

Honda Transalp XL700V/VA

Manual de Servicio Técnico

TYPE CODE

- Throughout this manual, the following abbreviations are used to identify individual model.

CODE	AREA TYPE
ED	EUROPEAN DIRECT SALES (Poland, Slovenia, Croatia, Latvia, Norway, Switzerland, Spain, Netherlands, Austria, Portugal, Belgium, Denmark, Greece, Italy, Macedonia, Romania, Bulgaria, Ukraine, Israel, Finland, Sweden, Iceland, Russia, Germany, Luxemburg, Hungary, Czech, Slovakia)
E	U.K.
F	France

A Few Words About Safety

Service Information

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Honda parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts—wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommended that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

Important Safety Precautions

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Any time you lift the vehicle, either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts or coolant. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes, sparks and flames away from the battery and all fuel-related parts.

WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

WARNING

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the XL700V/VA.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition.

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections. Section 4 through 21 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on the first page of the section.

Most sections start with an assembly or system illustration, service information and troubleshooting for the section. The subsequent pages give detailed procedure.

If you don't know the source of the trouble, go to section 23 Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle. You must use your own good judgement. You will find important safety information in a variety of forms including:

- Safety Labels – on the vehicle
- Safety Messages – preceded by a safety alert symbol  and one of three signal words, DANGER, WARNING, or CAUTION.

These signal words mean:

DANGER You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

WARNING You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

CAUTION You CAN be HURT if you don't follow instructions.

- Instructions – how to service this vehicle correctly and safely.

As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to your vehicle, other property, or the environment.

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Honda Motor Co., Ltd.
SERVICE PUBLICATION OFFICE

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SYMBOLS

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it would be explained specifically in the text without the use of the symbols.

	Replace the part (s) with new one (s) before assembly.
	Use recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum disulfide grease in a ratio of 1:1).
	Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent).
	Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® BR-2 plus manufactured by Dow Corning U.S.A. Multi-purpose M-2 manufactured by Mitsubishi Oil, Japan
	Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® G-n Paste manufactured by Dow Corning U.S.A. Honda Moly 60 (U.S.A. only) Rocol ASP manufactured by Rocol Limited, U.K. Rocol Paste manufactured by Sumico Lubricant, Japan
	Use silicone grease.
	Apply a locking agent. Use a middle strength locking agent unless otherwise specified.
	Apply sealant.
	Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.
	Use Fork or Suspension Fluid.

1. GENERAL INFORMATION

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GENERAL INFORMATION

SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown in the Cable and Harness Routing (page 1-21).
9. Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

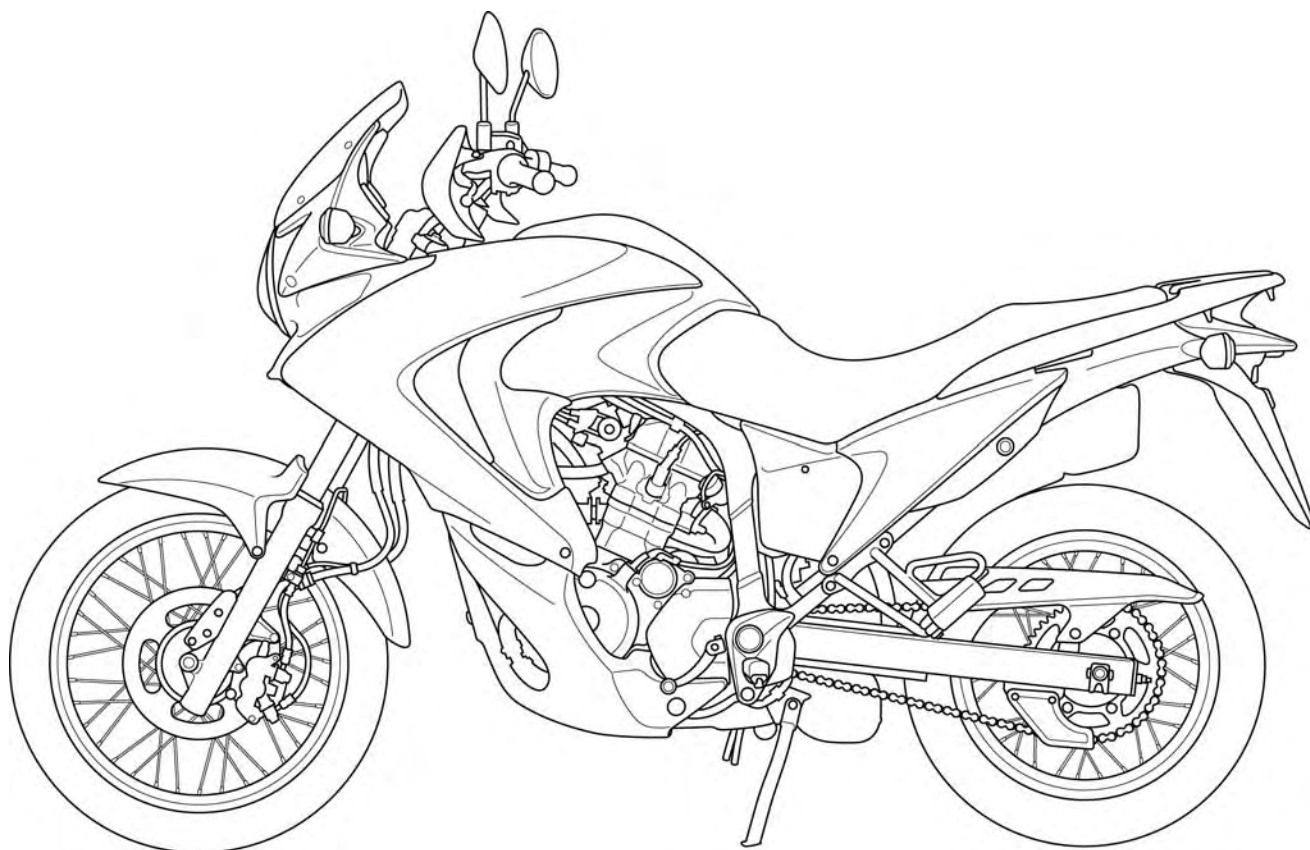
ABBREVIATION

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

Abbrev. term	Full term
ABS	Anti-lock Brake System
CKP sensor	Crankshaft Position sensor
CMP sensor	Camshaft Position sensor
DLC	Data Link Connector
DTC	Diagnostic Trouble Code
ECM	Engine Control Module
ECT sensor	Engine Coolant Temperature sensor
EEPROM	Electrically Erasable Programmable Read Only Memory
EOP switch	Engine Oil Pressure switch
HDS	Honda Diagnostic System
HISS	Honda Ignition Security System
IACV	Idle Air Control Valve
IAT sensor	Intake Air Temperature sensor
MAP sensor	Manifold Absolute Pressure sensor
MIL	Malfunction Indicator Lamp
PAIR	Pulsed Secondary Air Injection
PCV	Proportional Control Valve
PGM-FI	Programmed Fuel Injection
SCS connector	Service Check Short connector
TP sensor	Throttle Position sensor
VS sensor	Vehicle Speed sensor

MODEL IDENTIFICATION

XL700VA shown:



SERIAL NUMBERS

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

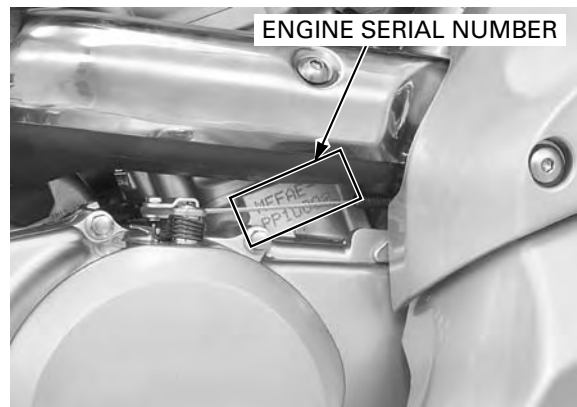


The registered number plate is located on the right side of the frame.

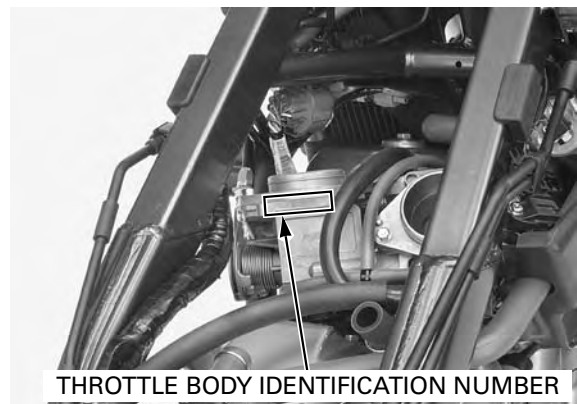


GENERAL INFORMATION

The engine serial number is stamped on the right side of the crankcase.

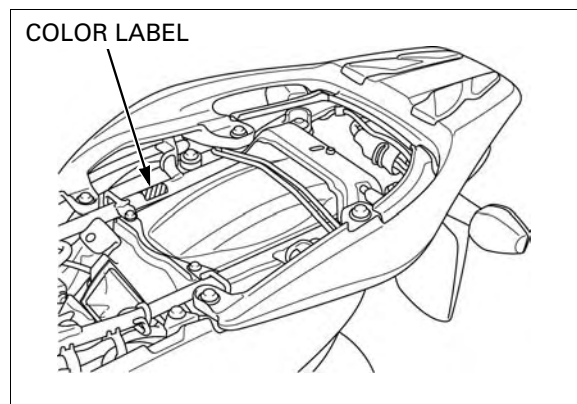


The throttle body identification number is stamped on the throttle drum side of the throttle body.



LABEL

The color label is attached as shown. When ordering color-coded parts, always specify the designated color code.



GENERAL SPECIFICATIONS

ITEM		SPECIFICATIONS
DIMENSION	Overall length	2,255 mm (88.8 in)
	Overall width	905 mm (35.6 in)
	Overall height	1,305 mm (51.4 in)
	Wheelbase	1,515 mm (59.6 in)
	Seat height	837 mm (33.0 in)
	Footpeg height	346 mm (13.6 in)
	Ground clearance	182 mm (7.2 in)
	Curb weight	214 kg (472 lbs)
	XL700V	219 kg (483 lbs)
	XL700VA	200 kg (441 lbs)
	Maximum weight capacity	
FRAME	Frame type	Semi double cradle
	Front suspension	Telescopic fork
	Front axle travel	177 mm (7.0 in)
	Rear suspension	Swingarm
	Rear axle travel	173 mm (6.8 in)
	Front tire size	100/90-19M/C 57H
	Rear tire size	130/80R-17M/C 65H
	Tire brand	Front: TRAIL WING 101
	Bridgestone	Rear: TRAIL WING 152 RADIAL
	Metzeler	Front: TOURANCE FRONT U
	Front brake	Rear: TOURANCE U
	Rear brake	Hydraulic double disc
	Caster angle	Hydraulic single disc
	Trail length	28° 04'
	Fuel tank capacity	105.5 mm (4.15 in)
		17 liters (4.5 US gal, 3.7 Imp gal)
ENGINE	Cylinder arrangement	2 cylinders 52° V transverse
	Bore and stroke	81.0 x 66.0 mm (3.19 x 2.60 in)
	Displacement	680 cm ³ (41.5 cu-in)
	Compression ratio	10.0:1
	Valve train	Silent cam chain driven, OHC
	Intake valve	10° BTDC (at 1 mm lift)
	Exhaust valve	25° ABDC (at 1 mm lift)
		35° BBDC (at 1 mm lift)
	Lubrication system	5° ATDC (at 1 mm lift)
	Oil pump type	Forced pressure and wet sump
	Cooling system	Trochoid
	Air filtration	Liquid cooled
	Engine dry weight	Viscous paper element
	Firing order	58.7 kg (129.4 lbs)
	Cylinder number	1 - 2
		Front: #2/Rear: #1
FUEL DELIVERY SYSTEM	Type	PGM-FI
DRIVE TRAIN	Throttle bore	40 mm (1.6 in)
	Clutch system	Multi-plate, wet
	Clutch operation system	Cable operating
	Transmission	Constant mesh, 5-speeds
	Primary reduction	1.763 (67/38)
	Final reduction	3.133 (47/15)
	Gear ratio	2.500 (35/14)
	1st	1.722 (31/18)
	2nd	1.333 (28/21)
	3rd	1.111 (30/27)
	4th	0.961 (25/26)
	5th	
	Gearshift pattern	Left foot operated return system,
		1 - N - 2 - 3 - 4 - 5

GENERAL INFORMATION

ITEM		SPECIFICATIONS
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

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	2.1 liters (2.2 US qt, 1.8 Imp qt)	–
	After draining/filter change	2.3 liters (2.4 US qt, 2.0 Imp qt)	–
	After disassembly	2.9 liters (3.1 US qt, 2.6 Imp qt)	–
Recommended engine oil		Honda "4-stroke motorcycle oil" or an equivalent Oil recommendation: API classification SG or higher (except oils labeled as energy conserving on the circular API service label) Viscosity: SAE 10W-30 JASO T 903 standard: MA	–
Oil pressure at EOP switch		294 kPa (3.0 kgf/cm ² , 43 psi) at 6,000 min ⁻¹ (rpm)/(100°C/212°F)	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.02 – 0.08 (0.001 – 0.003)	0.10 (0.004)

FUEL SYSTEM (PGM-FI) SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ6CA
Engine idle speed	1,200 ± 100 min ⁻¹ (rpm)
Throttle grip freeplay	2 – 4 mm (1/16 – 3/16 in)
IAT sensor resistance (at 20°C/68°F)	1 – 4 kΩ
Fuel injector resistance (at 20°C/68°F)	10 – 14 Ω
PAIR control solenoid valve resistance (at 20°C/68°F)	23 – 27 Ω
CMP sensor peak voltage (at 20°C/68°F)	0.7 V minimum
CKP sensor peak voltage (at 20°C/68°F)	0.7 V minimum
Fuel pressure at idle	343 kPa (3.5 kgf/cm ² , 50 psi)
Fuel pump flow (at 12 V)	189 cm ³ (6.4 US oz, 6.6 Imp oz) minimum/10 seconds

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.35 liters (2.48 US qt, 2.07 Imp qt)
	Reserve tank	0.6 liter (0.63 US qt, 0.53 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum at 95°C (203°F)
Recommended antifreeze		High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

GENERAL INFORMATION

CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 400 min ⁻¹ (rpm)			1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm ² , 199 ± 14 psi)	–
Valve clearance		IN	0.15 ± 0.02 (0.006 ± 0.001)	–
		EX	0.20 ± 0.02 (0.008 ± 0.001)	–
Camshaft	Cam lobe height	IN	40.609 – 40.769 (1.5988 – 1.6051)	40.58 (1.598)
		EX	40.695 – 40.855 (1.6022 – 1.6085)	40.67 (1.601)
	Runout		–	0.05 (0.002)
	Journal O.D.		21.959 – 21.980 (0.8645 – 0.8654)	21.90 (0.862)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Rocker arm, rocker arm shaft	Rocker arm shaft O.D.	IN/EX	11.983 – 11.994 (0.4718 – 0.4722)	11.92 (0.469)
	Rocker arm I.D.	IN/EX	12.006 – 12.024 (0.4727 – 0.4734)	12.05 (0.474)
	Rocker arm-to-shaft clearance		0.012 – 0.041 (0.0005 – 0.0016)	0.14 (0.006)
Valve, valve guide	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.460 (0.2150)
		EX	5.460 – 5.475 (0.2150 – 0.2156)	5.455 (0.2148)
	Valve guide I.D.	IN/EX	5.500 – 5.512 (0.2165 – 0.2170)	5.54 (0.218)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.07 (0.003)
		EX	0.025 – 0.052 (0.0010 – 0.0020)	0.09 (0.004)
	Valve guide projection above cylinder head	IN	12.5 – 12.7 (0.49 – 0.50)	–
		EX	16.7 – 16.9 (0.66 – 0.67)	–
Valve spring	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
	Free length	IN/EX	44.91 (1.768)	43.9 (1.73)
Cylinder head warpage			–	0.10 (0.004)

CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		81.000 – 81.015 (3.1890 – 3.1896)	81.10 (3.193)
	Out of round		–	0.06 (0.002)
	Taper		–	0.06 (0.002)
	Warpage		–	0.10 (0.004)
Piston, piston pin, piston rings	Piston O.D. at 15 mm (0.59 in) from bottom		80.97 – 80.99 (3.188 – 3.189)	80.91 (3.185)
	Piston pin bore I.D.		18.002 – 18.008 (0.7087 – 0.7090)	18.05 (0.711)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.98 (0.708)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.200 – 0.350 (0.0079 – 0.0138)	0.50 (0.020)
		Second	0.350 – 0.500 (0.0138 – 0.0197)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
	Piston ring-to-ring groove clearance	Top	0.015 – 0.045 (0.0006 – 0.0018)	0.065 (0.0026)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.065 (0.0026)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			18.016 – 18.037 (0.7093 – 0.7101)	18.047 (0.7105)
Connecting rod-to-piston pin clearance			0.016 – 0.043 (0.0006 – 0.0017)	0.06 (0.002)

CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever freeplay			10 – 20 (3/8 – 13/16)	–
Clutch	Spring free length		43.2 (1.70)	41.7 (1.64)
	Disc thickness	Disc A	2.62 – 2.78 (0.103 – 0.109)	2.3 (0.09)
		Disc B	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
		Disc C	2.62 – 2.78 (0.103 – 0.109)	2.3 (0.09)
	Plate warpage		–	0.30 (0.012)
Clutch outer guide		I.D.	21.991 – 22.016 (0.8658 – 0.8668)	22.03 (0.867)
		O.D.	31.959 – 31.975 (1.2582 – 1.2589)	31.92 (1.257)
Mainshaft O.D. at clutch outer guide			21.967 – 21.980 (0.8648 – 0.8654)	21.95 (0.864)
Clutch outer guide-to-mainshaft clearance			0.011 – 0.049 (0.0004 – 0.0019)	0.08 (0.003)
Clutch outer I.D.			32.000 – 32.025 (1.2598 – 1.2608)	32.09 (1.263)
Clutch outer-to-outer guide clearance			0.025 – 0.066 (0.0010 – 0.0026)	0.18 (0.007)
Oil pump drive sprocket I.D.			32.025 – 32.145 (1.2608 – 1.2655)	32.16 (1.266)
Oil pump drive sprocket-to-clutch outer guide clearance			0.050 – 0.186 (0.0020 – 0.0073)	0.24 (0.009)

ALTERNATOR/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	37.000 – 37.025 (1.4567 – 1.4577)	37.10 (1.461)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.73 (2.273)
Starter clutch outer I.D.		74.412 – 74.442 (2.9296 – 2.9308)	74.46 (2.931)

CRANKCASE/CRANKSHAFT/TRANSMISSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT	
Crankshaft	Connecting rod big end side clearance		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)	
	Crankpin bearing oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)	
	Main journal oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.07 (0.003)	
	Crankshaft runout		–	0.03 (0.001)	
	Main journal O.D.		52.976 – 52.994 (2.0857 – 2.0864)	52.976 (2.0857)	
Main journal I.D.			58.010 – 58.022 (2.2839 – 2.2843)	58.070 (2.2862)	
Shift fork, fork shaft	I.D.		13.000 – 13.021 (0.5118 – 0.5126)	13.03 (0.513)	
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)	
	Fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)	
Shift drum O.D.			11.966 – 11.984 (0.4711 – 0.4718)	11.94 (0.470)	
Shift drum journal I.D.			12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)	
Shift drum-to-shift drum journal clearance			0.016 – 0.052 (0.0006 – 0.0020)	0.09 (0.004)	
Transmission	Gear I.D.	M3, M5	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)	
		C1, C2, C4	31.000 – 31.025 (1.2205 – 1.2215)	31.05 (1.222)	
	Gear busing O.D.	M3, M5	27.959 – 27.980 (1.1007 – 1.1016)	27.940 (1.1000)	
		C1, C2, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)	
	Gear-to-bushing clearance	M3, M5	0.020 – 0.062 (0.0008 – 0.0024)	0.08 (0.003)	
		C1, C2, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)	
	Gear bushing I.D.	M3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.986)	
		C2	27.995 – 28.016 (1.1022 – 1.1030)	28.03 (1.104)	
	Mainshaft O.D.		at M3	24.972 – 24.993 (0.9831 – 0.9840)	24.95 (0.982)
	Countershaft O.D.		at C2	27.967 – 27.980 (1.1011 – 1.1016)	27.95 (1.100)
	Bushing-to-shaft clearance	M3	0.007 – 0.049 (0.0003 – 0.0019)	0.09 (0.004)	
		C2	0.015 – 0.049 (0.0006 – 0.0019)	0.08 (0.003)	

GENERAL INFORMATION

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)	–
	Driver and passenger	200 kPa (2.00 kgf/cm ² , 29 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1oz) max.
Fork	Spring free length	621.4 (24.47)	609.0 (23.98)
	Tube runout	–	0.20 (0.008)
	Recommended fork fluid	Honda ULTRA CUSHION OIL 10W or equivalent	–
	Fluid level	104 (4.1)	–
	Fluid capacity	598 ± 2.5 cm ³ (20.2 ± 0.08 US oz, 21.0 ± 0.09 Imp oz)	–
Steering head bearing pre-load		10.8 – 15.7 N (1.1 – 1.6 kgf)	–

REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			–	2.0 (0.08)
Cold tire pressure	Driver only		200 kPa (2.00 kgf/cm ² , 29 psi)	–
	Driver and passenger		280 kPa (2.80 kgf/cm ² , 41 psi)	–
Axle runout			–	0.20 (0.008)
Wheel rim runout	Radial		–	2.0 (0.08)
	Axial		–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Drive chain	Size/link	REGINA	REG525ZRH-B-118LE	–
	Slack		35 – 45 mm (1.4 – 1.8 in)	–
Shock absorber	Installed spring length		197.4 mm (7.77 in)	–
	Compression damping adjuster standard position		2 turns out from full in	–

HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Specified brake fluid				DOT 4	–
Front	Brake disc thickness			3.8 – 4.2 (0.15 – 0.17)	3.5 (0.14)
	Brake disc warpage			–	0.30 (0.012)
	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)
	XL700VA	Right caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
			Center	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
			Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Left caliper cylinder I.D.	Front	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
			Center	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
			Rear	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
		Right caliper piston O.D.	Front	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
			Center	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
			Rear	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
		Left caliper piston O.D.	Front	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
			Center	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
			Rear	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
XL700V	Caliper cylinder I.D.		27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)	
	Caliper piston O.D.		26.918 – 26.968 (1.0598 – 1.0617)	26.910 (1.0594)	
Rear	Brake disc thickness			5.8 – 6.2 (0.23 – 0.24)	5.0 (0.20)
	Brake disc warpage			–	0.30 (0.012)
	XL700VA	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
		Master piston O.D.		17.417 – 17.444 (0.6857 – 0.6848)	17.405 (0.6852)
	XL700V	Master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
		Master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Caliper cylinder I.D.			38.180 – 38.230 (1.5031 – 1.5051)	38.240 (1.5055)
	Caliper piston O.D.			38.098 – 38.148 (1.4999 – 1.5019)	38.090 (1.4996)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 11.2 Ah
	Current leakage		2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current	Normal	1.1 A/5 – 10 h
		Quick	5.5 A/1.0 h
Alternator	Capacity		396 W/5,000 min ⁻¹ (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	NGK	CPR8EA-9
	DENSO	U24EPR9
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

GENERAL INFORMATION

ELECTRIC STARTER SPECIFICATION

Unit: mm (in)

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

LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight (High)		12 V – 55 W
	Headlight (Low)		12 V – 55 W
	Position light		12 V – 5 W
	Brake/taillight		12 V – 21/5 W
	License light		12 V – 5 W
	Front turn signal light		12 V – 21 W x 2
	Rear turn signal light		12 V – 21 W x 2
	Instrument light		LED x 11
	Turn signal indicator		LED x 2
	High beam indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	MIL		LED
	HISS indicator		LED
	ABS indicator (XL700VA)		LED
Fuse	XL700V	Main fuse	30 A
		Sub fuse	20 A x 3, 10 A x 5
	XL700VA	Main fuse	30 A
		Sub fuse	30 A x 2, 20 A x 3, 10 A x 6

TORQUE VALUES

STANDARD TORQUE VALUES

FASTENER TYPE	N·m (kgf·m, lbf·ft)	FASTENER TYPE	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 (8 mm head, small flange)	10 (1.0, 7)
10 mm bolt and nut	34 (3.5, 25)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
12 mm bolt and nut	55 (5.6, 41)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut	27 (2.8, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

ENGINE & FRAME TORQUE VALUES

- Torque specifications listed below are for important fasteners.
- Others should be tightened to standard torque values listed above.

FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Exhaust pipe joint stud bolt	4	8	—	See page 2-18
Muffler band bolt	3	8	21 (2.1, 15)	
Rear carrier bolt	6	8	26.4 (2.7, 19)	Apply grease to the sliding surface.
Muffler mounting bolt	2	8	39.2 (4.0, 29)	
Exhaust chamber mounting bolt	2	8	30.8 (3.1, 23)	
Exhaust pipe joint nut	4	8	22.1 (2.3, 16)	
Sidestand pivot bolt	1	10	9.8 (1.0, 7.2)	
Sidestand pivot lock nut	1	10	29.4 (3.0, 22)	
Pillion step holder bolt	4	8	26.5 (2.7, 20)	

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	2	10	16 (1.6, 12)	Apply engine oil to the threads.
Timing hole cap	1	14	10 (1.0, 7)	
Crankshaft hole cap	1	30	15 (1.5, 11)	Apply engine oil to the threads.
Valve adjusting screw lock nut	8	7	23 (2.3, 17)	Apply engine oil to the threads and seating surface.
Oil filter cartridge	1	20	26 (2.7, 19)	Apply engine oil to the threads and O-ring.
Engine oil drain bolt	1	14	30 (3.1, 22)	

LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pump assembly bolt	3	6	13 (1.3, 10)	CT bolt

GENERAL INFORMATION

FUEL SYSTEM (PGM-FI)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
ECT sensor	1	12	24.5 (2.5, 18)	
Bank angle sensor mounting screw	2	4	1.5 (0.2, 1.1)	
MAP sensor mounting screw	1	5	5.0 (0.5, 3.7)	
IAT sensor mounting screw	2	5	4.0 (0.4, 3.0)	
Air cleaner housing cover screw	9	5	1.2 (0.1, 0.9)	
O ₂ sensor	1	18	44 (4.5, 32)	
Insulator band screw	2	5	–	See page 5-68
IACV cover screw	3	5	3.4 (0.3, 2.5)	
IACV setting plate torx screw	2	5	2.1 (0.2, 1.5)	
Throttle cable guide screw	2	5	3.4 (0.3, 2.5)	
Fuel injector mounting bolt	4	5	5.4 (0.6, 4.0)	
Fuel pump mounting nut	6	6	12 (1.2, 9)	See page 5-61
Fuel filler cap mounting bolt	1	4	1.8 (0.2, 1.3)	
Fuel tank mounting bolt	1	8	26.4 (2.7, 19)	
PAIR check valve cover bolt	4	5	5.2 (0.5, 3.8)	CT bolt

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fan motor mounting nut	3	5	5.1 (0.5, 3.8)	
Cooling fan nut	1	5	2.7 (0.3, 2.0)	Apply locking agent.
Fan motor assembly mounting bolt	3	6	8.4 (0.9, 6.2)	
Water pump drain bolt	1	6	13 (1.3, 10)	CT bolt
Water pump cover bolt	5	6	13 (1.3, 10)	CT bolt
Water hose band screw	14	–	–	See page 6-10
Thermostat housing cover bolt	2	6	10 (1.0, 7)	

ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine hanger nut	2	10	53.9 (5.5, 40)	
Engine hanger plate nut	2	8	26.4 (2.7, 19)	
Drive sprocket bolt	2	6	10 (1.0, 7)	
Drive sprocket cover bolt	2	6	13 (1.3, 10)	

CYLINDER HEAD/VALVES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head cover bolt	8	6	10 (1.0, 7)	
Cylinder head bolt	4	8	23 (2.3, 17)	Apply engine oil to the threads and seating surface.
Cylinder head nut	8	10	40 (4.1, 30)	Apply engine oil to the threads and seating surface.
Cam sprocket bolt	4	7	23 (2.3, 17)	Apply locking agent.
Cam chain tensioner bolt	4	6	10 (1.0, 7)	
Camshaft holder bolt	12	8	23 (2.3, 17)	Apply engine oil to the threads and seating surface.
Cylinder head sealing bolt	2	18	44 (4.5, 32)	ALOC bolt; replace with a new one.

CYLINDER/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder stud bolt, 12 mm	2	12	–	See page 9-9
Cylinder stud bolt, 10 mm	6	10	–	See page 9-9

CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch lifter plate bolt	4	6	12 (1.2, 9)	Apply engine oil to the threads and seating surface. Stake
Clutch center lock nut	1	18	128 (13.1, 94)	
Shift drum stopper arm pivot bolt	1	6	12 (1.2, 9)	
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	
Primary drive gear bolt	1	12	88 (9.0, 65)	
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	Apply locking agent. Apply locking agent. Apply engine oil to the threads and seating surface.
Gearshift pedal pinch bolt	1	6	17.6 (1.8, 13)	

ALTERNATOR/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Flywheel bolt	1	12	157 (16.0, 116)	Left hand thread Apply engine oil to the threads and seating surface.
Stator bolt	4	6	12 (1.2, 9)	Apply locking agent.
Starter clutch torx bolt	6	8	30 (3.1, 22)	Apply locking agent.
Stator wire holder bolt	1	6	12 (1.2, 9)	Apply locking agent.

CRANKCASE/CRANKSHAFT/TRANSMISSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankcase bolt (8 mm)	13	8	23 (2.3, 17)	Apply engine oil to the threads and seating surface.
Crank pin bearing cap nut	4	9	42 (4.3, 31)	
Oil seal setting plate bolt	1	6	10 (1.0, 7)	Apply locking agent.
Gearshift cam plate bolt	1	6	12 (1.2, 9)	Apply locking agent.
Transmission bearing setting plate bolt	3	6	12 (1.2, 9)	Apply locking agent.
Cam chain tensioner setting plate bolt	2	6	12 (1.2, 9)	Apply locking agent.
Oil filter boss	1	20	—	See page 12-29 Apply locking agent to the crankcase side threads.

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Handlebar holder bolt	4	8	27 (2.8, 20)	ALOC bolt; replace with a new one. Apply locking agent.
Handlebar lower holder nut	2	8	26.5 (2.7, 20)	
Throttle housing screw	2	5	4.2 (0.4, 3.1)	
Right handlebar switch screw	2	4	0.9 (0.1, 0.7)	
Spoke	36	BC 3.5	3.7 (0.4, 2.7)	
Front axle	1	16	64 (6.5, 47)	
Front axle holder nut	4	6	12 (1.2, 9)	
Front brake disc bolt	8	8	42 (4.3, 31)	
Fork center bolt	2	8	20 (2.0, 15)	See page 13-34
Fork cap	2	37	22 (2.2, 16)	
Fork top bridge pinch bolt	2	8	26 (2.7, 19)	
Fork bottom bridge pinch bolt	2	8	34 (3.5, 25)	
Steering top thread	1	26		
Steering stem nut	1	24	103 (10.5, 76)	

GENERAL INFORMATION

REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Drive chain slider mounting screw	2	5	6 (0.6, 4.4)	
Rear axle nut	1	16	88 (9.0, 65)	U-nut
Shock absorber upper mounting nut	1	10	44 (4.5, 32)	U-nut
Shock absorber lower mounting bolt	1	10	44 (4.5, 32)	
Swingarm pivot nut	1	16	88 (9.0, 65)	U-nut
Rear brake disc bolt	4	8	42 (4.3, 31)	ALOC bolt; replace with a new one.
Driven sprocket nut	6	10	45 (4.6, 33)	U-nut Apply engine oil to the threads.
Spoke	32	BC 3.5	3.7 (0.4, 2.7)	
Cushion arm nut	1	12	64 (6.5, 47)	U-nut
Cushion connecting rod nut (Frame side)	1	10	64 (6.5, 47)	U-nut
Cushion connecting rod nut (Cushion arm side)	1	10	44 (4.5, 32)	U-nut
Shock absorber pre-load adjuster lock nut	1	50	44 (4.5, 32)	

HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake caliper bleed valve	4	8	5.4 (0.6, 4.0)	
Front/rear master cylinder reservoir cap screw	2	4	1.5 (0.2, 1.1)	
Brake pad pin	3	10	18 (1.8, 13)	
Front brake pad pin plug screw (XL700V)	2	10	2.5 (0.3, 1.8)	
Brake hose oil bolt	6	10	34 (3.5, 25)	
Brake pipe joint nut	14	10	14 (1.4, 10)	Apply brake fluid to the threads.
Brake lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Brake lever pivot nut	1	6	5.9 (0.6, 4.4)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Front brake caliper bracket pin bolt	2	8	12 (1.2, 9)	Apply locking agent.
Rear master cylinder mounting bolt	2	6	12 (1.2, 9)	
Rear brake reservoir joint screw	1	4	1.5 (0.2, 1.1)	Apply locking agent.
Rear master cylinder push rod lock nut	1	8	18 (1.8, 1.3)	
Front brake caliper pin bolt	2	8	22 (2.2, 16)	Apply locking agent.
Front brake caliper mounting bolt	4	8	30 (3.1, 22)	ALOC bolt; replace with a new one.
Rear brake caliper mounting bolt	1	8	22 (2.2, 16)	ALOC bolt; replace with a new one.
Rear brake caliper pin bolt	1	12	27 (2.8, 20)	
Step holder bolt	2	10	63.7 (6.5, 47)	

ANTI-LOCK BRAKE SYSTEM (ABS)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front wheel pulser ring torx bolt (XL700VA)	6	5	8 (0.8, 5.9)	ALOC bolt; replace with a new one.
Rear wheel pulser ring torx bolt	6	5	8 (0.8, 5.9)	ALOC bolt; replace with a new one.

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 assembly bolt	2	5	4.9 (0.5, 3.6)	
Starter motor brush mounting screw	1	5	3.7 (0.4, 2.7)	

LIGHTS/METERS/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front brake light switch screw	1	4	1.2 (0.1, 0.9)	Apply sealant to the threads.
Turn signal lens screw	4	4	0.9 (0.1, 0.7)	
Neutral switch	1	10	12 (1.2, 9)	
EOP switch	1	PT 1/8	12 (1.2, 9)	
EOP switch terminal screw	1	4	1.9 (0.2, 1.4)	
Sidestand switch bolt	1	6	9.8 (1.0, 7.2)	
Combination meter mounting screw	3	5	1.0 (0.1, 0.7)	
Headlight mounting bolt	2	8	12 (1.2, 9)	

GENERAL INFORMATION

LUBRICATION & SEAL POINTS

ENGINE

MATERIAL	LOCATION	REMARKS
Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	Camshaft lobes/journals Valve stem (valve guide sliding surface) Rocker arm slipper surface Rocker arm shaft outer surface Crankpin bearing thrust surface Crankshaft main journal Clutch outer guide outer surface Transmission gear shift fork groove Transmission bushing inner and outer surface Transmission spline bushing outer surface Clutch assembly thrust washer Connecting rod small end inner surface	
Engine oil	Piston outer surface Piston ring outer surface Piston pin outer surface Starter one-way clutch sliding surface Starter idle and reduction gear shaft outer surface Clutch lifter piece sliding surface Clutch lifter rod sliding surface Clutch disc outer surface Cylinder stud bolt crankcase side threads Mainshaft spline area Countershaft spline area Shift fork sliding surface Shift fork shaft Transmission gear tooth Oil pipe seal Oil strainer packing Fuel injector seal ring Valve stem seal Each bearing Each O-ring (except coolant passage) Other rotating area and sliding surface	
Multi-purpose grease	Each oil seal lip	
Liquid sealant (Three Bond 1207B or equivalent)	Right and left crankcase mating surface Right crankcase cover mating surface Left crankcase cover mating surface Cylinder head semi-circular cut-out	See page 12-30 See page 10-21 See page 11-13 See page 8-33

GENERAL INFORMATION

MATERIAL	LOCATION	REMARKS
Locking agent	Cam sprocket bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Starter clutch torx bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Oil pump driven sprocket bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Stator wire holder bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Shift drum stopper arm pivot bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Gearshift cam plate bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Transmission bearing setting plate bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Cam chain tensioner setting plate bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Stator mounting bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Oil filter boss threads (crankcase side)	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Oil seal setting plate bolt threads	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)
	Left crankcase cover bolt threads	See page 11-13

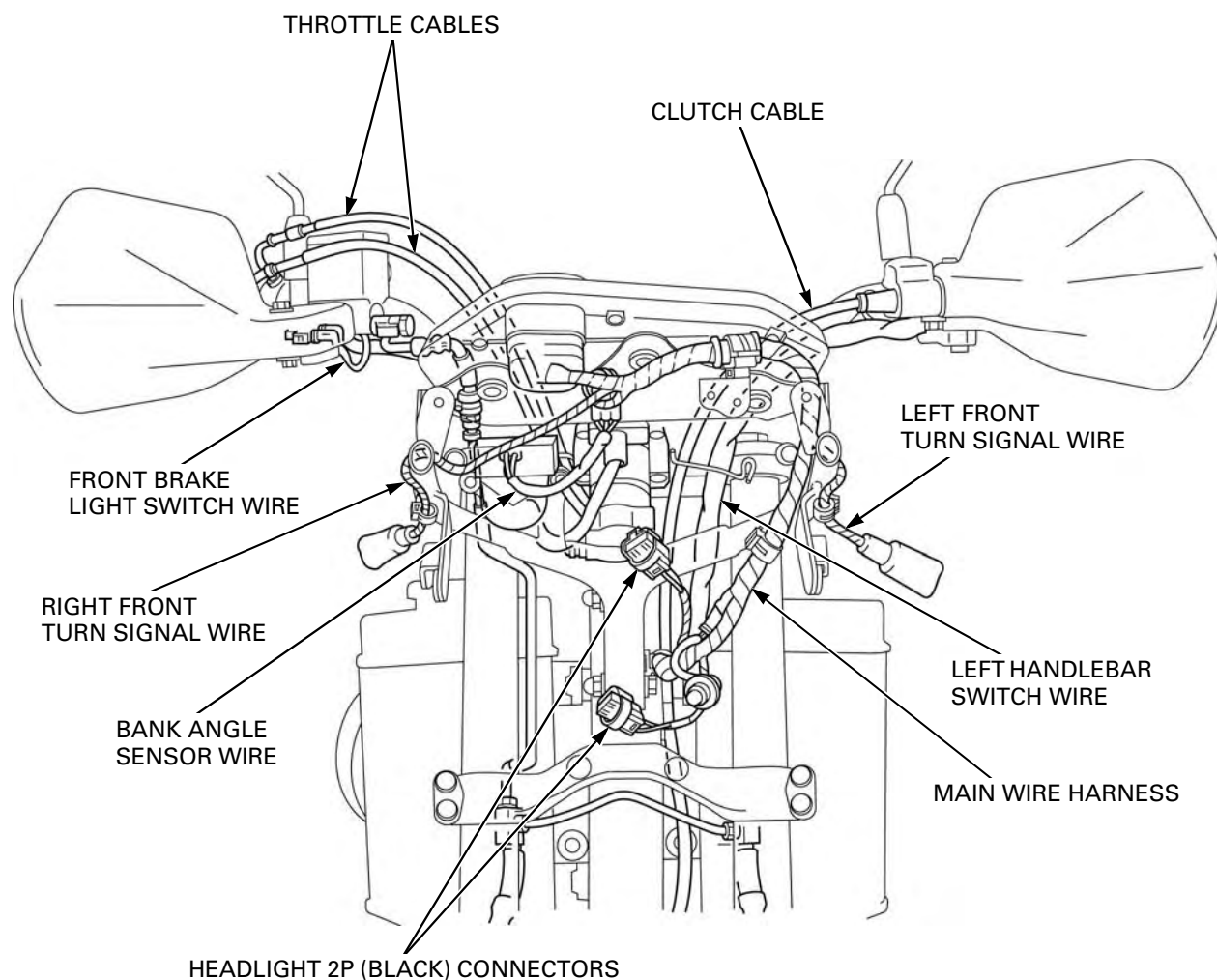
GENERAL INFORMATION

FRAME

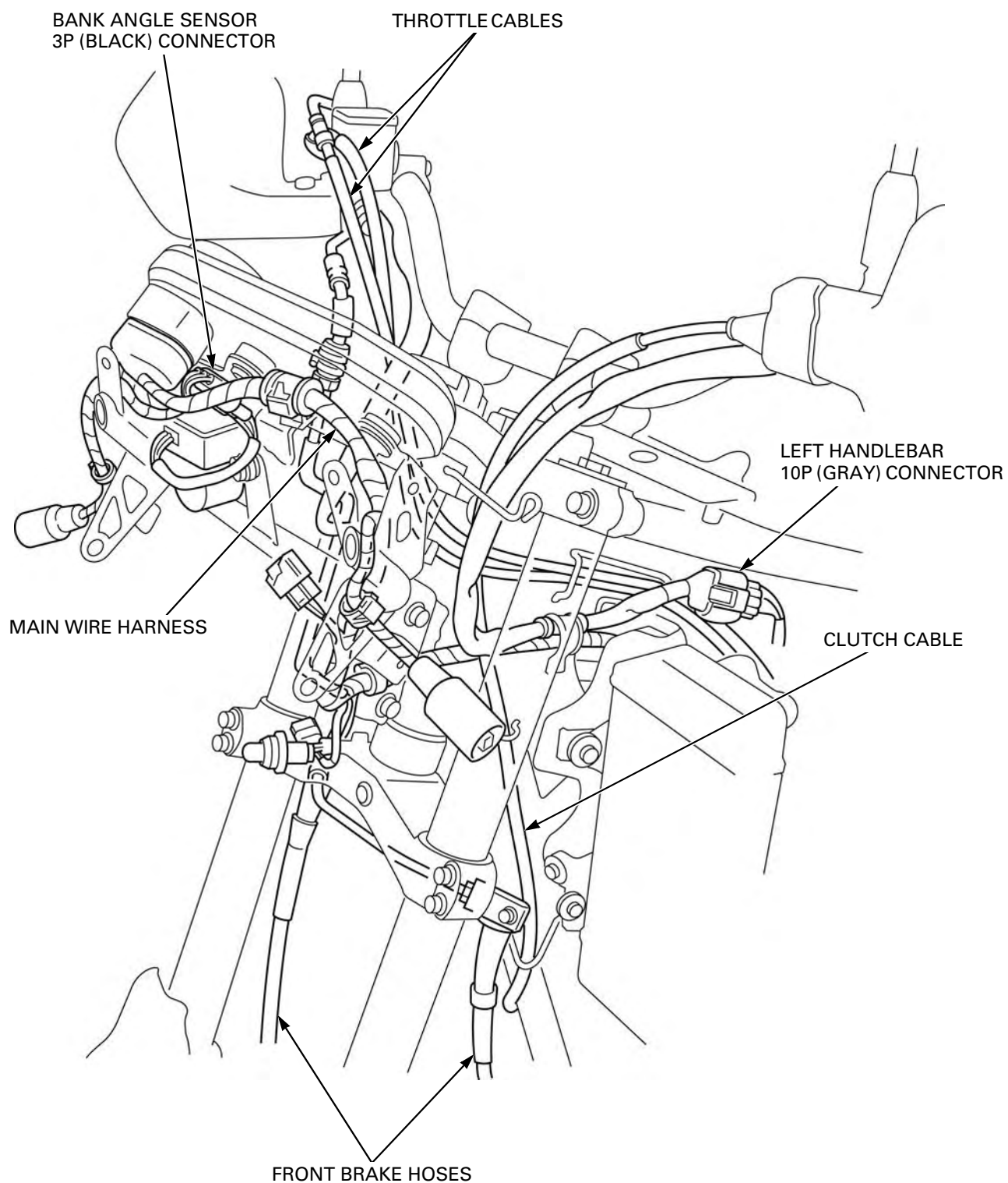
MATERIAL	LOCATION	REMARKS
Multi-purpose grease	Throttle pipe flange groove and sliding surface Clutch lever pivot bolt sliding surface Brake pedal pivot sliding surface Brake pedal dust seal lip Front/rear wheel dust seal lips Driven flange dust seal lip Driven flange-to-rear wheel hub mating surface	
Urea based multi-purpose grease with extreme pressure (Kyodo Yushi EXCELITE EP2, Shell stamina EP2 or equivalent)	Steering head bearings Steering head bearing dust seal lips	Apply 3 – 5 g for each bearing.
Honda bond A or equivalent	Handlebar grip rubber inside Air cleaner housing contacting surface with air funnel	
Engine oil	Steering top threads	
Silicone grease	Brake lever pivot bolt sliding surface Brake lever-to-master piston contacting area Brake master piston-to-boots fitting area Brake pedal push rod-to-master piston contacting area Brake pedal push rod-to-boots fitting area Front brake caliper pad pin stopper ring sliding surface (XL700VA) Rear brake caliper pad pin stopper ring sliding surface Brake caliper slide pin sliding surface Brake caliper bracket pin sliding surface Brake caliper dust seals Rear brake caliper sleeve outer surface	
DOT 4 brake fluid	Brake master piston and cups Brake caliper piston and piston seals	
Honda ULTRA CUSHION OIL 10W or equivalent	Fork dust seal and oil seal lips Fork cap O-ring	
Lithium based multi-purpose grease with extreme pressure (Shell Alvania EP2 or equivalent)	Swingarm pivot bearings Swingarm pivot dust seal lips Cushion arm bearings Cushion arm dust seal lips Cushion connecting rod bearings Cushion connecting rod dust seal lips Shock absorber needle bearing Shock absorber dust seal lips	

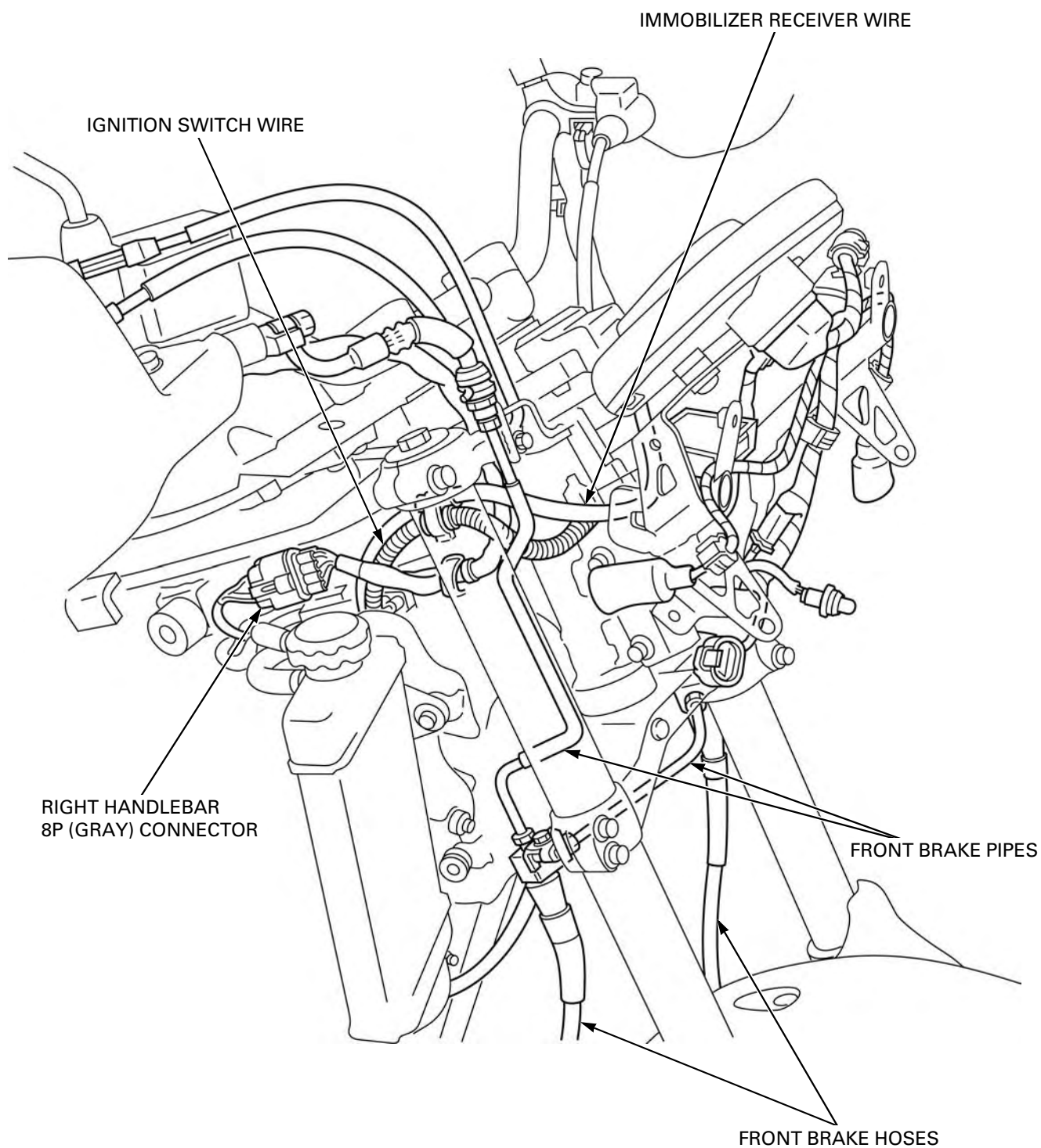
CABLE & HARNESS ROUTING

XL700V

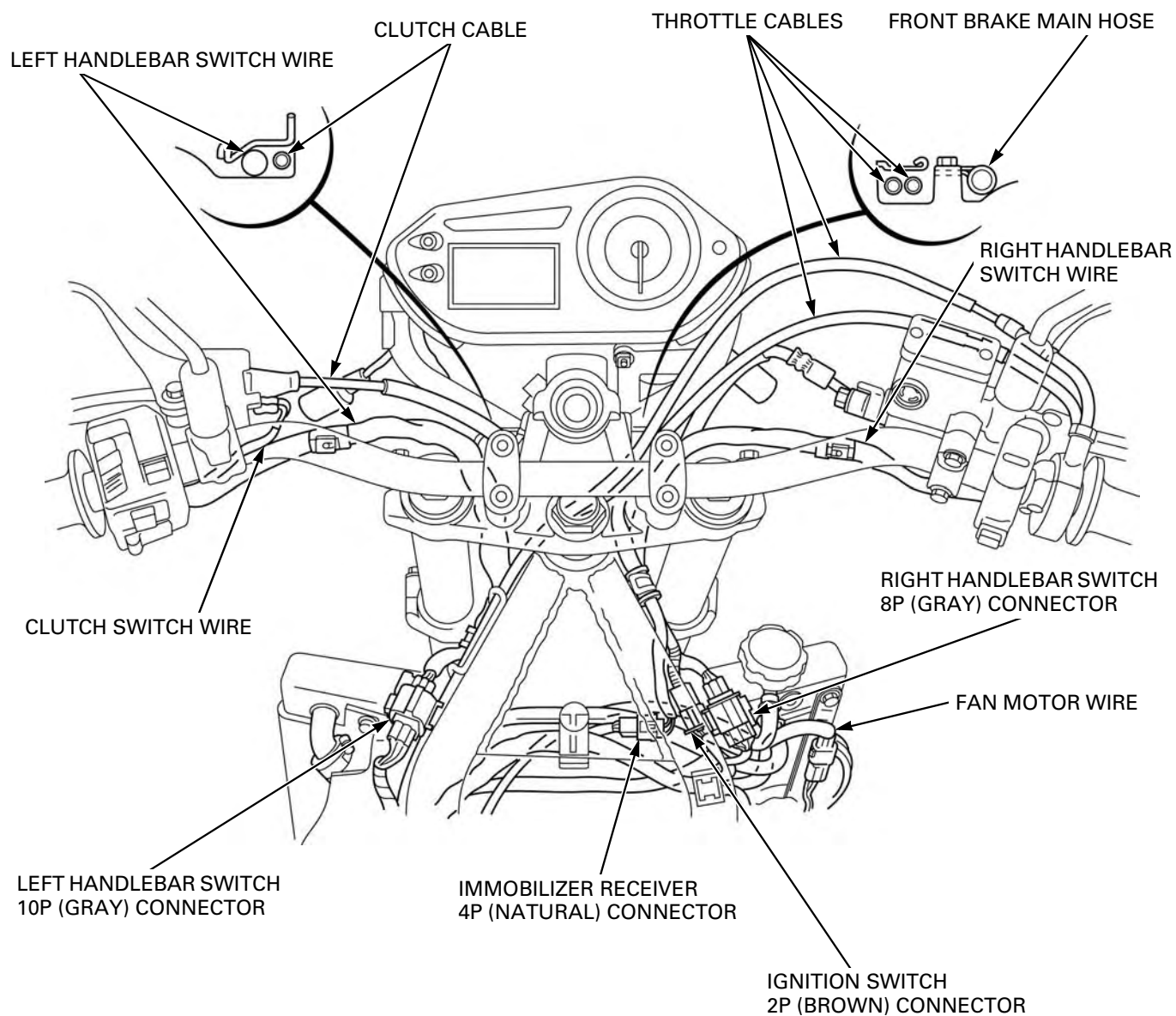


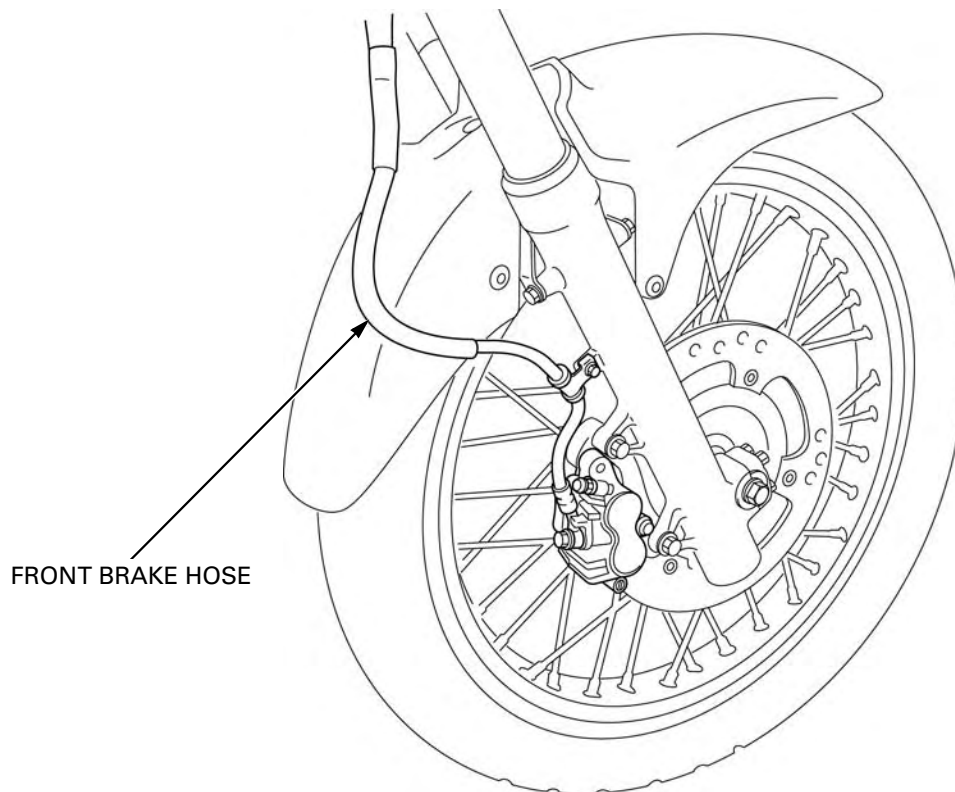
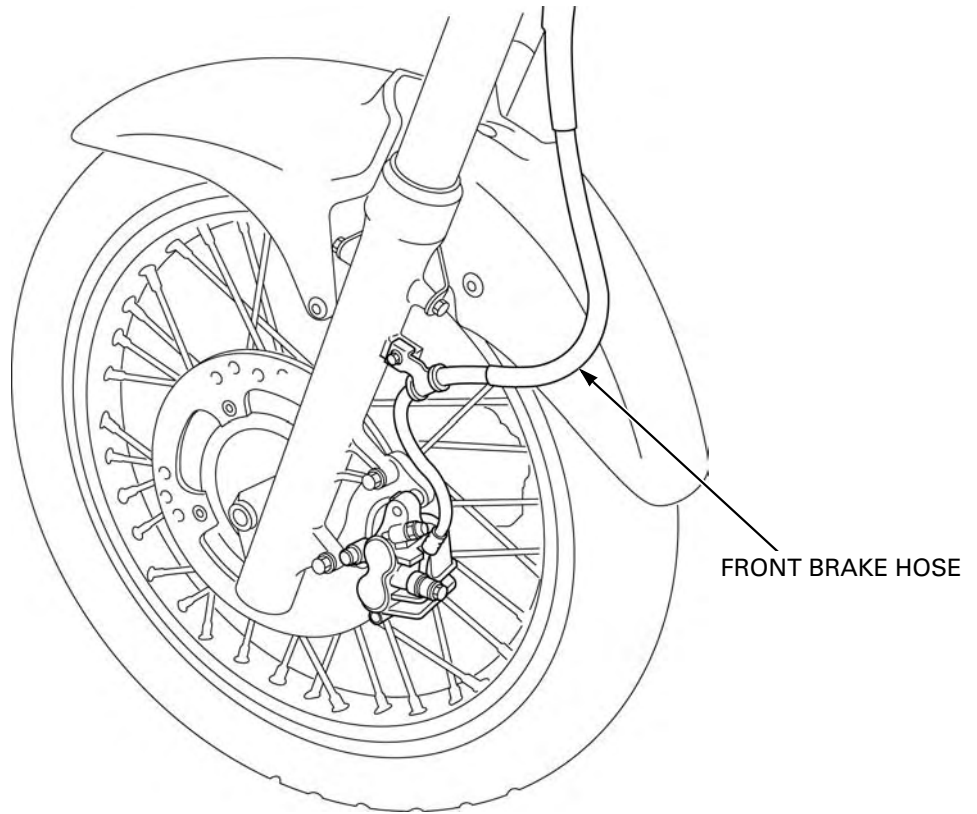
GENERAL INFORMATION



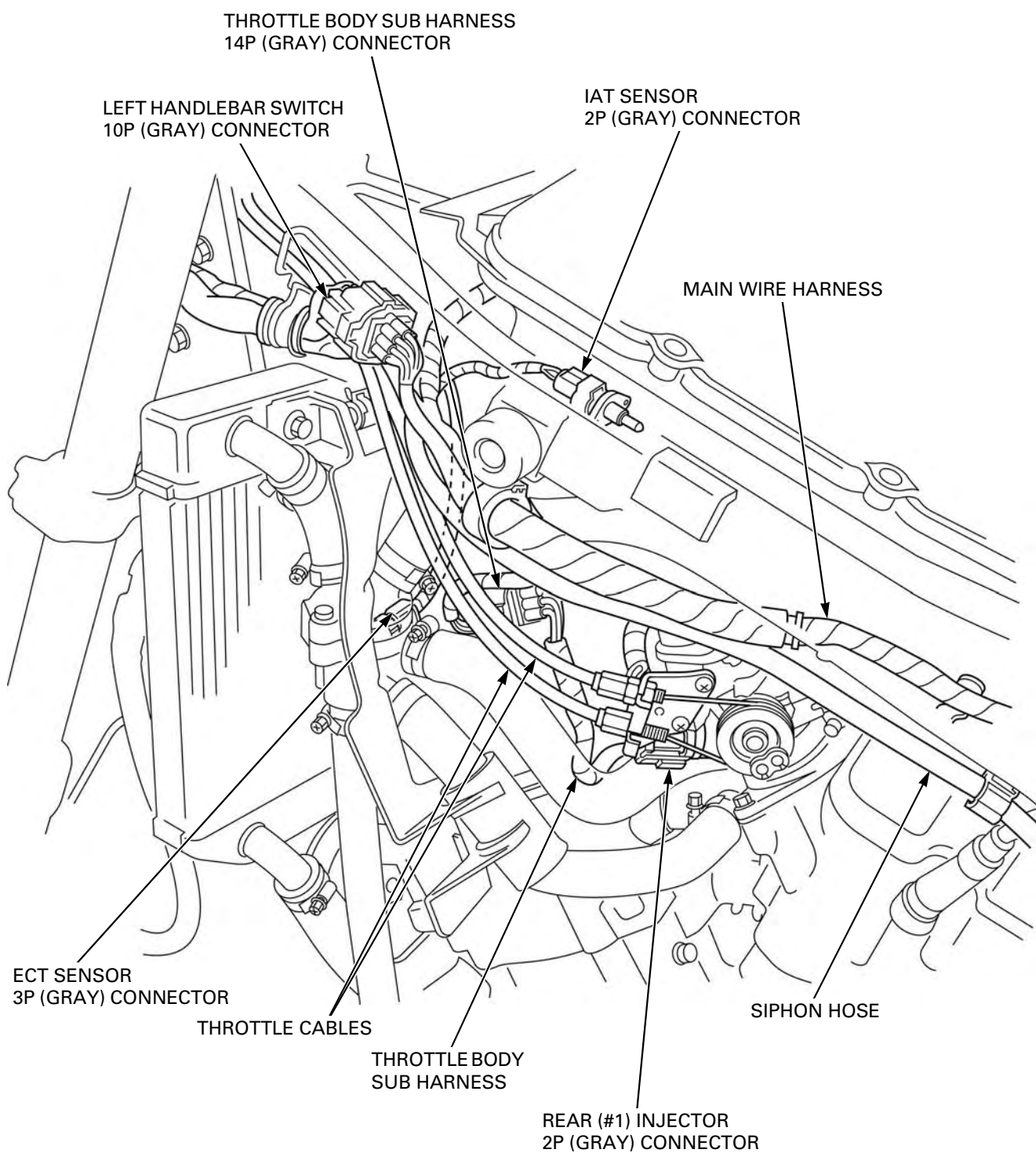


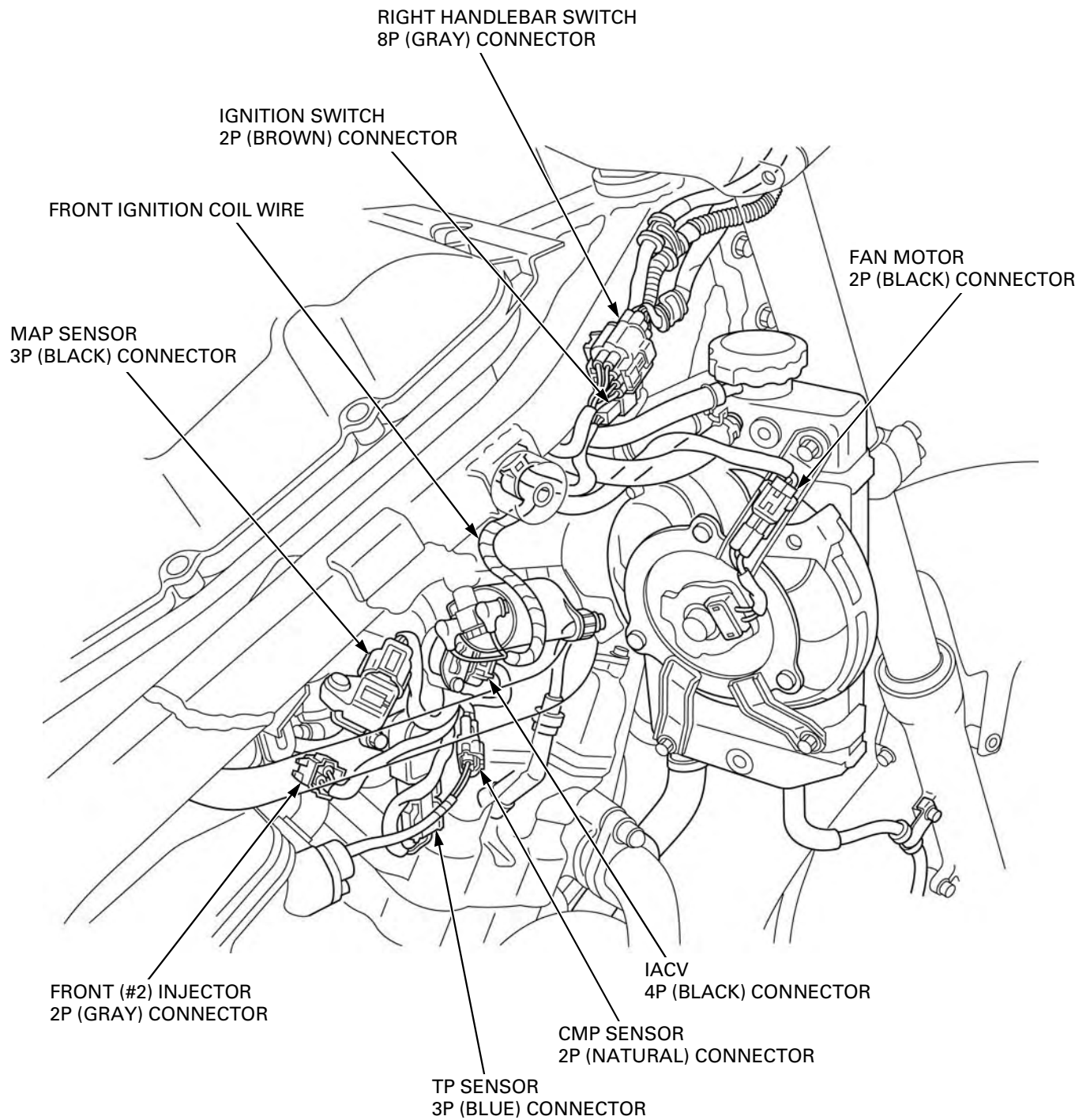
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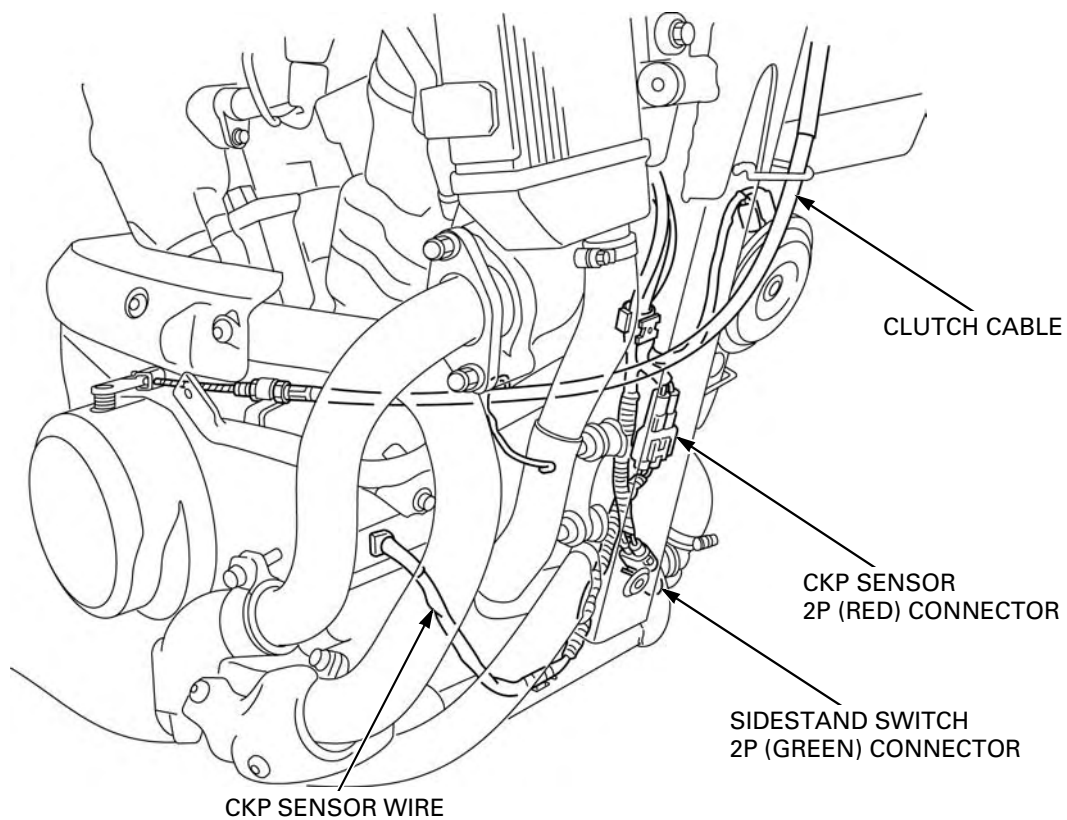
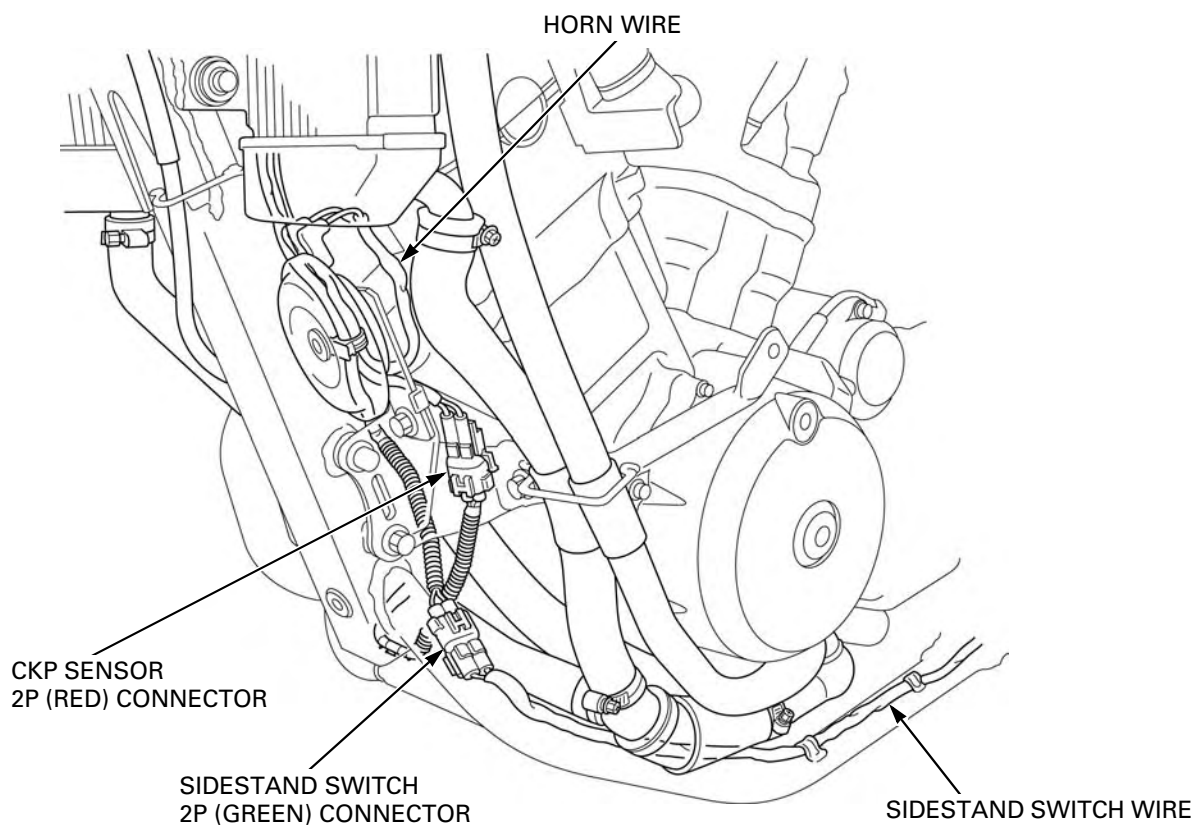


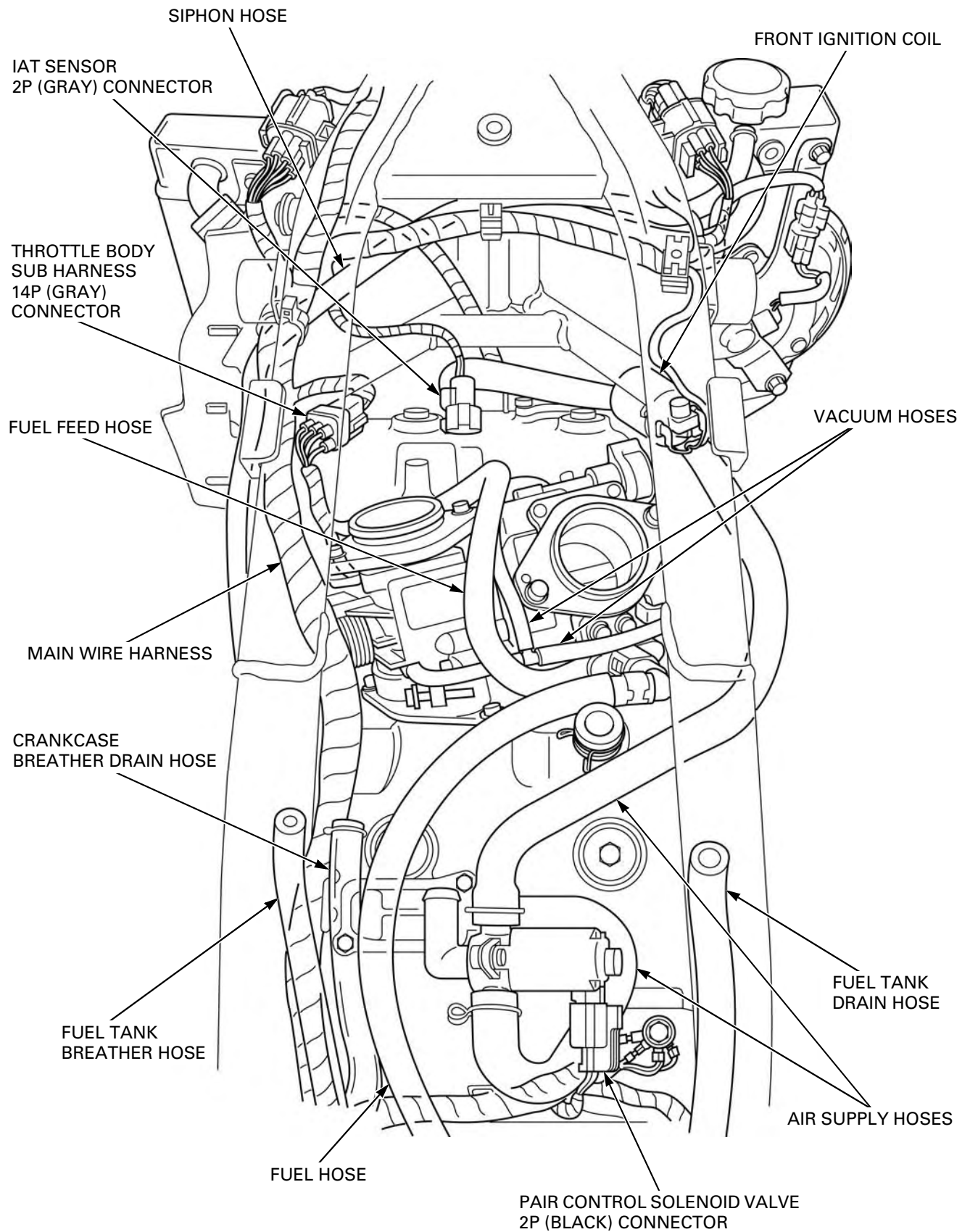
GENERAL INFORMATION



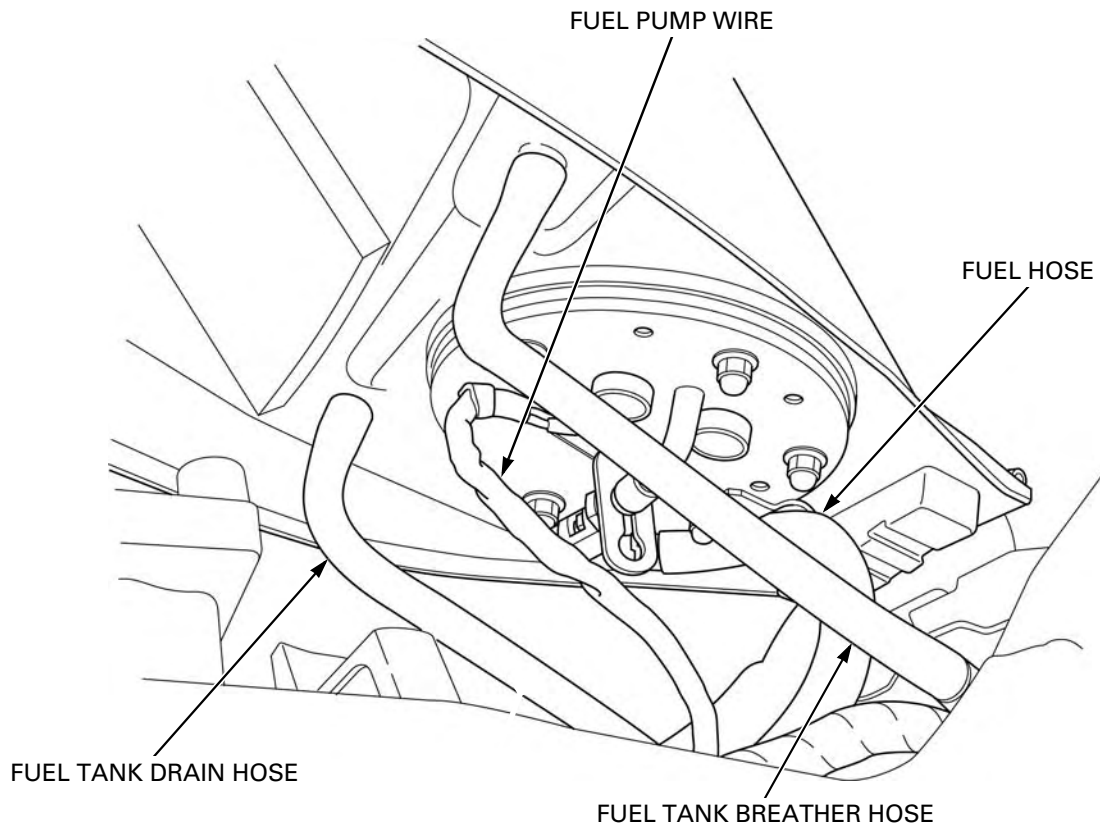
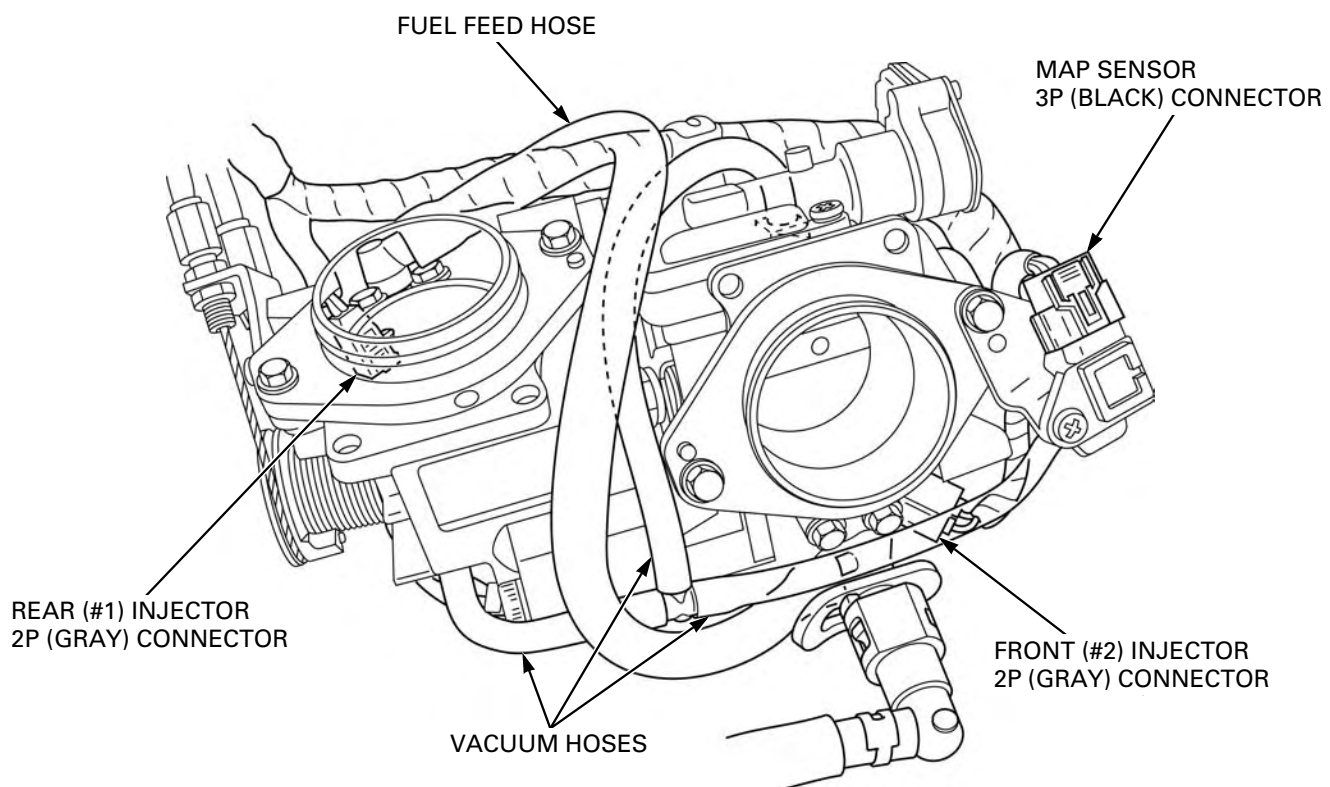


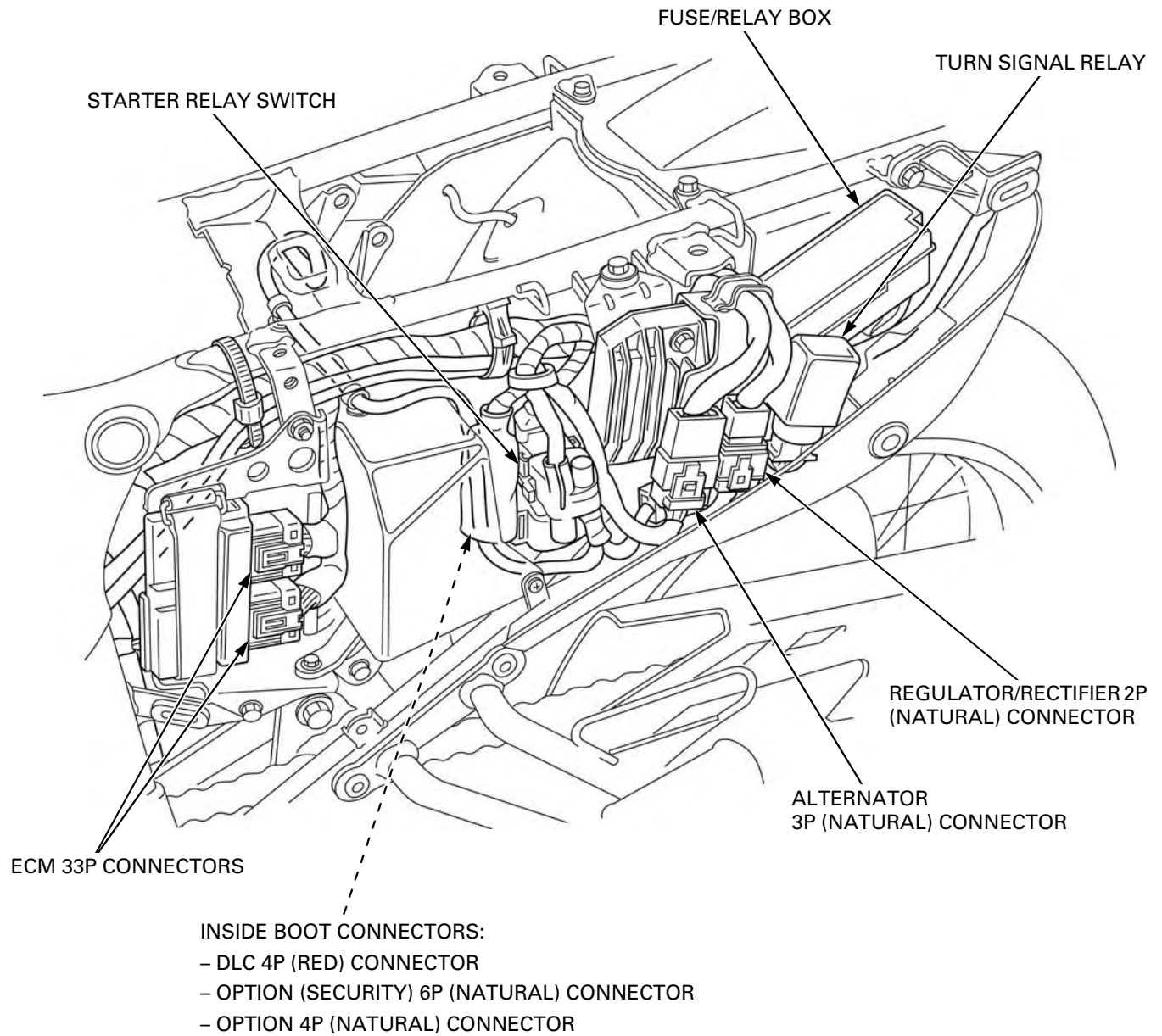
GENERAL INFORMATION





GENERAL INFORMATION



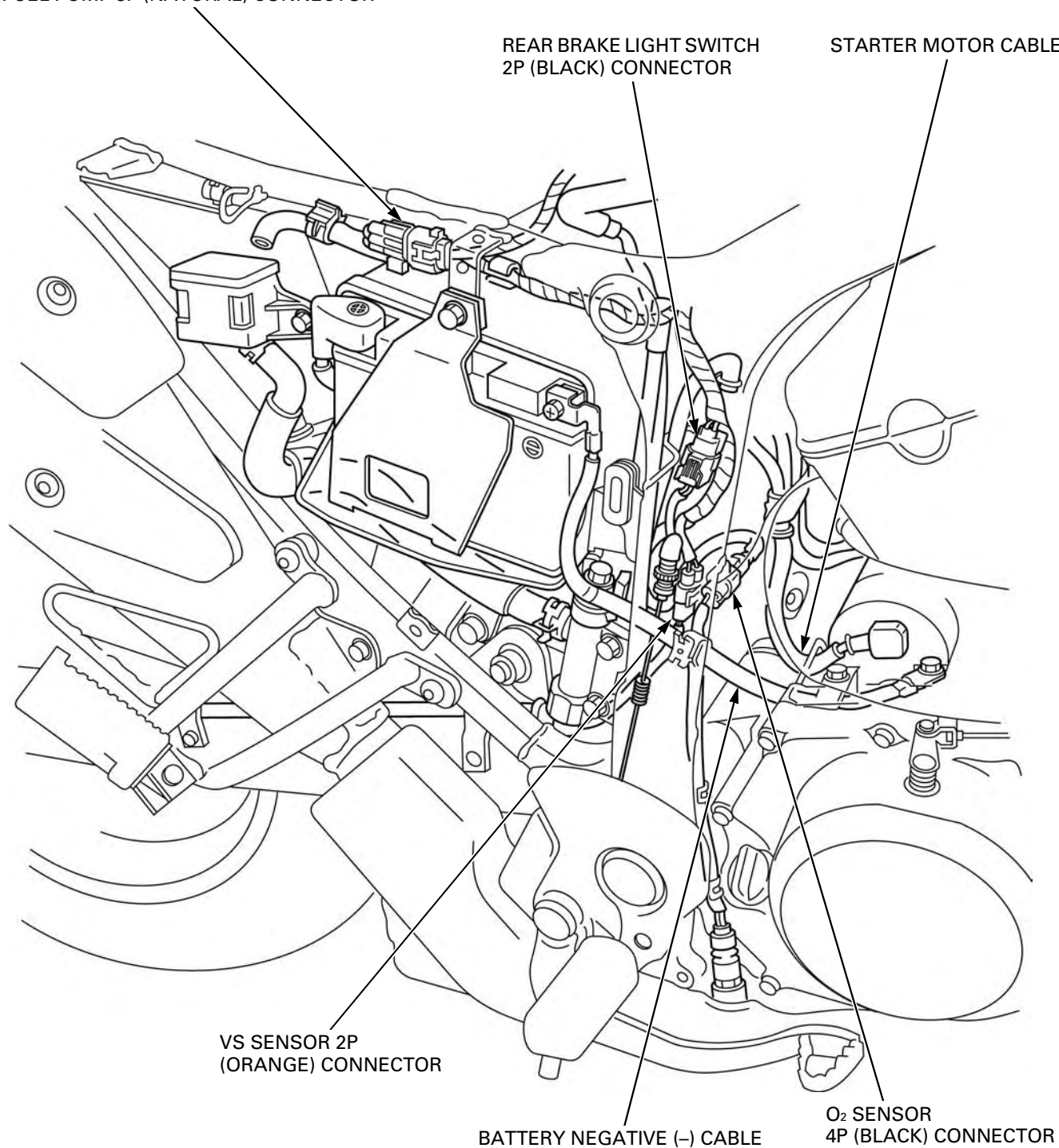


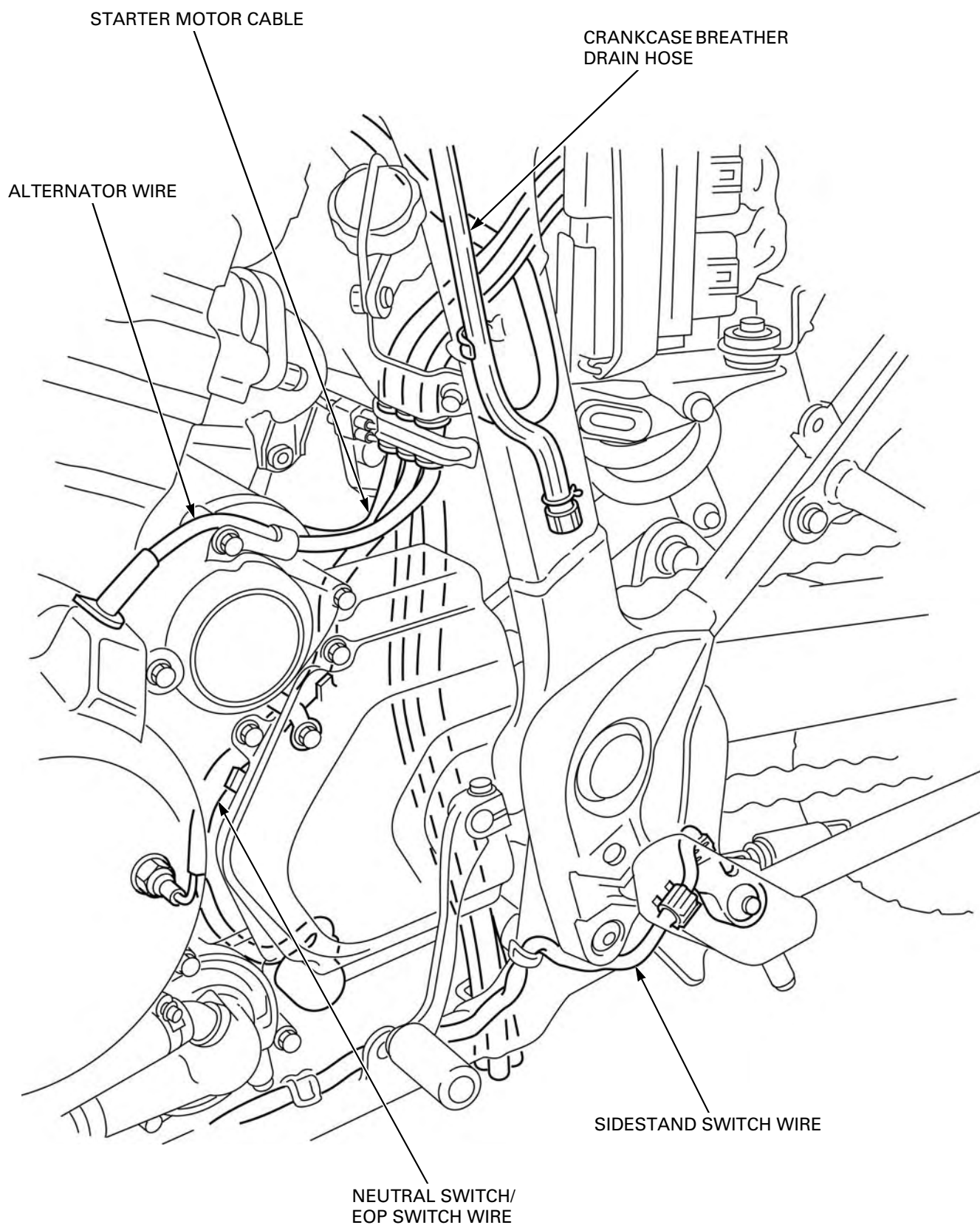
GENERAL INFORMATION

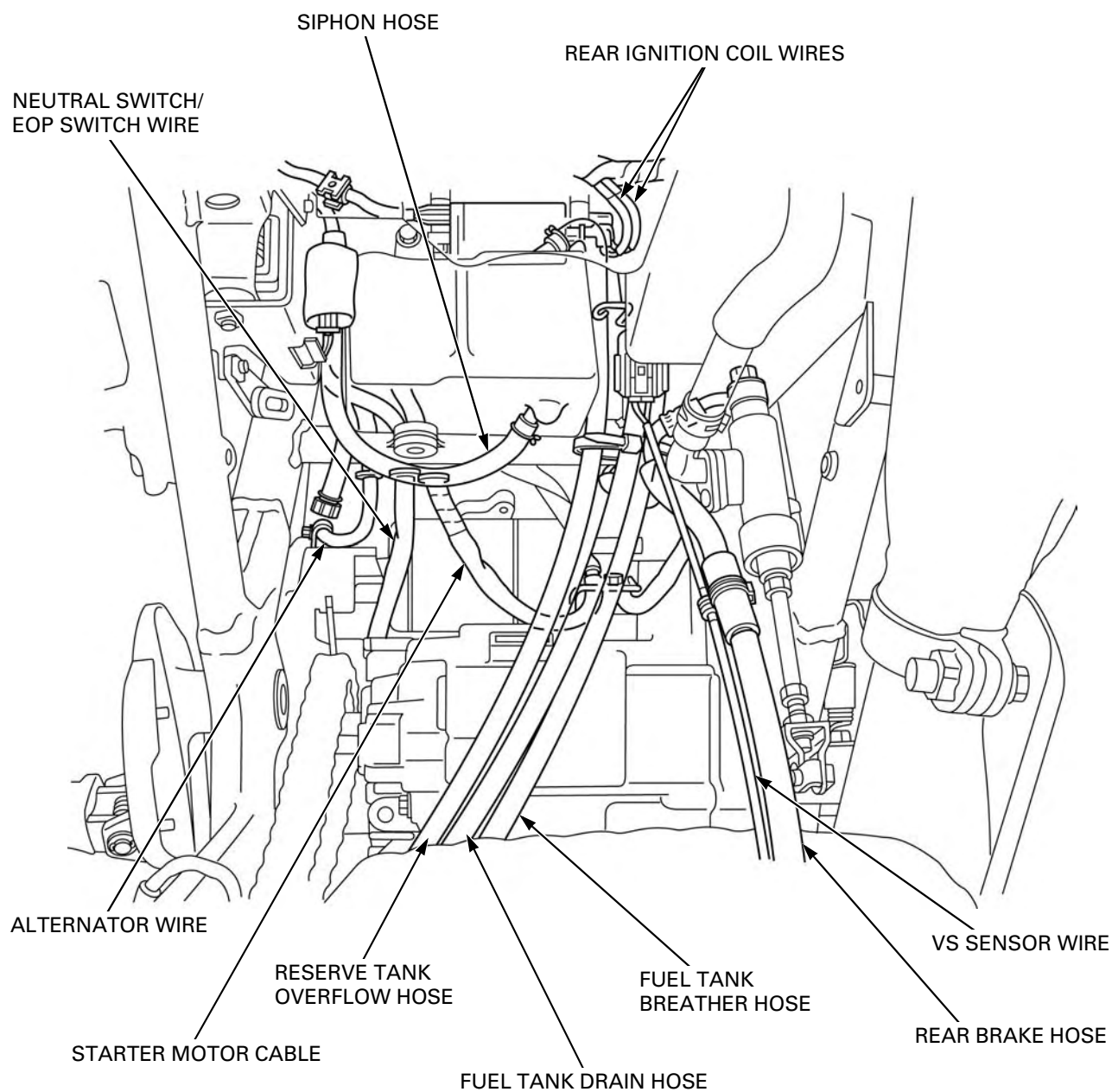
FUEL PUMP 3P (NATURAL) CONNECTOR

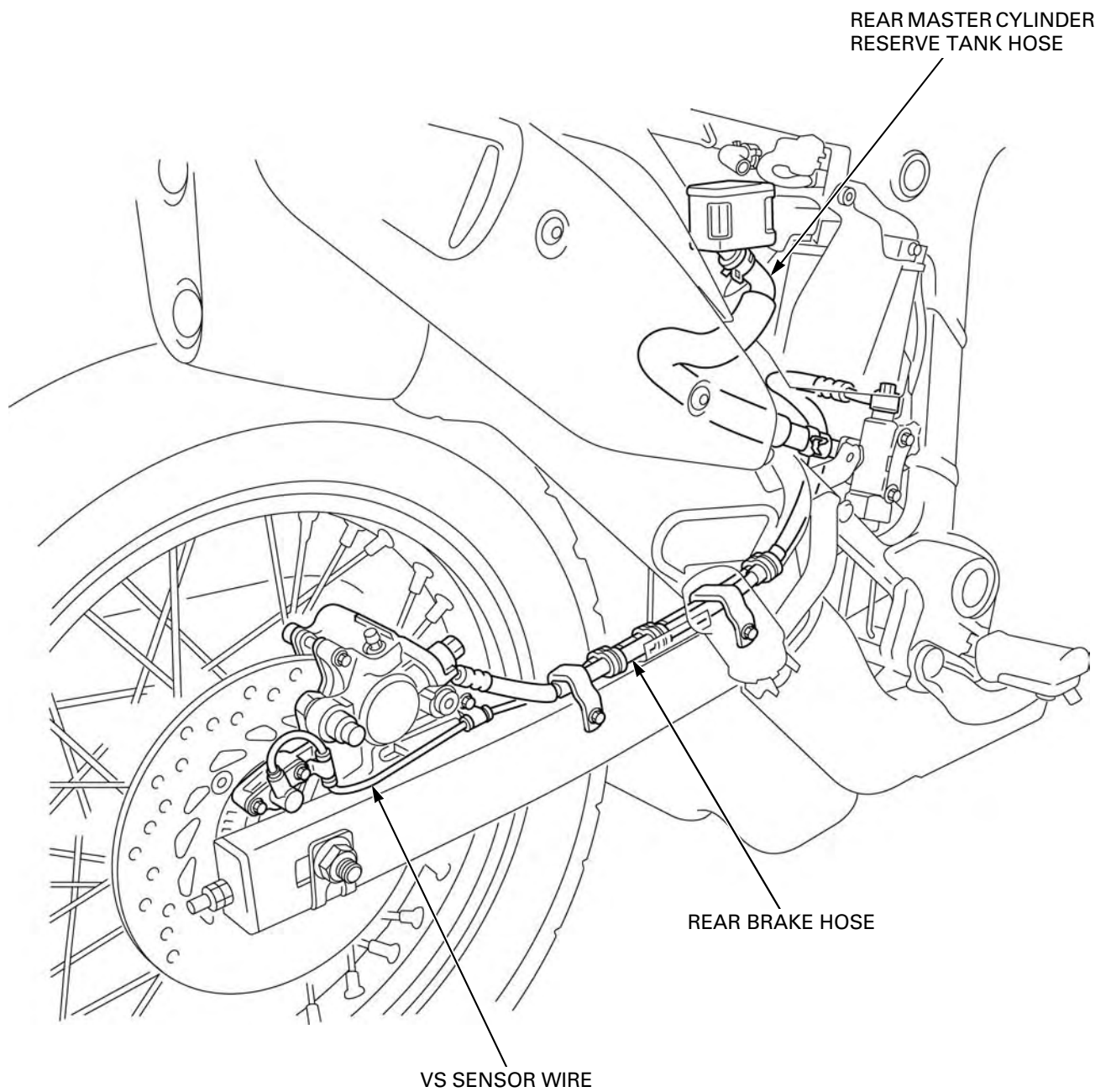
REAR BRAKE LIGHT SWITCH
2P (BLACK) CONNECTOR

STARTER MOTOR CABLE





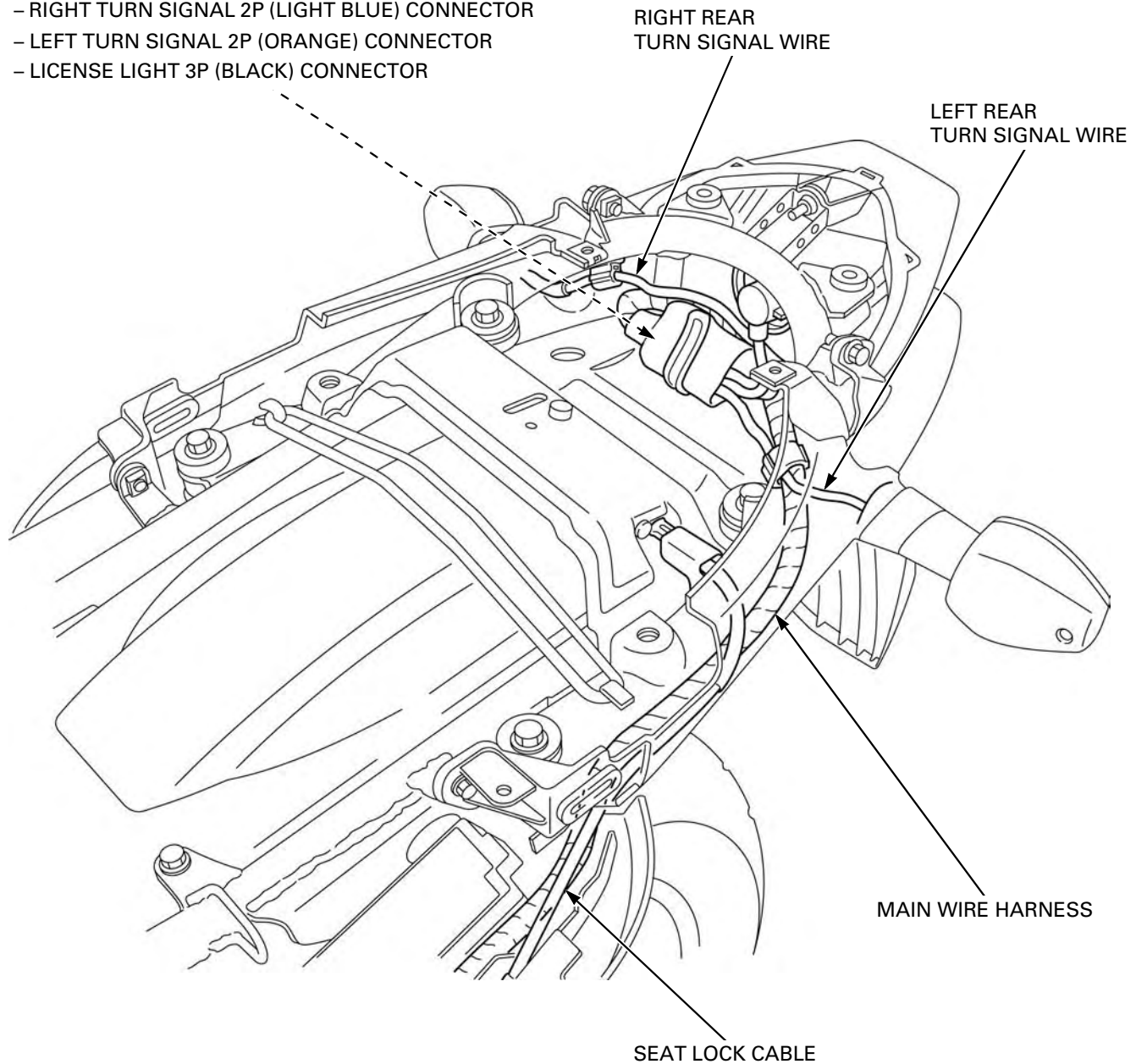




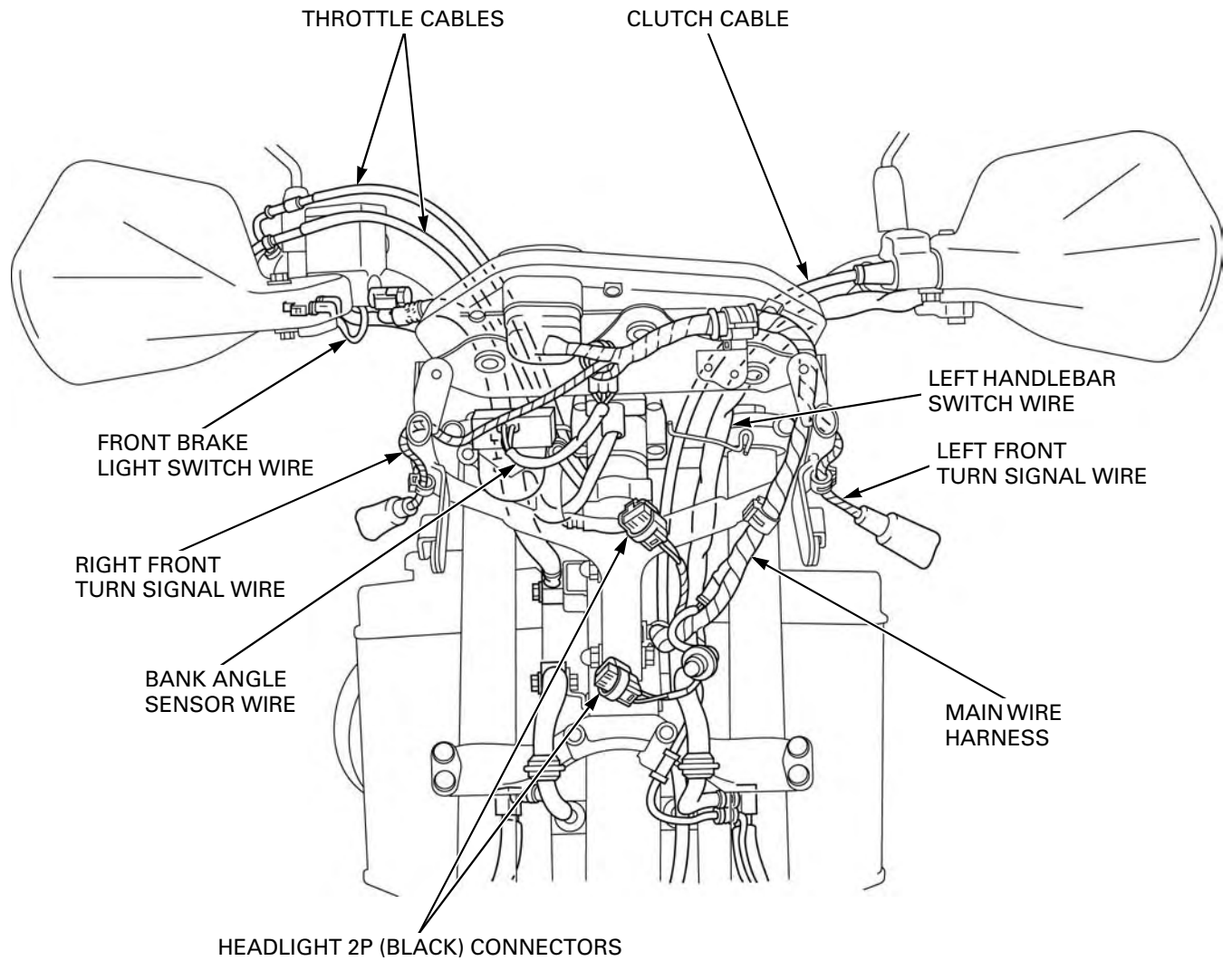
GENERAL INFORMATION

INSIDE BOOT CONNECTORS:

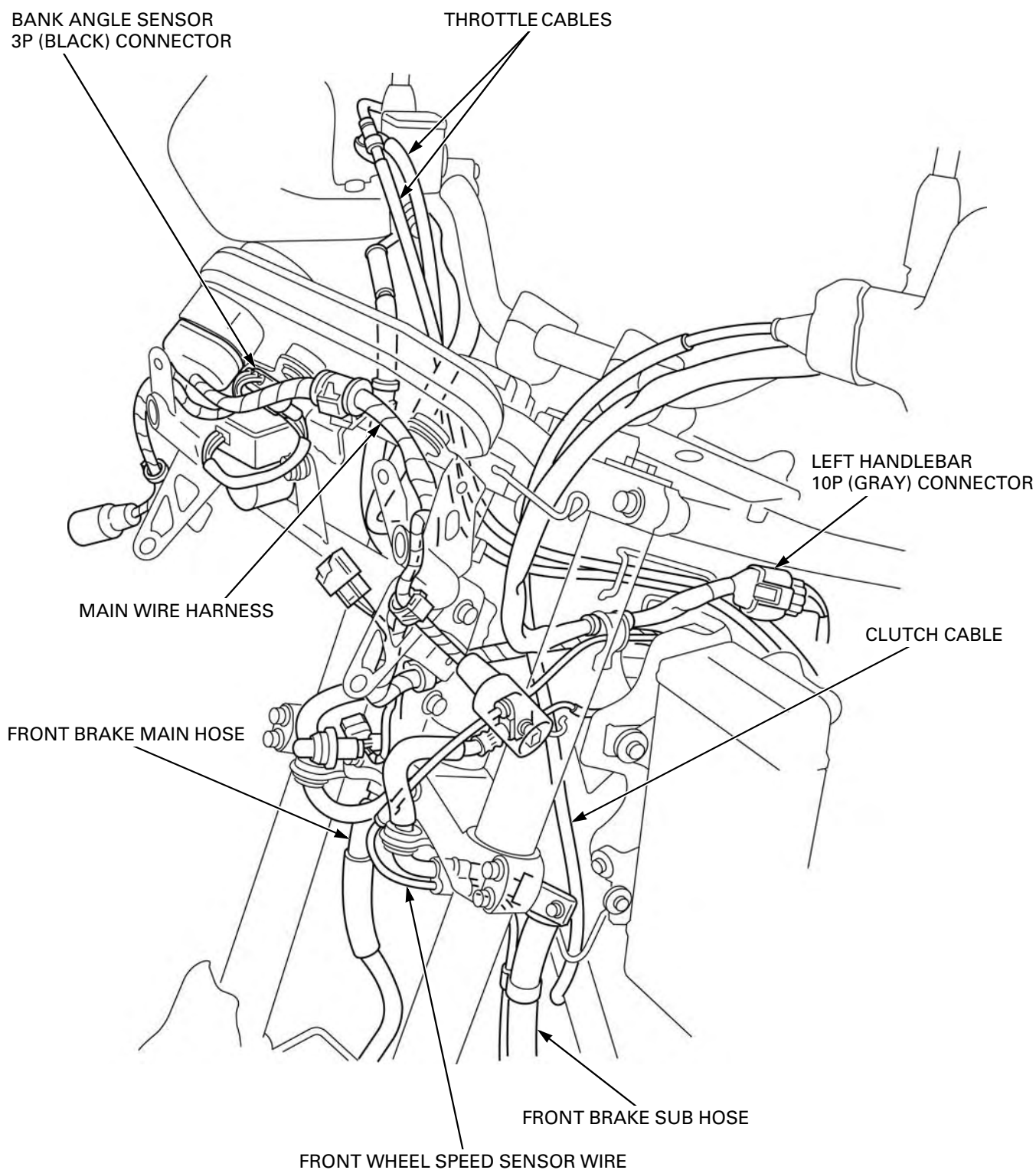
- TAIL/BRAKE LIGHT 3P (NATURAL) CONNECTOR
- RIGHT TURN SIGNAL 2P (LIGHT BLUE) CONNECTOR
- LEFT TURN SIGNAL 2P (ORANGE) CONNECTOR
- LICENSE LIGHT 3P (BLACK) CONNECTOR

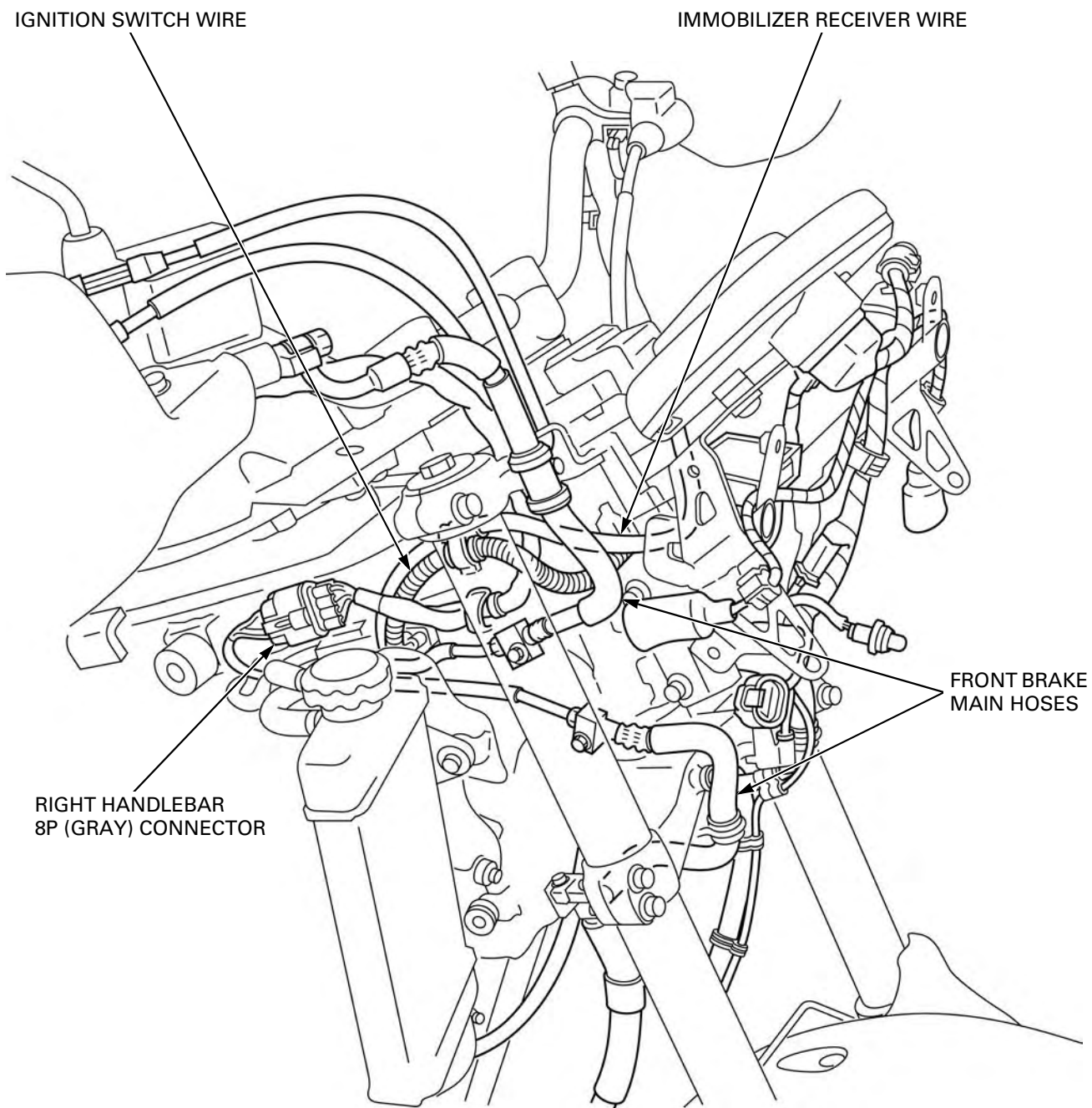


XL700VA

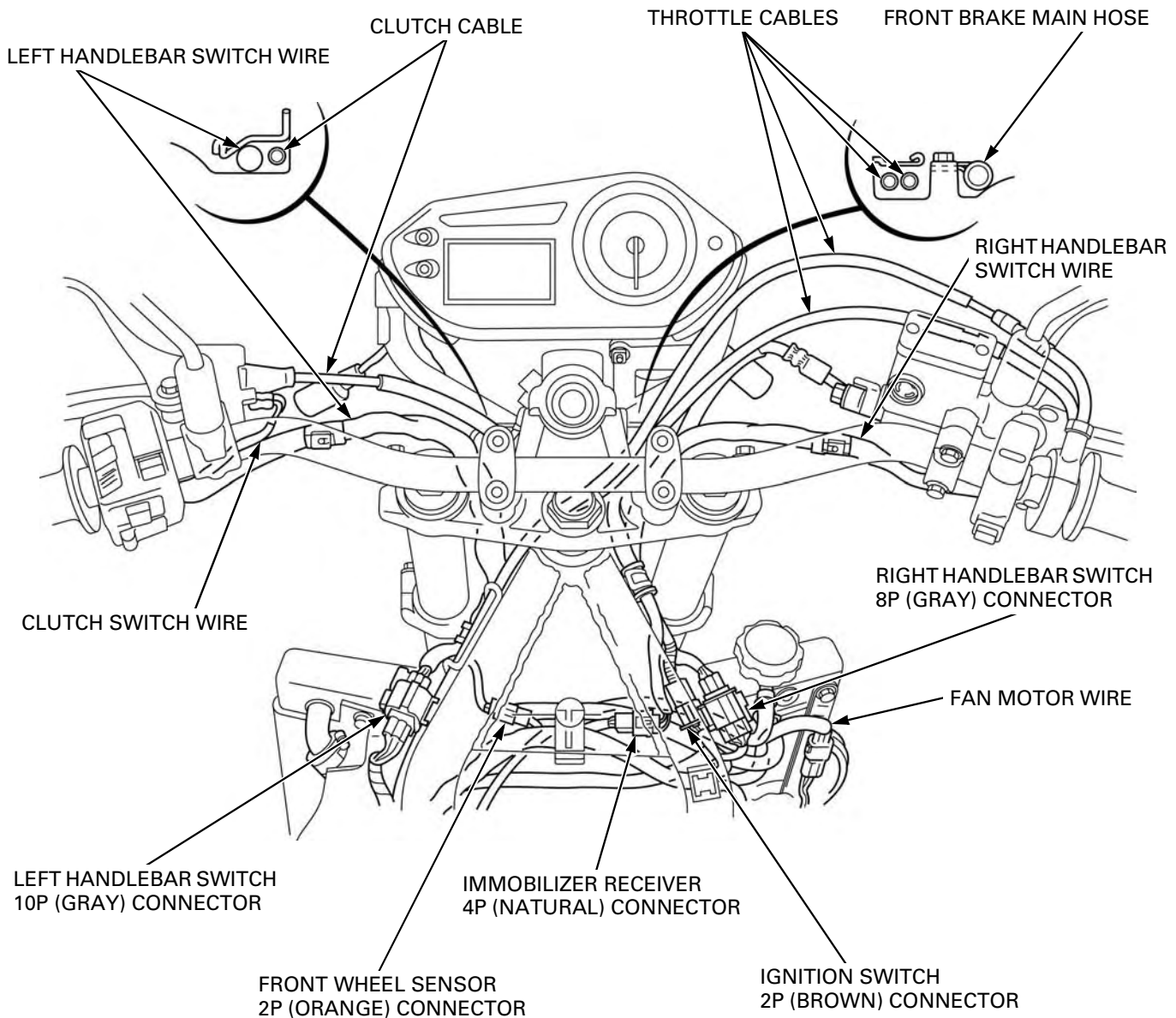


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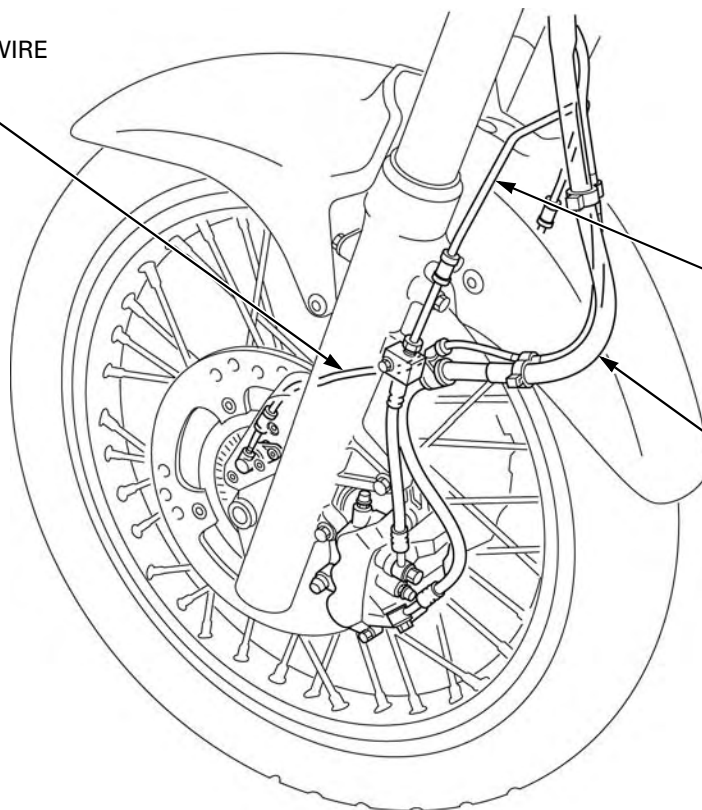




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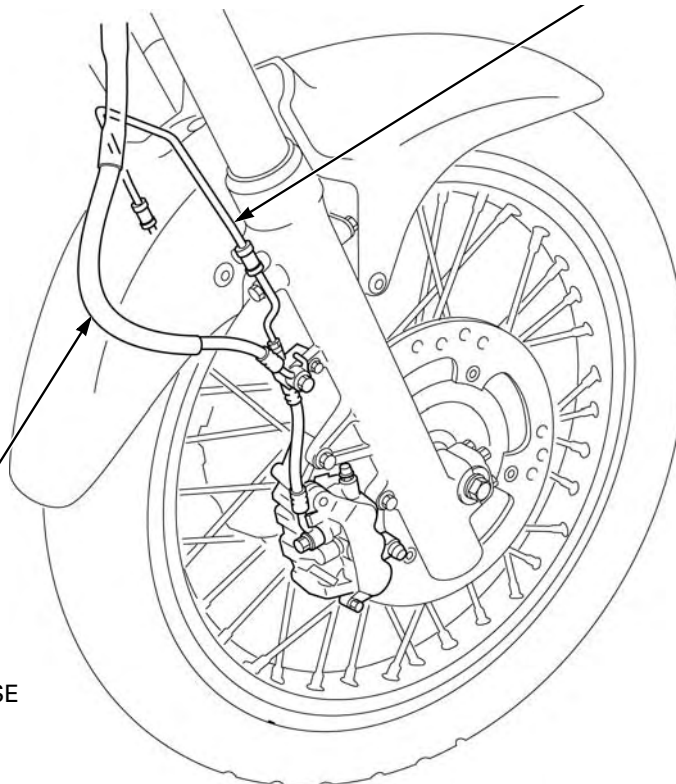
FRONT WHEEL
SPEED SENSOR WIRE



FRONT BRAKE MAIN PIPE

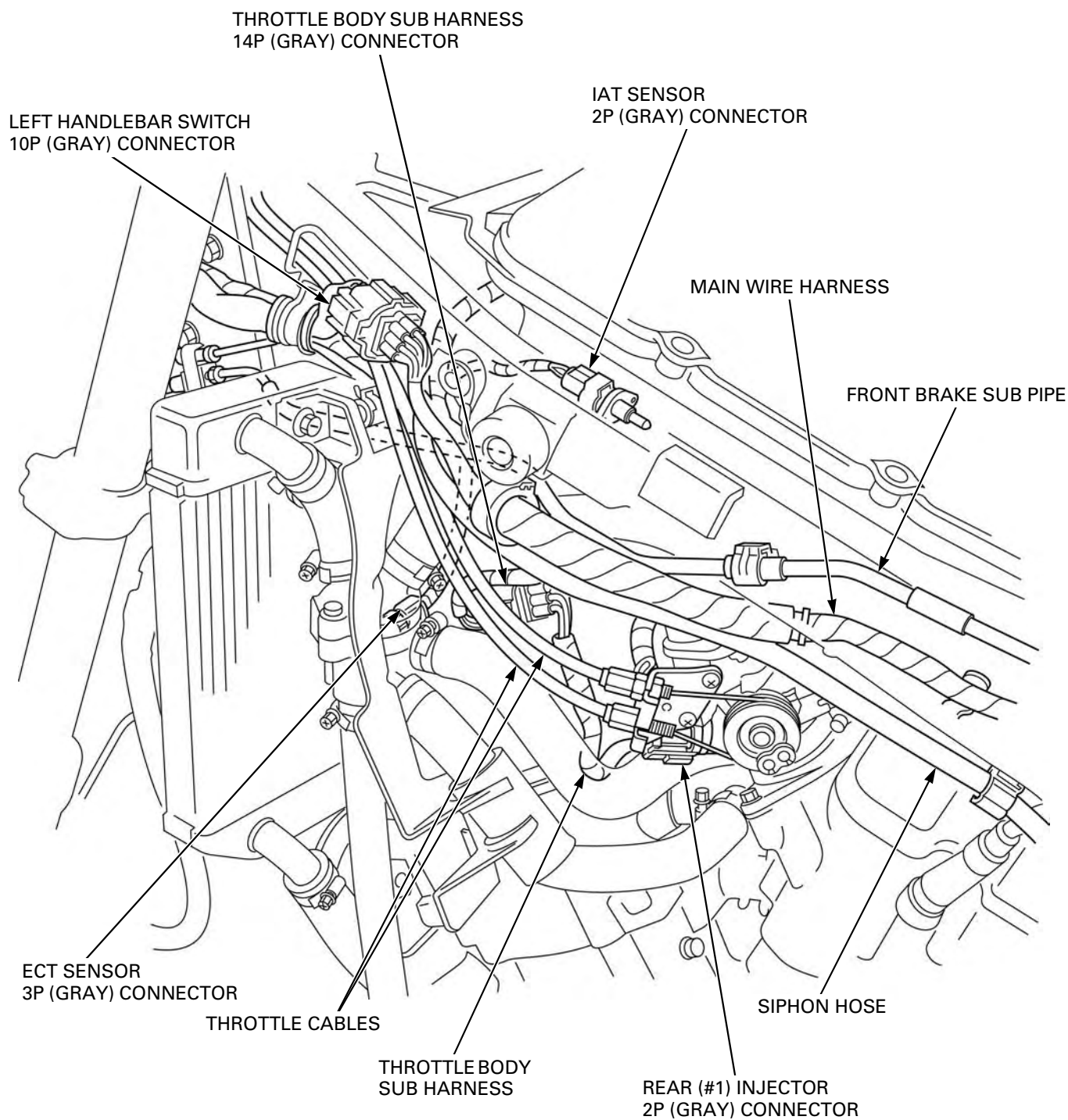
FRONT BRAKE SUB HOSE

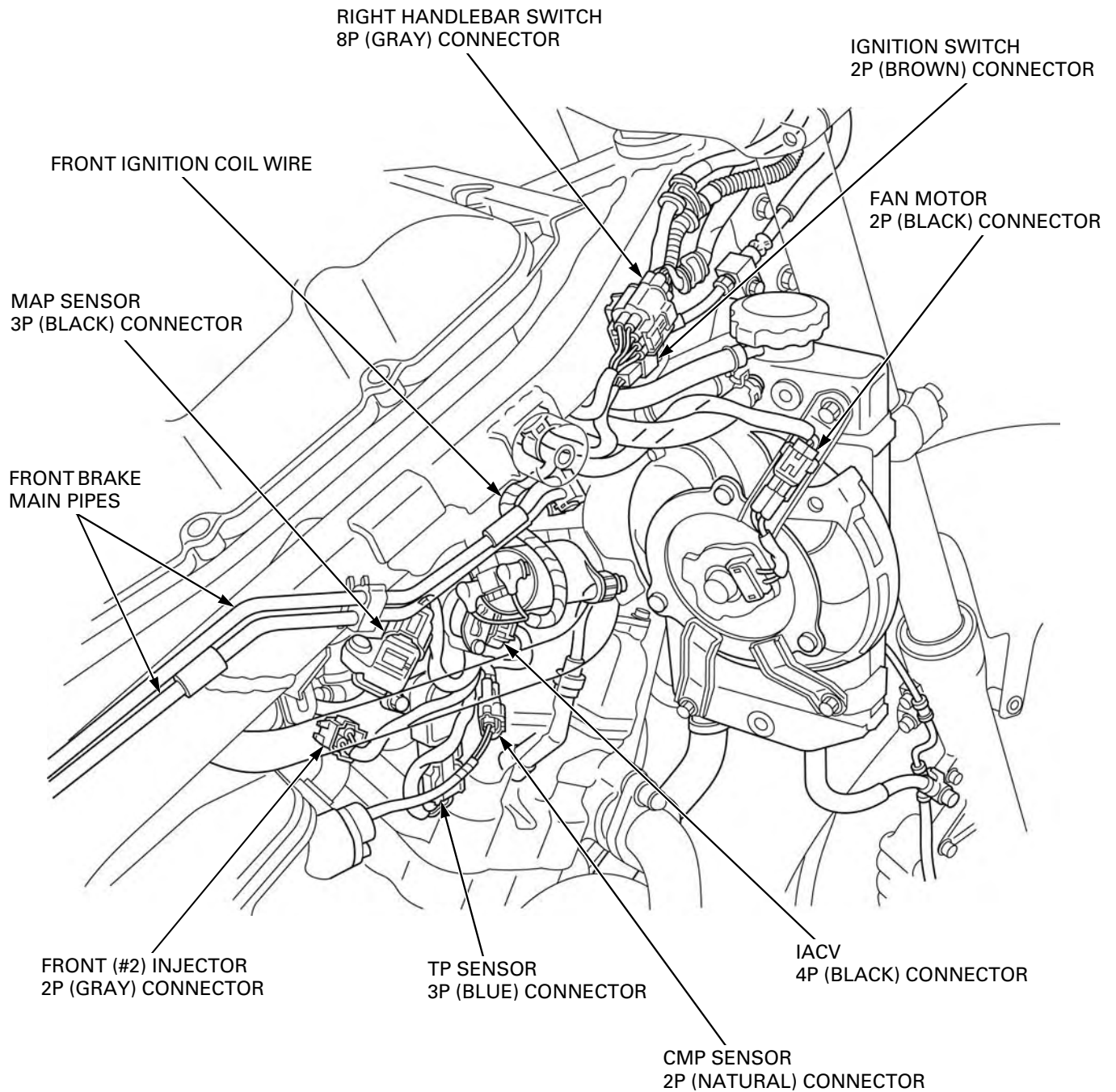
FRONT BRAKE MAIN PIPE



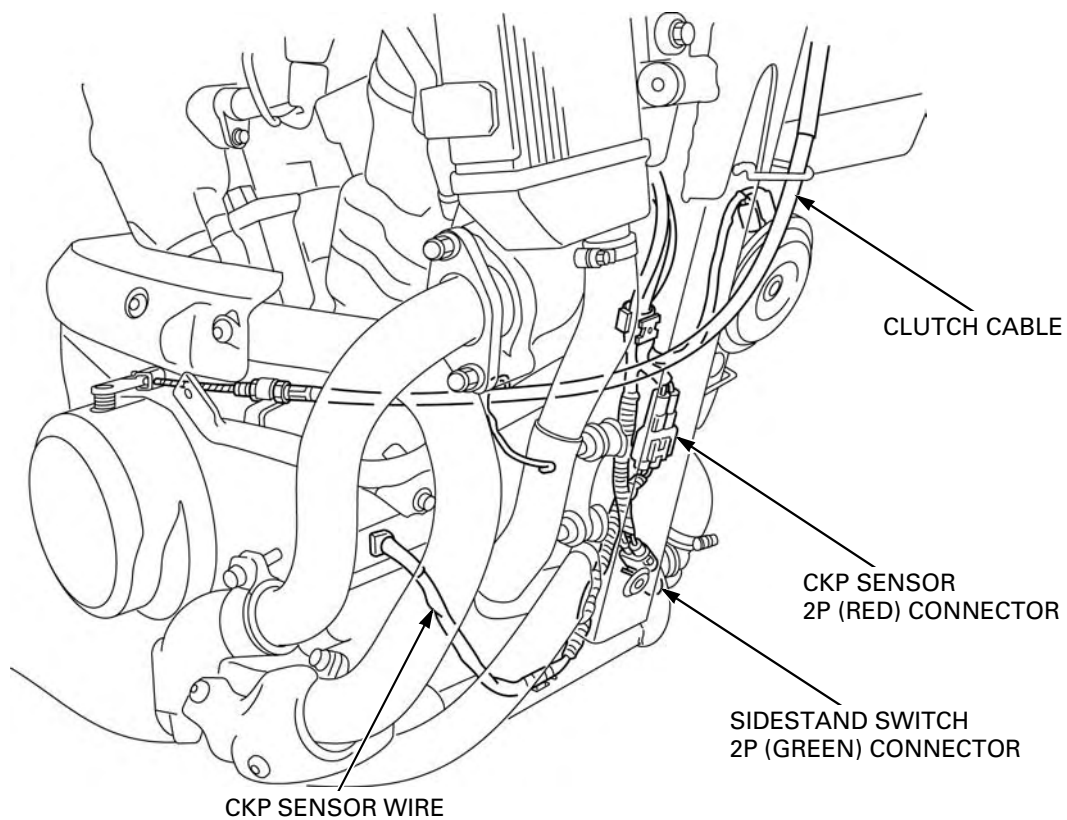
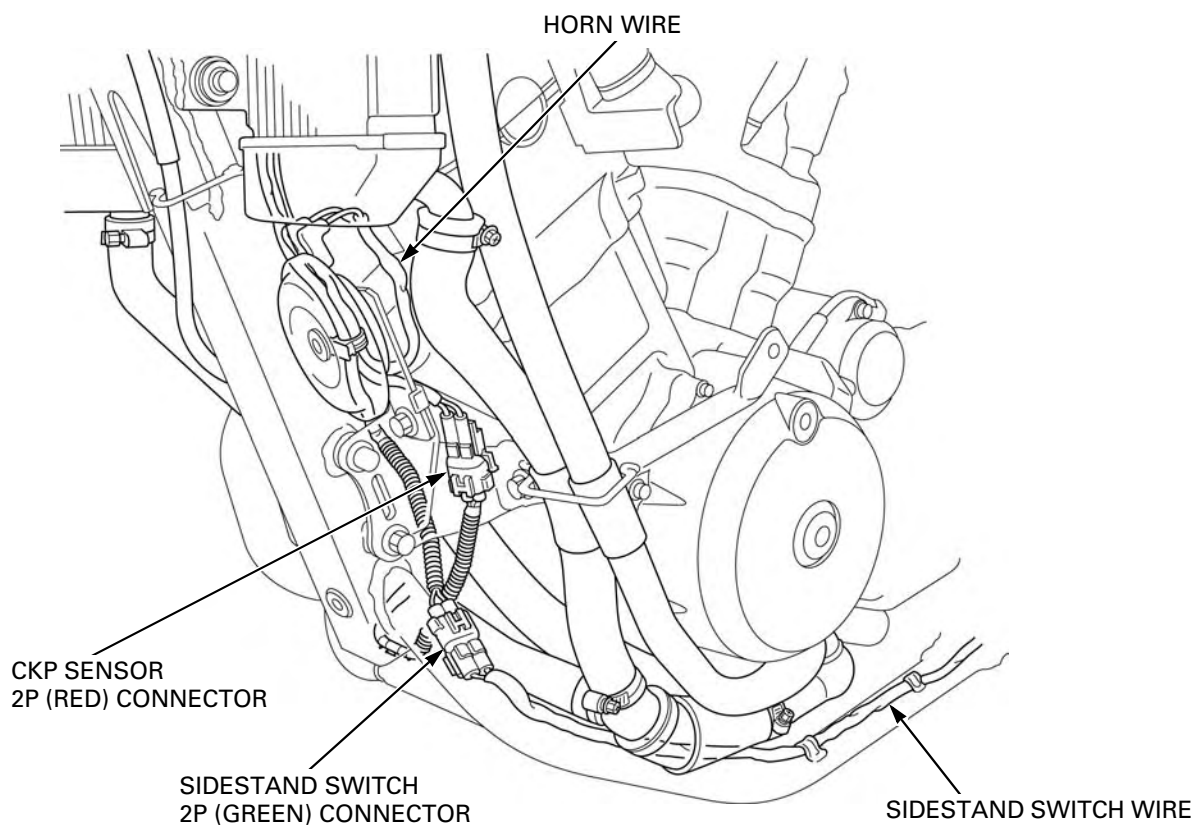
FRONT BRAKE MAIN HOSE

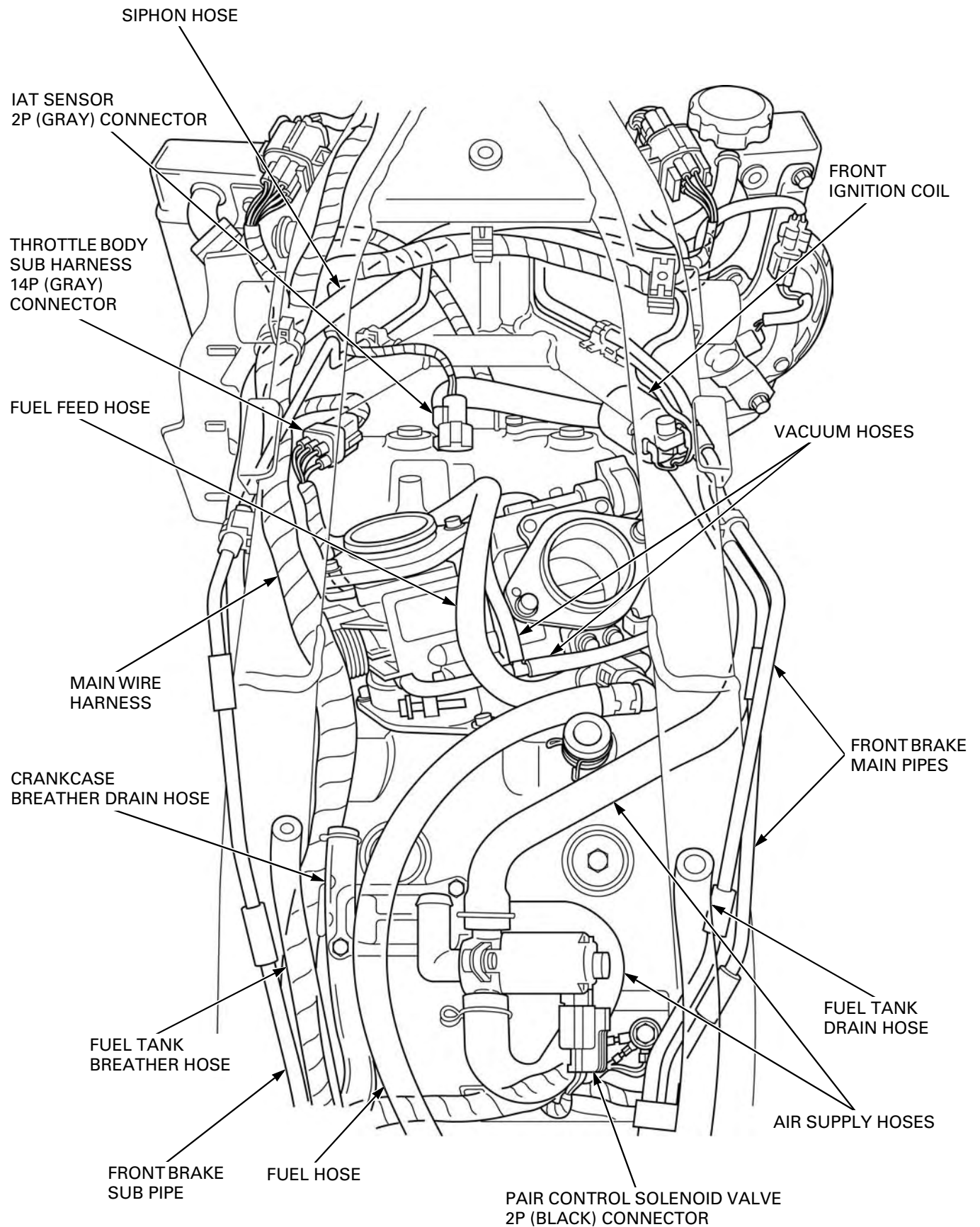
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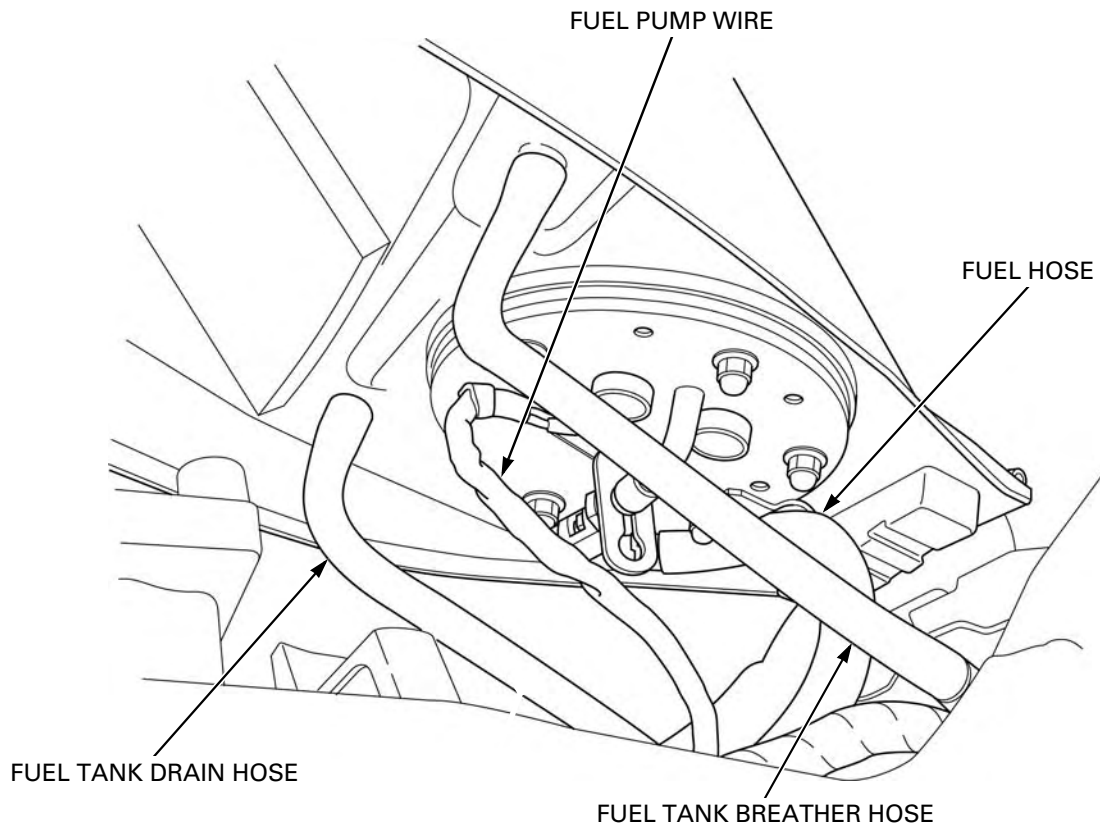
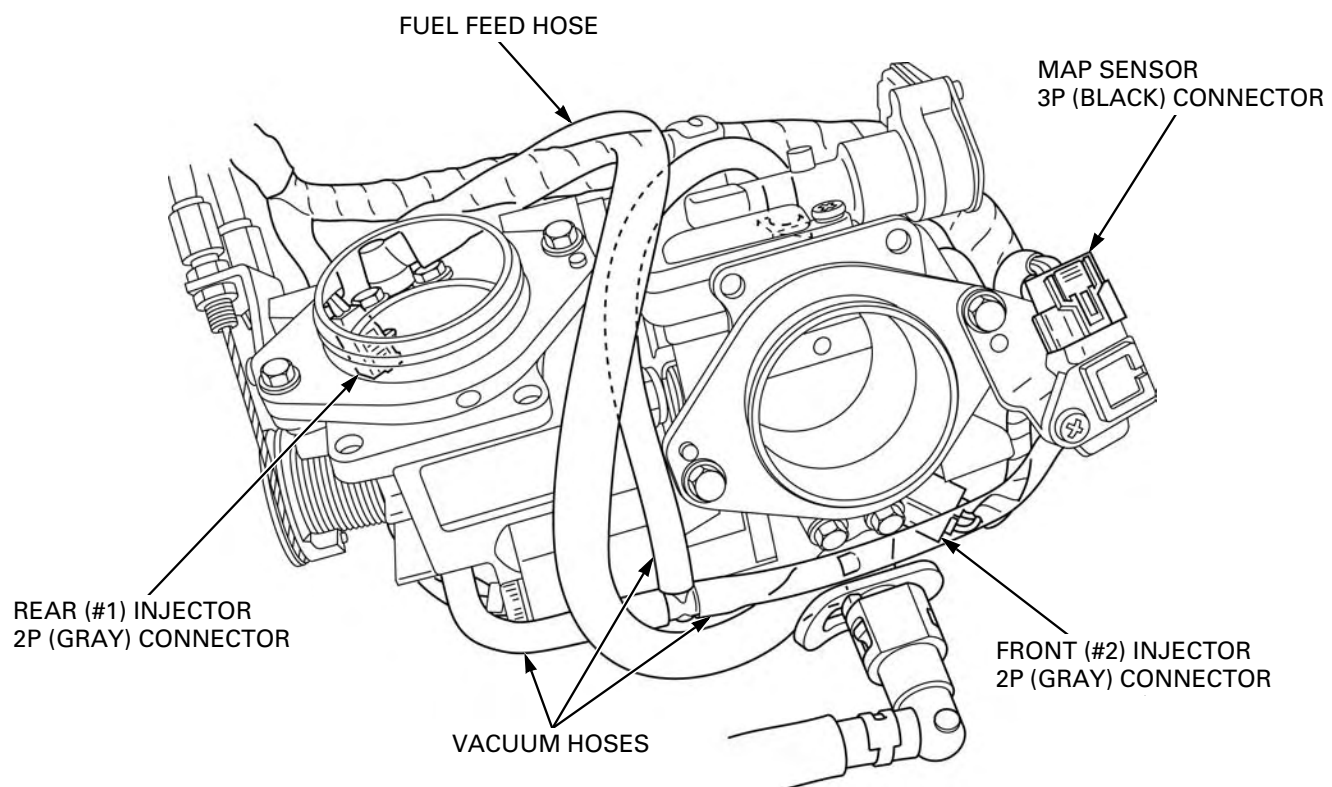


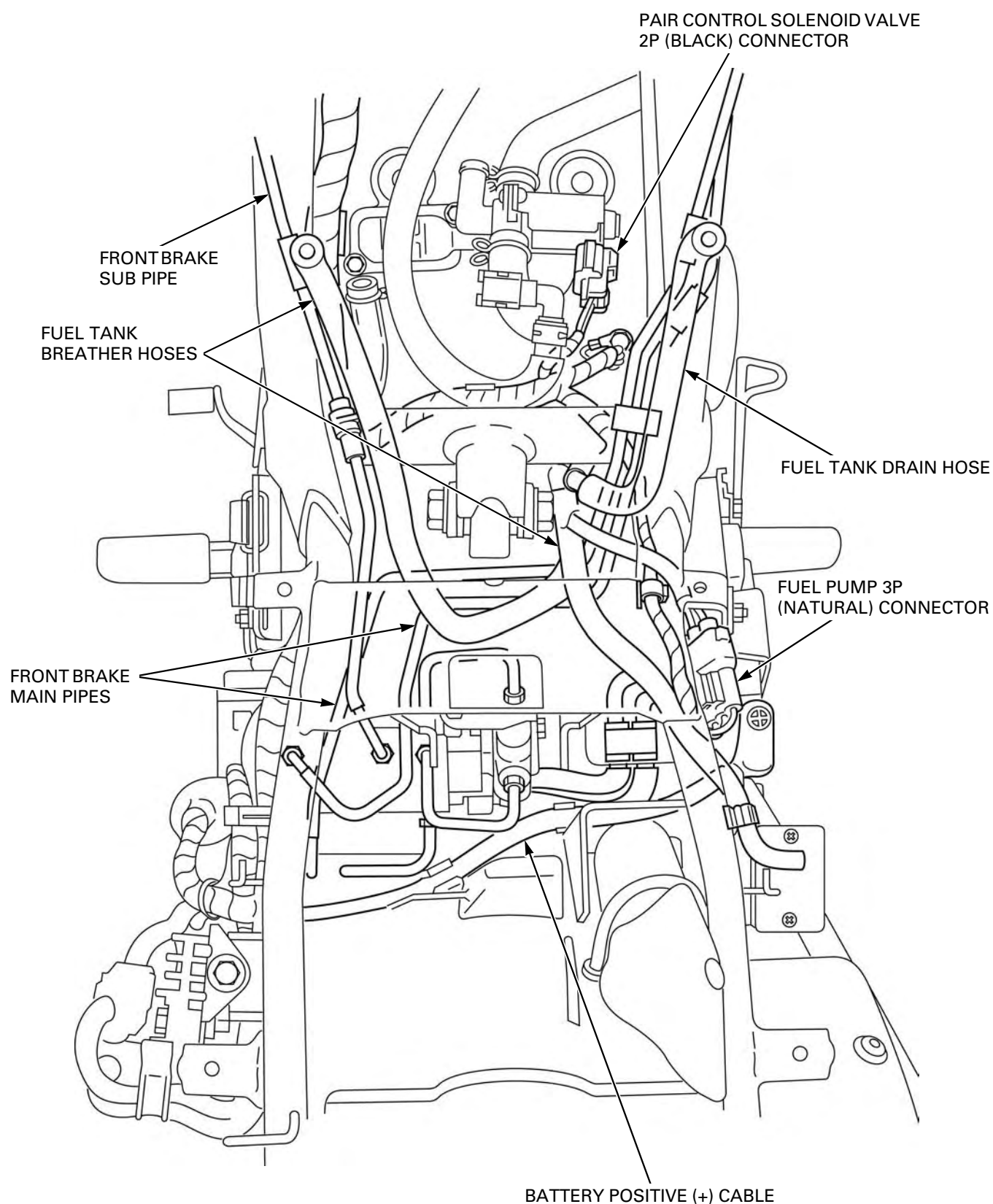
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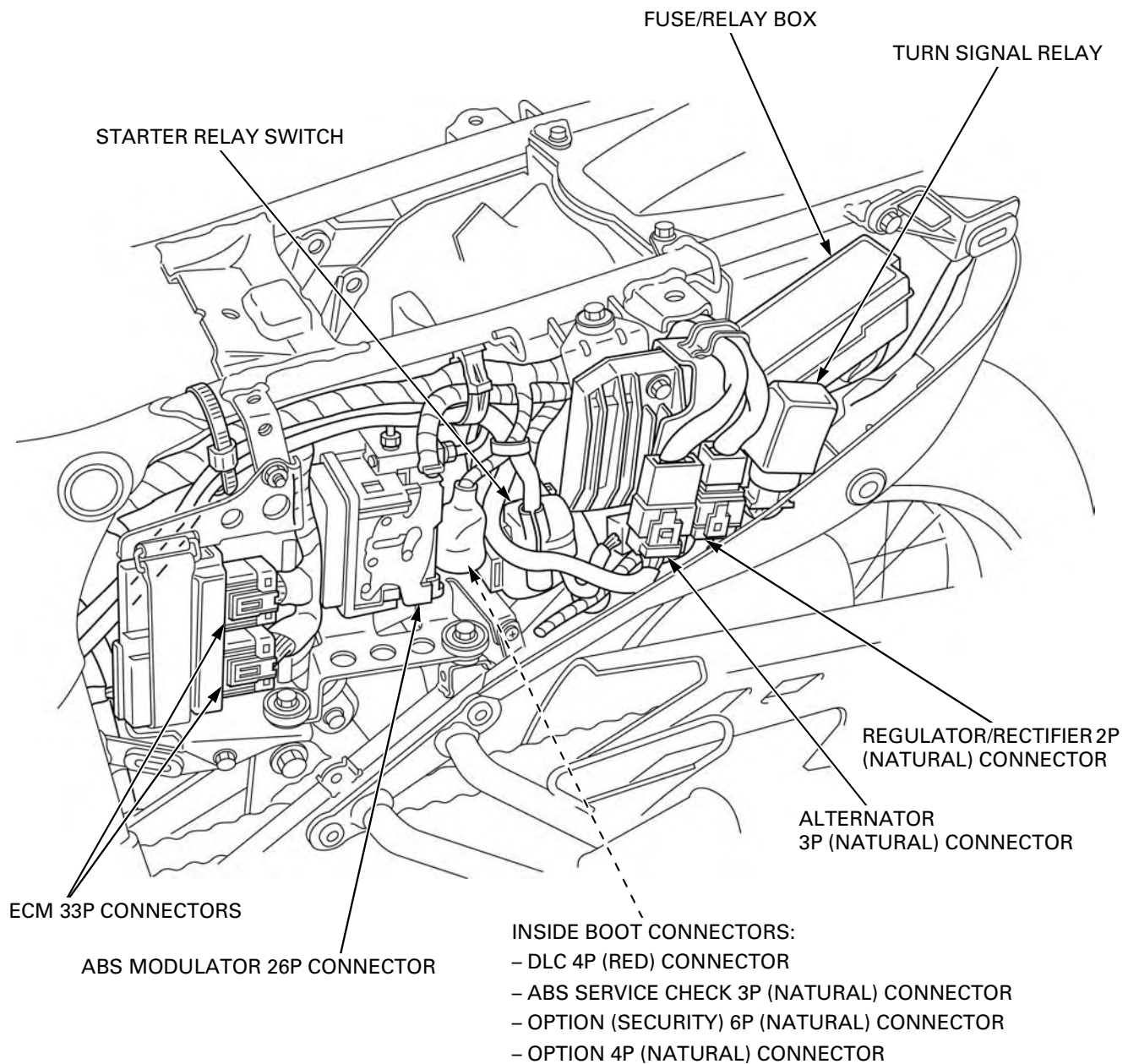


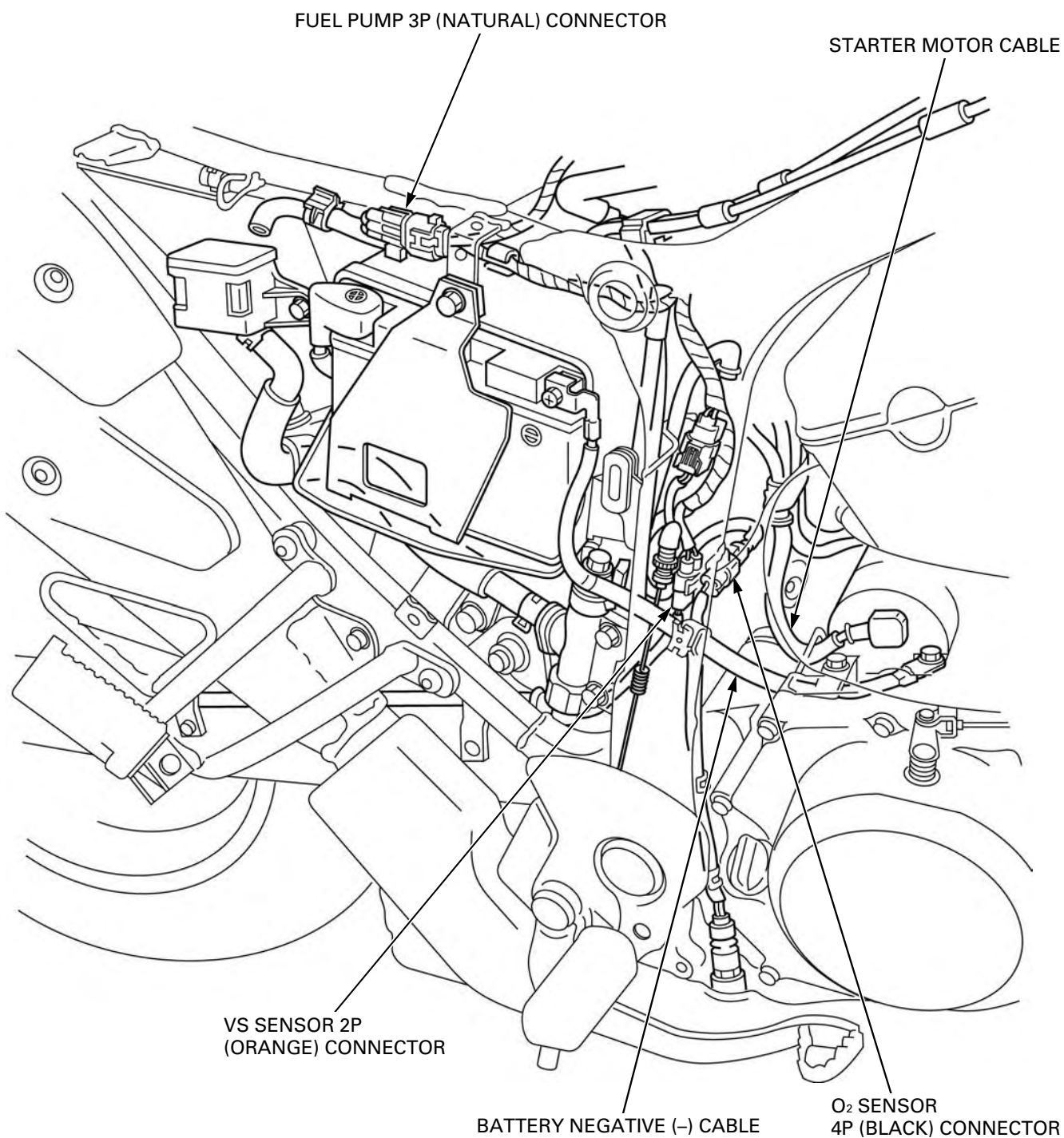


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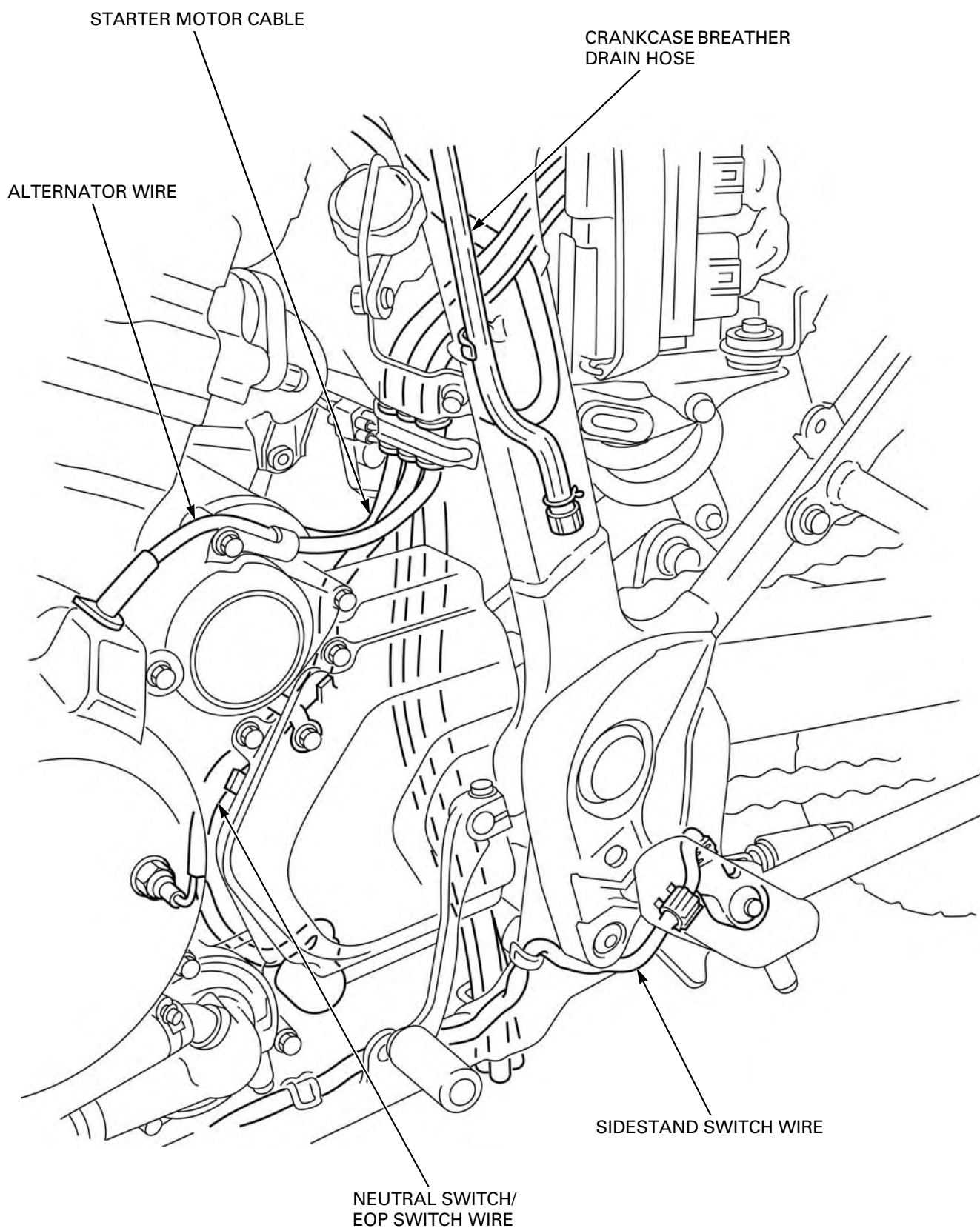


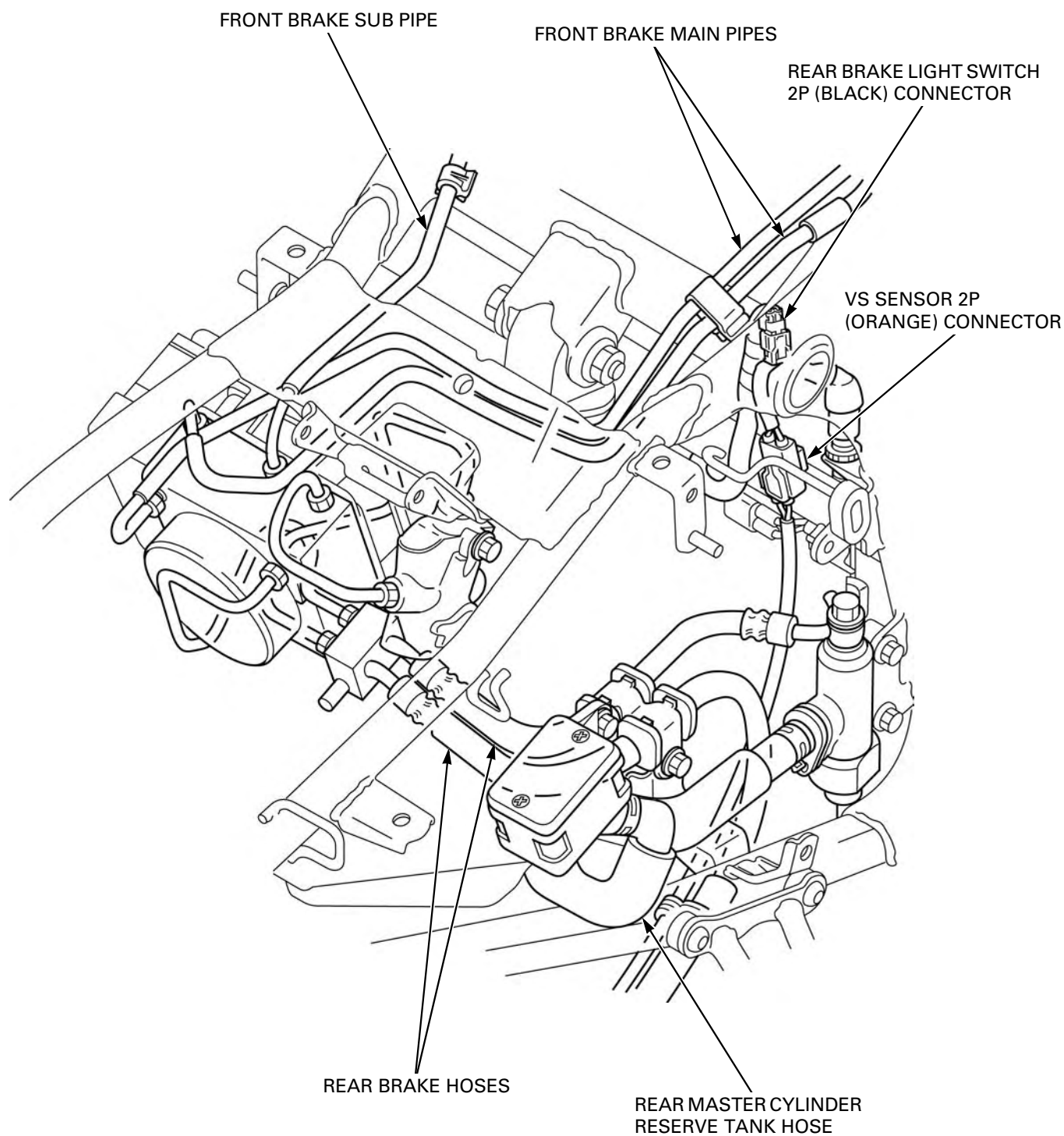




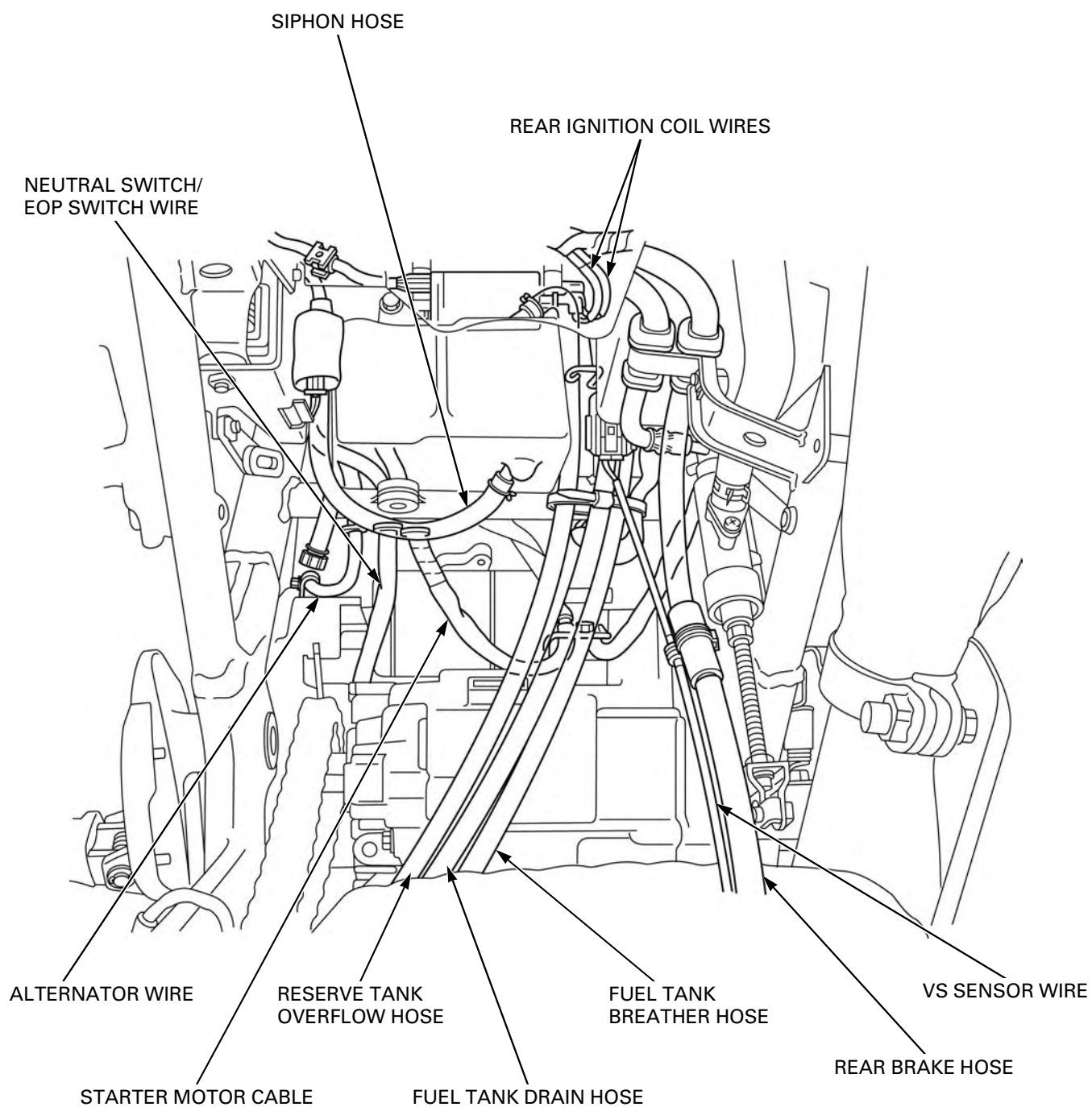


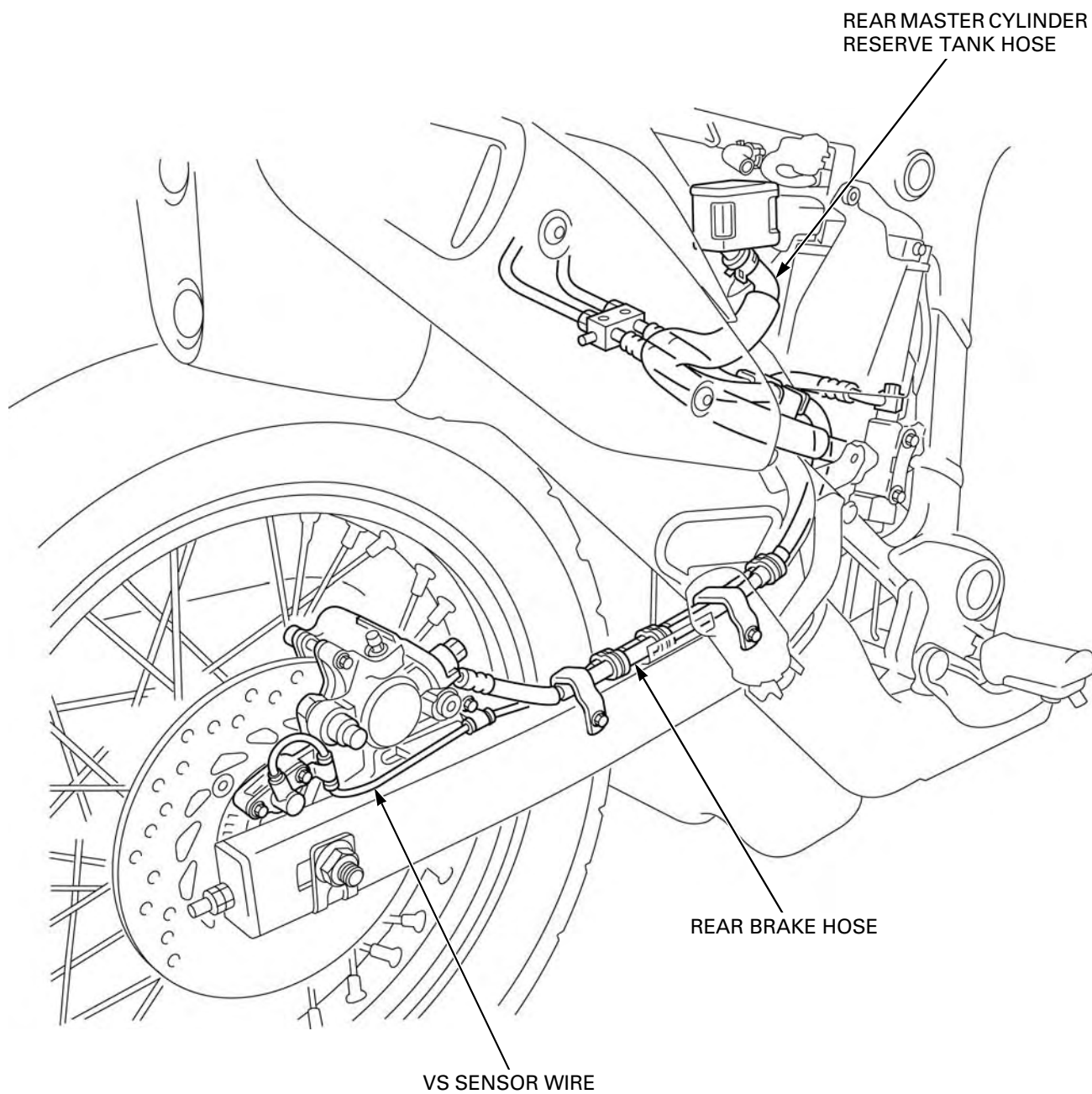
GENERAL INFORMATION





GENERAL INFORMATION

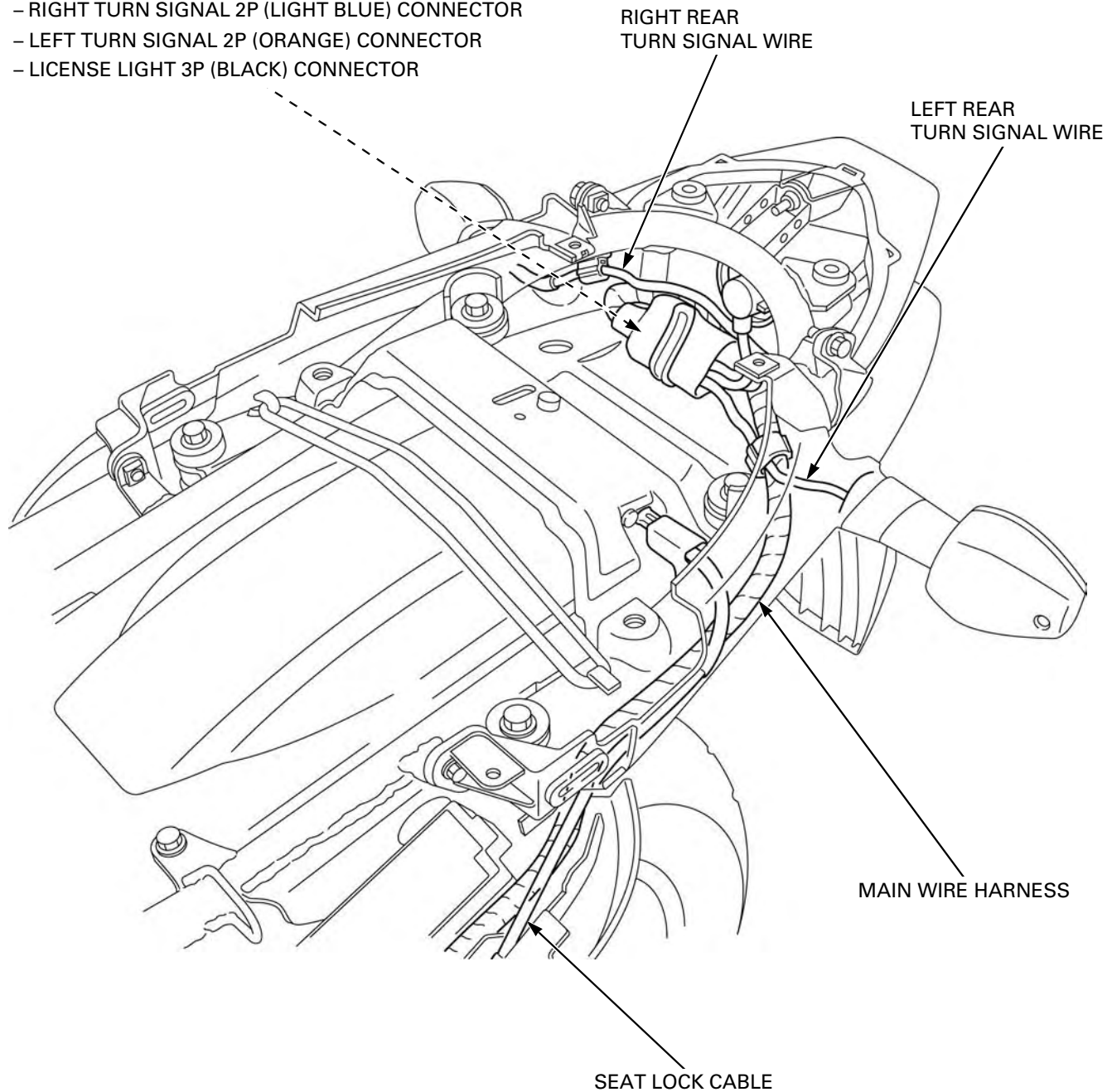




GENERAL INFORMATION

INSIDE BOOT CONNECTORS:

- TAIL/BRAKE LIGHT 3P (NATURAL) CONNECTOR
- RIGHT TURN SIGNAL 2P (LIGHT BLUE) CONNECTOR
- LEFT TURN SIGNAL 2P (ORANGE) CONNECTOR
- LICENSE LIGHT 3P (BLACK) CONNECTOR



EMISSION CONTROL SYSTEMS

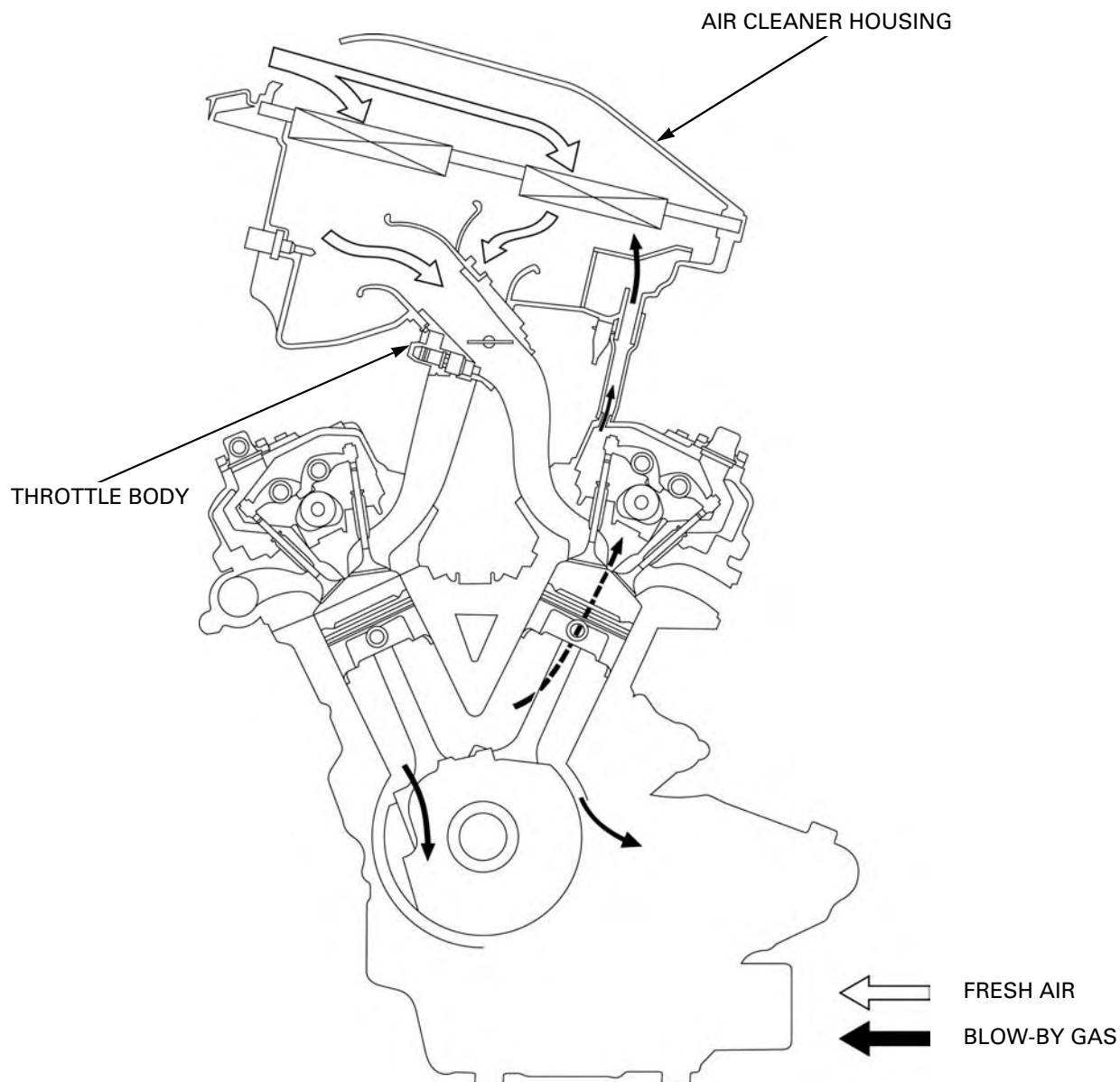
SOURCE OF EMISSIONS

The combustion process produces carbon monoxide (CO), oxides of nitrogen (NO_x) and hydrocarbons (HC). Control of carbon monoxide, 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.

Honda Motor Co., Ltd. utilizes various systems 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 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.

No adjustment should be made about the exhaust emission control systems. The exhaust emission control system is separate from the crankcase emission control system.

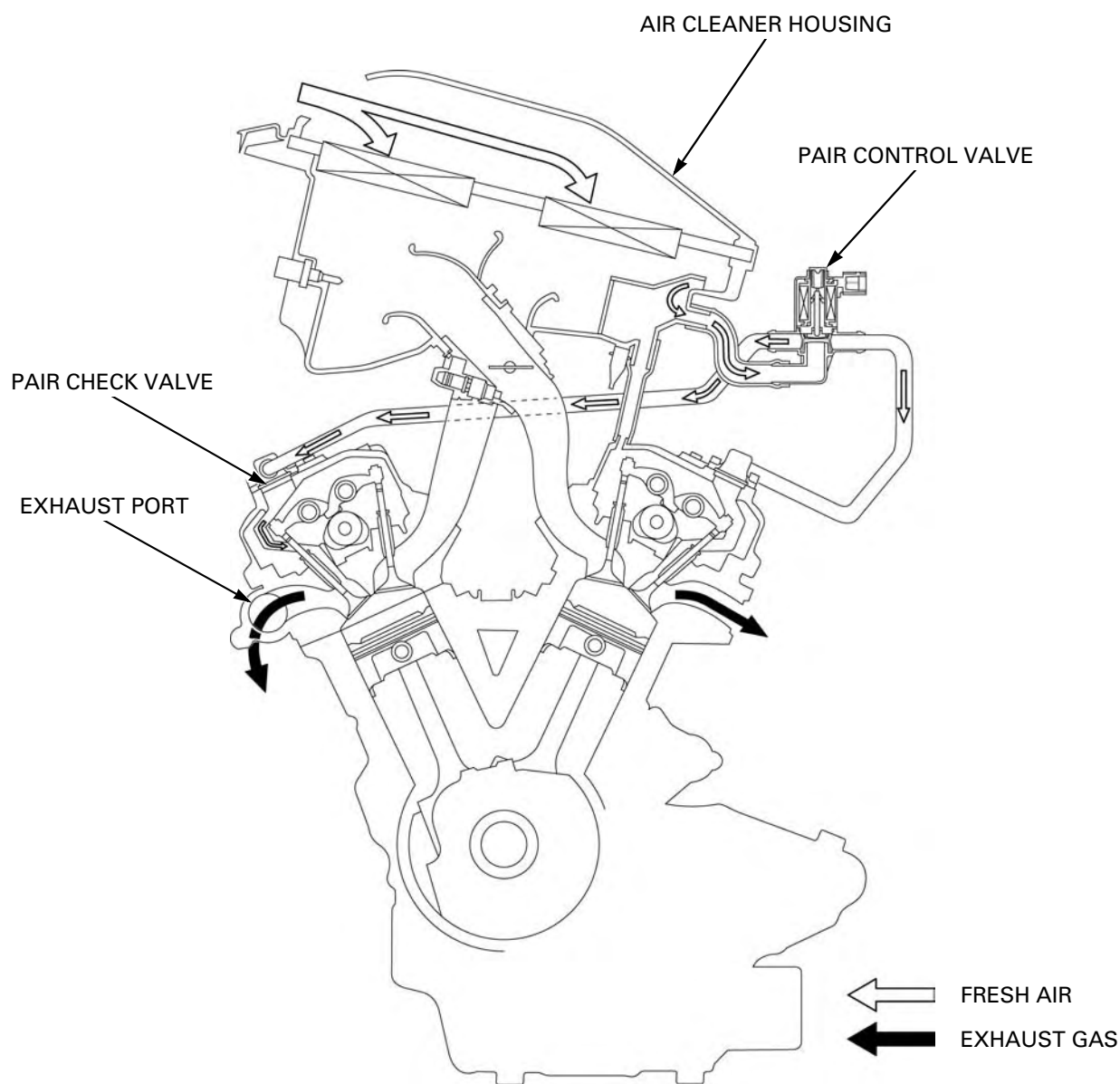
SECONDARY AIR SUPPLY SYSTEM

The 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 (Pulse Secondary Air Injection) 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 the 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 motorcycle 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_x in the engine's exhaust to carbon dioxide (CO₂), dinitrogen (N₂) and water vapor.

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

NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Local 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 vehicle for the purpose of noise control prior to its sale or delivery to the ultimate customer or while it is in use; (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

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

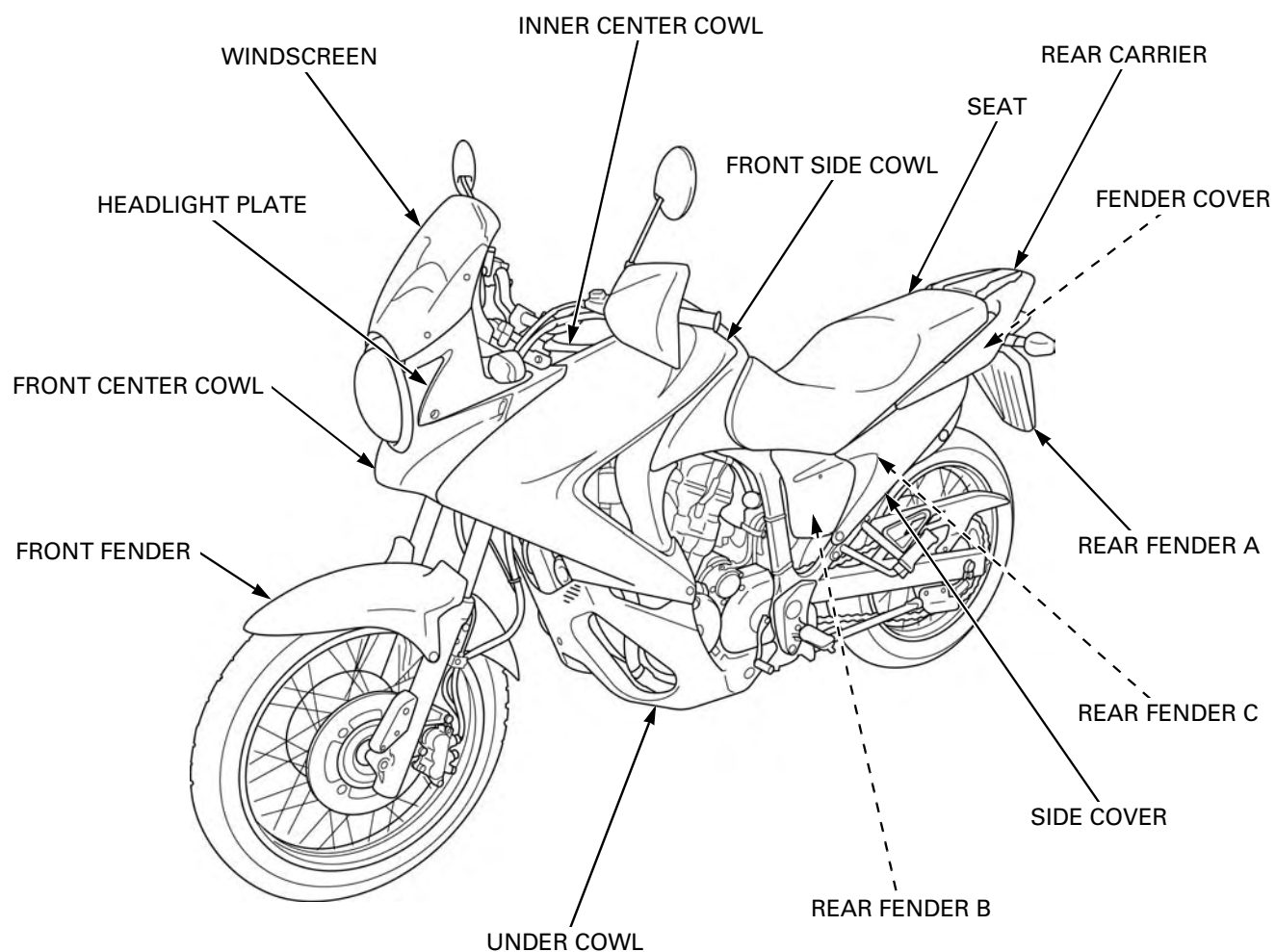
1. Removal of, or puncturing of the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

MEMO

2. FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATION.....	2-2	FRONT SIDE COWL.....	2-9
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TROUBLESHOOTING	2-3	AIR GUIDE	2-10
SEAT	2-4	WINDSCREEN	2-11
SIDE COVER.....	2-4	HEADLIGHT PLATE	2-11
REAR CARRIER	2-5	FRONT CENTER COWL.....	2-12
FENDER COVER.....	2-6	FRONT FENDER	2-13
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REAR FENDER C	2-7	EXHAUST SYSTEM	2-14
REAR FENDER B	2-8	HEAT GUARD PLATE	2-23
INNER CENTER COWL	2-9	SIDESTAND	2-23

BODY PANEL LOCATION



SERVICE INFORMATION

GENERAL

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

TORQUE VALUES

Exhaust pipe joint stud bolt	–	See page 2-18
Muffler band bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)	
Rear carrier bolt	26.4 N·m (2.7 kgf·m, 19 lbf·ft)	
Muffler mounting bolt	39.2 N·m (4.0 kgf·m, 29 lbf·ft)	
Exhaust chamber mounting bolt	30.8 N·m (3.1 kgf·m, 23 lbf·ft)	
Exhaust pipe joint nut	22.1 N·m (2.3 kgf·m, 16 lbf·ft)	
Pillion step holder bolt	26.5 N·m (2.7 kgf·m, 20 lbf·ft)	
Sidestand pivot bolt	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)	Apply grease to the sliding surface.
Sidestand pivot lock nut	29.4 N·m (3.0 kgf·m, 22 lbf·ft)	

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leaks

Poor performance

- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

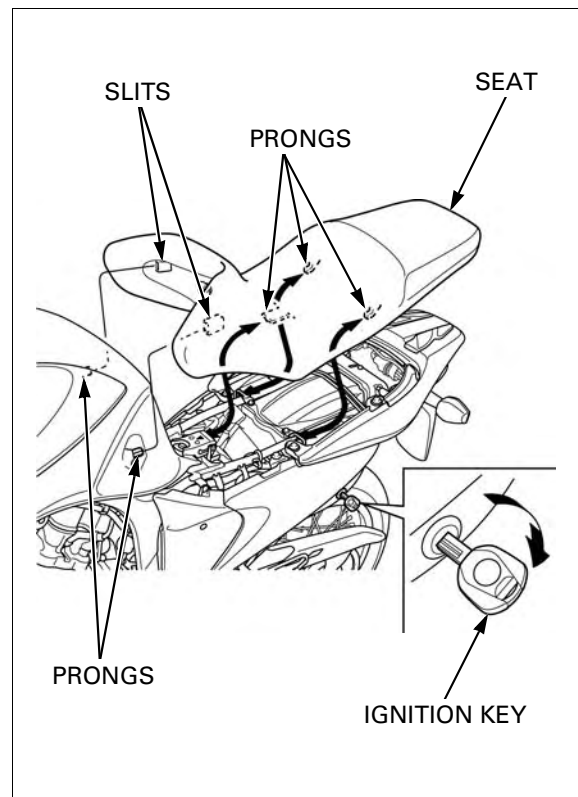
SEAT

REMOVAL/INSTALLATION

Unhook the seat lock using the ignition key.

Remove the seat backward.

Install the seat by inserting prongs to the frame and slits properly.



SIDE COVER

REMOVAL/INSTALLATION

Be careful not to damage the side cover bosses.

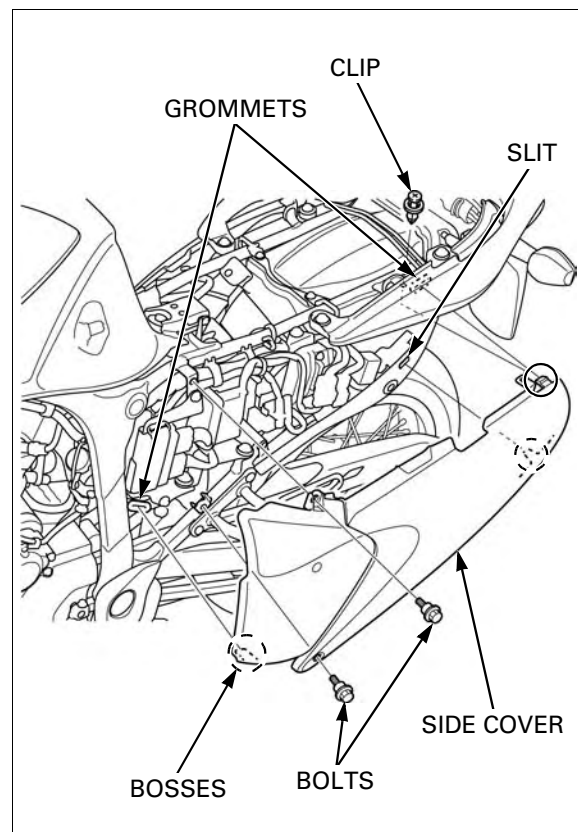
Remove the seat (page 2-4).

Remove the trim clip and bolts.

Release the bosses on the side cover from the frame grommets and rear fender C slit, then remove the side cover.

Install the side cover by inserting its bosses into the frame grommets and tighten the bolts securely.

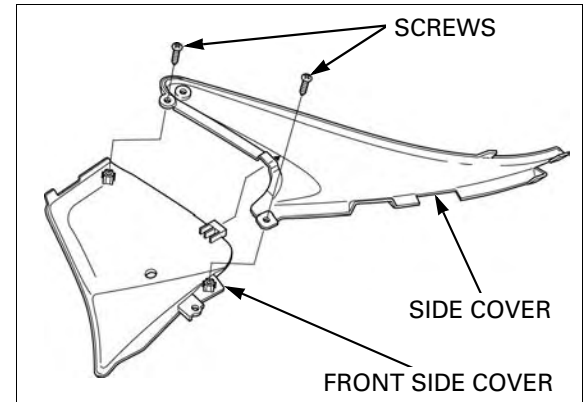
Install the seat (page 2-4).



DISASSEMBLY/ASSEMBLY

Remove the screws and front side cover from the side cover.

Assembly is in the reverse order of disassembly.



REAR CARRIER

REMOVAL/INSTALLATION

Remove the seat (page 2-4).

Remove the following:

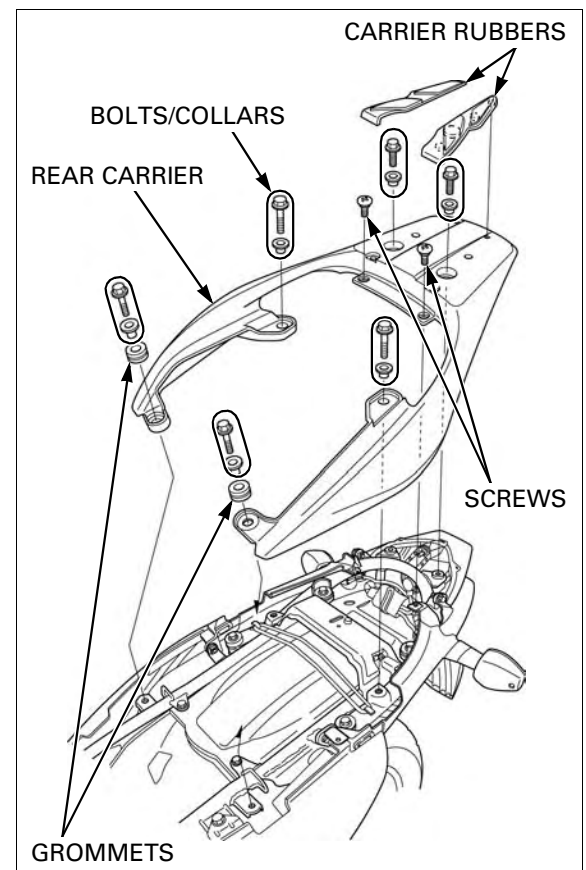
- Carrier rubbers
- Screws
- Bolts
- Collars
- Grommets
- Rear carrier

Installation is in the reverse order of removal.

TORQUE:

Rear carrier bolt:

26.4 N·m (2.7 kgf·m, 19 lbf·ft)



FENDER COVER

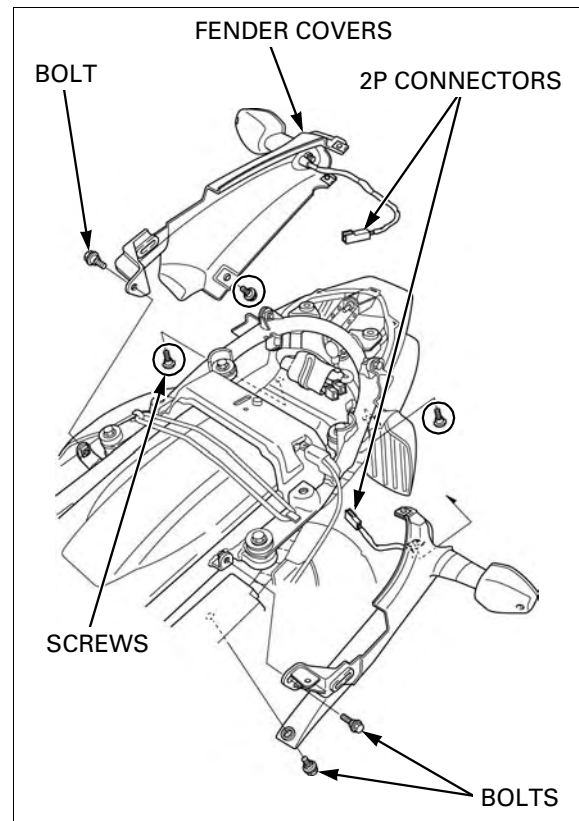
REMOVAL/INSTALLATION

Remove the rear carrier (page 2-5).

Disconnect the turn signal 2P connectors.

Remove the bolts, screws and fender covers.

Installation is in the reverse order of removal.



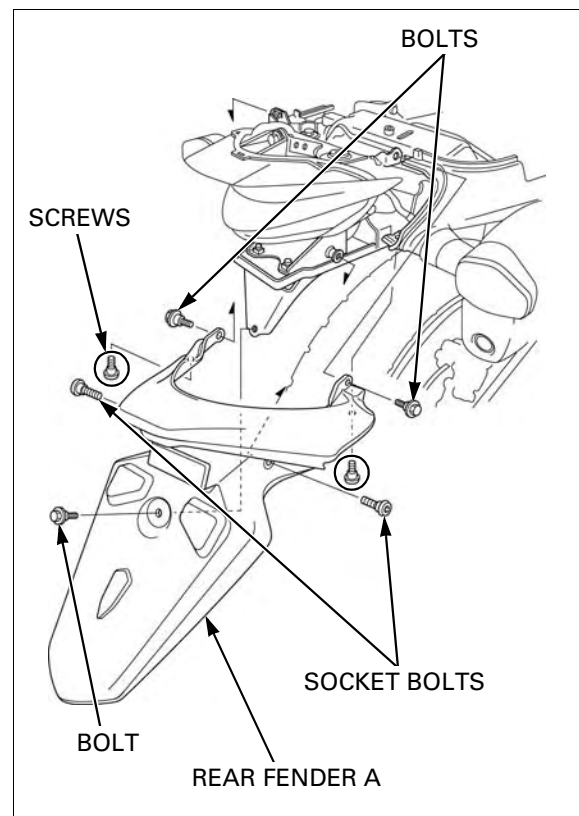
REAR FENDER A

REMOVAL/INSTALLATION

Remove the rear carrier (page 2-5).

Remove the socket bolts, screws, bolts and rear fender A.

Installation is in the reverse order of removal.



REAR FENDER C

REMOVAL/INSTALLATION

Remove the following:

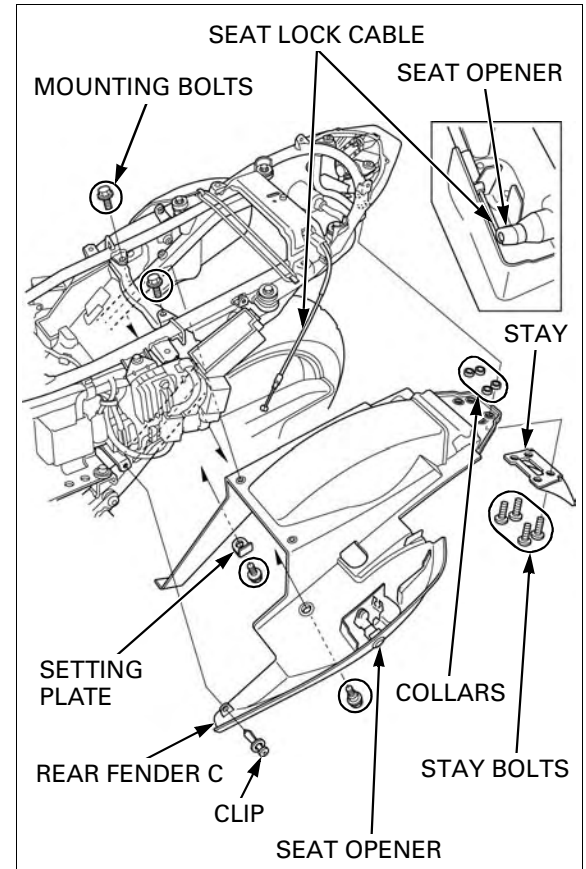
- Fender cover (page 2-6)
- Rear fender A (page 2-6)

Disconnect the seat lock cable from the seat opener.

Remove the stay bolts, collars and rear fender A mounting stay.

Remove the trim clip, rear fender C mounting bolts, setting plate and rear fender C.

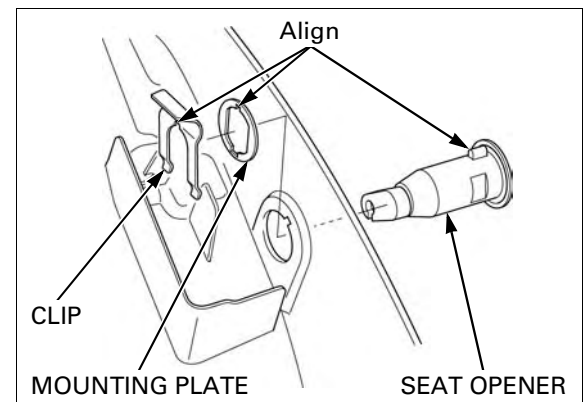
Installation is in the reverse order of removal.



DISASSEMBLY/ASSEMBLY

Remove the clip, seat opener and mounting plate.

Assembly is in the reverse order of disassembly.



REAR FENDER B

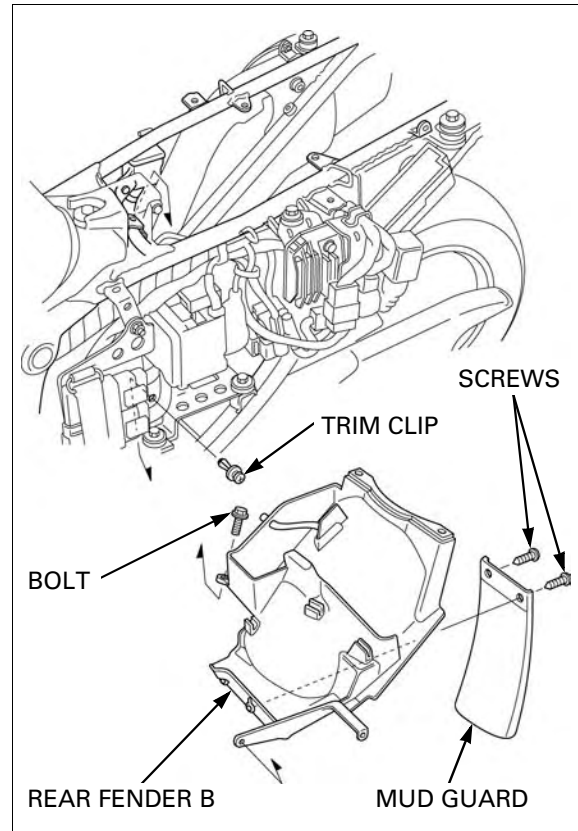
REMOVAL/INSTALLATION (XL700VA)

Remove the rear fender C (page 2-7).

Remove the screws and mud guard.

Remove the trim clip, bolt and rear fender B.

Installation is in the reverse order of removal.



REMOVAL/INSTALLATION (XL700V)

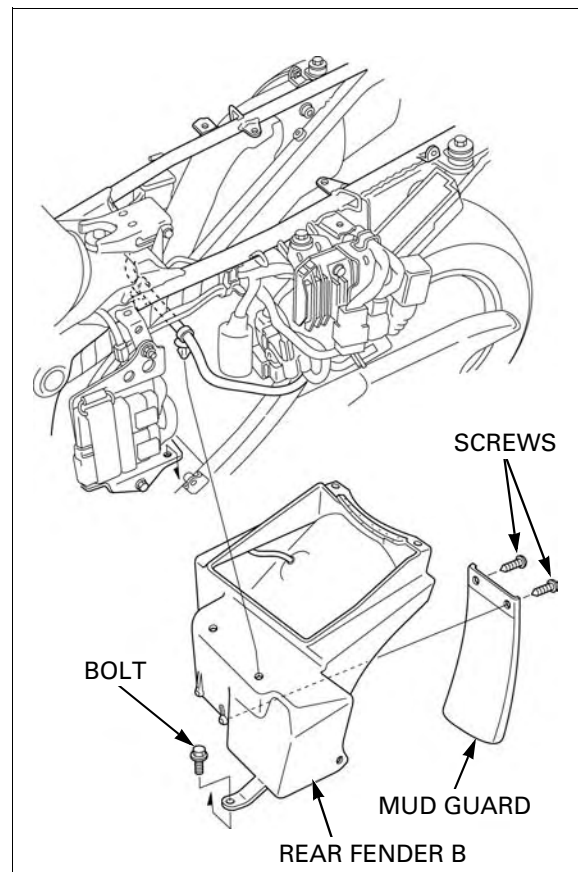
Remove the following:

- Rear fender C (page 2-7)
- Battery tray (page 17-6)

Remove the screws and mud guard.

Remove the bolt and rear fender B.

Installation is in the reverse order of removal.

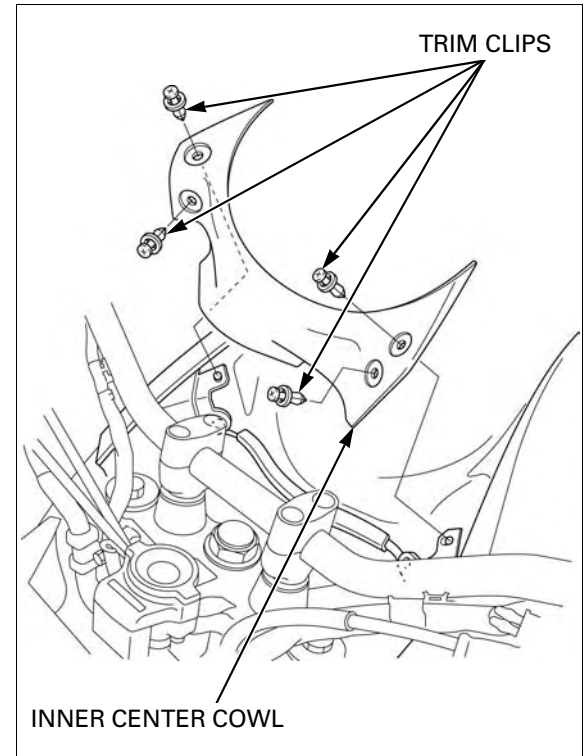


INNER CENTER COWL

REMOVAL/INSTALLATION

Remove the trim clips and inner center cowl.

Installation is in the reverse order of removal.



FRONT SIDE COWL

REMOVAL/INSTALLATION

Remove the inner center cowl (page 2-9).

Remove the bolt and screw.

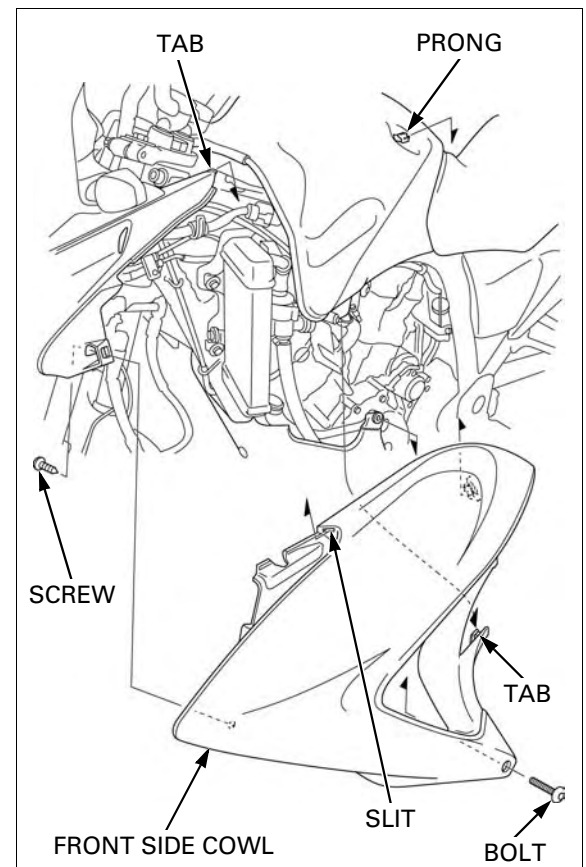
Be careful not to damage the tabs and slit.

