel on the ground to seat the pivots.

Tighten the engine pivot nut to the specified torque.

**TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)**

Tighten the frame pivot nut to the specified torque.

**TORQUE: 78 N·m (8.0 kgf·m, 58 lbf·ft)**

Install the remaining parts in the reverse order of removal.

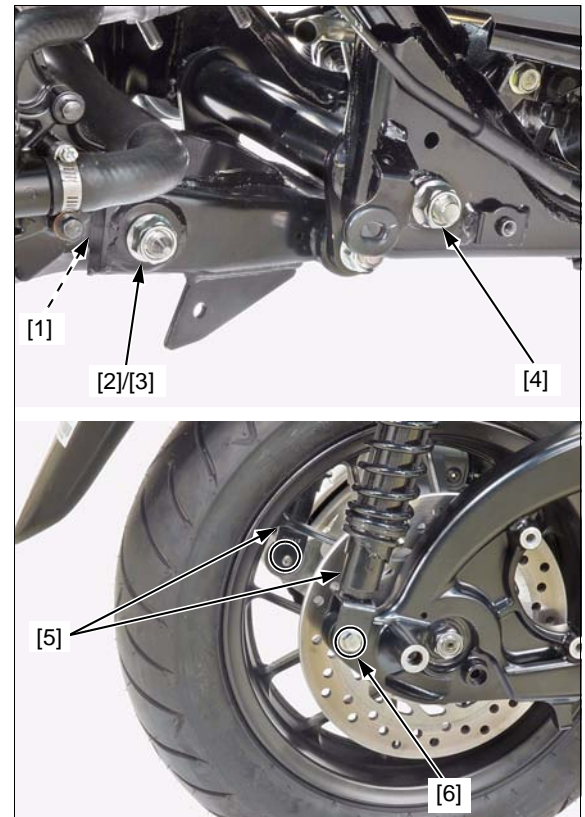
## TORQUE:

**Rear brake caliper mounting bolt:**  
**30 N·m (3.1 kgf·m, 22 lbf·ft)**

- Replace the caliper mounting bolts with new ones.

Fill the crankcase with engine oil (page 3-9).

Fill and bleed the cooling system (page 9-5).



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## MEMO

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# 17. FRONT WHEEL/SUSPENSION/STEERING

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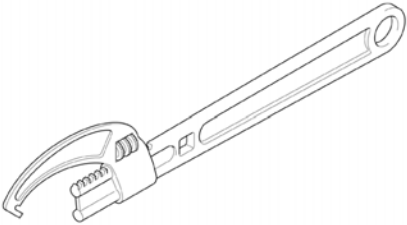
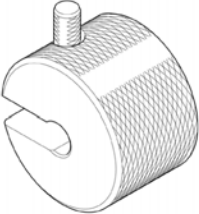
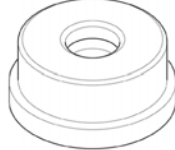
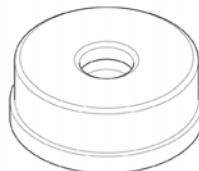


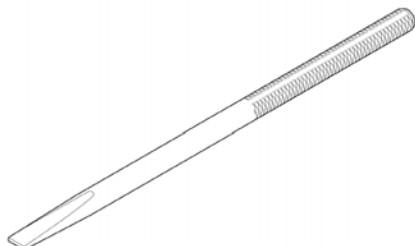

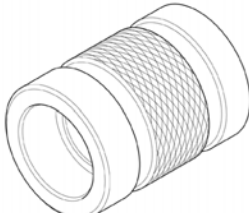
SERVICE INFORMATION .....	17-2	FORK .....	17-8
TROUBLESHOOTING .....	17-4	HANDLEBAR .....	17-15
COMPONENT LOCATION .....	17-5	HANDLEBAR POST .....	17-21
FRONT WHEEL .....	17-6	STEERING STEM .....	17-22

## SERVICE INFORMATION


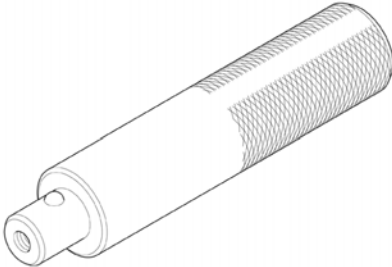
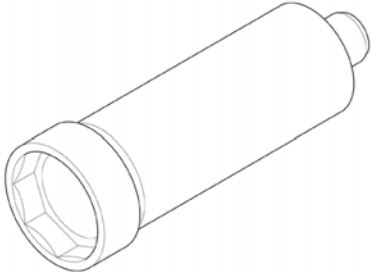
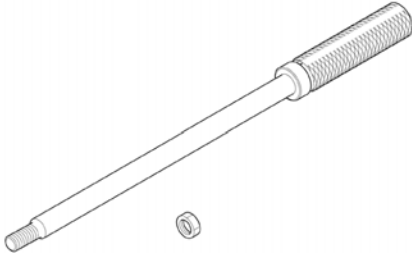
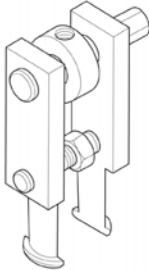
### GENERAL

- Raise the front wheel off the ground by supporting the frame securely when servicing the front wheel, suspension and steering stem. A hoist or equivalent is required to support the scooter.
- 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 installing the front wheel, check the brake operation by applying the brake lever.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- When using the pin spanner, use a 25 cm (10 in) long deflecting beam type torque wrench. The pin spanner increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the steering stem adjusting nut. The specification given on this page is actual torque applied to the steering stem adjusting nut, not the reading on the torque wrench when used with the pin spanner. The procedure later in the text gives the actual and indicated torque.
- For brake system service (page 19-2).
- For handlebar switch inspection (page 22-18).
- For ABS service (page 20-2).

### TOOLS

Adjustable Pin Spanner 07702-0020001 	Remover Weight 07741-0010201  or 07936-371020A (U.S.A. only) or 07936-3710200 (U.S.A. only)	Attachment, 42 x 47 mm 07746-0010300 
Attachment, 52 x 55 mm 07746-0010400 	Attachment, 35 mm I.D. 07746-0030400 	Pilot 17 mm 07746-0040400 
Bearing Remover Shaft 9 x 200L 07746-0050100 	Remover Head 17 mm 07746-0050500 	Fork Seal Driver Weight 07747-0010100 

**FRONT WHEEL/SUSPENSION/STEERING**

<p>Fork Seal Driver Attachment 37.2 07747-0010600</p> 	<p>Driver 07749-0010000</p> 	<p>Socket Wrench 32 (octagon) 07916-KM10000</p> 
<p>Bearing Remover Shaft 07JAC-PH80200</p>  <p>or 3/8 x 16 slide hammer commercially available in U.S.A.</p>	<p>Adjustable Bearing Puller, 45-75 mm 07YAC-0010102</p>  <p>(Not available in U.S.A.)</p>	

# TROUBLESHOOTING

### Hard steering

- Insufficient tire pressure
- Faulty tire
- Steering stem adjusting nut too tight
- Worn or damaged steering head bearings
- Worn or damaged steering head bearing races
- Bent steering stem

### Steers to one side or does not track straight

- Bent front axle
- Faulty tire
- Wheel installed incorrectly
- Worn or damaged wheel bearings
- Unbalanced fork fluid level
- Bent fork leg
- Damaged or loose steering head bearings
- Damaged frame
- Worn or damaged engine mounting bushings

### Front wheel wobbles

- Bent rim
- Worn or damaged wheel bearings
- Axle fastener not tightened properly
- Unbalanced tire and wheel
- Faulty tire

### Wheel turns hard

- Faulty wheel bearings
- Bent axle
- Front brake drag (page 19-2)

### Soft suspension

- Low tire pressure
- Weak fork spring
- Low fluid level in fork
- Incorrect fluid weight (low viscosity)

### Stiff suspension

- High tire pressure
- Bent fork pipe
- Bottom case binds
- High fluid level in fork
- Incorrect fluid weight (high viscosity)
- Clogged fork fluid passage

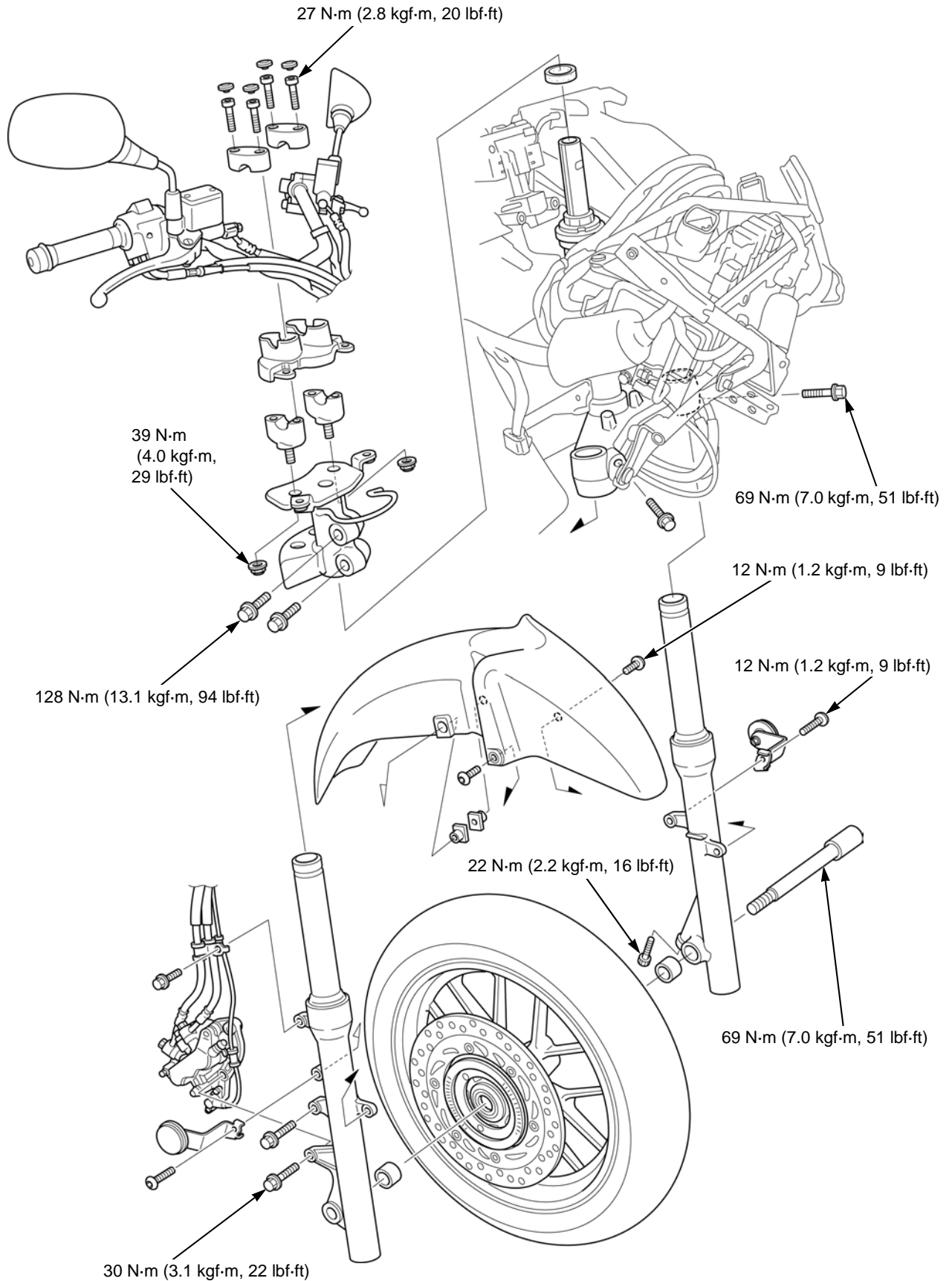
### Suspension noise

- Loose fork fasteners
- Incorrect fluid weight (low viscosity)
- Worn guide bushing or fork pipe bushing



# COMPONENT LOCATION

ABS type shown:



### FRONT WHEEL

#### REMOVAL/INSTALLATION

*ABS type only:* Remove the front wheel speed sensor (page 20-21).

Loosen the fork pinch bolt [1] on the left fork leg and remove the front axle bolt [2].

Remove front wheel and side collars [3].

- Do not operate the brake lever after removing the wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

Apply thin coat of grease to the axle outer surface.

Install the side collars to the both sides of the wheel.

Place the front wheel between the fork legs while inserting the brake disc between the brake pads.

Install the front axle bolt from the left side of the scooter, then tighten it to the specified torque.



**TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)**

With the front brake applied, pump the forks up and down several times to seat the axle and check the brake operation.

Tighten the fork pinch bolt to the specified torque.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

*ABS type only:* Install the front wheel speed sensor (page 20-21).  
Check the air gap between the front wheel speed sensor and pulser ring (page 20-20).

#### INSPECTION

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Replace the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Inspect the following parts for damage, abnormal wear, deformation, looseness or bend.

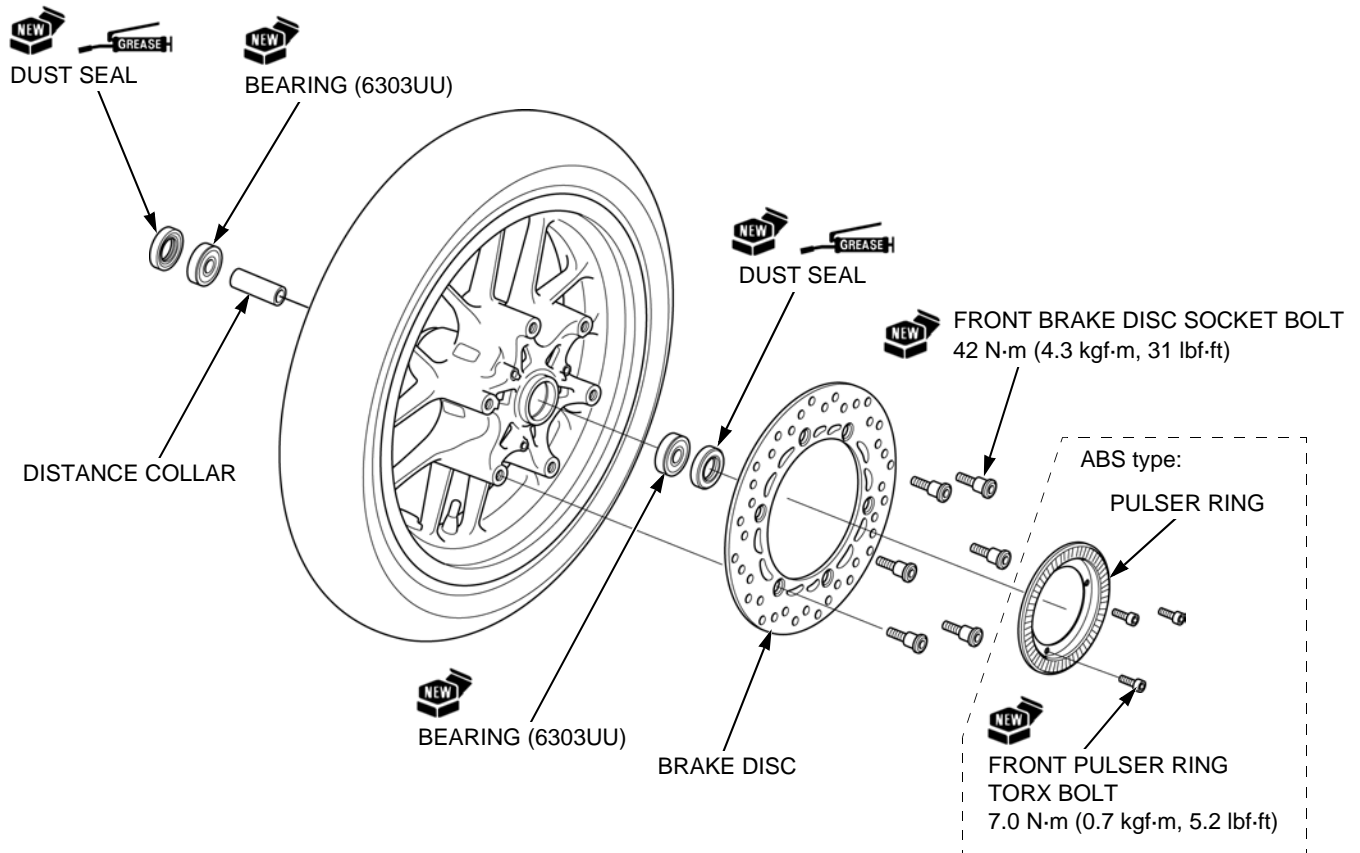
- Front axle
- Front Wheel

Measure each part according to FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS (page 1-9).

Replace any part if it is out of service limit.

## DISASSEMBLY/ASSEMBLY

Disassemble and assemble the front wheel as shown in the illustration.



## BEARING REPLACEMENT

*Replace the wheel bearings in pairs. Do not reuse old bearing.*

Install the bearing remover head [1] into the bearing. From the opposite side of the wheel, install the bearing remover shaft [2] and drive the bearing out of the wheel hub.

### TOOLS:

**Bearing Remover Shaft 9 x 200L** 07746-0050100  
**Remover Head 17 mm** 07746-0050500

Remove the distance collar and drive out the other bearing.



Drive in a new right side bearing [1] (brake disc side) squarely until it is fully seated.

Install the distance collar.

Drive in a new left side bearing squarely until it is fully seated.

### TOOLS:

**Driver [2]** 07749-0010000  
**Attachment, 42 x 47 mm [3]** 07746-0010300  
**Pilot 17 mm [4]** 07746-0040400

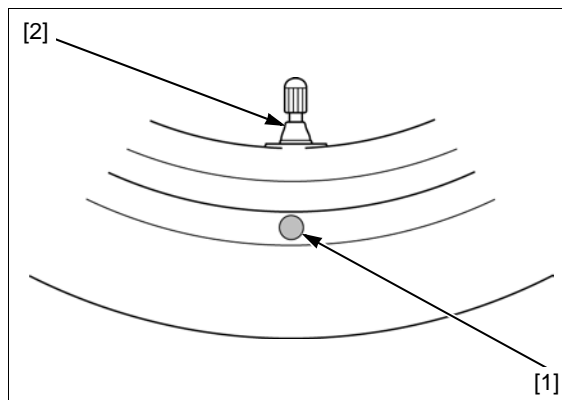


## FRONT WHEEL/SUSPENSION/STEERING

### WHEEL BALANCE

*Carefully check balance before installing the wheel.*

- Mount the tire with the arrow mark facing in the direction of rotation.
- For optimum balance, the tire balance mark [1] (light mass point: a paint dot on the side wall) must be located next to the valve stem [2]. Remount the tire if necessary.
- The wheel balance must be checked when the tire is remounted.



Mount the wheel, tire and brake disc assembly on an inspection stand [1].

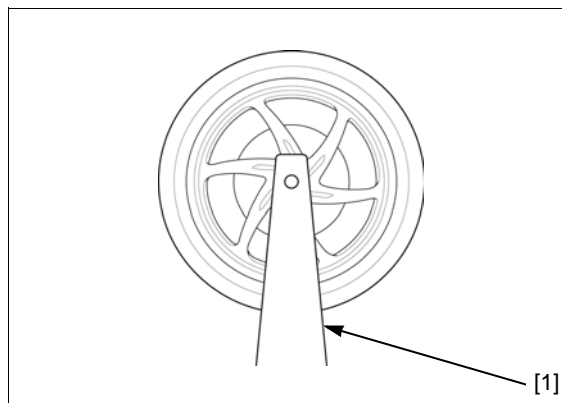
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.

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 a balance weight on the lightest 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 70 g (2.5 oz) to the wheel.



## FORK

### REMOVAL

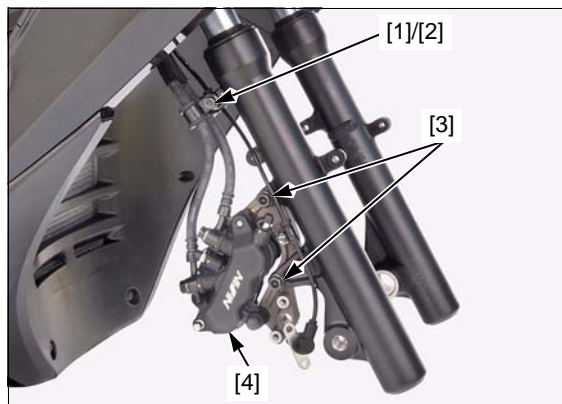
Remove the following:

- Front wheel (page 17-6)
- Front fender (page 2-9)

*Support the brake caliper so it does not hang from the brake hose. Do not twist the brake hose.*

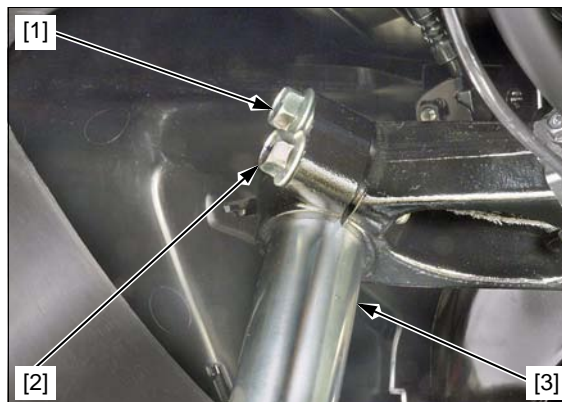
Remove the bolt [1] and brake hose clamp [2].

Remove the front brake caliper mounting bolts [3] and front brake caliper [4] from the fork leg.



Remove the upper fork pinch bolt [1].

Loosen the lower front fork pinch bolt [2] and remove the fork [3].

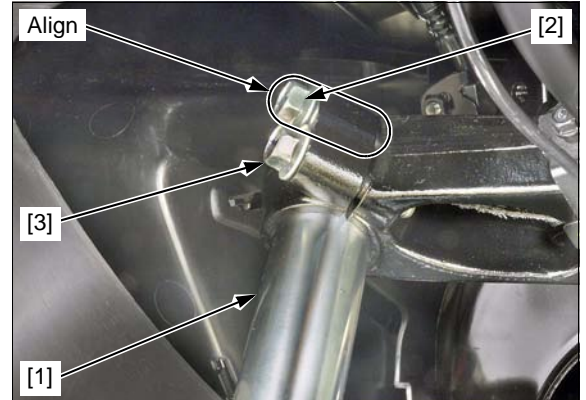


## INSTALLATION

Install the fork [1] into the steering stem and align the fork pipe groove with the bolt hole, then install the upper fork pinch bolt [2].

Tighten the upper/lower fork pinch bolts [3] to the specified torque.

**TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)**



Install the brake hose clamp [1] with the bolt [2], and tighten it.

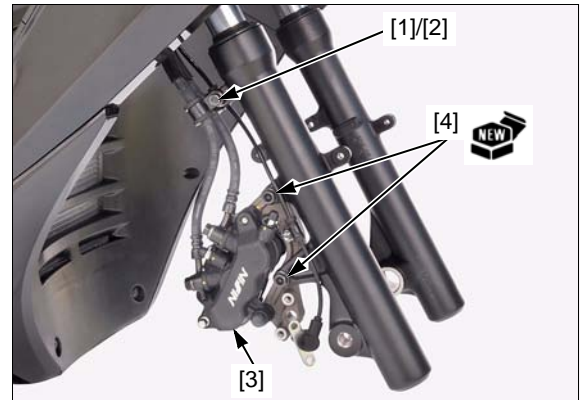
*Right fork only:* Install the brake caliper [3] with new mounting bolts [4] and tighten the bolts to the specified torque.

**TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)**

Install the following:

- Front fender (page 2-9)
- Front wheel (page 17-6)

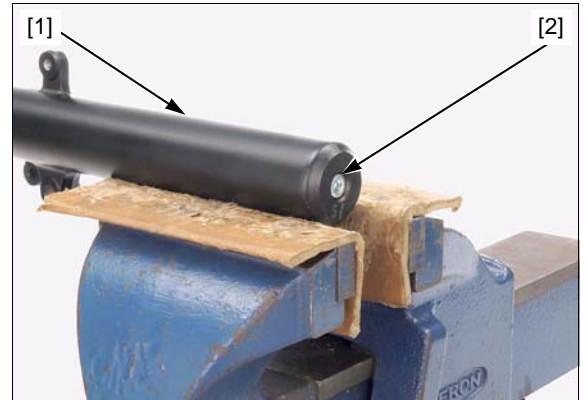
*ABS type only:* Check the air gap between the front wheel speed sensor and pulser ring (page 20-20)



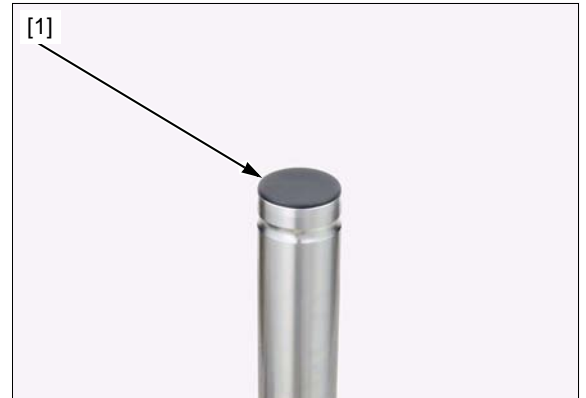
## DISASSEMBLY

Hold the bottom case [1] in a vise with soft jaws or shop towels.

*Remove the socket bolt after draining the fork fluid.* Loosen the fork socket bolt [2].



Remove the fork pipe cap [1].



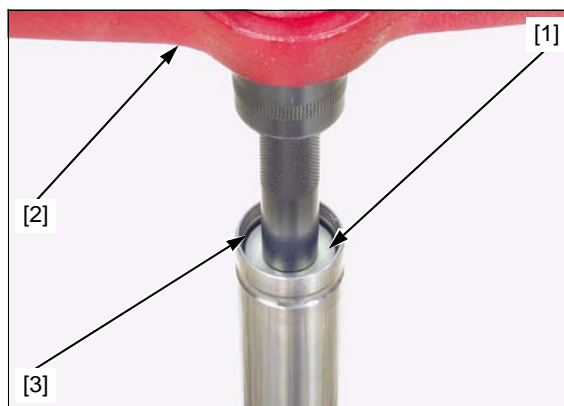


## FRONT WHEEL/SUSPENSION/STEERING

Press the spring seat [1] using a hydraulic press [2] and remove the stopper ring [3].

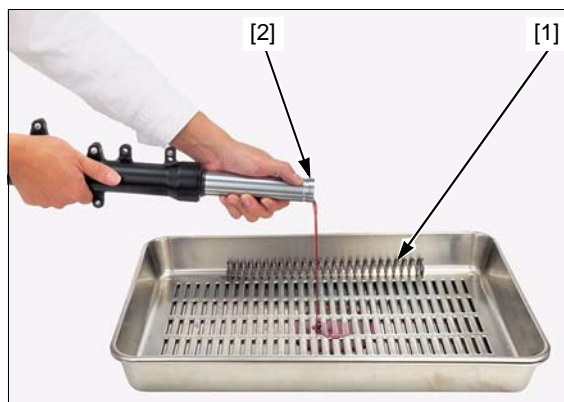
- Do not compress the fork spring more than necessary.
- Take care not to allow the spring seat to pop out when removing the fork leg from a hydraulic press.

Remove the spring seat.



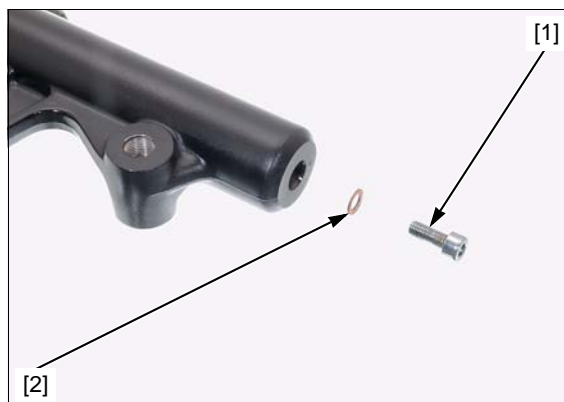
Remove the fork spring [1].

Pour out the fork fluid by pumping the fork pipe [2] up and down several times.



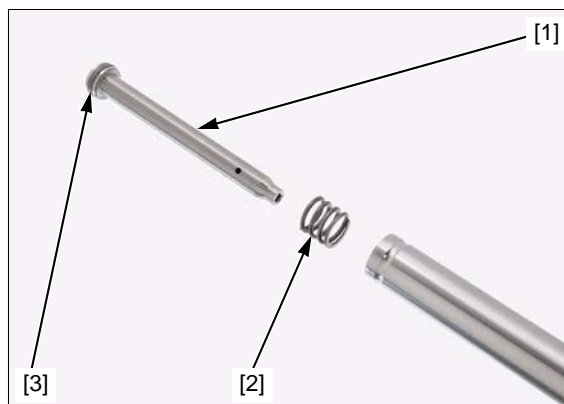
Remove the following:

- Fork socket bolt [1]
- Sealing washer [2]



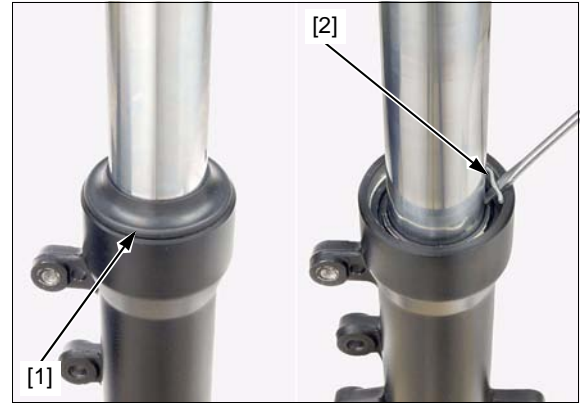
*Do not remove the fork piston ring [3], unless it is necessary to replace with a new one.*

- Fork piston [1]
- Rebound spring [2]

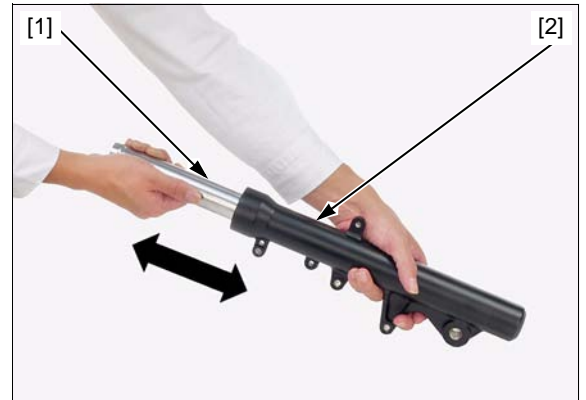


*Do not scratch the  
fork pipe sliding  
surface.*

- Dust seal [1]
- Stopper ring [2]



Using quick successive motion, pull the fork pipe [1] out of the bottom case [2].

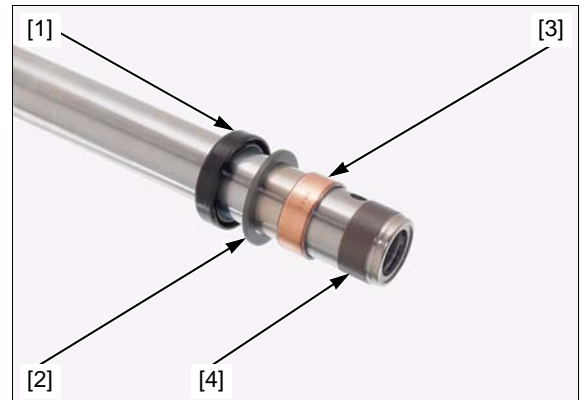


Remove the following:

- Oil lock piece [1]



- Oil seal [1]
- Back-up ring [2]
- Guide bushing [3]
- Fork pipe bushing [4]
- Do not remove the fork pipe bushing, unless it is necessary to replace with a new one.





## FRONT WHEEL/SUSPENSION/STEERING

### INSPECTION

Inspect the following parts for damage, abnormal wear, bend, deformation, scoring and teflon coating wear.

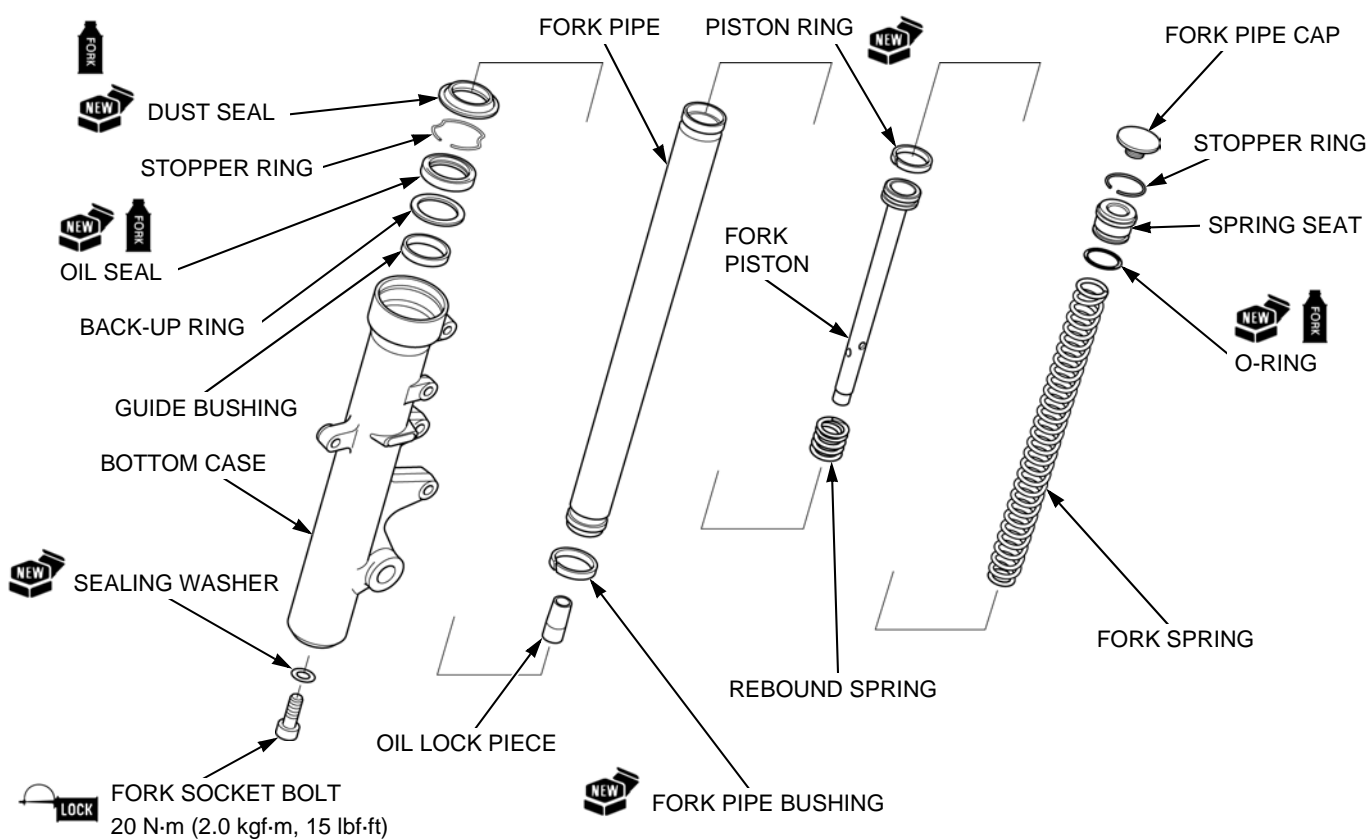
- Fork pipes
- Bottom cases
- Fork springs
- Guide bushings
- Back-up rings
- Fork pipe bushings
- Oil lock piece
- Rebound spring
- Fork piston
- Piston ring

Measure each part according to FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS (page 1-9).

Replace any part if it is out of service limit.

### ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



*Do not open the bushing slit more than necessary.*

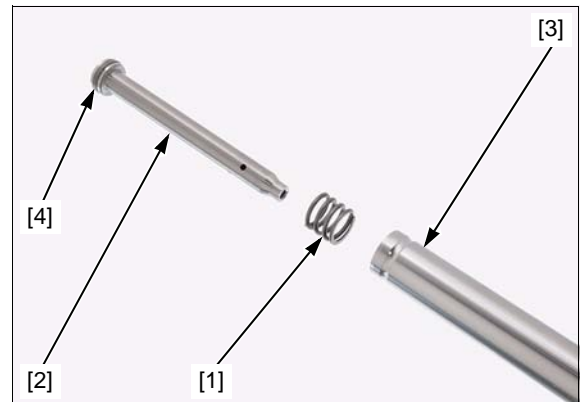
Install a new fork pipe bushing [1], being careful not to damage the coating of the bushing.

- Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

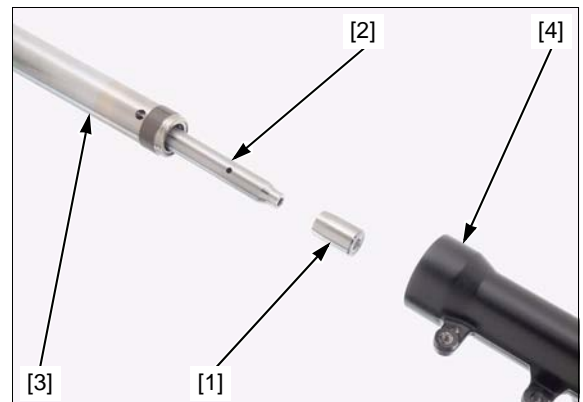


Install the rebound spring [1] to the fork piston [2], then install them into the fork pipe [3].

If the piston ring [4] is removed, replace with a new one.



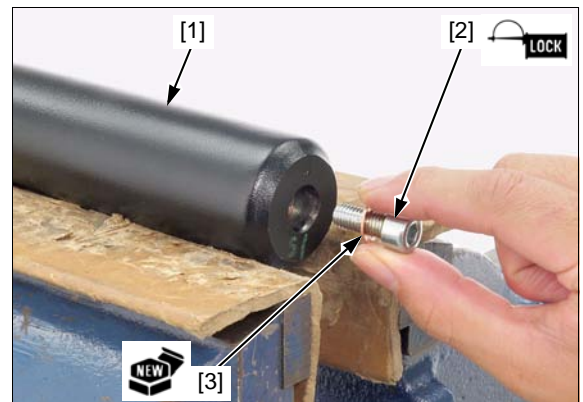
Install the oil lock piece [1] to the fork piston [2] end. Install the fork pipe [3] assembly into the bottom case [4].



Hold the bottom case [1] in a vise with soft jaws or shop towels.

Clean and apply locking agent to the fork socket bolt [2] threads.

Install the socket bolt with a new sealing washer [3] into the fork piston.

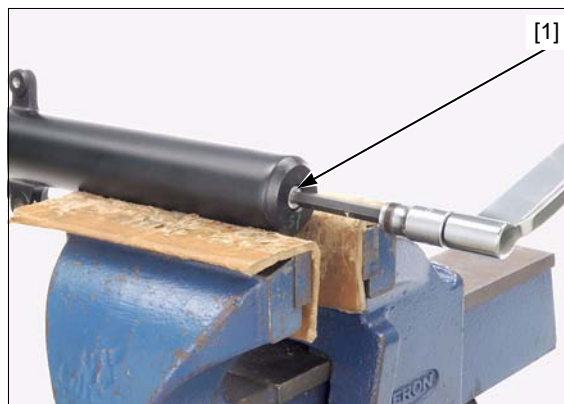


## FRONT WHEEL/SUSPENSION/STEERING

*If the fork piston turns with the socket bolt, temporarily install the fork spring and spring seat.*

Tighten the fork socket bolt [1] to the specified torque.

**TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)**



Install the guide bushing [1] and back up ring [2] over the fork pipe and set them on the bottom case.

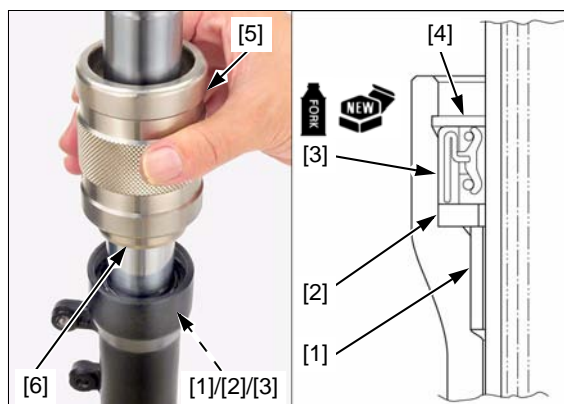
Coat a new oil seal [3] lips with fork fluid and install it onto the fork pipe with marked side facing up.

Install the fork oil seal into the bottom case until the stopper ring groove [4] appears, using special tools.

### TOOLS:

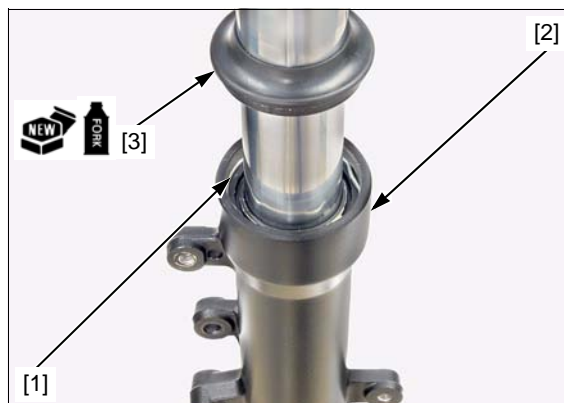
**Fork Seal Driver Weight [5] 07747-0010100**

**Fork Seal Driver Attachment 37.2 [6] 07747-0010600**



Install the stopper ring [1] into the groove in the bottom case [2], being careful not to scratch the fork pipe sliding surface.

Coat a new dust seal [3] lips with fork fluid and install it.



Pour the specified amount of the recommended fork fluid into the fork pipe.

### RECOMMENDED FORK FLUID:

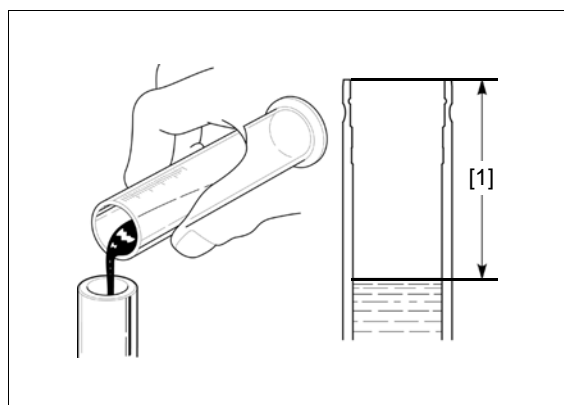
**Pro Honda Suspension Fluid SS-8 (10W)**

**FLUID CAPACITY: 204 ± 2.5 cm<sup>3</sup>  
(6.9 ± 0.08 oz, 7.2 ± 0.09 Imp oz)**

Slowly pump the fork pipe several times to remove any trapped air from the lower portion of the fork pipe.

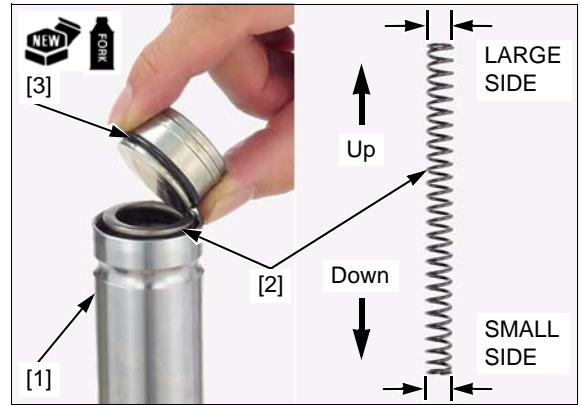
Compress the fork pipe fully. Measure the fluid level [1] from the top of the fork pipe.

**FLUID LEVEL: 78 mm (3.1 in)**



Pull the fork pipe [1] up and install the fork spring [2] with the small side facing down.

Coat a new O-ring [3] with fork fluid and install it into the spring seat groove.



