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.

⚠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.

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.

⚠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.

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.

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the NRX1800.

Follow the Maintenance Schedule (Section 4) recommendations to ensure that the vehicle is in peak operating condition and emission levels are within the standards set by the U.S. Environmental Protection Agency, California Air Resources Board and Transport Canada.

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

Sections 1 and 4 apply to the whole motorcycle. Section 3 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.
Section 5 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 procedures.

If you are not familiar with this motorcycle, read Technical Features in Section 2.
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.

Honda Motor Co., Ltd.
SERVICE PUBLICATION OFFICE

CONTENTS

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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.

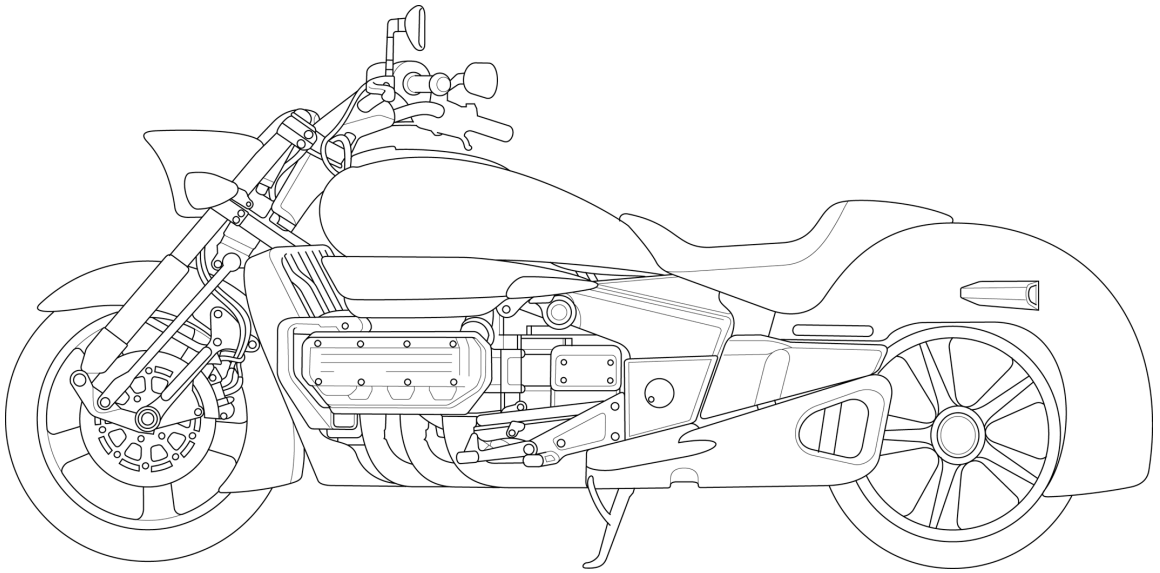
	Replace the part(s) with new one(s) before assembly.
	Use recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1)
	Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)
	Use molybdenum 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

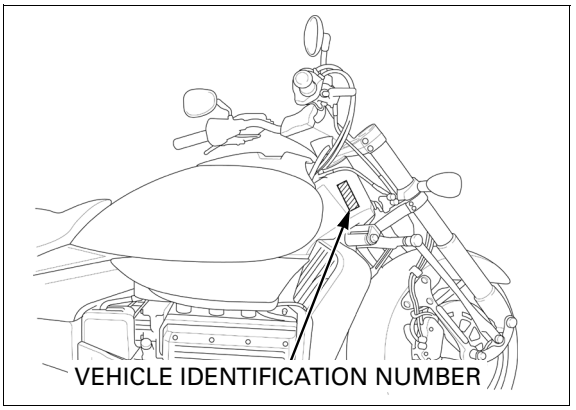
SERVICE RULES

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 show in the Cable and Harness Routing (page 1-22).

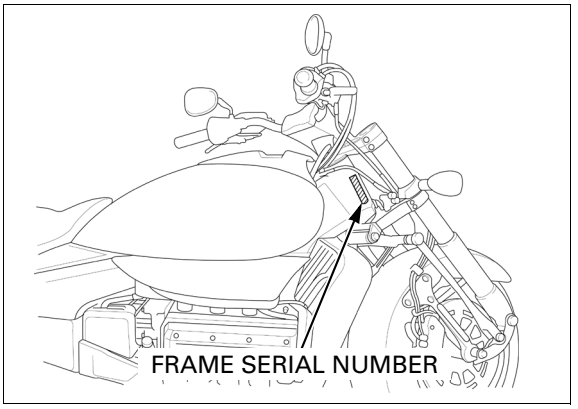
MODEL IDENTIFICATION



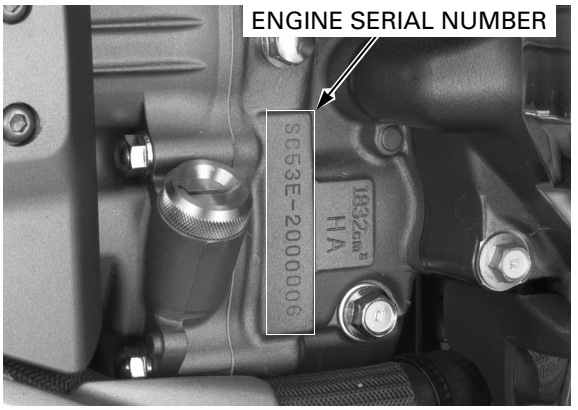
The Vehicle Identification Number (VIN) is located on right side of the frame near the steering head.



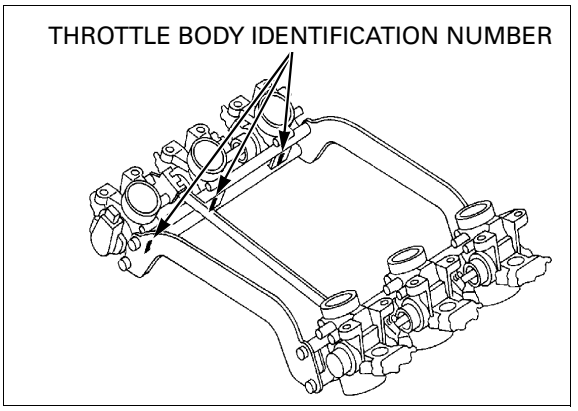
The frame serial number is stamped on the right side of the steering head.



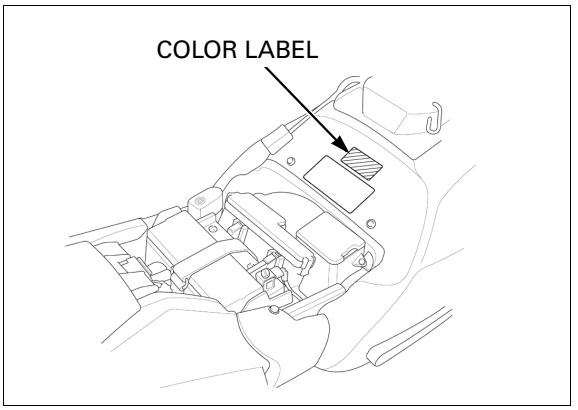
The engine serial number is stamped on the right side of the crankcase.



The throttle body identification numbers are stamped on the inside of all the throttle bodies.



The color label is attached on the rear fender under the seat. When ordering color-coded parts, always specify the designated color code.



GENERAL SPECIFICATIONS

ITEM			SPECIFICATIONS
DIMENSIONS	Overall length		2,560 mm (100.8 in)
	Overall width		920mm (36.2 in)
	Overall height		DA, EA, BA model: 1,090 mm (42.9 in) DB, EB, BB model: 1,070 mm (42.1 in)
	Wheel base		1,750 mm (68.9 in)
	Seat height		690 mm (27.2 in)
	Footpeg height		244 mm (9.6 in)
	Ground clearance		135 mm (5.3 in)
	Dry weight		49 state and Canada type: 368 kg (811 lbs) California type: 369 kg (813 lbs)
	Curb weight		49 state and Canada type: 398 kg (877 lbs) California type: 399 kg (880 lbs)
	Maximum weight capacity		125 kg (276 lbs)
FRAME	Frame type		Diamond
	Front suspension		Bottom link
	Front axle travel		100 mm (3.9 in)
	Rear suspension		Swingarm
	Rear axle travel		100 mm (3.9 in)
	Front tire size		150/60R18M/C 67V
	Rear tire size		180/55R17M/C 73V
	Front tire brand		D251F (Dunlop)
	Rear tire brand		D251 (Dunlop)
	Brake system		Combined brake system
	Front brake		Hydraulic double disc
	Rear brake		Hydraulic single disc
	Caster angle		29°00’
	Trail length		125 mm (4.9 in)
	Fuel tank capacity		23 liters (6.1 US gal, 5.1 Imp gal)
ENGINE	Cylinder arrangement		Flat six
	Bore and stroke		74.0 x 71.0 mm (2.91 x 2.80 in)
	Displacement		1,832 cm^3 (111.8 cu-in)
	Compression ratio		9.8 : 1
	Valve train		Silent cam chain driven, OHC
	Intake valve	opens	0° BTDC at 1 mm lift
	Intake valve	closes	25° ABDC at 1 mm lift
	Exhaust valve	opens	35° BBDC at 1 mm lift
	Exhaust valve	closes	– 5° ATDC (5° BTDC) at 1 mm lift
	Lubrication system		Forced pressure and wet sump
	Oil pump type		Trochoid
	Cooling system		Liquid cooled
	Air filtration		Viscous paper element
	Engine dry weight		118.6 kg (261.5 lbs)
	Firing order		1 - 4 - 5 - 2 - 3 - 6
	Cylinder number		1, 3, 5 2, 4, 6 Front ←
FUEL DELIV-ERY SYSTEM	Type		Programmed Fuel Injection (PGM-FI)
	Throttle bore		32 mm (1.3 in)

ITEM			SPECIFICATIONS
DRIVE TRAIN	Clutch system		Multi-plate, wet (hydraulically assisted)
	Clutch operation system		Hydraulically operated
	Transmission		Constant mesh, 5-speeds
	Primary reduction		1.591 (78/49)
	Secondary reduction		1.028 (36/35)
	Final reduction		2.917 (35/12)
	Gear ratio	1st	1.944 (35/18)
		2nd	1.347 (31/23)
		3rd	1.035 (29/28)
		4th	0.843 (27/32)
		5th	0.705 (24/34)
	Gearshift pattern		Left foot operated return system, 1 - N - 2 - 3 - 4 - 5
ELECTRICAL	Ignition system		Full transistorized ignition
	Starting system		Electric starter motor
	Charging system		Triple phase output alternator
	Regulator/rectifier		Triple phase full-wave rectification with field coil
	Lighting system		Battery

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity		After draining	3.6 liters (3.8 US qt, 3.2 Imp qt)	–
		After draining/ filter change	3.7 liters (3.9 US qt, 3.3 Imp qt)	–
		After disassembly	4.6 liters (4.9 US qt, 4.0 Imp qt)	–
Recommended engine oil			Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40	–
Oil pressure (at oil pressure switch)			530 kPa (5.4 kgf/cm^2, 77 psi) at 5,000 rpm/80°C (176°F)	–
Oil pump	Tip clearance		0.15 (0.006)	0.20 (0.008)
	Body clearance	Feed side	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
		Scavenge side	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
	Side clearance		0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

FUEL SYSTEM (Programmed Fuel Injection) SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle body identification number	49 state and Canada type	GQ81B
	California type	GQ81A
Starter valve vacuum difference		20mm Hg
Base throttle valve for synchronization		No. 4
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)
Intake air temperature sensor resistance (at 20°C/68°F)		2.2 – 2.7 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)		2.3 – 2.6 kΩ
Throttle position sensor resistance (at 20°C/68°F)		5 – 7.6 Ω
Fuel injector resistance (at 20°C/68°F)		10.5 – 14.5 Ω
Camshaft position sensor peak voltage		0.7 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Manifold absolute pressure at idle		250 – 300 mmHg (9.8 – 11.8 inHg)
Fuel pressure at idle		343 kPa (3.5 kgf/cm^2, 50 psi)
Fuel pump flow (at 12 V)		133 cm^3 (4.5 US oz, 4.7 Imp oz) minimum/10 seconds
Idle speed	49 state and Canada type	850 ± 100 rpm
	California type	950 ± 100 rpm

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	4.3 liters (4.5 US qt, 3.8 Imp qt)
	Reserve tank	0.50 liter (0.53 US qt, 0.44 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm^2, 16 – 20 psi)
Thermostat	Begin to open	76 – 80 °C (169 – 176 °F)
	Fully open	90 °C (194 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 mixture with distilled water

CYLINDER HEAD/VALVE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 300 rpm			1,383 kPa (14.1 kgf/cm^2, 201 psi)	–
Valve clearance		IN	0.15 ± 0.03 (0.006 ± 0.001)	–
		EX	0.22 ± 0.03 (0.009 ± 0.001)	–
Camshaft	Cam lobe height (49 state/Canada type)	IN	41.610 – 41.690 (1.6382 – 1.6413)	41.58 (1.637)
		EX	41.680 – 41.760 (1.6409 – 1.6441)	41.65 (1.640)
	Cam lobe height (California type)	IN	40.810 – 40.890 (1.6067 – 1.6098)	40.78 (1.606)
		EX	41.680 – 41.760 (1.6409 – 1.6441)	41.65 (1.640)
	Runout		–	0.03 (0.001)
	Journal O.D.		27.959 – 27.980 (1.1007 – 1.1016)	27.96 (1.101)
	Journal I.D.		28.000 – 28.021 (1.1024 – 1.1032)	28.05 (1.104)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Valve lifter	Valve lifter O.D.	IN/EX	28.978 – 28.993 (1.1409 – 1.1415)	28.97 (1.141)
	Valve lifter bore I.D.	IN/EX	29.010 – 29.026 (1.1421 – 1.1428)	29.04 (1.143)
Valve, valve guide	Valve stem O.D.	IN	4.970 – 4.995 (0.1957 – 0.1967)	4.96 (0.195)
		EX	4.955 – 4.980 (0.1951 – 0.1961)	4.95 (0.195)
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.04 (0.198)
	Stem-to-guide clearance	IN	0.005 – 0.042 (0.0002 – 0.0017)	0.075 (0.0030)
		EX	0.020 – 0.057 (0.0008 – 0.0022)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN/EX	11.8 – 12.0 (0.46 – 0.47)	–
	Valve seat width	IN/EX	0.9 – 1.1 (0.035 – 0.043)	1.5 (0.06)
Valve spring	Free length	IN/EX	38.20 (1.504)	37.0 (1.46)
Cylinder head warpage			–	0.10 (0.004)

CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended clutch fluid		DOT 4 brake fluid	–
Clutch master cylinder	Cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Piston O.D.	13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
Clutch	Clutch spring free height	4.8 (0.19)	4.6 (0.18)
	Clutch lifter spring free height	2.9 (0.11)	2.5 (0.10)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	–	0.30 (0.012)

GEARSHIFT LINKAGE/TRANSMISSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Output shaft	Damper spring free length		66.0 (2.60)	64.0 (2.52)
	Shaft O.D.		22.008 – 22.021 (0.8665 – 0.8670)	21.99 (0.866)
	Gear bushing	I.D.	22.026 – 22.041 (0.8672 – 0.8678)	22.05 (0.868)
		O.D.	25.959 – 25.980 (1.0220 – 1.0228)	25.95 (1.022)
	Driven gear I.D.		26.000 – 26.013 (1.0236 – 1.0241)	26.03 (1.025)
Shift fork	I.D.		14.000 – 14.018 (0.5512 – 0.5519)	14.04 (0.553)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)
Fork shaft	O.D.		13.966 – 13.984 (0.5498 – 0.5506)	13.90 (0.547)
Transmission	Gear I.D.	M4	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
		M5	35.000 – 35.025 (1.3780 – 1.3789)	35.04 (1.380)
		C2, C3	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Gear bushing O.D.	M4	30.950 – 30.975 (1.2186 – 1.2195)	30.93 (1.219)
		M5	34.950 – 34.975 (1.3760 – 1.3770)	34.93 (1.375)
		C2, C3	32.950 – 32.975 (1.2972 – 1.2982)	32.93 (1.296)
	Gear-to-bushing clearance		0.025 – 0.075 (0.0010 – 0.0030)	0.10 (0.004)
	Gear bushing I.D.	M4	28.007 – 28.028 (1.1026 – 1.1035)	28.04 (1.104)
		M5	32.007 – 32.028 (1.2601 – 1.2609)	32.04 (1.261)
	Mainshaft O.D.	at M4	27.987 – 28.000 (1.1018 – 1.1024)	27.96 (1.101)
		at M5	31.987 – 32.000 (1.2593 – 1.2598)	31.96 (1.258)
	Bushing-to-shaft clearance		0.007 – 0.041 (0.0003 – 0.0016)	0.08 (0.003)

CYLINDER/PISTON/CRANKSHAFT SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		74.000 – 74.015 (2.9134 – 2.9140)	74.10 (2.917)
	Out-of-round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.05 (0.002)
Piston, piston pin, piston ring	Piston O.D. at 10 mm (0.4 in) from bottom		73.970 – 73.990 (2.9122 – 2.9130)	73.85 (2.907)
	Piston pin hole I.D.		18.010 – 18.016 (0.7091 – 0.7093)	18.03 (0.710)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.99 (0.708)
	Piston-to-piston pin clearance		0.010 – 0.022 (0.0004 – 0.0009)	0.05 (0.002)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.5 (0.02)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.6 (0.02)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.9 (0.04)
	Piston ring-to-ring groove clearance	Top	0.025 – 0.055 (0.0010 – 0.0022)	0.10 (0.004)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.10 (0.004)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Crankshaft	Connecting rod side clearance		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
	Crankpin bearing oil clearance		0.028 – 0.046 (0.0011 – 0.0018)	0.06 (0.002)
	Main journal bearing oil clearance	1, 4	0.012 – 0.030 (0.0005 – 0.0012)	0.06 (0.002)
		2, 3	0.020 – 0.038 (0.0008 – 0.0015)	0.06 (0.002)
	Runout		–	0.03 (0.001)
	Crankpin and main journal	Taper	–	0.003 (0.0001)
		Out-of-round	–	0.005 (0.0002)

FINAL DRIVE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	–
Final drive oil capacity	after draining	125 cm^3 (4.2 US oz, 4.4 Imp oz)	–
	after disassembly	155 cm^3 (5.2 US oz, 5.5 Imp oz)	–
Final drive gear backlash		0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
Backlash difference between measurement		–	0.10 (0.004)
Final drive gear assembly preload		0.2 – 1.2 N·m (2 – 12 kgf·cm, 2 – 10 lbf·in)	–

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	250 kPa (2.50 kgf/cm^2, 36 psi)	–
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm^2, 36 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 (2.1oz) max.
Steering head bearing preload		6.8 – 10.8 N (0.7 – 1.1 kgf, 1.5 – 2.4 lbf)	–

REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	290 kPa (2.90 kgf/cm^2, 42 psi)	–
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm^2, 42 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1 oz) max.

HYDRAULIC DISC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Specified brake fluid			DOT 4	–
Front	Brake disc thickness		4.5 (0.18)	3.5 (0.14)
	Brake disc warpage		–	0.30 (0.012)
	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.	Upper, Lower	27.000 – 27.050 (1.0630 – 1.0650)	27.06 (1.065)
		Center	22.650 – 22.700 (0.8917 – 0.8937)	22.71 (0.894)
	Caliper piston O.D.	Upper, Lower	26.935 – 26.968 (1.0604 – 1.0617)	26.91 (1.059)
		Center	22.585 – 22.618 (0.8892 – 0.8905)	22.56 (0.888)
Rear	Brake disk thickness		7.5 (0.30)	6.5 (0.26)
	Brake disc warpage		–	0.30 (0.012)
	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 – 0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.		33.96 – 34.01 (1.337 – 1.339)	34.02 (1.340)
	Caliper piston O.D.		33.878 – 33.928 (1.3338 –1.3357)	33.87 (1.333)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Battery	Capacity		12V – 18 Ah	–
	Current leakage		5 mA max.	–
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V	–
		Needs charging	Below 12.3 V	–
	Charging current	Normal	1.8 A x 5 – 10 h	–
		Quick	9.0 A x 0.5 h	–
Alternator	Capacity		1 kW/2,400 rpm	–
	Stator coil resistance (20°C/68°F)		0.07 – 0.09 Ω	–
	Rotor coil resistance (20°C/68°F)		2.5 – 2.9 Ω	–
	Rotor coil slip ring O.D.		27 mm (0.89 in)	21.2 mm (0.83 in)

IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	BKR5E-11 (NGK), K16PR-U11 (DENSO)
	For extended high speed riding	BKR6E-11 (NGK), K20PR-U11 (DENSO)
Spark plug gap		1.0 – 1.1 mm (0.039 – 0.043 in)
Ignition coil signal peak voltage		2.5 – 5.0 V
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F"mark)		2° BTDC at idle

ELECTRIC STARTER SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 mm (0.49 in)	6.5 mm (0.26 in)

LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	High beam	12V – 55 W
		Low beam	12V – 55 W
	Turn signal light		12V – 21 W X 4
	Brake/taillight		LED
	License light		12V – 5 W
	Instrument light		LED
	Indicator		LED
Fuse	Main fuse A		30 A
	Main fuse B		100 A
	Sub–fuse		30 A X 1, 20 A X 2, 10 A X 3, 5 A X 2
ECT sensor resistance		at 80°C (176°F)	210 – 270 Ω
		at120°C (248°F)	64 – 74 Ω

STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
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)		
12 mm bolt and nut	54 (5.5, 40)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
		6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut	26 (2.7, 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.

NOTE:

1. Apply oil to the threads and seating surface.
2. Apply grease to the threads.
3. Apply locking agent to the threads.
4. Apply sealant to the threads.
5. Apply brake fluid to the threads.
6. Lock nut: replace with a new one and stake it.
7. ALOC bolt or screw: replace with a new one.
8. One-way bolt or screw: replace with a new one.
9. Left-hand threads.
10. U-nut.

ENGINE

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	6	14	18 (1.8, 13)	
Timing hole cap	1	45	18 (1.8, 13)	NOTE 2
Engine oil filter cartridge	1	20	26 (2.7, 20)	NOTE 1
Engine oil drain bolt	1	14	34 (3.5, 25)	

LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 4
Oil pressure switch terminal screw	1	4	2 (0.2, 1.4)	
Oil strainer bolt	1	6	12 (1.2, 9)	NOTE 3
Oil pump assembly bolt	3	6	13 (1.3, 9)	

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel hose joint bolt (at fuel rail on throttle body)	4	6	10 (1.0, 7)	
Fuel rail mounting bolt (at throttle body)	6	6	10 (1.0, 7)	
PAIR check valve cover bolt	12	5	5 (0.5, 3.6)	
Pressure regulator nut	1	12	29 (3.0, 22)	
Knock sensor	2	12	31 (3.2, 23)	
Vehicle speed sensor bolt	2	6	12 (1.2, 9)	

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Water pump cover sealing plate bolt	2	6	13 (1.3, 9)	
Water pump cover bolt	3	6	12 (1.2, 9)	

CYLINDER HEAD/VALVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head bolt	16	9	44 (4.5, 33)	NOTE 1
	6	6	12 (1.2, 9)	NOTE 1
Intake manifold bolt	12	6	12 (1.2, 9)	
Cylinder head front cover bolt	4	6	10 (1.0, 7)	
Left cam chain guide washer bolt	1	6	12 (1.2, 9)	
Cam chain tensioner pivot bolt	3	6	12 (1.2, 9)	
Ignition pulse generator rotor bolt	1	10	59 (6.0, 43)	NOTE 1
Front crankcase cover bolt	12	6	12 (1.2, 9)	
Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 3
Camshaft holder bolt	16	6	12 (1.2, 9)	NOTE 1
Cam chain tensioner lifter mounting bolt	4	6	12 (1.2, 9)	
Cam chain tensioner lifter sealing bolt	2	6	12 (1.2, 9)	
Cylinder head cover bolt	11	6	10 (1.0, 7)	
Cylinder head side cover bolt	4	6	10 (1.0, 7)	
Cylinder head top cover bolt (cover mount)	8	6	12 (1.2, 9)	
Cylinder head top cover bolt (dummy)	8	6	10 (1.0, 7)	NOTE 3

CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch slave cylinder bleed valve	1	8	9 (0.9, 6.5)	
Clutch slave cylinder mounting bolt	3	6	12 (1.2, 9)	NOTE 3
Clutch bleed hose oil bolt	1	10	34 (3.5, 25)	
Clutch outer lock nut	1	40	186 (19.0, 137)	NOTE 3, 6
Clutch center lock nut	1	22	127 (13.0, 94)	NOTE 1, 6

GEARSHIFT LINKAGE/TRANSMISSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Shift drum stopper arm pivot bolt	1	6	12 (1.2, 9)	
Shift drum joint bolt	1	8	27 (2.8, 20)	NOTE 3
Countershaft setting plate bolt	3	6	12 (1.2, 9)	NOTE 3
Mainshaft setting plate bolt	2	8	26 (2.7, 20)	NOTE 3
Shift drum end plate bolt	1	6	12 (1.2, 9)	NOTE 3
Shift drum bearing setting plate bolt	2	6	12 (1.2, 9)	NOTE 3
Gearshift spindle arm bolt	1	8	25 (2.5, 18)	
Gearshift spindle return spring pin	1	8	25 (2.5, 18)	
Final drive gear lock nut	1	22	186 (19.0, 137)	NOTE1, 6, 9
Alternator drive gear bolt	6	8	25 (2.6, 19)	NOTE 1
Oil pump driven sprocket bolt	1	6	18 (1.8, 13)	NOTE 3
Starter clutch bolt	1	12	74 (7.5, 54)	NOTE 9
Primary driven gear bearing setting plate bolt (rear crankcase cover)	4	6	12 (1.2, 9)	NOTE 3
Breather plate bolt (rear crankcase cover)	5	6	12 (1.2, 9)	NOTE 3
Rear crankcase cover bolt (pan-head)	8	8	31 (3.2, 23)	
Rear crankcase cover bolt (flange)	8	8	24 (2.4, 17)	
Output shaft lock nut	1	30	186 (19.0, 137)	NOTE 1, 6
Output shaft bearing holder bolt	3	8	28 (2.9, 21)	

CYLINDER/PISTON/CRANKSHAFT

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Connecting rod bearing cap nut	12	8	31 (3.2, 23)	NOTE 1
Crankshaft main journal bearing cap bolt	8	12	20 (2.0, 14) + 45°	NOTE 1: page 12-17
Left crankcase bolt	4	8	25 (2.6, 19)	
Right crankcase bolt	8	10	34 (3.5, 25)	NOTE 1
Water hose joint bolt	4	6	12 (1.2, 9)	NOTE 3

BATTERY/CHARGING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Alternator mounting bolt	3	8	29 (3.0, 22)	
Alternator terminal nut	1	6	8 (0.8, 5.8)	

IGNITION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Ignition pulse generator bolt	2	6	12 (1.2, 9)	NOTE 3

ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter motor mounting bolt	3	8	29 (3.0, 22)	

LIGHTS/METERS/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine coolant temperature (ECT) sensor	1	12	25 (2.5, 18)	

FRAME

FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Side cover bolt	2	5	4 (0.4, 2.9)	
Sub-side cover bolt	2	5	5 (0.5, 3.6)	
Fuel tank top cover bolt	4	5	2 (0.2, 1.4)	
Fuel tank top cover bolt (dummy)	3	4	2 (0.2, 1.4)	
Front inner cover screw	2	5	3 (0.3, 2.2)	
Front inner cover stay screw	2	5	5 (0.5, 3.6)	
Pivot cover bolt	6	5	5 (0.5, 3.6)	
Pivot cover cap bolt	2	5	3 (0.3, 2.2)	
Frame cover bolt	6	5	5 (0.5, 3.6)	
Exhaust pipe joint nut	12	6	10 (1.0, 7)	
Muffler mounting bolt	2	8	22 (2.2, 16)	
Muffler band bolt	1	8	22 (2.2, 16)	
Exhaust pipe cover bolt	6	6	14 (1.4, 10)	
Muffler cover bolt	4	6	14 (1.4, 10)	
Muffler cover protector bolt	4	5	5 (0.5, 3.6)	
Front fender plate bolt	4	4	4 (0.4, 2.9)	
Rear fender mounting bolt (inner)	4	10	54 (5.5, 40)	
Rear fender mounting bolt (upper)	2	5	3 (0.3, 2.2)	
Radiator cover lower bolt	2	6	12 (1.2, 9)	
Radiator sub-cover bolt (upper)	4	5	5 (0.5, 3.6)	
Radiator sub-cover bolt (lower)	2	5	1 (0.1, 0.7)	
Radiator cover lower stay screw	4	5	2 (0.2, 1.4)	
Radiator grille A screw	6	5	3 (0.3, 2.2)	
Radiator grille B screw	9	3	1 (0.1, 0.7)	

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Final drive oil filler cap	1	30	12 (1.2, 9)	
Final drive oil drain bolt	1	14	20 (2.0, 14)	

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel feed hose sealing nut (throttle body side)	1	12	22 (2.2, 16)	
Fuel feed hose banjo bolt (fuel tank side)	1	12	22 (2.2, 16)	
Fuel pump nut	7	6	12 (1.2, 9)	
MAP sensor screw	1	4	2 (0.2, 1.4)	
Fuel fill cap nut	4	5	4 (0.4, 2.9)	

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front engine hanger bracket bolt	4	12	64 (6.5, 47)	
Hanger bracket cross-pipe bolt	2	14	88 (9.0, 65)	
Left front engine hanger adjusting bolt	1	22	2 (0.2, 1.4)	
Left front engine hanger adjusting bolt lock nut	1	22	54 (5.5, 40)	
Front engine hanger bolt (left and right)	2	12	64 (6.5, 47)	
Left rear engine hanger adjusting bolt	1	22	4 (0.4, 2.9)	
Left rear engine hanger adjusting bolt lock nut	1	22	54 (5.5, 40)	
Rear engine hanger bolt (left and right)	2	12	64 (6.5, 47)	
Center engine hanger plate bolt	4	8	26 (2.7, 20)	
Center engine hanger bolt	2	10	39 (4.0, 29)	
Sub-frame cross-pipe bolt	2	8	26 (2.7, 20)	

CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch master cylinder reservoir cap screw	2	4	2 (0.2, 1.4)	
Clutch lever pivot bolt	1	6	1 (0.1, 0.7)	
Clutch lever pivot nut	1	6	6 (0.6, 4.3)	
Clutch switch screw	1	4	1 (0.1, 0.7)	
Clutch master cylinder holder bolt	2	6	12 (1.2, 9)	
Clutch hose oil bolt	2	10	34 (3.5, 25)	

FINAL DRIVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Pinion retainer	1	75	157 (16.0, 116)	NOTE 1
Pinion retainer lock tab bolt	1	6	10 (1.0, 7)	
Pinion joint nut	1	16	108 (11.0, 80)	NOTE 3
Gear case cover bolt	2	10	62 (6.3, 46)	NOTE 3
	6	8	25 (2.6, 19)	NOTE 3
Final drive assembly mounting nut	4	12	93 (9.5, 69)	
Final drive outer cover bolt	5	6	10 (1.0, 7)	

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Handlebar upper holder bolt	4	8	26 (2.7, 20)	
Handlebar lower holder nut	2	12	64 (6.5, 47)	NOTE 10
Front brake disc bolt	12	6	20 (2.0, 14)	NOTE 7
Front axle bolt	1	14	90 (9.2, 67)	
Front axle pinch bolt	2	8	26 (2.7, 20)	
Fork top bridge pinch bolt	2	10	39 (4.0, 29)	
Fork bottom bridge pinch bolt	4	8	26 (2.7, 20)	
Shock absorber upper bracket pinch bolt	2	10	39 (4.0, 29)	
Left shock absorber upper mounting bolt	1	12	59 (6.0, 43)	
Right shock absorber upper mounting bolt	1	10	39 (4.0, 29)	
Shock absorber lower mounting bolt	2	10	39 (4.0, 29)	
Shock arm pivot nut (arm-to-bottom bridge)	1	10	39 (4.0, 29)	NOTE 10
Suspension push rod nut (upper; rod-to-shock arm)	2	12	64 (6.5, 47)	NOTE 10
Suspension push rod nut (lower; rod-to-pivot arm)	2	12	39 (4.0, 29)	NOTE 10
Suspension pivot arm nut (arm-to-fork tube)	2	14	88 (9.0, 65)	NOTE 10
Fender link (fender stay–push rod) nut	4	8	28 (2.9, 21)	NOTE 10
Steering bearing adjustment nut	1	35	37 (3.8, 27)	NOTE 1
Steering bearing adjustment nut lock nut	1	35	–	See page 14-39
Steering stem nut	1	33	167 (17.0, 148)	NOTE 1

REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear wheel nut	5	12	108 (11.0, 80)	
Rear wheel cover bolt	5	6	10 (1.0, 7)	
Rear brake disc screw	1	6	9 (0.9, 6.5)	NOTE 7
Shock absorber mounting nut	2	10	42 (4.3, 31)	NOTE 10
Shock arm-to-swingarm nut	1	12	64 (6.5, 47)	NOTE 10
Shock arm-to-shock link nut	1	12	64 (6.5, 47)	NOTE 10
Shock link-to-frame nut	1	12	64 (6.5, 47)	NOTE 10
Swingarm right pivot bolt	1	36	108 (11.0, 80)	
Swingarm left pivot bolt	1	36	34 (3.5, 25)	
Swingarm left pivot lock nut	1	36	108 (11.0, 80)	

HYDRAULIC DISC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake caliper bleed valve	5	8	6 (0.6, 4.3)	
Master cylinder reservoir cap screw	2	4	2 (0.2, 1.4)	
Brake pad pin	3	10	18 (1.8, 13)	
Brake hose oil bolt	13	10	34 (3.5, 25)	
Brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Brake lever pivot nut	1	6	6 (0.6, 4.3)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Rear master cylinder reservoir mounting bolt	2	6	12 (1.2, 9)	
Rear master cylinder reservoir stay bolt	2	6	12 (1.2, 9)	
Rear master cylinder reservoir hose joint screw	1	4	2 (0.2, 1.4)	NOTE 3
Rear master cylinder switch plate lock nut	1	8	18 (1.8, 13)	
Rear master cylinder joint nut	1	8	18 (1.8, 13)	
Rear brake pedal pinch bolt	1	8	22 (2.2, 16)	
Rear master cylinder mounting bolt	2	6	12 (1.2, 9)	
Rear brake light switch holder screw	2	4	2 (0.15, 1.1)	NOTE 3
Rear master cylinder cover bolt	4	5	5 (0.5, 3.6)	
Front brake caliper bracket pin	2	8	13 (1.3, 9)	NOTE 3
Front brake caliper pin	2	8	23 (2.3, 17)	NOTE 3
Front brake caliper assembly bolt	6	8	23 (2.3, 17)	NOTE 7
Front brake caliper mounting bolt	4	10	45 (4.6, 33)	NOTE 7
Torque rod (caliper–fork tube) nut	4	10	39 (4.0, 29)	NOTE 10
Rear brake caliper bracket pin	1	8	23 (2.3, 17)	NOTE 3
Rear brake caliper pin bolt	1	12	27 (2.8, 20)	
Rear brake caliper mounting bolt	2	10	50 (5.1, 37)	NOTE 7
Proportional control valve mounting bolt	2	6	12 (1.2, 9)	
Brake pipe joint nut	12	10	17 (1.7, 12)	NOTE 5
Brake hose/pipe joint mounting bolt (fork bottom bridge)	2	8	26 (2.7, 20)	
Brake hose retaining bolt	6	6	12 (1.2, 9)	
Brake hose guide bolt (shock absorber upper bracket)	1	6	12 (1.2, 9)	

IGNITION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Bank angle sensor screw	2	4	2 (0.2, 1.4)	

LIGHTS/METERS/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Ignition switch mounting bolt	2	6	10 (1.0, 7)	
Ignition switch stay bolt	2	6	10 (1.0, 7)	
Side stand switch bolt	1	6	10 (1.0, 7)	
Speedometer mounting bolt	6	5	4 (0.4, 2.9)	
Speedometer visor tapping screw	3	5	4 (0.4, 2.9)	
Fuel level sensor nut	4	6	12 (1.2, 9)	
License light bolt	2	5	4 (0.4, 2.9)	
Brake/taillight cover tapping screw	8	5	2 (0.2, 1.4)	
Headlight upper cover bolt	1	5	5 (0.5, 3.6)	
Front shock absorber upper bracket cover bolt (front)	1	5	1 (0.1, 0.7)	
Front shock absorber upper bracket cover bolt (rear)	2	5	2 (0.2, 1.4)	
Handlebar lower holder cover bolt	1	5	2 (0.2, 1.4)	

OTHERS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine guard bolt (upper)	2	10	44 (4.5, 33)	
Engine guard bolt (lower)	4	8	26 (2.7, 20)	
Engine guard adjusting bolt lock nut	2	12	54 (5.5, 40)	
Rear sub-frame nut	4	12	64 (6.5, 47)	NOTE 2
Side stand pivot bolt	1	10	10 (1.0, 7)	
Side stand pivot lock nut	1	10	29 (3.0, 22)	NOTE 10
Side stand bracket bolt	3	10	44 (4.5, 33)	
Footpeg bracket bolt	6	8	26 (2.7, 20)	
Gearshift pedal pinch bolt	1	6	12 (1.2, 9)	
Gearshift arm pinch bolt	1	6	12 (1.2, 9)	
Front turn signal setting screw	2	6	10 (1.0, 7)	
Front turn signal inner stay bolt	2	6	9 (0.9, 6.5)	
Engine control module box bolt	2	5	5 (0.5, 3.6)	
Mud guard bolt	2	5	3 (0.3, 2.2)	
Tool box tapping screw	2	4	1 (0.1, 0.7)	
Tool box bottom plate bolt	1	5	5 (0.5, 3.6)	
Steering lock lever mounting bolt	2	5	5 (0.5, 3.6)	
Steering lock lever pivot screw	1	6	7 (0.7, 5.1)	
Radiator heat guard rubber screws	2	5	2 (0.2, 1.4)	

LUBRICATION & SEAL POINTS

ENGINE

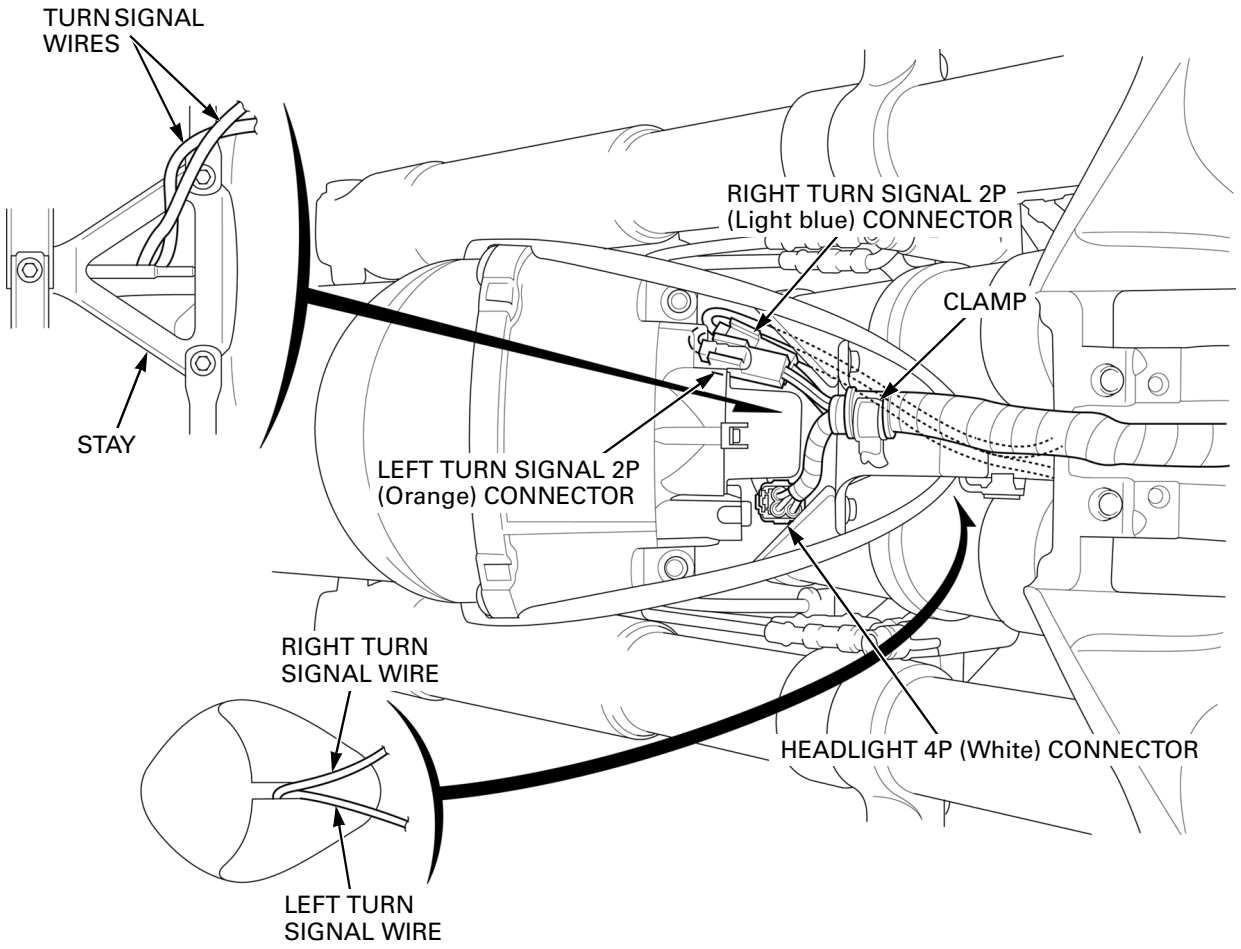
LOCATION	MATERIAL	REMARKS
Crankcase mating surface Rear crankcase cover gasket mating surface (case side) Gearshift linkage cover gasket mating surface (case side) Front crankcase cover gasket mating surface (case side) Cylinder head semi-circular edges Oil pressure switch threads	Sealant	Coating area: page 12-24 Coating area: page 11-29 Coating area: page 11-11 Coating area: page 9-29 Coating area: page 9-34 Do not apply to the sensor head.
Crankshaft main journal bearing sliding surface Crankpin bearing sliding surface Valve stem sliding surface Valve lifter outer surface Camshaft journals, thrust surfaces and cam lobes Clutch outer friction spring M2/3, C4, C5 gear shift fork grooves Starter reduction gear shaft outer surface	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Engine oil filter cartridge threads and seating surface Camshaft holder bolt threads and seating surface Cylinder head 9-mm bolt threads Cylinder head 6-mm bolt threads and seating surface Ignition pulse generator rotor bolt threads and seating surface Clutch lifter joint piece sliding surface Clutch disc lining surface Clutch center lock nut threads and seating surface Piston pin outer surface Piston outer surface and piston ring whole surface Crankshaft main journal bearing cap bolt threads Connecting rod bearing cap nut threads and seating surface Shift fork shaft Transmission bushing Final drive gear lock nut threads Right crankcase 10-mm bolt threads Alternator drive gear bolt threads and seating surface Starter sprag clutch contacting surfaces Each gear teeth and sliding surface Each bearing rotating area Each O-ring whole surface	Engine oil	
Timing hole cap threads Each oil seal lip	Multi-purpose grease	
Clutch lifter rod-to-slave cylinder piston contacting area	Silicone grease	
Oil filter boss threads (crankcase side) Oil strainer bolt threads Cam sprocket bolt threads Cylinder head top cover 6 x 10 mm bolt threads Shift drum joint bolt threads Clutch slave cylinder mounting bolt threads Clutch outer lock nut threads Oil pump driven sprocket bolt threads Primary driven gear bearing setting plate bolt threads (rear crankcase cover) Rear crankcase cover breather plate bolt threads Mainshaft setting plate bolt threads Countershaft setting plate bolt threads Shift drum end plate bolt threads Shift drum bearing setting plate bolt threads Water hose joint bolt threads (cylinder) Ignition pulse generator bolt threads	Locking agent	

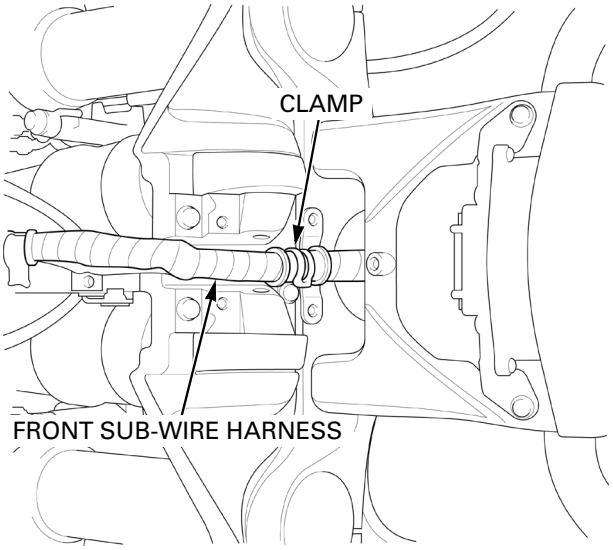
FRAME

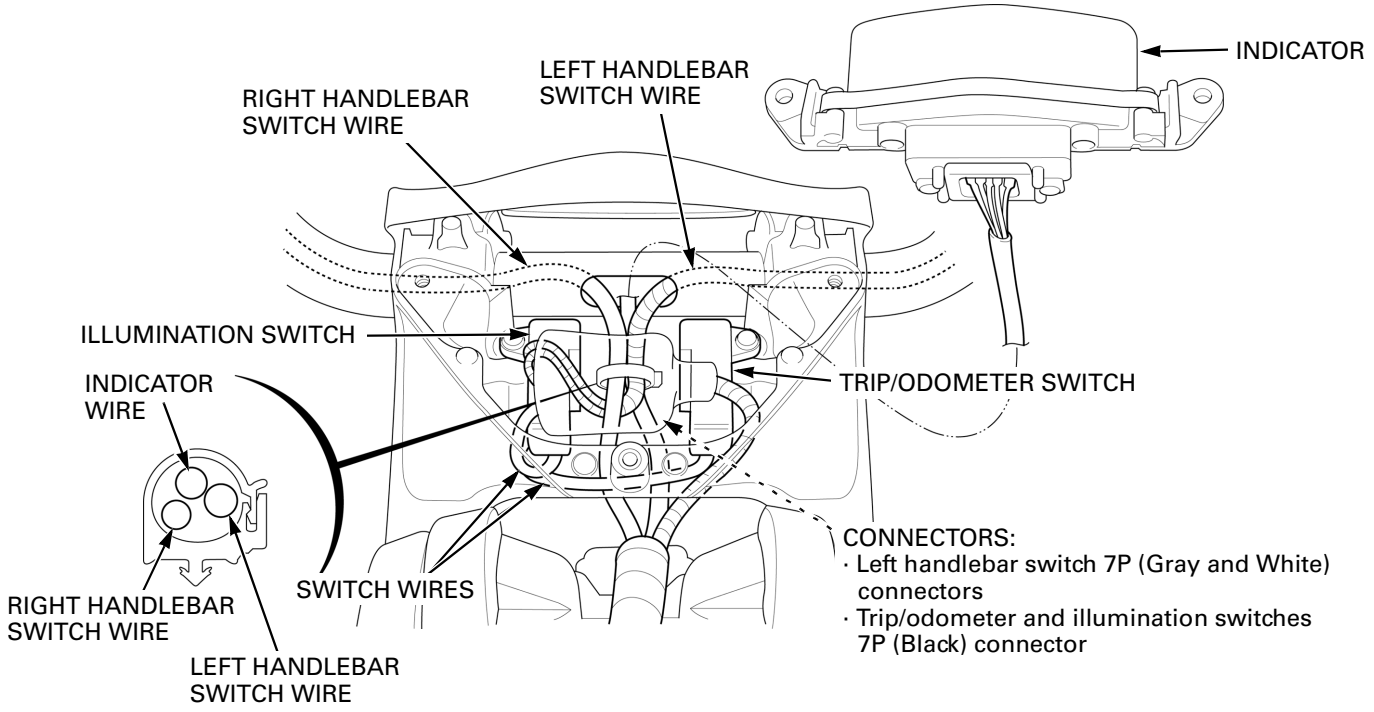
LOCATION	MATERIAL	REMARKS
Final gear case cover mating surface	Sealant	
Side stand pivot Footpeg sliding area Gearshift pedal link tie-rod ball joints Gearshift pedal pivot Brake pedal pivot Final gear case O-ring (2 places) Final gear case oil seal lips (2 places) Throttle grip pipe flange and sliding surface Front wheel dust seal lips Front brake caliper stay bearings Front fender link bearings Front fender link and fender bracket dust seal lips Front suspension bearings Front suspension dust seal lips Rear shock arm and link needle bearings Rear shock arm and link dust seal lips Rear shock absorber upper mounting bolt head Swingarm pivot bearings Swingarm pivot dust seal lips	Multi-purpose grease	1 – 1.5 g per each bearing
Steering head bearings Steering head bearing dust seal lips	Urea based multi-purpose grease with extreme pressure (Example: Excelite EP2 manufactured by Kyodo Yushi Japan, Shell Stamina EP2 or equivalent)	3 – 5 g per each bearing
Final drive pinion joint splines (joint shaft side) Final drive joint shaft dust seal lips Final drive shaft splines (output shaft and joint shaft) Front brake torque rod bearing (fork tube side)	Molybdenum disulfide grease	0.5 g 1 g per each splines
	Molybdenum disulfide paste	
Throttle cable outer inside Inner lock cable outer inside	Cable lubricant	
Handlebar grip rubber inside Brake caliper bracket retainer seating surface	Honda Bond A or Honda Hand Grip Cement (U.S.A. only)	
Fuel hose joint O-ring Final drive pinion retainer threads Steering bearing adjustment nut threads Steering stem nut washer seating surfaces (both sides) Steering stem nut threads	Engine oil	
Clutch lever pivot Clutch lever joint piece-to-push rod contacting area Clutch master piston-to-push rod contacting area Front brake lever pivot Front brake lever-to-master piston contacting area Front brake torque rod bearing (caliper side) Rear master cylinder push rod boot groove Rear master piston-to-push rod contacting area Brake caliper pad pin stopper ring Brake caliper pin boot inside	Silicone grease	
Clutch master piston and cups Brake master piston and cups Brake caliper piston and piston seals Brake pipe joint nut threads	DOT 4 brake fluid	

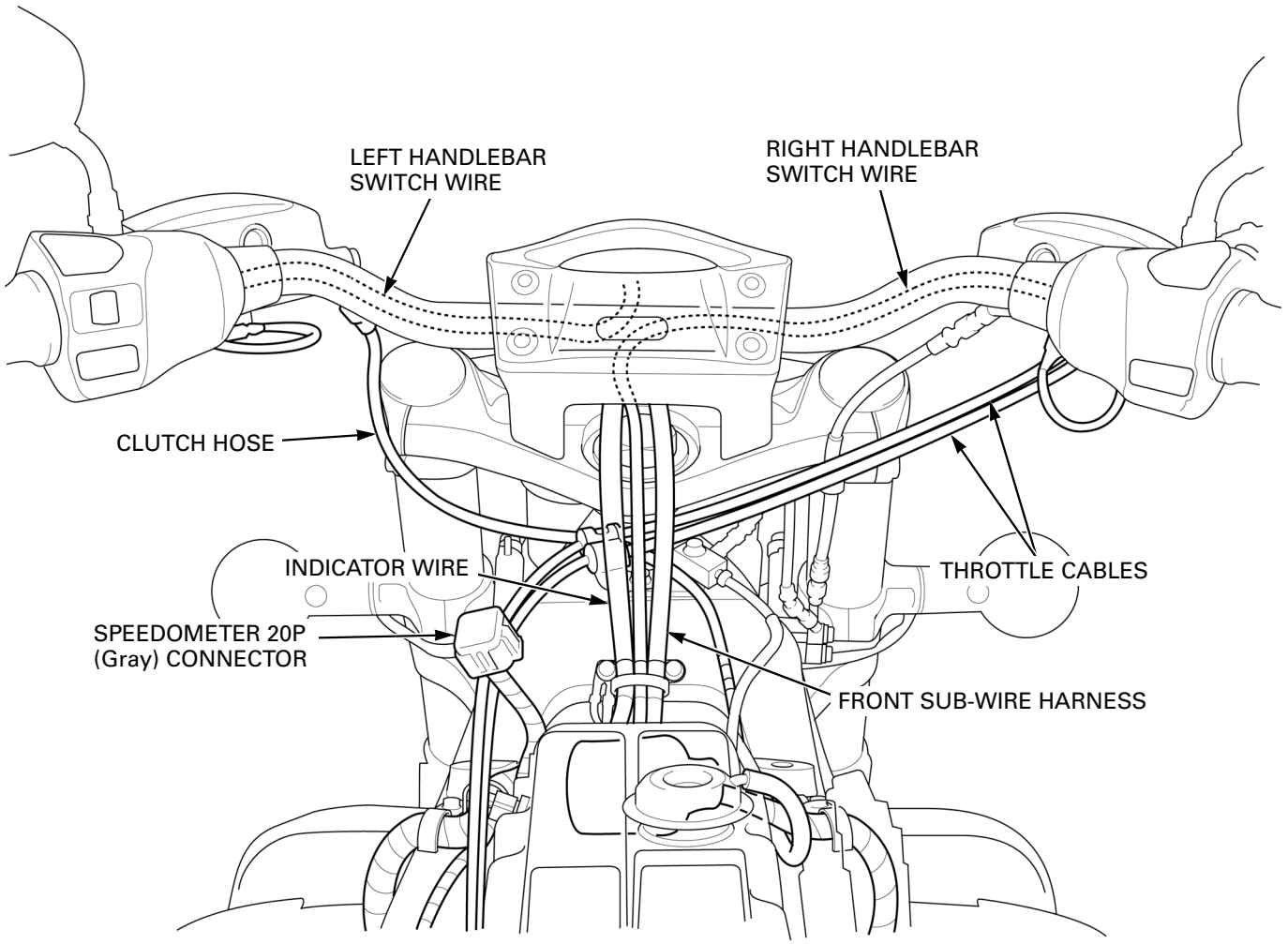
LOCATION	MATERIAL	REMARKS
Final drive pinion joint nut threads Final gear case cover bolt threads Final gear case stud bolt threads (case side) Rear master cylinder reservoir hose joint screw threads Rear brake light switch screw threads	Locking agent	

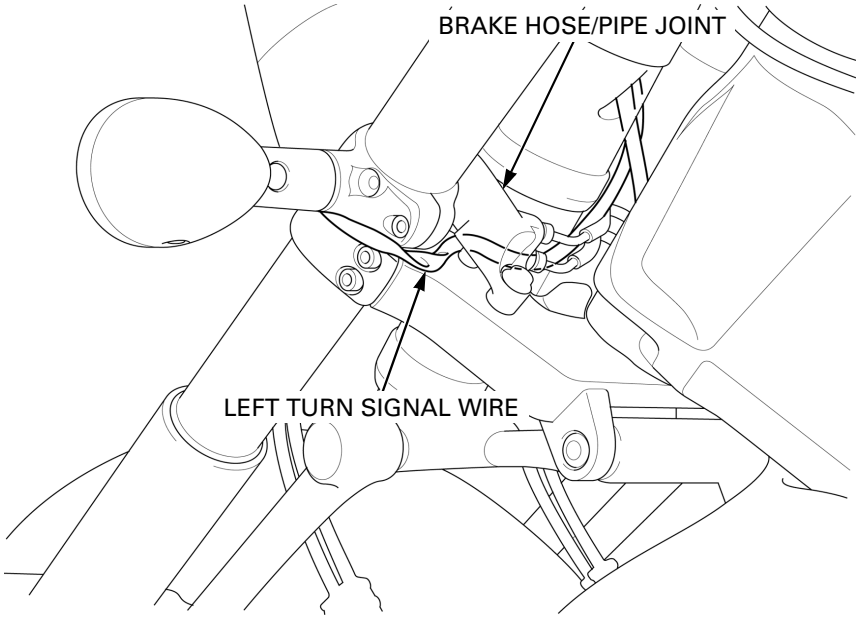
CABLE & HARNESS ROUTING

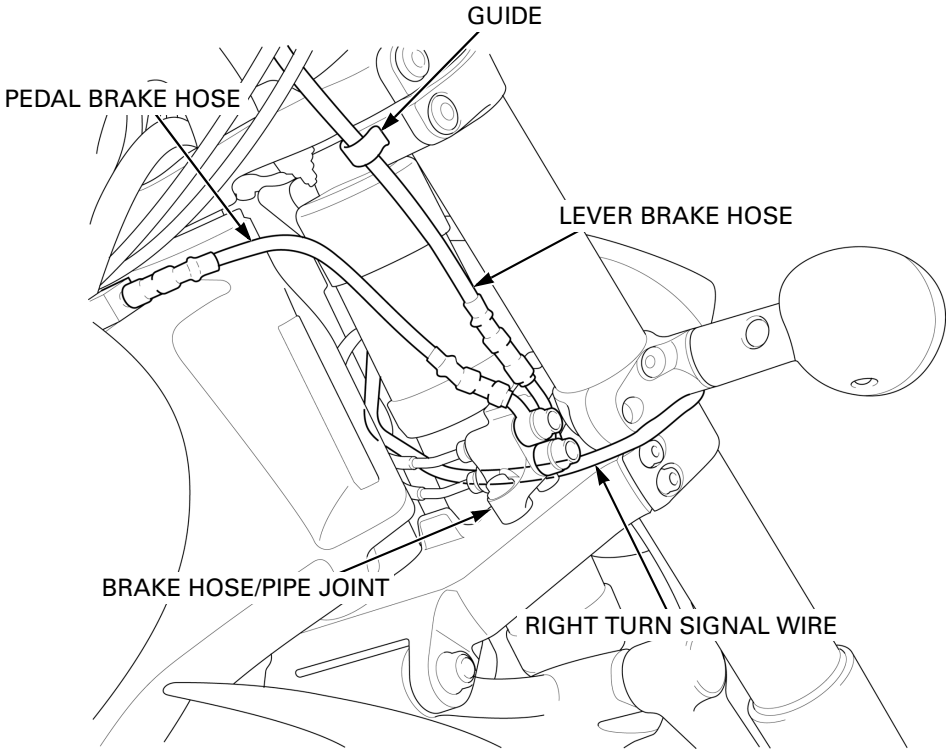


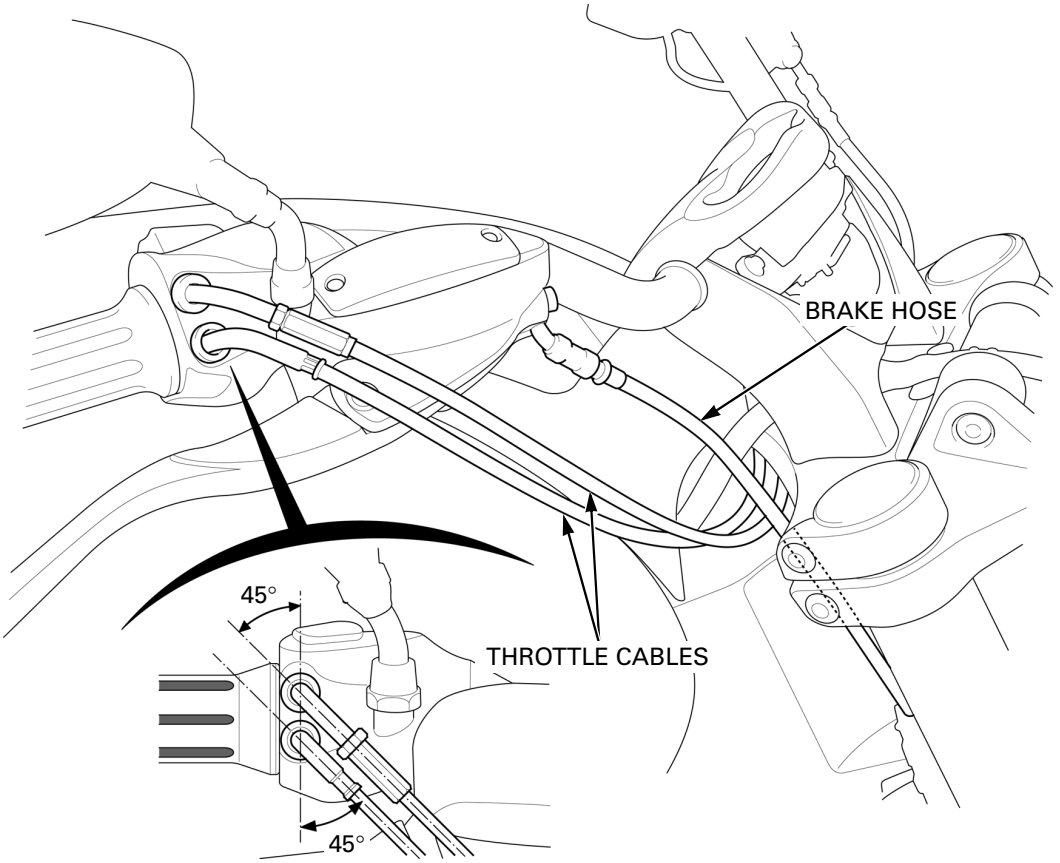


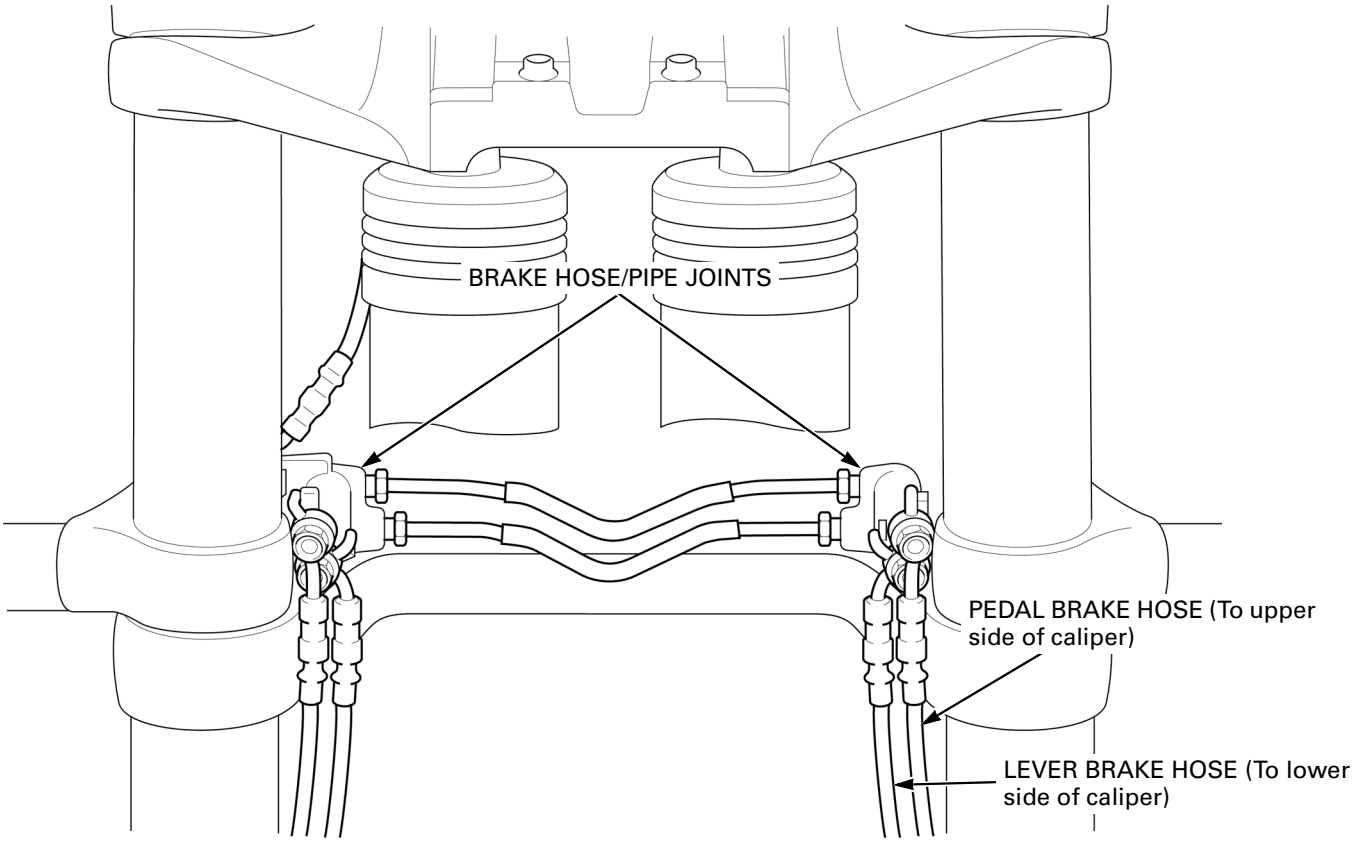

INDICATOR
LEFT HANDLEBAR SWITCH WIRE
RIGHT HANDLEBAR SWITCH WIRE
ILLUMINATION SWITCH
INDICATOR WIRE
TRIP/ODOMETER SWITCH
CONNECTORS:
· Left handlebar switch 7P (Gray and White) connectors
· Trip/odometer and illumination switches 7P (Black) connector
SWITCH WIRES
RIGHT HANDLEBAR SWITCH WIRE
LEFT HANDLEBAR SWITCH WIRE

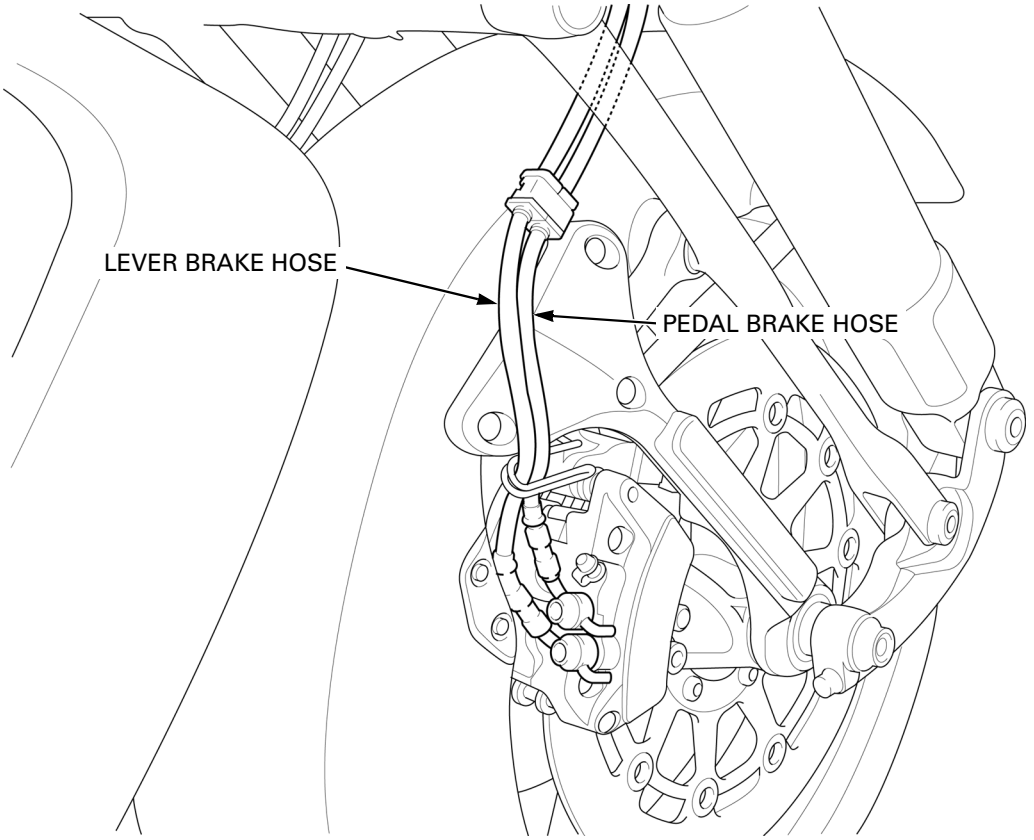

LEFT HANDLEBAR SWITCH WIRE
RIGHT HANDLEBAR SWITCH WIRE
CLUTCH HOSE
INDICATOR WIRE
THROTTLE CABLES
SPEEDOMETER 20P (Gray) CONNECTOR
FRONT SUB-WIRE HARNESS

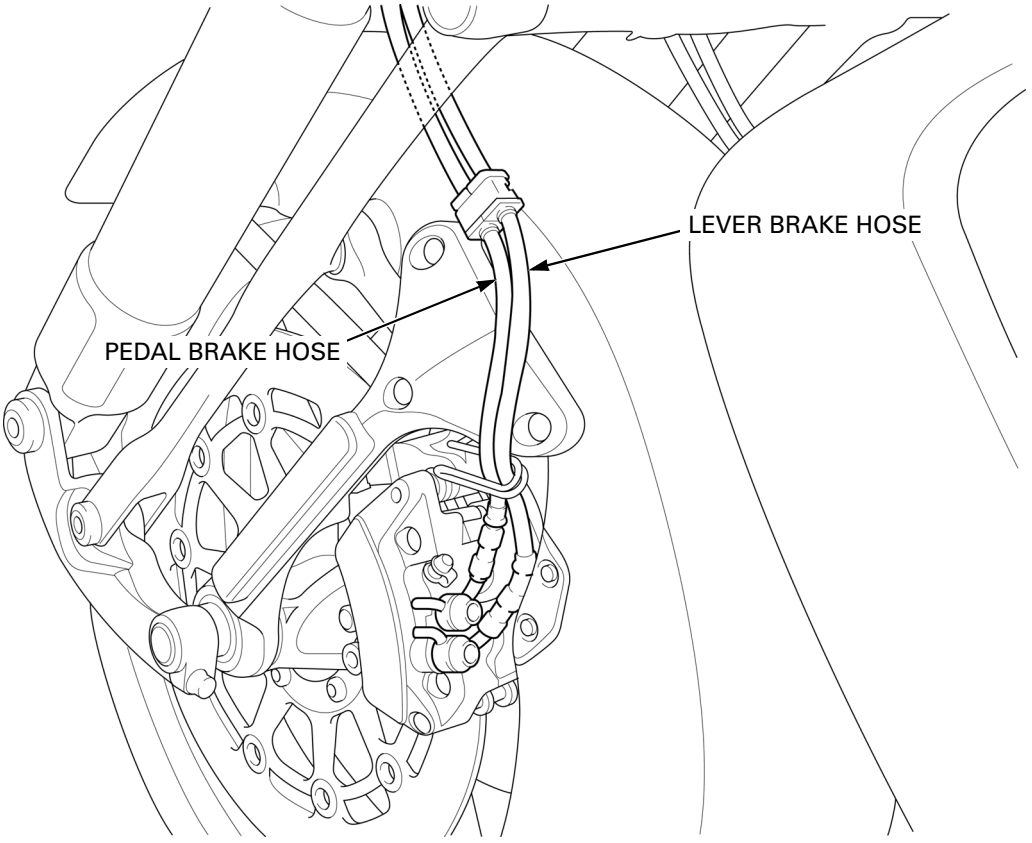

BRAKE HOSE/PIPE JOINT
LEFT TURN SIGNAL WIRE

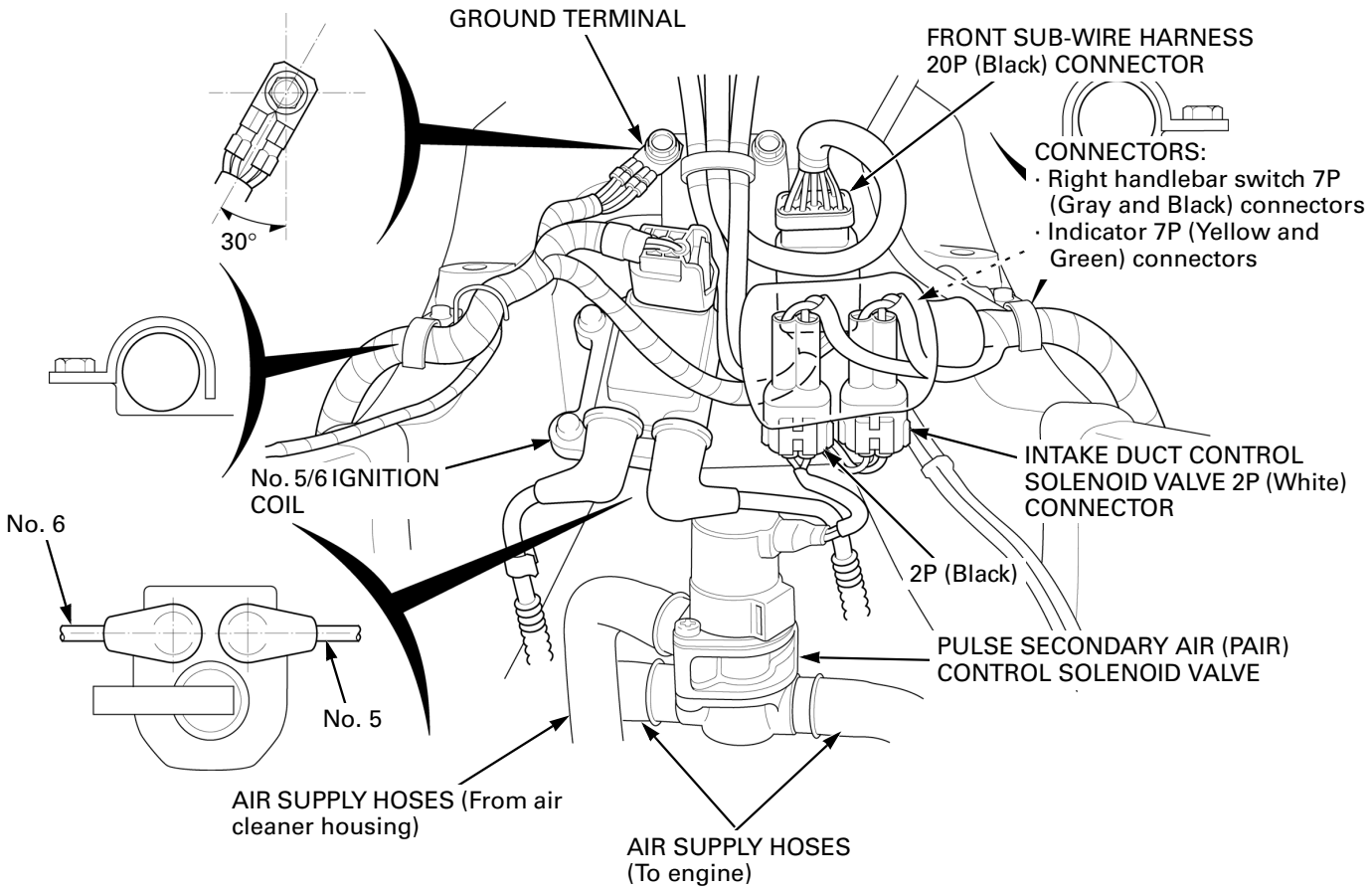

GUIDE
PEDAL BRAKE HOSE
LEVER BRAKE HOSE
BRAKE HOSE/PIPE JOINT
RIGHT TURN SIGNAL WIRE

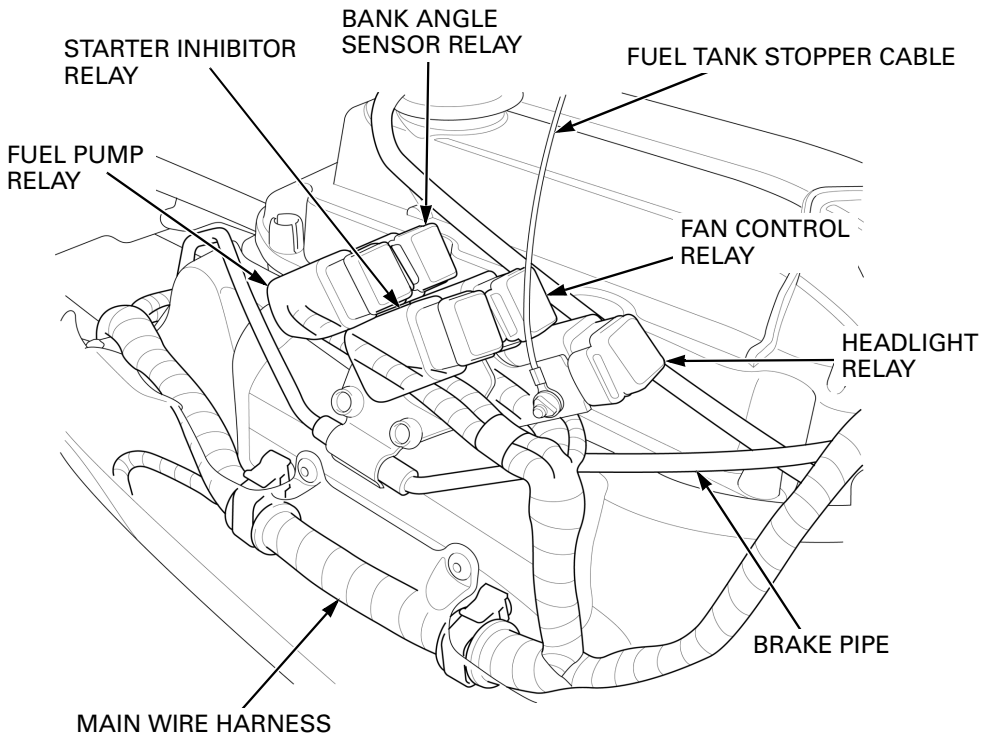

BRAKE HOSE
45°
THROTTLE CABLES
45°

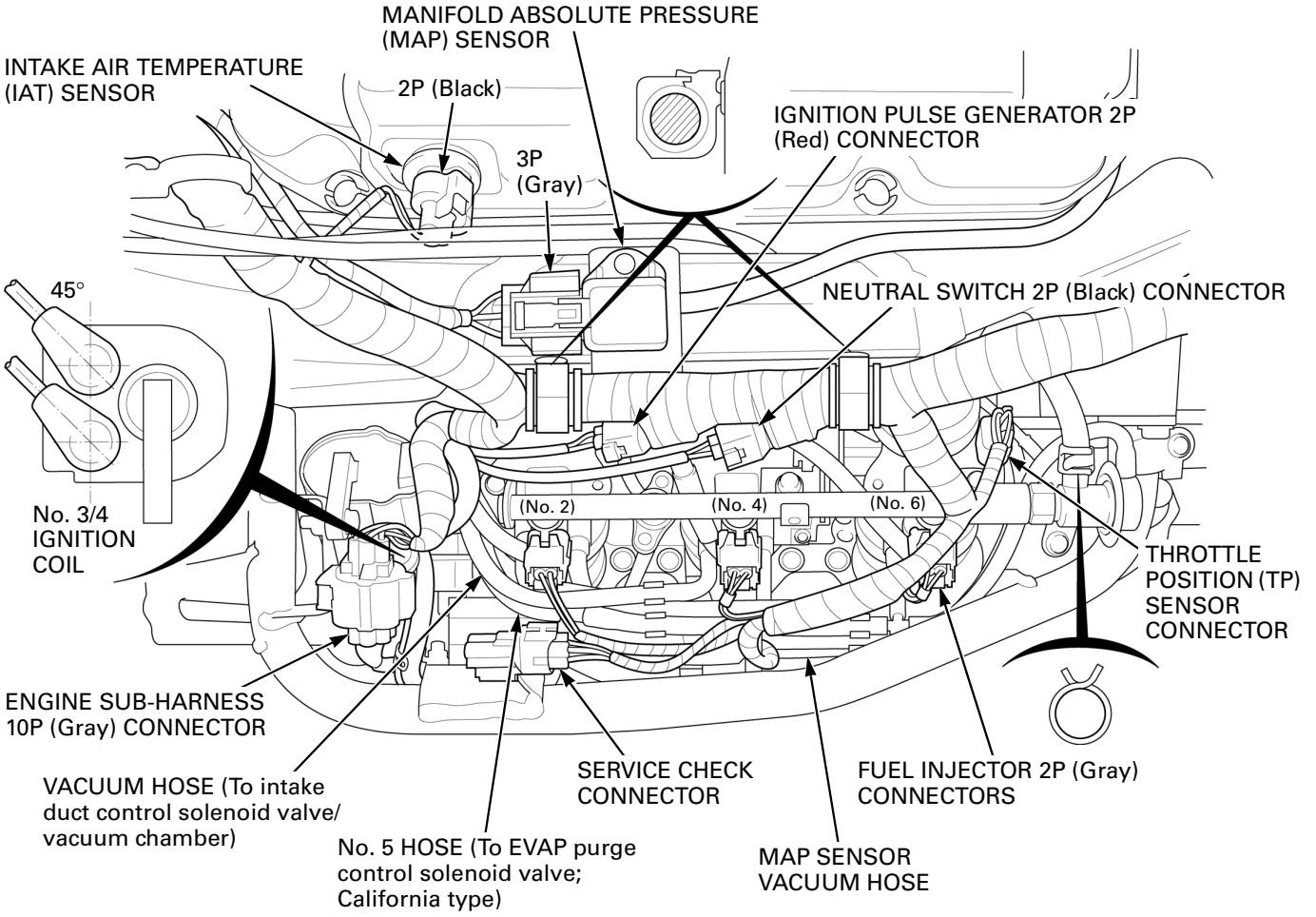

BRAKE HOSE/PIPE JOINTS
PEDAL BRAKE HOSE (To upper side of caliper)
LEVER BRAKE HOSE (To lower side of caliper)

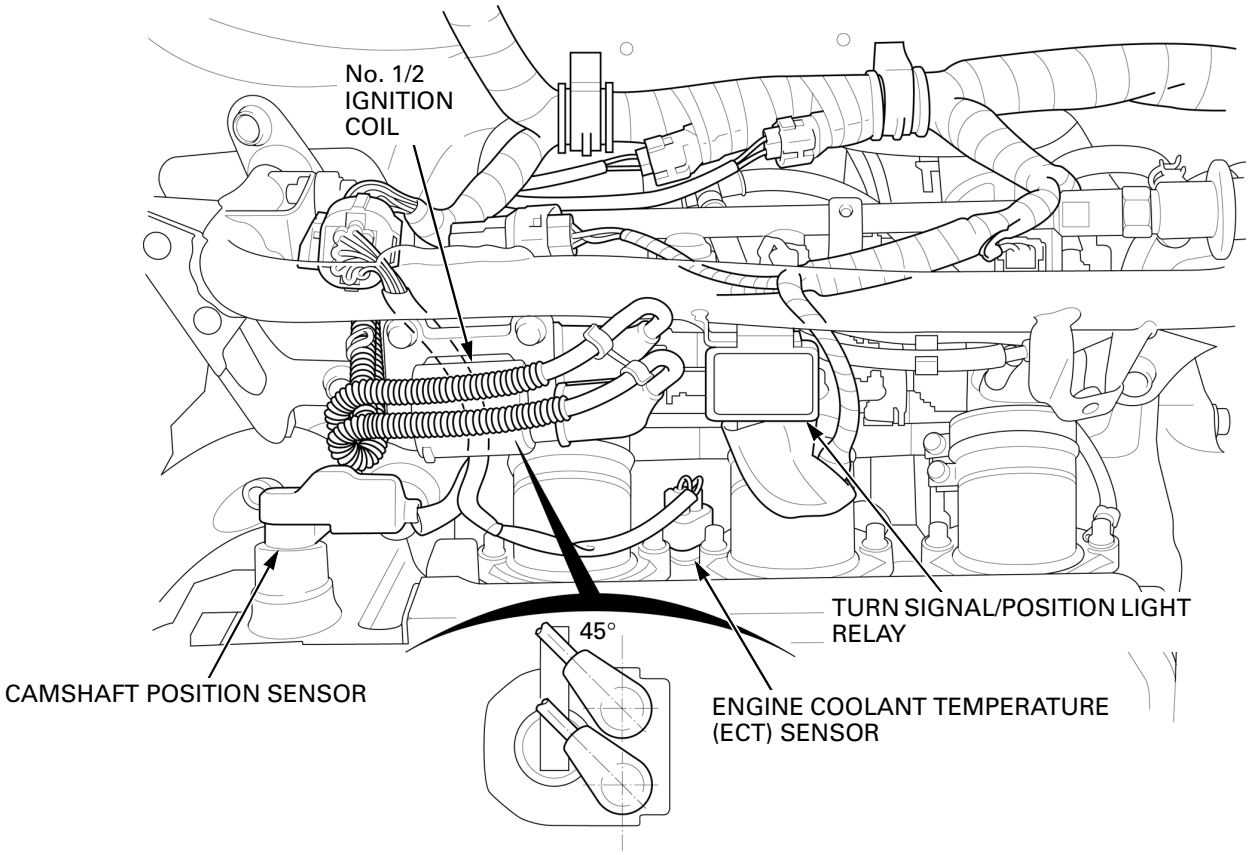

LEVER BRAKE HOSE
PEDAL BRAKE HOSE

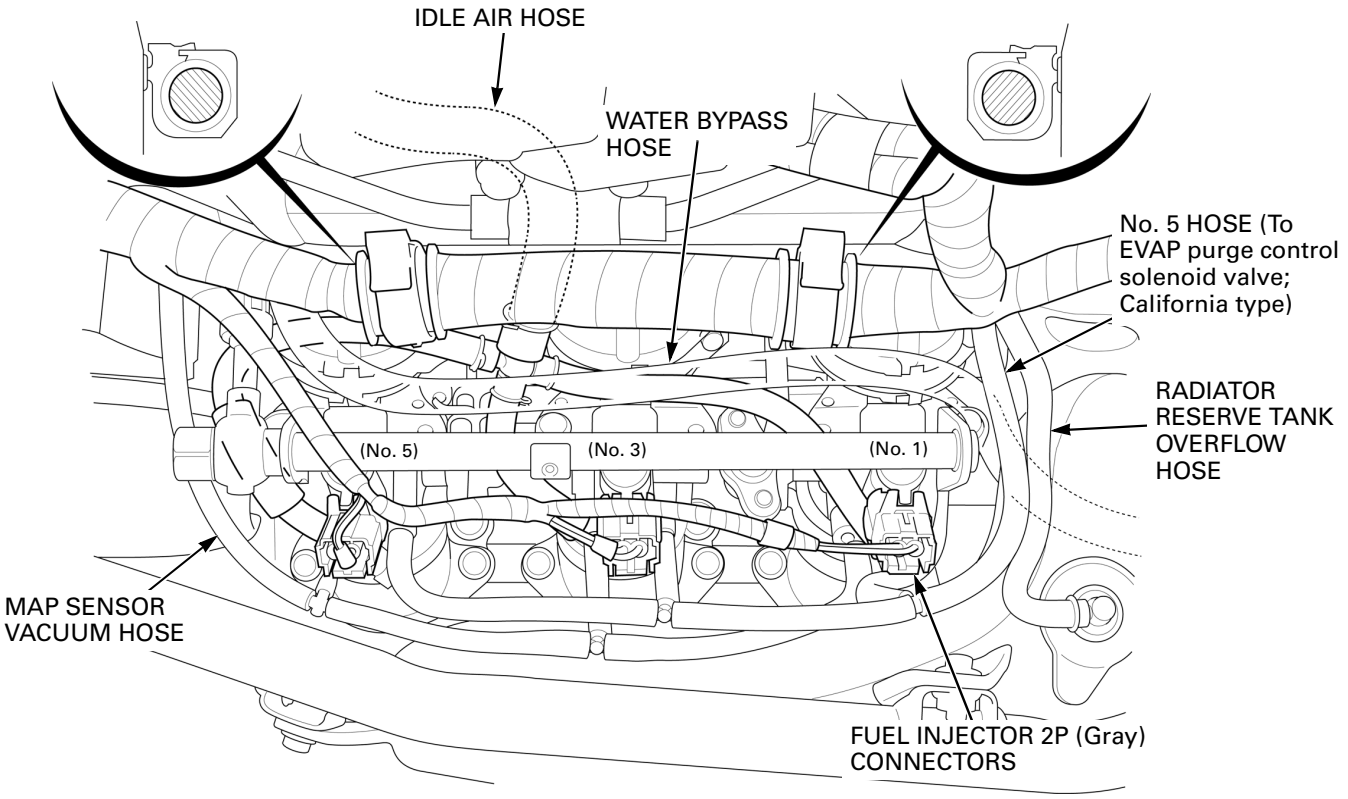

LEVER BRAKE HOSE
PEDAL BRAKE HOSE

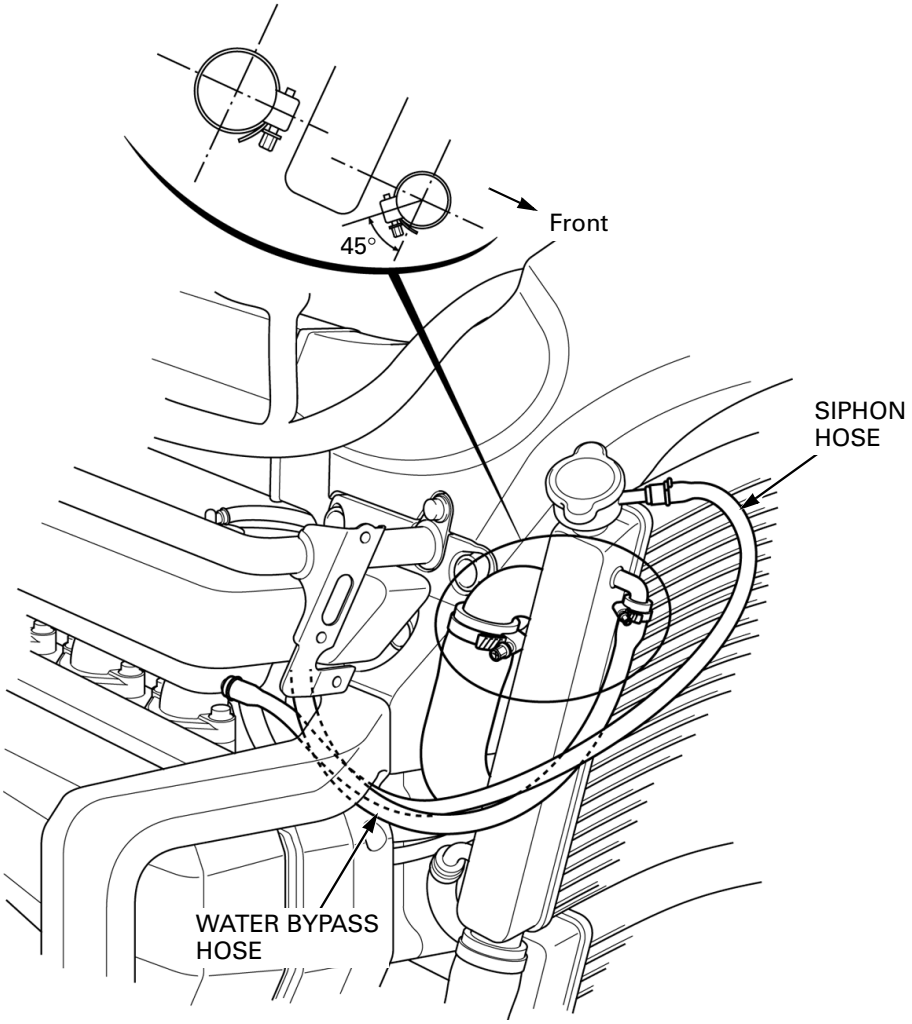

GROUND TERMINAL
FRONT SUB-WIRE HARNESS 20P (Black) CONNECTOR
CONNECTORS:
· Right handlebar switch 7P (Gray and Black) connectors
· Indicator 7P (Yellow and Green) connectors
30°
No. 5/6 IGNITION COIL
No. 6
No. 5
INTAKE DUCT CONTROL SOLENOID VALVE 2P (White) CONNECTOR
2P (Black)
PULSE SECONDARY AIR (PAIR) CONTROL SOLENOID VALVE
AIR SUPPLY HOSES (From air cleaner housing)
AIR SUPPLY HOSES (To engine)

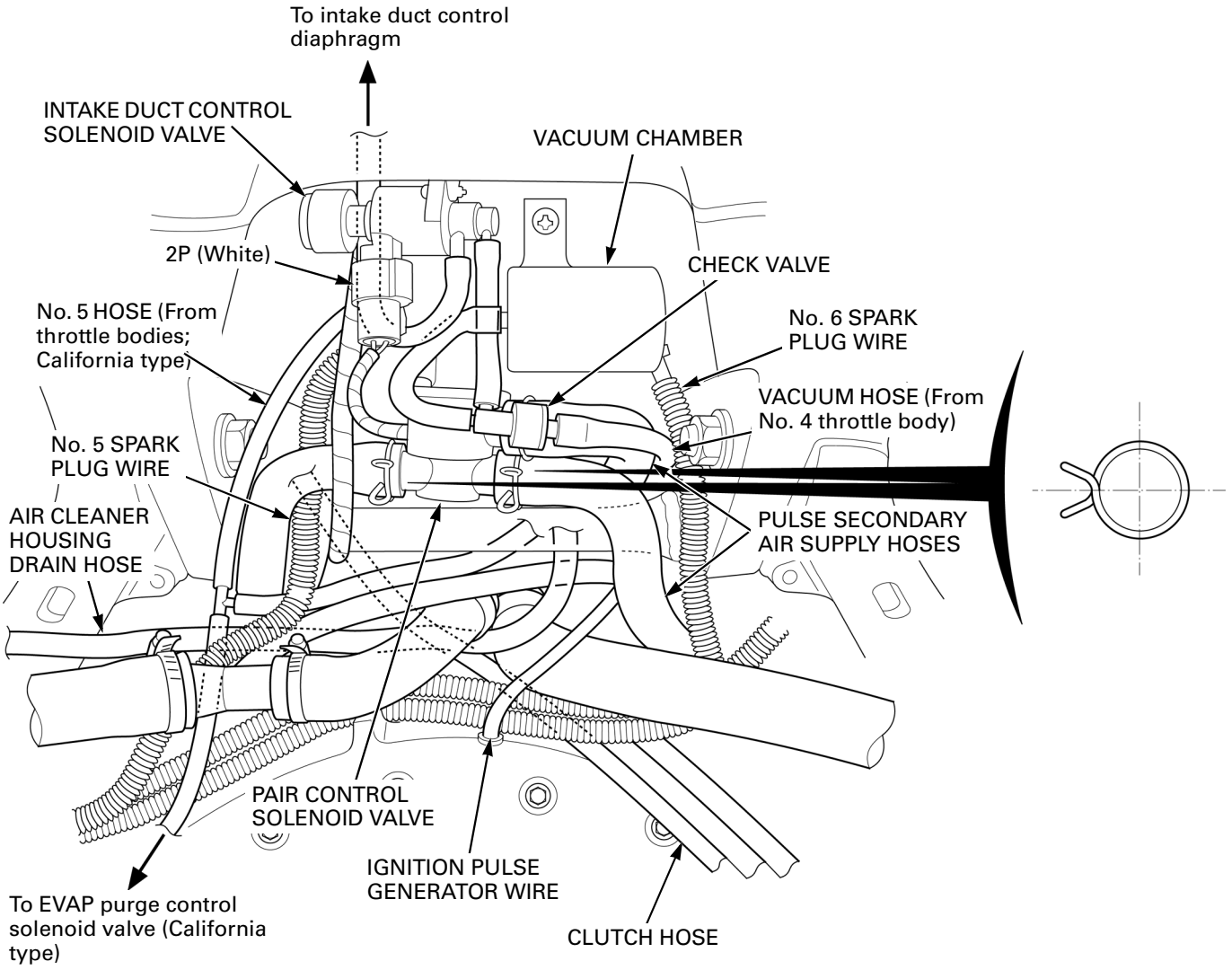

BANK ANGLE SENSOR RELAY
STARTER INHIBITOR RELAY
FUEL TANK STOPPER CABLE
FUEL PUMP RELAY
FAN CONTROL RELAY
HEADLIGHT RELAY
BRAKE PIPE
MAIN WIRE HARNESS

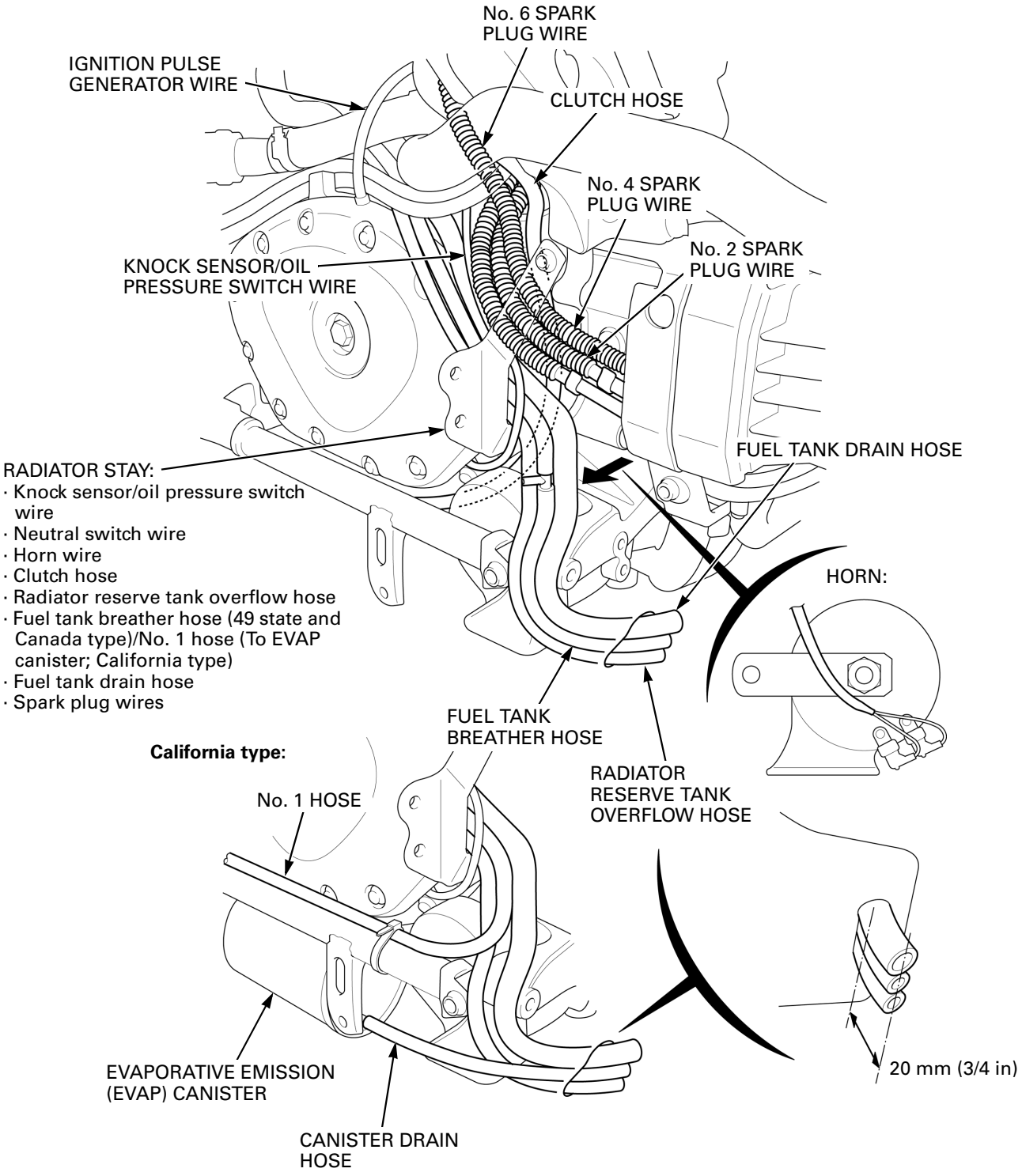

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
INTAKE AIR TEMPERATURE (IAT) SENSOR
2P (Black)
3P (Gray)
IGNITION PULSE GENERATOR 2P (Red) CONNECTOR
45°
NEUTRAL SWITCH 2P (Black) CONNECTOR
No. 3/4 IGNITION COIL
(No. 2)
(No. 4)
(No. 6)
THROTTLE POSITION (TP) SENSOR CONNECTOR
ENGINE SUB-HARNESS 10P (Gray) CONNECTOR
VACUUM HOSE (To intake duct control solenoid valve/ vacuum chamber)
SERVICE CHECK CONNECTOR
FUEL INJECTOR 2P (Gray) CONNECTORS
No. 5 HOSE (To EVAP purge control solenoid valve; California type)
MAP SENSOR VACUUM HOSE


No. 1/2 IGNITION COIL
TURN SIGNAL/POSITION LIGHT RELAY
45°
CAMSHAFT POSITION SENSOR
ENGINE COOLANT TEMPERATURE (ECT) SENSOR

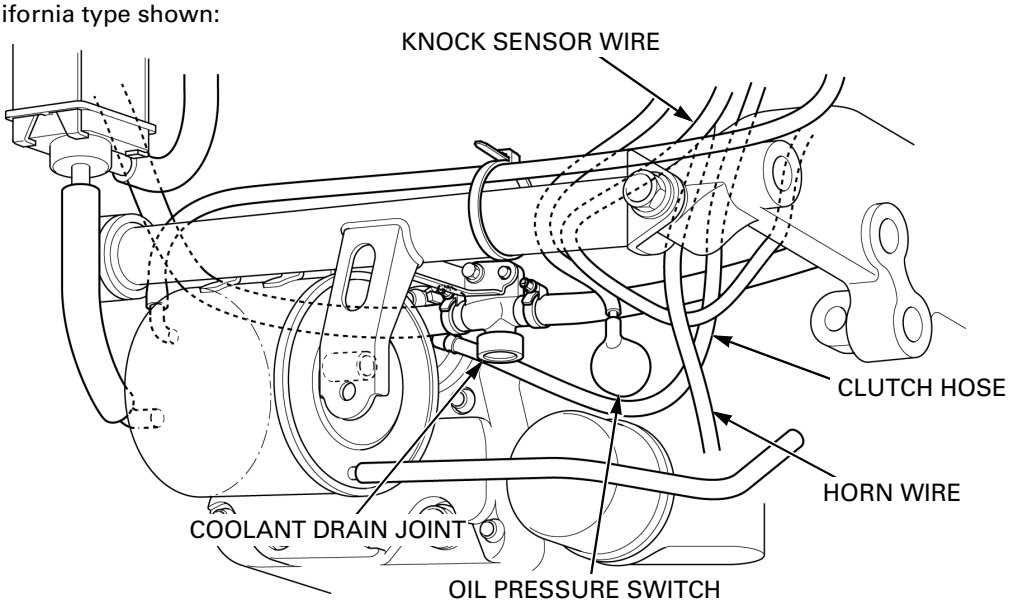

IDLE AIR HOSE
WATER BYPASS HOSE
No. 5 HOSE (To EVAP purge control solenoid valve; California type)
RADIATOR RESERVE TANK OVERFLOW HOSE
(No. 5)
(No. 3)
(No. 1)
MAP SENSOR VACUUM HOSE
FUEL INJECTOR 2P (Gray) CONNECTORS

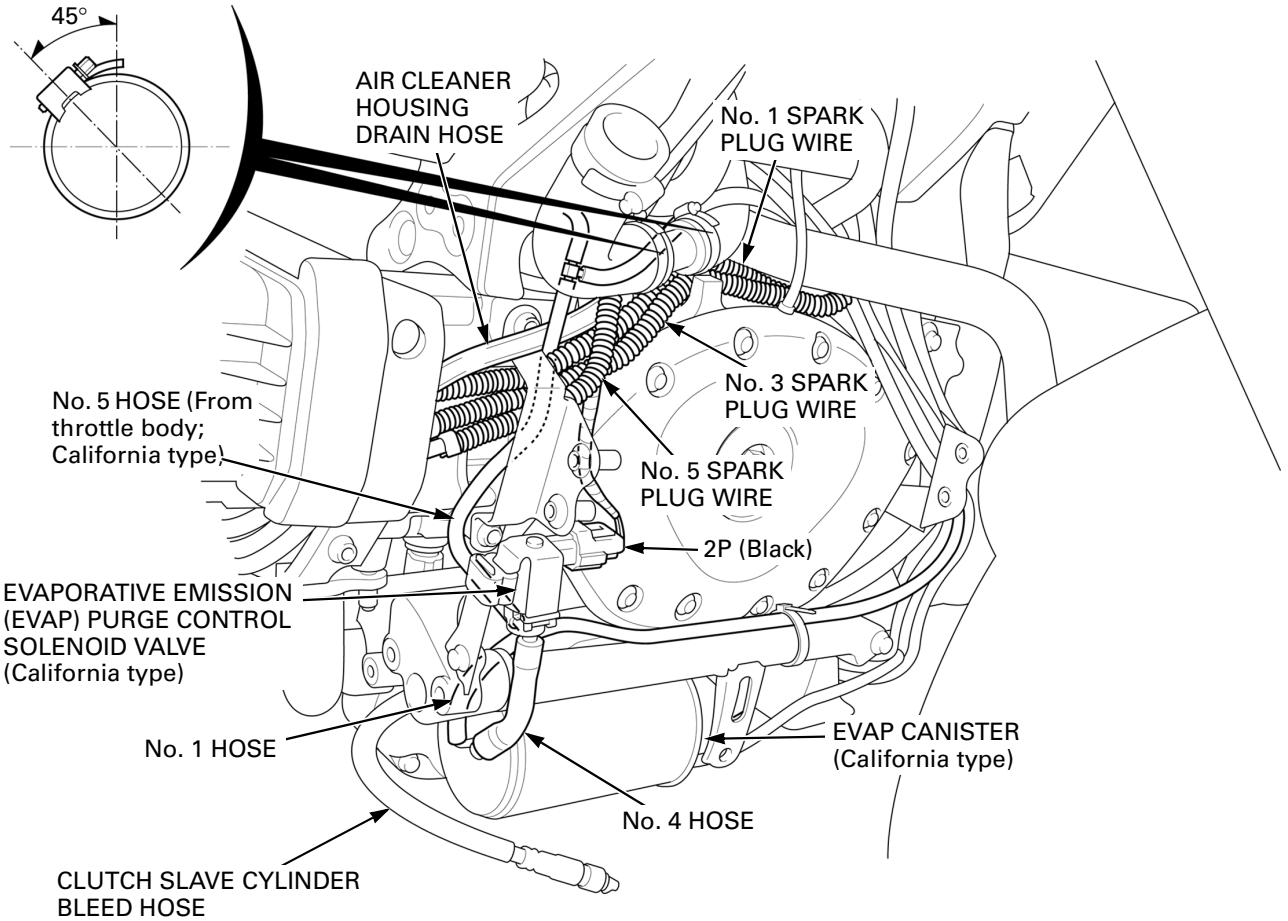

45°
Front
SIPHON HOSE
WATER BYPASS HOSE

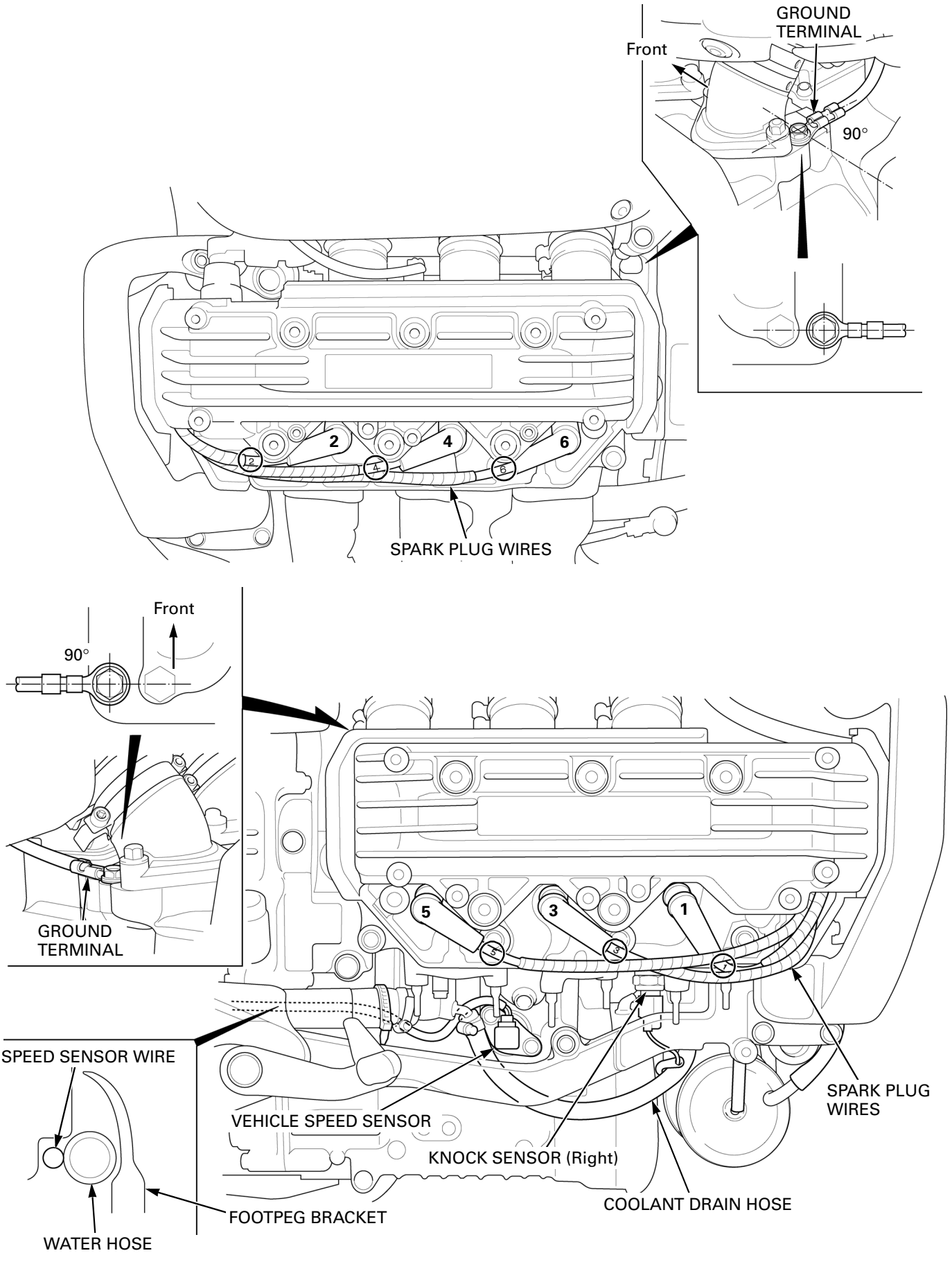

To intake duct control diaphragm
INTAKE DUCT CONTROL SOLENOID VALVE
VACUUM CHAMBER
2P (White)
CHECK VALVE
No. 5 HOSE (From throttle bodies; California type)
No. 6 SPARK PLUG WIRE
VACUUM HOSE (From No. 4 throttle body)
No. 5 SPARK PLUG WIRE
AIR CLEANER HOUSING DRAIN HOSE
PULSE SECONDARY AIR SUPPLY HOSES
PAIR CONTROL SOLENOID VALVE
IGNITION PULSE GENERATOR WIRE
To EVAP purge control solenoid valve (California type)
CLUTCH HOSE

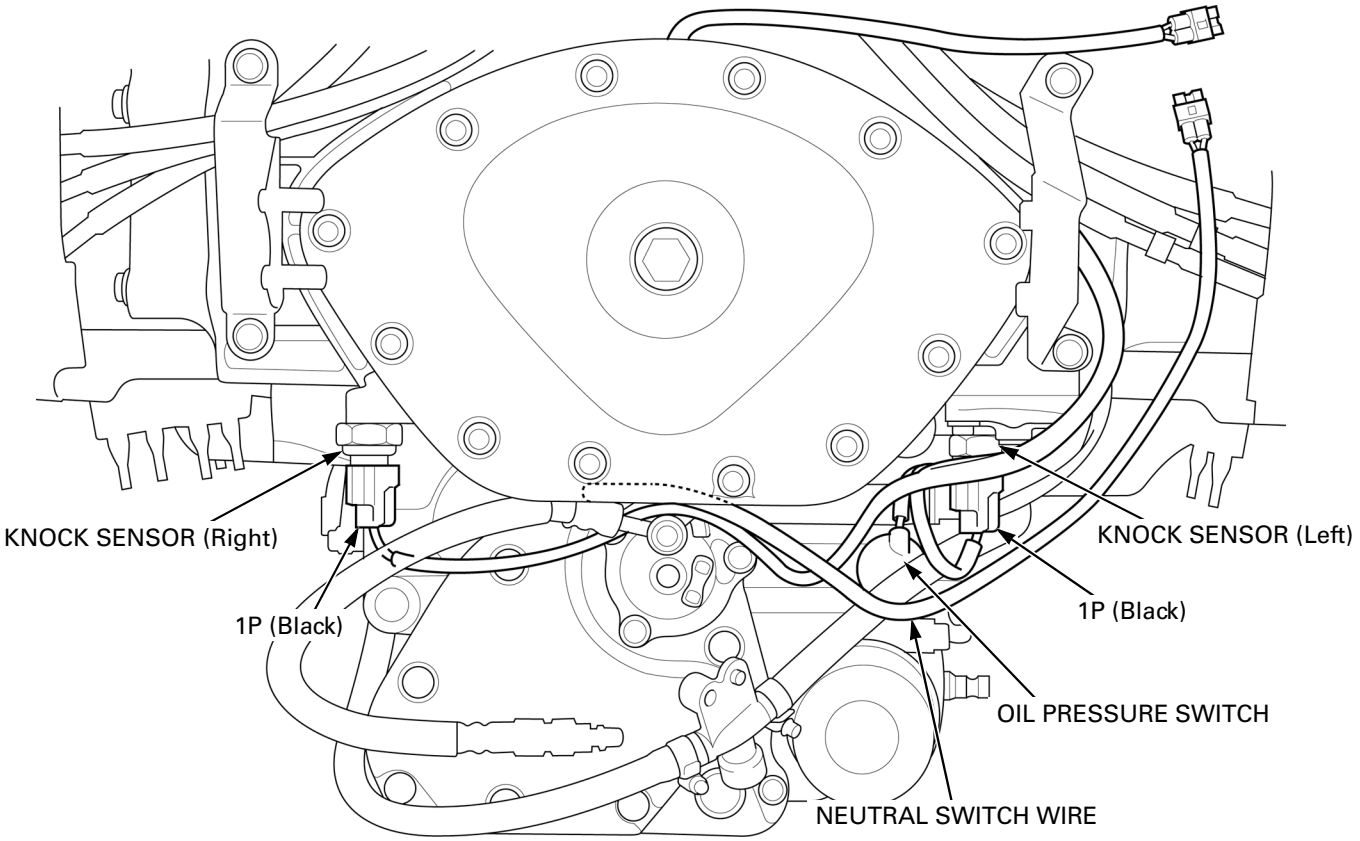

No. 6 SPARK PLUG WIRE
IGNITION PULSE GENERATOR WIRE
CLUTCH HOSE
No. 4 SPARK PLUG WIRE
No. 2 SPARK PLUG WIRE
KNOCK SENSOR/OIL PRESSURE SWITCH WIRE
FUEL TANK DRAIN HOSE
RADIATOR STAY:
· Knock sensor/oil pressure switch wire
· Neutral switch wire
· Horn wire
· Clutch hose
· Radiator reserve tank overflow hose
· Fuel tank breather hose (49 state and Canada type)/No. 1 hose (To EVAP canister; California type)
· Fuel tank drain hose
· Spark plug wires
HORN:
FUEL TANK BREATHER HOSE
RADIATOR RESERVE TANK OVERFLOW HOSE
California type:
No. 1 HOSE
EVAPORATIVE EMISSION (EVAP) CANISTER
CANISTER DRAIN HOSE
20 mm (3/4 in)

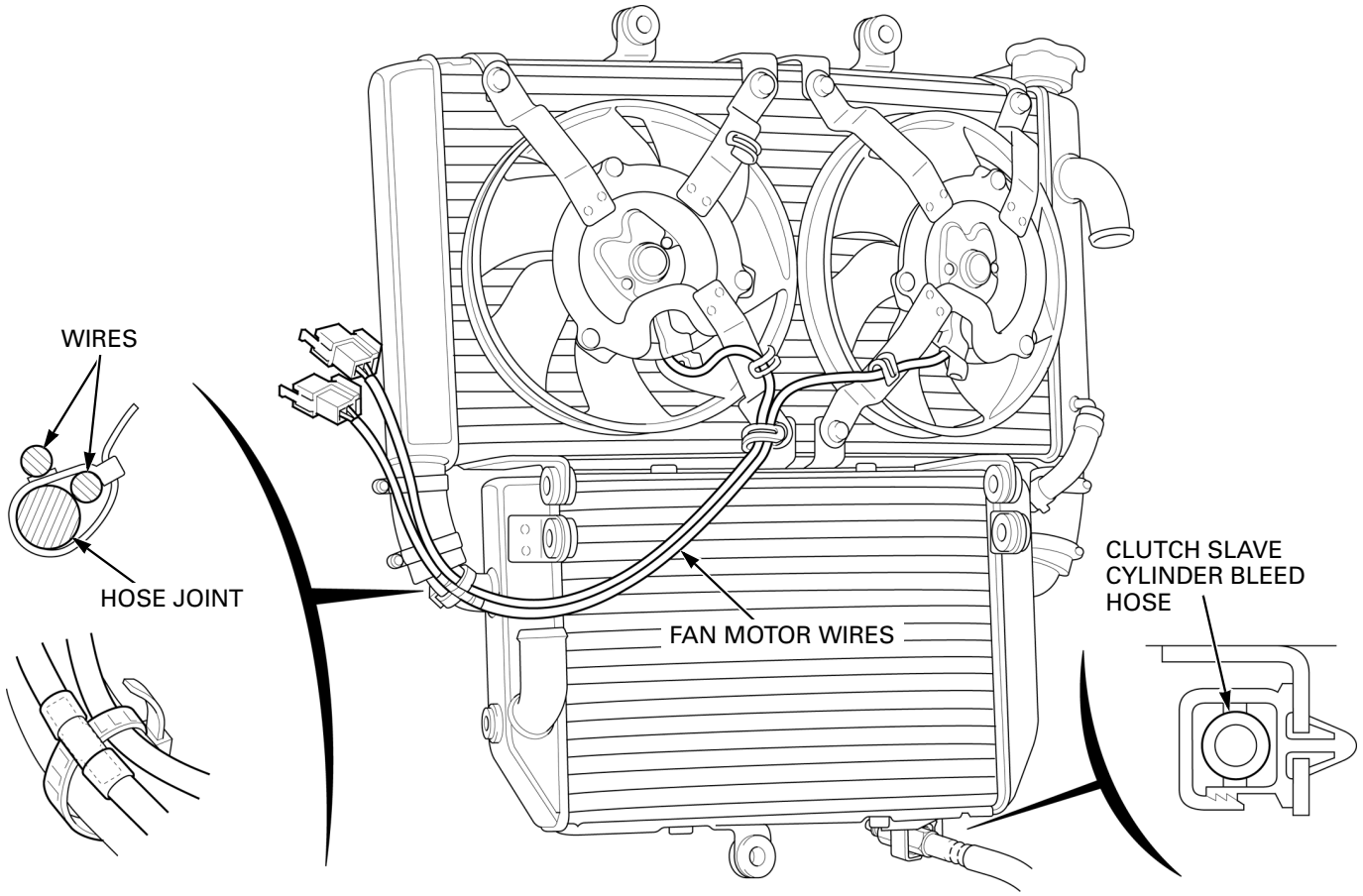
California type shown:

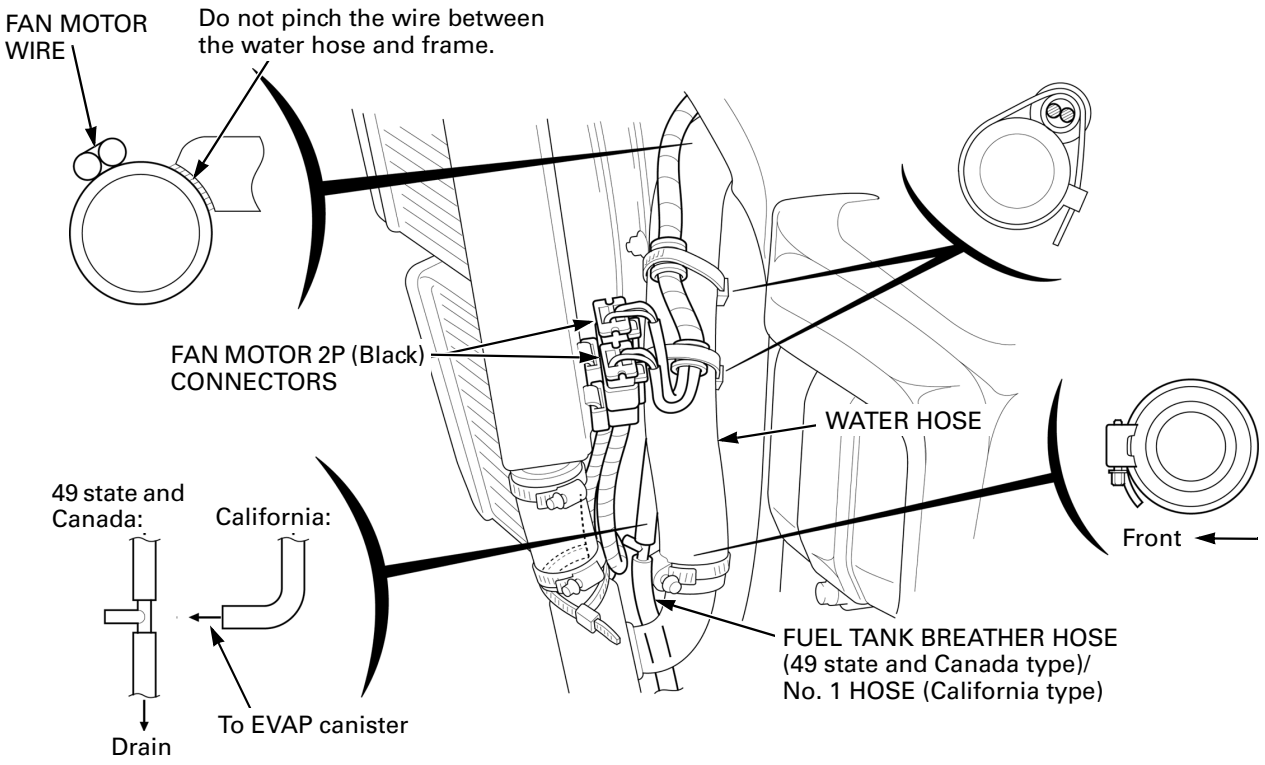


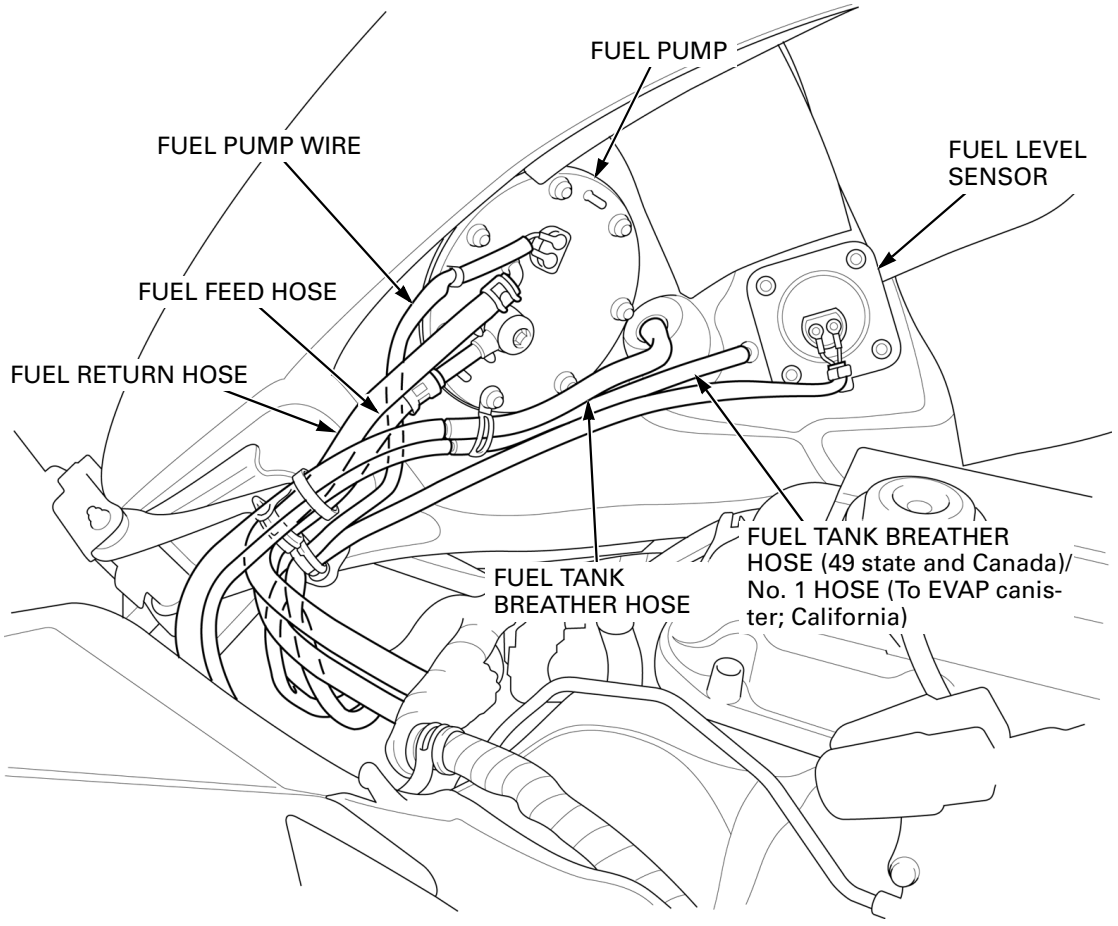


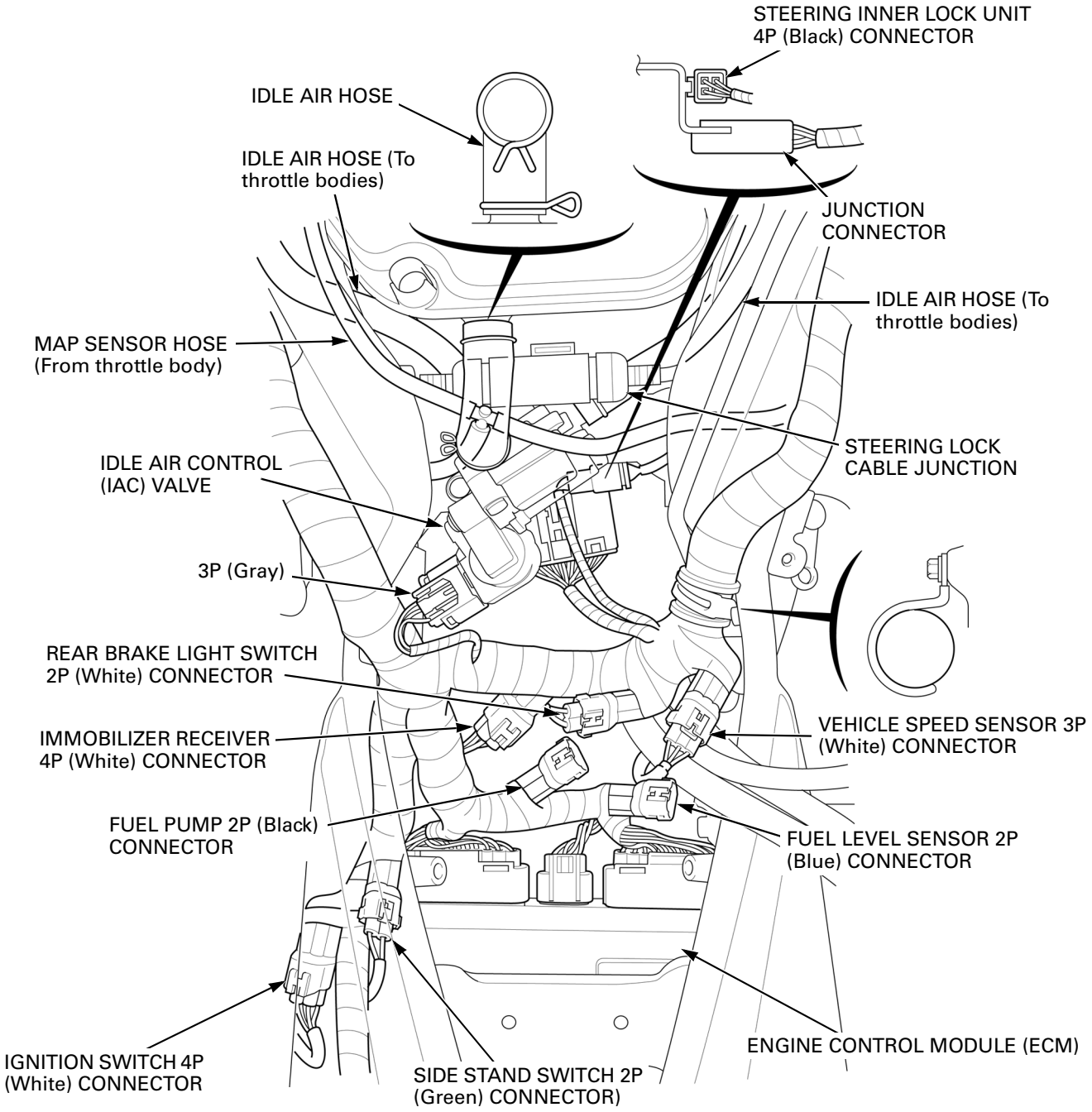

GROUND TERMINAL
Front
90°
2
4
6
SPARK PLUG WIRES
Front
90°
GROUND TERMINAL
5
3
1
SPEED SENSOR WIRE
VEHICLE SPEED SENSOR
KNOCK SENSOR (Right)
SPARK PLUG WIRES
COOLANT DRAIN HOSE
FOOTPEG BRACKET
WATER HOSE

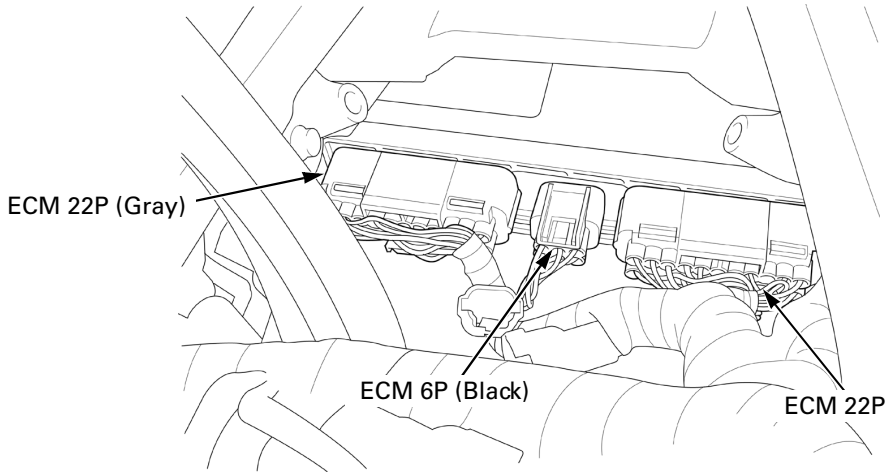

KNOCK SENSOR (Right)
1P (Black)
KNOCK SENSOR (Left)
1P (Black)
OIL PRESSURE SWITCH
NEUTRAL SWITCH WIRE

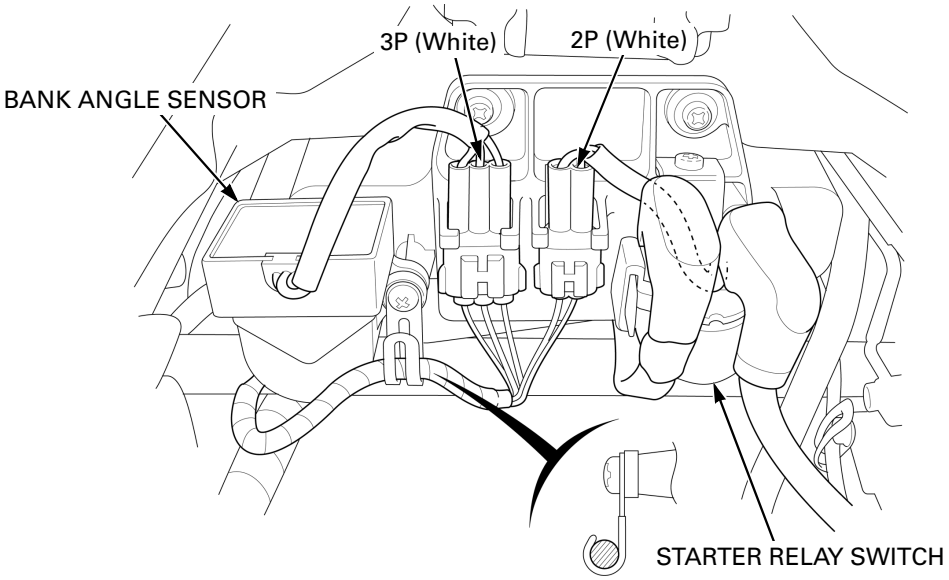

WIRES
HOSE JOINT
FAN MOTOR WIRES
CLUTCH SLAVE CYLINDER BLEED HOSE

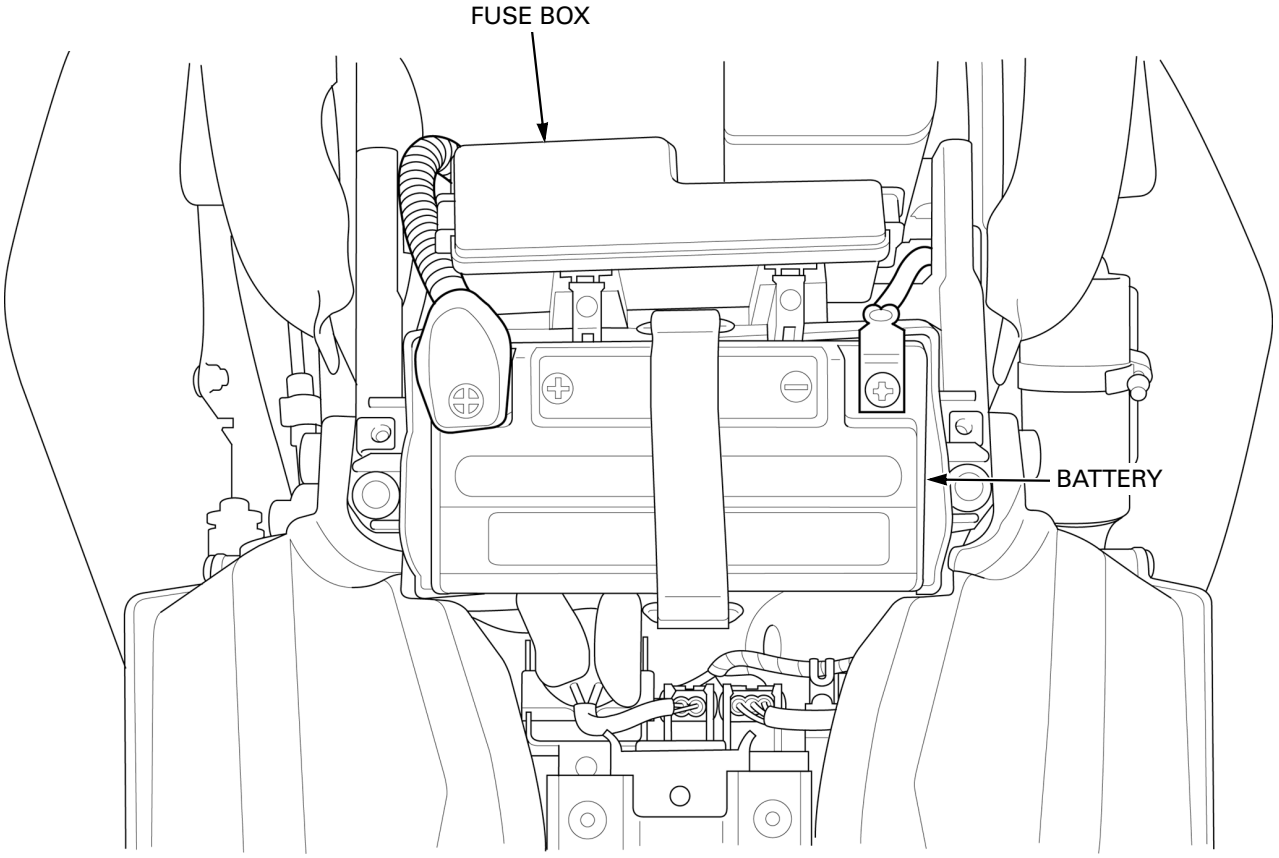

FAN MOTOR WIRE
Do not pinch the wire between the water hose and frame.
FAN MOTOR 2P (Black) CONNECTORS
WATER HOSE
Front
49 state and Canada:
California:
Drain
To EVAP canister
FUEL TANK BREATHER HOSE (49 state and Canada type)/ No. 1 HOSE (California type)

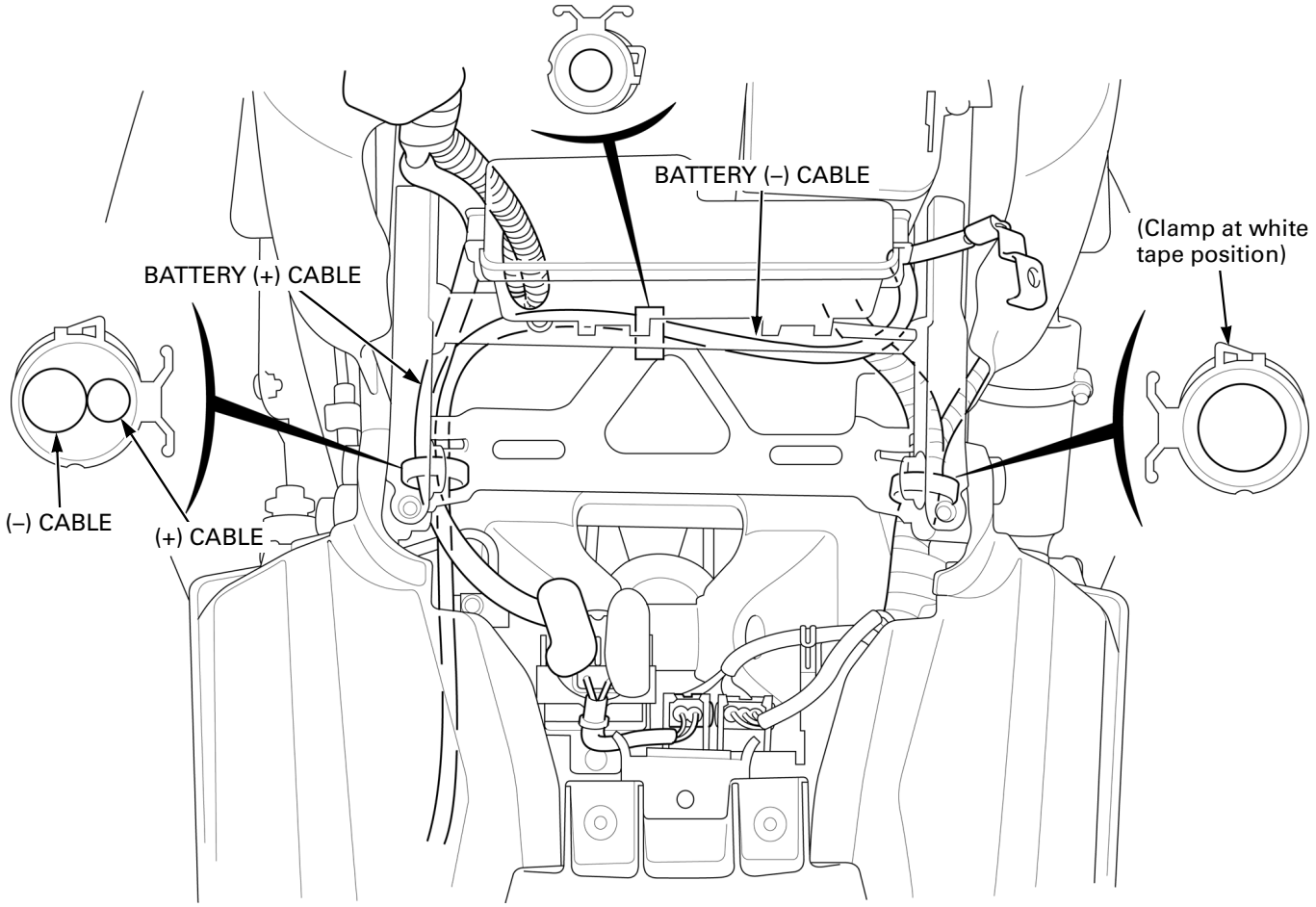

FUEL PUMP
FUEL PUMP WIRE
FUEL LEVEL SENSOR
FUEL FEED HOSE
FUEL RETURN HOSE
FUEL TANK BREATHER HOSE
FUEL TANK BREATHER HOSE (49 state and Canada)/ No. 1 HOSE (To EVAP canister; California)

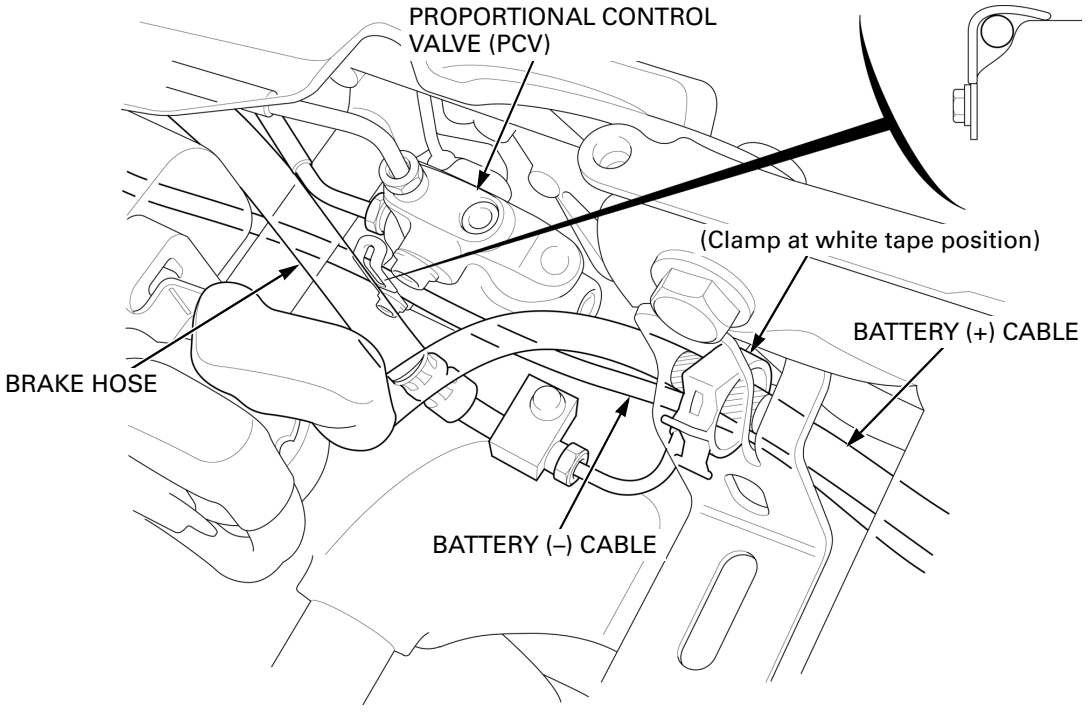

STEERING INNER LOCK UNIT
4P (Black) CONNECTOR
IDLE AIR HOSE
IDLE AIR HOSE (To
throttle bodies)
JUNCTION
CONNECTOR
IDLE AIR HOSE (To
throttle bodies)
MAP SENSOR HOSE
(From throttle body)
STEERING LOCK
CABLE JUNCTION
IDLE AIR CONTROL
(IAC) VALVE
3P (Gray)
REAR BRAKE LIGHT SWITCH
2P (White) CONNECTOR
VEHICLE SPEED SENSOR 3P
(White) CONNECTOR
IMMOBILIZER RECEIVER
4P (White) CONNECTOR
FUEL PUMP 2P (Black)
CONNECTOR
FUEL LEVEL SENSOR 2P
(Blue) CONNECTOR
ENGINE CONTROL MODULE (ECM)
IGNITION SWITCH 4P
(White) CONNECTOR
SIDE STAND SWITCH 2P
(Green) CONNECTOR)

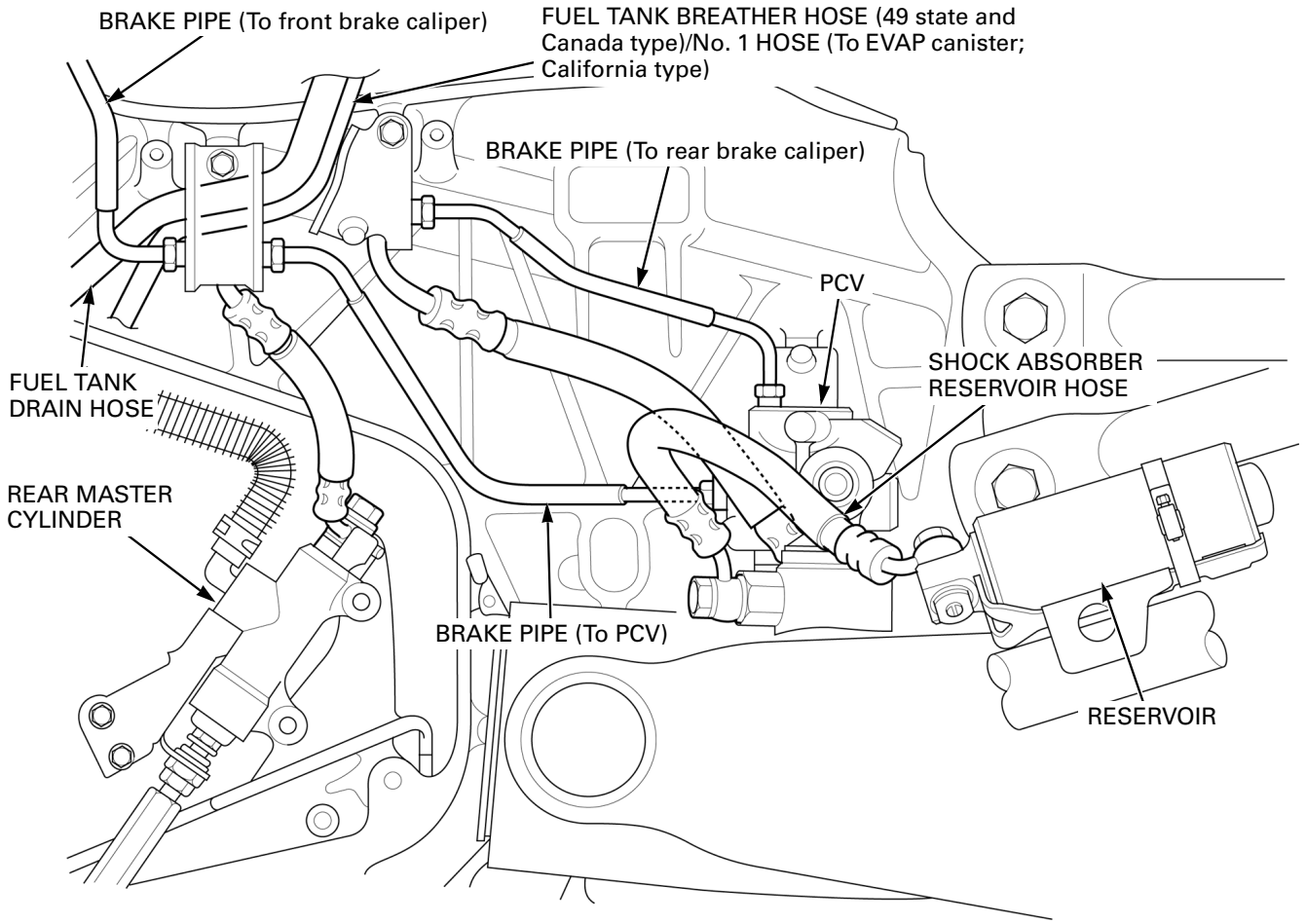

ECM 22P (Gray)
ECM 6P (Black)
ECM 22P (Black)

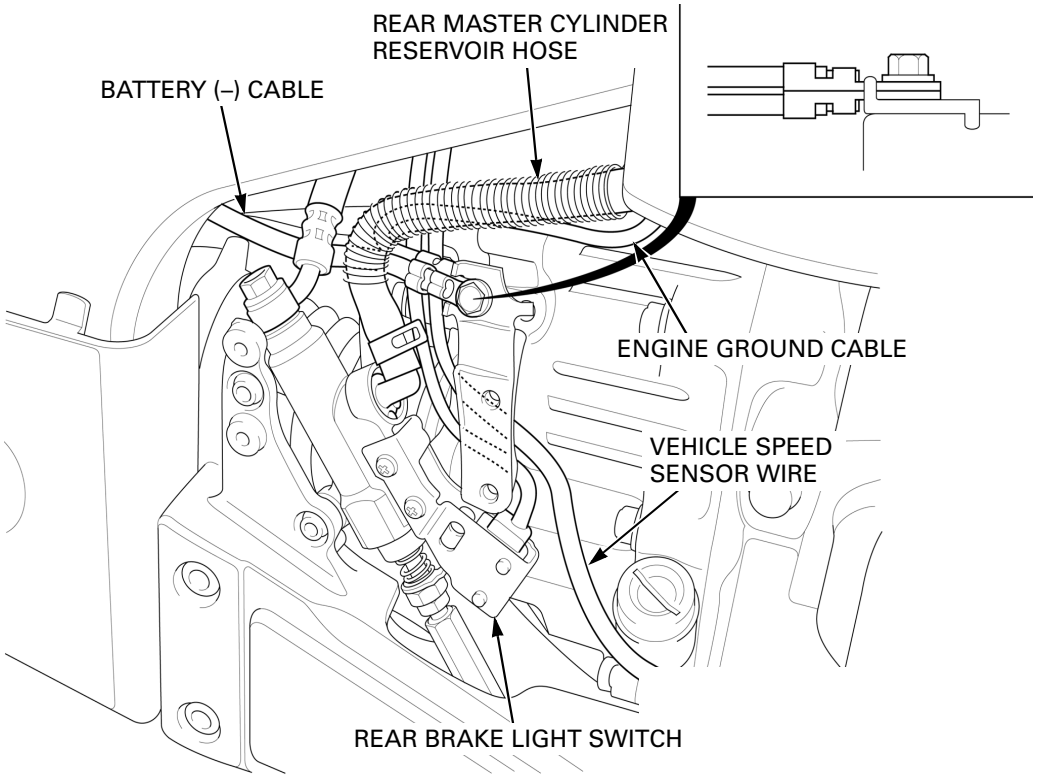

3P (White)
2P (White)
BANK ANGLE SENSOR
STARTER RELAY SWITCH

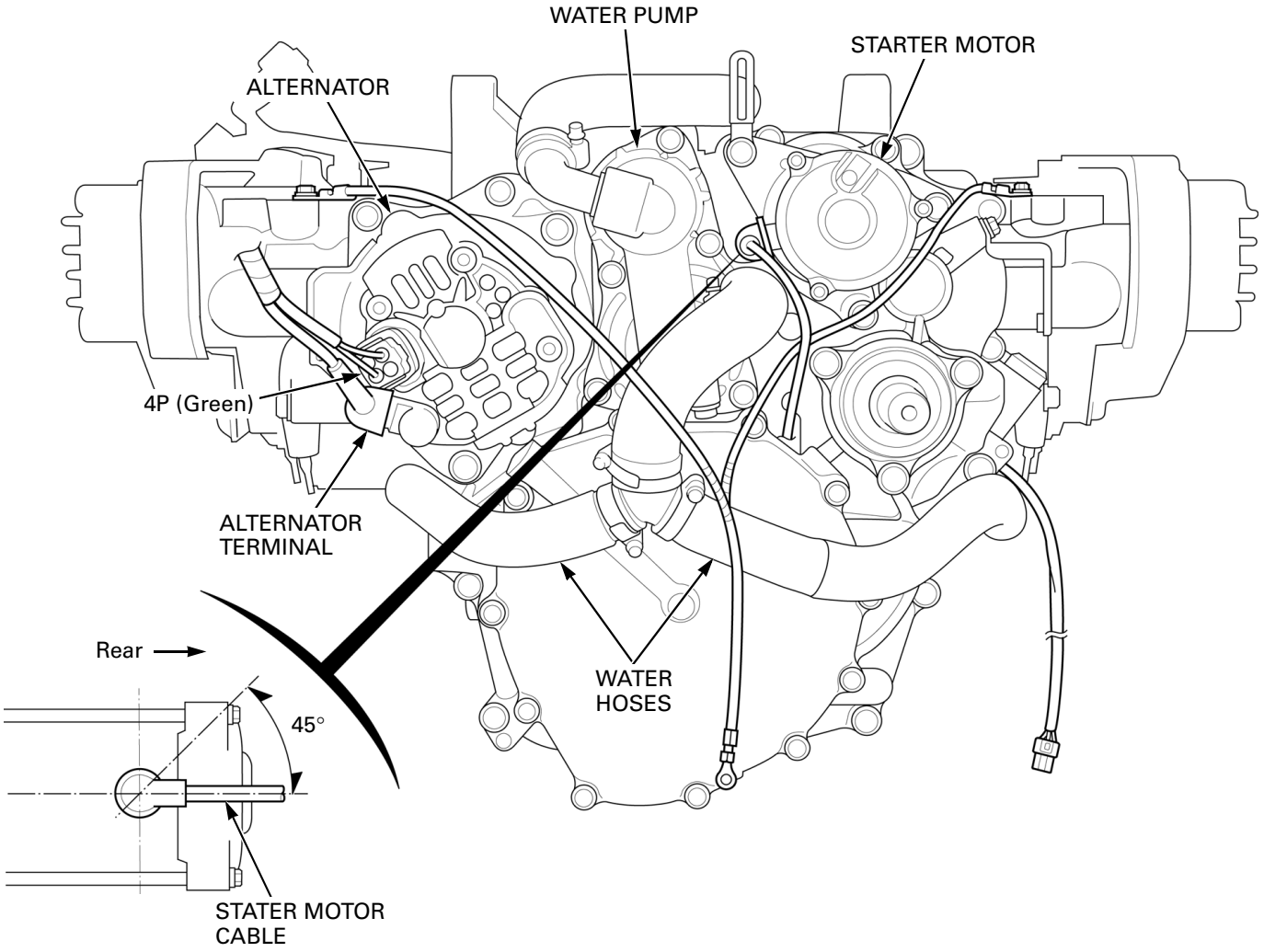

FUSE BOX
BATTERY

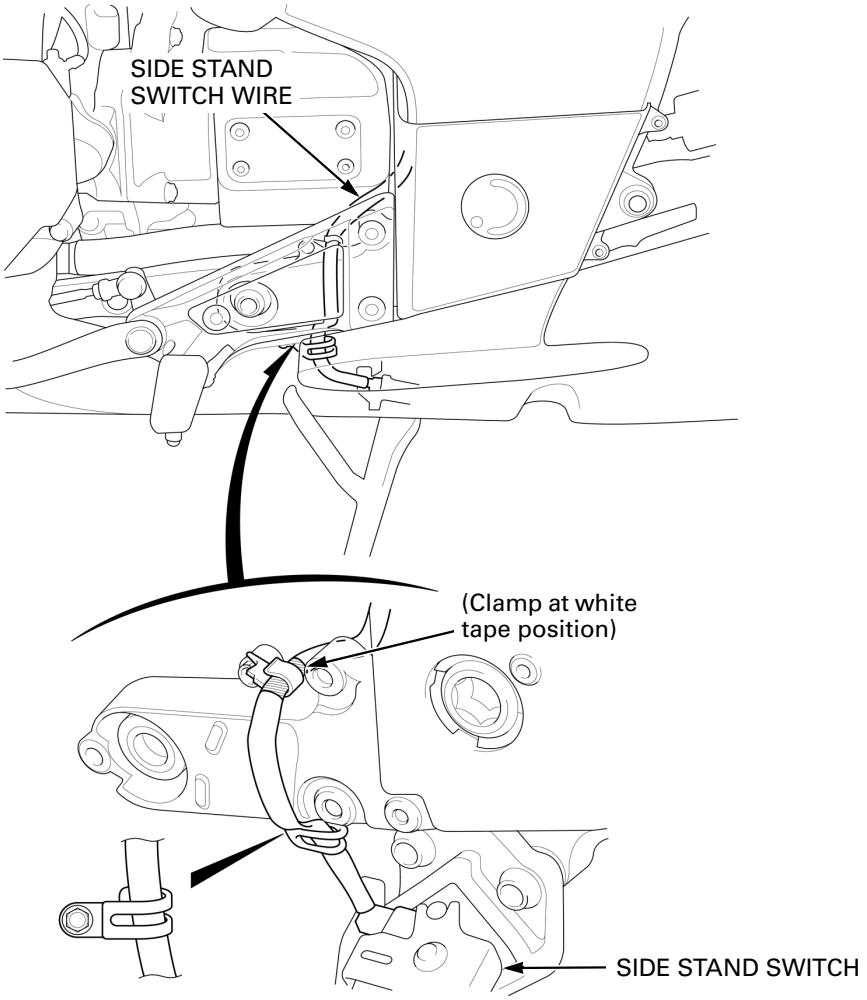

BATTERY (–) CABLE
(Clamp at white tape position)
BATTERY (+) CABLE
(–) CABLE
(+) CABLE

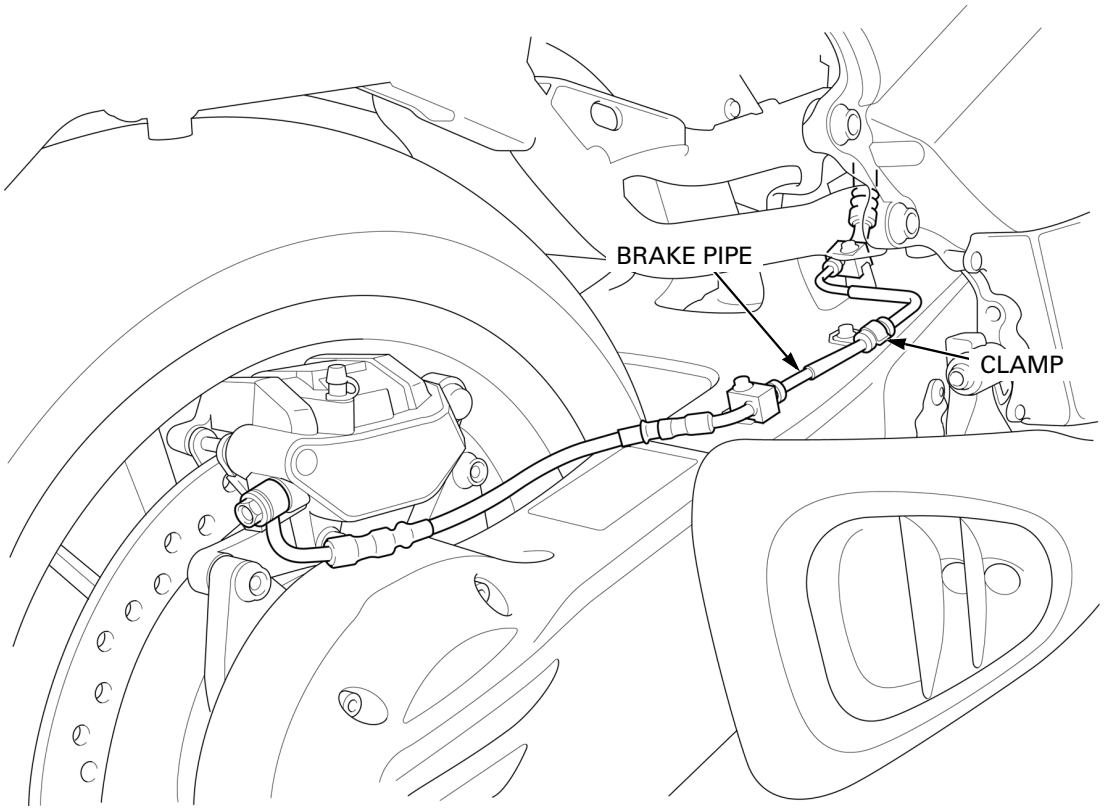

PROPORTIONAL CONTROL VALVE (PCV)
(Clamp at white tape position)
BATTERY (+) CABLE
BRAKE HOSE
BATTERY (–) CABLE

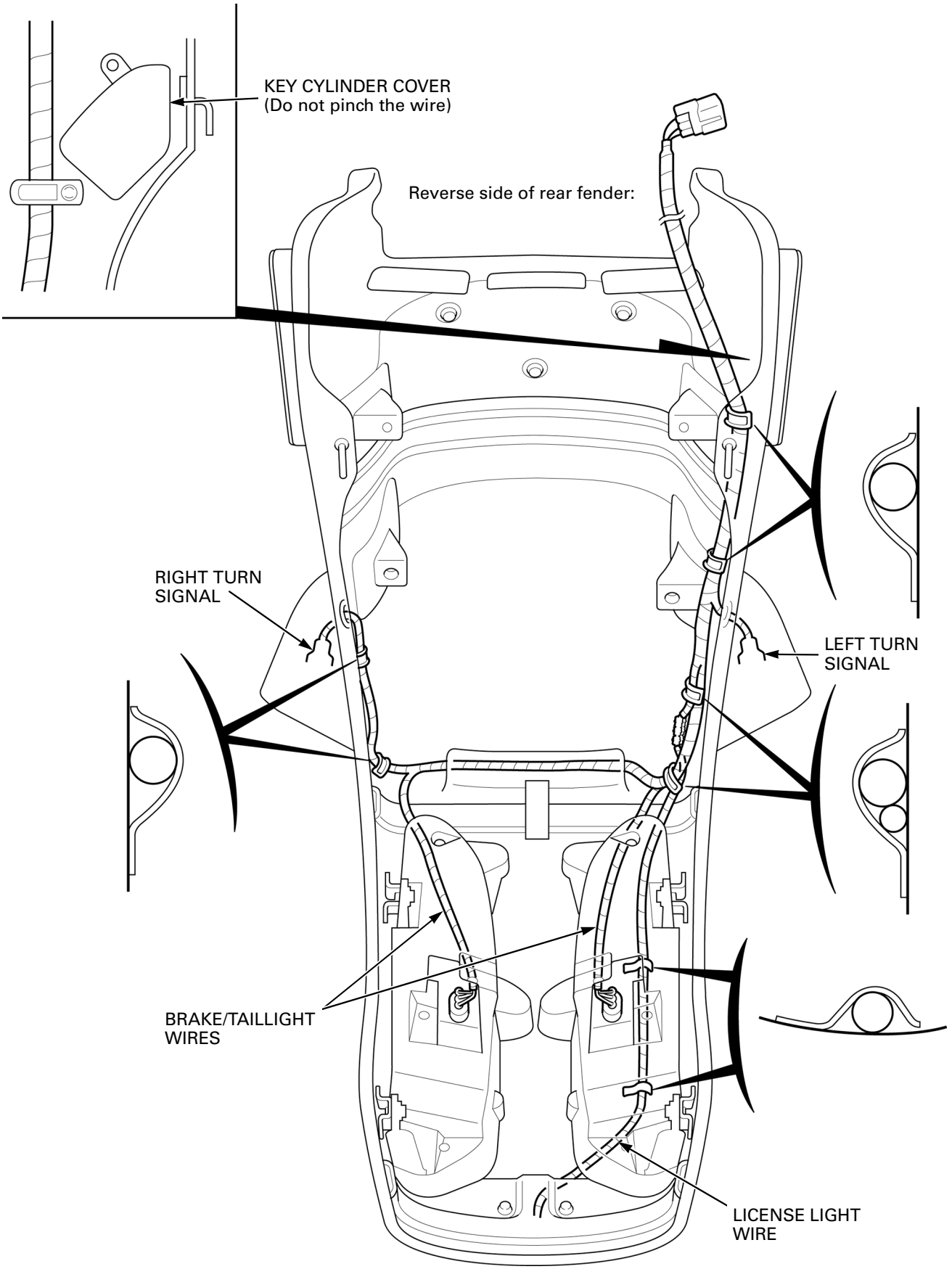

BRAKE PIPE (To front brake caliper)
FUEL TANK BREATHER HOSE (49 state and Canada type)/No. 1 HOSE (To EVAP canister; California type)
BRAKE PIPE (To rear brake caliper)
PCV
SHOCK ABSORBER RESERVOIR HOSE
FUEL TANK DRAIN HOSE
REAR MASTER CYLINDER
BRAKE PIPE (To PCV)
RESERVOIR

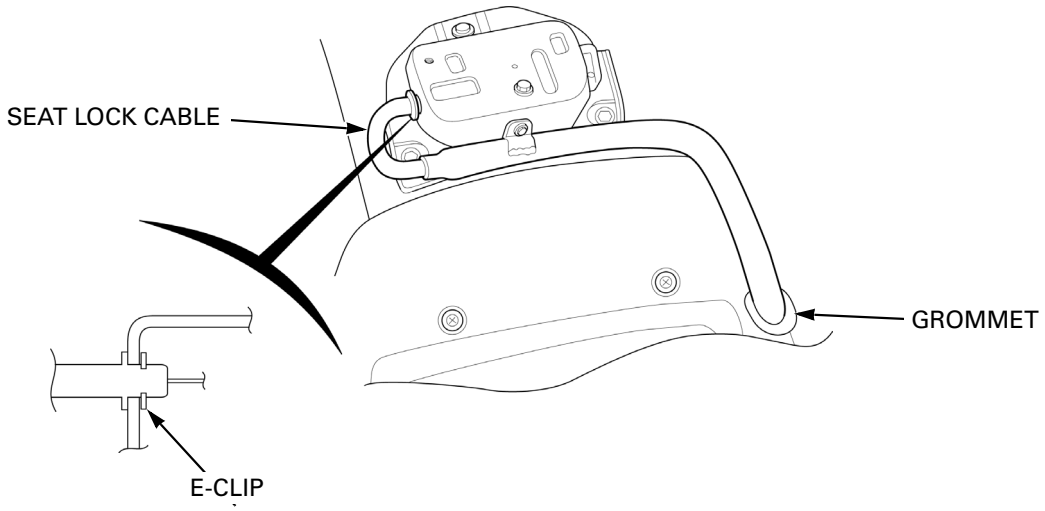

REAR MASTER CYLINDER RESERVOIR HOSE
BATTERY (–) CABLE
ENGINE GROUND CABLE
VEHICLE SPEED SENSOR WIRE
REAR BRAKE LIGHT SWITCH

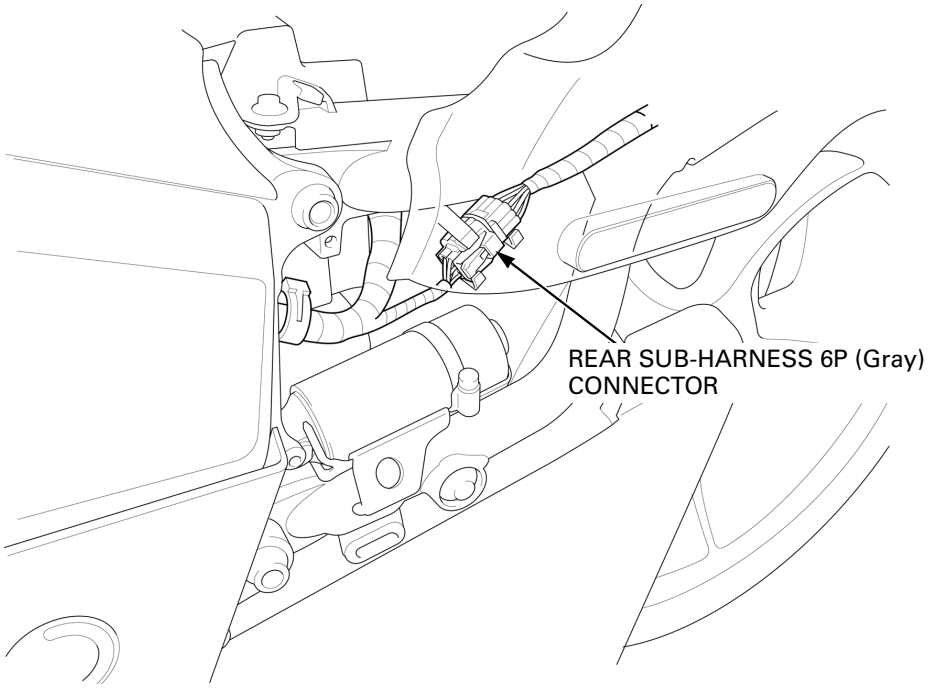

WATER PUMP
STARTER MOTOR
ALTERNATOR
4P (Green)
ALTERNATOR TERMINAL
Rear
45°
WATER HOSES
STATER MOTOR CABLE


SIDE STAND
SWITCH WIRE
(Clamp at white
tape position)
SIDE STAND SWITCH

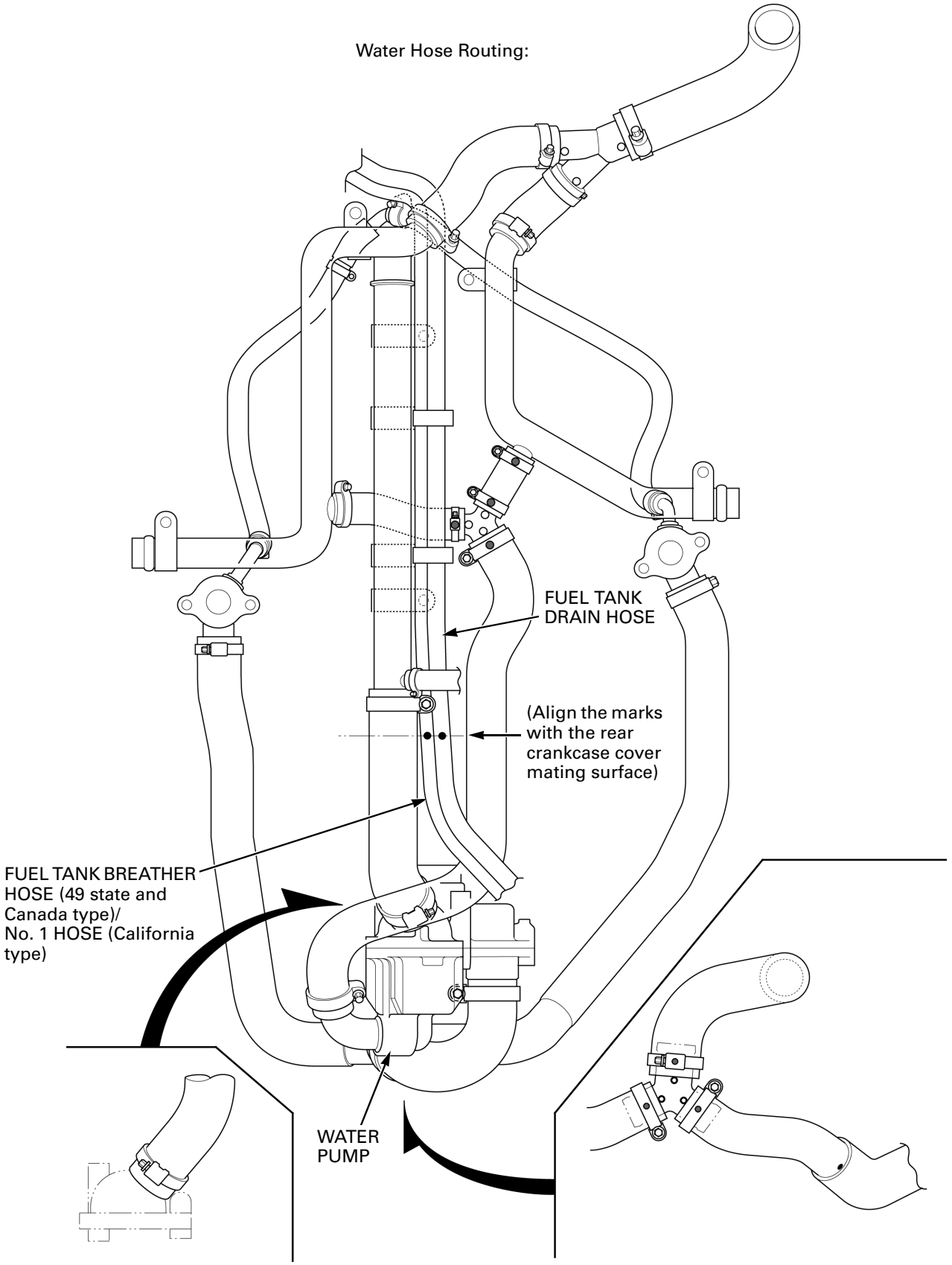

BRAKE PIPE
CLAMP


KEY CYLINDER COVER
(Do not pinch the wire)
Reverse side of rear fender:
RIGHT TURN
SIGNAL
LEFT TURN
SIGNAL
BRAKE/TAILLIGHT
WIRES
LICENSE LIGHT
WIRE


SEAT LOCK CABLE
GROMMET
E-CLIP


REAR SUB-HARNESS 6P (Gray)
CONNECTOR

Water Hose Routing:



EMISSION CONTROL SYSTEMS

The U.S. Environmental Protection Agency, Transport Canada and California Air Resources Board (CARB) require manufacturers to certify that their motorcycles comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided, and that motorcycles built after January 1, 1983 comply with applicable noise emission standards for one year or 6,000 km (3,730 miles) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided. Compliance with the terms of the Distributor's Limited Warranty for Honda Motorcycle Emission Control Systems is necessary in order to keep the emissions system warranty in effect.