Release the tab on the front center cowl from the front side cowl slit.

Release the tab on the front side cowl from the fuel tank.

Release the prong on the fuel tank and remove the front side cowl.

Installation is in the reverse order of removal.

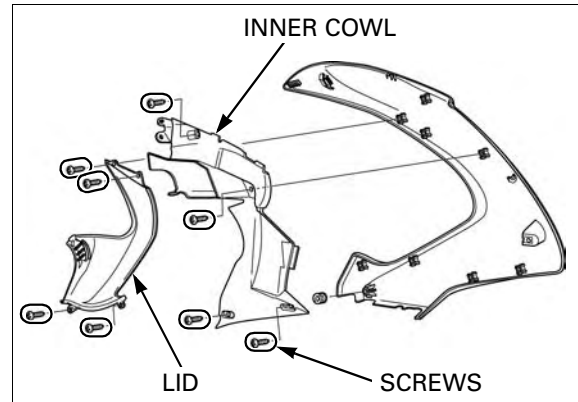


FRAME/BODY PANELS/EXHAUST SYSTEM

DISASSEMBLY/ASSEMBLY

Remove the screws, inner cowl and lid.

Assembly is in the reverse order of disassembly.



WIRE HARNESS COVER

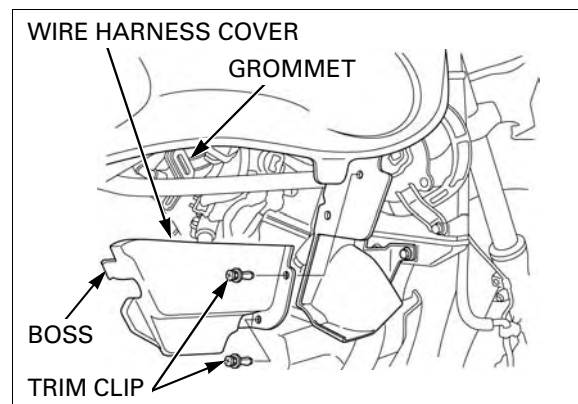
REMOVAL/INSTALLATION

Remove the front side cowl (page 2-9).

Remove the trim clips.

Release the boss on the wire harness cover from the grommet and remove the wire harness cover.

Installation is in the reverse order of removal.



AIR GUIDE

REMOVAL/INSTALLATION

Right side: Remove the wire harness cover (page 2-10).

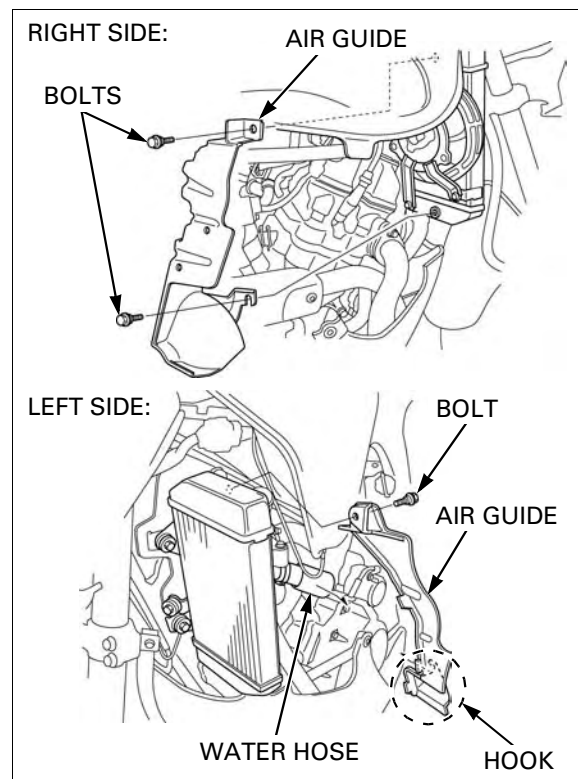
Remove the bolts and right air guide.

Left side: Remove the front side cowl (page 2-9).

Remove the bolt and release the hook from the water hose.

Remove the left air guide.

Installation is in the reverse order of removal.

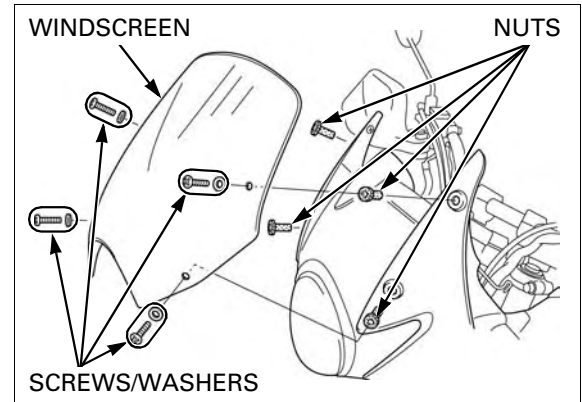


WINDSCREEN

REMOVAL/INSTALLATION

Remove the screws, plastic washers, windscreen and nuts.

Installation is in the reverse order of removal.



HEADLIGHT PLATE

REMOVAL/INSTALLATION

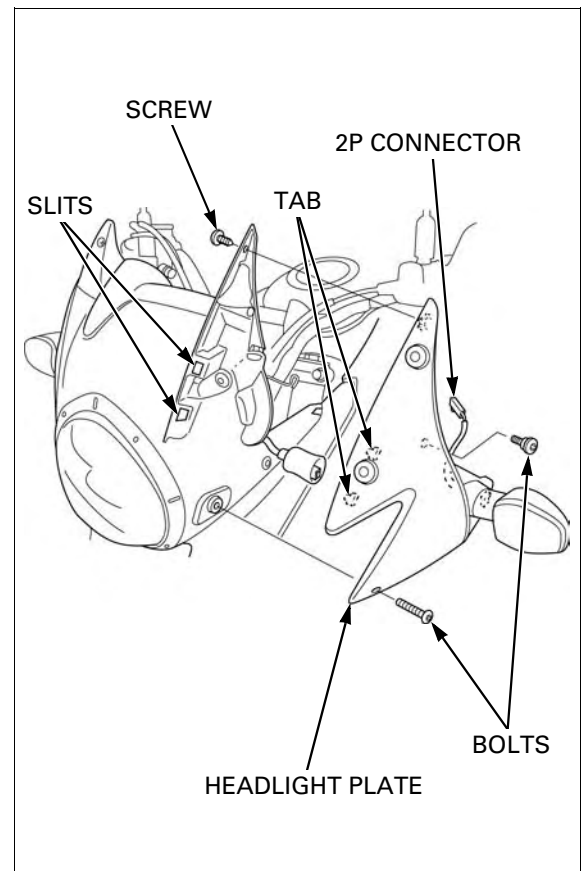
Remove the windscreen (page 2-11).

Remove the bolts and screw.

Release the tabs on the headlight plate from slit.

Disconnect the turn signal 2P connector and remove the headlight plate.

Installation is in the reverse order of removal.



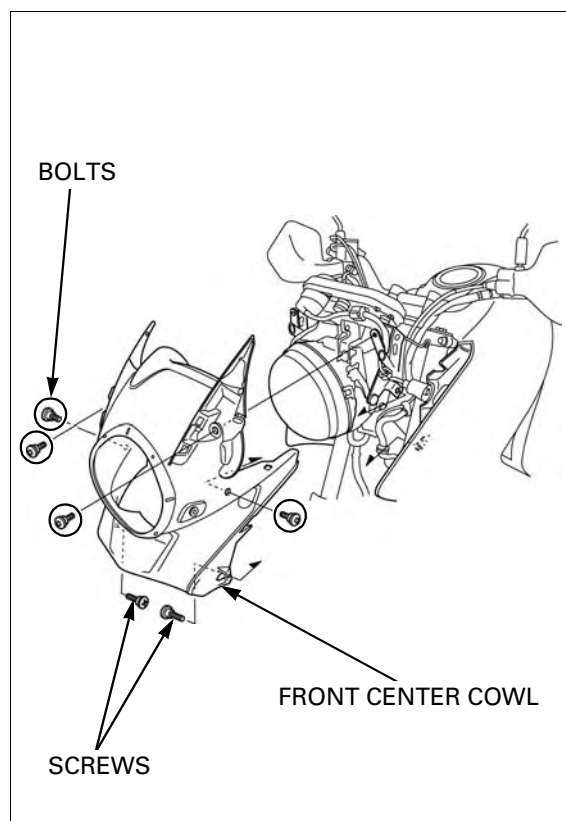
FRONT CENTER COWL

REMOVAL/INSTALLATION

Remove the headlight plate (page 2-11).

Remove the screws, bolts and front center cowl.

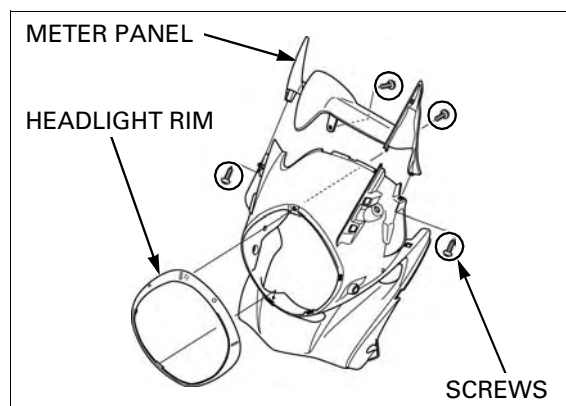
Installation is in the reverse order of removal.



DISASSEMBLY/ASSEMBLY

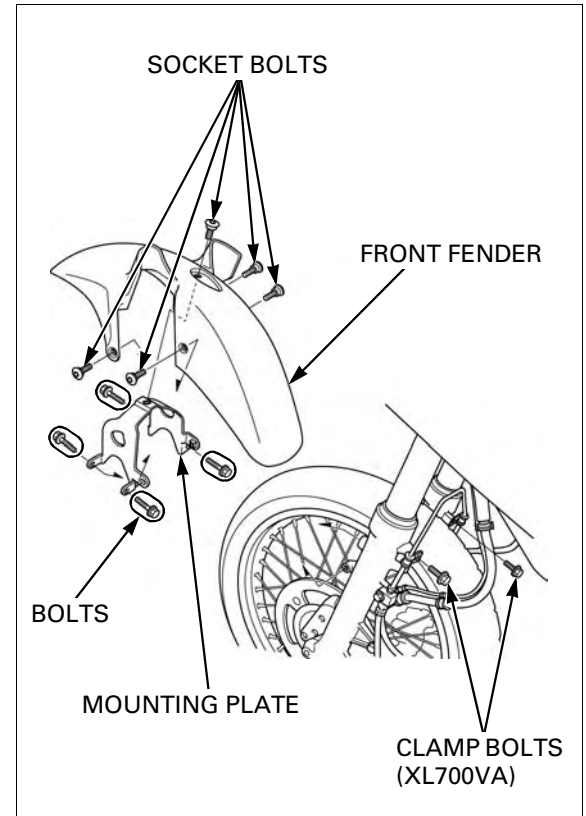
Remove the screws, headlight rim and meter panel.

Assembly is in the reverse order of disassemble.



FRONT FENDER

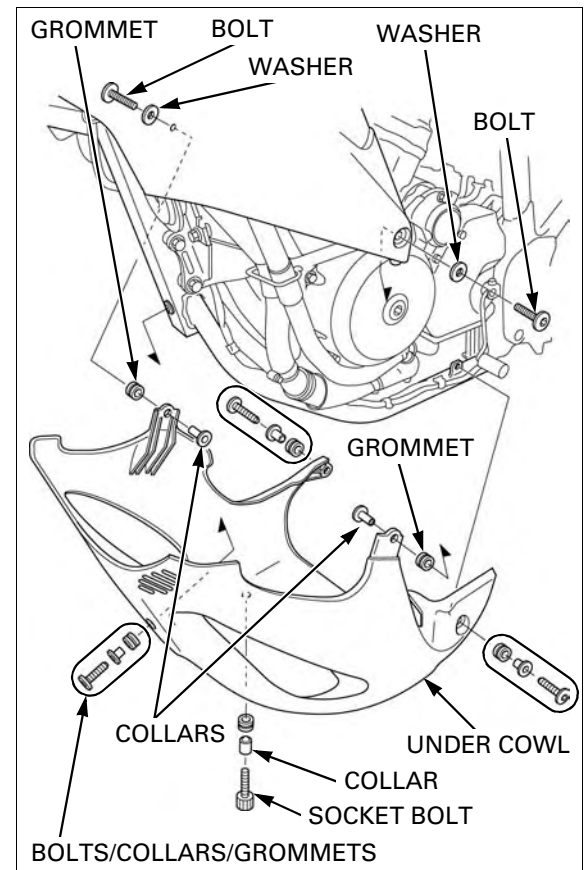
XL700VA only: Remove the brake hose clamp bolts.
Remove the socket bolts and bolts.
Remove the front fender and mounting plate forward.
Installation is in the reverse order of removal.



UNDER COWL

REMOVAL/INSTALLATION

Remove the bolts, socket bolt, washers, collars, under cowl and grommets.
Installation is in the reverse order of removal.



EXHAUST SYSTEM

REMOVAL

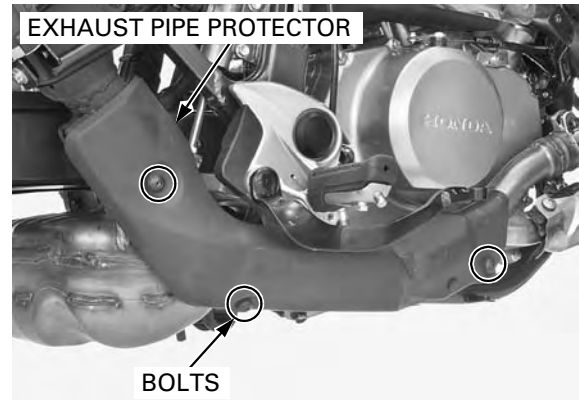
MUFFLER

Remove the following:

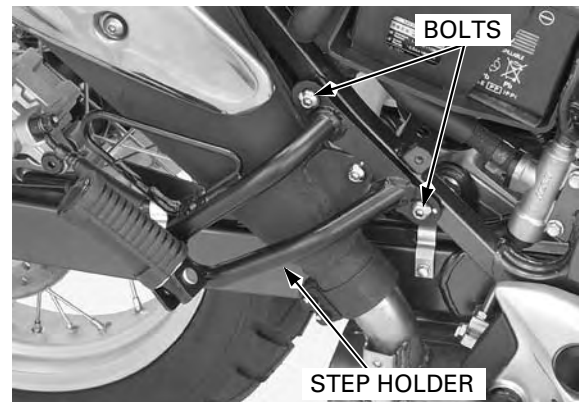
- Right front side cowl (page 2-9)
- Right side cover (page 2-4)
- Under cowl (page 2-13)

Remove the bolts.

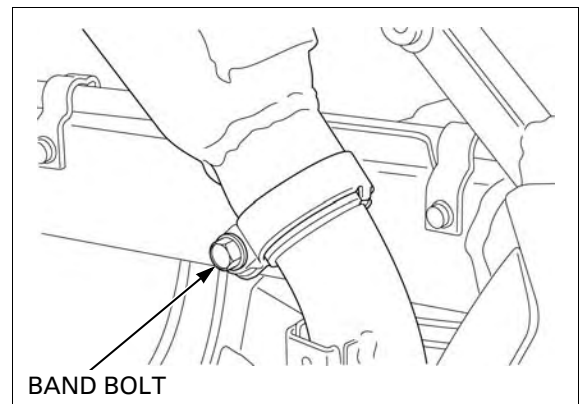
Slide the lower exhaust pipe protector forward and remove it.



Remove the bolts and pillion step holder.

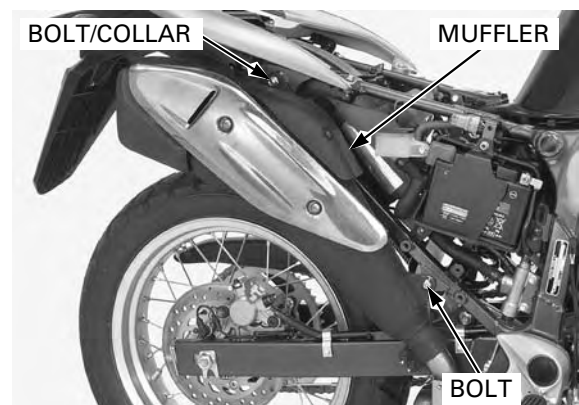


Loosen the muffler band bolt.



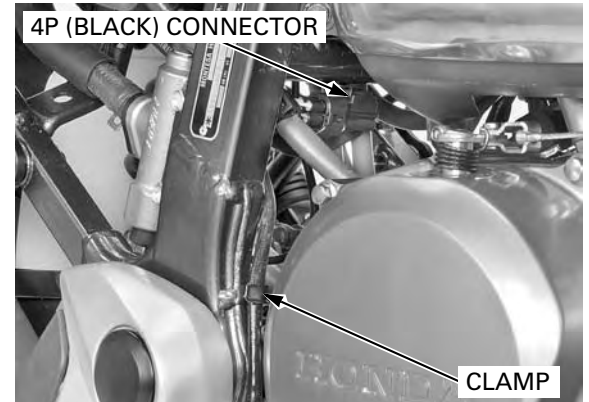
Remove the muffler mounting bolts and collar.

Remove the muffler.

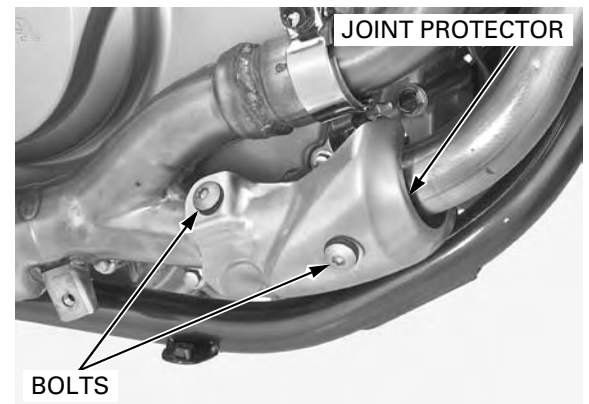


EXHAUST PIPE

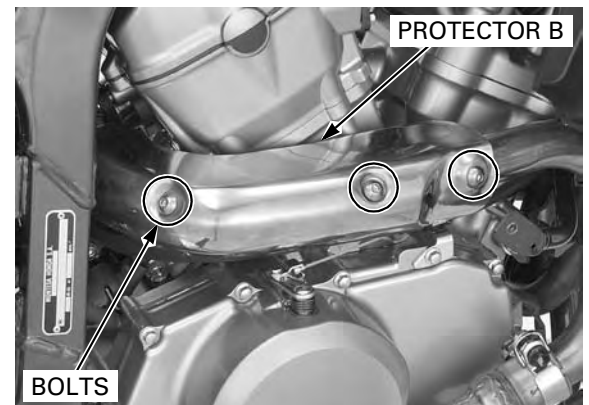
Disconnect the O₂ sensor 4P (Black) connector and release the O₂ sensor wire from the clamp.



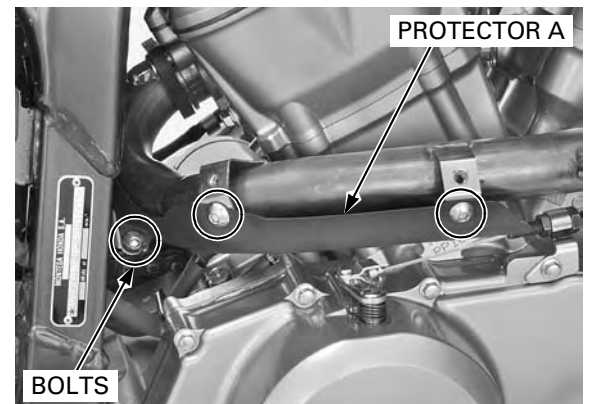
Remove the bolts and exhaust joint protector.



Remove the bolts and rear exhaust pipe protector B.

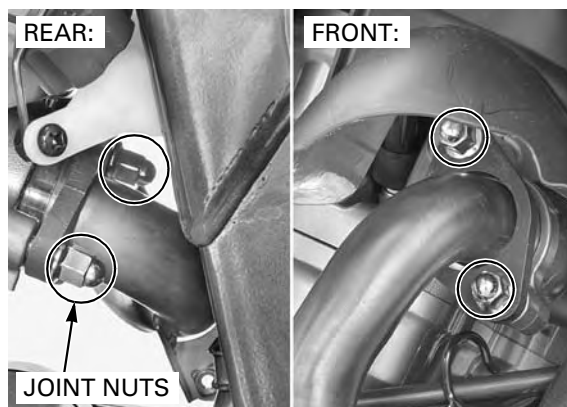


Remove the bolts and rear exhaust pipe protector A.

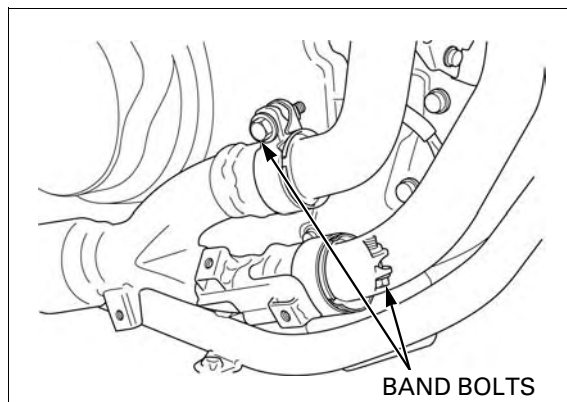


FRAME/BODY PANELS/EXHAUST SYSTEM

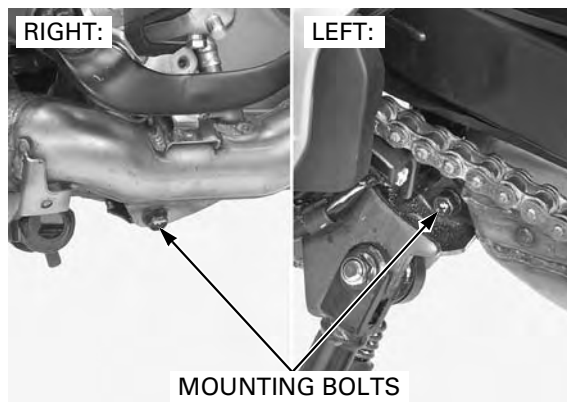
Remove the exhaust pipe joint nuts.



Loosen the exhaust pipe band bolts.

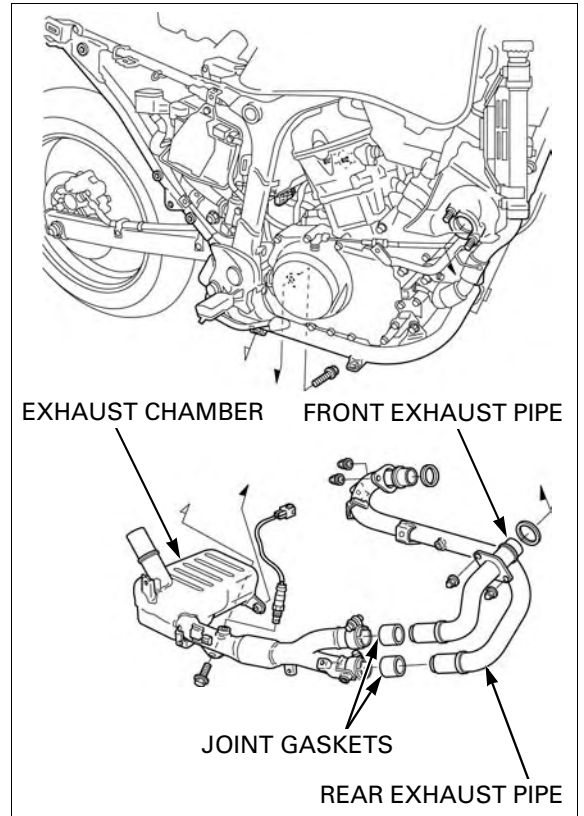


Remove the exhaust chamber mounting bolts.

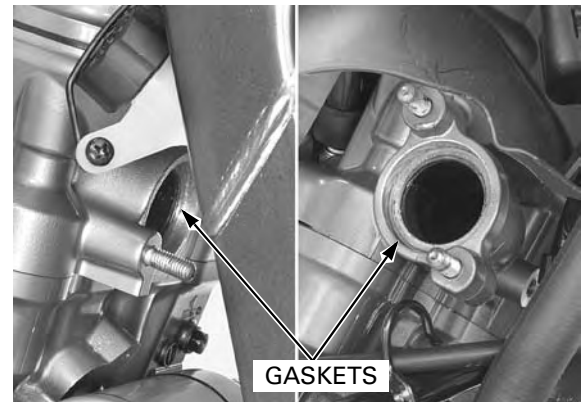


Remove the exhaust chamber, front exhaust pipe and rear exhaust pipe assembly.

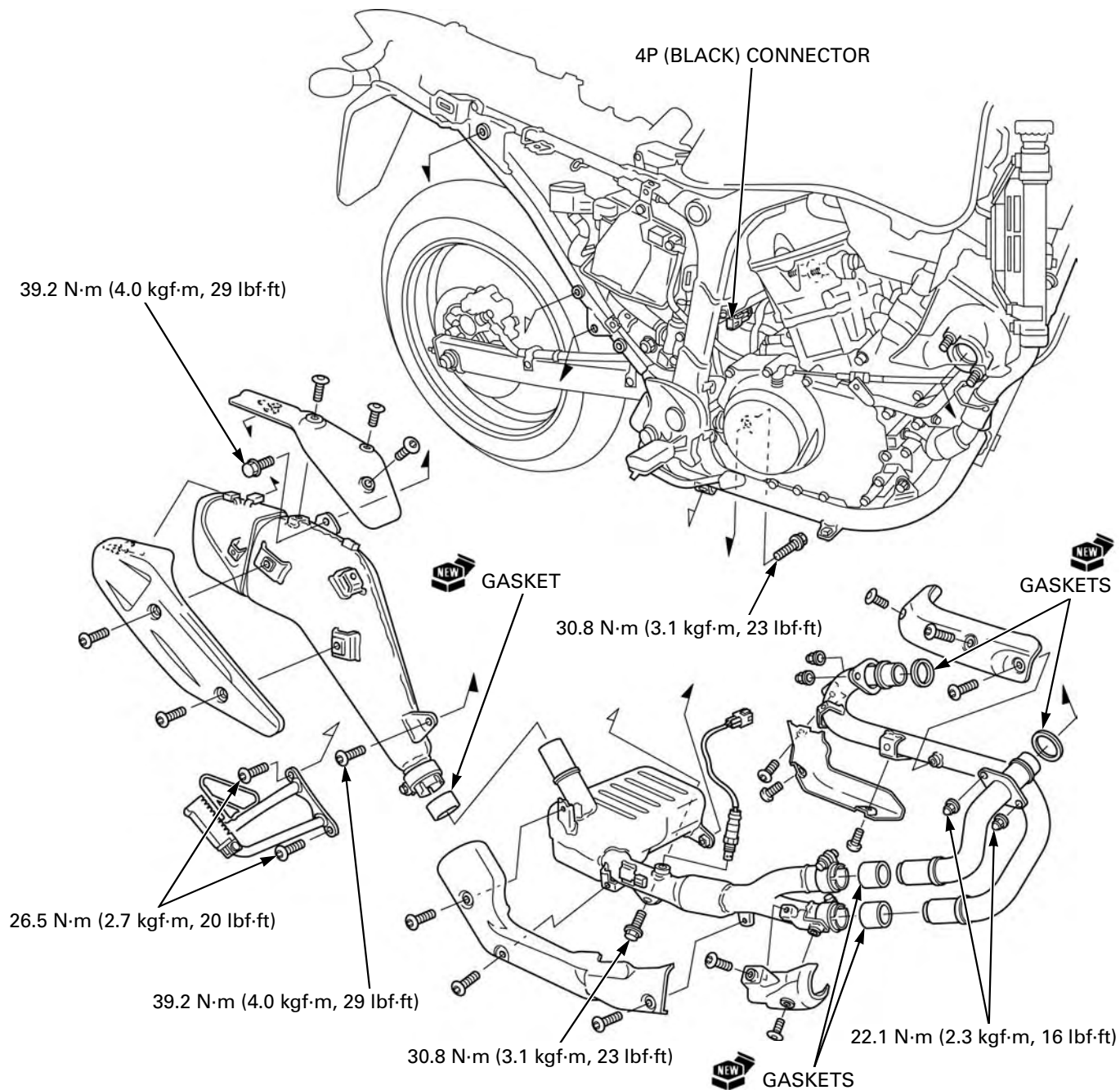
Remove the front exhaust pipe, rear exhaust pipe and joint gaskets.



Remove the exhaust pipe gaskets.



INSTALLATION

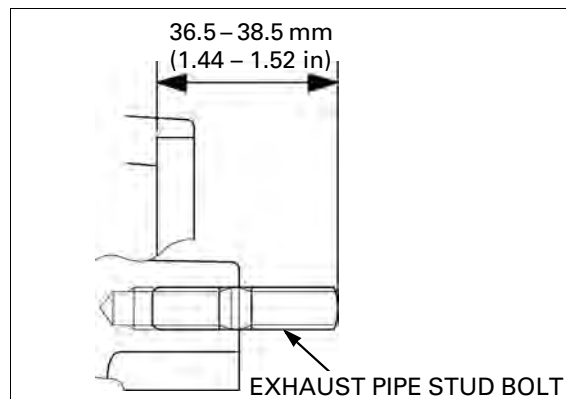


EXHAUST PIPE

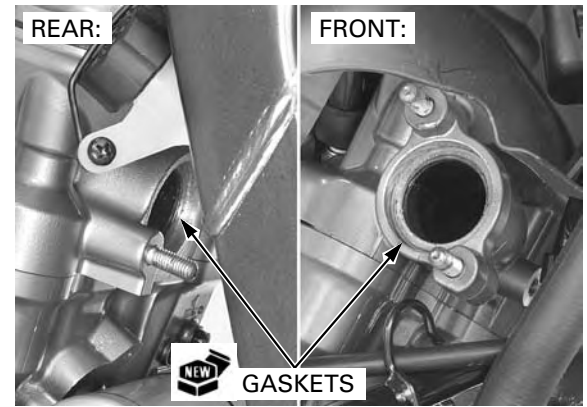
If the exhaust pipe stud bolts are loose, tighten them.

Be sure to verify the distance from the top of the stud to the cylinder head as shown.

SPECIFIED LENGTH: 36.5 – 38.5 mm (1.44 – 1.52 in)

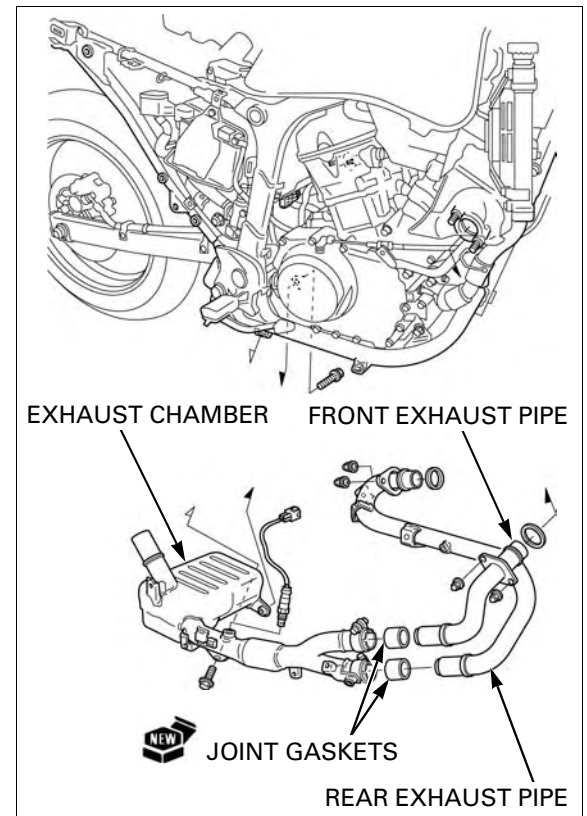


Install new exhaust pipe gaskets.

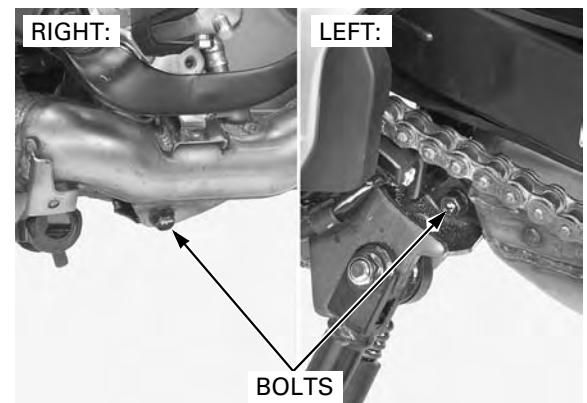


Install new joint gaskets on the front and rear exhaust pipes, and install the exhaust pipes to the exhaust chamber.

Install the exhaust pipes and exhaust chamber assembly.



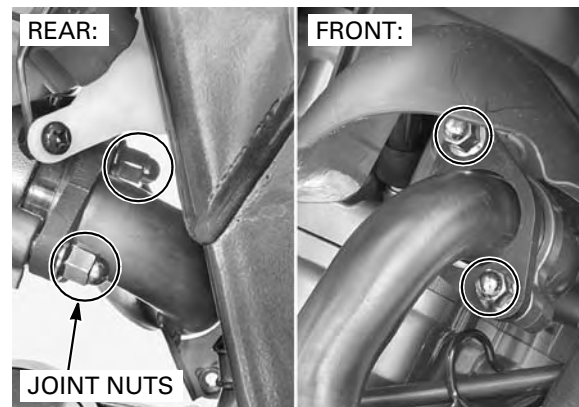
Loosely install the exhaust chamber mounting bolts.



FRAME/BODY PANELS/EXHAUST SYSTEM

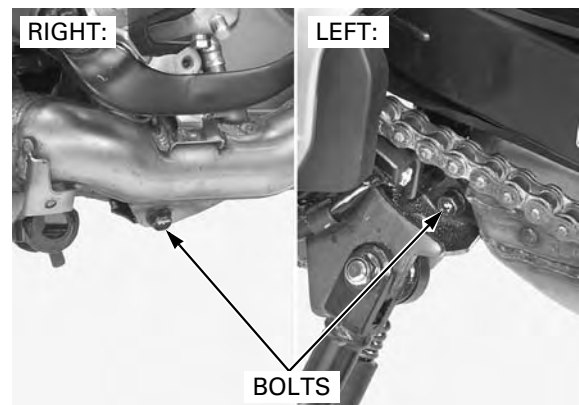
Install and tighten the exhaust pipe joint nuts to the specified torque.

TORQUE: 22.1 N·m (2.3 kgf·m, 16 lbf·ft)

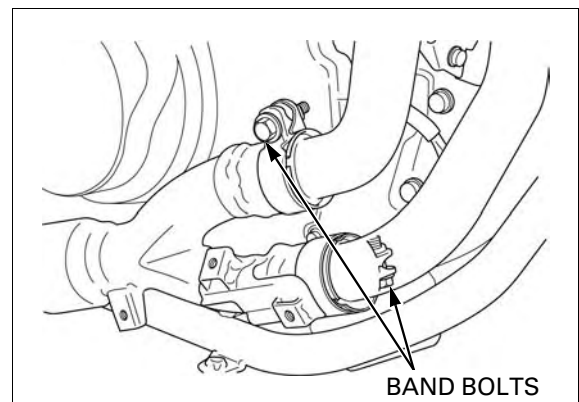


Tighten the exhaust chamber mounting bolt to the specified torque.

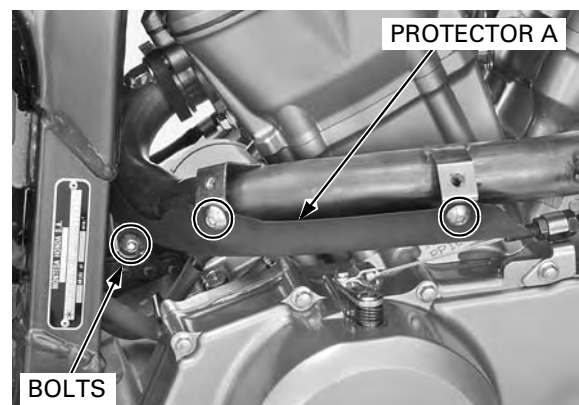
TORQUE: 30.8 N·m (3.1 kgf·m, 23 lbf·ft)



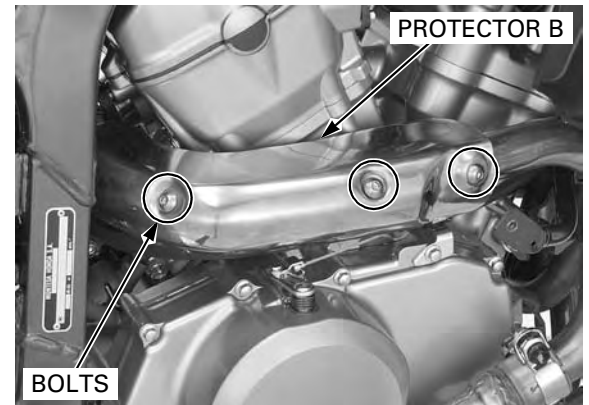
Tighten the exhaust pipe band bolts securely.



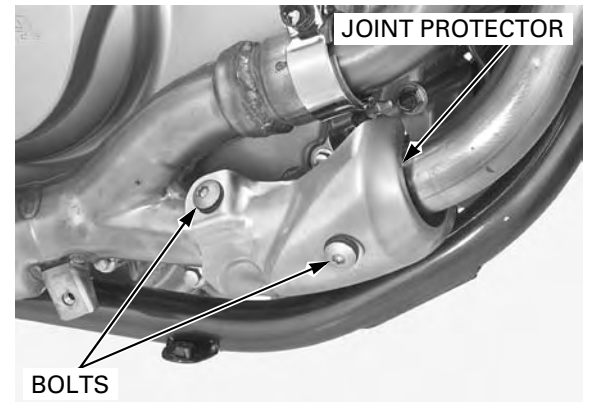
Install the rear exhaust pipe protector A and bolts.
Tighten the bolts securely.



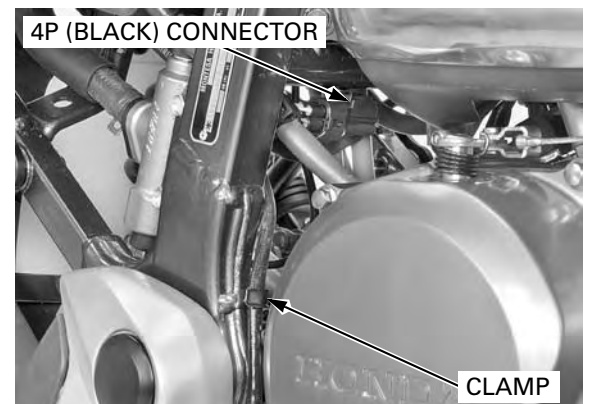
Install the rear exhaust pipe protector B and bolts.
Tighten the bolts securely.



Install the exhaust joint protector and tighten the bolts securely.

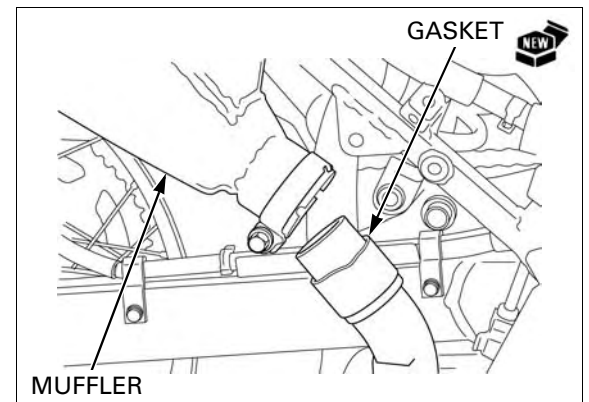


Connect the O₂ sensor 4P (Black) connector and clamp the O₂ sensor wire.



MUFFLER

Install a new muffler gasket to the exhaust chamber.
Install the muffler to the exhaust chamber.



FRAME/BODY PANELS/EXHAUST SYSTEM

Install the muffler mounting bolts and collar.

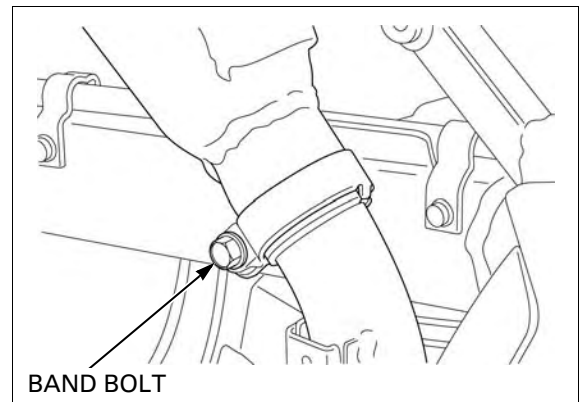
Tighten the muffler mounting bolts to the specified torque.

TORQUE: 39.2 N·m (4.0 kgf·m, 29 lbf·ft)



Tighten the muffler band bolt to the specified torque.

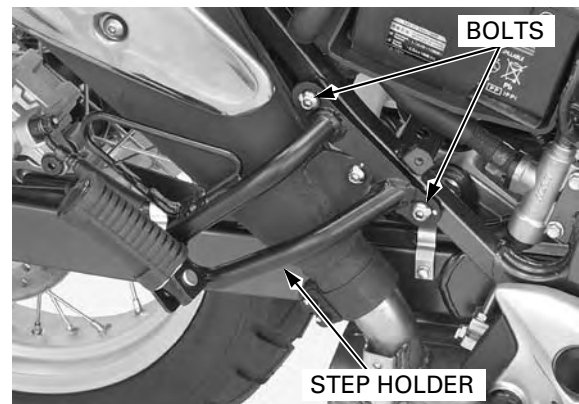
TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)



Install the pillion step holder.

Install and tighten the bolts to the specified torque.

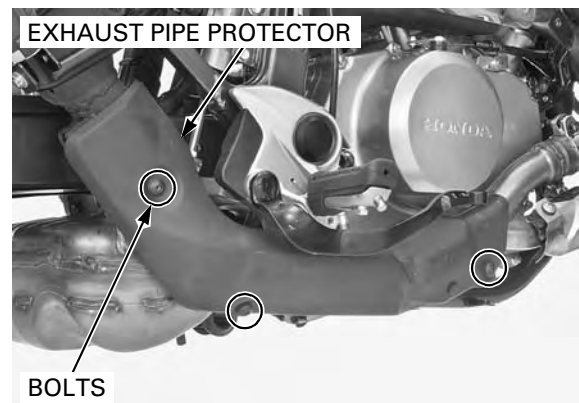
TORQUE: 26.5 N·m (2.7 kgf·m, 20 lbf·ft)



Install the lower exhaust pipe protector.
Install and tighten the bolts securely.

Install the following:

- Under cowl (page 2-13)
- Right side cover (page 2-4)
- Right front side cowl (page 2-9)



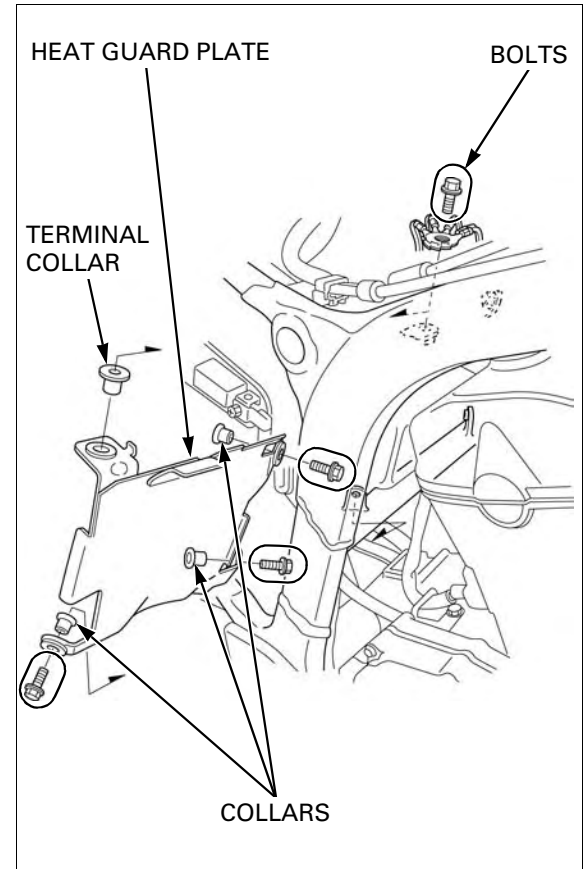
HEAT GUARD PLATE

REMOVAL/INSTALLATION

Remove the exhaust system (page 2-14).

Remove the bolts, terminal collar, heat guard plate and collars.

Installation is in the reverse order of removal.



SIDESTAND

REMOVAL/INSTALLATION

Remove the sidestand switch (page 20-25).

Support the motorcycle in an upright position.

Unhook the return spring.

Remove the pivot nut, bolt and sidestand.

Installation is in the reverse order of removal.

At installation, apply grease to the pivot bolt sliding surfaces.

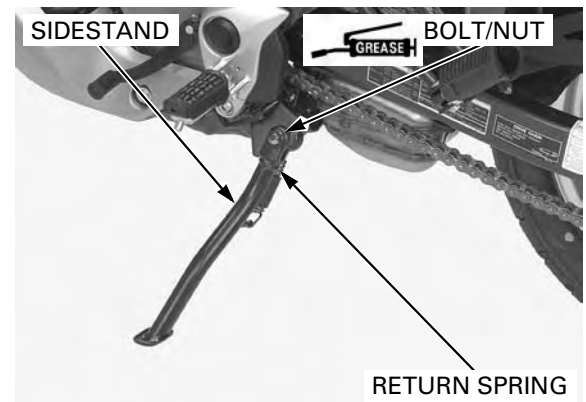
TORQUE:

Sidestand pivot bolt

9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

Sidestand pivot lock nut

29.4 N·m (3.0 kgf·m, 22 lbf·ft)



MEMO

SERVICE INFORMATION	3-2	DRIVE CHAIN.....	3-17
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ENGINE OIL FILTER.....	3-13	SUSPENSION	3-28
RADIATOR COOLANT	3-15	NUTS, BOLTS, FASTENERS.....	3-29
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MAINTENANCE

SERVICE INFORMATION

GENERAL

- Place the motorcycle on level ground before starting any work.
- Gasoline is extremely flammable and is explosive under certain conditions.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.
- 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.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle grip freeplay			2 – 4 mm (1/16 – 3/16 in)
Spark plug	NGK	CPR8EA-9	
	DENSO	U24EPR9	
Spark plug gap			0.8 – 0.9 mm (0.03 – 0.04 in)
Valve clearance	IN	0.15 ± 0.02 mm (0.006 ± 0.001 in)	
	EX	0.20 ± 0.02 mm (0.008 ± 0.001 in)	
Recommended engine oil			Honda "4-stroke motorcycle oil" or an equivalent Oil recommendation: API classification SG or higher (except oils labeled as energy conserving on circular API service label) Viscosity: SAE 10W-30 JASO T 903 standard: MA
Engine oil capacity	After draining		2.1 liters (2.2 US qt, 1.8 Imp qt)
	After draining/filter change		2.3 liters (2.4 US qt, 2.0 Imp qt)
	After disassembly		2.9 liters (3.1 US qt, 2.6 Imp qt)
Engine idle speed			1,200 ± 100 min ⁻¹ (rpm)
Recommended antifreeze			High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Drive chain	Size/link	REGINA	REG525ZRH-B-118LE
	Slack		35 – 45 mm (1.4 – 1.8 in)
Specified brake fluid			DOT 4
Clutch lever freeplay			10 – 20 mm (3/8 – 13/16 in)
Cold tire pressure	Driver only	Front	200 kPa (2.00 kgf/cm ² , 29 psi)
		Rear	200 kPa (2.00 kgf/cm ² , 29 psi)
	Driver and passenger	Front	200 kPa (2.00 kgf/cm ² , 29 psi)
		Rear	280 kPa (2.80 kgf/cm ² , 41 psi)
Tire size		Front	100/90-19M/C 57H
		Rear	130/80R-17M/C 65H
Tire brand	Bridgestone	Front	TRAIL WING 101
		Rear	TRAIL WING 152 RADIAL
	Metzeler	Front	TOURANCE FRONT U
		Rear	TOURANCE U
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)
Shock absorber	Compression damping adjuster standard position		2 turns out from full in

TORQUE VALUES

Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)
Valve adjusting screw lock nut	23 N·m (2.3 kgf·m, 17 lbf·ft)
Oil filter cartridge	26 N·m (2.7 kgf·m, 19 lbf·ft)
Engine oil drain bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)
Front/rear master cylinder reservoir cap screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Rear master cylinder push rod lock nut	18 N·m (1.8 kgf·m, 1.3 lbf·ft)
Drive sprocket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Driven sprocket nut	45 N·m (4.6 kgf·m, 33 lbf·ft)
Spoke	3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)
Rear axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)
Fuel tank mounting bolt	26.4 N·m (2.7 kgf·m, 19 lbf·ft)
Air cleaner housing cover screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)

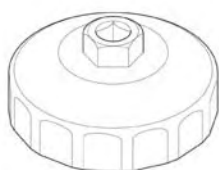
Apply engine oil to the threads.
 Apply engine oil to the threads.
 Apply engine oil to the threads and seating surface.
 Apply engine oil to the threads and O-ring.

U-nut
 Apply engine oil to the threads.

U-nut

TOOLS

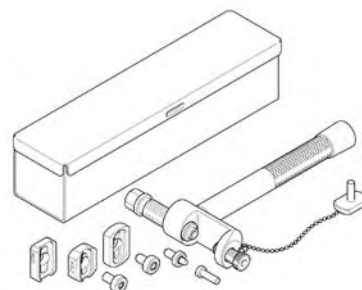
Oil filter wrench
07HAA-PJ70101



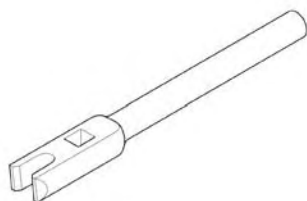
Tappet adjust wrench, 4 mm
07908-KE90100



Drive chain tool set
07HMH-MR10103



Spoke wrench, 6.1 mm
07JMA-MR60100



MAINTENANCE

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 an authorized Honda dealer.

ITEMS	FREQUENCY	WHICHEVER COMES FIRST 	ODOMETER READING (NOTE 1) 								REFER TO PAGE
			X1,000 km	1	6	12	18	24	30	36	
			X1,000 mi	0.6	4	8	12	16	20	24	
			Months		6	12	18	24	30	36	
* FUEL LINE						I		I		I	3-5
* THROTTLE OPERATION						I		I		I	3-6
* AIR CLEANER		NOTE 2					R			R	3-7
CRANKCASE BREATHER		NOTE 3			C	C	C	C	C	C	3-8
SPARK PLUG					I	R	I	R	I	R	3-8
* VALVE CLEARANCE				I		I		I		I	3-10
ENGINE OIL				R		R		R		R	3-12
ENGINE OIL FILTER				R		R		R		R	3-13
RADIATOR COOLANT		NOTE 4				I		I		R	3-15
* COOLING SYSTEM						I		I		I	3-15
* SECONDARY AIR SUPPLY SYSTEM						I		I		I	3-16
DRIVE CHAIN		NOTE 5	EVERY 1,000 km (600 mi) I, L								3-17
DRIVE CHAIN SLIDER					I	I	I	I	I	I	3-21
BRAKE FLUID		NOTE 4			I	I	R	I	I	R	3-22
BRAKE PADS WEAR					I	I	I	I	I	I	3-23
BRAKE SYSTEM				I		I		I		I	3-24
* BRAKE LIGHT SWITCH						I		I		I	3-26
* HEADLIGHT AIM						I		I		I	3-26
CLUTCH SYSTEM				I	I	I	I	I	I	I	3-27
SIDESTAND						I		I		I	3-27
* SUSPENSION						I		I		I	3-28
* NUTS, BOLTS, FASTENERS		NOTE 5		I		I		I		I	3-29
** WHEELS/TIRES		NOTE 5		I	I	I	I	I	I	I	3-29
** STEERING HEAD BEARINGS				I		I		I		I	3-30

* Should be serviced by an authorized Honda 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 an authorized Honda dealer.

Honda recommends that an authorized Honda dealer should road test the motorcycle after each periodic maintenance is carried out.

NOTES:

1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. Service more frequently when riding in rain or at full throttle.
4. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
5. Service more frequently when riding OFF-ROAD.

FUEL LINE

FUEL TANK LIFTING

Remove the following:

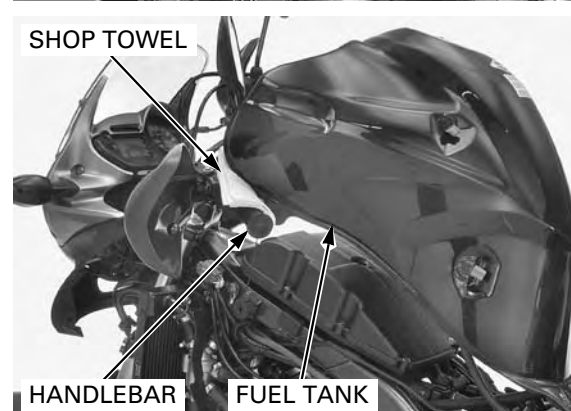
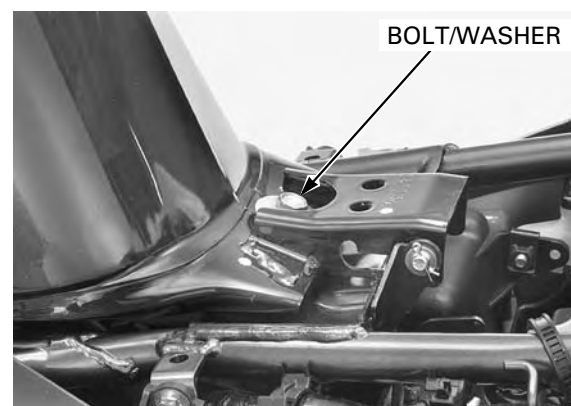
- Seat (page 2-4)
- Front side cowl (page 2-9)

Remove the fuel tank mounting bolt/washer and move the fuel tank to the backward.

Lift and open the fuel tank.

Turn the handlebar to left and lock with ignition key. Place a shop towel over the handlebar grip.

Place the fuel tank on the handlebar grip.



INSPECTION

Check the fuel line for deterioration, damage or leakage.

Replace the fuel line if necessary.



FUEL TANK LOWERING

Support the fuel tank.

Remove the shop towel and turn the handlebar to the straight position.

Guide the breather hose and drain hose so as not to be kinked or bound.

Lower the fuel tank, leading the breather hose and drain hose to downward. Then close the fuel tank and route the breather hose and drain hose.

NOTE:

- Route the hoses correctly (page 1-21).
- Be careful not to damage the harness and hoses.
- After installing the fuel tank, make sure the breather, drain and fuel hoses are not kinked or bound.

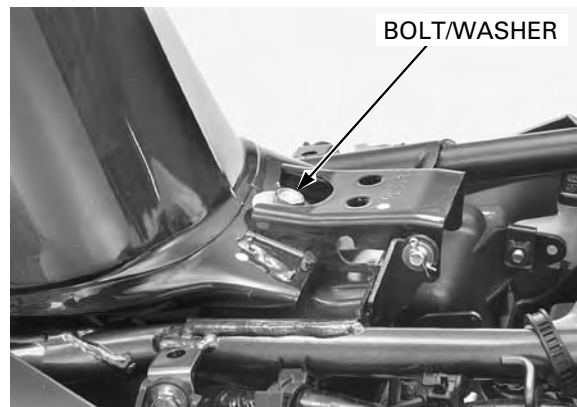


MAINTENANCE

Move the fuel tank forward, then install and tighten the fuel tank mounting bolt/washer to the specified torque.

TORQUE: 26.4 N·m (2.7 kgf·m, 19 lbf·ft)

Install the removed parts in the reverse order removal.



THROTTLE OPERATION

Check for any deterioration or damage to the throttle cables. 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, lubricate the throttle cables and overhaul and lubricate the throttle grip housing.

For cable lubrication: Disconnect the throttle cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

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

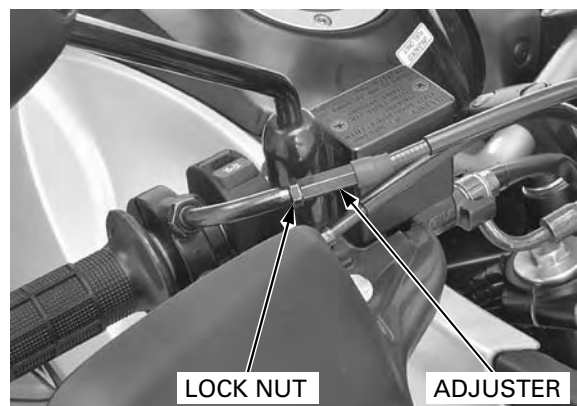
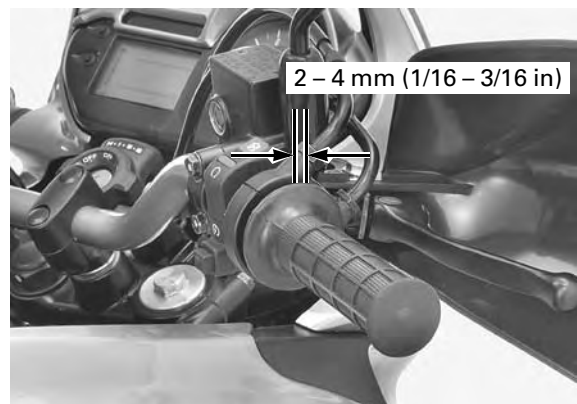
With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change. If idle speed increases, check the throttle grip freeplay and the throttle cable connection.

Measure the throttle grip freeplay at the throttle grip flange.

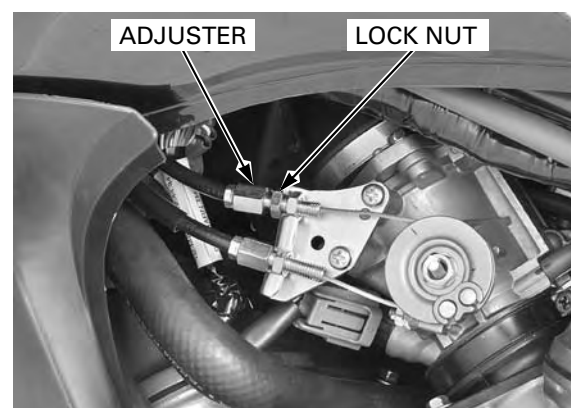
FREEPLAY: 2 – 4 mm (1/16 – 3/16 in)

Throttle grip freeplay can be adjusted at either end of the throttle cable. Minor adjustment is made with the upper adjuster.

Loosen the lock nut, turn the adjuster as required. Tighten the lock nut while holding the adjuster.



Major adjustment is made with the lower adjuster.
Loosen the lock nut, turn the adjuster as required.
Tighten the lock nut while holding the adjuster.
Recheck the throttle operation.



AIR CLEANER

NOTE:

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

Lift and support the fuel tank (page 3-5).

Remove the screws and air cleaner housing cover.

Remove the air cleaner element from the air cleaner housing.

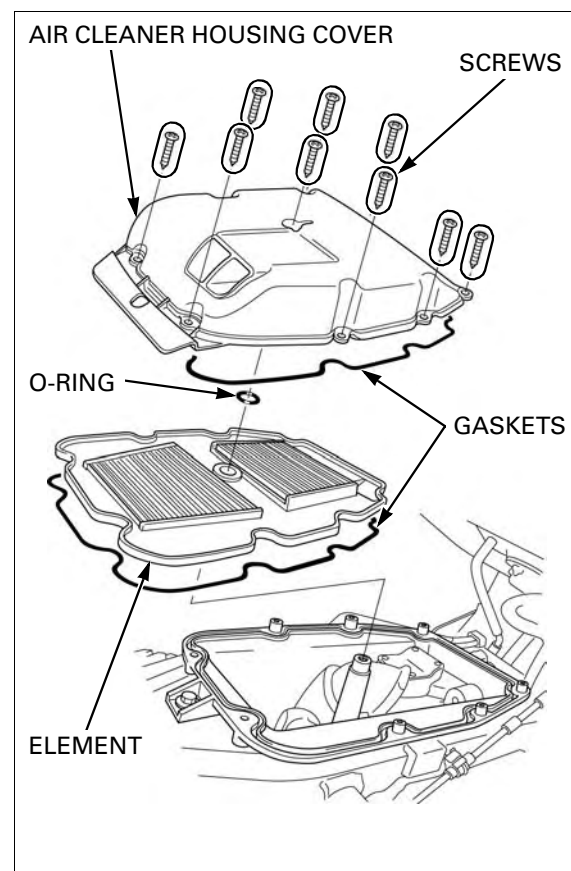
Replace the element in accordance with the maintenance schedule or any time it is excessively dirty or damaged.

Make sure the O-ring and gaskets are in good condition, replace it if necessary.

Install the removed parts in the reverse order of removal.

TORQUE:

Air cleaner housing cover screw:
1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)



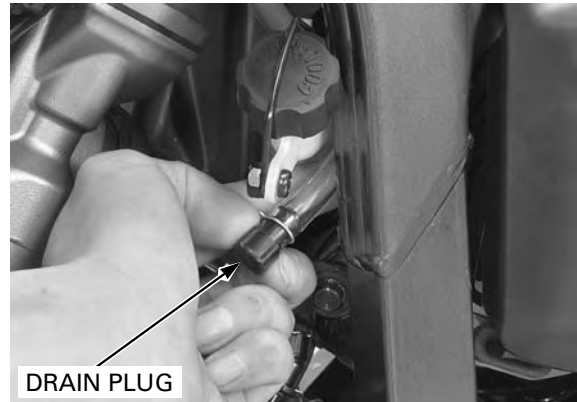
CRANKCASE BREATHER

NOTE:

Service more frequently when riding in rain, at full throttle, or after the motorcycle is washed or overturned. Service if the deposit level can be seen in the drain plug.

Pull out the crankcase breather drain hose from the frame rearward.

Remove the drain plug from the crankcase breather drain hose and drain the deposits into a suitable container, then reinstall the drain plug securely.



SPARK PLUG

REMOVAL

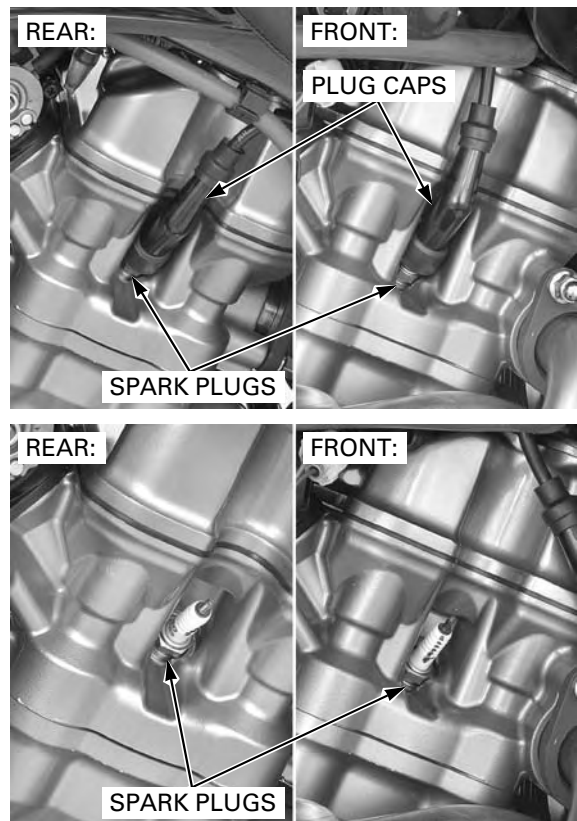
Front: Remove the right air guide (page 2-10).

Disconnect the spark plug caps and clean around the spark plug bases.

NOTE:

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

Remove the spark plugs.



INSPECTION

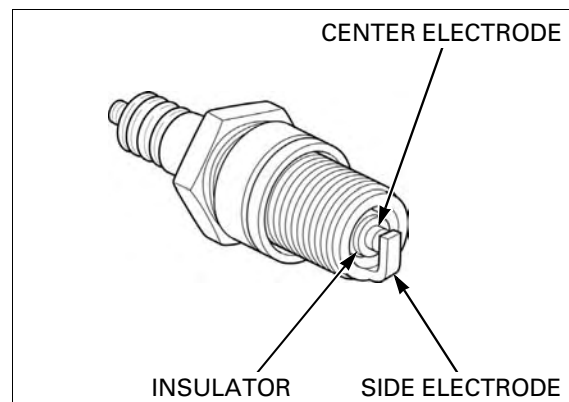
Check the insulator for cracks or damage, and the electrodes for wear, fouling or discoloration. Replace the plug if necessary.

RECOMMENDED SPARK PLUG:

NGK: CPR8EA-9

DENSO: U24EPR9

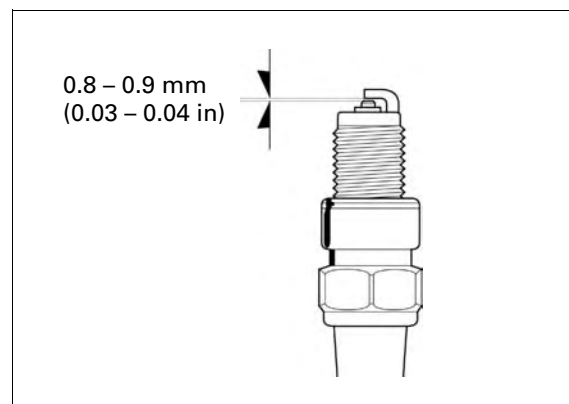
Clean the spark plug electrodes with a wire brush or special plug cleaner.



Check the 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.



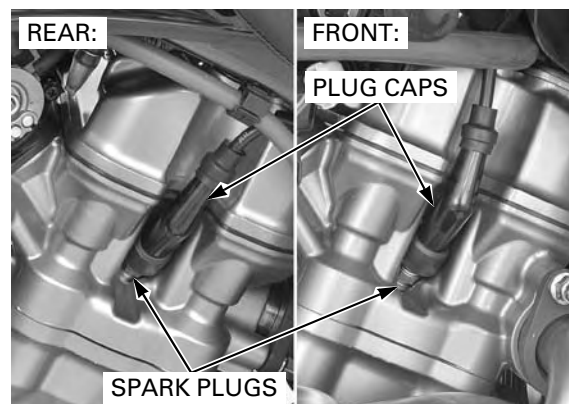
INSTALLATION

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

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

Connect the spark plug caps.

Front: Install the right air guide (page 2-10).



VALVE CLEARANCE

INSPECTION

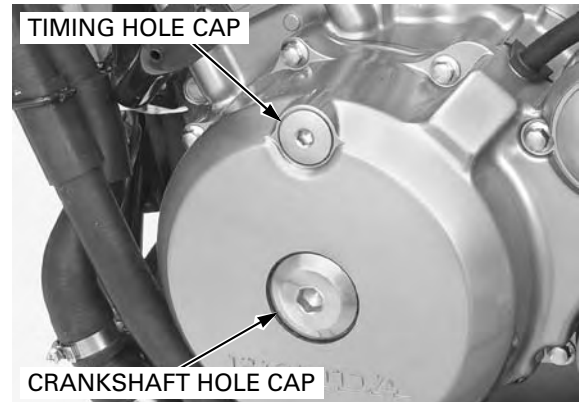
NOTE:

- After the valve clearance inspection, check the engine idle speed (page 5-78).
- Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).

FRONT:

Remove the cylinder head cover (page 8-6).

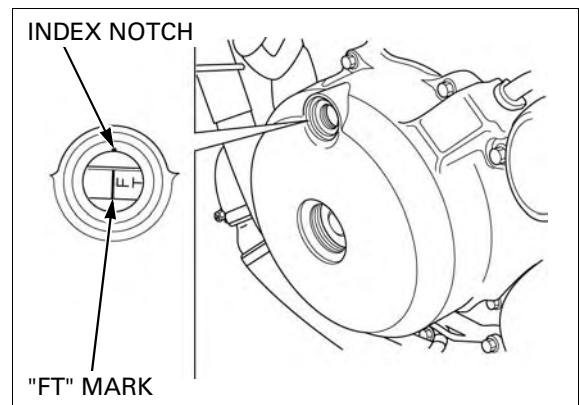
Remove the timing and crankshaft hole caps.



Rotate the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index notch on the left crankcase cover.

Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

This position can be obtained by confirming that there is slack in the rocker arms. If there is no slack, rotate the crankshaft counterclockwise one full turn and align the "FT" mark with the index notch again.



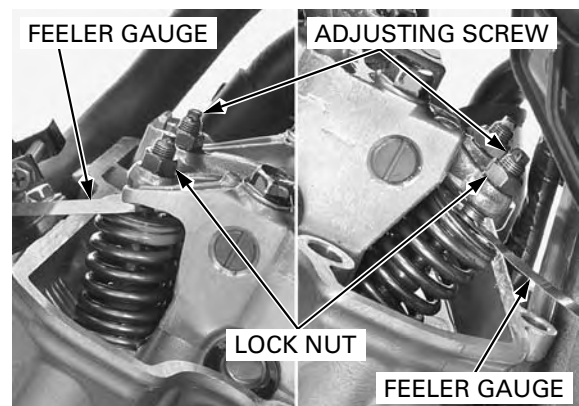
When checking the clearance, slide the feeler gauge from the center toward the outside.

Check the valve clearances by inserting a feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCES:

IN: 0.15 ± 0.02 mm (0.006 ± 0.001 in)

EX: 0.20 ± 0.02 mm (0.008 ± 0.001 in)



Loosen the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.

TOOL:

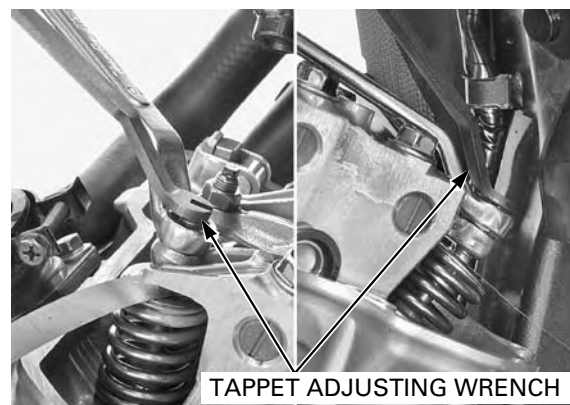
Tappet adjust wrench, 4 mm 07908-KE90100

Apply engine oil to the lock nut threads and seating surface.

Hold the adjusting screw and tighten the lock nut to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

After tightening the lock nut, recheck the valve clearance.



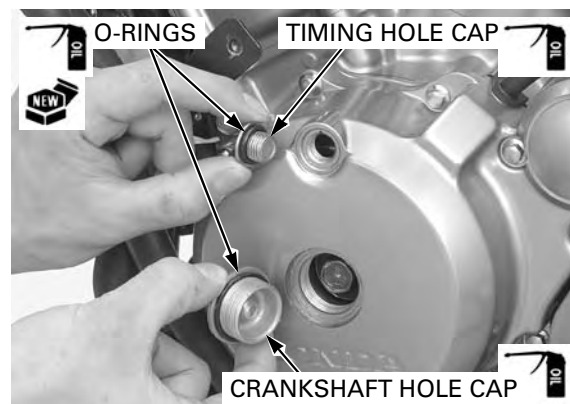
Coat new O-rings with engine oil and install them into the timing and crankshaft hole cap grooves. Apply engine oil to the timing and crankshaft hole cap threads. Install the timing hole cap and tighten it to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

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

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

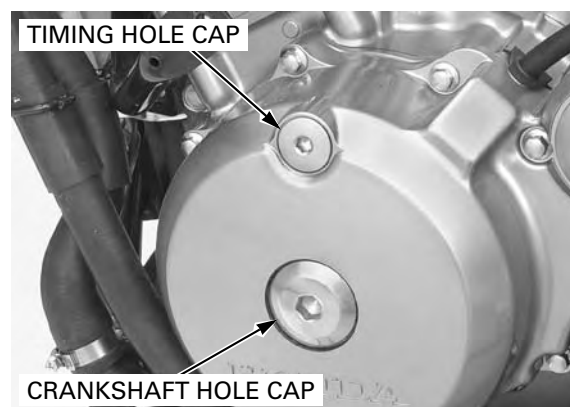
Install the cylinder head cover (page 8-33).



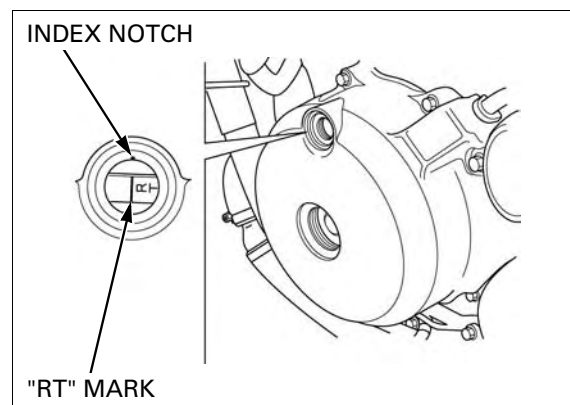
REAR:

Remove the cylinder head cover (page 8-6).

Remove the timing and crankshaft hole caps.



Rotate the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index notch on the left crankcase cover. Make sure the piston is at TDC (Top Dead Center) on the compression stroke.



MAINTENANCE

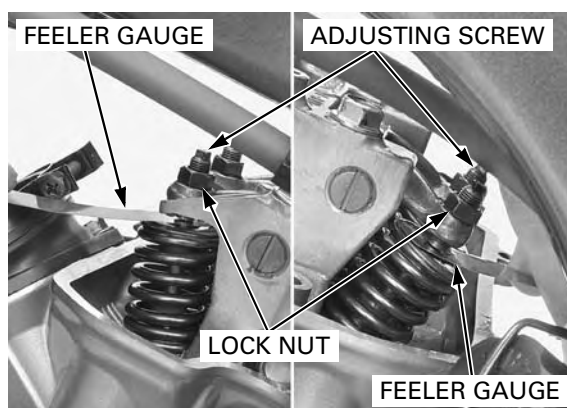
When checking the clearance, slide the feeler gauge from the center toward the outside.

Check the valve clearances by inserting a feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCES:

IN: 0.15 ± 0.02 mm (0.006 ± 0.001 in)

EX: 0.20 ± 0.02 mm (0.008 ± 0.001 in)



Loosen the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.

TOOL:

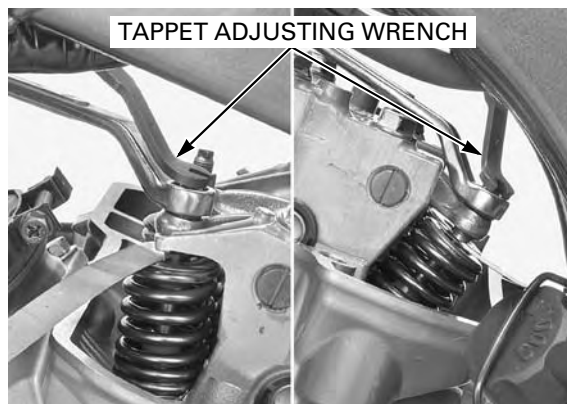
Tappet adjust wrench, 4 mm 07908-KE90100

Apply engine oil to the lock nut threads and seating surface.

Hold the adjusting screw and tighten the lock nut to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

After tightening the lock nut, recheck the valve clearance.



Coat new O-rings with engine oil and install them into the timing and crankshaft hole cap grooves. Apply engine oil to the timing and crankshaft hole cap threads.

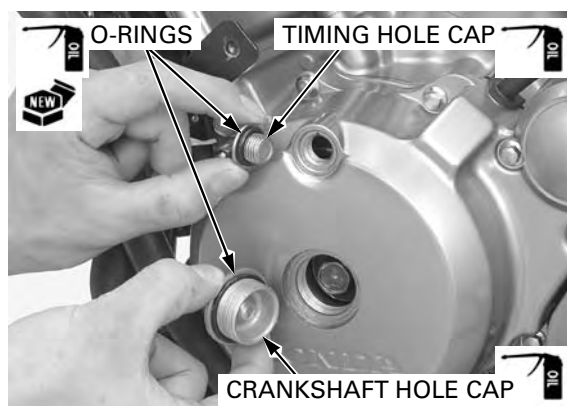
Install the timing hole cap and tighten it to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

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

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the cylinder head cover (page 8-33).



ENGINE OIL

OIL LEVEL CHECK

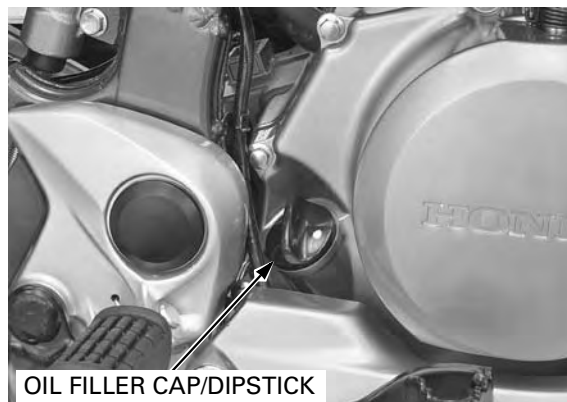
Start the engine and let it idle for 3 – 5 minutes.

Stop the engine and wait 2 – 3 minutes.

Hold the motorcycle in an upright position.

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

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



If the oil level is below or near the lower level mark on the dipstick, add the recommended oil to the upper level mark.



RECOMMENDED ENGINE OIL:

Honda "4-stroke motorcycle oil " or an equivalent

Oil recommendation:

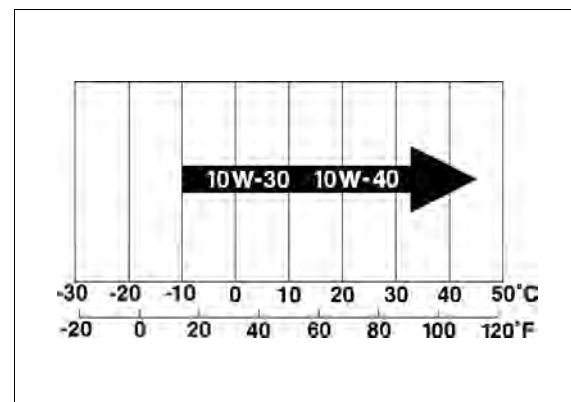
API service classification SG or higher
(except oils labeled as energy conserving on the circular API service label)

Viscosity: SAE 10W-30

JASO T 903 standard: MA

NOTE:

Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

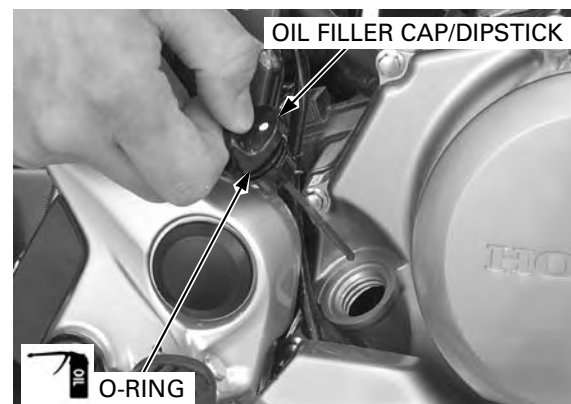


Make sure the O-ring is in good condition, replace it if necessary.

Coat the O-ring with engine oil and install it.

Install the oil filler cap/dipstick.

For engine oil change (page 3-13).



ENGINE OIL FILTER

NOTE:

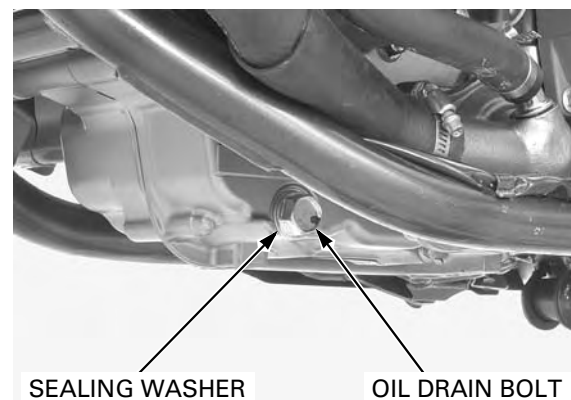
Change the oil with engine warm and the motorcycle on its sidestand to assure complete and rapid draining.

Remove the under cowl (page 2-13).

Start the engine, warm it up and stop it.

Remove the oil filler cap/dipstick (page 3-12).

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



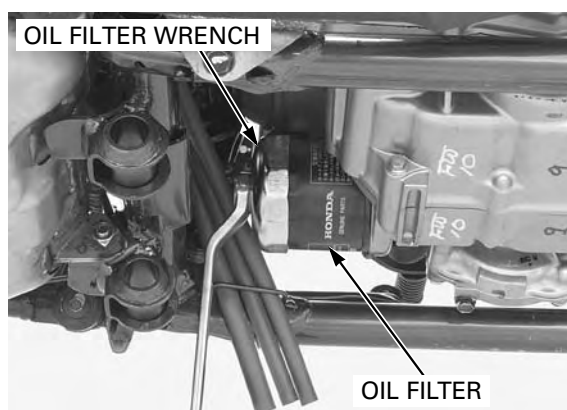
MAINTENANCE

Remove the oil filter cartridge using the special tool and let the remaining oil drain out.

TOOL:

Oil filter wrench

07HAA-PJ70101



Coat a new O-ring with engine oil and install it to the oil filter cartridge.

Apply engine oil to the threads of a new oil filter cartridge.

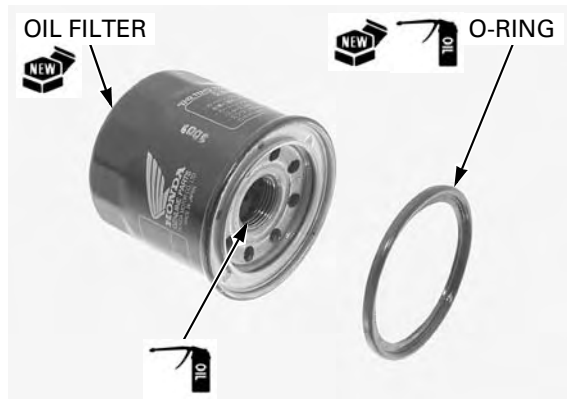
Install the oil filter cartridge and tighten it to the specified torque.

TOOL:

Oil filter wrench

07HAA-PJ70101

TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)



Install the oil drain bolt with a new sealing washer and tighten it to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Fill the crankcase with the recommended engine oil (page 3-12).

OIL CAPACITY:

2.1 liters (2.2 US qt, 1.8 Imp qt) at draining

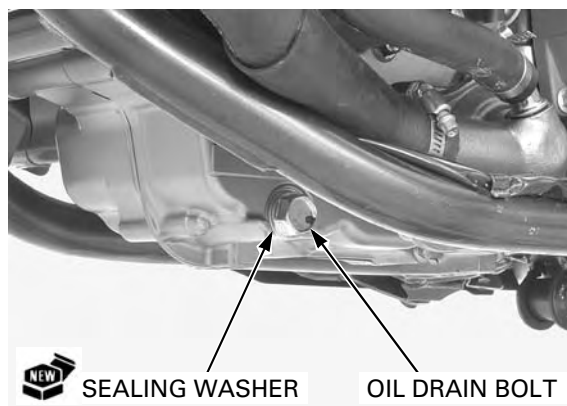
2.3 liters (2.4 US qt, 2.0 Imp qt) at filter change

2.9 liters (3.1 US qt, 2.6 Imp qt) at disassembly

Check the engine oil level (page 3-12).

Make sure there are no oil leaks.

Install the under cowl (page 2-13).



RADIATOR COOLANT

Check the coolant level of the reserve tank with the engine running at normal operating temperature. The level should be between the "UPPER" and "LOWER" level lines with the motorcycle in an upright position.

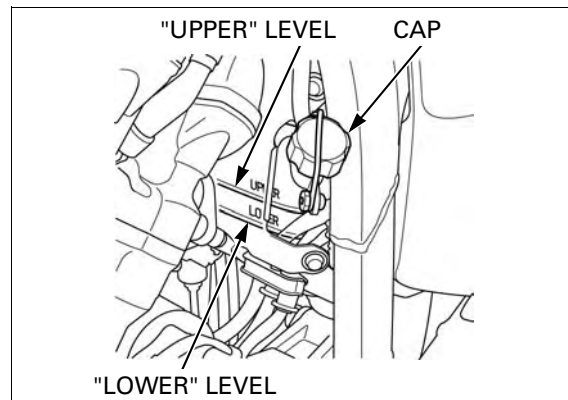
If the level is low, remove the reserve tank cap, and fill the tank to the "UPPER" level line with a 1:1 mixture of distilled water and antifreeze (coolant preparation: page 6-6).

RECOMMENDED ANTIFREEZE:

High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

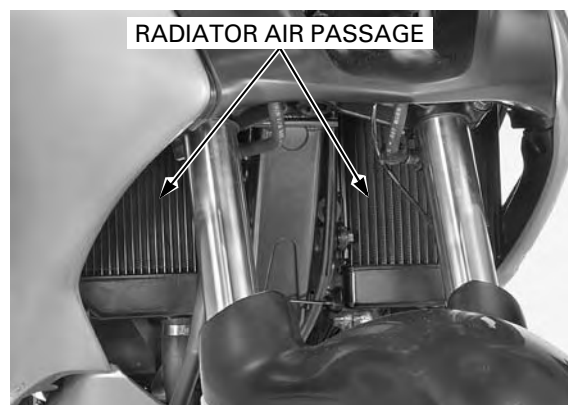
Check to see if there are any coolant leaks when the coolant level decreases very rapidly.

If the reserve tank becomes completely empty, there is a possibility of air getting into the cooling system. Be sure to remove any air from the cooling system (page 6-7).



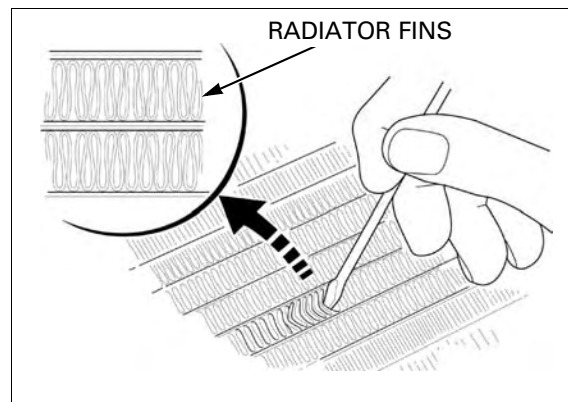
COOLING SYSTEM

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.

For radiator replacement (page 6-10).



MAINTENANCE

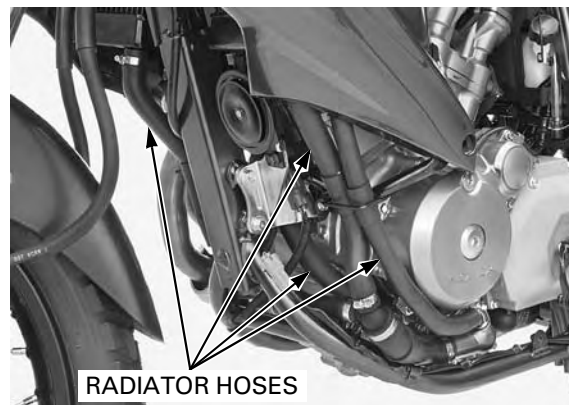
Remove the under cowl (page 2-13).

Check for any coolant leakage from the water pump, radiator hoses and hose joints.

Check the radiator hoses for cracks or deterioration and replace them if necessary.

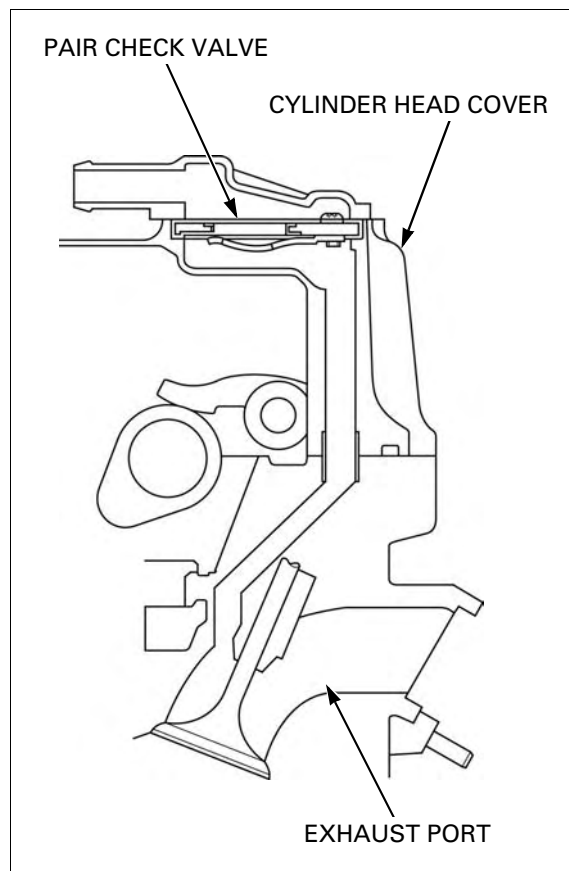
Check that all hose clamps are tight.

Install the under cowl (page 2-13).



SECONDARY AIR SUPPLY SYSTEM

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

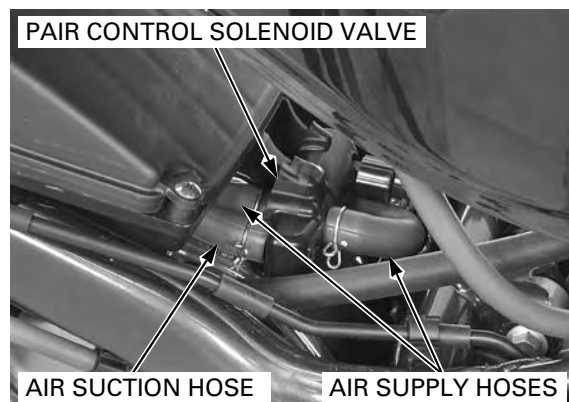


Lift and support the fuel tank (page 3-5).

If the hoses show any signs of heat damage, inspect the PAIR check valve in the cylinder head cover for damage.

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

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



DRIVE CHAIN

DRIVE CHAIN SLACK INSPECTION

Never inspect and adjust the drive chain while the engine is running.

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

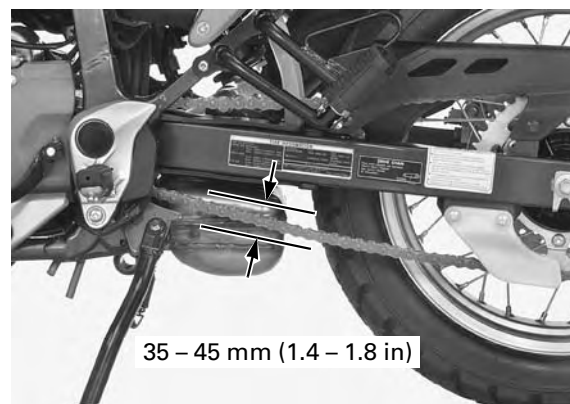
Check the slack in the drive chain lower run midway between the sprockets.

DRIVE CHAIN SLACK: 35 – 45 mm (1.4 – 1.8 in)

NOTICE

Excessive chain slack, 60 mm (2.4 in) or more, may damage the frame.

Lubricate the drive chain with #80 – 90 gear oil or chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.



ADJUSTMENT

Loosen the rear axle nut.

Loosen the lock nuts and turn the adjusting nuts until the correct drive chain slack is obtained.

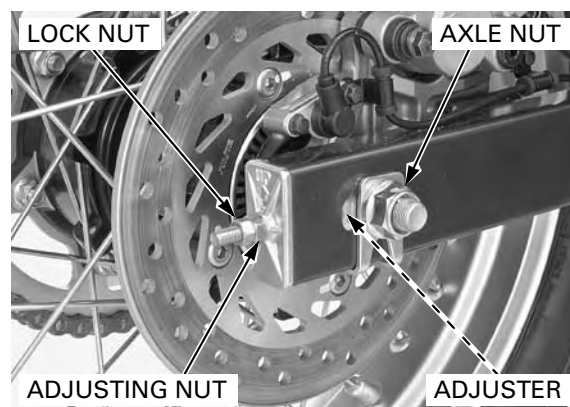
A scale is included on the adjusters.

Be sure the reading on the scale is same for both sides.

Tighten the rear axle nut to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Hold the adjusting nuts and tighten the lock nuts securely.

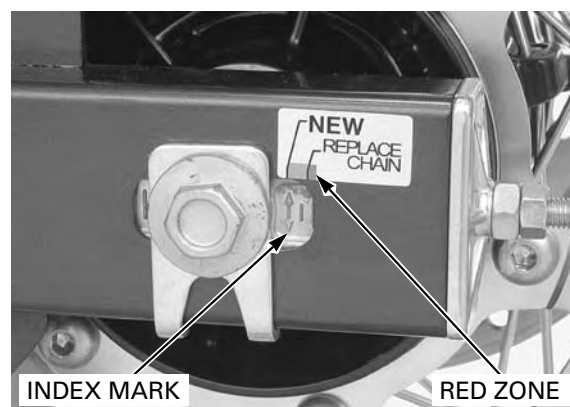


Recheck the drive chain slack and free wheel rotation.

Lubricate the drive chain with #80 – 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

Check the drive chain wear indicator label attached on the left swingarm.

If the drive chain adjuster index mark (arrow) reaches red zone of the indicator label, replace the drive chain with a new one (page 3-19).



MAINTENANCE

CLEANING AND LUBRICATION

Clean the chain with non-flammable or high flash point solvent and wipe it dry.

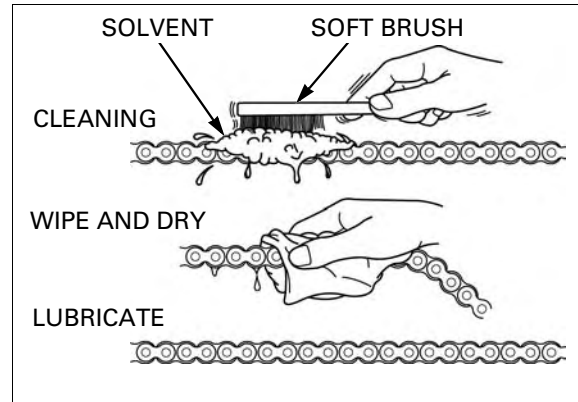
Be sure the chain has dried completely before lubricating.

Inspect the drive chain for possible damage or wear.

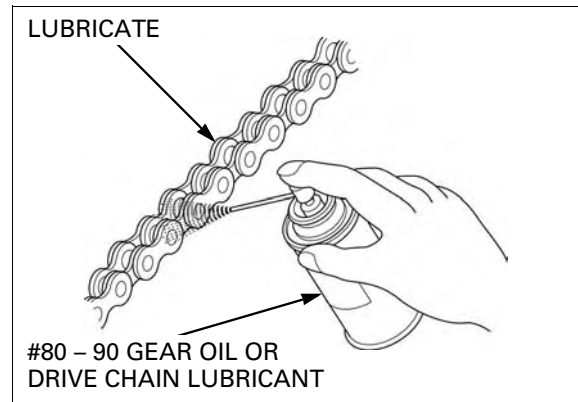
Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.

Inspect and replace sprocket as necessary.



Lubricate the drive chain with #80 – 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.



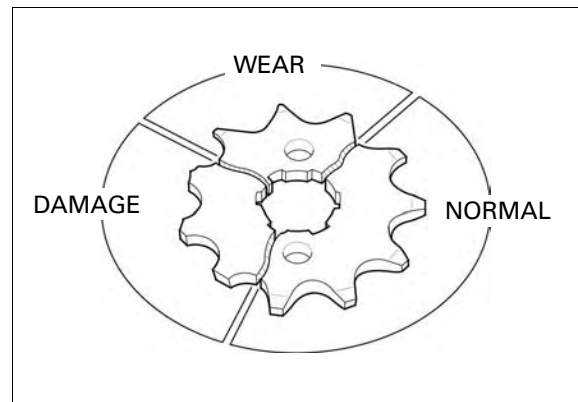
SPROCKET INSPECTION

Remove the drive sprocket cover (page 7-4).

Inspect the drive and driven sprocket teeth for wear or damage, replace them if necessary.

Never use a new drive chain on worn sprockets.

Both chain and sprockets must be in good condition, or the new replacement chain will wear rapidly.



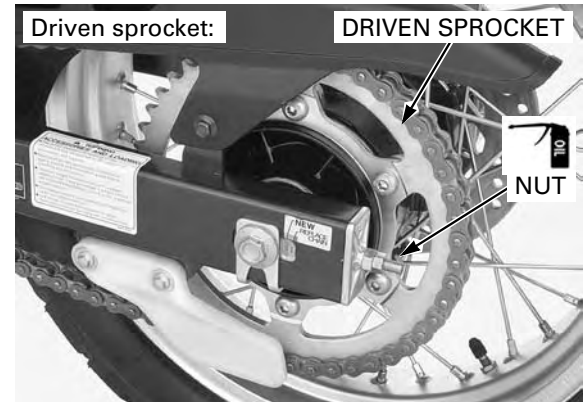
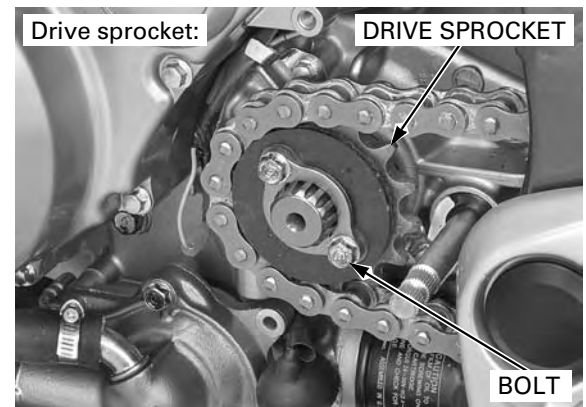
Check the attaching bolts and nuts on the drive and driven sprockets.
If any are loose, torque them.

Apply engine oil to the driven sprocket nut threads.

TORQUE:

Drive sprocket bolt: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Driven sprocket nut: 45 N·m (4.6 kgf·m, 33 lbf·ft)



REPLACEMENT

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

Loosen the drive chain (page 3-17).

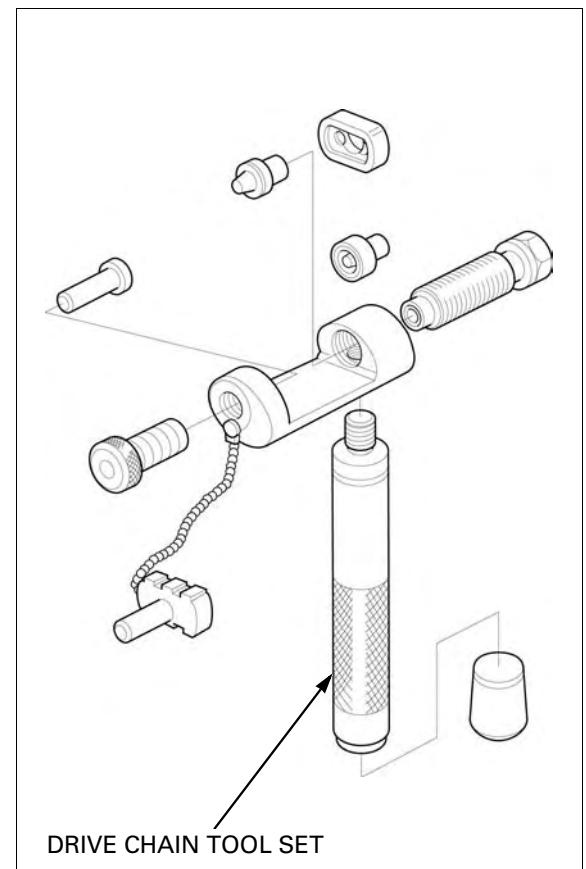
Assemble the special tool as shown.

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

TOOL:

Drive chain tool set

07HMH-MR10103



MAINTENANCE

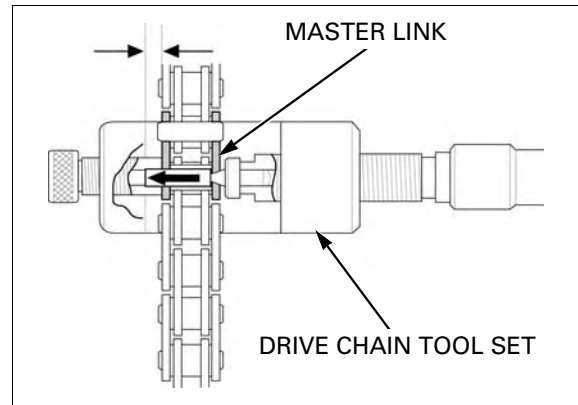
Locate the crimped pin ends of the master link from the outside of the chain, and remove the link with the drive chain tool set.

TOOL:

Drive chain tool set

07HMH-MR10103

Remove the drive chain.



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

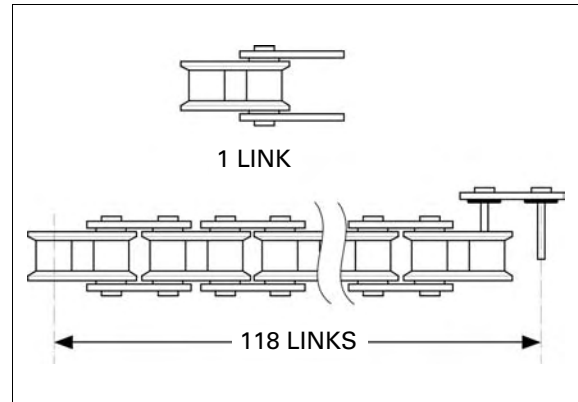
Remove the excess drive chain links from the new drive chain with the drive chain tool set.

STANDARD LINKS: 118 LINKS

REPLACEMENT CHAIN

RK: RK525SMOZ5-120LJFZ

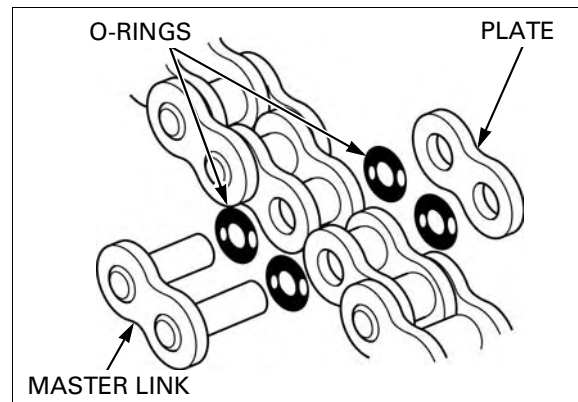
DID: DID525V8-120ZB



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

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

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

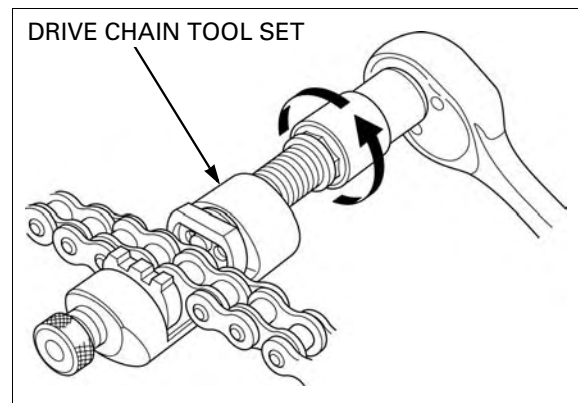


Assemble and set the drive chain tool set.

TOOL:

Drive chain tool set

07HMH-MR10103



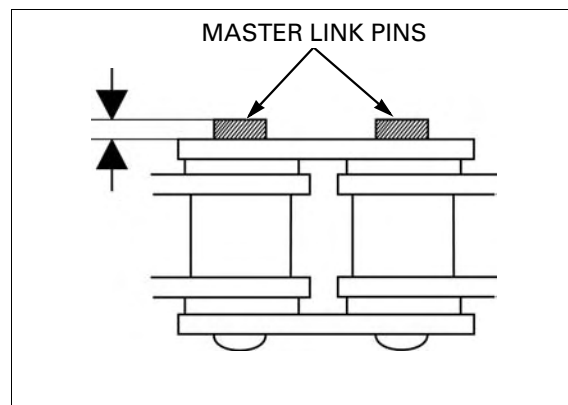
Make sure that the master link pins are installed properly.
Measure the master link pin length projected from the plate.

STANDARD LENGTH:

DID: 1.30 – 1.50 mm (0.051 – 0.059 in)

RK: 1.20 – 1.40 mm (0.047 – 0.055 in)

Stake the master link pins.

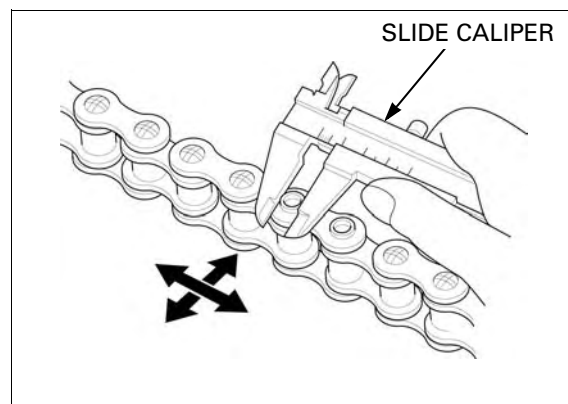


Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

DIAMETER OF THE STAKED AREA:

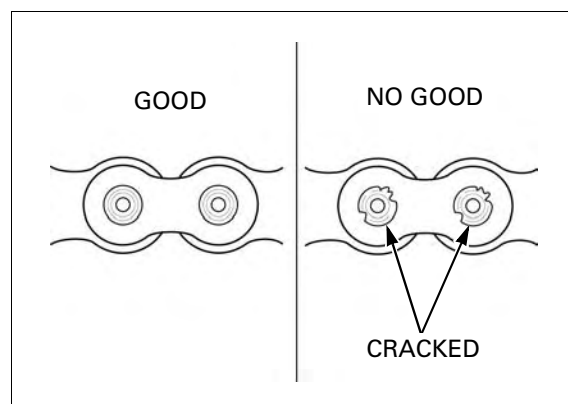
DID: 5.50 – 5.80 mm (0.217 – 0.228 in)

RK: 5.25 – 5.65 mm (0.207 – 0.222 in)



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

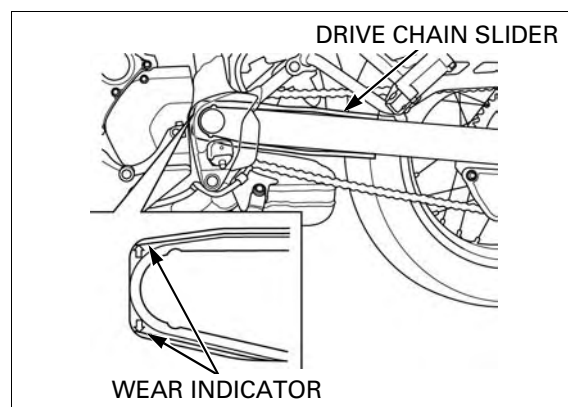
After staking, check the staked area of the master link for cracks.
If there is any cracking, replace the master link, O-rings and plate.



DRIVE CHAIN SLIDER

Inspect the drive chain slider for excessive wear or damage.

If it is worn to the wear indicator, replace the drive chain slider (page 14-21).



BRAKE FLUID

NOTICE

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

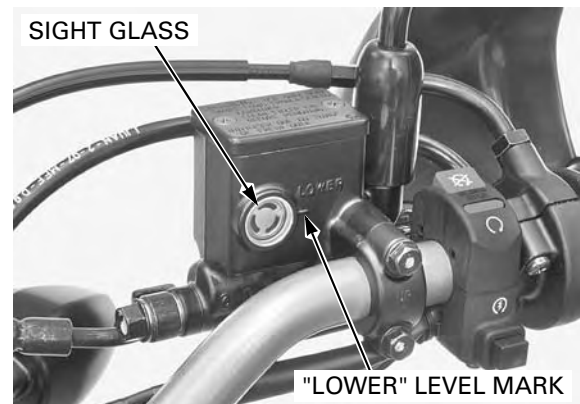
- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.

NOTE:

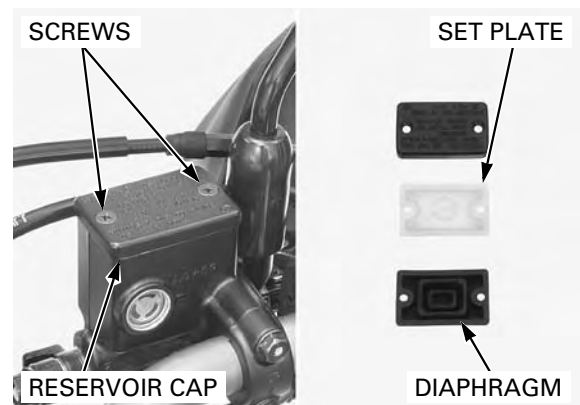
- When the fluid level is low, check the brake pads for wear (page 3-23).
- A low fluid level may be due to wear of the brake pads. If the brake pads are worn and the caliper pistons are pushed out, this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check the entire system for leaks (page 3-24).

FRONT

Turn the handlebar so the reservoir is level and check the brake fluid level through the sight glass.



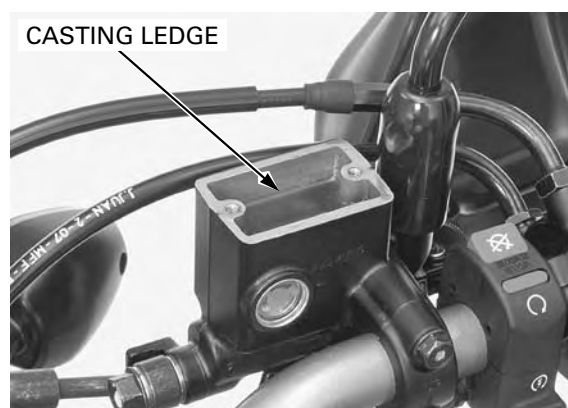
If the fluid level is near the "LOWER" level mark, remove the screws, reservoir cap, set plate and diaphragm.



Fill the reservoir with DOT 4 brake fluid from a sealed container to the casting ledge.

Install the diaphragm, set plate and reservoir cap, and tighten the cap screws.

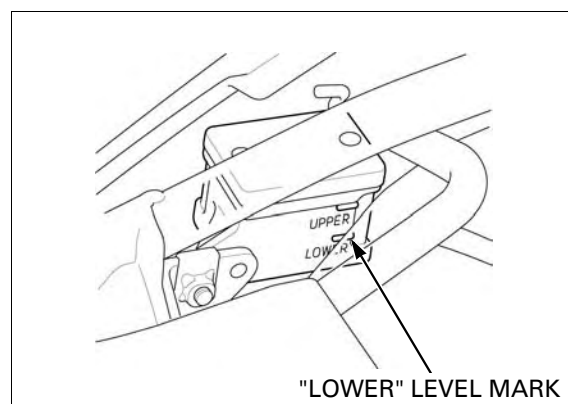
TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)



REAR

Remove the seat (page 2-4).

Support the motorcycle in an upright position.
Check the rear brake reservoir fluid level.



Remove the right side cover (page 2-4).

If the fluid level is near the "LOWER" level mark, remove the reservoir cap, set plate and diaphragm.

Fill the reservoir with DOT 4 brake fluid from a sealed container to the "UPPER" level mark.

Install the diaphragm, set plate and reservoir cap, and tighten the cap screws.

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



BRAKE PADS WEAR

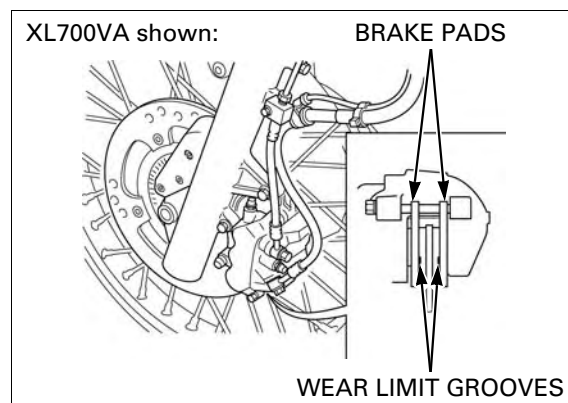
FRONT BRAKE PADS

Check the brake pad for wear.

Replace the brake pads if either pad is worn to the wear limit groove.

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

For brake pad replacement (page 15-17).



MAINTENANCE

REAR BRAKE PADS

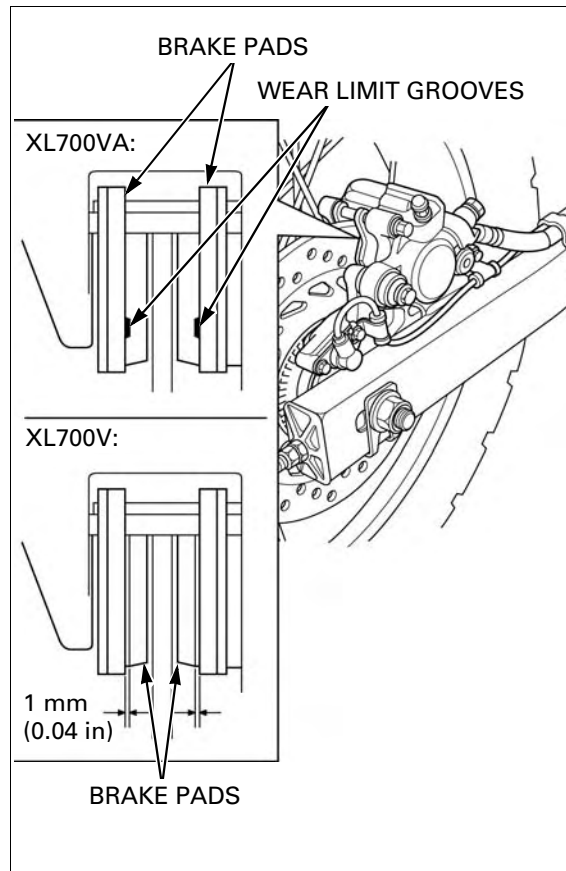
Check the brake pad for wear.

XL700VA only: Replace the brake pads if either pad is worn to the wear limit groove.

XL700V only: Replace the brake pads if either pad is worn anywhere to a thickness of 1 mm (0.04 in).

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

For brake pad replacement (page 15-17).



BRAKE SYSTEM

INSPECTION

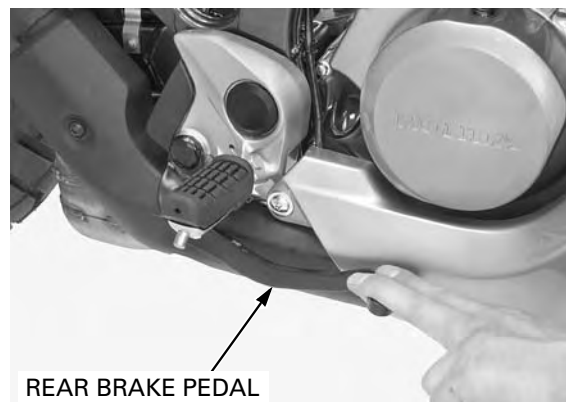
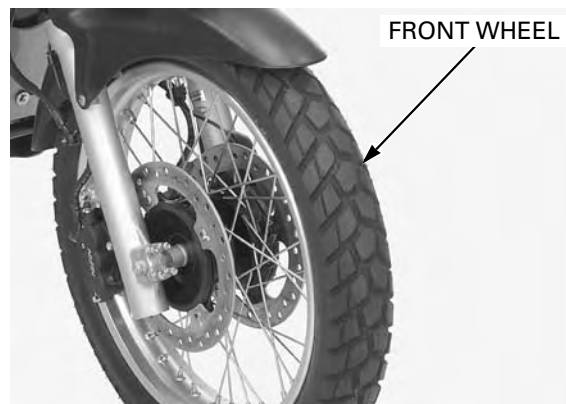
XL700VA only: This model is equipped with a Combined Brake System.

Check the front and rear brake operation as follows:

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

Apply the rear brake pedal.

Make sure the front wheel does not turn while the rear brake pedal is applied.



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

If the lever or pedal feels soft or spongy when operated, bleed the air from the system.

For air bleeding procedures

- XL700V (page 15-7)
- XL700VA (page 15-11)

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

Tighten any loose fittings.

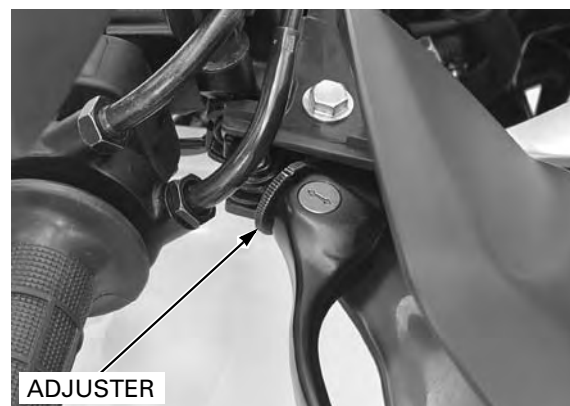
Replace the hose and fittings as required.



BRAKE LEVER ADJUSTMENT

Align the allowance on the brake lever with the index number on the adjuster.

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

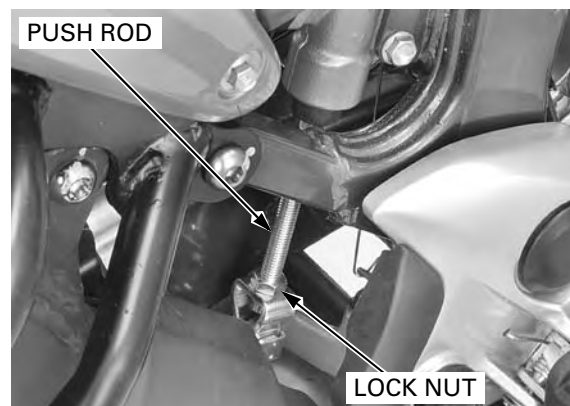


BRAKE PEDAL HEIGHT ADJUSTMENT

Loosen the lock nut and turn the push rod as required.

Tighten the lock nut to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 1.3 lbf·ft)



BRAKE LIGHT SWITCH

NOTE:

- The brake light switch on the front brake master cylinder cannot be adjusted. If the front brake light switch actuation and brake engagement are not synchronized, either replace the switch unit or the malfunctioning parts of the system.
- Make the rear brake light switch adjustments after the brake pedal height adjustment.

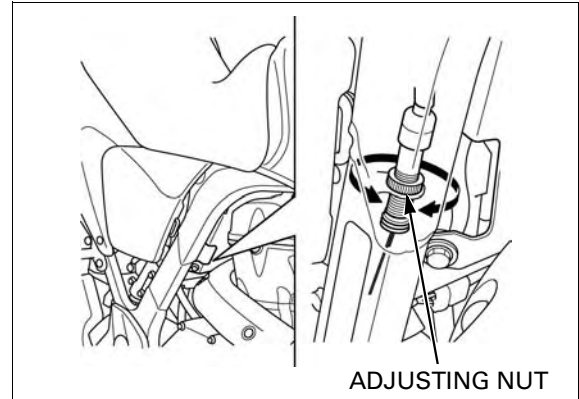
Check that the brake light comes on just prior to the brake actually being engaged.

If the light fails to come on, adjust the switch so that the light comes on at the proper time.

Hold the switch body and turn the adjusting nut as required.

Recheck the brake light switch operation.

Do not turn the switch body while turning the adjusting nut.



ADJUSTING NUT

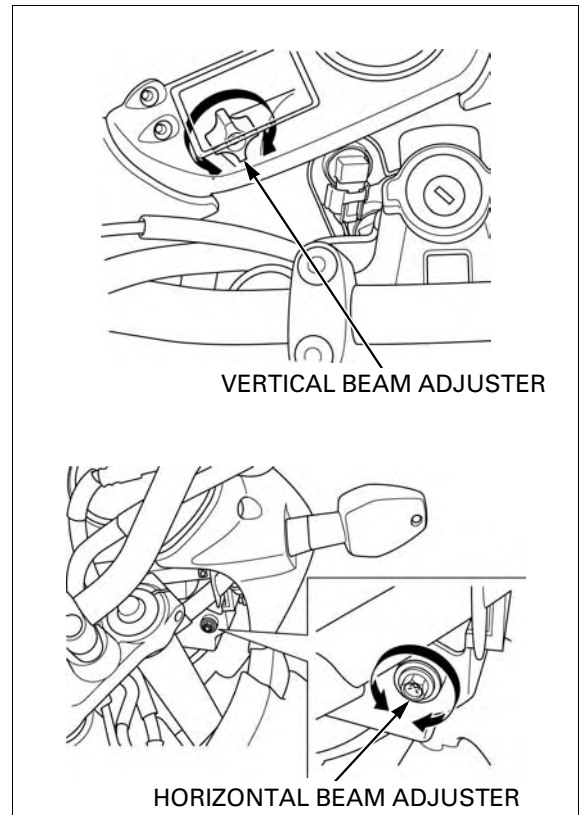
HEADLIGHT AIM

Support the motorcycle in an upright position.

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

Adjust the headlight beam vertically by turning the vertical beam adjuster.

Adjust the headlight beam horizontally by turning the horizontal beam adjuster.



VERTICAL BEAM ADJUSTER

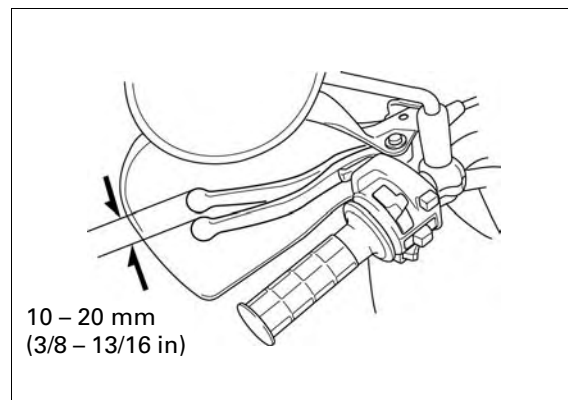
HORIZONTAL BEAM ADJUSTER

CLUTCH SYSTEM

Inspect the clutch cable for kinks or damage, and lubricate the cable if necessary.

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

FREEPLAY: 10 – 20 mm (3/8 – 13/16 in)



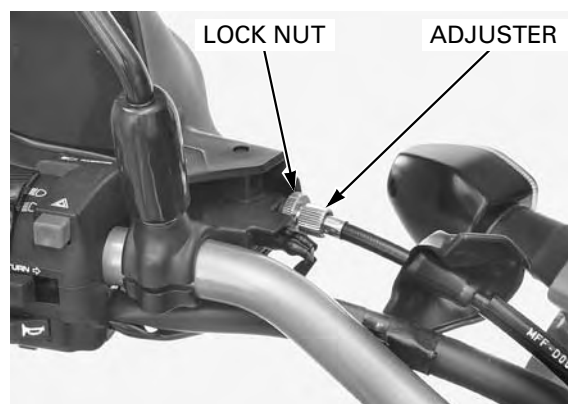
Minor adjustment is made with the upper adjuster at the clutch lever.

Loosen the lock nut and turn the adjuster as required.

Tighten the lock nut while holding the adjuster.

If the adjuster is threaded out near its limit and the correct freeplay cannot be obtained, turn the adjuster all the way in and back out one turn.

Tighten the lock nut and make major adjustment (page 3-27).



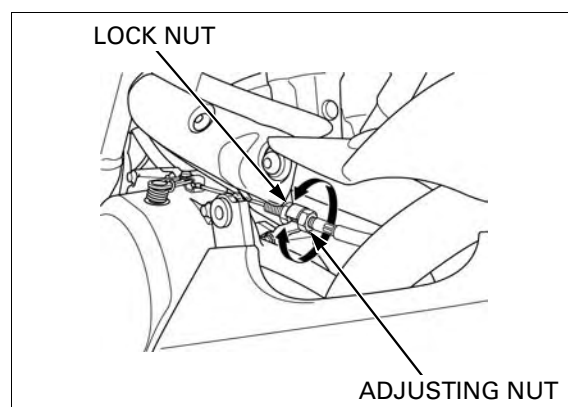
Major adjustment is made with the lower adjusting nut at the engine.

Loosen the lock nut and turn the adjusting nut as required.

After adjustment is complete, tighten the lock nut while holding the adjusting nut.

Check the clutch operation.

If the freeplay cannot be obtained, or the clutch slips during the test ride, remove and inspect the clutch (page 10-6).



SIDESTAND

Support the motorcycle on a level surface.

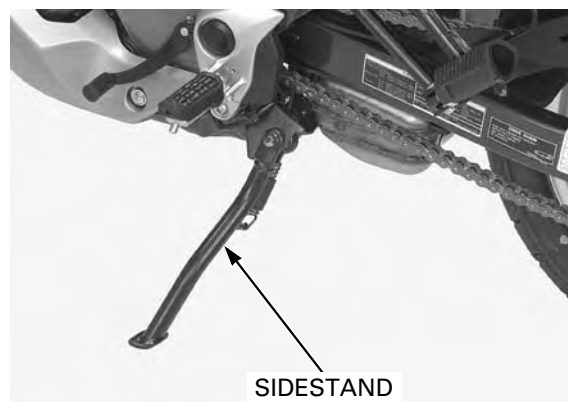
Check the sidestand spring for damage or loss of tension.

Check the sidestand assembly for freedom of movement and lubricate the sidestand pivot if necessary.

Check the sidestand ignition cut-off system:

- Sit astride the motorcycle and raise the sidestand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, while squeezing the clutch lever.
- Fully lower the sidestand.
- The engine should stop as the sidestand is lowered.

If there is a problem with the system, check the sidestand switch (page 20-25).



SUSPENSION

FRONT SUSPENSION INSPECTION

Check the action of the forks by applying the front brakes and compressing the front suspension several times.

Check the entire assembly for leaks, damage or loose fasteners.

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

For fork service (page 13-21).



REAR SUSPENSION INSPECTION

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

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

For shock absorber service (page 14-13).



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

Check for worn swingarm bearings by grabbing the rear end of the swingarm and attempting to move the swingarm side to side.

Replace the bearings if any looseness is noted (page 14-21).



REAR SUSPENSION ADJUSTMENT

COMPRESSION DAMPING ADJUSTER

NOTICE

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

- Damping adjustment is referenced from the full hard position.

The compression damping can be adjusted by turning the adjuster.

TURN CLOCKWISE:

Increase the damping force

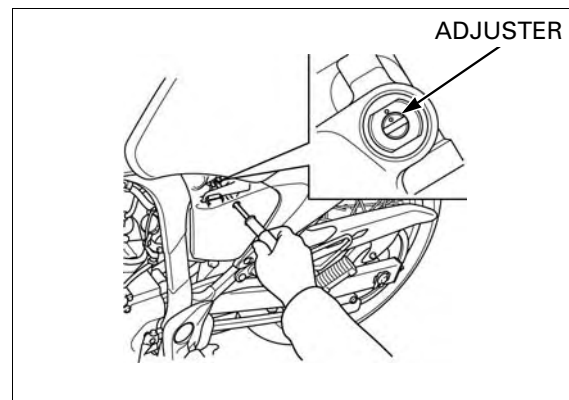
TURN COUNTERCLOCKWISE:

Decrease the damping force

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

COMPRESSION ADJUSTER STANDARD POSITION:

2 turns out from full in



NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-13).

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

WHEELS/TIRES

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

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

For front wheel service (page 13-15).



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

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

For rear wheel service (page 14-6).



MAINTENANCE

Tap on the spokes and be sure that the same clear metallic sound can be heard on all spokes.

Inspect the spokes for looseness by tapping them with a screwdriver.

If a spoke does not sound clearly, or if it sounds different from the other spokes, tighten it to the specified torque.

TOOL:

Spoke wrench, 6.1 mm 07JMA-MR60100

TORQUE: 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)



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

RECOMMENDED TIRE PRESSURE:

Driver only:

Front: 200 kPa (2.00 kgf/cm², 29 psi)

Rear: 200 kPa (2.00 kgf/cm², 29 psi)

Driver and passenger:

Front: 200 kPa (2.00 kgf/cm², 29 psi)

Rear: 280 kPa (2.80 kgf/cm², 41 psi)



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 following limits.

MINIMUM TREAD DEPTH: Front: 1.5 mm (0.06 in)

Rear: 2.0 mm (0.08 in)



STEERING HEAD BEARINGS

Support the motorcycle securely 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.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 13-31).



Check for steering stem bearings by grabbing the fork legs and attempting to move the front fork side to side.

Replace the bearings if any looseness is noted (page 13-31).

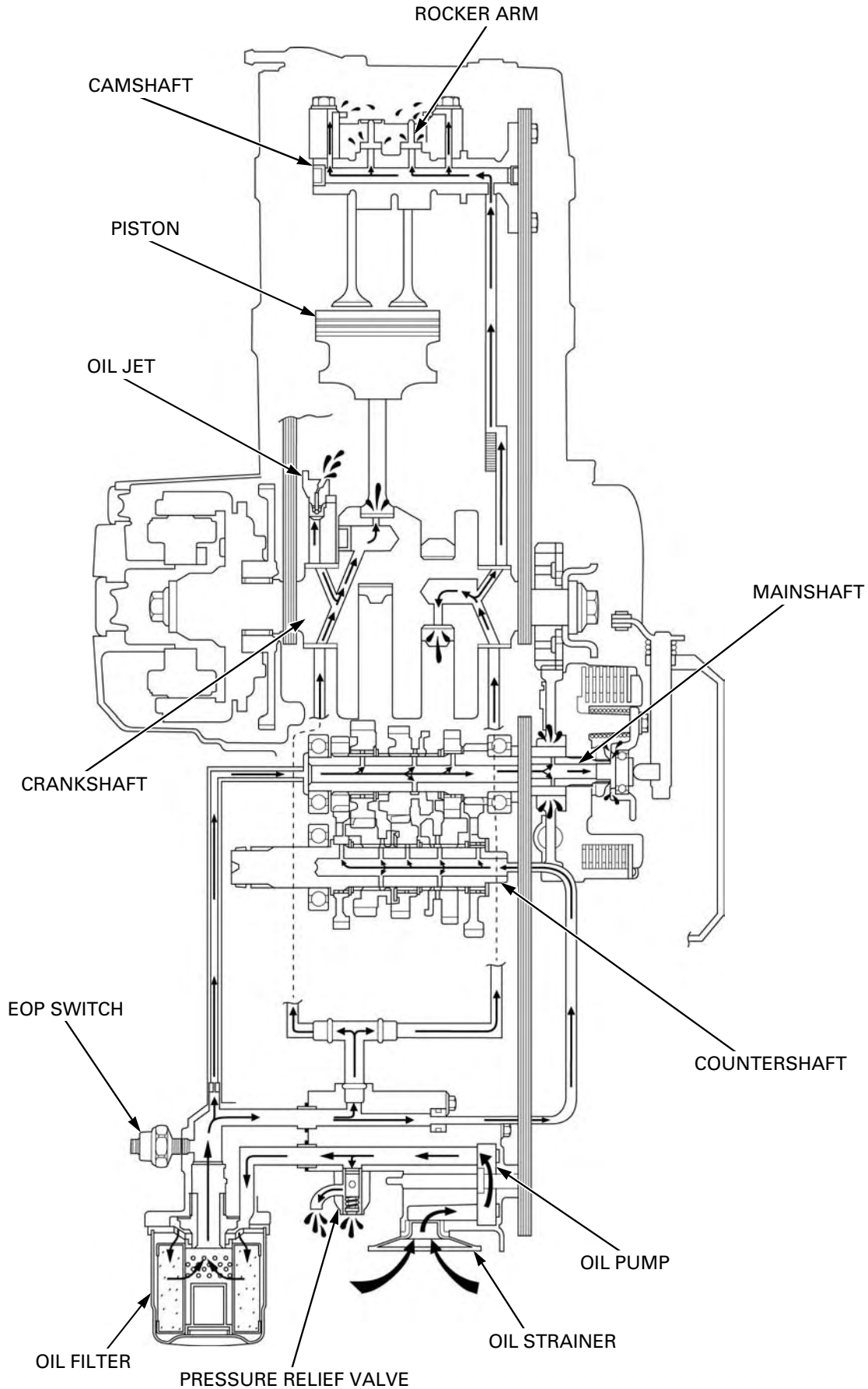


MEMO

4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-2	OIL PRESSURE CHECK	4-5
SERVICE INFORMATION	4-3	OIL PUMP	4-5
TROUBLESHOOTING	4-4		

LUBRICATION SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠ CAUTION

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

- The crankcase must be separated to service the oil pump (page 4-5).
- 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 3-12).
- For engine oil and filter change (page 3-13).
- For oil pressure indicator inspection (page 20-18).

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	2.1 liters (2.2 US qt, 1.8 Imp qt)	–
	After draining/filter change	2.3 liters (2.4 US qt, 2.0 Imp qt)	–
	After disassembly	2.9 liters (3.1 US qt, 2.6 Imp qt)	–
Recommended engine oil		Honda "4-stroke motorcycle oil" or an equivalent Oil recommendation: API classification SG or higher (except oils labeled as energy conserving on the circular API service label) Viscosity: SAE 10W-30 JASO T 903 standard: MA	–
Oil pressure at EOP switch		294 kPa (3.0 kgf/cm ² , 43 psi) at 6,000 min ⁻¹ (rpm)/(100°C/212°F)	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.02 – 0.08 (0.001 – 0.003)	0.10 (0.004)

TORQUE VALUE

Oil pump assembly bolt

13 N·m (1.3 kgf·m, 10 lbf·ft)

CT bolt

LUBRICATION SYSTEM

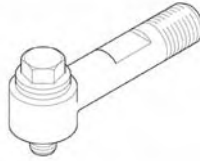
TOOLS

Oil pressure gauge set
07506-3000001



or equivalent commercially available

Oil pressure gauge attachment
07510-4220100



or equivalent commercially available

TROUBLESHOOTING

Oil level too low

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

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/or 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
- Worn piston rings

Oil emulsification

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

OIL PRESSURE CHECK

Remove the EOP switch (page 20-19).

Connect an oil pressure gauge attachment and gauge to the EOP switch hole.

TOOLS:

Oil pressure gauge set 07506-3000001 or equivalent commercially available

Oil pressure gauge attachment 07510-4220100 or equivalent commercially available

Check the oil level and add the recommended oil if necessary (page 3-12).

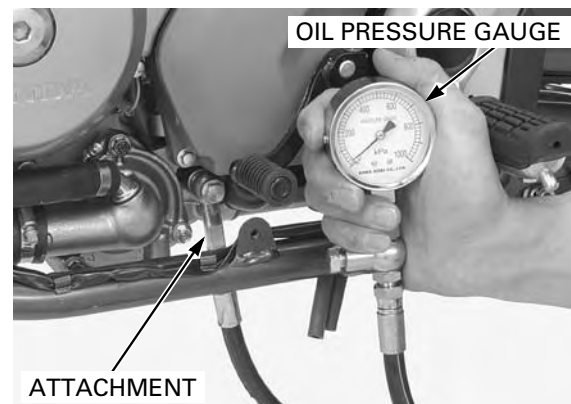
Start the engine and check the oil pressure at 5,000 min^{-1} (rpm).

OIL PRESSURE:

294 kPa (3.0 kgf/cm^2 , 43 psi) at 6,000 min^{-1} (rpm)
(100°C/212°F)

Stop the engine and remove the special tools.

Install the EOP switch (page 20-19).

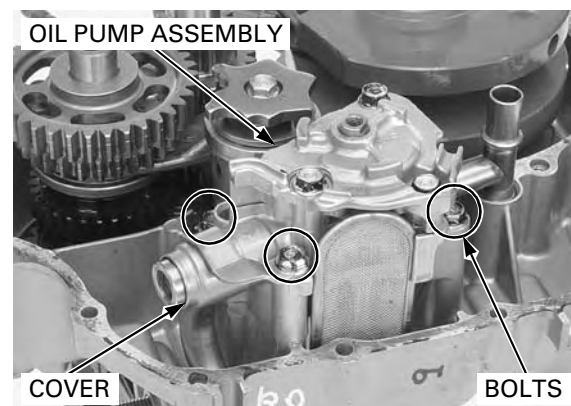


OIL PUMP

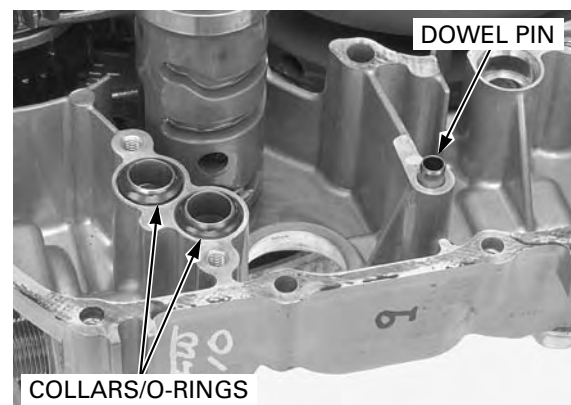
REMOVAL

Separate the crankcase (page 12-7).

Remove the bolts, pressure relief valve cover and oil pump assembly from the left crankcase.



Remove the dowel pin, collars and O-rings.

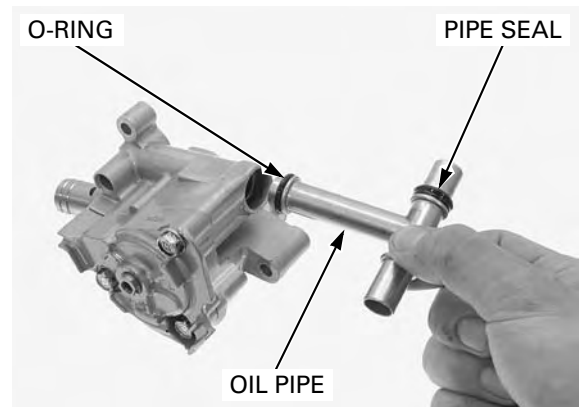


LUBRICATION SYSTEM

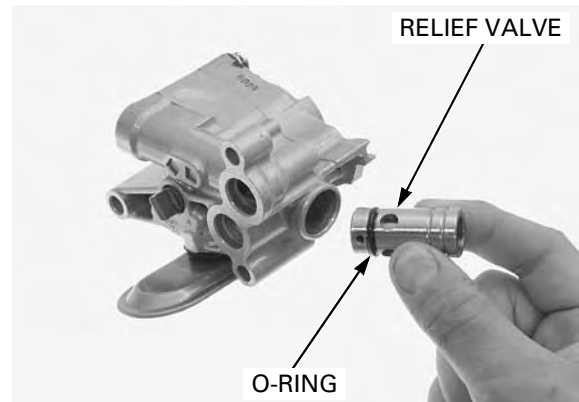
DISASSEMBLY

OIL PUMP BODY

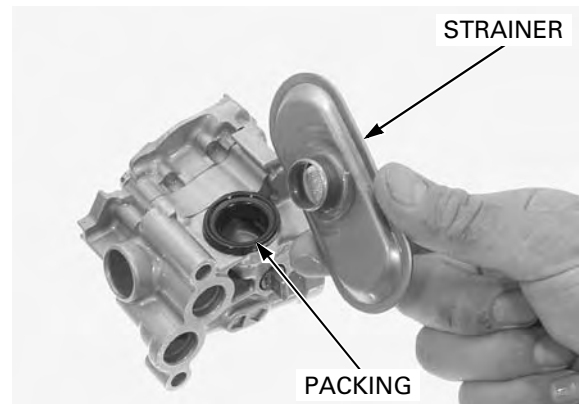
Remove the oil pipe, oil pipe seal and O-ring.



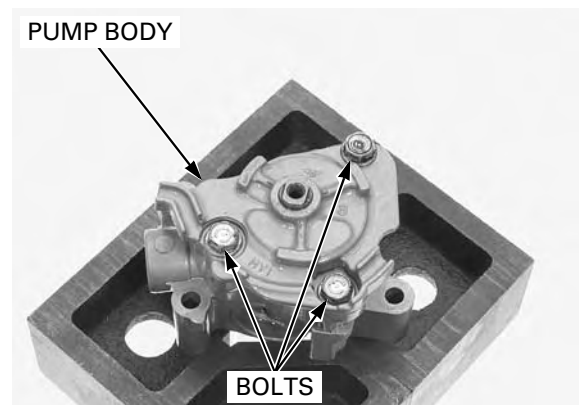
Remove the pressure relief valve and O-ring.



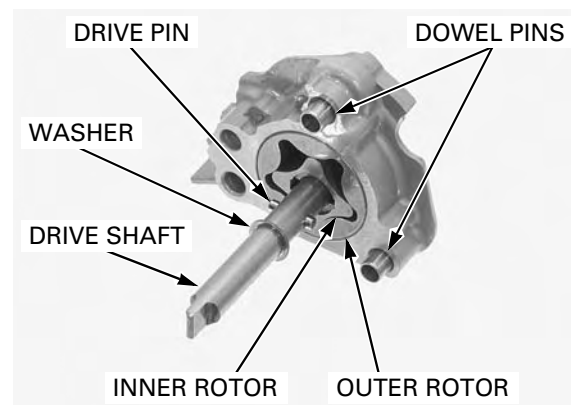
Remove the oil strainer and packing.



Remove the bolts and pump body from the pump cover.



Remove the dowel pins.
Remove the washer, drive shaft, drive pin, inner and outer rotors.



PRESSURE RELIEF VALVE

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

The snap ring is under spring pressure. Use care when removing it and wear eye and face protection. Be careful not to lose the disassembled parts.

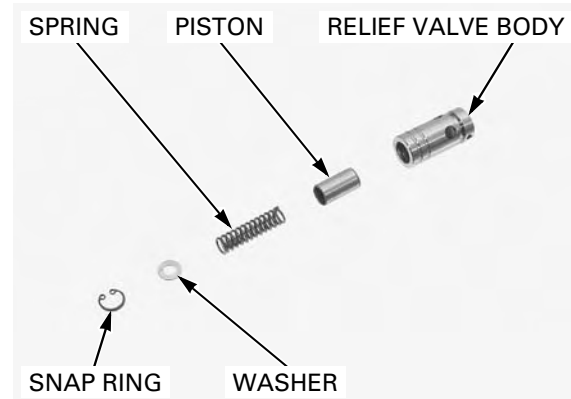
Remove the snap ring, washer, spring and piston from the pressure relief valve body.



Check the piston for wear, sticking or damage.
Check the valve spring for wear or fatigue.
Check the relief valve body for clogging or damage.
Clean all parts and assemble the relief valve in the reverse order of disassembly.

NOTE:

- 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.



LUBRICATION SYSTEM

INSPECTION

NOTE:

Measure each clearance at several points and use the largest reading to compare the service limit.

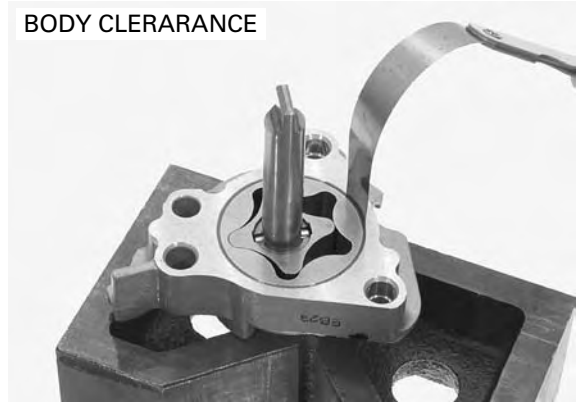
BODY CLEARANCE

Temporarily assemble the inner rotor, outer rotor, drive pin and pump shaft into the pump body.

Measure the body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)

BODY CLEARANCE



TIP CLEARANCE

Measure the tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)

TIP CLEARANCE



SIDE CLEARANCE

Measure the side clearance.

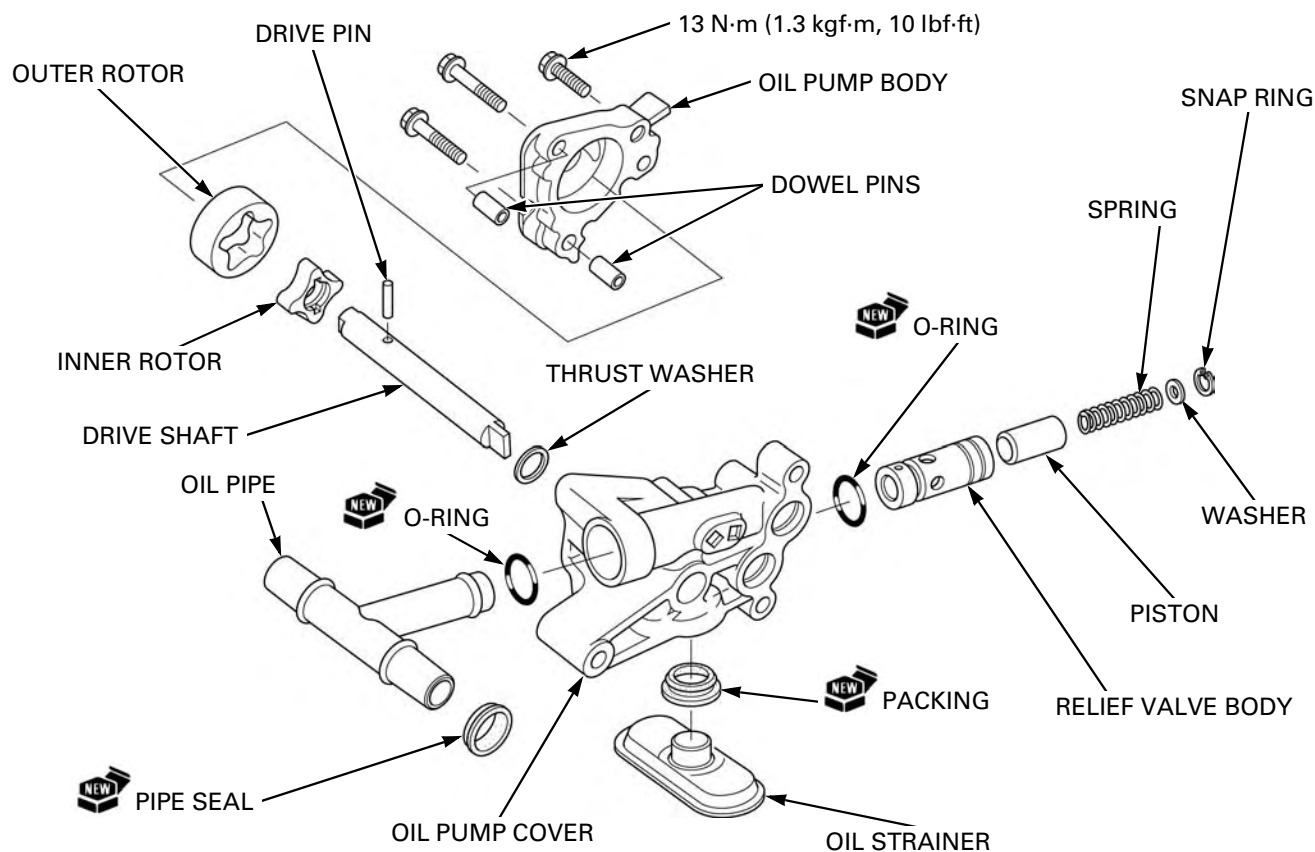
SERVICE LIMIT: 0.10 mm (0.004 in)

SIDE CLEARANCE



OIL PUMP ASSEMBLY

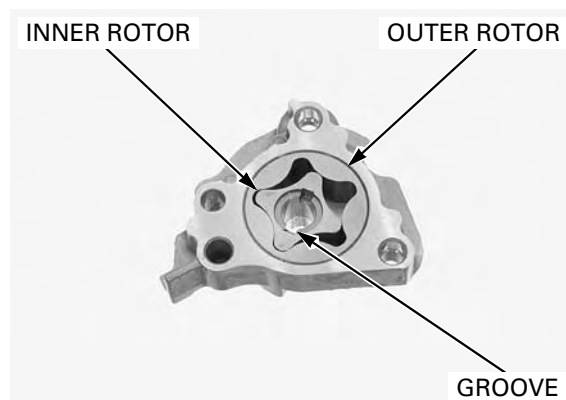
Dip all parts in clean engine oil.



Install the outer and inner rotors to the pump body.

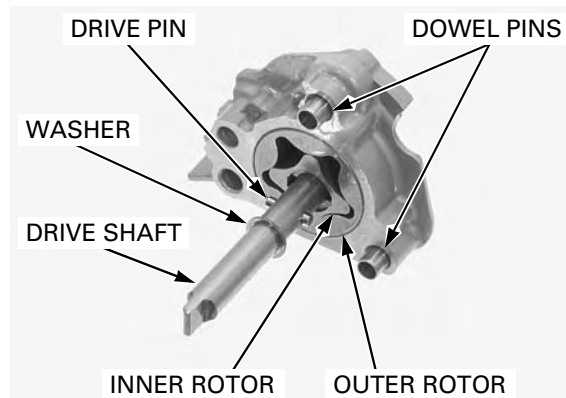
NOTE:

Install the inner rotor with the grooved side facing the pump cover.



Install the drive shaft and drive pin by aligning the drive pin with the grooves in the inner rotor.

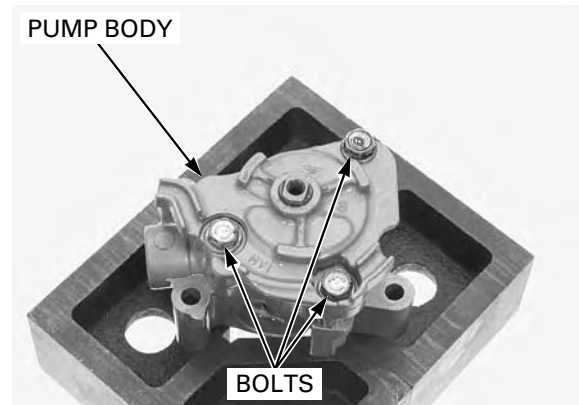
Place the washer into the inner rotor groove. Install the dowel pins to the pump body.



LUBRICATION SYSTEM

Install the pump cover on the pump body.
Install and tighten the bolts to the specified torque.

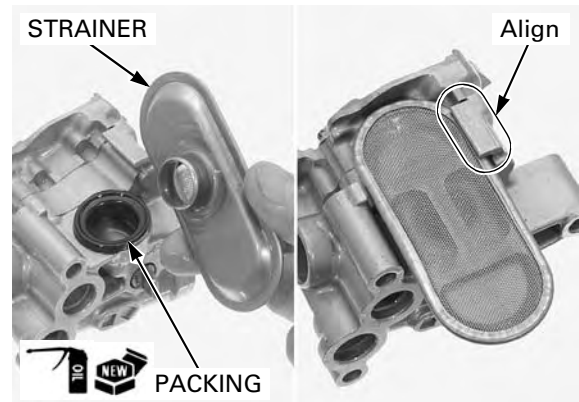
TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)



Clean the oil strainer.

Coat a new oil strainer packing with engine oil and install it to the oil pump body.

Install the oil strainer to the oil pump by aligning verge of the strainer with the groove on the oil pump.



Coat a new O-ring with engine oil and install it in the groove of the pressure relief valve.

Install the pressure relief valve into the oil pump body.

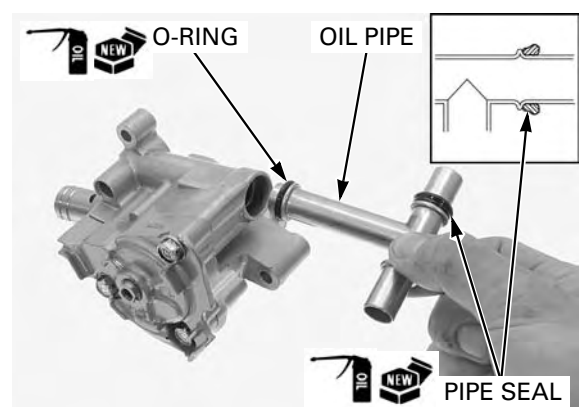


Coat a new oil pipe seal and new O-ring with engine oil, then install them to the oil pipe.

NOTE:

Install an oil pipe seal with its tapered side facing inside.

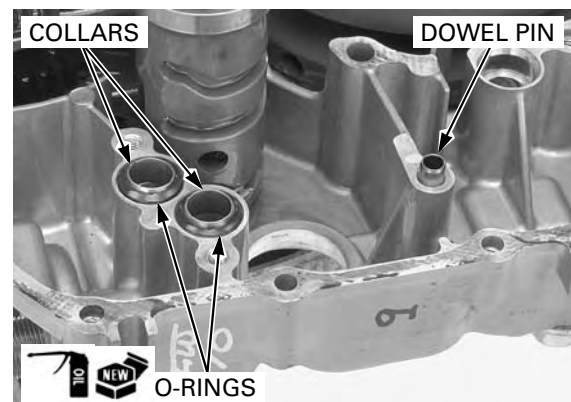
Install the oil pipe to the oil pump securely.



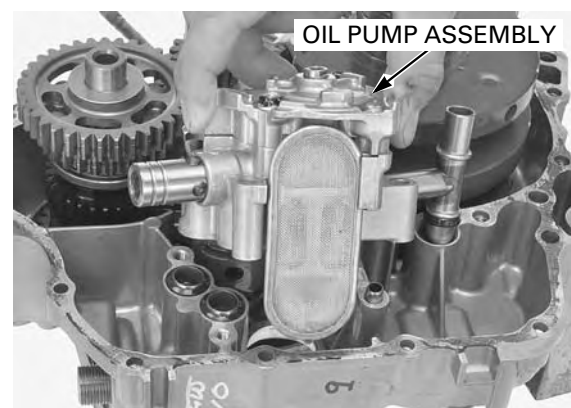
INSTALLATION

Install the dowel pin and collars.

Coat new O-rings with engine oil and install them.

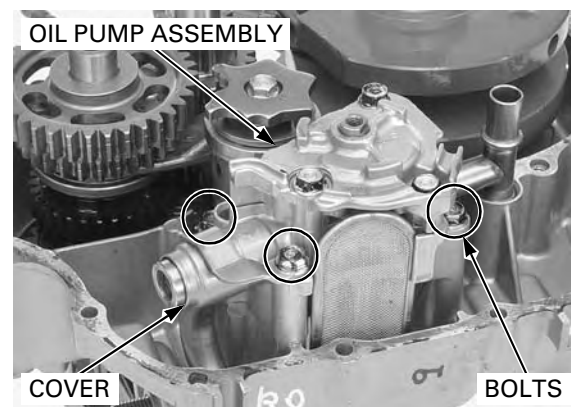


Install the oil pump assembly into the crankcase securely.



Install the pressure relief valve cover and tighten the bolts securely.

Assemble the crankcase (page 12-29).
Check the oil pressure (page 4-5).

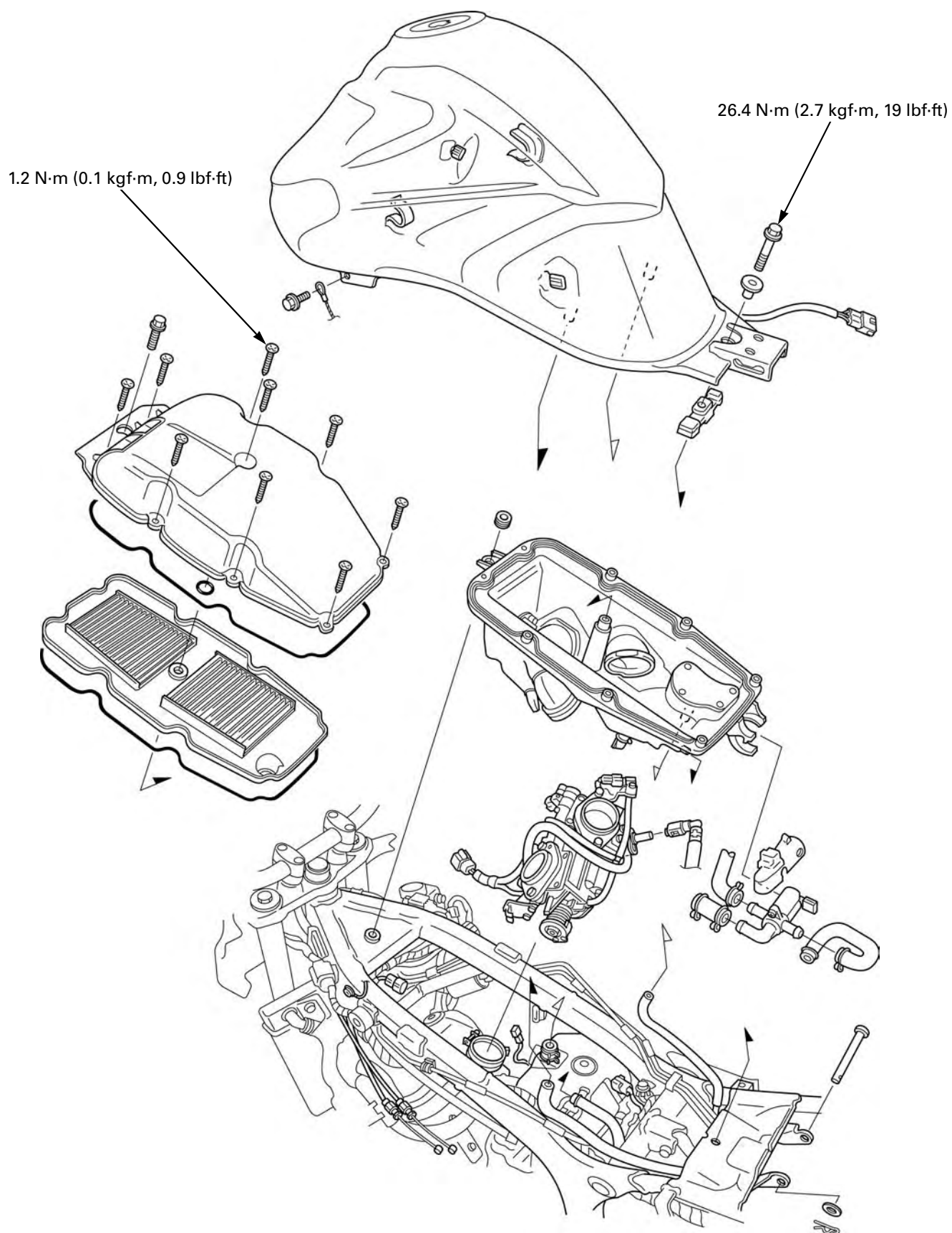


MEMO

5. FUEL SYSTEM (PGM-FI)

COMPONENT LOCATION	5-2	FUEL TANK	5-61
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COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Be sure to relieve the fuel pressure while the engine is OFF.
- For PGM-FI system location (page 5-7).
- The PGM-FI system is equipped with the Self-Diagnostic System described (page 5-13). If the malfunction indicator lamp (MIL) blinks, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI, always follow the steps in the troubleshooting flow chart.
- If replacing the ECM, always follow the steps in the IMMOBILIZER SYSTEM (page 21-3).
- Before disconnecting fuel feed hose, relieve fuel pressure from the system by disconnecting the quick connect fitting in the fuel pump (page 5-54).
- Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bend, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake port with tape or a clean cloth to keep dirt and debris from entering the intake port after the throttle body has been removed.
- Prevent dirt and debris from entering the engine, clean the throttle bore and fuel feed hose using compressed air.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- When disassembling the PGM-FI parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Use a digital tester for PGM-FI system inspection.
- For fuel level sensor inspection (page 20-16).

VS SENSOR INFORMATION

XL700V

The VS sensor sends signal to the ECM through the combination meter.

Check the speedometer system (page 20-11) before starting the troubleshooting for the VS sensor of the PGM-FI system.

XL700VA

This model uses the VS sensor (rear wheel speed sensor) both as for the PGM-FI system, speedometer operation and ABS.

Refer to the ABS troubleshooting (page 16-13) before starting the troubleshooting for the VS sensor of the PGM-FI system.

SPECIFICATIONS

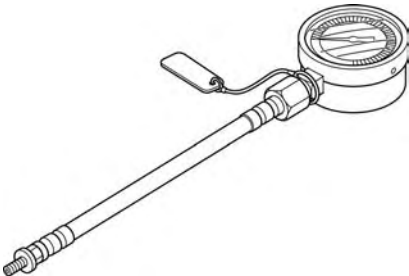
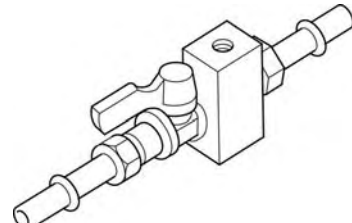
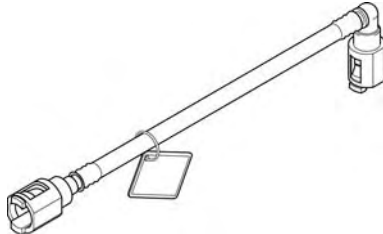
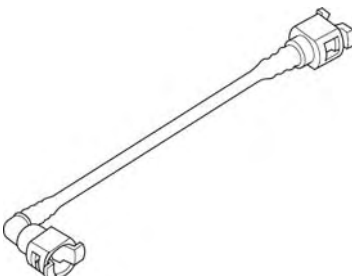
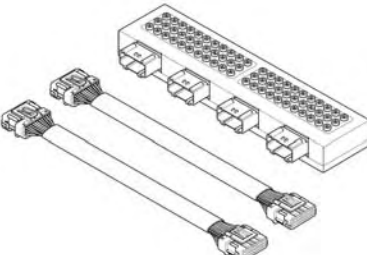
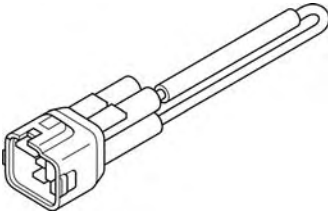
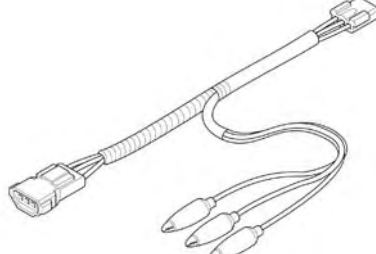
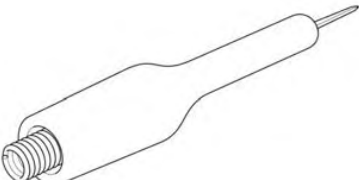
ITEM	SPECIFICATIONS
Throttle body identification number	GQ6CA
Engine idle speed	1,200 ± 100 min ⁻¹ (rpm)
Throttle grip freeplay	2 – 4 mm (1/16 – 3/16 in)
IAT sensor resistance (at 20°C/68°F)	1 – 4 kΩ
Fuel injector resistance (at 20°C/68°F)	10 – 14 Ω
PAIR control solenoid valve resistance (at 20°C/68°F)	23 – 27 Ω
CMP sensor peak voltage (at 20°C/68°F)	0.7 V minimum
CKP sensor peak voltage (at 20°C/68°F)	0.7 V minimum
Fuel pressure at idle	343 kPa (3.5 kgf/cm ² , 50 psi)
Fuel pump flow (at 12 V)	189 cm ³ (6.4 US oz, 6.6 Imp oz) minimum/10 seconds

FUEL SYSTEM (PGM-FI)

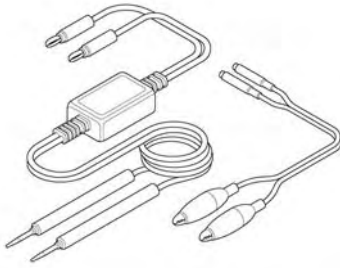
TORQUE VALUES

ECT sensor	24.5 N·m (2.5 kgf·m, 18 lbf·ft)	
Bank angle sensor mounting screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
MAP sensor mounting screw	5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)	
IAT sensor mounting screw	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	
Air cleaner housing cover screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
O ₂ sensor	44 N·m (4.5 kgf·m, 32 lbf·ft)	
Insulator band screw	–	See page 5-68
IACV cover screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
IACV setting plate torx screw	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Throttle cable guide screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
Fuel injector mounting bolt	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)	
Fuel pump mounting nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	See page 5-61
Fuel filler cap mounting bolt	1.8 N·m (0.2 kgf·m, 1.3 lbf·ft)	
Fuel tank mounting bolt	26.4 N·m (2.7 kgf·m, 19 lbf·ft)	
PAIR check valve cover bolt	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)	CT bolt

TOOLS

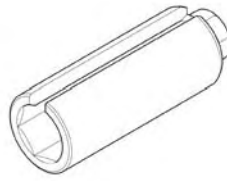
Fuel pressure gauge 07406-0040004 	Pressure gauge manifold 07ZAJ-S5A0111 	Hose attachment, 8 mm/9 mm 07ZAJ-S7C0100 
Hose attachment, 9 mm/9 mm 07ZAJ-S5A0120 	Attachment joint, 8 mm/9 mm 07ZAJ-S7C0200 	ECM test harness 33P 070MZ-MCA0100 
SCS connector 070PZ-ZY30100 	Inspection adaptor 07GMJ-ML80100 	Test probe 07ZAJ-RDJA110 

Imrie diagnostic tester (model 625)
or Peak voltage adaptor
07HGJ-0020100



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

O₂ sensor wrench
07LAA-PT50101



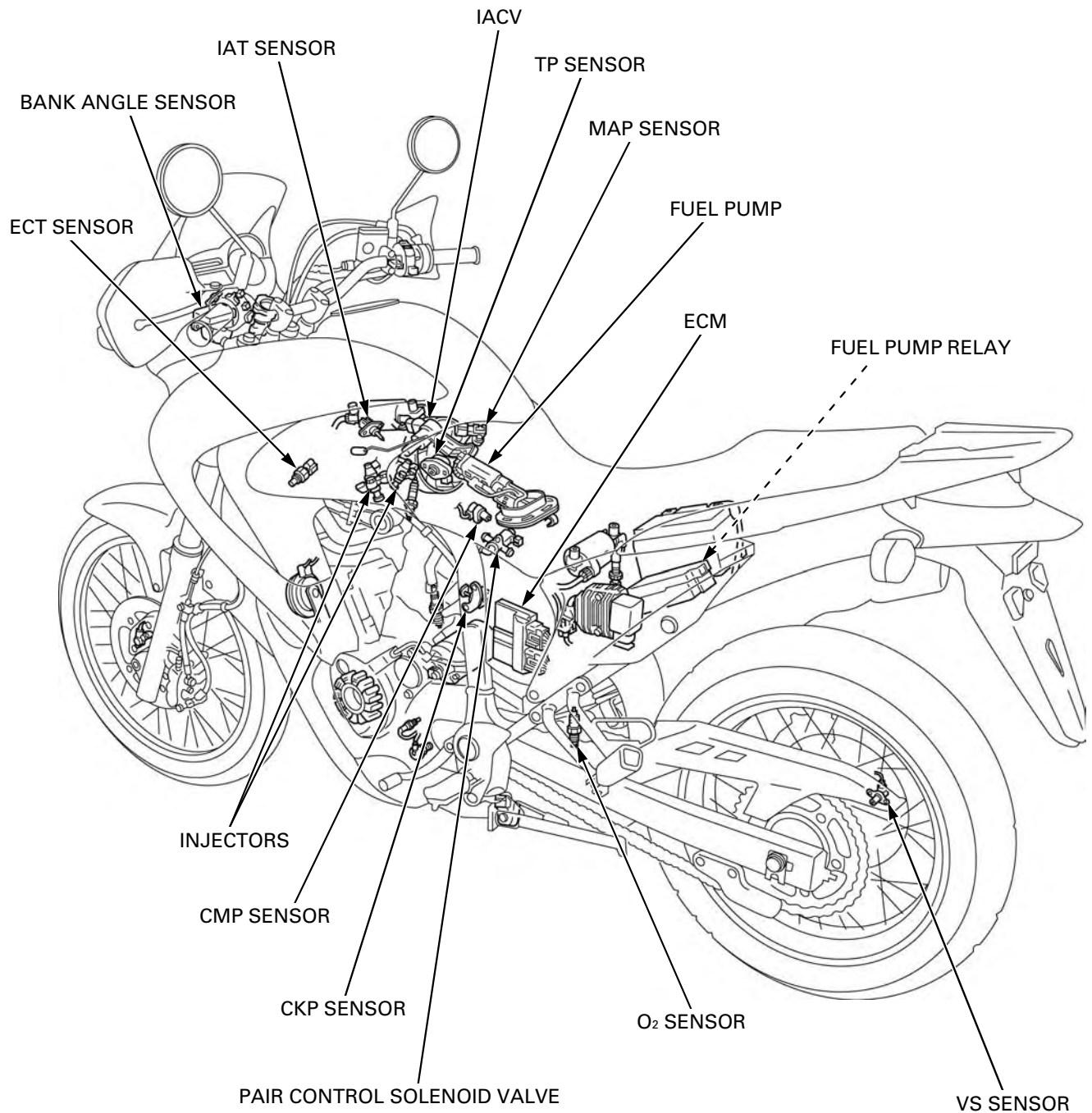
SYMPTOM TROUBLESHOOTING

When the motorcycle has one of these symptoms, check the DTC or MIL blinking, refer to the DTC index (page 5-17) and begin the appropriate troubleshooting procedure. If there are no DTC/MIL blinking stored in the ECM memory, do the diagnostic procedure for the symptom, in sequence listed below, until you find the cause.

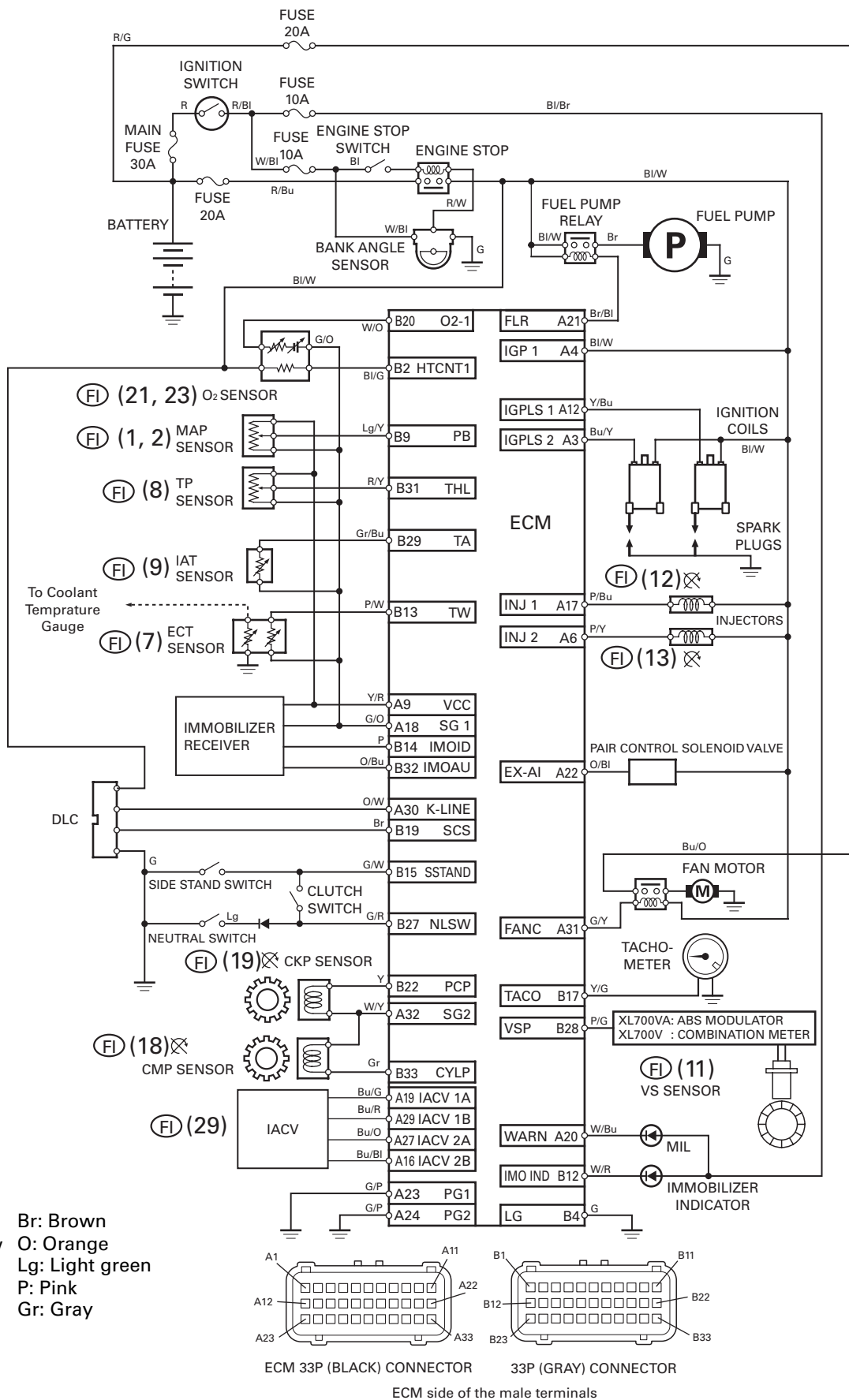
Symptom	Diagnosis procedure	Also check for
Engine cranks but won't start (No DTC and MIL blinking)	1. Crank the starter for more than 10 seconds and check the DTC (page 5-14) and execute the troubleshooting according to the DTC. 2. Inspect the fuel supply system (page 5-54).	• No fuel to injector – Clogged fuel strainer screen – Pinched or clogged fuel feed hose – Pinched or clogged fuel tank breather hose – Faulty fuel pump – Faulty fuel pump circuits • Intake air leak • Contaminated/deteriorated fuel • Faulty fuel injector • IACV stuck closed • Faulty ignition system
Engine cranks but won't start (No fuel pump operation sound when the turning the ignition ON)	1. ECM power/ground circuits malfunction (page 5-75) 2. Inspect the fuel supply system (page 5-54).	• Open circuit in power input and/or ground wire of the ECM • Faulty bank angle sensor or related circuit • Faulty engine stop relay or related circuit • Faulty engine stop switch or related circuit • Blown FI fuse (20 A)
Engine stalls, hard to start, rough idling	1. Check the idle speed. 2. Check the IACV. 3. Inspect the fuel supply system (page 5-54). 4. Inspect the battery charging system (page 17-7).	• Restricted fuel feed hose • Contaminated/deteriorated fuel • Intake air leak • Faulty IACV • Restricted fuel tank breather hose • Faulty ignition system • Faulty battery charging system
Afterburn when engine braking is used	Check the PAIR system (page 5-81).	• Faulty PAIR system – Faulty PAIR control solenoid valve – Faulty PAIR check valve – Clogged hose of the PAIR system • Faulty ignition system
Backfiring or misfiring during acceleration	Check the ignition system.	• Faulty ignition system
Poor performance (driveability) and poor fuel economy	Inspect the fuel supply system (page 5-54).	• Pinched or clogged fuel feed hose • Faulty pressure regulator • Faulty injector • Faulty ignition system
Idle speed is below specifications or fast idle too low (No DTC and MIL blinking)	1. Check the idle speed. 2. Check the IACV.	• IACV stuck closed • Faulty fuel supply system • Faulty ignition system
Idle speed is above specifications or fast idle too high (No DTC and MIL blinking)	1. Check the idle speed. 2. Check the throttle operation and freeplay 3. Check the IACV.	• IACV stuck opened • Faulty ignition system • Intake air leak • Engine top end problem • Air cleaner condition
MIL stays ON but no DTCs set, or MIL never comes ON at all	Troubleshoot the MIL circuit (page 5-53).	• Faulty MIL circuit
MIL stays ON at all (No DTC set)	Check the DLC circuit (Brown wire) for short circuit.	• Short circuit in DLC related wire

PGM-FI SYSTEM LOCATION

XL700VA shown:

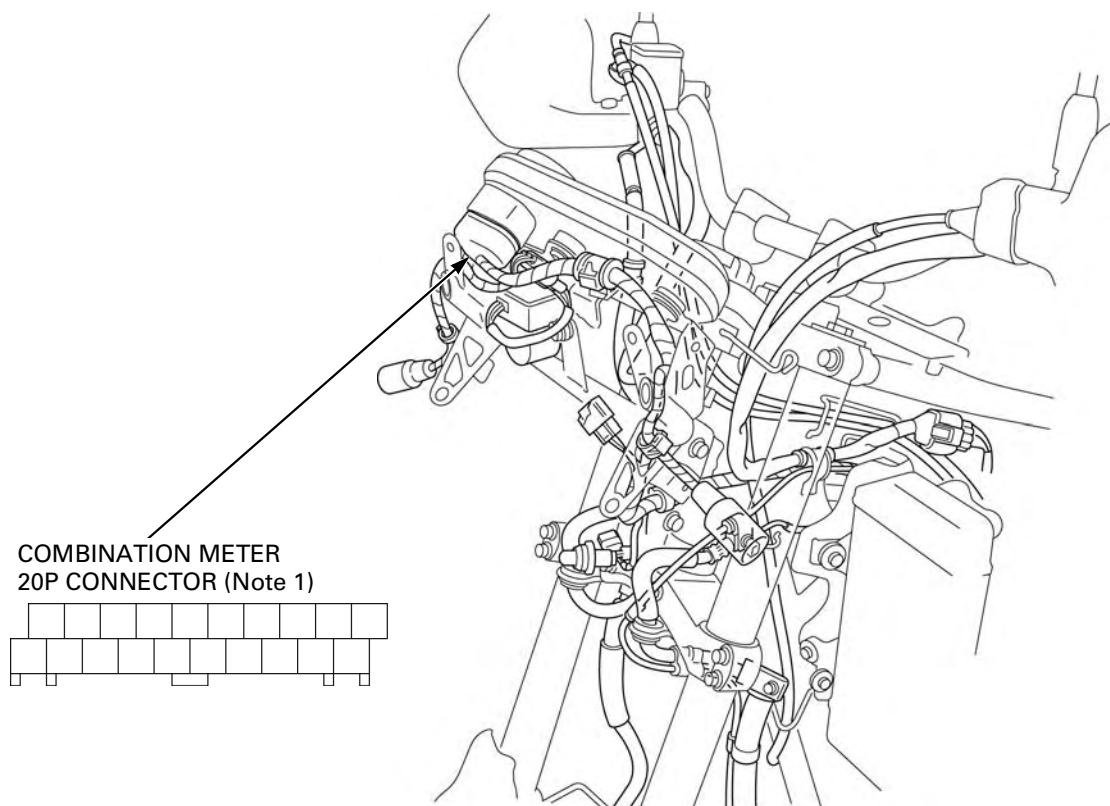


PGM-FI SYSTEM DIAGRAM

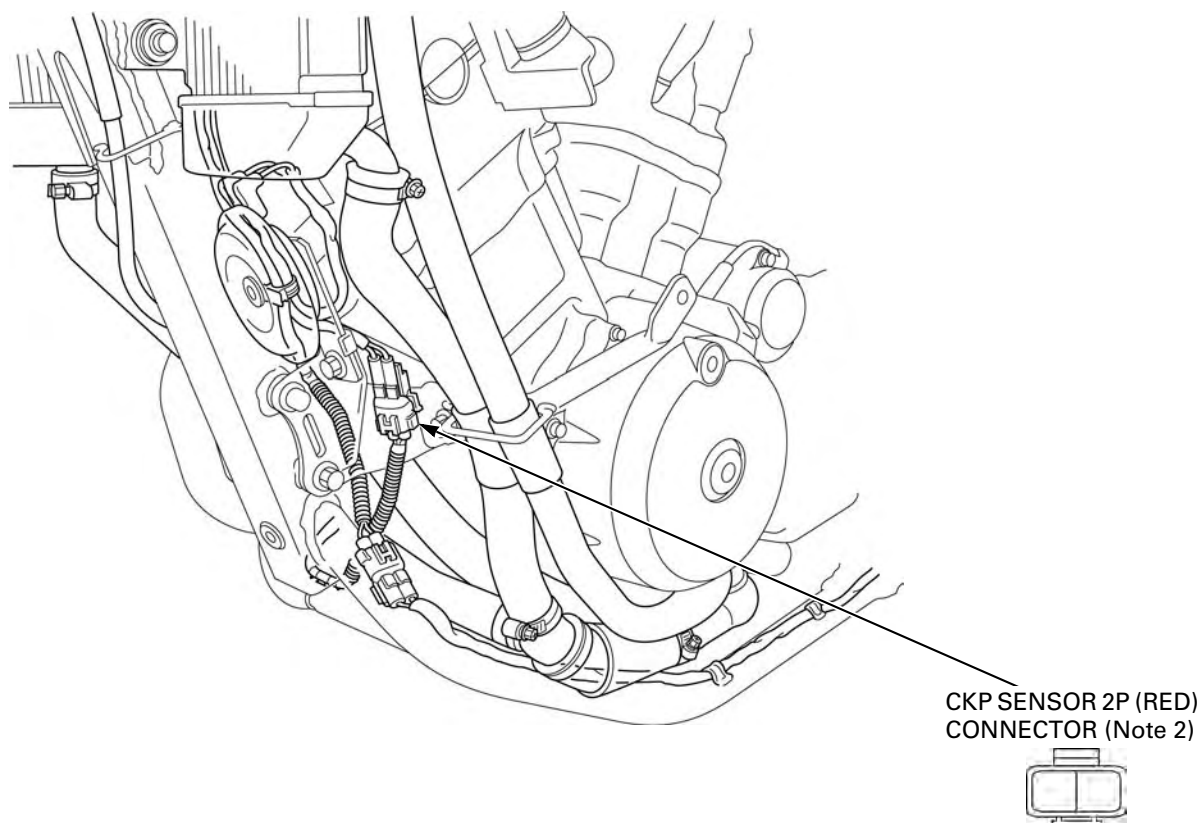


PGM-FI CONNECTOR LOCATIONS

Note 1: Remove the front center cowl (page 2-12).



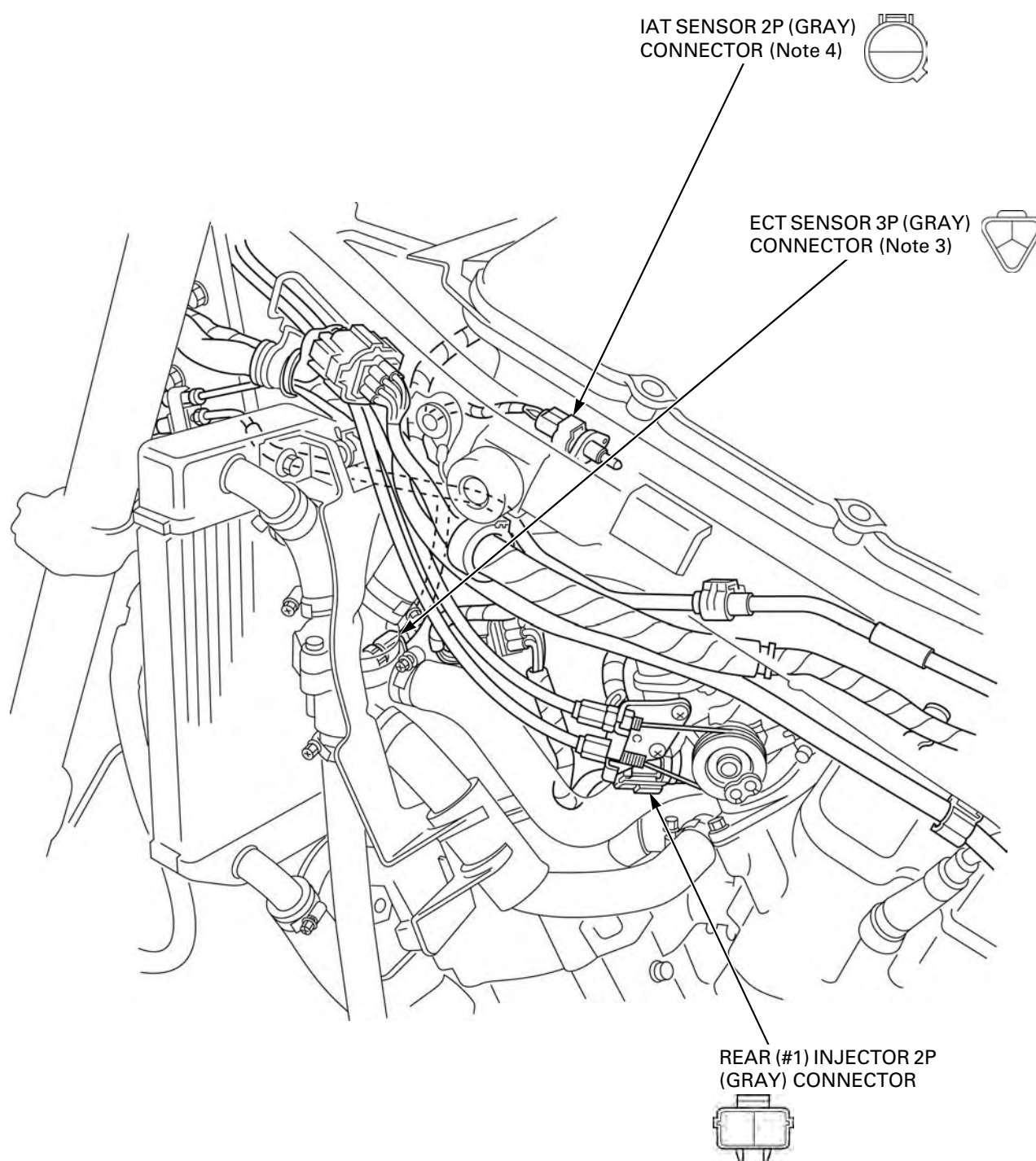
Note 2: Remove the under cowl (page 2-13).



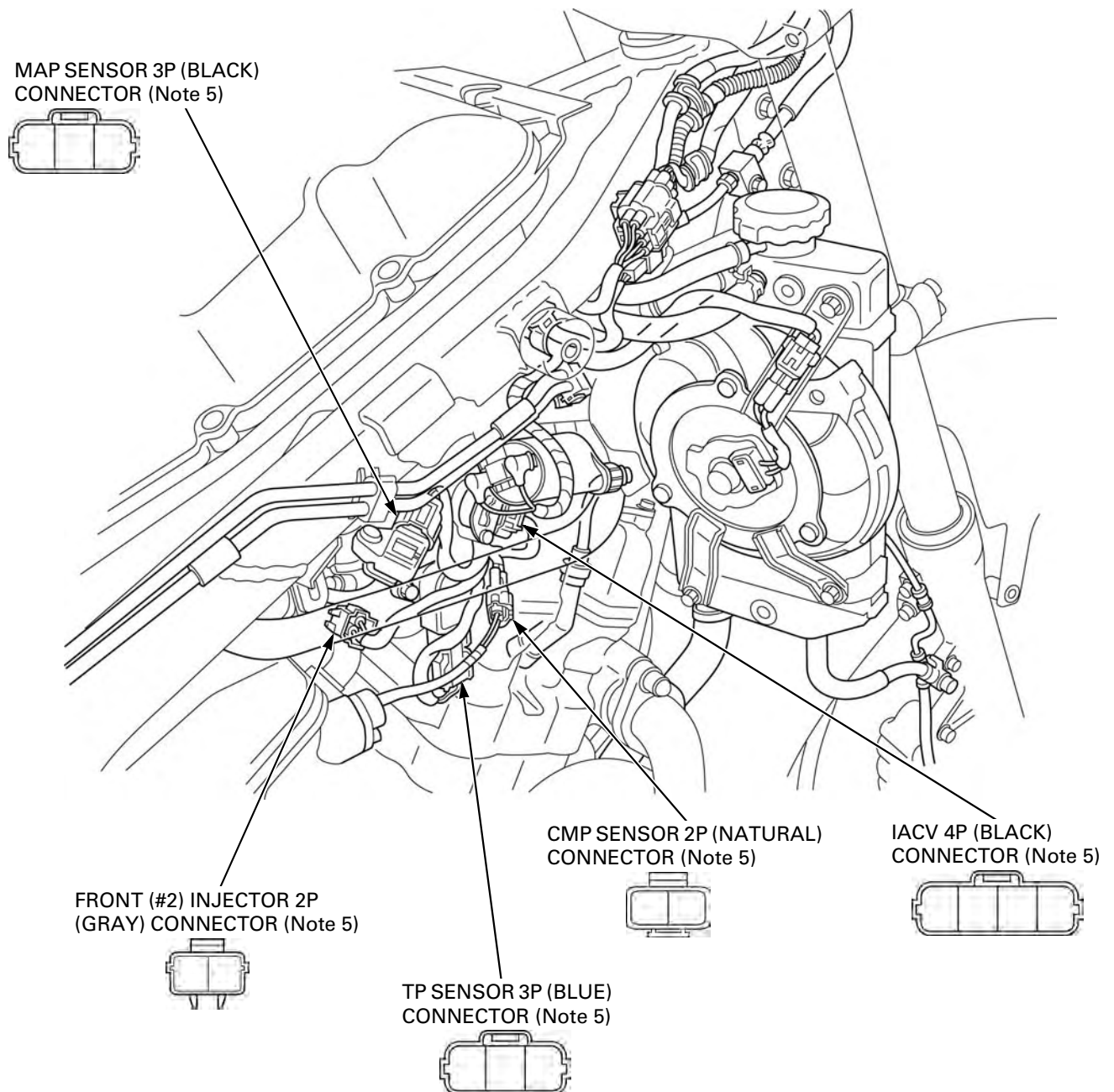
FUEL SYSTEM (PGM-FI)

Note 3: Remove the left front side cowl (page 2-9).

Note 4: Remove the air cleaner housing (page 5-62).

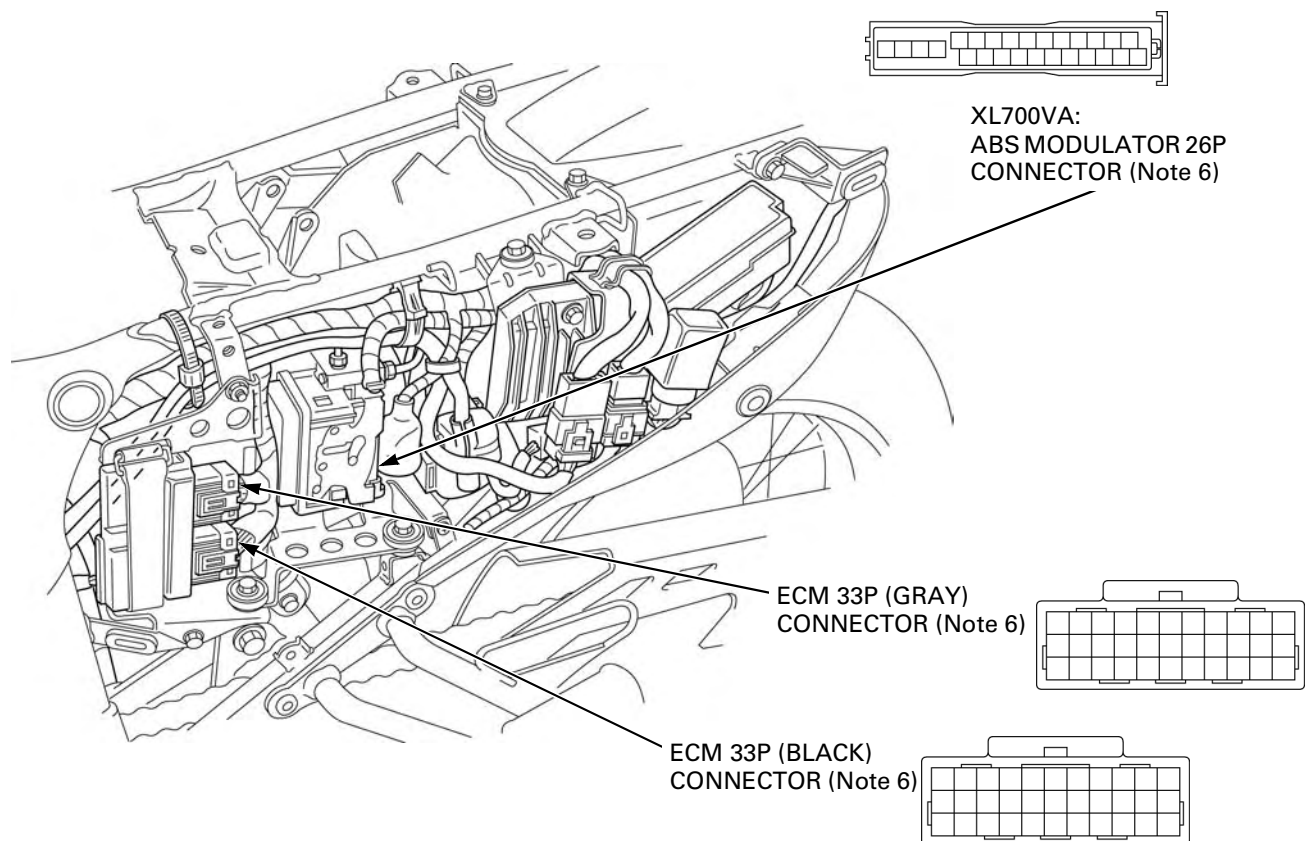


Note 5: Remove the wire harness cover (page 2-10).

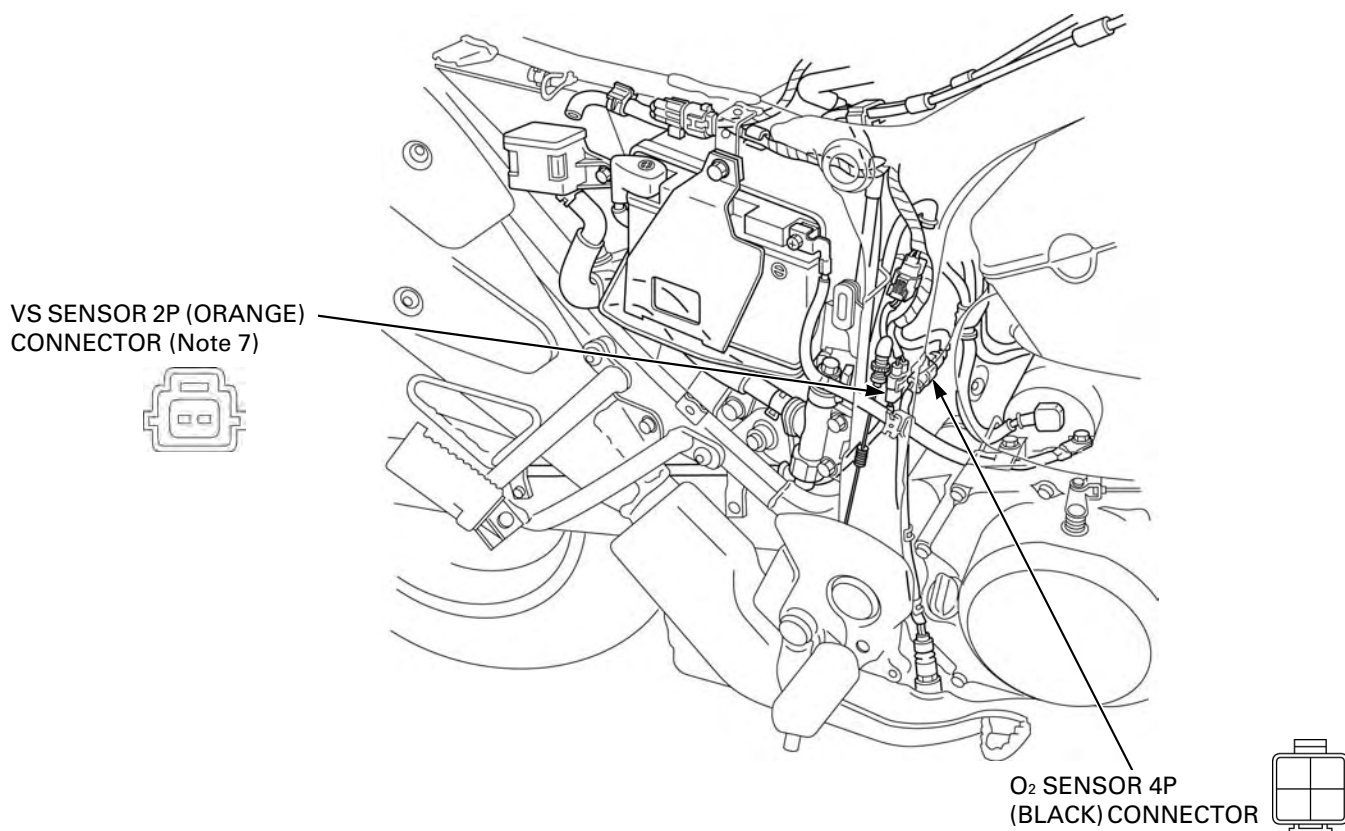


FUEL SYSTEM (PGM-FI)

Note 6: Remove the left side cover (page 2-4).



Note 7: Remove the battery tray (page 17-6).



PGM-FI TROUBLESHOOTING INFORMATION

GENERAL TROUBLESHOOTING

Intermittent Failure

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

Opens and Shorts

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

If the MIL has come on

Refer to DTC READOUT (page 5-14).

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 5-6).

SYSTEM DESCRIPTION

SELF-DIAGNOSIS SYSTEM

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

FAIL-SAFE FUNCTION

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

DTC (Diagnostic Trouble Code)

- The DTC is composed of a main code and a sub code and it is displayed as a hyphenated number when retrieved from the ECM with the HDS pocket tester.

The digits in front of the hyphen are the main code, they indicate the component of function failure.

The digits behind the hyphen are the sub code, they detail the specific symptom of the component or function failure.

For example, in the case of the TP sensor:

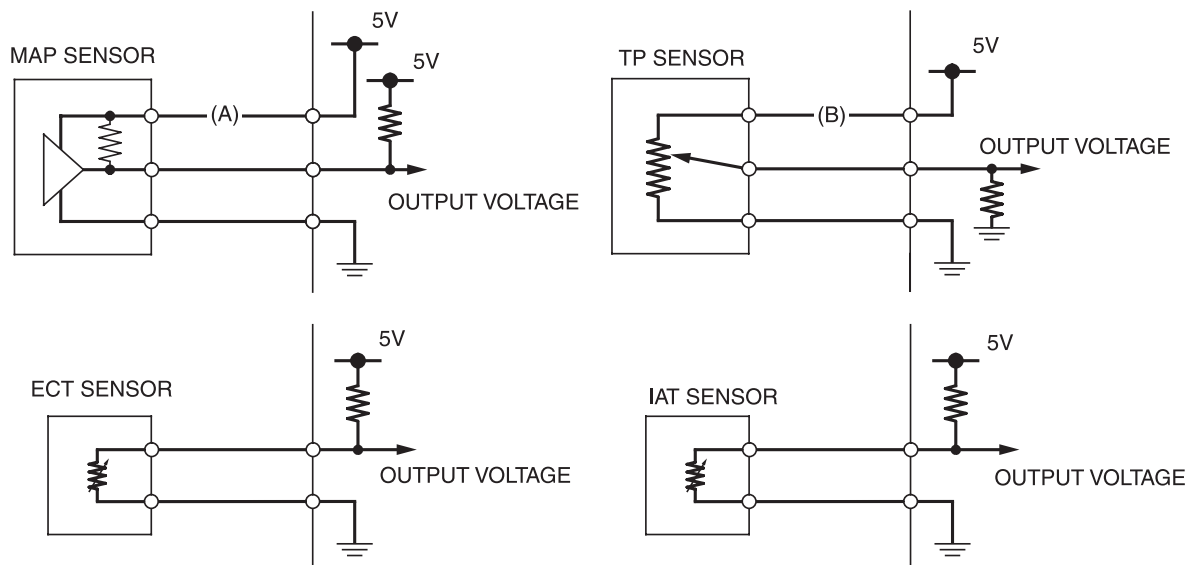
- DTC 08 - 1 = (TP sensor voltage) - (lower than the specified value)
- DTC 08 - 2 = (TP sensor voltage) - (higher than the specified value).

- The MAP, ECT, TP and IAT sensor diagnosis will be made according to the voltage output of the affected sensor.

If a failure occurs, the ECM determines the Function Failure, compares the sensor voltage output to the standard value, and then outputs the corresponding DTC to the HDS Pocket Tester.

For example:

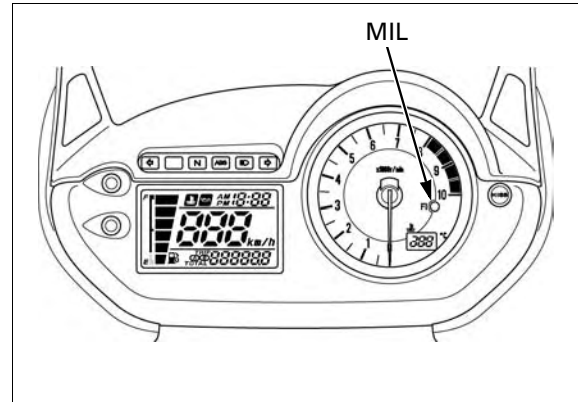
- If the input voltage line (A) on the MAP sensor is opened, the ECM detects the output voltage is about 5 V, then the DTC 1-2 (MAP sensor circuit high voltage) will be displayed.
- If the input voltage line (B) on the TP sensor is opened, the ECM detects the output voltage is 0 V, then the DTC 8-1 (TP sensor circuit low voltage) will be displayed.



FUEL SYSTEM (PGM-FI)

MIL Blink Pattern

- If the HDS pocket tester is not available, DTC can be read from the ECM memory by the MIL blink pattern.
- The number of MIL blinks is the equivalent of the main code of the DTC (the sub code cannot be displayed by the MIL).
- The MIL will blink the current DTC, in case the ECM detects the problem at present, when the ignition switch ON or idling with the sidestand down. The MIL will stay ON when the engine speed is over 5,000 min⁻¹ (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 5-53).

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 and the MIL will start to blink as its DTC when the sidestand is lowered. It is possible to readout 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, readout the freeze DTC by following the DTC readout procedure.

HDS POCKET TESTER INFORMATION

- The HDS pocket tester can readout the DTC, freeze data, current data and other ECM condition.

How to connect the HDS Pocket Tester

Turn the ignition switch OFF.

Remove the left side cover (page 2-4).

Remove the dummy connector from the DLC.

Connect the HDS pocket tester to the DLC.

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

NOTE:

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

ECM reset

The HDS pocket tester can reset the ECM data including the DTC, freeze data and some learning memory.



DTC READOUT

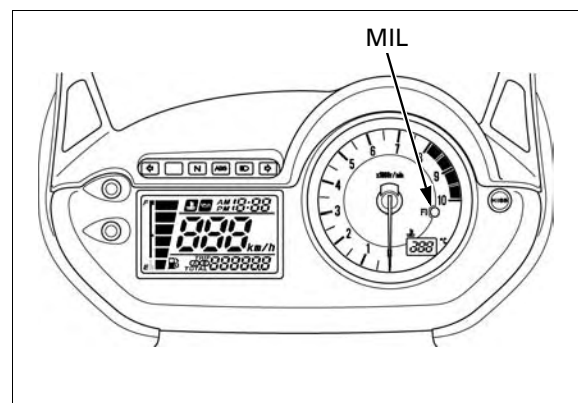
Start the engine and check the MIL.

- 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 HDS Pocket Tester to the DLC (page 5-14).

Read the DTC, freeze data and follow the troubleshooting index (page 5-17).

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 left side cover (page 2-4).

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

Connection: Brown – Green

TOOL:

SCS connector 070PZ-ZY30100

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

Turn the ignition switch ON, read, note the MIL blinks and refer to the troubleshooting index (page 5-17).

NOTE:

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

**CLEARING DTC**

Connect the HDS Pocket Tester to the DLC (page 5-14).

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

To clear the DTC without HDS, refer to the following procedure.

How to clear the DTC with SCS connector

1. Remove the left side cover (page 2-4).
2. Turn the ignition switch OFF.
3. Make sure the engine stop switch is turned to "O".
Remove the dummy connector and short the Brown and Green wire terminals of the DLC using the special tool.

Connection: Brown – Green

TOOL:

SCS connector 070PZ-ZY30100

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

NOTE:

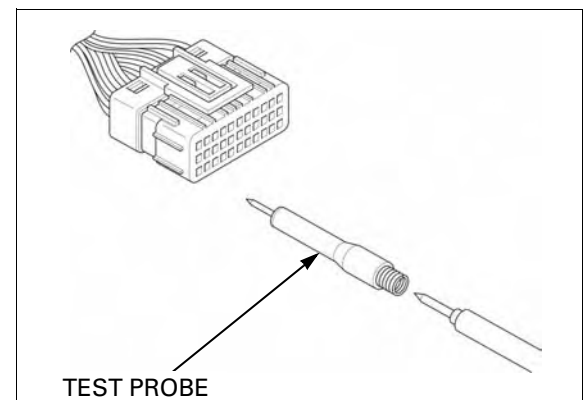
- The DLC must be jumped while the MIL lights. If not, the MIL will not start blinking.
- Note that the self-diagnostic memory cannot be erased if the ignition switch is turned "OFF" before the MIL starts blinking.

**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 connections. Check those connections before proceeding.
- In testing at ECM connector (wire harness side) terminal, always use the test probe. Insert the test probe into the connector terminal, then attach the digital multimeter probe to the test probe.

TOOL:

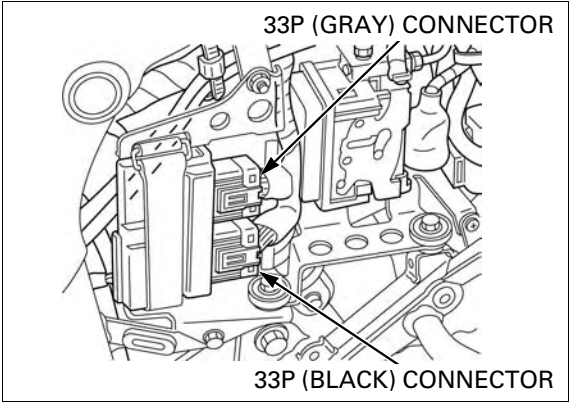
Test probe 07ZAJ-RDJA110



FUEL SYSTEM (PGM-FI)

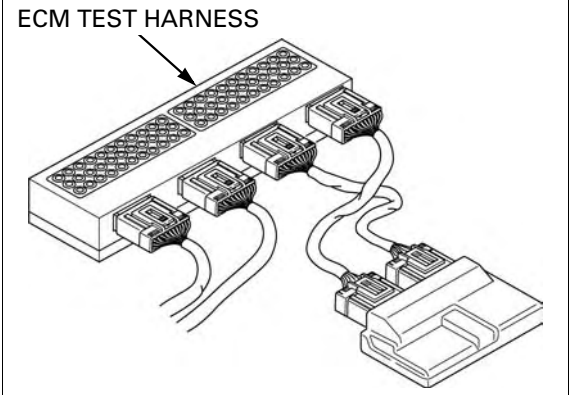
TEST HARNESS CONNECTION

Remove the left side cover (page 2-4).
Turn the ignition switch OFF.
Disconnect the ECM 33P (Black and Gray) connectors.



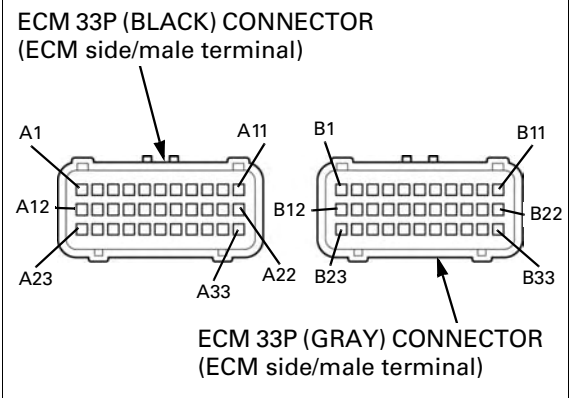
Connect the ECM test harness between the main wire harness and ECM.

TOOL:
ECM test harness 33P 070MZ-MCA0100

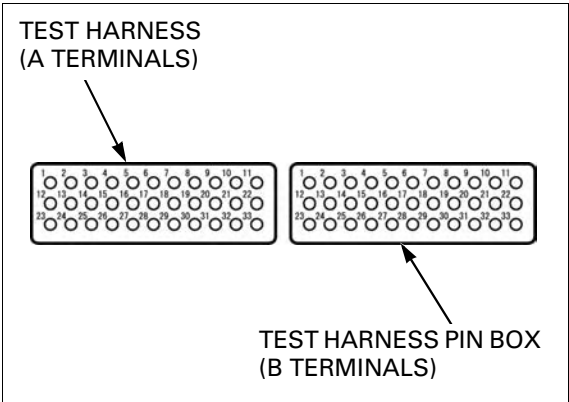


TEST HARNESS TERMINAL LAYOUT

The ECM connector terminals are numbered as shown in this illustration.



The ECM test harness terminals are same layout as for the ECM connector terminals as shown.