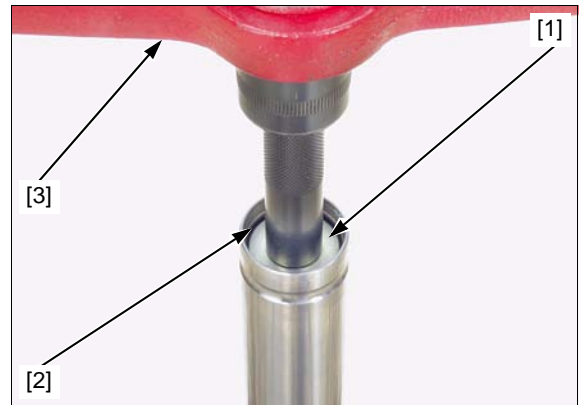
Set the fork assembly, spring seat [1] and stopper ring [2] onto the hydraulic press [3].

Press the spring seat into the fork pipe until the stopper ring groove is visible.

Install the stopper ring into the groove of the fork pipe.

- Do not compress the fork spring more than necessary.

Install the fork pipe cap onto the fork pipe.



## HANDLEBAR

### REMOVAL

*The left rearview mirror lock nut has left-hand threads.* Remove the following:

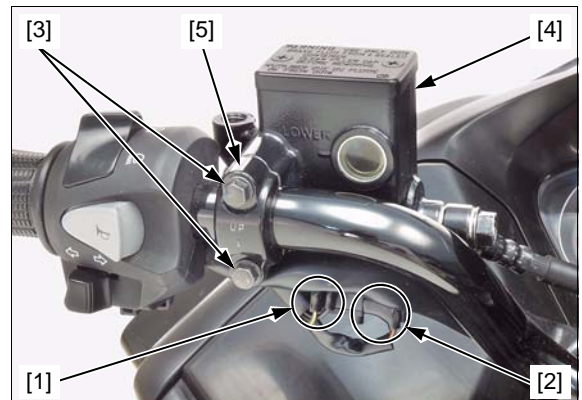
- Left rearview mirror [1]
- Wire band [2]



- Inhibitor switch connectors [1]
- Left brake light switch connectors [2]
- Master cylinder holder bolts [3]

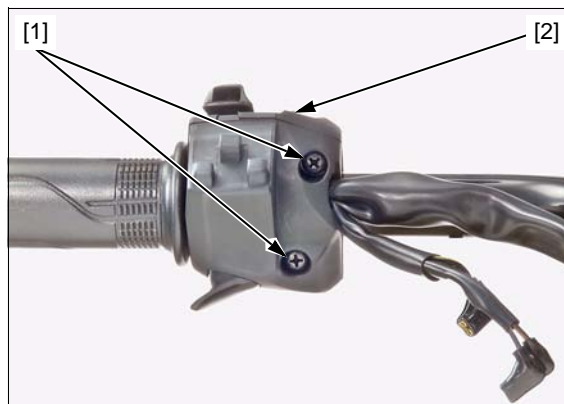
*Keep the left master cylinder upright, to prevent air from entering the hydraulic system. Do not twist the brake hose.*

- Left brake master cylinder [4]
- Left brake master cylinder holder [5]



## FRONT WHEEL/SUSPENSION/STEERING

- Screws [1]
- Left handlebar switch housing [2]

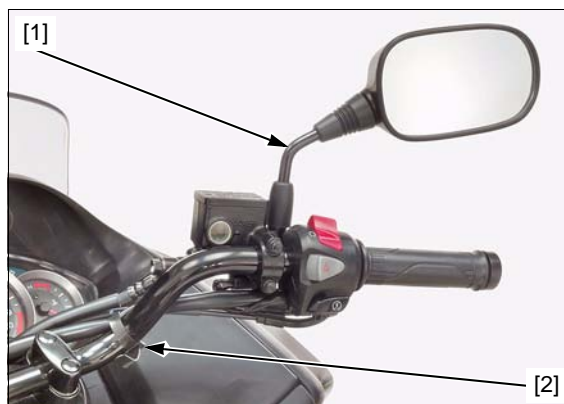


- Screw [1]
- Left handlebar weight [2]
- Handlebar grip [3]



*The right rearview mirror lock nut has left-hand threads.*

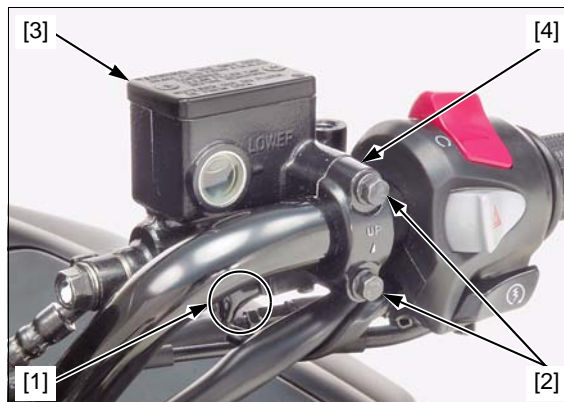
- Right rearview mirror [1]
- Wire band [2]



- Right brake light switch connectors [1]
- Master cylinder holder bolts [2]

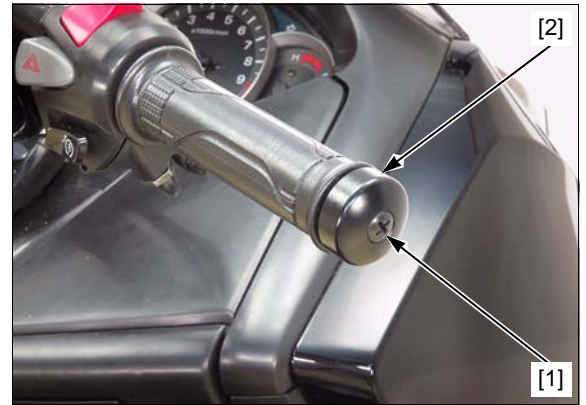
*Keep the right master cylinder upright, to prevent air from entering the hydraulic system.  
Do not twist the brake hose.*

- Right brake master cylinder [3]
- Right brake master cylinder holder [4]

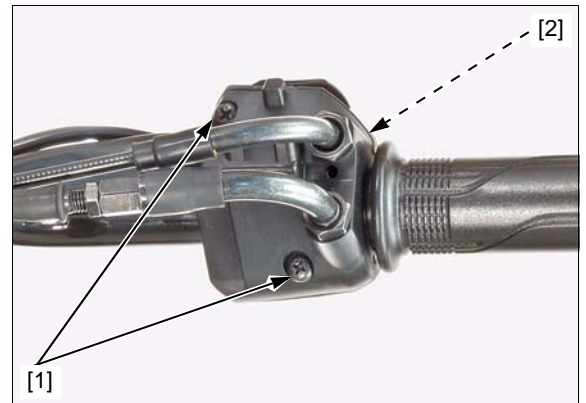




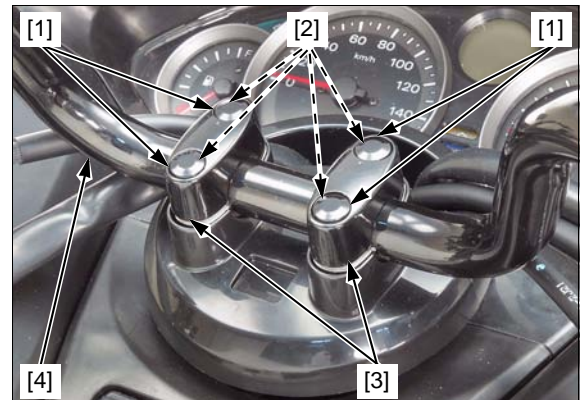
- Screw [1]
- Right handlebar weight [2]



- Screws [1]
- Upper throttle housing [2]

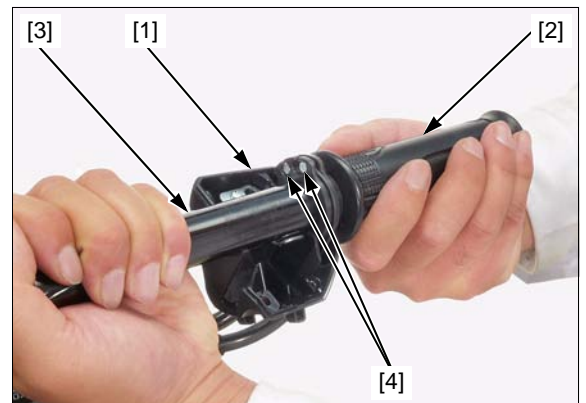


- Caps [1]
- Handle upper holder bolts [2]
- Upper holders [3]
- Handlebar [4]



Remove the lower throttle housing [1] and throttle pipe/grip [2] from the handlebar [3].

Disconnect the throttle cables [4] from the throttle pipe.



## FRONT WHEEL/SUSPENSION/STEERING

### INSTALLATION

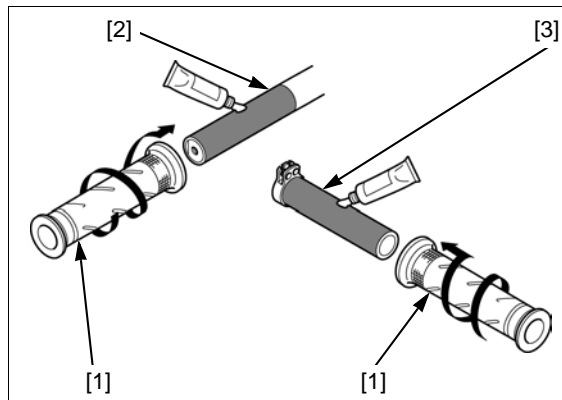
*Spreading bonded area should be 80% min of contact area.*

Apply Honda Bond A, Honda Handgrip Cement (U.S.A. only), Loctite 495 or equivalent adhesive to the inner surface of the grips [1] and to the clean surfaces of the left handlebar [2] and throttle pipe [3].

Wait 3 – 5 minutes and install the grips.

Rotate the grips for even application of the adhesive.

*Allow the adhesive to dry for 1 hour before using.*

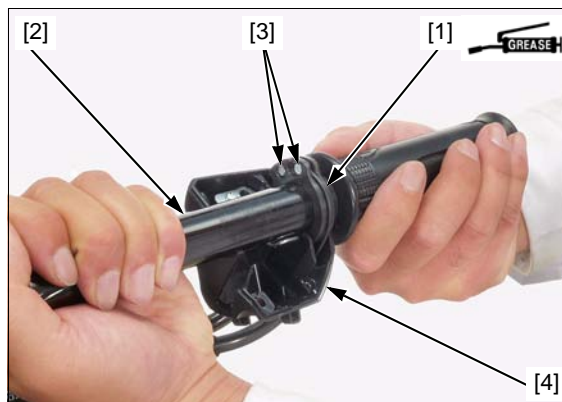


Clean the sliding surfaces of the throttle pipe [1] and handlebar [2].

Apply grease (0.1 – 0.2 g (0.004 – 0.007 oz)) to the throttle pipe flange groove and cable end.

Connect the throttle cables [3] to the throttle pipe flange.

Install the lower throttle housing [4] and throttle grip/throttle pipe onto the handlebar.



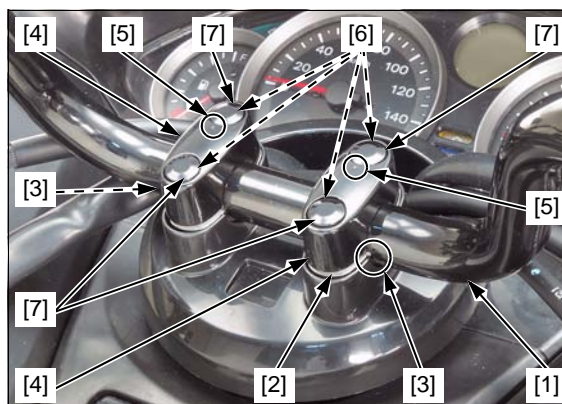
Install the handlebar [1] onto the lower holders [2] aligning the punch marks [3] on the handlebar with the top edge of the lower holder.

Install the upper holders [4] with the punch marks [5] facing forward.

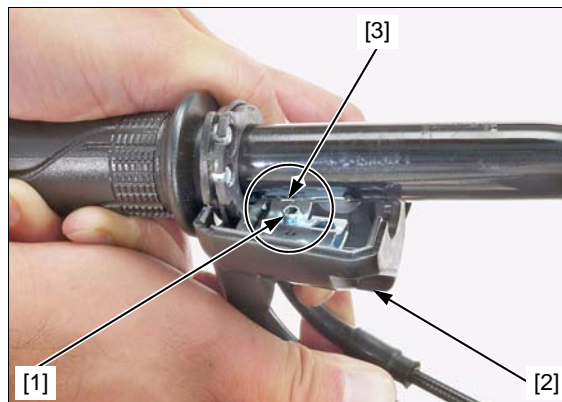
Install the handle upper holder bolts [6] and tighten the front side bolts first, and then tighten the rear side bolts to the specified torque.

**TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)**

Install the caps [7].

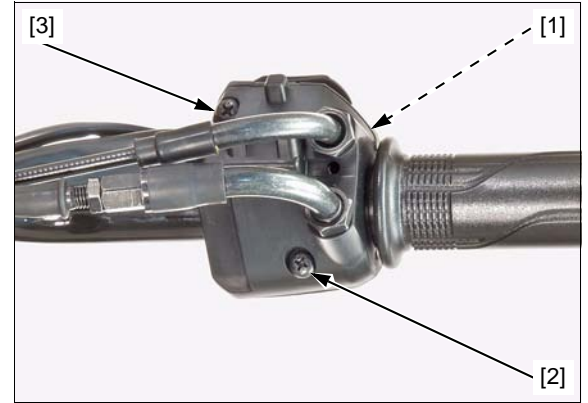


Align the locating pin [1] of the lower throttle housing [2] with the hole [3] in the handlebar.





Install the upper throttle housing [1] and screws.  
Tighten the forward screw [2] first, then the rear screw [3].



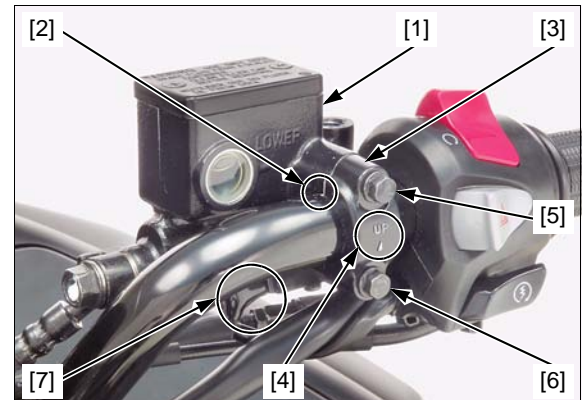
Install the right handlebar weight [1].  
Install a new screw [2] and tighten it.



Set the right brake master cylinder [1] by aligning the end of the master cylinder with the punch mark [2] on the handlebar.  
Set the holder [3] with the "UP" mark [4] facing up and tighten the upper bolt [5] first, then tighten the lower bolt [6] to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Connect the right brake light switch connectors [7].



Bind the right handlebar switch wire [1] with the wire band [2].

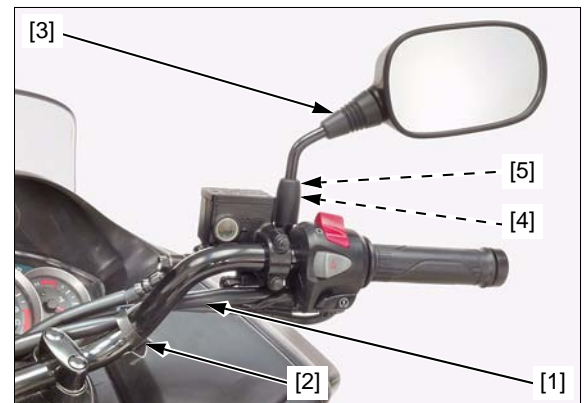
*The right rearview mirror lock nut has left-hand threads.*

Install the right rearview mirror [3] and tighten the adapter bolt [4] and lock nut [5] to the specified torque.

**TORQUE:**

**Adapter bolt: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

**Lock nut: 34 N·m (3.5 kgf·m, 25 lbf·ft)**



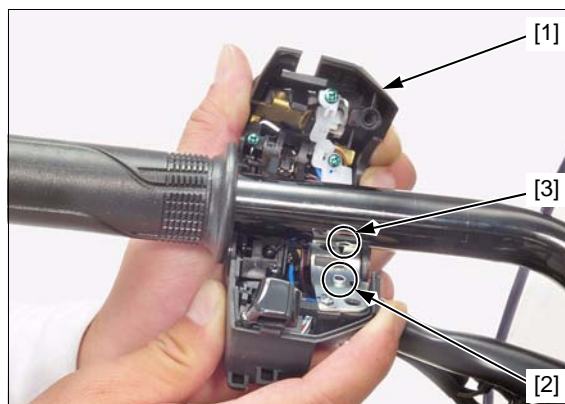
## FRONT WHEEL/SUSPENSION/STEERING

Install the left handlebar weight [1].

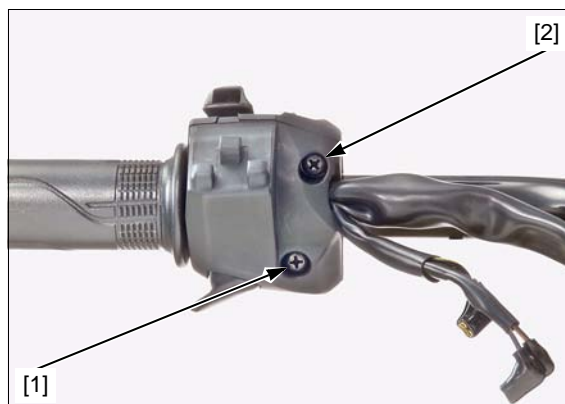
Install a new screw [2] and tighten it.



Install the left handlebar switch housing [1] by aligning the locating pin [2] of the switch housing with the hole [3] in the handlebar.



Install the screws and tighten the forward screw [1] first, then tighten the rear screw [2].

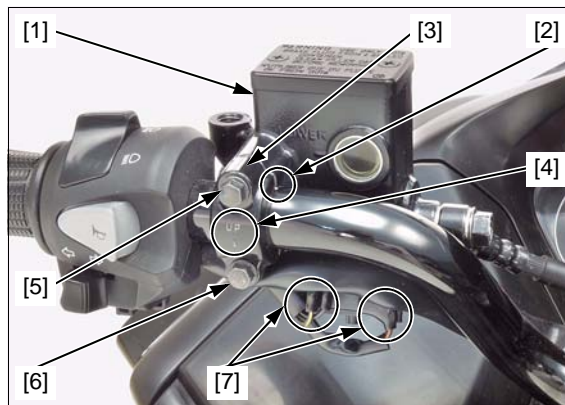


Set the left brake master cylinder [1] by aligning the end of the master cylinder with the punch mark [2] on the handlebar.

Set the holder [3] with the "UP" mark [4] facing up and tighten the upper bolt [5] first, then tighten the lower bolt [6] to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Connect the inhibitor switch and left brake light switch connectors [7].



Bind the left handlebar switch wire [1] with the wire band [2].

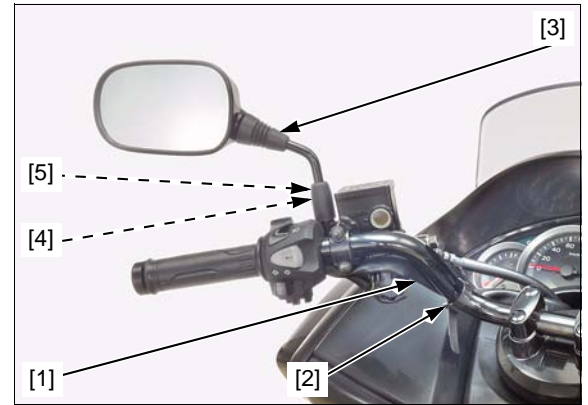
*The left rearview mirror lock nut has left-hand threads.*

Install the left rearview mirror [3] and tighten the adapter bolt [4] and lock nut [5] to the specified torque.

**TORQUE:**

**Adapter bolt:** 34 N·m (3.5 kgf·m, 25 lbf·ft)

**Lock nut:** 34 N·m (3.5 kgf·m, 25 lbf·ft)



## HANDLEBAR POST

### REMOVAL

Remove the following:

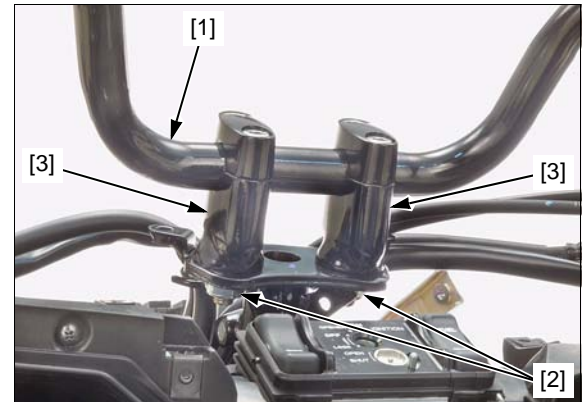
- Meter panel (page 2-13)
- Handlebar (page 17-15)

Remove the rear handle cover [1].



Temporarily install the handlebar [1] and remove the lower holder nuts [2].

Remove the lower holders [3].

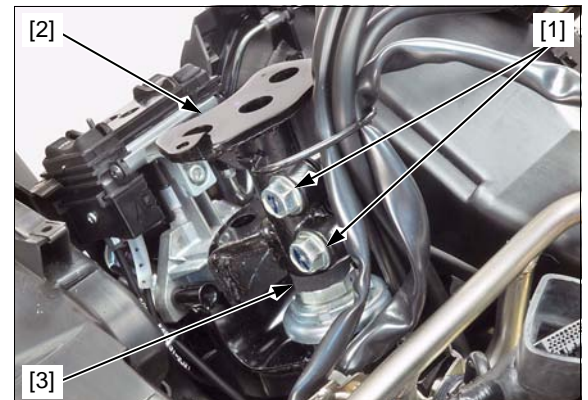


Remove the handlebar post bolts [1] and handlebar post [2] from the steering stem.

Discard the handlebar post bolts.

Remove the rubber seal [3].

Check the condition of the rubber seal, and replace it if necessary.





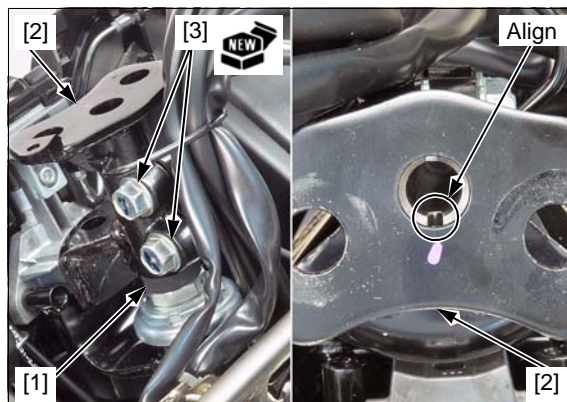
### INSTALLATION

Install the rubber seal [1].

Install the handlebar post [2] by aligning its pin with the cut-out of the steering stem.

Install and tighten new handlebar post bolts [3] to the specified torque.

**TORQUE: 128 N·m (13.1 kgf·m, 94 lbf·ft)**



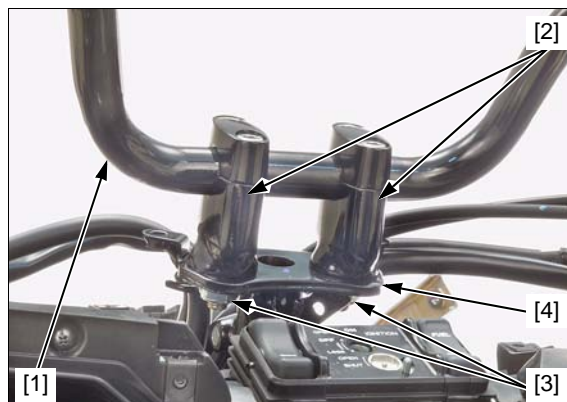
Temporarily assemble the handlebar [1] and lower holders [2].

Install the lower holders and nuts [3] to the handlebar post [4].

Tighten the handle lower holder nuts to the specified torque.

**TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)**

Remove the handlebar.



Install the rear handle cover [1].

Install the following:

- Meter panel (page 2-13)
- Handlebar (page 17-18)



## STEERING STEM

### REMOVAL

Remove the following:

- Fork (page 17-8)
- Handlebar post (page 17-21)

Remove the bolt [1] and clamp [2].

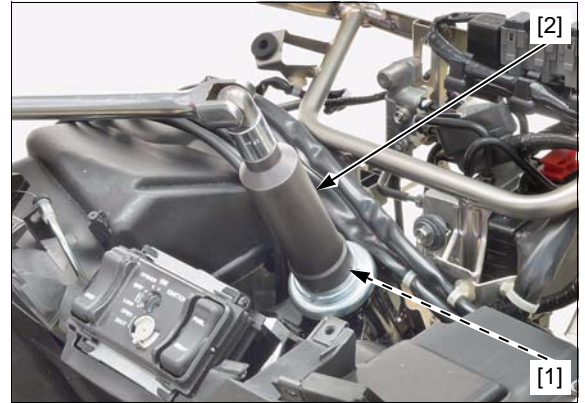


Loosen the steering stem lock nut [1] using the special tool.

**TOOL:**

**Socket Wrench 32 (octagon) [2] 07916-KM10000**

Remove the steering stem lock nut.



Remove the lock washer [1].

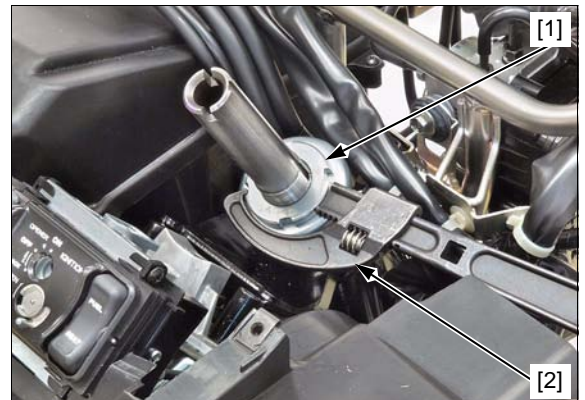


Hold the steering stem and loosen the steering stem adjusting nut [1] using the special tool [2].

**TOOL:**

**Adjustable Pin Spanner [2] 07702-0020001**

Remove the steering stem adjusting nut while supporting the steering stem.



Remove the following:

- Dust seal [1]
- Upper inner race [2]
- Upper steering bearing [3]





## FRONT WHEEL/SUSPENSION/STEERING

- Steering stem [1]
- Lower steering bearing [2]



### STEERING BEARING RACE REPLACEMENT

#### UPPER/LOWER OUTER RACE

Remove the upper [1]/lower [2] outer race using the special tools.

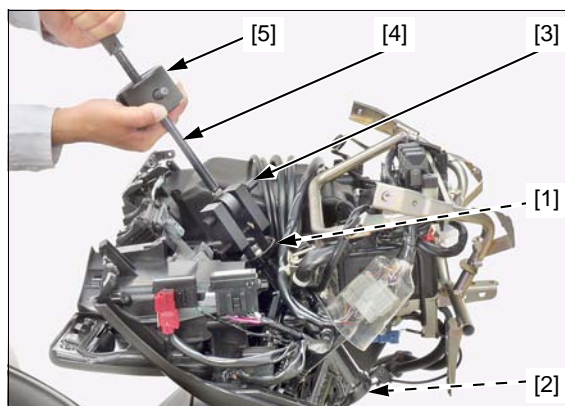
#### TOOLS:

Adjustable Bearing Puller,  
45 – 75 mm [3]

Bearing Remover Shaft [4]

Remover Weight [5]

07YAC-0010102  
(Not available in  
U.S.A.)  
07JAC-PH80200 or  
3/8 x 16 slide  
hammer  
commercially  
available in U.S.A.  
07741-0010201 or  
07936-371020A  
(U.S.A. only) or  
07936-3710200  
(U.S.A. only)



Drive in a new lower outer race [1] into the steering  
head pipe using the special tools.

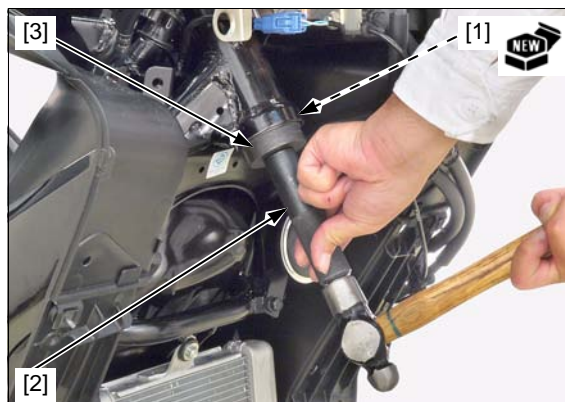
#### TOOLS:

Driver [2]

Attachment, 52 x 55 mm [3]

07749-0010000

07746-0010400



Drive in a new upper outer race [1] into the steering  
head pipe using the special tools.

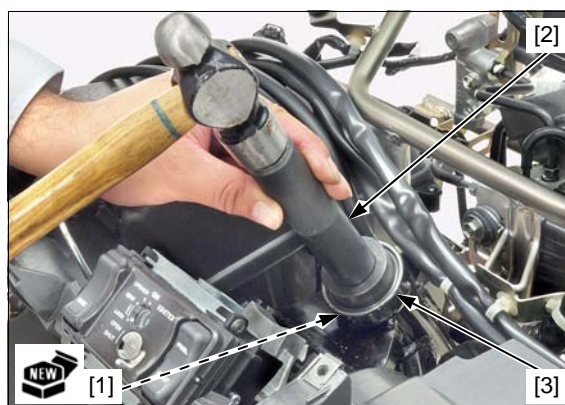
#### TOOLS:

Driver [2]

Attachment, 42 x 47 mm [3]

07749-0010000

07746-0010300



## LOWER INNER RACE

Remove the lower inner race [1] with a chisel or equivalent tool, being careful not to damage the stem.

Remove the dust seal [2].



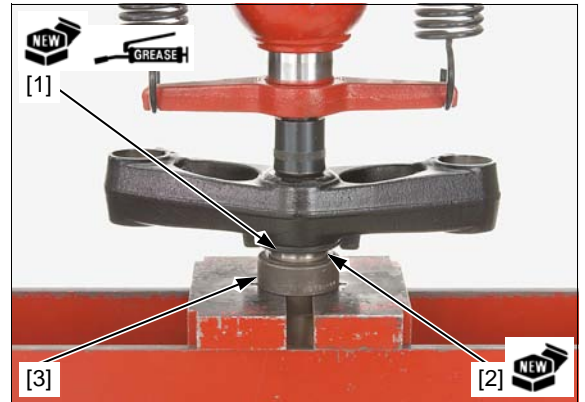
Apply specified grease to a new lower dust seal [1] lips (page 1-17). Install it onto the steering stem.

Press a new lower inner race [2] using a special tool and hydraulic press.

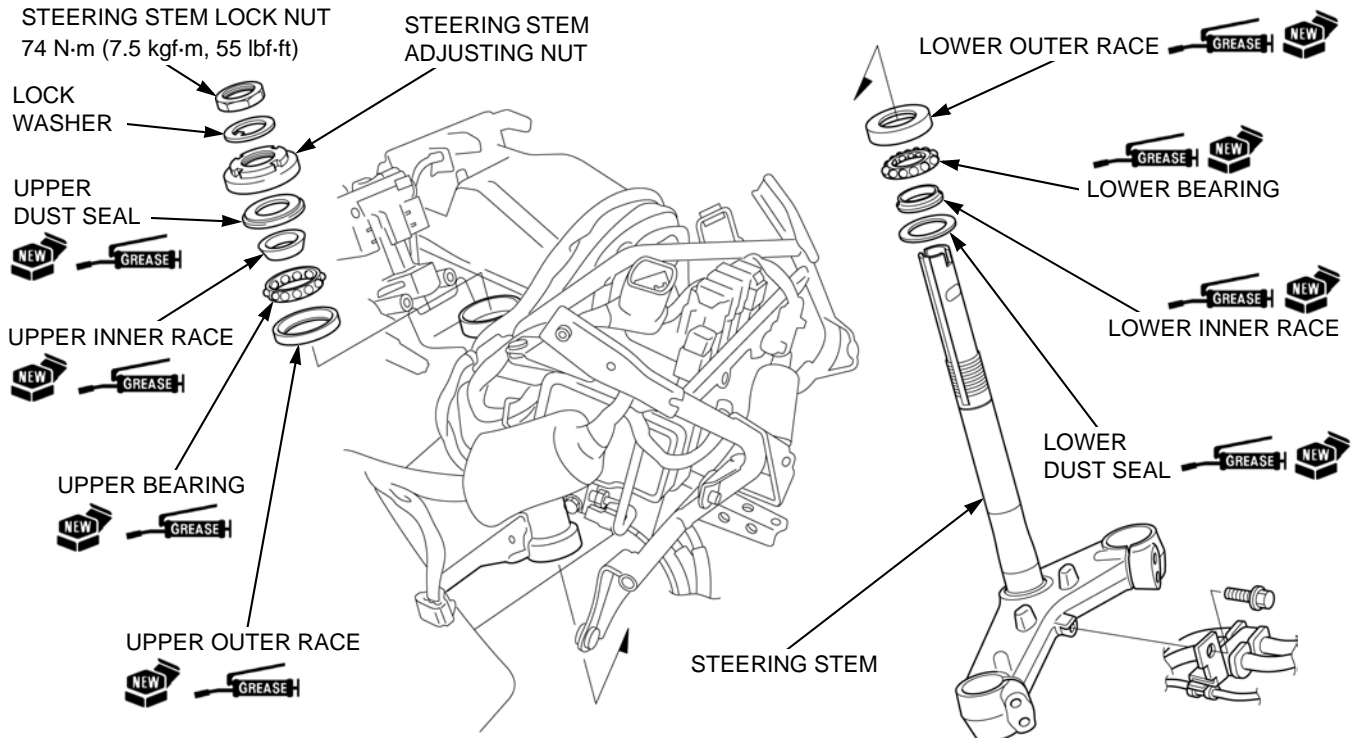
### TOOL:

Attachment, 35 mm I.D. [3]

07746-0030400



## INSTALLATION

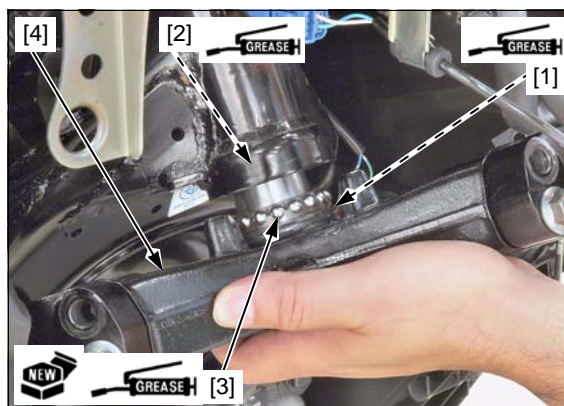




## FRONT WHEEL/SUSPENSION/STEERING

Apply specified grease to the lower inner race [1] and lower outer race [2] (page 1-17).  
Apply specified grease (3 – 5 g (0.1 – 0.2 oz)) to a new lower bearing [3] and fill it up (page 1-17). Install the lower bearing onto the stem [4].

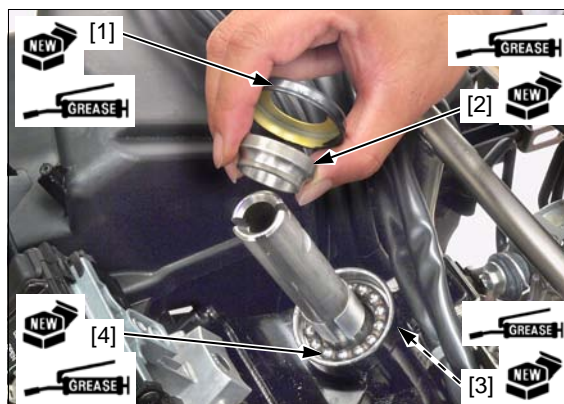
Insert the steering stem into the steering head pipe.



Apply specified grease to new upper dust seal [1] lips, upper inner race [2] and upper outer race [3] (page 1-17).

Apply specified grease (3 – 5 g (0.1 – 0.2 oz)) to a new upper bearing [4] and fill it up (page 1-17). Install the upper bearing onto the upper outer race.

Install the upper inner race and upper dust seal.



*Refer to torque  
wrench reading  
information on  
Service Information  
(page 17-2).*

Install and tighten the steering stem adjusting nut [1] to the specified torque.

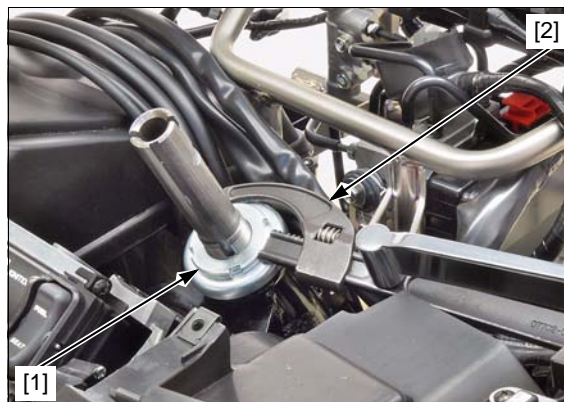
### TOOL:

**Adjustable Pin Spanner [2]      07702-0020001**

### TORQUE:

**Actual:      25 N·m (2.5 kgf·m, 18 lbf·ft)**

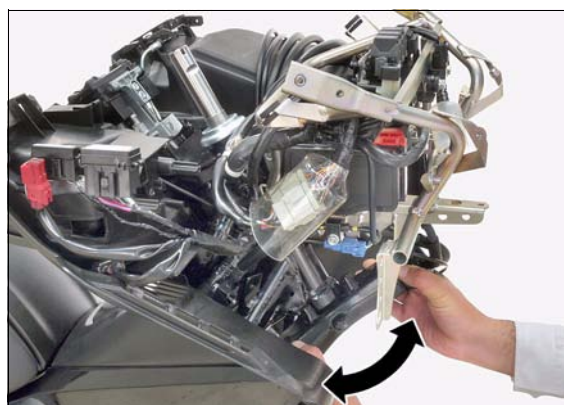
**Indicated: 18 N·m (1.8 kgf·m, 13 lbf·ft)**



Turn the steering stem lock-to-lock several times to seat the bearing.

Temporarily loosen the steering stem adjusting nut to the specified torque.

**TORQUE: 0 N·m (0.0 kgf·m, 0 lbf·ft)**



Install the following:

- Fork (page 17-9)
- Front wheel (page 17-6)

Lower the front wheel on the ground.

*Refer to torque wrench reading information on Service Information (page 17-2).*

Tighten the steering stem adjusting nut [1] to the specified torque.

**TOOL:**

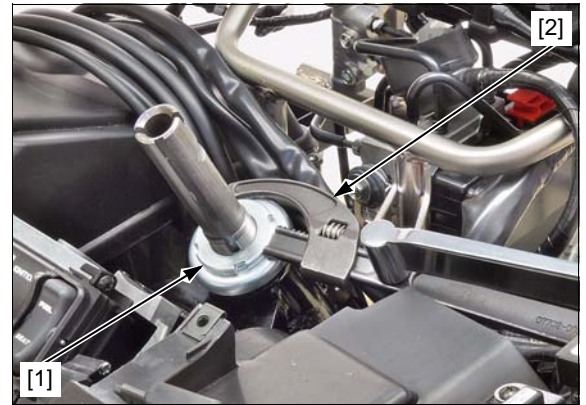
**Adjustable Pin Spanner [2] 07702-0020001**

**TORQUE:**

**Actual: 2.5 N·m (0.25 kgf·m, 1.8 lbf·ft)**

**Indicated: 1.8 N·m (0.18 kgf·m, 1.3 lbf·ft)**

Install the lock washer [1] onto the steering stem by aligning the tab with the groove.



Install the lock nut [1].

Tighten the steering stem lock nut using the special tool to the specified torque.

**TOOL:**

**Socket Wrench 32 (octagon) [2]**

**07916-KM10000**

**TORQUE: 74 N·m (7.5 kgf·m, 55 lbf·ft)**

Support the scooter securely and raise the front wheel. Make sure the steering stem moves smoothly without play or binding.



Install the clamp [1] and bolt [2], and tighten it.

*Route the hoses, cables and wire harness properly (page 1-18).*

Install the following:

- Handlebar post (page 17-22)
- Handlebar (page 17-18)



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## MEMO

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# 18. REAR WHEEL/PARKING BRAKE/SUSPENSION

---

SERVICE INFORMATION .....	18-2	REAR WHEEL/SWINGARM .....	18-5
TROUBLESHOOTING.....	18-2	PARKING BRAKE (AC TYPE ONLY) .....	18-11
COMPONENT LOCATION .....	18-3	REAR SHOCK ABSORBER .....	18-13



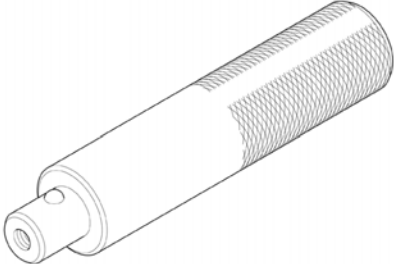
## REAR WHEEL/PARKING BRAKE/SUSPENSION

### 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 rear wheel installation, check the brake operation by applying the brake lever.
- When servicing the rear wheel and suspension, support the scooter securely on its centerstand.
- Use only tires marked "TUBELESS" and tubeless valve stems on rims marked "TUBELESS TIRE APPLICABLE".
- Use Honda genuine replacement bolts and nuts for all suspension pivot and mounting points.
- For brake system service (page 19-2).
- For ABS service (page 20-2).