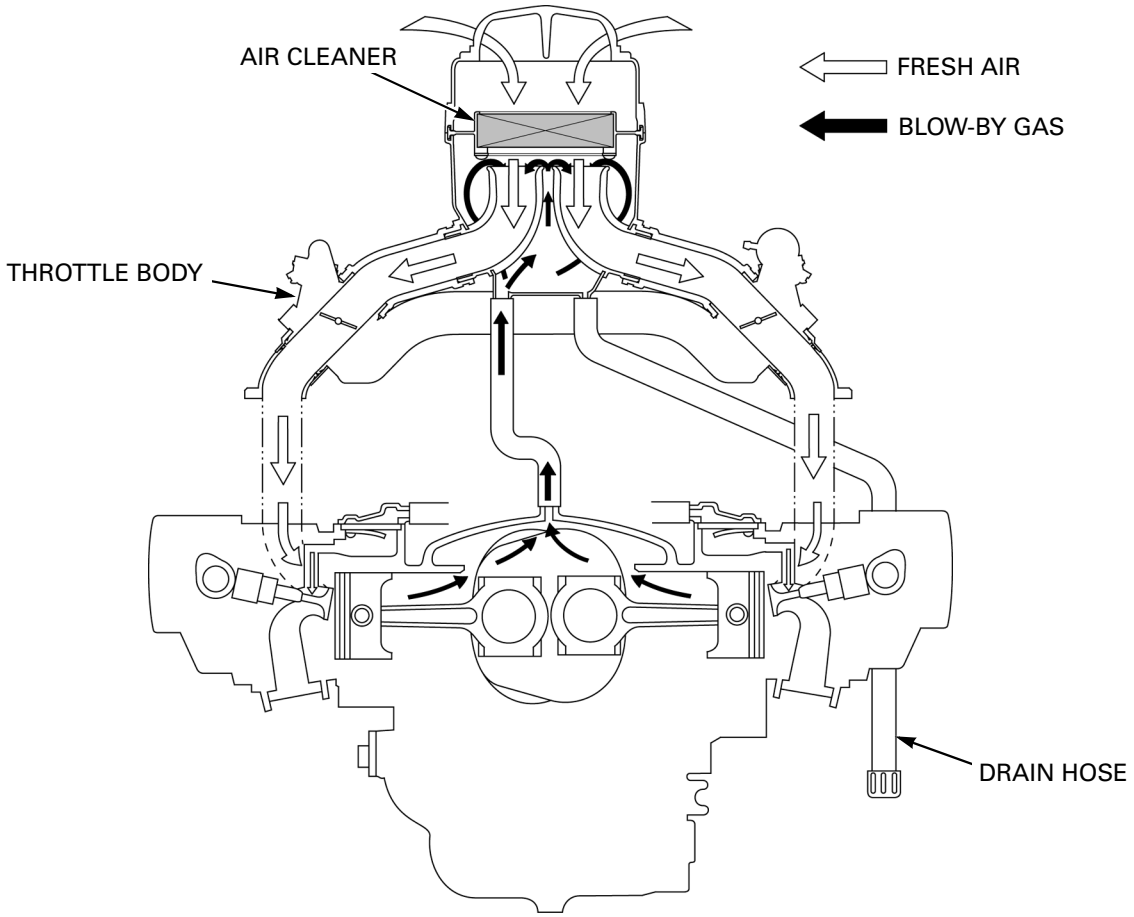
SOURCE OF EMISSIONS

The combustion process produces carbon monoxide, hydrocarbons and oxides of nitrogen. Control of hydrocarbons and oxides of nitrogen is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but is toxic.

Honda Motor Co., Ltd., utilizes PGM-FI, two three-way catalytic converters (one in each exhaust pipe) and two heated oxygen sensors (one in each exhaust pipe) to reduce carbon monoxide, hydrocarbons, and oxides of nitrogen.

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.



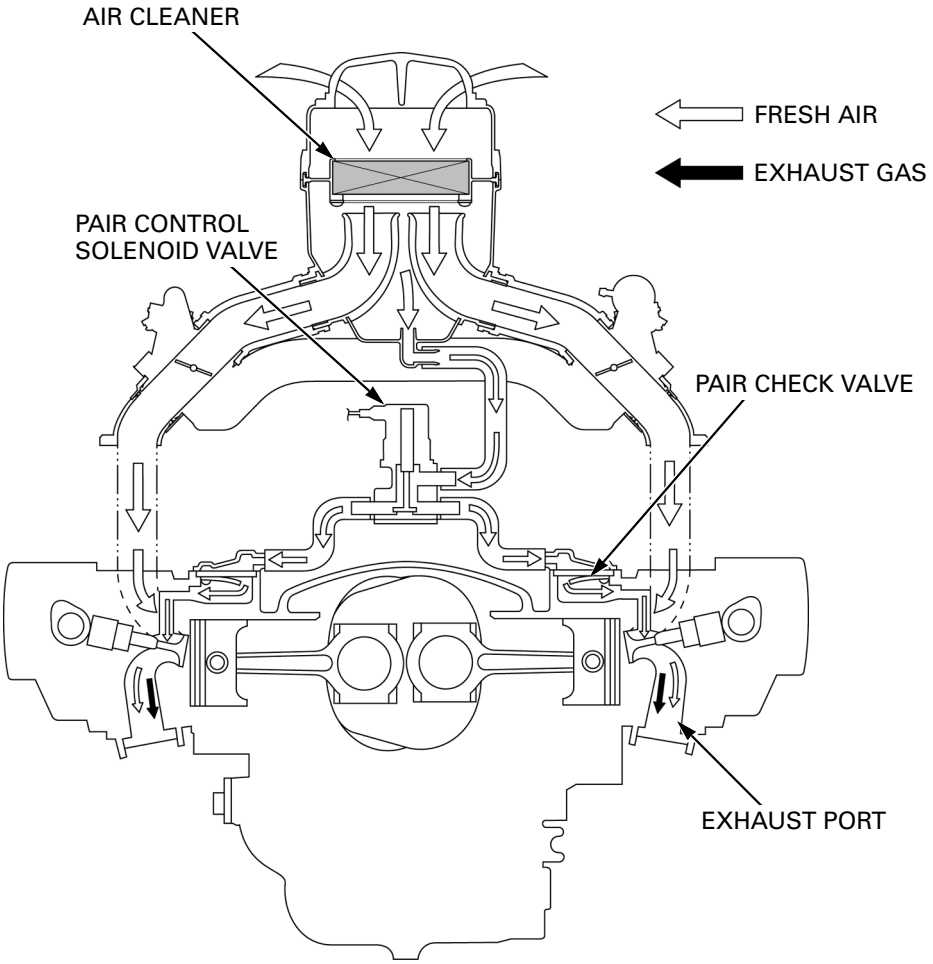
EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM)

The exhaust emission system is composed of a lean fuel injection setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crankcase emission control system.

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port by the function of the Pulse Secondary Air Injection (PAIR) control valve. This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

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

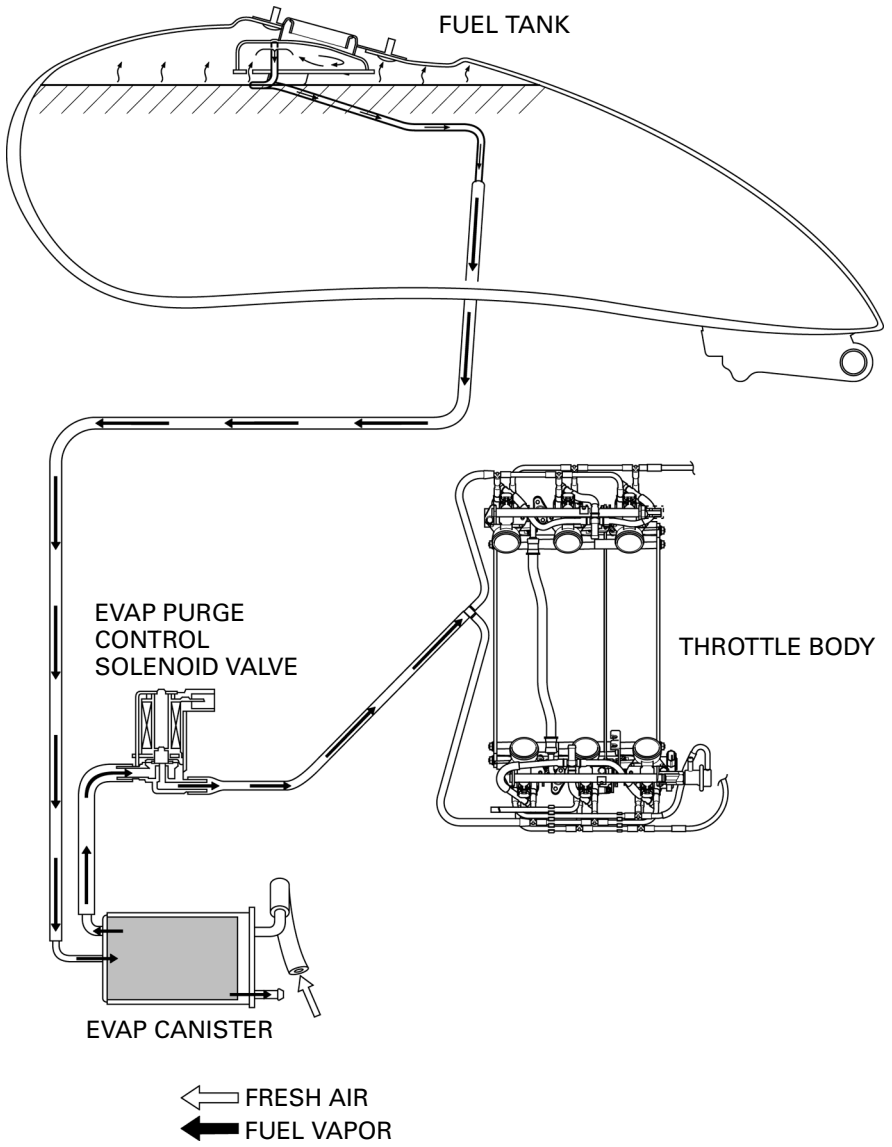
No adjustments to the secondary air supply system should be made, although periodic inspection of the components is recommended.



EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

This model complies with California Air Resources Board (CARB) evaporative emission requirements.

Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is absorbed and stored while the engine is stopped. When the engine is running and the EVAP purge control solenoid valve is open, fuel vapor in the EVAP canister is drawn into the engine through the throttle body.



NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE EMISSION CONTROL SYSTEM IS PROHIBITED: U.S. federal law prohibits, or Canadian provincial low may prohibit the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for the 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; or (2) the use of any 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:

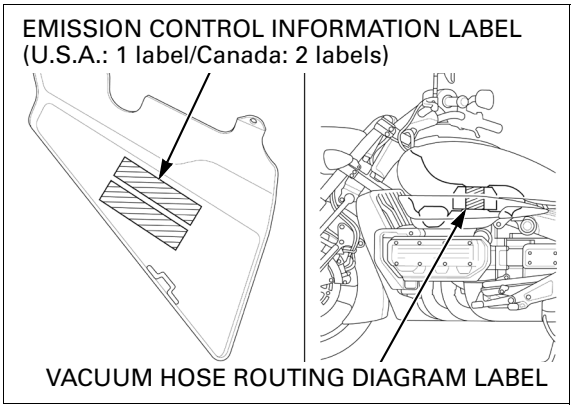
1. Removal of or puncturing of the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system,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

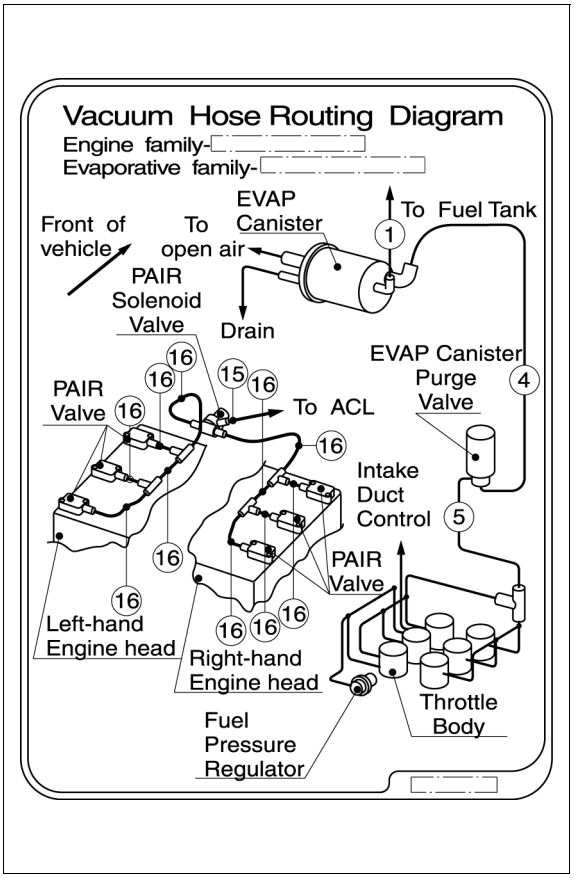
EMISSION CONTROL INFORMATION LABELS

An Emission Control Information Label is located on the reverse side of the left side cover as shown.
It gives basic tune-up specifications.

VACUUM HOSE ROUTING DIAGRAM LABEL (California type only)

The Vacuum Hose Routing Diagram Label is located on the left side of the frame.
The left front inner cover must be removed to read it (page 3-4).



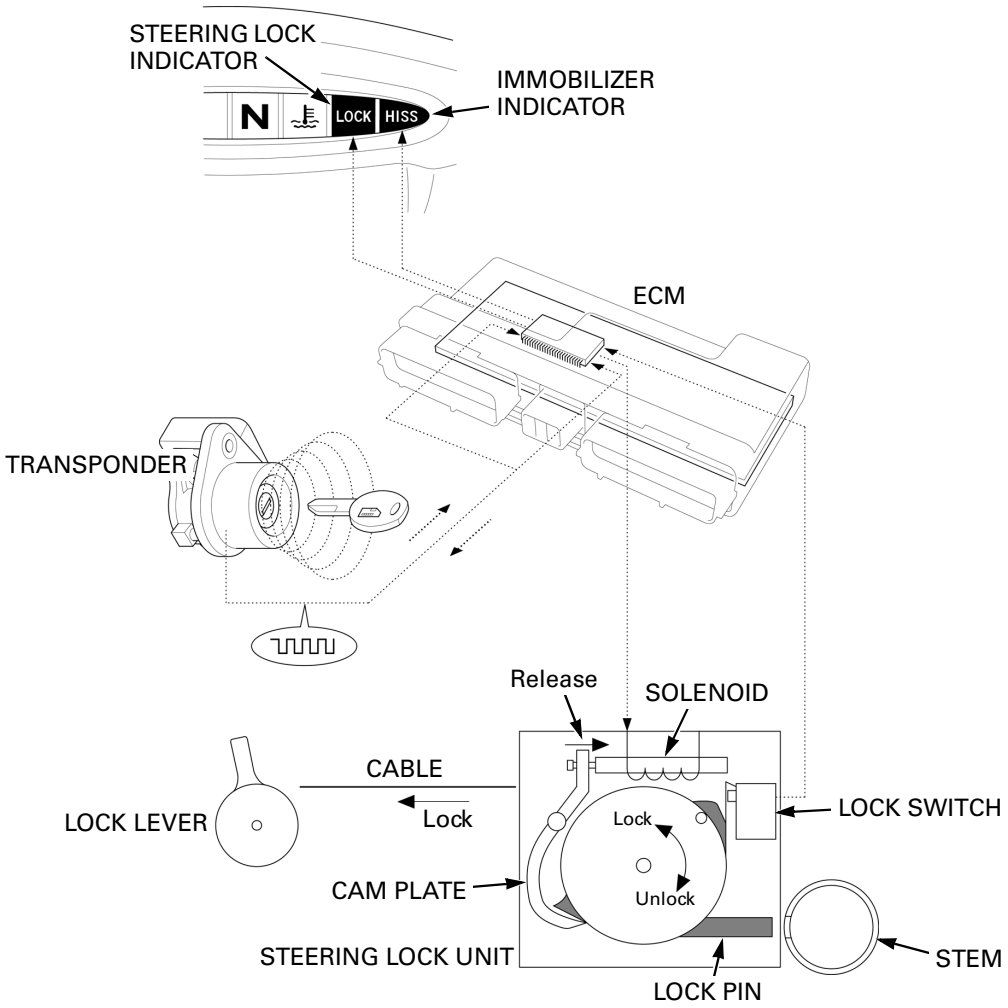


2. TECHNICAL FEATURE

STEERING LOCK-INTERLOCKING IMMOBILIZER SYSTEM

IMMOBILIZER SYSTEM

This motorcycle is equipped with an anti-theft immobilizer system. This feature functions without special operation.
The engine will not start unless the properly registered key is used. The immobilizer system consists of a transponder located in the ignition key, immobilizer receiver, immobilizer indicator, and engine control module (ECM).
When the ignition switch is turned "ON", the ECM sends power through the receiver to the transponder. The transponder sends a coded signal through the receiver to the ECM. When the code sent from the transponder matches the code registered in the ECM, the ECM begins to control the ignition system.
When the ignition switch is turned "ON" with the properly registered key and the ECM recognizes the code sent from the transponder, the immobilizer indicator lights for approximately 2 seconds then it goes out. If there is any problem in the system or the code is not recognized by the ECM, the indicator remains lit.



REMOTE STEERING LOCK

This model features a cable and solenoid operated steering stem lock. The lock lever is located near the ignition switch, on the left side of the main frame, under the seat. Pulling this lever locks the steering stem through a cable. A pulley in the steering lock unit rotates pushing the lock pin into the stem. The pulley is held in place by a cam plate.
When the ignition switch is turned "ON", a solenoid functions and the steering stem is unlocked (It is not necessary to operate the lock lever). When the immobilizer system recognizes the properly registered key, the ECM sends current to the solenoid, which operates the cam plate to disengage the pulley. The pulley is turned by a spring in the opposite direction of the locking cable, which withdraws the lock pin from the steering stem.
The lock switch detects the steering lock condition (i.e. lock pin inserted or withdrawn from the steering stem).
When the lock pin is withdrawn, the ECM turns the starter inhibitor relay on (page 19-2). The steering lock indicator lights when current is sent to the solenoid and it goes out after the lock pin is withdrawn from the steering stem completely.
The remote steering lock further enhances anti-theft security by integrating with the immobilizer system. The steering cannot be unlocked unless the properly coded key is inserted into the ignition switch and turned "ON".

To lock the steering:
Turn the handlebar to the left and pull the lock lever with the ignition switch turned "OFF".

To unlock the steering:
Turn the ignition switch "ON".

3. FRAME/BODY PANELS/EXHAUST SYSTEM

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 pipe gaskets after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust clamps first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Side cover bolt	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Sub-side cover bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Fuel tank top cover socket bolt	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Front inner cover screw	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Pivot cover bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Pivot cover cap bolt	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Exhaust pipe joint nut	10 N·m (1.0 kgf·m, 7 lbf·ft)
Muffler mounting bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Muffler band bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Exhaust pipe cover bolt	14 N·m (1.4 kgf·m, 10 lbf·ft)
Muffler cover bolt	14 N·m (1.4 kgf·m, 10 lbf·ft)
Muffler cover protector bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Front fender plate bolt	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Rear fender mounting bolt (10 mm)	54 N·m (5.5 kgf·m, 40 lbf·ft)
Rear fender mounting bolt (5 mm)	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Radiator cover flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Radiator sub-cover lower bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)

TROUBLESHOOTING

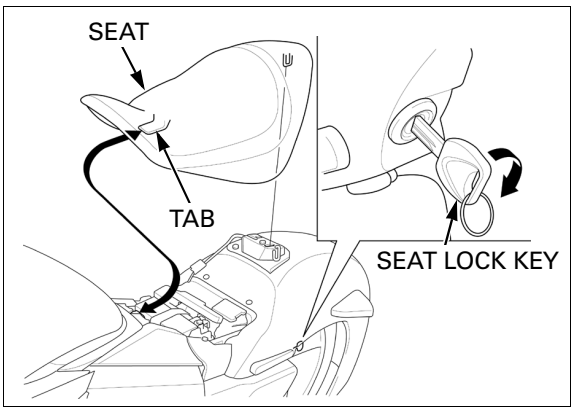
Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

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

SEAT

Unlock the seat with the seat lock key.
Slide the seat rearward and remove it.

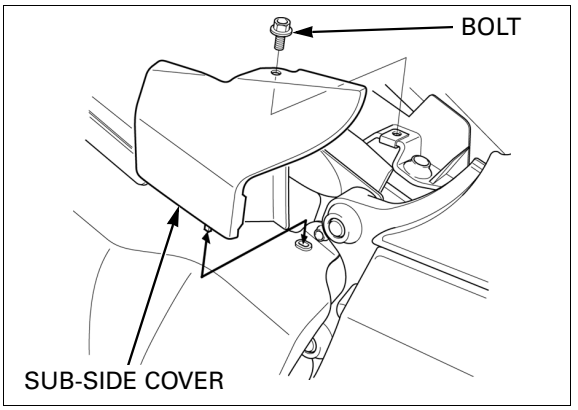
Install the seat while inserting the front tab under the frame.
Push down the rear of the seat securely to lock the seat.



SIDE COVER

Remove the seat (page 3-3).

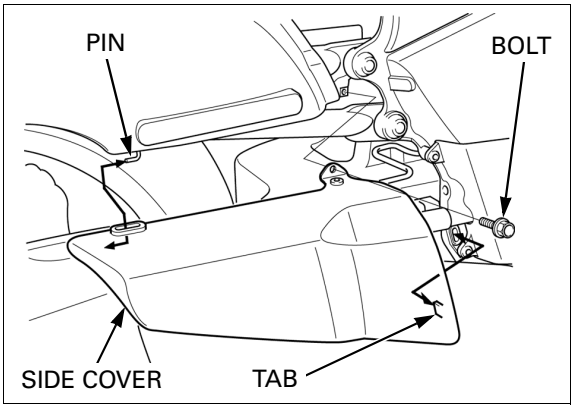
Remove the bolt and sub-side cover.



Remove the bolt, release the cover tab from the grommet and remove the side cover by sliding it rearward.

Hook the cover grommet to the pin of the rear fender and slide the cover forward.
Insert the cover tab into the grommet properly, and install and tighten the bolt.

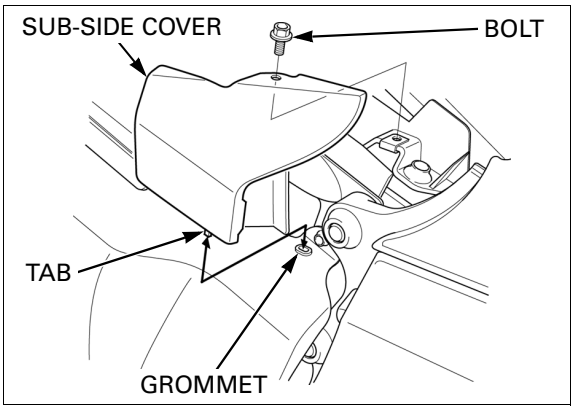
TORQUE: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)



Install the sub-side cover by aligning the tab with the grommet in the side cover.
Install and tighten the bolt.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

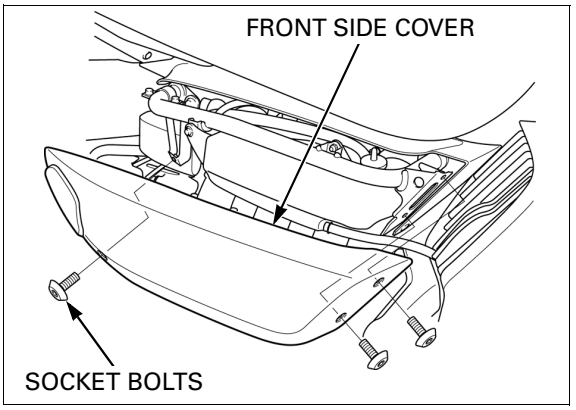
Install the seat (page 3-3).



FRONT SIDE COVER

Remove the three socket bolts and the front side cover.

Install the front side cover in the reverse order of removal.

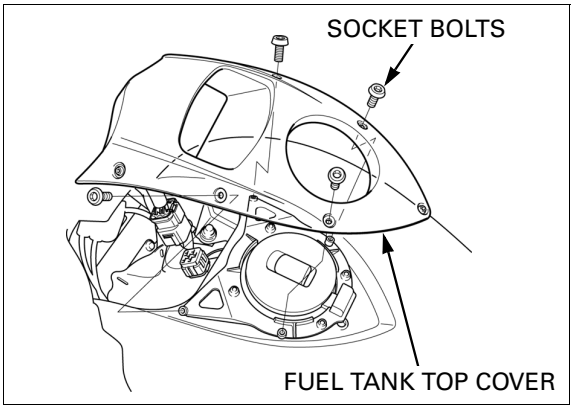


FUEL TANK TOP COVER

Remove the four socket bolts and the fuel top cover from the fuel tank.
Disconnect the speedometer 20P connector and remove the fuel tank top cover.

Install the fuel tank top cover in the reverse order of removal.

TORQUE: Socket bolt: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

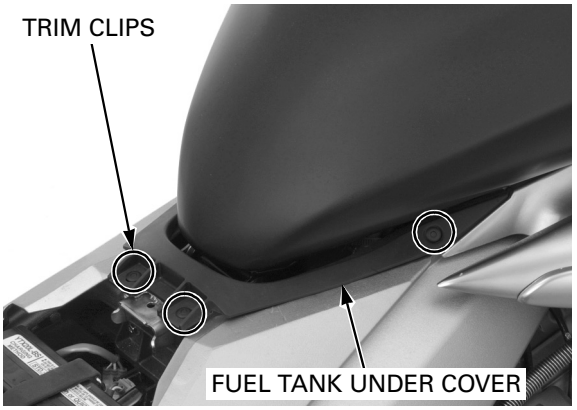


FRONT INNER COVER

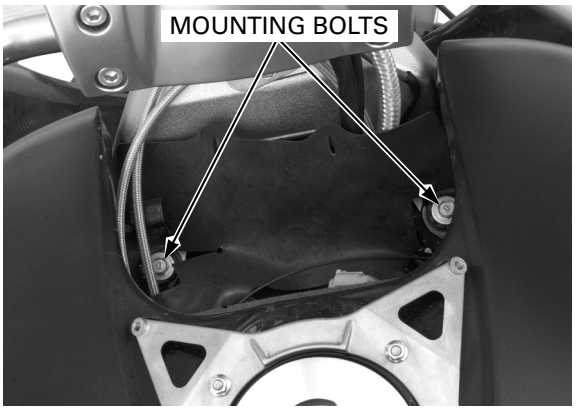
Remove the following:

– seat (page 3-3)
– front side cover (page 3-4)
– fuel tank top cover (page 3-4)

Remove the four trim clips and fuel tank under cover.

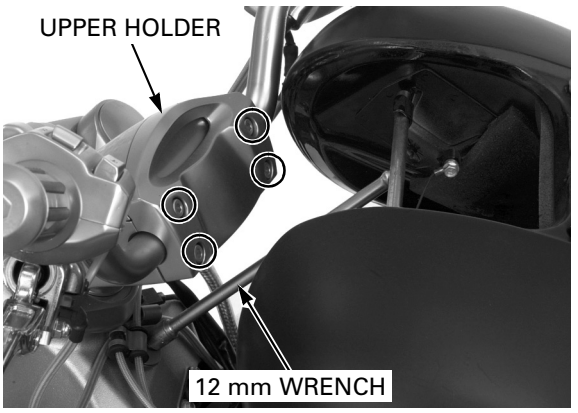


Remove the two fuel tank mounting bolts.



Be careful not to damage the splines of the handlebar and holders.

Remove the bolt caps, loosen the handlebar upper holder bolts, turn the handlebar forward until it stops and temporarily tighten the holder bolts.
Raise the front of the fuel tank and support it with a 12 mm T-wrench as shown.



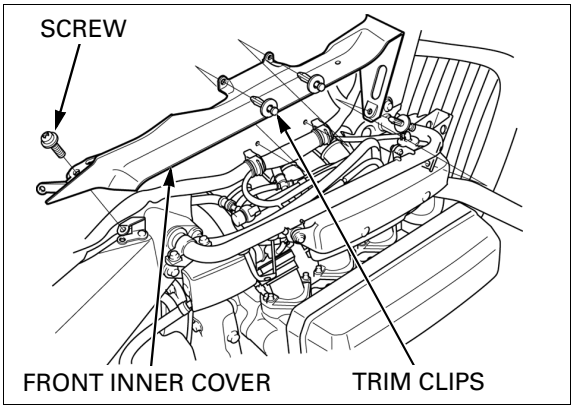
Remove the three trim clips, screw and the front inner cover.

Install the front inner cover in the reverse order of removal.

TORQUE: Front inner cover screw:
5 N·m (0.5 kgf·m, 3.6 lbf·ft)

NOTE:

- See page 14-11 for handlebar upper holder installation.



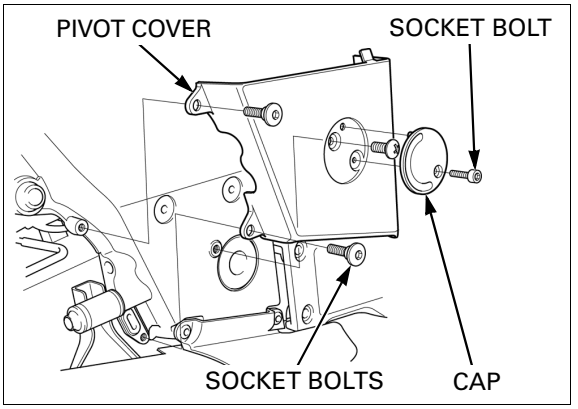
PIVOT COVER

Remove the following:

– side cover (page 3-3)
– socket bolt
– pivot cover cap
– three socket bolts
– pivot cover

Install the pivot cover in the reverse order of removal.

TORQUE:
Pivot cover bolt: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Pivot cover cap bolt: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)



FRONT FENDER

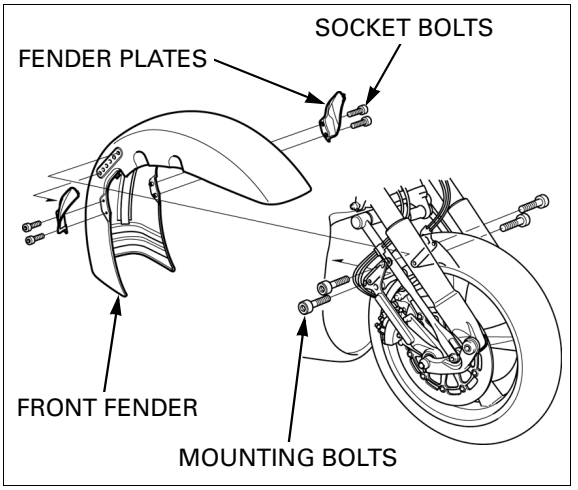
Remove the following:

– four socket bolts
– both fender plates
– four bolt caps
– four mounting bolts

Raise the front of the vehicle and remove the front fender.

Install the front fender in the reverse order of removal.

TORQUE: Fender plate bolt:
4 N·m (0.4 kgf·m, 2.9 lbf·ft)



REAR FENDER

Remove the following:

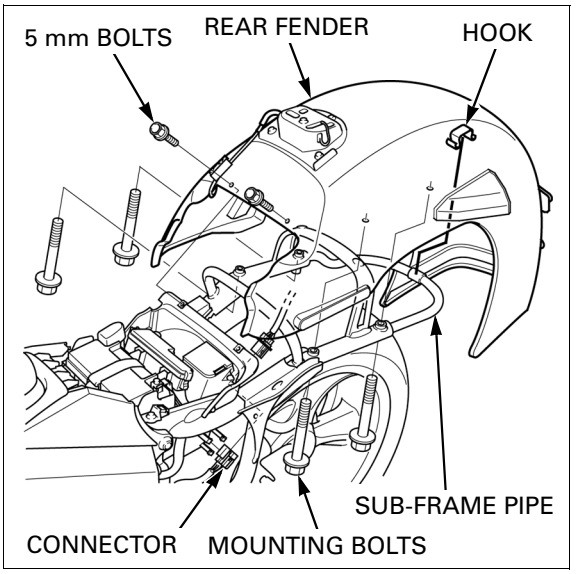
– seat (page 3-3)
– both side covers (page 3-3)
– two 5 mm bolts
– four 10 mm mounting bolts

Disconnect the taillight harness 6P connector and remove the rear fender.

Install the rear fender by aligning the hook with the sub-frame pipe.

Install the removed parts in the reverse order of removal.

TORQUE:
10 mm bolt: 54 N·m (5.5 kgf·m, 40 lbf·ft)
5 mm bolt: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)



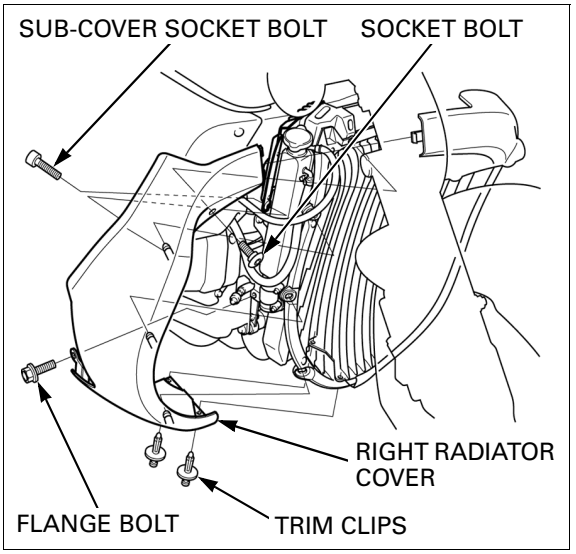
RADIATOR COVER

RIGHT RADIATOR COVER

Remove the radiator sub-cover lower socket bolt.
Remove the two trim clips, socket bolt and flange bolt.
Remove the right radiator cover from the left radiator cover by releasing the three bosses from the grommets.

Install the right radiator cover in the reverse order of removal.

TORQUE:
Radiator sub-cover lower socket bolt:
1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Radiator cover flange bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)



LEFT RADIATOR COVER

Remove the right radiator cover (page 3-6).

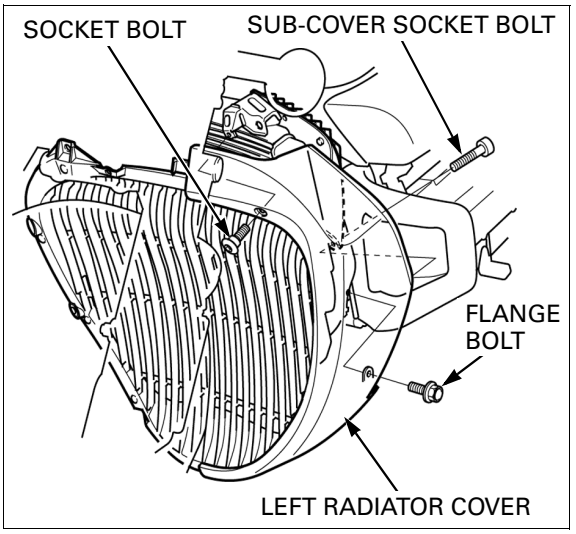
Remove the radiator sub-cover lower socket bolt.
Remove the socket bolt, flange bolt and the left radiator cover.

Install the left radiator cover in the reverse order of removal.

TORQUE:
Radiator sub-cover lower socket bolt:
1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Radiator cover flange bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

NOTE:

- When installing the left radiator cover, route the hoses into the cover properly (page 1-22).

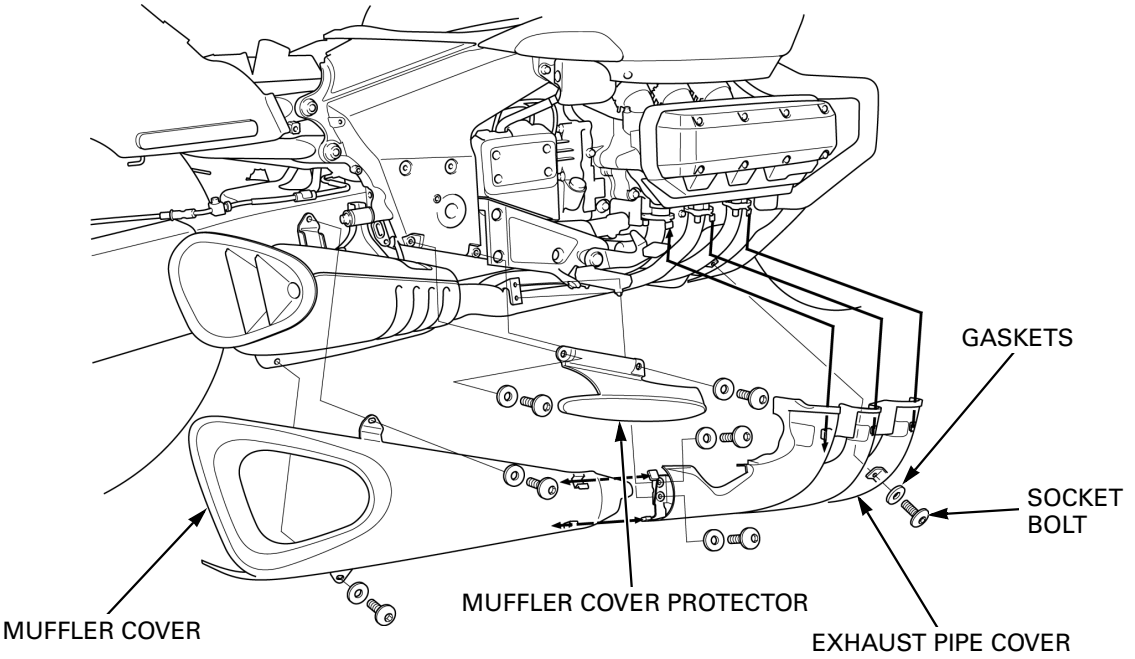


EXHAUST SYSTEM

REMOVAL

Remove the following:

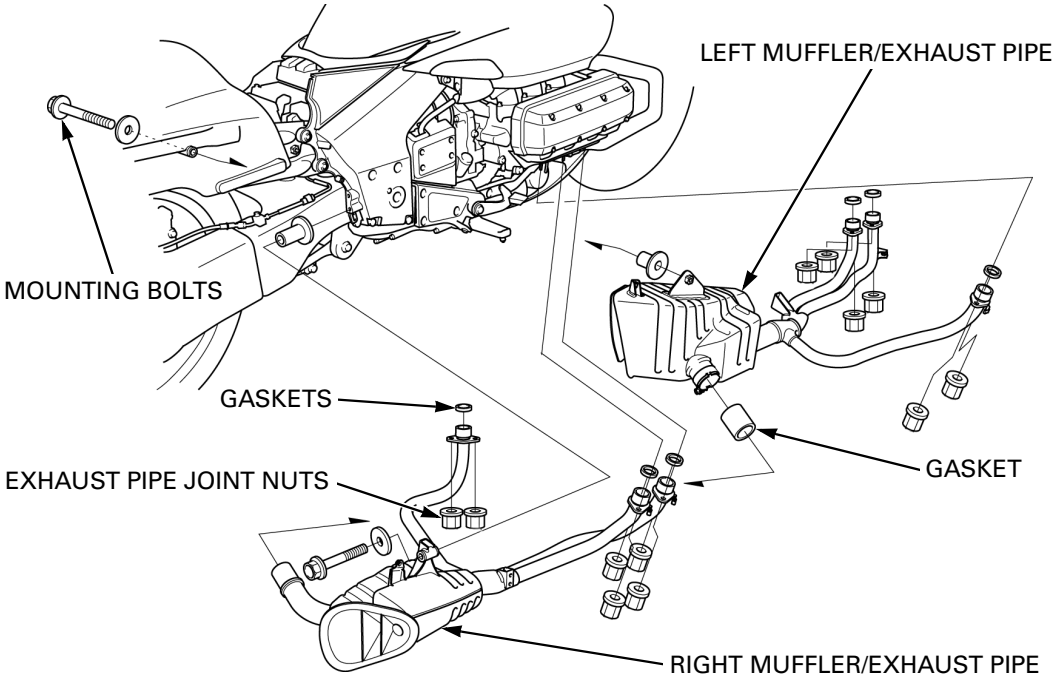
– two socket bolts and gaskets
– right and left muffler cover protectors
– two socket bolts and gaskets
– right and left muffler covers
– three socket bolts and gaskets
– exhaust pipe cover



Loosen the muffler band bolt.

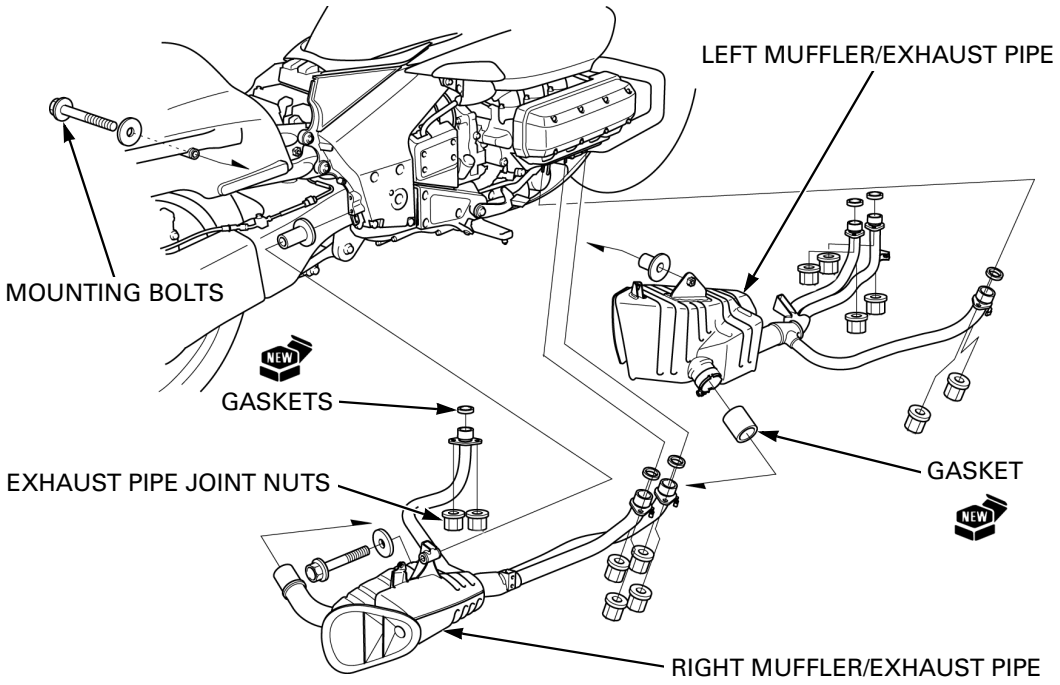
Remove the following:

– exhaust pipe joint nuts
– muffler mounting bolts
– right and left mufflers/exhaust pipes



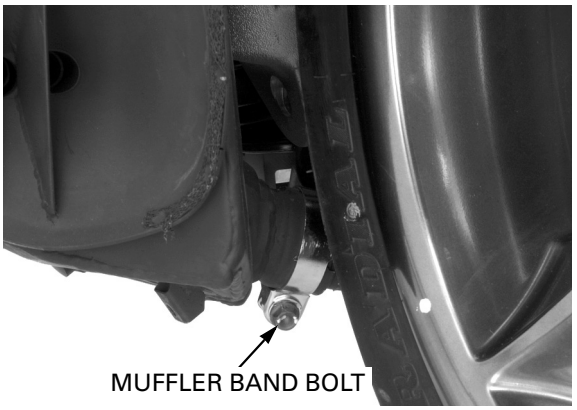
INSTALLATION

Install both mufflers/exhaust pipes with new gaskets.
Loosely install the exhaust pipe joint nuts and muffler mounting bolts.



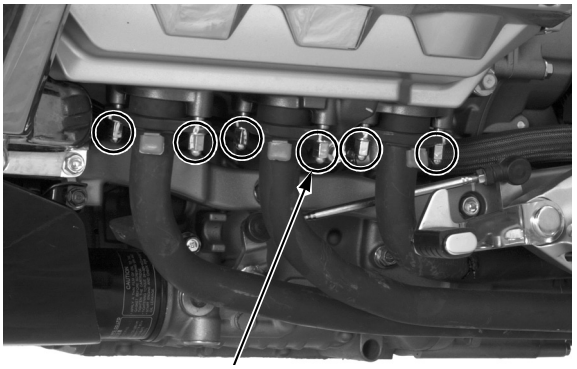
Tighten the muffler band bolt.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



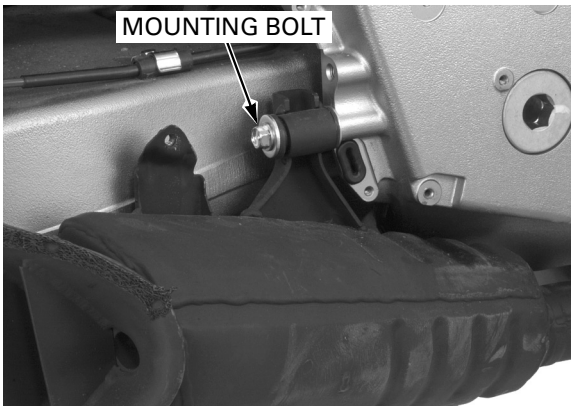
Tighten the exhaust pipe joint nuts.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Tighten the muffler mounting bolts.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the following:

– exhaust pipe cover
– three socket bolts and new gaskets

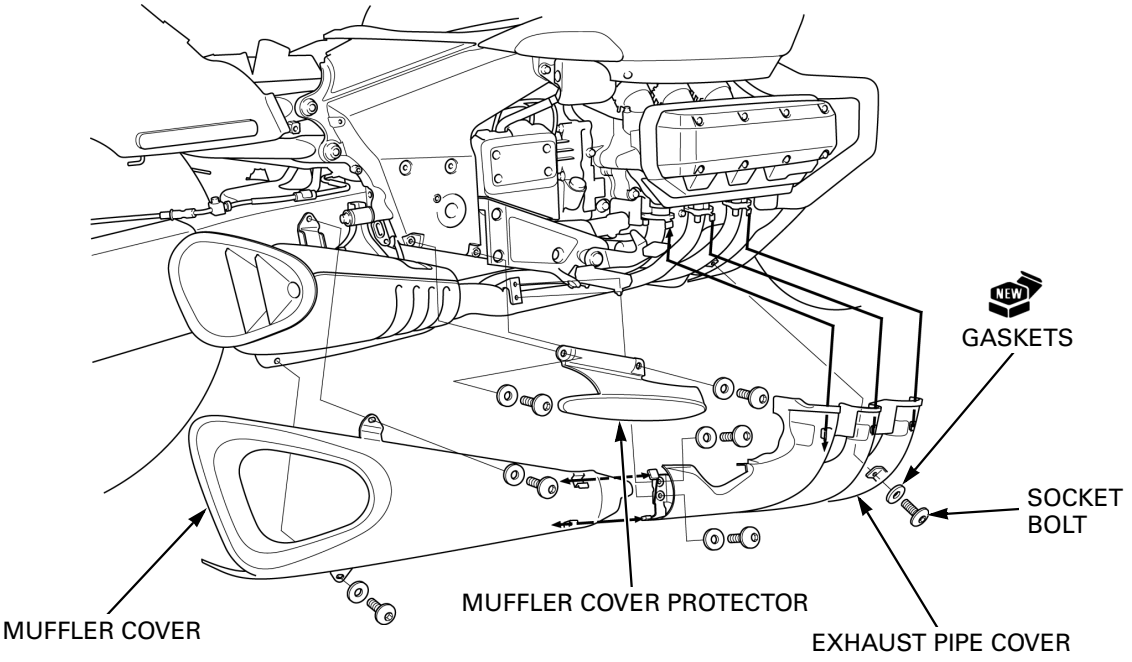
TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

– right and left muffler covers
– two socket bolts and new gaskets

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

– right and left muffler cover protectors
– two socket bolts and gaskets

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)



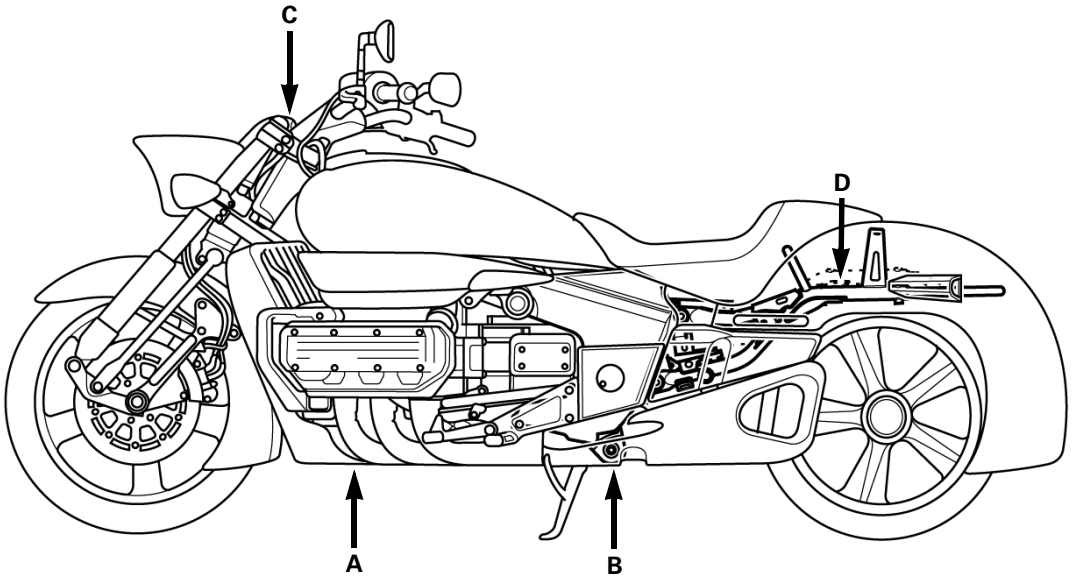
MEMO

4. 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.
- When supporting or lifting the motorcycle, use the following support points. Do not support using other components (exhaust system, suspension etc.); it will be damaged.
  – Jack-up: A; front center section of engine block / B; bottom of main frame
  – Hang-up: C; fork top bridge / D; rear frame pipe (rear fender removal is required; page 3-6)



SPECIFICATIONS

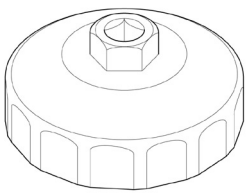
ITEM			SPECIFICATIONS
Throttle grip free play			2 – 6 mm (1/12 – 1/4 in)
Spark plug	Standard		BKR5E-11 (NGK), K16PR-U11 (DENSO)
	For extended high speed riding		BKR6E-11 (NGK), K20PR-U11 (DENSO)
Spark plug gap			1.0 – 1.1 mm (0.039 – 0.043 in)
Valve clearance		IN	0.15 ± 0.03 mm (0.006 ± 0.001 in)
		EX	0.22 ± 0.03 mm (0.009 ± 0.001 in)
Recommended engine oil			Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40
Engine oil capacity	after draining		3.6 liter (3.8 US qt, 3.2 Imp qt)
	after draining/oil filter change		3.7 liter (3.9 US qt, 3.3 Imp qt)
	after disassembly		4.6 liters (4.9 US qt, 4.0 Imp qt)
Recommended final drive oil			Hypoid gear oil, SAE #80
Final drive oil capacity	after draining		125 cm^3 (4.2 US oz, 4.4 Imp oz)
	after disassembly		155 cm^3 (5.2 US oz, 5.5 Imp oz)
Recommended brake fluid			DOT 4 brake fluid
Recommended clutch fluid			DOT 4 brake fluid
Cold tire pressure	Up to 90 kg (200 lb) load	Front	250 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	290 kPa (2.90 kgf/cm^2, 42 psi)
	Up to maximum weight capacity	Front	250 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	290 kPa (2.90 kgf/cm^2, 42 psi)
Tire size		Front	150/60R18M/C 67V
		Rear	180/55R17M/C 73V
Tire brand		Front	D251F (Dunlop)
		Rear	D251 (Dunlop)
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Spark plug	18 N·m (1.8 kgf·m, 13 lbf·ft)
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft) Apply grease to the threads.
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft) Apply oil to the threads and seating surface.
Engine oil drain bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Final drive oil filler cap	12 N·m (1.2 kgf·m, 9 lbf·ft)
Final drive oil drain bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)
Final drive outer cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Muffler cover bolt	14 N·m (1.4 kgf·m, 10 lbf·ft)
Master cylinder reservoir cap screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)

TOOL

Oil filter wrench
07HAA-PJ70101



or 07HAA-PJ70100

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 your Honda dealer.

		ITEMS / FREQUENCY	NOTE ⇨	ODOMETER READING (NOTE 1) X1,000 mi	4	8	12	16	20	24	REFER TO PAGE
				X1,000 km	6.4	12.8	19.2	25.6	32.0	38.4	
EMSSION RELATED ITEMS	*	FUEL LINE				I		I		I	4-5
	*	THROTTLE OPERATION				I		I		I	4-5
	*	AIR CLEANER	NOTE 2				R			R	4-6
		CRANKCASE BREATHER	NOTE 3		C	C	C	C	C	C	4-6
		SPARK PLUG			Every 16,000 mi (25,600 km) R						4-7
	*	VALVE CLEARANCE	NOTE 4		Every 32,000 mi (51,200 km) I						4-7
		ENGINE OIL			R		R		R		4-9
		ENGINE OIL FILTER			R		R		R		4-10
		RADIATOR COOLANT	NOTE 5			I		I		R	4-11
	*	COOLING SYSTEM				I		I		I	4-12
	*	SECONDARY AIR SUPPLY SYSTEM				I		I		I	4-12
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 6				I			I	4-13
NON-EMSSION RELATED ITEMS		FINAL DRIVE OIL				I		I		R	4-13
		BRAKE FLUID	NOTE 5		I	I	R	I	I	R	4-14
		BRAKE PAD WEAR			I	I	I	I	I	I	4-16
		BRAKE SYSTEM				I		I		I	4-16
	*	BRAKE LIGHT SWITCH				I		I		I	4-16
	*	HEADLIGHT AIM				I		I		I	4-17
		CLUTCH SYSTEM				I		I		I	4-17
		CLUTCH FLUID	NOTE 5		I	I	R	I	I	R	4-17
		SIDE STAND				I		I		I	4-18
	*	SUSPENSION				I		I		I	4-18
	*	NUTS, BOLTS, FASTENERS				I		I		I	4-19
	**	WHEELS/TIRES				I		I		I	4-19
	**	STEERING HEAD BEARINGS				I		I		I	4-20

* Should be serviced by your 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 your Honda dealer.

NOTES:

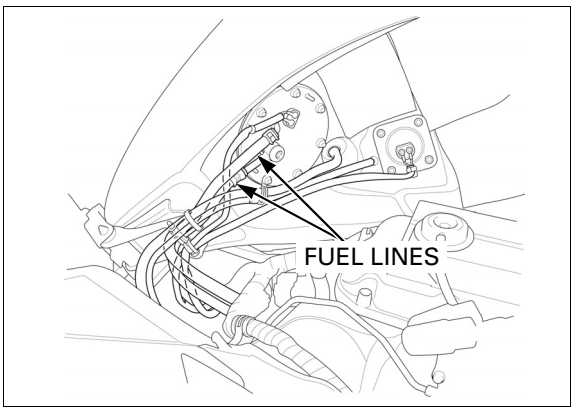
1. At higher odometer readings, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. Service more frequently when riding in rain or at full throttle.
4. Service more frequently if noisy.
5. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
6. California type only.

FUEL LINE

Remove the front inner covers (page 3-4).

Check the fuel lines and fittings for deterioration, damage or leakage.
Replace the fuel lines if necessary.

Install the front inner cover (page 3-4).



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.

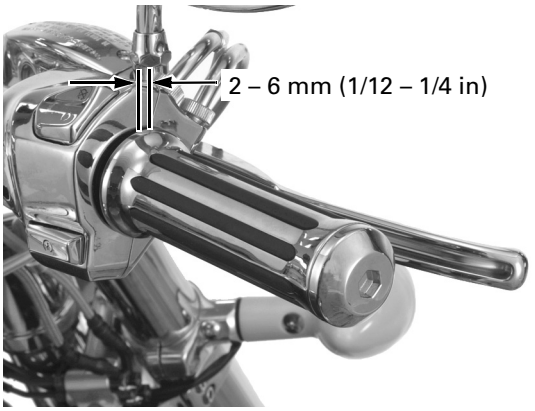
Reusing a damaged or abnormally bent or kinked throttle cable can prevent proper throttle valve operation.

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 free play and the throttle cable connection.

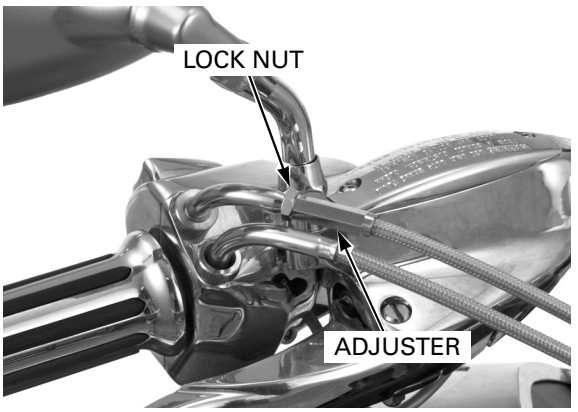
Measure the throttle grip free play at the throttle grip flange.

FREE PLAY: 2 – 6 mm (1/12 – 1/4 in)



Adjust the free play as follows.

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

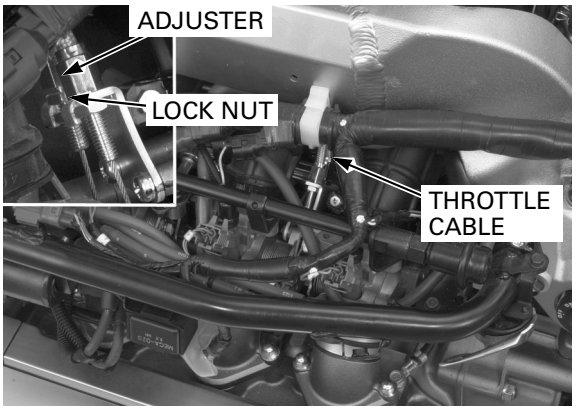


If the free play cannot be obtained, perform the adjustment at the throttle body side.

The throttle body removal is required for this adjustment (page 6-42).

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

After adjustment, recheck the throttle operation.



AIR CLEANER

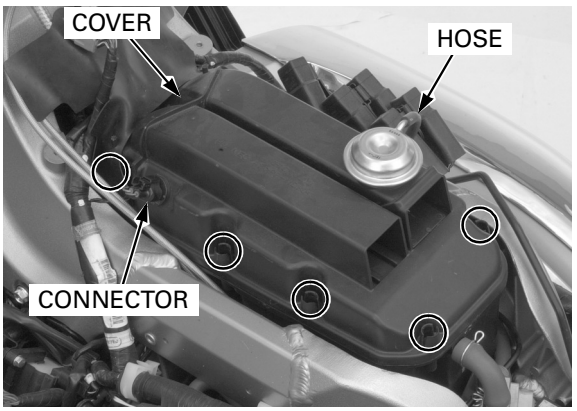
NOTE:

- The viscous-paper-element-type air cleaner cannot 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.

Raise the fuel tank and support it (page 3-4).

Disconnect the following:
– intake air temperature (IAT) sensor connector
– intake air control vacuum hose (from the diaphragm)

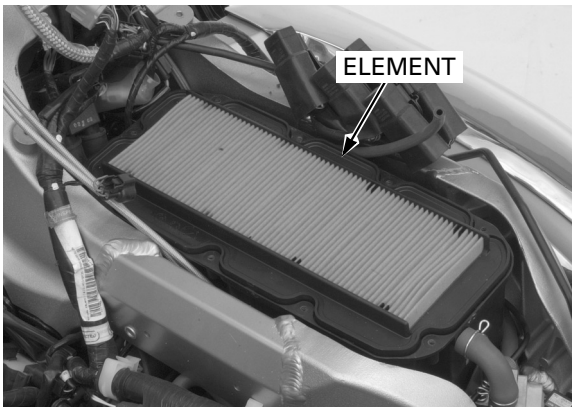
Loosen the nine screws and remove the air cleaner cover.



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

Make sure the seal rubbers are in position and in good condition.
Install a new air cleaner element.

Install the removed parts in the reverse order of removal.



CRANKCASE BREATHER

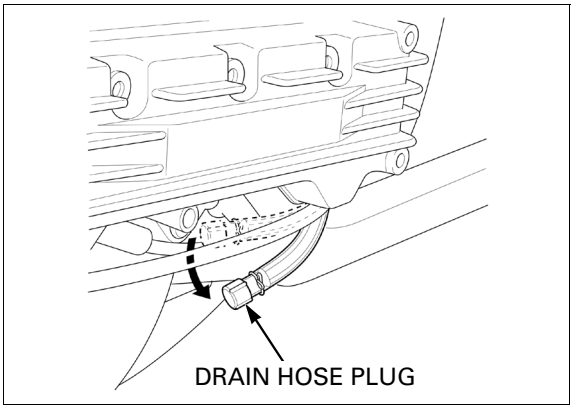
NOTE:

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

Remove the right cylinder head top and side covers (page 9-7).

Remove the plug from the air cleaner housing drain hose and drain the deposits into a suitable container, then reinstall the plug securely.

Install the cylinder head side and top covers with the socket bolts (page 9-34).

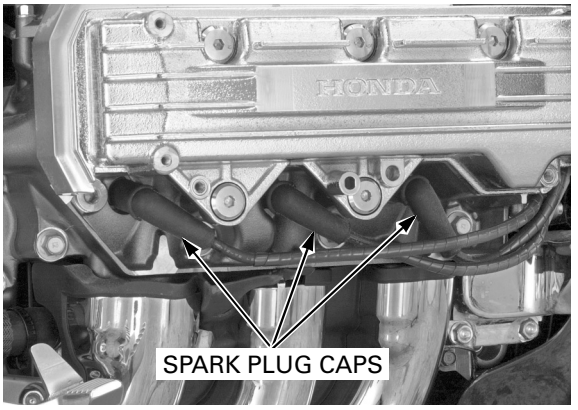


SPARK PLUG

Remove the cylinder head top and side covers (page 9-7).

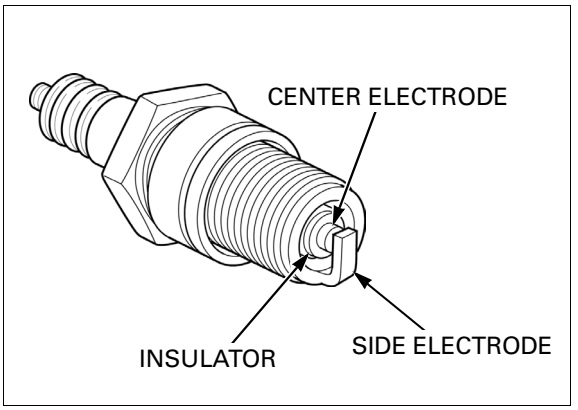
Clean around the spark plug bases with compressed air before removing the plugs, and be sure that no debris is allowed to enter into the combustion chamber.

Disconnect the spark plug caps and remove the spark plugs.



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

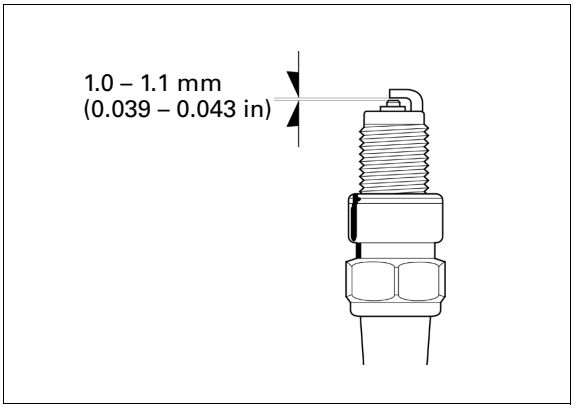
RECOMMENDED SPARK PLUG:
Standard:
BKR5E-11 (NGK), K16PR-U11 (DENSO)
For extended high speed riding:
BKR6E-11 (NGK), K20PR-U11 (DENSO)



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

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

SPARK PLUG GAP: 1.0 – 1.1 mm (0.039 – 0.043 in)



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

Thread each spark plug in by hand to prevent cross-threading and tighten them with a spark plug wrench.

TORQUE: 18 N·m (1.8 kgf·m, 12 lbf·ft)

Connect the spark plug caps.

Install the cylinder head side and top covers (page 9-34).

VALVE CLEARANCE

INSPECTION

NOTE:

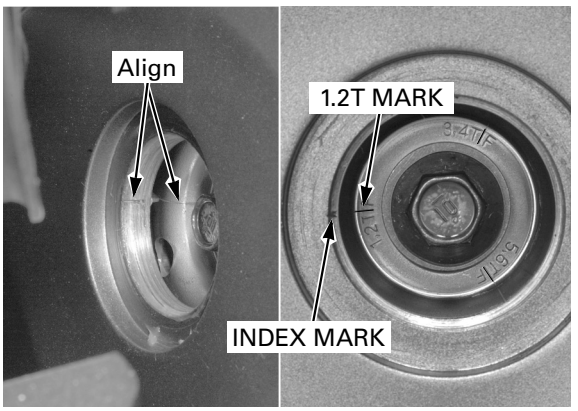
- Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).

Remove the left and right cylinder head covers (page 9-7).

Failure to loosen the cam chain tensioner will result in inaccurate valve clearance measurements due to the force of the cam chain on the camshaft.

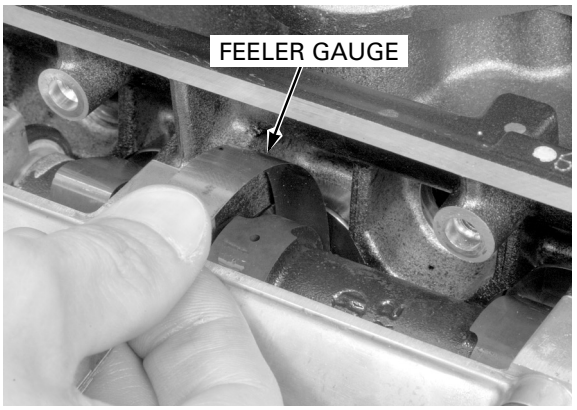
Remove the timing hole cap and loosen the cam chain tensioner lifter (page 9-8).

Rotate the crankshaft counterclockwise and align the 1.2T mark on the ignition pulse generator rotor with the index mark in the front crankcase cover. Make sure the No. 1 cylinder cam lobes are facing out. If they are facing in, rotate the crankshaft counterclockwise 360° (one full turn) and align the 1.2T mark with the index mark.



Measure the No. 1 cylinder valve clearance by inserting a feeler gauge between the valve lifter and cam lobe.

VALVE CLEARANCES:
IN: 0.15 ± 0.03 mm (0.006 ± 0.001 in)
EX: 0.22 ± 0.03 mm (0.009 ± 0.001 in)



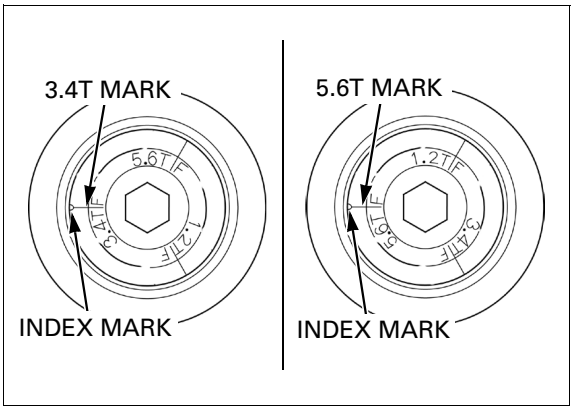
Rotate the crankshaft counterclockwise 120° and align the 3.4T mark with the index mark.
Check the No. 4 cylinder valve clearance.

Rotate the crankshaft counterclockwise 120° and align the 5.6T mark with the index mark.
Check the No. 5 cylinder valve clearance.

Rotate the crankshaft counterclockwise 120° and align the 1.2T mark with the index mark.
Check the No. 2 cylinder valve clearance.

Rotate the crankshaft counterclockwise 120° and align the 3.4T mark with the index mark.
Check the No. 3 cylinder valve clearance.

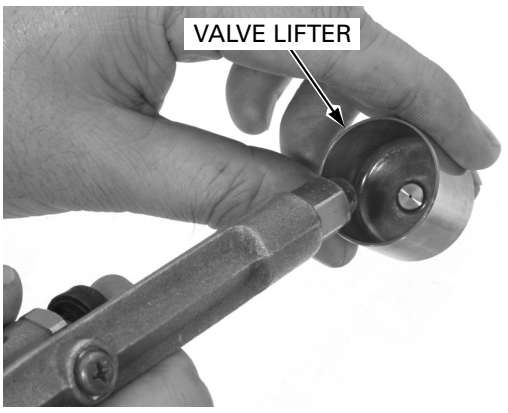
Rotate the crankshaft counterclockwise 120° and align the 5.6T mark with the index mark.
Check the No. 6 cylinder valve clearance.



ADJUSTMENT

Remove the valve lifters and shims (page 9-10).

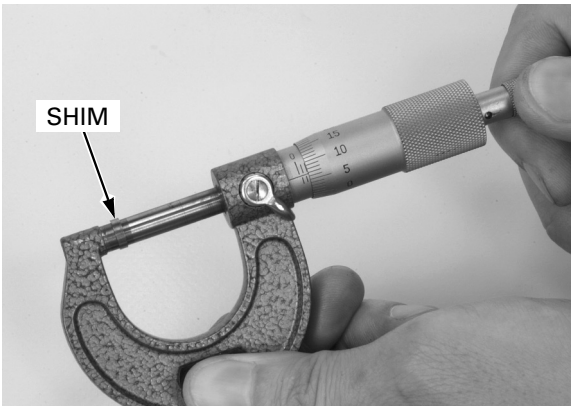
Clean the valve shim contact area in the valve lifter with compressed air.



Measure the shim thickness and record it.

NOTE:

- Sixty-five different shim thicknesses are available in increments of 0.025 mm (from 1.200 mm to 2.800 mm).



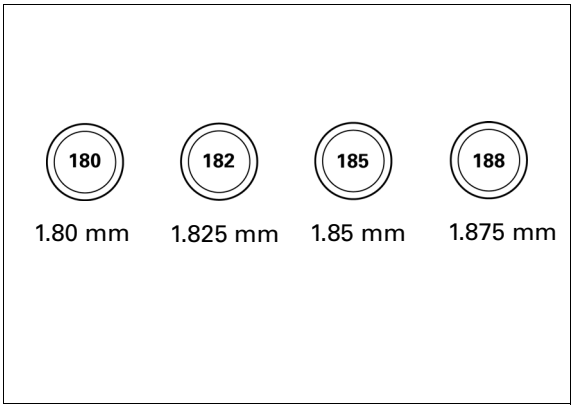
Calculate the new shim thickness using the equation below.

A = (B – C) + D

A: New shim thickness
B: Recorded valve clearance
C: Specified valve clearance
D: Old shim thickness

NOTE:

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



Install the newly selected shims on the valve retainers.

Install the valve lifters and camshafts (page 9-30).
Rotate the camshafts by rotating the crankshaft counterclockwise several times.
Recheck the valve clearances.

Install the removed parts (page 9-33).

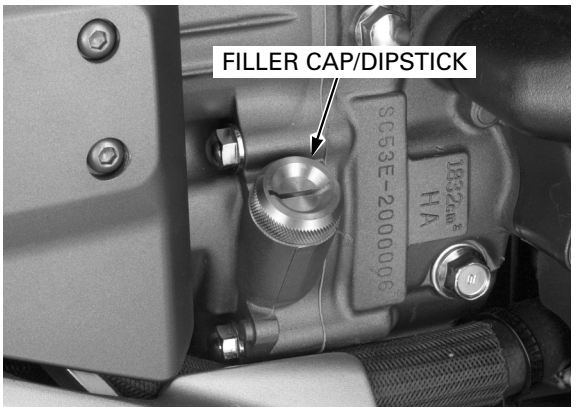
ENGINE OIL

OIL LEVEL CHECK

Start the engine and let it idle for a few minutes.

Stop the engine and support the motorcycle upright on a level surface.

Wait for 2 or 3 minutes after stopping the engine.
Remove the oil filler cap/dipstick and wipe the oil from the dipstick with a clean cloth.

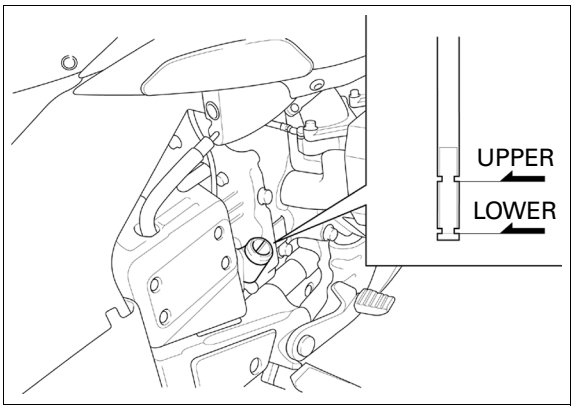


Insert the dipstick without screwing it in, remove it and check the oil level.

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

RECOMMENDED ENGINE OIL:

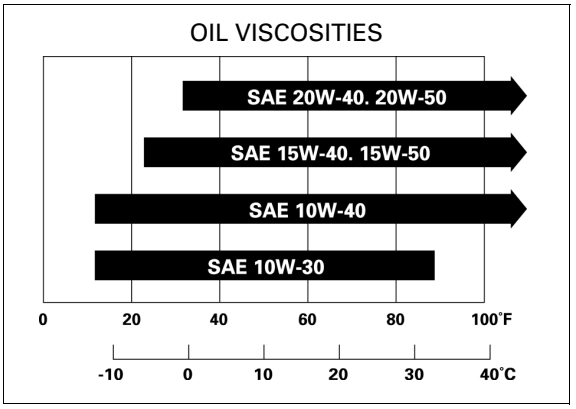
Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil
API service classification SG or Higher
JASO T 903 standard: MA
Viscosity: SAE 10W-40



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

Reinstall the oil filler cap/dipstick.

For engine oil change, see below.



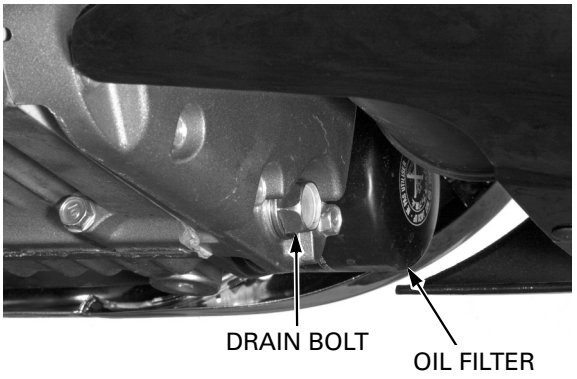
ENGINE OIL FILTER

NOTE:

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

Warm the engine.

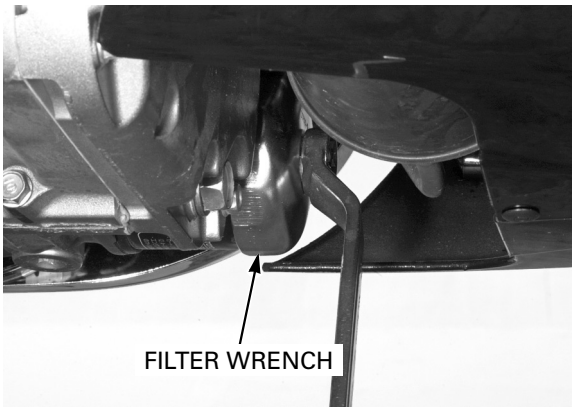
Stop the engine.
Remove oil filler cap/dipstick and drain bolt, and drain the oil.



Remove the oil filter cartridge and let the remaining oil drain out.

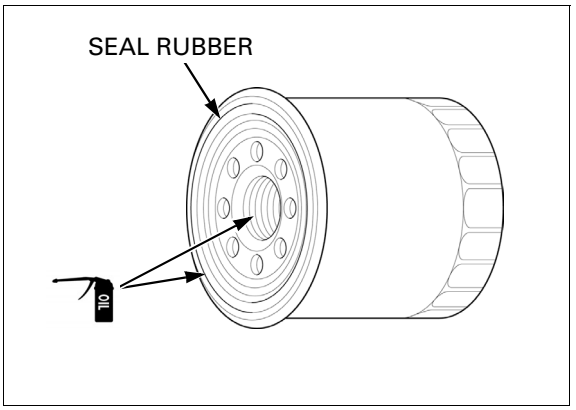
TOOL:

Oil filter wrench	**07HAA-PJ70101 or 07HAA-PJ70100**



Apply oil to the seal rubber and threads of a new oil filter cartridge and install the filter cartridge, using the same tool.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



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

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill the crankcase with the recommended oil (page 4-9).

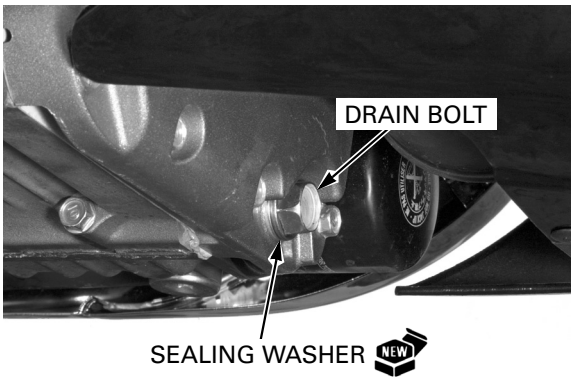
OIL CAPACITY:

3.6 liters (3.8 US qt, 3.2 Imp qt) at draining
3.7 liters (3.9 US qt, 3.3 Imp qt) at filter change
4.6 liters (4.9 US qt, 4.0 Imp qt) at disassembly

Check the engine oil level (page 4-9).

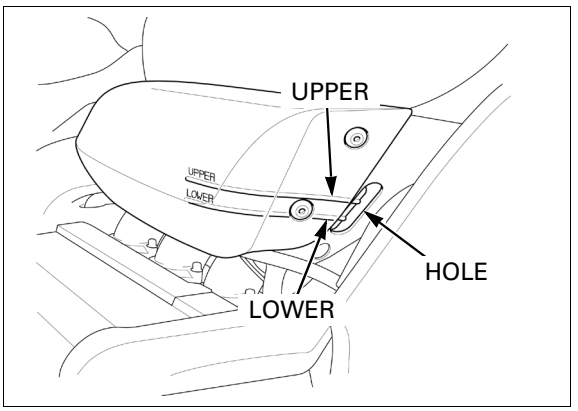
Install the oil filler cap/dipstick.

Make sure there are no oil leaks.



RADIATOR COOLANT

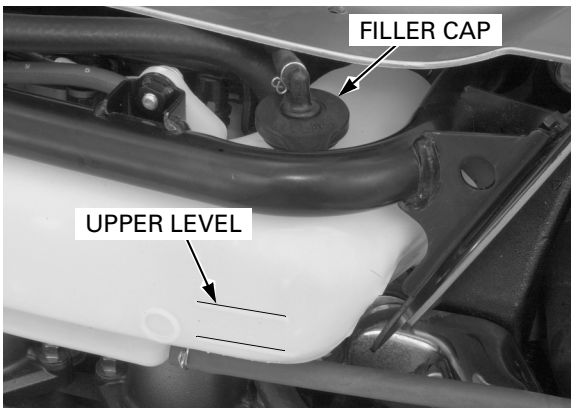
With the engine running at normal operating temperature, check the coolant level of the reserve tank through the inspection hole in the right front inner cover.
The level should be between the UPPER and LOWER level lines with the motorcycle upright on a level surface.



If the level is low, remove the right front side cover (page 3-4) and 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 7-6).

RECOMMENDED ANTIFREEZE:

Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors.



NOTICE

Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

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 all air from the cooling system (page 7-7).

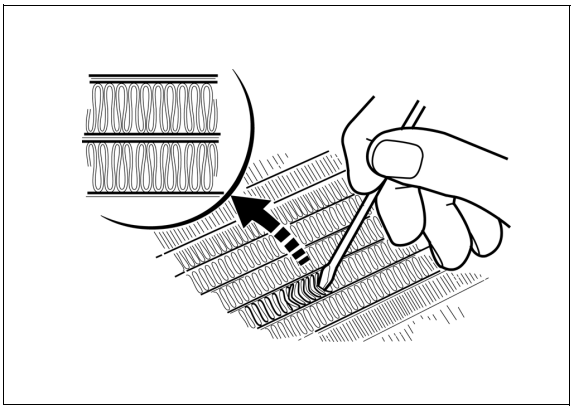
COOLING SYSTEM

Remove the radiator covers (page 3-6).

Check for any coolant leakage from the water hoses and hose joints.
Check the water hoses for cracks or deterioration and replace if necessary.
Check that all hose clamps are tight.

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.

Install the radiator covers (page 3-6).



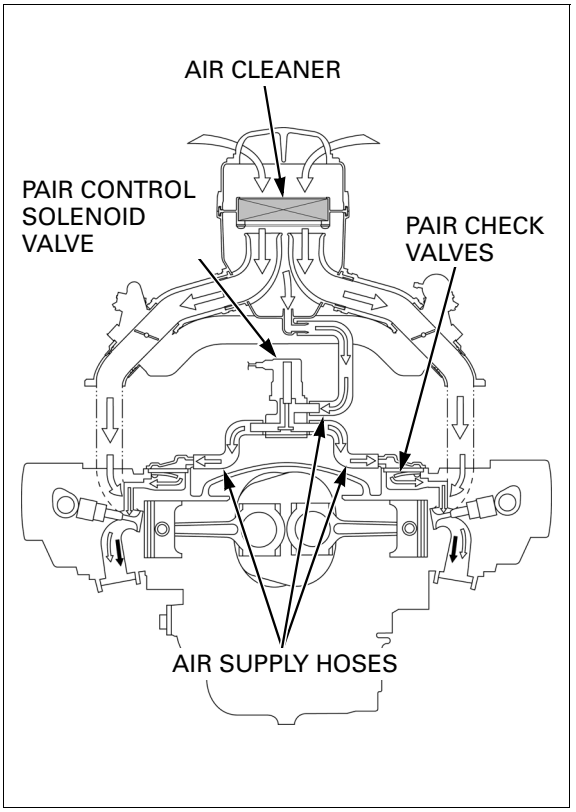
SECONDARY AIR SUPPLY SYSTEM

Remove the radiator without disconnecting the water hoses (page 7-8).

Check the air supply hoses between the pulse secondary air injection (PAIR) control solenoid valve and PAIR check valves for damage or loose connections.
Check the air supply hoses for cracks or deterioration.

If the hoses show any signs of heat damage, inspect the PAIR check valves (page 6-59).

For secondary air supply system inspection, see page 6-58.



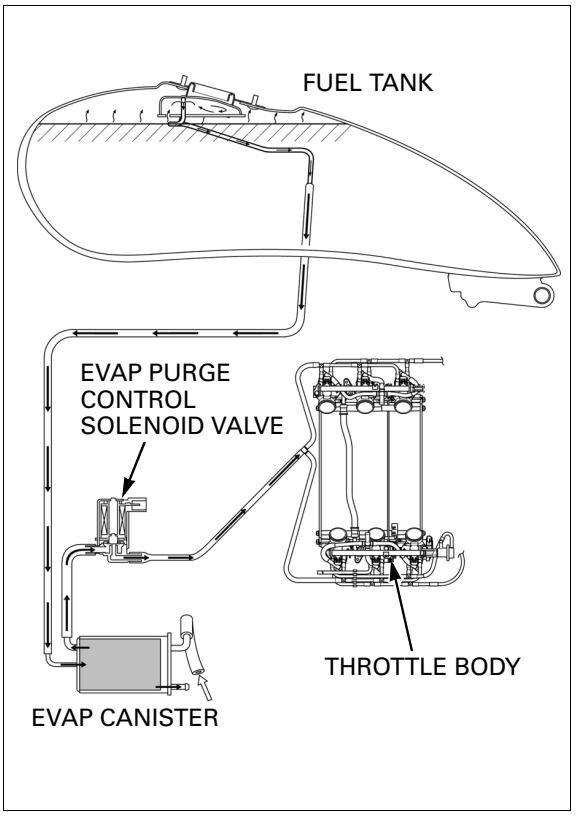
EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

Remove the radiator without disconnecting the water hoses (page 7-8).
Raise the fuel tank and support it (page 3-4).

Check the evaporative emission (EVAP) canister, which is located on the front lower side of the engine, for cracks or damage.

Check the hoses between the fuel tank, EVAP canister, EVAP purge control valve solenoid and throttle body for deterioration, damage or loose connections. Also check that the hoses are not kinked or pinched.

Refer to the Vacuum Hose Routing Diagram Label and Cable & Harness Routing (page 1-22) for hose connections and routing.



FINAL DRIVE OIL

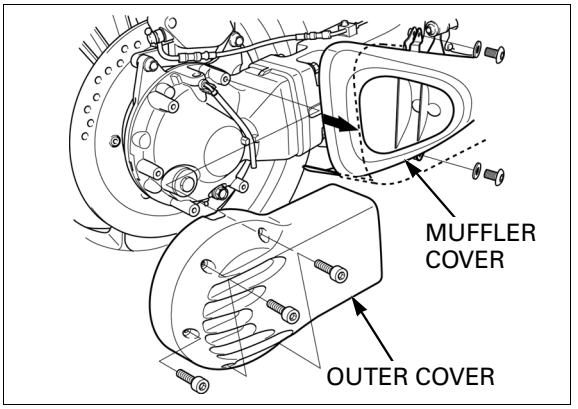
OIL LEVEL CHECK

Place the motorcycle on a level surface and support it upright.

Remove the two bolts and fiber washers from the right muffler cover to get the clearance for final drive outer cover removal.

Take care not to deform the muffler cover.

Remove the five bolts and the outer cover while pulling the muffler cover slightly, being careful not to scratch it.



Remove the oil filler cap from the final gear case. Check that the oil level is to the lower edge of the oil filler hole.

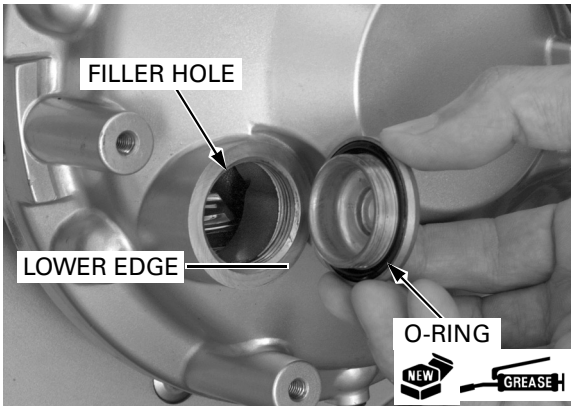
Check for leaks if the oil level is low. Pour the recommended oil through the oil filler hole until it reaches the lower edge of the hole.

RECOMMENDED OIL: Hypoid gear oil, SAE #80

Coat a new O-ring with grease and install it onto the oil filler cap.

Install the oil filler cap and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the removed parts in the reverse order of removal.

TORQUE: Outer cover: 10 N·m (1.0 kgf·m, 7 lbf·ft)
Muffler cover: 14 N·m (1.4 kgf·m, 10 lbf·ft)

OIL CHANGE

Raise the rear wheel off the ground and support the motorcycle securely (page 4-2).

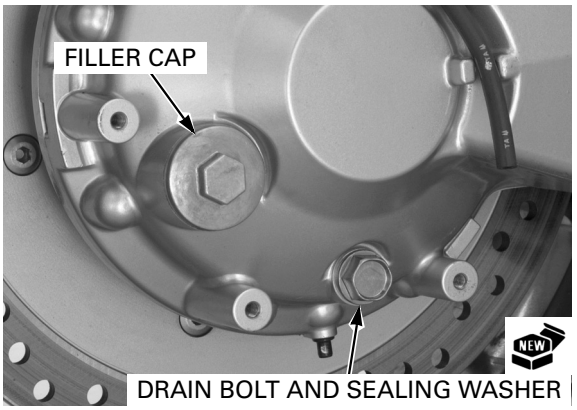
Remove the oil filler cap and drain bolt from the final gear case, slowly turn the rear wheel and drain the oil.

After the oil is completely drained, install the drain bolt with a new sealing washer and tighten it.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Fill the final gear case with the recommended oil to the correct level (page 4-13).

OIL CAPACITY:
125 cm³ (4.2 US oz, 4.4 Imp oz) after draining
155 cm³ (5.2 US oz, 5.5 Imp oz) after disassembly



BRAKE FLUID

NOTICE

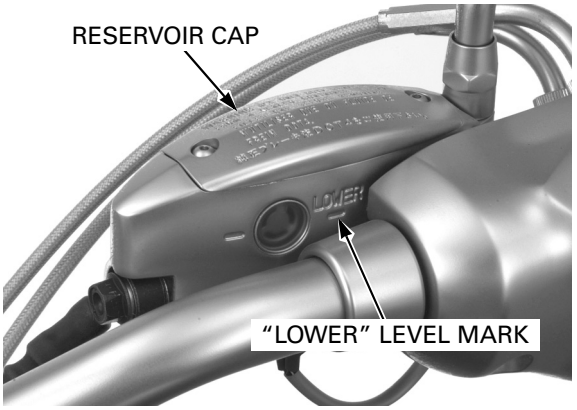
- *Spilling fluid can damage painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

NOTE:

- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.
- When the fluid level is low, check the brake pads for wear (page 4-16). 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 4-16).

FRONT BRAKE

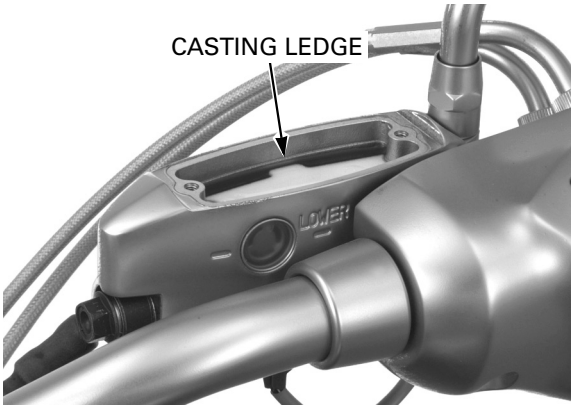
Turn the handlebar to the left side so the reservoir is level and check the front brake reservoir fluid level through the sight glass.



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

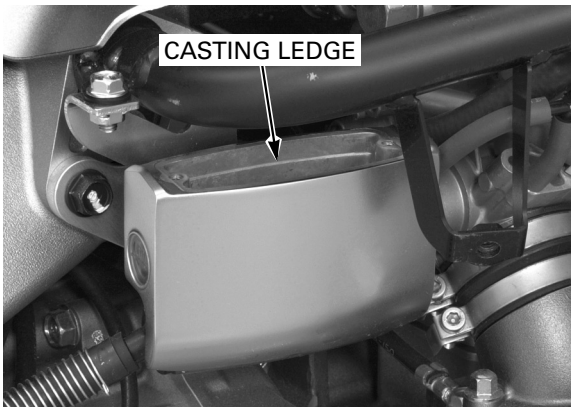
TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



REAR BRAKE

Support the motorcycle upright on a level surface and check the rear brake reservoir fluid level through the sight glass.

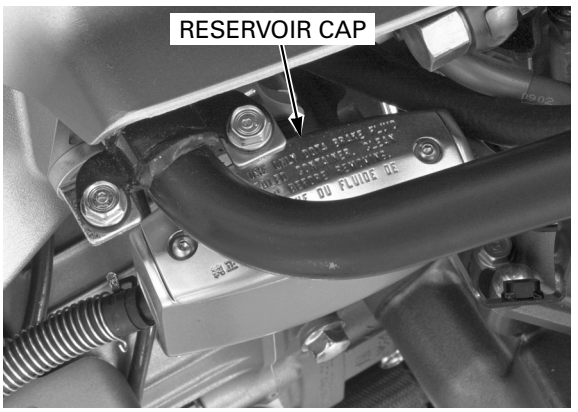
If the fluid level is near the "LOW" level mark, remove the right front side cover (page 3-4) and the reservoir cap, set plate and diaphragm. Fill the reservoir with DOT 4 brake fluid from a sealed container to the casting ledge.



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

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the front side cover (page 3-4).

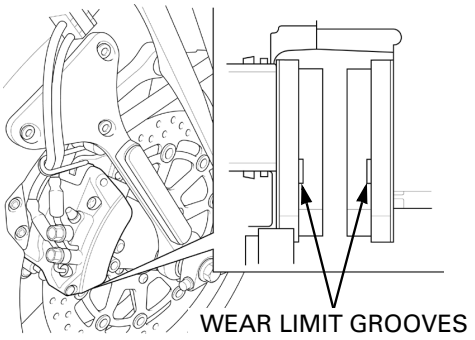


BRAKE PAD WEAR

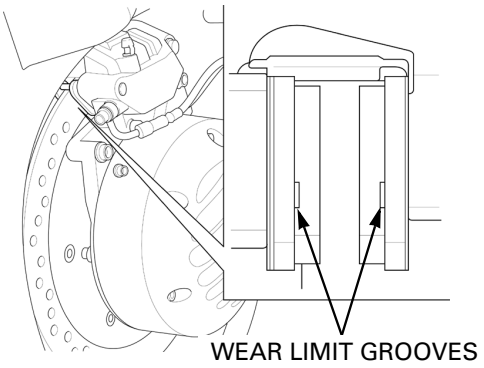
Check the brake pads for wear.
Replace the brake pads if either pad is worn to the bottom of the wear limit groove.

Refer to page 16-14 for brake pad replacement.

FRONT:



REAR:

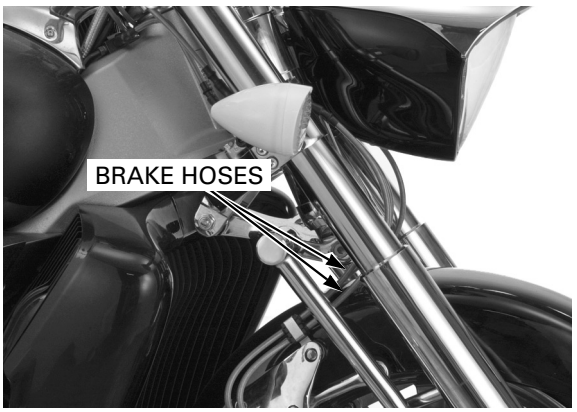


BRAKE SYSTEM

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.

Refer to page 16-7 for air bleeding procedures.

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



BRAKE LIGHT SWITCH

NOTE:

- The brake light switches cannot be adjusted. If the brake light switch actuation and brake engagement are not synchronized, either replace the switch unit or the malfunctioning parts of the system.

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

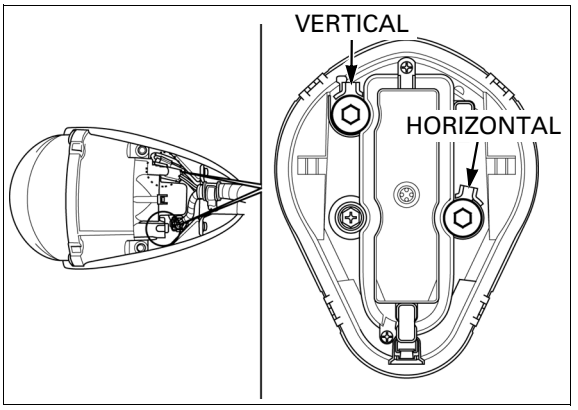
HEADLIGHT AIM

Remove the headlight cover (page 20-5).

Support the motorcycle upright securely on a level surface.

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

Adjust the headlight beam by turning the vertical and horizontal adjusters, using a phillips-type screwdriver.



CLUTCH SYSTEM

Operate the clutch lever and check that no air has entered the system.
If the clutch is not disengaged properly, or the lever feels soft or spongy, bleed the air from the system.

Refer to page 16-7 for air bleeding procedures.

Inspect the clutch hoses, pipe and fittings for damage, deterioration, cracks or leakage.
Tighten any loose fittings.
Replace hoses, pipe and fittings as required.

CLUTCH FLUID

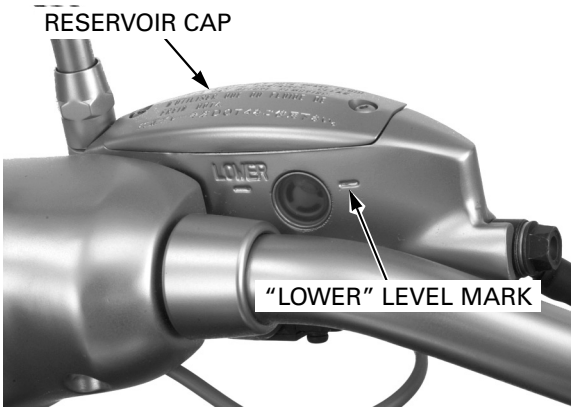
NOTICE

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

NOTE:

- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.
- When the fluid level is low, check entire system for leaks.

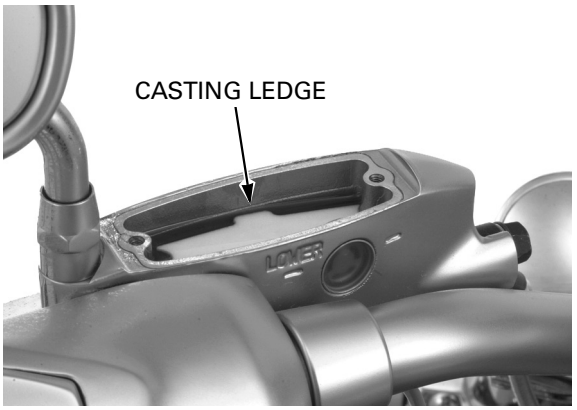
Turn the handlebar to the right side so that the reservoir is level and check the clutch reservoir fluid level through the sight glass.



If the level is near the "LOWER" level mark, remove the reservoir cap, set plate and diaphragm, and 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: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



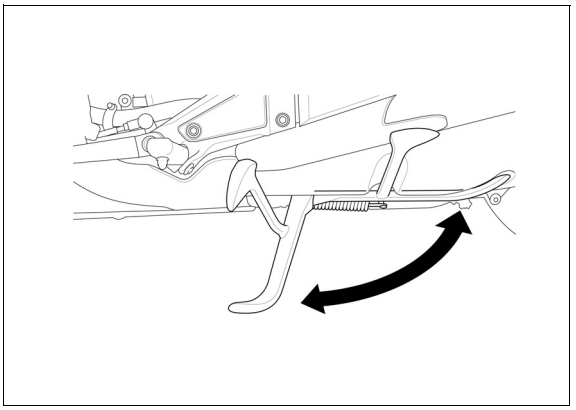
SIDE STAND

Support the motorcycle on a level surface.

Check the side stand spring for damage or loss of tension.
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.

Check the side stand ignition cut-off system:
- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, while squeezing the clutch lever.
- Fully lower the side stand.
- The engine should stop as the side stand is lowered.

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



SUSPENSION

FRONT SUSPENSION INSPECTION

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

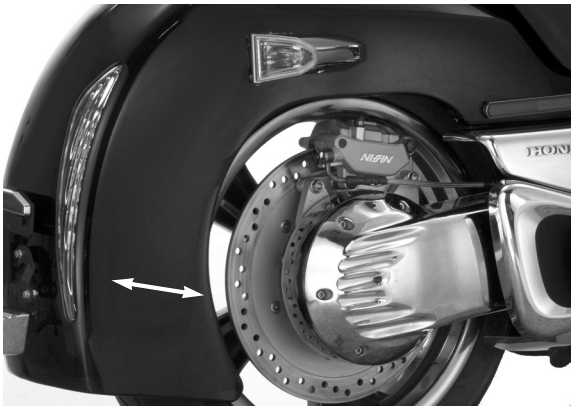
Check the action of the front suspension by applying the front brakes and compressing it several times.
Check the entire assembly for leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

Refer to page 14-23 for front suspension service.

REAR SUSPENSION INSPECTION

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

Refer to page 15-8 for rear suspension service.



Raise the rear wheel off the ground and support the motorcycle securely (page 4-2).
Check for worn swingarm bearings by grabbing the rear wheel and attempting to move the wheel side to side.
Replace the bearings if any looseness is noted (page 15-12).

NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).
Check that all cotter pins, safety clips, hose clamps and cable stays are in place and properly secured.

WHEELS/TIRES

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

RECOMMENDED TIRE PRESSURE:
Up to 90 kg (200 lbs) load:
Front: 250 kPa (2.50 kgf/cm^2, 36 psi)
Rear: 290 kPa (2.90 kgf/cm^2, 42 psi)
Up to maximum weight capacity:
Front: 250 kPa (2.50 kgf/cm^2, 36 psi)
Rear: 290 kPa (2.90 kgf/cm^2, 42 psi)

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.

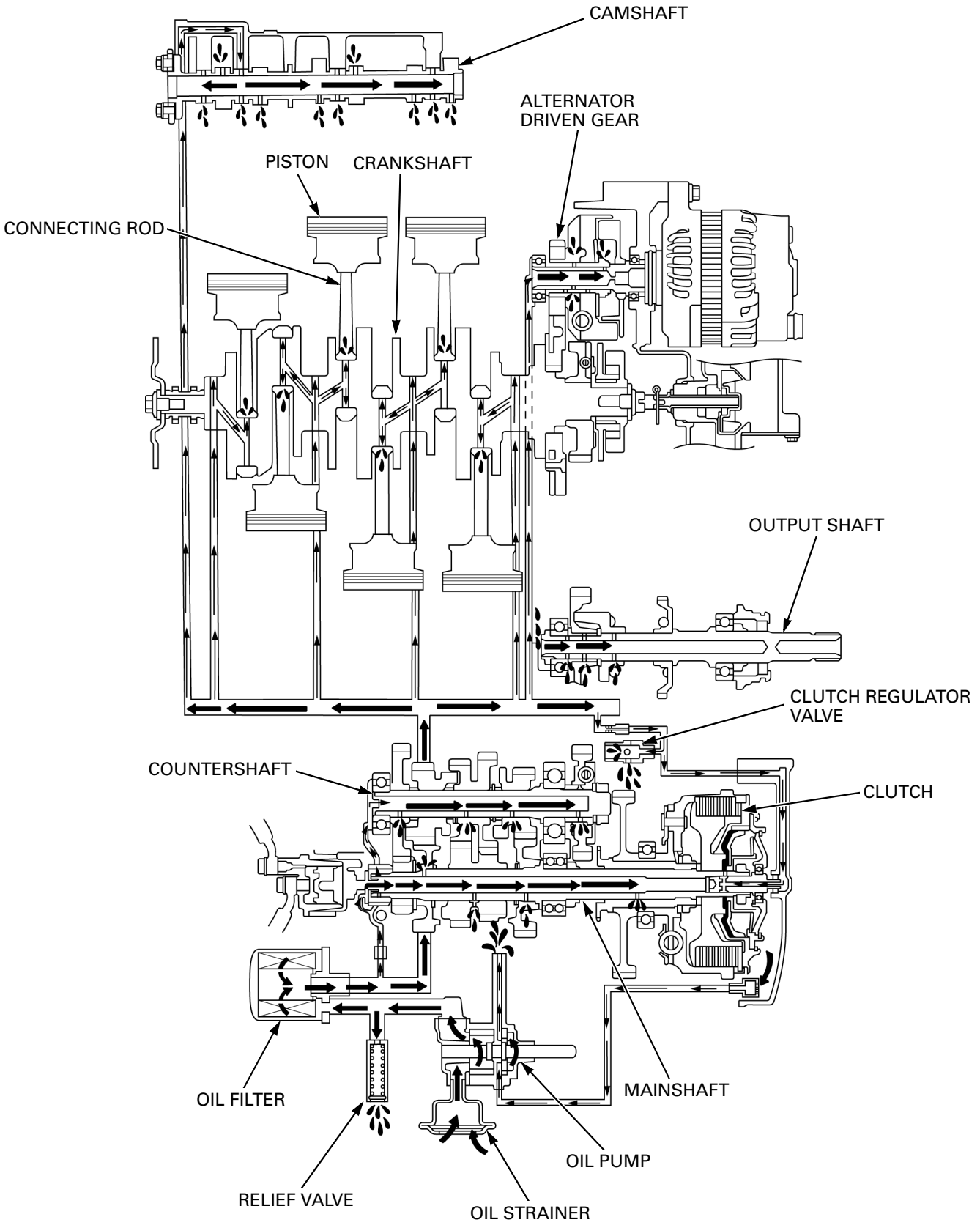
MINIMUM TREAD DEPTH: Front: 1.5 mm (0.06 in)
Rear: 2.0 mm (0.08 in)

STEERING HEAD BEARINGS

Raise the front wheel off the ground and support the motorcycle securely (page 4-2).
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 14-30).

5. LUBRICATION SYSTEM

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 oil pump has twin pump rotors; main and scavenging. The main rotors pick up oil from the crankcase and delivers it under pressure to the bearing and other important parts of the engine. The scavenge rotors draw oil from the clutch housing in the rear case and sends it to the primary drive and driven gears to lubricate and cool them.
- The crankcase must be separated to service the oil pump (page 12-6).
- Refer to page 4-9 for engine oil level check.
- Refer to page 4-10 for engine oil and filter change.
- Refer to page 4-13 for final drive oil check and change.
- Refer to page 20-20 for oil pressure switch inspection.

SPECIFICATIONS

Unit: mm (in)

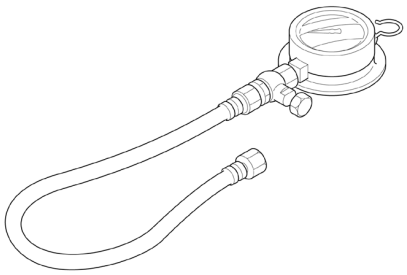
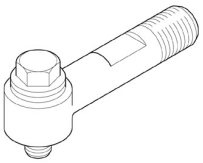
ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity	After draining		3.6 liter (3.8 US qt, 3.2 Imp qt)	–
	After draining/filter change		3.7 liter (3.9 US qt, 3.3 Imp qt)	–
	After disassembly		4.6 liter (4.9 US qt, 4.0 Imp qt)	–
Recommended engine oil			Honda GN4 or HP4 (Without Moly) 4-stroke oil (U.S.A. and Canada) or Honda 4-stroke oil (Canada only), or equivalent motor oil API service classification SE, SF or Higher JASO 4T service classification: MA Viscosity: SAE 10W-40	–
Oil pressure at oil pressure switch			530 kPa (5.4 kgf/cm^2, 77 psi) at 5,000 rpm/80°C (176°F)	–
Oil pump	Tip clearance		0.15 (0.006)	0.20 (0.008)
	Body clearance	Feed side	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
		Scavenge side	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
	Side clearance		0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

TORQUE VALUES

Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads.
Oil strainer bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Oil pump assembly bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	

TOOLS

Available through the Honda Motorcycle Tool and Equipment Program; to order call 888-424-6857.

Oil pressure gauge set 07506-3000001  or equivalent commercially available in U.S.A.	Oil pressure gauge attachment 07510-4220100  or equivalent commercially available in U.S.A.

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 or driven sprocket
- Damaged oil pump
- Internal oil leak

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

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

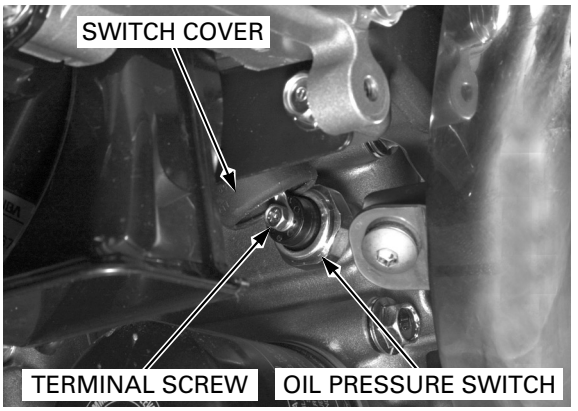
Oil emulsification
- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water

OIL PRESSURE CHECK

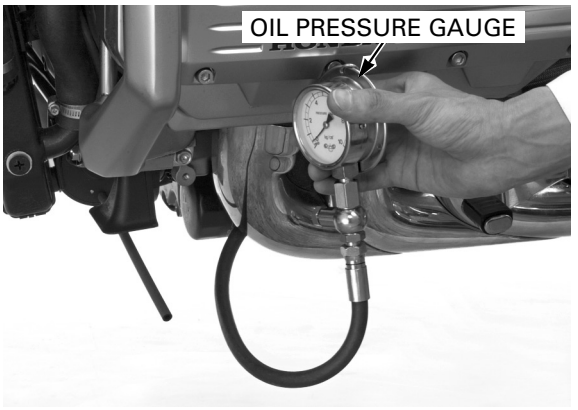
If the engine is cold, the pressure reading will be abnormally high.
Warm the engine to normal operating temperature before checking the oil pressure.
Stop the engine.

Remove the radiator covers (page 3-6).

Remove the switch cover and disconnect to the oil pressure switch wire by removing the terminal screw.



Remove the oil pressure switch and connect an oil pressure gauge attachment and gauge to the pressure switch hole.



TOOL:

Oil pressure gauge attachment	**07510-4220100**
Oil pressure gauge	**07506-3000001**

Check the oil level and add the recommended oil if necessary (page 4-9).

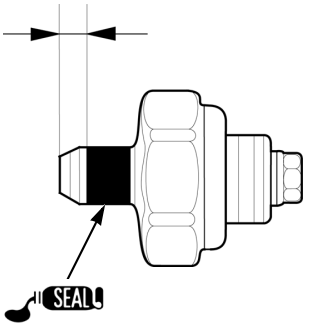
Start the engine and check the oil pressure at 5,000 rpm (80°C/176°F).

OIL PRESSURE: 530 kPa (5.4 kgf/cm^2, 77 psi)

Stop the engine.

Apply sealant to the oil pressure switch threads as shown and install it.

Do not apply to the thread head.
3 – 4 mm (0.1 – 0.2 in)



TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the oil pressure switch wire and tighten the terminal screw.
Install the switch cover.

Start the engine.
Check that the oil pressure indicator turns off after 1 or 2 seconds. If the oil pressure indicator stays on, stop the engine immediately and determine the cause (page 20-20).

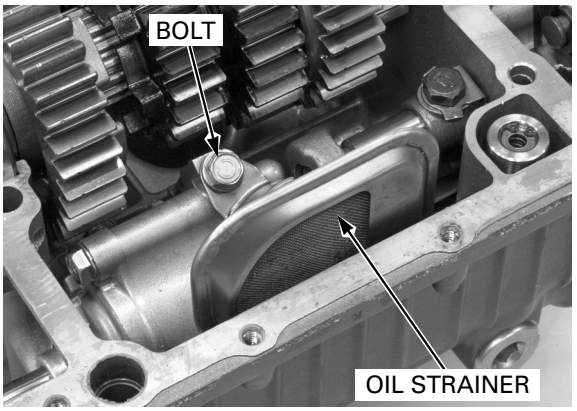
Install the radiator covers (page 3-6).

OIL STRAINER/PRESSURE RELIEF VALVE

OIL STRAINER

Separate the crankcase (page 12-6).

Remove the strainer bolt and oil strainer from the oil pump.
Remove the oil strainer packing.



Clean the oil strainer thoroughly.

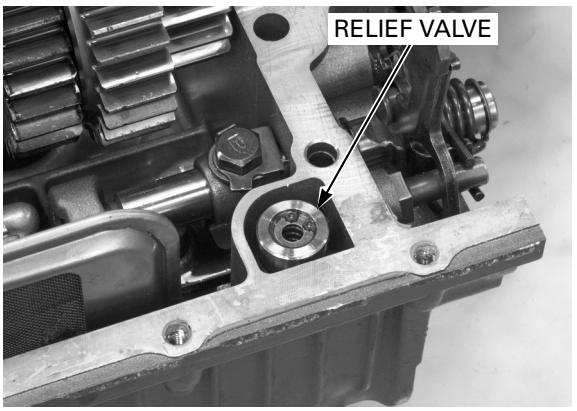
Apply engine oil to the new packing and install it onto the oil pump.
Apply locking agent to the oil strainer bolt threads.
Install the oil strainer onto the oil pump with the strainer bolt.
Tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

OIL PRESSURE RELIEF VALVE

Separate the crankcase (page 12-6).

Remove the oil pressure relief valve and O-ring.

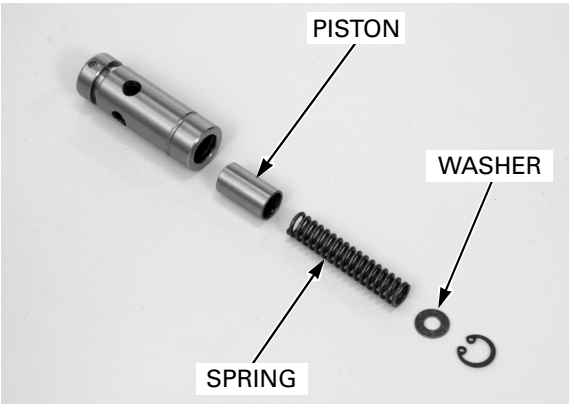


Check the operation of the pressure relief valve by pushing on the piston.

Disassemble the relief valve by removing the snap ring.

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

Assemble the relief valve in the reverse order of disassembly.



Apply engine oil to the new O-ring and install it onto the relief valve.
Install the relief valve into the crankcase.

Assemble the crankcase (page 12-22).

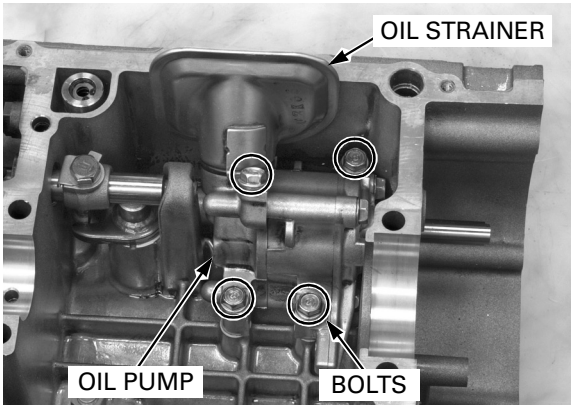
OIL PUMP

REMOVAL

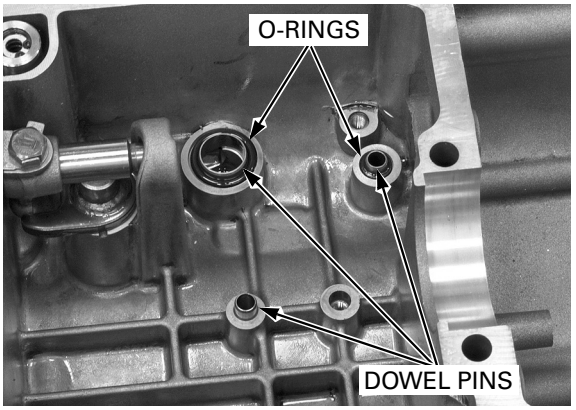
Remove the transmission (page 11-33).

Remove the strainer bolt and oil strainer from the oil pump.
Remove the oil strainer packing.

Remove the three mounting bolts and oil pump from the crankcase.

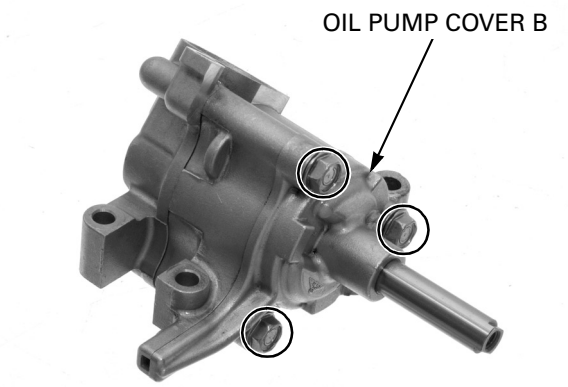


Remove the three dowel pins and two O-rings.



DISASSEMBLY

Remove the three oil pump assembly bolts and oil pump cover B.

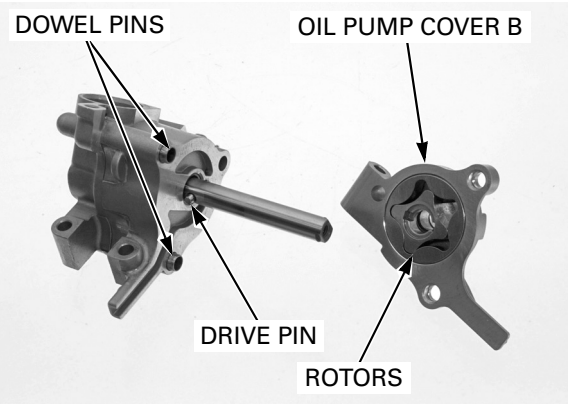


Remove the dowel pins from the oil pump body.

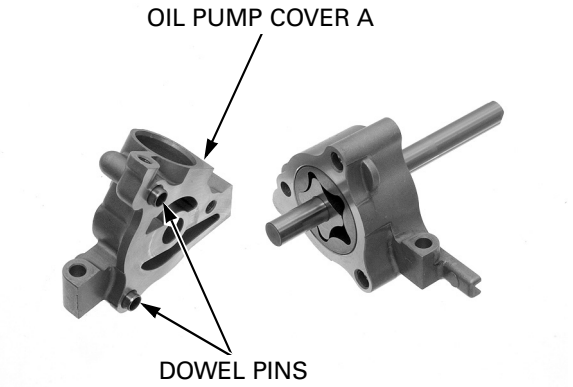
SCAVENGE PUMP SIDE:

Remove the drive pin from the oil pump shaft.
Remove outer rotor B and inner rotor B from oil pump cover B.

Remove the oil seal from oil pump cover B to avoid damaging the cover.



Remove oil pump cover A from the oil pump body.
Remove the dowel pins from the cover.

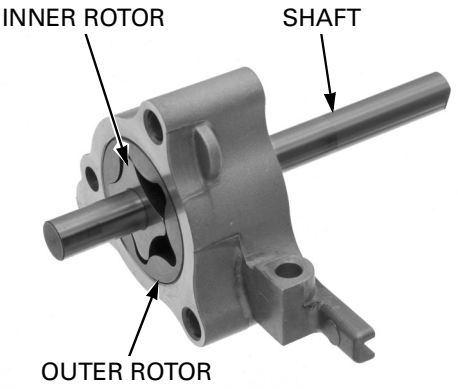


FEED PUMP SIDE:

Remove the following from the oil pump body.

- oil pump shaft
- thrust washer
- drive pin
- inner rotor
- outer rotor

Remove the oil seal from the oil pump body to avoid damaging the pump body.



INSPECTION

Temporarily assemble each inner rotor, outer rotor and drive pin onto the pump shaft, and install them into the pump body and pump cover B.

Measure the tip clearance for the feed and scavenge pumps.

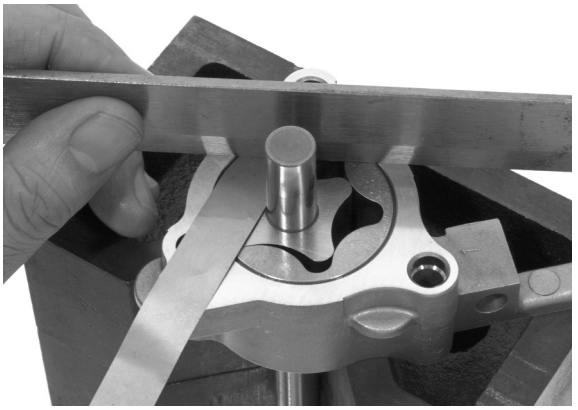
SERVICE LIMIT: 0.20 mm (0.008 in)

Measure the pump body clearance for the feed and scavenge pumps.

SERVICE LIMIT: 0.35 mm (0.014 in)

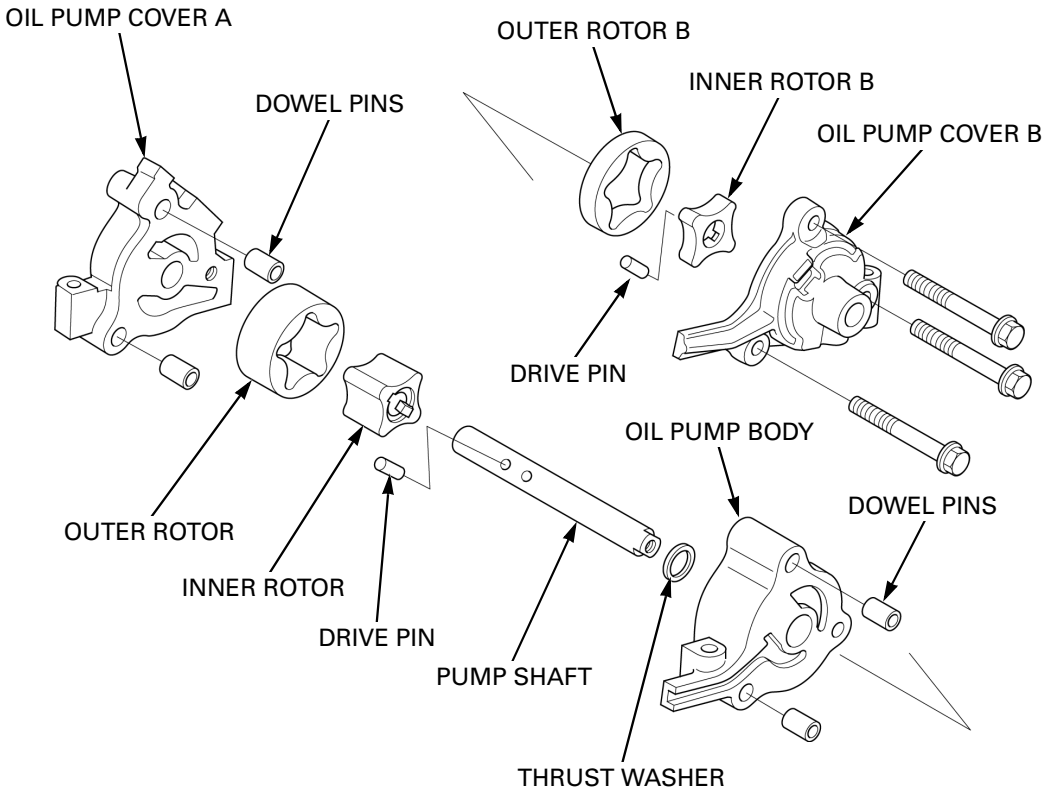
Measure the pump side clearance for the feed and scavenge pumps.

SERVICE LIMIT: 0.12 mm (0.005 in)



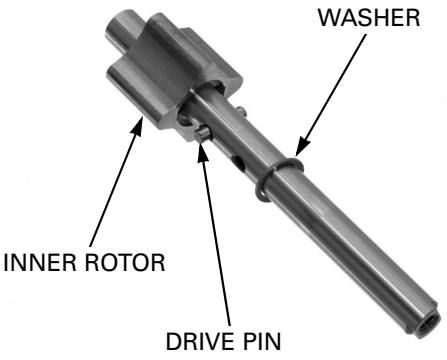
ASSEMBLY

Dip all parts in clean engine oil.

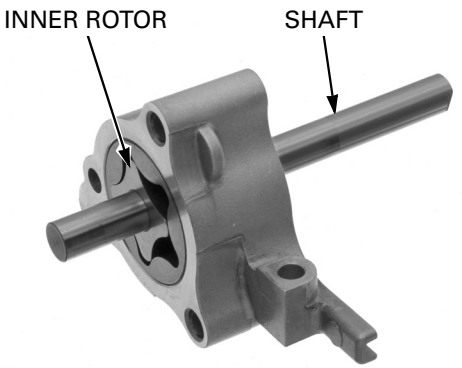


Coat the new oil seal lips with grease.
Drive the new oil seals into the oil pump body and oil pump cover B with the sealed side facing up until they are fully seated using the suitable collar (15-mm O.D.).

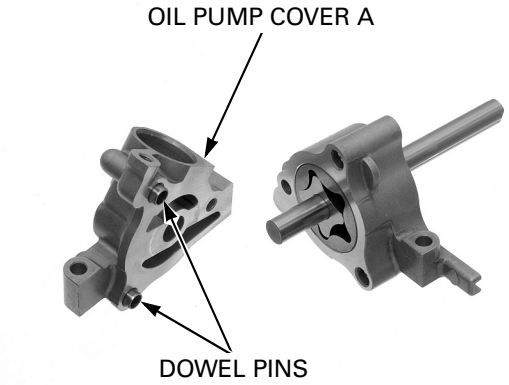
Install the inner rotor onto the oil pump shaft.
Install the drive pin into the pump shaft hole and align the drive pin with the groove in the inner rotor.
Install the thrust washer onto the shaft.



Install the assembled pump shaft into the oil pump body with the threaded hole end facing toward the pump body.
Install the outer rotor into the pump body.



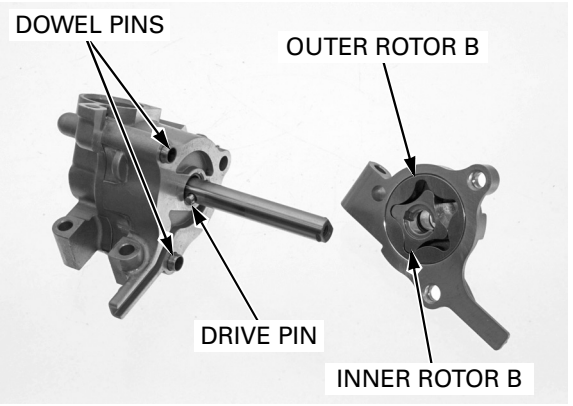
Install the dowel pins as shown.
Assemble the oil pump body and pump cover A.



Install the drive pin into the pump shaft hole.
Install outer rotor B and inner rotor B into pump cover B.

Install the dowel pins as shown.

Assemble the pump body and pump cover B by aligning the drive pin with the groove in inner rotor B.

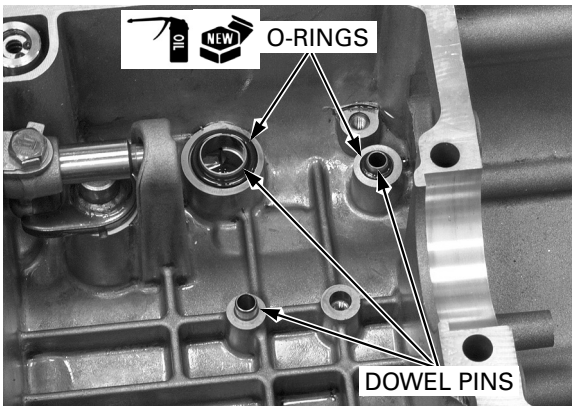


Install the oil pump assembly bolts and tighten the bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

INSTALLATION

Install the three dowel pins.
Coat the new O-rings with engine oil and install them.

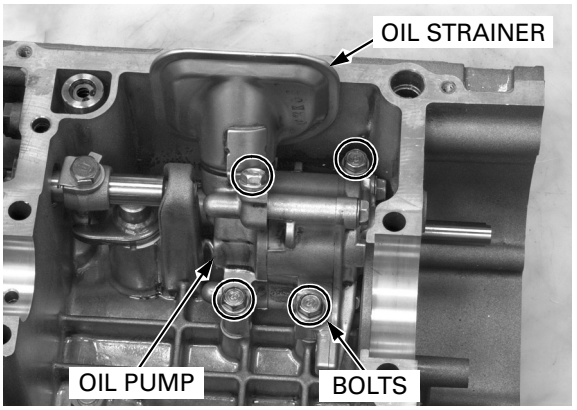


Install the oil pump with the three mounting bolts.
Tighten the bolts securely.

Apply engine oil to the new packing and install it onto the oil pump.
Apply locking agent to the oil strainer bolt threads.
Install the oil strainer onto the oil pump with the strainer bolt.
Tighten the strainer bolt to the specified torque.

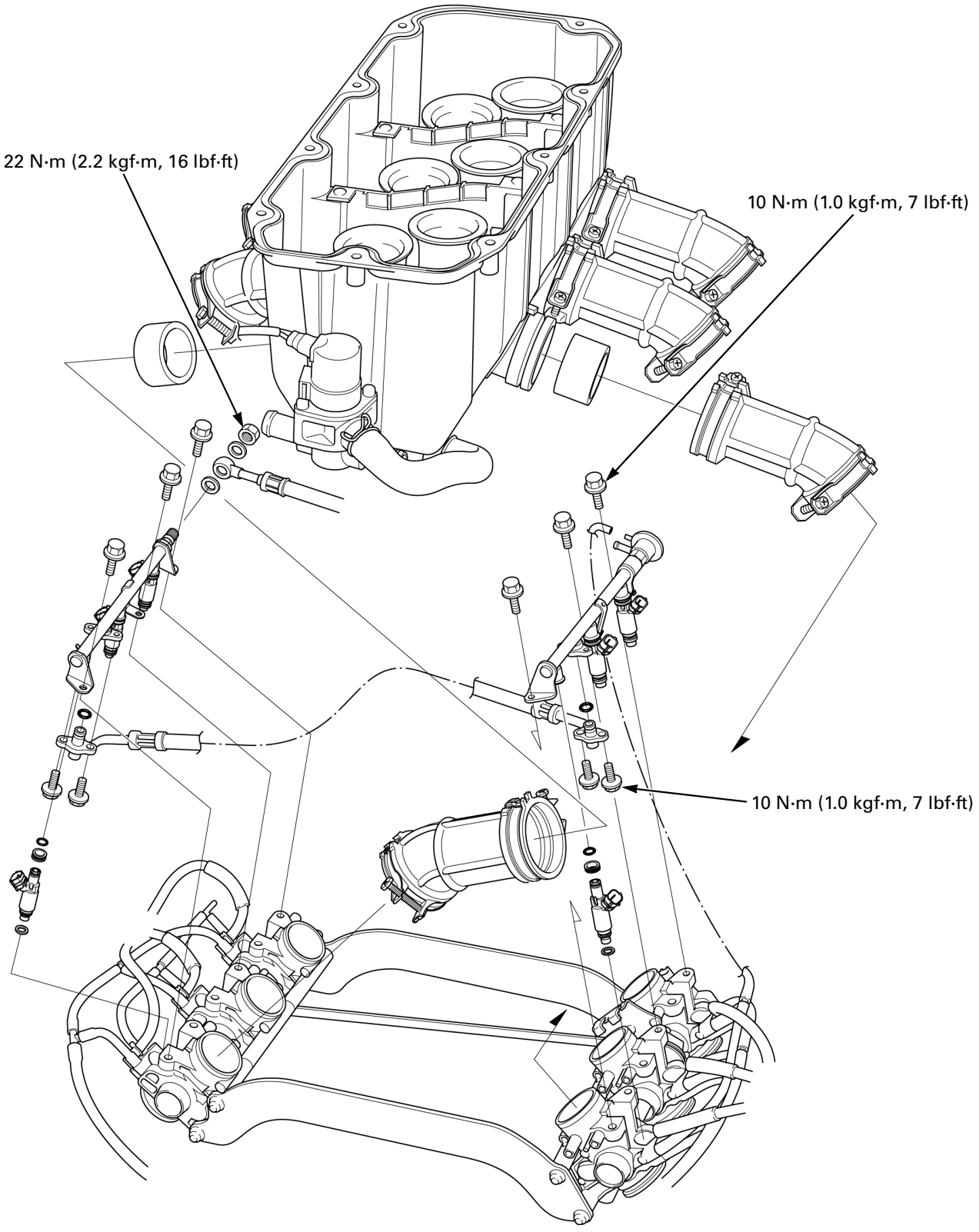
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the transmission (page 11-40).



6. FUEL SYSTEM (Programmed Fuel Injection)

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- Be sure to relieve the fuel pressure with the ignition switch turned to "OFF".
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel pipe on the throttle body while removing or installing the throttle body.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- Prevent dirt and debris from entering the throttle bore, fuel hose and return hose. Clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not push the fuel pump base under the fuel tank when the fuel tank is stored.
- Always replace the O-ring when the fuel pump is removed.
- The PGM-FI (Programmed Fuel Injection) system is equipped with a Self-Diagnostic System (page 6-8). If the malfunction indicator lamp (MIL) blinks, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI system, always follow the steps in the troubleshooting flow chart (page 6-12).
- The PGM-FI system is provided with a fail-safe function to ensure a minimum running capability, even if there is trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is ensured by using numerical values preset in advance in the program map. It must be remembered, however, that when any abnormality is detected in the injectors, ignition pulse generator and/or camshaft position sensor, the fail-safe function stops the engine to protect it from damage.
- Refer to PGM-FI system location (page 6-6).
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- The vehicle speed sensor sends a digital pulse signal to the ECM (PGM-FI unit) for computation.
- When disassembling the programmed fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Before disconnecting the fuel hose, release the fuel pressure by loosening the fuel hose banjo bolt at the fuel tank.
- Always replace the sealing washers when the fuel hose banjo bolt is removed or loosened.
- Use a digital tester for PGM-FI system inspection.
- See page 18-12 for bank angle sensor inspection.
- See page 18-11 for bank angle sensor relay inspection.
- See page 20-17 for ECT sensor inspection.
- See page 20-18 for fuel level sensor information.
- See page 20-24 for neutral switch inspection.

SPECIFICATIONS

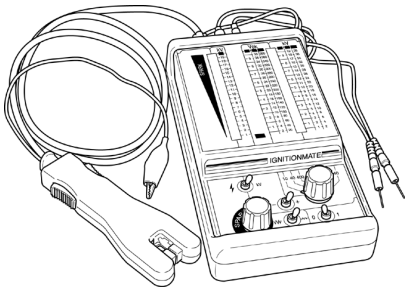
ITEM		SPECIFICATIONS
Throttle body identification number	49 state and Canada type	GQ81B
	California type	GQ81A
Starter valve vacuum difference		20mm Hg
Base throttle valve for synchronization		No. 4
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)
Intake air temperature sensor resistance (at 20°C/68°F)		2.2 – 2.7 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)		2.3 – 2.6 kΩ
Throttle position sensor resistance (at 20°C/68°F)		5 – 7.6 Ω
Fuel injector resistance (at 20°C/68°F)		10.5 – 14.5 Ω
Camshaft position sensor peak voltage		0.7 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Manifold absolute pressure at idle		250 – 300 mmHg (9.8 – 11.8 inHg
Fuel pressure at idle		343 kPa (3.5 kgf/cm^2, 50 psi)
Fuel pump flow (at 12 V)		133 cm^3 (4.5 US oz, 4.7 Imp oz) minimum/10 seconds
Idle speed	49 state and Canada type	850 ± 100 rpm
	California type	950 ± 100 rpm

TORQUE VALUES

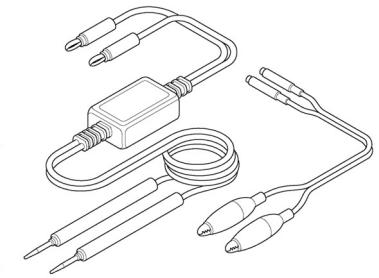
Fuel feed hose sealing nut (fuel rail side)	22 N·m (2.2 kgf·m, 16 lbf·ft)
Fuel feed hose banjo bolt (fuel tank side)	22 N·m (2.2 kgf·m, 16 lbf·ft)
Fuel hose joint bolt (at fuel rail)	10 N·m (1.0 kgf·m, 7 lbf·ft)
Fuel rail mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Pressure regulator nut	29 N·m (3.0 kgf·m, 22 lbf·ft)
Steering lock lever mounting bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Rear brake fluid reservoir stay bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Fuel pump nut	12 N·m (1.2 kgf·m, 9 lbf·ft)
MAP sensor screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
PAIR check valve cover bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Knock sensor	31 N·m (3.2 kgf·m, 23 lbf·ft)
Engine coolant temperature (ECT) sensor	25 N·m (2.5 kgf·m, 18 lbf·ft)
Vehicle speed sensor bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

TOOLS

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

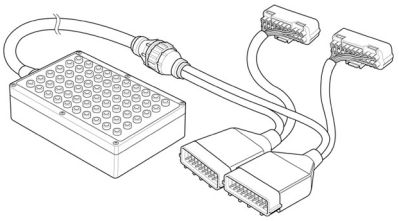


Peak voltage adaptor
07HGJ-0020100

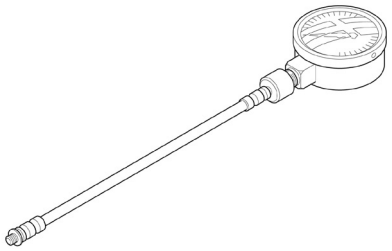


(not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

Test harness set
07WMZ-MBGA000

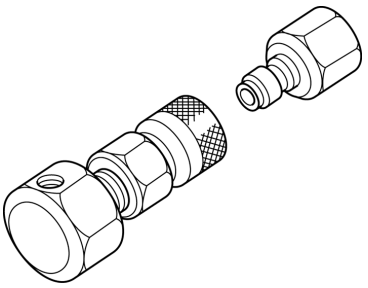


Fuel pressure gauge, 0 – 100 psi
07406-0040003

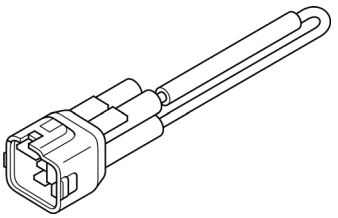


or 07406-004000B or 07406-004000A (U.S.A. only)

Fuel pressure adaptor, 90°
07AMJ-HW1A100 (U.S.A. only)



SCS service connector
070PZ-ZY30100



TROUBLESHOOTING

Engine cranks but won't start
- No fuel in tank
- No fuel to injector
  - Clogged fuel filter
  - Pinched or clogged fuel feed hose
  - Pinched or clogged fuel tank breather tube
  - Faulty fuel pump
  - Faulty fuel pump circuits
- Intake air leak
- Contaminated/deteriorated fuel
- Faulty fuel injector
- Idle air control (IAC) valve stuck closed
- Pinched or clogged IAC valve hoses
- No spark at plug (faulty ignition system)

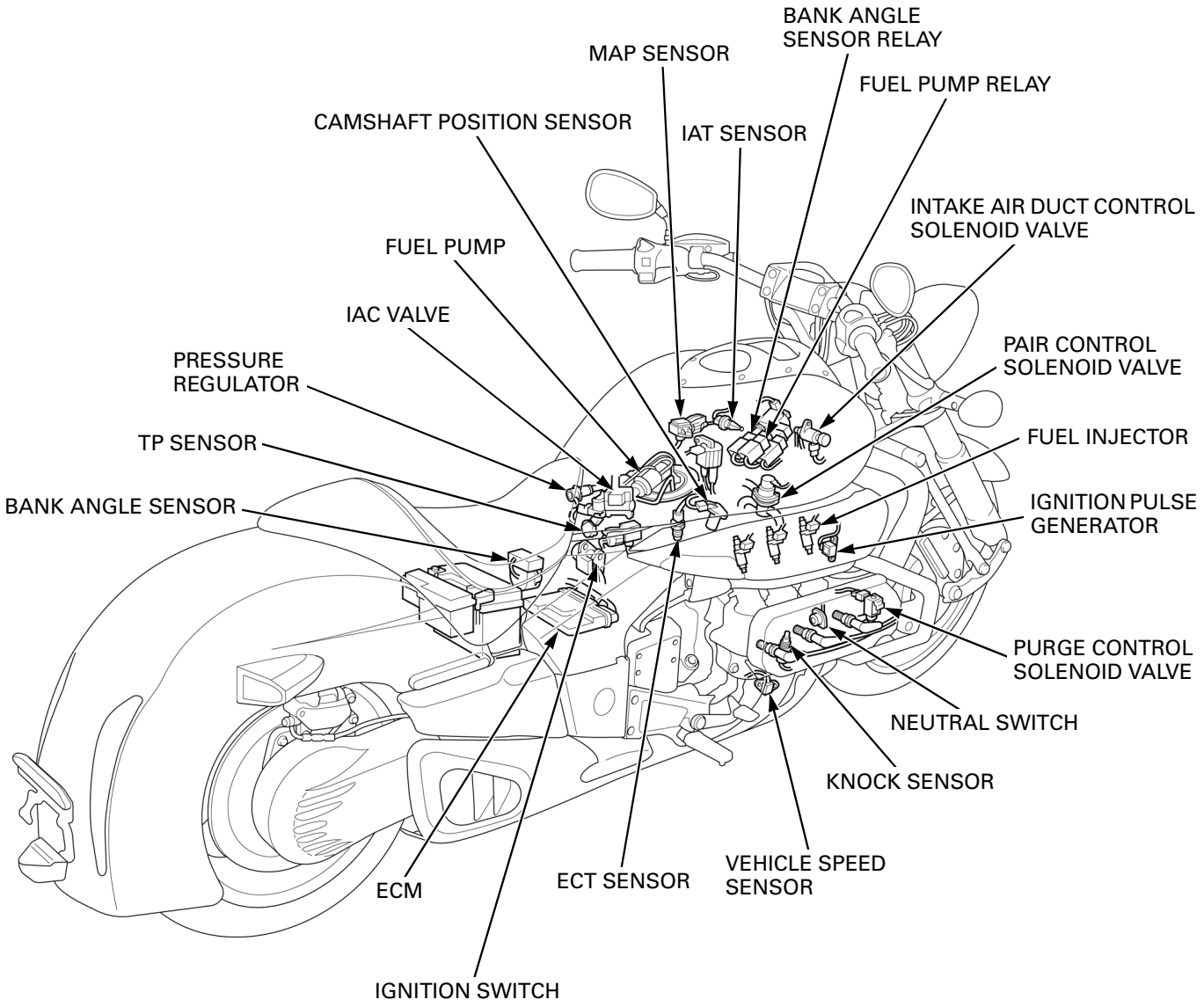
Engine stalls, hard to start, rough idling
- Restricted fuel feed hose
- Contaminated/deteriorated fuel
- Intake air leak
- Faulty idle air control valve
- Restricted IAC valve hoses
- Restricted fuel tank breather tube
- Faulty ignition system
- Faulty pressure regulator

Afterburn when engine braking is used
- Faulty pulse secondary air injection (PAIR) system
  - Faulty PAIR control solenoid valve
  - Faulty PAIR check valve
  - Clogged hose in the PAIR system
- Faulty ignition system

Backfiring or misfiring during acceleration
- Faulty ignition system

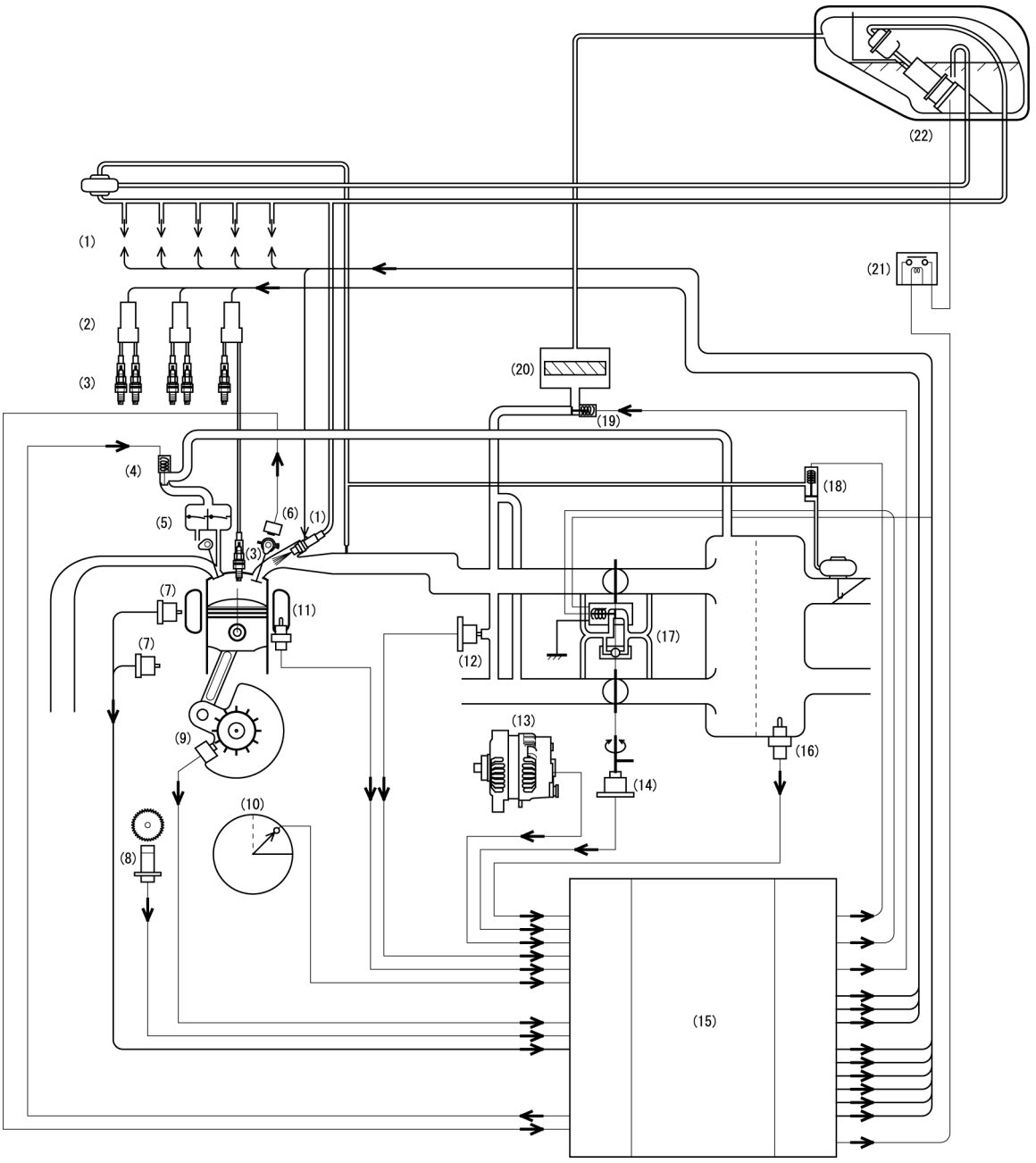
Poor performance (driveability) and poor fuel economy
- Pinched or clogged fuel feed hose
- Faulty pressure regulator
- Faulty ignition system

SYSTEM LOCATION



FULL NAME	ABBREVIATIONS
Engine control module	ECM
Engine coolant temperature sensor	ECT sensor
Idle air control valve	IAC valve
Intake air temperature sensor	IAT sensor
Manifold absolute pressure sensor	MAP sensor
Throttle position sensor	TP sensor

SYSTEM DIAGRAM

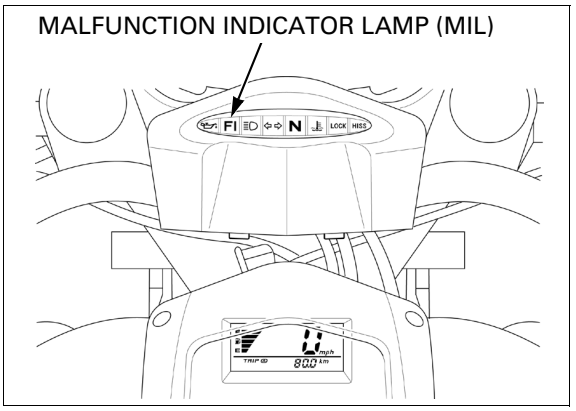


(1)	Fuel injectors	(12)	MAP sensor
(2)	Ignition coils	(13)	Alternator
(3)	spark plugs	(14)	TP sensor
(4)	Pulse secondary air (PAIR) control solenoid valve	(15)	ECM
(5)	PAIR check valve	(16)	IAT sensor
(6)	Camshaft position sensor	(17)	IAC valve
(7)	Knock sensor	(18)	Intake air duct control solenoid valve
(8)	Vehicle speed sensor	(19)	Evaporative emission (EVAP) control solenoid valve (California type only)
(9)	Ignition pulse generator	(20)	EVAP canister (California type only)
(10)	Neutral switch	(21)	Fuel pump relay
(11)	ECT sensor	(22)	Fuel pump

PGM-FI SELF-DIAGNOSIS INFORMATION

SELF-DIAGNOSTIC DATA INDICATION PROCEDURE

Place the motorcycle on its side stand.
Turn the ignition switch to "ON" and engine stop switch to "".
The malfunction indicator lamp (MIL) lights for a few seconds, then goes out.



Start the engine and let it idle.

NOTE:

- If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blinks.

If the MIL does not blink, the ECM has no problem data.
If the MIL blinks, read and record how many times the MIL blinks, and determine the cause of the problem (page 6-12).

NOTE:

- The MIL will start blinking when the side stand is lowered and the engine speed is below 1,500 rpm. If the side stand is retracted or the engine speed is above 1,500 rpm, the MIL will illuminate and stay lit.

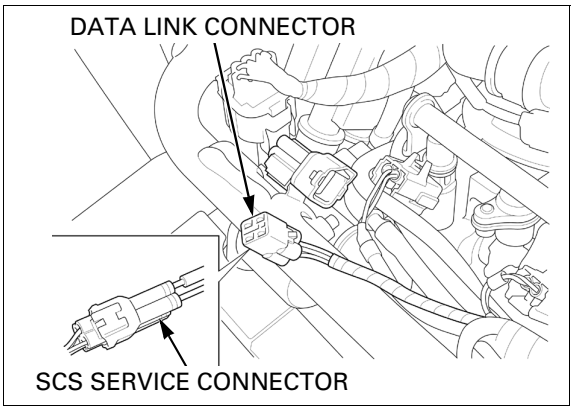
To read the ECM memory of problem data, perform the following:

Turn the ignition switch to "OFF".

Remove the left front side cover (page 3-4).

Short the Data Link Connector (DLC) terminals using the special tool.

TOOL:
SCS service connector 070PZ-ZY30100



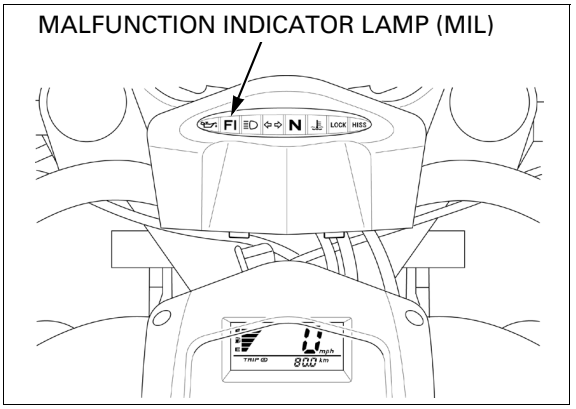
Make sure the engine stop switch is turned to "".

Turn the ignition switch to "ON".

If the ECM has no problem data in its memory, the MIL will come on and stay on.

If the ECM has problem data in its memory, the MIL will start blinking.

Read and record how many times the MIL blinks, and determine the cause of the problem (page 6-12).



SELF-DIAGNOSTIC MEMORY RESET PROCEDURE

Remove the left front side cover (page 3-4).

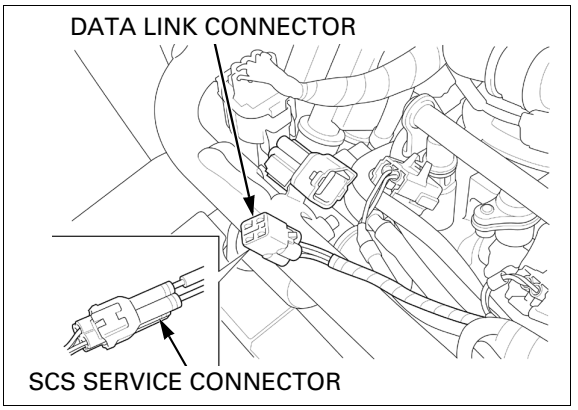
Place the side stand down.

1. Make sure the engine stop switch is turned to "⟲" and turn the ignition switch to "OFF".

Do not short the other terminals except specified.

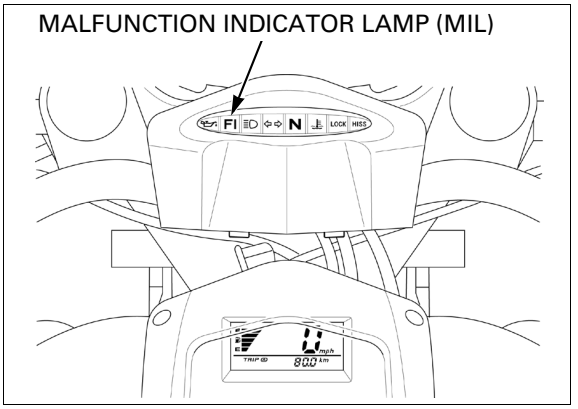
2. Short the Data Link Connector (DLC) terminals using a special tool.

TOOL:
SCS service connector 070PZ-ZY30100



3. Turn the ignition switch to "ON".
4. Remove the special tool from the Data Link Connector (DLC).
5. The MIL will light for approximately 5 seconds. While the MIL lights, short the Data Link Connector (DLC) again with the special tool.

   The self-diagnostic memory is erased if the MIL goes off and starts blinking.



NOTE:

- The Data Link Connector (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 to "OFF" before the MIL starts blinking.

  If the MIL blinks 33 times, the self-diagnostic memory has not been erased.

PEAK VOLTAGE INSPECTION PREPARATION

NOTE:

- Use this procedure for the ignition pulse generator and camshaft position sensor inspection.
- Use a commercially available digital multimeter (impedance 10 MΩ/DCV minimum).
- The display value differs depending upon the internal impedance of the multimeter.
- Check the cylinder compression of each cylinder and check that each spark plug is installed correctly.

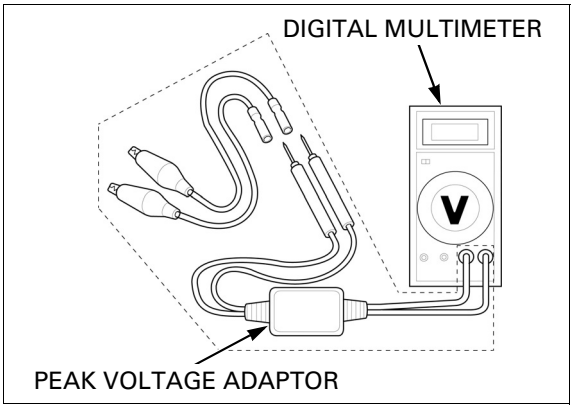
Raise the front of the fuel tank and support it (page 3-4).

Disconnect the fuel pump 2P connector.

Connect the peak voltage adaptor to the digital multimeter.

TOOLS:

IgnitionMate peak voltage tester (U.S.A. only) or	**MTP07-0286**
Peak voltage adaptor with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)	**07HGJ-0020100 (not available in U.S.A.)**

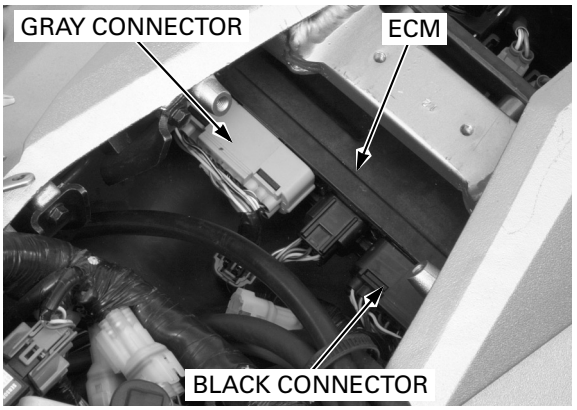


TEST HARNESS CONNECTION

Remove the seat (page 3-3).

Do not disconnect the 6P black connector from the ECM.

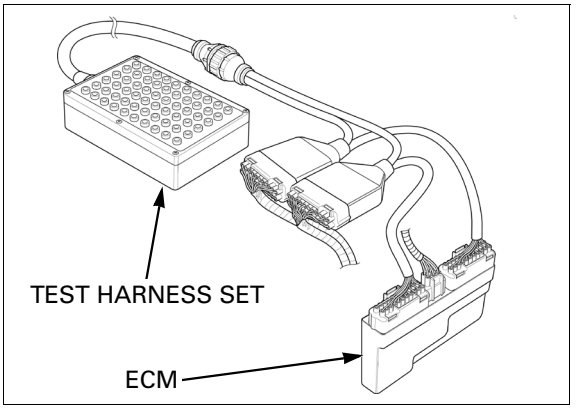
Turn the ignition switch to "OFF".
Disconnect the 22P black and gray connectors from the ECM.



Connect the test harnesses set to the ECM and ECM connectors.

TOOLS:

Test harness set	**07WMZ-MBGA000**

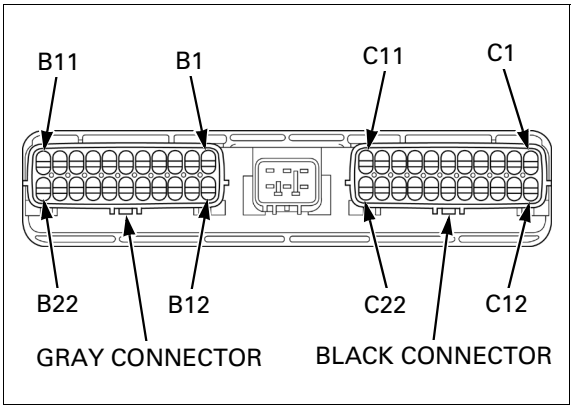


TEST PIN BOX TERMINAL LAYOUT

The ECM connector terminals are numbered as shown.

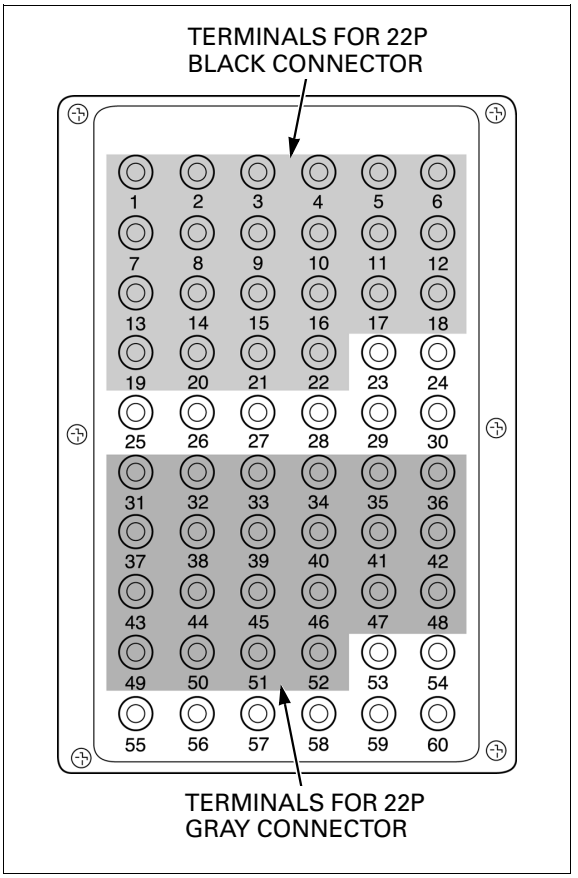
Terminals No. 1 to No. 22 of the test pin box of the test harness are for terminals C1 to C22 of the ECM black connector.
Terminals No. 31 to No. 52 of the test pin box of the test harness are for terminals B1 to B22 of the ECM gray connector.

Example:
ECM terminals: B8 (+) – C8 (–)
Test pin box terminals: No. 38 – No. 8



Terminal conversion chart

22P black connector terminal No.	Test pin box terminal No.
C1 C2 ⋮ C21 C22	1 2 ⋮ 21 22
22P gray connector terminal No.	Test pin box terminal No.
B1 B2 ⋮ B21 B22	31 32 ⋮ 51 52



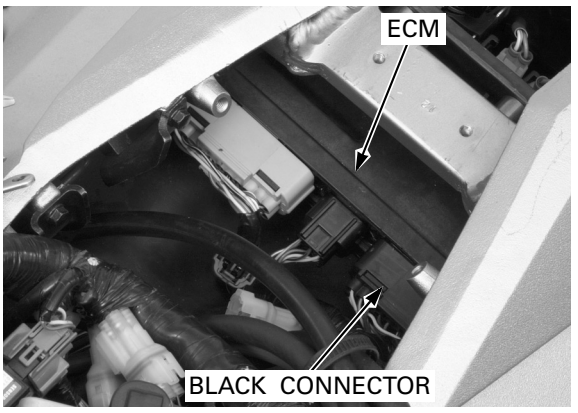
MALFUNCTION INDICATOR LAMP (MIL) CHECK

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

Check the oil pressure and high beam indicator function properly.