DTC INDEX

DTC (MIL blinks)	Function Failure	Symptom/Fail-safe function	Refer to (DTC)	Refer to (MIL)
1-1 (1)	MAP sensor circuit low voltage (less than 0.2 V) • MAP sensor or its circuit malfunction	• Engine operates normally	5-18	5-38
1-2 (1)	MAP sensor circuit high voltage (more than 3.9 V) • Loose or poor contact of the MAP sensor connector • MAP sensor or its circuit malfunction	• Engine operates normally	5-19	5-38
2-1 (2)	MAP sensor performance problem • Loose or poor connection of the MAP sensor vacuum hose • MAP sensor malfunction	• Engine operates normally	5-20	5-39
7-1 (7)	ECT sensor circuit low voltage (less than 0.07 V) • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 90°C/194°F • Cooling fan turns on	5-21	5-40
7-2 (7)	ECT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the ECT sensor connector • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 90°C/194°F • Cooling fan turns on	5-22	5-40
8-1 (8)	TP sensor circuit low voltage (less than 0.3 V) • TP sensor or its circuit malfunction • Loose or poor contact of the TP sensor connector	• Poor engine acceleration • Pre-program value: 0°	5-23	5-42
8-2 (8)	TP sensor circuit high voltage (more than 4.93 V) • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-program value: 0°	5-25	5-42
9-1 (9)	IAT sensor circuit low voltage (less than 0.07 V) • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 25°C/77°F	5-26	5-43
9-2 (9)	IAT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the IAT sensor connector • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 25°C/77°F	5-27	5-43
11-1 (11)	VS sensor no signal • Loose or poor contact of the VS sensor connector • VS sensor or its circuit malfunction	• Engine operates normally	5-28	5-45
12-1 (12)	No. 1 rear injector circuit malfunction • Loose or poor contact of the injector connector • Injector or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	5-30	5-46
13-1 (13)	No. 2 front injector circuit malfunction • Loose or poor contact of the injector connector • Injector or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	5-31	5-48
18-1 (18)	CMP sensor no signal • Loose or poor contact of the CMP sensor connector • CMP sensor or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	5-32	5-48
19-1 (19)	CKP sensor no signal • Loose or poor contact of the CKP sensor connector • CKP sensor or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	5-33	5-49
21-1 (21)	O ₂ sensor malfunction • Loose or poor contact of the O ₂ sensor connector • O ₂ sensor or its circuit malfunction	• Engine operates normally	5-34	5-50
23-1 (23)	O ₂ sensor heater circuit malfunction • Loose or poor contact of the O ₂ sensor heater connector • O ₂ sensor heater or its circuit malfunction	• Engine operates normally	5-35	5-51
29-1 (29)	IACV circuit malfunction • Loose or poor contact of the IACV connector • IACV or its circuit malfunction	• Engine stalls, hard to start, rough idling	5-36	5-52
33-2 (-)	EEPROM in ECM malfunction • Faulty ECM	• Engine operates normally • Does not hold the self-diagnosis data	5-37	—

DTC TROUBLESHOOTING

DTC 1-1 (MAP SENSOR LOW VOLTAGE)

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

1. MAP Sensor System Inspection

Turn the ignition switch ON and engine stop switch "O".
Check the MAP sensor with the HDS.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. MAP Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the MAP sensor 3P (Black) connector.

Turn the ignition switch ON and engine stop switch "O".
Measure the voltage at the wire harness side.

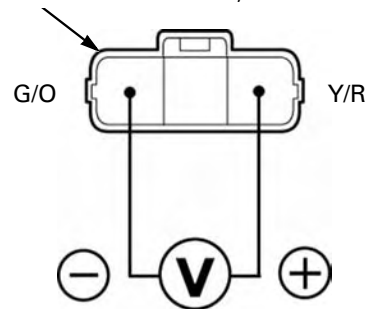
Connection: Yellow/red (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.

MAP SENSOR 3P (BLACK) CONNECTOR
(Wire side/female terminal)



3. MAP Sensor Input Line Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector.

Check for continuity between the MAP sensor 3P (Black) connector and ECM 33P (Black) connector.

Connection: A9 – Yellow/red

TOOL:

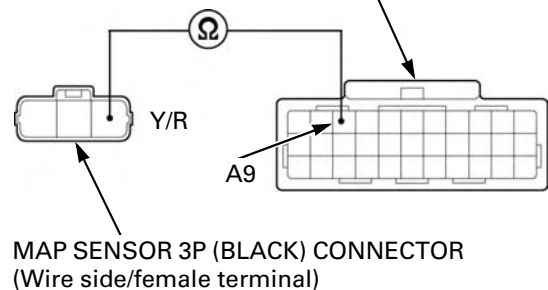
Test probe 07ZAJ-RDJA110

Is there continuity?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Open circuit in Yellow/red wire

ECM 33P (BLACK) CONNECTOR
(Wire side/female terminal)



4. MAP Sensor Output Line Short Circuit Inspection

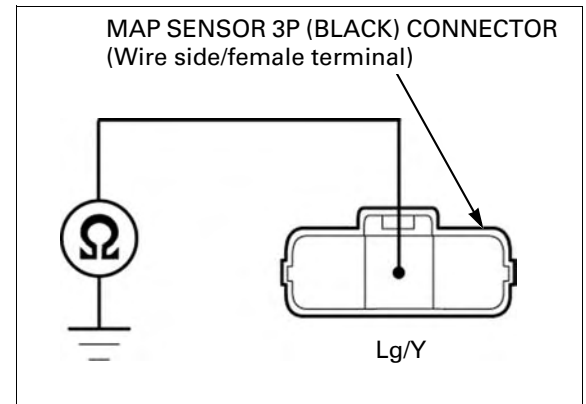
Check for continuity between the MAP sensor 3P (Black) connector of the wire harness side and ground.

Connection: Light green/yellow – ground

Is there continuity?

YES – Short circuit in Light green/yellow wire

NO – GO TO STEP 5.



5. MAP Sensor Inspection

Replace the MAP sensor with a known good one (page 5-71).

Clear the DTC's (page 5-15).

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

Check the MAP sensor with the HDS.

Is DTC 1-1 indicated?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Faulty original MAP sensor

DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

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

1. MAP Sensor System Inspection 1

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

Check the MAP sensor with the HDS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. MAP Sensor System Inspection 2

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P (Black) connector.

Connect the MAP sensor 3P (Black) connector at the wire harness side with a jumper wire.

Connection: Light green/yellow – Green/orange

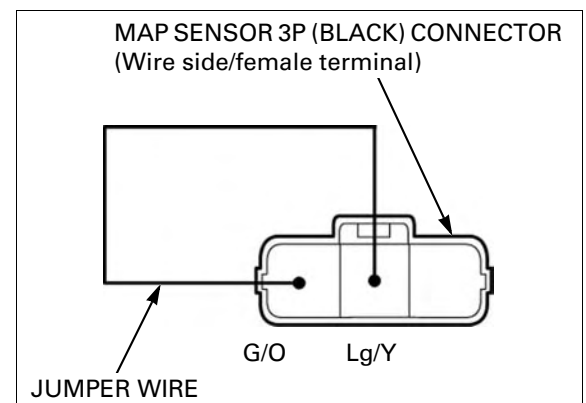
Turn the ignition switch ON and engine stop switch "Q".

Check the MAP sensor with the HDS.

Is about 0 V indicated?

YES – Faulty MAP sensor

NO – GO TO STEP 3.



FUEL SYSTEM (PGM-FI)

3. MAP Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Remove the jumper wire.

Turn the ignition switch ON and engine stop switch "O".
Measure the voltage at the wire harness side.

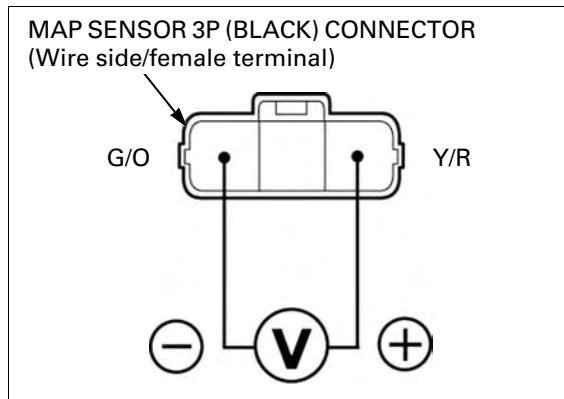
Connection: Yellow/red (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 4.

NO –

- Open circuit in Green/orange wire
- Open circuit in Yellow/red wire



4. MAP Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector.
Check for continuity between the MAP sensor 3P (Black) connector and ECM 33P (Gray) connector.

Connection: B9 – Light green/yellow

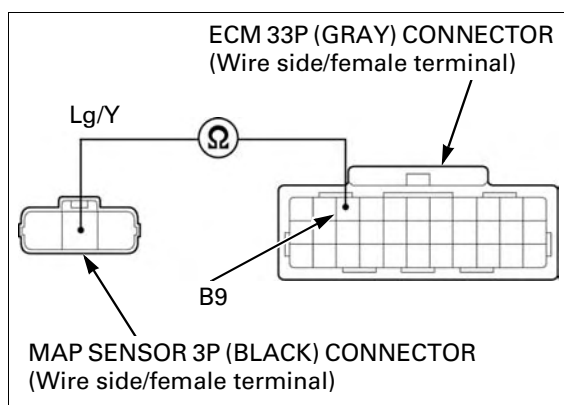
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Open circuit in Light green/yellow wire



DTC 2-1 (MAP SENSOR)

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

1. MAP Sensor System Inspection

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

Start the engine and check the MAP sensor with the HDS at idle speed.

Is the reading changed?

YES – Intermittent failure

NO – GO TO STEP 2.

2. Manifold Absolute Pressure Test

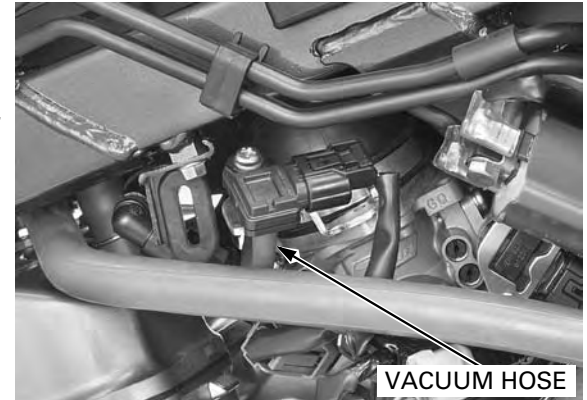
Turn the ignition switch OFF.

Check for connection and installation of the MAP sensor vacuum hose.

Is the MAP sensor vacuum hose connection correct?

YES – GO TO STEP 3.

NO – Correct the hose installation



3. MAP Sensor System Inspection

Replace the MAP sensor with a known good one (page 5-71).

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

Start the engine and check the MAP sensor with the HDS at idle speed.

Is the reading changed?

YES – Faulty original MAP sensor

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

DTC 7-1 (ECT SENSOR LOW VOLTAGE)

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

1. ECT Sensor System Inspection

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

Check the ECT sensor with the HDS.

Is about 0 V indicated?

NO – Intermittent failure

YES – GO TO STEP 2.

2. ECT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P (Gray) connector.

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

Check the ECT sensor with the HDS.

Is about 0 V indicated?

NO – GO TO STEP 3.

YES – GO TO STEP 4.

3. ECT Sensor Resistance Inspection

Turn the ignition switch OFF.

Measure the resistance at the ECT sensor terminals.

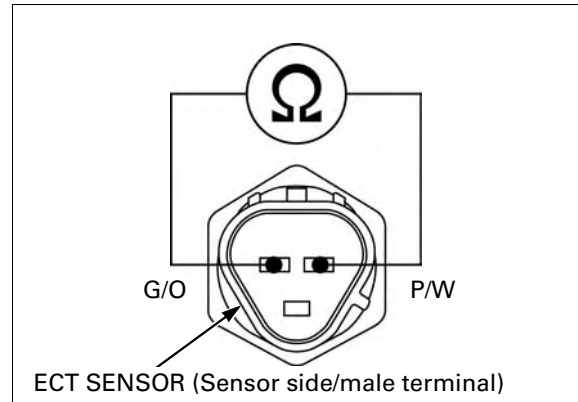
Connection: Pink/white – Green/orange

STANDARD: 2.3 – 2.6 k Ω (20°C/68°F)

Is the resistance within 2.3 – 2.6 k Ω ?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

No – Faulty ECT sensor



4. ECT Sensor Short Circuit Inspection

Turn the ignition switch OFF

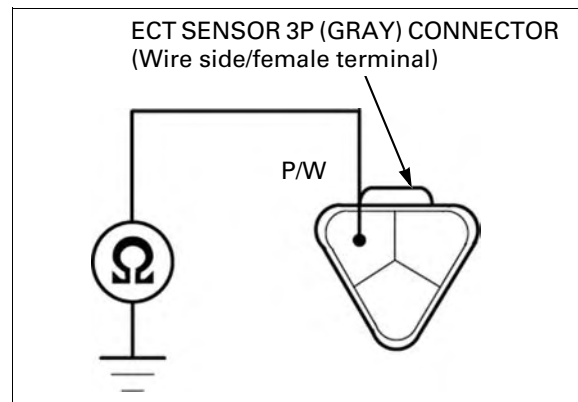
Check for continuity between the ECT sensor 3P (Gray) connector of the wire harness side and ground.

Connection: Pink/white – Ground

Is there continuity?

YES – Short circuit in Pink/White wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).



DTC 7-2 (ECT SENSOR HIGH VOLTAGE)

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

1. ECT Sensor System Inspection

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

Check the ECT sensor with the HDS.

Is about 5 V indicated?

NO – Intermittent failure.

YES – GO TO STEP 2.

2. ECT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P (Gray) connector. Connect the ECT sensor 3P (Gray) connector at the wire harness side with a jumper wire.

Connection: Pink/white – Green/orange

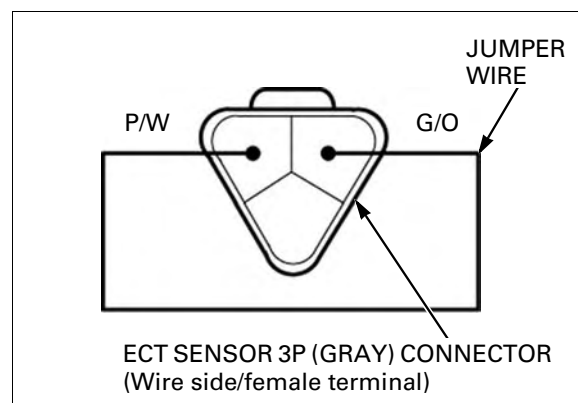
Turn the ignition switch ON and engine stop switch "O".

Check the ECT sensor with the HDS.

Is about 0 V indicated?

YES – Faulty ECT sensor

NO – GO TO STEP 3.



3. ECT Sensor Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the jumper wire.

Disconnect the ECM 33P connectors.
Check for continuity between the ECM 33P connectors and ECT sensor 3P (Gray) connector.

Connection: B13 – Pink/white
A18 – Green/orange

TOOL:

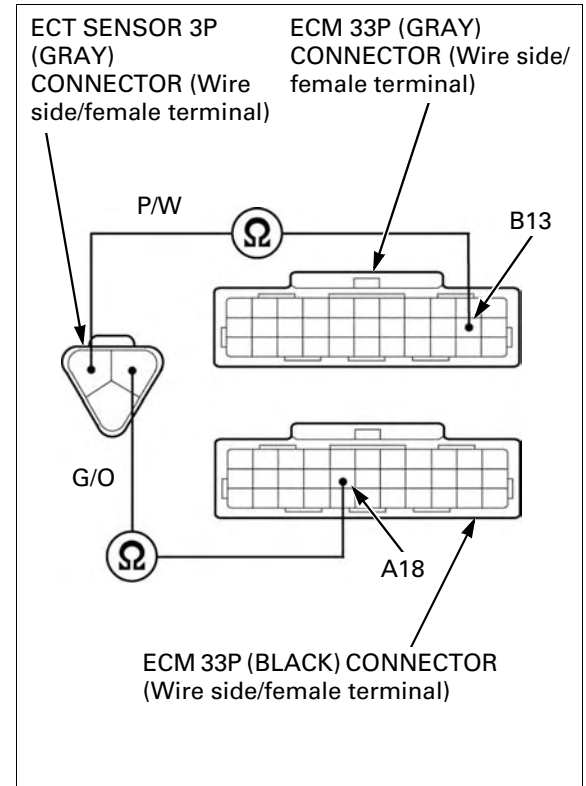
Test probe

07ZAJ-RDJA110

Is there continuity?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

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



DTC 8-1 (TP SENSOR LOW VOLTAGE)

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

1. TP Sensor System Inspection

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

Check the TP sensor with the HDS when the throttle fully closed.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – GO TO STEP 2.

2. TP Sensor Inspection

Check that the TP sensor voltage increases continuously when moving the throttle from fully closed to fully opened using the data list menu of the HDS.

Does the voltage increase continuously?

YES – Intermittent failure

NO – Faulty TP sensor

FUEL SYSTEM (PGM-FI)

3. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the TP sensor 3P (Blue) connector.
Turn the ignition switch ON and engine stop switch "O".
Measure the voltage at the wire harness side.

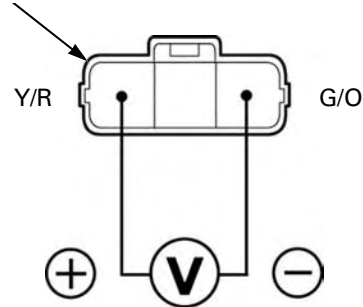
Connection: Yellow/red (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 5.

NO – GO TO STEP 4.

TP SENSOR 3P (BLUE) CONNECTOR
(Wire side/female terminal)



4. TP Sensor Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector.
Check for continuity between the TP sensor 3P (Blue) connector and ECM 33P (Black) connector.

Connection: A9 – Yellow/red

TOOL:

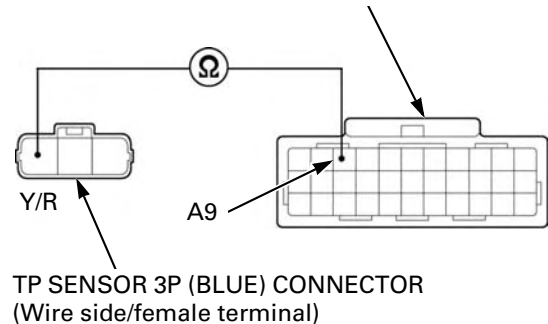
Test probe 07ZAJ-RDJA110

Is there continuity?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Open circuit in Yellow/red wire

ECM 33P (BLACK) CONNECTOR
(Wire side/female terminal)



5. TP Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the 33P (Gray) connector.
Check for continuity between the TP sensor 3P (Blue) connector and ECM 33P (Gray) connector.

Connection: B31 – Red/yellow

TOOL:

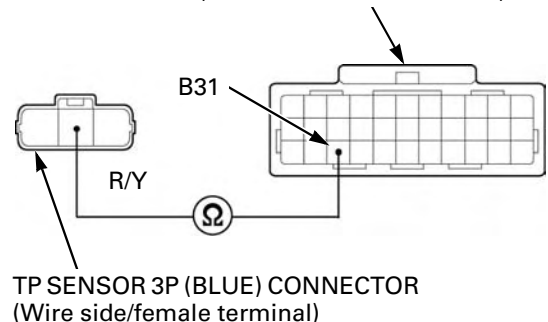
Test probe 07ZAJ-RDJA110

Is there continuity?

YES – GO TO STEP 6.

NO – Open circuit in Red/yellow wire

ECM 33P (GRAY) CONNECTOR
(Wire side/female terminal)



6. TP Sensor Output Line Short Circuit Inspection

Connect the ECM 33P (Gray) connector.
Check for continuity between the TP sensor 3P (Blue) connector of the wire harness side and ground.

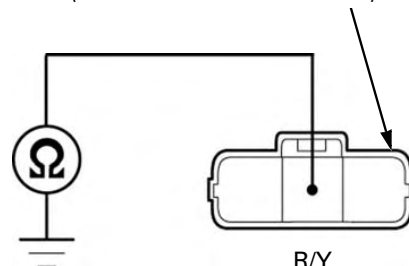
Connection: Red/yellow – Ground

Is there continuity?

YES – Short circuit in Red/yellow wire

NO – GO TO STEP 7.

TP SENSOR 3P (BLUE) CONNECTOR
(Wire side/female terminal)



7. TP Sensor Inspection

Replace the throttle body with a known good one.

Clear the DTC's (page 5-15).

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

Check the TP sensor with the HDS.

Is DTC 8-1 indicated?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Faulty original TP sensor

DTC 8-2 (TP SENSOR HIGH VOLTAGE)

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

1. TP Sensor System Inspection

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

Check the TP sensor with the HDS.

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 HDS.

Does the voltage increase continuously?

YES – Intermittent failure

NO – Faulty TP sensor

3. TP Sensor Resistance Inspection

Turn the ignition switch OFF.

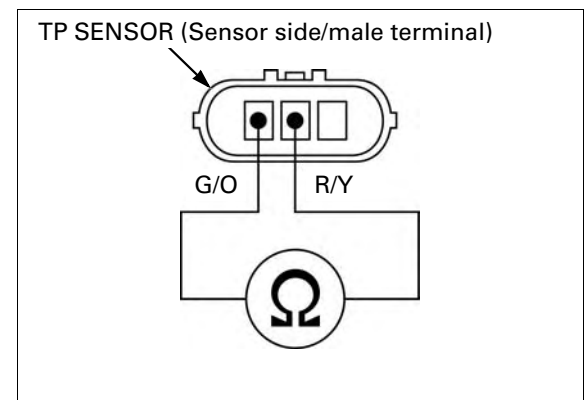
Disconnect the TP sensor 3P (Blue) connector. Measure the resistance at the TP sensor side.

Connection: Red/yellow – Green/orange

Is the resistance within 0.5 - 1.5 k Ω ?

YES – GO TO STEP 4.

NO – Faulty TP sensor



4. TP Sensor Input Voltage Inspection

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

Measure the voltage at the wire harness side.

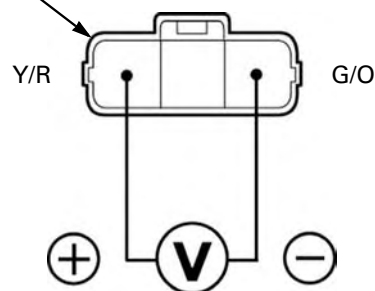
Connection: Yellow/red (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO –
• Open circuit in Green/orange wire
• Open circuit in Yellow/red wire

TP SENSOR 3P (BLUE) CONNECTOR
(Wire side/female terminal)



DTC 9-1 (IAT SENSOR LOW VOLTAGE)

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

1. IAT Sensor System Inspection

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

Check the IAT sensor with the HDS.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. IAT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P (Gray) connector.

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

Check the IAT sensor with the HDS.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – Faulty IAT sensor

3. IAT Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

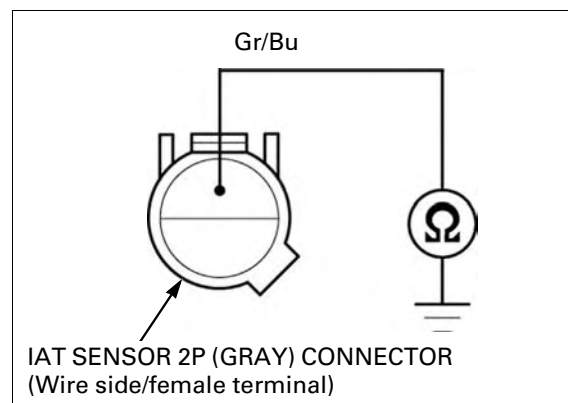
Check for continuity between the IAT sensor 2P (Gray) connector of the wire harness side and ground.

Connection: Gray/blue – ground

Is there continuity?

YES – Short circuit in Gray/blue wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).



DTC 9-2 (IAT SENSOR HIGH VOLTAGE)

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

1. IAT Sensor System Inspection

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

Check the IAT sensor with the HDS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. IAT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P (Gray) connector. Connect the IAT sensor 2P (Gray) connector at the wire harness side with a jumper wire.

Connection: Gray/blue – Green/orange

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

Check the IAT sensor with the HDS.

Is about 0 V indicated?

YES – Faulty IAT sensor

NO – GO TO STEP 3.

3. IAT Sensor Output Line Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P connectors.

Check for continuity between the IAT sensor 2P (Gray) connector and ECM 33P connectors.

Connection: B29 – Gray/blue
A18 – Green/orange

TOOL:

Test probe

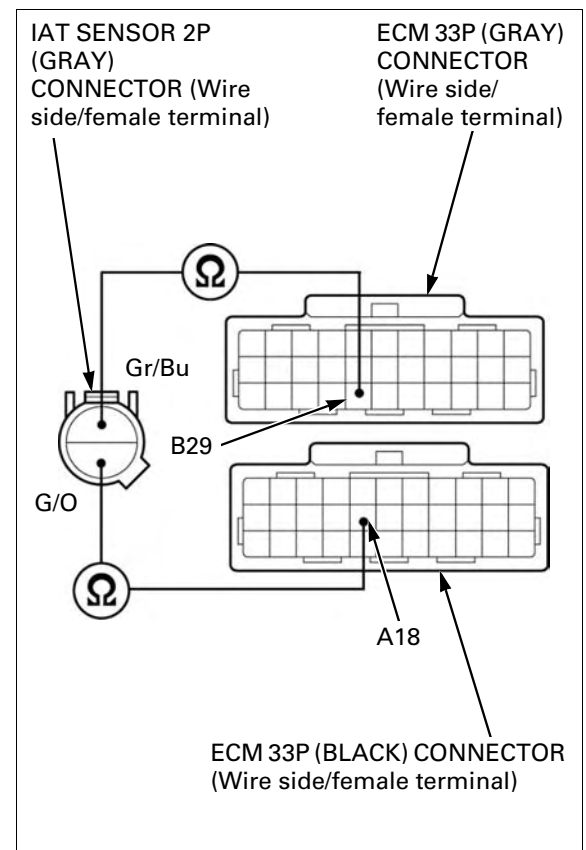
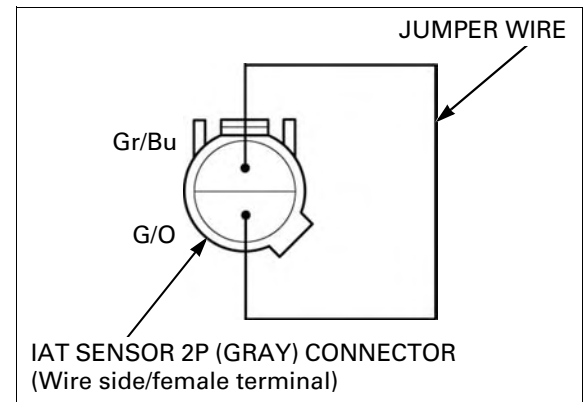
07ZAJ-RDJA110

Is there continuity?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO –

- Open circuit in Gray/blue wire
- Open circuit in Green/orange wire



DTC 11-1 (VS SENSOR)

- Before starting the troubleshooting, check the following.
 - Speedometer/VS sensor (XL700V: 20-11)
 - ABS indicator problem code (XL700VA: 16-10)
- Before starting the inspection, check for loose or poor contact on the VS sensor 2P (Orange) connector, combination meter 20P connector, ABS modulator 26P connector (XL700VA) and ECM 33P connectors, then recheck the DTC.

1. VS Sensor System Inspection

Clear the DTC's (page 5-15).

Test ride the motorcycle.

Stop the engine.

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

Check the VS sensor with the HDS.

Is the DTC 11-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. ECM Signal Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the combination meter 20P connector.

Check for continuity between the combination meter 20P connector of the wire harness side and ground.

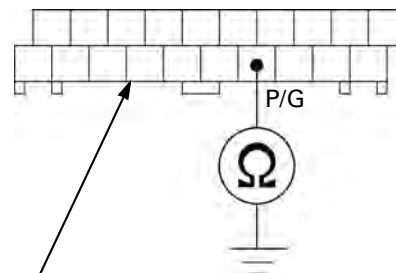
Connection: Pink/green – ground

Is there continuity?

YES – Short circuit in Pink/green wire

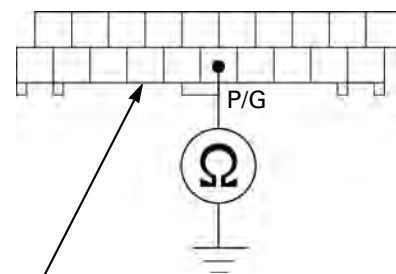
NO – GO TO STEP 3.

XL700V:



COMBINATION METER 20P CONNECTOR
(Wire side/female terminal)

XL700VA:



COMBINATION METER 20P CONNECTOR
(Wire side/female terminal)

3. ECM Signal Line Open Circuit Inspection

Disconnect the ECM 33P (Gray) connector.
Disconnect the ABS modulator 26P connector.

Check the continuity between the ECM 33P (Gray) connector and combination meter 20P connector (XL700V) or ABS modulator 26P connector (XL700VA).

Connection: B28 – Pink/green

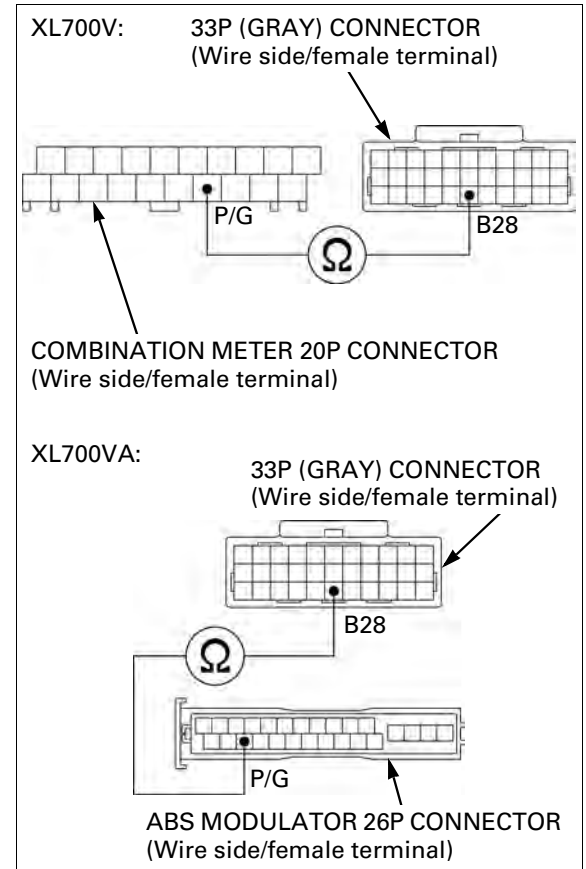
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

YES – Open circuit in Pink/green wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).



DTC 12-1 (No.1 REAR INJECTOR)

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

DTC	INJECTOR	POWER INPUT LINE	SIGNAL LINE	SIGNAL AT ECM
12-1	No.1 Rear	Black/white	Pink/blue	A17
13-1	No.2 Front	Black/white	Pink/yellow	A6

1. Injector System Inspection

Clear the DTC's (page 5-15).

Turn the ignition switch ON and engine stop switch "O", start the engine and check the injector with the HDS.

Is the DTC 12-1 indicated?

NO – Intermittent failure

YES – GO TO STEP 2.

2. Injector Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the injector 2P (Gray) connector.

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

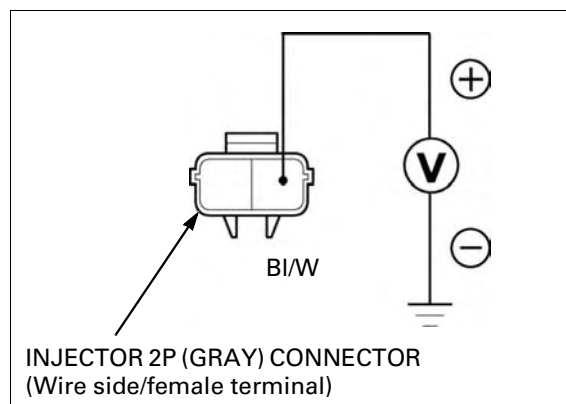
Measure the voltage between the injector 2P (Gray) connector of the wire harness side and ground.

Connection: Black/white (+) – Ground (-)

Is there battery voltage?

NO – Open circuit in Black/white wire

YES – GO TO STEP 3.



3. Injector Resistance Inspection

Turn the ignition switch OFF.

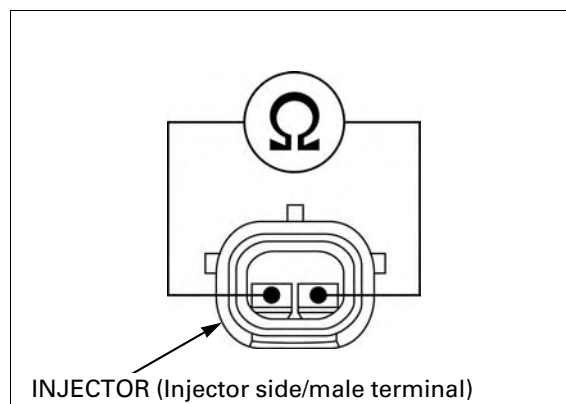
Measure the resistance of the injector connector terminals.

STANDARD: 10 – 14 Ω (20°C/68°F)

Is the resistance within 10 – 14 Ω (20°C/68°F)?

NO – Faulty injector

YES – GO TO STEP 4.



4. Injector Signal Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector.

Check for continuity between the ECM 33P (Black) connector and injector 2P (Gray) connector.

Connection: SIGNAL LINE – SIGNAL LINE

TOOL:

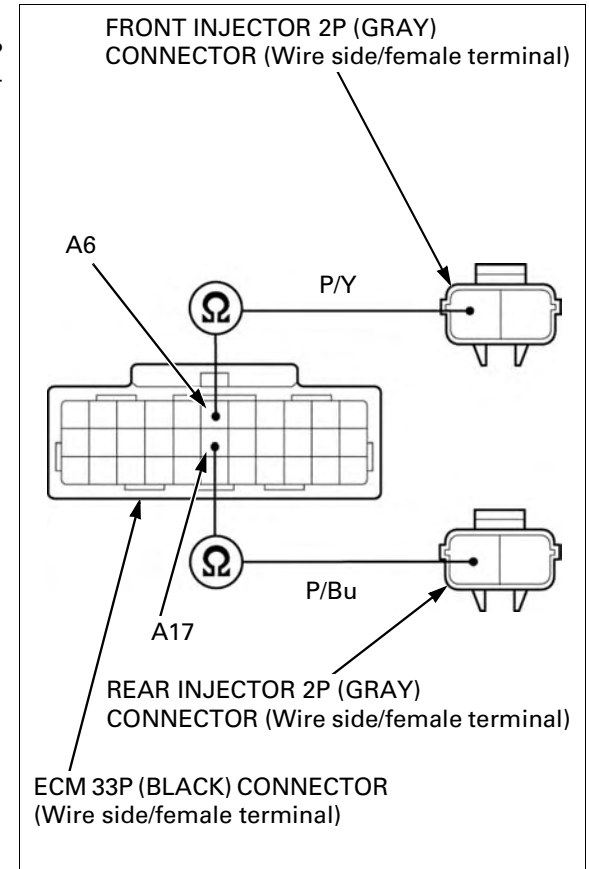
Test probe

07ZAJ-RDJA110

Is there continuity?

NO – Open circuit in SIGNAL LINE wire

YES – GO TO STEP 5.



5. Injector Signal Line Short Circuit Inspection

Connect the ECM 33P (Black) connector.

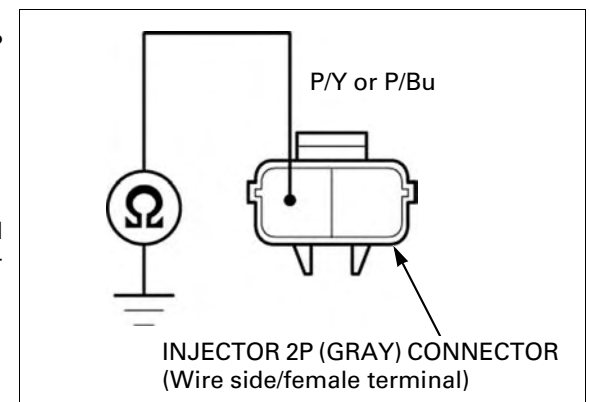
Check for continuity between the injector 2P (Gray) connector and ground.

Connection: SIGNAL LINE – Ground

Is there continuity?

YES – Short circuit in SIGNAL LINE wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).



DTC 13-1 (No.2 FRONT INJECTOR)

See page 5-30

DTC 18-1 (CMP SENSOR)

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

1. CMP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.
Disconnect the CMP sensor 2P (Natural) connector.

Turn the ignition switch ON and engine stop switch "O".
Crank the engine with the starter motor, and measure the CMP sensor peak voltage at the CMP sensor 2P (Natural) connector.

Connection: Gray (+) – Black (–)

TOOL:

Imrie diagnosis tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

Is the voltage more than 0.7 V (20°C/68°F)?

YES – GO TO STEP 2.

NO – Faulty CMP sensor

2. CMP Sensor Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P connectors.

Check for continuity between the CMP sensor 2P (Natural) connector and ECM 33P connectors.

Connection: B33 – Gray
A32 – White/yellow

TOOL:

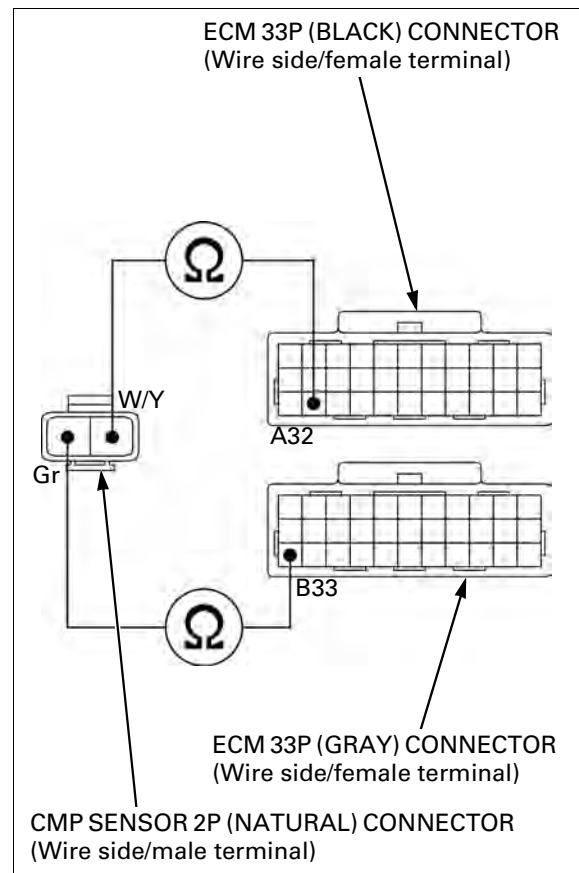
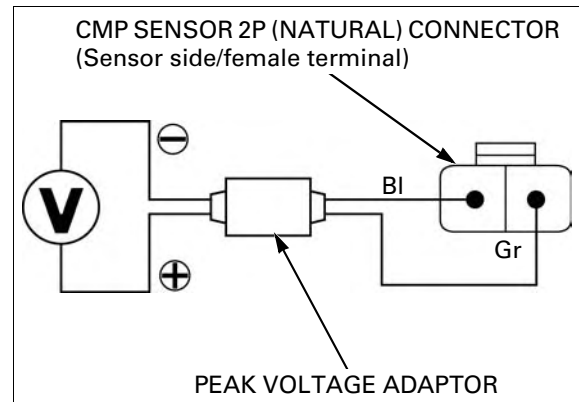
Test probe 07ZAJ-RDJA110

Is there continuity?

YES – Short circuit in Gray wire

NO –

- Open circuit in White/yellow wire
- Open circuit in Gray wire



DTC 19-1 (CKP SENSOR)

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

1. CKP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.
Disconnect the CKP sensor 2P (Red) connector.

Turn the ignition switch ON and engine stop switch "O".
Crank the engine with the starter motor, and measure the CKP sensor peak voltage at the CKP sensor 2P (Red) connector.

Connection: Yellow (+) – White/yellow (–)

TOOL:

Imrie diagnosis tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

Is the voltage more than 0.7 V (20°C/68°F)?

YES – GO TO STEP 2.

NO – Faulty CKP sensor

2. CKP Sensor Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P connectors.

Check for continuity between the CKP sensor 2P (Red) connector and ECM 33P connector.

Connection: B22 – Yellow
A32 – White/yellow

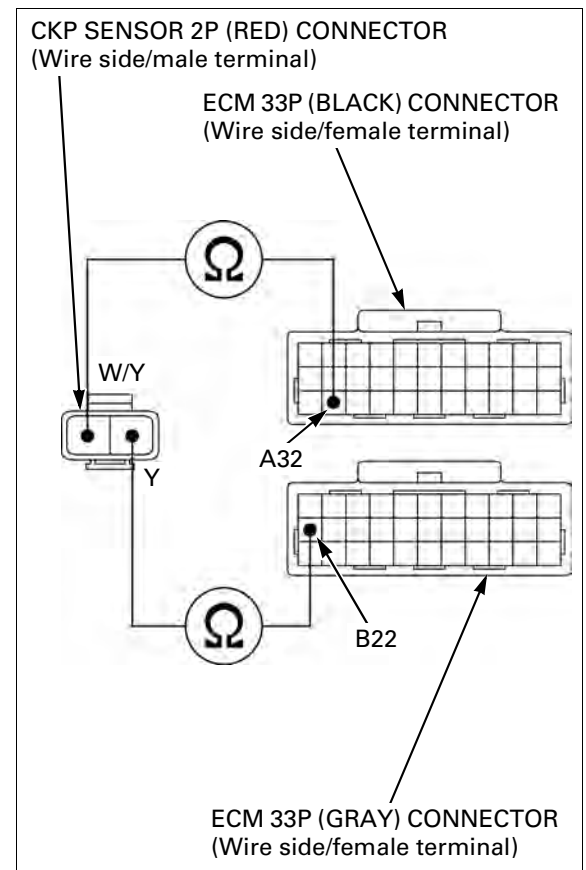
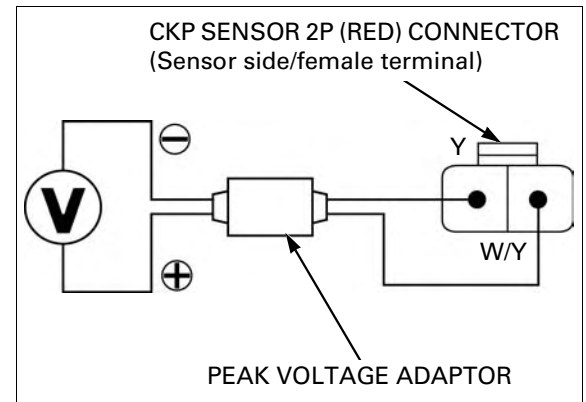
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

YES – Short circuit in Yellow wire

NO – • Open circuit in Yellow wire
• Open circuit in White/yellow wire



DTC 21-1 (O₂ SENSOR)

- Before starting the inspection, check for loose or poor contact on the O₂ sensor 4P (Black) connector and ECM 33P connectors, then recheck the DTC.

1. O₂ Sensor System Inspection

Clear the DTC's (page 5-15).

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

Check the O₂ sensor with the HDS.

Is the DTC 21-1 indicated?

NO – Check the fuel pressure (page 5-56).

YES – GO TO STEP 2.

2. O₂ Sensor Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P connectors and O₂ sensor 4P (Black) connector.

Check for continuity between the ECM 33P connectors and O₂ sensor 4P (Black) connector.

Connection: A18 – Green/orange
B20 – White/orange

TOOL:

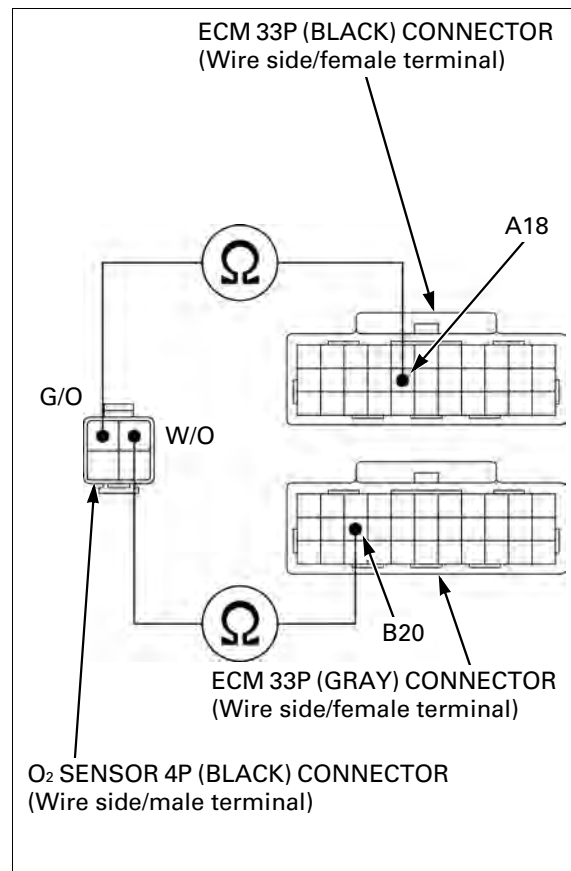
Test probe 07ZAJ-RDJA110

Is there continuity?

YES – GO TO STEP 3.

NO –

- Open circuit in Green/orange wire
- Open circuit in White/orange wire



3. O₂ Sensor Short Circuit Inspection

Connect the ECM 33P connectors.

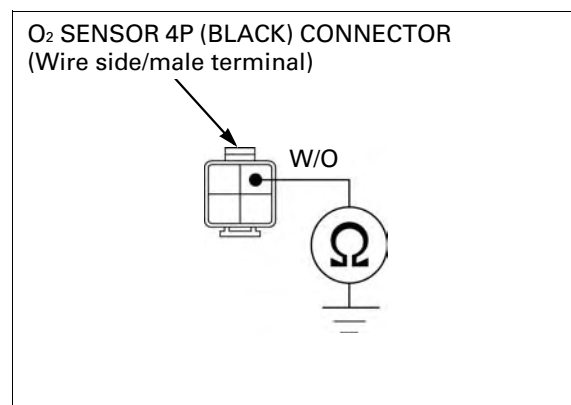
Check the continuity between the O₂ sensor 4P (Black) connector and ground.

Connection: White/orange – Ground

Is there continuity?

YES – Short circuit in White/orange wire

NO – GO TO STEP 4.



4. O₂ Sensor Inspection

Replace the O₂ sensor with a known good one (page 5-84).

Clear the DTC's (page 5-15).

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

Check the O₂ sensor with the HDS.

Is the DTC21-1 indicated?

NO – Faulty original O₂ sensor

YES – Replace the ECM with a new one. and recheck; for Key Registration Procedures (page 21-4).

DTC 23-1 (O₂ SENSOR HEATER)

- Before starting the inspection, check for loose or poor contact on the O₂ sensor 4P (Black) connector and ECM 33P connectors, then recheck the DTC.

1. O₂ Sensor Heater System Inspection

Clear the DTC's (page 5-15).

Start the engine and check the O₂ sensor heater with the HDS.

Is the DTC 23-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. O₂ Sensor Heater Resistance Inspection

Turn the ignition switch OFF.

Disconnect the O₂ sensor 4P (Black) connector.

Measure the resistance at the O₂ sensor 4P (Black) connector of the sensor side.

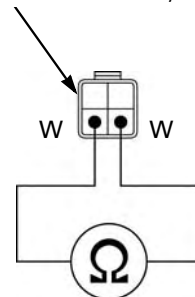
Connection: White – White

Is the resistance within 10 – 16 Ω (20°C/68°F)?

YES – GO TO STEP 3.

NO – Faulty O₂ sensor

O₂ SENSOR 4P (BLACK) CONNECTOR
(Sensor side/female terminal)



3. O₂ Sensor Heater Power Input Line Inspection

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

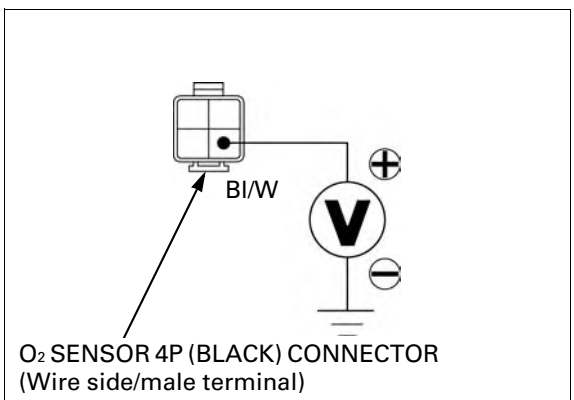
Measure the voltage between the O₂ sensor 4P (Black) connector of the wire harness side and ground.

Connection: Black/white (+) – Ground (-)

Is there the battery voltage?

YES – GO TO STEP 4.

NO – Open circuit in Black/white wire



O₂ SENSOR 4P (BLACK) CONNECTOR
(Wire side/male terminal)

FUEL SYSTEM (PGM-FI)

4. O₂ Sensor Heater Open circuit Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P (Gray) connector.

Check for continuity between the ECM 33P (Gray) connector and O₂ sensor 4P (Black) connector of the wire harness side.

Connection: B2 – Black/green

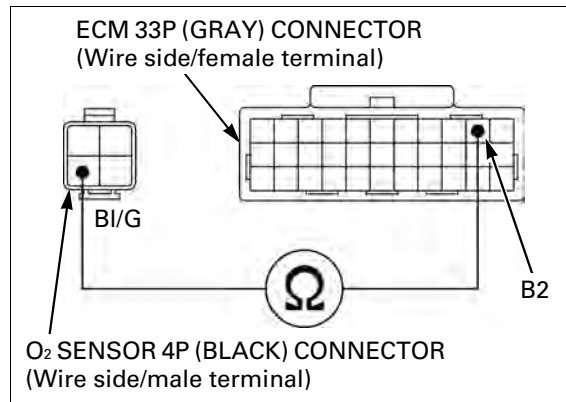
TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Black/green wire



5. O₂ Sensor Heater Short circuit Inspection

Connect the ECM 33P (Gray) connector.

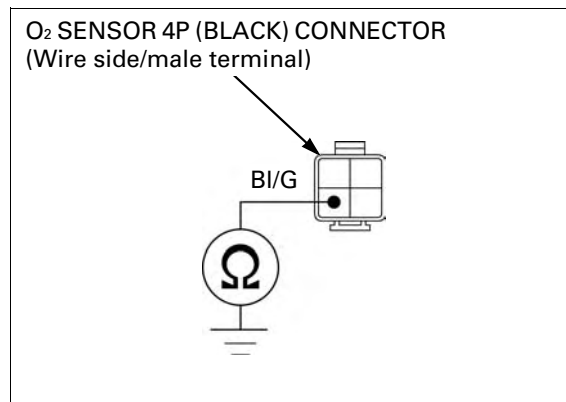
Check for continuity between the O₂ sensor 4P (Black) connector of the wire harness side and ground.

Connection: Black/green – Ground

Is there continuity?

YES – Short circuit in Black/green wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).



DTC 29-1 (IACV)

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

1. Recheck DTC

Clear the DTC's (page 5-15).

Start the engine and recheck the DTC.

Is the DTC 29-1 indicated?

NO – Intermittent failure

YES – GO TO STEP 2.

2. IACV Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the IACV 4P (Black) connector.

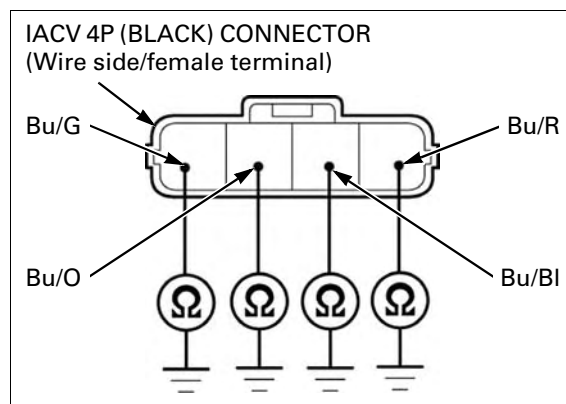
Check for continuity between the IACV 4P (Black) connector of the wire harness side and ground.

Connection: Blue/green – Ground
Blue/orange – Ground
Blue/black – Ground
Blue/red – Ground

Is there continuity?

YES – • Short circuit in Blue/green or Blue/orange wire.
• Short circuit in Blue/black or Blue/red wire.

NO – GO TO STEP 3.



3. IACV Circuit Continuity Inspection

Disconnect the ECM 33P (Black) connector.

Check for continuity between the ECM 33P (Black) connector and IACV 4P (White) connector.

Connection: A19 – Blue/green
A27 – Blue/orange
A16 – Blue/black
A29 – Blue/red

TOOL:

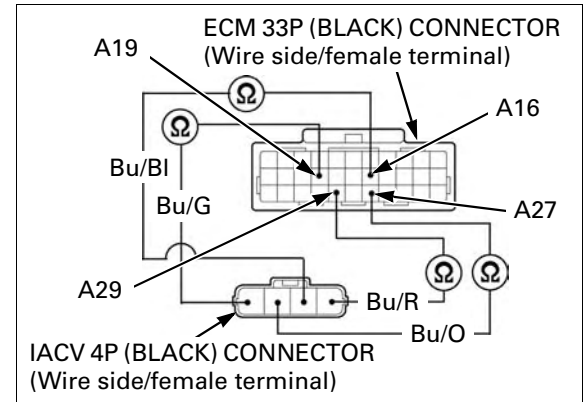
Test probe

07ZAJ-RDJA110

Is there continuity?

YES – GO TO STEP 4.

NO – • Open circuit in Blue/green or Blue/orange wire
• Open circuit in Blue/black or Blue/red wire



4. IACV Resistance Inspection

Measure the resistance at the IACV motor side.

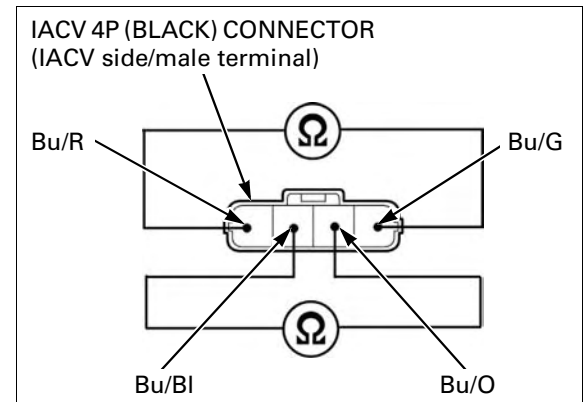
Connection: Blue/green – Blue/red
Blue/black – Blue/orange

STANDARD: 99 – 121 Ω (25°C/77°F)

Is the resistance within 99 – 121 Ω (25°C/77°F)?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Faulty IACV



DTC 33-2 (EEPROM)

1. Recheck DTC

Clear the DTC's (page 5-15).

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 a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Intermittent failure

MIL TROUBLESHOOTING

MIL 1 BLINK (MAP SENSOR)

- Before starting the inspection, check for loose or poor contact on the MAP sensor 3P (Black) connector and ECM 33P connectors, then recheck the MIL blinking.

1. MAP Sensor Output Voltage Inspection

Connect the ECM test harness to ECM connectors (page 5-16).

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

Measure the voltage at the test harness terminals.

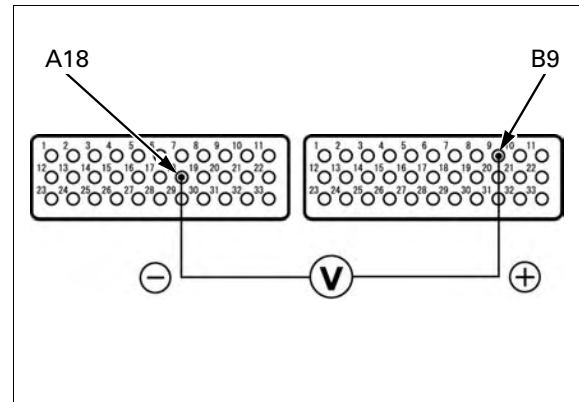
Connection: B9 (+) – A18 (–)

Is the voltage within 2.7 – 3.1V?

YES – Intermittent failure

NO –

- About 5 V
GO TO STEP 2.
- About 0 V
GO TO STEP 3.



2. MAP Sensor Output Line Inspection

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P (Black) connector.

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

Measure the voltage at the wire harness side.

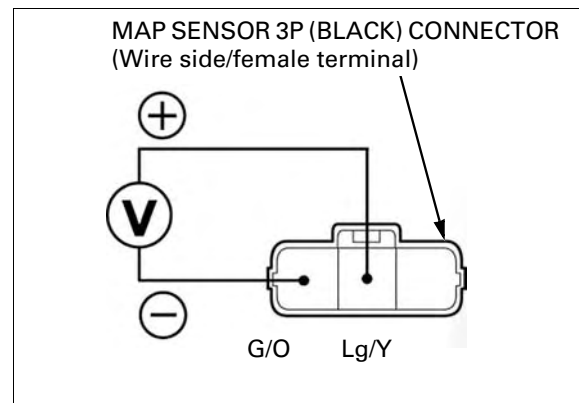
Connection: Light green/yellow (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 3.

NO –

- Open circuit in Light green/orange wire
- Open circuit in Green/orange wire



3. MAP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P (Black) connector.

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

Measure the voltage at the wire harness side.

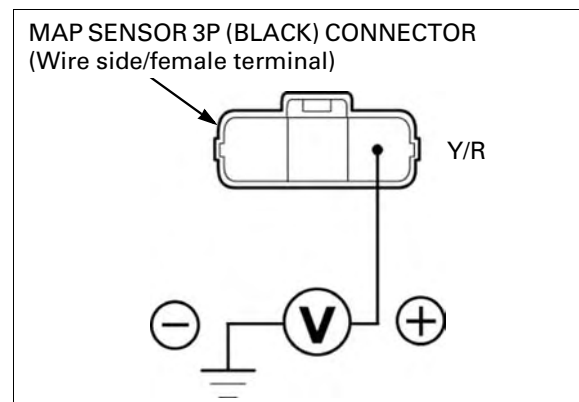
Connection: Yellow/red (+) – Ground (–)

Is the voltage within 4.75 – 5.25V?

YES –

- From STEP 1: GO TO STEP 4.
- From STEP 2: Faulty MAP sensor

NO – GO TO STEP 5.



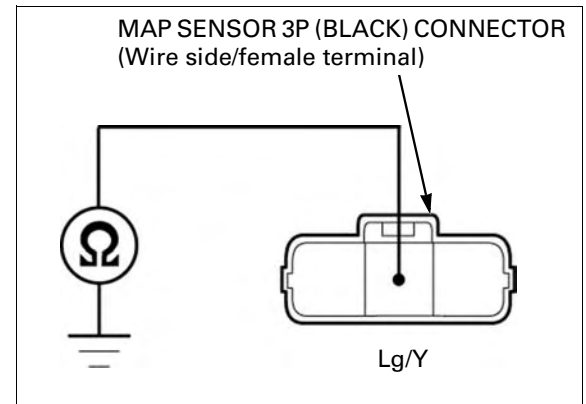
4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.
Check for continuity between the MAP sensor 3P (Black) connector and ground.

Connection: Light green/yellow – Ground

Is there continuity?

- YES** – Short circuit in Light green/yellow wire
NO – Faulty MAP sensor



5. MAP Sensor Input Line Inspection

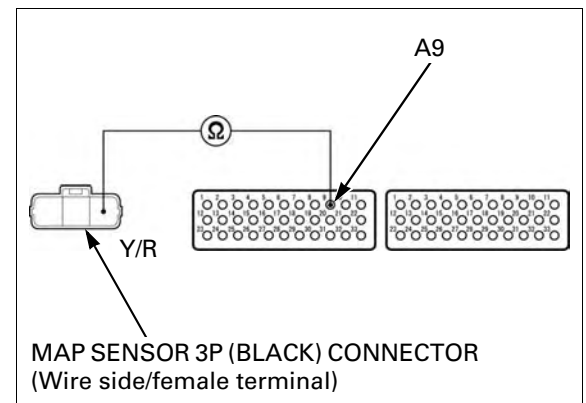
Turn the ignition switch OFF.

Check for continuity between the MAP sensor 3P (Black) connector and test harness terminal.

Connection: A9 – Yellow/red

Is there continuity?

- YES** – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).
NO – Open circuit in Yellow/red wire



MIL 2 BLINKS (MAP SENSOR)

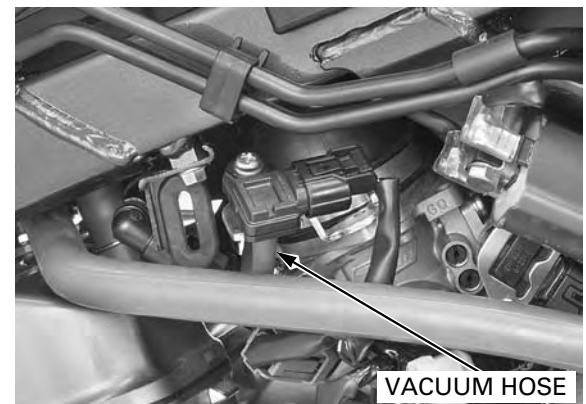
- Before starting the inspection, check for loose or poor contact on the MAP sensor 3P (Black) connector and ECM 33P connectors, then recheck the MIL blinking.

1. MAP Sensor Hose Inspection

Check for connection and installation of the MAP sensor vacuum hose.

Is the MAP sensor hose connection correct?

- YES** – GO TO STEP 2.
NO – Correct the hose connection or installation



2. MAP Sensor Output Voltage Inspection

Connect the ECM test harness to ECM connectors (page 5-16).

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

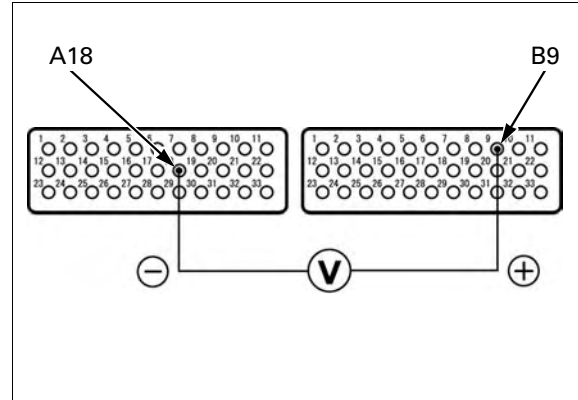
Measure the voltage at the test harness terminals.

Connection: B9 (+) –A18 (–)

Is the voltage within 2.7 – 3.1 V?

YES – GO TO STEP 3.

NO – Faulty MAP sensor



3. MAP Sensor Output Voltage Inspection At Idle

Start the engine.

Measure the voltage at the test harness terminals.

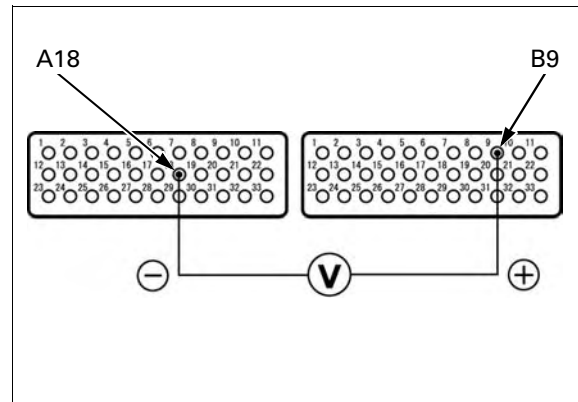
Connection: B9 (+) –A18 (–)

Standard: 2.7 V maximum

Is the voltage less than 2.7 V?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Faulty MAP sensor



MIL 7 BLINKS (ECT SENSOR)

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

1. ECT Sensor Output voltage Inspection

Connect the test harness to ECM 33P connectors (page 5-16).

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

Measure the voltage at the test harness terminals.

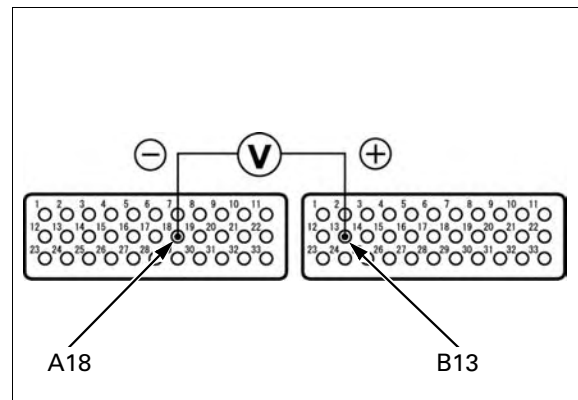
Connection: B13 (+) – A18 (–)

STANDARD: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

YES – Intermittent failure.

NO – GO TO STEP 2.



2. ECT Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the ECT sensor 3P (Gray) connector.
Turn the ignition switch ON and engine stop switch "O".
Measure the voltage at the wire side.

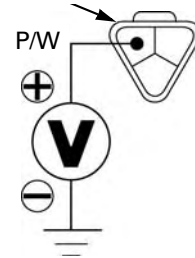
Connection: Pink/white (+) – Ground (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 3.

NO – GO TO STEP 4.

3P CONNECTOR
(Wire side/female terminals)



3. ECT Sensor Resistance Inspection

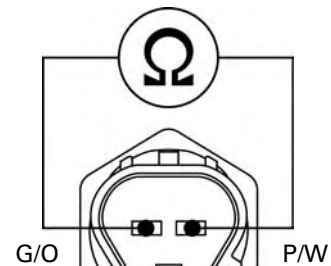
Turn the ignition switch OFF.
Measure the resistance at the ECT sensor 3P (Gray) connector.

Connection: Pink/white – Green/orange
STANDARD: 2.3 – 2.6 kΩ (20°C/68°F)

Is the resistance within 2.3 – 2.6 kΩ?

No – Faulty ECT sensor

YES – GO TO STEP 4.



ECT SENSOR (Sensor side/male terminal)

4. ECT Sensor Open Circuit Inspection

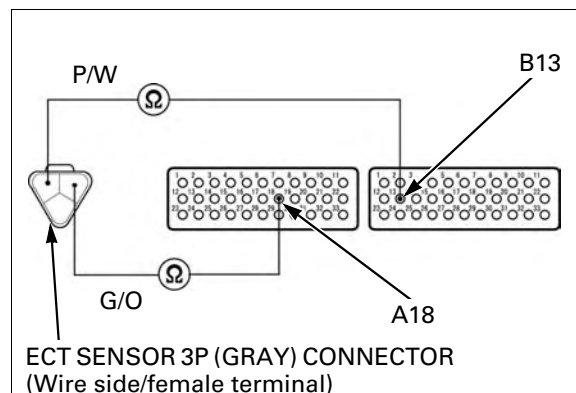
Check for continuity between the test harness terminals and ECT sensor 3P (Gray) connector of the wire harness side.

Connection: B13 – Pink/white
A18 – Green/orange

Is there continuity?

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

YES – GO TO STEP 5.



5. ECT Sensor Short Circuit Inspection

Check for continuity between the ECT sensor 3P (Gray) connector and ground.

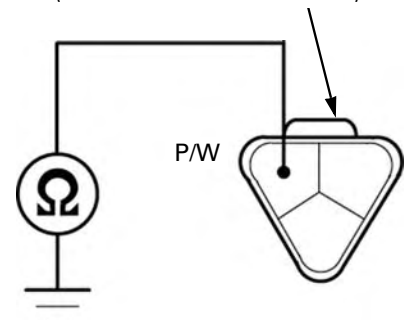
Connection: Pink/white – Ground

Is there continuity?

YES – Short circuit in Pink/white wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

ECT SENSOR 3P (GRAY) CONNECTOR
(Wire side/female terminal)



MIL 8 BLINKS (TP SENSOR)

- Before starting the inspection, check for loose or poor contact on the TP sensor 3P (Blue) connector and ECM 33P connectors, then recheck the MIL blinking.

1. TP Sensor Output Voltage

Connect the ECM test harness to ECM connectors (page 5-16).

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

Measure the TP sensor output voltage at the test harness terminals.

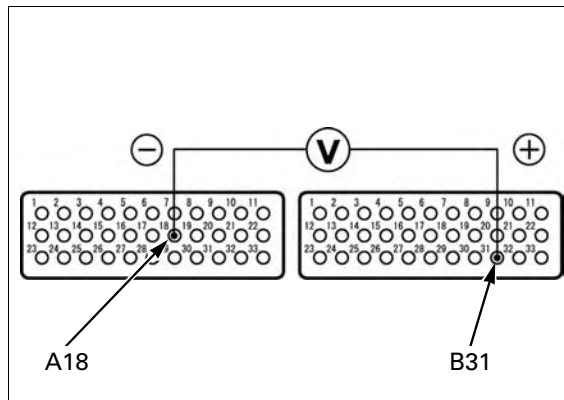
Connection: B31 (+) – A18 (–)

Standard: 0.45 – 0.55 V (throttle fully closed)
4.72 – 4.77 V (throttle fully opened)

Is there standard voltage?

YES – Intermittent failure

NO – GO TO STEP 2.



2. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the TP sensor 3P (Blue) connector.

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

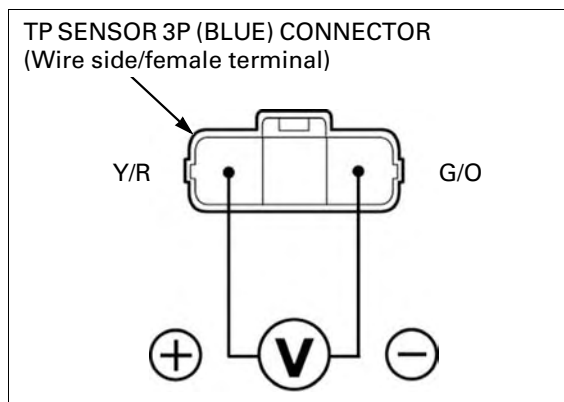
Measure the voltage at the wire harness side.

Connection: Yellow/red (+) – Green/orange (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



3. TP Sensor Output Voltage Inspection

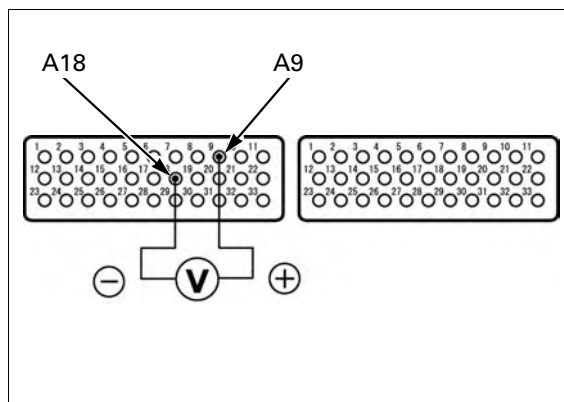
Measure the voltage at the test harness terminals.

Connection: A9 (+) – A18 (–)

Is the voltage within 4.75 – 5.25V?

YES – • Open circuit in Red/yellow wire
• Open circuit in Green/orange wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).



4. TP Sensor Output Line Inspection

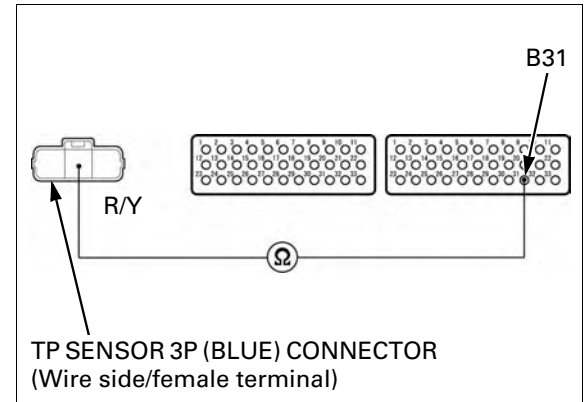
Turn the ignition switch OFF.
Check for continuity between the TP sensor 3P (Blue) connector and test harness terminal.

Connection: Red/yellow – B31

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Red/yellow wire



5. TP Sensor Output Line Short Circuit Inspection

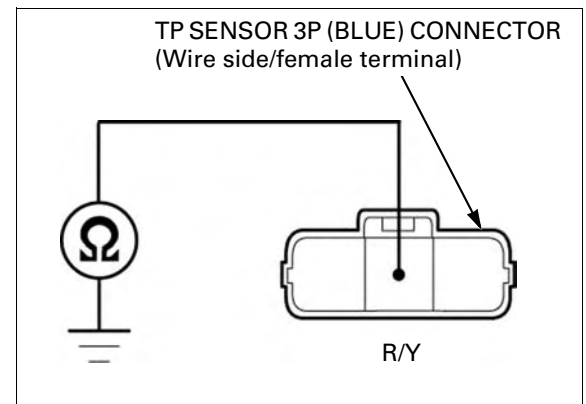
Check for continuity between the TP sensor 3P (Blue) connector and ground.

Connection: Red/yellow (+) – ground (–)

Is there continuity?

YES – Short circuit in Red/yellow wire

NO – Faulty TP sensor



MIL 9 BLINKS (IAT SENSOR)

- Before starting the inspection, check for loose or poor contact on the IAT sensor 2P (Gray) connector and ECM 33P connectors, then recheck the MIL blinking.

1. IAT Sensor Output Voltage Inspection

Connect the ECM test harness to ECM connectors (page 5-16).

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

Measure the voltage at the test harness terminals.

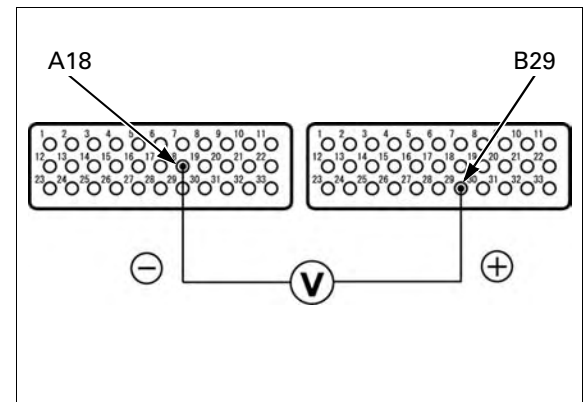
Connection: B29 (+) – A18 (–)

Standard: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

YES – Intermittent failure

NO – GO TO STEP 2.



FUEL SYSTEM (PGM-FI)

2. IAT Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P (Gray) connector.
Turn the ignition switch ON and engine stop switch "O".
Measure the voltage at the wire harness side of IAT sensor connector.

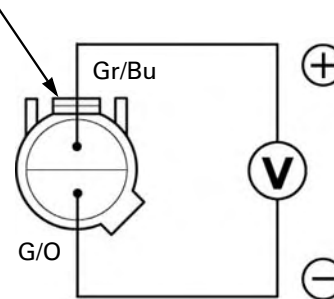
Connection: Gray/blue (+) – Green/orange (-)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 3.

NO – GO TO STEP 4.

IAT SENSOR 2P (GRAY) CONNECTOR
(Wire side/female terminal)



3. IAT Sensor Resistance Inspection

Turn the ignition switch OFF.
Measure the resistance at the IAT sensor terminals (at 20°C/68°F).

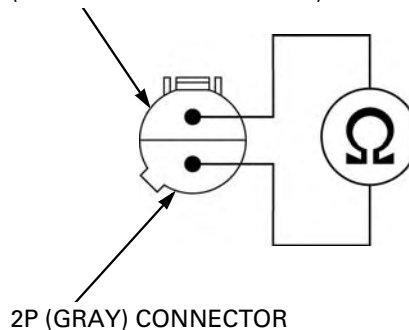
Standard: 1 – 4 kΩ (20°C/68°F)

Is the resistance within 1 – 4 kΩ?

NO – Faulty IAT sensor

YES – GO TO STEP 4.

IAT SENSOR 2P (GRAY) CONNECTOR
(Sensor side/male terminal)



4. IAT Sensor Open Circuit Inspection

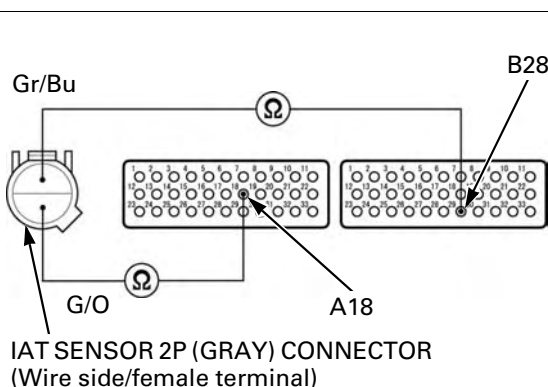
Turn the ignition switch OFF.
Check for continuity between the IAT sensor 2P (Gray) connector and the test harness terminals.

Connection: Gray/blue – B29
Green/orange – A18

Is there continuity?

YES – GO TO STEP 5.

NO – • Open circuit in Gray/blue wire
• Open circuit in Green/orange wire



5. IAT Sensor Output Line Short Circuit Inspection

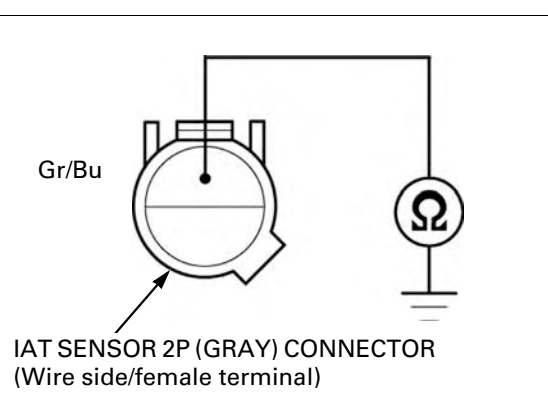
Check for continuity between the IAT sensor 2P (Gray) connector and ground.

Connection: Gray/blue – ground

Is there continuity?

YES – Short circuit in Gray/blue wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).



MIL 11 BLINKS (VS SENSOR)

- Before starting the troubleshooting, check the following.
 - Speedometer/VS sensor (XL700V: 20-11)
 - ABS indicator problem code (XL700VA: 16-10)
- Before starting the inspection, check for loose or poor contact on the VS sensor 2P (Orange) connector, combination meter 20P connector, ABS modulator 26P connector (XL700VA) and ECM 33P connectors, then recheck the MIL blinking.

1. ECM Signal Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the combination meter 20P connector.

Check for continuity between the combination meter 20P connector of the wire harness side and ground.

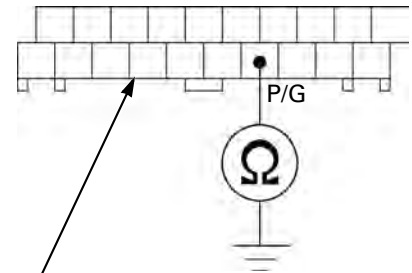
Connection: Pink/green – ground

Is there continuity?

YES – Short circuit in Pink/green wire

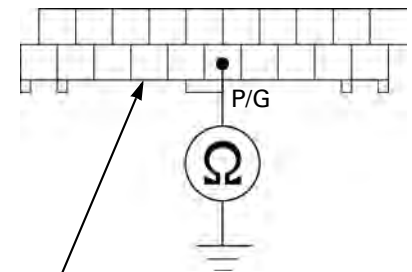
NO – GO TO STEP 2.

XL700V:



COMBINATION METER 20P CONNECTOR
(Wire side/female terminal)

XL700VA:



COMBINATION METER 20P CONNECTOR
(Wire side/female terminal)

FUEL SYSTEM (PGM-FI)

2. ECM Signal Line Open Circuit Inspection

Disconnect the ABS modulator 26P connector (XL700VA).

Check for continuity between the combination meter 20P connector (XL700V) or ABS modulator 26P connector (XL700VA) and test harness terminal.

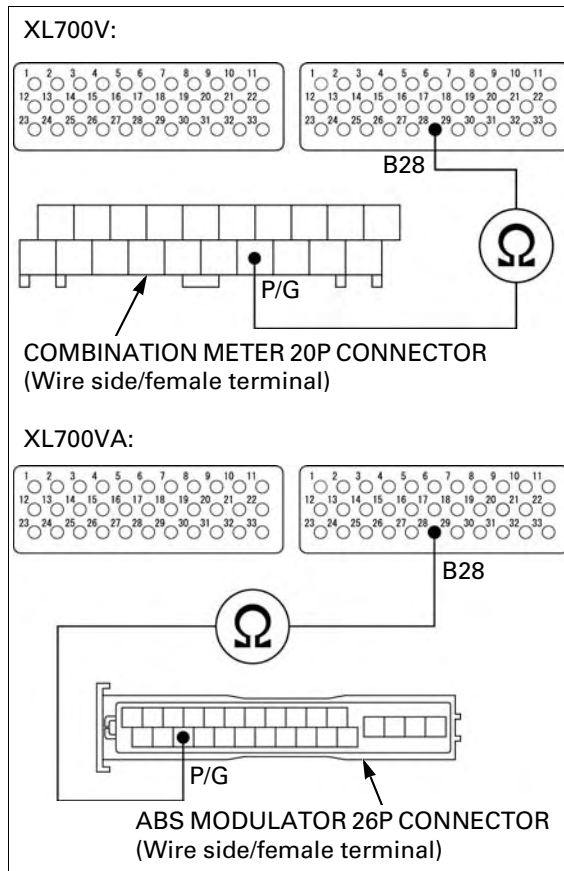
Connection: Pink/green – B28

Is there continuity?

YES – Open circuit in Pink/green wire

NO –

- Inspect the VS sensor (page 20-11)
- Faulty combination meter (XL700V)
- Faulty ABS modulator (XL700VA)



MIL 12 BLINKS (No.1 REAR INJECTOR)

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

DTC	INJECTOR	POWER INPUT LINE	SIGNAL LINE	SIGNAL AT ECM
12	No.1 Rear	Black/white	Pink/blue	A17
13	No.2 Front	Black/white	Pink/yellow	A6

1. Injector Input Voltage Inspection

Disconnect the injector 2P (Gray) connector.

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

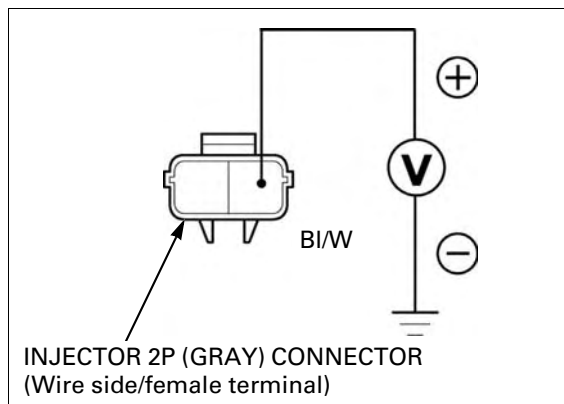
Measure the voltage between the injector 2P (Gray) connector of the wire harness side and ground.

Connection: Black/white (+) – Ground (–)

Is there the battery voltage?

NO – Open circuit in Black/white wire

YES – GO TO STEP 2.



2. Injector Resistance Inspection

Turn the ignition switch OFF.

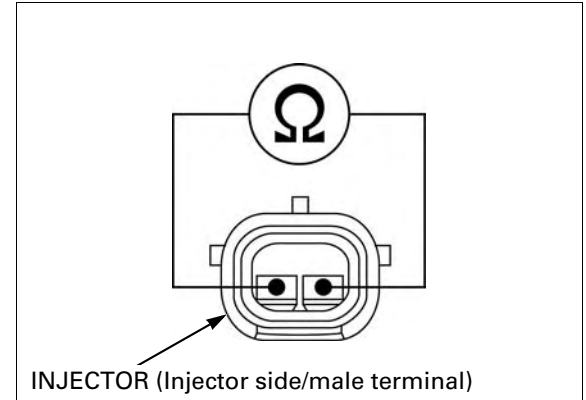
Measure the resistance of the injector connector terminals.

STANDARD: 10 – 14 Ω (20°C/68°F)

Is the resistance within 10 – 14 Ω (20°C/68°F)?

NO – Faulty injector

YES – GO TO STEP 3.



3. Injector Signal Line Open Circuit Inspection

Connect the test harness to the ECM 33P (Black) connector (page 5-16).

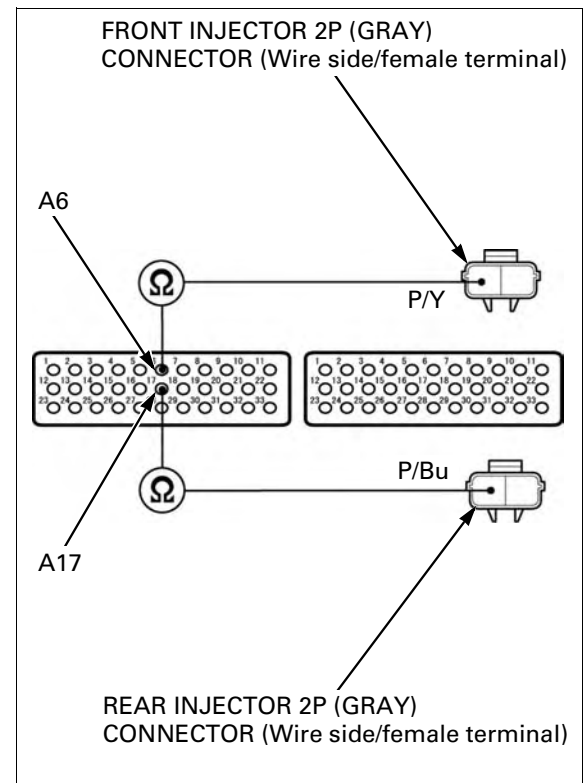
Check for continuity between the test harness terminal and injector 2P (Gray) connector.

Connection: SIGNAL LINE – SIGNAL LINE

Is there continuity?

NO – Open circuit in SIGNAL line wire.

YES – GO TO STEP 4.



4. Injector Signal Line Short Circuit Inspection

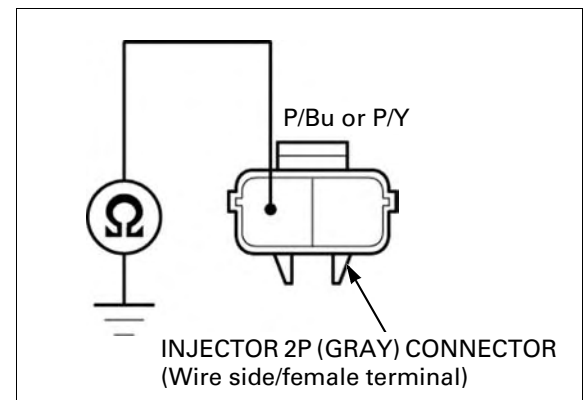
Check for continuity between the injector 2P (Gray) connector and ground.

Connection: SIGNAL LINE – Ground

Is there continuity?

YES – Short circuit in SIGNAL line wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).



MIL 13 BLINKS (No.2 FRONT INJECTOR)

See page 5-46

MIL 18 BLINKS (CMP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CMP sensor 2P (Natural) connector and ECM 33P connectors, then recheck the MIL blinking.

1. CMP Sensor Peak Voltage Inspection at ECM

Connect the ECM test harness to the ECM connectors (page 5-16).

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

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

Connection: B33 (+) – A32 (–)

TOOL:

Imrie diagnosis tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)

Is the voltage more than 0.7 V (20°C/68°F)?

YES – Intermittent failure

NO – GO TO STEP 2.

2. CMP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.

Disconnect the CMP sensor 2P (Natural) connector.

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

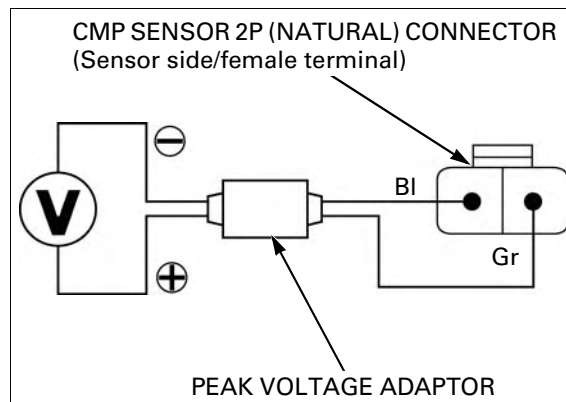
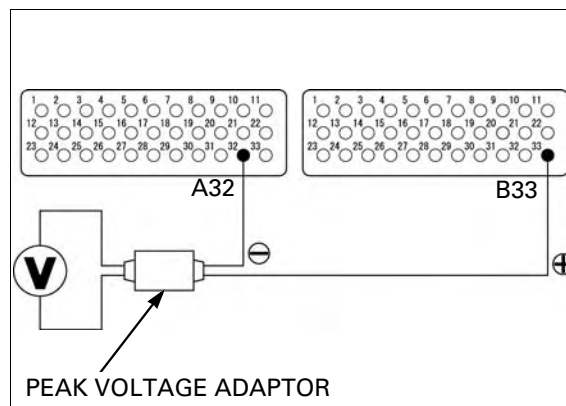
Crank the engine with the starter motor, and measure the CMP sensor peak voltage.

Connection: Gray (+) – Black (–)

Is the voltage more than 0.7 V (20°C/68°F)?

YES – • Open circuit in White/yellow wire
• Open or short circuit in Gray wire

NO – Faulty CMP sensor



MIL 19 BLINKS (CKP SENSOR)

- Before starting the inspection, check for loose or poor contact on the CKP sensor 2P (Red) connector and ECM 33P connectors, then recheck the MIL blinking.

1. CKP Sensor Peak Voltage Inspection at ECM

Connect the ECM test harness to the ECM connectors (page 5-16).

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

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

Connection: B22 (+) – A32 (–)

TOOL:

Imrie diagnosis tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

Is the voltage more than 0.7 V (20°C/68°F)?

YES – Intermittent failure

NO – GO TO STEP 2.

2. CKP Sensor Peak Voltage Inspection

Turn the ignition switch OFF.

Disconnect the CKP sensor 2P (Red) connector.

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

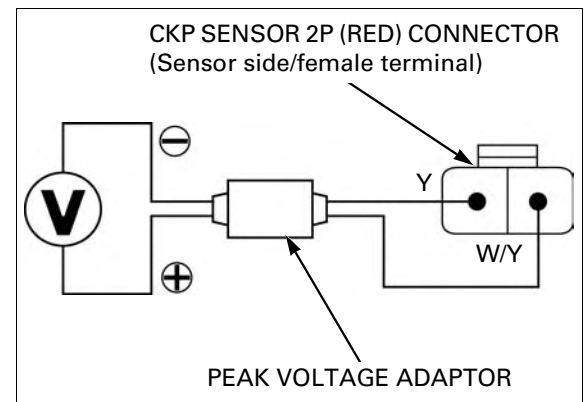
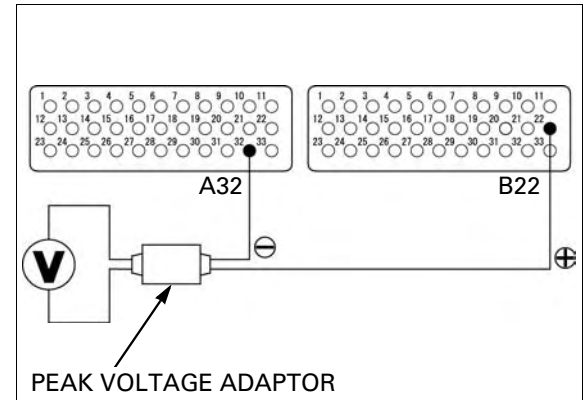
Crank the engine with the starter motor, and measure the CKP sensor peak voltage.

Connection: Yellow (+) – White/yellow (–)

Is the voltage more than 0.7 V (20°C/68°F)?

- YES** –
- Open circuit in White/yellow wire
 - Open or short circuit in Yellow wire

NO – Faulty CKP sensor



MIL 21 BLINKS (O₂ SENSOR)

- Before starting the inspection, check for loose or poor contact on the O₂ sensor 4P (Black) connector and ECM 33P connectors, then recheck the MIL blinking.

1. O₂ Sensor System Inspection

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

Check the MIL blinking.

Is the MIL 21 blinks?

NO – Check the fuel pressure (page 5-56).

YES – GO TO STEP 2.

2. O₂ Sensor Open Circuit Inspection

Connect the ECM test harness to the ECM connectors (page 5-16).

Disconnect the O₂ sensor 4P (Black) connector.

Check for continuity between the test harness terminals and the O₂ sensor 4P (Black) connector.

Connection: B20 – White/orange
A18 – Green/orange

Is there continuity?

NO –

- Open circuit in White/orange wire
- Open circuit in Green/orange wire

YES – GO TO STEP 3.

3. O₂ Sensor Short Circuit Inspection

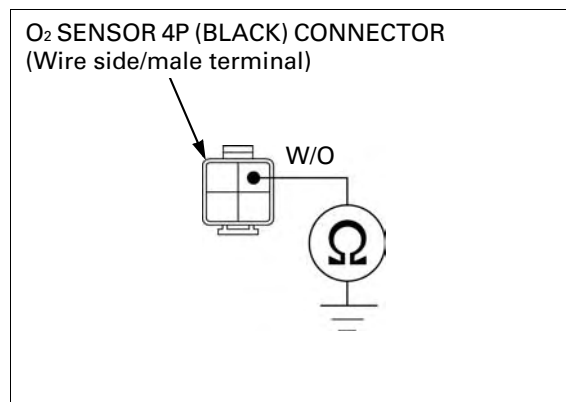
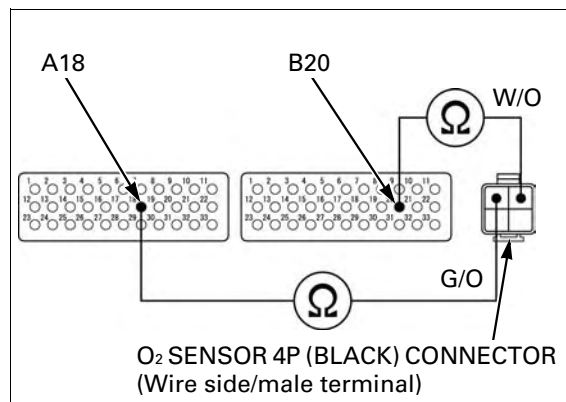
Check for continuity between the O₂ sensor 4P (Black) connector and ground.

Connection: White/orange – Ground

Is there continuity?

YES – Short circuit in White/orange wire

NO – GO TO STEP 4.



4. O₂ Sensor Inspection

Replace the O₂ sensor with a known good one.

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

Check the MIL blinking.

Is the MIL 21 blinks?

NO – Faulty original O₂ sensor

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

MIL 23 BLINKS (O₂ SENSOR HEATER)

- Before starting the inspection, check for loose or poor contact on the O₂ sensor 4P (Black) connector and ECM 33P connectors, then recheck the MIL blinking.

1. O₂ Sensor Heater Resistance Inspection

Disconnect the O₂ sensor 4P (Black) connector.

Measure the resistance at the O₂ sensor connector.

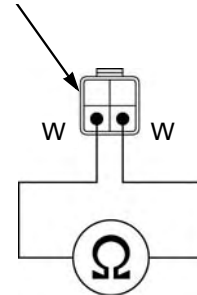
Connection: White – White

Is the resistance within 10 – 16 Ω (20°C/68°F)?

NO – Faulty O₂ sensor.

YES – GO TO STEP 2.

O₂ SENSOR 4P (BLACK) CONNECTOR
(Sensor side/female terminal)



2. O₂ Sensor Heater Open Circuit Inspection 1

Turn the ignition switch ON.

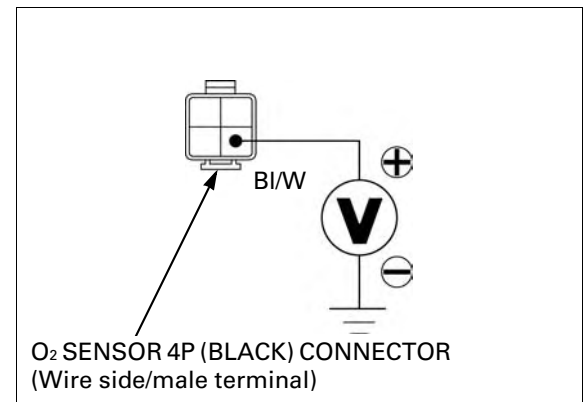
Measure the voltage at the O₂ sensor 4P (Black) connector.

Connection: Black/white (+) – Ground (–)

Is there battery voltage?

NO – Open circuit in Black/white wire

YES – GO TO STEP 3.



3. O₂ Sensor Heater Open circuit Inspection 2

Connect the ECM test harness to the ECM connectors (page 5-16).

Check for continuity between the test harness terminal and O₂ sensor 4P (Black) connector.

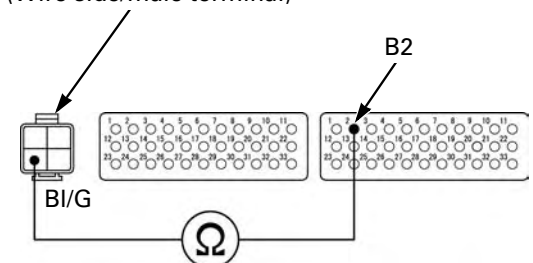
Connection: B2 – Black/green

Is there continuity?

NO – Open circuit in Black/green wire

YES – GO TO STEP 4.

O₂ SENSOR 4P (BLACK) CONNECTOR
(Wire side/male terminal)



FUEL SYSTEM (PGM-FI)

4. O₂ Sensor Heater Short circuit Inspection

Check for continuity between the O₂ sensor 4P (Black) connector and ground.

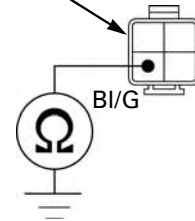
Connection: Black/green – Ground

Is there continuity?

YES – Short circuit in Black/green wire

NO – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

O₂ SENSOR 4P (BLACK) CONNECTOR
(Wire side/male terminal)



MIL 29 BLINKS (IACV)

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

1. IACV Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the IACV 4P (Black) connector.

Check for continuities between the IACV 4P (Black) connector and ground.

Connection: Blue/green – Ground
Blue/orange – Ground
Blue/black – Ground
Blue/red – Ground

Is there continuity?

YES –

- Short circuit in Blue/black or Blue/orange wire.
- Short circuit in Blue/red or Blue/green wire.

NO – GO TO STEP 2.

2. IACV Circuit Continuity Inspection

Connect the ECM test harness to ECM connectors (page 5-16).

Check for continuities between the test harness terminal and the IACV 4P (Black) connector.

Connection: A16 – Blue/black
A27 – Blue/orange
A29 – Blue/red
A19 – Blue/green

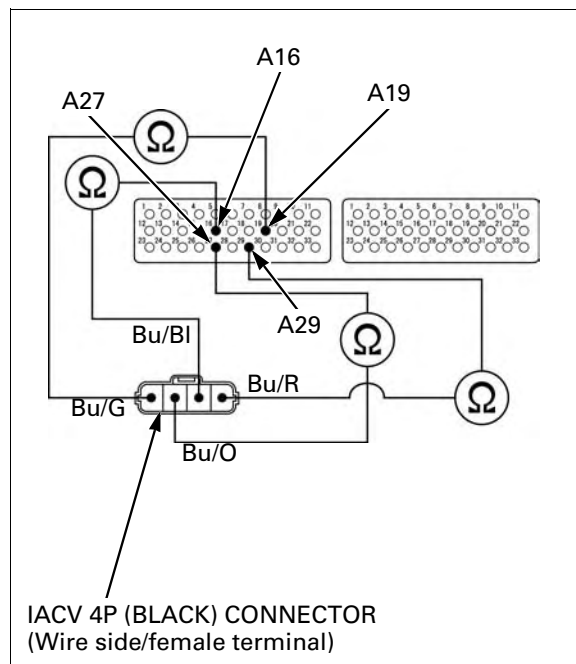
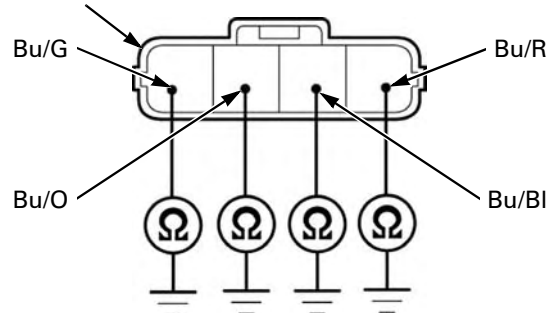
Is there continuity?

YES – GO TO STEP 3.

NO –

- Open circuit in Blue/black or Blue/orange wire.
- Open circuit in Blue/red or Blue/green wire.

IACV 4P (BLACK) CONNECTOR
(Wire side/female terminal)



3. IACV Resistance Inspection

Connect the IACV 4P (White) connector.
Measure the resistance at the test harness terminals.

Connection: A19 – A29

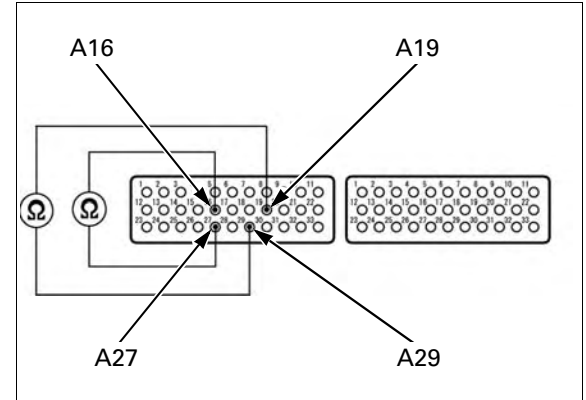
A16 – A27

STANDARD: 99 – 121 Ω (25°C/77°F)

Is the resistance within 99 – 121 Ω (25°C/77°F)?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Faulty IACV



MIL CIRCUIT INSPECTION

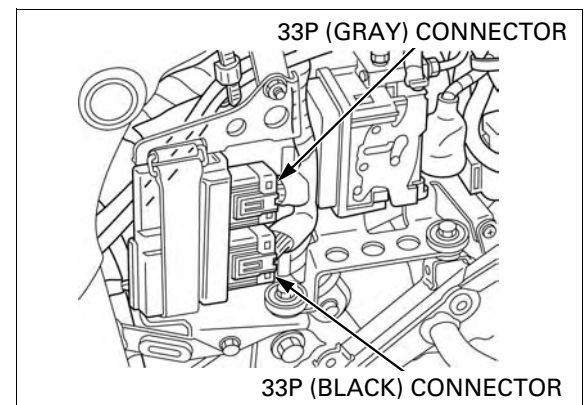
If the engine can be started but the MIL does not come on when the ignition switch ON and engine stop switch "O", check the follows:

Check for operation of the combination meter function properly.

- If they do not function, check the combination meter power input line (page 20-9).
- If they function properly, check as follows:

Turn the ignition switch OFF.

Disconnect the ECM 33P connectors.



Ground the White/blue wire terminal of the wire harness side connector with a jumper wire.

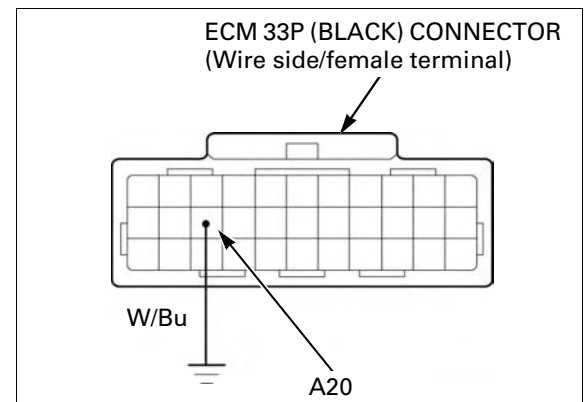
TOOL:

Test probe

07ZAJ-RDJA110

Turn the ignition switch ON and engine stop switch "O", the MIL should come on.

- If the MIL come on, replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).
- If the MIL does not come on, check for open circuit in White/blue wire between the combination meter and ECM.
If the wire is OK, replace the combination meter (page 20-10).



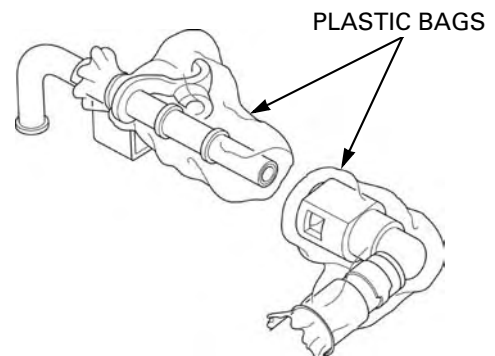
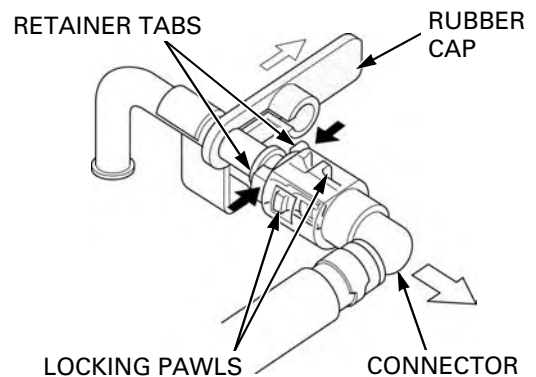
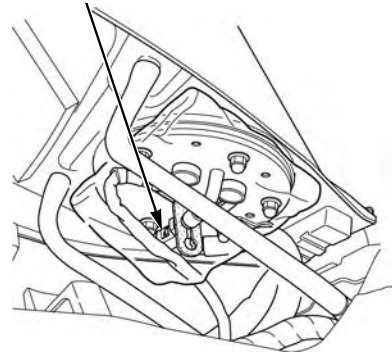
FUEL LINE INSPECTION

FUEL PRESSURE RELIEVING/QUICK CONNECT FITTING REMOVAL

- Before disconnecting fuel feed hose, relieve pressure from the system as follows.
1. Turn the ignition switch OFF.
Lift and support the fuel tank (page 3-5).
 2. Remove the right side cover (page 2-4).
Disconnect the fuel pump 3P (Natural) connector.
 3. Start the engine, and let it idle until the engine stalls.
 4. Turn the ignition switch OFF.
 5. Disconnect the battery negative (-) cable (page 17-6).
 6. Check the fuel quick connect fitting for dirt, and clean if necessary.
Place a shop towel over the quick connect fitting.
 7. Slide and release the rubber cap.
 8. Hold the connector with one hand and squeeze the retainer tabs with the other hand to release them from the locking pawls.
Pull the connector off.
 - Absorb the remaining fuel in the fuel feed hose from following out with a shop towel.
 - Be careful not to damage the hose, pipe or other parts.
 - Do not use tools.
 - If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.
 9. To prevent damage and keep foreign matter out, cover the disconnected connector and pipe end with the plastic bags.

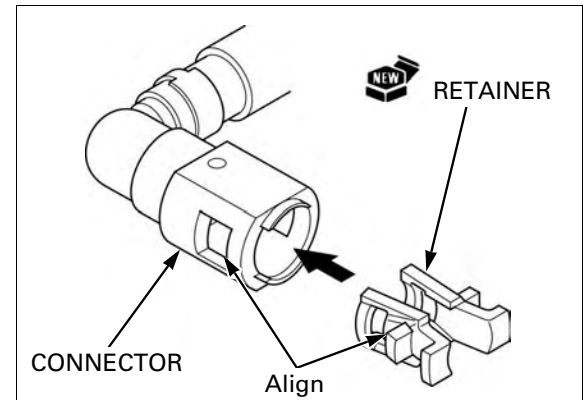


QUICK CONNECT FITTING

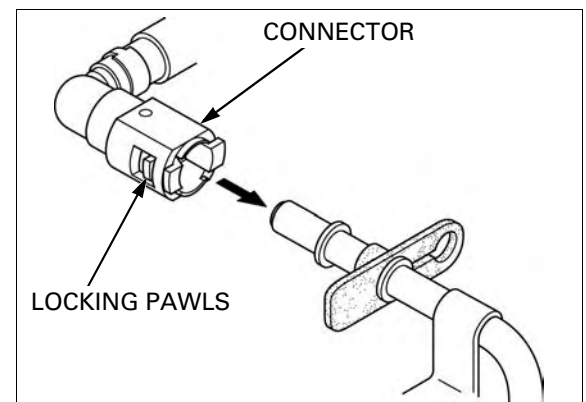


QUICK CONNECT FITTING INSTALLATION

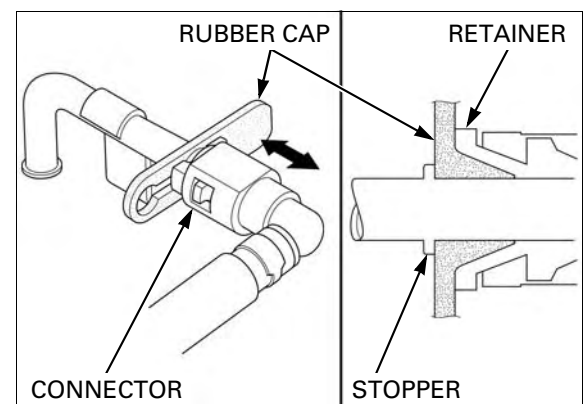
- Always replace the retainer of the quick connect fitting when the fuel feed hose is disconnected.
 - If the rubber cap is damaged or cut, replace it with a new ones.
 - Do not bent or twist fuel feed hose.
 - If any retainer needs replacing, use the same manufacturer's retainer as the ones being removed (The various manufactures feature different retainer specification).
1. Insert a new retainer into the connector aligning the retainer locking pawls with the connector holes.



2. Press the quick connect fitting onto the pipe until both retainer pawls lock with a "CLICK".
If it is hard to connect, put a small amount of engine oil on the pipe end.



3. Make sure the connection is secure and that the locking pawls are firmly locked into place; check visually and by pulling the connector.
4. Make sure the rubber cap is in place (between the retainer tab and stopper on pipe).



FUEL SYSTEM (PGM-FI)

5. Connect the fuel pump 3P (Natural) connector.



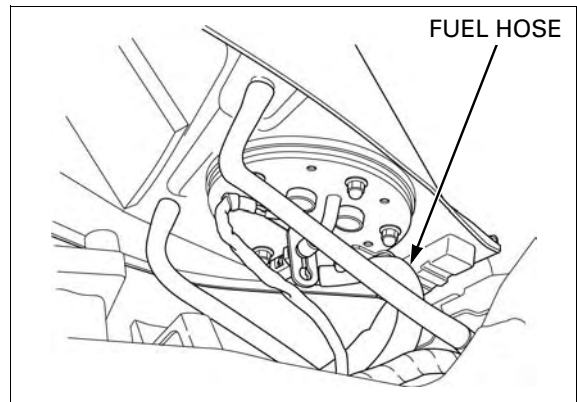
6. Set the fuel hose to the clamp.
7. Connect the battery negative (–) cable to the battery.
8. Turn the ignition switch ON and engine stop switch "O".

NOTE:

- Do not start the engine.

The fuel pump will run for about 2 seconds, and fuel pressure will rise.
Repeat 2 or 3 times of turn the ignition switch OFF to ON, and check that there is no leakage in the fuel supply system.

Lower the fuel tank (page 3-5).



FUEL PRESSURE TEST

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-54).

Attach the fuel pressure gauge, attachment and manifold.

TOOLS:

- | | |
|----------------------------------|---------------|
| (1): Fuel pressure gauge | 07406-0040004 |
| (2): Pressure gauge manifold | 07ZAJ-S5A0111 |
| (3): Hose attachment, 8 mm/9 mm | 07ZAJ-S7C0100 |
| (4): Hose attachment, 9 mm/9 mm | 07ZAJ-S5A0120 |
| (5): Attachment joint, 8 mm/9 mm | 07ZAJ-S7C0200 |

Temporarily connect the battery negative (–) cable to the battery.

Start the engine and let it idle.

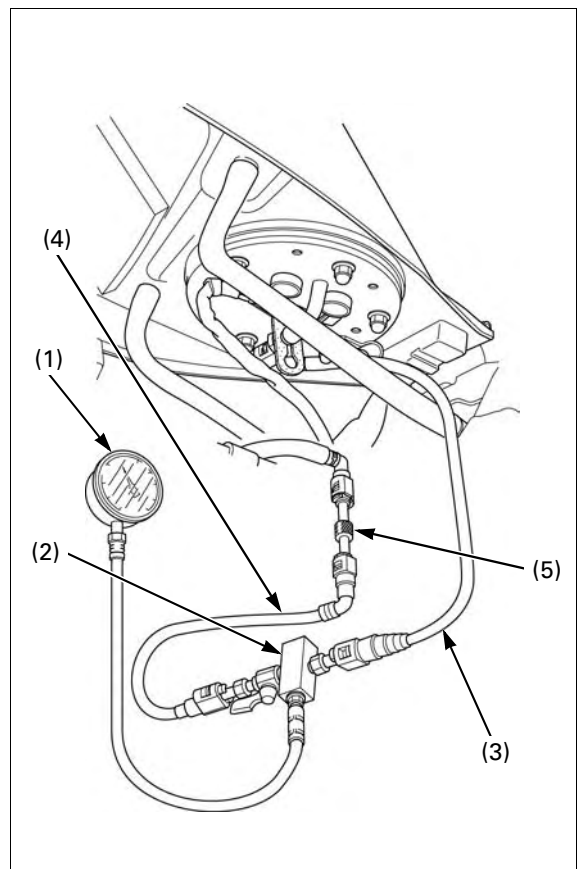
Read the fuel pressure.

STANDARD: 343 kPa (3.5 kgf/cm², 50 psi)

If the fuel pressure is higher than specified, replace the fuel pump assembly (faulty fuel pump or fuel pressure regulator).

If the fuel pressure is lower than specified, inspect the following:

- Fuel line leaking
- Pinched or clogged fuel feed hose or fuel tank breather hose
- Fuel pump (page 5-58)
- Clogged fuel strainer screen (Assembly of the fuel pump: page 5-59)

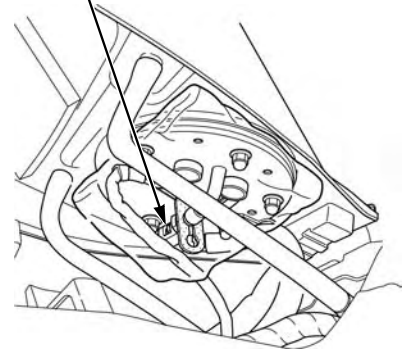


Wrap a shop towel around the attachment to soak up any spilled fuel.

After inspection, relieve the fuel pressure and disconnect the quick connect fitting (page 5-54).

Remove the fuel pressure gauge, attachment and manifold from the fuel pump.

Connect the quick connect fitting (page 5-55).

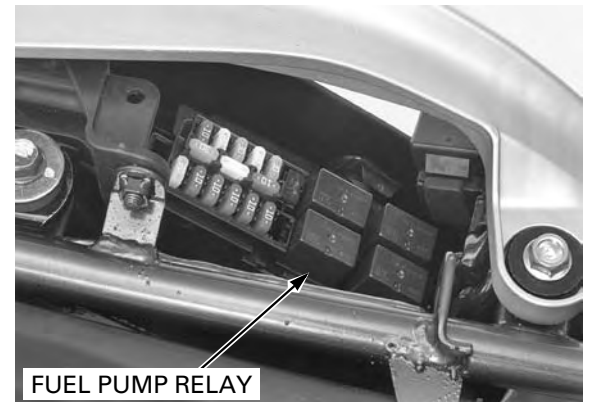
QUICK CONNECT FITTING

FUEL FLOW INSPECTION

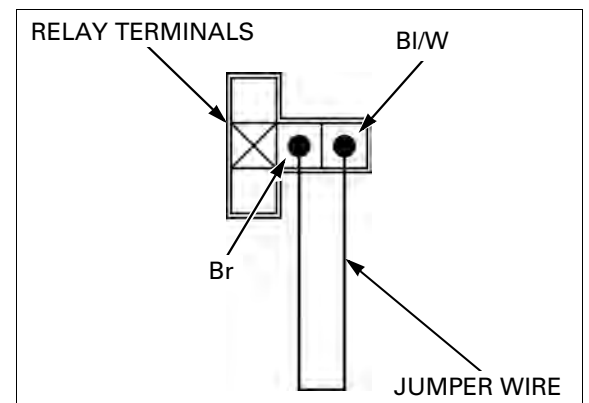
Remove the seat (page 2-4).

Turn the ignition switch OFF.

Open the fuse/relay box and remove the fuel pump relay.



Jump the Brown and Black/White wire terminals using a jumper wire as shown.



FUEL SYSTEM (PGM-FI)

Relieve the fuel pressure and remove the quick connect fitting (page 5-54).

Connect the hose attachment to the fuel pump joint.

TOOL:

Hose attachment, 8 mm/9 mm 07ZAJ-S7C0100

Wipe spilled gasoline out of the container.

Place the end of the hose into an approved gasoline container.

Temporarily connect the battery negative (–) cable to the battery.

Turn the ignition switch ON, engine stop switch "O" for 10 seconds.

Measure the amount of fuel flow.

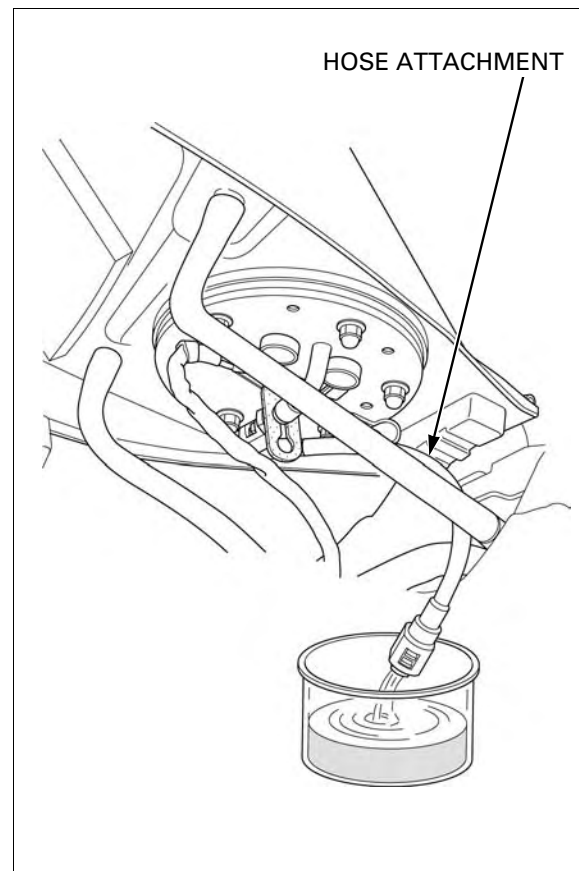
Amount of fuel flow:

**189 cm³ (6.4 US oz, 6.6 Imp oz) minimum
/10 seconds at 12 V**

If the fuel flow is less than specified, inspect the following:

- Fuel pump (page 5-58).
- Clogged fuel filter (Assembly of the fuel pump: page 5-59)

Connect the quick connect fitting (page 5-55).



FUEL PUMP

INSPECTION

- Refer to the fuel level sensor inspection (page 20-16).

Turn the ignition switch ON, engine stop switch "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 right side cover (page 2-4).

Disconnect the fuel pump 3P (Natural) connector.

Turn the ignition switch ON, engine stop switch "O" and measure the voltage at the wire side.

Connection: Brown (+) – 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 Brown wire and/or Green wire
- Fuse 20 A (FI)
- Fuse 10 A (BANK ANGLE)
- Main fuse 30 A
- Fuel pump relay (page 5-61)
- Engine stop relay (page 5-75)
- Engine stop switch (page 20-21)
- Ignition switch (page 20-20)
- Bank angle sensor (page 5-73)
- ECM (page 5-75)



REMOVAL

- Be careful not to damage the float arm and fuel level sensor when removing the fuel pump assembly.
- Do not disassemble the fuel pump assembly.

Remove the fuel tank (page 5-61).

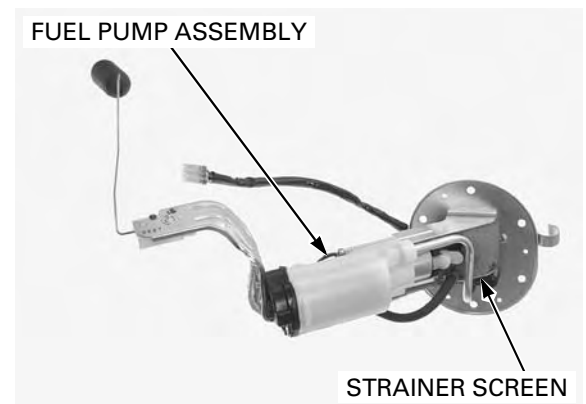
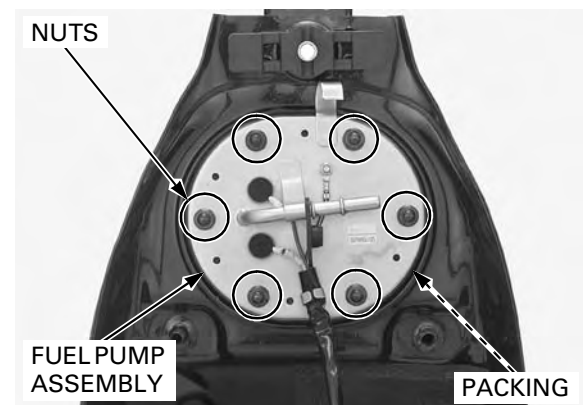
Remove the following:

- Nuts
- Fuel pump assembly
- Packing

Check the fuel pump assembly for damage.

Replace the fuel pump if it necessary.

Clean the fuel strainer screen.

**INSTALLATION**

- Be careful not to damage the float arm and fuel level sensor when installing the fuel pump assembly.

When installing the fuel pump assembly, place the fuel tank upright so its front side faces downward.

Clean the mating surface of the fuel tank and fuel pump.

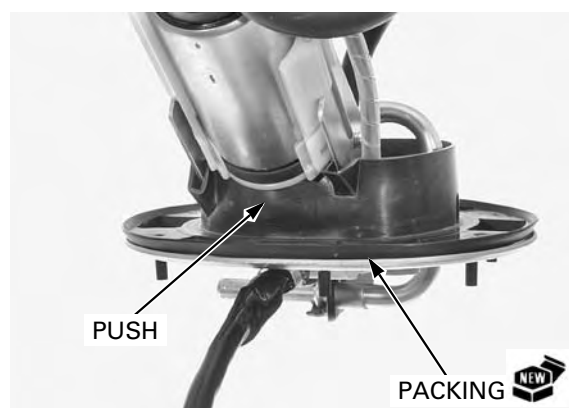


FUEL SYSTEM (PGM-FI)

Always replace the packing with a new one.

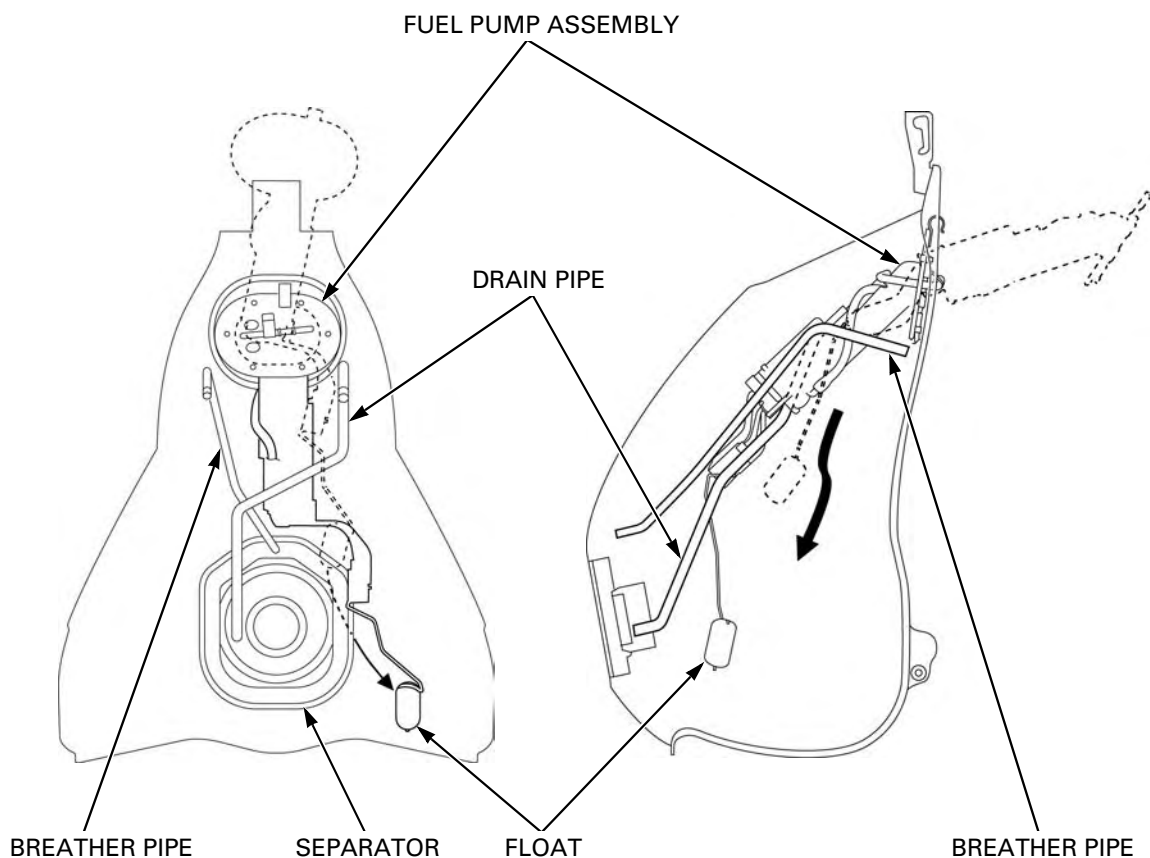
Place a new packing onto the fuel pump.

Push the front end of the packing to fit it on the fuel tank.



Be careful not to damage the float arm and fuel level sensor by fuel tank drain/breather pipes and separator.

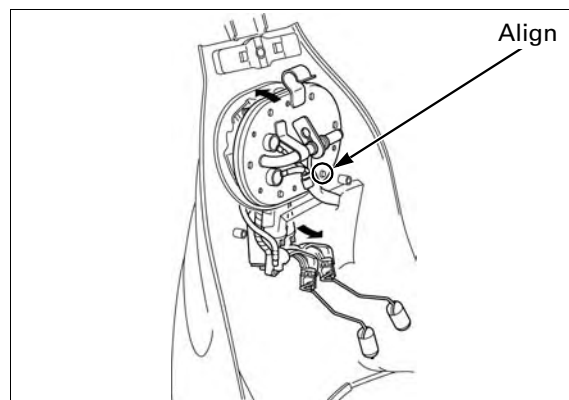
Install the fuel pump assembly as shown.



Be careful not to pinch the dirt and debris between the fuel pump and packing.

Align with the one of stud bolts and holes as shown.

Push the fuel pump assembly to mate the setting plate of the fuel pump assembly with the fuel tank.



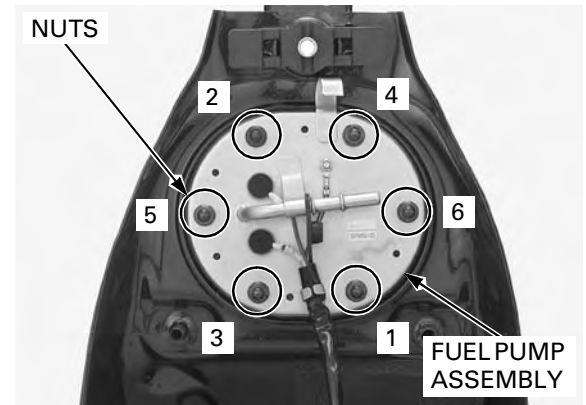
Install the fuel pump mounting nuts.

Tighten the fuel pump mounting nuts in the specified sequence as shown.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the fuel tank (page 5-61).

- If the fuel pump is replaced, check the fuel meter indication at the empty (page 20-17).
If fuel meter indicate the full position, the fuel pump installation does not correctly.



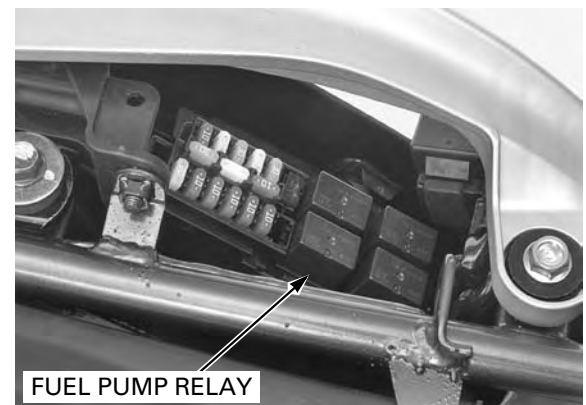
FUEL PUMP RELAY

INSPECTION

Remove the seat (page 2-4).

Turn the ignition switch OFF.

Open the fuse box and remove the fuel pump relay.



Connect the ohmmeter to the fuel pump relay connector terminals.

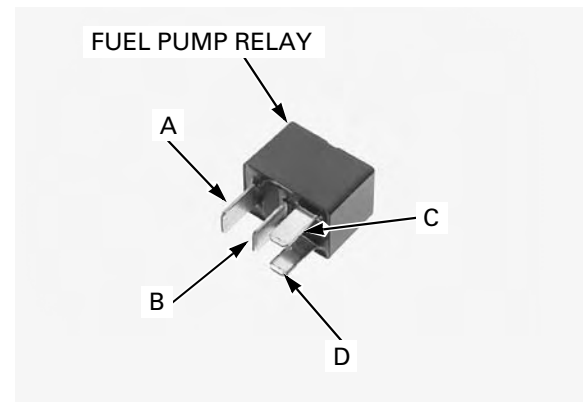
Connection: A – B

Connect the 12 V battery to the following fuel pump relay connector terminals.

Connection: C – D

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the fuel pump relay.



FUEL TANK

REMOVAL/INSTALLATION

Remove the front side cowl (page 2-9).

Remove the nut, bolt and washer.

Release the wire from fuel tank.

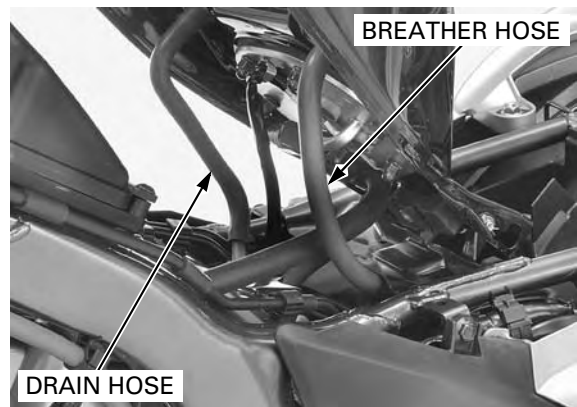


FUEL SYSTEM (PGM-FI)

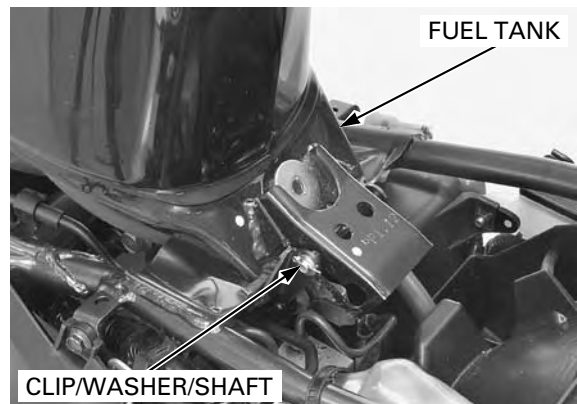
Lift and support the fuel tank (page 3-5).

Disconnect the fuel tank drain hose and breather hose.

Relieve the fuel pressure and remove the quick connect fitting (page 5-54).



Remove the clip, washer, shaft and fuel tank assembly.



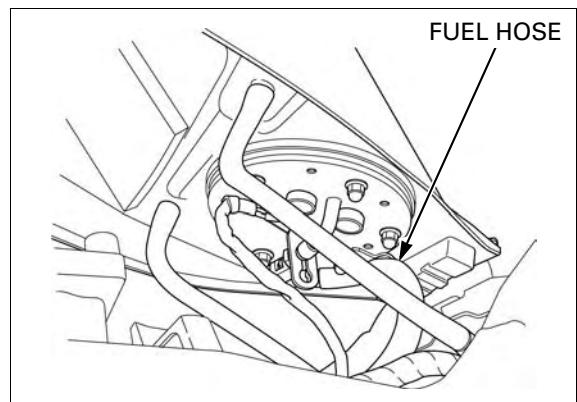
Installation is in the reverse order of removal.

While installing the fuel tank, route the wire harness properly (page 1-21).

Do not kink or bind the fuel tank drain hose and breather hose.

Clamp the fuel hose securely.

- If replace the fuel pump, check the fuel meter indication at the empty (page 20-17).
If fuel meter indicate the full position, the fuel pump installation does not correctly.



AIR CLEANER HOUSING

REMOVAL

- Be careful not to damage the hoses and pipe end.

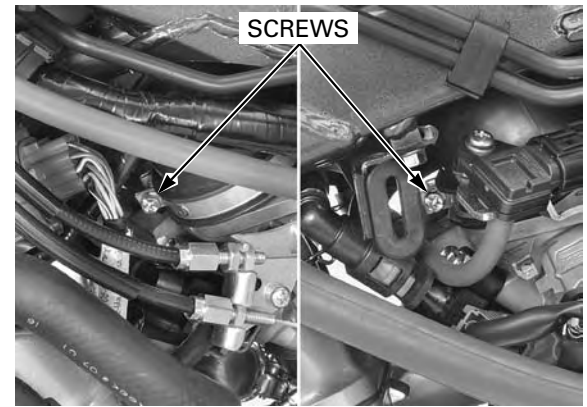
Lift and support the fuel tank (page 3-5).

Remove the wire harness cover (page 2-10).

Remove the bolt/washer.

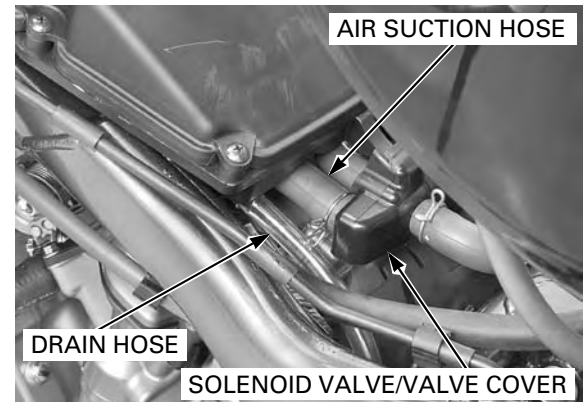


Loosen the air cleaner housing connecting tube band screws.

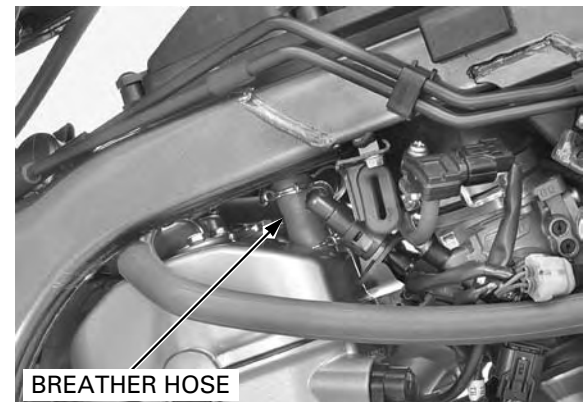


Disconnect the crankcase breather drain hose and PAIR air suction hose from the air cleaner housing.

Remove the PAIR control solenoid valve and valve cover from the air cleaner housing.



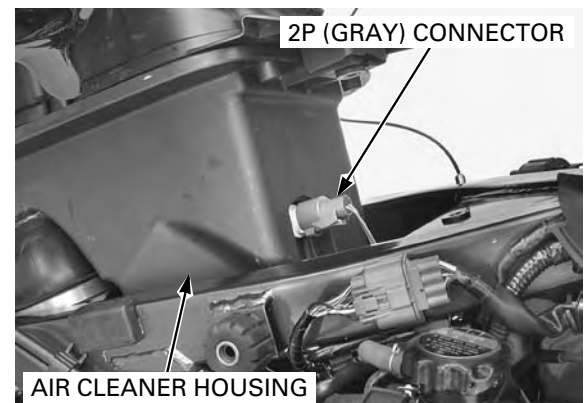
Disconnect the crankcase breather hose from air cleaner housing.



Disconnect the IAT sensor 2P (Gray) connector.

Remove the air cleaner housing.

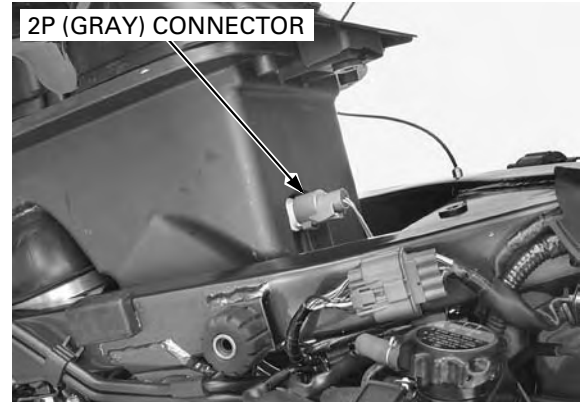
- Seal the throttle body intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the air cleaner housing has been removed. If debris is allowed to enter the ports the engine may be damaged.



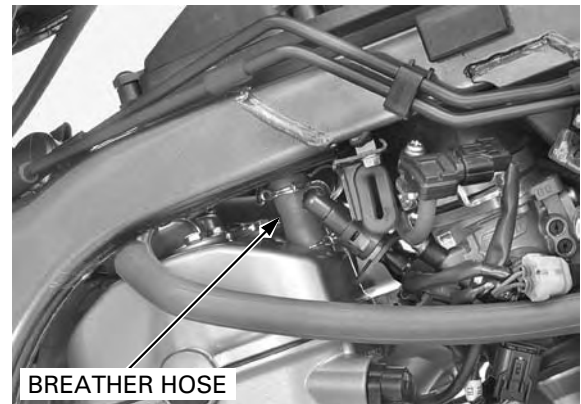
FUEL SYSTEM (PGM-FI)

INSTALLATION

Connect the IAT sensor 2P (Gray) connector.

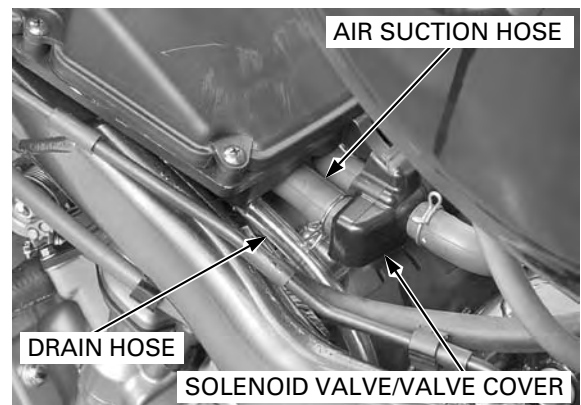


Connect the crankcase breather hose to the air cleaner housing.

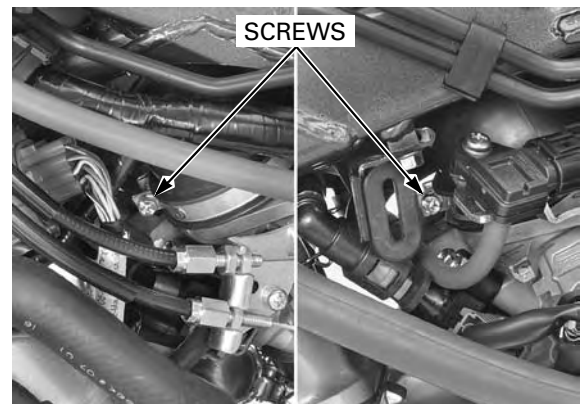


Connect the crankcase breather drain hose and PAIR air suction hose to the air cleaner housing.

Install the PAIR solenoid valve and valve cover to the air cleaner housing.



Tighten the air cleaner housing connecting tube band screws securely.



Install and tighten the bolt/washer securely.
Lower the fuel tank (page 3-5).
Install the wire harness cover (page 2-10).



THROTTLE BODY

REMOVAL

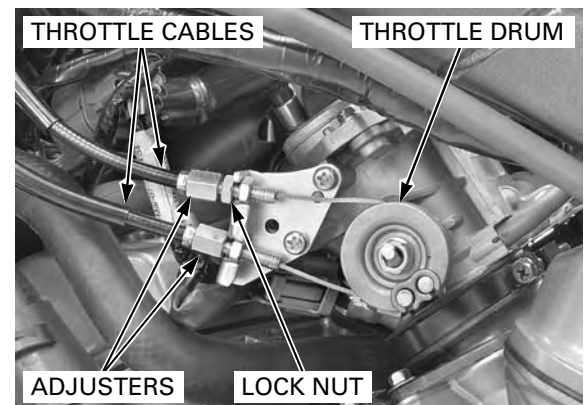
NOTE:

- 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.
- Before disconnecting the fuel hose, release the fuel pressure (page 5-54).

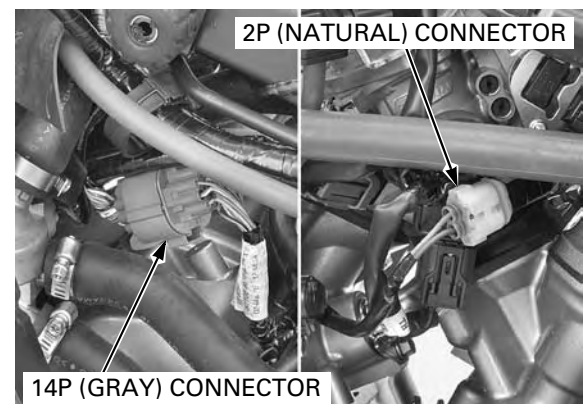
Relieve the fuel pressure and disconnect the quick connect fitting (page 5-54).

Remove the air cleaner housing (page 5-62).

Loosen the throttle cable lock nut and adjusters then disconnect the throttle cables from the throttle drum and cable bracket.



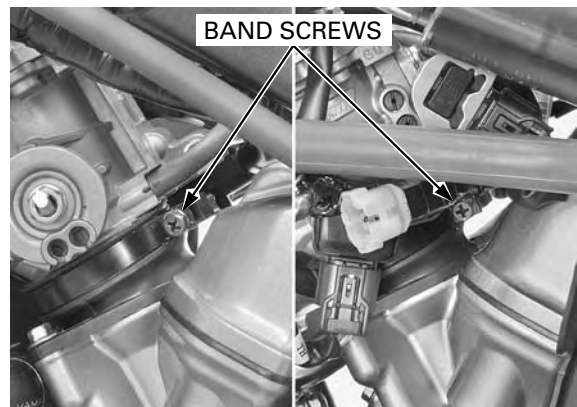
Disconnect the throttle body sub harness 14P (Gray) connector and CMP sensor 2P (Natural) connector.



FUEL SYSTEM (PGM-FI)

Loosen the insulator band screws.

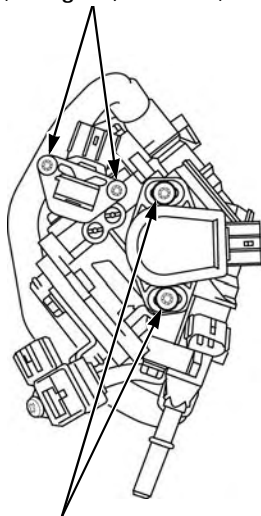
Remove the throttle body from the insulators.



NOTE:

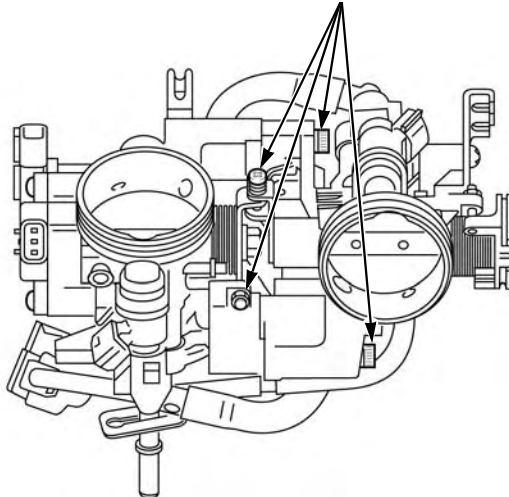
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed. If debris is allowed to enter the ports the engine may be damaged.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not 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.

2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)

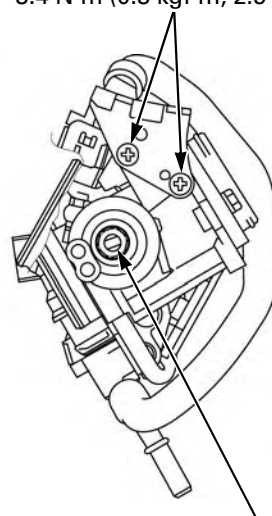


BOLTS (NOTE 1)

BOLTS/SCREWS (NOTE 1)



3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)



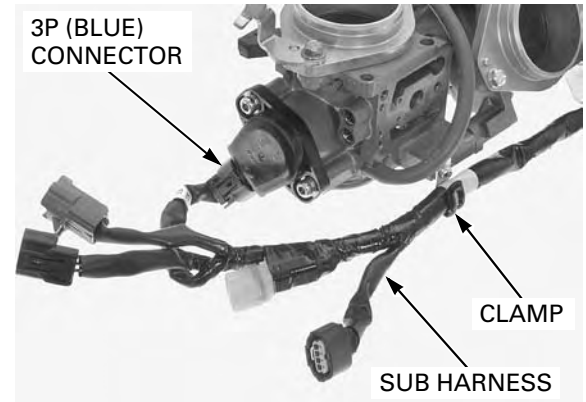
NUT (NOTE 1)

NOTE 1: Do not loosen or tighten the bolts, nut and screws of the throttle body. Loosening or tightening them can cause throttle valve and idle control failure.

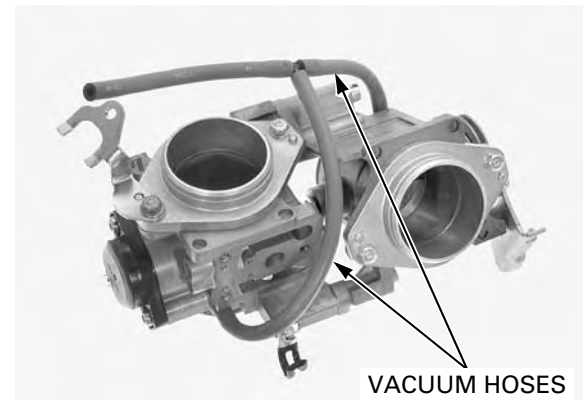
DISASSEMBLY/ASSEMBLY

Disconnect the TP sensor 3P (Blue) connector.

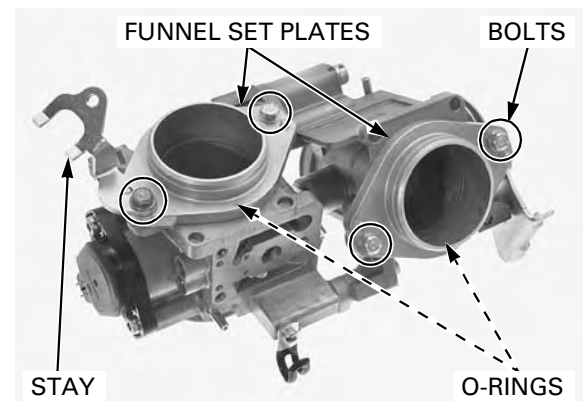
Release the throttle body sub harness from the clamp and remove it.



Disconnect the vacuum hoses.



Remove the bolts, MAP sensor stay, funnel set plates and O-rings.



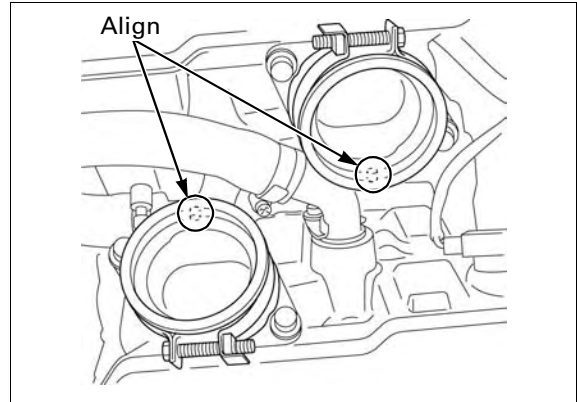
Install a new O-ring to the funnel set plate groove.
Assembly is in the reverse order of disassembly.



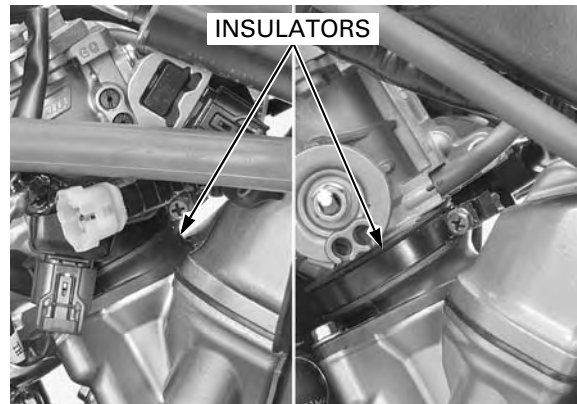
INSTALLATION

Check the insulator band angle.

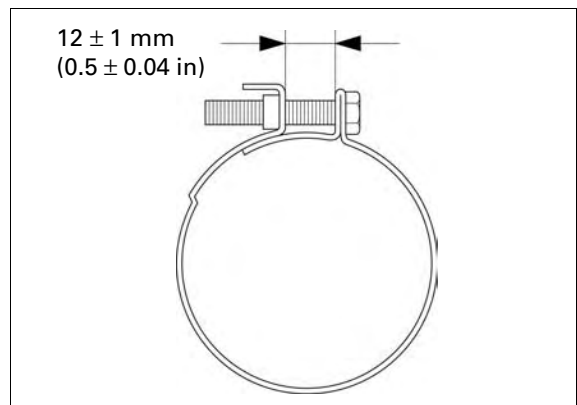
- Align the insulator band hole with the insulator boss.



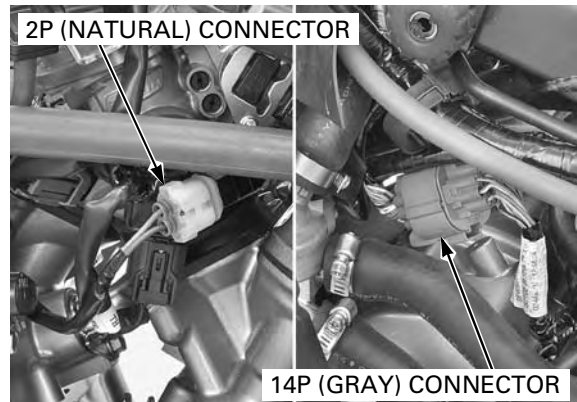
Install the throttle body to the insulators.



Tighten the insulator band screw so that the insulator band distance is 12 ± 1 mm (0.5 ± 0.04 in).



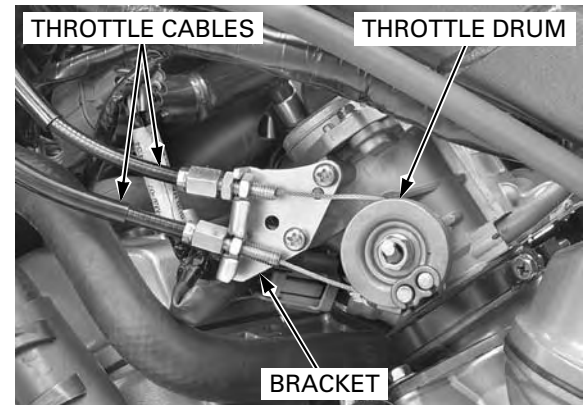
Connect the CMP sensor 2P (Natural) connector and throttle body sub harness 14P (Gray) connector.



Connect the throttle cables to the throttle drum and cable bracket.

Adjust the throttle grip freeplay (page 3-6).

Install the air cleaner housing (page 5-64).

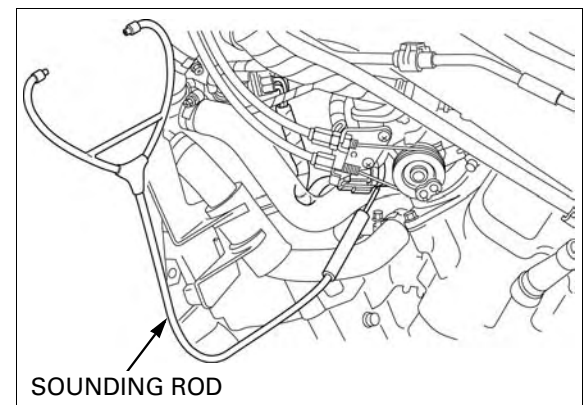


INJECTOR

INSPECTON

Start the engine and let it idle.

Confirm the injector operating sounds with a sounding rod or stethoscope.



REMOVAL

NOTE:

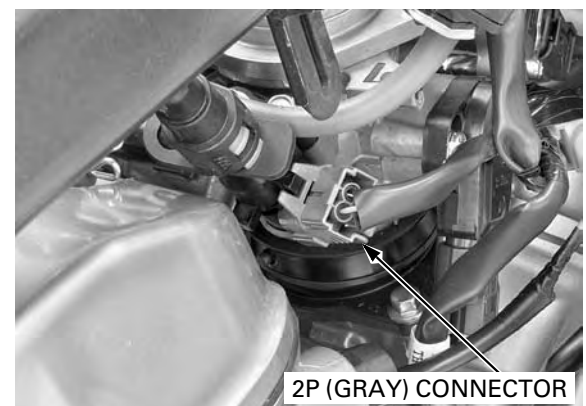
- Before disconnecting fuel feed hose, relieve pressure from the system (page 5-54).
- The fuel feed hose is made of the resin. Be careful not to bend or fold the fuel feed hose.

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-54).

Remove the air cleaner housing (page 5-62).

Clean around the injector base and fuel hose quick connector with compressed air before removing the injector, and be sure that no debris is allowed to enter into the throttle body.

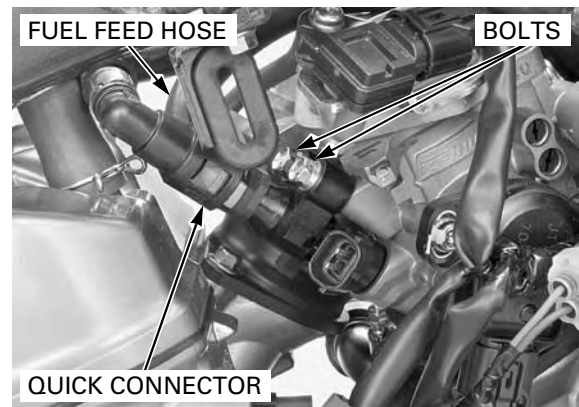
Disconnect the injector 2P (Gray) connector.



FUEL SYSTEM (PGM-FI)

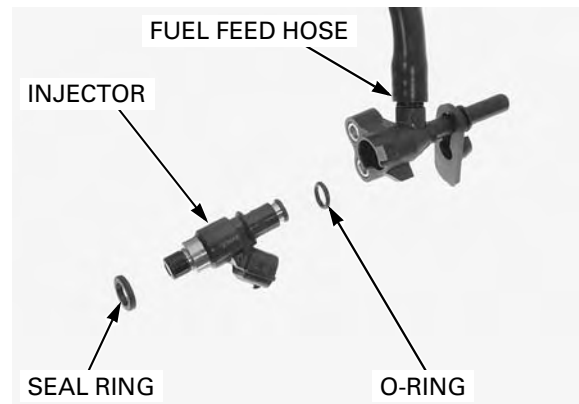
Disconnect the fuel hose quick connector (page 5-54).

Remove the bolts and fuel feed hose and injector from the throttle body.



Remove the injector from the fuel feed hose.

Remove the O-ring and seal ring.



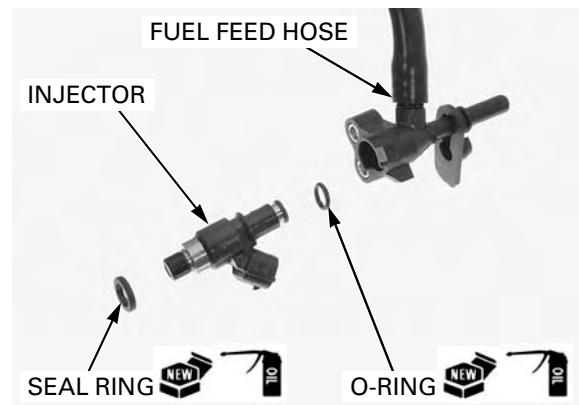
INSTALLATION

Replace the O-ring and seal ring with new ones as a set.

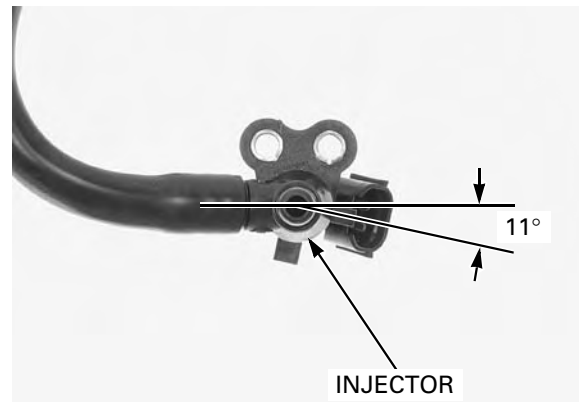
Coat a new O-ring and new seal ring with engine oil.

Install a new O-ring and new seal ring on the injector, being careful not to damage.

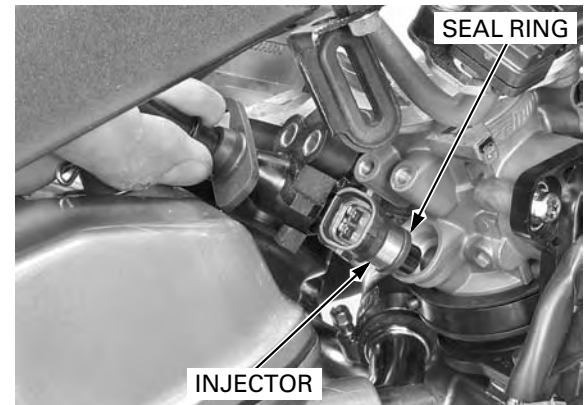
Install the injector to the fuel feed hose.



Set the injector installation angle as shown.



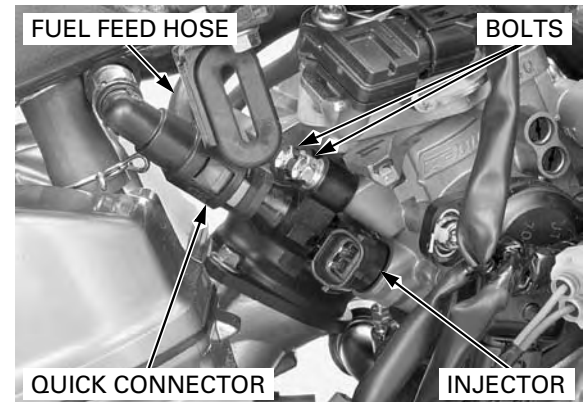
Install the injector and fuel feed hose to the throttle body, being careful not to damage the seal ring.



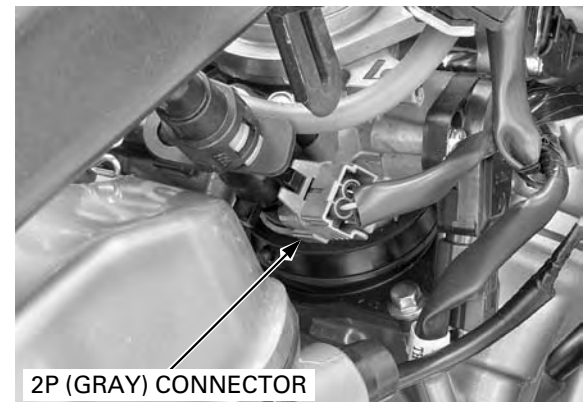
Install and tighten the bolts to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Connect the fuel hose quick connector (page 5-55).



Connect the injector 2P (Gray) connector.
Install the air cleaner housing (page 5-64).



MAP SENSOR

REMOVAL/INSTALLATION

Remove the wire harness cover (page 2-10).

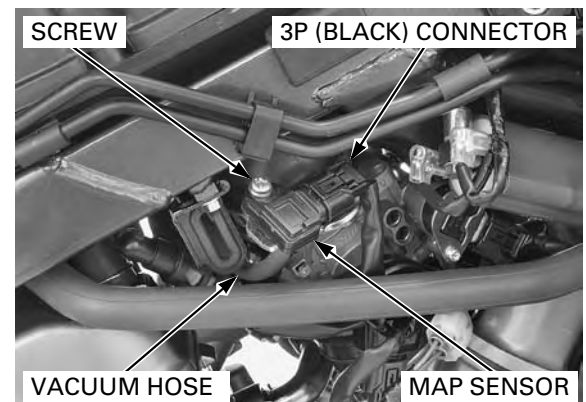
Disconnect the MAP sensor 3P (Black) connector and vacuum hose.

Remove the screw and MAP sensor.

Installation is in the reverse order of removal.

TORQUE:

MAP sensor mounting screw:
5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)



IAT SENSOR

REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-62).

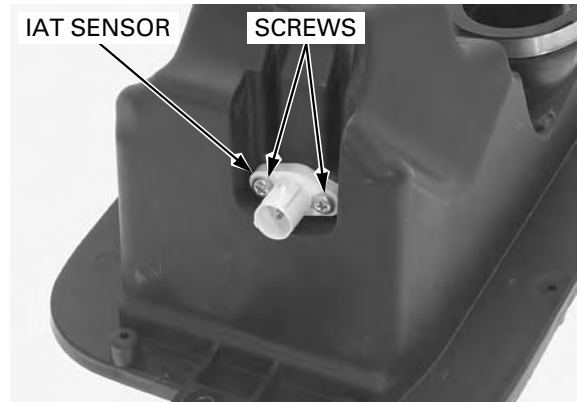
Remove the screws and IAT sensor from the air cleaner housing.

Installation is in the reverse order of removal.

TORQUE:

IAT sensor mounting screw:

4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)

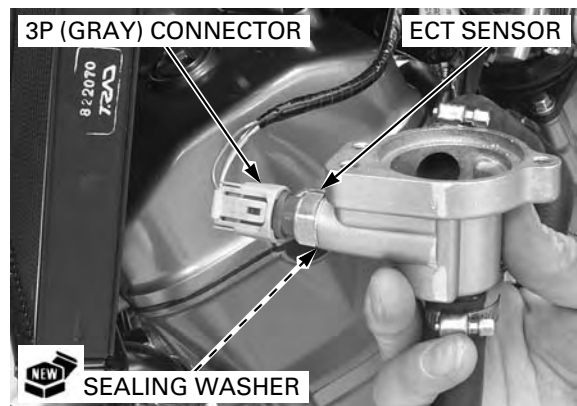


ECT SENSOR

REMOVAL

Remove the thermostat (page 6-8).

Disconnect the ECT sensor 3P (Gray) connector.
Remove the ECT sensor and sealing washer.



INSTALLATION

*Always replace a
sealing washer with
a new one.*

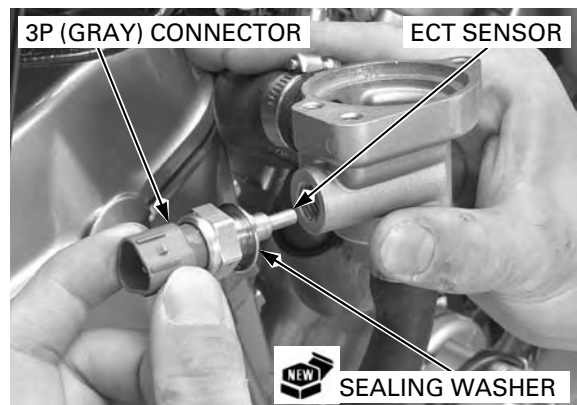
Install a new sealing washer and ECT sensor.
Tighten the ECT sensor to the specified torque.

TORQUE: 24.5 N·m (2.5 kgf·m, 18 lbf·ft)

Connect the ECT sensor 3P (Gray) connector.

Install the thermostat (page 6-9).

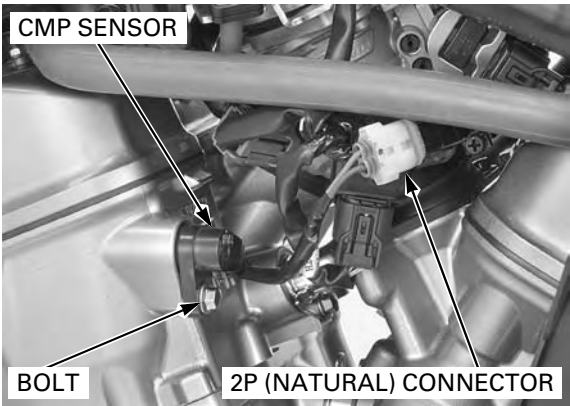
Fill the cooling system with recommended coolant
(page 6-6).



CMP SENSOR

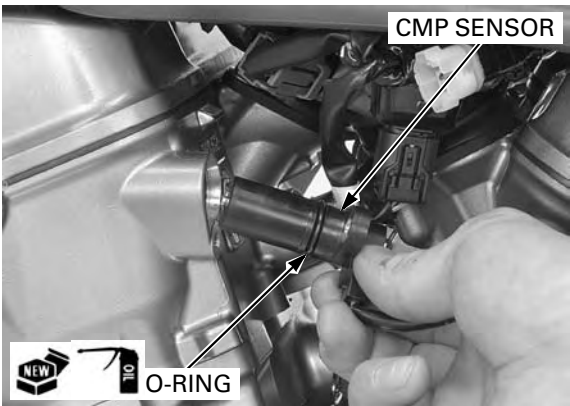
REMOVAL

Remove the right front side cowl (page 2-9).
Disconnect the CMP sensor 2P (Natural) connector.
Remove the bolt and CMP sensor.



INSTALLATION

Apply engine oil to a new O-ring and install it onto the CMP sensor.
Install the CMP sensor into the rear cylinder head.
Install and tighten the bolt securely.
Connect the CMP sensor 2P (Natural) connector.
Install the right front side cowl (page 2-9).



BANK ANGLE SENSOR

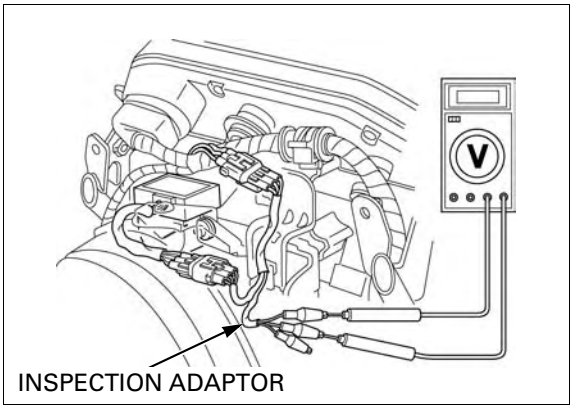
INSPECTION

Hold the motorcycle in an upright position.
Remove the front center cowl (page 2-12).
Disconnect the bank angle sensor 3P (Black) connector and connect the inspection adaptor.

TOOL:
Inspection adaptor **07GMJ-ML80100**

Turn the ignition switch ON and engine stop switch "O".
Measure the voltage between the test harness terminals.

CONNECTION	STANDARD
White clip (+) – Red clip (–)	Battery voltage
Red clip (+) – Green clip (–)	0 – 1 V



FUEL SYSTEM (PGM-FI)

Turn the ignition switch OFF.

Remove the headlight (page 20-6).

Do not disconnect the bank angle sensor connector during inspection.

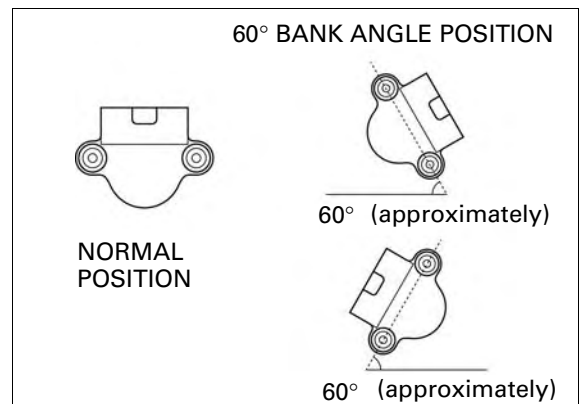
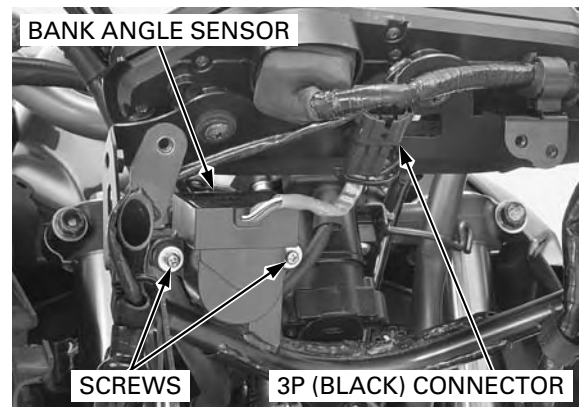
Remove the screws and bank angle sensor.

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

If you check this test, the ignition switch "OFF", then turn the ignition switch "ON" and engine stop switch "O".

Place the bank angle sensor in normal position as shown, and ignition switch ON and engine stop switch "O" then bank angle sensor is normal if the engine stop relay clicks and power supply is closed.

Incline the bank angle sensor approximately 60° to the left or right with keep the ignition switch ON and engine stop switch "O" then bank angle sensor is normal if the engine stop relay clicks and power supply is open.



REMOVAL/INSTALLATION

Remove the headlight (page 20-6).

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

Remove the screws and bank angle sensor.

Route the sensor wire properly (page 1-21).

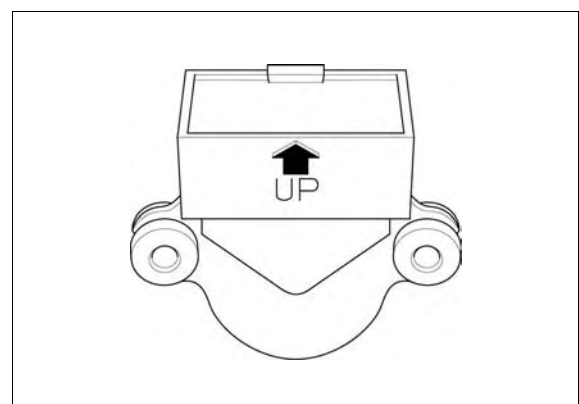
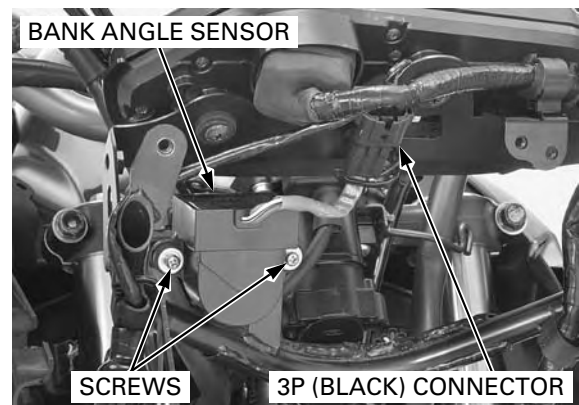
Install the bank angle sensor with its "UP" mark facing up.

Tighten the mounting screws to the specified torque.

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

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

Install the headlight (page 20-6).

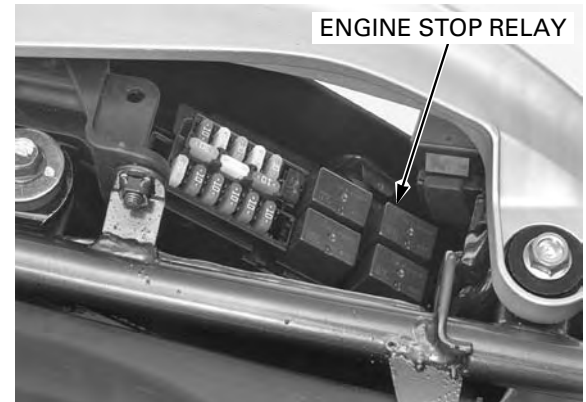


ENGINE STOP RELAY

INSPECTION

Remove the seat (page 2-4).

Open the fuse box and remove the engine stop relay.



Connect the ohmmeter to the relay connector terminals.

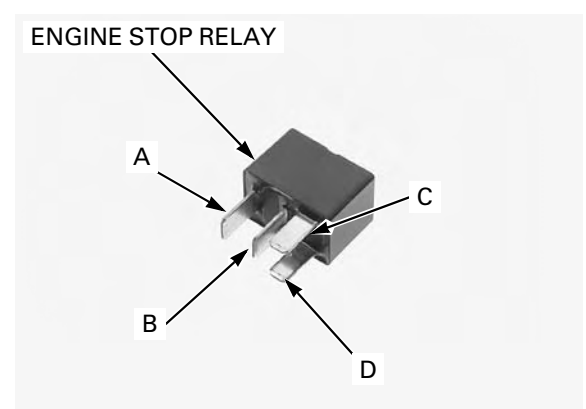
Connection: A – B

Connect the 12 V battery to the following relay connector terminals.

Connection: C – D

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the relay.



ECM

POWER/GROUND LINE INSPECTION

ENGINE DOES NOT START (MIL NO BLINKS)

1. ECM Power Input Voltage Inspection

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

Disconnect the ECM 33P connectors (page 5-77).

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

Measure the voltage between the ECM 33P (Black) connector and ground.

Connection: A4 (+) – Ground (–)

TOOL:

Test probe

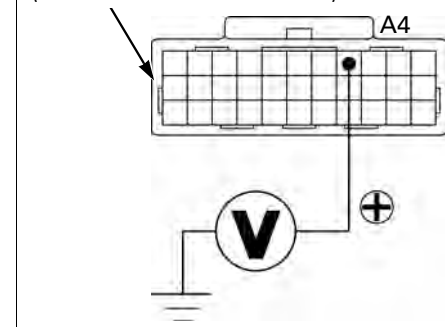
07ZAJ-RDJA110

Is there the battery voltage?

YES – GO TO STEP 2.

NO – GO TO STEP 3.

ECM 33P (BLACK) CONNECTOR
(Wire side/female terminal)



FUEL SYSTEM (PGM-FI)

2. ECM Ground Line Inspection

Turn the ignition switch OFF.
Check for continuity between the ECM 33P connectors and ground.

Connection: A23 – Ground
A24 – Ground
B4 – Ground

TOOL:

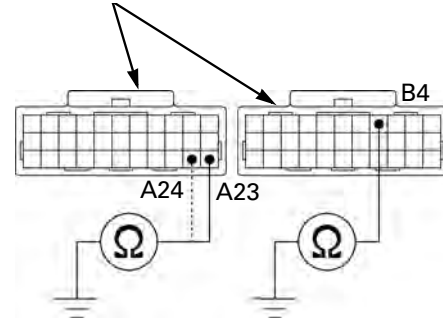
Test probe 07ZAJ-RDJA110

Is there continuity?

YES – Replace the ECM with a new one, and recheck; for Key Registration Procedures (page 21-4).

NO – Open circuit in Green line

ECM 33P CONNECTORS
(Wire side/female terminal)



3. Engine Stop Relay Inspection 1

Turn the ignition switch OFF.
Remove the seat (page 2-4).
Open the fuse box and remove the engine stop relay.

Turn the ignition switch ON and engine stop switch "O".
Measure the voltage at the engine stop relay terminal of the wire harness side.

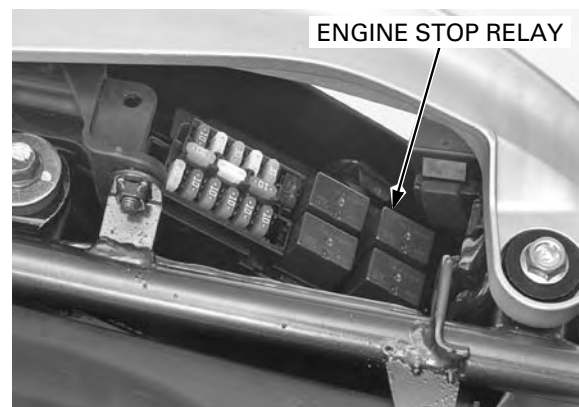
Connection: Black (+) – Red/white (–)

Is there battery voltage?

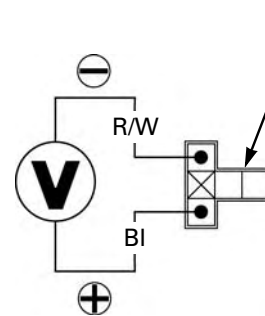
NO –

- Inspect the bank angle sensor (page 5-73).
- Inspect the engine stop switch (page 20-21).
- Inspect the ignition switch (page 20-20).
- Blown fuse (MAIN 30 A)
- Blown fuse (BANK ANGLE 10 A)

YES – GO TO STEP 4.



RELAY TERMINAL



4. Engine Stop Relay Inspection 2

Turn the ignition switch OFF.
Jump the engine stop relay connector terminals.

Connection: Black/white – Red/blue

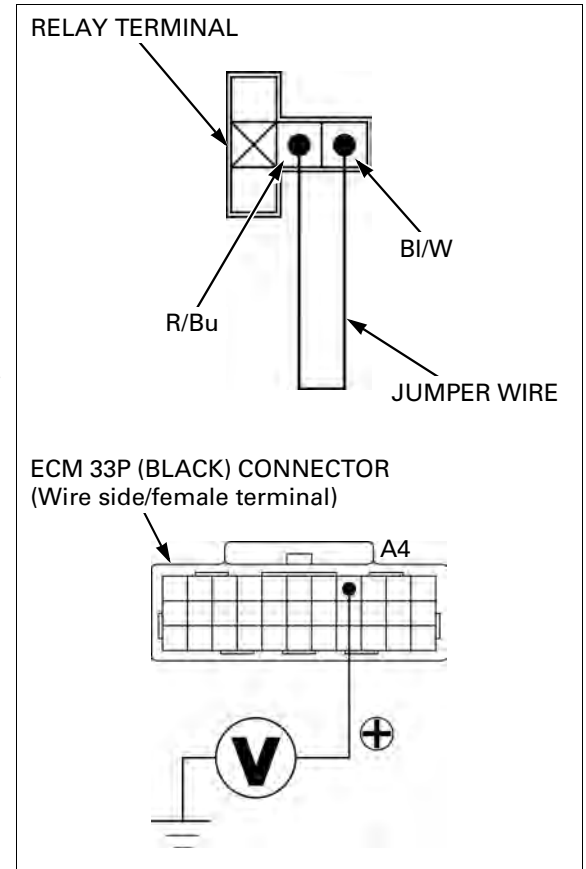
Turn the ignition switch ON and engine stop switch "O".
Measure the voltage at the ECM 33P connector and ground.

Connection: A4 (+) – Ground (–)

Is there the battery voltage?

YES – Inspect the engine stop relay (page 5-75).

NO – Open circuit in power input line (Black/white, Red/blue or Red/green) between the battery and the ECM.



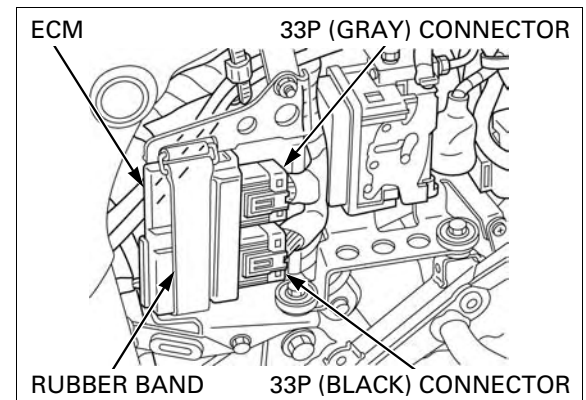
REMOVAL/INSTALLATION

EXCEPT E, F TYPE

Remove the left side cover (page 2-4).

Disconnect the ECM 33P connectors.
Remove the rubber band and the ECM.

Installation is in the reverse order of removal.



FUEL SYSTEM (PGM-FI)

E, F TYPE

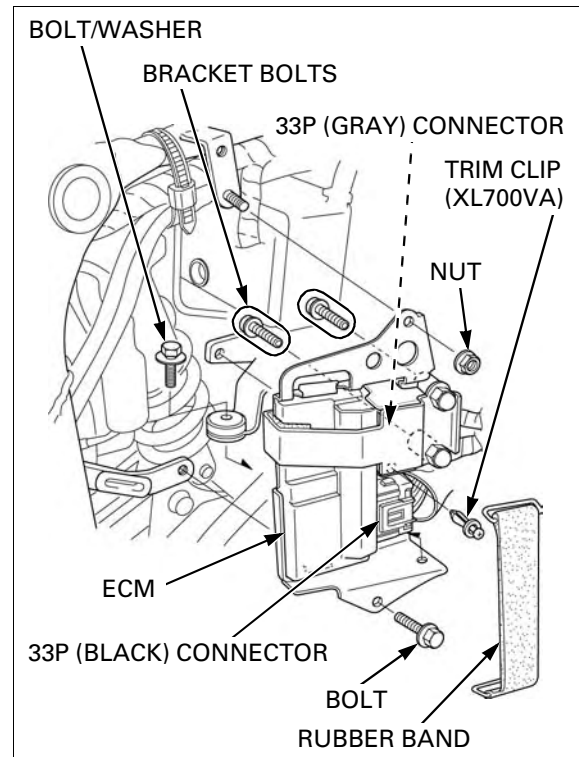
Remove the left side cover (page 2-4).

Remove the following:

- Rubber band
- Trim clip (XL700VA)
- Bolt
- Nut
- Bolt/washer

Remove the ECM bracket bolts and ECM bracket. Disconnect the ECM 33P connectors and remove the ECM.

Installation is in the reverse order of removal.



ENGINE IDLE SPEED

IDLE SPEED INSPECTION

NOTE:

- Inspect the idle speed after all other engine maintenance items have been performed and are within specifications.
- Before checking the idle speed, inspect following items.
 - No DTC and MIL blinking.
 - Spark plug condition (page 3-8).
 - Air cleaner condition (page 3-7).
- The engine must be warm for accurate idle speed inspection.
- This system eliminates the need for manual idle speed adjustment from the previous designs.
- Use a tachometer with graduations of 50 min⁻¹ (rpm) or smaller that will accurately indicate a 50 min⁻¹ (rpm) change.

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

Stop the engine and connect a tachometer according to the tachometer manufacturer's operating instructions.

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

ENGINE IDLE SPEED: 1,200 ± 100 min⁻¹ (rpm)

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

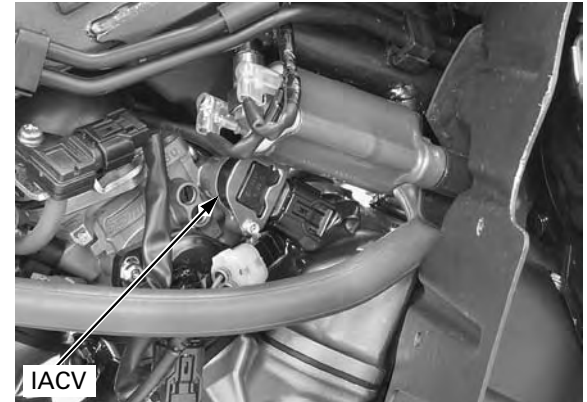
- Throttle operation and throttle grip freeplay (page 3-6).
- Intake air leak or engine top-end problem (page 8-5).
- IACV operation (page 5-79).

IACV

INSPECTION

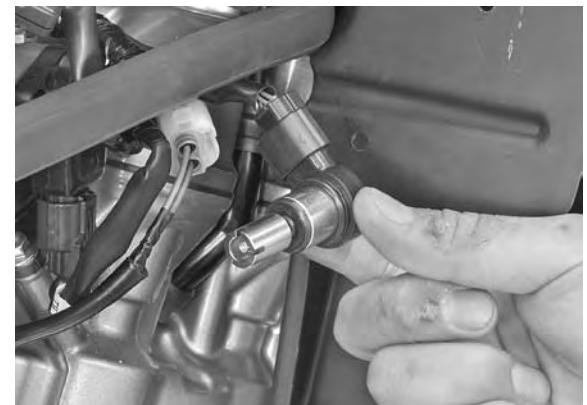
The IACV is installed on the throttle body and is operated by the step motor. When the ignition switch is turned ON, the IACV operates for a few seconds.

Check the step motor operating (beep) sound with the ignition switch turned ON.



The IACV operation can be checked visually as follows:

1. Remove the IACV (page 5-79).
2. Connect the IACV 4P (Black) connector.
3. Turn the ignition switch ON.

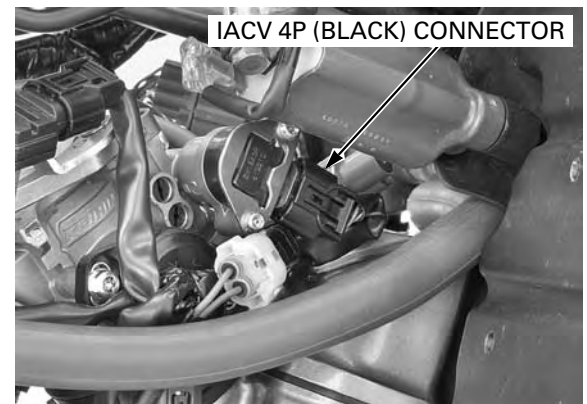


REMOVAL

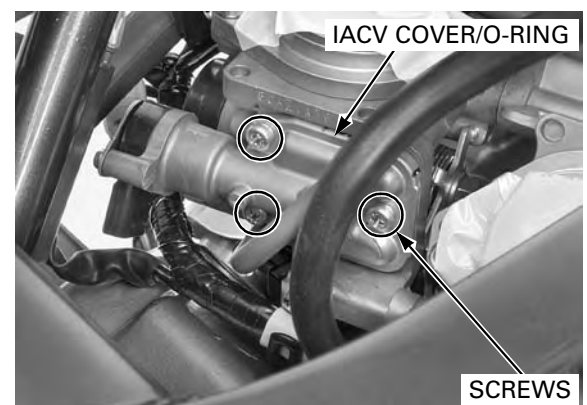
- Always clean the throttle body before the IACV removal to prevent dirt and debris from entering the IACV passage.

Remove the air cleaner housing (page 5-62).

Disconnect the IACV 4P (Black) connector.

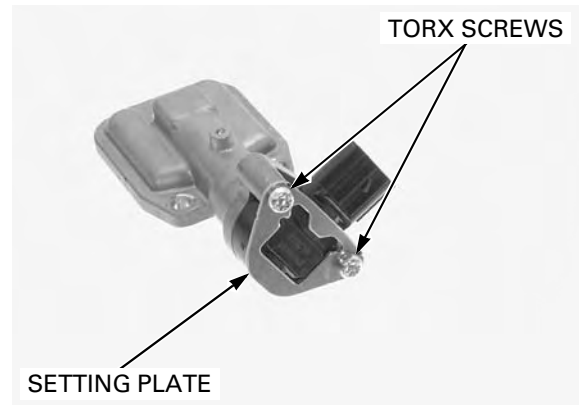


Remove the screws, IACV cover and O-ring.



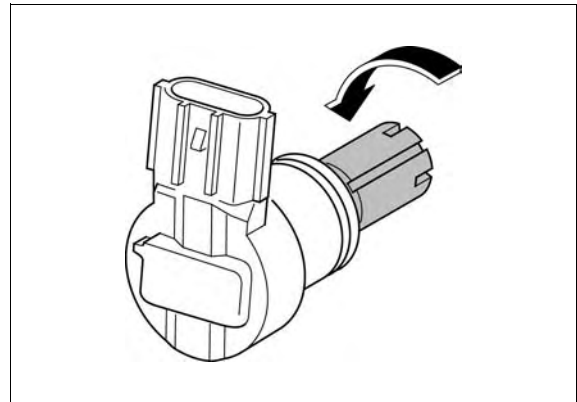
FUEL SYSTEM (PGM-FI)

Remove the torx screws, setting plate and IACV.
Check the IACV for wear or damage.
If necessary, replace the IACV with a new one.

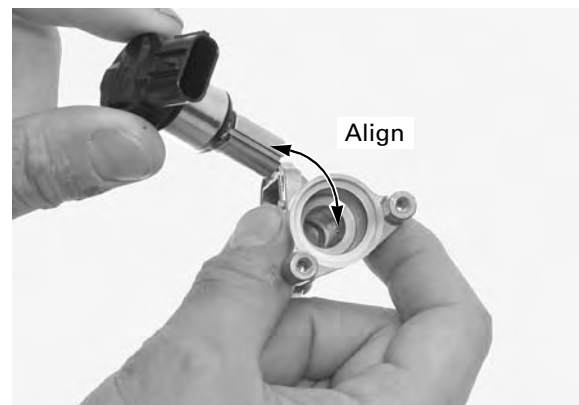


INSTALLATION

Turn the slide valve clockwise until lightly seated on IACV.

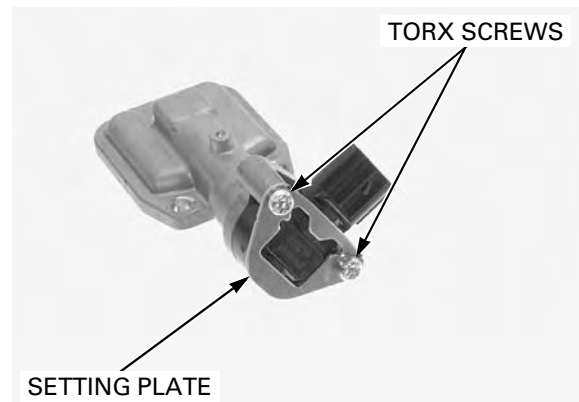


Install the IACV aligning its groove with the IACV cover pin.

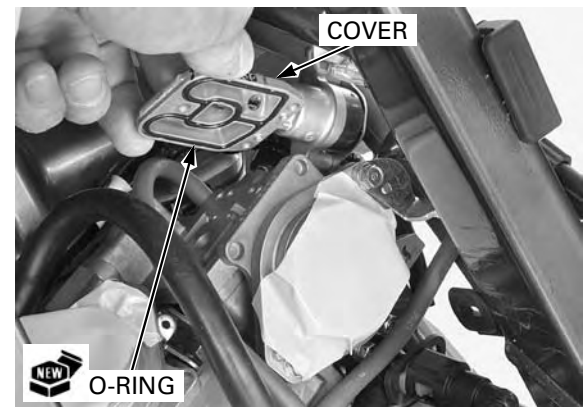


Install the setting plate and tighten the torx screws to the specified torque.

TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)

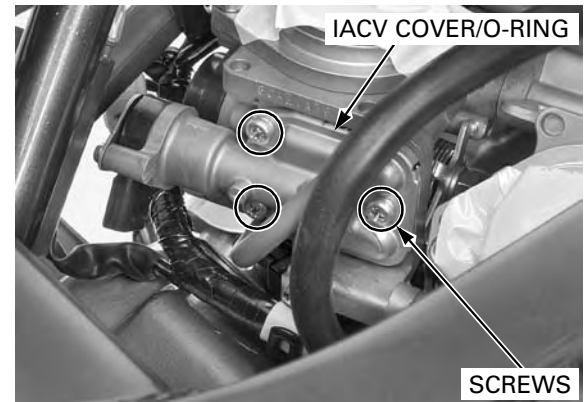


Install a new O-ring to the IACV cover groove.



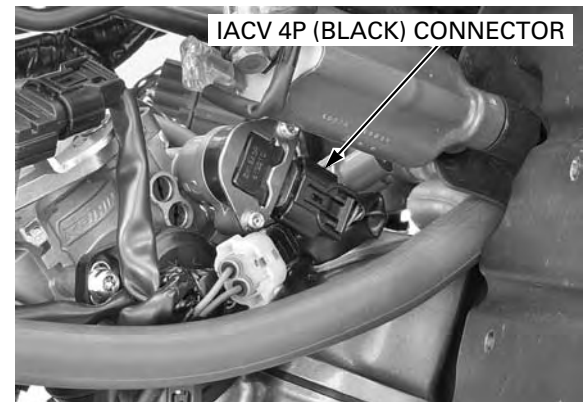
Install the IACV cover and tighten the screws to the specified torque.

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



Connect the IACV 4P (Black) connector.

Install the air cleaner housing (page 5-64).



SECONDARY AIR SUPPLY SYSTEM

SYSTEM INSPECTION

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

Stop the engine.

Remove the air cleaner element (page 3-7).

Check that the secondary air intake port is clean and free of carbon deposits.

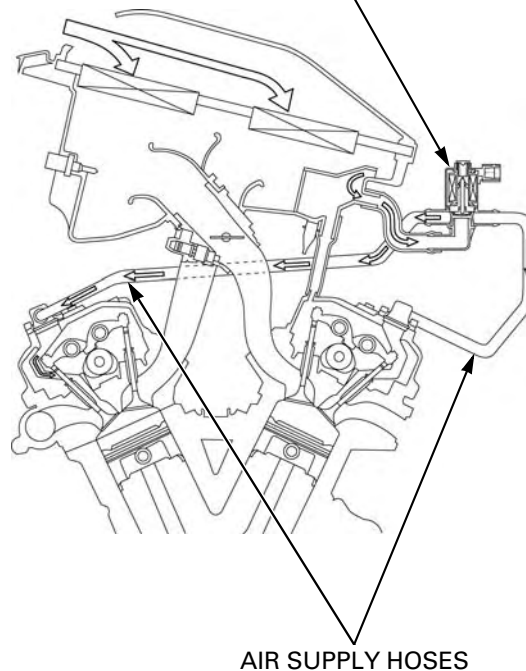
Check the PAIR check valve if the port is carbon fouled (page 5-83).



FUEL SYSTEM (PGM-FI)

Start the engine and open the throttle slightly to be certain that air is sucked in through the air intake port.
If the air is not drawn in, check the air supply hoses for clogs and the PAIR control solenoid valve (page 5-82).

PAIR CONTROL SOLENOID VALVE



PAIR CONTROL SOLENOID VALVE

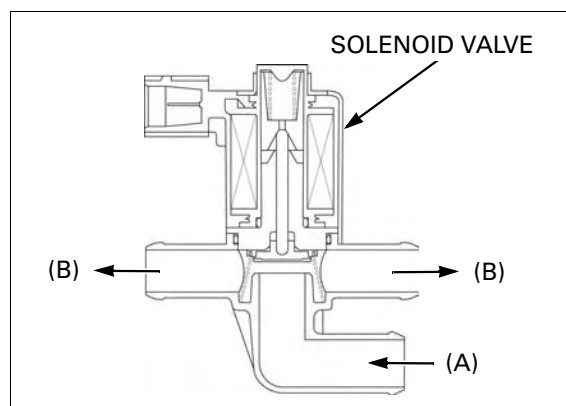
INSPECTION

Remove the PAIR control solenoid valve (page 5-83).

Check that air does not flow (A) to (B) when a 12 V battery is connected to the PAIR control solenoid valve terminals. Air should flow (A) to (B) when there is no voltage applied to the PAIR valve terminals.

Connection: Black/white (+) – Orange/black (–)

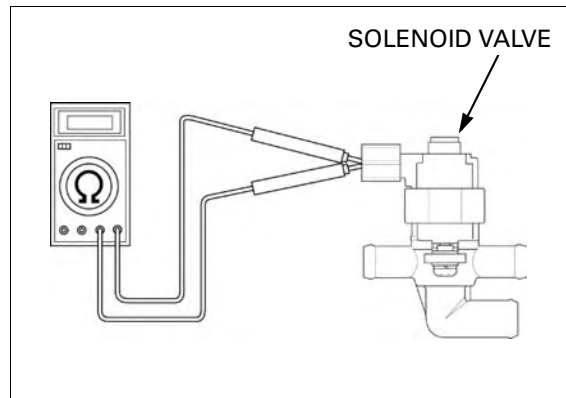
Air should not flow when the battery is connected.



Measure the resistance between the PAIR control solenoid valve 2P (Black) connector terminals.

STANDARD: 23 – 27 Ω (20°C/68°F)

If it is out of the standard, replace the PAIR solenoid valve.



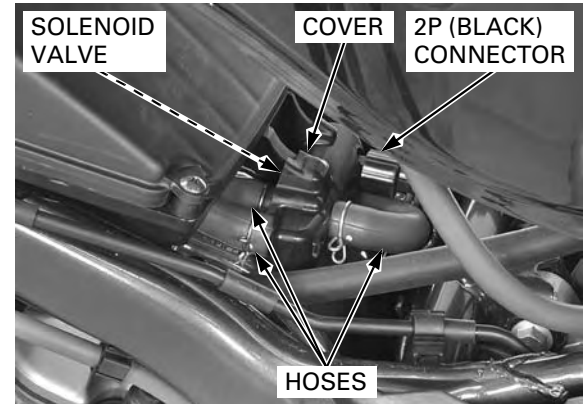
REMOVAL/INSTALLATION

Lift and support the fuel tank (page 3-5).

Disconnect the air suction hose and air supply hoses from the solenoid valve.

Disconnect the solenoid valve 2P (Black) connector. Remove the solenoid valve cover and solenoid valve from the air cleaner housing.

Installation is in the reverse order of removal.



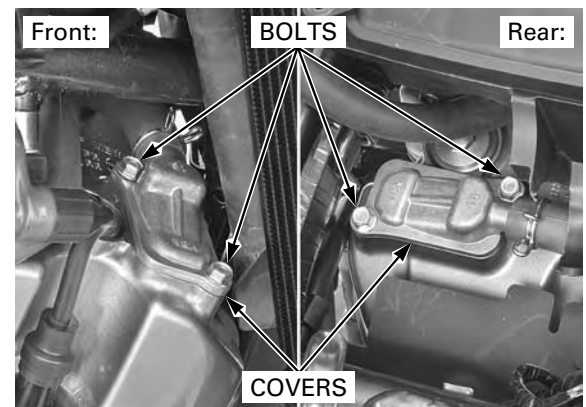
PAIR CHECK VALVE

INSPECTION

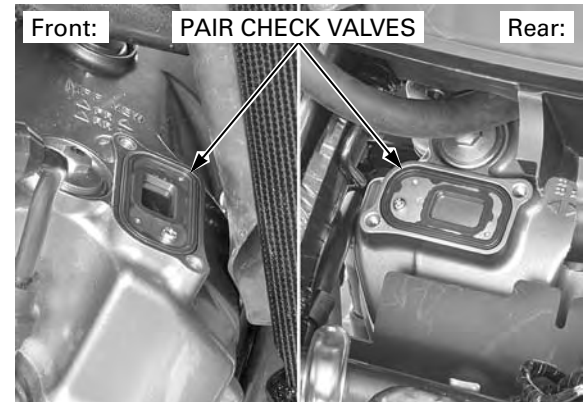
Front: Remove the cooling fan (page 6-11).

Rear: Remove the PAIR control solenoid valve (page 5-83).

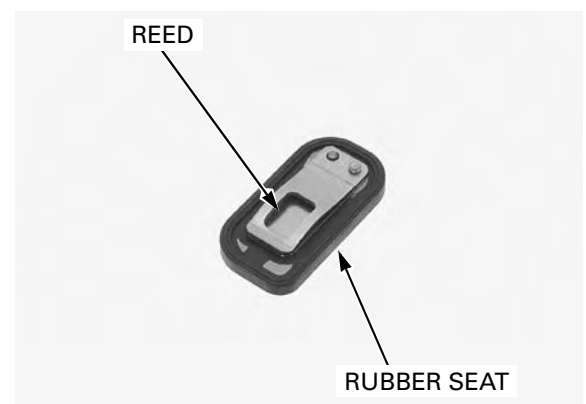
Remove the bolts and PAIR check valve cover.



Remove the PAIR check valve from the cylinder head cover.

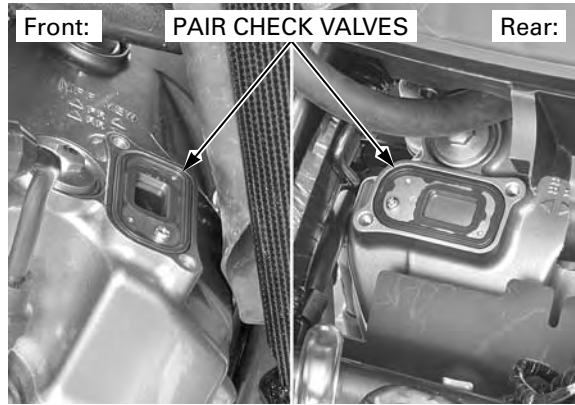


Check the reed for damage or fatigue. Replace the PAIR check valve if necessary. Replace the PAIR check valve if the rubber seat is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.



FUEL SYSTEM (PGM-FI)

Install the PAIR check valve to the cylinder head cover.

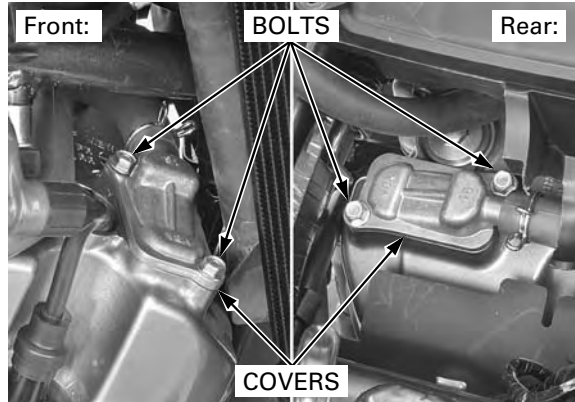


Install the PAIR check valve cover.
Install and tighten the bolts to the specified torque.

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

Front: Install the cooling fan (page 6-13).

Rear: Install the PAIR control solenoid valve (page 5-83).



O₂ SENSOR

REMOVAL

- Handle the O₂ sensor with care.
- Do not get grease, oil or other materials in the O₂ sensor air hole.
- Do not use an impact wrench while removing or installing the O₂ sensor.
- Be careful not to damage the sensor wire.

*Do not service the
O₂ sensor while it is
hot.*

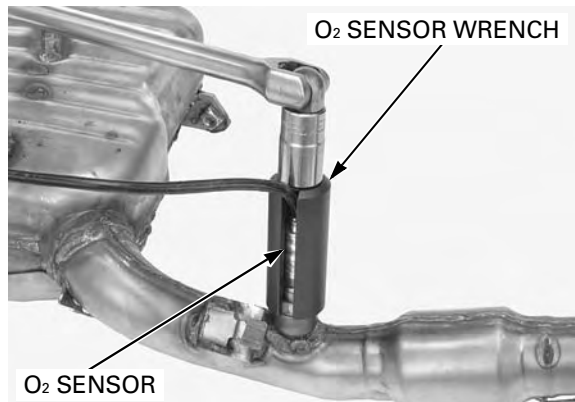
Remove the exhaust system (page 2-14).

Remove the O₂ sensor using the special tool.

TOOL:

O₂ sensor wrench

07LAA-PT50101



INSTALLATION

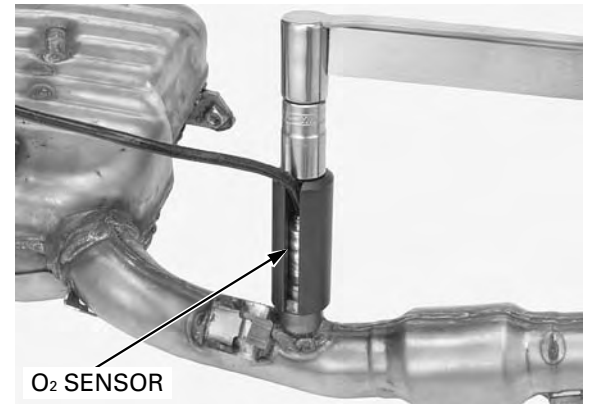
Install the O₂ sensor and tighten it to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)

TOOL:

O₂ sensor wrench **07LAA-PT50101**

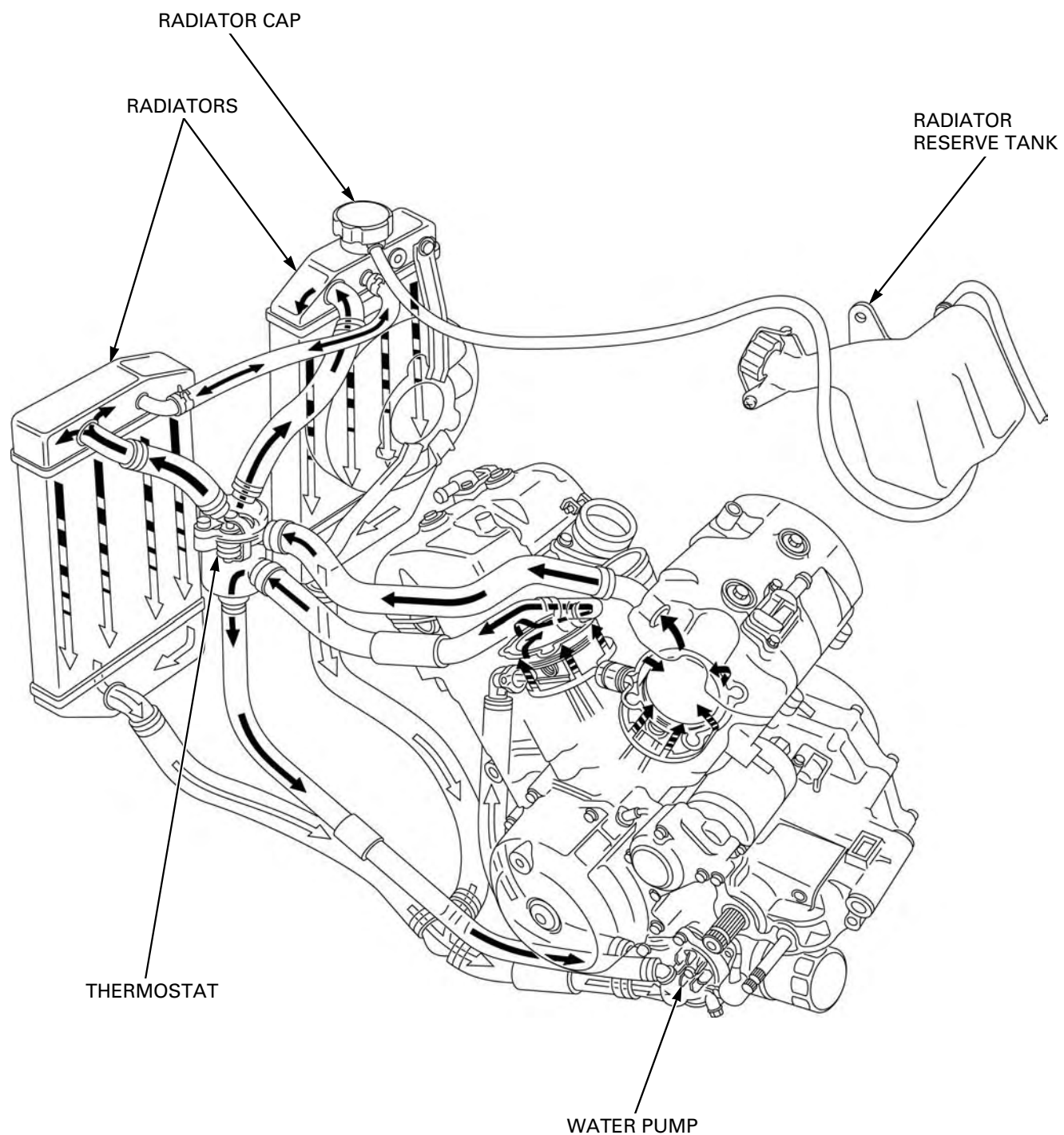
Install the exhaust system (page 2-18).



MEMO

SYSTEM FLOW PATTERN	6-2	THERMOSTAT HOUSING.....	6-10
SERVICE INFORMATION	6-3	RADIATOR	6-10
TROUBLESHOOTING	6-4	COOLING FAN	6-11
SYSTEM TESTING.....	6-5	FAN MOTOR RELAY	6-13
COOLANT REPLACEMENT	6-6	WATER PUMP	6-14
THERMOSTAT	6-8	RADIATOR RESERVE TANK	6-16

SYSTEM FLOW PATTERN



SERVICE INFORMATION

GENERAL

⚠ WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

- If any coolant gets in your eyes, rinse them with water and consult a physician immediately.
- If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
- If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.

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 service 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.
- Refer to the ECT sensor inspection (page 20-14).

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.35 liters (2.48 US qt, 2.07 Imp qt)
	Reserve tank	0.6 liter (0.63 US qt, 0.53 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum at 95°C (203°F)
Recommended antifreeze		High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

TORQUE VALUES

Water pump cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	CT bolt
Thermostat housing cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Water hose band screw	–	See page 6-10
Fan motor mounting nut	5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)	
Cooling fan nut	2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)	Apply a locking agent.
Fan motor assembly mounting bolt	8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)	
Water pump drain bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	CT bolt

COOLING SYSTEM

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature indicator
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty water pump
- Faulty fan motor relay
- Blown fuse (FAN MOTOR 20 A)

Engine temperature too low

- Thermostat stuck open
- Faulty fan motor relay

Coolant leaks

- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hoses

SYSTEM TESTING

COOLANT (HYDROMETER TEST)

Remove the right front side cowl (page 2-9).

Remove the radiator cap.



Test the coolant specific gravity using a hydrometer.