#### TOOLS

Attachment, 42 x 47 mm 07746-0010300 	Pilot 17 mm 07746-0040400 	Driver 07749-0010000 
--	---	--

### TROUBLESHOOTING

#### Rear wheel wobbles

- Bent rim
- Faulty tire
- Axle nut and/or engine mounting bolt not tightened properly
- Unbalanced tire and wheel
- Loose or worn final gear shaft bearing
- Insufficient tire pressure
- Bent final gear shaft

#### Soft suspension

- Low tire pressure
- Oil leakage from damper unit
- Weak rear shock absorber spring

#### Stiff suspension

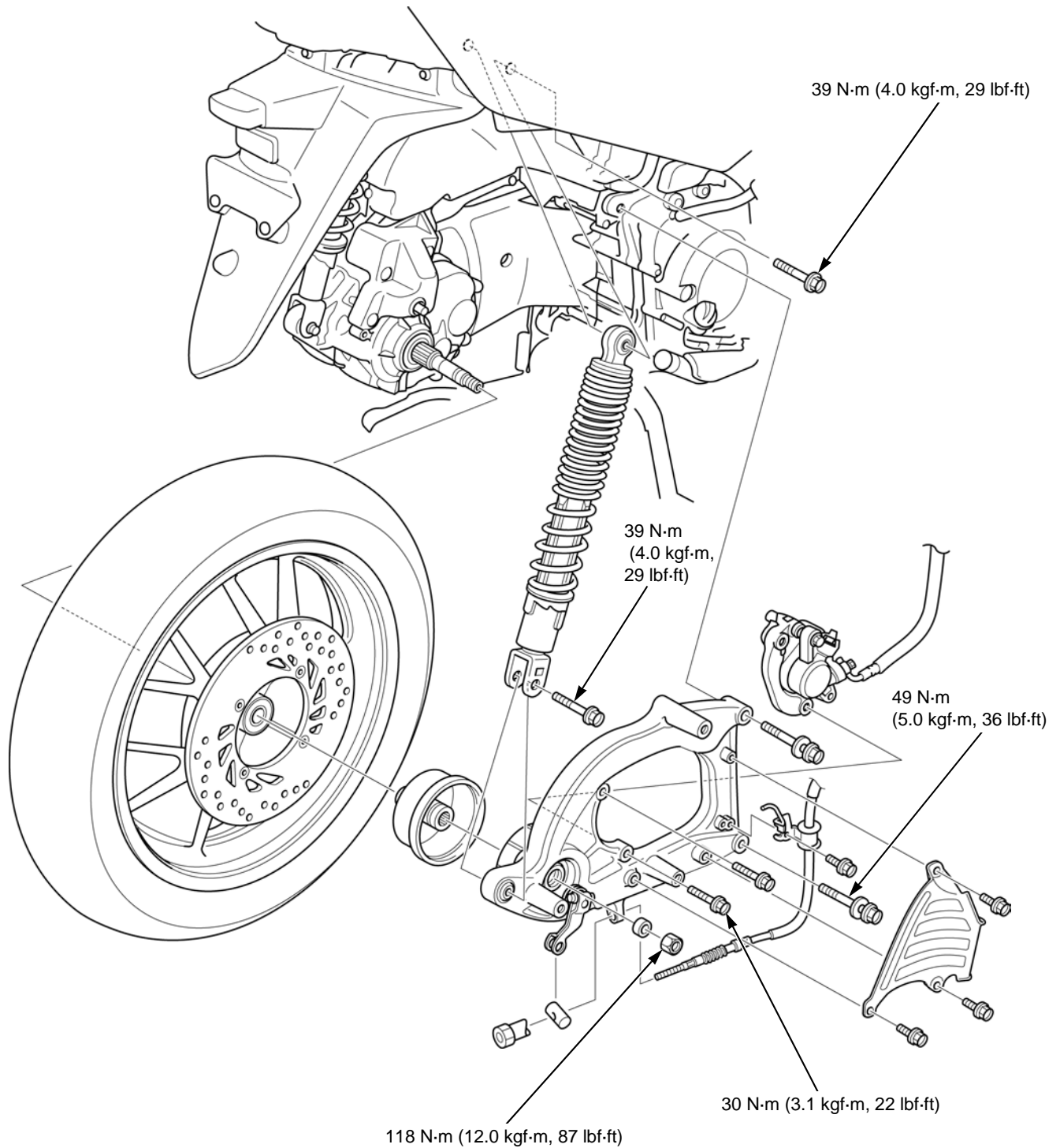
- High tire pressure
- Bent damper rod
- Worn or damaged shock absorber bushings
- Worn or damaged engine mount bushings

#### Rear suspension noisy

- Loose mounting fasteners
- Weak or damage rear suspension bushings
- Faulty shock absorber

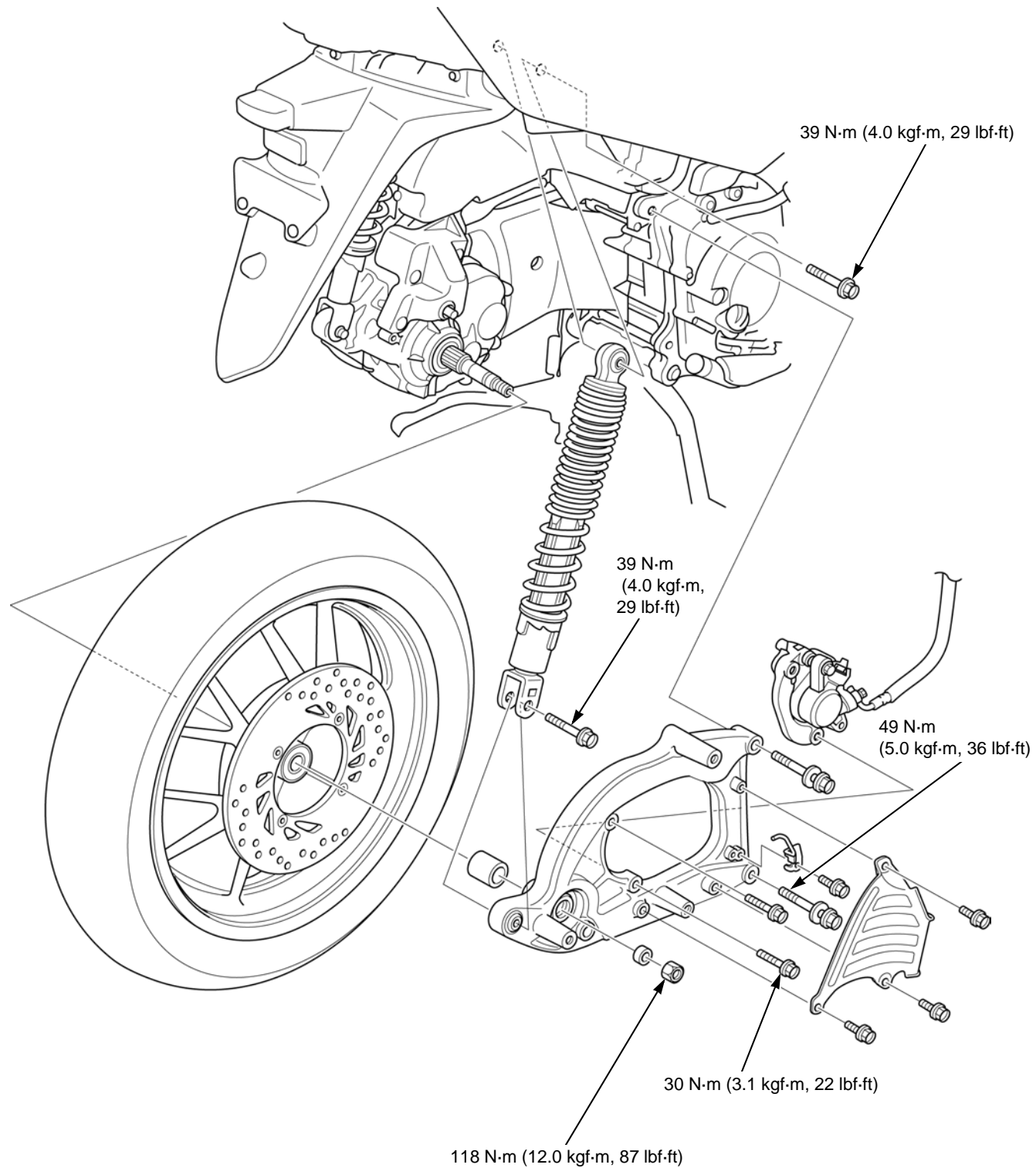
## COMPONENT LOCATION

AC type:



## REAR WHEEL/PARKING BRAKE/SUSPENSION

CM type:





# REAR WHEEL/SWINGARM

## REMOVAL

Remove the muffler (page 2-25).

Lower the rear wheel and ground it, then loosen the rear axle nut [1].

Support the scooter securely on its centerstand.

Remove the following:

- Bolts [2]
- Brake hose protector [3]

*Support the brake caliper so that it does not hang from the brake hose. Do not twist the brake hose. Do not operate the brake lever after removing the brake caliper.*

- Bolt [1] and brake hose clamp [2]
- Rear brake caliper mounting bolts [3]
- Rear brake caliper [4]

*AC type only:* Remove the adjusting nut [1].

Remove the parking brake cable [2] from the joint pin [3] and swingarm [4].

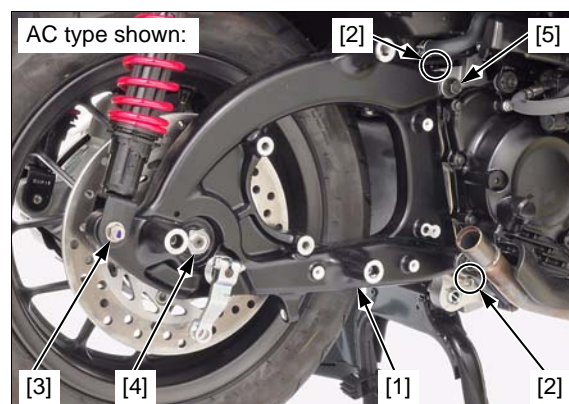
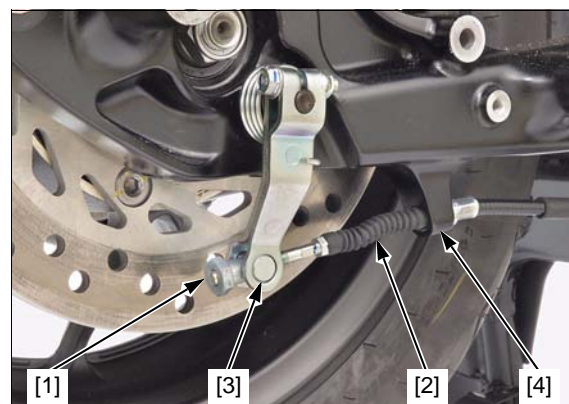
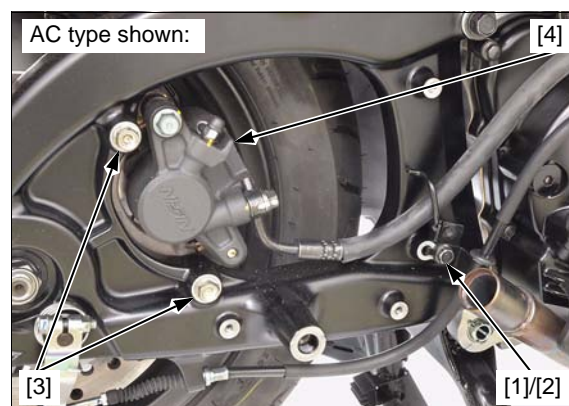
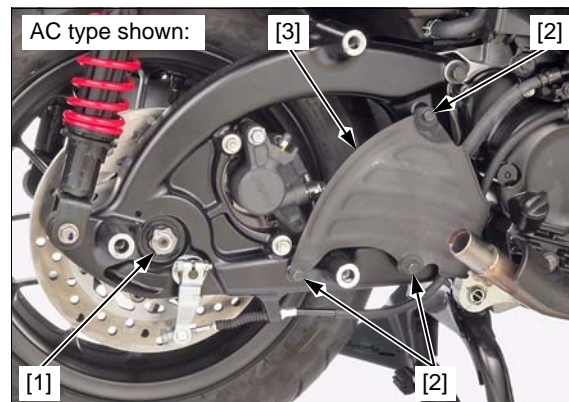
Remove the joint pin.

- Before removing the swingarm [1], mark the two points [2] where the swingarm contacts the engine with paint. If the swingarm is not installed in the same position as the original installation position before removal, installing the muffler would be difficult.

Remove the right rear shock absorber lower mounting bolt [3] and secure the shock absorber with a piece of rope.

Remove the Axle nut [4].

Remove the upper swingarm mounting bolt [5].



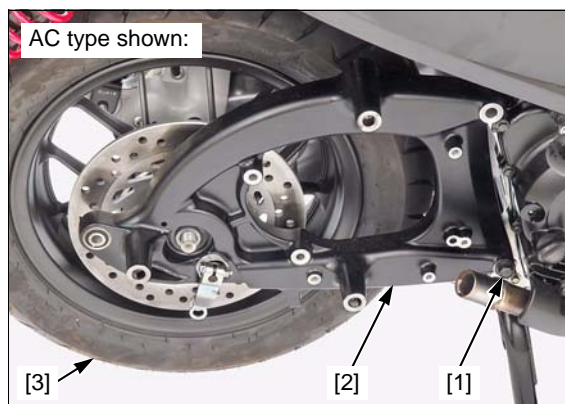
## REAR WHEEL/PARKING BRAKE/SUSPENSION

Loosen the lower swingarm mounting bolt [1].

- Do not remove the lower swingarm mounting bolt completely.

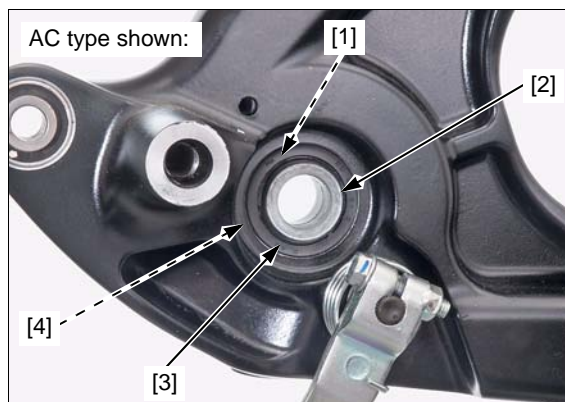
Remove the following:

- Swingarm [2] (with lower swingarm mounting bolt)
- Rear wheel [3]



Remove the inside collar (CM type only) [1] and outside collar [2] from the swingarm.

Inspect the outside dust seal [3] and inside dust seal (CM type only) [4] for deterioration or damage and replace if necessary.



*AC type only:* Remove the parking brake drum [1] from the rear wheel.



### PARKING BRAKE DISASSEMBLY (AC TYPE ONLY)

- Mark all parts during disassembly so they can be placed back in the original locations.

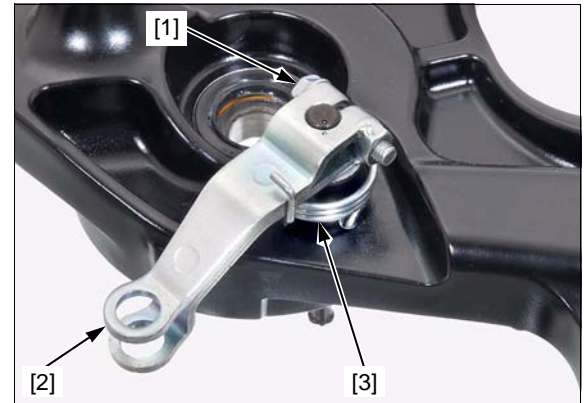
Remove the brake shoes [1] and shoe springs [2] by spreading the brake shoes.

*Always replace the brake shoes as a set.*

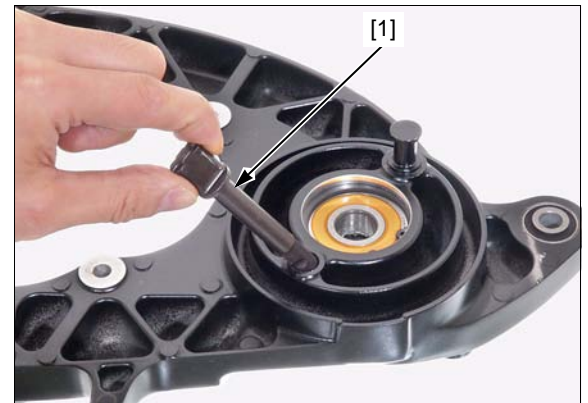


Remove the parking brake arm bolt [1].

Remove the parking brake arm [2] and return spring [3].

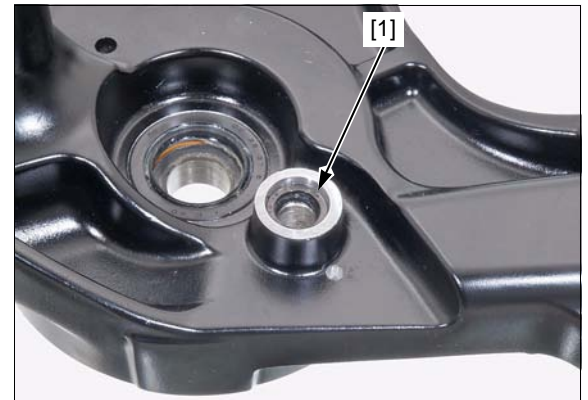


Remove the brake cam [1].



Inspect the brake cam dust seal [1] for deterioration or damage and replace if necessary.

- Install a new dust seal until it is fully seated.



### INSPECTION

Inspect the following parts for damage, abnormal wear, deformation, looseness or bend.

- Rear wheel
- Swingarm
- Parking brake drum (AC type only)
- Brake shoes (AC type only)

Measure each part according to REAR WHEEL/SUSPENSION/SPECIFICATIONS (page 1-9).  
Replace any part if it is out of service limit.

### BEARINGS

Turn the inner race of each bearing with your finger.  
The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the wheel.

Replace the bearings if they do not turn smoothly, quietly, or if they fit loosely in the wheel.



## REAR WHEEL/PARKING BRAKE/SUSPENSION

### WHEEL BALANCE

For wheel balance (page 17-8).

Do not add balance weight more than 70 g (2.5 oz) to the rear wheel.

### SWINGARM BEARING/REPLACEMENT

Remove the following:

- Inside dust seal (CM type only) [1]
- Outside dust seal [2]
- Snap ring [3]

Drive the bearing [4] out of the swingarm.

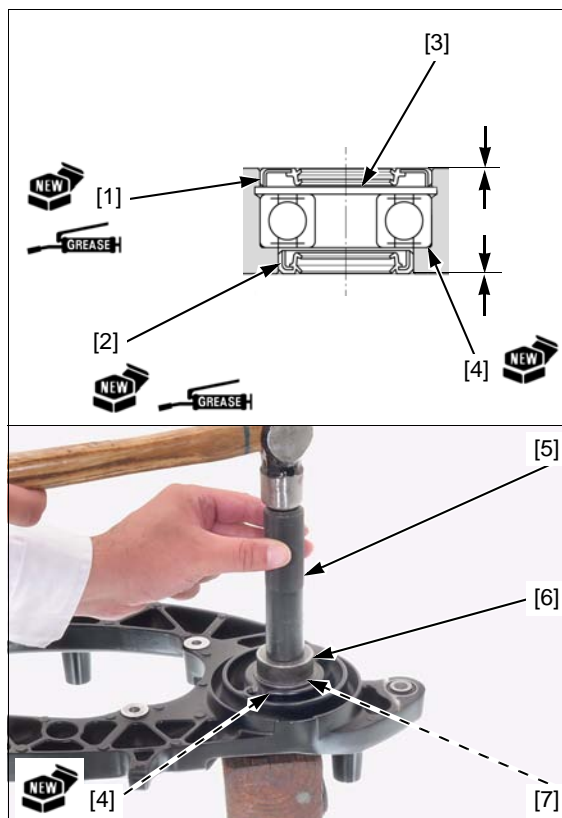
Drive in a new bearing into the swingarm squarely until it is fully seated, using the special tools.

#### TOOLS:

<b>Driver [5]</b>	<b>07749-0010000</b>
<b>Attachment, 42 x 47 mm [6]</b>	<b>07746-0010300</b>
<b>Pilot 17 mm [7]</b>	<b>07746-0040400</b>

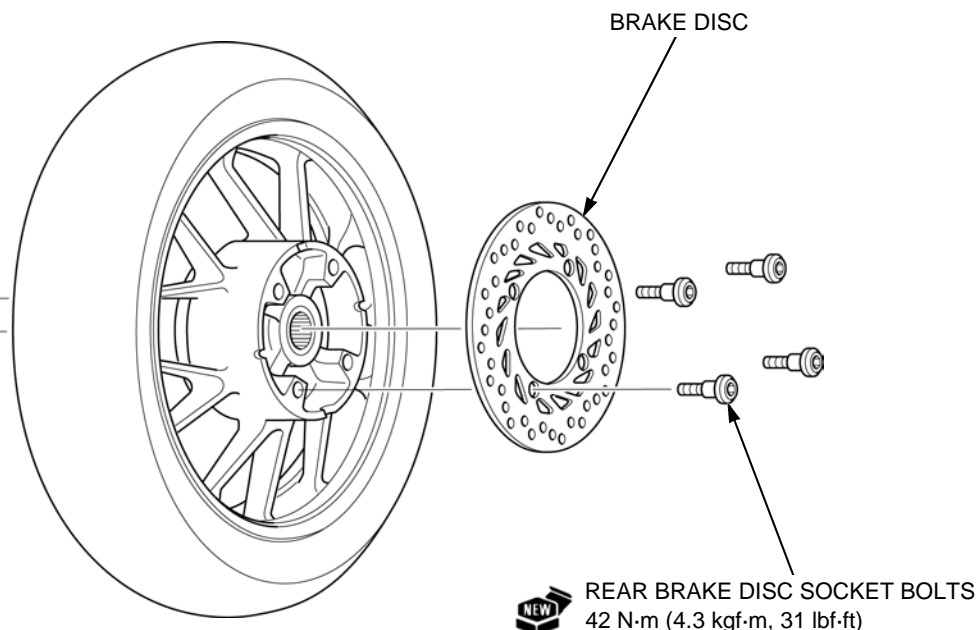
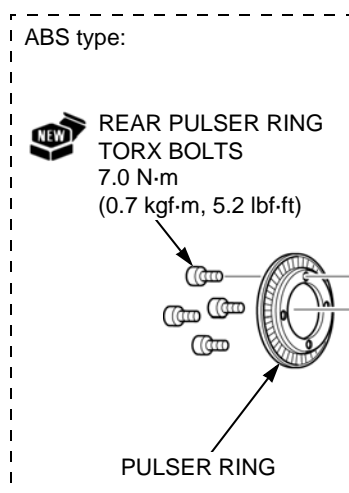
Install the snap ring into the swingarm groove securely with the chamfered side facing the bearing.

Install a new inside dust seal (CM type only) and outside dust seal until they are flush with the swingarm. Apply grease to the lips of the inside dust seal (CM type only) and outside dust seal.



### DISASSEMBLY/ASSEMBLY

Disassemble and assemble the rear wheel as shown in the illustration.



## PARKING BRAKE ASSEMBLY (AC TYPE ONLY)

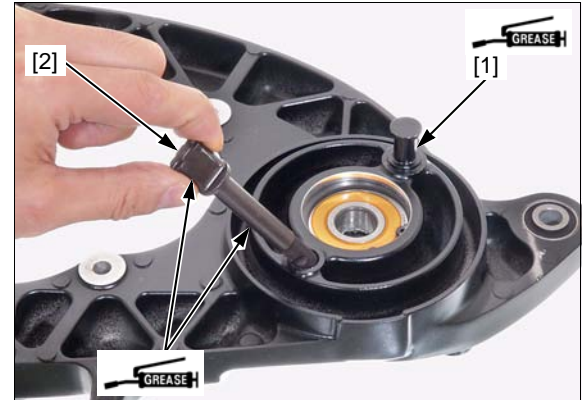
Apply grease to the brake cam dust seal [1] lips.



Apply grease (0.03 – 0.05 g (0.001 – 0.002 oz)) to the sliding surface of the anchor pin [1].

Apply grease (0.06 – 0.1 g (0.002 – 0.004 oz)) to the sliding surface of the brake cam [2].

Install the brake cam.



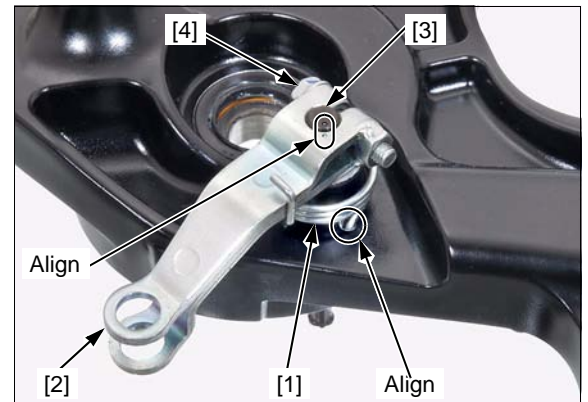
Hitch the hook of the return spring [1] to the parking brake arm.

Install the parking brake arm [2] by aligning the punch marks on the parking brake arm and brake cam [3].

- Align the projection of the return spring and the hole of the swingarm.

Install the parking brake arm bolt [4], and tighten it to the specified torque.

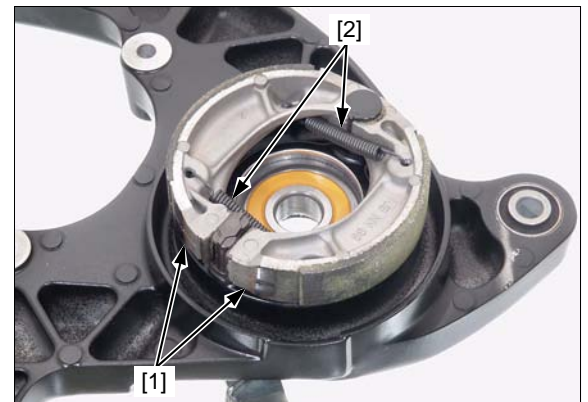
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



*If the brake shoes and springs are reused, they must be placed back in their original locations.*

Assemble the brake shoes [1] and shoe springs [2] as shown.

Install the brake shoes and springs onto the swingarm.



## REAR WHEEL/PARKING BRAKE/SUSPENSION

### INSTALLATION

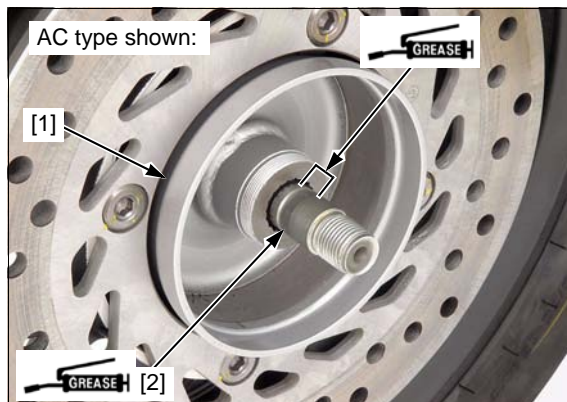
Install the rear wheel onto the final gear shaft, aligning the splines.

*AC type only:* Install the parking brake drum [1].

Apply grease (0.03 – 0.04 g (0.0011 – 0.0014 oz)) to the groove of the final gear shaft [2].

Apply grease to bearing fitting area of the final gear shaft.

Install the inside collar (CM type only) and outside collar into the swingarm.



Install the swingarm [1] and swingarm mounting bolts [2].

Align the paint marks of the swingarm and engine (page 18-5), and tighten the mounting bolts to the specified torque.

**TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)**

Apply engine oil to the rear axle nut [3] threads.

Install the rear axle nut and temporarily tighten it.

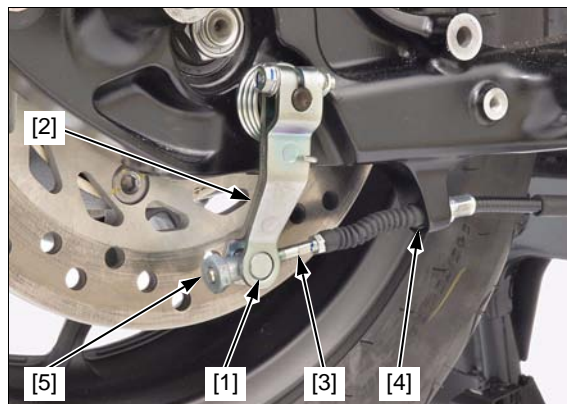
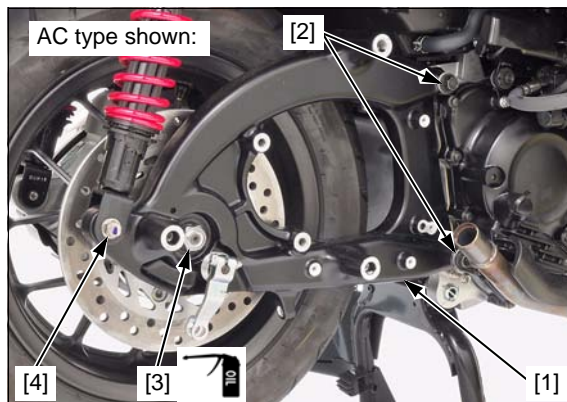
Set the right rear shock absorber and tighten the rear shock absorber lower mounting bolt [4] to the specified torque.

**TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)**

*AC type only:* Install the joint pin [1] on the brake arm [2].

Install the parking brake cable [3] through the hole [4] of the swingarm and joint pin as shown.

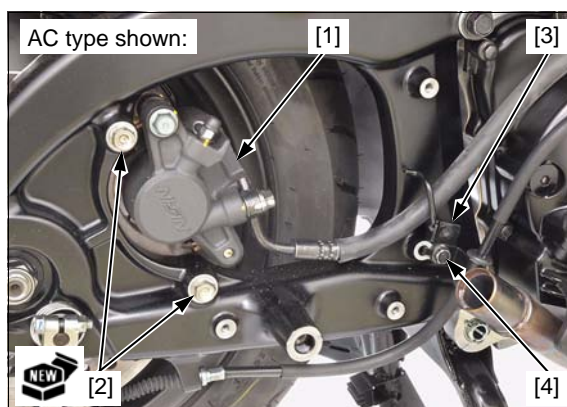
Temporarily install the adjusting nut [5].



Install the rear brake caliper [1] to the swingarm and tighten the new rear brake caliper mounting bolts [2] to the specified torque.

**TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)**

Install the brake hose clamp [3] to the swingarm and tighten the bolt [4].





Install the brake hose protector [1] to the swingarm and tighten the bolts [2].

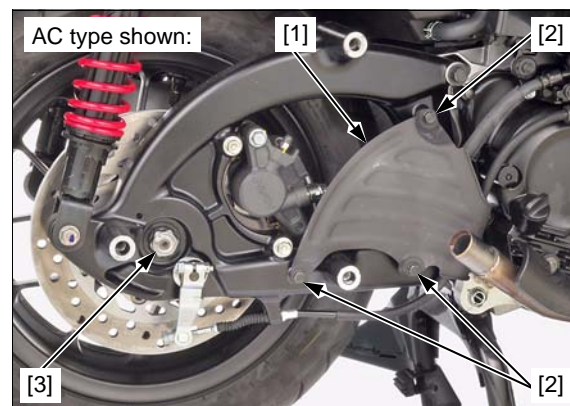
Tighten the rear axle nut [3] to the specified torque.

**TORQUE: 118 N·m (12.0 kgf·m, 87 lbf·ft)**

*ABS type only:* Measure the air gap between the rear wheel speed sensor and pulser ring (page 20-20).

Install the muffler (page 2-25).

Adjust the parking brake operation (page 18-11).



## PARKING BRAKE (AC TYPE ONLY)

### ADJUSTMENT

Place the scooter on its center stand.

Release the parking brake lever lock.

Pull the parking brake lever one notch.

*When turning in the adjusting nut, do not use the tool.* Turn in the adjusting nut [1] until you feel resistance when turning the rear wheel with your hand.



Release the parking brake lever lock.

Make sure that the rear wheel turn smoothly.

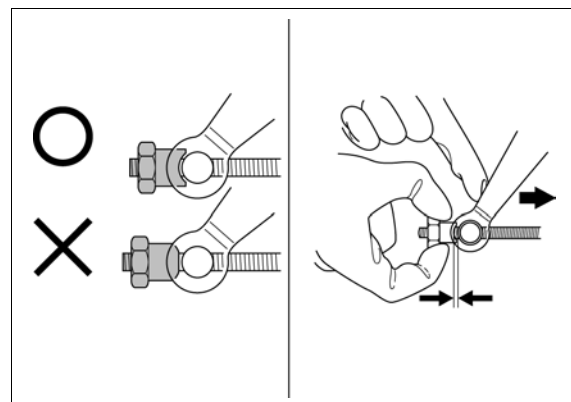
Make sure that there is clearance between the adjusting nut and joint pin.

Make sure aligning the groove of the adjusting nut and joint pin.

Pull the parking brake lever slowly and check the lever stroke.

**STANDARD: 5 – 8 notches**

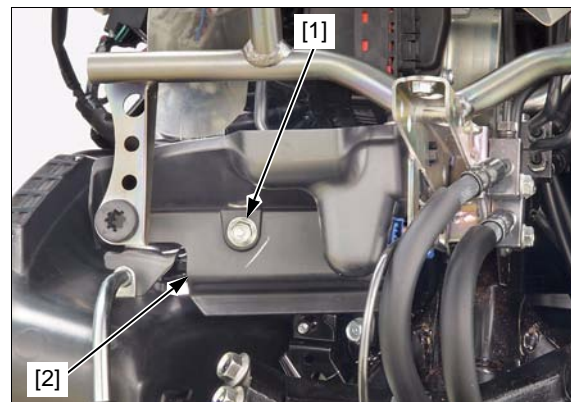
**ALL STROKE: 12 notches**



### REMOVAL/INSTALLATION

#### PARKING BRAKE LEVER LINK

Remove the bolt [1] and parking brake lever link cover [2].





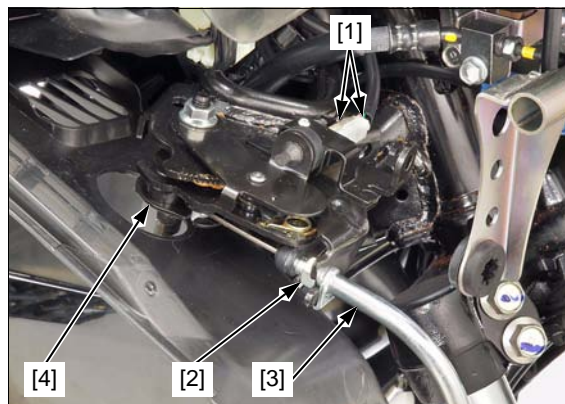
## REAR WHEEL/PARKING BRAKE/SUSPENSION

Remove the meter panel (page 2-13).

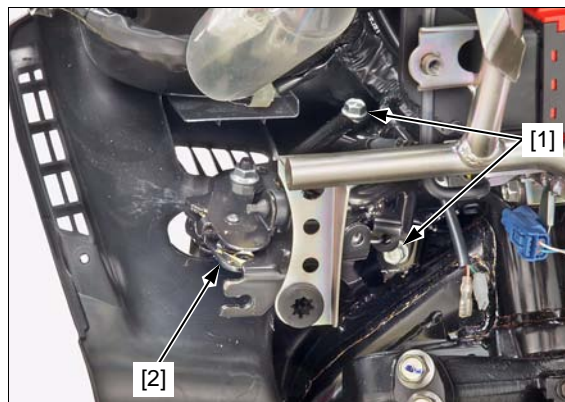
Remove the parking brake lever (page 2-17).

Disconnect the parking brake switch connectors [1].

Loosen the lock nut [2], and release the parking brake cable [3] from the parking brake lever link [4].

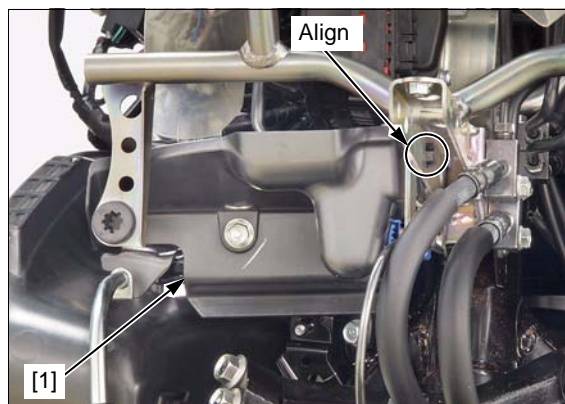


Remove the bolts [1] and parking brake lever link [2].



Installation is in the reverse order of removal.

- Align the tab of the parking brake lever link cover [1] and hole of the stay.

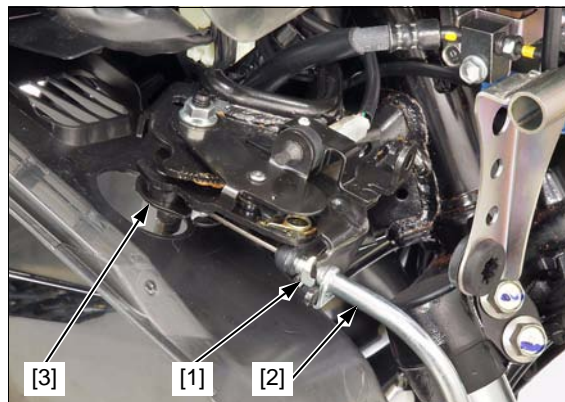


### PARKING BRAKE CABLE

Remove the parking brake lever link cover (page 18-11).

Remove the front cover (page 2-10).

Loosen the lock nut [1], and release the parking brake cable [2] from the parking brake lever link [3].



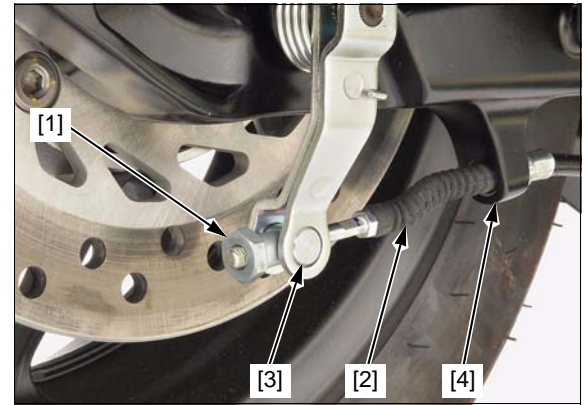
Remove the adjusting nut [1].

Remove the parking brake cable [2] from the joint pin [3] and swingarm [4].

Refer to CABLE & HARNESS ROUTING (page 1-18) for removal of the parking brake cable from the clumps.

*Route the parking  
brake cable  
properly (page 1-  
18).*

Installation is in the reverse order of removal.



## REAR SHOCK ABSORBER

### REMOVAL/INSTALLATION

Remove the rear body lower cover (page 2-23).

Support the frame with a jack or adjustable support to relieve stress from the rear shock absorber [1].

Remove the rear shock absorber upper/lower mounting bolts [2] and shock absorber.

Installation is in the reverse order of removal.

Tighten the upper/lower mounting bolts to the specified torque.

**TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)**



### INSPECTION

Inspect the following parts for damage, abnormal wear, bend deformation, scoring and leakage.

- Upper joint bushing
- Dumper rod
- Dumper unit
- Lower joint bushings

Measure each part according to REAR WHEEL/SUSPENSION SPECIFICATIONS (page 1-9).

Replace any part if it is out of service limit.

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## MEMO

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# 19. HYDRAULIC BRAKE SYSTEM

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SERVICE INFORMATION .....	19-2	RIGHT MASTER CYLINDER .....	19-12
TROUBLESHOOTING .....	19-2	LEFT MASTER CYLINDER .....	19-14
COMPONENT LOCATION .....	19-3	DELAY VALVE .....	19-16
BRAKE FLUID REPLACEMENT/AIR BLEEDING .....	19-5	FRONT BRAKE CALIPER .....	19-16
BRAKE PAD/DISC .....	19-9	REAR BRAKE CALIPER .....	19-18

## HYDRAULIC BRAKE SYSTEM

# 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 reservoir cap; make sure the master cylinder reservoir is horizontal first.*

- This model is equipped with a Combined Brake System. For the system air bleeding procedure (page 19-5).
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Check the brake system by applying the brake levers after the air bleeding.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- 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 scooter.
- This section covers service of the standard brake components (including CBS) of the brake system. For ABS service (page 20-2).
- The brake fluid replacement procedure for the ABS model should be performed in the same manner as in the standard model. Note that there is no brake fluid in the ABS modulator (except in the modulator head), because the modulator is the motor-driven hydraulic pressure type. Therefore, brake fluid replacement and bleeding air from the modulator body is not necessary.