If they do not function, check the indicator box power input line (page 20-15).

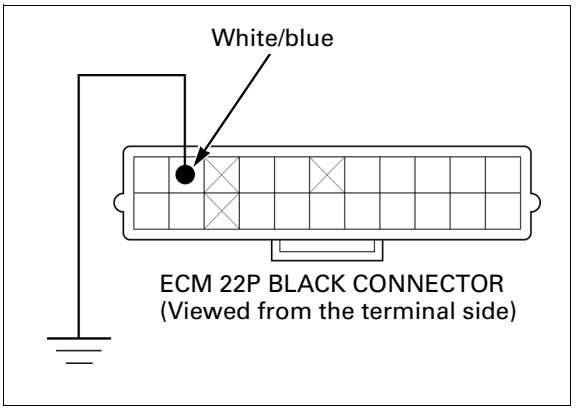
If they function properly, check as follows:
Remove the seat (page 3-3).
Turn the ignition switch to "OFF" and disconnect the ECM 22P black connector.



Ground the White/blue wire terminal of the wire harness side connector with a jumper wire.
Turn the ignition switch to "ON", the MIL should light.

If the MIL lights, replace the ECM.

If the MIL does not light, check for open circuit in the White/blue wire between the indicator box and ECM.
If the wire is OK, replace the indicator box.



MALFUNCTION INDICATOR LAMP (MIL) FAILURE CODES

- The PGM-FI malfunction indicator lamp (MIL) denotes the failure codes (the number of blinks from 0 to 33). The MIL has two types of blinks, a long blink and short blink. The long blink lasts for 1.3 seconds, the short blink lasts for 0.5 seconds. When a long blink occurs, that counts for 10 blinks of the MIL. The short blink counts for one MIL blink. Therefore, if the MIL blinks two long blinks, and one short blink, that problem code is 21 (two long blinks = 20 blinks, one short blink = 1 blink). Then, go to the flow chart and see problem code 21.
- When the Engine Control Module (ECM) stores some failure codes, the MIL shows the failure codes in the order from the lowest number to highest number. For example, when the MIL blinks once, then blinks seven times, two failures have occurred. Follow the flow charts for failure codes 1 and 7.

MIL	Function failure	Causes	Symptoms	Refer to
No blinks	ECM malfunction	• Faulty ECM	• Engine does not start	6-11
No blinks	ECM power/ ground circuits malfunction	• Open circuit in the power input wire of the ECM • Faulty bank angle sensor • Open circuit in bank angle sensor related circuit • Faulty bank angle sensor relay • Open circuit in bank angle sensor relay related wires • Faulty engine stop switch • Open circuit in engine stop switch related wires • Faulty ignition switch • Blown FI IGN fuse (20 A) • Blown IGNITION fuse (10A)	• Engine does not start	6-57
No blinks	MIL circuit malfunction	• Open circuit in MIL wire	• Engine operates normally	6-11
Stays lit	Data link circuit malfunction	• Short circuit in data link connector brown and green wire terminals • Faulty ECM • Short circuit in data link connector brown wire	• Engine operates normally	–
Stays lit	MIL circuit malfunction	• Short circuit in MIL wire	• Engine operates normally	–
1 blink	MAP sensor circuit malfunction	• Loose or poorly connected MAP sensor connector • Open or short circuit in MAP sensor wire • Faulty MAP sensor	• Engine operates normally	6-14
2 blinks	MAP sensor performance problem	• Loose or poorly connected MAP sensor vacuum hose • Faulty MAP sensor	• Engine operates normally	6-16
7 blinks	ECT sensor circuit malfunction	• Loose or poorly connected ECT sensor connector • Open or short circuit in ECT sensor wire • Faulty ECT sensor	• Hard start at a low temperature (ECM controls using preset value; coolant temperature: 85°C/ 185°F)	6-17
8 blinks	TP sensor circuit malfunction	• Loose or poorly connected TP sensor connector • Open or short circuit in TP sensor wire • Faulty TP sensor	• Poor engine response when operating the throttle quickly (ECM controls using preset value; throttle opening: 0°)	6-19
9 blinks	IAT sensor circuit malfunction	• Loose or poorly connected IAT sensor connector • Open or short circuit in IAT sensor wire • Faulty IAT sensor	• Engine operates normally (ECM controls using preset value; intake air temperature: 28°C/82°F)	6-21
11 blinks	Vehicle speed sensor circuit malfunction	• Loose or poorly connected vehicle speed sensor connector • Open or short circuit in vehicle speed sensor wire • Faulty vehicle speed sensor	• Engine operates normally	6-22

MIL	Function failure	Causes	Symptoms	Refer to
12 blinks	No. 1 injector circuit malfunction	• Loose or poorly connected No. 1 injector connector • Open or short circuit in No. 1 injector wire • Faulty No. 1 injector	• Engine does not start	6-24
13 blinks	No. 2 injector circuit malfunction	• Loose or poorly connected No. 2 injector connector • Open or short circuit in No. 2 injector wire • Faulty No. 2 injector	• Engine does not start	6-25
14 blinks	No. 3 injector circuit malfunction	• Loose or poorly connected No. 3 injector connector • Open or short circuit in No. 3 injector wire • Faulty No. 3 injector	• Engine does not start	6-25
15 blinks	No. 4 injector circuit malfunction	• Loose or poorly connected No. 4 injector connector • Open or short circuit in No. 4 injector wire • Faulty No. 4 injector	• Engine does not start	6-26
16 blinks	No. 5 injector circuit malfunction	• Loose or poorly connected No. 5 injector connector • Open or short circuit in No. 5 injector wire • Faulty No. 5 injector	• Engine does not start	6-26
17 blinks	No. 6 injector circuit malfunction	• Loose or poorly connected No. 6 injector connector • Open or short circuit in No. 6 injector wire • Faulty No. 6 injector	• Engine does not start	6-26
18 blinks	Camshaft position sensor, no signal	• Loose or poorly connected camshaft position sensor • Open or short circuit in camshaft position sensor wire • Faulty camshaft position sensor	• Engine does not start	6-27
19 blinks	Ignition pulse generator, no signal	• Loose or poorly connected ignition pulse generator • Open or short circuit in ignition pulse generator wire • Faulty ignition pulse generator	• Engine does not start	6-28
25 blinks	Right knock sensor circuit malfunction	• Loose or poorly connected right knock sensor connector • Open or short circuit in right knock sensor wire • Faulty right knock sensor	• Engine operates normally	6-29
26 blinks	Left knock sensor circuit malfunction	• Loose or poorly connected left knock sensor connector • Open or short circuit in left knock sensor wire • Faulty left knock sensor	• Engine operates normally	6-30
29 blinks	IAC valve circuit malfunction	• Loose or poorly connected IAC valve connector • Open or short circuit in IAC valve wire • Faulty IAC valve	• Engine stalls, hard to start, rough idling	6-31
33 blinks	ECM E^2-PROM malfunction	• Faulty ECM	• Engine operates normally • ECM does not hold the self-diagnosis data	6-33

MIL TROUBLESHOOTING

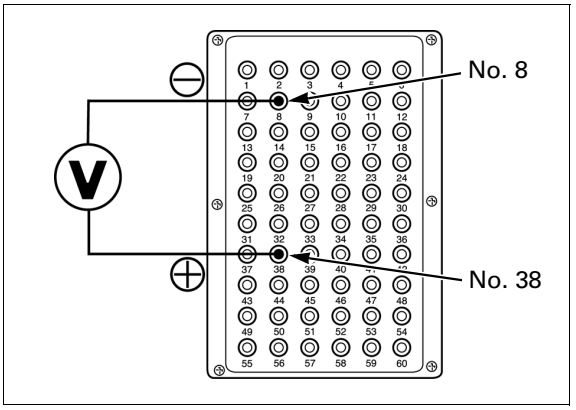
MIL 1 BLINK (MAP SENSOR)

- Before starting the troubleshooting, check the MAP sensor connector for loose contacts or corroded terminals, and recheck the MIL blinking.

1. MAP Sensor Output Voltage Inspection

Turn the ignition switch to "OFF".
Connect the ECM test harness to the ECM connectors (page 6-10).
Turn the ignition switch to "ON" and engine stop switch to "".
Measure the voltage between the test pin box terminals.

Connection: No. 38 (+) – No. 8 (–)
Standard: 2.7 – 3.1 V (760 mm Hg/1,013 hPa)



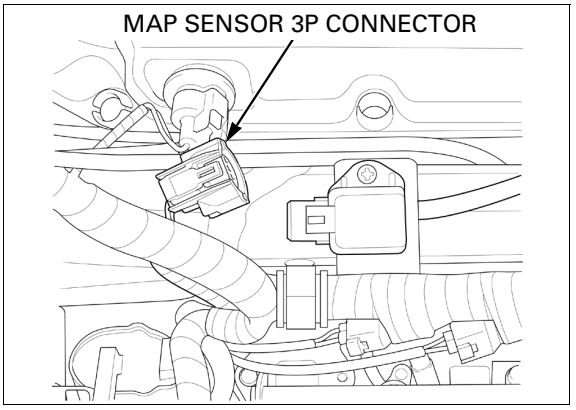
Is the voltage within 2.7 – 3.1 V?

YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

NO – • About 5 V
GO TO STEP 2.
• About 0 V
GO TO STEP 3.

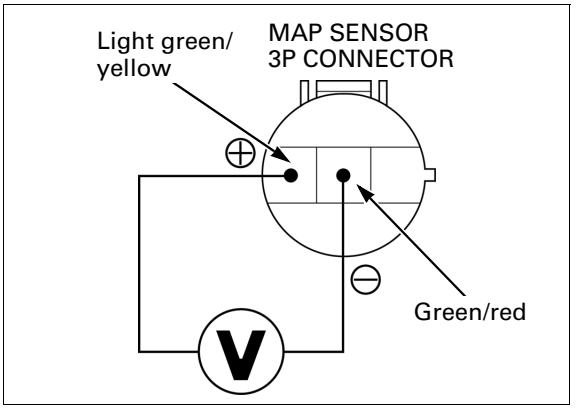
2. MAP Sensor Output Line Inspection

Turn the ignition switch to "OFF".
Disconnect the MAP sensor 3P connector.



Turn the ignition switch to "ON".
Measure the voltage between the wire harness side connector terminals.

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



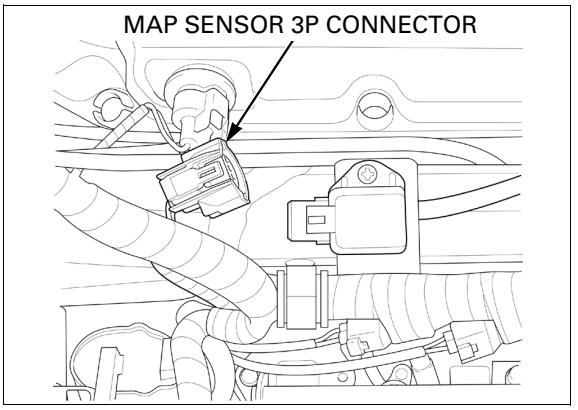
Is the voltage within 4.75 – 5.25 V?

YES – Faulty MAP sensor.

NO – • Open circuit in the Light green/yellow wire.
• Open circuit in the Green/red wire.

3. MAP Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the MAP sensor 3P connector.



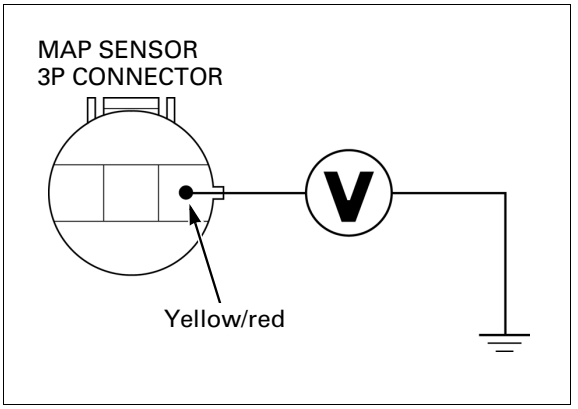
Turn the ignition switch to "ON".
Measure the voltage between the wire harness side connector terminals.

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

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 5.



4. MAP Sensor Output Line Short Circuit Inspection

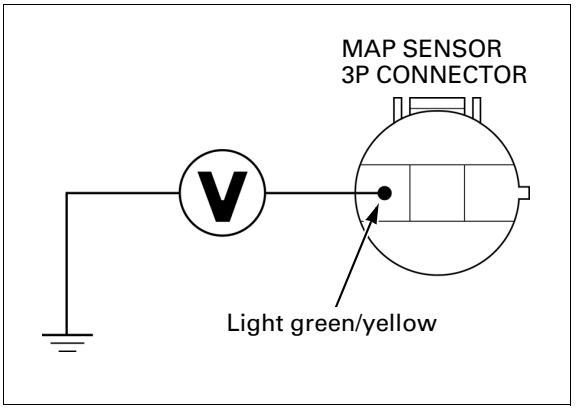
Turn the ignition switch to "OFF".
Check for continuity between the wire harness side connector terminal and ground.

Connection: Light green/yellow – Ground

Is there continuity?

YES – Short circuit in the Light green/yellow wire.

NO – Faulty MAP sensor.



5. MAP Sensor Input Line Inspection

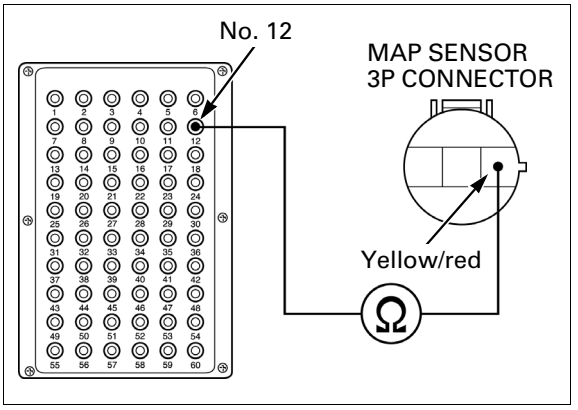
Turn the ignition switch to "OFF".
Check Yellow/red wire for continuity between the MAP sensor 3P connector terminal and test pin box terminal.

Connection: Yellow/red – No. 12

Is there continuity?

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

NO – Open circuit in the Yellow/red wire.



MIL 2 BLINKS (MAP SENSOR)

- Before starting the troubleshooting, check the MAP sensor connector for loose contacts or corroded terminals, and recheck the MIL blinking.

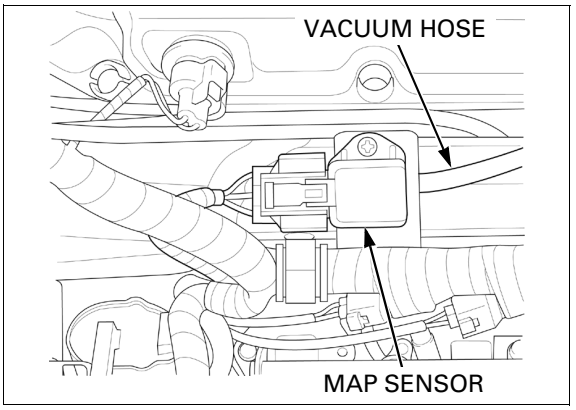
1. MAP Sensor Hose Inspection

Turn the ignition switch to "OFF".
Check the MAP sensor vacuum hose.

Is the MAP sensor vacuum hose connected securely?

YES – GO TO STEP 2.

NO – Connect the MAP sensor vacuum hose securely.



2. MAP Sensor Output Voltage Inspection

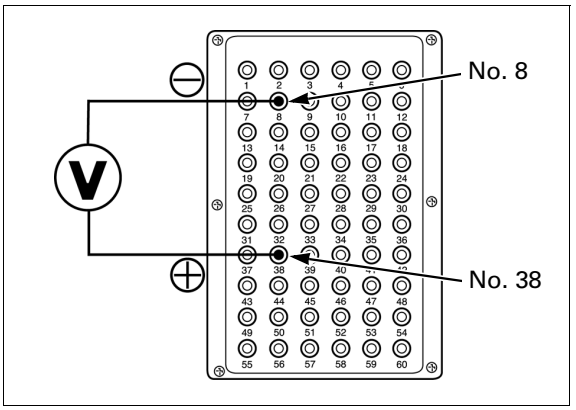
Connect the ECM test harness to the ECM connectors (page 6-10).
Turn the ignition switch to "ON" and engine stop switch to "".
Measure the voltage between the test pin box terminals.

Connection: No. 38 (+) – No. 8 (–)

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 between the test pin box terminals.

Connection: No. 38 (+) – No. 8 (–)
Standard: 2.7 V maximum

Is the voltage less than 2.7 V?

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

NO – Faulty MAP sensor.

MIL 7 BLINKS (ECT SENSOR)

- Before starting the troubleshooting, check the ECT sensor connector for loose contacts or corroded terminals, and recheck the MIL blinking.

1. ECT Sensor Output Voltage Inspection

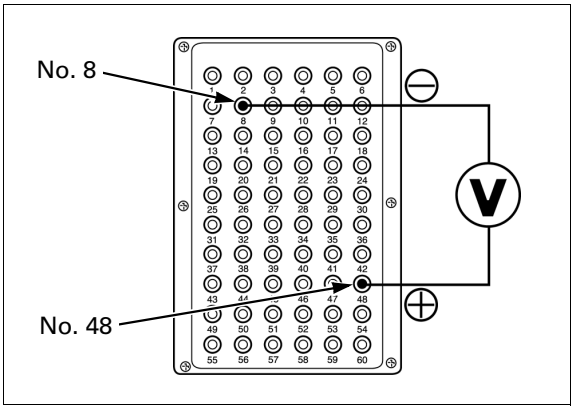
Turn the ignition switch to "OFF".
Connect the ECM test harness to the ECM connectors (page 6-10).
Turn the ignition switch to "ON" and engine stop switch to "".
Measure the voltage between the test pin box terminals.

Connection: No. 48 (+) – No. 8 (–)
Standard: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

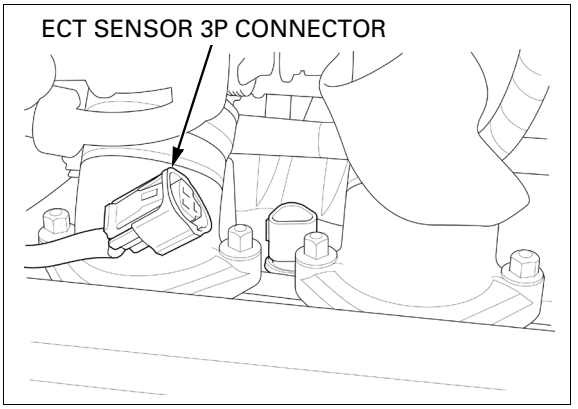
YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

No – GO TO STEP 2.



2. ECT Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the ECT sensor 3P connector.



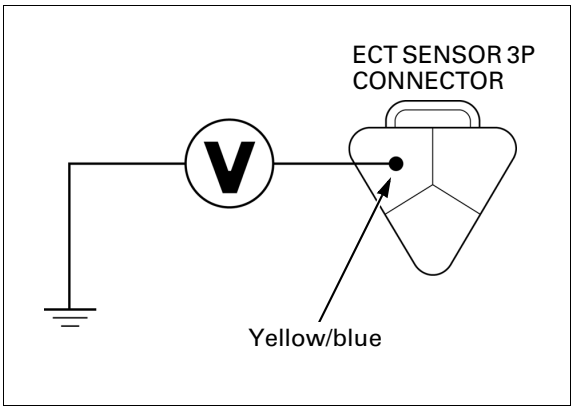
Turn the ignition switch to "ON".
Measure the voltage between the wire harness side connector terminals.

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

Is the voltage within 4.75 – 5.25V?

YES – Faulty ECT sensor.

NO – GO TO STEP 3.



3. ECT Sensor Open Circuit Inspection

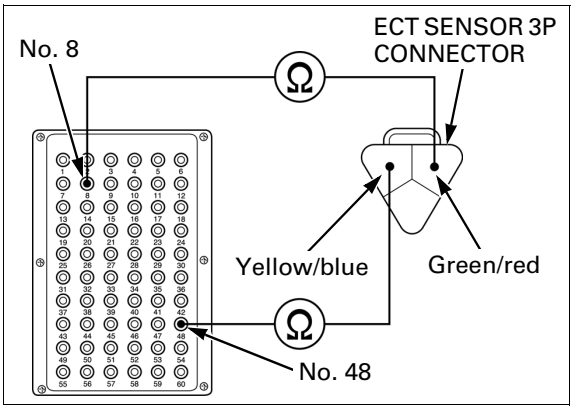
Turn the ignition switch to "OFF".
Check the Yellow/blue and Green/red wires for continuity between the ECT sensor 3P connector terminals and test pin box terminals.

Connection: Yellow/blue – No. 48
Green/red – No. 8

Are there continuity?

YES – GO TO STEP 4.

NO – • Open circuit in the Yellow/blue wire.
• Open circuit in the Green/red wire.



4. ECT Sensor Output Line Short Circuit Inspection

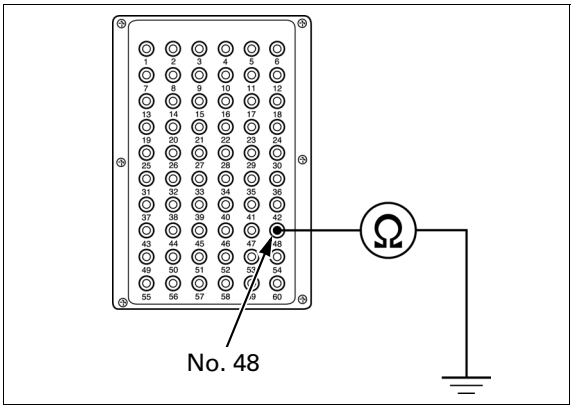
Check for continuity between the test pin box terminal and ground.

Connection: No. 48 – Ground

Is there continuity?

YES – Short circuit in the Yellow/blue wire.

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



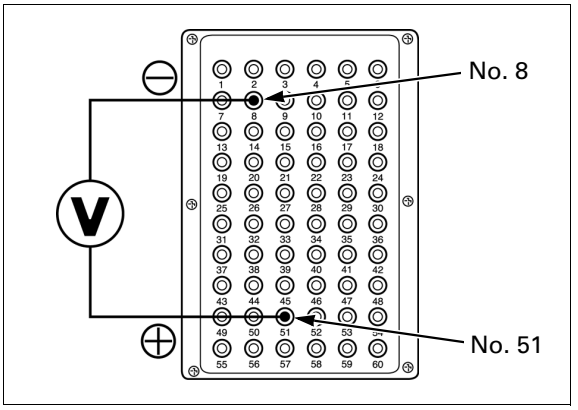
MIL 8 BLINKS (TP SENSOR)

- Before starting the troubleshooting, check the TP sensor connector for loose contacts or corroded terminals, and recheck the MIL blinking.

1. TP Sensor Output Voltage

Turn the ignition switch to "OFF".
Connect the ECM test harness to the ECM connectors (page 6-10).
Turn the ignition switch to "ON" and engine stop switch to "".
Measure the voltage between the test pin box terminals.

Connection: No. 51 (+) – No. 8 (–)
Standard: *0.4 – 0.6 V (throttle fully closed)
***4.2 – 4.8 V (throttle fully opened)**



NOTE:

- A voltage marked * refers to the value when the input voltage reading (page 6-19) shows 5 V.
  If the reading shows other than 5 V, derive a voltage range at the test pin box as follows:
  In the case of the ECM input voltage of 4.75 V:
  0.4 x 4.75/5.0 = 0.38 V
  0.6 x 4.75/5.0 = 0.57 V
  Thus, the solution is "0.38 – 0.57 V" with the throttle fully closed.
  Replace this calculation using 4.2 and 4.8 to get the resulting range for the throttle fully open.

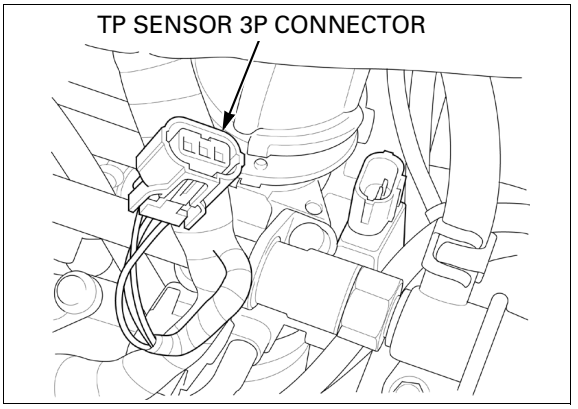
Is there standard voltage?

YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

NO – GO TO STEP 2.

2. TP Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the TP sensor 3P connector.



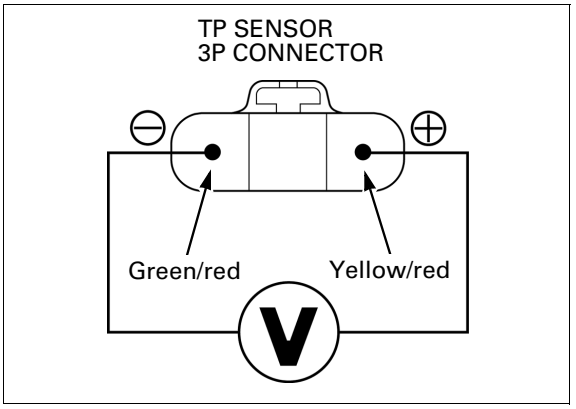
Turn the ignition switch to "ON".
Measure the voltage between the wire harness side connector terminals.

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

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



3. ECM Output Voltage Inspection

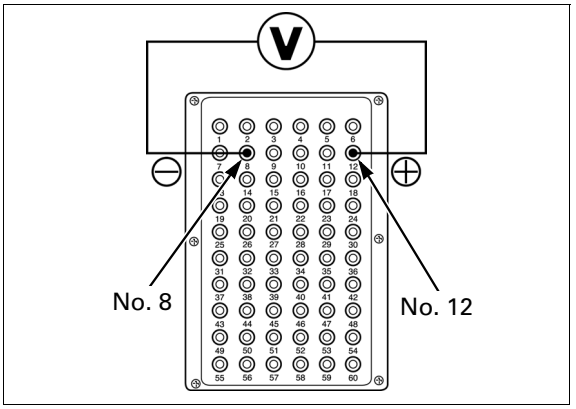
Measure the voltage between the test pin box terminals.

Connection: No. 12 (+) – No. 8 (–)

Is the voltage within 4.75 – 5.25V?

YES – • Open circuit in the Yellow/red wire.
• Open circuit in the Green/red wire.

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



4. TP Sensor Output Line Open Circuit Inspection

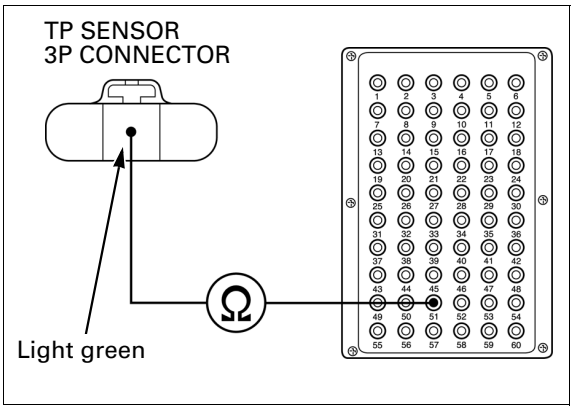
Turn the ignition switch to "OFF".
Check the Light green wire for continuity between the TP sensor 3P connector terminal and test pin box terminal.

Connection: Light green – No. 51

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the Light green wire.



5. TP Sensor Output Line Short Circuit Inspection

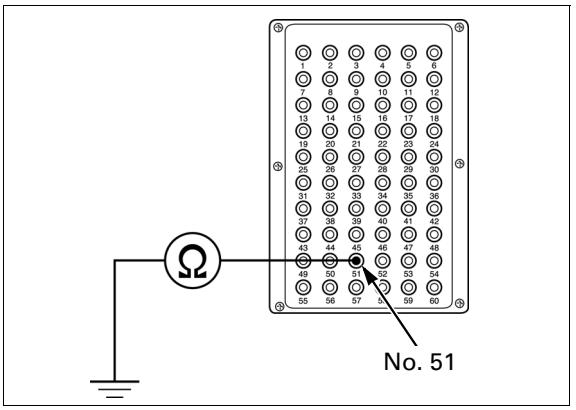
Check for continuity between the test pin box terminal and ground.

Connection: No. 51 – Ground

Is there continuity?

YES – Short circuit in the Light green wire.

NO – Faulty TP sensor.



MIL 9 BLINKS (IAT SENSOR)

- Before starting the troubleshooting, check the IAT sensor connector for loose contacts or corroded terminals, and recheck the MIL blinking.

1. IAT Sensor Output Voltage Inspection

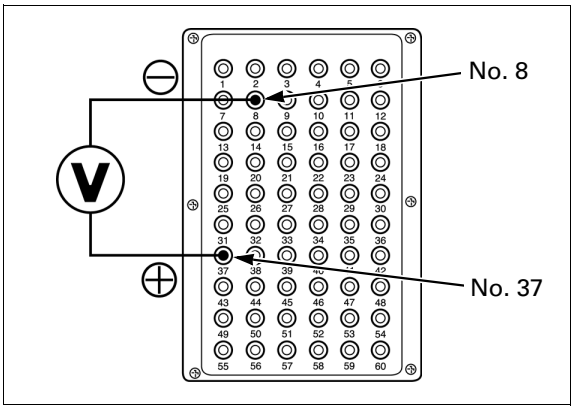
Turn the ignition switch to "OFF".
Connect the ECM test harness to the ECM connectors (page 6-10).
Turn the ignition switch to "ON" and engine stop switch to "".
Measure the voltage between the test pin box terminals.

Connection: No. 37 (+) – No. 8 (–)
Standard: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

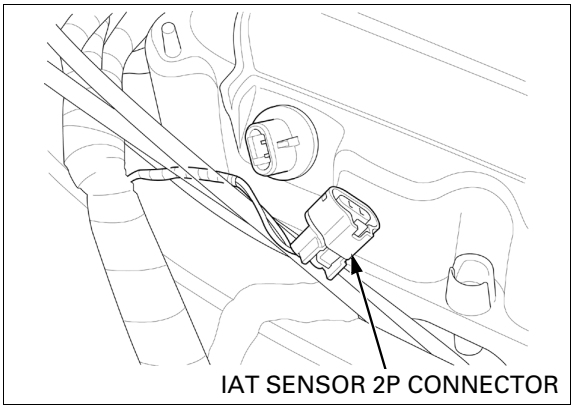
YES – • Intermittent failure.
• Loose or poor contact on the ECM connectors.

NO – GO TO STEP 2.



2. IAT Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the IAT sensor 2P connector.



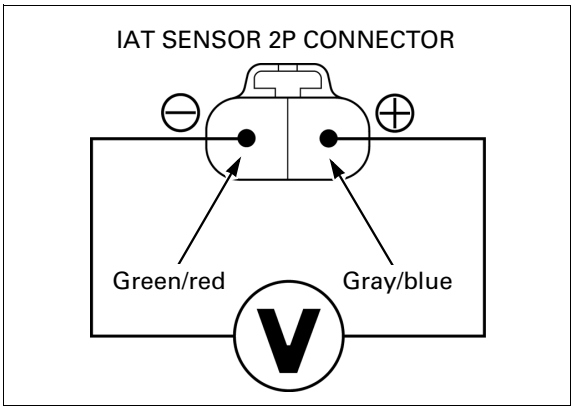
Turn the ignition switch to "ON".
Measure the voltage between the wire harness side connector terminals.

Connection: Gray/blue (+) – Green/red (–)

Is the voltage within 4.75 – 5.25V?

YES – Faulty IAT sensor.

NO – GO TO STEP 3.



3. IAT Sensor Open Circuit Inspection

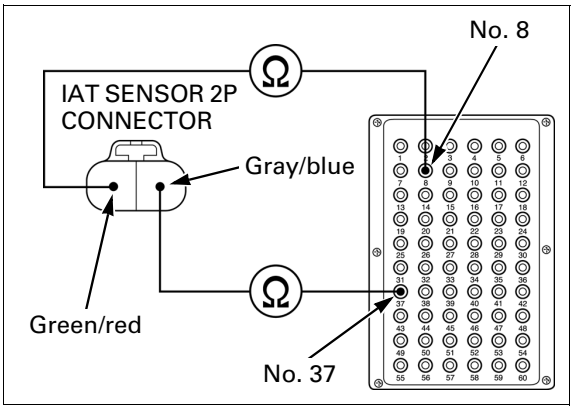
Turn the ignition switch to "OFF".
Check the Gray/blue and Green/red wires for continuity between the IAT sensor 2P connector terminals and test pin box terminals.

Connection: Gray/blue – No. 37
Green/red – No. 8

Are there continuity?

YES – GO TO STEP 4.

NO – • Open circuit in the Gray/blue wire.
• Open circuit in the Green/red wire.



4. IAT Sensor Output Line Short Circuit Inspection

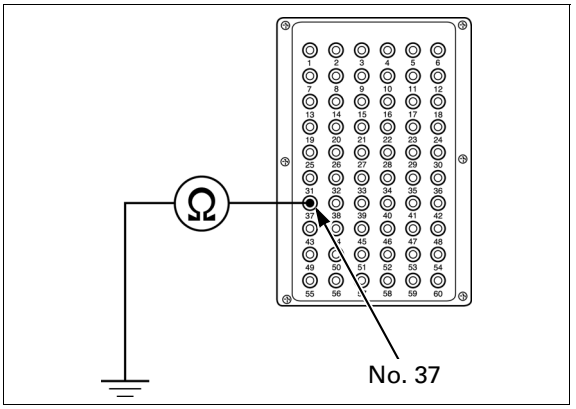
Check for continuity between the test pin box terminal and ground.

Connection: No. 37 – Ground

Is there continuity?

YES – Short circuit in the Gray/blue wire.

NO – Faulty IAT sensor.



MIL 11 BLINKS (VEHICLE SPEED SENSOR)

- Before starting the troubleshooting, check the vehicle speed sensor connector for loose contacts or corroded terminals, and recheck the MIL blinking.

1. Vehicle Speed Sensor Pulse Inspection

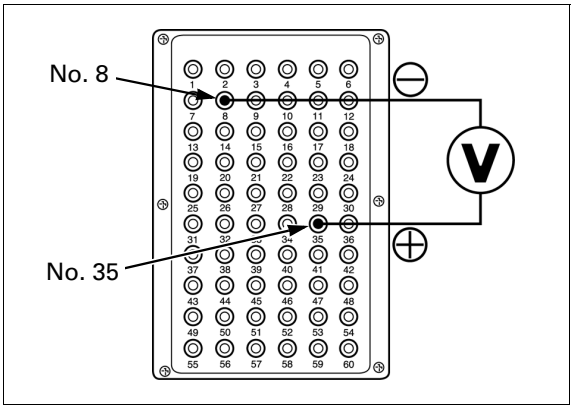
Turn the ignition switch to "OFF".
Connect the ECM test harness to the ECM connectors (page 6-10).
Support the motorcycle securely and place the rear wheel off the ground.
Shift the transmission into gear.
Turn the ignition switch to "ON" and engine stop switch to "".
Measure the voltage between the test pin box terminals while slowly turning the rear wheel by hand.

Connection: No. 35 (+) – No. 8 (–)
Standard: Repeat 0 to 5 V

Is there standard voltage?

YES – • Intermittent failure.
• Loose or poor contact on the ECM connectors.

NO – GO TO STEP 2.



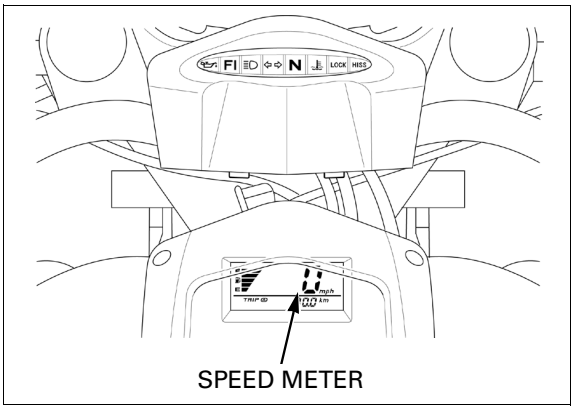
2. Combination Meter Inspection

Check that the speedometer operates normally.

Does the speedometer operate normally?

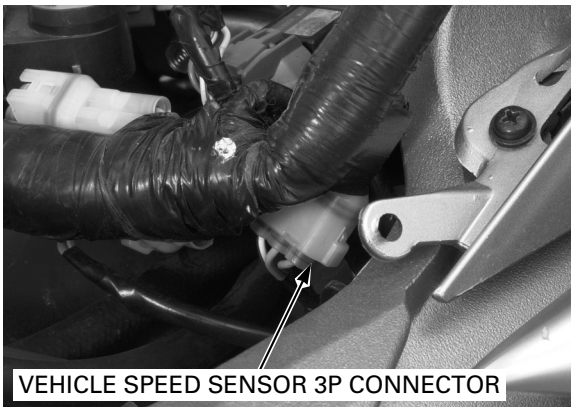
YES – Open circuit in the White/black wire.

NO – GO TO STEP 3.



3. Vehicle Speed Sensor Input Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the vehicle speed sensor 3P connector.



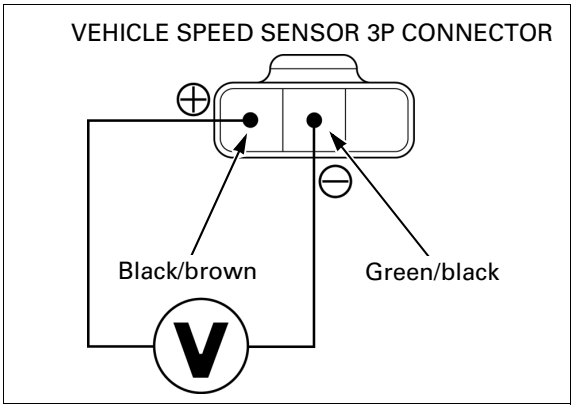
Turn the ignition switch to "ON".
Measure the voltage between the wire harness side connector terminals.

Connection: Black/brown (+) – Green/black (–)

Is there battery voltage?

YES – GO TO STEP 4.

NO – • Open circuit in the Black/brown wire.
• Open circuit in the Green/black wire.



4. Vehicle Speed Sensor Signal Line Short Circuit Inspection

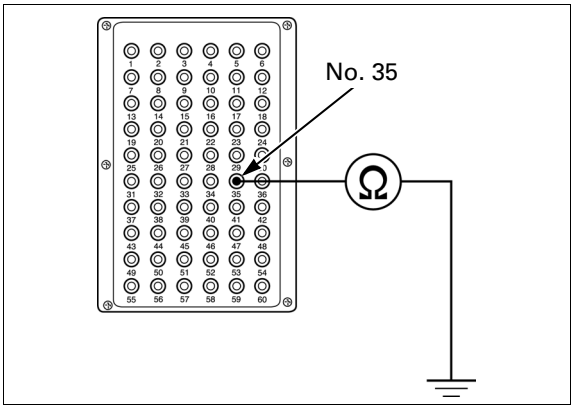
Turn the ignition switch to "OFF".
Check for continuity between the test pin box terminal and ground.

Connection: No. 35 – Ground

Is there continuity?

YES – Short circuit in the White/black wire.

NO – Faulty vehicle speed sensor.



MIL 12 BLINKS (No. 1 INJECTOR)

MIL	INJEC-TOR	POWER INPUT LINE	SIGNAL LINE	SIGNAL AT ECM
12	No. 1	Brown	Pink/blue	A1
13	No. 2	Brown	Red/yellow	A4
14	No. 3	Brown	Red/black	A2
15	No. 4	Brown	Red/black	A5
16	No. 5	Brown	Pink	A3
17	No. 6	Brown	Light green	A6

1. Injector Circuit Resistance Inspection

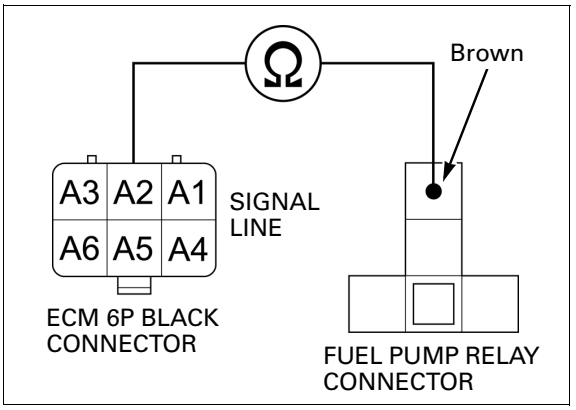
Turn the ignition switch to "OFF".
Disconnect the ECM 6P black connector.
Remove the fuel pump relay.
Check for continuity between the fuel pump relay connector terminal and ECM 6P black connector terminals.

Connection: Brown – SIGNAL LINE

Is there continuity?

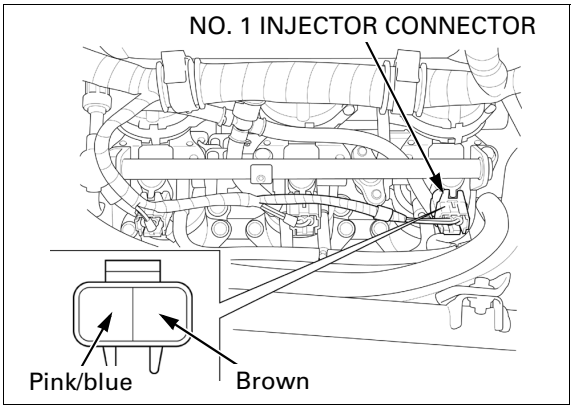
YES – GO TO STEP 4.

NO – GO TO STEP 2.



2. Injector Resistance Inspection

Disconnect the No. 1 injector 2P connector.

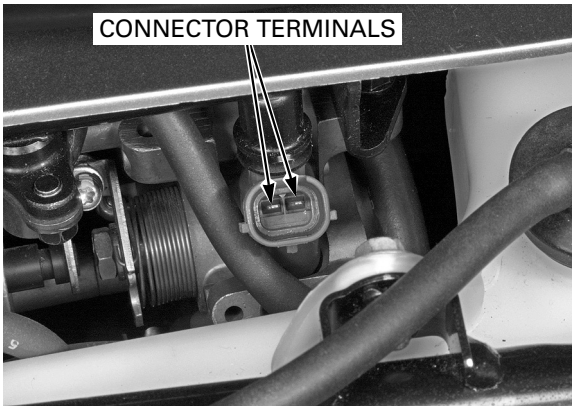


Measure the resistance between the No. 1 injector 2P connector terminals.

Is the resistance within 10.5 – 14.5 Ω (20°C/68°F)?

YES – GO TO STEP 3.

NO – Faulty injector.



3. Injector Input Voltage Inspection

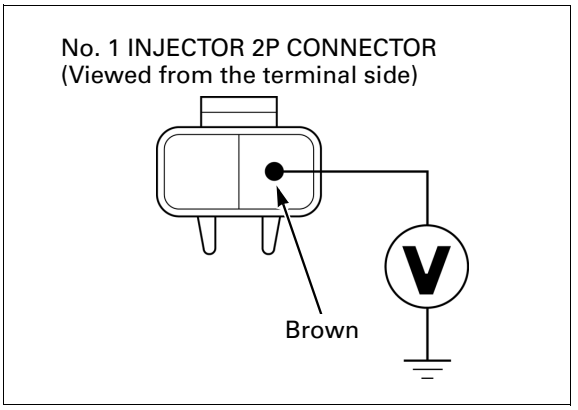
Install the fuel pump relay and connect the ECM 6P black connector.
Turn the ignition switch to "ON" and engine stop switch to "Ω".
Measure the voltage between the wire harness side connector terminal of the No. 1 injector and ground.

Connection: Brown (+) – Ground (–)

Is there battery voltage?

YES – Open circuit in the SIGNAL LINE wire.

NO – Open circuit in the Brown wire.



4. Injector Signal Line Short Circuit Inspection

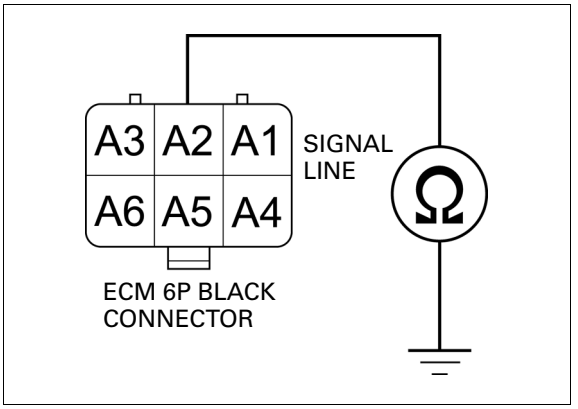
Check for continuity between the ECM 6P black connector terminals and ground.

Connection: SIGNAL LINE – Ground

Is there continuity?

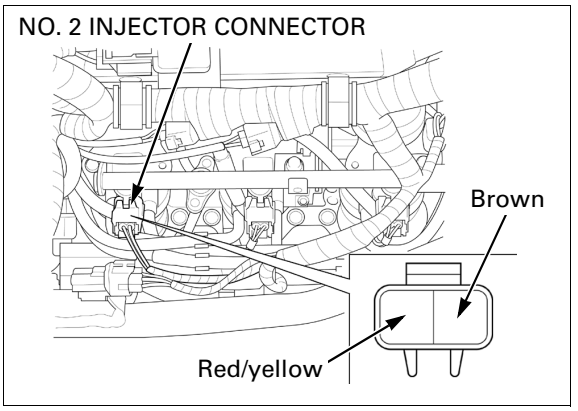
YES – • Short circuit in the SIGNAL LINE wire.
• Faulty injector.

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



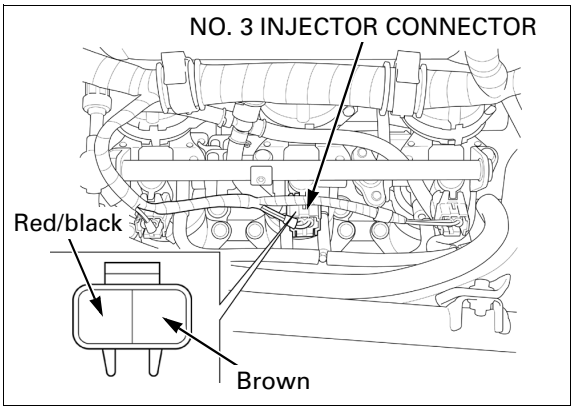
MIL 13 BLINKS (No. 2 INJECTOR)

(page 6-24)



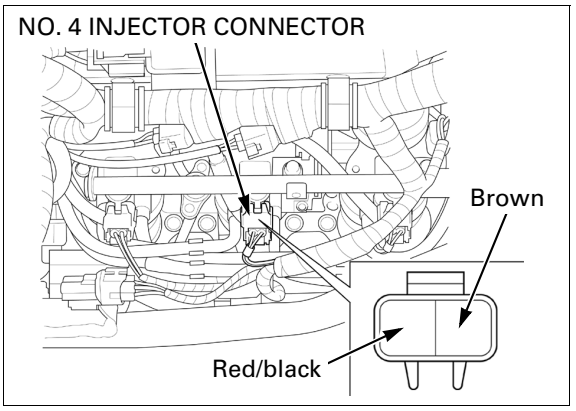
MIL 14 BLINKS (No. 3 INJECTOR)

(page 6-24)



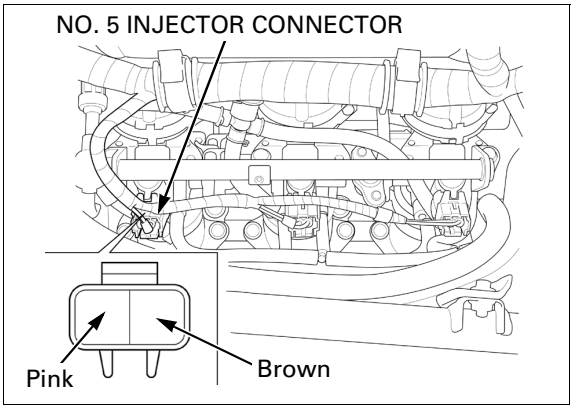
MIL 15 BLINKS (No. 4 INJECTOR)

(page 6-24)



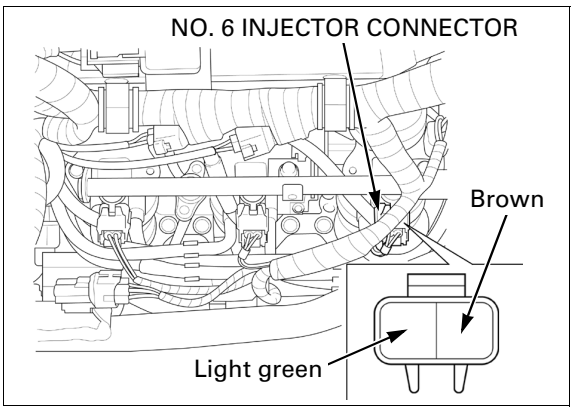
MIL 16 BLINKS (No. 5 INJECTOR)

(page 6-24)



MIL 17 BLINKS (No. 6 INJECTOR)

(page 6-24)



MIL 18 BLINKS (CAMSHAFT POSITION SENSOR)

- Before starting the troubleshooting, check the camshaft position sensor connector for loose contacts or corroded terminals, and recheck the MIL blinking.

1. Camshaft Position Sensor Peak Voltage Inspection at ECM

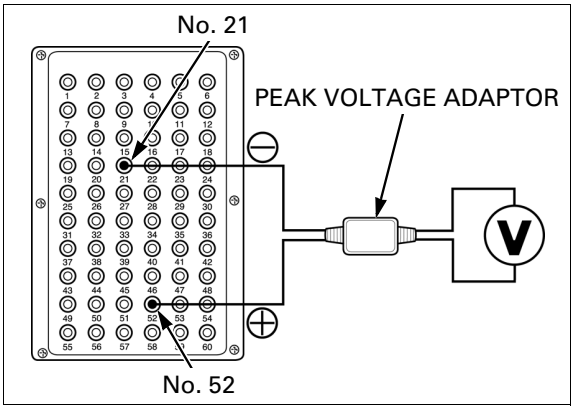
Turn the ignition switch to "OFF".
Connect the peak voltage adaptor to the digital multimeter (page 6-9).
Connect the ECM test harness to the ECM connectors (page 6-10).
Turn the ignition switch to "ON" and engine stop switch to "".
Crank the engine with the starter motor, and measure the camshaft position sensor peak voltage between the test pin box terminals.

Connection: No. 52 (+) – No. 21 (–)

Is the voltage more than 0.7 V?

YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

NO – GO TO STEP 2.



2. Camshaft Position Sensor Peak Voltage Inspection

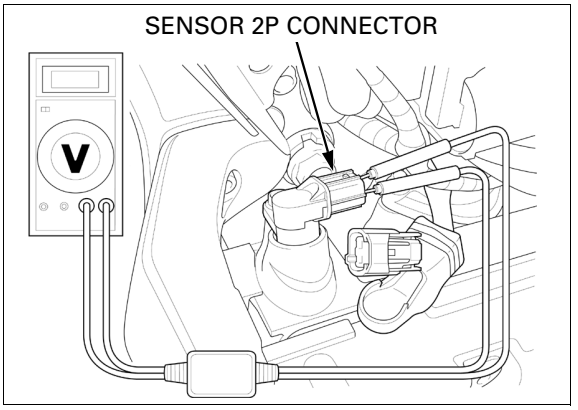
Turn the ignition switch to "OFF".
Disconnect the camshaft position sensor 2P connector.
Turn the ignition switch to "ON".
Crank the engine with the starter motor, and measure the camshaft position sensor peak voltage at the camshaft position sensor 2P connector.

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

Is the voltage more than 0.7 V?

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

NO – Faulty camshaft position sensor



MIL 19 BLINKS (IGNITION PULSE GENERATOR)

- Before starting the troubleshooting, check the ignition pulse generator connector for loose contacts or corroded terminals, and recheck the MIL blinking.

1. Ignition Pulse Generator Peak Voltage Inspection at ECM

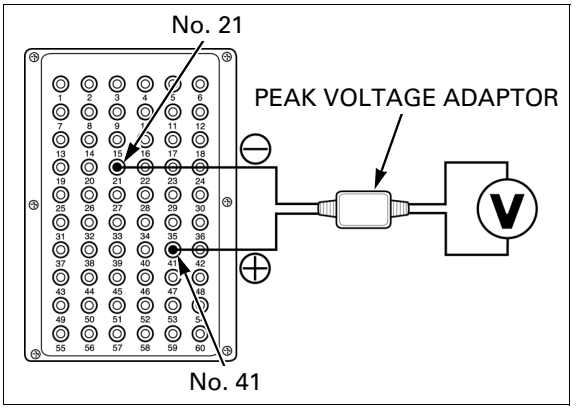
Turn the ignition switch to "OFF".
Connect the peak voltage adaptor to the digital multimeter (page 6-9).
Connect the ECM test harness to the ECM connectors (page 6-10).
Turn the ignition switch to "ON" and engine stop switch to "".
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage between the test pin box terminals.

Connection: No. 41 (+) – No. 21 (–)

Is the voltage more than 0.7 V?

YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

NO – GO TO STEP 2.



2. Ignition Pulse Generator Peak Voltage Inspection

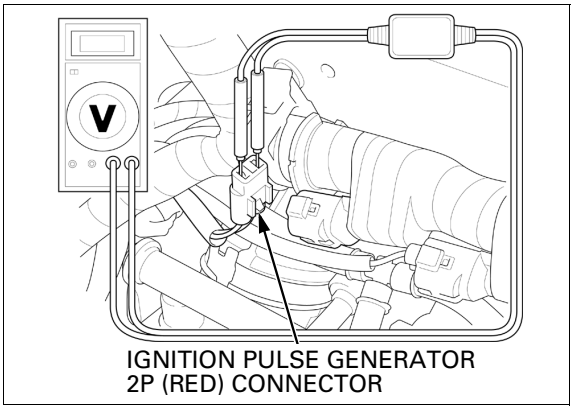
Turn the ignition switch to "OFF".
Disconnect the ignition pulse generator 2P red connector.
Turn the ignition switch to "ON".
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the ignition pulse generator 2P red connector.

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

Is the voltage more than 0.7 V?

YES – Open or short circuit in the Yellow or White/yellow wire.

NO – Faulty ignition pulse generator.



MIL 25 BLINKS (RIGHT KNOCK SENSOR)

- Before starting the troubleshooting, check the right knock sensor connector for loose contacts or corroded terminals, and recheck the MIL blinking.

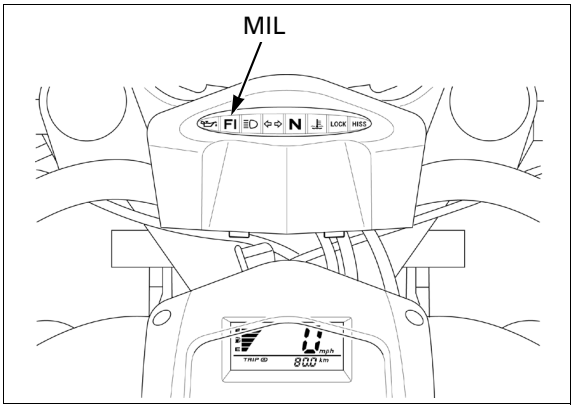
1. Right Knock Sensor Connection Inspection

Reset the self-diagnosis memory data (page 6-9).
Place the motorcycle on its side stand.
Start the engine and hold the engine speed above 2,500 rpm for 10 seconds or more.
Check the MIL.

Is the MIL blinking?

YES – GO TO STEP 2.

NO – Temporary failure.



2. Right Knock Sensor Short Circuit Inspection

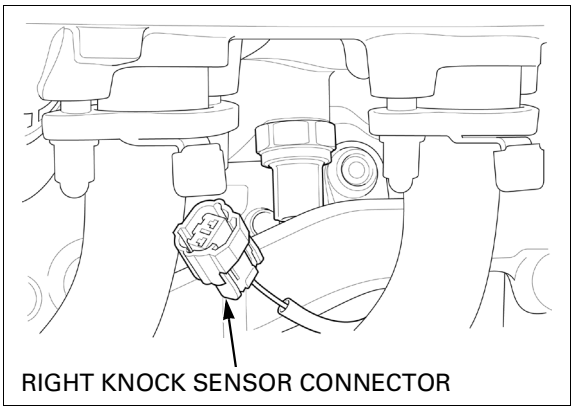
Turn the ignition switch to "OFF".
Disconnect the ECM 22P gray connector.
Disconnect the right knock sensor 1P connector.
Check for continuity between the right knock sensor 1P connector terminal and ground.

Connection: Red/blue – Ground

Is there continuity?

YES – Short circuit in the Red/blue wire.

NO – GO TO STEP 3.



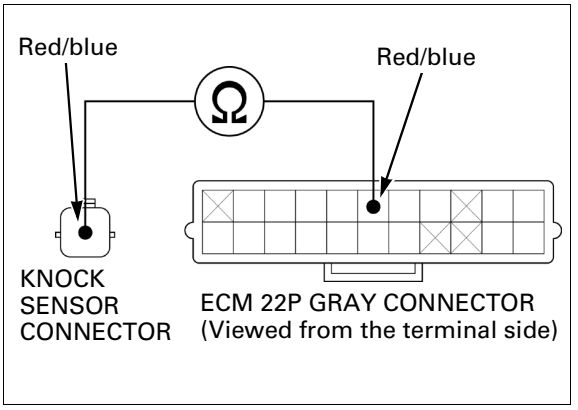
3. Right Knock Sensor Open Circuit Inspection

Check the Red/blue wire for continuity between the right knock sensor 1P connector terminal and ECM 22P gray connector terminal.

Is there continuity?

YES – Replace the right knock sensor and recheck. If the MIL is still blinking, replace the ECM and recheck.

NO – Open circuit in the Red/blue wire.



MIL 26 BLINKS (LEFT KNOCK SENSOR)

- Before starting the troubleshooting, check the left knock sensor connector for loose contacts or corroded terminals, and recheck the MIL blinking.

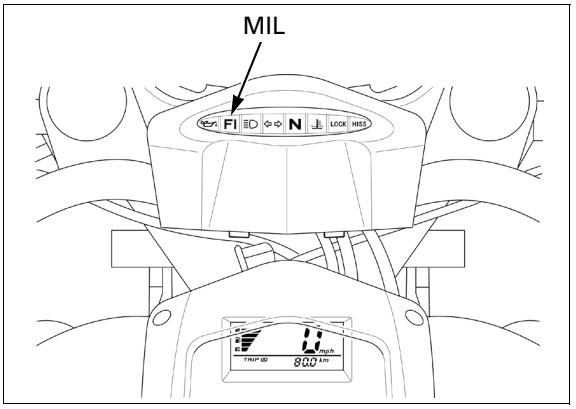
1. Left knock Sensor Connection Inspection

Reset the self-diagnosis memory data (page 6-9).
Place the motorcycle on its side stand.
Start the engine and hold the engine speed above 2,500 rpm for 10 seconds or more.
Check the MIL.

Is the MIL blinking?

YES – GO TO STEP 2.

NO – Temporary failure.



2. Left knock Sensor Short Circuit Inspection

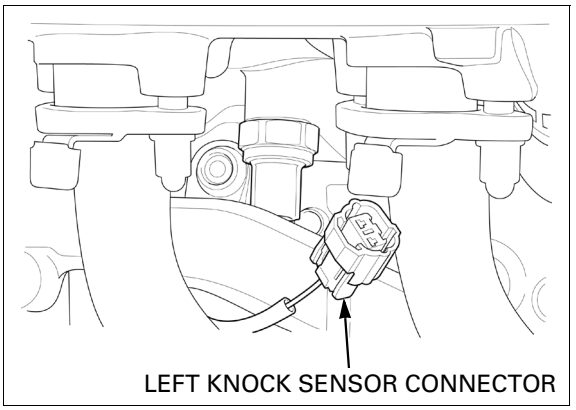
Turn the ignition switch to "OFF".
Disconnect the ECM 22P gray connector.
Disconnect the left knock sensor 1P connector.
Check for continuity between the left knock sensor 1P connector terminal and ground.

Connection: Blue – Ground

Is there continuity?

YES – Short circuit in the Blue wire.

NO – GO TO STEP 3.



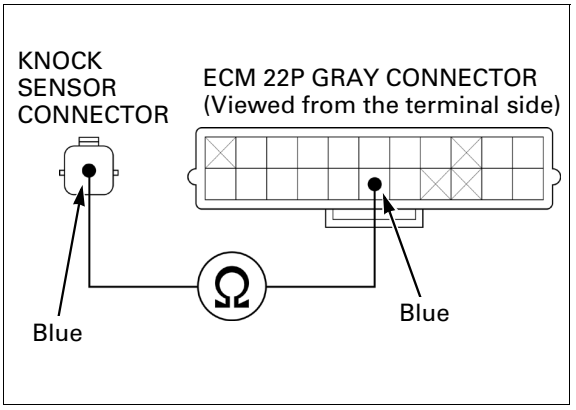
3. Left knock Sensor Open Circuit Inspection

Check the Blue wire for continuity between the left knock sensor 1P connector terminal and ECM 22P gray connector terminal.

Is there continuity?

YES – Replace the left knock sensor and recheck. If the MIL is still blinking, replace the ECM and recheck.

NO – Open circuit in the Blue wire.

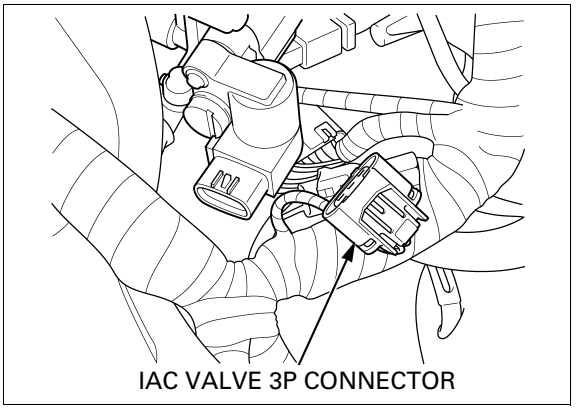


MIL 29 BLINKS (IAC VALVE)

- Before starting the troubleshooting, check the IAC valve connector for loose contacts or corroded terminals, and recheck the MIL blinking.

1. IAC Valve Input Voltage Inspection

Turn the ignition switch to "OFF".
Disconnect the IAC valve 3P connector.



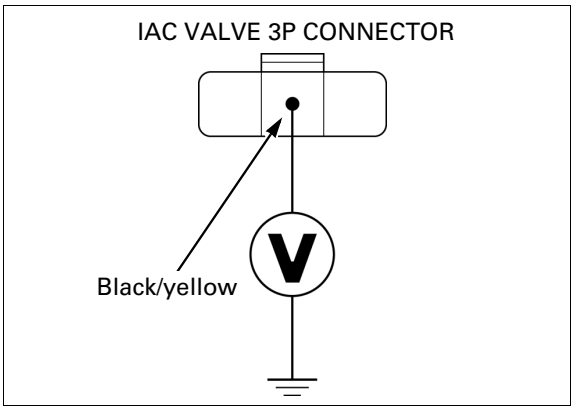
Turn the ignition switch to "ON" and engine stop switch to "".
Measure the voltage between the wire harness side connector terminal ground.

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

Is there battery voltage?

YES – GO TO STEP 2.

NO – Open circuit in the Black/yellow wire.



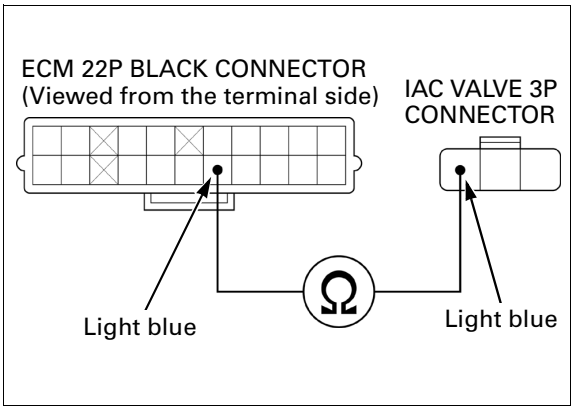
2. IAC Valve Control Line Open Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the ECM 22P black connector.
Check the Light blue wire for continuity between the IAC valve 3P connector terminal and ECM 22P black connector terminal.

Is there continuity?

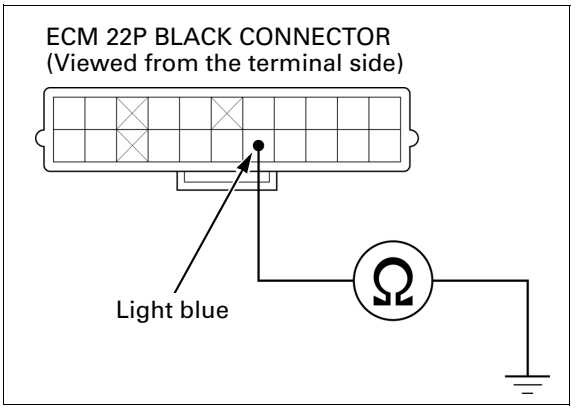
YES – GO TO STEP 3.

NO – Open circuit in the Light blue wire.



3. IAC Valve Control Line Short Circuit Inspection

Check the Light blue wire for continuity between the ECM 22P black connector terminal and ground.



Is there continuity?

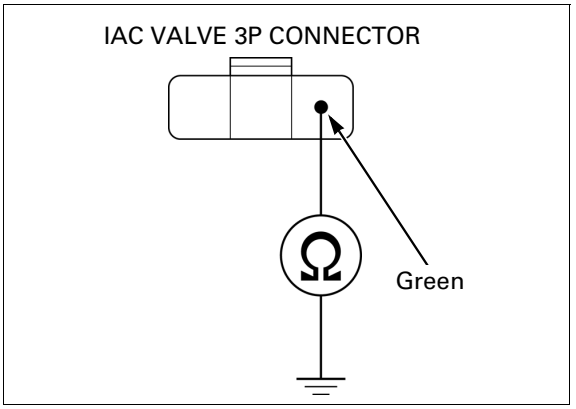
YES – Short circuit in the Light blue wire.

NO – GO TO STEP 4.

4. IAC Valve Ground Line Inspection

Check for continuity between the wire harness side IAC valve 3P connector terminal and ground.

Connection: Green – Ground (–)



Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the Green wire.

5. Recheck With a New IAC Valve

Replace the IAC valve with a new one.
Connect the IAC valve 3P connector and ECM 22P black connector.
Turn the ignition switch to "ON" and engine stop switch to "".
Check that the MIL blinks.

Does the MIL blink 29 times?

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

NO – Faulty IAC valve.

MIL 33 BLINKS (E^2-PROM)

1. Recheck MIL Blinks 1

Reset the self-diagnosis memory data (page 6-9).
Turn the ignition switch to "ON" and engine stop switch to "".
Check that the MIL blinks.

Does the MIL blink 33 times?

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

NO – GO TO STEP 2.

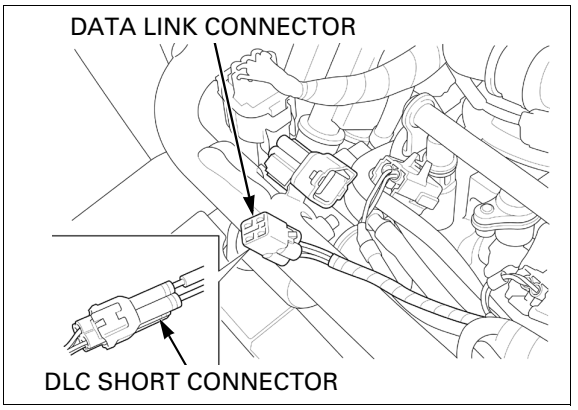
2. Recheck MIL Blinks 2

Turn the ignition switch to "OFF".
Short the data link connector with the DLC short connector (070PZ-ZY30100).
Turn the ignition switch to "ON" and engine stop switch to "".
Check that the MIL blinks.

Does the MIL blink 33 times?

YES – GO TO STEP 3.

NO – Intermittent failure.



3. Recheck MIL Blinks 3

Reset the self-diagnosis memory data (page 6-9).
Turn the ignition switch to "ON" and engine stop switch to "".
Check that the MIL blinks.

Does the MIL blink 33 times?

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

NO – Intermittent failure.

FUEL LINE INSPECTION

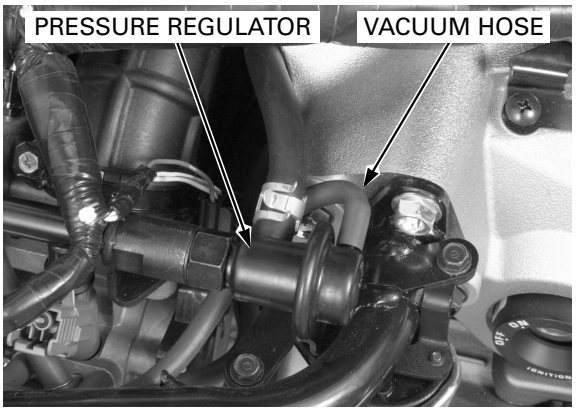
FUEL PRESSURE INSPECTION

NOTICE

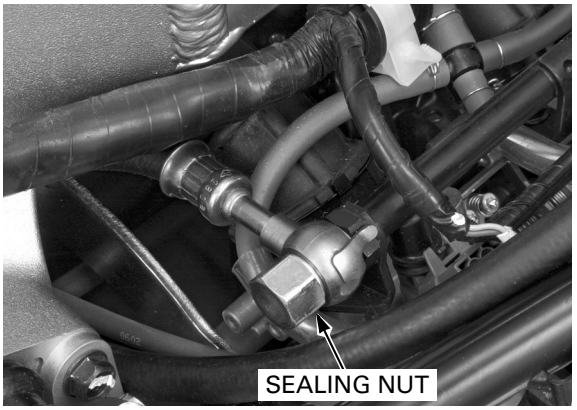
- *Before disconnecting the fuel feed hose, release the fuel pressure by loosening the fuel feed hose joint nut at the fuel rail.*
  Failure to release the fuel pressure could result in fuel spilling onto painted or plastic parts, which will be damaged.
- *Always replace the sealing washers with new ones when the fuel feed hose joint nut is removed or loosened.*

Remove both front inner covers (page 3-4).

Disconnect the vacuum hose from the pressure regulator and plug the vacuum hose.



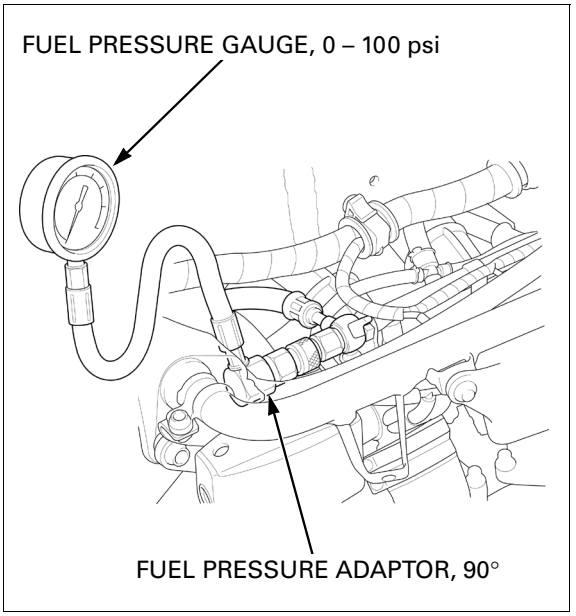
Cover the fuel feed hose nut joint with a rag or shop towel.
Slowly loosen the sealing nut by holding the fuel rail and catch the remaining fuel using an approved gasoline container.



Connect the fuel pressure gauge and attachment to the fuel rail.

TOOL:

Fuel pressure gauge, 0 – 100 psi	**07406–0040003 or 07406-004000B or 07406-004000A (U.S.A. only)**
Fuel pressure adaptor, 90°	**07AMJ-HW1A100 (U.S.A. only)**



Start the engine, let it idle and read the fuel pressure.

STANDARD: 343 kPa (3.5 kgf/cm^2, 50 psi)

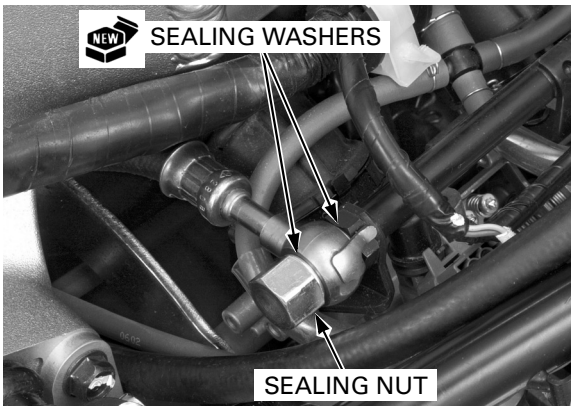
If the fuel pressure is higher than the specified pressure, inspect the following:
– pinched or clogged fuel return hose
– pressure regulator
– fuel pump (page 6-38)

If the fuel pressure is lower than the specified pressure, inspect the following:
– fuel line leaking
– pressure regulator
– fuel pump (page 6-38)

After inspection, remove the fuel pressure gauge and attachment.
Install the feed hose with new sealing washers and the sealing nut, and tighten the nut by holding the fuel rail.

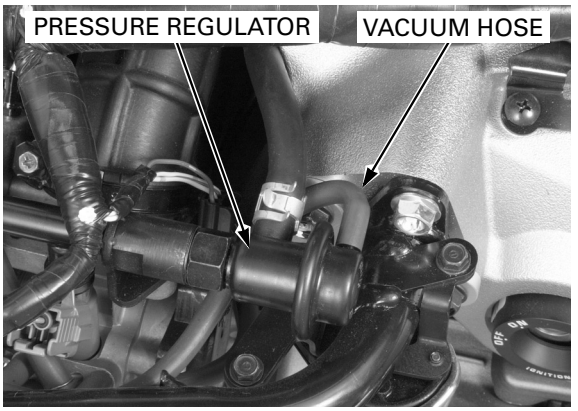
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Turn the ignition switch to "ON" and check that there is no fuel leakage.



Connect the vacuum hose to the pressure regulator.

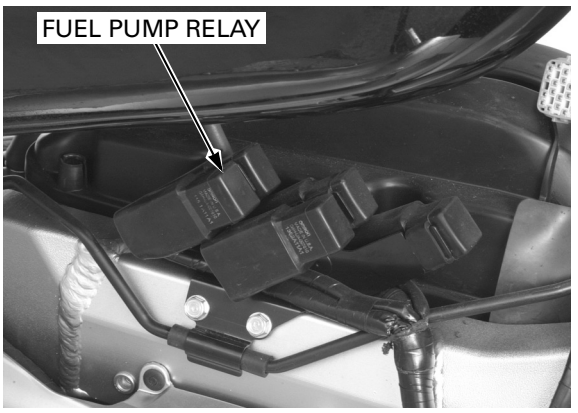
Install both front side covers (page 3-4).



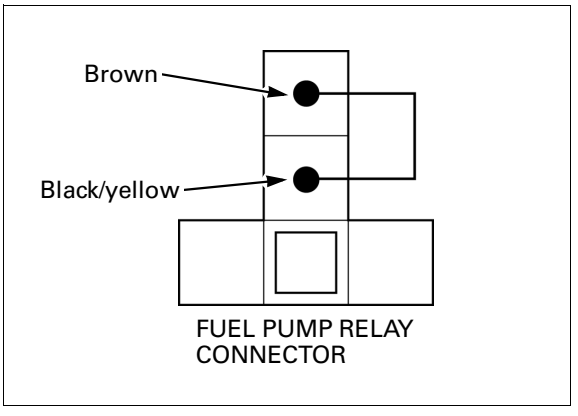
FUEL FLOW INSPECTION

Raise the front of the fuel tank and support it (page 3-4).

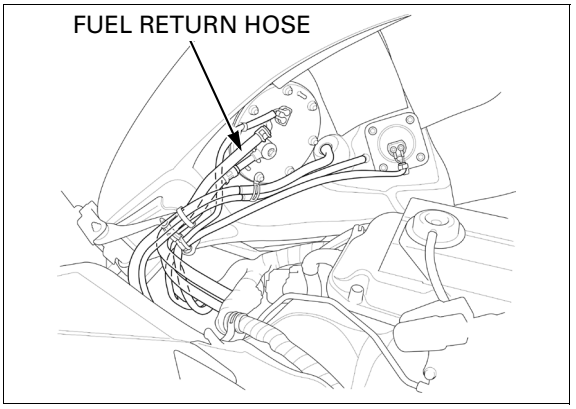
Remove the fuel pump relay.



Connect the Black/yellow and Brown wire terminal of the relay with a jumper wire.



Disconnect the fuel return hose from fuel tank and plug the fuel tank hose joint.
Place the end of the fuel return hose into an approved gasoline container.



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

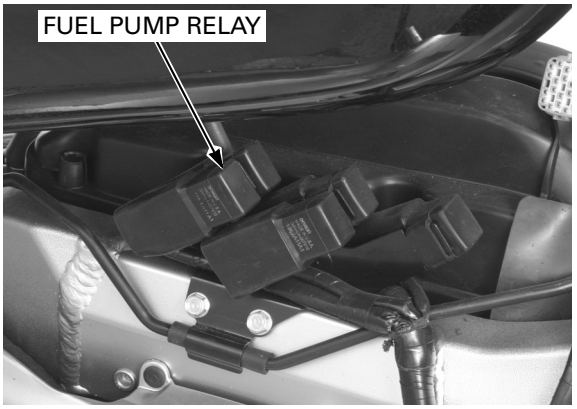
Turn the ignition switch to "ON" for 10 seconds.
Measure the amount of fuel flow.

Amount of fuel flow:
133 cm³ (4.5 US oz, 4.7 Imp oz) minimum for 10 seconds at 12 V

If the fuel flow is less than the specified amount, inspect the following:
– pinched or clogged fuel feed hose and/or fuel return hose
– pressure regulator
– fuel pump (page 6-38)

Connect the fuel return hose to the fuel tank.
Remove the jumper wire and install the fuel pump relay.
Turn the ignition switch to "ON" and check that there is no fuel leakage.

Lower the fuel tank and install the removed parts in the reverse order of removal.



FUEL TANK

REMOVAL

NOTICE

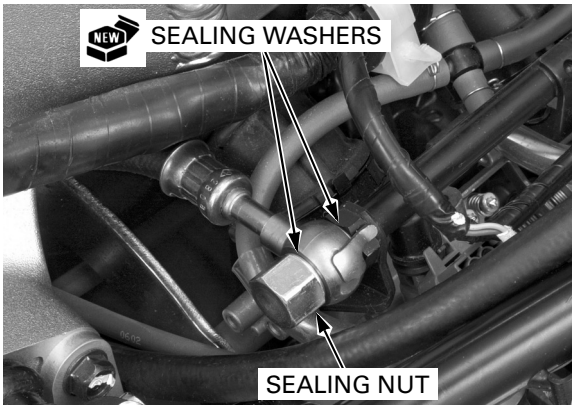
- *Before disconnecting the fuel feed hose, release the fuel pressure by loosening the fuel feed hose joint nut at the fuel rail.*
  Failure to release the fuel pressure could result in fuel spilling onto painted or plastic parts, which will be damaged.
- *Always replace the sealing washers with new ones when the fuel feed hose joint nut is removed or loosened.*

Remove the both front inner covers (page 3-4).

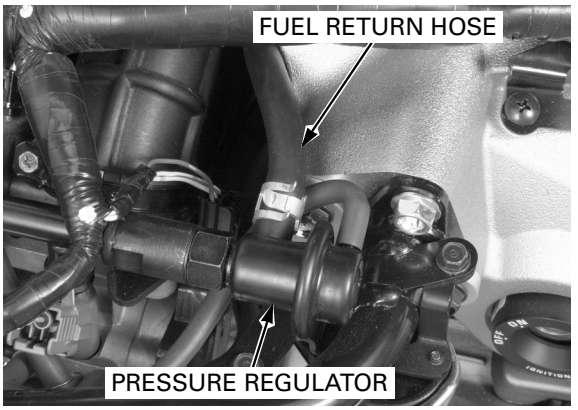
Cover the fuel feed hose nut joint with a rag or shop towel.
Slowly loosen the joint nut by holding the fuel rail and catch the remaining fuel using a approved gasoline container.

Install the feed hose with new sealing washers and the sealing nut, and tighten the nut by holding the fuel rail.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

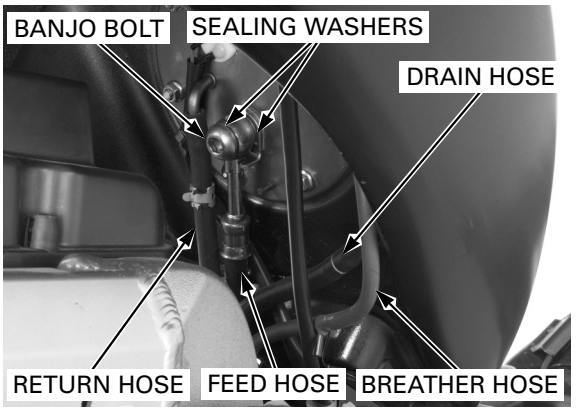


Disconnect the fuel return hose from the pressure regulator and drain the gasoline into an approved gasoline container.



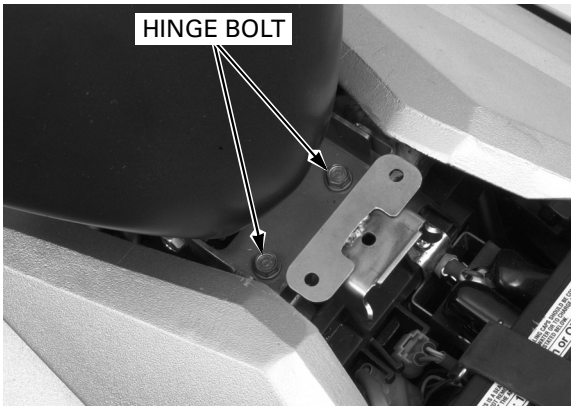
Raise the front of the fuel tank and support it (page 3-4).

Release the hoses from the clamps.
Disconnect the fuel tank breather hose, drain hose and fuel return hose.
Disconnect the fuel feed hose by removing the banjo bolt and sealing washers.

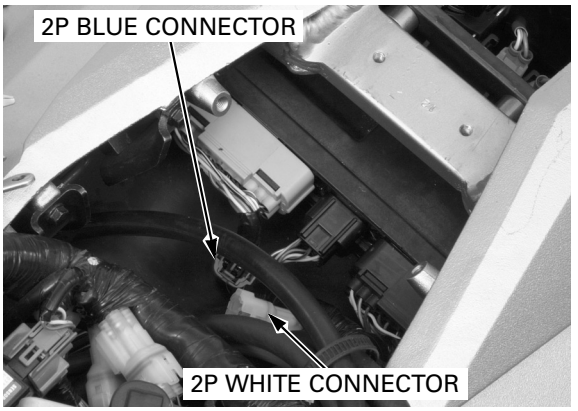


Remove the support and lower the fuel tank.

Remove the two fuel tank hinge bolts.



Disconnect the fuel level sensor 2P blue and fuel pump 2P white connectors, and remove the fuel tank from the frame.

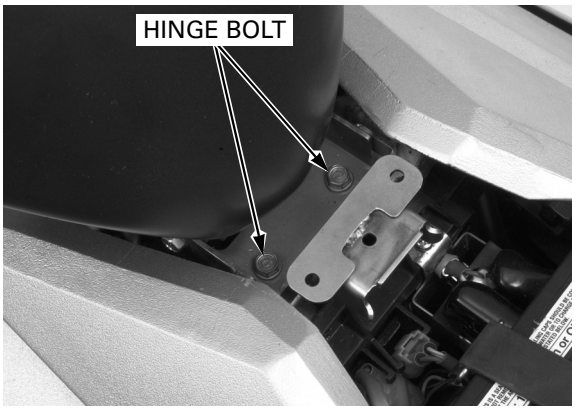


INSTALLATION

Place the fuel tank onto the frame.
Connect the fuel level sensor 2P blue and fuel pump 2P white connectors.

Install the two fuel tank hinge bolts.

Raise the front of the fuel tank and support it (page 3-4).



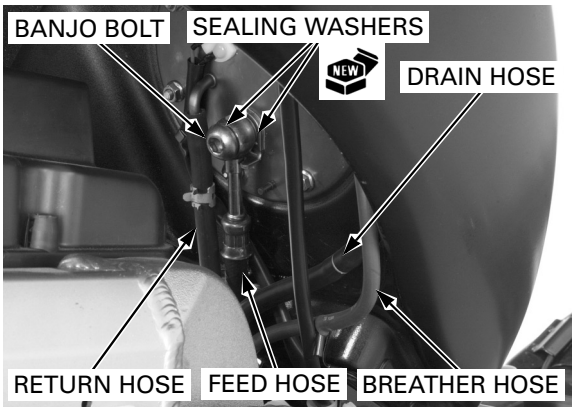
Connect the fuel feed hose with new sealing washers and the banjo bolt.
Tighten the banjo bolt.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Route the fuel tank hoses properly (page 1-22).

Connect the fuel tank breather hose, drain hose and fuel return hose.
Clamp the hoses properly.

Install the removed parts in the reverse order of removal.



FUEL PUMP

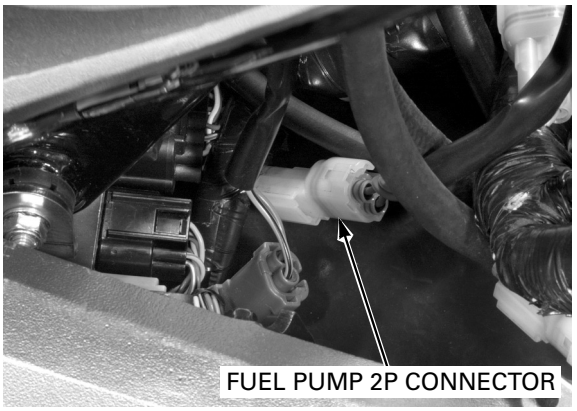
INSPECTION

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

Turn the ignition switch to "ON" and confirm that the fuel pump operates for a few seconds.
If the fuel pump does not operate, inspect as follows:

Raise the front of the fuel tank and support it (page 3-4).

Disconnect the fuel pump 2P connector.



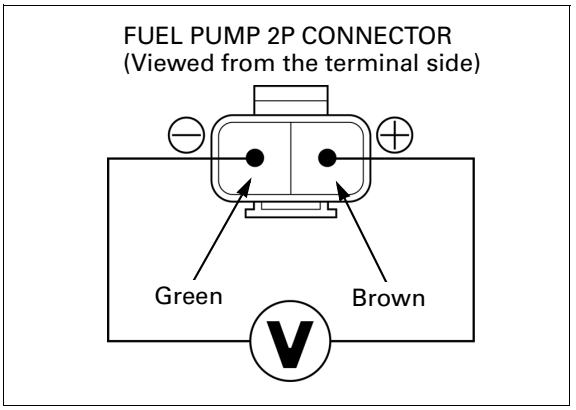
Turn the ignition switch to "ON" and measure the voltage between the connector terminals.

Connection: Brown (+) – Green (–)

There should be battery voltage for a few seconds.

If there is battery voltage, replace the fuel pump.

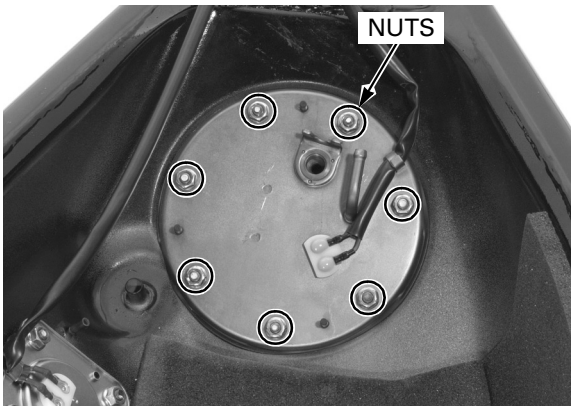
If there is no battery voltage, inspect the following:
– Brown wire for open or short circuit
– Green wire for open circuit
– fuel pump relay (page 6-52)



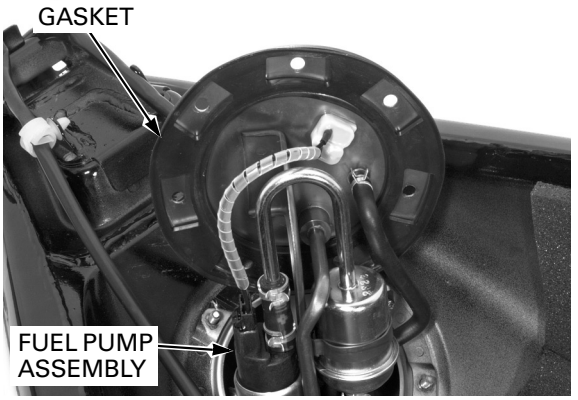
REMOVAL

Remove the fuel tank (page 6-36).

Remove the fuel pump mounting nuts.



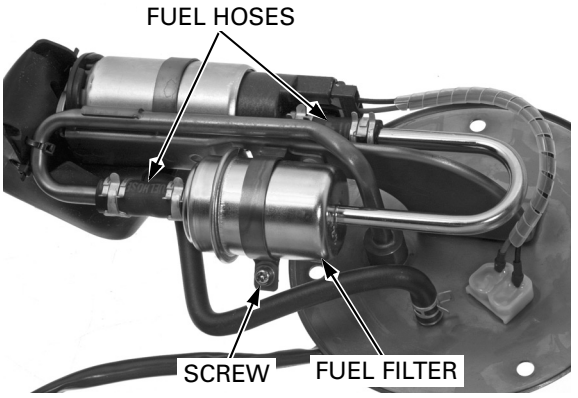
Remove the fuel pump assembly and gasket.



FUEL FILTER REPLACEMENT

Disconnect the fuel hoses from the fuel filter.
Remove the screw, disconnect the fuel pump hoses and remove the fuel filter.

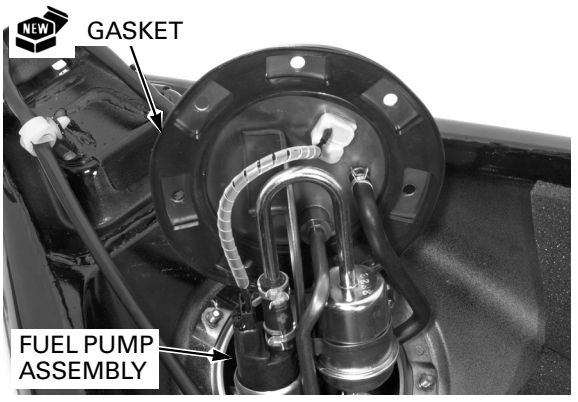
Install the fuel filter in the reverse order of removal.



INSTALLATION

Install a new gasket onto the fuel pump base.

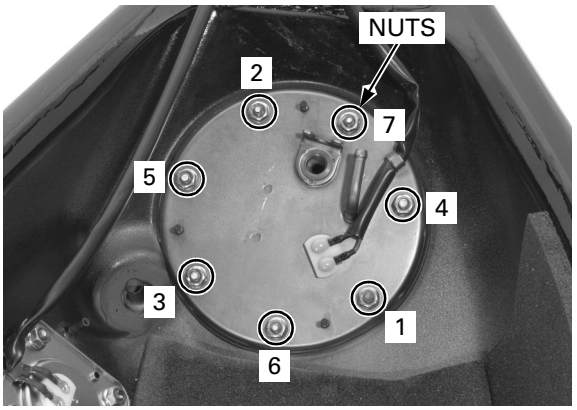
Install the fuel pump being careful not to damage the fuel pump wire and gasket.



Install the fuel pump mounting nuts and tighten them in the sequence shown.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the fuel tank (page 6-37).



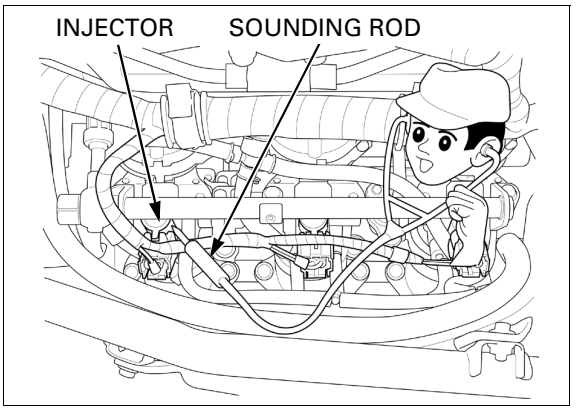
FUEL INJECTOR

INSPECTION

Remove the front inner cover (page 3-4).

Start the engine and let it idle.
Confirm the injector operating sounds with a sounding rod or stethoscope.

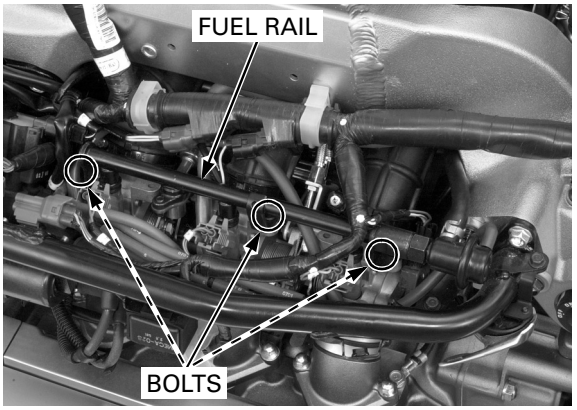
If the injector does not operate, replace it.



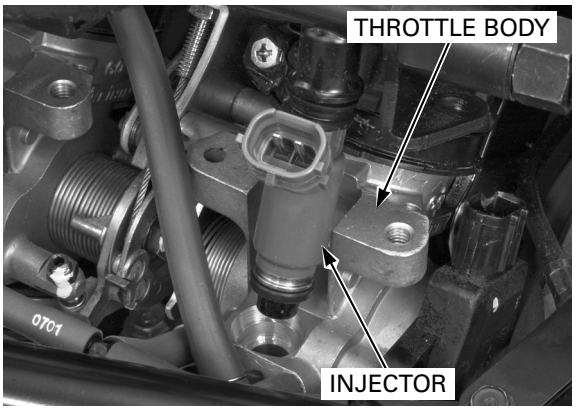
REMOVAL

Release the fuel pressure (page 6-36).

Remove the three bolts attaching the fuel rail onto the throttle body assembly.

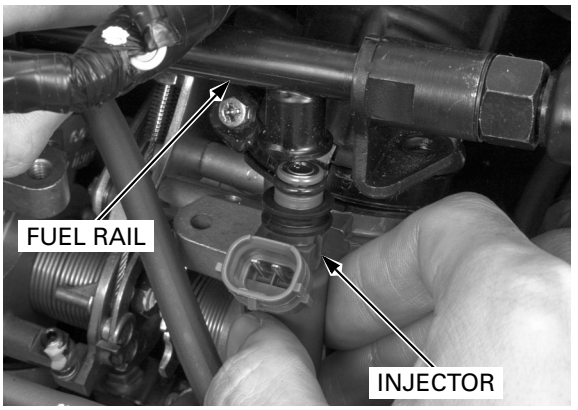


Raise the fuel rail and remove the injectors from the throttle body assembly.



Remove the injectors from the fuel rail.

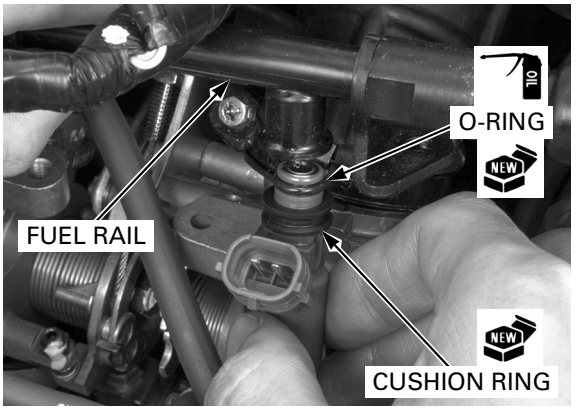
Remove the O-rings and cushion rings from the injectors.



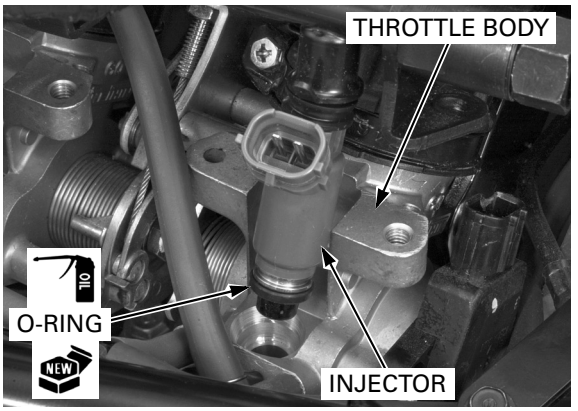
INSTALLATION

Install new cushion rings onto the fuel injectors. Coat new O-rings with oil and install them into the injector grooves.

Install the injectors into the fuel rail.

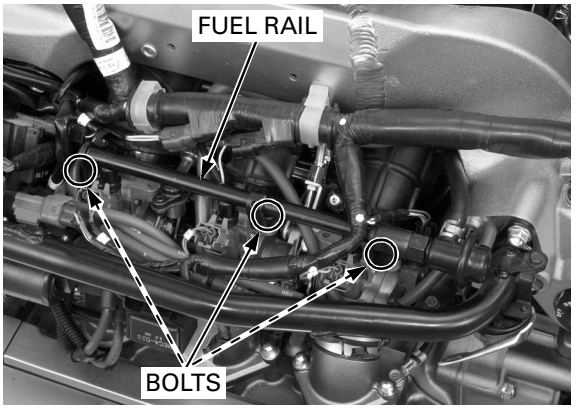


Install the fuel injectors into the throttle body assembly.



Install the fuel rail onto the throttle body assembly. Install the three bolts and tighten them securely.

Install the removed parts in the reverse order of removal.



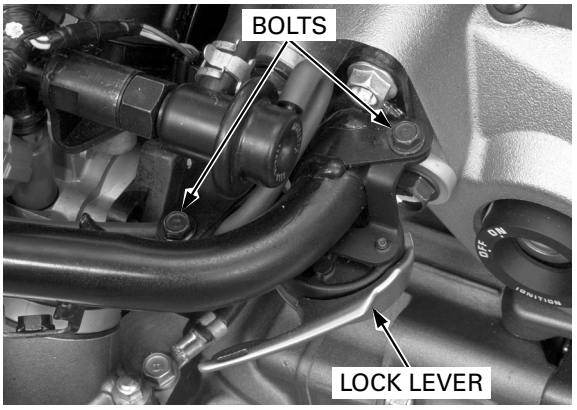
THROTTLE BODY

REMOVAL

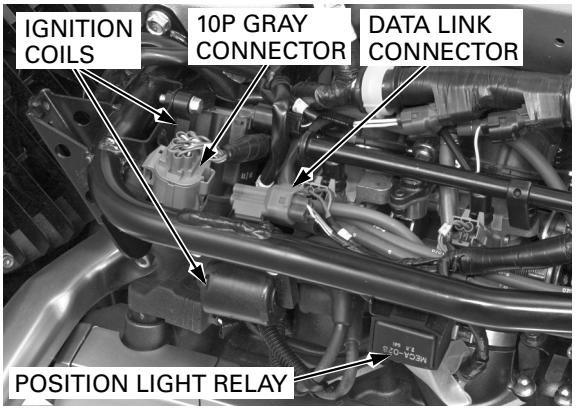
Remove the following:
– air cleaner element (page 4-6)
– fuel tank (page 6-36)

Remove the radiator mounting bolts and move the radiator forward (page 7-8).

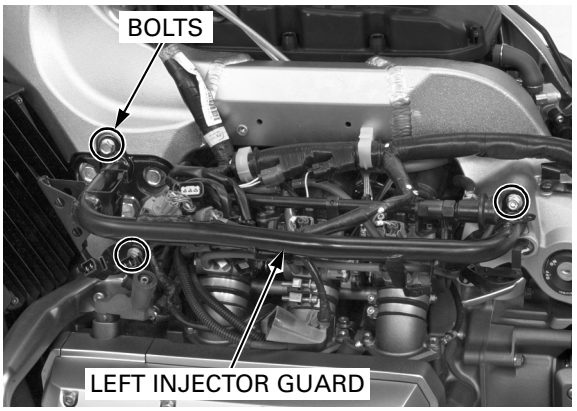
Remove the following from the left injector guard:
– two bolts and steering lock lever



– engine sub-harness 10P gray connector
– data link connector
– turn signal/position light relay
– No. 1 & 2 and No. 3 & 4 ignition coils

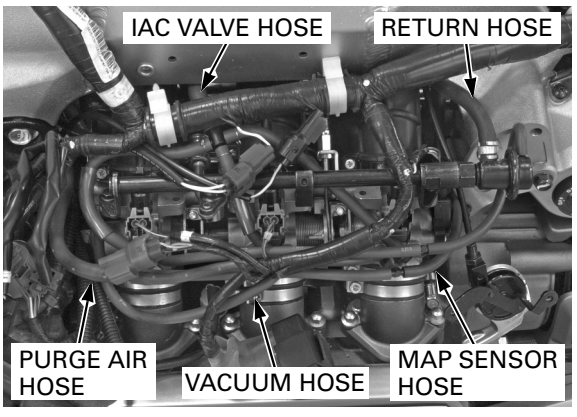


Remove the three bolts and left injector guard.

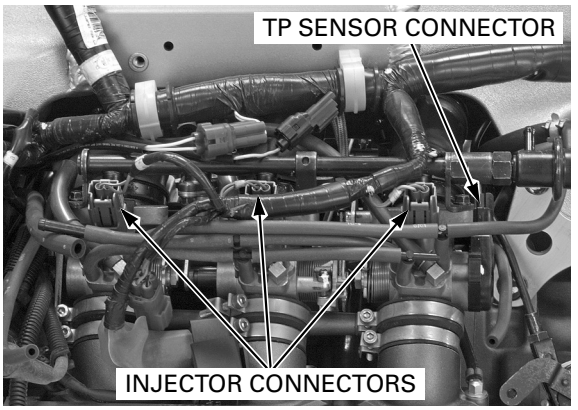


Disconnect the following:

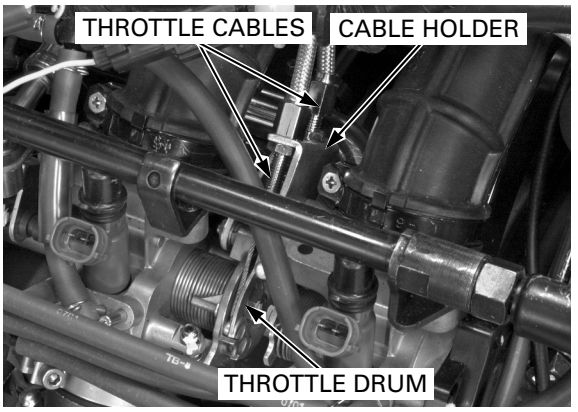
– fuel return hose
– IAC valve hose from the four way joint
– intake air duct control valve vacuum hose from the throttle body
– purge air hose from the three way joint (California type only)
– MAP sensor hose from the three way joint



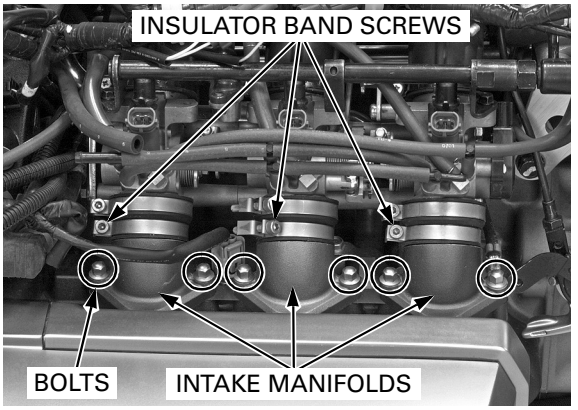
– three injector connectors
– throttle position (TP) sensor 3P connector



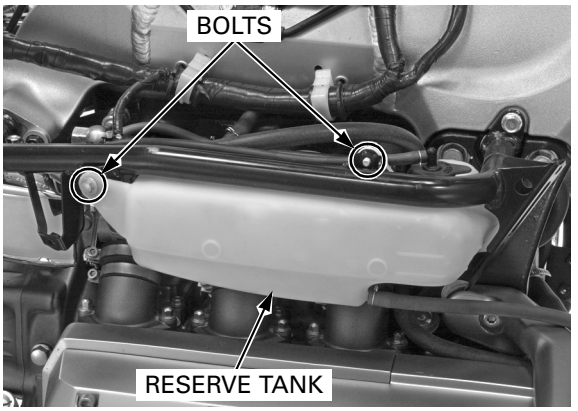
Remove the throttle cables from the cable stay and disconnect them from the throttle drum.



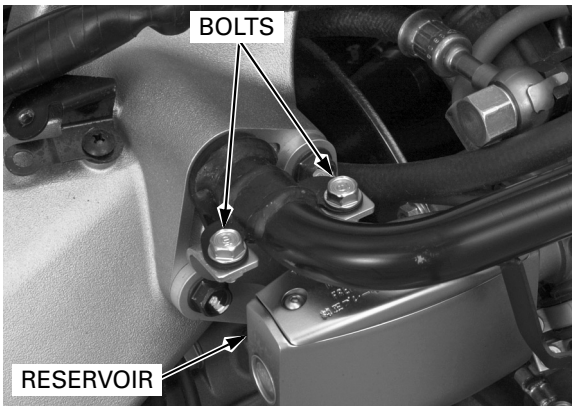
Loosen the insulator band screws.
Remove the six bolts, three left intake manifolds and insulators.
Remove the intake manifold gasket.



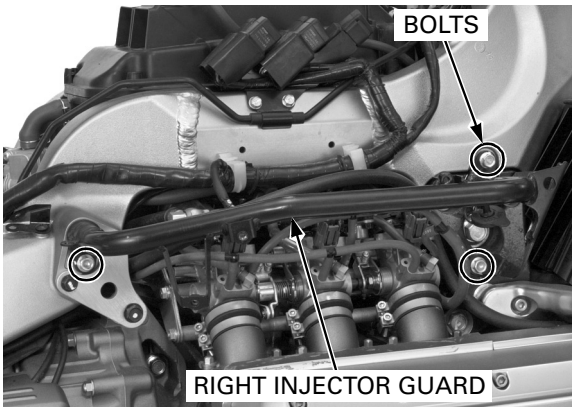
Remove the two bolts and radiator reserve tank from the right injector guard.



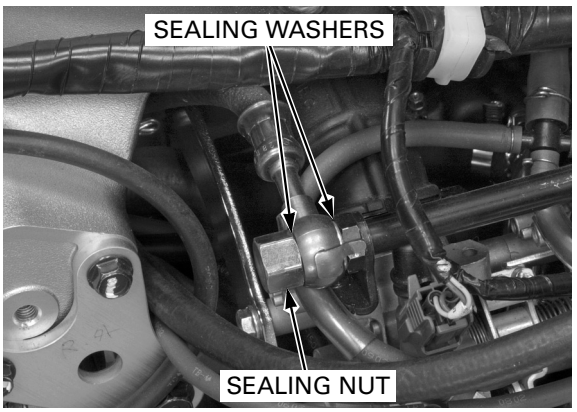
Remove the two bolts and the rear brake fluid reservoir stay from the right injector guard.



Remove the three bolts and right injector guard.

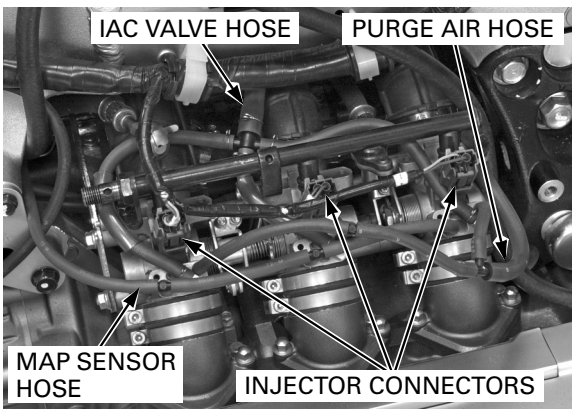


Remove the fuel feed hose from the right fuel rail by removing the sealing nut and sealing washers.

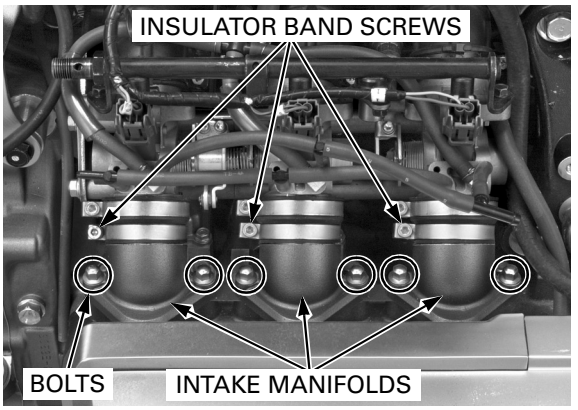


Disconnect the following:

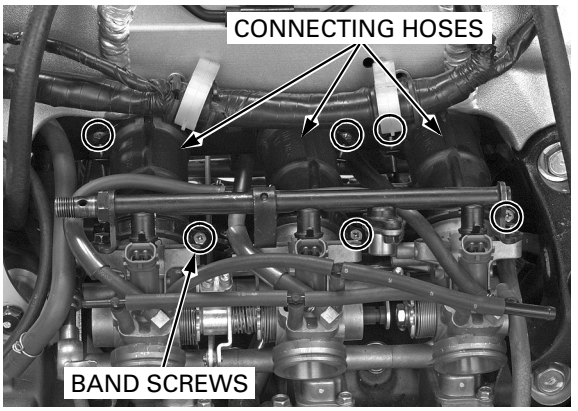
- three injector connectors
- IAC valve hose from the four way joint
- purge air hose from the three way joint (California type only)
- MAP sensor vacuum hose from the three way joint



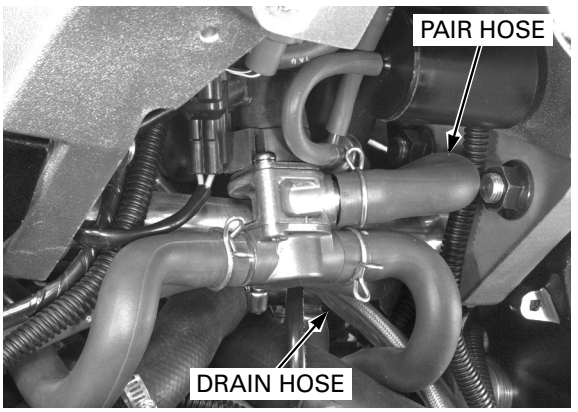
Loosen the insulator band screws.
Remove the six bolts, three left intake manifolds and insulators.
Remove the intake manifold gasket.



Loosen the band screws and remove the six connecting hoses from the air cleaner housing and throttle body assembly.



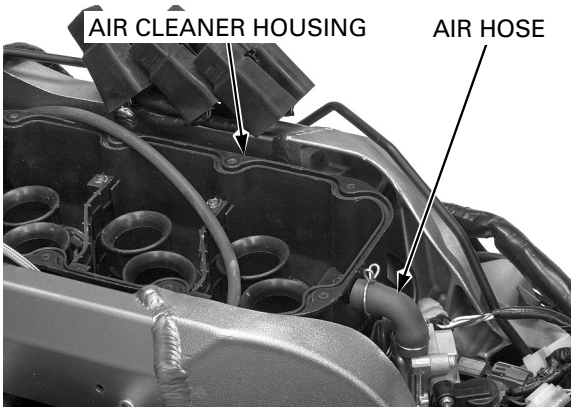
Disconnect the PAIR hose and drain hose from the bottom of the air cleaner housing.



Disconnect the IAC valve air hose from the air cleaner housing.

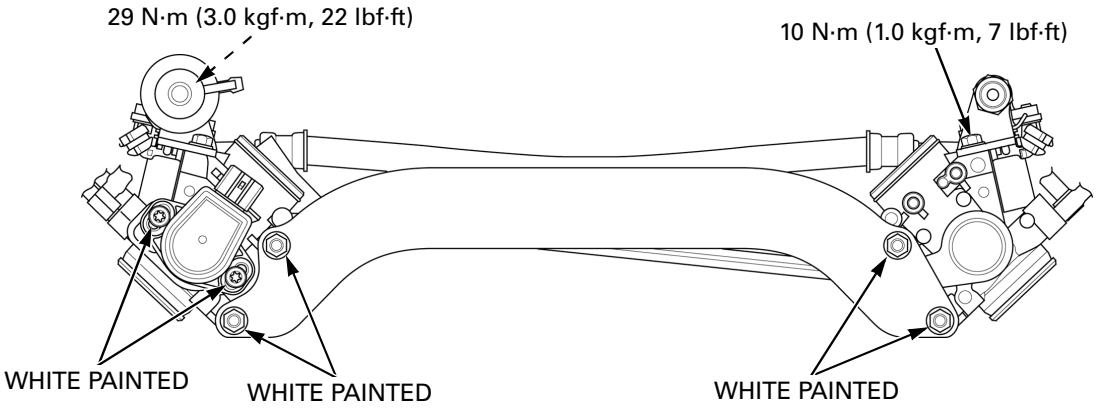
Disconnect the crankcase breather hose from the air cleaner housing and remove the air cleaner housing from the frame.

Remove the throttle body assembly from the left side of the frame.

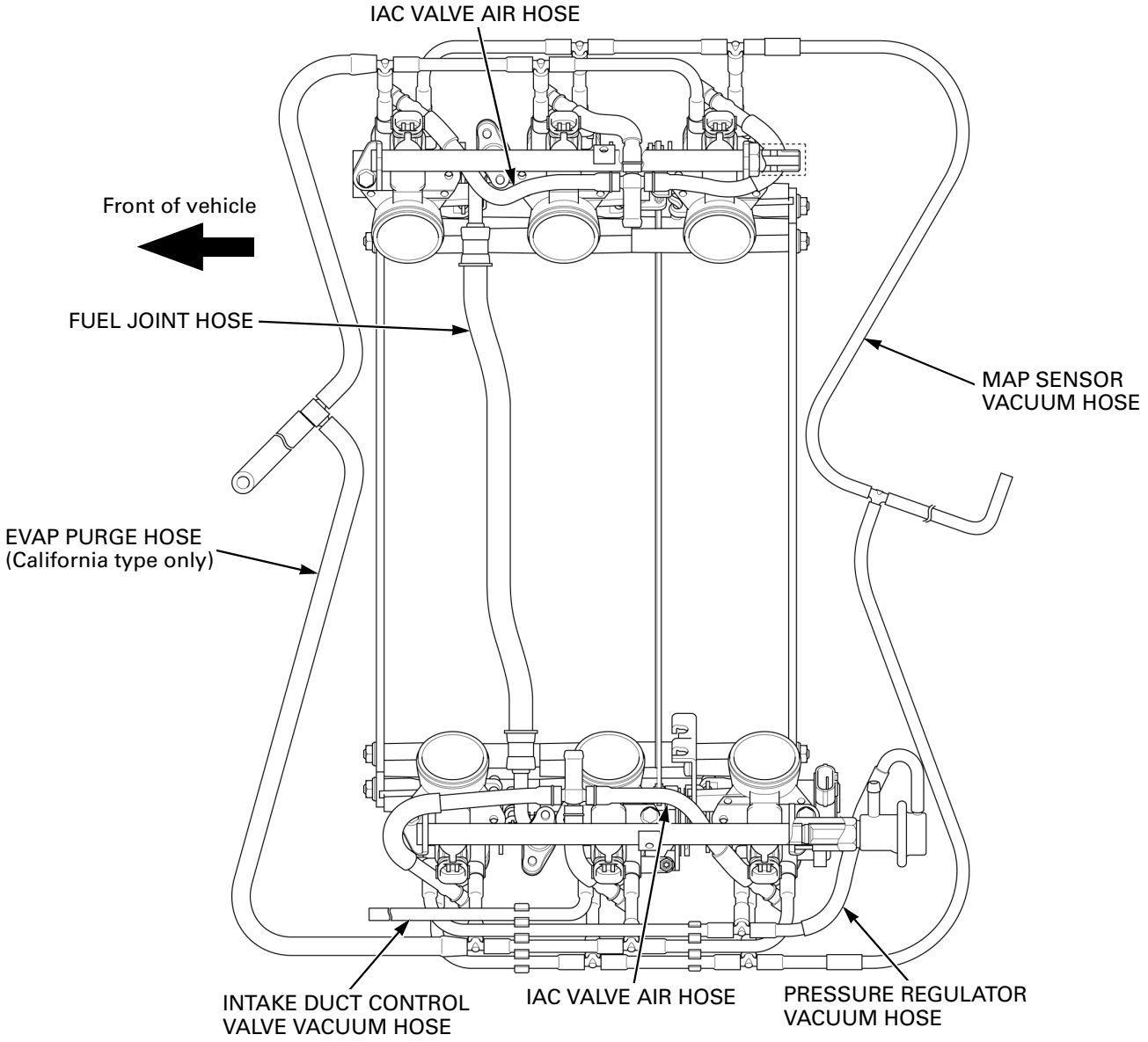


NOTICE

Do not loosen or tighten the white painted bolts, nuts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.



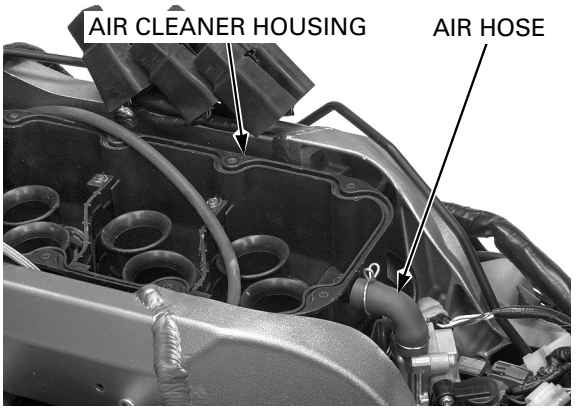
THROTTLE BODY VACUUM HOSE ROUTING



INSTALLATION

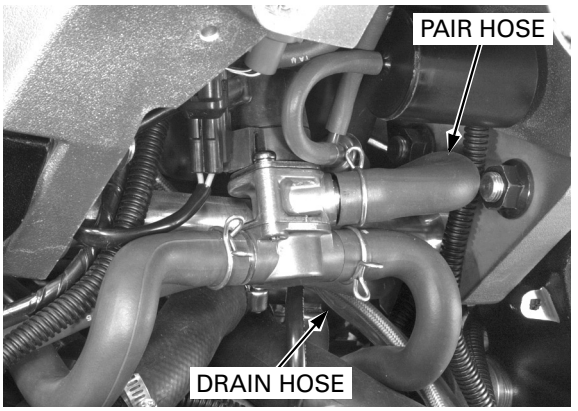
Install the throttle body assembly from the left side of the frame.

Install the air cleaner housing into the frame and connect the crankcase breather hose to the air cleaner housing.
Connect the IAC valve air hose to the air cleaner housing.

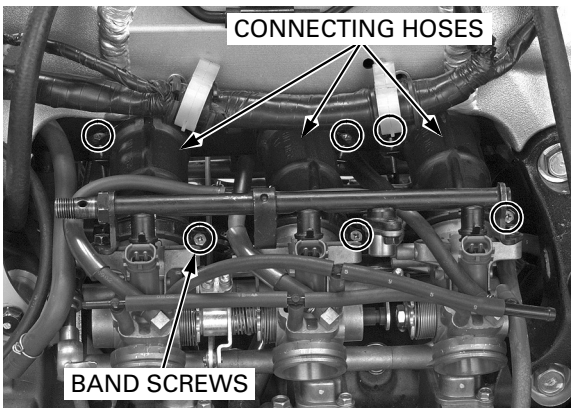


Route the hoses properly (page 1-22).

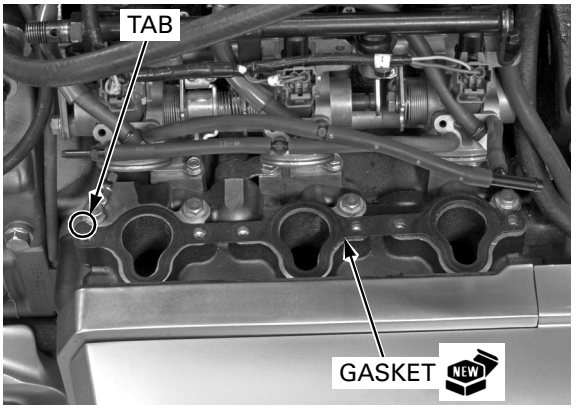
Connect the PAIR hose and drain hose to the bottom of the air cleaner housing.



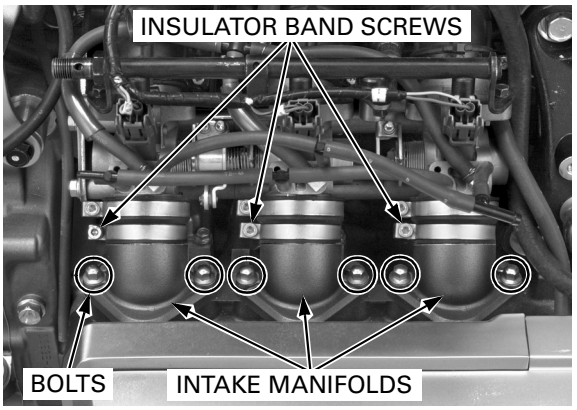
Install the six connecting hoses onto the throttle body assembly and air cleaner housing, and tighten the band screws securely.



Install a new intake manifold gasket onto the cylinder head with the tab facing rearward.



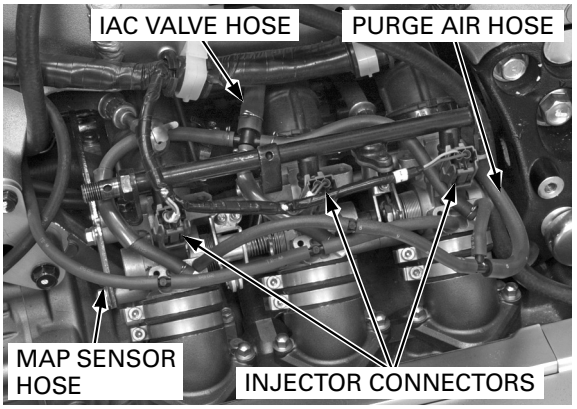
Install the three right intake manifolds and insulators onto the throttle body assembly.
Install the intake manifolds onto the cylinder head with the six bolts.
Tighten the bolts and insulator bands securely.



Route the hoses and wires properly (page 1-22).

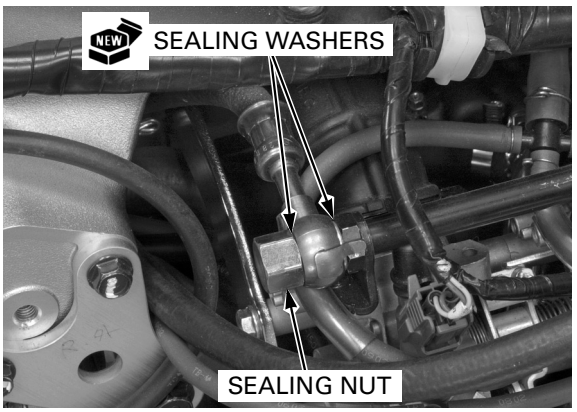
Connect the following:

- IAC valve hose to the three way joint
- purge air hose to the three way joint (California type only)
- MAP sensor hose to the three way joint
- three injector connectors

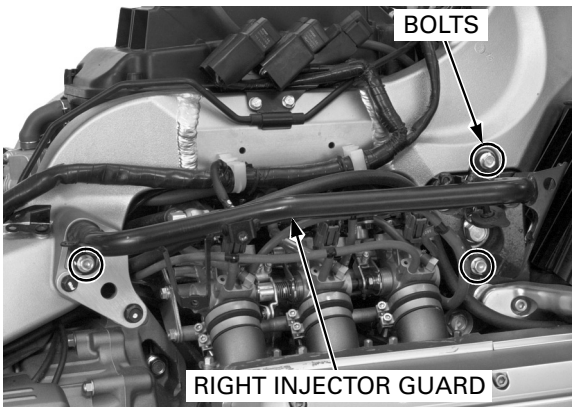


Install the fuel feed hose to the right fuel rail with new sealing washers and the sealing nut, and tighten the nut by holding the fuel rail.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

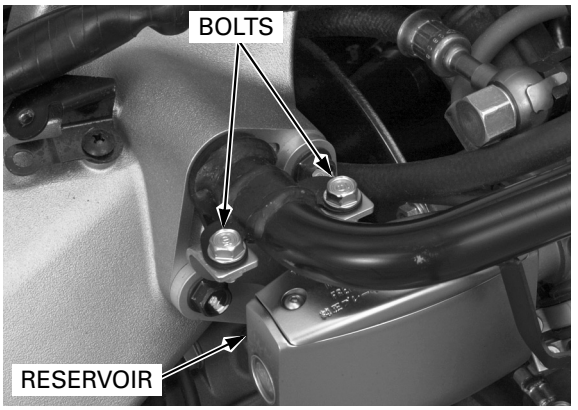


Install the right injector guard and tighten the three bolts securely.

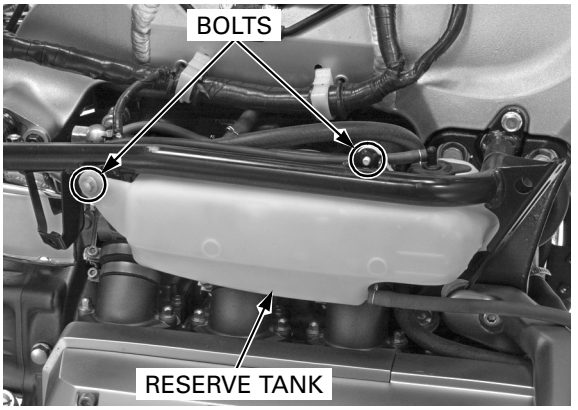


Install the rear brake fluid reservoir stay onto the right injector guard and tighten the two bolts.

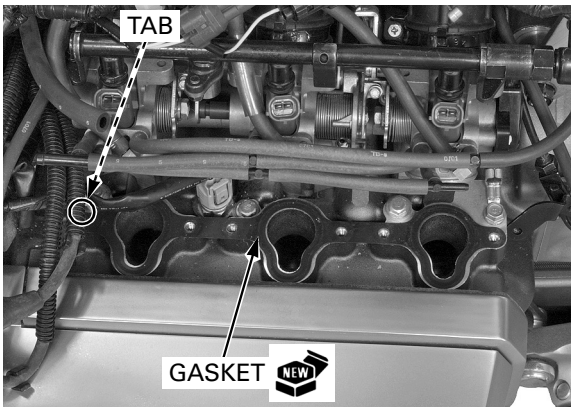
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



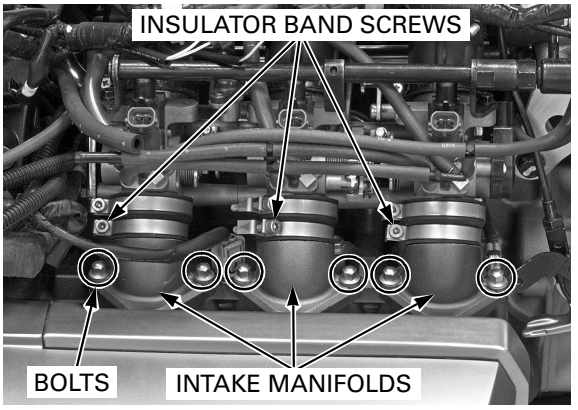
Install the radiator reserve tank and tighten the two bolts.



Install a new intake manifold gasket onto the cylinder head with the tab facing forward.

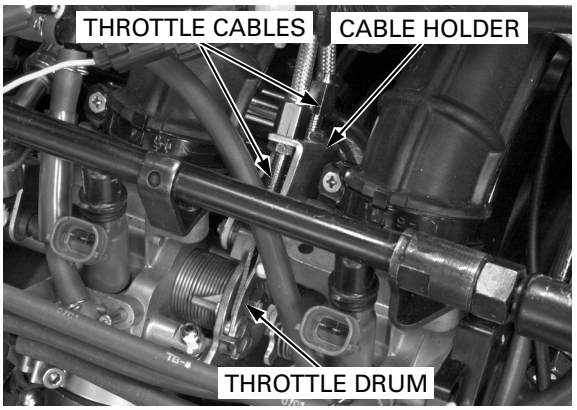


Install the three left intake manifolds and insulators onto the throttle body assembly.
Install the intake manifolds onto the cylinder head with the six bolts.
Tighten the bolts and insulator bands securely.



Connect the throttle cables to the throttle drum and install them onto the cable stay.

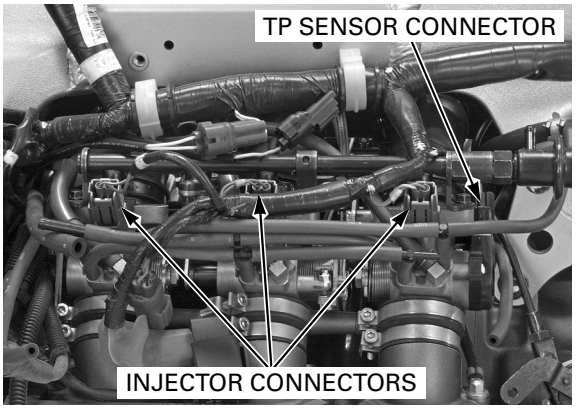
Adjust the throttle grip free play (page 4-5).



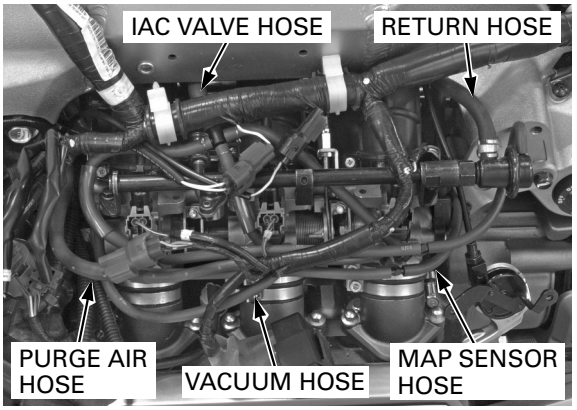
Route the hoses and wires properly (page 1-22).

Connect the following:

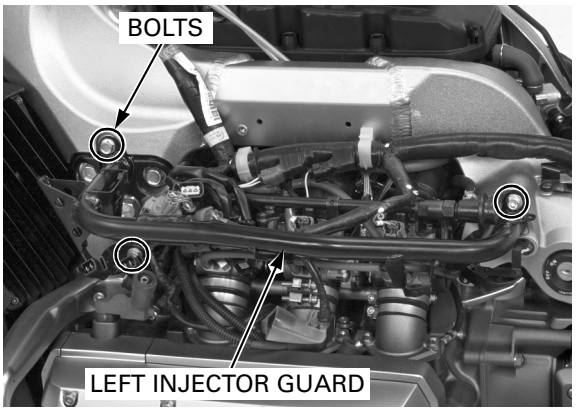
- three injector connectors
- throttle position (TP) sensor 3P connector



- IAC valve hose to the three way joint
- intake air duct control valve vacuum hose to the throttle body
- purge air hose to the three way joint (California type only)
- MAP sensor vacuum hose to the three way joint
- fuel return hose

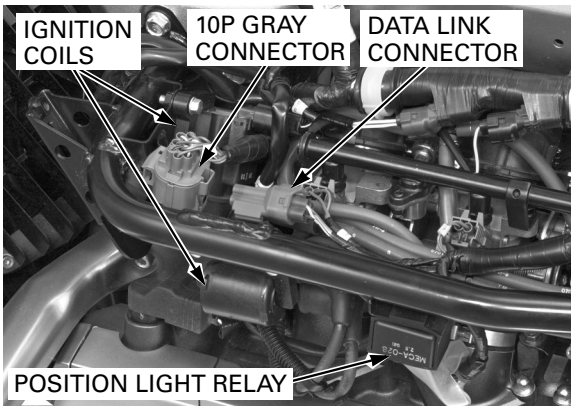


Install the left injector guard and tighten the three bolts securely.



Install the following onto the left injector guard:

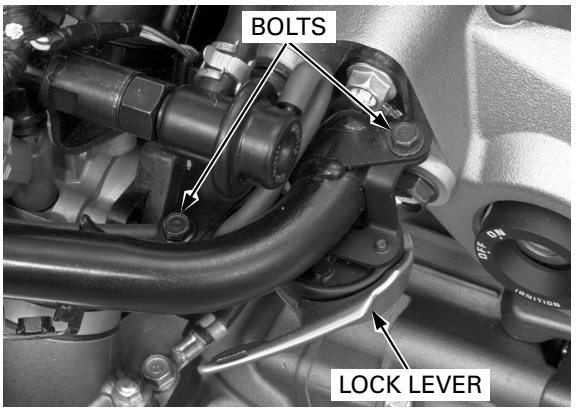
– No. 1 & 2 and No. 3 & 4 ignition coils
– engine sub-harness 10P gray connector
– data link connector
– turn signal/position light relay



– steering lock lever and two bolts

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

Install the fuel tank (page 6-37).



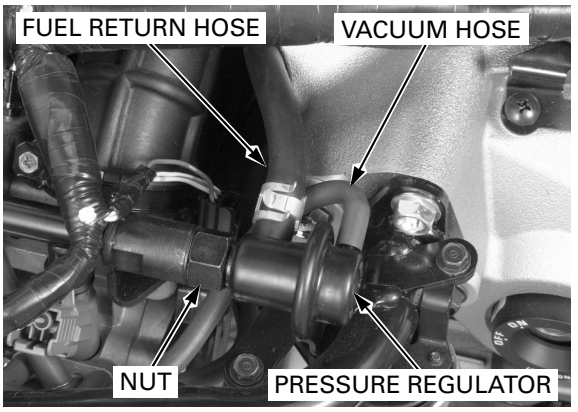
PRESSURE REGULATOR

REMOVAL

Release the fuel pressure (page 6-36).

Disconnect the vacuum hose from the pressure regulator.
Pinch the fuel return hose using a hose clamp and disconnect it from the pressure regulator.

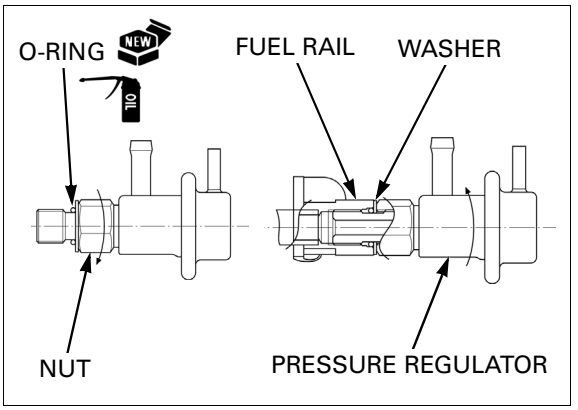
Hold the fuel rail with an adjustable wrench and loosen the pressure regulator nut.
Remove the pressure regulator and joint pipe.



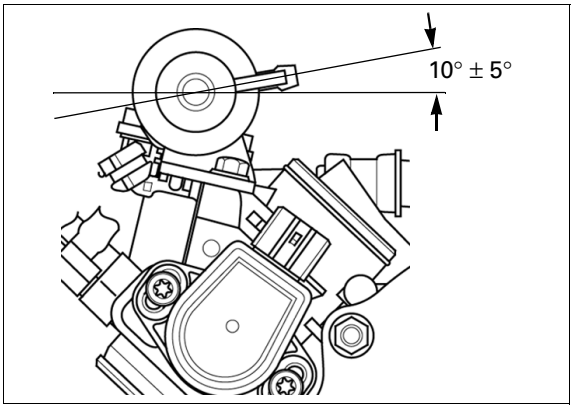
INSTALLATION

Turn the nut until it contacts the pressure regulator body.
Coat a new O-ring with oil and install it onto the pressure regulator.

Install the pressure regulator and turn it in until the washer contacts fuel rail.



Position the pressure regulator within the specified angle as shown.

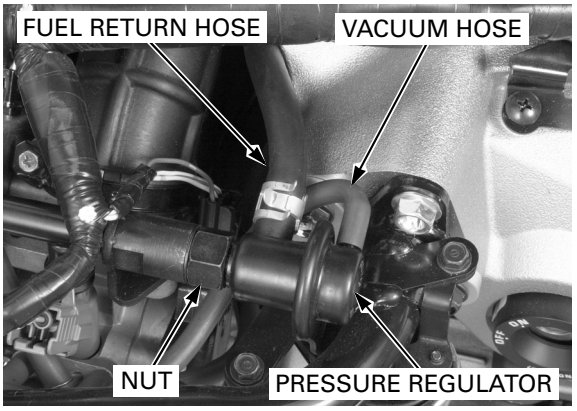


Hold the fuel rail with an adjustable wrench and tighten the pressure regulator nut.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

Connect the vacuum hose and fuel return hose to the pressure regulator and remove the hose clamp from the return hose.

Install the removed parts in the reverse order of removal.



FUEL PUMP RELAY

INSPECTION

NOTE:

- Perform the fuel pump inspection (page 6-38) before this inspection.

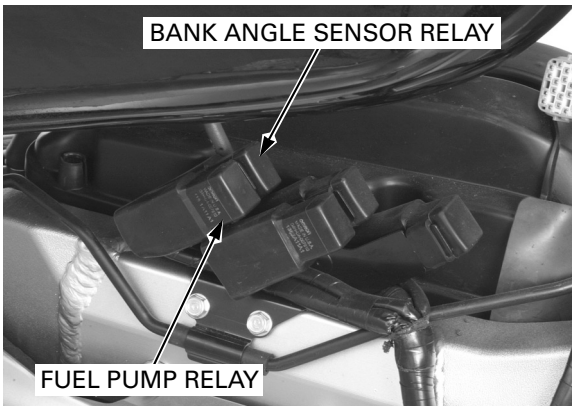
1. Raise the front of the fuel tank and support it (page 3-4).

   Turn the ignition switch to "OFF".
   Exchange the fuel pump relay with a known-good one.

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

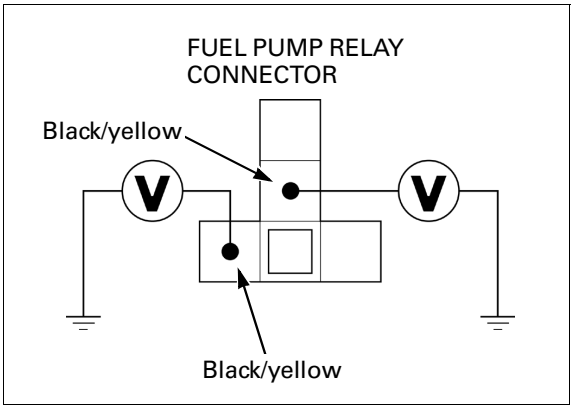
   Turn the ignition switch to "ON" and check that the fuel pump operates for a few seconds.

- If the pump operates, replace the fuel pump relay with a new one.
- If the fuel pump does not operate, go to step 2.



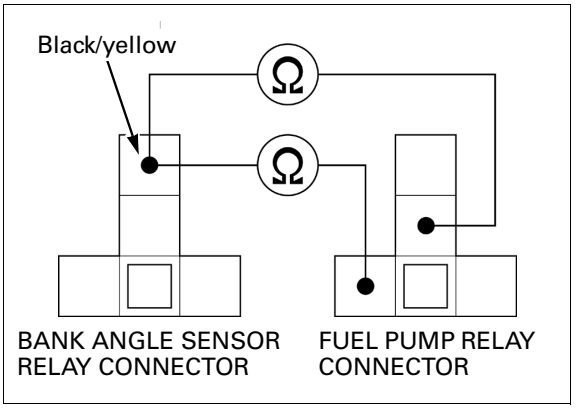
2. Turn the ignition switch to "OFF" and remove the fuel pump relay.
   Turn the ignition switch to "ON" and measure the voltage between the Black/yellow wire terminal (+) of the relay connector and ground (–).
   There should be battery voltage.

- If there is no voltage, go to step 3.
- If there is battery voltage, go to step 4.



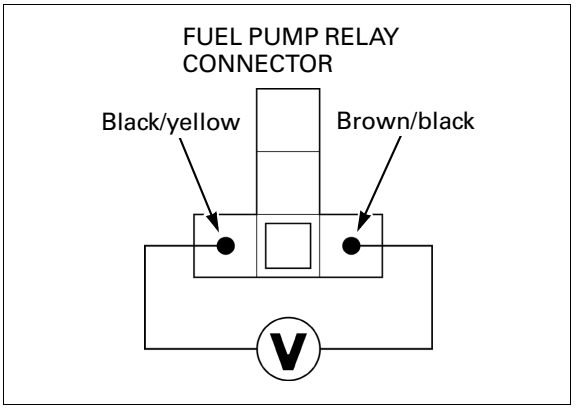
3. Turn the ignition switch to "OFF" and remove the bank angle sensor relay.
   Check for continuity between the Black/yellow wire terminals of the fuel pump relay and bank angle sensor relay connector.
   There should be continuity.

- If there is no continuity, repair the open circuit in the Black/yellow wire.
- If there is continuity, check the bank angle sensor relay circuit (page 18-11).



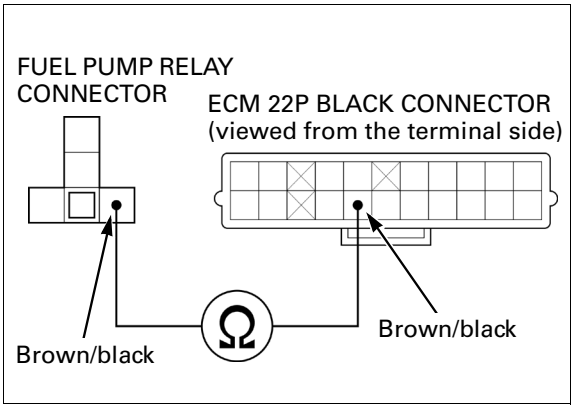
4. Turn the ignition switch to "OFF".
   Measure the voltage between the Black/yellow wire terminal (+) and Brown/black wire terminal (–) of the fuel pump relay connector.
   Turn the ignition switch to "ON".
   There should be battery voltage for a few seconds.

- If there is battery voltage for a few seconds, the system is OK; check for loose contacts or corroded terminals.
- If there is no voltage, go to step 5.



5. Turn the ignition switch to "OFF".
   Disconnect the ECM 22P black connector.
   Check for continuity between the Brown/black wire terminals of the fuel pump relay and ECM 22P black connectors.
   There should be continuity.

- If there is no continuity, repair the open circuit in the Brown/black wire.
- If there is continuity, replace the ECM with a new one and inspect again.



MAP SENSOR

OUTPUT VOLTAGE INSPECTION

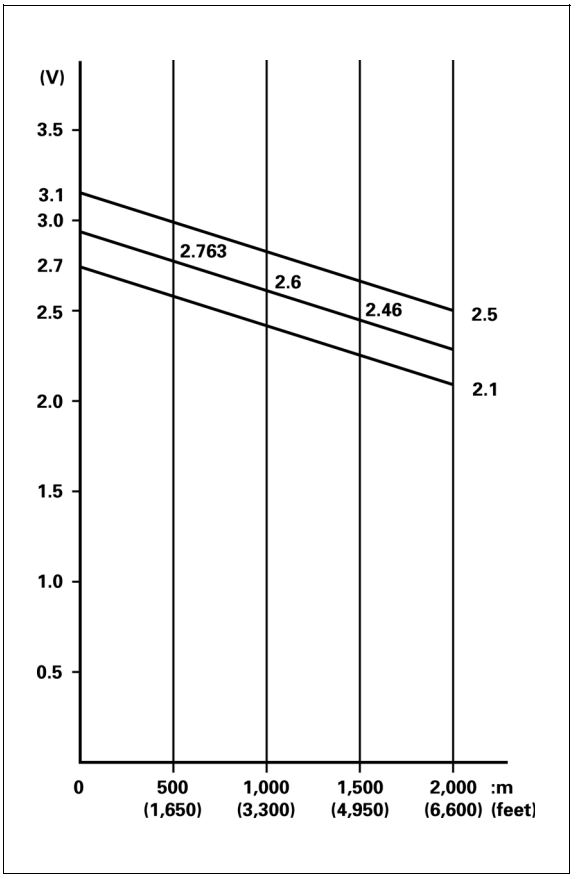
Connect the test harness to the ECM (page 6-10).

Turn the ignition switch to "ON" and engine stop switch to "".
Measure the voltage at the test pin box terminals (page 6-10).

CONNECTION: No. 38 (+) – No. 8 (–)

STANDARD: 2.7 – 3.1 V

The output voltage (above) is measured under the standard atmosphere (1 atm = 1,030 hPa).
The output voltage is changed by altitude as shown in the chart, because it varies in accordance with the atmospheric pressure.



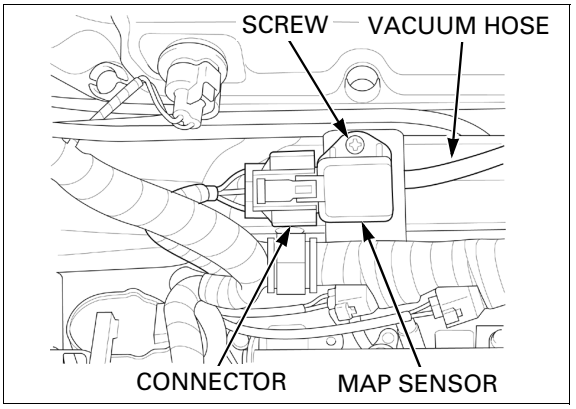
REPLACEMENT

Raise the front of the fuel tank and support it (page 3-4).

Disconnect the 3P gray connector from the MAP sensor.
Remove the screw and MAP sensor from the stay of the frame.
Disconnect the vacuum hose from the MAP sensor.

Install a new MAP sensor in the reverse order of removal.

TORQUE:
MAP sensor screw: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



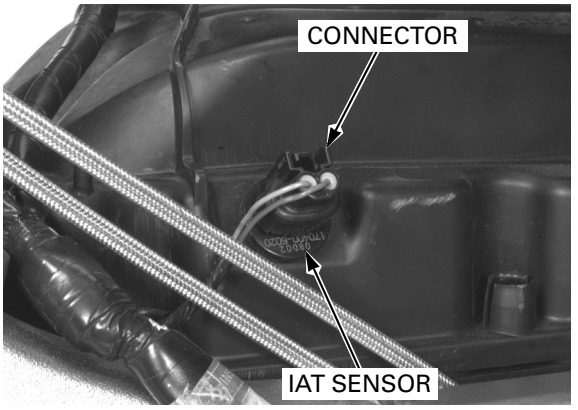
IAT SENSOR

REPLACEMENT

Raise the front of the fuel tank and support it (page 3-4).

Disconnect the IAT sensor 2P black connector.
Remove the screws and IAT sensor from the air cleaner housing cover.

Install a new IAT sensor in the reverse order of removal.

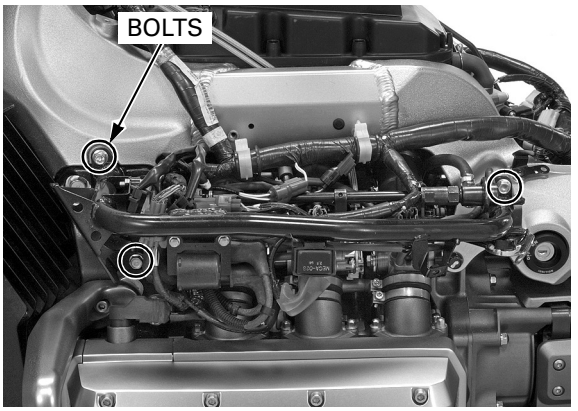


CAMSHAFT POSITION SENSOR

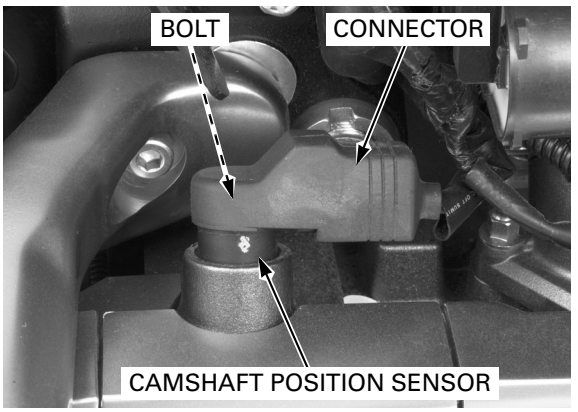
REPLACEMENT

Remove the left front inner cover (page 3-4).

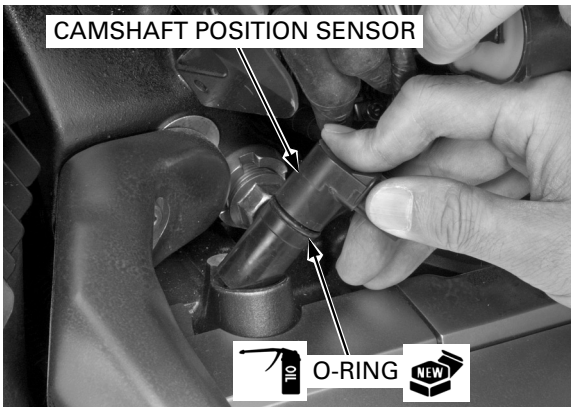
Remove the three left injector guard mounting bolts.



Disconnect the camshaft position sensor 2P connector.
Remove the bolt and camshaft position sensor from the left cylinder head.

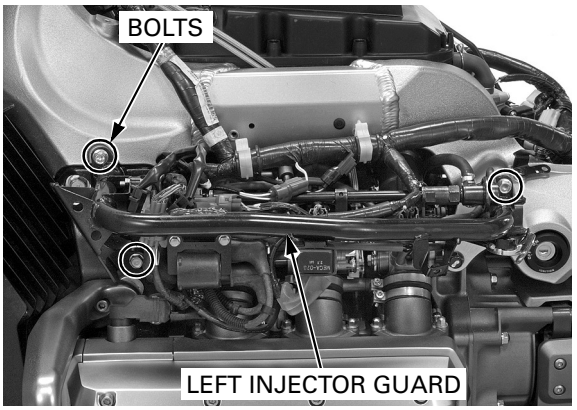


Coat a new O-ring with oil and install it onto a new camshaft position sensor.
Install the camshaft position sensor into the left cylinder head and tighten the bolt securely.
Connect the camshaft position sensor 2P connector.



Install the left injector guard onto the frame and tighten the three mounting bolt securely.

Install the left front inner cover (page 3-4).



KNOCK SENSOR

REPLACEMENT

Remove the exhaust pipe cover (page 3-7).

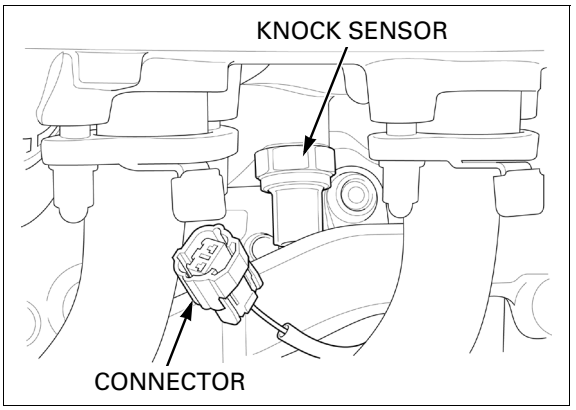
Disconnect the knock sensor 1P connector.
Remove the knock sensor from the cylinder block.

Install a new knock sensor into the cylinder block and tighten it.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Connect the knock sensor 1P connector.

Instal the exhaust pipe cover (page 3-8).

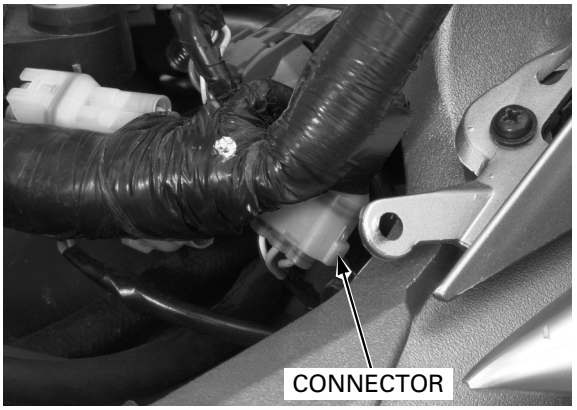


VEHICLE SPEED SENSOR

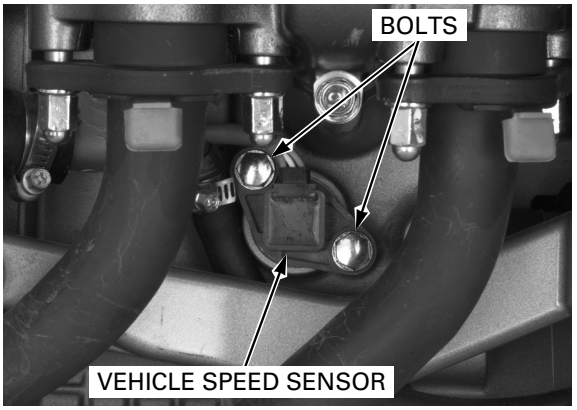
REPLACEMENT

Remove the right exhaust pipe cover (page 3-7).
Raise the front of the fuel tank and support it (page 3-4).

Disconnect the vehicle speed sensor 3P connector.



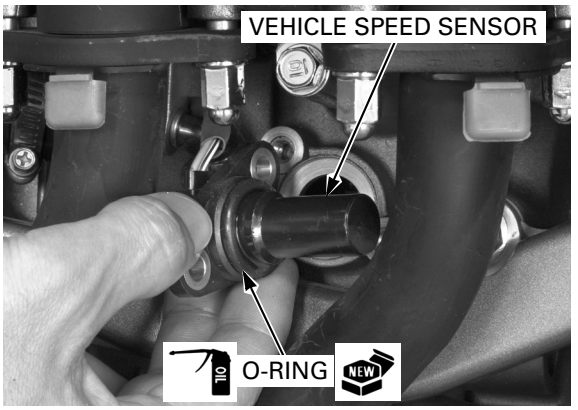
Remove the two bolts and the vehicle speed sensor from the crankcase.



Coat a new O-ring with oil and install it onto a new vehicle speed sensor.

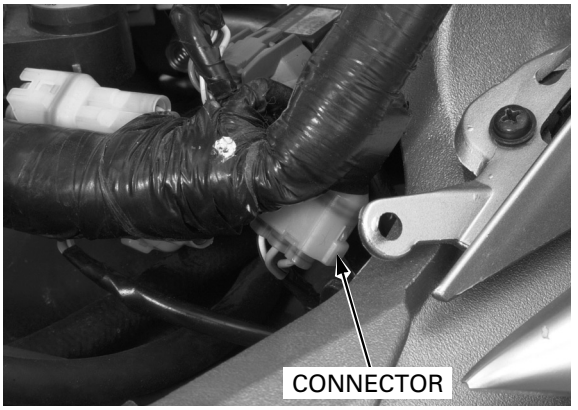
Install the vehicle speed sensor and tighten the bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Route the vehicle speed sensor wire properly (page 1-22).
Connect the vehicle speed sensor 3P connector.

Install the removed parts in the reverse order of removal.



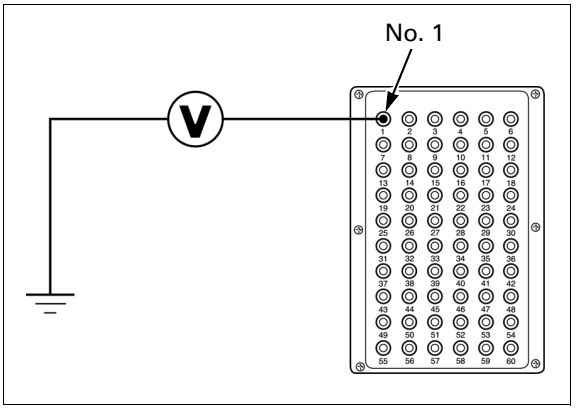
ECM (ENGINE CONTROL MODULE)

POWER/GROUND LINE INSPECTION

Connect the ECM test harness to the ECM connectors (page 6-10).

POWER INPUT LINE

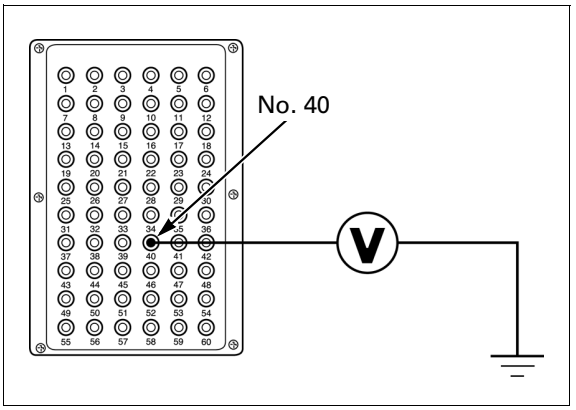
Turn the ignition switch to "ON".
Measure the voltage between the test pin box No. 1 terminal (+) and ground.
There should be battery voltage.
If there is no voltage, check for open circuit in the White wire between the ECM and IGNITION fuse (10 A).



ENGINE STOP SWITCH LINE

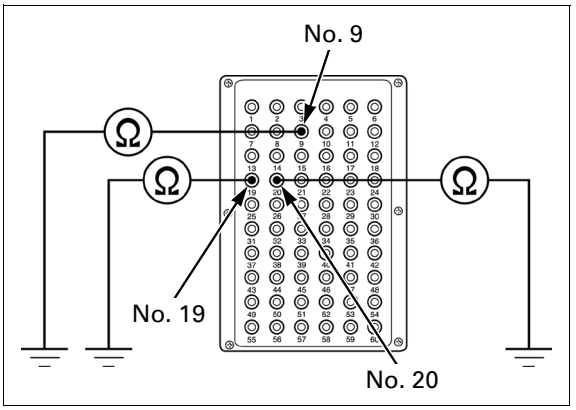
Turn the ignition switch to "ON" with the engine stop switch in "".
Measure the voltage between the test pin box No. 40 terminal (+) and ground.
There should be battery voltage.
If there is no voltage, check the following:

– open circuit in the Black/yellow wire between the ECM and bank angle sensor relay
– bank angle sensor relay circuits (page 18-11)



GROUND LINE

Check for continuity between the test pin box No. 9 terminal and ground, between the No. 19 terminal and ground, and between the No. 20 terminal and ground.
There should be continuity at all times.
If there is no continuity, check for open circuit in Green wire.



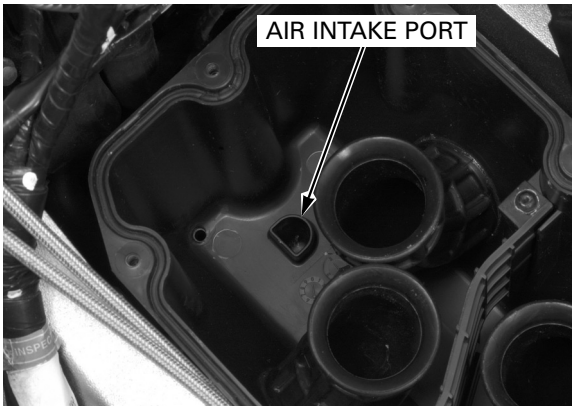
SECONDARY AIR SUPPLY SYSTEM

SYSTEM INSPECTION

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

Remove the air cleaner element (page 4-6).

Check that the secondary air intake port is clean and free of carbon deposits.
If there is carbon in the air intake port, check the pulse secondary air injection (PAIR) check valves.



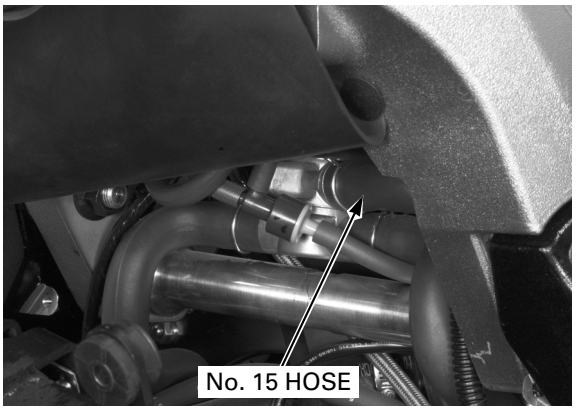
Do not disconnect the radiator hoses.

Remove the radiator mounting bolts (page 7-8) and move the radiator forward.

Disconnect the No. 15 air hose from the air cleaner housing.

Start the engine and open the throttle slightly to be certain that air is sucked in through the No. 15 air hose.

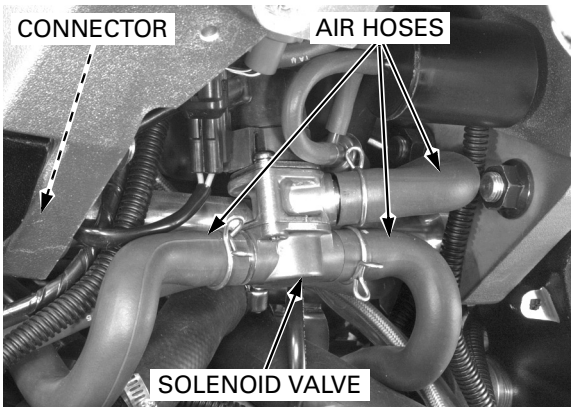
If air is not drawn in, check the air hoses for clogs and the PAIR control solenoid valve.



PAIR CONTROL SOLENOID VALVE INSPECTION

Remove the radiator mounting bolts and move the radiator forward (page 7-8).

Disconnect the three air hose from the PAIR control solenoid valve.
Disconnect the 2P black connector and remove the PAIR control solenoid valve.



Check air flow from hose fitting (A) (input port) to hose fittings (B) (output ports).
Air should flow out.

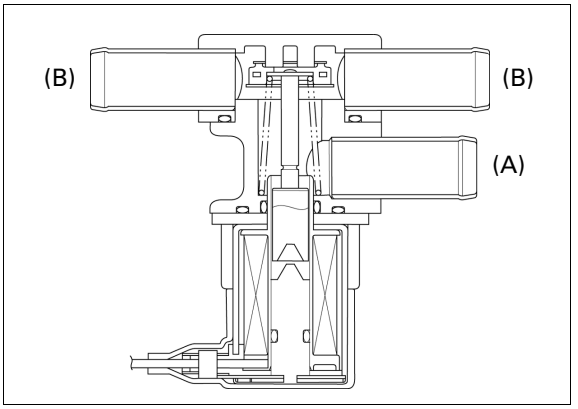
Connect a 12 V battery to the solenoid valve connector terminals.

CONNECTION:

Battery (+) – Black/yellow wire terminal
Battery (–) – Orange/green wire terminal

Air should not flow when the battery is connected.

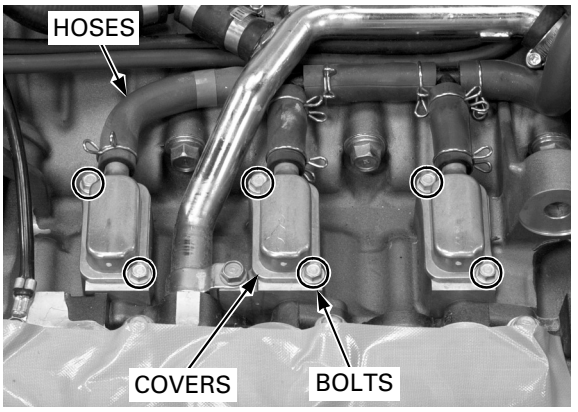
Install the PAIR control solenoid valve in the reverse order of removal.



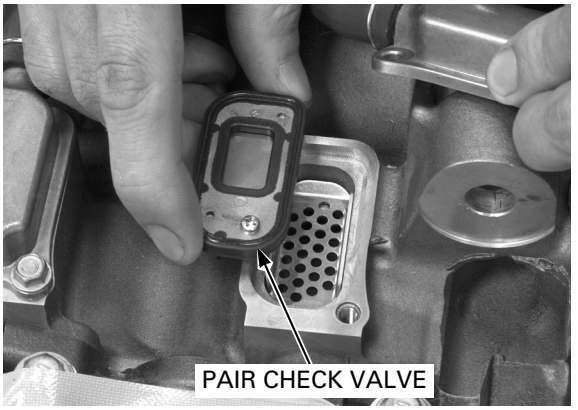
PAIR CHECK VALVE REPLACEMENT

Remove the throttle body assembly (page 6-42).

Remove the six bolts and check valve covers/hoses from the cylinder.

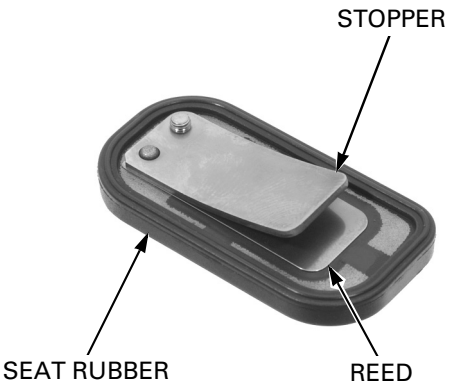


Remove the PAIR check valves from the cylinder.



Check the reed for damage or fatigue.
Replace the PAIR check valve if necessary.

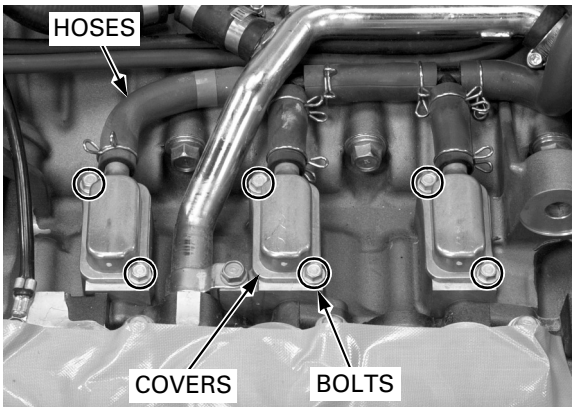
Replace the PAIR check valve if the seat rubber is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.



Install the PAIR check valves and covers/hoses onto the cylinder.
Install and tighten the bolts.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

Install the throttle body assembly (page 6-47).

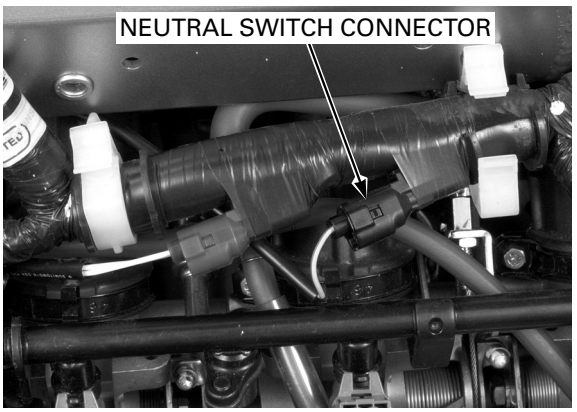


VARIABLE AIR INTAKE CONTROL SYSTEM

SYSTEM INSPECTION

Remove the left front inner cover (page 3-4).