STANDARD COOLANT CONCENTRATION:

1:1 (distilled water and the recommended antifreeze)

Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

		Coolant temperature °C (°F)										
		0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
Coolant ratio %	5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
	10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
	15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
	20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
	25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
	30	1.053	1.052	1.051	1.047	1.046	1.045	1.043	1.041	1.038	1.035	1.032
	35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
	40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
	45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
	50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
	55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
	60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

COOLING SYSTEM

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

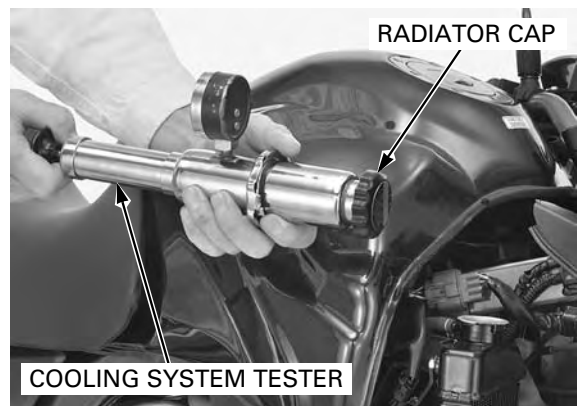
Remove the radiator cap (page 6-5).

Wet the sealing surfaces of the cap, then install the cap onto the tester.

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:

108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)



Pressurize the radiator, engine and hoses using the tester, and check for leaks.

NOTICE

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

Repair or replace components if the system will not hold the specified pressure for at least 6 seconds.

Remove the tester and install the radiator cap.



COOLANT REPLACEMENT

PREPARATION

NOTE:

The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.

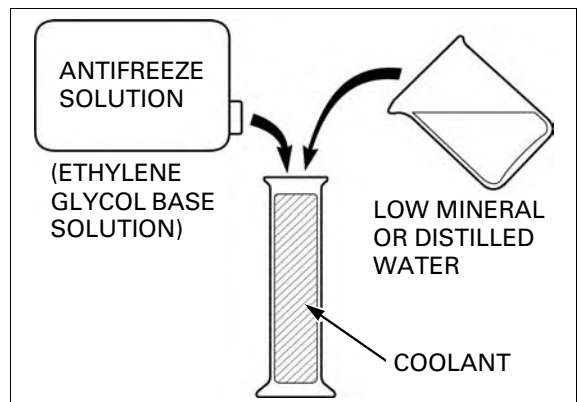
Mix only distilled, low mineral water with the recommended antifreeze.

RECOMMENDED ANTIFREEZE:

High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

RECOMMENDED MIXTURE:

1:1 (mixture with distilled water)



REPLACEMENT/AIR BLEEDING**NOTE:**

When filling the system or reserve tank with coolant, or checking the coolant level, hold the motorcycle in an upright position.

Remove the following:

- Right front side cowl (page 2-9)
- Under cowl (page 2-13)

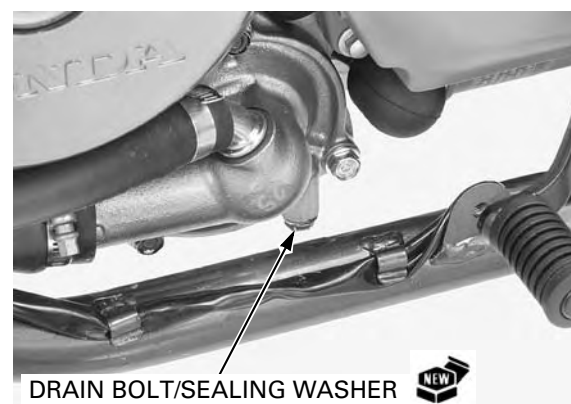
Remove the radiator cap.



Drain the coolant from the system by removing the drain bolt and sealing washer.

Reinstall the drain bolt with a new sealing washer and tighten it to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)

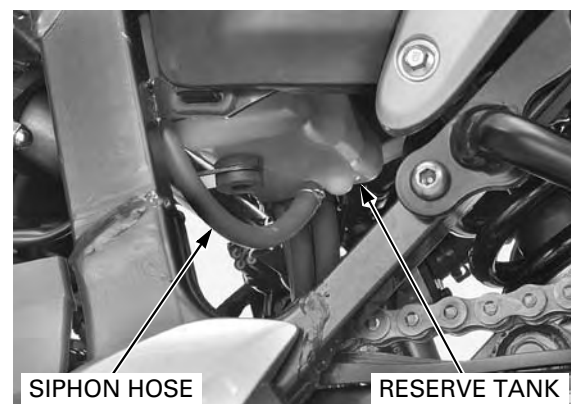


Disconnect the siphon hose from the reserve tank and drain the coolant.

Empty the coolant by removing the reserve tank (page 6-16).

Rinse the inside of the reserve tank with water.

Install the reserve tank (page 6-16).



Fill the system with the recommended coolant through the filler opening up to the filler neck.



COOLING SYSTEM

Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.

Bleed air from the system as follows:

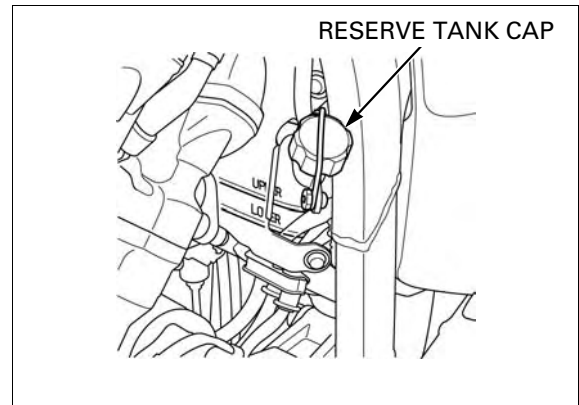
1. Shift the transmission into neutral.
Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle three to four times to bleed air from the system.
3. Stop the engine and add coolant up to the filler neck.
4. Install the radiator cap.

Install the radiator reserve tank cap.

After installation, check that there are no coolant leaks.

Install the following:

- Under cowl (page 2-13)
- Right front side cowl (page 2-9)



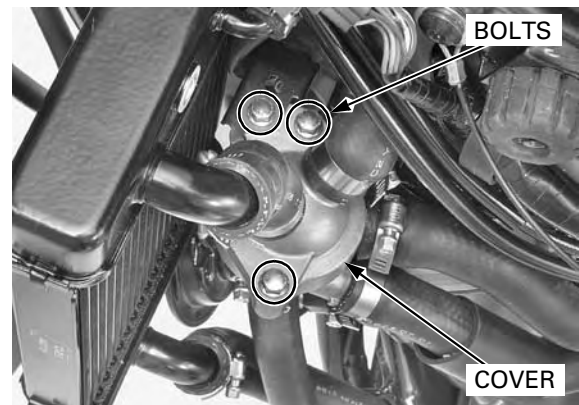
THERMOSTAT

REMOVAL

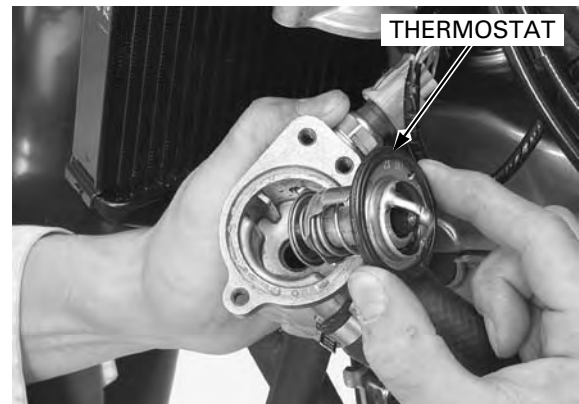
Remove the left air guard (page 2-10).

Drain the coolant by removing the water pump drain bolt (page 6-7).

Place a shop towel under the thermostat housing.
Remove the bolts and thermostat cover.

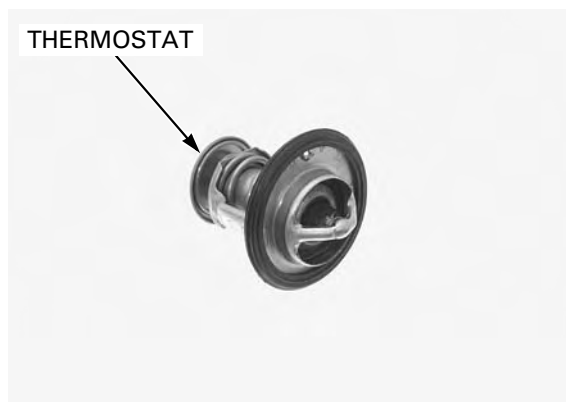


Remove the thermostat.



THERMOSTAT INSPECTION

Visually inspect the thermostat for damage.
Replace the thermostat if the valve stays open at room temperature.



Wear insulated gloves and adequate eye protection. Keep flammable materials away from the electric heating element.

Do not let the thermostat or thermometer touch the pan, or you will get false readings.

Heat a container of water with an electric heating element for 5 minutes.
Suspend the thermostat in the heated water to check its operation.

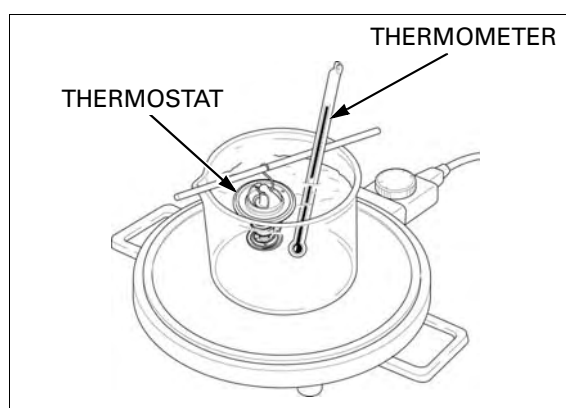
THERMOSTAT BEGINS TO OPEN:

80 – 84 °C (176 – 183 °F)

VALVE LIFT:

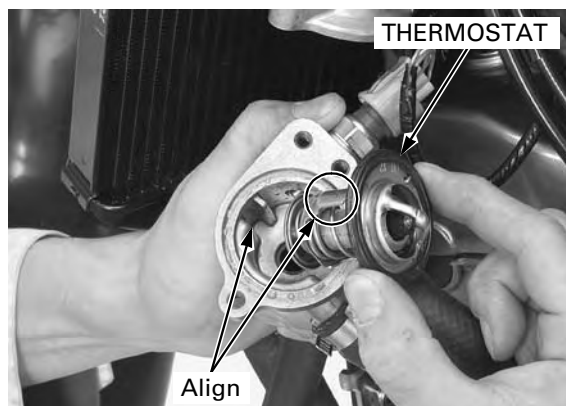
8 mm (0.3 in) minimum at 95 °C (203 °F)

Replace the thermostat if the valve opens at a temperature other than those specified.



INSTALLATION

Install the thermostat by aligning its rib with the thermostat housing groove.



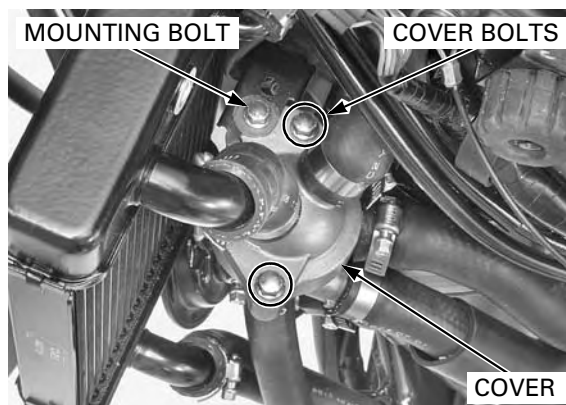
Install the thermostat cover to the housing and tighten the cover bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install and tighten the thermostat housing mounting bolt securely.

Fill and bleed the cooling system (page 6-7).

Install the left air guard (page 2-10).



COOLING SYSTEM

THERMOSTAT HOUSING

REMOVAL/INSTALLATION

Remove the left air guard (page 2-10).

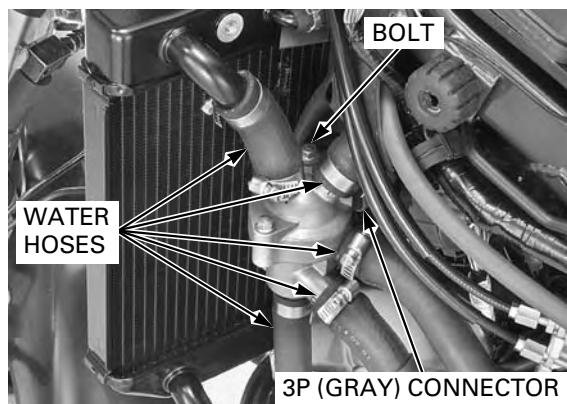
Drain the coolant from by removing the water pump drain bolt (page 6-7).

Loosen the band screws and disconnect the water hoses.

Remove the thermostat housing mounting bolt.

Disconnect the ECT sensor 3P (Gray) connector.

Remove the thermostat housing.

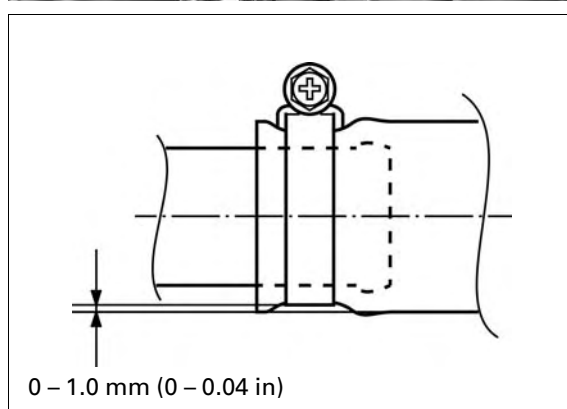


Route the hoses and wires properly (page 1-21).

Install the thermostat housing assembly in the reverse order of removal.

NOTE:

Tighten the water hose band screws to the specified range as shown.



RADIATOR

REMOVAL

Be careful not to damage the radiator fins while servicing the radiator and fan motor.

Drain the coolant from by removing the water pump drain bolt (page 6-7).

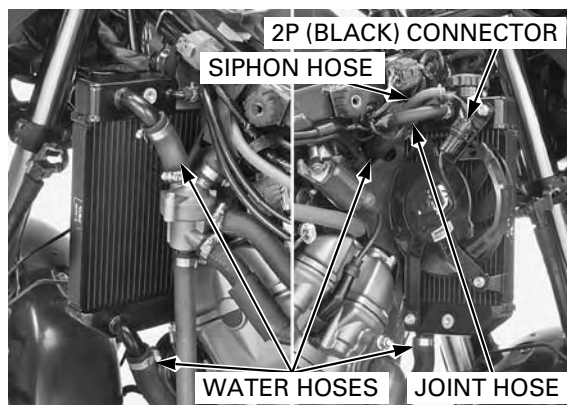
Lift and support the fuel tank (page 3-5).

Remove the right and left air guard (page 2-10).

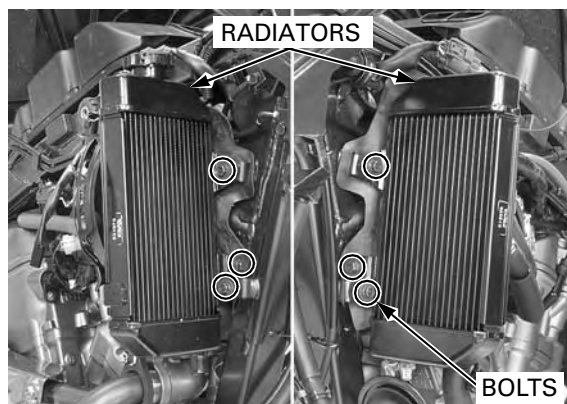
Loosen the band screws and disconnect the water hoses.

Disconnect the siphon hose and joint hose.

Disconnect the fan motor 2P (Black) connector.



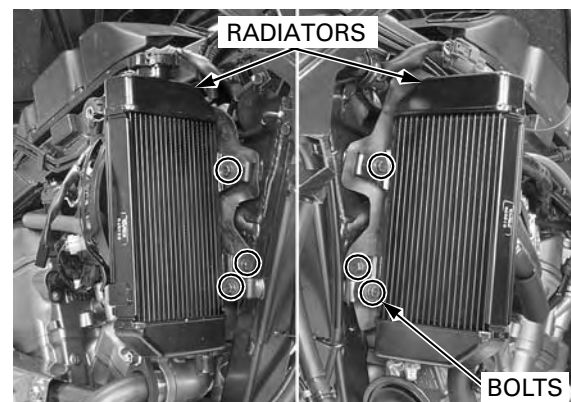
Remove the bolts and radiators.



INSTALLATION

Install the radiators and bolts.

Tighten the bolts securely.

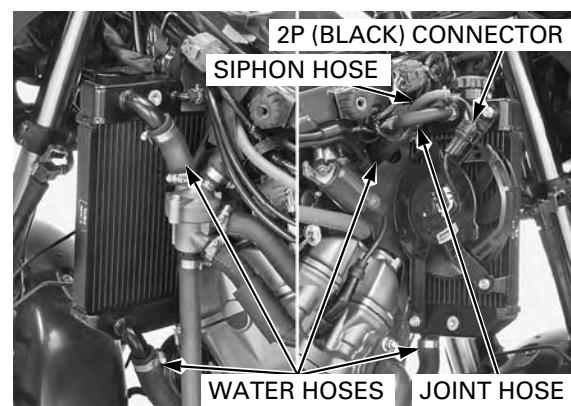


Connect the fan motor 2P (Black) connector.
Connect the siphon hose and joint hose.
Connect the water hoses and tighten the band screws specified range (page 6-10).

Install the right and left air guard (page 2-10).

Lowering the fuel tank (page 3-5).

Fill and bleed the cooling system (page 6-7).



COOLING FAN

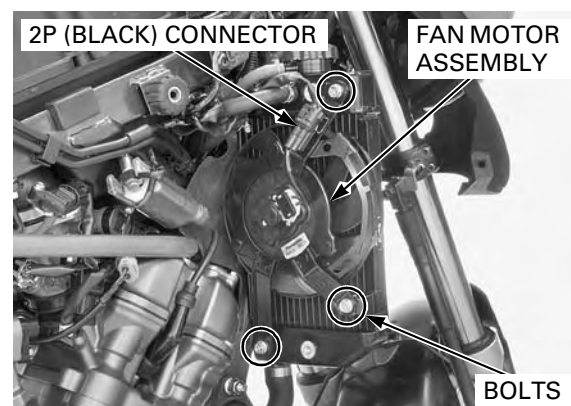
REMOVAL

Lift and support the fuel tank (page 3-5).

Remove the right air guard (page 2-10).

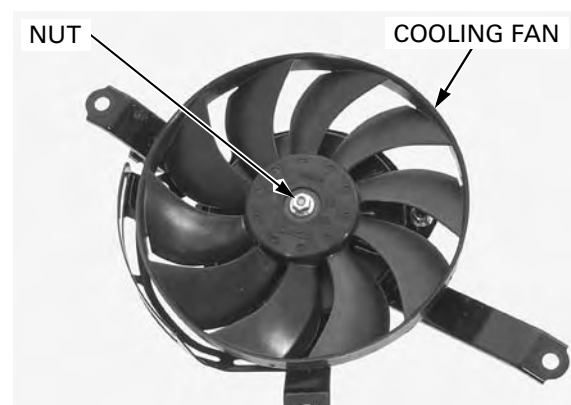
Disconnect the fan motor 2P (Black) connector.

Remove the bolts and fan motor assembly.



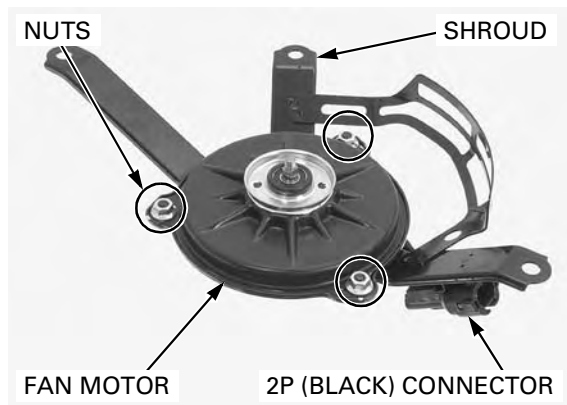
DISASSEMBLY

Remove the nut and cooling fan.

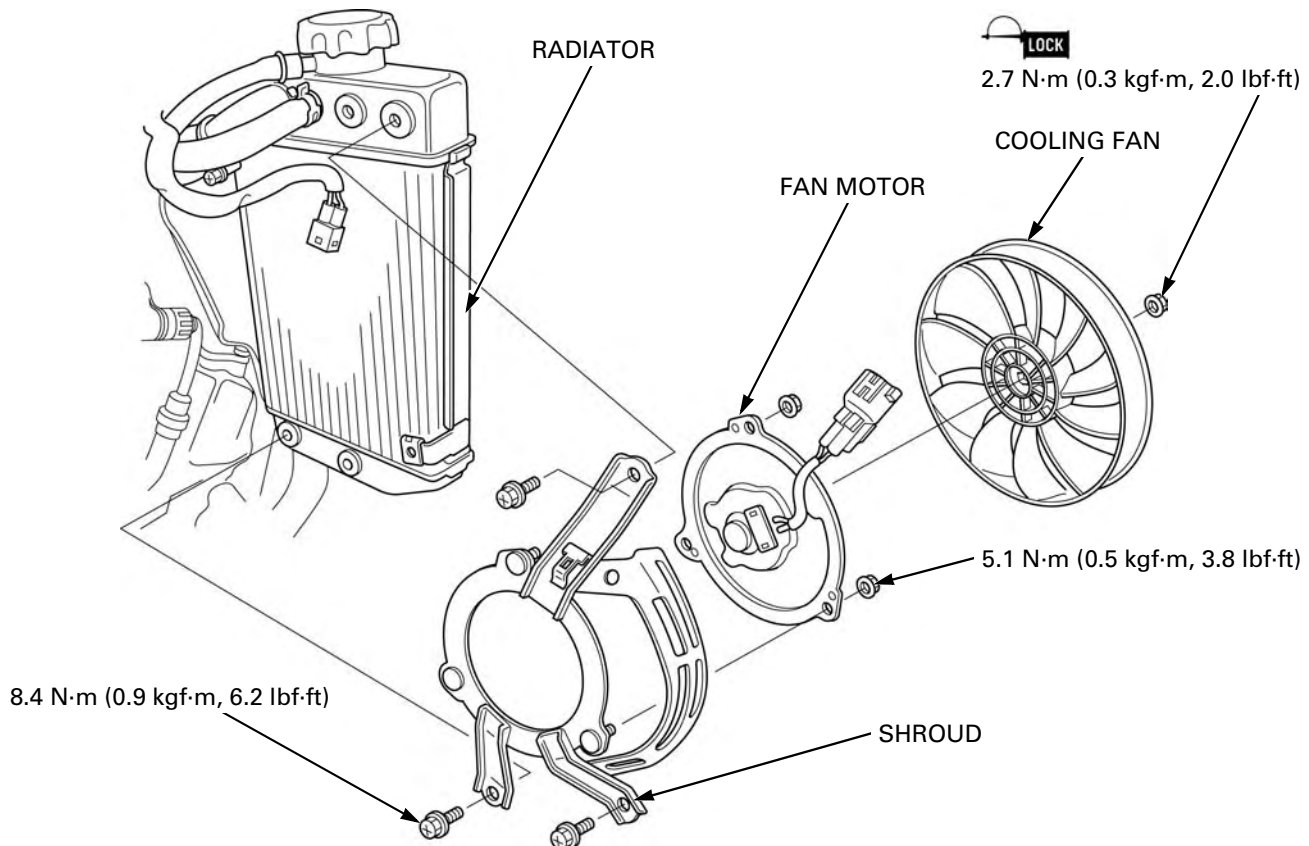


COOLING SYSTEM

Remove the fan motor 2P (Black) connector from the shroud.
Remove the nuts and fan motor from the shroud.



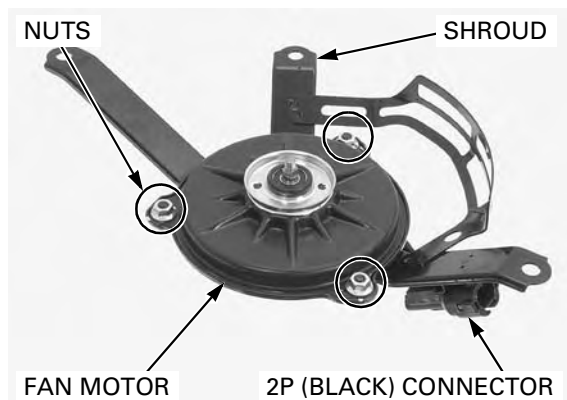
ASSEMBLY



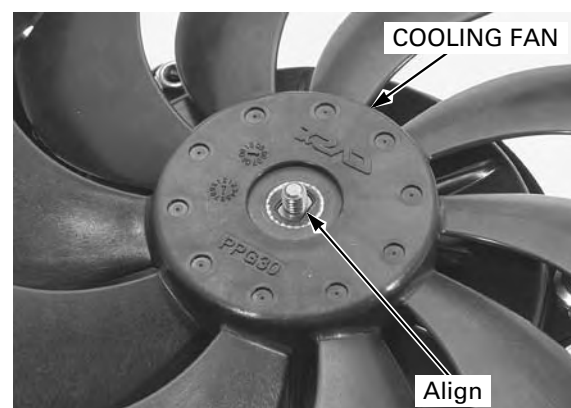
Install the fan motor on the shroud and mounting nuts.
Tighten the mounting nuts to the specified torque.

TORQUE: 5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)

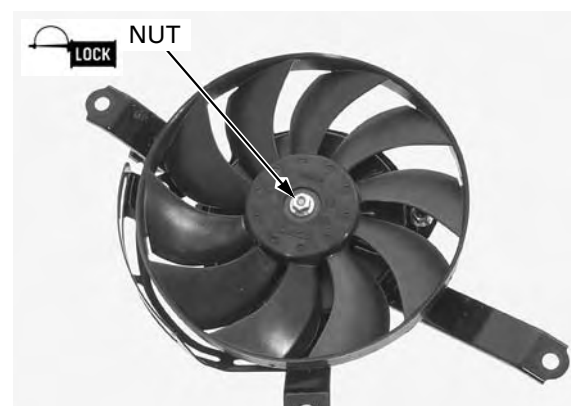
Install the fan motor 2P (Black) connector to the shroud.



Install the cooling fan onto the motor shaft, aligning the flat surfaces.



Apply locking agent to the cooling fan nut threads. Install and tighten the nut to the specified torque.
TORQUE: 2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)



INSTALLATION

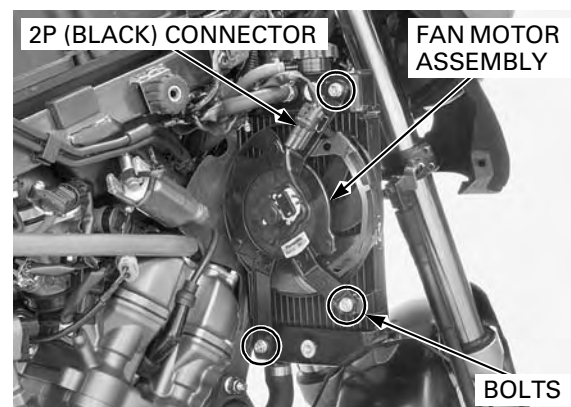
Install the fan motor assembly on the radiator and tighten the bolts to the specified torque.

TORQUE: 8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)

Connect the fan motor 2P (Black) connector.

Install the right air guard (page 2-10).

Lowering the fuel tank (page 3-5).

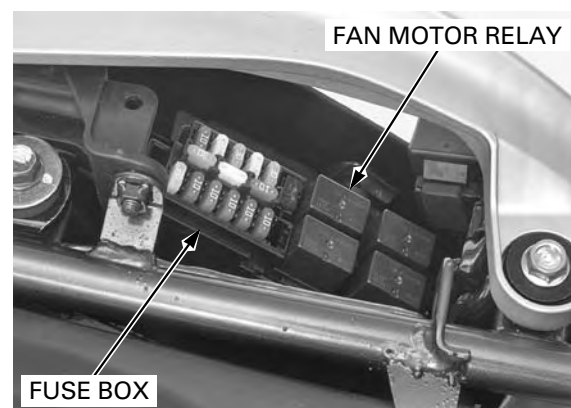


FAN MOTOR RELAY

INSPECTION

Remove the seat (page 2-4).

Open the fuse box and remove the fan motor relay.



COOLING SYSTEM

Connect the ohmmeter to the fan control relay connector terminals.

Connection: A – B

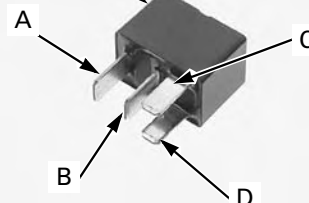
Connect the 12 V battery to the following fuel pump relay connector terminals.

Connection: C – D

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the fan control relay.

FAN CONTROL RELAY



WATER PUMP

MECHANICAL SEAL INSPECTION

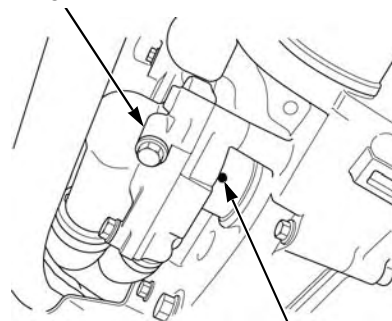
Remove the under cowl (page 2-13).

Check for signs of seal leakage.

A small amount of "weeping" from the bleed hole is normal.

Install the under cowl (page 2-13).

WATER PUMP



REMOVAL

Drain the coolant from by removing the water pump drain bolt (page 6-7).

Remove the drive sprocket cover (page 7-4).

Loosen the band screw and disconnect the water hoses.

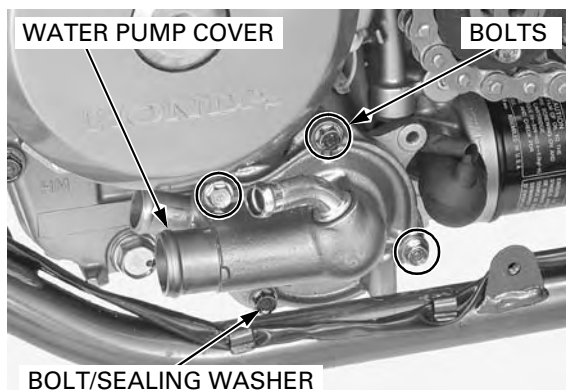
WATER HOSES



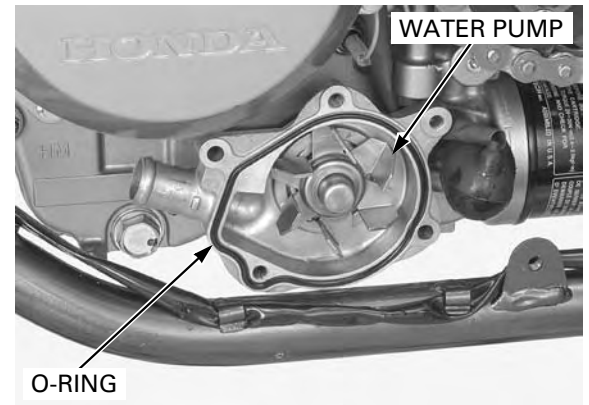
Remove the bolts, sealing washer and water pump cover.

WATER PUMP COVER

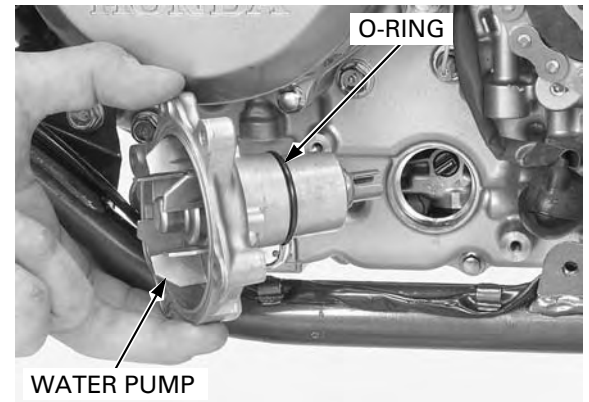
BOLTS



Remove the O-ring from the water pump groove.



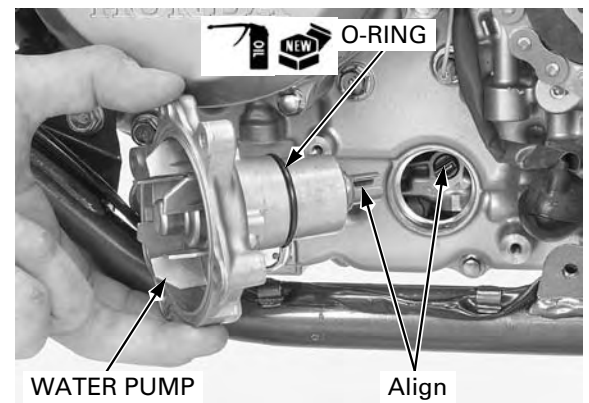
Remove the water pump and O-ring



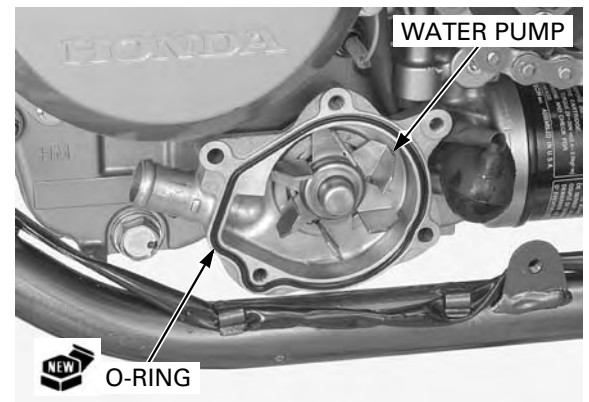
INSTALLATION

Coat a new O-ring with engine oil and install it onto the stepped section of the water pump.

Install the water pump while aligning its groove with the projection of the oil pump shaft.



Install a new O-ring into the groove in the water pump groove.

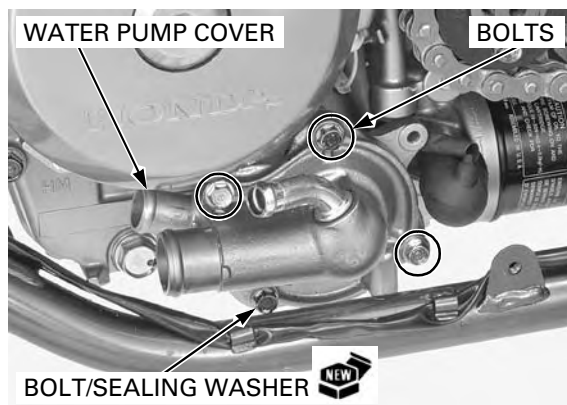


COOLING SYSTEM

Align the bolt holes in the pump and crankcase, and install the water pump cover with the bolts and a new sealing washer.

Tighten the bolts in a crisscross pattern in several steps.

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)

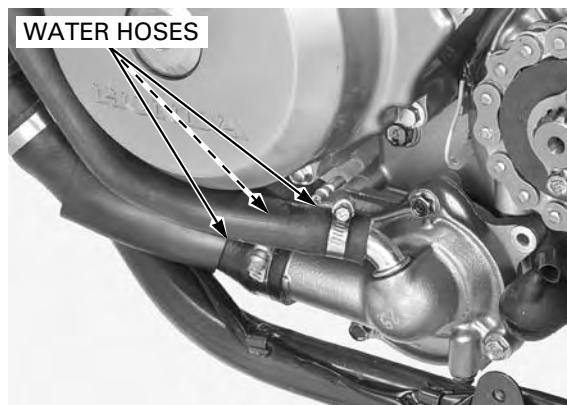


Connect the water hoses.

Tighten the band screws to the specified range (page 6-10).

Fill and bleed the cooling system (page 6-7).

Install the drive sprocket cover (page 7-13).



RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

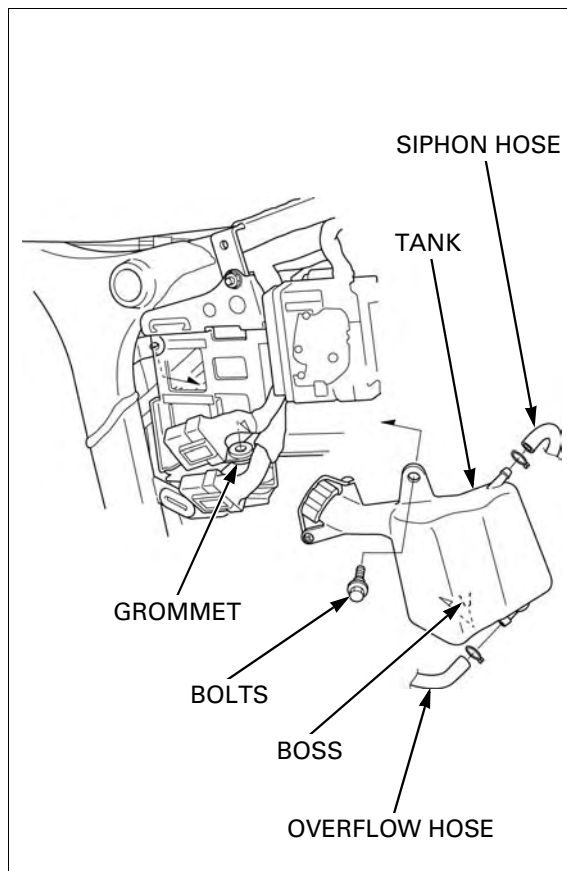
Remove the shock absorber (page 14-13).

Disconnect the siphon hose and overflow hose from the reserve tank and drain the reserve coolant.

Remove the bolt and release the boss from the grommet.

Installation is in the reverse order of removal.

Route the hoses properly (page 1-21).



7. ENGINE REMOVAL/INSTALLATION

COMPONENT LOCATION 7-2

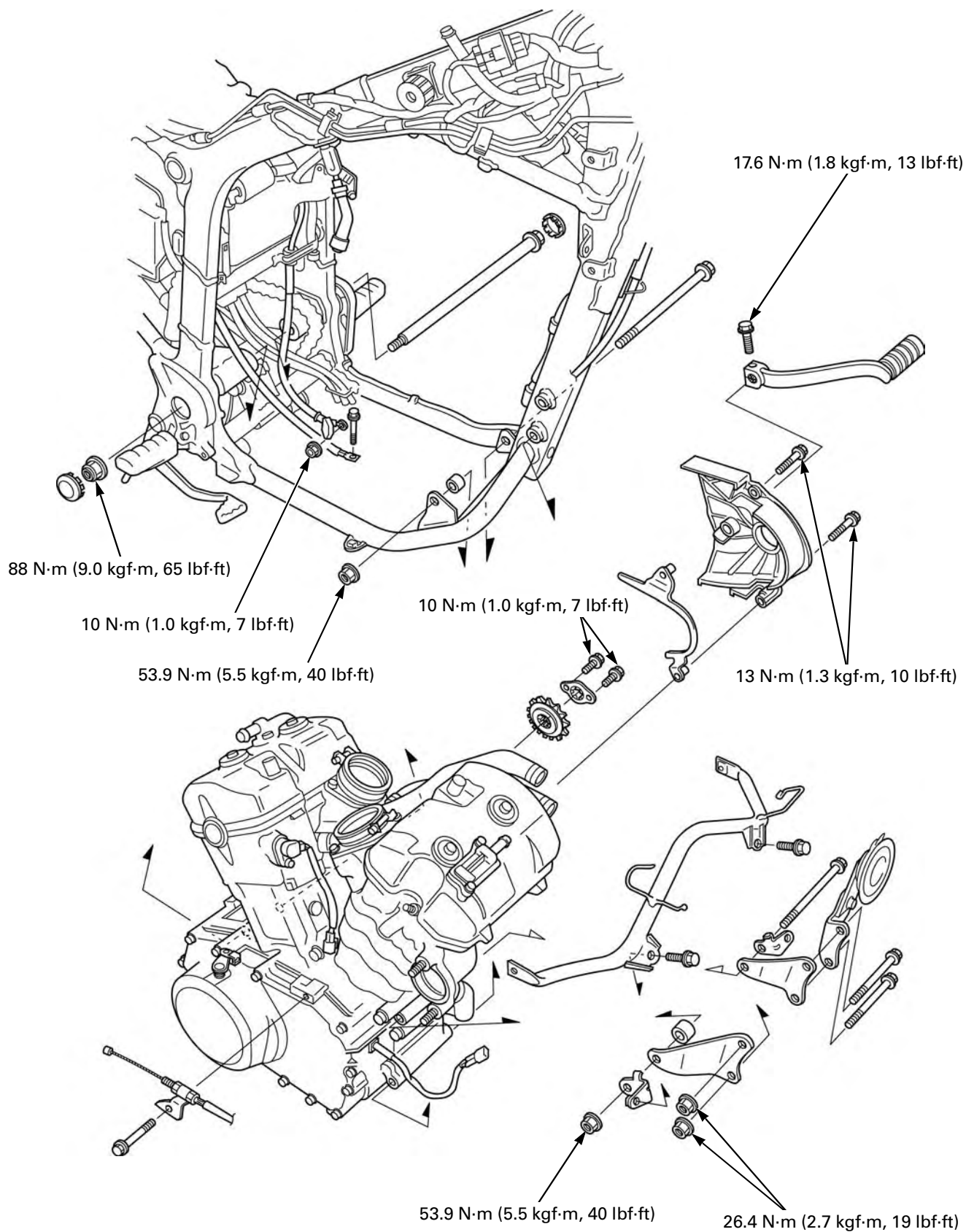
SERVICE INFORMATION 7-3

ENGINE REMOVAL 7-4

ENGINE INSTALLATION..... 7-8

7

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- Do not support the engine using the engine oil filter or it will be damaged.
- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- The following components require engine removal for servicing.
 - Crankshaft (page 12-8)
 - Transmission (Including gearshift drum/shift fork: page 12-19)
 - Oil pump (page 4-5)
- The following components can be serviced with the engine in the frame.
 - Cylinder head (page 8-13)
 - Cylinder/piston (page 9-4)
 - Throttle body (page 5-65)
 - Water pump (page 6-14)
 - Clutch/gearshift linkage (page 10-6)
 - Alternator/starter clutch (page 11-4)
 - Electric starter (page 19-6)

SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	58.7 kg (129.4 lbs)
Engine oil capacity at disassembly	2.9 liters (3.1 US qt, 2.6 Imp qt)
Coolant capacity (radiator and engine)	2.35 liters (2.48 US qt, 2.07 Imp qt)

TORQUE VALUES

Engine hanger nut	53.9 N·m (5.5 kgf·m, 40 lbf·ft)	
Engine hanger plate nut	26.4 N·m (2.7 kgf·m, 19 lbf·ft)	
Drive sprocket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Starter motor cable terminal nut	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Gearshift pedal pinch bolt	17.6 N·m (1.8 kgf·m, 13 lbf·ft)	
Drive sprocket cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	

ENGINE REMOVAL/INSTALLATION

ENGINE REMOVAL

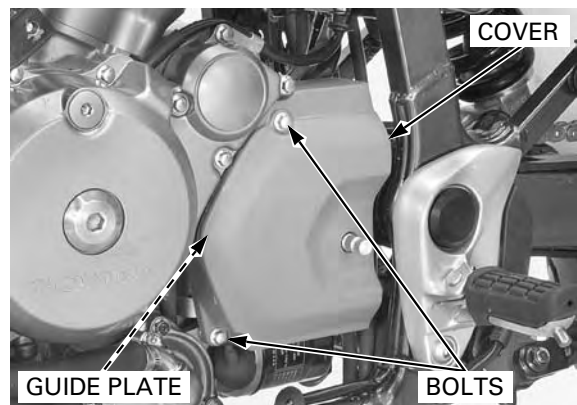
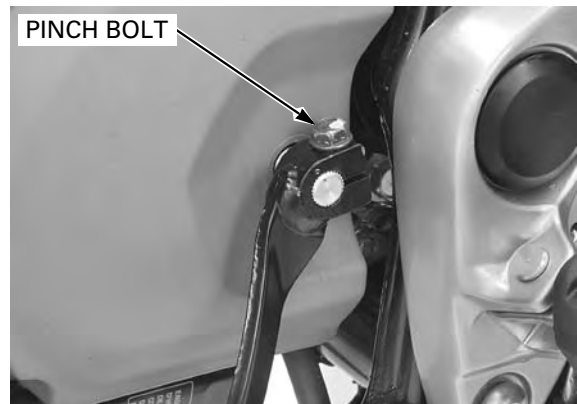
Drain the engine oil (page 3-13).
Drain the coolant by removing the water pump drain bolt (page 6-7).

Remove the following:

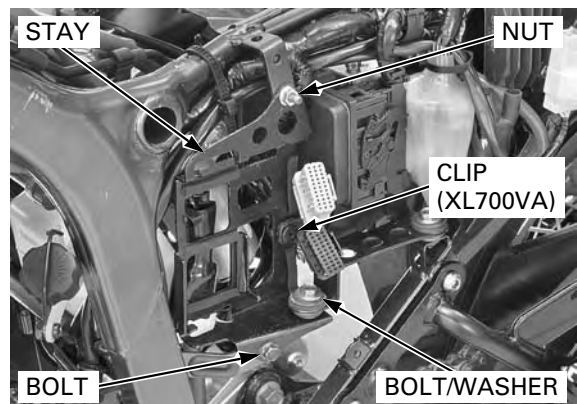
- Both side covers (page 2-4)
- ECM (page 5-77)
- Fuel tank (page 5-61)
- Throttle body (page 5-65)
- Radiator (page 6-10)
- Thermostat housing (page 6-10)
- Spark plug caps (page 3-8)
- Exhaust system (page 2-14)
- Heat guard plate (page 2-23)

Remove the pinch bolt and gearshift pedal from the spindle.

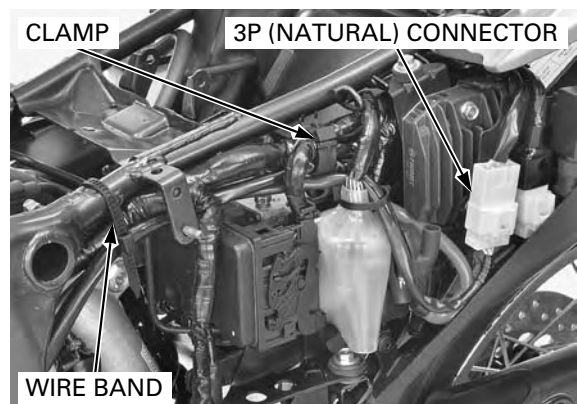
Remove the bolts, drive sprocket cover and guide plate.



Remove the bolt, bolt/washer, nut and trim clip (XL700VA only).
Remove the ECM stay.

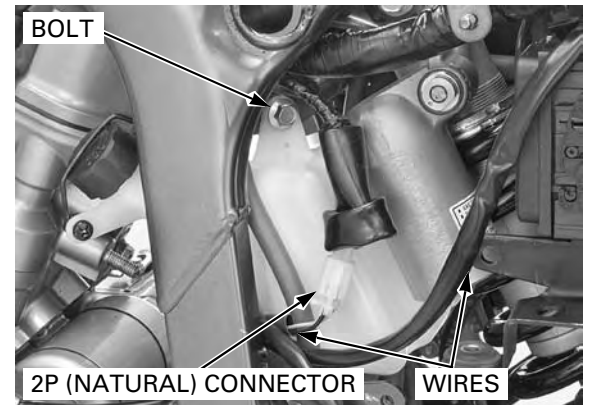


Release the wire band and harness clamp.
Disconnect the alternator 3P (Natural) connector.

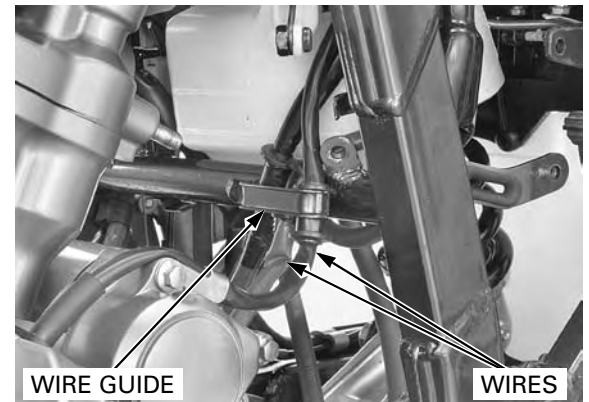


Disconnect the neutral switch/EOP switch 2P (Natural) connector.

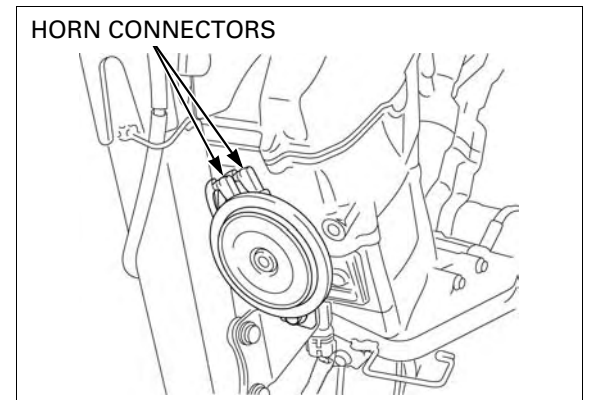
Remove the reserve tank mounting bolt and move the reserve tank slightly. Alternator wire and neutral switch/EOP switch wire pass through the between reserve tank and frame.



Release the alternator wire and neutral switch/EOP switch wire from the wire guide.

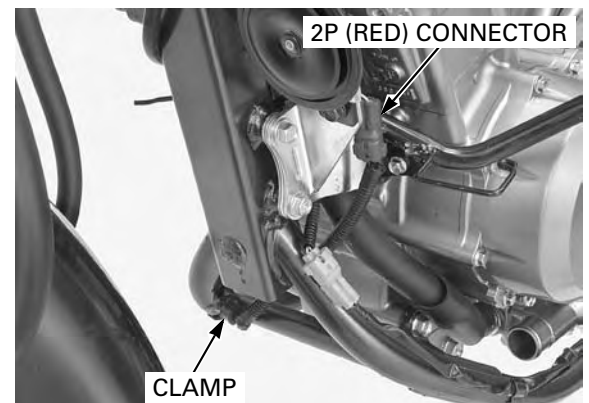


Disconnect the horn connectors.



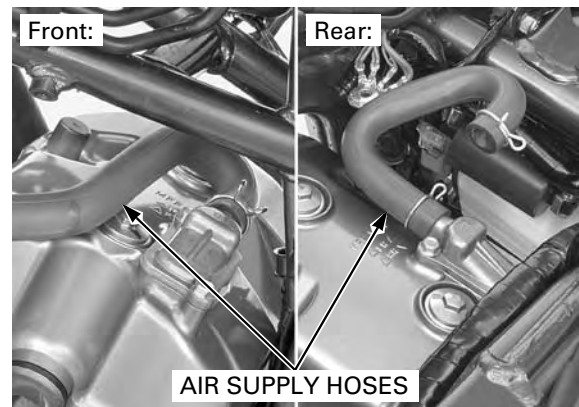
Release the CKP sensor 2P (Red) connector from the under cowl stay and CKP sensor wire from the frame clamp.

Disconnect the CKP sensor 2P (Red) connector.

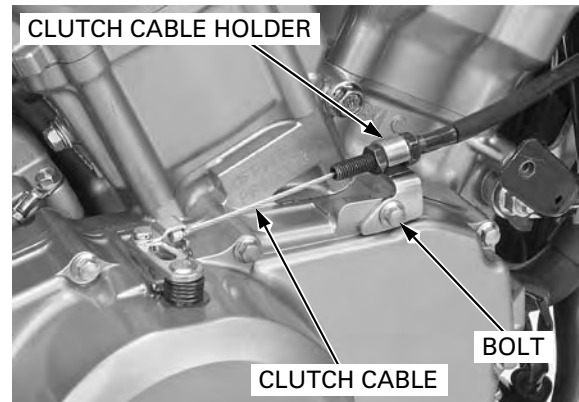


ENGINE REMOVAL/INSTALLATION

Disconnect the air supply hoses from the PAIR check valve covers.



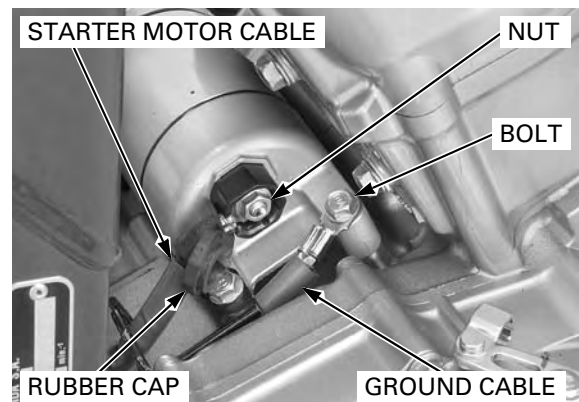
Remove the clutch cable holder bolt and disconnect the clutch cable end from the clutch lifter arm.



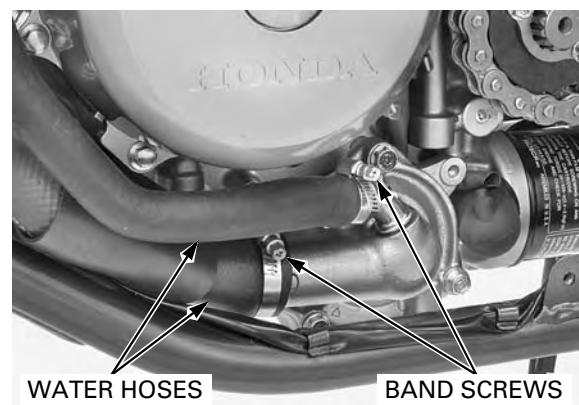
Remove the rubber cap and starter motor terminal nut.

Disconnect the starter motor cable.

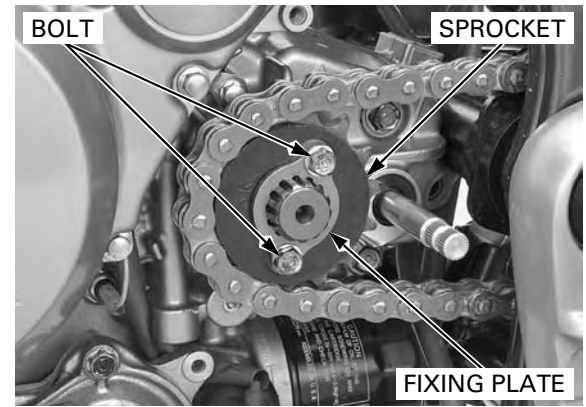
Remove the bolt and disconnect the ground cable.



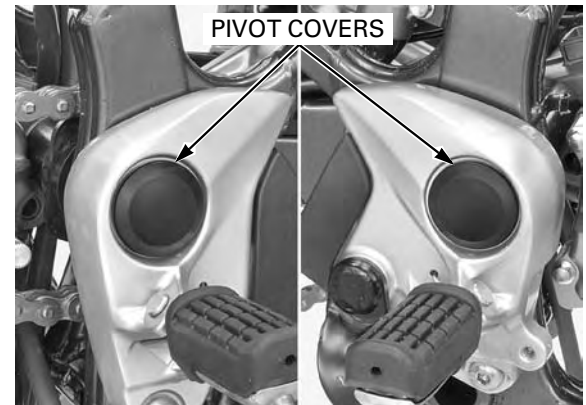
Loosen the band screws and disconnect the water hoses.



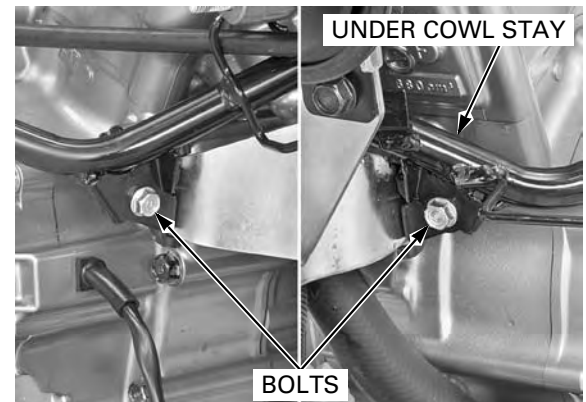
Loosen the rear axle nut.
Turn the drive chain adjusting nuts and make drive chain slack fully (page 3-17).
Remove the bolts, fixing plate and drive sprocket.



Remove the swingarm pivot covers.



Remove the bolts and under cowl stay from the engine mounting plate.

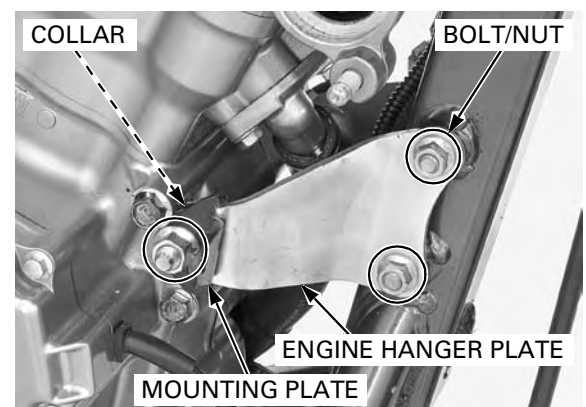


The jack height must be continually adjusted to relieve stress for bolt removal.

Place a floor jack or other adjustable support under the engine.

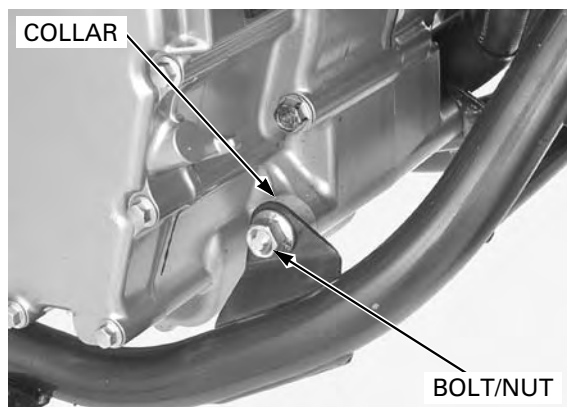
Remove the following:

- Engine hanger plate nuts
- Engine hanger plate bolts
- Horn stay
- Under cowl stay mounting plate
- Collar
- Engine hanger plate



ENGINE REMOVAL/INSTALLATION

Remove the engine hanger nut, bolt and collar.



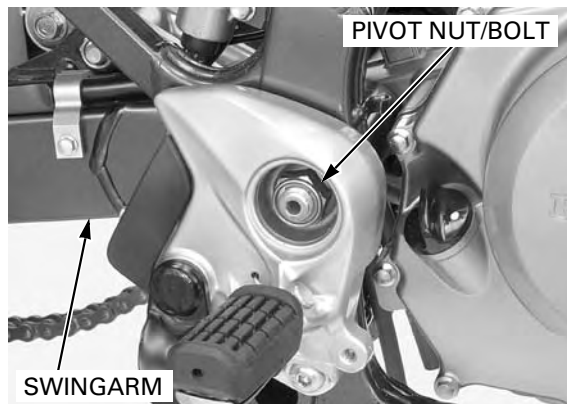
Remove the swingarm pivot nut and bolt.

During engine removal, hold the engine securely and be careful not to damage the frame and engine.

Move the swingarm backward and the engine to right.

Slide out the drive chain from the gearshift spindle and countershaft.

Carefully maneuver the engine and removed it out of the frame to the right.



ENGINE INSTALLATION

NOTE:

- All the engine mounting bolts, engine hanger plates and nuts loosely install with the horn stay and under cowl mounting plate, then tighten the bolts and nuts to the specified torque.
- Route the wires, hoses and cables properly (page 1-21).

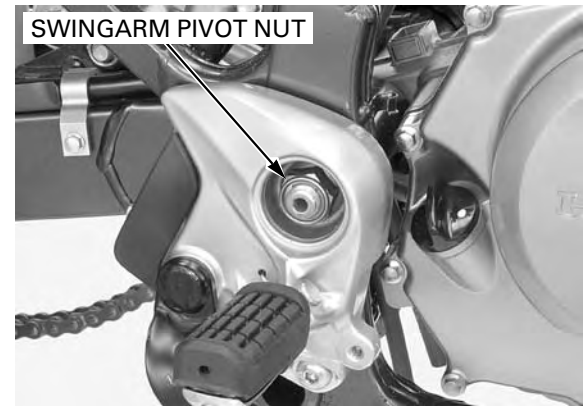
During engine installation, hold the engine securely and be careful not to damage the frame and engine.

Using a floor jack or other adjustable support, carefully place the engine into the frame and maneuver it into place.



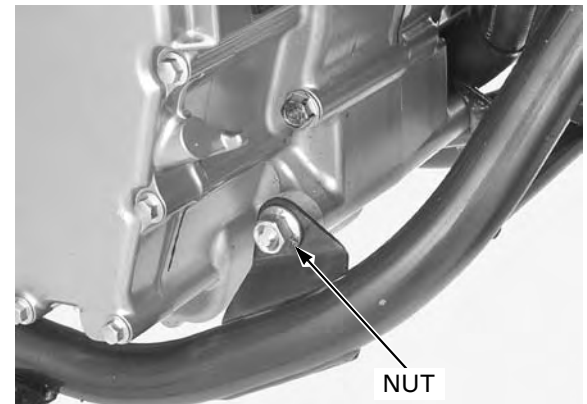
Tighten the swingarm pivot nut to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)



Tighten the engine hanger nut to the specified torque.

TORQUE: 53.9 N·m (5.5 kgf·m, 40 lbf·ft)



Tighten the engine hanger nut, then tighten the engine hanger plate nut to the specified torque.

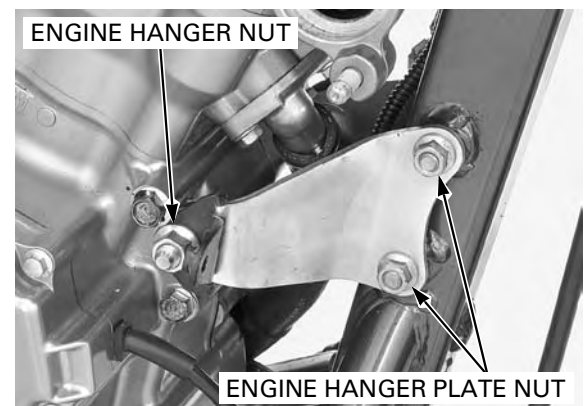
TORQUE:

Engine hanger nut:

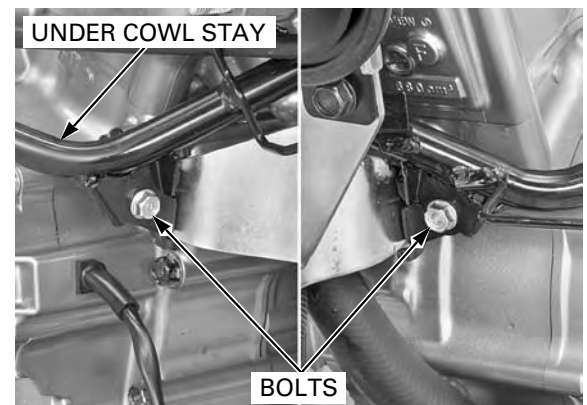
53.9 N·m (5.5 kgf·m, 40 lbf·ft)

Engine hanger plate nut:

26.4 N·m (2.7 kgf·m, 19 lbf·ft)

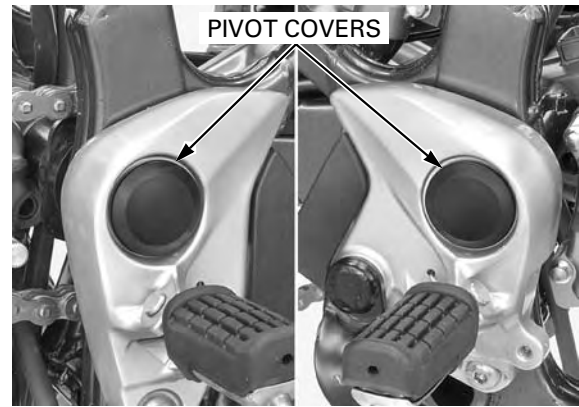


Install the under cowl stay and bolts.
Tighten the bolts securely.

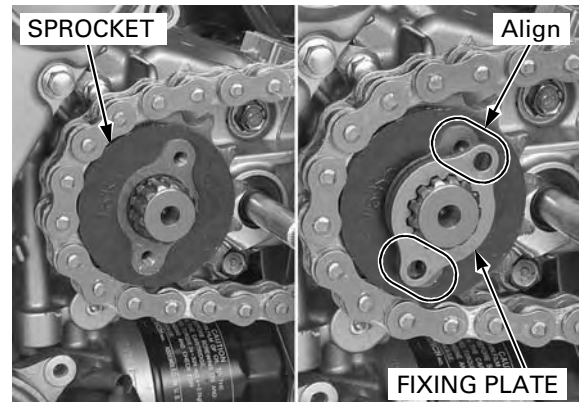


ENGINE REMOVAL/INSTALLATION

Install the pivot covers.

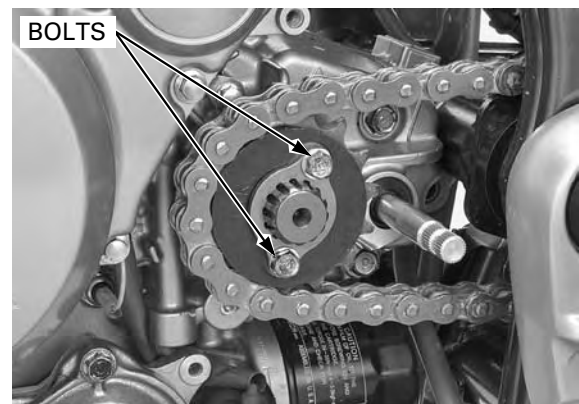


Install the drive sprocket with the drive chain onto the countershaft.
Install the fixing plate onto the countershaft, aligning each tooth with the countershaft grooves.
Rotate the fixing plate and align the each bolt hole.

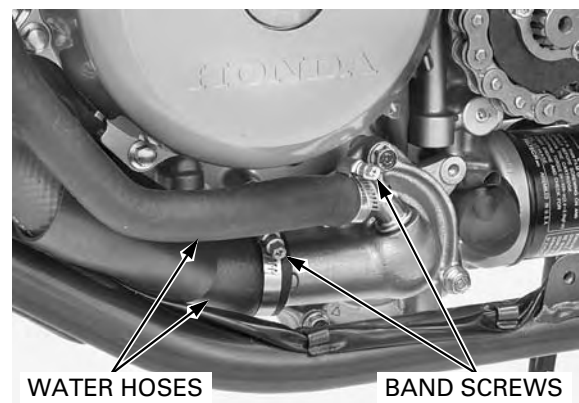


Install the drive sprocket bolts and tighten them to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



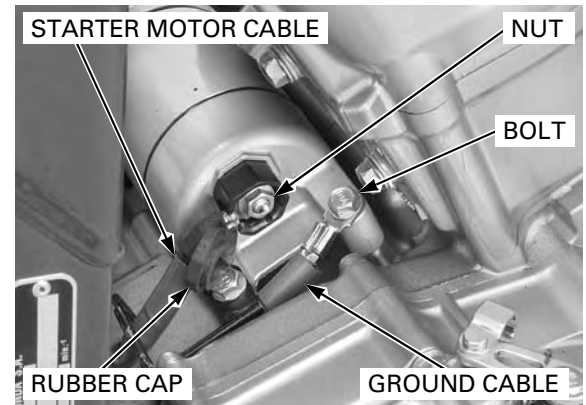
Connect the water hoses and tighten the band screws specified range (page 6-10).



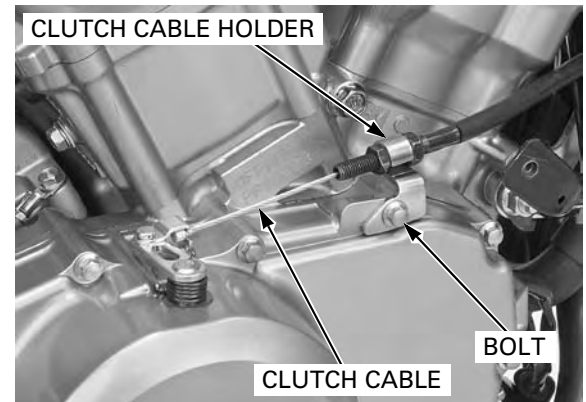
Connect the starter motor cable and tighten the terminal nut to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

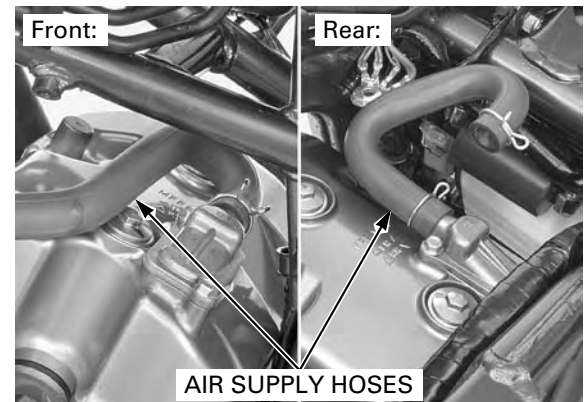
Connect the ground cable and tighten the bolt securely.



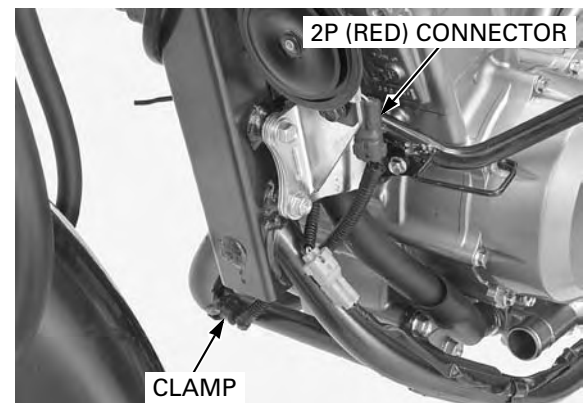
Connect the clutch cable end to the clutch lifter arm. Install the clutch cable holder and bolt. Tighten the bolt securely.



Connect the air supply hoses to the PAIR check valve covers.

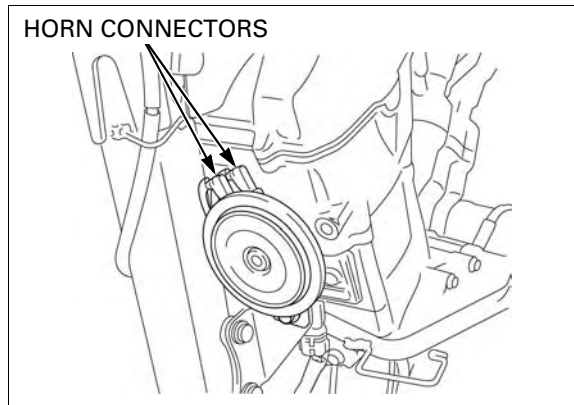


Connect the CKP sensor 2P (Red) connector. Clamp the CKP sensor wire and install the CKP sensor 2P (Red) connector to the under cowl stay.

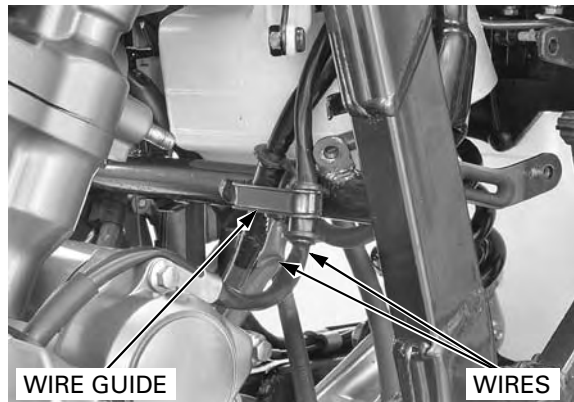


ENGINE REMOVAL/INSTALLATION

Connect the horn connectors.

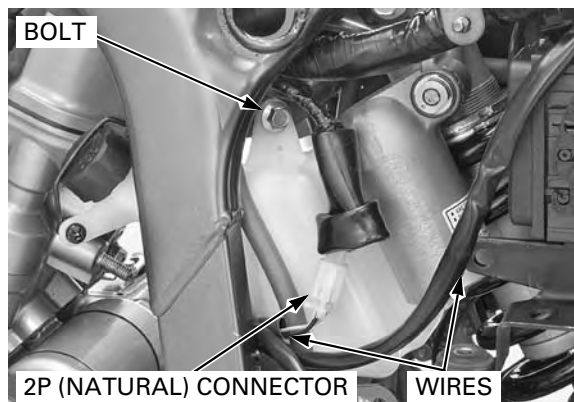


Install the neutral switch/EOP switch wire and alternator wire to the wire guide.



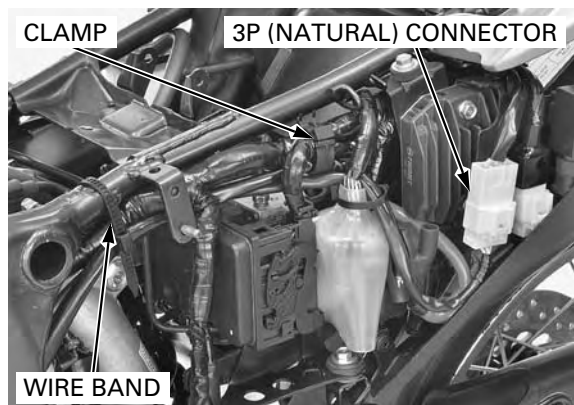
Route the neutral switch/EOP switch and alternator wires, and connect the neutral switch/EOP switch 2P (Natural) connector.

Install and tighten the reserve tank mounting bolt.

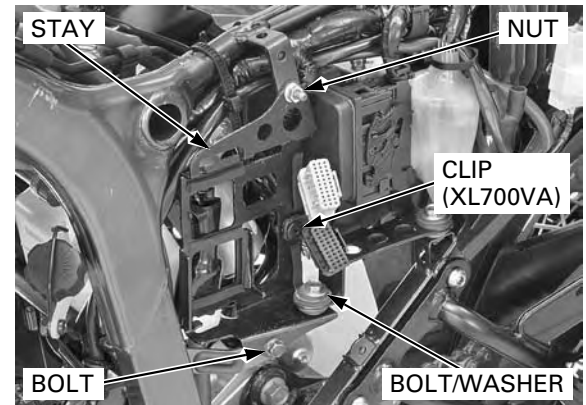


Install the alternator wire to the harness clamp and wire band.

Connect the alternator 3P (Natural) connector.

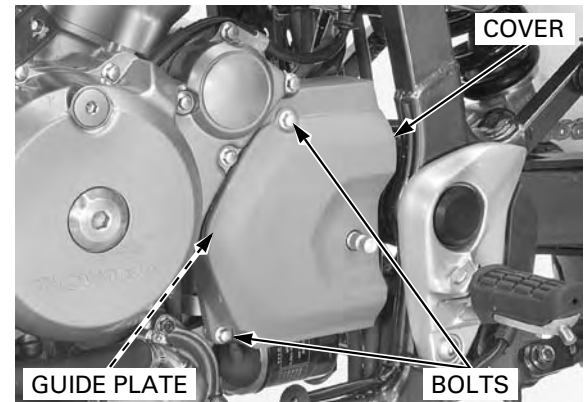


Install the ECM stay.
Install and tighten the nut, bolt/washer and bolt.
Install the trim clip (XL700VA only).



Install the guide plate, drive sprocket cover and bolts.
Tighten the bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)



Install the gearshift pedal to the spindle, aligning with the punch marks.
Tighten the pinch bolt to the specified torque.

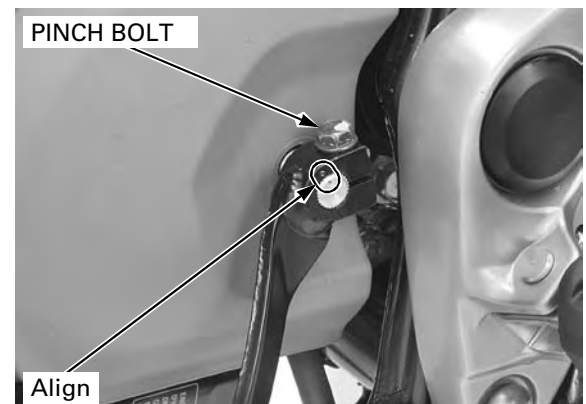
TORQUE: 17.6 N·m (1.8 kgf·m, 13 lbf·ft)

Install the following:

- Heat guard plate (page 2-23)
- Exhaust system (page 2-18)
- Spark plug cap (page 3-9)
- Thermostat housing (page 6-10)
- Radiator (page 6-11)
- Throttle body (page 5-68)
- Fuel tank (page 5-61)
- ECM (page 5-77)
- Both side covers (page 2-4)

Fill the crankcase with engine oil (page 3-12).
Fill and bleed the cooling system (page 6-7).

Check the engine oil level (page 3-12).

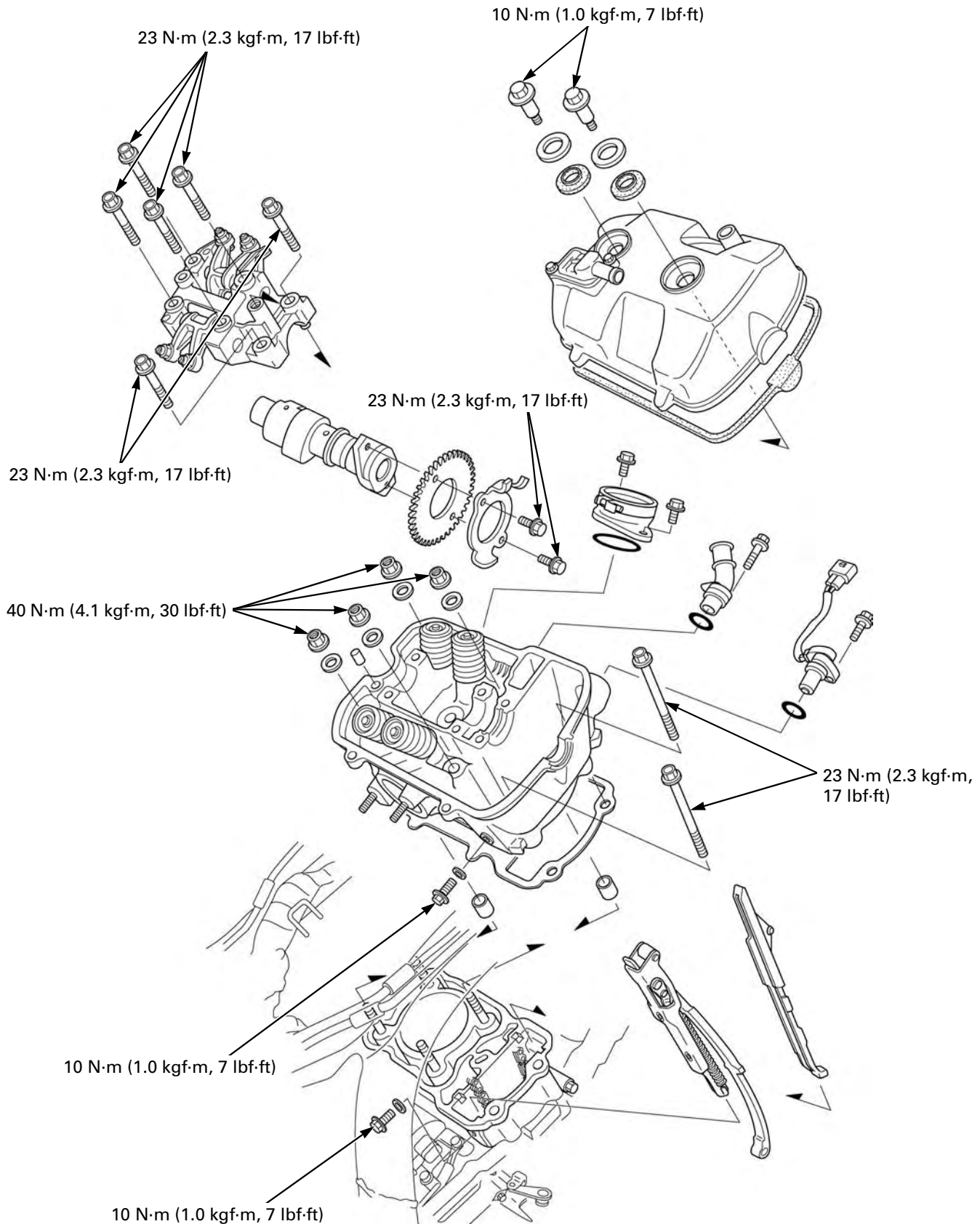


MEMO

8. CYLINDER HEAD/VALVES

COMPONENT LOCATION	8-2	CYLINDER HEAD DISASSEMBLY	8-15
SERVICE INFORMATION	8-3	VALVE GUIDE REPLACEMENT	8-19
TROUBLESHOOTING	8-5	VALVE SEAT INSPECTION/ REFACING	8-20
CYLINDER COMPRESSION	8-6	CYLINDER HEAD ASSEMBLY	8-23
CYLINDER HEAD COVER REMOVAL	8-6	CYLINDER HEAD INSTALLATION	8-25
CAMSHAFT REMOVAL	8-8	CAMSHAFT INSTALLATION	8-28
CYLINDER HEAD REMOVAL	8-13	CYLINDER HEAD COVER INSTALLATION	8-33

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the rocker arm, camshaft, cylinder head and valve.
- The cylinder head services can be done with the engine installed in the frame.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head. Do not strike the cylinder head cover and cylinder head too hard during removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder head and camshaft holder. Clean the oil passages before assembling the cylinder head and cover.

SPECIFICATIONS

Unit: mm (in)

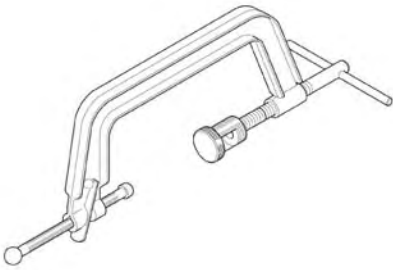
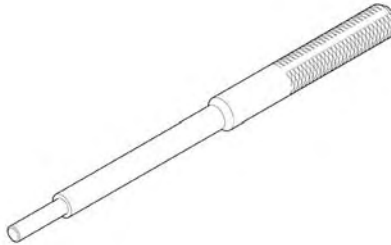
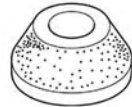
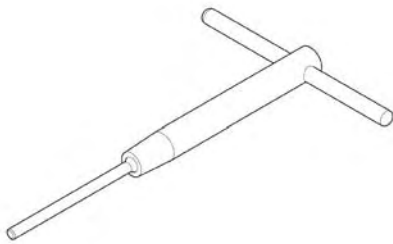
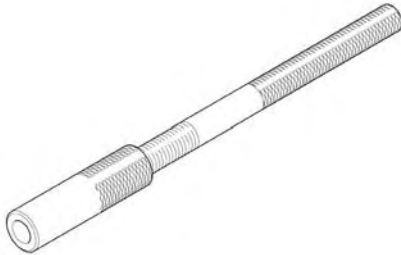
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 400 min ⁻¹ (rpm)			1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm ² , 199 ± 14 psi)	–
Valve clearance		IN	0.15 ± 0.02 (0.006 ± 0.001)	–
		EX	0.20 ± 0.02 (0.008 ± 0.001)	–
Camshaft	Cam lobe height	IN	40.609 – 40.769 (1.5988 – 1.6051)	40.58 (1.598)
		EX	40.695 – 40.855 (1.6022 – 1.6085)	40.67 (1.601)
			–	0.05 (0.002)
	Runout		–	0.05 (0.002)
	Journal O.D.		21.959 – 21.980 (0.8645 – 0.8654)	21.90 (0.862)
Rocker arm, rocker arm shaft	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
	Rocker arm shaft O.D.	IN/EX	11.983 – 11.994 (0.4718 – 0.4722)	11.92 (0.469)
	Rocker arm I.D.	IN/EX	12.006 – 12.024 (0.4727 – 0.4734)	12.05 (0.474)
	Rocker arm-to-shaft clearance		0.012 – 0.041 (0.0005 – 0.0016)	0.14 (0.006)
Valve, valve guide	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.460 (0.2150)
		EX	5.460 – 5.475 (0.2150 – 0.2156)	5.455 (0.2148)
	Valve guide I.D.	IN/EX	5.500 – 5.512 (0.2165 – 0.2170)	5.54 (0.218)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.07 (0.003)
		EX	0.025 – 0.052 (0.0010 – 0.0020)	0.09 (0.004)
	Valve guide projection above cylinder head	IN	12.5 – 12.7 (0.49 – 0.50)	–
		EX	16.7 – 16.9 (0.66 – 0.67)	–
Valve spring	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
	Free length	IN/EX	44.91 (1.768)	43.9 (1.73)
Cylinder head warpage			–	0.10 (0.004)

TORQUE VALUES

Valve adjusting screw lock nut	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply engine oil to the threads and seating surface.
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Cylinder head bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply engine oil to the threads and seating surface.
Cylinder head nut	40 N·m (4.1 kgf·m, 30 lbf·ft)	Apply engine oil to the threads and seating surface.
Cam sprocket bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply locking agent.
Cam chain tensioner bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Camshaft holder bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply engine oil to the threads and seating surface.
Cylinder head sealing bolt	44 N·m (4.5 kgf·m, 32 lbf·ft)	ALOC bolt; replace with a new one.

CYLINDER HEAD/VALVES

TOOLS

Valve spring compressor 07757-0010000 	Valve guide reamer, 5.510 mm 07984-2000001 	Valve guide driver, 5.5 mm 07742-0010100 
Valve seat cutter, 27.5 mm (45° EX) 07780-0010200 	Valve seat cutter, 33 mm (45° IN) 07780-0010800 	Flat cutter, 33 mm (32° IN) 07780-0012900 
Flat cutter, 28 mm (32° EX) 07780-0012100 	Interior cutter, 26 mm (60° EX) 07780-0014500 	Interior cutter, 34 mm (60° IN) 07780-0014700 
Cutter holder, 5.5 mm 07781-0010101 	Valve guide driver 07743-0020000 	

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope.

Compression too low, hard starting or poor performance at low speed

- Valves
 - Incorrect valve adjustment
 - Burned or bent valves
 - Incorrect valve timing
 - Broken valve spring
 - Uneven valve seating
 - Valve stuck open
- Cylinder head
 - Leaking or damaged cylinder head gasket
 - Warped or cracked cylinder head
 - Loose spark plug
- Cylinder/piston problem (page 9-3)

Compression too high

- Excessive carbon build-up on piston head or combustion chamber

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (page 9-3)

Excessive noise

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn or damaged rocker arm and/or shaft
- Worn rocker arm follower or valve stem end
- Worn cam sprocket teeth
- Worn cam chain
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (page 9-3)

Rough idle

- Low cylinder compression

CYLINDER HEAD/VALVES

CYLINDER COMPRESSION

NOTE:

If the engine must be running to do some work, make sure the area is well-ventilated, Never run the engine in an enclosed area.

To measure the cylinder compression of each cylinder, remove only one plug at a time.

Warm up the engine to normal operating temperature.

Stop the engine, disconnect the spark plug caps and remove one spark plug at a time.

Shift the transmission into neutral.

Install a compression gauge into the spark plug hole.

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stop rising.

To avoid discharging the battery, do not operate the starter motor for more than seven seconds.

The maximum reading is usually reached within 4 – 7 seconds.

Compression pressure:

$1,373 \pm 98 \text{ kPa}$ ($14.0 \pm 1.0 \text{ kgf/cm}^2$, $199 \pm 14 \text{ psi}$) at 400 min^{-1} (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 combustion chamber or on piston head



CYLINDER HEAD COVER REMOVAL

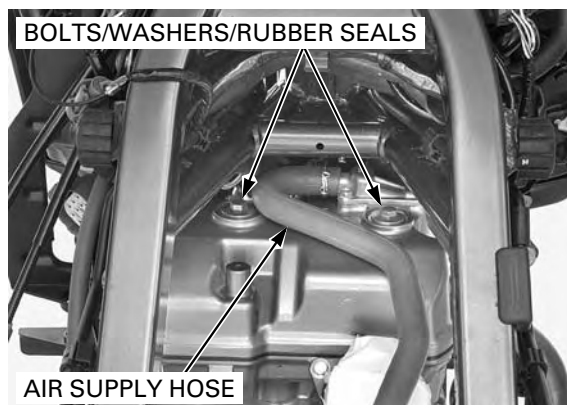
FRONT

Remove the following:

- Right air guide (page 2-10)
- Front ignition coil (page 18-8)
- Throttle body (page 5-65)

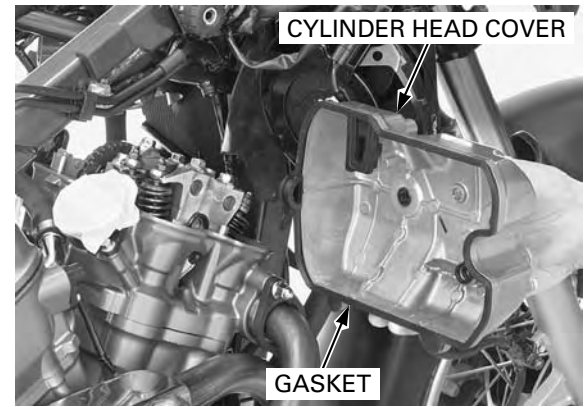
Remove the cylinder head cover bolts, washers and rubber seals.

Disconnect the air supply hose from the PAIR check valve cover.

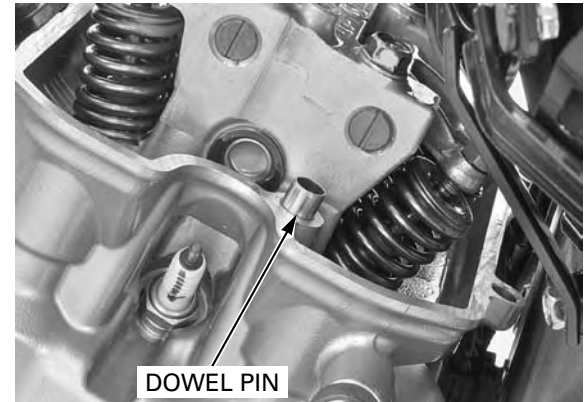


Be careful not to damage the wire harness and mating surfaces when removing the cylinder head cover.

Remove the cylinder head cover and gasket.



Remove the dowel pin.



REAR

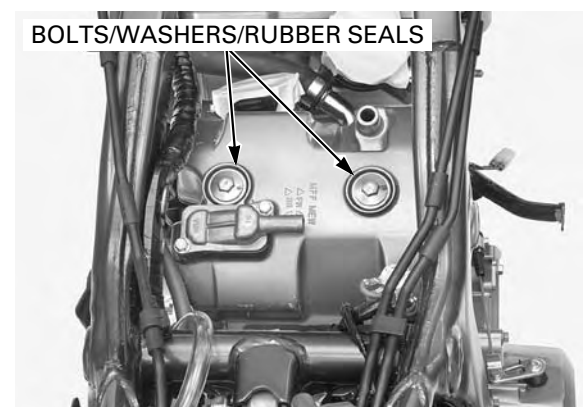
Remove the following:

- Throttle body (page 5-65)
- PAIR solenoid valve (page 5-83)
- Heat guard plate (page 2-23)

Remove the bolt and wire harness cover stay.



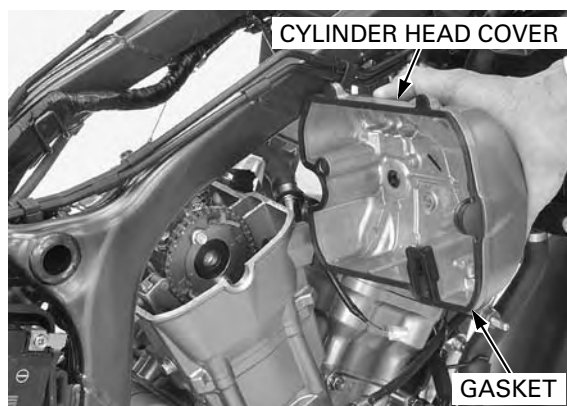
Remove the cylinder head cover bolts, washers and rubber seals.



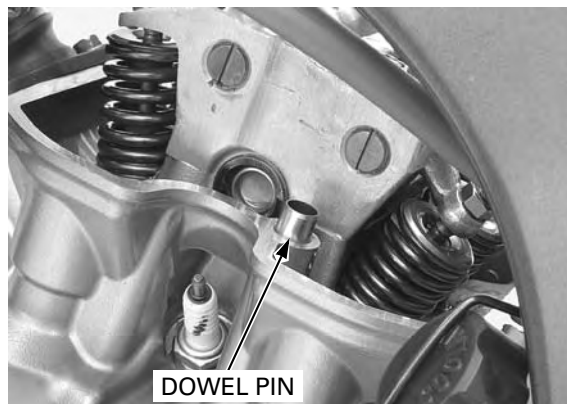
CYLINDER HEAD/VALVES

Be careful not to damage the wire harness and mating surfaces when removing the cylinder head cover.

Remove the cylinder head cover and gasket.



Remove the dowel pin.



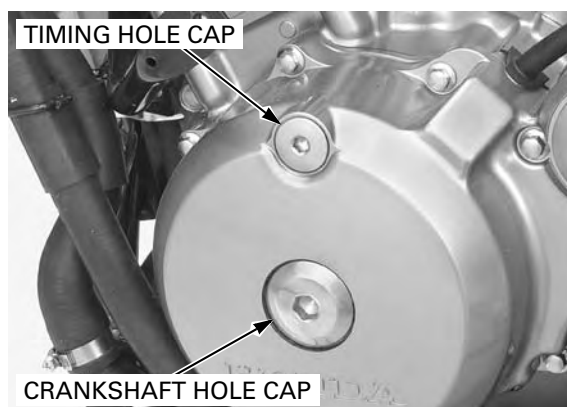
CAMSHAFT REMOVAL

NOTE:

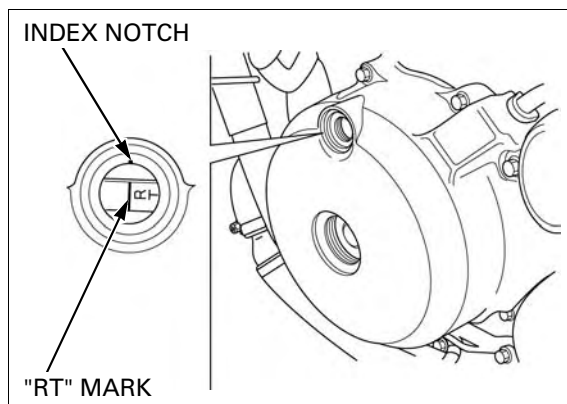
- The camshaft can be serviced with the engine in the frame.
- The front camshaft uses the same service procedure as the rear camshaft.

Remove the cylinder head cover (page 8-6).

Remove the crankshaft hole cap, timing hole cap and O-rings from the left crankcase cover.



Turn the crankshaft counterclockwise and align the "RT" mark (front cylinder: "FT" mark) with the index notch on the left crankcase cover. Make sure the piston is at TDC (Top Dead Center) on the exhaust stroke so the piston is at TDC on the compression stroke when removing the camshaft holder.



Measure the cam chain tensioner wedge B length as shown.

SERVICE LIMIT: 6 mm (0.2 in)

Replace the cam chain with a new one if the projection exceeds the service limit.

For the cam chain replacement, remove the following:

Front:

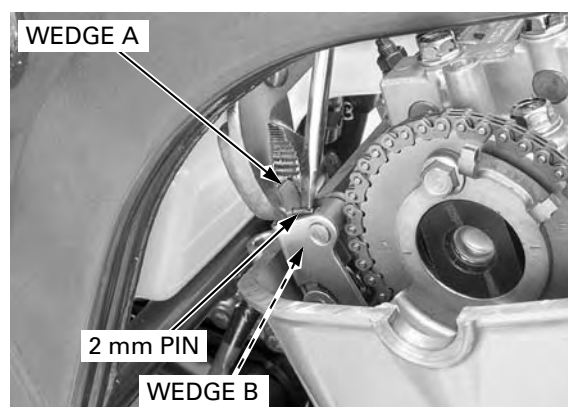
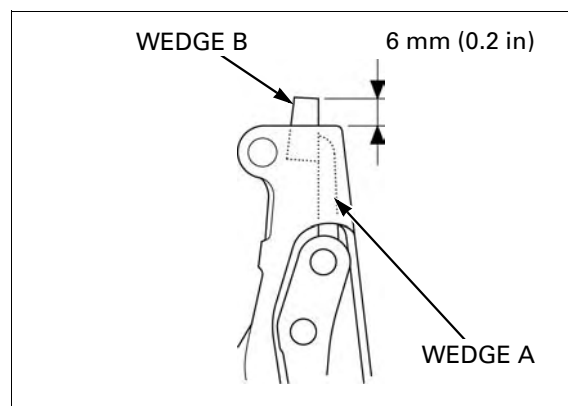
- Front camshaft
- Flywheel (page 11-6)

Rear:

- Rear camshaft
- Primary drive gear (page 10-12)

Be careful not to let the 2 mm pin fall into the crankcase.

Install the 2 mm pin into the cam chain tensioner wedge A hole while pulling the wedge A straight up and pushing down the wedge B.



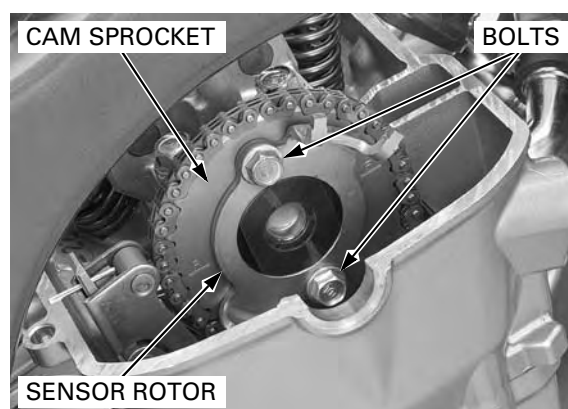
Be careful not to let the cam sprocket bolts fall into the crankcase.

Remove the cam sprocket bolt, turn the crankshaft counterclockwise one full turn (360°) and remove the other cam sprocket bolt.

Remove the CMP sensor rotor (rear cylinder only) and cam sprocket from the camshaft flange surface.

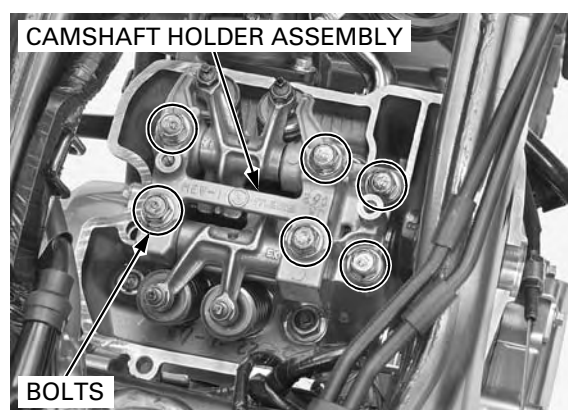
NOTE:

Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.



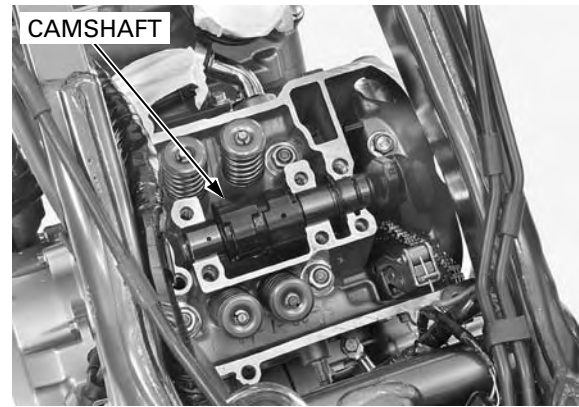
Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

Loosen the bolts in a crisscross pattern in several steps, then remove them and camshaft holder assembly.



CYLINDER HEAD/VALVES

Remove the camshaft.



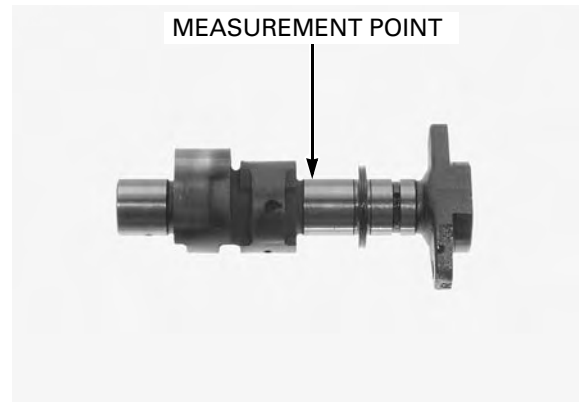
INSPECTION

CAMSHAFT RUNOUT

Support both end journals of the camshaft with V-blocks and check the camshaft runout with a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.05 mm (0.002 in)



CAM LOBE HEIGHT

Check the cam lobe surfaces for scoring or evidence of insufficient lubrication.

Measure each cam lobe height.

SERVICE LIMITS: IN: 40.58 mm (1.598 in)

EX: 40.67 mm (1.601 in)

NOTE:

Check the rocker arm if the cam lobe is worn or damaged.



CAMSHAFT JOURNAL

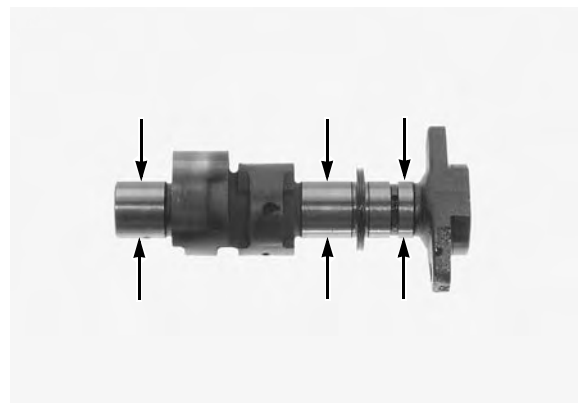
Check the camshaft journal surfaces for scoring or evidence of insufficient lubrication.

Measure the O.D. of each camshaft journal.

SERVICE LIMIT: 21.90 mm (0.862 in)

NOTE:

Check the oil passages and camshaft holder for wear or damage if the journal surface is worn or damaged.

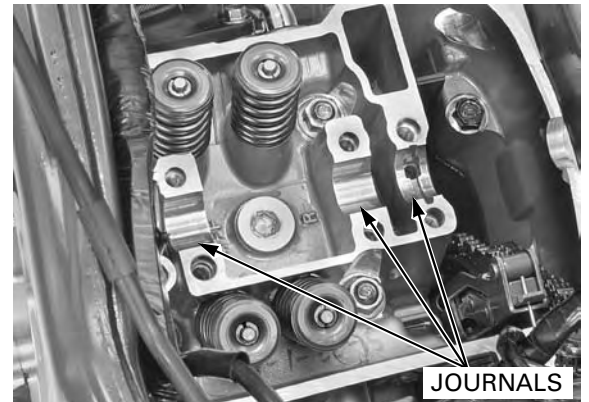


CAM SPROCKET

Check the cam sprocket for wear or damage.

**CYLINDER HEAD**

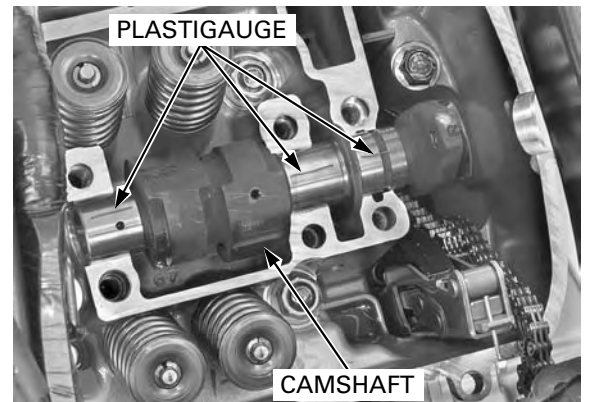
Check the camshaft journal surfaces of cylinder head for scoring, scratches or evidence of insufficient lubrication.

**CAMSHAFT OIL CLEARANCE**

Clean off any oil from the journals of the camshaft holders, cylinder head and camshaft. Put the camshaft onto the cylinder head and lay a strip of plastigauge lengthwise on each camshaft journal.

NOTE:

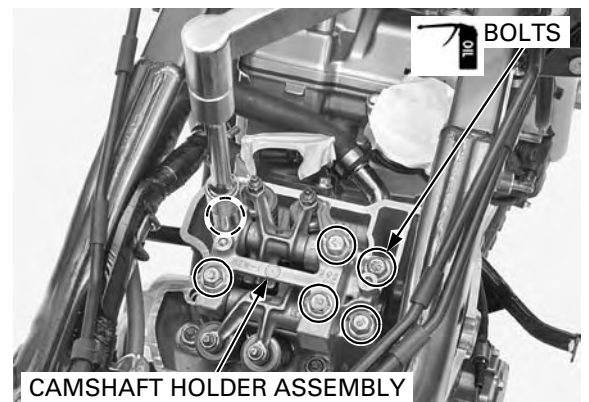
- Do not block any oil holes with the plastigauge.
- Do not rotate the camshaft during inspection.



Apply engine oil to the camshaft holder bolt threads and seating surface.

Carefully install the camshaft holder and tighten the camshaft holder bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



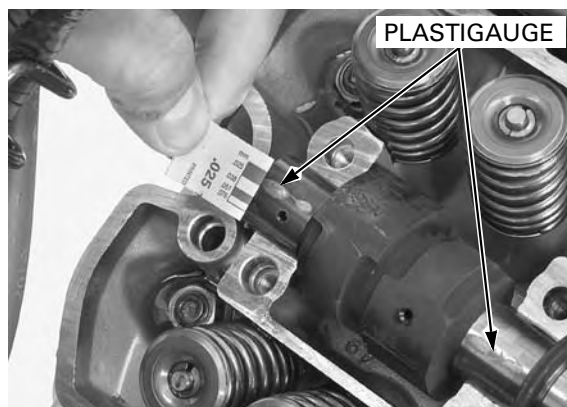
CYLINDER HEAD/VALVES

Remove the camshaft holder and measure the compressed plastigauge at its widest point on each camshaft journal to determine the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

When the service limit is exceeded, replace the camshaft and recheck the oil clearance.

Replace the cylinder head and camshaft holder if the clearance still exceeds the service limit.

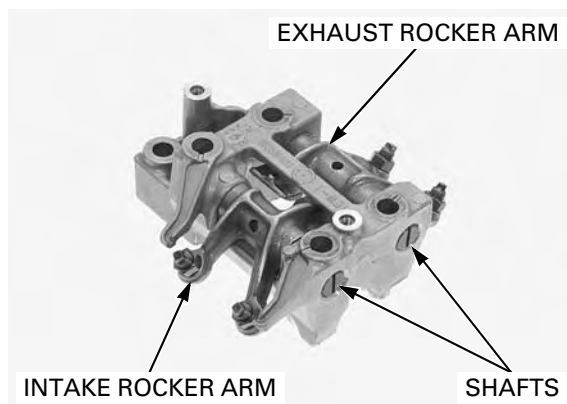


CAMSHAFT HOLDER DISASSEMBLY

NOTE:

The front camshaft holder service uses the same procedure as the rear camshaft holder.

Remove the rocker arm shafts, intake and exhaust rocker arms.



ROCKER ARM/ROCKER ARM SHAFT INSPECTION

Check the sliding surface of the rocker arms for wear or damage where they contact the camshaft, or for clogged oil holes.

Check the contact surface of the valve adjusting screw for wear or damage.

Measure the I.D. of each rocker arm.

SERVICE LIMIT: 12.05 mm (0.474 in)



Check the shaft for wear or damage.

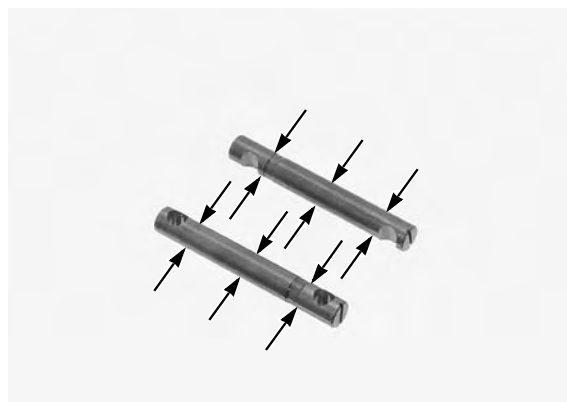
Measure each rocker arm shaft O.D.

SERVICE LIMIT: 11.92 mm (0.469 in)

Calculate the rocker arm-to-shaft clearance.

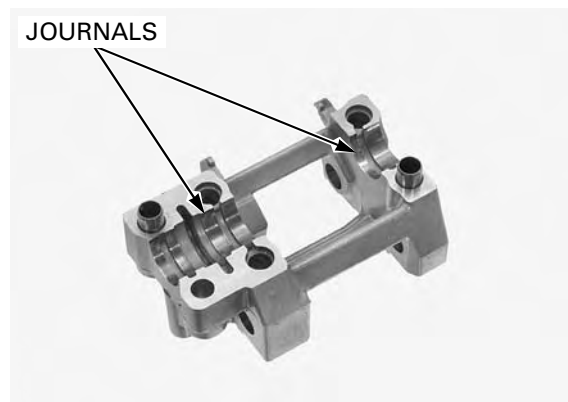
SERVICE LIMIT: 0.14 mm (0.006 in)

Replace the rocker arm and/or shaft if necessary.



CAMSHAFT HOLDER INSPECTION

Check the camshaft journal surfaces of each camshaft holder for scoring, scratches or evidence of insufficient lubrication.

**CYLINDER HEAD REMOVAL****NOTE:**

- The cylinder head service can be done with the engine in the frame.
- The front cylinder head uses the same service procedure as the rear cylinder head.

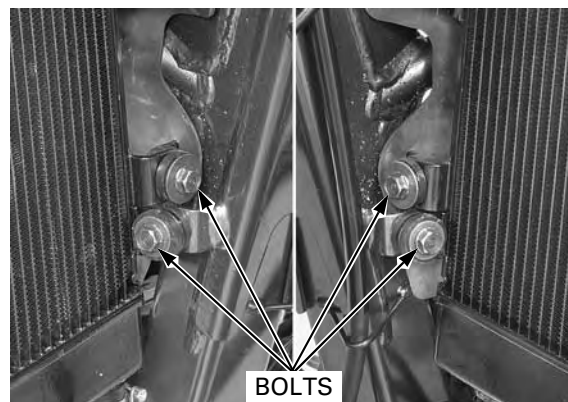
Remove the following:

- Cylinder head cover (page 8-6)
- Camshaft (page 8-8)
- CMP sensor (page 5-73)

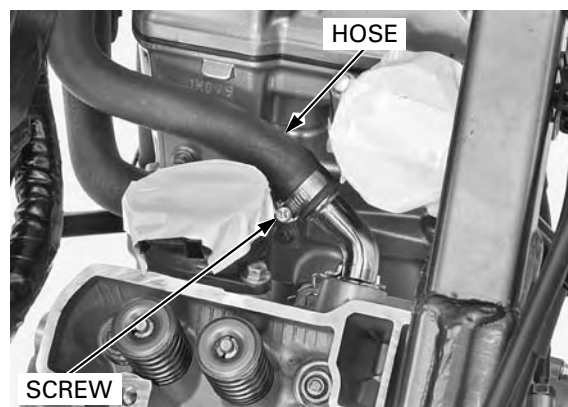
Drain the coolant by removing the water pump drain bolt (page 6-7).

Front cylinder head only:

Remove the radiator lower mounting bolts and swing the radiator to forward.

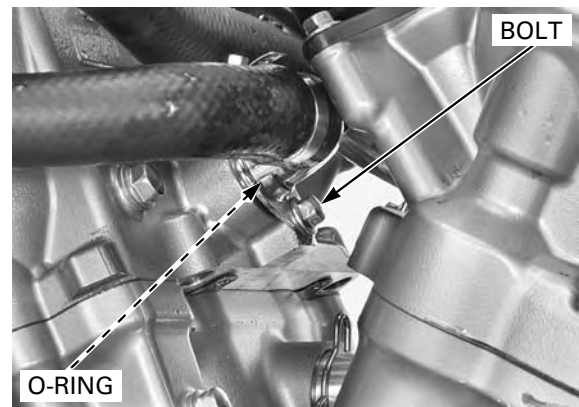


Loosen the band screw and disconnect the water hose.

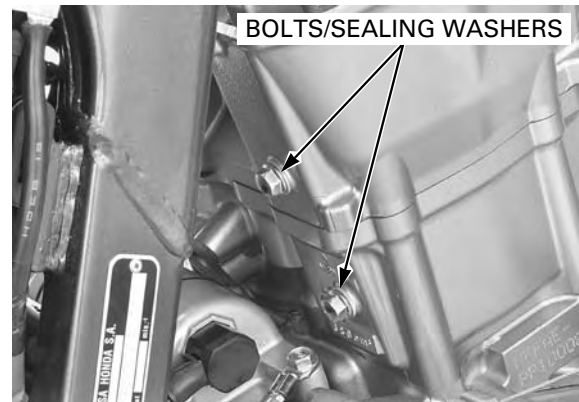


CYLINDER HEAD/VALVES

Front cylinder head only: Remove the bolt water hose joint and O-ring.



Remove the cam chain tensioner mounting bolts and sealing washers.



Remove the cam chain tensioner.



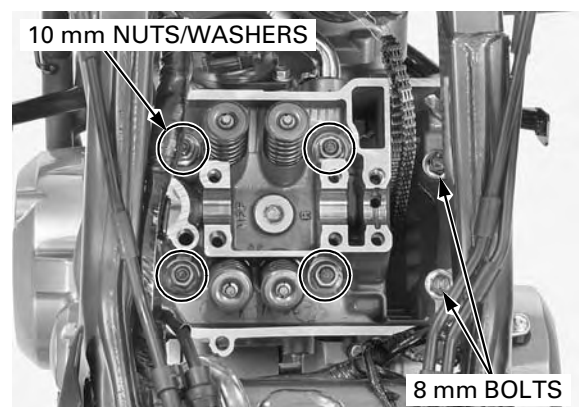
Remove the 8 mm bolts.

Loosen the 10 mm nuts in a crisscross pattern in several steps.

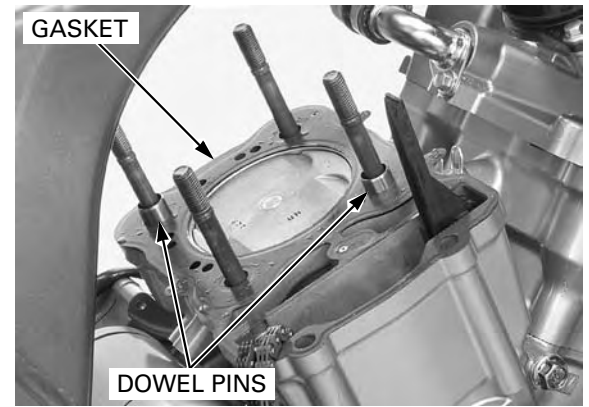
Remove the nuts and washers.

Remove the cylinder head.

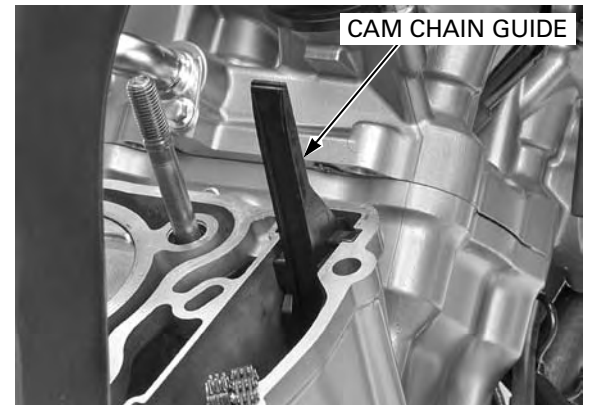
Be careful not to damage the mating surface when removing the cylinder head.



Remove the gasket and dowel pins.



Remove the cam chain guide.

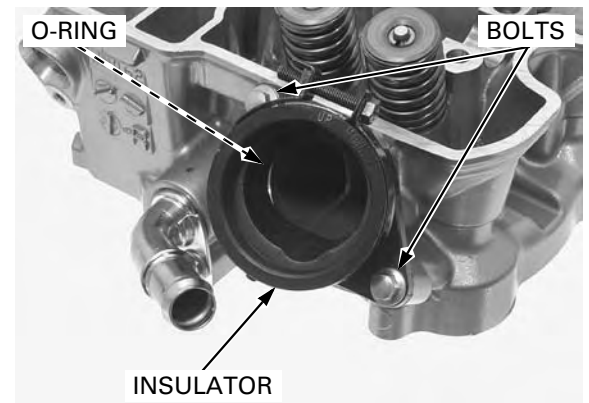


CYLINDER HEAD DISASSEMBLY

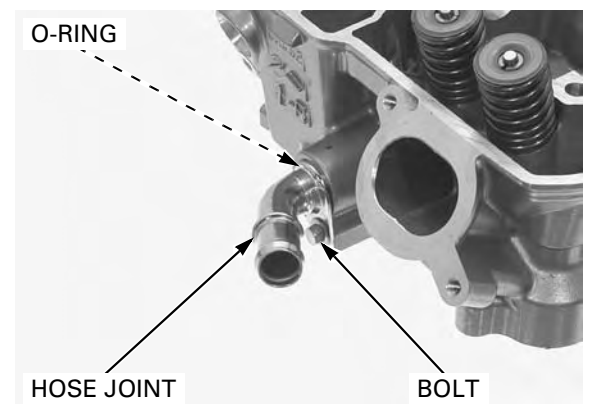
Remove the following:

- Spark plug (page 3-8)
- Cylinder head (page 8-13)

Remove the bolts, insulator and O-ring.



Rear cylinder head only: Remove the bolt, water hose joint and O-ring.



CYLINDER HEAD/VALVES

Mark all parts during disassembly so they can be placed back in their original position.

Remove the cotters using a special tool.

TOOL:

Valve spring compressor 07757-0010000

NOTE:

Compressing the valve spring more than necessary will cause loss of valve spring tension.

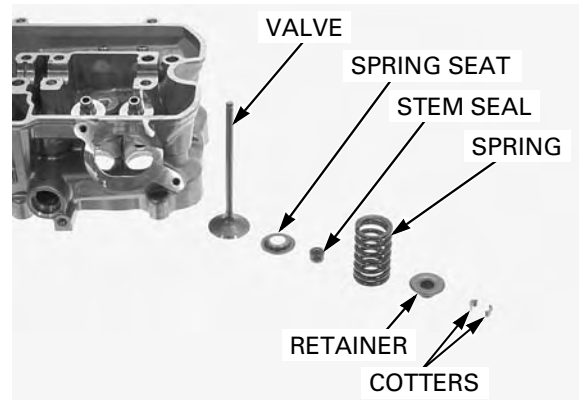
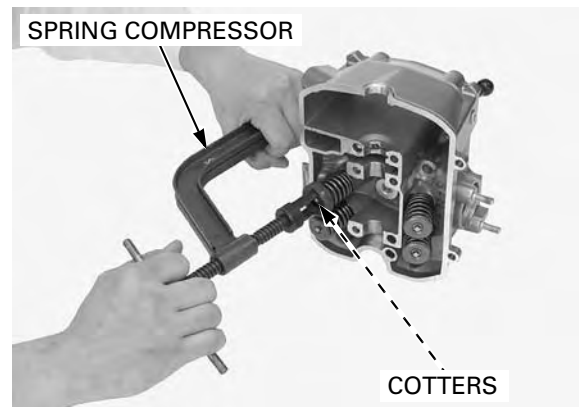
Do not reuse the removed stem seal.

Remove the valve spring compressor, then remove the retainer, spring and valve.
Remove the stem seal and spring seat.

Avoid damaging the gasket surface.

Remove the carbon deposits from the combustion chamber and clean off the head gasket surface.

Check the spark plug hole and valve areas for cracks.

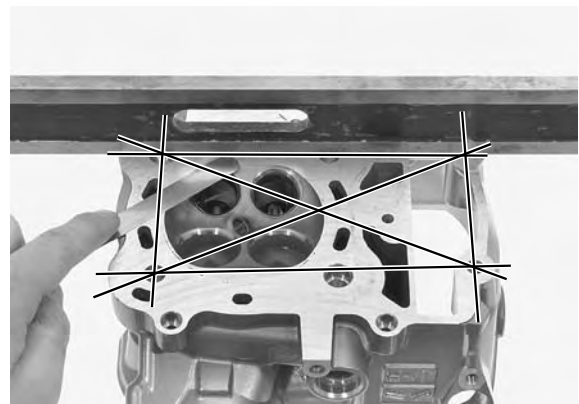


INSPECTION

CYLINDER HEAD

Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)

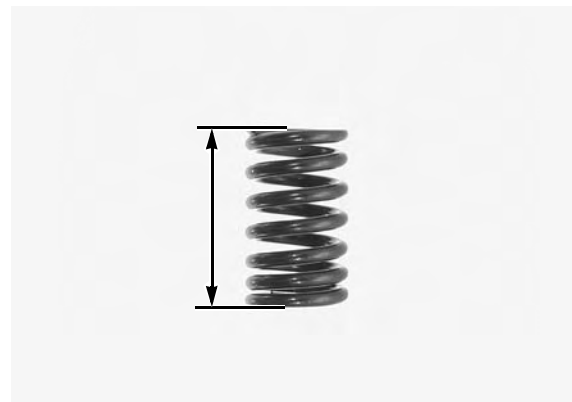


VALVE SPRING

Check the valve spring for fatigue or damage.

Measure the free length of each valve spring.

SERVICE LIMIT: 43.9 mm (1.73 in)

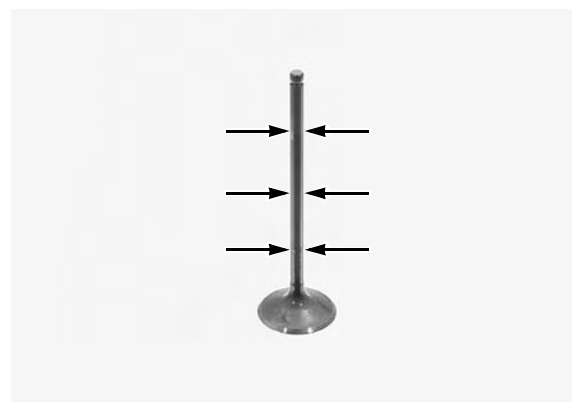
**VALVE STEM, VALVE GUIDE**

Check each valve for bending, burning, scratches or abnormal wear.

Insert the valves in their original positions in the cylinder head. Check that each valve moves up and down smoothly, without binding.

Measure each valve stem O.D. and record it.

SERVICE LIMITS: IN: 5.460 mm (0.2150 in)
EX: 5.455 mm (0.2148 in)



Ream the valve guide to remove any carbon build-up before measuring the guide I.D.

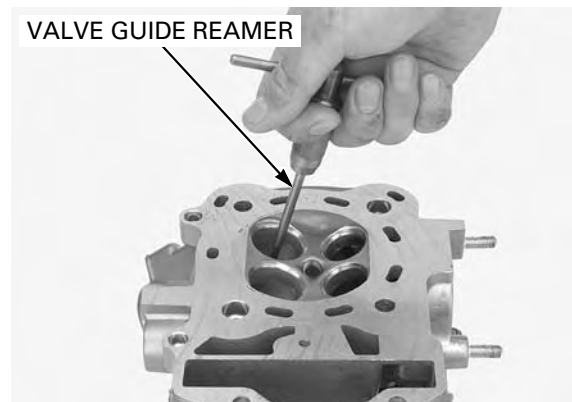
NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valves maybe installed slanted, causing oil leakage from the stem seal and improper valve seat contact. This may prevent valve seat refacing.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:

Valve guide reamer, 5.510 mm 07984-2000001

VALVE GUIDE REAMER



CYLINDER HEAD/VALVES

Measure each valve guide I.D. and record it.

SERVICE LIMIT: IN/EX: 5.54 mm (0.218 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

SERVICE LIMITS: IN: 0.07 mm (0.003 in)

EX: 0.09 mm (0.004 in)

If the stem-to-guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance.

If so, replace any guides as necessary and ream to fit.

If the stem-to-guide clearance exceeds the service limit with a new guide, also replace the valve.

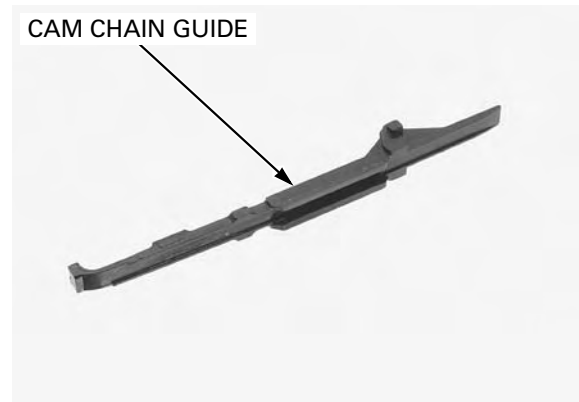
NOTE:

Inspect and reface the valve seats whenever the valve guides are replaced (page 8-20).



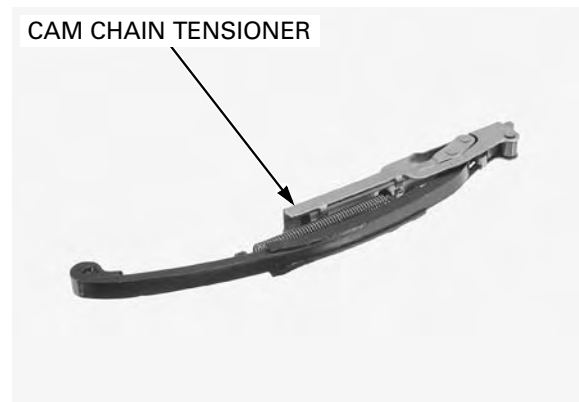
CAM CHAIN GUIDE

Check the cam chain guide for wear or damage.
Replace the cam chain guide if necessary.



CAM CHAIN TENSIONER

Check the cam chain tensioner for wear or damage.
Replace the cam chain tensioner if necessary.



VALVE GUIDE REPLACEMENT

NOTE:

Refinish the valve seats whenever the valve guides are replaced to prevent uneven seating.

Chill new valve guides in a freezer section of refrigerator for about an hour.

Using a torch to heat the cylinder head may cause warping.

Heat the cylinder head to 130 – 140°C (275 – 290°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (300°F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

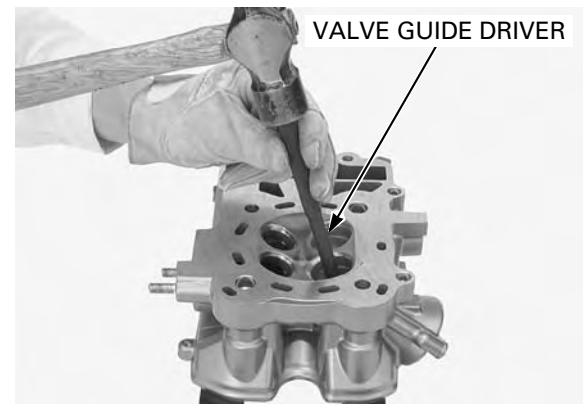
To avoid burns, wear insulated gloves when handling the heated cylinder head.

Be careful not to damage the cylinder head.

Support the cylinder head and drive out the old guides from the combustion chamber side of the head.

TOOL:

Valve guide driver, 5.5 mm 07742-0010100



Adjust the valve guide driver to the valve guide height.

TOOL:

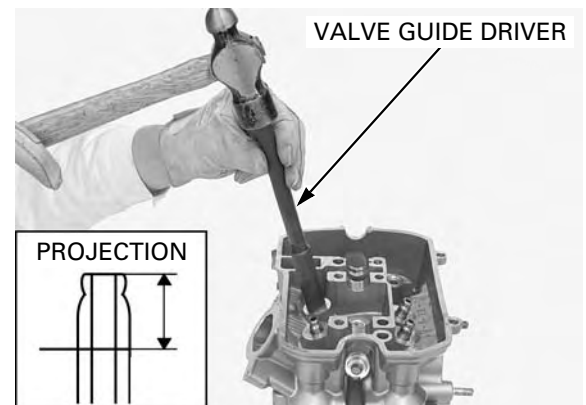
Valve guide driver 07743-0020000

VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:

IN: 12.5 – 12.7 mm (0.49 – 0.50 in)

EX: 16.7 – 16.9 mm (0.66 – 0.67 in)

Drive new guides in from the camshaft side of the cylinder head to the valve guide height while the cylinder head is still heated.



Let the cylinder head cool to room temperature, then ream the new valve guides.

TOOL:

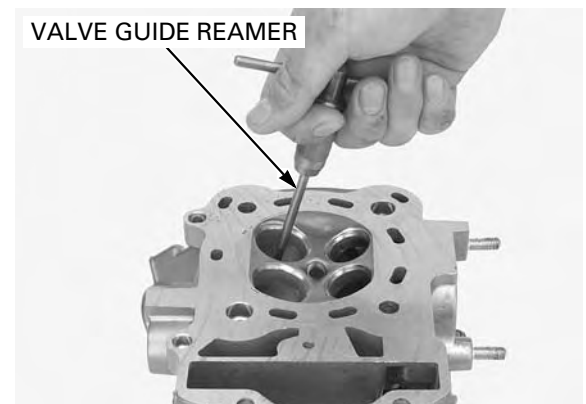
Valve guide reamer, 5.510 mm 07984-2000001

NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valves maybe installed slanted, causing oil leakage from the stem seal and improper valve seat contact. This may prevent valve seat refacing.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

Clean the cylinder head thoroughly to remove any metal particles after reaming.

Reface the valve seat (page 8-21).



VALVE SEAT INSPECTION/REFACING

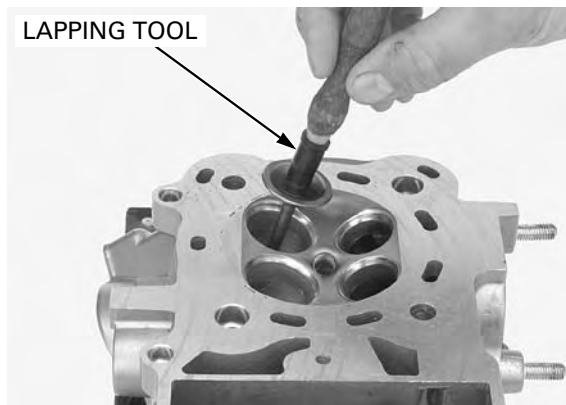
INSPECTION

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a thin coat of Prussian Blue to each valve face.

Tap the valve against the valve seat several times using a hand-lapping tool, without rotating valve, to make a clear pattern.

LAPPING TOOL



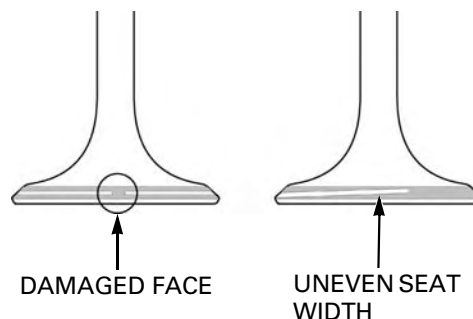
Remove the valve and inspect the valve seat face.

NOTE:

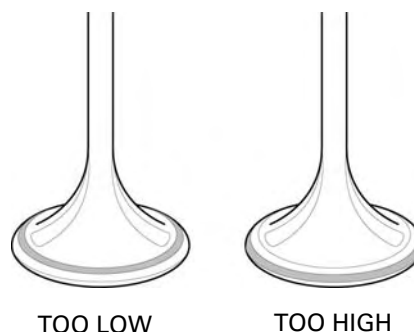
- The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

Inspect the valve seat face for:

- Uneven seat width:
 - Replace the valve and reface the valve seat.
- Damaged face:
 - Replace the valve and reface the valve seat.



- Contact area (too high or too low area):
 - Reface the valve seat.



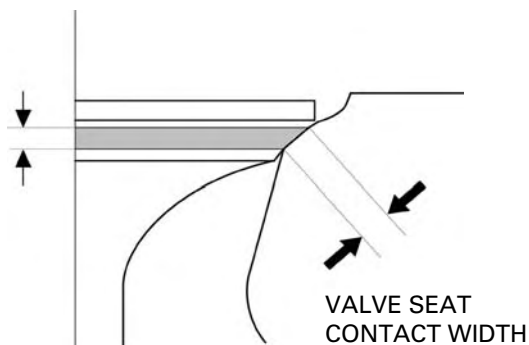
Inspect the width of the valve seat.

The valve seat contact should be within the specified width and even all around the circumference.

STANDARD: 0.90 – 1.10 mm (0.035 – 0.043 in)

SERVICE LIMIT: 1.5 mm (0.06 in)

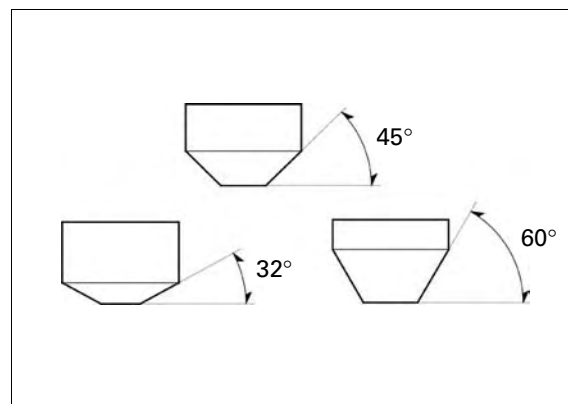
If the valve seat width is not within specification, reface the valve seat.



VALVE SEAT REFACING

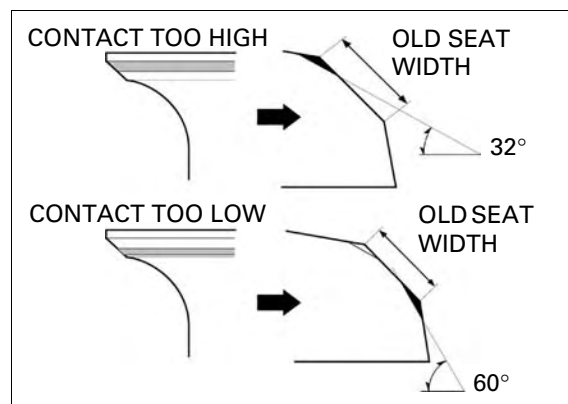
NOTE:

- Follow the refacer manufacturer's operating instructions.
- Reface the valve seat whenever the valve guide has been replaced.
- Be careful not to grind the seat more than necessary.



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



Using a 45° cutter, remove any roughness or irregularities from the seat.

TOOLS:

Seat cutter, 27.5 mm (EX)

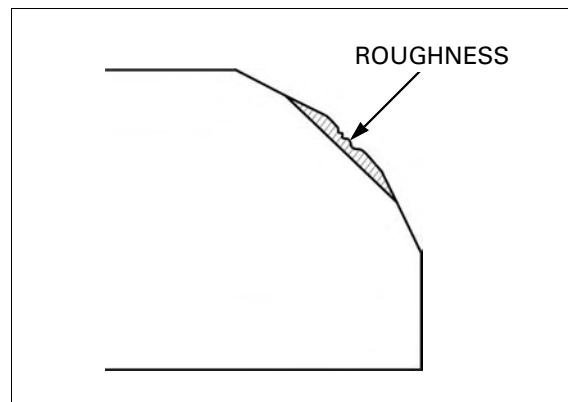
Seat cutter, 33 mm (IN)

Cutter holder, 5.5 mm

07780-0010200

07780-0010800

07781-0010101
or equivalent commercially available



Using a 32° cutter, remove the top 1/4 of the existing valve seat material.

TOOLS:

Flat cutter, 33 mm (IN)

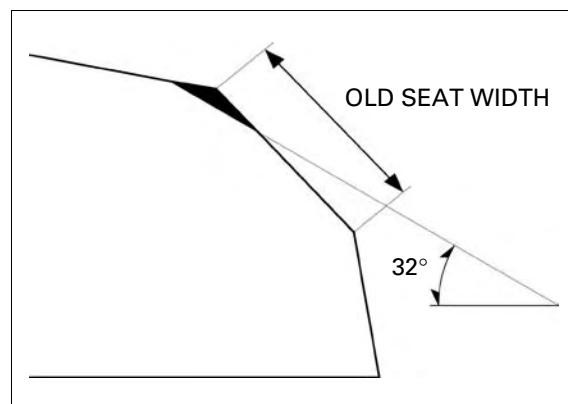
Flat cutter, 28 mm (EX)

Cutter holder, 5.5 mm

07780-0012900

07780-0012100

07781-0010101
or equivalent commercially available



CYLINDER HEAD/VALVES

Using a 60° cutter, remove the bottom 1/4 of the old seat.

TOOLS:

Interior cutter, 34 mm (IN)

Interior cutter, 26 mm (EX)

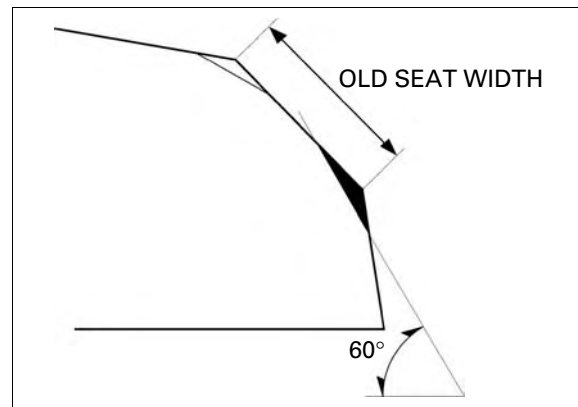
Cutter holder, 5.5 mm

07780-0014700

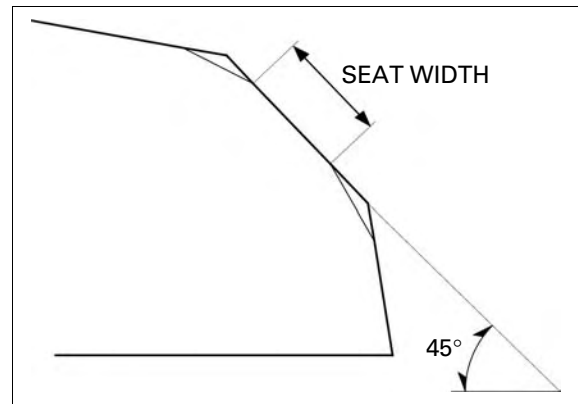
07780-0014500

07781-0010101

or equivalent commercially available



Using a 45° seat cutter, cut the seat to the proper width. Make sure that all pitting and irregularities are removed.



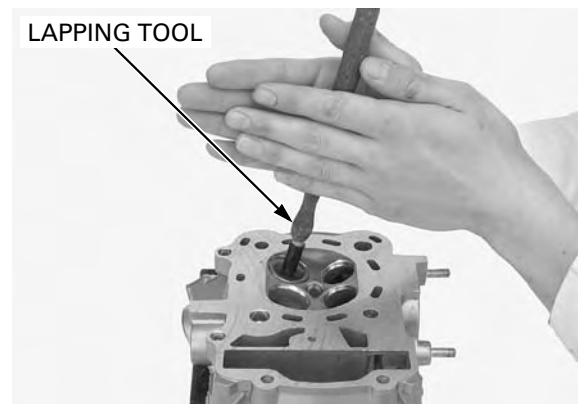
NOTE:

- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Lapping compound can cause damage if it enters between the valve stem and guide.

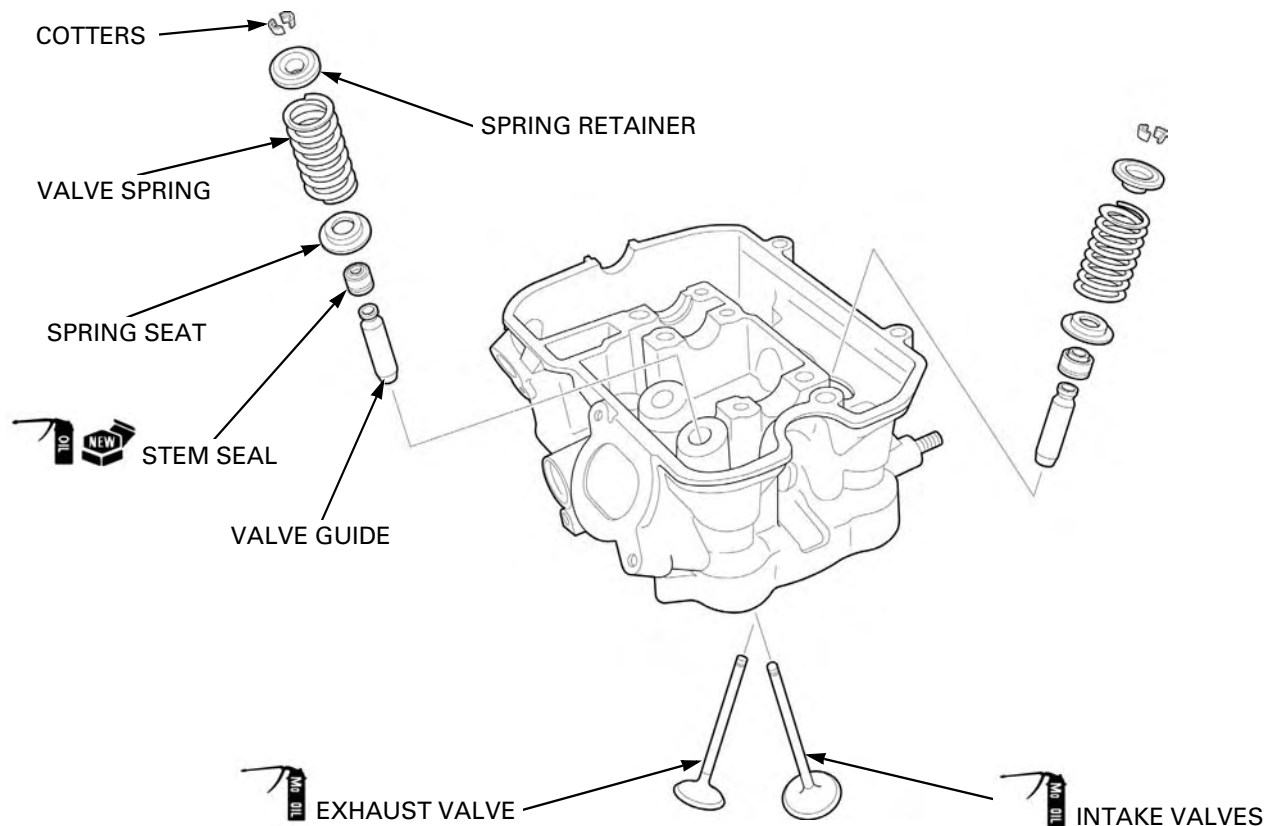
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

After lapping, wash any residual compound off the cylinder head and valve.

Recheck the seat contact after lapping.

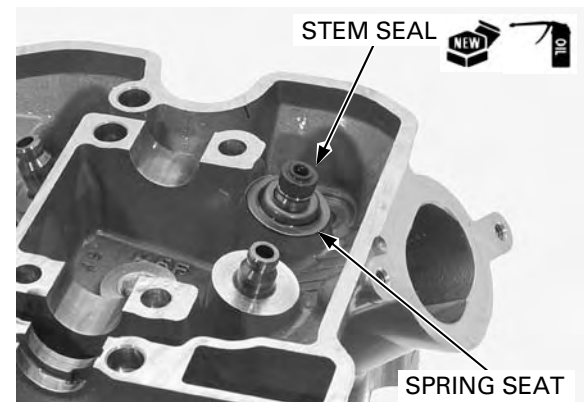


CYLINDER HEAD ASSEMBLY



Blow out all of the oil passages in the cylinder head with compressed air.

Coat new stem seal with engine oil.
Install the spring seat and new stem seal.



Lubricate valve stem and valve guide inner surfaces with molybdenum disulfide oil solution.

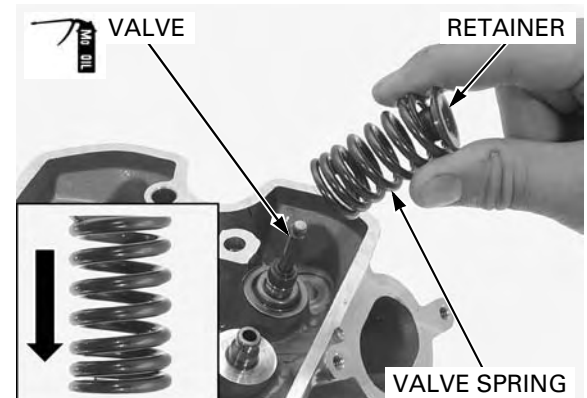
Install the valve into the valve guide.

NOTE:

To avoid damage to the stem seal, turn the valve slowly when valve installing.

Install the valve spring with tightly wound coils facing the combustion chamber.

Install the spring retainer.



CYLINDER HEAD/VALVES

Grease the cotters to ease installation.

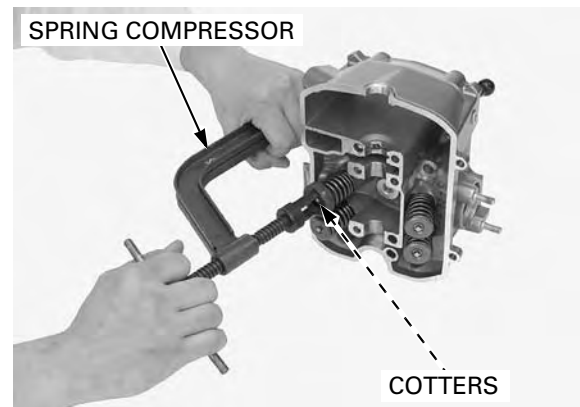
Install the cotters using a special tool.

TOOL:

Valve spring compressor 07757-0010000

NOTE:

Compressing the valve springs more than necessary will cause loss of valve spring tension.



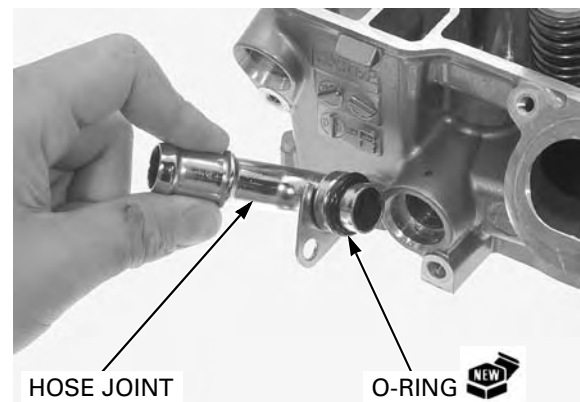
Support the cylinder head so the valve heads will not contact anything and possibly get damaged.

Tap the valve stems gently with two plastic hammers to seat the cotters firmly as shown.



Rear cylinder head only:

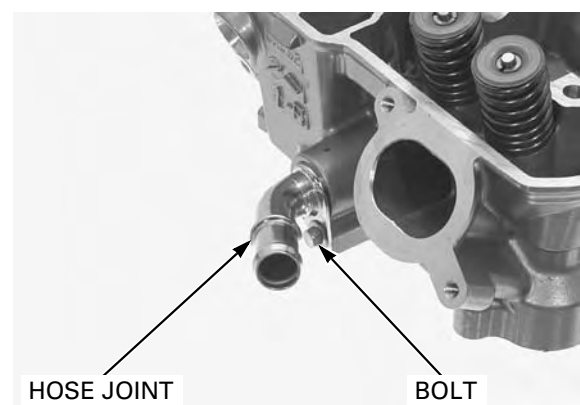
Install a new O-ring to the water hose joint.



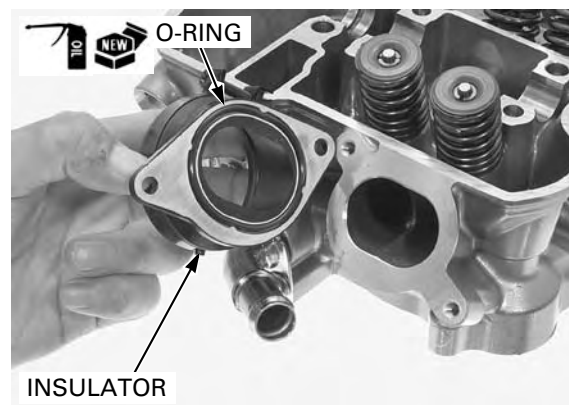
Rear cylinder head only:

Install the water hose joint by aligning the bolt hole in the stopper plate and cylinder head.

Install and tighten the bolt securely.



Coat a new O-ring with engine oil and install it to the insulator groove.

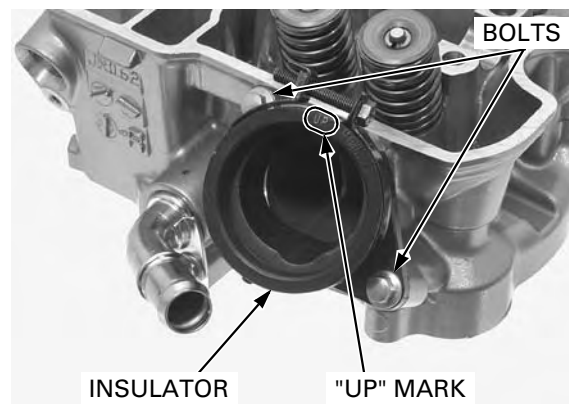


Install the insulator with "UP" mark facing up.

Install and tighten the bolts securely.

Install the following:

- Cylinder head (page 8-25)
- Spark plug (page 3-9)



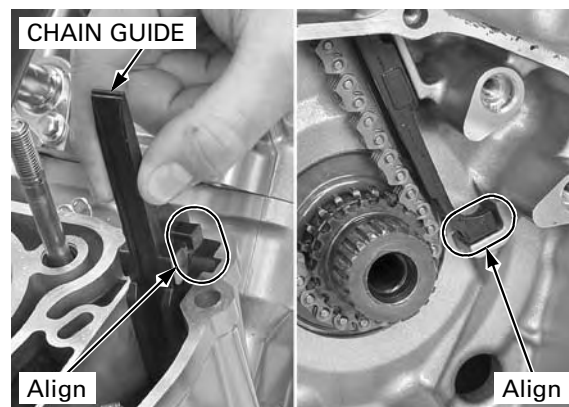
CYLINDER HEAD INSTALLATION

NOTE:

- The front cylinder head uses the same service procedure as the rear cylinder head.
- Be careful not to damage the mating surfaces.
- When cleaning the cylinder head mating surface, place the shop towel over the cylinder opening to prevent dust or dirt from entering the engine.

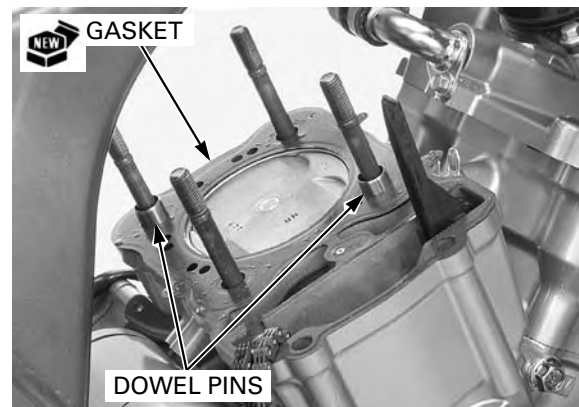
Clean the gasket mating surfaces of the cylinder and cylinder head thoroughly.

Install the cam chain guide by aligning the guide end with the groove in the crankcase and the bosses with the groove in the cylinder.



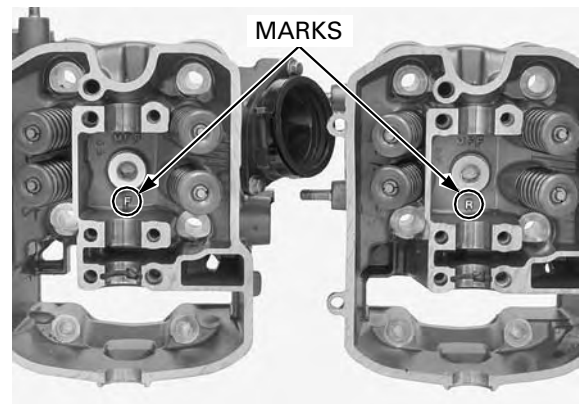
CYLINDER HEAD/VALVES

Install the dowel pins and a new gasket.



The cylinder heads are identified by marks on their oil pockets.

- "F" for front cylinder head
- "R" for rear cylinder head



Install the cylinder head to the cylinder.

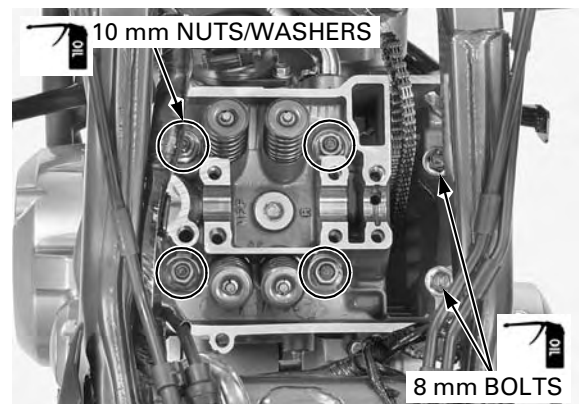
Apply engine oil to the each bolts and nuts threads and seating surfaces.

Install and tighten the cylinder head nuts and washer in a crisscross pattern in several steps to the specified torque.

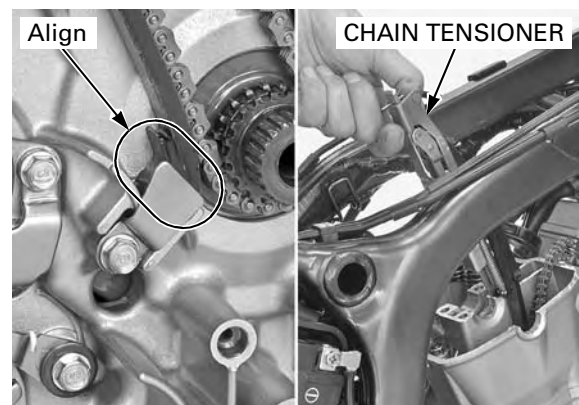
TORQUE: 40 N·m (4.1 kgf·m, 30 lbf·ft)

Install and tighten the cylinder head bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

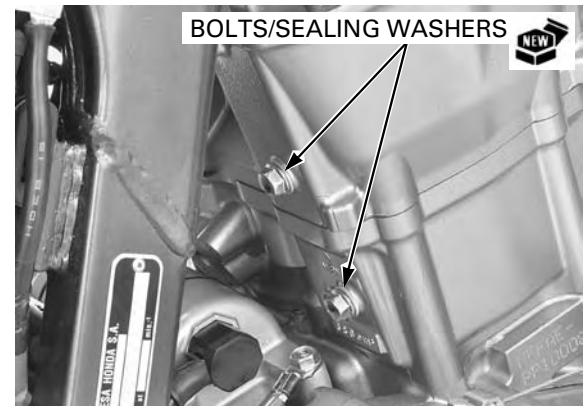


Install the cam chain tensioner, aligning its end with the groove in the crankcase.

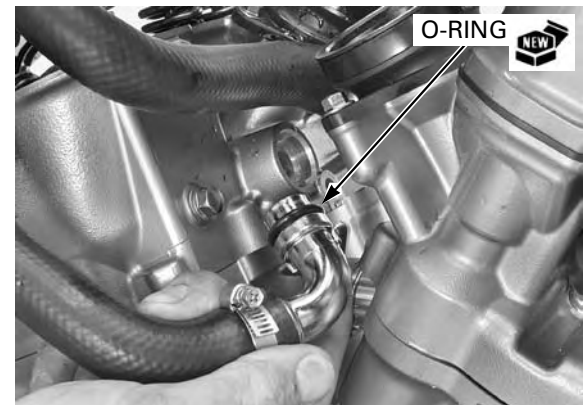


Install the cam chain tensioner bolts with new sealing washers and tighten them alternately.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



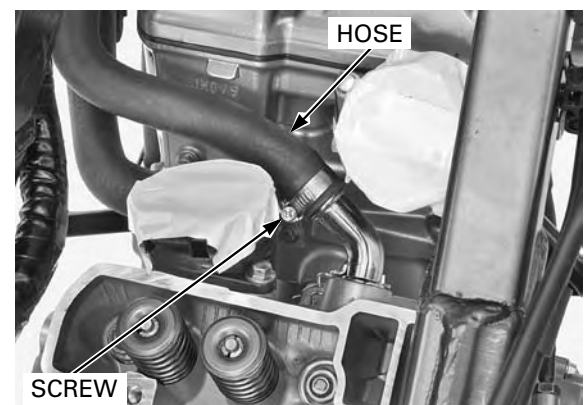
Front cylinder head only: Install a new O-ring to the water hose joint.



Front cylinder head only: Install the water hose joint by aligning the bolt hole in the stopper plate and cylinder head. Install and tighten the bolt securely.



Connect the water hose and tighten the band screw specified range (page 6-10).



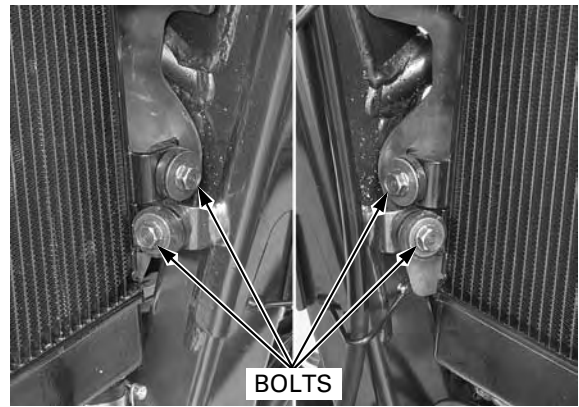
CYLINDER HEAD/VALVES

Front cylinder head only: Align the bolt holes in the radiator and stay.
Install and tighten the radiator lower mounting bolts securely.

Install the following:

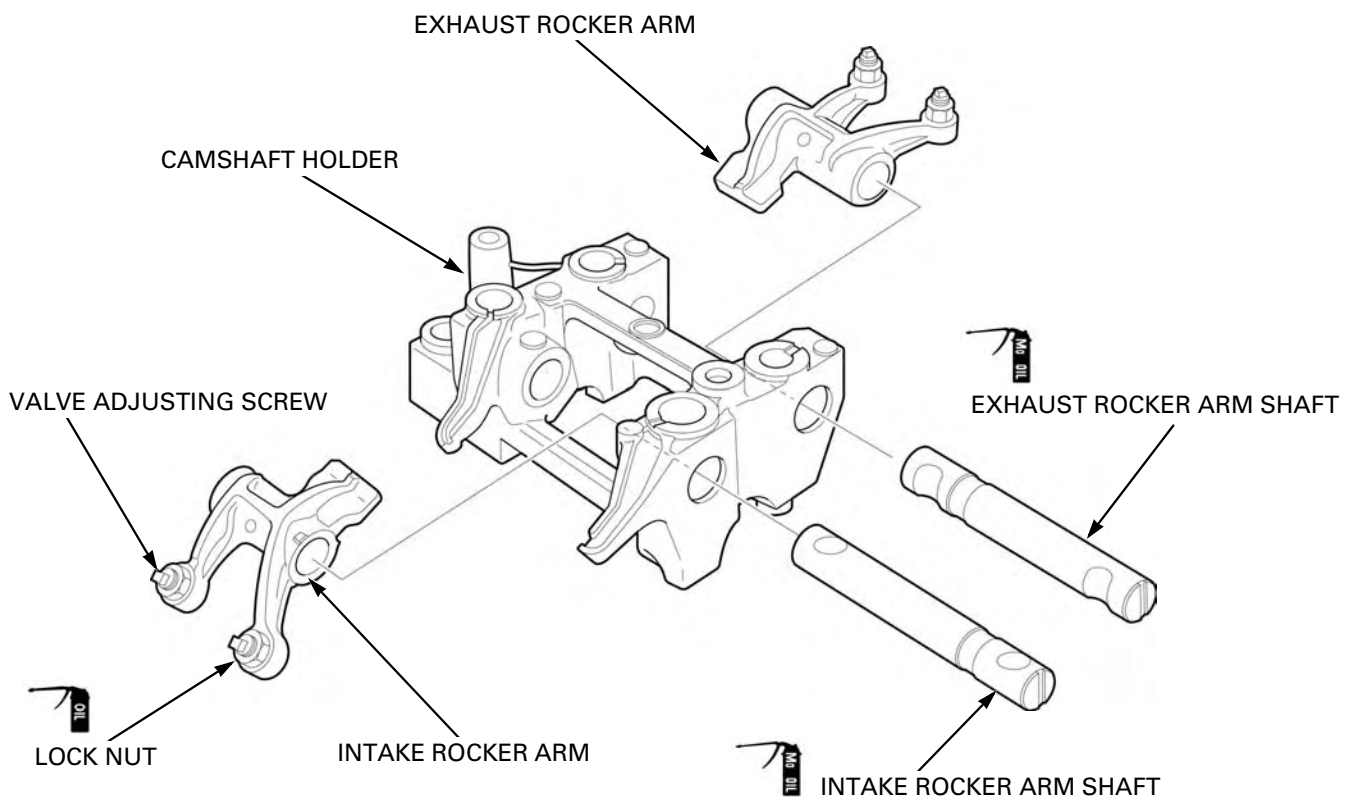
- CMP sensor (page 5-73)
- Camshaft (page 8-28)
- Cylinder head cover (page 8-33)

Fill and bleed the cooling system (page 6-7).



CAMSHAFT INSTALLATION

CAMSHAFT HOLDER ASSEMBLY

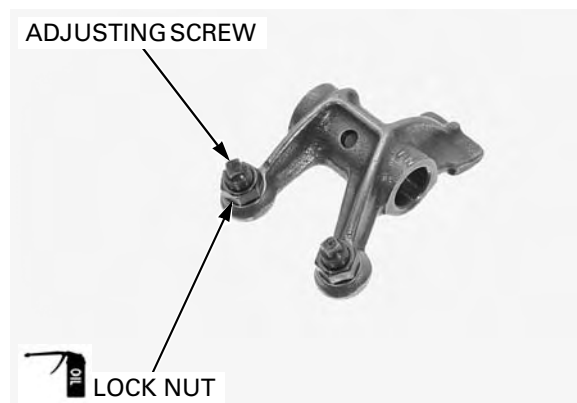


If disassembled the valve adjusting lock nut and adjusting screw.

Apply engine oil to the valve adjusting screw lock nut threads and seating surface.

Install the valve adjusting screw and lock nut.

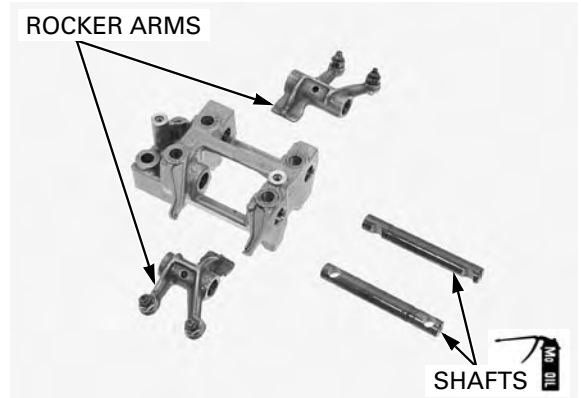
ADJUSTING SCREW



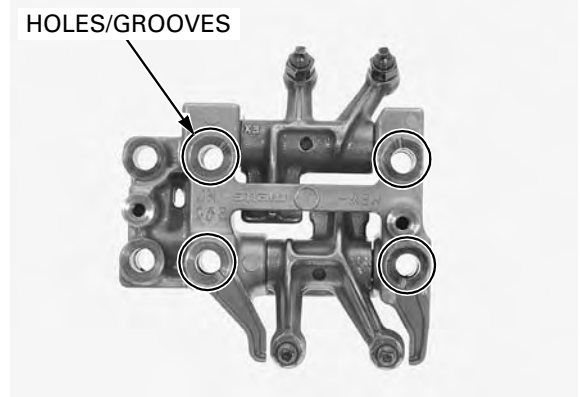
NOTE:

- The rocker arms are identified by the stamped marks:
"IN" for intake rocker arm
"EX" for exhaust rocker arm
- The intake rocker arm shaft has two holes on each end.
- The exhaust rocker arm shaft has two grooves on each end.

Apply molybdenum disulfide oil solution to the outer surface of the shaft.
Install the rocker arms and shafts.



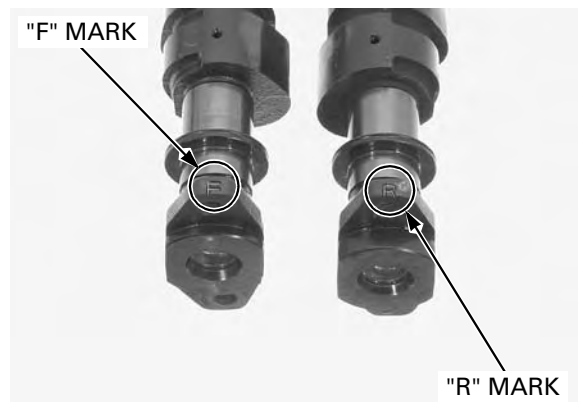
Align the intake rocker arm shaft holes with the holder holes.
Align the exhaust rocker arm shaft grooves with the holder holes.



CAMSHAFT INSTALLATION

NOTE:

- The camshafts are identified by the stamped marks:
"F" for front cylinder camshaft
"R" for rear cylinder camshaft
- If both (front and rear) camshafts were removed, install the front cylinder camshaft first, then install the rear cylinder camshaft.
- If the rear cylinder head was not serviced, remove the rear cylinder head cover to check the camshaft position.
- If the front cylinder head was not serviced, remove the front cylinder head cover to check the camshaft position.
- Take care not to jam the cam chain at the crankshaft.

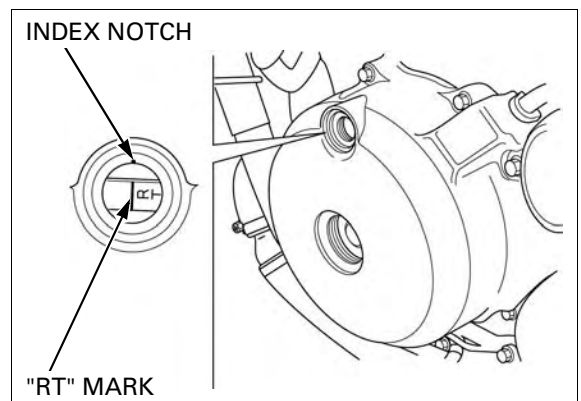


FRONT CYLINDER TDC SETTING

If the rear cylinder has not been serviced, begin here.

Remove the rear cylinder head cover (page 8-7).
Check the rear cylinder camshaft position as follows:

Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index notch on the left crankcase cover.

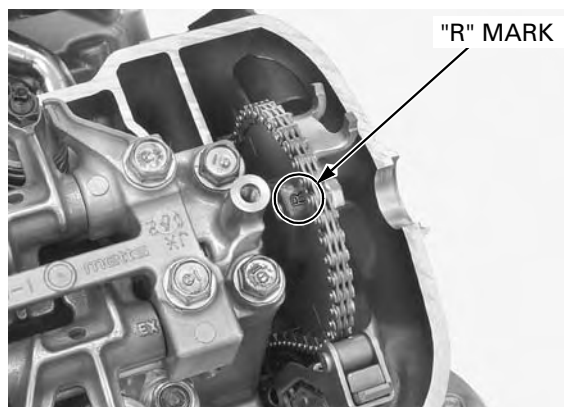


CYLINDER HEAD/VALVES

Then check the identification mark "R" on the rear camshaft.

- If the "R" mark faces up, turn the crankshaft counterclockwise $1-16/45$ (488°) turn (align the "FT" mark on the flywheel with the index notch) and begin installation of the front camshaft.
- If the "R" mark faces down (cannot be seen), turn the crankshaft counterclockwise $16/45$ (128°) turn (align the "FT" mark with the index notch) and begin installation of the front camshaft.

Install the front camshaft (page 8-31).



BOTH CYLINDER TDC SETTING

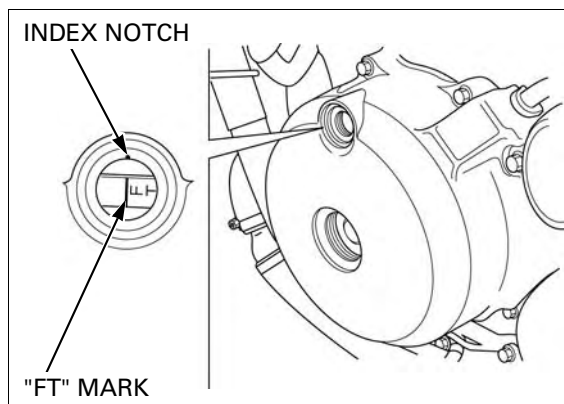
If both camshafts have been serviced, begin installation of the front camshaft.

Align the "FT" mark on the flywheel with the index notch on the left crankcase cover.

Install the front camshaft (page 8-31).

Set the rear cylinder at TDC (page 8-30).

Install the rear camshaft (page 8-31).



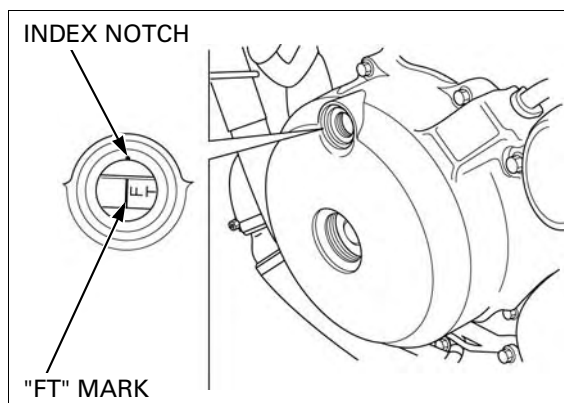
REAR CYLINDER TDC SETTING

If the front cylinder has not been serviced, begin here.

Remove the front cylinder head cover (page 8-6).

Check the front cylinder camshaft position as follows:

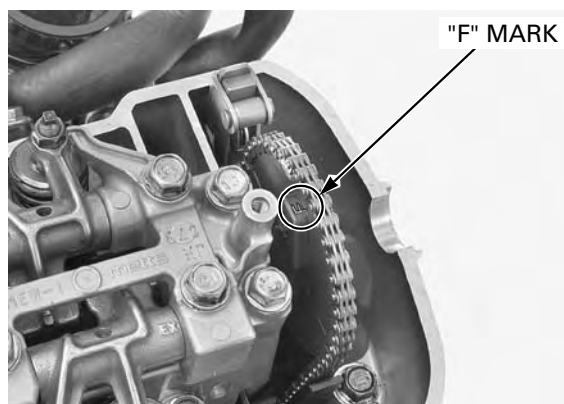
Turn the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index notch on the left crankcase cover.



Then check the identification mark "F" on the front camshaft.

- If the "F" mark faces up, turn the crankshaft counterclockwise $29/45$ (232°) turn (align the "RT" mark on the flywheel with the index notch) and begin installation of the rear camshaft.
- If the "F" mark faces down (cannot be seen), turn the crankshaft clockwise $1-29/45$ (592°) turn (align the "RT" mark with the index notch) and begin installation of the rear camshaft.

Install the rear camshaft using the following procedure.

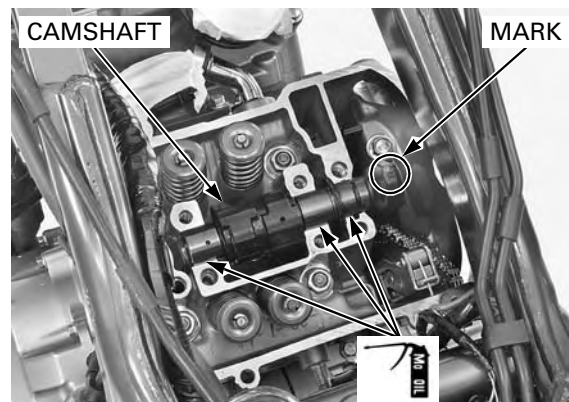


CAMSHAFT INSTALLATION

The front camshaft uses the same service procedure as the rear camshaft.

Lubricate the camshaft lobe and journal surfaces with molybdenum disulfide oil solution.

Install the camshaft with the camshaft identification mark (R: rear camshaft, F: front camshaft) facing up.

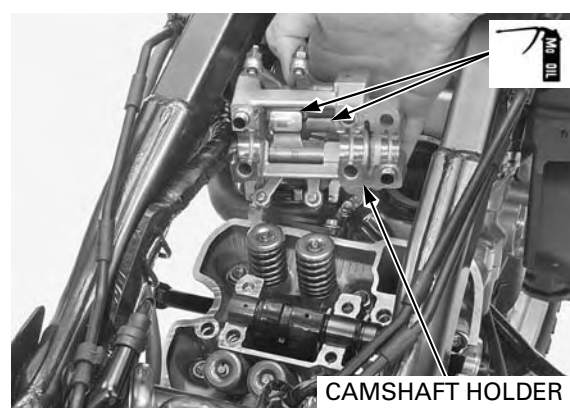


Lubricate each rocker arm slipper surfaces with molybdenum disulfide oil solution.

NOTE:

Before camshaft holder installation, loosen the valve adjusting screw and lock nut fully.

Install the camshaft holder assembly.

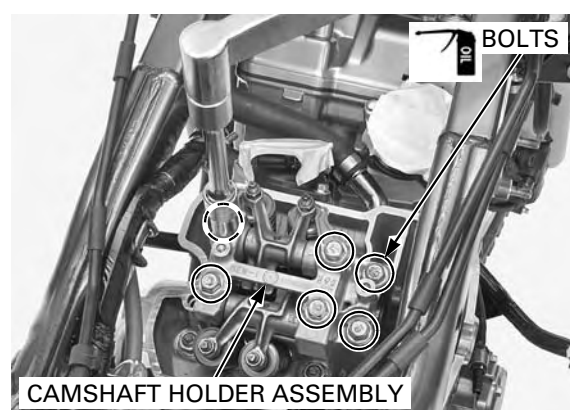


Apply engine oil to the camshaft holder bolt threads and seating surface.

Install the camshaft holder bolts.

Tighten the bolts to the specified torque in a criss-cross pattern in several steps.

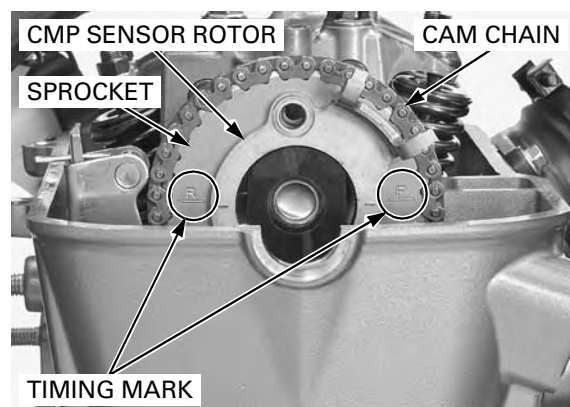
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Install the cam sprocket to the cam chain with the timing mark facing outside.

Install the cam sprocket and CMP sensor rotor (rear cylinder head only) on the camshaft flange.

Check that the timing marks align with the upper surface of the cylinder head.



CYLINDER HEAD/VALVES

Be careful not to let the cam sprocket bolts fall into the crankcase.

Clean and apply locking agent to the cam sprocket bolt threads (page 1-18).

Align the cam sprocket bolt holes in the cam sprocket, CMP sensor rotor (rear cylinder head only) and camshaft.

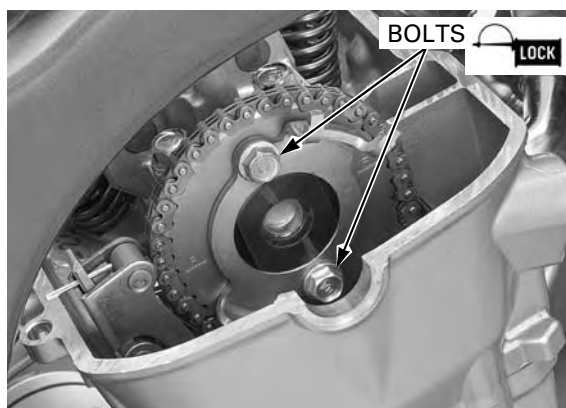
Temporarily install the cam sprocket bolt.

Turn the crankshaft counterclockwise 360° and tighten the other sprocket bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Turn the crankshaft counterclockwise 360° and tighten the other sprocket bolt to the specified torque.

Fill the oil pockets in the head with engine oil.
Adjust the valve clearance (page 3-10).

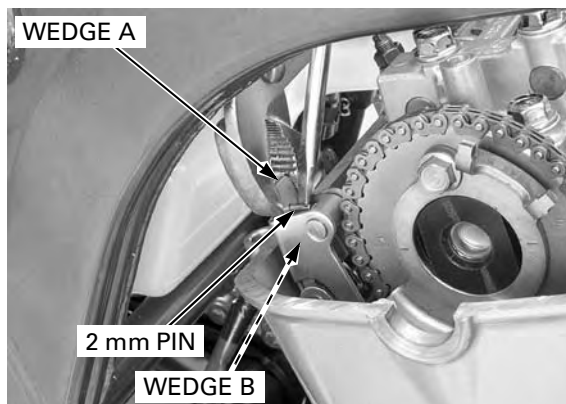


Remove the 2 mm pin while holding cam chain tensioner wedge A and pushing down the wedge B.

NOTE:

- Be careful not to let the 2 mm pin fall into the crankcase.
- Do not forget to remove the 2 mm pin before installing the cylinder head cover.

Install the cylinder head cover (page 8-33).



CYLINDER HEAD COVER INSTALLATION

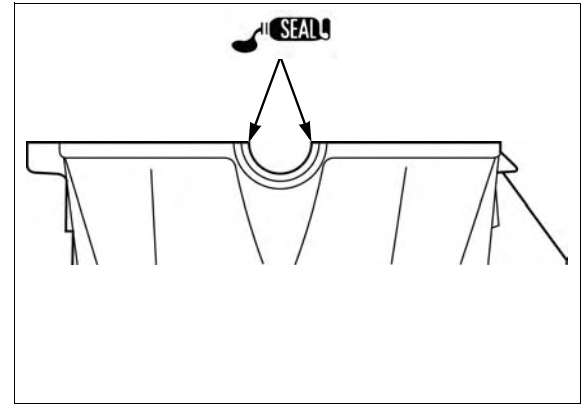
Clean the gasket groove and cylinder head mating surface of the cylinder head cover.

Check the gasket is in good condition, replace it if necessary.

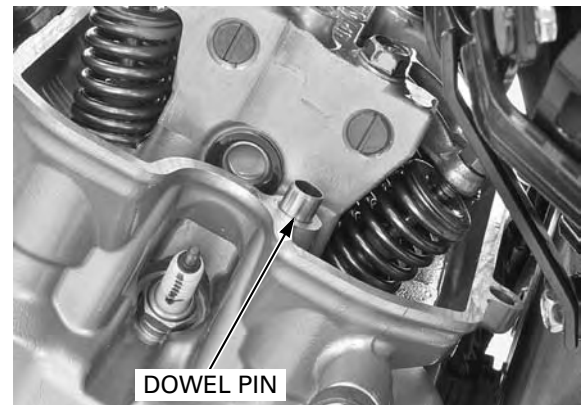
Install the gasket into the groove.

Clean the cylinder head cover mating surface of the cylinder head.

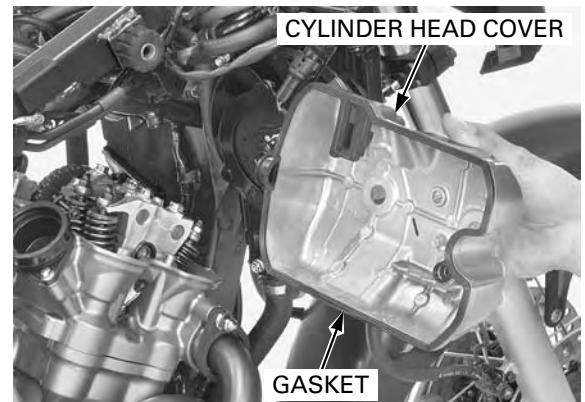
Apply liquid sealant (Three Bond 1207B or equivalent) to the cylinder head semi-circular cut-outs as shown.



Install the dowel pin.



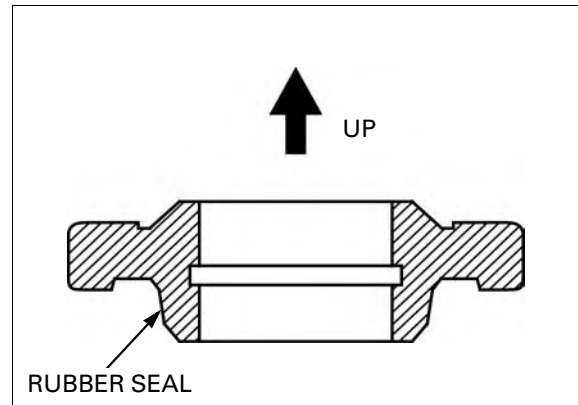
Install the cylinder head cover on the cylinder head.



CYLINDER HEAD/VALVES

Check the condition of the rubber seals, replace them if necessary.

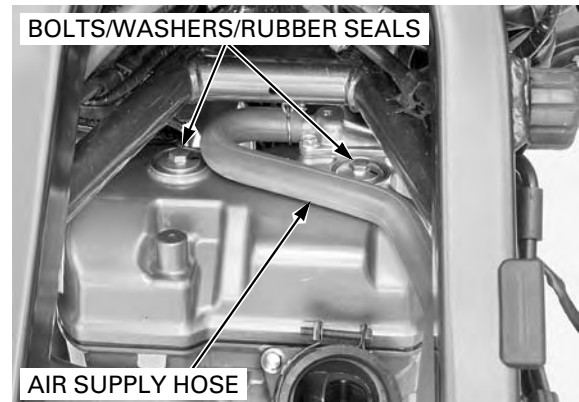
Install the rubber seals onto the cylinder head cover in the direction as shown.



Install the washers.
Install and tighten the cylinder head cover bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Front cylinder only: Connect the air supply hose to the PAIR check valve cover.



Rear cylinder only: Install the wire harness cover stay and bolt.
Tighten the bolt securely.

Install the following:

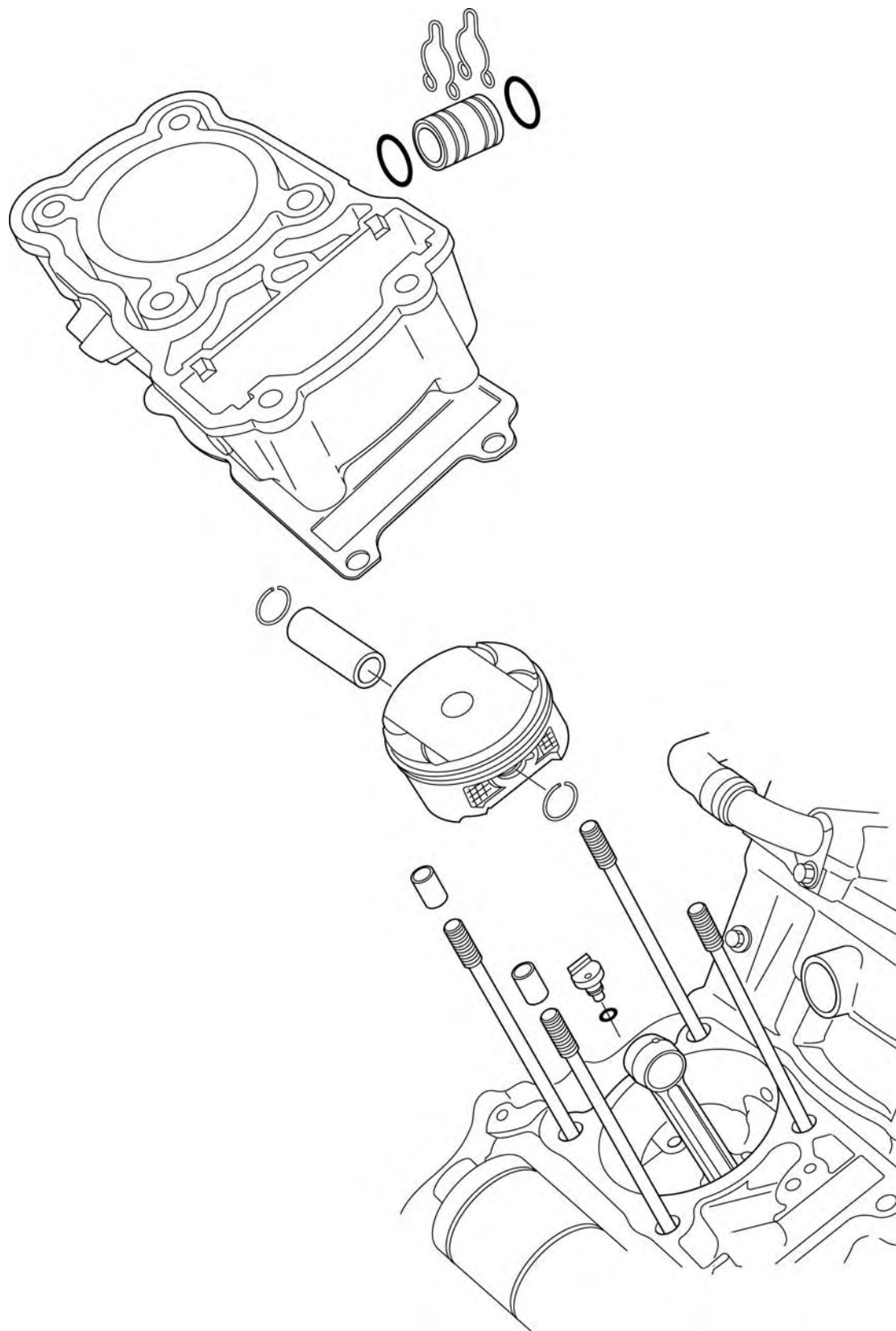
- Throttle body (page 5-68)
- PAIR solenoid valve (page 5-83)
- Right air guide (page 2-10)



9. CYLINDER/PISTON

COMPONENT LOCATION	9-2	CYLINDER/PISTON REMOVAL	9-4
SERVICE INFORMATION	9-3	CYLINDER/PISTON INSTALLATION.....	9-10
TROUBLESHOOTING	9-3		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the piston and cylinder.
- The piston and cylinder can be serviced with the engine in the frame.
- Take care not to damage the cylinder walls and pistons.
- Be careful not to damage the mating surfaces when removing the cylinder. Do not strike the cylinder too hard during removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder. Clean the oil passages before installing the cylinder.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		81.000 – 81.015 (3.1890 – 3.1896)	81.10 (3.193)
	Out of round		–	0.06 (0.002)
	Taper		–	0.06 (0.002)
	Warpage		–	0.10 (0.004)
Piston, piston pin, piston rings	Piston O.D. at 15 mm (0.59 in) from bottom		80.97 – 80.99 (3.188 – 3.189)	80.91 (3.185)
	Piston pin bore I.D.		18.002 – 18.008 (0.7087 – 0.7090)	18.05 (0.711)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.98 (0.708)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.200 – 0.350 (0.0079 – 0.0138)	0.50 (0.020)
		Second	0.350 – 0.500 (0.0138 – 0.0197)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
	Piston ring-to-ring groove clearance	Top	0.015 – 0.045 (0.0006 – 0.0018)	0.065 (0.0026)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.065 (0.0026)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			18.016 – 18.037 (0.7093 – 0.7101)	18.047 (0.7105)
Connecting rod-to-piston pin clearance			0.016 – 0.043 (0.0006 – 0.0017)	0.06 (0.002)

TORQUE VALUE

Cylinder stud bolt, 12 mm

See page 9-9

Cylinder stud bolt, 10 mm

See page 9-9

TROUBLESHOOTING

Compression too low, hard starting or poor performance at low speed

- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

Compression too high, overheating or knocking

- Excessive carbon built-up on piston head or combustion chamber

Excessive smoke

- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise

- Worn piston pin or piston pin hole
- Worn cylinder, piston or piston rings
- Worn connecting rod small end

CYLINDER/PISTON REMOVAL

CYLINDER REMOVAL

NOTE:

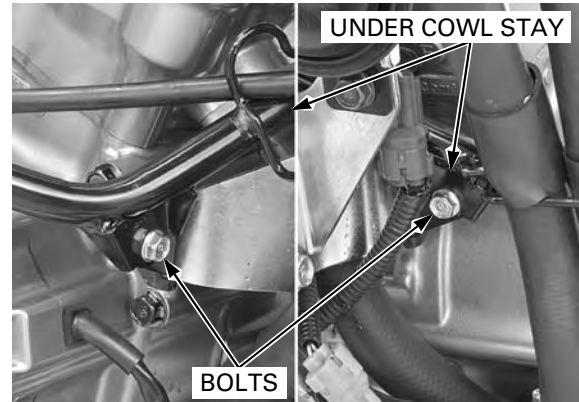
The front cylinder uses the same service procedure as the rear cylinder.

Remove the cylinder head (page 8-13).

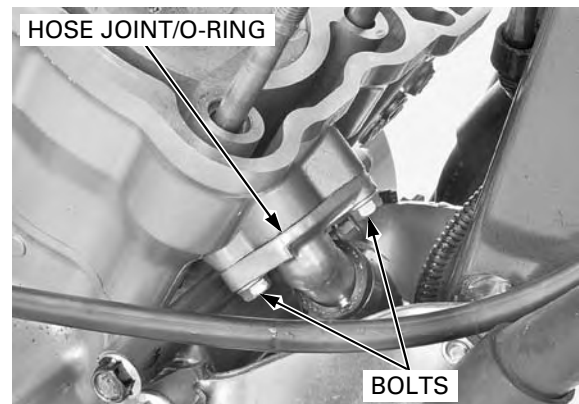
Front cylinder only: Remove the bolts and under cowl stay.

NOTE:

Release the clutch cable and water hoses from under cowl stay.

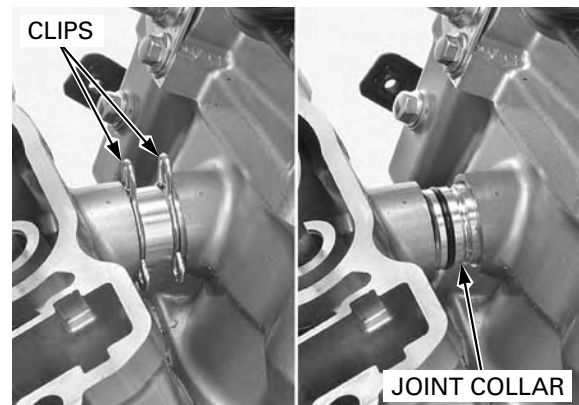


Front cylinder only: Remove the bolts and water hose joint/O-ring.



Remove the retaining clips.

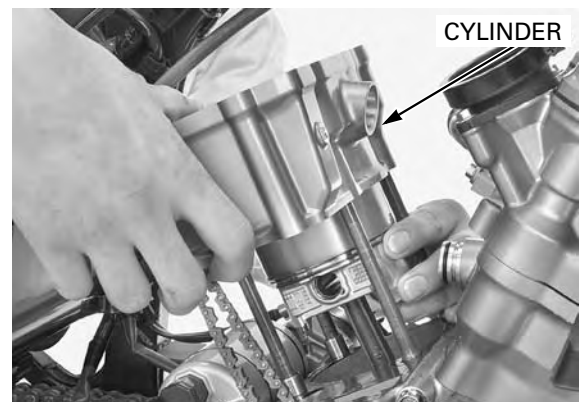
Slide the cylinder joint collar toward either the front or rear cylinder.



Lift the cylinder and remove it, being careful not to damage the piston with the stud bolts.

NOTE:

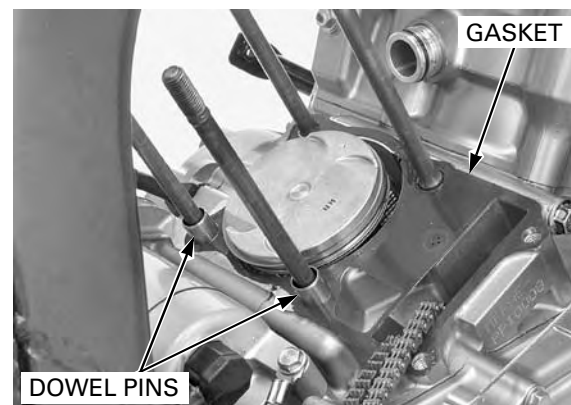
- Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.
- Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.



Remove the gasket and dowel pins.

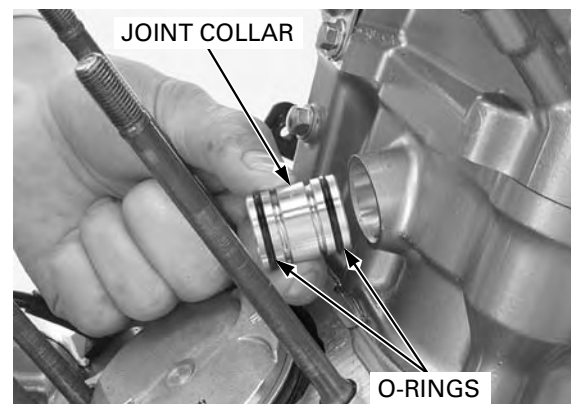
Be careful not to damage the mating surface.

Clean off any gasket material from the crankcase upper surface.



Remove the joint collar from the cylinder.

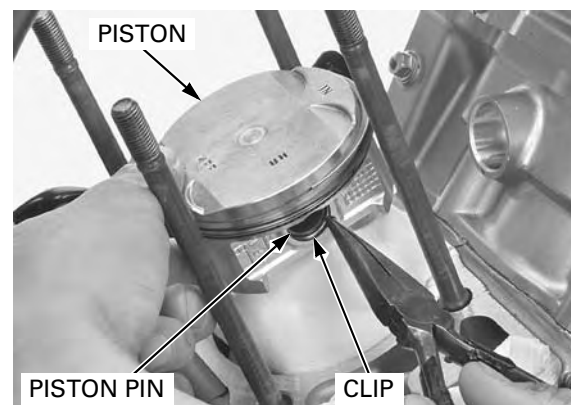
Remove the O-rings.



PISTON REMOVAL

Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Remove the piston pin clip with pliers. Push the piston pin out of the piston and connecting rod, then remove the piston.



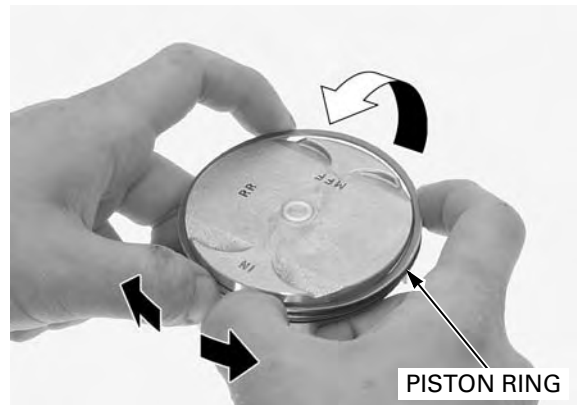
Remove the oil jet from the crankcase.



CYLINDER/PISTON

Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up a point opposite the gap.



Never use a wire brush; it will scratch the groove.

Clean carbon deposits from the ring grooves with a used piston ring that will be discarded.



INSPECTION

PISTON/PISTON RING

Always replace the piston rings as a set.

Inspect the piston rings for smooth movement by rotating them. The rings should be able to move in their grooves without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

SERVICE LIMITS:

Top: 0.065 mm (0.0026 in)

Second: 0.065 mm (0.0026 in)



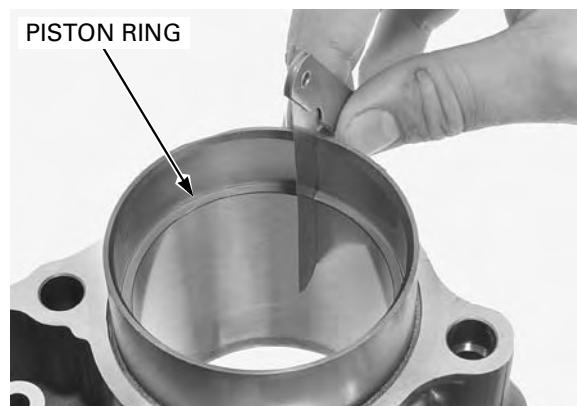
Insert the piston ring into the bottom of the cylinder squarely using the piston crown. Measure the ring end gap.

SERVICE LIMITS:

Top: 0.50 mm (0.020 in)

Second: 0.65 mm (0.026 in)

Oil (side rail): 0.90 mm (0.035 in)

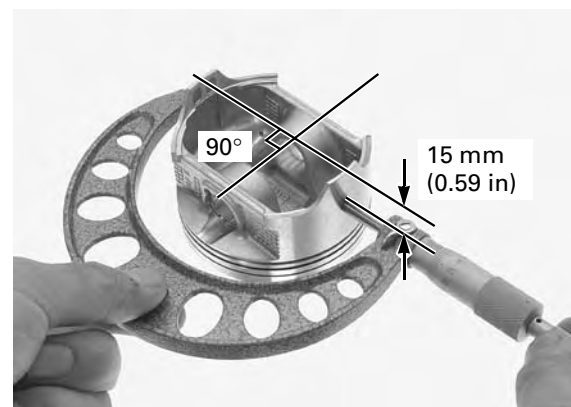


Measure the piston O.D. at a point 15 mm (0.59 in) from the bottom and 90° to the piston pin hole.

SERVICE LIMIT: 80.91 mm (3.185 in)

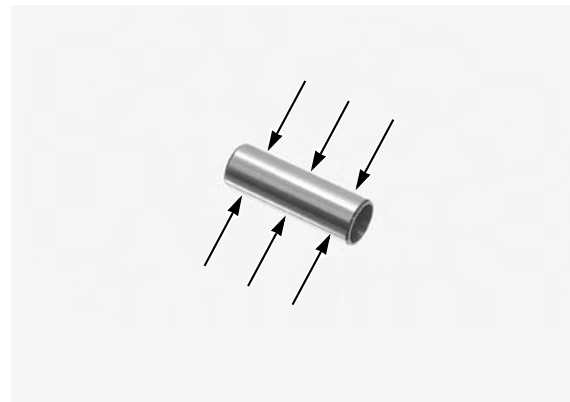
Compare this measurement against the maximum cylinder I.D. measurement and calculate the cylinder-to-piston clearance (page 9-8).

SERVICE LIMIT: 0.10 mm (0.004 in)



Measure the piston pin O.D. at three points.

SERVICE LIMIT: 17.98 mm (0.708 in)



Measure the piston pin bore I.D.

SERVICE LIMIT: 18.05 mm (0.711 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)



CONNECTING ROD

Measure the connecting rod small end I.D.

SERVICE LIMIT: 18.047 mm (0.7105 in)

Calculate the connecting rod-to-piston pin clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)

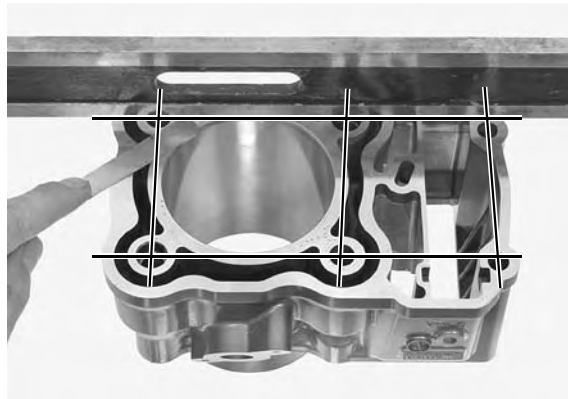


CYLINDER/PISTON

CYLINDER

Check the top of the cylinder for warpage with a straight edge and feeler gauge across the stud holes.

SERVICE LIMIT: 0.10 mm (0.004 in)



Check the cylinder wall for scratches or wear. Measure the cylinder I.D. at three levels on the X and Y axes. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 81.10 mm (3.193 in)

Calculate the cylinder-to-piston clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



Calculate the cylinder taper and out-of-round at three levels on the X and Y axes. Take the maximum reading to determine the taper and out-of-round.

SERVICE LIMITS:

Taper: 0.06 mm (0.002 in)

Out-of-round: 0.06 mm (0.002 in)

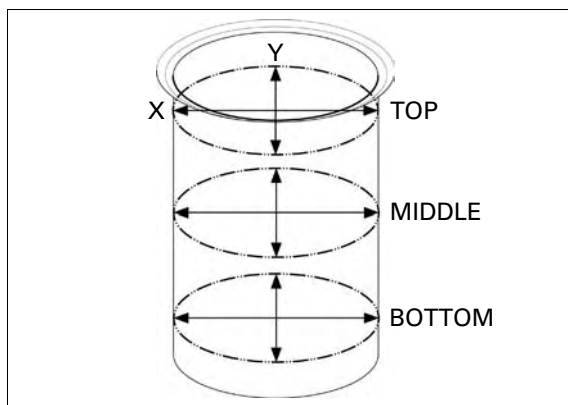
The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:

0.25 mm (0.010 in)

0.50 mm (0.020 in)

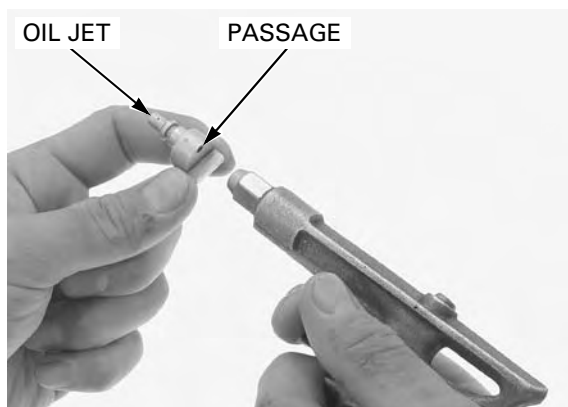
The piston to cylinder clearance for the oversize piston must be: 0.010 – 0.045 mm (0.0004 – 0.0018 in).



OIL JET

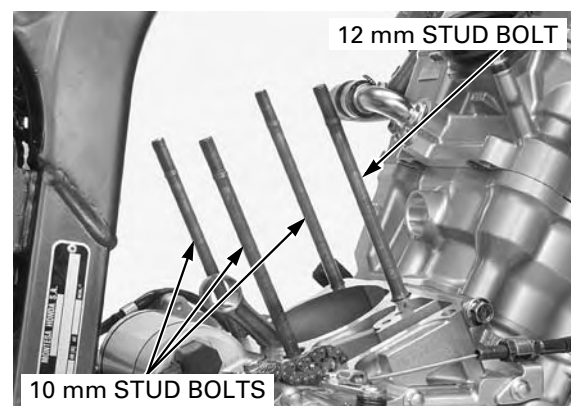
Remove the O-ring from the oil jet.

Blow open oil passage in the oil jet with compressed air.



CYLINDER STUD BOLT REPLACEMENT

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

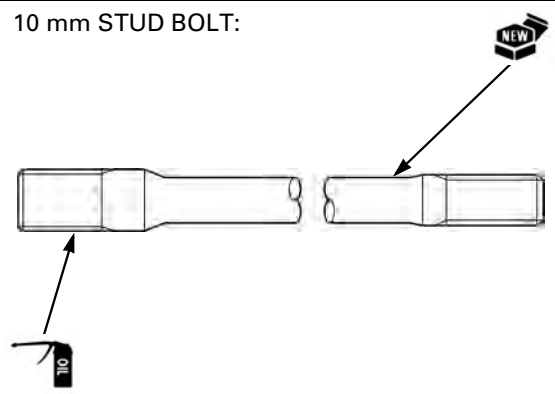


Apply engine oil to the lower threads of a new stud bolt and install it.

NOTE:

- Install the 10 mm stud bolt with its narrow differently size portion side facing the cylinder head side.
- Install the 12 mm stud bolt with its small I.D. side facing the cylinder head side.

10 mm STUD BOLT:

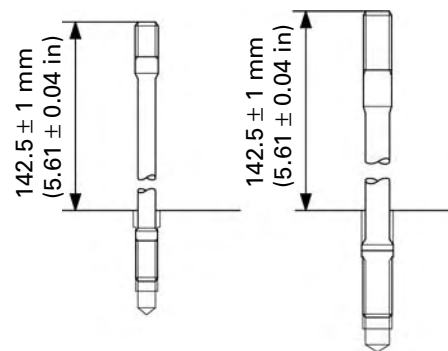


Be sure to verify the stud height from the crankcase surface.

Adjust the height if necessary.

10 mm STUD BOLT:

12 mm STUD BOLT:



CYLINDER/PISTON INSTALLATION

PISTON RING INSTALLATION

Apply engine oil to the piston and piston ring outer surface.

Be careful not to damage the piston and rings.

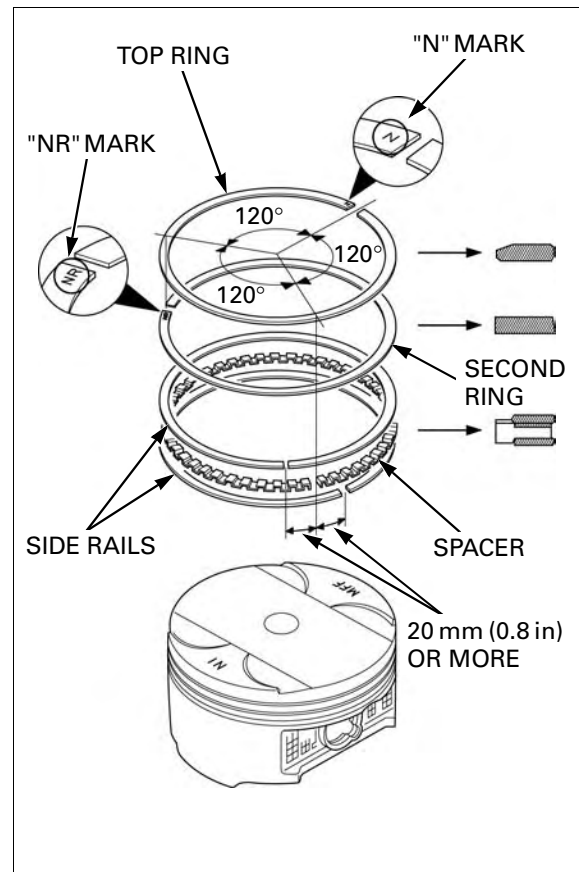
Carefully install the piston rings into the piston ring grooves with the markings facing up.

NOTE:

- Do not confuse the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.

Stagger the piston ring end gaps 120° apart from each other.

Stagger the side rail end gaps as shown.

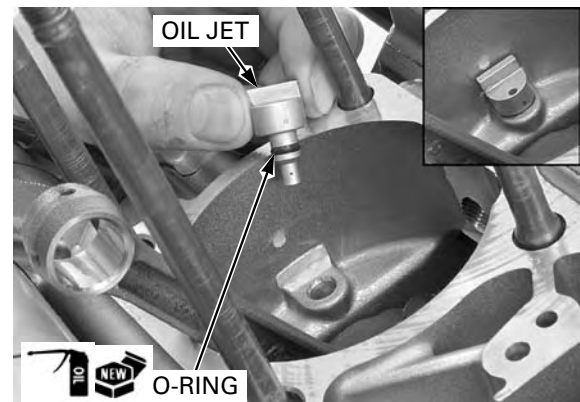


PISTON INSTALLATION

Replace the O-ring with a new one and apply engine oil.

Install new O-ring to the oil jet groove securely.

Install the oil jet to the crankcase securely with the semi-circular side facing in.



Apply molybdenum disulfide oil solution to the connecting rod bore.



Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Apply engine oil to the piston pin outer surface.

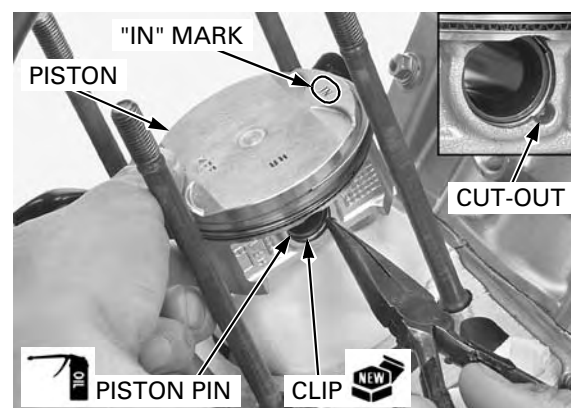
Install the piston with the "IN" mark facing intake side.

Install the piston pin through the piston and connecting rod.

Install new piston pin clips into the grooves in the piston pin hole.

NOTE:

- Make sure the piston pin clip is seated securely.
- Do not align the clip end gap with the piston cut-out.



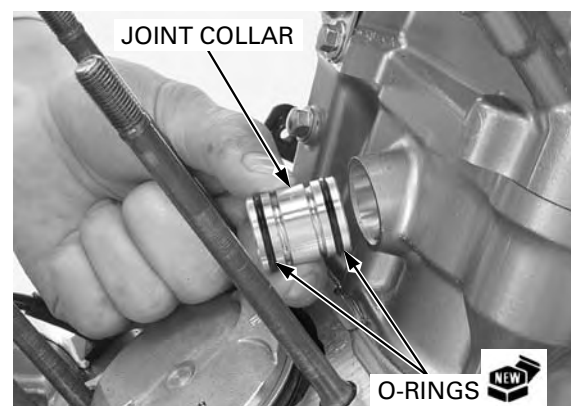
CYLINDER INSTALLATION

The front cylinder uses the same service procedure as the rear cylinder.

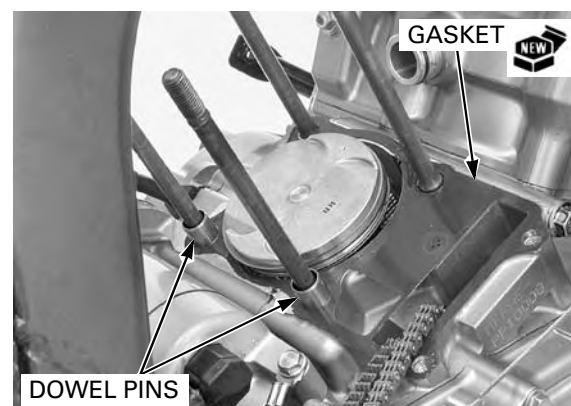
Clean the gasket surfaces of the cylinder and crankcase thoroughly, being careful not to damage them.