## TROUBLESHOOTING

### Brake lever 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
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Bent brake lever

### Brake lever hard

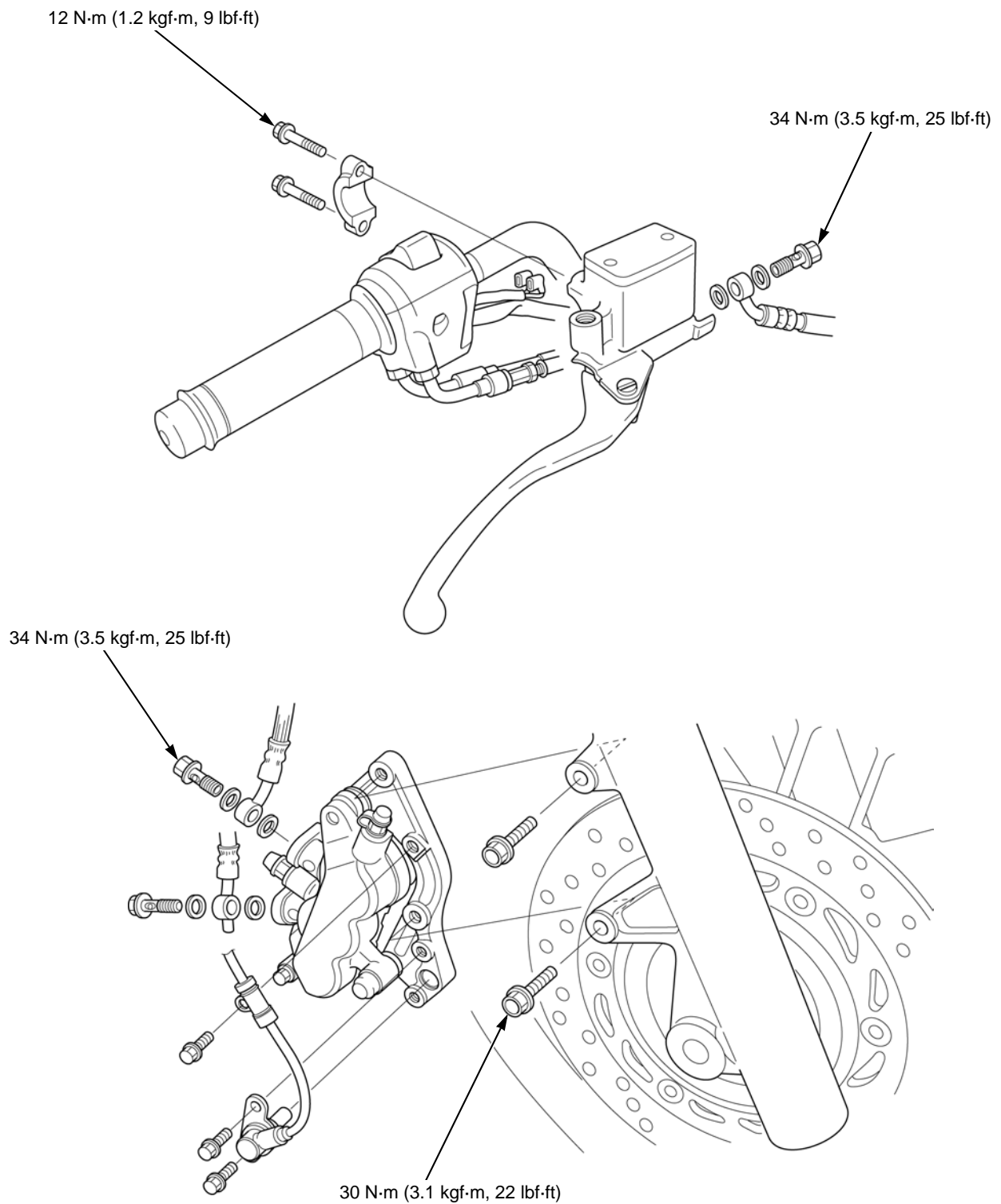
- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever

### Brake drags

- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted brake hydraulic system
- Clogged/restricted fluid passage
- Clogged master cylinder port
- Sticking caliper piston

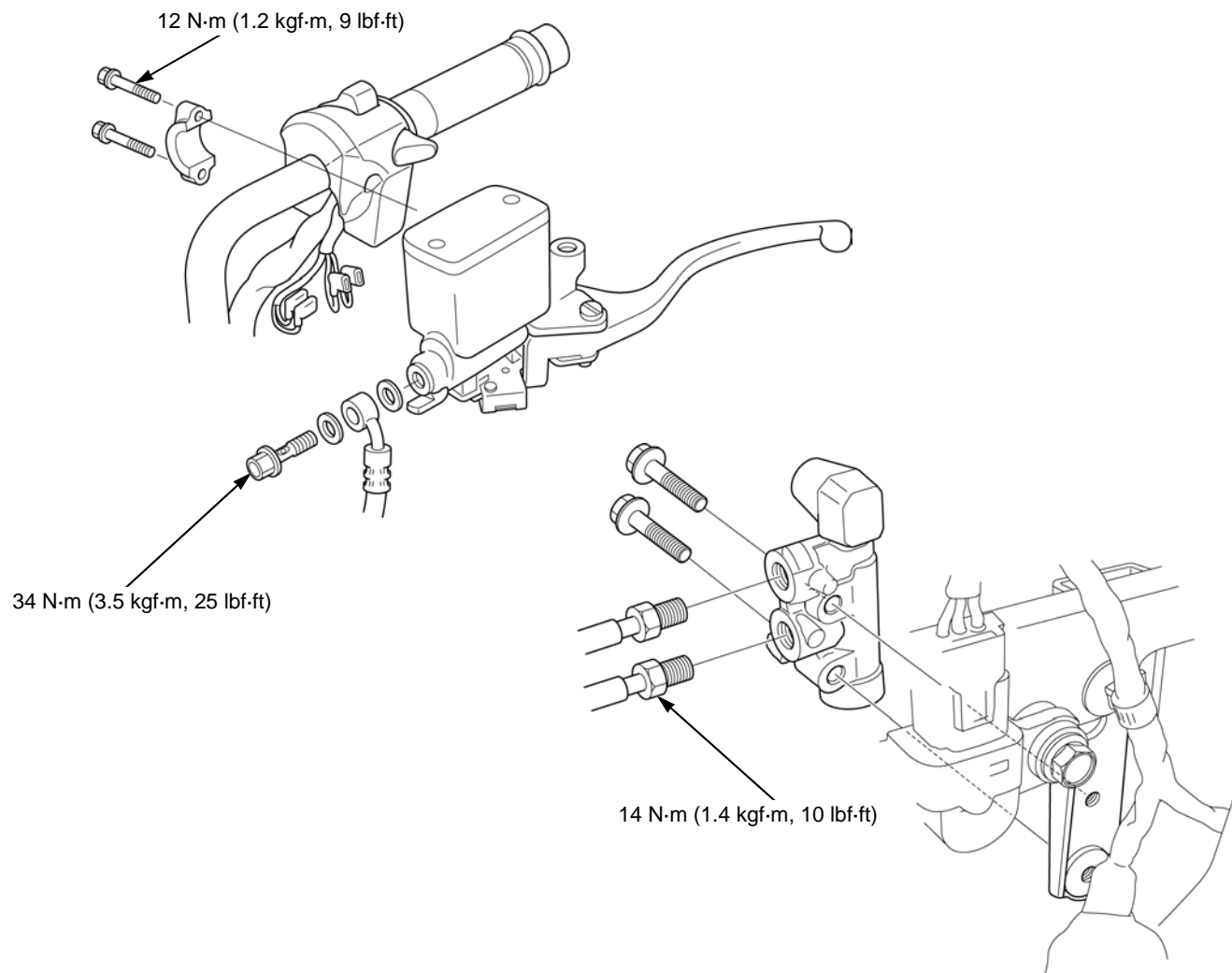
# COMPONENT LOCATION

FRONT:

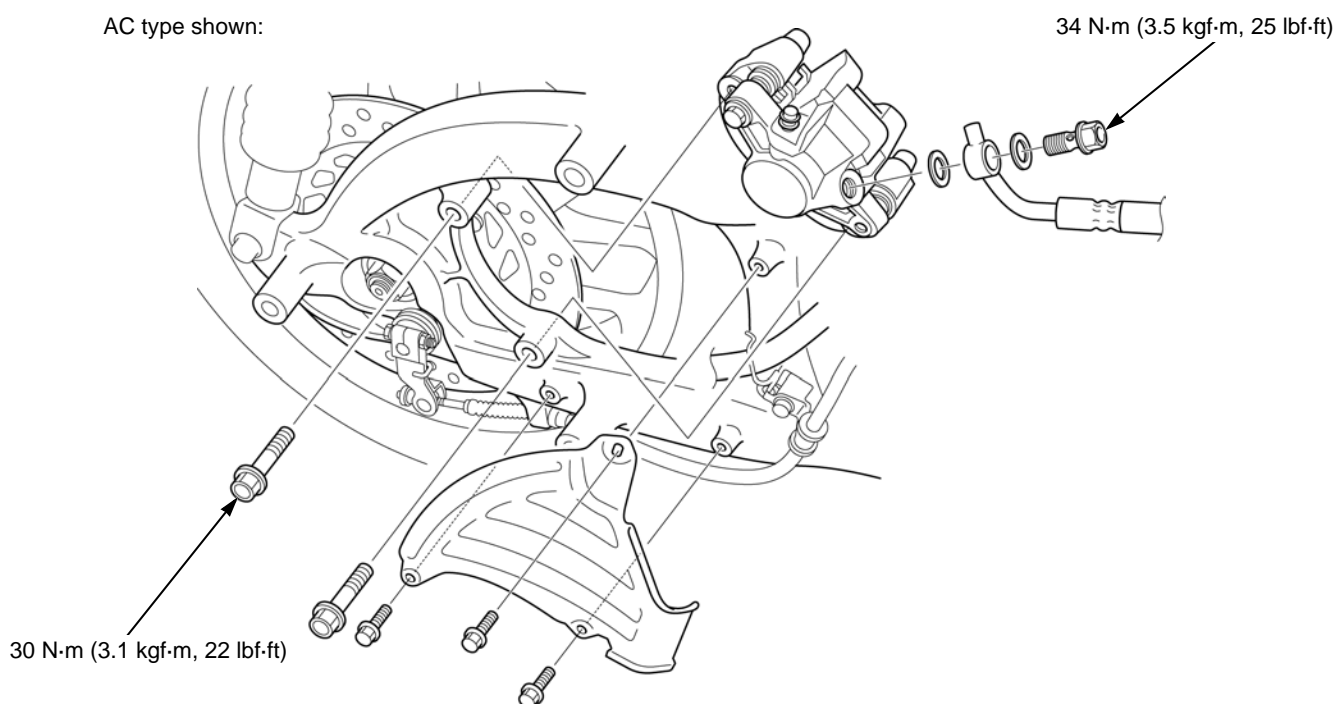


## HYDRAULIC BRAKE SYSTEM

### REAR:



AC type shown:





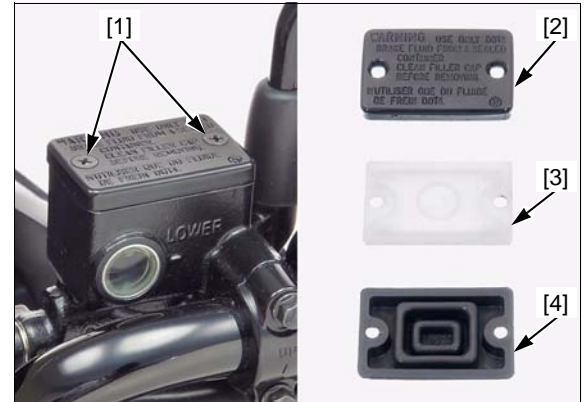
## BRAKE FLUID REPLACEMENT/AIR BLEEDING

### BRAKE FLUID DRAINING

#### FRONT BRAKE LINE

Support the scooter on its centerstand and turn the handlebar until the reservoir is parallel to the ground, before removing the reservoir cap.

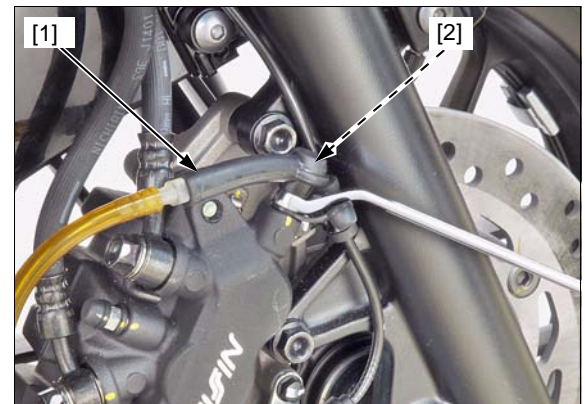
Remove the screws [1], reservoir cap [2], diaphragm plate [3] and diaphragm [4].



Connect a bleed hose [1] to the front caliper upper bleed valve [2].

Loosen the upper bleed valve and pump the right brake lever until no more fluid flows out of the upper bleed valve.

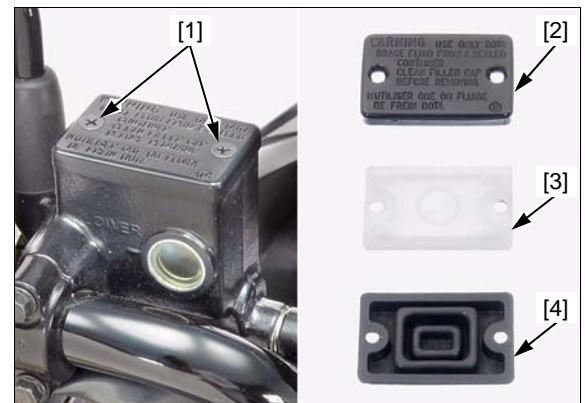
Tighten the front caliper upper bleed valve.



#### REAR (COMBINED) BRAKE LINE

Support the scooter on its centerstand and turn the handlebar until the reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws [1], reservoir cap [2], diaphragm plate [3] and diaphragm [4].

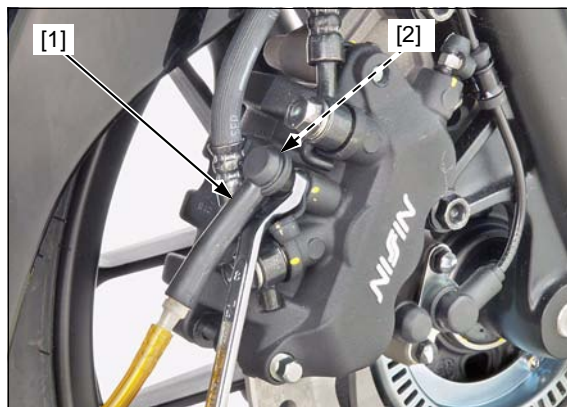


## HYDRAULIC BRAKE SYSTEM

Connect a bleed hose [1] to the front caliper lower bleed valve [2].

Loosen the lower bleed valve and pump the left brake lever until no more fluid flows out of the lower bleed valve.

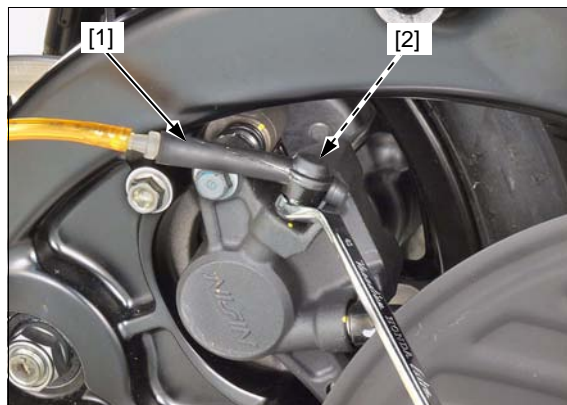
Tighten the front caliper lower bleed valve.



Connect a bleed hose [1] to the rear brake caliper bleed valve [2].

Loosen the bleed valve and pump the left brake lever until no more fluid flows out of the bleed valve.

Tighten the rear caliper bleed valve.



### FRONT BRAKE LINE FLUID FILLING/ AIR BLEEDING

Close the bleed valves.

Fill the reservoir with DOT 4 brake fluid to the upper level [1] from a sealed container.

Connect an automatic refill system to the reservoir.

- If an automatic refill system is not used, add brake fluid when the fluid level in the reservoir 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.
- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.



Connect a commercially available brake bleeder [1] to the front brake caliper upper bleed valve [2].

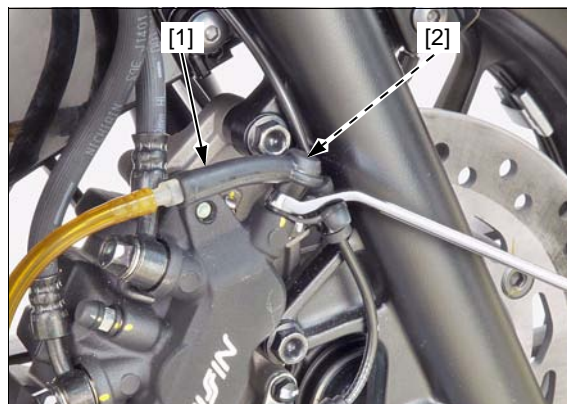
Operate the brake bleeder and loosen the bleed valve.

Perform the bleeding procedure until the system is completely flushed/bled.

Close the bleed valve and operate the brake lever. If it is still spongy, bleed the system again.

After bleeding the air completely, tighten the brake caliper bleed valve to the specified torque.

**TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**



If a brake bleeder is not available, use the following procedure:

Fill the reservoir [1] with DOT 4 brake fluid to the upper level from a sealed container.

*Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.*

Operate the right brake lever several times to bleed air from the master cylinder.

Connect a bleed hose to the front caliper upper bleed valve and bleed the system as follows:

1. Pump the right brake lever several (5-10) times, then squeeze the right brake lever all way and loosen the bleed valve 1/4 turn. Wait several seconds and then close the bleed valve.
  2. Release the right brake lever slowly and wait several seconds after it reaches the end of its travel.
  3. Repeat steps 1 and 2 until there are no air bubbles in the bleed hose.
- Do not release the brake lever until the bleed valve has been closed.

After bleeding air completely, tighten the front brake caliper upper bleed valve to the specified torque.

**TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**

Close the bleed valve and operate the brake lever. If it is still spongy, bleed the system again.

Fill the reservoir with DOT 4 brake fluid to the upper level.

Install the diaphragm and diaphragm plate.

Install the reservoir cap and tighten the screws to the specified torque.

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

### REAR (COMBINED) BRAKE LINE FLUID FILLING/AIR BLEEDING

#### BRAKE FLUID FILLING

Fill the reservoir with DOT 4 brake fluid to the upper level [1] from a sealed container.

*Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.*

Operate the left brake lever several times to bleed air from the master cylinder.





## HYDRAULIC BRAKE SYSTEM

Connect a commercially available brake bleeder [1] to the front brake lower center bleed valve [2].

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

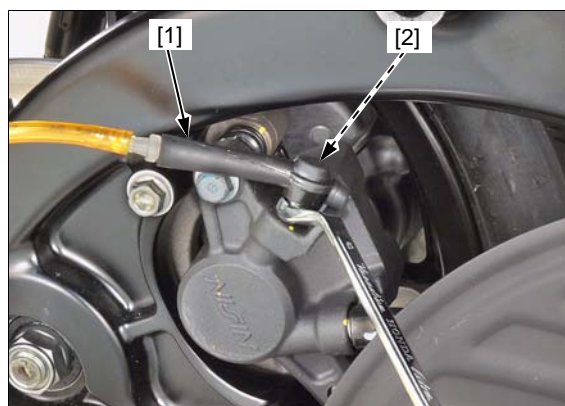
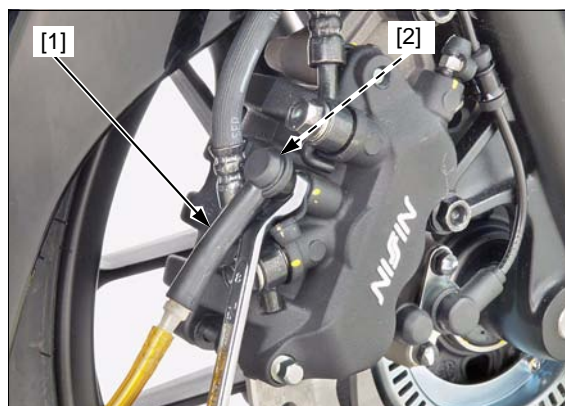
1. Operate the brake bleeder and loosen the front brake caliper lower bleed valve. Add fluid when the fluid level in the master cylinder is low to prevent drawing air into the system.
2. Repeat the above procedures until a sufficient amount of fluid flows out of the front brake caliper lower bleed valve.

It is not a problem if the fluid flowing out from the lower bleed valve contains air bubbles because the lines will be bled later (page 19-9).

Connect a commercially available brake bleeder [1] to the rear brake caliper bleed valve [2].

Repeat above step 1. and 2. for rear brake caliper bleed valve.

Bleed the rear (combined) brake line hydraulic system (page 19-9).



If a brake bleeder is not available, use the following procedure:

Connect a bleed hose [1] to the front caliper lower bleed valve [2] and bleed the system as follows:

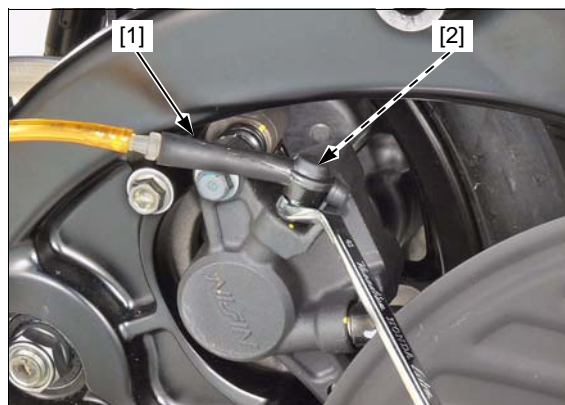
1. Pump the left brake lever several (5-10) times, then squeeze the left brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and then close the bleed valve. Do not release the brake lever until the bleed valve has been closed.
2. Release the left brake lever slowly and wait several seconds after it reaches the end of travel.
3. Repeat the steps 1 and 2 until fluid flows out from the bleed valve.

- It is not a problem if the fluid flowing out from the lower bleed valve contains air bubbles because the lines will be bled in later steps (page 19-9).

Connect a bleed hose [1] to the rear caliper bleed valve [2].

Repeat steps for rear caliper bleed valve.

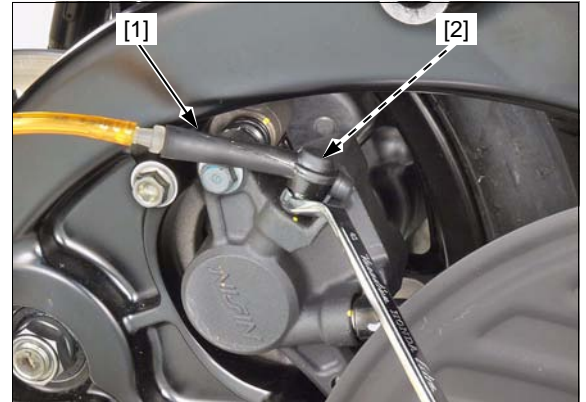
Bleed the rear (combined) brake line hydraulic system (page 19-9).



## AIR BLEEDING

Connect a bleed hose [1] to the rear caliper bleed valve [2] and bleed the system as follows:

1. Pump the left brake lever several (5-10) times, then squeeze the left brake lever all the way and loosen the bleed valve 1/4 of a turn. Wait several seconds and then close the bleed valve.
  2. Release the left brake lever slowly until the bleed valve has been closed.
  3. Repeat steps 1 and 2 until there are no air bubbles in the bleed hose.
- Do not release the brake lever until the bleed valve has been closed.



Connect a bleed hose [1] to the front caliper lower bleed valve [2].

Repeat step 1 and 3 for front caliper bleed valve.

- Note that you may feel strong resistance on the rear (combined) brake lever during pumping to bleed air from the caliper. This symptom is caused by the delay valve function. Be sure to push the left brake lever fully in by this point.

After air bubbles cease to appear in the fluid, repeat air bleeding procedure about 2 – 3 times at each bleed valve.

Make sure the bleed valves are closed and operate the left brake lever.

If it still feels spongy, bleed the system again.

After bleeding the air out completely, tighten the bleed valves to the specified torque.

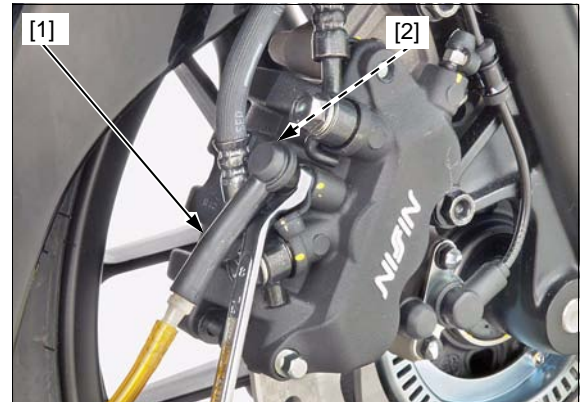
**TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**

Fill the reservoir with DOT 4 brake fluid to the upper level.

Install the diaphragm and diaphragm plate.

Install the reservoir cap and tighten the screws to the specified torque.

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



## BRAKE PAD/DISC

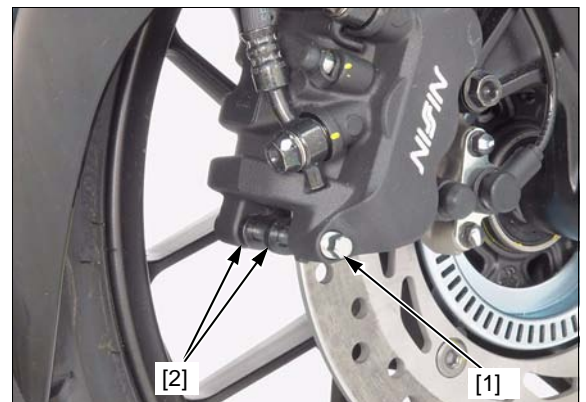
### BRAKE PAD REPLACEMENT

#### FRONT

Loosen the front caliper pad pin [1].

Pull the pad pin out of the caliper body while pushing in the brake pads [2] against the pad spring.

Remove the brake pads.



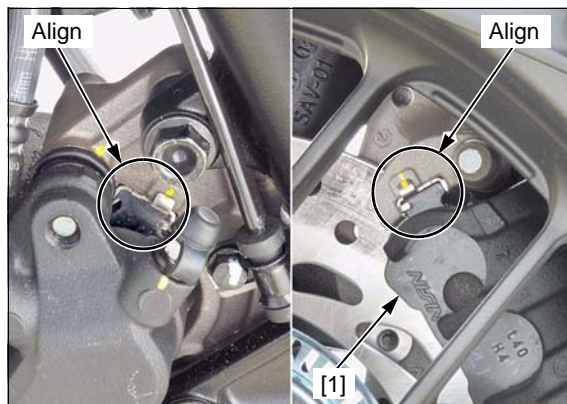


## HYDRAULIC BRAKE SYSTEM

Make sure the pad spring is installed correctly.

*Always replace the brake pads in pairs to ensure even disc pressure.*

Install new brake pads [1] so that their ends are set in the pad retainer on the caliper bracket properly.



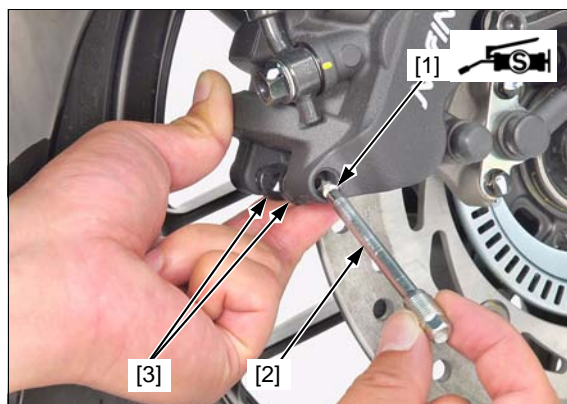
Apply silicone grease to the front caliper pad pin stopper ring [1] outer surface.

Install the pad pin [2] by pushing the brake pads [3] against the pad spring to align the pad pin holes in the pads and caliper body.

Tighten the front caliper pad pin to the specified torque.

**TORQUE: 17 N·m (1.7 kgf·m, 13 lbf·ft)**

Operate the right/left brake lever to seat the caliper pistons against the pads.



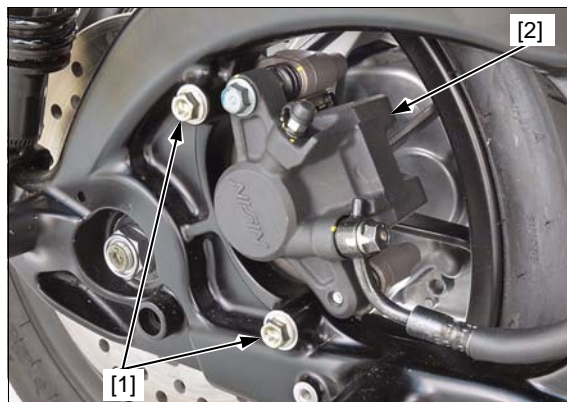
### REAR

Remove the muffler (page 2-25).

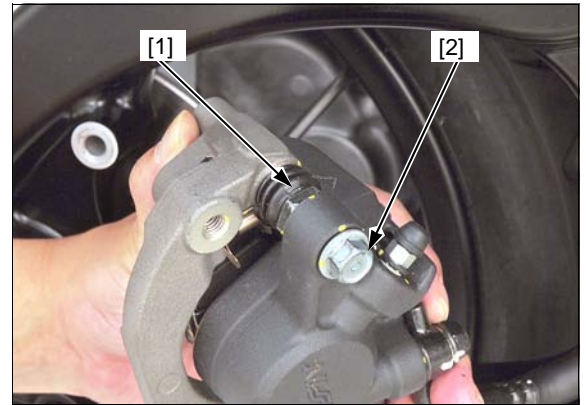
Remove the bolts [1] and brake hose protector [2].



Remove the rear brake caliper mounting bolts [1] and rear brake caliper [2] from the swingarm.



Hold the rear caliper pin [1] and remove the rear caliper bolt [2].



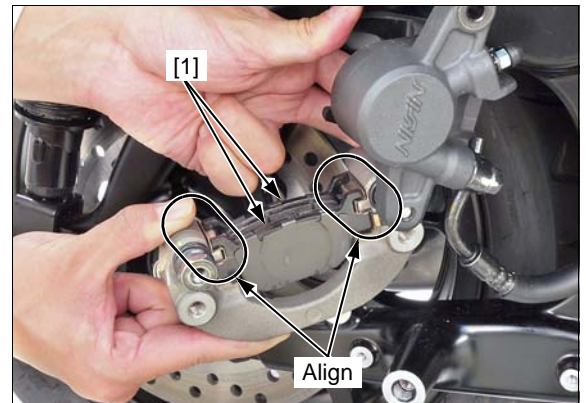
Pivot the caliper body out of the brake pads [1].

Remove the brake pads.

Clean the inside of the caliper especially around the caliper piston.

*Always replace the brake pads in pairs to ensure even disc pressure.*

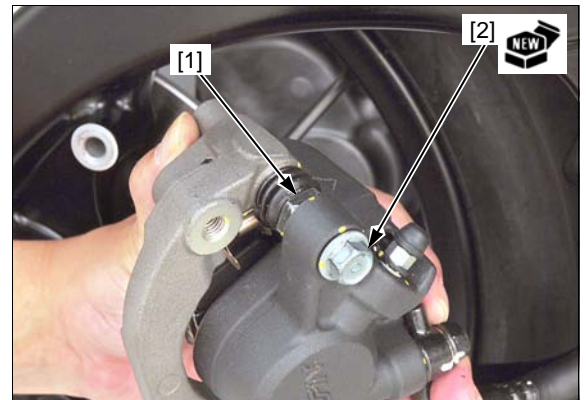
Install new brake pads so that their ends are set in the pad retainers on the caliper bracket properly.



Pivot the caliper body in position.

Hold the rear caliper pin [1] and tighten a new rear caliper bolt [2] to the specified torque.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

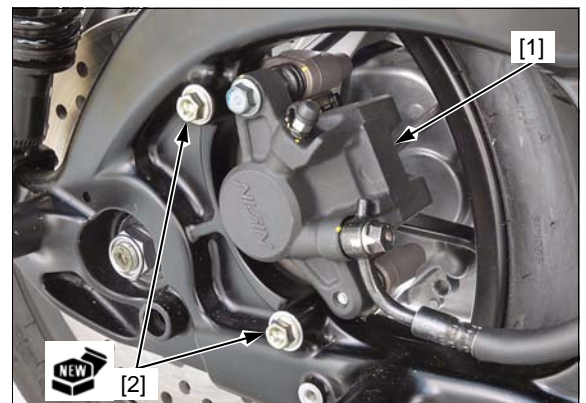


Install the rear brake caliper [1] to the swingarm so that the disc is positioned between the pads, being careful not to damage the pads.

Install the new rear brake caliper mounting bolts [2] and tighten them to the specified torque.

**TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)**

Operate the left brake lever to seat the caliper piston against the pads.





## HYDRAULIC BRAKE SYSTEM

Install the brake hose protector [1] and bolts [2].  
Install the muffler (page 2-25).



### BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.

Measure the brake disc according to HYDRAULIC BRAKE SYSTEM SPECIFICATIONS (page 1-9) and replace if necessary.

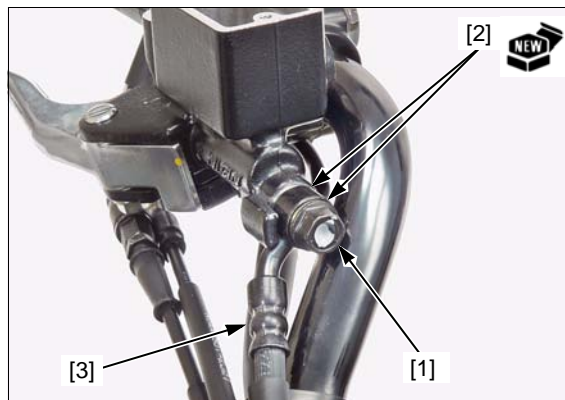
## RIGHT MASTER CYLINDER

### REMOVAL/INSTALLATION

Drain the brake fluid from the front brake line hydraulic system (page 19-5).

*When removing the oil bolt, cover the end of the hose to prevent contamination.*

Remove the oil bolt [1], sealing washers [2] and brake hose [3].



Disconnect the front brake light switch connectors [1].

Remove the master cylinder holder bolts [2], holder [3] and right master cylinder [4].

Installation is in the reverse order of removal.

- Replace the sealing washers with new ones.
- Align the edge of the master cylinder with the punch mark [5] on the handlebar.
- Install the master cylinder and holder with its "UP" mark [6] facing up.
- Tighten the upper bolt first, then tighten the lower bolt.

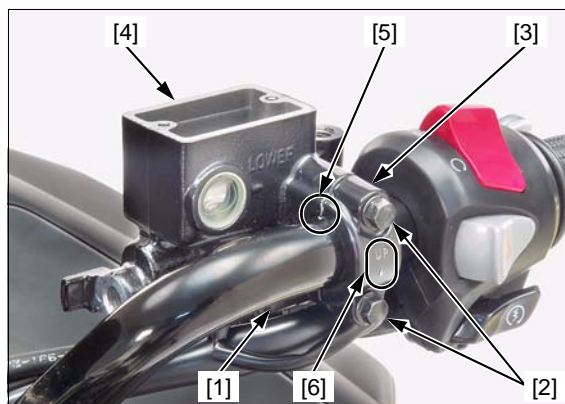
#### TORQUE:

**Master cylinder holder bolt:**

**12 N·m (1.2 kgf·m, 9 lbf·ft)**

**Brake hose oil bolt:**

**34 N·m (3.5 kgf·m, 25 lbf·ft)**

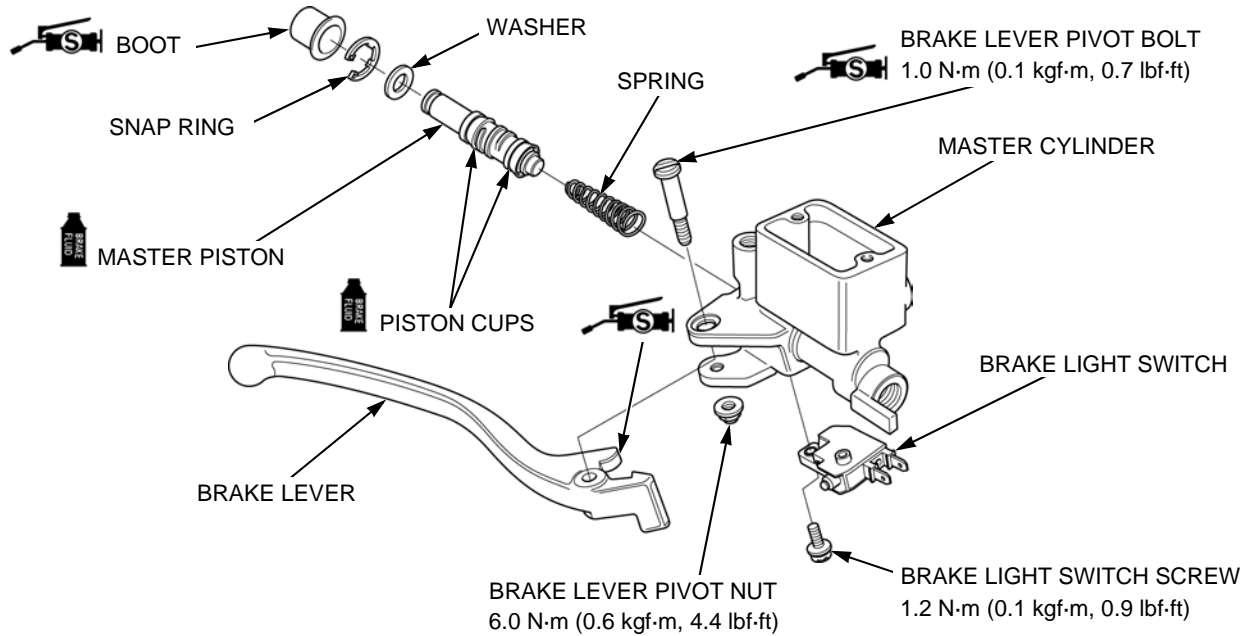


Fill and bleed the front brake line hydraulic system (page 19-6).

## DISASSEMBLY/ASSEMBLY

Disassemble and assemble the front brake master cylinder as shown in the illustration.

- Replace the master piston, spring, piston cups, washer, boot and snap ring as a set.
- Do not allow the piston cup lips to turn inside out.
- Be certain the snap ring is firmly seated in the groove.



## INSPECTION

Check the following parts for scoring, scratches, deterioration or damage.

- Master cylinder
- Master piston
- Piston cups
- Spring
- Boot

Measure the parts according to HYDRAULIC BRAKE SYSTEM SPECIFICATIONS (page 1-9) and replace if necessary.

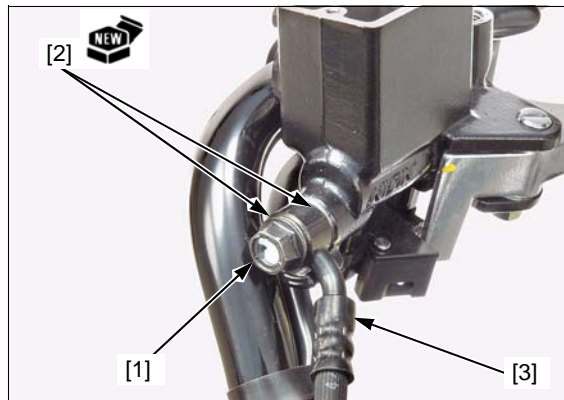
### LEFT MASTER CYLINDER

#### REMOVAL/INSTALLATION

Drain the brake fluid from the rear (combined) brake line hydraulic system (page 19-5).

*When removing the oil bolt, cover the end of the hose to prevent contamination.*

Remove the oil bolt [1], sealing washers [2] and brake hose [3].

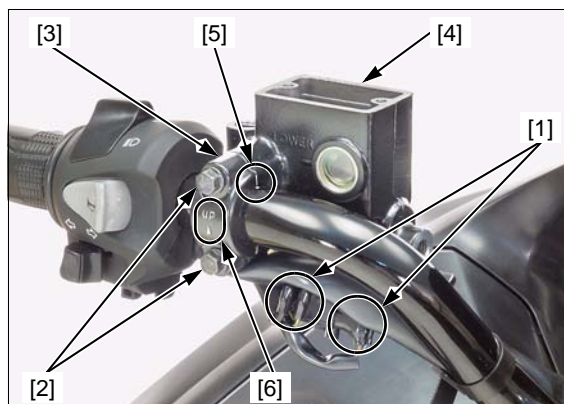


Disconnect the inhibitor switch and rear brake light switch connectors [1].

Remove the master cylinder holder bolts [2], holder [3] and left master cylinder [4].

Installation is in the reverse order of removal.

- Replace the sealing washers with new ones.
- Align the edge of the master cylinder with the punch mark [5] on the handlebar.
- Install the master cylinder and holder with its "UP" mark [6] facing up.
- Tighten the upper bolt first, then tighten the lower bolt.



#### TORQUE:

**Master cylinder holder bolt:**

**12 N·m (1.2 kgf·m, 9 lbf·ft)**

**Brake hose oil bolt:**

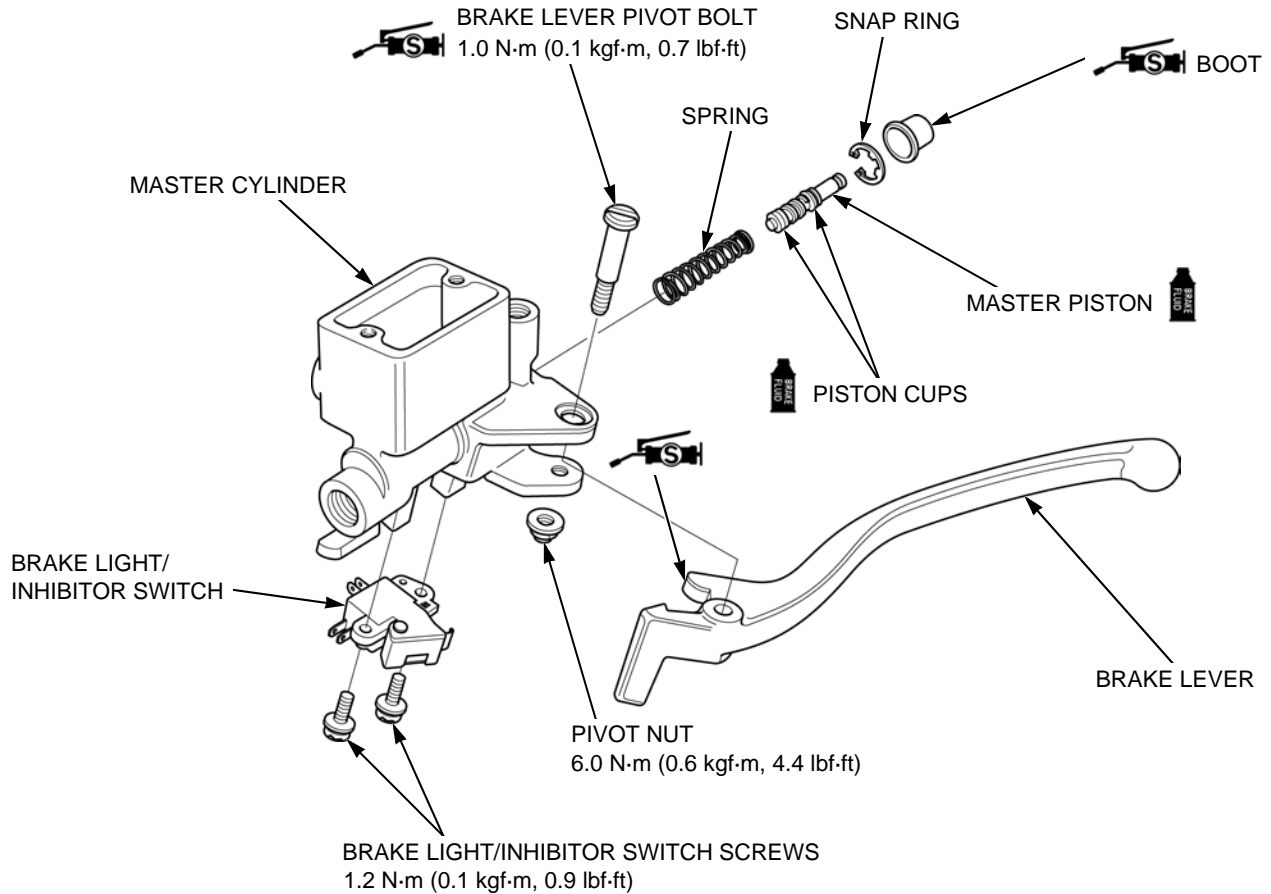
**34 N·m (3.5 kgf·m, 25 lbf·ft)**

Fill and bleed the rear (combined) brake line hydraulic system (page 19-7).

## DISASSEMBLY/ASSEMBLY

Disassemble and assemble the rear brake master cylinder as shown in the illustration.

- Replace the master piston, spring, piston cups, boot and snap ring as a set.
- Do not allow the piston cup lips to turn inside out.
- Be certain the snap ring is firmly seated in the groove.



## INSPECTION

Check the following parts for scoring, scratches, deterioration or damage.

- Master cylinder
- Master piston
- Piston cups
- Spring
- Boot

Measure the parts according to HYDRAULIC BRAKE SYSTEM SPECIFICATIONS (page 1-9) and replace if necessary.

### DELAY VALVE

#### REMOVAL/INSTALLATION

Remove the front meter panel (page 2-4).

Drain the brake fluid from the rear (combined) brake line hydraulic system (page 19-5).

*Be careful not to damage the brake pipe.*

Loosen the brake pipe joint nuts [1] and disconnect the brake pipes [2] from the delay valve [3].

- When removing the brake pipe joint nuts, cover the end of the pipes to prevent contamination.

Remove the delay valve mounting bolts [4] and delay valve.

Install the delay valve and tighten the delay valve mounting bolts.

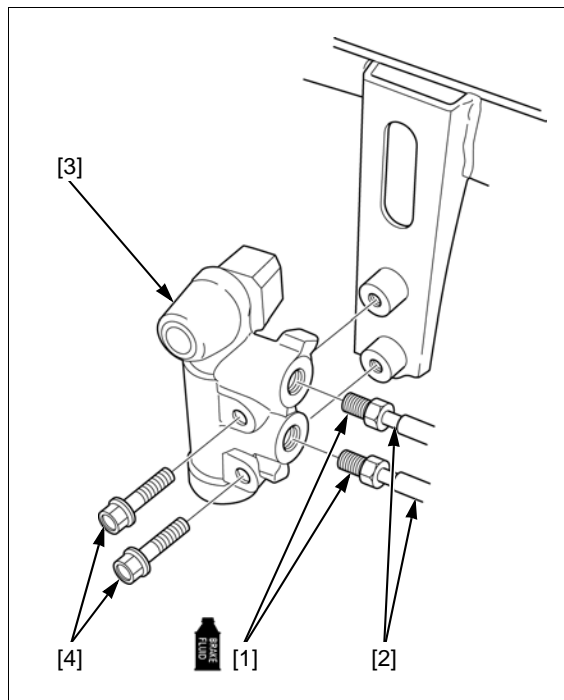
Apply clean brake fluid to the brake pipe joint nut threads.

Install the brake pipes to the delay valve and tighten the joint nuts to the specified torque.

**TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)**

Fill brake fluid and bleed air the rear (combined) brake line hydraulic system (page 19-7).

Install the front meter panel (page 2-4).



### FRONT BRAKE CALIPER

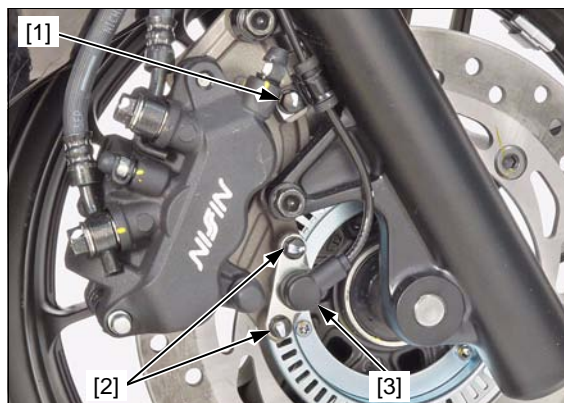
#### REMOVAL/INSTALLATION

Drain the brake fluid from the front brake line hydraulic system (page 19-5).

*ABS type only:*

Remove the following:

- Wire clamp bolt [1]
- Bolts [2]
- Wheel speed sensor [3]



When removing the oil bolts, cover the end of the hoses to prevent contamination.

Remove the brake pads (page 19-9)

Disconnect the brake hoses [1] from the brake caliper by removing the oil bolts [2] and sealing washers [3].

Remove the front brake caliper mounting bolts [4] and brake caliper.

Installation is in the reverse order of removal.

- Replace the brake caliper mounting bolts and sealing washers with new ones.