Disconnect the neutral switch 2P black connector to simulate that the transmission is in gear.



Shift the transmission into neutral and retract the side stand.
Squeeze the clutch lever and start the engine.
Check that the intake air duct valve is opened.

Check that the intake air duct valve is closed in the following conditions:

– engine speed: below 3,000 rpm
– throttle opening: more than 30°

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (California type only)

NOTE:

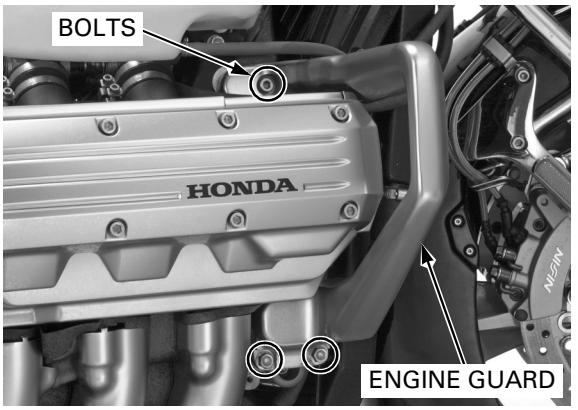
- Refer to the Vacuum Hose Routing Diagram (page 1-48) and Cable & Harness Routing (page 1-22) for hose connections and routing.

EVAP CANISTER REMOVAL/ INSTALLATION

Remove the following:

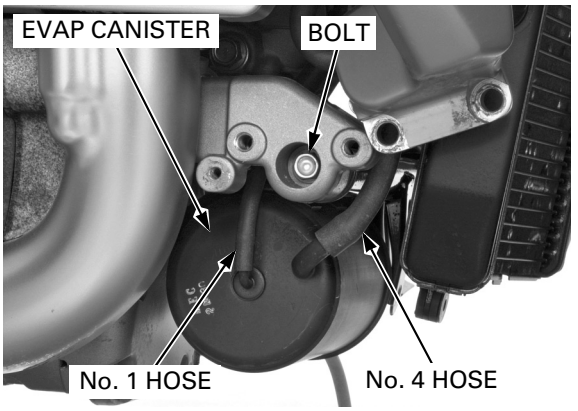
– right front side cover (page 3-4)
– radiator covers (page 3-6)
– lower radiator mounting bolt

Loosen the lock nut and lower the adjusting bolt (page 8-7).
Remove the three bolts, washers and slide the engine guard forward.



Disconnect the No. 1 and No. 4 hoses from the EVAP canister.

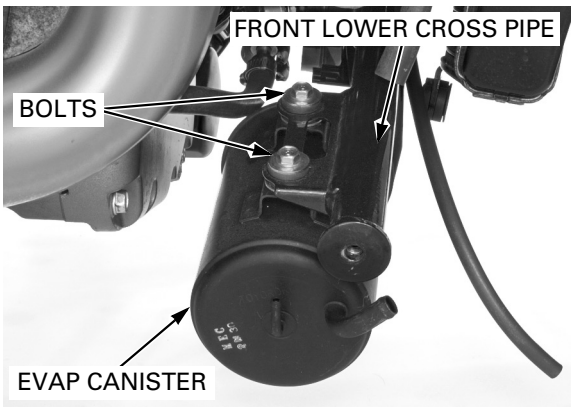
Remove the bolt and lower the front lower cross pipe.



Remove the two mounting bolts, washers and the EVAP canister from the front lower cross pipe.

Refer to page 8-18 for engine guard installation.

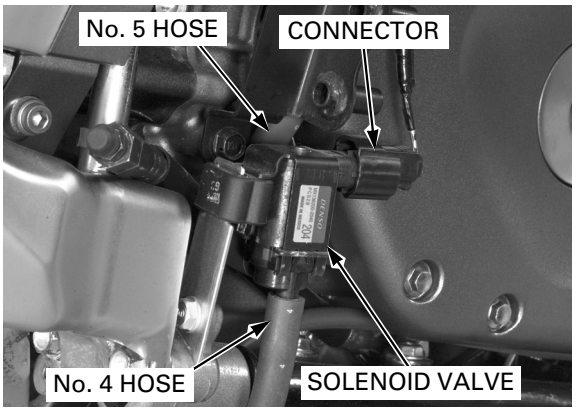
Install the EVAP canister in the reverse order of removal.



EVAP PURGE CONTROL SOLENOID VALVE INSPECTION

Remove the radiator (page 7-8).

Disconnect the 2P connector, No. 4 and No. 5 hoses from the EVAP purge control solenoid valve.
Remove the EVAP purge control solenoid valve from the stay.



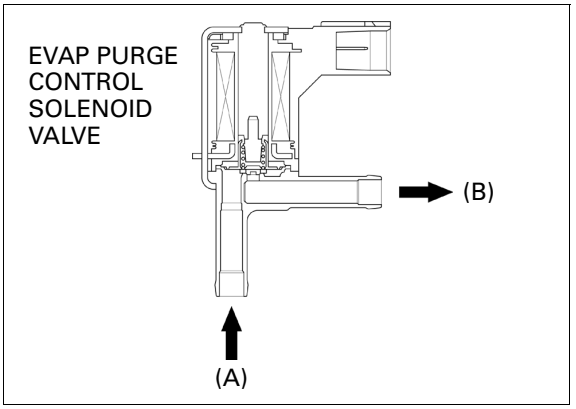
Check air flow from hose fitting (A) (input port) to hose fittings (B) (output ports).
Air should flow out.

Connect a 12 V battery to the solenoid valve connector terminals.

CONNECTION:
Battery (+) – Black/Yellow wire terminal
Battery (–) – Yellow/Black wire terminal

Air should not flow when the battery is connected.

Install the EVAP purge control solenoid valve in the reverse order of removal.



ENGINE IDLE SPEED

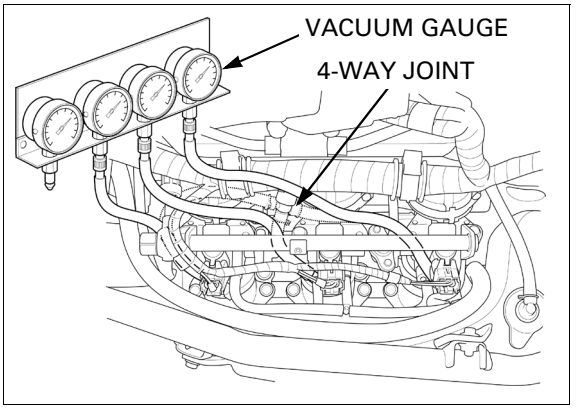
NOTE:

- Check the following before inspecting the engine idle speed:
  - The malfunction indicator lamp (MIL) does not indicate any failure codes.
  - The PAIR system functions properly.
  - The throttle cable free play is properly adjusted.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

Check that the vacuum hoses of the intake air control (IAC) valve are not clogged, pinched or bent.

Start the engine, warm it to normal operating temperature.

Stop the engine and connect a tachometer according to the tachometer manufacturer's instructions.
Disconnect the IAC valve vacuum hoses from the 4-way joint.
Connect vacuum gauge to the IAC valve vacuum hoses.



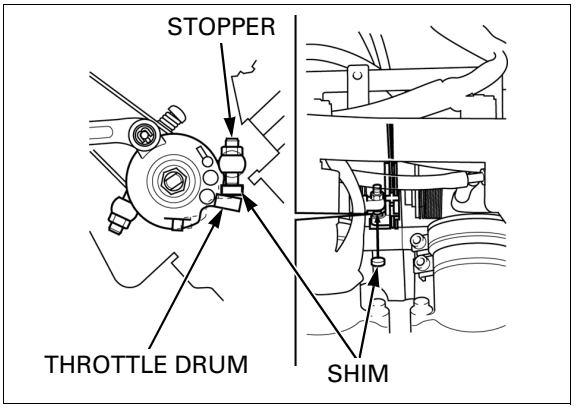
Raise the idle speed to 800 – 900 rpm by inserting a shim (thickness: approx. 0.7 mm/0.03 in) between the No. 4 throttle drum and stopper.

Check the vacuum pressure difference in each cylinder is within 4.0 kPa (30 mmHg/1.2 inHg) at 800 – 900 rpm.

If the vacuum pressure difference is not within 4.0 kPa (30 mmHg/1.2 inHg) at 800 – 900 rpm, check the following:

– valve clearance (page 4-7)
– ignition timing (page 18-13)
– exhaust system for clogs

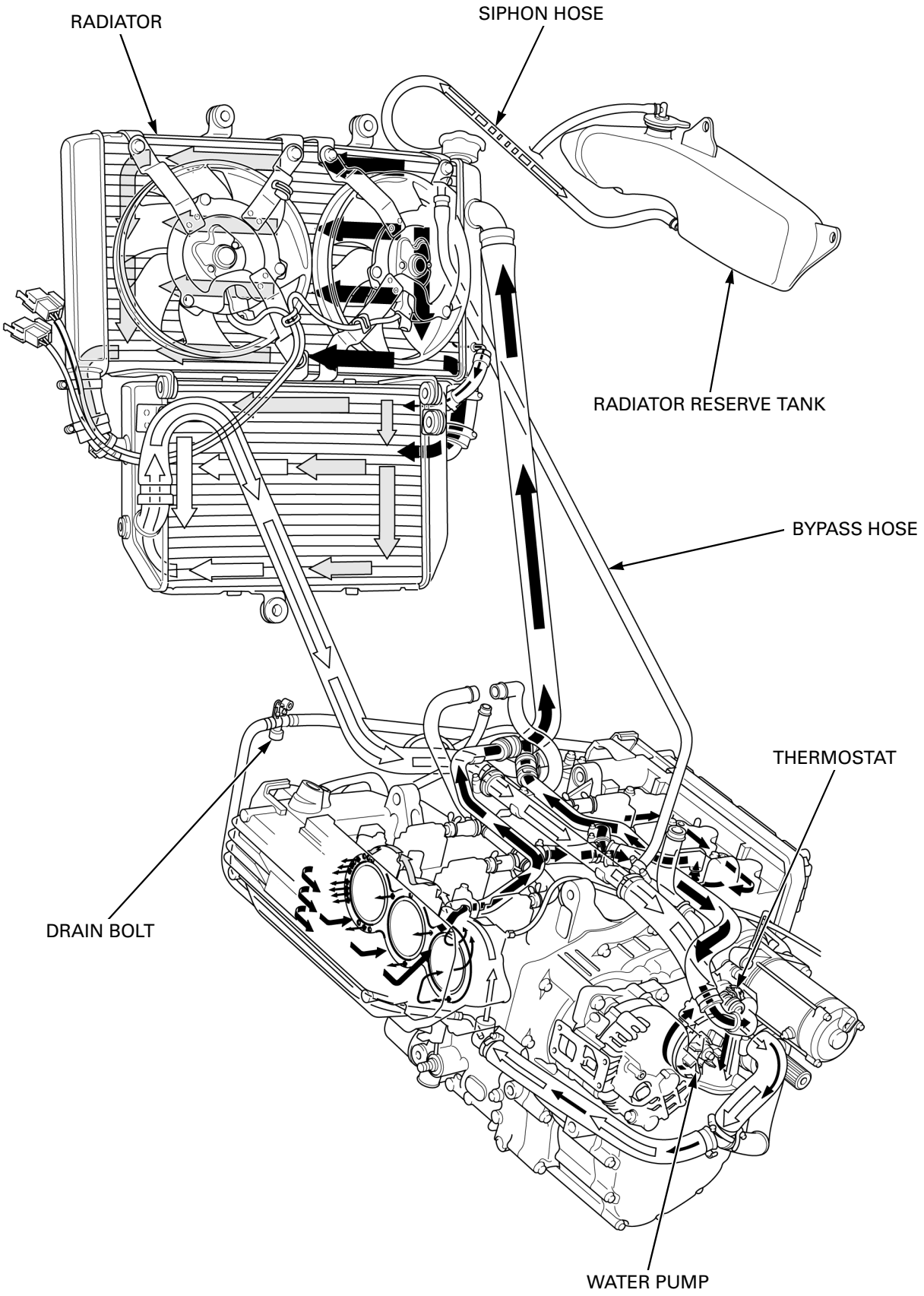
Replace the throttle body assembly if the above items are OK.



MEMO

7. COOLING SYSTEM

SYSTEM FLOW PATTERN



SERVICE INFORMATION

GENERAL

⚠WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

NOTICE

Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- If any coolant gets in your eyes, rinse them with water and consult a doctor 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.
- See page 20-28 for fan control relay inspection.
- See page 20-17 for ECT sensor inspection.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	4.3 liter (4.5 US qt, 3.8 Imp qt)
	Reserve tank	0.50 liter (0.53 US qt, 0.44 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm^2, 16 – 20 psi)
Thermostat	Begin to open	76 – 80°C (169 – 176°F)
	Fully open	90°C (194°F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 mixture with distilled water

TORQUE VALUES

Water pump cover sealing plate bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)
Water pump cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

TROUBLESHOOTING

Engine temperature too high
- Faulty temperature gauge or ECT sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passage blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump

Engine temperature too low
- Faulty temperature gauge or ECT sensor
- Thermostat stuck open
- Faulty cooling fan motor switch

Coolant leak
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose

SYSTEM TESTING

COOLANT (HYDROMETER TEST)

Remove the right radiator sub-cover (page 3-6).

Remove the radiator cap.

Test the coolant gravity using a hydrometer (see below for "Coolant gravity chart").
For maximum corrosion protection, a 50 – 50% solution of ethylene glycol and distilled water is recommended (page 7-6).
Look for contamination and replace the coolant if necessary.

COOLANT GRAVITY CHART

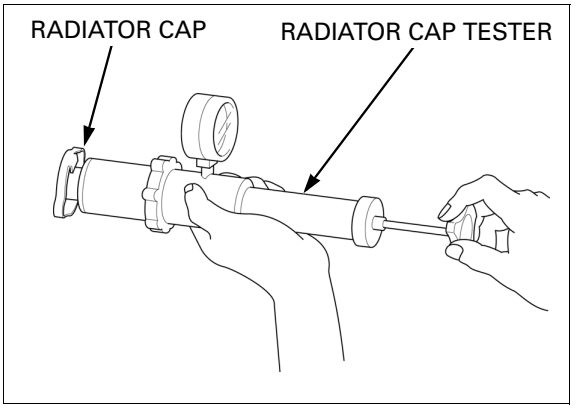
		Coolant temperature °C (°F)										
		0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
Coolant ratio%	5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
	10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
	15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
	20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
	25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
	30	1.053	1.052	1.051	1.047	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

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap (page 7-5).

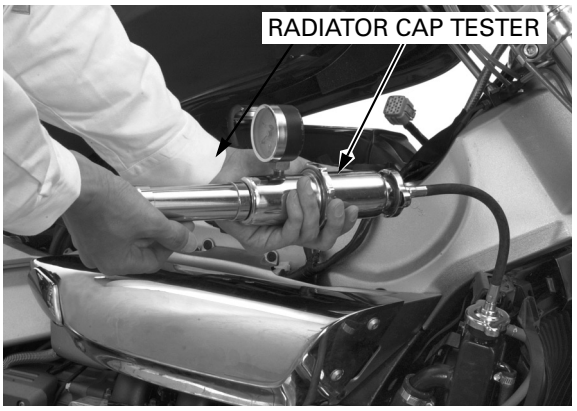
Before installing the cap in the tester, wet the sealing surfaces.

Pressure test the radiator cap.
Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low.
It must hold 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.

Install the right radiator sub-cover (page 3-6).

COOLANT REPLACEMENT

PREPARATION

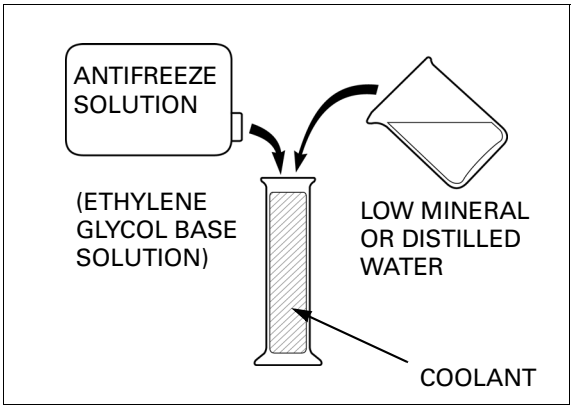
NOTICE

Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

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

RECOMMENDED MIXTURE:
1:1 (Distilled water and recommended antifreeze)

REPLACEMENT/AIR BLEEDING

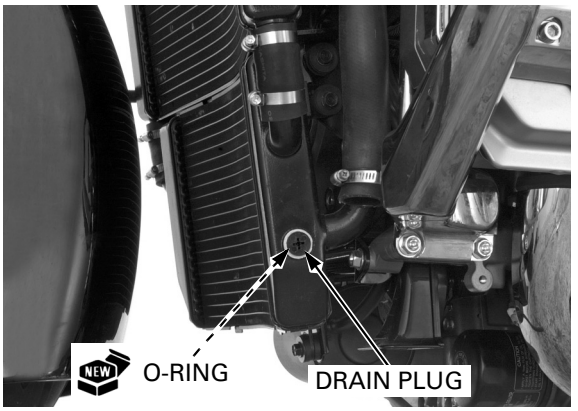
When filling the system or reserve tank with a coolant (checking coolant level), place the motorcycle in a vertical position on a flat, level surface.

Remove the radiator covers (page 3-6).
Remove the right front side cover (page 3-4).

Remove the radiator cap.

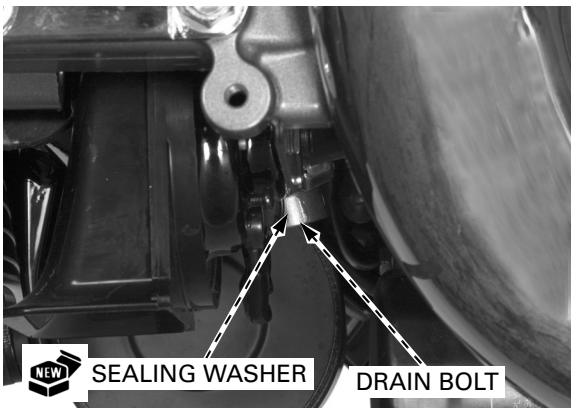
Remove the drain plug and O-ring, and drain the coolant from the radiator.

Reinstall the drain plug with a new O-ring.



Remove the drain bolt and sealing washer, and drain the coolant from the engine.

Reinstall the drain bolt with a new sealing washer.



Remove the reserve tank filler cap, disconnect the siphon hose from the radiator filler neck, and drain the coolant from the reserve tank.

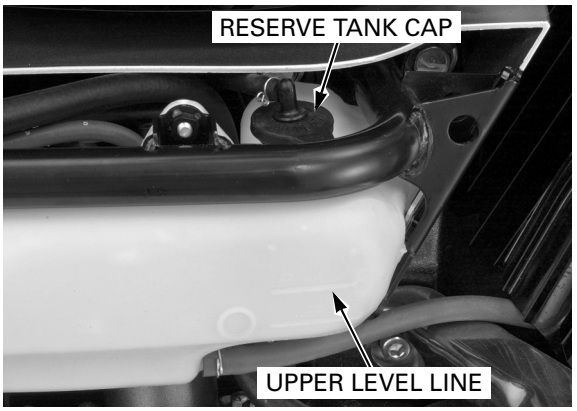
Reconnect the siphon hose.

Fill the system with the recommended coolant through the filler opening up to the filler neck.

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 3 – 4 times to bleed air from the system.
3. Stop the engine and add coolant up to the filler neck.
4. Install the radiator cap.

Fill the reserve tank to the upper level line and install the reserve tank cap.

Install the right front side cover (page 3-4).
Install the radiator covers (page 3-6).



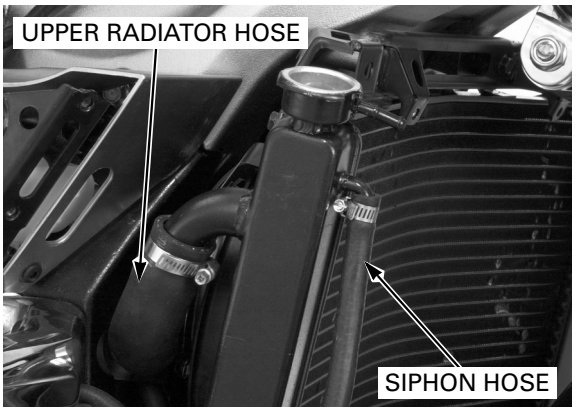
RADIATOR/COOLING FAN

REMOVAL

Drain the coolant (page 7-7).

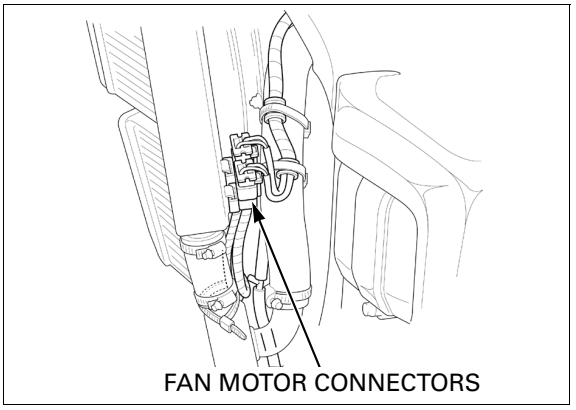
Remove the left front inner cover (page 3-4).

Disconnect the siphon hose and upper radiator hose by loosening the hose band screws.



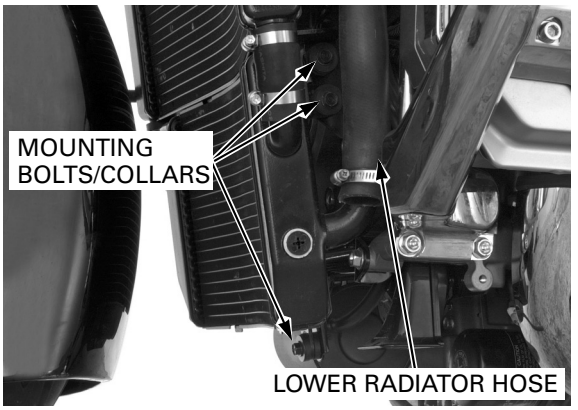
Disconnect the fan motor connectors.

Remove the clutch hose bleed valve from the bottom of the radiator.

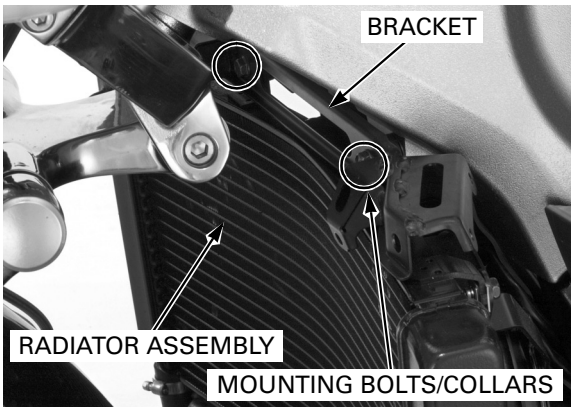


Disconnect the lower radiator hose by loosening the hose band screw.

Remove the three mounting bolts and collars.



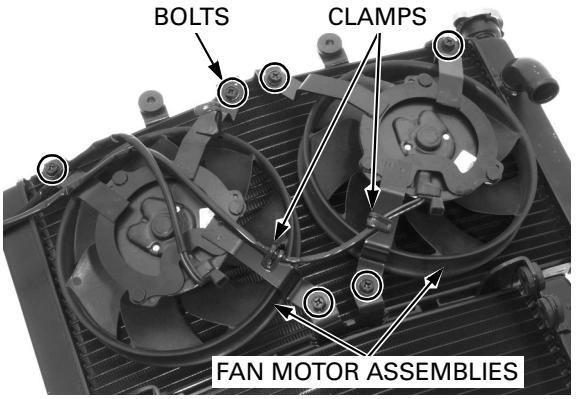
Remove the two mounting bolts, bracket, collars and the radiator assembly.



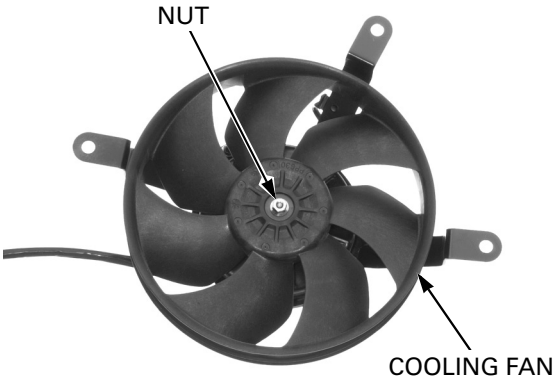
DISASSEMBLY

Release the fan motor wires from the clamps.

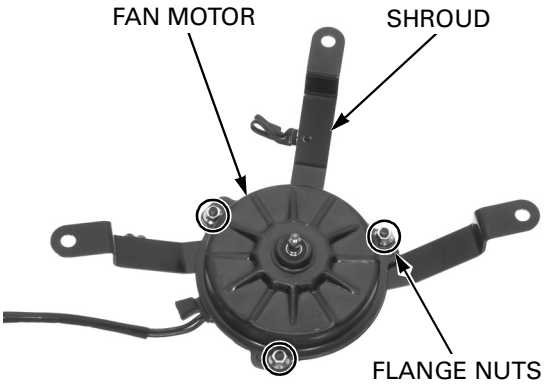
Remove the mounting bolts and cooling fan motor assemblies.



Remove the nut and cooling fan.



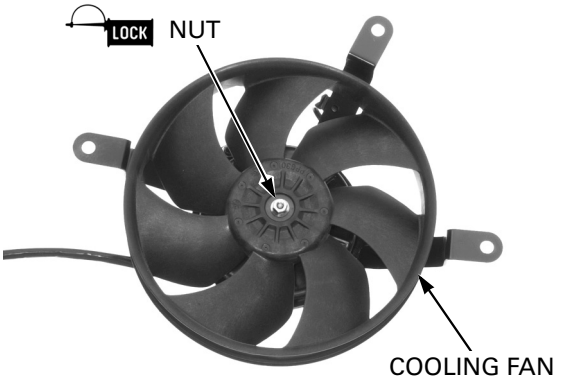
Remove the flange nuts and fan motor from the fan motor shroud.



ASSEMBLY

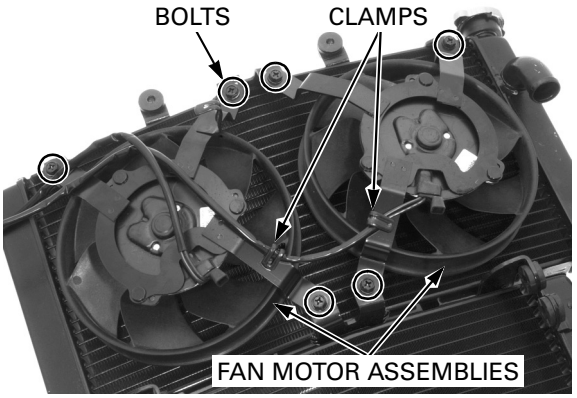
Install the fan motor onto the fan motor shroud in the direction as shown and tighten the flange nuts.

Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.
Apply locking agent to the fan nut threads.
Install the nut and tighten it.



Install the cooling fan motor assemblies onto the radiator.
Install and tighten the radiator mounting bolts.

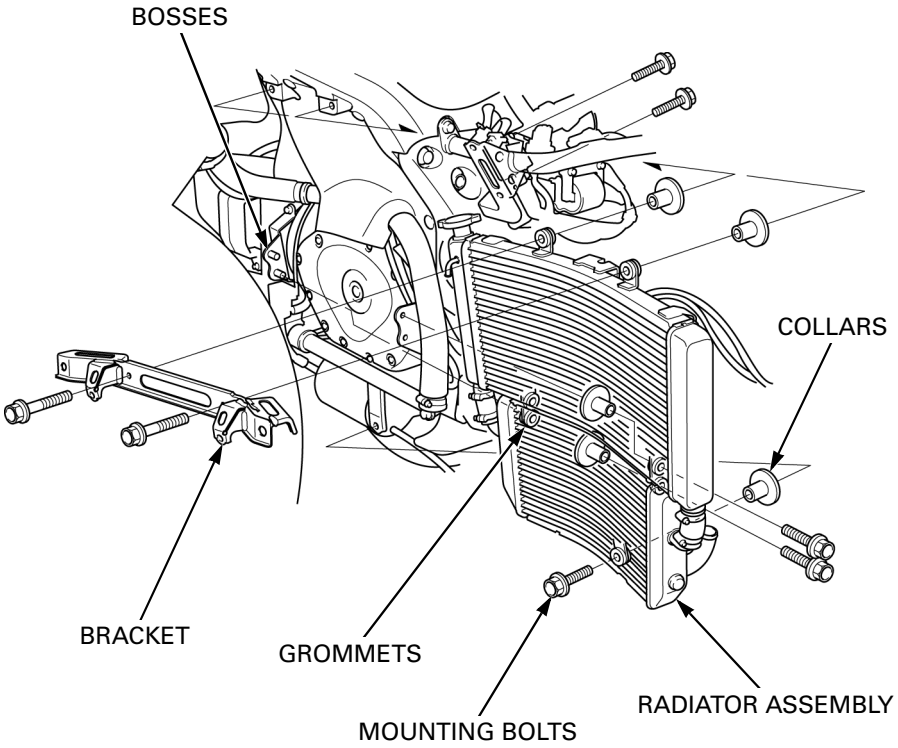
Clamp the fan motor wires properly.



INSTALLATION

Be careful not to damage the radiator core.

Install the radiator assembly onto the frame, aligning the grommets with the boss of the frame.



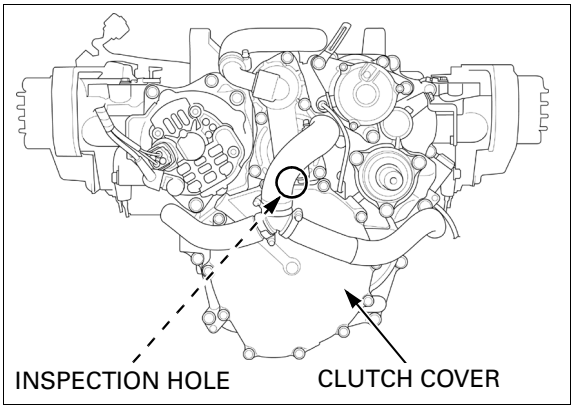
Install the removed parts in the reverse order of removal.

Fill and bleed the cooling system (page 7-7).

WATER PUMP/THERMOSTAT

MECHANICAL SEAL INSPECTION

Check for signs of coolant leakage from the inspection hole in the water pump by looking at the clutch cover, there will be coolant on the clutch cover.
If there is leakage, the water pump mechanical seal is defective and the water pump should be replaced.

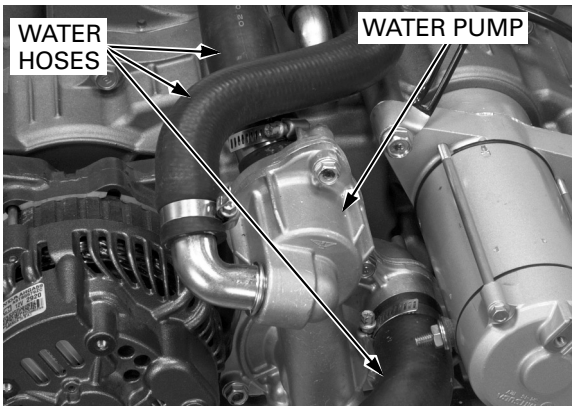


REMOVAL

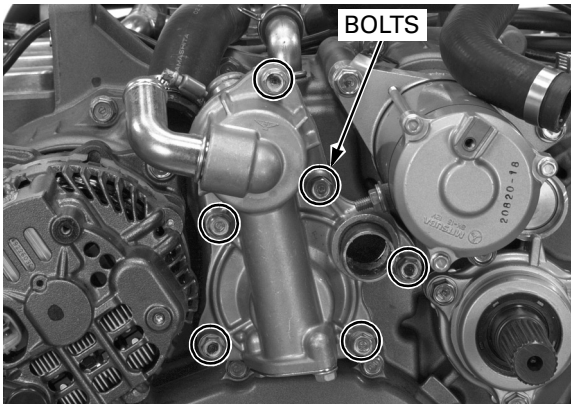
Remove the alternator (page 17-10).

Drain the coolant from the system (page 7-7).

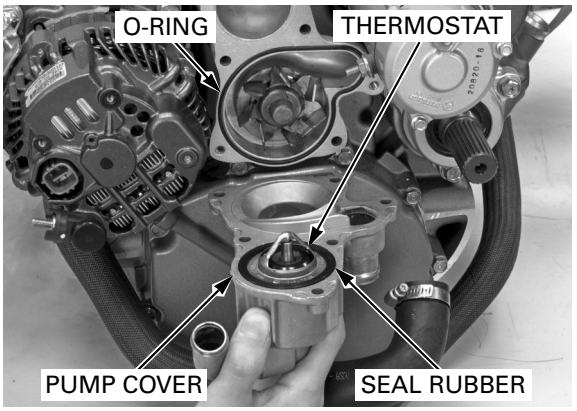
Loosen the hose band screws and disconnect the three water hoses from the water pump.



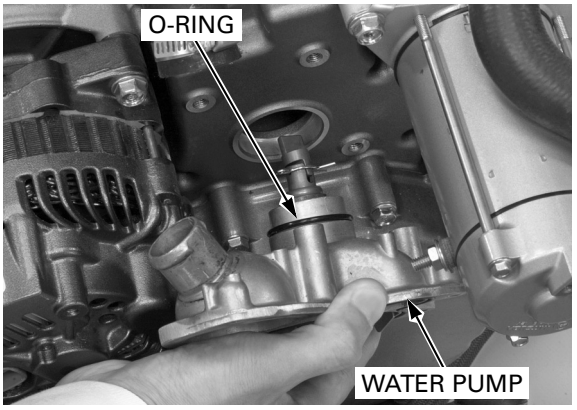
Remove the three pump cover bolts and three water pump mounting bolts.



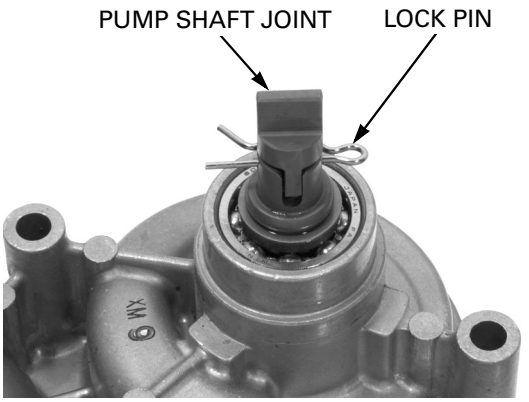
Remove the water pump cover.
Remove the thermostat from the pump cover.
Remove the rubber seal from the thermostat.
Remove the O-ring from the water pump.



Remove the water pump from the rear crankcase cover.
Remove the O-ring from the water pump.



Remove the lock pin and water pump shaft joint from the pump shaft if necessary.



INSPECTION

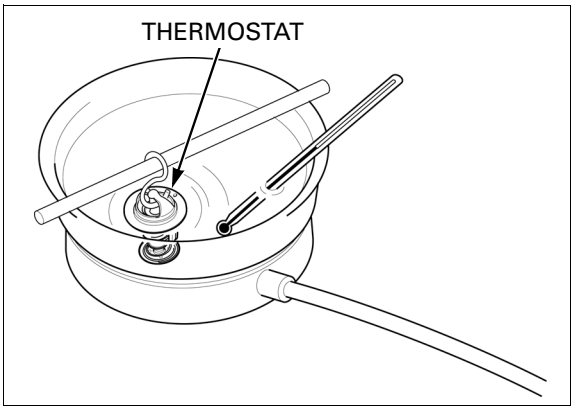
Visually inspect the thermostat for damage.
Replace the thermostat if the valve stays open at room temperature.

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 a false reading.

Heat a container of water with an electric heating element for 5 minutes.

Suspend the thermostat in heated water to check its operation.



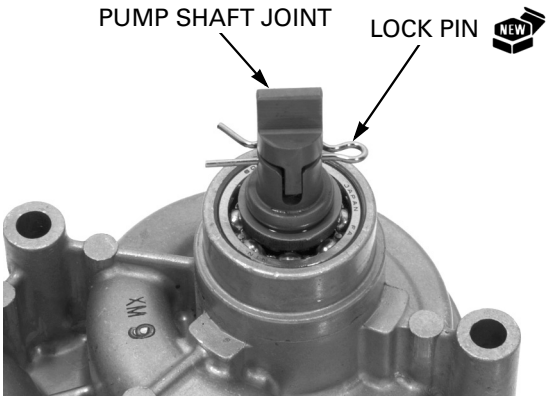
THERMOSTAT BEGINS TO OPEN:
76 – 80°C (169 – 176°F)

VALVE LIFT:
8 mm (0.3 in) minimum at 90°C (194°F)

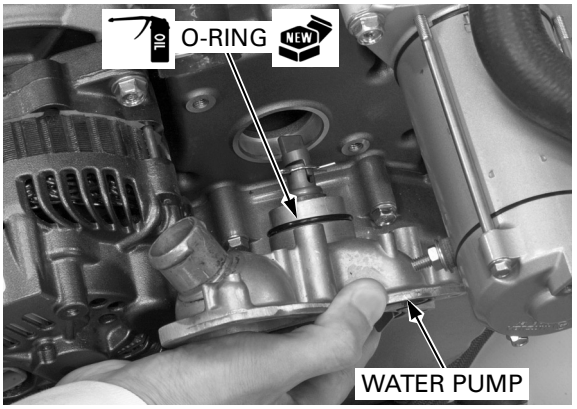
Replace the thermostat if the valve opens at a temperature other than those specified.

INSTALLATION

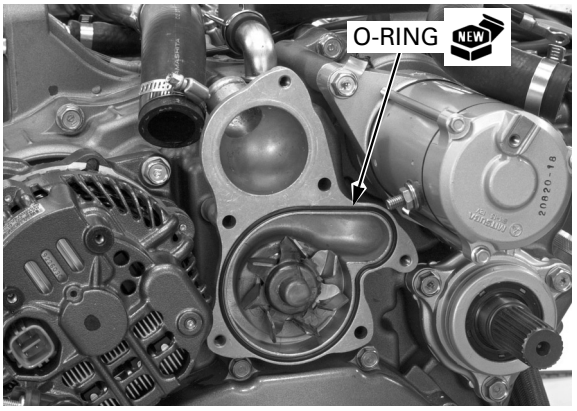
Install the pump shaft joint and secure it with a new lock pin.



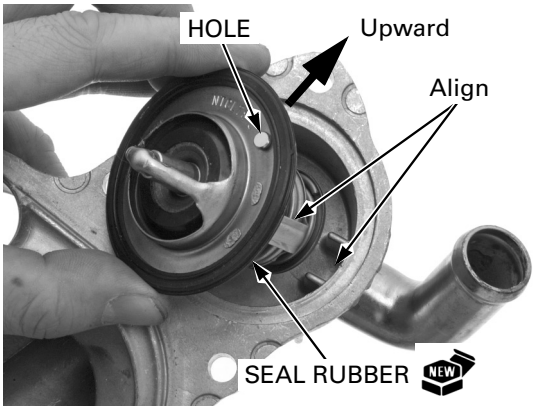
Coat a new O-ring with engine oil and install it into the groove in the water pump.
Install the water pump into the rear crankcase cover while aligning the flat end of the pump shaft joint with the slot in the starter clutch bolt.



Install a new O-ring onto the water pump groove.

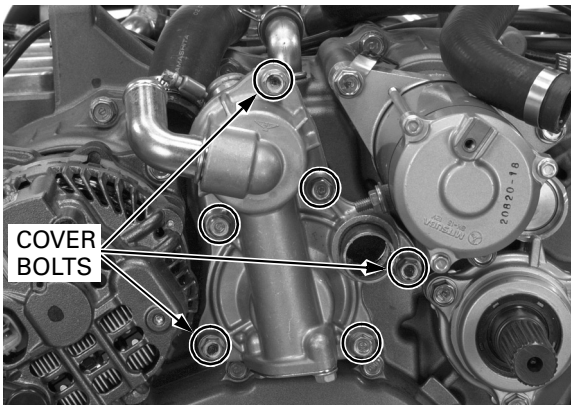


Install a new rubber seal onto the thermostat flange.
Install the thermostat into the water pump cover with the hole facing upward while aligning the lug with the cover groove as shown.



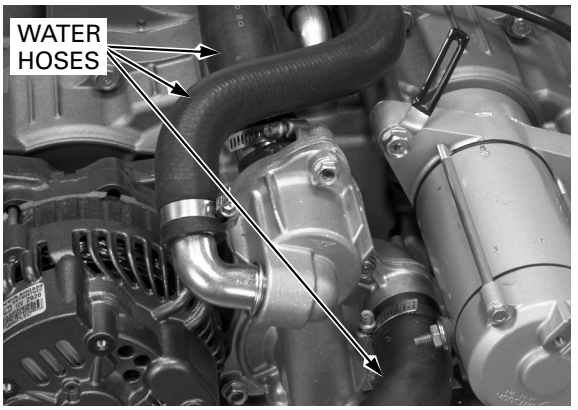
Install the water pump cover onto the pump.
Install the three cover bolts and three mounting bolts, and tighten them.

TORQUE: Cover bolt: 13 N·m (1.3 kgf·m, 9 lbf·ft)



Connect the water hoses to the water pump and tighten the hose band screws securely.

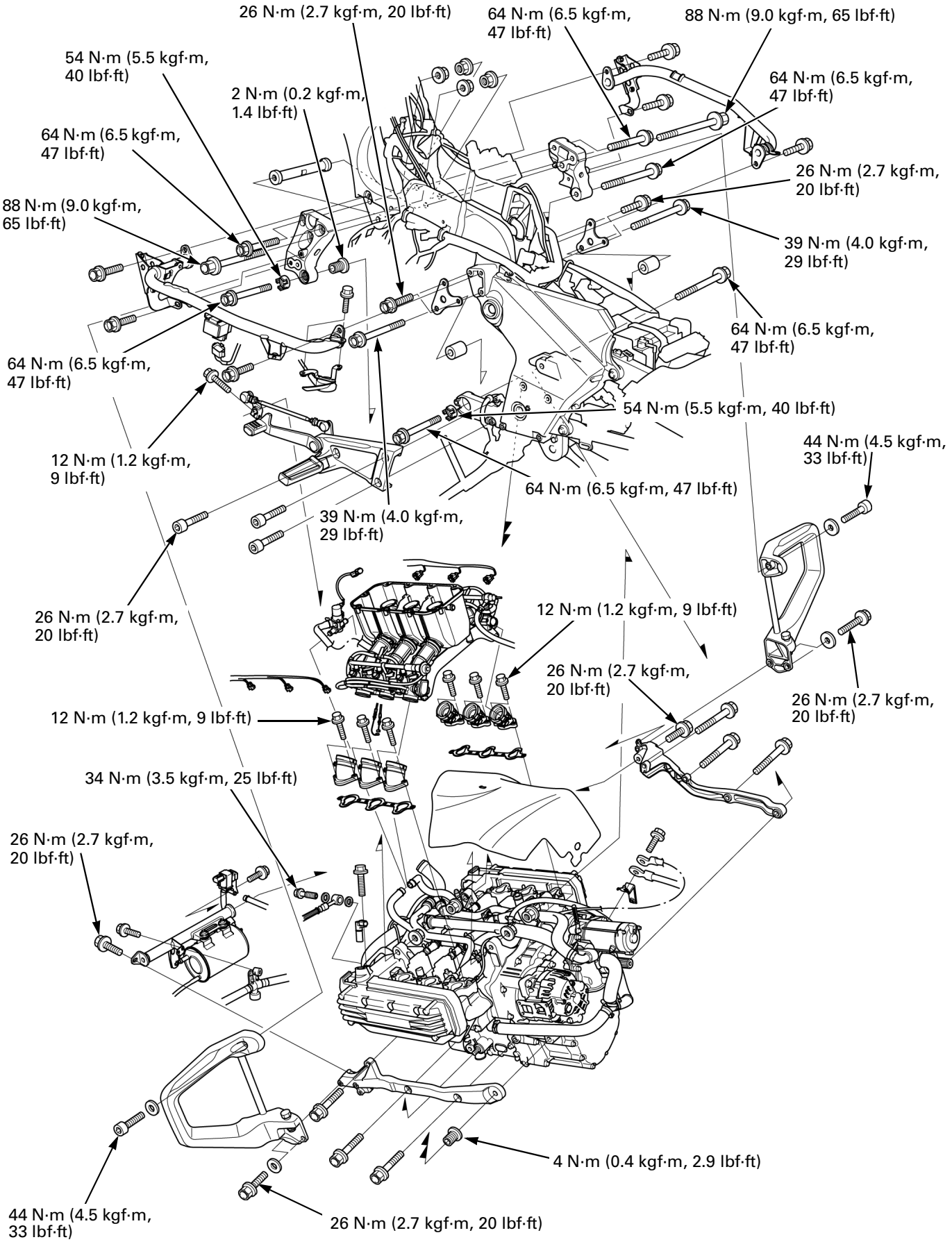
Fill and bleed the cooling system (page 7-7).



MEMO

8. ENGINE REMOVAL/INSTALLATION

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- A floor jack or other adjustable support is required to support and maneuver the engine.
- A hoist or equivalent is required to support the motorcycle when removing and installing the engine (page 4-2).

NOTICE

Do not support the engine using the engine oil filter.

- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- The following components require engine removal for servicing.
  - oil pump (page 5-2)
  - primary gears/output shaft (page 11-2)
  - transmission (including gearshift spindle: page 11-2)
  - crankcase, piston/connecting rod, crankshaft (page 12-2)
- The following components can be serviced with the engine in the frame.
  - throttle body, injector (page 6-2)
  - water pump/thermostat (page 7-2)
  - cylinder head/valves (page 9-2)
  - clutch (page 10-2)
  - gearshift linkage (exception of the gearshift spindle: page 11-2)
  - alternator (page 17-2)
  - ignition pulse generator (page 18-2)
  - starter motor (page 19-2)
- When using the lock nut wrench, use a deflecting beam type torque wrench 20-inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given on the this page is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives both actual and indicated torque readings.

SPECIFICATIONS

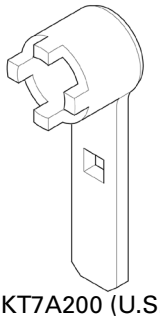
ITEM	SPECIFICATIONS
Engine dry weight	118.6 kg (261.5 lbs)
Engine oil capacity at disassembly	4.6 liters (4.9 US qt, 4.0 Imp qt)
Coolant capacity (radiator and engine)	4.3 liters (4.5 US qt, 3.8 Imp qt)

TORQUE VALUES

Front engine hanger bracket bolt	64 N·m (6.5 kgf·m, 47 lbf·ft)
Hanger bracket cross-pipe bolt	88 N·m (9.0 kgf·m, 65 lbf·ft)
Left front engine hanger adjusting bolt	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Left front engine hanger adjusting bolt lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Front engine hanger bolt (left and right)	64 N·m (6.5 kgf·m, 47 lbf·ft)
Left rear engine hanger adjusting bolt	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Left rear engine hanger adjusting bolt lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Rear engine hanger bolt (left and right)	64 N·m (6.5 kgf·m, 47 lbf·ft)
Center engine hanger plate bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Center engine hanger bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Intake manifold bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Clutch slave cylinder oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Sub-frame cross-pipe bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Engine guard bolt (upper)	44 N·m (4.5 kgf·m, 33 lbf·ft)
Engine guard bolt (lower)	26 N·m (2.7 kgf·m, 20 lbf·ft)
Engine guard adjusting bolt lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Footpeg bracket bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Gearshift arm pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Steering lock lever mounting bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)

TOOL

Lock nut wrench
07908-ME90000



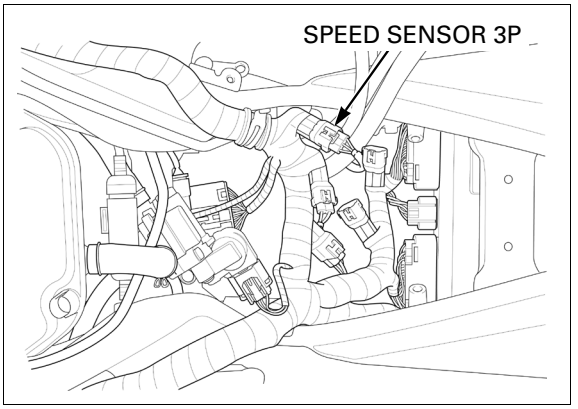
or 07GMA-KT7A200 (U.S.A. only)

ENGINE REMOVAL

Drain the following:
– engine oil (page 4-10)
– coolant (page 7-7)
– clutch fluid (page 10-6)

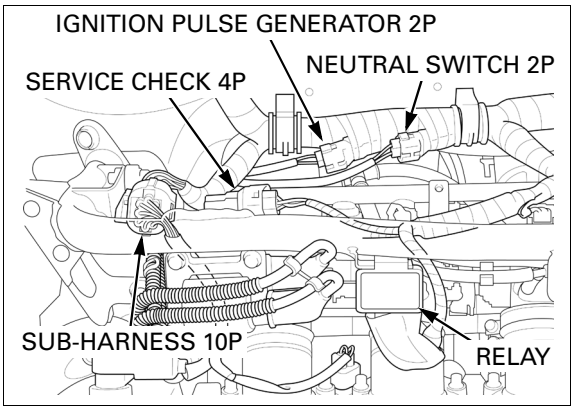
Remove the following:
– radiator (page 7-8)
– front fender (page 3-6)
– front inner covers (page 3-4)
– fuel tank (page 6-36)
– radiator reserve tank (page 6-43)
– ignition coils (page 18-9)
– alternator cover (page 17-10)
– right footpeg/master cylinder assembly (page 16-25)
– exhaust system (page 3-7)
– horn (page 20-26)

Disconnect the following connectors:
– vehicle speed sensor 3P (white)

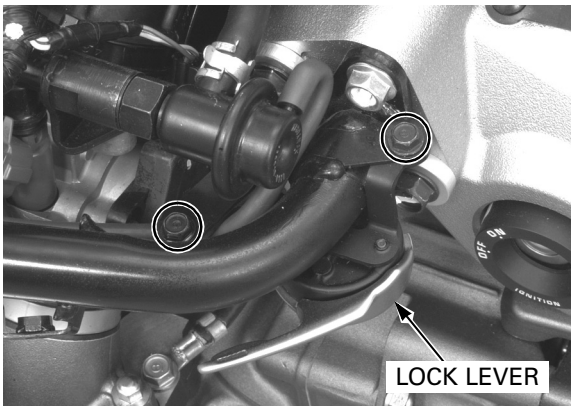


– neutral switch 2P (black)
– ignition pulse generator 2P (red)
– engine sub-wire harness 10P (gray) (remove from stay and disconnect it)

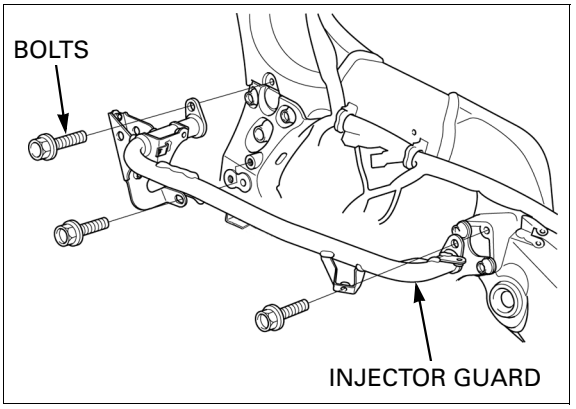
Remove the following from the left front side cover stay:
– service check 4P connector
– turn signal/running light relay



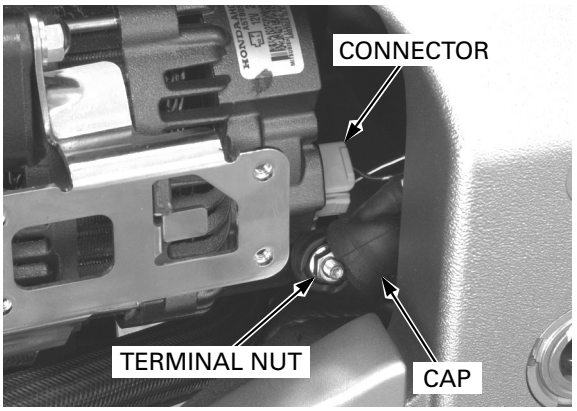
– two bolts and steering lock lever



Remove the three bolts and both injector guards.

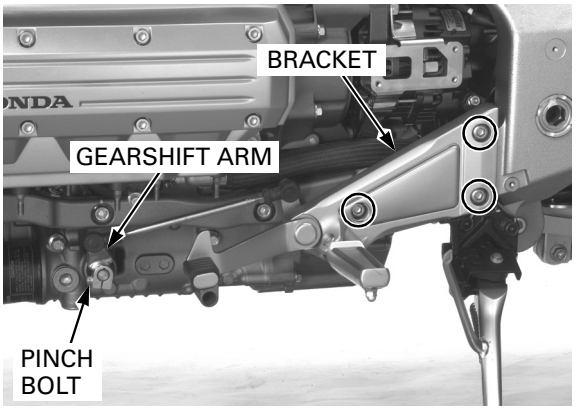


Slide the rubber cap off the alternator terminal, and remove the terminal nut and alternator cable.
Disconnect the alternator 4P connector.



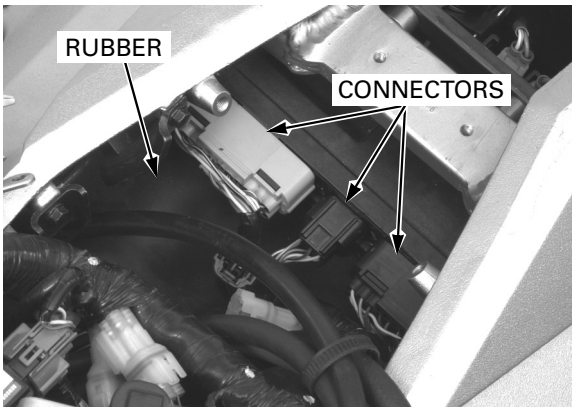
Remove the pinch bolt and the gearshift arm.

Remove the bolt caps from the footpeg bracket bolts.
Remove the three bolts and left footpeg bracket.

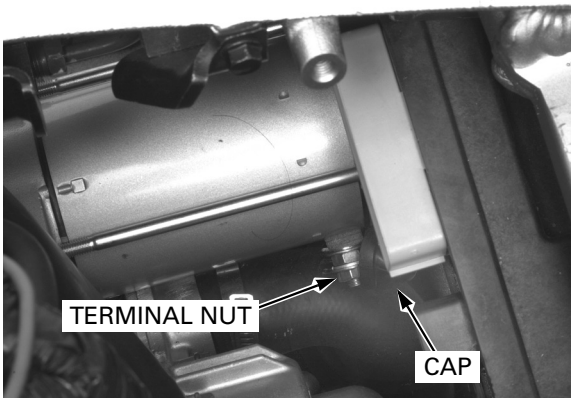


Disconnect the engine control module (ECM) connectors.

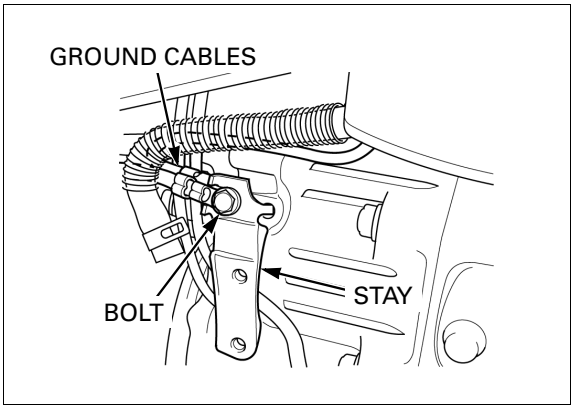
Release the heat guard rubber from the clamp on the starter motor mounting bolt and remove it out of the frame.



Slide the rubber cap off the starter motor terminal, and remove the terminal nut and motor cable.

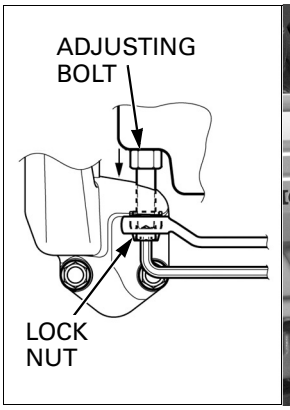


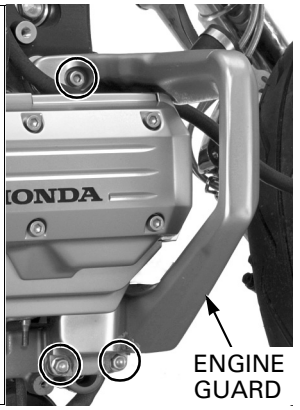
Remove the bolt, ground cables and master cylinder cover stay.



Loosen the lock nut and lower the adjusting bolt.

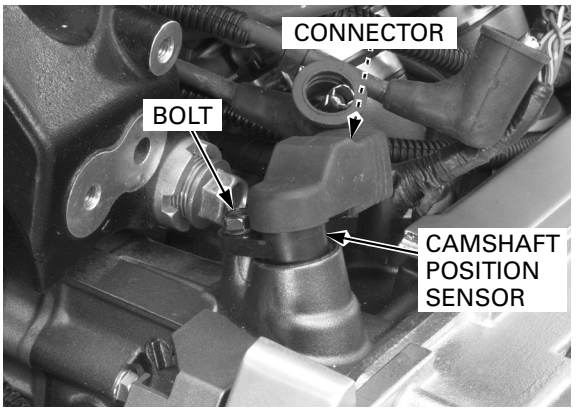
Remove the mounting bolts and washers, and both engine guards.



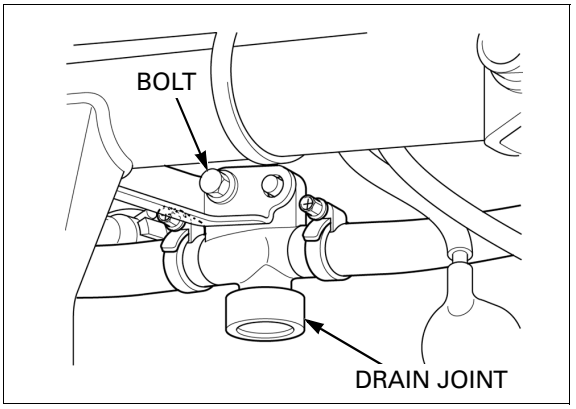


Remove the four bolts and left cylinder head top cover (page 9-7).

Slide the rubber cap off the camshaft position sensor and disconnect the connector.
Remove the bolt and the camshaft position sensor.



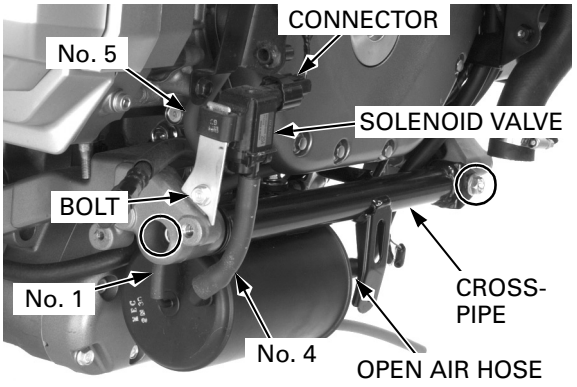
Remove the bolt and coolant drain joint from the sub-frame cross-pipe.



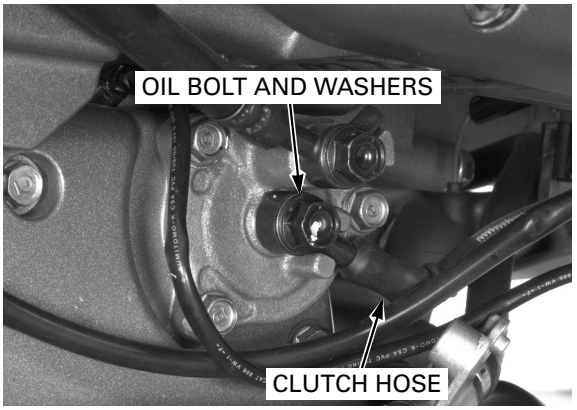
California type only: Disconnect the connector, No 4 and No. 5 hoses. Remove the stay bolt and EVAP purge control solenoid valve.

California type only: Disconnect the No. 1 and open air hoses from the EVAP canister.

Remove the two bolts and the cross-pipe (EVAP canister assembly).



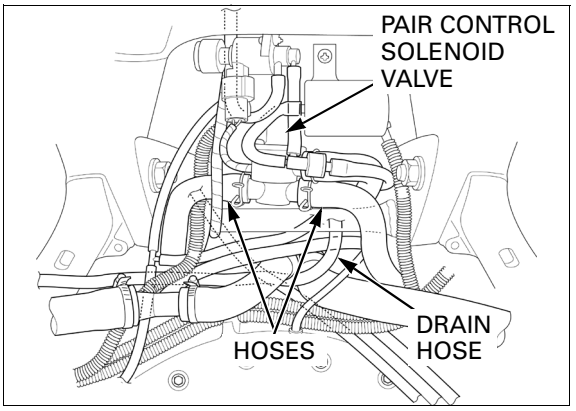
Remove the clutch slave cylinder oil bolt and sealing washers.



Remove the trim clips from the frame and turn up the heat guard rubber.

Disconnect the two air supply hoses from the PAIR control solenoid valve.

Disconnect the transparent drain hose from the bottom of the air cleaner housing (behind the hanger bracket cross-pipe).



Clean around the intake manifolds with compressed air before removing them.

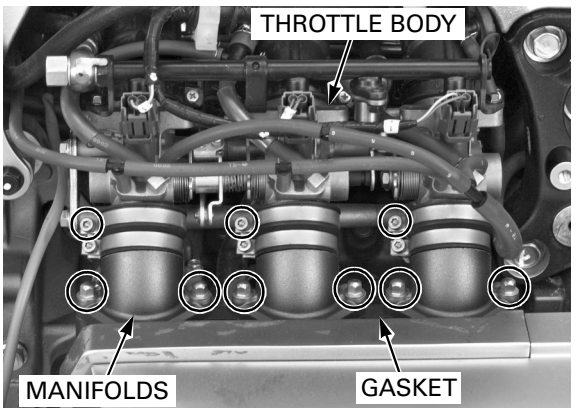
Loosen the upper insulator band bolts (on both sides of the throttle body).
Remove the 12 intake manifold bolts.

Secure the throttle body assembly with strings to the frame.

Remove the manifold gaskets.
Cover the intake ports of the cylinder head with tape to keep dirt and debris from entering the engine and to avoid damaging the mating surfaces.

Take care not to damage the mating surfaces.

Remove all the Intake manifolds from the throttle body.



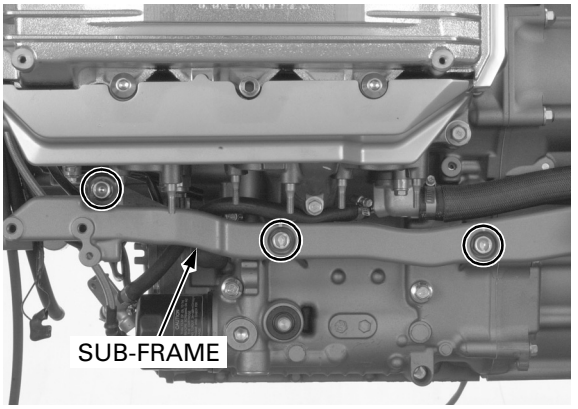
Support the frame securely (page 4-2).

NOTE:
- A hoist or equivalent is required to support the motorcycle when removing the engine.

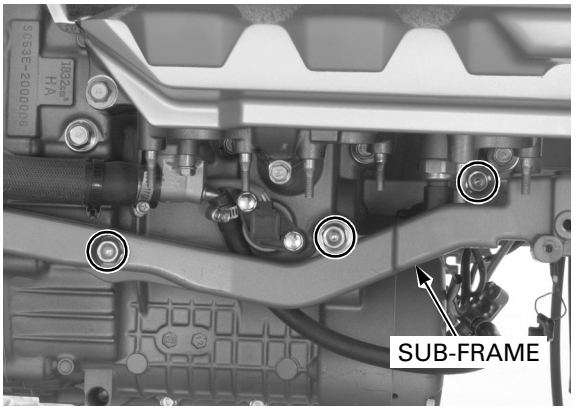
Place a floor jack or other adjustable support under the engine.

NOTE:
- The jack height must be continually adjusted to relieve stress for ease of bolt removal.

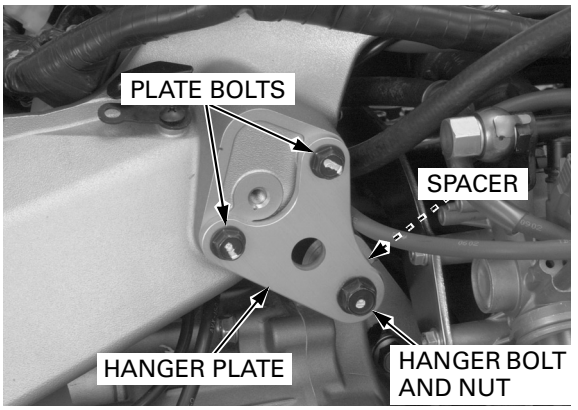
Loosen the three left sub-frame mounting bolts.



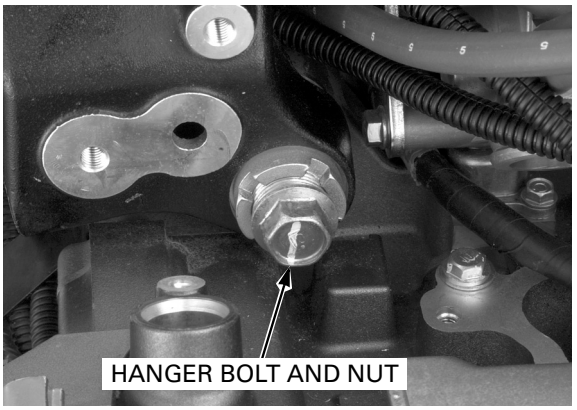
Loosen the three right sub-frame mounting bolts.



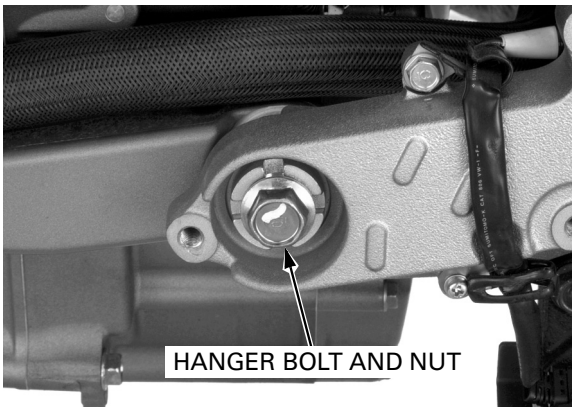
Remove the following mounting fasteners:
– center hanger nut, bolt and spacer
– two bolts and hanger plate
– other side hanger plate (using same procedure as above)



– left front hanger nut and bolt



– left rear hanger bolt

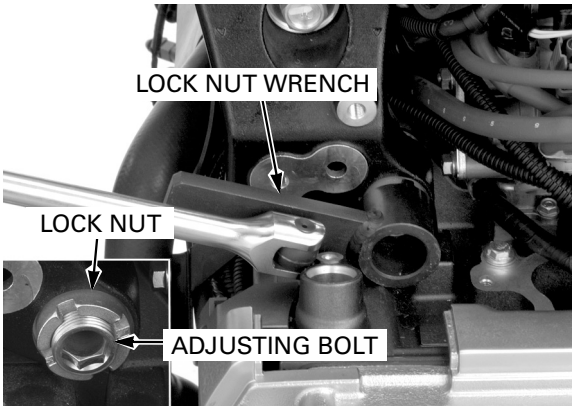


Loosen the left front hanger adjusting bolt lock nut.

TOOL:

Lock nut wrench	**07908-ME90000 or 07GMA-KT7A200 (U.S.A. only)**

Remove the lock nut.
Loosen the adjusting bolt.



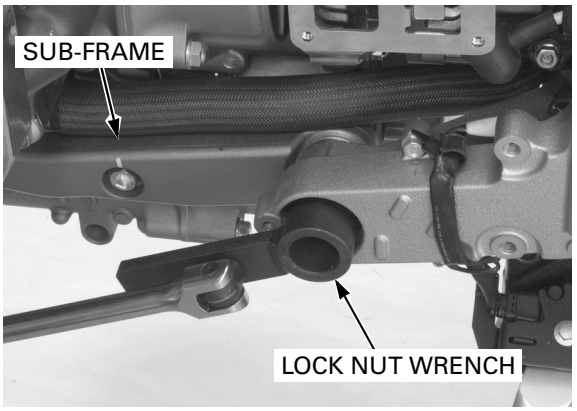
Loosen the rear lower hanger adjusting bolt lock nut.

TOOL:

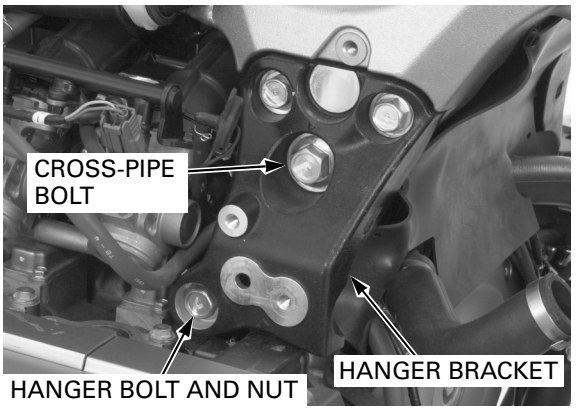
Lock nut wrench	**07908-ME90000 or 07GMA-KT7A200 (U.S.A. only)**

Remove the lock nut.
Loosen the adjusting bolt.

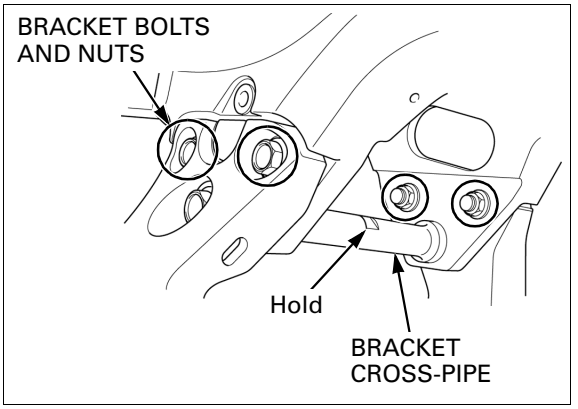
Remove the following mounting fasteners:
– three bolts and left sub-frame



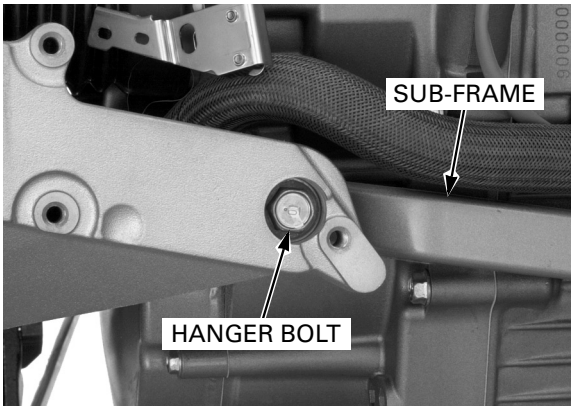
– right front hanger nut and bolt
– hanger bracket cross-pipe bolts (while holding the flats of the pipe)



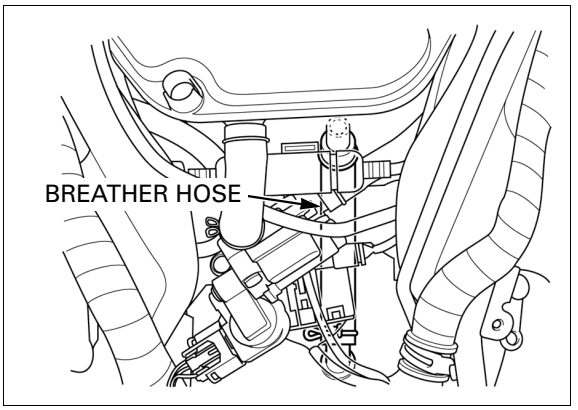
– bracket cross-pipe (loosen bracket bolts)
– hanger bracket nuts and bolts
– left and right front hanger brackets



– right rear lower hanger bolt
– three bolts and right sub-frame



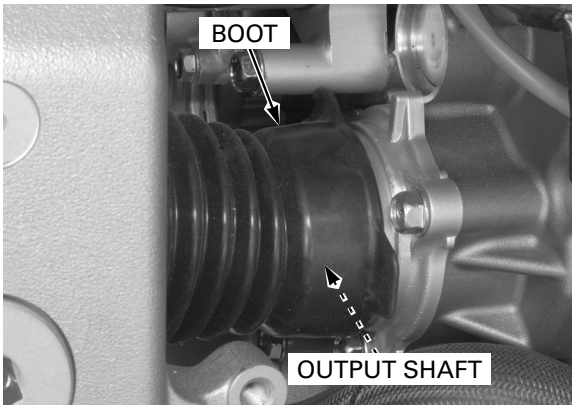
Disconnect the crankcase breather hose from the bottom of the air cleaner housing (lower the engine slightly).



Remove the joint boot from the engine.

Be careful not to damage the wire harnesses, hoses and cables during engine removal.

Move the engine forward slightly and remove the output shaft from the universal joint (drive shaft) in the swingarm.



ENGINE INSTALLATION

NOTE:

- Before installing the engine, route the wires, hoses and cables properly (page 1-22).
- When tightening the lock nut with the lock nut wrench, refer to torque wrench reading information on page 8-3 "Service Information".
- A hoist or equivalent is required to support the motorcycle when installing the engine.
- Be sure to use the engine hanger plates, hanger adjusting bolts, lock nuts, hanger bolts and hanger nuts in their correct positions.

Install the hanger adjusting bolts into the left side mounting points (front hanger bracket and rear lower side of the frame) from the inside, and screw them fully.

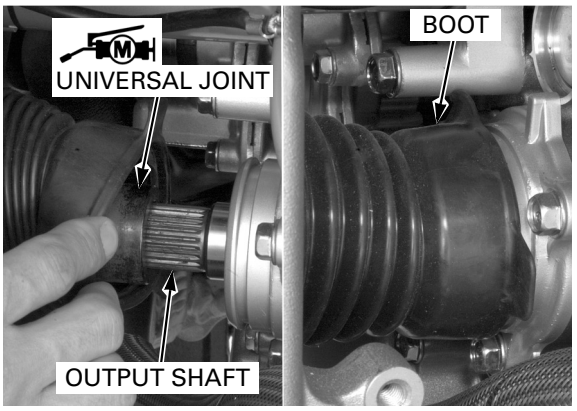
Support the motorcycle securely (page 4-2).

Be careful not to damage the wire harnesses, hoses and cables during engine installation.

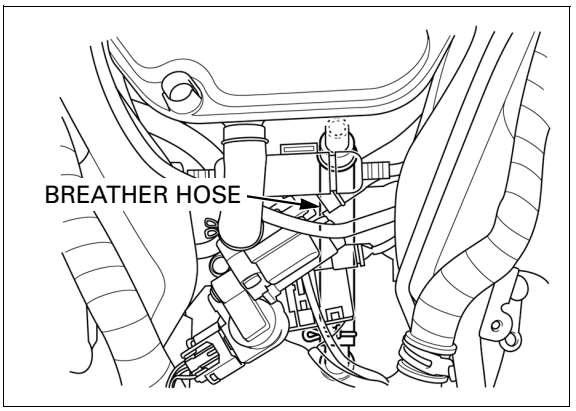
Use the floor jack or other adjustable support to carefully maneuver the engine into place.

Apply 1 g (0.04 oz) of molybdenum disulfide grease to the universal joint (drive shaft) splines.

Install the engine in the frame while engaging the output shaft splines with the universal joint splines. Install the joint boot over the engine securely.



Connect the crankcase breather hose to the air cleaner housing.

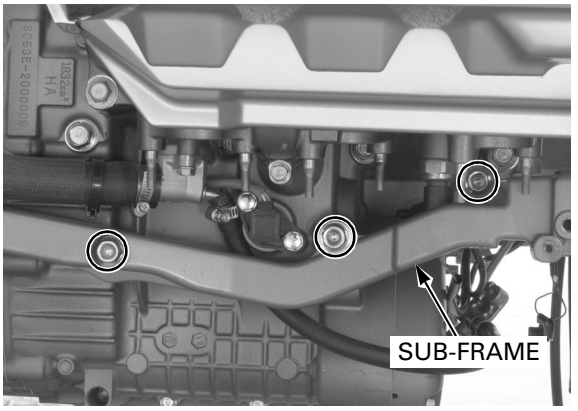


Carefully align the mounting points in the engine and frame.

Remove the left cylinder head top cover if it was installed.

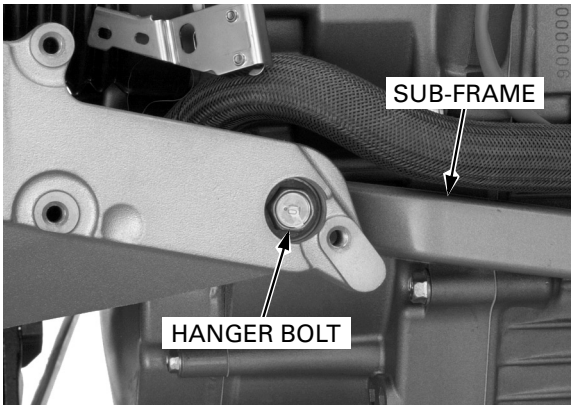
Temporarily install all the engine mounting fasteners with the sub-frames, hanger brackets and hanger plates, then tighten them to the specified torque in the correct sequence as follows.

1. Tighten the right sub-frame mounting bolts.



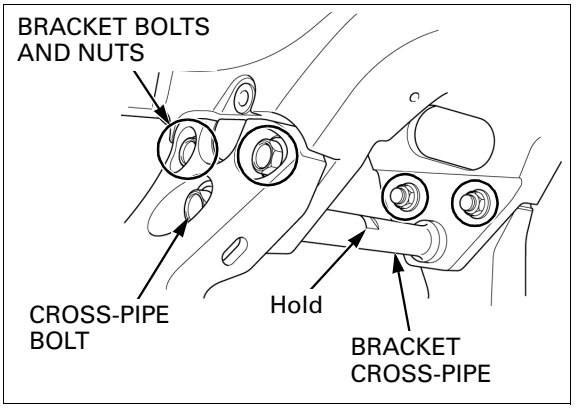
2. Tighten the right rear hanger bolt.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



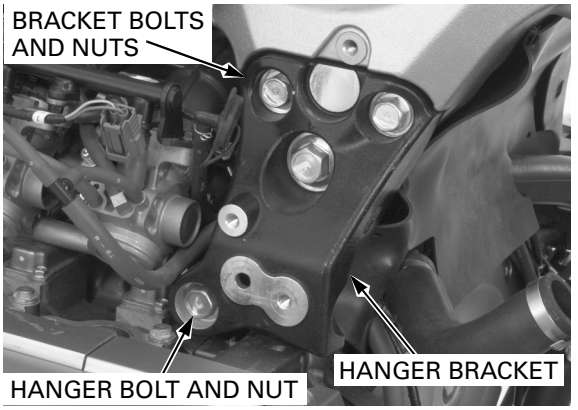
3. Tighten the hanger bracket bolts and hanger bracket cross-pipe bolts (while holding the flats of the pipe) on both sides.

TORQUE: Bracket: 64 N·m (6.5 kgf·m, 47 lbf·ft)
Cross-pipe: 88 N·m (9.0 kgf·m, 65 lbf·ft)



4. Tighten the right front hanger bolt.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

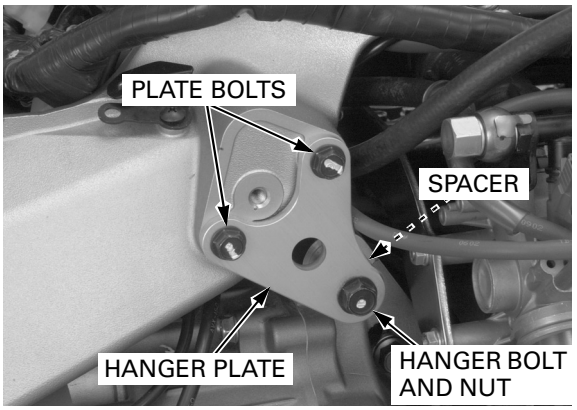


5. Tighten the right hanger plate bolts.

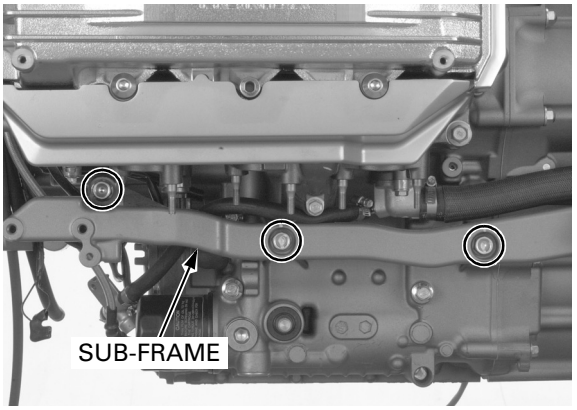
TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Tighten the right center hanger bolt.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

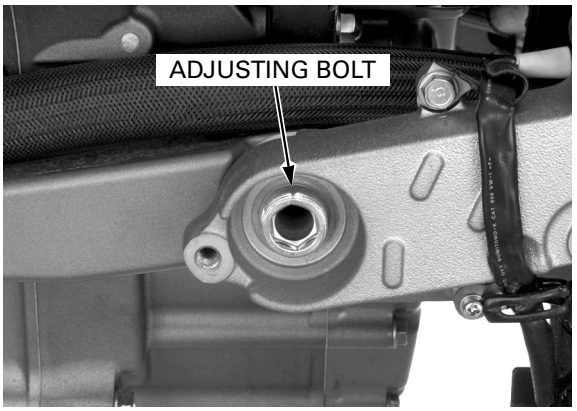


6. Tighten the left sub-frame mounting bolts.



7. Remove the left rear hanger bolt.
Tighten the left rear hanger adjusting bolt until it contacts the engine.

TORQUE: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)

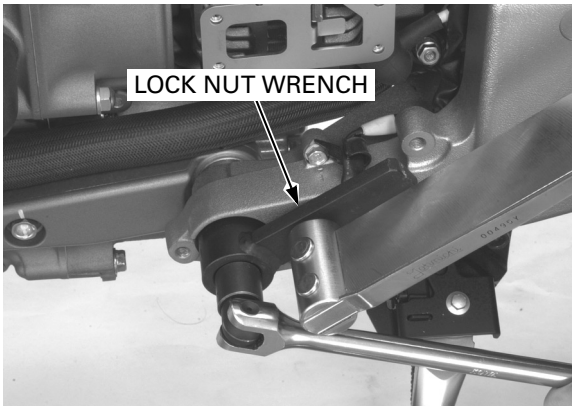


8. Install the lock nut onto the left rear hanger adjusting bolt.
Hold the adjusting bolt and tighten the lock nut.

TOOL:

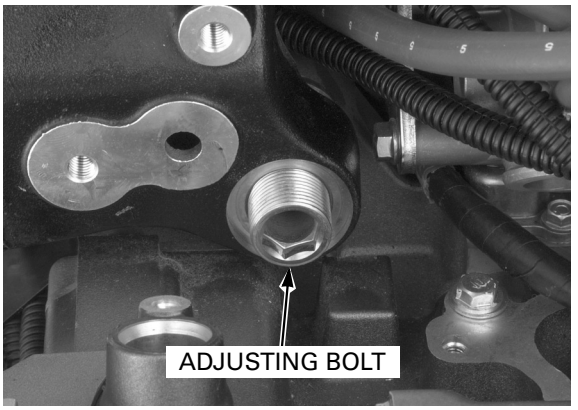
Lock nut wrench	**07908-ME90000 or 07GMA-KT7A200 (U.S.A. only)**

TORQUE: Actual: 54 N·m (5.5 kgf·m, 40 lbf·ft)
Indicated: 49 N·m (5.0 kgf·m, 36 lbf·ft)



9. Remove the left front hanger bolt.
   Tighten the left front hanger adjusting bolt until it contacts the engine.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

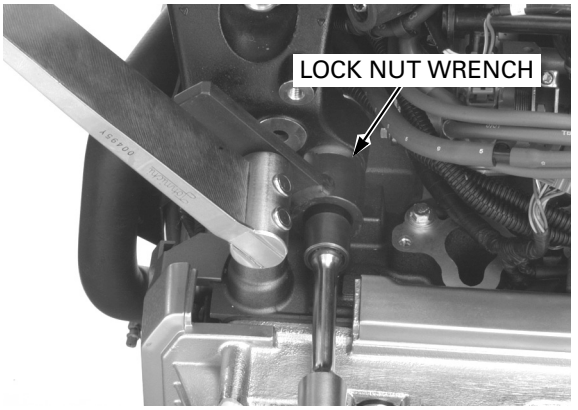


10. Install the lock nut onto the left front hanger adjusting bolt.
    Hold the adjusting bolt and tighten the lock nut.

TOOL:

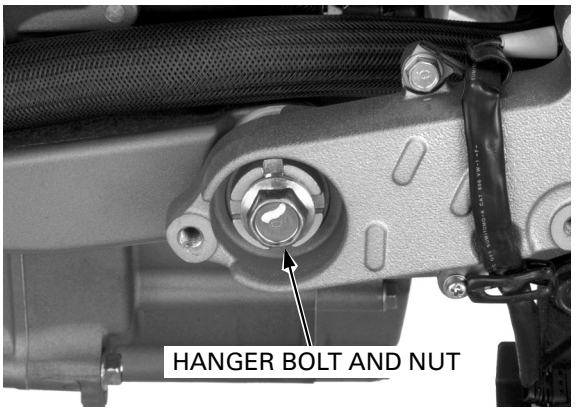
Lock nut wrench	**07908-ME90000 or 07GMA-KT7A200 (U.S.A. only)**

TORQUE: Actual: 54 N·m (5.5 kgf·m, 40 lbf·ft)
Indicated: 49 N·m (5.0 kgf·m, 36 lbf·ft)



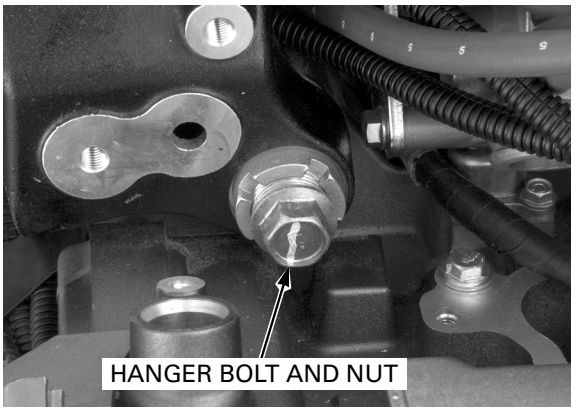
11. Install the left rear hanger bolt and tighten it.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



12. Install the left front hanger bolt and nut, and tighten it.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

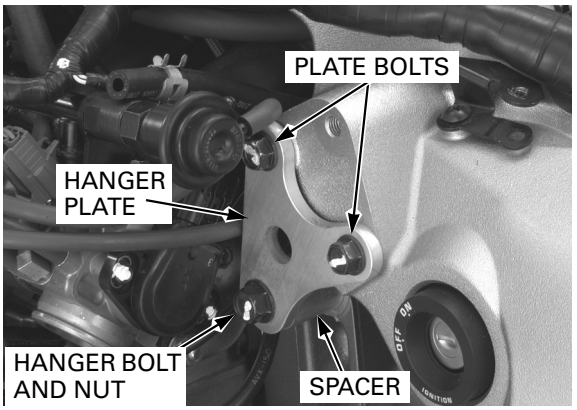


13. Tighten the left hanger plate bolts.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Tighten the left center hanger bolt.

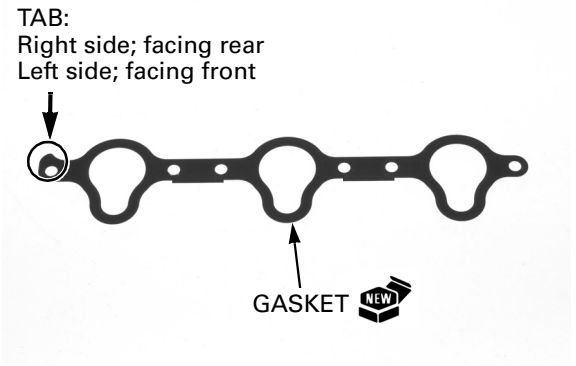
TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



Take care not to damage the mating surfaces.

Install the intake manifolds over the throttle body securely.

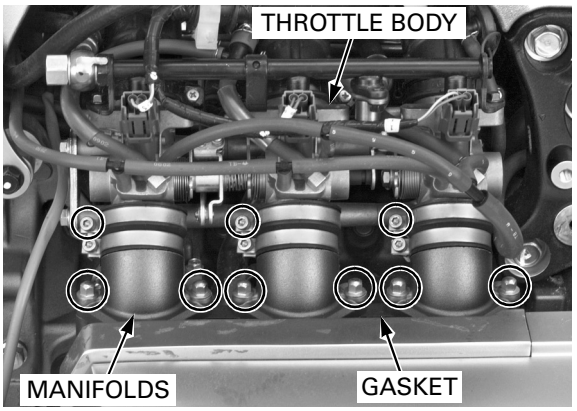
Install new gaskets onto the cylinder heads in the direction as shown.



Lower the throttle body assembly. Carefully align the bolt holes and install the 12 manifold bolts.

Tighten the upper insulator band bolts until their end clearances are 10 mm (lower side; 9 mm). Tighten the manifold bolts.

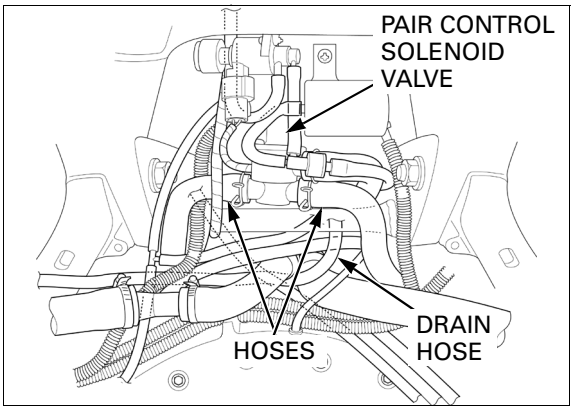
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the transparent drain hose to the bottom of the air cleaner housing (behind the hanger bracket cross-pipe).

Connect the air supply hoses to the PAIR control solenoid valve.

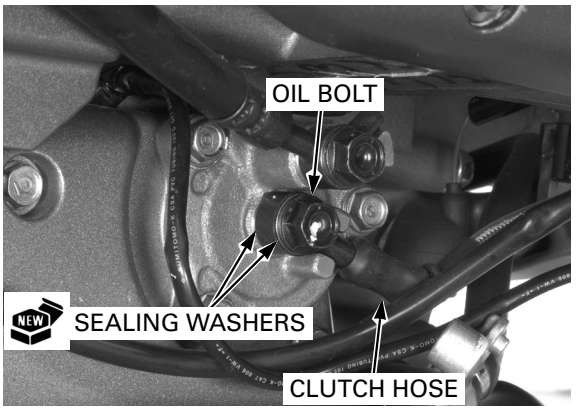
Secure the heat guard rubber with the trim clips.



Connect the clutch hose to the slave cylinder with the oil bolt and new sealing washer, and tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the clutch hydraulic system (page 10-6).

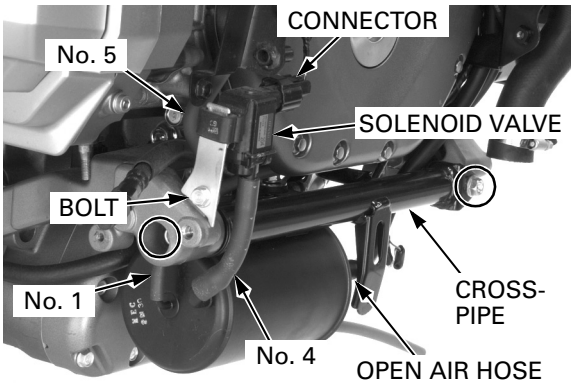


Install the cross-pipe (EVAP canister assembly: California) and tighten the two bolts.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

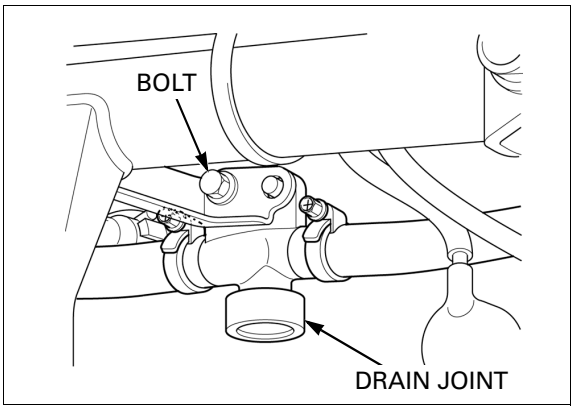
California type only: Connect the No. 1 and open air hoses to the EVAP canister.

California type only: Install the EVAP purge control solenoid valve with the stay bolt. Connect the No 4, No. 5 hoses and solenoid valve connector.



Install the coolant drain joint and tighten the bolt.

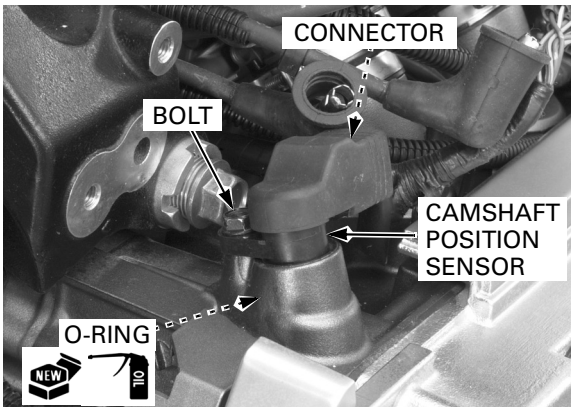
Install the horn (page 20-26).



Coat a new O-ring with engine oil and install it in the camshaft position sensor groove.

Install the camshaft position sensor and tighten the bolt.
Connect the connector and cover it with the rubber cap.

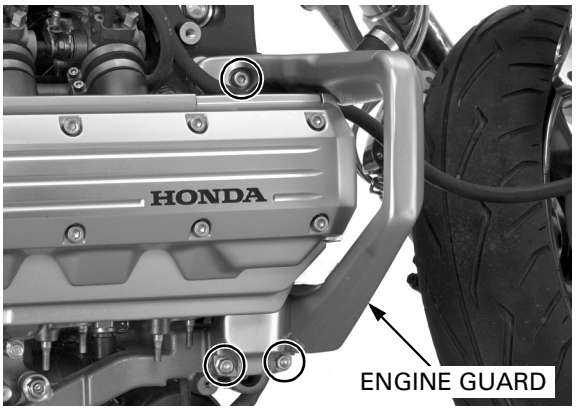
Install the cylinder head top cover (page 9-35).



Before installing each engine guard, turn the adjusting bolt to lower it and set the lock nut against the engine guard as shown below.

Install both engine guards with the mounting bolts and washers and tighten them.

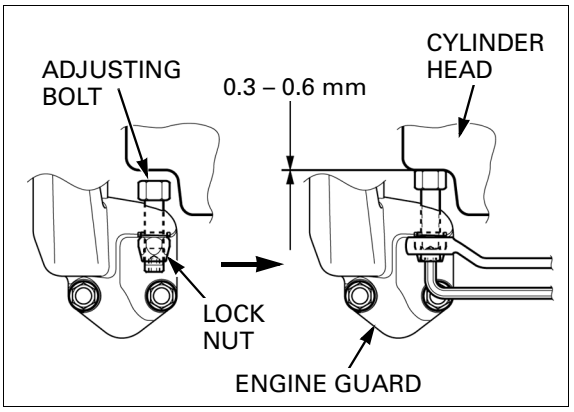
TORQUE: Upper: 44 N·m (4.5 kgf·m, 33 lbf·ft)
Lower: 26 N·m (2.7 kgf·m, 20 lbf·ft)



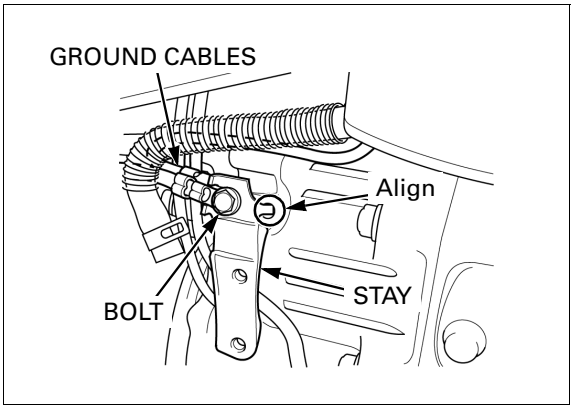
While holding the lock nut, turn the adjusting bolt until it contacts the cylinder head, then loosen the adjusting bolt 1/4 – 1/2 turn.
Hold the adjusting bolt and tighten the lock nut to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

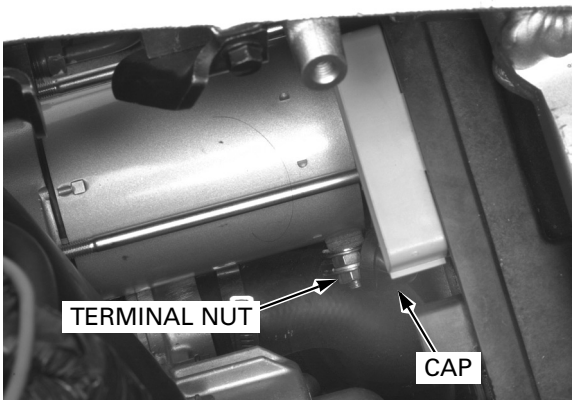
Make sure the clearance between the adjusting bolt and cylinder head is 0.3 – 0.6 mm (0.01 – 0.02 in), using a feeler gauge.



Install the master cylinder cover stay with the ground cables, aligning the locating tab with the threaded hole and tighten the bolt.

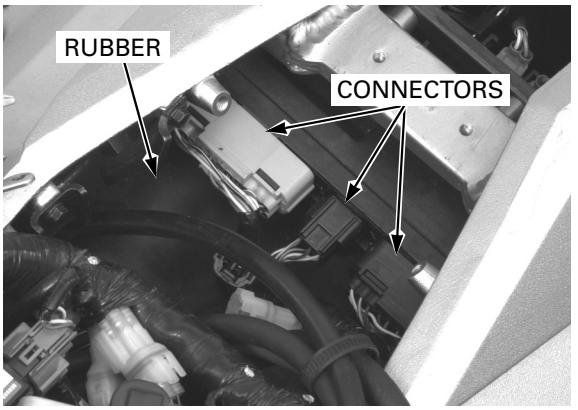


Connect the starter motor cable with the terminal nut.
Install the rubber cap over the terminal properly.



Install the heat guard rubber into place and secure it with the clamp on the starter motor mounting bolt.

Connect the ECM connectors.



Apply grease to the gearshift pedal link tie-rod ball joints and pedal pivot if necessary.

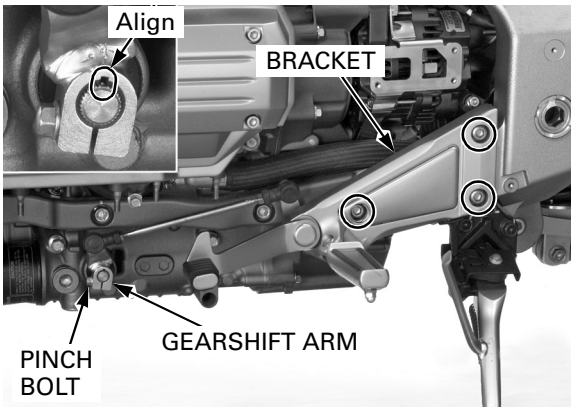
Install the left footpeg bracket and tighten the three bolts.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Install the gearshift arm by aligning the wide groove with the wide tooth of the spindle. Install the pinch bolt and tighten it.

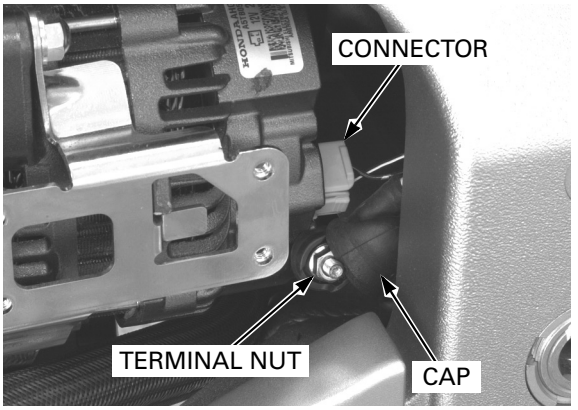
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the bolt caps onto the bracket bolts.

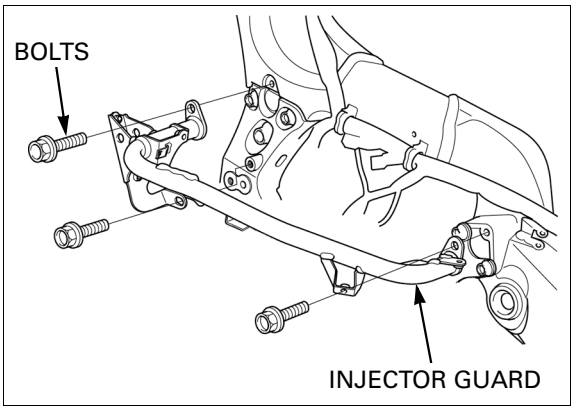


Connect the alternator cable with the terminal nut. Install the rubber cap over the terminal properly.

Connect the alternator 4P connector.



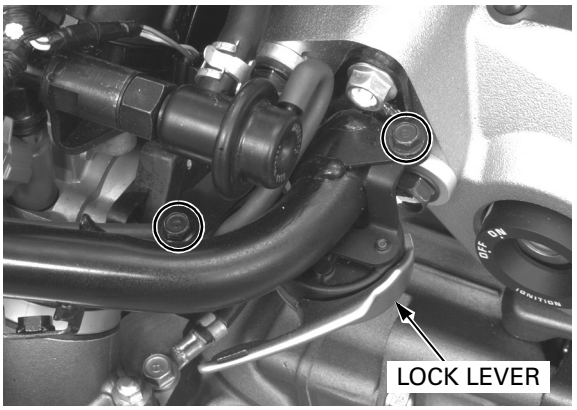
Install both injector guards and tighten the mounting bolts.



Install the following onto the left front side cover stay:

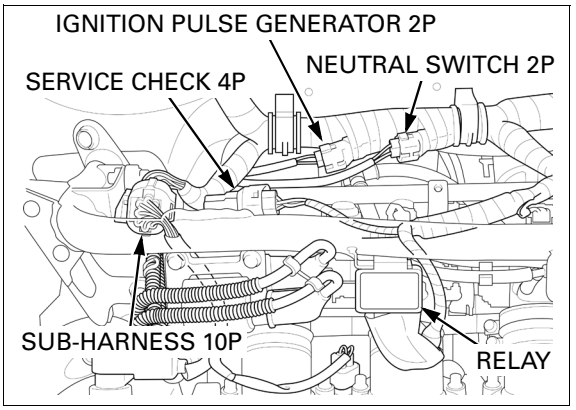
– steering lock lever with the two bolts

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

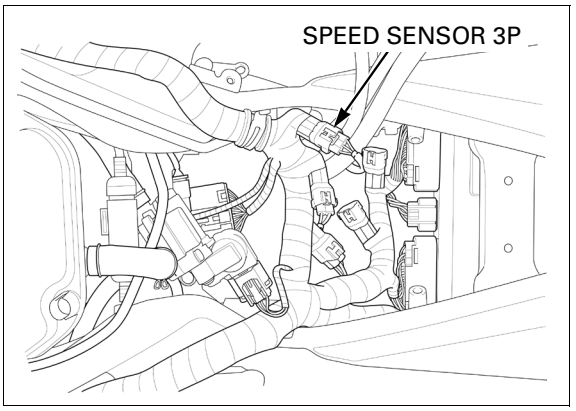


– turn signal/running light relay
– service check 4P connector

Connect the following connectors:
– engine sub-wire harness 10P (gray)
(install it onto the stay after connecting)
– ignition pulse generator 2P (red)
– neutral switch 2P (black)



– vehicle speed sensor 3P (white)



Install the following:
– exhaust system (page 3-8)
– radiator (page 7-11)
– front fender (page 3-5)
– fuel tank (page 6-37)
– radiator reserve tank (page 6-49)
– ignition coils (page 18-9)
– front inner covers (page 3-4)
– alternator cover (page 17-19)
– right footpeg/master cylinder assembly (page 16-30)

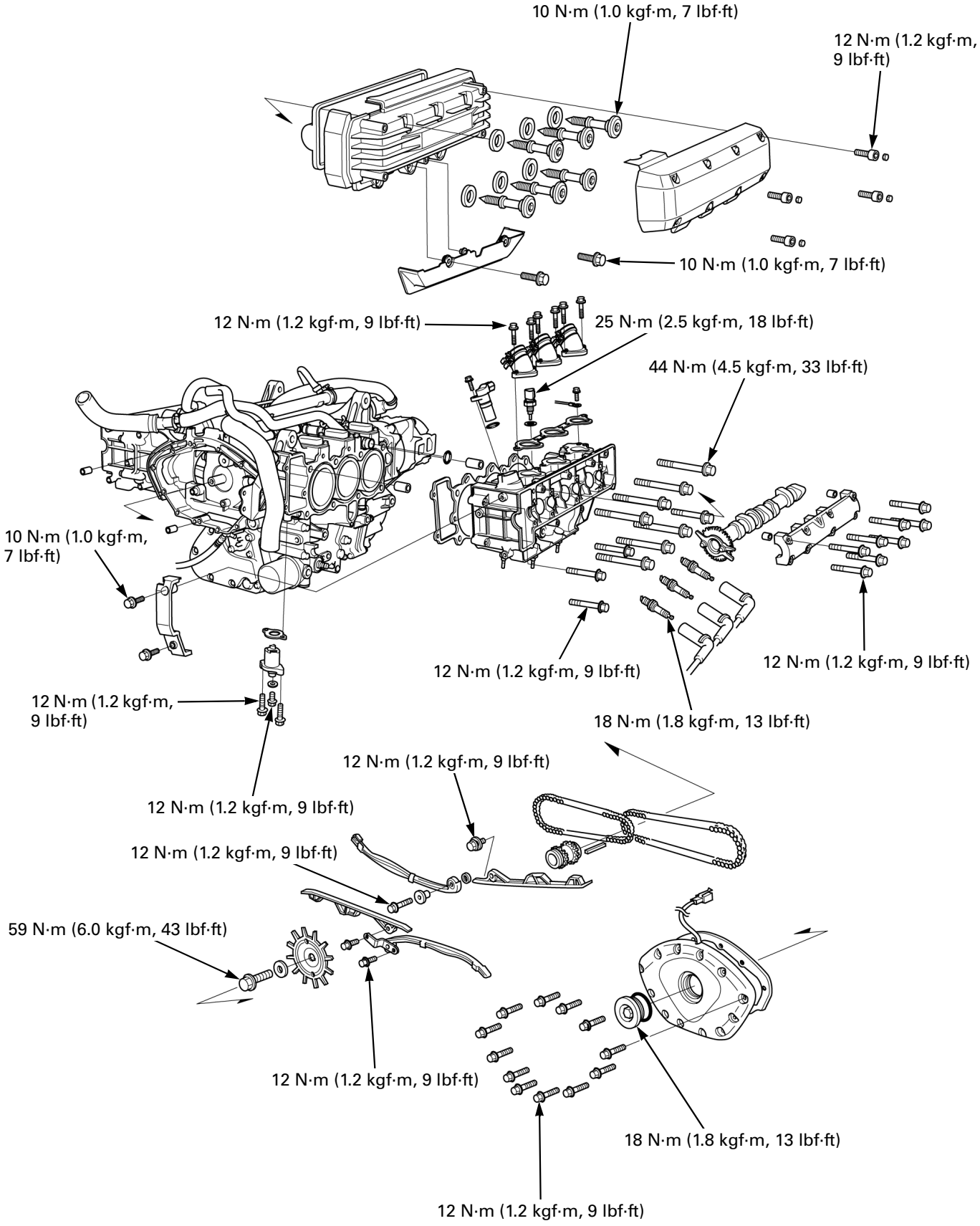
Fill the engine with recommended oil (page 4-10).

Fill and bleed the cooling system (page 7-6).

Check the engine oil level (page 4-9).

9. CYLINDER HEAD/VALVE

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- This section covers service of the camshaft, cylinder head and valves.
- The camshaft, cylinder head and valves can be serviced with the engine installed in the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling the cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

SPECIFICATIONS

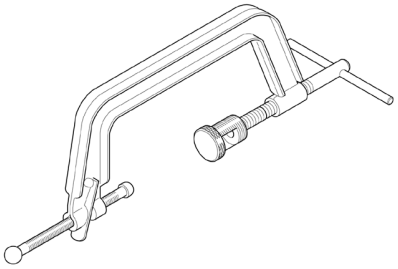
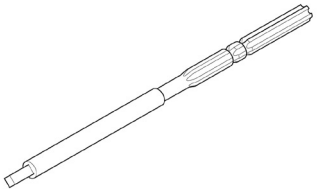
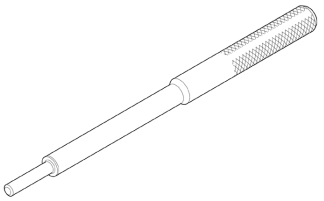
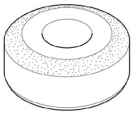
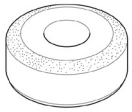
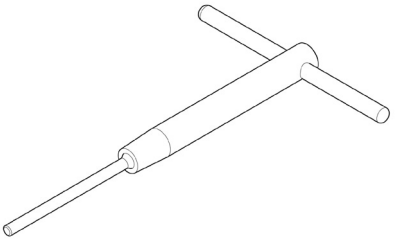
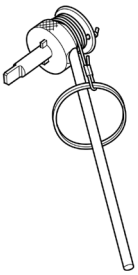
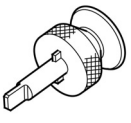
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 300 rpm			1,383 kPa (14.1 kgf/cm^2, 201 psi)	–
Valve clearance		IN	0.15 ± 0.03 (0.006 ± 0.001)	–
		EX	0.22 ± 0.03 (0.009 ± 0.001)	–
Camshaft	Cam lobe height (49 state/Canada type)	IN	41.610 – 41.690 (1.6382 – 1.6413)	41.58 (1.637)
		EX	41.680 – 41.760 (1.6409 – 1.6441)	41.65 (1.640)
	Cam lobe height (California type)	IN	40.810 – 40.890 (1.6067 – 1.6098)	40.78 (1.606)
		EX	41.680 – 41.760 (1.6409 – 1.6441)	41.65 (1.640)
	Runout		–	0.03 (0.001)
	Journal O.D.		27.959 – 27.980 (1.1007 – 1.1016)	27.96 (1.101)
	Journal I.D.		28.000 – 28.021 (1.1024 – 1.1032)	28.05 (1.104)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Valve lifter	Valve lifter O.D.	IN/EX	28.978 – 28.993 (1.1409 – 1.1415)	28.97 (1.141)
	Valve lifter bore I.D.	IN/EX	29.010 – 29.026 (1.1421 – 1.1428)	29.04 (1.143)
Valve, valve guide	Valve stem O.D.	IN	4.970 – 4.995 (0.1957 – 0.1967)	4.96 (0.195)
		EX	4.955 – 4.980 (0.1951 – 0.1961)	4.95 (0.195)
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.04 (0.198)
	Stem-to-guide clearance	IN	0.005 – 0.042 (0.0002 – 0.0017)	0.075 (0.0030)
		EX	0.020 – 0.057 (0.0008 – 0.0022)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN/EX	11.8 – 12.0 (0.46 – 0.47)	–
	Valve seat width	IN/EX	0.9 – 1.1 (0.035 – 0.043)	1.5 (0.06)
Valve spring	Free length	IN/EX	38.20 (1.504)	37.0 (1.46)
Cylinder head warpage			–	0.10 (0.004)

TORQUE VALUES

Spark plug	18 N·m (1.8 kgf·m, 13 lbf·ft)
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft) Apply grease to the threads.
Cylinder head 9 mm bolt	44 N·m (4.5 kgf·m, 33 lbf·ft) Apply engine oil to the threads.
Cylinder head 6 mm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply engine oil to the threads and seating surface.
Intake manifold bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Engine coolant temperature (ECT) sensor	25 N·m (2.5 kgf·m, 18 lbf·ft)
Cylinder head front cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Left cam chain guide washer bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Cam chain tensioner pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Ignition pulse generator rotor bolt	59 N·m (6.0 kgf·m, 43 lbf·ft) Apply engine oil to the threads and seating surface.
Front crankcase cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Cam sprocket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft) Apply locking agent to the threads.
Camshaft holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply engine oil to the threads and seating surface.
Cam chain tensioner lifter mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Cam chain tensioner lifter sealing bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Cylinder head side cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Cylinder head top cover bolt (cover mount)	12 N·m (1.2 kgf·m, 9 lbf·ft)
Cylinder head top cover bolt (dummy)	10 N·m (1.0 kgf·m, 7 lbf·ft) Apply locking agent to the threads.

TOOLS

Valve spring compressor 07757-0010000 	Valve guide reamer, 5.0 mm 07984-MA60001  or 07984-MA6000D	Valve guide driver, 5.0 mm 07942-MA60000  or 07942-8920000
Valve seat cutter, 33 mm (45° IN) 07780-0010800  or equivalent commercially available in U.S.A.	Valve seat cutter, 29 mm (45° EX) 07780-0010300  or equivalent commercially available in U.S.A.	Flat cutter, 35 mm (32° IN) 07780-0012300  or equivalent commercially available in U.S.A.
Flat cutter, 33 mm (32° EX) 07780-0012900  or equivalent commercially available in U.S.A.	Interior cutter, 30 mm (60° IN/EX) 07780-0014000  or equivalent commercially available in U.S.A.	Cutter holder, 6.6 mm 07781-0010400  or equivalent commercially available in U.S.A.
Tensioner holder A 07ZMG-MCAA300 	Tensioner holder B 07ZMG-MCAA400 	

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 valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston problem (page 12-5)

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 12-5)

Excessive noise
- Incorrect valve clearance
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn or damaged valve lifter
- Worn cam chain
- Worn cam sprocket teeth
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (page 12-5)

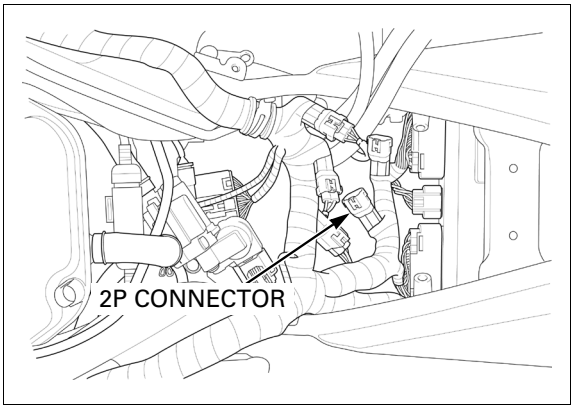
Rough idle
- Low cylinder compression

CYLINDER COMPRESSION

Warm up the engine to normal operating temperature. Stop the engine.

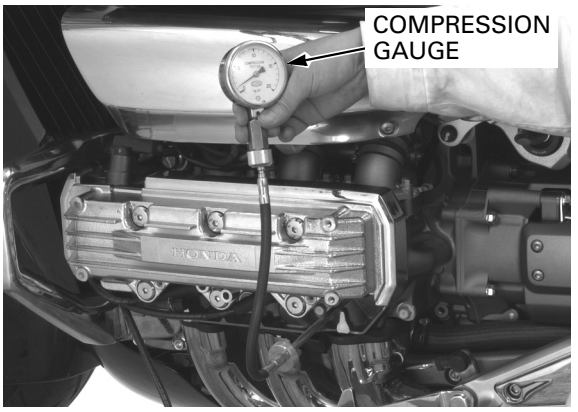
Raise the fuel tank and hold it (page 3-4).
Disconnect the fuel pump 2P (black) connector.

Remove all the spark plug caps and spark plugs (page 4-7).



Install a compression gauge into the spark plug hole.

With the transmission is in neutral, open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising. The maximum reading is usually reached within 4 – 7 seconds.



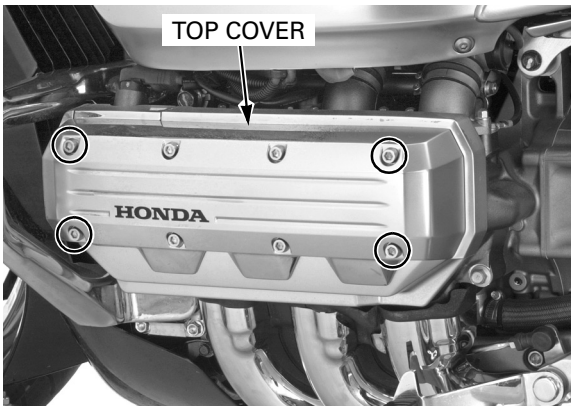
COMPRESSION PRESSURE:
1,383 kPa (14.1 kgf/cm^2, 201 psi) at 300 rpm

Low compression can be caused by:
– blown cylinder head gasket
– improper valve adjustment
– valve leakage
– worn piston ring or cylinder

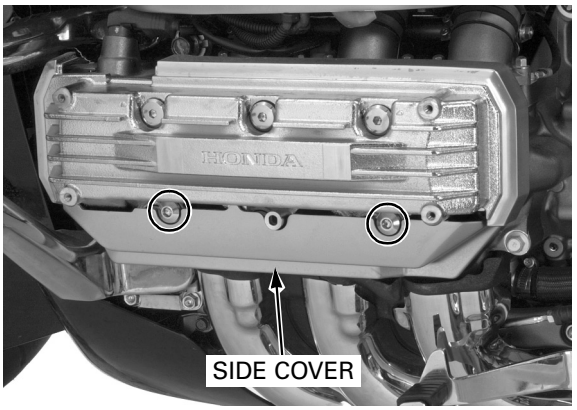
High compression can be caused by:
– carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER REMOVAL

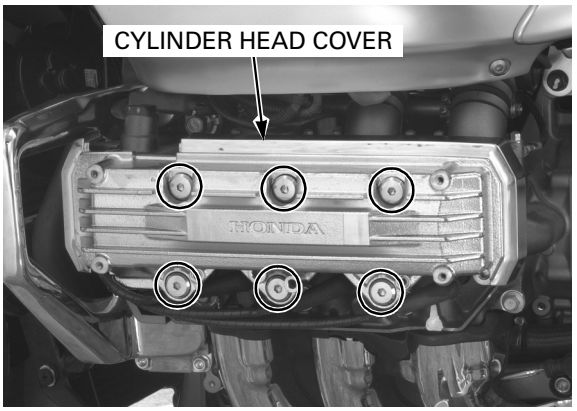
Remove the following:
– four rubber plugs and socket bolts
– cylinder head top cover



– two socket bolts
– cylinder head side cover



– six socket bolts (left cylinder head)
– five socket bolts (right cylinder head)
– cylinder head cover

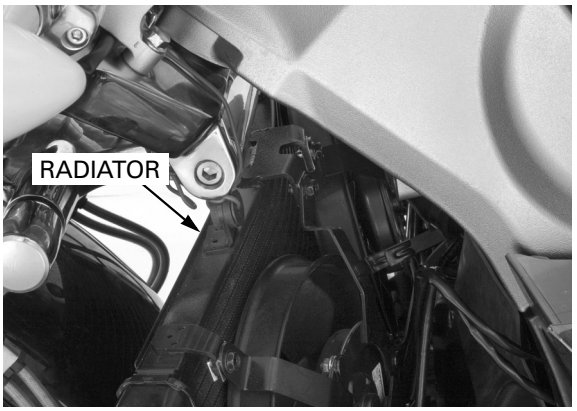


CAMSHAFT REMOVAL

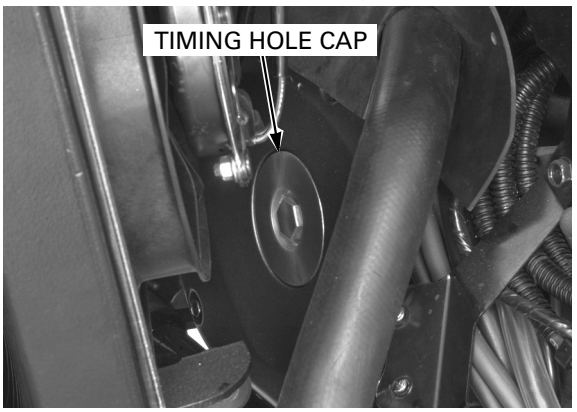
If you plan to remove the cylinder head, drain the coolant from the system (page 7-7).

Remove the following:
– cylinder head cover (page 9-7)
– spark plugs (page 4-7)
– radiator without disconnecting the water hoses (page 7-8)

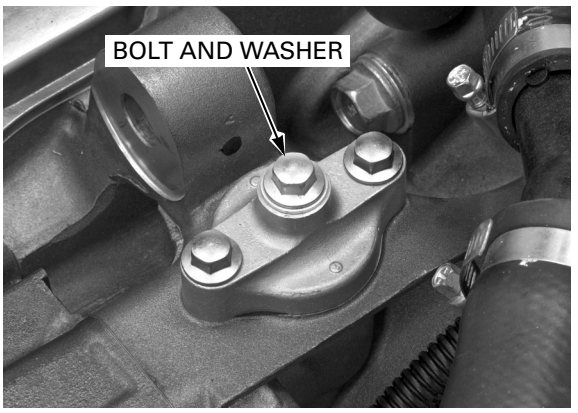
Cover the radiator fins with a shop towel to prevent damaging them by the front fender.
Secure the radiator assembly with strings to the front suspension to get the clearance between the engine and radiator.



Remove the timing hole cap.



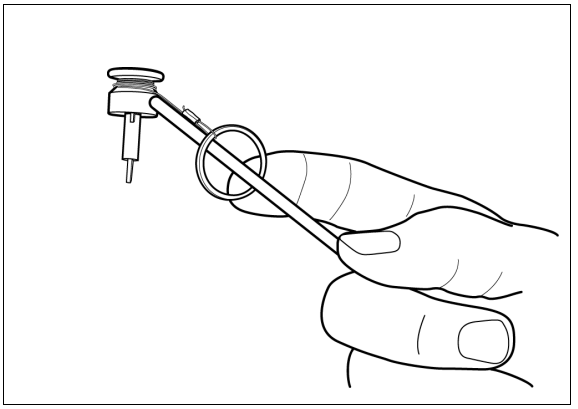
Right camshaft: Remove the cam chain tensioner sealing bolt and washer.



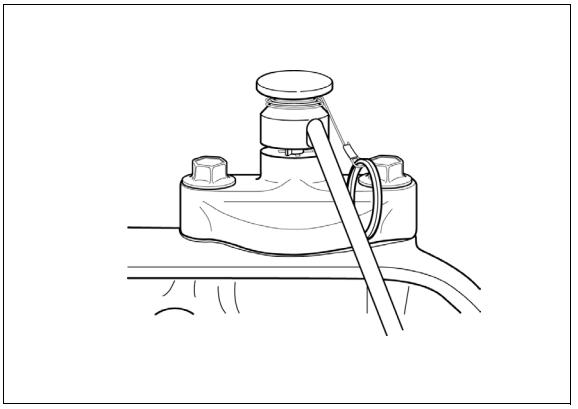
Wind the string clockwise around the tool.

Insert the rod through the ring and screw the rod into the tool.

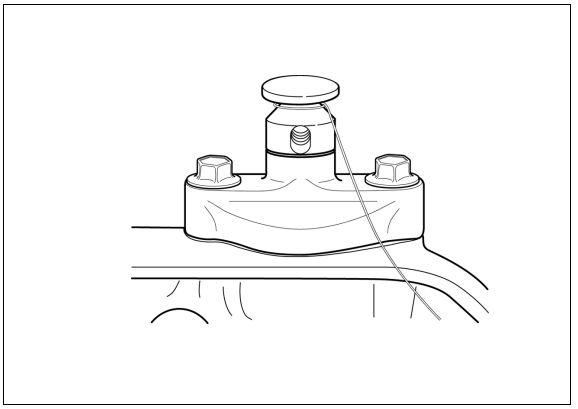
TOOL:
Tensioner holder A **07ZMG-MCAA300**



Pull both coolant hoses out of the way and insert the special tool into the tensioner body.
Push the special tool into the tensioner so the blade of the tool is in the tensioner and the tabs are just above the slots in the tensioner. (There should be space between the bottom of the tool and the tensioner body; do not engage the tabs on the special tool with the slots in the tensioner body.)



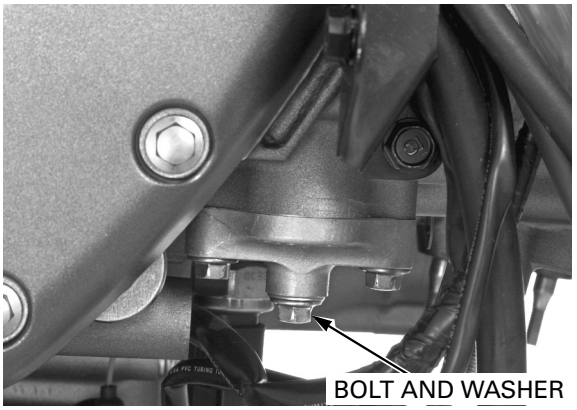
Unscrew the rod from the tool and pull the ring until the tool stops turning (the tensioner lifter shaft is fully secured with the special tool). Make sure the blade is fully engaged into the tensioner before pulling the string.



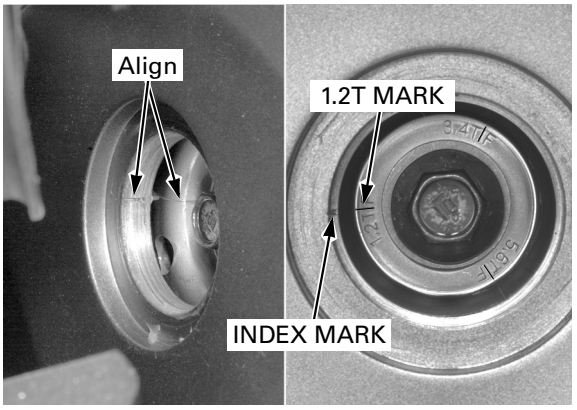
Left camshaft: Remove the horn (page 20-26).

Keep some rags handy because oil will drop out of the left cam chain tensioner.

Remove the cam chain tensioner lifter bolt and sealing washer.



Rotate the crankshaft counterclockwise and align the 1.2T mark on the ignition pulse generator rotor with the index mark in the front crankcase cover.

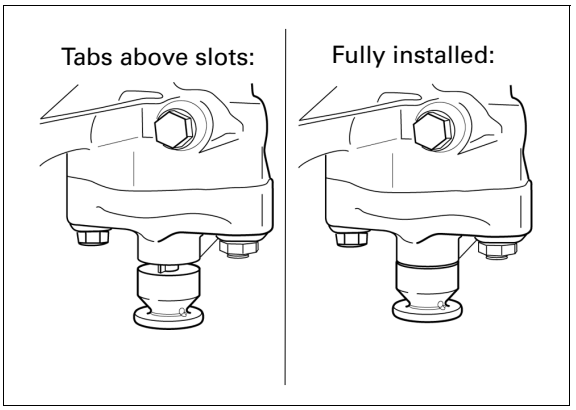


Install the special tool into the tensioner body so the blade of the tool is in the tensioner and the tabs are just above the slots in the tensioner. (There should be space between the bottom of the tool and the tensioner body; do not engage the tabs on the special tool with the slots in the tensioner body.)

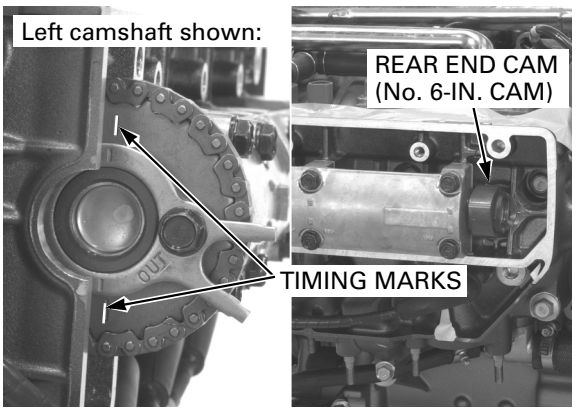
Turn the tool clockwise until it stops turning (the tensioner lifter shaft is fully secured with the special tool).

TOOL:

Tensioner holder B (without rod and cord)	**07ZMG-MCAA400**



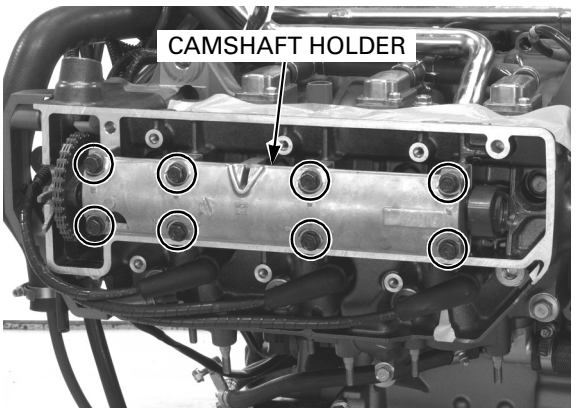
The timing marks on the cam sprocket must be flush with the cylinder head surface and make sure the rear end cam lobe is facing outward (TDC on exhaust stroke).
If the rear end cam lobe is facing inward (TDC on compression stroke), rotate the crankshaft counterclockwise 360° (one full turn) so the rear end cam lobe faces out.



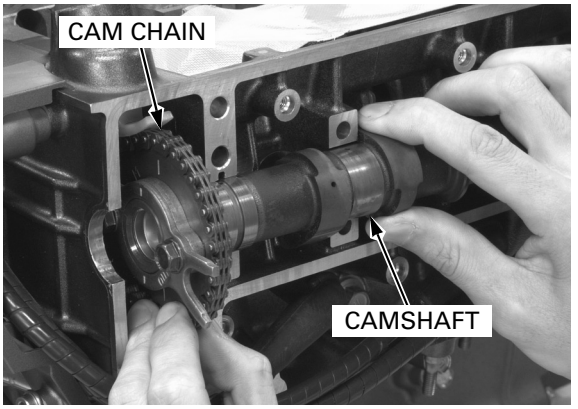
Do not forcibly remove the dowel pins from the camshaft holder.

Loosen the camshaft holder bolts in a crisscross pattern in several steps from the outside to inside to prevent damaging the camshaft holder and camshaft.

Remove the camshaft holder.



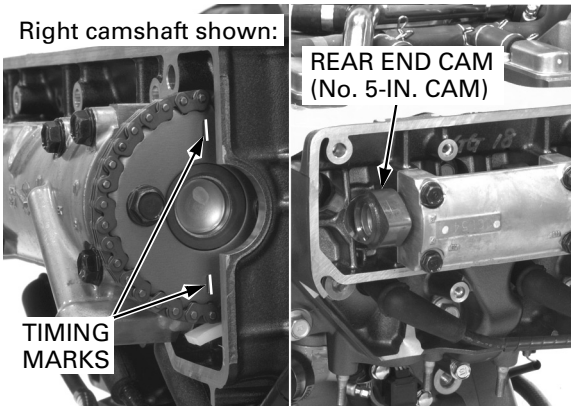
Remove the cam chain off the cam sprocket, being careful not to damage the cylinder head and camshaft. Remove the camshaft.



Be careful not to jam the removed cam chain into the timing sprocket of the crankshaft when rotating the crankshaft.

Rotate the crankshaft counterclockwise 360° (one full turn) and align the 1.2T mark on the ignition pulse generator rotor with the index mark in the front crankcase cover.

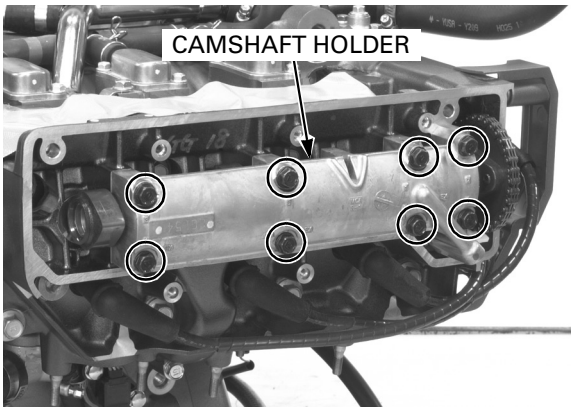
Be sure that the timing marks on the cam sprocket of other camshaft are flush with the cylinder head surface and that the rear end cam lobe is facing outward (TDC on exhaust stroke).



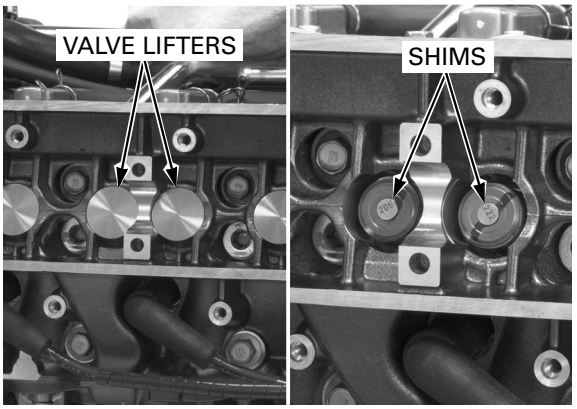
Loosen the camshaft holder bolts in a crisscross pattern in several steps from the outside to inside to prevent damaging the camshaft holder and camshaft.

Remove the camshaft holder.

Remove the cam chain off the cam sprocket, being careful not to damage the cylinder head and camshaft and then remove the camshaft.



Remove the valve lifters and shims.



NOTE:

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

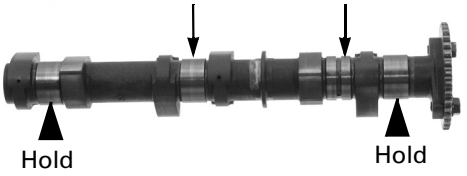
INSPECTION

CAMSHAFT

Check the cam sprocket for wear or damage.
Check the cam and journal surfaces of the camshaft for scoring, scratches or evidence of insufficient lubrication.
Check the oil holes in the camshaft for debris.

Measure the camshaft runout using a dial indicator.

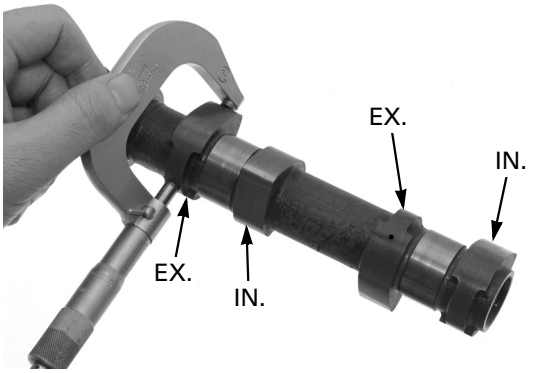
SERVICE LIMIT: 0.03 mm (0.001 in)



Measure each cam lobe height using a micrometer.

SERVICE LIMITS:

49 state/Canada:	**IN:**	**41.58 mm (1.637 in)**
	EX:	**41.65 mm (1.640 in)**
California:	**IN:**	**40.78 mm (1.606 in)**
	EX:	**41.65 mm (1.640 in)**



CAMSHAFT JOURNAL

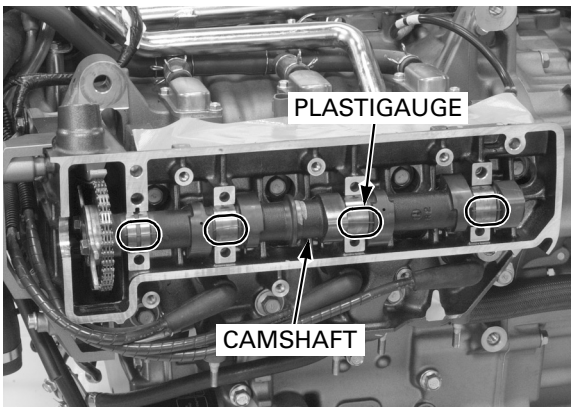
Check the camshaft journal surfaces of the camshaft holder and cylinder head for scoring, scratches or evidence of insufficient lubrication.

Do not rotate the camshaft during inspection.

CAMSHAFT OIL CLEARANCE

Wipe any oil from the journals of the cylinder head, camshaft and camshaft holder.

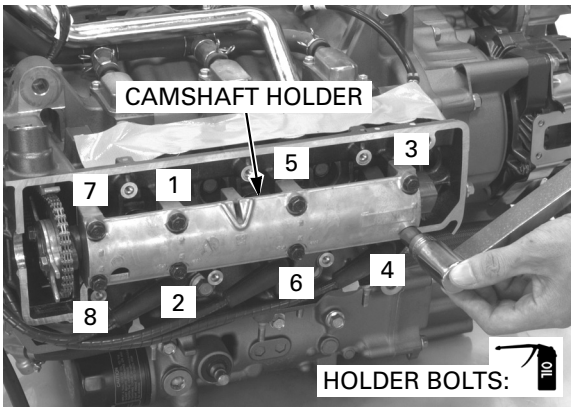
Install the cam chain onto the camshaft sprocket and install the camshaft into the cylinder head (page 8-25). Lay a strip of plastigauge lengthwise on each camshaft journal and be sure to avoid the oil passages.



Install the dowel pins and camshaft holder onto the cylinder head, being careful not to drop the plastigauge.
Apply engine oil to the threads and seating surfaces of the camshaft holder bolts and install them.

Tighten the holder bolts in several steps according to the numerical order cast on the camshaft holder (1 thru 8).

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

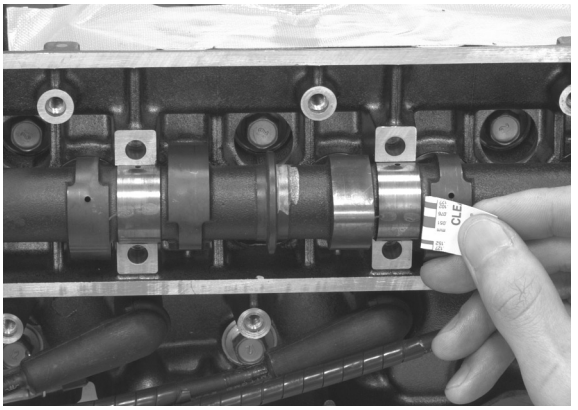


Remove the camshaft holder and measure the compressed plastigauge at its widest point on the camshaft to determine the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

If the oil clearance exceeds the service limit, replace the camshaft and recheck the oil clearance.

Replace the cylinder head and camshaft holder as a set if the oil clearance still exceeds the service limit.



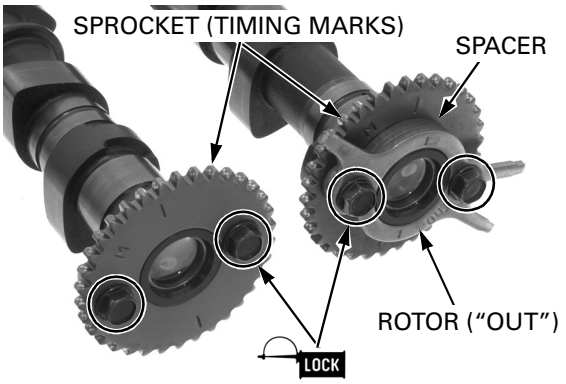
CAM SPROCKET REPLACEMENT

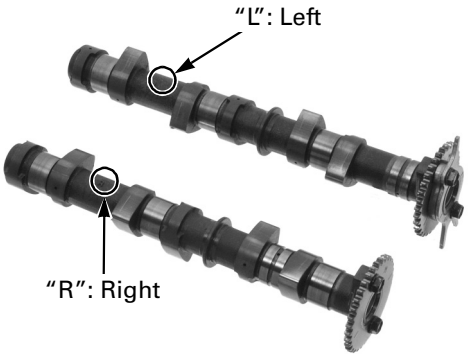
Remove the following:
– cam sprocket bolts
– cam pulse rotor and spacer (left camshaft only)
– cam sprocket

The camshafts have the following identification marks:
L: left cylinder camshaft
R: right cylinder camshaft

Install the cam sprocket with the timing marks facing out and align the bolt holes.
Install the spacer and cam pulse rotor onto the left camshaft with the "OUT" mark on the rotor facing out.
Apply locking agent to the threads of the sprocket bolts. Install the bolts and tighten them.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

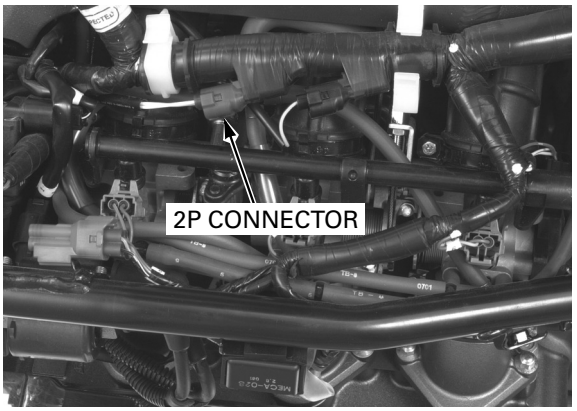




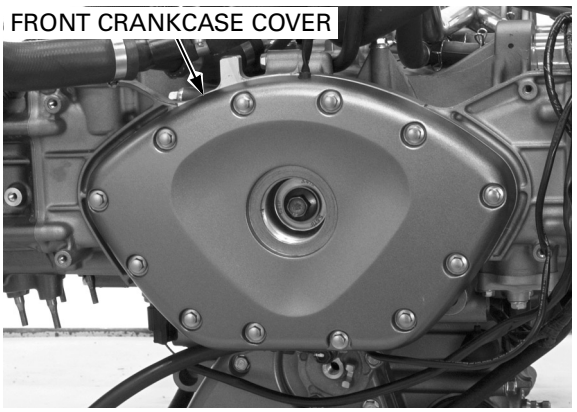
CAM CHAIN REMOVAL

Remove the following:
– camshafts (page 9-8)
– left front inner cover (page 3-4)

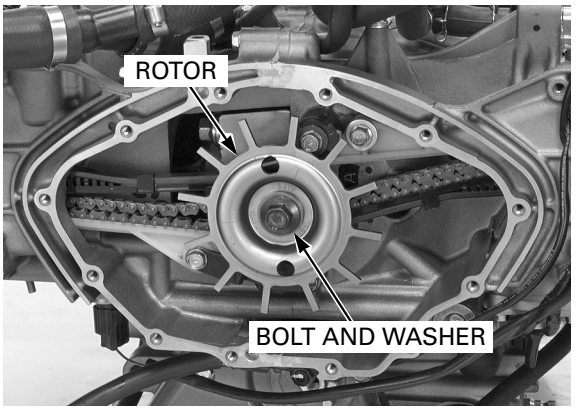
Disconnect the ignition pulse generator 2P (red) connector and remove the its wire out of the frame.



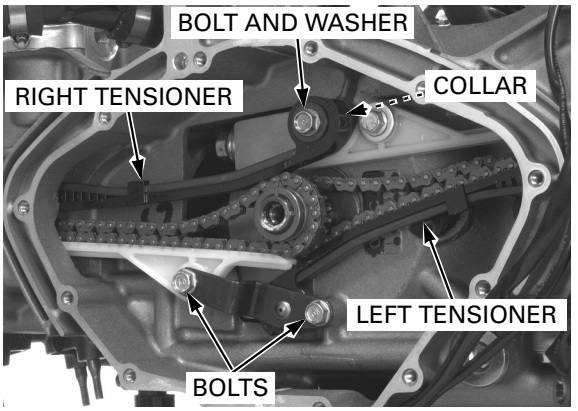
Remove the following:
– twelve cover bolts
– front crankcase cover
– two dowel pins
– gasket



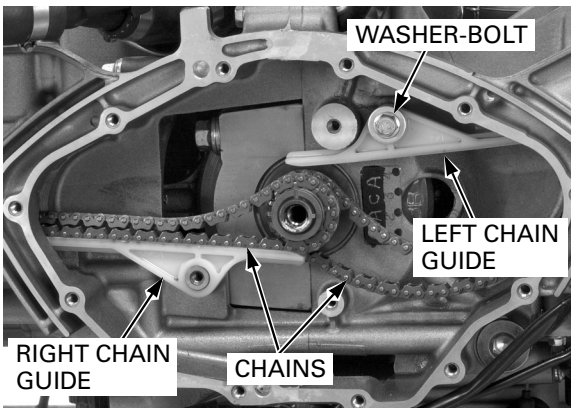
– rotor bolt and washer
– ignition pulse generator rotor



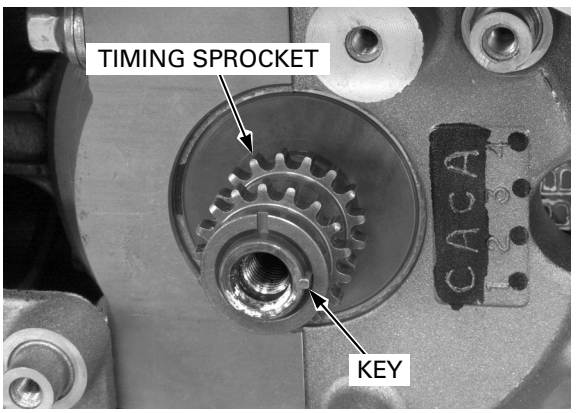
– tensioner pivot bolt and washer
– right cam chain tensioner and collar
– tensioner arm bolts
– left cam chain tensioner



– right cam chain guide
– washer-bolt and left cam chain guide
– right and left cam chains



– timing sprocket
– key



INSPECTION

TIMING SPROCKET/CAM CHAIN

Check the sprocket teeth and chain for wear or damage.

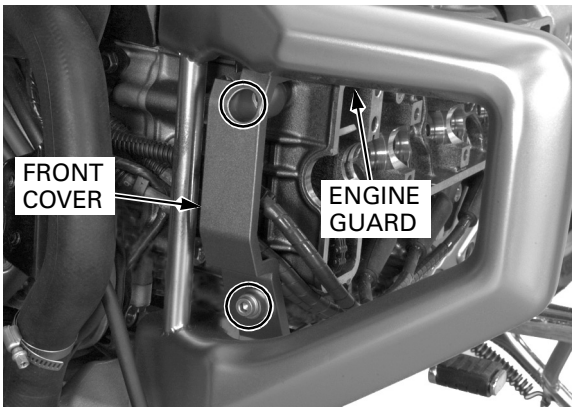
CAM CHAIN TENSIONER/GUIDE

Check the tensioner and guide for excessive wear or damage.

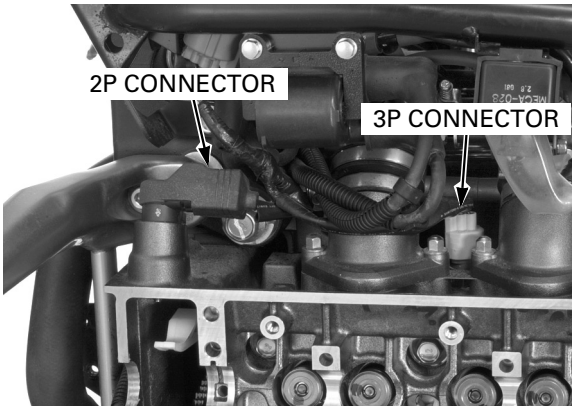
CYLINDER HEAD REMOVAL

Remove the following:
- exhaust system (page 3-7)
- camshafts (page 9-8)

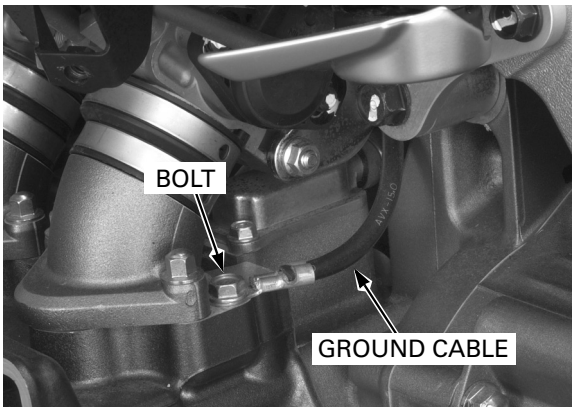
Remove the following from the cylinder head:
- two socket bolts and cylinder head front cover
- engine guard (page 8-7)



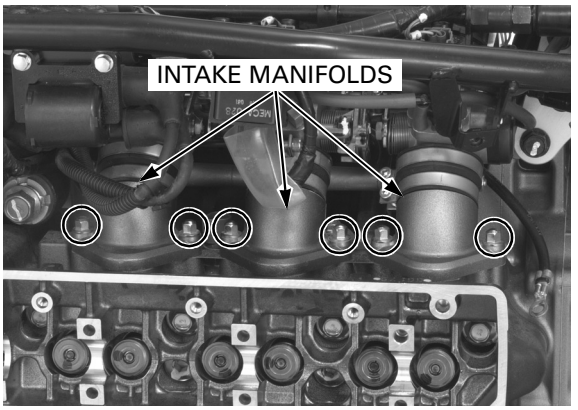
Left cylinder head only:
- camshaft position sensor 2P (black) connector
- engine coolant temperature (ECT) sensor 3P (gray) connector



- terminal bolt and ground cable

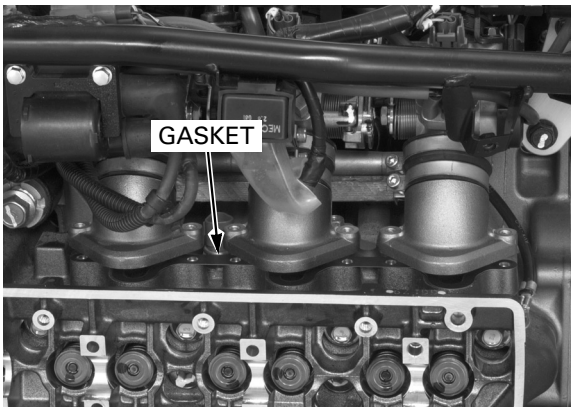


– twelve intake manifold bolts (from the left and right cylinder heads)



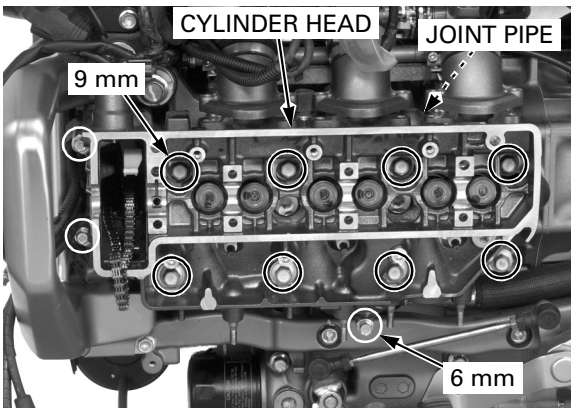
Raise the intake manifolds and set suitable wooden blocks between the crankcase (cylinder) and throttle body to support it.

Remove the following:
– manifold gaskets



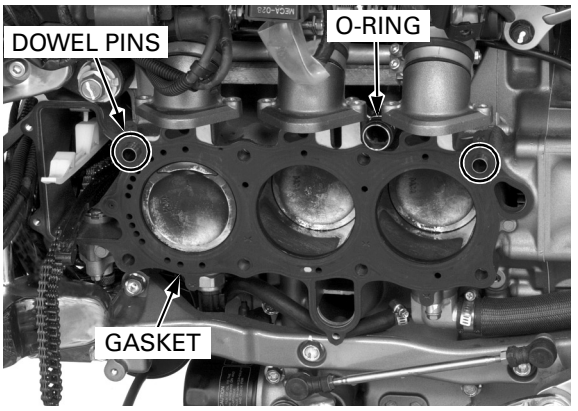
– cylinder head bolts (three 6-mm bolts and eight 9-mm bolts)

Remove the cylinder head while disconnecting the water hose joint pipe, being careful not to damage the mating surface of the manifold and cylinder head.



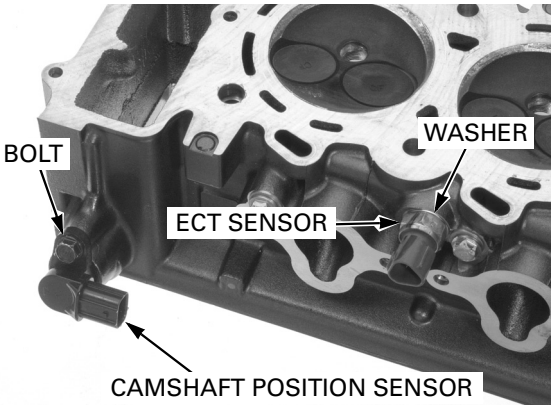
Remove the following:
– cylinder head gasket
– two dowel pins
– O-ring from the water hose joint pipe

Remove the other side cylinder head in the same manner as above.

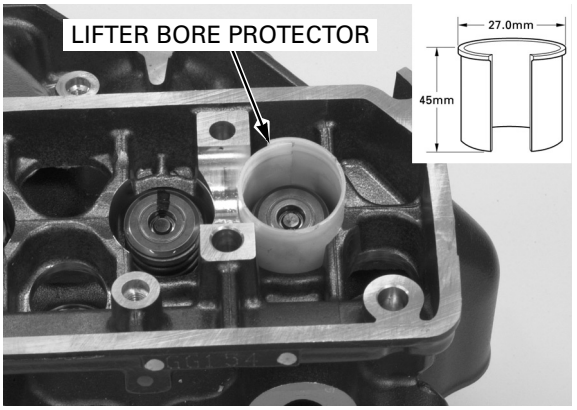


CYLINDER HEAD DISASSEMBLY

Remove the following:
– bolt
– camshaft position sensor
– O-ring
– ECT sensor
– sealing washer



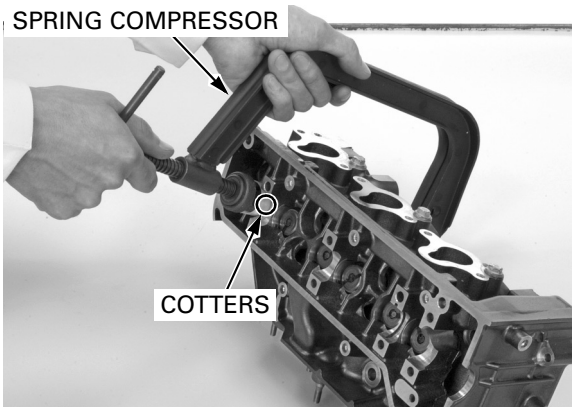
Make a lifter bore protector from a plastic 35-mm film container by cutting the bottom and side wall of the container.
Install the protector into the valve lifter bore.



To prevent loss of tension, do not compress the valve spring more than necessary to remove the cotters.

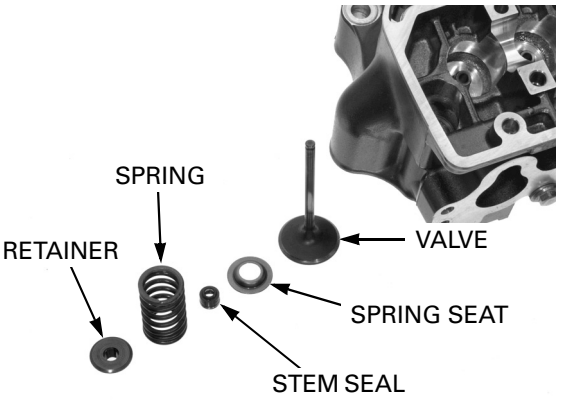
Remove the valve spring cotters using the valve spring compressor.

TOOL:
Valve spring compressor 07757-0010000



Mark all parts so they can be placed back in their original locations.

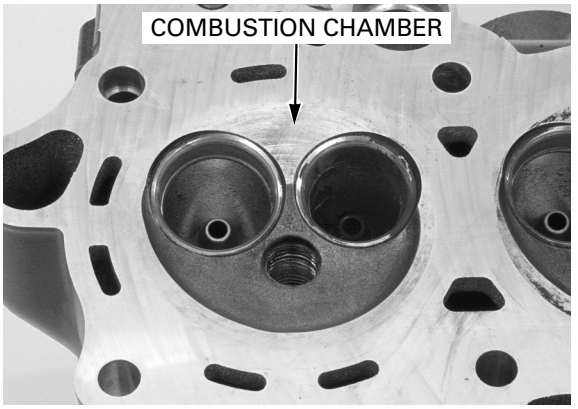
Remove the following:
– spring retainer
– valve spring
– valve
– stem seal
– spring seat



INSPECTION

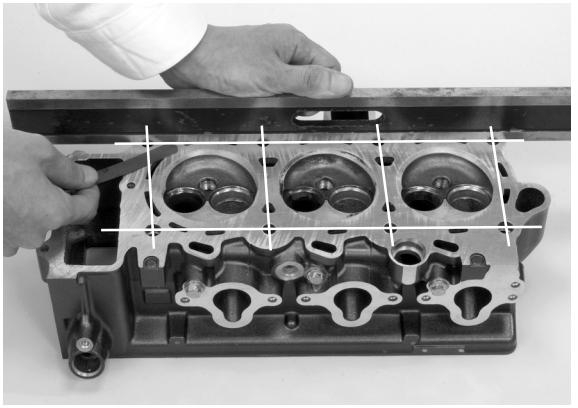
CYLINDER HEAD

Remove the carbon deposits from the combustion chamber, being careful not to damage the gasket surface.
Check the spark plug hole and valve areas for cracks.



Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)



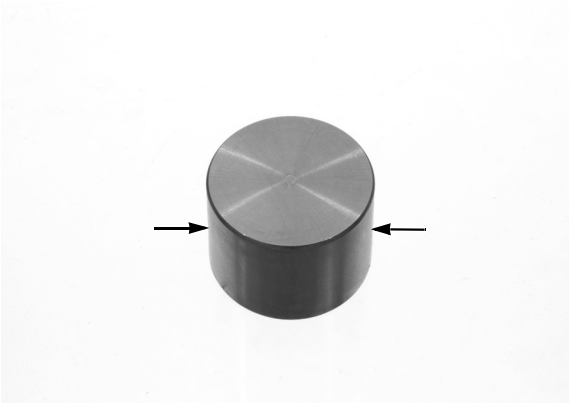
Check the valve lifter bore in the cylinder head for scoring, scratches or damage.
Measure each valve lifter bore I.D.

SERVICE LIMIT: 29.04 mm (1.143 in)

VALVE LIFTER

Check the valve lifter for scoring, scratches or damage.
Measure each valve lifter O.D.

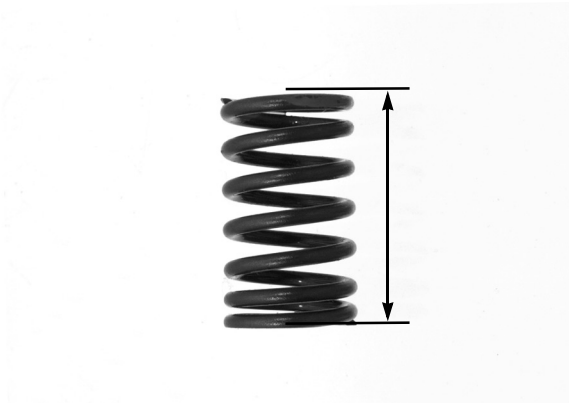
SERVICE LIMIT: 28.97 mm (1.141 in)



VALVE SPRING

Measure the valve spring free length.

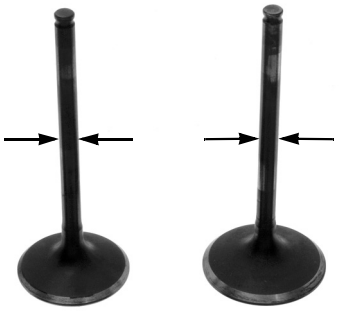
SERVICE LIMIT: IN/EX: 37.0 mm (1.46 in)



VALVE/VALVE GUIDE

Check that the valve moves smoothly in the guide.
Check the valve for bends, burns or abnormal wear.
Measure each valve stem O.D. and record it.

SERVICE LIMITS: IN: 4.96 mm (0.195 in)
EX: 4.95 mm (0.195 in)



Ream the valve guide to remove any carbon build-up before measuring the guide.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

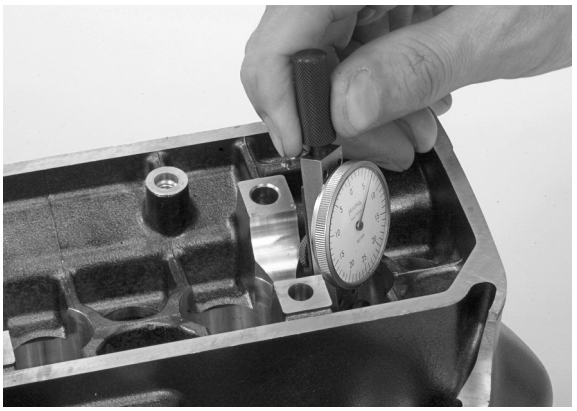
TOOL:
Valve guide reamer, 5.0 mm 07984-MA60001 or 07984-MA6000D

Measure each valve guide I.D. and record it.

SERVICE LIMIT: IN/EX: 5.04 mm (0.198 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

SERVICE LIMITS: IN: 0.075 mm (0.0030 in)
EX: 0.085 mm (0.0033 in)



Inspect and reface the valve seats whenever the valve guides are replaced (page 9-22).

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.

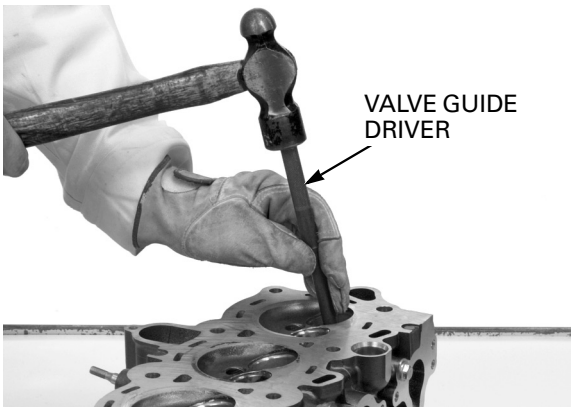
VALVE GUIDE REPLACEMENT

Chill the new valve guides a freezer for about an hour.

Be sure to wear heavy gloves to avoid burns when handling the heated cylinder head. Using a torch to heat the cylinder head may cause warpage.

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.

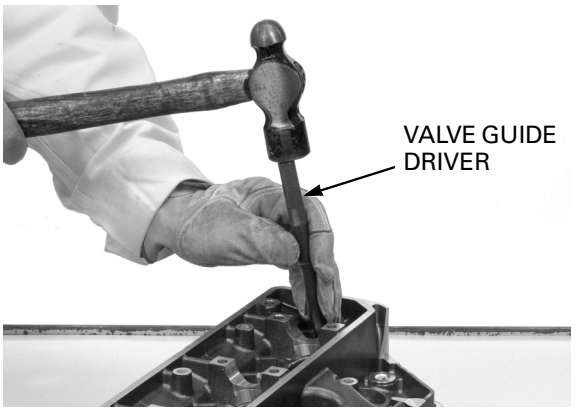
Support the cylinder head and drive the valve guides out of the cylinder head from the combustion chamber side.



TOOL:

Valve guide driver, 5.0 mm	**07942-MA60000 or 07942-8920000**

While the cylinder head is still heated, drive new valve guides into the cylinder head from the camshaft side until the exposed height is specified value.



TOOL:

Valve guide driver, 5.0 mm	**07942-MA60000 or 07942-8920000**

VALVE GUIDE PROJECTION:
IN/EX: 11.8 – 12.0 mm (0.46 – 0.47 in)

Let the cylinder head cool to room temperature.

Take care not to tilt or lean the reamer in the guide while reaming. Use cutting oil on the reamer during this operation.

Ream the new valve guides.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:

Valve guide reamer, 5.0 mm	**07984-MA60001 or 07984-MA6000D**

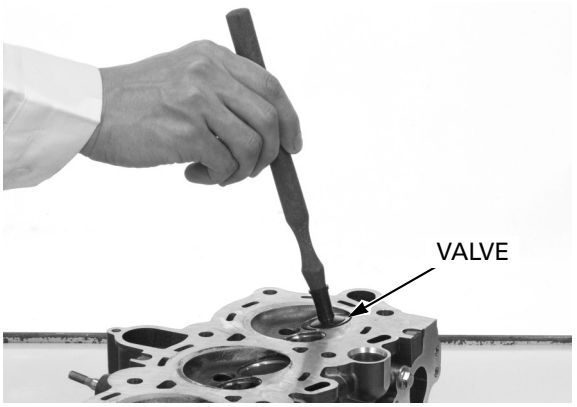
Clean the cylinder head thoroughly to remove any metal particles after reaming and refacing the valve seat (page 9-22).

VALVE SEAT INSPECTION/REFACING

INSPECTION

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coat of Prussian Blue to each valve seat.
Tap the valve against the valve seat several times without rotating the valve, to check for proper valve seat contact.

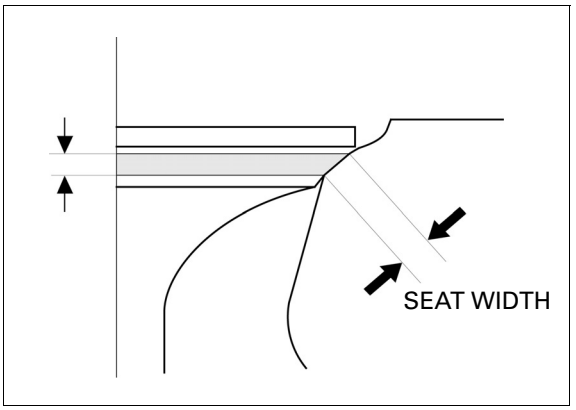


The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

Remove the valve and inspect the valve seat face. The valve seat contact should be within the specified width and even all around the circumference.