Install new O-rings to the joint collar.

Install the joint collar to the cylinder.



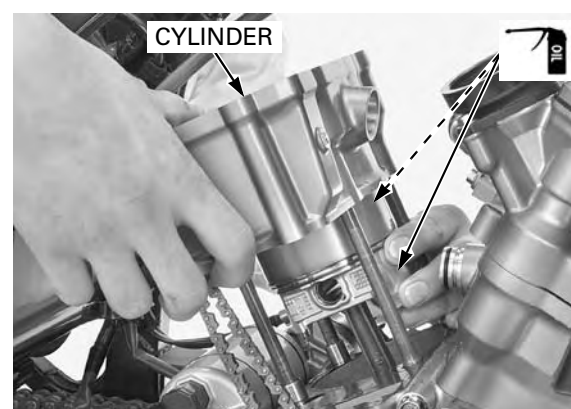
Install the dowel pins and a new gasket.



Be careful not to damage the piston rings and cylinder wall.

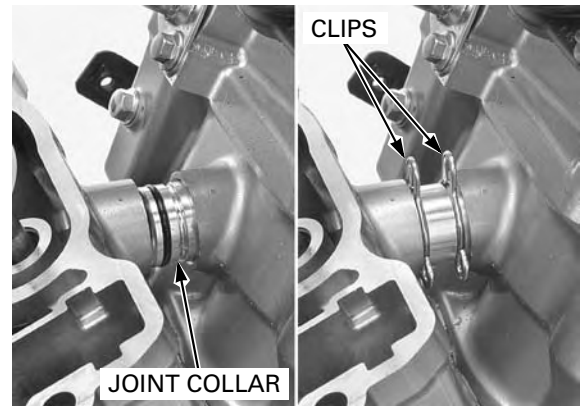
Apply engine oil to the cylinder wall, piston outer surface and piston rings.

Route the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.

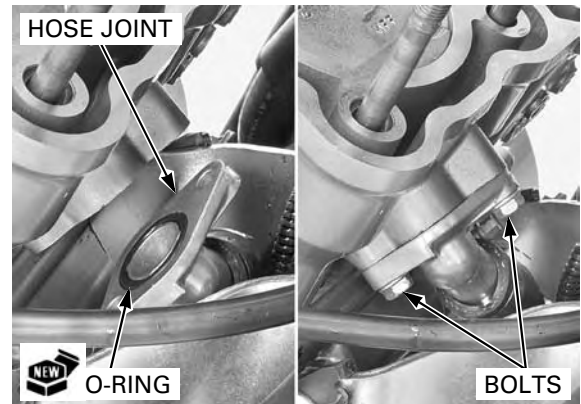


CYLINDER/PISTON

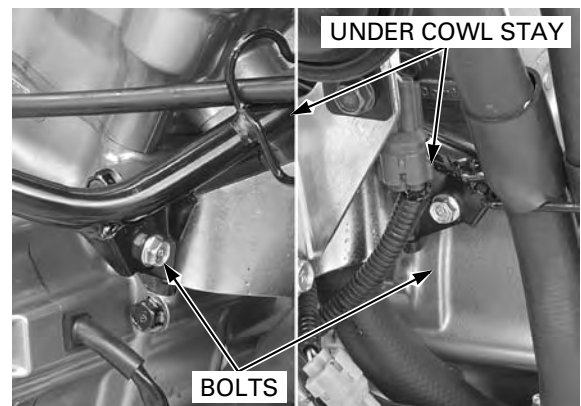
Slide the joint collar into the hole in the cylinder and connect it.
Install the retaining clips into the joint collar grooves.



Front cylinder only: Install a new O-ring to the hose joint groove.
Install the hose joint to the front cylinder and tighten the bolts securely.



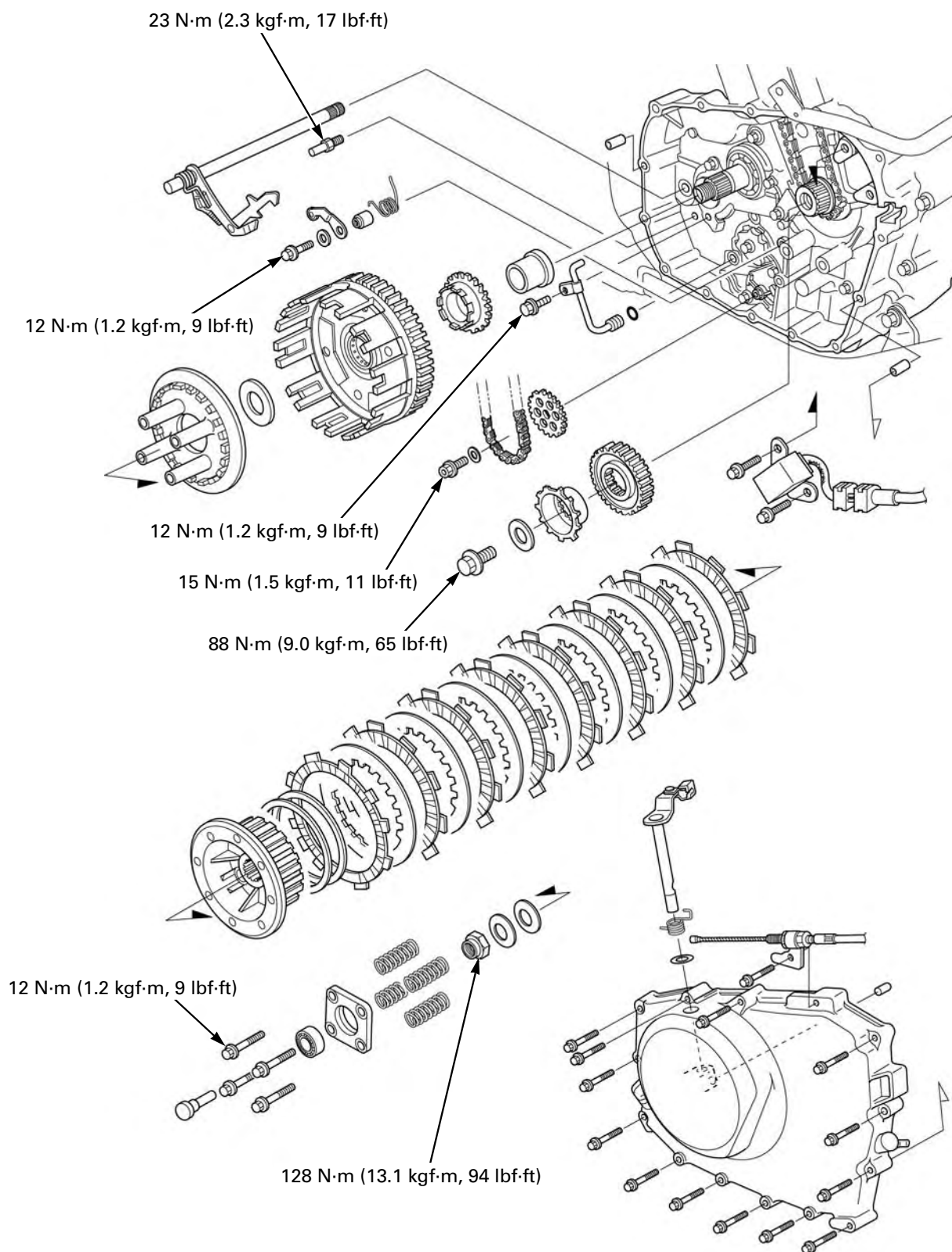
Front cylinder only: Install the under cowl stay and bolts.
Tighten the bolts securely.
NOTE:
Route the clutch cable and water hoses properly (page 1-21).
Install the cylinder head (page 8-25).



10. CLUTCH/GEARSHIFT LINKAGE

COMPONENT LOCATION	10-2	PRIMARY DRIVE GEAR.....	10-12
SERVICE INFORMATION	10-3	GEARSHIFT LINKAGE.....	10-14
TROUBLESHOOTING	10-4	CLUTCH INSTALLATION	10-16
RIGHT CRANKCASE COVER REMOVAL	10-5	RIGHT CRANKCASE COVER INSTALLATION	10-20
CLUTCH REMOVAL	10-6		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The clutch and gearshift linkage can be serviced with the engine in the frame.
- Engine oil viscosity, oil level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil and oil level before servicing the clutch system.

SPECIFICATIONS

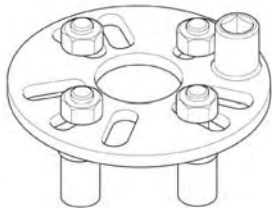
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever freeplay			10 – 20 (3/8 – 13/16)	–
Clutch	Spring free length		43.2 (1.70)	41.7 (1.64)
	Disc thickness	Disc A	2.62 – 2.78 (0.103 – 0.109)	2.3 (0.09)
		Disc B	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
		Disc C	2.62 – 2.78 (0.103 – 0.109)	2.3 (0.09)
	Plate warpage		–	0.30 (0.012)
Clutch outer guide		I.D.	21.991 – 22.016 (0.8658 – 0.8668)	22.03 (0.867)
		O.D.	31.959 – 31.975 (1.2582 – 1.2589)	31.92 (1.257)
Mainshaft O.D. at clutch outer guide			21.967 – 21.980 (0.8648 – 0.8654)	21.95 (0.864)
Clutch outer guide-to-mainshaft clearance			0.011 – 0.049 (0.0004 – 0.0019)	0.08 (0.003)
Clutch outer I.D.			32.000 – 32.025 (1.2598 – 1.2608)	32.09 (1.263)
Clutch outer-to-outer guide clearance			0.025 – 0.066 (0.0010 – 0.0026)	0.18 (0.007)
Oil pump drive sprocket I.D.			32.025 – 32.145 (1.2608 – 1.2655)	32.16 (1.266)
Oil pump drive sprocket-to-clutch outer guide clearance			0.050 – 0.186 (0.0020 – 0.0073)	0.24 (0.009)

TORQUE VALUES

Clutch lifter plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch center lock nut	128 N·m (13.1 kgf·m, 94 lbf·ft)	Apply engine oil to the threads and seating surface. Stake
Shift drum stopper arm pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent.
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply locking agent.
Primary drive gear bolt	88 N·m (9.0 kgf·m, 65 lbf·ft)	Apply engine oil to the threads and seating surface.
Gearshift spindle return spring pin	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Gearshift pedal pinch bolt	17.6 N·m (1.8 kgf·m, 13 lbf·ft)	
Transmission bearing setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent.

TOOLS

Clutch center holder 07JMB-MN50301 	Gear holder, 2.5 07724-0010100 
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TROUBLESHOOTING

Clutch lever engagement hard

- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing

Clutch will not disengage or motorcycle creeps with clutch disengaged

- Too much clutch lever freeplay
- Warped clutch plates
- Loose clutch center lock nut
- Engine oil level too high, improper oil viscosity or oil additive used

Clutch slips

- No clutch lever freeplay
- Worn clutch discs
- Weak clutch springs
- Clutch lifter sticking
- Engine oil level too low or oil additive used

Hard to shift

- Improper clutch operation
- Incorrect engine oil viscosity
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Damaged gearshift cam
- Bent shift fork shaft or damaged shift forks and shift drum (page 12-20)

Transmission jumps out of gear

- Broken shift drum stopper arm
- Weak or broken gearshift spindle return springs
- Worn or damaged gearshift cam
- Bent shift fork shaft or worn shift forks and shift drum (page 12-20)
- Worn gear dogs or dog holes (page 12-20)

RIGHT CRANKCASE COVER REMOVAL

REMOVAL

Drain the engine oil (page 3-13).

Remove the exhaust system (page 2-14).

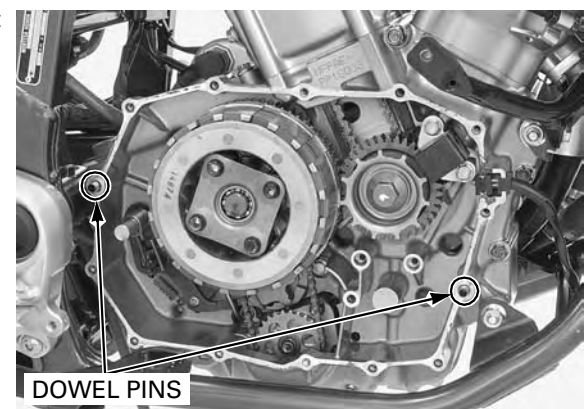
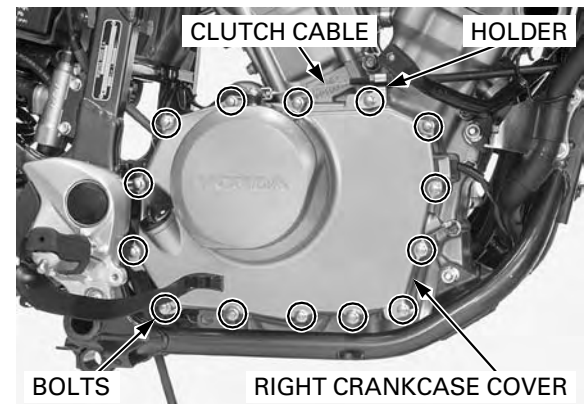
Remove the bolts in a crisscross pattern in several steps.

Remove the clutch cable holder and disconnect the clutch cable end from the clutch lifter arm.

Remove the right crankcase cover.

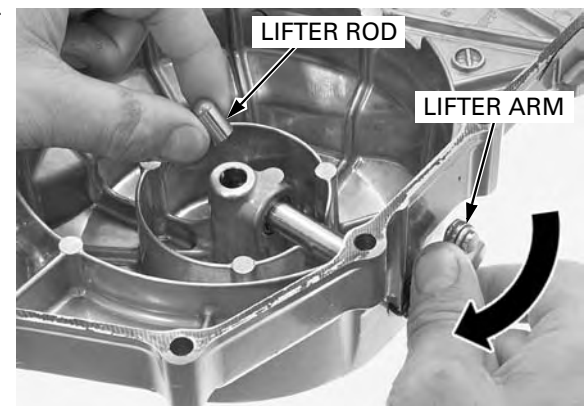
Be careful not to damage the mating surface.

Remove the dowel pins and clean off the sealant from the mating surface.

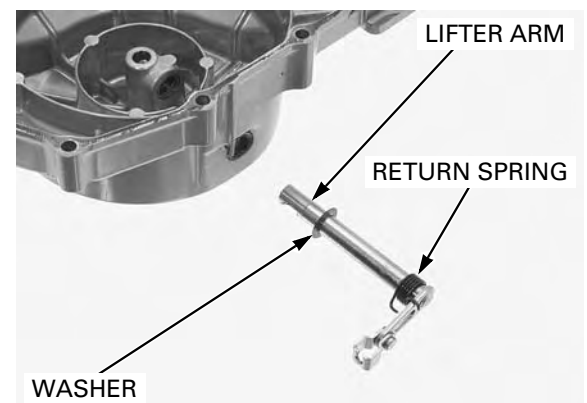


DISASSEMBLY

Remove the clutch lifter rod while turning the lifter arm clockwise.



Remove the clutch lifter arm, washer and return spring.



CLUTCH/GEARSHIFT LINKAGE

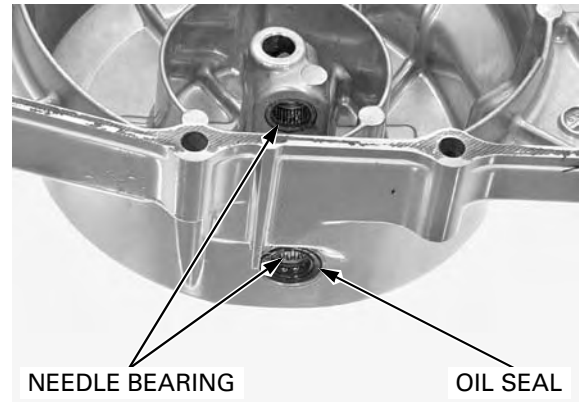
INSPECTION

Check the oil seal for fatigue or damage.
Check the needle bearings for wear, damage or loose fit.

Replace these parts if necessary.

NOTE:

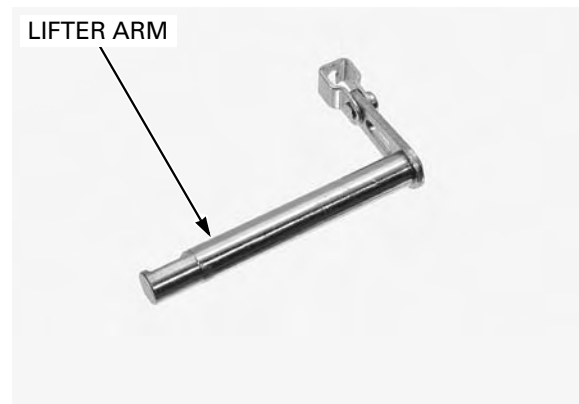
If the oil seal replacement is required, install the oil seal to the case surface.



Check the clutch lifter arm for wear, damage or bending.

Check the spring for fatigue or damage.

Replace it if necessary.

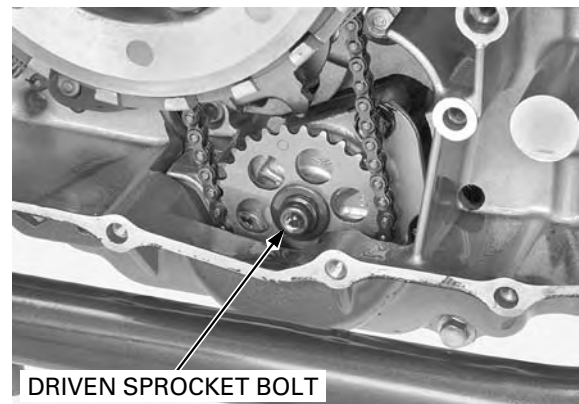


CLUTCH REMOVAL

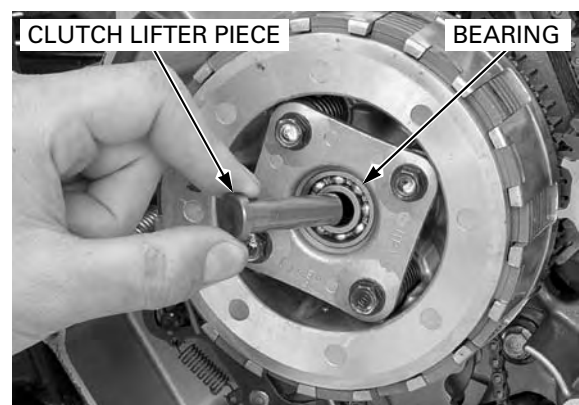
REMOVAL

Remove the right crankcase cover (page 10-5).

If the oil pump driven sprocket will be removed, loosen the driven sprocket bolt while the clutch is still installed.



Remove the clutch lifter piece from the lifter bearing.



Loosen the clutch lifter plate bolts in a crisscross pattern in several steps.
Remove the lifter plate/bearing and clutch springs.

Be careful not to damage the mainshaft threads.

Unstake the clutch center lock nut.

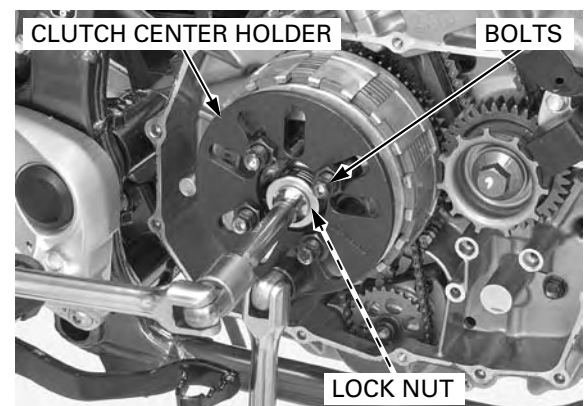
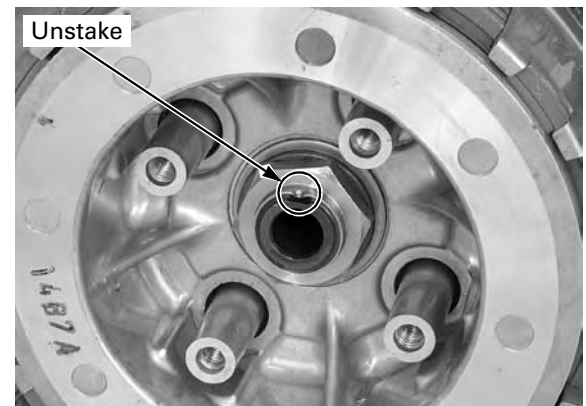
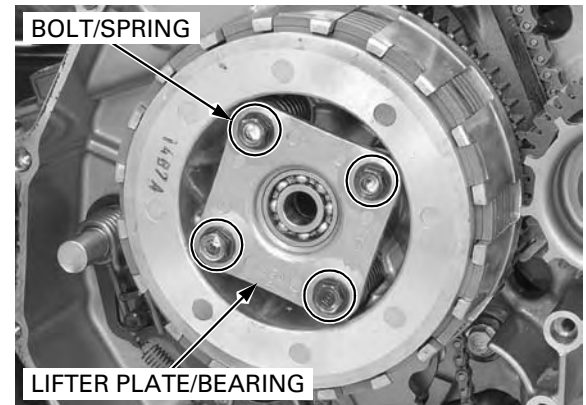
Hold the clutch center using the special tool and loosen the clutch center lock nut.

TOOL:

Clutch center holder 07JMB-MN50301

Remove the special tool and clutch center lock nut.

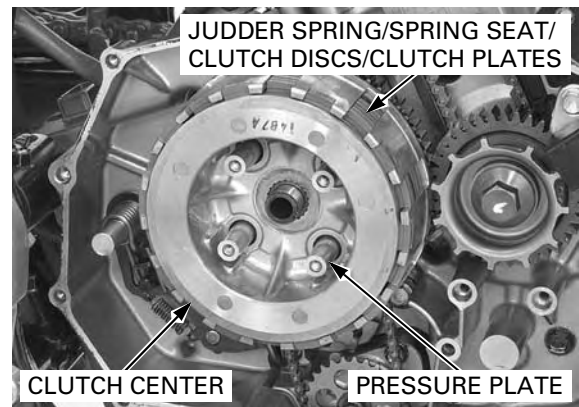
Remove the spring washer and thrust washer.



CLUTCH/GEARSHIFT LINKAGE

Remove the following:

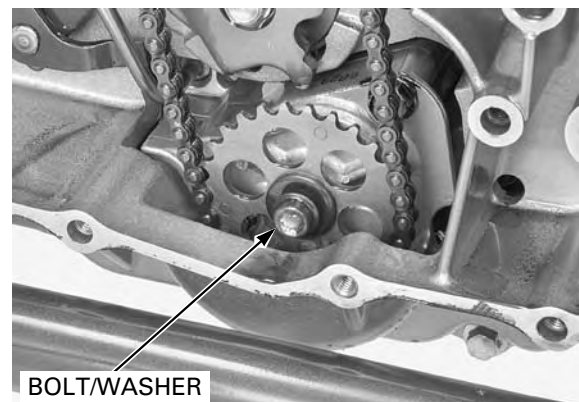
- Clutch center
- Pressure plate
- Clutch disc C
- Clutch plates
- Clutch disc A
- Clutch disc B
- Judder spring
- Spring seat



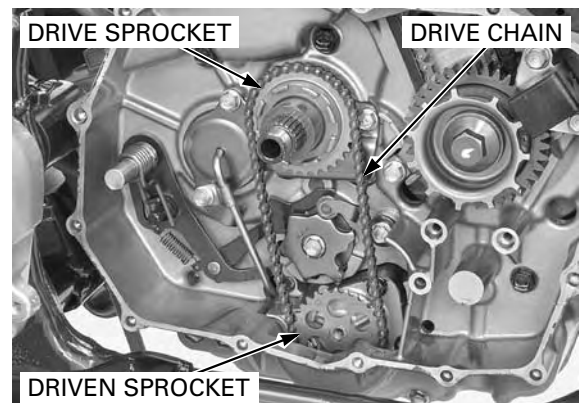
Remove the thrust washer and clutch outer.



Remove the oil pump driven sprocket bolt and washer.



Remove the oil pump drive sprocket, driven sprocket and drive chain as a set.



Remove the clutch outer guide.



INSPECTION

LIFTER PLATE BEARING

Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the lifter plate.

Remove and discard the bearing if the race does not turn smoothly and quietly, or if it fits loosely in the lifter plate.

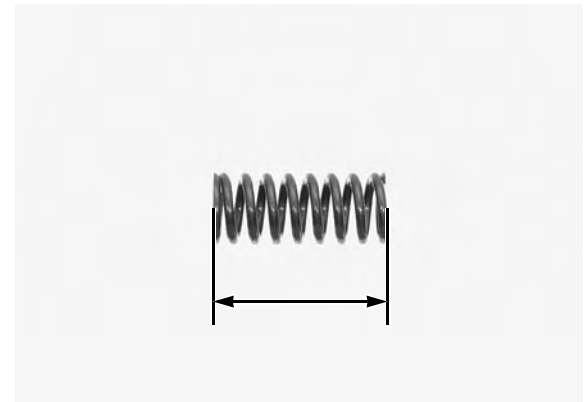


CLUTCH SPRING

Replace the clutch springs as a set.

Check the clutch spring free length.

SERVICE LIMIT: 41.7 mm (1.64 in)



CLUTCH DISC

Replace the clutch discs and plates as a set.

Replace the clutch discs for signs of scoring or discoloration.

Measure the clutch disc thickness.

SERVICE LIMITS: Disc A: 2.3 mm (0.09 in)
Disc B: 2.6 mm (0.10 in)
Disc C: 2.3 mm (0.09 in)



CLUTCH/GEARSHIFT LINKAGE

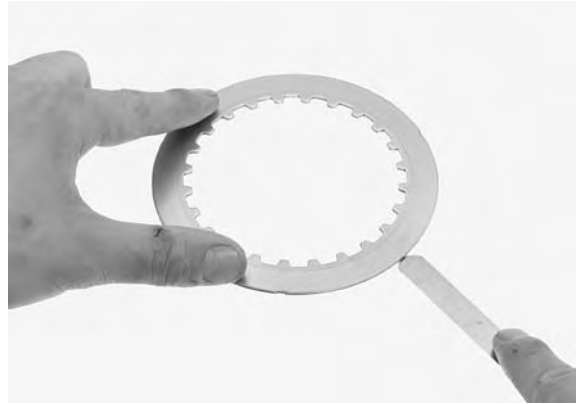
CLUTCH PLATE

Replace the clutch discs and plates as a set.

Check the clutch plate for discoloration.

Check the clutch plate warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)



CLUTCH CENTER

Check the clutch center for nicks, indentations or abnormal wear caused by the clutch plates.

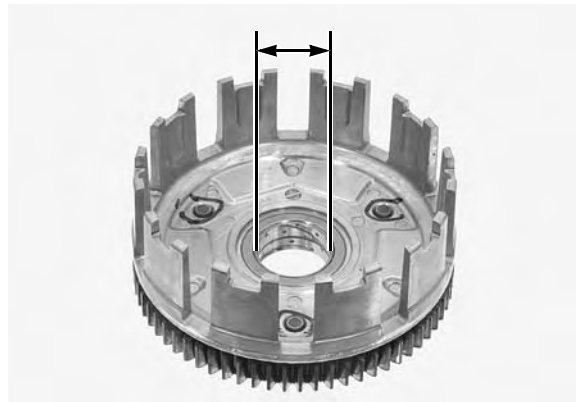


CLUTCH OUTER

Check the slot in the clutch outer for nicks, indentations or abnormal wear caused by the clutch discs.

Measure the clutch outer I.D.

SERVICE LIMIT: 32.09 mm (1.263 in)



CLUTCH OUTER GUIDE

Check the clutch outer guide for damage or abnormal wear.

Measure the clutch outer guide I.D.

SERVICE LIMIT: 22.03 mm (0.867 in)

Measure the clutch outer guide O.D.

SERVICE LIMIT: 31.92 mm (1.257 in)

Calculate the clutch outer-to-outer guide clearance.

SERVICE LIMIT: 0.18 mm (0.007 in)



OIL PUMP DRIVE SPROCKET

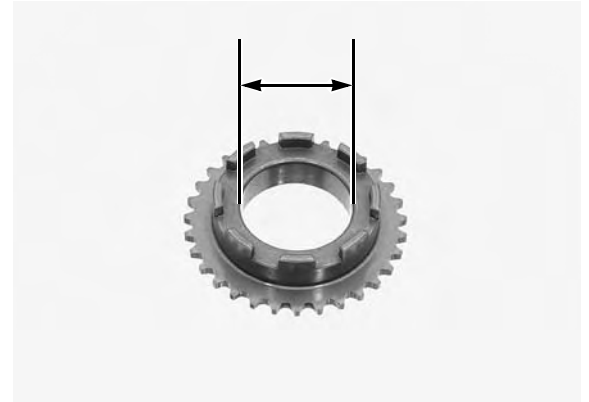
Check the oil pump drive sprocket for wear or damage.

Measure the I.D. of the drive sprocket.

SERVICE LIMIT: 32.16 mm (1.266 in)

Calculate the oil pump drive sprocket-to-clutch outer guide clearance.

SERVICE LIMIT: 0.24 mm (0.009 in)

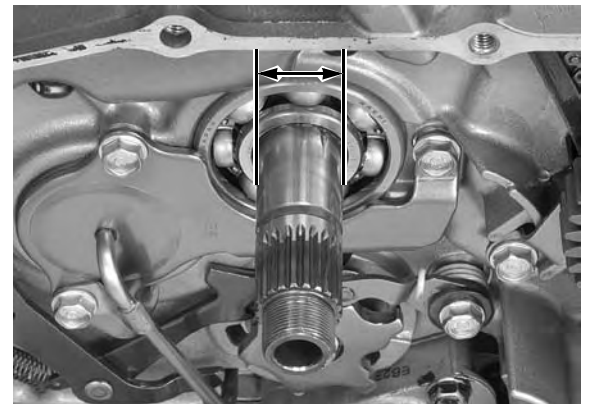
**MAINSHAFT**

Measure the mainshaft O.D. at the clutch outer guide sliding surface.

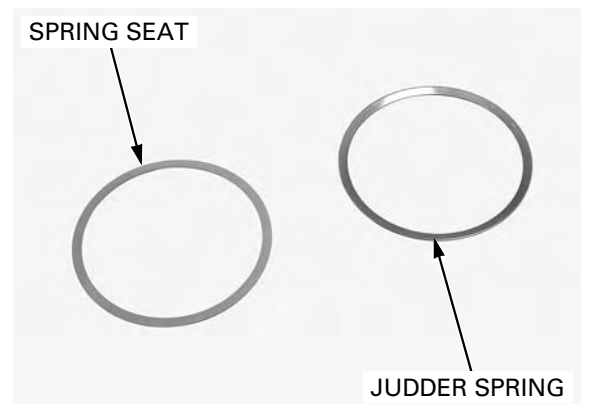
SERVICE LIMIT: 21.95 mm (0.864 in)

Calculate the clutch outer guide-to-mainshaft clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)

**JUDDER SPRING/SPRING SEAT**

Check the spring seat and judder spring for distortion, wear or damage.

**OIL PUMP DRIVEN SPROCKET**

Check the oil pump driven sprocket for wear or damage.



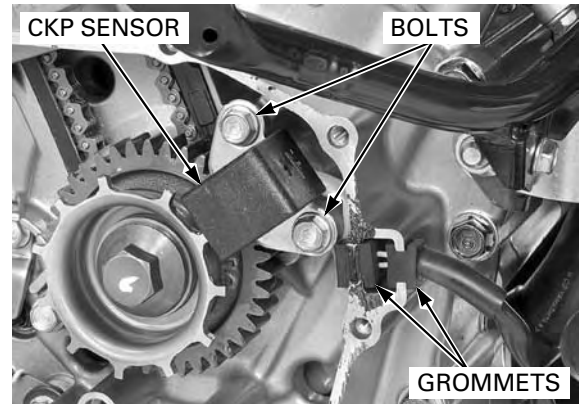
PRIMARY DRIVE GEAR

REMOVAL

Remove the clutch (page 10-6).

Remove the CKP sensor bolts.

Remove the CKP sensor and grommets.



Temporarily install the clutch outer guide, oil pump drive sprocket and clutch outer onto the mainshaft (page 10-16).

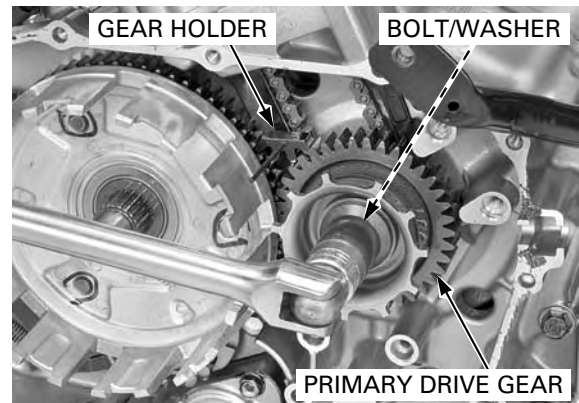
Hold the primary drive gear using the special tool and remove the primary drive gear bolt and washer.

TOOL:

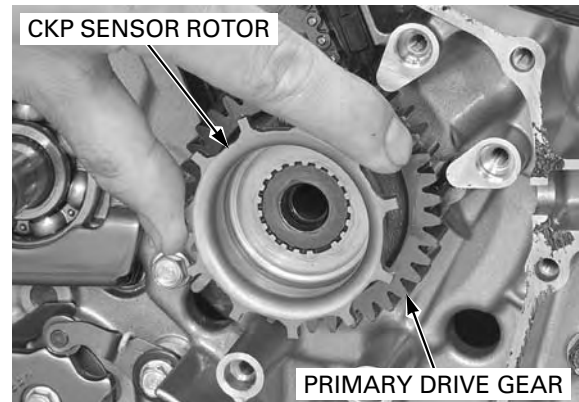
Gear holder, 2.5

07724-0010100

Remove the gear holder and temporarily installed parts.



Remove the CKP sensor rotor and primary drive gear.



INSPECTION

Check the CKP sensor rotor for wear or damage.



Check the primary drive gear for wear or damage.



INSTALLATION

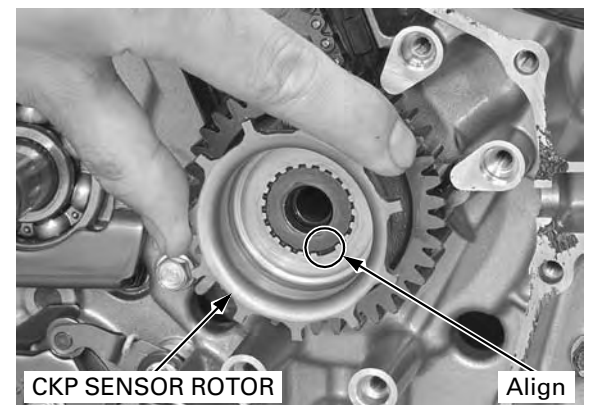
Install the primary drive gear on the crankshaft.

NOTE:

- Install the primary drive gear, aligning its wide groove with the wide tooth of the crankshaft.
- Install the primary drive gear with its "OUT" mark facing out.



Install the CKP sensor rotor, aligning its wide groove with the wide tooth of the crankshaft.



Temporarily install the clutch outer guide, oil pump drive sprocket and clutch outer onto the mainshaft (page 10-16).

Apply engine oil to the primary drive gear bolt threads and seating surface.

Install the washer and primary drive gear bolt.

Hold the primary drive gear using the special tool.

TOOL:

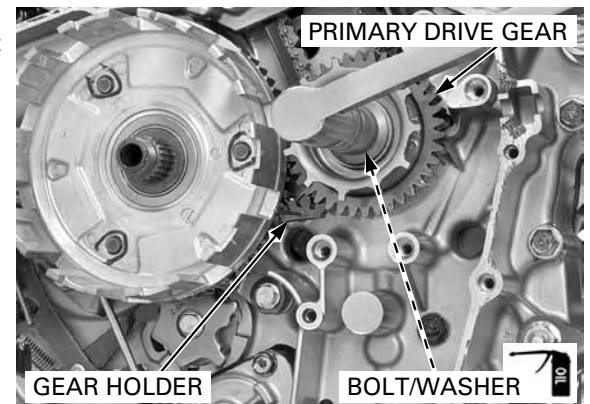
Gear holder, 2.5

07724-0010100

Tighten the bolt to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

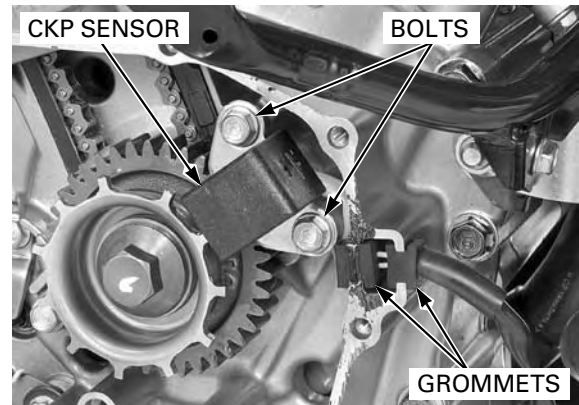
Remove the gear holder and temporarily installed parts.



CLUTCH/GEARSHIFT LINKAGE

Install the CKP sensor, wire grommets and tighten the bolts.

Install the clutch (page 10-16).



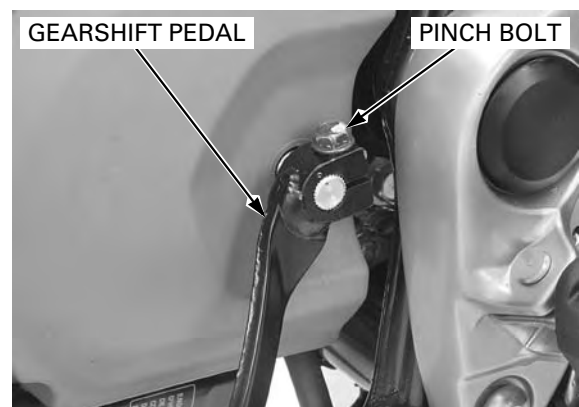
GEARSHIFT LINKAGE

REMOVAL

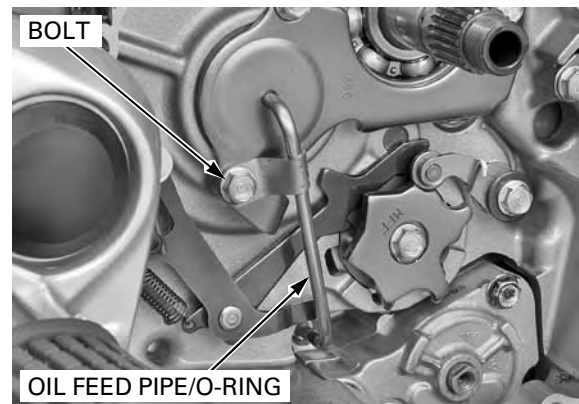
Remove the clutch (page 10-6).

Remove the pinch bolt and gearshift pedal from the spindle.

Clean the gearshift spindle.

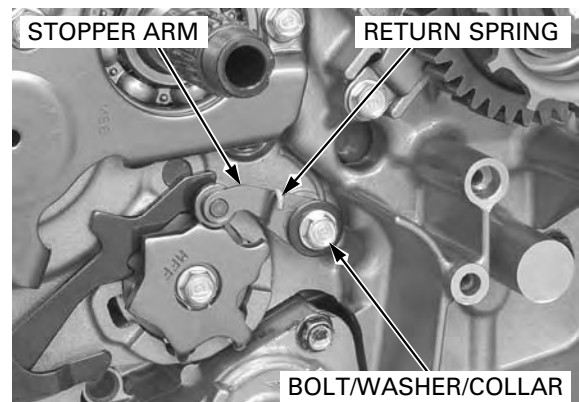


Remove the bolt, oil feed pipe and O-ring.

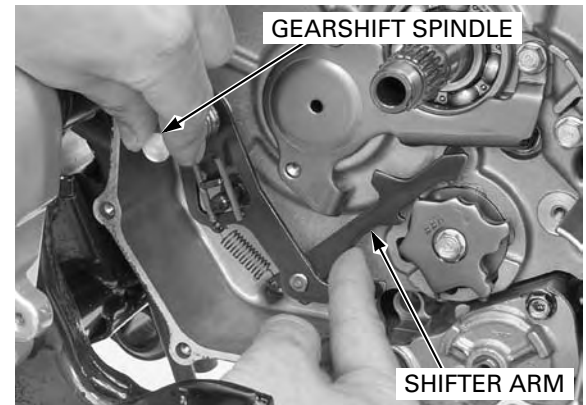


Remove the following:

- Bolt
- Washer
- Stopper arm
- Collar
- Return spring



Remove the gearshift spindle from the crankcase while unhooking the shifter arm from the gearshift cam plate.



INSPECTION

Check the gearshift spindle for bend, wear or damage.

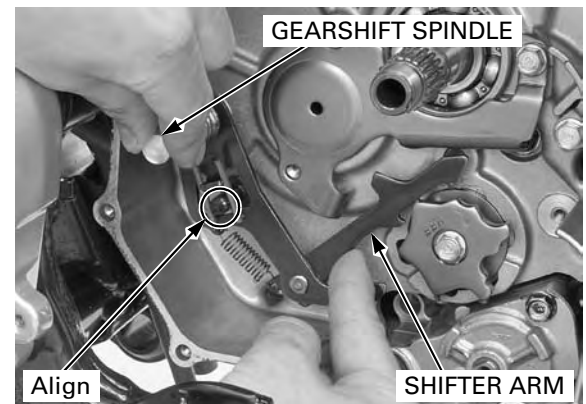
Check the return spring for fatigue or damage.



INSTALLATION

Install the gearshift spindle, aligning the return spring ends with the pin in the case.

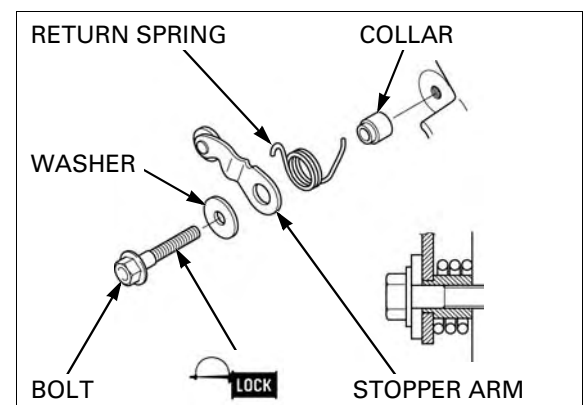
Hook the shift arm to the gearshift cam plate.



Clean and apply a locking agent to the bolt threads (page 1-18).

Install the following:

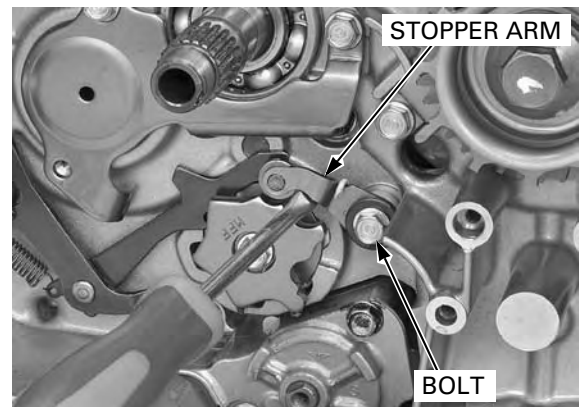
- Collar
- Return spring
- Stopper arm
- Washer
- Bolt



CLUTCH/GEARSHIFT LINKAGE

Hold the stopper arm with a screwdriver, and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



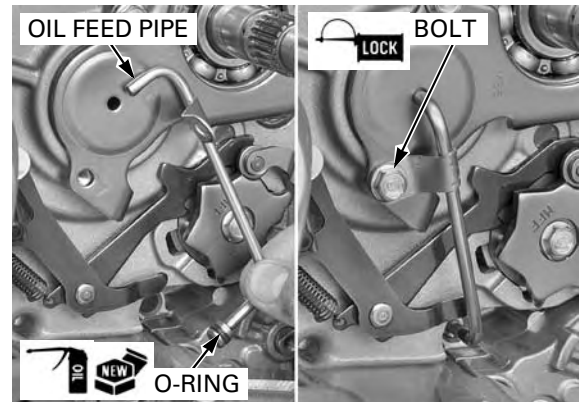
Apply engine oil to a new O-ring and install it to the oil feed pipe.

Install the oil feed pipe.

Clean and apply locking agent to the bolt threads (page 1-18).

Install and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

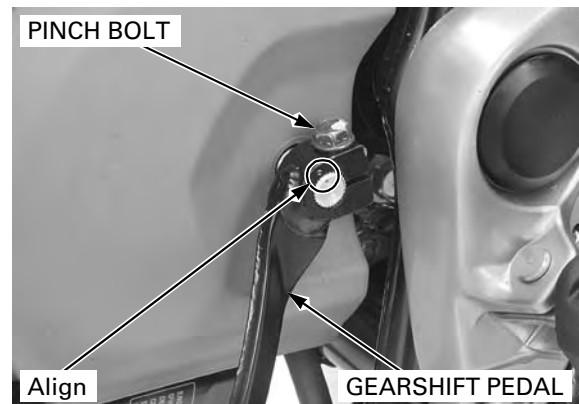


Install the gearshift pedal to the spindle, aligning with the punch marks.

Tighten the pinch bolt to the specified torque.

TORQUE: 17.6 N·m (1.8 kgf·m, 13 lbf·ft)

Install the clutch (page 10-16).



CLUTCH INSTALLATION

Apply molybdenum disulfide oil solution to the clutch outer guide outer surface.

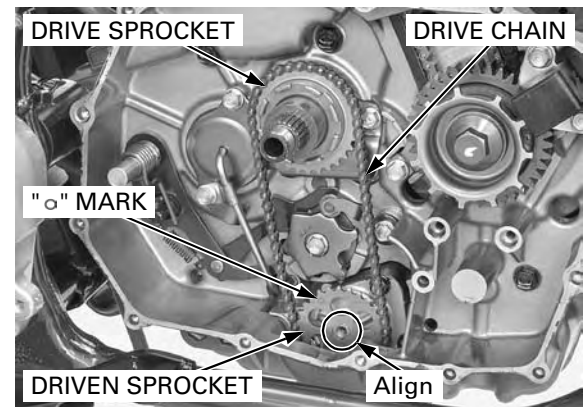
Install the clutch outer guide to the mainshaft.



Install the oil pump drive chain, drive sprocket and driven sprocket as a set.

NOTE:

- Install the driven sprocket with its "o" mark facing outside.
- Align the flat surfaces of the driven sprocket hole and oil pump shaft end.

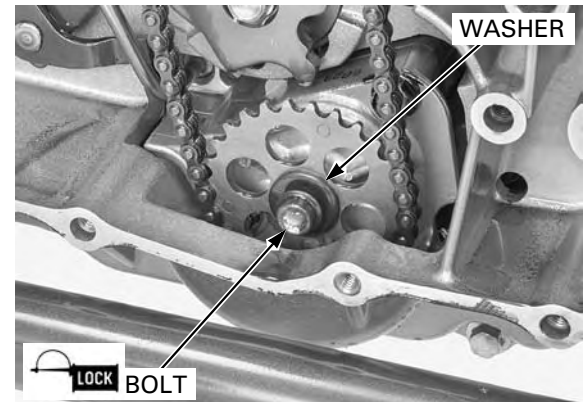


Apply locking agent to the oil pump driven sprocket bolt threads (page 1-18).

Install the washer and bolt.

NOTE:

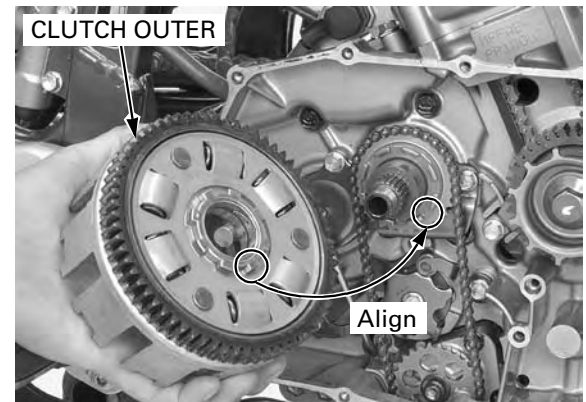
Tighten the driven sprocket bolt to the specified torque after installing the clutch.



Install the clutch outer onto the mainshaft.

NOTE:

Align the grooves in the clutch outer with the bosses on the oil pump drive sprocket while turning the sprocket with the chain and pushing the clutch outer onto the shaft.



Apply molybdenum disulfide oil solution to the thrust washer.

Install the thrust washer onto the mainshaft.

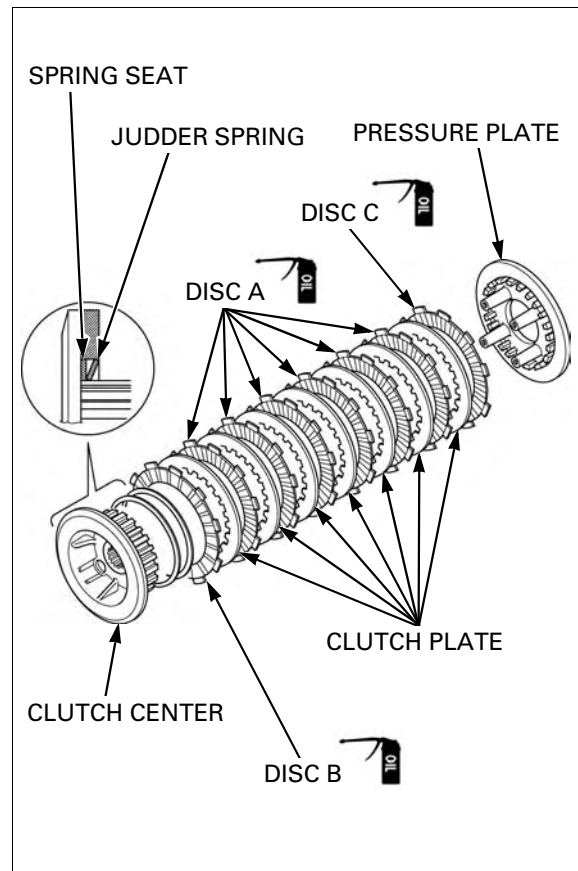


CLUTCH/GEARSHIFT LINKAGE

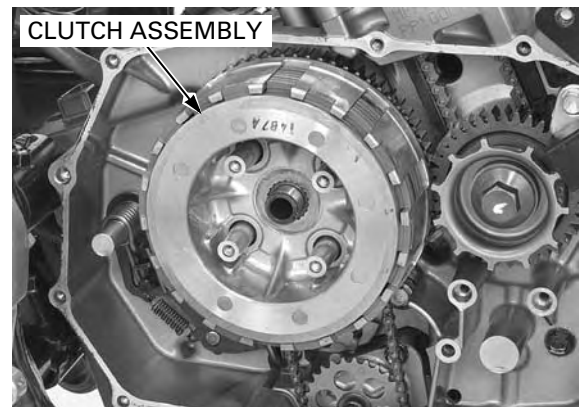
- Clutch disc is available in three types.
 - Clutch disc B: Clutch disc B has a larger I.D. than disc A and C.
 - Clutch disc A: Black paint on the tab.

Coat the clutch discs with engine oil.
Install the spring seat and judder spring to the clutch center as shown.

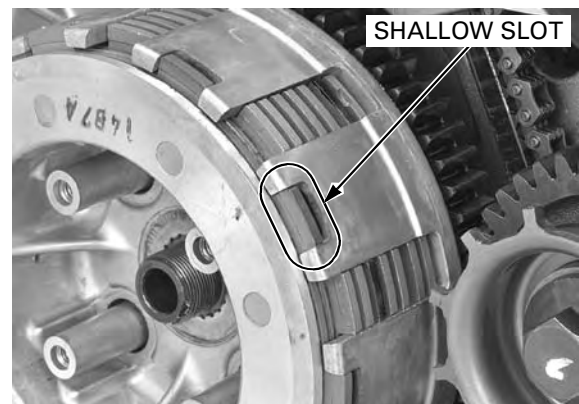
Install the clutch disc B.
Install the seven clutch plate and six disc A, starting with the clutch plate.
Install the clutch disc C.
Install the pressure plate.



Install the clutch assembly into the clutch outer.

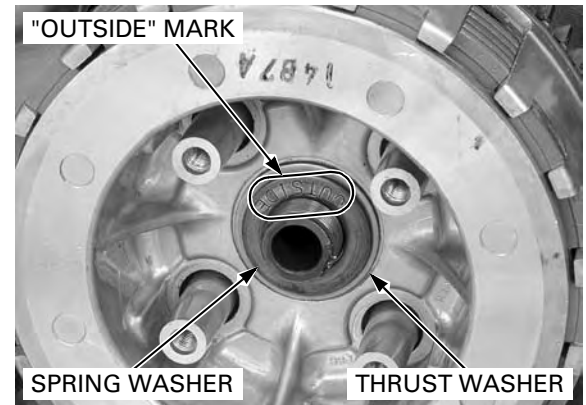


Install the clutch disc B into the shallow slots of the clutch outer.



Install the thrust washer.

Install the spring washer with its "OUTSIDE" mark facing out.

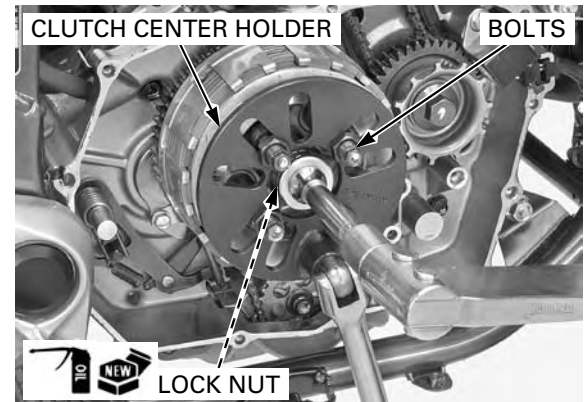


Apply engine oil to the threads and seating surface of a new clutch center lock nut and install it onto the mainshaft.
Hold the clutch center using the special tool and tighten the lock nut to the specified torque.

TOOL:

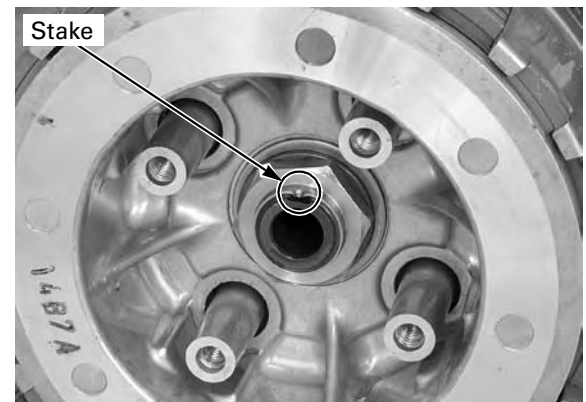
Clutch center holder 07JMB-MN50301

TORQUE: 128 N·m (13.1 kgf·m, 94 lbf·ft)



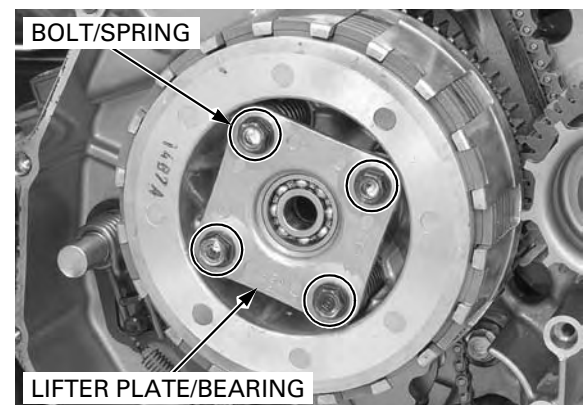
Be careful not to damage the mainshaft threads.

Stake the clutch center lock nut into the mainshaft groove.



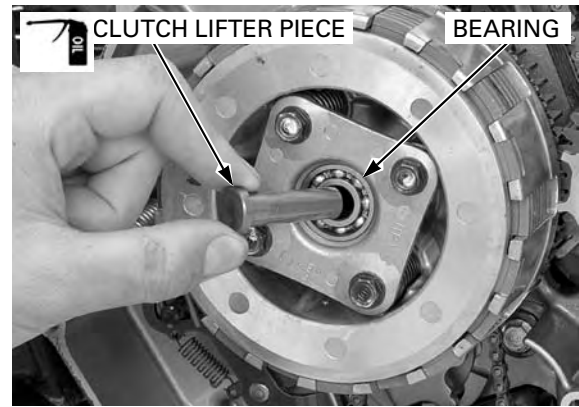
Install the clutch springs, lifter plate/bearing and bolts.
Tighten the bolts in a crisscross pattern in several steps to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



CLUTCH/GEARSHIFT LINKAGE

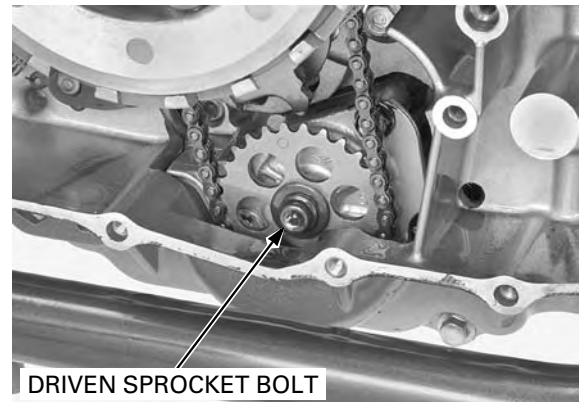
Apply engine oil to the clutch lifter piece sliding surface and install it to the clutch lifter bearing.



Tighten the oil pump driven sprocket bolt if it is removed.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the right crankcase cover (page 10-20).

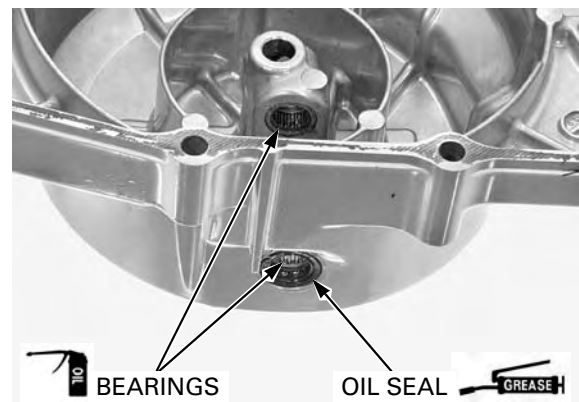


RIGHT CRANKCASE COVER INSTALLATION

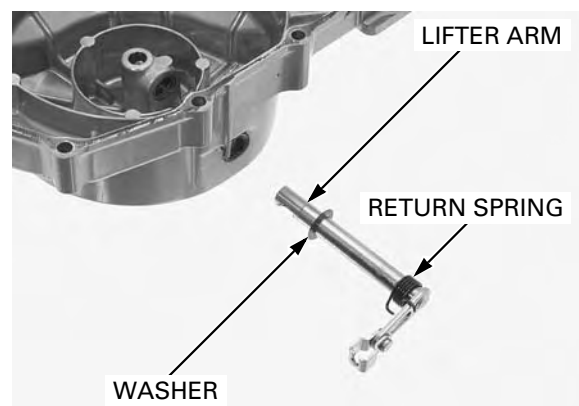
ASSEMBLY

Apply engine oil to the needle bearings.

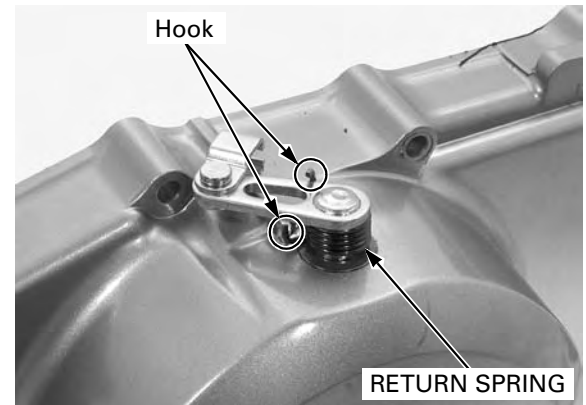
Apply grease to the oil seal lips.



Install the return spring, washer and clutch lifter arm.

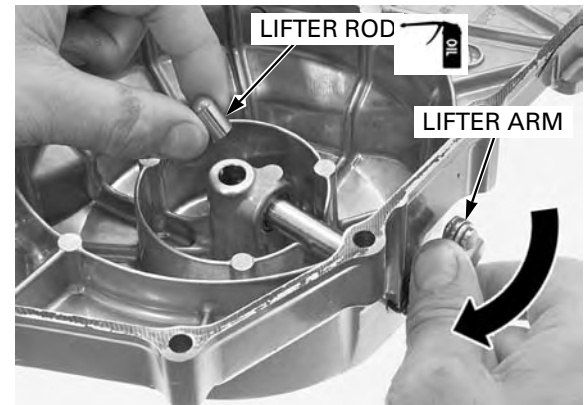


Hook the spring end to the cover tab and lifter arm.



Apply engine oil to the clutch lifter rod sliding surface.

Install the clutch lifter rod, aligning the rod end with the groove in the clutch lifter arm by turning the clutch lifter arm clockwise.

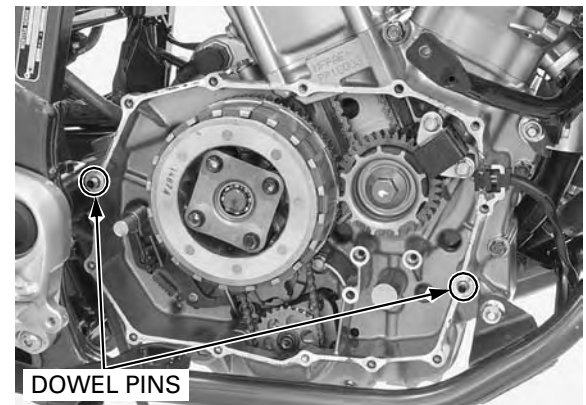


INSTALLATION

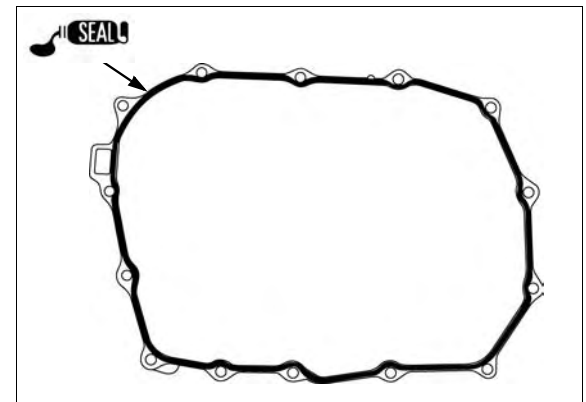
Be careful not to damage the mating surfaces.

Clean the mating surfaces of the right crankcase and cover.

Install the two dowel pins.



Apply liquid sealant (Three Bond 1207B or equivalent) to the right crankcase cover mating surface.

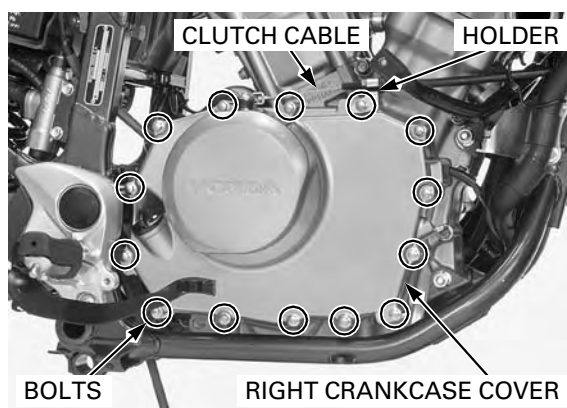


CLUTCH/GEARSHIFT LINKAGE

Connect the clutch cable.
Install the right crankcase cover, clutch cable holder, and tighten the bolts in a crisscross pattern in several steps.

Install the exhaust system (page 2-18).

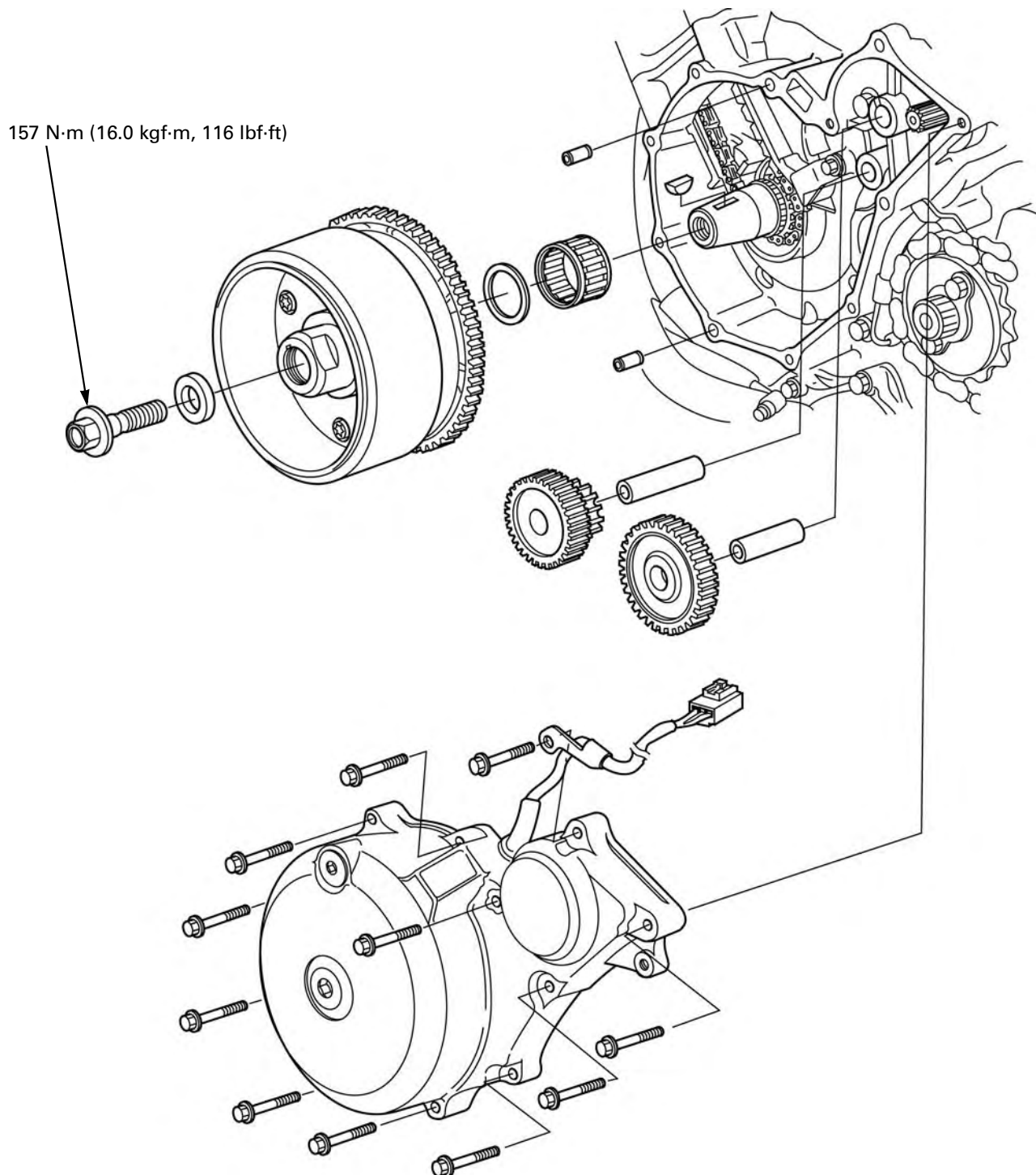
Fill the crankcase with the recommended engine oil (page 3-12).



11. ALTERNATOR/STARTER CLUTCH

COMPONENT LOCATION	11-2	STATOR REMOVAL	11-4
SERVICE INFORMATION	11-3	FLYWHEEL/STARTER CLUTCH	11-6
TROUBLESHOOTING	11-3	STATOR INSTALLATION	11-12

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the alternator stator and flywheel. All service can be done with the engine installed in the frame.
- For alternator charging coil inspection (page 17-9).
- For starter motor service (page 19-6).

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	37.000 – 37.025 (1.4567 – 1.4577)	37.10 (1.461)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.73 (2.273)
Starter clutch outer I.D.		74.412 – 74.442 (2.9296 – 2.9308)	74.46 (2.931)

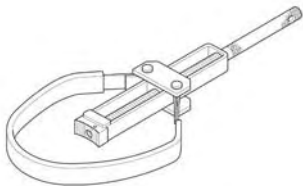
Unit: mm (in)

TORQUE VALUES

Flywheel bolt	157 N·m (16.0 kgf·m, 116 lbf·ft)	Left hand thread Apply engine oil to the threads and seating surface.
Stator bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent.
Starter clutch torx bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	Apply locking agent.
Stator wire holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent.

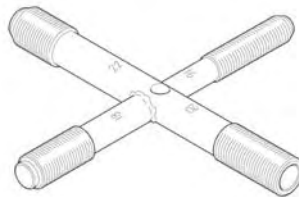
TOOLS

Flywheel holder
07725-0040001



or equivalent commercially available

Rotor puller
07733-0020001



TROUBLESHOOTING

Starter motor turns, but engine does not turn

- Faulty starter clutch
- Damaged reduction gear
- Damaged starter idle gear

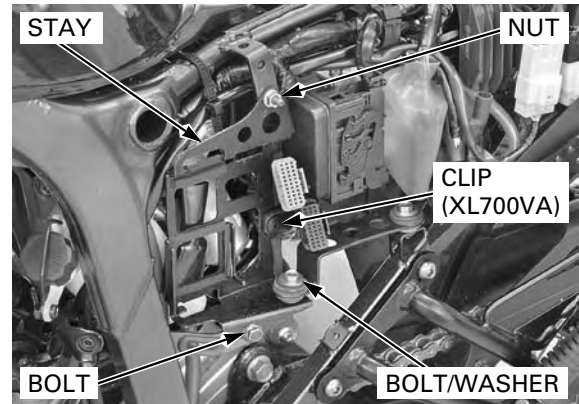
STATOR REMOVAL

Remove the following:

- Left front side cowl (page 2-9)
- Under cowl (page 2-13)
- ECM (page 5-77)
- Heat guard plate mounting bolt (page 2-23)
- Drive sprocket cover (page 7-4)

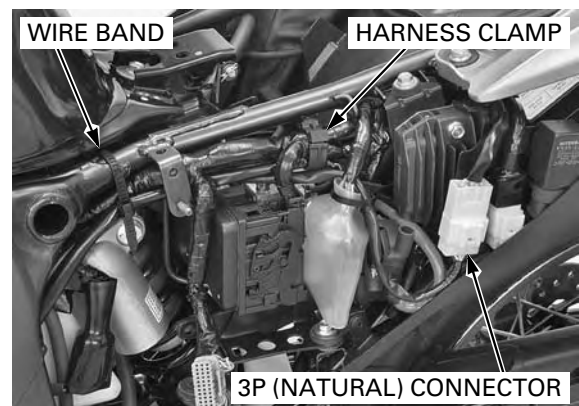
Remove the bolt, bolt/washer, nut and trim clip (XL700VA only).

Remove the ECM stay.

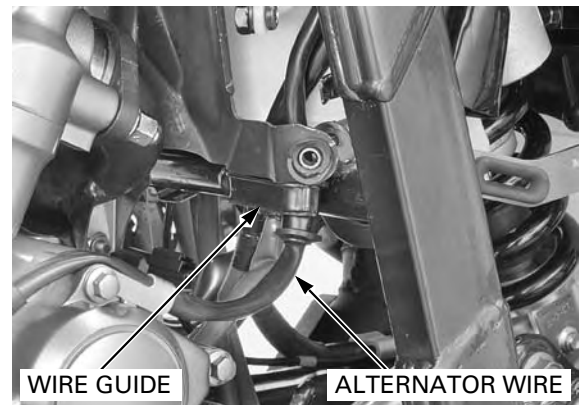


Release the wire harness from the wire band and harness clamp.

Disconnect the alternator 3P (Natural) connector.

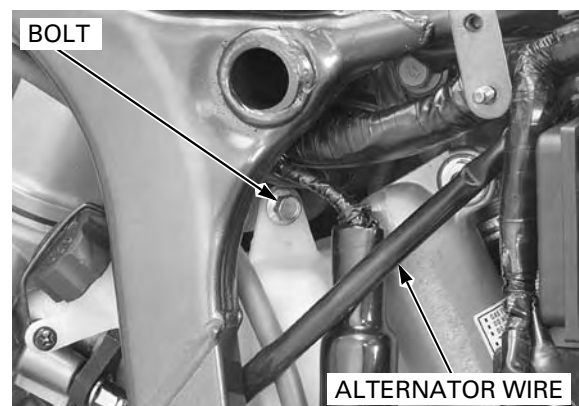


Release the alternator wire from the wire guide.



Remove the reserve tank mounting bolt and move the reserve tank slightly.

Alternator wire pass through the between reserve tank and frame.



Loosen the bolts in a crisscross pattern in several steps.

Remove the bolts and left crankcase cover.

NOTE:

- The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during removal.
- Be careful not to damage the alternator cover mating surface.
- Engine oil will run out when the alternator cover is removed. Set a oil pan under the engine and add the recommended oil to the specified level after installation.

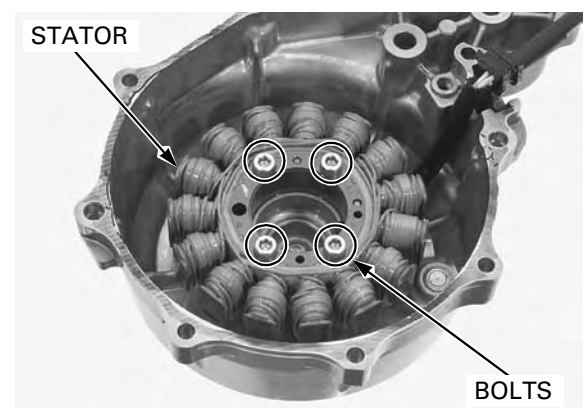
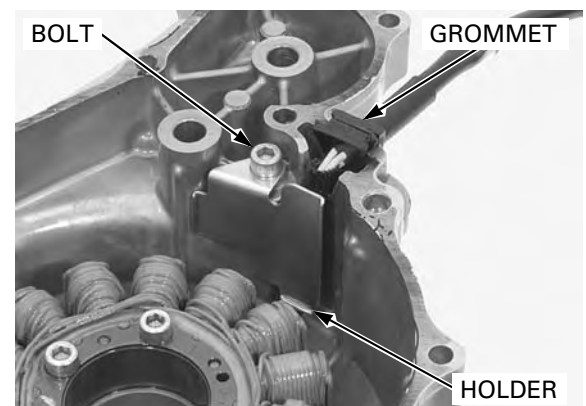
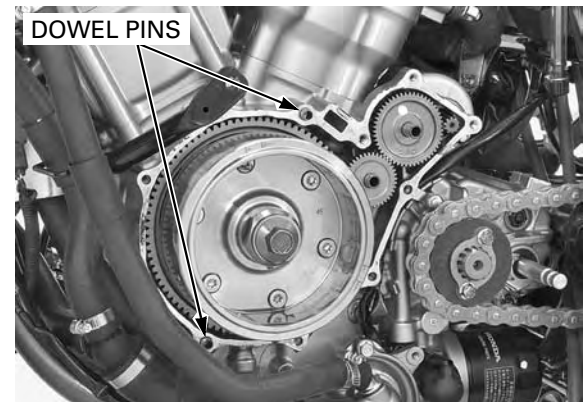
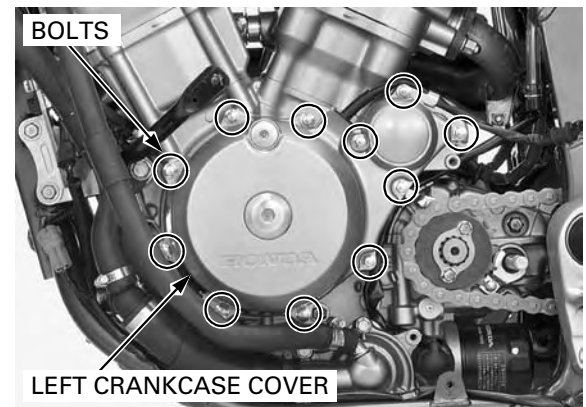
Be careful not to damage the mating surface.

Remove the dowel pins and clean off the sealant from the mating surface.

Remove the bolt and stator wire holder from the left crankcase cover.

Remove the wire grommet.

Remove the bolts and stator from the left crankcase cover.



ALTERNATOR/STARTER CLUTCH

FLYWHEEL/STARTER CLUTCH

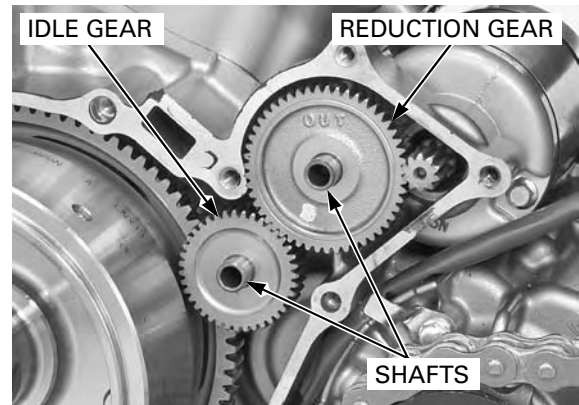
FLYWHEEL REMOVAL

*For alternator
charging coil
inspection (page
17-9).*

Remove the left crankcase cover (page 11-4).

Remove the starter reduction gear and shaft.

Remove the starter idle gear and shaft.



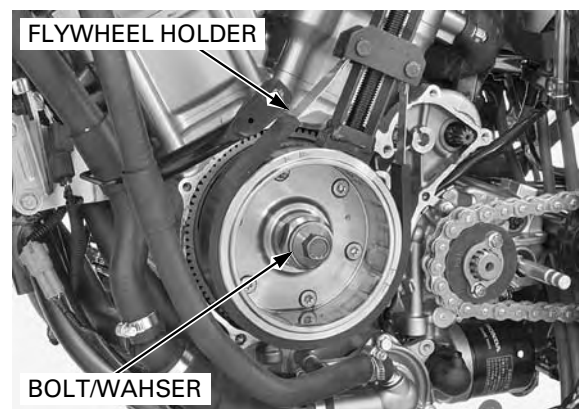
*The flywheel bolt
has left hand
thread.*

Remove the flywheel bolt and washer while holding the flywheel using the special tool.

TOOL:

Flywheel holder

**07725-0040001 or
equivalent commer-
cially available**

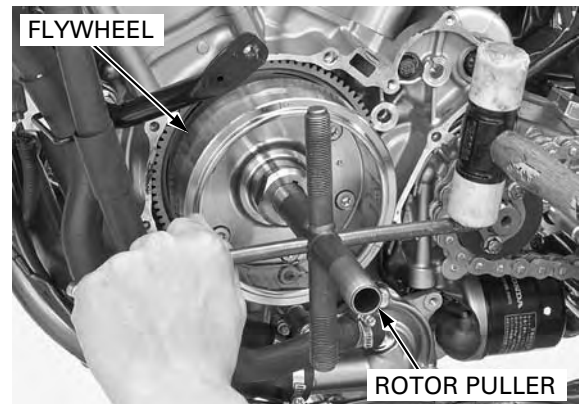


Remove the flywheel using the special tool.

TOOL:

Rotor puller

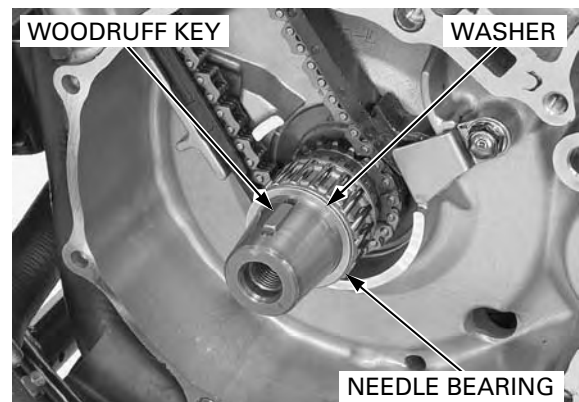
07733-0020001



Remove the washer and needle bearing and woodruff key from the crankshaft.

NOTE:

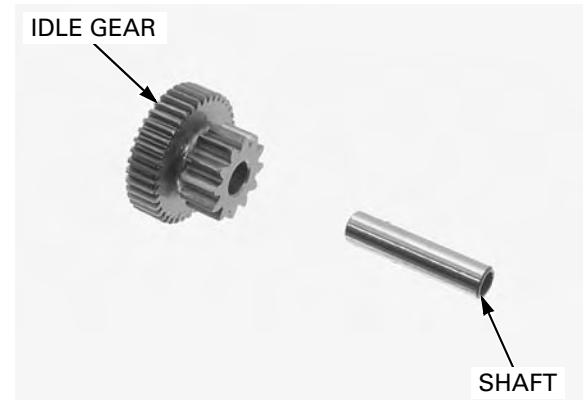
- When woodruff key removal, be careful not to damage the key groove and crankshaft.
- Do not lose the woodruff key.



STARTER IDLE/REDUCTION GEAR INSPECTION

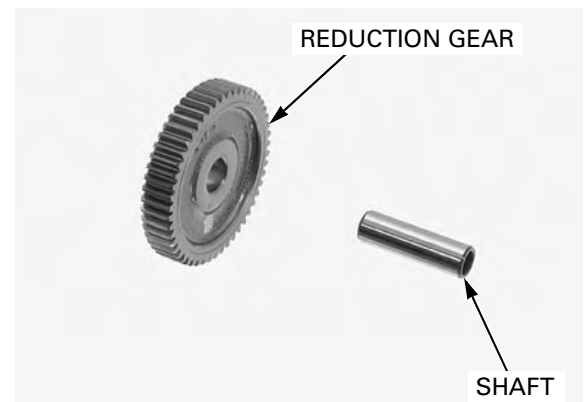
STARTER IDLE GEAR/SHAFT

Check the starter idle gear and shaft for wear or damage.



STARTER REDUCTION GEAR/SHAFT

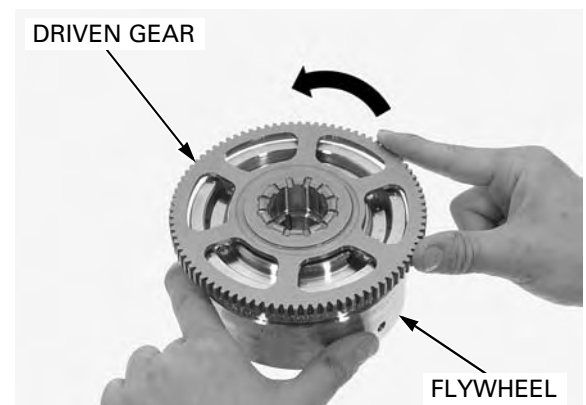
Check the starter reduction gear and shaft for wear or damage.



STARTER DRIVEN GEAR/STARTER CLUTCH REMOVAL

Check the operation of the one-way clutch by turning the starter driven gear. You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.

Remove the starter driven gear from the flywheel while turning the driven gear counterclockwise.



ALTERNATOR/STARTER CLUTCH

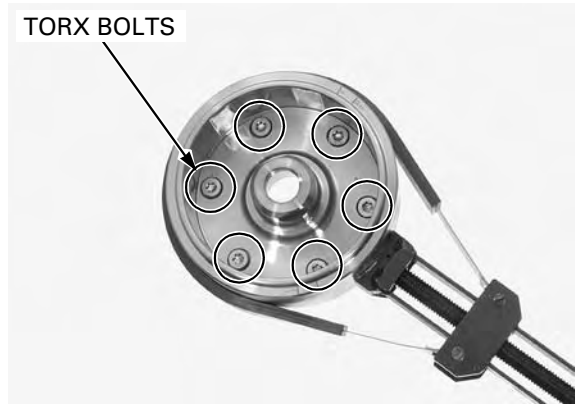
Remove the torx bolts while holding the flywheel using the special tool.

TOOL:

Flywheel holder

07725-0040001 or equivalent commercially available

TORX BOLTS

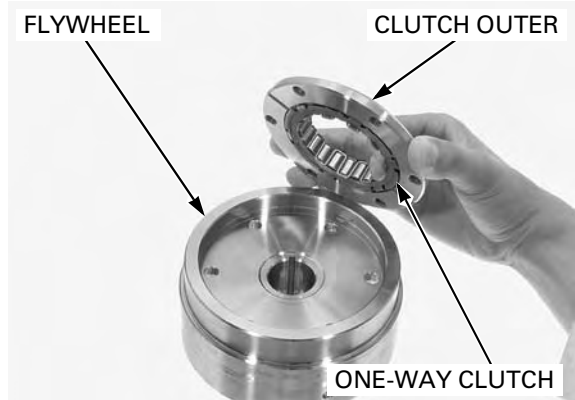


Remove the clutch outer and one-way clutch from the flywheel.

FLYWHEEL

CLUTCH OUTER

ONE-WAY CLUTCH

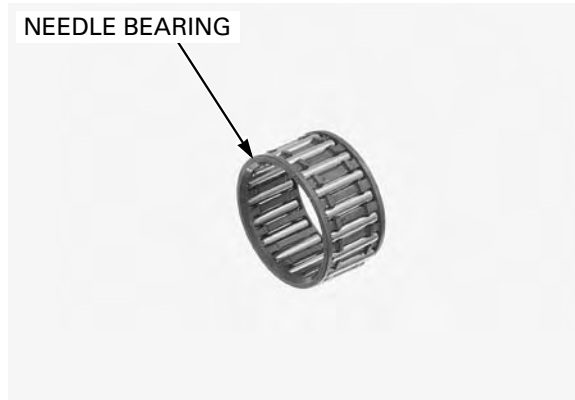


STARTER CLUTCH INSPECTION

NEEDLE BEARING

Check the needle bearing for abnormal wear or damage.

NEEDLE BEARING



ONE-WAY CLUTCH/CLUTCH OUTER

Check the one-way clutch sprag for abnormal wear, damage or irregular movement.

NOTE:

- Do not remove the one-way clutch from the clutch outer, unless it is necessary to replace with a new one.
- If the spring is removed from the one-way clutch groove, replace the one-way clutch assembly with a new one.

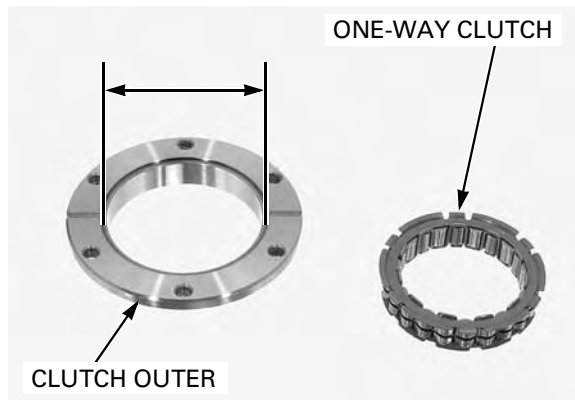
Check the clutch outer for wear or damage.

Measure the clutch outer I.D.

SERVICE LIMIT: 74.46 mm (2.931 in)

ONE-WAY CLUTCH

CLUTCH OUTER



STARTER DRIVEN GEAR

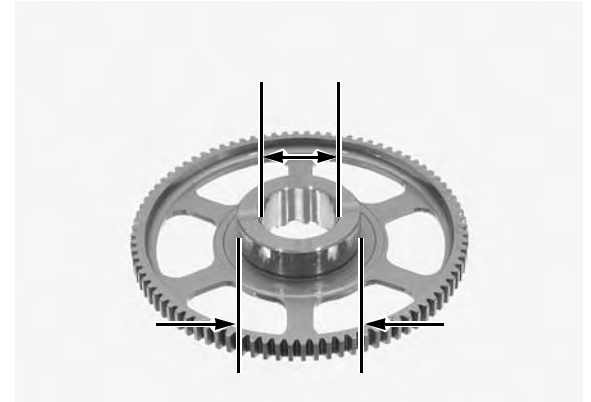
Check the one-way clutch sprag contact surface, teeth and sliding surface for wear or damage.

Measure the driven gear O.D.

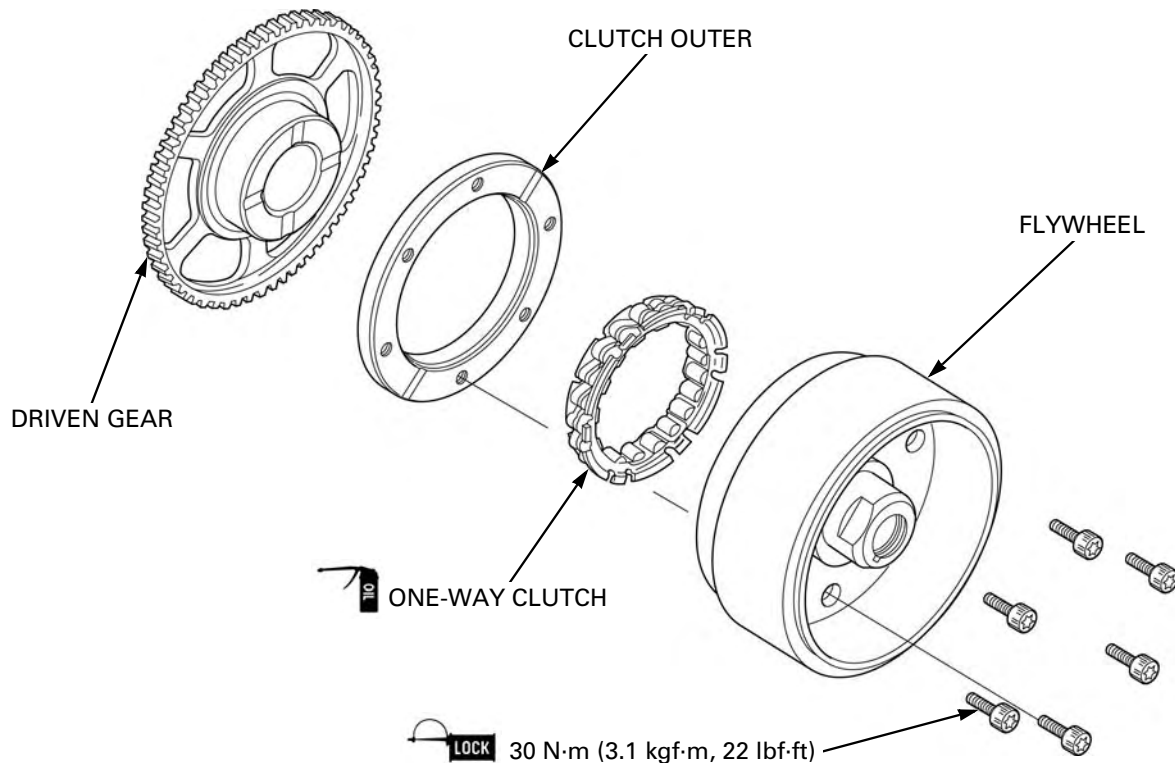
SERVICE LIMIT: 57.73 mm (2.273 in)

Measure the driven gear I.D.

SERVICE LIMIT: 37.10 mm (1.461 in)

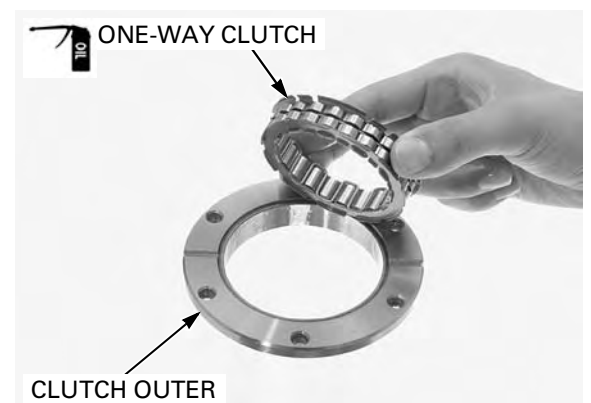


STARTER DRIVEN GEAR/STARTER CLUTCH INSTALLATION



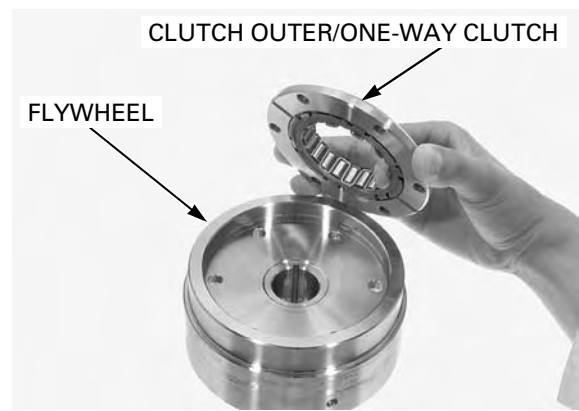
Clean and apply engine oil to the one-way clutch sliding surface.

Install the one-way clutch into the clutch outer with its flange side facing the flywheel.



ALTERNATOR/STARTER CLUTCH

Install the clutch outer and one-way clutch to the flywheel.



Hold the flywheel using the special tool.

TOOL:

Flywheel holder

**07725-0040001 or
equivalent commercially available**

Clean and apply a locking agent to the torx bolt threads (page 1-18).
Install and tighten the torx bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)



Install the starter driven gear to the flywheel while turning the driven gear counterclockwise.

Recheck the one-way clutch operation (page 11-7).



FLYWHEEL INSTALLATION

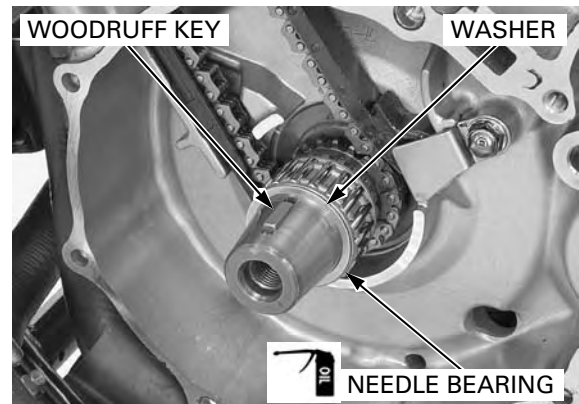
Apply engine oil to the needle bearing and install it to the crankshaft.

Install the washer to the crankshaft.

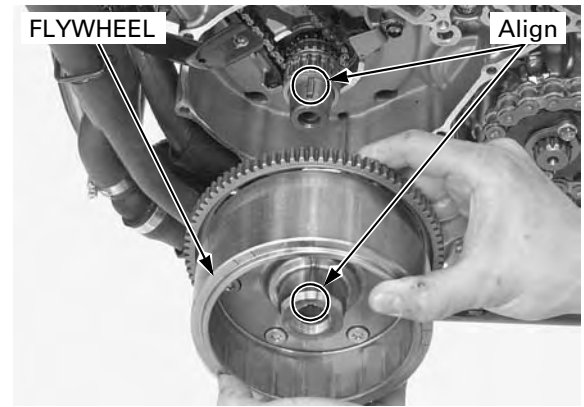
Wipe any oil off the mating surface of the crankshaft with flywheel and woodruff key groove.

Install the woodruff key to the key groove of the crankshaft.

During woodruff key installation, be careful not to damage the key groove or crankshaft.



Wipe any oil off the mating surface of the flywheel with crankshaft.
Install the flywheel to the crankshaft, aligning its key groove with the woodruff key.



Hold the flywheel using the special tool.

TOOL:

Flywheel holder

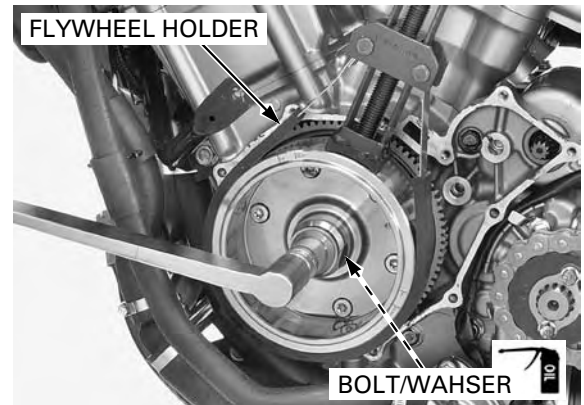
**07725-0040001 or
equivalent commercially available**

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

*The flywheel bolt
has left hand
thread.*

Install and tighten the flywheel bolt with the washer to the specified torque.

TORQUE: 157 N·m (16.0 kgf·m, 116 lbf·ft)

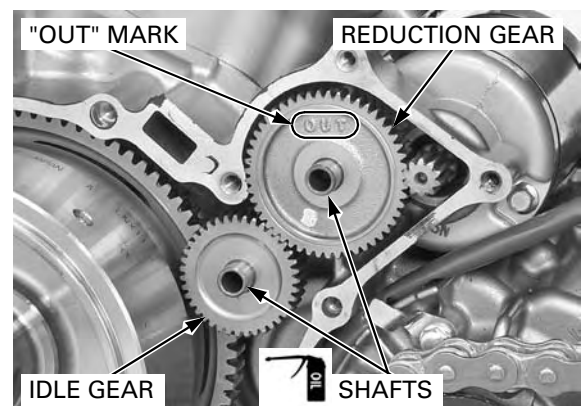


Apply engine oil to the starter reduction gear and starter idle gear shafts outer surface.
Install the starter reduction gear, idle gear and shafts to the left crankcase as an assembly.

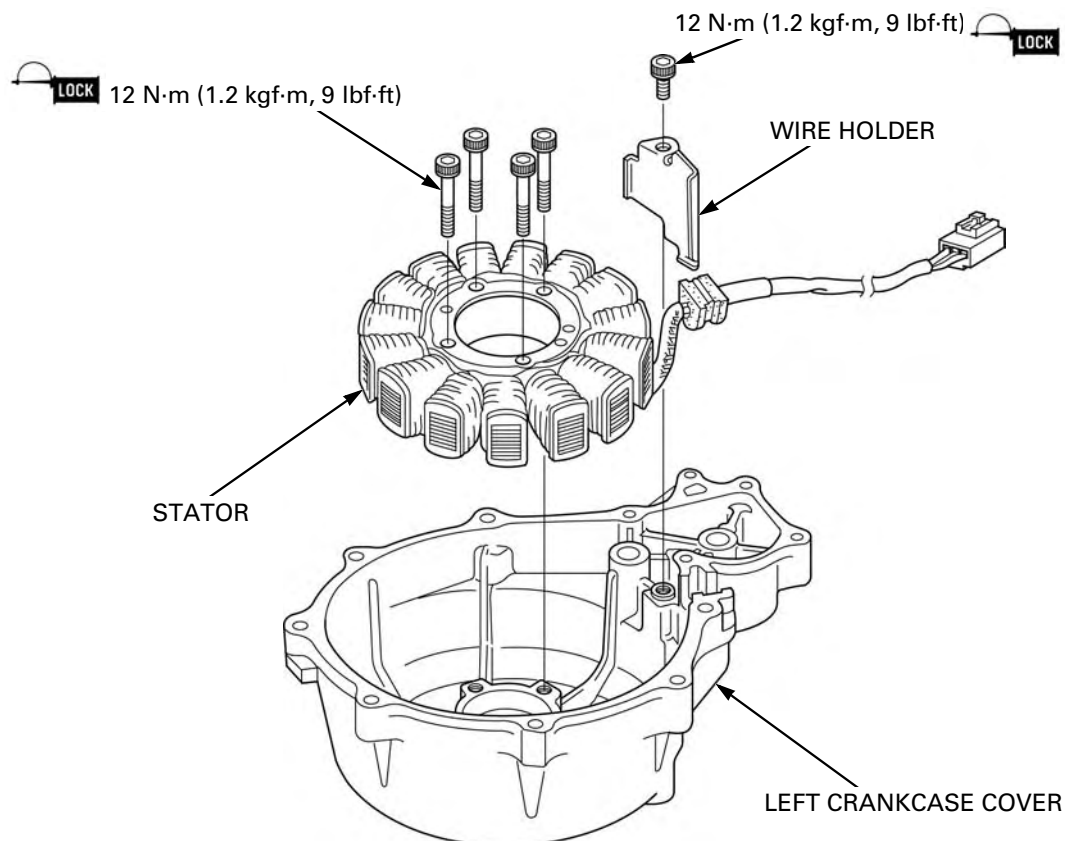
NOTE:

Install the starter reduction gear with its "OUT" mark facing out.

Install the stator and left crankcase cover (page 11-12).

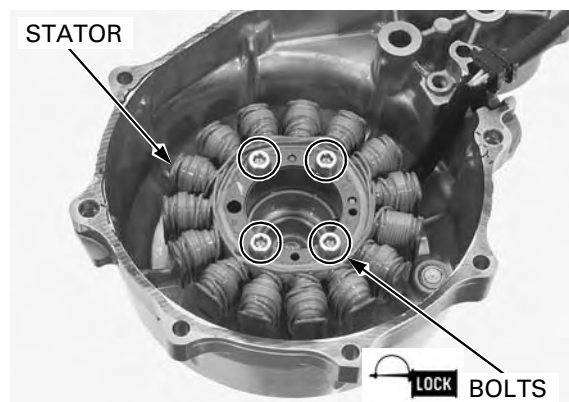


STATOR INSTALLATION



Install the stator to the left crankcase cover.
Clean and apply a locking agent to the bolt threads (page 1-18).
Install and tighten the stator bolts to the specified torque.

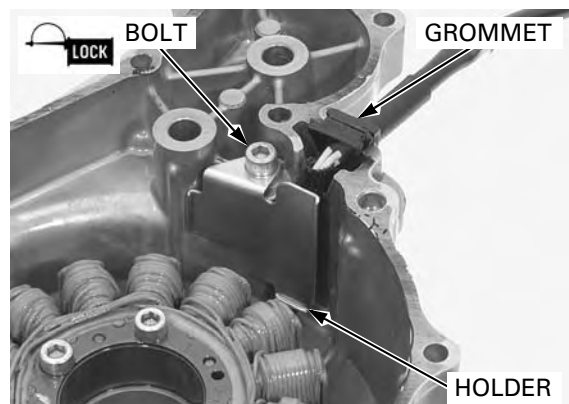
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the grommets into the groove in the left crankcase cover.

Clean and apply a locking agent to the bolt threads (page 1-18).
Install the wire holder to the left crankcase cover.
Install and tighten the bolt to the specified torque.

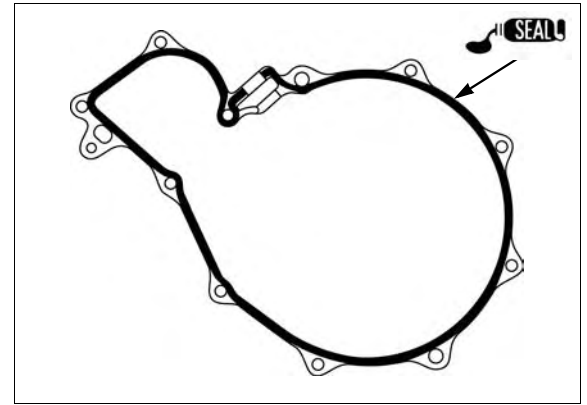
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



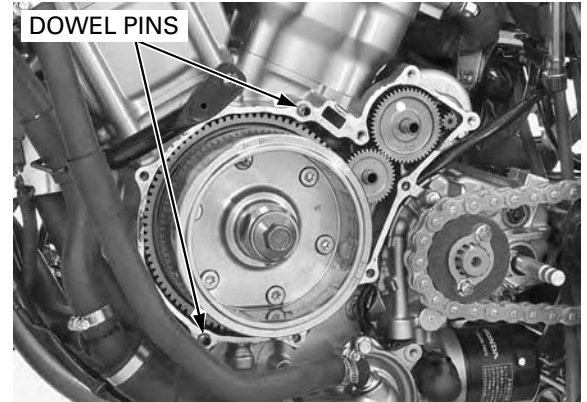
Clean off the sealant from the left crankcase cover mating surface.

Do not use an organic solvent when wiping off the excessive sealant.

Apply liquid sealant (Three Bond 1207B or equivalent) to the left crankcase cover mating surface.



Install the dowel pins.

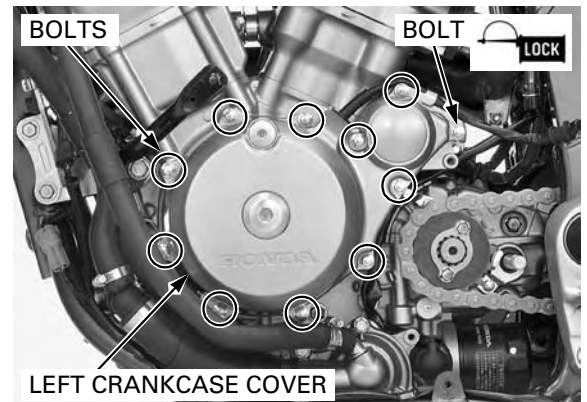


The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during installation.

Install the left crankcase cover.

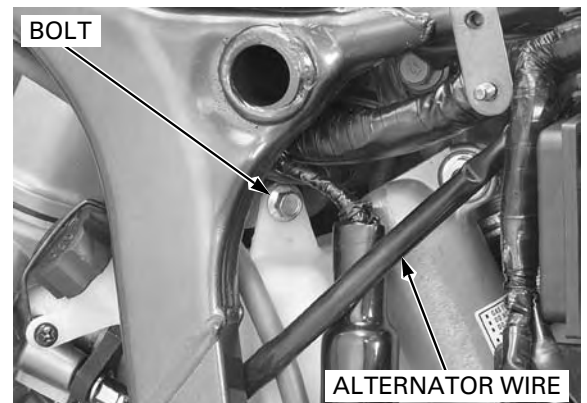
Clean and apply locking agent to the bolt threads as shown.

Install and tighten the left crankcase cover bolts in a crisscross pattern in several steps.



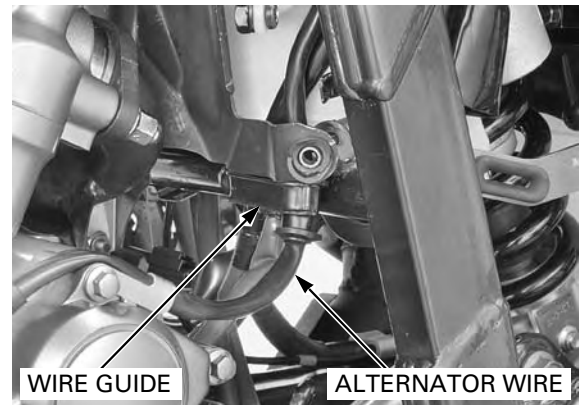
Route the alternator wire between the reserve tank and frame.

Install and tighten the reserve tank mounting bolt.



ALTERNATOR/STARTER CLUTCH

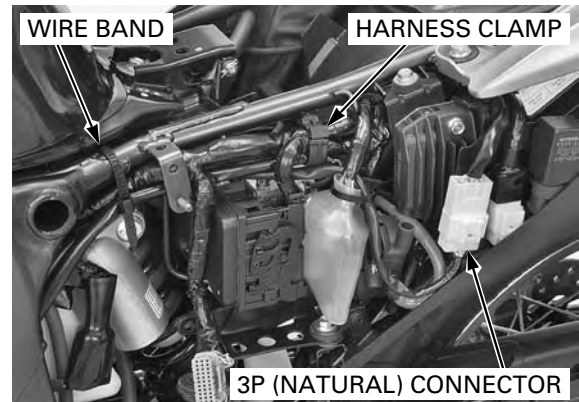
Install the alternator wire to the wire guide.



Connect the alternator 3P (Natural) connector.

Route the wire harness properly (page 1-21).

Install the alternator wire to the wire band and harness clamp.

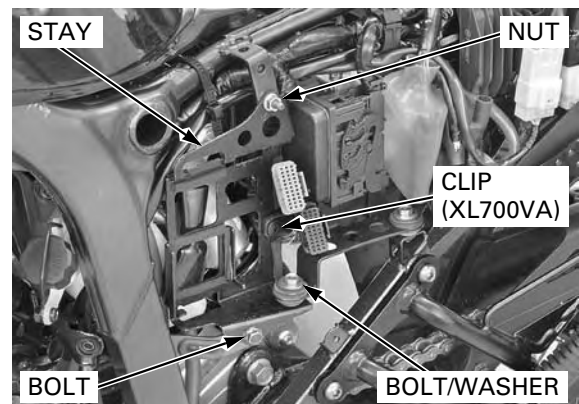


Install the ECM stay and trim clip (XL700VA only). Install and tighten the nut, bolt/washer and bolt securely.

Install the following:

- Drive sprocket cover (page 7-13)
- Heat guard plate mounting bolt (page 2-23)
- ECM (page 5-77)
- Under cowl (page 2-13)
- Left front side cowl (page 2-9)

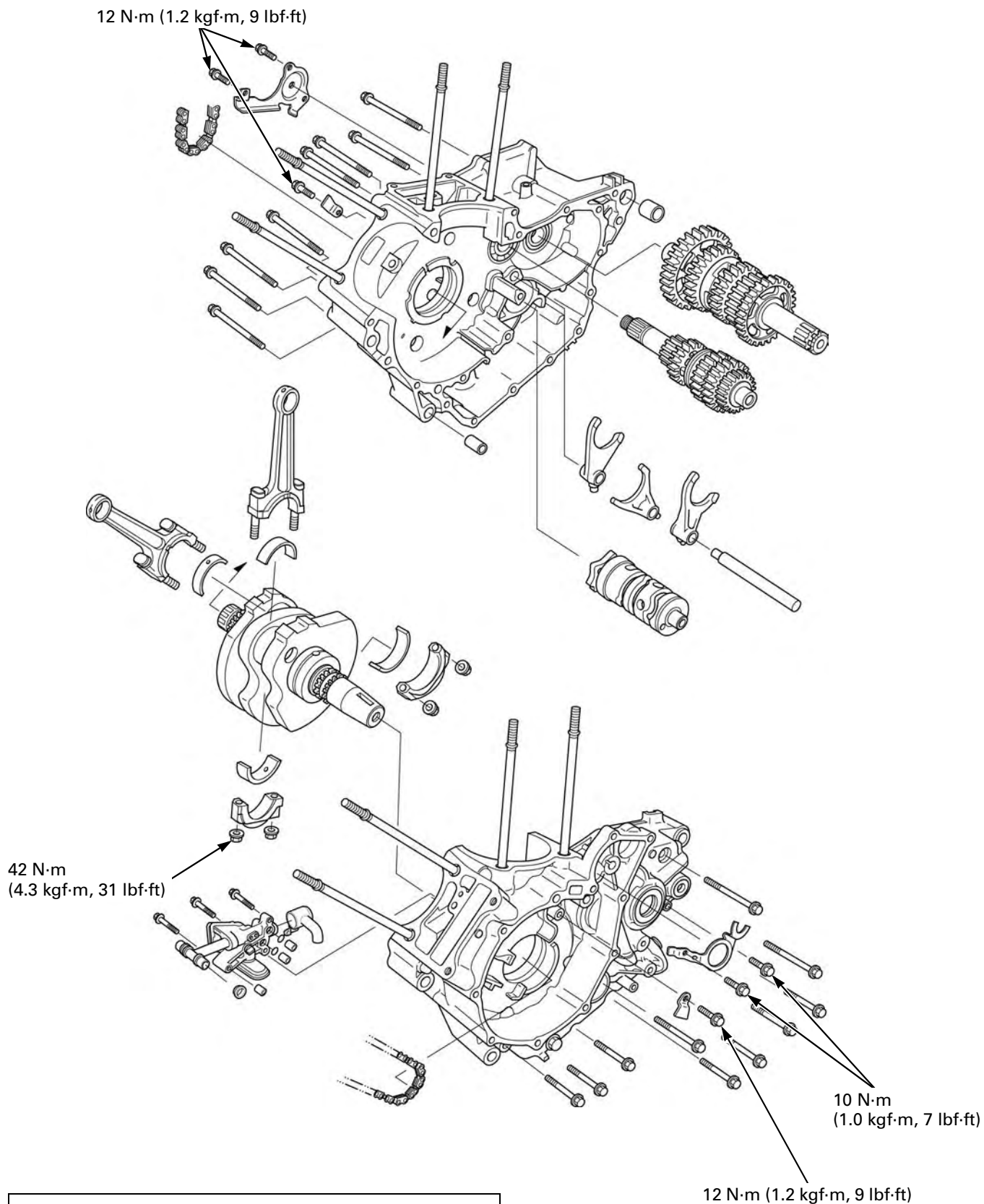
Check the engine oil level (page 3-12).



12. CRANKCASE/CRANKSHAFT/TRANSMISSION

COMPONENT LOCATION	12-2	CRANKPIN BEARING	12-11
SERVICE INFORMATION	12-3	MAIN JOURNAL BEARING	12-14
TROUBLESHOOTING	12-6	TRANSMISSION.....	12-19
CRANKCASE SEPARATION.....	12-7	CRANKCASE BEARING REPLACEMENT	12-27
CRANKSHAFT/CONNECTING ROD	12-8	CRANKCASE ASSEMBLY	12-29

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
 - Oil pump (page 4-5)
 - Crankshaft/connecting rod (page 12-8)
 - Transmission (page 12-19)
- The following parts must be removed before separating the crankcase:
 - Oil filter (page 3-13)
 - Water pump (page 6-14)
 - Cylinder head (page 8-13)
 - Cylinder (page 9-4)
 - Piston (page 9-5)
 - Clutch (page 10-6)
 - Gearshift linkage (page 10-14)
 - Primary drive gear (page 10-12)
 - Flywheel (page 11-6)
 - Starter motor (page 19-6)
 - Neutral switch (page 20-24)
 - EOP switch (page 20-19)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Mark and store the connecting rods, bearing caps and bearing inserts to be sure of their correct locations for reassembly.
- The crank pin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance. Incorrect oil clearance can cause major engine damage.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.

SPECIFICATIONS

Unit: mm (in)

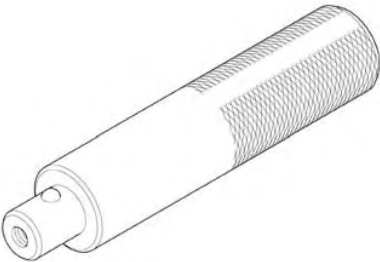
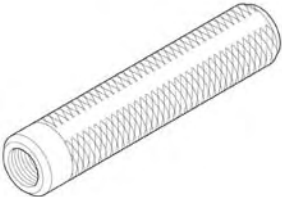
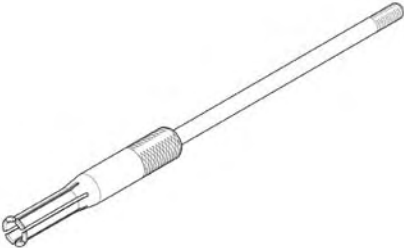
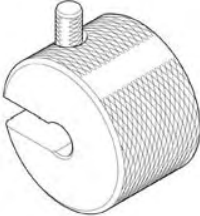
ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.015)
	Crankpin bearing oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)
	Main journal oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.07 (0.003)
	Crankshaft runout		–	0.03 (0.001)
	Main journal O.D.		52.976 – 52.994 (2.0857 – 2.0864)	52.976 (2.0857)
Main journal I.D.			58.010 – 58.022 (2.2839 – 2.2843)	58.070 (2.2862)
Shift fork, fork shaft	I.D.		13.000 – 13.021 (0.5118 – 0.5126)	13.03 (0.513)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)
	Fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)
Shift drum O.D.			11.966 – 11.984 (0.4711 – 0.4718)	11.94 (0.470)
Shift drum journal I.D.			12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
Shift drum-to-shift drum journal clearance			0.016 – 0.052 (0.0006 – 0.0020)	0.09 (0.003)
Transmission	Gear I.D.	M3, M5	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1, C2, C4	31.000 – 31.025 (1.2205 – 1.2215)	31.05 (1.222)
	Gear busing O.D.	M3, M5	27.959 – 27.980 (1.1007 – 1.1016)	27.940 (1.1000)
		C1, C2, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Gear-to-bushing clearance	M3, M5	0.020 – 0.062 (0.0008 – 0.0024)	0.08 (0.003)
		C1, C2, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Gear bushing I.D.	M3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.986)
		C2	27.995 – 28.016 (1.1022 – 1.1030)	28.03 (1.103)
	Mainshaft O.D.	at M3	24.972 – 24.993 (0.9831 – 0.9840)	24.95 (0.982)
	Countershaft O.D.	at C2	27.967 – 27.980 (1.1011 – 1.1016)	27.95 (1.100)
	Bushing-to-shaft clearance	M3	0.007 – 0.049 (0.0003 – 0.0019)	0.09 (0.003)
		C2	0.015 – 0.049 (0.0006 – 0.0019)	0.08 (0.003)

CRANKCASE/CRANKSHAFT/TRANSMISSION

TORQUE VALUES

Crankcase bolt (8 mm)	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Crank pin bearing cap nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	Apply engine oil to the threads and seating surface.
Oil seal setting plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent.
Gearshift cam plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent.
Transmission bearing setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent.
Cam chain tensioner setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent.
Oil filter boss	–	See page 12-29
		Apply locking agent to the crankcase side threads.

TOOLS

Driver 07749-0010000 	Attachment, 42 x 47 mm 07746-0010300 	Attachment, 52 x 55 mm 07746-0010400 
Pilot, 22 mm 07746-0041000 	Pilot, 25 mm 07746-0040600 	Pilot, 20 mm 07746-0040500 
Remover handle 07936-3710100 	Bearing remover, 20 mm 07936-3710600 	Remover weight 07741-0010201 
Driver, 57 mm 070MF-MEG0100 	Metal installer set 070MF-MEG0200 	

TROUBLESHOOTING

Excessive engine noise

- Worn main journal bearings
- Worn crankpin bearings
- Worn or damaged transmission gear
- Worn or damaged transmission bearings

Hard to shift

- Improper clutch operation (page 10-4)
- Incorrect engine oil viscosity
- Bent shift forks
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam grooves
- Bent gearshift spindle

Transmission jumps out of gear

- Worn gear dogs or holes
- Worn gearshifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken drum stopper arm spring
- Broken gearshift spindle return spring

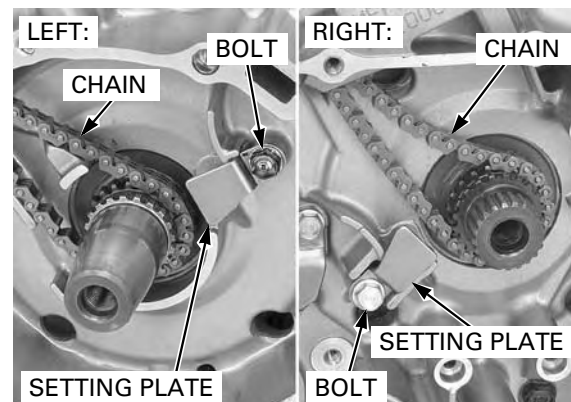
CRANKCASE SEPARATION

Remove the engine from the frame (page 7-4).

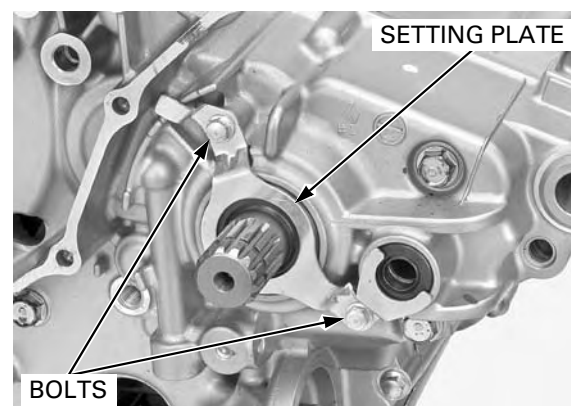
For Service Information for removal of necessary parts before separating the crankcase (page 12-3).

Remove the bolts and cam chain tensioner setting plates.

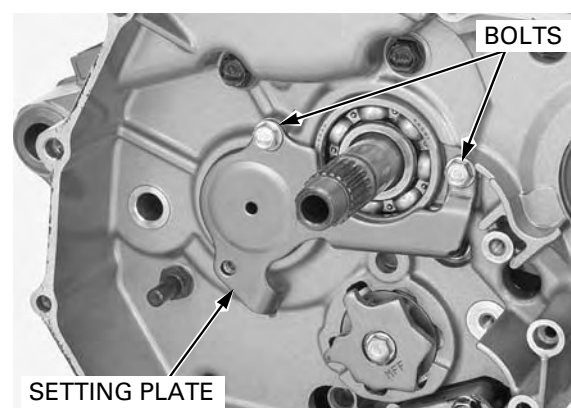
Remove the cam chains.



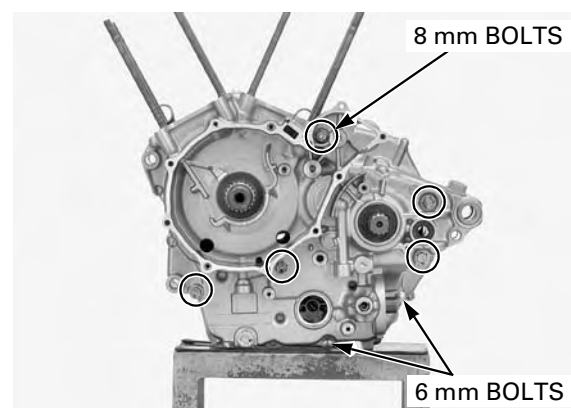
Remove the bolts and oil seal setting plate.



Remove the bolts and bearing setting plate.



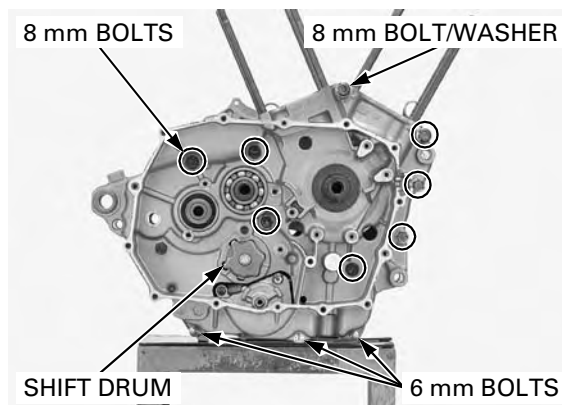
Loosen the 6 mm and 8 mm bolts in a crisscross pattern in several steps, then remove them.



CRANKCASE/CRANKSHAFT/TRANSMISSION

Loosen the 6 mm and 8 mm bolts with washer in a crisscross pattern in several steps, then remove them.

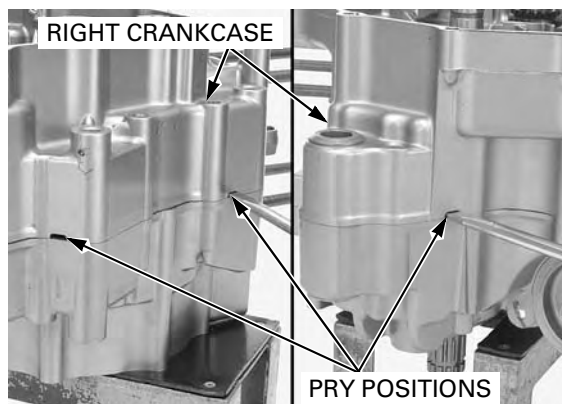
Set the shift drum to the position as shown.



Place the crankcase with the left crankcase down and remove the right crankcase.

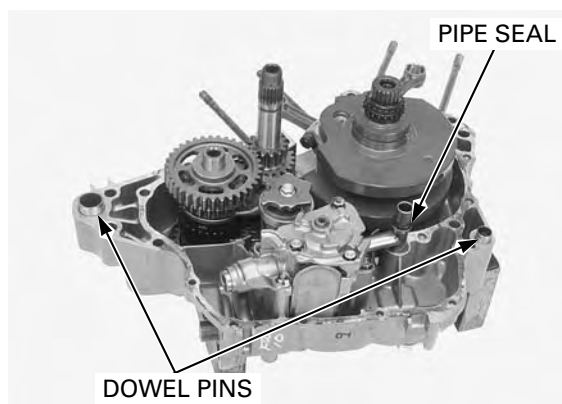
NOTE:

- Separate the right crankcase from the left crankcase while prying at the points as shown.
- Separate the right crankcase from the left crankcase while softly tapping them at several locations with a soft hammer.



Remove the dowel pins and pipe seal.

Clean off the sealant from the left and right crankcase mating surfaces.



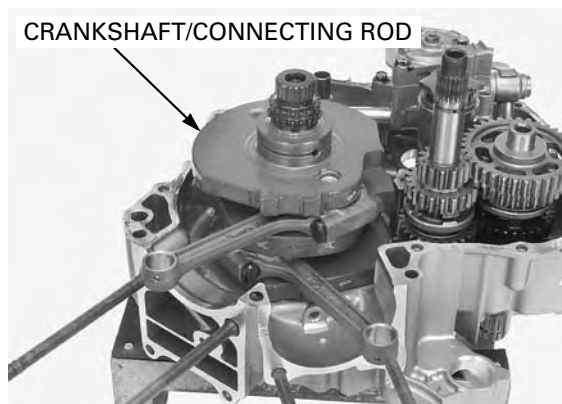
CRANKSHAFT/CONNECTING ROD

CRANKSHAFT REMOVAL

Separate the crankcase (page 12-7).

Remove the crankshaft/connecting rod from the left crankcase.

During crankshaft and connecting rod service, be careful not to damage the main journal or crank pin bearing inserts.

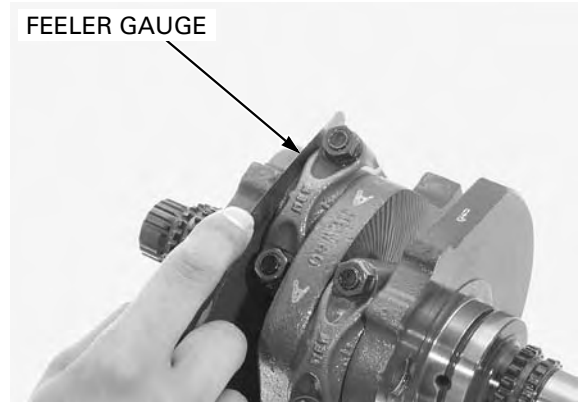


SIDE CLEARANCE INSPECTION

Before removing the connecting rods, check the big end side clearance.

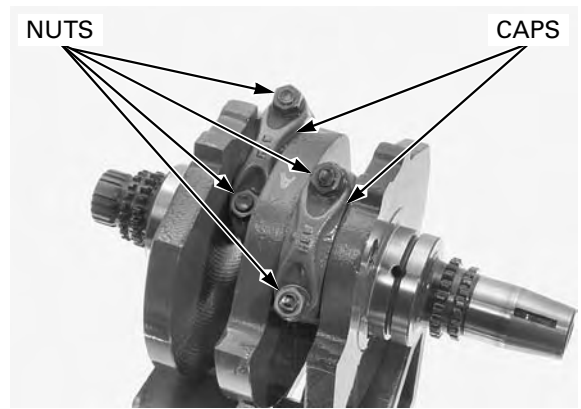
Measure the side clearance by inserting the feeler gauge between the crankshaft and connecting rod big end.

SERVICE LIMIT: 0.40 mm (0.016 in)

**CONNECTING ROD REMOVAL**

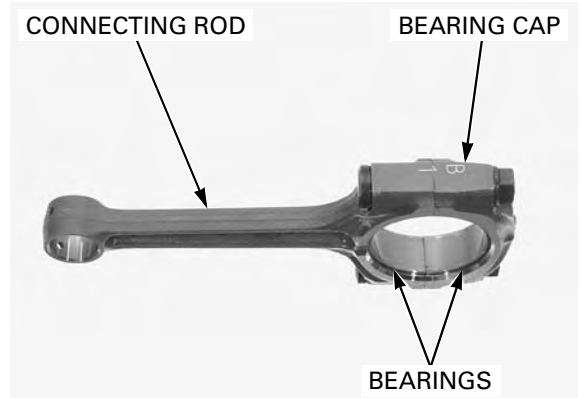
Tap the side of the cap lightly if bearing cap is hard to remove.

Remove the crankpin bearing cap nuts and the bearing caps.



Mark the rods, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins for reassembly.

For the connecting rod small end inspection (page 9-7).



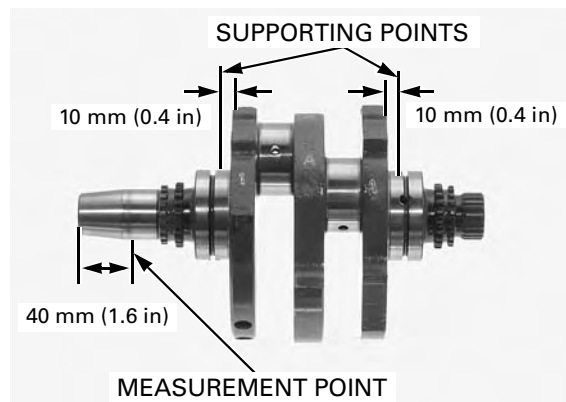
CRANKSHAFT INSPECTION

Check the crankshaft journal surfaces for damage, discoloration or scratch.

CRANKSHAFT RUNOUT

Place the crankshaft on a stand or V-blocks.
Set a dial indicator on the measurement point.
Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.03 mm (0.001 in)



CONNECTING ROD INSTALLATION

NOTICE

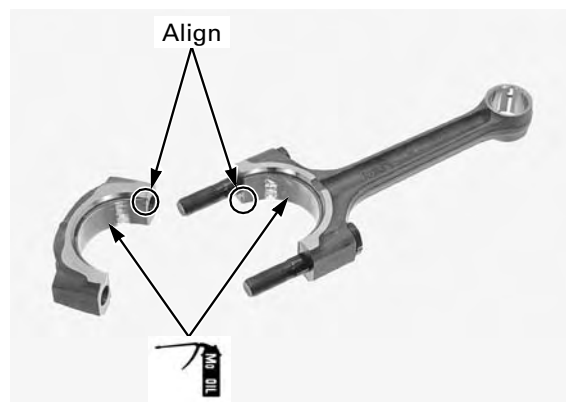
Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Wipe any oil from the connecting rod, cap and bearing inserts.

Install the bearing inserts on the connecting rods and caps by aligning the tab with the groove.

Apply molybdenum disulfide oil solution to the thrust surface of the bearings.

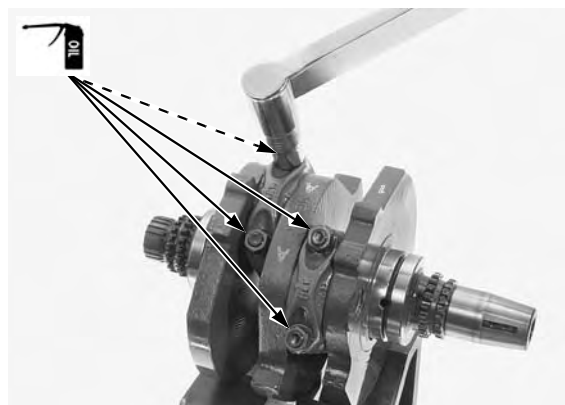
Install the rods and caps on the crankshaft by aligning the I.D. code on the rod and cap. Be sure each part is installed in its original position, as noted during removal.



Apply engine oil to the bearing cap nut threads and seating surface, then tighten them in several steps alternately.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

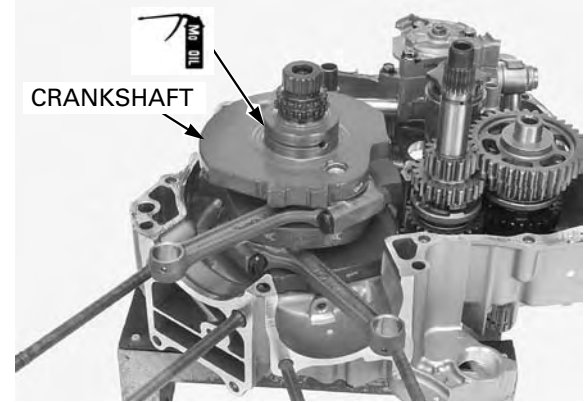
After tightening the nuts, check that the connecting rods move freely without binding.



CRANKSHAFT INSTALLATION

Apply molybdenum disulfide oil solution to the crankshaft main journals and install the crankshaft into the left crankcase.

Assemble the crankcase (page 12-29).



CRANKPIN BEARING

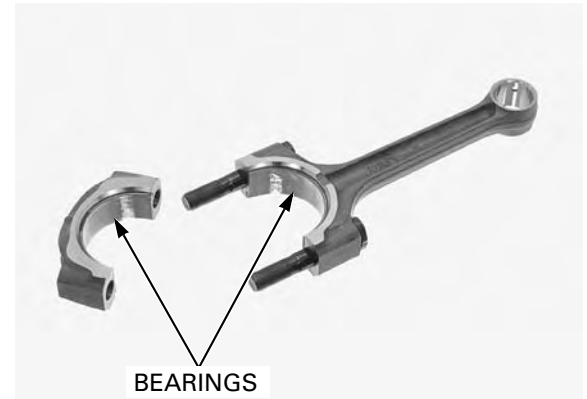
NOTICE

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 12-9).
Check the bearing inserts for unusual wear, damage or peeling and replace them if necessary.

Select the replacement bearing (page 12-12).

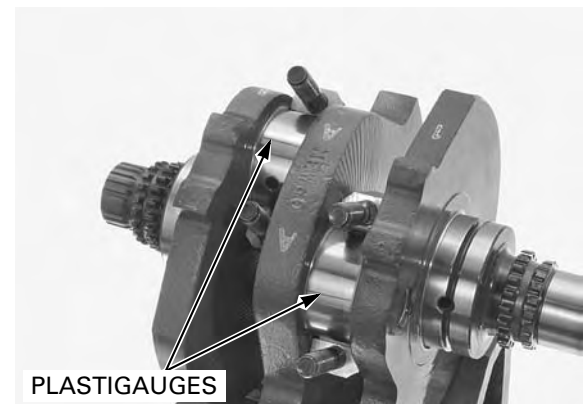


OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and crankpins.

Put a strip of plastigauge lengthwise on each crankpin avoiding the oil hole.

Carefully install the connecting rods and bearing caps on the correct crankpins.

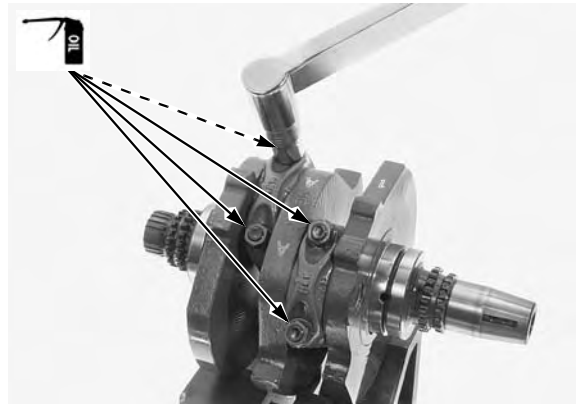


CRANKCASE/CRANKSHAFT/TRANSMISSION

Do not rotate the crankshaft during inspection.

Apply engine oil to the bearing cap nut threads and seating surfaces, then tighten them to the specified torque in several steps alternately.

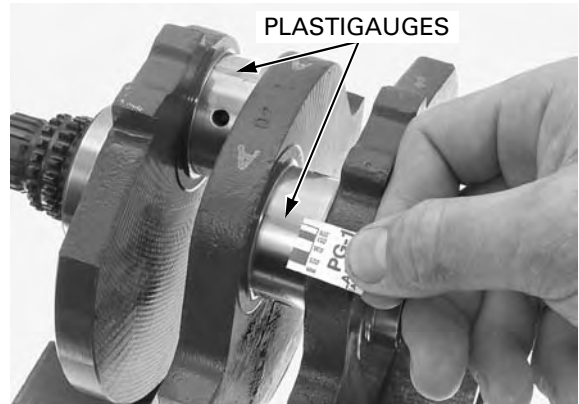
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Remove the bearing caps and measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)

If the clearance exceeds the service limit, select the correct replacement bearings as follows.



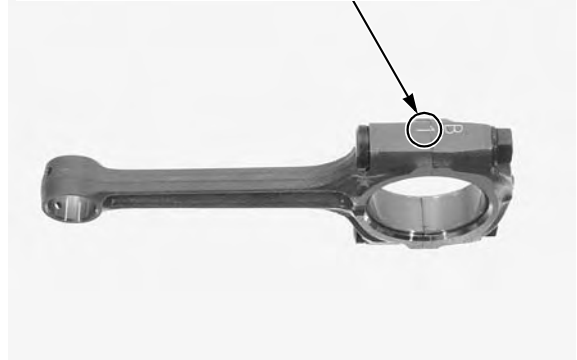
BEARING SELECTION

Record the connecting rod I.D. code number.

NOTE:

Number 1 or 2 on the connecting rod is the code for the connecting rod I.D.

CONNECTING ROD I.D. CODE NUMBER



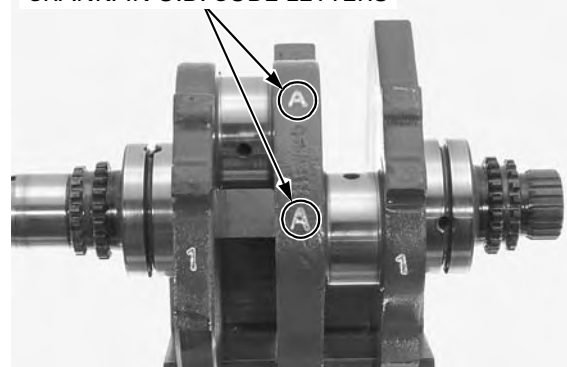
Record the crankpin O.D. code letter.

NOTE:

Letters A or B on each crank weight is the code for the crankpin O.D.

Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.

CRANKPIN O.D. CODE LETTERS



CRANKPIN BEARING SELECTION TABLE:

			CONNECTING ROD I.D. CODE NUMBER	
			1	2
			46.000 – 46.008 mm (1.8110 – 1.8113 in)	46.008 – 46.016 mm (1.8113 – 1.8116 in)
CRANKPIN O.D. CODE LETTER	A	42.985 – 42.993 mm (1.6923 – 1.6926 in)	C (Black)	B (Blue)
	B	42.977 – 42.985 mm (1.6920 – 1.6923 in)	B (Blue)	A (Purple)

BEARING THICKNESS:

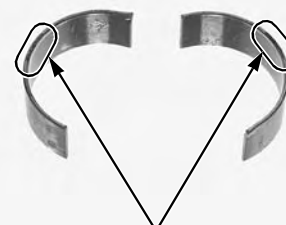
A (Purple): Thick

B (Blue): ↓

C (Black): Thin

NOTICE

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.



IDENTIFICATION COLOR

CONNECTING ROD SELECTION

An alphabetical weight code is stamped on the cap.

If a connecting rod requires replacement, you should select a rod with the same weight code as the original.

But if that is unavailable, you may use one of the others specified in the following chart.

CONNECTING ROD WEIGHT COMBINATION TABLE:

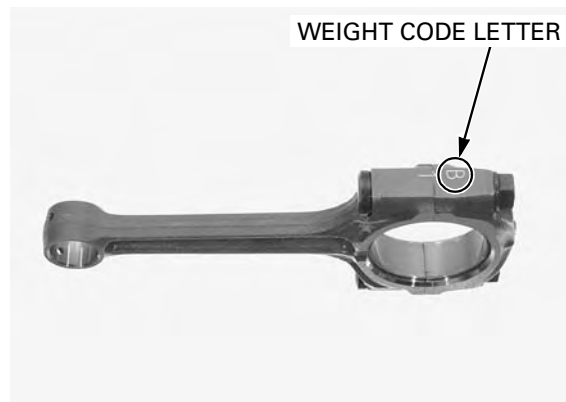
- The "O" mark in the table indicated that matching is possible in the crossed codes.

		REAR WEIGHT CODE LETTER		
		A	B	C
FRONT WEIGHT CODE LETTER	A	○	○	
	B	○	○	○
	C		○	○

		WEIGHT
CONNECTING ROD WEIGHT CODE	A	400.0 – 407.5 g (14.11 – 14.37 oz)
	B	407.5 – 412.5 g (14.37 – 14.55 oz)
	C	412.5 – 417.5 g (14.55 – 14.73 oz)

Install the following:

- Connecting rod (page 12-10).
- Crankshaft (page 12-11).



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.

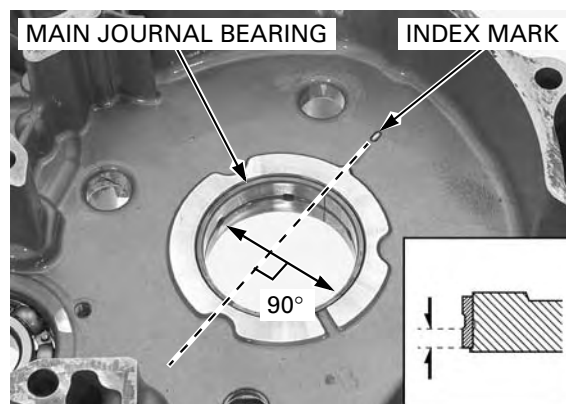
BEARING INSPECTION

Remove the crankshaft (page 12-8).

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 I.D. at between the bearing groove and crankcase outer side end of the bearing, and 90 degrees to the index mark.



Clean off any oil from the crankshaft journals.

Measure and record the crankshaft main journal O.D.

SERVICE LIMIT: 52.976 mm (2.0857 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.



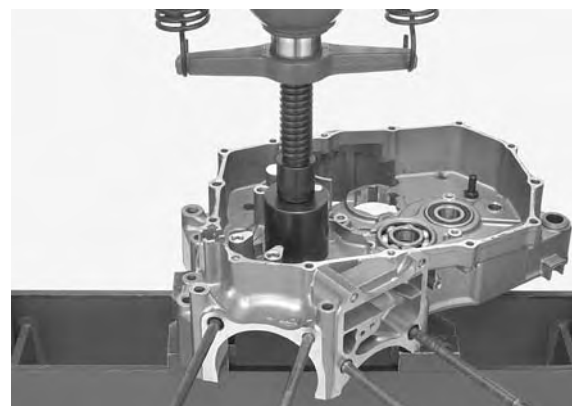
BEARING SELECTION

Set the special tool and hydraulic press on the outside of the crankcase.

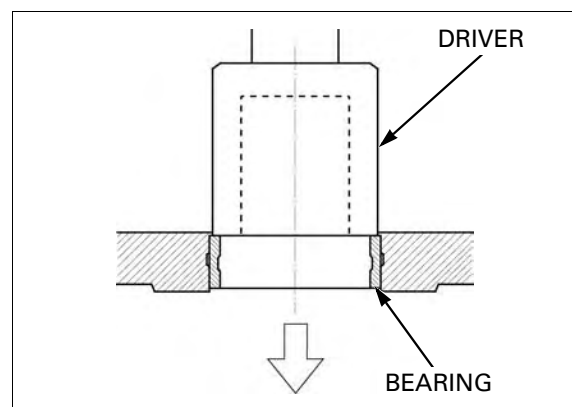
TOOL:

Driver, 57 mm

070MF-MEG0100

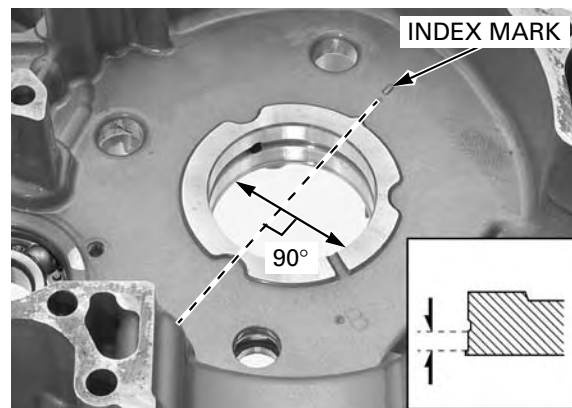


Press the main journal bearings toward the outside of the crankcase.



Measure and record the crankcase main journal I.D. at between the main journal groove and crankcase outer side end, and 90 degrees to the index mark.

SERVICE LIMIT: 58.070 mm (2.2862 in)



CRANKCASE/CRANKSHAFT/TRANSMISSION

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 bearings only are replaced

Carefully refer to the following instructions and tables for main bearing selection.

Record the bearing support I.D. code letter.

NOTE:

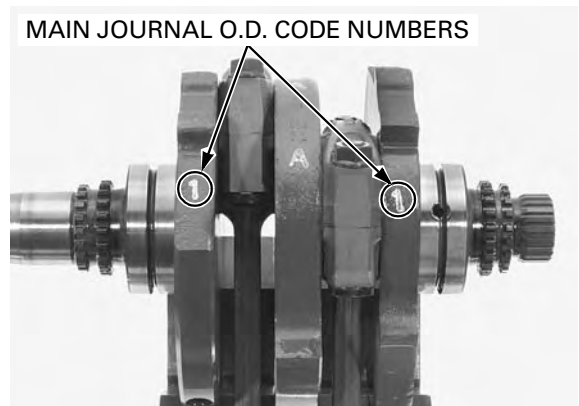
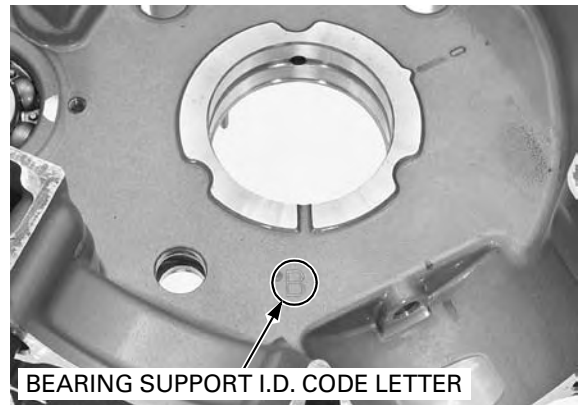
Letters A or B on each crankcase is the code for the crankcase I.D.

Record the main journal O.D. code number.

NOTE:

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.



CRANKCASE/CRANKSHAFT/TRANSMISSION

In case the crankshaft and crankcase are replaced:

			MAIN JOURNAL O.D. CODE NUMBER		
			1	2	3
			52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)
BEARING SUPPORT I.D. CODE LETTER	A	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)
	B	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)

In case the crankcase only is replaced:

			MAIN JOURNAL O.D.			
			52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)	52.970 – 52.976 mm (2.0854 – 2.0857 in)
BEARING SUPPORT I.D. CODE LETTER	A	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)	A (Blue)
	B	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)	A (Blue)

In case the crankshaft only is replaced:

		MAIN JOURNAL O.D. CODE NUMBER		
		1	2	3
		52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)
BEARING SUPPORT I.D.	58.058 – 58.070 mm (2.2857 – 2.2862 in)	O.S. F (Pink)	O.S. E (Yellow)	O.S. E (Yellow)
	58.046 – 58.058 mm (2.2853 – 2.2857 in)	O.S. G (Red)	O.S. F (Pink)	O.S. F (Pink)
	58.034 – 58.046 mm (2.2848 – 2.2853 in)	A (Blue)	O.S. G (Red)	O.S. G (Red)
	58.022 – 58.034 mm (2.2843 – 2.2848 in)	B (Black)	A (Blue)	A (Blue)
	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)
	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)

In case of main bearing replacement only:

		MAIN JOURNAL O.D.			
		52.988 – 52.994 mm (2.0861 – 2.0864 in)	52.982 – 52.988 mm (2.0859 – 2.0861 in)	52.976 – 52.982 mm (2.0857 – 2.0859 in)	52.970 – 52.976 mm (2.0854 – 2.0857 in)
BEARING SUPPORT I.D.	58.058 – 58.070 mm (2.2857 – 2.2862 in)	O.S. F (Pink)	O.S. E (Yellow)	O.S. E (Yellow)	O.S. E (Yellow)
	58.046 – 58.058 mm (2.2853 – 2.2857 in)	O.S. G (Red)	O.S. F (Pink)	O.S. F (Pink)	O.S. E (Yellow)
	58.034 – 58.046 mm (2.2848 – 2.2853 in)	A (Blue)	O.S. G (Red)	O.S. G (Red)	O.S. F (Pink)
	58.022 – 58.034 mm (2.2843 – 2.2848 in)	B (Black)	A (Blue)	A (Blue)	O.S. G (Red)
	58.016 – 58.022 mm (2.2841 – 2.2843 in)	C (Brown)	B (Black)	A (Blue)	A (Blue)
	58.010 – 58.016 mm (2.2839 – 2.2841 in)	D (Green)	C (Brown)	B (Black)	A (Blue)

CRANKCASE/CRANKSHAFT/TRANSMISSION

BEARING THICKNESS:

O.S. E (Yellow): Thick
O.S. F (Pink):
O.S. G (Red): ↑
A (Blue): Middle
B (Black):
C (Brown): ↓
D (Green): Thin

NOTICE

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.



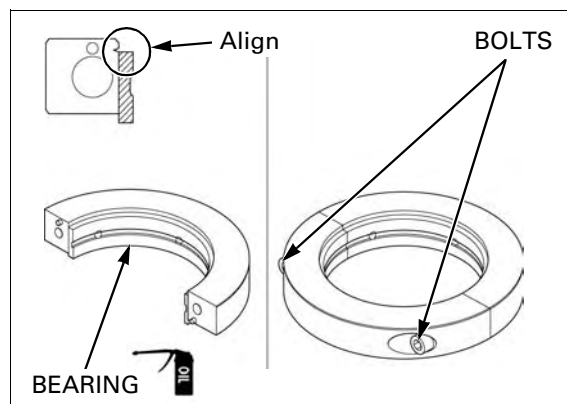
BEARING INSTALLATION

Apply engine oil to new bearing surface.
Set new bearings to the metal installer aligning its side edge with the metal installer grooves.

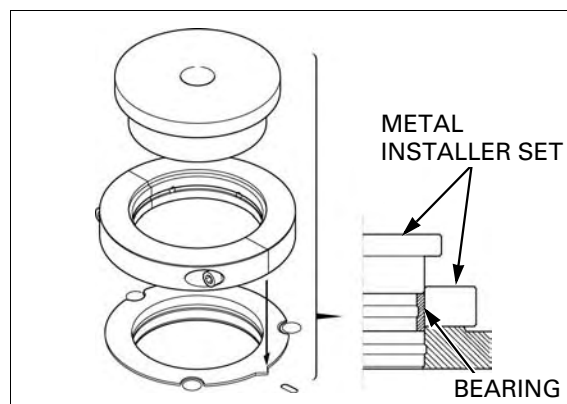
TOOL:

Metal installer set

070MF-MEG0200



Set the bearings and special tools assembly on inside of the crankcase, fitting the bearing edge in the crankcase main journal.
Align the mating line of the bearings with the index mark on the crankcase as shown.

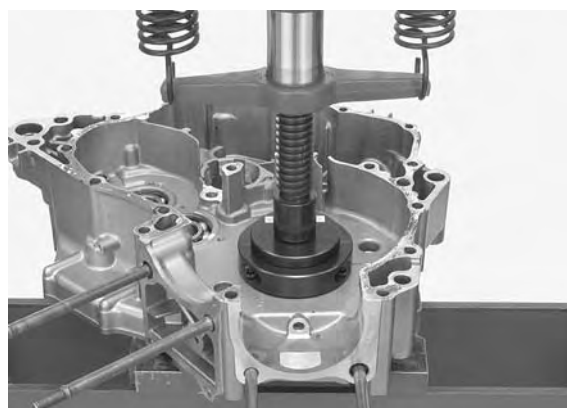


Set the hydraulic press.

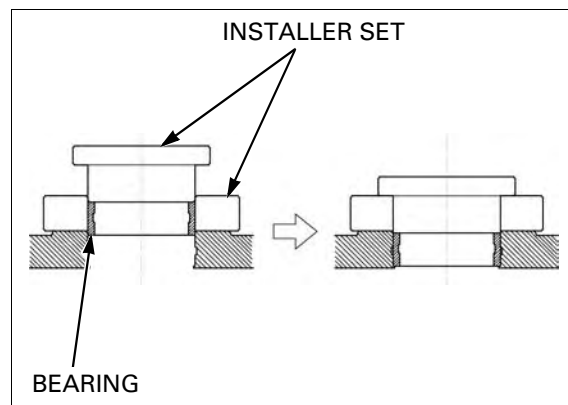
TOOL:

Metal installer set

070MF-MEG0200



Press the new bearings until the metal installer flange fully seat.



Make sure the bearing mating line aligns with the index mark on the crankcase.

Check the oil clearance (page 12-14).

- After selecting new bearings, recheck the clearance. Incorrect clearance can cause severe engine damage.

Install the crankshaft (page 12-11).

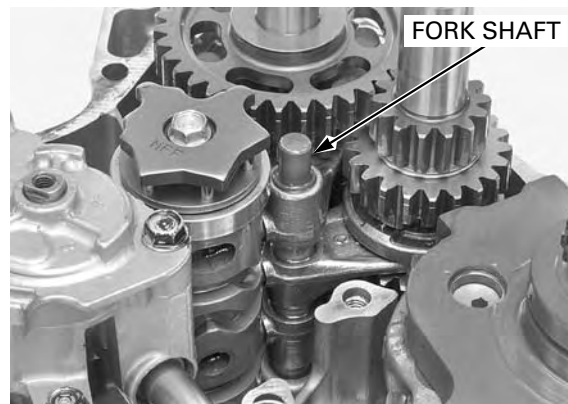


TRANSMISSION

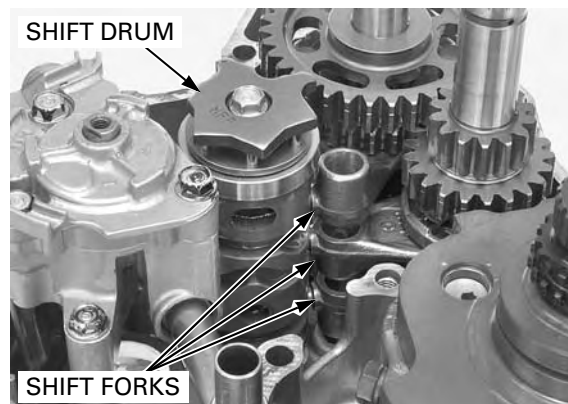
REMOVAL

Separate the crankcase (page 12-7).

Remove the fork shaft from the shift forks.

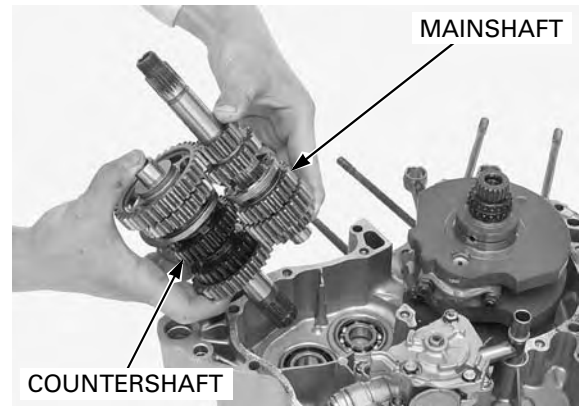


Remove the shift forks and shift drum.



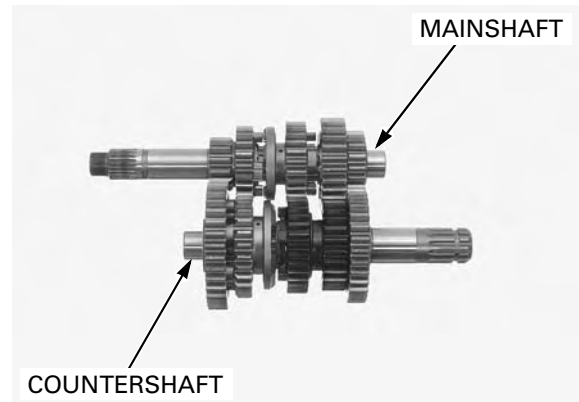
CRANKCASE/CRANKSHAFT/TRANSMISSION

Remove the mainshaft and countershaft together.



TRANSMISSION DISASSEMBLY

Disassemble the mainshaft and countershaft.



INSPECTION

GEARS

Check the gear dogs, dog holes and teeth for damage or excessive wear.

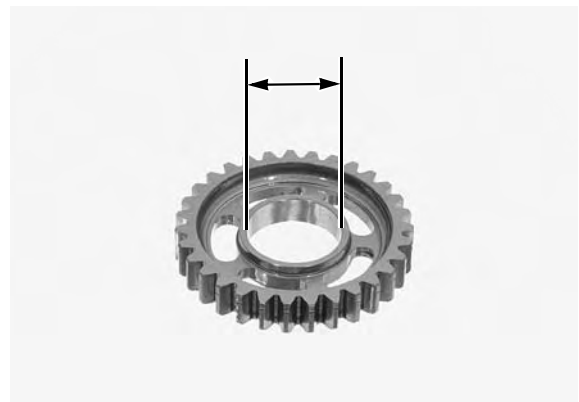


Measure the I.D. of each gear.

SERVICE LIMITS:

M3, M5 gears: 28.04 mm (1.104 in)

C1, C2, C4 gears: 31.05 mm (1.222 in)



BUSHINGS

Check the bushings for wear or damage.
Measure the O.D. of each bushing.

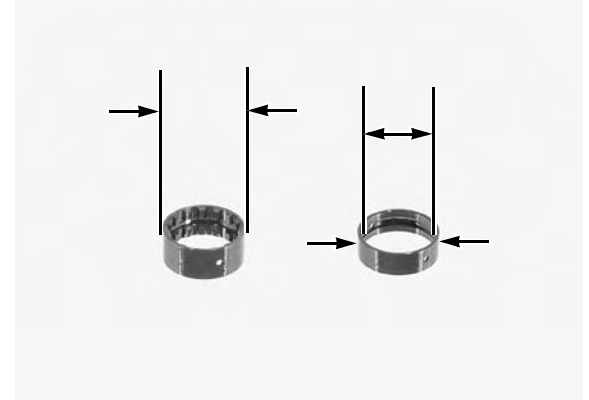
SERVICE LIMITS:

M3, M5 gear bushings: 27.940 mm (1.1000 in)
C1, C2, C4 gear bushings: 30.93 mm (1.218 in)

Measure the I.D. of the each gear bushing.

SERVICE LIMITS:

M3 gear bushing: 25.04 mm (0.986 in)
C2 gear bushing: 28.03 mm (1.104 in)

**MAINSHAFT/COUNTERSHAFT**

Check the spline grooves and sliding surfaces for abnormal wear or damage.
Measure the O.D. of the mainshaft and countershaft at the gear and bushing sliding areas.

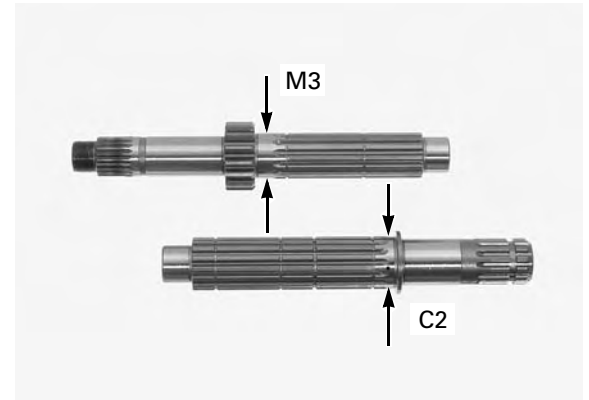
SERVICE LIMITS:

Mainshaft (at M3 gear bushing):
24.95 mm (0.982 in)
Countershaft (at C2 gear bushing):
27.95 mm (1.100 in)

Calculate the gear-to-bushing and bushing-to-shaft clearance.

SERVICE LIMITS:

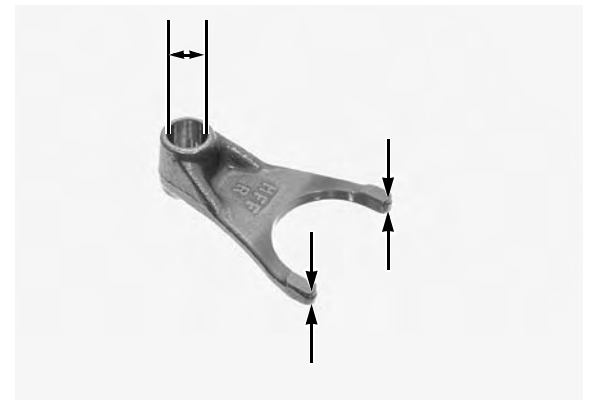
Gear-to-bushing
M3, M5: 0.08 mm (0.003 in)
C1, C2, C4: 0.11 mm (0.004 in)
Bushing-to-shaft
M3: 0.09 mm (0.004 in)
C2: 0.08 mm (0.003 in)

**SHIFT FORK**

Check for deformation or abnormal wear.
Measure the shift fork claw thickness.

SERVICE LIMITS: 5.6 mm (0.22 in)

Measure the shift fork I.D.

SERVICE LIMIT: 13.03 mm (0.513 in)

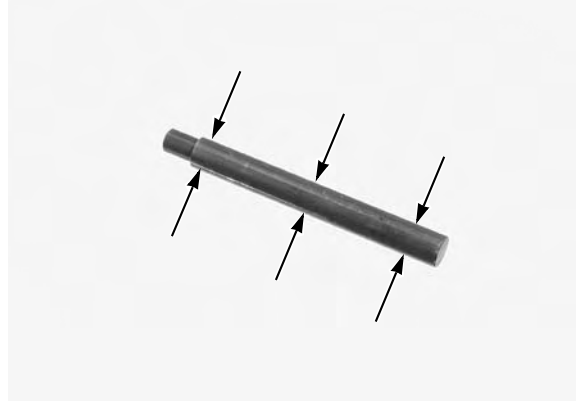
CRANKCASE/CRANKSHAFT/TRANSMISSION

SHIFT FORK SHAFT

Check the shaft for bend, abnormal wear or damage.

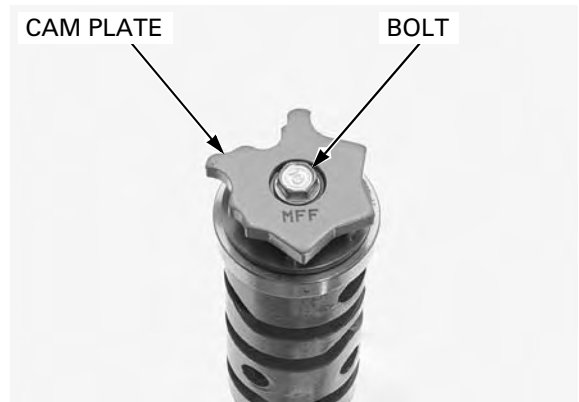
Measure the shift fork shaft O.D.

SERVICE LIMIT: 12.90 mm (0.508 in)

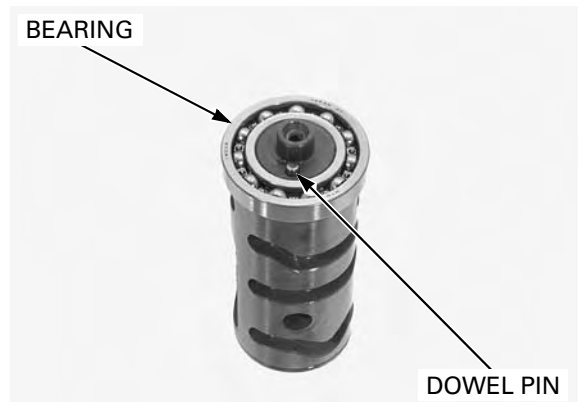


SHIFT DRUM/SHIFT DRUM BEARING

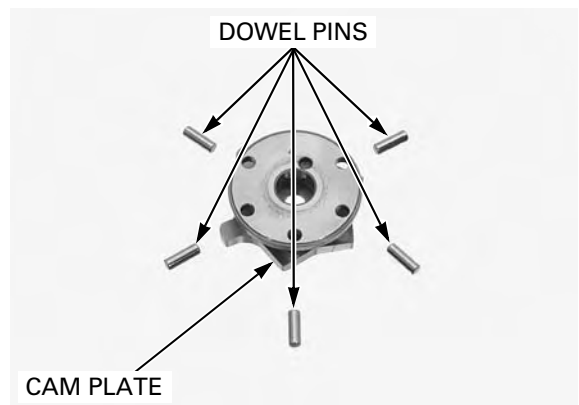
Remove the bolt and gearshift cam plate.



Remove the dowel pin and bearing.



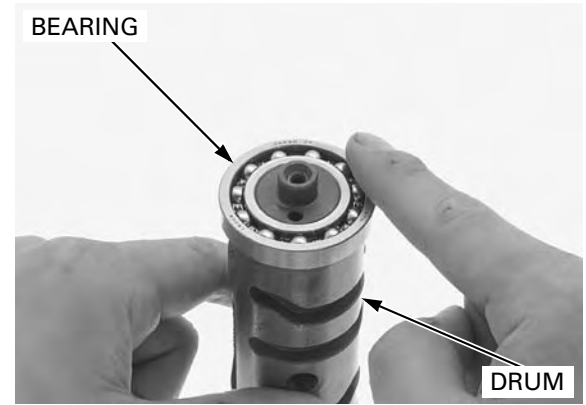
Remove the dowel pins from the gearshift cam plate.



Temporarily install the bearing on the shift drum.
Turn the outer race of the bearing with your finger.
The bearing should turn smoothly and quietly.

Also check that the bearing inner race fits tightly on the shift drum.

Remove and discard the bearing if the races do not turn smoothly, quietly, or if it fits loosely on the shift drum.



Check the shift drum end for scoring, scratches, or evidence of insufficient lubrication.
Check the shift drum grooves for abnormal wear or damage.

Measure the shift drum O.D. at left end.

SERVICE LIMIT: 11.94 mm (0.470 in)



Check the shift drum journal in the left crankcase for excessive wear or damage.
Measure the shift drum journal I.D.

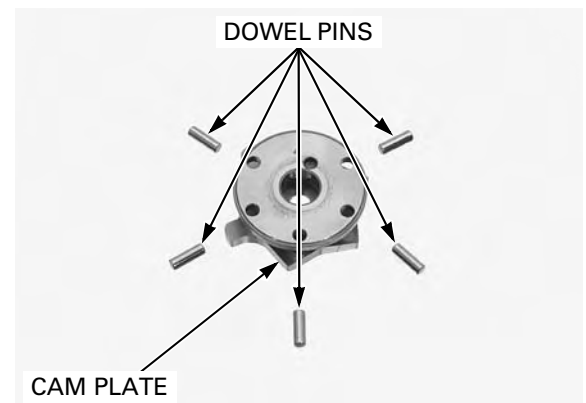
SERVICE LIMIT: 12.05 mm (0.474 in)

Calculate the shift drum-to-shift drum journal clearance.

SERVICE LIMIT: 0.09 mm (0.004 in)

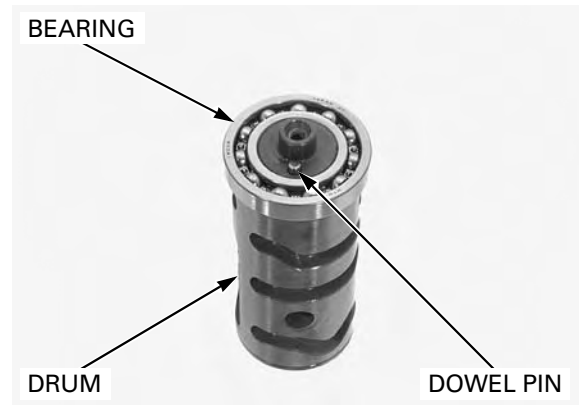


Install the dowel pins into the cam plate holes.

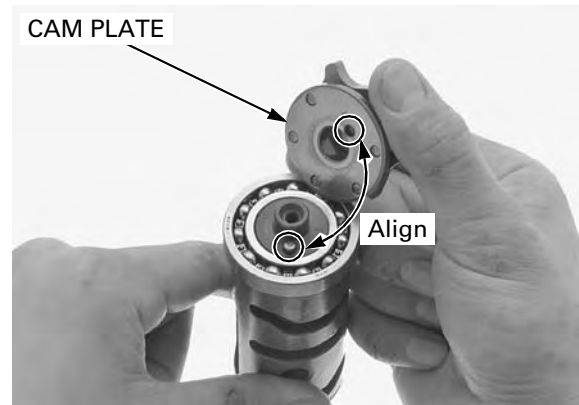


CRANKCASE/CRANKSHAFT/TRANSMISSION

Install the bearing on the shift drum.
Install the dowel pin into the shift drum hole.

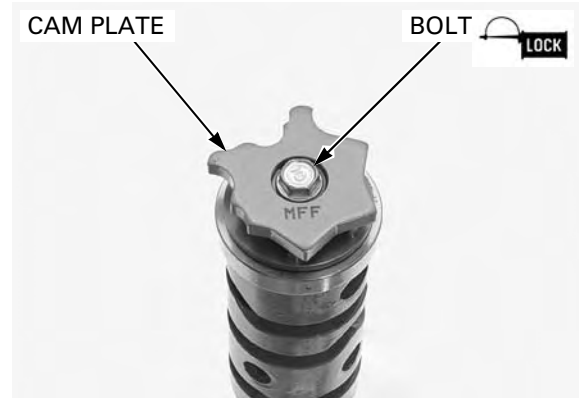


Install the gearshift cam plate by aligning the hole on the cam plate with the dowel pin.



Clean and apply locking agent to the gearshift cam plate bolt (page 1-18).
Install and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



TRANSMISSION ASSEMBLY

Clean all parts in solvent.

Apply engine oil to the all gear teeth and main and countershaft spline area.

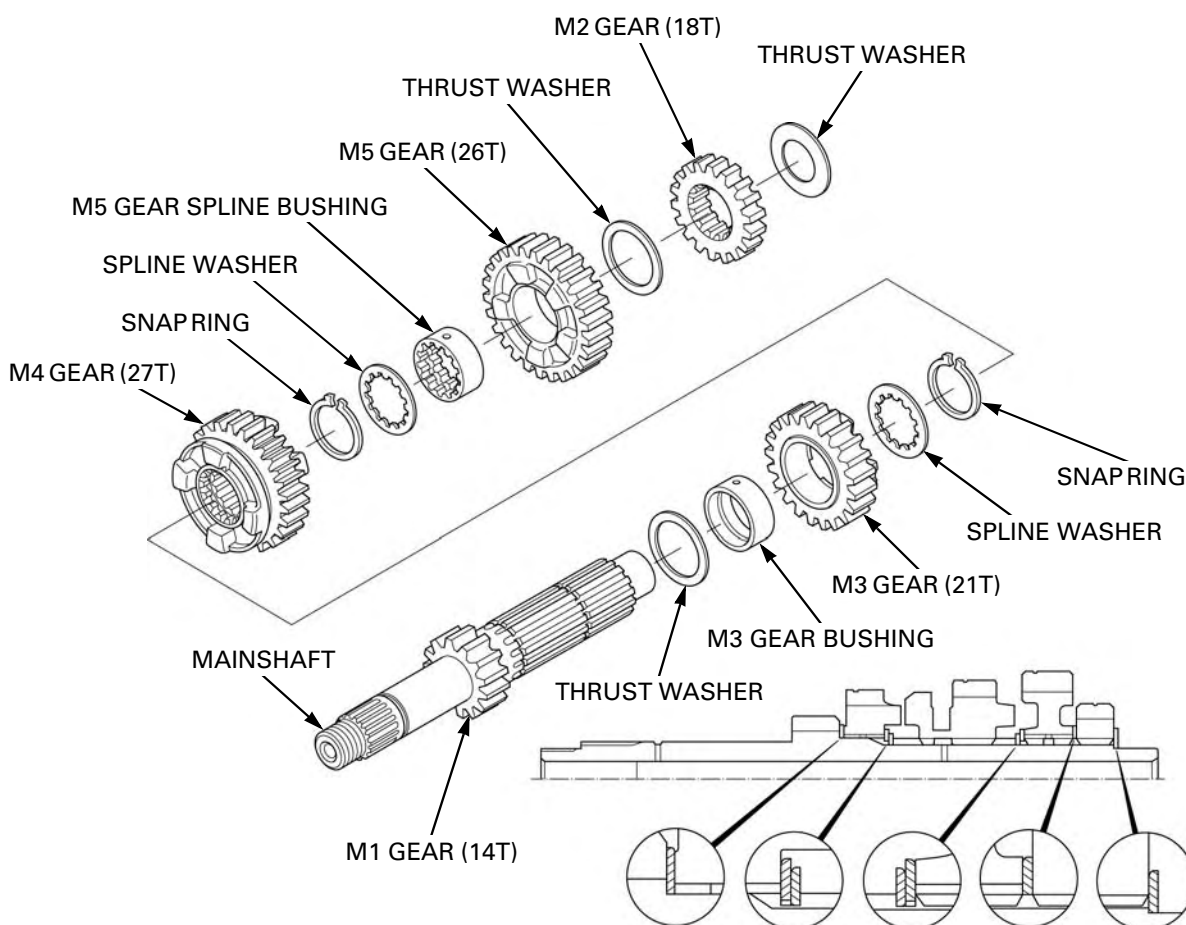
Apply molybdenum disulfide oil solution to the each bushing sliding surface and shift fork grooves to ensure initial lubrication.

Assemble all parts into their original positions.

NOTE:

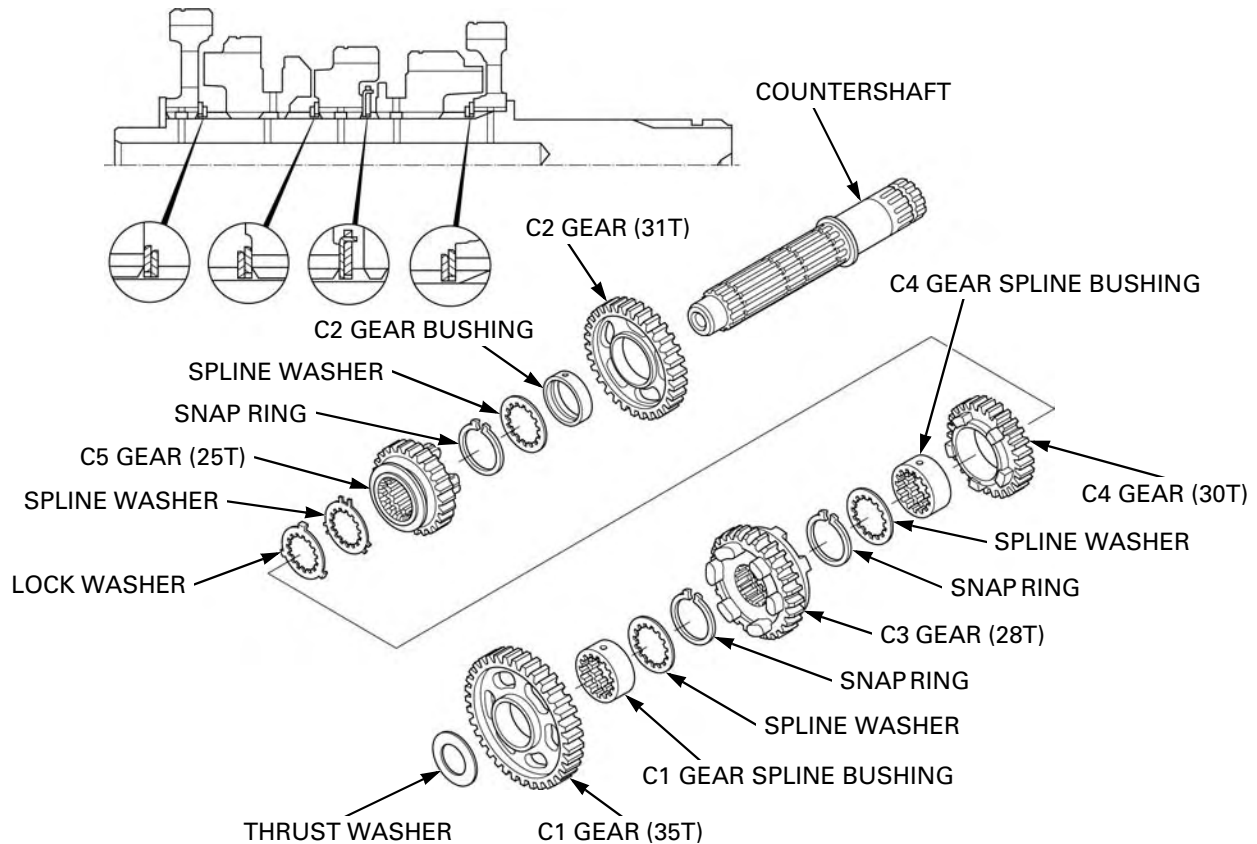
- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edges facing the thrust load side.
- Do not reuse a worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the grooves and align their end gaps with the grooves of the spline.
- Align the lock washer tabs with the spline washer grooves.

MAINSHAFT



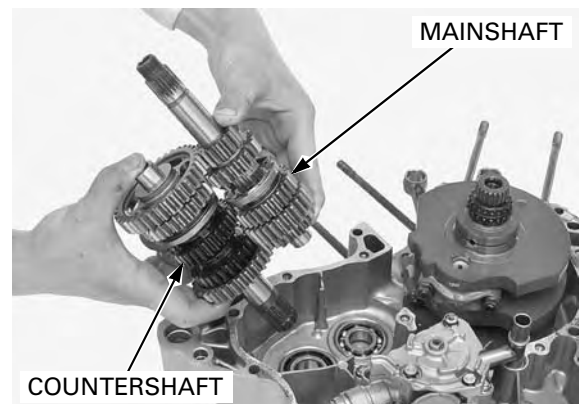
CRANKCASE/CRANKSHAFT/TRANSMISSION

COUNTERSHAFT



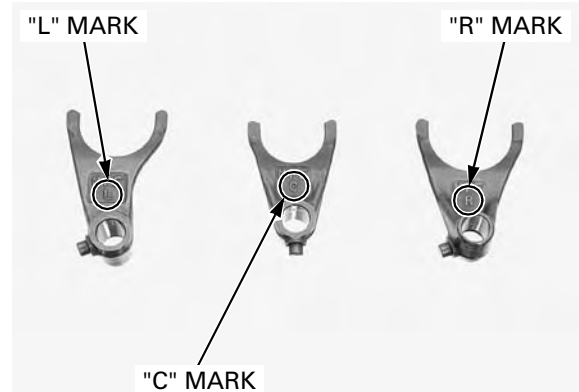
INSTALLATION

Install the mainshaft and countershaft together into the left crankcase.

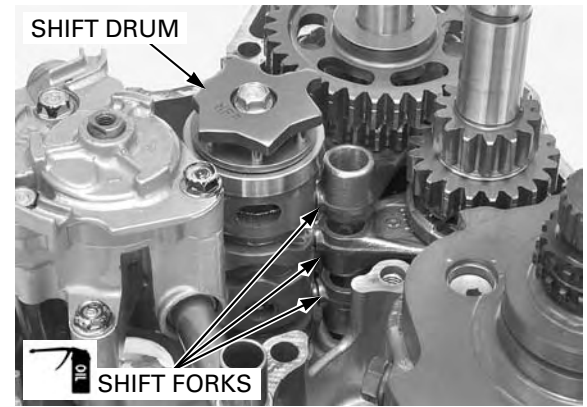


The shift forks have the following identification marks.

- "L" for left shift fork
- "C" for center shift fork
- "R" for right shift fork



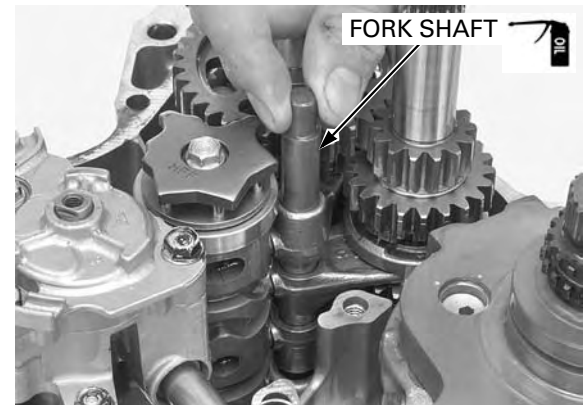
Apply engine oil to the shift fork sliding surface and install the shift forks into the shifter gear grooves with the markings facing up (right crankcase side). Install the shift drum by aligning the shift fork guide pins with the shift drum guide grooves.



Apply engine oil to the shift fork shaft and insert it through the shift forks into the right crankcase.

After installation, check for smooth transmission operation.

Assemble the crankcase (page 12-29).



CRANKCASE BEARING REPLACEMENT

INSPECTION

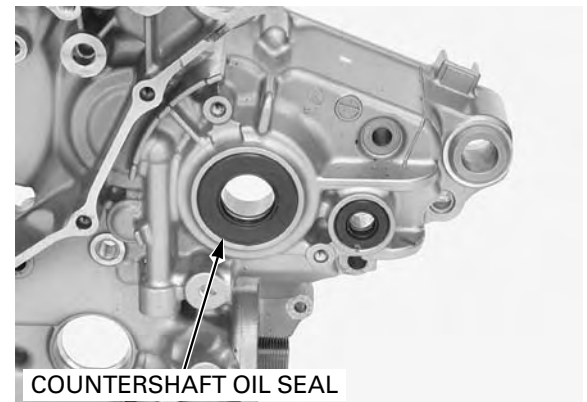
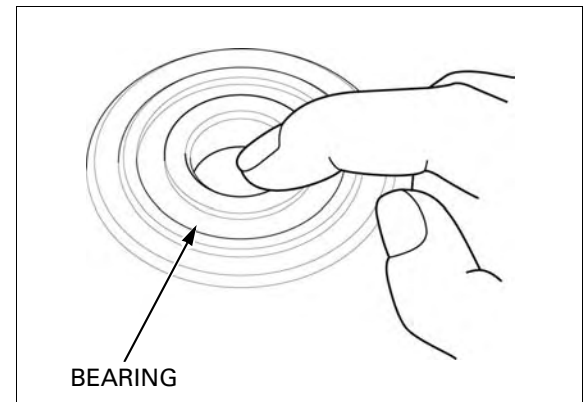
Remove the following:

- Crankshaft (page 12-8)
- Transmission (page 12-19)
- Oil pump (page 4-5)

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer races fit tightly in the crankcase.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the crankcase.

Remove the countershaft oil seal.



CRANKCASE/CRANKSHAFT/TRANSMISSION

LEFT CRANKCASE BEARINGS

Remove the mainshaft bearings using the special tools.

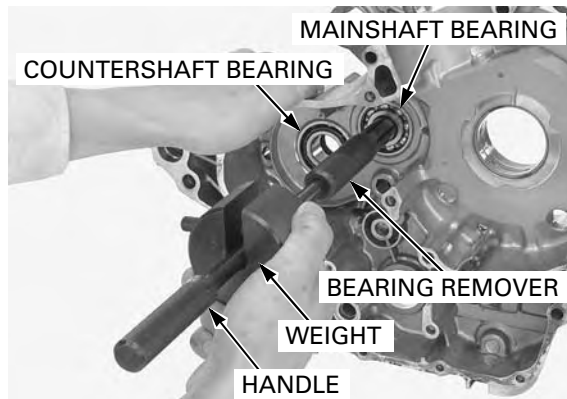
TOOLS:

Bearing remover, 20 mm 07936-3710600

Remover handle 07936-3710100

Remover weight 07741-0010201

Drive the countershaft bearing out of the left crankcase.



Drive new bearings into the left crankcase with the marked side facing up until they are fully seated.

TOOLS:

Mainshaft bearing:

Driver 07749-0010000

Attachment, 42 x 47 mm 07746-0010300

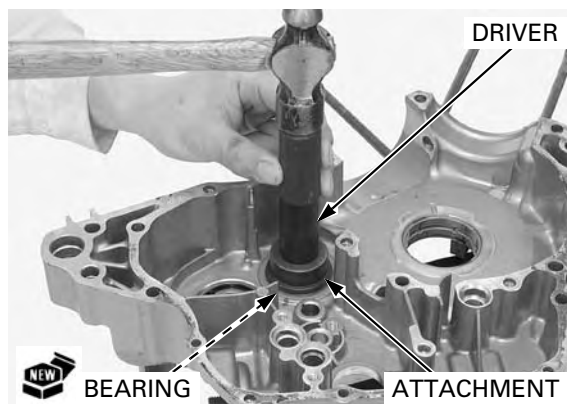
Pilot, 20 mm 07746-0040500

Countershaft bearing:

Driver 07749-0010000

Attachment, 52 x 55 mm 07746-0010400

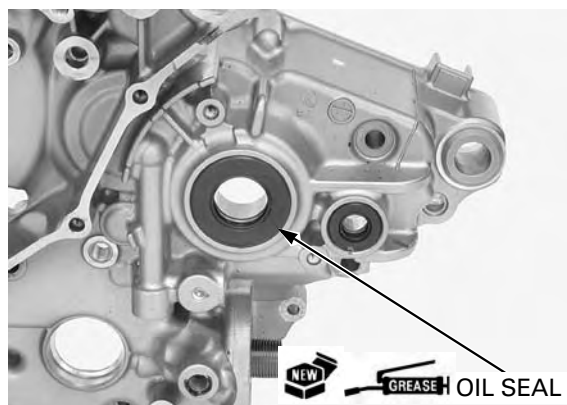
Pilot, 25 mm 07746-0040600



Install the oil seal with its marked side facing out.

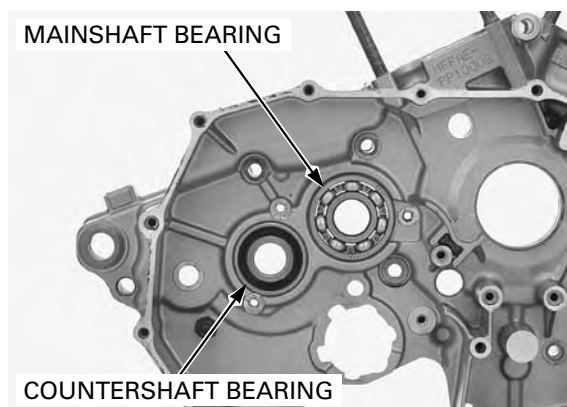
Apply grease to a new countershaft oil seal lip.

Install the countershaft oil seal.



RIGHT CRANKCASE BEARINGS

Drive the bearings out of the right crankcase.



Drive new bearings into the right crankcase with the marked side facing up until they are fully seated.

TOOLS:

Mainshaft bearing:

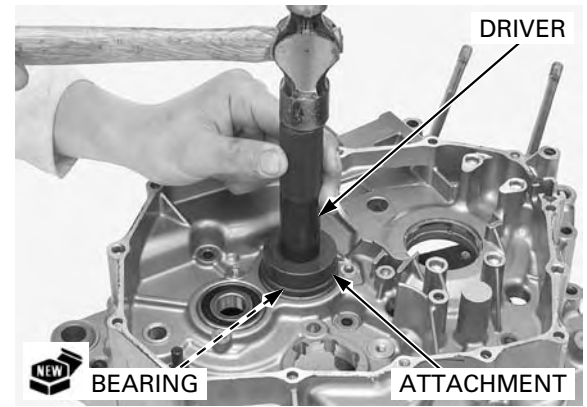
Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 22 mm	07746-0041000

Countershaft bearing:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500

Install the following:

- Oil pump (page 4-11)
- Transmission (page 12-26)
- Crankshaft (page 12-11)

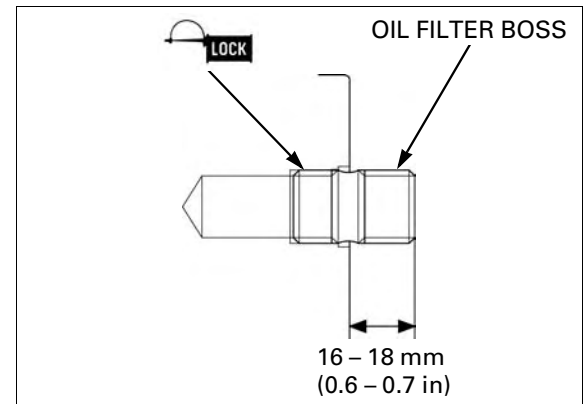


CRANKCASE ASSEMBLY

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

If the oil filter boss is loose, remove it.
Clean and apply a locking agent to the oil filter boss crankcase side threads and tighten it.
Be sure to verify the distance from the top of the oil filter boss to the crankcase as shown.

SPECIFIED LENGTH: 16 – 18 mm (0.6 – 0.7 in)

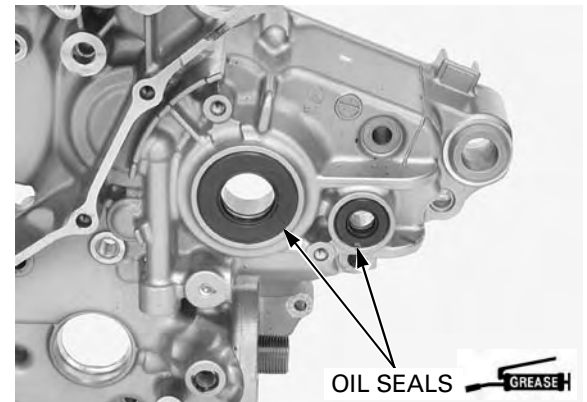


Check the oil seals for deterioration or damage, replace them if necessary.

Apply grease to the oil seal lips.

NOTE:

Install the oil seal with its marked side facing out.

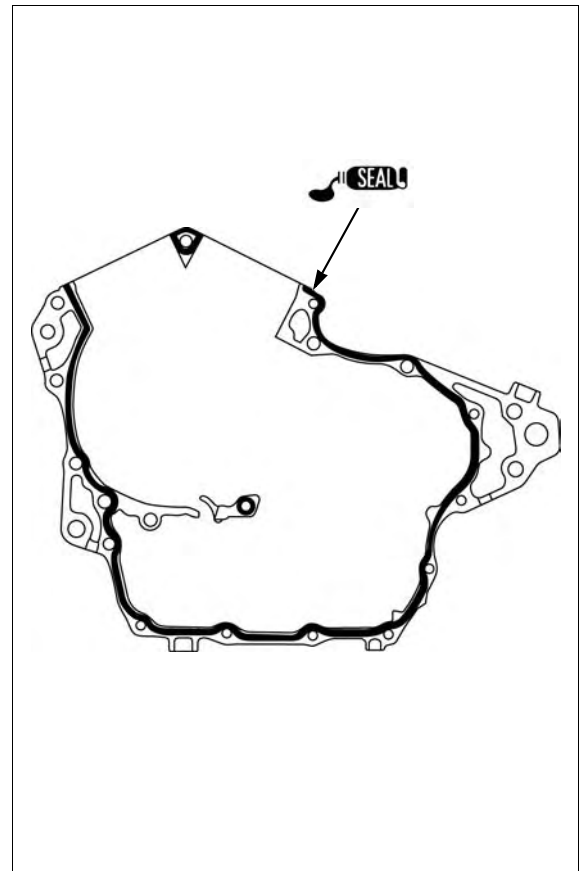


CRANKCASE/CRANKSHAFT/TRANSMISSION

Clean the left and right crankcase mating surfaces thoroughly, being careful not to damage them.

Make sure the all parts are installed in the left crankcase.

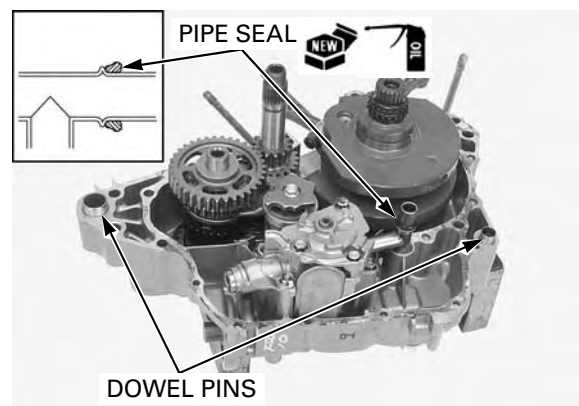
Apply liquid sealant (Three Bond 1207B or equivalent) to the crankcase mating surfaces.



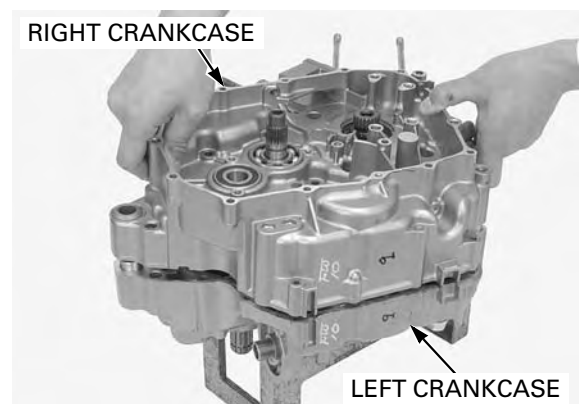
Install the dowel pins into the left crankcase. Coat a new pipe seal with engine oil and install it to the oil pipe.

NOTE:

Install an pipe seal with its tapered side facing inside.



Install the right crankcase over the left crankcase.



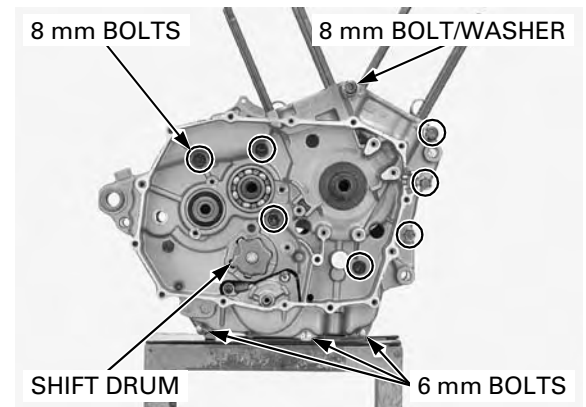
Set the shift drum to the position as shown.

Install the right crankcase bolts with the washer.

Tighten the 8 mm bolts in a crisscross pattern in several steps.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

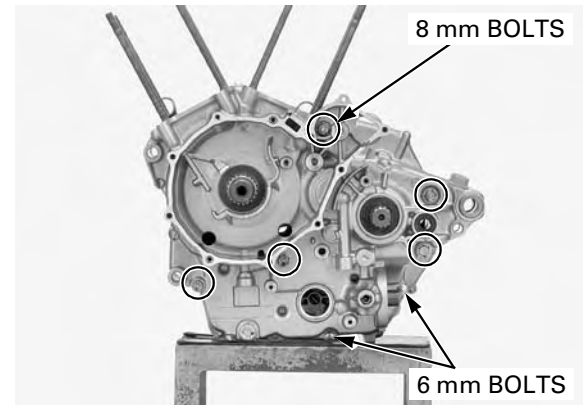
Tighten the 6 mm bolts securely.



Install the left crankcase bolts and tighten the 8 mm bolts in a crisscross pattern in several steps.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

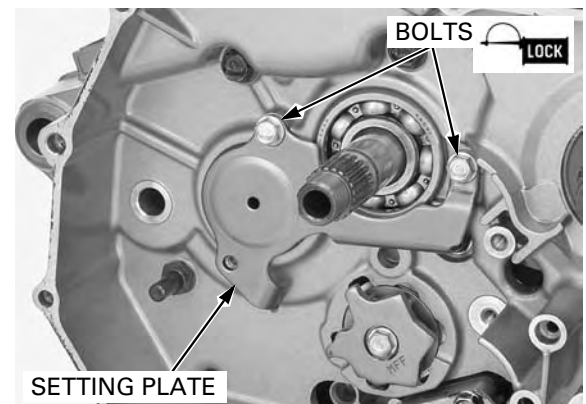
Tighten the 6 mm bolts securely.



Clean and apply locking agent to the bolt threads (page 1-18).

Install the bearing setting plate and tighten the bolts to the specified torque.

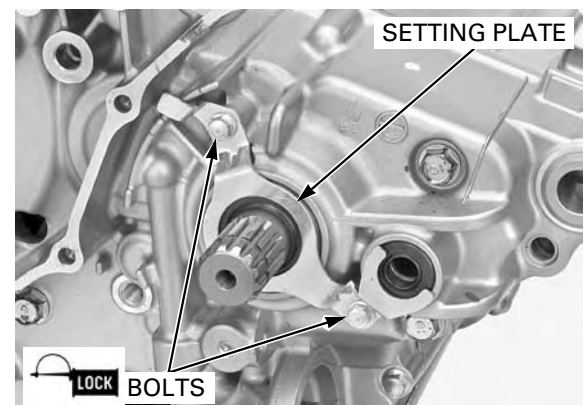
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Clean and apply locking agent to the bolt threads (page 1-18).

Install the oil seal setting plate and tighten the bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



CRANKCASE/CRANKSHAFT/TRANSMISSION

Install the cam chains.

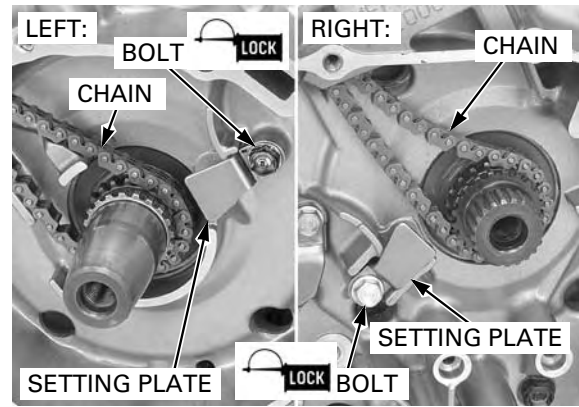
Clean and apply locking agent to the bolt threads (page 1-18).

Install the cam chain tensioner setting plates and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the remaining parts (page 12-3).

Install the engine into the frame (page 7-8).

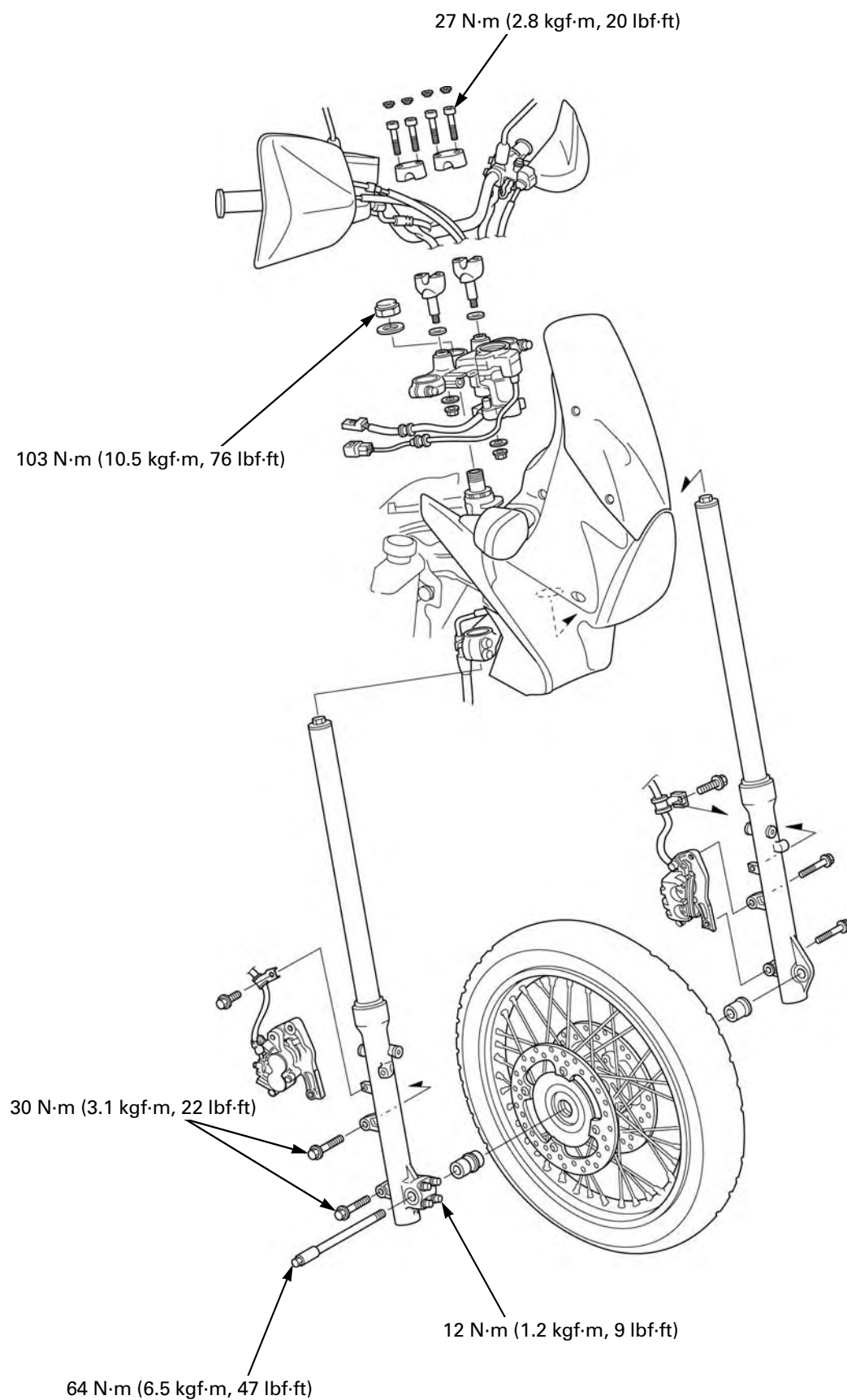


13. FRONT WHEEL/SUSPENSION/STEERING

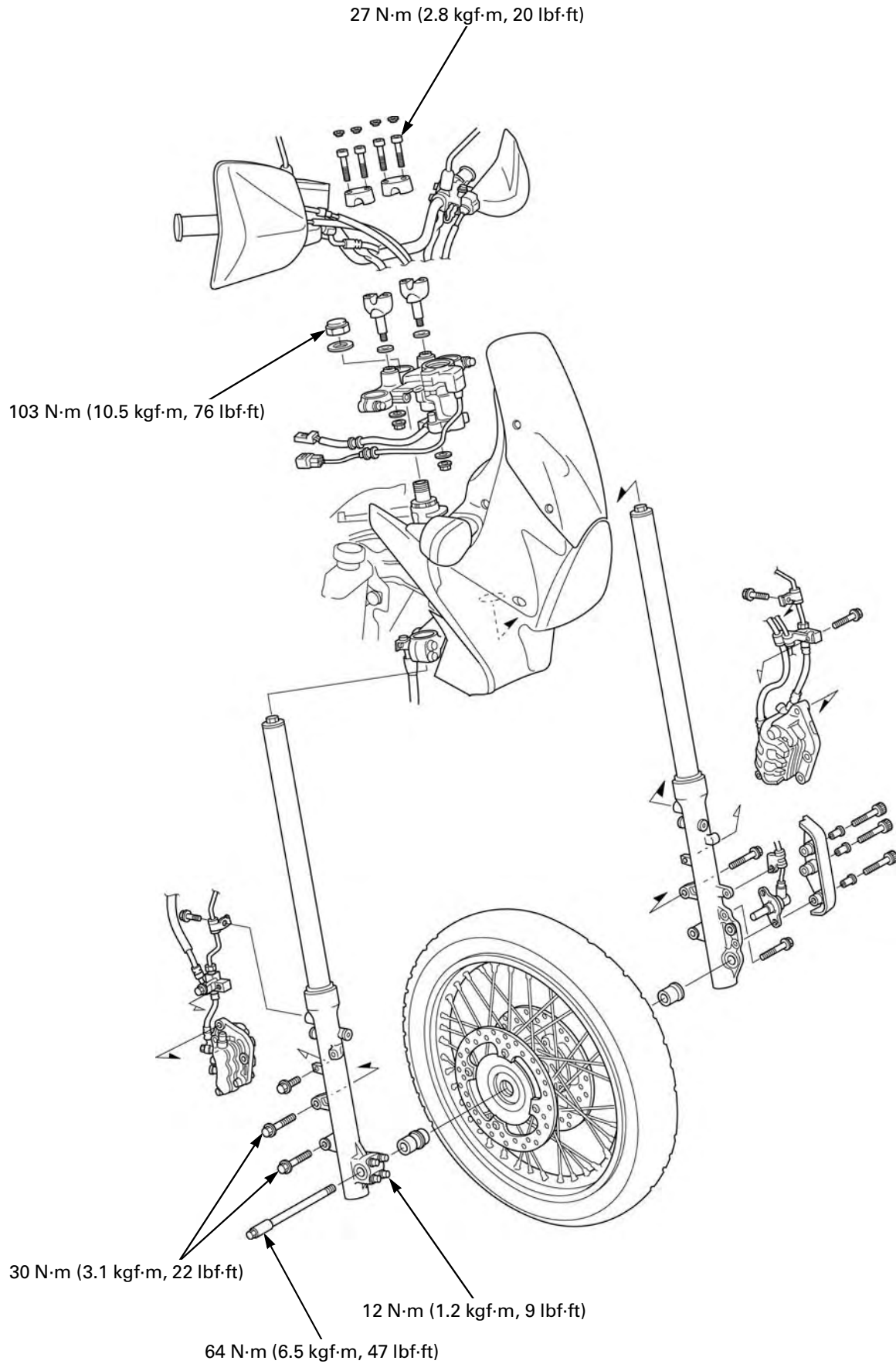
COMPONENT LOCATION	13-2	FRONT WHEEL	13-15
SERVICE INFORMATION	13-4	FORK	13-21
TROUBLESHOOTING	13-6	STEERING STEM.....	13-31
HANDLEBAR	13-7		

COMPONENT LOCATION

XL700V:



XL700VA:



FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION

GENERAL

- Riding on damaged rims impairs safe operation of the vehicle.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- A hoist or equivalent is required to support the motorcycle when servicing the front wheel, fork and steering stem.
- For hydraulic brake system service (page 15-4).