## TORQUE:

**Front brake caliper mounting bolt:**

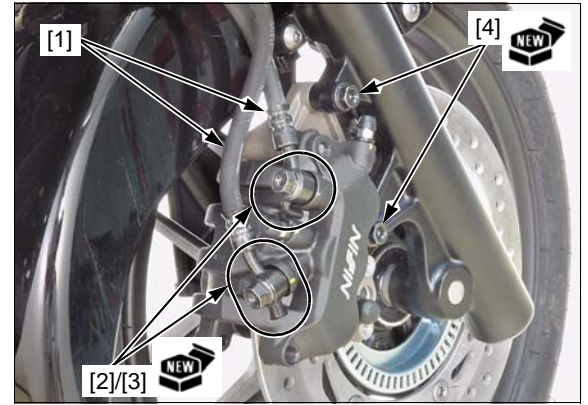
**30 N·m (3.1 kgf·m, 22 lbf·ft)**

**Brake hose oil bolt:**

**34 N·m (3.5 kgf·m, 25 lbf·ft)**

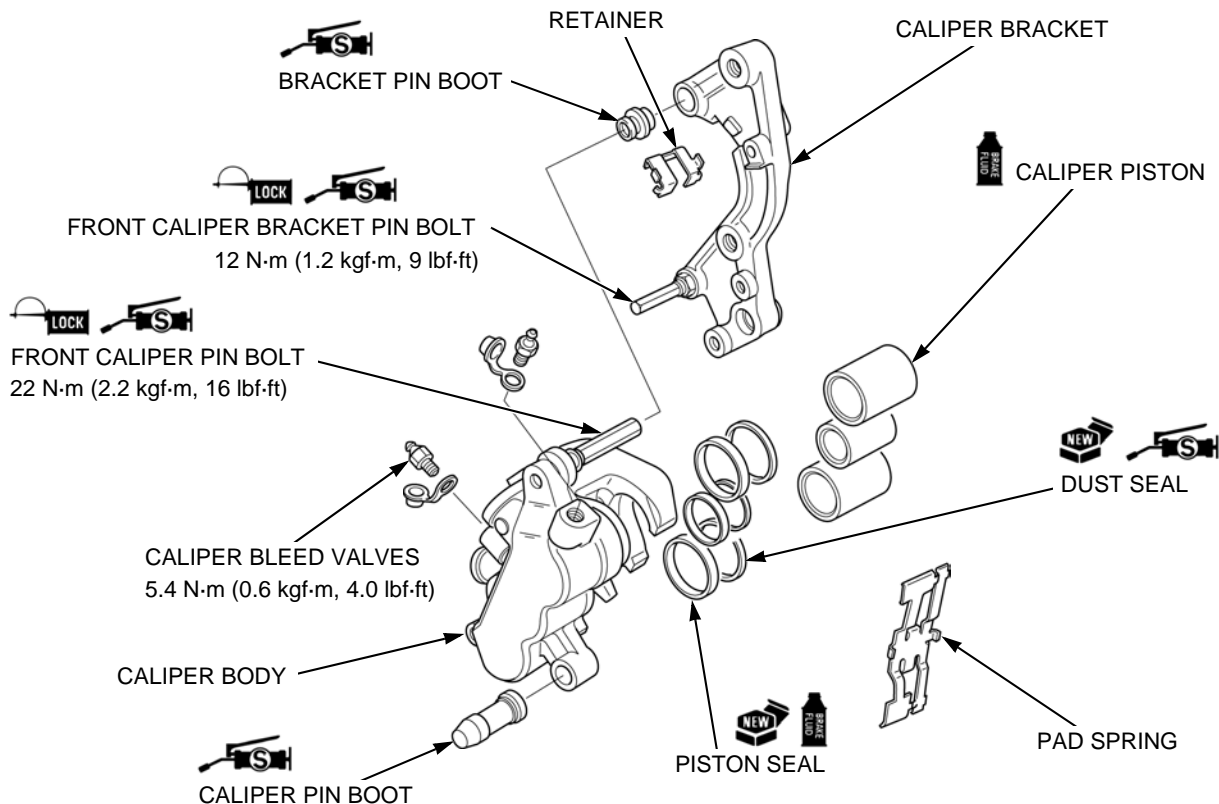
Fill and bleed the front brake line hydraulic system (page 19-6).

*ABS type only:* Check the air gap between the front wheel speed sensor and pulser ring (page 20-20).



## DISASSEMBLY/ASSEMBLY

Disassemble and assemble the front brake caliper as shown in the illustration.



## INSPECTION

Check the following parts for scoring, scratches, deterioration or damage.

- Caliper cylinders
- Caliper pistons

Measure the parts according to HYDRAULIC BRAKE SYSTEM SPECIFICATIONS (page 1-9) and replace if necessary.



### REAR BRAKE CALIPER

#### REMOVAL/INSTALLATION

Remove the muffler (page 2-25).

Remove the bolts [1] and brake hose protector [2].

Drain the brake fluid from the rear (combined) brake line hydraulic system (page 19-5).

*When removing the brake hose oil bolt, cover the end of the hose to prevent contamination.*

Disconnect the brake hose [1] from the rear brake caliper by removing the oil bolt [2] and sealing washers [3].

Remove the following:

- Mounting bolts [4]
- Brake caliper [5]
- Rear brake pads (page 19-10)

Installation is in the reverse order of removal.

- Replace the brake caliper mounting bolts and sealing washers with new ones.

#### TORQUE:

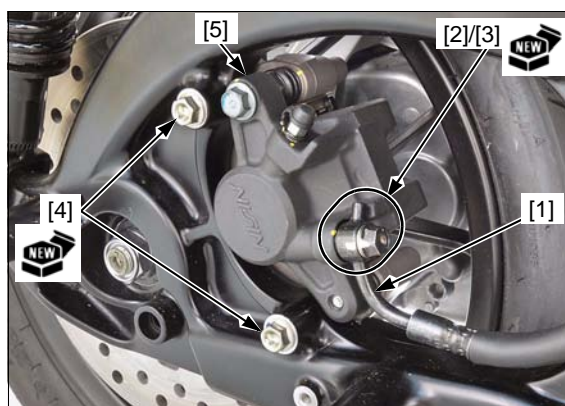
**Rear brake caliper mounting bolt:**

**30 N·m (3.1 kgf·m, 22 lbf·ft)**

**Brake hose oil bolt:**

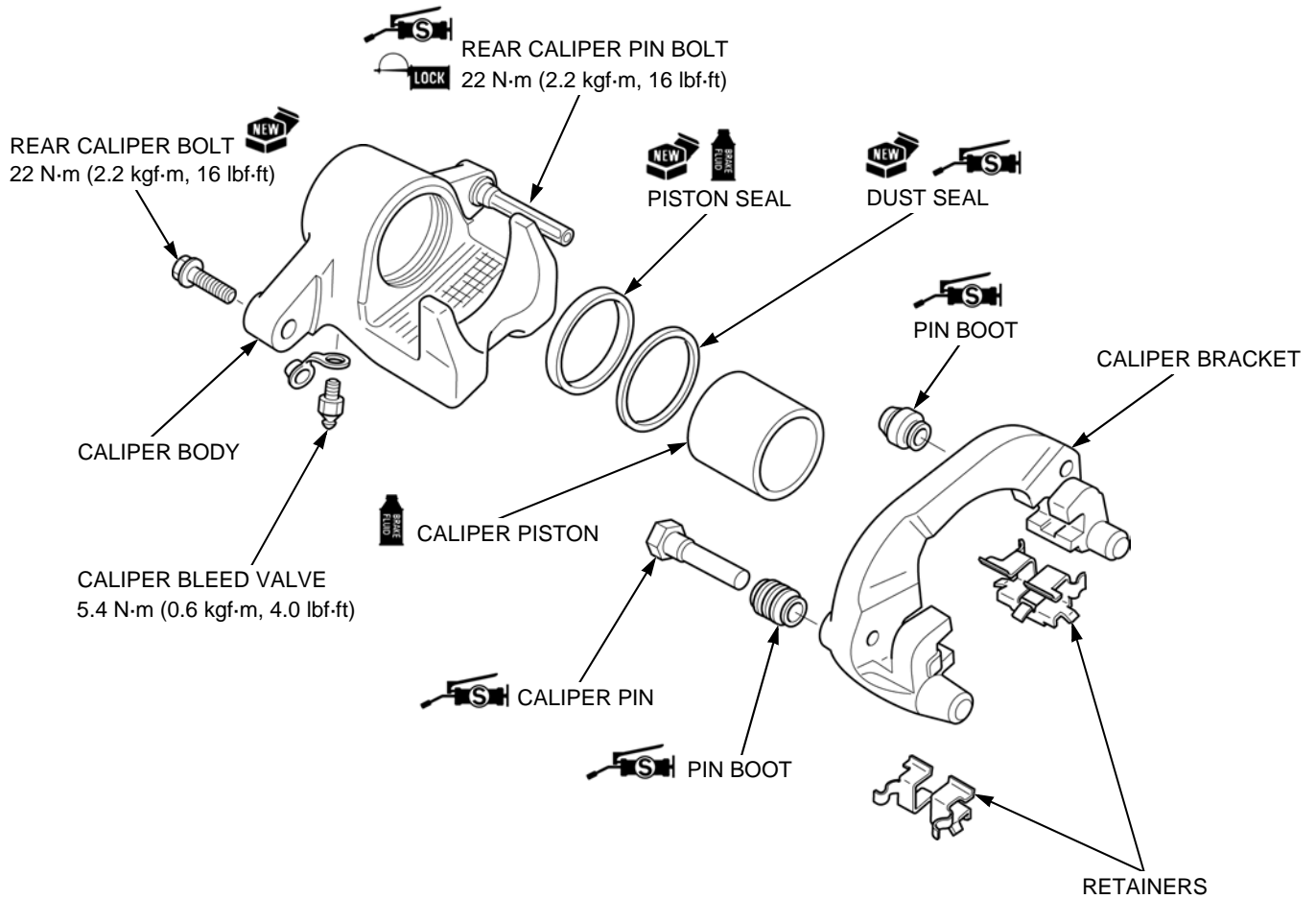
**34 N·m (3.5 kgf·m, 25 lbf·ft)**

Fill and bleed the rear (combined) brake line hydraulic system (page 19-7).



## DISASSEMBLY/ASSEMBLY

Disassemble and assemble the rear brake caliper as shown in the illustration.



## INSPECTION

Check the following parts for scoring, scratches, deterioration or damage.

- Caliper cylinder
- Caliper piston

Measure the parts according to HYDRAULIC BRAKE SYSTEM SPECIFICATIONS (page 1-9) and replace if necessary.

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## MEMO

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## 20. ANTI-LOCK BRAKE SYSTEM

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SERVICE INFORMATION .....	20-2	ABS INDICATOR CIRCUIT TROUBLESHOOTING .....	20-10
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ABS SYSTEM DIAGRAM .....	20-4	WHEEL SPEED SENSOR .....	20-20
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## ANTI-LOCK BRAKE SYSTEM

# SERVICE INFORMATION

## GENERAL

### NOTICE

*The ABS modulator may be damaged if dropped. Also if a connector is disconnected when current is flowing, the excessive voltage may damage the control unit. Always turn off the ignition switch before servicing.*

- This section covers service of the Anti-lock Brake System (ABS). Refer to information for the conventional brake system servicing (page 19-2).
- The ABS control unit performs Pre-start self-diagnosis to check whether the ABS system functions normally until the vehicle speed reaches 10 km/h (6 mph). After pre-start self-diagnosis, the ABS control unit monitors the ABS system and vehicle running condition constantly until the ignition switch is turned OFF (ordinary self-diagnosis).
- When the ABS modulator control unit detects a problem, the ABS indicator blinks to notify the rider of the problem. To detect the faulty part, retrieve the problem code by shorting the DLC terminals.
- When the ABS control unit detects a problem, it stops the ABS function and switches back to the conventional brake operation, and the ABS indicator blinks or stays on. Take care during the test ride.
- Read "ABS TROUBLESHOOTING INFORMATION" carefully, inspect and troubleshoot the ABS system according to the Diagnostic Troubleshooting flow chart. Observe each step of the procedures one by one. Write down the problem code and probable faulty part before starting diagnosis and troubleshooting.
- Use a fully charged battery. Do not diagnose with a charger connected to the battery.
- After troubleshooting, erase the problem code and perform the pre-start self-diagnosis to be sure that the ABS indicator is operating normally.
- Troubles not resulting from a faulty ABS (e.g. brake disc squeak, unevenly worn brake pad) cannot be recognized by the ABS diagnosis system.
- When the wheel speed sensor and/or pulser ring is replaced, check the clearance (air gap) between both components.
- The ABS control unit (ECU) is mounted on the modulator (the modulator with the built-in ECU). Do not disassemble the ABS modulator. Replace the ABS modulator as an assembly if it is faulty.
- Be careful not to damage the wheel speed sensor and pulser ring when removing and installing the wheel.
- The following color codes are used throughout this section.

Bl = Black  
Br = Brown

Bu = Blue  
G = Green

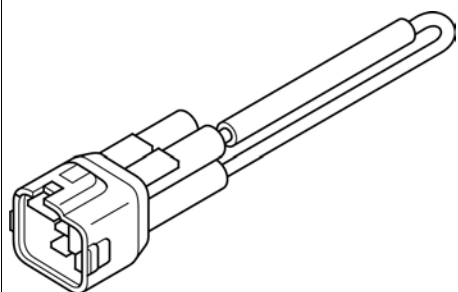
O = Orange  
P = Pink

R = Red  
Lg = Light green

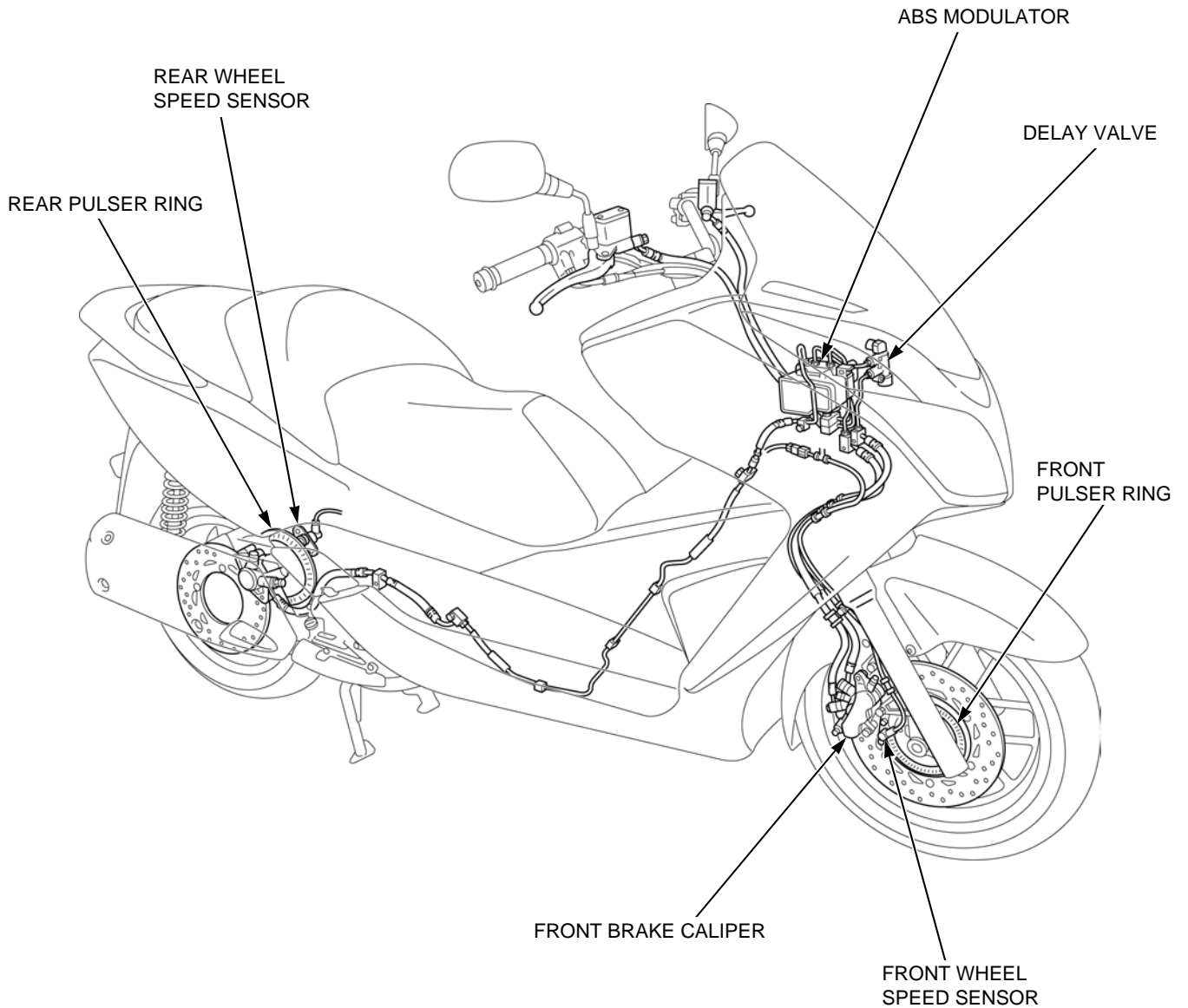
W = White

## TOOLS

SCS Service Connector  
070PZ-ZY30100



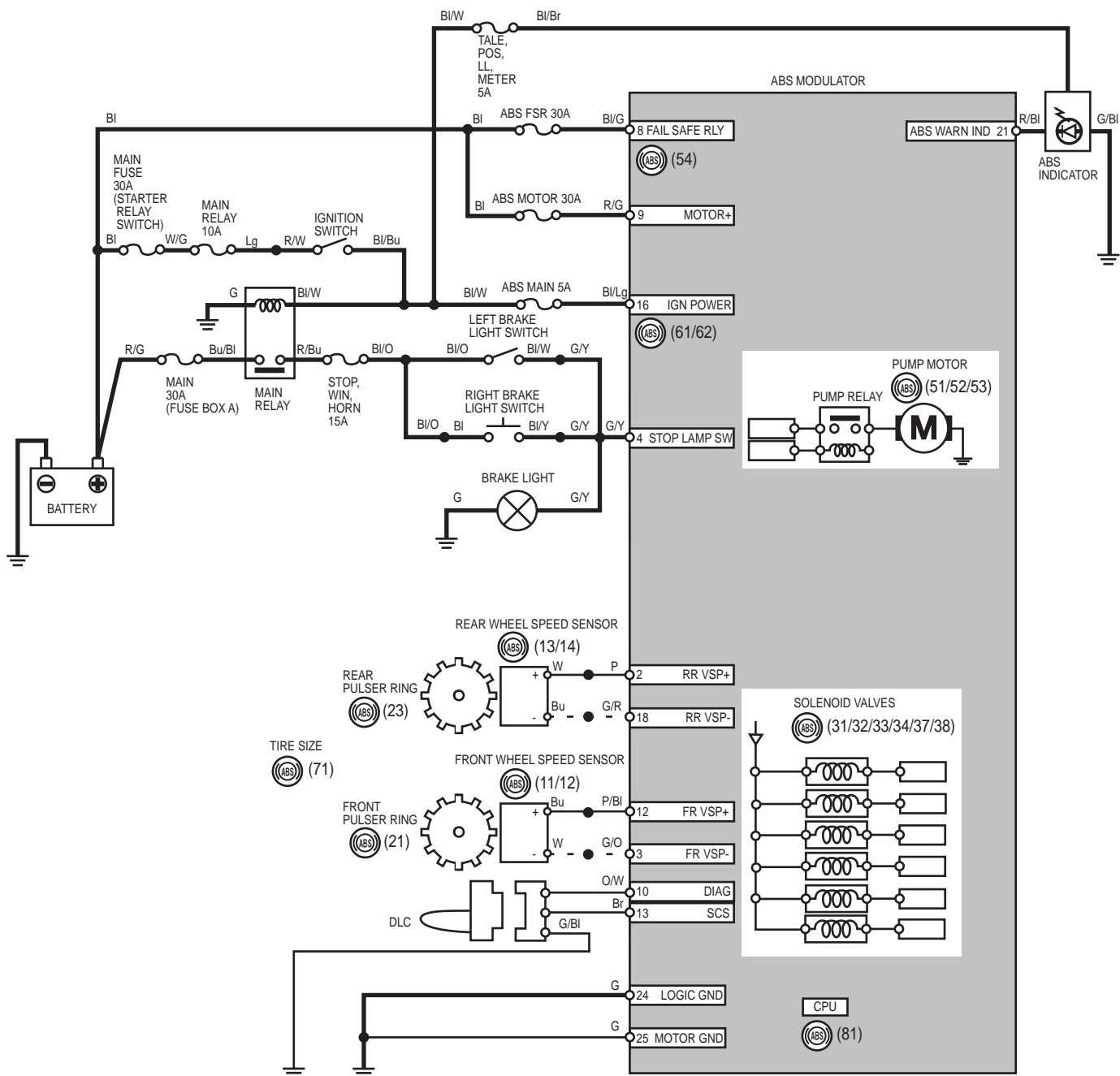
## ABS SYSTEM LOCATION





# ANTI-LOCK BRAKE SYSTEM

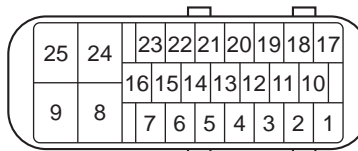
## ABS SYSTEM DIAGRAM



Bl : Black    O : Orange  
 Br : Brown    P : Pink  
 Bu : Blue    R : Red  
 G : Green    W : White  
 Lg : Light green    Y : Yellow

(ABS) ( ) : ABS problem code number

⏏ : Short terminals for reading ABS problem code



ABS MODULATOR 25P CONNECTOR

# ABS TROUBLESHOOTING INFORMATION

## SYSTEM DESCRIPTION

### SUMMARY OF ABS PRE-START SELF-DIAGNOSIS SYSTEM

The ABS pre-start self-diagnosis system diagnoses the electrical system as well as the operating status of the modulator. When there is any abnormality, the problem and the associated part can be detected by reading the problem code.

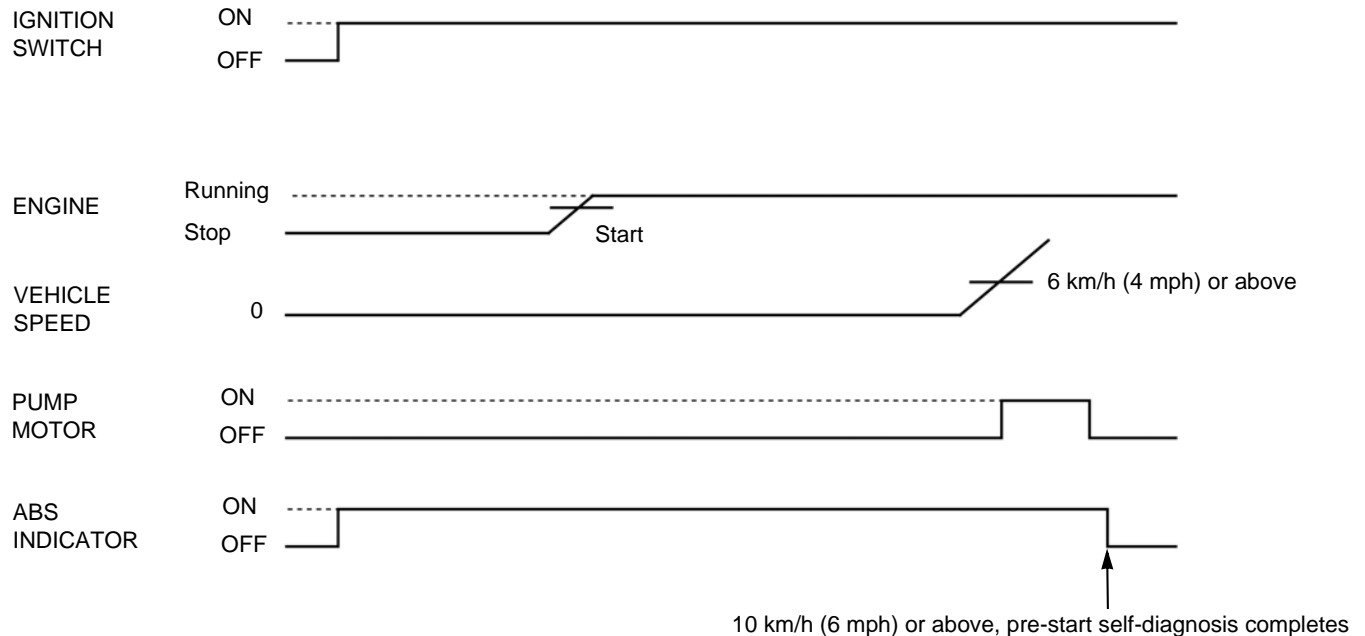
When the scooter is running, pulse signals generated at the front/rear wheel speed sensor are sent to the ABS Control Unit. When the ABS Control Unit detects that vehicle speed reaches 6 km/h (4 mph) the pump motor is temporarily operated to check if the ABS system functions normally. If the system is normal, pre-start self-diagnosis is complete by the time the vehicle speed reaches 10 km/h (6 mph) approximately.

If a problem is detected, the ABS indicator blinks or comes on and stays on to notify the rider of the problem. The self-diagnosis is also made while the scooter is running, and the ABS indicator blinks when a problem is detected.

When the ABS indicator blinks, the cause of the problem can be identified by retrieving the problem code following the specified retrieval procedure (page 20-6).

If the ABS indicator does not come on when the ignition switch is turned ON, or the ABS indicator stays on after the pre-start self-diagnosis procedure is complete, the ABS indicator may be faulty. Follow the troubleshooting (page 20-10).

Pre-start self-diagnosis when normal:



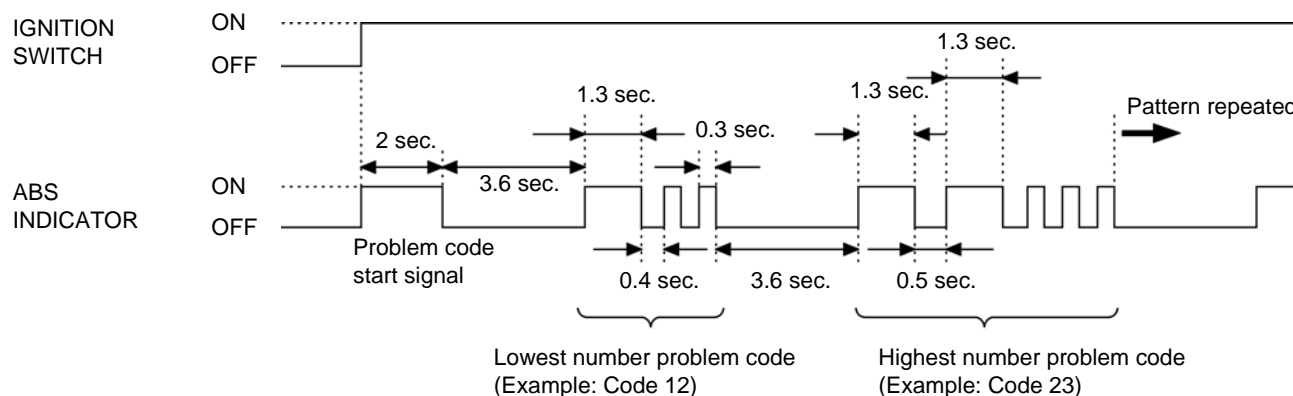
## PRE-START SELF-DIAGNOSIS PROCEDURE

1. Turn the ignition switch ON and engine stop switch to "Q".
2. Make sure the ABS indicator comes on.
3. Start the engine.
4. Ride the scooter and increase the vehicle speed to approximately 10 km/h (6 mph).
5. The ABS is normal if the ABS indicator goes off.

## ANTI-LOCK BRAKE SYSTEM

### PROBLEM CODE INDICATION PATTERN

- The ABS indicator denotes the problem codes from 11 to 81. The ABS indicator has two types of blinks, a long blink and short blink. The long blink lasts for 1.3 seconds, the short blink lasts for 0.3 seconds. When two long blinks occur, and three short blinks, that problem code is 23 (two long blinks = 20 blinks, three short blinks = 3 blinks). Then, go to the troubleshooting and see problem code 23.
- When the ABS control unit stores some problem codes, the ABS indicator shows the problem codes in the order from the lowest number to highest number. For example, when the ABS indicator indicates code 12, then indicates code 23, two failures have occurred.



When the problem code is not stored:



### PROBLEM CODE READOUT

- The ABS indicator indicates the problem code by blinking a specified number of times.
- The problem code is not erased by turning the ignition switch OFF while the problem code is being output. Note that turning the ignition switch ON again does not indicate the problem code. To show the problem code again, repeat the problem code retrieval procedures from the beginning.
- Be sure to make a note of the retrieval problem code(s).
- After diagnostic troubleshooting, erase the problem code(s) and perform the pre-start self-diagnosis to be sure that there is no problem in the ABS indicator (indicator is operating normally).
- Do not apply the front or rear brake during retrieval.

Turn the ignition switch ON and engine stop switch to "O".  
Start the engine and test ride the scooter above 10 km/h (6 mph).  
If the ABS indicator blinks or stays on, follow the steps described below:

1. Turn the ignition switch OFF.

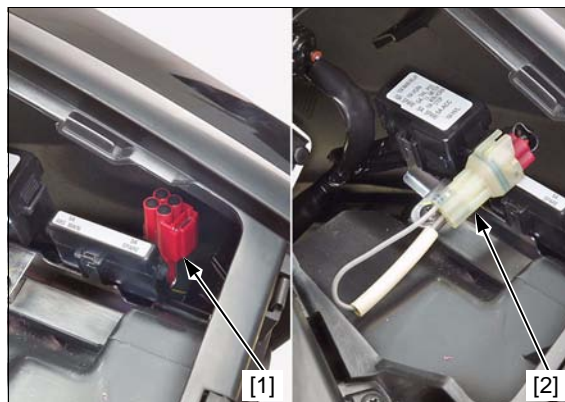
Remove the right front panel (page 2-12).

Remove the dummy connector [1] from the DLC.

Short the DLC terminals using a special tool.

#### TOOL:

**SCS Service Connector [2] 070PZ-ZY30100**



2. Turn the ignition switch ON with the engine stop switch at "O".

The ABS indicator should come on 2 seconds (start signal) (then goes off 3.6 seconds) and starts problem code indication.

3. The problem code is indicated by the number of the times of the ABS indicator blinking.

If the problem code is not stored, the ABS indicator stays on.

4. Turn the ignition switch OFF and remove the special tool from the DLC.  
Install the dummy connector to the DLC.  
Install the right front panel (page 2-12).

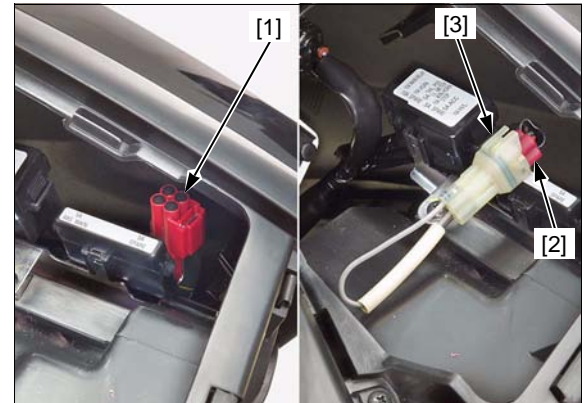
## ERASING PROBLEM CODE

1. Turn the ignition switch OFF.  
Remove the right front panel (page 2-12).  
Remove the dummy connector [1] and short the wire terminals of the DLC [2] using the special tool.

### TOOL:

**SCS Service Connector [3] 070PZ-ZY30100**

2. Turn the ignition switch ON with the engine stop switch at "O" while squeezing the brake lever. The ABS indicator should come on 2 seconds and go off.
3. Release the brake lever immediately after the ABS indicator is off. The ABS indicator should come on.
4. Squeeze the brake lever immediately after the ABS indicator is on. The ABS indicator should go off.
5. Release the brake lever immediately after the ABS indicator is off.  
When code erasure is complete, the ABS indicator blinks 2 times and stays on.  
If the ABS indicator does not blink 2 times, the data has not been erased, so try again.  
If the ABS indicator blinks 2 times and blinks, faulty ABS system, go to ABS troubleshooting (page 20-8).
6. Turn the ignition switch OFF and remove the special tool from the DLC.  
Install the dummy connector to the DLC.  
Install the right front panel (page 2-12).



## ABS INDICATOR PROBLEM CODE INDEX

- The ABS indicator might blink in the following cases. Correct the faulty part.
  - Incorrect tire pressure.
  - Tires not recommended for the scooter were installed (incorrect tire size).
  - Deformation of the wheel or tire.
- The ABS indicator might blink while riding under the following conditions. This is temporary failure. Be sure to erase the problem code (page 20-7).
 

Then, test ride the scooter above 10 km/h (6 mph) and check the problem code by retrieving the self-diagnosis system (page 20-6). Ask the rider for the riding conditions in detail when the scooter is brought in for inspection.

  - The scooter has continuously run bumpy roads.
  - The front wheel leaves the ground for a long time when riding (wheelie).
  - Only either the front or rear wheel rotates.
  - The ABS operates continuously.
  - The ABS control unit has been disrupted by an extremely powerful radio wave (electromagnetic interference).

Problem Code	Function failure	Detection		Symptom/Fail-safe function	Refer to
		A	B		
–	<ul style="list-style-type: none"> <li>ABS modulator voltage input line</li> <li>Indicator related wires</li> <li>Combination meter</li> <li>ABS modulator</li> <li>Sub fuse 5 A (ABS MAIN)</li> </ul>			• ABS indicator never come ON at all	20-10
				• ABS indicator stays ON at all	20-11
11	Front wheel speed sensor circuit malfunction	○	○	• Stops ABS operation	20-13
13	Wheel speed sensor or related wires	○	○		20-15
12	Rear wheel speed sensor malfunction		○	• Stops ABS operation	20-13
14	Wheel speed sensor or related wires		○		20-15
21	Electromagnetic interference		○	• Stops ABS operation	20-13
23	Wheel speed sensor, pulser ring or related wires		○		20-15
31	Front pulser ring		○	• Stops ABS operation	20-13
32	Pulser ring or related wires		○		20-15
33	Solenoid valve malfunction (ABS modulator)	○	○	• Stops ABS operation	20-16
34					
37					
38					
41	Front wheel lock		○	• Stops ABS operation	20-13
42	Riding condition		○		
43	Front wheel lock (Wheelie)		○	• Stops ABS operation	20-15
	Riding condition		○		
51	Rear wheel lock		○	• Stops ABS operation	20-17
52	Riding condition		○		
53	Motor lock	○	○	• Stops ABS operation	20-17
54	Motor stuck off	○	○		
	Pump motor (ABS modulator) or related wires	○	○	• Stops ABS operation	20-17
	Sub fuse 30 A (ABS MOTOR)	○	○		
55	Motor stuck on	○	○	• Stops ABS operation	20-17
56	Pump motor (ABS modulator) or related wires	○	○		
57	Sub fuse 30 A (ABS MOTOR)	○	○	• Stops ABS operation	20-17
58	Fail-safe relay malfunction	○	○		
59	Fail-safe relay (ABS modulator) or related wires	○	○	• Stops ABS operation	20-18
60	Sub fuse 30 A (ABS FSR)	○	○		

## ANTI-LOCK BRAKE SYSTEM

Problem Code	Function failure	Detection		Symptom/Fail-safe function	Refer to
		A	B		
61	Power circuit/Under voltage <ul style="list-style-type: none"> <li>Input voltage (too low)</li> <li>Sub fuse 5 A (ABS MAIN)</li> </ul>	O	O	• Stops ABS operation	20-19
62	Power circuit/Over voltage <ul style="list-style-type: none"> <li>Input voltage (too high)</li> </ul>	O	O	• Stops ABS operation	
71	Tire malfunction <ul style="list-style-type: none"> <li>Tire size</li> </ul>		O	• Stops ABS operation	20-20
81	ABS control unit <ul style="list-style-type: none"> <li>ABS control unit malfunction (ABS modulator)</li> </ul>	O	O	• Stops ABS operation	20-20

(A) Pre-start self-diagnosis (page 20-5)

(B) Ordinary self-diagnosis: diagnoses while the scooter is running (after pre-start self-diagnosis)

# ABS INDICATOR CIRCUIT TROUBLESHOOTING

### ABS INDICATOR DOES NOT COME ON (when the ignition switch turned ON)

#### 1. Combination Meter Power/ground Line Inspection

Check the combination meter power and ground lines (page 22-6).

**Are the wires normal?**

**YES** – GO TO STEP 2.

**NO** – Open circuit in related wires

#### 2. Indicator Operation Inspection

Pull up the lock lever [1] and disconnect the ABS modulator 25P connector [2].

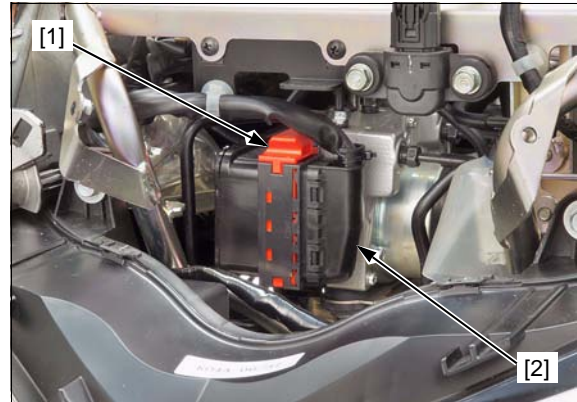
Turn the ignition switch ON with the engine stop switch at "O".

Check the ABS indicator.

**Does the ABS indicator come on?**

**YES** – Faulty ABS modulator

**NO** – GO TO STEP 3.



#### 3. Indicator Signal Line Short Circuit Inspection

Turn the ignition switch OFF.

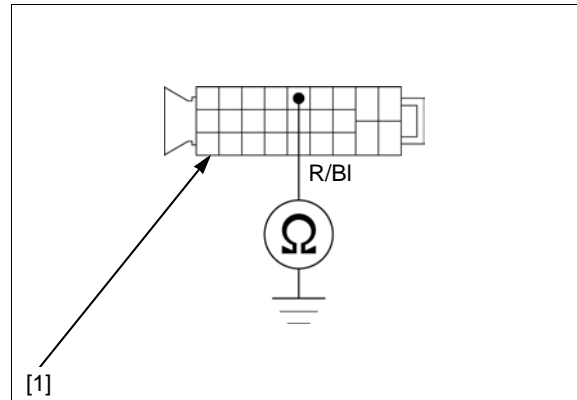
Check for continuity between the ABS modulator 25P connector [1] of the wire harness side and ground.

**CONNECTION: Red/black – Ground**

**Is there continuity?**

**YES** – Short circuit in Red/black wire

**NO** – Faulty combination meter





**ABS INDICATOR STAYS ON (Indicator does not go off when the motorcycle is running, problem code is not indicated by the retrieval procedure)**

**1. Service Check Line Short Circuit Inspection**

Disconnect the ABS modulator 25P connector [1] (page 20-23).

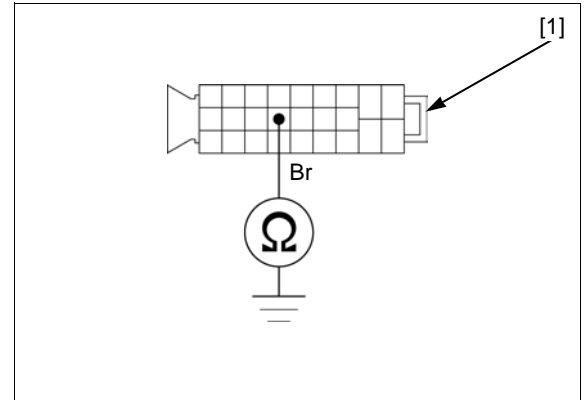
Check for continuity between the ABS modulator 25P connector of the wire harness side and ground.

**CONNECTION: Brown – Ground**

**Is there continuity?**

**YES** – Short circuit in Brown wire

**NO** – GO TO STEP 2.



**2. Indicator Operation Inspection**

With the connector connected, short the combination meter 20P (Gray) connector [1] of the wire harness side and ground with a jumper wire [2].

**CONNECTION: Red/black – Ground**

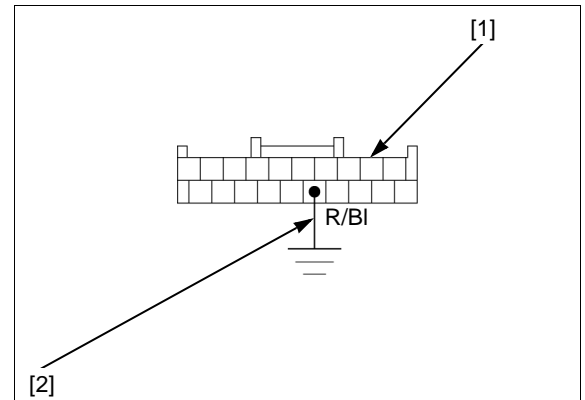
Turn the ignition switch ON with the engine stop switch at "Q".

Check the ABS indicator.

**Does it go off?**

**YES** – GO TO STEP 3.

**NO** – Faulty combination meter



**3. Indicator Signal Line Open Circuit Inspection**

Turn the ignition switch OFF.

Remove the jumper wire from the combination meter 20P (Gray) connector.

Short the ABS modulator 25P connector [1] of the wire harness side and ground with a jumper wire [2].

**CONNECTION: Red/black – Ground**

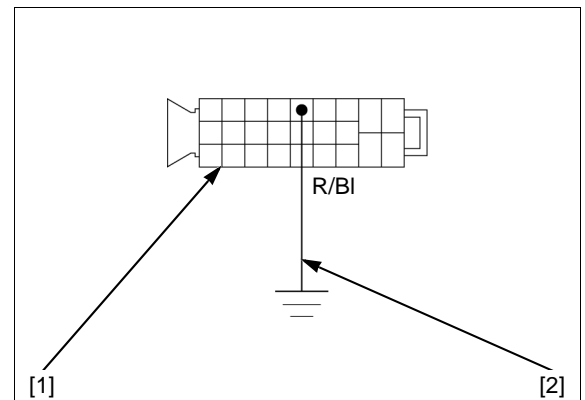
Turn the ignition switch ON with the engine stop switch at "Q".

Check the ABS indicator.

**Does it go off?**

**YES** – GO TO STEP 4.

**NO** – Open circuit in Red/black wire



## ANTI-LOCK BRAKE SYSTEM

### 4. Logic Ground Line Open Circuit Inspection

Turn the ignition switch OFF.

Remove the jumper wire from the ABS modulator 25P connector [1].

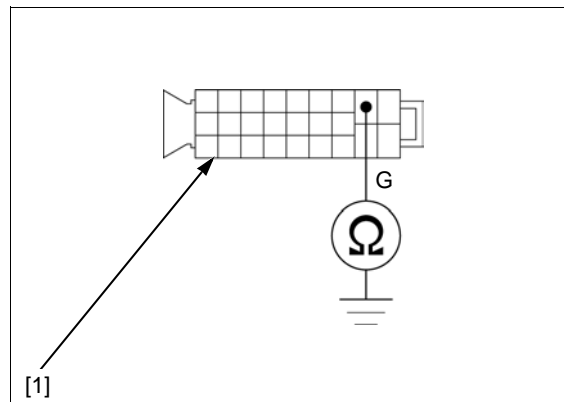
Check for continuity between the ABS modulator 25P connector of the wire harness side and ground.

**CONNECTION: Green – Ground**

*Is there continuity?*

**YES** – GO TO STEP 5.

**NO** – Open circuit in Green wire



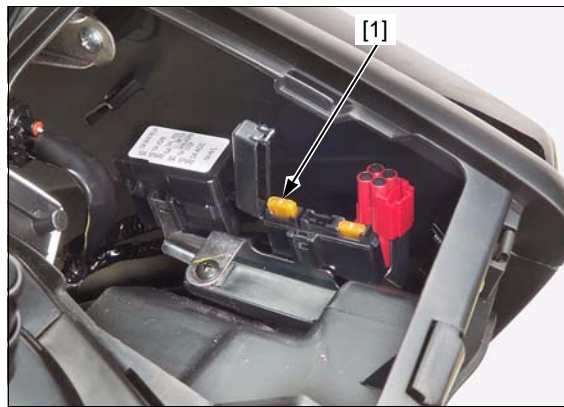
### 5. Fuse Inspection

Check the sub fuse 5 A (ABS MAIN) [1] in the fuse box C for blown.