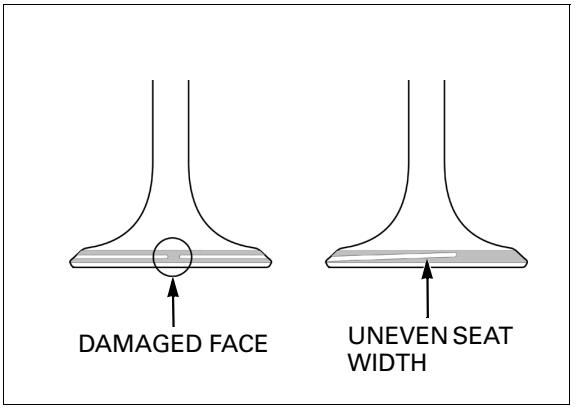
STANDARD: 0.9 – 1.1 mm (0.035 – 0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

If the seat width is not within specification, reface the valve seat.

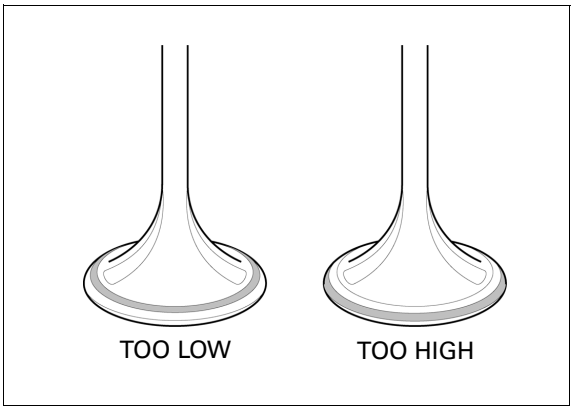


Inspect the valve seat face for:

- Damaged face:
  – Replace the valve and reface the valve seat.
- Uneven seat width:
  – Replace the valve and reface the valve seat.



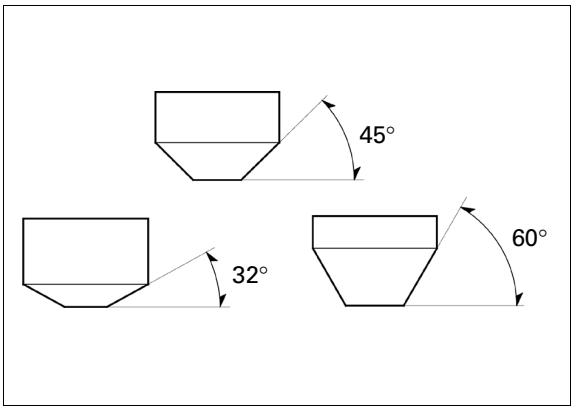
- Contact area (too high or too low)
  – Reface the valve seat.



VALVE SEAT REFACING

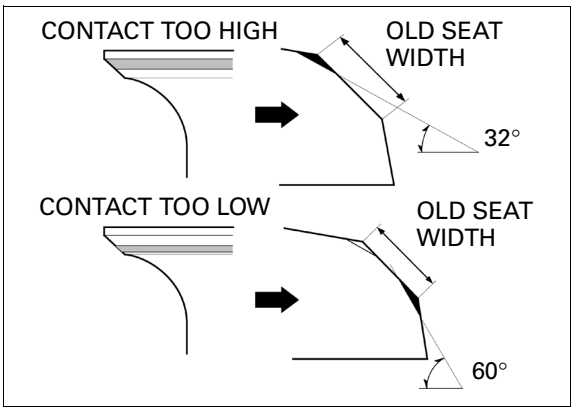
NOTE:

- Follow the refacer manufacturer's operating instructions.
- 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.

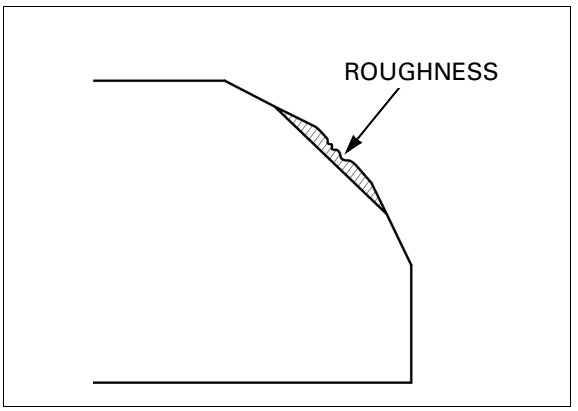


Using a 45° seat cutter, remove any roughness or irregularities from the seat.

TOOLS:

Seat cutter, 33 mm (45° IN)	**07780-0010800**
Seat cutter, 29 mm (45° EX)	**07780-0010300**
Cutter holder, 5.0 mm	**07781-0010400**

or equivalent commercially available in U.S.A.

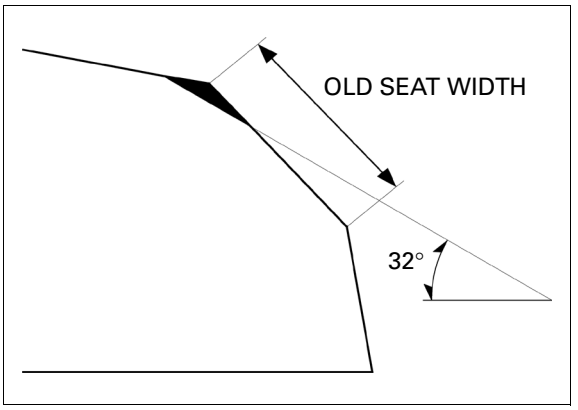


Using a 32° flat cutter, remove 1/4 of the existing valve seat material.

TOOLS:

Flat cutter, 35 mm (32° IN)	**07780-0012300**
Flat cutter, 33 mm (32° EX)	**07780-0012900**
Cutter holder, 5.0 mm	**07781-0010400**

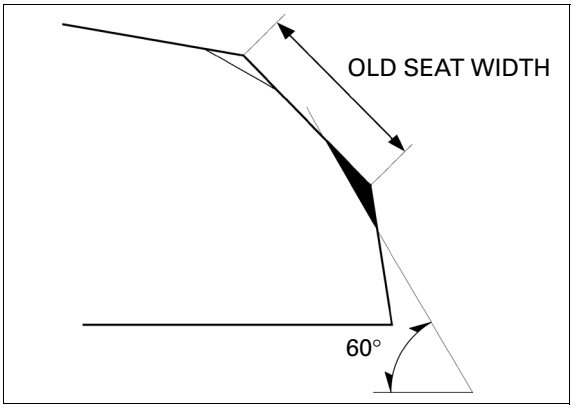
or equivalent commercially available in U.S.A.



Use a 60° interior cutter to remove the bottom 1/4 of the old seat.

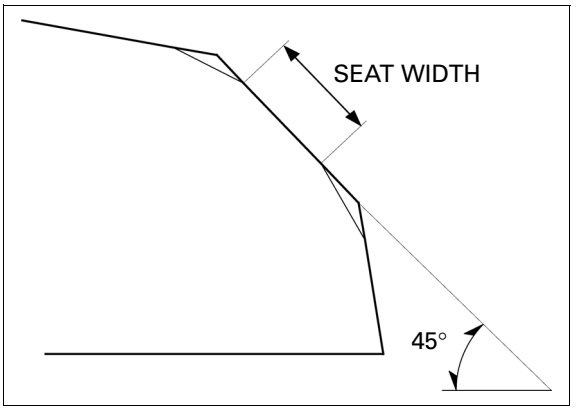
TOOLS:
Interior cutter, 30 mm (60° IN/EX) 07780-0014000
Cutter holder, 5.0 mm 07781-0010400

or equivalent commercially available in U.S.A.



Using a 45° seat cutter, cut the seat to the proper width.

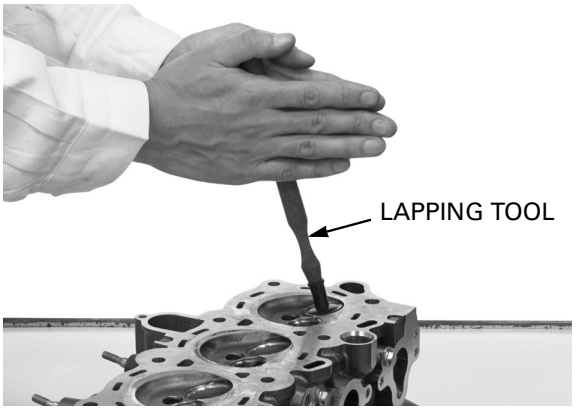
Make sure all pitting and irregularities are removed.



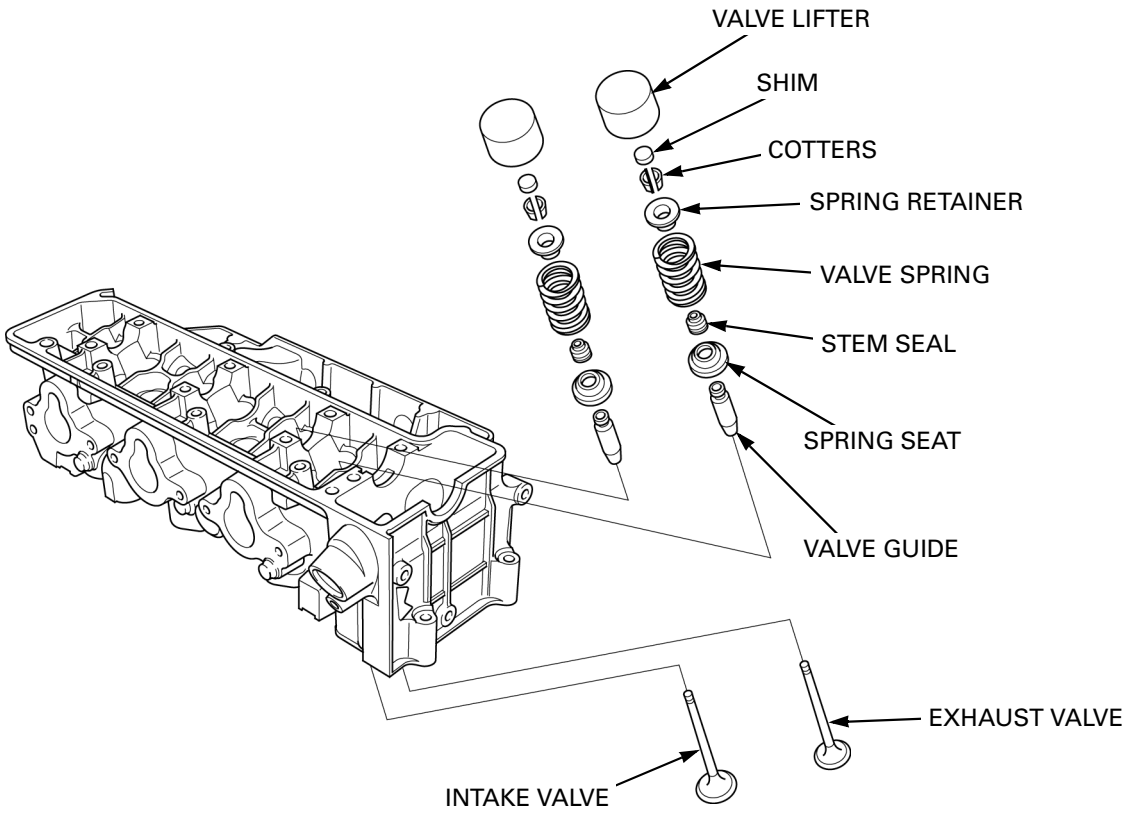
Excessive lapping pressure may deform or damage the seat. Do not allow lapping compound to enter the guides.

After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.
Change the angle of the lapping tool frequently to prevent uneven seat wear.

After lapping, wash any residual compound off the cylinder head and valve and recheck the seat contact.

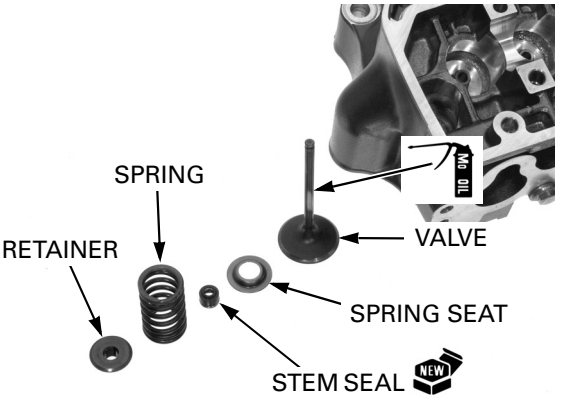


CYLINDER HEAD ASSEMBLY



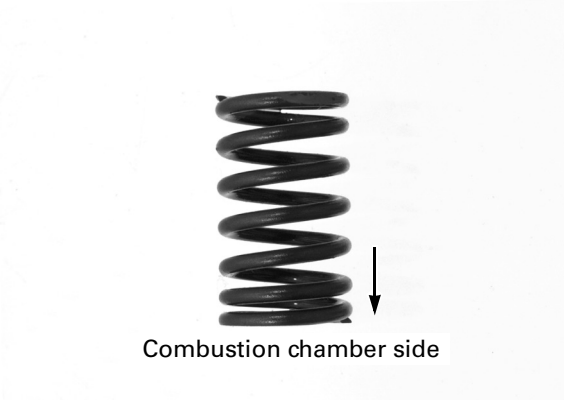
Blow out all oil passages in the cylinder head with compressed air.
Install the valve spring seats.
Install new stem seals.

Lubricate the valve stem sliding surface with molybdenum oil solution.
Insert the valve into the guide while turning it slowly to avoid damaging the stem seal.

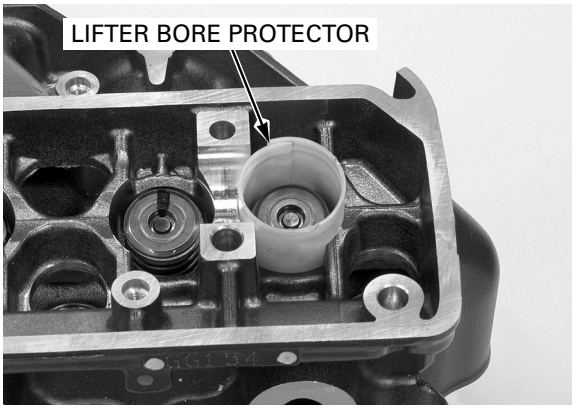


Install the valve springs with the tightly wound coils facing the combustion chamber.

Install the spring retainer.



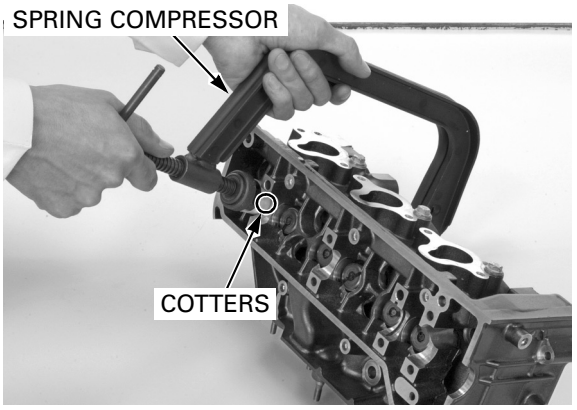
Install the lifter bore protector made from a film container into the valve lifter bore.



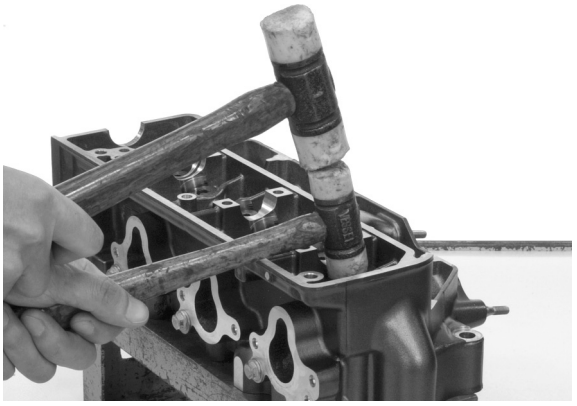
Grease the cotters to ease installation. To prevent loss of tension, do not compress the valve spring more than necessary to install the cotters.

Install the valve spring cotters using the valve spring compressor.

TOOL:
Valve spring compressor 07757-0010000



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.

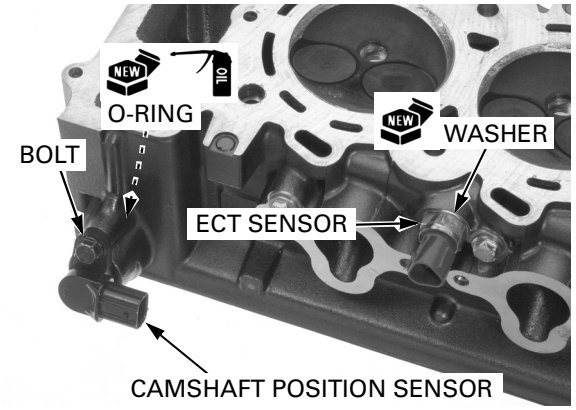


Left cylinder head only:

Install the ECT sensor with a new sealing washer and tighten it.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Coat a new O-ring with engine oil and install it into the groove in the camshaft position sensor groove. Install the camshaft position sensor and tighten the bolt.

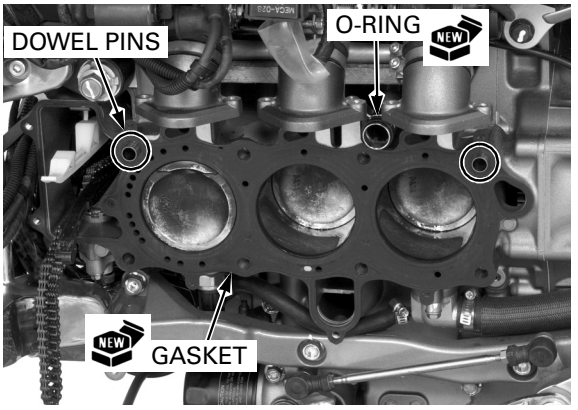


CYLINDER HEAD INSTALLATION

Clean the gasket mating surfaces of the crankcase, manifold and cylinder head thoroughly, being careful not to damage them.

Set support blocks between the crankcase and throttle body to prevent interference the cylinder head with the manifold.

Install the two dowel pins and a new gasket.
Coat a new O-ring with coolant and install it onto the water joint pipe.



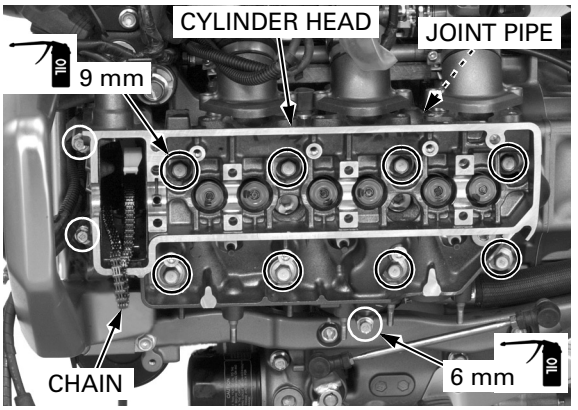
Be careful not to damage the joint pipe O-ring.

Route the cam chain through the cylinder head, and install the cylinder head while connecting the joint pipe.

Apply engine oil to the threads and seating surfaces of all the cylinder head bolts.
Install the eight 9-mm bolts and three 6-mm bolts, and tighten them in a crisscross pattern in several steps.

TORQUE: 9 mm bolt: 44 N·m (4.5 kgf·m, 33 lbf·ft)
6 mm bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the other side cylinder head in the same manner as above.

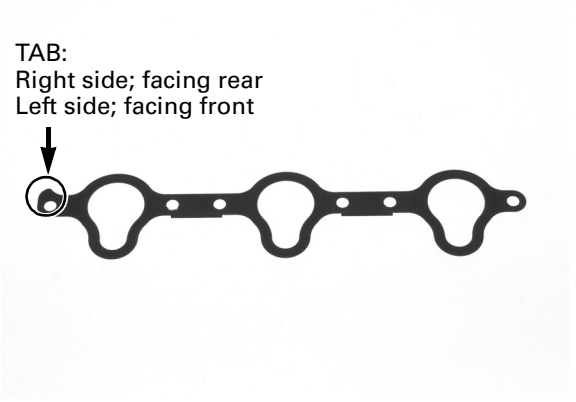


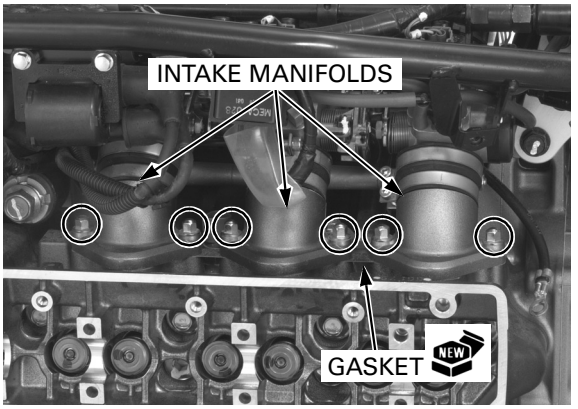
Install new gaskets onto the cylinder heads in the direction as shown, and align the bolt holes in the cylinder head and gasket.

Carefully remove the support blocks and place the manifolds onto the cylinder heads.

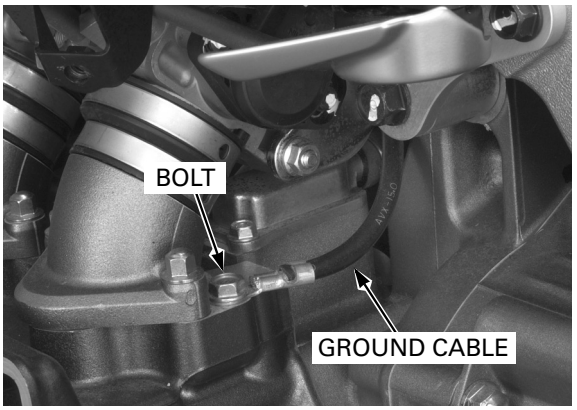
Be sure to align the bolt holes and install the twelve bolts. Tighten the bolts alternately.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

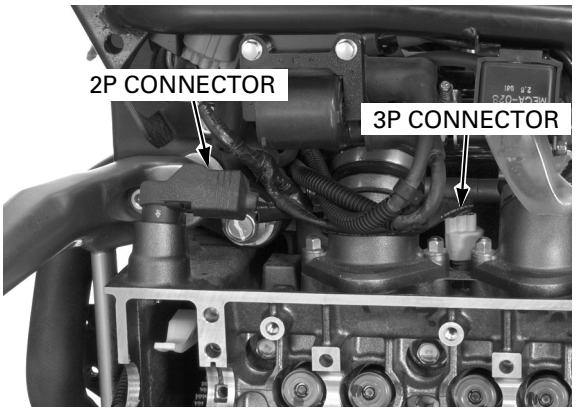




Connect the following:
– ground cable (with the terminal bolt) to each cylinder head



Left cylinder head only:
– ECT sensor 3P (gray) connector
– camshaft position sensor 2P (black) connector

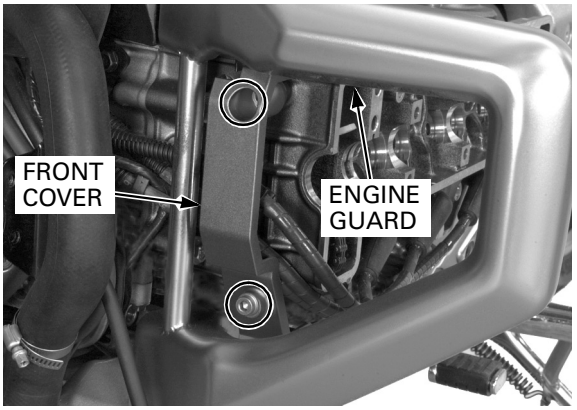


Install the engine guard (page 8-18).

Install the cylinder head front covers and tighten the socket bolts.

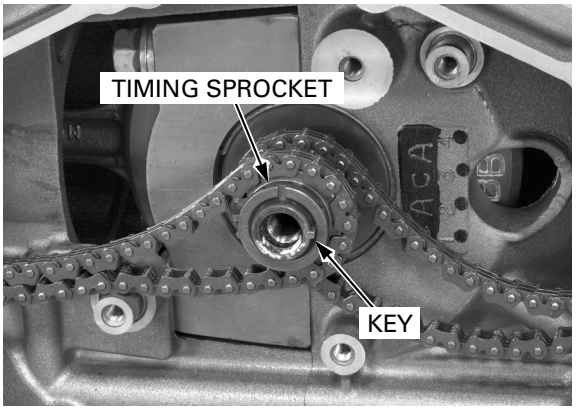
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the following:
– camshafts (page 9-30)
– exhaust system (page 3-8)



CAM CHAIN INSTALLATION

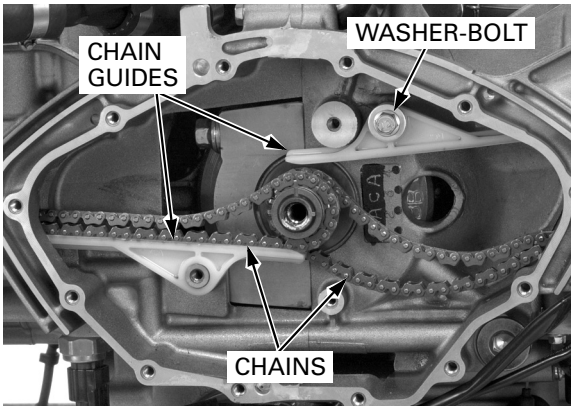
Install the following:
– key
– timing sprocket (with the groove facing out)



Left cam chain: rear side teeth (first)/ Right cam chain: front side teeth (next).

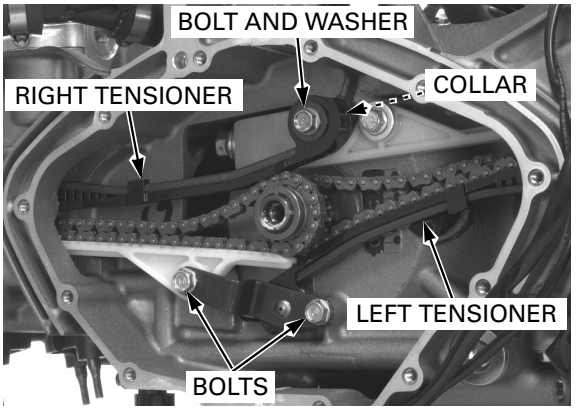
– cam chains
– cam chain guides
– left chain guide washer bolt

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



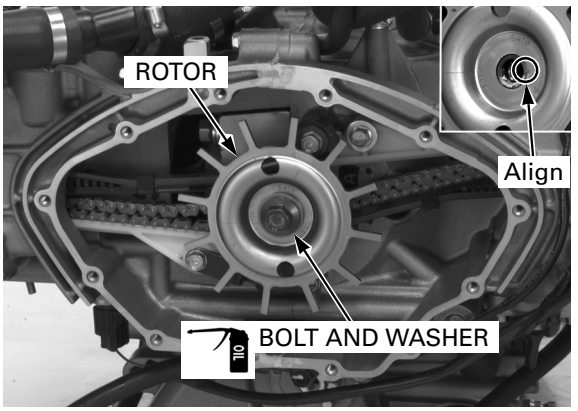
– left cam chain tensioner with two bolts
– right cam chain tensioner and collar (with the flange side facing the crankcase) with the pivot bolt and washer

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



– ignition pulse generator rotor (aligning the groove with the key)
– washer and bolt (apply engine oil to the threads and seating surface)

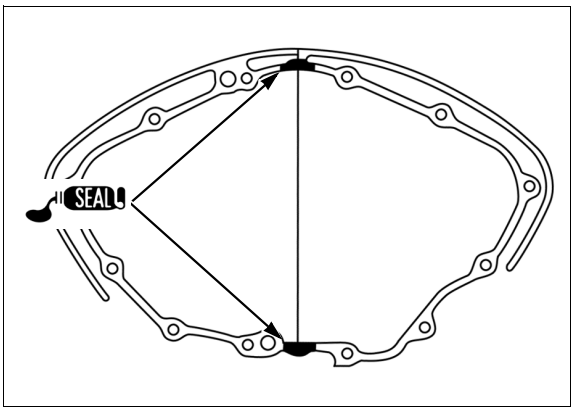
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



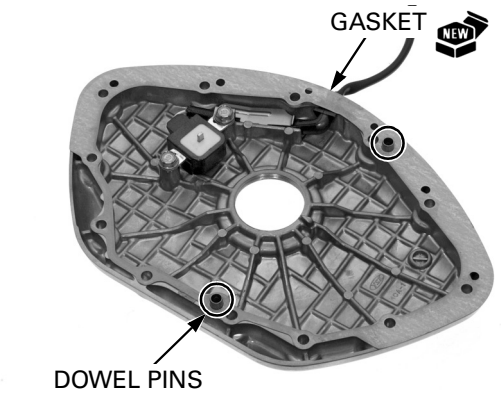
Clean the gasket mating surfaces of the crankcase and cover thoroughly, being careful not to damage them.

Route the pulse generator wire into the frame properly (page 1-22).

Apply liquid sealant to the mating areas of the crankcase as shown.

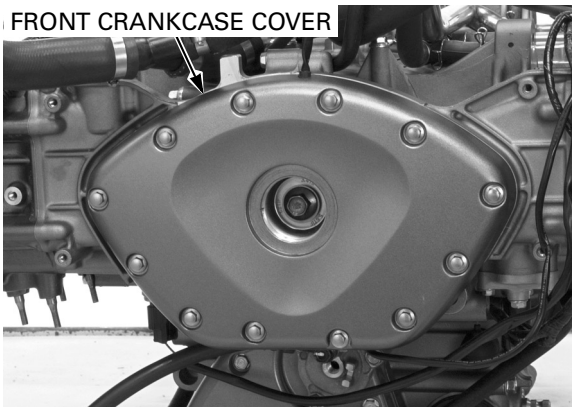


Install the following:
– two dowel pins
– new gasket

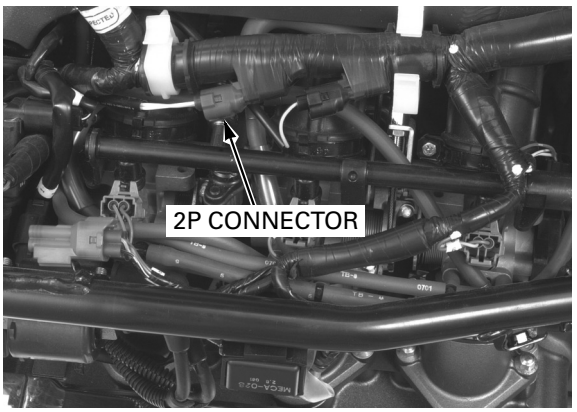


– front crankcase cover
– twelve bolts

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



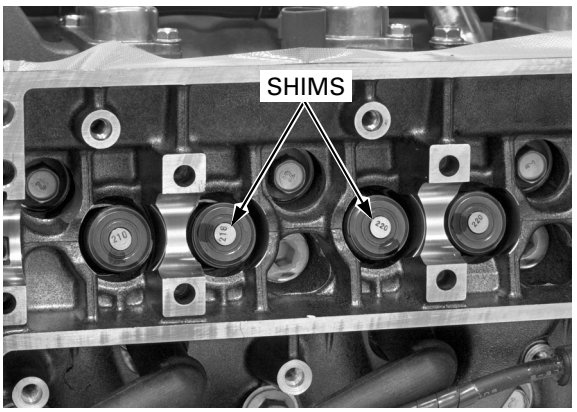
– ignition pulse generator 2P (red) connector
– left front inner cover (page 3-4)
– camshafts (page 9-30)



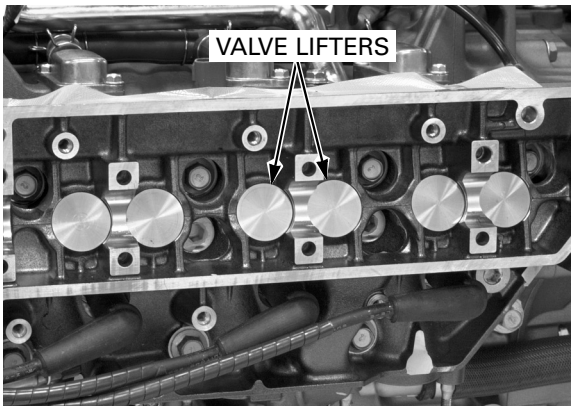
CAMSHAFT INSTALLATION

NOTE:
- When either is serviced, the other cylinder head cover must be removed and the other camshaft position must be checked.

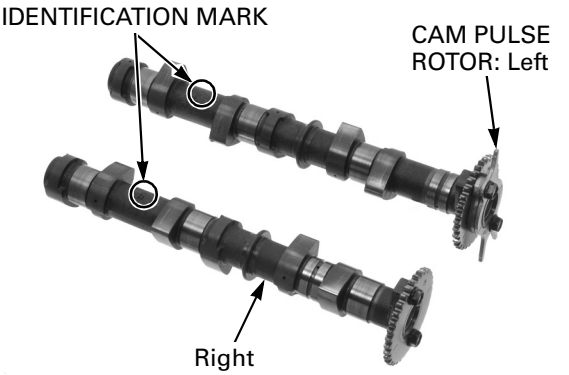
Install the valve shims in their original locations.



Coat the outer surfaces of the valve lifters with molybdenum oil solution.
Install the valve lifters in their original lifter bores, being careful not to damage the sliding surfaces of the lifters and bores.



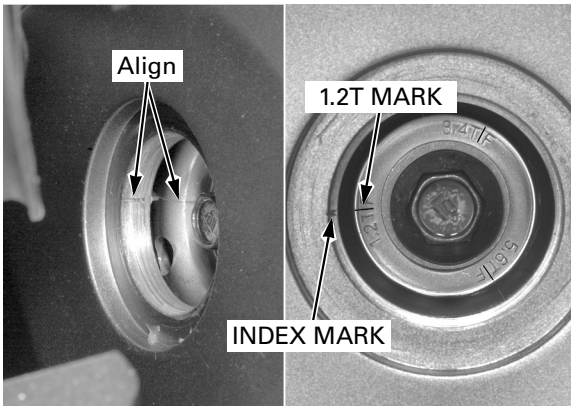
The camshafts have the following identification marks:
L: left cylinder camshaft (installed cam pulse rotor)
R: right cylinder camshaft



Be careful not to jam the cam chain and timing sprocket on the crankshaft when rotating the crankshaft.

Rotate the crankshaft counterclockwise and align the 1.2T mark on the ignition pulse generator rotor with the index mark in the front crankcase cover.

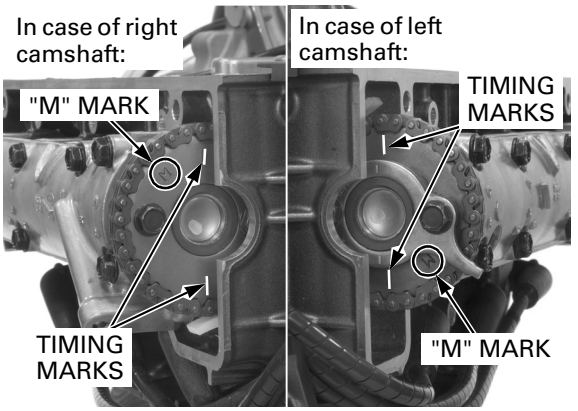
If the other camshaft has not been serviced, remove its cylinder head cover and check the camshaft position as shown in the next step.



NOTE:

- If the crankshaft has not been rotated since the camshaft was removed, it should not be necessary to rotate it (i.e., it should still be in the proper position). However, check the other camshaft's position as described in the next step, to ensure proper camshaft positioning. Then, install the camshaft.

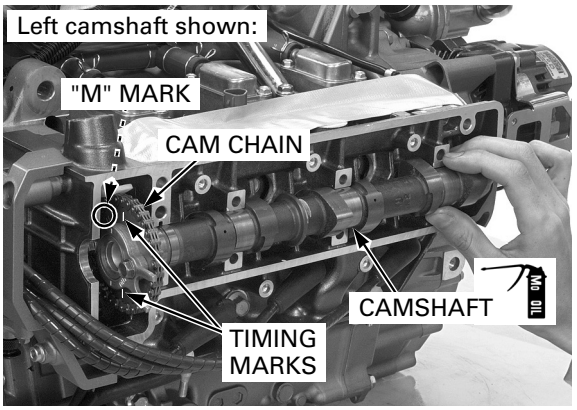
The timing marks on the cam sprocket must be flush with the cylinder head surface and make sure that the index mark "M" is facing out as shown (rear end cam lobe is facing inward).
If the "M" mark is facing in (cannot be seen), rotate the crankshaft counterclockwise 360° (one full turn) and turn the "M" mark so it faces out.

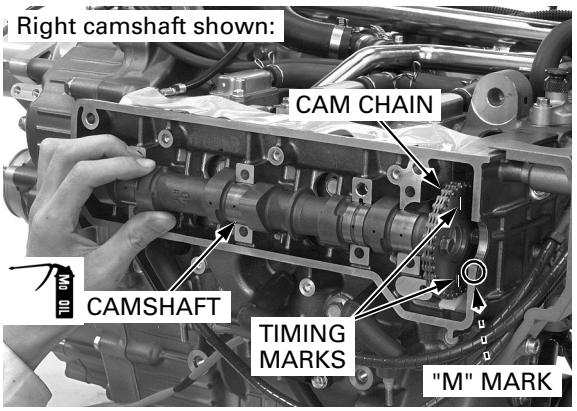


Apply molybdenum oil solution to the camshaft journals, thrust surfaces and cam lobes.

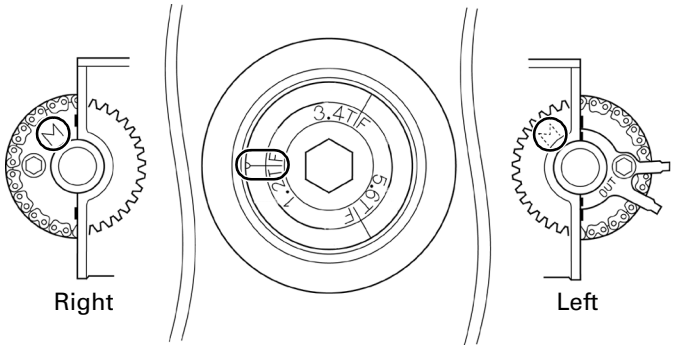
Be careful not to damage the cylinder head and camshaft.

Install the camshaft while installing the cam chain onto the cam sprocket in its proper location so that the timing marks on the sprocket are flush with the cylinder head surface. Make sure the "M" mark is facing in and the rear end cam lobe is facing out.

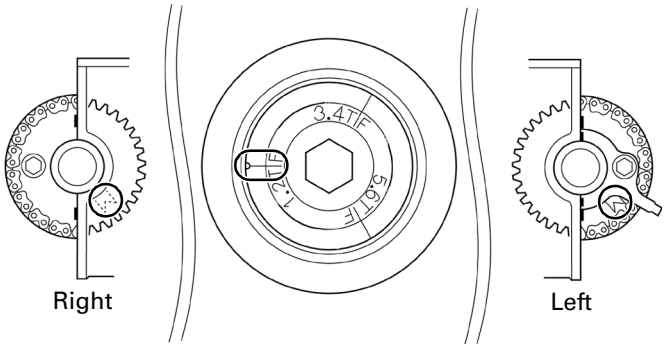




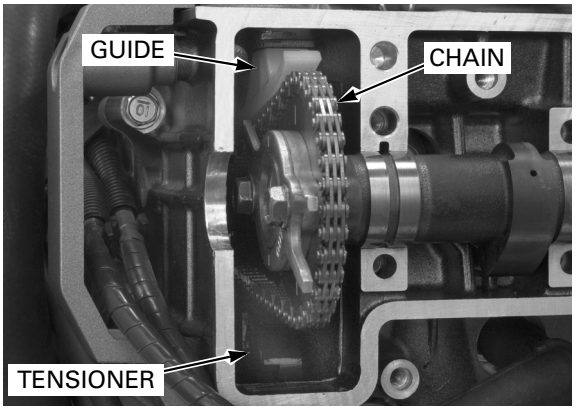
Left camshaft installation:



Right camshaft installation:



Make sure the guide rails of the cam chain tensioner and guide are positioned over the cam chain properly.

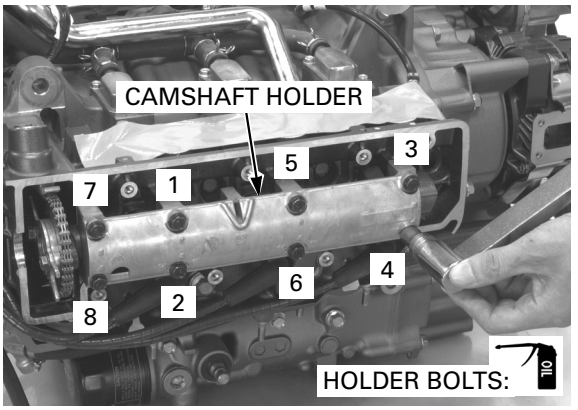


Install the dowel pins and camshaft holder.
Apply oil to the threads and seating surfaces of the camshaft holder bolts and install them.

Tighten the holder bolts in several steps according to the numerical order cast on the camshaft holder (1 thru 8).

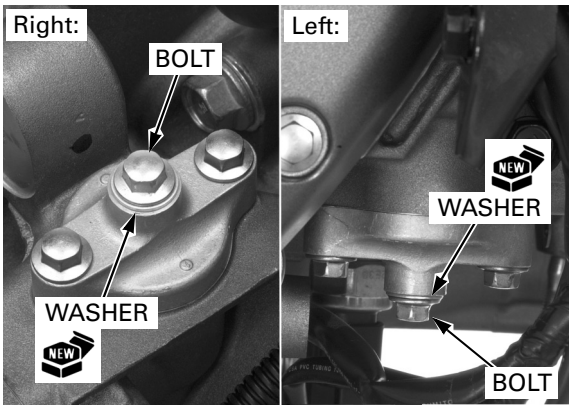
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

The remaining camshaft installation is the same as the procedures described on page 9-31.



Remove the stopper tool from the tensioner lifter.
Install the sealing bolt with a new sealing washer and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



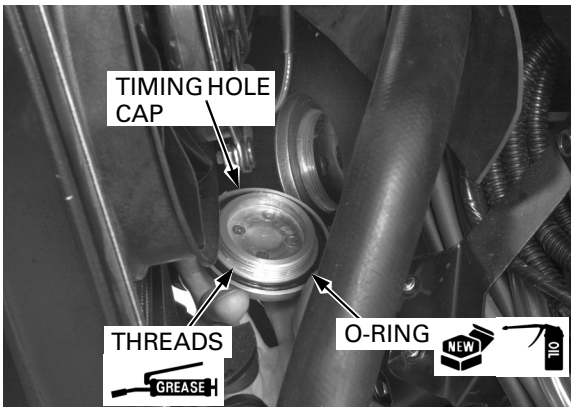
Make sure the timing marks on each cam sprocket are flush with the cylinder head surface when the 1.2T mark on the ignition pulse generator rotor is aligned with the index mark in the front crankcase cover.

Apply grease to the timing hole cap threads and coat a new O-ring with engine oil.

Install the timing hole cap with the O-ring and tighten it.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

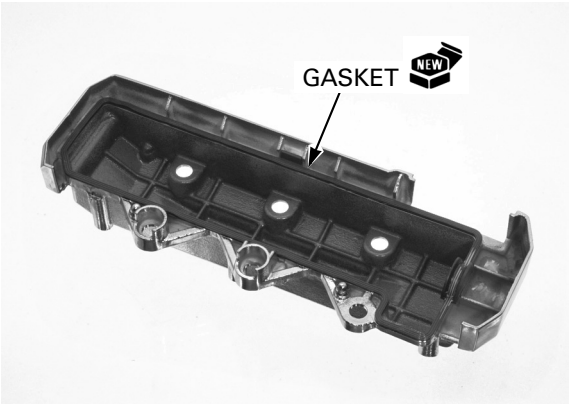
Install the following:
– radiator (page 7-11)
– spark plugs (page 4-7)
– cylinder head cover(s) (page 9-33)



CYLINDER HEAD COVER INSTALLATION

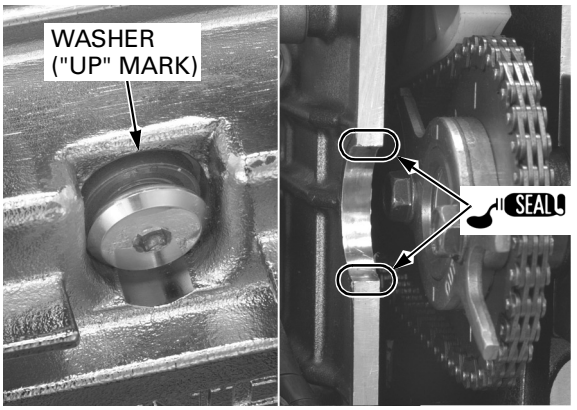
Clean the gasket mating surfaces of the cylinder head and cover thoroughly, being careful not to damage them.

Install a new gasket into the groove in the cylinder head cover.



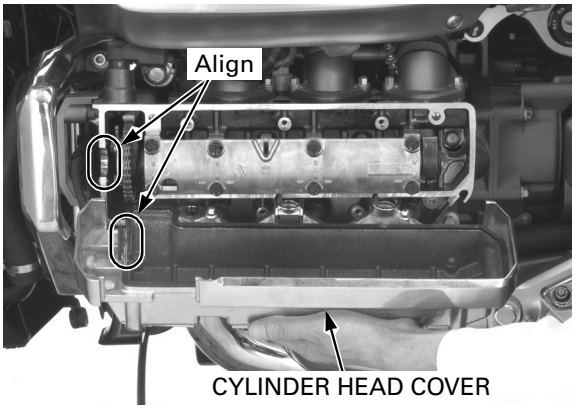
Install the special washers onto the head cover bolts with the "UP" mark facing the bolt head.

Apply sealant to the semi-circular edges of the cylinder head as shown.



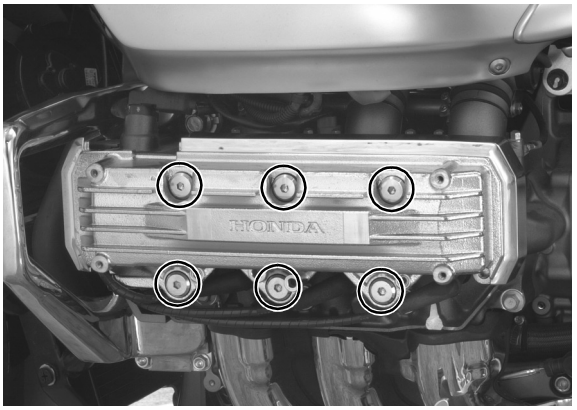
Be careful not to damage the semi-circular area of the gasket.

Install the head cover by aligning the semi-circular areas of the cylinder head and gasket properly, then install the cover bolts (left side: six bolts, right side: five bolts) by aligning them with the bolt holes in the cylinder head.

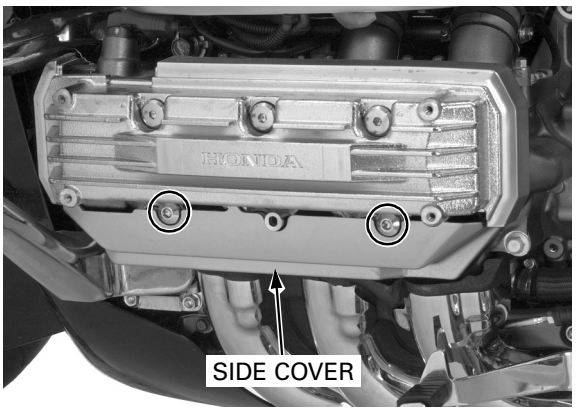


Tighten the head cover bolts in a crisscross pattern in several steps.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

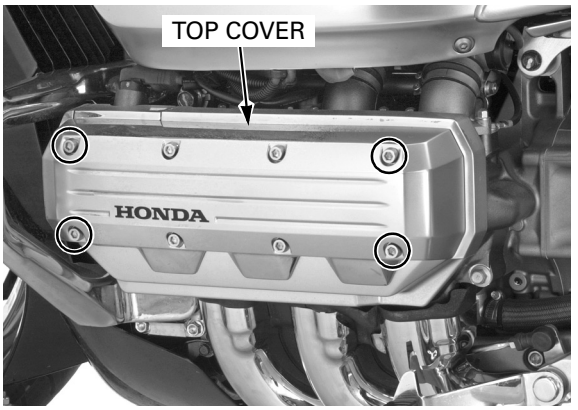


Install the cylinder head side cover and tighten the two bolts.



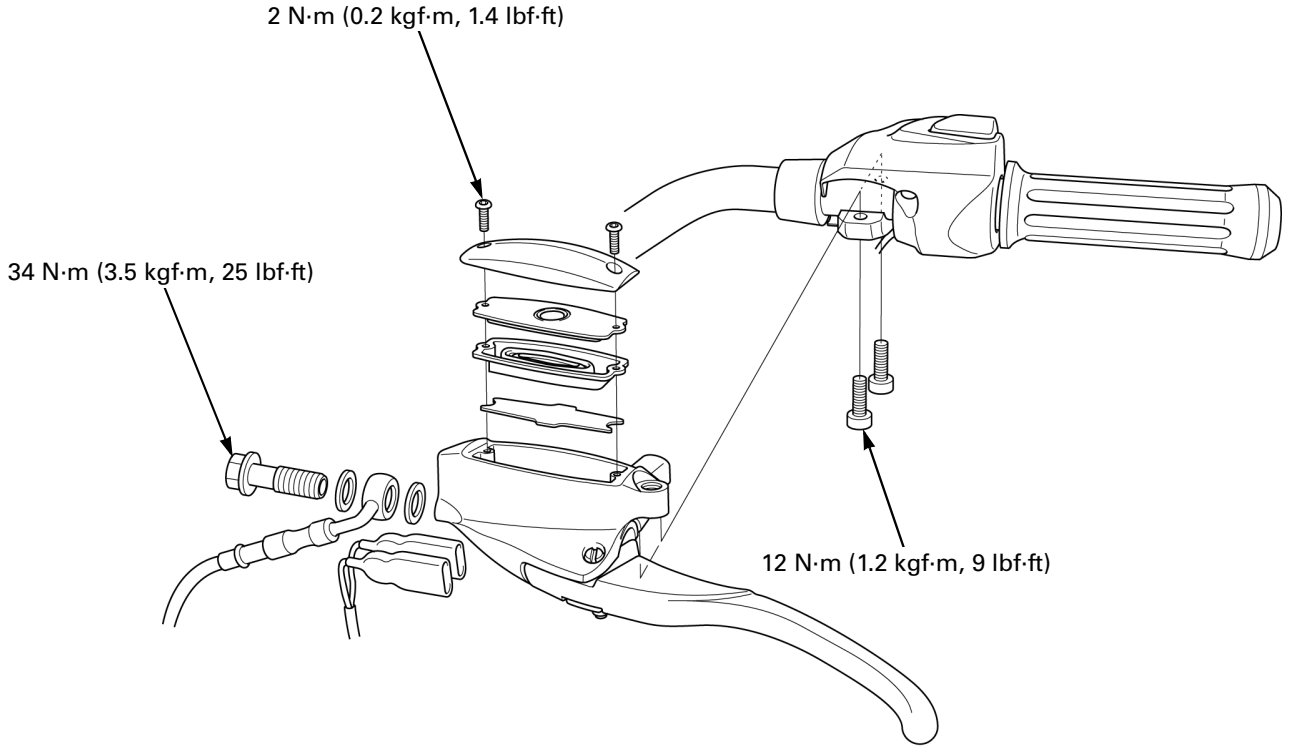
Install the cylinder head top cover and tighten the four bolts. Install the rubber plugs into the socket bolts.

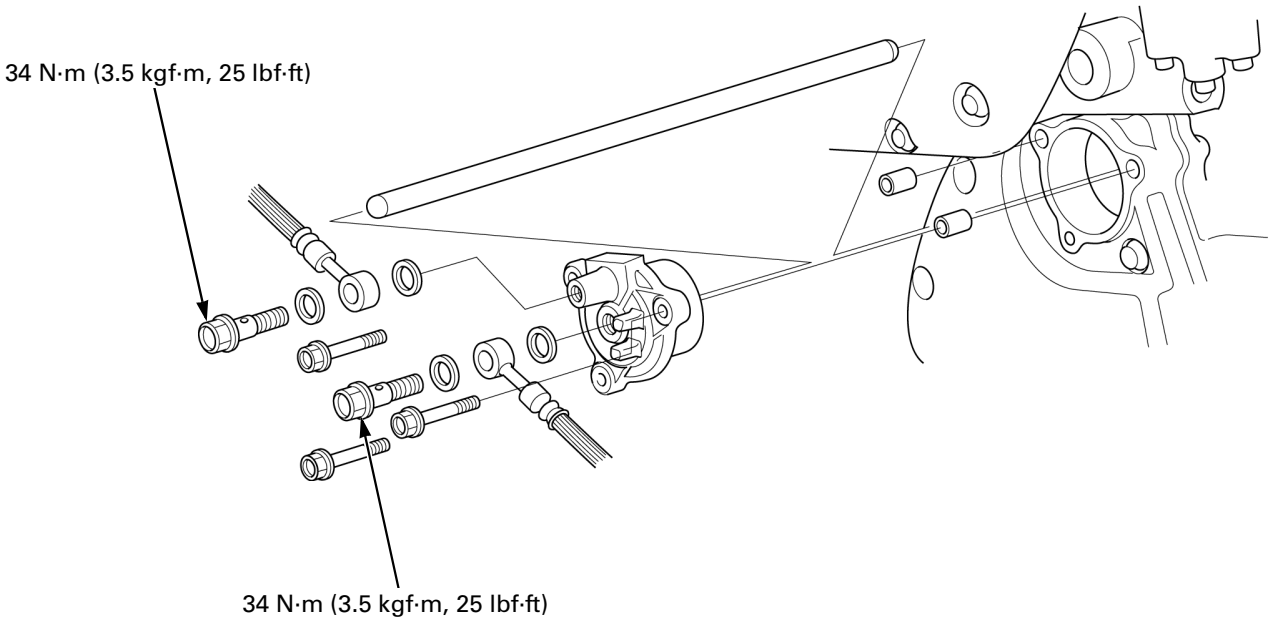
Fill and bleed the cooling system if the cylinder head was removed (page 7-6).

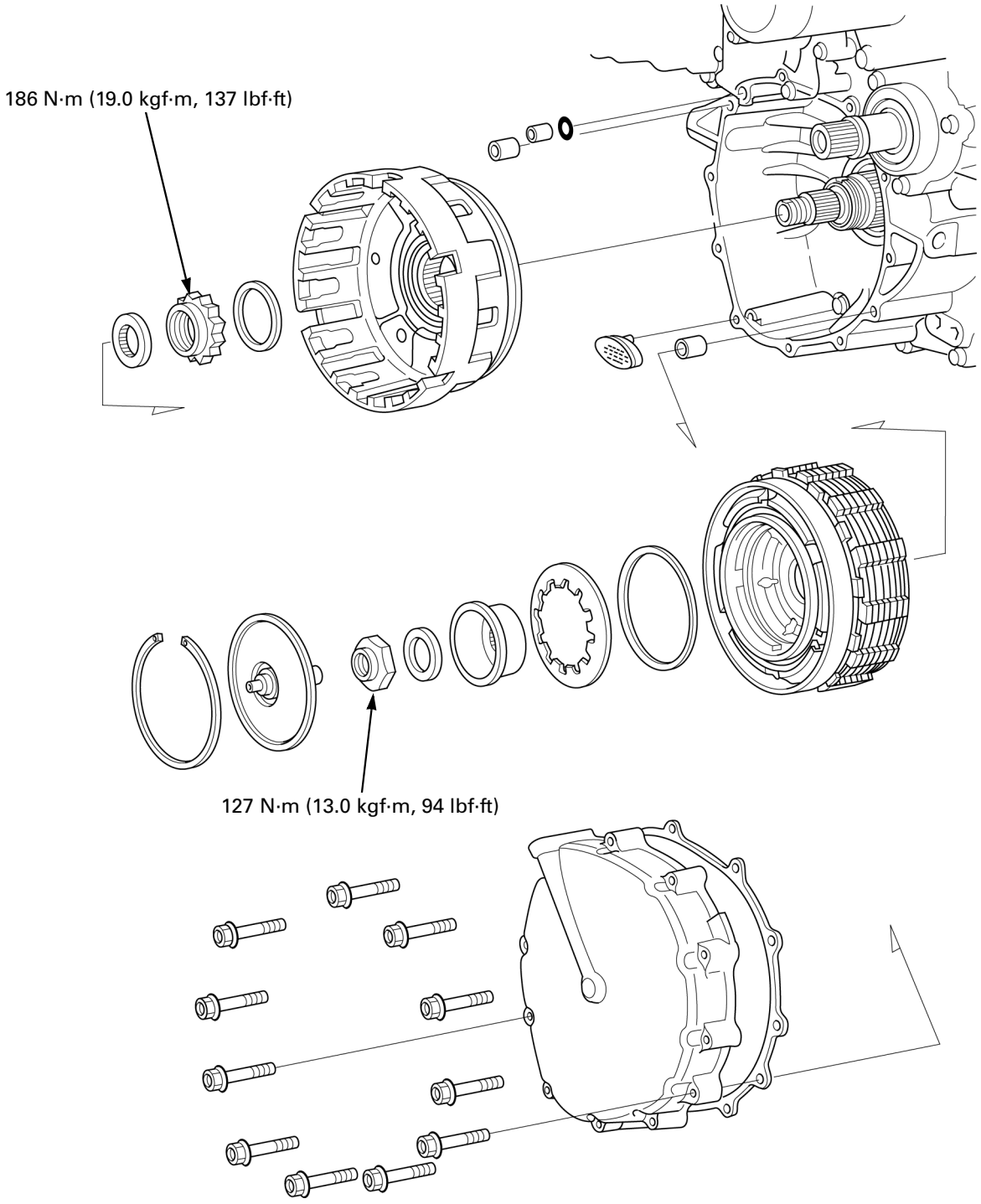


MEMO

SYSTEM COMPONENTS






186 N·m (19.0 kgf·m, 137 lbf·ft)
127 N·m (13.0 kgf·m, 94 lbf·ft)

SERVICE INFORMATION

GENERAL

- The clutch system can be serviced with the engine installed in the frame.
- DOT 4 brake fluid is used for the hydraulic clutch and is referred to as clutch fluid in this section. Do not use other types of fluid as they are not compatible.
- Spilled clutch (brake) fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminants (e.g. dirt, water) to get into an open reservoir.
- Once the hydraulic system has been opened, 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.
- Engine oil viscosity and 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 viscosity and level before servicing the clutch system.

SPECIFICATIONS

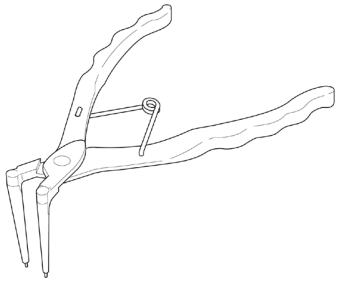
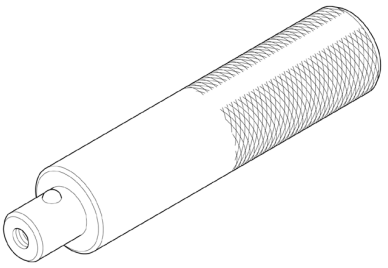
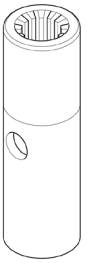
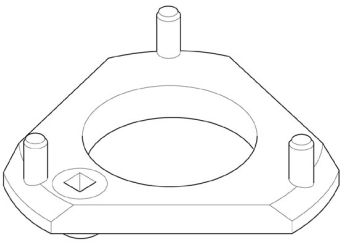
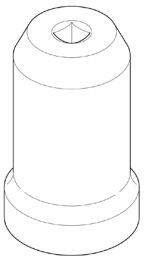
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended clutch fluid		Honda DOT 4 brake fluid	–
Clutch master cylinder	Cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Piston O.D.	13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
Clutch	Clutch spring free height	4.8 (0.19)	4.6 (0.18)
	Lifter spring free height	2.9 (0.11)	2.5 (0.10)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	–	0.30 (0.012)

TORQUE VALUES

Clutch master cylinder reservoir cap screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Clutch slave cylinder bleed valve	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Clutch lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Clutch switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Clutch slave cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Clutch outer lock nut	186 N·m (19.0 kgf·m, 137 lbf·ft)	Apply locking agent to the threads and stake the nut.
Clutch center lock nut	127 N·m (13.0 kgf·m, 94 lbf·ft)	Apply engine oil to the thread and flange surface and stake the nut.

TOOLS

Snap ring pliers 07914-SA50001 	Driver 07749-0010000 	Attachment, 32 x 35 mm 07746-0010100 
Pilot, 17 mm 07746-0040400 	Shaft holder 07PAB-0010200  or 07924-PJ40001 (U.S.A. only)	Clutch outer holder 07JMB-MN50100 
Lock nut wrench, 46 mm 07JMA-MN50100 		

TROUBLESHOOTING

Clutch lever pressure stiff
- Sticking piston
- Clogged hydraulic system

Clutch slips
- Stuck piston
- Clogged hydraulic system
- Worn clutch disc
- Weak clutch spring
- Clutch regulator valve stuck open (section 11)
- Low oil pressure (section 5)

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Air in hydraulic system
- Low clutch fluid level
- Stuck piston
- Leaking hydraulic system
- Warped clutch plates
- Oil level too high, improper oil viscosity or oil additive used

CLUTCH FLUID REPLACEMENT/AIR BLEEDING

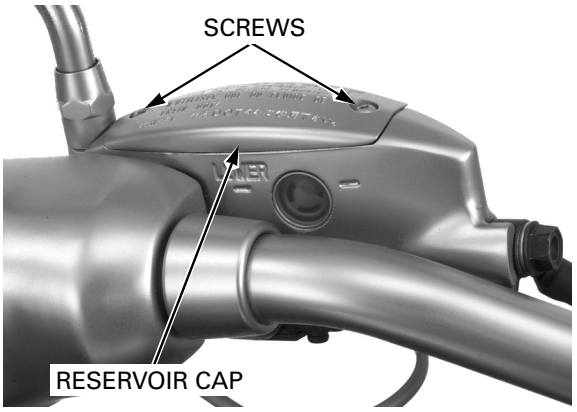
CLUTCH FLUID DRAINING

Remove the right radiator cover (page 3-6).

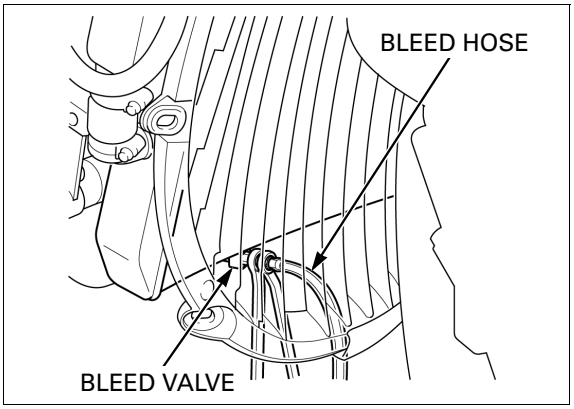
Turn the handlebar to the right until the reservoir is parallel to the ground, before removing the reservoir cap.

Do not allow foreign material to enter the system.

Remove the two screws, reservoir cap, set plate and diaphragm.



Connect a bleed hose to the bleed valve of the clutch slave cylinder.
Loosen the bleed valve and pump the clutch lever until fluid stops flowing out of the bleed valve.



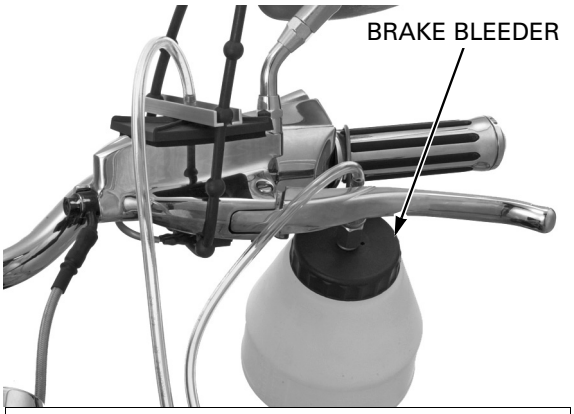
CLUTCH FLUID FILLING/BLEEDING

Close the bleed valve.
Fill the reservoir with Honda DOT 4 Brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve.
Pump the brake bleeder and loosen the bleed valve.
Add brake fluid when the fluid level in the reservoir is low.

NOTE:

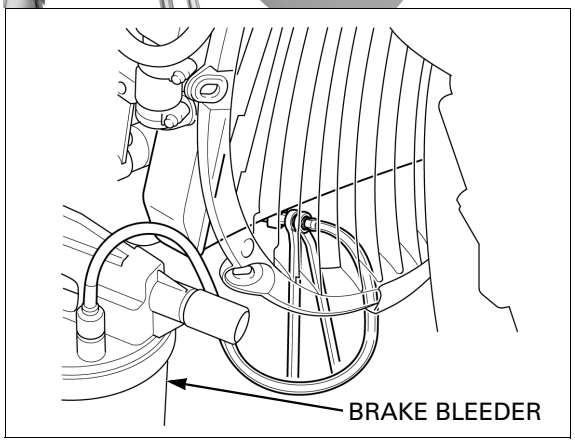
- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Repeat the above procedures until new fluid flows out of the bleed valve and air bubbles do not appear in the plastic hose.

Close the bleed valve.

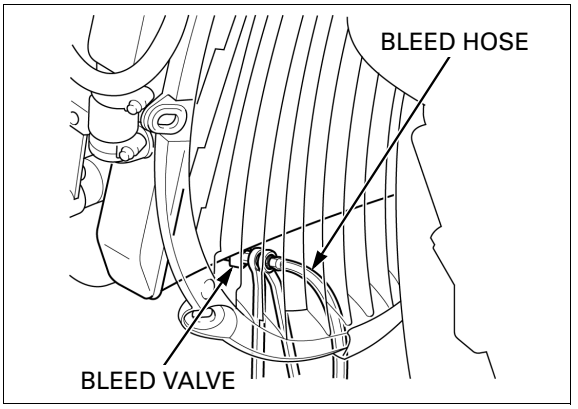


If a brake bleeder is not available, use the following procedure:
Pump the clutch lever until lever resistance is felt.

Connect a bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the clutch lever, open the bleed valve 1/4 of a turn and then close it. Do not release the clutch lever until the bleed valve has been closed.
2. Release the clutch lever slowly and wait several seconds after it reaches the end of its travel.

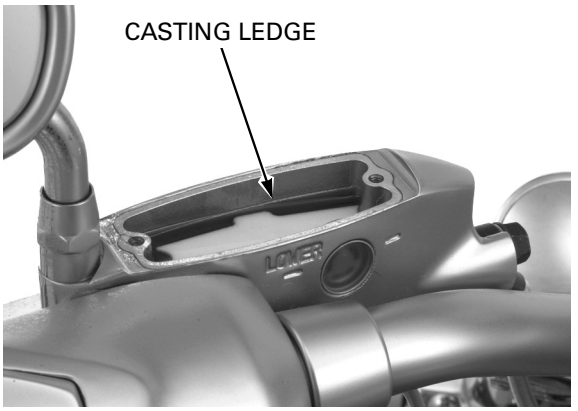
   Repeat steps 1 and 2 until air bubbles do not appear in the bleed hose.



Tighten the bleed valve to the specified torque.

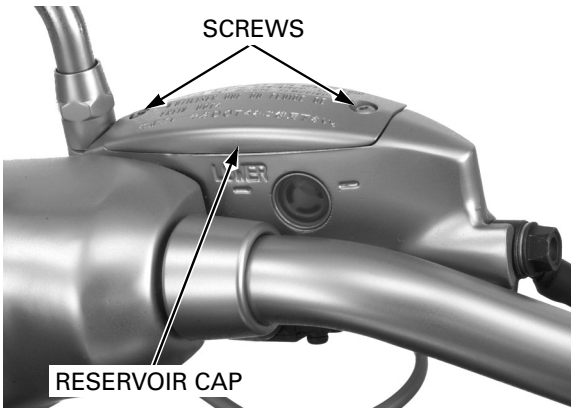
TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)

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



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

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

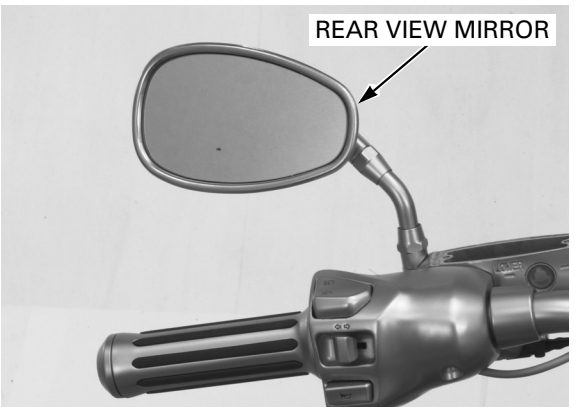


CLUTCH MASTER CYLINDER

DISASSEMBLY

Drain the clutch hydraulic system (page 10-6).

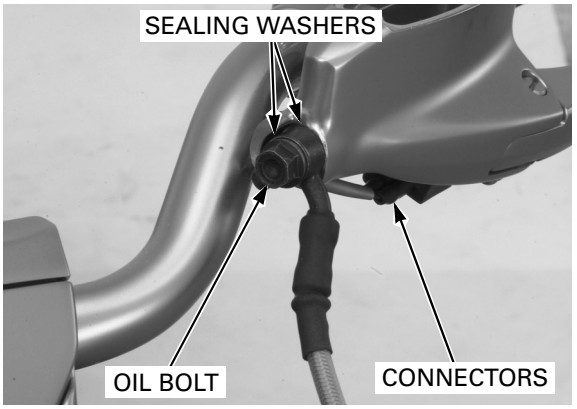
Remove the left rear view mirror.



Disconnect the clutch switch connectors.

When removing the oil bolt, cover the end of the hose to prevent contamination.

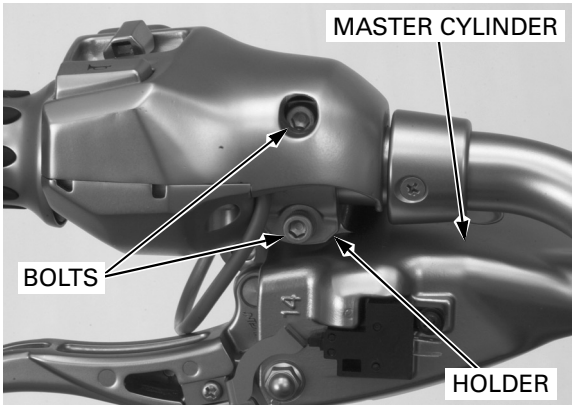
Disconnect the clutch hose from the master cylinder by removing the oil bolt and sealing washers.



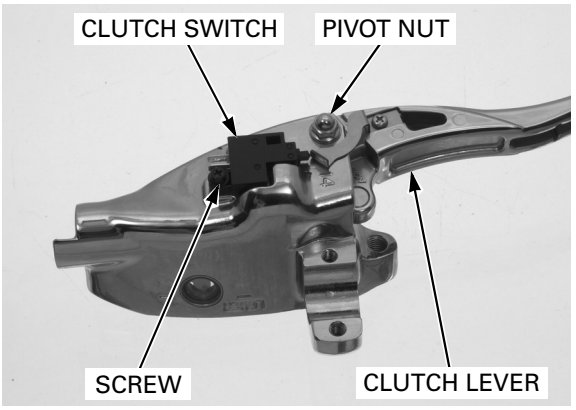
Remove the following:

The master cylinder holder is left in the handlebar switch and cannot be removed.

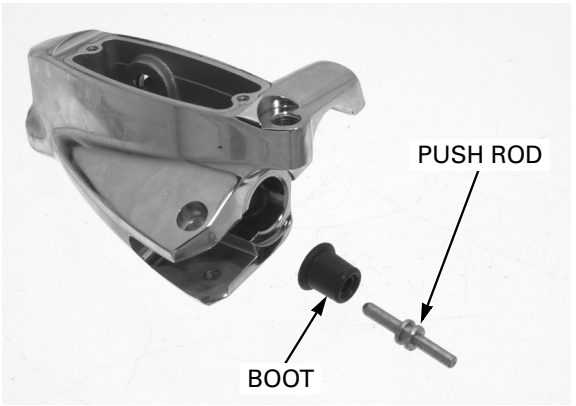
- bolts
- master cylinder



- screw
- clutch switch
- pivot nut
- pivot bolt
- clutch lever

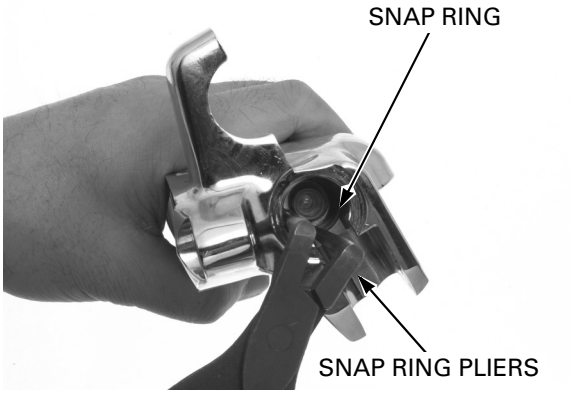


- push rod
- boot



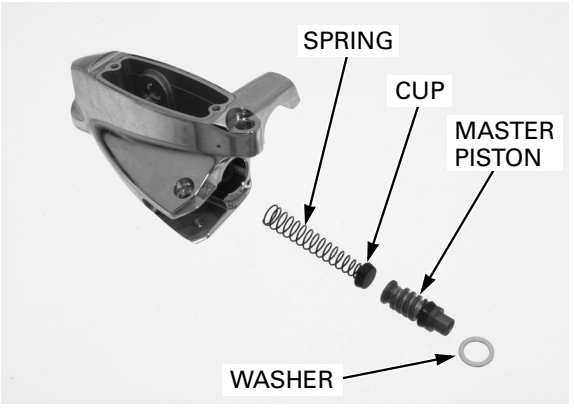
– snap ring using the special tool

TOOL:
Snap ring pliers **07914–SA50001**



– washer
– master piston
– primary cup
– snap ring

Clean the master cylinder and master piston in clean brake fluid.



INSPECTION

Check the piston cups for wear, deterioration or damage.
Check the spring for damage.

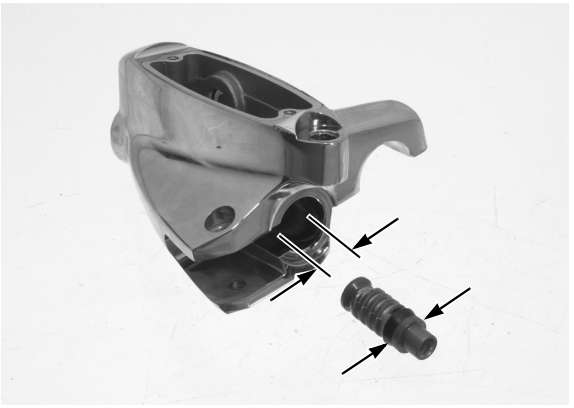
Check the master cylinder and piston for scoring, scratches or damage.

Measure the master cylinder I.D.

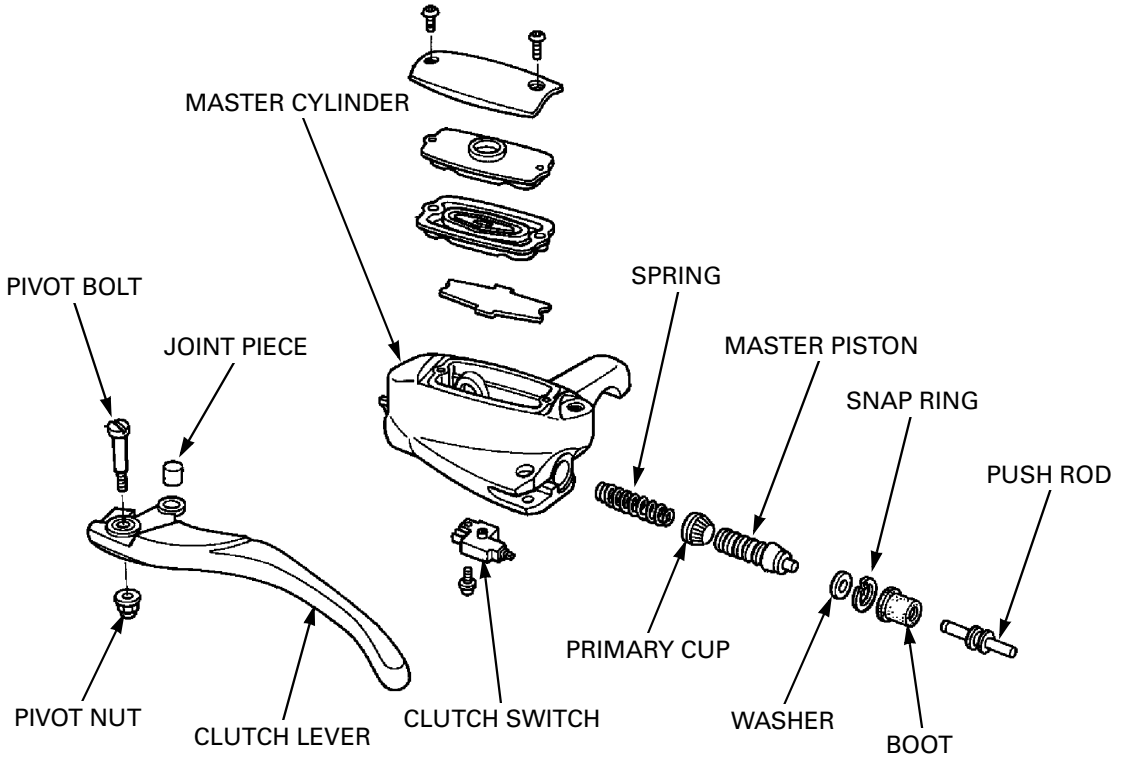
SERVICE LIMIT: 14.055 mm (0.5533 in)

Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)



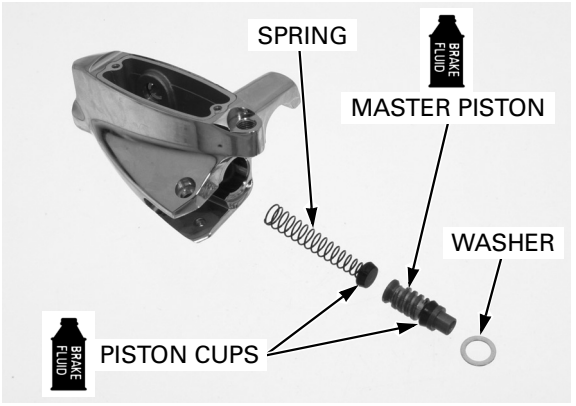
ASSEMBLY



Coat the master piston and piston cups with clean brake fluid.
Install the primary cup onto the spring.

Do not allow the piston cup lips to turn inside out.

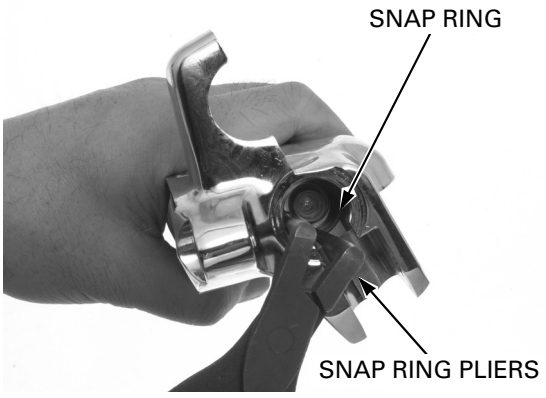
Install the spring, master piston and spring seat into the master cylinder.



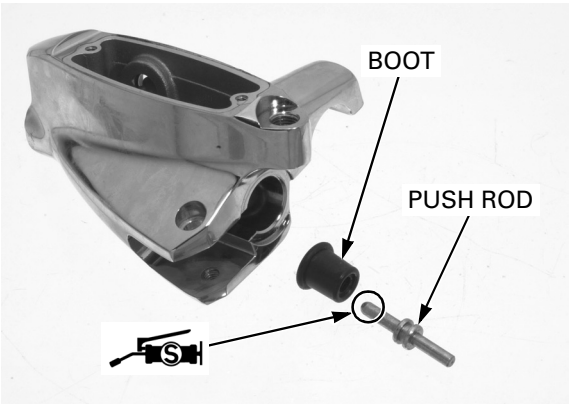
Make sure the snap ring is firmly seated in the groove.

Install the snap ring into the groove in the master cylinder using the special tool.

TOOL:
Snap ring pliers **07914–SA50001**

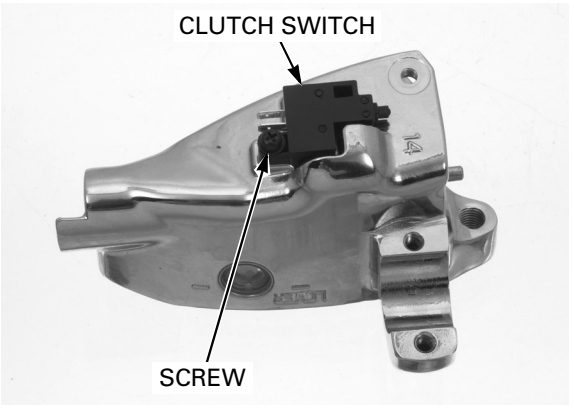


Apply silicone grease to the push rod contacting area of the master piston.
Install the boot onto the push rod groove.
Install the boot and push rod into the master cylinder.

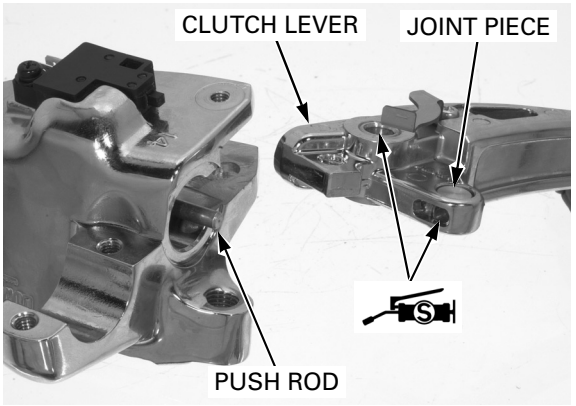


Install the clutch switch with the screw and tighten the screw.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



Apply silicone grease to the push rod hole in the clutch lever joint piece.
Apply silicone grease to the clutch lever pivot.
Insert the push rod into the hole in the joint piece to install the clutch lever assembly onto the master cylinder.

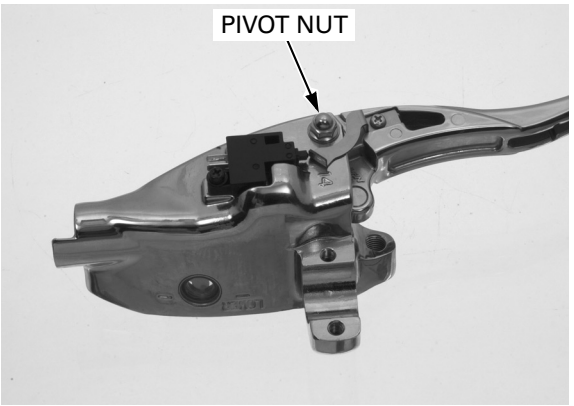


Install and tighten the pivot bolt.

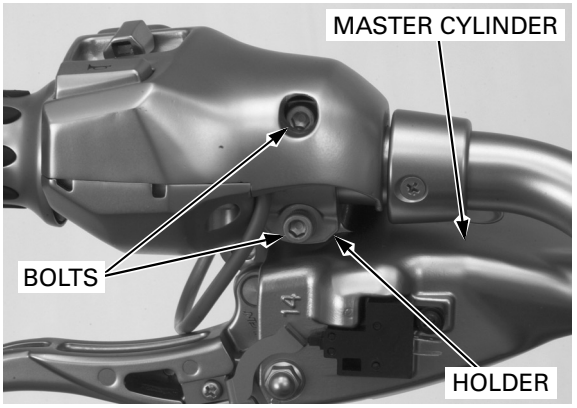
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install and tighten the pivot nut.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



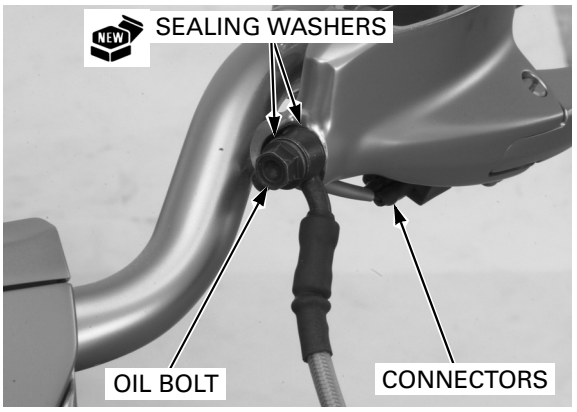
Install the master cylinder on the handlebar and loosely tighten the holder bolts.
Contact the master cylinder to the handlebar switch and tighten the front bolt first, then tighten the rear bolt.



Connect the clutch hose to the master cylinder with the oil bolt and new sealing washers.
Be sure to rest the hose joint pin against the stopper and tighten the oil bolt.

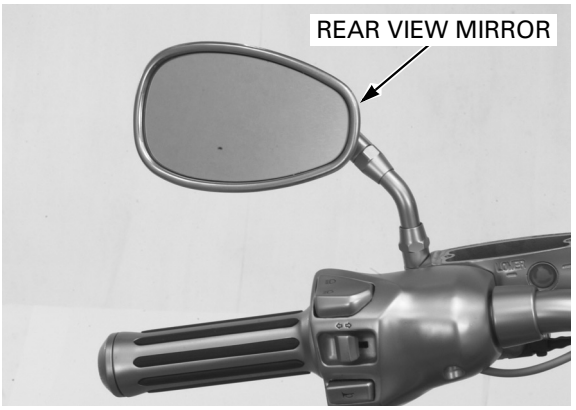
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the clutch switch connectors.



Install the left rear view mirror.

Fill and bleed the clutch hydraulic system (page 10-6).



CLUTCH SLAVE CYLINDER

DISASSEMBLY

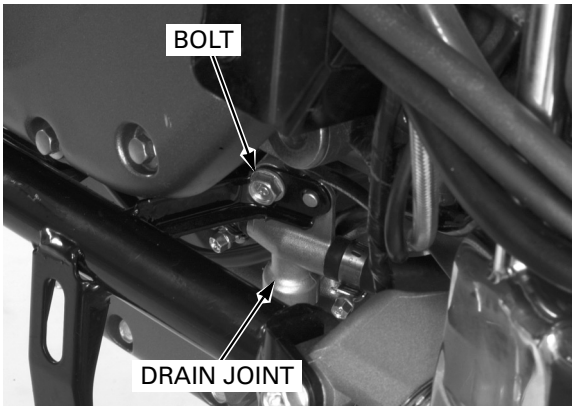
Drain the clutch fluid from the hydraulic system (page 10-6).

Do not disconnect the radiator hoses.

Remove the radiator mounting bolts (page 7-8) and move the radiator forward.

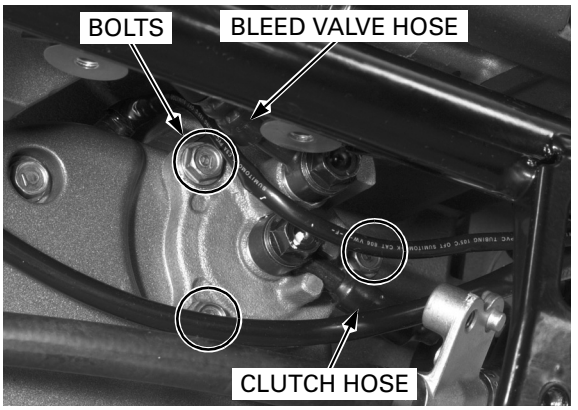
Remove the canister (page 6-61).

Remove the bolt and coolant drain joint from the bracket.

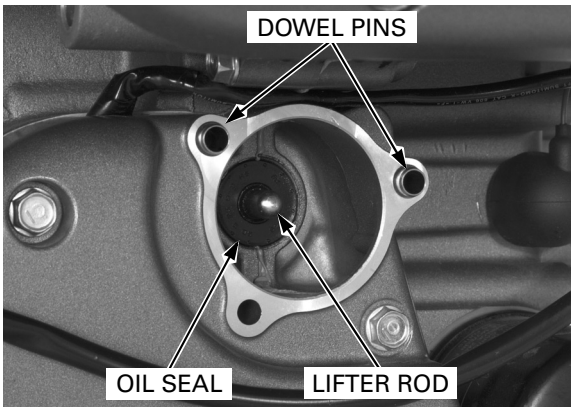


Disconnect the clutch hose and bleed valve hose from the slave cylinder by removing the oil bolts and sealing washers.

Remove the following:
– three mounting bolts
– slave cylinder



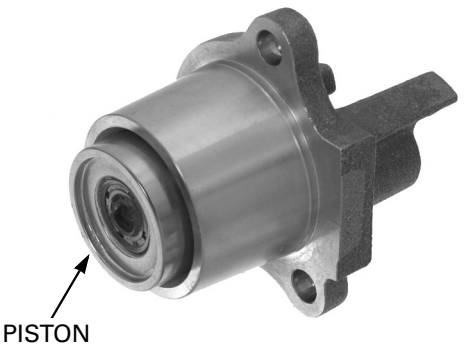
– dowel pins
– lifter rod
– oil seal



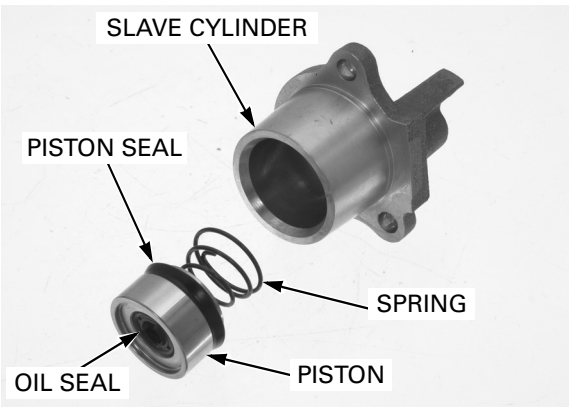
– piston

Do not use high pressure air or bring the nozzle too close to the inlet.

If piston removal is hard, place a shop towel over the piston, position the cylinder body with the piston down and apply small squirts of air pressure to the fluid inlet.



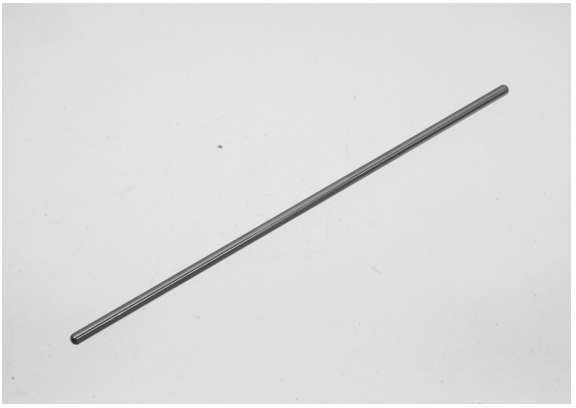
Remove the spring, piston seal and oil seal from the piston.



INSPECTION

Check the piston spring for fatigue or damage.
Check the slave cylinder and piston for scoring or damage.

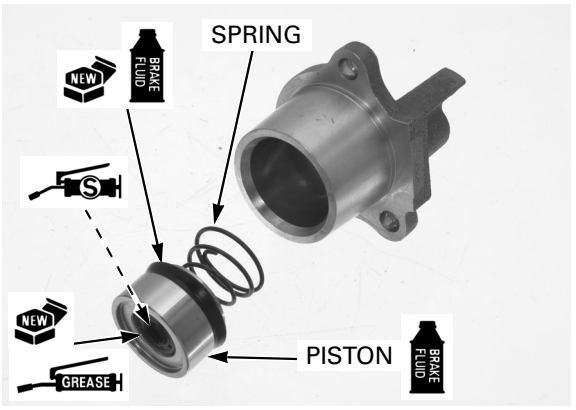
Check the clutch lifter rod for bends or damage.



ASSEMBLY

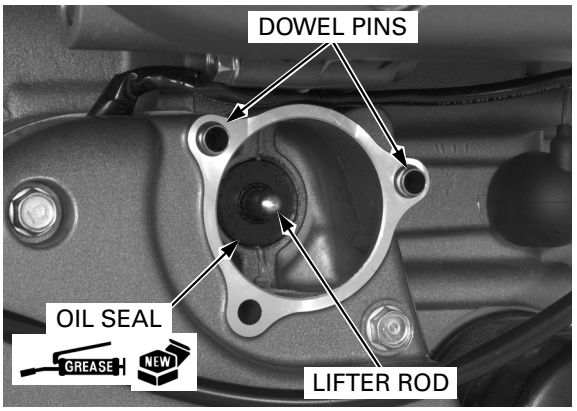
Apply a small amount of silicone grease to the lifter rod contacting area of the piston.
Apply grease to the lips of a new oil seal and install it into the piston.
Install a new piston seal into the piston groove.
Install the piston spring onto the piston.

Coat the piston and piston seal with clutch fluid and install the piston and spring into the slave cylinder.



Apply grease to the lips of a new oil seal and install it into the crankcase.
Install the lifter rod.

Install the dowel pins.

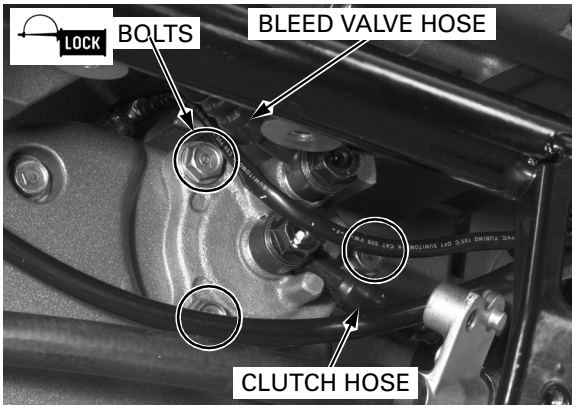


Apply locking agent to the slave cylinder mounting bolt threads.
Install the slave cylinder onto the gearshift linkage cover and tighten the mounting bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the bleed valve hose and clutch hose with the oil bolts and new sealing washers by aligning the hose joint with the groove in the slave cylinder.
Tighten the oil bolt.

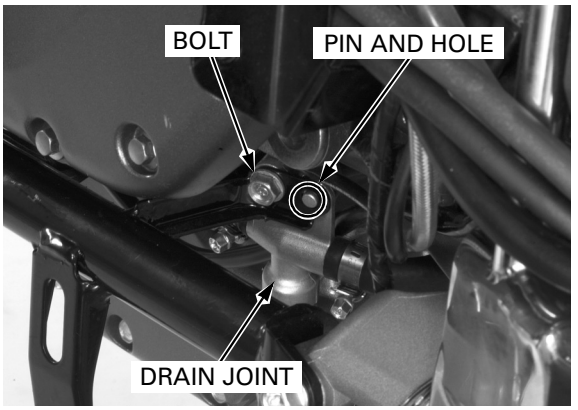
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Install the coolant drain joint onto the bracket by aligning the pin with the hole, and tighten the bolt securely.

Install the canister (page 6-61).
Install the radiator (page 7-11).

Fill and bleed the clutch hydraulic system (page 7-7).



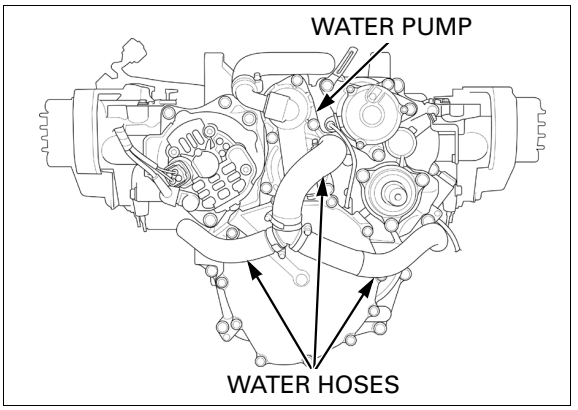
CLUTCH

CLUTCH COVER REMOVAL

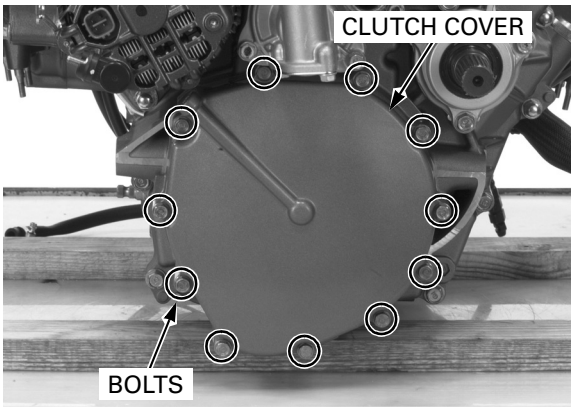
Drain the engine oil (page 4-10).

Remove the following:
– exhaust system (page 3-7)
– alternator (page 17-10)

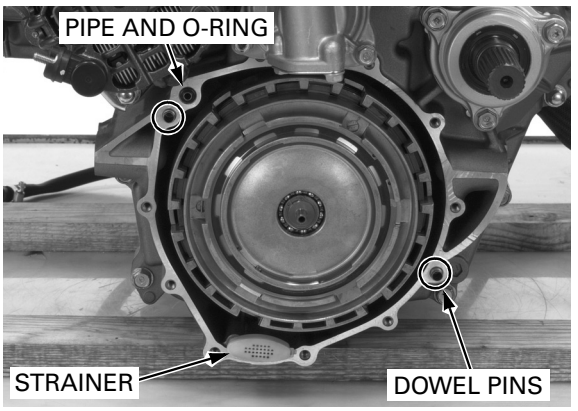
Disconnect the water hoses from the water hose joints and water pump.



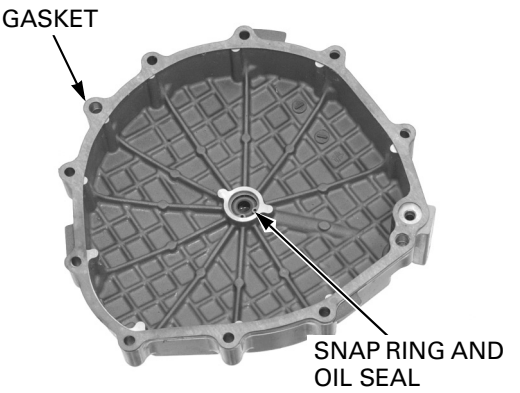
Remove the following:
– eleven bolts and clamp
– clutch cover



– two dowel pins
– oil through pipe and O-ring
– scavenge oil strainer

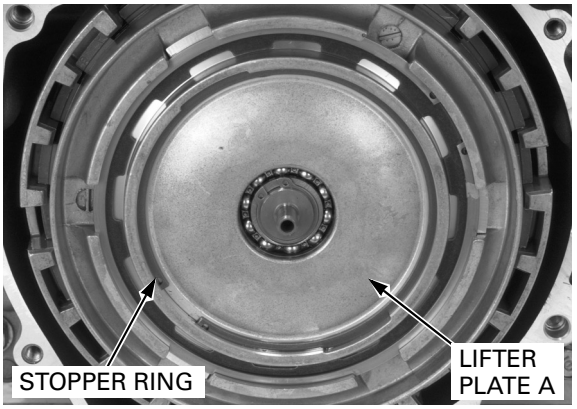


– gasket
– snap ring
– oil seal



CLUTCH DISASSEMBLY

Remove the following:
– stopper ring
– clutch lifter plate A

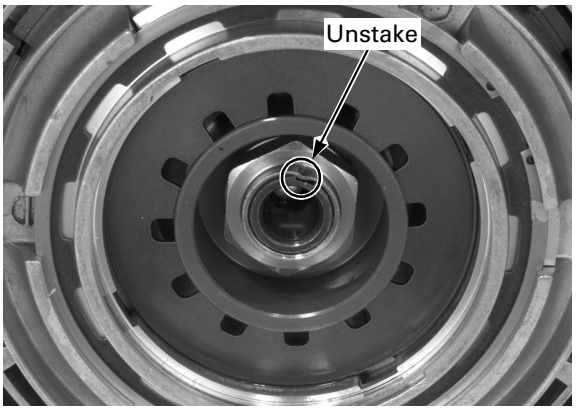


Be careful not to damage the mainshaft threads.

Unstake the clutch center lock nut.

Shift the transmission into any gear except neutral.

Loosen the lock nut while applying the rear brake.

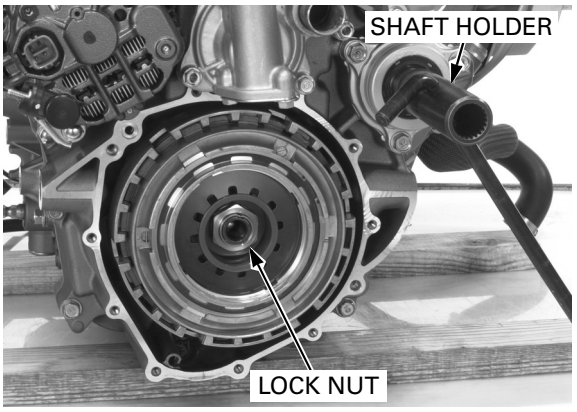


If the engine was removed from the frame, hold the output shaft with the special tool and loosen the lock nut.

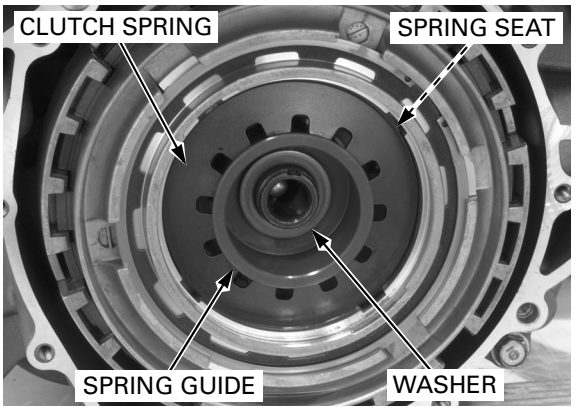
TOOL:

Shaft holder	**07PAB-0010200 or 07924-PJ40001 (U.S.A. only)**

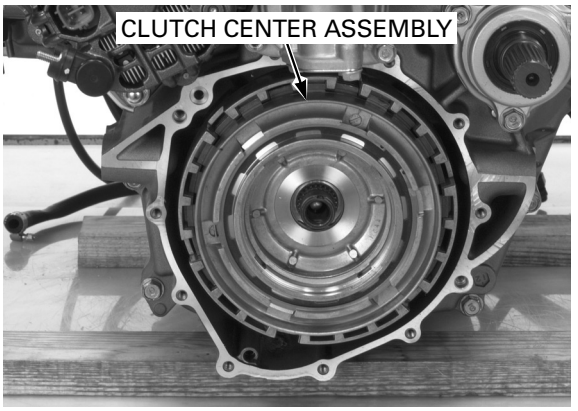
Remove the following:
– lock nut



– lock washer
– spring guide
– clutch spring
– spring seat

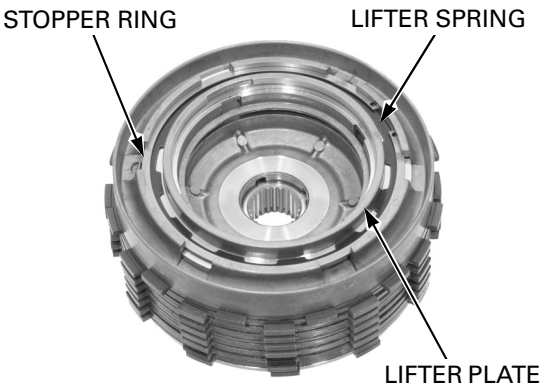


– clutch center assembly from clutch outer

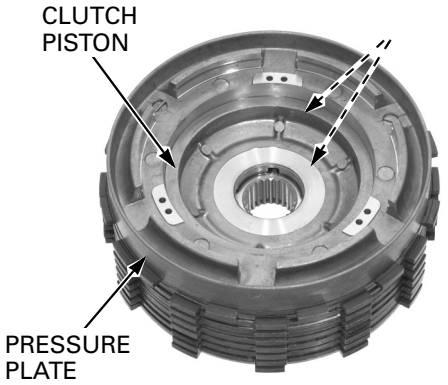


– splined washer

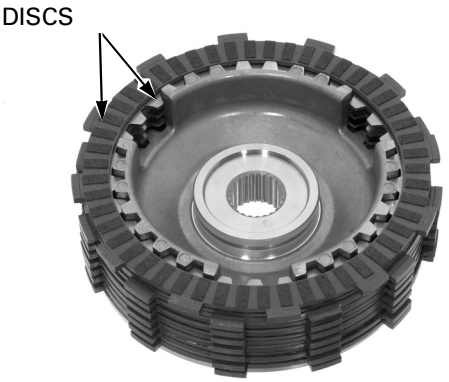
– stopper ring
– lifter spring
– clutch lifter plate B



– pressure plate from clutch center
– O-ring
– clutch piston from pressure plate
– O-ring

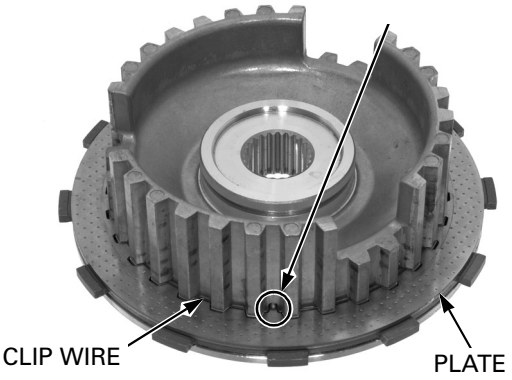


– clutch disc C, six clutch plates and six clutch discs A

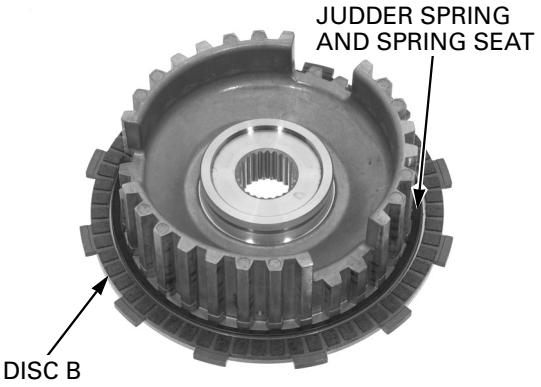


While pressing the clutch plate, push the clip wire ends from the inside of the clutch center to remove them off the wire hole in the clutch center.
Continuously press the clutch plate and remove the clip wire from the clip groove in the clutch center.

Remove the following:
– clutch plate



– clutch disc B
– judder spring
– spring seat



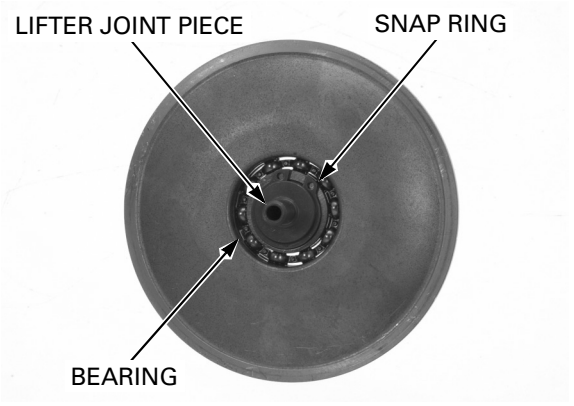
INSPECTION

LIFTER JOINT PIECE, LIFTER BEARING

Check the lifter joint piece for damage or abnormal wear and the oil passages in the joint piece for debris.

Turn the lifter joint piece in the lifter bearing with your finger. The bearing should turn smoothly and quietly.
Also, check that the bearing races fit tightly in the lifter plate and joint piece.
Replace the bearing as follows if the bearing does not turn smoothly, quietly, or if the races fits loosely.

Remove the snap ring and lifter joint piece.



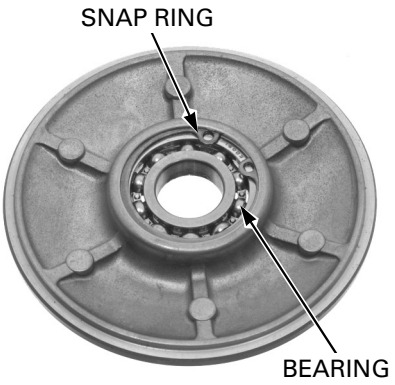
Remove the snap ring and drive the bearing out of the lifter plate.

Drive a new bearing into the plate with its mark side facing up.

TOOL:

Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 17 mm	**07746-0040400**

Install the snap ring into the lifter plate groove securely.
Install the lifter joint piece into the bearing and secure it with the snap ring.

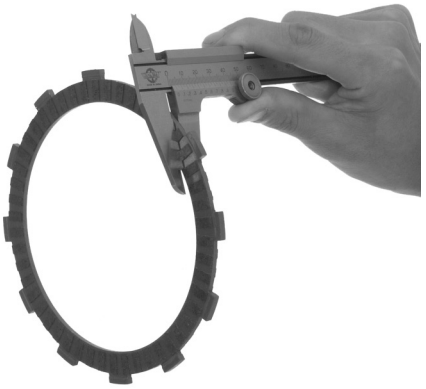


CLUTCH DISC

Replace the clutch discs and plates as a set.

Check the clutch discs for signs of scoring or discoloration.
Measure the clutch disc thickness.

SERVICE LIMIT: 3.5 mm (0.14 in)



CLUTCH PLATE

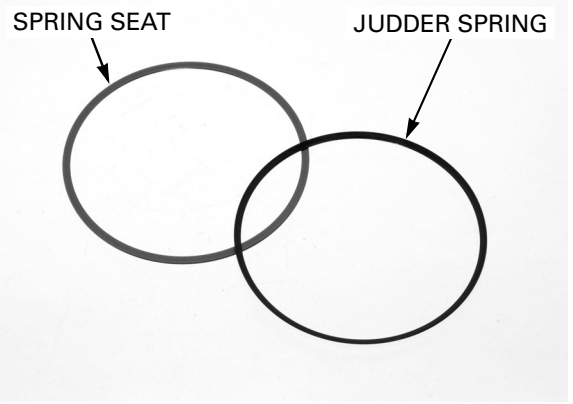
Replace the clutch discs and plates as a set.

Check the plates for discoloration.
Check each disc plate for warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)

JUDDER SPRING, SPRING SEAT

Check the judder spring and spring seat for distortion, wear or damage.



CLUTCH SPRING, LIFTER SPRING

Check the clutch and lifter springs for distortion.
Measure the height of the clutch spring.

SERVICE LIMIT: 4.6 mm (0.18 in)

Measure the height of the lifter spring.

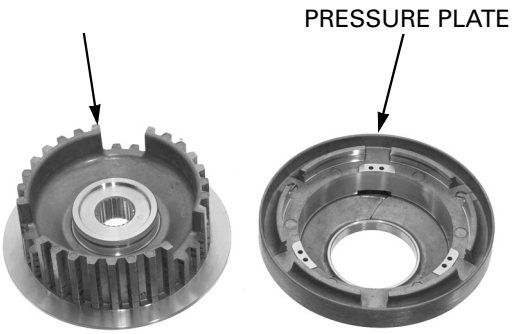
SERVICE LIMIT: 2.5 mm (0.10 in)

CLUTCH CENTER

Check the clutch center for nicks, indentations or abnormal wear made by the plates.

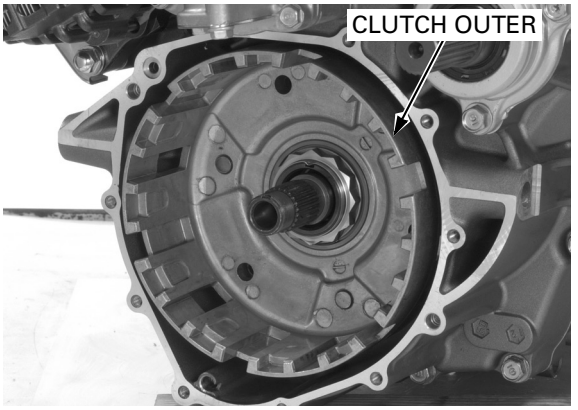
PRESSURE PLATE

Clean the inner side of the pressure plate.
Check the pressure plate for abnormal wear and the oil passages for debris.



CLUTCH OUTER

Check the slots in the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.

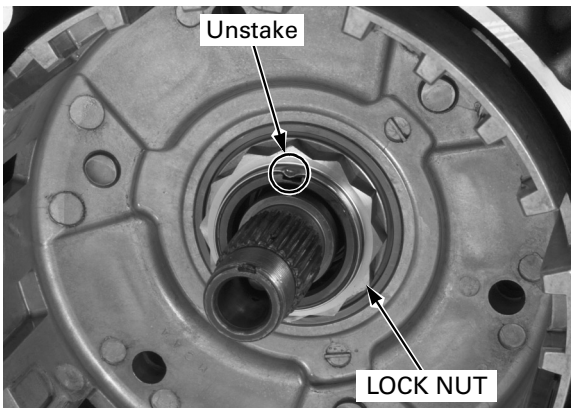


CLUTCH OUTER REMOVAL

Remove the engine from the frame (page 8-5).

Be careful not to damage the primary driven gear boss threads.

Unstake the clutch outer lock nut.

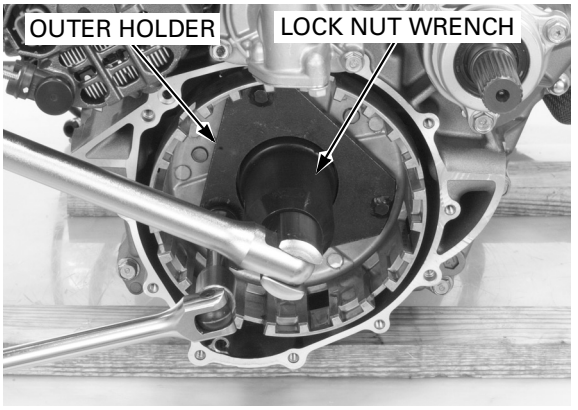


Hold the clutch outer with the special tool and loosen the clutch outer lock nut.

TOOL:

Clutch outer holder	**07JMB-MN50100**
Lock nut wrench, 46 mm	**07JMA-MN50100**

Remove the lock nut.

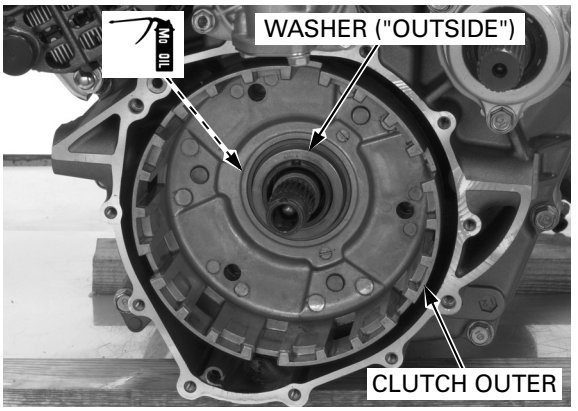


Remove the special washer and clutch outer.

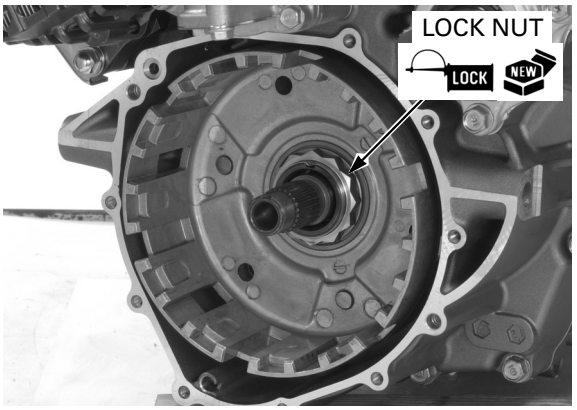
CLUTCH OUTER INSTALLATION

Clean the primary driven gear boss threads thoroughly.

Apply molybdenum oil solution to the friction spring (cone spring) on the reverse side of the clutch outer.
Install the clutch outer and the special washer with the "OUTSIDE" mark facing out.



Apply locking agent to the threads of a new clutch outer lock nut and install it.

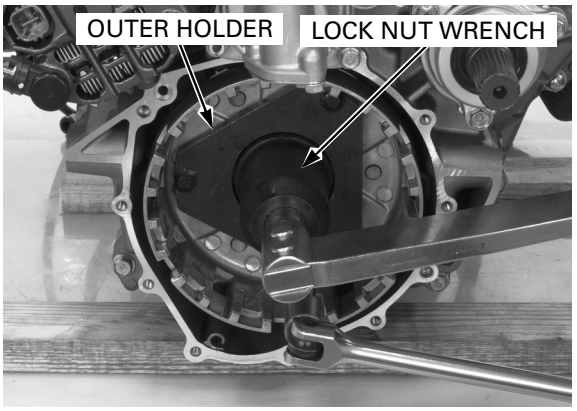


Hold the clutch outer with the special tool and tighten the lock nut.

TOOL:

Clutch outer holder	**07JMB-MN50100**
Lock nut wrench, 46 mm	**07JMA-MN50100**

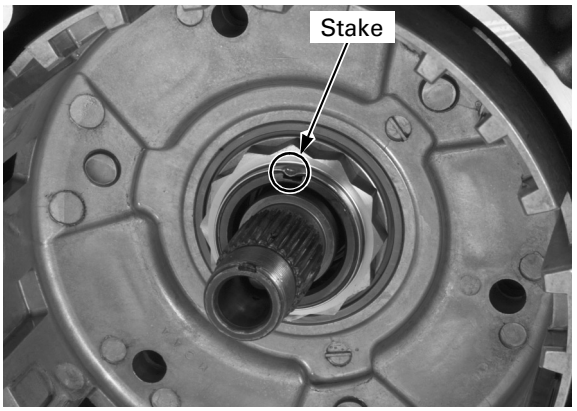
TORQUE: 186 N·m (19.0 kgf·m, 137 lbf·ft)



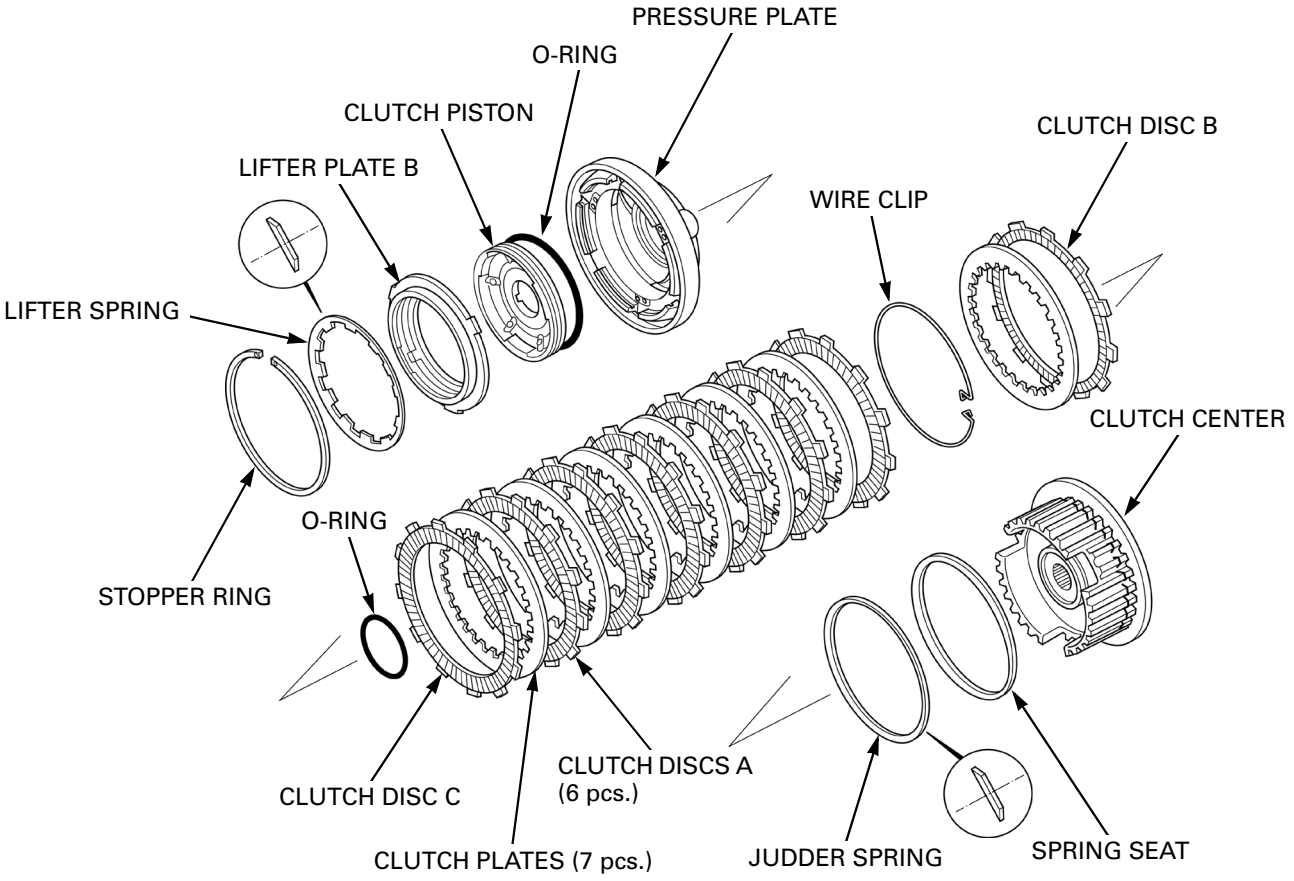
Be careful not to damage the primary driven gear boss threads.

Stake the lock nut into the driven gear boss groove.

Install the engine (page 8-12).

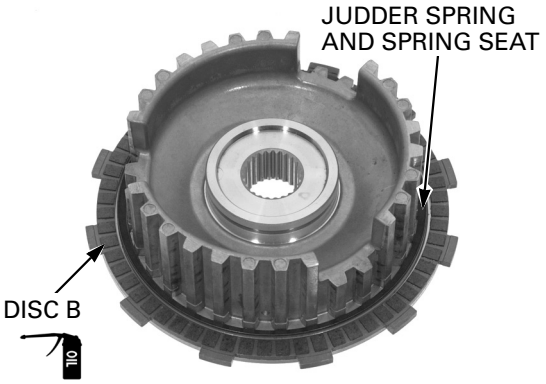


CLUTCH ASSEMBLY



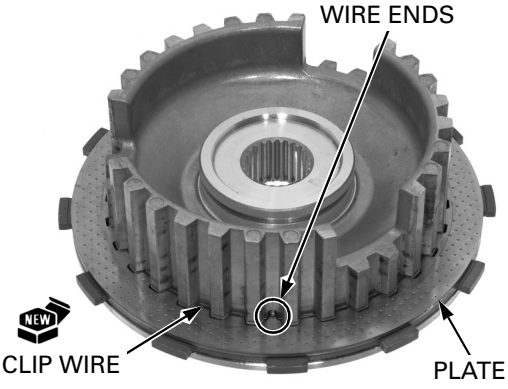
Install the spring seat and the judder spring onto the clutch center with the concaved side of the judder spring facing out.

Coat clutch discs A, B and C with clean engine oil.
Install clutch disc B (blue paint on the tabs).



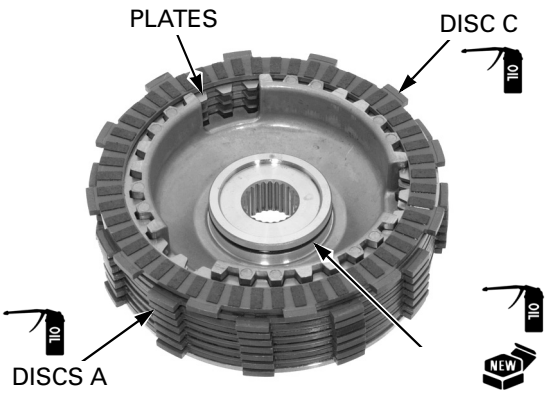
Install the clutch plate.

Install the end of a new clip wire into the hole in the clutch center.
While pressing the clutch plate, set the clip wire into the groove in the clutch center firmly and install the other end into the hole to secure it.

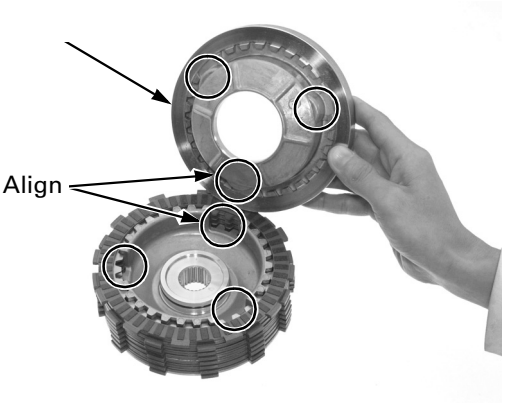


Install six clutch discs A (black paint on the tabs) and six clutch plates alternately, starting with the disc.
Install clutch disc C (green paint on the tabs).

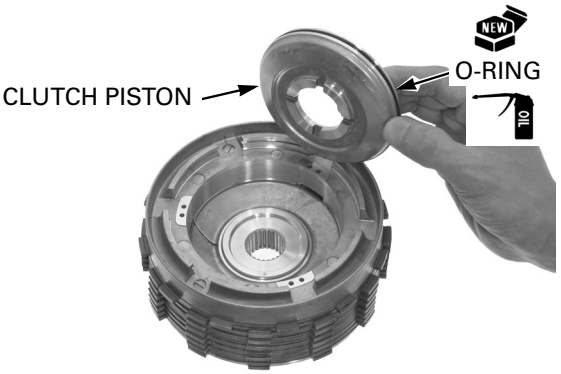
Coat a new O-ring with engine oil and install it into the groove in the clutch center boss.



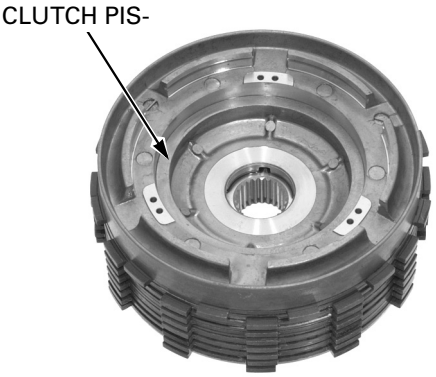
Install the pressure plate by aligning its convex areas with the grooves in the clutch center.



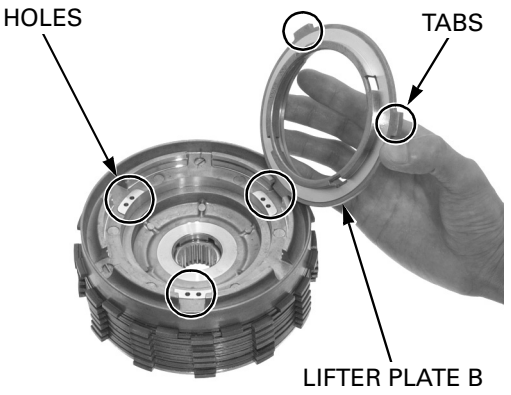
Coat a new O-ring with engine oil and install it into the groove in the clutch piston.



Install the clutch piston evenly until it is fully seated.



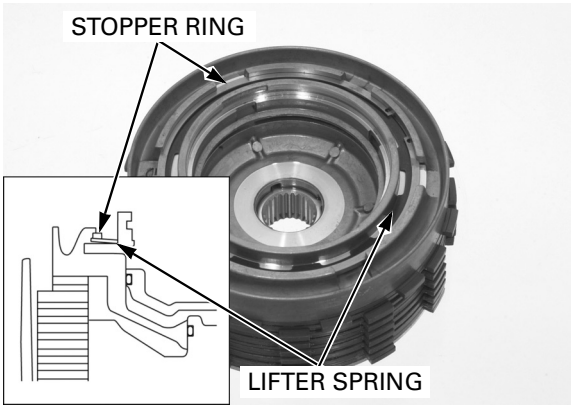
Install lifter plate B by aligning the tabs with the oil holes in the pressure plate.



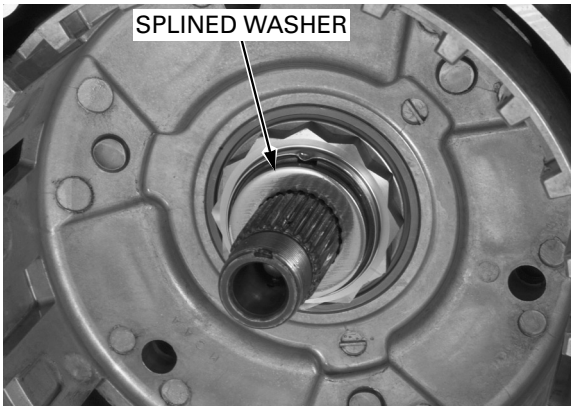
Install the lifter spring with the concaved side facing out.

Make sure the stopper ring is seated securely.

Install the stopper ring into the ring groove in the pressure plate.

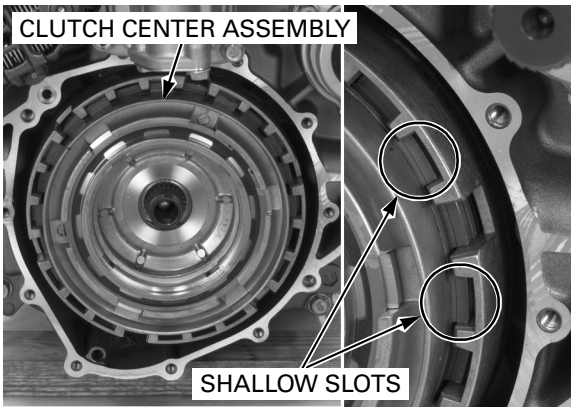


Install the splined washer onto the mainshaft.



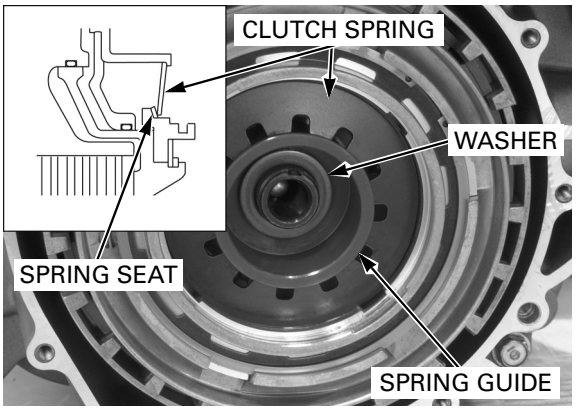
Install the tabs of the outside clutch disc into the shallow slots in the clutch outer.

Line up the disc tabs carefully and install the clutch center assembly by aligning the disc tabs with the slots in the clutch outer.



Install the spring seat with the concaved side facing out.
Install the clutch spring and spring guide with the concaved side of the spring facing in.

Install the lock washer.



Apply engine oil to the threads and seating surface of a new lock nut, and install it.

Shift the transmission into any gear except neutral.

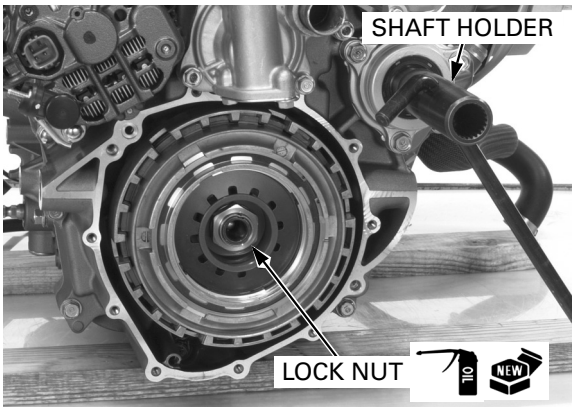
Apply the rear brake and tighten the lock nut.

TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)

If the engine was removed from the frame, hold the output shaft with the special tool and tighten the lock nut.

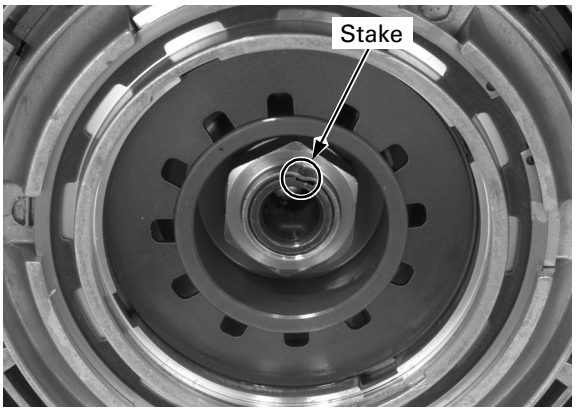
TOOL:

Shaft holder	**07PAB-0010200 or 07924-PJ40001 (U.S.A. only)**

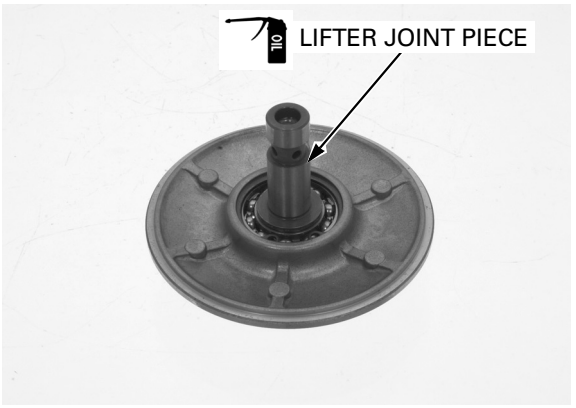


Be careful not to damage the mainshaft threads.

Stake the lock nut into the mainshaft groove.

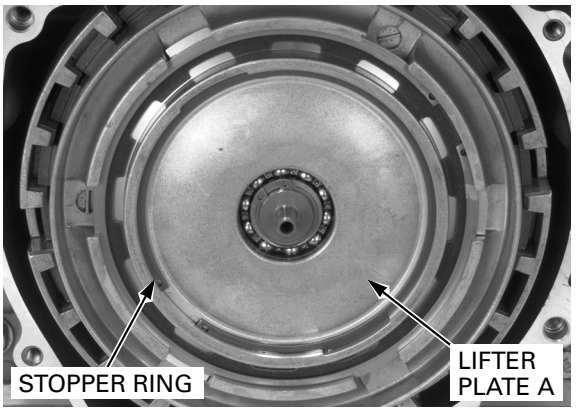


Apply engine oil to the sliding surface of the lifter joint piece.



Make sure the stopper ring is seated securely.

Install lifter plate A and secure it with the stopper ring.



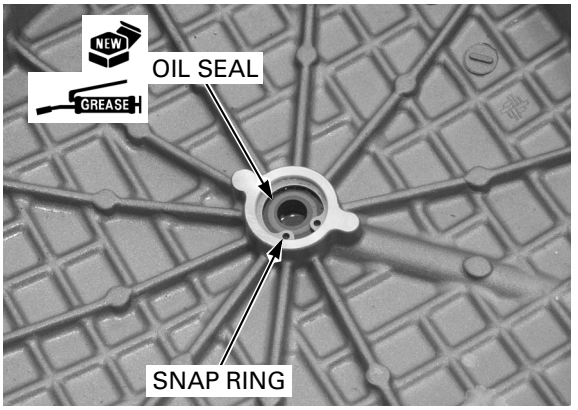
CLUTCH COVER INSTALLATION

Apply grease to the lips of a new lifter joint piece oil seal.
Install the oil seal into the clutch cover with the flat side facing up until the snap ring groove is visible.

TOOL:

Pilot, 17 mm	**07746-0040400**
Driver	**07749-0010000**

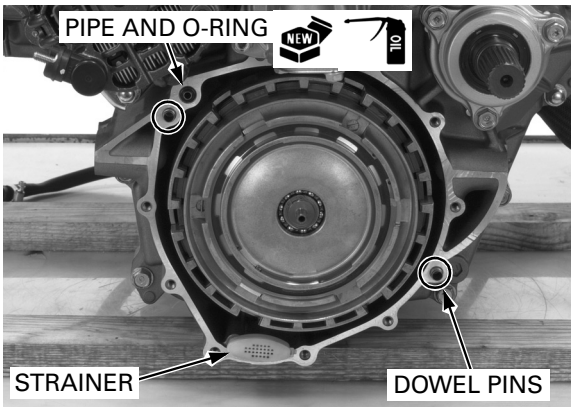
Install the snap ring into the cover groove securely.



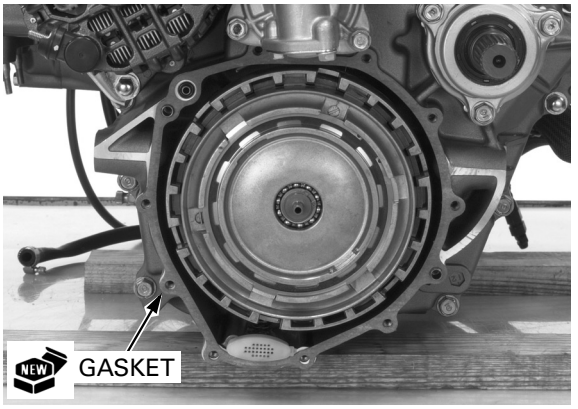
Clean the gasket mating surfaces of the clutch cover and rear crankcase cover thoroughly, being careful not to damage them.

Install the scavenge oil strainer.

Coat a new O-ring with engine oil and install the oil through pipe and O-ring.
Install the two dowel pins.

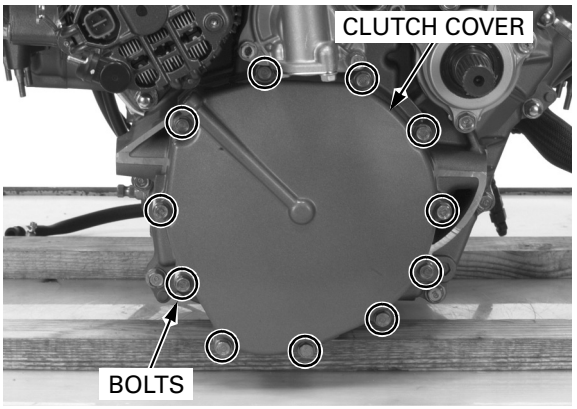


Install a new gasket.



Install the clutch cover, being careful not to damage the oil seal in the cover.

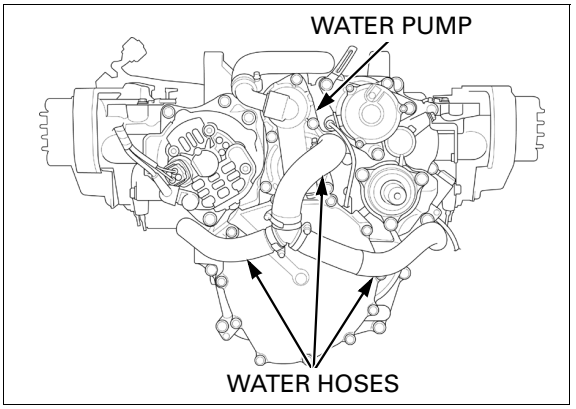
Install the 11 cover bolts with the clamp and tighten them in a crisscross pattern in several steps.



Connect the water hoses to the water hose joints and water pump.

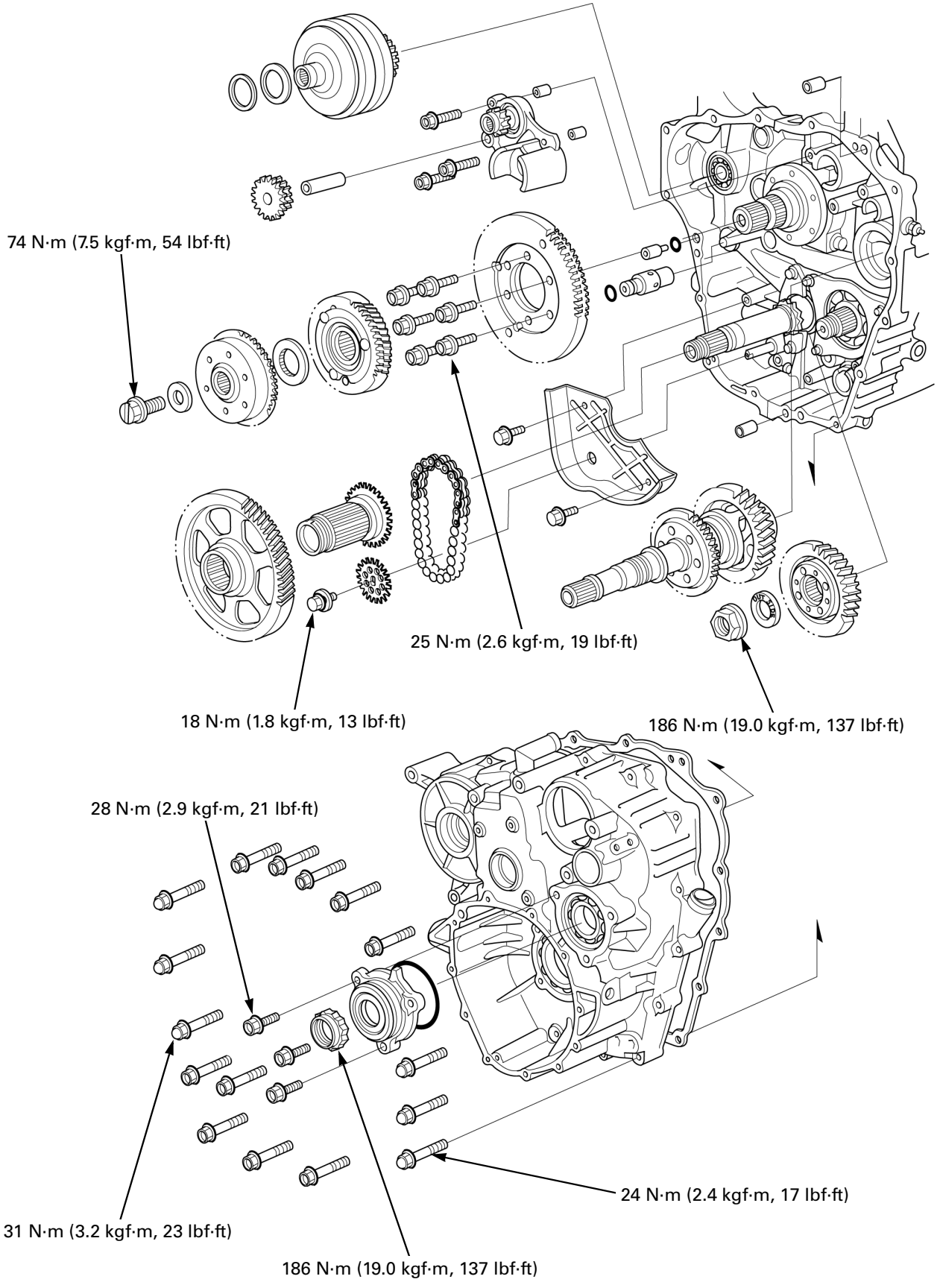
Install the following:
– alternator (page 17-10)
– exhaust system (page 3-8)

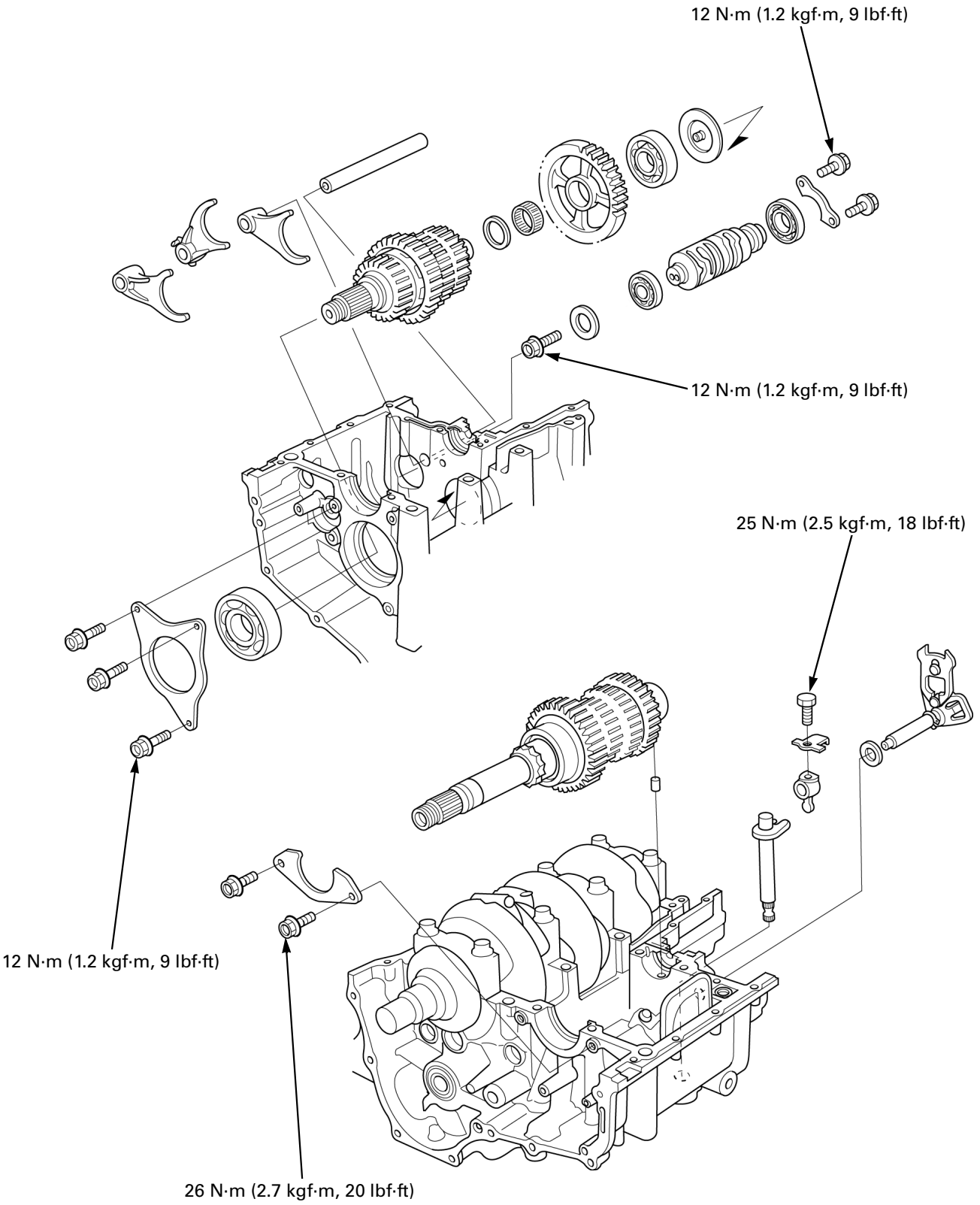
Fill the crankcase with the recommended engine oil (page 4-10).



11. GEARSHIFT LINKAGE/TRANSMISSION

SYSTEM COMPONENTS




12 N·m (1.2 kgf·m, 9 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
25 N·m (2.5 kgf·m, 18 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
26 N·m (2.7 kgf·m, 20 lbf·ft)

SERVICE INFORMATION

GENERAL

- The gearshift linkage can be serviced with the engine installed in the frame with the exception of the gearshift spindle. The engine must be removed from the frame to service the primary gears and output shaft. Refer to section 8 for engine removal and installation.
  The crankcase must be separated to service the transmission (including gearshift spindle). Refer to section 12 for crankcase separation and assembly.
- Be careful not to damage the crankcase mating surfaces when servicing the transmission.
- When using the lock nut wrench for the lock nuts of the output shaft and mainshaft bearing, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not overtighten the lock nut. The specification later in the text gives both actual and indicated.

SPECIFICATIONS

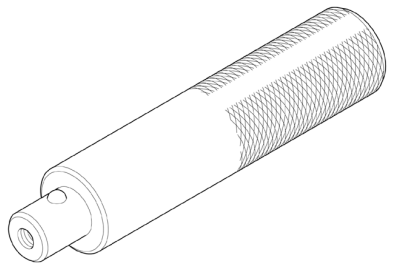
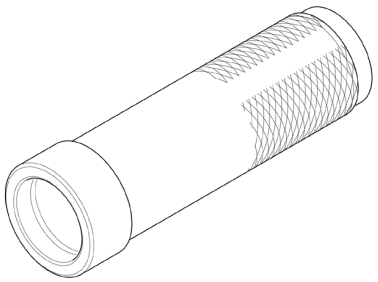
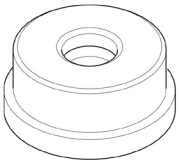
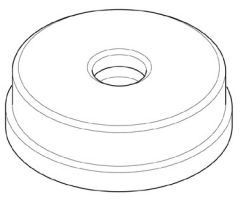
Unit: mm (in)

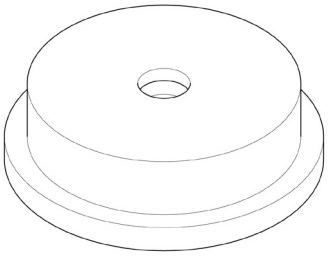
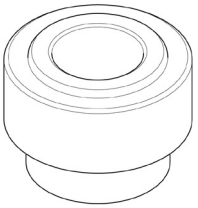
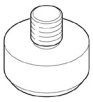
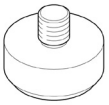
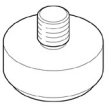
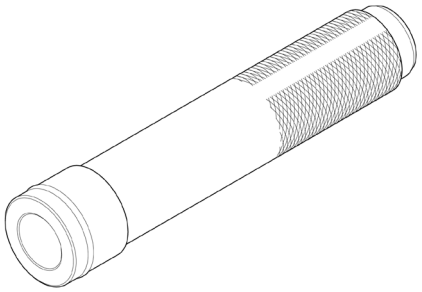
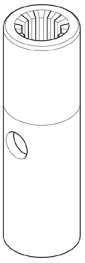
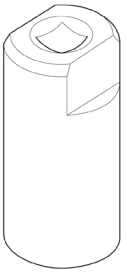
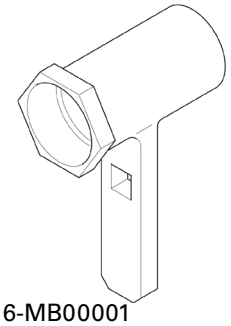
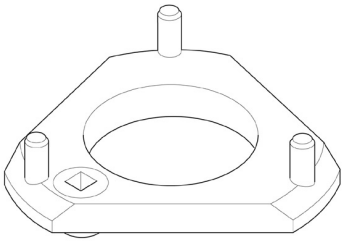
ITEM			STANDARD	SERVICE LIMIT
Output shaft	Damper spring free length		66.0 (2.60)	64.0 (2.52)
	Shaft O.D.		22.008 – 22.021 (0.8665 – 0.8670)	21.99 (0.866)
	Gear bushing	I.D.	22.026 – 22.041 (0.8672 – 0.8678)	22.05 (0.868)
		O.D.	25.959 – 25.980 (1.0220 – 1.0228)	25.95 (1.022)
	Driven gear I.D.		26.000 – 26.013 (1.0236 – 1.0241)	26.03 (1.025)
Shift fork	I.D.		14.000 – 14.018 (0.5512 – 0.5519)	14.04 (0.553)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)
	Shaft O.D.		13.966 – 13.984 (0.5498 – 0.5506)	13.90 (0.547)
Transmission	Gear I.D.	M4	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
		M5	35.000 – 35.025 (1.3780 – 1.3789)	35.04 (1.380)
		C2, C3	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Gear busing O.D.	M4	30.950 – 30.975 (1.2185 – 1.1295)	30.93 (1.218)
		M5	34.950 – 34.975 (1.3760 – 1.3770)	34.93 (1.375)
		C2, C3	32.950 – 32.975 (1.2972 – 1.2982)	32.93 (1.296)
	Gear-to-bushing clearance		0.025 – 0.075 (0.0010 – 0.0030)	0.10 (0.004)
	Gear bushing I.D.	M4	28.007 – 28.028 (1.1026 – 1.1035)	28.04 (1.104)
		M5	32.007 – 32.028 (1.12601 – 1.2609)	32.04 (1.261)
	Mainshaft O.D.	at M4	27.987 – 28.000 (1.1018 – 1.1024)	27.96 (1.101)
		at M5	31.987 – 32.000 (1.2593 – 1.2598)	31.96 (1.258)
	Bushing-to-shaft clearance		0.007 – 0.041 (0.0003 – 0.0016)	0.08 (0.003)

TORQUE VALUES

Shift drum stopper arm pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Shift drum joint bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	Apply locking agent to the threads.
Countershaft setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Mainshaft setting plate bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply locking agent to the threads.
Shift drum end plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Shift drum bearing setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Gearshift spindle arm bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Gearshift spindle return spring pin	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Final drive gear lock nut	186 N·m (19.0 kgf·m, 137 lbf·ft)	Apply engine oil to the threads/Left-hand threads/stake the nut.
Alternator drive gear bolt	25 N·m (2.6 kgf·m, 19 lbf·ft)	Apply engine oil to the threads and seating surface.
Oil pump driven sprocket bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply locking agent to the threads.
Starter clutch bolt	74 N·m (7.5 kgf·m, 54 lbf·ft)	Left-hand threads.
Primary driven gear bearing setting plate bolt (rear crankcase cover)	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Breather plate bolt (rear crankcase cover)	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Rear crankcase cover bolt (pan-head)	31 N·m (3.0 kgf·m, 23 lbf·ft)	
Rear crankcase cover bolt (flange)	24 N·m (2.4 kgf·m, 17 lbf·ft)	
Output shaft lock nut	186 N·m (19.0 kgf·m, 137 lbf·ft)	Stake the lock nut.
Output shaft bearing holder bolt	28 N·m (2.9 kgf·m, 21 lbf·ft)	
Mainshaft bearing lock nut	186 N·m (19.0 kgf·m, 137 lbf·ft)	Apply engine oil to the threads and seating surface/stake the nut.

TOOLS

Driver 07749-0010000 	Driver, 40 mm 07746-0030100 	Attachment, 28 x 30 mm 07946-1870100 
Attachment, 32 x 35 mm 07746-0010100 	Attachment, 42 x 47 mm 07746-0010300 	Attachment, 62 x 68 mm 07746-0010500 

Attachment, 78 x 90 mm 07GAD-SD40101 	Attachment, 30 mm I.D. 07746-0030300 	Pilot, 20 mm 07746-0040500 
Pilot, 25 mm 07746-0040600 	Pilot, 28 mm 07746-0041100 	Pilot, 30 mm 07746-0040700 
Driver, 22 mm I.D. 07746-0020100 	Shaft holder 07PAB-0010200  or 07924-PJ40001 (U.S.A. only)	Shaft holder 07JMB-MN50200 
Lock nut wrench, 30 x 64 mm 07916-MB00002  or 07916-MB00001	Clutch outer holder 07JMB-MN50100 	

TROUBLESHOOTING

Hard to shift
- Improper clutch operation
- Incorrect engine oil viscosity
- Damaged gearshift cam
- Bent shift forks
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam grooves
- Damaged spindle arm
- Bent or damaged gearshift spindle

Transmission jumps out of gear
- Worn or damaged gearshift cam
- Broken drum stopper arm spring
- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken gearshift spindle return spring

Gearshift pedal will not return
- Worn or damaged transmission gears or bearing
- Worn or damaged primary drive and driven gears or bearing
- Worn or damaged alternator drive and driven gears or bearing
- Worn or damaged final drive and driven gears or bearing

GEARSHIFT LINKAGE

DISASSEMBLY

NOTE:

- Refer to page 11-31 "Transmission Disassembly" for gearshift spindle service.

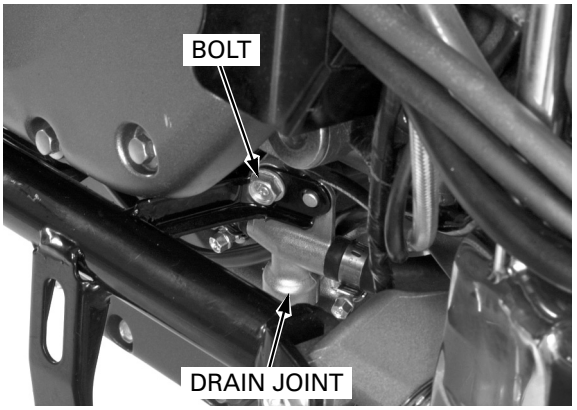
Drain the engine oil (page 4-10).

Do not disconnect the radiator hoses.

Remove the radiator mounting bolts (page 7-8) and move the radiator forward.

Remove the canister (page 6-61).

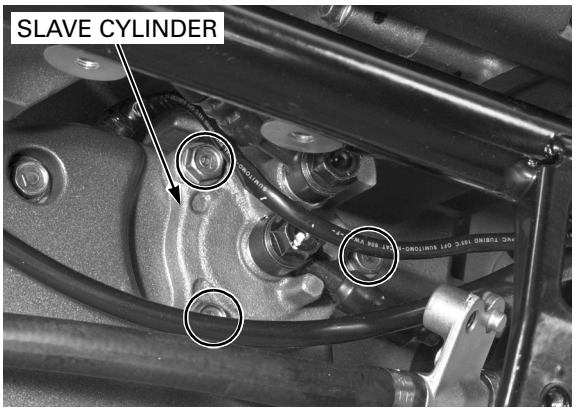
Remove the bolt and coolant drain joint from the bracket.



Shift the transmission into neutral.

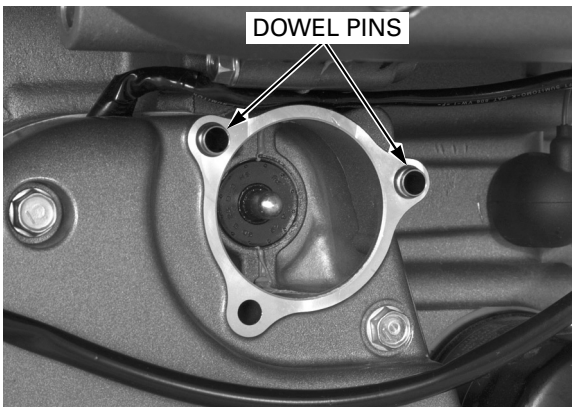
Do not disconnect the clutch hose.

Remove the three bolts and clutch slave cylinder.



Remove the two dowel pins.

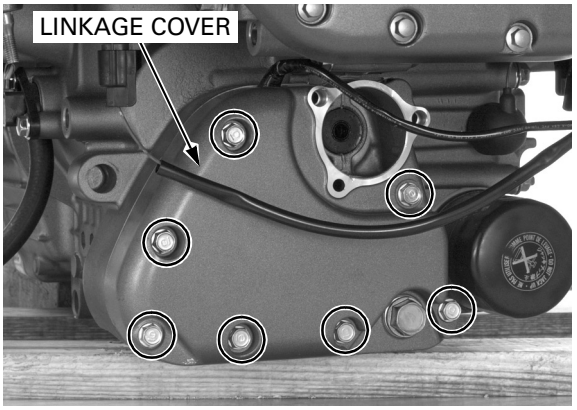
To keep the slave cylinder piston from being forced out of the cylinder, squeeze the clutch lever and tie it to the handlebar.



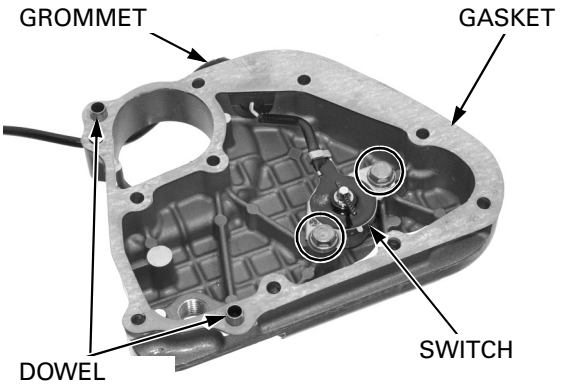
Remove the following:

Support the linkage cover so it does not hang from the neutral switch wire

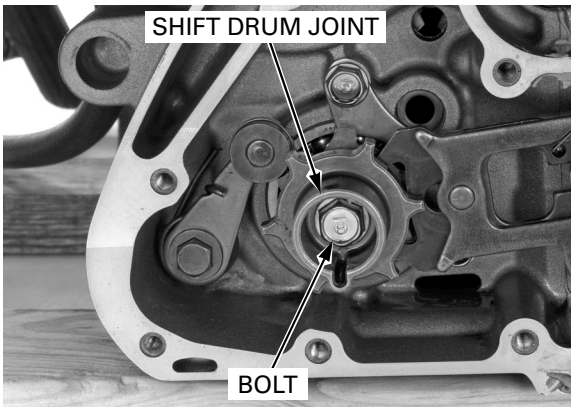
– seven cover bolts
– gearshift linkage cover



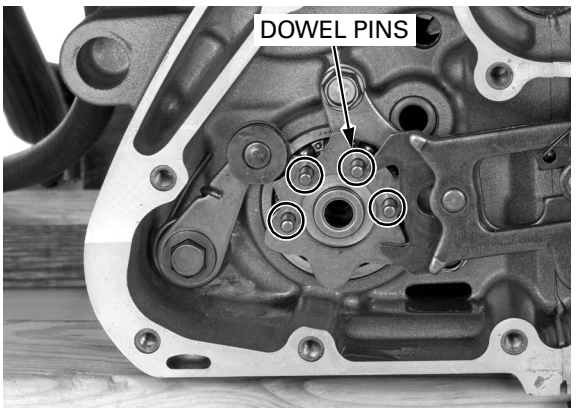
– two dowel pins
– gasket
– grommet from cover
– two bolts and neutral switch



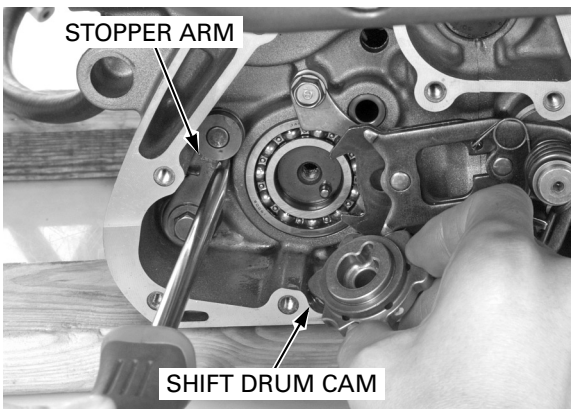
– bolt and shift drum joint



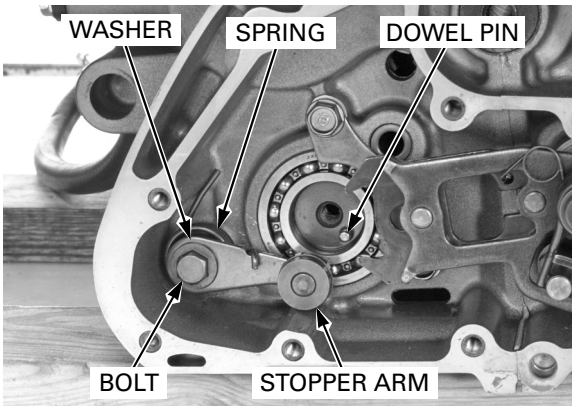
– four dowel pins



– shift drum cam (lift stopper arm with a screwdriver)



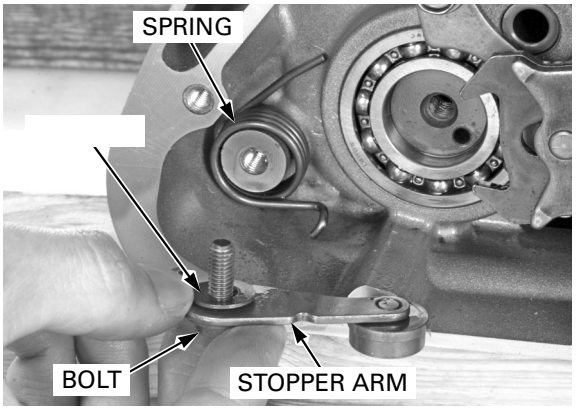
– dowel pin
– pivot bolt
– stopper arm
– return spring
– washer



ASSEMBLY

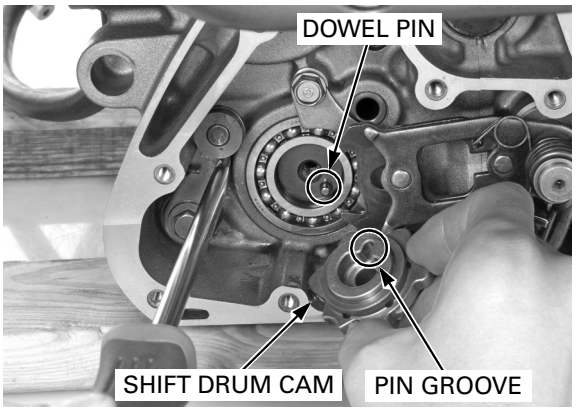
Install the return spring onto the crankcase as shown.
Install the washer (between the arm and crankcase) and stopper arm with the bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

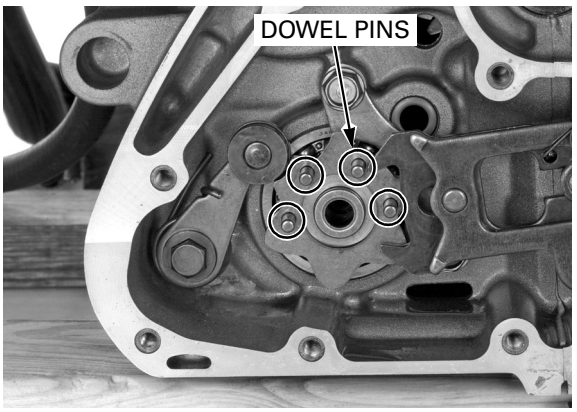


Install the dowel pin into the shift drum.

Lift the stopper arm with a screwdriver and install the shift drum cam by aligning the pin groove with the dowel pin.



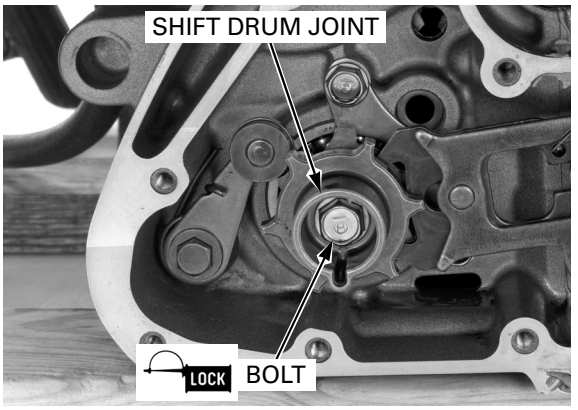
Install the four dowel pins into the shift drum cam.



Apply locking agent to the threads of the shift drum joint bolt.
Install the shift drum joint by aligning the holes with the dowel pins.
Install the bolt and tighten it.