SPECIFICATIONS

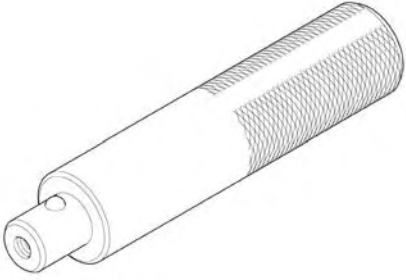
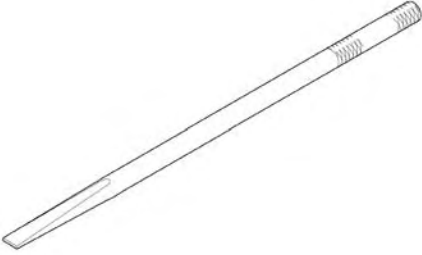
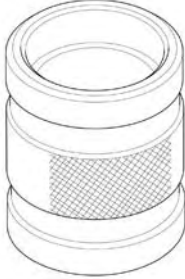
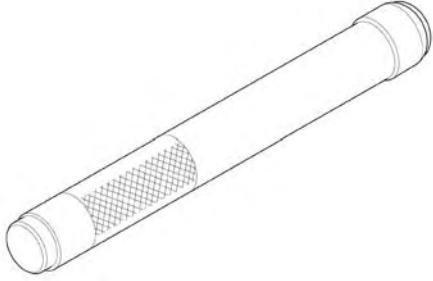
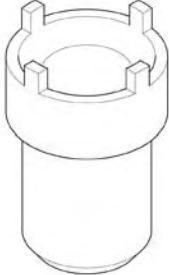
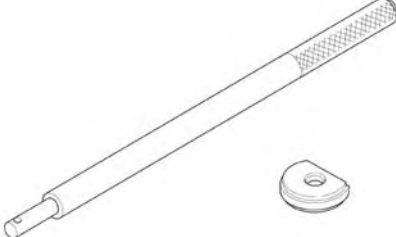
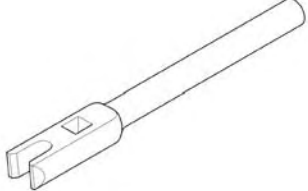
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)	–
	Driver and passenger	200 kPa (2.00 kgf/cm ² , 29 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1oz) max.
Fork	Spring free length	621.4 (24.47)	609.0 (23.97)
	Tube runout	–	0.20 (0.008)
	Recommended fork fluid	Honda ULTRA CUSHION OIL 10W or equivalent	–
	Fluid level	104 (4.1)	–
	Fluid capacity	598 ± 2.5 cm ³ (20.2 ± 0.08 US oz, 21.0 ± 0.09 Imp oz)	–
Steering head bearing pre-load		10.8 – 15.7 N (1.1 – 1.6 kgf)	–

TORQUE VALUES

Handlebar holder bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Handlebar lower holder nut	26.5 N·m (2.7 kgf·m, 20 lbf·ft)	
Front axle	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Front axle holder nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt; replace with a new one.
Fork center bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent.
Fork cap	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork top bridge pinch bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)	
Fork bottom bridge pinch bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Steering top thread	–	See page 13-34
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt; replace with a new one.
Front wheel pulser ring torx bolt (ABS type)	8 N·m (0.8 kgf·m, 5.9 lbf·ft)	ALOC bolt; replace with a new one.
Spoke	3.7 N·m (0.4 kgf·m, 27 lbf·ft)	
Brake lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake lever pivot nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Throttle housing screw	4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	
Right handlebar switch screw	0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)	

TOOLS

Driver 07749-0010000 	Attachment, 37 x 40 mm 07746-0010200 	Attachment, 42 x 47 mm 07746-0010300 
Pilot, 17 mm 07746-0040400 	Bearing remover shaft 07GGD-0010100 	Bearing remover head, 17 mm 07746-0050500 
Slider weight 07947-KA50100 	Driver attachment 07947-KF00100 	Inner driver, 28 mm I.D. 07946-4300101 
Lock nut wrench 07916-KA50100 	Ball race remover set 07953-MJ10000 	Spoke wrench, 6.1 mm 07JMA-MR60100 

TROUBLESHOOTING

Hard steering

- Steering top thread too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure
- Faulty tire

Steers to one side or does not track straight

- Bent fork leg
- Damaged steering head bearings
- Loose steering top thread
- Bent frame
- Worn wheel bearings
- Bent front axle
- Worn swingarm pivot components (page 14-21)

Front wheel wobbles

- Bent rim
- Worn wheel bearings
- Faulty tire
- Unbalanced tire and wheel
- Axle fastener not tightened properly

Wheel hard to turn

- Faulty wheel bearings
- Bent axle
- Brake drag (page 15-6)

Soft suspension

- Weak fork spring
- Low fluid level in fork
- Insufficient fluid weight (low viscosity)
- Low tire pressure

Stiff suspension

- High tire pressure
- Bent fork tube
- Fork slider binds
- High fluid level in fork leg
- Incorrect fluid weight (high viscosity)
- Clogged fork fluid passage

Front suspension noise

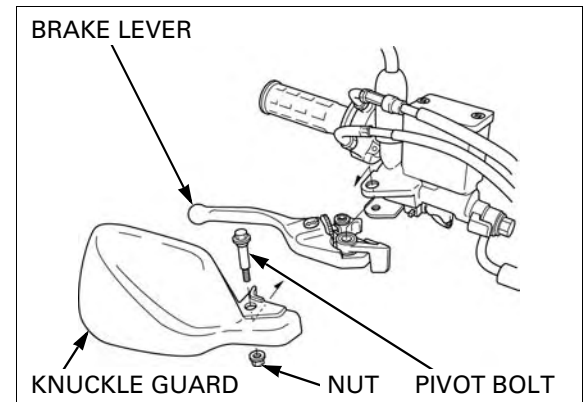
- Loose fork fasteners
- Insufficient fluid weight (low viscosity)
- Worn slider or fork tube bushing

HANDLEBAR

REMOVAL

Remove the following:

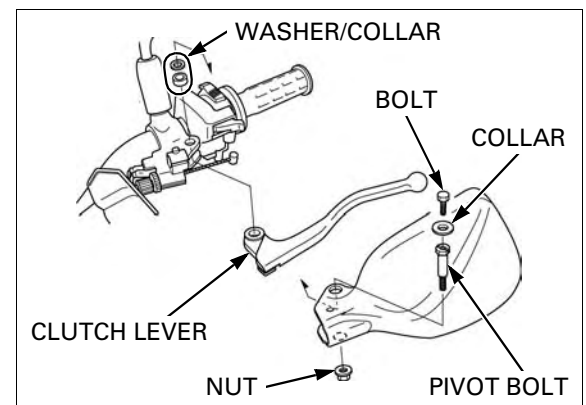
- Nut
- Pivot bolt
- Knuckle guard
- Brake lever



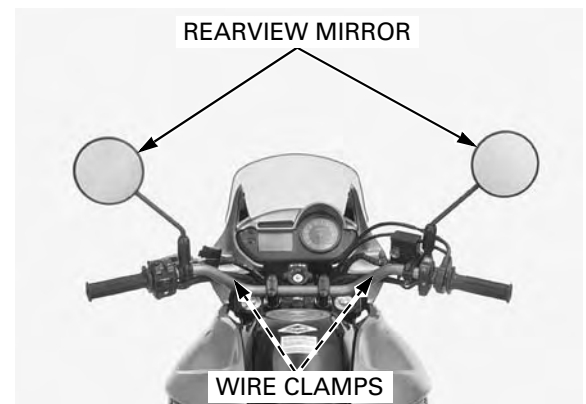
Remove the following:

- Bolt
- Collar
- Washer/collar
- Nut
- Pivot bolt
- Knuckle guard

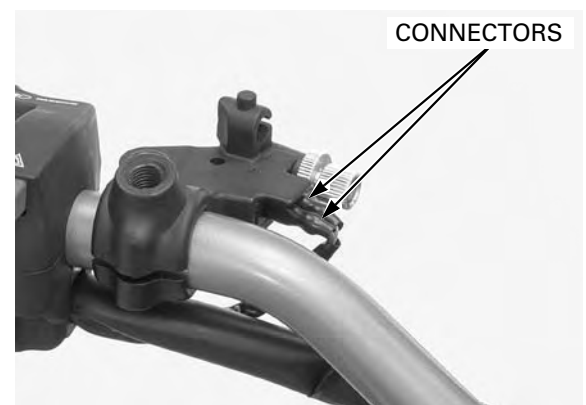
Disconnect the clutch cable and remove the clutch lever.



Remove the wire clamps and rearview mirror.

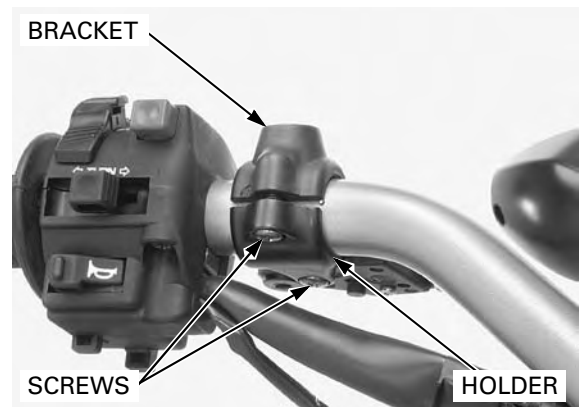


Disconnect the clutch switch connectors from the clutch switch.

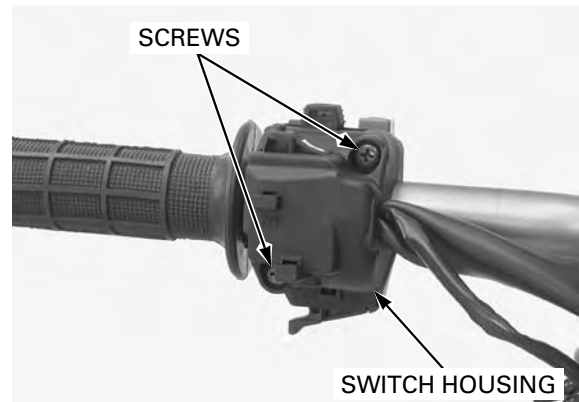


FRONT WHEEL/SUSPENSION/STEERING

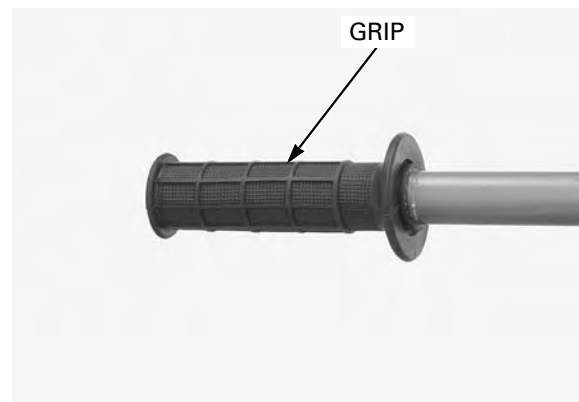
Remove the screws, holder and clutch lever bracket.



Remove the screws and left handlebar switch housing.



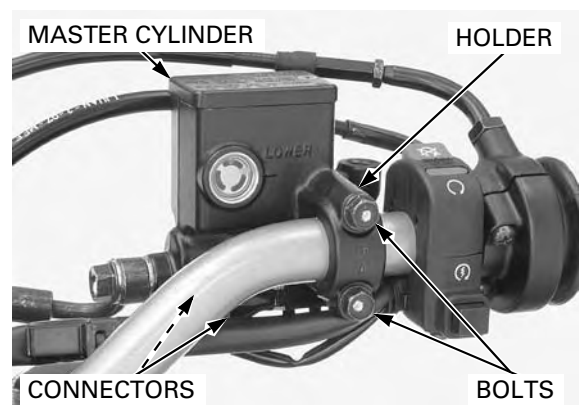
Remove the left handlebar grip.



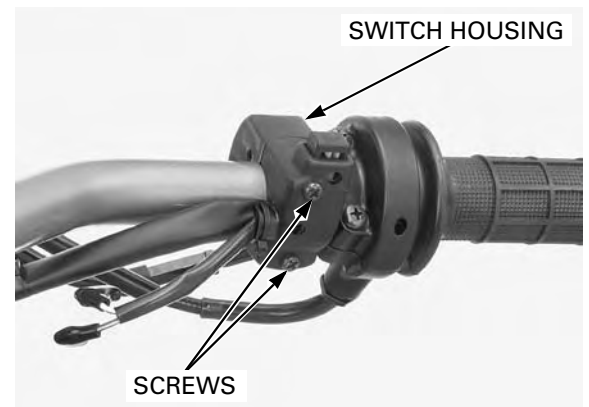
Disconnect the front brake light switch wire connectors from the switch.

Keep the reservoir upright to prevent air from entering the hydraulic system.

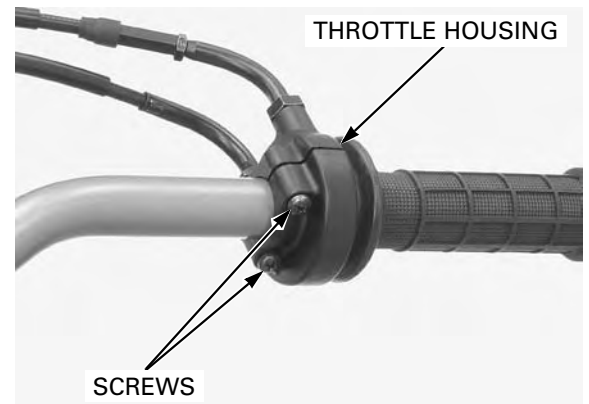
Remove the bolts, holder and master cylinder assembly.



Remove the screws and right handlebar switch housing.

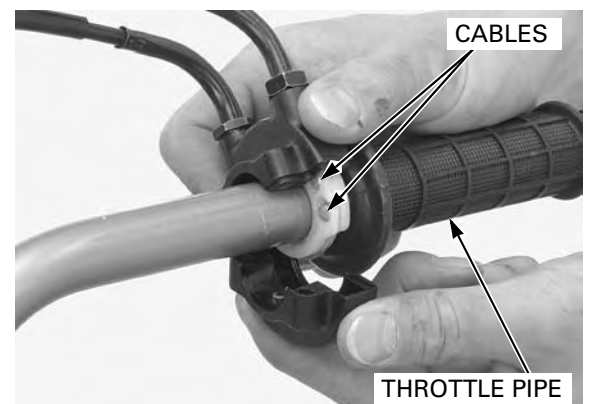


Remove the screws and separate the throttle housing.

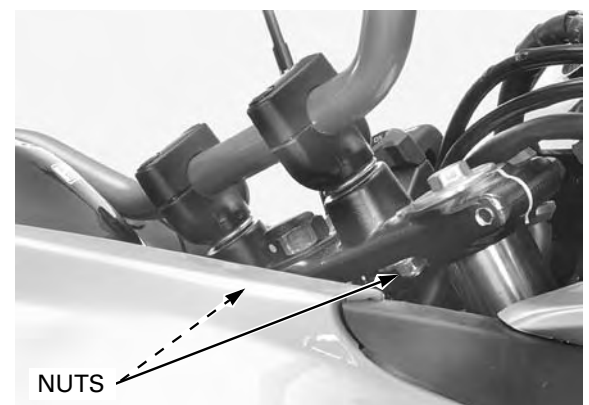


Disconnect the throttle cables from the throttle pipe and remove the throttle pipe from the right handlebar.

Remove the throttle housing from the handlebar.

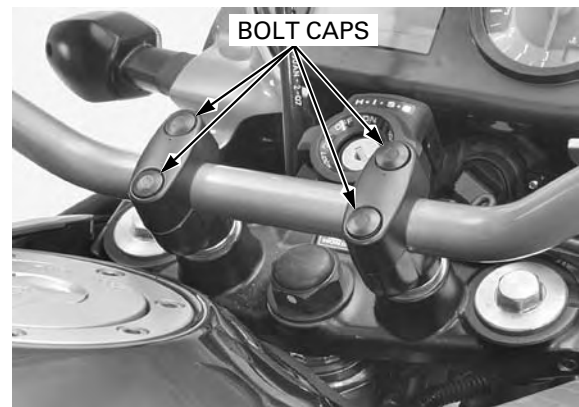


Loosen the handlebar lower holder nuts.

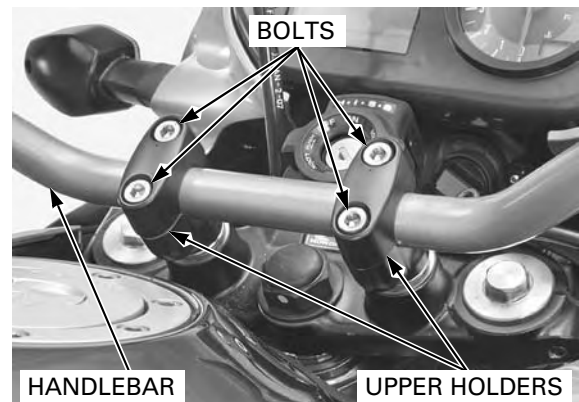


FRONT WHEEL/SUSPENSION/STEERING

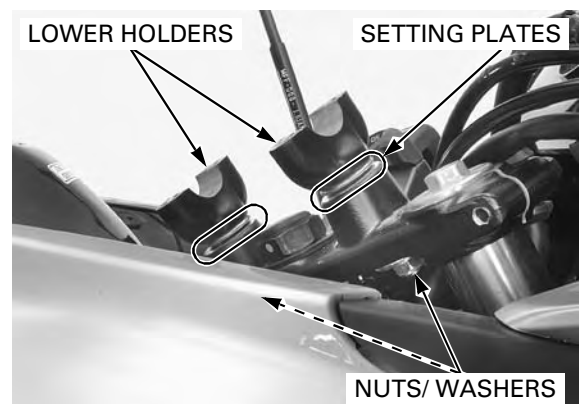
Remove the bolt caps.



Remove the bolts, upper holders and handlebar.

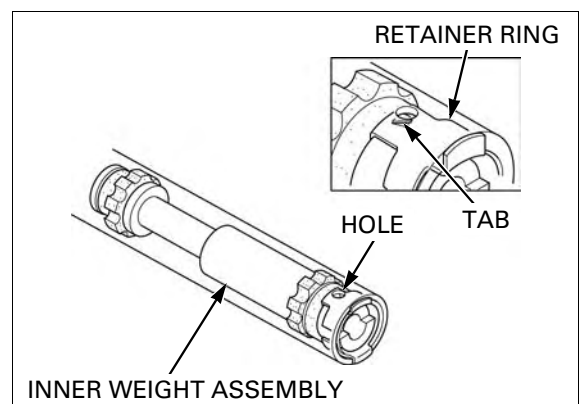


Remove the lower holder nuts, washers, setting plates and handlebar lower holders.

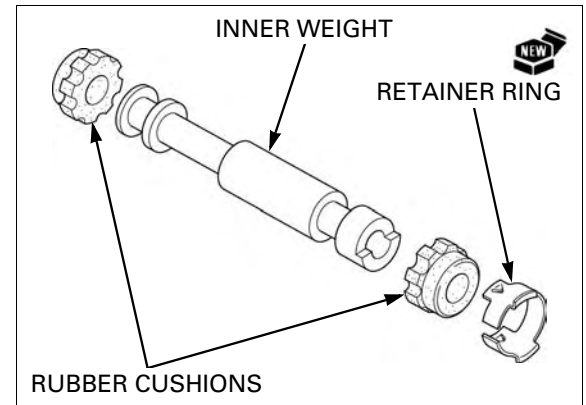


INNER WEIGHT REMOVAL/ INSTALLATION

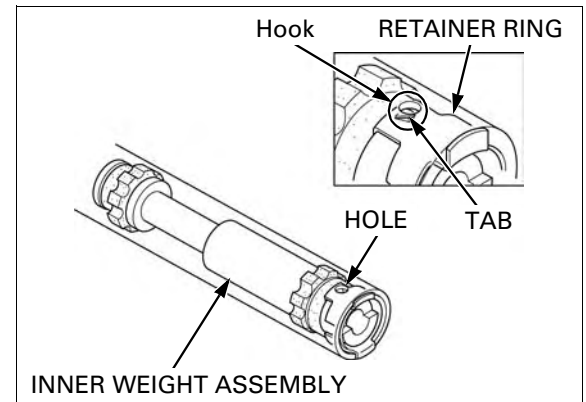
Remove the grip or throttle pipe from the handlebar.
Straighten the weight retainer tabs by the screwdriver or punch.



Remove the inner weight assembly from the handlebar.
Discard the retainer ring.
Check the rubber cushions for wear or damage.
Install a new retainer ring onto the inner weight.



Insert the inner weight assembly into the handlebar by hooking the retainer ring tabs with the holes in the handlebar.

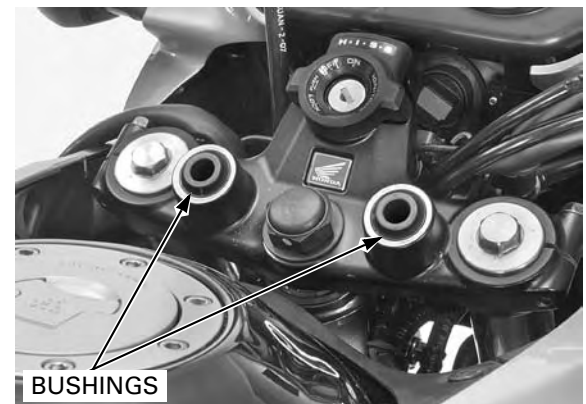


INSTALLATION

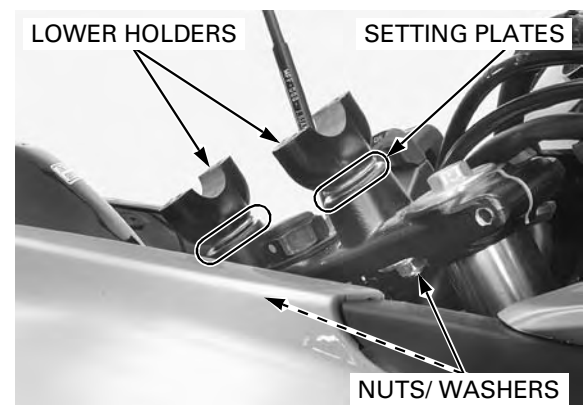
NOTE:

- Route the cable, hose and wires properly (page 1-21).

Check the bushings for abnormal wear or damage.



Install the handlebar lower holders, setting plates, washers and nuts onto the top bridge.



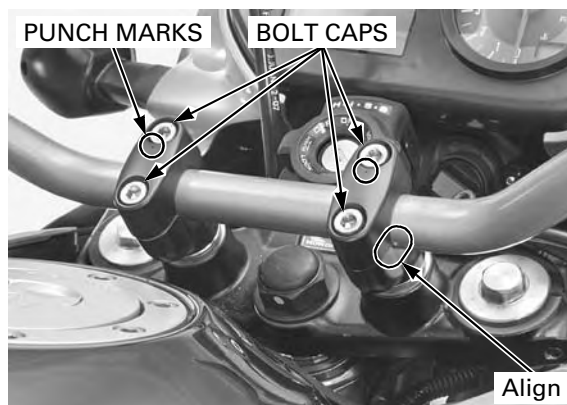
FRONT WHEEL/SUSPENSION/STEERING

Install the handlebar onto the lower holders and align the punch mark on the handlebar with the top surface of the lower holder.

Install the upper holder with its punch marks facing forward.

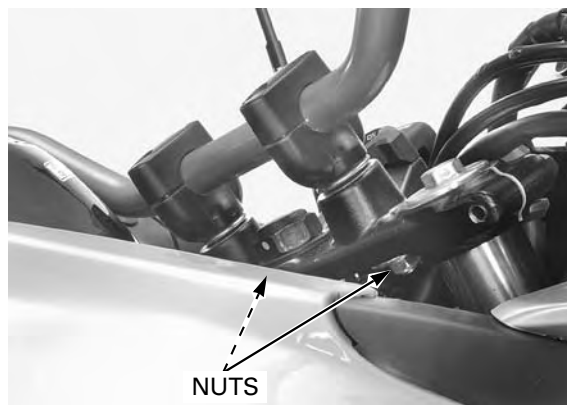
Install the holder bolts and tighten the forward bolts first, then tighten the rear bolts to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Tighten the handlebar lower holder nuts to the specified torque.

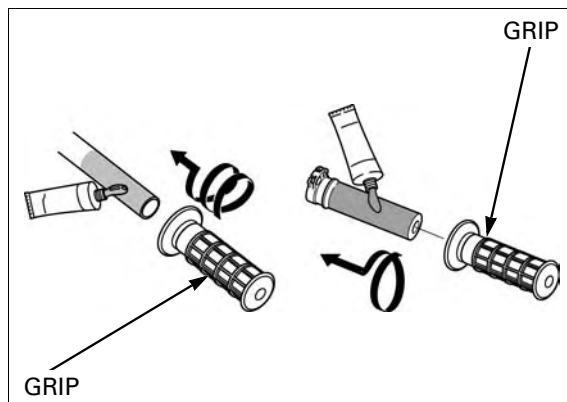
TORQUE: 26.5 N·m (2.7 kgf·m, 20 lbf·ft)



Apply Honda bond A or equivalent adhesive to the inside surface of the handlebar grip and to the clean surfaces of the left handlebar and throttle pipe. Wait 3 – 5 minutes and install the grip.

Allow the adhesive to dry for 1 hour before using.

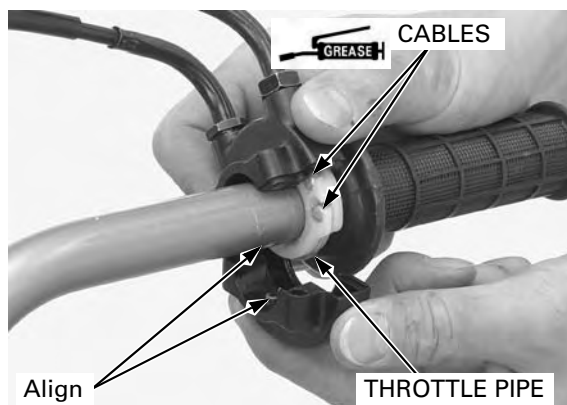
Rotate the grip for even application of the adhesive.



Apply grease 0.2 – 0.3 g to the throttle pipe flange groove and sliding surface.

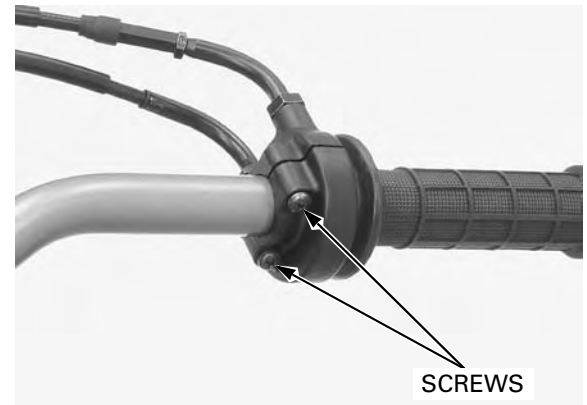
Install the throttle pipe and connect the throttle cables to the throttle pipe flange.

Install the throttle housing, aligning the locating pin with the hole in the handlebar.



Install and tighten the front screw first, then tighten the rear screw to the specified torque.

TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)

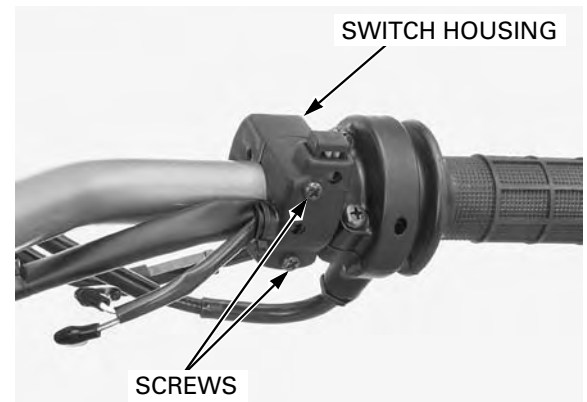


Install the right handlebar switch housing, aligning the locating pin with the hole in the handlebar.



Install and tighten the front long screw first, then tighten the rear short screw to the specified torque.

TORQUE: 0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)

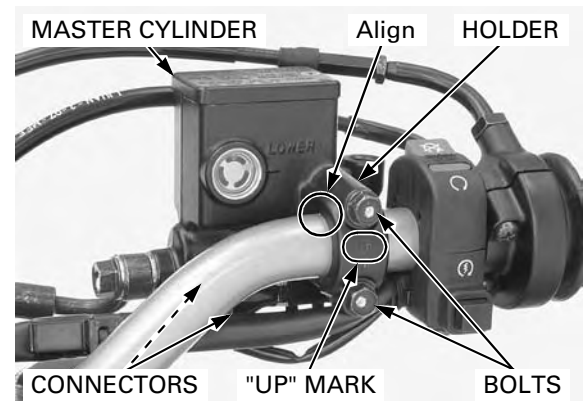


Install the holder with its "UP" mark facing up.

Install the master cylinder, holder and bolts. Align the edge of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

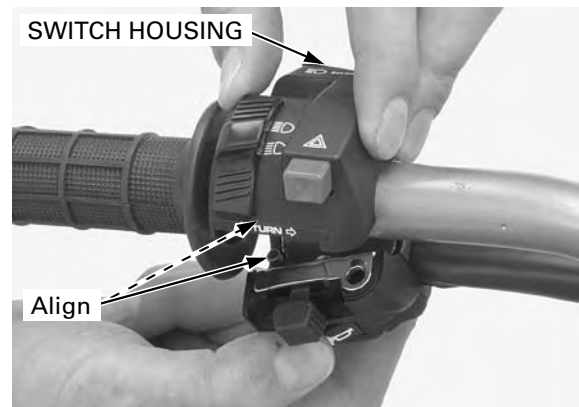
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the front brake light switch connectors.

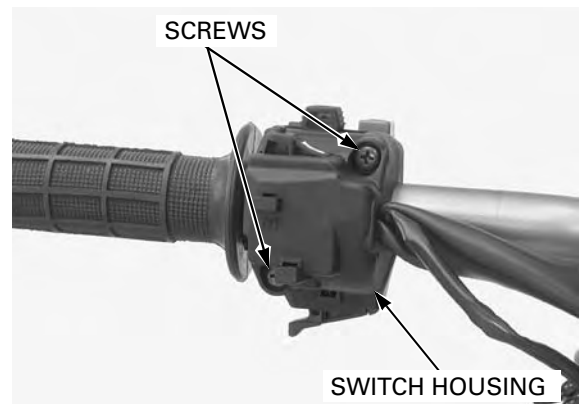


FRONT WHEEL/SUSPENSION/STEERING

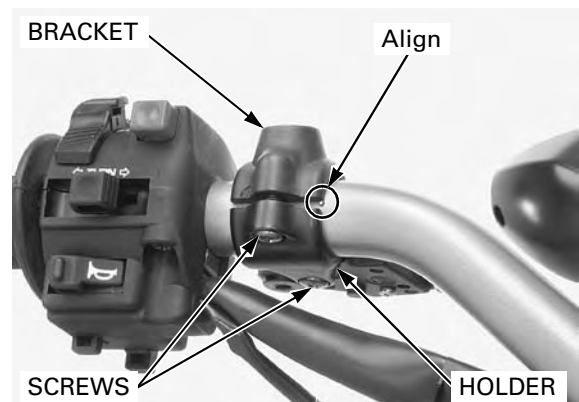
Install the left handlebar switch housing, aligning the locating pin with the hole in the handlebar.



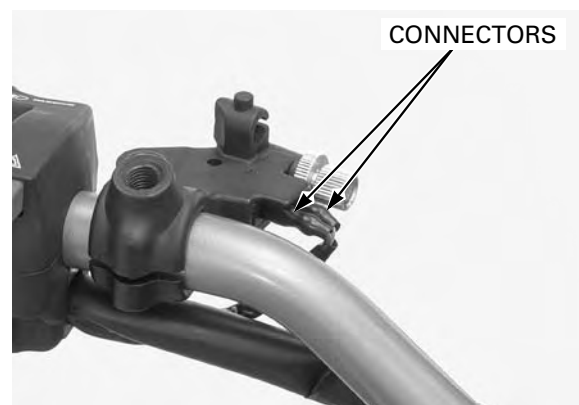
Install the screws.
Tighten the front short screw first, then tighten the rear long screw.



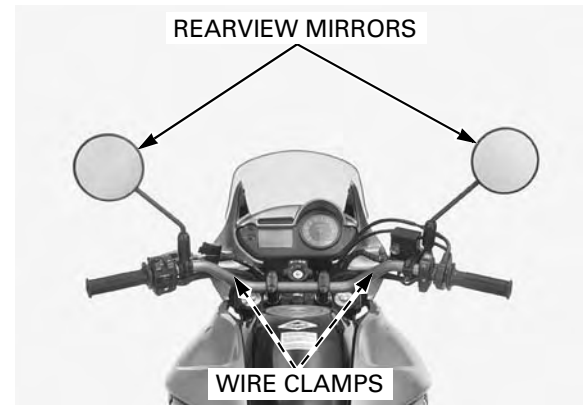
Install the clutch lever bracket, holder and screws.
Align the edge of the bracket with the punch mark on the handlebar and tighten the front screw first, then tighten the rear screw.



Connect the clutch switch connectors.



Install the rearview mirrors and handlebar switch wire clamps to the handlebar.



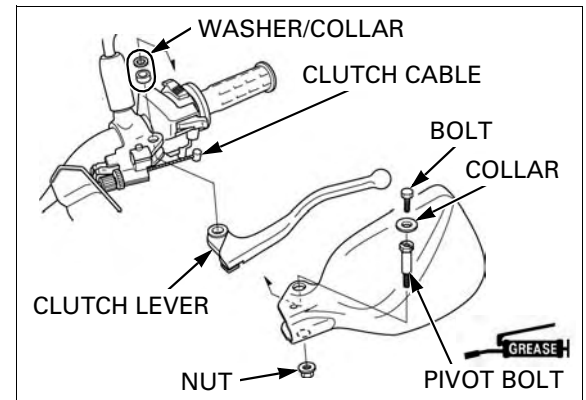
Install the clutch lever after connecting the clutch cable.

Apply grease to the clutch lever pivot bolt sliding surface.

Install the knuckle guard, washer/collar and pivot bolt, then tighten it securely.

Install and tighten the nut securely.

Install the collar and bolt, and tighten it securely.



Apply silicone grease to the brake lever pivot bolt sliding surface and lever-to-master piston contacting area.

Install the knuckle guard, brake lever and pivot bolt, and tighten it to the specified torque.

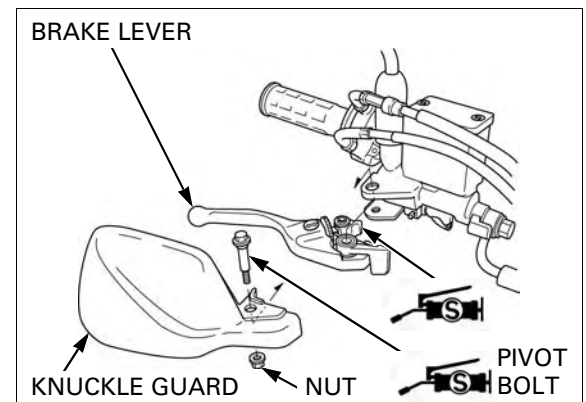
TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install and tighten the nut to the specified torque.

TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)

Adjust the clutch lever freeplay (page 3-27).

Adjust the throttle grip freeplay (page 3-6)



FRONT WHEEL

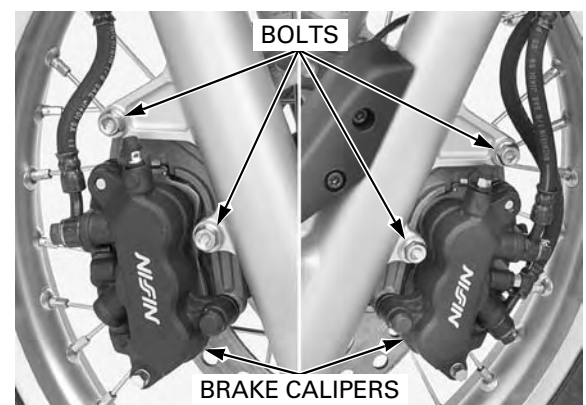
REMOVAL

Remove the brake caliper mounting bolts and brake calipers.

Do not operate the brake lever and brake pedal (XL700VA only) after removing the wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

Support the brake caliper with a piece of wire so that it does not hang from the brake hose.

Do not twist the brake hose.



FRONT WHEEL/SUSPENSION/STEERING

Loosen the axle holder nuts.

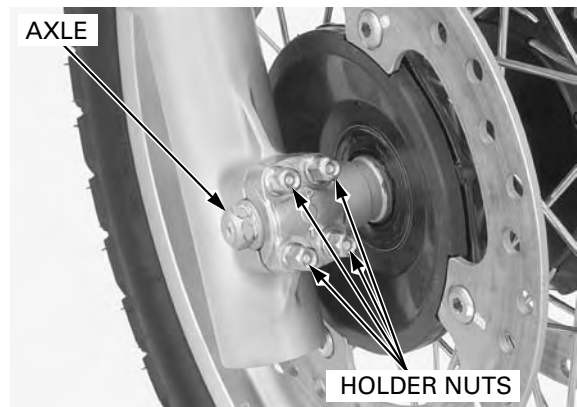
Loosen the front axle.

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

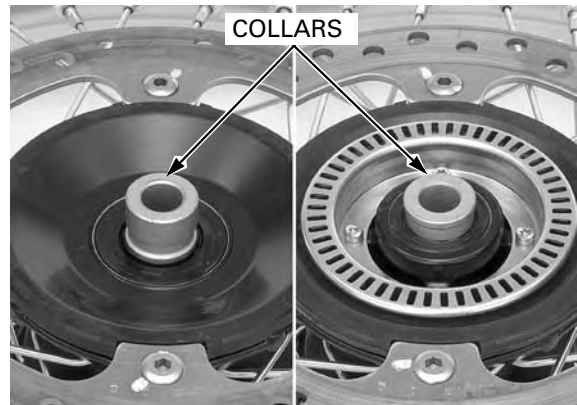
Remove the axle and front wheel.

NOTE:

- Be careful not to damage the wheel speed sensor when removing the wheel.



Remove the side collars.



INSPECTION

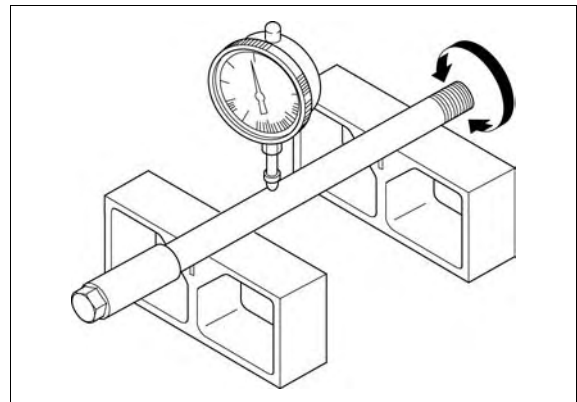
AXLE

Set the front axle in V-blocks.

Turn the axle and measure the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)



WHEEL RIM

Check the rim runout by placing the wheel in a truing stand.

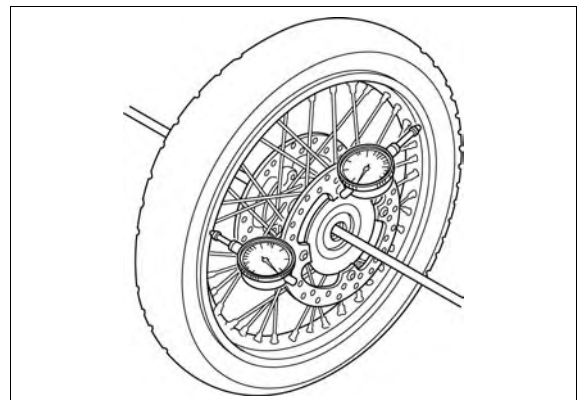
Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

Axial: 2.0 mm (0.08 in)

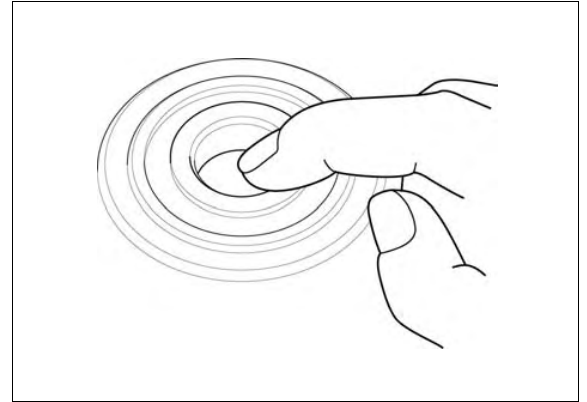


WHEEL BEARING

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that each bearing outer race fits tightly in the hub.

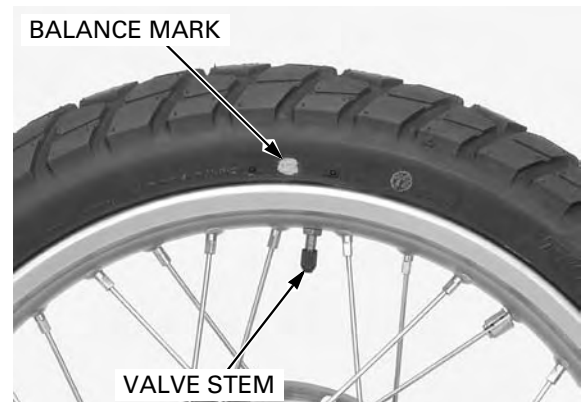
Replace the wheel bearings in pairs.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub (page 13-18).



WHEEL BALANCE

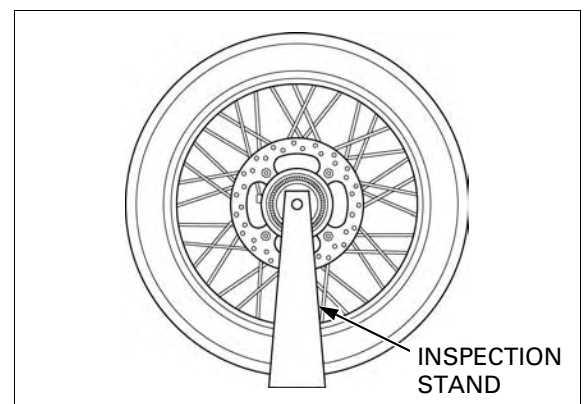
- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (light mass point: a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.



- Mount the tire with the arrow mark facing in the direction of rotation.



Remove the dust seals from the wheel. Mount the wheel, tire and brake disc assembly on an inspection stand. 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.



FRONT WHEEL/SUSPENSION/STEERING

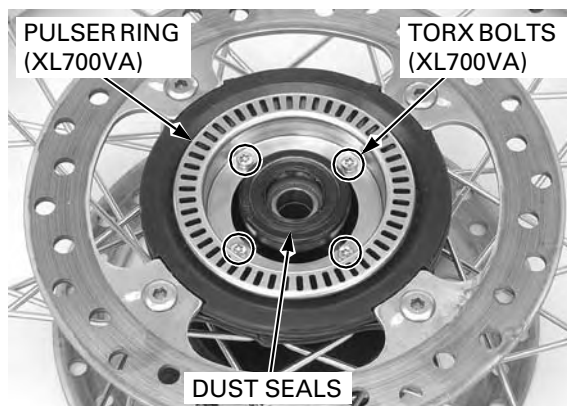
To balance the wheel, install a new balance weight on the lightest side of the spoke, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.

Do not add more than 60 g (2.1 oz) to the front wheel.

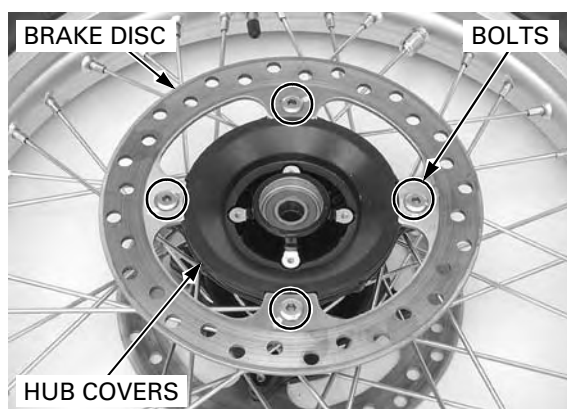


DISASSEMBLY

XL700VA only: Remove the torx bolts and pulser ring.
Remove the dust seals.



Do not reuse the bolts. Remove the bolts, brake discs and hub covers from both sides of the wheel.

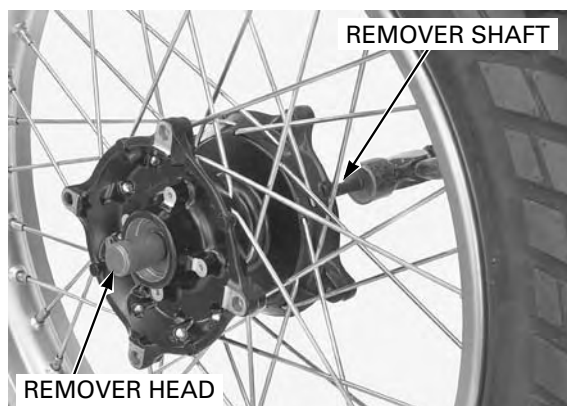


WHEEL BEARING REPLACEMENT

Replace the wheel bearings in pairs.
Do not reuse old bearing. Install the remover head into the bearing. From the opposite side of the wheel, install the remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover shaft 07GGD-0010100
Bearing remover head, 17 mm 07746-0050500



Drive in a new left bearing squarely with the marked side facing up until it is fully seated.

Install the distance collar.

Drive in a new right bearing squarely with the marked side facing up until it is seated on the collar.

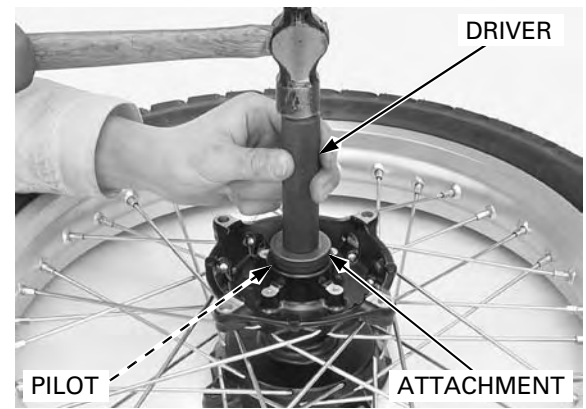
TOOLS:

Left side:

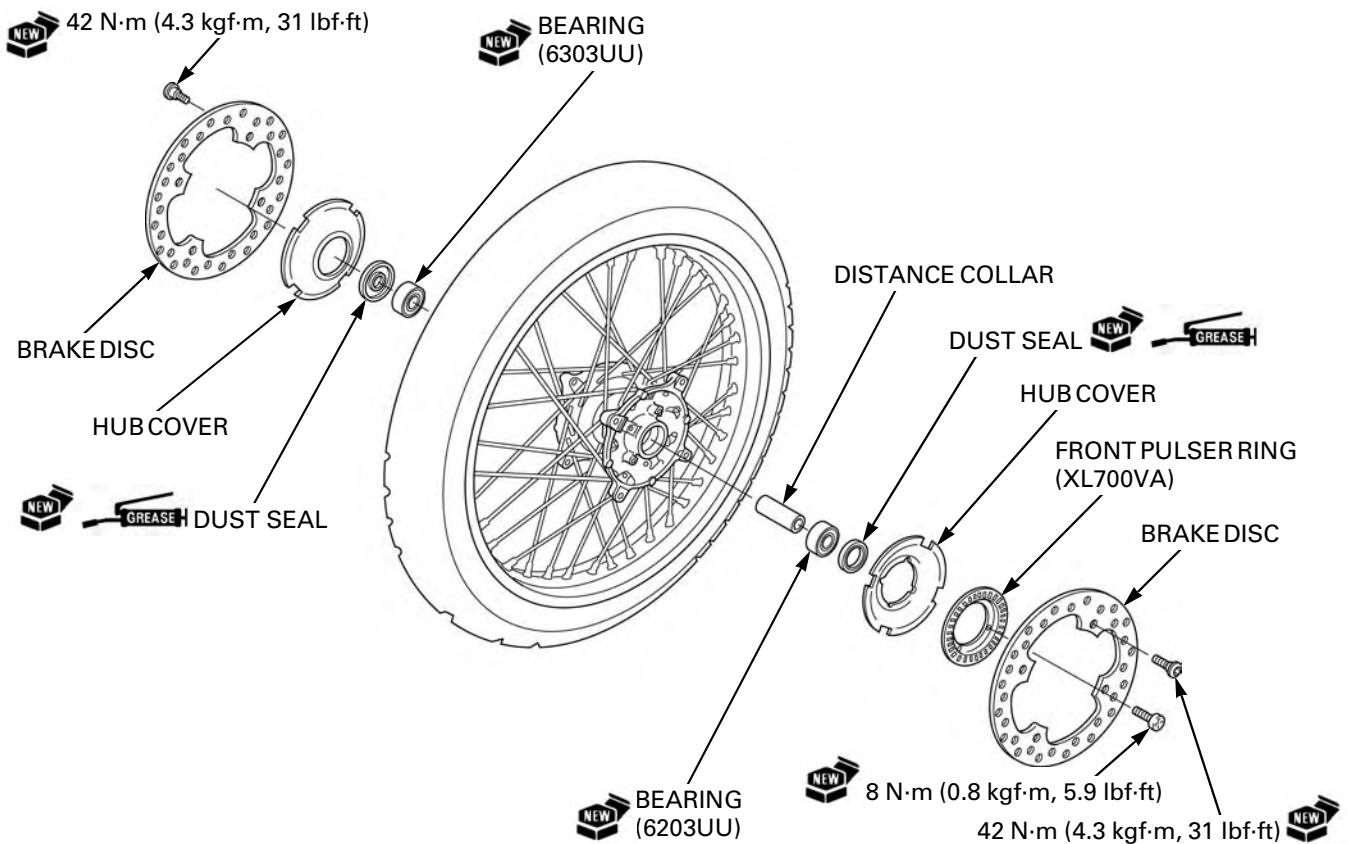
Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400

Right side:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 17 mm	07746-0040400



ASSEMBLY



Place the wheel rim on the work bench.

Place the wheel hub in the center of the rim and begin lacing with new spokes.

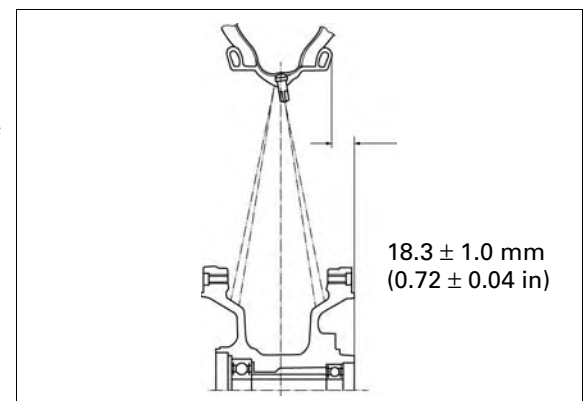
Adjust the wheel hub position so that the distance from the wheel hub right end surface to the side of rim is 18.3 ± 1.0 mm (0.72 ± 0.04 in) as shown.

TOOL:

Spoke wrench, 6.1 mm **07JMA-MR60100**

TORQUE: 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)

Check the rim runout (page 13-16).

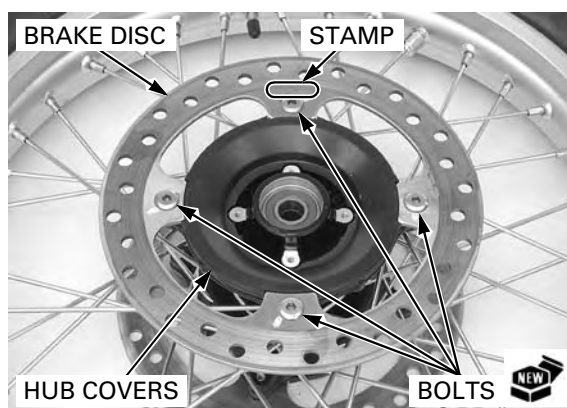


FRONT WHEEL/SUSPENSION/STEERING

Do not get grease on the brake disc or stopping power will be reduced.

Install the hub covers and brake discs with the stamped side facing out. Install new bolts and tighten them in a crisscross pattern in several steps.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

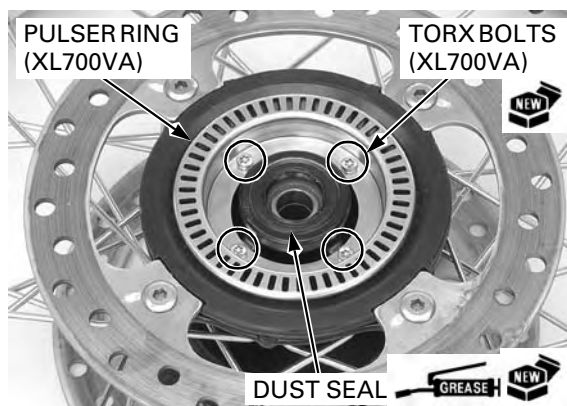


XL700VA only:

Install the pulser ring onto the left wheel hub and new torx bolts, then tighten the torx bolts to the specified torque.

TORQUE: 8 N·m (0.8 kgf·m, 5.9 lbf·ft)

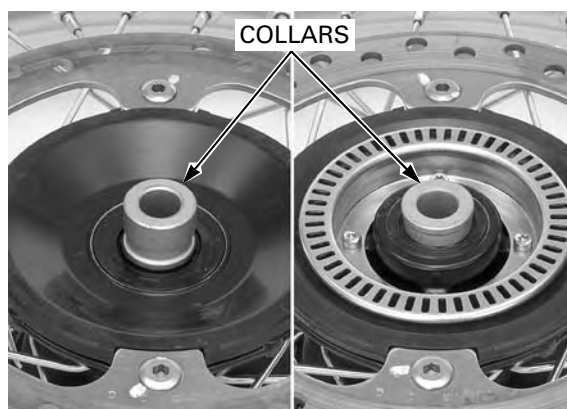
Apply grease to new dust seal lips and install the dust seals until they are flush with the wheel hub.



INSTALLATION

Right side collar is longer than left side collar.

Install the side collars.



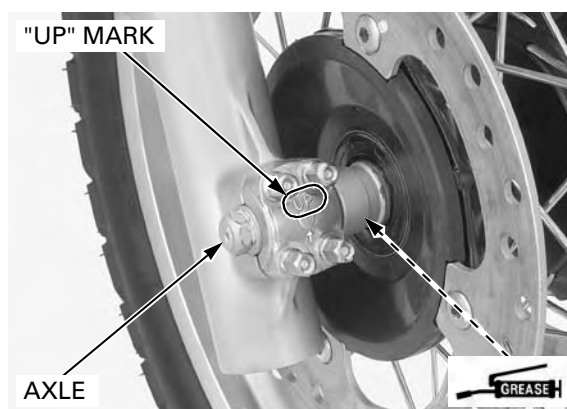
Be careful not to damage the wheel speed sensor when removing the wheel.

Place the front wheel between the fork legs. Apply thin coat of grease to the axle sliding surface. Install and tighten the axle to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

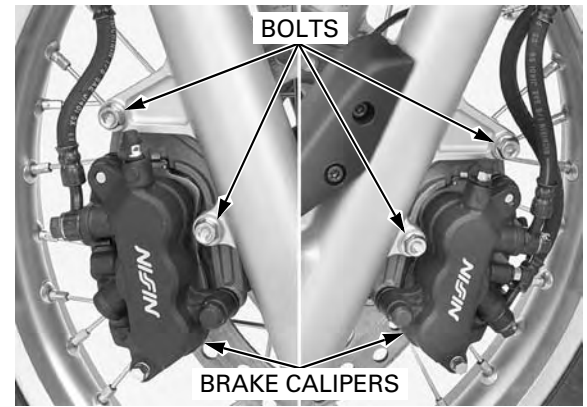
NOTE:

If the axle holder is removed, install it with its "UP" mark facing up.



Install the brake calipers.
Install and tighten new mounting bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

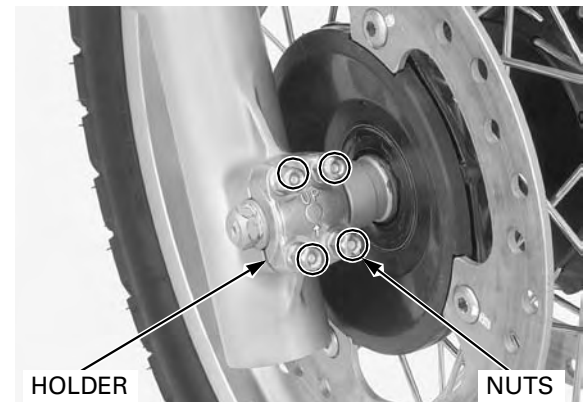


With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.



Tighten the axle holder upper nuts first, then the lower nuts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



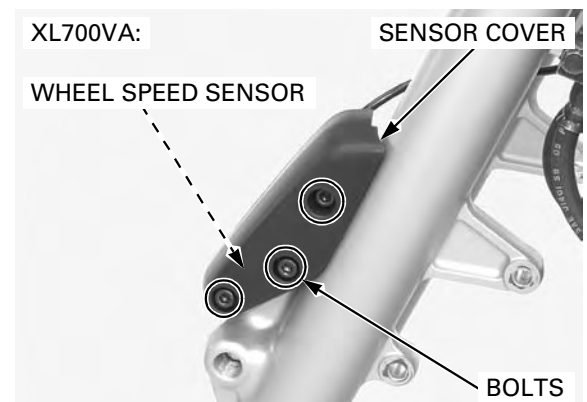
FORK

REMOVAL

Remove the following:

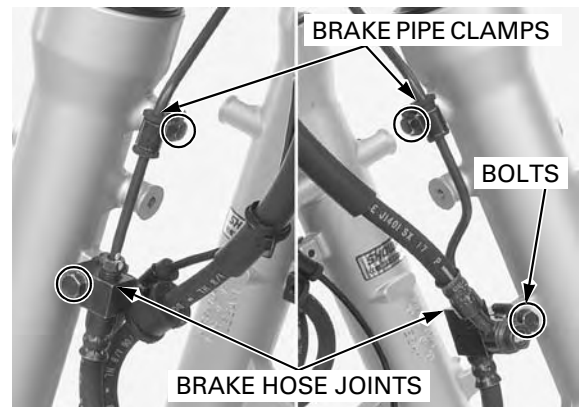
- Front fender (page 2-13)
- Front wheel (page 13-15)

XL700VA only: Remove the bolts, wheel speed sensor cover and front wheel speed sensor.

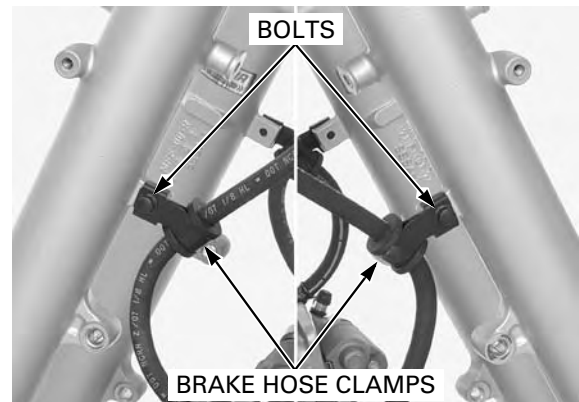


FRONT WHEEL/SUSPENSION/STEERING

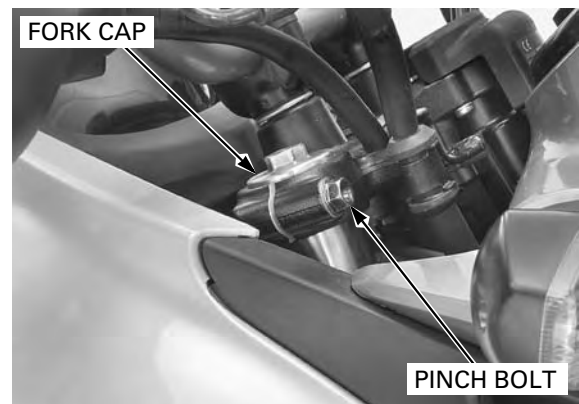
XL700VA: Remove the bolts and brake hose joints.
Remove the bolts and brake pipe clamps.
Support the brake caliper with a piece of wire so that it does not hang from the brake hose and pipe.



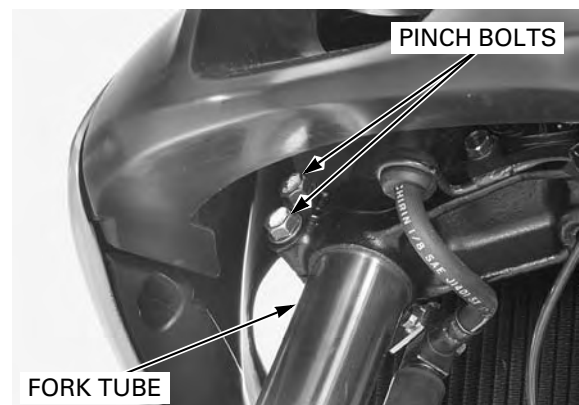
XL700V: Remove the bolts and brake hose clamps.
Support the brake caliper with a piece of wire so that it does not hang from the brake hose and pipe.



Loosen the fork top bridge pinch bolt.
When the fork is ready to be disassembled, loosen the fork cap, but do not remove it yet.



Loosen the fork bottom bridge pinch bolts.
Pull the fork leg down and remove the fork tube.

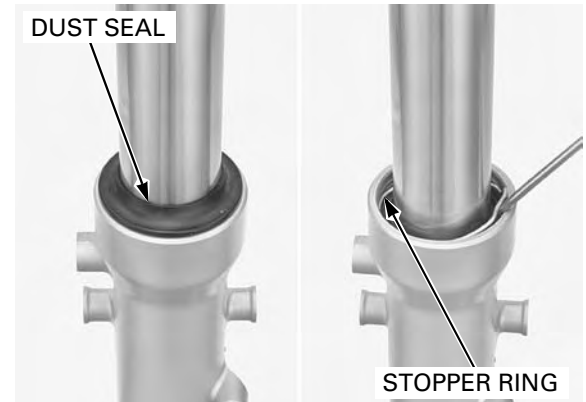


DISASSEMBLY

Remove the dust seal.

Do not scratch the fork tube sliding surface.

Remove the oil seal stopper ring.



The fork cap is under spring pressure; use care when loosening it.

Remove the fork cap and O-ring.



Remove the fork spring from the fork tube.

Pour out the fork fluid by pumping the fork tube several times.



Hold the fork slider in a vise with soft jaws.

If the fork piston turns with the fork center bolt, temporarily install the fork spring and fork cap.

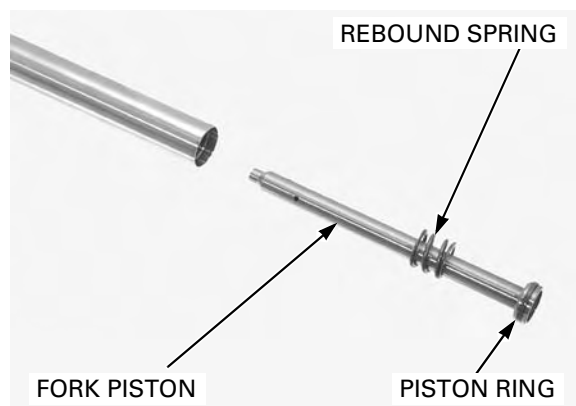
Remove the fork center bolt and sealing washer.



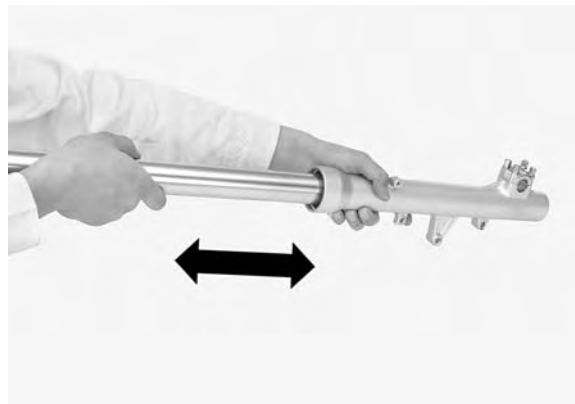
FRONT WHEEL/SUSPENSION/STEERING

Do not remove the fork piston ring, unless it is necessary to replace with a new one.

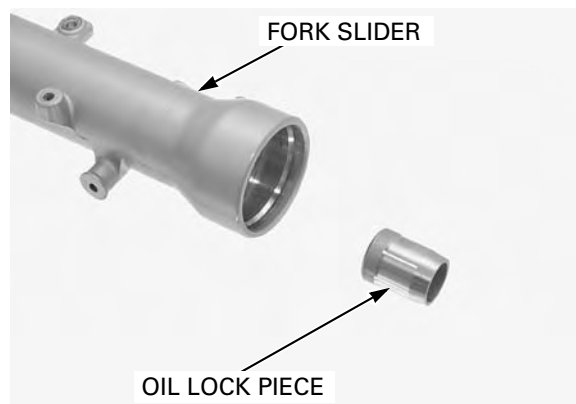
Remove the fork piston and rebound spring.



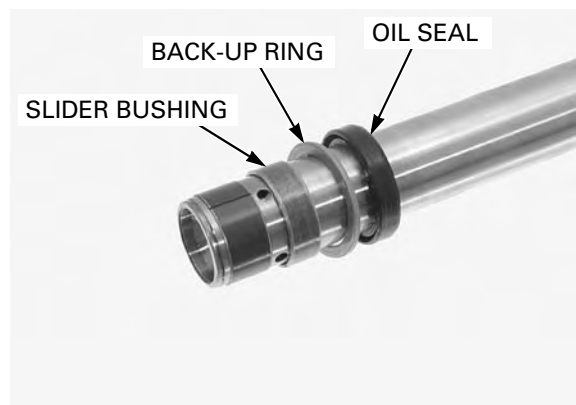
Using quick successive motions, pull the fork tube out of the fork slider.



Remove the oil lock piece.



Remove the oil seal, back-up ring and slider bushing.



Do not damage the fork tube bushing, especially the sliding surface. To prevent loss of tension, do not open the bushing more than necessary.

Carefully remove the fork tube bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand.

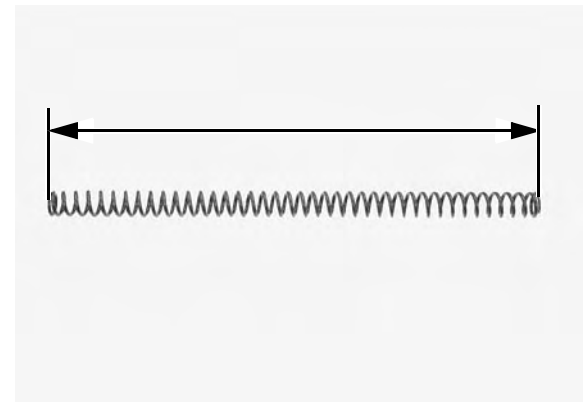


INSPECTION

FORK SPRING

Measure the fork spring free length.

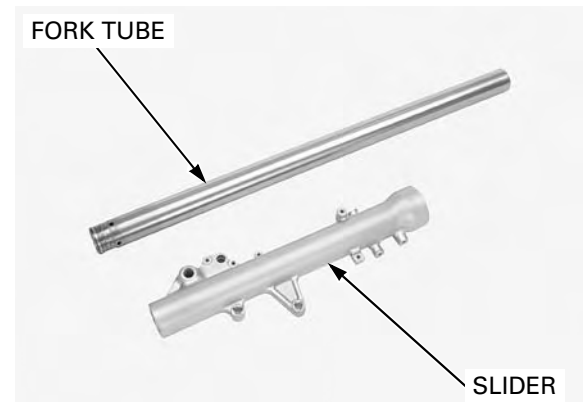
SERVICE LIMIT: 609.0 mm (23.98 in)



FORK TUBE/SLIDER/PISTON

Check the fork tube and slider for score marks, and excessive or abnormal wear.

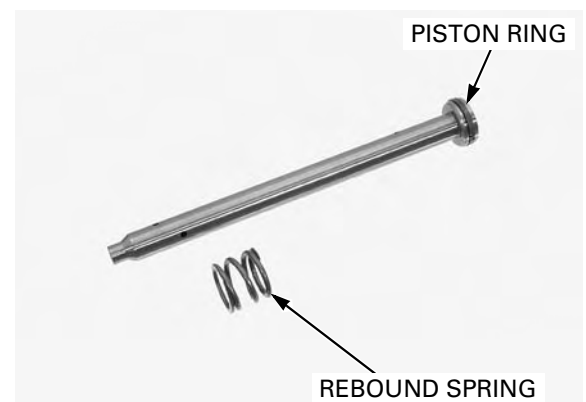
Replace any damaged component if necessary.



Check the fork piston for score marks, and excessive or abnormal wear.

Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.

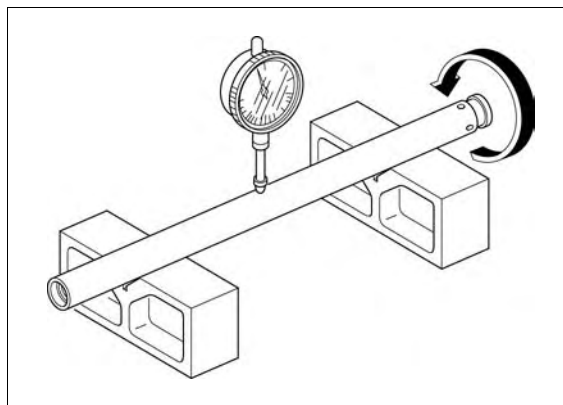
Replace any damaged component if necessary.



FRONT WHEEL/SUSPENSION/STEERING

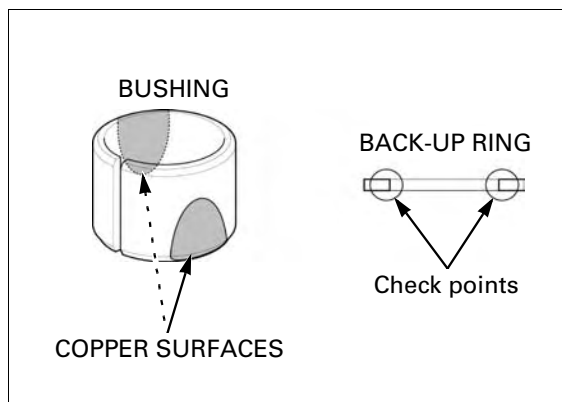
Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



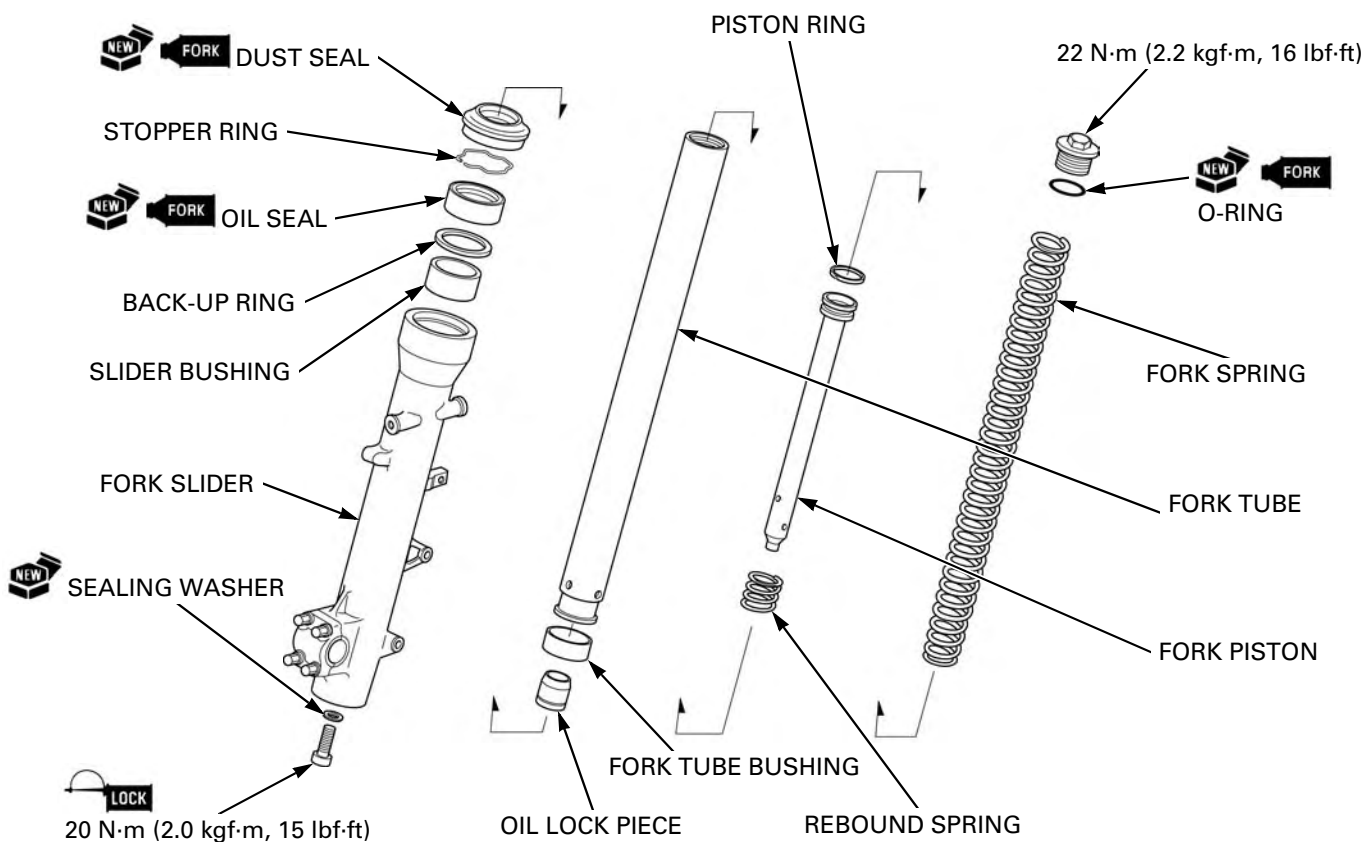
Visually inspect the slider and tube bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



Do not open the bushing slit more than necessary.

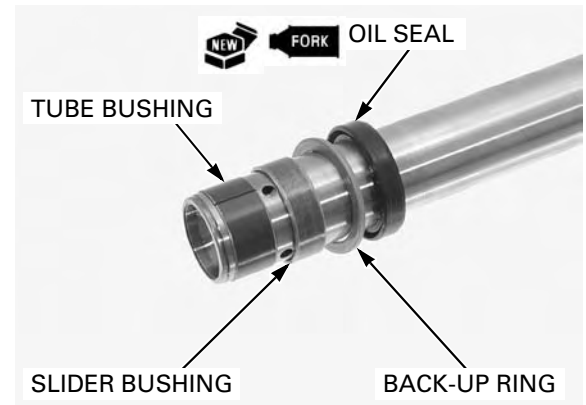
Install the fork tube bushing, being careful not to damage the coating of the bushing if it has been removed.

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

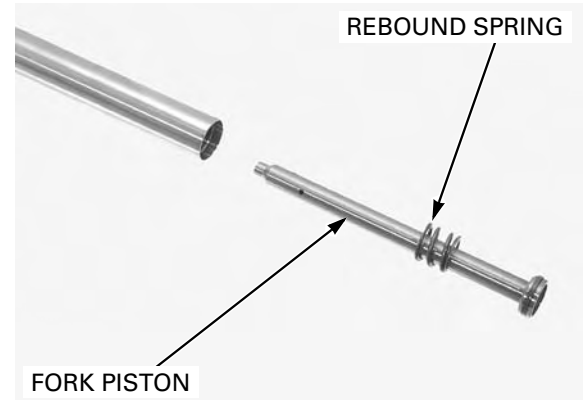
Install the oil seal with its marked side facing up.

Apply fork fluid to the new oil seal lips.

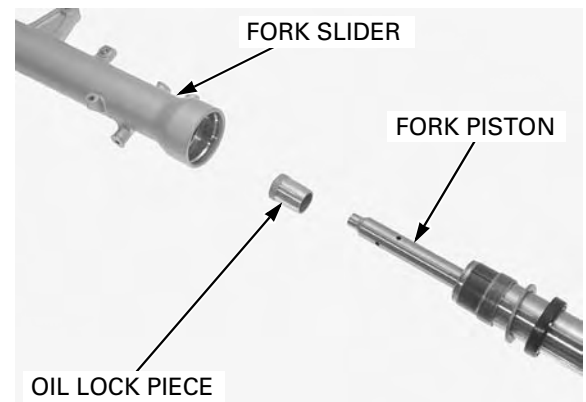
Install the slider bushing, back-up ring and new oil seal onto the fork tube.



Install the rebound spring to the fork piston, then install them into the fork tube.



Install the oil lock piece to the fork piston end. Install the fork tube assembly into the fork slider.



Hold the fork slider in a vise with soft jaws.

Apply a locking agent to the fork center bolt threads. Install the socket bolt with a new sealing washer.

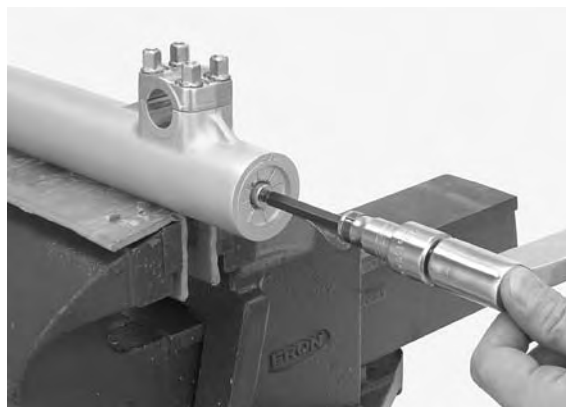


FRONT WHEEL/SUSPENSION/STEERING

If the fork piston turns with the fork center socket bolt, temporarily install the fork spring and fork cap

Tighten the fork center bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)



Drive the oil seal until the stopper ring groove is visible using the special tools.

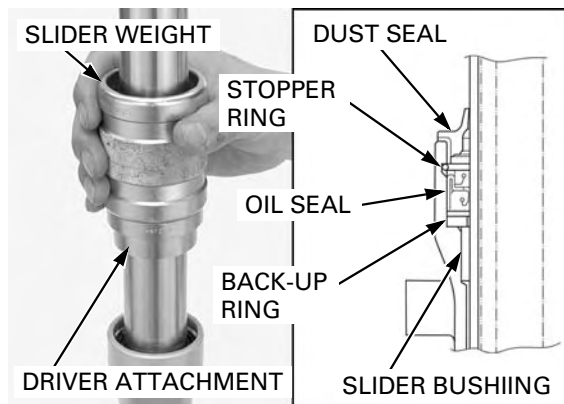
TOOLS:

Slider weight

07947-KA50100

Driver attachment

07947-KF00100



Pour the specified amount of the recommended fork fluid into the fork tube.

RECOMMENDED FORK FLUID:

Honda ULTRA CUSHION OIL 10W or equivalent

FORK FLUID CAPACITY:

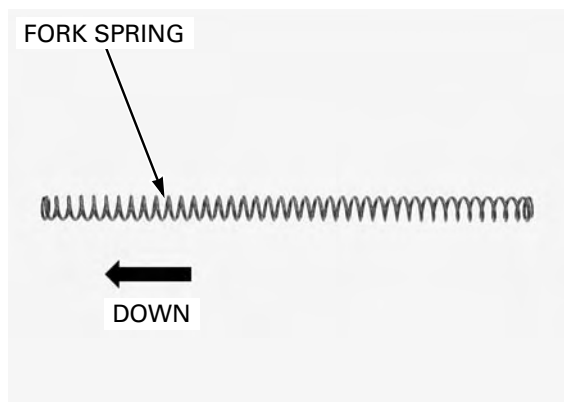
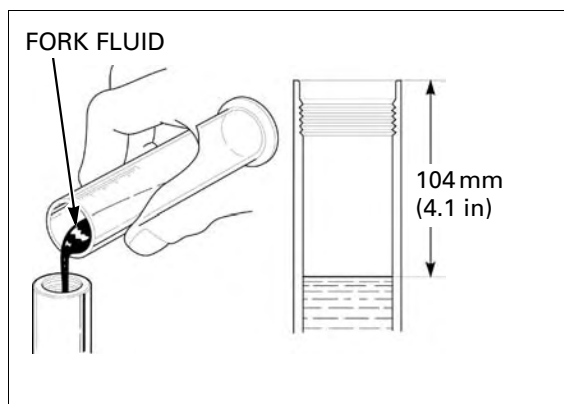
$598 \pm 2.5 \text{ cm}^3$ ($20.2 \pm 0.08 \text{ US oz}$, $21.0 \pm 0.09 \text{ Imp oz}$)

Slowly pump the fork tube several times to remove any trapped air from the lower portion of the fork tube.

Compress the fork tube fully. Measure the fluid level from the top of the fork tube.

FORK FLUID LEVEL: 104 mm (4.1 in)

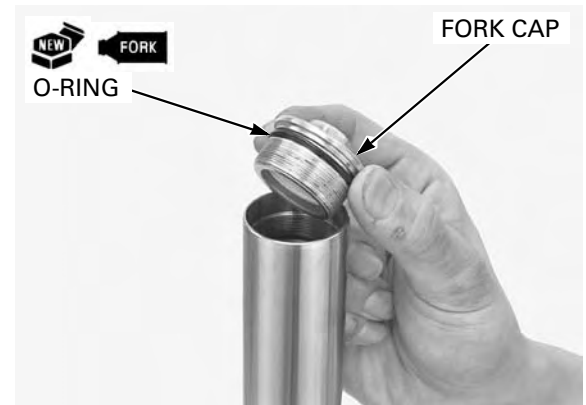
Pull the fork tube up and install the fork spring with the tapered side facing down.



Coat a new O-ring with fork fluid and install it into the fork cap groove.

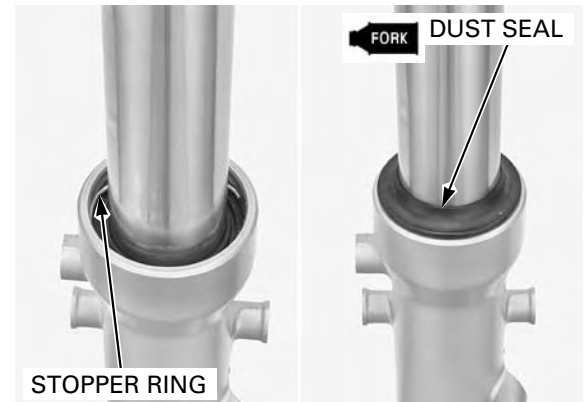
Be careful not to cross-thread the fork cap. Tighten the fork cap after installing the fork tube into the fork bridge.

Hold the fork cap securely and install it into the fork tube.



Install the stopper ring into the groove of the fork slider, being careful not to scratch the fork tube sliding surface.

Coat a new dust seal lips with fork fluid and install it.

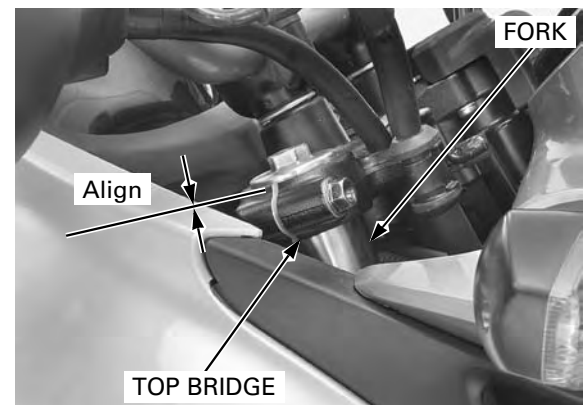


INSTALLATION

Route the wires, hoses and cables properly (page 1-21)

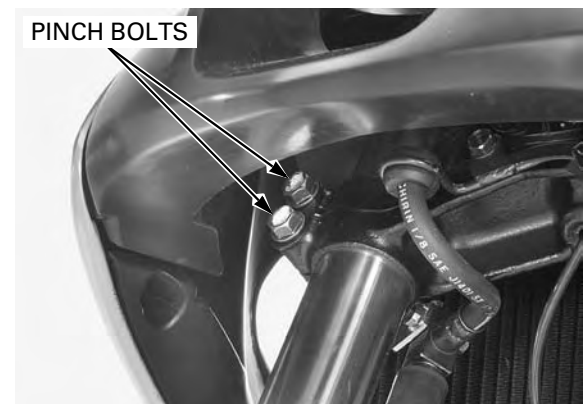
Install the fork leg into the steering stem and top bridge.

Align the top end of the fork tube with the upper surface of the top bridge.



Tighten the bottom bridge pinch bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



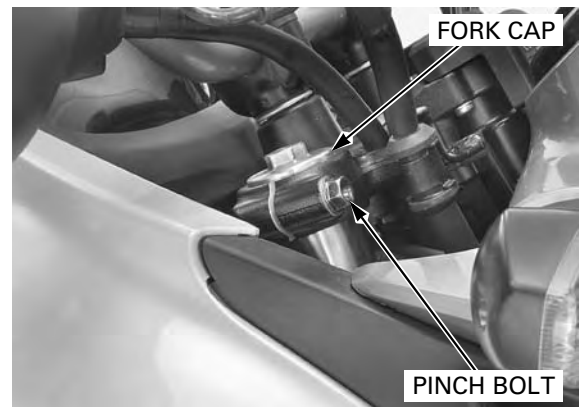
FRONT WHEEL/SUSPENSION/STEERING

Tighten the fork cap to the specified torque if it was removed.

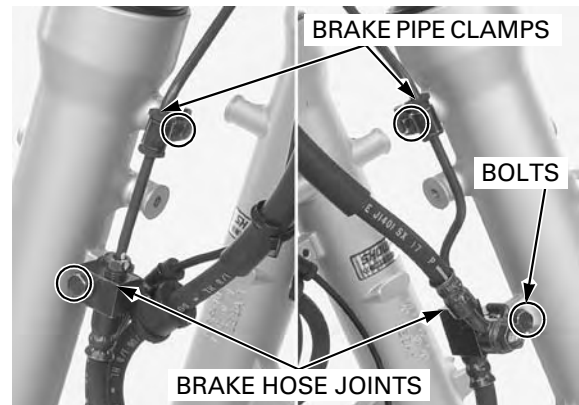
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the fork top bride pinch bolt to the specified torque.

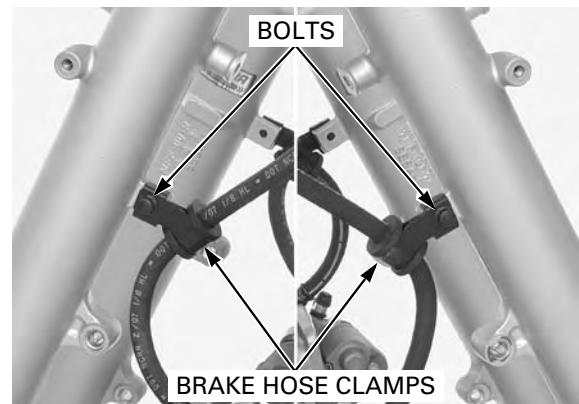
TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)



XL700VA: Install the brake hose joints and bolts.
Install the brake pipe clamps and bolts.
Tighten the bolts securely.



XL700V: Install the brake hose clamps and bolts.
Tighten the bolts securely.

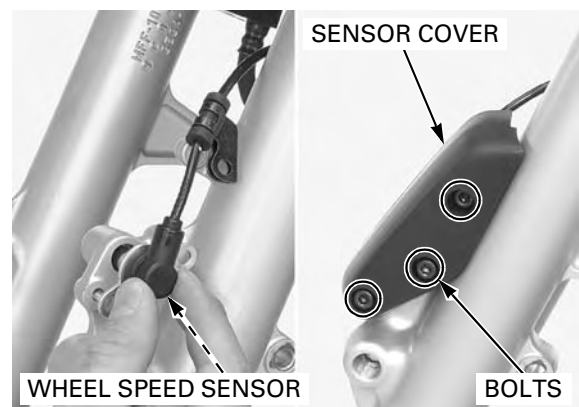


XL700VA only: Install the front wheel sensor, wheel speed sensor cover and bolts.

Tighten the bolts securely.

Install the following:

- Front wheel (page 13-20)
- Front fender (page 2-13)



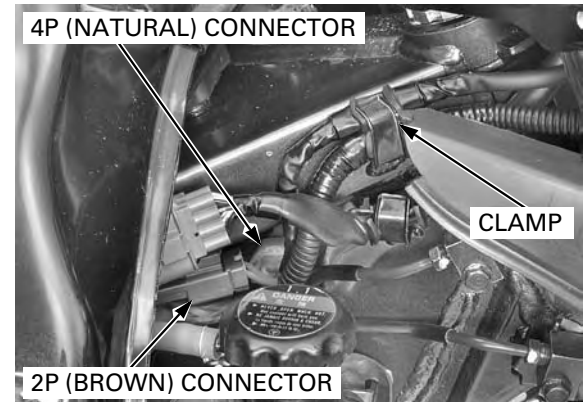
STEERING STEM

REMOVAL

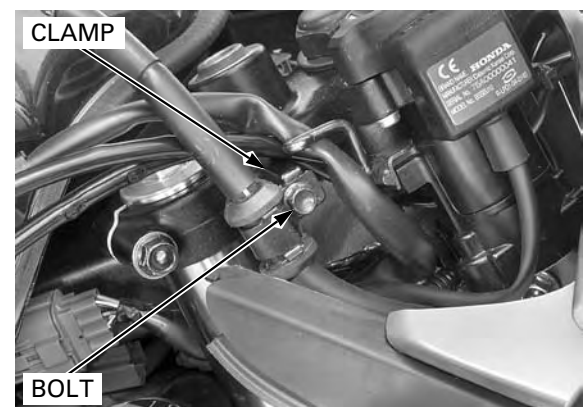
Remove the following:

- Right front side cowl (page 2-9)
- Handlebar (page 13-7)
- Front fender (page 2-13)
- Front wheel (page 13-15)

Release the wire clamp and disconnect the ignition switch 2P (Brown) connector and immobilizer 4P (Natural) connector.



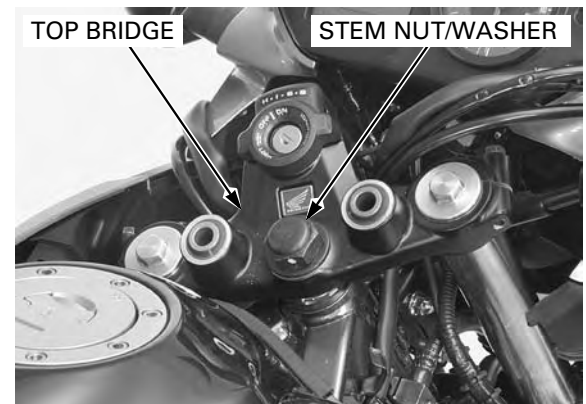
Remove the bolt and front brake hose clamp.



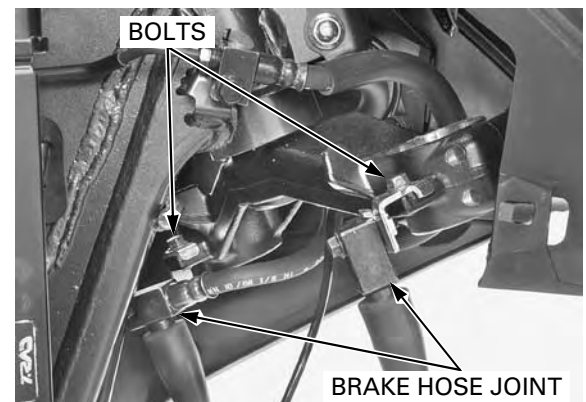
Remove the steering stem nut and washer.

Remove the fork legs (page 13-21).

Remove the top bridge.

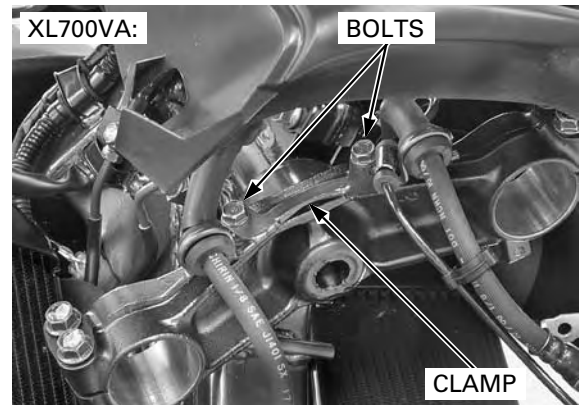


Remove the bolts and brake hose joints.



FRONT WHEEL/SUSPENSION/STEERING

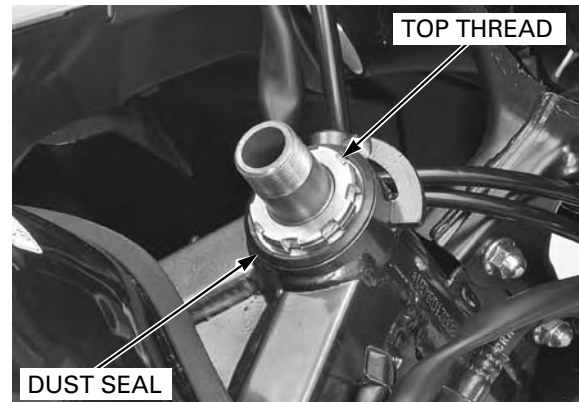
XL700VA only: Remove the bolts and brake hose clamp.



Loosen the steering top thread.

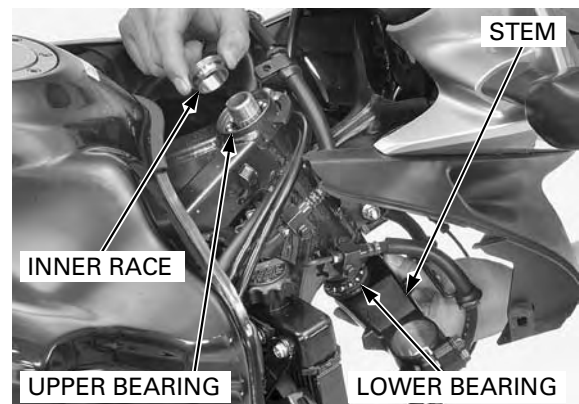
While holding the steering stem, remove the top thread.

Remove the dust seal.



Remove the following:

- Steering stem
- Upper inner race
- Upper bearing
- Lower bearing



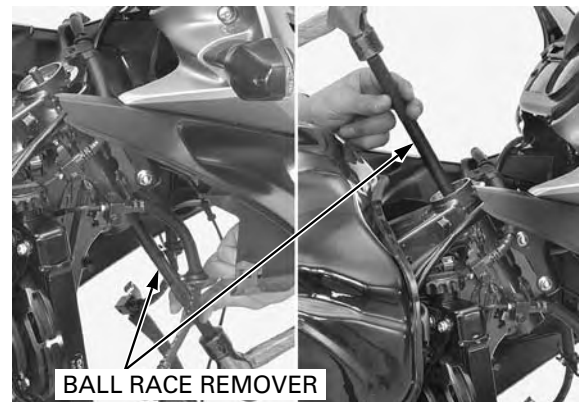
BEARING RACE REPLACEMENT

Remove the upper and lower bearing outer race using the special tools.

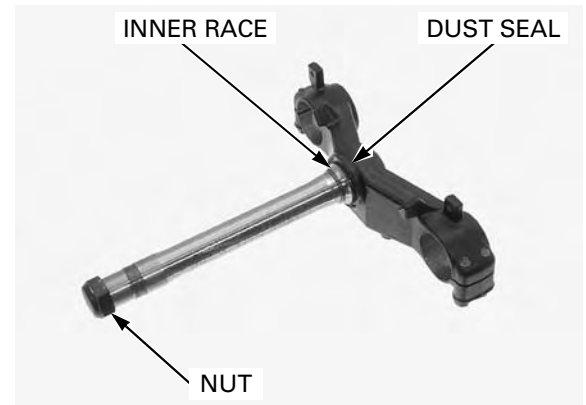
TOOLS:

- Ball race remover set**
- Remover attachment
 - Driver shaft

07953-MJ10000
07953-MJ10100
07953-MJ10200



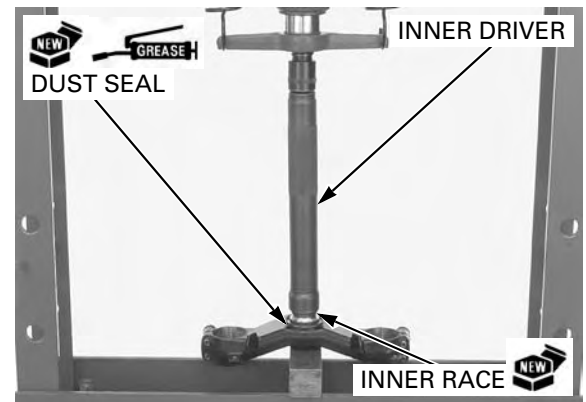
Install the stem nut onto the stem to prevent the threads from being damaged while removing the lower bearing inner race.
Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal.



Apply specified grease to a new dust seal lip (page 1-18).
Install a new dust seal onto the steering stem.
Press a new lower bearing inner race using the special tool and hydraulic press.

TOOL:

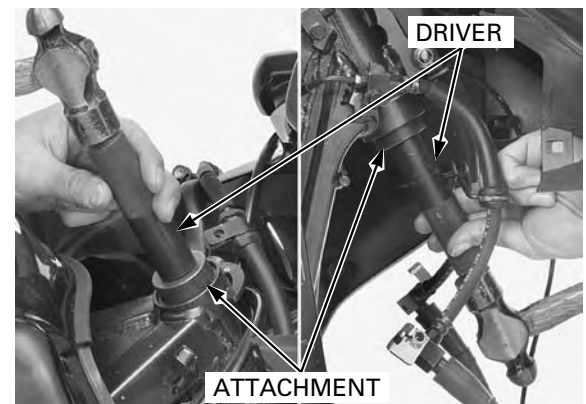
Inner driver, 28 mm I.D. 07946-4300101



Drive in a new upper and lower bearing outer races into the steering head pipe using the special tools.

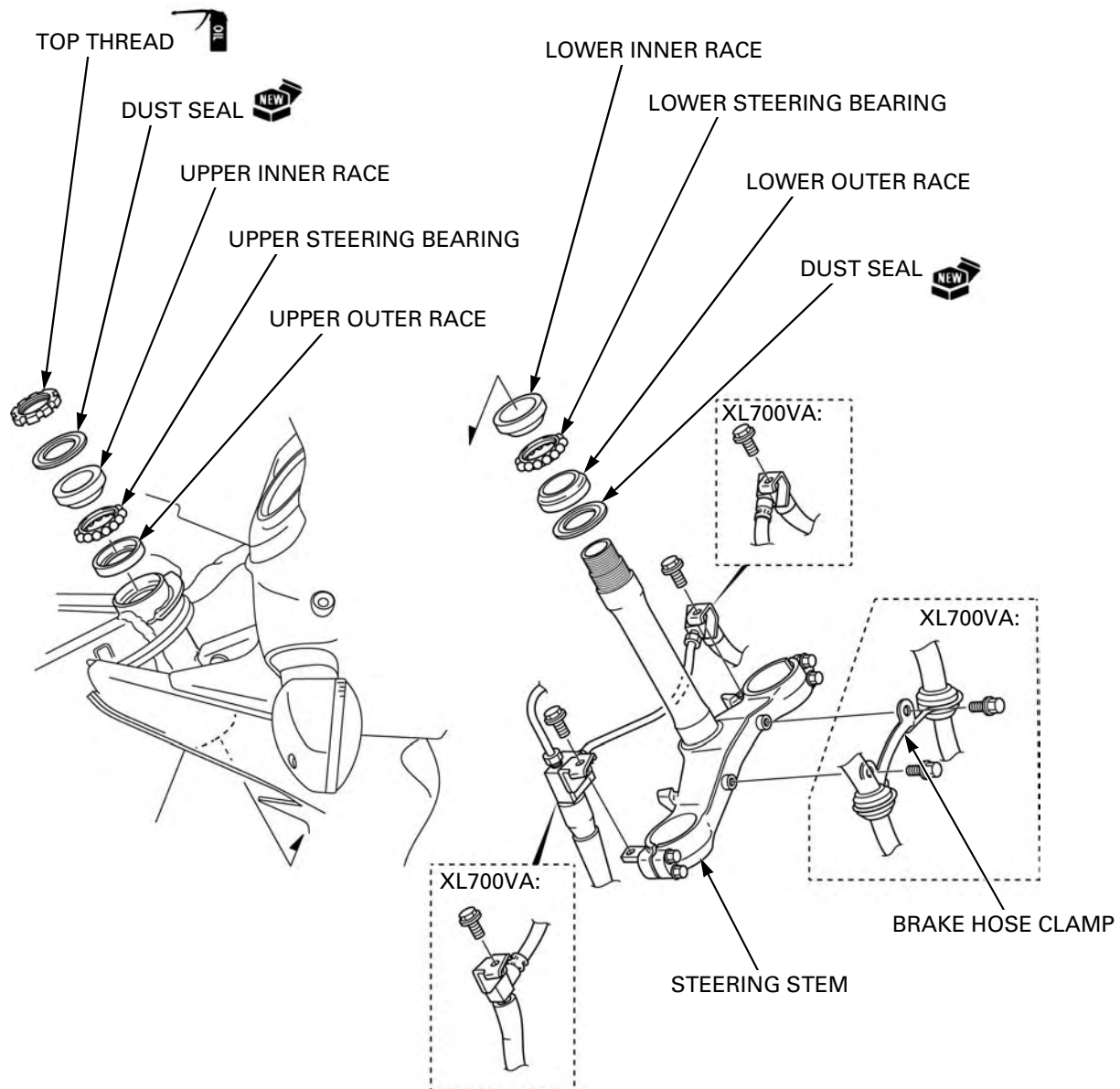
TOOLS:

Driver 07749-0010000
Attachment, 42 x 47 mm 07746-0010300



FRONT WHEEL/SUSPENSION/STEERING

INSTALLATION



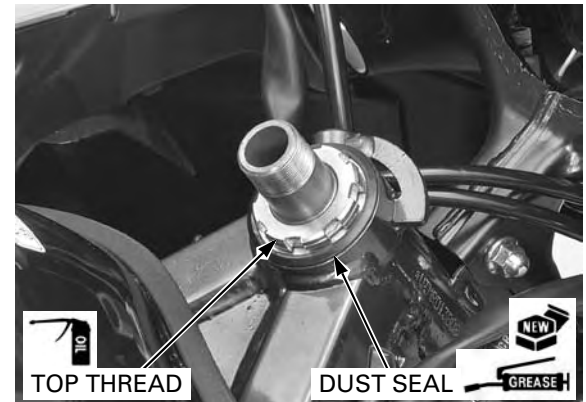
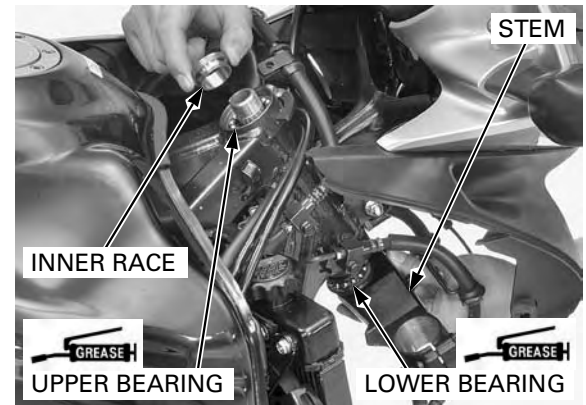
Apply 3 – 5 g of specified grease to each new steering bearing and fill it up (page 1-18).
Install the lower steering bearing onto the stem.

Apply specified grease to a new upper dust seal lip (page 1-18).

Apply engine oil to the threads of the steering top thread.

Insert the steering stem into the steering head pipe and install the following while holding the stem:

- Upper steering bearing
- Upper inner race
- Dust seal
- Top thread



Tighten the top thread to the specified torque using the special tool.

TOOL:

Lock nut wrench **07916-KA50100**

TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)



Turn the steering stem left and right, lock-to-lock five times to seat the bearings.



FRONT WHEEL/SUSPENSION/STEERING

Retighten the top thread to the specified torque.

TOOL:

Lock nut wrench 07916-KA50100

TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)



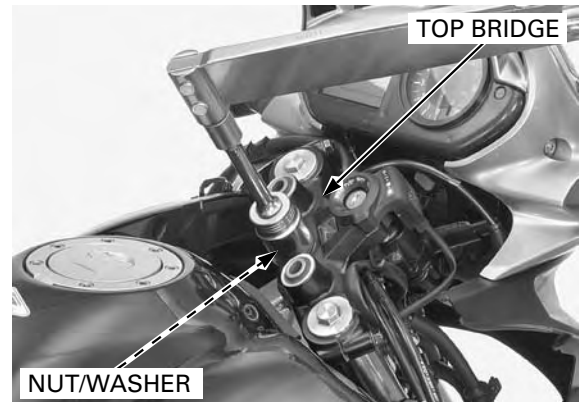
Install the top bridge, washer and stem nut.

Install the fork legs into the steering stem and top bridges (page 13-29).

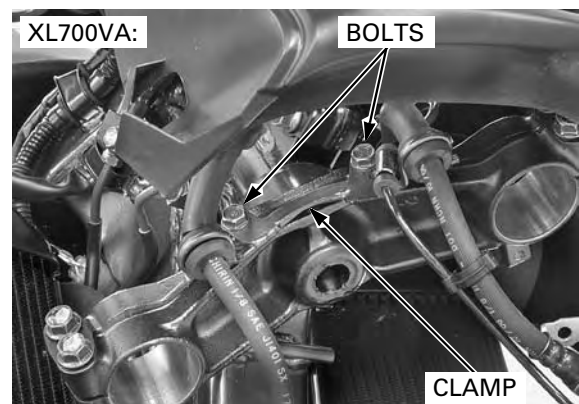
Tighten the stem nut to the specified torque.

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

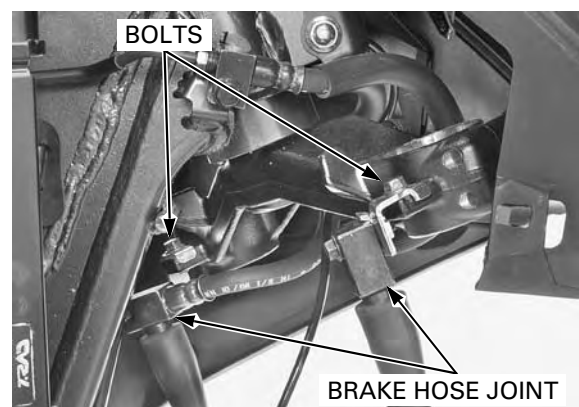
Turn the steering stem left and right, lock-to-lock several times to make sure the steering stem moves smoothly, without play or binding.



XL700VA only: Install the brake hose clamp and tighten the bolts securely.

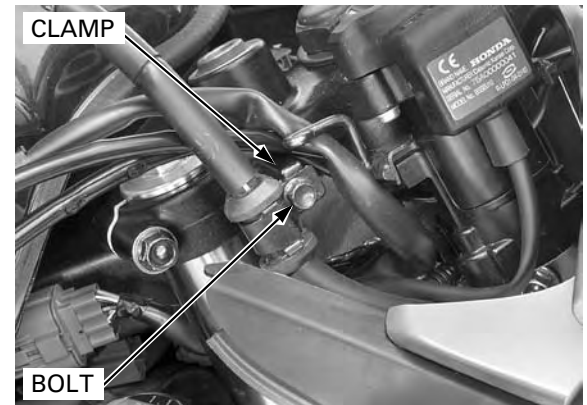


Install the brake hose joints and tighten the bolts securely.



Install the front brake hose clamp and tighten the bolt securely.

Route the hose, wires and cables into the cable guides properly (page 1-21).

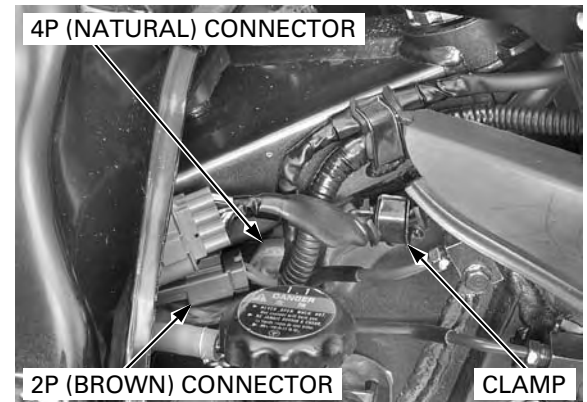


Connect the immobilizer 4P (Natural) connector and ignition switch 2P (Brown) connector.

Install the wires to the clamp.

Install the following:

- Front wheel (page 13-20)
- Front fender (page 2-13)
- Handlebar (page 13-11)
- Right front side cowl (page 2-9)



STEERING HEAD BEARING PRE-LOAD

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

Position the steering stem straight ahead.

Make sure there is no cable, wire harness or hose interference.

Hook a spring scale to the fork tube between the fork top and bottom bridges.

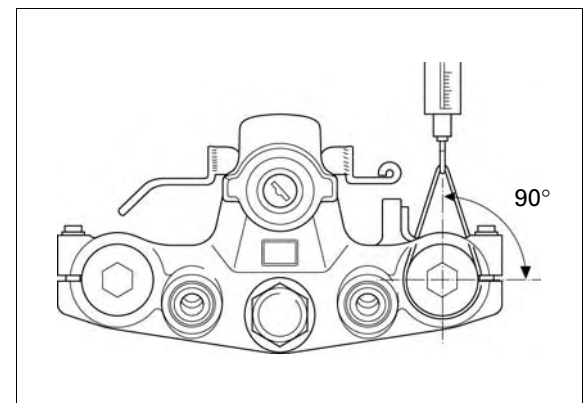
Pull the spring scale keeping it at a right angle to the steering stem.

Read the scale at the point where the steering stem just starts to move.

STEERING HEAD BEARING PRE-LOAD:

10.8 – 15.7 N (1.1 – 1.6 kgf)

If the readings do not fall within the limits, readjust the steering top thread.

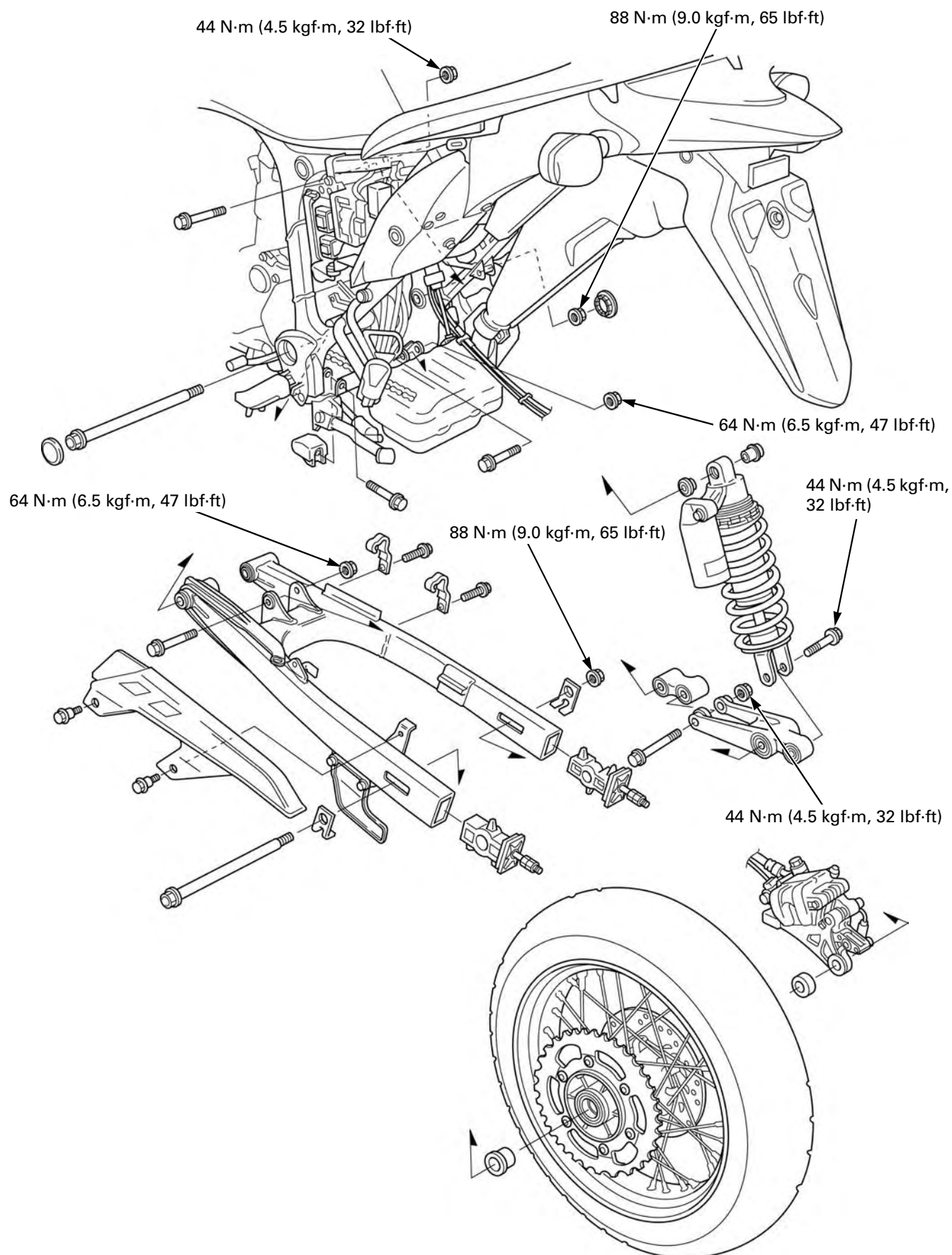


MEMO

14. REAR WHEEL/SUSPENSION

COMPONENT LOCATION	14-2	SHOCK ABSORBER.....	14-13
SERVICE INFORMATION	14-3	SUSPENSION LINKAGE	14-16
TROUBLESHOOTING	14-5	SWINGARM	14-21
REAR WHEEL	14-6		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Riding on damaged rims impairs safe operation of the vehicle.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- When servicing the rear wheel, suspension, or swingarm, raise the rear wheel off the ground by supporting the frame securely.
- Use only genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.

SPECIFICATIONS

Unit: mm (in)

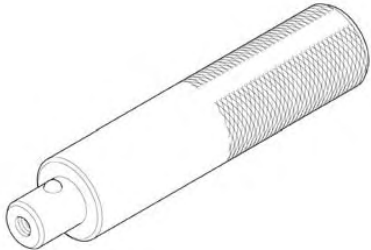
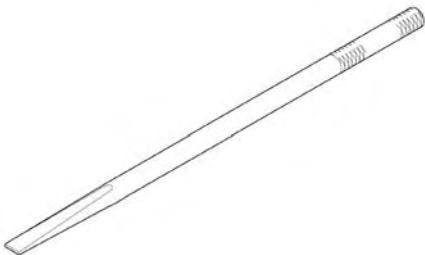
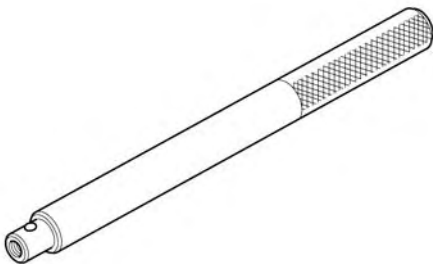
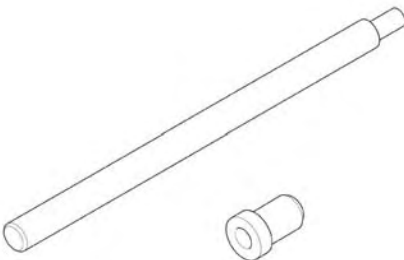
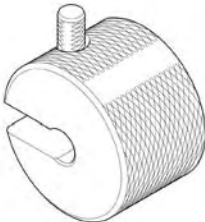
ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			—	2.0 (0.08)
Cold tire pressure	Driver only		200 kPa (2.00 kgf/cm ² , 29 psi)	—
	Driver and passenger		280 kPa (2.80 kgf/cm ² , 41 psi)	—
Axle runout			—	0.20 (0.008)
Wheel rim runout	Radial		—	2.0 (0.08)
	Axial		—	2.0 (0.08)
Wheel balance weight			—	60 g (2.1 oz) max.
Drive chain	Size/link	REGINA	REG525ZRHB-118LE	—
	Slack		35 – 45 mm (1.4 – 1.8 in)	—
Shock absorber	Installed spring length		197.4 mm (7.77 in)	—
	Compression damping adjuster standard position		2 turns out from full in	—

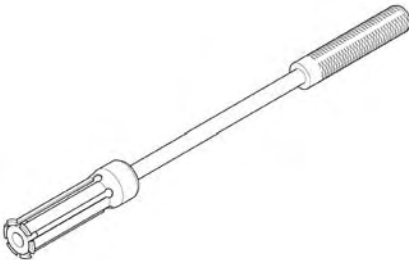
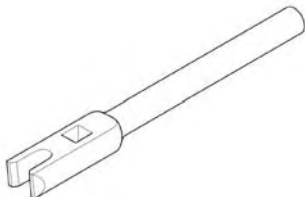
TORQUE VALUES

Rear axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Shock absorber upper mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Shock absorber lower mounting bolt	44 N·m (4.5 kgf·m, 32 lbf·ft)	
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt; replace with a new one.
Rear wheel pulser ring torx bolt	8 N·m (0.8 kgf·m, 5.9 lbf·ft)	ALOC bolt; replace with a new one.
Driven sprocket nut	45 N·m (4.6 kgf·m, 33 lbf·ft)	U-nut
		Apply engine oil to the threads.
Spoke	3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)	
Cushion connecting rod nut (frame side)	64 N·m (6.5 kgf·m, 47 lbf·ft)	U-nut
Cushion arm nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	U-nut
Cushion connecting rod nut (cushion arm side)	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Shock absorber pre-load adjuster lock nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	
Drive chain slider mounting screw	6 N·m (0.6 kgf·m, 4.4 lbf·ft)	

REAR WHEEL/SUSPENSION

TOOLS

Driver 07749-0010000 	Attachment, 37 x 40 mm 07746-0010200 	Attachment, 42 x 47 mm 07746-0010300 
Pilot, 20 mm 07746-0040500 	Bearing remover shaft 07GGD-0010100 	Bearing remover head, 17 mm 07746-0050500 
Driver handle 070GD-0010100 	Pilot, 17mm 07746-0040400 	Attachment, 22 x 24 mm 07746-0010800 
Needle bearing pusher 07946-KA50000 	Remover weight 07741-0010201 	Attachment, 52 x 55 mm 07746-0010400 

Attachment, 32 x 35 mm 07746-0010100 	Pilot, 25 mm 07746-0040600 	Pilot, 22 mm 07746-0041000 
Pilot, 16 mm 07746-0041300 	Bearing remover shaft, 25 mm 07936-ZV10100 	Spoke wrench, 6.1 mm 07JMA-MR60100 

TROUBLESHOOTING

Soft suspension

- Incorrect suspension adjustment
- Weak shock absorber spring
- Oil leakage from damper unit
- Low tire pressure

Stiff suspension

- Incorrect suspension adjustment
- Bent damper rod
- Damaged shock absorber rubber mounts
- Damaged swingarm pivot bearings
- High tire pressure

Rear suspension noise

- Loose suspension fasteners
- Binding shock absorber case
- Worn shock absorber rubber mounts
- Faulty rear shock absorber

Rear wheel wobbles

- Bent rim
- Unbalanced rear tire and wheel
- Insufficient tire pressure
- Faulty swingarm pivot bearings
- Axle fastener not tightened properly
- Faulty tire

Wheel hard to turn

- Faulty wheel bearings
- Bent axle
- Brake drag (page 15-6)

REAR WHEEL

REMOVAL

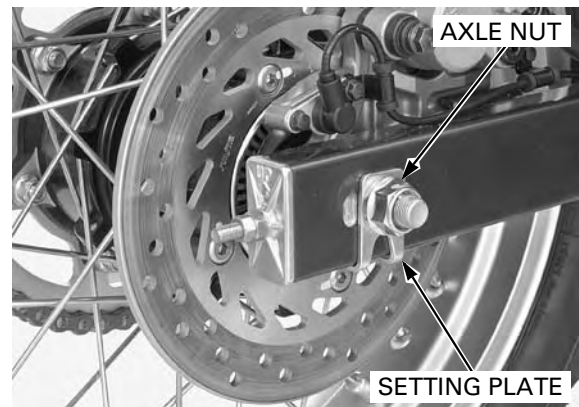
Support the motorcycle securely and raise the rear wheel off the ground.

Fully slacken the drive chain (page 3-17).

Remove the axle nut and setting plate.

NOTE:

- Do not operate the brake pedal after removing the wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.



Push the rear wheel forward.

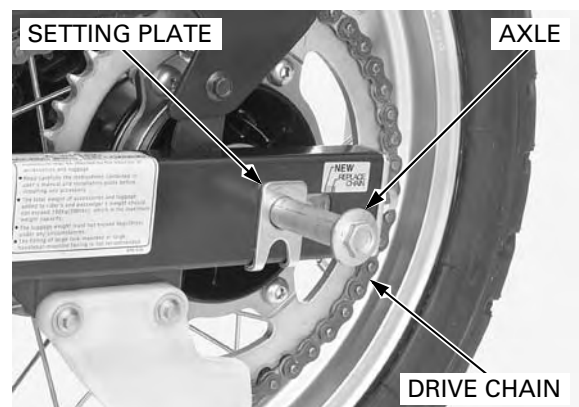
Remove the rear axle and setting plate.

Derail the drive chain from the drive sprocket.

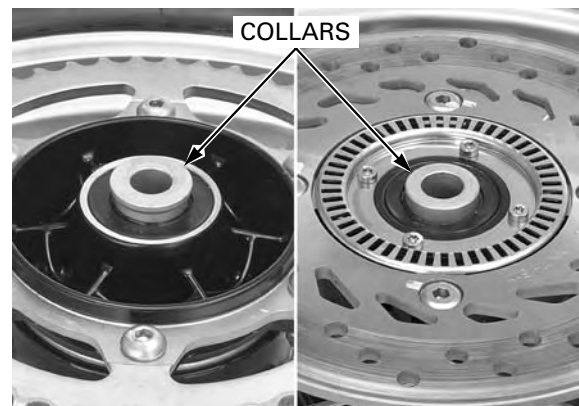
Remove the rear wheel.

NOTE:

- Be careful not to damage the VS sensor when removing the wheel.



Remove the side collars.



INSPECTION

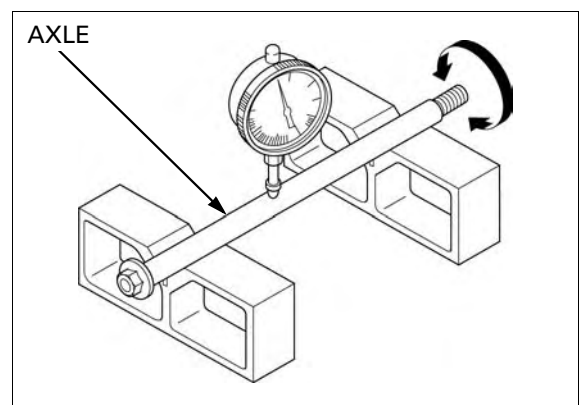
AXLE

Set the rear axle in V-blocks.

Turn the axle and measure the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



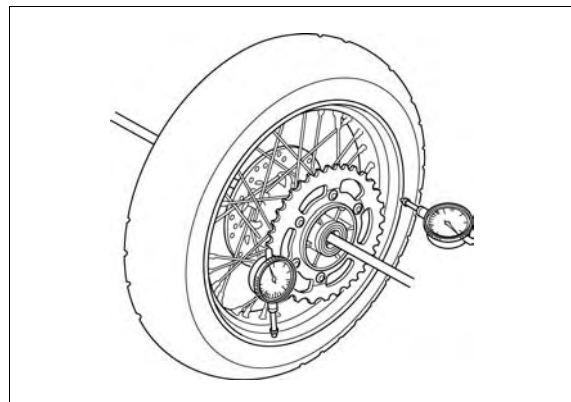
WHEEL RIM

Check the rim runout by placing the wheel in a trueing stand. Spin the wheel slowly and read the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

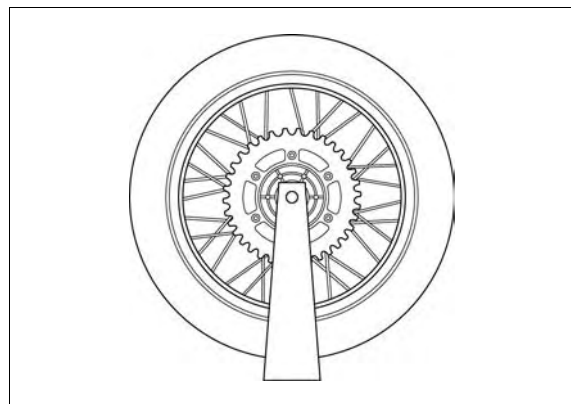
Axial: 2.0 mm (0.08 in)



WHEEL BALANCE

Refer to the wheel balance servicing (page 13-17).

Do not add balance weight more than 60 g (2.1 oz) to the rear wheel.

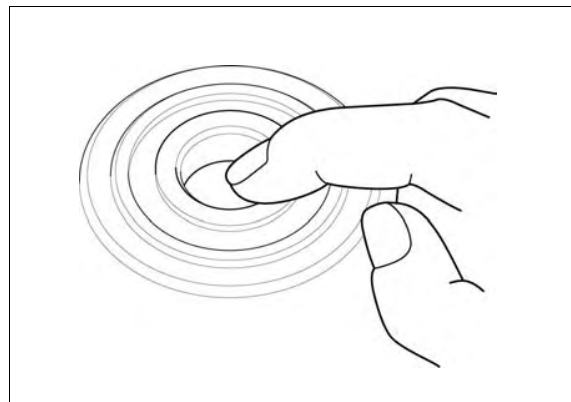


WHEEL/DRIVEN FLANGE BEARINGS

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer races fit tightly in the hub or flange.

*Replace the wheel/
driven flange
bearings in pairs.*

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub or flange.

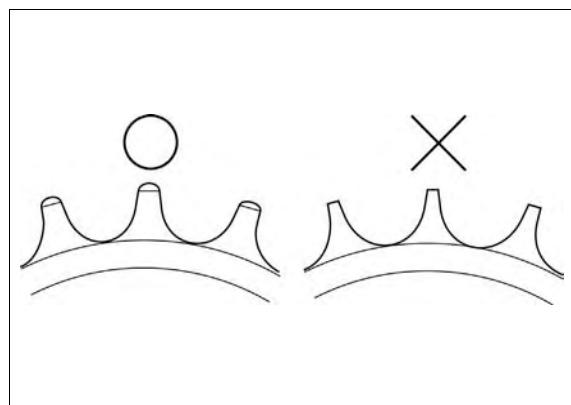


DRIVEN SPROCKET

Check the condition of the final driven sprocket teeth.

Replace the sprocket if worn or damaged.

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.

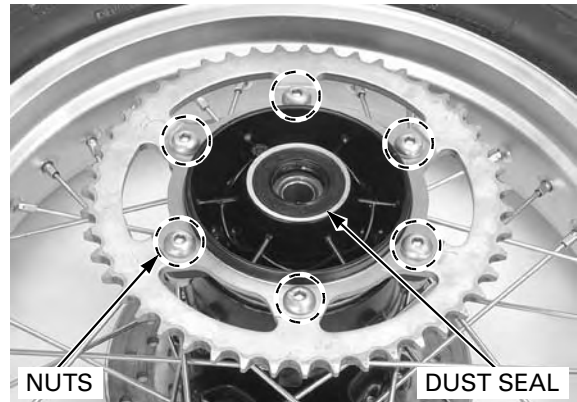


REAR WHEEL/SUSPENSION

DISASSEMBLY

If you replace the driven sprocket, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.

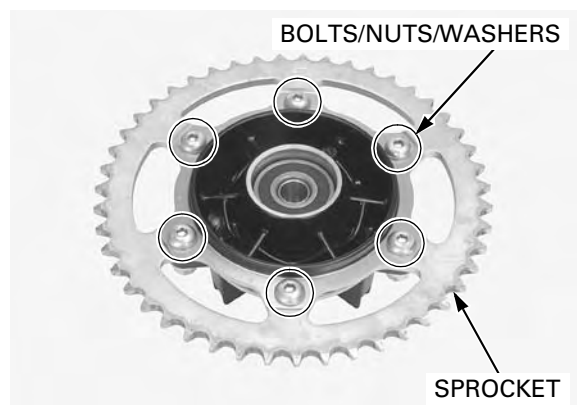
Remove the dust seal.



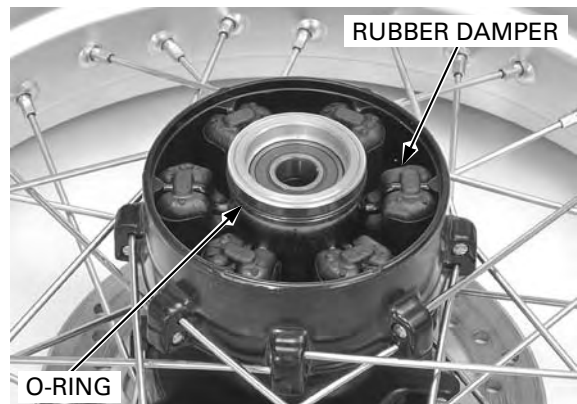
Remove the driven flange assembly from the left wheel hub.



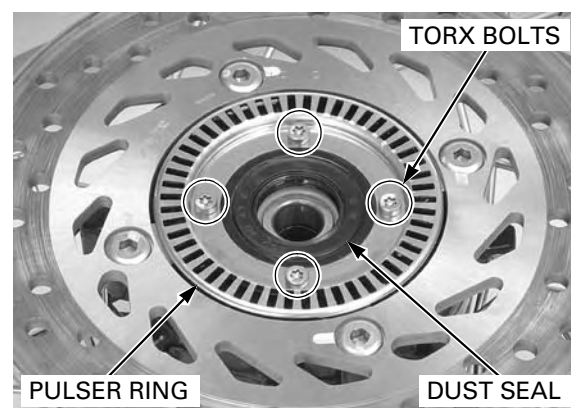
If you replace the driven sprocket, remove the nuts, washers, driven sprocket and bolts.



Remove the O-ring.
Remove the wheel rubber dampers.

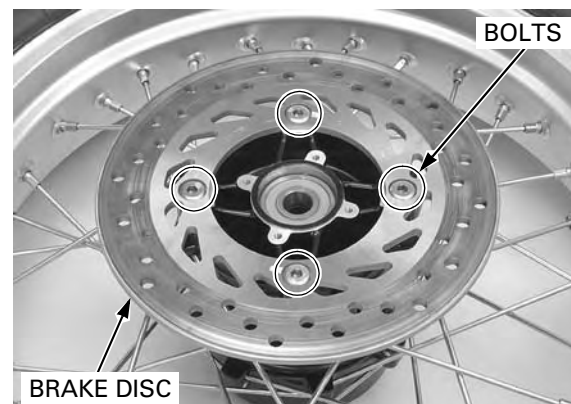


Remove the torx bolts and pulser ring.
Remove the dust seal.



Do not reuse the bolts.

Remove the bolts and brake disc.



DRIVEN FLANGE BEARING REPLACEMENT

*Replace the wheel/
driven flange
bearings as a set.
Do not reuse old
bearing.*

Remove the driven flange collar out of the driven flange bearing.

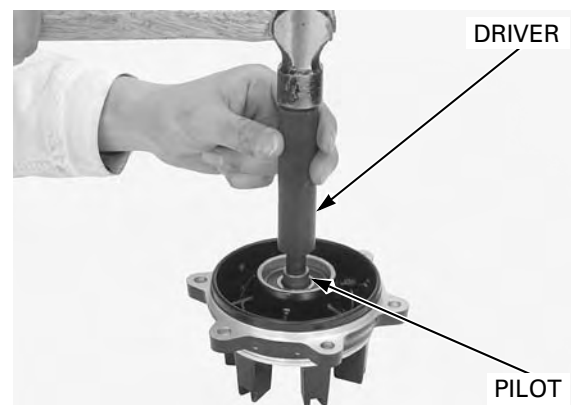
TOOLS:

Driver

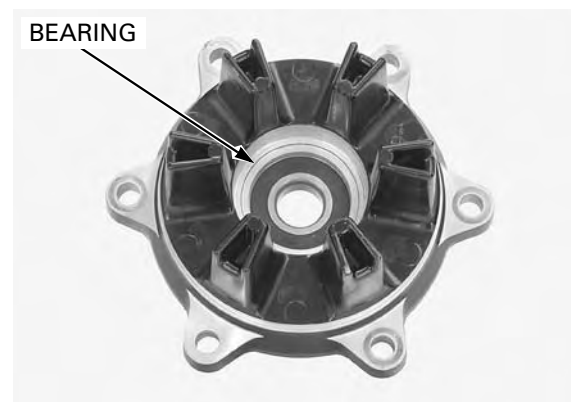
Pilot, 20 mm

07749-0010000

07746-0040500



Drive out the driven flange bearing.

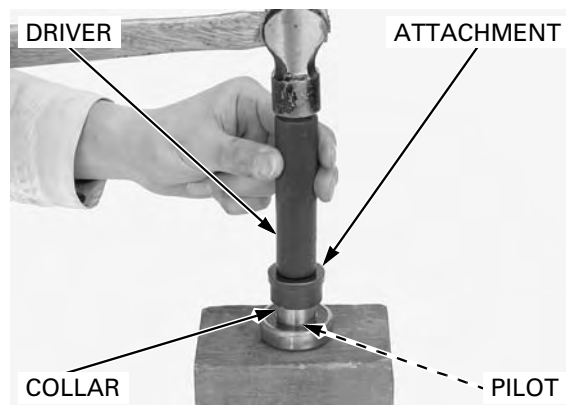


REAR WHEEL/SUSPENSION

Install the driven flange collar in a new driven flange bearing until it is fully seated.

TOOLS:

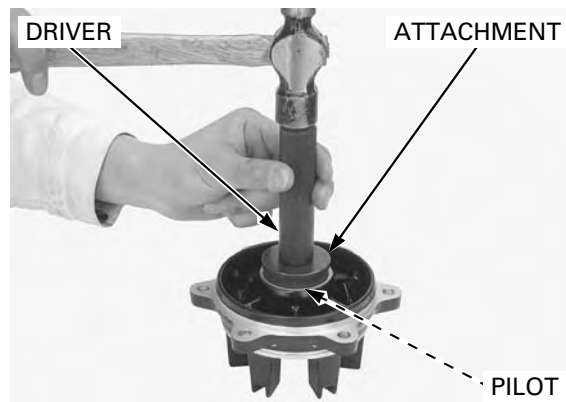
Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400



Install the driven flange bearing/collar into the driven flange using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 17 mm	07746-0040400



WHEEL BEARING REPLACEMENT

*Replace the wheel/
driven flange
bearings as a set.
Do not reuse old
bearing.*

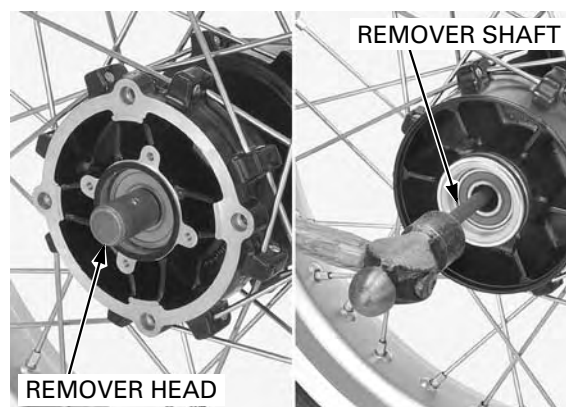
Install the remover head into the bearing.

From the opposite side of the wheel, install the remover shaft and drive the bearing out of the wheel hub.

Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover shaft	07GGD-0010100
Bearing remover head, 17 mm	07746-0050500



Drive in a new right bearing squarely with the marked side facing up until it is fully seated.

Install the distance collar.

Drive in a new left bearing squarely with the marked side facing up until it is fully seated.

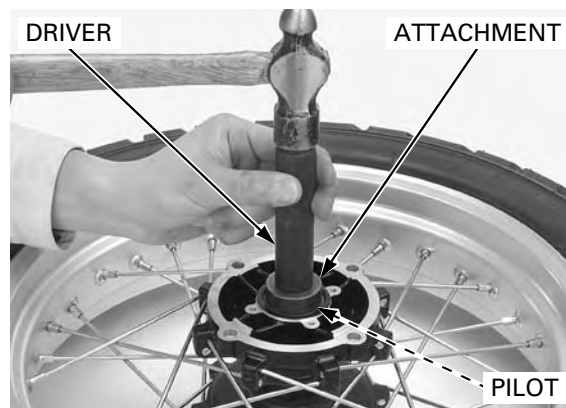
TOOLS:

Right side:

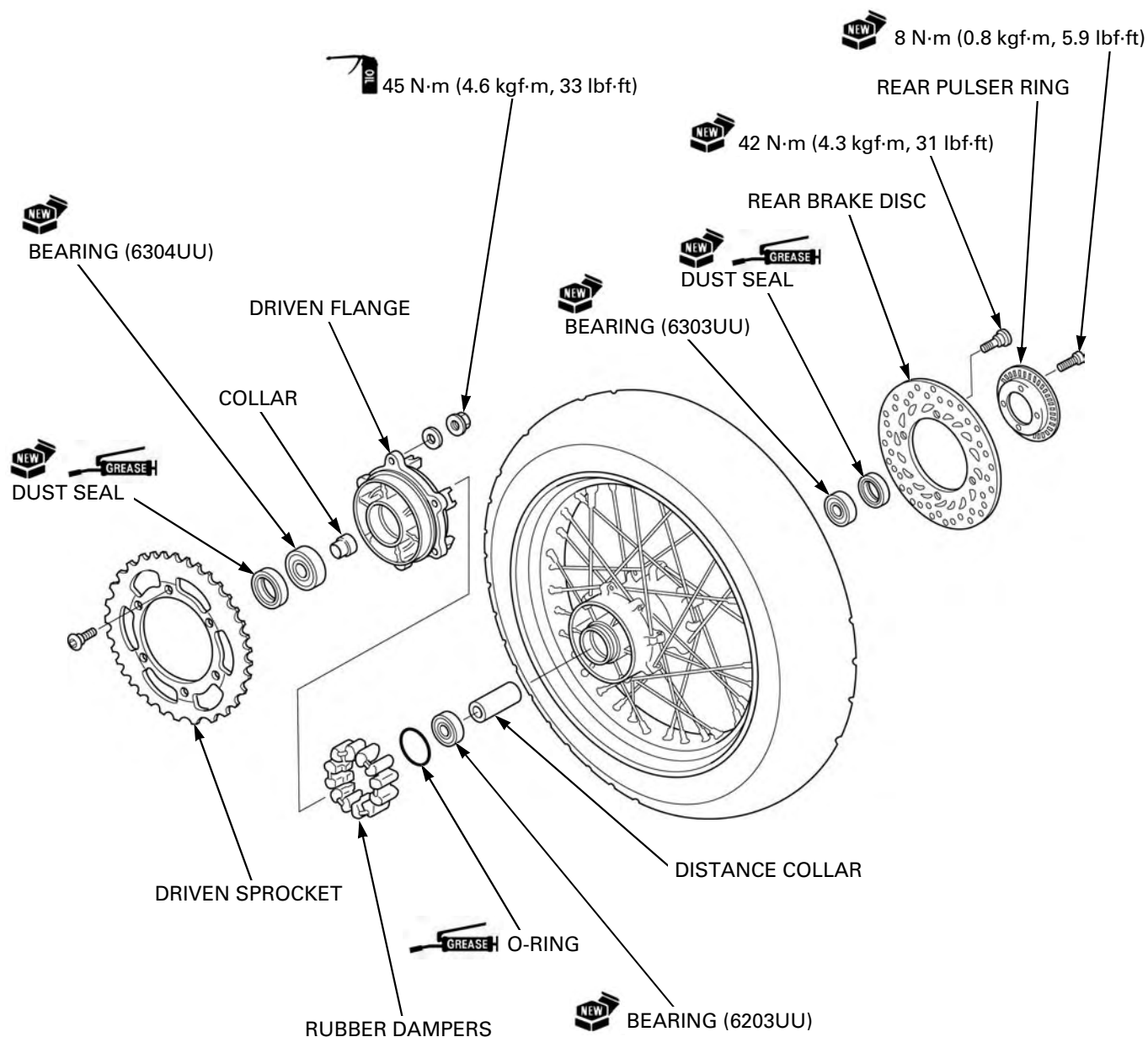
Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 17 mm	07746-0040400

Left side:

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400



ASSEMBLY



Place the wheel rim on the work bench.
Place the wheel hub in the center of the rim and begin lacing with new spokes.

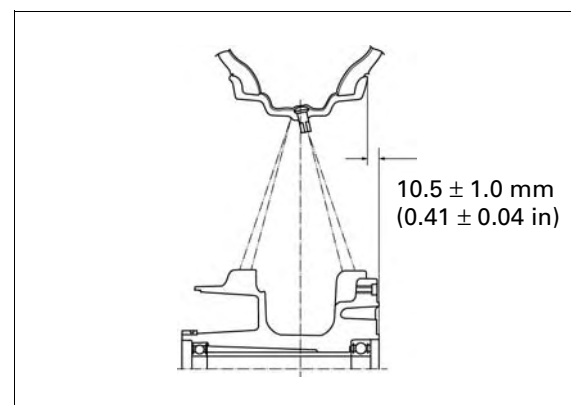
Adjust the wheel hub position so that the distance from the wheel hub right end surface to the side of rim is 10.5 ± 1.0 mm (0.41 ± 0.04 in) as shown.

TOOL:

Spoke wrench, 6.1 mm **07JMA-MR60100**

TORQUE: 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)

Check the rim runout (page 14-7).



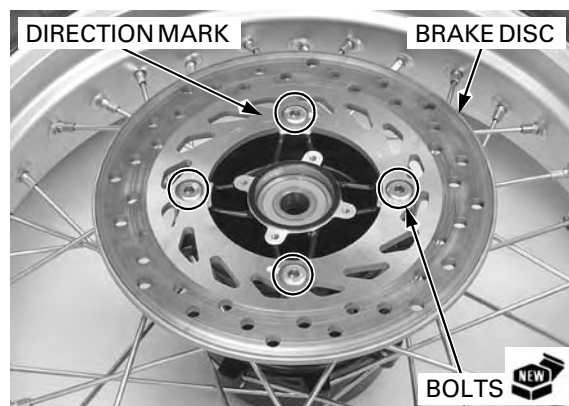
REAR WHEEL/SUSPENSION

Do not get grease on the brake disc or stopping power will be reduced.

Install the brake disc with its rotating direction mark facing out.

Install new bolts and tighten them in a crisscross pattern in several steps.

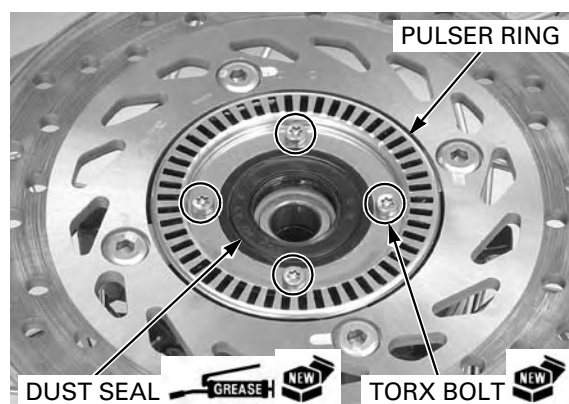
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Install the pulser ring onto the right wheel hub, then tighten new torx bolts to the specified torque.

TORQUE: 8 N·m (0.8 kgf·m, 5.9 lbf·ft)

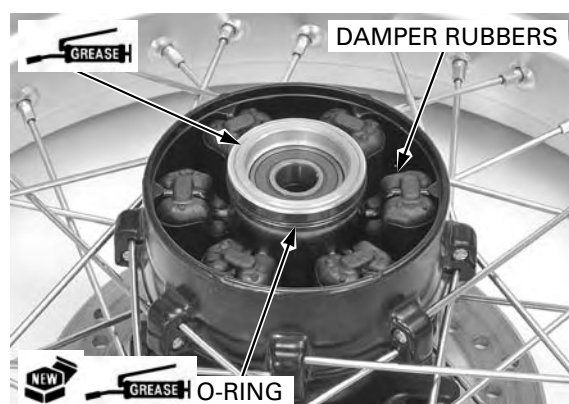
Apply grease to new dust seal lips and install the dust seal until it is flush with the wheel hub.



Install the damper rubbers into the wheel hub.

Apply grease to a new O-ring and driven flange-to-rear wheel hub mating surface.

Install a new O-ring into the groove of the wheel hub.



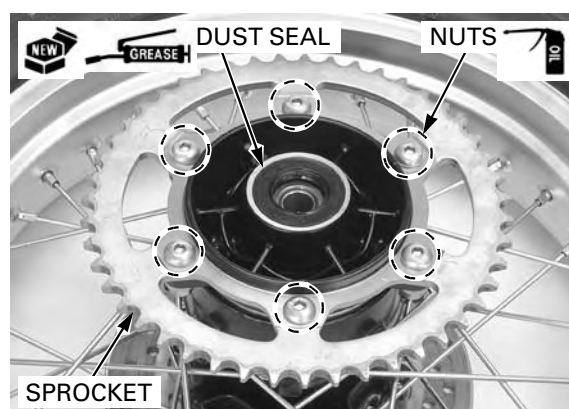
If the driven sprocket is removed, apply engine oil to the driven sprocket nut threads and install the driven sprocket bolts, sprocket, washers and nuts onto the driven flange.

Install the driven flange assembly into the left wheel hub.

If the driven sprocket is removed, tighten the driven sprocket nuts to the specified torque.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

Apply grease to a new dust seal lips, then install it into the driven flange.



INSTALLATION

Install the side collars.

Be careful not to damage the VS sensor when installing the wheel.

Place the rear wheel into the swingarm.

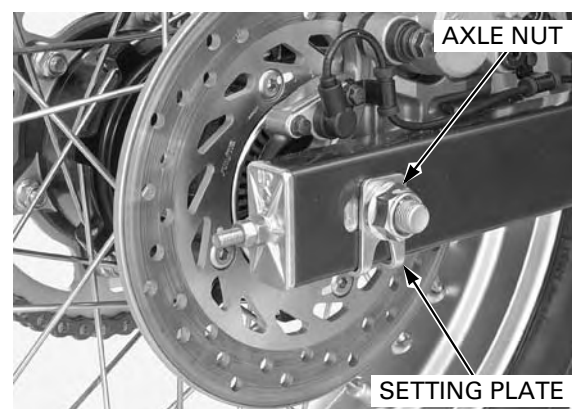
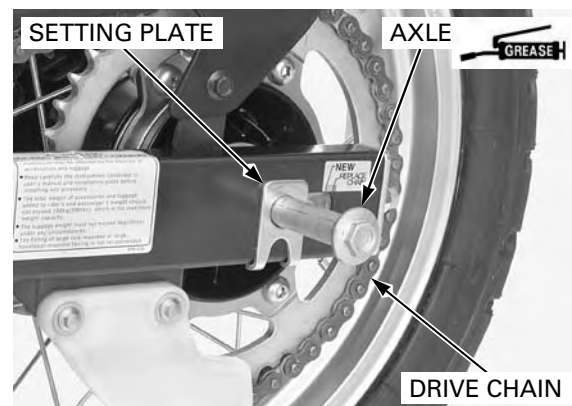
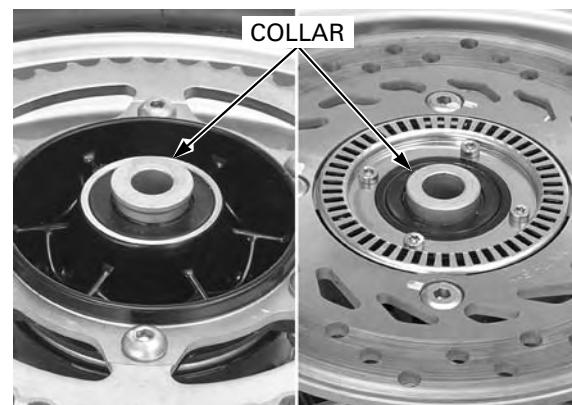
Install the drive chain over the driven sprocket.

Apply a thin coat of grease to the rear axle surface.

Install the adjusting plate and rear axle from the left side.

Install the adjusting plate and rear axle nut.

Adjust the drive chain slack (page 3-17).



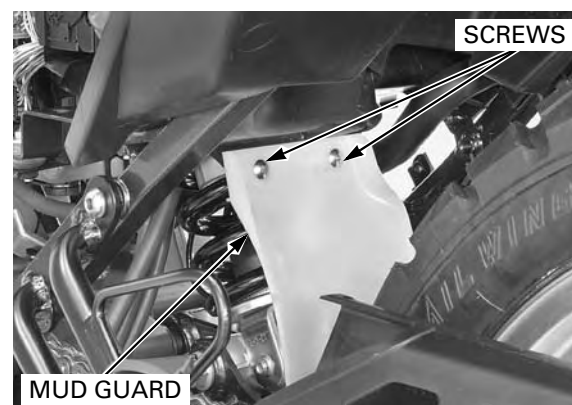
SHOCK ABSORBER

REMOVAL

Remove the side covers (page 2-4).

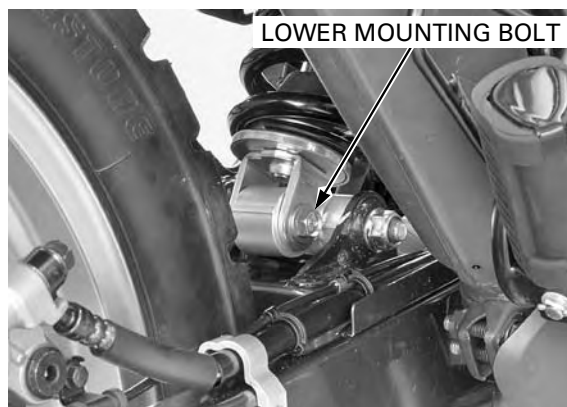
Support the motorcycle using a hoist or equivalent, and raise the rear wheel off the ground.

Remove the screws and mud guard.



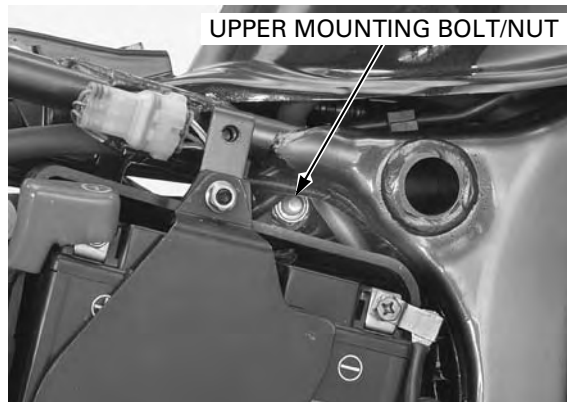
REAR WHEEL/SUSPENSION

Remove the lower mounting bolt.



Remove the upper mounting bolt and nut.

Remove the shock absorber.



INSPECTION

Visually inspect the damper unit for damage.

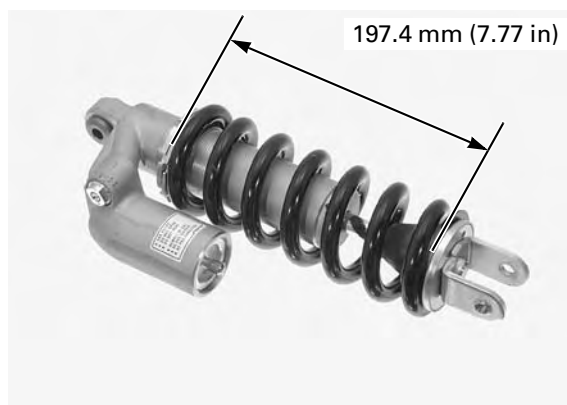
Check for the:

- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Rubber bumper for wear or damage

Inspect all the other parts for wear or damage.

If necessary, replace the shock absorber as an assembly.

INSTALLED SPRING LENGTH: 197.4 mm (7.77 in)



TORQUE:

Shock absorber pre-load adjuster lock nut:
44 N·m (4.5 kgf·m, 32 lbf·ft)

SHOCK ABSORBER DISPOSAL PROCEDURE

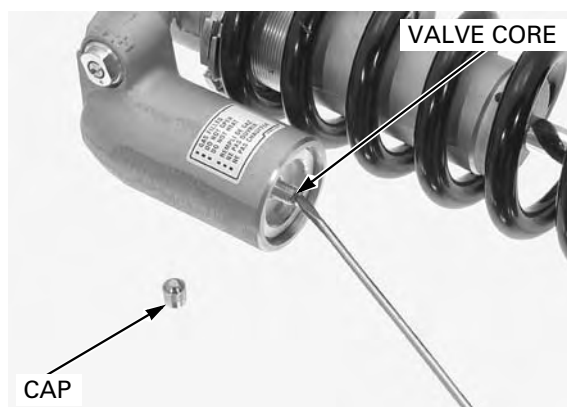
*Do not remove the
valve core until
pressure is
released.*

Remove the shock absorber reservoir valve core cap.

Put on safety glasses, then release the nitrogen from the reservoir by depressing the valve core.

NOTE:

- Point the valve away from you to prevent debris getting in your eyes.
- Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve from the shock absorber reservoir.



NEEDLE BEARING REPLACEMENT

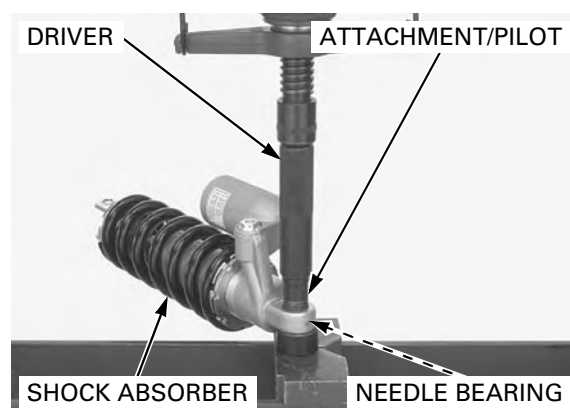
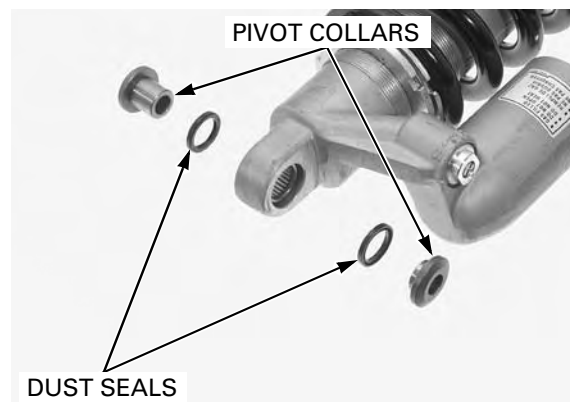
Remove the pivot collars and dust seals.

Set the shock absorber in a hydraulic press.

Press the needle bearing out from the upper joint.

TOOLS:

Driver	07749-0010000
Attachment, 22 x 24 mm	07746-0010800
Pilot, 22 mm	07746-0041000

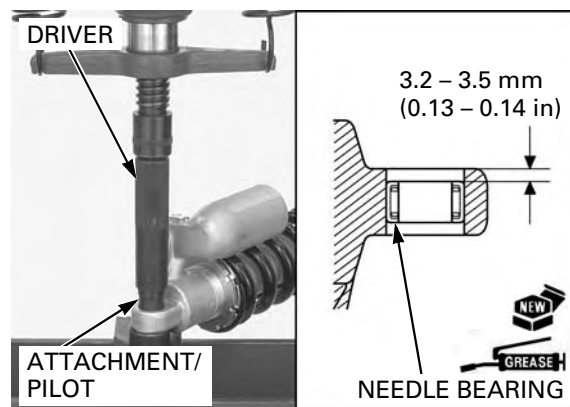


Pack a new needle bearing with specified grease (page 1-18).

Press the needle bearing into the upper joint until the depth from the lower joint surface is 3.2 – 3.5 mm (0.13 – 0.14 in) with the marked side facing up, using the special tool.

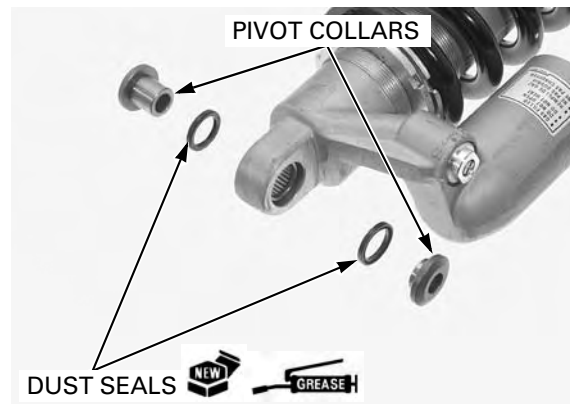
TOOLS:

Driver	07749-0010000
Attachment, 22 x 24 mm	07746-0010800
Pilot, 16 mm	07746-0041300



Apply specified grease to new dust seal lips (page 1-18).

Install new dust seals and pivot collars.



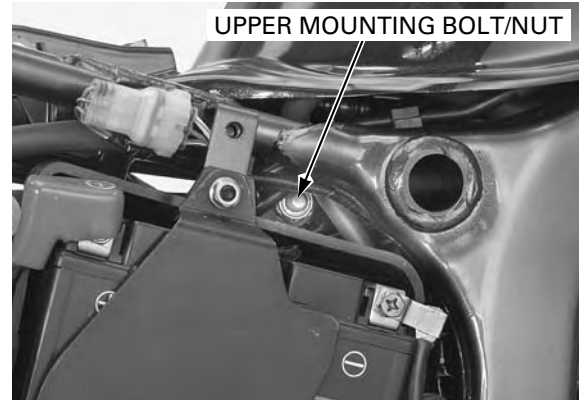
REAR WHEEL/SUSPENSION

INSTALLATION

Install the shock absorber into the frame.

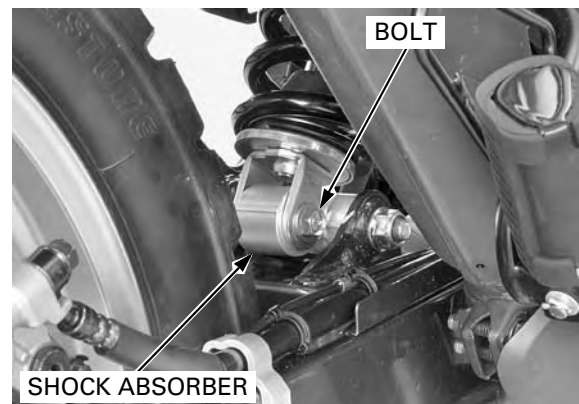
Install the upper mounting bolt and nut.
Tighten the upper mounting nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)

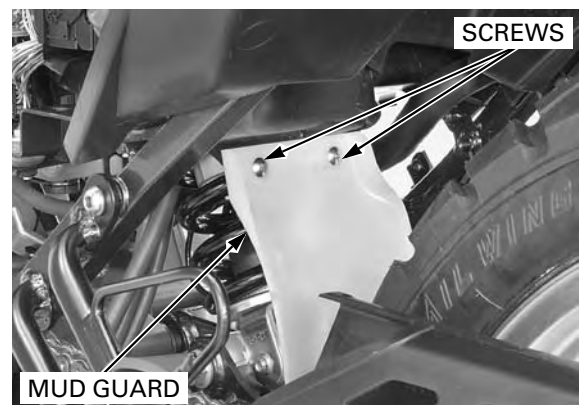


Install and tighten the lower mounting bolt to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)



Install the mud guard and tighten the screws.
Install the side covers (page 2-4).



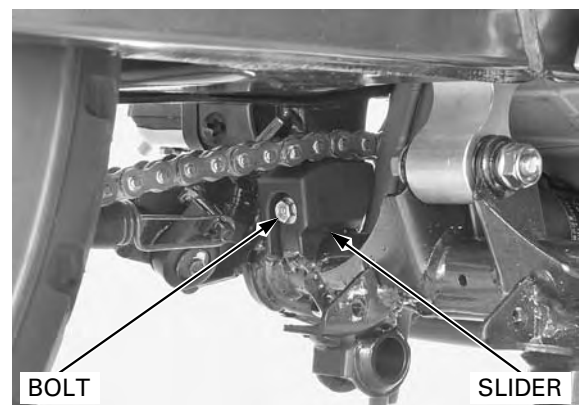
SUSPENSION LINKAGE

REMOVAL

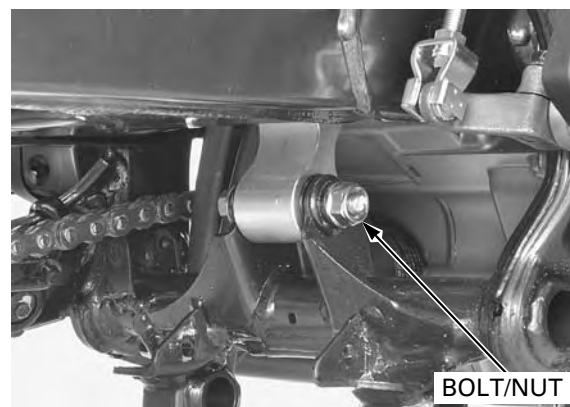
Remove the exhaust system (page 2-14).

Support the motorcycle using a hoist or equivalent,
and raise the rear wheel off the ground.

Remove the bolt and lower drive chain slider.



Remove the cushion connecting rod nut and bolt.



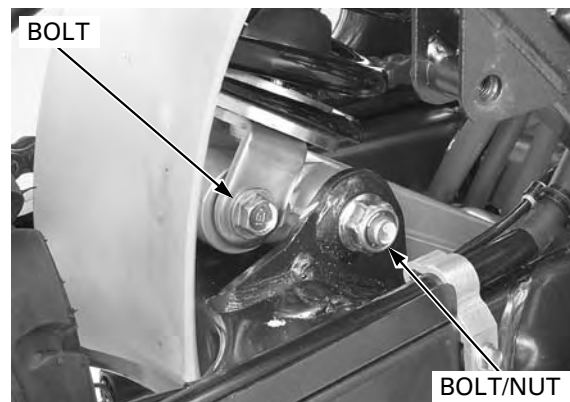
Remove the drive chain slider upper side screw and collar.



Remove the shock absorber lower mounting bolt and cushion arm nut.

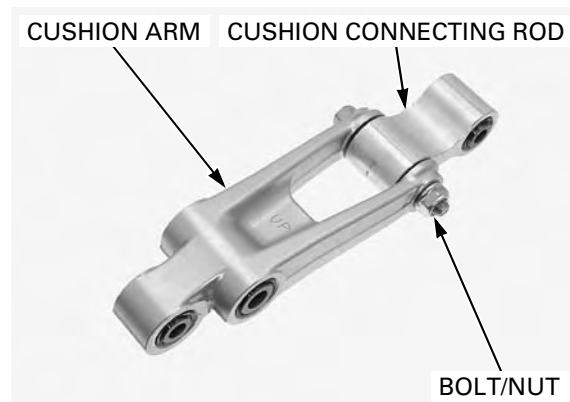
When removing the cushion arm bolt, lift the drive chain slider upper side.

Remove the cushion arm bolt and suspension linkage assembly downward.



DISASSEMBLY

Remove the nut, bolt and cushion connecting rod from the cushion arm.

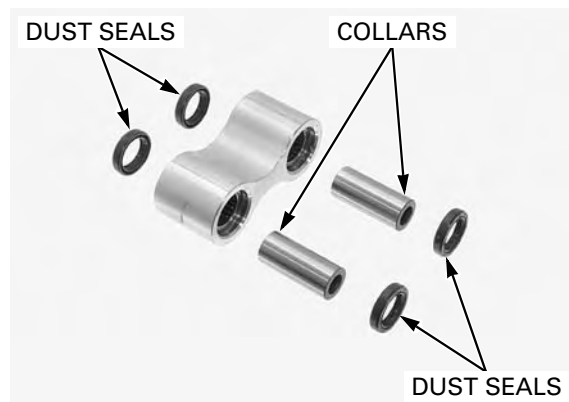


REAR WHEEL/SUSPENSION

BEARING REPLACEMENT

CUSHION CONNECTING ROD

Remove the pivot collars and dust seals.



Press the needle bearings out of the cushion connecting rod using special tools.

TOOLS:

Driver handle

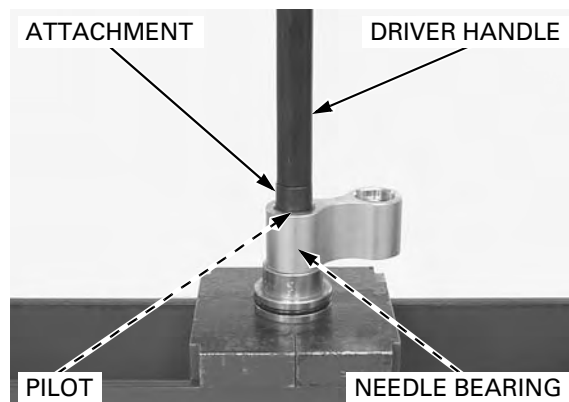
070GD-0010100

Attachment, 22 x 24 mm

07746-0010800

Pilot, 17 mm

07746-0040400



Pack new needle bearings with specified grease (page 1-18).

Press the needle bearing into the cushion connecting rod so that the needle bearing surface is lower 5.3 – 5.7 mm (0.21 – 0.22 in) from the end of the cushion connecting rod using the special tools.

TOOLS:

Driver

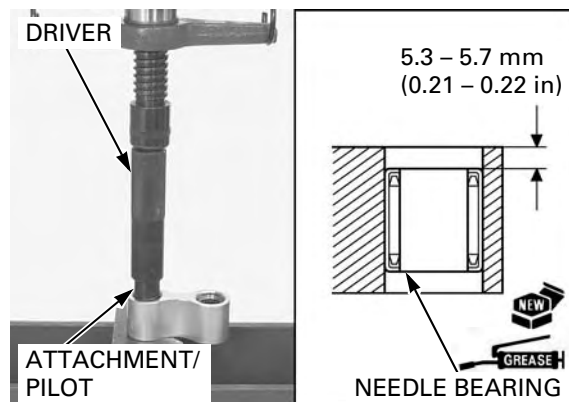
07749-0010000

Attachment, 22 x 24 mm

07746-0010800

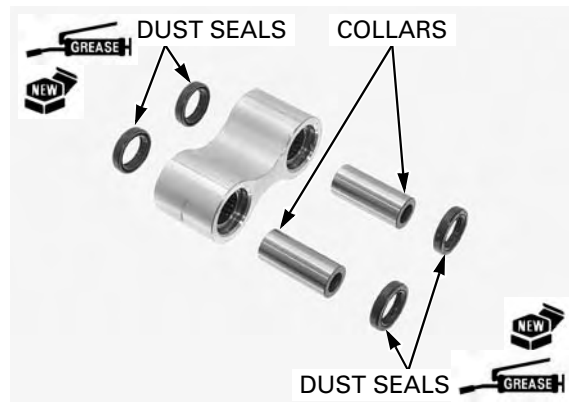
Pilot, 17 mm

07746-0040400



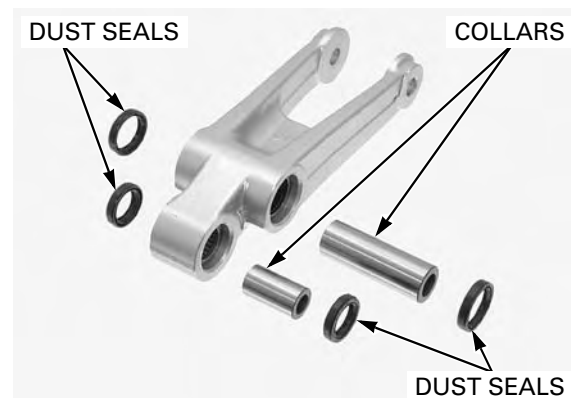
Apply specified grease to new dust seal lips (page 1-18).

Install the dust seals and pivot collars.



CUSHION ARM

Remove the pivot collars and dust seals.



Press the needle bearings out of the cushion arm using the special tools.

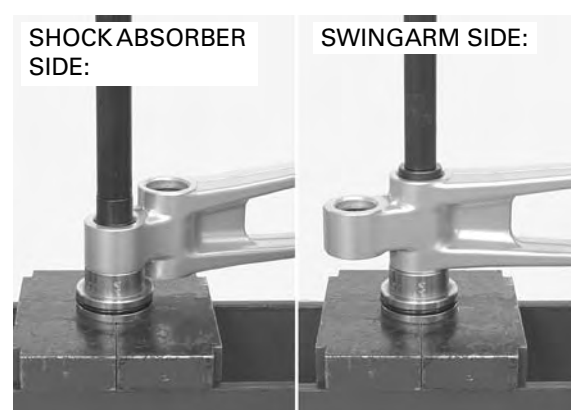
TOOLS:

Shock absorber side:

Driver handle	070GD-0010100
Attachment, 22 x 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

Swingarm side:

Needle bearing pusher	07946-KA50000
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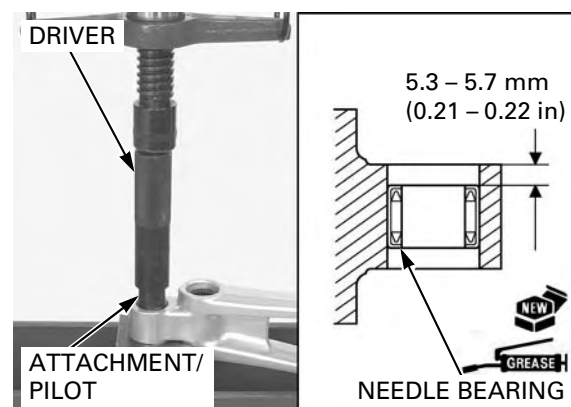


Pack a new needle bearing with specified grease (page 1-18).

Press the shock absorber side needle bearing into the cushion arm so that the needle bearing surface is lower 5.3 – 5.7 mm (0.21 – 0.22 in) from the end of the cushion arm using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 22 x 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

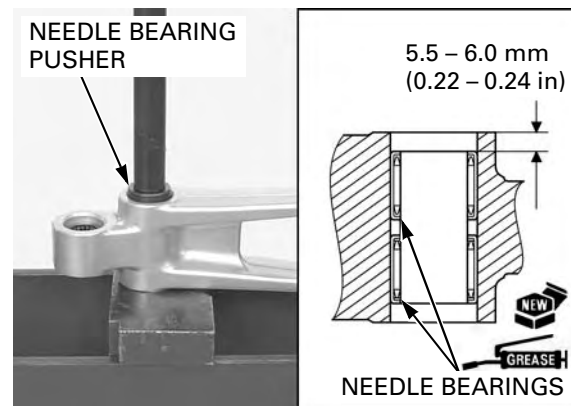


Pack a new needle bearings with specified grease (page 1-18).

Press the swingarm side needle bearings into the cushion arm so that the needle bearings surface are lower 5.5 – 6.0 mm (0.22 – 0.24 in) from the end of the cushion arm using the special tool.

TOOL:

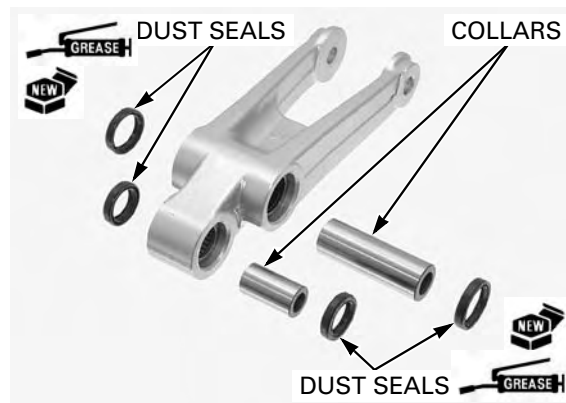
Needle bearing pusher	07946-KA50000
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REAR WHEEL/SUSPENSION

Apply specified grease to new dust seal lips (page 1-18).

Install the dust seals and pivot collars.

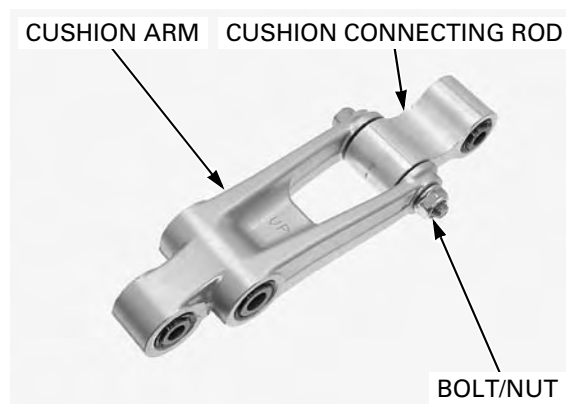


ASSEMBLY

Install the cushion connecting rod, bolt and nut to the cushion arm.

Tighten the nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)



INSTALLATION

When installing the cushion arm bolt, lift the drive chain slider upper side.

Install the suspension linkage assembly with cushion arm "UP" mark facing up.

Install the following:

- Shock absorber lower mounting bolt
- Cushion arm bolt
- Cushion arm nut

Tighten the shock absorber lower mounting bolt and cushion arm nut to the specified torque.

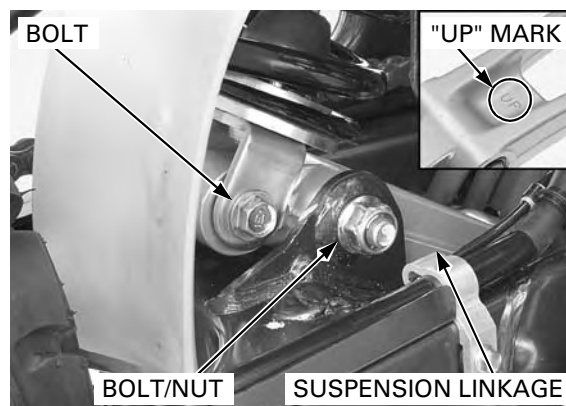
TORQUE:

Shock absorber lower mounting bolt

44 N·m (4.5 kgf·m, 32 lbf·ft)

Cushion arm nut

64 N·m (6.5 kgf·m, 47 lbf·ft)



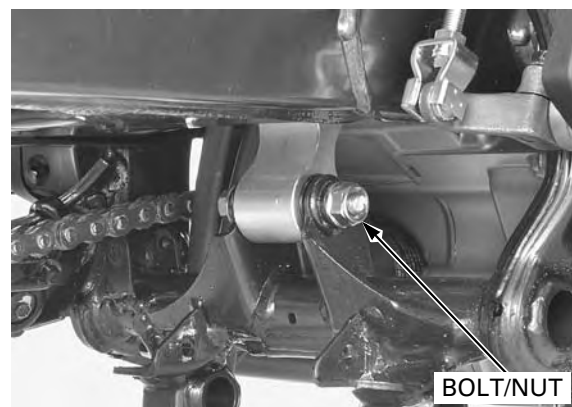
Install the collar and drive chain slider upper side screw.

Tighten the screw to the specified torque.

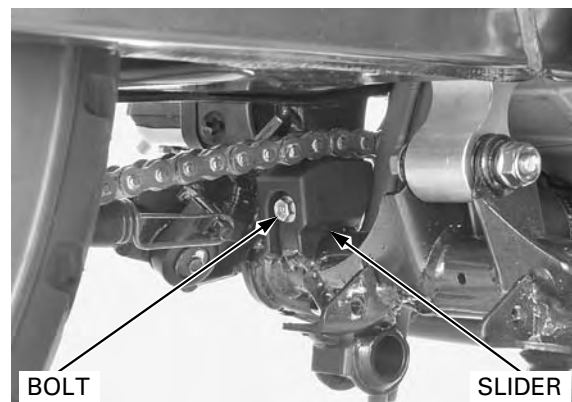
TORQUE: 6 N·m (0.6 kgf·m, 4.4 lbf·ft)



Install the cushion connecting rod bolt and nut.
Tighten the nut to the specified torque.
TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



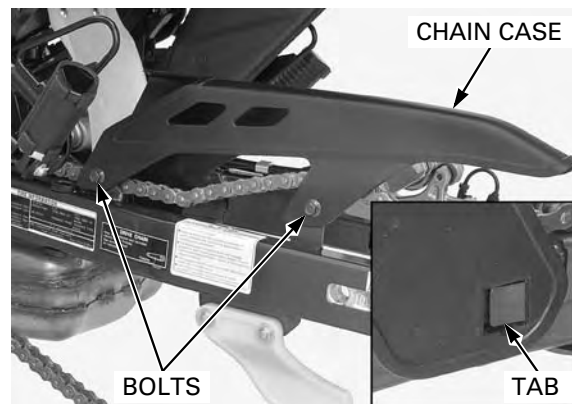
Install the lower drive chain slider and bolt.
Install the exhaust system (page 2-18).



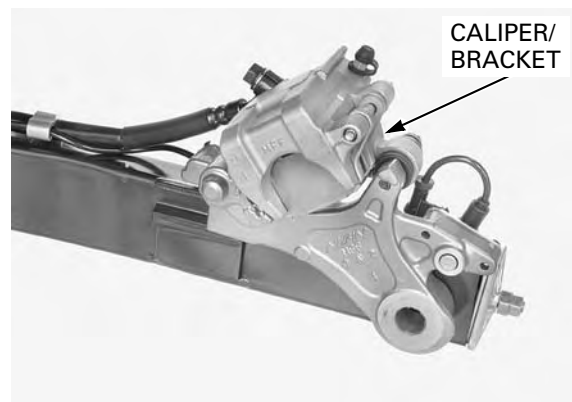
SWINGARM

REMOVAL

Remove the rear wheel (page 14-6).
Remove the bolts and release the tab from the slit, then remove the drive chain case.

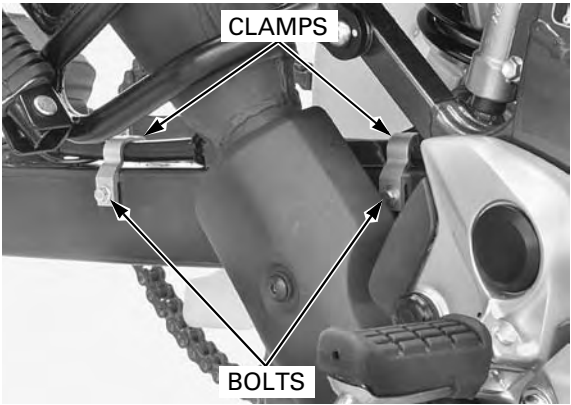


Remove the rear brake caliper/bracket assembly.

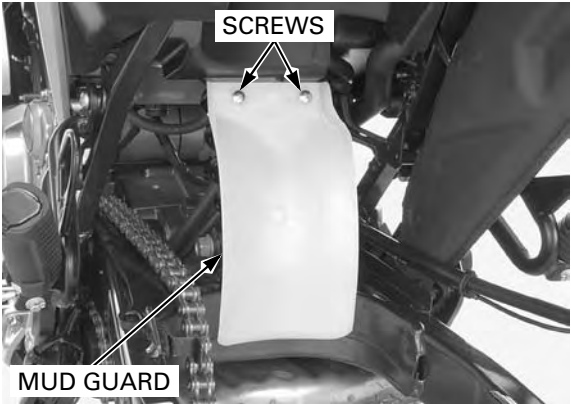


REAR WHEEL/SUSPENSION

Remove the bolts and brake hose clamps.



Remove the screws and mud guard.

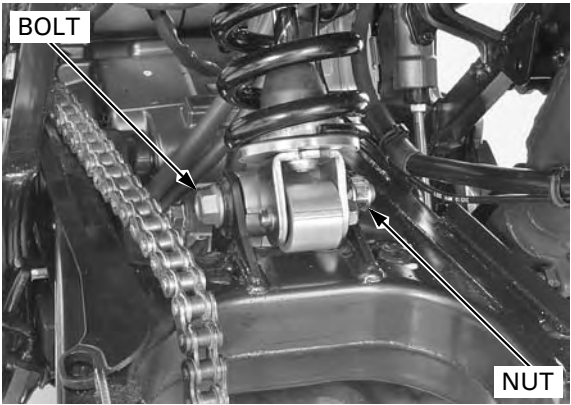


Remove the drive chain slider upper side screw and collar.

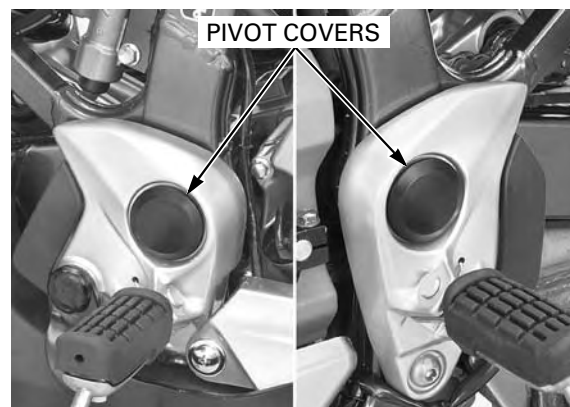


When removing the cushion arm bolt, lift the drive chain slider upper side.

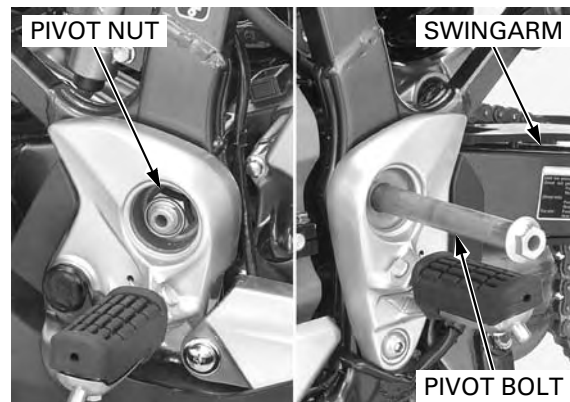
Remove the cushion arm nut and bolt.



Remove the swingarm pivot covers.



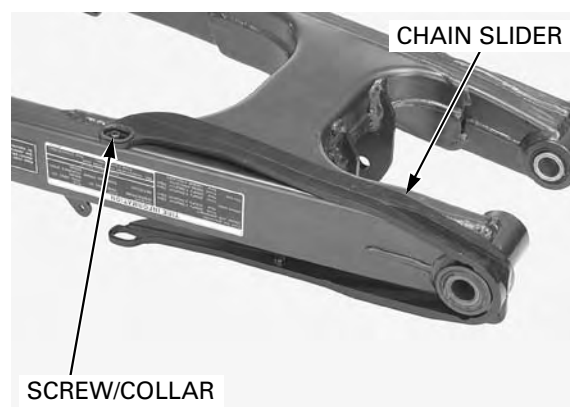
Remove the swingarm pivot nut, swingarm pivot bolt and swingarm.



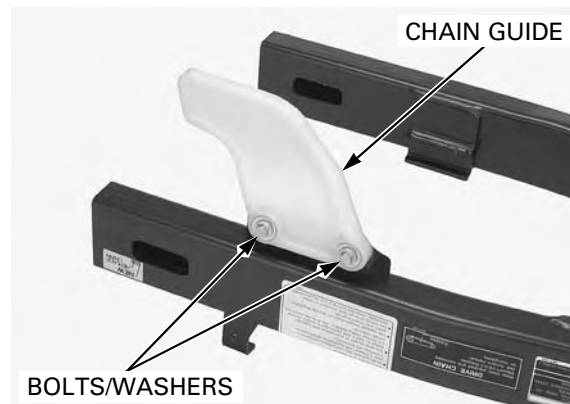
DISASSEMBLY/INSPECTION

Remove the screw, collar and drive chain slider.

Check the drive chain slider for wear or damage (page 3-21).



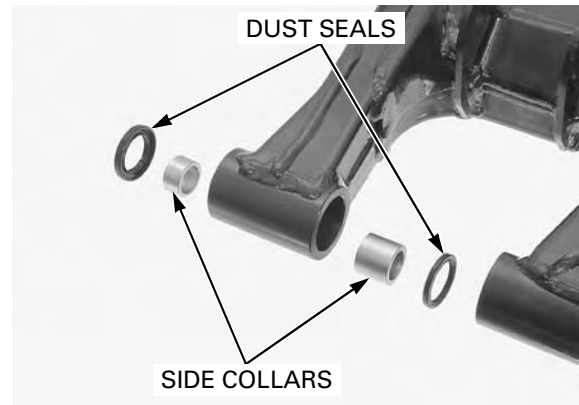
Remove the bolts, washers and drive chain guide.



REAR WHEEL/SUSPENSION

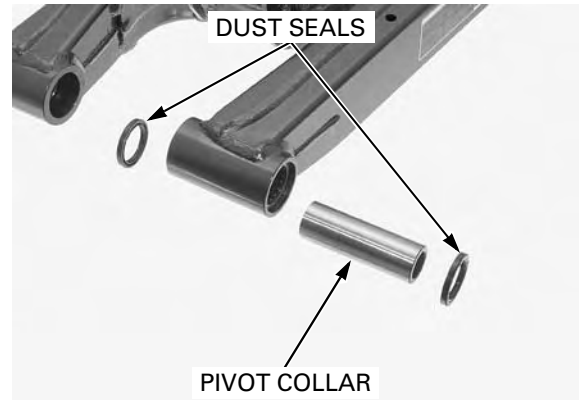
Right side: Remove the side collars and dust seals from the swingarm right side pivot.

Check the dust seals and side collars for damage or fatigue.



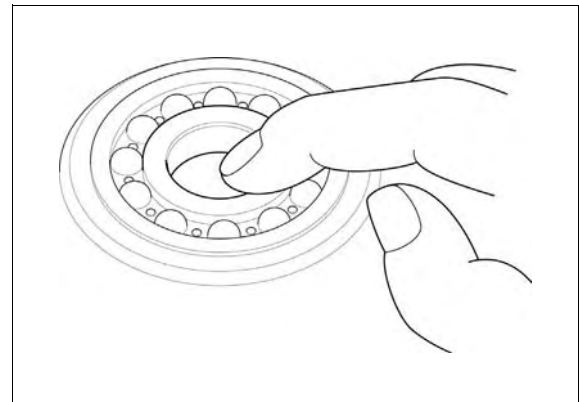
Left side: Remove the pivot collar and dust seals from the swingarm left side pivot.

Check the dust seals and pivot collar for damage or fatigue.



Turn the inner race of the right side pivot ball bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the swingarm pivot.

Remove and discard the bearing if the race does not turn smoothly and quietly, or if it fits loosely in the swingarm pivot.



PIVOT BEARING REPLACEMENT

RIGHT SIDE

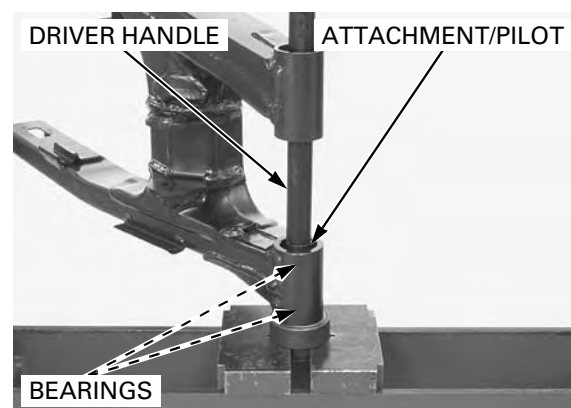
Remove the snap ring from the swingarm right side pivot.



Press the right side pivot bearings and distance collar out of the swingarm pivot using the special tools.

TOOLS:

Driver handle	070GD-0010100
Attachment, 22 x 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400



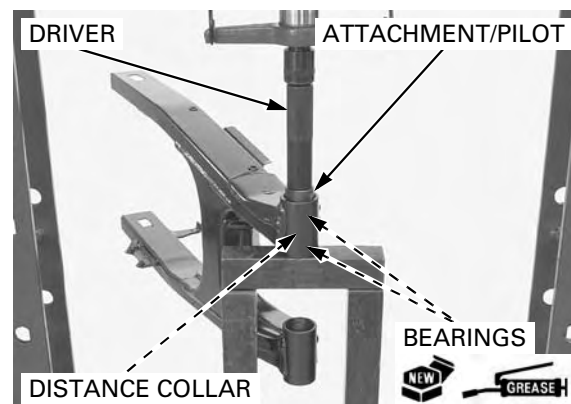
Pack new bearings with specified grease (page 1-18).

Press the inner bearing in right side pivot with the marking side facing up until it seat.

Install the distance collar, then press the outer bearing with the marking side facing up until it seat, using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Pilot, 17 mm	07746-0040400



Install the snap ring into the groove securely.

- Always install the snap ring with the chamfered (rolled) edge facing away from the thrust load.

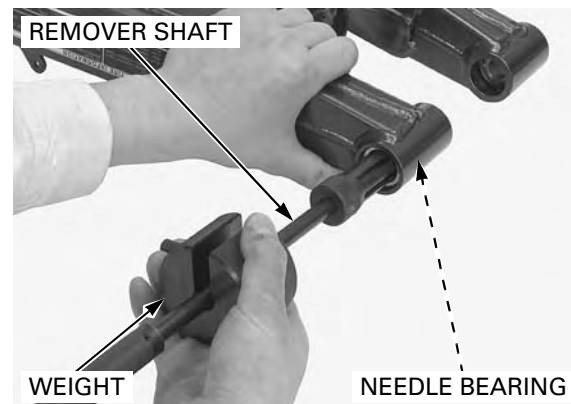


LEFT SIDE

Remove the left side pivot needle bearing using the special tools.

TOOLS:

Bearing remover shaft, 25 mm	07936-ZV10100
Remover weight	07741-0010201



REAR WHEEL/SUSPENSION

Pack new needle bearing with specified grease (page 1-18).
Press the needle bearing in left side pivot with the marking side facing up until the depth from the swingarm outer surface is 4.0 – 4.5 mm (0.16 – 0.18 in), using the special tools.

TOOLS:

Driver

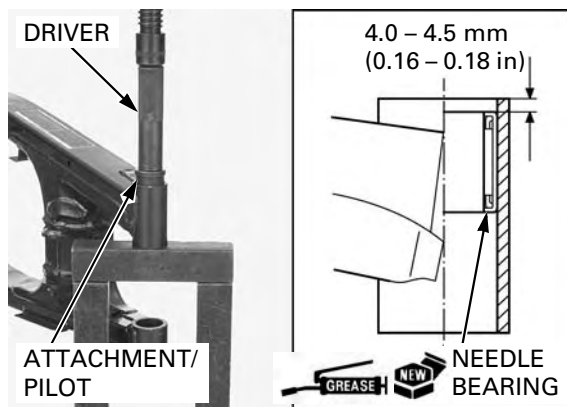
Attachment, 32 x 35 mm

Pilot, 25 mm

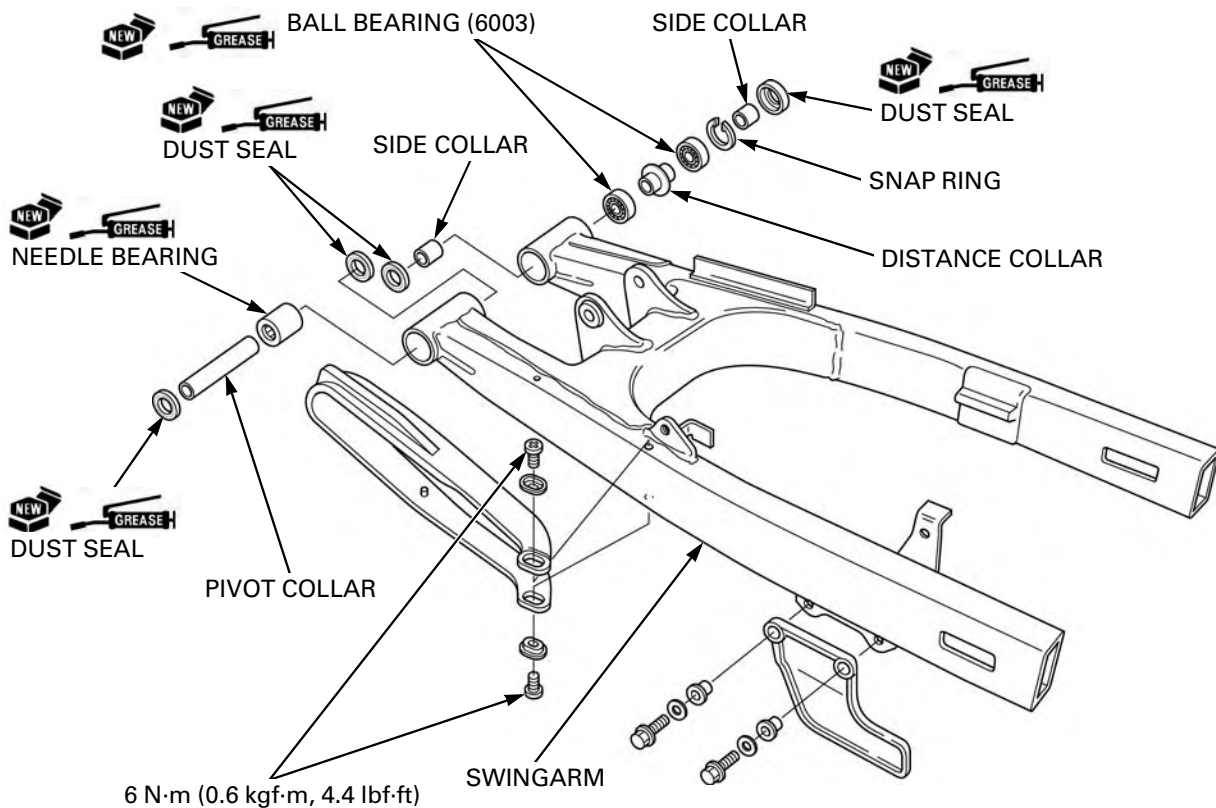
07749-0010000

07746-0010100

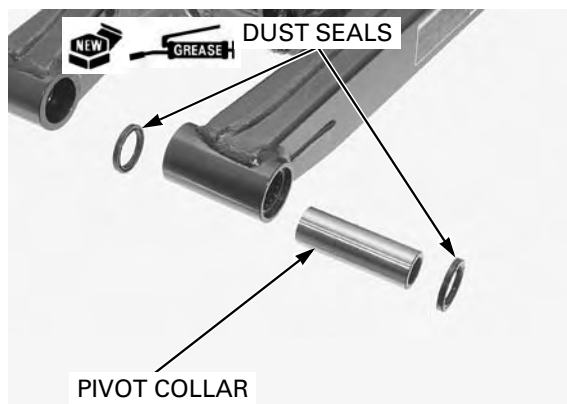
07746-0040600



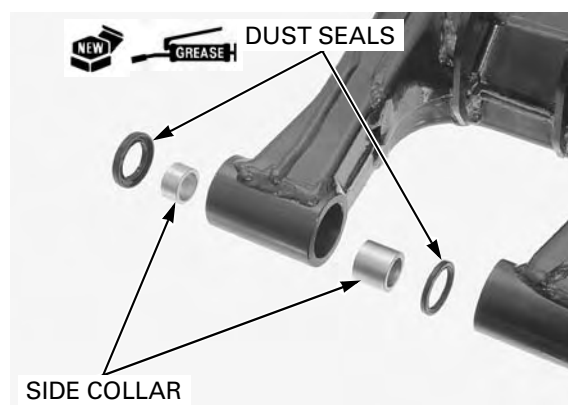
ASSEMBLY



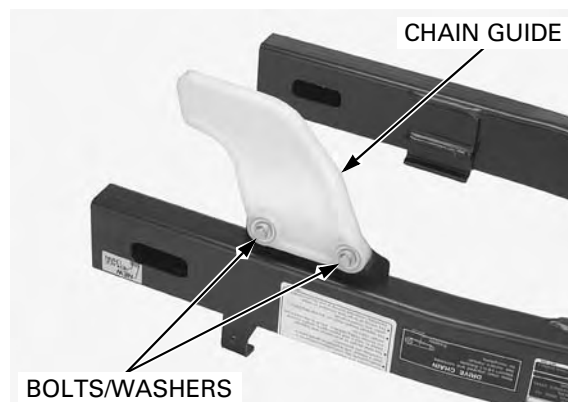
Left side: Apply specified grease to the dust seal lips (page 1-18).
Install new dust seals into the left side pivot.
Install the pivot collar to the left side pivot.



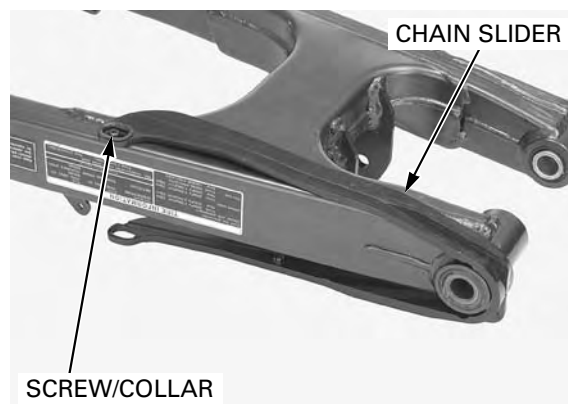
Right side: Apply specified grease to the dust seal lips (page 1-18).
Install new dust seals into the right side pivot.
Install the side collars to the right side pivot.



Install the drive chain guide, washers and bolts.

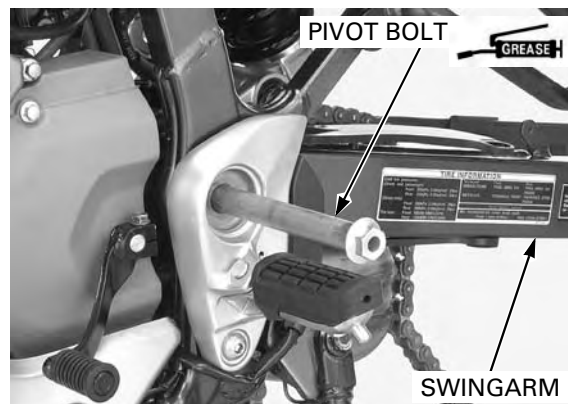


Install the drive chain slider, collar and screw.
Tighten the lower side screw to the specified torque.
TORQUE: 6 N·m (0.6 kgf·m, 4.4 lbf·ft)



INSTALLATION

Apply a thin coat grease to the pivot bolt surface.
Set the swingarm into the frame and hold it.
Install the pivot bolt.

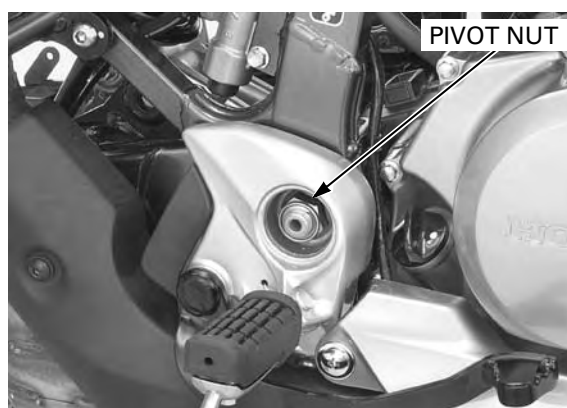


REAR WHEEL/SUSPENSION

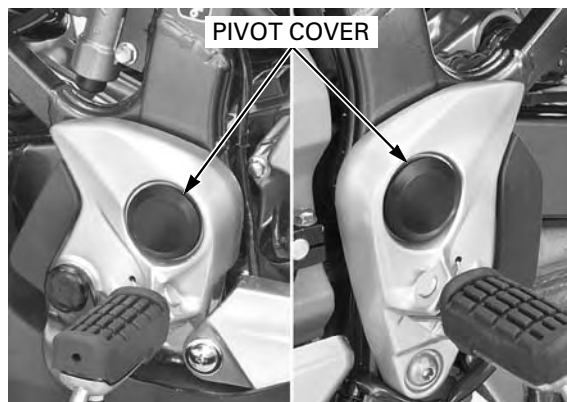
Install the pivot nut.

Tighten the pivot nut to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)



Install the swingarm pivot covers.



When installing the cushion arm bolt, lift the drive chain slider upper side.

Install the cushion arm bolt and nut.

Tighten the nut to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



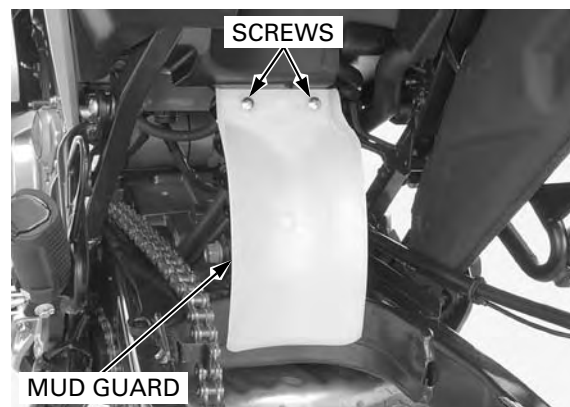
Install the collar and drive chain slider upper side screw.

Tighten the screw to the specified torque.

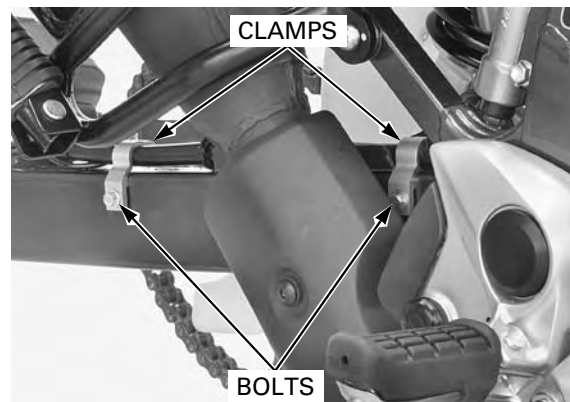
TORQUE: 6 N·m (0.6 kgf·m, 4.4 lbf·ft)



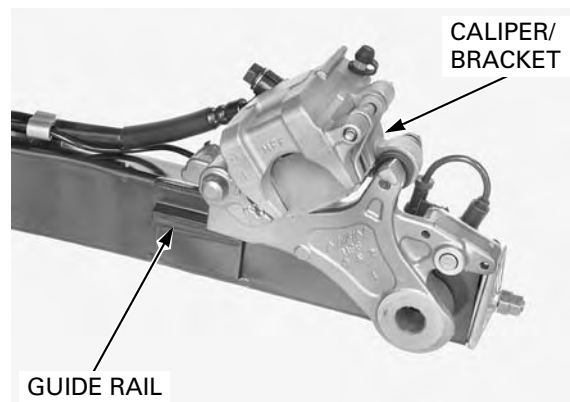
Install the mud guard and tighten the screws.



Install the brake hose clamps and bolts securely.



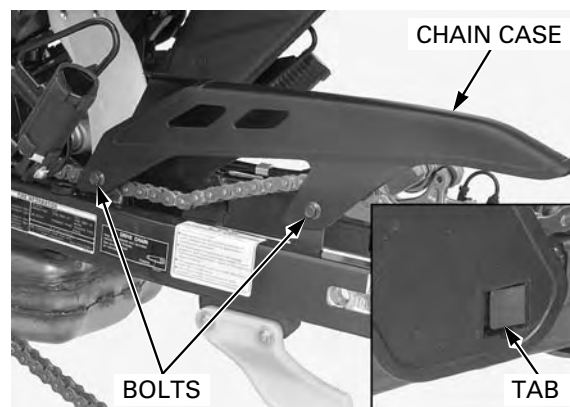
Install the rear brake caliper/bracket onto the guide rail of the swingarm.



Install the drive chain case aligning its slit with the swingarm tab.

Install and tighten the bolts securely.

Install the rear wheel (page 14-13).



MEMO

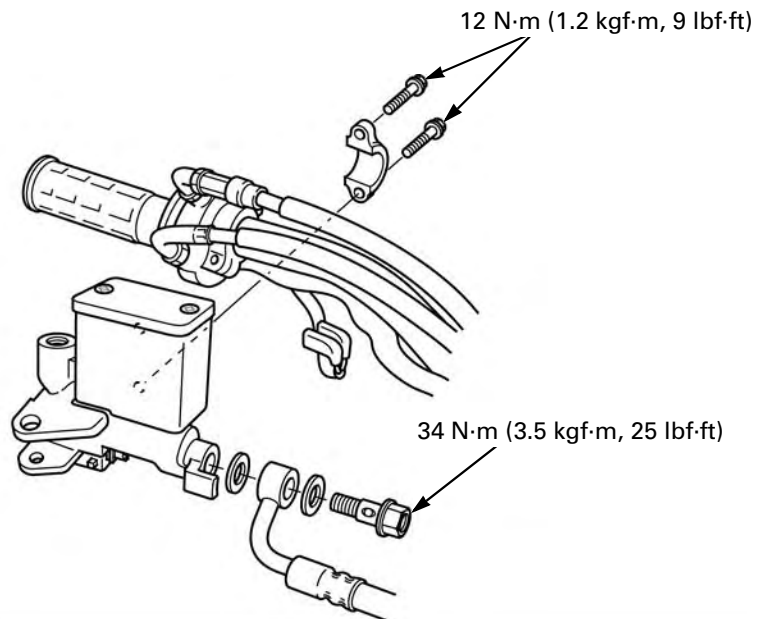
15. HYDRAULIC BRAKE

COMPONENT LOCATION	15-2	FRONT MASTER CYLINDER.....	15-21
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BRAKE FLUID REPLACEMENT/ AIR BLEEDING (XL700VA)	15-11	REAR BRAKE CALIPER	15-41
BRAKE PAD/DISC.....	15-17	BRAKE PEDAL	15-45

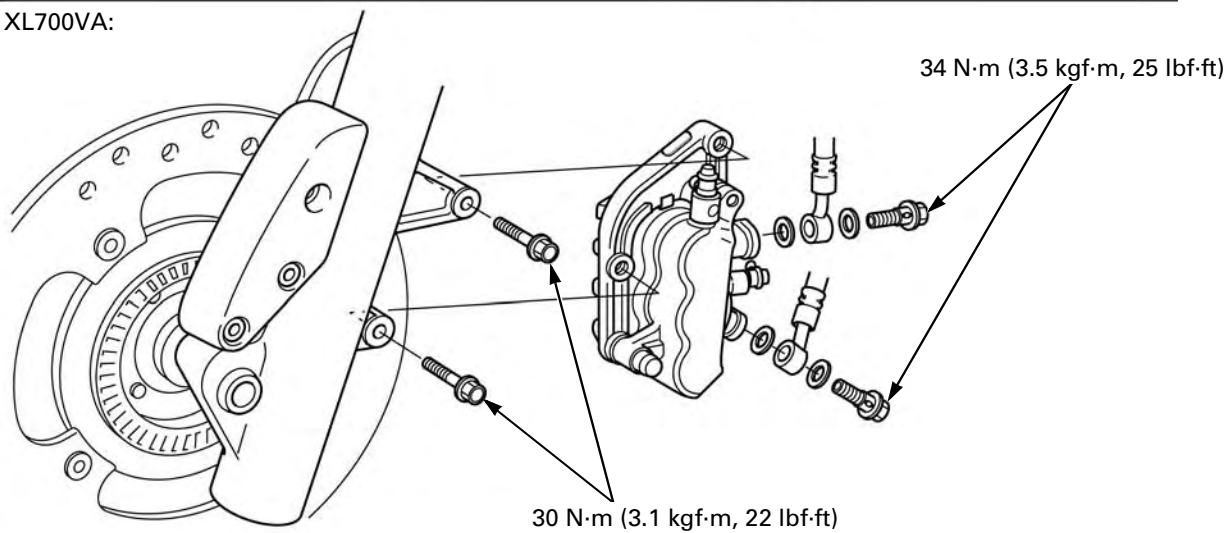
HYDRAULIC BRAKE

COMPONENT LOCATION

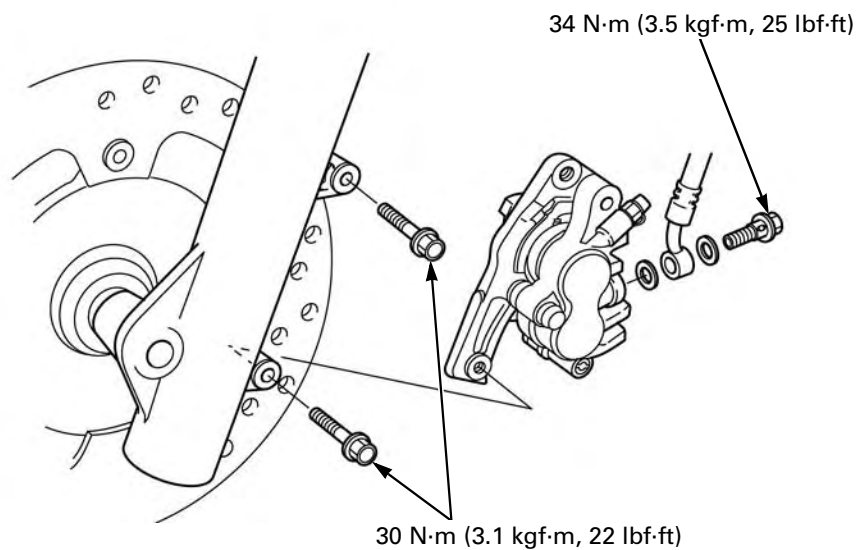
FRONT:



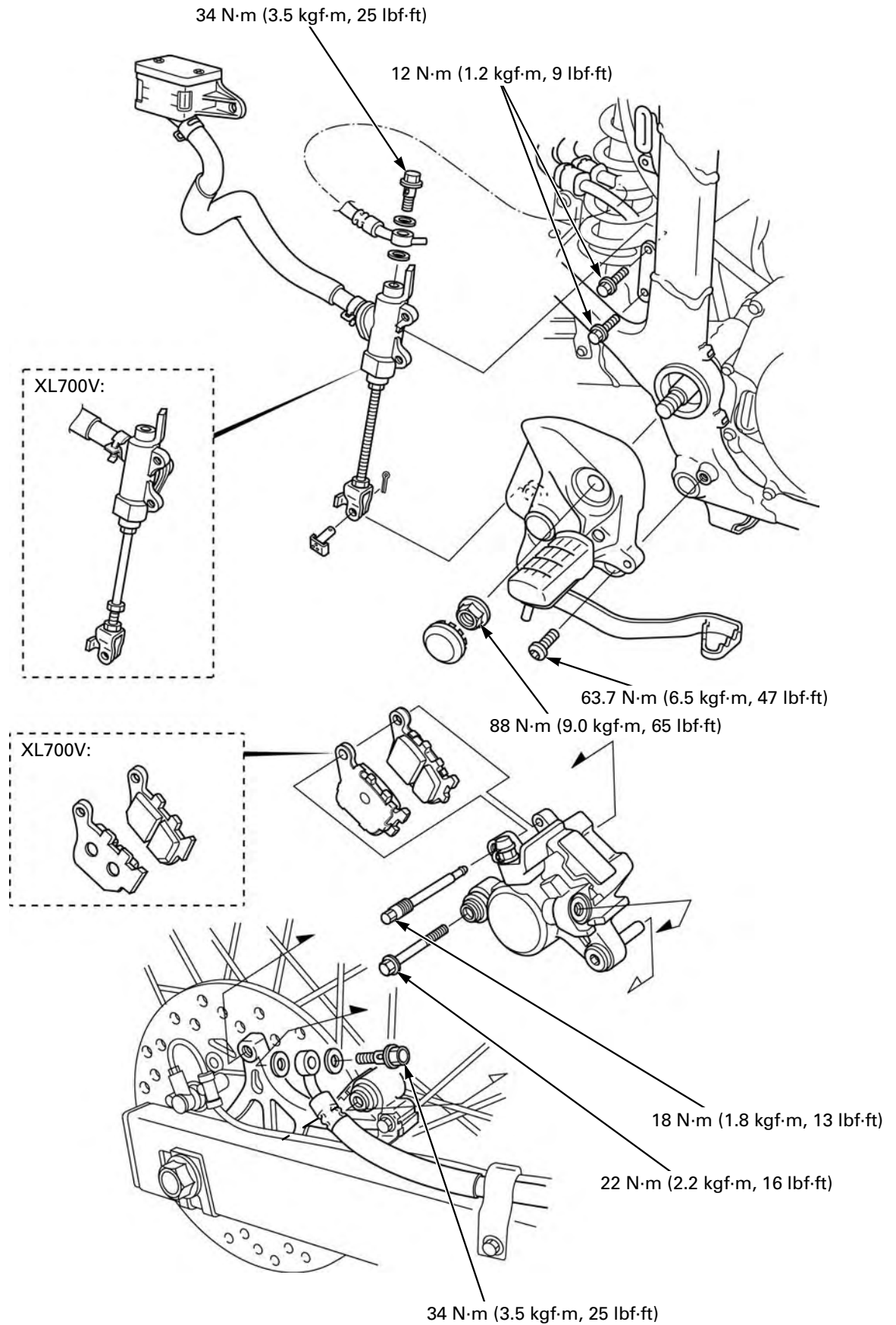
XL700VA:



XL700V:



REAR:



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 front reservoir is horizontal first.