*Is the fuse blown?*

**YES** – GO TO STEP 6.

**NO** – GO TO STEP 7.



### 6. Power Input Line Short Circuit Inspection

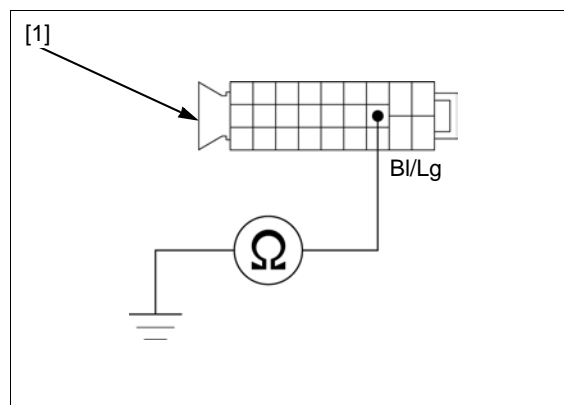
With the sub fuse 5 A (ABS MAIN) removed, check for continuity between the ABS modulator 25P connector [1] of the wire harness side and ground.

**CONNECTION: Black/light green – Ground**

*Is there continuity?*

**YES** – Short circuit in Black/light green wire. Repair short and replace the sub fuse 5 A (ABS MAIN) with a new one, and recheck.

**NO** – Intermittent failure. Replace the sub fuse 5 A (ABS MAIN) with a new one, and recheck.



### 7. Power Input Line Open Circuit Inspection

Turn the ignition switch ON with the engine stop switch at "O".

Measure the voltage between the ABS modulator 25P connector [1] of wire harness side and ground.

**CONNECTION:**

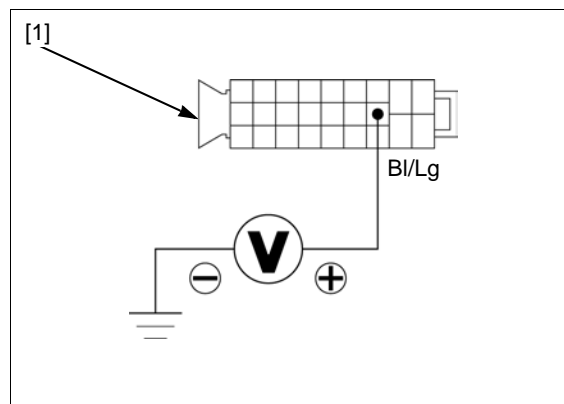
**Black/light green (+) – Ground (–)**

**STANDARD: Battery voltage**

*Does the standard voltage exist?*

**YES** – Faulty ABS modulator.

**NO** – Open circuit in Black/light green wire between the ABS modulator 25P connector and ignition switch



## ABS TROUBLESHOOTING

- Perform inspection with the ignition switch OFF, unless otherwise specified.
- All connector diagrams in the troubleshooting are viewed from the terminal side.
- Use a fully charged battery. Do not diagnose with a charger connected to the battery.
- When the ABS modulator assembly is detected to be faulty, recheck the wire harness and connector connections closely before replacing it.
- After diagnostic troubleshooting, erase the problem code (page 20-7) then test ride the scooter above 30 km/h (19 mph) and check the other problem code by retrieving the self-diagnosis system (page 20-6).
- Before starting the diagnosis and troubleshooting, check the ABS indicator circuit (page 20-10).

### PROBLEM CODE 11, 12, 21, 41 or 42 (Front Wheel Speed Sensor/Front Pulser Ring/Front Wheel Lock)

- The ABS indicator might blink under unusual riding or conditions (page 20-8). This is temporary failure. Erase the problem code (page 20-7) then test ride the scooter above 30 km/h (19 mph) and check the problem code by retrieving the self-diagnosis system (page 20-6).
- If the problem code 41 is indicated, check the front brake for drag.

#### 1. Speed Sensor Air Gap Inspection

Measure the air gap between the speed sensor and pulser ring (page 20-20).

**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. Speed Sensor Condition Inspection

Inspect the area around the speed sensor:

Check that there is no iron or other magnetic deposits between the pulser ring [1] and wheel speed sensor [2], and the pulser ring slots for obstructions.

Check the installation condition of the pulser ring or wheel speed sensor for looseness.

Check the pulser ring and sensor tip for deformation or damage (e.g., chipped pulser ring teeth).

**Are the sensor and pulser ring in good condition?**

**YES** – GO TO STEP 3.

**NO** – Remove any deposits. Install properly or replace faulty part.



## ANTI-LOCK BRAKE SYSTEM

### 3. Front Wheel Speed Sensor Line Short Circuit Inspection (at sensor side)

Turn the ignition switch OFF.  
Disconnect the front wheel speed sensor 2P (Blue) connector [1] (page 20-21).

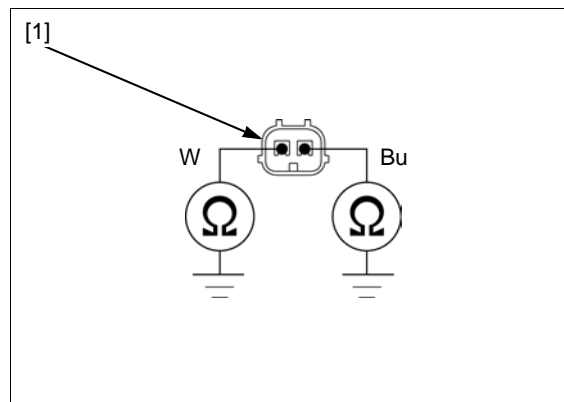
Check for continuity between each terminal of the sensor side front wheel speed sensor 2P (Blue) connector and ground.

**CONNECTION: White – Ground**  
**Blue – Ground**

*Is there continuity?*

**YES** – Faulty front wheel speed sensor

**NO** – GO TO STEP 4.



### 4. Front Wheel Speed Sensor Line Short Circuit Inspection (at wire harness side)

Disconnect the ABS modulator 25P connector (page 20-23).

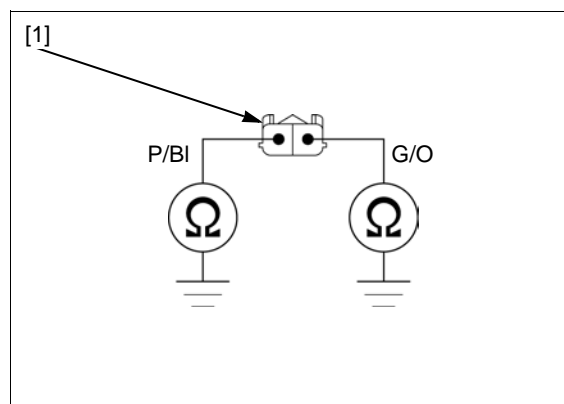
Check for continuity between each terminal of the wire harness side front wheel speed sensor 2P (Blue) connector [1] and ground.

**CONNECTION: Pink/black – Ground**  
**Green/orange – Ground**

*Is there continuity?*

**YES** – • Short circuit in Pink/black wire  
• Short circuit in Green/orange wire

**NO** – GO TO STEP 5.



### 5. Speed Sensor Line Open Circuit Inspection

Short the ABS modulator 25P connector [1] terminals of the wire harness side with a jumper wire [2].

**CONNECTION: Pink/black – Green/orange**

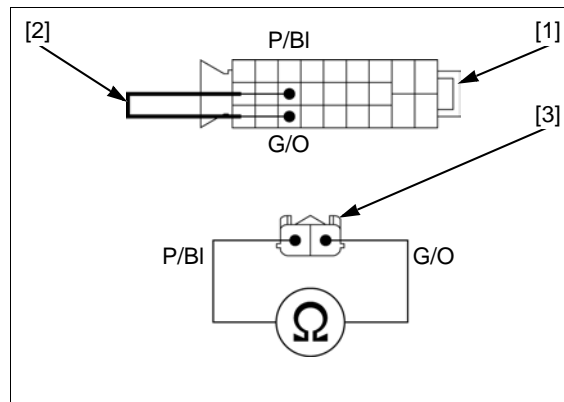
Check for continuity between the terminals of the wire harness side front wheel speed sensor 2P (Blue) connector [3].

**CONNECTION: Pink/black – Green/orange**

*Is there continuity?*

**YES** – GO TO STEP 6.

**NO** – Open circuit in Pink/black or Green/orange wire



### 6. Failure Reproduction with a New Speed Sensor

Replace the front wheel speed sensor with a new one (page 20-21).

Connect the ABS modulator 25P and front wheel speed sensor 2P (Blue) connectors.

Erase the problem code (page 20-7).

Test ride the scooter above 30 km/h (19 mph).

Retrieve the problem code (page 20-6) and recheck the ABS indicator.

**Dose the ABS indicator indicate the code "11, 12, 21, 41 or 42"?**

**YES** – Faulty ABS modulator.

**NO** – Faulty original wheel speed sensor

### PROBLEM CODE 13, 14, 23 or 43 (Rear Wheel Speed Sensor/Rear Pulser Ring/Rear Wheel Lock)

- The ABS indicator might blink under unusual riding or conditions (page 20-8). This is a temporary failure.  
Erase the problem code (page 20-7) then test ride the scooter above 30 km/h (19 mph) and check the problem code by retrieving the self-diagnosis system (page 20-6).
- If the problem code 43 is indicated, check the rear brake for drag.

#### 1. Speed Sensor Air Gap Inspection

Measure the air gap between the speed sensor and pulser ring (page 20-20).

**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. Speed Sensor Condition Inspection

Inspect the area around the speed sensor:

Check that there is no iron or other magnetic deposits between the pulser ring [1] and wheel speed sensor [2], and the pulser ring slots for obstructions.

Check installation condition of the pulser ring or wheel speed sensor for looseness.

Check the pulser ring and sensor tip for deformation or damage (e.g., chipped pulser ring teeth).

**Are the 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 (at sensor side)

Turn the ignition switch OFF.

Disconnect the rear wheel speed sensor 6P (Black) connector [1] (page 20-21).

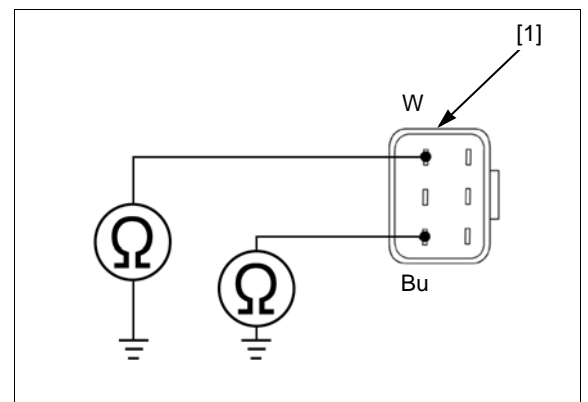
Check for continuity between each terminal of the sensor side rear wheel speed sensor 6P (Black) connector and ground.

**CONNECTION: Blue – Ground**  
**White – Ground**

**Is there continuity?**

**YES** – Faulty rear wheel speed sensor

**NO** – GO TO STEP 4.



## ANTI-LOCK BRAKE SYSTEM

### 4. Rear Wheel Speed Sensor Line Short Circuit Inspection (at wire harness side)

Disconnect the ABS modulator 25P connector (page 20-23).

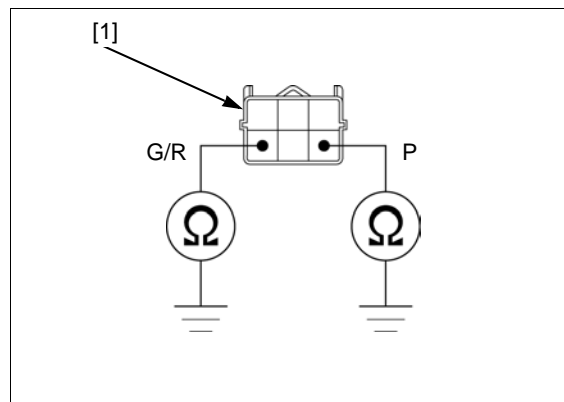
Check for continuity between each terminal of the wire harness side speed sensor/EOP switch 6P (Black) connector [1] and ground.

**CONNECTION: Green/red – Ground  
Pink – Ground**

*Is there continuity?*

**YES** – • Short circuit in Green/red wire  
• Short circuit in Pink wire

**NO** – GO TO STEP 5.



### 5. Speed Sensor Line Open Circuit Inspection

Short the ABS modulator 25P connector [1] terminals of the wire harness side with a jumper wire [2].

**CONNECTION: Green/red – Pink**

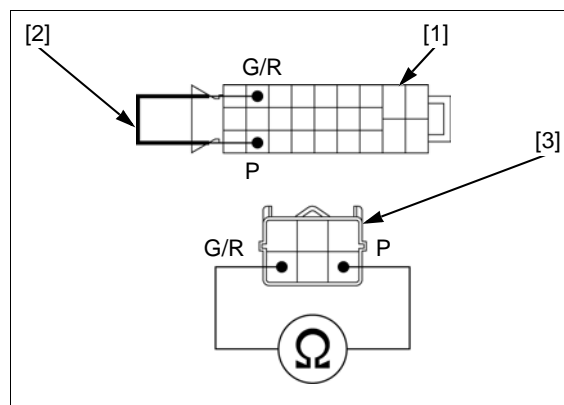
Check for continuity between the terminals of the wire harness side speed sensor/EOP switch 6P (Black) connector [3].

**CONNECTION: Green/red – Pink**

*Is there continuity?*

**YES** – GO TO STEP 6.

**NO** – Open circuit in Green/red or Pink wire



### 6. Failure Reproduction with a New Speed Sensor

Replace the rear wheel speed sensor with a new one (page 20-21).

Connect the ABS modulator 25P and speed sensor/EOP switch 6P (Black) connectors.

Erase the problem code (page 20-7).

Test ride the scooter above 30 km/h (19 mph).

Retrieve the problem code (page 20-6) and recheck the ABS indicator.

***Dose the ABS indicator indicate the code "13, 14, 23 or 43"?***

**YES** – Faulty ABS modulator

**NO** – Faulty original wheel speed sensor

## PROBLEM CODE 31, 32, 33, 34, 37 or 38 (Solenoid Valve)

### 1. Failure Reproduction

Erase the problem code (page 20-7).

Test ride the scooter above 30 km/h (19 mph).

Retrieve the problem code (page 20-6) and recheck the ABS indicator.

***Does the ABS indicator indicate the code "31, 32, 33, 34, 37 or 38"?***

**YES** – Faulty ABS modulator

**NO** – Solenoid valve is normal (intermittent failure).

## PROBLEM CODE 51, 52 or 53 (Pump Motor)

### 1. Fuse Inspection

Remove the battery lid (page 21-5).  
Check the sub fuse 30 A (ABS MOTOR) [1] in the fuse box A for blown.

**Is the fuse blown?**

**YES** – GO TO STEP 2.

**NO** – GO TO STEP 3.



### 2. Motor Power Input Line Short Circuit Inspection

Turn the ignition switch OFF.  
Disconnect the ABS modulator 25P connector [1] (page 20-23).

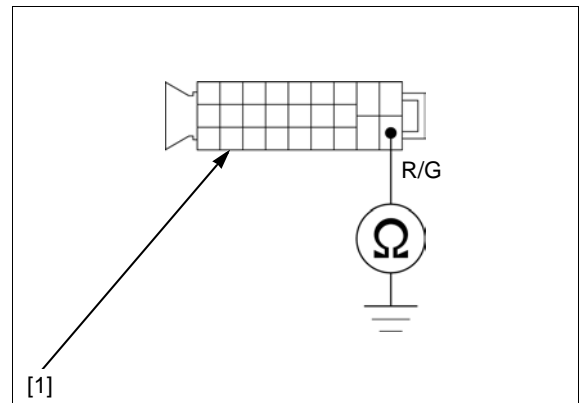
Check for continuity between the ABS modulator 25P connector of the wire harness side and ground.

**CONNECTION: Red/green – Ground**

**Is there continuity?**

**YES** – Short circuit in Red/green wire

**NO** – Intermittent failure. Replace the sub fuse 30 A (ABS MOTOR) with a new one, and recheck.



### 3. Motor Power Input Line Open Circuit Inspection

Turn the ignition switch OFF.  
Disconnect the ABS modulator 25P connector [1].

Measure the voltage between the ABS modulator 25P connector of the wire harness side and ground.

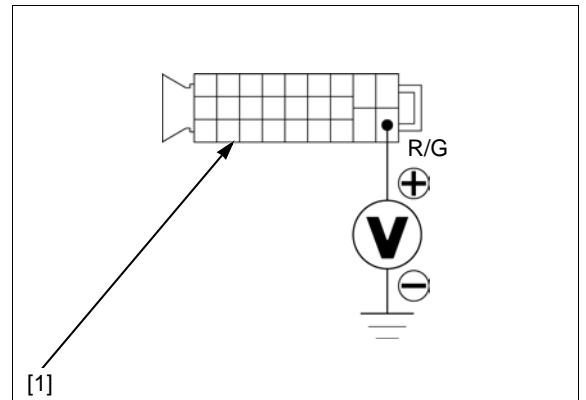
**CONNECTION: Red/green (+) – Ground (-)**

**STANDARD: Battery voltage**

**Does the standard voltage exist?**

**YES** – GO TO STEP 4.

**NO** – Open circuit in Red/green or Black wire between the battery and ABS modulator 25P connector



### 4. Failure Reproduction

Connect the ABS modulator 25P connector.

Erase the problem code (page 20-7).

Test ride the scooter above 30 km/h (19 mph).

Retrieve the problem code (page 20-6) and recheck the ABS indicator.

**Does the ABS indicator indicate the code "51, 52 or 53"?**

**YES** – Faulty ABS modulator

**NO** – Pump motor is normal (intermittent failure).



### PROBLEM CODE 54 (Fail-safe Relay)

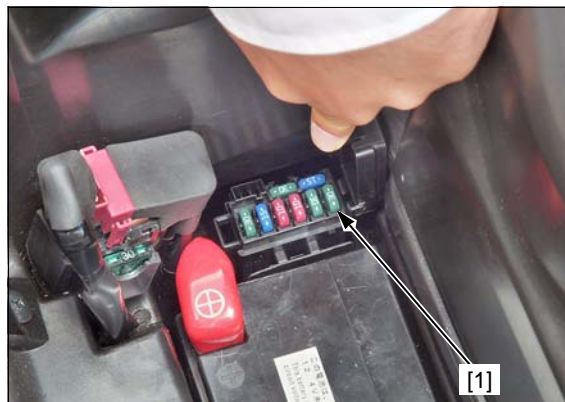
#### 1. Fuse Inspection

Remove the battery lid (page 21-5).  
Check the sub fuse 30 A (ABS FSR) [1] in the fuse box A for blown.

**Is the fuse blown?**

**YES** – GO TO STEP 2.

**NO** – GO TO STEP 3.



#### 2. Relay Power Input Line Short Circuit Inspection

Turn the ignition switch OFF.  
Disconnect the ABS modulator 25P connector [1] (page 20-23).

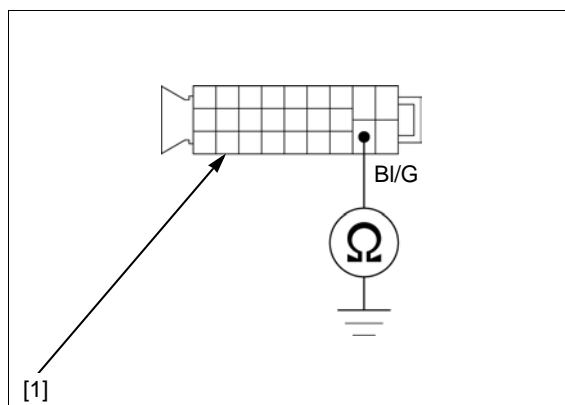
Check for continuity between the ABS modulator 25P connector of the wire harness side and ground.

**CONNECTION: Black/green – Ground**

**Is there continuity?**

**YES** – Short circuit in Black/green wire

**NO** – Intermittent failure. Replace the sub fuse 30 A (ABS FSR) with a new one, and recheck.



#### 3. Relay Power Input Line Open Circuit Inspection

Turn the ignition switch OFF.  
Disconnect the ABS modulator 25P connector [1].

Measure the voltage between the ABS modulator 25P connector of the wire harness side and ground.

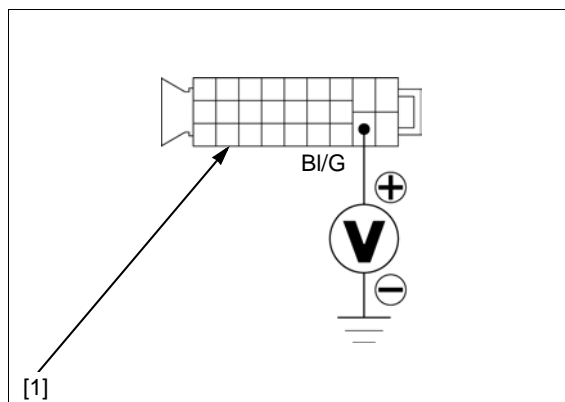
**CONNECTION: Black/green (+) – Ground (-)**

**STANDARD: Battery voltage**

**Does the standard voltage exist?**

**YES** – GO TO STEP 4.

**NO** – Open circuit in Black/green or Black wire between the battery and ABS modulator 25P connector



#### 4. Failure Reproduction

Connect the ABS modulator 25P connector.  
Erase the problem code (page 20-7).  
Test ride the scooter above 30 km/h (19 mph).  
Retrieve the problem code (page 20-6) and recheck the ABS indicator.

**Does the ABS indicator indicate the code "54"?**

**YES** – Faulty ABS modulator

**NO** – Fail-safe relay is normal (intermittent failure)

## PROBLEM CODE 61 or 62 (Power Circuit)

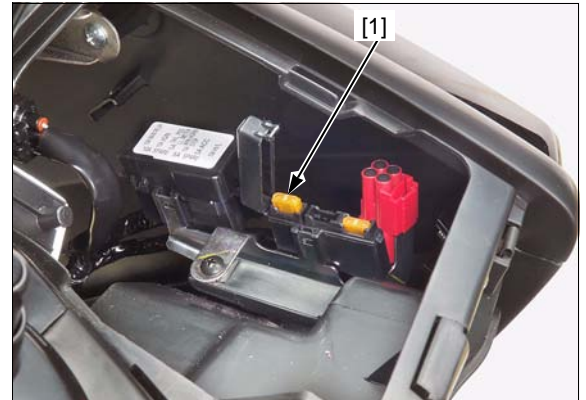
### 1. Fuse Inspection

Remove the right front panel (page 2-12).  
Check the sub fuse 5 A (ABS MAIN) [1] in the fuse box C for blown.

**Is the fuse blown?**

**YES** – GO TO STEP 2.

**NO** – GO TO STEP 3.



### 2. Power Input Line Short Circuit Inspection

Turn the ignition switch OFF.  
Disconnect the ABS modulator 25P connector [1] (page 20-23).

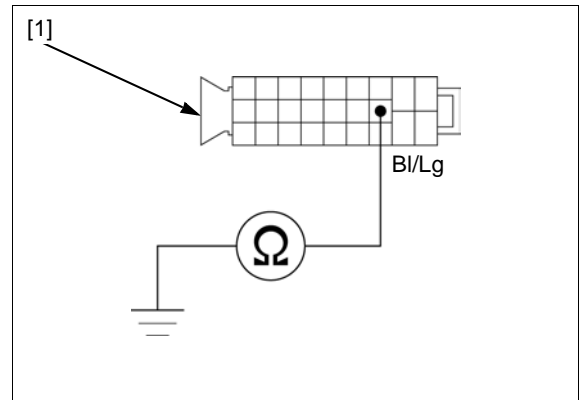
With the sub fuse 5 A (ABS MAIN) removed, check for continuity between the ABS modulator 25P connector of the wire harness side and ground.

**CONNECTION: Black/light green – Ground**

**Is there continuity?**

**YES** – Short circuit in Black/light green wire

**NO** – Intermittent failure. Replace the sub fuse 5 A (ABS MAIN) with a new one, and recheck.



### 3. Power Input Line Open Circuit Inspection

Turn the ignition switch OFF.  
Disconnect the ABS modulator 25P connector [1].

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

Measure the voltage between the ABS modulator 25P connector of the wire harness side and ground.

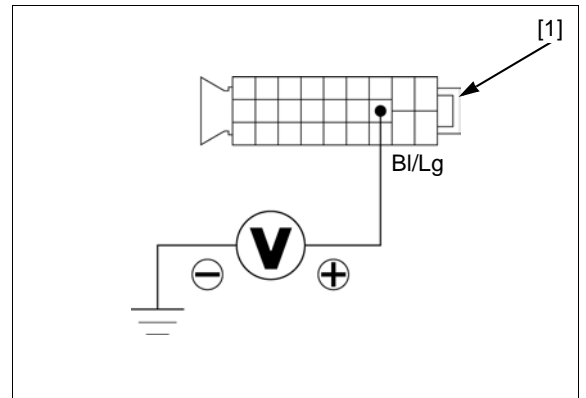
**CONNECTION: Black/light green (+) – Ground (-)**

**STANDARD: Battery voltage**

**Does the standard voltage exist?**

**YES** – GO TO STEP 4.

**NO** – Open circuit in Black/light green wire or Black/white wire between the ABS modulator 25P connector and ignition switch



### 4. Failure Reproduction

Turn the ignition switch OFF.  
Connect the ABS modulator 25P connector.

Erase the problem code (page 20-7).

Test ride the scooter above 30 km/h (19 mph).

Retrieve the problem code (page 20-6) and recheck the ABS indicator.

**Does the ABS indicator indicate the code "61 or 62"?**

**YES** – Faulty ABS modulator

**NO** – Power circuit is normal (intermittent failure)

## ANTI-LOCK BRAKE SYSTEM

---

### PROBLEM CODE 71 (Tire Size)

- Check the following and correct the faulty part.
  - Incorrect tire pressure.
  - Tires not recommended for the scooter were installed (incorrect tire size).
  - Deformation of the wheel or tire.

#### 1. Failure Reproduction

If the above items are normal, recheck the problem code indication:

Erase the problem code (page 20-7).

Test ride the scooter above 30 km/h (19 mph).

Retrieve the problem code (page 20-6) and recheck the ABS indicator.

***Does the ABS indicator indicate the code "71"?***

**YES** – Faulty ABS modulator

**NO** – Tire size is normal (intermittent failure)

### PROBLEM CODE 81 (ABS Control Unit)

#### 1. Failure Reproduction

Erase the problem code (page 20-7).

Test ride the scooter above 30 km/h (19 mph).

Retrieve the problem code (page 20-6) and recheck the ABS indicator.

***Does the ABS indicator indicate the code "81"?***

**YES** – Faulty ABS modulator

**NO** – ABS control unit is normal (intermittent failure)

## WHEEL SPEED SENSOR

### AIR GAP INSPECTION

Support the scooter securely using a hoist or equivalent and 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: 0.2 – 1.5 mm (0.01 – 0.06 in)**

The clearance (air gap) cannot be adjusted.

If it is not within specification, check each part for deformation, looseness or damage.

Check the wheel speed sensor for damage, and replace if necessary.

Check the pulse ring for deformation or damage, and replace if necessary.

- Front pulser ring (page 17-7)
- Rear pulser ring (page 18-8)



## WHEEL SPEED SENSOR REPLACEMENT

### FRONT WHEEL SPEED SENSOR REMOVAL/ INSTALLATION

*AC type only:* Remove the parking brake lever link cover (page 18-11).

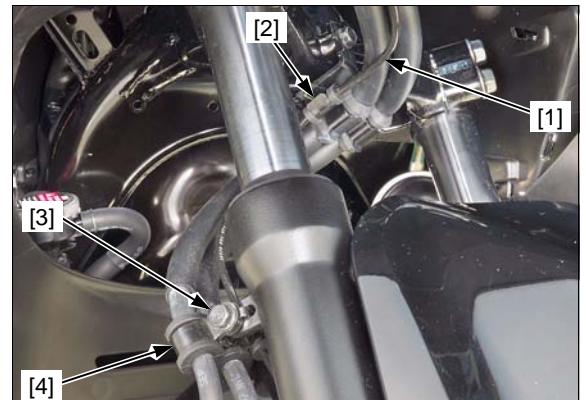
Disconnect the front wheel speed sensor 2P (Blue) connector [1].

Release the sensor wire from the guide [2].



Release the sensor wire [1] from the clamp [2].

Remove the bolt [3] and brake hose clamp [4], then release the speed sensor wire.



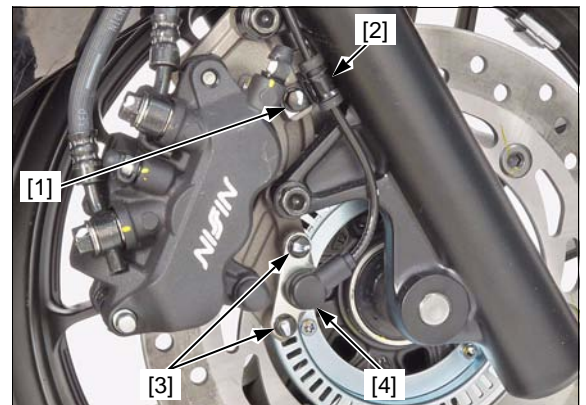
Remove the bolt [1] and front wheel speed sensor wire guide [2].

Remove the bolts [3] and front wheel speed sensor [4].

Clean around the mounting area of the caliper bracket thoroughly, and be sure that no foreign material is allowed to enter the mounting hole.

Installation is in the reverse order of removal.

- Route the wire properly (page 1-18).



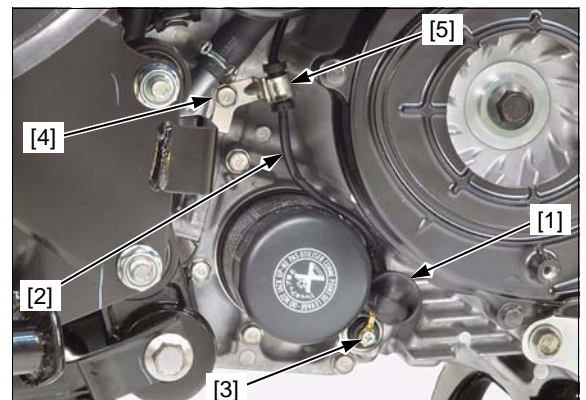
### REAR WHEEL SPEED SENSOR REMOVAL/ INSTALLATION

Remove the following:

- Air cleaner housing (page 7-13)
- Rear wheel (page 18-5)

Slide the rubber cap [1], and disconnect the EOP switch wire [2] by removing the terminal screw [3].

Remove the bolt [4] and wire clamp [5].





## ANTI-LOCK BRAKE SYSTEM

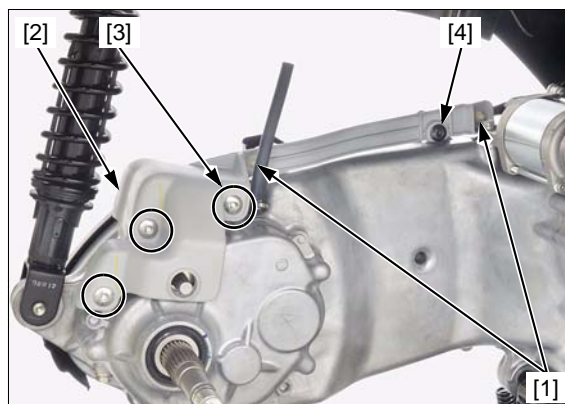
Release the wire clamp [1] from the engine.

Disconnect the speed sensor/EOP switch 6P (Black) connector [2].



Release the wire clamps [1] from the sensor protector [2].

Remove the speed sensor protector socket bolts A [3], speed sensor protector socket bolts B [4] and sensor protector.



Disconnect the VS sensor 3P (Black) connector [1].

Remove the bolts [2] and rear wheel speed sensor [3].

Clean around the mounting area of the crankcase and sensor protector thoroughly.

Installation is in the reverse order of removal.

- Replace the speed sensor protector socket bolts A [4] and B [5] with new ones.
- Route the wire and hoses properly (page 1-18).

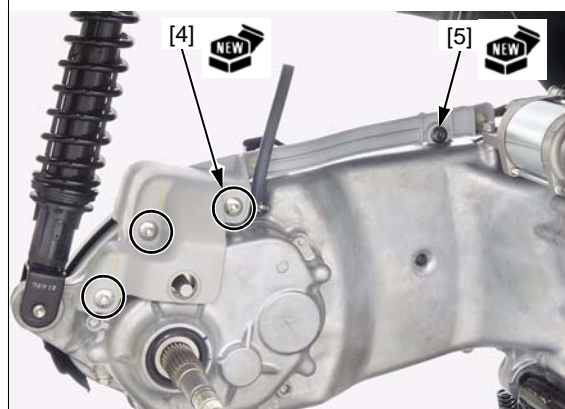
### TORQUE:

**Speed sensor protector socket bolt A:**

**10 N·m (1.0 kgf·m, 7 lbf·ft)**

**Speed sensor protector socket bolt B:**

**10 N·m (1.0 kgf·m, 7 lbf·ft)**



# ABS MODULATOR

## REMOVAL/INSTALLATION

Drain the brake fluid from the hydraulic systems (page 19-5).

Remove the meter panel (page 2-13).

Pull up the lock lever [1] and disconnect the ABS modulator 25P connector [2].

*When loosening the joint nuts, cover the end of the brake pipes to prevent contamination.*

Loosen the brake pipe joint nuts [3] and disconnect the brake pipes [4].

*Be careful not to bend or damage the brake pipes during ABS modulator assembly removal.*

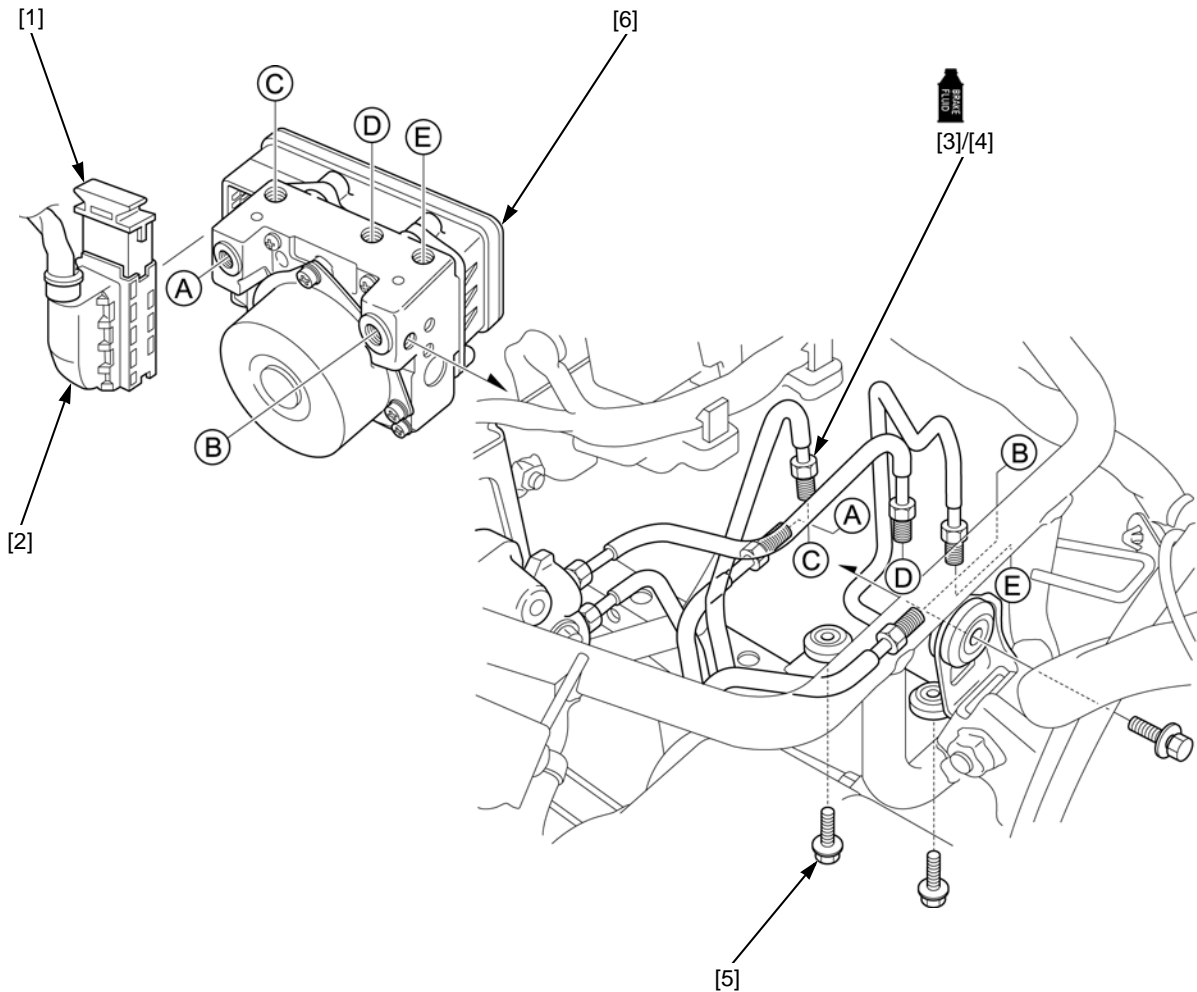
Remove the mounting bolts [5] and ABS modulator assembly [6] (so the assembly does not interfere with the brake pipes).

Installation is in the reverse order of removal.

### TORQUE:

**Brake pipe joint nut: 14 N·m (1.4 kgf·m, 10 lbf·ft)**

- Apply brake fluid to the brake pipe joint nut threads.



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## MEMO

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# 21. BATTERY/CHARGING SYSTEM

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SERVICE INFORMATION .....	21-2	BATTERY .....	21-5
TROUBLESHOOTING .....	21-3	CHARGING SYSTEM INSPECTION .....	21-6
SYSTEM LOCATION .....	21-4	ALTERNATOR .....	21-6
SYSTEM DIAGRAM .....	21-4	REGULATOR/RECTIFIER .....	21-7

## BATTERY/CHARGING SYSTEM

# 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 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 turned ON and current is present.*
- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  - Use only the electrolyte that comes with the battery.
  - Use all of the electrolyte.
  - Seal the battery properly.
  - Never open the seals after installation.
- 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 scooter, disconnect the battery (–) cable from the battery terminal.
- The battery sealing caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- The maintenance free (MF) 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 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, the 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 scooter.
- The battery will self-discharge when the scooter is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- When servicing the charging system, always follow the steps in the troubleshooting flow chart (page 21-3).
- For alternator service (page 14-2).

## BATTERY CHARGING


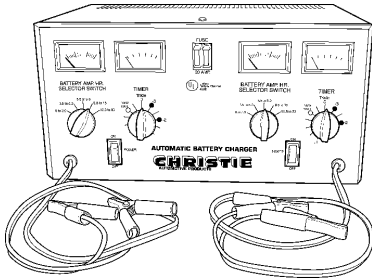
- Turn the power ON/OFF at the charger, not at the battery terminal.
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.
- Quick charging should only be done in an emergency; slow charging is preferred.

## BATTERY TESTING

Refer to the instructions 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 the actual battery condition can be measured.

**Recommended battery tester: Micro 404XL (U.S.A. only)**

TOOLS

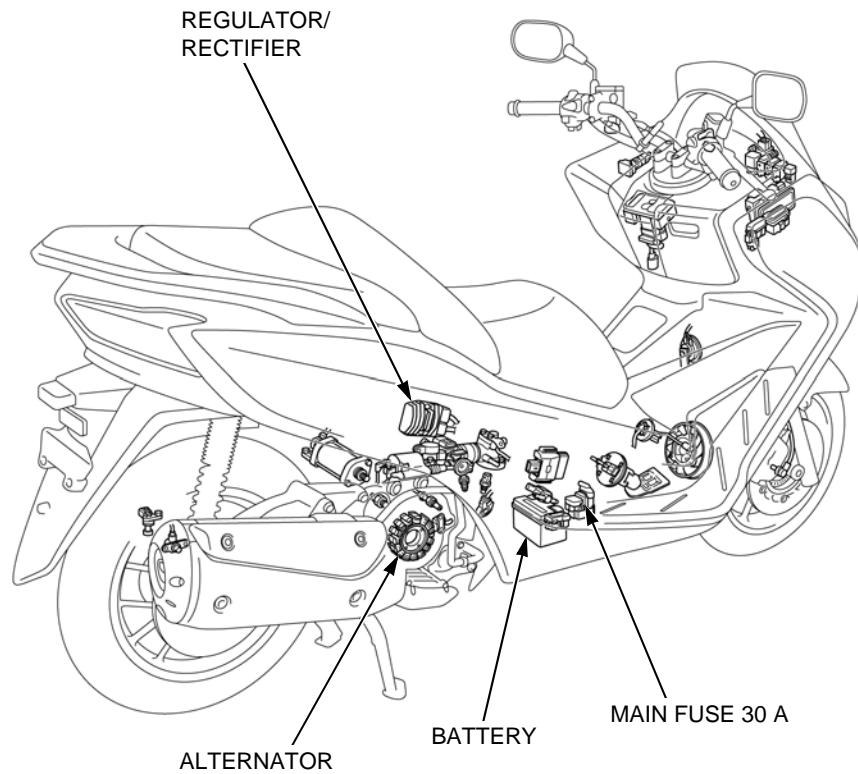
<p>Motorcycle battery analyzer Micro 404XL (U.S.A. only)</p> 	<p>Christie battery charger MC1012/2T (U.S.A. only)</p> 
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TROUBLESHOOTING

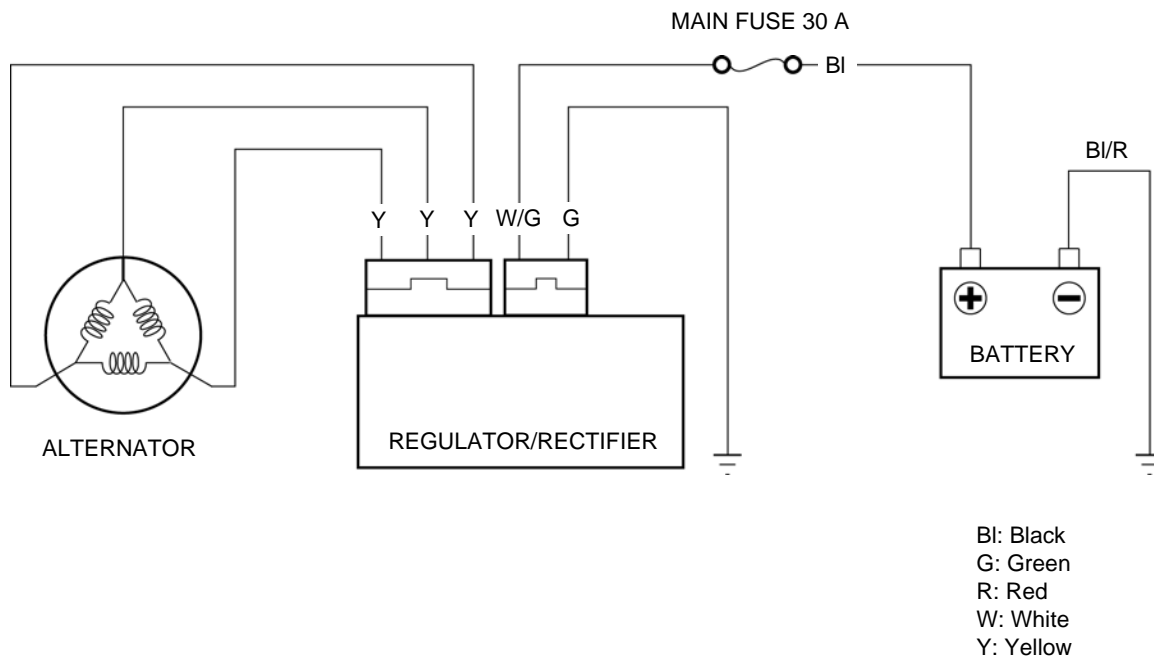
Unusual condition		Probable cause (Check in numerical order)
Battery	Battery is damaged or weak	<div>1. Faulty battery</div> <div>2. Current leakage higher than specified value<ul style="list-style-type: none"><li>– Faulty ignition switch</li><li>– Shorted wire harness</li></ul></div> <div>3. Faulty alternator charging coil</div> <div>4. Faulty regulator/rectifier</div> <div>5. Open circuit or loose connection in the wire harness</div>

## BATTERY/CHARGING SYSTEM

### SYSTEM LOCATION



### SYSTEM DIAGRAM

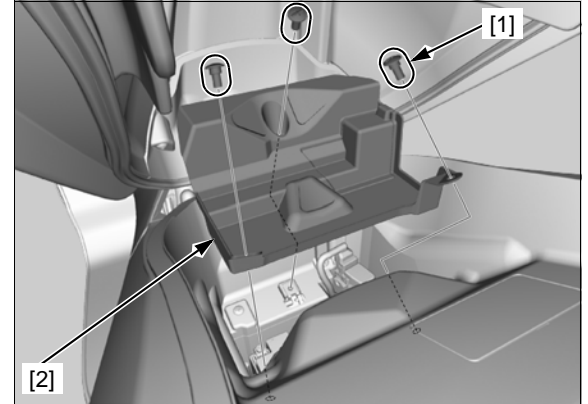


## BATTERY

### REMOVAL/INSTALLATION

Open the seat.