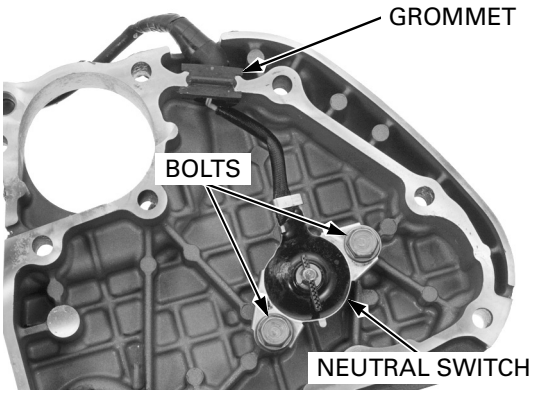
TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

Check the gearshift linkage operation and shift the transmission into neutral.

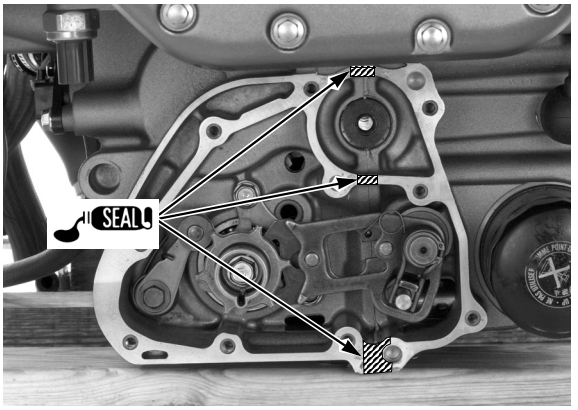


Install the neutral switch with the bolts.

Install the wire grommet into the cover groove securely.

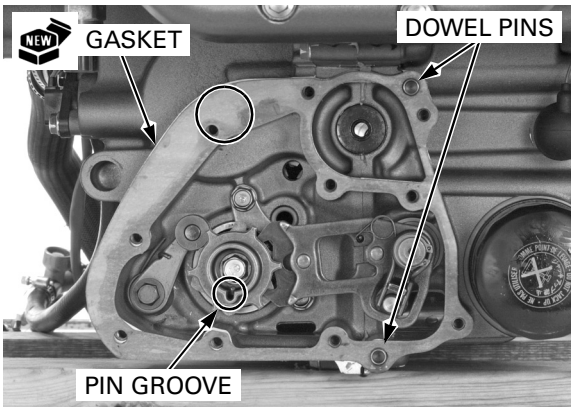


Apply sealant to the mating areas of the crankcase as shown.

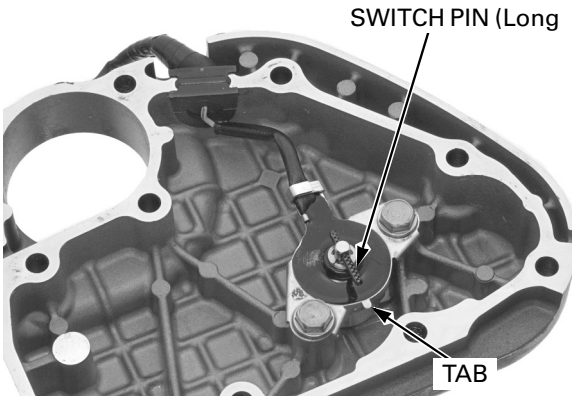


Install the two dowel pins and a new gasket.

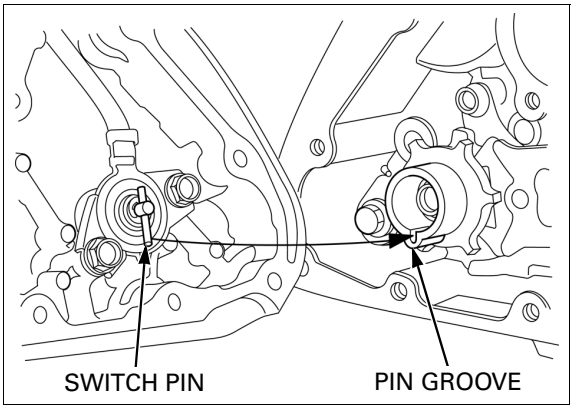
Make sure the pin groove in the shift drum joint faces down (transmission is in neutral).



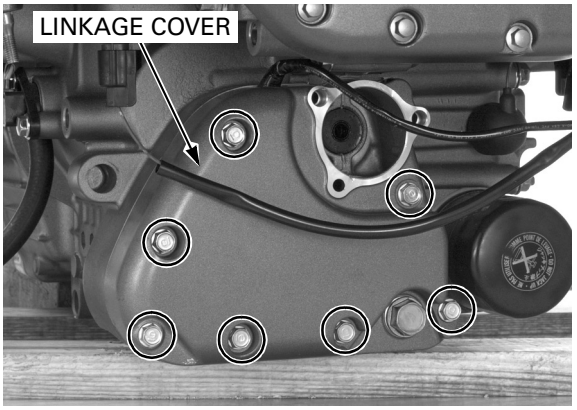
Align the long end of the switch pin with the tab on the switch.



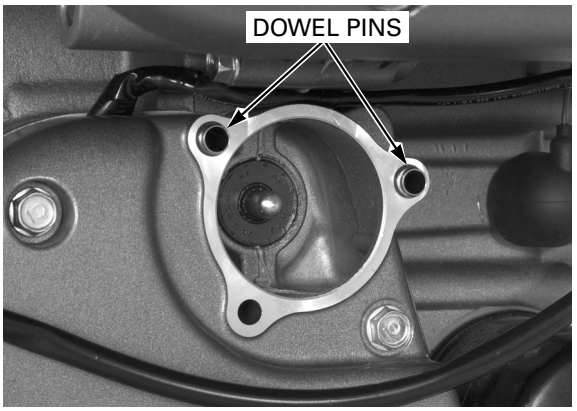
Install the linkage cover, being careful not to damage the switch pin.



Install the seven bolts and tighten them.

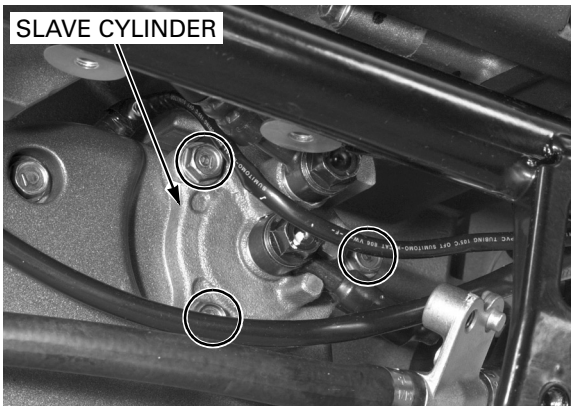


Install the two dowel pins.



Install the slave cylinder and tighten the three bolts.

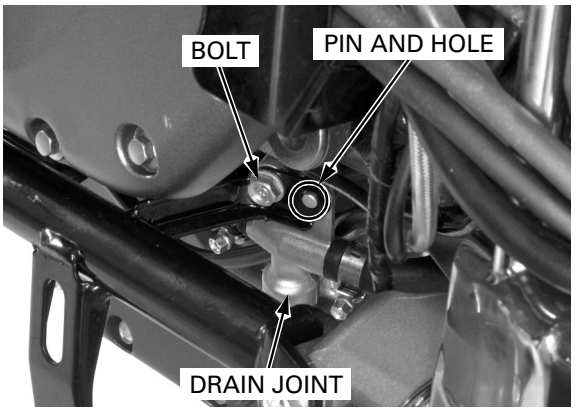
Release the clutch lever from the handlebar.



Install the coolant drain joint onto the bracket by aligning the pin with the hole, and tighten the bolt securely.

Install the EVAP canister (page 6-61).
Install the radiator (page 7-11).

Fill the crankcase with the recommended engine oil (page 4-10).

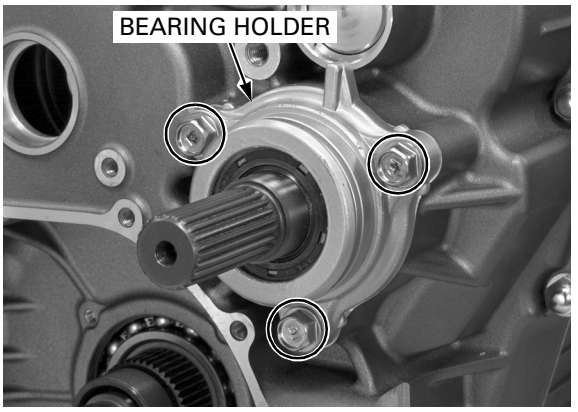


REAR CRANKCASE COVER REMOVAL

Remove the following:

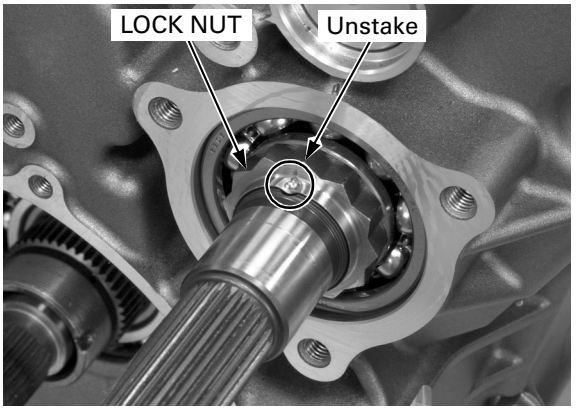
– engine (page 8-5)
– starter motor (page 19-6)
– alternator (page 17-10)
– water pump (page 7-12)
– clutch (page 10-15)
– clutch outer (page 10-21)

Remove the three bolts and the output shaft bearing holder.
Remove the O-ring and oil seal.



Be careful that metal particles do not enter the bearing and that the output shaft threads are not damaged.

Unstake the lock nut with a drill or grinder.

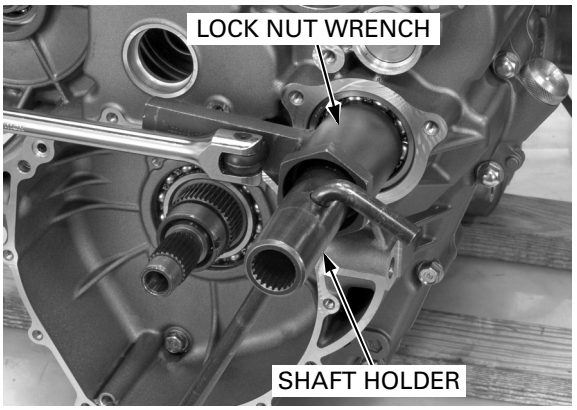


Hold the output shaft and loosen the lock nut, using the special tools and breaker bar.

TOOLS:

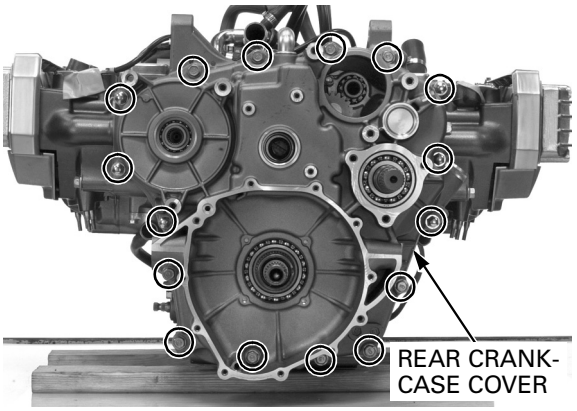
Shaft holder	**07PAB-0010200 or 079249-PJ40001 (U.S.A. only)**
Lock nut wrench, 30 x 64 mm	**07916-MB00002 or 07916-MB00001**

Remove the lock nut and discard it.

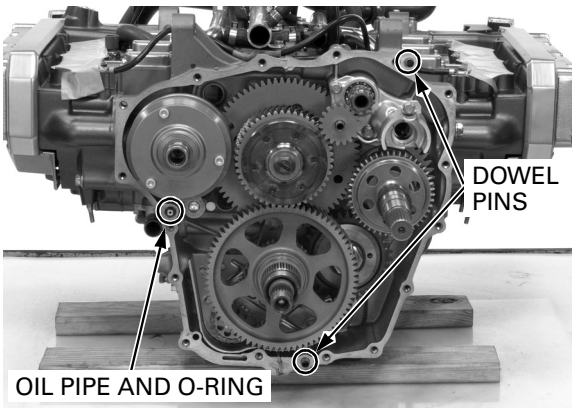


Remove the following:

– sixteen cover bolts in a crisscross pattern in several steps

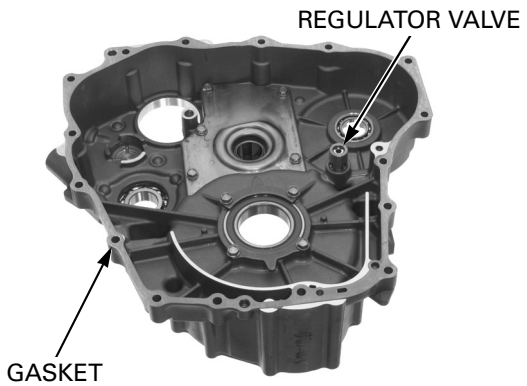


– two dowel pins
– oil orifice and O-ring



– clutch regulator valve and O-ring
– gasket

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the cover.



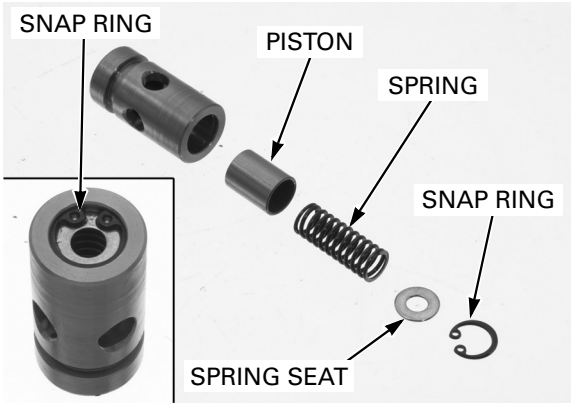
CLUTCH REGULATOR VALVE CHECK

Remove the following:

– snap ring
– spring seat
– valve spring
– piston

Check the piston for wear, unsmooth movement or other damage.
Check the spring for fatigue or damage.

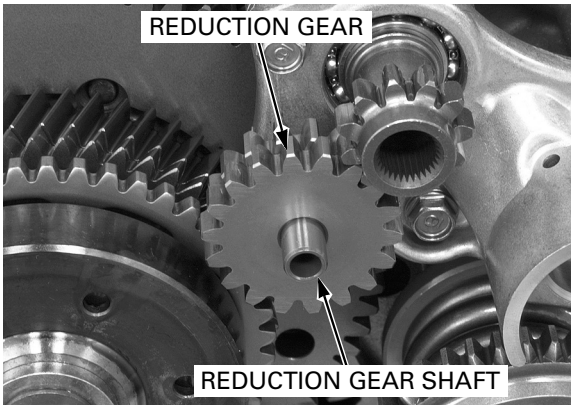
Install the piston, spring and spring seat, and secure them with the snap ring.



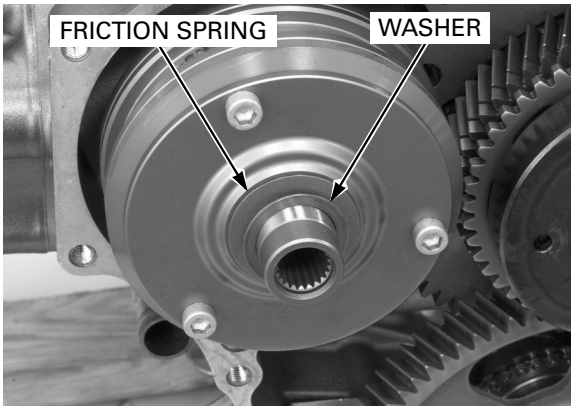
PRIMARY GEARS/OUTPUT SHAFT REMOVAL

Remove the rear crankcase cover (page 11-13).

Remove the following:
– starter reduction gear and shaft



– plain washer
– friction spring



Do not disassemble the driven gear assembly.

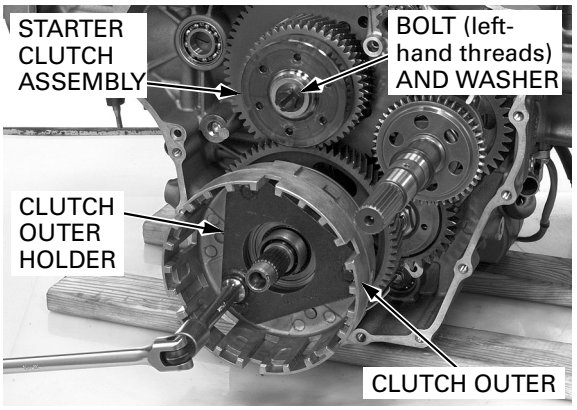
– alternator driven gear assembly (to ease removal: align the gear teeth of the scissor gears [alternator drive gear and sub-gear] by inserting a screw driver into the gear holes and prying the scissor gears)

Temporarily install the clutch outer onto the primary driven gear boss.

The starter clutch bolt has left-hand threads.

Hold the clutch outer with the special tool and loosen the starter clutch bolt.

TOOL:
Clutch outer holder **07JMB-MN50100**



Remove the clutch outer.

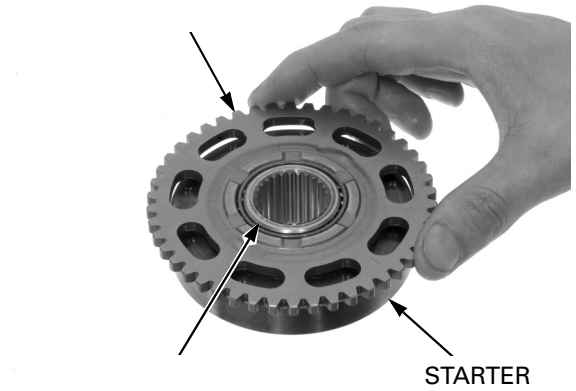
Remove the following:
- starter clutch bolt
- washer
- starter clutch assembly

Replace the starter clutch as an assembly

Make sure the starter driven gear rotates smoothly. The gear should only rotate clockwise and lock up in the other direction.

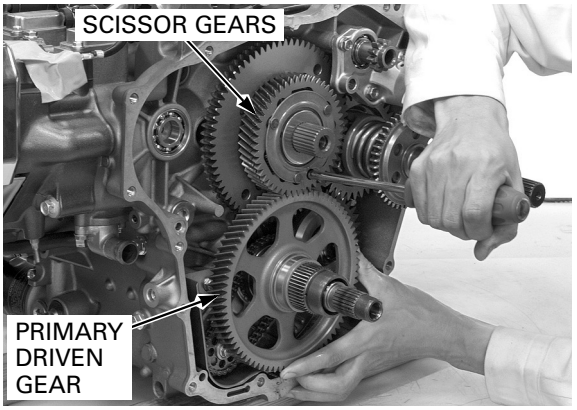
Remove the starter driven gear and needle bearing.

Check the driven gear boss, sprag clutch and bearing for abnormal wear or damage

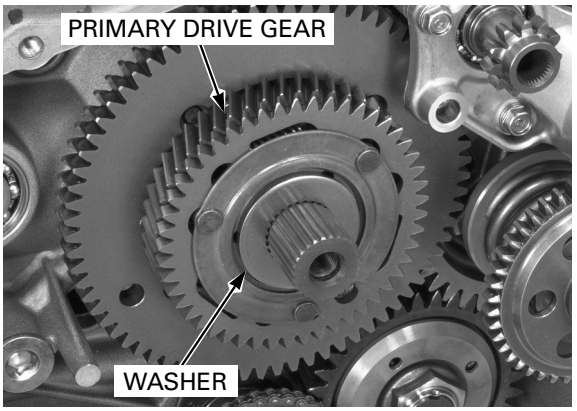


Remove the following:

- primary driven gear (align the gear teeth of the scissor gears [primary drive gear and sub-gear] by inserting a screwdriver into the gear holes and prying the scissor gear)



- spline washer
- primary drive gear

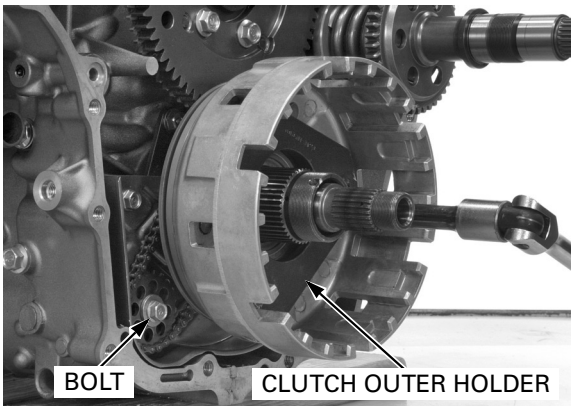


Temporarily install the clutch outer onto the primary driven gear boss.
Hold the clutch outer with the special tool and loosen the oil pump driven sprocket bolt.

TOOL:
Clutch outer holder 07JMB-MN50100

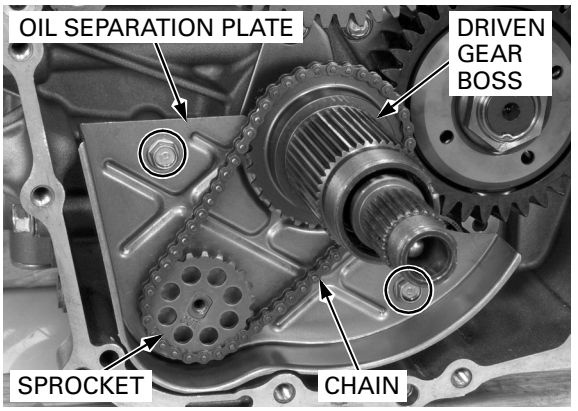
Remove the clutch outer.

Remove the following:
– driven sprocket bolt



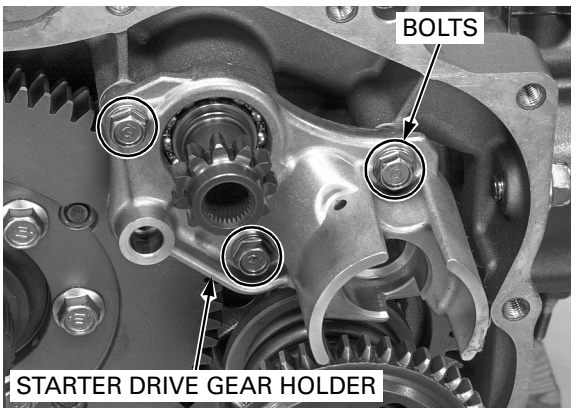
– driven sprocket, drive chain and primary driven gear boss as a set
– two bolts and oil separation plate (if necessary)

Check the driven gear boss bearing for wear or damage.

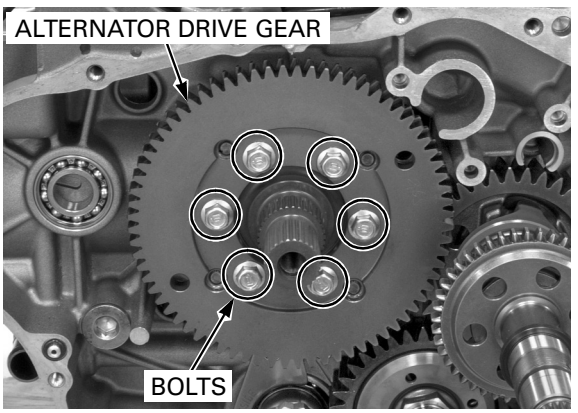


Remove the following:

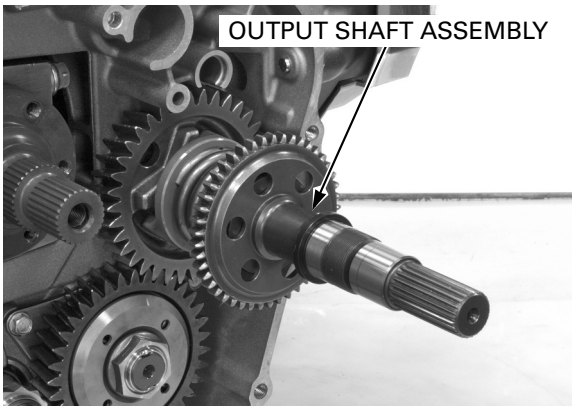
– three bolts
– starter drive gear holder
– two dowel pins



– six bolts
– alternator drive gear

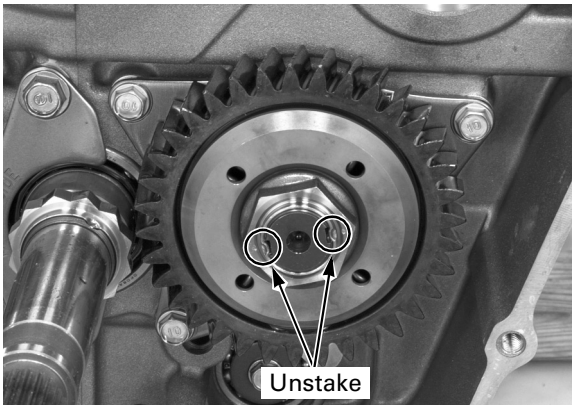


– output shaft assembly



Be careful not to damage the countershaft threads.

Unstake the final drive gear lock nut with a drill or grinder.



Shift the transmission into any forward gear except neutral.

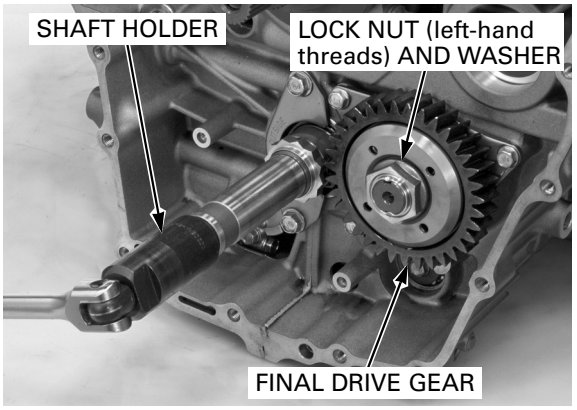
The final drive gear lock nut has left hand threads.

Hold the mainshaft with the special tool and loosen the lock nut.

TOOL:

Shaft holder	**07JMB-MN50200**

Remove the following:
– lock nut
– washer
– final drive gear



STARTER DRIVE GEAR BEARING REPLACEMENT

Support the gear holder and press the starter drive gear out of the bearing using the special tools.

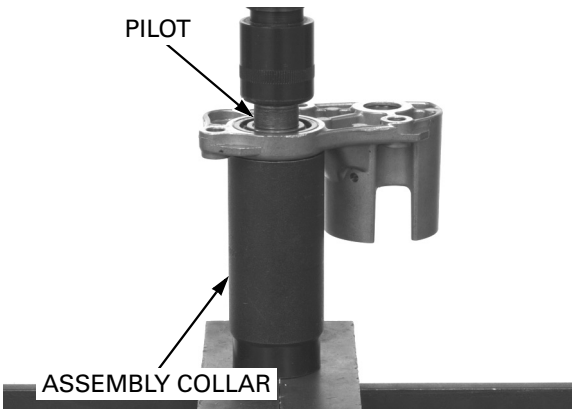
TOOLS:

Pilot, 20 mm	**07746-0040500**
Assembly collar	**07965-VM00100**

Press the bearing out of the gear holder using the special tools.

TOOLS:

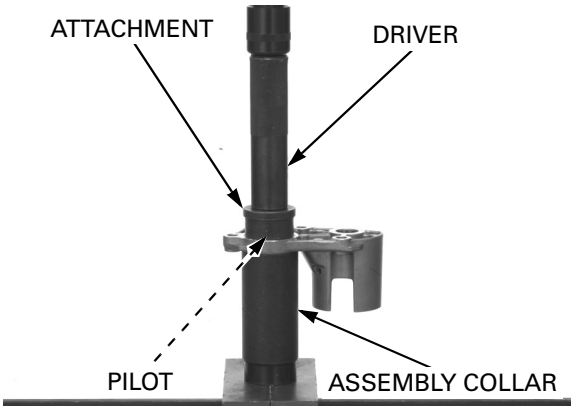
Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Assembly collar	**07965-VM00100**



Support the gear holder and press the bearing into the holder using the special tools.

TOOLS:

Driver	**07749-0010000**
Attachment, 37 x 40 mm	**07746-0010200**
Pilot, 20 mm	**07746-0040500**
Assembly collar	**07965-VM00100**

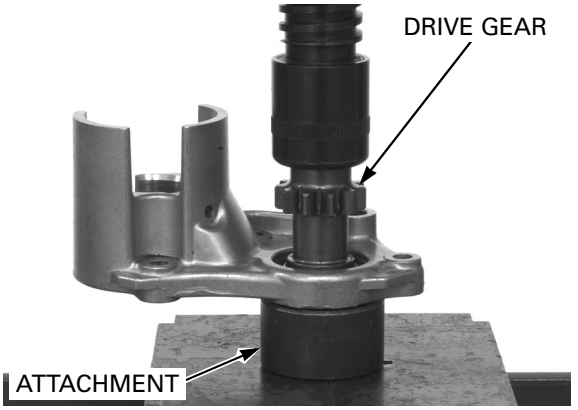


Use the small I.D. of the special tool to support the bearing inner race.

Support the bearing inner race with the special tool and press the starter drive gear into the bearing.

TOOLS:

Attachment, 20 mm I.D.	**07746-0020400**

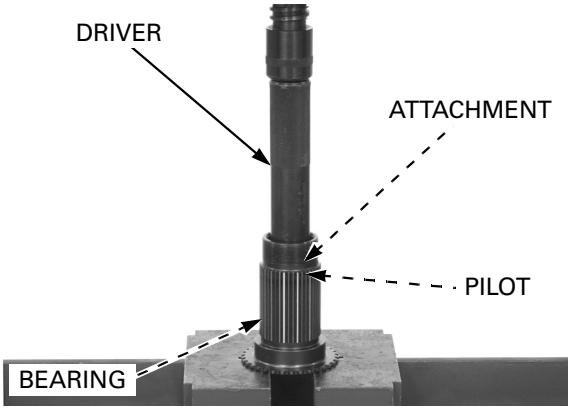


DRIVEN GEAR BOSS BEARING REPLACEMENT

Press the needle bearing out of the primary driven gear boss.

TOOLS:

Driver	**07749-0010000**
Attachment, 28 x 30 mm	**07946-1870100**
Pilot, 28 mm	**07746-0041100**

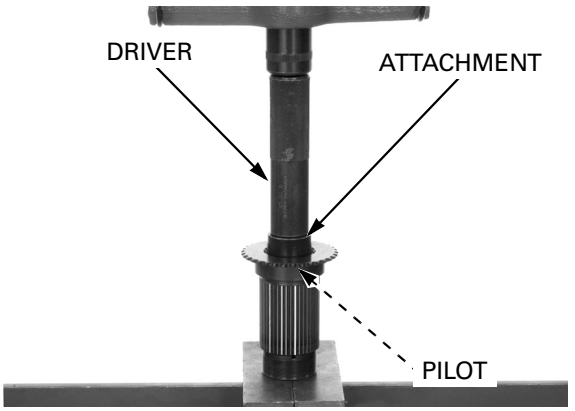


Install the needle bearing with the stamped side facing up

Press a new needle bearing into the driven gear boss until the depth from the outer surface (oil pump drive sprocket) is 3.5—4.0 mm (0.14—0.16in) using the special tools.

TOOLS:

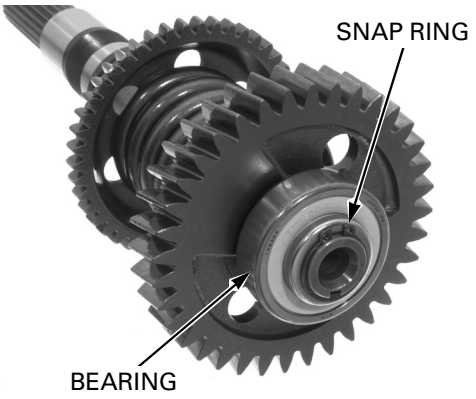
Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 28 mm	**07746-0041100**



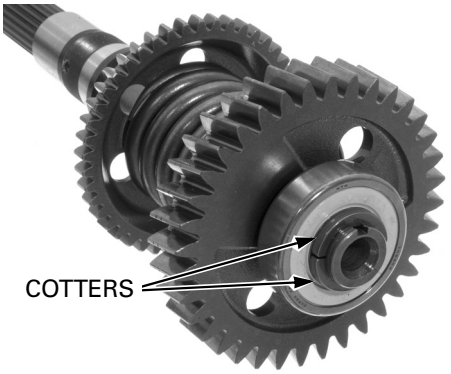
OUTPUT SHAFT DISASSEMBLY/ INSPECTION

Turn the bearing outer race with your finger. The bearing should turn smoothly and quietly.

Remove the following:
– snap ring
– retainer

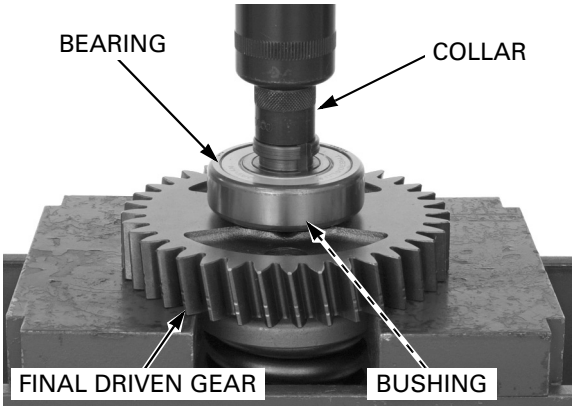


– cotters

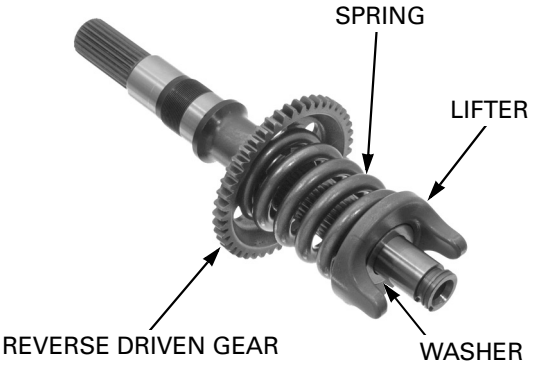


Press the output shaft out of the bearing using a suitable collar (about 20 mm O.D.) and remove the following:

– bearing
– gear bushing
– final driven gear

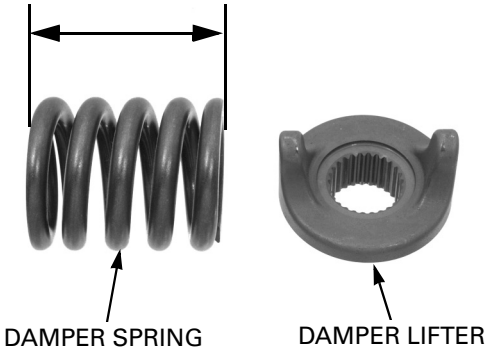


– thrust washer
– damper lifter
– damper spring
– reverse driven gear



Check the damper lifter for wear or damage.
Measure the damper spring free length.

SERVICE LIMIT: 64.0 mm (2.52 in)



Check the output shaft, gear bushing and final driven gear for abnormal wear or damage.
Measure the driven gear I.D.

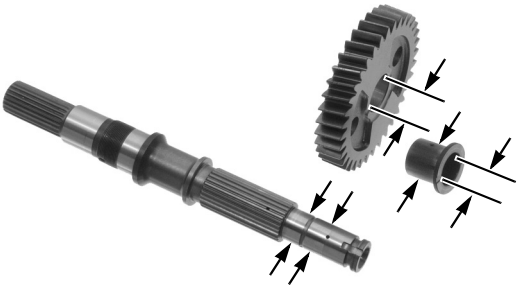
SERVICE LIMIT: 26.03 mm (1.025 in)

Measure the bushing O.D. and I.D.

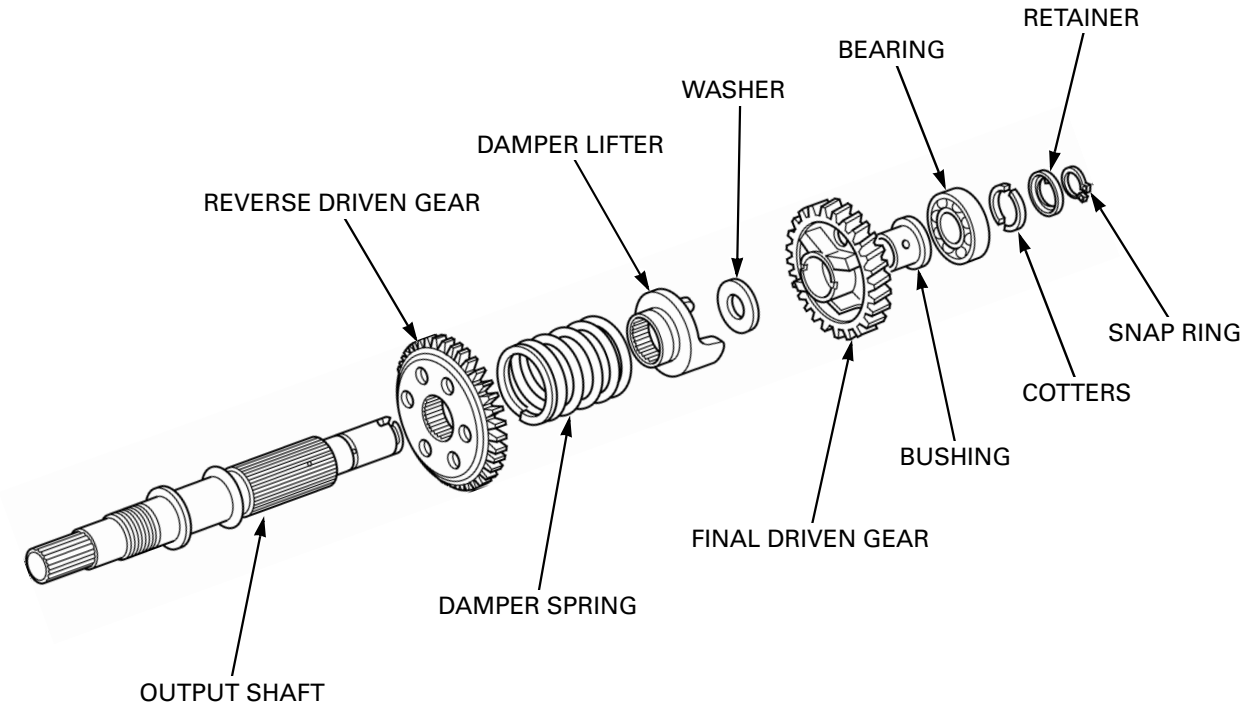
SERVICE LIMITS: O.D.: 25.95 mm (1.022 in)
I.D.: 22.05 mm (0.868 in)

Measure the shaft O.D.

SERVICE LIMIT: 21.99 mm (0.866 in)

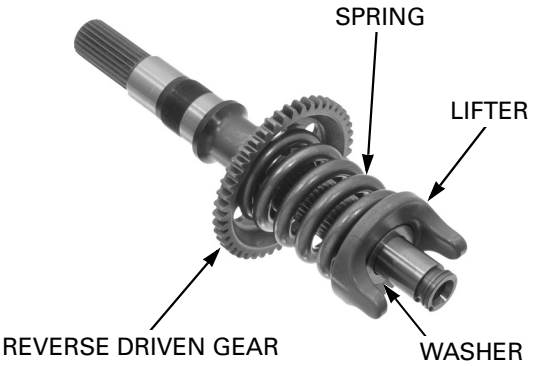


OUTPUT SHAFT ASSEMBLY

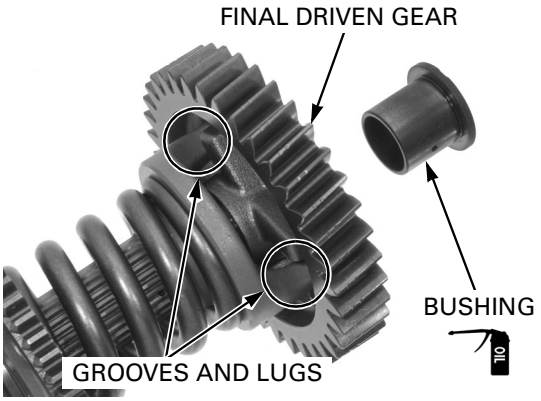


Install the following onto the output shaft:

- reverse driven gear (with dished side facing spring)
- damper spring
- damper lifter
- thrust washer



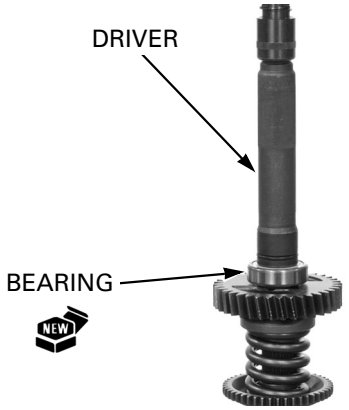
- final driven gear (by aligning its grooves with lifter lugs)
- gear bushing (apply engine oil)



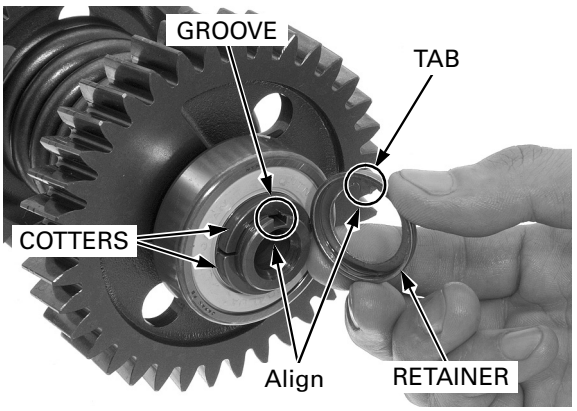
Install the bearing with the sealed side facing up

Press a new bearing onto the output shaft using the special tool.

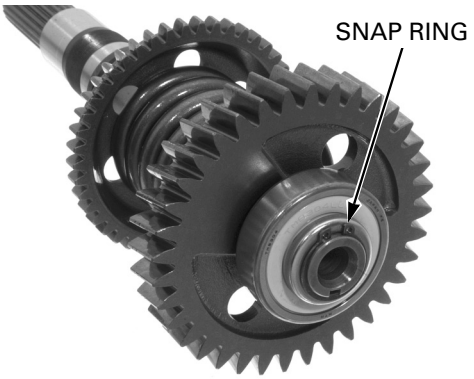
TOOL:
Driver, 22 mm I.D. 07746-0020100



Install the cotters into the cotter groove.
Install the retainer by aligning its tab with the groove in the shaft and turn it to set the tab in the opposite position of the groove.

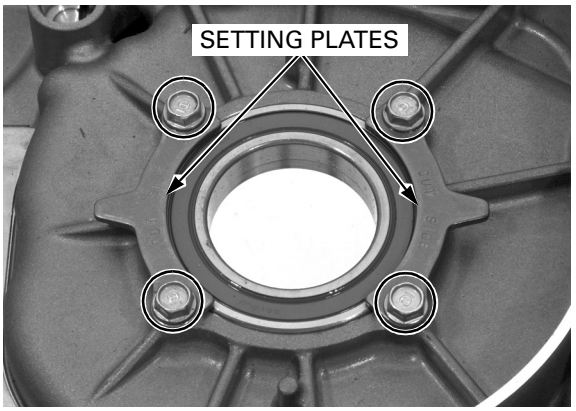


Secure the retainer with the snap ring.

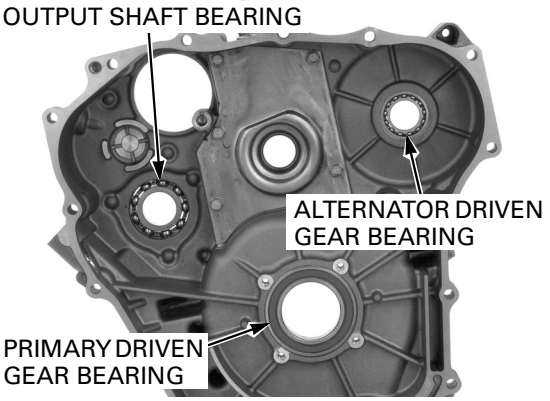


REAR CRANKCASE COVER BEARING REPLACEMENT

Remove the bolts and bearing setting plates.



Drive the output shaft, alternator driven gear and primary driven gear bearings out of the rear crankcase cover.



Remove the alternator driven gear bearing from the crankcase.

Drive a new alternator driven gear bearing in the crankcase with the sealed side facing in.

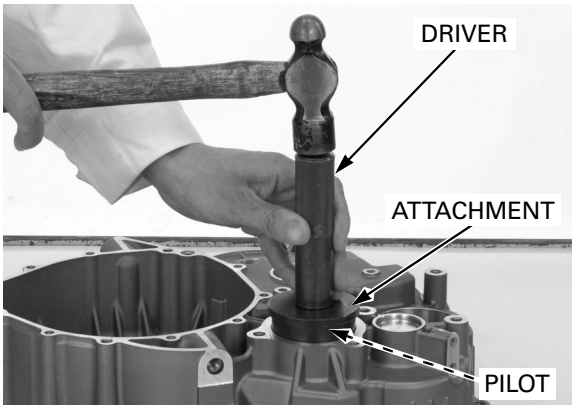
TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**

Drive the following bearings into the rear crankcase cover with the markings facing up. Use new bearings.

TOOLS:

Output shaft:	
Driver	**07749-0010000**
Attachment, 62 x 68 mm	**07746-0010500**
Pilot, 30 mm	**07746-0040700**
Alternator driven gear:	
Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**



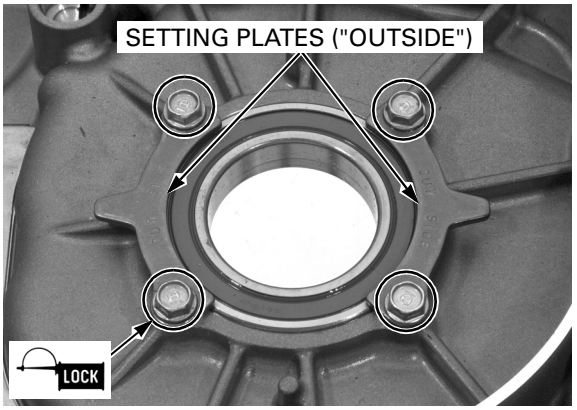
Drive a new primary driven gear bearing into the rear crankcase with the sealed side facing up.

TOOLS:

Driver	**07749-0010000**
Attachment, 78 x 90 mm	**07GAD-SD40101**

Apply locking agent to the threads of the setting plate bolts.
Install the bearing setting plates with the "OUT SIDE" mark facing up and tighten the bolts.

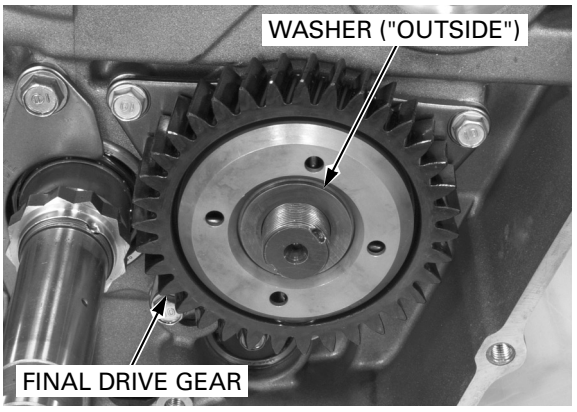
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



PRIMARY GEARS/OUTPUT SHAFT INSTALLATION

Apply engine oil to the gear teeth and sliding surface.

Install the final drive gear and lock washer onto the countershaft.

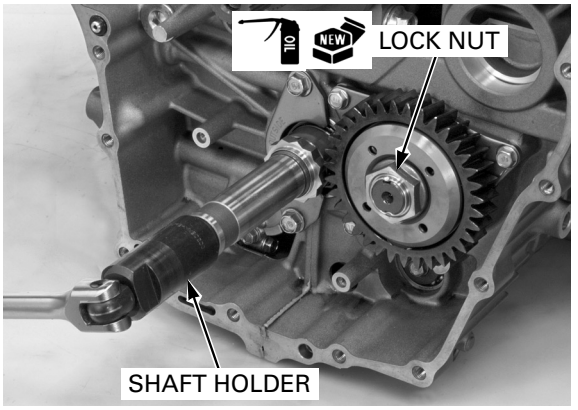


The final drive gear lock nut has left-hand threads.

Apply engine oil to the threads of a new lock nut and install it.
Hold the mainshaft with the special tool and tighten the lock nut.

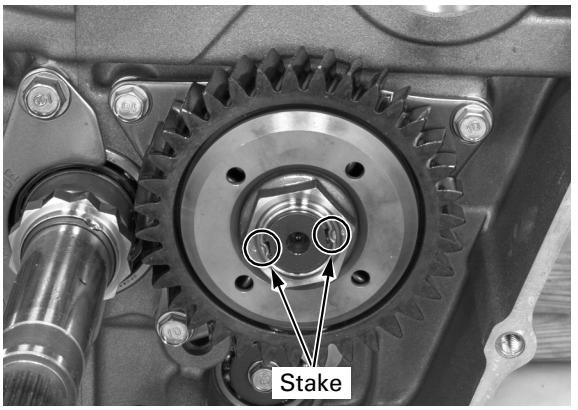
TOOL:
Shaft holder 07JMB-MN50200

TORQUE: 186 N·m (19.0 kgf·m, 137 lbf·ft)

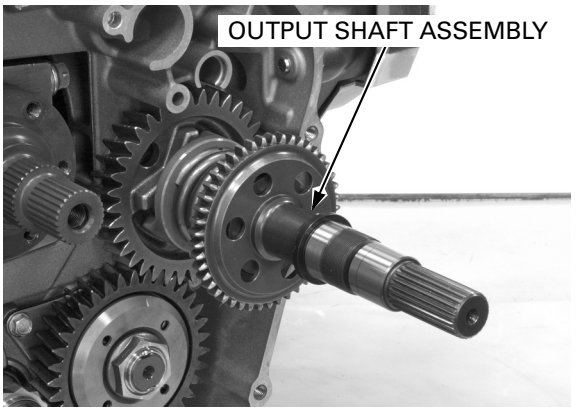


Be careful not to damage the countershaft threads.

Stake the lock nut into the countershaft groove in two places.



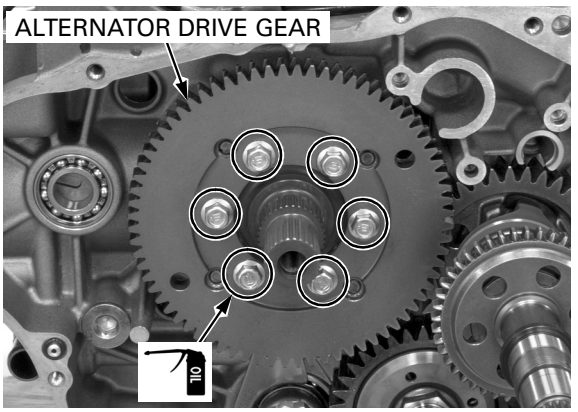
Install the output shaft assembly onto the crankcase.



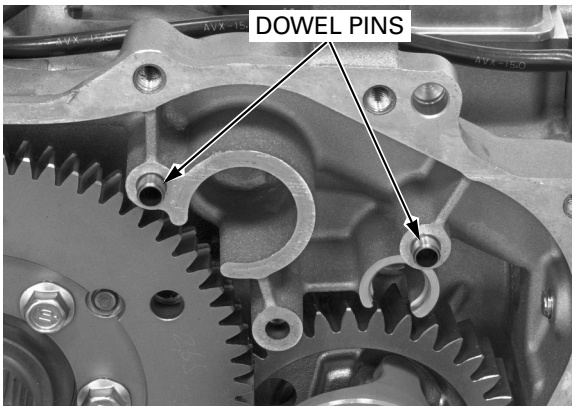
Install the alternator drive gear by aligning the bolt holes in the crankshaft and gear.

Apply engine oil to the threads and seating surface of the drive gear bolts and install them.
Remove the timing hole cap and hold the ignition pulse generator bolt which is located on the opposite side of the crankcase and tighten the bolts.

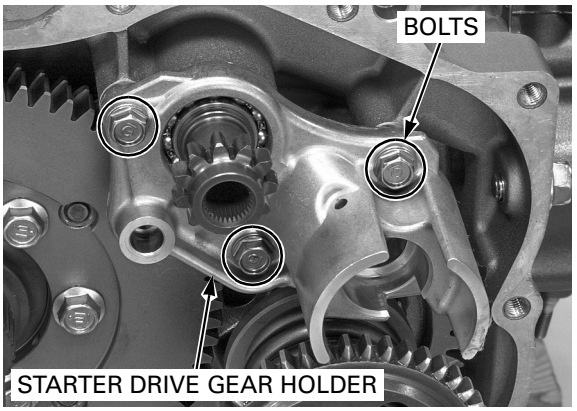
TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)



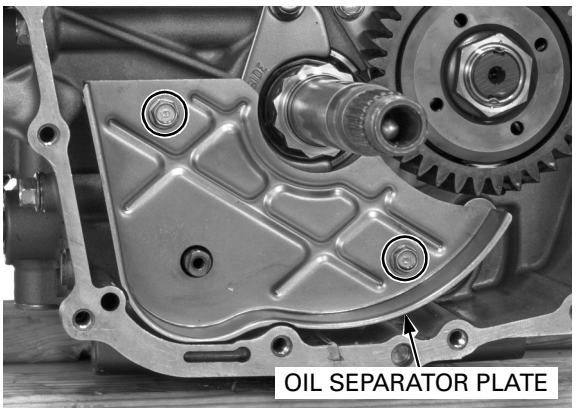
Install the two dowel pins into the crankcase.



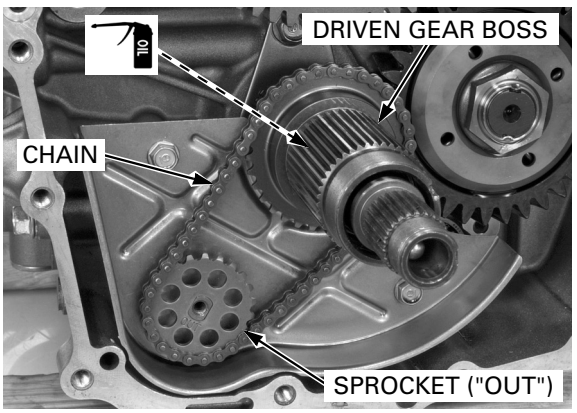
Install the starter drive gear holder and tighten the three bolts securely.



Install the oil separate plate and tighten the two bolts.



Apply engine oil to the needle bearing in the primary driven gear boss.
Install the oil pump driven sprocket, drive chain and driven gear boss as a set with the "OUT" mark of the sprocket facing out.

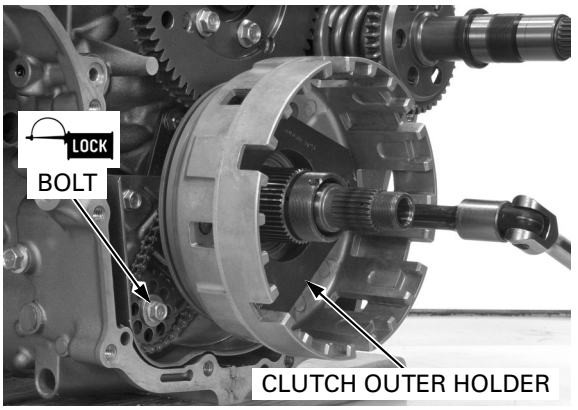


Apply locking agent to the threads of the driven sprocket bolt and install it.

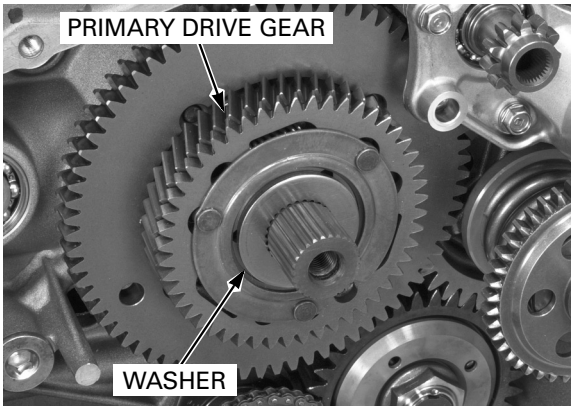
Temporarily install the clutch outer onto the primary driven gear boss.
Hold the clutch outer with the special tool and tighten the oil pump driven sprocket bolt.

TOOL:
Clutch outer holder 07JMB-MN50100

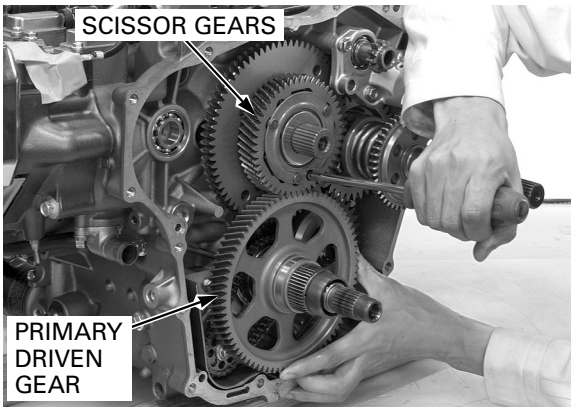
TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



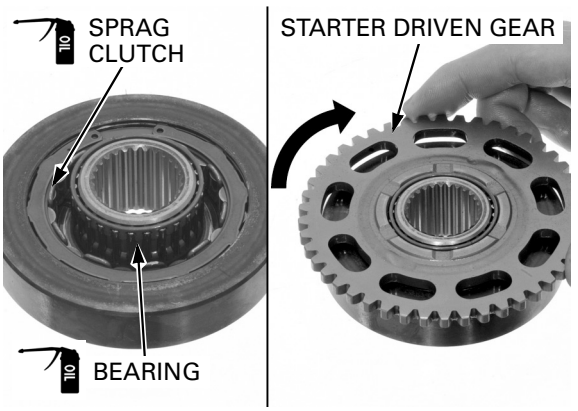
Install the primary drive gear and spline washer.



Install the primary driven gear with the long boss side facing out while aligning the scissors gears (primary drive gear and sub-gear) by inserting the screwdriver into the gear holes.

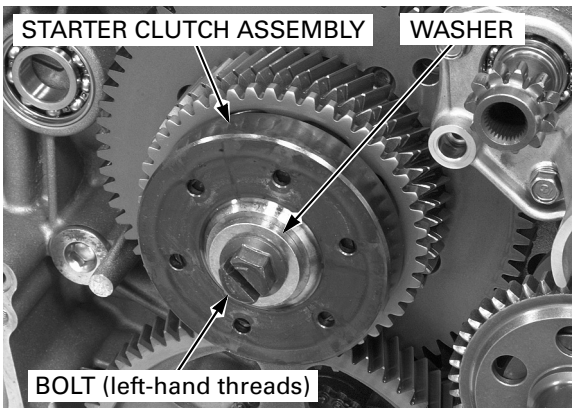


Apply engine oil to the needle bearing and sprag clutch contacting surfaces.
Install the bearing and the starter driven gear while turning gear clockwise.



The starter clutch bolt has left-hand threads.

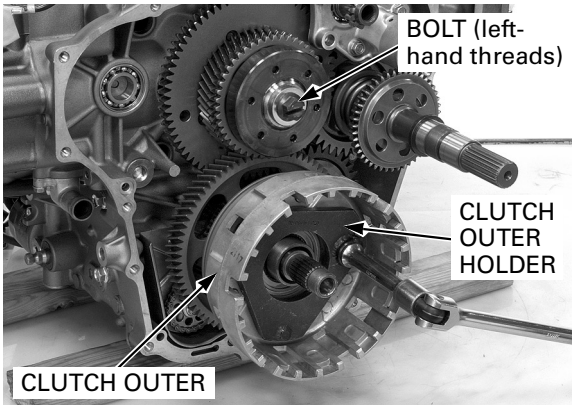
Install the starter clutch assembly, washer and bolt.



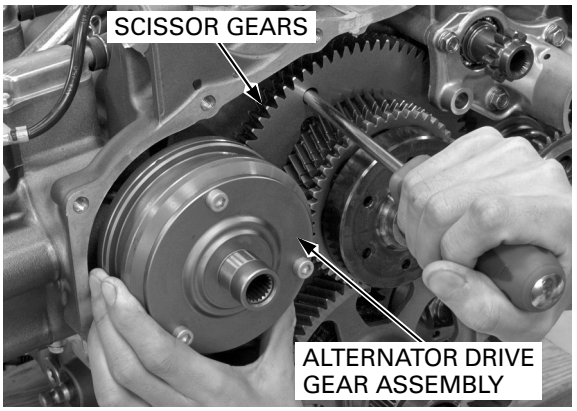
Temporarily install the clutch outer on the primary driven gear boss.
Hold the clutch outer with the special tool and tighten the starter clutch bolt.

TOOL:
Clutch outer holder 07JMB-MN50100

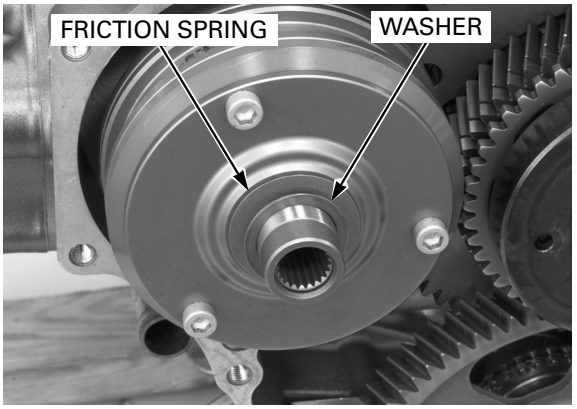
TORQUE: 74 N·m (7.5 kgf·m, 54 lbf·ft)



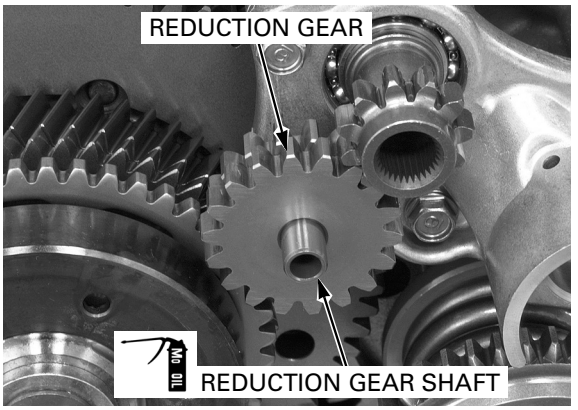
Install the alternator driven gear assembly while aligning the scissors gears (alternator drive gear and sub-gear) by inserting the screwdriver into the gear holes.



Install the friction spring and washer with the concaved side of the spring facing in.



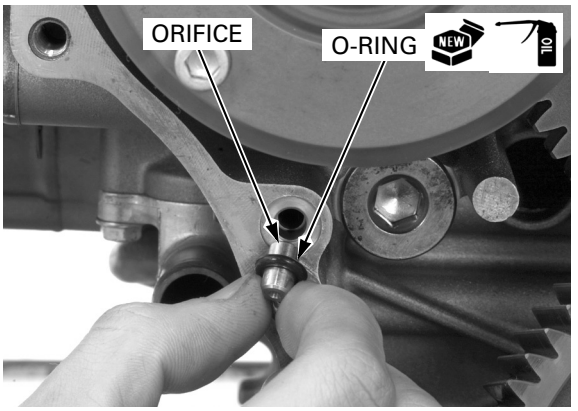
Apply molybdenum oil solution to the outer surface of the reduction gear shaft.
Install the starter reduction gear and shaft with the large gear side facing out.



REAR CRANKCASE COVER INSTALLATION

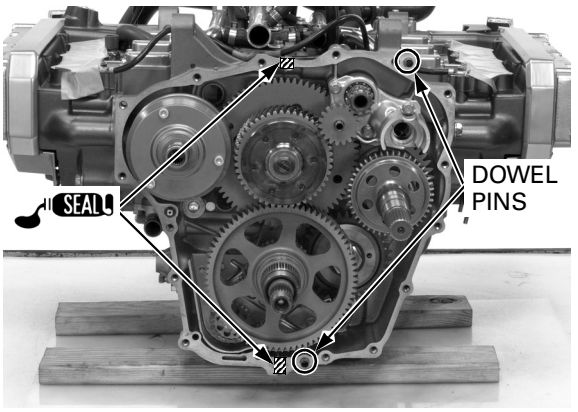
Clean the gasket mating surfaces of the crankcase cover and crankcase thoroughly, being careful not to damage them.

Install the orifice into the crankcase.
Coat a new O-ring with engine oil and install it.

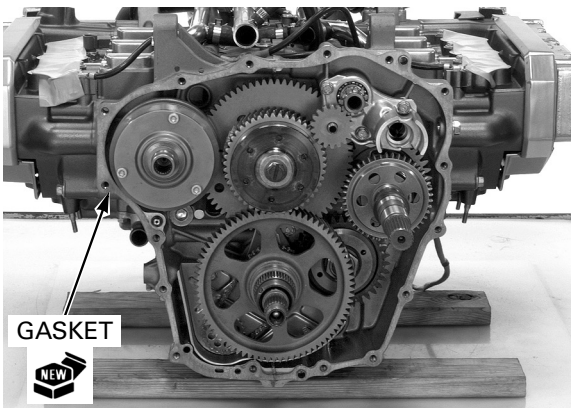


Install the two dowel pins.

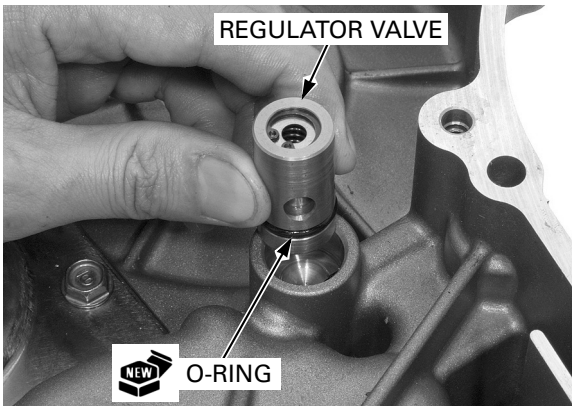
Apply sealant to the mating areas of the crankcase as shown.



Install a new gasket.

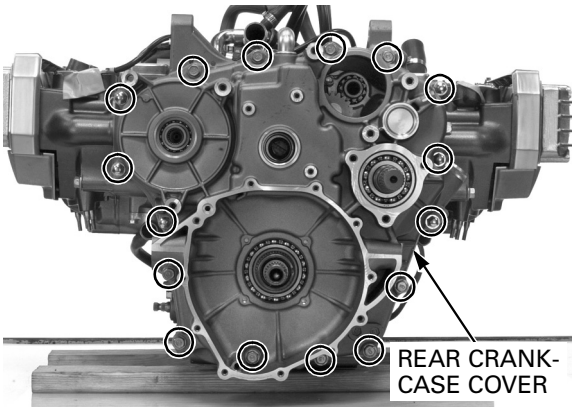


Coat a new O-ring with engine oil and install it into the groove in the clutch regulator valve.
Install the regulator valve into the crankcase cover.



Install the crankcase cover onto the crankcase.
Install the 16 cover bolts and tighten them in a criss-cross pattern in several steps.

TORQUE: 24 N·m (2.4 kgf·m, 17 lbf·ft)



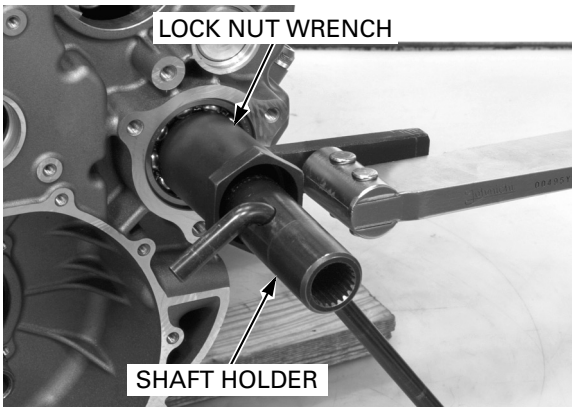
Install a new output shaft lock nut.

Shift the transmission into any gear except neutral. Hold the output shaft and tighten the lock nut using the special tools.

TOOLS:

Shaft holder	**07PAB-0010200 or 079249-PJ40001 (U.S.A. only)**
Lock nut wrench, 30 x 64 mm	**07916-MB00002 or 07916-MB00001**

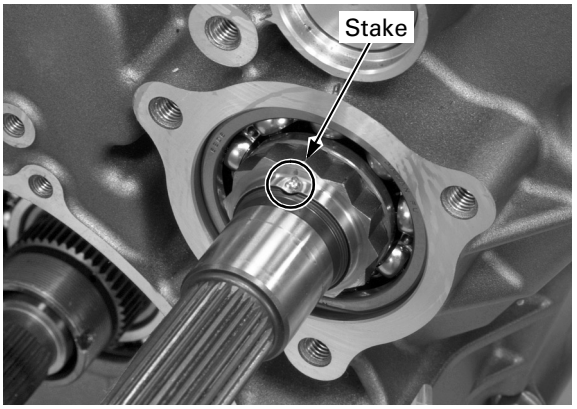
TORQUE:
Actual: 186 N·m (19.0 kgf·m, 137 lbf·ft)
Indicated: 170 N·m (17.3 kgf·m, 125 lbf·ft)



Refer to torque wrench reading information in "Service Information" (page 11-4).

Be careful not to damage the output shaft threads.

Stake the lock nut into the output shaft groove.



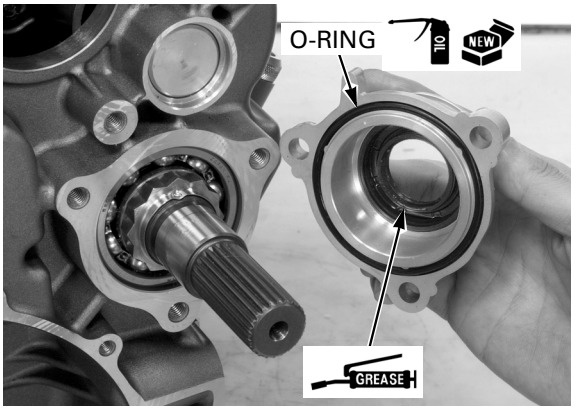
Install a new oil seal into the bearing holder until it is fully seated.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**

Coat a new O-ring with engine oil and install it into the bearing holder groove.

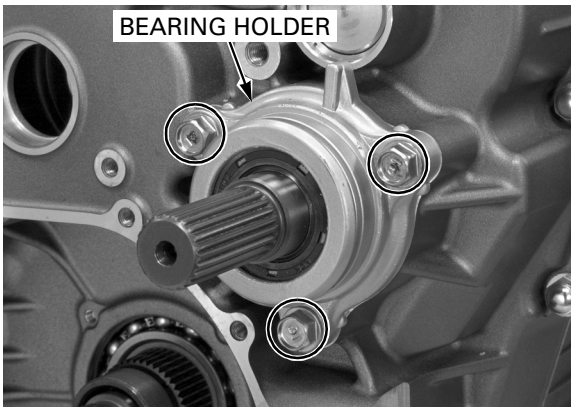
Pack grease into the oil seal lip cavity and install the bearing holder, being careful not to damage the seal lips.



Install the three bolts and tighten them.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

Install the following:
- clutch outer (page 10-21)
- clutch (page 10-23)
- water pump (page 7-13)
- alternator (page 17-18)
- starter motor (page 19-12)
- engine (page 8-12)



TRANSMISSION DISASSEMBLY

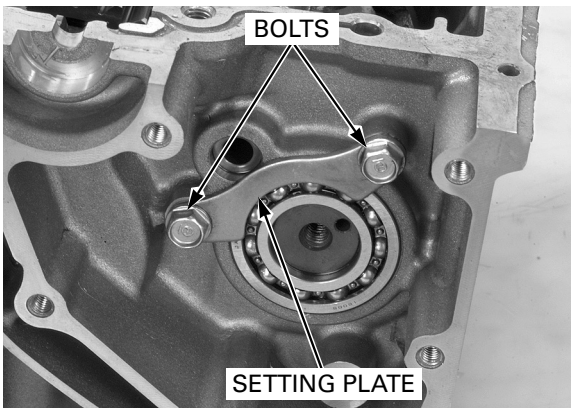
Separate the crankcase (page 12-6).

RIGHT CRANKCASE

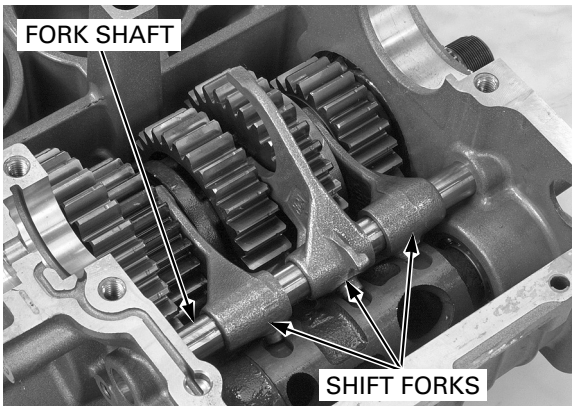
SHIFT FORK AND SHIFT DRUM:

Remove the following:

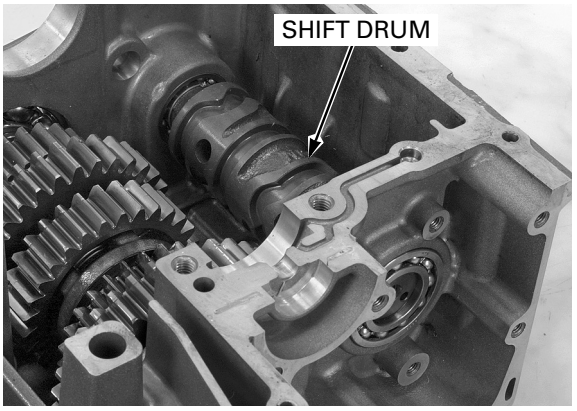
- two bolts
- shift drum setting plate



– fork shaft
– shift forks

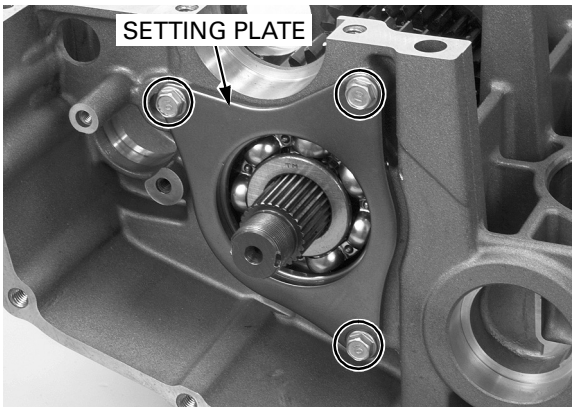


– shift drum assembly

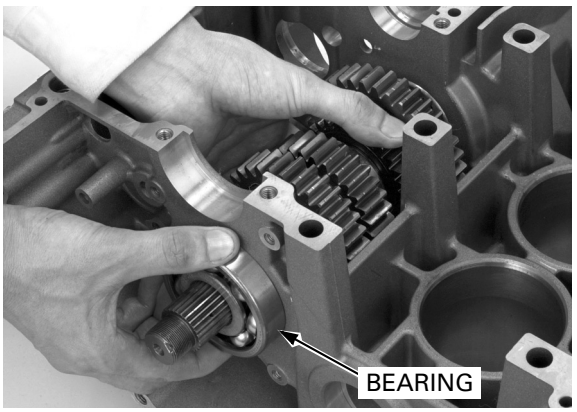


COUNTERSHAFT:

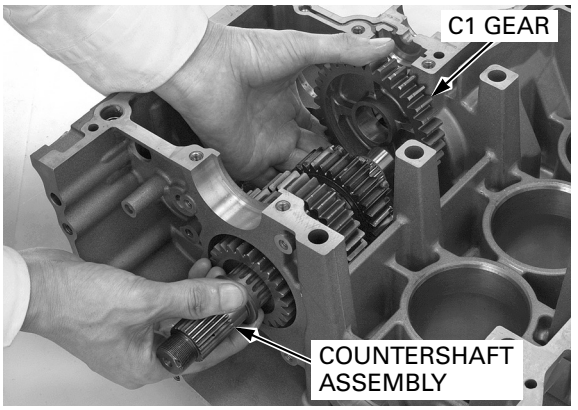
Remove the three bolts and countershaft setting plate.



Slide the countershaft off the crankcase and remove the rear side bearing.



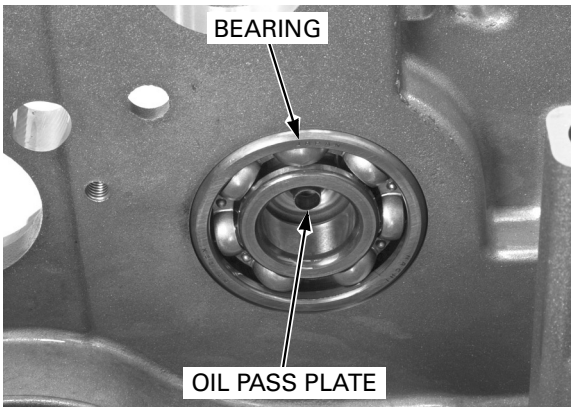
Remove the C1 gear (front end gear) to avoid interference with the crankcase.
Remove the countershaft assembly out of the crankcase.



Remove the front side bearing and oil pass plate.

Disassemble the countershaft.

Clean all disassembled parts in solvent thoroughly.

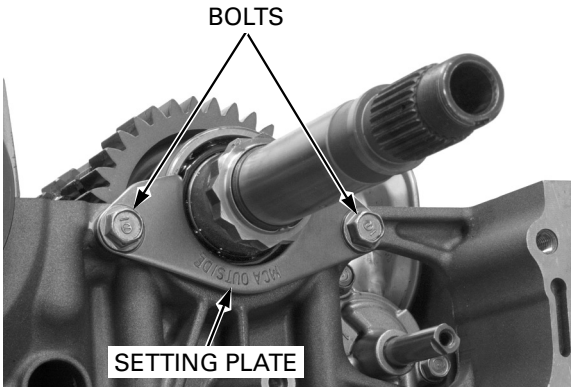


LEFT CRANKCASE

MAINSHAFT:

Remove the following:

– two bolts
– mainshaft setting plate

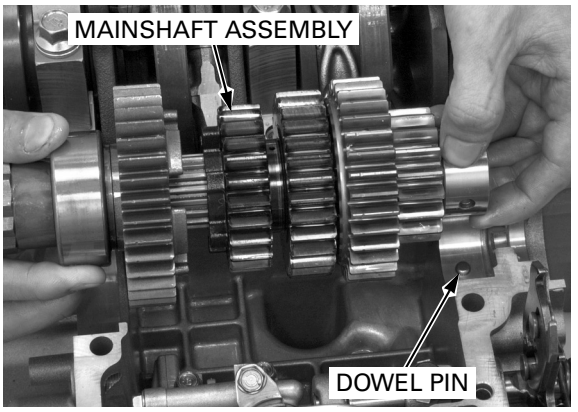


– mainshaft assembly
– dowel pin

Disassemble the mainshaft.

Clean all disassembled parts in solvent thoroughly.

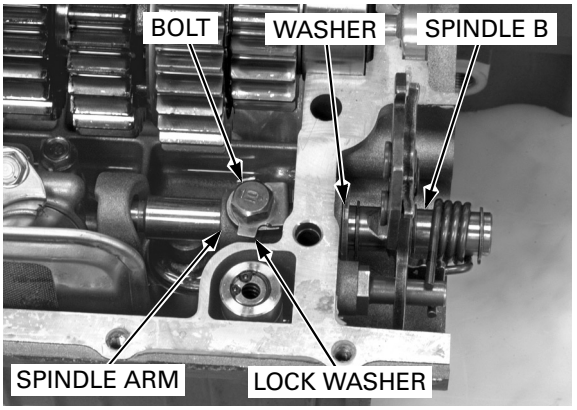
Check the needle bearing for abnormal wear or damage.



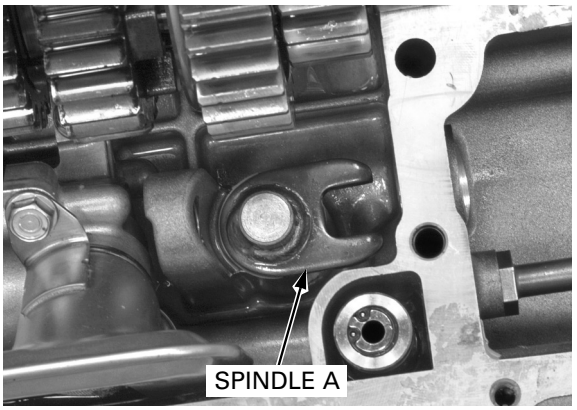
GEARSHIFT SPINDLE:

Remove the following:

– bolt and lock washer (straighten washer tabs)
– gearshift spindle B
– thrust washer
– spindle arm

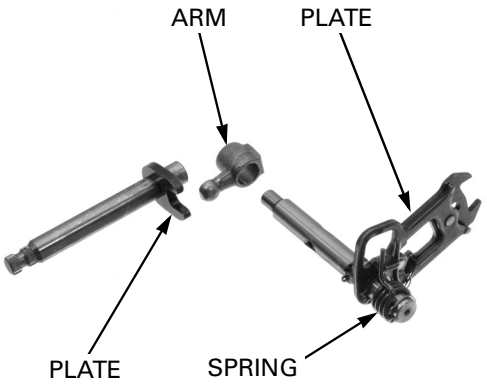


– gearshift spindle A
– oil seal



INSPECTION

Check the gearshift spindles for bends.
Check the spindle arm and spindle plates for wear or damage.
Check the spindle return spring for fatigue or damage.

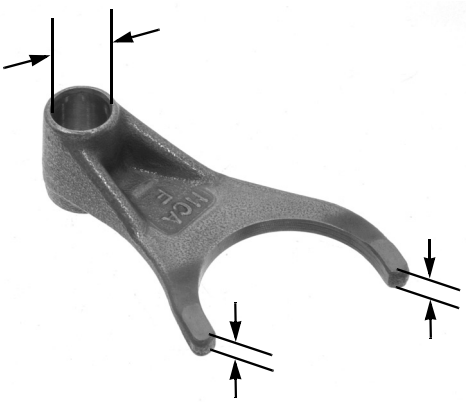


Check the shift fork guide pins for abnormal wear or damage.
Measure the shift fork I.D.

SERVICE LIMIT: 14.04 mm (0.553 in)

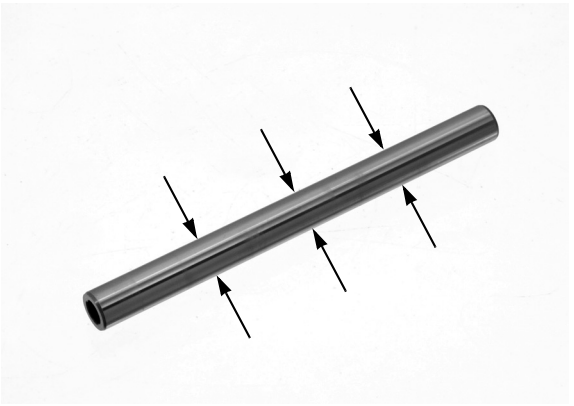
Measure the shift fork claw thickness.

SERVICE LIMIT: 5.6 mm (0.22 in)



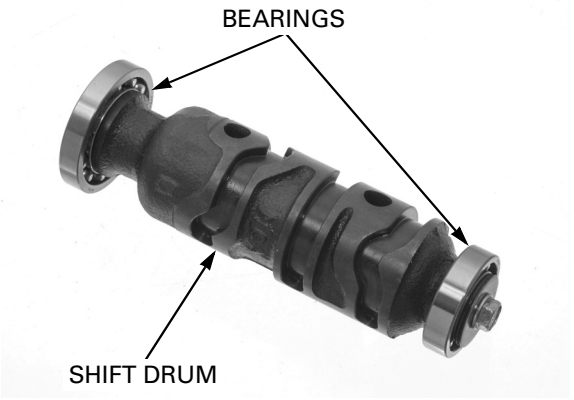
Measure the shift fork shaft O.D.

SERVICE LIMIT: 13.90 mm (0.547 in)



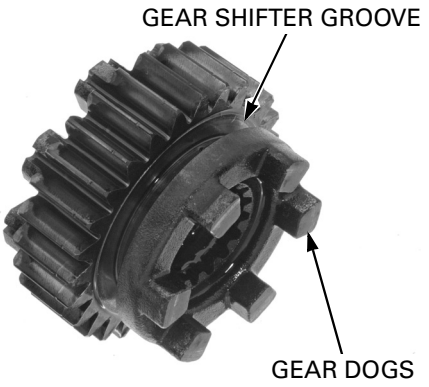
Check the shift drum guide grooves and reverse lock cam for abnormal wear or damage.

Check the shift drum bearings for smooth rotation.



Check the gear shifter groove for abnormal wear or damage. Check the gear dogs and teeth for abnormal wear or damage.

If there is damage to the gear dogs, check the slots or dogs on the corresponding engagement gear for damage.

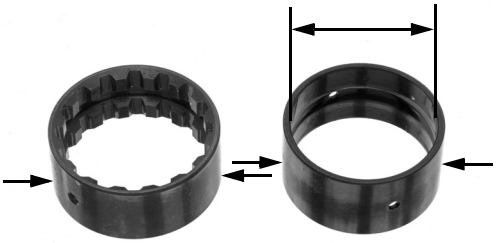


Measure the gear I.D.

SERVICE LIMITS:
M4: 31.04 mm (1.222 in)
M5: 35.04 mm (1.380 in)
C2, C3: 33.04 mm (1.301 in)

Measure the gear bushing O.D.

SERVICE LIMITS:
M4: 30.93 mm (1.218 in)
M5: 34.93 mm (1.375 in)
C2, C3: 32.93 mm (1.296 in)



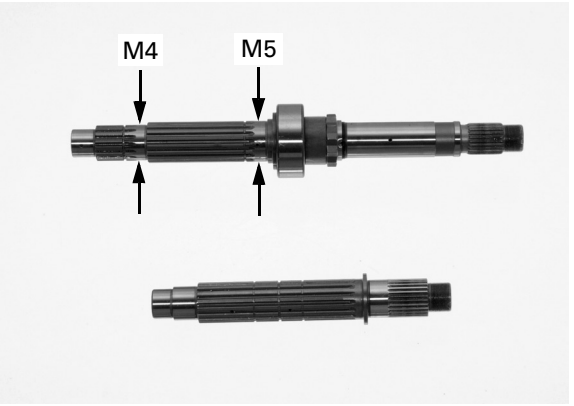
Calculate the gear-to-bushing clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

Measure the gear bushing I.D.

SERVICE LIMITS:
M4: 28.04 mm (1.104 in)
M5: 32.04 mm (1.261 in)

Check the mainshaft and countershaft for abnormal wear or damage.
Measure the mainshaft O.D. at the M4 and M5 gears.



SERVICE LIMITS:
M4: 27.96 mm (1.101 in)
M5: 31.96 mm (1.258 in)

Calculate the gear bushing-to-shaft clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)

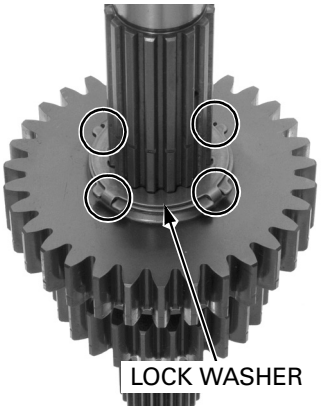
Turn the mainshaft bearing race with your finger. The bearing should turn smoothly and quietly.

Replace the mainshaft if the race does not turn smoothly or quietly.

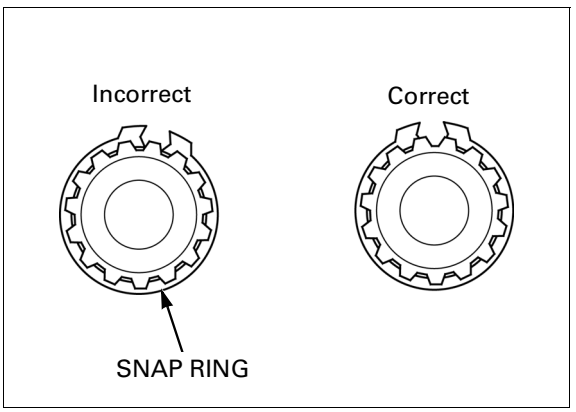
TRANSMISSION ASSEMBLY

NOTE:

- Align the lock washer tabs with the splined washer grooves.
- Always install the thrust washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.



- Install the snap ring so its end gap aligns with the groove in the splines
- Make sure the snap ring is fully seated in the shaft groove after installing it.

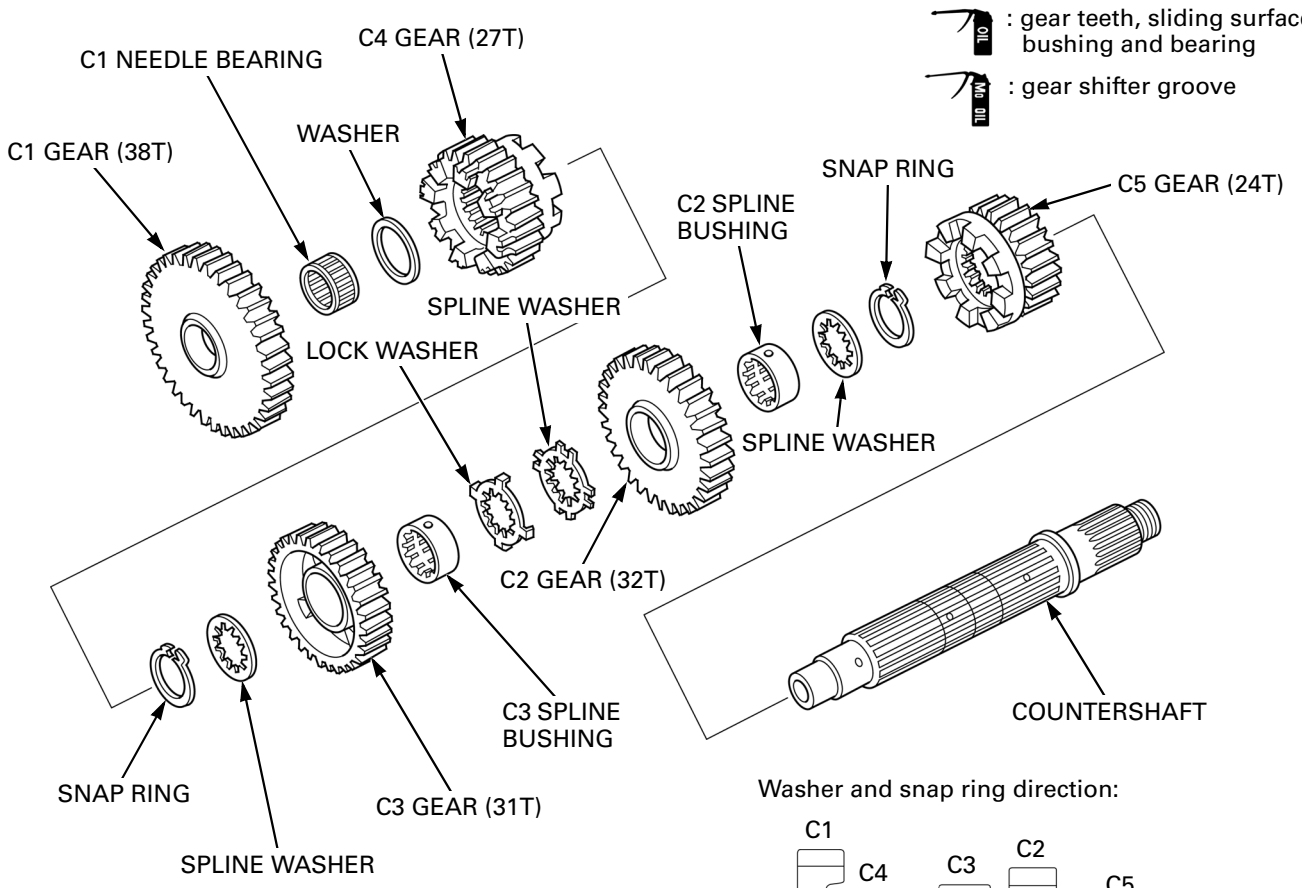


COUNTERSHAFT

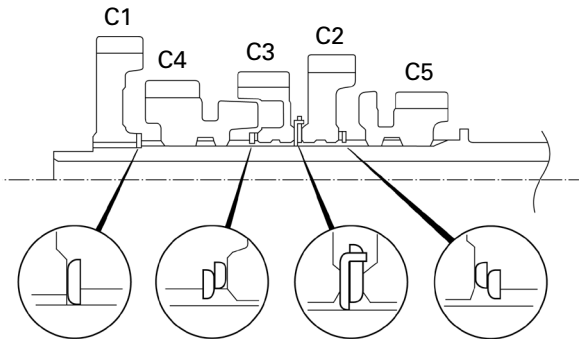
Apply engine oil to the gear teeth, sliding surfaces, bushings and bearing.

Apply molybdenum oil solution to the gear shifter grooves.

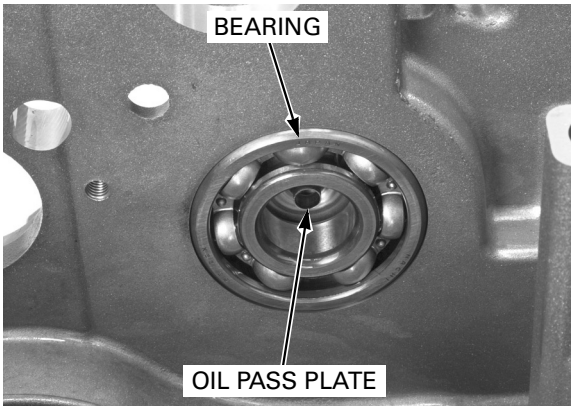
Assemble the countershaft except the C1 gear (front end gear).



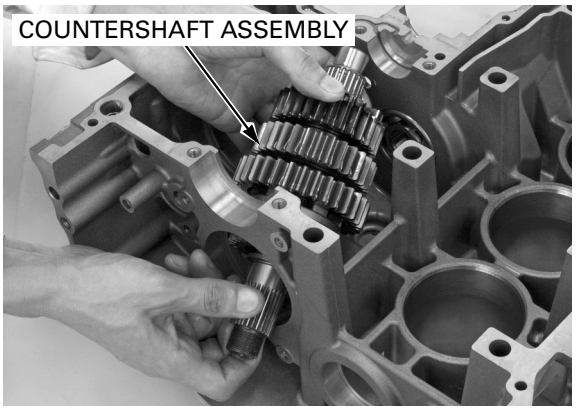
Washer and snap ring direction:



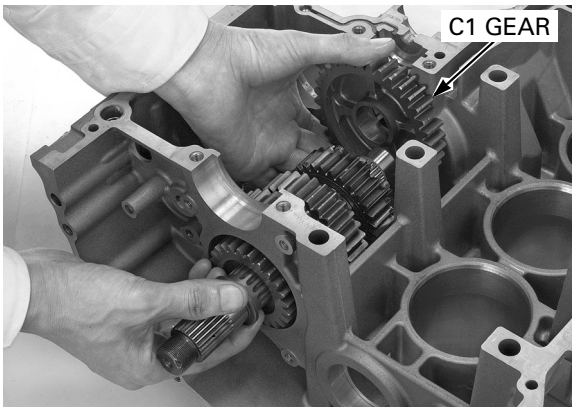
Install the oil pass plate and front side bearing into the right crankcase.



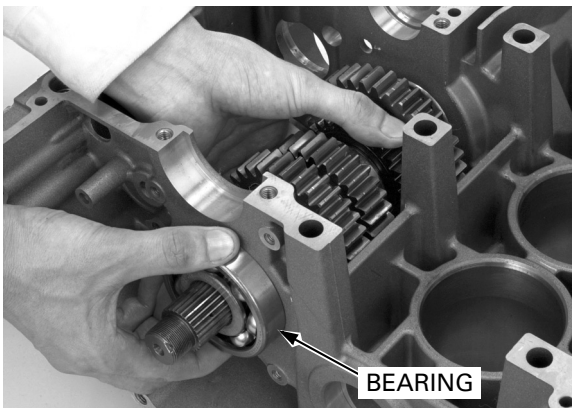
Insert the countershaft assembly into the hole (bearing support) in the crankcase and support it, being careful not to damage the gear teeth.



Install the C1 gear onto the countershaft. Install the countershaft assembly into the bearing in the crankcase.

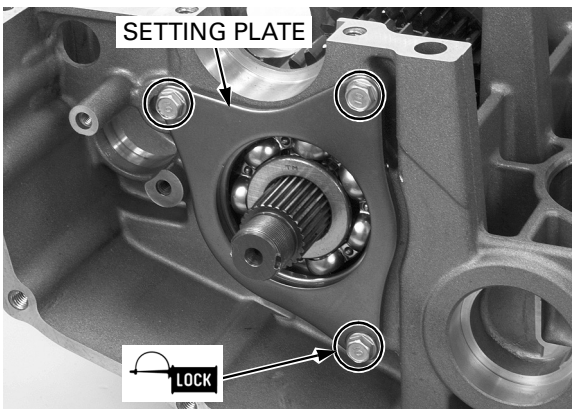


Support the countershaft assembly and install the rear side bearing onto the countershaft and into the crankcase.



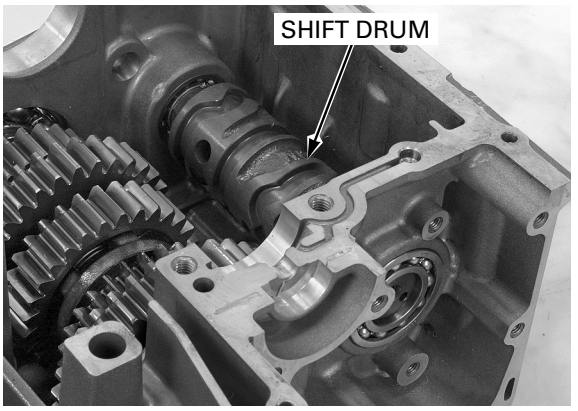
Apply locking agent to the setting plate bolt threads. Install the setting plate and tighten the three bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

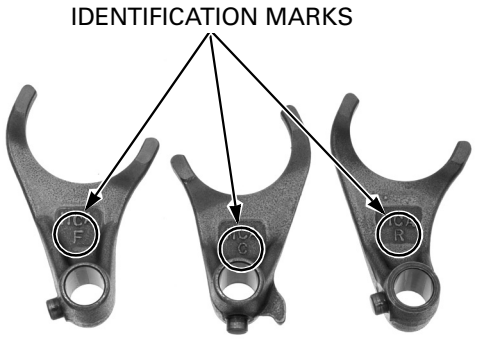


SHIFT DRUM AND SHIFT FORK

Install the shift drum assembly from the front side of the crankcase to seat its bearings into the bearing supports properly.

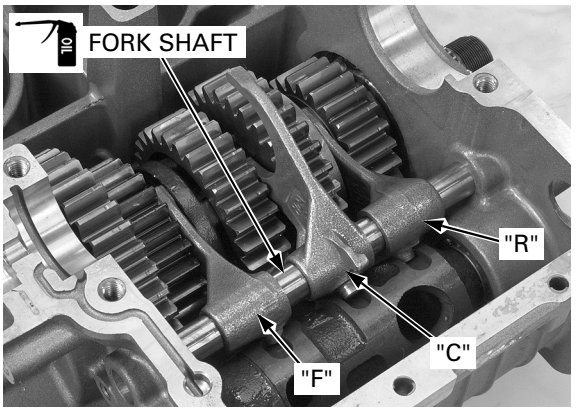


The shift forks have the following identification marks:
F: front shift fork
C: center shift fork
R: rear shift fork



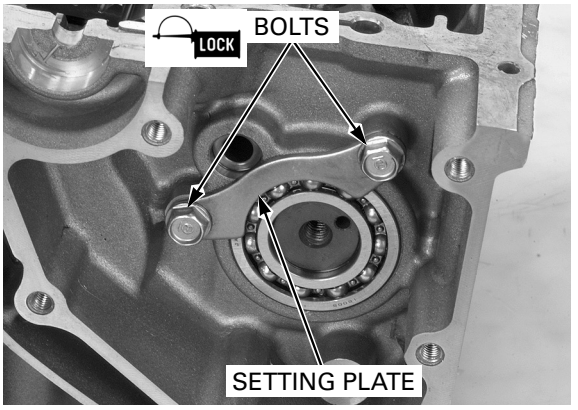
Apply engine oil to the outer surface of the shift fork shaft.

Install the shift forks into the gear shifter grooves (front and rear forks) and into the shift drum guide grooves with the identification marks facing toward the front side of the engine, then insert the fork shaft.



Apply locking agent to the setting plate bolt threads. Install the setting plate and tighten the two bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



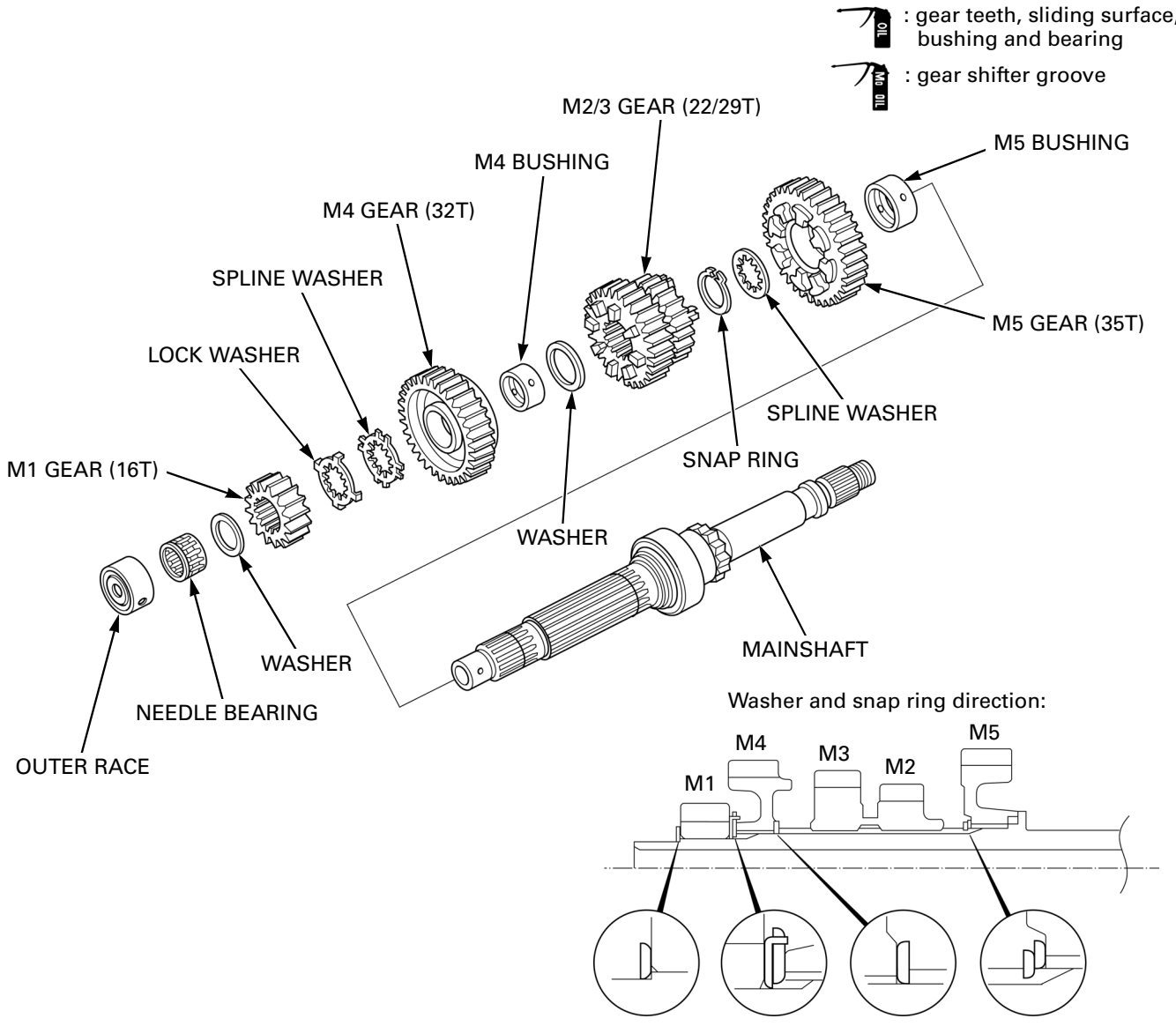
MAINSHAFT

Apply engine oil to the gear teeth, sliding surfaces, bushings and bearing.

Apply molybdenum oil solution to the gear shifter grooves.

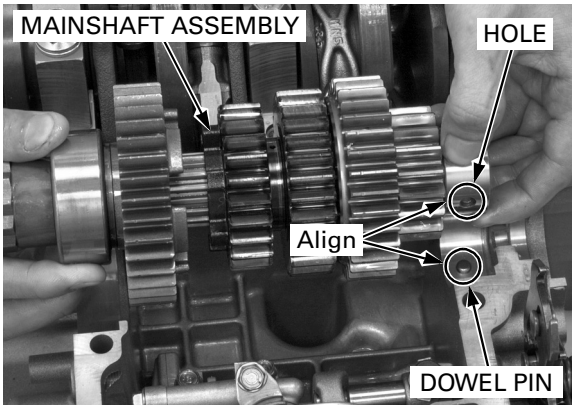
See NOTE on page 11-36.

Assemble the mainshaft.



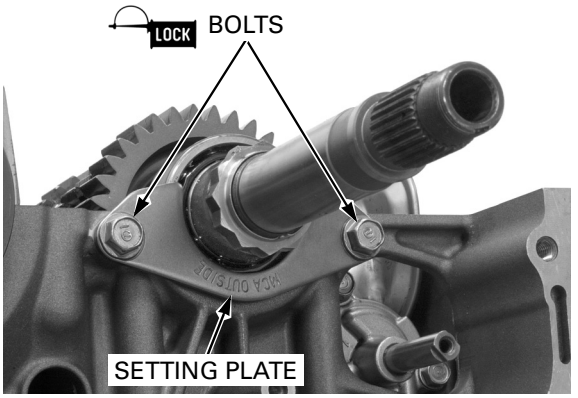
Washer and snap ring direction:

Install the dowel pin into the crankcase.
Install the mainshaft assembly by properly aligning the hole in the needle bearing with the dowel pin.



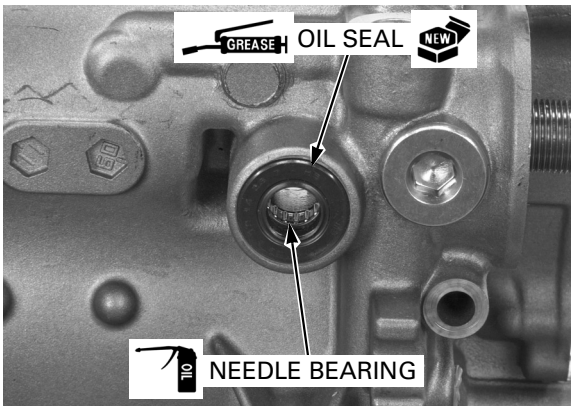
Apply locking agent to the setting plate bolt threads. Install the setting plate with the "OUTSIDE" mark facing out and tighten the two bolts.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

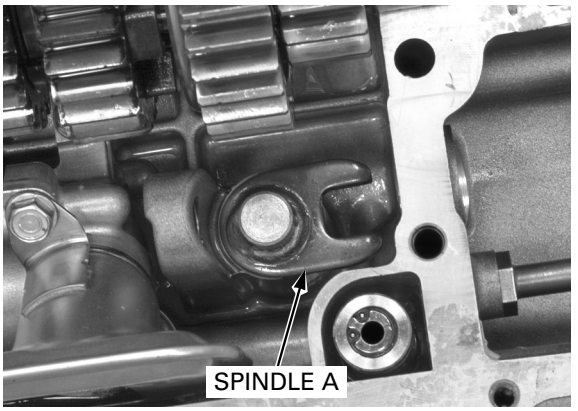


GEARSHIFT SPINDLE

Apply engine oil to the needle bearings (four places).
Pack grease into the seal lip cavity of a new oil seal and install it into the crankcase.

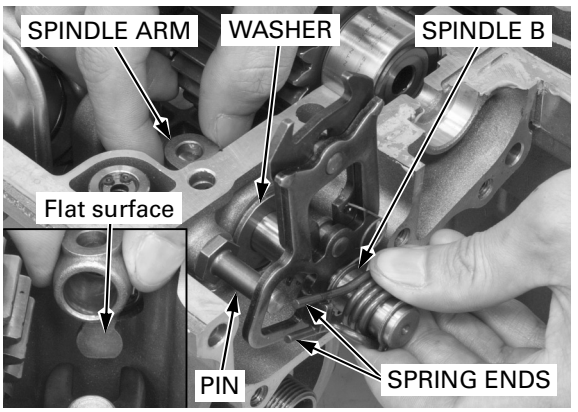


Install gearshift spindle A, being careful not to damage the oil seal lips.



Install the thrust washer onto gearshift spindle B.

Place the spindle arm through the notch in spindle A with the flat surface of the arm facing in. Then insert spindle B through the crankcase and spindle A, align the spring ends with the spring pin.



Align the bolt holes in the spindle arm and spindle B, and install a new lock washer and the bolt. Tighten the bolt.

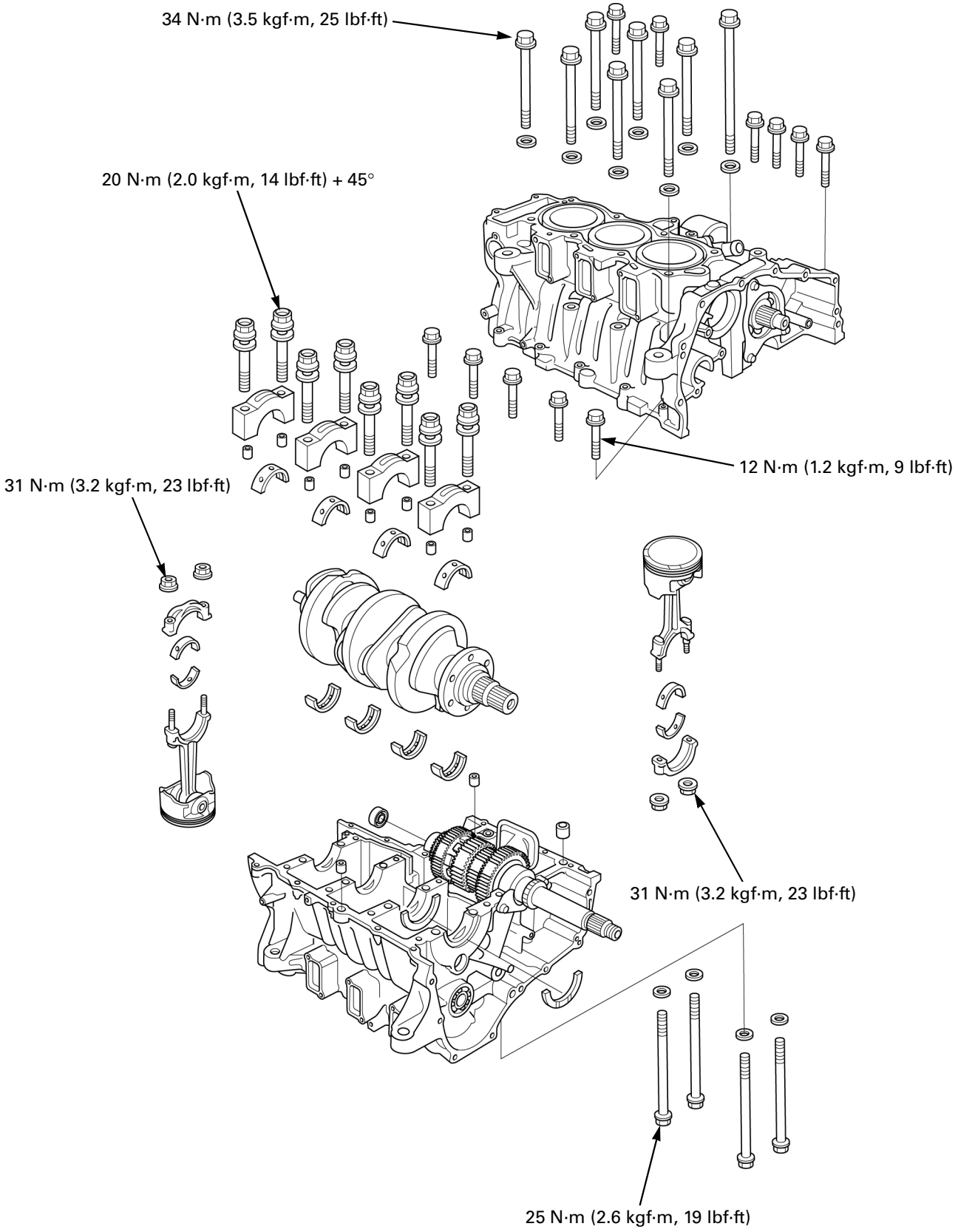
TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Bend the lock tabs up against the bolt head.

Assemble the crankcase halves (page 12-22).

12. CYLINDER/PISTON/CRANKSHAFT

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the piston/connecting rod, crankcase and crankshaft.
- Avoid damaging the pistons against the transmission gears or crankcase when separating the crankcase halves because the pistons will fall as the crankcase is pulled off them.
- Be careful not to damage the crankcase mating surface when servicing.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.
- Mark and store the connecting rods, bearing caps, pistons, main journal bearing cap bolts and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.
- Before loosening the crankshaft bearing cap bolts, punch each bolt flange and main journal bearing cap at the same position to indicate the aligning point for tightening the bolts during reassembly.

SPECIFICATIONS

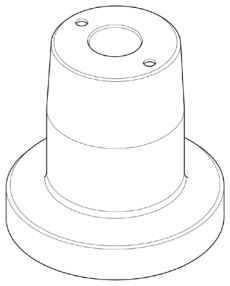
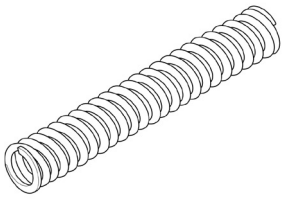
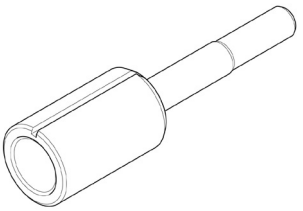
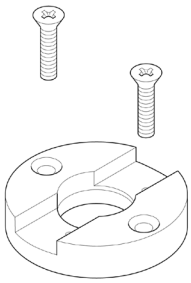
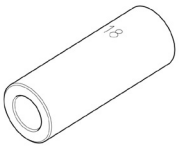
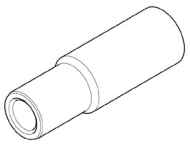
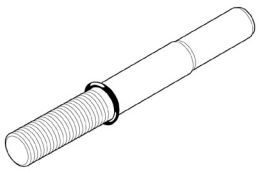
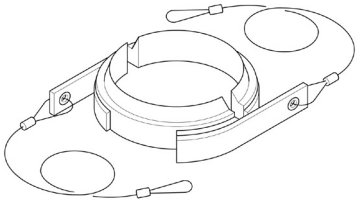
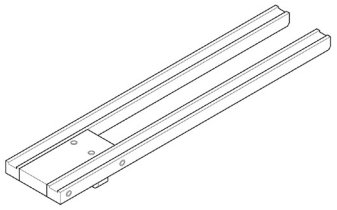
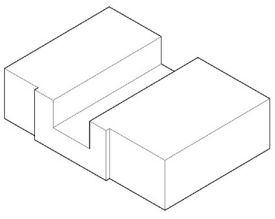
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		74.000 – 74.015 (2.9134 – 2.9140)	74.10 (2.917)
	Out of round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.05 (0.002)
Piston, piston pin, piston rings	Piston O.D. at 10 mm (0.4 in) from bottom		73.970 – 73.990 (2.9122 – 2.9130)	73.85 (2.907)
	Piston pin hole I.D.		18.010 – 18.016 (0.7091 – 0.7093)	18.03 (0.710)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.99 (0.708)
	Piston-to-piston pin clearance		0.010 – 0.022 (0.0004 – 0.0009)	0.05 (0.002)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.5 (0.02)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.6 (0.02)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.9 (0.04)
	Piston ring-to-ring groove clearance	Top	0.025 – 0.055 (0.0010 – 0.0022)	0.10 (0.004)
		Second	0.015 – 0.045 (0.0008 – 0.0018)	0.10 (0.004)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Crankshaft	Connecting rod side clearance		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
	Crankpin bearing oil clearance		0.028 – 0.046 (0.0011 – 0.0018)	0.06 (0.002)
	Main journal bearing oil clearance	1, 4	0.012 – 0.030 (0.0005 – 0.0012)	0.06 (0.002)
		2, 3	0.020 – 0.038 (0.0008 – 0.0015)	0.06 (0.002)
	Runout		–	0.03 (0.001)
	Crankpin and main journal	Taper	–	0.003 (0.0001)
		Out-of-round	–	0.005 (0.0002)

TORQUE VALUES

Connecting rod bearing cap nut	31 N·m (3.2 kgf·m, 23 lbf·ft)	Apply engine oil to the threads and seating surface.
Crankshaft main journal bearing cap bolt	20 N·m (2.0 kgf·m, 14 lbf·ft) + 45°	Apply engine oil to the threads.
Left crankcase bolt	25 N·m (2.6 kgf·m, 19 lbf·ft)	
Right crankcase 10 mm bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	Apply engine oil to the threads.
Water hose joint bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.

TOOLS

Piston base 07973-6570500 	Piston base spring 07973-6570600 	Piston pin pilot 07PAF-0010300  or Pilot base insert 07973-6570400 (U.S.A. only)
Piston base head 07PAF-0010400  or 07JGF-001010A (U.S.A. only)	Pilot collar, 18 mm 07PAF-0010640  or 07KMF-MT20200 (U.S.A. only)	Adjustable piston pin driver head 07PAF-0010700  or 07973-6570210 (U.S.A. only)
Adjustable piston pin driver shaft 07PAF-0010800  or 07973-6570300	Piston ring compressor 07JMG-MN5000B (U.S.A. only)  or 07JMG-MN5000A (U.S.A. only)	Piston base A 07ZMG-MCAA100 (U.S.A. only) 
Piston base B 07ZMG-MCAA200 (U.S.A. only) 		

TROUBLESHOOTING

Cylinder compression is too low, hard to start, or poor performance at low speed
- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

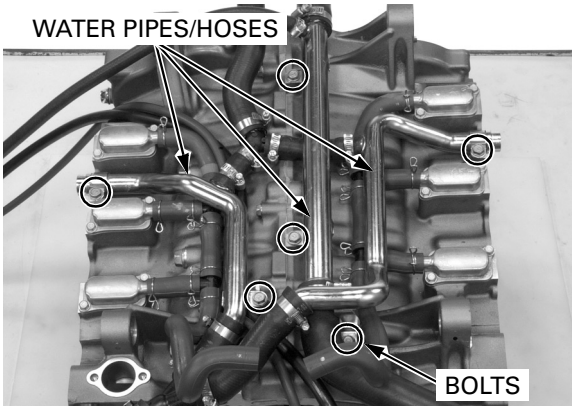
Cylinder compression too high, overheats or knocks
- Carbon deposits on the cylinder head and/or piston crown

Excessive smoke
- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

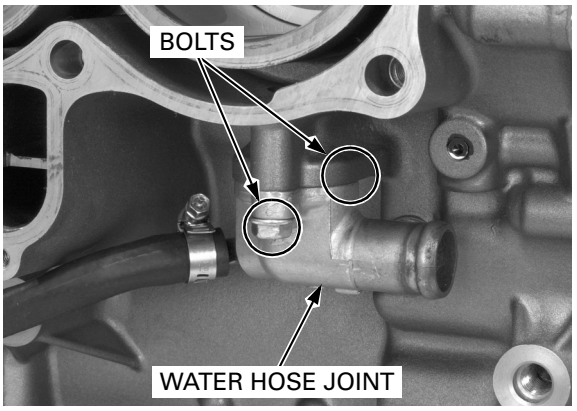
Abnormal noise
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings
- Worn main journal bearings
- Worn crankpin bearings

CRANKCASE SEPARATION

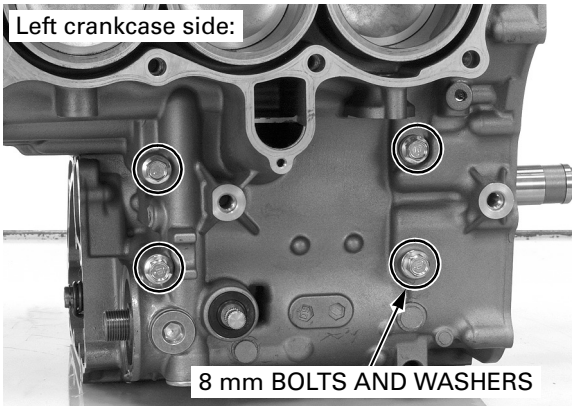
Remove the following:
- engine (page 8-5)
- cylinder head and cam chain (section 8)
- gearshift linkage (page 11-8)
- primary gears and output shaft (section 10: If you plan to service the transmission, remove the final drive gear)
- six bolts and water pipes/hoses
- PAIR check valves (page 6-59)



Remove the following from the left crankcase:
- four bolts
- water hose joints
- O-rings

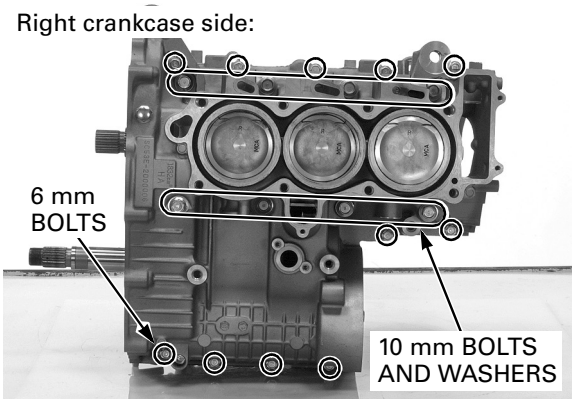


- four 8-mm bolts and washers



Place the engine with the left side down.

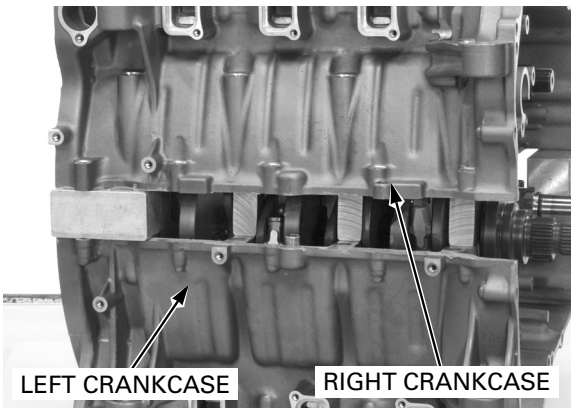
Loosen the eleven 6-mm bolts and eight 10-mm bolts in a crisscross cross pattern in several steps. Remove the bolts and washers.



Be careful not to damage the crankcase mating surfaces.

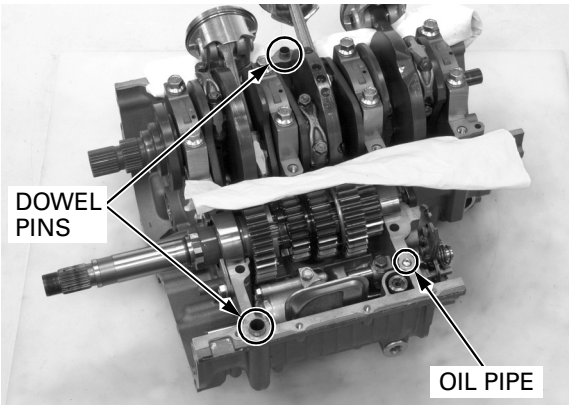
Lift the right crankcase and separate the crankcase halves, and set suitable wooden blocks between them to support the right crankcase.

To prevent the pistons from falling and from being damaged when removing the right crankcase, place shop towels under the pistons and over the transmission gears and crankcase mating surfaces.
Remove the right crankcase.



Remove the dowel pins and oil pipe.

Clean any sealant from the crankcase mating surface.



PISTON/CONNECTING ROD REMOVAL

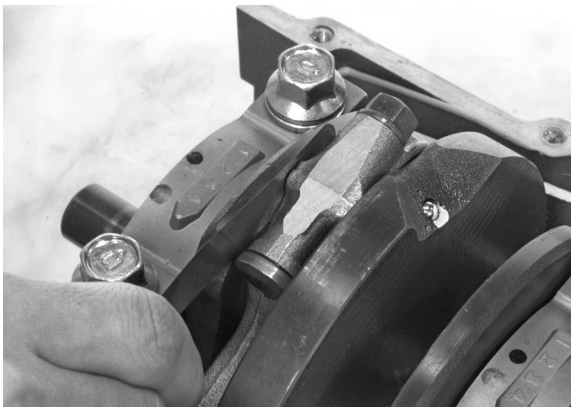
Separate the crankcase halves (page 12-6).

SIDE CLEARANCE INSPECTION

Measure the connecting rod side clearance.

SERVICE LIMIT: 0.40 mm (0.016 in)

If the clearance exceeds the service limit, replace the connecting rod.
Recheck and if it is still out of specification, replace the crankshaft.



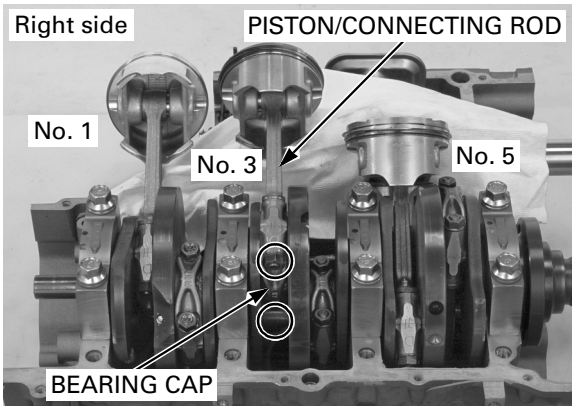
PISTON/CONNECTING ROD REMOVAL

NOTE:

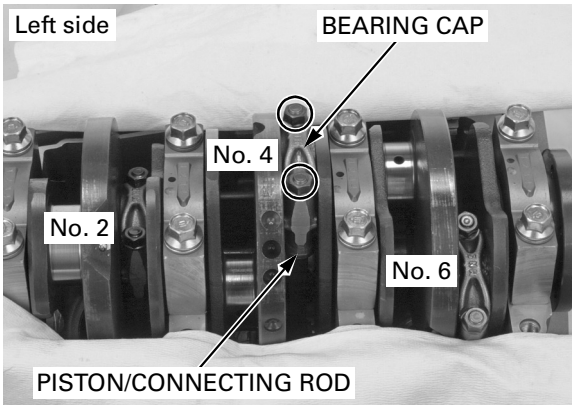
- Mark the bearing caps, bearings, connecting rods and pistons as you remove them to indicate the correct cylinders.

Tap the side of the cap lightly if the bearing cap is hard to remove. Be careful not to damage the crankpin and bearing inserts.

Remove the bearing cap nuts, bearing caps and piston/connecting rod assemblies of the right cylinder (No. 1, 3 and 5).

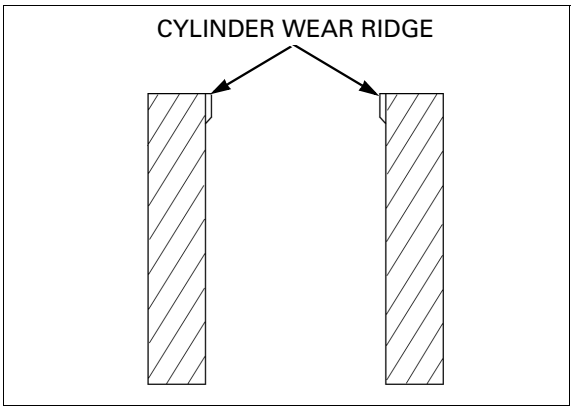


Remove the bearing cap nuts and bearing caps on the left side connecting rods.



Any ridge on the cylinder must be removed with an automotive type ridge reamer before removing the left side pistons.

Push the piston/connecting rod assemblies out through the top of the left cylinder bores (No. 2, 4 and 6).

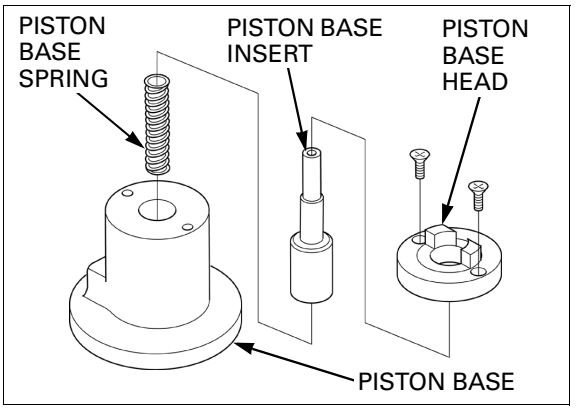


PISTON/PISTON RING REMOVAL

Assemble the special tools (piston base assembly) as shown.

TOOLS:

Piston base	**07973-6570500**
Piston base spring	**07973-6570600**
Pilot base insert	**07973-6570400**
Piston base head	**07JGF-001010A**

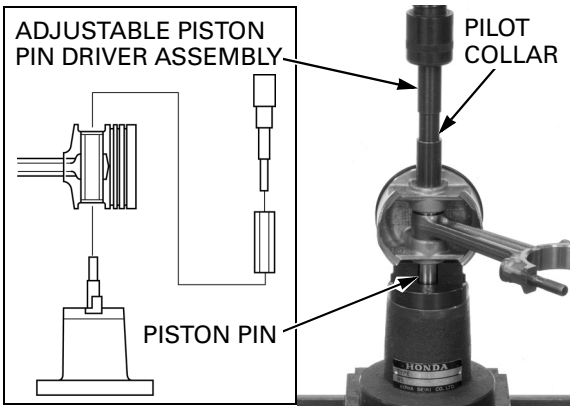


Set the piston by aligning its boss with the base head inserts and install the following special tools into the piston as shown.

TOOLS:

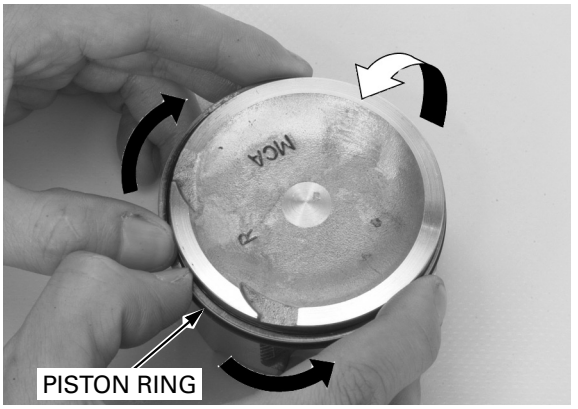
Pilot collar, 18 mm	**07KMF-MT20200**
Adjustable piston pin driver head	**07973-6570210**
Adjustable piston pin driver shaft	**07973-6570300**

Press the piston pin out of the connecting rod.



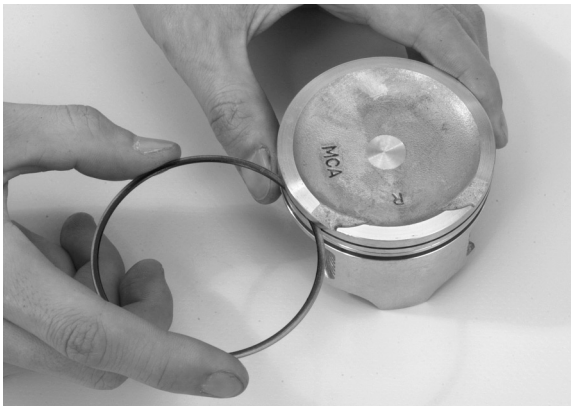
Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up at 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.Never use a wire brush; it will scratch the groove.



PISTON INSPECTION

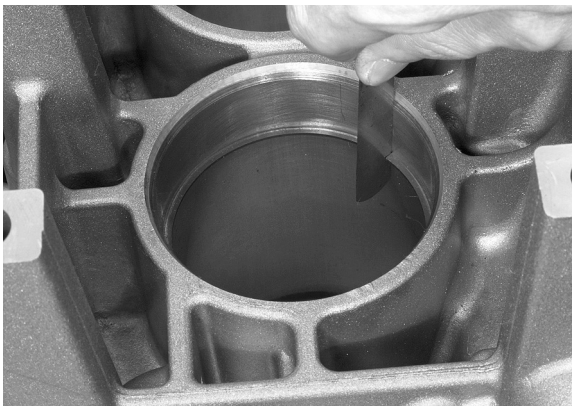
Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

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/Second: 0.10 mm (0.004 in)

Insert each piston ring into the bottom of the cylinder squarely using the piston crown.
Measure the ring end gap.

SERVICE LIMITS: Top: 0.5 mm (0.02 in)
Second: 0.6 mm (0.02 in)
Oil (side rail): 0.9 mm (0.04 in)



Measure the piston pin O.D. at piston pin hole areas.

SERVICE LIMIT: 17.99 mm (0.708 in)

Measure the piston pin hole I.D.

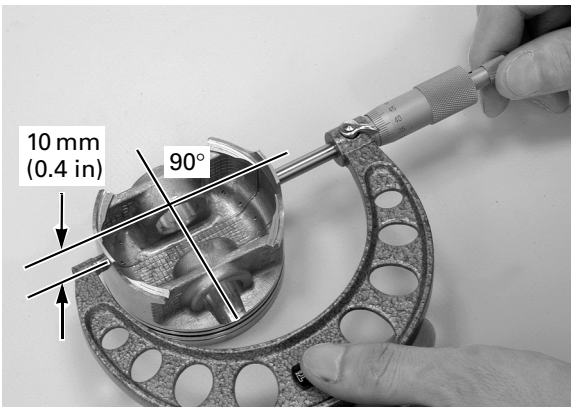
SERVICE LIMIT: 18.03 mm (0.710 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.05 mm (0.002 in)

Measure the piston O.D. at a point 10 mm (0.4 in) from the bottom and 90° to the piston pin hole.

SERVICE LIMIT: 73.85 mm (2.907 in)



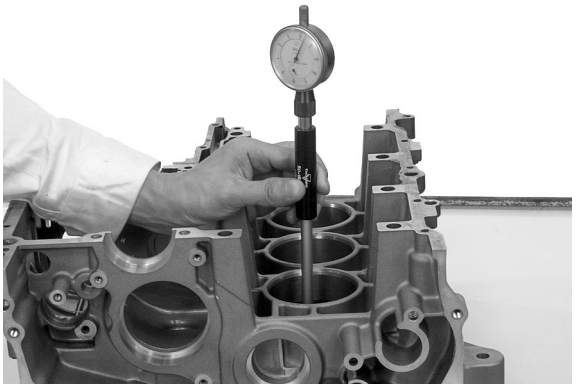
CYLINDER INSPECTION

Inspect 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: 74.10 mm (2.917 in)

Calculate the cylinder-to-piston clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

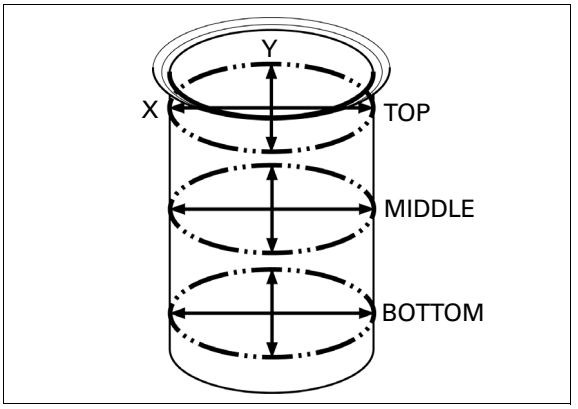


Calculate the cylinder taper and out-of-round at three levels on the X and Y axes. Take the maximum reading to determine the taper and out-of-round.

SERVICE LIMITS: Taper: 0.10 mm (0.004 in)
Out-of-round: 0.10 mm (0.004 in)

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

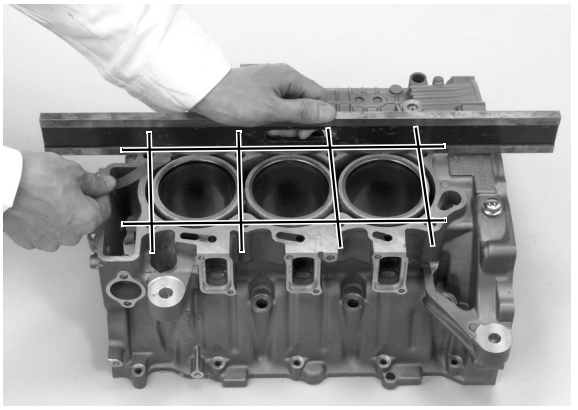
The following oversize pistons are available:
– 0.25 mm (0.010 in)
– 0.50 mm (0.020 in)
– 0.75 mm (0.030 in)
– 1.00 mm (0.040 in)



The cylinder must be rebored so the clearance for an oversize piston is 0.010—0.045 mm (0.0004—0.0018 in).

Check the top of the cylinder for warpage with a straight edge and feeler gauge.

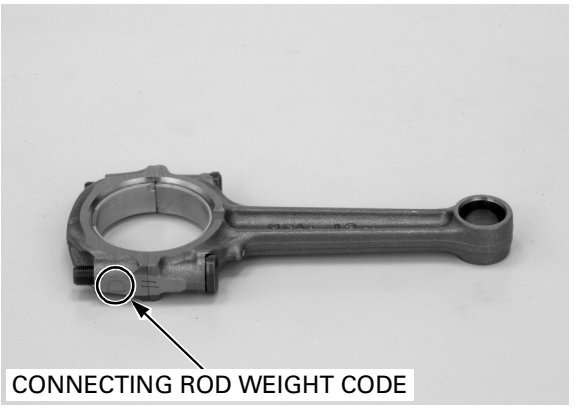
SERVICE LIMIT: 0.05 mm (0.002 in)



CONNECTING ROD SELECTION

Letter A, B, C, D or E on the rod is the code for the connecting rod weight.

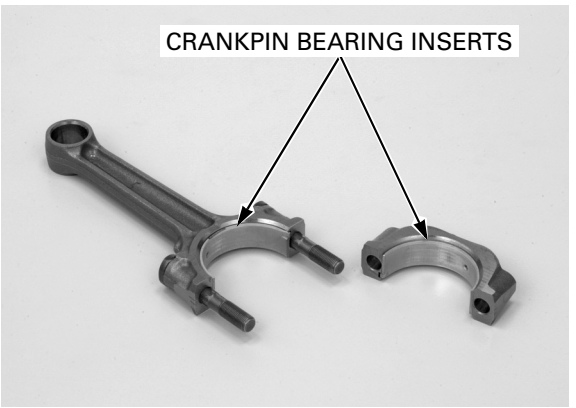
If a connecting rod requires replacement, you should select a rod with the same weight code as the original.



CRANKPIN BEARING

BEARING INSPECTION

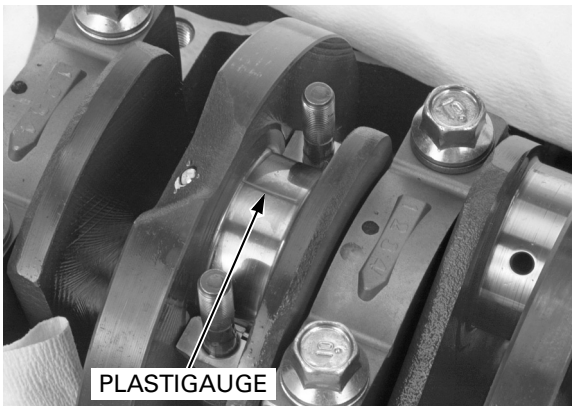
Check the bearing inserts for unusual wear or peeling.
Check the bearing tabs for damage.



OIL CLEARANCE INSPECTION

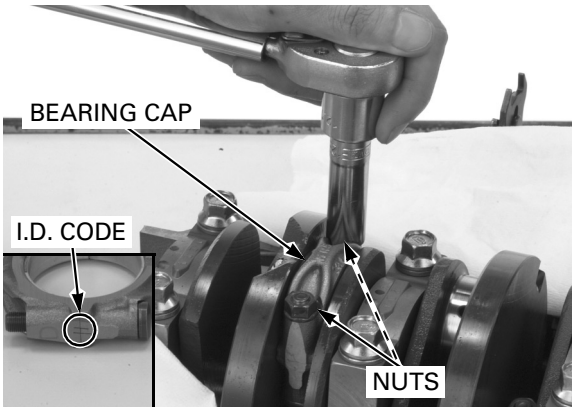
Do not rotate the crankshaft and connecting rod during inspection.

Clean off any oil from the bearing inserts and crankpins.
Set the connecting rods onto the crankpins.
Put strips of plastigauge lengthwise on the crankpins being sure to avoid the oil hole.



Carefully install the bearing caps by aligning the I.D. code.
Apply engine oil to the bearing cap nut threads and seating surfaces and install them.
Tighten the nuts in several steps alternately.

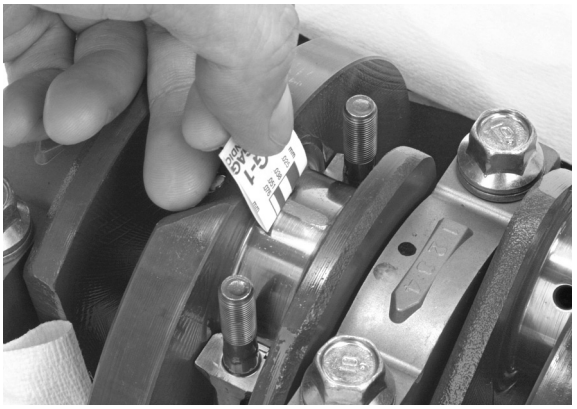
TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



Remove the bearing caps and measure the compressed plastigauge at its widest point on each crank-pin to determine the oil clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)

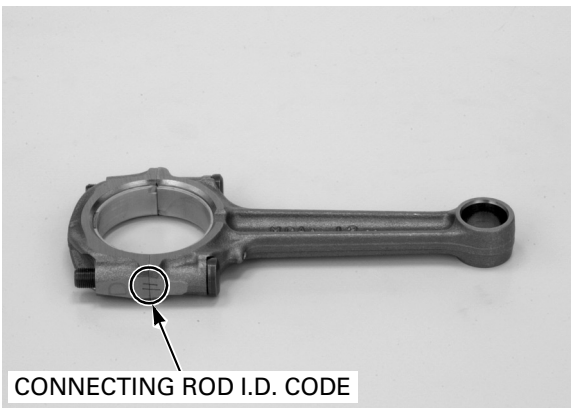
If the oil clearance exceeds the service limit, select the correct replacement bearings.



BEARING SELECTION

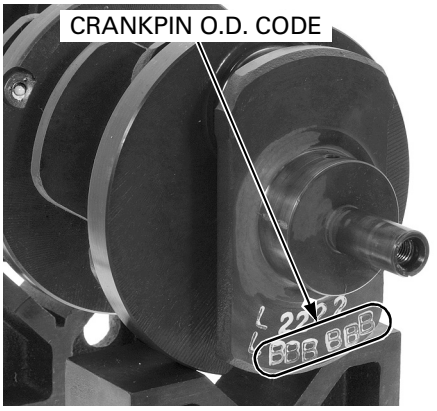
Number 1 (I), 2 (II) or 3 (III) on the connecting rod is the code for the connecting rod I.D.

Record the connecting rod I.D. code numbers.

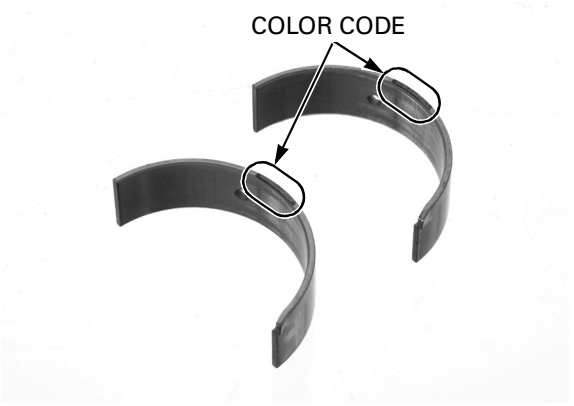


Letter A, B or C on the front side of the crankshaft are the codes for the crankpin O. D. in the sequence from the No. 1 crankpin (front to rear).

Record the crankpin O.D. code letters.



Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.



Connecting rod I.D. code / Crankpin O.D. code	1 (I)	2 (II)	3 (III)
A	Yellow	Green	Brown
B	Green	Brown	Black
C	Brown	Black	Blue

Bearing thickness:

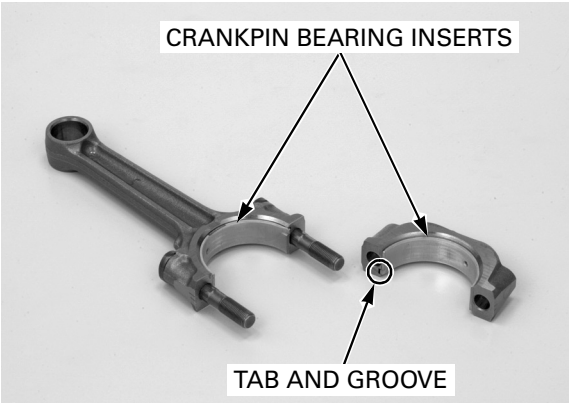
Blue
Black
Brown
Green
Yellow

Thick
Thin

After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.

BEARING INSTALLATION

Clean the bearing outer surfaces, bearing caps and connecting rods.
Install the crankpin bearing inserts onto the bearing caps and connecting rods, aligning each tab with each groove.



CRANKSHAFT REMOVAL

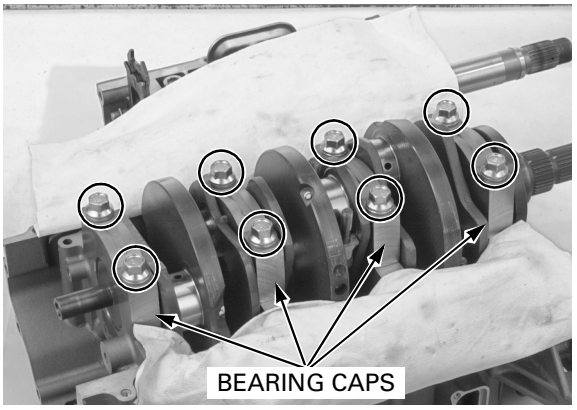
Remove the piston/connecting rod assemblies of the right cylinder and the bearing caps on the left cylinder connecting rods (page 12-8).

NOTE:

- Mark the bearing cap bolts and bearings as you remove them to indicate the correct journals.

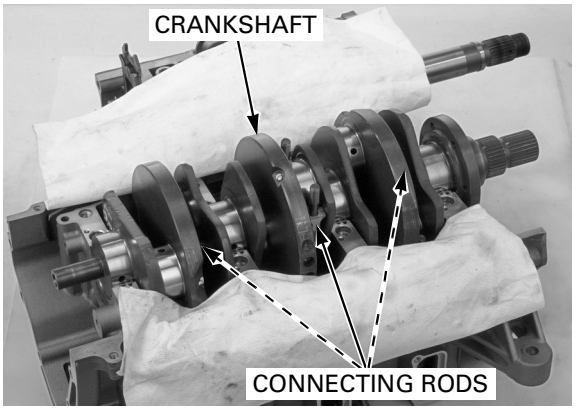
Do not forcibly remove the dowel pins from the bearing caps.

Remove the bolts and the main journal bearing caps.



Move the left crankcase pistons to the top of the bores to avoid damaging the crankshaft with the connecting rod bolts.

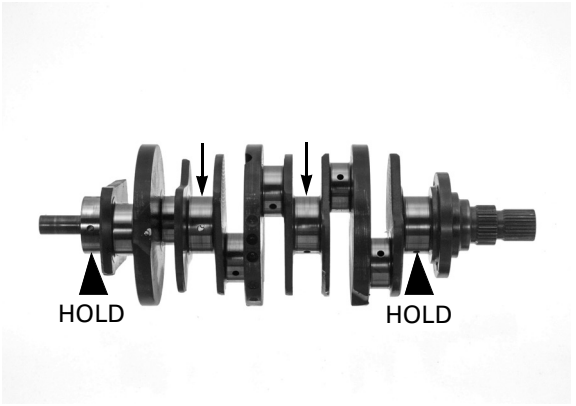
Remove the crankshaft.



CRANKSHAFT INSPECTION

Hold the crankshaft and set a dial indicator on a main journal.
Rotate the crankshaft two revolutions and read the runout at two points.
Actual runout is 1/2 the total indicated reading.

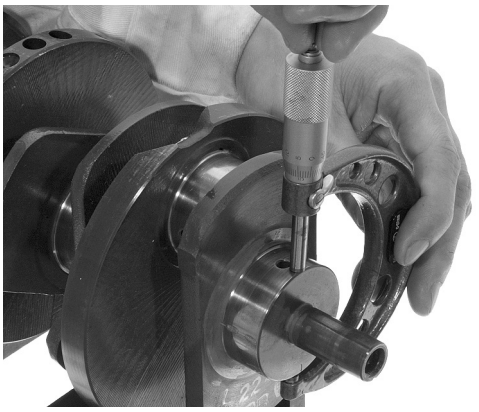
SERVICE LIMIT: 0.03 mm (0.001 in)



The crankshaft cannot be repaired.

Measure the main journals and crankpins with a micrometer for out-of-round and taper.

SERVICE LIMITS: Taper: 0.003 mm (0.0001 in)
Out-of-round: 0.005 (0.0002 in)

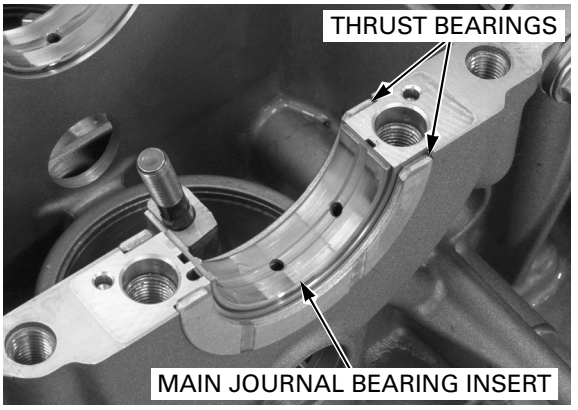


MAIN JOURNAL BEARING

BEARING INSPECTION

Check the main journal bearing inserts on the left crankcase and main journal bearing caps for unusual wear or peeling.
Check the bearing tabs for damage.

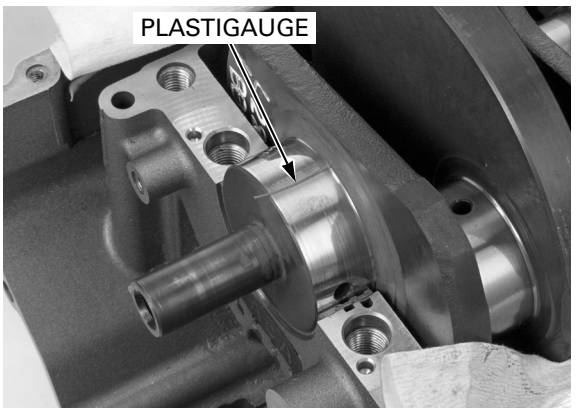
Check the thrust bearings on the rear end bearing support of the left crankcase for wear, scoring or discoloration and replace them if necessary.



OIL CLEARANCE INSPECTION

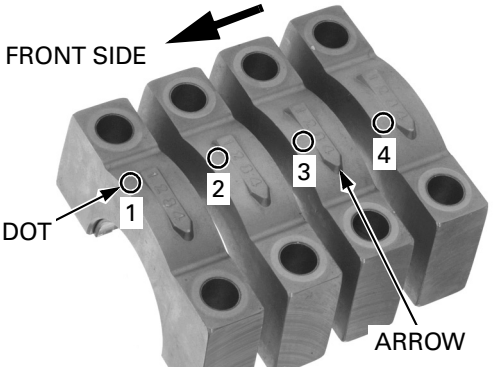
Do not rotate the crankshaft during inspection.

Clean off any oil from the bearing inserts and main journals.
Carefully install the crankshaft onto the left crankcase.
Put strips of plastigauge lengthwise on each main journal, being careful to avoid the oil passage.



The installation position of each main journal bearing cap is identified with a dot mark that is aligned with the journal number 1, 2, 3 and 4, as viewed from the front of the engine.

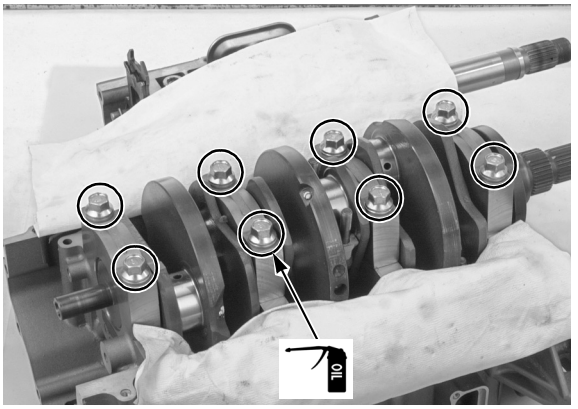
Carefully install the dowel pins and main journal bearing caps onto the corresponding journals with the arrow facing toward the upper side of the engine.



Apply engine oil to the bearing cap bolt threads.
Install the bolts into the correct bolt holes in the bearing caps.

Tighten the bolts in a crisscross pattern in several steps to the specified torque.

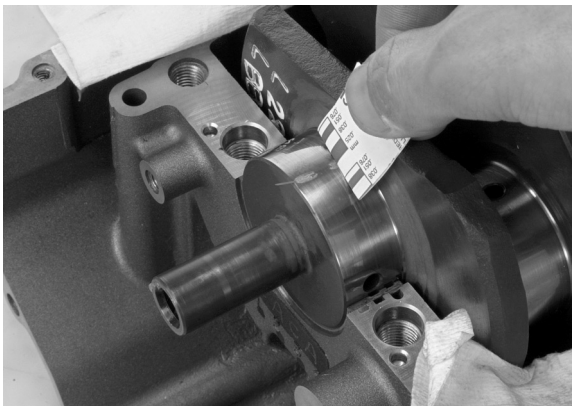
TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft) + 45°



Remove the bearing caps and measure the compressed plastigauge at its widest point on each main journal to determine the oil clearance.

SERVICE LIMIT: All journals: 0.06 mm (0.002 in)

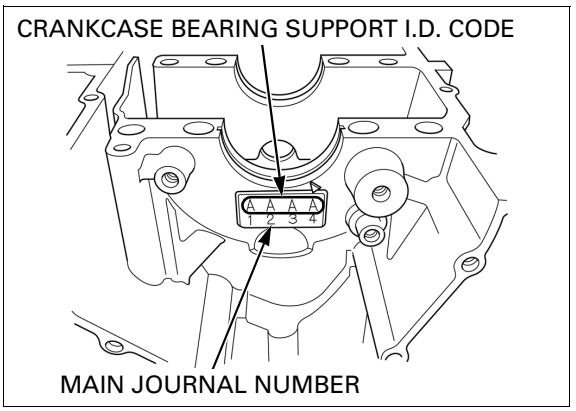
If the oil clearance exceeds the service limit, select the correct replacement bearings.



BEARING SELECTION

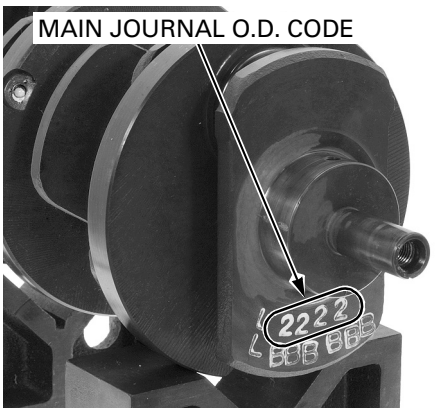
Letter A, B or C on the front side of the left crankcase are the codes for the bearing support I.D. in the sequence from the No. 1 journal (front to rear).

Record the crankcase bearing support I.D. code letters.

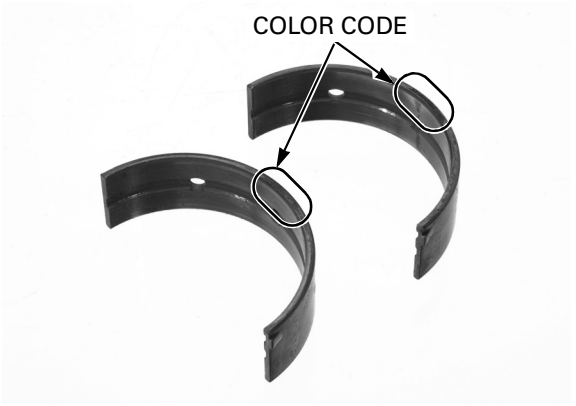


Numbers 1, 2 or 3 on the front side of the crankshaft are the codes for the main journal O.D. in the sequence from the No. 1 journal (front to rear).

Record the main journal O.D. code numbers.



Cross reference the main journal and bearing support codes to determine the replacement bearing color code.



Bearing support I.D. code / Main journal O.D. code	A	B	C
1	Yellow	Green	Brown
2	Green	Brown	Black
3	Brown	Black	Blue

Bearing thickness:

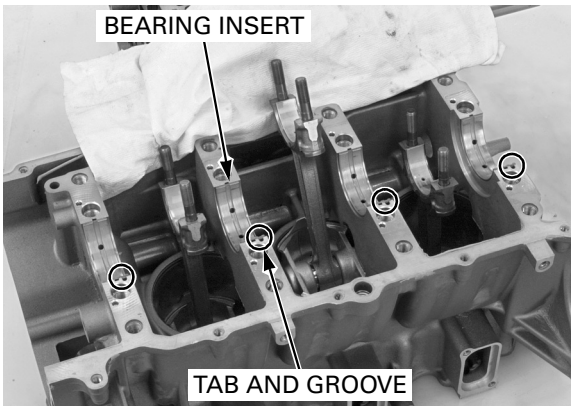
Blue
Black
Brown
Green
Yellow

Thick ↕ Thin

After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.

BEARING INSTALLATION

Clean the bearing outer surfaces, bearing caps and crankcase bearing supports.
Install the main journal bearing inserts onto the bearing caps and crankcase bearing supports, aligning each tab with each groove.



CRANKSHAFT INSTALLATION

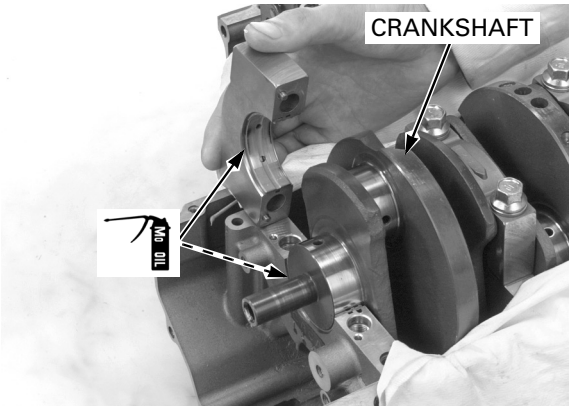
Install the thrust bearings onto the rear end bearing support of the left crankcase with the groove side facing the crankshaft.

Apply molybdenum oil solution to the main journal bearing sliding surfaces on the left crankcase and main journal bearing caps.

Be careful not to damage the crankpins with the connecting rod bolts if the left cylinder pistons are installed in the crankcase.

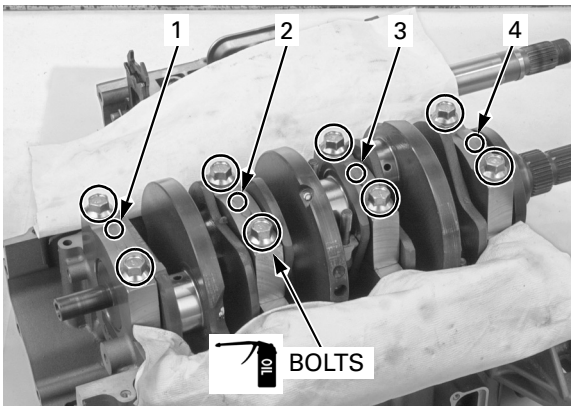
Carefully install the crankshaft onto the left crankcase.

Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the connecting rods and set the connecting rods onto the crankpins if the left cylinder pistons are installed in the crankcase.



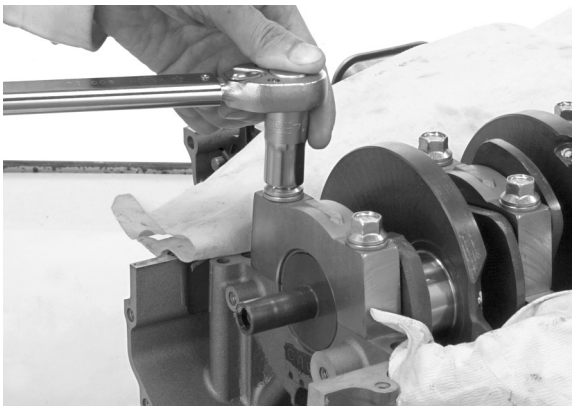
The installation position of each main journal bearing cap is identified with a dot mark that is aligned with the journal number 1, 2, 3 and 4, as viewed from the front of the engine.
Install the dowel pins and main journal bearing caps onto the correct journals with the arrows facing toward the upper side of the engine.

Apply engine oil onto the bearing cap bolt threads.
Install the bolts into the correct bolt holes in the bearing caps.



Tighten the bolts in a crisscross pattern in several steps to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft) + 45°



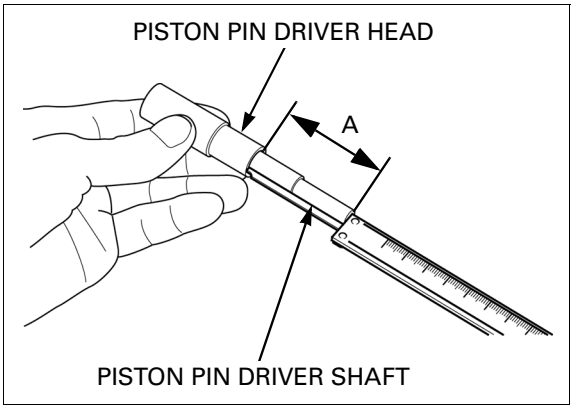
PISTON/CONNECTING ROD INSTALLATION

PISTON INSTALLATION

Turn the adjustable piston pin driver shaft in the adjustable piston pin driver head so that dimension A is 51 mm.

TOOLS:

Adjustable piston pin driver head	**07973-6570210**
Adjustable piston pin driver shaft	**07973-6570300**

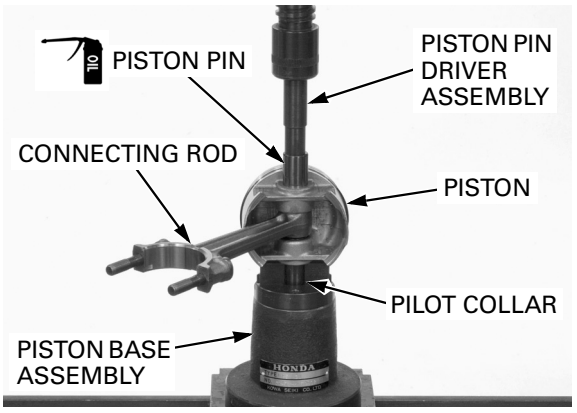


Have the crown of the piston facing the arrow on the piston base head.

Install the pilot collar into the piston base assembly. Set the piston and connecting rod over the pilot collar.

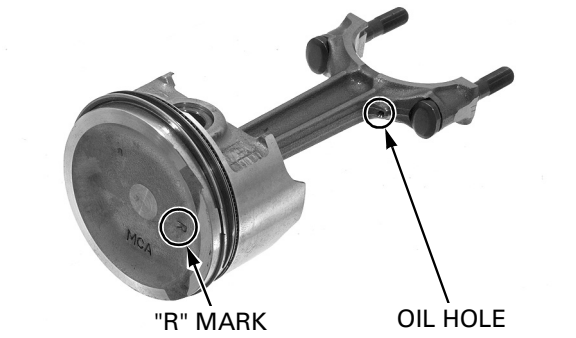
TOOLS:

Pilot collar, 18 mm	**07KMF-MT20200**
Piston base	**07973-6570500**
Piston base spring	**07973-6570600**
Piston base insert	**07973-6570400**
Piston base head	**07JGF-001010A**



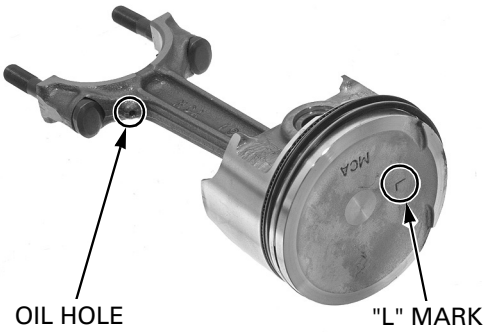
Right cylinder piston (No. 1, 3 and 5):
"R" mark on the piston head is facing the same direction as the oil hole in the connecting rod.

RIGHT CYLINDER PISTON

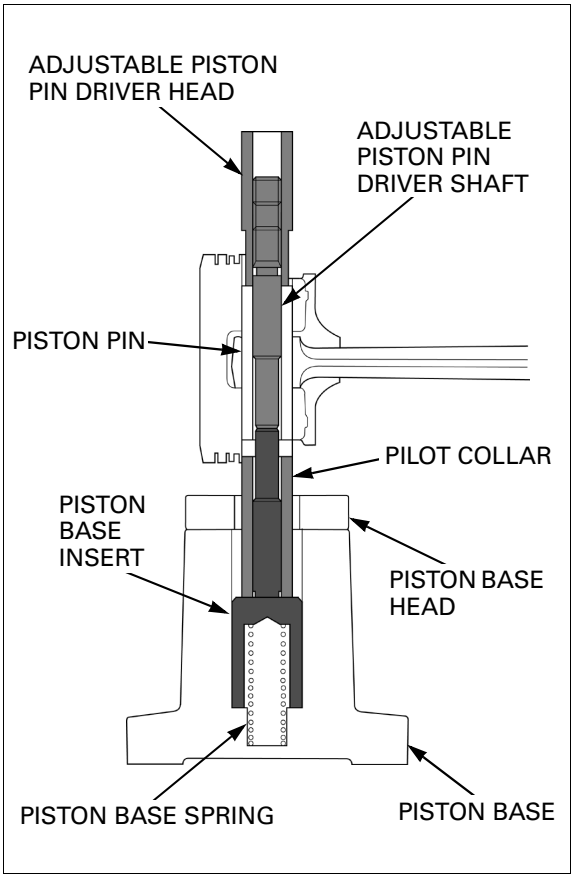


Left cylinder piston (No. 2, 4 and 6):
"L" mark on the piston head is opposite the oil hole in the connecting rod.