- This section covers service of the conventional brake components of the brake system. For ABS service (page 16-4).
- The brake fluid replacement procedure for the ABS type (XL700VA) should be performed in the same manner as in the ordinal procedure. Note that replacement and bleeding air from the brake fluid in the modulator is not necessary, as it sealed in the modulator.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Never allow contaminants (e.g., dirt, water) to enter 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 as they may not be compatible.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

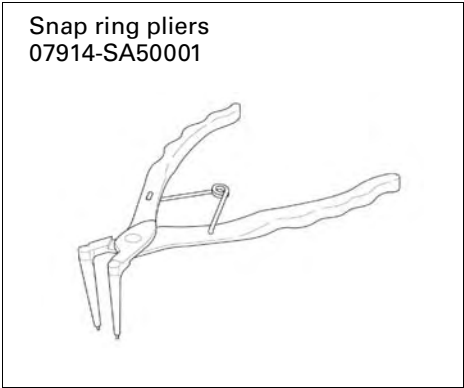
Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Specified brake fluid				DOT 4	–
Front	Brake disc thickness			3.8 – 4.2 (0.15 – 0.17)	3.5 (0.14)
	Brake disc warpage			–	0.30 (0.012)
	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)
	XL700VA	Right caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
			Center	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
			Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
		Left caliper cylinder I.D.	Front	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
			Center	22.650 – 22.700 (0.8917 – 0.8937)	22.712 (0.8942)
			Rear	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
		Right caliper piston O.D.	Front	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
			Center	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
			Rear	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
	Left caliper piston O.D.	Front	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)	
		Center	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)	
		Rear	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)	
XL700V	Caliper cylinder I.D.		27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)	
	Caliper piston O.D.		26.918 – 26.968 (1.0598 – 1.0617)	26.910 (1.0594)	
Rear	Brake disc thickness			5.8 – 6.2 (0.23 – 0.24)	5.0 (0.20)
	Brake disc warpage			–	0.30 (0.012)
	XL700VA	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
		Master piston O.D.		17.417 – 17.444 (0.6857 – 0.6848)	17.405 (0.6852)
	XL700V	Master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
		Master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Caliper cylinder I.D.			38.180 – 38.230 (1.5031 – 1.5051)	38.240 (1.5055)
	Caliper piston O.D.			38.098 – 38.148 (1.4999 – 1.5019)	38.090 (1.4996)

TORQUE VALUES

Brake caliper bleed valve	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)	
Front/rear master cylinder reservoir cap screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Brake pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Front brake pad pin plug screw (STD type)	2.5 N·m (0.3 kgf·m, 1.8 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Brake pipe joint nut	14 N·m (1.4 kgf·m, 10 lbf·ft)	Apply brake fluid to the threads.
Brake lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake lever pivot nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Front brake light switch screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper bracket pin bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent.
Rear master cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear brake reservoir joint screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	Apply locking agent.
Rear master cylinder push rod lock nut	18 N·m (1.8 kgf·m, 1.3 lbf·ft)	
Front brake caliper pin bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent.
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt; replace with a new one.
Rear brake caliper mounting bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	ALOC bolt; replace with a new one.
Rear brake caliper pin bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Step holder bolt	63.7 N·m (6.5 kgf·m, 47 lbf·ft)	
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut

TOOL



TROUBLESHOOTING

Brake lever soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seals
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master piston
- Contaminated master cylinder
- Bent brake lever/pedal

Brake lever/pedal hard

- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master piston
- Bent brake lever/pedal

Brake drag

- Contaminated brake pad/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

Rear wheel locks when only the brake lever is applied/Front wheel locks when only the brake pedal is applied (in the case that all items are normal in "Poor lever/pedal brake performance")

- Faulty PCV

BRAKE FLUID REPLACEMENT/AIR BLEEDING (XL700V)

NOTE:

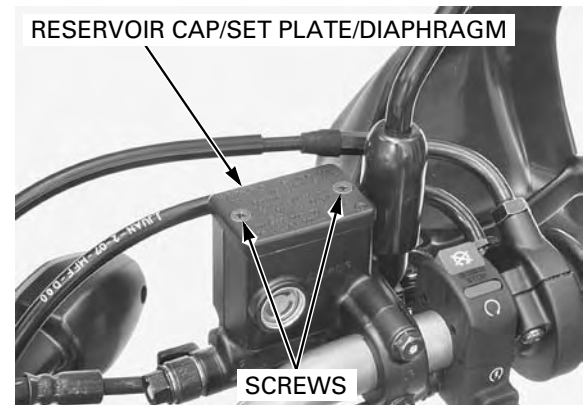
- Do not allow foreign material to enter the system when filling the reservoir.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

BRAKE FLUID DRAINING

LEVER BRAKE LINE

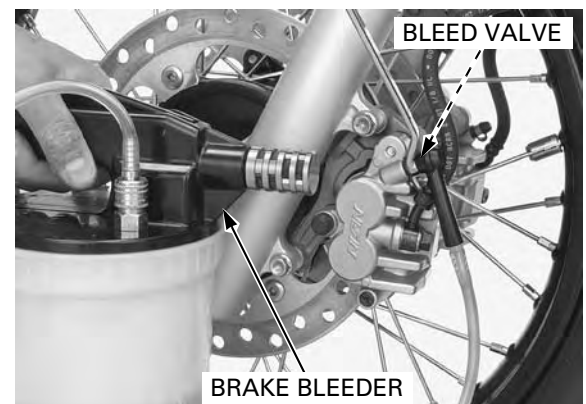
Turn the handlebar until the front master cylinder reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws and reservoir cap.
Remove the set plate and diaphragm.



Connect a commercially available brake bleeder to the front brake caliper bleed valve.

Loosen the bleed valve and operate a air bleed tool.
Drain the brake fluid.

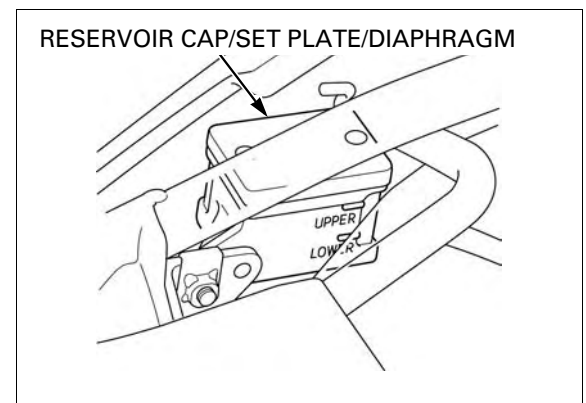


PEDAL BRAKE LINE

Remove the seat (page 2-4).

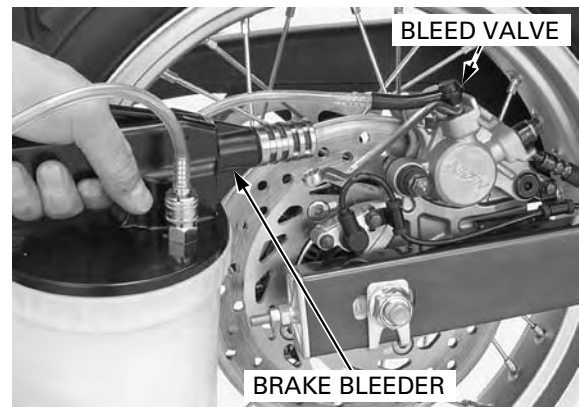
Remove the screws and reservoir cap.

Remove the diaphragm plate and diaphragm.



HYDRAULIC BRAKE

Connect a commercially available brake bleeder to the rear brake caliper bleed valve.
Loosen the bleed valve and operate a air bleed tool.
Drain the brake fluid.



BRAKE FLUID FILLING/BLEEDING

LEVER BRAKE LINE

Fill the reservoir with DOT 4 brake fluid from a sealed container.

NOTE:

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid since they are not compatible.

Connect a commercially available brake bleeder to the front brake caliper bleed valve.

Operate the brake bleeder and loosen the bleed valve.

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 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.

Close the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Perform the bleeding procedure until the system is completely flushed/bled.

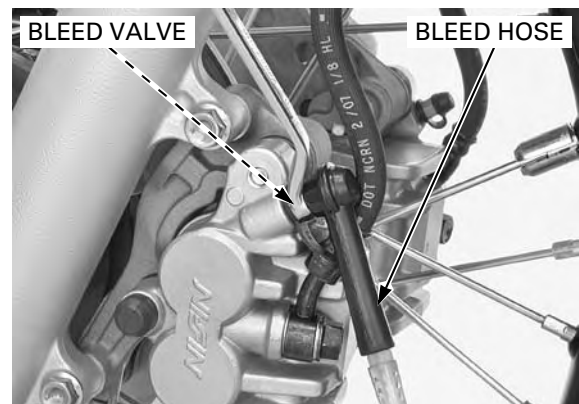
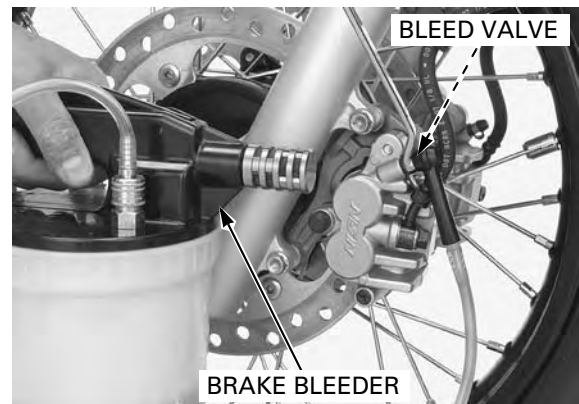
Operate the brake lever. If it is still spongy, bleed the system again.

If a brake bleeder is not available, use the following procedure:

Fill the reservoir with DOT 4 brake fluid from a sealed container.

Connect a bleed hose to the front brake caliper bleed valve.

Pressurize the system with the brake lever until lever resistance is felt.



1. Squeeze the brake lever, open the bleed valve 1/4 turn and then close it.
2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

NOTE:

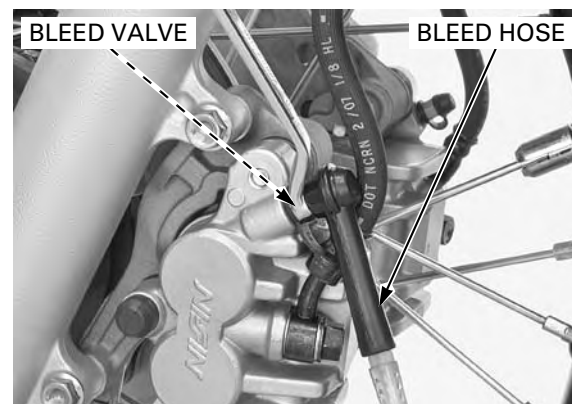
- Do not release the lever until the bleed valve has been closed.



Repeat steps 1 and 2 until air bubbles do not appear in the bleed hose.

After bleeding the air completely, tighten the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

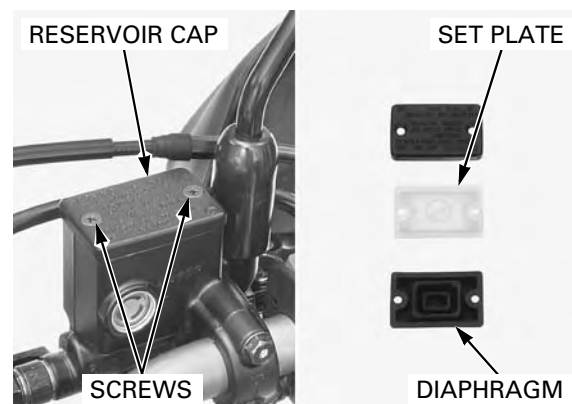


Fill the reservoir to the upper level line with DOT 4 brake fluid.

Install the diaphragm and set plate.

Install the reservoir cap and tighten the screws to the specified torque.

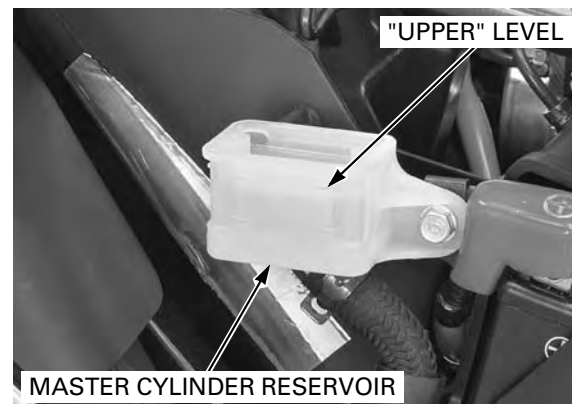
TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)



PEDAL BRAKE LINE

Fill the reservoir with DOT 4 brake fluid from a sealed container.

Operate the brake pedal several times to bleed any air from the master cylinder.



HYDRAULIC BRAKE

Connect a commercially available brake bleeder to the rear caliper bleed valve.

NOTE:

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.
1. Pump the brake bleeder and loosen the 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 bleed valve.

It is not problem if the fluid flowing out from the bleed valve contains air bubbles because the lines will be bled later.

If a brake bleeder is not available, perform the following procedure.

Connect a commercially available brake bleeder to the rear caliper bleed valve.

1. Pump the brake pedal several times quickly, then push the brake pedal all the way down, loosen the bleed valve and 1/4 of a turn. Wait several seconds and close the bleed valve. Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.
2. Repeat the above procedures until air bubbles do not appear in the transparent hose.

Connect a bleed hose to the rear caliper bleed valve. Repeat step 1 and 2 for the rear caliper bleed valve.

Note that you may feel strong resistance on the rear brake pedal during pumping when bleeding air from the caliper. Be sure to apply the brake pedal fully.

Tighten the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

After there are no more air bubbles in the fluid, repeat the air bleeding procedure about two or three times at bleed valve.

Make sure the bleed valve are closed and operate the brake pedal. If it still feels spongy, bleed the system again.

After bleeding the air completely, tighten the bleed valves to the specified torque.

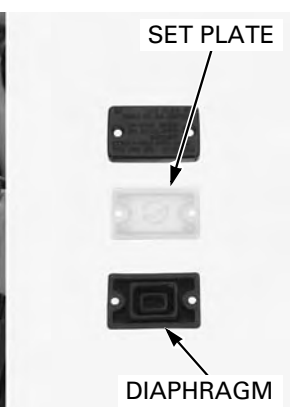
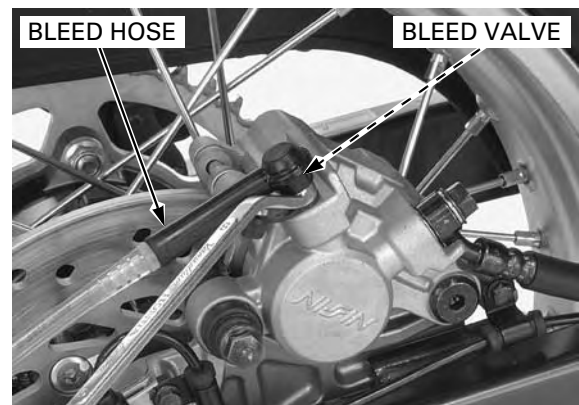
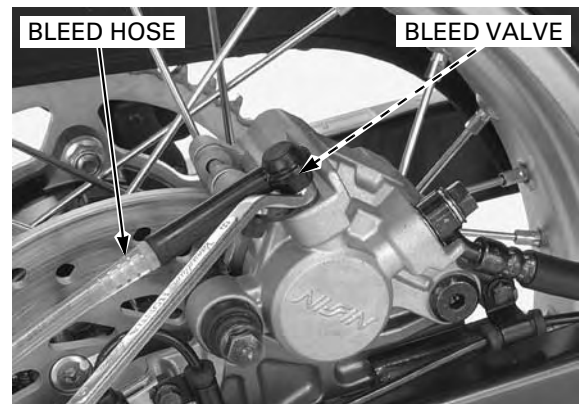
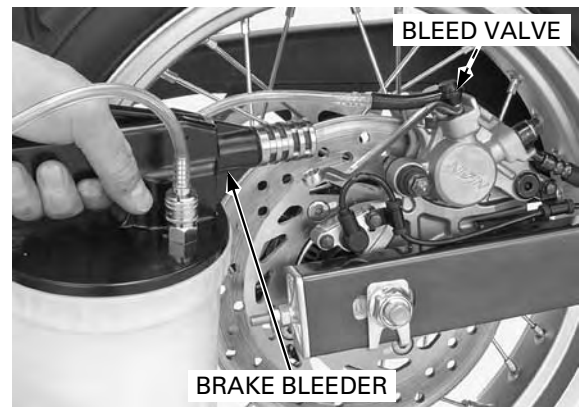
TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Fill the reservoir to the "UPPER" level with DOT4 brake fluid to the upper level.

Install the diaphragm, set plate and reservoir cap.

Install and tighten the reservoir cap screws to the specified torque.

TORQUE: 1.5 N·m (0.2 kgf·m, 1.10 lbf·ft)



BRAKE FLUID REPLACEMENT/AIR BLEEDING (XL700VA)

NOTE:

- Do not allow foreign material to enter the system when filling the reservoir.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

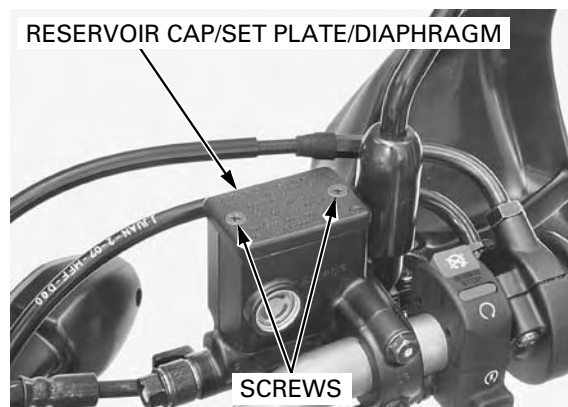
BRAKE FLUID DRAINING

LEVER BRAKE LINE

Turn the handlebar until the front master cylinder reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws and reservoir cap.

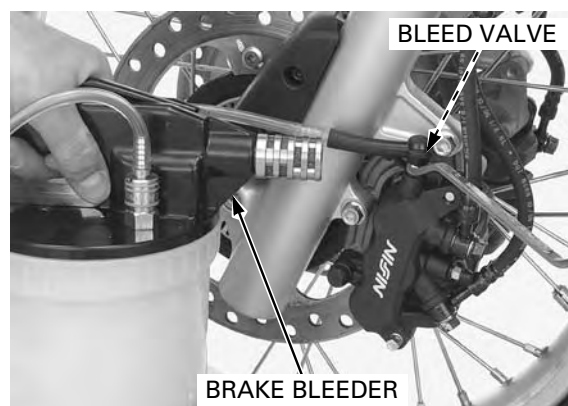
Remove the set plate and diaphragm.



Left side: Connect the bleed hose to the upper bleed valve.

Connect a commercially available brake bleeder to the front brake caliper bleed valve.

Loosen the bleed valve and operate a air bleed tool. Drain the brake fluid.

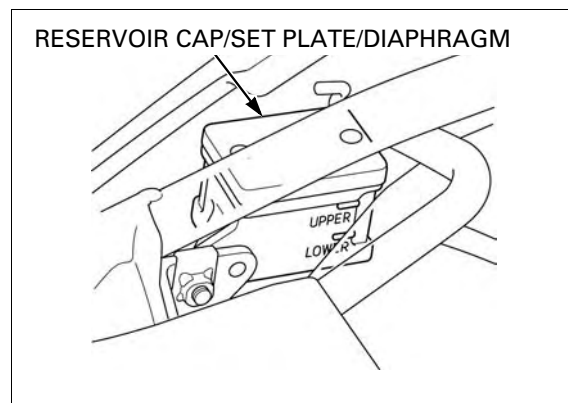


PEDAL BRAKE LINE

Remove the seat (page 2-4).

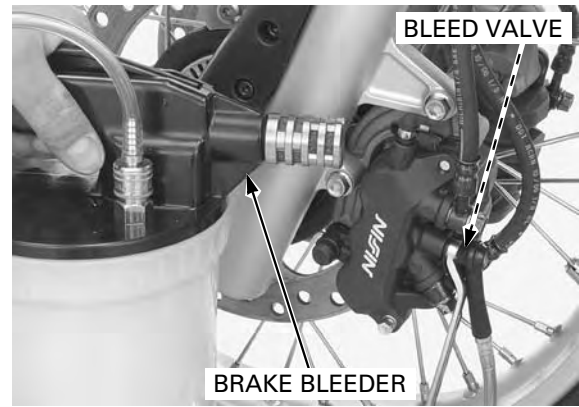
Remove the screws and reservoir cap.

Remove the diaphragm plate and diaphragm.

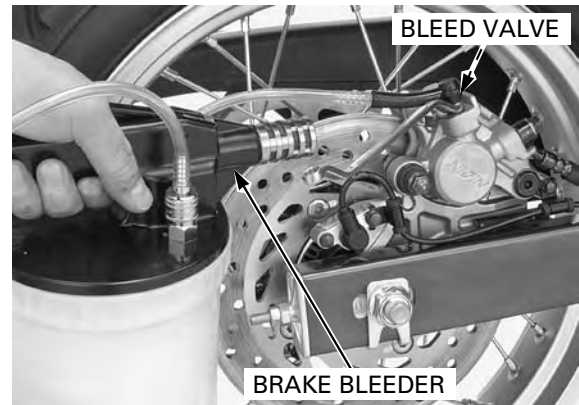


HYDRAULIC BRAKE

Connect a commercially available brake bleeder to the left front brake caliper lower bleed valve. Loosen the bleed valve and operate a air bleed tool. Drain the brake fluid.

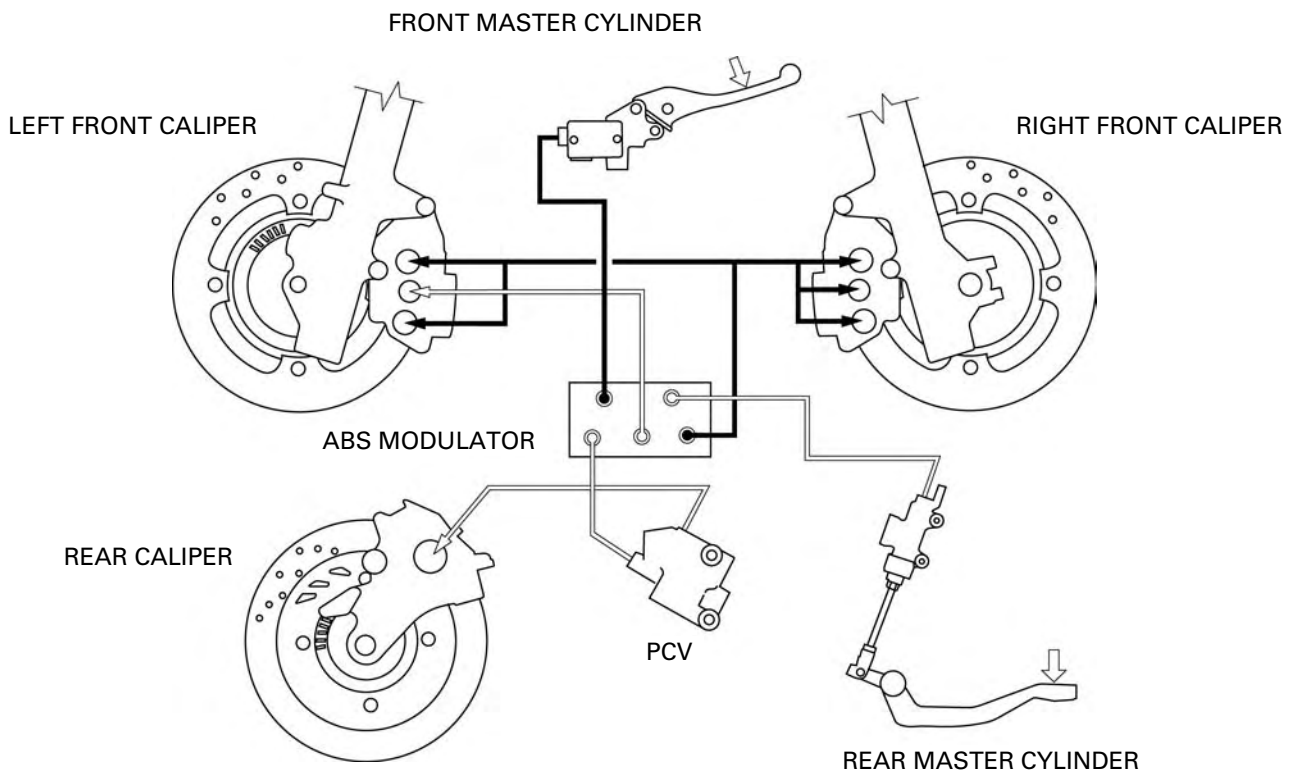


Connect a commercially available brake bleeder to the rear brake caliper bleed valve. Loosen the bleed valve and operate a air bleed tool. Drain the brake fluid.



BRAKE FLUID FILLING/BLEEDING

BRAKE FLUID LINE



LEVER BRAKE LINE

Fill the reservoir with DOT 4 brake fluid from a sealed container.

NOTE:

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid since they are not compatible.

Left side: Connect the bleed hose to the upper bleed valve.

Connect a commercially available brake bleeder to the front brake caliper bleed valve.

Operate the brake bleeder and loosen the bleed valve.

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 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.

Close the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Perform the bleeding procedure until the system is completely flushed/bled.

Operate the brake lever. If it is still spongy, bleed the system again.

If a brake bleeder is not available, use the following procedure:

Fill the reservoir with DOT 4 brake fluid from a sealed container.

Left side: Connect the bleed hose to the upper bleed valve.

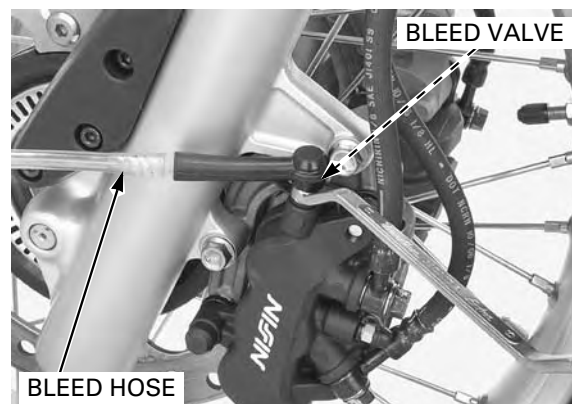
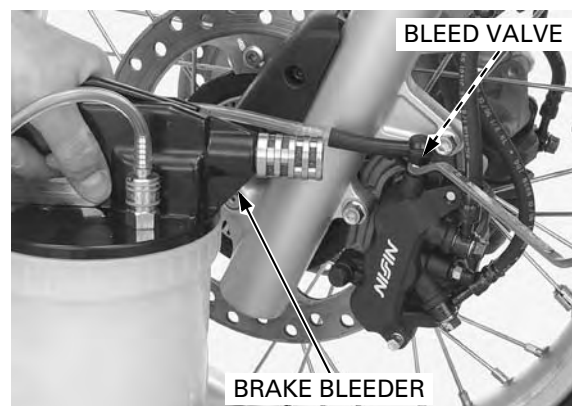
Connect a bleed hose to the front brake caliper bleed valve.

Pressurize the system with the brake lever until lever resistance is felt.

1. Squeeze the brake lever, open the bleed valve 1/4 turn and then close it.
2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

NOTE:

- Do not release the lever until the bleed valve has been closed.

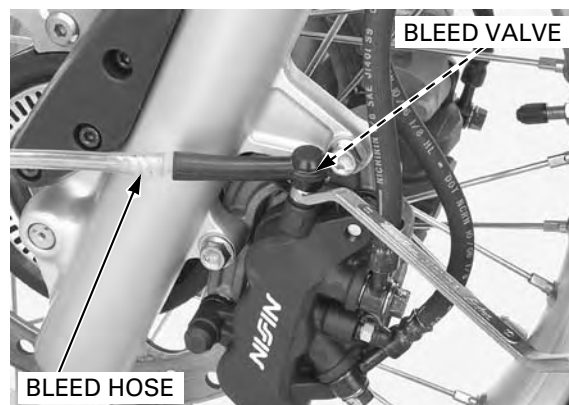


HYDRAULIC BRAKE

Repeat steps 1 and 2 until air bubbles do not appear in the bleed hose.

After bleeding the air completely, tighten the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

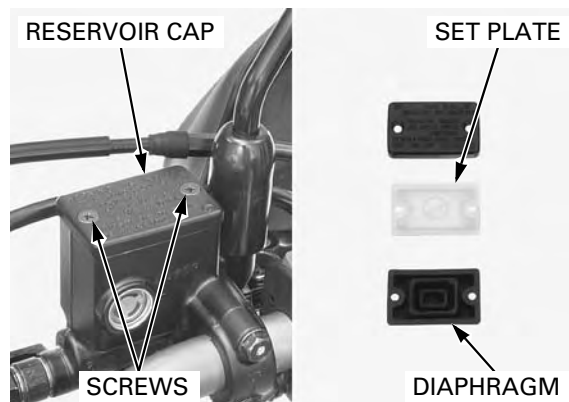


Fill the reservoir to the upper level line with DOT 4 brake fluid.

Install the diaphragm and set 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)



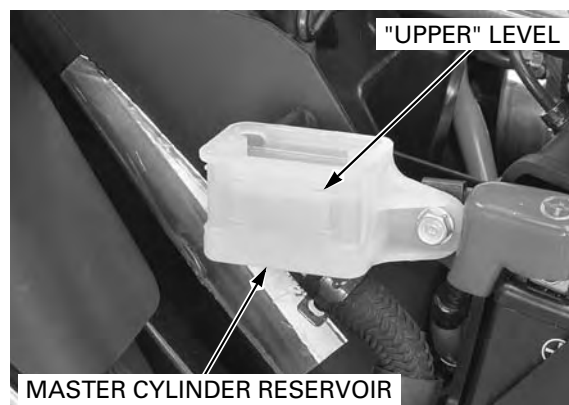
PEDAL BRAKE LINE

Add fluid and bleed any air from the brake pedal line in the sequence as follow:

1. Left front brake caliper lower bleed valve
2. Rear caliper bleed valve

Fill the reservoir with DOT 4 brake fluid from a sealed container.

Operate the brake pedal several times to bleed any air from the master cylinder.

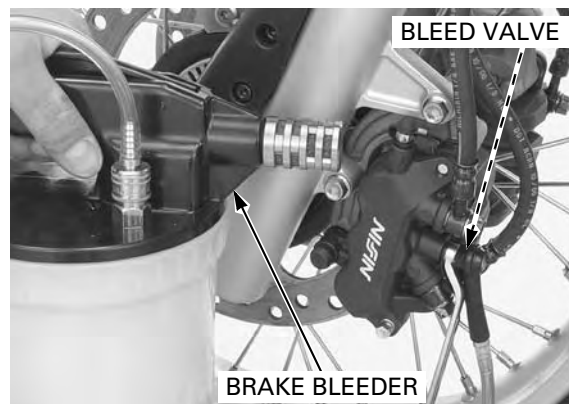


Connect a commercially available brake bleeder to the left front caliper lower bleed valve.

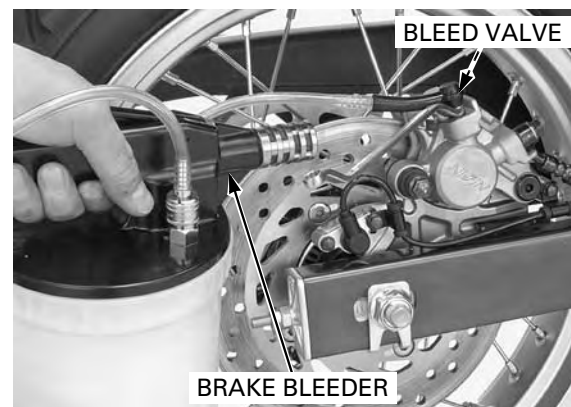
NOTE:

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.
1. Pump the brake bleeder and loosen the left front 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 left front caliper lower bleed valve.

It is not problem if the fluid flowing out from the lower bleed valve contains air bubbles because the lines will be bled later.



Connect a commercially available brake bleeder to the rear caliper bleed valve.
Repeat step 1 and 2 for rear caliper bleed valve.
Bleed the hydraulic system.



If a brake bleeder is not available, perform the following procedure.

Connect a bleed hose to the left front caliper lower bleed valve.

1. Pump the brake pedal several times quickly, then push the brake pedal all the way down, loosen the left front caliper lower bleed valve and loosen the bleed valve 1/4 of turn.

Wait several seconds and close the bleed valve

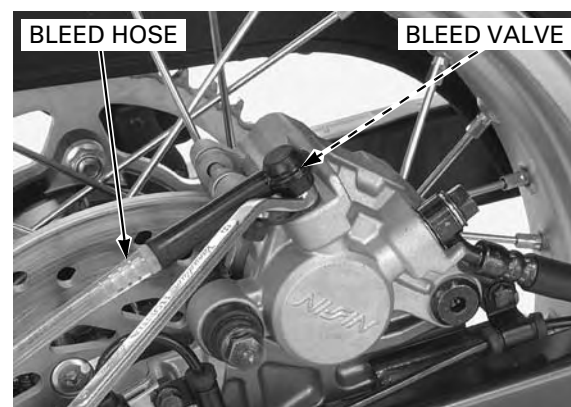
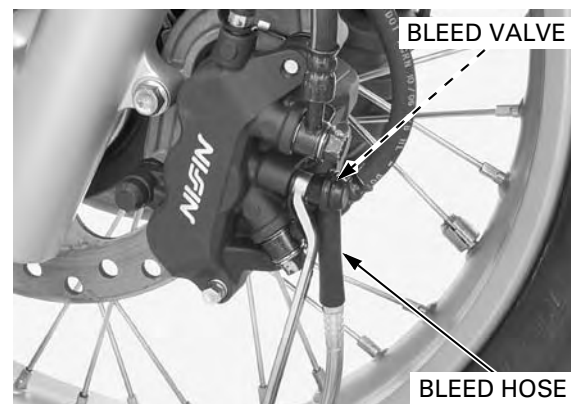
Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.

NOTE:

- Do not release the pedal until the bleed valve has been closed.
2. Repeat the above procedures until a sufficient amount of the fluid flows out from the left front caliper lower bleed valve.

It is not a problem if the fluid flowing out from the left front lower bleed valve contains air bubbles because the lines will be bled later.

Connect a commercially available brake bleeder to the rear caliper bleed valve.
Repeat step 1 and 2 for the rear caliper bleed valve.
Bleed the hydraulic system.



HYDRAULIC BRAKE

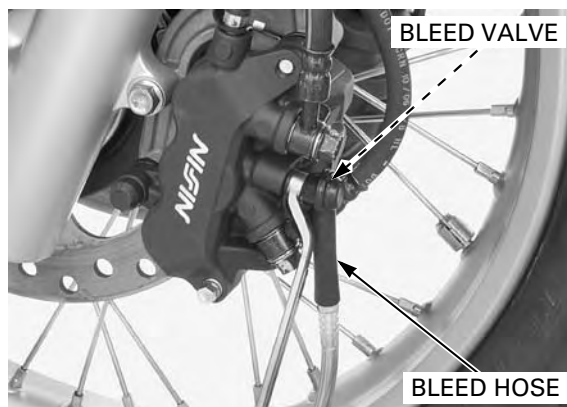
Connect a bleed hose to the left front caliper lower bleed valve.

1. Pump the brake pedal several times quickly, then push the brake pedal all the way down, loosen the left front caliper center bleed valve and loosen the bleed valve 1/4 of a turn.

Wait several seconds and close the bleed valve.

Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.

2. Repeat the above procedures until air bubbles do not appear in the transparent hose.

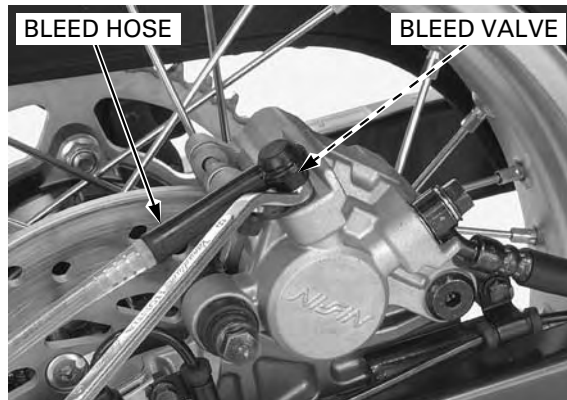


Connect a bleed hose to the rear caliper bleed valve. Repeat step 1 and 2 for the rear caliper bleed valve.

Note that you may feel strong resistance on the rear (combined) brake pedal during pumping when bleeding air from the caliper. This symptom is caused by the PCV function. Be sure to apply the brake pedal fully.

Tighten the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



After there are no more air bubbles in the fluid, repeat the air bleeding procedure about two or three times at each bleed valve.

Make sure the bleed valves are closed and operate the brake pedal. If it still feels spongy, bleed the system again.

After bleeding the air completely, tighten the bleed valves to the specified torque.

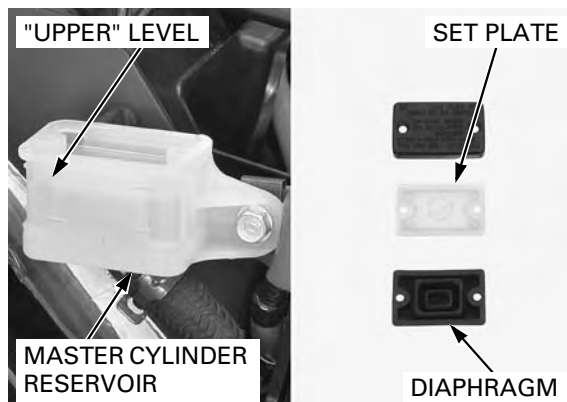
TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Fill the reservoir to the "UPPER" level with DOT4 brake fluid to the upper level.

Install the diaphragm, set plate and reservoir cap.

Install and tighten the reservoir cap screws to the specified torque.

TORQUE: 1.5 N·m (0.2 kgf·m, 1.10 lbf·ft)



BRAKE PAD/DISC

BRAKE PAD REPLACEMENT

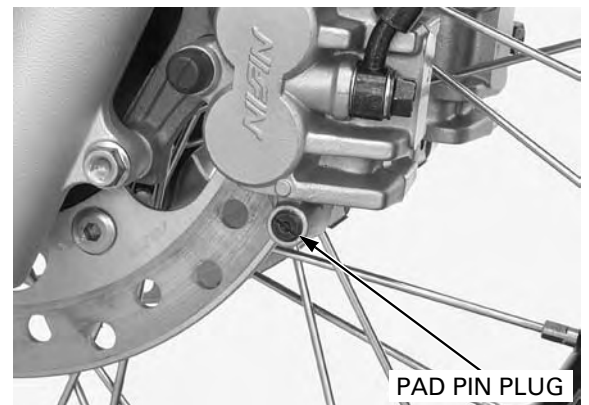
FRONT (XL700V)

Check the brake fluid level in the reservoir as this operation causes the level to rise.

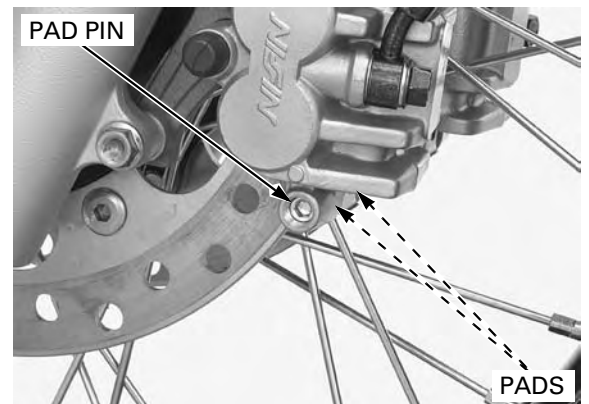
Push the caliper piston all the way in to allow installation of new brake pads.



Remove the pad pin plug.

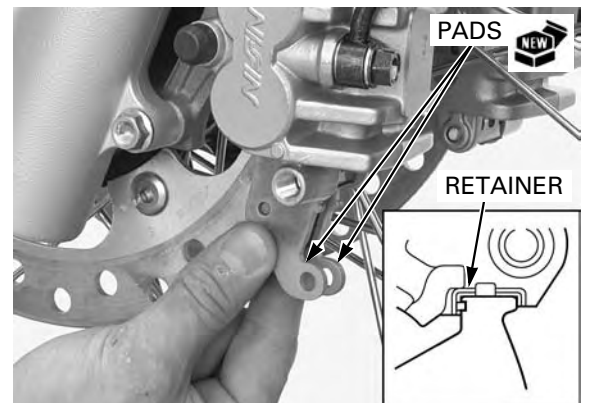


Loosen the pad pin.
Pull the pad pin out of the caliper body while pushing in the pads against the pad spring.
Remove the brake pads.



Make sure the pad spring is installed correctly.

Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly.



HYDRAULIC BRAKE

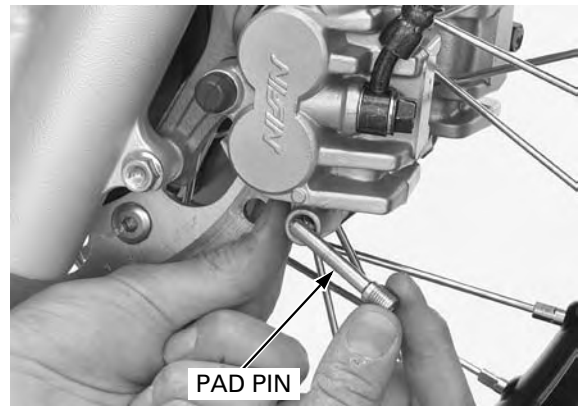
Always replace the brake pads in pairs to ensure even disc pressure.

Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.

Tighten the pad pin to the specified torque.

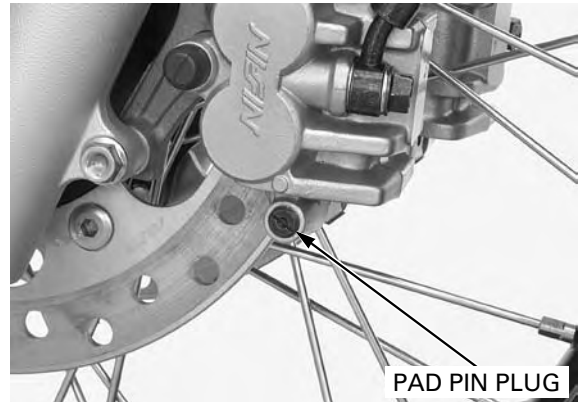
TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Operate the brake lever to seat the caliper piston against the pads.



Install and tighten the pad pin plug to the specified torque.

TORQUE: 2.5 N·m (0.3 kgf·m, 1.8 lbf·ft)



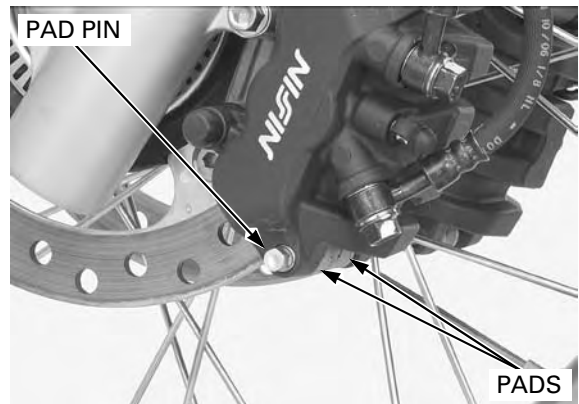
FRONT (XL700VA)

Check the brake fluid level in the reservoir as this operation causes the level to rise.

Push the caliper piston all the way in to allow installation of new brake pads.

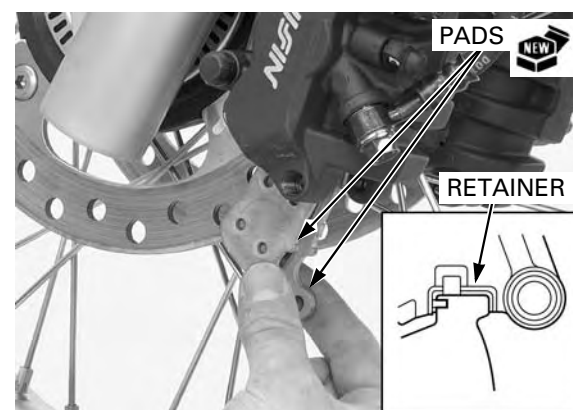


Loosen the pad pin.
Pull the pad pin out of the caliper body while pushing in the pads against the pad spring.
Remove the brake pads.



Make sure the pad spring is installed correctly.

Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly.



Apply silicone grease to the pad pin stopper ring sliding surface.

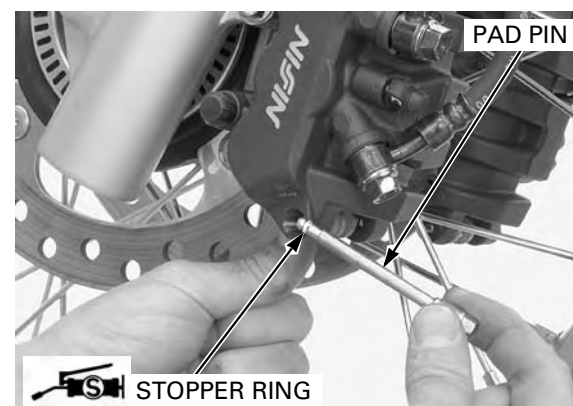
Always replace the brake pads in pairs to ensure even disc pressure.

Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.

Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Operate the brake lever to seat the caliper piston against the pads.



REAR

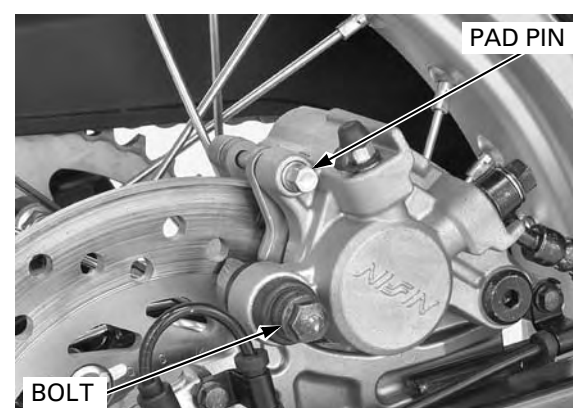
Check the brake fluid level in the reservoir as this operation causes the level to rise.

Push the caliper piston all the way in to allow installation of new brake pads.



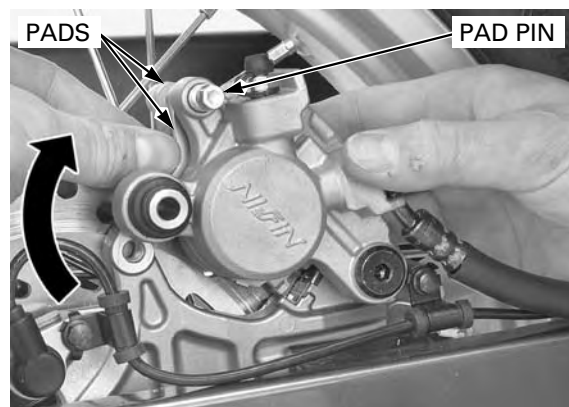
Loosen the pad pin.

Remove the rear brake caliper mounting bolt.



HYDRAULIC BRAKE

Pivot the caliper up, and remove the pad pin and the brake pads.



Make sure the pad spring is installed correctly.

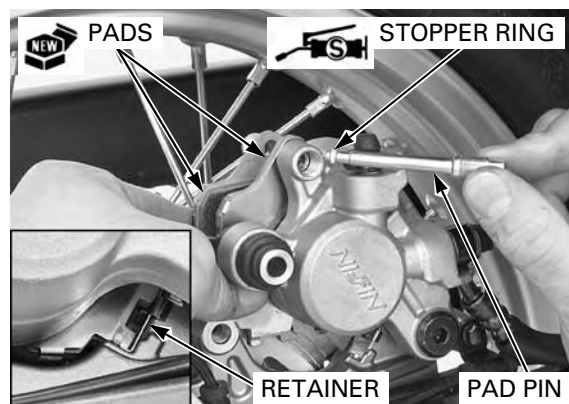
Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly.

- Always replace the brake pads in pairs to ensure even disc pressure.

Apply silicone grease to the pad pin stopper ring sliding surface.

Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.

Lower the caliper while pushing the pads against the pad spring so that the pad ends are positioned onto the retainer on the caliper bracket.



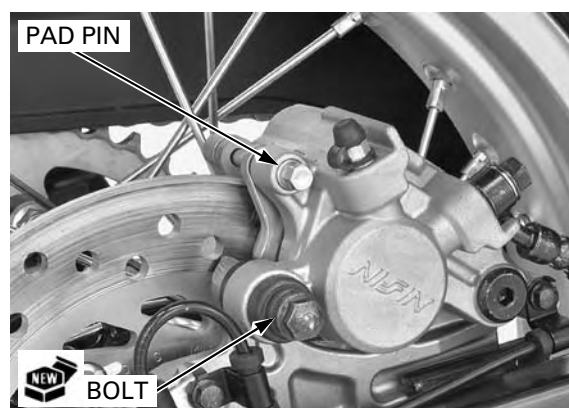
Install a new mounting bolt and tighten it to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Operate the brake pedal to seat the caliper piston against the pads.



BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.

Measure the brake disc thickness at several points.

SERVICE LIMITS:

FRONT: 3.5 mm (0.14 in)

REAR: 5.0 mm (0.20 in)



Measure the brake disc warpage with a dial indicator.

SERVICE LIMITS:

FRONT: 0.30 mm (0.012 in)

REAR: 0.30 mm (0.012 in)

Check the bearing for excessive play, if the warpage exceeds the service limit.

Replace the brake disc if the bearings are normal.

For brake disc replacement (page 13-15).



FRONT MASTER CYLINDER

REMOVAL

Drain the brake fluid from the hydraulic system.

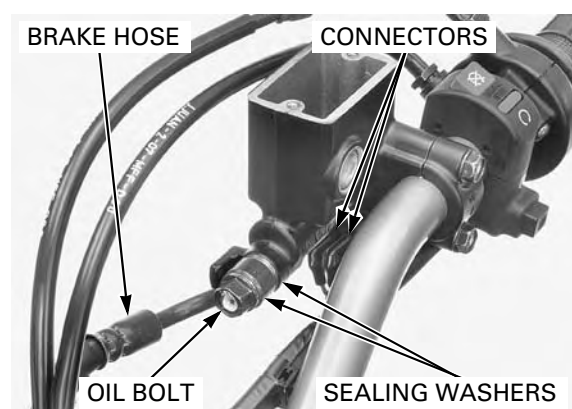
- XL700V (page 15-7)
- XL700VA (page 15-11)

Remove the knuckle guard and brake lever (page 13-7).

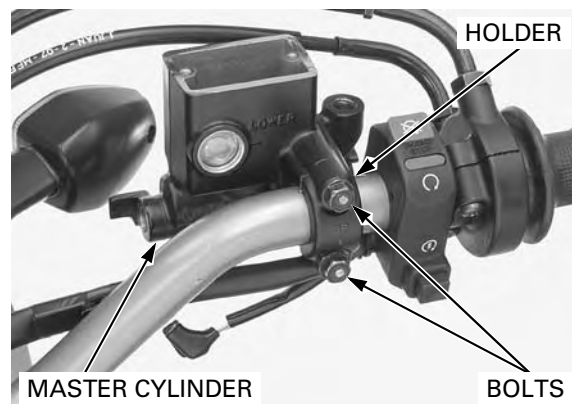
Disconnect the front brake light switch connectors.

Remove the oil bolt and sealing washers.

When removing the oil bolt, cover the end of the hose to prevent contamination.

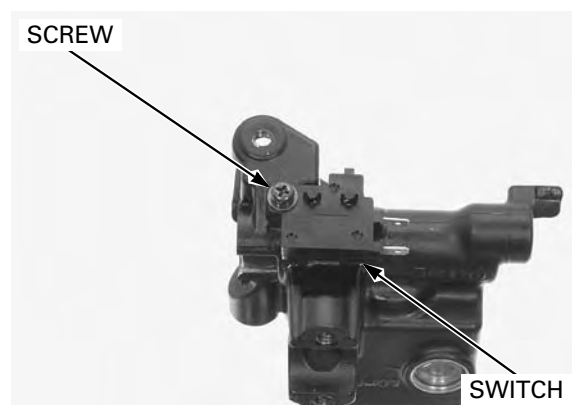


Remove the bolts, holder and master cylinder.



DISASSEMBLY

Remove the screw and front brake light switch.



HYDRAULIC BRAKE

Remove the boot.

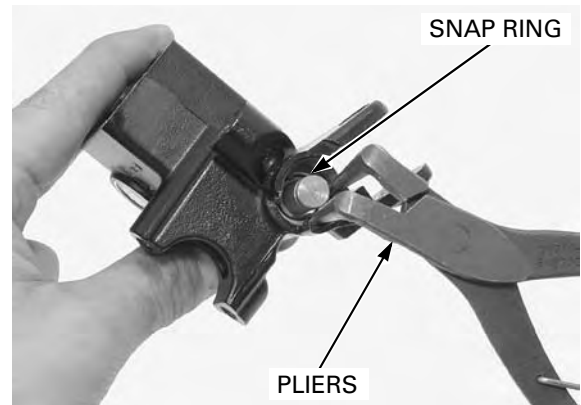


Remove the snap ring using a special tool.

TOOL:

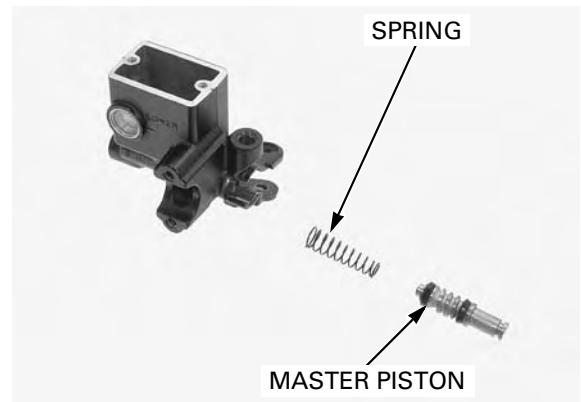
Snap ring pliers

07914-SA50001



Remove the master piston and spring.

Clean the master cylinder, reservoir and master piston in clean brake fluid.

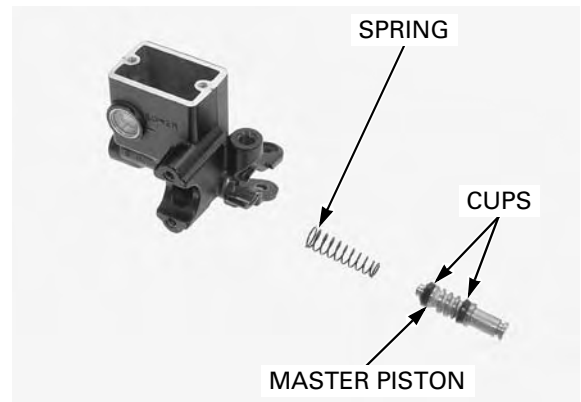


INSPECTION

Check the piston cups for wear, deterioration or damage.

Check the spring for fatigue or damage.

Check the master cylinder and piston for scoring, scratches or damage.



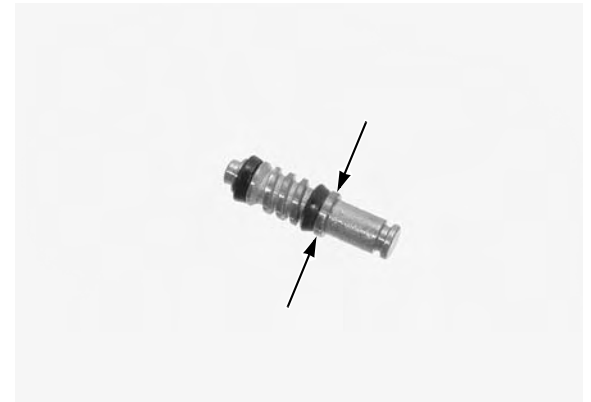
Measure the master cylinder I.D.

SERVICE LIMIT: 12.755 mm (0.5022 in)



Measure the master piston O.D.

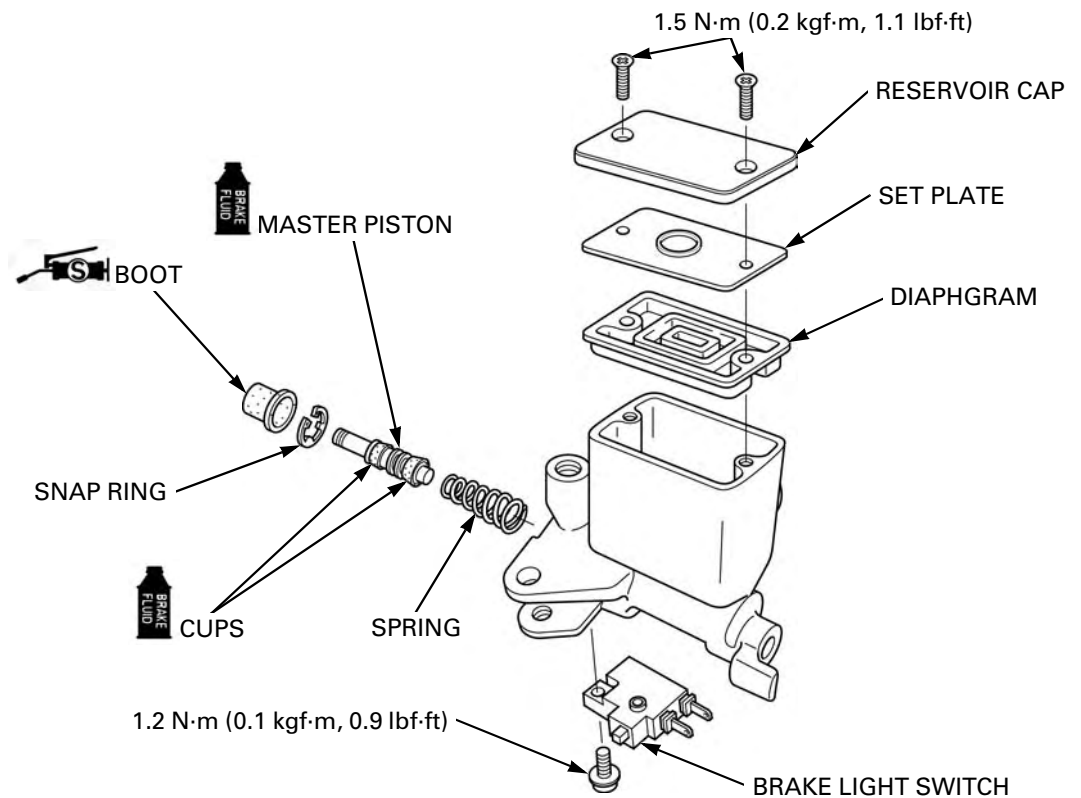
SERVICE LIMIT: 12.645 mm (0.4978 in)



ASSEMBLY

NOTE:

Replace the piston, spring, cups and snap ring as a set.



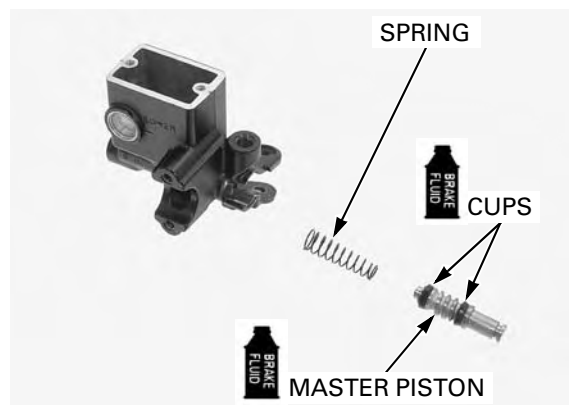
HYDRAULIC BRAKE

Coat the master piston and piston cups with clean brake fluid.

Install the spring onto the piston end.

Do not allow the piston cup lips to turn inside out.

Install the master piston/spring into the master cylinder.



Install the snap ring into the groove in the master cylinder using a special tool.

TOOL:

Snap ring pliers

07914-SA50001

- Install the snap ring with the chamfered edges facing the thrust load side.
- Check that the snap ring is seated in the grooves.

Apply silicone grease to the master piston-to-boot fitting area.

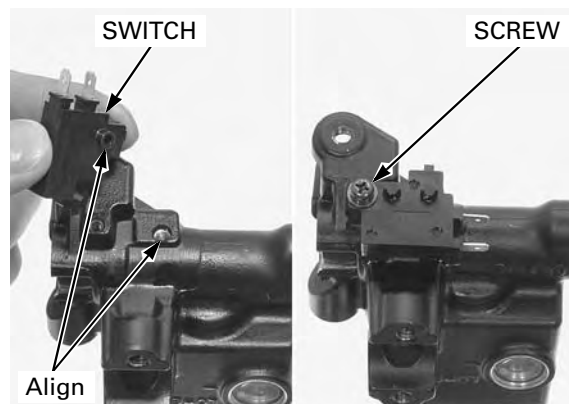
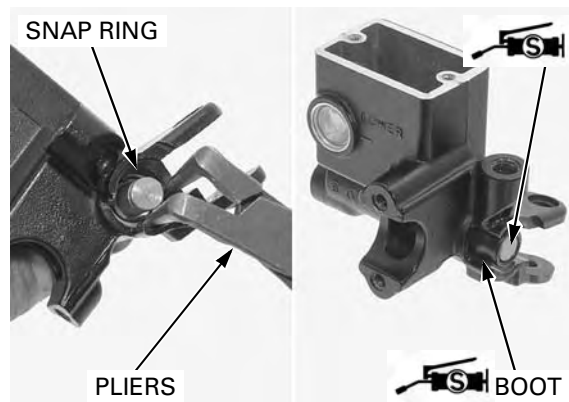
Install the boot into the master cylinder and the piston groove.

Apply silicone grease to the brake lever contacting surface of the piston.

Install the brake light switch, aligning its boss with the groove of the master cylinder.

Install and tighten the screw to the specified torque.

TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)

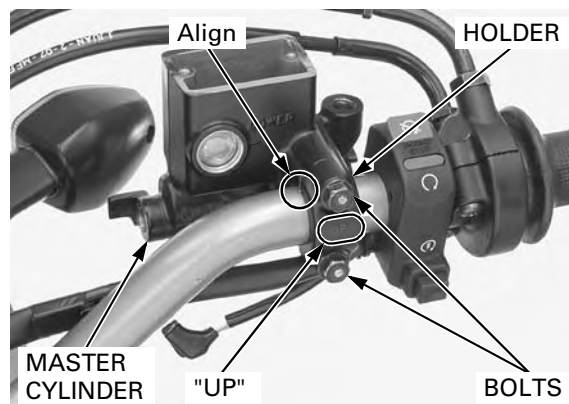


INSTALLATION

Install the holder with its "UP" mark facing up.

Install the master cylinder with the holder and bolts. Align the edge of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Be sure to rest the hose joint against the stopper.

Connect the brake hose to the master cylinder with the oil bolt and new sealing washers. Tighten the oil bolt to the specified torque.

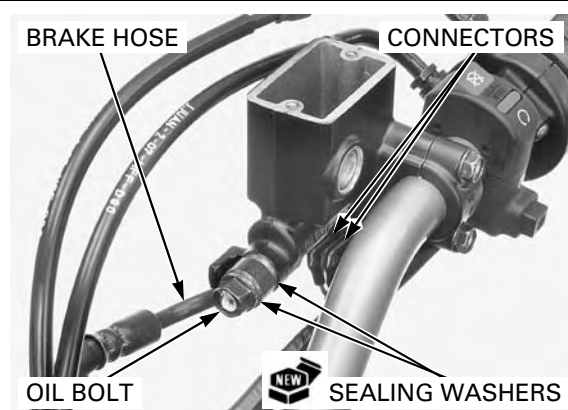
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the brake light switch connectors.

Install the knuckle guard and brake lever (page 13-15).

Fill and bleed the hydraulic system.

- XL700V (page 15-8)
- XL700VA (page 15-12)



FRONT BRAKE CALIPER (XL700V)

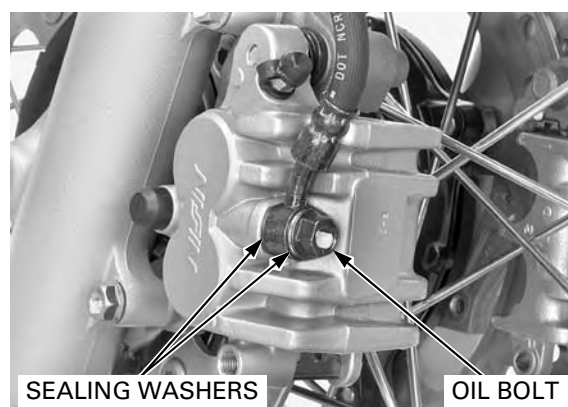
REMOVAL

Drain the brake fluid from the hydraulic system (page 15-7).

Remove the brake pads (page 15-17).

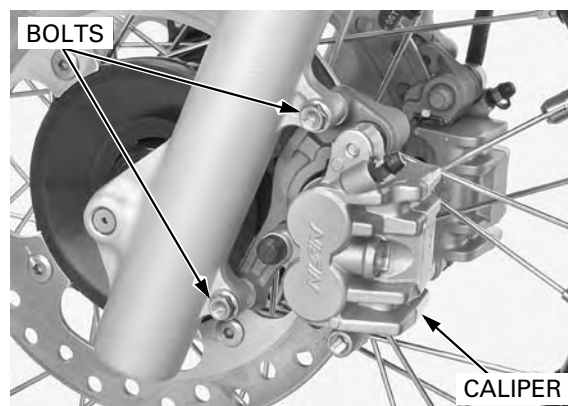
Remove the oil bolt and sealing washers.

When removing the oil bolt, cover the end of the hose to prevent contamination.



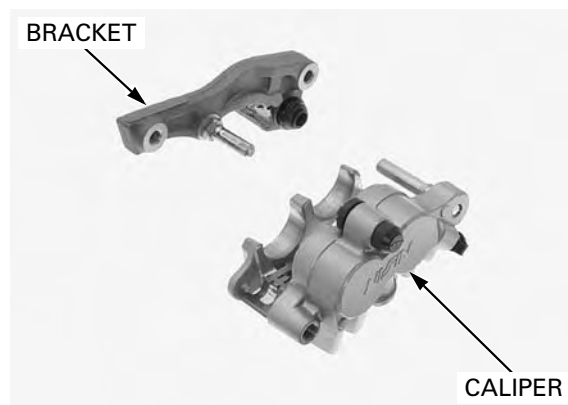
Do not reuse the bolts.

Remove the mounting bolts and caliper assembly.



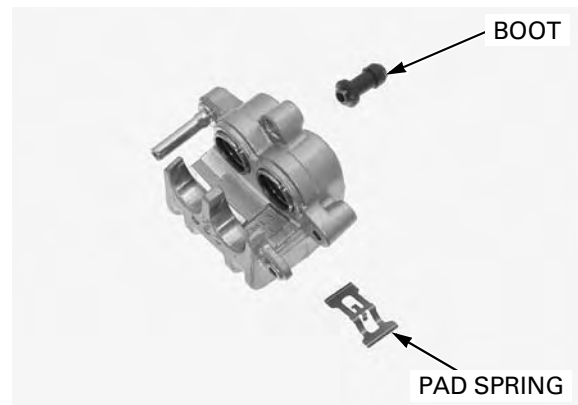
DISASSEMBLY

Disassemble the bracket from the caliper.

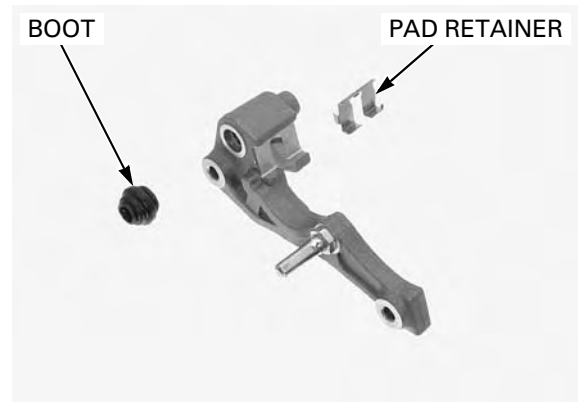


HYDRAULIC BRAKE

Remove the bracket pin boot and pad spring from the caliper.



Remove the caliper pin boot and pad retainer from the bracket.
Clean the retainer and bracket mating surfaces.



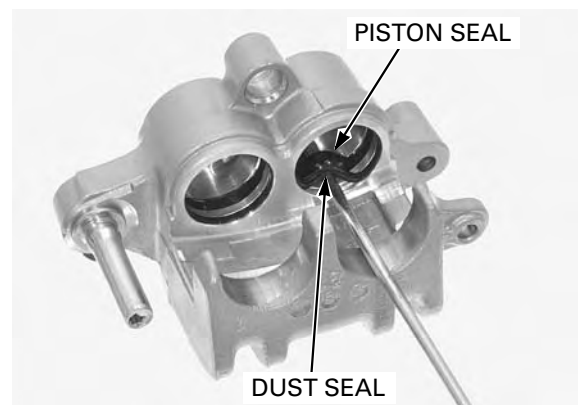
Do not use high pressure air or bring the nozzle too close the inlet.

Place a shop towel over the pistons.
Position the caliper body with the piston facing down and apply small squirts of air pressure to the fluid inlet to remove the pistons.



Be careful not to damage the piston sliding surface.

Push the dust and piston seals in and lift them out.
Clean the seal grooves, caliper cylinders and pistons with clean brake fluid.



INSPECTION

Check the caliper cylinders for scoring, scratches or damage.

Measure the caliper cylinder I.D.

SERVICE LIMIT: 27.060 mm (1.0654 in)



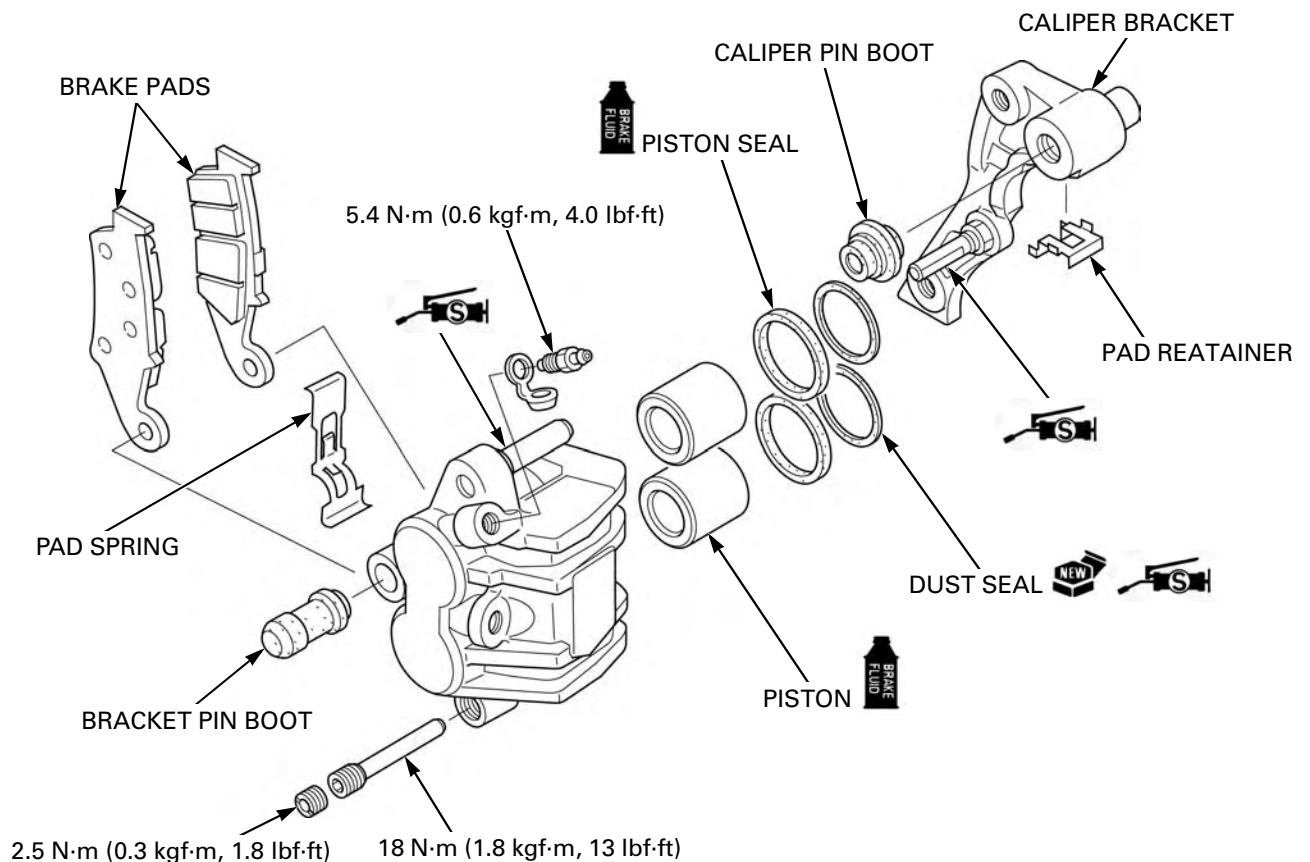
Check the caliper pistons for scoring, scratches or damage.

Measure the caliper piston O.D.

SERVICE LIMIT: 26.910 mm (1.0594 in)



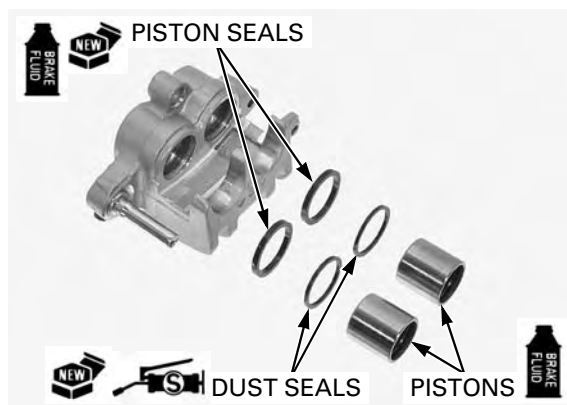
ASSEMBLY



HYDRAULIC BRAKE

Coat new piston seals with clean brake fluid, and install them into the seal grooves in the caliper.
Coat new dust seals with silicone grease and install them into the seal grooves in the caliper.

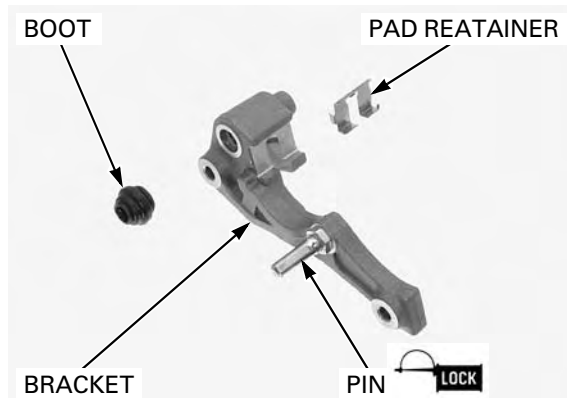
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.



Check the caliper pin boot and replace it if it is hard, deteriorated or damaged.
Install the caliper pin boot in the bracket.
If the bracket pin is removed, apply locking agent to the threads and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the retainer onto the bracket.

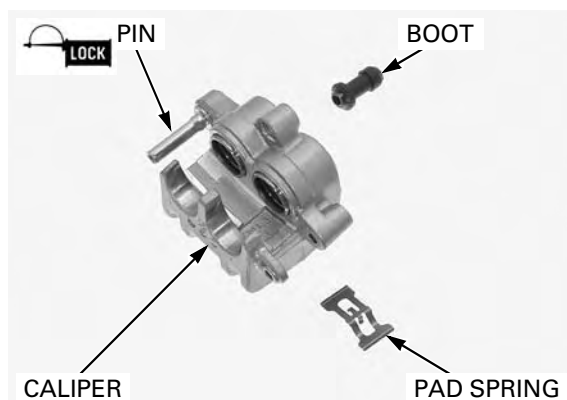


Check the bracket pin boot and replace it if it is hard, deteriorated or damaged.

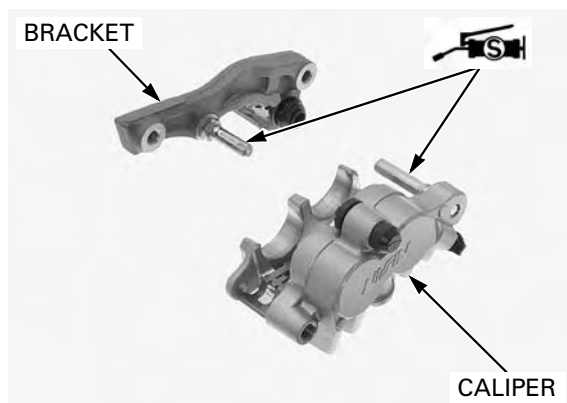
Install the bracket pin boot and pad spring in the caliper.

If the caliper pin is removed, apply locking agent to the threads and tighten it.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Apply silicone grease to the caliper and bracket pin sliding surface.
Assemble the caliper bracket and the caliper body.

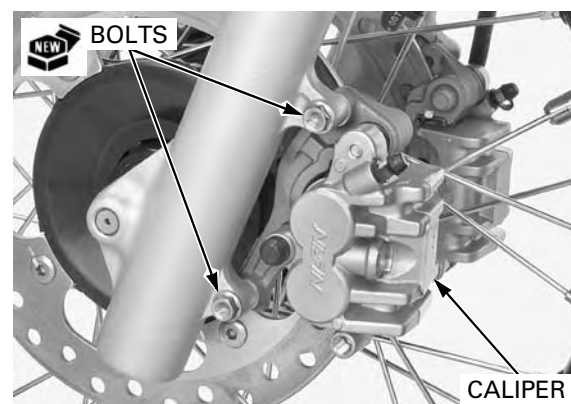


INSTALLATION

Install the brake caliper onto the fork leg.

Install new mounting bolts and tighten them to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)



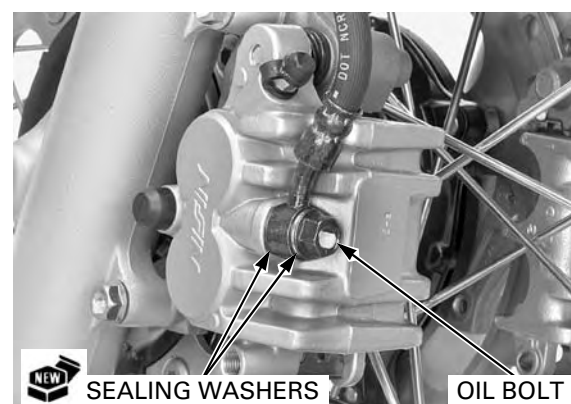
Connect the brake hose to the caliper with the oil bolt and new sealing washers.

Push the stopper or the brake hose eyelet joint against the caliper body, then tighten the oil bolts to the specified torque

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 15-17).

Fill and bleed the hydraulic system (page 15-8).



FRONT BRAKE CALIPER (XL700VA)

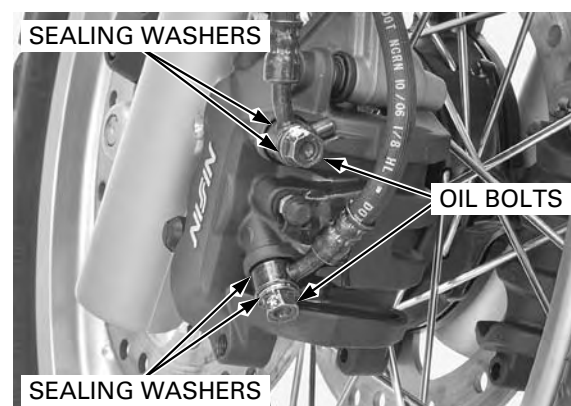
REMOVAL

Drain the brake fluid from the hydraulic system (page 15-11).

Remove the brake pads (page 15-17).

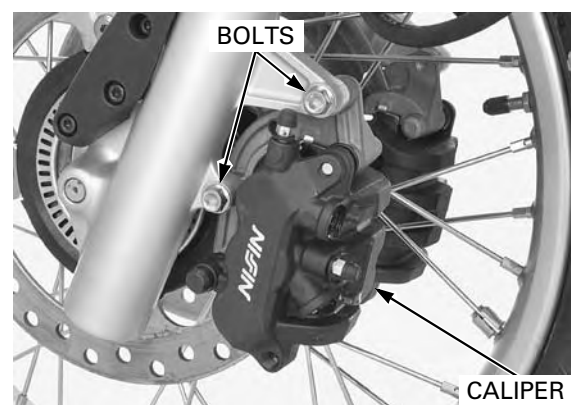
When removing the oil bolt, cover the end of the hose to prevent contamination.

Remove the oil bolts and sealing washers.



Do not reuse the bolts.

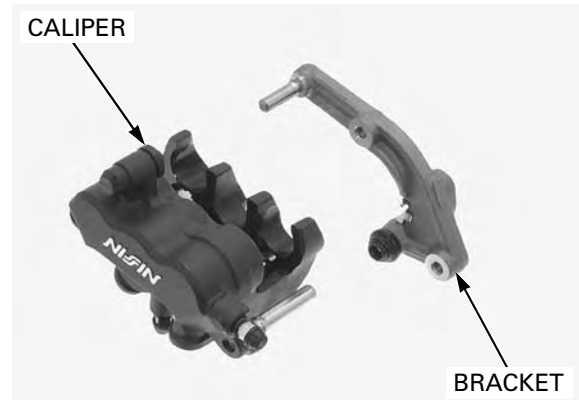
Remove the mounting bolts and caliper assembly.



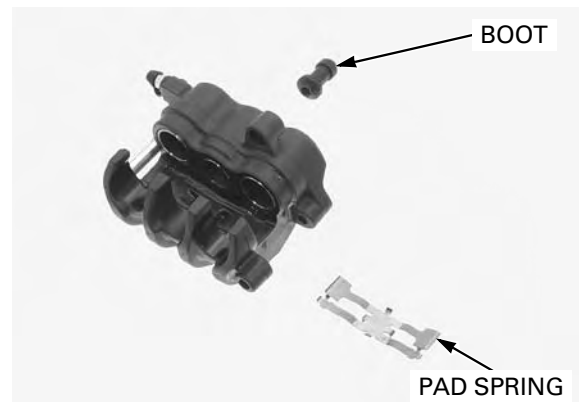
HYDRAULIC BRAKE

DISASSEMBLY

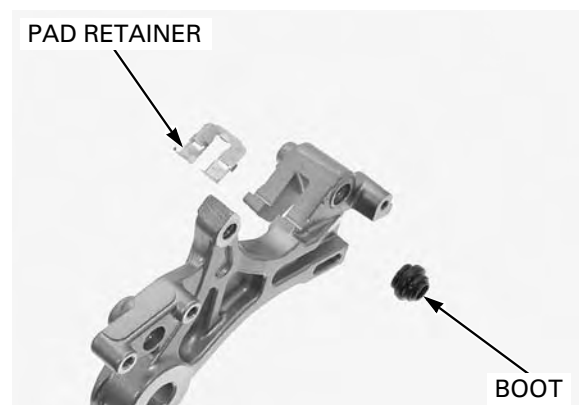
Disassemble the bracket from the caliper.



Remove the bracket pin boot and pad spring from the caliper.



Remove the caliper pin boot and pad retainer from the bracket.
Clean the retainer and bracket mating surfaces.



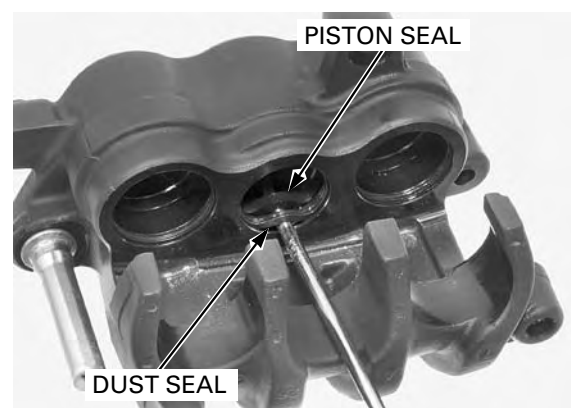
Do not use high pressure air or bring the nozzle too close the inlet.

Place a shop towel over the pistons.
Position the caliper body with the piston facing down and apply small squirts of air pressure to the fluid inlet to remove the pistons.



Be careful not to damage the piston sliding surface.

Push the dust and piston seals in and lift them out.
Clean the seal grooves, caliper cylinders and pistons with clean brake fluid.



INSPECTION

Check the caliper cylinders for scoring, scratches or damage.

Measure the caliper cylinder I.D.

SERVICE LIMITS:

Right caliper:	Front:	22.712 mm (0.8942 in)
	Center:	22.712 mm (0.8942 in)
	Rear:	22.712 mm (0.8942 in)
Left caliper:	Front:	25.460 mm (1.0024 in)
	Center:	22.712 mm (0.8942 in)
	Rear:	25.460 mm (1.0024 in)

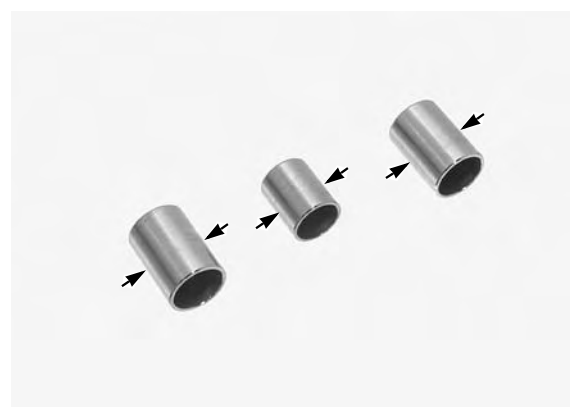


Check the caliper pistons for scoring, scratches or damage.

Measure the caliper piston O.D.

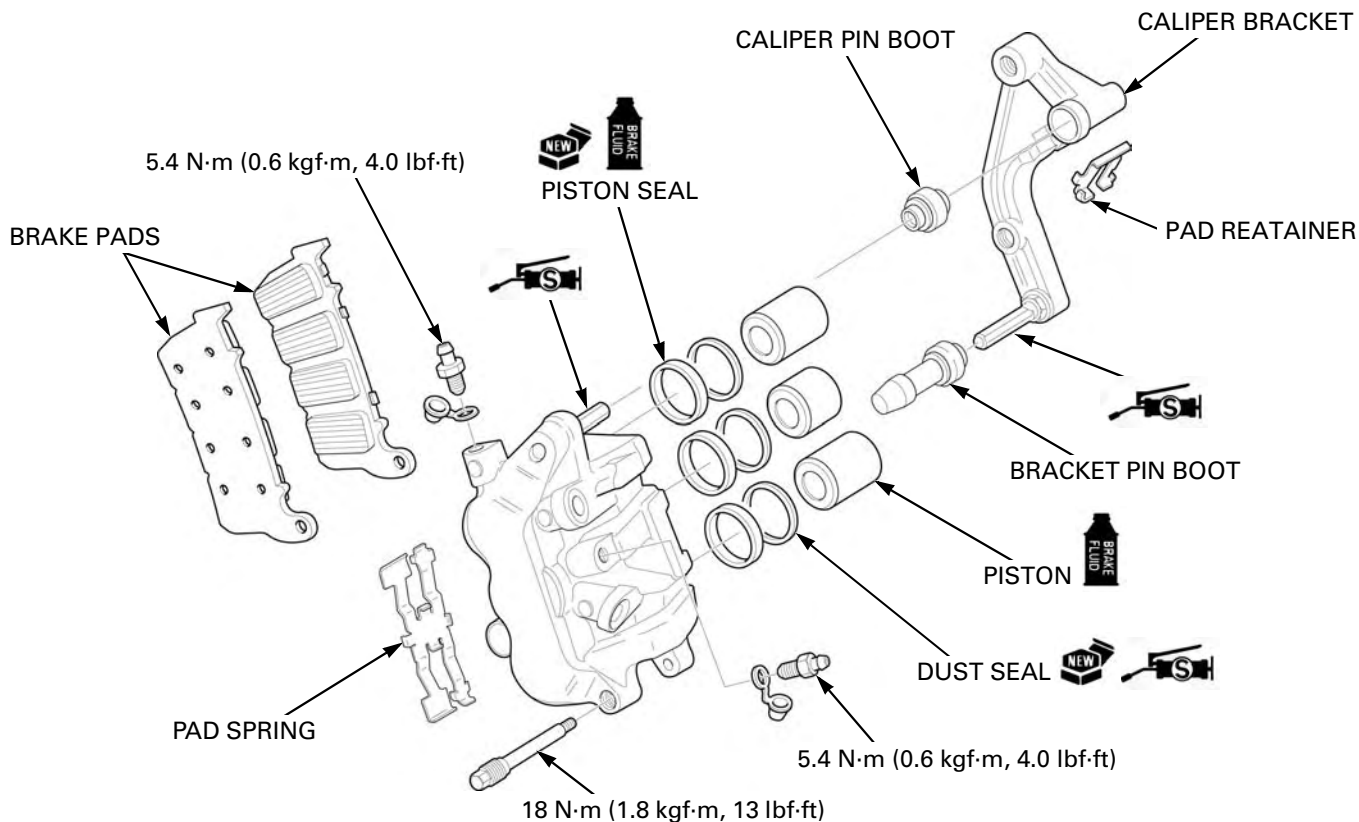
SERVICE LIMITS:

Right caliper:	Front:	22.560 mm (0.8882 in)
	Center:	22.560 mm (0.8882 in)
	Rear:	22.560 mm (0.8882 in)
Left caliper:	Front:	25.310 mm (0.9965 in)
	Center:	22.560 mm (0.8882 in)
	Rear:	25.310 mm (0.9965 in)



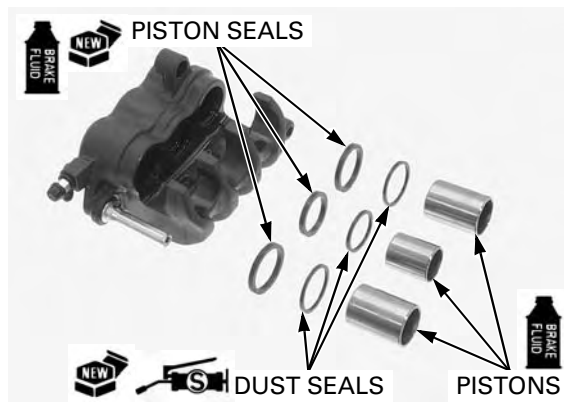
HYDRAULIC BRAKE

ASSEMBLY



Coat new piston seals with clean brake fluid, and install them into the seal grooves in the caliper.
Coat new dust seals with silicone grease and install them into the seal grooves in the caliper.

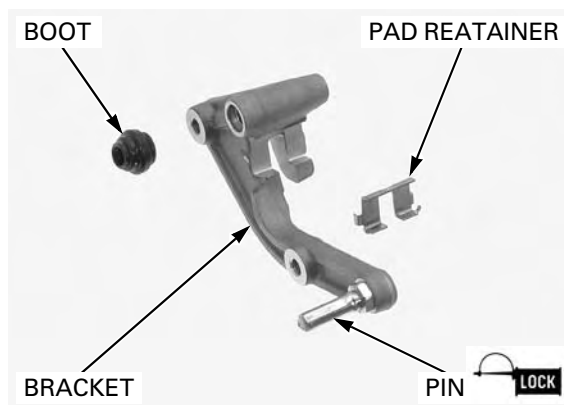
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.



Check the caliper pin boot and replace it if it is hard, deteriorated or damaged.
Install the caliper pin boot in the bracket.
If the bracket pin is removed, apply locking agent to the threads and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the retainer onto the bracket.

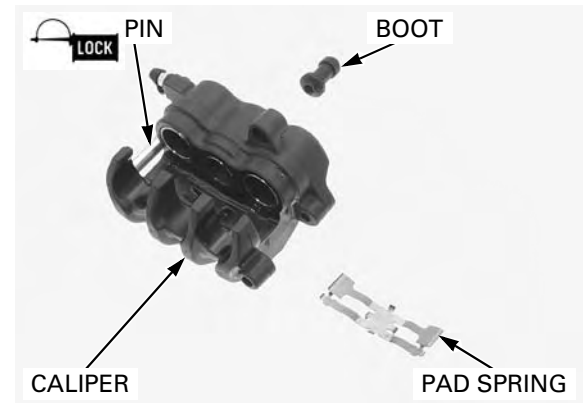


Check the bracket pin boot and replace it if it is hard, deteriorated or damaged.

Install the bracket pin boot and pad spring in the caliper.

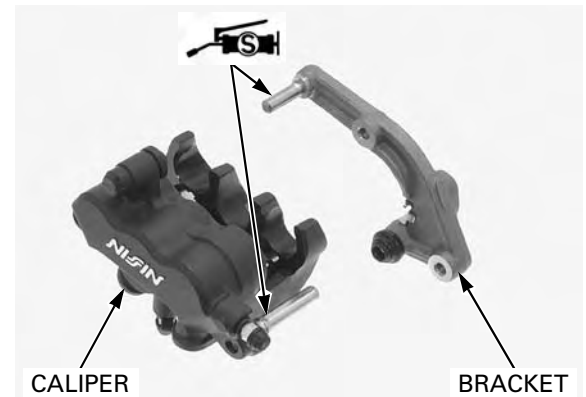
If the caliper pin is removed, apply locking agent to the threads and tighten it.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Apply silicone grease to the caliper and bracket pin sliding surface.

Assemble the caliper bracket and the caliper body.

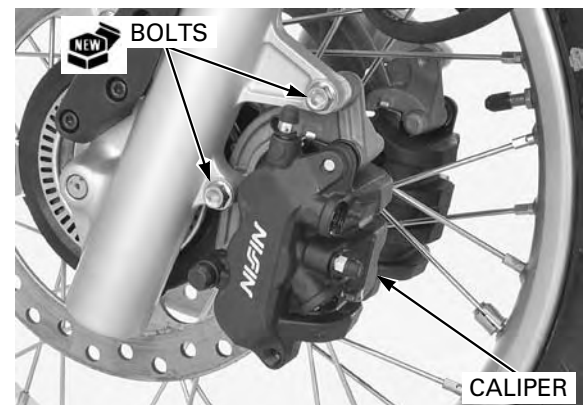


INSTALLATION

Install the brake caliper onto the fork leg.

Install new mounting bolts and tighten them to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)



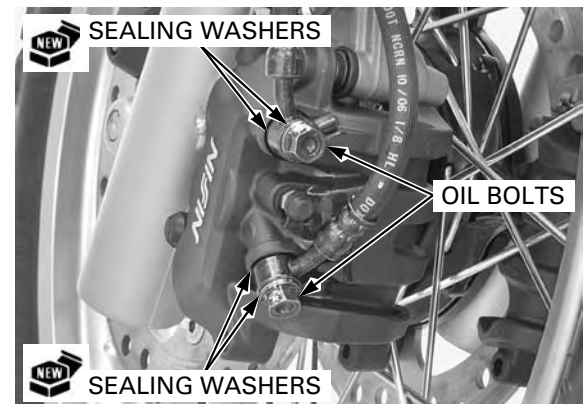
Connect the brake hoses to the caliper with the oil bolts and new sealing washers.

Push the stopper or the brake hose eyelet joint against the caliper body, then tighten the oil bolts to the specified torque

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 15-17).

Fill and bleed the hydraulic system (page 15-12).



REAR MASTER CYLINDER

REMOVAL

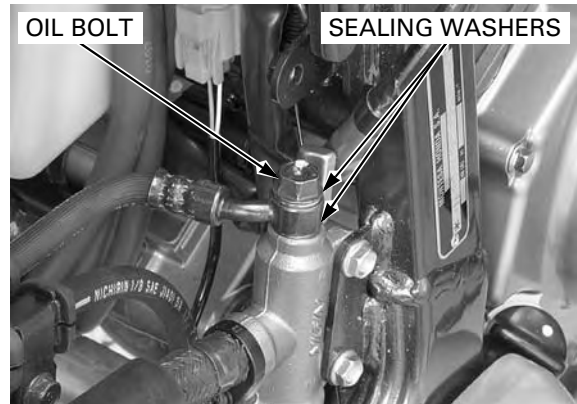
Remove the battery tray (page 17-6).

Drain the brake fluid from the hydraulic system.

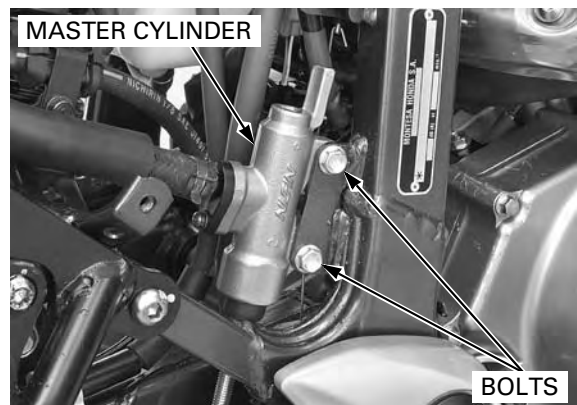
- XL700V (page 15-7)
- XL700VA (page 15-11)

When removing the oil bolt, cover the end of the hose to prevent contamination.

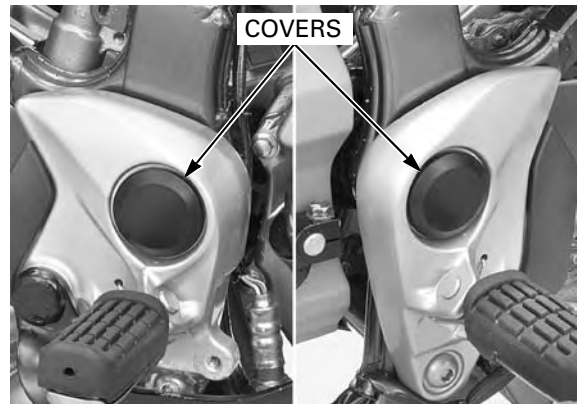
Remove the brake hose oil bolt, sealing washers and brake hose.



Remove the bolt and rear master cylinder assembly.

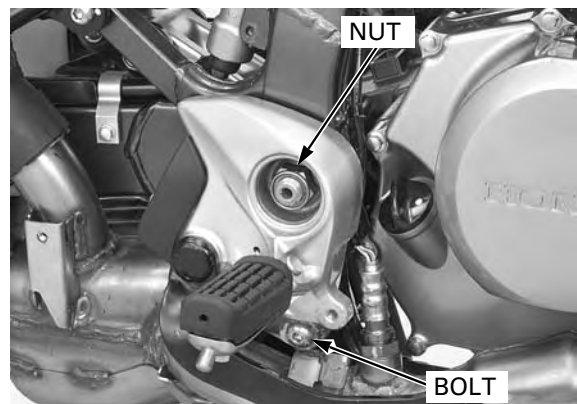


Remove the swingarm pivot covers.

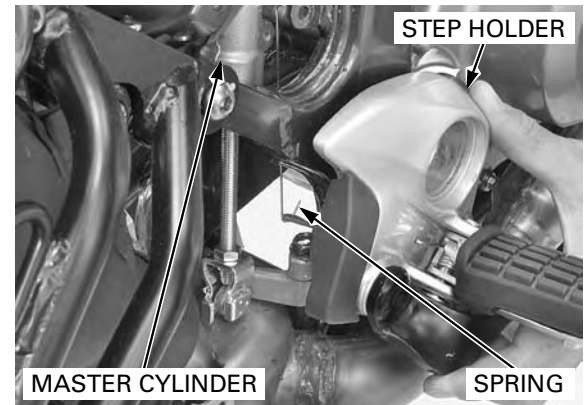


Remove the swingarm pivot nut and step holder bolt.

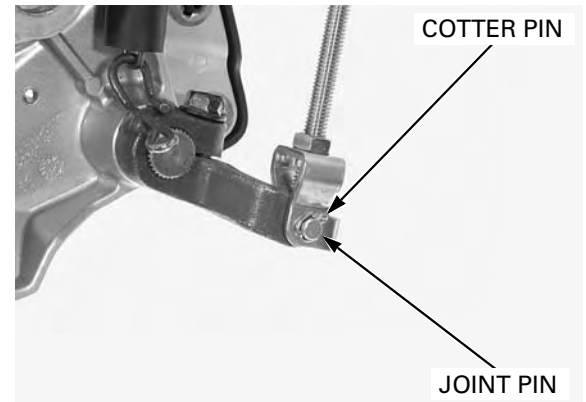
- Push the swingarm pivot bolt into the frame, do not remove it.



Release the rear brake light switch spring.
Remove the rear master cylinder and step holder.

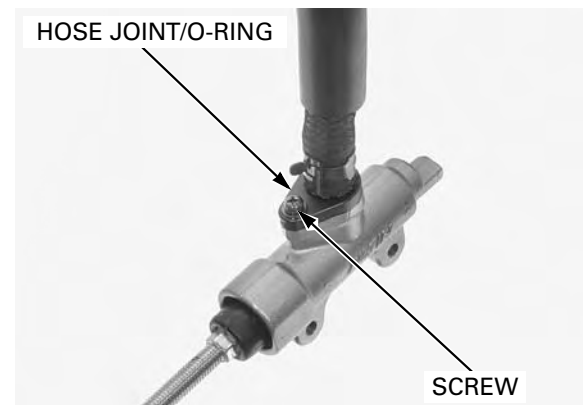


Remove the cotter pin and joint pin.



DISASSEMBLY

Remove the screw, reservoir hose joint and O-ring.



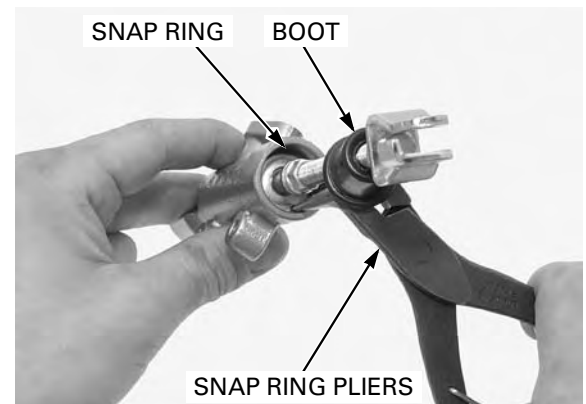
Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:

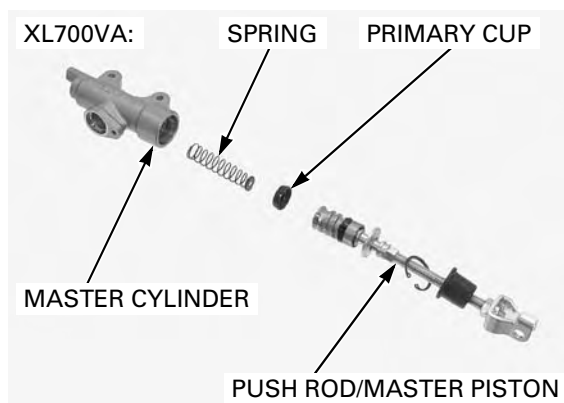
Snap ring pliers

07914-SA50001

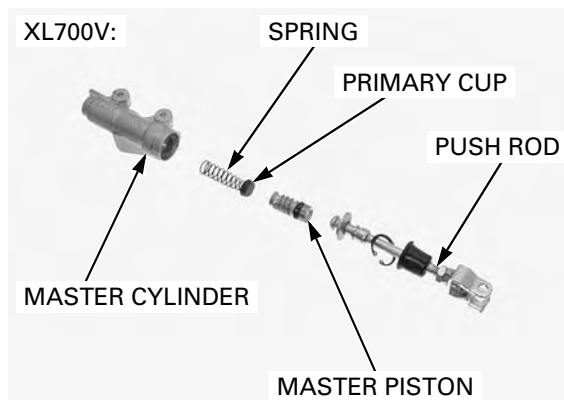


HYDRAULIC BRAKE

XL700VA: Remove the push rod/master piston, primary cup and spring.

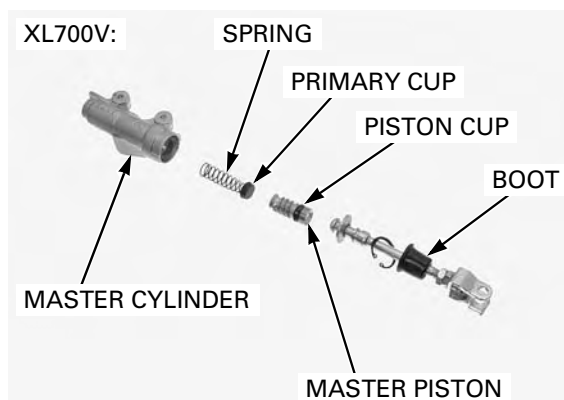
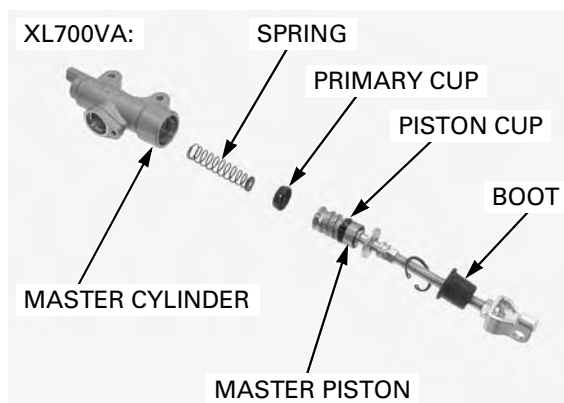


XL700V: Remove the push rod, master piston, primary cup and spring.



INSPECTION

Check the primary cup, piston cup and boot for wear, deterioration or damage.
Check the spring for fatigue or damage.
Check the master cylinder and piston for scoring, scratches or damage.



Measure the master cylinder I.D.

SERVICE LIMITS:

XL700VA: 17.515 mm (0.6896 in)

XL700V: 14.055 mm (0.5533 in)

XL700VA:



XL700V:



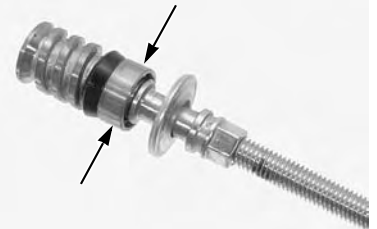
Measure the master piston O.D.

SERVICE LIMITS:

XL700VA: 17.405 mm (0.6852 in)

XL700V: 13.945 mm (0.5490 in)

XL700VA:



XL700V:

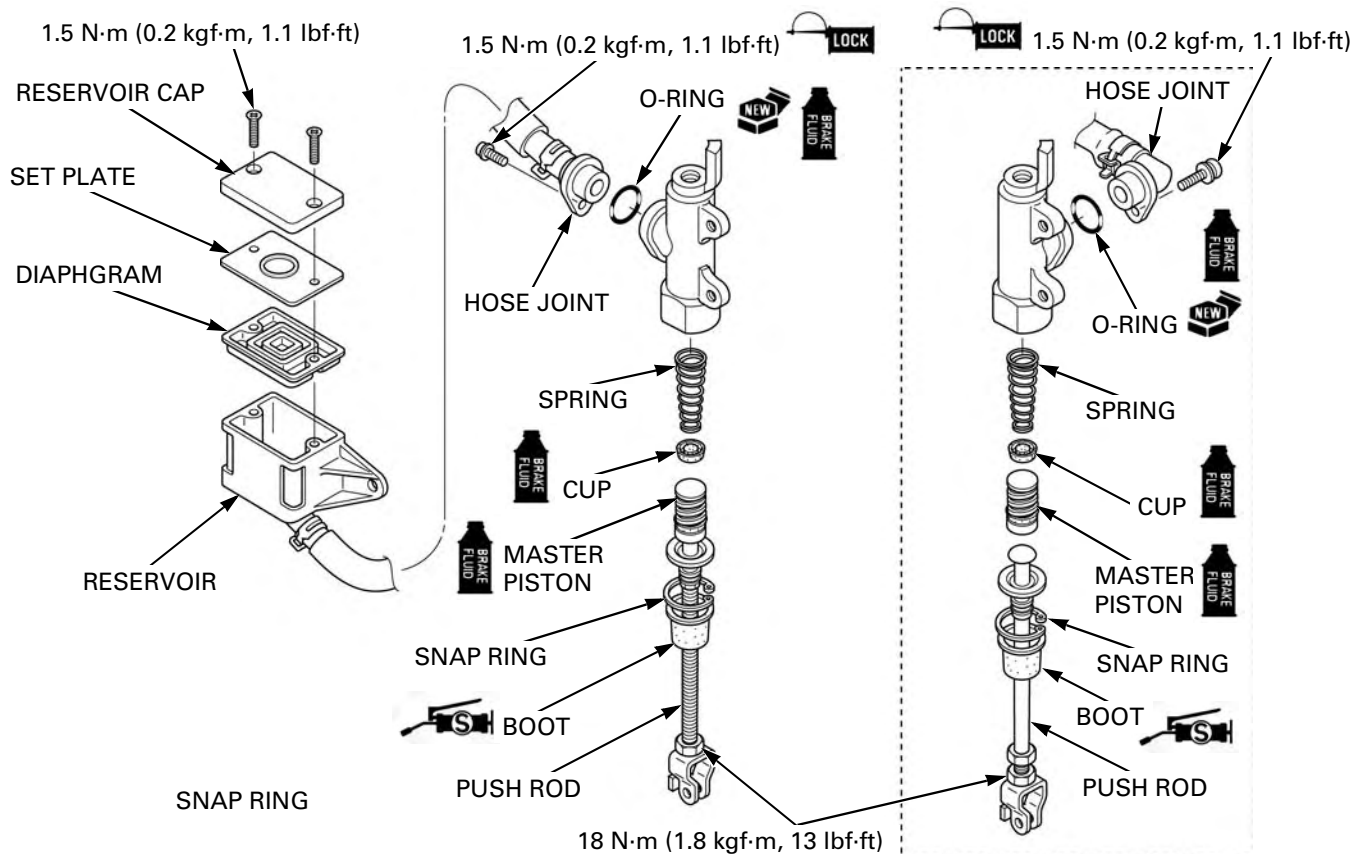


HYDRAULIC BRAKE

ASSEMBLY

NOTE:

Replace the piston, spring, primary cup and piston cup as a set.



XL700V: Apply silicone grease to the push rod and master piston contacting area.

Coat the master piston, primary cup and piston cup with clean brake fluid.
Install the primary cup onto the tip of the spring.

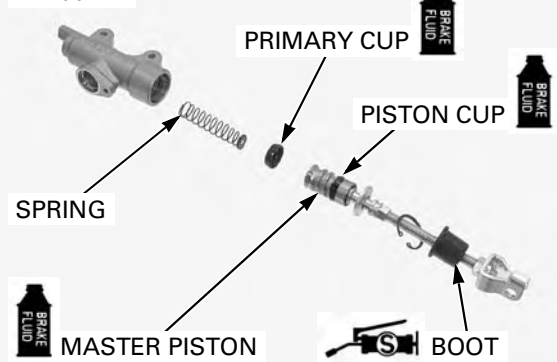
XL700VA: Install the spring, primary cup and master piston/push rod assembly.

XL700V: Install the spring, primary cup, master piston and push rod assembly.

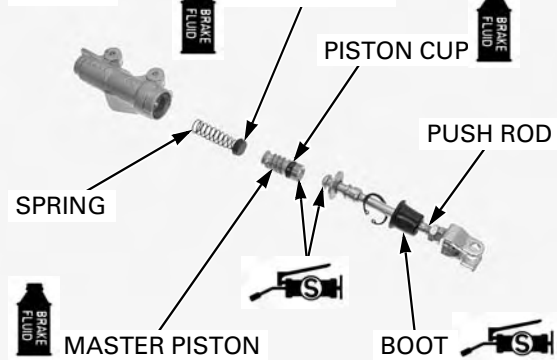
- Do not allow the piston cup lips to turn inside out.

Apply silicone grease to the push rod boot fitting area.

XL700VA:



XL700V:



Install the snap ring into the groove in the master cylinder using a special tool.

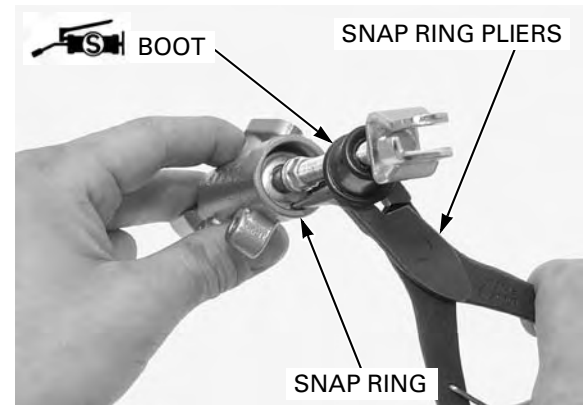
TOOL:

Snap ring pliers

07914-SA50001

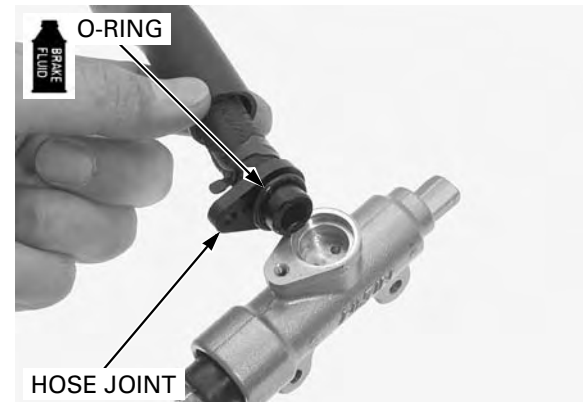
- Install the snap ring with the chamfered edges facing the thrust load side.
- Check that the snap ring is seated in the groove.

Apply silicone grease to the boot inner surface. Install the boot into the master cylinder and the piston groove.



Apply brake fluid to a new O-ring and install it onto the reservoir hose joint.

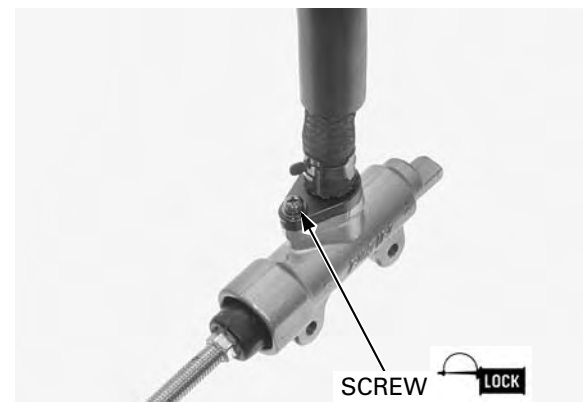
Install the reservoir hose joint into the master cylinder.



Apply a locking agent to the reservoir hose joint screw threads.

Install and tighten the screw to the threads.

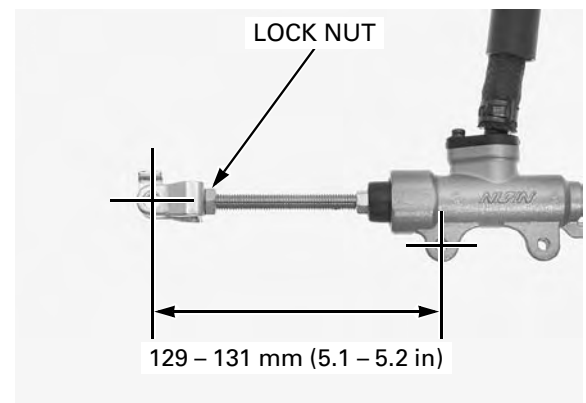
TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)



If the push rod is disassembled, adjust the push rod length as shown.

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

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

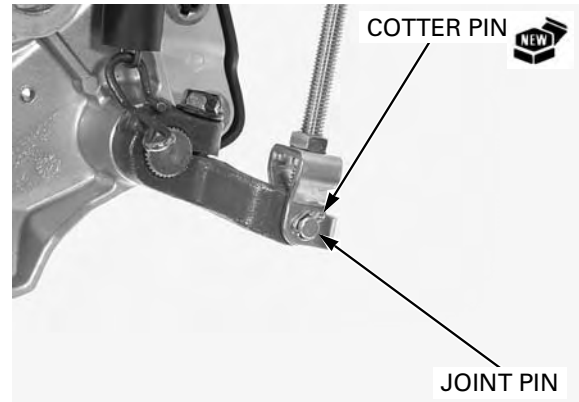


HYDRAULIC BRAKE

INSTALLATION

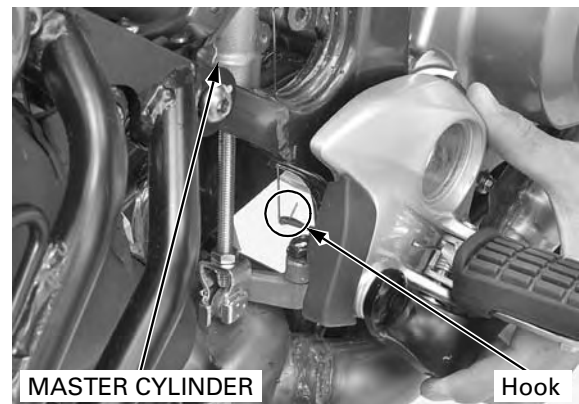
Install the joint pin.

Secure the joint pin using a new the cotter pin.



Install the rear master cylinder to the inside of frame.

Hook the rear brake light switch spring.



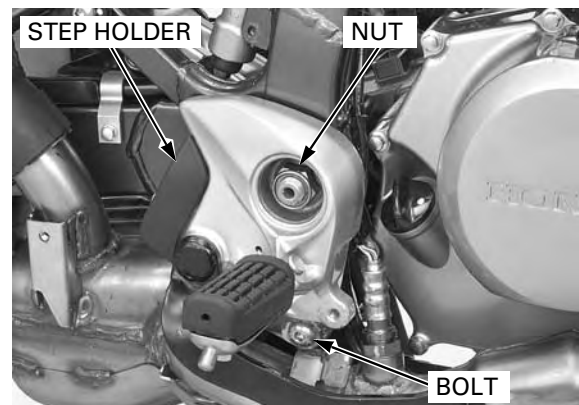
Install the step holder, swingarm pivot nut and step holder bolt.

Tighten the swingarm pivot nut and step holder bolt to the specified torque.

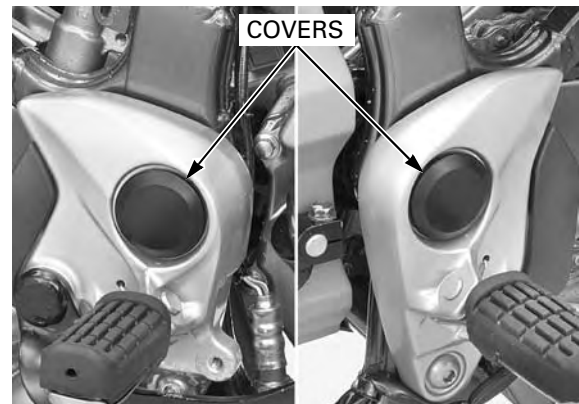
TORQUE:

Swingarm pivot nut: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Step holder bolt: 63.7 N·m (6.5 kgf·m, 47 lbf·ft)

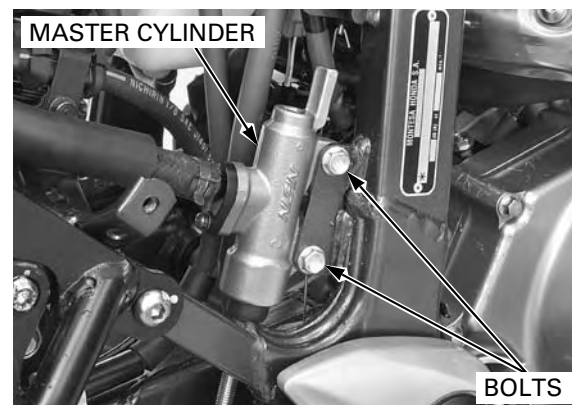


Install the swingarm pivot covers.



Install the rear master cylinder assembly and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the brake hose with the oil bolt and new sealing washers.

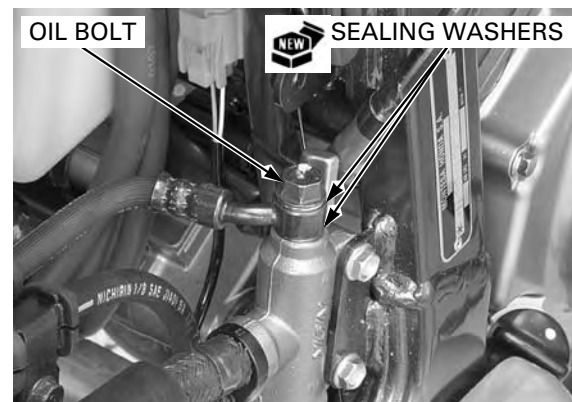
Push the stopper on the eyelet joint against the stopper of the master cylinder, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the hydraulic system.

- XL700V (page 15-8)
- XL700VA (page 15-12)

Install the battery tray (page 17-6).



REAR BRAKE CALIPER

REMOVAL

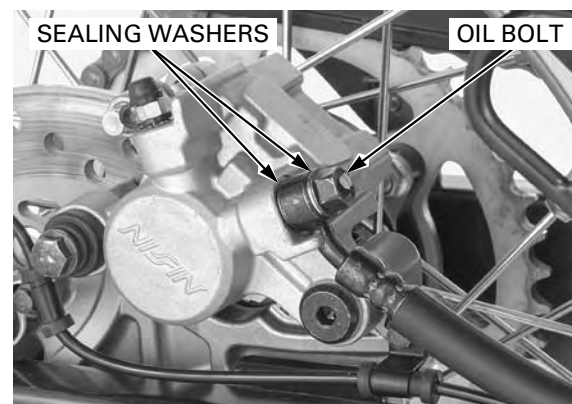
Drain the brake fluid from the hydraulic system.

- XL700V (page 15-7)
- XL700VA (page 15-11)

When removing the oil bolt, cover the end of the hose to prevent contamination.

Remove the oil bolt and sealing washers.

Remove the brake pads (page 15-17).



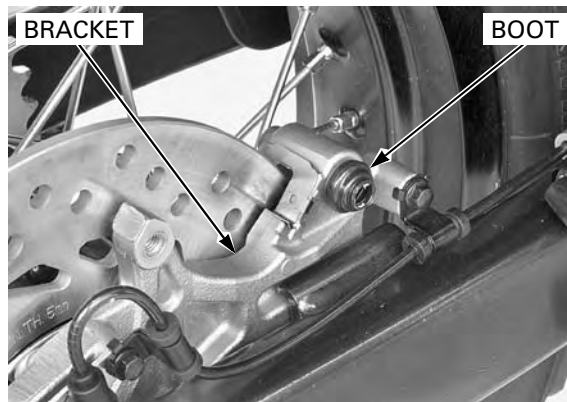
Pivot the caliper up, and remove the rear brake caliper.



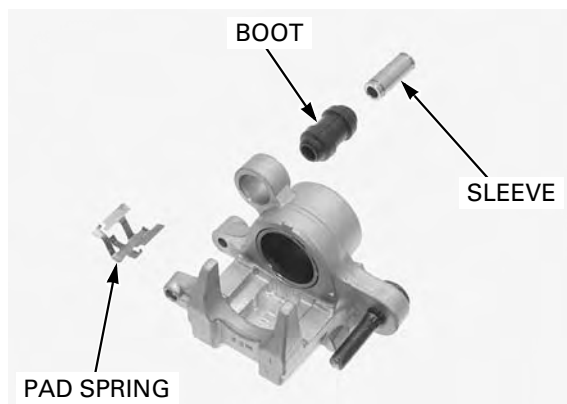
HYDRAULIC BRAKE

DISASSEMBLY

Remove the slide pin boot from the caliper bracket.
If the boot is hard, damaged or deteriorated, replace it with a new one.



Remove the caliper boot, sleeve and pad spring from the caliper.



Do not use high pressure air or bring the nozzle too close the inlet.

Place a shop towel over the piston.
Position the caliper body with the piston facing down and apply small squirts of air pressure to the fluid inlet to remove the piston.



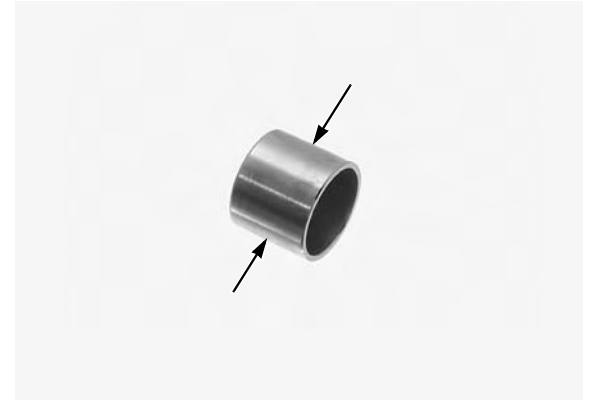
Be careful not to damage the piston sliding surface.

Push the dust and piston seal in and lift them out.
Clean the seal grooves, caliper cylinder and piston with clean brake fluid.



Check the caliper cylinders for scoring, scratches or damage.

SERVICE LIMIT: 38.240 mm (1.5055 in)



SERVICE LIMIT: 38.090 mm (1.4996 in)

Diagram illustrating the components and assembly steps for the rear disc brake assembly:

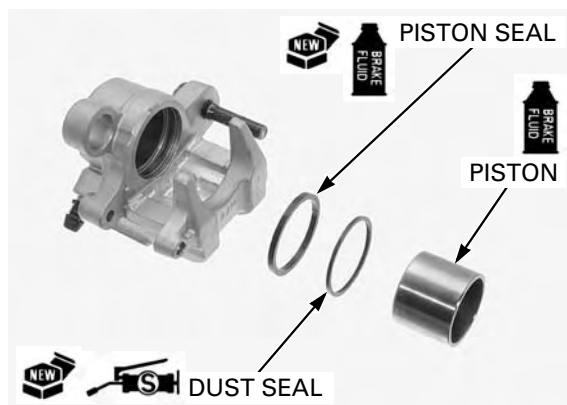
- 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**: Torque specification for the Caliper Boot.
- 18 N·m (1.8 kgf·m, 13 lbf·ft)**: Torque specification for the Piston Seal.
- 27 N·m (2.8 kgf·m, 20 lbf·ft)**: Torque specification for the Caliper Bracket.
- Components and Labels:**
 - Brake Pads**: Two pads shown being installed into the caliper.
 - Piston Seal**: Two seals shown being installed into the caliper.
 - Dust Seal**: One seal shown being installed into the caliper.
 - Piston**: One piston shown being installed into the caliper.
 - Caliper Boot**: A boot shown being installed onto the caliper.
 - Sleeve**: A sleeve shown being installed onto the caliper.
 - Pad Spring**: A spring shown being installed onto the caliper.
 - Bracket Boot**: A boot shown being installed onto the caliper bracket.
 - Caliper Bracket**: The main bracket shown being installed onto the hub.
 - Pad Retainer**: A retainer shown being installed onto the caliper.

HYDRAULIC BRAKE

Coat a new piston seal with clean brake fluid and install it into the seal groove in the caliper.

Coat a new dust seal with silicone grease and install into the seal groove in the caliper.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.



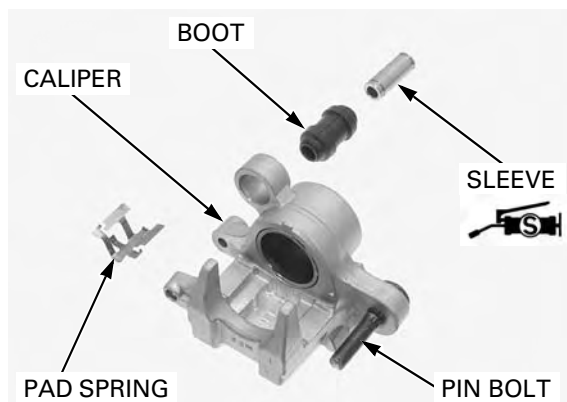
Check the caliper boot and replace it if it is hard, deteriorated or damaged.

Apply silicone grease to the caliper sleeve outer surface.

Install the caliper boot, sleeve and pad spring in the caliper.

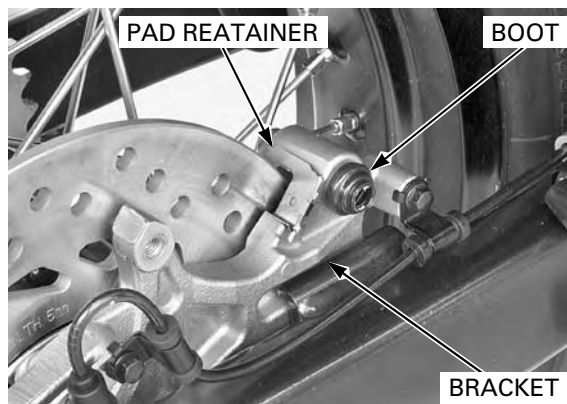
If the caliper pin bolt is removed, tighten it to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Check that the pad retainer is in place on the caliper bracket.

Install the slide pin boot into the caliper bracket.

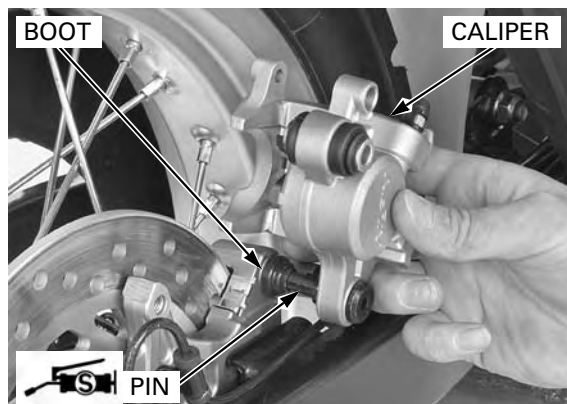


INSTALLATION

Check the bracket boot and replace it if it is hard, deteriorated or damage.

Apply silicone grease to the caliper pin bolt sliding surface.

Install the rear brake caliper to the bracket.



Install the brake pad (page 15-17).

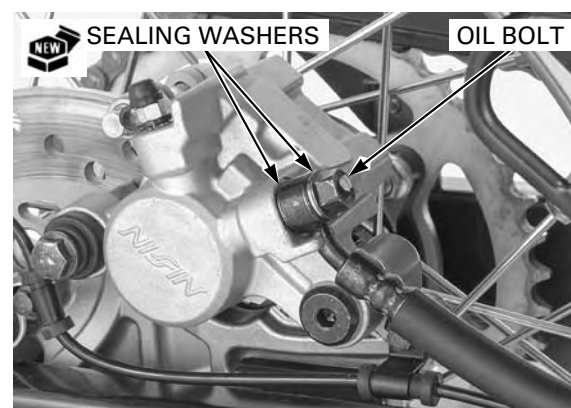
Install the brake hose with new sealing washers and oil bolt.

Push the brake hose stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 24 lbf·ft)

Fill and bleed the hydraulic system.

- XL700V (page 15-8)
- XL700VA (page 15-12)

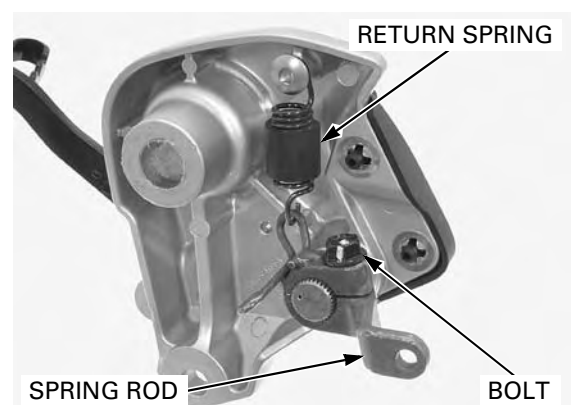


BRAKE PEDAL

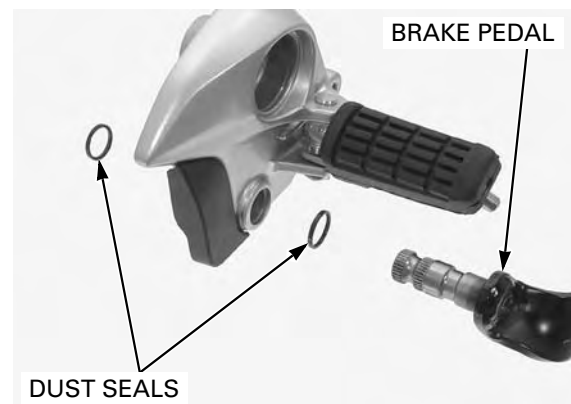
REMOVAL

Remove the rear master cylinder (page 15-34).

Remove the return spring, brake pedal pinch bolt and spring rod.



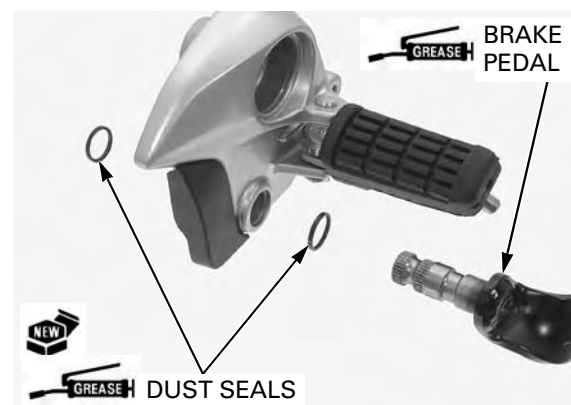
Remove the brake pedal and dust seals.



INSTALLATION

Apply grease to the sliding surface of the brake pedal pivot and new dust seal lips.

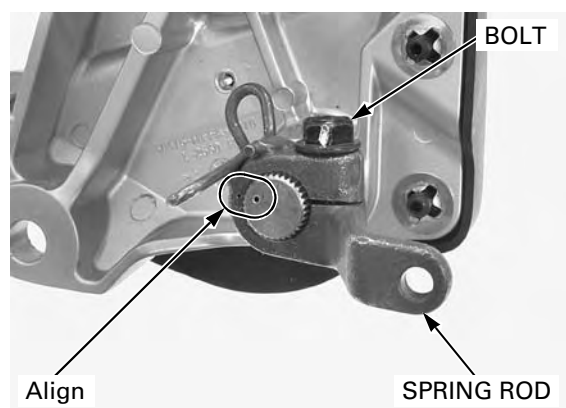
Install new dust seals and brake pedal to the step holder.



HYDRAULIC BRAKE

Install the spring rod to the brake pedal pivot, aligning the punch marks on the rod and pivot.

Install and tighten the pinch bolt securely.



Install the return spring.

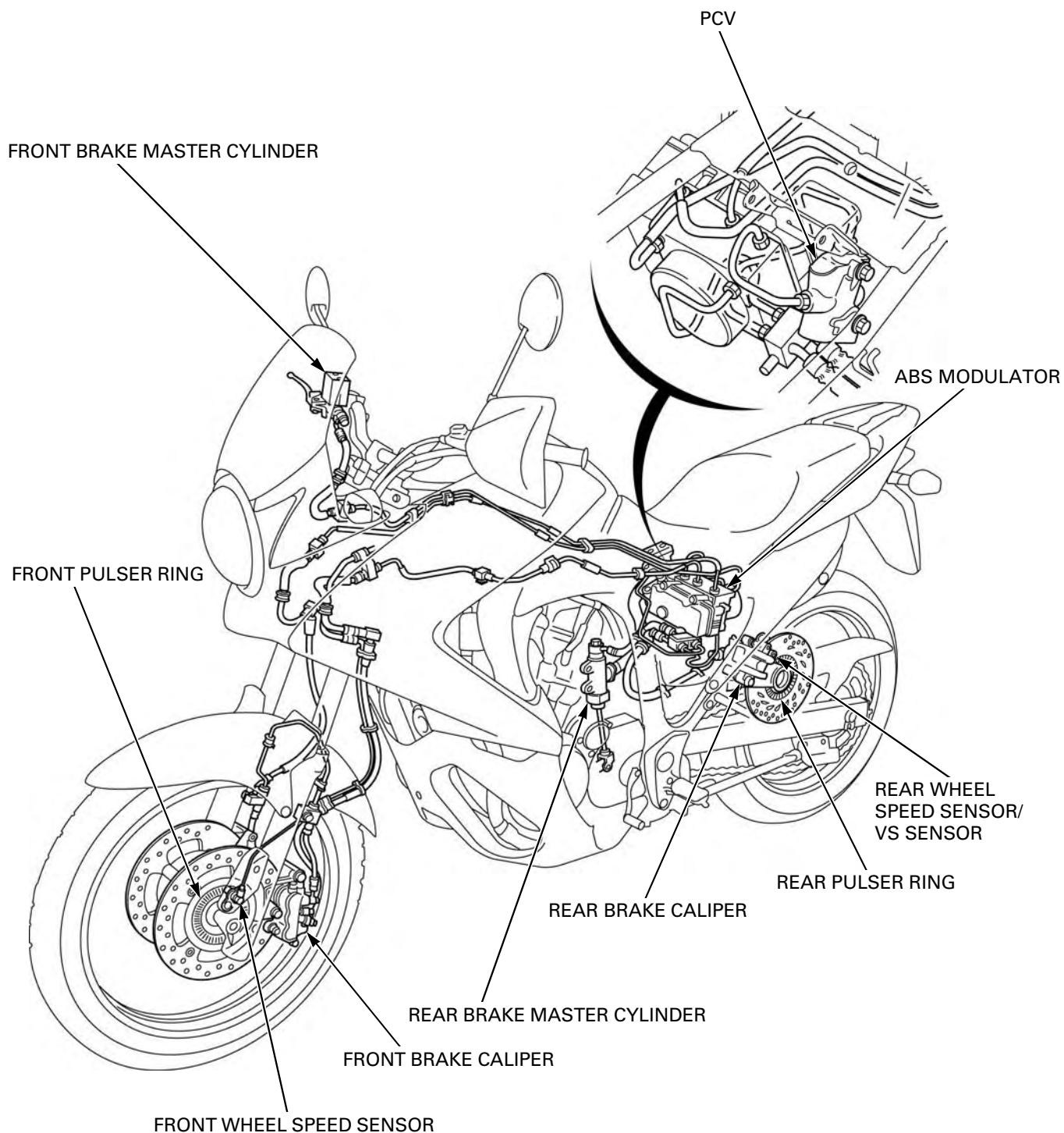
Install the rear master cylinder (page 15-40).



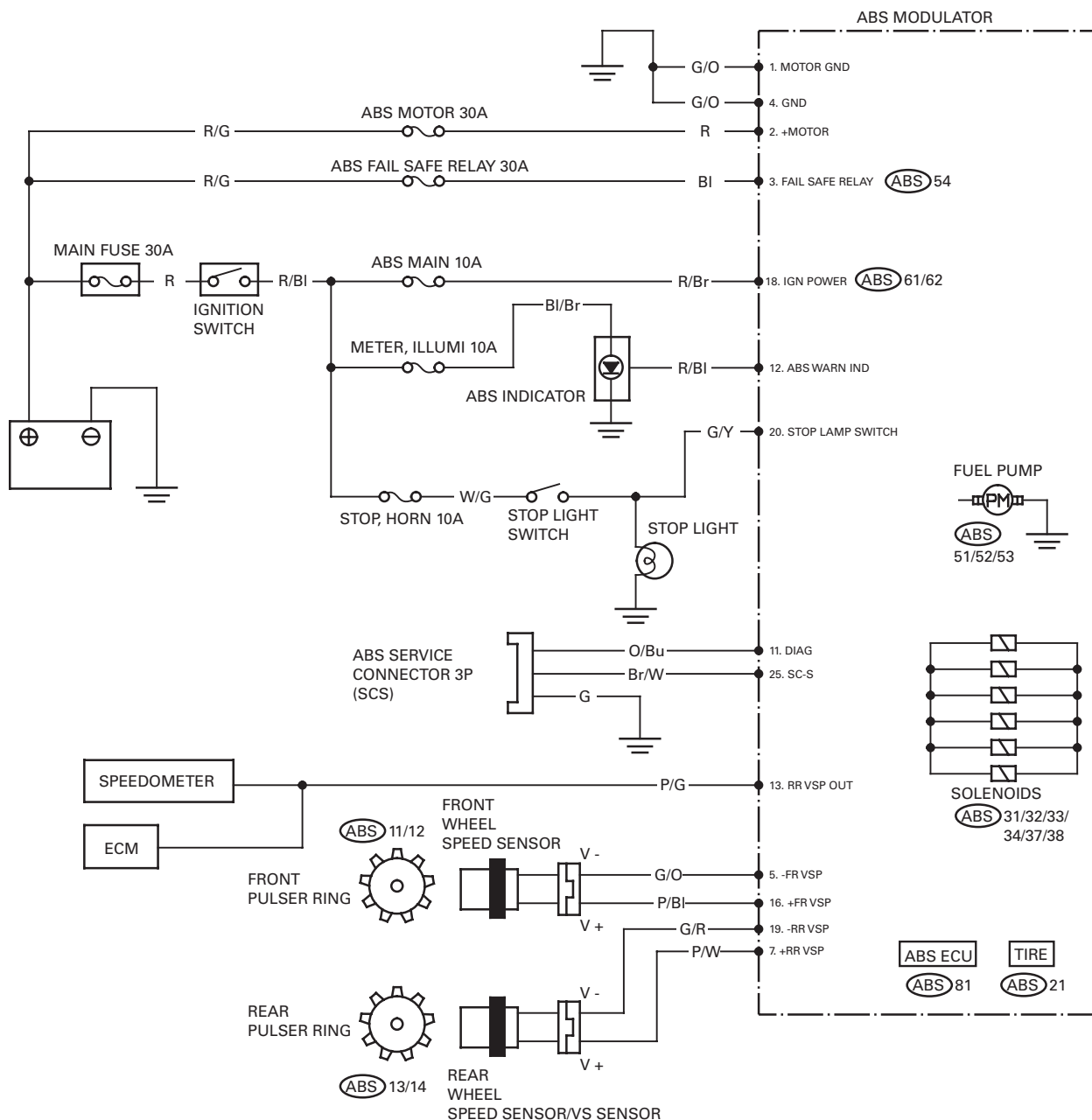
16. ANTI-LOCK BRAKE SYSTEM (ABS)

ABS SYSTEM LOCATION	16-2	ABS INDICATOR CIRCUIT TROUBLESHOOTING	16-11
ABS SYSTEM DIAGRAM	16-3	ABS TROUBLESHOOTING	16-13
SERVICE INFORMATION	16-4	FRONT WHEEL SPEED SENSOR	16-21
ABS CONNECTOR LOCATIONS	16-5	REAR WHEEL SPEED SENSOR/ VS SENSOR	16-22
ABS TROUBLESHOOTING INFORMATION	16-7	PCV	16-24
ABS INDICATOR PROBLEM CODE INDEX	16-10	ABS MODULATOR	16-24

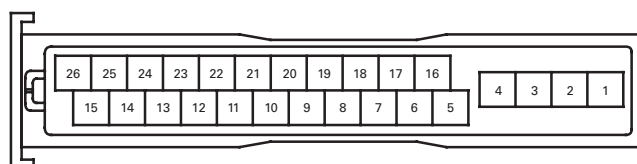
ABS SYSTEM LOCATION



ABS SYSTEM DIAGRAM



Br : Brown
Bl : Black
Y : Yellow
Bu : Blue
G : Green
R : Red
W : White
O : Orange
P : Pink



ANTI-LOCK BRAKE SYSTEM (ABS)

SERVICE INFORMATION

GENERAL

NOTICE

The ABS control module may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the control module. Always turn the ignition switch OFF before servicing.

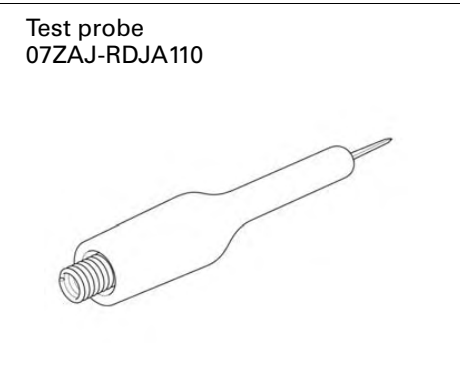
- This section covers service of the Anti-lock Brake System (ABS). For conventional brake service (page 15-4).
- When the motorcycle is running and the front wheel leaves the ground for a long time (wheelies), the ABS control unit (ECU) detects difference of the front and rear wheel speeds and then the indicator blinks.
- When the ABS control unit (ECU) 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.
- Troubles not resulting from a faulty ABS (e.g. brake disc squeak, unevenly worn brake pad) cannot be recognized by the ABS diagnosis system.
- Read "ABS Troubleshooting information" carefully, inspect and troubleshoot the ABS according to the Diagnostic Troubleshooting. Observe each step of the procedures one by one. Write down the problem code and probable faulty part before starting diagnosis and troubleshooting.
- After troubleshooting, erase the problem code and perform the pre-start self-diagnosis to be sure that the ABS indicator is operating normally.
- 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 when it is faulty.
- 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.
- Be careful not to damage the wheel speed sensor and pulser ring when removing and installing the wheel.
- The VS sensor is used for the PGM-FI system and also used as rear wheel speed sensor for the ABS.
- The following color codes are used throughout this section.

Bu = Blue	G = Green	Lg = Light green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light blue	P = Pink	Y = Yellow

TORQUE VALUES

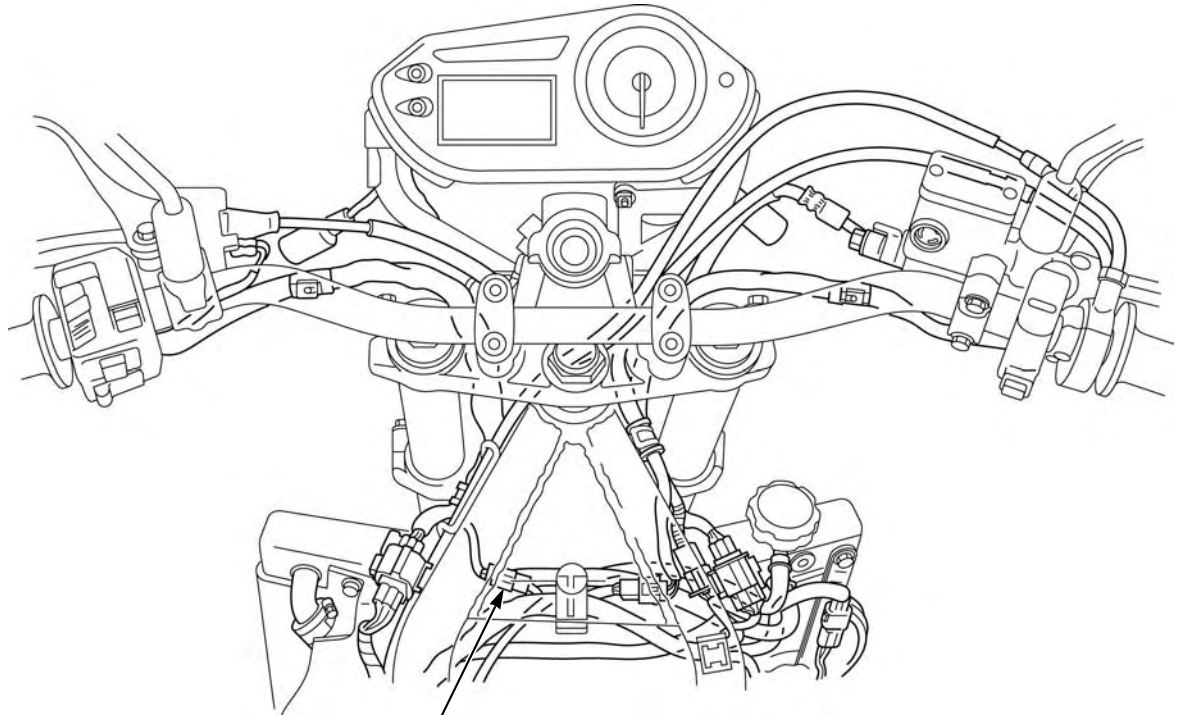
Front wheel pulser ring bolt	8 N·m (0.8 kgf·m, 5.9 lbf·ft)	
Rear wheel pulser ring bolt	8 N·m (0.8 kgf·m, 5.9 lbf·ft)	
Brake pipe joint nut	14 N·m (1.4 kgf·m, 10 lbf·ft)	Apply brake fluid to the threads.

TOOL



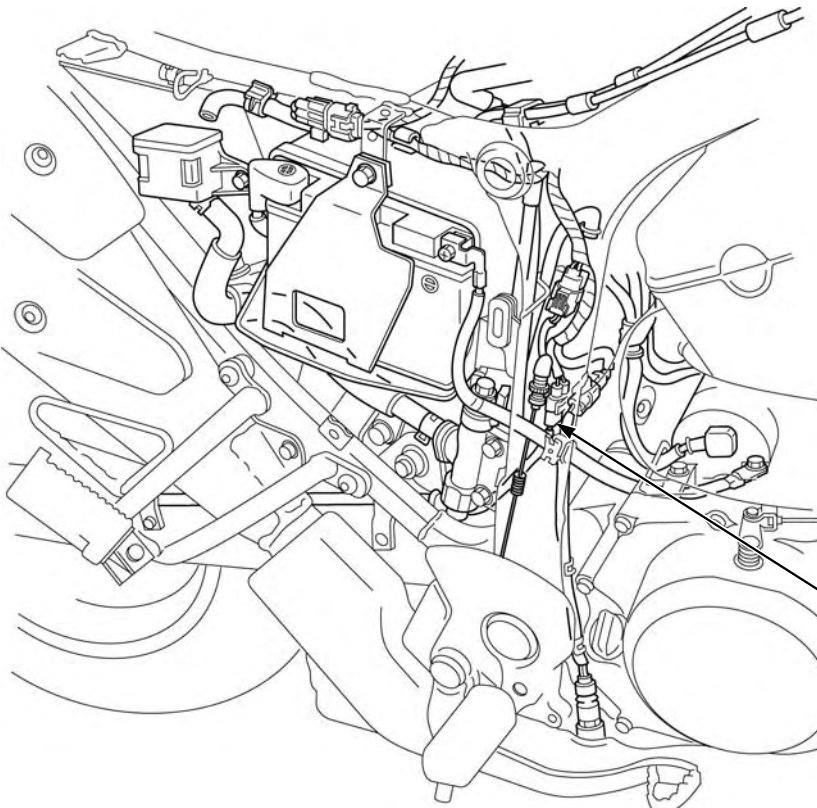
ABS CONNECTOR LOCATIONS

Note 1: Remove the air cleaner housing (page 5-62).



FRONT WHEEL SPEED SENSOR
2P (ORANGE) CONNECTOR (Note 1)

Note 2: Remove the battery tray (page 17-6).



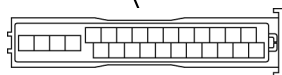
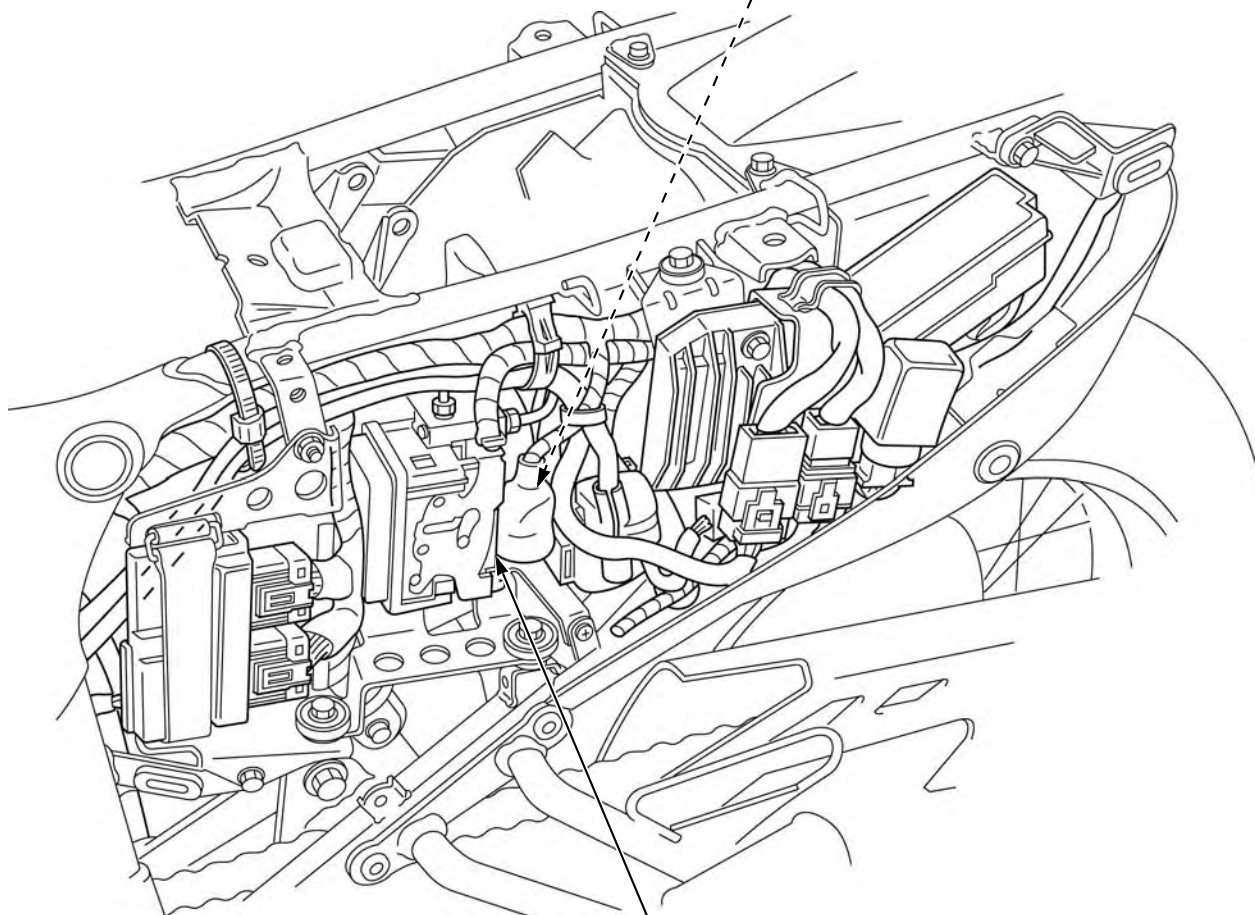
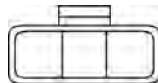
REAR WHEEL SPEED SENSOR/VS SENSOR
2P (ORANGE) CONNECTOR (Note 1)

ANTI-LOCK BRAKE SYSTEM (ABS)

Note 3: Remove the seat (page 2-4).

Note 4: Remove the left side cover (page 2-4).

ABS SERVICE CHECK
3P (NATURAL) CONNECTOR (Note 3)



ABS MODULATOR
26P CONNECTOR (Note 4)

ABS TROUBLESHOOTING INFORMATION

SYSTEM DESCRIPTION

SUMMARY OF ABS PRE-START SELF-DIAGNOSIS SYSTEM

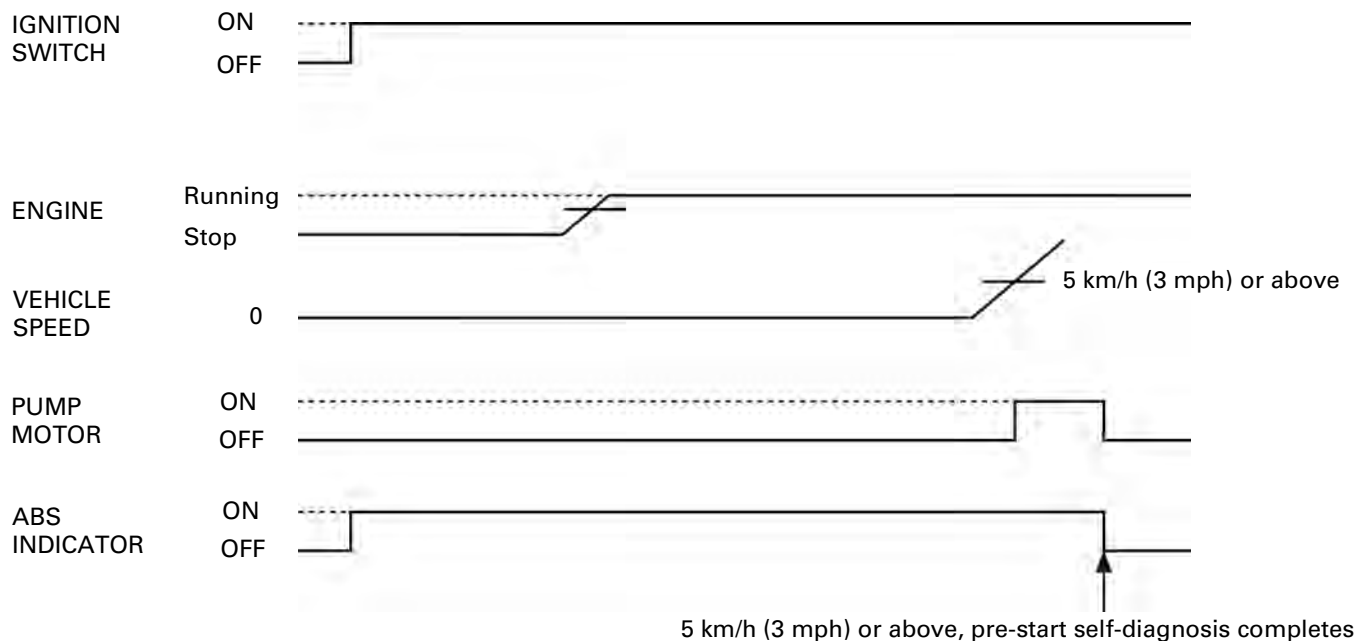
The ABS pre-start self-diagnosis system diagnoses the electrical system as well as the operating status of the modulator. When there is any abnormality, the problem and the problematic part can be detected by outputting the problem code.

When the vehicle is running, pulse signals generated at the front wheel speed sensor and rear wheel speed sensor/VS sensor are sent to the ABS control unit. When the ABS control unit detects that vehicle speed goes to 5 km/h (3 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 when the vehicle speed goes to 5 km/h (3 mph) approximately.

If the ABS indicator blinks, because problem is detected during the pre-start self-diagnosis (page 16-7).

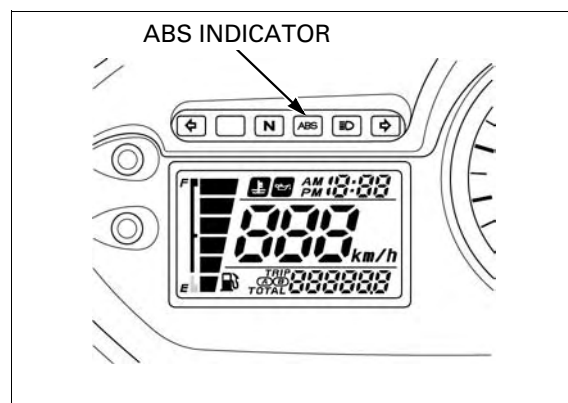
If the ABS indicator does not come on when the ignition switch is turned ON, or the ABS indicator stays on after the pre-start self-diagnosis procedure is complete, the ABS indicator may be faulty. Follow the troubleshooting (page 16-11).

Pre-start self-diagnosis when normal:



PRE-START SELF-DIAGNOSIS PROCEDURE

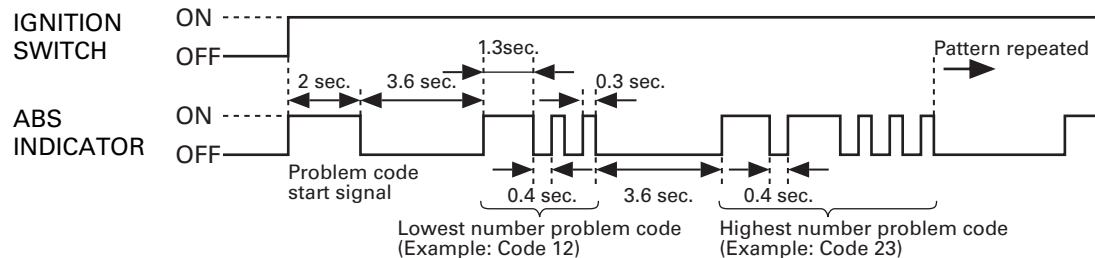
1. Turn the ignition switch ON and engine stop switch "O".
2. Make sure the ABS indicator comes on.
3. Start the engine.
4. Ride the motorcycle and increase the vehicle speed to approximately 5 km/h (3 mph).
5. The ABS is normal if the ABS indicator goes off.



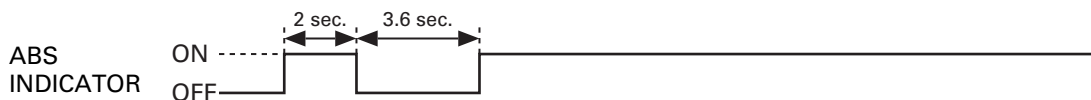
ANTI-LOCK BRAKE SYSTEM (ABS)

PROBLEM CODE INDICATION PATTERN

- The ABS indicator indicates the problem code by blinking a specified number of times. The indicator has two types of blinkings, 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 troubleshooting and see problem code 23.
- When the ABS control unit stores six problem codes, the ABS indicator shows the problem codes in the order from the latest problem code to earliest problem code.



When the problem code is not stored:



PROBLEM CODE READOUT

NOTE:

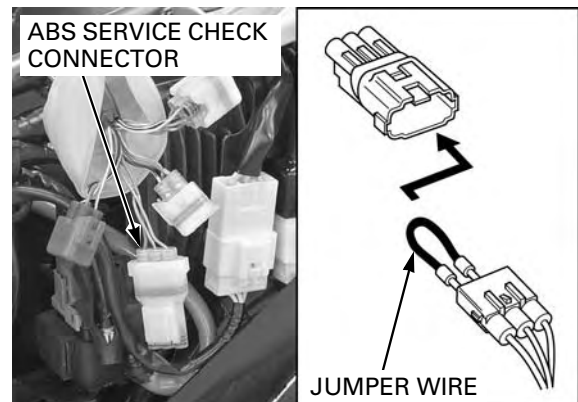
- The problem code is not erased by turning the ignition switch OFF while the problem code is being output. Note that turning the ignition switch ON again does not indicate the problem code. To show the problem code again, repeat the problem code retrieval procedures from the beginning. Do not apply the front or rear brake during retrieval.
- 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).

- Remove the left side cover (page 2-4).

Turn the ignition switch OFF.

Disconnect the dummy connector from the ABS service check 3P (Natural) connector. Short the wire terminals of the ABS service check 3P (Natural) connector with a jumper wire.

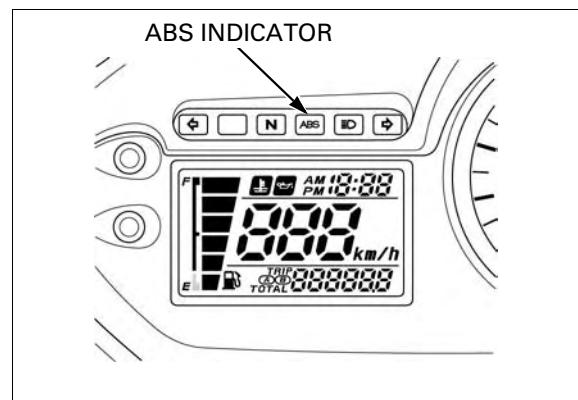
Connection: Brown/white – Green



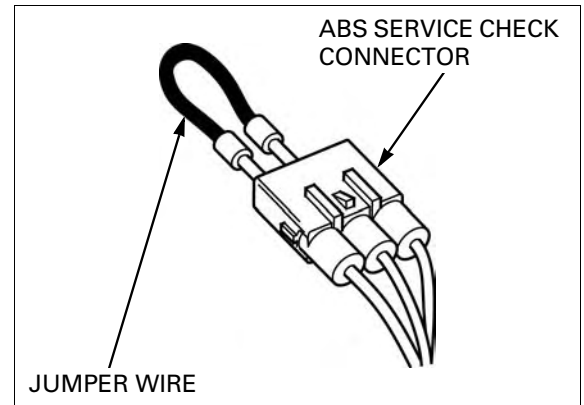
- Turn the ignition switch ON.

The ABS indicator starts problem code indication.

Note how many times the ABS indicator blinks, and determine the cause of the problem (page 16-10).



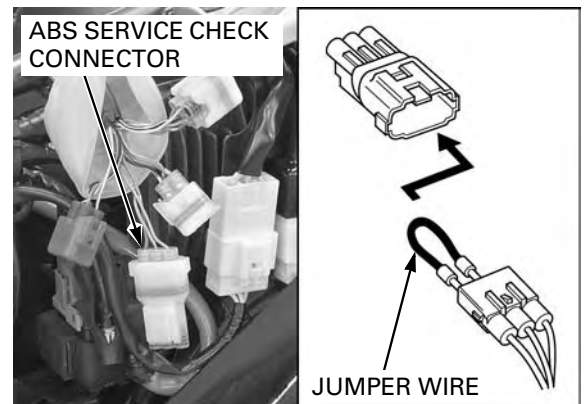
3. Turn the ignition switch OFF and remove the jumper wire.



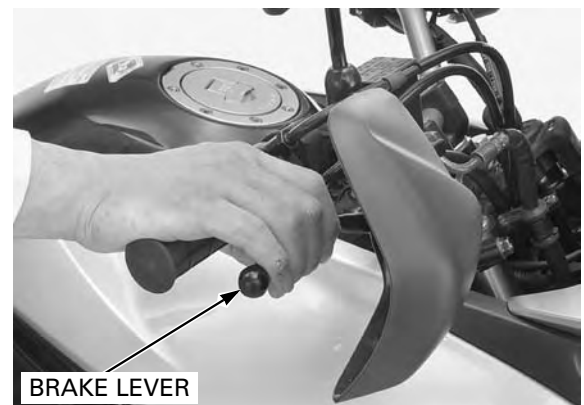
CLEANING PROBLEM CODE

1. Short the wire terminals of the ABS service check 3P (Natural) connector with a jumper wire with the ignition switch turned OFF in the same manner as retrieval.

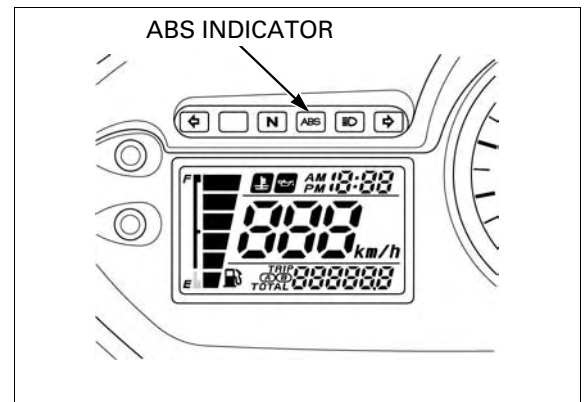
Connection: Brown/white – Green



2. Turn the ignition switch ON and engine stop switch "O" while squeezing the brake lever. The ABS indicator should come on for 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 16-13).
6. Turn the ignition switch OFF.



ANTI-LOCK BRAKE SYSTEM (ABS)

ABS INDICATOR PROBLEM CODE INDEX

NOTE:

- The ABS indicator might blink in the following cases. Correct the faulty part.
 - Incorrect tire pressure.
 - Tires not recommended for the motorcycle were installed (incorrect tire size).
 - Deformation of the wheel or tire.
- The ABS indicator might blink while riding under the following conditions. This is temporary failure. Erase the problem code and perform the pre-start self-diagnosis. The ABS is normal if the indicator goes off. Ask the rider for the riding conditions in detail when the motorcycle is brought in for inspection.
 - The motorcycle has continuously run 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		
–	ABS indicator circuit malfunction • Indicator related wires • Combination meter • ABS modulator			• ABS indicator never come ON at all	16-11
				• ABS indicator stays ON at all	16-12
11	Front wheel speed sensor circuit malfunction • Wheel speed sensor or related wires	O	O	• Stops ABS operation	16-13
12	Front wheel speed sensor malfunction • Wheel speed sensor, pulser ring or related wires • Electromagnetic interference • Riding condition		O	• Stops ABS operation	16-13
13	Rear wheel speed sensor/VS sensor circuit malfunction • Wheel speed sensor or related wires	O	O	• Stops ABS operation	16-15
14	Rear wheel speed sensor/VS sensor malfunction • Wheel speed sensor, pulser ring or related wires • Electromagnetic interference • Riding condition		O	• Stops ABS operation	16-15
21	Wheel slipping • Riding condition • Incorrect tire size		O	• Stops ABS operation	16-17
31	Solenoid valve malfunction	O	O	• Stops ABS operation	16-17
32					
33					
34					
37					
38					
42	Front wheel speed sensor/Wheelie • Riding condition (wheelie)		O	• Stops ABS operation	16-13
51	Motor/Stick		O	• Stops ABS operation	16-18
52	Motor/Stop	O	O	• Stops ABS operation	
53	Motor/Run	O	O	• Stops ABS operation	
54	Valve relay/Abnormal voltage	O	O	• Stops ABS operation	16-19
61	Power circuit/Under-voltage	O	O	• Stops ABS operation	16-20
62	Power circuit/Over-voltage	O	O	• Stops ABS operation	
81	CPU (ABS control unit)	O	O	• Stops ABS operation	16-21

(A) Pre-start self-diagnosis (page 16-7)

(B) Ordinary self-diagnosis: diagnoses while the motorcycle 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 20-9).

Are the wires normal?

NO – Open circuit in related wires

YES – GO TO STEP 2.

2. Indicator Operation Inspection

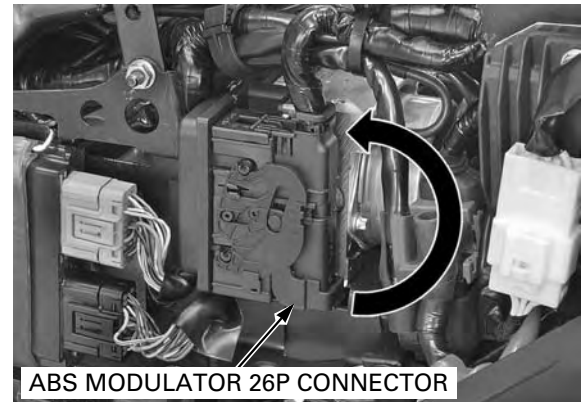
Disconnect the ABS modulator 26P connector.

Turn the ignition switch ON and check the ABS indicator.

Does the indicator come on?

YES – Faulty ABS modulator

NO – GO TO STEP 3.



3. Indicator Signal Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the combination meter 20P connector.

Check for continuity between the ABS modulator 26P connector of the wire harness side and ground.

TOOL:

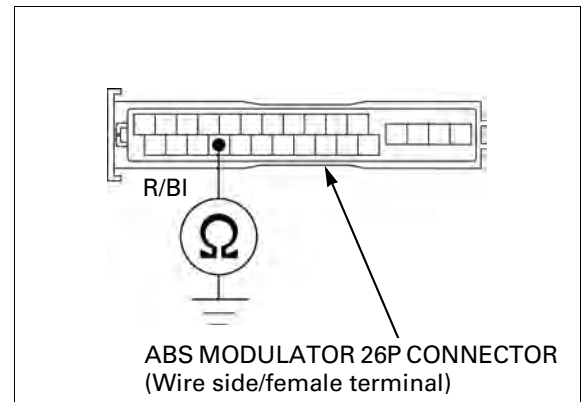
Test probe 07ZAJ-RDJA110

Connection: Red/black – Ground

Is there continuity?

YES – Short circuit in Red/black wire between the combination meter and ABS modulator

NO – Faulty combination meter



ANTI-LOCK BRAKE SYSTEM (ABS)

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 26P connector.

Check for continuity between the ABS modulator 26P connector of the wire harness side and ground.

TOOL:

Test probe 07ZAJ-RDJA110

Connection: Brown/white – Ground

Is there continuity?

YES – Short circuit in Brown/white wire between the service check connector and ABS modulator

NO – GO TO STEP 2.

2. Indicator Operation Inspection

With the combination meter 20P connector connected, short the Red/black wire terminal of the combination meter and ground with a jumper wire.

Check the ABS indicator with the ignition switch turned ON.

Does the ABS indicator go off?

NO – Faulty combination meter

YES – GO TO STEP 3.

3. Indicator Signal Line Open Circuit Inspection

Turn the ignition switch OFF.

Remove the jumper wire from the combination meter 20P connector.

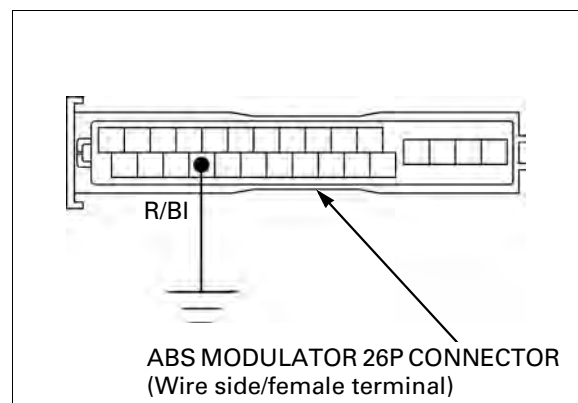
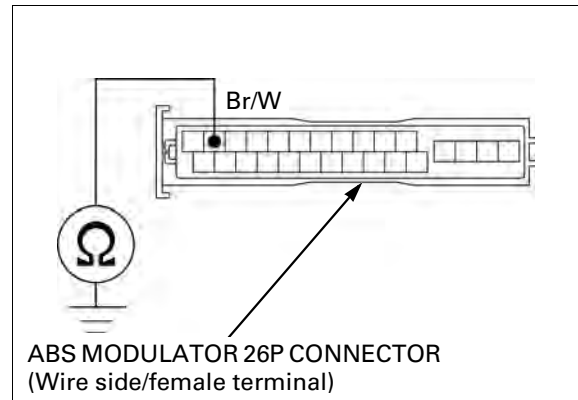
Short the Red/black wire terminal of the ABS modulator 26P connector and ground with a jumper wire.

Check the ABS indicator with the ignition switch turned ON.

Does the ABS indicator go off?

NO – Open circuit in Red/black wire between the combination meter and ABS modulator

YES – Faulty ABS modulator



ABS TROUBLESHOOTING

NOTE:

- Perform inspection with the ignition switch turned OFF, unless otherwise specified.
- Refer to the ABS Connector Locations (page 16-5). 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 16-9).
Then test ride the motorcycle above 5 km/h (3 mph) and check the other problem code by retrieving the self-diagnosis system (page 16-7).
- Before starting the diagnosis and troubleshooting, check the ABS modulator power/ground line (page 16-24).
Also, check the ABS indicator circuit (page 16-11).

PROBLEM CODE 11, 12 or 42 (Front Wheel Speed Sensor)

NOTE:

- The ABS indicator might blink under unusual riding or conditions (page 16-10).
This is temporary failure. Erase the problem code (page 16-9).
Then test ride the motorcycle above 5 km/h (3 mph) and check the problem code by retrieving the self-diagnosis system (page 16-8).
- If the problem code 12 is indicated, check the front brake for drag.

1. Speed Sensor Air Gap Inspection

Support the motorcycle 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.

STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

Is the air gap correct?

- NO** – Check each part for deformation and looseness and correct accordingly.
Recheck the air gap.
- YES** – GO TO STEP 2.



ANTI-LOCK BRAKE SYSTEM (ABS)

2. Speed Sensor Condition Inspection

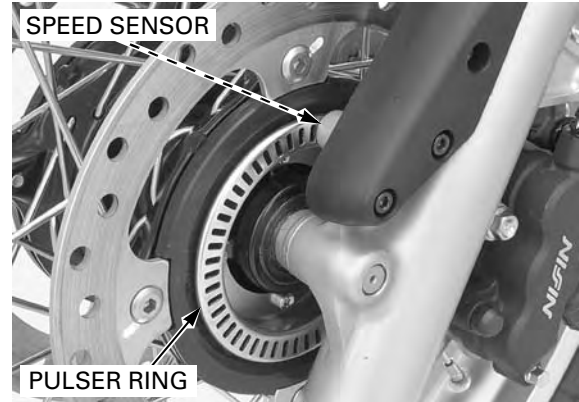
Inspect the area around the front wheel speed sensor:

Check that there is iron or other magnetic deposits between the pulser ring and wheel speed sensor, 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?

NO – Remove any deposits. Install properly or replace faulty part.

YES – GO TO STEP 3.



3. Speed Sensor Input Voltage Inspection

Disconnect the front wheel speed sensor 2P (Orange) connector.

Measure the voltage at the front wheel speed sensor 2P (Orange) connector of the wire harness side with the ignition switch turned ON.

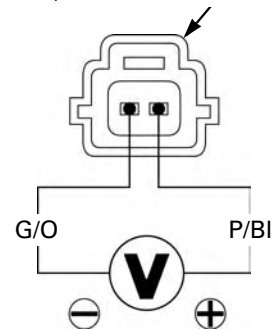
Connection: Pink/black (+) – Green/orange (–)

Is there battery voltage?

YES – Faulty front wheel speed sensor

NO – GO TO STEP 4.

FRONT WHEEL SPEED SENSOR 2P (ORANGE) CONNECTOR (Wire side/female terminal)



4. Speed Sensor Line Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ABS modulator 26P connector.

Check for continuity at the Pink/black and Green/orange terminals between front wheel speed sensor 2P (Orange) connector and ABS modulator 26P connector.

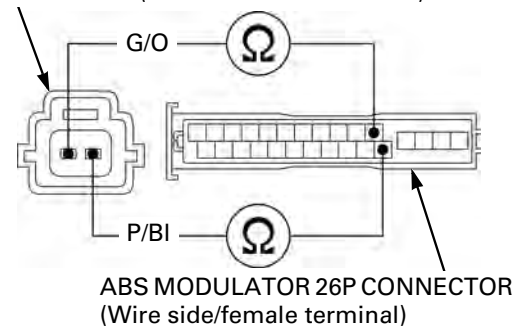
**Connection: Pink/black – Ground
Green/orange – Ground**

Is there continuity?

NO – Open circuit in wire between the ABS modulator and speed sensor

YES – GO TO STEP 5.

FRONT WHEEL SPEED SENSOR 2P (ORANGE) CONNECTOR (Wire side/male terminal)



5. Speed Sensor Line Short Circuit Inspection

Connect the ABS modulator 26P connector.

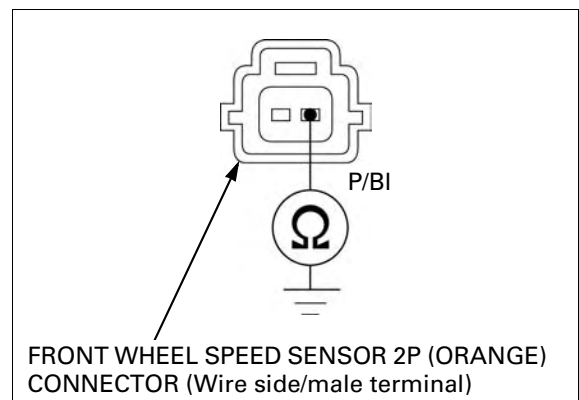
Check for continuity between the front wheel speed sensor 2P (Orange) connector of the wire harness side and ground.

Connection: Pink/black – Ground

Is there continuity?

YES – Short circuit in Pink/black wire

NO – GO TO STEP 6.

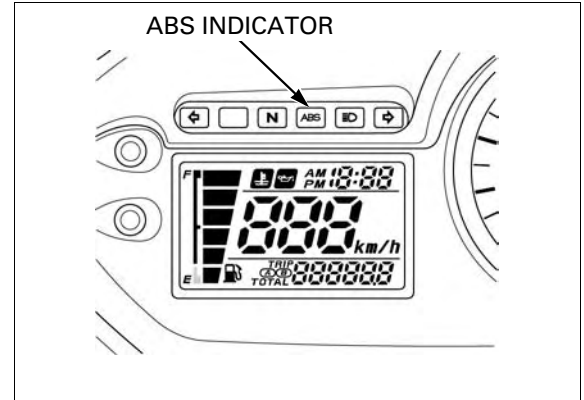


6. Failure Reproduction With A New Speed Sensor

Replace the front wheel speed sensor with a new one (page 16-21).
Connect the ABS modulator 26P connector.
Erase the problem code (page 16-9).
Test ride the motorcycle above 5 km/h (3 mph).
Retrieve the problem code (page 16-8).

Dose the indicator blink 11, 12 or 42 times?

- NO** – Faulty removed front wheel speed sensor
YES – Faulty ABS modulator



PROBLEM CODE 13 or 14 (Rear Wheel Speed Sensor/VS sensor)

NOTE:

- The ABS indicator might blink under unusual riding or conditions (page 16-10).
This is temporary failure. Erase the problem code (page 16-9).
Then test ride the motorcycle above 5 km/h (3 mph) and check the problem code by retrieving the self-diagnosis system (page 16-8).
- If the problem code 14 is indicated, check the rear brake for drag.

1. Speed Sensor Air Gap Inspection

Support the motorcycle securely and raise the rear wheel off the ground.
Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.

STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

Is the air gap correct?

- NO** – Check each part for deformation and looseness and correct accordingly.
Recheck the air gap.
YES – GO TO STEP 2.

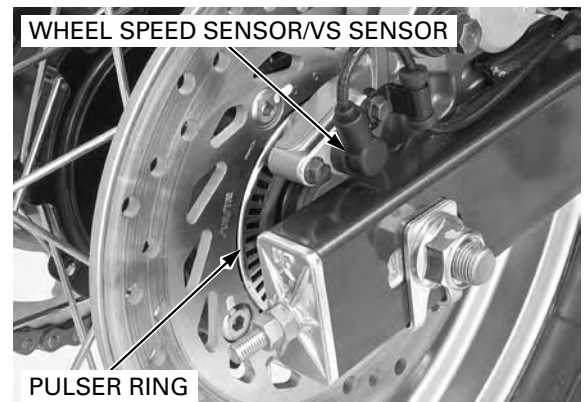


2. Speed Sensor Condition Inspection

Inspect the area around the rear wheel speed sensor/VS sensor:
Check that there is iron or other magnetic deposits between the pulser ring and wheel speed sensor/VS sensor, and the pulser ring slots for obstructions.
Check installation condition of the pulser ring or wheel speed sensor/VS 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?

- NO** – Remove any deposits. Install properly or replace faulty part.
YES – GO TO STEP 3.



ANTI-LOCK BRAKE SYSTEM (ABS)

3. Speed Sensor Input Voltage Inspection

Disconnect the rear wheel speed sensor/VS sensor 2P (Orange) connector.

Measure the voltage at the rear wheel speed sensor/VS sensor 2P (Orange) connector of the wire harness side with the ignition switch turned ON.

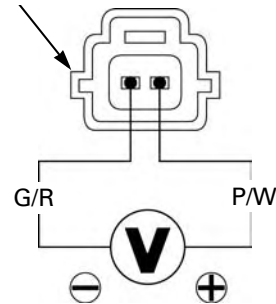
Connection: Pink/white (+) – Green/red (-)

Is there battery voltage?

YES – Faulty rear wheel speed sensor/VS sensor

NO – GO TO STEP 4.

REAR WHEEL SPEED SENSOR/
VS SENSOR 2P (ORANGE) CONNECTOR
(Wire side/female terminal)



4. Speed Sensor Line Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ABS modulator 26P connector.

Check for continuity at the Pink/white and Green/red terminals between rear wheel speed sensor/VS sensor 2P (Orange) connector and ABS modulator 26P connector.

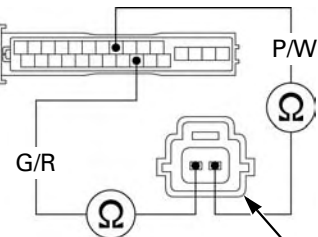
**Connection: Pink/white – Ground
Green/red – Ground**

Is there continuity?

NO – Open circuit in wire between the ABS modulator and rear wheel speed sensor/VS sensor

YES – GO TO STEP 5.

ABS MODULATOR 26P CONNECTOR
(Wire side/female terminal)



REAR WHEEL SPEED SENSOR/
VS sensor 2P (ORANGE) CONNECTOR
(Wire side/male terminal)

5. Speed Sensor Line Short Circuit Inspection

Connect the ABS modulator 26P connector.

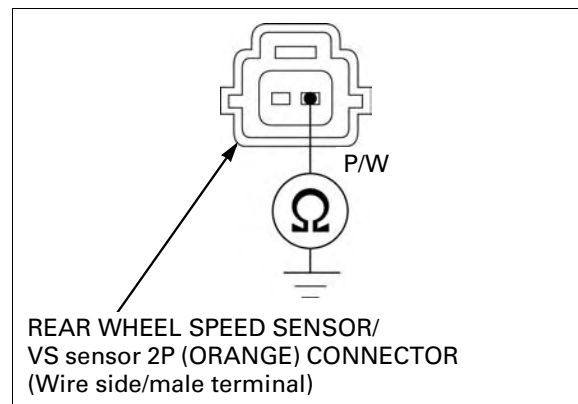
Check for continuity between the rear wheel speed sensor/VS sensor 2P (Orange) connector of the wire harness side and ground.

Connection: Pink/white – Ground

Is there continuity?

YES – Short circuit in Pink/black wire

NO – GO TO STEP 6.



6. Failure Reproduction With A New Speed Sensor

Replace the rear wheel speed sensor/VS sensor with a new one (page 16-23).

Connect the ABS modulator 26P connector.

Erase the problem code (page 16-9).

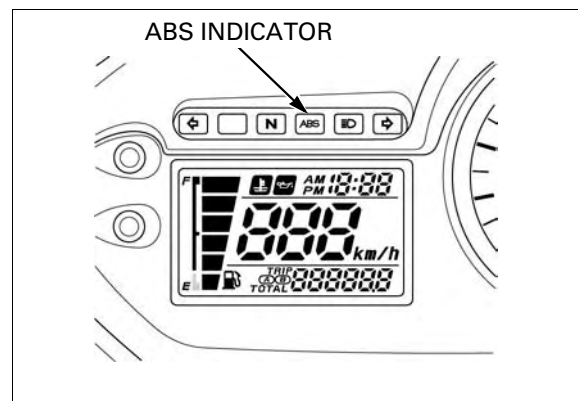
Test ride the motorcycle above 5 km/h (3 mph).

Retrieve the problem code (page 16-8).

Dose the indicator blink 13 or 14 times?

NO – Faulty removed rear wheel speed sensor/VS sensor

YES – Faulty ABS modulator



PROBLEM CODE 21 (Wheel slipping)

NOTE:

- The ABS indicator might blink under unusual riding or conditions (page 16-10). This is temporary failure. Erase the problem code (page 16-9). Then test ride the motorcycle above 5 km/h (3 mph) and check the problem code by retrieving the self-diagnosis system (page 16-8).
- Check the following and correct the faulty part.
 - Incorrect tire pressure.
 - Tires not recommended for the motorcycle 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 16-9).

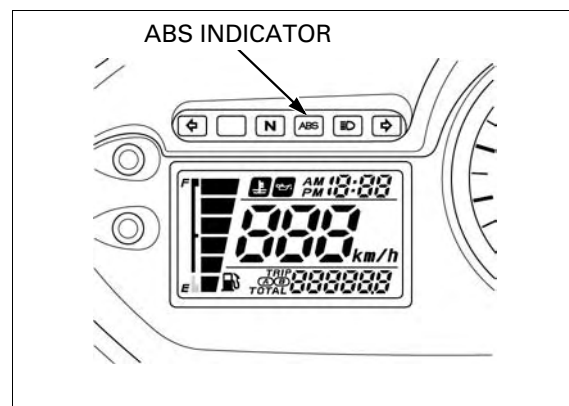
Test ride the motorcycle above 5 km/h (3 mph).

Retrieve the problem code (page 16-8).

Does the indicator blink 21 times?

YES – Faulty ABS modulator

NO – Tire size is normal (temporary failure).



PROBLEM CODE 31, 32, 33, 34, 37 or 38 (Solenoid Valve)

1. Failure Reproduction

Erase the problem code (page 16-9).

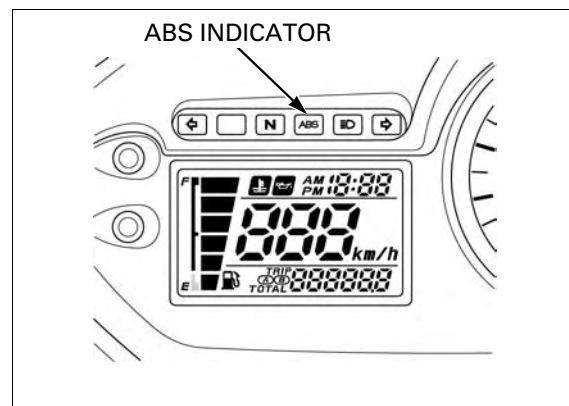
Test ride the motorcycle above 5 km/h (3 mph).

Retrieve the problem code (page 16-8).

Does the indicator blink 31, 32, 33, 34, 37 or 38 times?

YES – Faulty ABS modulator

NO – Solenoid valve is normal (temporary failure).



ANTI-LOCK BRAKE SYSTEM (ABS)

PROBLEM CODE 51, 52 or 53 (Pump Motor)

1. Motor Power Input Line Open Circuit Inspection

Disconnect the ABS modulator 26P connector.

Measure the voltage between the ABS modulator 26P connector of the wire harness side and ground.

There should be battery voltage at all times.

TOOL:

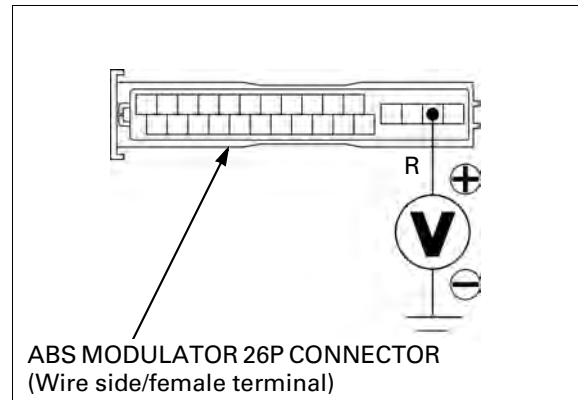
Test probe 07ZAJ-RDJA110

Connection: Red (+) – Ground (-)

Is there battery voltage?

NO – GO TO STEP 2.

YES – GO TO STEP 3.



2. Motor Power Input Line Short Circuit Inspection

Check for continuity between the ABS modulator 26P connector of the wire harness side and ground.

TOOL:

Test probe 07ZAJ-RDJA110

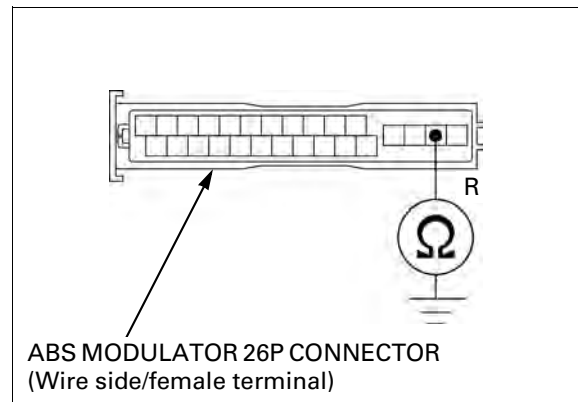
Connection: Red – Ground

Is there continuity?

NO –

- Open circuit in Red wire and/or Red/green wire
- Loose or poor contact on the connector
- Blown the "ABS MOTOR" fuse (30 A)

YES – Short circuit in Red and/or Red/green wires



3. Failure Reproduction

Connect the ABS modulator 26P connector.

Erase the problem code (page 16-9).

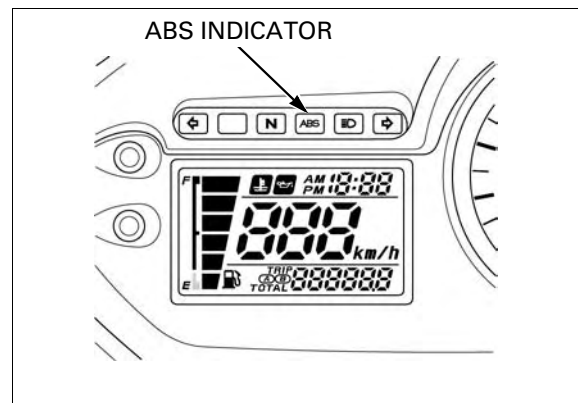
Test ride the motorcycle above 5 km/h (3 mph).

Retrieve the problem code (page 16-8).

Does the indicator blink 51, 52, or 53 times?

YES – Faulty ABS modulator

NO – Pump motor is normal (temporary failure).



PROBLEM CODE 54 (Valve Relay)

1. Relay Power Input Line Open Circuit Inspection

Disconnect the ABS modulator 26P connector.

Measure the voltage between the ABS modulator 26P connector of the wire harness side and ground.

There should be battery voltage at all times.

TOOL:

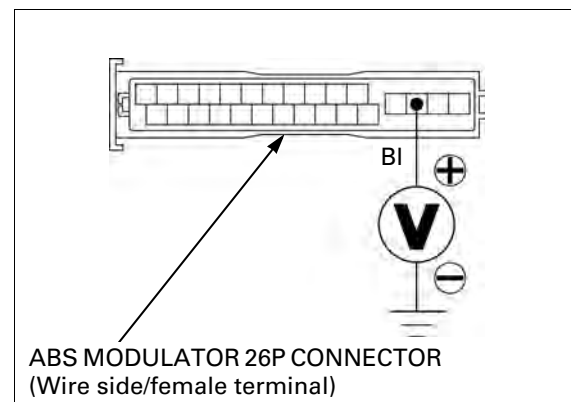
Test probe 07ZAJ-RDJA110

Connection: Black (+) – Ground (–)

Is there battery voltage?

NO – GO TO STEP 2.

YES – GO TO STEP 3.



2. Relay Power Input Line Short Circuit Inspection

Check for continuity between the ABS modulator 26P connector of the wire harness side and ground.

TOOL:

Test probe 07ZAJ-RDJA110

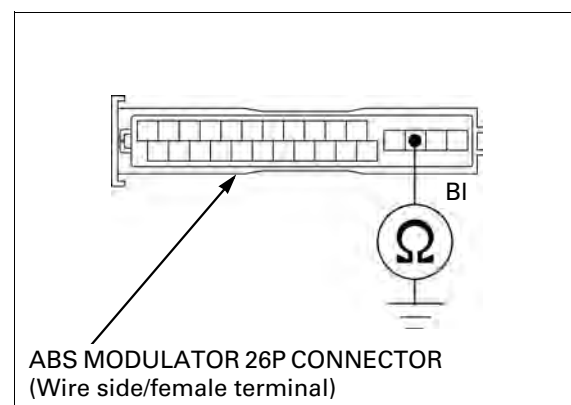
Connection: Black – Ground

Is there continuity?

NO –

- Open circuit in Black wire and/or Red/green wires
- Loose or poor contact on the connector
- Blown the "ABS FAIL SAFE RELAY" fuse (30 A)

YES – Short circuit in Black and/or Red/green wire



3. Failure Reproduction

Connect the ABS modulator 26P connector.

Erase the problem code (page 16-9).

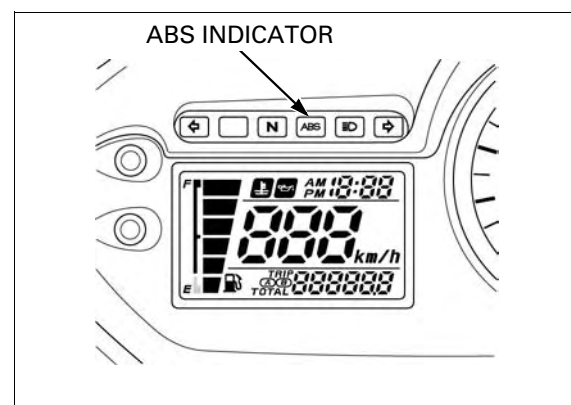
Test ride the motorcycle above 5 km/h (3 mph).

Retrieve the problem code (page 16-8).

Does the indicator blink 54 times?

YES – Faulty ABS modulator

NO – Fail-safe relay is normal (temporary failure)



ANTI-LOCK BRAKE SYSTEM (ABS)

PROBLEM CODE 61 or 62 (Power Circuit)

1. ABS Power Input Line Short Circuit Inspection

Disconnect the ABS modulator 26P connector.

Check for continuity between the ABS modulator 26P connector of the wire harness side and ground.

TOOL:

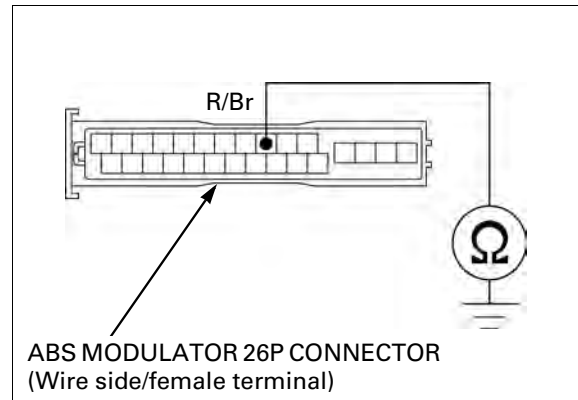
Test probe 07ZAJ-RDJA110

Connection: Red/brown – Ground

Is there continuity?

NO – GO TO STEP 2.

YES – Short circuit in Red/brown, Red/black and/or Red wires



2. ABS Power Input Line Open Circuit Inspection

Measure the voltage between the ABS modulator 26P connector of the wire harness side and ground with the ignition switch turned ON.

TOOL:

Test probe 07ZAJ-RDJA110

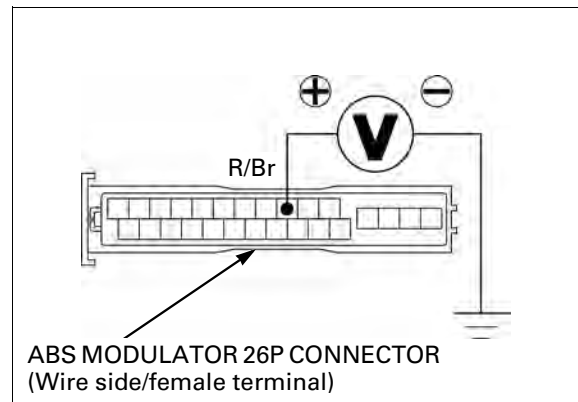
Connection: Red/brown (+) – Ground (–)

Is there battery voltage?

NO –

- Open circuit in Red/brown wire between the fuse box and ABS modulator
- Loose or poor contact on the connector
- Blown the "ABS MAIN" fuse (10 A)

YES – GO TO STEP 3.



3. Failure Reproduction

Turn the ignition switch OFF.

Connect the ABS modulator 26P connector.

Erase the problem code (page 16-9).

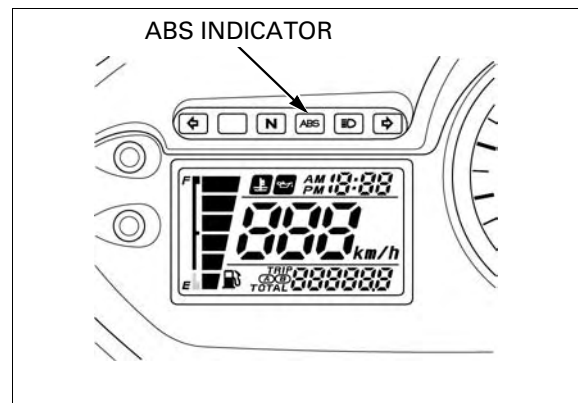
Test ride the motorcycle above 5 km/h (3 mph).

Retrieve the problem code (page 16-8).

Does the indicator blink 61 or 62 times?

YES – Faulty ABS modulator

NO – Power circuit is normal (temporary failure).



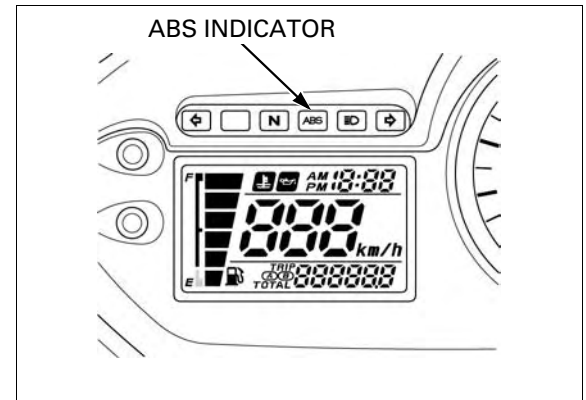
PROBLEM CODE 81 (CPU; ABS Control Unit)

1. Failure Reproduction

Erase the problem code (page 16-9).
Test ride the motorcycle above 5 km/h (3 mph).
Retrieve the problem code (page 16-8).

Does the indicator blink 81 times?

- YES** – Faulty ABS modulator
NO – CPU is normal (temporary failure).



FRONT WHEEL SPEED SENSOR

INSPECTION

Support the motorcycle securely using a hoist or equivalent and raise the front wheel off the ground.

Measure the clearance (air gap) between the sensor and pulser ring at several points by turning the wheel slowly.
It must be within specification.

STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

The sensor air gap cannot be adjusted.
If it is not within specification, check each installation part for deformation, looseness and damage.

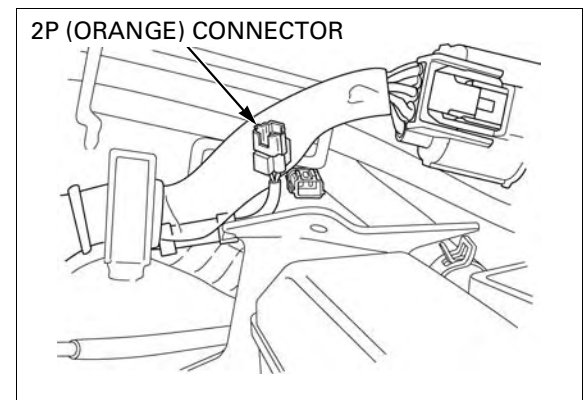


REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-62).

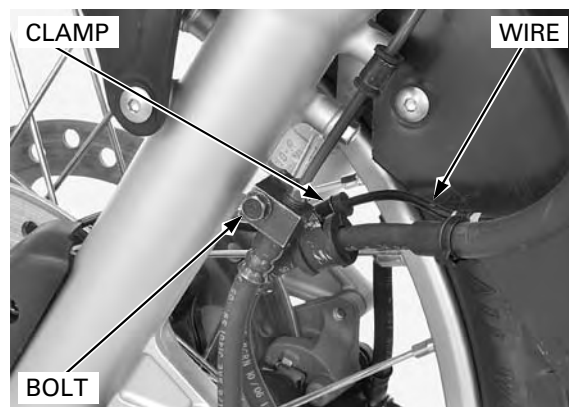
Disconnect the front wheel speed sensor 2P (Orange) connector.

Release the wheel speed sensor wire from the clamps (page 1-21).

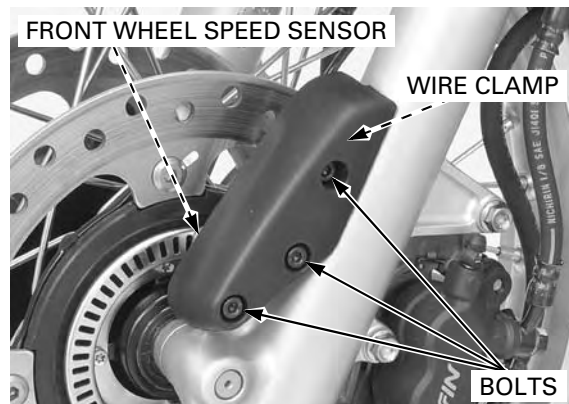


ANTI-LOCK BRAKE SYSTEM (ABS)

Remove the bolt, then release the wheel speed sensor wire from the clamp.



Remove the bolts, sensor cover, wire clamp and front wheel speed sensor.



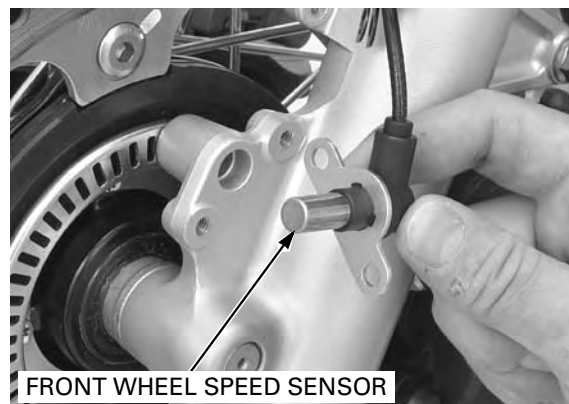
Check that there is iron or other magnetic deposits between the pulser ring and front wheel speed sensor.
Remove any deposits.

Check the sensor tip for deformation or damage (e.g., chipped pulser ring teeth).
Replace the front wheel speed sensor if necessary.

Installation is in the reverse order of removal.

After installing the speed sensor, Measure the clearance (air gap) between the sensor and pulser ring (page 16-21).

Route the sensor wire properly (page 1-21).



REAR WHEEL SPEED SENSOR/VS SENSOR

INSPECTION

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

Measure the clearance (air gap) between the rear wheel speed sensor/VS sensor and pulser ring at several points by turning the wheel slowly.
It must be within specification.

STANDARD: 0.4 – 1.2 mm (0.02 – 0.05 in)

The sensor air gap cannot be adjusted.
If it is not within specification, check each installed part for deformation, looseness and damage.

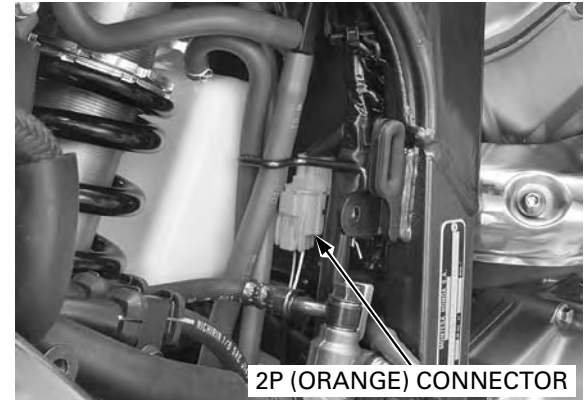


REMOVAL/INSTALLATION

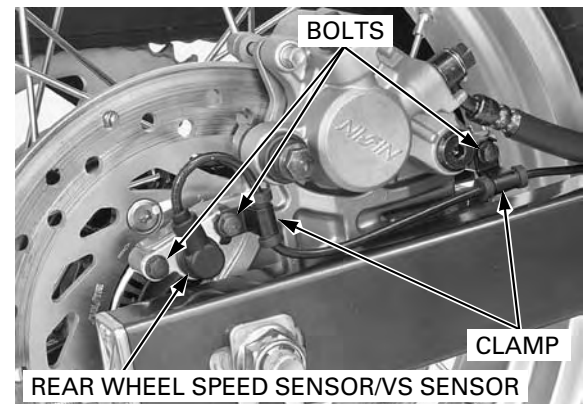
Remove the battery tray (page 17-6).

Disconnect the rear wheel speed sensor/VS sensor 2P (Orange) connector.

Remove the wire harness from the clamps (page 1-21).



Remove the bolts, wire clamp and rear wheel speed sensor/VS sensor.



Check that there is iron or other magnetic deposits between the pulser ring and rear wheel speed sensor/VS sensor.
Remove any deposits.

Route the sensor wire properly (page 1-21).

Check the sensor tip for deformation or damage (e.g., chipped pulser ring teeth).
Replace the wheel speed sensor/VS sensor if necessary.

Installation is in the reverse order of removal.

After installing the wheel speed sensor/VS sensor, Measure the clearance (air gap) between the sensor and pulser ring (page 16-22).



ANTI-LOCK BRAKE SYSTEM (ABS)

PCV

REMOVAL/INSTALLATION

Drain the brake fluid from the front and rear hydraulic systems (page 15-11).

Remove the battery tray (page 17-6).

Loosen the joint nuts and remove the brake pipe.

When loosening the brake pipe joint nuts, cover the end of the brake pipes to prevent contamination.

Be careful not to bend or damage the brake pipes during PCV removal.

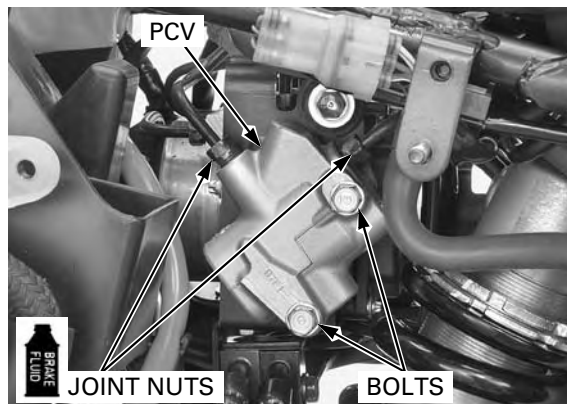
Remove the bolts and PCV.

Install the PCV and tighten the bolts securely.

Apply brake fluid to the brake pipe joint nut threads. Install the brake pipe to the PCV and tighten the brake pipe joint nuts to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Fill and bleed the hydraulic system (page 15-12).
Install the battery (page 17-6).

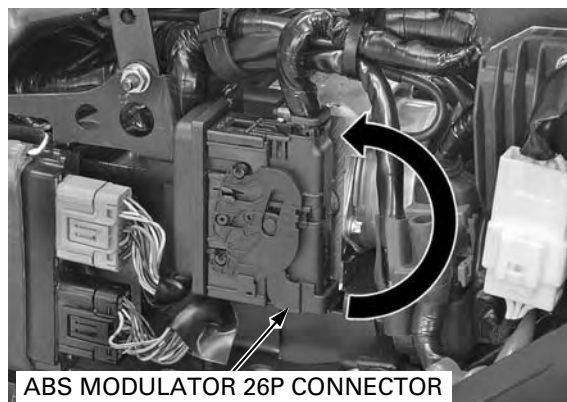


ABS MODULATOR

POWER/GROUND LINE INSPECTION

Remove the left side cover (page 2-4).