Remove the screws [1] and battery lid [2].



Turn the ignition switch OFF.

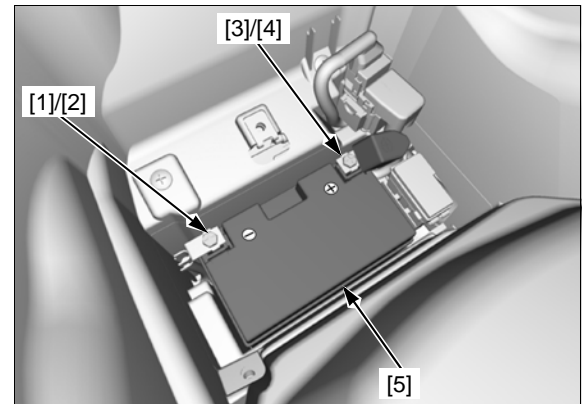
Remove the bolt [1] and disconnect the battery (-) cable [2] from the battery.

Remove the bolt [3] and disconnect the battery (+) cable [4] from the battery.

Remove the battery [5].

*Connect the battery (+) cable first, then the battery (-) cable.*

Installation is in the reverse order of removal.



### VOLTAGE INSPECTION

Remove the battery lid (page 21-5).

Measure the battery voltage using a digital multimeter.

**VOLTAGE (20°C/68°F):**

**YTZ12S:**

**Fully charged: 13.0 – 13.2 V**

**Needs charging: Below 12.4 V**

**FTZ12S:**

**Fully charged: Above 12.8 V**

**Needs charging: Below 12.3 V**



### BATTERY CHARGING (U.S.A. only)

Remove the battery (page 21-5).

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

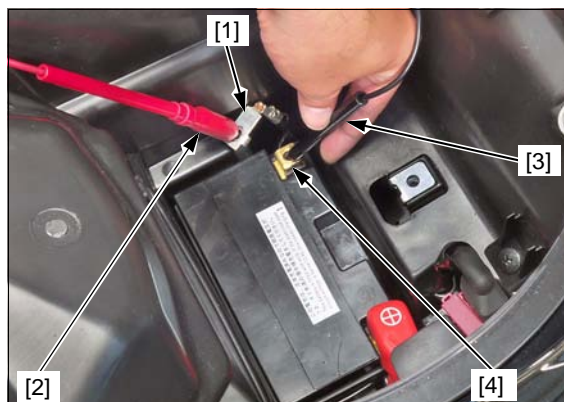
Remove the battery lid (page 21-5).

Turn the ignition switch OFF and disconnect the negative (-) cable [1] from the battery.

Connect the ammeter (+) probe [2] to the battery (-) cable and the ammeter (-) probe [3] to the battery (-) terminal [4].

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 the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow the fuse in the tester.



**SPECIFIED CURRENT LEAKAGE: 0.1 mA max.**

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

#### CHARGING VOLTAGE INSPECTION

- Make sure the battery is in good condition before performing this test.

Remove the battery lid (page 21-5).

Warm up the engine to normal operating temperature. Connect the multimeter between the battery (+) terminal [1] and (-) terminal [2].

- To prevent a short, make absolutely certain which are the (+) and (-) terminals or cable.

With the headlight high beam, measure the charging voltage on the multimeter when the engine runs at 5,000 rpm.

**STANDARD:**

**Measured BV < Measured CV < 15.5 V**

- BV = Battery Voltage
- CV = Charging Voltage



*Do not disconnect the battery or any cable in the charging system without first switching the ignition switch "OFF". Failure to do so can damage the tester or electrical components.*

### ALTERNATOR

#### INSPECTION

Disconnect the alternator 3P (Black) connector [1].

Measure the resistance between each Yellow wire terminals.

**STANDARD: 0.1 – 0.5  $\Omega$  (20°C/68°F)**

Check for continuity between each wire terminal of the alternator/stator side connector and ground. There should be no continuity.

Replace the stator (page 14-6), if the resistance is out of specification, or if any wire has continuity to ground.





## REGULATOR/RECTIFIER

### WIRE HARNESS INSPECTION

Turn the ignition switch OFF.

Remove the right side body cover (page 2-14).

Disconnect the regulator/rectifier 2P (Black) connector [1], and check them for loose contact or corroded terminals.

Check the regulator/rectifier 2P (Black) connector terminals (wire harness side) as follows:

- Measure the voltage between the White/green wire terminal (+) of the 2P (Black) connector and ground (-).  
There should be battery voltage at all times.
- Check for continuity between the Green wire terminal of the 2P (Black) connector and ground.  
There should be continuity at all times.



### REMOVAL/INSTALLATION

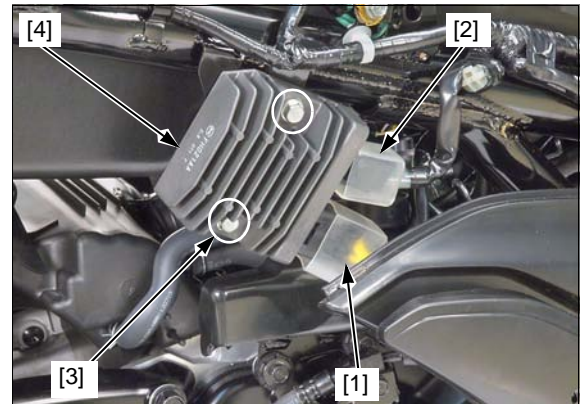
Remove the right side body cover (page 2-14).

Disconnect the following:

- Alternator 3P (Black) connector [1]
- Regulator/rectifier 2P (Black) connector [2]

Remove the mounting bolts [3] and regulator/rectifier [4].

Installation is in the reverse order of removal.





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## MEMO

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## 22. LIGHTS/METERS/SWITCHES

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SERVICE INFORMATION .....	22-2	LID/SEAT OPENER .....	22-17
SYSTEM LOCATION .....	22-3	IGNITION SWITCH .....	22-17
HEADLIGHT .....	22-4	HANDLEBAR SWITCH .....	22-18
FRONT TURN SIGNAL LIGHT .....	22-4	INHIBITOR SWITCH .....	22-18
REAR COMBINATION LIGHT .....	22-5	BRAKE LIGHT SWITCH .....	22-19
LICENSE LIGHT .....	22-6	PARKING BRAKE SWITCH (AC TYPE ONLY) .....	22-19
COMBINATION METER .....	22-6	SIDESTAND SWITCH .....	22-20
SPEEDOMETER/VS SENSOR .....	22-10	MAIN RELAY .....	22-21
TACHOMETER .....	22-12	TURN SIGNAL RELAY .....	22-22
FUEL GAUGE/FUEL LEVEL SENSOR ....	22-13	HORN .....	22-23
COOLANT TEMPERATURE GAUGE/ECT SENSOR .....	22-15	ACCESSORY SOCKET .....	22-24
OIL PRESSURE INDICATOR .....	22-16	HAZARD DIODE (CM TYPE ONLY) .....	22-24

SERVICE INFORMATION

GENERAL

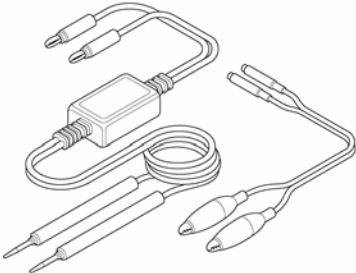
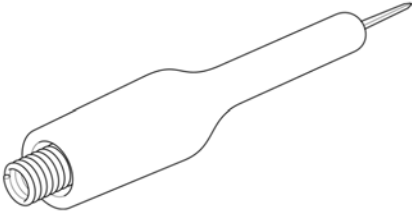
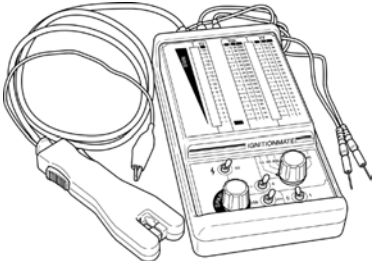
NOTICE

Note the following when replacing the halogen headlight bulb.

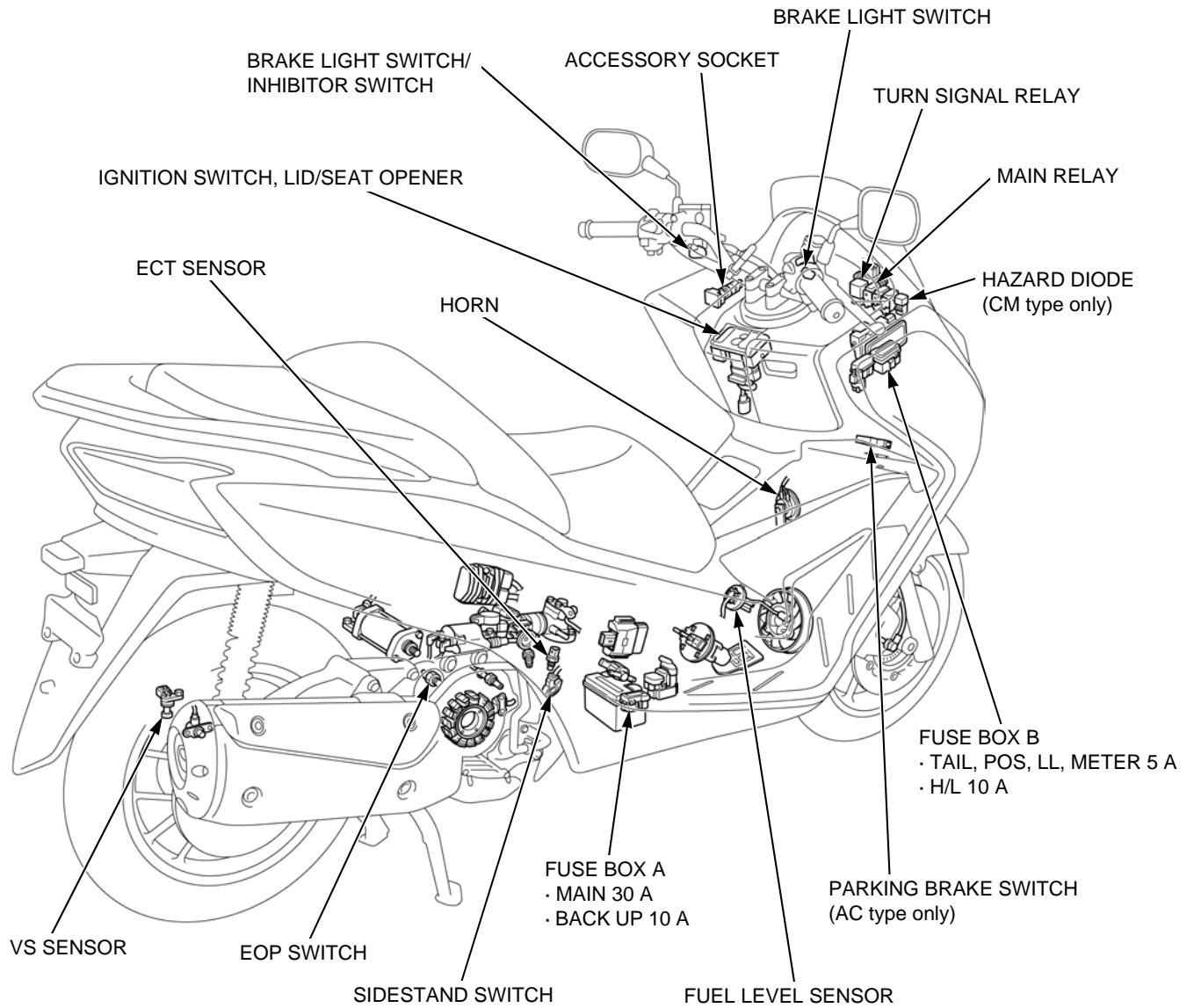
- Wear clean gloves while replacing the headlight bulb. Do not put fingerprints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
- If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
- A halogen headlight 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.
- Be sure to install the dust cover after replacing the headlight bulb.
- Use an electric heating element to heat the water/coolant mixture for the ECT sensor inspection. Keep all 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 scooter.
- The following color codes used are indicated through out this section.

Bu: Blue	Br: Brown	Gr: Gray	P: Pink	R: Red	Y: Yellow
Bl: Black	G: Green	Lb: Light Blue	O: Orange	W: White	

TOOLS

<p>Peak Voltage Adaptor 07HGJ-0020100</p>  <p>with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)</p>	<p>Pin Probe Male (2 pack) 07ZAJ-RDJA110</p> 	<p>IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only)</p> 
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# SYSTEM LOCATION



### HEADLIGHT

- For headlight removal/installation (page 2-11).

#### BULB REPLACEMENT

Disconnect the headlight 3P (White) connector [1].

Remove the dust cover [2].

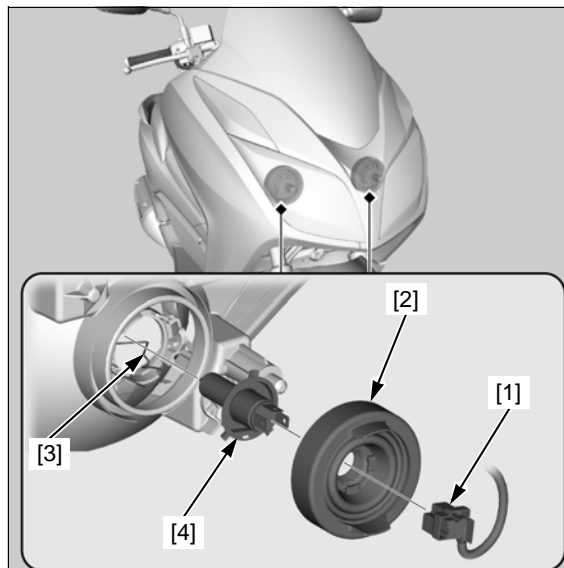
Unhook the bulb retainer [3] and remove the headlight bulb [4].

#### NOTICE

*Avoid touching a new halogen bulb. Finger prints can create hot spots that cause a bulb to break.*

Installation is in the reverse order of removal.

- Align the bulb tabs with the headlight unit grooves properly.



### FRONT TURN SIGNAL LIGHT

- For front turn signal light removal/installation (page 2-11).

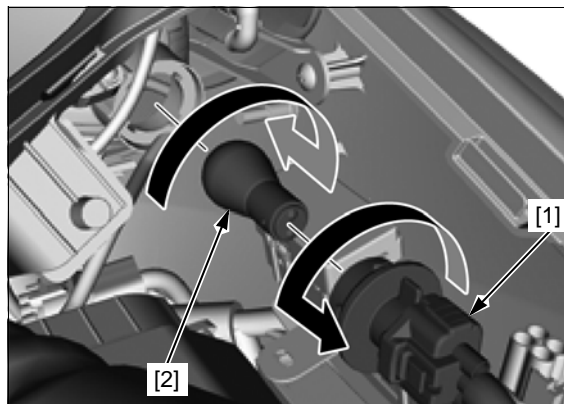
#### BULB REPLACEMENT

Remove the front panel (page 2-12).

Remove the front turn signal light bulb socket [1] by turning it counterclockwise.

While pushing the front turn signal light bulb [2] in, turn it counterclockwise to remove it, and replace it with a new one.

Installation is in the reverse order of removal.



## REAR COMBINATION LIGHT

- For rear combination light removal/installation (page 2-22).

### BULB REPLACEMENT

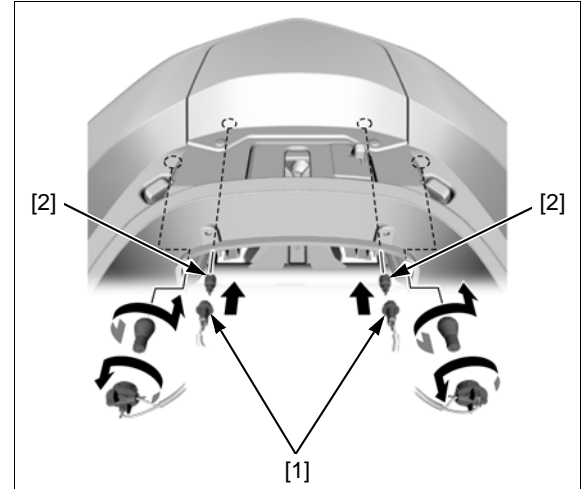
#### BRAKE LIGHT

Remove the tool box (page 2-21).

Remove the brake light bulb socket [1] by turning it counterclockwise.

Remove the brake light bulb [2] from the socket, replace it with a new one.

Installation is in the reverse order of removal.



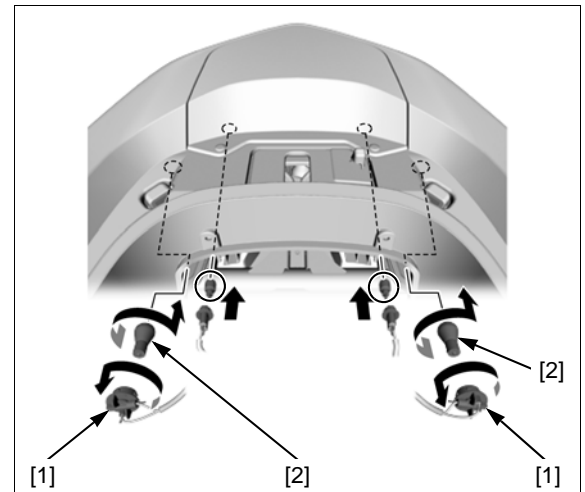
#### REAR TURN SIGNAL LIGHT

Remove the tool box (page 2-21).

Remove the rear turn signal light bulb socket [1] by turning it counterclockwise.

While pushing the rear turn signal light bulb [2] in, turn it counterclockwise to remove it, and replace it with a new one.

Installation is in the reverse order of removal.



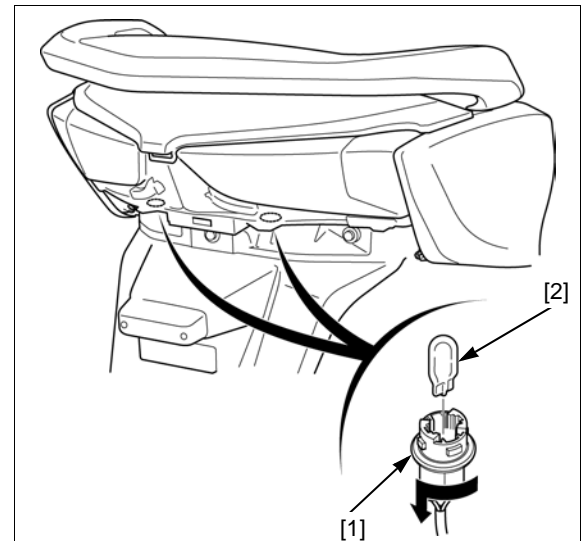
#### TAIL LIGHT

Remove the rear body lower cover (page 2-23).

Remove the bulb socket [1] by turning it counterclockwise.

Remove the tail light bulb [2] from the socket, and replace it with a new one.

Installation is in the reverse order of removal.



### LICENSE LIGHT

- For license light removal/installation (page 2-24).

#### BULB REPLACEMENT

Remove the license light cover screws [1] and lens cover [2].

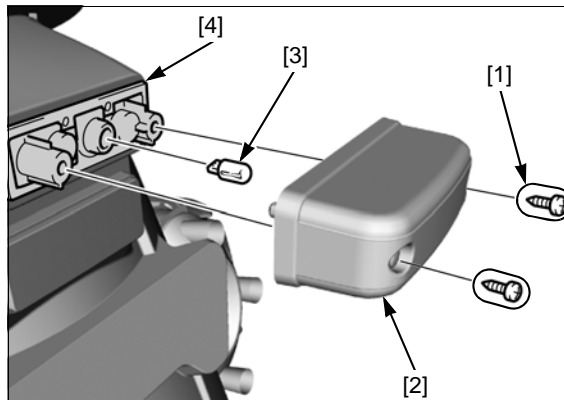
Remove the license light bulb [3] from the license light base, replace it with a new one.

Check the packing [4] is installed in position and is in good condition, replace it with a new one if necessary.

Installation is in the reverse order of removal.

- When installing the license light cover, tighten the screws to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**



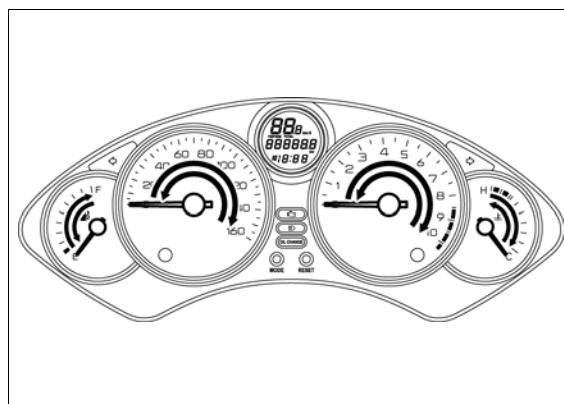
### COMBINATION METER

#### METER INSPECTION

##### INITIAL FUNCTION

Turn the ignition switch ON, and check that the speedometer, tachometer, fuel gauge and coolant temperature gauge needles move to full scale and then return to zero.

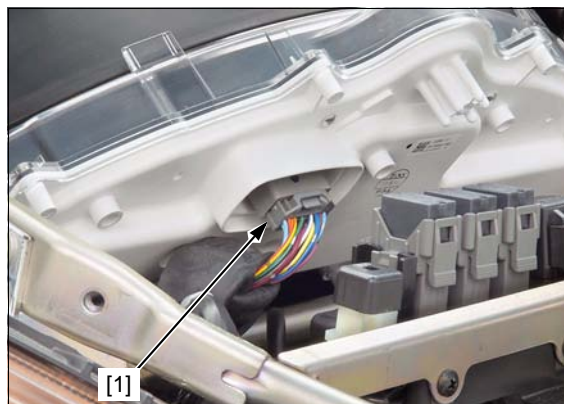
If the all needles does not move, perform the power and ground line inspection of the combination meter (page 22-6).



##### POWER/GROUND LINE INSPECTION

Remove the front meter panel (page 2-4).

Perform the following inspections with the combination meter 20P (Gray) connector [1] connected.





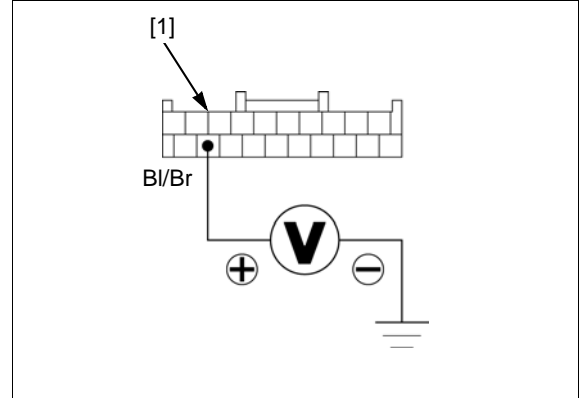
### POWER INPUT LINE

Measure the voltage between the combination meter 20P (Gray) connector [1] and ground.

**CONNECTION: Black/brown (+) – Ground (–)**

There should be battery voltage with the ignition switch ON.

If there is no voltage, check the sub fuse 5 A (TAIL, POS, LL, METER), open circuit in the Black/brown wire and a loose connection.



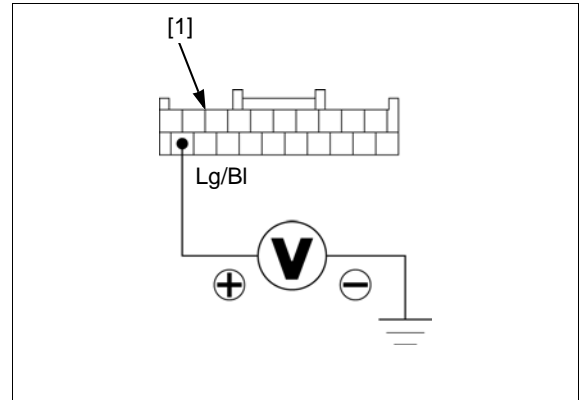
### BACKUP LINE

Measure the voltage between the combination meter 20P (Gray) connector [1] and ground.

**CONNECTION: Light green/black (+) – Ground (–)**

There should be battery voltage.

If there is no voltage, check the sub fuse 10 A (BACK UP), open circuit in the Light green/black wire and a loose connection.



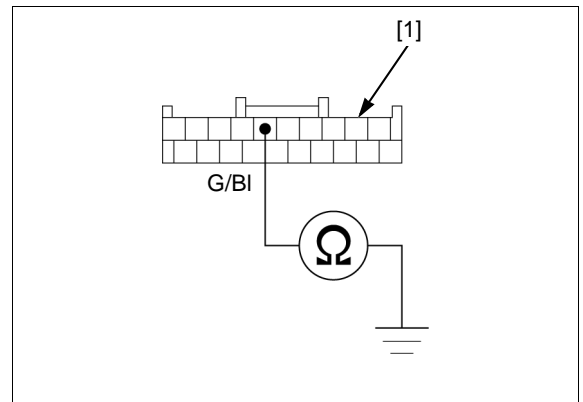
### GROUND LINE

Check for continuity between the combination meter 20P (Gray) connector [1] and ground.

**CONNECTION: Green/black – Ground**

There should be continuity.

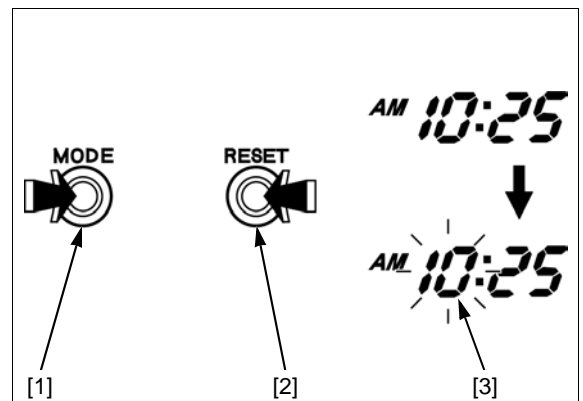
If there is no continuity, check for an open circuit in Green/black wire.



### DIGITAL CLOCK ADJUSTMENT

Turn the ignition switch ON.

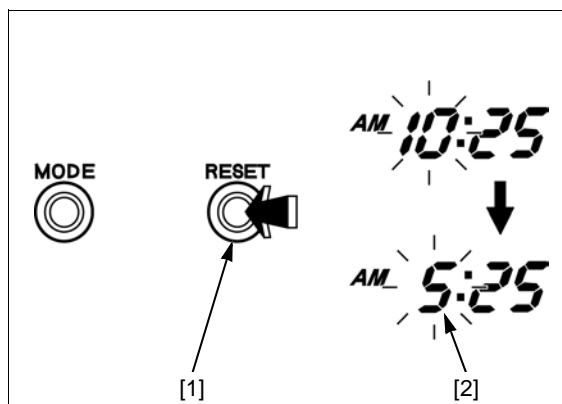
Push and hold both the "MODE" button [1] and "RESET" button [2] until the hour digits [3] start blinking.



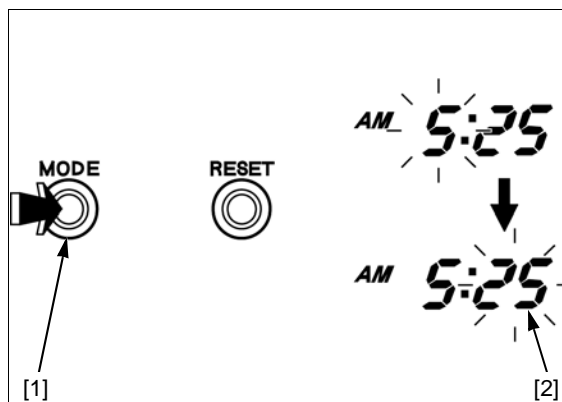
## LIGHTS/METERS/SWITCHES

Push the "RESET" button [1] until the desired hour [2] and AM/PM are displayed.

- Push and hold to advance the hour fast.



Push the "MODE" button [1], then the minute digits [2] start blinking.

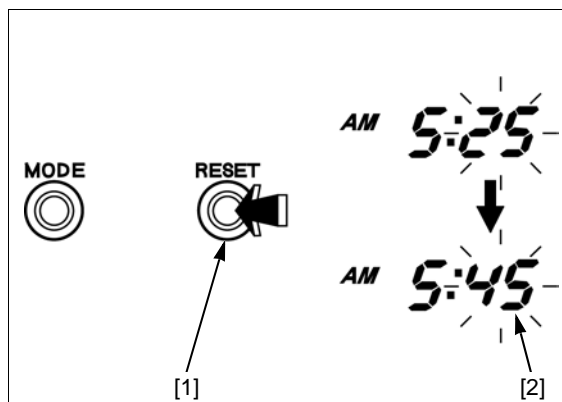


Push the "RESET" button [1] until the desired minute [2] is displayed.

- Push and hold to advance the minute fast.

Push the "MODE" button, then digital clock is set.

- The time can also be set by turning the ignition switch OFF.



## REMOVAL/INSTALLATION

Remove the meter panel (page 2-13).

Remove the combination meter mounting screws [1] and combination meter [2].

Installation is in the reverse order of removal.

### TORQUE:

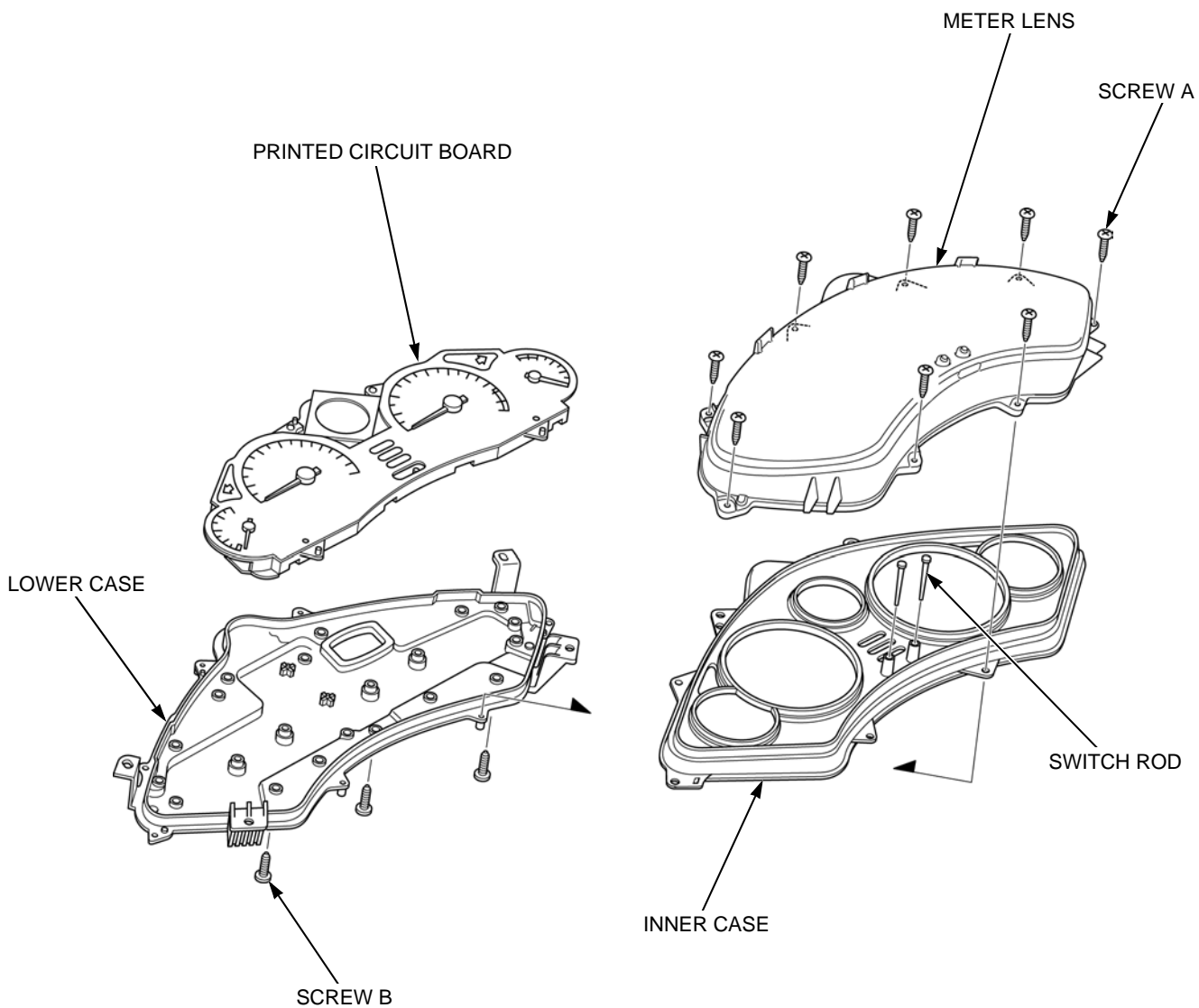
**Combination meter mounting screw:**  
1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)



## DISASSEMBLY/ASSEMBLY

Remove the combination meter (page 22-8).

Disassemble and assemble the combination meter as shown in the illustration.



## SPEEDOMETER/VS SENSOR

### SYSTEM INSPECTION

Check the combination meter initial function (page 22-6).

If the speedometer needle shows initial function but speedometer operate abnormally at running, check the following:

Support the scooter on its centerstand to rise the rear wheel off the ground.

Turn the ignition switch ON.

Measure the output voltage (sensor signal) between the combination meter 20P (Gray) connector [1] terminal with the connector connected and ground then while slowly turning the rear wheel by your hand.

**CONNECTION: Pink/green (+) – Ground (–)**

**STANDARD: Repeat 0 to 5 V**

If the pulse voltage appears, but the speedometer operate abnormally, replace the printed circuit board (page 22-9).

If the pulse voltage does not appear, check the following:

- Power input voltage (page 22-10)
- Output line open or short circuit (page 22-10)

If power input/output line are normal, replace the VS sensor (page 22-11).

### POWER INPUT VOLTAGE INSPECTION

Turn the ignition switch OFF.

Disconnect the VS sensor 3P (Black) connector [1] (page 22-11).

Check for loose or poor contact of the VS sensor 3P (Black) connector.

Turn the ignition switch ON.

Measure the voltage at the VS sensor 3P (Black) connector of the wire harness side.

**CONNECTION: Yellow/red (+) – Green/black (–)**

**STANDARD: About 5 V**

If there is no voltage, check for open or short circuit in Yellow/red or an open circuit in Green/black wire.

### OUTPUT LINE INSPECTION

#### OUTPUT LINE OPEN CIRCUIT INSPECTION

Turn the ignition switch OFF.

Disconnect the VS sensor 3P (Black) connector [1] (page 22-11).

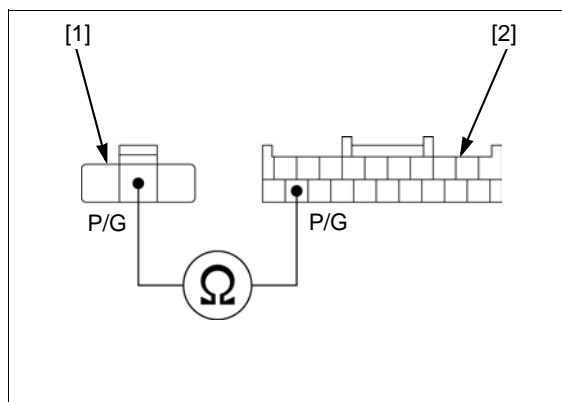
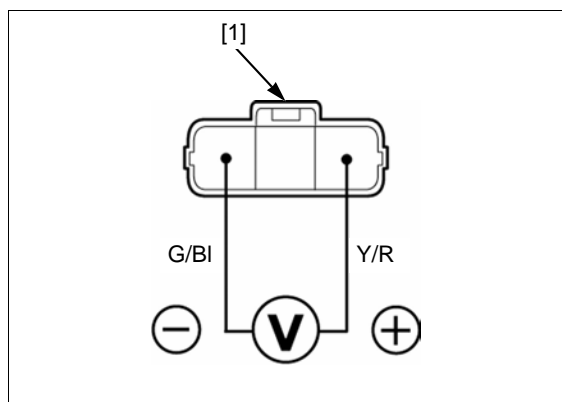
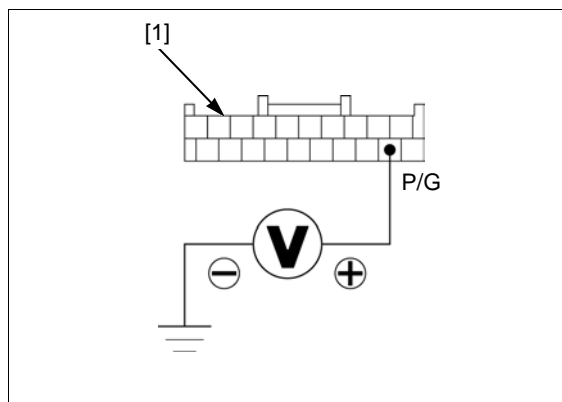
Disconnect the combination meter 20P (Gray) connector [2] (page 22-6).

Check for continuity between the VS sensor 3P (Black) connector and combination meter 20P (Gray) connector of the wire harness side.

**CONNECTION: Pink/green – Pink/green**

There should be continuity.

If there is no continuity, repair the Pink/green wire.



### OUTPUT LINE SHORT CIRCUIT INSPECTION

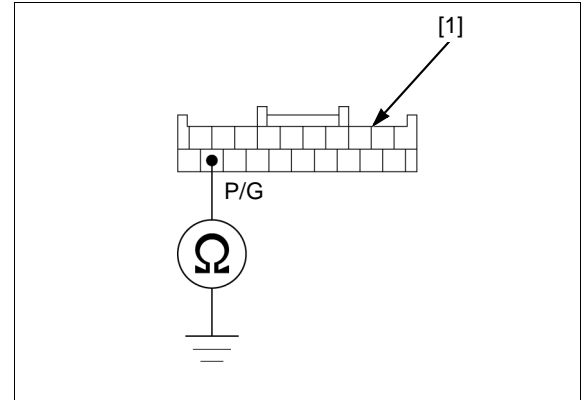
Disconnect the combination meter 20P (Gray) connector [1] (page 22-6).

Check for continuity between the combination meter 20P (Gray) connector of the wire harness side and ground.

#### CONNECTION: Pink/green (+) – Ground (–)

There should be no continuity.

If there is continuity, check for short circuit in Pink/green wire.



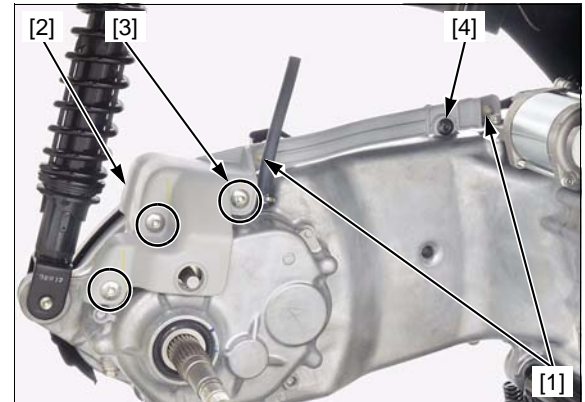
### REMOVAL/INSTALLATION

Remove the following:

- Air cleaner housing (page 7-13)
- Rear wheel (page 18-5)

Release the wire clamps [1] from the sensor protector [2].

Remove the speed sensor protector socket bolts A [3] and B [4], and sensor protector.



Disconnect the VS sensor 3P (Black) connector [1].

Remove the bolt [2] and VS sensor [3].

Remove the O-ring [4] and replace it with a new one.

Installation is in the reverse order of removal.

- Coat a new O-ring with engine oil.
- Route the wire harness properly (page 1-18).
- Replace the speed sensor protector socket bolts A [5] and B [6] with new ones.

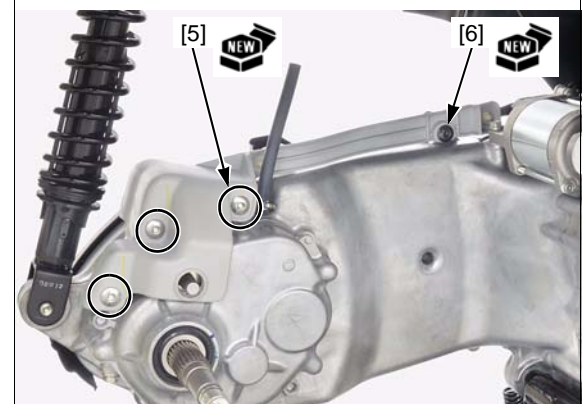
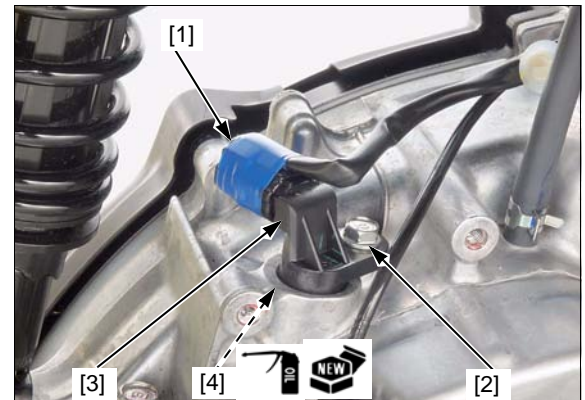
#### TORQUE:

**Speed sensor protector socket bolt A:**

10 N·m (1.0 kgf·m, 7 lbf·ft)

**Speed sensor protector socket bolt B:**

10 N·m (1.0 kgf·m, 7 lbf·ft)



# TACHOMETER

## SYSTEM INSPECTION

### Tachometer gauge does not move

Check the combination meter initial function (page 22-6).

If the tachometer needle shows initial function but tachometer operate abnormally at running, check the following.

Disconnect the combination meter 20P (Gray) connector [1] (page 22-6).

Connect a peak voltage tester or adaptor [2] to the terminal of the combination meter 20P (Gray) connector and ground.

### 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 $\Omega$ /DCV minimum)

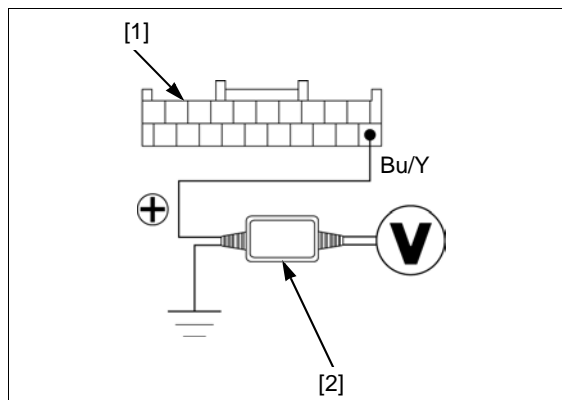
### CONNECTION: Blue/yellow (+) – Ground (–)

Start the engine and measure the tachometer input peak voltage.

### PEAK VOLTAGE: 11.0 V minimum

If the peak voltage is normal, replace the printed circuit board (page 22-9).

If the measured value is below 11.0 V, replace the ECM (page 4-31).



Disconnect the ECM 33P (Black) connector [1] (page 4-31).

If the value is 0 V, check for continuity between the combination meter 20P (Gray) connector [2] and ECM 33P (Black) connector at the wire harness side.