LEFT CYLINDER PISTON



Apply engine oil to the piston pin outer surface.
Press the piston pin into the connecting rod through the piston until the hydraulic press stops (gauge rises slightly), using the adjustable piston pin driver assembly.



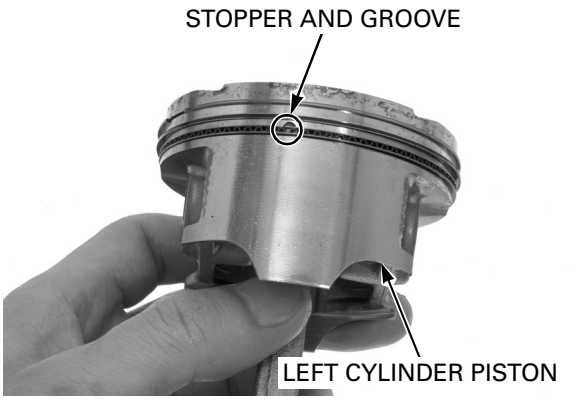
PISTON RING INSTALLATION

Be careful not to damage the piston and rings.

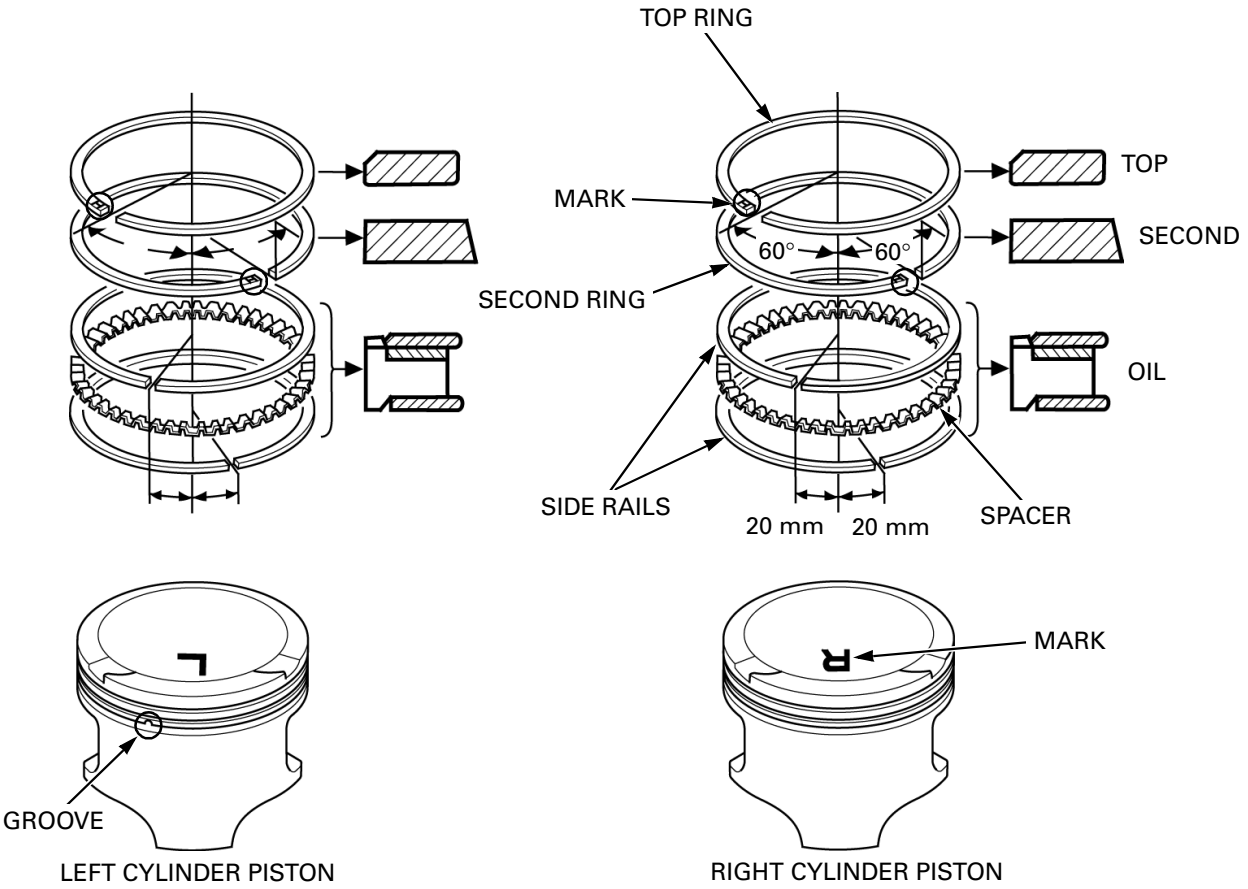
Carefully install the piston rings into the piston ring grooves with the markings facing up.

NOTE:

- Do not confuse the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.
- On the upper side rail of the left cylinder pistons (No. 2, 4 and 6), align the end stopper with the stopper groove.



Stagger the top and second piston ring end gaps 60 degrees apart "L" or "R" mark as shown.
Stagger the side rail end gaps as shown.



PISTON/CONNECTING ROD INSTALLATION

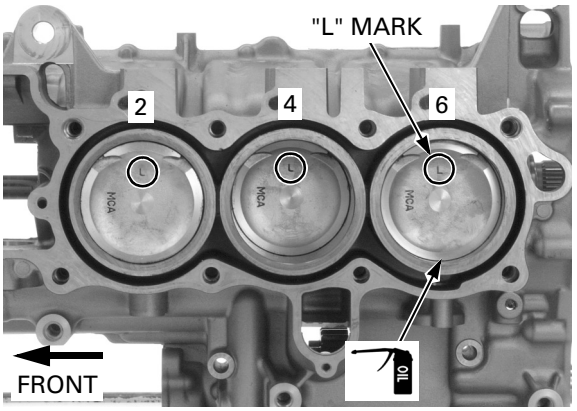
LEFT CYLINDER SIDE

Slip short sections of rubber hose over the connecting rod bolts to prevent damaging the crankpin.

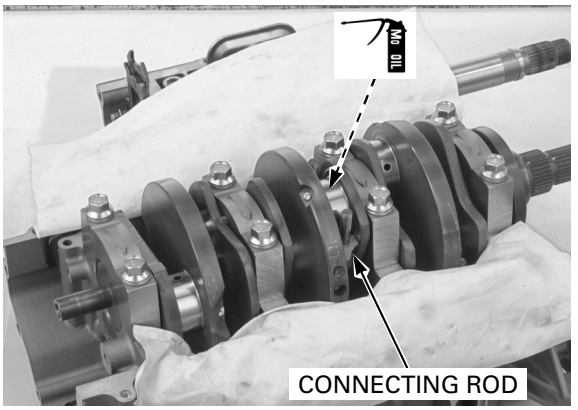
Apply engine oil to the left cylinder wall, piston and piston rings.

Be careful not to damage the piston rings and the cylinder wall by the connecting rod.

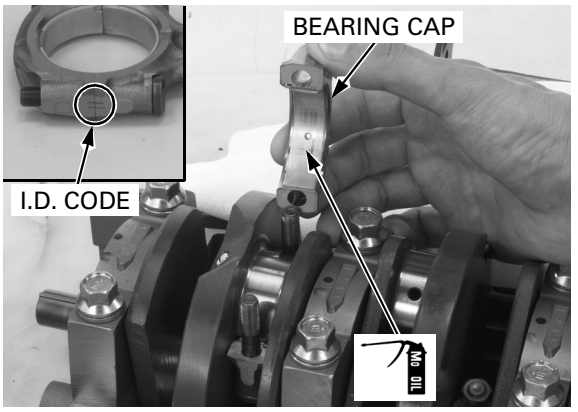
Install the left piston/connecting rod assemblies (No. 2, 4 and 6) into the correct cylinders from the cylinder top of the left crankcase with the “L” mark toward the intake side, using a commercially available piston ring compressor tool.



Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the connecting rods.
Set the connecting rods onto the crankpins.

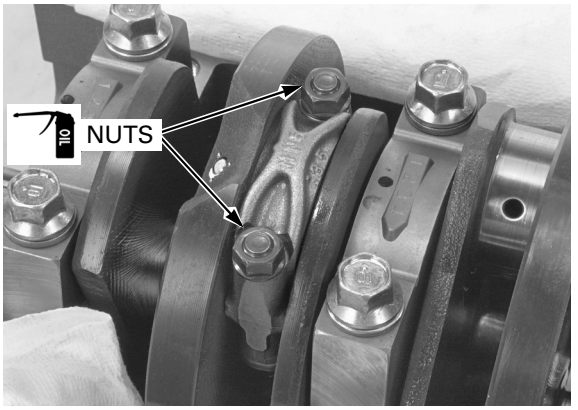


Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the connecting rods.
Install the bearing caps by aligning the I.D. code on the connecting rod and bearing cap. Be sure each part is installed in its correct position, as noted during removal.



Apply engine oil to the bearing cap nut threads and seating surfaces and install them.
Tighten the nuts in several steps alternately.

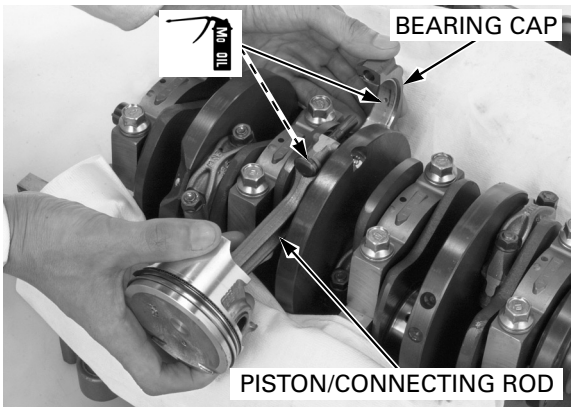
TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



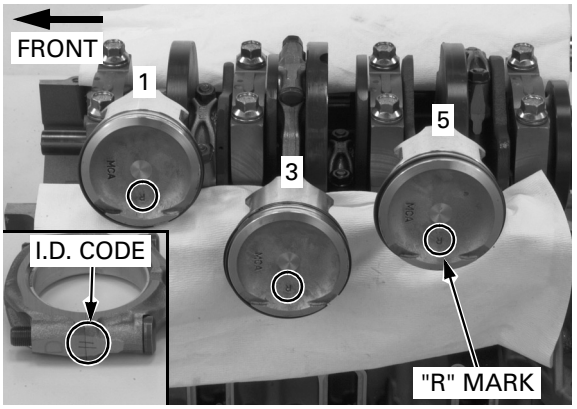
RIGHT CYLINDER SIDE

Cover the transmission gears and crankcase mating surfaces with shop towels to prevent damaging the pistons during installation.

Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the connecting rods and bearing caps.



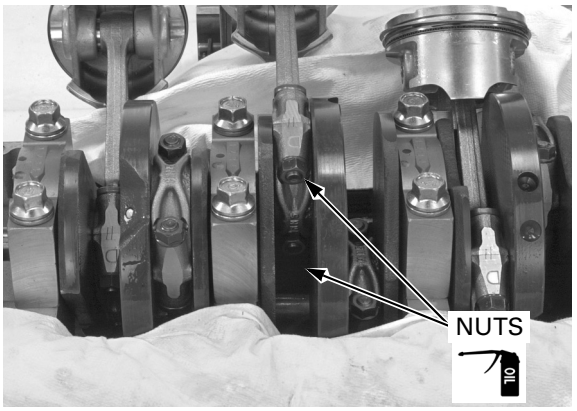
Install the right piston/connecting rod assemblies and bearing caps (No. 1, 3 and 5) onto the corresponding crankpins with the "R" mark toward the intake side by aligning the I.D. code. Be sure each part is installed in its correct position.



Apply engine oil to the bearing cap nut threads and seating surfaces and install them.
Tighten the nuts in several steps alternately.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Assemble the crankcase halves.



CRANKCASE ASSEMBLY

Clean the left and right crankcase mating surfaces.

Temporarily install the ignition pulse generator bolt.

Be careful that the right cylinder pistons do not interfere with the transmission gears or crankcase.

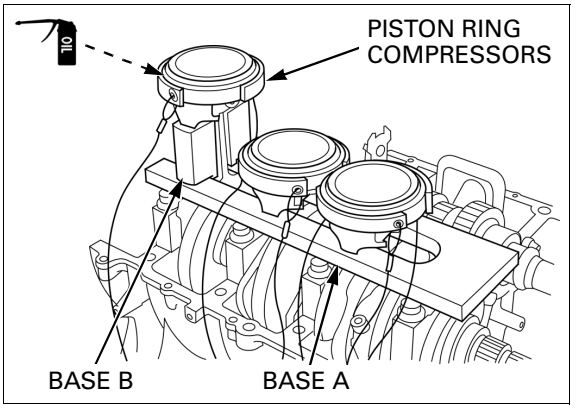
Turn the crankshaft and position the front piston (No. 1) to the top dead center (highest position) while holding the right cylinder pistons.

Apply engine oil to the cylinder wall, piston and piston rings.

Install the special tools as shown.

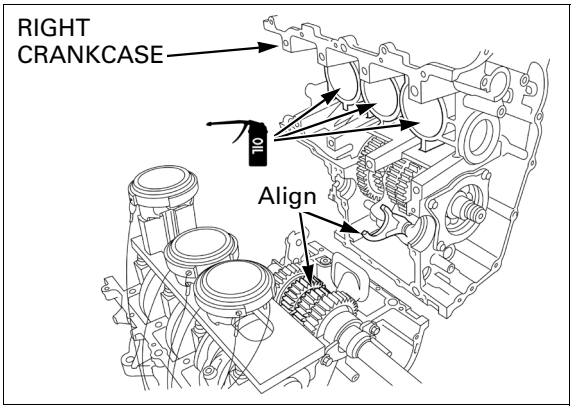
TOOLS:

Piston ring compressor	**07JMG-MN5000B or 07JMG-MN5000A (3 pcs) (U.S.A. only)**
Piston base A	**07ZMG-MCAA100**
Piston base B	**07ZMG-MCAA200**

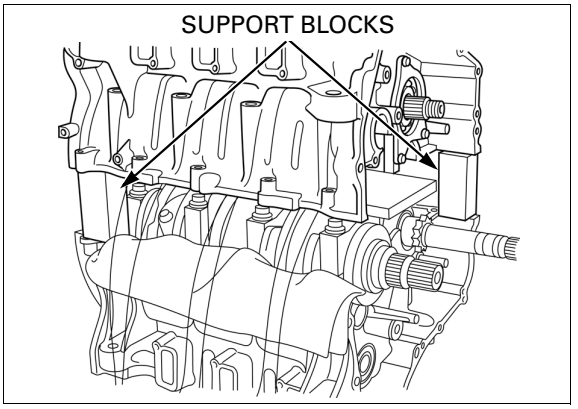


Prepare wooden blocks (40 x 40 x 85 mm) for support of crankcase.

Cover the transmission gears and crankcase mating surfaces with shop towel to prevent damaging them.
Place the support blocks lengthwise onto the left crankcase mating surfaces.

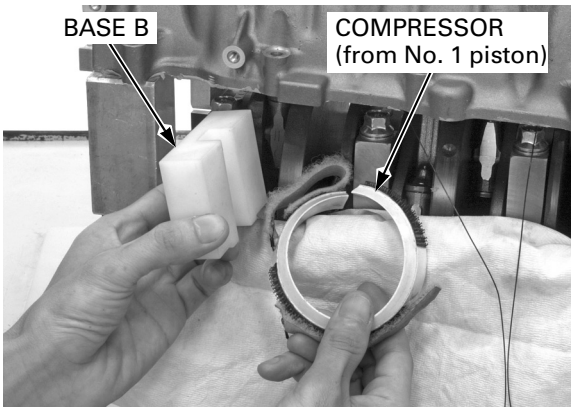


Hold the right crankcase over the left crankcase and set the front cylinder (No. 1) straight onto the No. 1 piston while aligning the center shift fork with the transmission gear shifter groove. The right crankcase will rest on the support blocks.

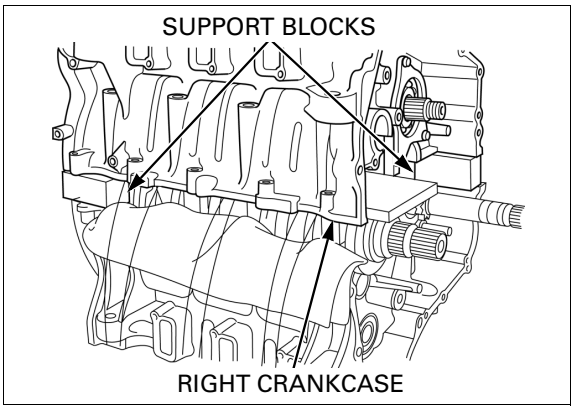


Carefully pull the wires of the No. 1 piston ring compressor to separate the two halves and remove the No. 1 compressor out of the crankcase.

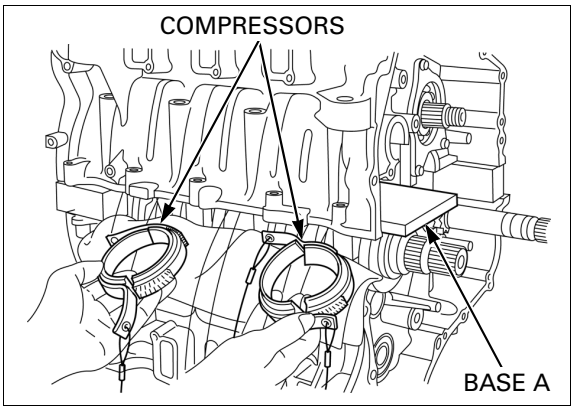
Remove piston base B.



Have an assistant turn the support blocks on their sides.
Set both cylinders (No. 3 and 5) of the right crankcase straight onto the pistons and let the crankcase rest onto the support blocks.

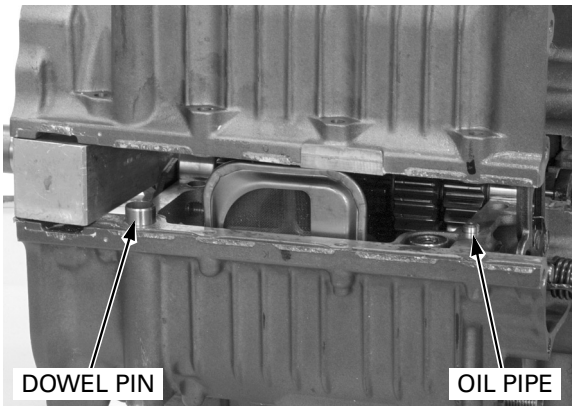


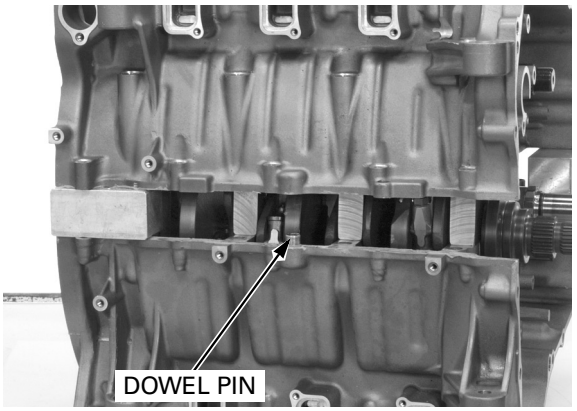
Remove piston base A.
Pull the cords of the piston ring compressors to separate the two halves and remove the remaining compressors.



Remove the shop towels.

Install the two dowel pins and oil pipe.



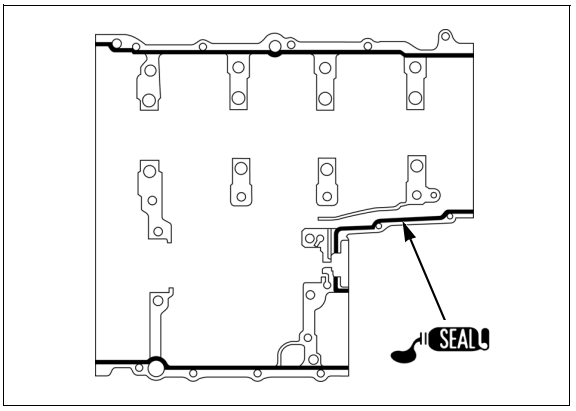


Apply sealant to the crankcase mating surface as shown.

Have an assistant hold the right crankcase while you remove the support blocks and apply sealant to the areas where the support blocks were.

Lower the right crankcase and place it onto the left crankcase.

Make sure there are no gaps between the crankcase mating surfaces after assembling the crankcase halves.



Apply engine oil to the threads of the right crankcase 10-mm bolts.

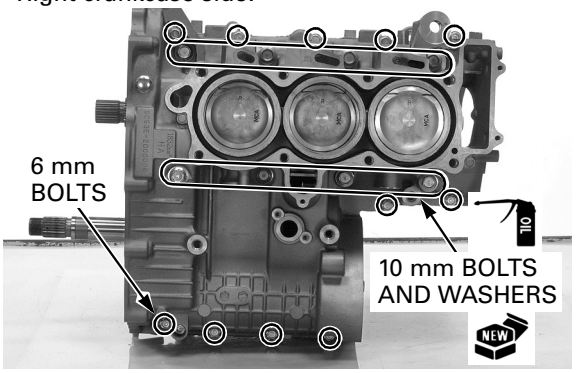
Install the eight 10-mm bolts, new washers and eleven 6-mm bolts into the right crankcase.

Tighten bolts in a crisscross cross pattern in several steps.

TORQUE:

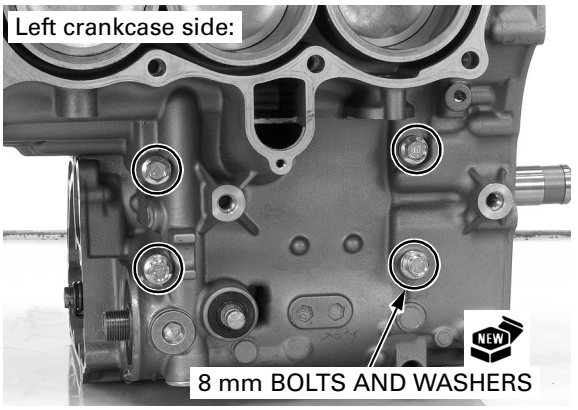
10 mm bolt: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Right crankcase side:



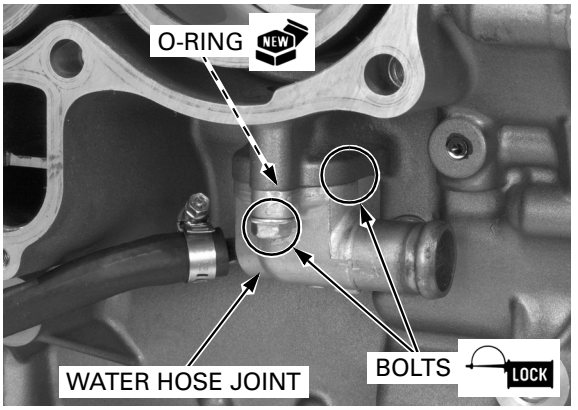
Install the four 8-mm bolts and new washers into the left crankcase and tighten them in a crisscross pattern in several steps.

TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)

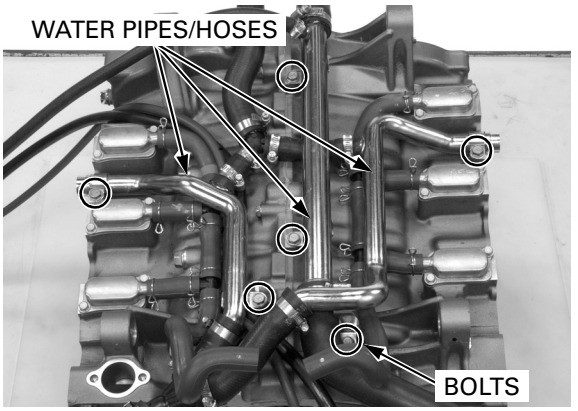


Apply locking agent to the water hose joint bolt threads.
Install new O-rings into the water hose joints.
Install the water hose joints with the large spout facing the rear of the engine and tighten the bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



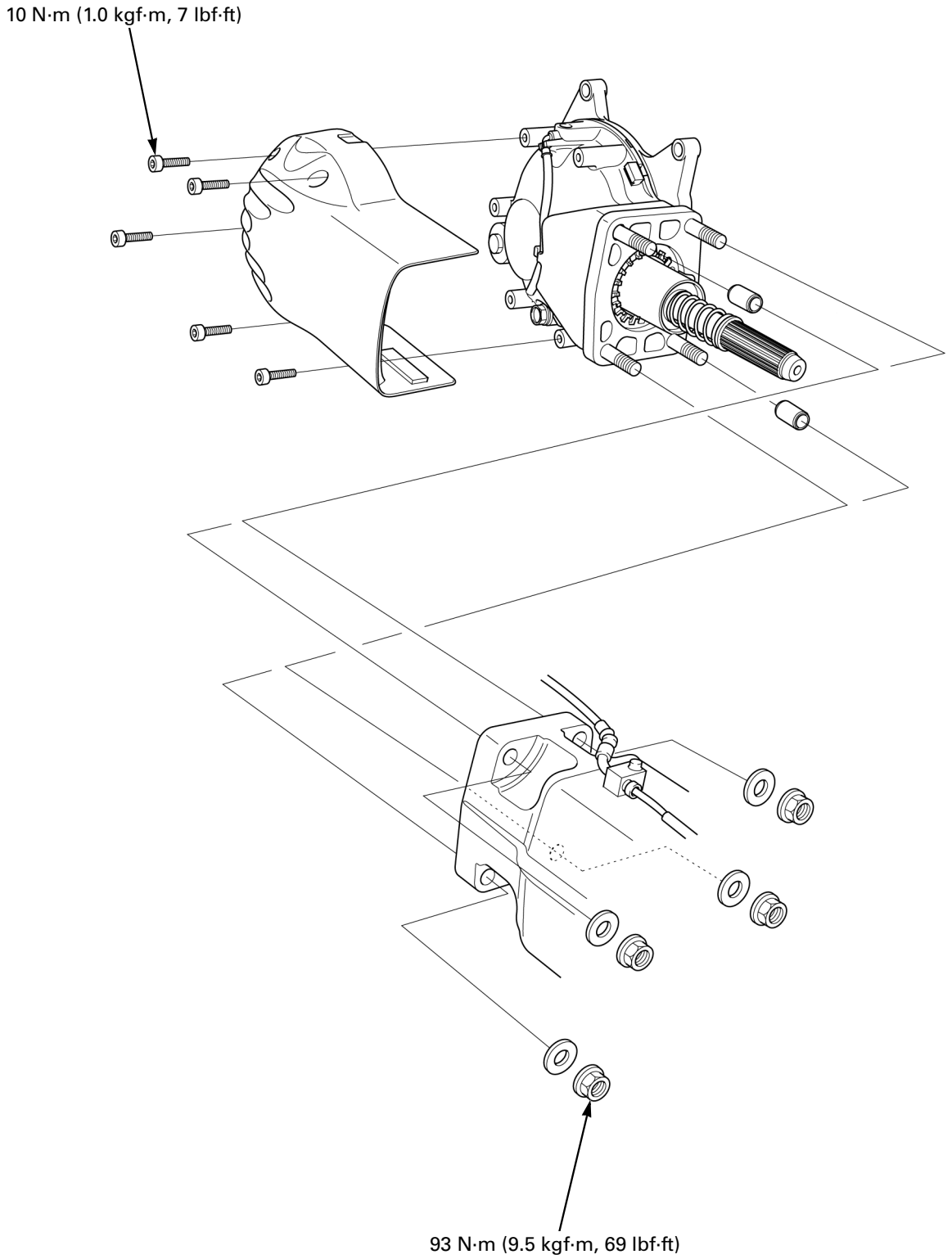
Install the following:
- PAIR check valves (page 6-59)
- six bolts and water pipes/hoses (page 1-22)
- primary gears and output shaft (section 10: If you plan to service the transmission, remove the final drive gear)
- gearshift linkage (page 11-10)
- cylinder head and cam chain (section 8)
- engine (page 8-12)



MEMO

13. FINAL DRIVE

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- Perform the gear contact pattern and backlash inspection whenever you replace the bearings, gears or gear case. The extension lines from the gear engagement surfaces should intersect at one point.
- Protect the gear case with a shop towel or soft jaws while holding it in a vise. Do not clamp the gear case too tight or it could get damaged.
- Replace the ring and pinion gears as a set.

SPECIFICATIONS

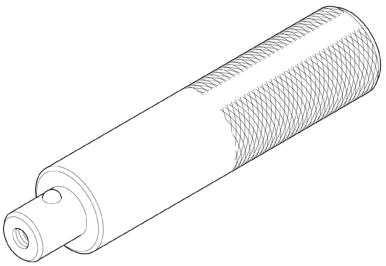
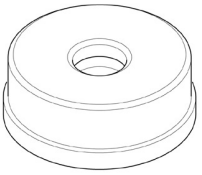
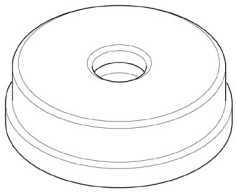
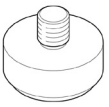
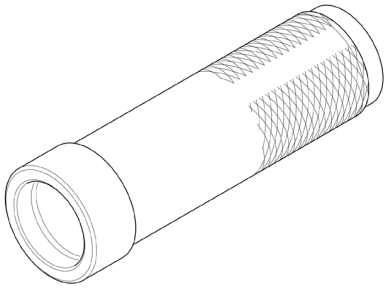
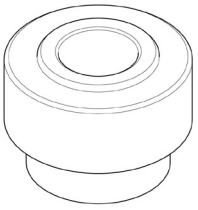
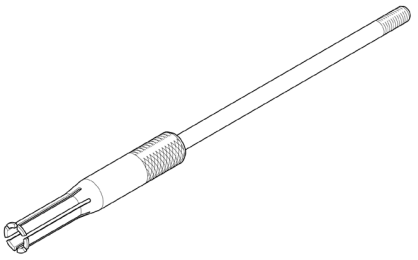
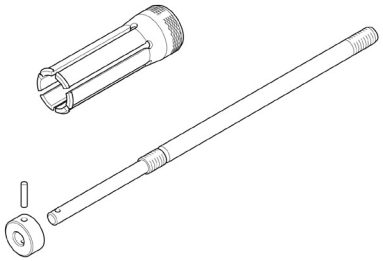
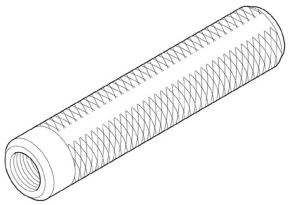
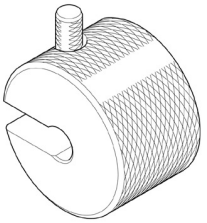
Unit: mm (in)

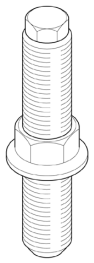
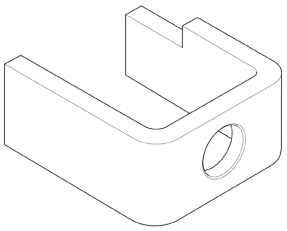
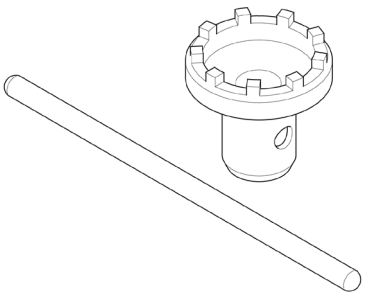
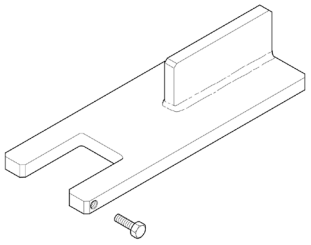
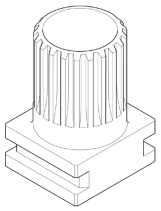
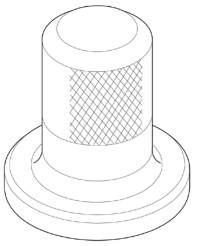
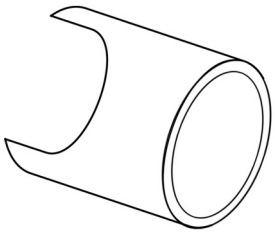
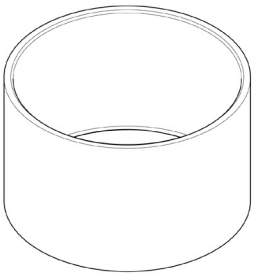
ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	–
Final drive oil capacity	after draining	125 cm^3 (4.2 US oz, 4.4 Imp oz)	–
	after disassembly	155 cm^3 (5.2 US oz, 5.5 Imp oz)	–
Final drive gear backlash		0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
Backlash difference between measurement		–	0.10 (0.004)
Final drive gear assembly preload		0.2 – 1.2 N·m (2 – 12 kgf·cm, 2 – 10 lbf·in)	–

TORQUE VALUES

Pinion retainer	157 N·m (16.0 kgf·m, 116 lbf·ft) Apply engine oil to the threads.
Pinion retainer lock tab bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Pinion joint nut	108 N·m (11.0 kgf·m, 80 lbf·ft) Apply locking agent to the threads.
Gear case cover 10 mm bolt	62 N·m (6.3 kgf·m, 46 lbf·ft) Apply locking agent to the threads.
Gear case cover 8 mm bolt	25 N·m (2.6 kgf·m, 19 lbf·ft) Apply locking agent to the threads.
Final drive assembly mounting nut	93 N·m (9.5 kgf·m, 69 lbf·ft)
Final drive outer cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Final drive oil filler cap	12 N·m (1.2 kgf·m, 9 lbf·ft)
Final drive oil drain bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)

TOOLS

Driver 07749-0010000 	Attachment, 32 x 35 mm 07746-0010100 	Attachment, 52 x 55 mm 07746-0010400 
Attachment, 62 x 68 mm 07746-0010500 	Pilot, 19 mm 07746-0041400 	Pilot, 30 mm 07746-0040700 
Driver, 40 mm I.D. 07746-0030100 	Attachment, 25 mm I.D. 07746-0030200 	Bearing remover, 20 mm 07936-3710600  or equivalent commercially available in U.S.A.
Bearing remover, 30 mm 07936-8890300  or 07736-A01000B or 07736-A01000A (U.S.A. only) with slide hammer, 3/8″ x 16 mm thread	Bearing remover handle 07936-3710100  or equivalent commercially available in U.S.A.	Bearing remover weight 07741-0010201  or 07936-371020A or 07936-371020 (U.S.A. only) or equivalent commercially available in U.S.A.

Puller shaft 07931-ME40000  or 07931-ME4010B and 07931-HB3020A (U.S.A. only)	Pinion puller base 07HMC-MM80110  or 07HMC-MM8011A (U.S.A. only)	Retainer wrench 07910-ME80000 
Pinion holder plate 070MB-0010110 	Pinion holder attachment 070MB-0010120 	Oil seal driver 07948-SC20200  or 07749-0010000, 07946-ME90200 and 07947-KA50100
Bearing clip compressor, 35 mm 07ZME-MCAA100 	Assembly base 070MF-MEC0400  (Newly designed tool)	

TROUBLESHOOTING

Excessive noise
- Worn or scored pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gears
- Oil level too low

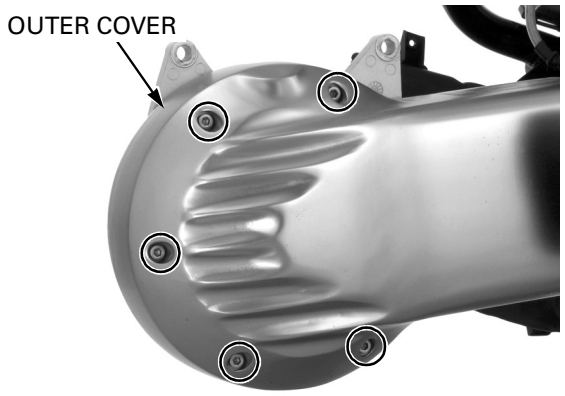
Oil leakage
- Clogged breather
- Oil level too high
- Damaged seals
- Loose case cover bolts

FINAL DRIVE REMOVAL

Drain the final drive gear case oil (page 4-14).

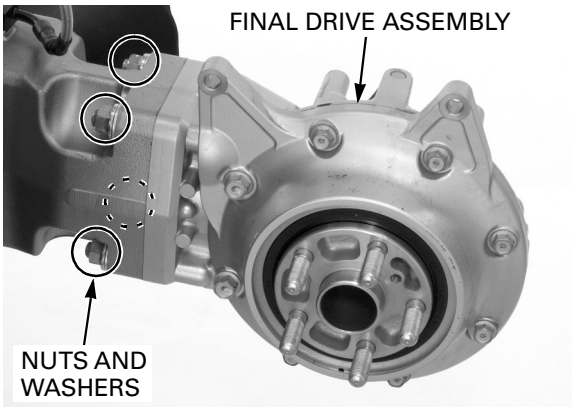
Remove the following:
– rear wheel and brake disc (page 15-6)
– right muffler cover (page 3-7)

Remove the five bolts and final drive outer cover.



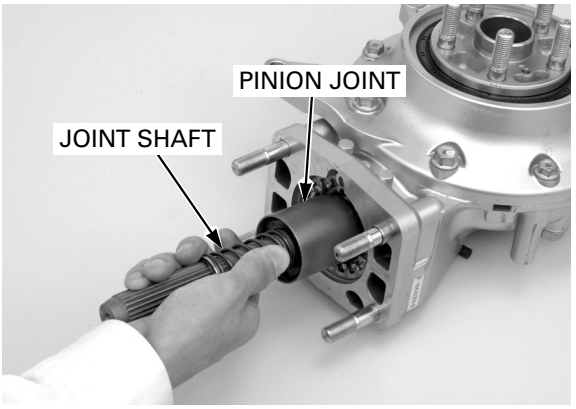
Remove the four nuts and washers, and the final drive assembly while holding it securely.

Remove the two dowel pins.



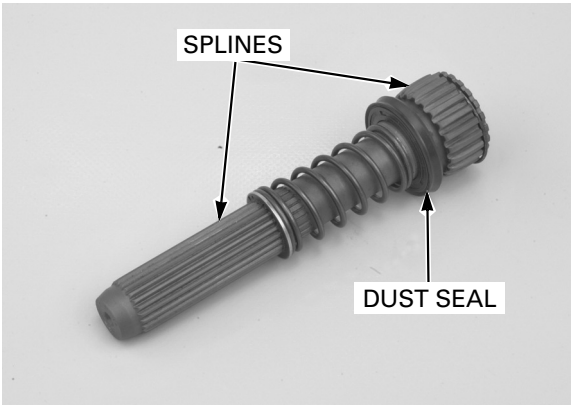
INSPECTION

Remove the joint shaft assembly from the pinion joint by pulling it. This will force the stopper ring at the joint shaft past the groove in the pinion joint.



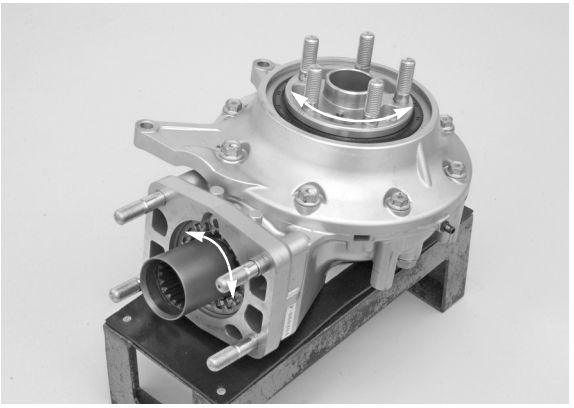
Check the dust seal for fatigue, wear or damage.
Check the splines of the joint shaft for wear or damage.
If the splines are damaged, check the pinion joint and drive shaft splines.

To remove the drive shaft, remove the swingarm (page 15-12).



Turn the pinion joint and check that the pinion and ring gears turn smoothly and quietly without binding.

If the gears do not turn smoothly or quietly, the gears and/or bearing may be damaged or faulty. They must be checked after disassembly; replace faulty parts/ assemblies as required.



FINAL DRIVE DISASSEMBLY/ INSPECTION

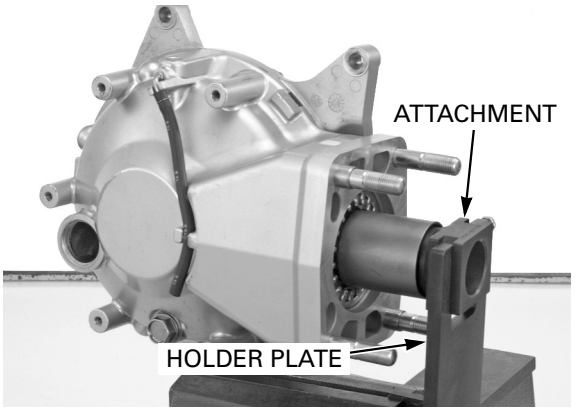
BACKLASH INSPECTION

Remove the oil filler cap.

Install the special tool into the pinion joint, and set the final drive assembly and tool in a vise.

TOOLS:

Pinion holder plate	**070MB-0010110**
Pinion holder attachment	**070MB-0010120**

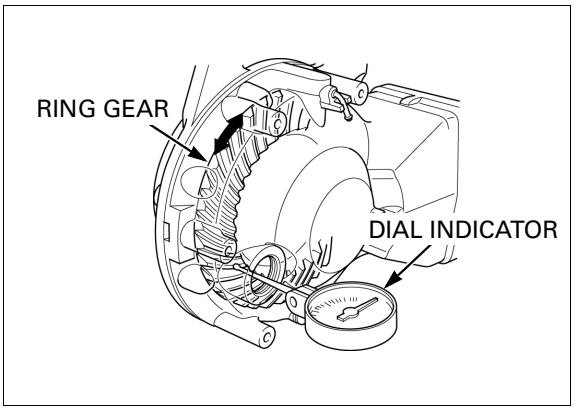


Set a horizontal type dial indicator on the ring gear through the filler hole.
Turn the ring gear back and forth to read the backlash.

STANDARD: 0.05 – 0.15 mm (0.002 – 0.006 in)
SERVICE LIMIT: 0.30 mm (0.012 in)

Remove the dial indicator. Turn the ring gear 120° and measure the backlash. Repeat this procedure once more.
Compare the difference of the three measurements.

SERVICE LIMIT: 0.10 mm (0.004 in)

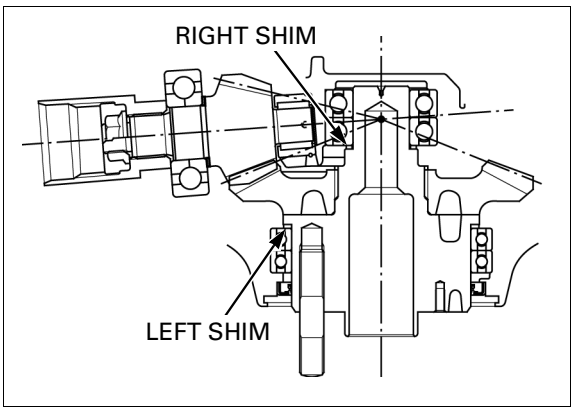


If the difference between the three measurements exceeds the service limit, it indicates that the bearing is not installed squarely, or the case is deformed.
Inspect the bearings and case.

If the backlash is excessive, replace the right ring gear shim with a thinner one.
If the backlash is too small, replace the right ring gear shim with a thicker one.

NOTE:

- Sixteen different right shim thicknesses (from A to P) are available in increments of 0.03 mm (0.001 in).
  Nine different left shim thicknesses (from B to J) are available in increments of 0.06 mm (0.002 in).



Ring gear shims:

Right:

A:	**1.73 mm (0.068 in)**	**I:**	**1.97 mm (0.078 in)**
B:	**1.76 mm (0.069 in)**	**J:**	**2.00 mm (0.079 in)**
C:	**1.79 mm (0.070 in)**	**K:**	**2.03 mm (0.080 in)**
D:	**1.82 mm (0.072 in)**	**L:**	**2.06 mm (0.081 in)**
E:	**1.85 mm (0.073 in)**	**M:**	**2.09 mm (0.082 in)**
F:	**1.88 mm (0.074 in)**	**N:**	**2.12 mm (0.083 in)**
G:	**1.91 mm (0.075 in)**	**O:**	**2.15 mm (0.085 in)**
H:	**1.94 mm (0.076 in)**	**P:**	**2.18 mm (0.086 in)**

Left:

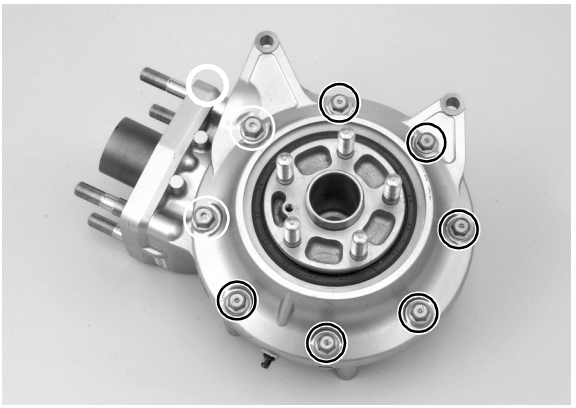
B:	**1.88 mm (0.074 in)**	**G:**	**2.18 mm (0.086 in)**
C:	**1.94 mm (0.076 in)**	**H:**	**2.24 mm (0.088 in)**
D:	**2.00 mm (0.079 in)**	**I:**	**2.30 mm (0.091 in)**
E:	**2.06 mm (0.081 in)**	**J:**	**2.36 mm (0.093 in)**
F:	**2.12 mm (0.083 in)**		

Change the left shim thickness in an opposite amount of what the right shim was changed; if the right shim was replaced with a 0.12 mm (0.005 in) thicker one, replace the left shim with a 0.12 mm (0.005 in) thinner one.

For ring gear shim replacement, see (page 13-10).

FINAL GEAR CASE SEPARATION

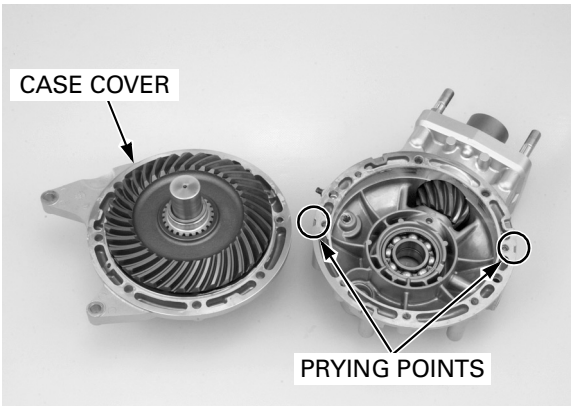
Loosen the eight cover bolts in a crisscross pattern in several steps and remove them.



Pry the cover at the prying points using a screwdriver and remove the case cover.

Remove the right ring gear shim.

Check the ring gear bearing in the gear case for wear or damage.



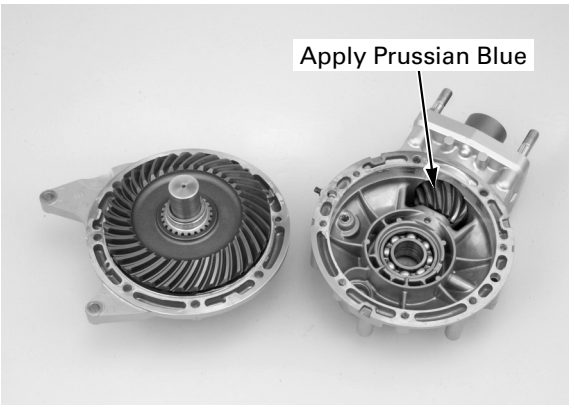
GEAR TOOTH CONTACT PATTERN CHECK

Keep dust and dirt out of the case and cover.

Clean the sealing material off the mating surfaces of the gear case and cover, being careful not to damage them.

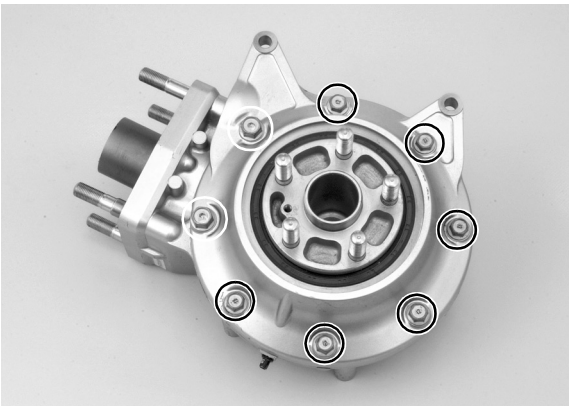
Apply a thin coat of Prussian Blue to the pinion gear teeth for the tooth contact pattern check.

Install the right ring gear shim onto the ring gear.



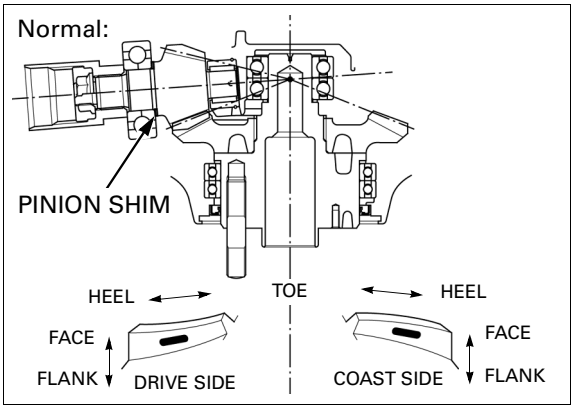
Install the case cover and tighten the bolts in several steps until the cover evenly touches the gear case. Then, while rotating the pinion gear, tighten the bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 10 mm bolt: 62 N·m (6.3 kgf·m, 46 lbf·ft)
8 mm bolt: 25 N·m (2.6 kgf·m, 19 lbf·ft)

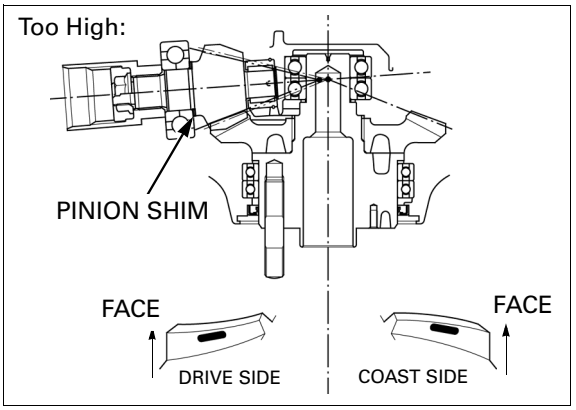


Remove the oil filler cap.
Rotate the ring gear several times in both directions of rotation.
Check the gear tooth contact pattern through the oil filler hole.
The pattern is indicated by the Prussian Blue applied to the pinion gear.
Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth and slightly towards the face.

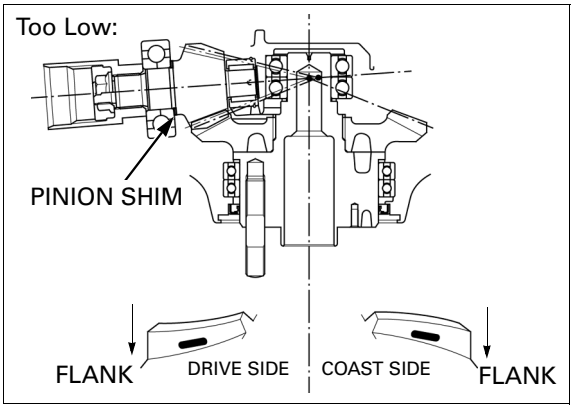
If the patterns are not correct, remove and change the pinion shim with a suitable one.



Replace the pinion gear shim with a thicker one if the contact pattern is too high, toward the face.



Replace the pinion gear shim with a thinner one if the contact pattern is too low, toward the flank.



NOTE:

- Seven different shim thicknesses (from A to G) are available in increments of 0.06 mm (0.002 in).

Pinion gear shims:

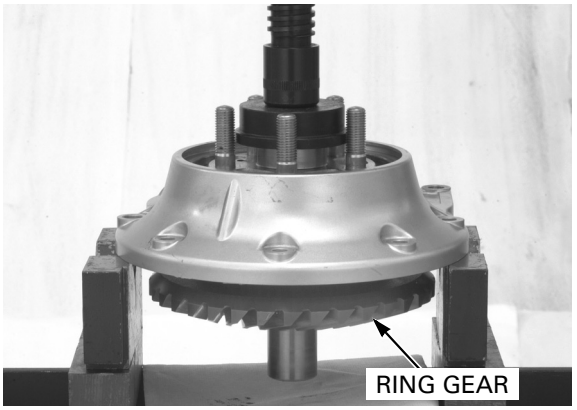
A: 1.32 mm (0.052 in)
B: 1.38 mm (0.054 in)
C: 1.44 mm (0.057 in)
D: 1.50 mm (0.059 in)
E: 1.56 mm (0.061 in)
F: 1.62 mm (0.063 in)
G: 1.68 mm (0.066 in)

For pinion gear shim replacement, see page 13-12.

RING GEAR BEARING/SHIM REPLACEMENT

Press the ring gear out of the case cover using a hydraulic press.

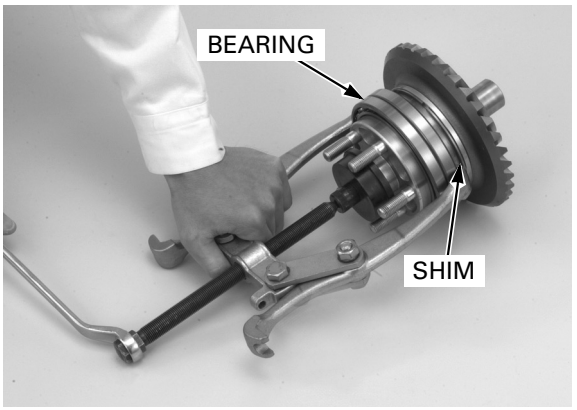
Remove the left ring gear shim.



This bearing may not need to be replaced after removal. However, inspect the bearing for excessive play after removal.

If the bearing stays on the ring gear; remove the ring gear bearing using a commercially available bearing puller.
Remove the left ring gear shim.

Install the ring gear bearing into the case cover (see following step).



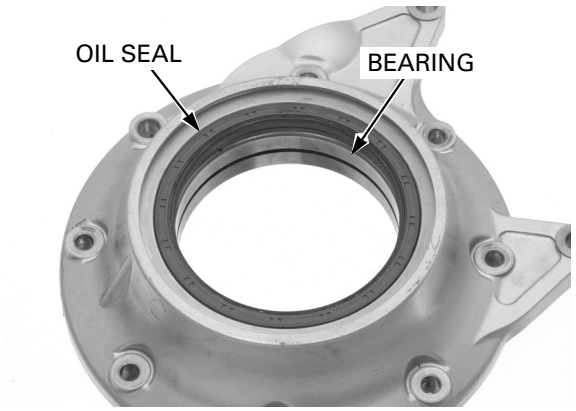
Remove the oil seal from the case cover.

Be sure to wear heavy gloves to avoid burns when handling the heated case cover. Do not use a torch to heat the case cover, this may cause warpage.

Heat the case cover to 80°C (176°F) and drive the bearing out of the case cover.

Install a new bearing while the cover is still heated.

Install the ring gear (page 13-16).



NOTE:

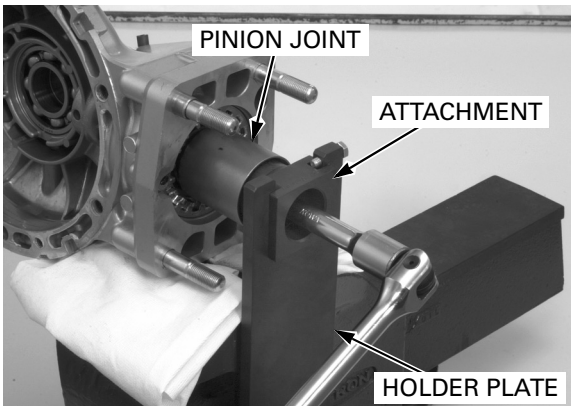
- When the gear set, pinion bearing, and/or gear case has been replaced, use a 2.00 mm (0.079 in) thick shim for initial reference.

PINION GEAR REMOVAL

Install the special tool into the pinion joint, and set the final drive assembly and tool in a vise.

TOOLS:

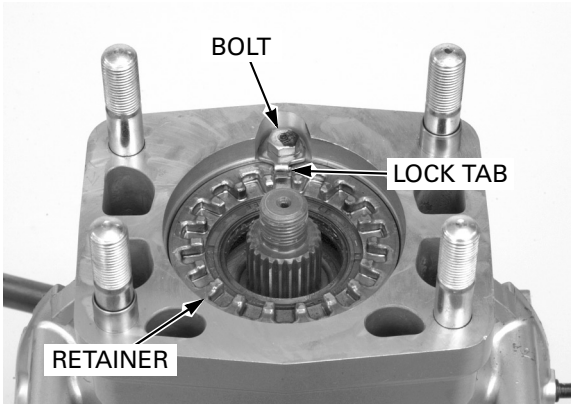
Pinion holder plate	**070MB-0010110**
Pinion holder attachment	**070MB-0010120**



Take care not to drop the final drive assembly from the vise.

Loosen the pinion joint nut, and remove the joint nut and pinion joint.

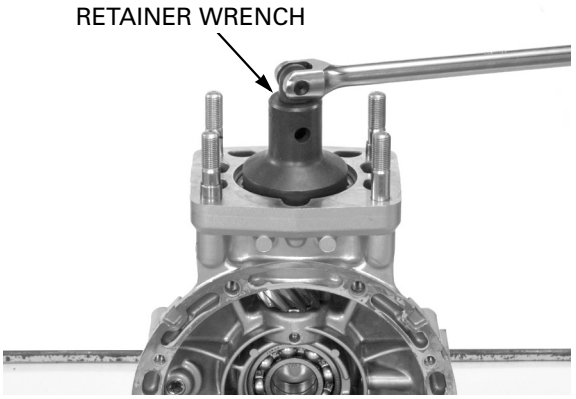
Remove the bolt and retainer lock tab.



Remove the pinion retainer using the special tool.

TOOL:

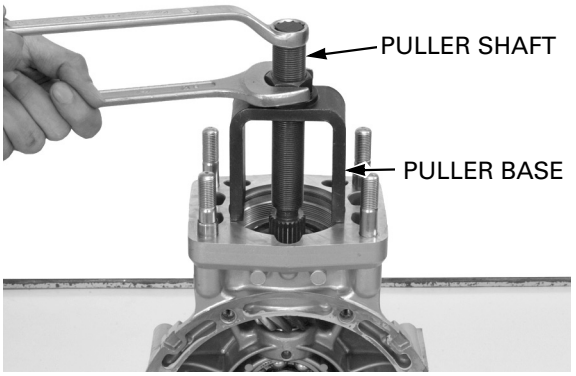
Retainer wrench	**07910-ME80000**



Install the special tools onto the pinion gear shaft and gear case.

TOOLS:

Pinion puller base	**07HMC-MM80110 or 07HMC-MM8011A (U.S.A. only)**
Puller shaft	**07931-ME40000 or 07931-ME4000B and 07931-HB3020A (U.S.A. only)**

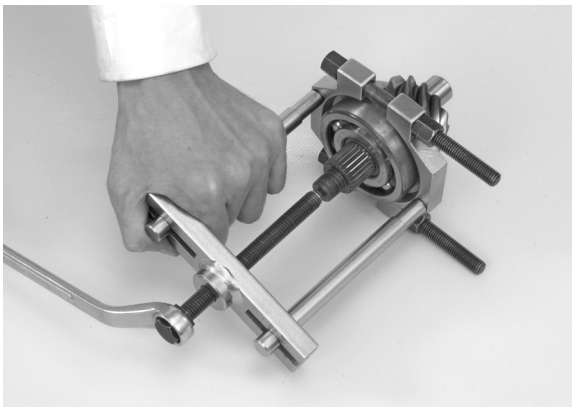


Pull the pinion gear assembly out of the gear case. Check the pinion needle bearing in the gear case for wear or damage.

PINION BEARING/SHIM REPLACEMENT

Pull the pinion bearing from the shaft with a commercially available bearing puller.

Remove the pinion shim.



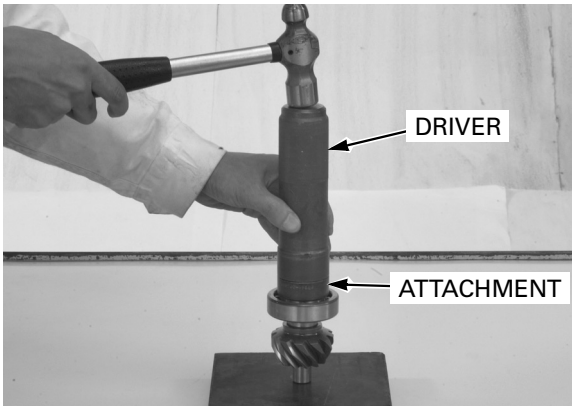
Install the shim and a new bearing onto the pinion gear.

NOTE:

- When the gear set, ring gear bearing, and/or gear case has been replaced, use a 1.50 mm (0.059 in) thick shim for initial reference.

Drive the bearing using the special tools.

TOOLS:	
Driver, 40 mm I.D.	**07746-0030100**
Attachment, 25 mm I.D.	**07746-0030200 or**
Oil seal driver	**07948-SC20200**

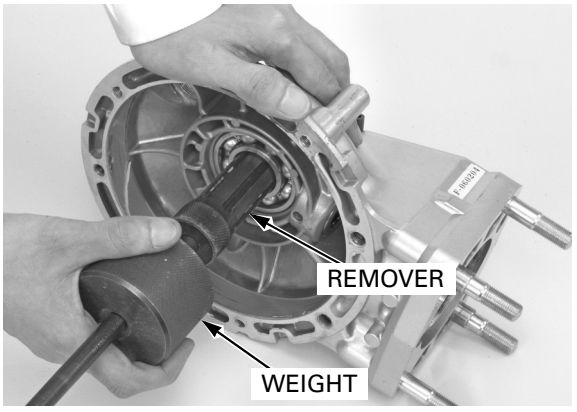


CASE BEARING REPLACEMENT

RING GEAR BEARING

Remove the ring gear bearing in the gear case using the special tools.

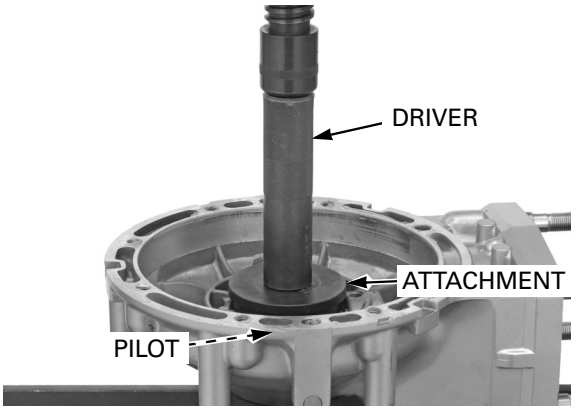
TOOLS:	
Bearing remover, 30 mm	**07936-8890300**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)**
U.S.A. only:	
Adjustable bearing puller, 20-40 mm	**07736-A01000B or 07736-A01000A**
Slide hammer, 3/8" x 16 mm thread	**(commercially available in U.S.A.)**



Press a new bearing into the gear case using the special tools.

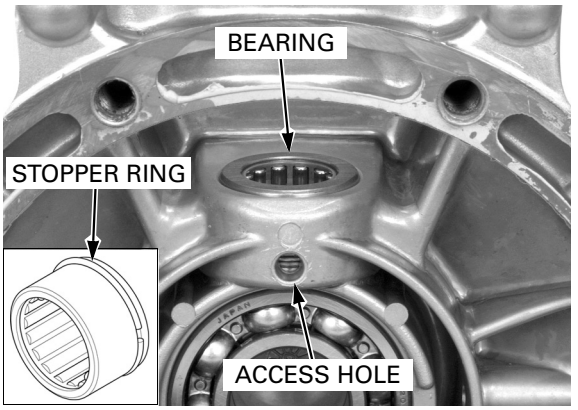
TOOLS:

Driver	**07749-0010000**
Attachment, 62 x 68 mm	**07746-0010500**
Pilot, 30 mm	**07746-0040700**



PINION NEEDLE BEARING

Remove the stopper ring by rotating it until the end of the stopper ring appears in the access hole.
Strike gently near the end of the ring with a punch to bend the end upward.
Grasp the end of the ring with needle-nose pliers and pull the stopper ring out through the access hole.



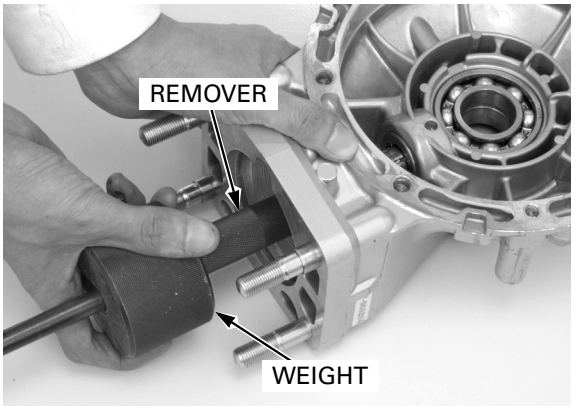
Be sure to wear heavy gloves to avoid burns when handling the heated gear case. Do not use a torch to heat the gear case; this may cause warpage.

Heat the gear case to 80°C (176°F) and remove the needle bearing by using the special tools.

TOOLS:

Bearing remover, 20 mm	**07936-3710600**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)**

Remove the bearing cage and bearings from the inside of the pinion bearing to allow the special tool to grip the bearing.

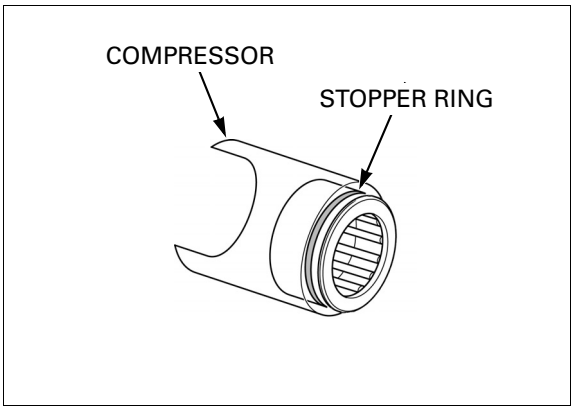


Install the stopper ring into the groove in a new bearing.
Install the bearing into the special tool until the bearing is flush with the end of the tool.

TOOLS:

Bearing clip compressor, 35 mm	**07ZME-MCAA100**

Freeze the pinion bearing with the tool on ice or in a freezer.
Heat the gear case to 80°C (176°F).



Tape the clip compressor to the driver for bearing installation.

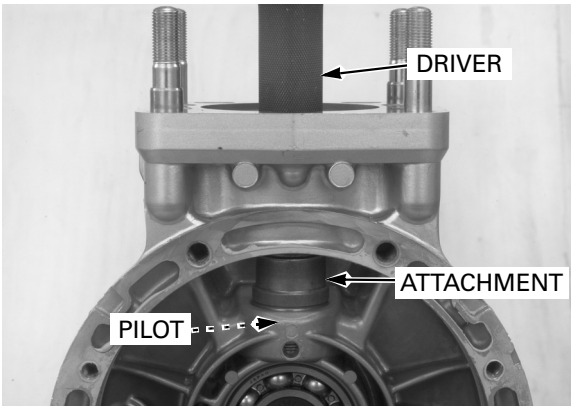
Drive the pinion bearing into the gear case using the special tools as follows.

TOOLS:

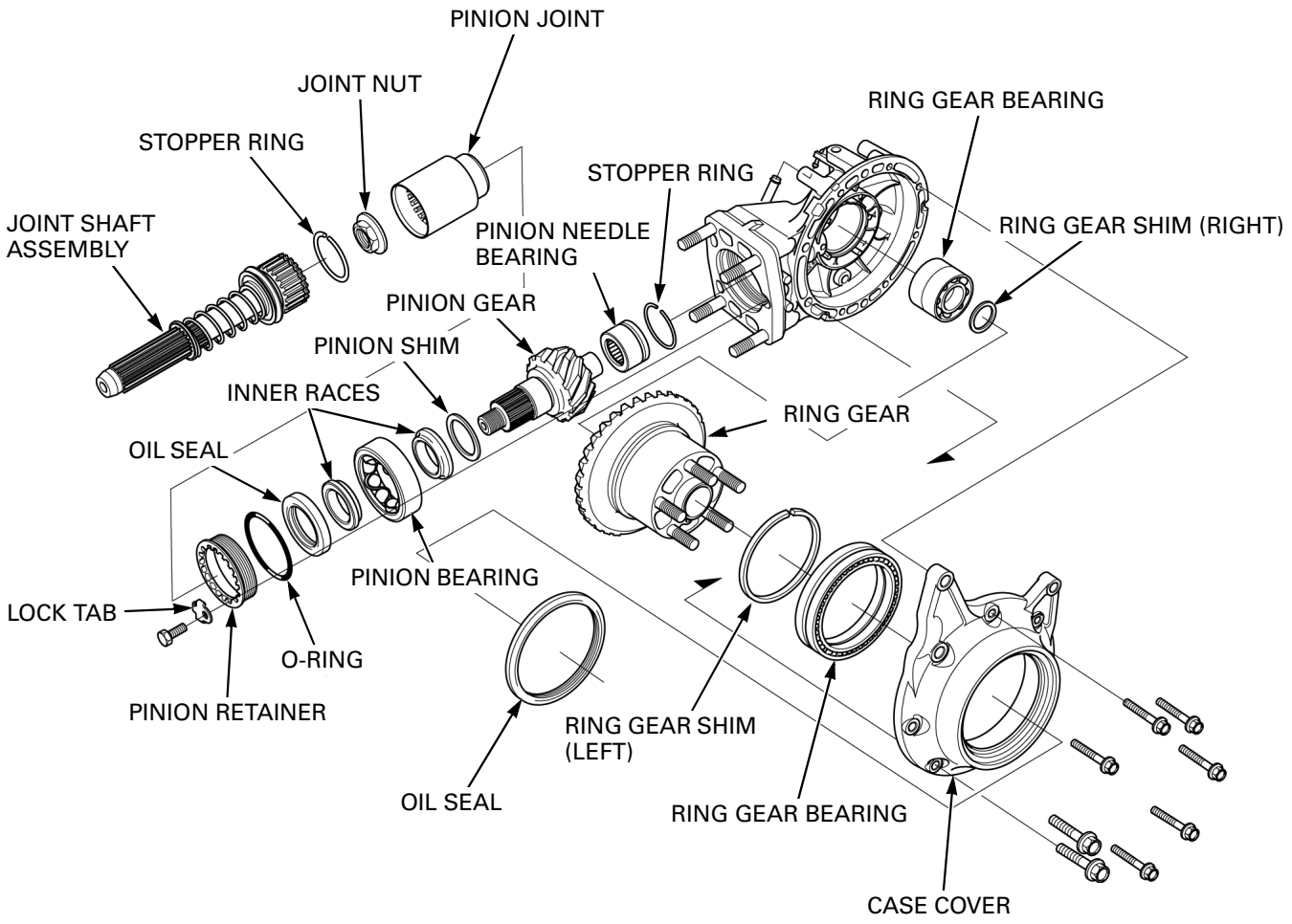
Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 19 mm	**07746-0041400**

Only strike the driver once. If you strike it more than once, the stopper ring may slip out of the groove. If this happens, remove the ring and bearing, and install a new one again.

Make sure the stopper ring is securely set in the groove of the gear case.



FINAL DRIVE ASSEMBLY

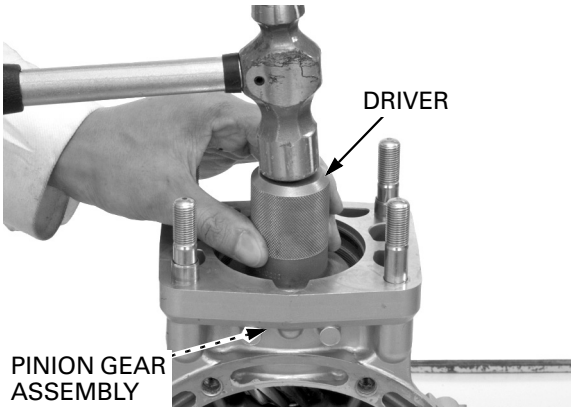


PINION GEAR INSTALLATION

Drive the pinion gear assembly into the gear case using the special tool.

TOOL:

Oil seal driver	**07948-SC20200**
U.S.A. only:	
Driver	**07749-0010000**
Attachment	**07946-ME90200**
Fork seal driver body	**07947-KA50100**



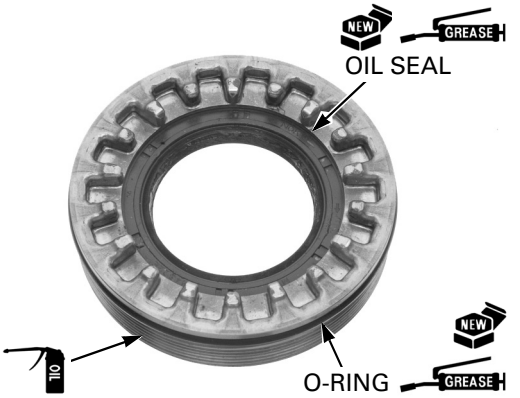
Drive a new oil seal into the pinion retainer with the flat side facing down using the special tool.

TOOLS:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**

Pack grease into the seal lip cavity.

Coat a new O-ring with grease and install it into the retainer groove.

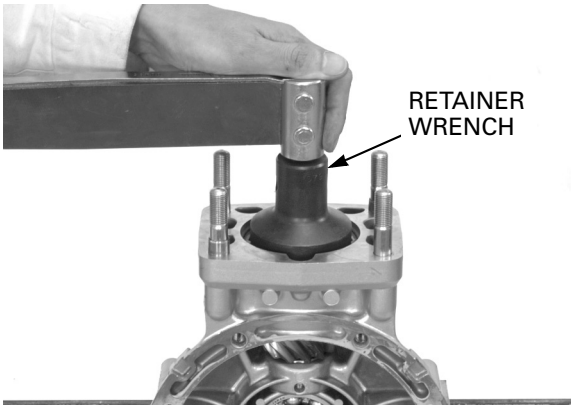


Install the retainer into the gear case and tighten it. Apply engine oil to the threads of the pinion retainer.

TOOL:

Retainer wrench	**07910-ME80000**

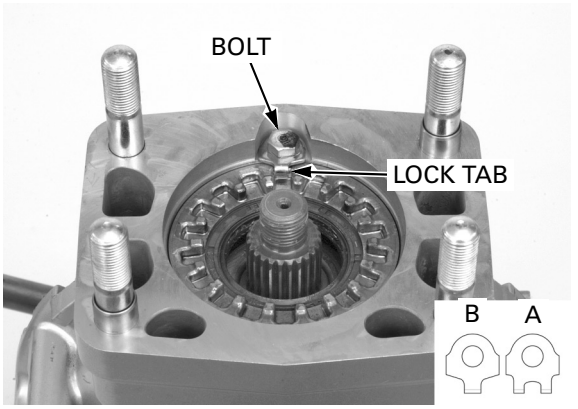
TORQUE: 157 N·m (16.0 kgf·m, 116 lbf·ft)



The lock tab is available in the two types (A and B) shown.

Install the lock tab, depending on the position of the pinion retainer grooves in relation to the lock tab and tighten the bolt.

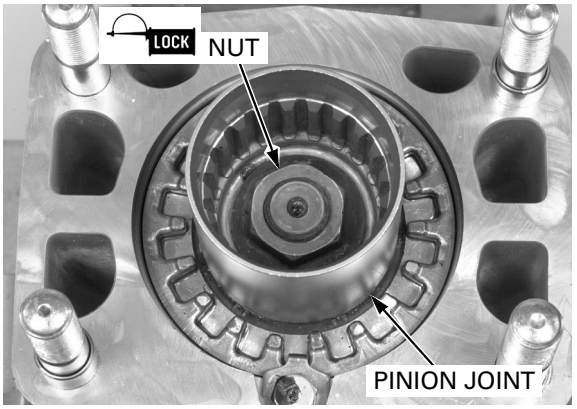
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Clean the threads of the pinion gear shaft and pinion joint nut thoroughly.

Install the pinion joint onto the pinion gear shaft, being careful not to damage the oil seal.

Apply locking agent to the threads of the joint nut and screw it in by hand as far as it goes.

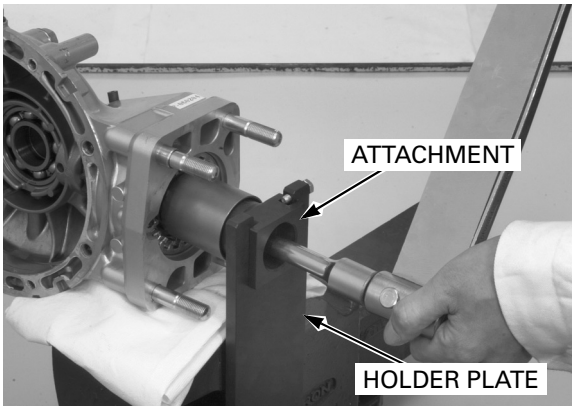


Hold the pinion joint with the special tool and tighten the joint nut.

TOOLS:

Pinion holder plate	**070MB-0010110**
Pinion holder attachment	**070MB-0010120**

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)



RING GEAR INSTALLATION

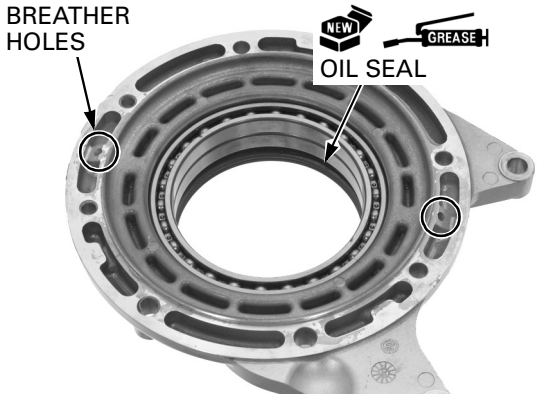
Check that the ring gear stud bolts are tight.
If any are loose, remove them, clean their threads with contact cleaner, then install using locking agent.

After installing, be sure to measure the distance from the top of each stud to the ring gear boss surface as shown.

Keep dust and dirt out of the case cover.

Blow compressed air through the breather holes in the case cover to clean them.

Install a new oil seal into the case cover with the flat side facing out until it is flush with the cover edge. Pack grease into the seal lip cavity.

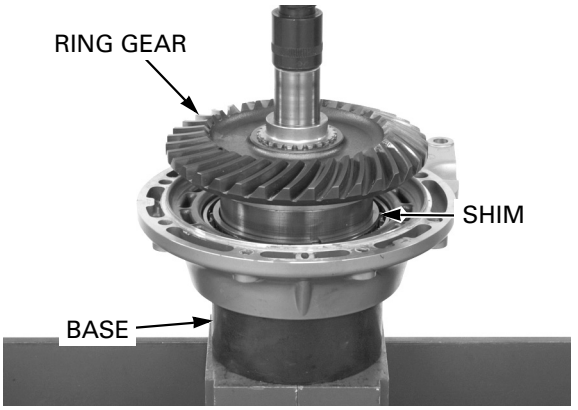


Place the left side shim onto the ring gear bearing.

Keep the base centered with the bearing inner race during installation.

Support the bearing inner race with the special tool and press the ring gear into the case cover.

TOOL:
Assembly base **070MF-MEC0400**



FINAL GEAR CASE ASSEMBLY

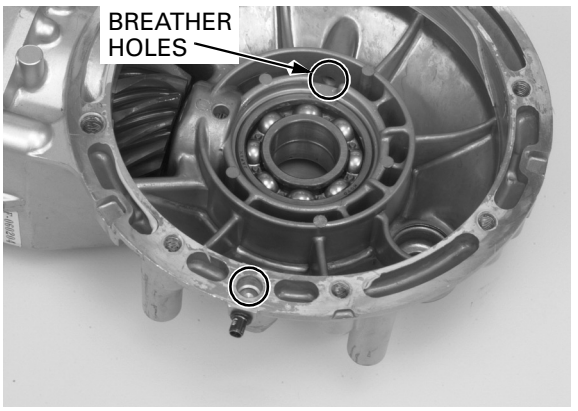
NOTE:

- When the gear set, bearing, and/or gear case has been replaced, check the tooth contact pattern (page 13-9) and gear backlash (page 13-7).

Keep dust and dirt out of the case and cover.

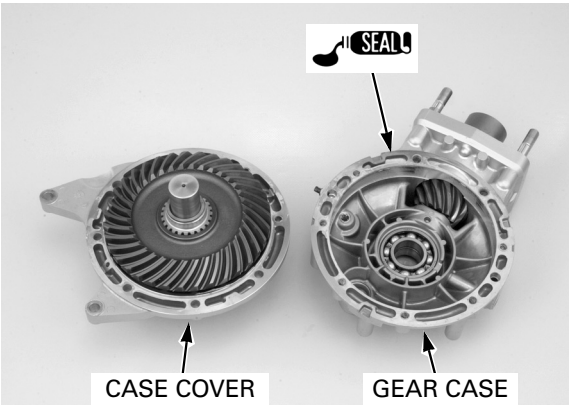
Clean the mating surface of the gear case and cover, being careful not to damage them.

Blow compressed air through the breather holes (hose) in the gear case.



Apply liquid sealant to the mating surface of the gear case.

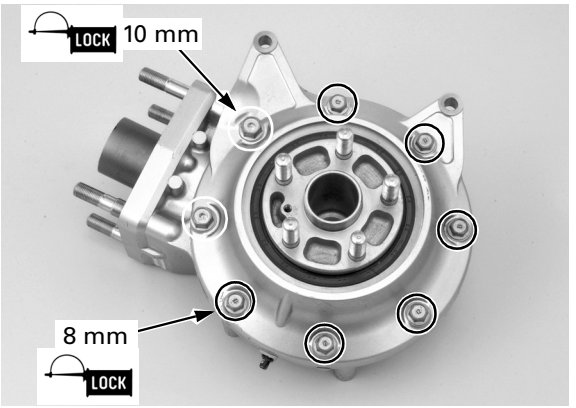
Install the case cover onto the gear case.



Apply locking agent to the threads of the case cover bolts.

Install the bolts and tighten them in several steps until the cover evenly touches the gear case. Then, while rotating the pinion gear, tighten the bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 10 mm bolt: 62 N·m (6.3 kgf·m, 46 lbf·ft)
8 mm bolt: 25 N·m (2.6 kgf·m, 19 lbf·ft)

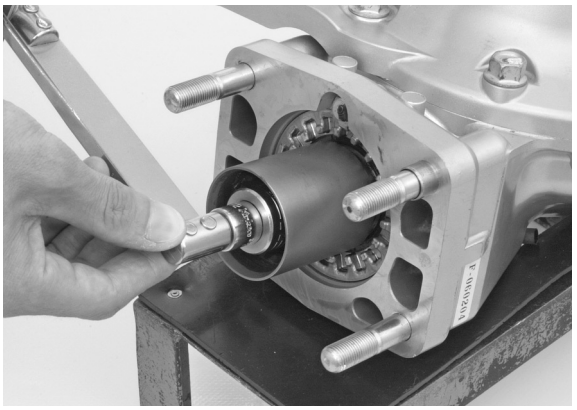


Check that the gear assembly turns smoothly without binding.

Measure the gear assembly preload.

STANDARD:
0.2 – 1.2 N·m (2 – 12 kgf·cm, 1.7 – 10.4 lbf·in)

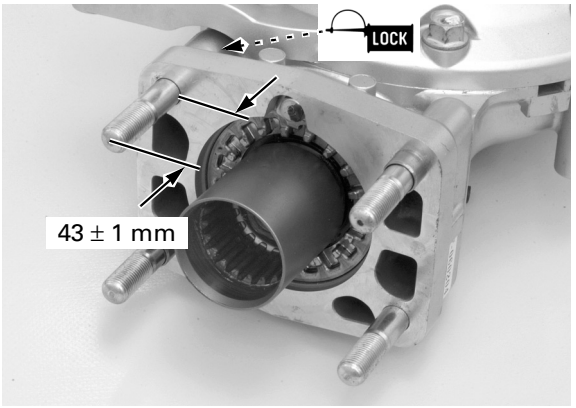
If the preload reading does not fall within the limit, check the bearings for proper installation.



FINAL DRIVE INSTALLATION

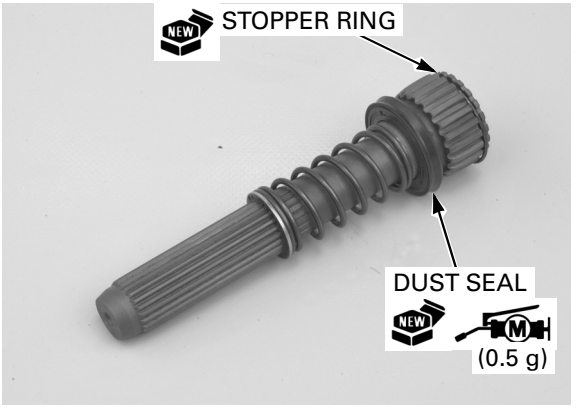
Check that the gear case stud bolts are tight.
If any are loose, remove them, clean their threads with contact cleaner, then install using locking agent.

After installing, be sure to measure the distance from top of each stud to the gear case surface as shown.



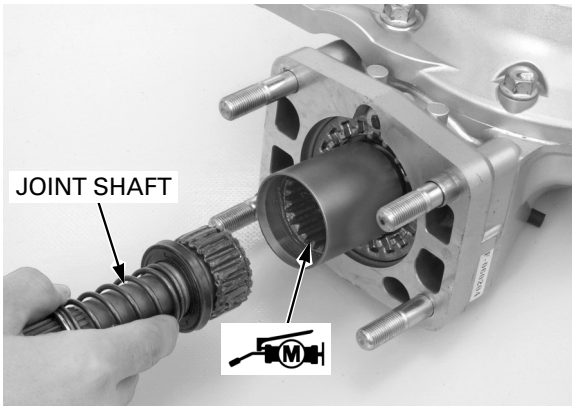
Install a new stopper ring into the groove in the joint shaft splines.

Install a new dust seal onto the joint shaft with the flat side facing the spring and pack molybdenum disulfide grease into the seal lip cavity.



Apply molybdenum disulfide grease to the pinion joint splines.
Install the joint shaft assembly into the pinion joint until the stopper ring on the shaft seats in the pinion joint groove.

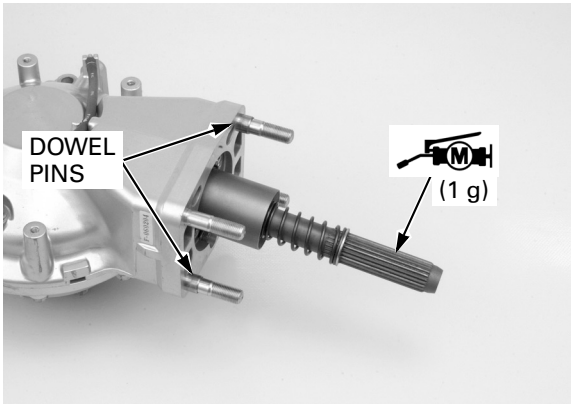
Make sure the stopper ring is seated properly by pulling on the joint shaft lightly.



Clean the mating surfaces of the swingarm and final gear case.

Install the two dowel pins.

Apply molybdenum disulfide grease to the joint shaft splines.

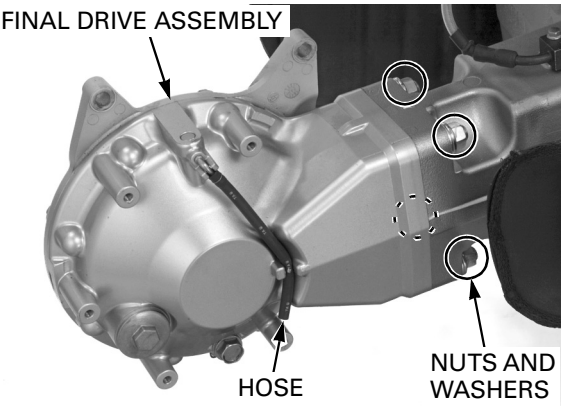


Install the final drive assembly, while aligning the splines of the joint shaft and drive shaft.

Install the four washers and nuts, and tighten them.

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

Be sure to install the breather hose into the groove in the gear case.

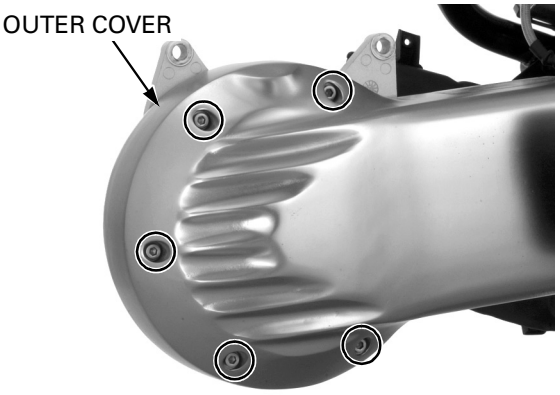


Install the brake disc and rear wheel (page 15-6).

Before installing the outer cover, fill the gear case with the recommended oil if it was disassembled (page 4-14).

Install the final drive outer cover and tighten the five bolts.

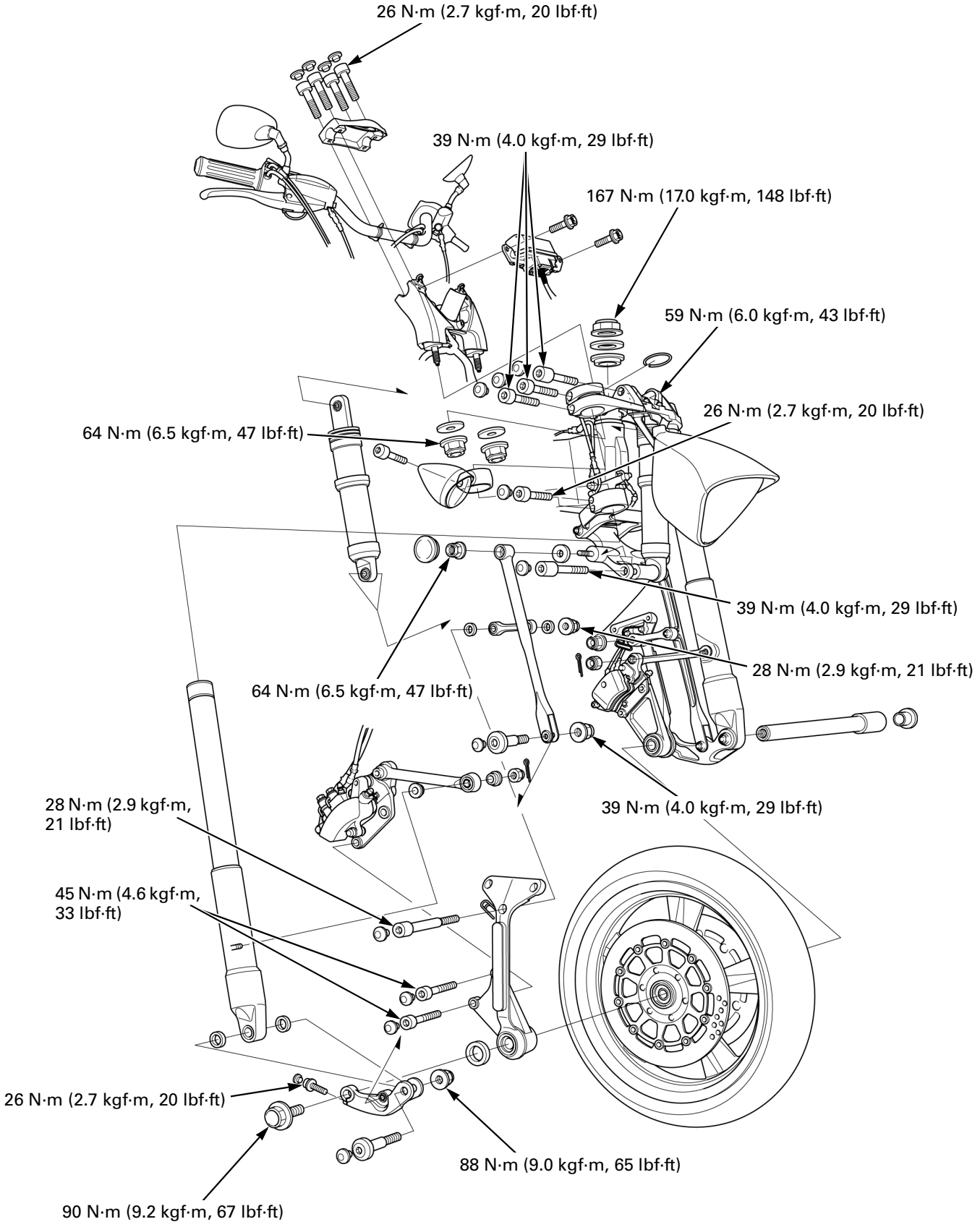
Install the muffler cover (page 3-9).



MEMO

14. FRONT WHEEL/SUSPENSION/STEERING

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- Riding on damaged rims impairs safe operation of the vehicle.
- Raise the front wheel off the ground by supporting the frame securely when servicing the front wheel, suspension and steering stem. A hoist or equivalent is required to support the motorcycle (page 4-2).
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After installing the front wheel, check the brake operation by applying the brake lever and pedal.
- When the fork tube is removed, axle alignment must be adjusted with a 15 mm O.D. shaft. Incorrect alignment will cause difficulty in fitting the front wheel or faulty suspension operation.
- Refer to page 16-2 for hydraulic brake system service.

SPECIFICATIONS

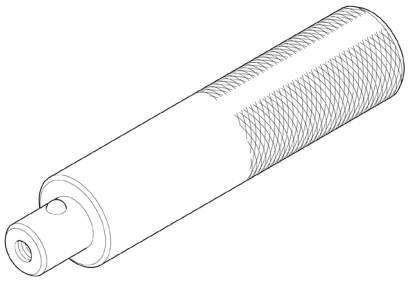
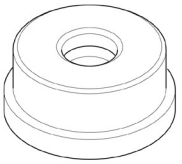
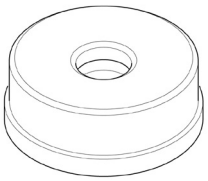
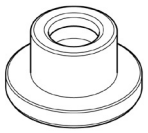
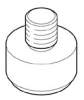
Unit: mm (in)

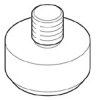
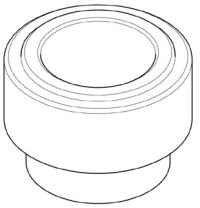
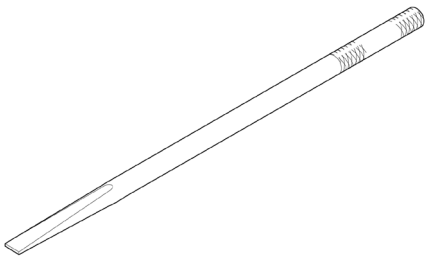
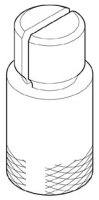
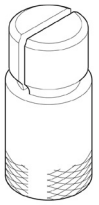
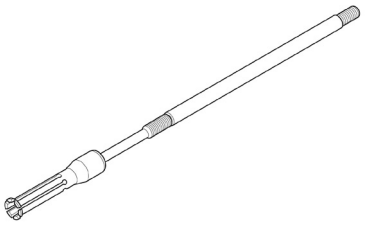
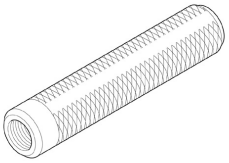
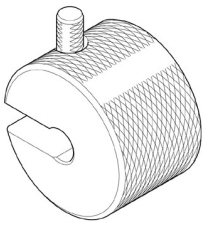
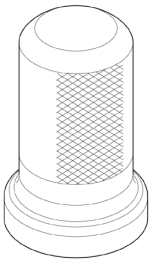
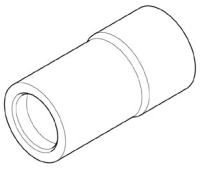
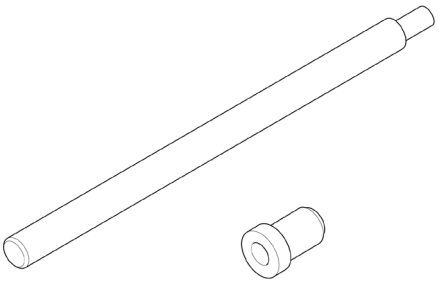
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	250 kPa (2.50 kgf/cm^2, 36 psi)	–
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm^2, 36 psi)	–
Axle runout		–	0.20 (0.008)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1oz) max.
Steering head bearing preload		6.8 – 10.8 N (0.7 – 1.1 kgf, 1.5 – 2.4 lbf)	–

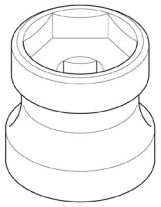
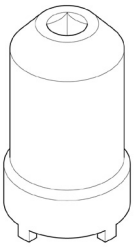
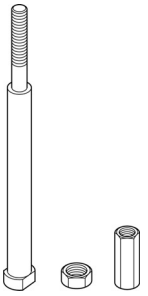
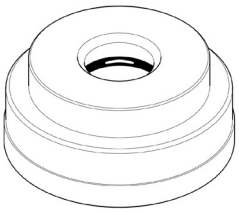
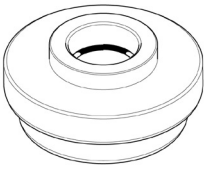
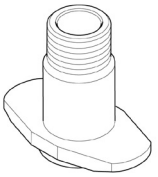
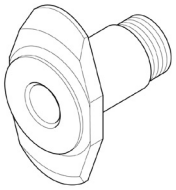
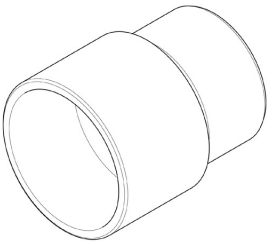
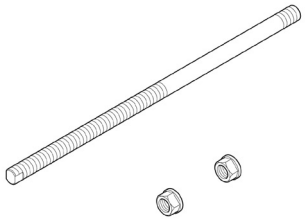
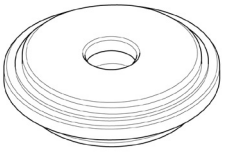
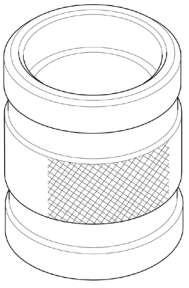
TORQUE VALUES

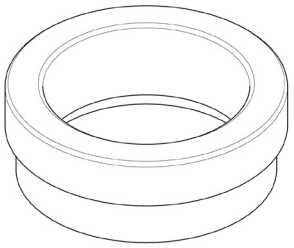
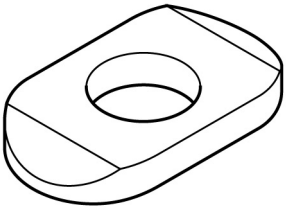
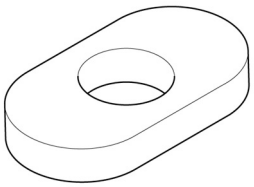
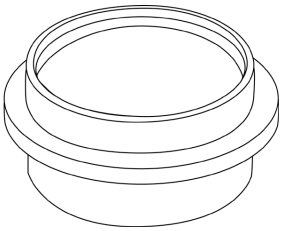
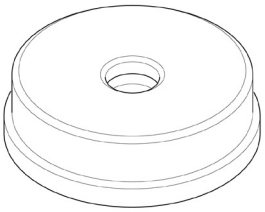
Handlebar upper holder bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Handlebar lower holder nut	64 N·m (6.5 kgf·m, 47 lbf·ft) U-nut.
Handlebar lower holder cover bolt	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Shock absorber upper bracket cover bolt (front)	1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Shock absorber upper bracket cover bolt (rear)	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Front brake disc bolt	20 N·m (2.0 kgf·m, 14 lbf·ft) ALOC bolt: replace with a new one.
Front axle bolt	90 N·m (9.2 kgf·m, 67 lbf·ft)
Front axle pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Front brake caliper mounting bolt	45 N·m (4.6 kgf·m, 33 lbf·ft) ALOC bolt: replace with a new one.
Fork top bridge pinch bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Fork bottom bridge pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Shock absorber upper bracket pinch bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Left shock absorber upper mounting bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)
Right shock absorber upper mounting bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Shock absorber lower mounting bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Shock arm pivot nut (arm-to-bottom bridge)	39 N·m (4.0 kgf·m, 29 lbf·ft) U-nut.
Suspension push rod nut (upper; rod-to-shock arm)	64 N·m (6.5 kgf·m, 47 lbf·ft) U-nut.
Suspension push rod nut (lower; rod-to-pivot arm)	39 N·m (4.0 kgf·m, 29 lbf·ft) U-nut.
Suspension pivot arm nut (arm-to-fork tube)	88 N·m (9.0 kgf·m, 65 lbf·ft) U-nut.
Fender link (fender stay–push rod) nut	28 N·m (2.9 kgf·m, 21 lbf·ft) U-nut.
Steering bearing adjustment nut	37 N·m (3.8 kgf·m, 27 lbf·ft) Apply engine oil to the threads.
Steering bearing adjustment nut lock nut	See page 14-39
Steering stem nut	167 N·m (17.0 kgf·m, 148 lbf·ft) Apply engine oil to the threads.
Brake pipe/hose joint mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Brake hose guide bolt (shock absorber upper bracket)	12 N·m (1.2 kgf·m, 9 lbf·ft)

TOOLS

Driver 07749-0010000 	Attachment, 22 x 24 mm 07746-0010800 	Attachment, 24 x 26 mm 07746-0010700 
Attachment, 28 x 30 mm 07946-1870100 	Attachment, 32 x 35 mm 07746-0010100 	Attachment, 42 x 47 mm 07746-0010300 
Attachment, 52 x 55 mm 07746-0010400 	Attachment, 25 x 38.5 mm 07YMD-MCJ0100 	Pilot, 15 mm 07746-0040300 
Pilot, 17 mm 07746-0040400 	Pilot, 19 mm 07746-0041400 	Pilot, 20 mm 07746-0040500 

Pilot, 22 mm 07746-0041000 	Pilot, 25 mm 07746-0040600 	Attachment, 35 mm I.D. 07746-0030400 
Bearing remover shaft 07GGD-0010100 	Bearing remover head, 20 mm 07746-0050600 	Bearing remover head, 22 mm 07746-0050700 
Bearing remover, 17 mm 07936-3710300 	Bearing remover handle 07936-3710100 	Bearing remover weight 07741-0010201  or 07936-371020A or 07936-3710200 (U.S.A. only)
Oil seal driver 07HAD-PJ70100 	Spherical bearing driver 07HMF-KS60100 	Bearing driver 07946-KA50000 

Socket wrench, 39 x 41 mm 07GMA-KS40100  or equivalent commercially available in U.S.A.	Steering stem socket 07HMA-MR70100 	Installer shaft assembly 07946-KM90301 
Installer attachment A 070MF-MEC0100  (Newly designed tool)	Installer attachment B 07NMF-MT70120 	Remover attachment A 07NMF-MT70110 
Remover attachment B 070MF-MEC0200  (Newly designed tool)	Assembly base 56 x 65 mm 070MF-MEC0300  (Newly designed tool)	Support base 07GAF-SD40310 
Installer shaft 07VMF-KZ30200 	Main bearing driver attachment 07946-ME90200 	Fork seal driver weight 07947-KA50100 

Attachment 07965-MA60000 	Remover attachment, F 07AMF-MECA100  (Newly designed tool)	Installer attachment, D 070MF-MECA100  (Newly designed tool)
Remover attachment, E 07AMF-MECA200  (Newly designed tool)	Installer attachment, C 07AMF-MT7A120 	Oil seal driver 07965-MC70100 
Attachment, 72 x 75 mm 07746-0010600 		

TROUBLESHOOTING

Hard steering
- Steering head bearing adjustment nut too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure
- Faulty front tire

Steers to one side or does not track straight
- Bent fork leg
- Bent front axle or suspension components
- Damaged or loose steering head bearings
- Damaged frame
- Worn wheel bearings
- Wheel installed incorrectly
- Loose or damaged suspension components
- Incorrect axle alignment
- Worn swingarm pivot components (page 15-12)

Front wheel wobbles
- Bent rim
- Worm or damaged wheel bearings
- Faulty tire
- Loose axle fasteners
- Unbalanced tire and wheel

Wheel turns hard
- Faulty wheel bearings
- Bent axle
- Brake drag (page 16-6)

Soft suspension
- Weak shock absorber spring
- Oil leakage from damper unit
- Insufficient tire pressure

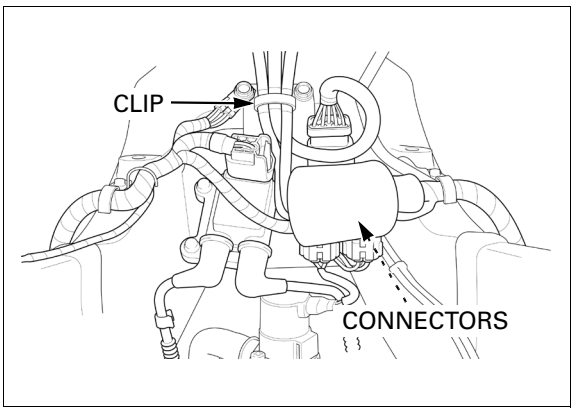
Stiff suspension
- Worn or damaged suspension pivot bearings
- Damaged suspension linkage components
- Bent damper rod
- Incorrect axle alignment
- Tire pressure too high

Front suspension noise
- Worn or damaged suspension pivot bearings
- Damaged suspension linkage components
- Loose fork or suspension fasteners
- Binding shock absorber case
- Faulty shock absorber

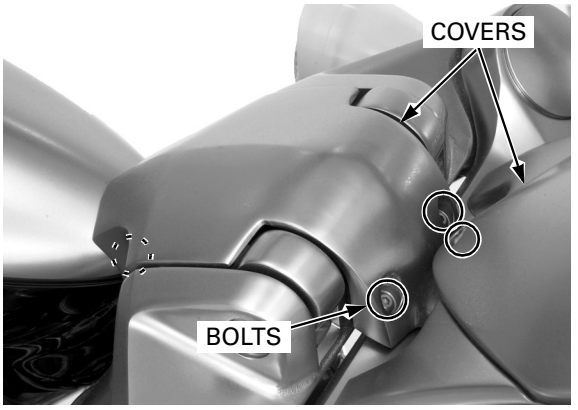
HANDLEBAR

REMOVAL

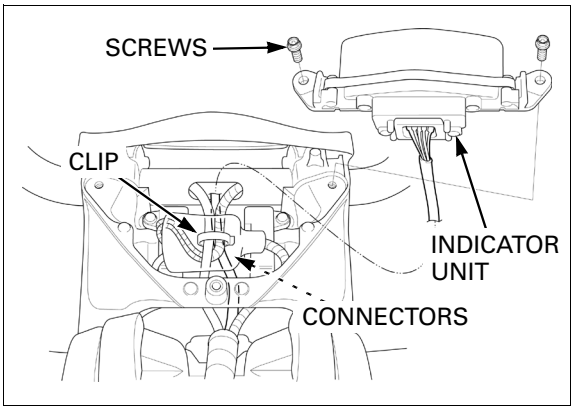
Remove the following and disconnect the switch connectors:
- fuel tank top cover (page 3-4)
- wires (from the clip)
- right handlebar switch 7P connectors (gray and white)



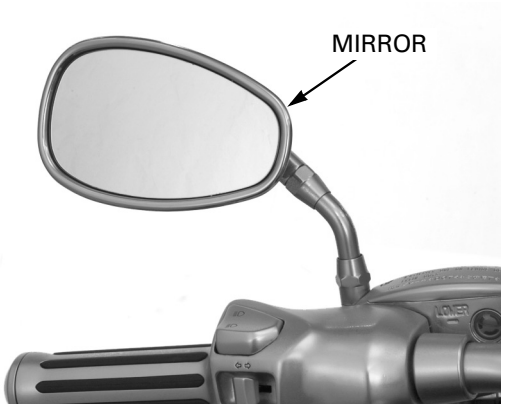
- three socket bolts
- shock absorber upper bracket cover
- socket bolt
- lower holder cover



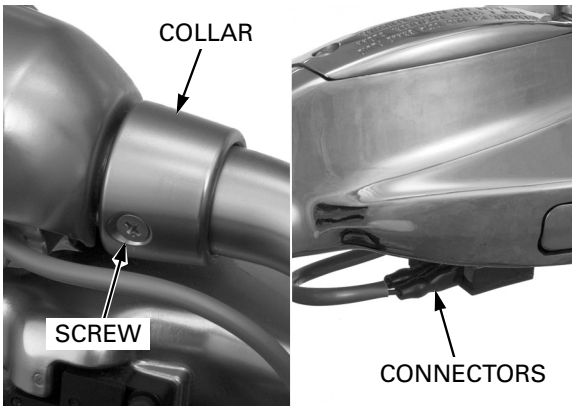
- two screws
- indicator unit
- wires (from the clip)
- left handlebar switch 7P connectors (gray and black)



Remove the following from the handlebar:
- left and right rearview mirror

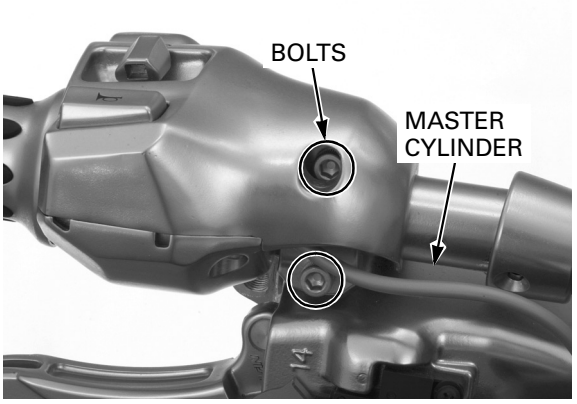


– collar screw (on the left and right sides if the handlebar collar will be removed)
– clutch switch connectors

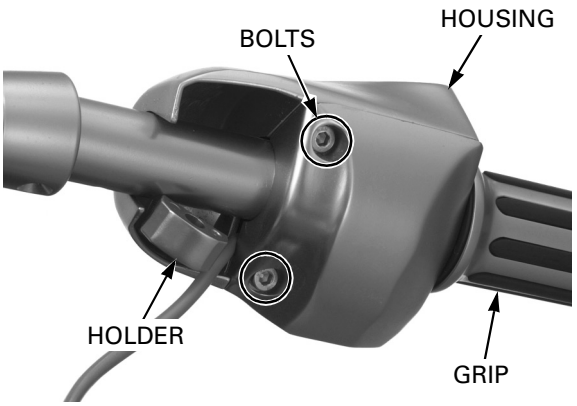


Keep the reservoir upright to prevent air from entering the hydraulic system.

– two socket bolts
– clutch master cylinder

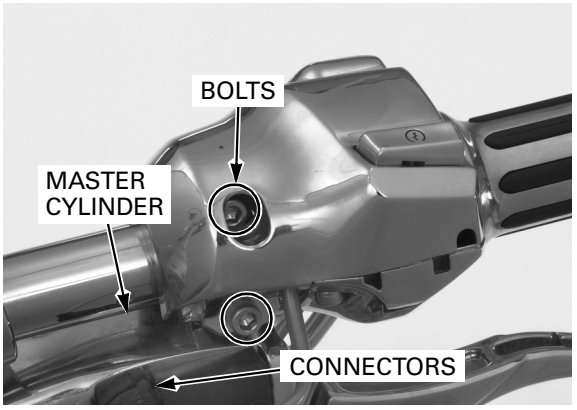


– master cylinder holder (by loosening the housing bolts)
– two socket bolts
– left handlebar switch housing (remove the switch wire out of the handlebar pipe)
– grip end cap
– left handlebar grip
– handlebar collar

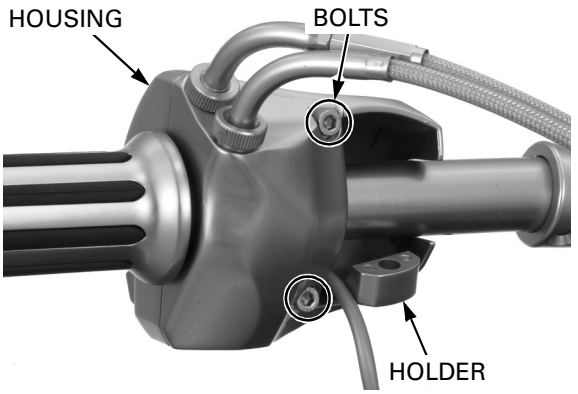


Keep the reservoir upright to prevent air from entering the hydraulic system.

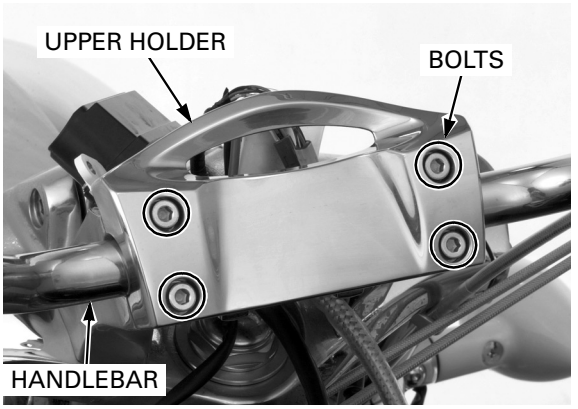
– brake light switch connectors
– two socket bolts
– brake master cylinder



– master cylinder holder (by loosening the housing bolts)
– two socket bolts
– right handlebar switch/throttle housing (carefully remove the switch wire out of the lower holder and handlebar pipe)



Remove the bolt caps from the socket bolts.
Remove the four socket bolts and upper holder, and the handlebar from the lower holder.



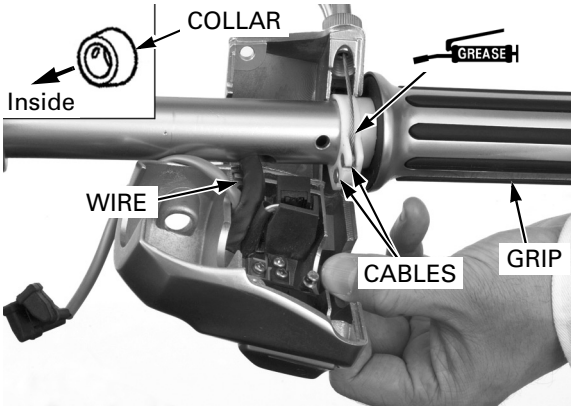
Remove the throttle grip and handlebar collar from the handlebar.

INSTALLATION

NOTE:

- Route the cables, hoses and wires properly (page 1-22).

Install the collar onto the handlebar.



Take care not to damage the connectors.

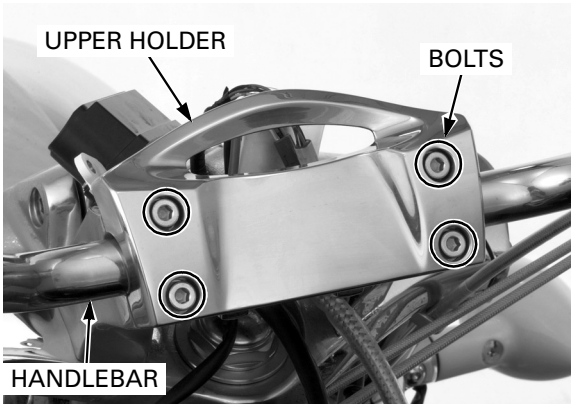
Route the right handlebar switch wire through the handlebar pipe and lower holder with a piece of wire.

Apply grease to the throttle grip flange groove and sliding surface.
Connect the throttle cables to the throttle grip flange and install the throttle grip onto the handlebar.

Place the handlebar onto the lower holder, then install the upper holder with the bolts.
Lower the handlebar until it stops (seat the handlebar stoppers against the lower holder).
Tighten the front bolt first, then tighten the rear bolts.

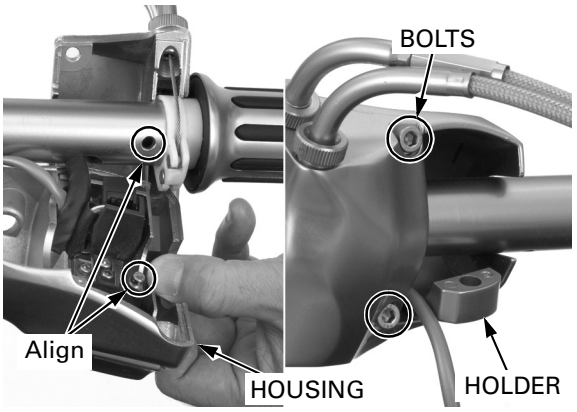
TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Install the bolt caps.



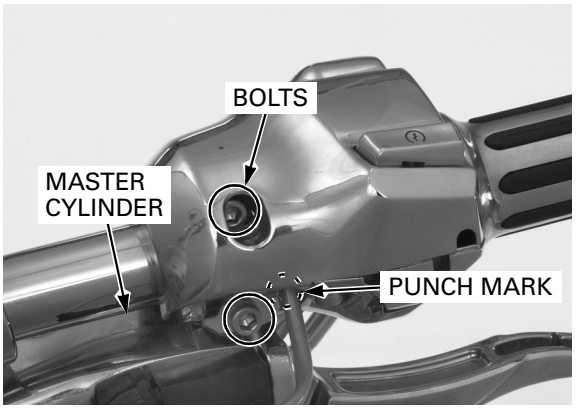
Place the master cylinder holder in the housing so the bevel edge is facing the master cylinder.

Install the right handlebar switch/throttle housing with the two bolts, aligning the locating pin with the hole in the handlebar.
Tighten the upper bolt first, then tighten the lower bolt.



Install the master cylinder with the holder and two bolts.
Align the edge of the master cylinder with the punch mark on the handlebar and tighten the rear bolt first, then tighten the front bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the handlebar collar.

Clean the inside surface of the left handlebar grip and the outside surface of the handlebar.
Apply Honda Bond A or Honda Hand Grip Cement (U.S.A. only) to the inside surface of the handlebar grip and to the outside surface of the handlebar.

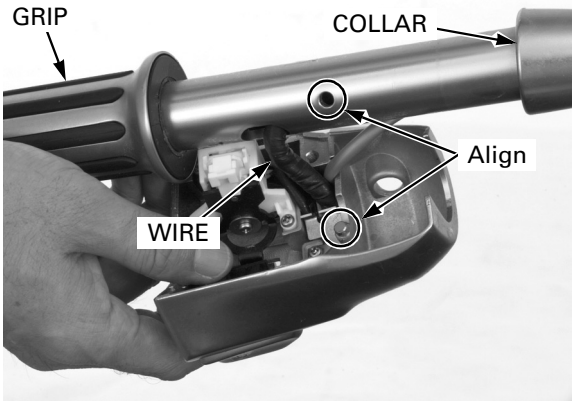
Allow the adhesive to dry for 1 hour before using.

Wait 3 – 5 minutes and install the grip. Rotate the grip for even application of the adhesive.

Install the end cap and tighten it

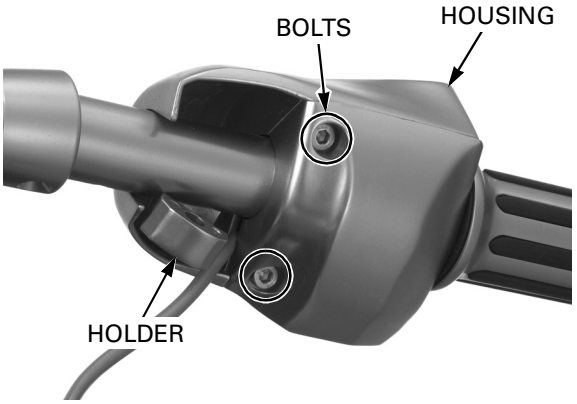
Take care not to damage the connectors.

Route the left handlebar switch wire through the handlebar pipe with a piece of wire.



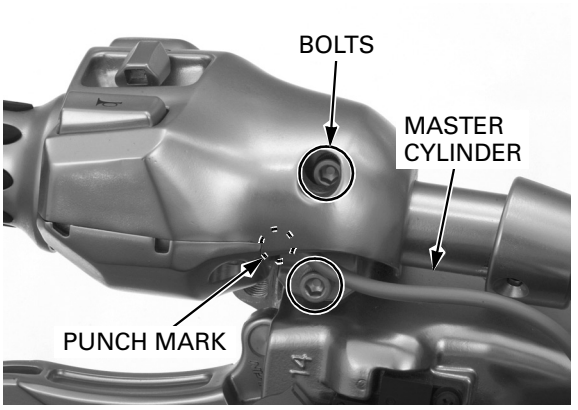
Place the master cylinder holder in the housing so the bevel edge is facing the master cylinder.

Install the left handlebar switch housing with the two bolts, aligning the locating pin with the hole in the handlebar.
Tighten the upper bolt first, then tighten the lower bolt.



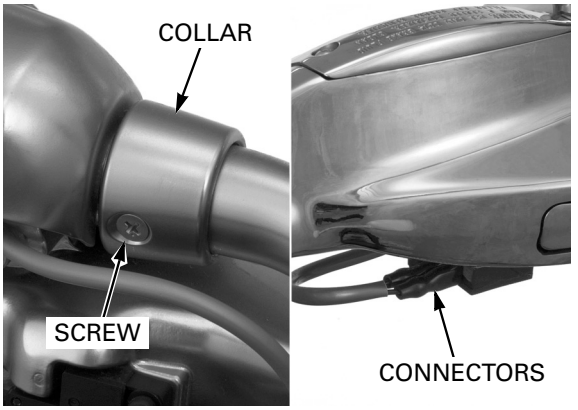
Install the clutch master cylinder with the holder and two bolts.
Align the edge of the master cylinder with the punch mark on the handlebar and tighten the rear bolt first, then tighten the front bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

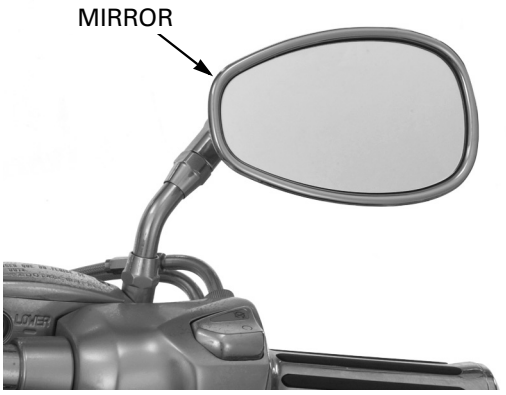


Secure each handlebar collar with the screw.

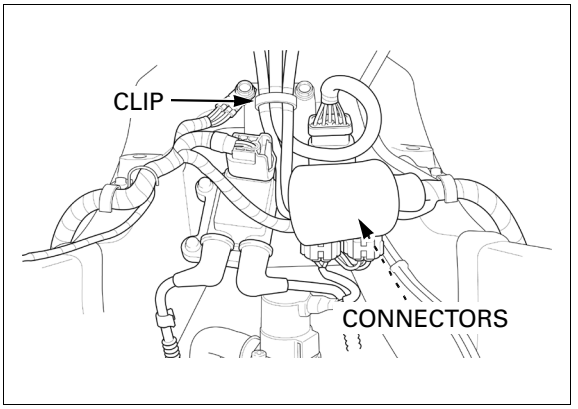
Connect the clutch switch and brake light switch connectors.



Install the left and right rearview mirror

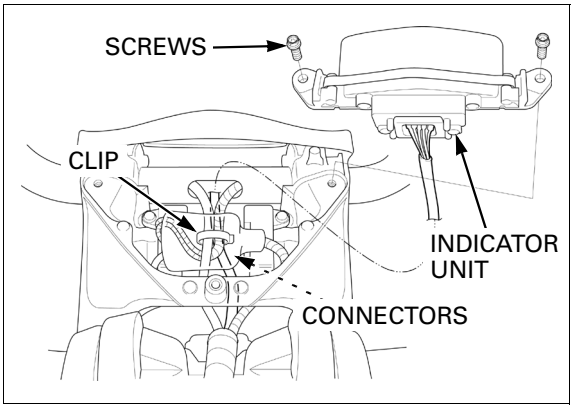


Connect the right handlebar switch 7P connectors (gray and white) and secure the wires with the clip.



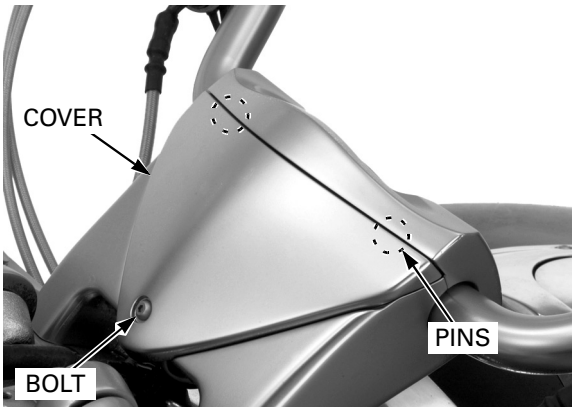
Connect the left handlebar switch 7P connectors (gray and black) and secure the wires with the clip.

Install the following:
– indicator unit with the two screws



– lower holder cover with the socket bolts (aligning the pins with the grooves)

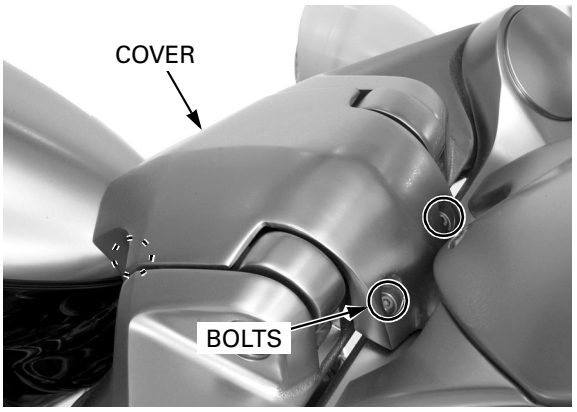
TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



– upper bracket cover with the three socket bolts

TORQUE: Front: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Rear: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

– fuel tank top cover (page 3-4)



FRONT WHEEL

REMOVAL

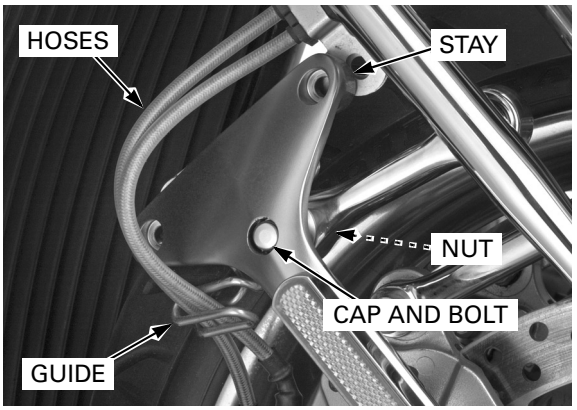
Support the motorcycle securely using a hoist or equivalent and raise the front wheel off the ground (page 4-2).

Remove the front fender (page 3-5).

Remove the fender link by removing the nut on the push rod if necessary. For link bearing replacement, see page 14-28.

Remove the bolt cap, and the fender link nut and bolt to disconnect each fender link from the fender stays.

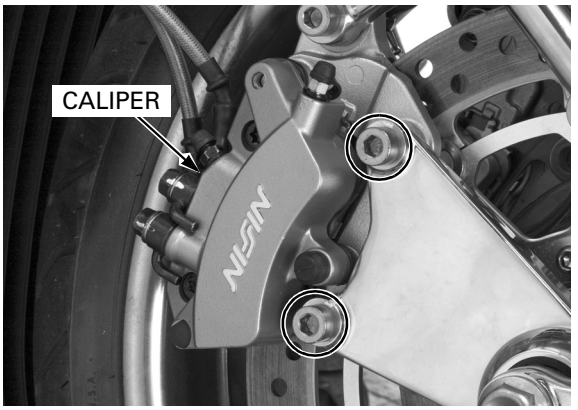
Release the brake hoses from the hose guides on the left and right stays, and lower the fender stays.



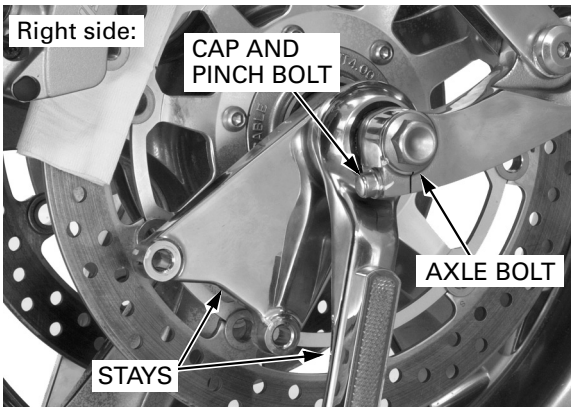
Remove the bolt caps, and the left and right caliper mounting bolts.

Do not operate the brake lever and pedal after removing the caliper. To do so will cause difficulty in fitting the brake pads over the disc.

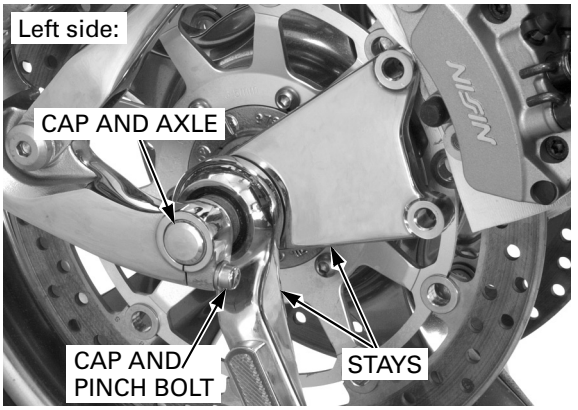
Support the calipers with piece of strings so they does not interfere with the brake discs when removing the wheel.



Remove the bolt cap and loosen the right axle pinch bolt.
Remove the axle bolt.



Remove the bolt cap and loosen the left axle pinch bolt.
Remove the axle cap. Pull the front axle out while holding the wheel securely and remove the front wheel and stay assemblies to the rear side.

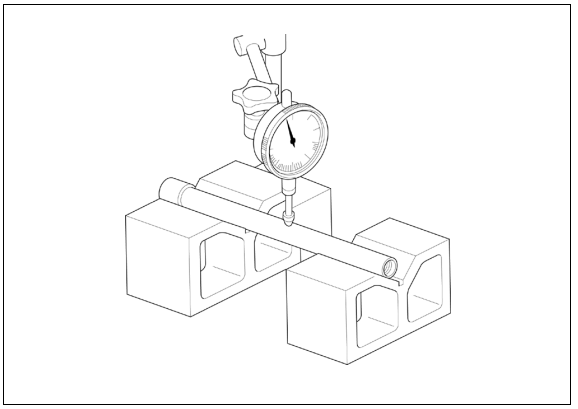


INSPECTION

AXLE

Set the axle in V-blocks.
Turn the axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

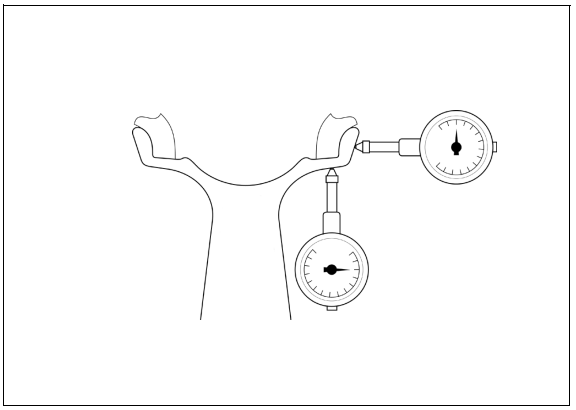
SERVICE LIMIT: 0.20 mm (0.008 in)



WHEEL RIM

Check the rim runout by placing the wheel in a trueing stand.
Spin the wheel slowly by hand and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

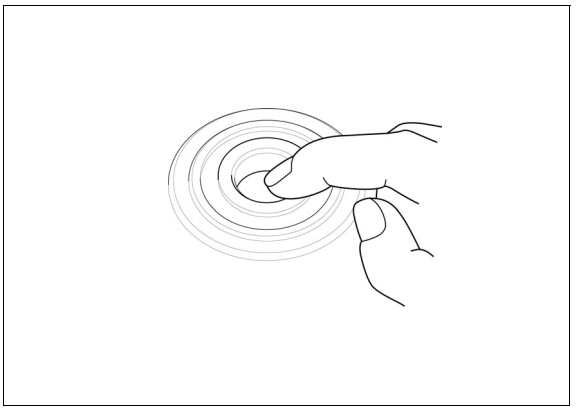
SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)



WHEEL AND STAY BEARINGS

Turn the inner race of each bearing with your finger; the bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub or stay.

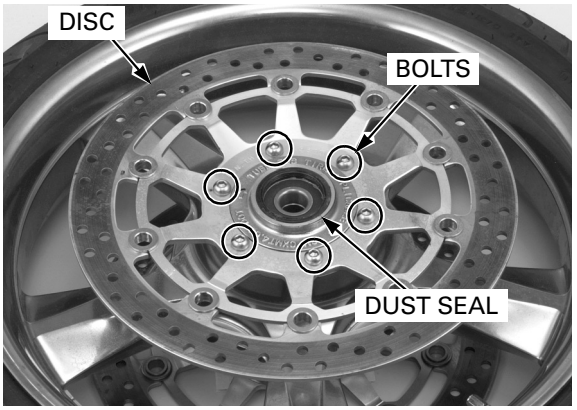
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely.



DISASSEMBLY

Remove the disc bolts and brake discs.

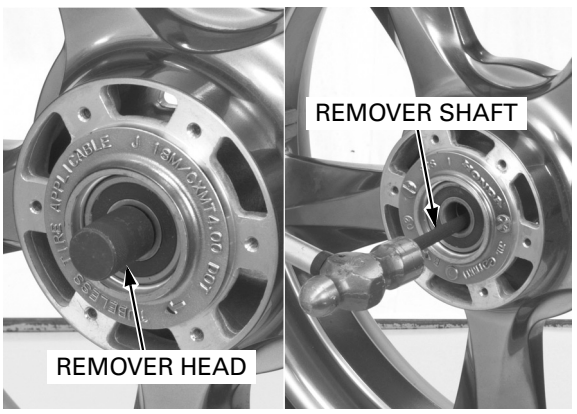
Remove the dust seals.



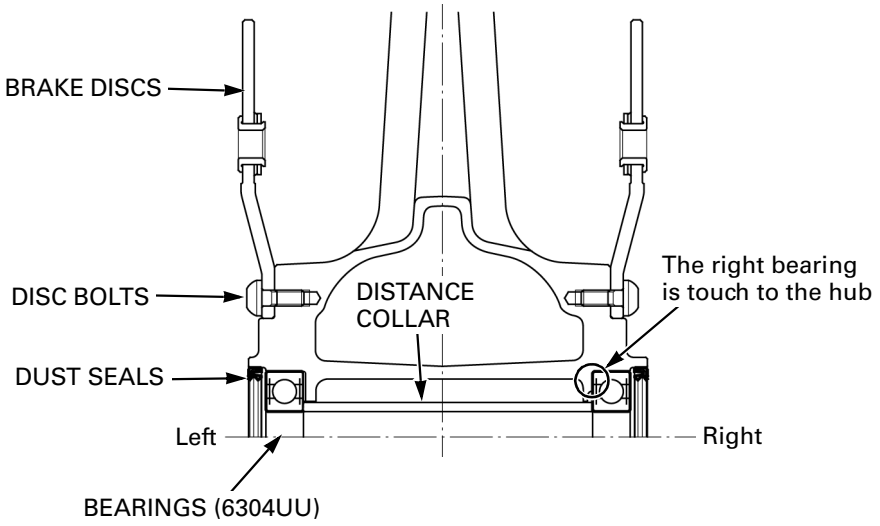
Replace the wheel bearings in pairs. Do not reuse old bearings.

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 head, 20 mm 07746-0050600
Bearing remover shaft 07GGD-0010100



ASSEMBLY

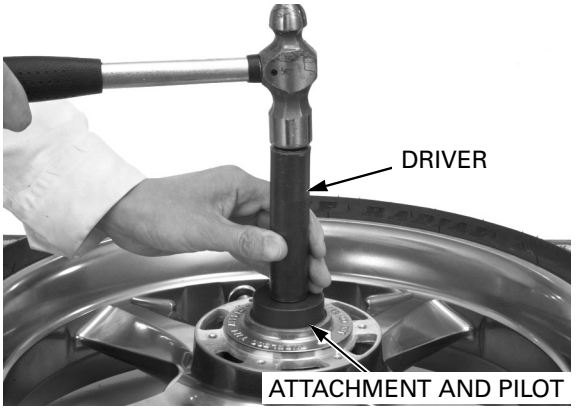


Drive in a new right bearing squarely with the marked side facing up until it is fully seated.

Install the distance collar.
Drive in the left bearing squarely with the marked side facing up until it is fully seated.

TOOLS:

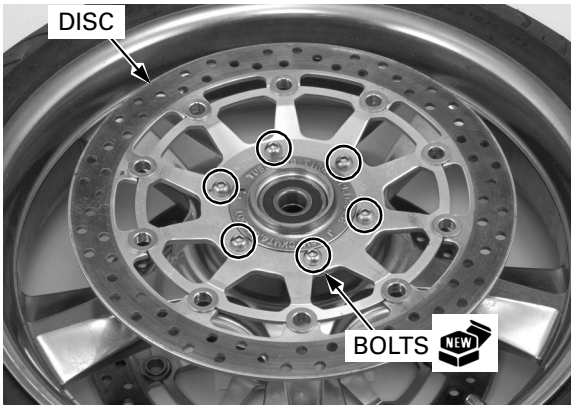
Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**
Pilot, 20 mm	**07746-0040500**



Do not get grease on the brake discs or stopping power will be reduced.

Install the brake discs with new disc bolts.
Tighten the disc bolts in a crisscross pattern in several steps.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

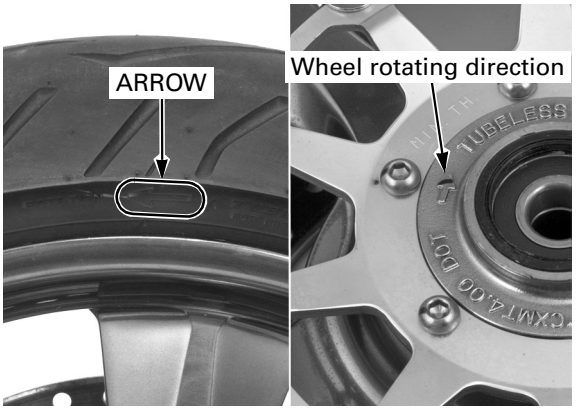


WHEEL BALANCE

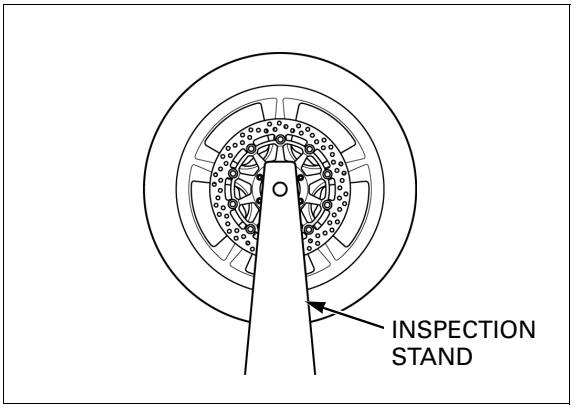
Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before installing the wheel.

NOTE:

- Mount the tire with the arrow mark facing in the direction of rotation.
- 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 wheel balance mark (heavy mass point: a paint dot on left side surface of the rim; not valve stem). Remount the tire if necessary.
- This motorcycle is used stick-type balance weight.
  - Before installing the weights, remove any adhesive from the rim thoroughly and clean the area where new weights are to be placed with degreasing agent. Take care not to scratch the rim surface.
  - Do not touch the adhesive surface of the weight with your bare hands when installing.
  - The balance weights are always replaced with new ones whenever they are removed. Do not reuse them.



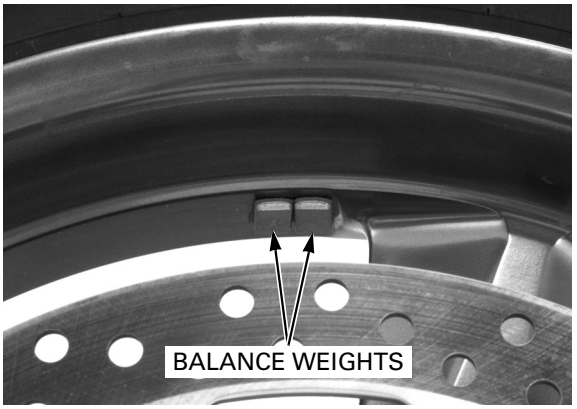
Mount the wheel, tire and brake disc assembly on an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not stop consistently in the same position.



Attach a balance weight on the center line of the front wheel rim in the direction as shown.

To balance the wheel, install a balance weight on the lightest side of the rim, on the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.
Do not add more than 60 g (2.1 oz) to the wheel.

Press the weights by your hands firmly and make sure they are not come off the rim.



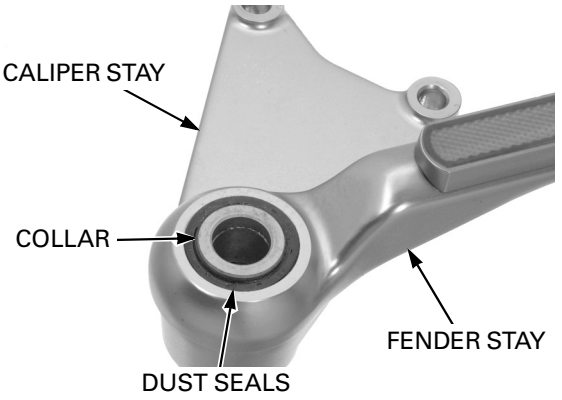
Apply grease to new dust seal lips and install the dust seals until they are flush with the wheel hub.

Do not reuse old bearings.

STAY BEARING REPLACEMENT

Remove the fender stay side collar.

Separate the stays by prying it using a screwdriver with a shop towel, being careful not to damage them.



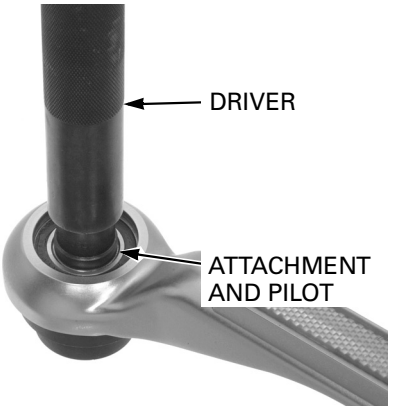
FENDER STAY

Remove the dust seals from both sides of the fender stay.

Drive the inner collar and the bearing out of the stay.

TOOLS:

Collar:	
Driver	**07749-0010000**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 20 mm	**07746-0040500**
Bearing:	
Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 25 mm	**07746-0040600**



Drive in a new bearing squarely until it is fully seated.

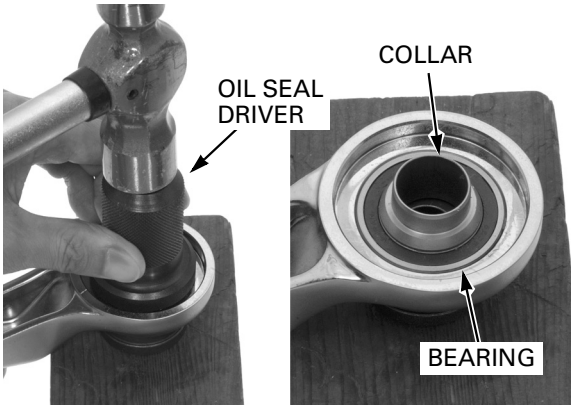
TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**

Drive in the collar (drive at flange section) by supporting the bearing inner race.

TOOLS:

Oil seal driver	**07HAD-PJ70100**



Apply grease to new dust seal lips and install the dust seals until they are flush with the stay.

Replace the caliper stay bearings in pairs.

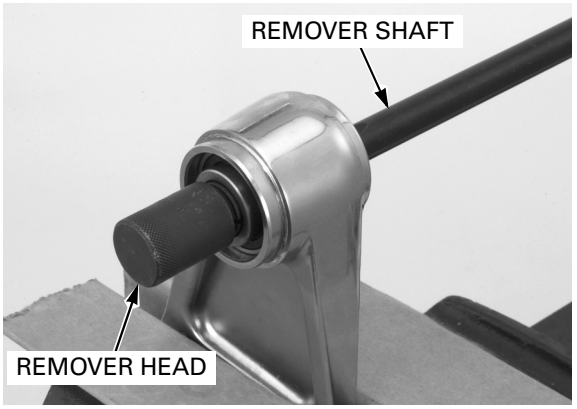
CALIPER STAY

Install the remover head into the caliper stay side collar.
From the opposite side, install the remover shaft and drive collar out of the bearing.

Remove the bearing in the same manner as above.

TOOLS:

Collar:	
Bearing remover head, 20 mm	**07746-0050600**
Bearing remover shaft	**07GGD-0010100**
Bearing:	
Bearing remover head, 22 mm	**07746-0050700**
Bearing remover shaft	**07GGD-0010100**



Remove the distance collar and drive out the other bearing.

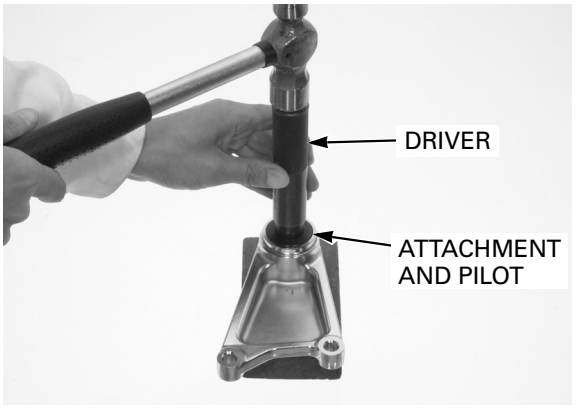
Pack the cavities in new bearings with grease.

Drive in the inside (wheel side) bearing squarely with the sealed side facing up until it is fully seated.

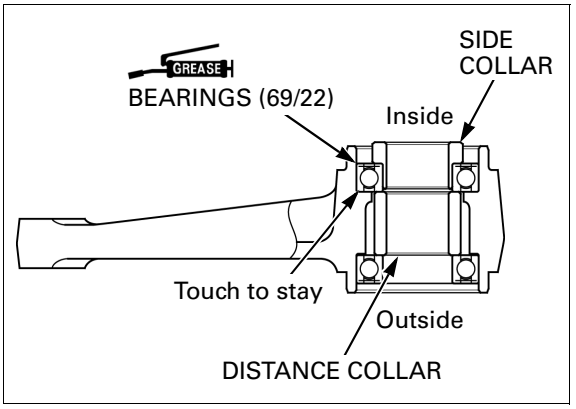
Install the distance collar.
Drive in the outside bearing squarely with the sealed side facing up until it is fully seated.

TOOLS:

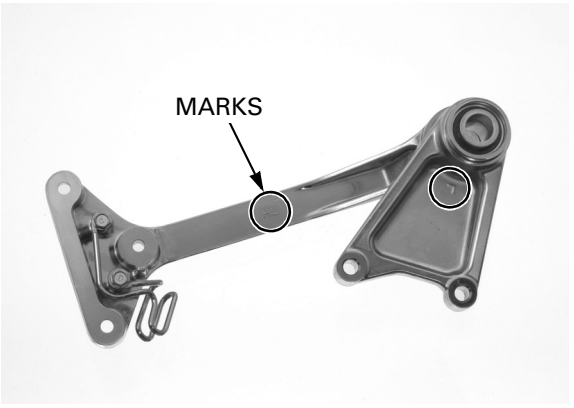
Driver	**07749-0010000**
Attachment, 25 x 38.5 mm	**07YMD-MCJ0100**
Pilot, 22 mm	**07746-0041000**



Install the side collar into the inside (wheel side) bearing by tapping it with a plastic hammer until it is fully seated.

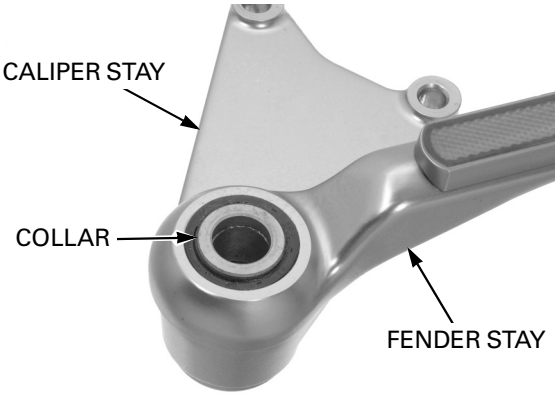


The fender and caliper stays have the following identification marks:
Fender stay: LH; left side / RH; right side
Caliper stay: L; left side / R; right side



Install the side collar into the fender stay.

Install the fender stay over the caliper stay by tapping the side collar with a plastic hammer while supporting the opposite side collar.

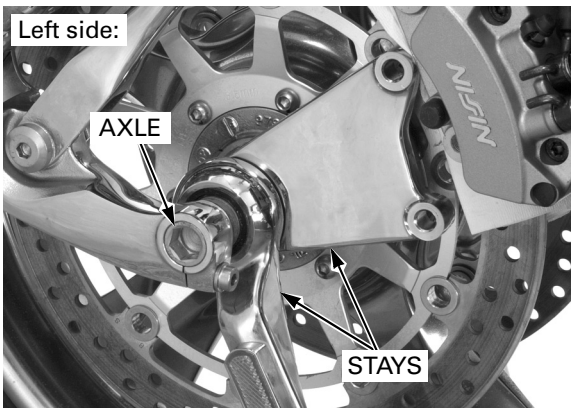


INSTALLATION

Do not exchange the left and right stay assemblies.

Install the stay assemblies into the wheel.

Apply thin layer of grease to the axle surface.
Place the front wheel between the fork legs from the rear side. Insert the axle from the left side through the pivot arm, stays and wheel.

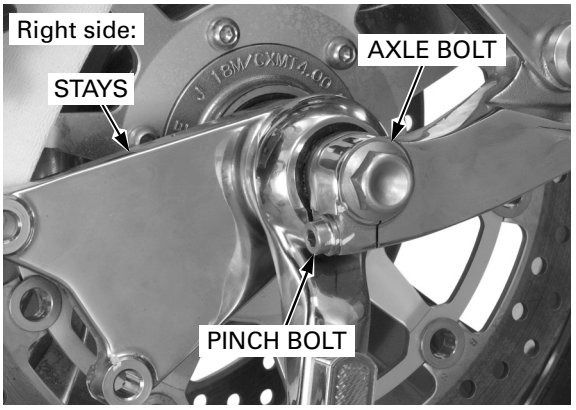


Install the axle bolt and tighten it while holding the axle.

TORQUE: 90 N·m (9.2 kgf·m, 67 lbf·ft)

Tighten the right axle pinch bolt.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

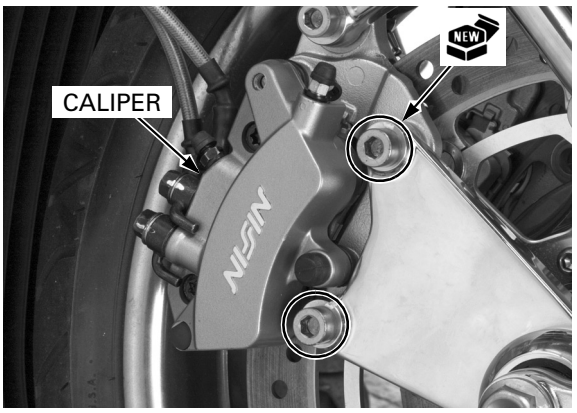


Be careful not to damage the brake pads.

Install the left and right calipers over the discs and onto the stays with new mounting bolts.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

Be sure each caliper bracket is not interfered with the brake disc.



Raise the fender stay and install the brake hoses into the hose guide.

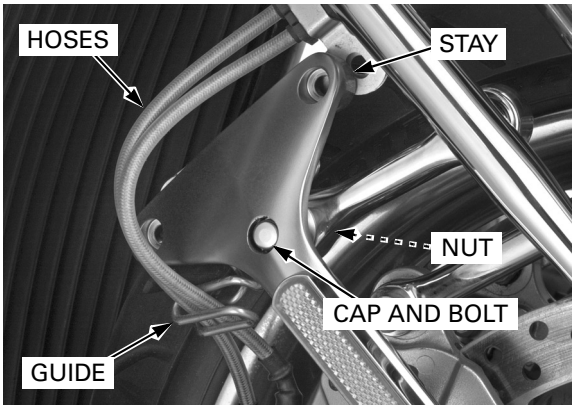
Connect the fender link to the fender stay with the bolt and nut, and tighten it.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

Install the other side fender stay.

Install the bolt caps.

With the brake applied, pump the front suspension up and down several times to seat the axle and check brake operation.

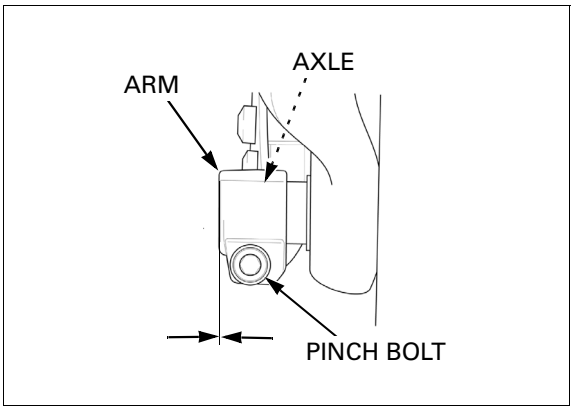


Make sure that the left end of the axle is flush with the pivot arm.
Tighten the left axle pinch bolt.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Install the bolt caps into the caliper mounting bolts, pinch bolts and axle.

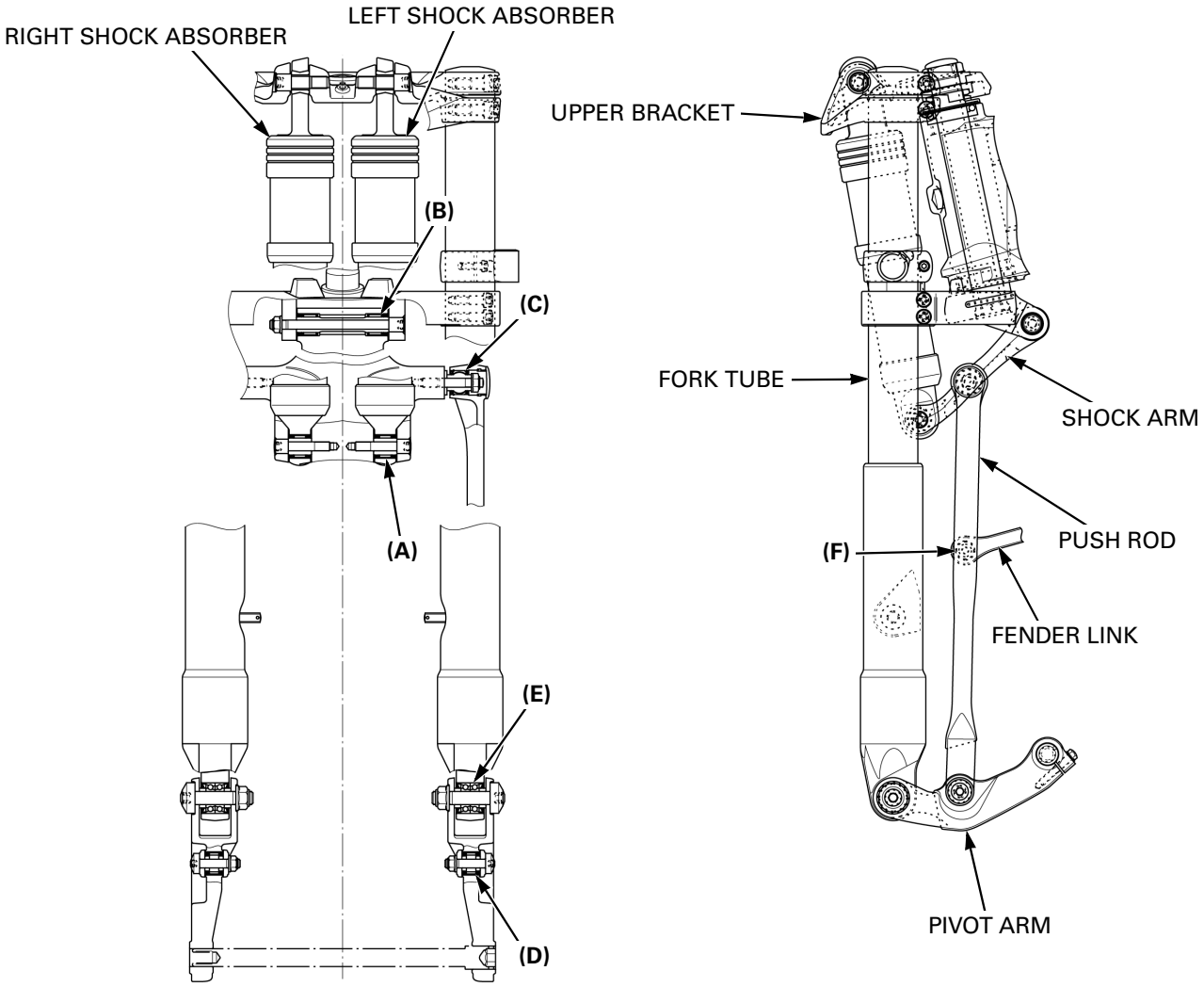
Install the front fender (page 3-5).



SUSPENSION LINKAGE/SHOCK ABSORBER

NOTE:

- The letter in parenthesis indicates the pivot bearing. For these bearing replacement, see page 14-26.

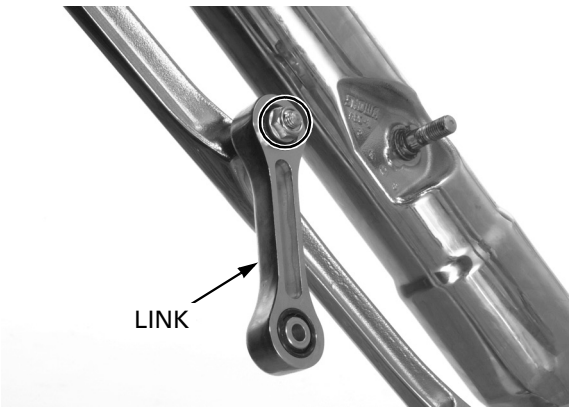


REMOVAL

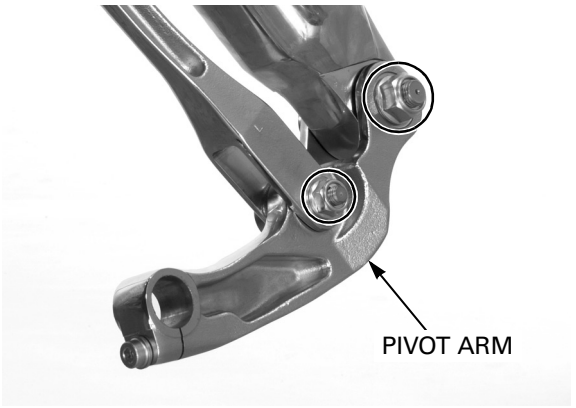
Support the brake caliper so that it does not hang from the brake hoses. Do not twist the brake hoses.

Remove the front brake calipers without disconnecting the brake hoses (page 16-19).
Remove the front wheel (page 14-14).

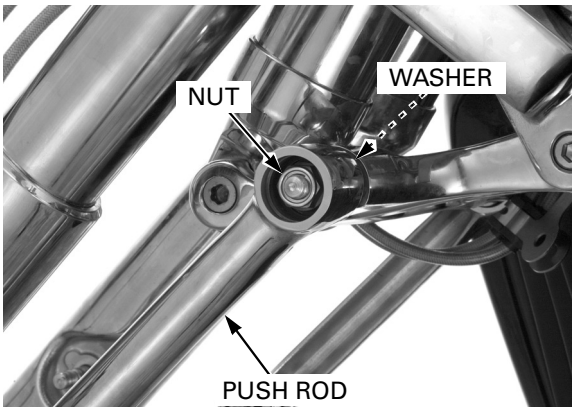
Remove the following:
– nut
– fender link



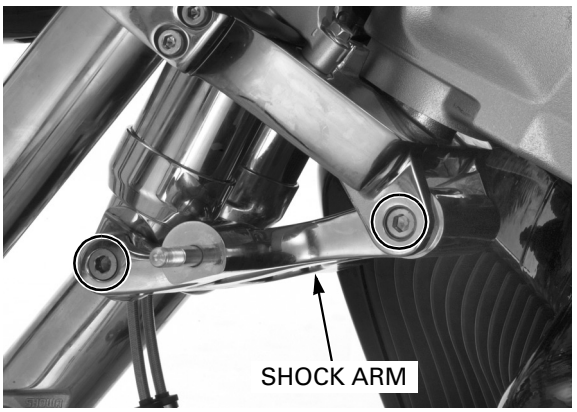
– bolt cap, nut and bolt (push rod-to-pivot arm)
– bolt cap, nut and bolt (pivot arm-to-fork tube)
– suspension pivot arm



– pivot cap and nut
– suspension push rod
– washer

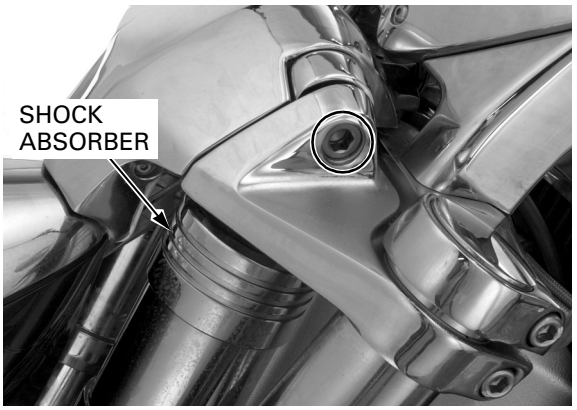


– bolt cap, nut and bolt
(shock arm-to-bottom bridge)
– bolt caps, nuts and bolts
(shock absorber lower mount)
– shock arm



– bolt cap and bolt (left:12 mm / right 10 mm)
– shock absorber

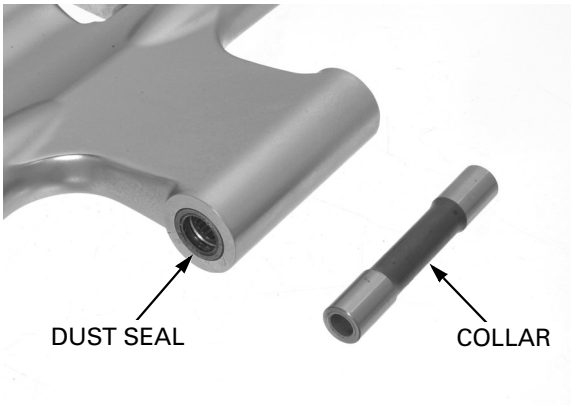
For fork tube removal, refer to page 14-30 “Steering Stem”.



Remove the collars and dust seal from all the suspension components.

INSPECTION

Check the pivot collars and bearings for wear or damage.



Replace the shock absorber as an assembly.

Check the shock absorber for leakage or other damage.

Check the pivot collar, bushing and bearing for wear or damage.

Check the fork tube for deformation or other damage.

SUSPENSION PIVOT BEARING REPLACEMENT

NOTE:

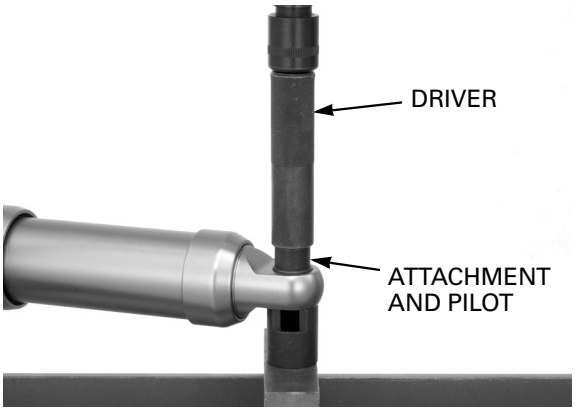
- The letter in parenthesis on the title indicates the bearing location as shown on page 14-23.

SHOCK ABSORBER (A)

Press the bearing out of the shock absorber using the special tools.

TOOLS:

Driver	**07749-0010000**
Attachment, 24 x 26 mm	**07746-0010700**
Pilot, 19 mm	**07746-0041400**



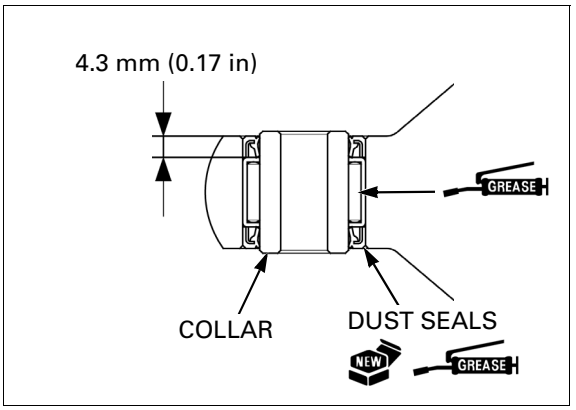
Apply grease to the needle rollers of a new bearing.

Press in the bearing with the marked side facing up.

Carefully press the bearing in the pivot until the depth from the absorber outer surface is 4.3 mm (0.17 in) using the same tools.

Apply grease to new dust seal lips.
Install the dust seals with the flat surface facing out until they are fully seated.

Install the pivot collar.

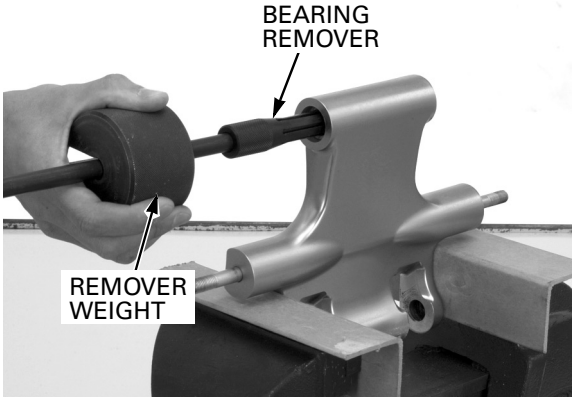


SHOCK ARM (B)

Remove the bearings using the special tools.