Disconnect the ABS modulator 26P connector.



POWER INPUT LINE SHORT CIRCUIT INSPECTION

Measure the continuity between the Red/brown wire terminals and ground.

There should be no continuity.

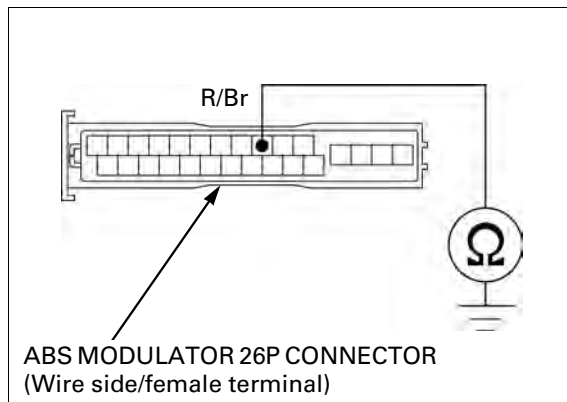
If there is continuity, check for open circuit in Red/brown wires.

TOOL:

Test probe

07ZAJ-RDJA110

Connection: Red/brown – Ground



POWER INPUT LINE OPEN CIRCUIT INSPECTION

Measure the voltage between the Red/brown wire terminal (+) and ground (-).

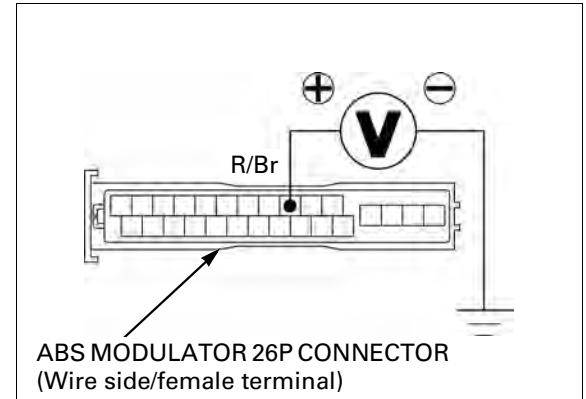
There should be battery voltage with the ignition switch ON.

If there is no voltage, check for ABS MAIN fuse.

TOOL:

Test probe 07ZAJ-RDJA110

Connection: Red/brown (+) – Ground (-)



GROUND LINE

Measure the continuity between the Green/orange wire terminals and ground.

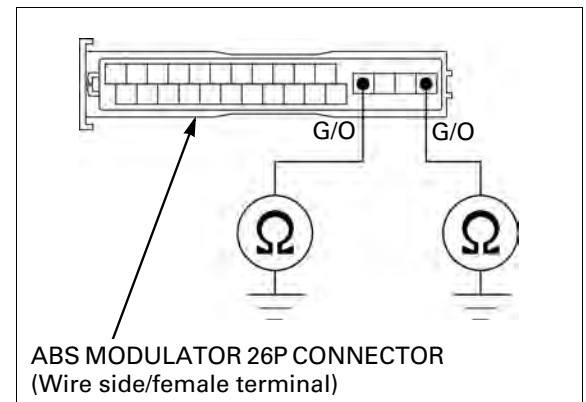
There should be continuity.

If there is no continuity, check for open circuit in Green/orange wires.

TOOL:

Test probe 07ZAJ-RDJA110

Connection: Green/orange – Ground



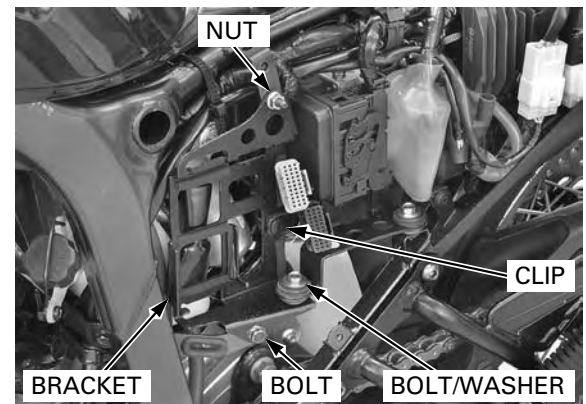
REMOVAL/INSTALLATION

Drain the brake fluid from the front and rear hydraulic systems (page 15-11).

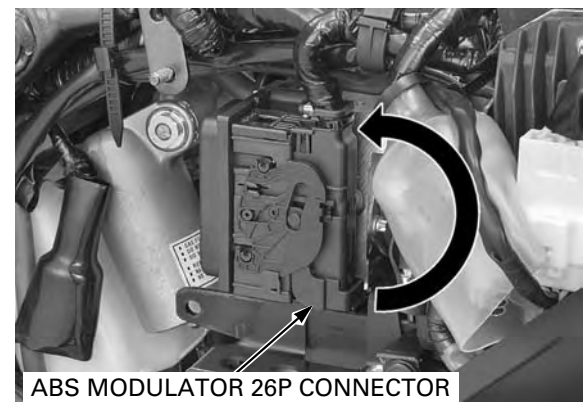
Remove the following:

- Left side cover (page 2-4)
- ECM (page 5-77)

Remove the bolt, bolt/washer, nut, trim clip and ECM bracket.



Disconnect the ABS modulator 26P connector (turn the lock lever up to disconnect it).



ANTI-LOCK BRAKE SYSTEM (ABS)

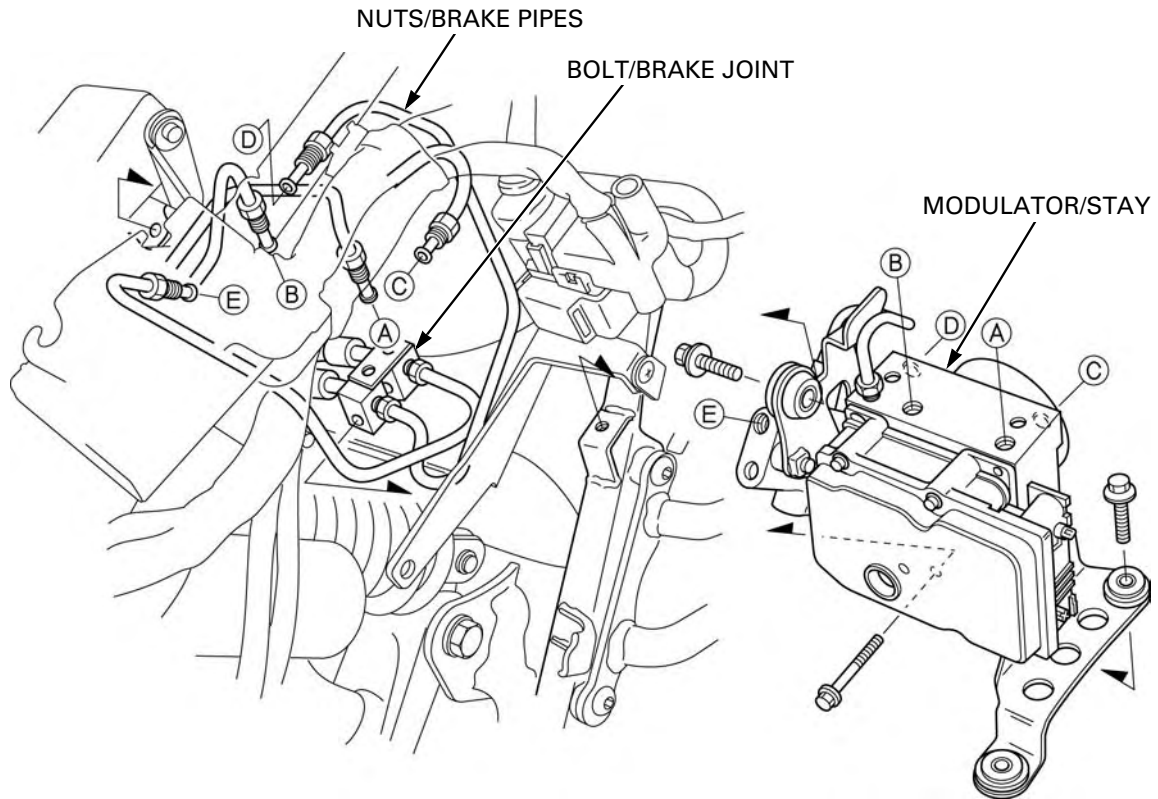
When loosening the brake pipe joint nuts, cover the end of the brake pipes to prevent contamination.

Loosen the brake pipe joint nuts and disconnect the brake pipes.

Remove the bolts/washers, bolt and brake joints from the modulator stay.

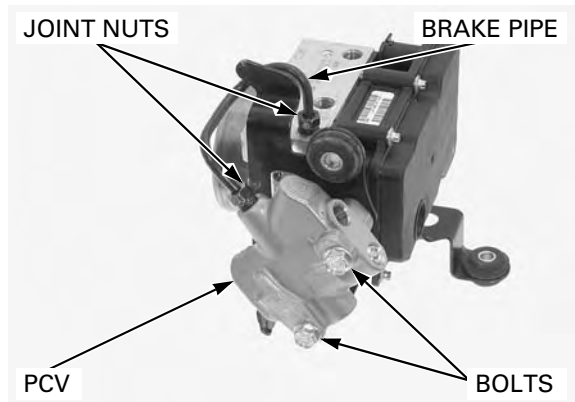
Be careful not to bend or damage the brake pipes during ABS modulator assembly removal.

Remove the modulator/stay.



Loosen the brake pipe joint nuts and disconnect the brake pipe.

Remove the bolts and PCV.



Remove the bolts and modulator stay from the modulator.

Installation is in the reverse order of removal.

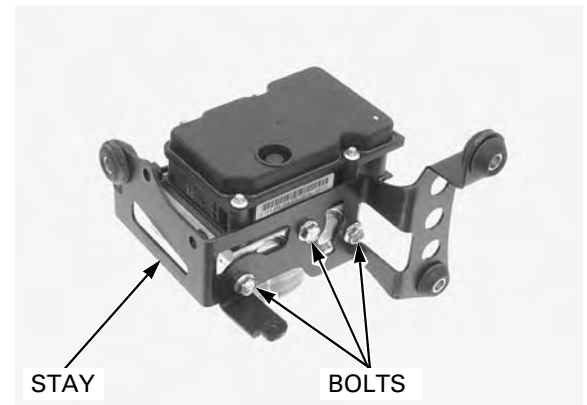
Apply brake fluid to the brake pipe joint nut threads.

Tighten the brake pipe joint nuts to the specified torque.

TORQUE:

Brake pipe joint nut:

14 N·m (1.4 kgf·m, 10 lbf·ft)

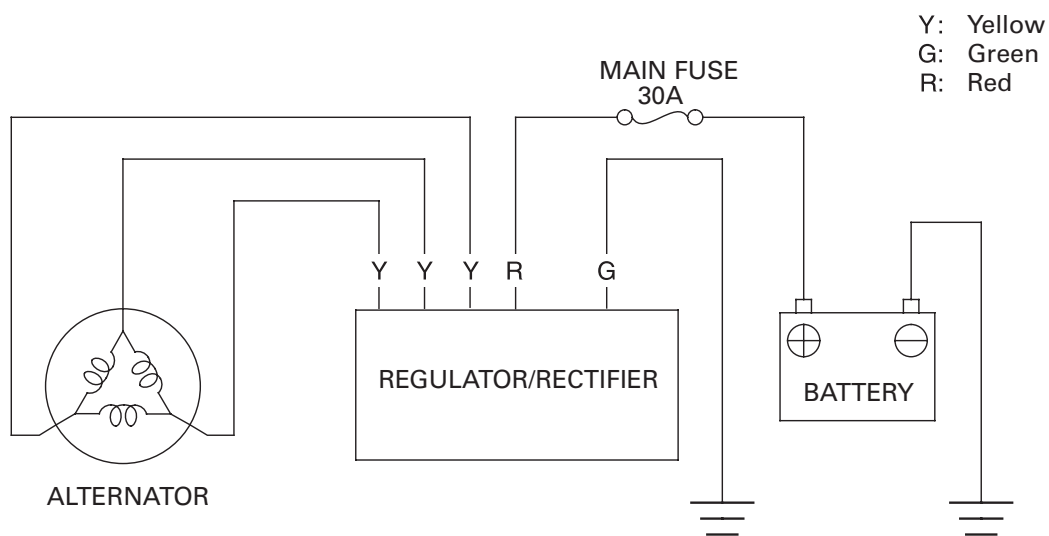
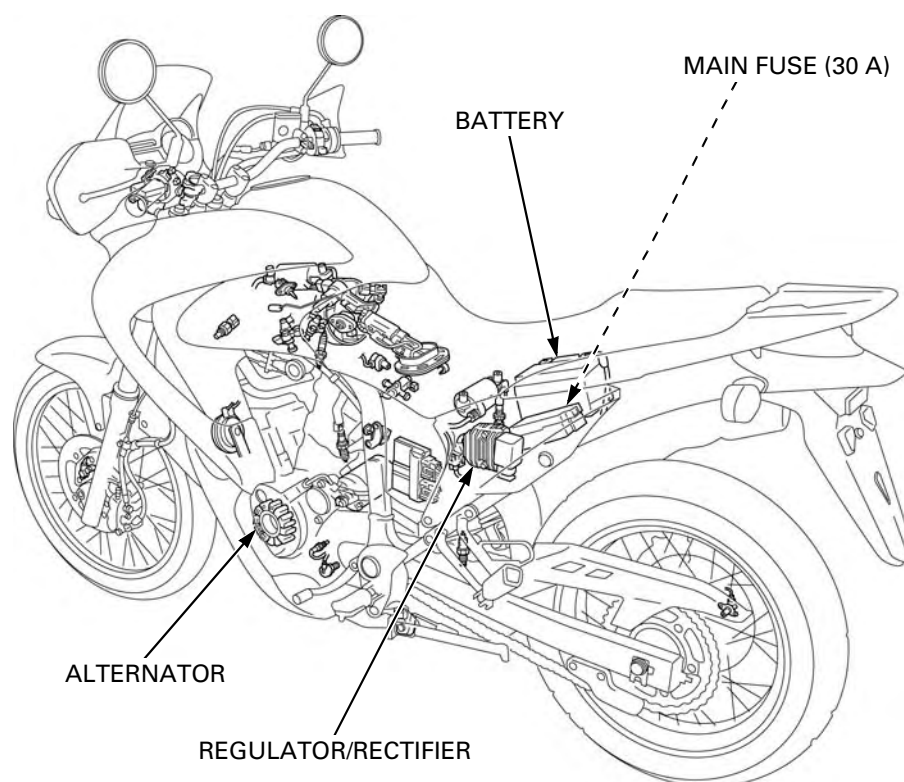


MEMO

17. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM.....	17-2	CHARGING SYSTEM INSPECTION.....	17-7
SERVICE INFORMATION	17-3	REGULATOR/RECTIFIER	17-8
TROUBLESHOOTING	17-5	ALTERNATOR CHARGING COIL	17-9
BATTERY	17-6		

SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
 - If electrolyte gets on your skin, flush with water.
 - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
 - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a call a physician immediately.

NOTICE

- *Always turn OFF the ignition switch before disconnecting any electrical component.*
- *Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.*
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space.
- For a battery remaining in a stored motorcycle, disconnect the negative 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 motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- When servicing the charging system, always follow the steps in the troubleshooting flow chart (page 17-5)
- For alternator service (page 11-3).

BATTERY CHARGING

- Turn power ON/OFF at the charger, not at the battery terminal.
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.
- Quick charging should only be done in an emergency; slow charging is preferred.

BATTERY TESTING

Refer to the battery tester's Operation Manual for the recommended battery testing procedure.

The recommended battery tester puts a "load" on the battery so the actual battery condition of the load can be measured.

Recommended battery tester: BM-210 or BATTERY MATE or equivalent

BATTERY/CHARGING SYSTEM

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 11.2 Ah
	Current leakage		2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current	Normal	1.1 A/5 – 10 h
		Quick	5.5 A/1.0 h
Alternator	Capacity		396 W/5,000 min ⁻¹ (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. Battery Test

Remove the battery (page 17-6).

Check the battery condition using the recommended battery tester (page 17-6).

RECOMMENDED BATTERY TESTER: BM-210 or BATTERY MATE or equivalent

Is the battery good condition?

NO – Faulty battery.

YES – GO TO STEP 2.

2. Current Leakage Test

Install the battery (page 17-6).

Check the battery current leakage test (page 17-7).

Is the current leakage below 2 mA?

YES – GO TO STEP 4.

NO – GO TO STEP 3.

3. Current Leakage Test Without Regulator/rectifier Connector

Disconnect the regulator/rectifier connector and recheck the battery current leakage.

Is the current leakage below 2 mA?

YES – Faulty regulator/rectifier.

NO – • Shorted wire harness.
• Faulty ignition switch.

4. Alternator Charging Coil Inspection

Check the alternator charging coil (page 17-9).

Is the alternator charging coil resistance within 0.1 – 1.0 Ω (20°C/68°F)?

NO – Faulty charging coil.

YES – GO TO STEP 5.

5. Charging Voltage Inspection

Measure and record the battery voltage using a digital multimeter (page 17-6).

Start the engine.

Measure the charging voltage (page 17-7).

Compare the measurements to result of the following calculation.

STANDARD: Measured BV < Measured CV < 15.5 V

· BV = Battery Voltage (page 17-6)

· CV = Charging Voltage (page 17-7)

Is the measured charging voltage within the standard voltage?

YES – Faulty battery.

NO – GO TO STEP 6.

6. Regulator/rectifier System Inspection

Check the voltage and resistance at the regulator/rectifier connectors (page 17-8).

Are the results of checked voltage and resistance correct?

YES – Faulty regulator/rectifier.

NO – • Open circuit in related wire.
• Loose or poor contacts of related terminal.
• Shorted wire harness.

BATTERY

REMOVAL/INSTALLATION

Always turn the ignition switch OFF before removing the battery.

Remove the right side cover (page 2-4).

Disconnect the battery negative (-) cable first, then disconnect the battery positive (+) cable.

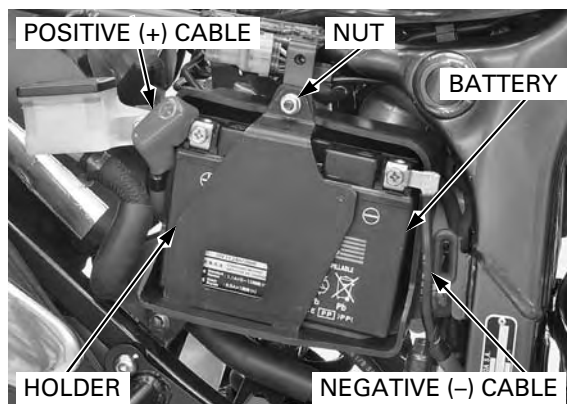
Remove the nut and battery holder.

Remove the battery.

Install the battery in the reverse order of removal.

NOTE:

- Connect the positive (+) cable first, then connect the negative (-) cable.
- After connecting the battery cables, coat the terminals with grease.

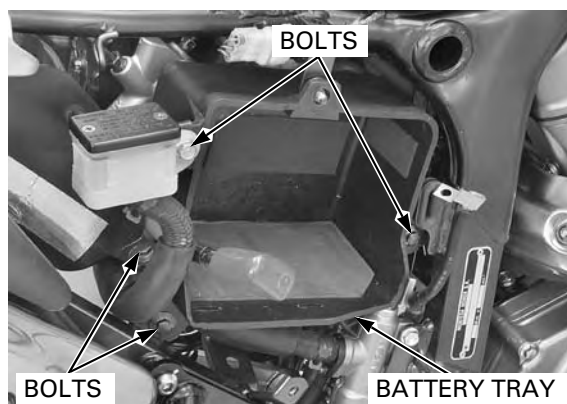


BATTERY TRAY REMOVAL/INSTALLATION

Remove the battery (page 17-6).

Remove the bolts and battery tray.

Installation is in the reverse order of removal.



VOLTAGE INSPECTION

Remove the right side cover (page 2-4).

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20°C/68°F): Fully charged: 13.0 – 13.2 V
Under charged: Below 12.4 V



BATTERY TESTING

Refer to the instructions that are appropriate to the battery testing equipment available to you.

TOOL:

Battery tester

**BM-210 or
BATTERY MATE or
equivalent**

CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE TEST

Remove the right side cover (page 2-4).

With the ignition switch turned OFF, disconnect the negative (-) cable from the battery.

Connect the ammeter (+) probe to the negative (-) cable and the ammeter (-) probe to the battery (-) terminal.

With the ignition switch turned OFF, check for current leakage.

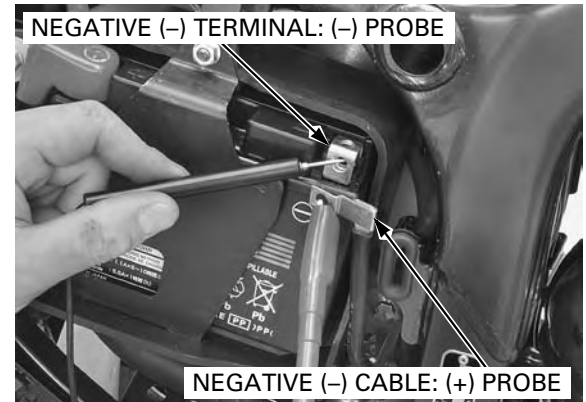
NOTE:

- 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: 2 mA maximum

If current leakage exceeds the specified value, a shorted circuit is the probable cause.

Locate the short by disconnecting connections one by one and measuring the current.



CHARGING VOLTAGE INSPECTION

NOTE:

Make sure the battery is in good condition before performing this test.

Start the engine and warm it up to the operating temperature; then stop the engine.

Remove the right side cover (page 2-4).

Connect the multimeter between the positive and negative terminals of the battery.

NOTE:

To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

With the headlight on high beam, restart the engine. Measure the voltage on the multimeter when the engine runs at 5,000 min⁻¹ (rpm).

STANDARD:

Measured BV < Measured CV < 15.5 V

- BV = Battery Voltage (page 17-6)
- CV = Charging Voltage

Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.



REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

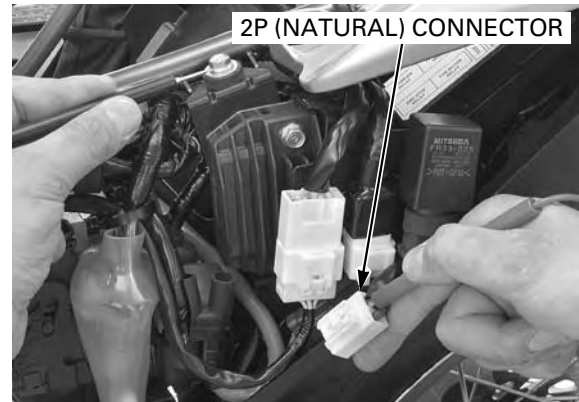
BATTERY CHARGING LINE

Remove the left side cover (page 2-4).

With the ignition switch turned OFF, disconnect the regulator/rectifier 2P (Natural) connector.

Measure the voltage between the Red wire terminal (+) of the wire harness side 2P (Natural) connector and ground (-).

There should be battery voltage at all times.



GROUND LINE

Check for continuity between the Green wire terminal of the wire harness side 2P (Natural) connector and ground (-).

There should be continuity at all times.

If all components of the charging system are normal and there are no loose connection at the regulator/rectifier connector, replace the regulator/rectifier.



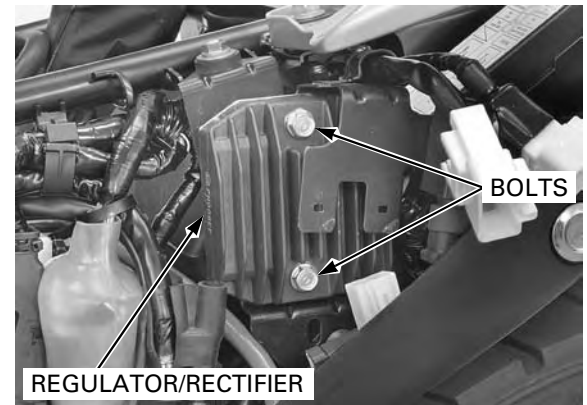
REMOVAL/INSTALLATION

Remove the left side cover (page 2-4).

With the ignition switch turned OFF, disconnect the regulator/rectifier 2P (Natural) connector and alternator 3P (Natural) connector.



Remove the bolts and regulator/rectifier.
Install the regulator/rectifier in the reverse order of removal.



ALTERNATOR CHARGING COIL

INSPECTION

Remove the left side cover (page 2-4).

With the ignition switch turned OFF, disconnect the alternator 3P (Natural) connector.

Measure the resistance between the Yellow wire terminals.

STANDARD: 0.1 – 1.0 Ω at 20°C (68°F)

Check for continuity between each wire terminals of the alternator/stator side connector and ground. There should be no continuity.

Replace the stator if the resistance is out of specification, or if any wire has continuity to ground.

For alternator/starter replacement (page 11-4).



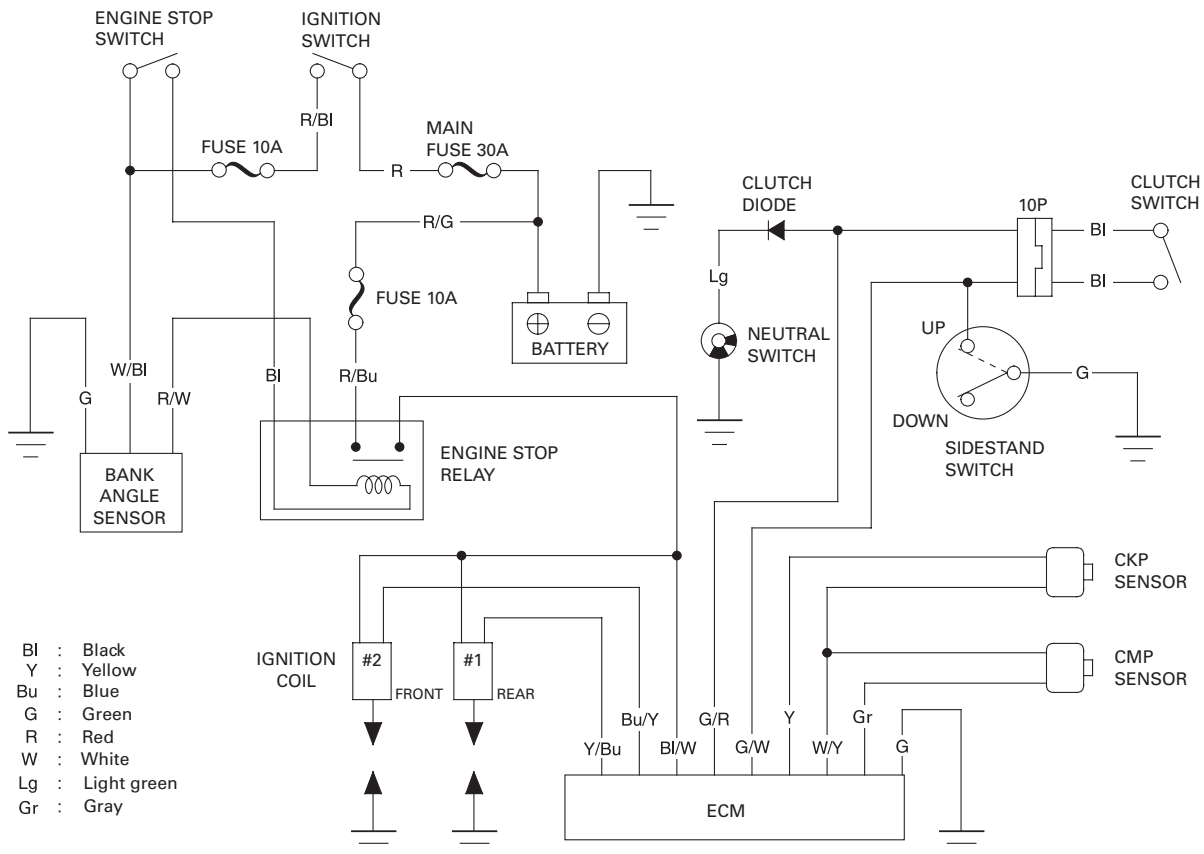
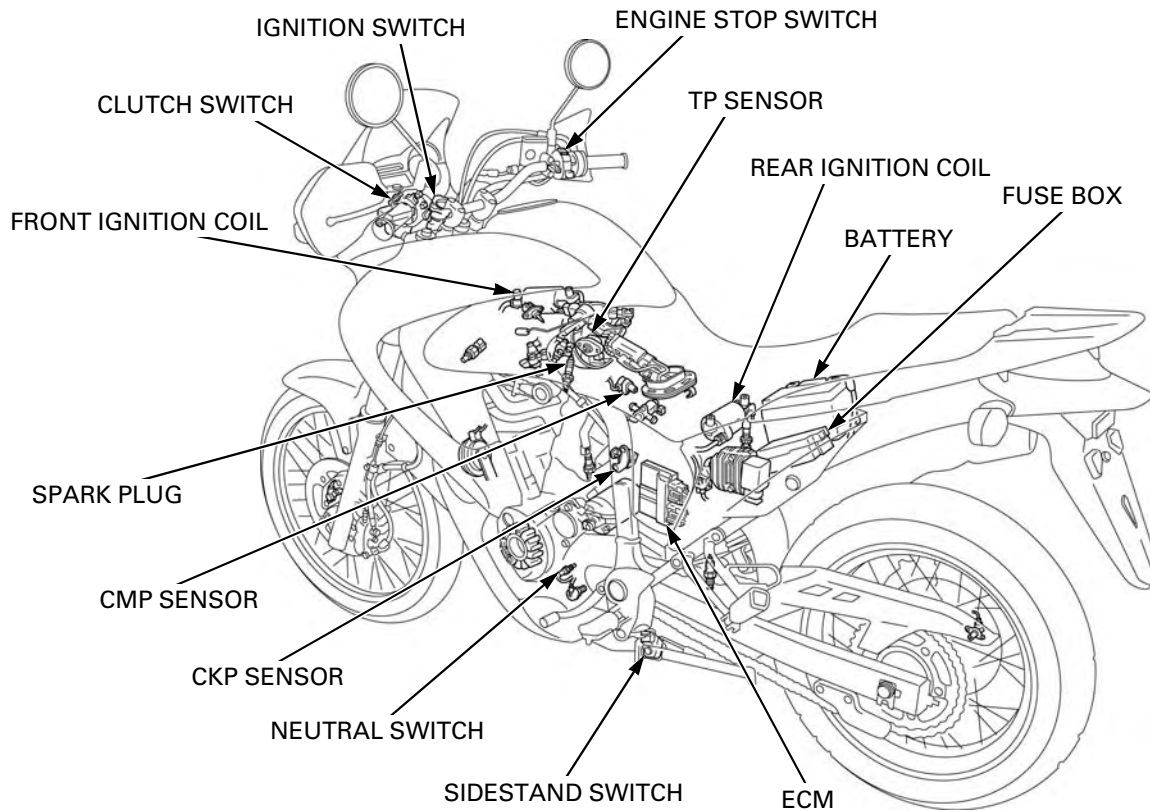
MEMO

18. IGNITION SYSTEM

SYSTEM DIAGRAM.....	18-2	IGNITION SYSTEM INSPECTION.....	18-5
SERVICE INFORMATION	18-3	IGNITION COIL	18-8
TROUBLESHOOTING	18-4	IGNITION TIMING	18-8

IGNITION SYSTEM

SYSTEM DIAGRAM



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 OFF the ignition switch before servicing.
- Use spark plugs of the correct heat range. Using spark plugs 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 ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting table (page 18-4).
- The transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- The ECM varies ignition timing according to the engine speed. The TP sensor signals the ECM to compensate the ignition timing according to the throttle opening.
- 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 plugs.
- For spark plug inspection (page 3-8).
- For CKP sensor service (page 10-12).
- Following components information.
 - Ignition switch (page 20-20)
 - Engine stop switch (page 20-21)
 - Neutral switch (page 20-24)
 - Sidestand switch (page 20-25)
 - Clutch switch (page 20-24)
 - Diode (page 19-16)

SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	NGK	CPR8EA-9
	DENSO	U24EPR9
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

TORQUE VALUE

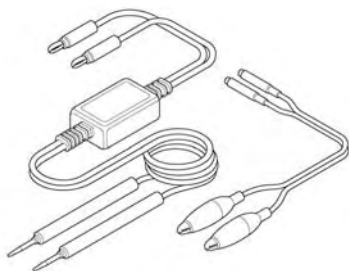
Timing hole cap

10 N·m (1.0 kgf·m, 7 lbf·ft)

Apply engine oil to the threads.

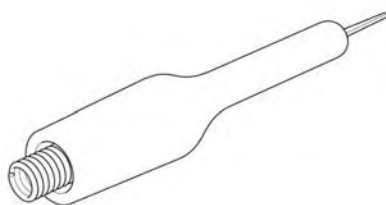
TOOLS

Imrie diagnostic tester (model 625)
or
Peak voltage adaptor
07HGJ-0020100



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

Test probe
07ZAJ-RDJA110



TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Faulty spark plug
 - Loose spark plug cap or spark plug wire connection
 - Water in the spark plug cap (Leaking the ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the ignition coil with a known-good one and perform the spark test. If there is spark, the original ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned ON and the engine stop switch at "Q" (The engine is not cranked by the starter motor).

No spark at spark plugs

UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch turned ON and the engine stop switch at "Q" (Other electrical components are normal).	1. Faulty engine stop switch. 2. An open circuit in Black/white wire between the ignition coil and engine stop relay. 3. Loose or poor connection of the primary terminal, or an open circuit in the primary coil. 4. Faulty ECM (in case when the initial voltage is normal with the ECM connector disconnected).
	Initial voltage is normal, but it drops by 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connections). 2. Battery is undercharged (Voltage drops largely when the engine is started). 3. No voltage at the Black/white wire of the ECM connector, or loose or poorly connected ECM connector. 4. Loose or poor connection or an open circuit in Green wire of the ECM. 5. Loose or poor connection or an open circuit in Blue/yellow or Yellow/blue wire between the ignition coils and ECM. 6. Faulty sidestand switch, clutch switch or neutral switch. 7. Loose or poor connection or an open circuit in No. 6 related wires. – Sidestand switch line: Green/white wire – Neutral switch line: Light green and Green/red wires 8. Faulty CKP sensor (Measure peak voltage). 9. Faulty ECM (in case when above No. 1 through 8 are normal).
	Initial voltage is normal but there is no peak voltage while cranking the engine.	1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.) 2. Faulty peak voltage adaptor. 3. Faulty CKP sensor (Measure peak voltage). 4. Faulty ECM (in case when above No. 1 through 3 are normal).
	Initial voltage is normal but peak voltage is lower than the standard value.	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 ECM (in case when above No. 1 through 3 are normal).
	Initial and peak voltages are normal but no spark jumps.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil(s).
CKP sensor	Peak voltage is lower than the standard value.	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 (in case when above No. 1 through 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty CKP sensor.

IGNITION SYSTEM INSPECTION

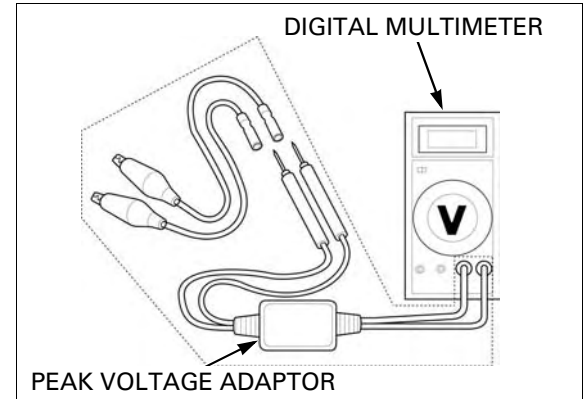
NOTE:

- If no spark jumps at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use a commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.

Connect the peak voltage adaptor to the digital multimeter or use the peak voltage tester.

TOOL:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)



IGNITION COIL PRIMARY PEAK VOLTAGE

NOTE:

- Check all system connections before performing this inspection. Loose connectors can cause incorrect readings.
- Check that the cylinder compression is normal for each cylinder and the spark plugs are installed correctly in each cylinder head.

Remove the right side cover (page 2-4).

Disconnect the fuel pump 3P (Natural) connector.



Front side: Remove the right air guide (page 2-10).

Disconnect all spark plug caps from the spark plugs. Connect known-good spark plugs to all spark plug caps and ground them to the cylinder heads as done in a spark test.



IGNITION SYSTEM

Rear side: Lift and support the fuel tank (page 3-5).

With the ignition coil primary wires connected, connect the peak voltage tester or adaptor probes to the ignition coil primary terminal and ground.

TOOL:

**Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)**

**Connection: FRONT: Blue/yellow (+) – ground (–)
REAR: Yellow/blue (+) – ground (–)**

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

Check the initial voltage at this time.

The battery voltage should be measured.

If the initial voltage cannot be measured, follow the checks in the troubleshooting table (page 18-4).

Shift the transmission into neutral.

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

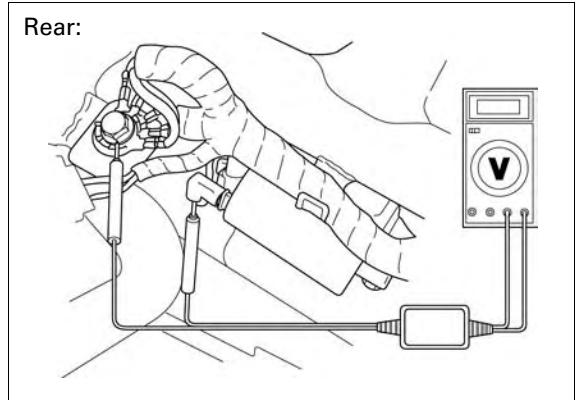
PEAK VOLTAGE: 100 V minimum

NOTE:

Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than the standard value, follow the checks in the troubleshooting table (page 18-4).

Install the removed parts in the reverse order of removal.



CKP SENSOR PEAK VOLTAGE

NOTE:

Check that the cylinder compression is normal for each cylinder and the spark plug is installed correctly in the cylinder head.

Remove the left side cover (page 2-4).

Disconnect the ECM 33P connectors (page 5-77).

Connect the peak voltage tester or adaptor probes to the wire harness side ECM 33P connector terminals.

TOOLS:

**Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)
Test probe 07ZAJ-RDJA110**

Connection: White/yellow (+) – Yellow (–)

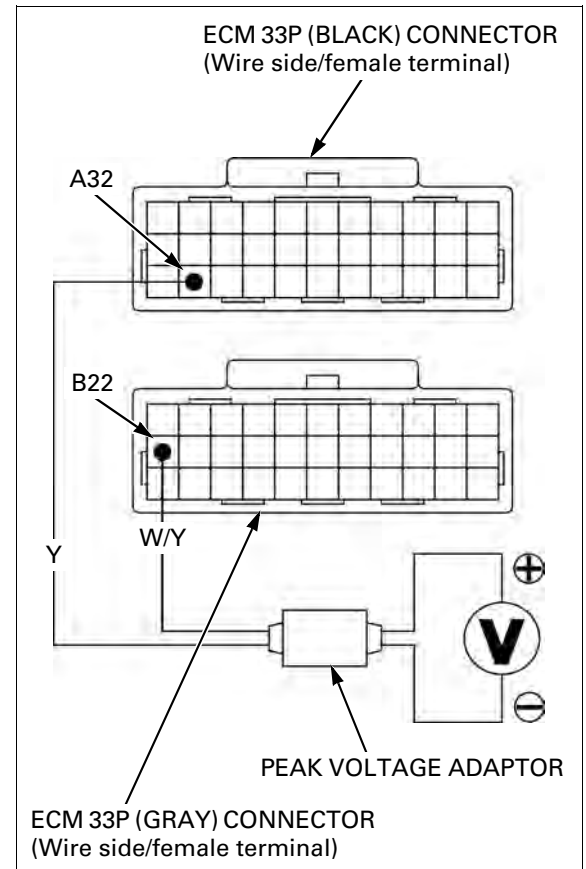
Turn the ignition switch ON with the engine stop switch at "O".

Shift the transmission into neutral.

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

PEAK VOLTAGE: 0.7 V minimum

If the voltage measured at the ECM connector is abnormal, measure the peak voltage at the CKP sensor connector.



Remove the under cowl (page 2-13).

Turn the ignition switch OFF.

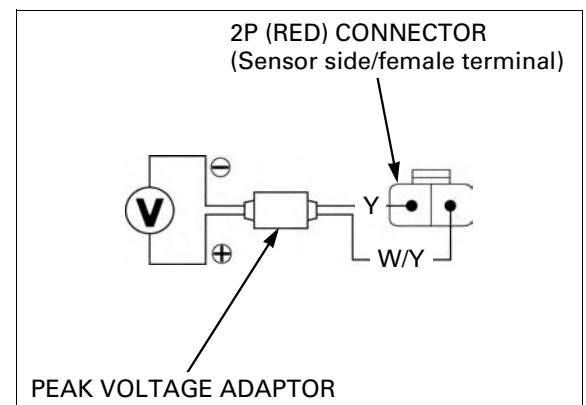
Disconnect the CKP sensor 2P (Red) connector and connect the peak voltage tester or adaptor probes to the connector terminals of the CKP sensor side.

Connection: White/yellow (+) – Yellow (–)

In the same manner as at the ECM 33P connector, measure the peak voltage and compare it to the voltage measured at the ECM 33P 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 the peak voltage of the CKP sensor side is lower than standard value, follow the checks in the troubleshooting table (page 18-4).

Install the removed parts in the reverse order of removal.



IGNITION SYSTEM

IGNITION COIL

REMOVAL/INSTALLATION

Turn the ignition switch OFF.

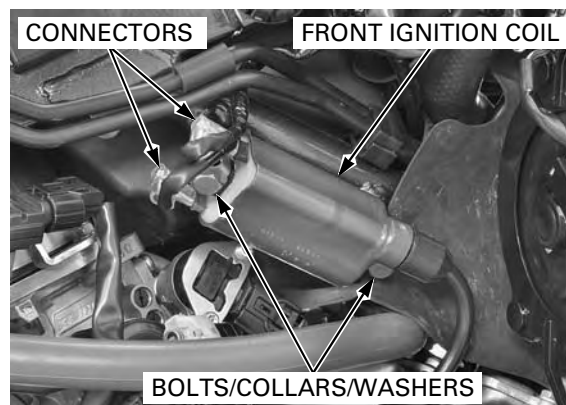
FRONT IGNITION COIL

Remove the right air guard (page 2-10).
Disconnect the spark plug cap (page 3-8).

Disconnect the ignition coil primary wire connectors.
Remove the bolts, collars, washers and front ignition coil from the frame.

Route the spark plug wire properly (page 1-21).

Install the front ignition coil in the reverse order of removal.



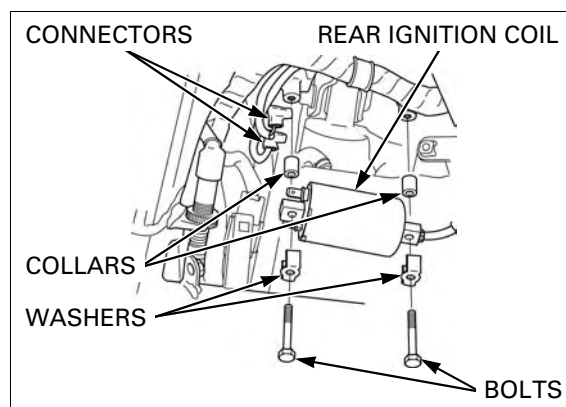
REAR IGNITION COIL

Remove the heat guard plate (page 2-23).
Disconnect the spark plug cap (page 3-8).

Disconnect the ignition coil primary wire connectors.
Remove the bolts, collars, washers and rear ignition coil from the frame.

Route the spark plug wires properly (page 1-21).

Install the rear ignition coil 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.

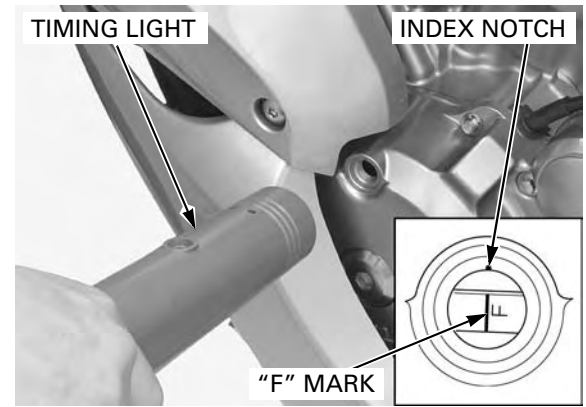


Read the manufacturer's instructions for timing light operation.

Connect the timing light to the front spark plug wire.
Start the engine, let it idle and check the ignition timing.

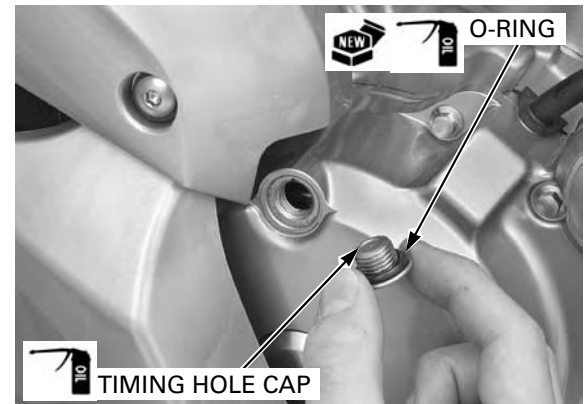
IDLE SPEED: $1,200 \pm 100 \text{ min}^{-1}$ (rpm)

The timing is correct if the "F" mark on the flywheel aligns with the index notch on the left crankcase cover.



Coat a new O-ring with engine oil and install it into the timing hole cap groove.
Apply engine oil to the timing hole cap threads.
Install and tighten the timing hole cap to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

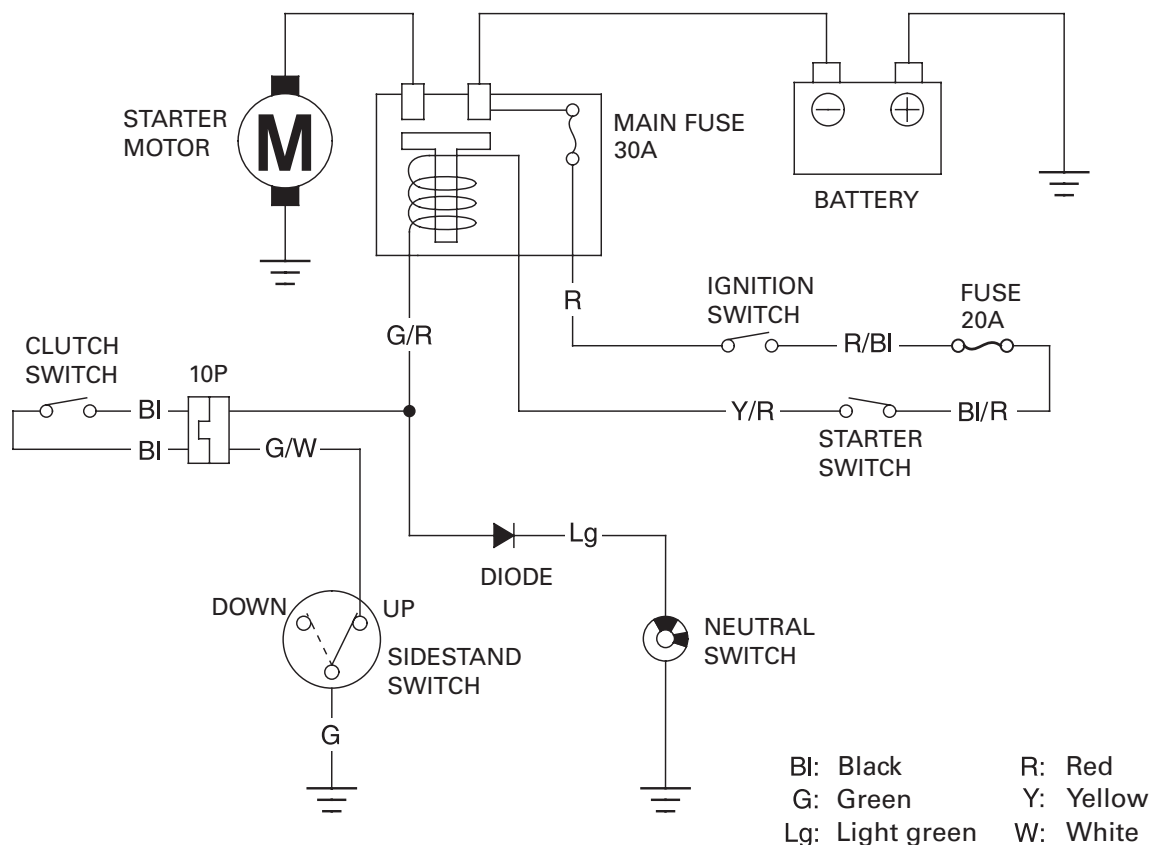
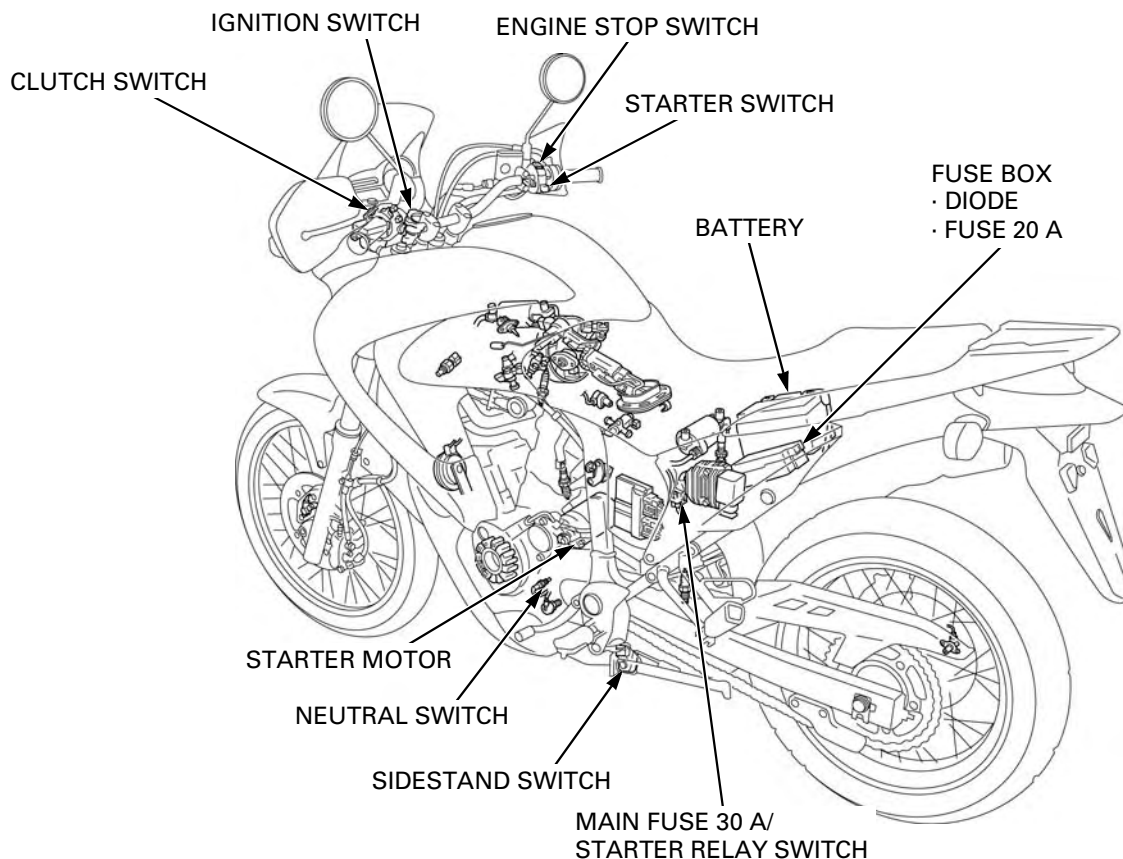


MEMO

19. ELECTRIC STARTER

SYSTEM DIAGRAM.....	19-2	STARTER MOTOR.....	19-6
SERVICE INFORMATION	19-3	STARTER RELAY SWITCH.....	19-15
TROUBLESHOOTING	19-4	DIODE.....	19-16

SYSTEM DIAGRAM



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 OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-4).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- Following component information.
 - Ignition switch (page 20-20)
 - Engine stop switch (page 20-21)
 - Starter switch (page 20-21)
 - Neutral switch (page 20-24)
 - Sidestand switch (page 20-25)
 - Clutch switch (page 20-24)
 - Diode (page 19-16)

SPECIFICATION

		Unit: mm (in)
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 (0.47)	6.5 (0.26)

TORQUE VALUES

Starter motor cable terminal nut	10 N·m (1.0 kgf·m, 7 lbf·ft)
Starter motor assembly bolt	4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)
Starter motor brush mounting screw	3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)

TROUBLESHOOTING

Starter motor does not turn

1. Fuse Inspection

Check for blown main fuse or sub fuse.

Is the fuse blown?

YES – Replace the fuse

NO – GO TO STEP 2.

2. Battery Inspection

Make sure the battery is fully charged and in good condition (page 17-6).

Is the battery in good condition?

YES – GO TO STEP 3.

NO – Replace the battery

3. Starter Relay Switch Operation

Check the starter relay switch operation.

You should hear the relay "CLICK" when the starter switch button is depressed.

Is there a "CLICK"?

YES – GO TO STEP 4.

NO – GO TO STEP 5.

4. Starter Motor Inspection

Apply battery voltage directly to the starter motor and check the operation.

Does the starter motor turn?

YES –

- Poorly connected starter motor cable
- Faulty starter relay switch (page 19-15)

NO – Faulty starter motor (page 19-6)

5. Relay Coil Ground Lines Inspection

Disconnect the starter relay switch connector, and check the relay coil ground lines as below for continuity:

1. Green/red terminal – diode – neutral switch line (with the transmission in neutral and clutch lever released).
2. Green/red terminal – clutch switch – sidestand switch line (in any gear except neutral, and with the clutch lever pulled in and the sidestand up).

Is there continuity?

NO –

- Faulty neutral switch (page 20-24)
- Faulty diode (page 19-16)
- Faulty clutch switch (page 20-24)
- Faulty sidestand switch (page 20-25)
- Loose or poor contact connector
- Open circuit in wire harness

YES – GO TO STEP 6.

6. Starter Relay Voltage Inspection

Connect the starter relay switch connector.

With the ignition switch ON and engine stop switch at "O" and the starter switch button pushed, measure the voltage at the starter relay switch connector (between Yellow/red (+) and body ground (-)).

Is there battery voltage?

NO –

- Faulty ignition switch (page 20-20)
- Faulty starter switch (page 20-21)
- Faulty engine stop switch (page 20-21)
- Loose or poor contact connector
- Open circuit in wire harness

YES – GO TO STEP 7.

7. Starter Relay Switch Continuity Inspection

- Remove and check the operation of the starter relay switch (page 19-15).

Is there continuity?

NO – Faulty starter relay switch

YES – Loose or poor contact starter relay switch connector

The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the sidestand up and the clutch lever pulled in.

1. Clutch Switch Inspection

Check the clutch switch operation (page 20-24).

Is the clutch switch operation normal?

NO – Faulty clutch switch

YES – GO TO STEP 2.

2. Sidestand Switch Inspection

Check the sidestand switch operation (page 20-25).

Is the sidestand switch operation normal?

NO – Faulty sidestand switch (page 20-25)

YES –

- Open circuit in wire harness
- Loose or poor contact connector

Starter motor turns slowly

- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

Starter motor turns, but engine does not turn

- Starter motor is running backwards
 - Case assembled improperly
 - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter idle gear and/or reduction gear

Starter relay switch "Clicks", but engine does not turn over

- Crankshaft does not turn due to engine problems

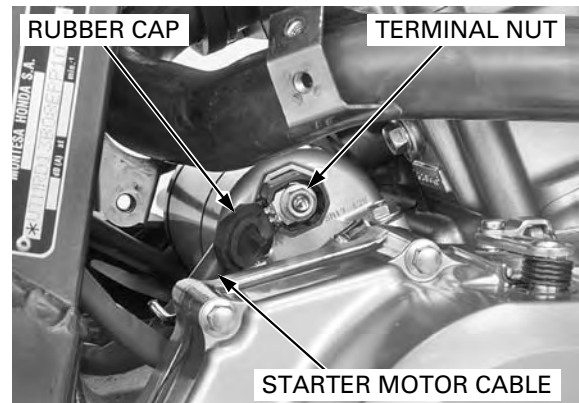
STARTER MOTOR

REMOVAL

- With the ignition switch OFF, disconnect the battery negative (-) cable before servicing the starter motor.

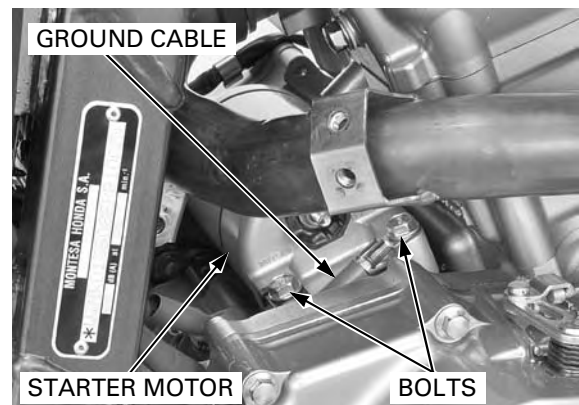
Remove the rear exhaust pipe protector A and exhaust pipe protector B (page 2-15).

Remove the rubber cap and terminal nut.
Disconnect the starter motor cable.

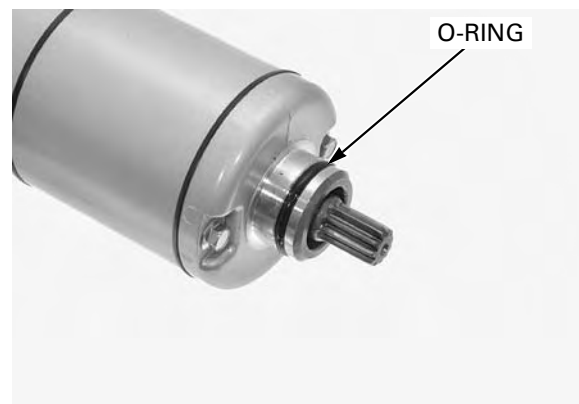


Remove the bolts and ground cable.

Remove the starter motor from the crankcase.



Remove the O-ring from the starter motor.

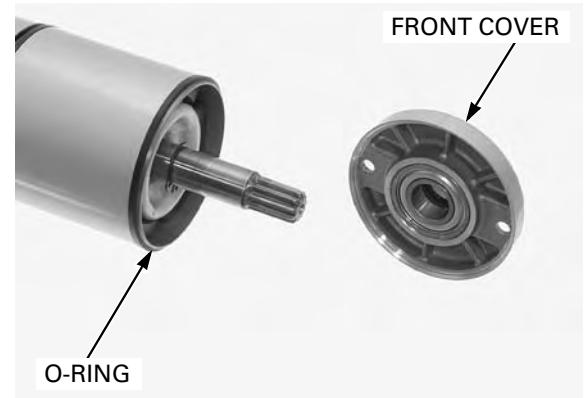


DISASSEMBLY/INSPECTION

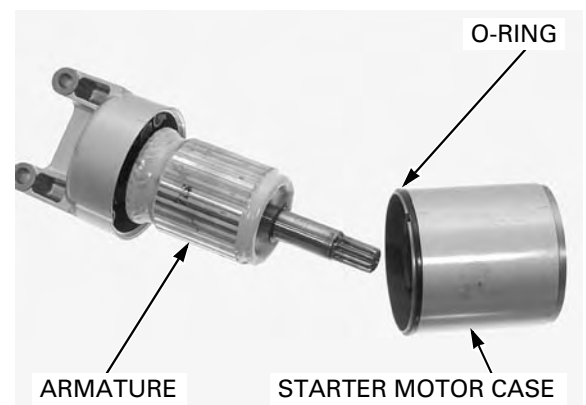
Remove the bolts and O-rings.



Remove the front cover and O-ring.

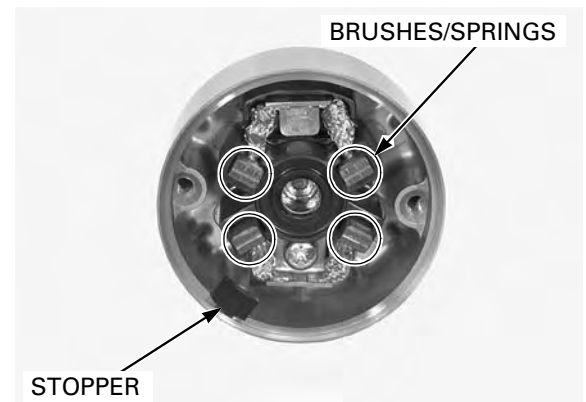


Remove the starter motor case and O-ring.
Remove the armature from the rear cover.



Remove the brushes and springs from the brush holder.

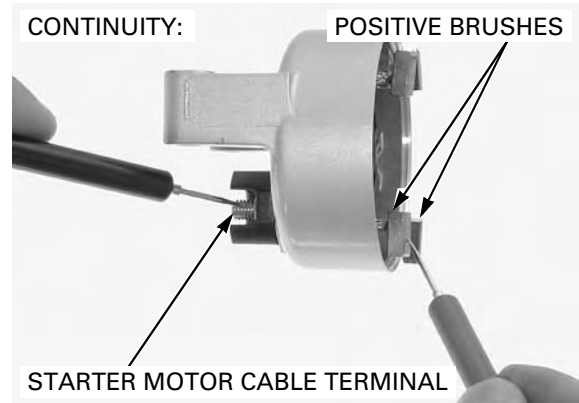
Remove the stopper from the rear cover assembly.



ELECTRIC STARTER

Check for continuity between starter motor cable terminal and positive brushes.

There should be continuity.

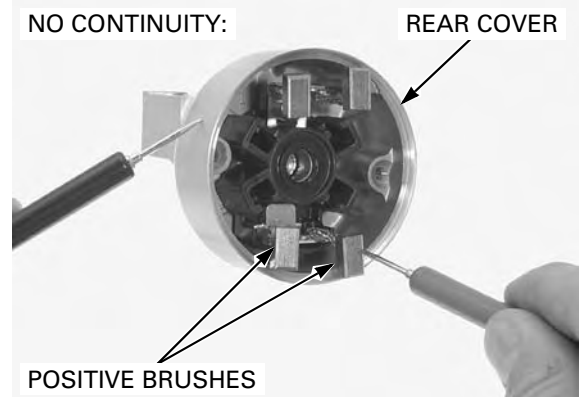


Check for continuity between positive brushes and rear cover.

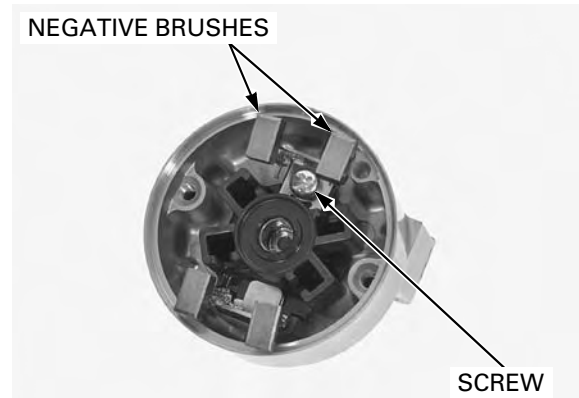
There should be no continuity.

Check for continuity between positive and negative brushes.

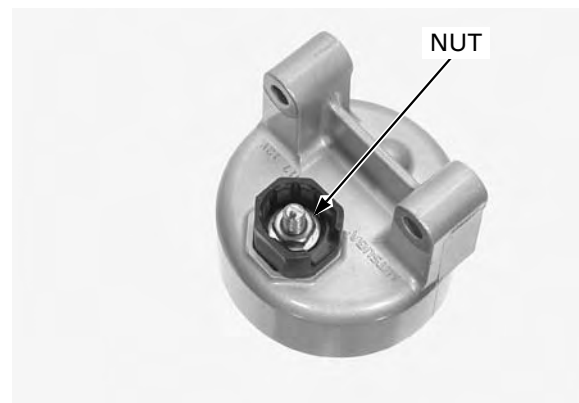
There should be no continuity.



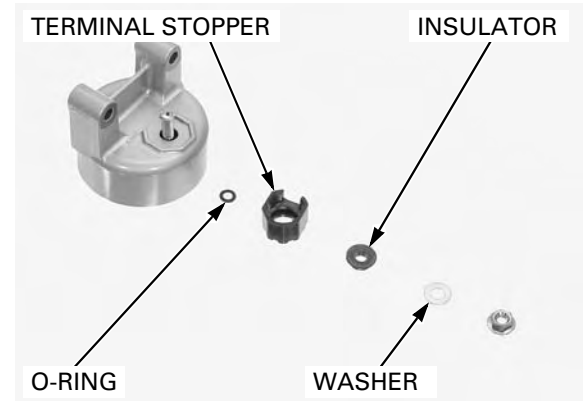
Remove the screw and negative brushes.



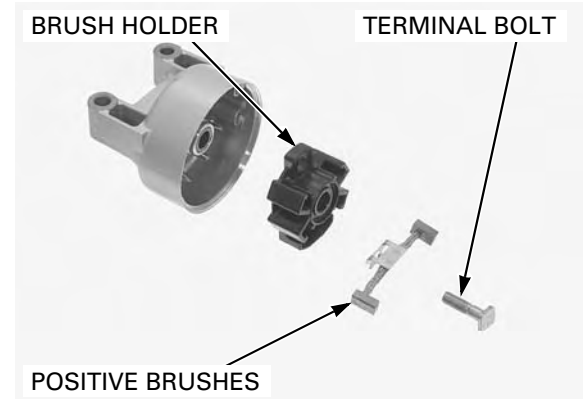
Remove the terminal nut.



Remove the washer, insulator, terminal stopper and O-ring.

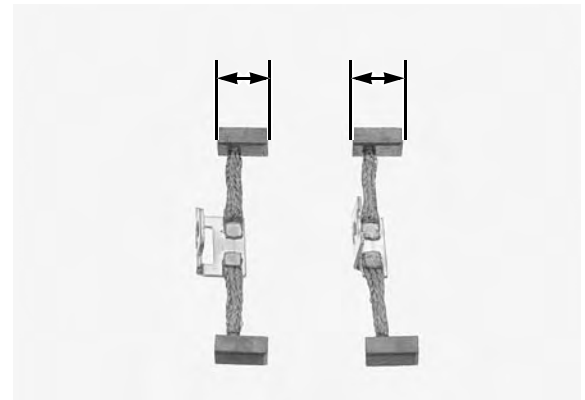


Remove the terminal bolt, positive brushes and brush holder.



Measure each brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)

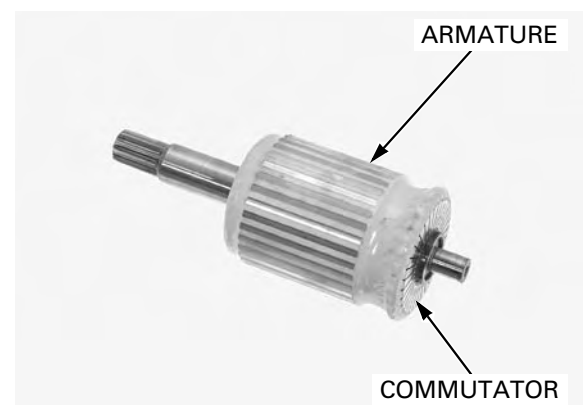


Check the commutator for damage or abnormal wear.

Do not use emery or sand paper on the commutator.

Check the commutator bar for discoloration. Clean the metallic debris off between commutator bars.

Replace the armature with a new one if necessary.



ELECTRIC STARTER

Check for continuity between pairs of commutator bars.
There should be continuity.

CONTINUITY:



Check for continuity between each individual commutator bar and the armature shaft.
There should be no continuity.

NO CONTINUITY:

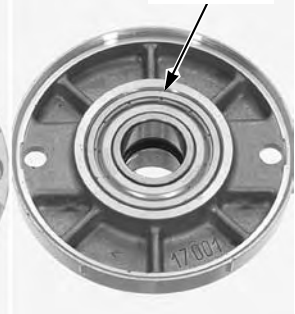


Check the dust seal and bearing for wear or damage.
Turn the inner race of the starter motor bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the front cover.

DUST SEAL

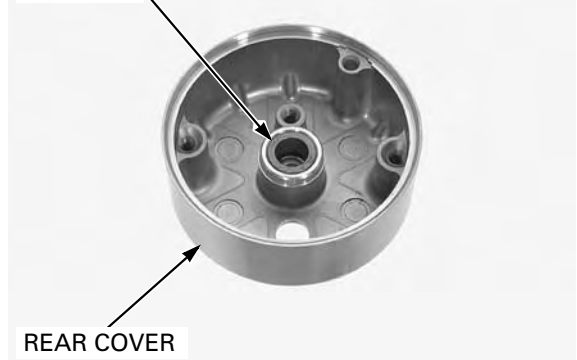


BEARING

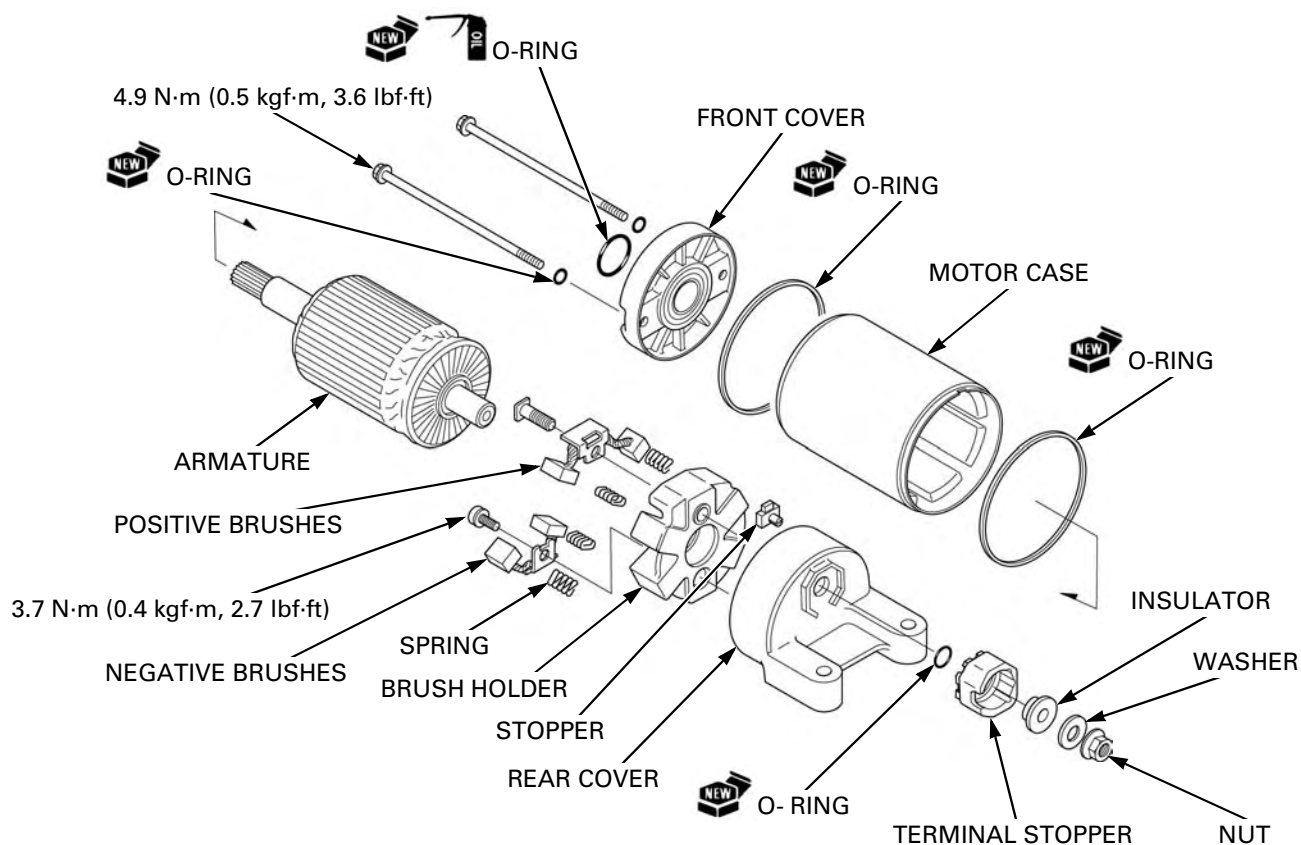


Check the bushing of the rear cover for wear or damage.

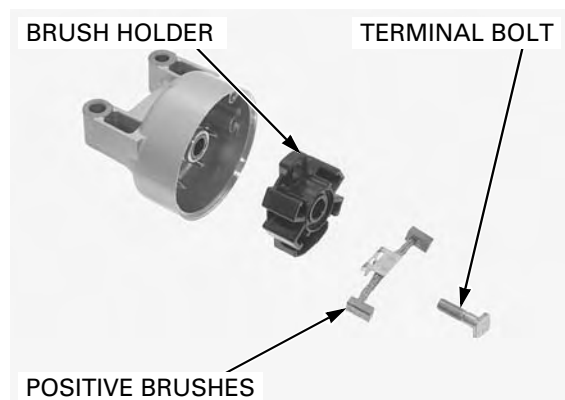
BUSHING



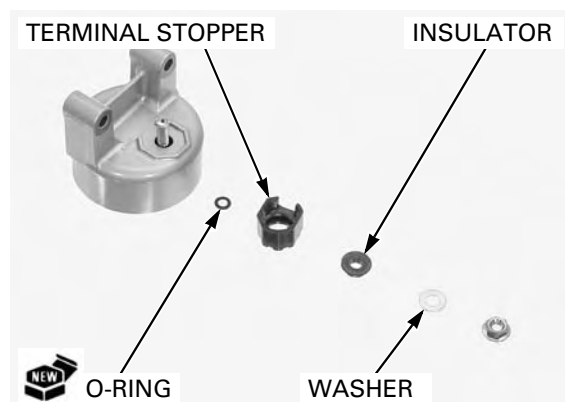
ASSEMBLY



Install the brush holder, positive brushes and terminal bolt.



Install a new O-ring, terminal stopper, insulator and washer.



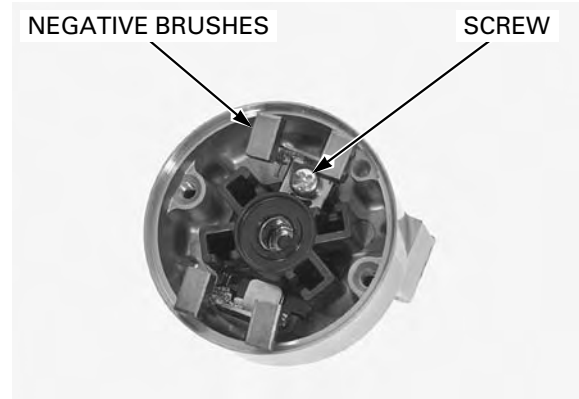
ELECTRIC STARTER

Install and tighten the terminal nut securely.

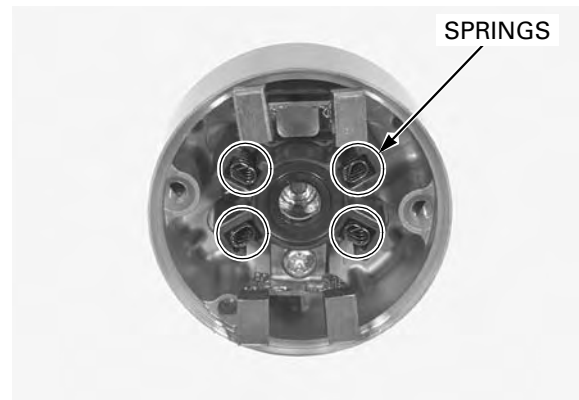


Install the negative brushes and tighten the screw to the specified torque.

TORQUE: 3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)

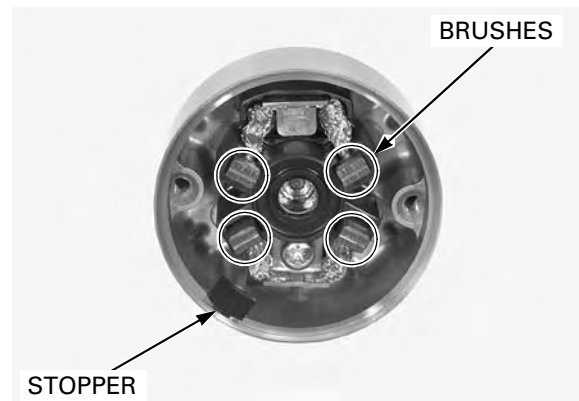


Install the brush springs to the brush holder grooves.



Install the brushes to the brush holder.

Install the stopper to the rear cover assembly.



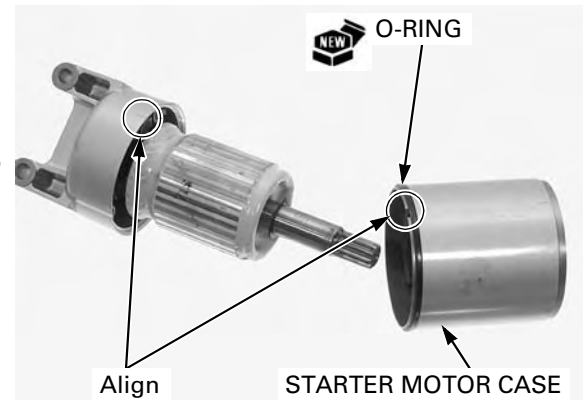
Install the armature to the rear cover assembly.



Install a new O-ring to the starter motor case. Install the starter motor case with its groove to the stopper on the rear cover assembly.

NOTICE

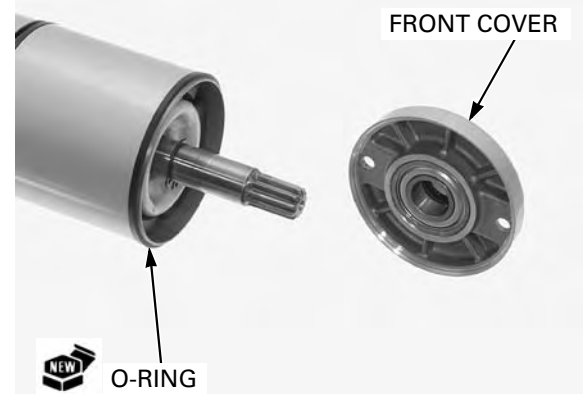
The coil may be damaged if the magnet pulls the armature against the case.



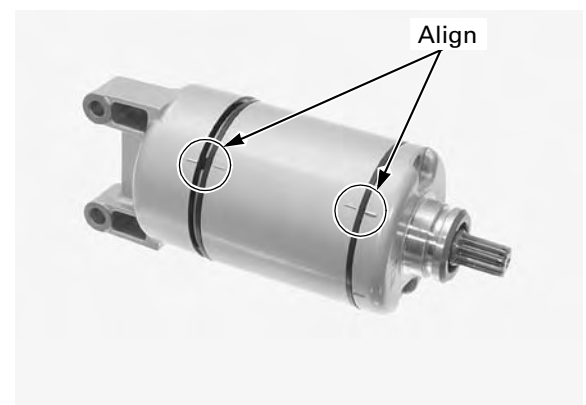
Install a new O-ring to the starter motor case. Install the front cover to the starter motor case.

NOTE:

- When installing the front cover, take care to prevent damaging the oil seal lip with the armature shaft.



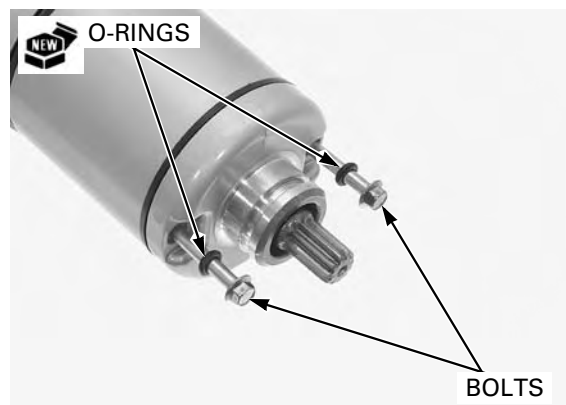
Align the index marks on the front cover, starter motor case and rear cover.



ELECTRIC STARTER

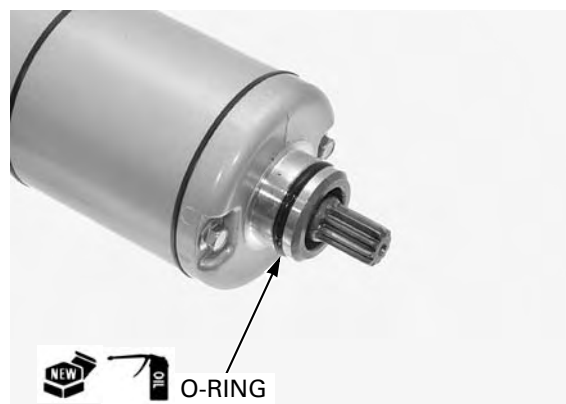
Install a new O-rings to the bolts.
Install and tighten the bolts to the specified torque.

TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)



INSTALLATION

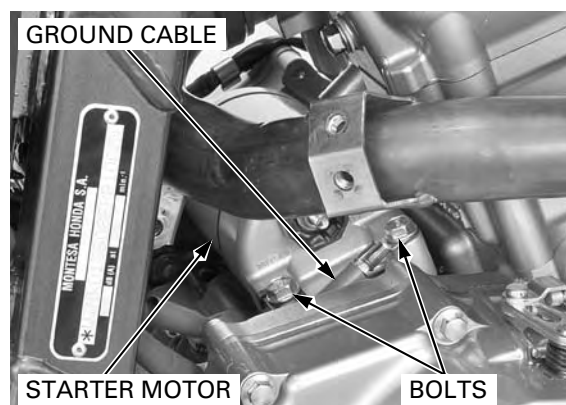
Apply engine oil to a new O-ring and install it to the starter motor groove.



Route the cable properly (page 1-21).

Install the starter motor to the crankcase.

Install the ground cable and tighten the bolts securely.

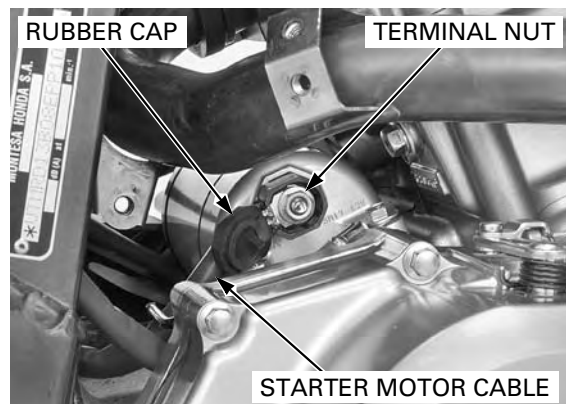


Connect the starter motor cable.
Install and tighten the terminal nut to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the rubber cap securely.

Install the rear exhaust pipe protector A and exhaust pipe protector B (page 2-20).



STARTER RELAY SWITCH

INSPECTION

Remove the left side cover (page 2-4).

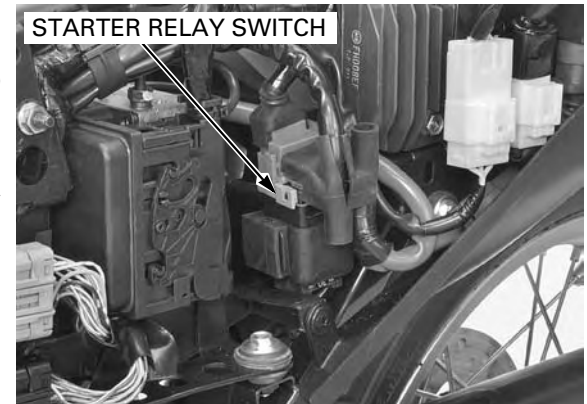
Shift the transmission into neutral.

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

Push the starter switch button.

The coil is normal if the starter relay switch clicks.

If you do not hear the switch click, inspect the relay switch using the procedure below.

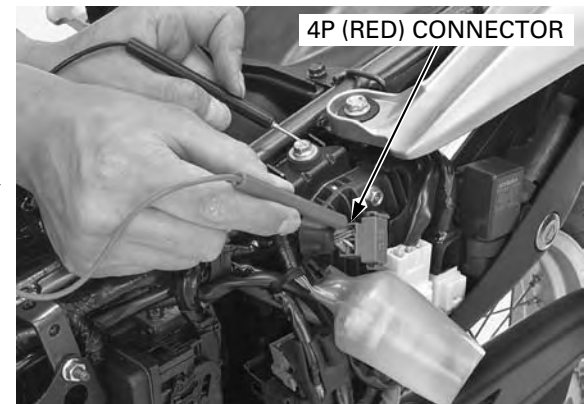


GROUND LINE

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

Check for continuity between the Green/red wire (ground line) terminal and ground.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the sidestand is retracted, the ground circuit of the relay coil is normal. (In neutral, there is a slight resistance due to the diode.)



STARTER RELAY VOLTAGE

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

Shift the transmission into neutral.

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

Measure the voltage between the yellow/red wire terminal (+) and ground (-).

If the battery voltage appears when the starter switch button is pushed, the power supply circuit of the relay coil is normal.



ELECTRIC STARTER

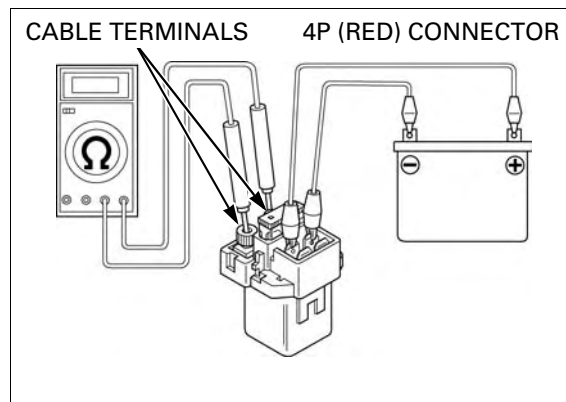
OPERATION CHECK

Remove the starter relay switch (page 19-16).

Connect an ohmmeter to the starter relay switch large terminals.

Connect a fully charged 12 V battery positive (+) wire to the starter relay switch Yellow/red wire terminal and negative (-) wire to Green/red wire terminal.

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 left side cover (page 2-4).

Turn the ignition switch OFF.

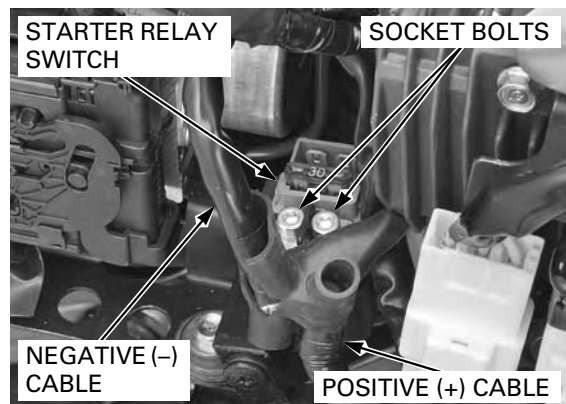
Disconnect the battery negative (-) cable (page 17-6).

Disconnect the starter relay 4P (Red) connector.
Remove the dust cover.



Remove the bolts and cables.
Remove the starter relay switch.

Installation is in the reverse order of removal.



DIODE

INSPECTION

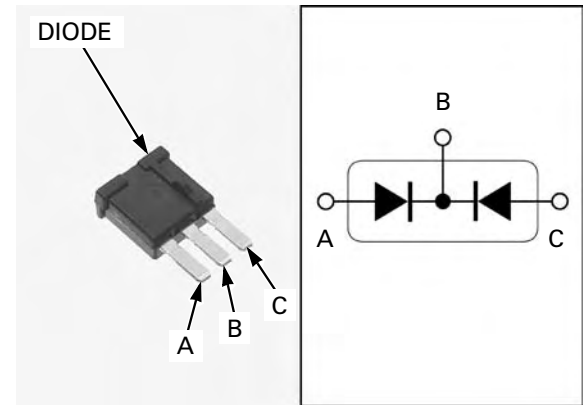
Remove the seat (page 2-4).

Open the fuse box cover and remove the diode.



Check for continuity between the diode terminals.
When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.

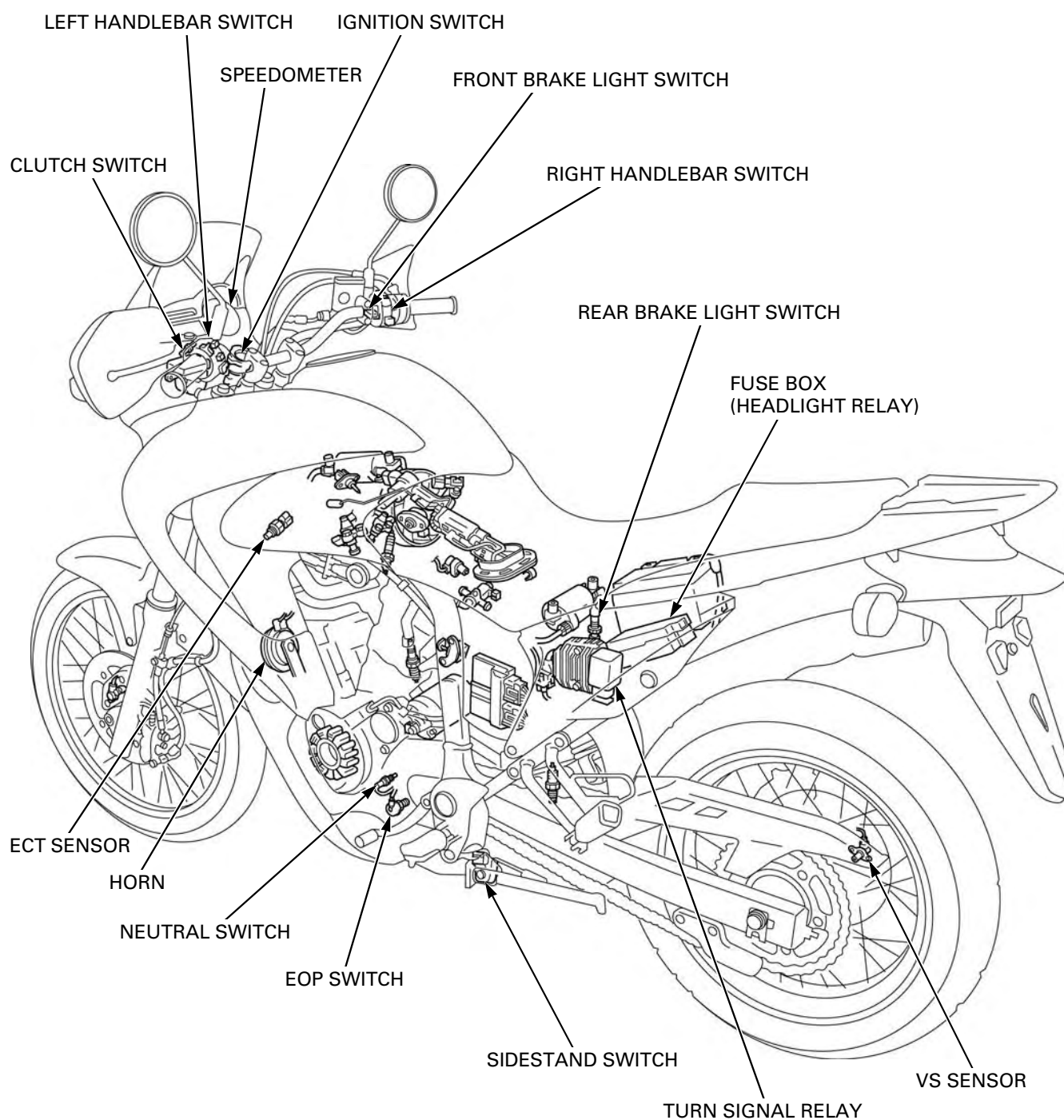


MEMO

20. LIGHTS/METERS/SWITCHES

COMPONENT LOCATION	20-2	FUEL LEVEL SENSOR/FUEL METER	20-16
SERVICE INFORMATION	20-3	EOP SWITCH	20-18
TROUBLESHOOTING	20-4	IGNITION SWITCH	20-20
HEADLIGHT	20-6	HANDLEBAR SWITCH	20-21
POSITION LIGHT	20-7	BRAKE LIGHT SWITCH	20-23
TURN SIGNAL LIGHT	20-7	CLUTCH SWITCH	20-24
BRAKE/TAIL LIGHT	20-8	NEUTRAL SWITCH	20-24
LICENSE LIGHT	20-9	SIDESTAND SWITCH	20-25
COMBINATION METER	20-9	HORN	20-26
SPEEDOMETER/VS SENSOR	20-11	TURN SIGNAL RELAY	20-26
TACHOMETER	20-13	HEADLIGHT RELAY	20-27
COOLANT TEMPERATURE GAUGE/ ECT SENSOR	20-14		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

NOTICE

Note the following when replacing the halogen headlight bulb.

- Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
- If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
- Be sure to install the dust cover after replacing the bulb.
- 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.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes used are indicated throughout this section.

Bu = Blue	G = Green	Lg = Light green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light blue	Y = Yellow	

SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight (High)		12 V – 55 W
	Headlight (Low)		12 V – 55 W
	Position light		12 V – 5 W
	Brake/taillight		12 V – 21/5 W
	License light		12 V – 5 W
	Front turn signal light		12 V – 21 W x 2
	Rear turn signal light		12 V – 21 W x 2
	Instrument light		LED x 11
	Turn signal indicator		LED x 2
	High beam indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	MIL		LED
	HISS indicator		LED
	ABS indicator (XL700VA)		LED
Fuse	XL700V	Main fuse	30 A
		Sub fuse	20 A x 3, 10 A x 5
	XL700VA	Main fuse	30 A
		Sub fuse	30 A x 2, 20 A x 3, 10 A x 6

TORQUE VALUES

Sidestand switch bolt	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)
EOP switch terminal screw	1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)
EOP switch	12 N·m (1.2 kgf·m, 9 lbf·ft)
Front brake light switch screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)
Turn signal lens screw	0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)
Headlight mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Combination meter mounting screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

Apply sealant to the threads.

TROUBLESHOOTING

VS SENSOR/SPEEDOMETER

The speedometer and odometer/trip meter indicates "----".

Faulty EEPROM in ECM

The odometer/trip meter operate normally, but the speedometer does not operate

Faulty speedometer in combination meter

The speedometer operates normally, but the odometer/trip meter does not operate

Faulty odometer/trip meter in combination meter

The speedometer operates abnormally

1. Fuse Inspection

Check for blown main fuse or sub fuse (METER. ILLUMI 10 A).

Is the fuse blown?

YES – Replace the fuse.

NO – GO TO STEP 2.

2. Battery Inspection

Make sure the battery is fully charged and in good condition.

Is the battery in good condition?

YES – GO TO STEP 3.

NO – Replace the battery.

3. VS Sensor Air Gap Inspection

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

Check the air gap between the VS sensor and pulser ring at the several points by turning the rear wheel slowly.

Standard: 0.4 – 1.2 mm (0.02 – 0.05 in)

Is the air gap correct?

NO – • Check each part for deformation and looseness and correct accordingly.
• Recheck the air gap.

YES – GO TO STEP 4.

4. VS Sensor Condition Inspection

Check that there is iron or other magnetic deposits between the pulser ring and VS sensor, and the pulser ring slots for obstructions.

Check installation condition of the pulser ring or VS sensor for looseness.

Are the VS sensor and pulser ring in good condition?

NO – Remove any deposits. Install properly or replace faulty part.

YES – • XL700V: GO TO STEP 5.
• XL700VA: GO TO STEP 8.

5. VS Sensor Input Voltage Inspection (XL700V)

Disconnect the VS sensor 2P (Orange) connector.

Turn the ignition switch ON.

Measure the voltage at the VS sensor 2P (Orange) connector Pink/white (+) and Green/red (–) wires.

Is there battery voltage?

NO – GO TO STEP 6.

YES – Faulty VS sensor

6. VS Sensor Line Open Circuit Inspection (XL700V)

Disconnect the combination meter 20P connector.
Check for continuity of the Pink/white and Green/red wires between the combination meter 20P and VS sensor 2P (Orange) connector terminals.

Is there continuity?

NO – Open circuit in Pink/white and/or Green/red wires between the combination meter 20P and VS sensor 2P (Orange) connector

YES – GO TO STEP 7.

7. VS Sensor Line Short Circuit Inspection (XL700V)

Connect the combination meter 20P connector.
Check for continuity of the Pink/white wire between the VS sensor 2P (Orange) connector terminal and ground.

Is there continuity?

YES – Short circuit in wire between the combination meter and VS sensor

NO – Faulty combination meter

8. Combination Meter Signal Voltage Inspection (XL700VA)

Turn the ignition switch ON.
Measure the voltage at the combination meter connector Pink/green terminal (+) and ground (–) while turning the rear wheel by hand.

Is the voltage repeat 0 to 5 V?

NO – GO TO STEP 9.

YES – Faulty combination meter

9. Combination Meter Signal Line Open Circuit Inspection (XL700VA)

Turn the ignition switch OFF.
Disconnect the combination meter 20P and ABS modulator 26P connectors.
Check for continuity of the Pink/green wire between the terminals of the wire harness side combination meter 20P connector and ABS modulator 26P connector.

Is there continuity?

NO – Open circuit in Pink/green wire

YES – GO TO STEP 10.

10. VS Sensor Line Open Circuit Inspection (XL700VA)

Disconnect the VS sensor 2P (Orange) connector.
Check for continuity of the Pink/white and Green/red wires between the ABS modulator 26P connector and VS sensor 2P (Orange) connector.

Is there continuity?

NO – Open circuit in Pink/white and/or Green/red wires between the ABS modulator and VS sensor

YES – GO TO STEP 11.

11. VS Sensor Line Short Circuit Inspection At The VS Sensor 2P (Orange) Sensor side (XL700VA)

Connect the ABS modulator 26P connector.
Check for continuity of the Pink/white wire between the VS sensor 2P (Orange) connector terminal and ground.

Is there continuity?

YES – Short circuit in Pink/white wire between the combination meter and VS sensor

NO – • Faulty VS sensor
• Faulty ABS modulator

HEADLIGHT

BULB REPLACEMENT

Disconnect the headlight 2P connectors.

Turn the headlight bulb counterclockwise and remove the headlight bulb.

NOTICE

Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent early bulb failure.

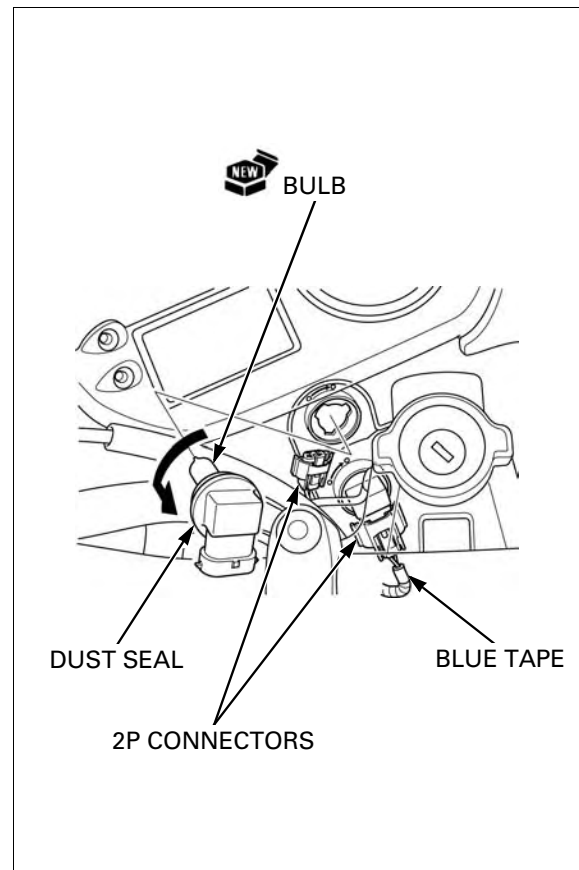
Install a new bulb, aligning its tabs with the grooves in the headlight unit.

Turn the headlight bulb clockwise.

Connect the headlight 2P connectors.

NOTE:

- The blue tape is attached on the lower (high beam) side headlight wires.



REMOVAL/INSTALLATION

Remove the front center cowl (page 2-12).

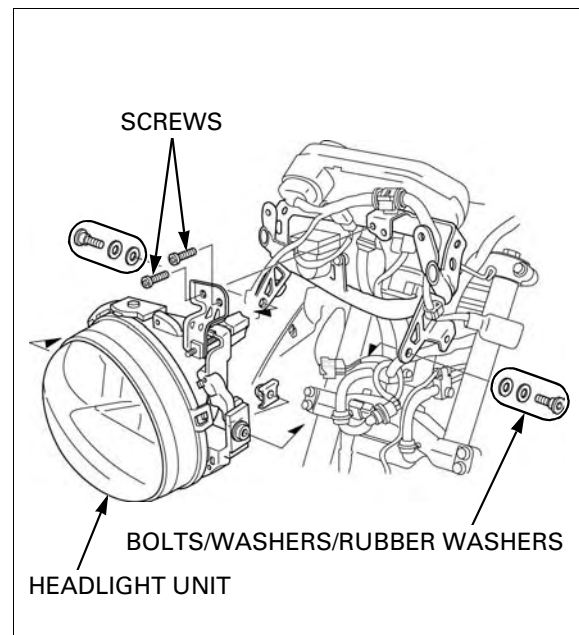
Remove the screws, bolts, washers, rubber washers and headlight unit.

Installation is in the reverse order of removal.

TORQUE:

Headlight mounting bolt:

12 N·m (1.2 kgf·m, 9 lbf·ft)



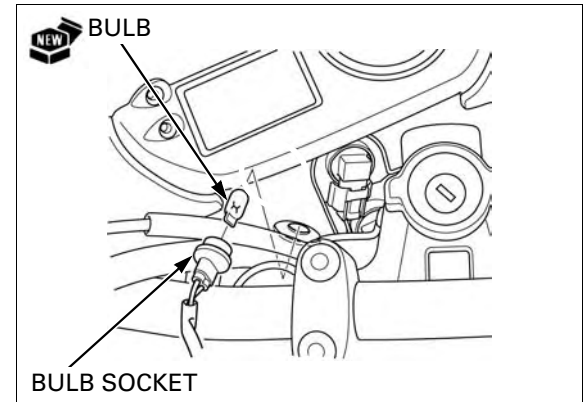
POSITION LIGHT

BULB REPLACEMENT

Pull out the position light bulb socket.

Remove the bulb from the bulb socket and replace it with a new one.

Installation is in the reverse order of removal.



TURN SIGNAL LIGHT

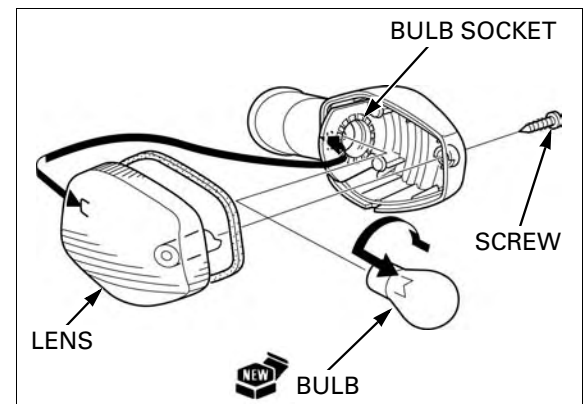
BULB REPLACEMENT

Remove the screw, turn signal light lens and gasket.

While pushing the bulb in, turn it counterclockwise to remove it from the bulb socket, and replace it with a new one.

Install the gasket, turn signal light lens and screw. Tighten the screw to the specified torque.

TORQUE: 0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)



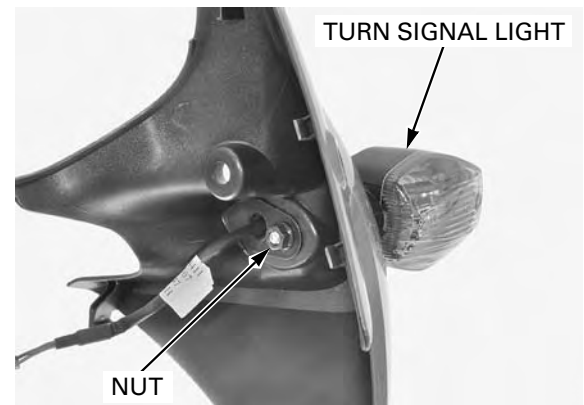
REMOVAL/INSTALLATION

FRONT

Remove the headlight plate (page 2-11).

Remove the nut and turn signal light.

Installation is in the reverse order of removal.



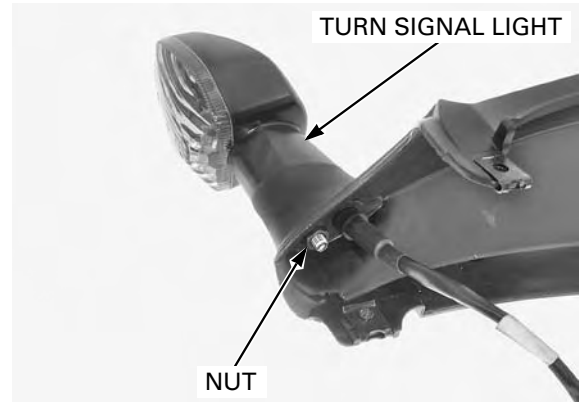
LIGHTS/METERS/SWITCHES

REAR

Remove the fender cover (page 2-6).

Remove the nut and turn signal light.

Installation is in the reverse order of removal.



BRAKE/TAIL LIGHT

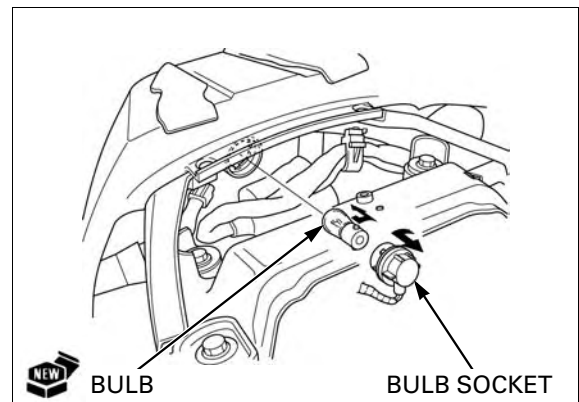
BULB REPLACEMENT

Remove the seat (page 2-4).

Turn the bulb socket counterclockwise, then remove it from the brake/tail light unit.

While pushing the bulb in, turn it counterclockwise to remove it from the bulb socket, and replace it with a new one.

Installation is in the reverse order of removal.



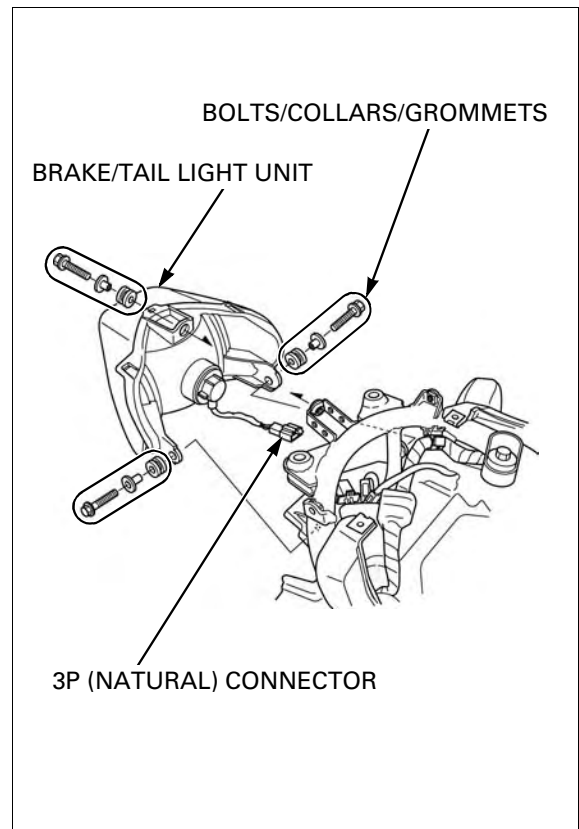
REMOVAL/INSTALLATION

Remove the rear fender A (page 2-6).

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

Remove the bolts, collars, grommets and brake/tail light unit.

Installation is in the reverse order of removal.



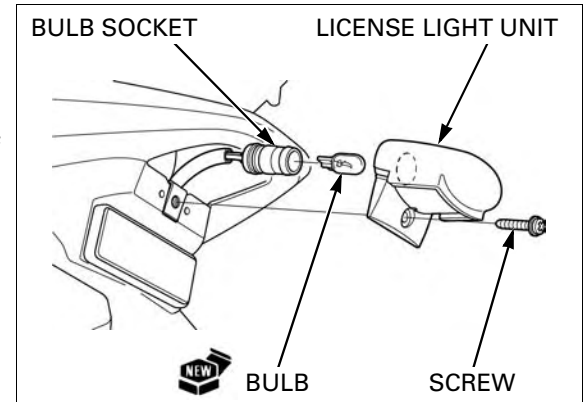
LICENSE LIGHT

BULB REPLACEMENT

Remove the screw and license light unit.

Pull out the license light bulb socket.
Remove bulb from the bulb socket, and replace it with a new one.

Install the removed parts in the reverse order of removal.



COMBINATION METER

POWER/GROUND LINE INSPECTION

Remove the front center cowl (page 2-12).

Check for following at the wire harness side connector terminals of the combination meter 20P (Gray) connector.

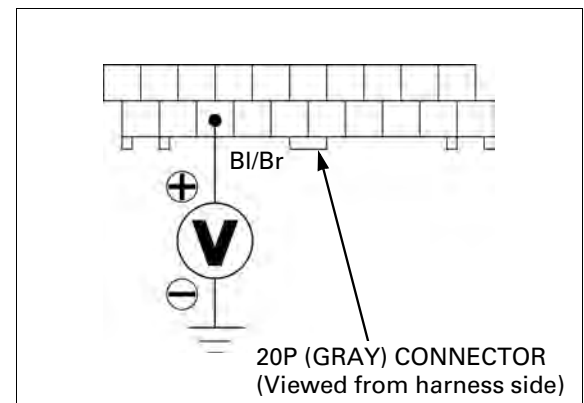


POWER INPUT LINE

Measure the voltage between the Black/brown wire terminal (+) of the combination meter 20P (Gray) connector and ground (-).
There should be battery voltage with the ignition switch turned ON.

If there is no voltage, check the following:

- Open circuit in the Black/brown wire
- Blown fuse (METER. ILLUMI 10 A)



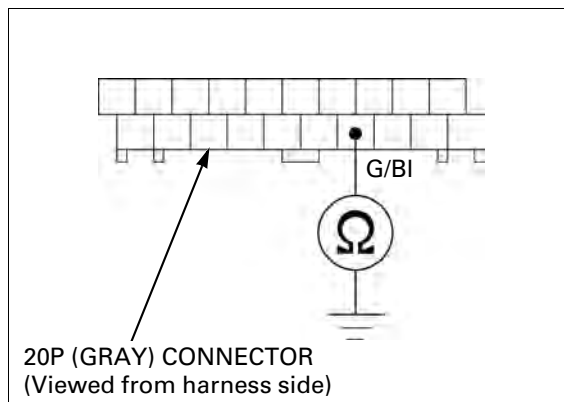
LIGHTS/METERS/SWITCHES

GROUND LINE

Check for continuity between the Green/black wire terminal and ground.

There should be continuity at all times.

If there is no continuity, check for an open circuit in the Green/black wire.



BACK-UP VOLTAGE LINE

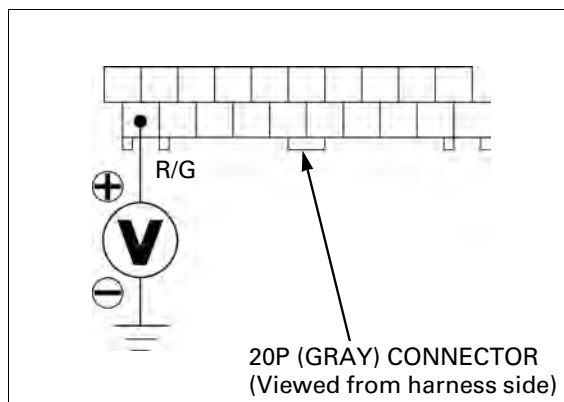
Check this line if the odometer/trip meter does not function.

Measure the voltage between the Red/green wire terminal (+) and ground (-).

There should be battery voltage at all times.

If there is no voltage, check the following:

- Open circuit in the Red/green wire
- Blown fuse (TURN/CLOCK 10 A)
- Open circuit in the Red wire



REMOVAL/INSTALLATION

Remove the headlight (page 20-6).

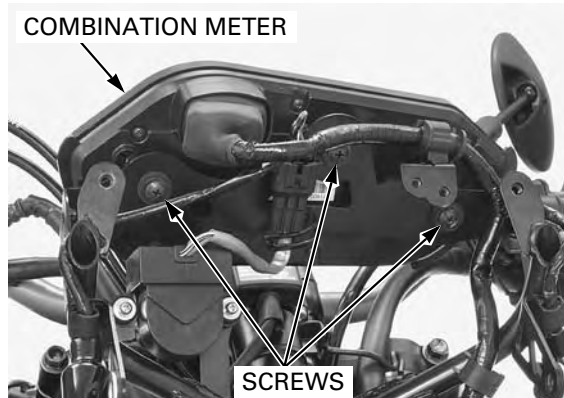
Remove the dust cover and disconnect the combination meter 20P (Gray) connector.



Remove the screws and combination meter. Installation is in the reverse order of removal.

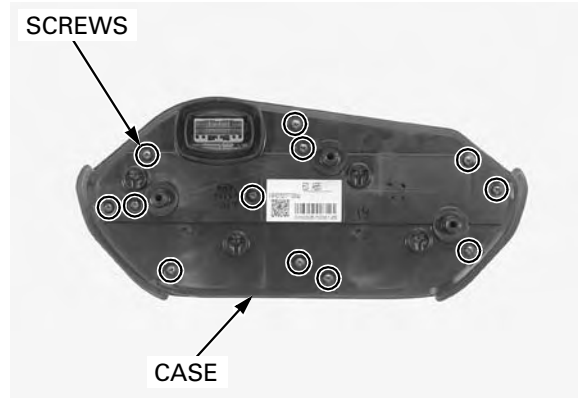
TORQUE:

Combination meter mounting screw:
1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)



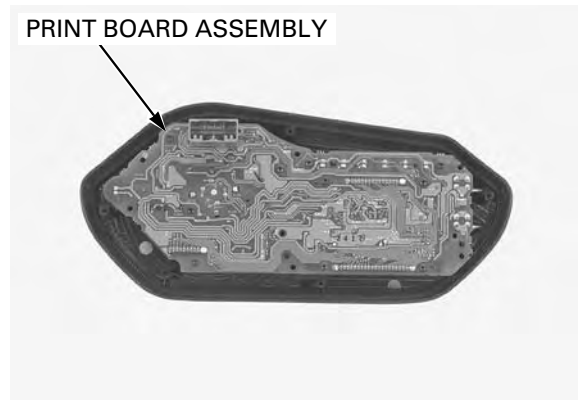
DISASSEMBLY/ASSEMBLY

Remove the screws and combination meter case.



Remove the combination meter print board assembly.

Assembly is in the reverse order of disassembly.



SPEEDOMETER/VS SENSOR

SYSTEM INSPECTION

Check the following:

- Combination meter power/ground line (page 20-9)
- ABS modulator power/ground line (page 16-24)

XL700VA: Check the ABS indicator.
If the ABS indicator blinks, follow the check in the troubleshooting table (page 16-10).

Support the motorcycle securely and raise the rear wheel off the ground.
Shift the transmission into neutral and turn the ignition switch ON.

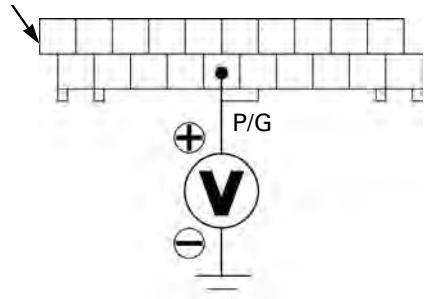
Measure the voltage at the combination meter 20P (Gray) connector between the Pink/green (+) and ground (-).

Slowly turn the rear wheel by hand.
There should be 0 V to 5 V pulse voltage.

- If pulse voltage appears, replace the combination meter.
- If pulse voltage does not appear, check the following:
 - **XL700VA:**
Pink/green wire for an open or short circuit
If the wire is OK, replace the ABS modulator.
 - **XL700V:**
Pink/white and Green/red wires for an open or short circuit
If the wires are OK, check the VS sensor inspection (page 20-12).

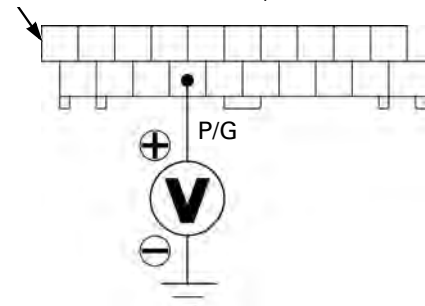
XL700VA:

20P (GRAY) CONNECTOR
(viewed from harness side)



XL700V:

20P (GRAY) CONNECTOR
(viewed from harness side)



VS SENSOR INSPECTION

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

Measure the clearance (air gap) between the VS sensor and pulser ring at several points by turning the wheel slowly.

It must be within specification.

STANDARD: 0.2 – 1.2 mm (0.01 – 0.05 in)

The sensor air gap cannot be adjusted.

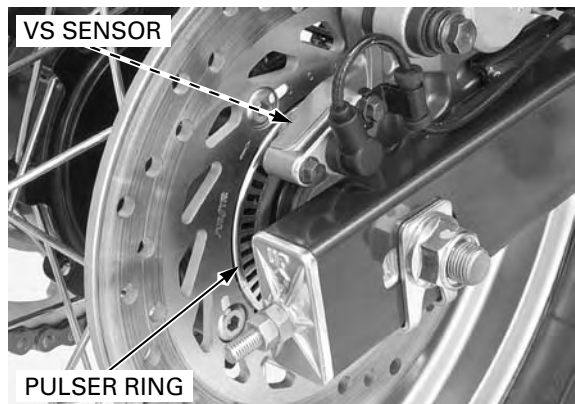
If it is not within specification, check each installed part for deformation, looseness and damage.

Inspect the area around the VS sensor:

Check that there is iron or other magnetic deposits between the pulser ring and VS sensor, and the pulser ring slots for obstructions.

Check installation condition of the pulser ring or VS sensor for looseness.

Check the pulser ring and sensor tip for deformation or damage (e.g., chipped pulser ring teeth).

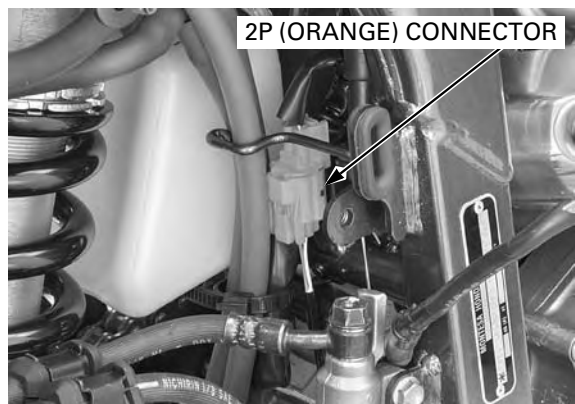


VS SENSOR REMOVAL/INSTALLATION

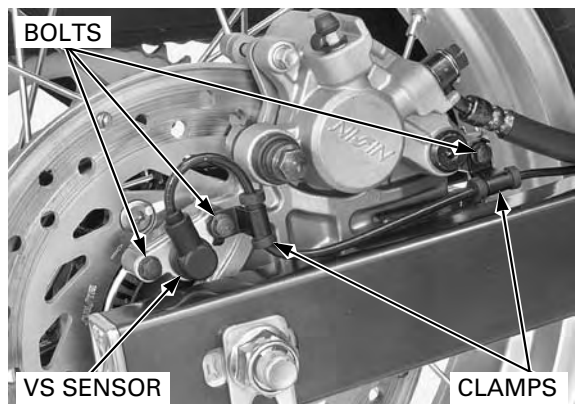
Remove the battery tray (page 17-6).

Disconnect the VS sensor 2P (Orange) connector.

Remove the VS sensor wire harness from the clamps (page 1-21).



Remove the bolts, clamps and VS sensor.



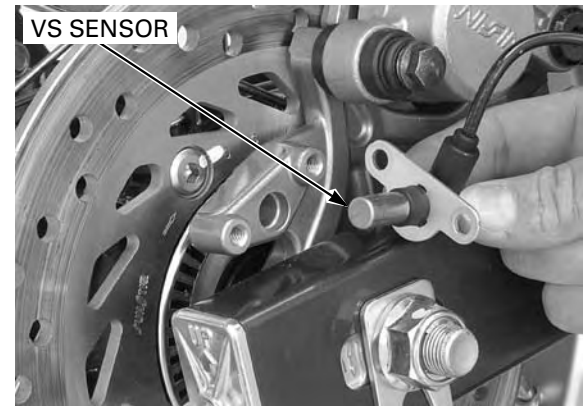
Check that there is iron or other magnetic deposits between the pulser ring and VS sensor.
Remove any deposits.

Route the sensor wire properly (page 1-21).

Check the sensor tip for deformation or damage (e.g., chipped pulser ring teeth).
Replace the VS sensor if necessary.

Installation is in the reverse order of removal.

After installing the VS sensor, Measure the clearance (air gap) between the sensor and pulser ring (page 20-12).



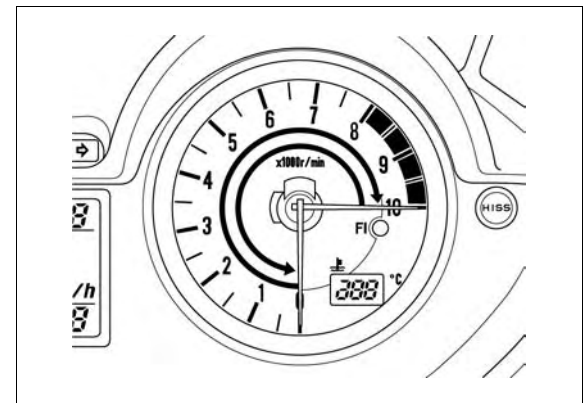
TACHOMETER

SYSTEM INSPECTION

- Check for loose or poor contact terminals at the combination meter 20P (Gray) connector.

Turn the ignition switch ON, check that the tachometer needle move to full scale and then returns to zero.

If the needle does not show initial function, check the combination meter power input line (page 20-9).



Remove the front center cowl (page 2-12).

Connect the peak voltage adaptor to the combination meter terminal and ground.

TOOL:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)

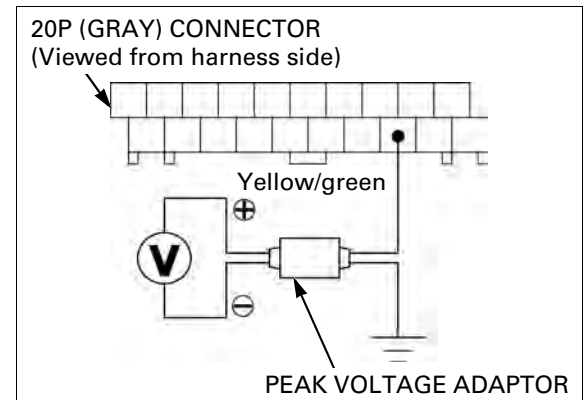
Connection: Yellow/green (+) and Ground (-)

Start the engine and measure the tachometer input peak voltage.

PEAK VOLTAGE: 10.5 V minimum

If the peak voltage is normal, replace the combination meter assembly (page 20-10).

If the measured value is below 10.5 V, replace the ECM (page 5-77).



LIGHTS/METERS/SWITCHES

If the value is 0 V, check for continuity between the combination meter 20P connector and ECM 33P (Gray) connector Yellow/green terminals.

TOOL:

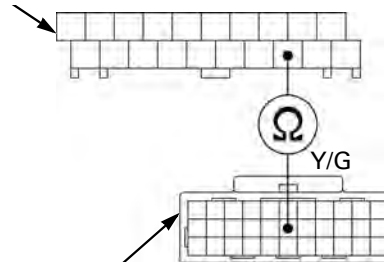
Test probe

07ZAJ-RDJA110

If there is no continuity, check the wire harness for an open circuit.

If there is continuity, replace the combination meter assembly (page 20-10).

20P (GRAY) CONNECTOR
(Viewed from harness side)



33P (GRAY) CONNECTOR
(Wire side/female terminal)

COOLANT TEMPERATURE GAUGE/ ECT SENSOR

NOTE:

- Before starting the inspection, check the thermostat housing mounting bolt.
If the thermostat housing mounting bolt is loose, tighten it.

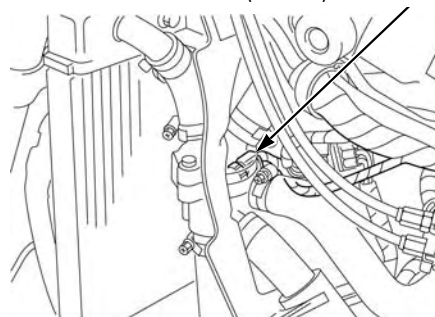
INSPECTION

If the engine coolant temperature indicates too high or too low temperature in spite of normal engine coolant temperature, inspect the following.

Remove the left front side cowl (page 2-9).

Disconnect the ECT sensor 3P (Gray) connector.

3P (GRAY) CONNECTOR



COOLANT TEMPERATURE GAUGE INDICATE THE "___"

1. ECT Sensor Line Short Circuit Inspection

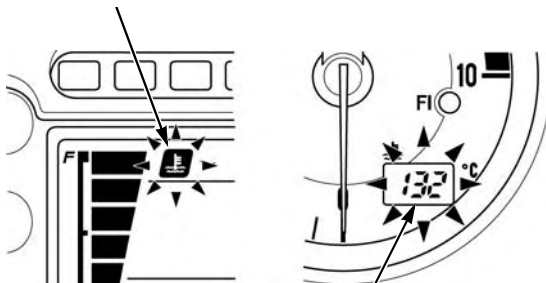
Ground the Green/blue wire of the ECT 3P (Gray) connector with a jumper wire.

Do the temperature indicate "132°C" and warning indicator blinks?

YES – Faulty ECT sensor

NO – GO TO STEP 2.

WARNING INDICATOR



COOLANT TEMPERATURE GAUGE

2. ECT Sensor Line Open Circuit Inspection

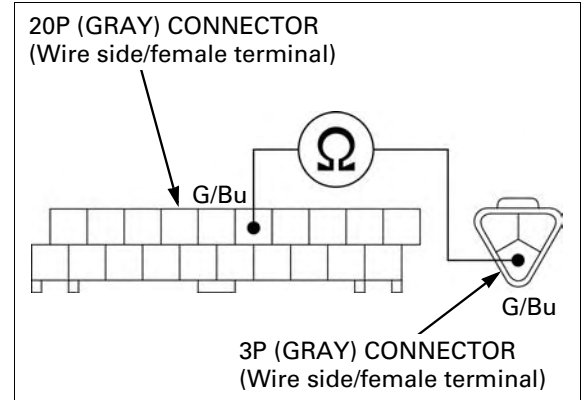
Disconnect the combination meter 20P (Gray) connector.
Check the continuity between the ECT sensor 3P (Gray) and combination meter 20P (Gray) connectors.

Connection: Green/blue – Green/blue

Is there continuity?

YES – Faulty combination meter

NO – Open circuit in Green/blue wire



COOLANT TEMPERATURE GAUGE INDICATE THE "132°C" AND WARNING INDICATOR BLINKS

1. Coolant Temperature Gauge Operation Inspection

Turn the ignition switch ON and check the coolant temperature gauge.

Does the coolant temperature gauge indicate the "– – –"?

YES – Inspect the ECT sensor (page 20-16).

NO – GO TO STEP 2.

2. ECT Sensor Line Short Circuit Inspection

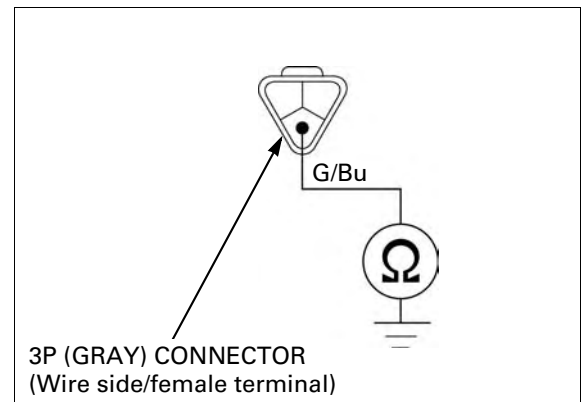
Turn the ignition switch OFF.
Check the continuity between the ECT sensor 3P (Gray) connector and ground.

Connection: Green/blue – Ground

Is there continuity?

YES – Short circuit in Green/blue wire

NO – GO TO STEP 3.



3. ECT Sensor Inspection

Inspect the ECT Sensor (page 20-16).

Does the ECT Sensor correctly?

YES – Faulty combination meter

NO – Faulty ECT Sensor

ECT SENSOR INSPECTION

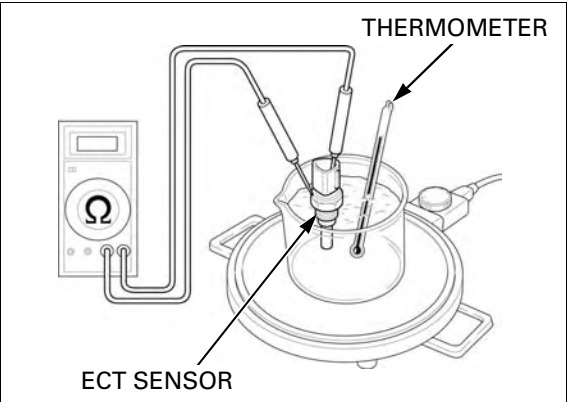
Drain the coolant from by removing the water pump drain bolt (page 6-7).
Remove the ECT sensor (page 5-72).

Wear insulated gloves and adequate eye protection. Keep flammable materials away from the burner.

Heat the coolant (1:1mixture) with an electric heating element.
Suspend the ECT sensor in heated coolant and check the continuity through the sensor as the coolant heats up.

NOTE:

- Soak the ECT sensor in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to the bottom of the switch.
- Keep temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT sensor touch the pan.



Connection: Green/blue – Body ground

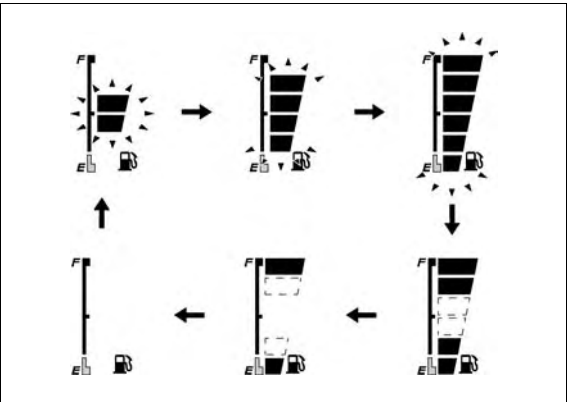
Temperature °C (°F)	50 (122)	80 (176)	120 (248)
Resistance (kΩ)	6.8 – 7.4	2.1 – 2.7	0.6 – 0.8

Replace the ECT sensor if it is out of specifications.
Install the ECT sensor (page 5-72).

FUEL LEVEL SENSOR/FUEL METER

If the fuel meter display is as shown, check for an open circuit in wire harness and the fuel level sensor.

If the wire harness and fuel level sensor are good, replace the combination meter assembly (page 20-10).



FUEL LEVEL SENSOR INSPECTION

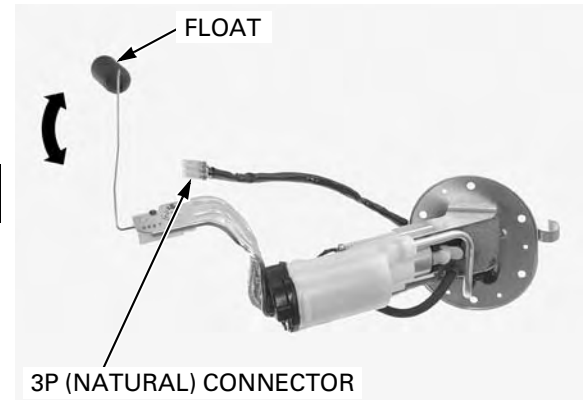
Remove the fuel pump (page 5-59).

Connect an ohmmeter to the fuel pump 3P (Natural) connector Black/white and Red/black terminals. Inspect the resistance of the float at the full and empty positions.

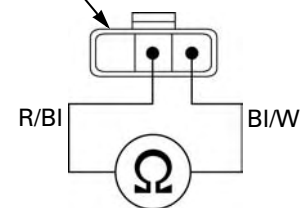
Position	FULL	EMPTY
Resistance	8 – 12 Ω	233 – 240 Ω

Replace the fuel pump assembly if fuel level sensor is out of specification.

Install the fuel pump (page 5-59).



3P (NATURAL) CONNECTOR
(Wire side/male terminal)



FUEL METER INSPECTION

Remove the fuel pump (page 5-59).

Connect the fuel pump 3P (Natural) connector. Turn the ignition switch ON.

Keep the float at each position in several tens of seconds.

Move the float from the empty to check full position, then check the fuel meter indication.

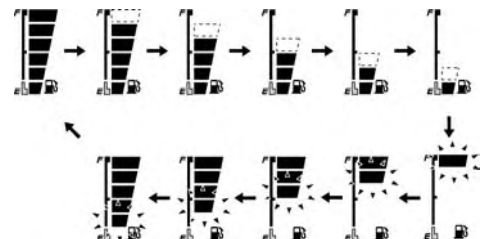
If the fuel meter does not indicate properly, check for open or short circuit in wire harness.

If the wire harness is good, replace the combination meter assembly (page 20-10).

FULL:



EMPTY:



EOP SWITCH

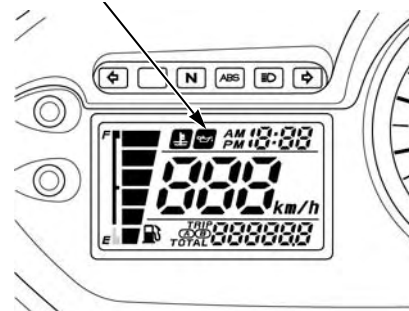
INSPECTION

Indicator does not come on with the ignition switch turned ON

Check that the neutral and high beam indicators function properly.

If they do not function properly, check the power input line of the combination meter (page 20-9).

OIL PRESSURE INDICATOR



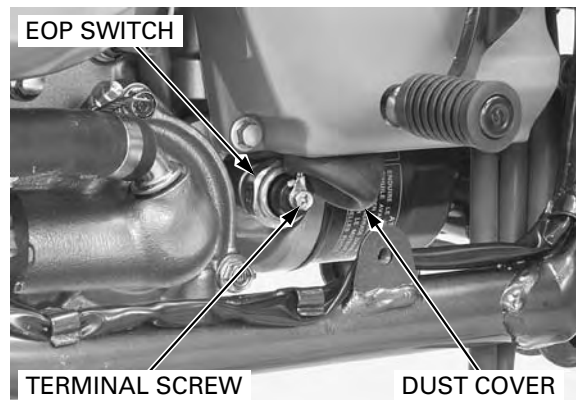
Remove the under cowl (page 2-13).

Remove the dust cover, and disconnect the EOP switch wire by removing the terminal screw.

Ground the EOP switch 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 loose or an open circuit in the Blue/red wire. If the wire is OK, replace the combination meter assembly (page 20-10).



Indicator stays on while the engine is running

Remove the dust cover, and disconnect the EOP switch wire by removing the terminal screw.

Check for continuity between the wire terminal and ground.

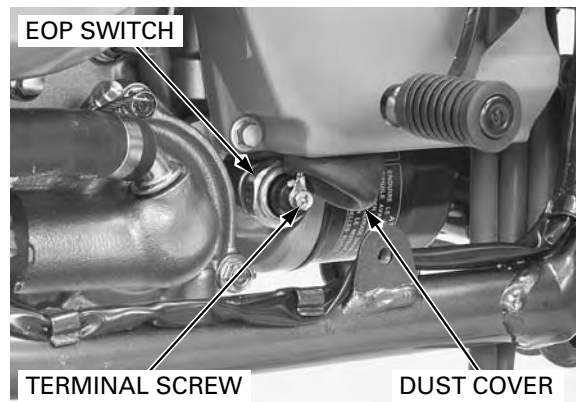
- If there is continuity, short circuit in Blue/red wire.
- If there is no continuity, check the oil pressure (page 4-5).
If the oil pressure is normal, replace the EOP switch.

After inspection, connect the EOP switch wire terminal and tighten the terminal screw to the specified torque.

TORQUE: 1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)

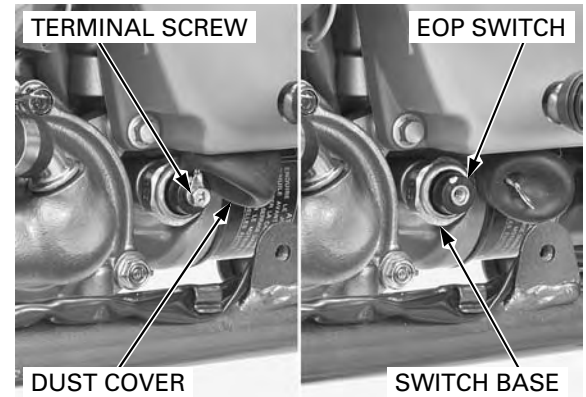
Install the dust cover properly.

Install the under cowl (page 2-13).



REMOVAL/INSTALLATION

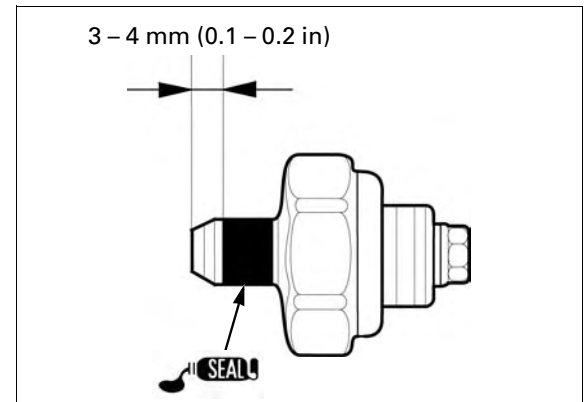
Remove the under cowl (page 2-13).
 Remove the dust cover.
 Remove the terminal screw and disconnect the EOP switch wire.
 Remove the EOP switch while holding the switch base.



Apply liquid sealant (Three Bond 1207B or equivalent) to the EOP switch threads.

Install and tighten the EOP switch to the specified torque while holding the switch base.

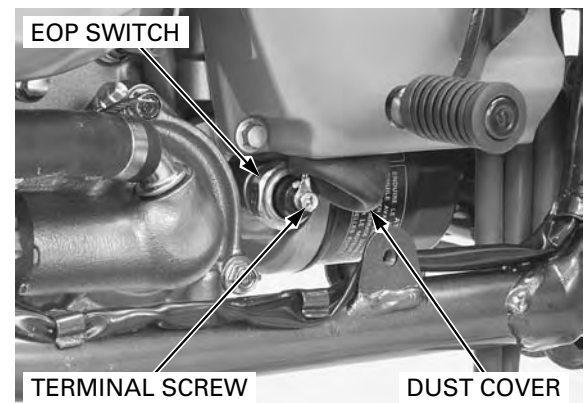
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the EOP switch wire terminal and tighten the screw to the specified torque.

TORQUE: 1.9 N·m (0.2 kgf·m, 1.4 lbf·ft)

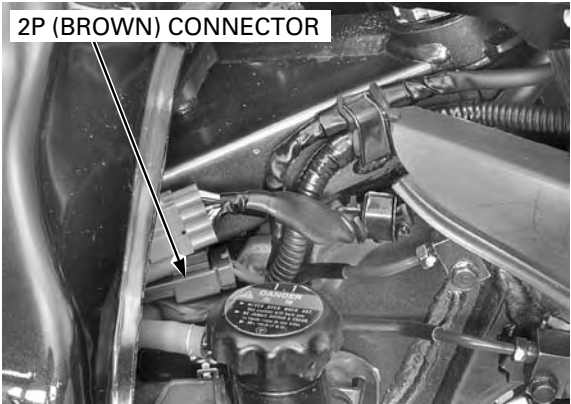
Install the dust cover.
 Start the engine and check that there are no oil leaks and indicator function.
 Install the under cowl (page 2-13).



IGNITION SWITCH

INSPECTION

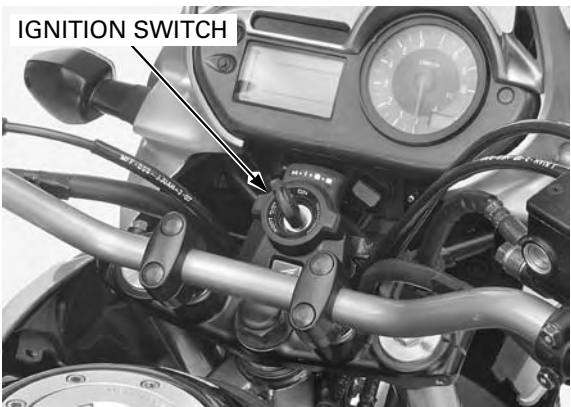
Remove the right front side cowl (page 2-9).
Disconnect the ignition switch 2P (Brown) connector.



Check for continuity between the switch side connector terminals in each switch position. Continuity should exist between the color coded wires as follow:

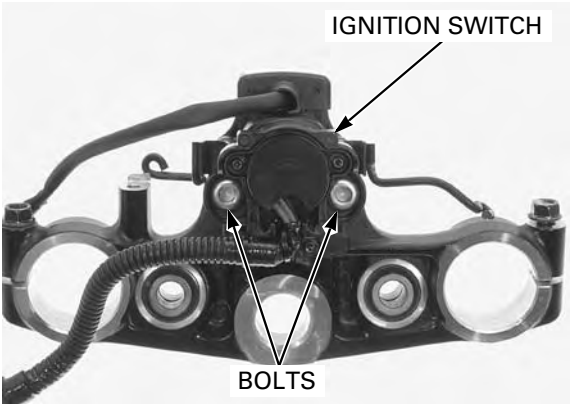
IGNITION SWITCH

	BAT	IGN
ON	○	○
OFF		
LOCK		
COLOR	R	R/BI



REMOVAL/INSTALLATION

Remove the top bridge (page 13-31).
Remove the bolts and ignition switch assembly.
Install and tighten a new mounting bolts securely.
Install the top bridge (page 13-34).



HANDLEBAR SWITCH

RIGHT HANDLEBAR SWITCH

Lift and support the fuel tank (page 3-5).

Disconnect the right handlebar switch 8P (Gray) connector.



8P (GRAY) CONNECTOR

Check for continuity between the connector terminals in each switch position.

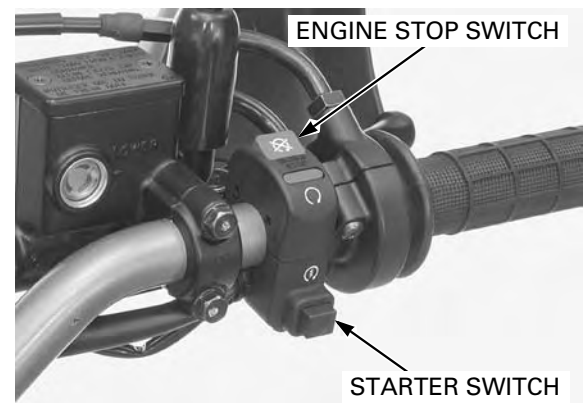
Continuity should exist between the wires as follows:

ENGINE STOP SWITCH

	IG	BAT5
	○	○
COLOR	BI	W/BI

STARTER SWITCH

	BAT4	ST	HL
FREE	○		○
PUSH	○	○	
COLOR	BI/R	Y/R	W



ENGINE STOP SWITCH

STARTER SWITCH

LEFT HANDLEBAR SWITCH

Lift and support the fuel tank (page 3-5).
Disconnect the left handlebar switch 10P (Gray) connector.



Check for continuity between the connector terminals in each switch position.
Continuity should exist between the wires as follows:

TURN SIGNAL SWITCH

	W	L	R
N			
COLOR	Gr	O	Lb

DIMMER SWITCH

	HI	HL	
(N)			
COLOR	Bu	W	

HORN SWITCH

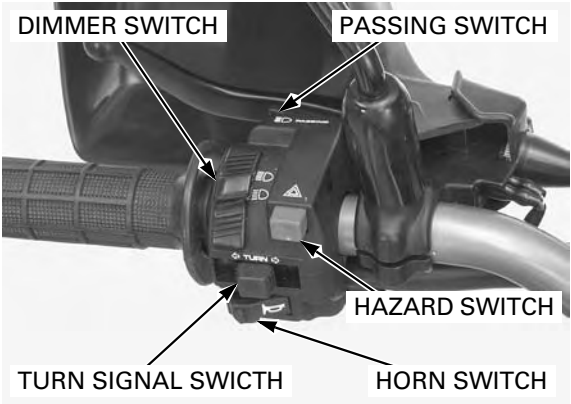
	Ho	BAT3
FREE		
PUSH		
COLOR	Lg	W/G

PASSING SWITCH

	HL	HI
FREE		
PUSH		
COLOR	W	Bu

HAZARD SWITCH

	W	R	L
ON			
OFF			
COLOR	Gr	Lb	O

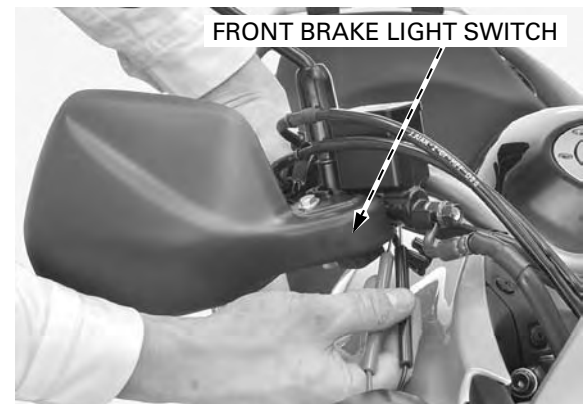


BRAKE LIGHT SWITCH

FRONT

Disconnect the brake light switch connectors and check for continuity between the switch terminals.

There should be continuity with the brake lever squeezed and no continuity with the lever released.



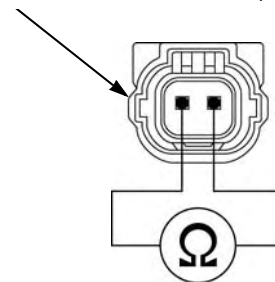
REAR

Remove the battery tray (page 17-6).

Disconnect the rear brake light switch 2P (Black) connector and check for continuity between the switch side connector terminals.

There should be continuity with the brake pedal depressed and no continuity with the pedal released.

REAR BRAKE LIGHT SWITCH
2P (BLACK) CONNECTOR
(Switch side/female terminal)



REAR BRAKE LIGHT SWITCH REMOVAL/INSTALLATION

Remove the battery tray (page 17-6).

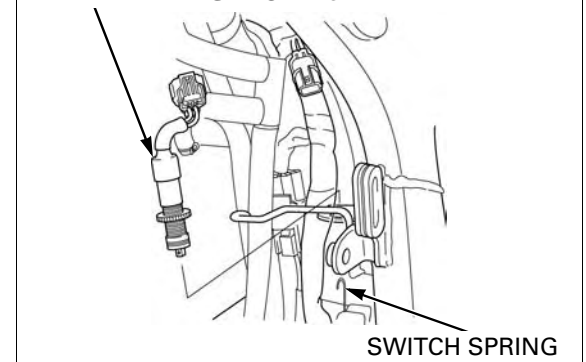
Unhook the brake light switch spring.

Disconnect the rear brake light switch 2P (Black) connector and remove the rear brake light switch.

Installation is in the reverse order of removal.

Adjust the rear brake light switch (page 3-26).

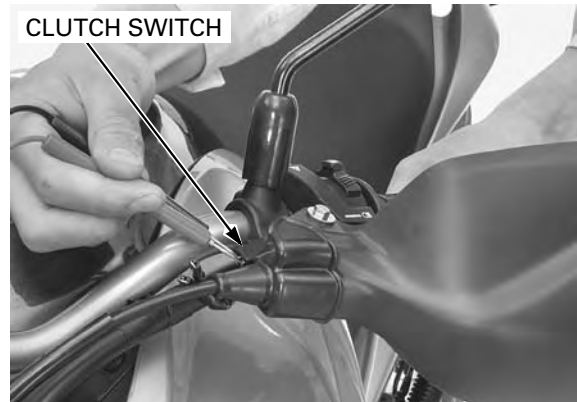
REAR BRAKE LIGHT SWITCH



CLUTCH SWITCH

Disconnect the clutch switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed and no continuity with the lever released.

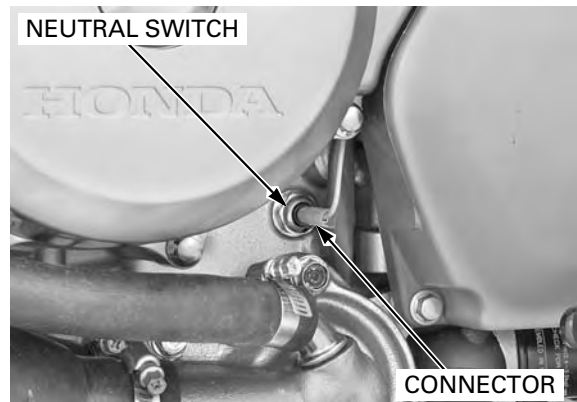


NEUTRAL SWITCH

INSPECTION

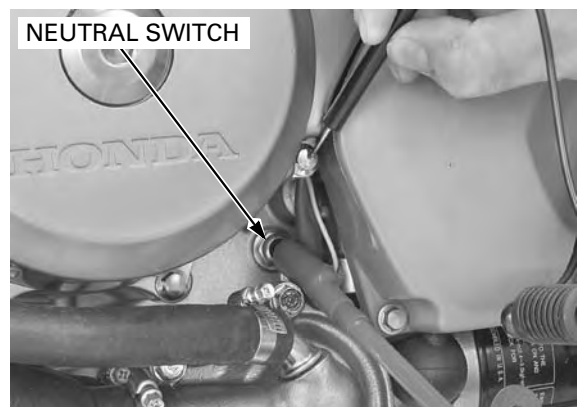
Remove the under cowl (page 2-13).

Disconnect the neutral switch connector.



Check for continuity between the switch terminal and engine ground.

There should be continuity when the transmission is in neutral, and no continuity when the transmission is in gear except neutral.

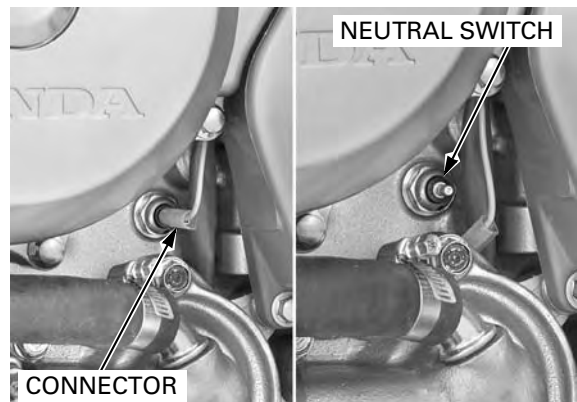


REMOVAL/INSTALLATION

Remove the under cowl (page 2-13).

Disconnect the neutral switch connector.

Remove the neutral switch with the sealing washer from the crankcase.

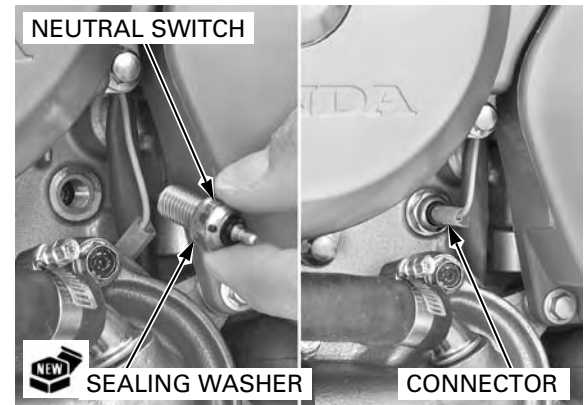


Install the neutral switch with a new sealing washer and tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the neutral switch connector.

Install the under cowl (page 2-13).



SIDESTAND SWITCH

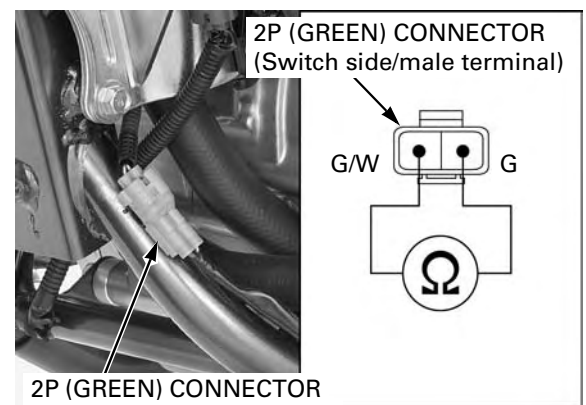
INSPECTION

Remove the under cowl (page 2-13).

Disconnect the sidestand switch 2P (Green) connector.

Check for continuity between the switch side connector terminals.

There should be continuity with the sidestand retracted and no continuity with the sidestand lowered.



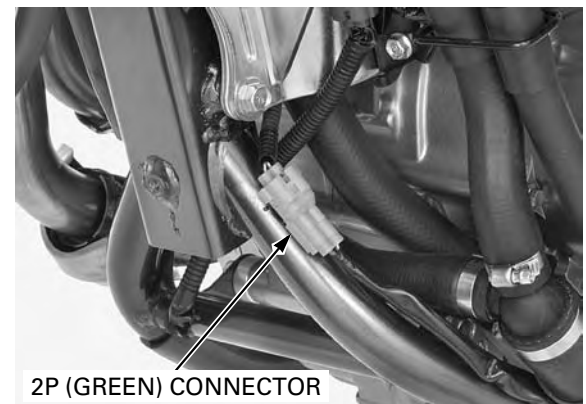
REMOVAL/INSTALLATION

Remove the under cowl (page 2-13).

Support the motorcycle on a level surface.

Disconnect the sidestand switch 2P (Green) connector.

Release the sidestand switch wire from the clamps (page 1-21).



Remove the bolt and sidestand switch.

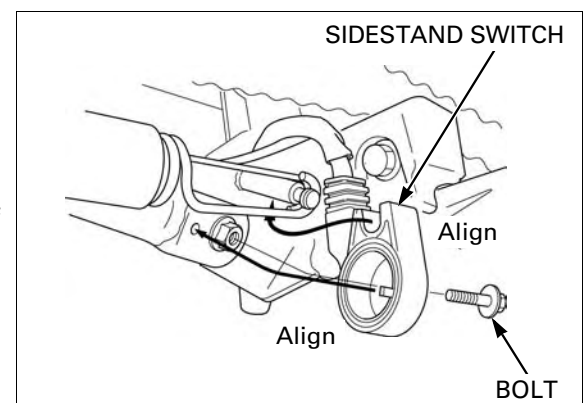
Install the sidestand switch by aligning its pin with the sidestand hole and switch groove with the bracket pin.

Install and tighten the bolt to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

Install the removed parts in the reverse order of removal.

Route the sidestand switch wire properly (page 1-21).

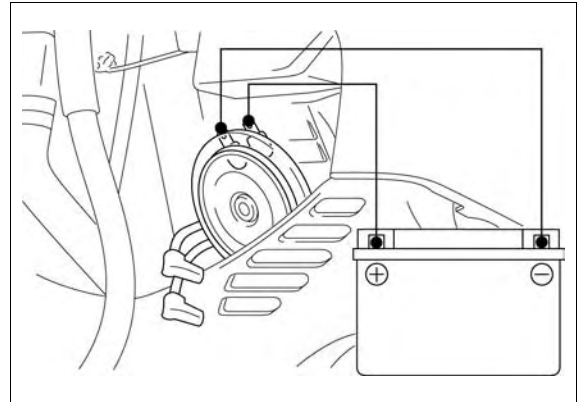


HORN

INSPECTION

Disconnect the connectors 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.



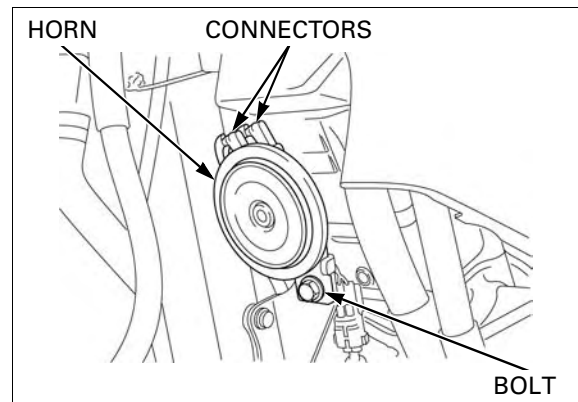
REMOVAL/INSTALLATION

Remove the under cowl (page 2-13).

Disconnect the connectors from the horn.

Remove the bolt and horn.

Installation is in the reverse order of removal.



TURN SIGNAL RELAY

Turn signal light does not blink

Check the following:

- Burned bulb or non-specified wattage
- Blown fuse

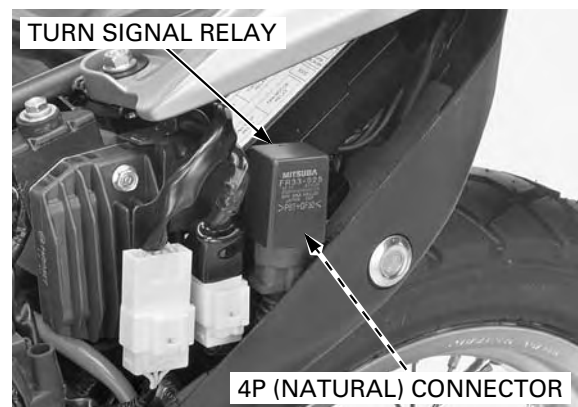
Remove the left side cover (page 2-4).

Remove the turn signal relay from the stay.

Slide the rubber cap and disconnect the turn signal relay 4P (Natural) connector.

Connect the Red/green and Gray wire terminals of the wire harness side connector with a jumper wire. 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 Red/green and Gray wires.
 - If the light comes on, check the connector terminals for loose or poor contact.
- If the connector terminals are OK, replace the turn signal relay.

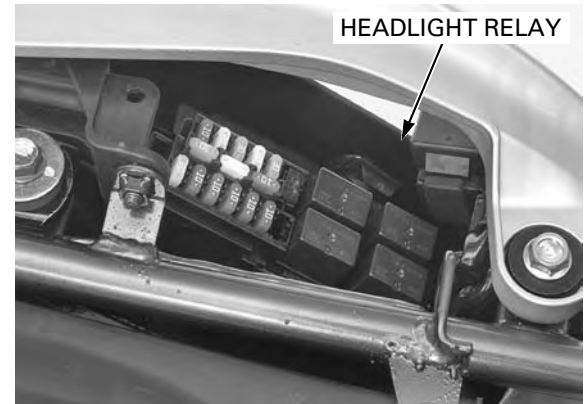


HEADLIGHT RELAY

INSPECTION

Remove the seat (page 2-4).

Open the fuse/relay box and remove the headlight relay.

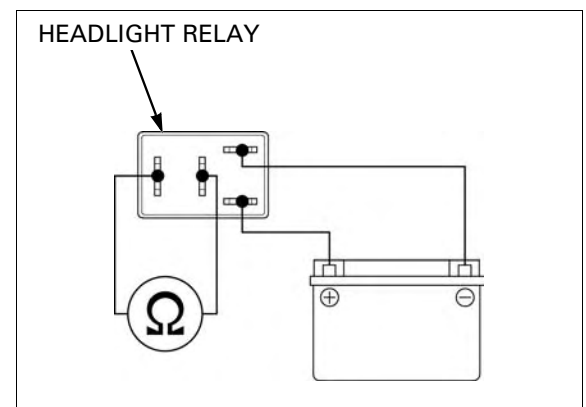


Connect an ohmmeter to the headlight relay connector terminals.

Connect a 12 V battery to the headlight relay connector terminals as shown.

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the headlight relay.

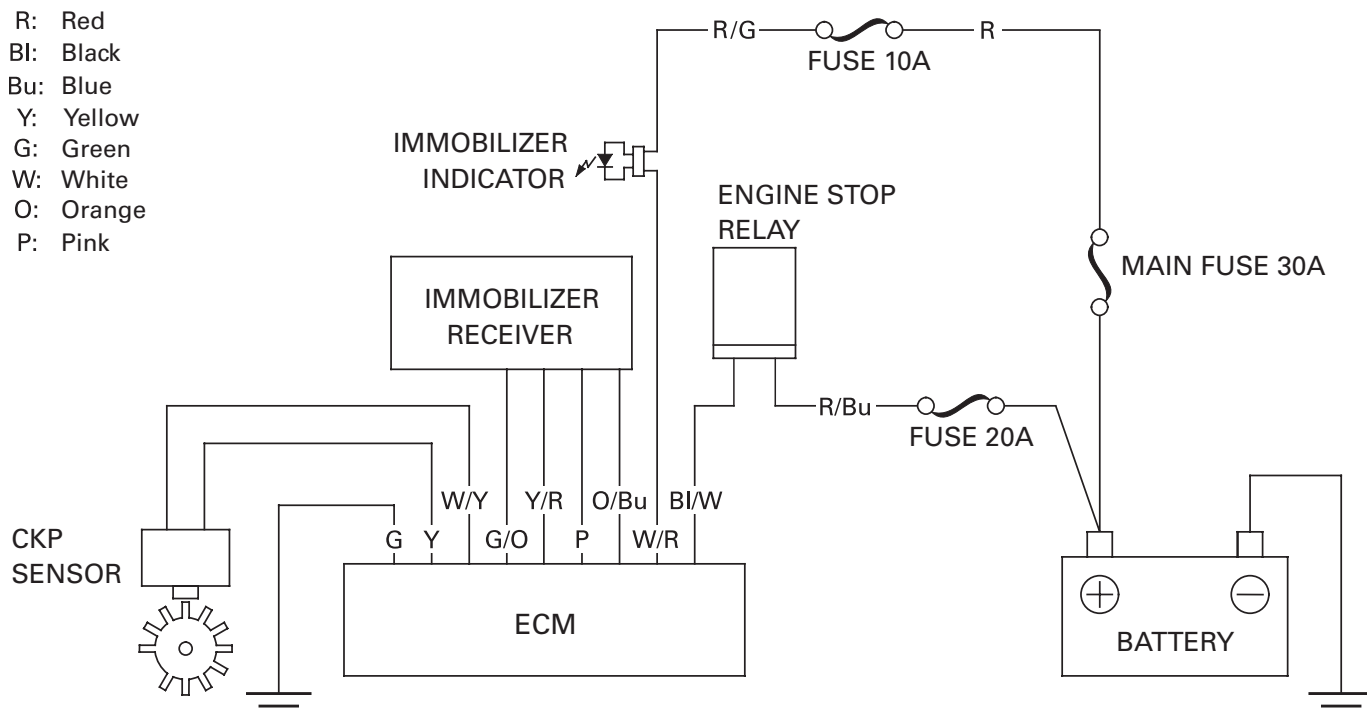


MEMO

21. IMMOBILIZER SYSTEM (HISS)

SYSTEM DIAGRAM.....	21-2	TROUBLESHOOTING.....	21-9
SERVICE INFORMATION	21-3	HISS INDICATOR.....	21-12
KEY REGISTRATION PROCEDURES	21-4	ECM.....	21-12
DIAGNOSTIC CODE INDICATION	21-7	IMMOBILIZER RECEIVER.....	21-14

SYSTEM DIAGRAM



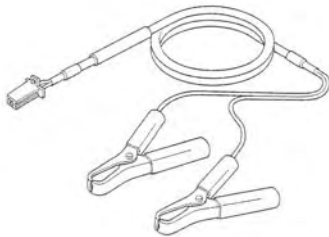
SERVICE INFORMATION

GENERAL

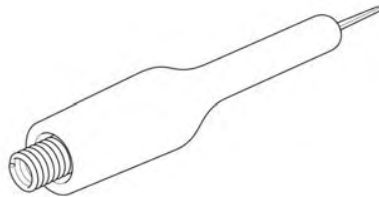
- When checking the immobilizer system (HISS), follow the steps in the troubleshooting flow chart (page 21-9).
- Keep the immobilizer key away from the other vehicle's immobilizer key when using it. The jamming of the key code signal may occur and the proper operation of the system will be obstructed.
- The key has built-in electronic part (transponder). Do not drop and strike the key against a hard material object, and do not leave the key on the dashboard in the car, etc. where the temperature will rise. Do not leave the key in the water for a prolonged time such as by washing the clothes.
- The ECM as well as the transponder keys must be replaced if all transponder keys have been lost.
- The system does not function with a duplicated key code is registered into the transponder with the immobilizer system (HISS).
- The ECM can store up to four key codes. (The four keys can be registered.)
- Do not modify the immobilizer system as it can cause the system failure. (The engine cannot be started.)
- Refer to the ignition system inspection (page 18-5).
- Refer to the ignition switch servicing (page 20-20).

TOOLS

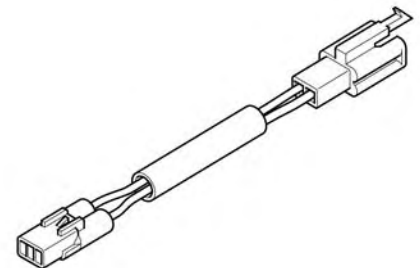
Inspection test harness
07XMZ-MBW0101



Test probe
07ZAJ-RDJA110



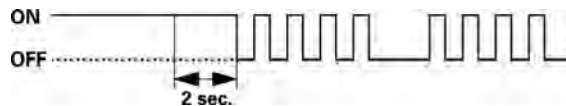
Test harness adaptor
070MZ-MEC0100



KEY REGISTRATION PROCEDURES

When the key has been lost, or additional spare key is required:

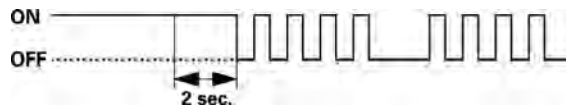
1. Obtain a new transponder key.
2. Grind the key in accordance with the shape of the original key.
3. Apply 12 V battery voltage to the CKP sensor lines of the ECM using the special tool (page 21-7).
4. Turn the ignition switch ON with the original key. The HISS indicator comes on and it remains on.
 - The code of the original key recognized by the ECM.
 - If there is any problem in the immobilizer system (HISS), the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 21-7).
5. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds, then it blinks four times repeatedly.



- The immobilizer system (HISS) enters the registration mode. Registrations of all key except the original key inserted in the ignition switch are cancelled. (Registration of the lost key or spare key is cancelled.)

The spare key must be registered again.

6. Turn the ignition switch OFF and remove the key.
7. Turn the ignition switch ON with a new key or the spare key. (Never use the key registered in previous steps.) The indicator comes on for two seconds then it blinks four times repeatedly.

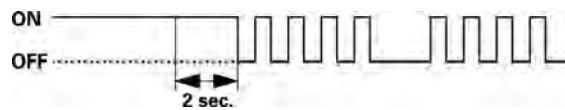


- The new key or spare key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 21-8).
 - Keep the other transponder key away from the immobilizer receiver more than 50 mm (2.0 in).
8. Repeat the steps 6 and 7 when you continuously register the other new key.

The ECM can store up to four key codes. (The four keys can be registered.)
 9. Turn the ignition switch OFF, remove the inspection adaptor and connect the CKP sensor 2P (Red) connector.
 10. Turn the ignition switch ON with the registered key.
 - The immobilizer system (HISS) returns to the normal mode.
 11. Check that the engine can be started using all registered key.

When the ignition switch is faulty:

1. Obtain a new ignition switch and two new transponder keys.
2. Remove the ignition switch (page 20-20).
3. Apply 12 V battery voltage to the CKP sensor lines of the ECM using the special tool (page 21-7).
4. Set the original (registered) key near the immobilizer receiver so that the transponder in the key can communicate with the receiver.
5. Connect a new ignition switch to the wire harness and turn it ON with a new transponder key. (keep the ignition switch away from the receiver.) The HISS indicator comes on and it remains on.
 - The code of the original key recognized by the ECM.
 - If there is any problem in the immobilizer system (HISS), the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 21-7).
6. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds then it blinks four times repeatedly.



- The immobilizer system (HISS) enters the registration mode. Registrations of all key except the original key set near the receiver are cancelled.
7. Turn the ignition switch OFF and remove the key.
 8. Install the ignition switch (page 20-20).
 9. Turn the ignition switch ON with a first new key. The indicator comes on for two seconds then it blinks four times repeatedly.



- The first key or spare key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 21-8).
10. Turn the ignition switch OFF and disconnect the red clip of the inspection adaptor from the battery positive (+) terminal.
 11. Turn the ignition switch ON (with the first key registered in step 9). The HISS indicator comes on for two seconds then it goes off.
 - The immobilizer system (HISS) returns to the normal mode.
 12. Turn the ignition switch OFF and connect the red clip of the inspection adaptor to the battery positive (+) terminal.
 13. Turn the ignition switch ON (with the first key registered in step 9). The HISS indicator comes on and it remains on.
 - The code of the first key is recognized by the ECM.
 - If there is any problem in the immobilizer system (HISS), the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 21-7).
 14. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds then it blinks four times repeatedly.
 - The immobilizer system (HISS) enters the registration mode. Registration of the original key used in step 4 is cancelled.

IMMOBILIZER SYSTEM (HISS)

15. Turn the ignition switch OFF and remove the key.
16. Turn the ignition switch ON with a second new key. (Never use the key registered in previous step.) The indicator comes on for two seconds then it blinks four times repeatedly.
 - The second key or spare key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 21-8).
 - Keep the other transponder key away from the immobilizer receiver more than 50 mm (2.0 in).
17. Repeat the steps 15 and 16 when you continuously register the other new key.

The ECM can store up to four key codes. (The four keys can be registered.)
18. Turn the ignition switch OFF, remove the inspection adaptor and connect the CKP sensor 2P (Red) connector.
19. Turn the ignition switch ON with the registered key.
 - The immobilizer system (HISS) returns to the normal mode.
20. Check that the engine can be started using all registered key.

When all keys have been lost, or the ECM is faulty

1. Obtain a new ECM and two new transponder keys.
2. Grind the keys in accordance with the shape of the original key (or use the key number plate when all key have been lost).
3. Replace the ECM with a new one.
4. Turn the ignition switch ON with a first new key. The HISS indicator comes on for two seconds, then it blinks four times repeatedly.
 - The first key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 21-8).
5. Turn the ignition switch OFF and remove the first key.
6. Turn the ignition switch ON with a second new key. The HISS indicator comes on for two seconds, then it blinks four times repeatedly.
 - The second key is registered in the ECM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain for approx. ten seconds, then it will indicate the diagnostic code (page 21-8).
7. Turn the ignition switch OFF and remove the second key.
 - The system (ECM) will not enter the normal mode unless the two keys are registered in ECM.
 - The third new key cannot be continuously registered. When it is necessary to register the third key, follow the procedures "When the key has been lost, or additional key is required" (page 21-4).
8. Check that the engine can be started using all registered keys.

DIAGNOSTIC CODE INDICATION

Remove the under cowl (page 2-13).

Disconnect the CKP sensor 2P (Red) connector.

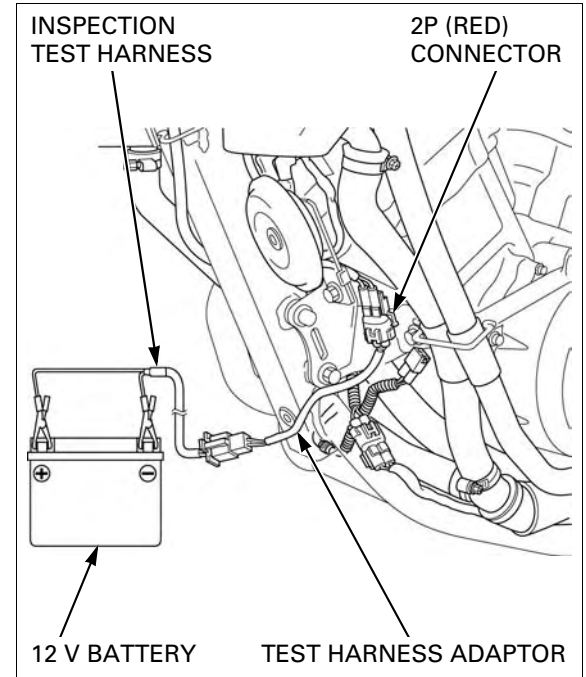
Connect the inspection adaptor to the wire harness side connector.

Connect the Red clip of the adaptor to the 12 V battery positive (+) terminal and Black clip to the negative (-) terminal.

TOOLS:

Inspection test harness
Test harness adaptor

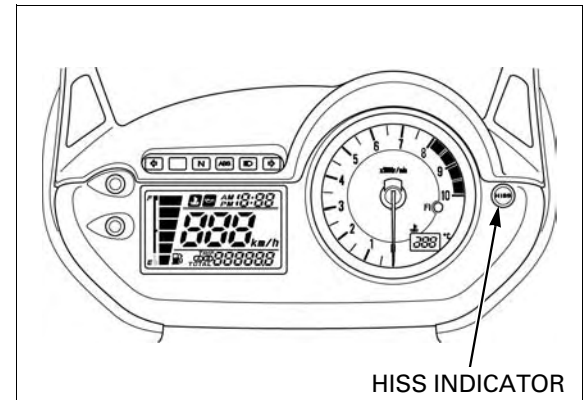
07XMZ-MBW0101
070MZ-MEC0100



Turn the ignition switch ON with the properly registered key.

The HISS indicator will come on for approx. ten seconds then it will start blinking to indicate the diagnostic code if the system is abnormal. The blinking frequency is repeated.

The HISS indicator remains on when the system is normal. (The system is in the normal mode and the diagnostic code does not appear.)



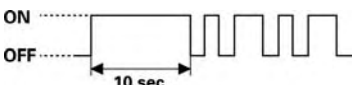
DIAGNOSTIC CODE

When the system (ECM) enters the diagnostic mode from the normal mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
ON --- OFF --- 10 sec.	ECM data is abnormal.	Faulty ECM	Replace the ECM.
	Code signals cannot send or receive.	Faulty immobilizer receiver or wire harness	Follow the troubleshooting (page 21-9).
	Identification code is disagree.	Jamming by the other transponder.	Keep the other vehicle's transponder key away from the immobilizer receiver more than 50 mm (2.0 in).
	Secret code is disagree.		

IMMOBILIZER SYSTEM (HISS)

When the system (ECM) enters the diagnostic mode from the registration mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
	Registration is overlapped.	The key is already registered properly.	Use a new key or cancelled key.
	Code signals cannot send or receive.	Communication fails.	Follow the troubleshooting (page 21-9).
	Registration is impossible.	The key is already registered on the other system.	Use a new key.

TROUBLESHOOTING

The HISS indicator comes on for approx. two seconds then it goes off, when the ignition switch is turned ON with the properly registered key and the immobilizer system (HISS) functions normally. If there is any problem or the properly registered key is not used, the indicator will remain on.

HISS indicator does not come on when the ignition switch is turned ON

1. Fuse Inspection

Check for blown fuse (TURN/CLOCK 10 A).

Is the fuse blown?

YES – Replace the fuse.

NO – GO TO STEP 2.

2. Combination Meter Inspection

Check that the odometer/trip meter function with the ignition switch ON.

Is the meter function normal?

NO – GO TO STEP 3.

YES – GO TO STEP 4.

3. Combination Meter Back-up voltage line Inspection

Check the back-up voltage line (Red/green wire) at the combination meter 20P connector (page 20-9).

Is the voltage specified value?

NO – • Open circuit in Red/green wire
• Open circuit in Green wire

YES – Faulty combination meter

4. HISS Indicator Line Inspection At The ECM Connector

Check the HISS indicator line (White/red wire) at the ECM 33P (Gray) connector (page 21-13).

Is the voltage specified value?

NO – GO TO STEP 5.

YES – GO TO STEP 6.

5. HISS Indicator Line Inspection At The Combination Meter Connector

Check the HISS indicator line (White/red wire) at the combination meter 20P connector (page 21-12).

Is the voltage specified value?

YES – Open circuit in White/red wire

NO – Faulty combination meter

6. Power Input Line Inspection At The ECM Connector

Check the power input line (Black/white wire) at the ECM 33P (Black) connector (page 21-13).

Is the voltage specified value?

NO – • Open circuit in Black/white wire
• Faulty engine stop relay
• Blown fuse (FI 20 A)

YES – GO TO STEP 7.

7. Ground Line Inspection At The ECM Connector

Check the ground line (Green and Green/pink wires) at the ECM 33P connectors (page 21-13).

Is there continuity?

NO – Open circuit in Green and Green/pink wires

YES – • Loose or poor ECM connector contact
• Faulty ECM

IMMOBILIZER SYSTEM (HISS)

HISS indicator remains on with the ignition switch ON

1. Immobilizer Receiver Jamming Inspection

Check that there is any metal obstruction or the other vehicle's transponder key near the immobilizer receiver and key.

Is there any metal obstruction or the other key?

YES – Remove it and recheck.

NO – GO TO STEP 2.

2. First Transponder Key Inspection

Turn the ignition switch ON with the spare transponder key and check the HISS indicator. The indicator should come on for two seconds then go off.

Is there indicator go off?

YES – Faulty first transponder key

NO – GO TO STEP 3.

3. Diagnostic Code Inspection

Perform the diagnostic code indication procedure (page 21-7) and check that the HISS indicator comes on then it starts blinking.

Is there indicator Brinks or Stay Lit?

BRINKS—Read the diagnostic code (page 21-7).

STAY LIT—GO TO STEP 4.

4. HISS Indicator Line Inspection At The ECM Connector

Check the HISS indicator line (White/red wire) at the ECM 33P (Gray) connector (page 21-13).

Is the voltage specified value?

NO – Short circuit in White/red wire

YES – GO TO STEP 5.

5. CKP Sensor Line Inspection

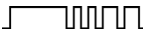
Check the CKP sensor lines (Yellow and White/yellow wires) between the ECM and CKP sensor connectors (page 21-14).

Is there Continuity?

YES – Faulty ECM

NO –

- Open circuit in Yellow wire
- Open circuit in White/yellow wire

Diagnostic code  is indicated (Code signals cannot send or receive)

1. Immobilizer Receiver Power Input Line Inspection

Check the power input line (Yellow/red) at the immobilizer receiver 4P (Natural) connector (page 21-15).

Is there approx. 5 V?

NO – Open or short circuit in Yellow/red wire

YES – GO TO STEP 2.

2. Immobilizer Receiver Ground Line Inspection

Check the ground line (Green/orange) at the immobilizer receiver 4P (Natural) connector (page 21-15).

Is there continuity?

NO – Open circuit in Green/orange wire

YES – GO TO STEP 3.

3. Immobilizer Receiver Signal Line Inspection

Check the signal lines (Pink and Orange/blue) between the immobilizer receiver 4P (Natural) connector and ECM 33P (Gray) connector (page 21-15).

Is there continuity?

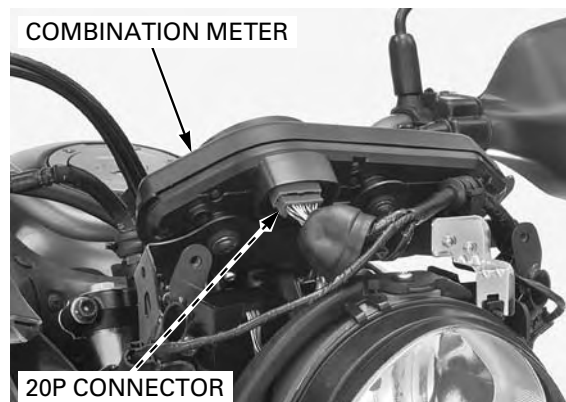
NO – • Open circuit in Pink wire
• Open circuit in Orange/blue wire

YES – Faulty immobilizer receiver

IMMOBILIZER SYSTEM (HISS)

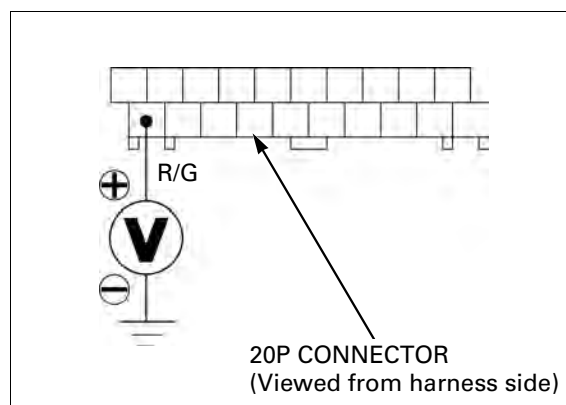
HISS INDICATOR

Remove the front center cowl (page 2-12).
Perform the following inspections.



BACK-UP VOLTAGE LINE INSPECTION

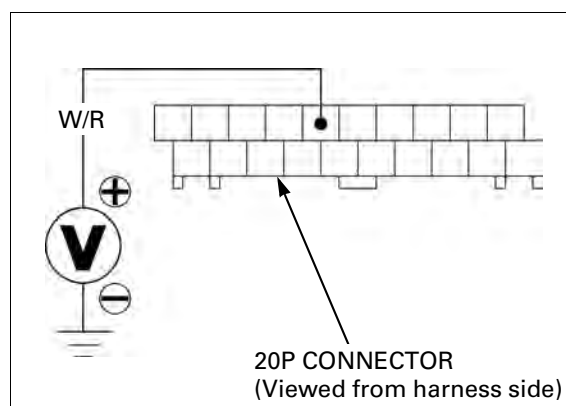
Measure the voltage between the Red/green wire terminal (+) and ground (-).
There should be battery voltage at all times.



HISS INDICATOR LINE INSPECTION

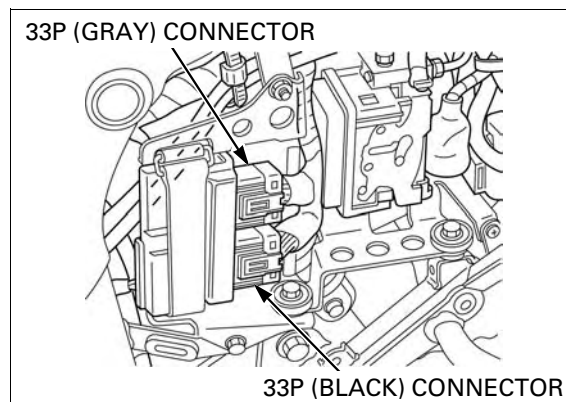
Measure the voltage between the White/red wire terminal (+) and ground (-) with the combination meter 20P connector connected.
Turn the ignition switch ON.
There should be battery voltage.

There should be no voltage for approx. two seconds after the ignition switch is turned ON, then the battery voltage should appear, if the system is normal.



ECM

Remove the left side cover (page 2-4).
Disconnect the ECM 33P (Black) and 33P (Gray) connectors.
Perform the following inspections at the wire harness side connector of the ECM.



HISS INDICATOR LINE INSPECTION

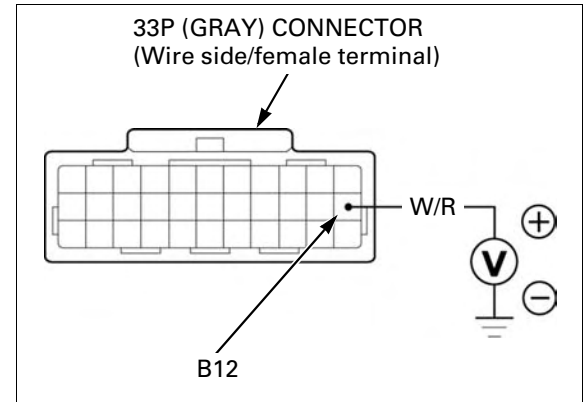
Measure the voltage between the B12 (White/red) wire terminal (+) and ground (-).

TOOL:

Test probe

07ZAJ-RDJA110

Turn the ignition switch ON.
There should be battery voltage.



POWER INPUT LINE INSPECTION

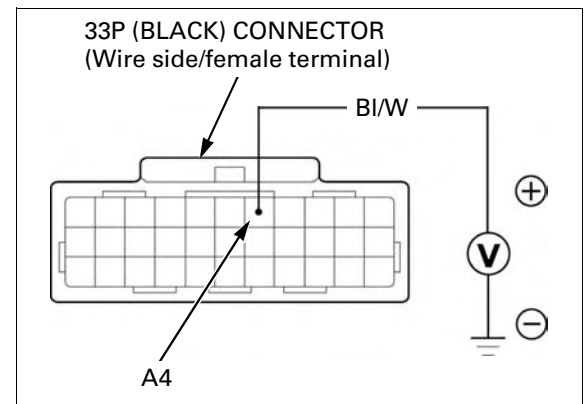
Measure the voltage between the A4 (Black/white) wire terminal (+) and ground (-).

TOOL:

Test probe

07ZAJ-RDJA110

Turn the ignition switch ON.
There should be battery voltage.



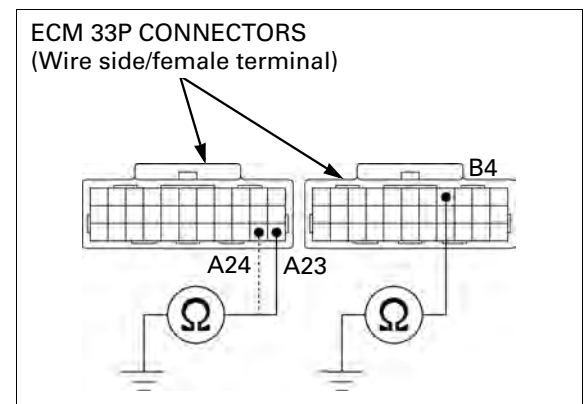
GROUND LINE INSPECTION

Check for continuity between the B4 (Green) and A23/24 (Green/pink) wire terminals and ground. There should be continuity at all times.

TOOL:

Test probe

07ZAJ-RDJA110



IMMOBILIZER SYSTEM (HISS)

CKP SENSOR LINE INSPECTION

Remove the under cowl (page 2-13).

Disconnect the CKP sensor 2P (Red) connector.

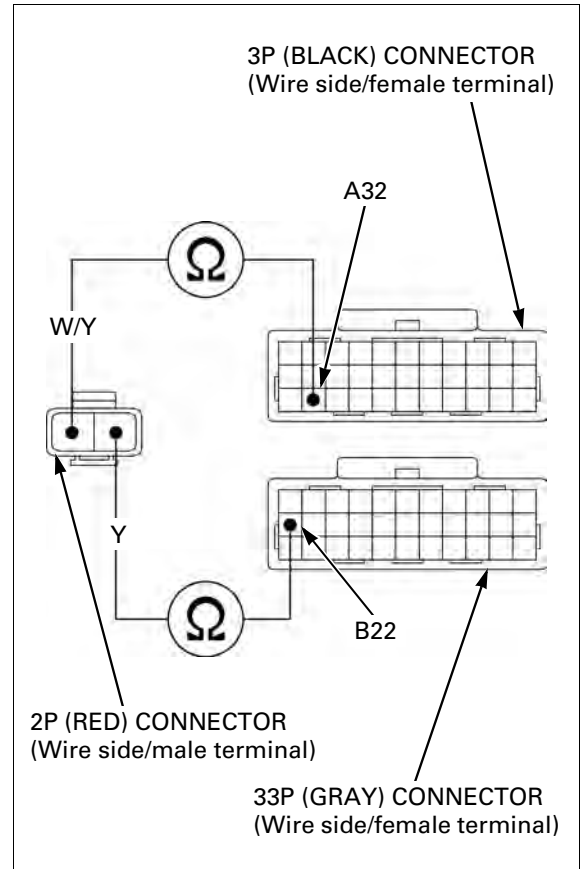
Check the Yellow and White/yellow wire for continuity between the ECM and CKP sensor connectors.

There should be continuity between the same color wire terminals.

TOOL:

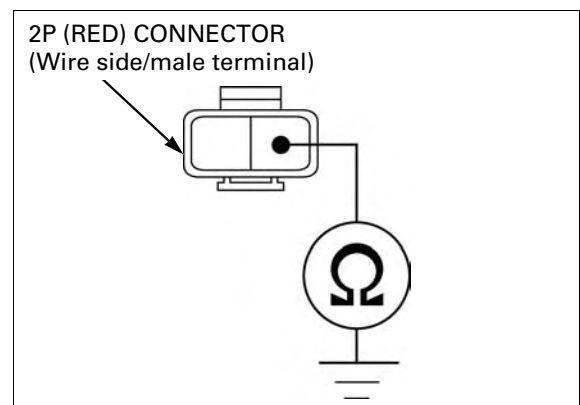
Test probe

07ZAJ-RDJA110



Connect the ECM 33P connectors.

Check the Yellow wire for continuity between the CKP sensor 2P (Red) connector of the wire harness side and ground.



IMMOBILIZER RECEIVER

Remove the right front side cowl (page 2-9).

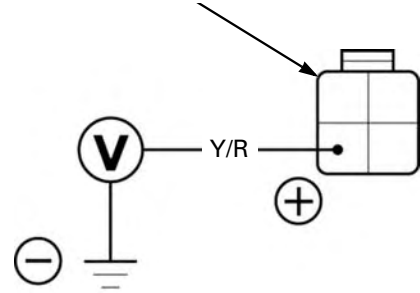
Disconnect the immobilizer receiver 4P (Natural) connector.



POWER INPUT LINE INSPECTION

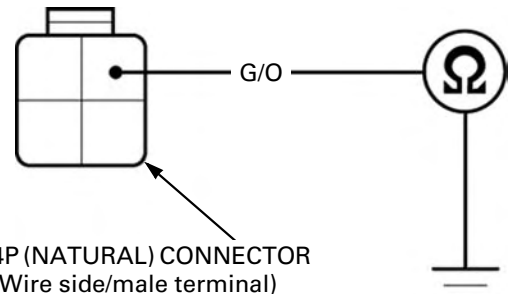
Measure the voltage between the Yellow/red wire terminal (+) of the wire harness side connector and ground (-).
Turn the ignition switch ON.
There should be approx. 5 V.

4P (NATURAL) CONNECTOR
(Wire side/male terminal)



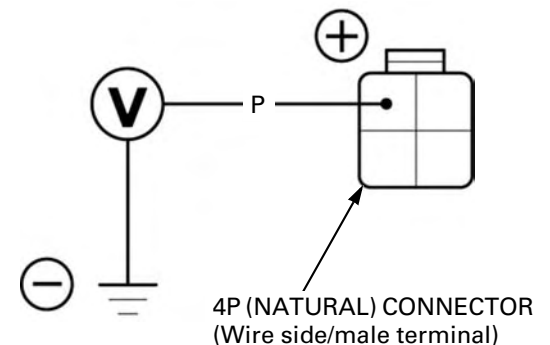
GROUND LINE INSPECTION

Check for continuity between the Green/orange wire terminal of the wire harness side connector and ground.
There should be continuity at all times.



SIGNAL LINE INSPECTION

Measure the voltage between the Pink wire terminal (+) of the wire harness side connector and ground (-).
Turn the ignition switch ON.
There should be approx. 5 V.



Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector.
Check the Orange/blue wire for continuity between the immobilizer receiver and ECM connectors.
There should be continuity.

Check for continuity between the Orange/blue wire terminal and ground.
There should be no continuity.

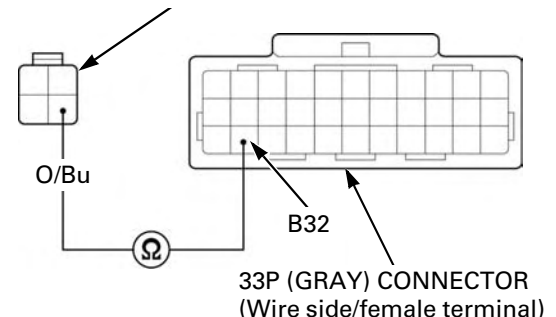
TOOL:

Test probe

07ZAJ-RDJA110

Connect the ECM 33P (Gray) connector.

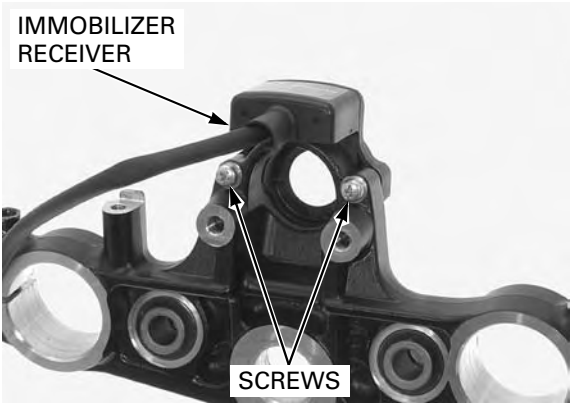
2P (NATURAL) CONNECTOR
(Wire side/female terminal)



IMMOBILIZER SYSTEM (HISS)

REPLACEMENT

Remove the ignition switch (page 20-20).
Remove the screws and the immobilizer receiver.
Install a new receiver and tighten the screws securely.
Route the receiver wire properly (page 1-21).
Install the ignition switch (page 20-20).



REPLACEMENT PARTS FOR PROBLEM

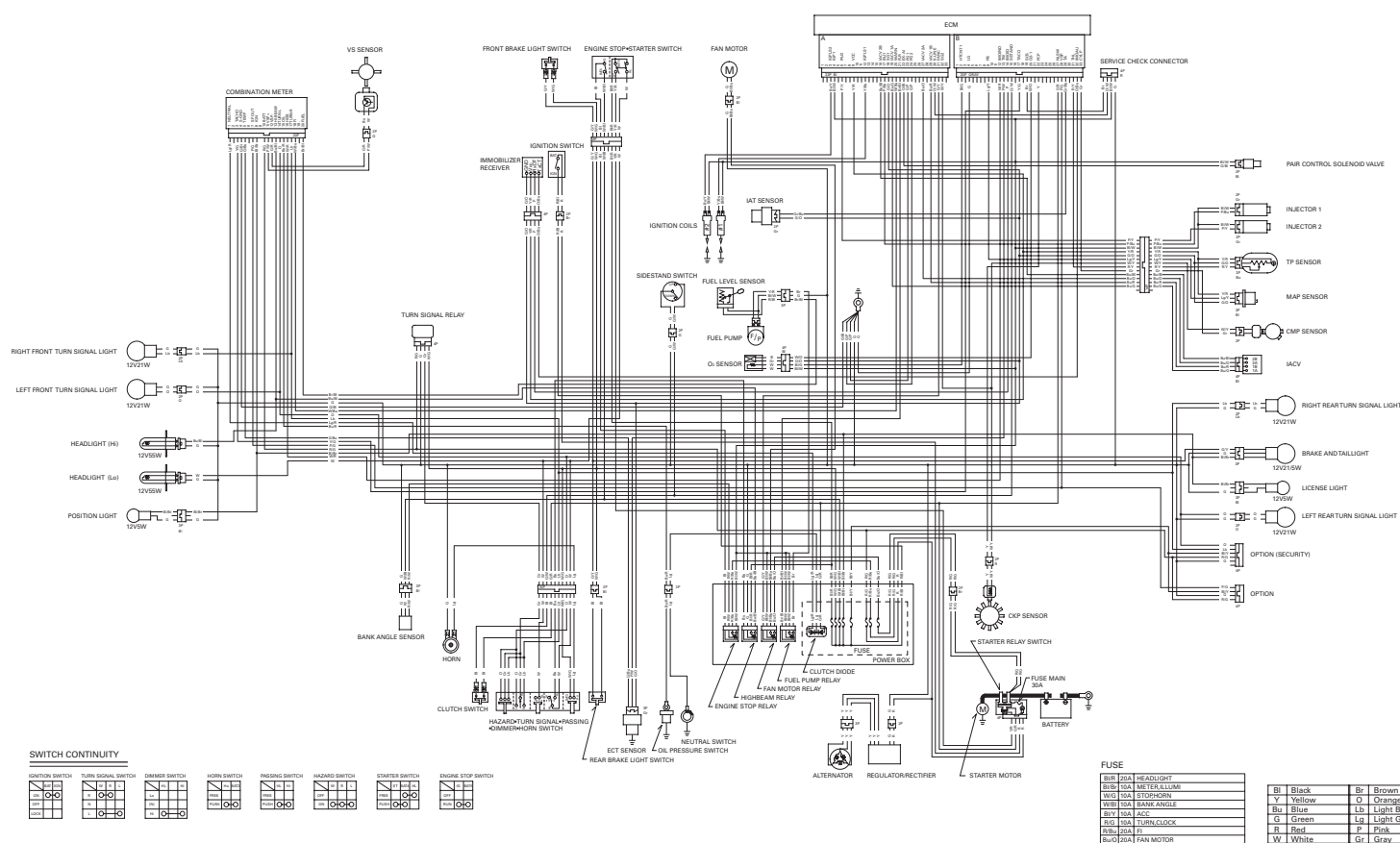
Problem	Replacement parts				
	Transponder Key	Immobilizer receiver	ECM	Ignition switch	*Accessory lock and key
One Key has been lost, or additional spare key is required.	⦿				
All key have been lost, or ECM is faulty.	⦿		⦿		
Immobilizer receiver is faulty.		⦿			
Ignition switch is faulty.	⦿			⦿	
*Accessory lock is faulty.					⦿

*Accessory lock means the fuel fill cap, seat lock or handle lock.

22. WIRING DIAGRAMS

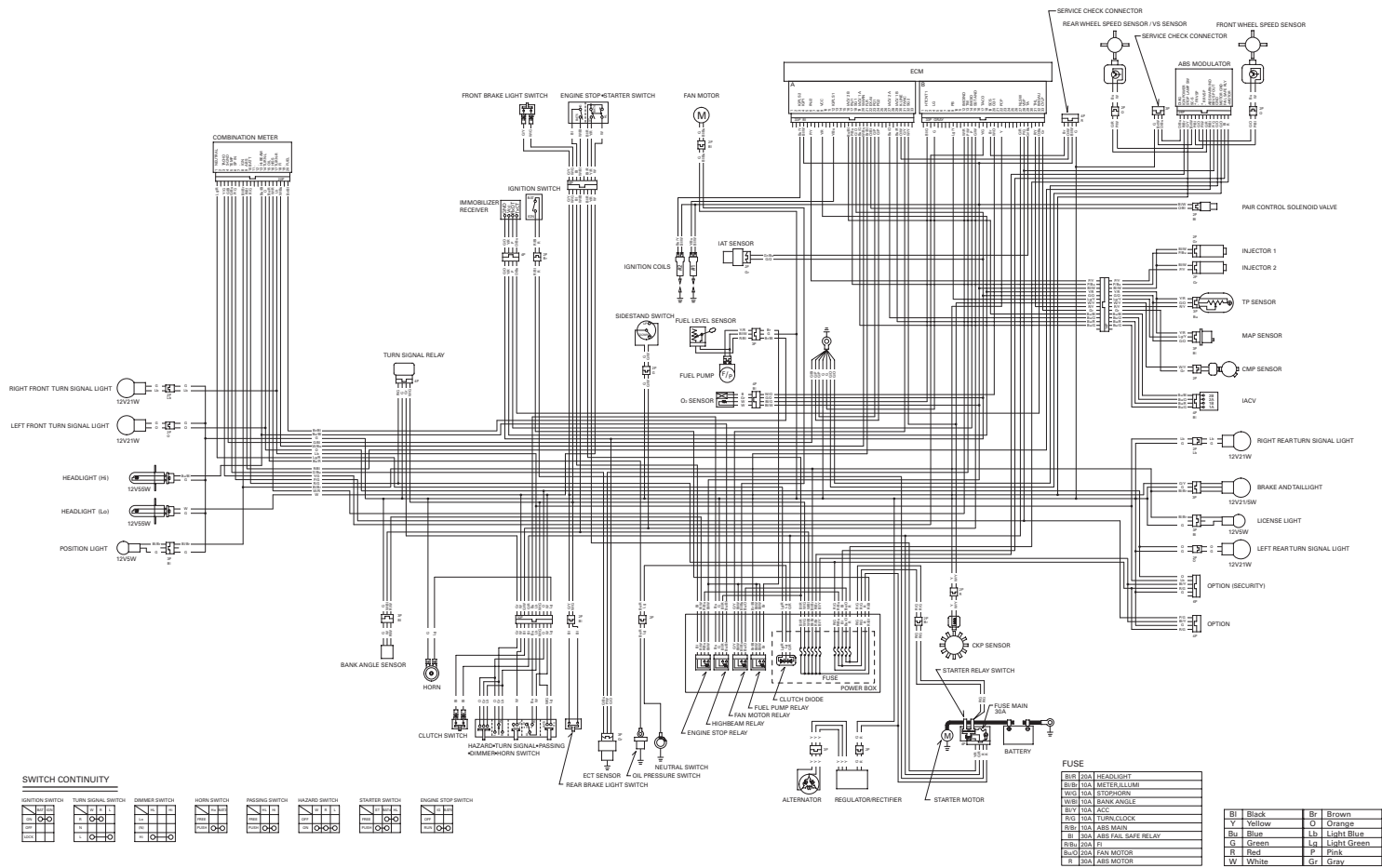
XL700V	22-3	XL700VA	22-4
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XL700V



0030Z-MFF-D000

WIRING DIAGRAMS
XL700VA



0030Z-MFF-D400

23. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START	23-2	POOR PERFORMANCE AT HIGH SPEED	23-6
ENGINE LACKS POWER	23-3	POOR HANDLING	23-7
POOR PERFORMANCE AT LOW AND IDLE SPEED	23-5		

ENGINE DOES NOT START OR IS HARD TO START

1. Fuel Line Inspection

Check fuel flow to throttle body.

Does fuel reach the throttle body?

- NO** – • Clogged fuel line and strainer
• Clogged fuel tank breather
• Faulty fuel pump unit (page 5-58)

YES – GO TO STEP 2.

2. Spark Plug Inspection

Remove and inspect spark plugs.

Are the spark plugs in good condition?

- NO** – • Incorrect spark plug heat range
• Incorrect spark plug gap
• Dirty air cleaner

YES – GO TO STEP 3.

3. Spark Test

Perform spark test.

Is there weak or no spark?

- YES** – • Faulty spark plug
• Loose or disconnected ignition system wires
• Broken or shorted spark plug wire
• Faulty CKP sensor
• Faulty ignition coil
• Faulty engine stop relay
• Faulty ECM
• Faulty engine stop switch

NO – GO TO STEP 4.

4. PGM-FI System Inspection

Check the PGM-FI system.

Is the PGM-FI system normal?

YES – GO TO STEP 5.

NO – Faulty PGM-FI system (page 5-13)

5. Cylinder Compression

Test cylinder compression.

Is the compression low?

- YES** – • Valve clearance too small
• Valve stuck open
• Worn cylinder and piston rings
• Damaged cylinder head gasket
• Improper valve timing

NO – GO TO STEP 6.

6. Engine Starting Condition

Start engine by following normal procedure.

Does the engine start then stops?

- YES** – • Leaking intake manifold
• Faulty IACV
• Improper ignition timing (Faulty ECM, CKP sensor or TP sensor)
• Contaminated fuel

ENGINE LACKS POWER

1. Drive Train Inspection

Raise wheel off the ground and spin it by hand.

Does the wheel spin freely?

- NO** – • Brake dragging
• Worn or damaged wheel bearings

YES – GO TO STEP 2.

2. Tire Pressure Inspection

Check tire pressure.

Are the tire pressures low?

- YES** – • Faulty tire valve
• Punctured tire

NO – GO TO STEP 3.

3. Clutch Inspection

Accelerate rapidly, shift from first to second.

Does the engine speed change accordingly when clutch is engaged?

- NO** – • Clutch slipping
• Worn clutch discs/plates
• Warped clutch discs/plates
• Weak clutch spring
• Additive in engine oil

YES – GO TO STEP 4.

4. Engine Performance Inspection

Accelerate lightly.

Does the engine speed increase?

- NO** – • Dirty air cleaner
• Restricted fuel flow
• Clogged muffler
• Clogged fuel tank breather

YES – GO TO STEP 5.

5. Engine Condition Inspection

Accelerate or run at high speed.

Is there knocking?

- YES** – • Worn piston and cylinder
• Wrong type of fuel
• Excessive carbon build-up in combustion chamber
• Ignition timing too advanced (Faulty ECM)

NO – GO TO STEP 6.

6. Spark Plug Inspection

Remove and inspect spark plugs.

Are the spark plugs in good condition?

- NO** – • Plugs not serviced frequently enough
• Incorrect spark plug heat range
• Incorrect spark plug gap

YES – GO TO STEP 7.

7. Engine Oil Inspection

Check oil level and condition.

Is there correct level and good condition?

- NO** – • Oil level too high
• Oil level too low
• Contaminated oil

YES – GO TO STEP 8.

8. Ignition Timing Inspection

Check ignition timing.

Is the ignition timing correct?

- NO** – • Faulty ECM
• Faulty CKP sensor
• Faulty TP sensor
• Improper valve timing

YES – GO TO STEP 9.

9. Cylinder Compression Inspection

Test cylinder compression.

Is the compression low?

- YES** – • Valve clearance too small
• Valve stuck open
• Worn cylinder and piston rings
• Damaged cylinder head gasket
• Improper valve timing

NO – GO TO STEP 10.

10. PGM-FI System Inspection

Check the PGM-FI system.

Is the PGM-FI system normal?

- NO** – Faulty PGM-FI system (page 5-13)

YES – GO TO STEP 11.

11. Lubrication Inspection

Remove cylinder head cover and inspect for proper lubrication.

Is the valve train lubricated properly?

- NO** – • Faulty oil pump
• Faulty oil pressure relief valve
• Clogged oil passage
• Clogged oil orifice

YES – GO TO STEP 12.

12. Over Heating Inspection

Check for engine over heating.

Is the engine over heating?

- YES** – • Coolant level too low
• Fan motor not working
• Thermostat stuck closed
• Excessive carbon build-up in combustion chamber
• Use of poor quality fuel
• Wrong type of fuel
• Clutch slipping

NO – GO TO STEP 13.

13. Engine Knocking Inspection

Accelerate or run at high speed.

Is the engine knocking?

- YES** – • Worn piston and cylinder
• Wrong type of fuel
• Thermostat stuck closed
• Excessive carbon build-up in combustion chamber
• Ignition timing too advance (Faulty ECM)
• Faulty CKP sensor

- NO** – • Engine does not knock.

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. Intake Air Leak Inspection

Check for leaking at insulators.

Are there leaks?

- YES** – • Loose insulator bands
• Loose insulator mounting bolts
• Damaged insulator
• Faulty O-ring

- NO** – GO TO STEP 2.

2. Spark Test

Perform spark test.

Is there weak or intermittent spark?

- YES** – • Faulty spark plug
• Fouled spark plug
• Loose or disconnected ignition system wires
• Faulty CKP sensor
• Faulty ignition coil
• Faulty engine stop switch
• Faulty ECM

- NO** – GO TO STEP 3.

3. Fuel Pump Inspection

Inspect the fuel flow.

Is the fuel pump unit normal?

- YES** – GO TO STEP 4.

- NO** – Faulty fuel pump unit (page 5-58)

4. Ignition Timing Inspection

Check ignition timing.

Is the ignition timing correct?

- NO** – • Faulty ECM
• Faulty CKP sensor
• Faulty TP sensor
• Improper valve timing

- YES** – GO TO STEP 5.

5. PGM-FI System Inspection

Check the PGM-FI system.

Is the PGM-FI system normal?

- NO** – Faulty PGM-FI system (page 5-13)

- YES** – GO TO STEP 6.

TROUBLESHOOTING

6. IACV Inspection

Check the IACV operation.

Does the IACV operates normally?

NO – Faulty IACV

POOR PERFORMANCE AT HIGH SPEED

1. Ignition Timing Inspection

Check ignition timing.

Is the ignition timing correct?

NO – • Faulty ECM
• Faulty CKP sensor
• Faulty TP sensor

YES – GO TO STEP 2.

2. Fuel Pump Inspection

Inspect the fuel flow.

Is the fuel pump unit operation normal?

NO – Faulty fuel pump unit

YES – GO TO STEP 3.

3. PGM-FI System Inspection

Check the PGM-FI system.

Is the PGM-FI system normal?

NO – Faulty PGM-FI system (page 5-13)

YES – GO TO STEP 4.

4. Valve Timing Inspection

Check valve timing.

Is the valve timing correct?

NO – Cam sprockets not installed properly

YES – GO TO STEP 5.

5. Valve Spring Inspection

Check valve springs.

Is the valve spring free length within specification?

NO – Faulty valve spring

YES – GO TO STEP 6.

6. Camshaft Inspection

Remove and inspect the camshaft.

Is the cam lobe height within specification?

NO – Faulty camshaft

YES – Camshaft is OK.

POOR HANDLING

Steering is heavy

- Steering top thread too tight
- Damaged steering head bearings
- Low tire pressure

Either wheel is wobbling

- Excessive wheel bearing play
- Bent rim
- Improperly installed wheel hub
- Excessively worn swingarm pivot bearings
- Bent frame

Motorcycle pulled to one side

- Front and rear wheels not aligned
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

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