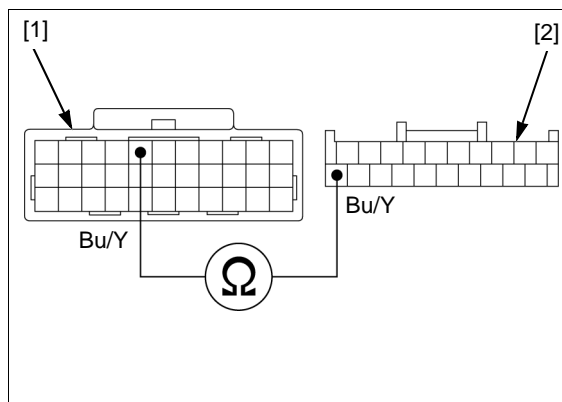
### TOOL:

**Pin Probe Male (2 pack)** 07ZAJ-RDJA110

### CONNECTION: Blue/yellow – Blue/yellow

There should be continuity.

If there is continuity replace the ECM (page 4-31).



## FUEL GAUGE/FUEL LEVEL SENSOR

### CIRCUIT INSPECTION

**Fuel gauge does not move with the fuel tank at full of tank**

Check the combination meter initial function (page 22-6).

If the fuel gauge needle shows initial function but fuel gauge does not move with the fuel tank at about full, check the following.

Remove the luggage box (page 2-21).

Disconnect the fuel level sensor 3P connector [1] (page 22-13).

Short the connector terminals of the wire harness side with a jumper wire [2].

**CONNECTION: Yellow/white – Green/black**

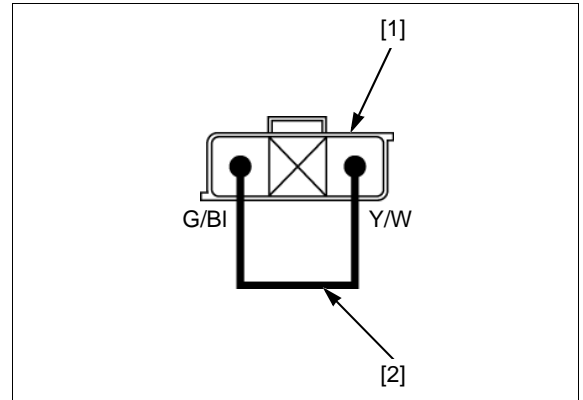
*Do not leave the terminals connected with jumper wire for a long time, as it causes damage to the fuel gauge.*

Turn the ignition switch ON, check if the fuel gauge needle moves to "F".

If the needle moves, the system is normal.

In that case, check the fuel level sensor (page 22-13).

- If the needle does not move, check the following:
  - Yellow/white wire between the fuel level sensor and combination meter for open circuit
  - Green/black wire between the fuel level sensor and ground for open circuit
- If the wires are normal, replace the printed circuit board with a new one, and recheck.



### FUEL LEVEL SENSOR INSPECTION

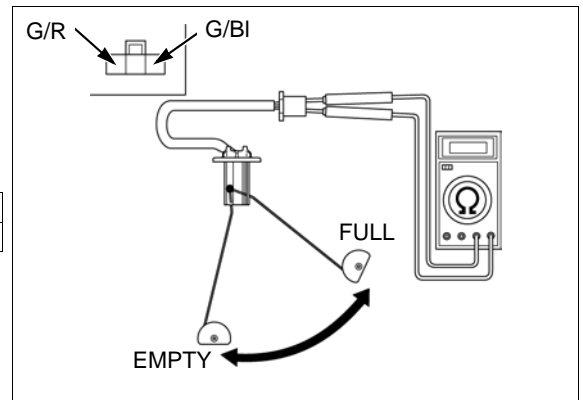
Remove the fuel level sensor (page 22-13).

Measure the resistance between the connector terminals with the float at upper (full) and lower (empty) positions.

**CONNECTION: Green/red – Green/black**

FLOAT POSITION	FULL	EMPTY
RESISTANCE	8 – 12 $\Omega$	265 – 275 $\Omega$

Replace the fuel level sensor if the resistance is out of specification.



### REMOVAL

Remove the following:

- Luggage box (page 2-21)
- Battery (page 21-5)

Disconnect the fuel level sensor 3P connector [1].



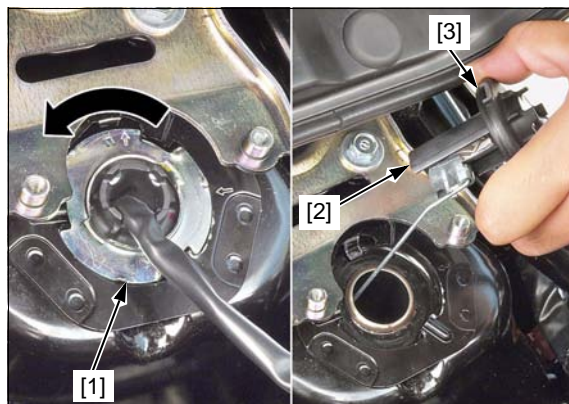


## LIGHTS/METERS/SWITCHES

Turn the fuel unit holder plate [1] counterclockwise with a pair of needle nose pliers and remove it.

*Be careful not to damage the float arm.*

Remove the fuel level sensor [2] and O-ring [3].



## INSTALLATION

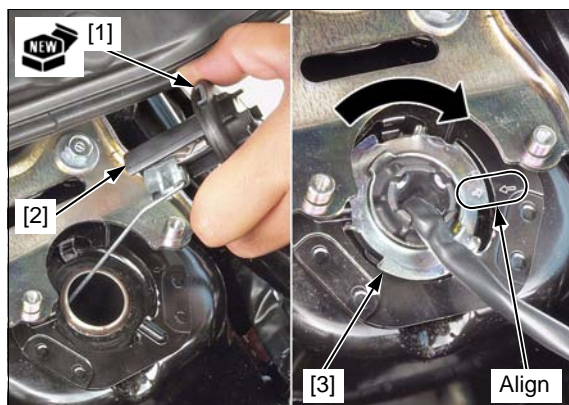
Install a new O-ring [1] to the fuel level sensor [2].

*Be careful not to damage the float arm.*

Install the fuel level sensor as shown.

Set the fuel unit holder plate [3] as shown.

Turn the holder plate clockwise until the arrow marks on the holder plate and the fuel tank are aligned.



Connect the fuel level sensor 3P connector [1].

Install the following:

- Luggage box (page 2-21)
- Battery (page 21-5)



## COOLANT TEMPERATURE GAUGE/ ECT SENSOR

### CIRCUIT INSPECTION

**When engine is hot but gauge needle does not move**

Check the combination meter initial function (page 22-6).

If the coolant temperature gauge needle shows initial function but coolant temperature gauge does not move when engine is hot, check the following.

Remove the luggage box (page 2-21).

*Disconnect the ECM connector or failure code will be stored in ECM.*

Disconnect the ECM 33P (Black) connector (page 4-31).

Disconnect the ECT sensor 3P (Gray) connector [1].

Ground the wire harness side connector terminal with a jumper wire.

**CONNECTION: Green/blue – Ground**

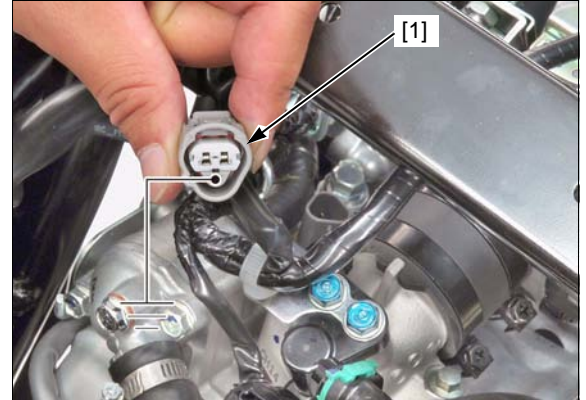
*Do not leave the terminal connected with jumper wire for a long time, as it causes damage to the coolant temperature gauge.*

Turn the ignition switch ON, and check the coolant temperature gauge needle moves to "H".

If the needle moves, the system is normal.

In that case, check the ECT sensor (page 22-15).

- If the needle does not move, check the Green/blue wire between the ECT sensor and combination meter for an open circuit.
- If the wire is normal, replace the printed circuit board with a new one, and recheck.



### ECT SENSOR INSPECTION

Remove the ECT sensor (page 4-33).

Suspend the ECT sensor [1] in a pan of coolant (1:1 mixture) on an electric heating element and measure the resistance between the ECT sensor terminal and body as the coolant heats up.

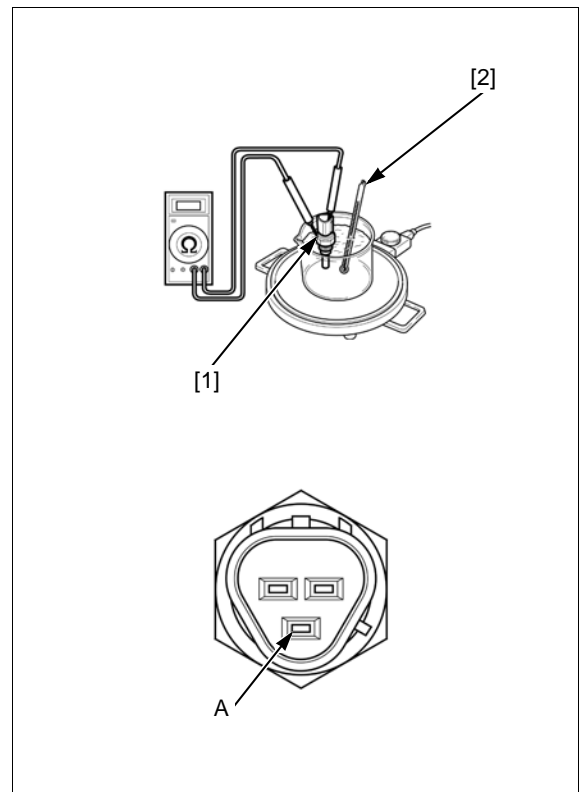
- Dip the ECT sensor in coolant up to its threads while keeping the distance at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect reading. Do not let the thermometer [2] or ECT sensor touch the pan.

Measure the resistance between the ECT sensor terminal and thread.

**CONNECTION: A – Ground**

Temperature	50°C (122°F)	80°C (176°F)
Resistance	6.8 – 7.4 kΩ	2.1 – 2.6 kΩ

- If the resistance is out of above range by 10% at any temperature listed, replace the ECT sensor.



## OIL PRESSURE INDICATOR

### INSPECTION

#### Indicator does not come on with the ignition switch turned ON

Check the combination meter initial function (page 22-6).

If the combination meter show initial functions but oil pressure indicator does not come on, check the following.

Slide the rubber cap [1], and disconnect the EOP switch wire [2] by removing the terminal screw [3].

Ground the wire terminal.

Turn the ignition switch ON and check the oil pressure indicator.

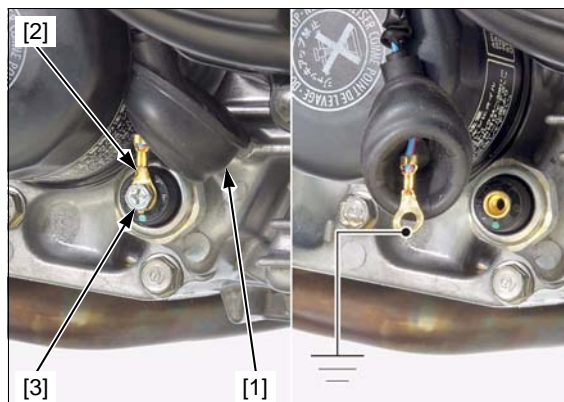
- If the indicator comes on, replace the EOP switch.
- If the indicator does not come on, check for an open circuit in the Blue/red wire. If the wire is OK, replace the printed circuit board (page 22-9).

Installation is in the reverse order of removal.

#### TORQUE:

**EOP switch terminal screw:**

**1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)**



#### Indicator stays on while the engine is running

Slide the rubber cap [1], and disconnect the EOP switch wire [2] by removing the terminal screw [3].

Check for continuity between the wire terminal and ground.

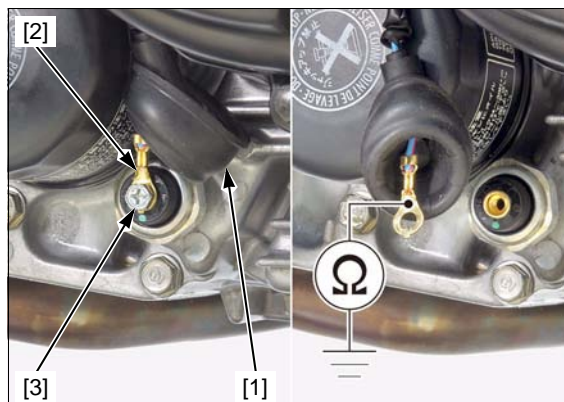
- If there is continuity, repair a short circuit in the Blue/red wire.
- If there is no continuity, check the oil pressure (page 8-5).  
If the oil pressure is normal, replace the EOP switch.

Installation is in the reverse order of removal.

#### TORQUE:

**EOP switch terminal screw:**

**1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)**

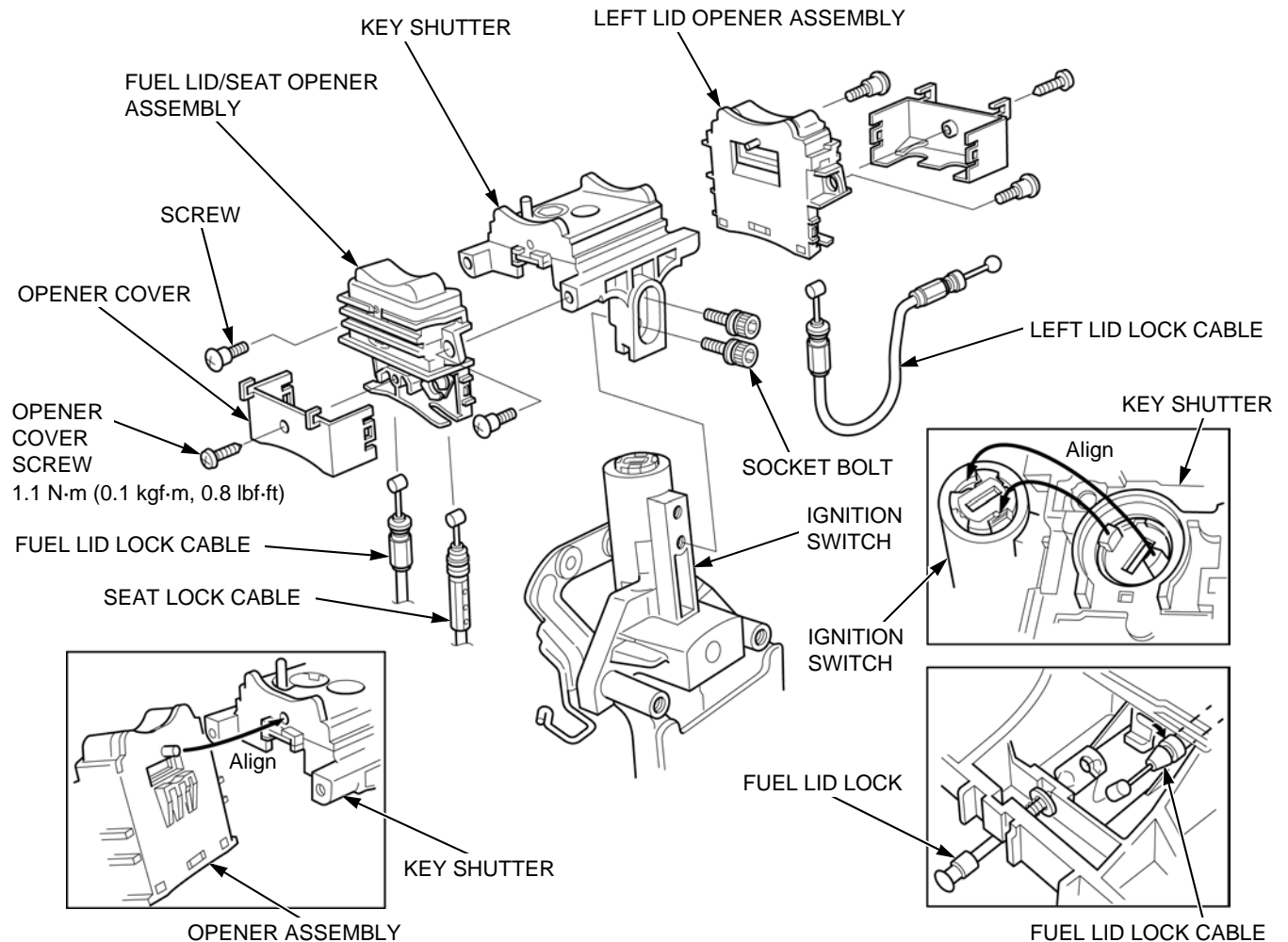


## LID/SEAT OPENER

### REMOVAL/INSTALLATION

Remove the inner cover (page 2-17).

Remove and install the lid/seat opener as shown in the illustration.



## IGNITION SWITCH

### INSPECTION

Remove the inner cover (page 2-17).

Disconnect the ignition switch 4P connector [1].

Check for continuity between the switch side connector terminals in each switch position according to the chart (page 23-2).





## LIGHTS/METERS/SWITCHES

### REMOVAL/INSTALLATION

Remove the key shutter (page 22-17).

Disconnect the ignition switch 4P connector [1].

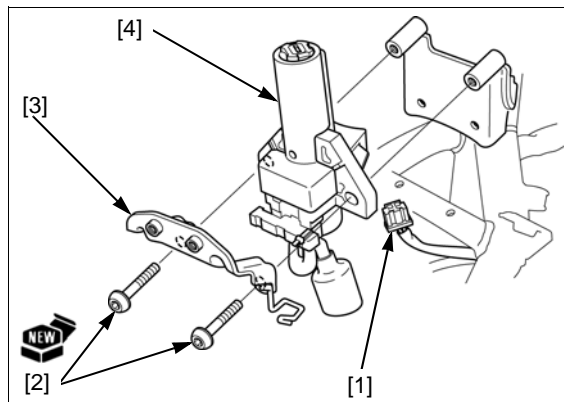
Remove the ignition switch mounting bolts [2], Inner cover stay [3] and ignition switch [4].

- Use a drill or an equivalent tool when removing the ignition switch mounting bolts.

*Route the wires and cables properly (page 1-18).*

Installation is in the reverse order of removal.

- Replace the ignition switch mounting bolts with new ones.

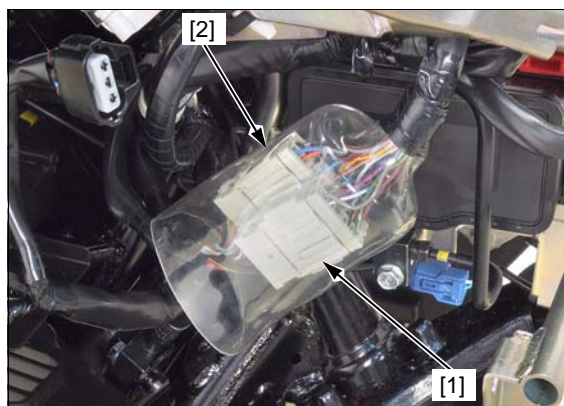


### HANDLEBAR SWITCH

Remove the front cover (page 2-10).

Disconnect the right handlebar switch 10P (Gray) connector [1] and left handlebar switch 14P (Gray) connector [2].

Check for continuity between the switch side connector terminals in each switch position according to the chart (page 23-2).



### INHIBITOR SWITCH

Disconnect the inhibitor switch connectors.

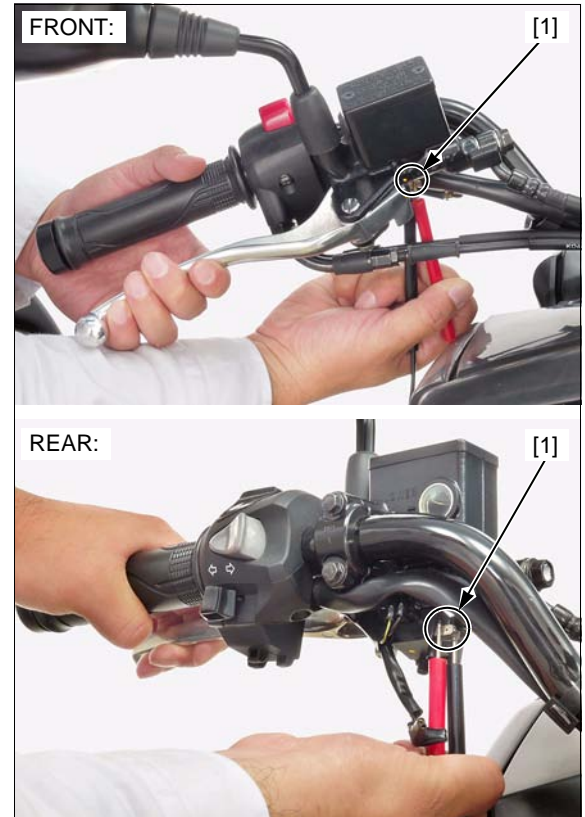
Check for continuity between the switch terminals [1]. There should be continuity with the left brake lever squeezed, and there should be no continuity when the brake lever is released.



## BRAKE LIGHT SWITCH

Disconnect the brake light switch connectors [1].

Check for continuity between the switch terminals. There should be continuity with the brake lever squeezed, and there should be no continuity when the brake lever is released.



## PARKING BRAKE SWITCH (AC TYPE ONLY)

Remove the parking brake lever link cover (page 18-11).

Remove the front cover (page 2-10).

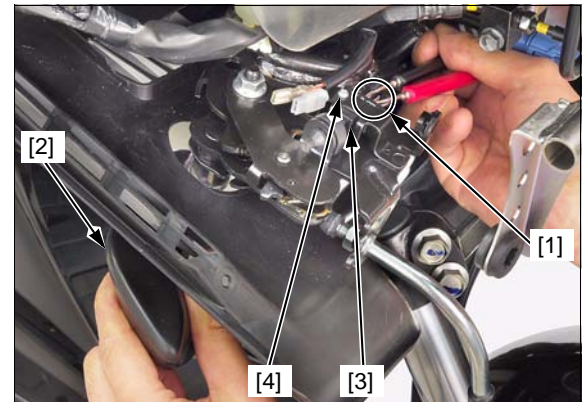
Disconnect the parking brake switch connectors [1].

Check for continuity between the switch terminals. There should be continuity with the parking brake lever [2] pulled, and there should be continuity when the parking brake lever is released.

If there is no continuity, replace the parking brake switch [3].

- When installing the parking brake switch, tighten the parking brake switch screw [4] to the specified torque.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**



### SIDESTAND SWITCH

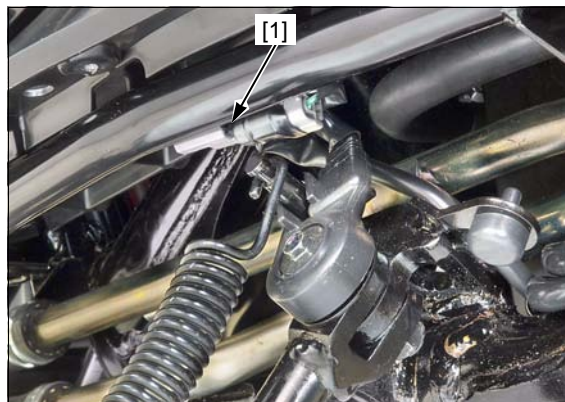
#### INSPECTION

Remove the left floor skirt (page 2-6).

Disconnect the sidestand switch 2P (Gray) connector [1].

Check for continuity between the switch side connector terminals.

There should be continuity with the sidestand retracted and no continuity with the sidestand lowered.



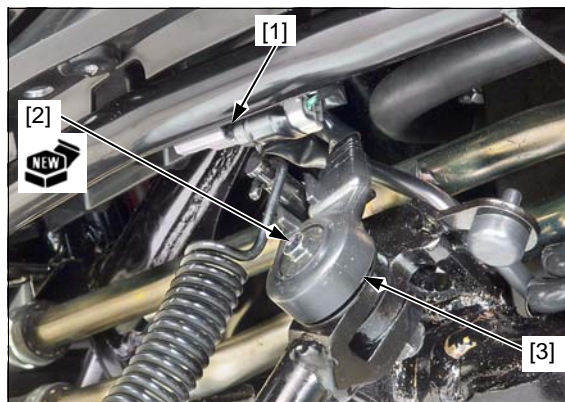
#### REMOVAL/INSTALLATION

Remove the left floor skirt (page 2-6).

Support the scooter on its centerstand.

Disconnect the sidestand switch 2P (Gray) connector [1].

Remove the bolt [2] and sidestand switch [3].



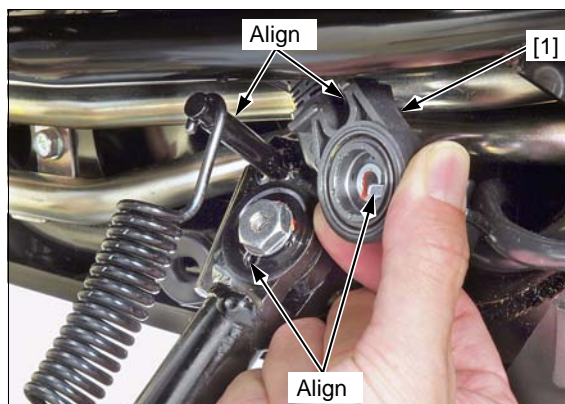
Install the sidestand switch [1] by aligning its pin with the sidestand hole and its groove with the return spring pin.

Install and tighten a new bolt to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

*Route the sidestand switch wire properly (page 1-18).*

Install the removed parts in the reverse order of removal.





## MAIN RELAY

### COIL LINE INSPECTION

Turn the ignition switch OFF.

Remove the main relay (page 22-22).

Turn the ignition switch ON.

Measure the voltage between the relay connector [1] terminal of the wire harness side and ground.

**CONNECTION: Black/white (+) – Ground (–)**

If the battery voltage does not appear, inspect the open circuit in Black/white wire between the ignition switch and main relay coil line side.

If the battery voltage appears, the main relay coil input voltage line is normal.

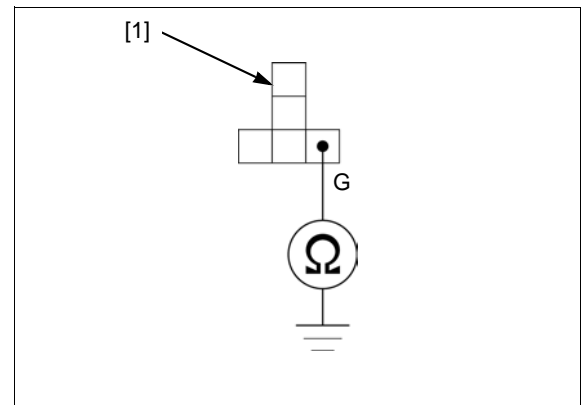
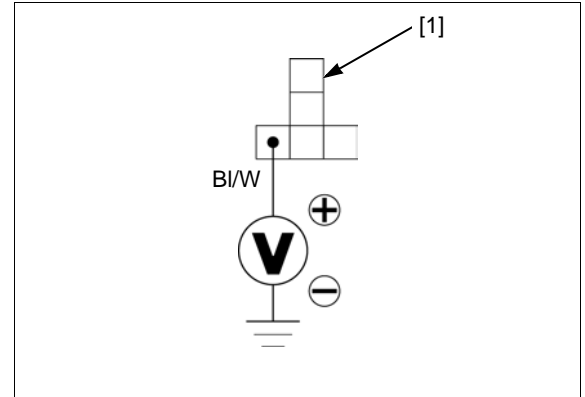
Turn the ignition switch OFF.

Check for continuity between the relay connector [1] terminal of the wire harness side and ground.

**CONNECTION: Green – Ground**

There should be continuity at all times.

If there is no continuity, repair the Green wire.



### SWITCH LINE INSPECTION

Turn the ignition switch OFF.

Remove the main relay (page 22-22).

Disconnect the sub fuse 10 A (H/L) from the fuse box B [1].

Short the relay connector [2] terminals of the wire harness side with a jumper wire [3].

**CONNECTION: Red/blue – Blue/black**

Measure the voltage between the fuse box B terminal connector of the wire harness side and ground.

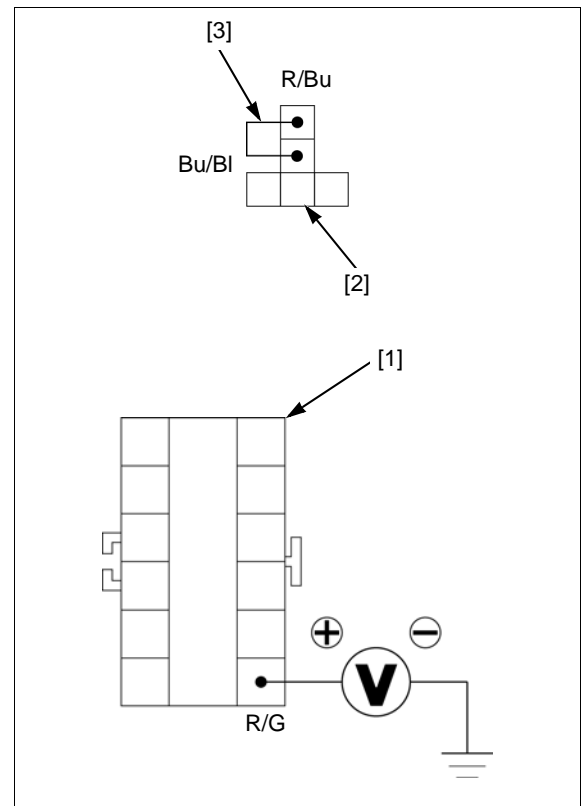
**CONNECTION: Red/green (+) – Ground (–)**

If the battery voltage appears, the main relay switch line is normal.

Inspect the main relay function test (page 22-22).

If the battery voltage does not appear, inspect the following:

- Open circuit in Red/green wire between the fuse box A and battery
- Blown sub fuse 30 A (MAIN)
- Open circuit in Blue/black wire between the main relay and fuse box A
- Open circuit in Red/blue wire between the main relay and fuse box B



### FUNCTION TEST

Turn the ignition switch OFF.

Remove the main relay [1] (page 22-22).

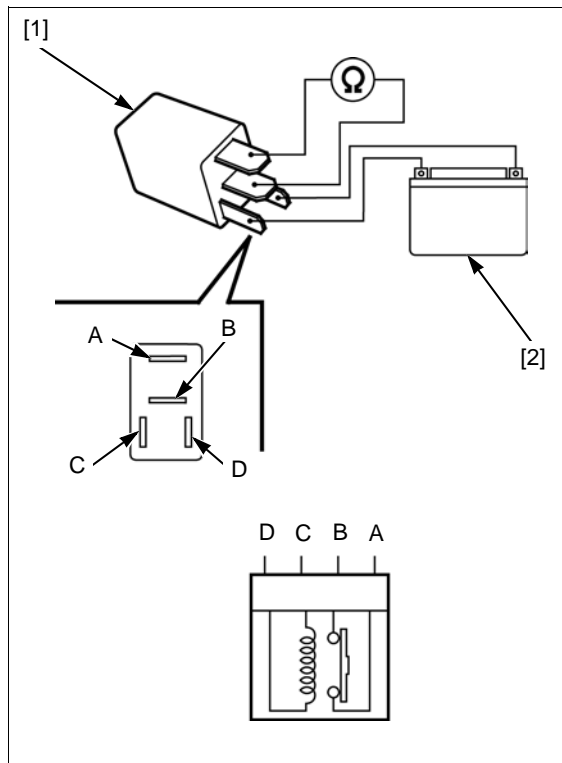
Connect an ohmmeter to the switching side relay terminals.

#### CONNECTION: A – B

Connect a 12 V battery [2] to the coil side relay terminals.

#### CONNECTION: C (+) – D (–)

There should be continuity while the battery is connected and no continuity when the battery is disconnected.

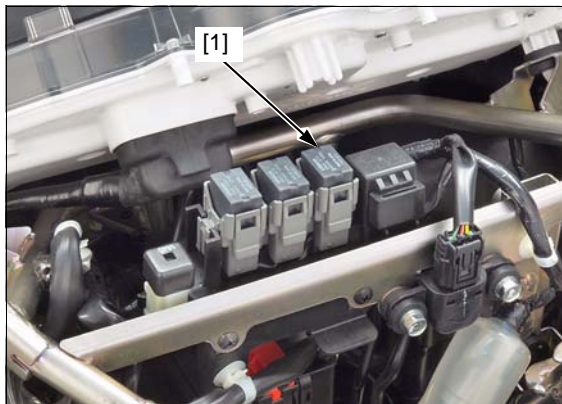


### REMOVAL/INSTALLATION

Remove the front meter panel (page 2-4).

Remove the main relay [1] from the relay connector.

Installation is in the reverse order of removal.



## TURN SIGNAL RELAY

### INSPECTION

#### All turn signal lights does not blink

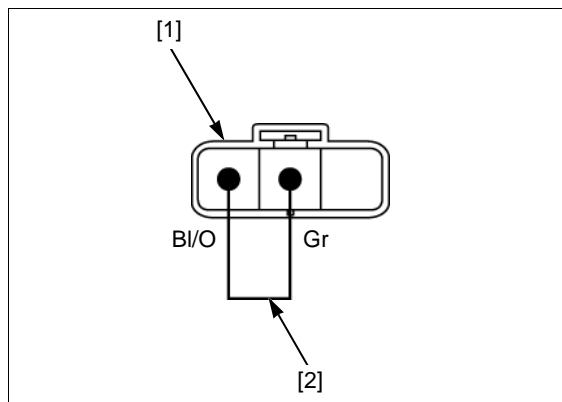
Remove the turn signal relay (page 22-23).

Short the relay connector [1] terminals of the wire harness side with a jumper wire [2].

#### CONNECTION: Black/orange – Gray

Turn the ignition switch ON and check the turn signal lights by operating the turn signal switch.

- If the light does not come on, check for an open circuit in the Black/orange and Gray wires.
- If the light comes on, check for open circuit in the Green wire. If it is OK, replace the relay.



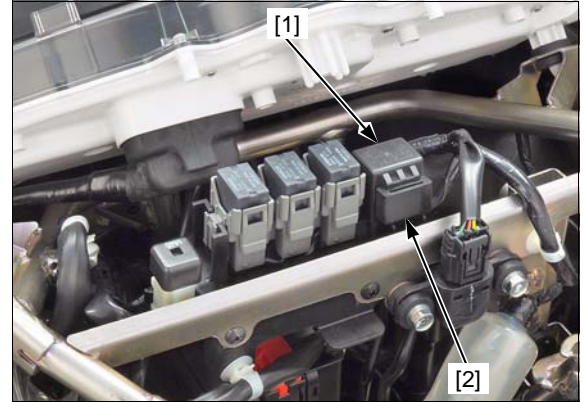
## REMOVAL/INSTALLATION

Remove the front meter panel (page 2-4).

Remove the turn signal relay [1] from the relay holder [2].

Disconnect the turn signal relay from the relay connector.

Installation is in the reverse order of removal.



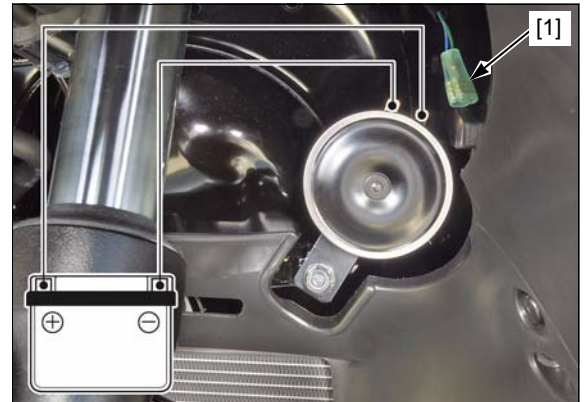
## HORN

### INSPECTION

Disconnect the horn connectors [1] from the horn.

Connect a 12 V battery to the horn terminals.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



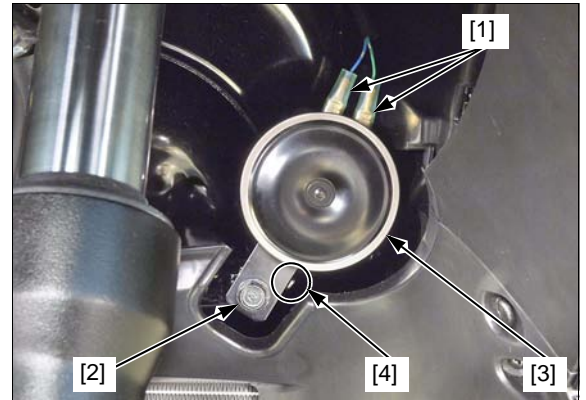
### REMOVAL/INSTALLATION

Disconnect the horn connectors [1].

Remove the bolt [2] and horn [3].

Installation is in the reverse order of removal.

- Be sure to rest the horn against the tab [4].



## ACCESSORY SOCKET

### INSPECTION

Remove the front cover (page 2-10).

Slide the connector cover [1], and disconnect the accessory socket 2P connector [2].

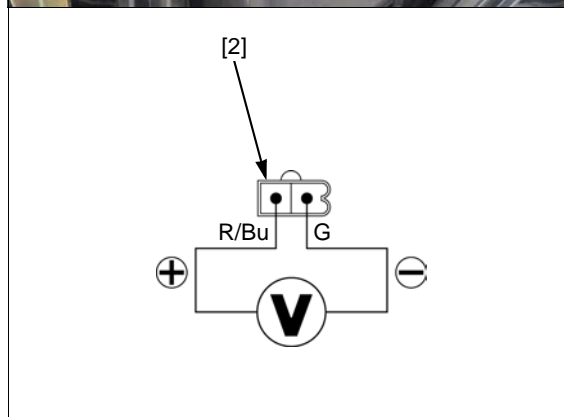
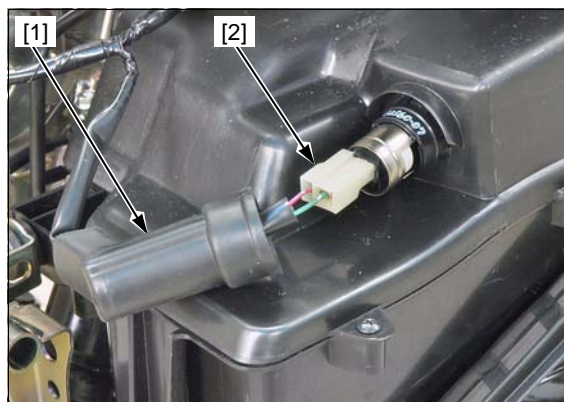
Turn the ignition switch ON and measure the voltage at the accessory socket 2P connector of the wire harness side.

**CONNECTION: Red/blue (+) – Green (–)**

If the battery voltage appears, the accessory socket circuit is normal.  
Faulty accessory socket.

If the battery voltage does not appear, inspect the following:

- Open circuit in Red/blue wire between the fuse box B and accessory socket
- Open circuit in Green wire



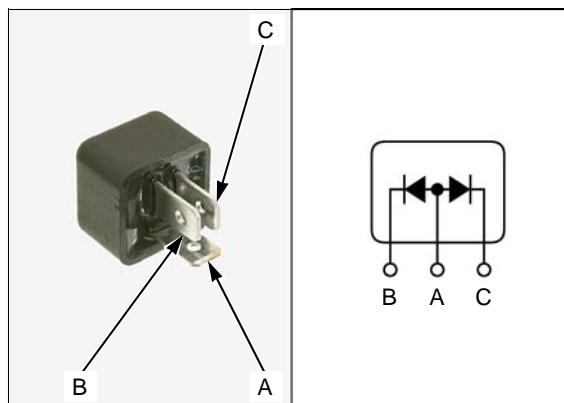
## HAZARD DIODE (CM TYPE ONLY)

### INSPECTION

Remove the hazard diode (page 22-25).

Check for continuity between the diode terminals. When there is continuity, a small resistance value will be registered.

If there is continuity, in one direction, the diode is normal.



**REMOVAL/INSTALLATION**

Remove the front meter panel (page 2-4).

Remove the diode [1].

Installation is in the reverse order of removal.



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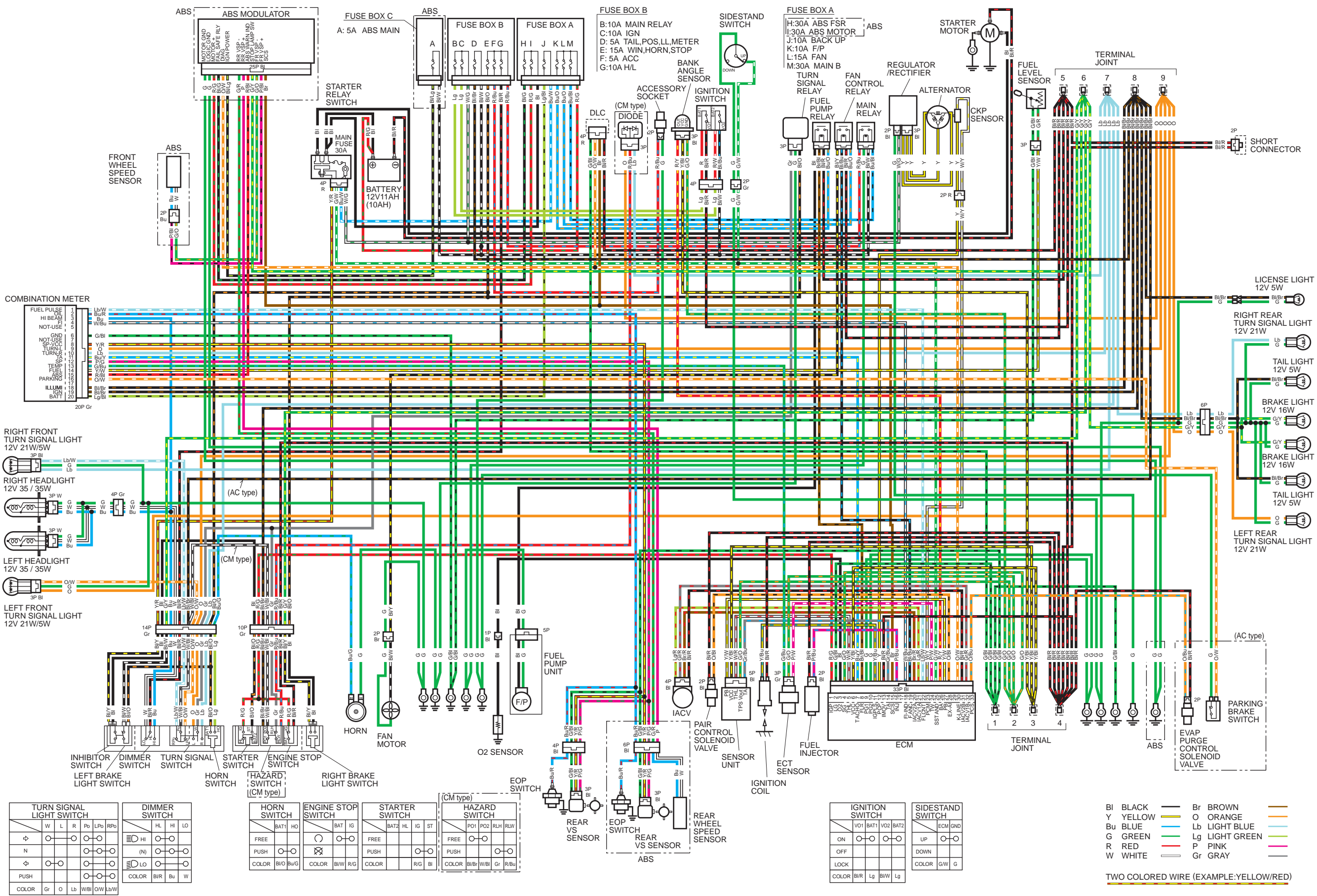
## MEMO

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WIRING DIAGRAM.....23-2



WIRING DIAGRAM



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# MEMO

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## MEMO

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## MEMO

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## MEMO

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