TOOLS:

Bearing remover, 17 mm	**07936-3710300**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)**



Apply grease to the needle rollers of new bearings.

Press in the bearing with the marked side facing up.

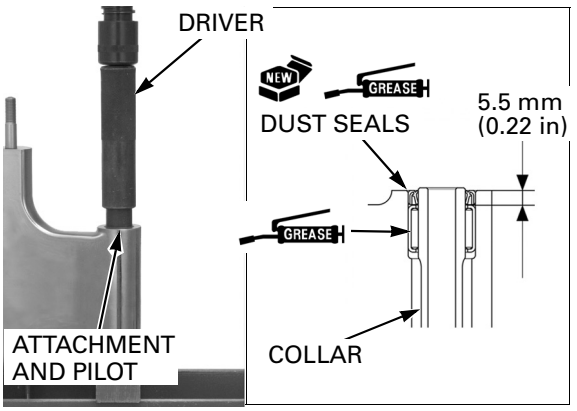
Carefully press each bearing in the pivot until the depth from the arm outer surface is 5.5 mm (0.22 in).

TOOLS:

Driver	**07749-0010000**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 17 mm	**07746-0040400**

Apply grease to new dust seal lips.
Install the dust seals with the flat surface facing out until they are flush with the arm.

Install the pivot collar.



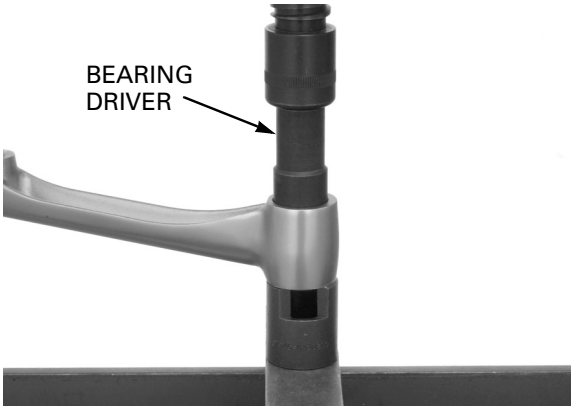
PUSH ROD (C)

Remove the inside (shock arm side) dust seal and the stopper ring.

Press the bearing with the dust seal out of the push rod using the special tool.

TOOL:

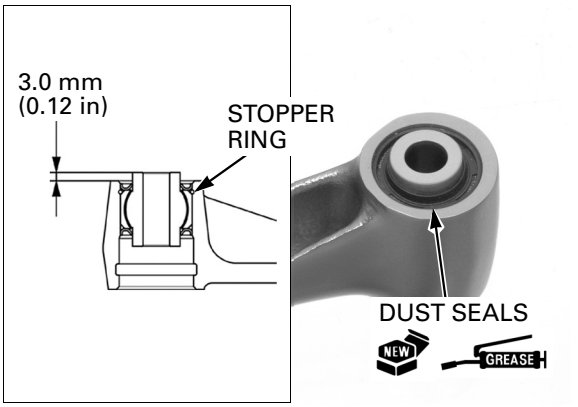
Spherical bearing driver	**07HMF-KS60100**



Install the stopper ring into the pivot groove properly.

Carefully press a new bearing in the pivot from the outside until the height from the rod surface is 3.0 mm (0.12 in) using the same tool.

Apply grease to new dust seal lips.
Install the dust seals with the lip side facing out until they are fully seated using the same tool.

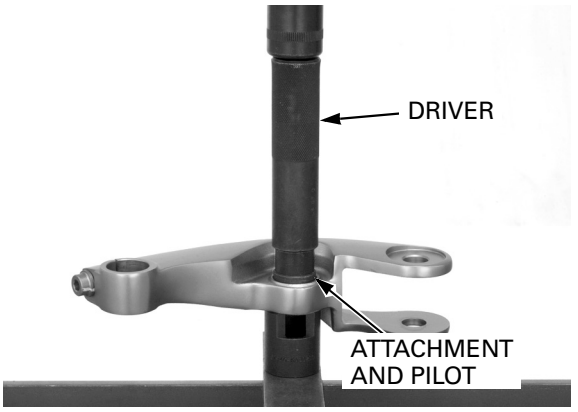


PIVOT ARM (D)

Press the bearing out of the pivot arm using the special tools.

TOOLS:

Driver	**07749-0010000**
Attachment, 24 x 26 mm	**07746-0010700**
Pilot, 19 mm	**07746-0041400**

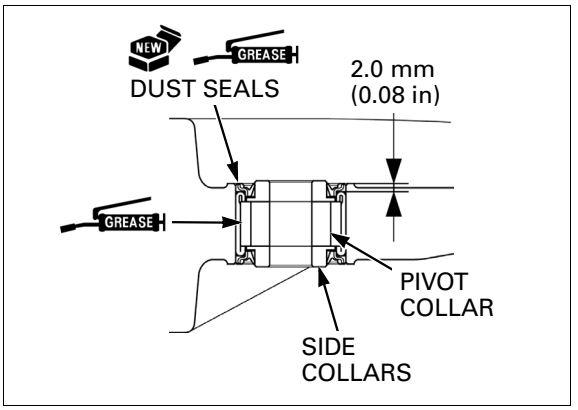


Apply grease to the needle rollers of a new bearing.

Press in the bearing with the marked side facing up.

Carefully press the bearing in the pivot until the depth from the arm surface is 2.0 mm (0.08 in) using the same tools.

Apply grease to new dust seal lips.
Install the pivot and side collars, and the dust seals with the lip side facing out until they are fully seated.



FORK TUBE (E)

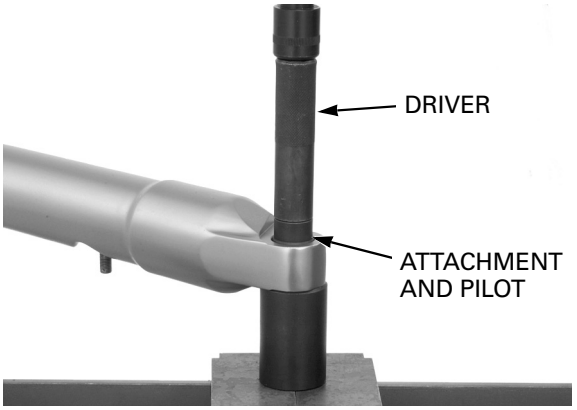
Press the bearing out of the fork tube using the special tool.

TOOLS:

Driver	**07749-0010000**
Attachment, 28 x 30 mm	**07946-1870100**
Pilot, 15 mm	**07746-0040300**

Pack the cavities in a new bearing with grease.

Carefully press the bearing in the pivot until it is fully seated.

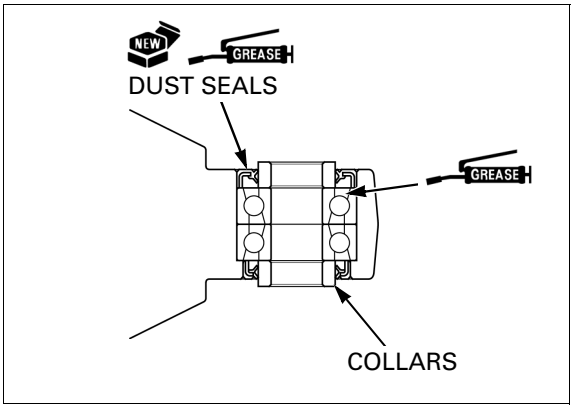


TOOLS:

Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 15 mm	**07746-0040300**

Apply grease to new dust seal lips.
Install the dust seals with the flat side facing out until they are fully seated.

Install the side collars.



FENDER LINK (F)

Press the bearings out of the fender link from the outside using the special tool.

TOOL:

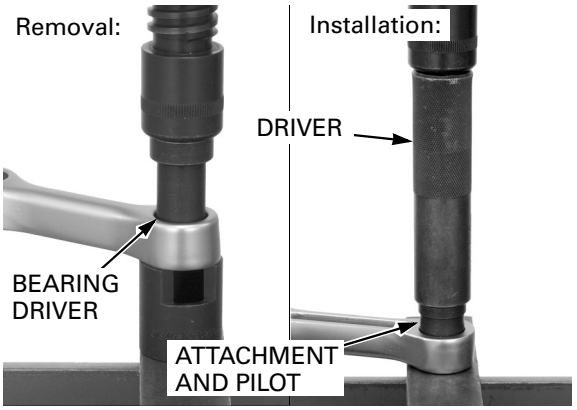
Bearing driver	**07946-KA50000**

Pack the cavities in new bearings with grease.

Carefully press the bearings in the pivots from the inside until the depth from the link surface is 5.8 mm (0.23 in).

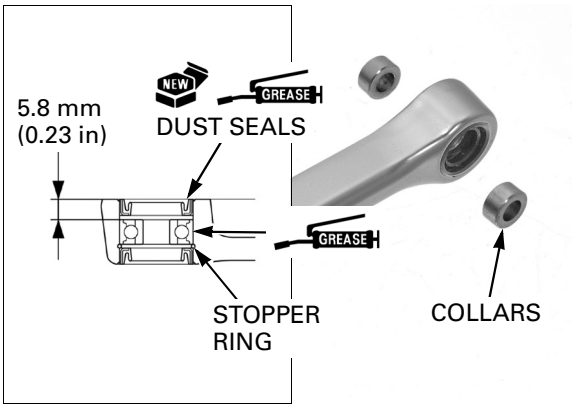
TOOLS:

Driver	**07749-0010000**
Attachment, 22 x 24 mm	**07746-0010800**



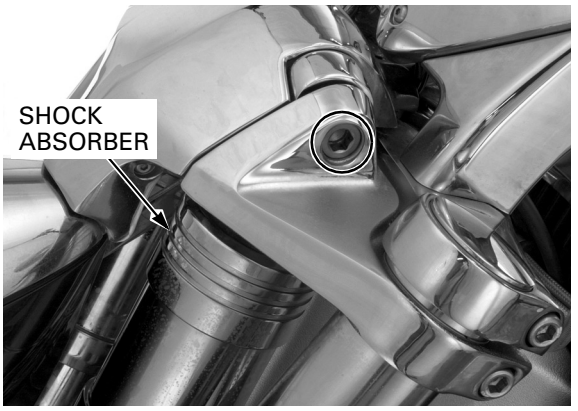
Apply grease to new dust seal lips.
Install the dust seals with the lip side facing out until they are flush with the link surface.

Install the side collars.



INSTALLATION

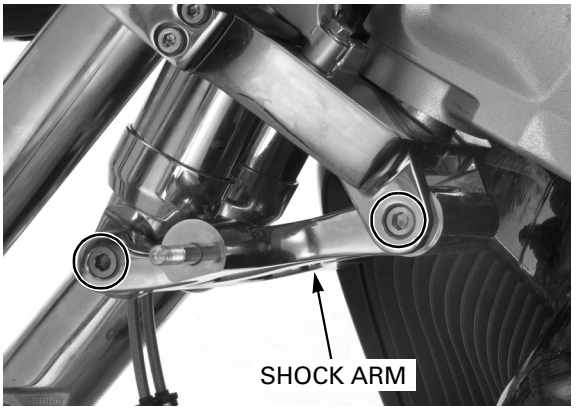
Install the shock absorbers into the upper bracket with the bolts (left:12 mm / right 10 mm).



Install the shock arm onto the shock absorbers with the bolts.
Connect the shock arm into the bottom bridge with the bolt (insert from left side) and nut.

Tighten the pivot bolts and nut.

TORQUE:
Left shock absorber upper mount:
59 N·m (6.0 kgf·m, 43 lbf·ft)
Left shock absorber lower mount:
39 N·m (4.0 kgf·m, 29 lbf·ft)
Right shock absorber (upper and lower):
39 N·m (4.0 kgf·m, 29 lbf·ft)
Shock arm-to-bottom bridge:
39 N·m (4.0 kgf·m, 29 lbf·ft)



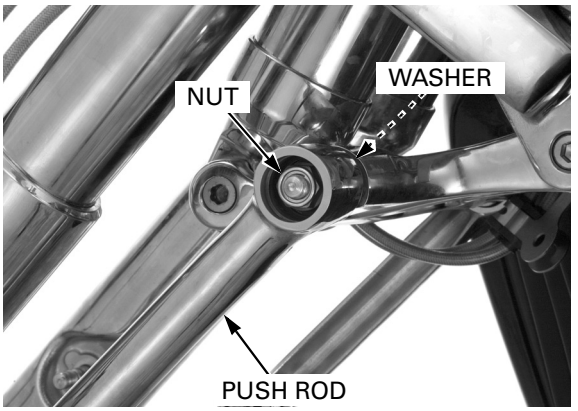
The push rods have the following identification marks: L; left side / R; right side

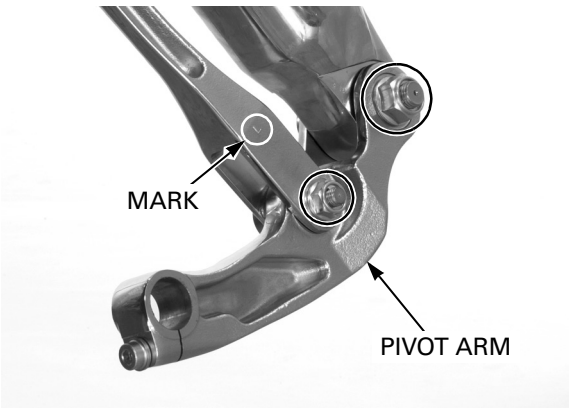
Install the washer, push rod and pivot nut.

Install the pivot arm onto the fork tube with the pivot bolt and nut.
Connect the push rod to the pivot arm with the pivot bolt and nut.

Tighten the pivot nuts.

TORQUE:
Pivot arm-to-fork tube:
88 N·m (9.0 kgf·m, 65 lbf·ft)
Push rod:
Upper:
64 N·m (6.5 kgf·m, 47 lbf·ft)
Lower:
39 N·m (4.0 kgf·m, 29 lbf·ft)



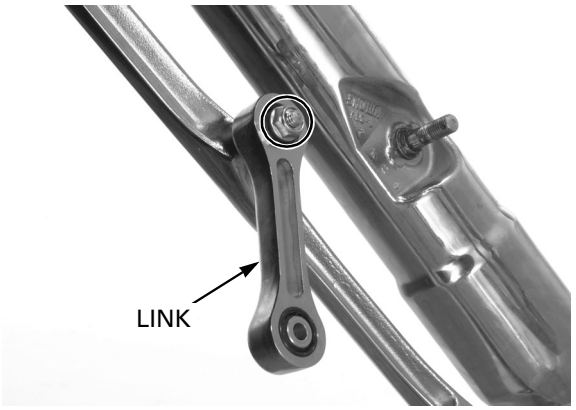


Install the fender link and pivot nut, and tighten it.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

Install the bolt caps into all the pivot bolts and the pivot caps into the push rod upper pivots (page 14-29).

Install the following:
– front wheel (page 14-21)
– brake calipers (page 16-24)



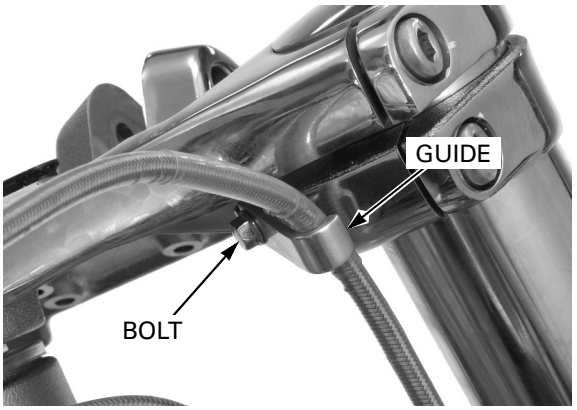
STEERING STEM

REMOVAL

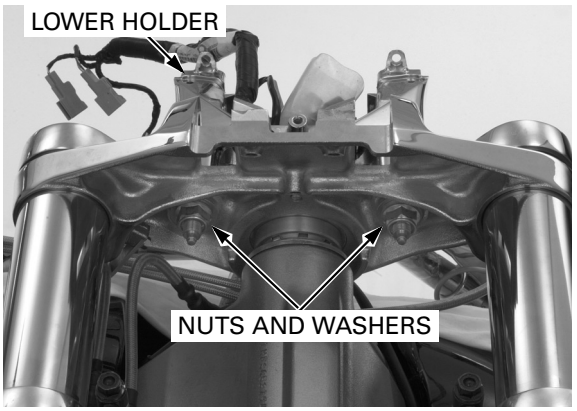
NOTE:

- For replacement of the pivot arm bearing in the fork tube, see page 14-28.

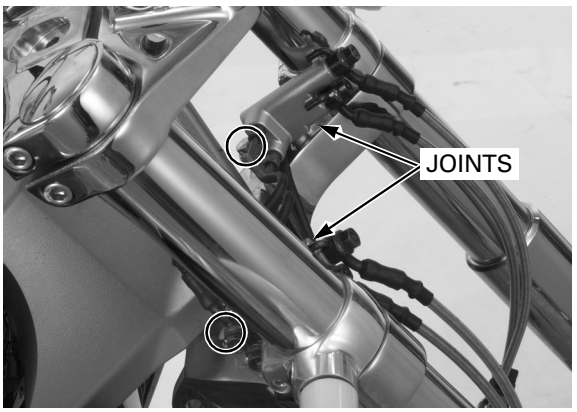
Remove the following:
– suspension linkage/shock absorber (page 14-23)
– headlight case (page 20-8)
– indicator box (page 20-14)
– handlebar (page 14-9)
– bolt and hose guide



– two nuts and washers
– handlebar lower holder



– two bolts
– brake hose/pipe joints



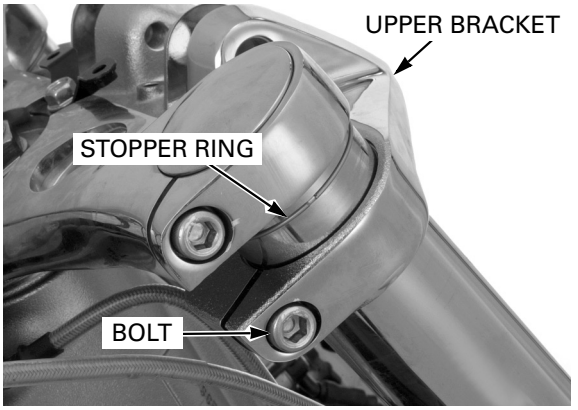
Loosen the steering stem nut.

TOOL:

Socket wrench, 39 x 41 mm	**07GMA-KS40100 or equivalent commercially available in U.S.A.**

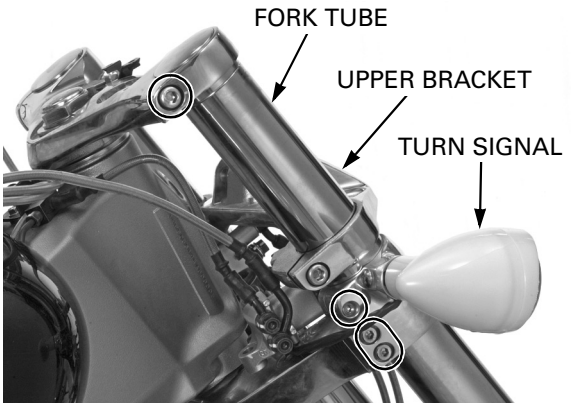
Remove the bolt caps from the pinch bolts (suspension upper bracket, top and bottom bridges and turn signal).

Loosen the bracket pinch bolts and slide the upper bracket.
Remove the stopper rings from each fork tube.

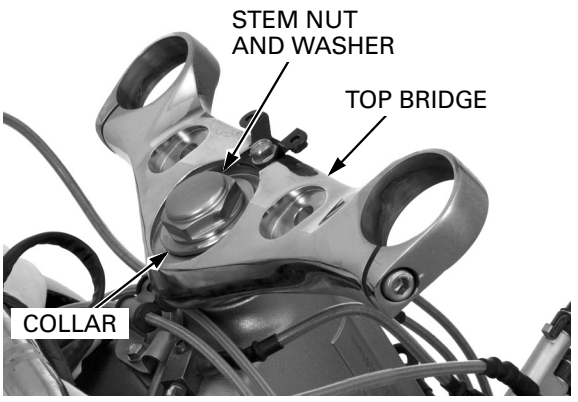


Loosen the turn signal, top and bottom bridge pinch bolts while supporting the fork leg.
Pull the fork tube down and remove it out of the bridges and bracket, then remove the turn signal.

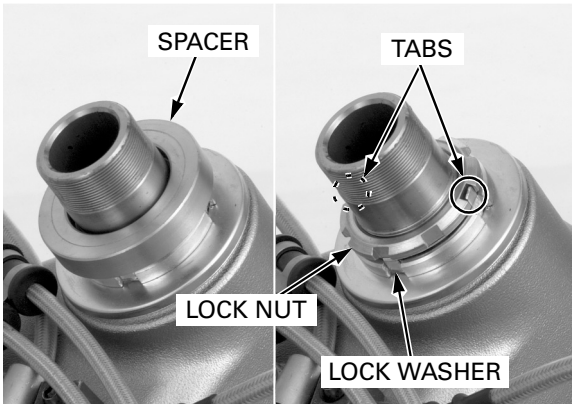
Remove the other side fork tube as same manner as above, then remove the upper bracket and turn signal.



Remove the following:
- stem nut
- washer
- top bridge
- collar



– spacer
– lock washer (straighten the washer tabs)
– lock nut

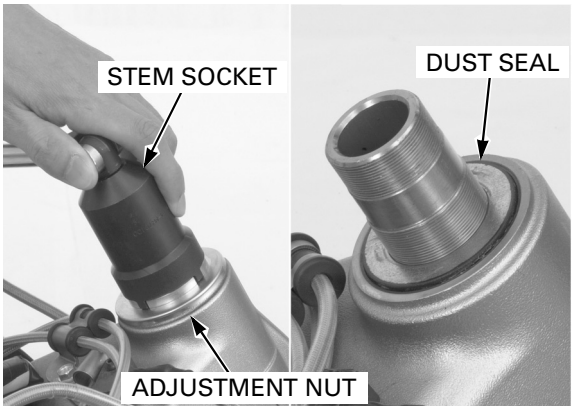


– adjustment nut (while supporting the stem)

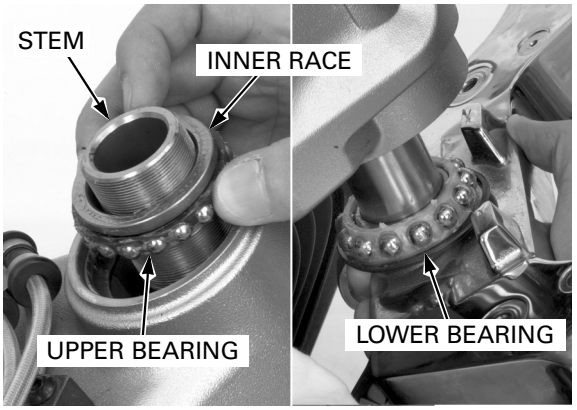
TOOL:

Steering stem socket	**07HMA-MR70100**

– dust seal



– steering stem
– upper bearing inner race
– upper steering bearing
– lower steering bearing



STEERING BEARING REPLACEMENT

Always replace the bearings and races as a set.

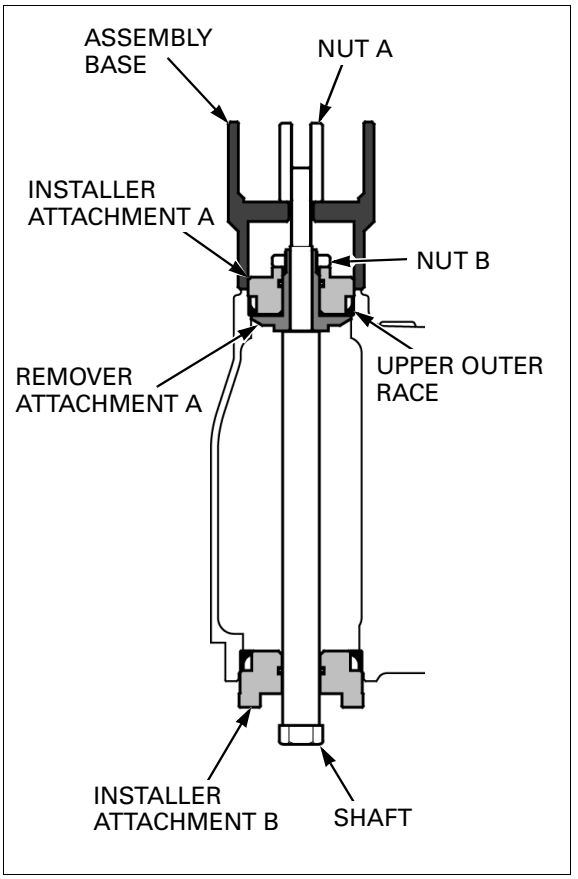
Replace the bearing outer races using the special tools listed below.

TOOLS:

Installer shaft assembly	**07946-KM90301**
Installer attachment A	**07NMF-MT70120**
Installer attachment B	**070MF-MEC00100**
Remover attachment A	**07NMF-MT70110**
Remover attachment B	**070MF-MEC00200**
Assembly base, 56 x 65 mm	**070MF-MEC00300**
Support base	**07GAF-SD40310**

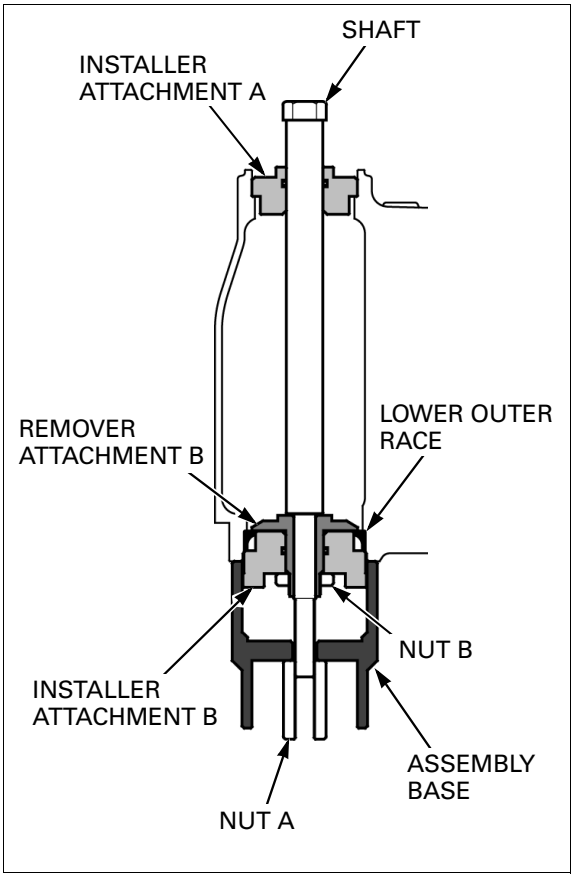
Note the installation direction of the assembly base.

Install the special tools into the steering head pipe as shown.
Align remover attachment A with the grooves in the steering head.
Lightly tighten the nut B.
While holding the installer shaft with a wrench, turn the nut A gradually to remove the upper bearing outer race.



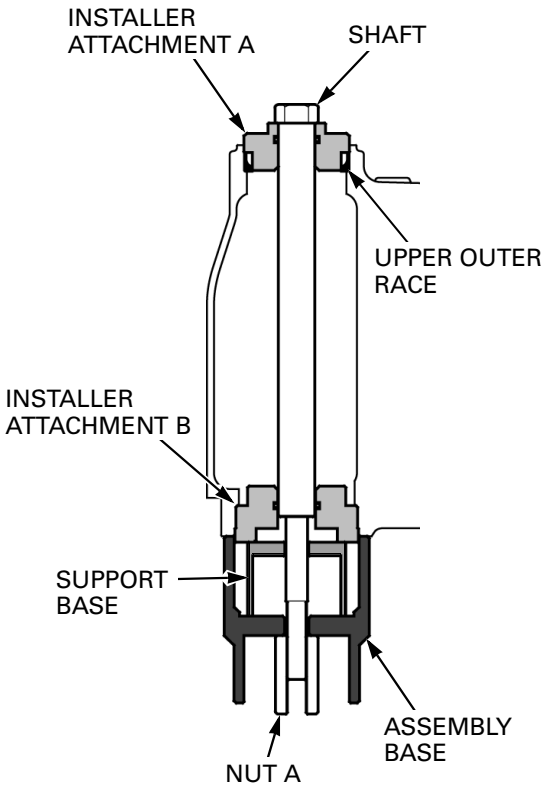
Note the installation direction of the assembly base.

Install the special tools into the head pipe as shown.
Align remover attachment B with the grooves in the steering head.
Lightly tighten the nut B.
While holding the shaft, turn the nut A gradually to remove the lower bearing outer race.



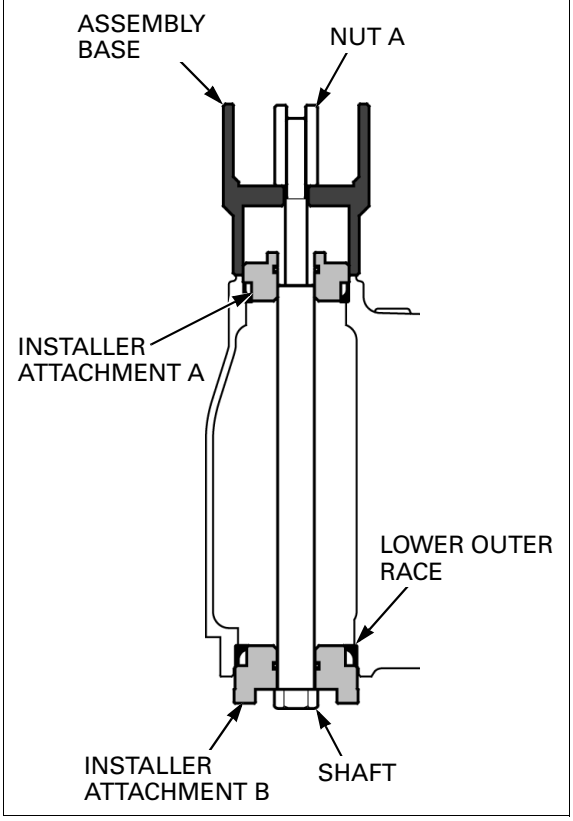
Install a new upper outer race and the special tools as shown.
While holding the shaft with a wrench, turn the nut A gradually until the outer race bottoms on the head pipe.

Upper outer race installation:



Install a new lower outer race and the special tools as shown.
While holding the shaft with a wrench, turn the nut A gradually until the outer race bottoms on the head pipe.

Lower outer race installation:



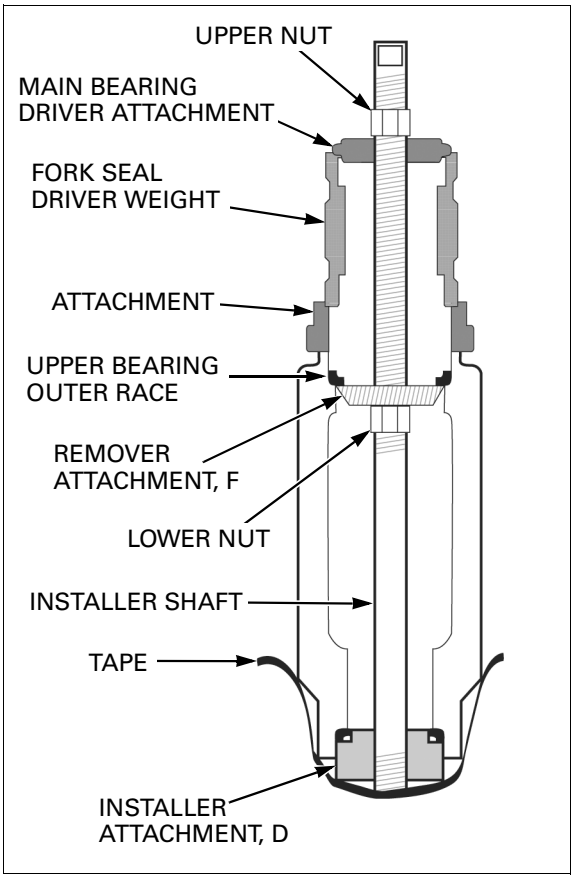
U.S.A. Only

Replace the steering head bearing outer races using the special tools listed below.

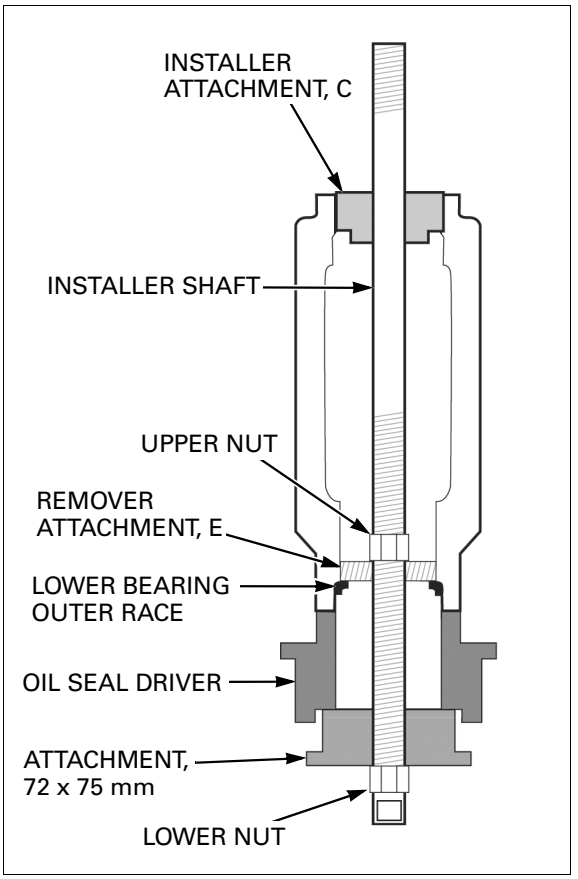
TOOLS:

Installer shaft	**07VMF-KZ30200**
Main bearing driver attachment	**07946-ME90200**
Fork seal driver weight	**07947-KA50100**
Attachment	**07965-MA60000**
Remover attachment, F	**07AMF-MECA100**
Installer attachment, D	**070MF-MECA100**
Remover attachment, E	**07AMF-MECA200**
Oil seal driver	**07965-MC70100**
Attachment, 72 x 75 mm	**07746-0010600**
Installer attachment, C	**07AMF-MT7A120**

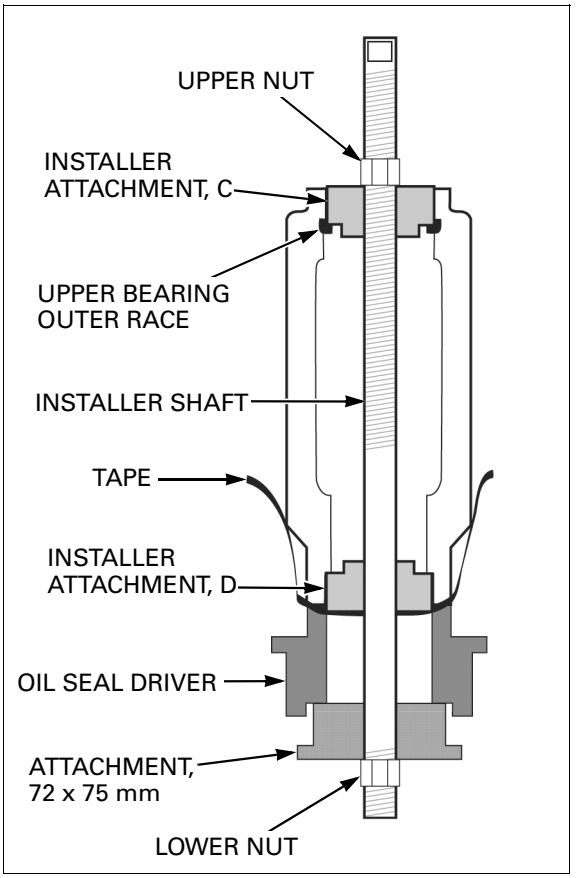
Install the special tools into the steering head pipe as shown.
Make sure to tape installer attachment, D to the bottom of the frame.
Align remover attachment, F with the grooves in the steering head.
While holding the installer shaft with the wrench, turn the upper nut gradually to remove the upper bearing outer race.



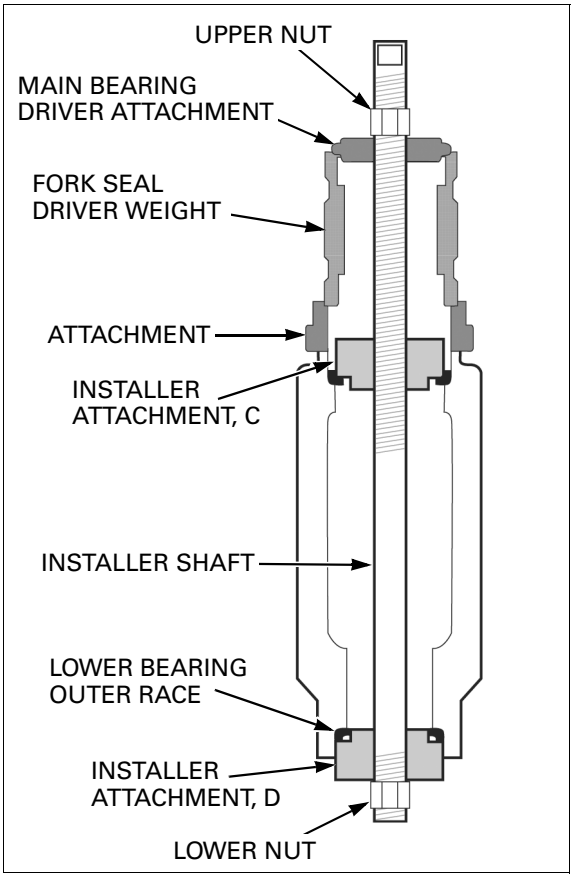
Install the special tools into the head pipe as shown.
Align remover attachment, E with the grooves in the steering head.
While holding the installer shaft with the wrench, turn the lower nut gradually to remove the lower bearing outer race.



Tape installer attachment, D into the bottom race cavity of the frame.
Install a new upper bearing outer race and the special tools as shown.
While holding the installer shaft with the wrench, turn the upper nut gradually until the upper bearing outer race is fully seated.

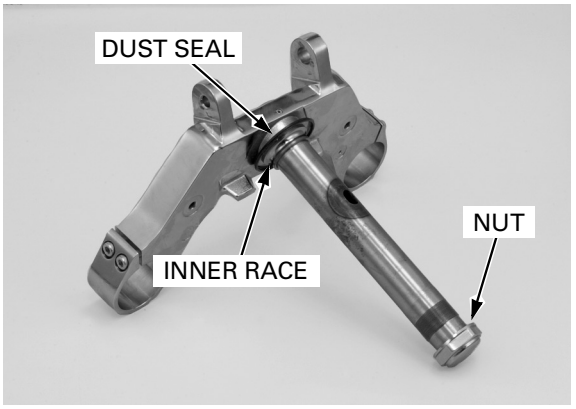


Install a new lower bearing outer race and the special tools as shown.
While holding the installer shaft with the wrench, turn the lower nut gradually until the lower bearing outer race is fully seated.



Install the stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal.

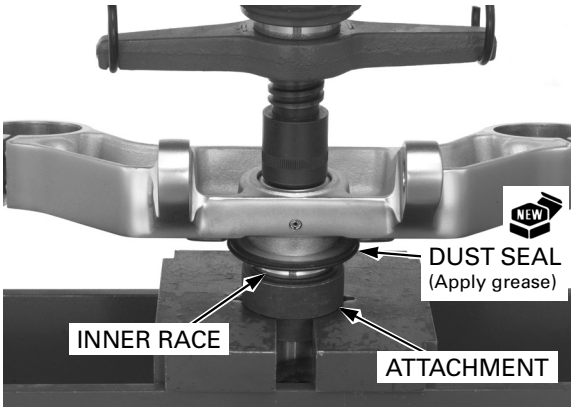


NOTE:

- Use urea based multi-purpose grease with extreme pressure for the steering bearings and dust seals:
  – Excelite EP2 (Kyodo Yushi) or
  – Stamina EP2 (Shell) or equivalent

Apply grease to a new dust seal lip and install it onto the stem.
Press a new lower bearing inner race using the special tool.

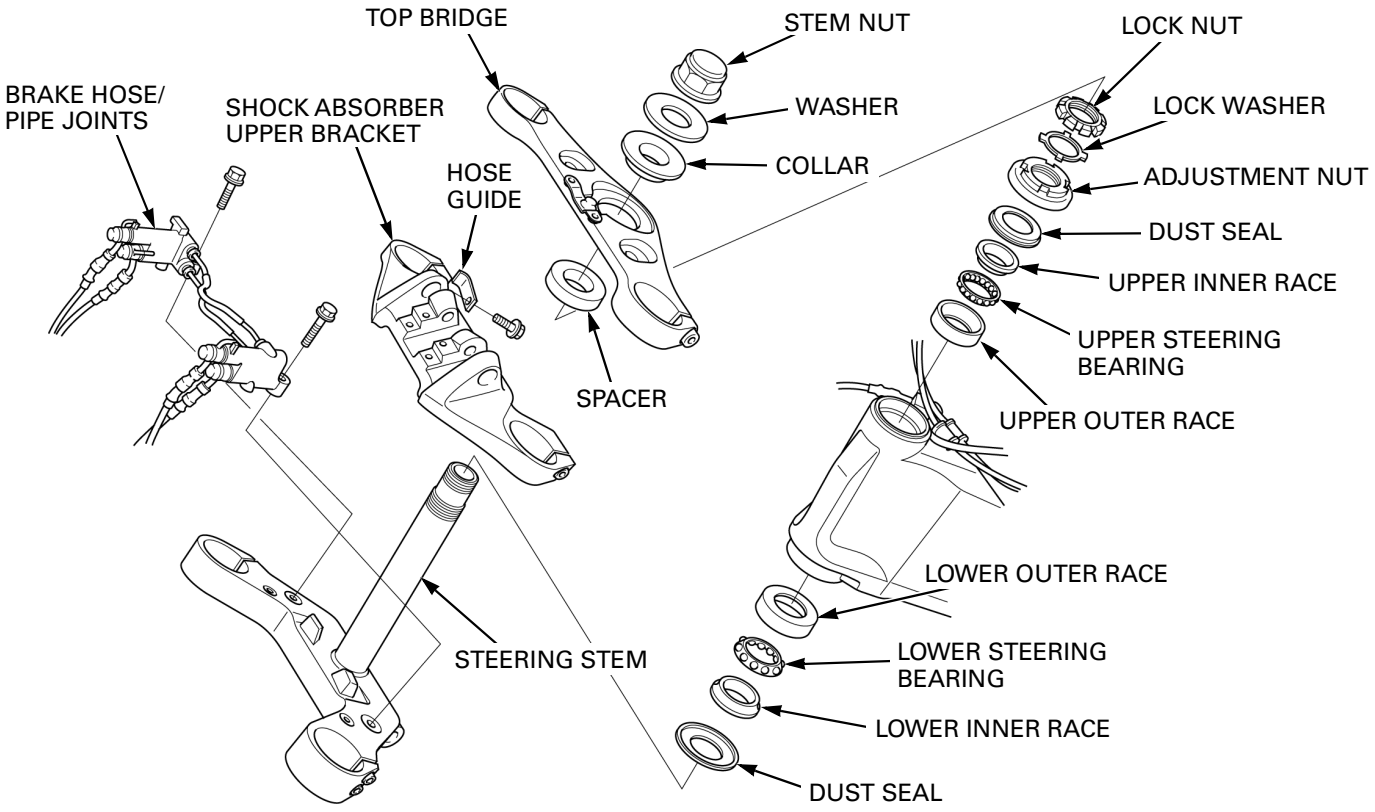
TOOL:
Attachment, 35 mm I.D. 07746-0030400



INSTALLATION

NOTE:

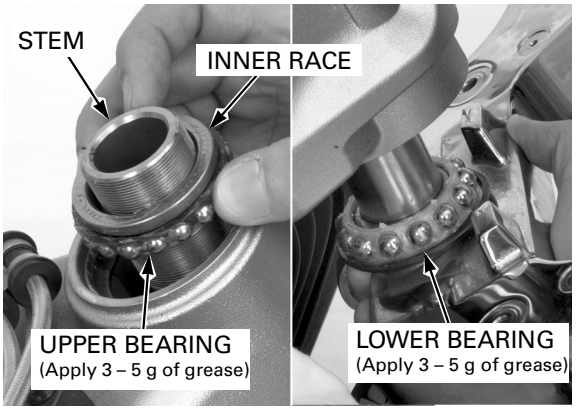
- Route the wires, hoses and cables properly (page 1-22).



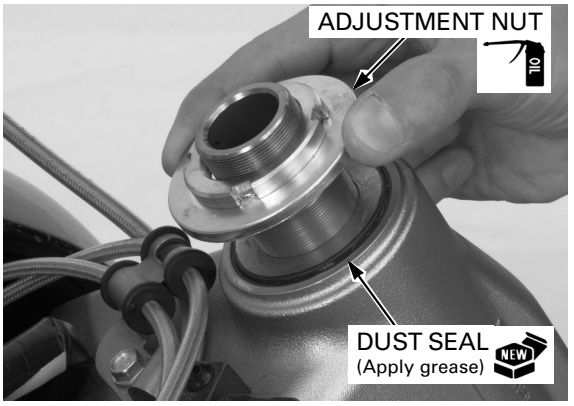
Refer to applying grease information on page 14-37.

Apply 3 – 5 g (0.1 – 0.2 oz) of grease to each new steering bearing and fill it up. Install the lower steering bearing onto the stem.
Apply grease to a new upper dust seal lip.
Apply engine oil to the bearing adjustment nut threads.

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
– adjustment nut

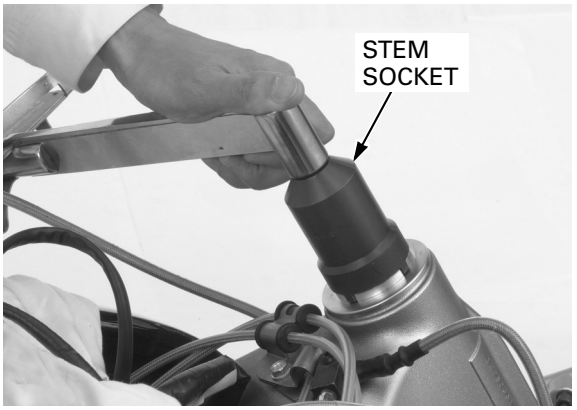


1. Tighten the adjustment nut to the specified torque.

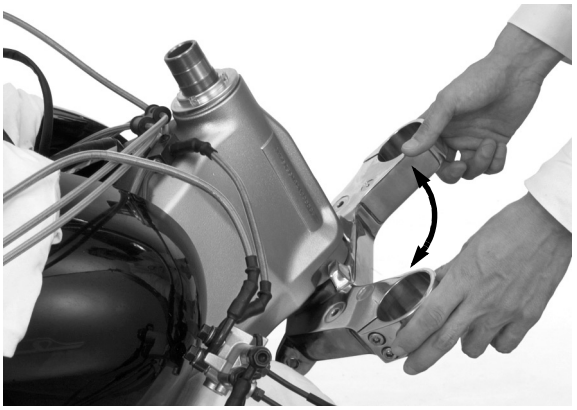
TOOL:
Steering stem socket 07HMA-MR70100

TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)

2. Loosen the adjustment nut and retighten it to the same torque.



3. Turn the steering stem left and right, lock-to-lock at least four times to seat the bearings.
   Retighten the adjustment nut to the same torque.
4. Repeat step 3. at two times.

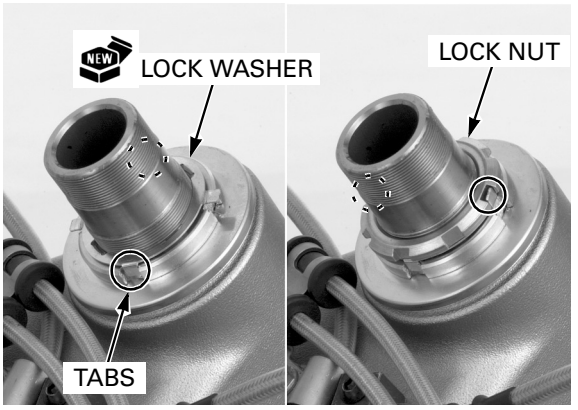


Install with the inner tabs facing down.

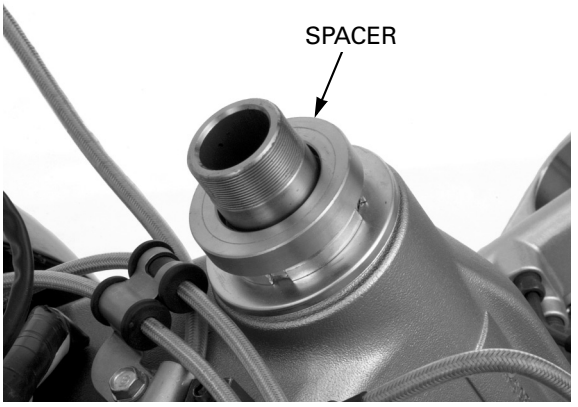
Install a new lock washer to align its bended tabs with the grooves in the adjustment nut.

Install the lock nut and finger tighten it all the way.

Further tighten the lock nut, within 90 degrees, to align its grooves with the tabs of the lock washer. Bend up the washer tabs into the grooves of the lock nut.

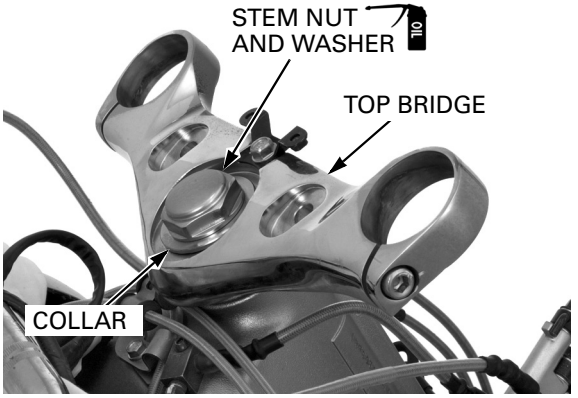


Install the spacer.



Install the top bridge with the collar.

Apply engine oil to the stem nut threads and the washer seating surfaces (both sides). Install the washer and stem nut.



Temporarily install the fork legs into the bottom and top bridges.

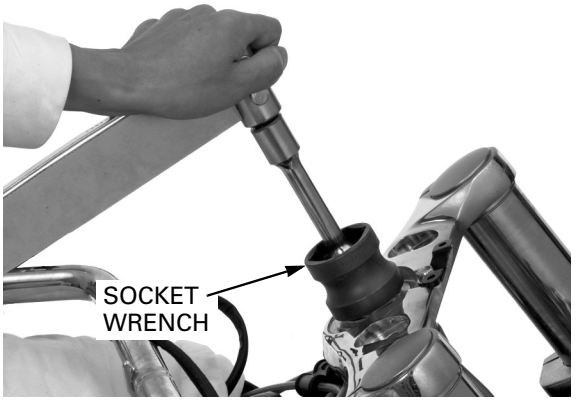
Tighten the stem nut.

TOOL:

Socket wrench, 39 x 41 mm	**07GMA-KS40100 or equivalent commercially available in U.S.A.**

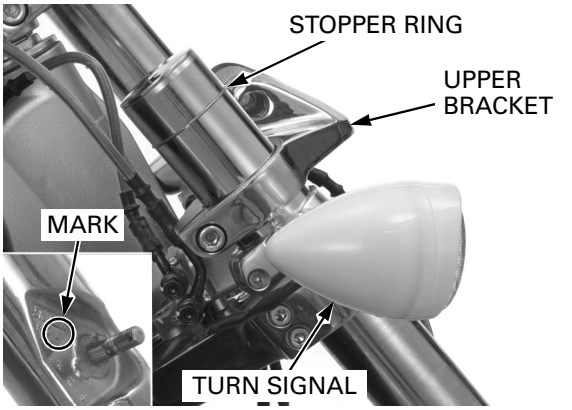
TORQUE: 167 N·m (17.0 kgf·m, 148 lbf·ft)

Remove the fork legs.
Make sure the steering stem moves smoothly, without play or binding.



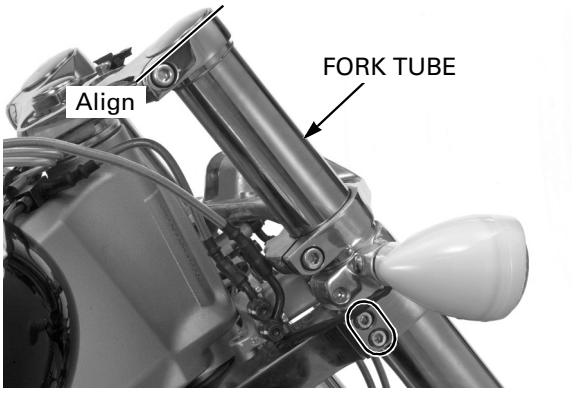
The fork tubes have the following identification marks: L; left side / R; right side

Insert the fork tube into the bottom bridge and temporarily tighten the pinch bolts to secure it.
Install the turn signal and upper bracket over the fork tube and the stopper ring into the groove.



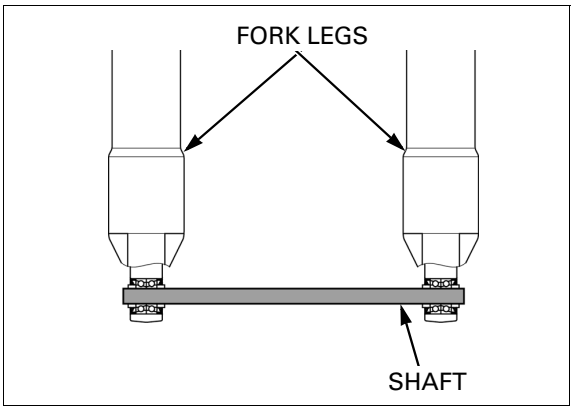
Insert the fork tube into the top bridge with the stud bolt facing in and align the top of the fork tube, then temporarily tighten the bottom bridge pinch bolts.

Install the other side fork tube as same manner as above.



Be careful not to drop the fork tube when loosening the pinch bolts.

Adjust the axle alignment:
Obtain a 15 mm O.D. shaft (14 inches long or more). Carefully adjust the fork tube position (horizontal direction) while loosening the bottom bridge pinch bolts so the shaft can be installed into the pivot arm holes (bearings) in the fork tubes as follows.

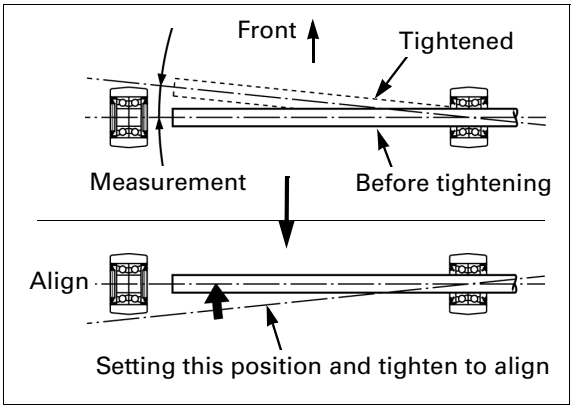


Insert the 15 mm O.D. shaft into the fork tube and slide it until its end is near the bearing in other side fork tube.

When tightening the pinch bolts, the fork tube slips and the shaft direction is turned to front side.

Support the lower end of the fork tubes so they are not slide to the vertical direction (be sure that the fork tube top is flush with the top bridge during adjustment).
Measure the movement value of the shaft end between loosening and tightening the bottom bridge pinch bolts to the specified torque, and record it.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



Adjust the angle of the shaft installed side fork tube by reference to recorded value.
Tighten the bottom bridge pinch bolts to the specified torque.

Repeat above procedure for each fork tube at least 2 times alternately to correct the alignment.

Make sure that the shaft is rotate and slide smoothly (not locked).
Remove the shaft.

After the alignment is completed, tighten the top bridge pinch bolts to the specified torque.

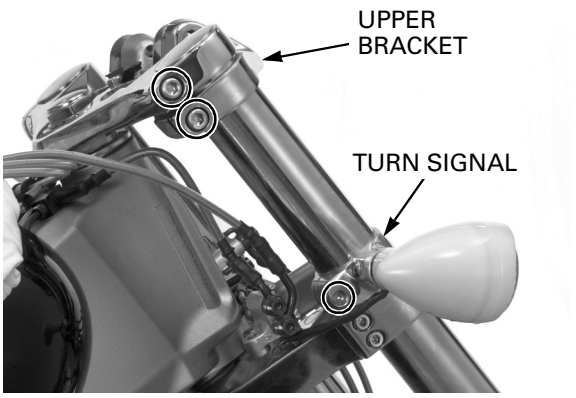
TORQUE: 39N·m (4.0 kgf·m, 29 lbf·ft)

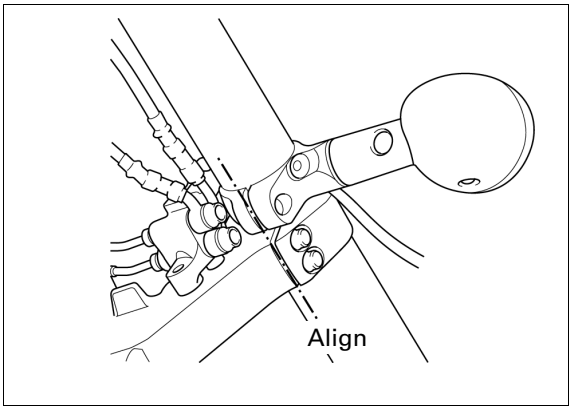
Slide the upper bracket upward against the stopper rings and tighten the pinch bolts.

TORQUE: 39N·m (4.0 kgf·m, 29 lbf·ft)

Install the bolt caps onto all the pinch bolts.

Align the slits in each turn signal holder and bottom bridge, and tighten the pinch bolt.





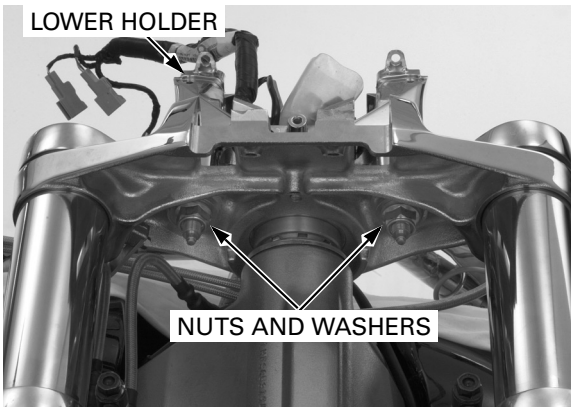
Route the turn signal wire between the joint and bottom bridge.

Install the brake hose/pipe joints with the two bolts, being careful not to pinch the turn signal wire.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

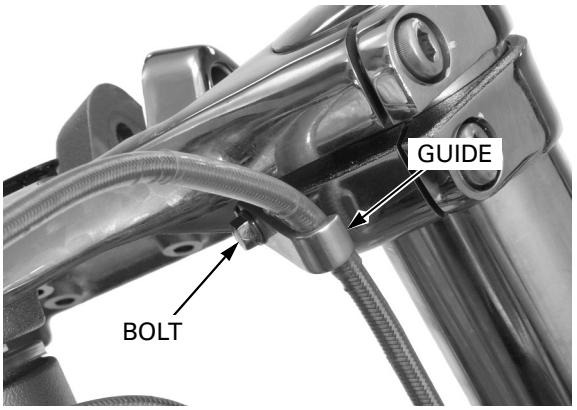
Install the handlebar lower holder with the two nuts and washers, and tighten it.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



Secure the brake hose with the bolt and hose guide.

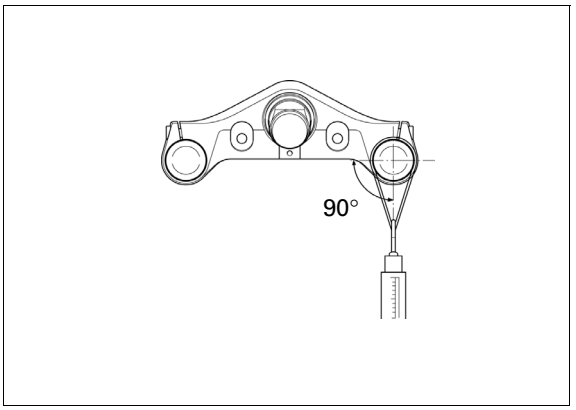
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the following:
– suspension linkage/shock absorber (page 14-23)
– headlight case (page 20-8)
– indicator box (page 20-15)
– handlebar (page 14-9)

STEERING BEARING PRE-LOAD

Support the motorcycle securely using safety stands or a hoist and raise the front wheel off the ground.
Position the steering stem straight ahead.
Hook a spring scale to the fork tube between the fork top and bottom bridges.
Make sure there is no cable, wire harness or hose interference.
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.

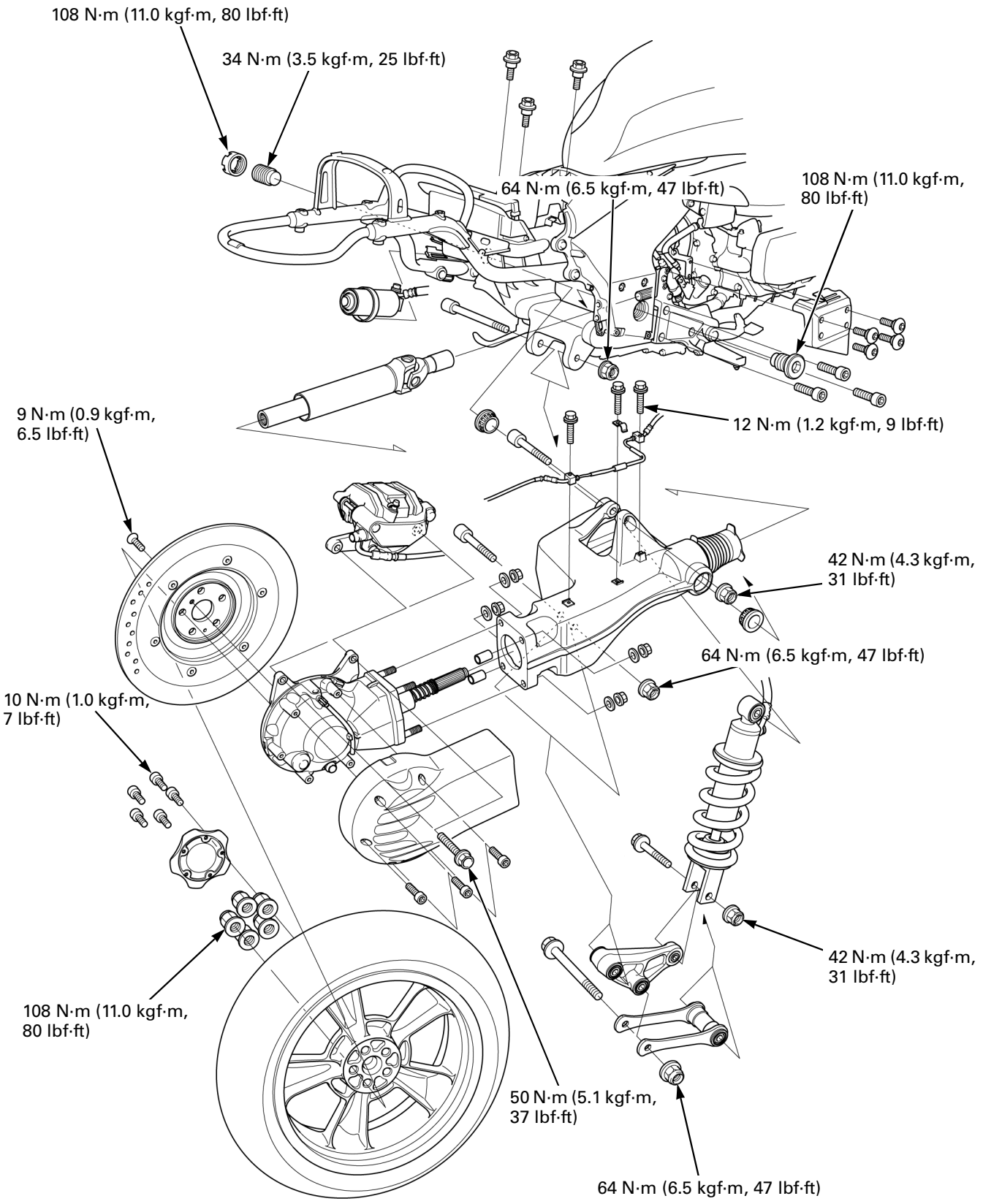


STEERING BEARING PRE-LOAD:
6.8 – 10.8 N (0.7 – 1.1 kgf, 1.5 – 2.4 lbf)

If the readings do not fall within the limits, readjust the steering bearing adjustment.

15. REAR WHEEL/SUSPENSION

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- Riding on damaged rims impairs safe operation of the vehicle.
- Raise the rear wheel off the ground by supporting the frame securely when servicing. A hoist or equivalent is required to support the motorcycle (page 4-2).
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- Use only genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- When using the lock nut wrench, use a deflecting beam type torque wrench 20-inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given on the this page is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives both actual and indicated torque readings.
- Refer to page 16-2 for hydraulic brake system service.

SPECIFICATIONS

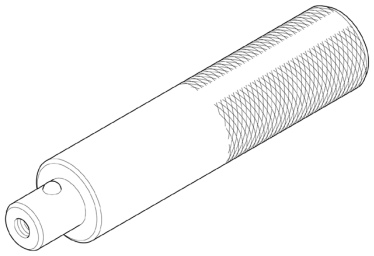
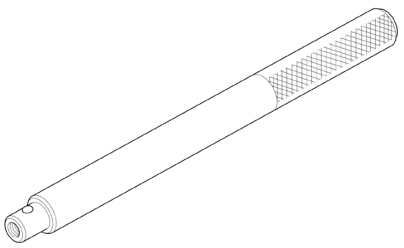
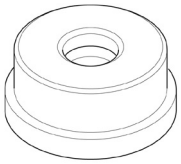
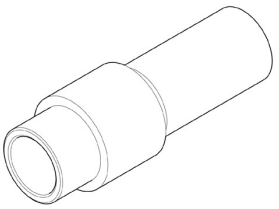
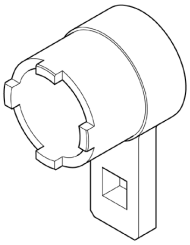
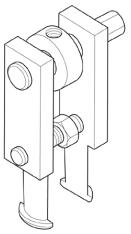
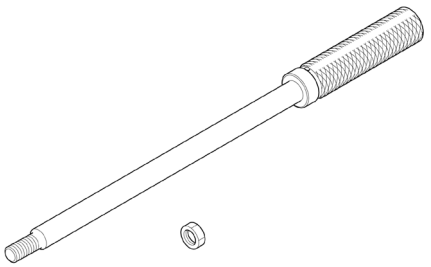
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	290 kPa (2.90 kgf/cm^2, 42 psi)	–
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm^2, 42 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1 oz) max.

TORQUE VALUES

Rear wheel nut	108 N·m (11.0 kgf·m, 80 lbf·ft)
Rear wheel cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Rear brake disc screw	9 N·m (0.9 kgf·m, 6.5 lbf·ft) ALOC screw: replace with a new one.
Rear brake caliper mounting bolt	50 N·m (5.1 kgf·m, 37 lbf·ft) ALOC bolt: replace with a new one.
Shock absorber mounting nut	42 N·m (4.3 kgf·m, 31 lbf·ft) U-nut.
Shock arm-to-swingarm nut	64 N·m (6.5 kgf·m, 47 lbf·ft) U-nut.
Shock arm-to-shock link nut	64 N·m (6.5 kgf·m, 47 lbf·ft) U-nut.
Shock link-to-frame nut	64 N·m (6.5 kgf·m, 47 lbf·ft) U-nut.
Swingarm right pivot bolt	108 N·m (11.0 kgf·m, 80 lbf·ft)
Swingarm left pivot bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Swingarm left pivot lock nut	108 N·m (11.0 kgf·m, 80 lbf·ft)
Brake pipe retaining bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

TOOLS

Driver 07749-0010000 	Driver 07949-3710001 	Attachment, 24 x 26 mm 07746-0010700 
Attachment, 42 x 47 mm 07746-0010300 	Pilot, 20 mm 07746-0040500 	Crank assembly collar 07965-GM00100 
Lock nut wrench 07ZMA-MCA0100  or 07ZMA-MCAA101 (U.S.A. only)	Adjustable bearing remover 07JAC-PH80100  or 07736-A01000B or 07736-A01000A (U.S.A. only) with slide hammer, 3/8″ x 16 (commercially available)	Bearing remover shaft 07JAC-PH80200  or 07736-A01000B or 07736-A01000A (U.S.A. only) with slide hammer, 3/8″ x 16 (commercially available)

TROUBLESHOOTING

Soft suspension
- Weak shock absorber spring
- Oil leakage from damper unit
- Insufficient tire pressure

Stiff suspension
- Worn or damaged suspension pivot bearings
- Improperly tightened swingarm pivot
- Bent damper rod
- Tire pressure too high

Rear suspension noise
- Loose suspension fasteners
- Worn or damaged suspension pivot bearings
- Worn or damaged shock absorber mount bushing
- Faulty rear shock absorber

Rear wheel wobbles
- Bent rim
- Unbalanced rear tire and wheel
- Faulty swingarm pivot bearings
- Wheel fastener not tightened properly
- Insufficient tire pressure
- Faulty rear tire

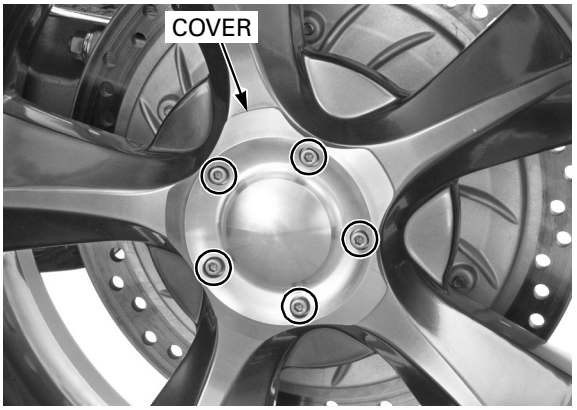
Wheel turns hard
- Brake drag (page 16-6)

REAR WHEEL

REMOVAL

Remove the following:
– left muffler cover (page 3-7)
– rear fender (page 3-6)

Remove the five bolts and wheel cover.



Loosen the five wheel nuts while applying the rear brake with the wheel is on the ground.

Support the motorcycle securely using a hoist or equivalent and raise the rear wheel off the ground (page 4-2).

Remove the wheel nuts and the rear wheel.

REAR BRAKE DISC REPLACEMENT

Support the brake caliper so it does not hang from the brake hose. Do not twist the brake hose.
Do not operate the brake pedal after removing the caliper. To do so will cause difficulty in fitting the brake pads over the disc.

Remove the following:
– two bolts and brake caliper
– screw (using an impact driver)
– brake disc (replace the disc and hub as an assembly)

Clean the mating surface of the final drive assembly (ring gear boss) and disc hub, and make sure that no foreign materials are allowed.
Install a new brake disc onto the stud bolts.

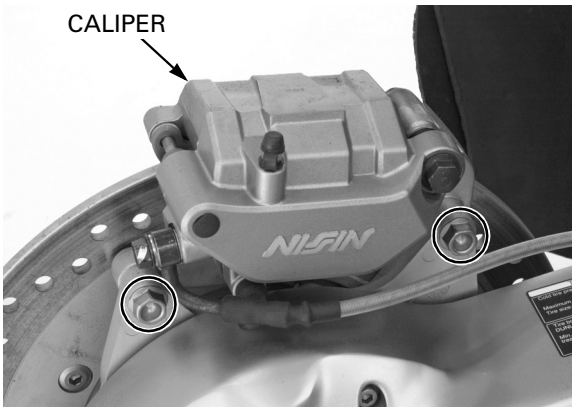
Install a new screw and tighten it.

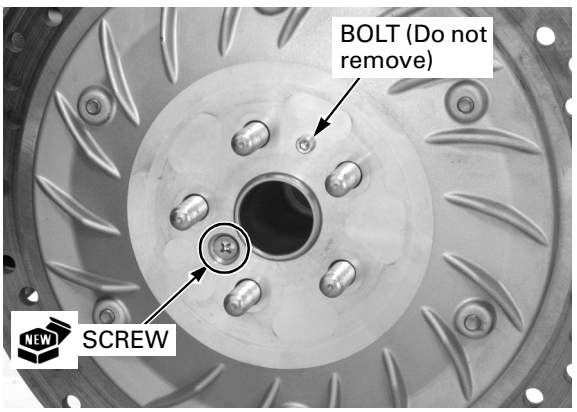
TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)

Install the brake caliper with new bolts and tighten them.

TORQUE: 50 N·m (5.1 kgf·m, 37 lbf·ft)

For rear wheel installation, see page 15-7.

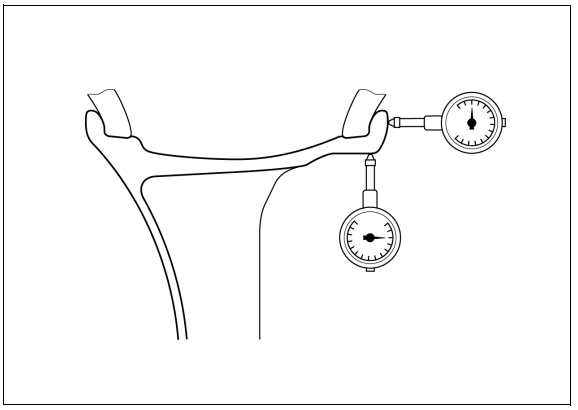




INSPECTION

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.

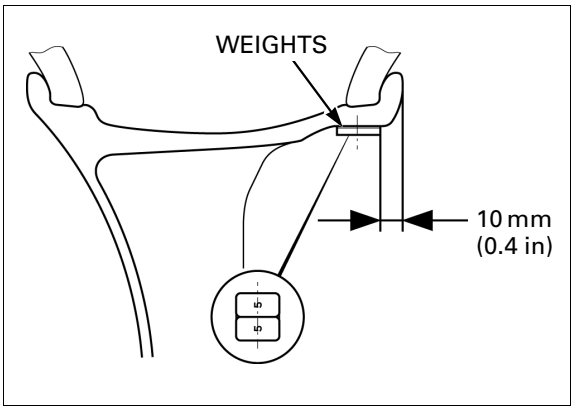


SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

WHEEL BALANCE

NOTE:

- For wheel balance procedure, refer to front wheel described on page 14-18. However, the balance weights are attached on the right side of the rim in the direction as shown.



INSTALLATION

Check the bolt holes in the wheel for wear, cracks or other damage.
Clean the mating surfaces of the rear wheel and disc hub, and make sure that no foreign materials are allowed.

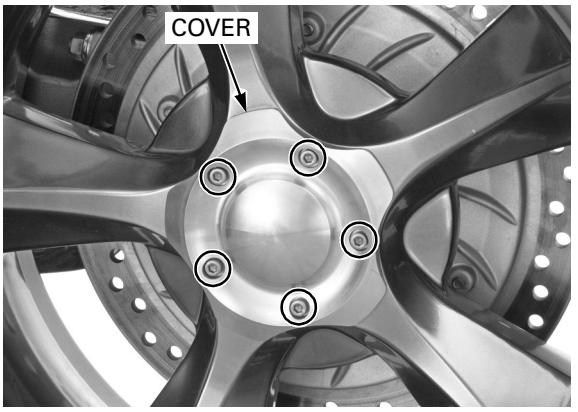
After installing the wheel, and make sure the balance weight is not interfered with the caliper body while turning the wheel.

Install the rear wheel, aligning the bolt holes with the stud bolts.
Install the wheel nuts and temporarily tighten them alternately.

Place the motorcycle on its side stand so the rear wheel touches the ground.
Tighten the wheel nuts in a crisscross pattern in several steps while applying the rear brake.

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)

Install the wheel cover and tighten the five bolts.



TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the following:
– rear fender (page 3-6)
– left muffler cover (page 3-9)

SUSPENSION LINKAGE/SHOCK ABSORBER

Remove the exhaust system (page 3-7).

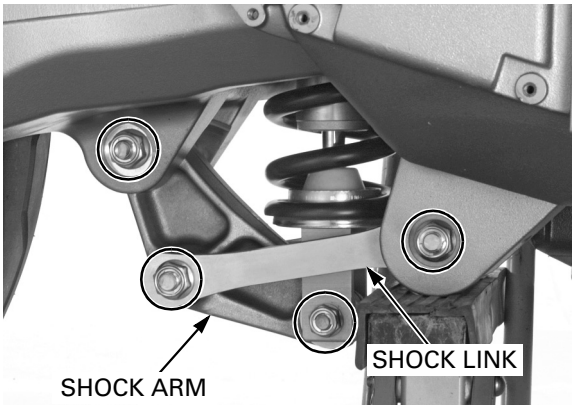
If the shock absorber will be removed, remove the battery case (page 19-6).

Support the motorcycle securely using a hoist or equivalent and raise the rear wheel off the ground (page 4-2).

LINKAGE REMOVAL

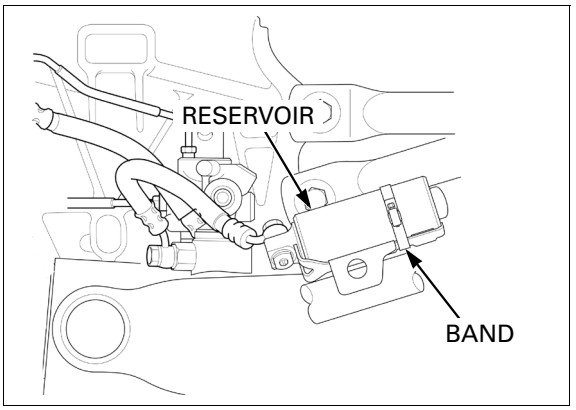
Support the swingarm securely.

Remove the following:
- lower mounting nut and bolt (shock absorber)
- shock arm-to-shock link nut and bolt
- shock arm-to-swingarm nut and bolt
- shock arm
- shock link-to-frame nut and bolt
- shock link



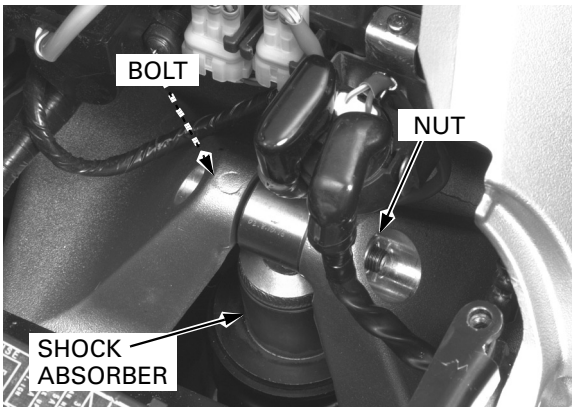
SHOCK ABSORBER REMOVAL

Remove the following:
- lower mounting nut and bolt (shock absorber)
- shock arm-to-shock link nut and bolt
- band (loosen band screw)
- reservoir



Be careful not to damage the reservoir and hose.

- upper mounting nut and bolt
- shock absorber (out of the swingarm to the lower side)

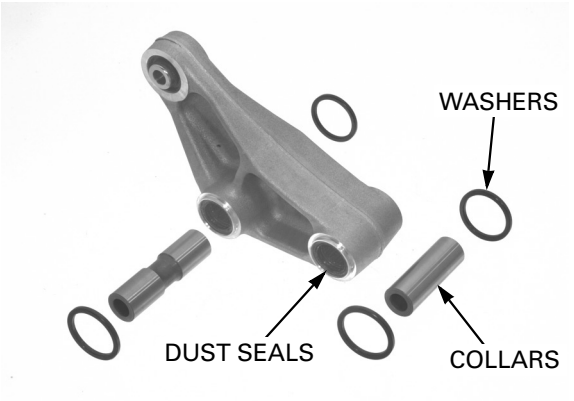


INSPECTION

Remove the thrust washers, pivot collars and dust seals from the shock link and arm.

Check the pivot collars and bearings for wear or damage.

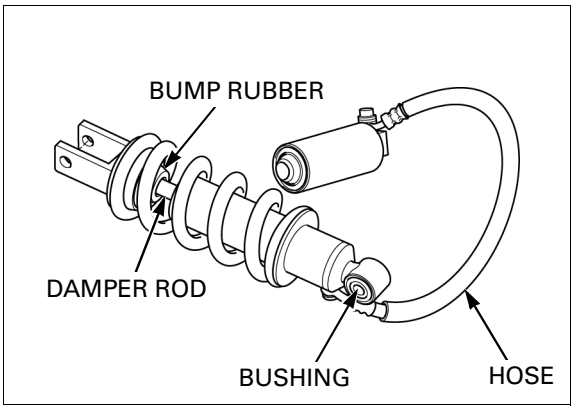
For bearing replacement, see page 15-10.



Replace the shock absorber as an assembly.

Check the following:
- damper unit and reservoir for leakage or other damage.
- reservoir hose and fittings for loose connection, deterioration or cracks.
- bump rubber for wear or damage.
- bushing for wear or damage.
- damper rod for bend or damage.

If the shock absorber is replaced, refer to disposal procedure as follows.



SHOCK ABSORBER DISPOSAL

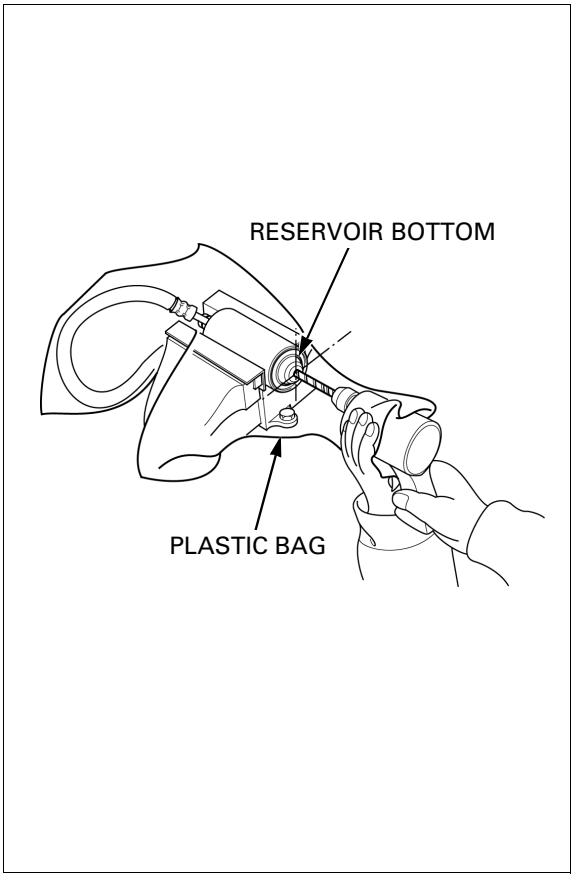
Center punch the center of the reservoir bottom to mark the drilling point.

Wrap the shock absorber inside a plastic bag and support it upright in a vise as shown.
Through the open end of the bag, insert a drill motor with a sharp 2 – 3 mm (5/64 – 1/8 in) drill bit.

⚠CAUTION

- Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the reservoir, leading to explosion and severe personal injury.
- The shock absorber contains nitrogen gas and oil under high pressure. Do not drill the side of the reservoir or the damper case, or you may drill into the oil chamber (bladder); oil escaping under high pressure may cause serious personal injury.
- Always wear eye protection to avoid getting metal shavings in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.

Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from the getting caught in the bit when you start.



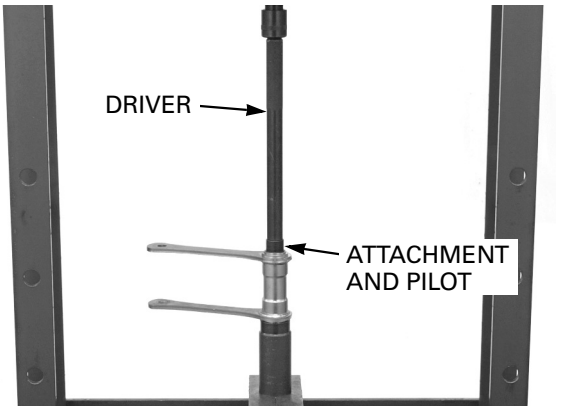
LINKAGE PIVOT BEARING REPLACEMENT

SHOCK LINK

Press the bearings out of the shock link using the special tools.

TOOLS:

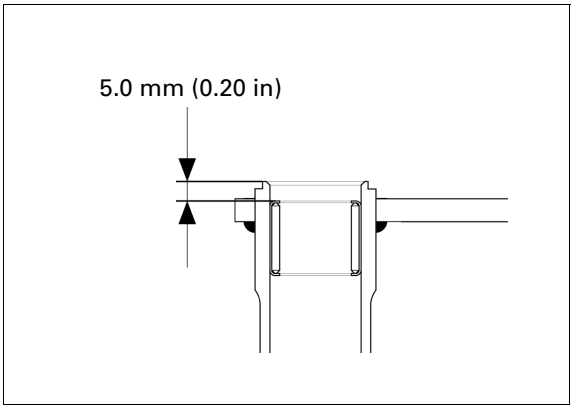
Driver	**07949-3710001**
Attachment, 24 x 26 mm	**07746-0010700**
Pilot, 20 mm	**07746-0040500**



Apply grease to the needle rollers of new bearings.

Press in the bearing with the marked side facing up.

Carefully press each bearing in the pivot until the depth from the link outer surface is 5.0 mm (0.20 in) using the same tools.

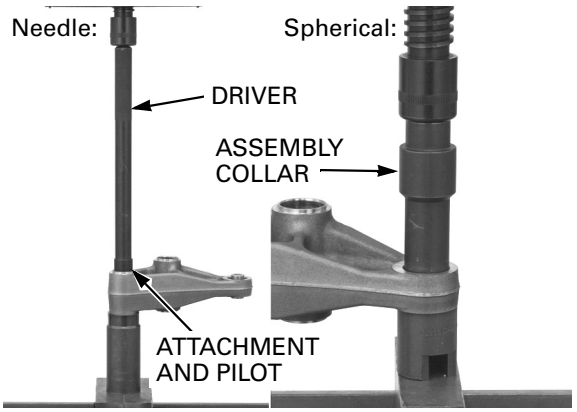


SHOCK ARM

Press the bearings out of the shock arm using the special tools.

TOOLS:

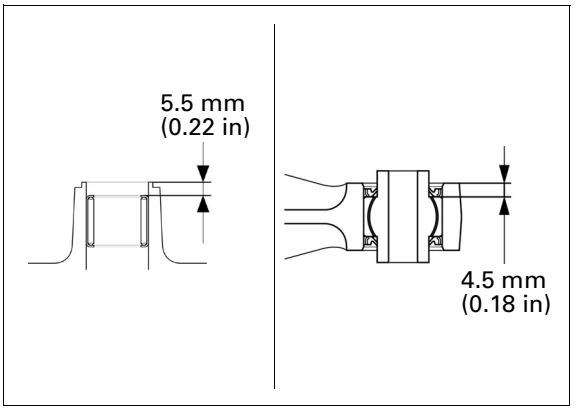
Swingarm and Shock Link side:	
Driver	**07949-3710001**
Attachment, 24 x 26 mm	**07746-0010700**
Pilot, 20 mm	**07746-0040500**
Shock Absorber side (spherical):	
Crank assembly collar	**07965-GM00100**



Apply grease to the needle rollers of new needle bearings.

Press in the bearing with the marked side facing up.

Carefully press each bearing in the pivot until the depth from the arm outer surface is at specification, using the same tools.



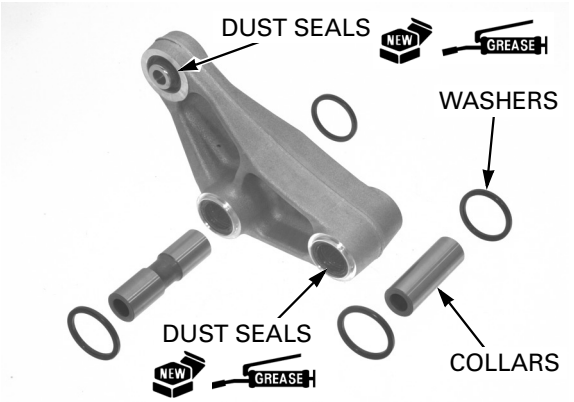
INSTALLATION

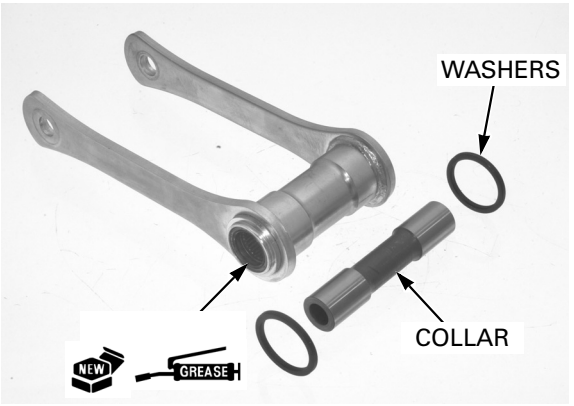
Make sure the needle rollers in the bearings are in position.

Apply grease to new dust seal lips.
Install the dust seals with the flat surface facing out (the dust seals of the spherical bearing are with the lip side facing out) until they are fully seated.

Install the pivot collars into the needle bearings.

Install the thrust washers over each pivot of the needle bearing.

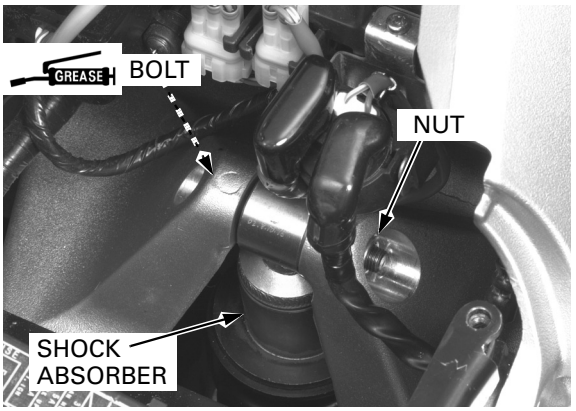




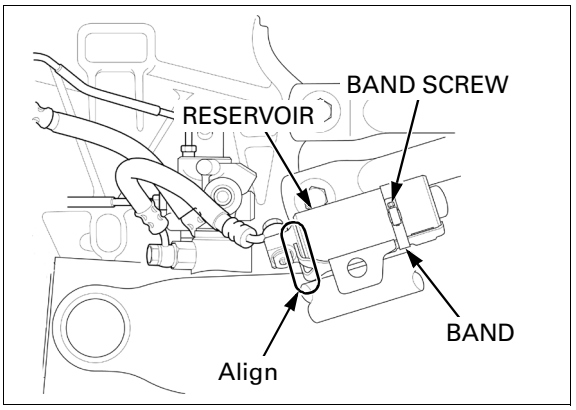
Apply grease to the outer surface of the upper mounting bolt head.

Route the reservoir into the swingarm from the lower side of it and place the shock absorber into the swingarm with the hose joint facing the front, then install the mounting bolt from the left side.

Install the nut.

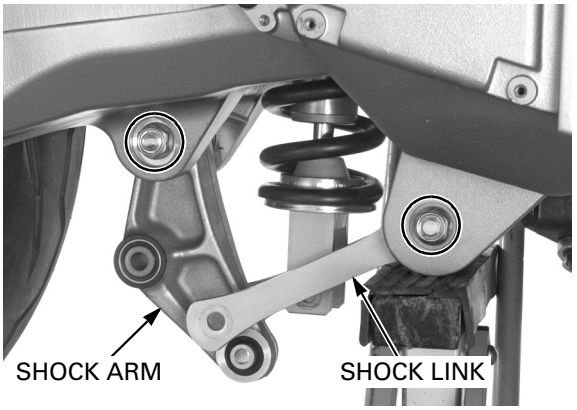


Install the reservoir onto the frame, aligning the flat surfaces of the hose joint with the stay groove.
Install the reservoir band with the screw head facing up as shown and tighten the band screw to secure the reservoir.



Insert all the pivot bolts from the left side.

Install the shock link in the frame and the shock arm in the swingarm.



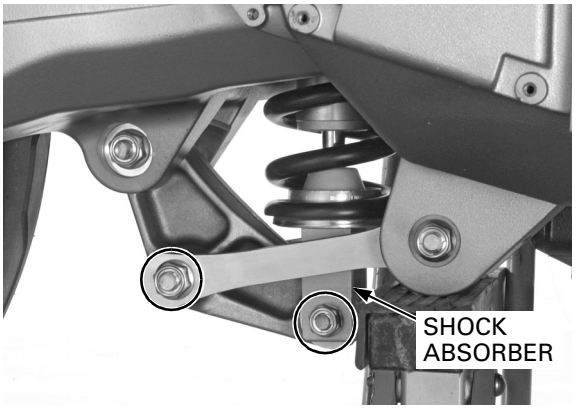
Insert the pivot bolt from the left side.

Adjust the swingarm height, and connect the shock link to the shock arm and the shock arm to the shock absorber.

Install the nuts and tighten them.

TORQUE:
Linkage (3 places):
64 N·m (6.5 kgf·m, 47 lbf·ft)
Shock absorber (upper and lower):
42 N·m (4.3 kgf·m, 31 lbf·ft)

Install the following:
– battery box (page 19-13)
– exhaust system (page 3-8)

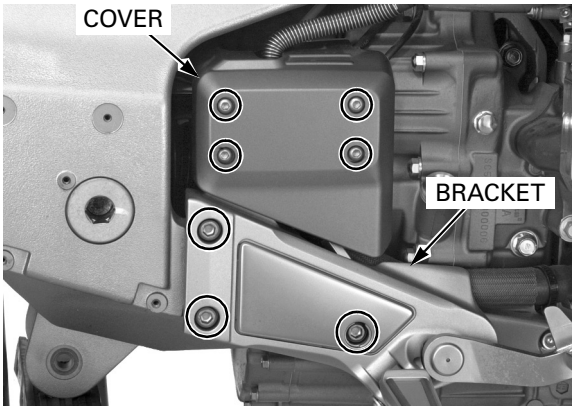


SWINGARM

REMOVAL

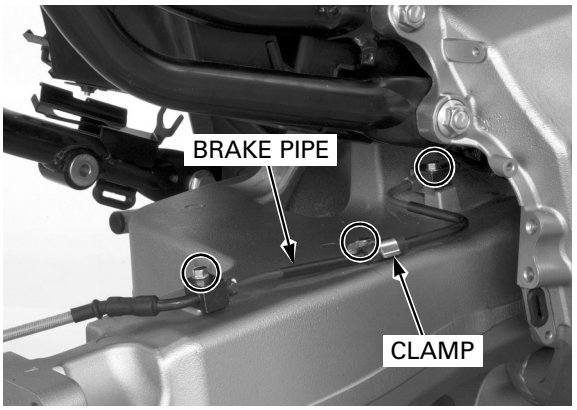
Support the master cylinder so it does not hang from the brake hose. Do not twist the brake hose.

Remove the following:
– final drive assembly (page 13-6)
– shock absorber and linkage (page 15-8)
– four bolts and master cylinder cover
– three bolt caps, bolts and footpeg bracket/master cylinder assembly



Take care not to deform the brake pipe after removing the pipe retaining bolts.

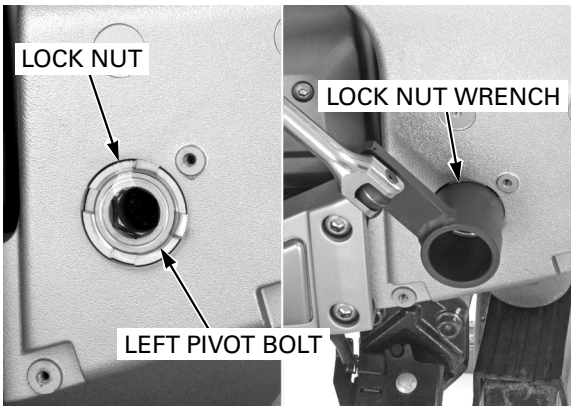
– three bolts and brake pipe clamp



Loosen the left pivot lock nut and remove it.

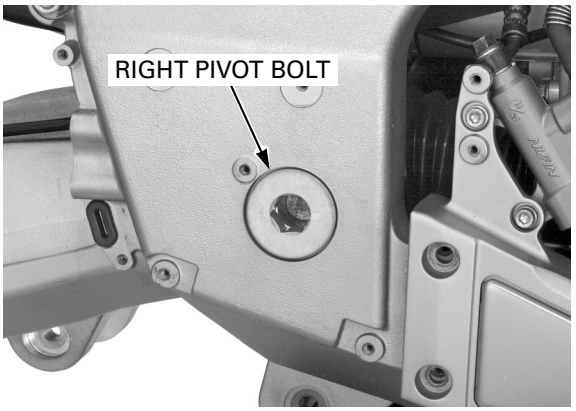
TOOL:

Lock nut wrench	**07ZMA-MCA0100 or 07ZMA-MCAA101 (U.S.A. only)**



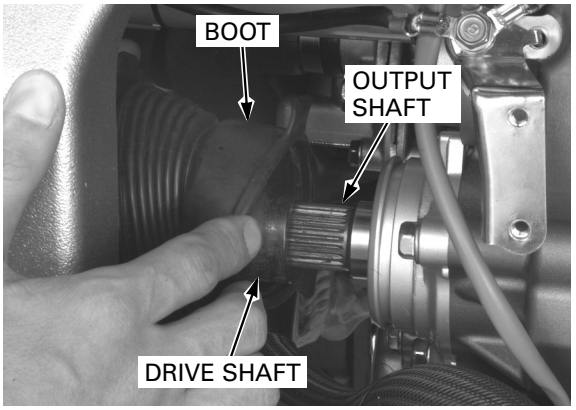
Loosen the left pivot bolt.

Loosen the right pivot bolt.

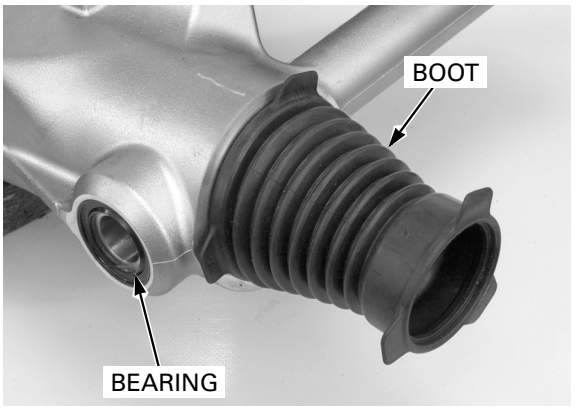


Release the joint boot from the engine.

Remove the left and right pivot bolts while holding the swingarm.
Separate the drive shaft in the swingarm off the output shaft, and remove the swingarm.



Remove the following from the swingarm:
– bearings
– boot
– drive shaft (from rear of the swingarm)

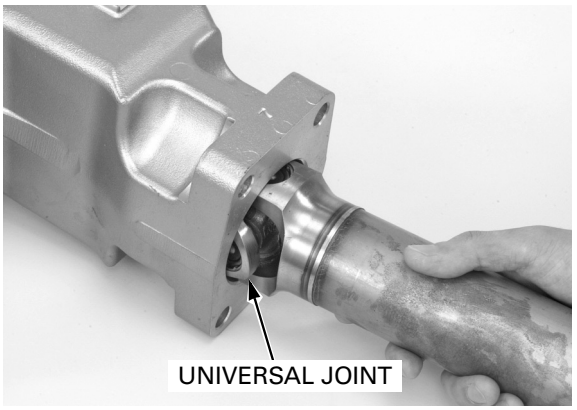


INSPECTION

Check that the universal joint of the drive shaft moves smoothly without binding or noise.

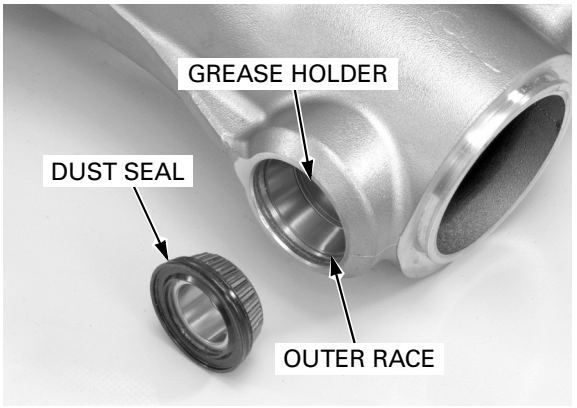
Check the splines for wear or damage.
If damaged, check the splines of the output shaft and joint shaft (final drive) also.

Check the boot for cuts or other damage.



Both bearings, outer races and grease holders must be replaced as a set if any part is damaged or worn.

Check the bearings and dust seals for wear or damage.
Check the outer races for wear or damage.
Check the grease holders for damage or deformation.



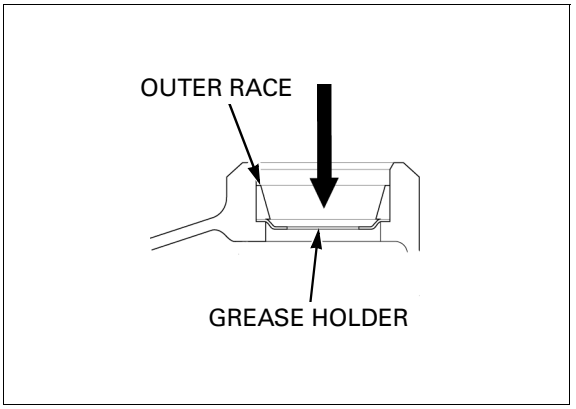
PIVOT BEARING OUTER RACE REPLACEMENT

Punch or drill an appropriate hole into the grease holder.
Pull the outer race and grease holder out of the swingarm using the special tools.

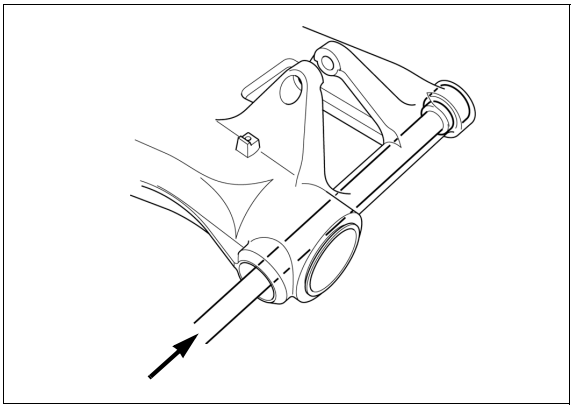
TOOLS:

Adjustable bearing remover	**07JAC-PH80100**
Remover shaft	**07JAC-PH80200**
Remover weight	**07741-0010201**
U.S.A. only:	
Adjustable bearing puller, 25 – 40 mm	**07736-A01000B or 07736-A01000A and**

Slide hammer, 3/8" x 16 (equivalent commercially available in U.S.A.)



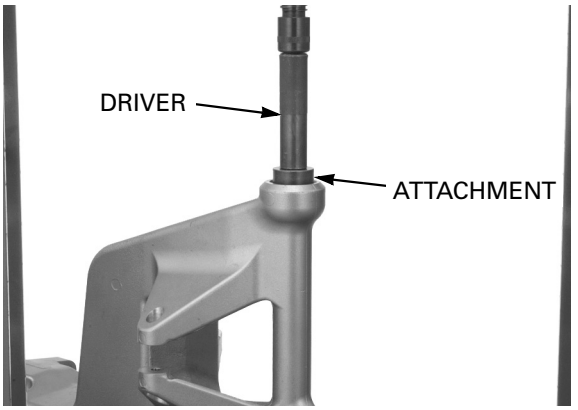
Insert a suitable driver through the swingarm and drive the other outer race and grease holder out of the swingarm.



Install a new grease holder into the pivot.
Carefully press a new outer race into the pivot until it is fully seated.

TOOLS:

Driver	**07949-0010000**
Attachment, 42 x 47 mm	**07746-0010300**

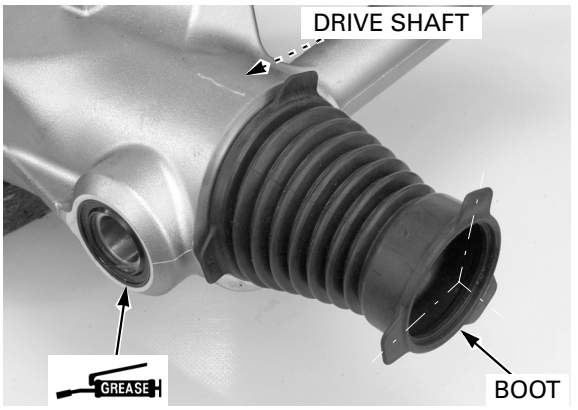


INSTALLATION

Install the joint boot by aligning the boot rib with the swingarm groove in the direction as shown.

Place the drive shaft into the swingarm with the universal joint side facing the engine.

Apply 1 – 1.5 g (0.04 – 0.05 oz) of grease to the needle rollers and dust seal lips of each new bearing.
Install the bearings into the swingarm pivots.



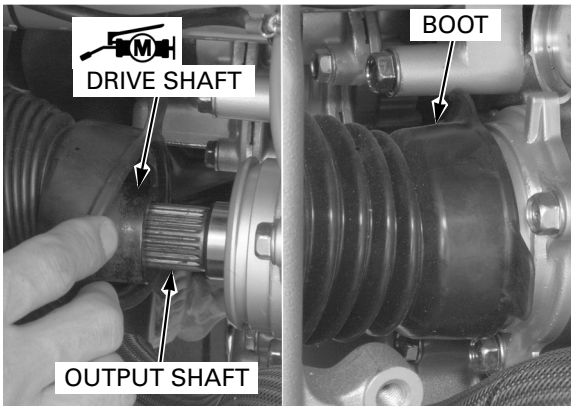
Apply 1 g (0.04 oz) of molybdenum disulfide grease to the drive shaft splines.

Temporarily install the joint shaft into the drive shaft to ease installation (page 13-6).

Set the swingarm into the frame and hold it. Engage the splines of the drive and output shafts properly.

Install the pivot bolts by carefully aligning them with the swingarm pivots (bearings).

Install the joint boot over the engine securely.



Screw the left and right pivot bolts until they stops.

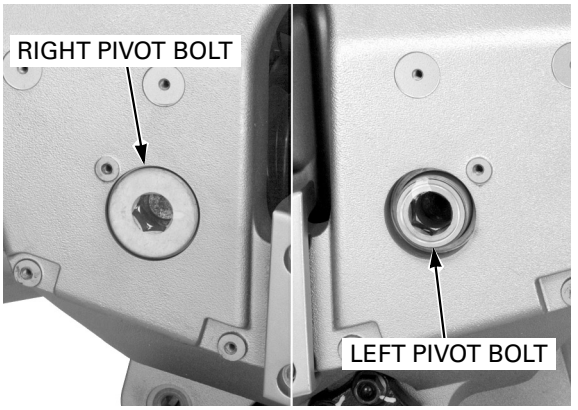
Tighten the right pivot bolt to the specified torque.

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)

Tighten the left pivot bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Move the swingarm up and down several times to seat the pivot bearings.
Retighten the pivot bolts to the same torque.

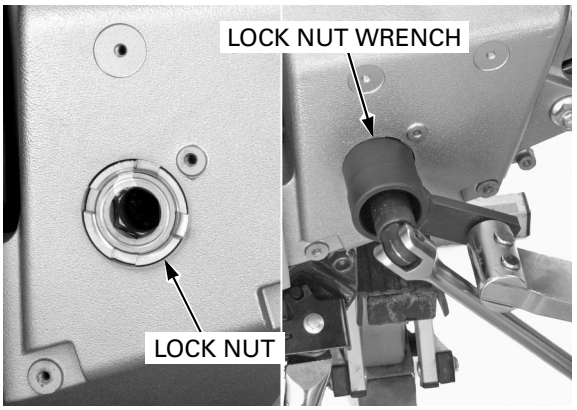


Install the left pivot lock nut.
Tighten the lock nut while holding the pivot bolt.

TOOL:
Lock nut wrench **07ZMA-MCA0100 or 07ZMA-MCAA101 (U.S.A. only)**

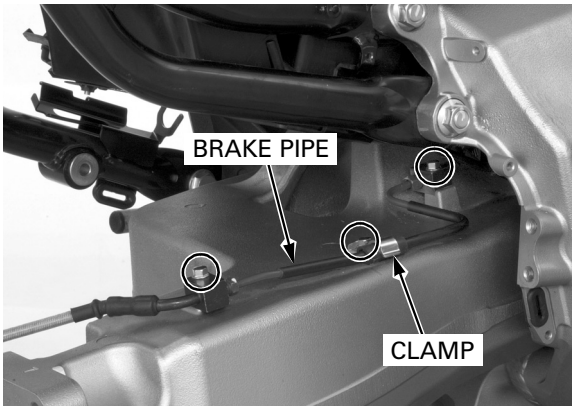
Refer to torque wrench reading information on page 15-3 "Service Information."

TORQUE: Actual: 108 N·m (11.0 kgf·m, 80 lbf·ft)
Indicated: 98 N·m (10.0 kgf·m, 72 lbf·ft)



Secure the brake pipe with the three bolts and clamp.

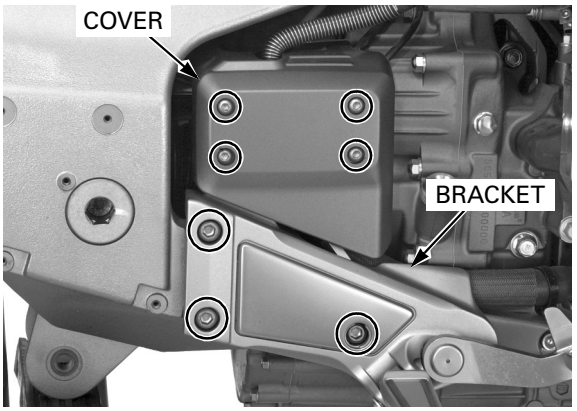
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the footpeg bracket/master cylinder assembly and tighten the three bolts. Install the bolt caps.

Install the master cylinder cover and tighten the four bolts.

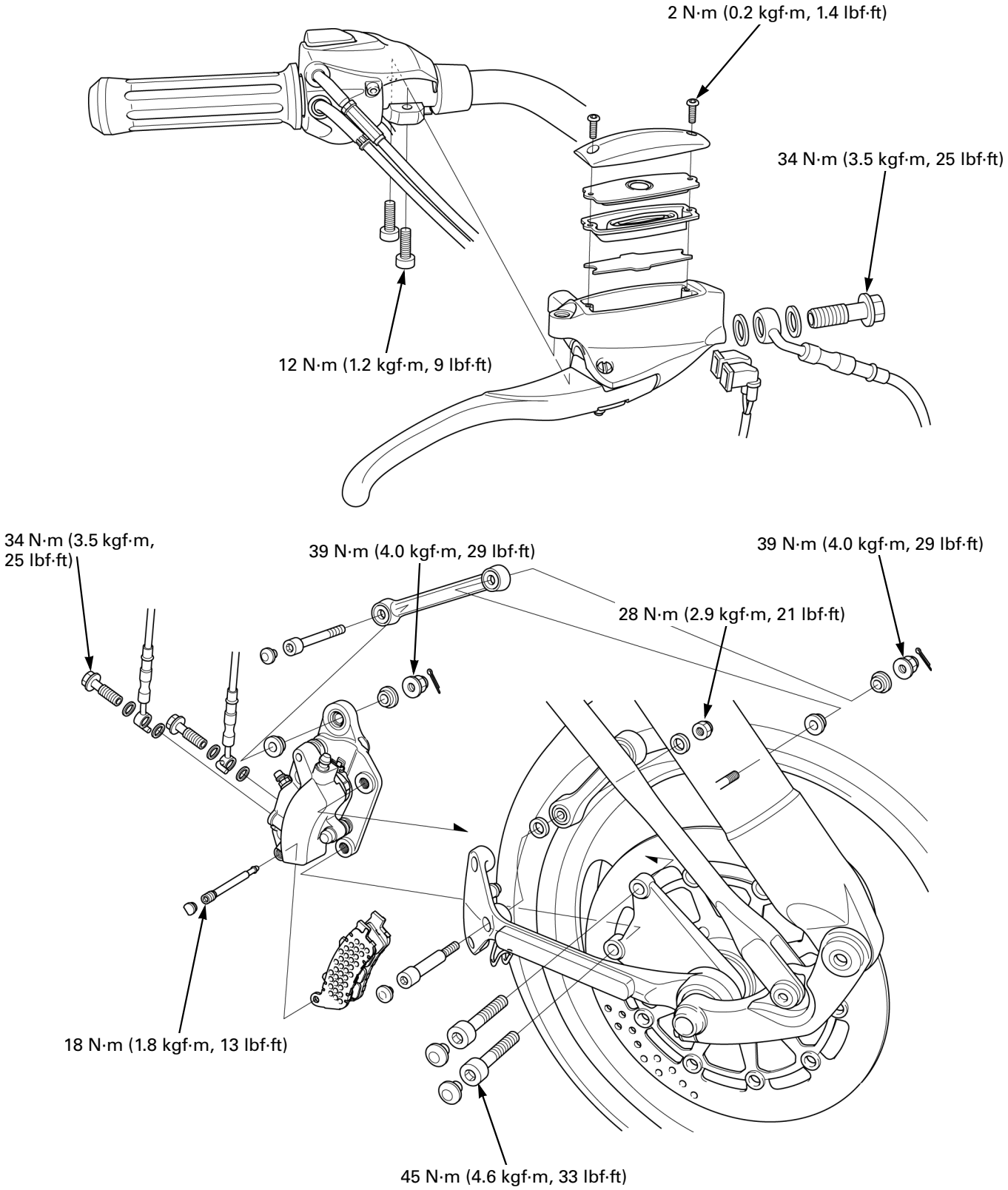
Install the following:
– shock absorber and linkage (page 15-11)
– final drive assembly (page 13-18)



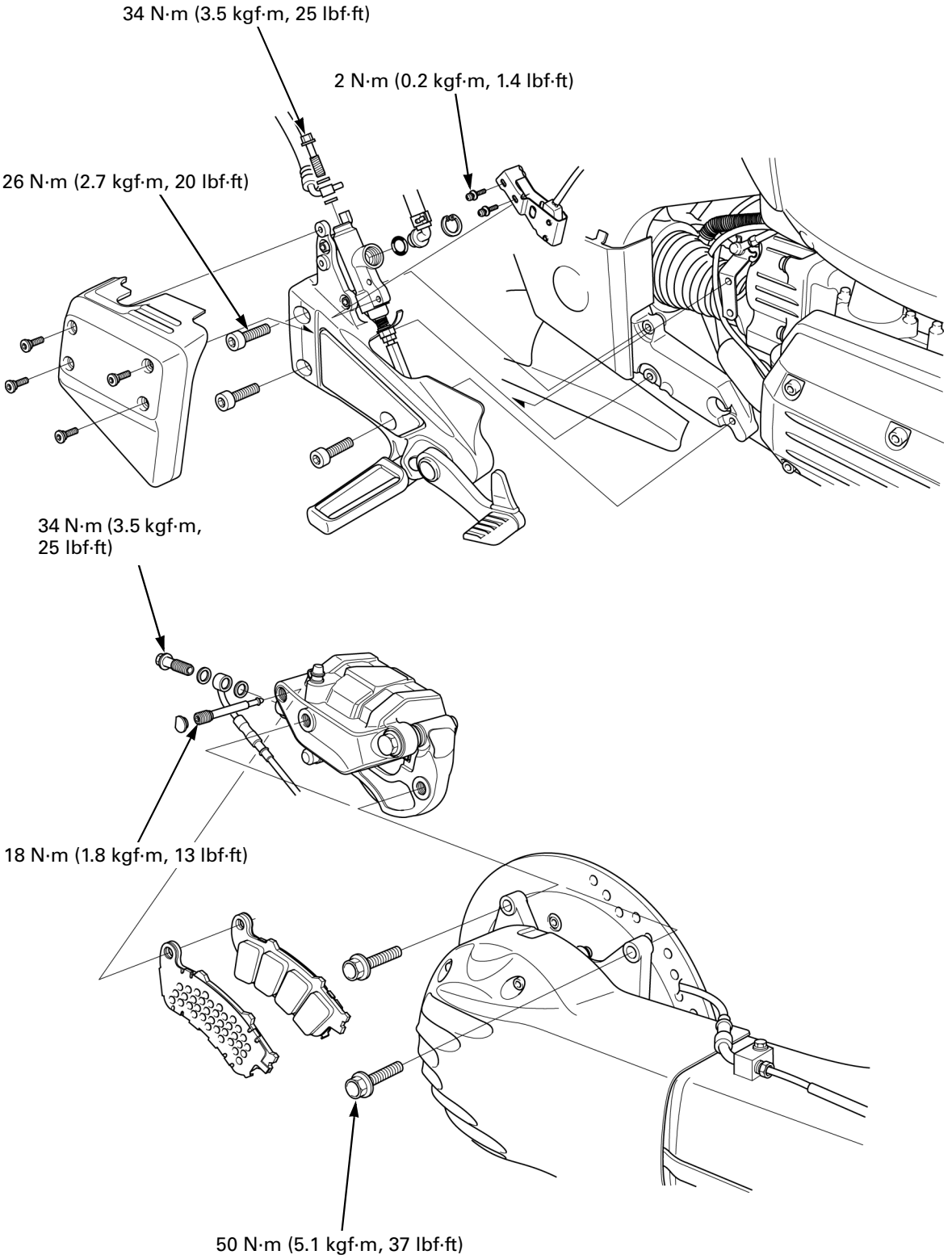
16. HYDRAULIC DISC BRAKE

SYSTEM COMPONENTS

FRONT:



REAR:


34 N·m (3.5 kgf·m, 25 lbf·ft)
2 N·m (0.2 kgf·m, 1.4 lbf·ft)
26 N·m (2.7 kgf·m, 20 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
18 N·m (1.8 kgf·m, 13 lbf·ft)
50 N·m (5.1 kgf·m, 37 lbf·ft)

SERVICE INFORMATION

GENERAL

⚠ CAUTION

Frequent inhalation of brake lining 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 the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.

- The pedal brake system is designed to engage both front and rear brakes when the brake pedal is used (combined brake system). The hydraulic pressure from the rear master cylinder is applied to the front and rear calipers directly. The connection to the front caliper acts on the center piston (each front caliper is 3-pistons), and the rear brake line runs to the all the rear caliper pistons by way of the proportional control valve (PCV; regulates the rear caliper hydraulic pressure).
- 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

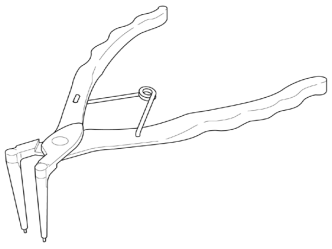
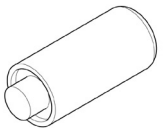
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Specified brake fluid			DOT 4	–
Front	Brake disc thickness		4.5 (0.18)	3.5 (0.14)
	Brake disc warpage		–	0.30 (0.012)
	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.	Upper, Lower	27.000 – 27.050 (1.0630 – 1.0650)	27.06 (1.065)
		Center	22.650 – 22.700 (0.8917 – 0.8937)	22.71 (0.894)
	Caliper piston O.D.	Upper, Lower	26.935 – 26.968 (1.0604 – 1.0617)	26.91 (1.059)
		Center	22.585 – 22.618 (0.8892 – 0.8905)	22.56 (0.888)
Rear	Brake disk thickness		7.5 (0.30)	6.5 (0.26)
	Brake disc warpage		–	0.30 (0.012)
	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 – 0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.		33.96 – 34.01 (1.337 – 1.339)	34.02 (1.340)
	Caliper piston O.D.		33.878 – 33.928 (1.3338 –1.3357)	33.87 (1.333)

TORQUE VALUES

Brake caliper bleed valve	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Master cylinder reservoir cap screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Brake pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Brake lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Brake lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Front brake light switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear master cylinder reservoir mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear master cylinder reservoir stay bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear master cylinder reservoir hose joint screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft) Apply locking agent to the threads.
Rear master cylinder switch plate lock nut	18 N·m (1.8 kgf·m, 13 lbf·ft)
Rear master cylinder joint nut	18 N·m (1.8 kgf·m, 13 lbf·ft)
Rear brake pedal pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Rear master cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear brake light switch holder screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft) Apply locking agent to the threads.
Rear master cylinder cover bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Front brake caliper bracket pin	13 N·m (1.3 kgf·m, 9 lbf·ft) Apply locking agent to the threads.
Front brake caliper pin	23 N·m (2.3 kgf·m, 17 lbf·ft) Apply locking agent to the threads.
Front brake caliper assembly bolt	23 N·m (2.3 kgf·m, 17 lbf·ft) ALOC bolt; replace with a new one.
Front brake caliper mounting bolt	45 N·m (4.6 kgf·m, 33 lbf·ft) ALOC bolt; replace with a new one.
Torque rod (caliper–fork tube) nut	39 N·m (4.0 kgf·m, 29 lbf·ft) U-nut.
Fender link (fender stay–push rod) nut	28 N·m (2.9 kgf·m, 21 lbf·ft) U-nut.
Rear brake caliper bracket pin	23 N·m (2.3 kgf·m, 17 lbf·ft) Apply locking agent to the threads.
Rear brake caliper pin bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)
Rear brake caliper mounting bolt	50 N·m (5.1 kgf·m, 37 lbf·ft) ALOC bolt; replace with a new one.
Proportional control valve mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Brake pipe joint nut	17 N·m (1.7 kgf·m, 12 lbf·ft) Apply brake fluid to the threads.
Brake hose/pipe joint mounting bolt (fork bottom bridge)	26 N·m (2.7 kgf·m, 20 lbf·ft)
Brake hose retaining bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Brake hose guide bolt (shock absorber upper bracket)	12 N·m (1.2 kgf·m, 9 lbf·ft)
Footpeg bracket bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)

TOOLS

Snap ring pliers 07914-SA50001	Spherical bearing driver 07HMF-HC00100
	

TROUBLESHOOTING

Brake lever/pedal 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
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master piston
- Bent brake lever/pedal

Brake lever/pedal hard
- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Sticking/worn master piston
- Caliper not sliding properly
- Bent brake lever/pedal

Brake drag
- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper piston
- Faulty proportional control valve (rear brake)

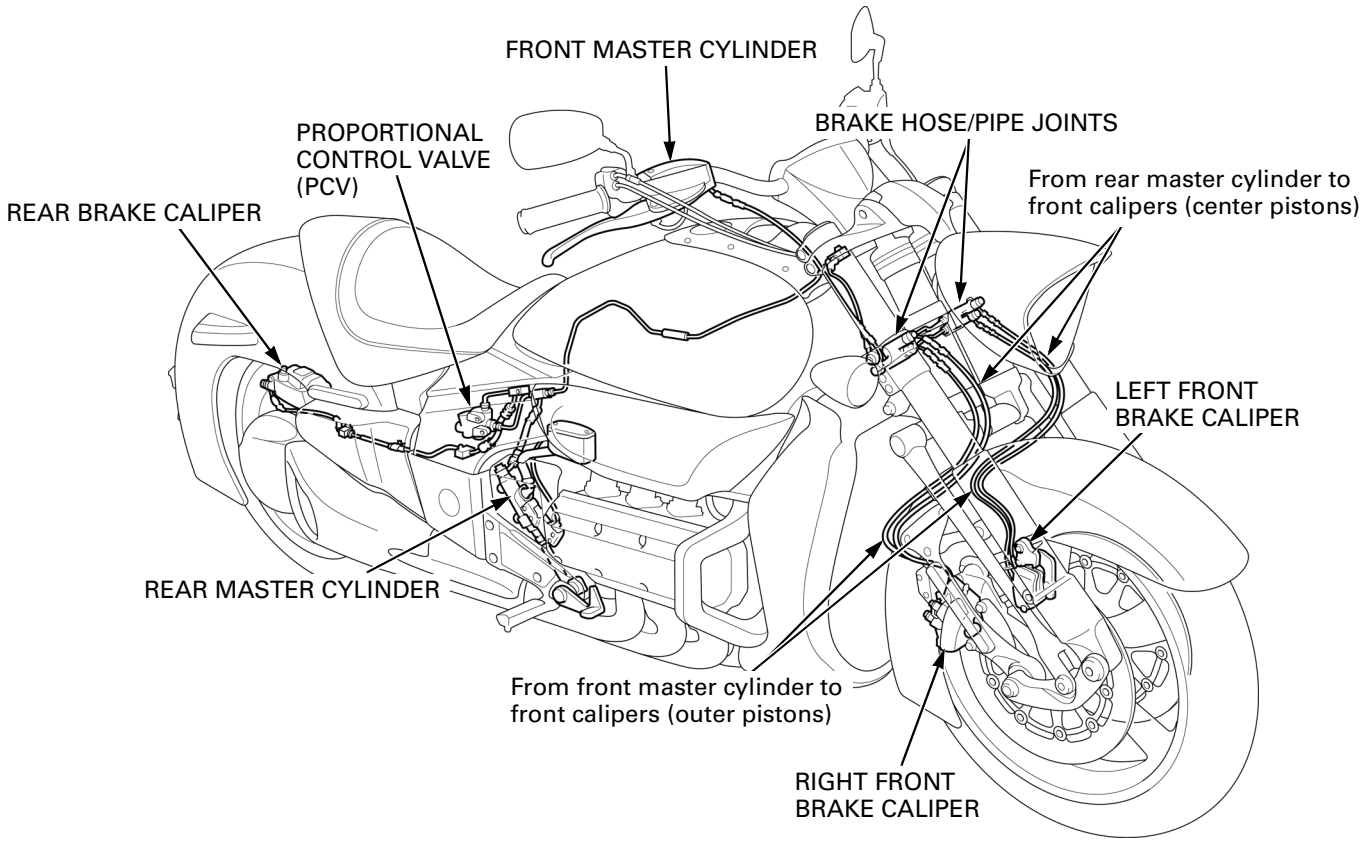
BRAKE FLUID REPLACEMENT/AIR BLEEDING

NOTICE

- *A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*
- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *Use only DOT 4 brake fluid from a sealed container.*
- *Do not mix different types of fluid. They are not compatible.*

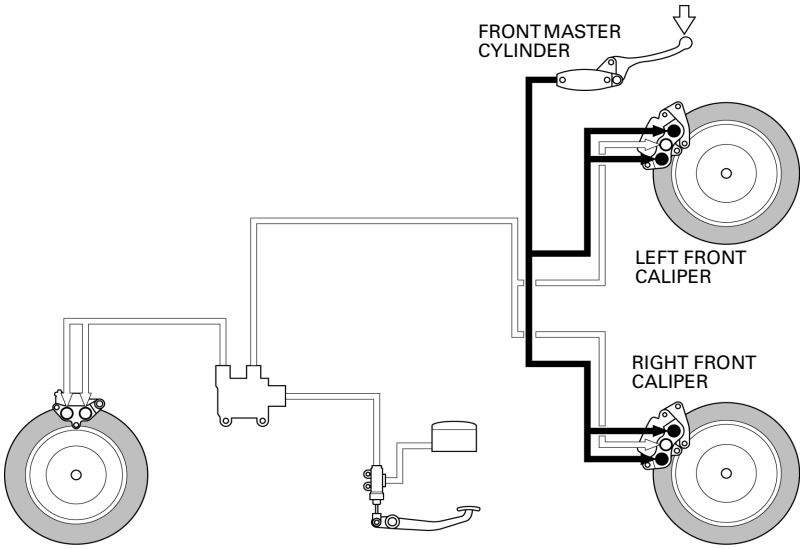
NOTE:

- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.
- The lever brake line from the front master cylinder is connected to the two outer pistons of each front caliper (3-pistons).
  The pedal brake line from the rear master cylinder is connected to the center piston of each front caliper and to all the rear caliper pistons.

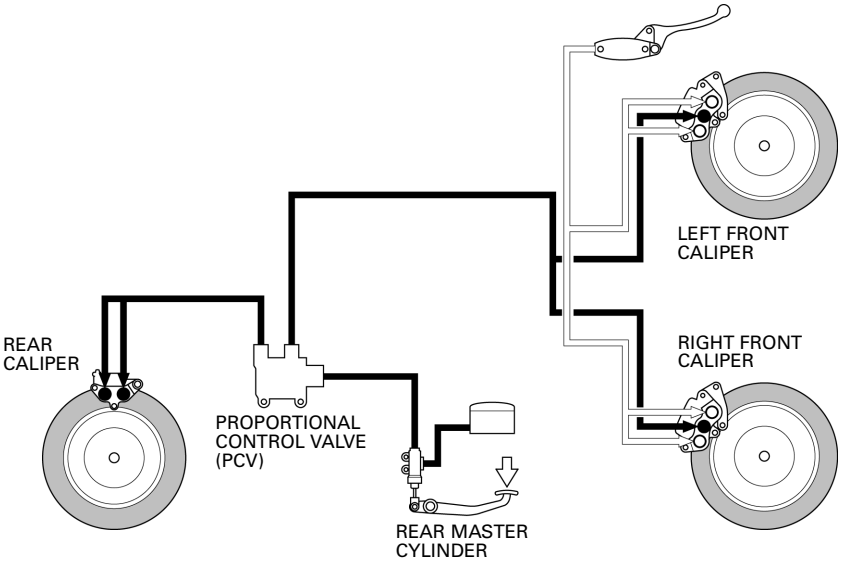


BRAKE FLUID DRAINING

LEVER BRAKE LINE (Front Brake)



PEDAL BRAKE LINE (Rear Brake)

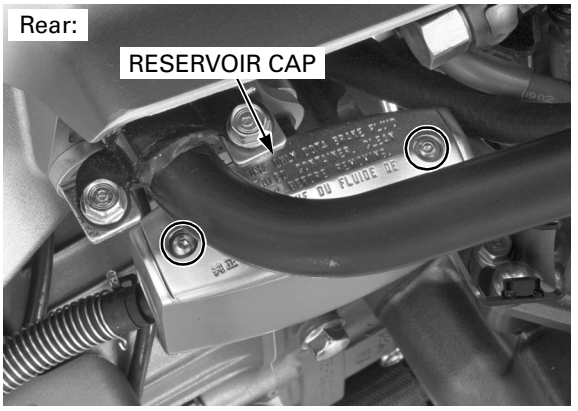


For front brake: Turn the handlebar to the left until the front master cylinder reservoir is level before removing the reservoir cap.
Remove the screws, reservoir cap, set plate and diaphragm.

Front:

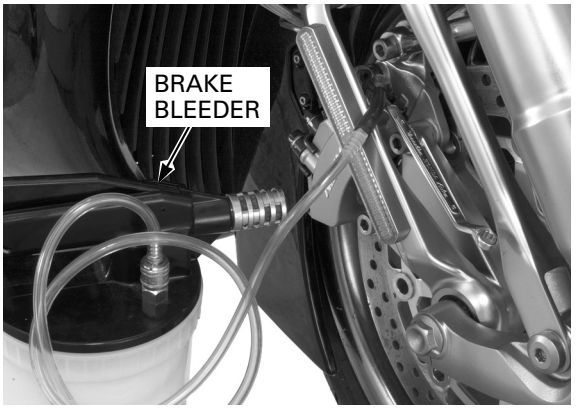
For rear brake: Remove the right front side cover (page 3-4).

Remove the screws, reservoir cap, set plate and diaphragm.



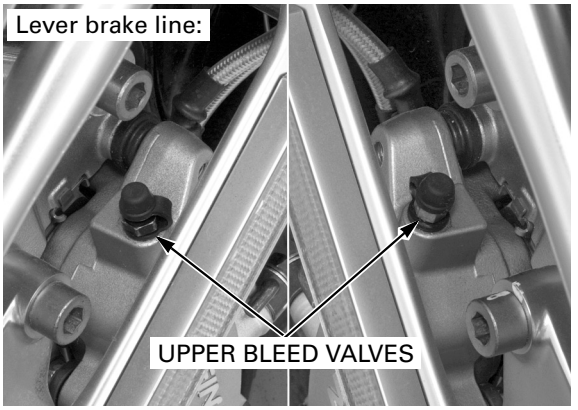
Connect a commercially available brake bleeder to the bleed valve of the caliper at the position as shown below.

Loosen the bleed valve and pump the brake bleeder until no more fluid flows out of the bleed valve. Tighten the bleed valve.

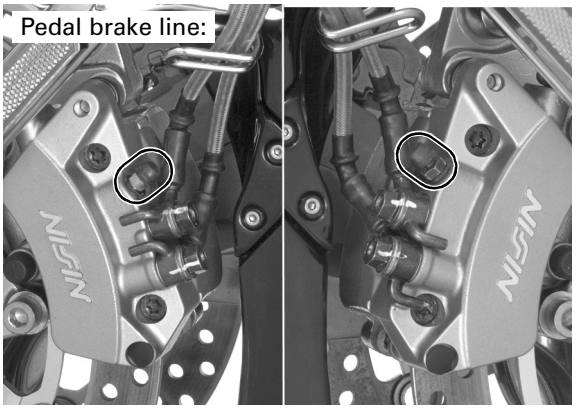


Perform the above procedure at each bleed valve:

- Lever brake line (2 places): at the upper bleed valve of each front caliper



- Pedal brake line (3 places): at the lower bleed valve of each front caliper and the rear caliper bleed valve



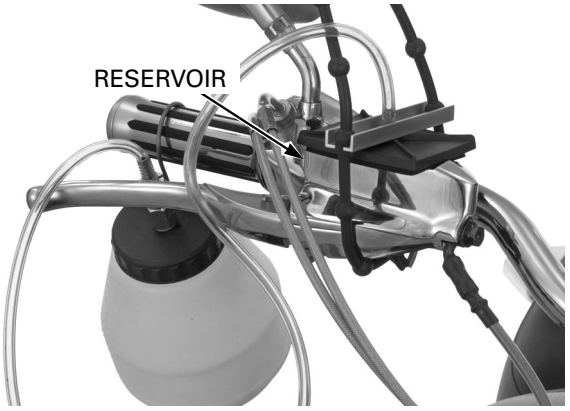
LEVER BRAKE LINE FLUID FILLING/ AIR BLEEDING

FLUID FILLING

NOTE:

- It is not a problem if the fluid flowing out from the bleed valve contains air bubbles because the lines will be bled in next steps ("Air Bleeding").

Fill the reservoir with DOT 4 brake fluid from a sealed container.
Operate the brake lever several times to bleed air from the master cylinder.



Check the fluid level often while bleeding the brake to prevent air from being pumped into the system. If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

1. Connect a commercially available brake bleeder to the upper bleed valve of the front caliper.
   Pump 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.

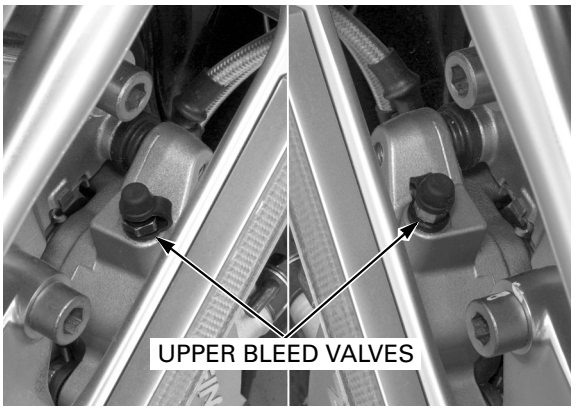
   Repeat above procedure until sufficient amount of the fluid flows out from the bleed valve.
   Close the bleed valve.

NOTE:

- When using a brake bleeding tool, follow the manufacturer's operating instructions.

2. Perform step 1 at the upper bleed valve of the other front caliper.

Next, perform the air bleeding without using a brake bleeder tool (page 16-11).

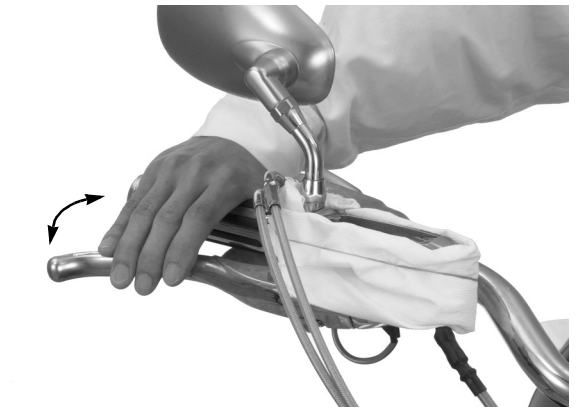


<u>If a brake bleeder is not available, use the following procedure</u>:

Do not release the lever until the bleed valve has been closed.

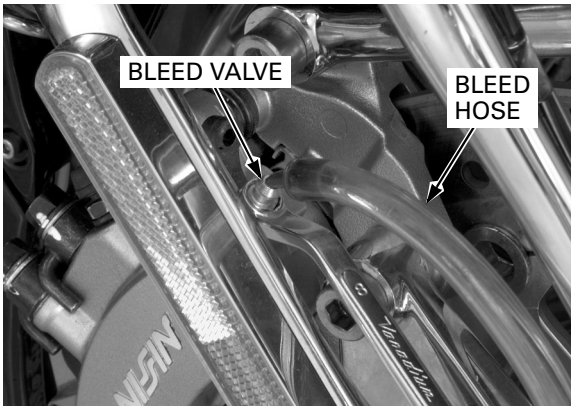
1. Connect a bleed hose to the upper bleed valve of the front caliper.
   Pump the brake lever several (5–10) times quickly, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.
   Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

   Repeat above procedure until sufficient amount of fluid flows out of the bleed valve.



2. Perform step 1 at the upper bleed valve of the other front caliper.

Next, perform the air bleeding (page 16-11).



AIR BLEEDING

Air bleeding procedure is performed in the same way as in the fluid filling procedure without using a bleeder tool (see above step).
Repeat this procedure until air bubbles do not appear in the plastic hose of each bleed valve.

Make sure that the bleed valves are closed and operate the brake lever. If it still feels spongy, bleed the system again.

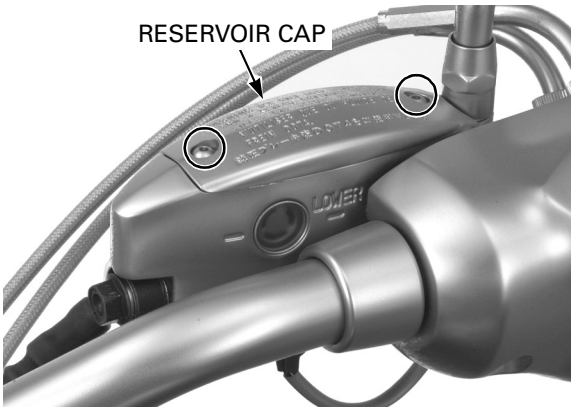
After bleeding the air completely, tighten the bleed valves.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Fill the reservoir to the casting ledge with DOT 4 brake fluid.

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

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



PEDAL BRAKE LINE FLUID FILLING/ AIR BLEEDING

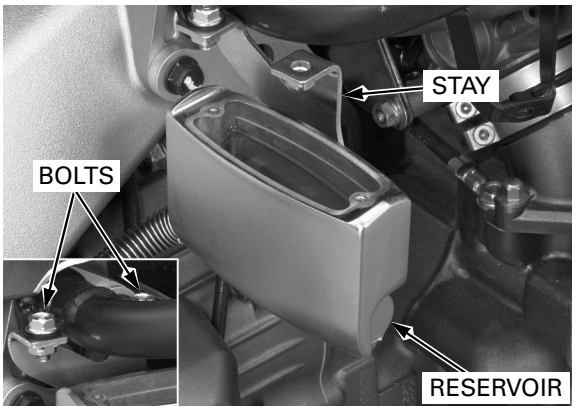
FLUID FILLING

NOTE:

- It is not a problem if the fluid flowing out from the bleed valve contains air bubbles because the lines will be bled in next steps ("Air Bleeding").

Remove the front bolt of the reservoir stay and loosen the rear bolt. Turn the reservoir outward and secure it by tightening the rear bolt as shown.

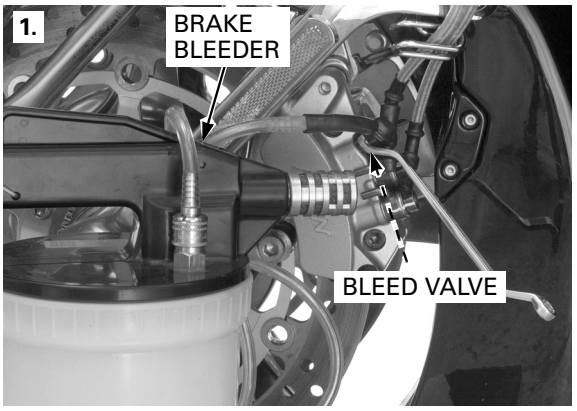
Fill the reservoir with DOT 4 brake fluid from a sealed container.
Operate the brake pedal several times until the brake fluid in the reservoir goes down.



Check the fluid level often while bleeding the brake to prevent air from being pumped into the system. If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

1. Connect a commercially available brake bleeder to the lower bleed valve of the left front caliper as shown.
   Pump 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.

   Repeat above procedure until sufficient amount of the fluid flows out from the bleed valve.
   Close the bleed valve.

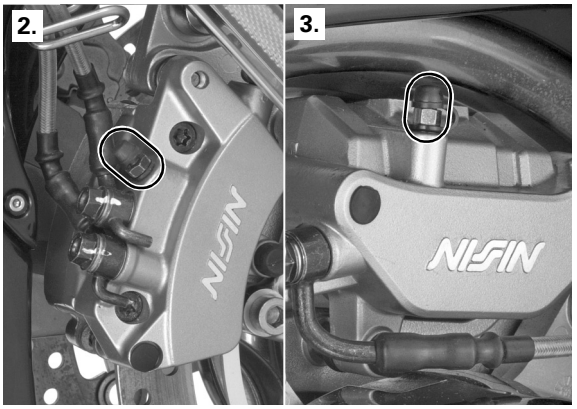


NOTE:

- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Perform step 1 at each bleed valve in the sequence as follows:

2. Right front caliper lower bleed valve
3. Rear caliper bleed valve



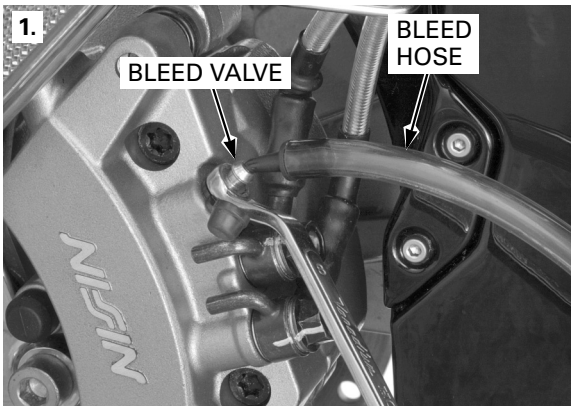
Next, perform the air bleeding without using a brake bleeder tool (page 16-13).

If a brake bleeder is not available, use the following procedure:

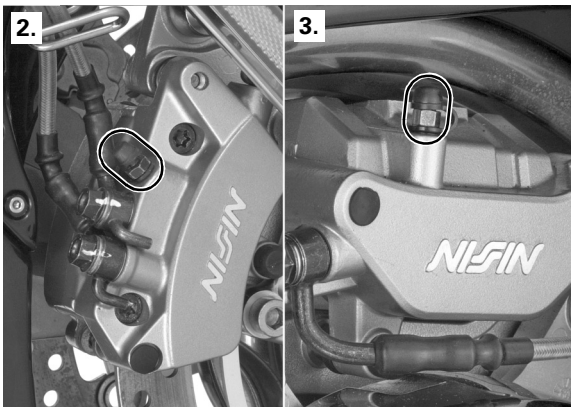
Do not release the pedal until the bleed valve has been closed.

1. Connect a bleed hose to the lower bleed valve of the left front caliper.
   Pump the brake pedal several (5–10) times quickly, then depress the pedal all the way and loosen the bleed valve 1/4 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.

   Repeat above procedure until sufficient amount of fluid flows out of the bleed valve.



   Perform step 1 at each bleed valve in the sequence as follows:
2. Right front caliper lower bleed valve
3. Rear caliper bleed valve



Next, perform the air bleeding (page 16-13).

AIR BLEEDING

Air bleeding procedure is performed in the same way as in the fluid filling procedure without using a bleeder tool (see above step).
Repeat this procedure until air bubbles do not appear in the plastic hose of each bleed valve.

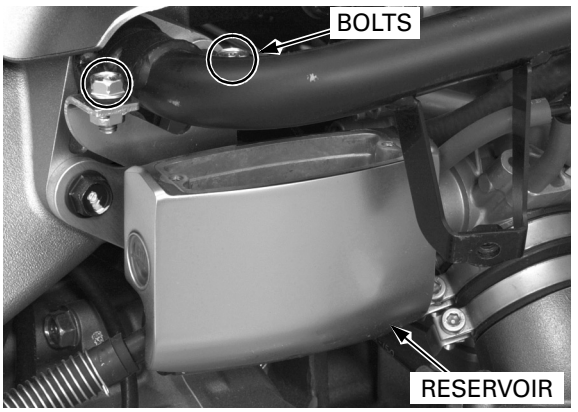
After air bubbles cease to appear in the fluid, repeat air bleeding procedure about 2–3 times.

Make sure that 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.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

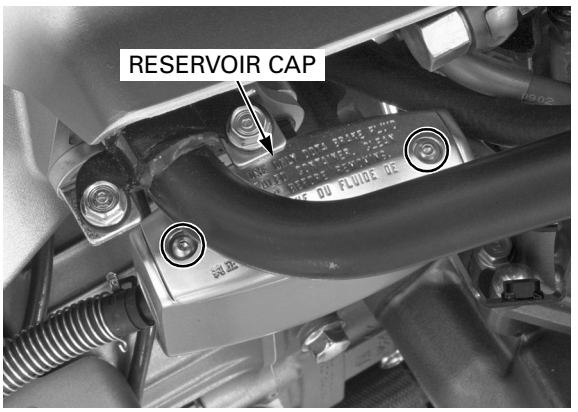
Loosen the reservoir stay bolt and install the reservoir in the original position with the two stay bolts, being careful not to spill brake fluid.



TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Fill the reservoir to the casting ledge with DOT 4 brake fluid.

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



TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the front side cover (page 3-4).

BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

Check the brake fluid level in the front and rear reservoirs as this operation causes the level to rise.

Push the caliper piston all the way in to allow installation of new brake pads by pushing the caliper body inward.

Remove the pad pin plug and 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.

Coat the stopper ring on the pad pin end with the silicone grease.

Make sure the pad spring is installed correctly. Always replace the brake pads in pairs to ensure even disc pressure.

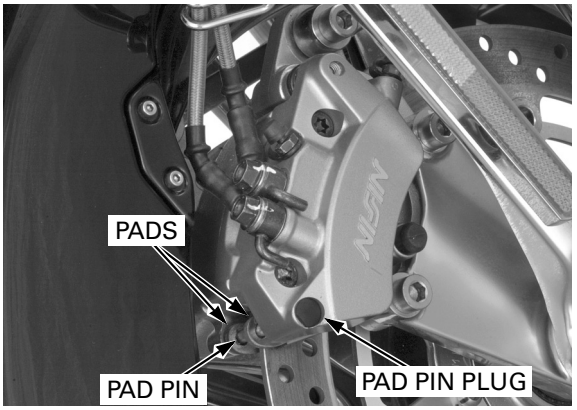
Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly.
Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.

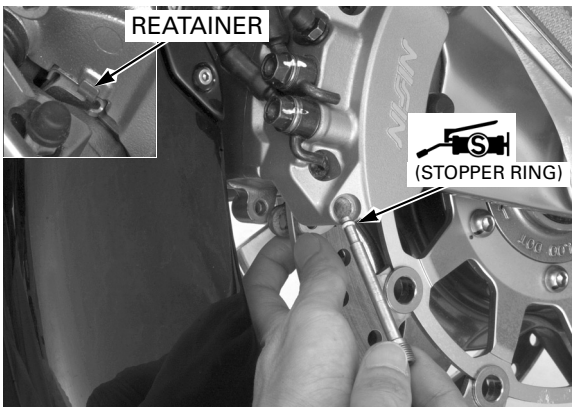
Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the pad pin plug securely.

Operate the brake lever and pedal to seat the caliper piston against the pads.





REAR BRAKE PAD REPLACEMENT

Check the brake fluid level in the rear reservoir as this operation causes the level to rise.

Push the caliper piston all the way in to allow installation of new brake pads by pushing the caliper body inward.

Remove the pad pin plug and 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.

Coat the stopper ring on the pad pin end with the silicone grease.

Make sure the pad spring is installed correctly. Always replace the brake pads in pairs to ensure even disc pressure.

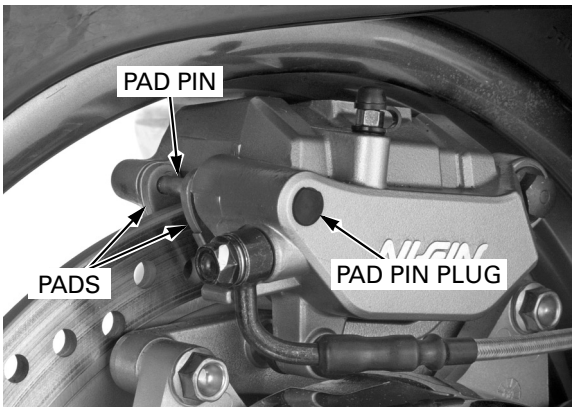
Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly.
Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.

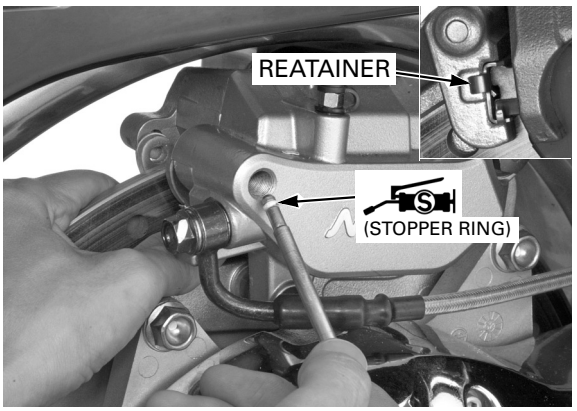
Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the pad pin plug securely.

Operate the brake pedal to seat the caliper piston against the pads.



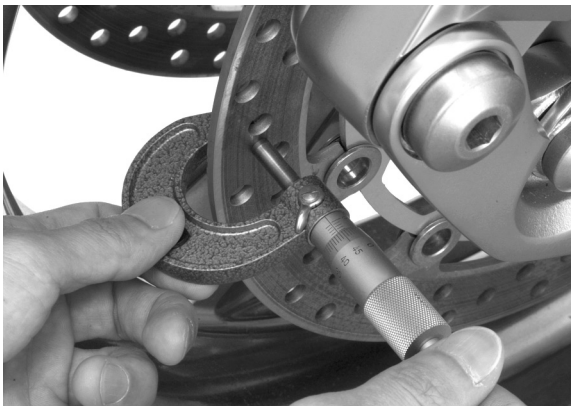


BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.

Measure the brake disc thickness at several points.

SERVICE LIMIT: Front: 3.5 mm (0.14 in)
Rear: 6.5 mm (0.26 in)



Measure the brake disc warpage with a dial indicator.

SERVICE LIMIT: Front/Rear: 0.30 mm (0.012 in)

Check the wheel bearing for excessive play, if the warpage exceeds the service limit.
Replace the brake disc if the bearings are normal.

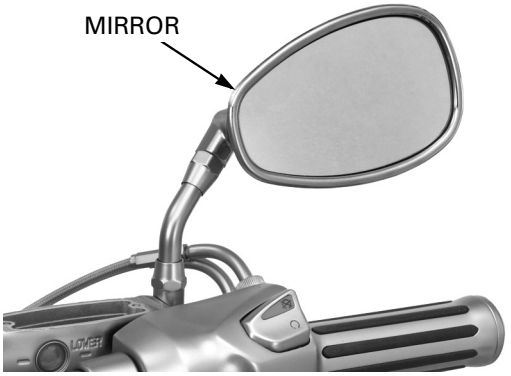
For brake disc replacement, see page 14-14 (front) or 15-6 (rear).

FRONT MASTER CYLINDER

DISASSEMBLY

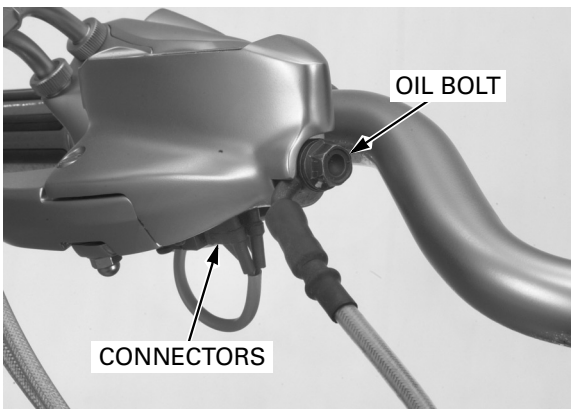
Drain the brake fluid from the lever brake hydraulic system (page 16-7).

Remove the following:
– rearview mirror

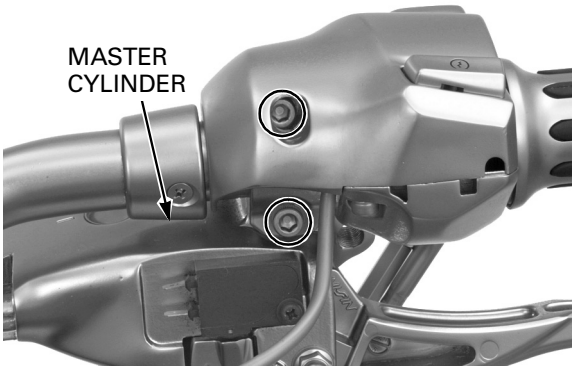


When removing the oil bolt, cover the end of the hose to prevent contamination.

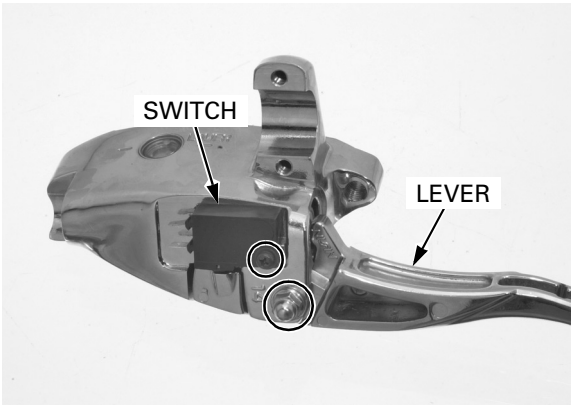
– brake light switch connectors
– oil bolt and sealing washers
– brake hose



– two socket bolts
– brake master cylinder



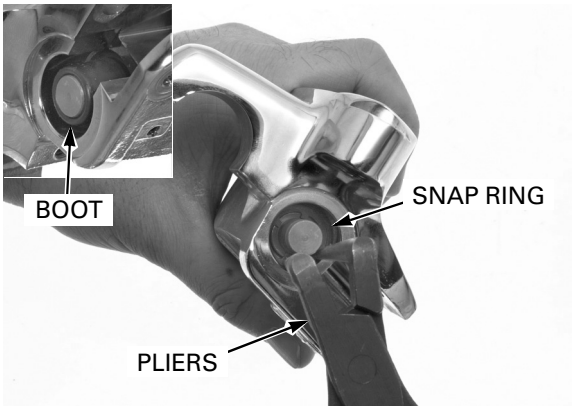
– screw and brake light switch
– pivot nut and bolt
– brake lever



– piston boot
– snap ring

TOOL:

Snap ring pliers	**07914-SA50001**

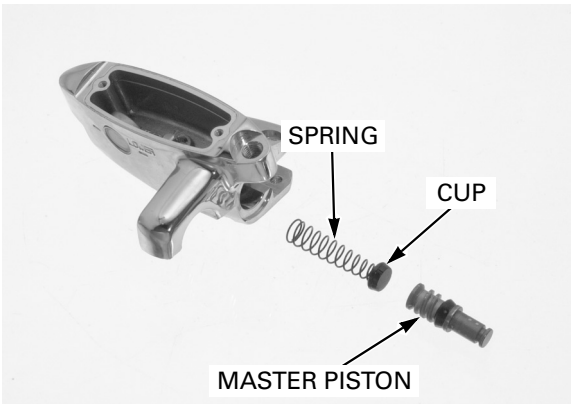


– master piston
– primary cup
– spring

Clean the master cylinder, reservoir and master piston in clean brake fluid.

INSPECTION

Check the piston cups and boot for wear, deterioration or damage.
Check the spring for damage.

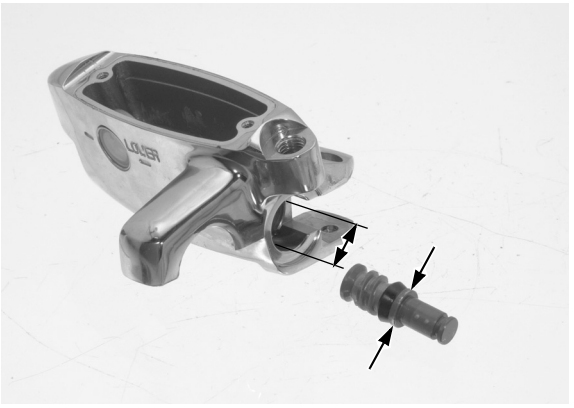


Check the master cylinder and piston for scoring, scratches or damage.
Measure the master cylinder I.D.

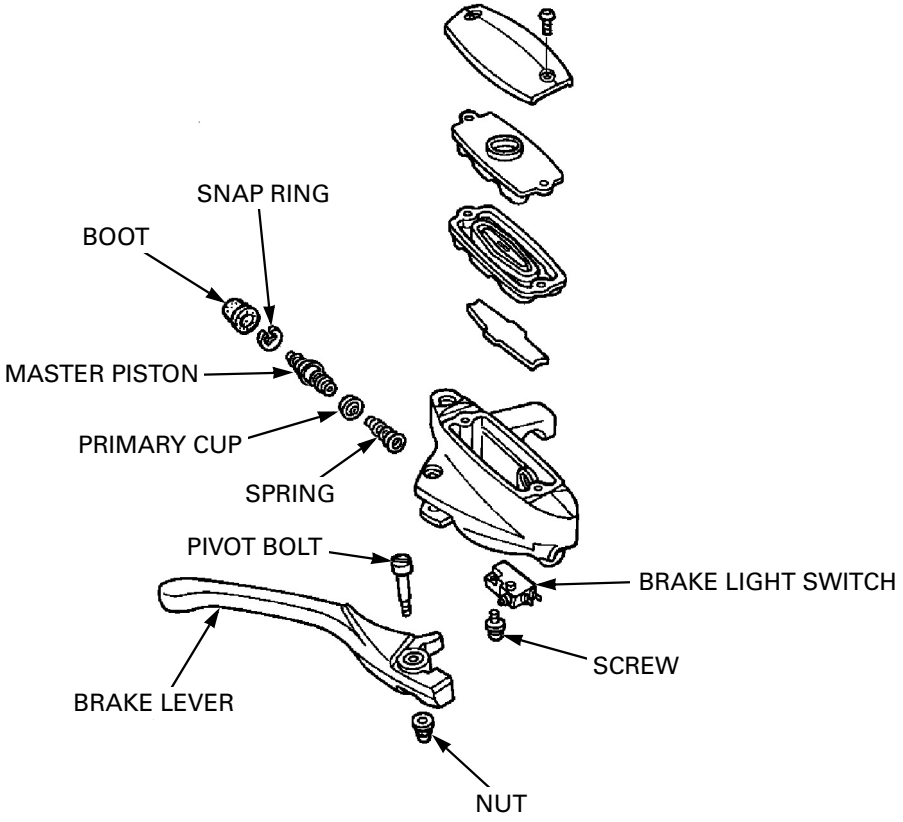
SERVICE LIMIT: 14.055 mm (0.5533 in)

Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)



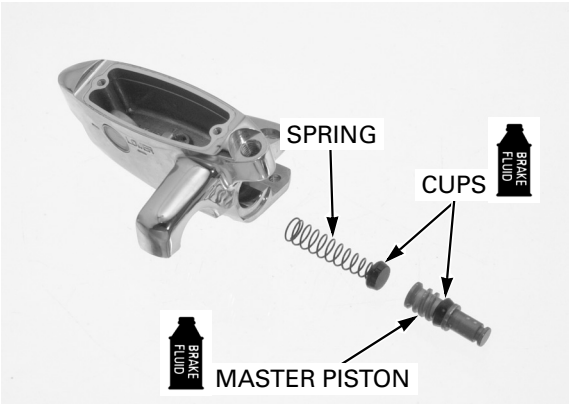
ASSEMBLY



Coat the master piston and piston cups with clean brake fluid.
Install the primary cup onto the spring.

Do not allow the piston cup lips to turn inside out.

Install the spring and master piston into the master cylinder.



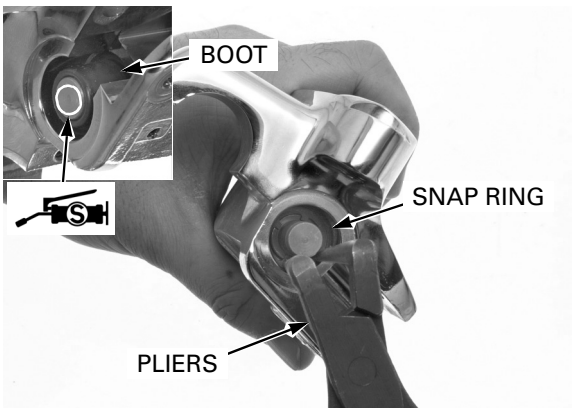
Make sure the snap ring is firmly seated in the groove.

Install the snap ring into the groove in the master cylinder.

TOOL:
Snap ring pliers 07914-SA50001

Install the boot into the master cylinder and the piston groove.

Apply silicone grease to the brake lever contacting surface of the piston.



Apply silicone grease to the brake lever pivot.
Install the brake lever and pivot bolt, and tighten it.

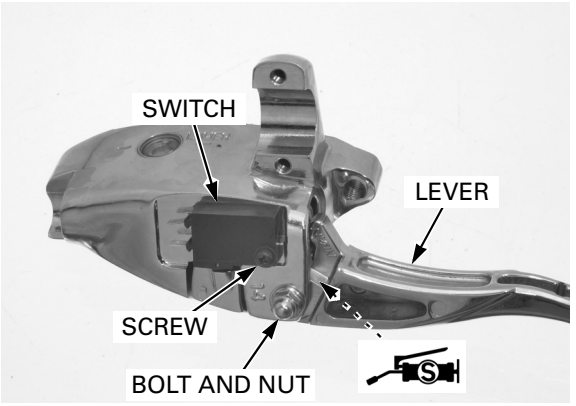
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install the pivot nut and tighten it.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Install the brake light switch with the screw.

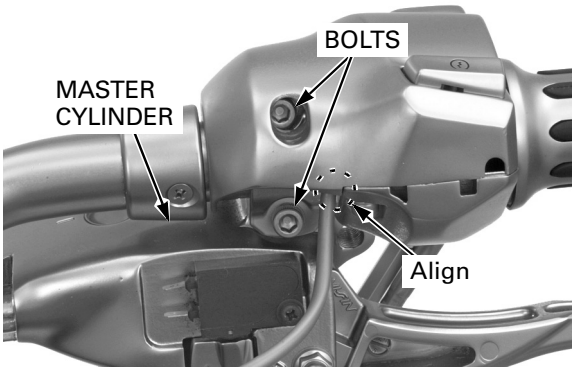
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



Place the master cylinder holder in the switch housing so the bevel edge is facing the master cylinder if it is removed.

Install the master cylinder with the holder and two bolts.
Align the edge of the master cylinder with the punch mark on the handlebar and tighten the rear bolt first, then tighten the front bolt.

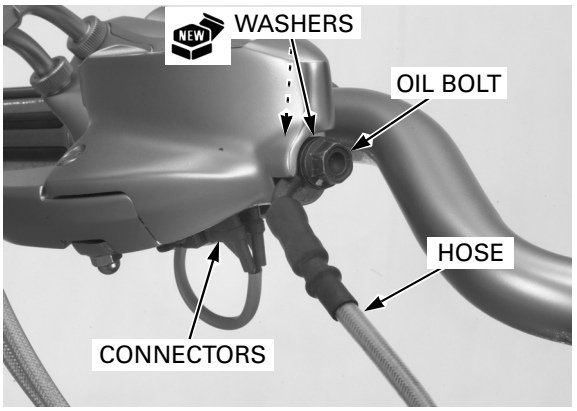
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the brake hose to the master cylinder with the oil bolt and new sealing washers.
Be sure to rest the hose joint pin against the stopper (master cylinder body). Tighten the oil bolt.

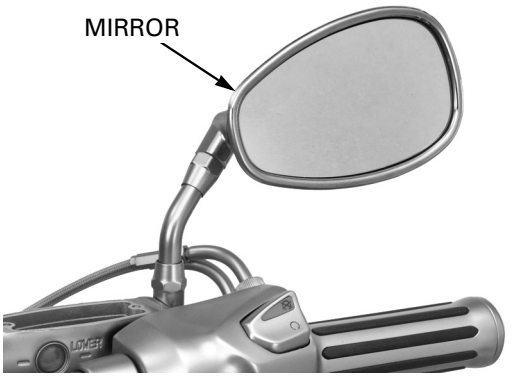
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the brake light switch connectors.



Install the rearview mirror.

Fill and bleed the lever brake hydraulic system (page 16-10).



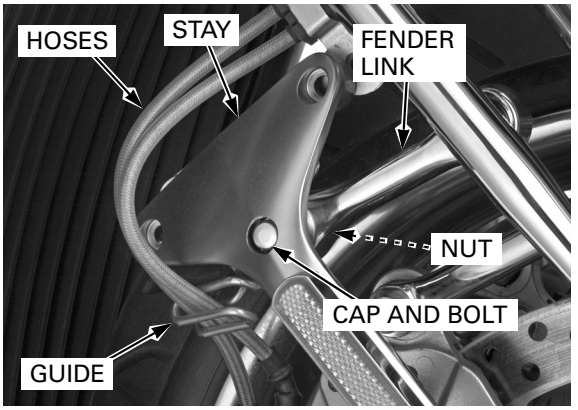
FRONT BRAKE CALIPER

DISASSEMBLY

Drain the lever and pedal brake hydraulic system (page 16-8).

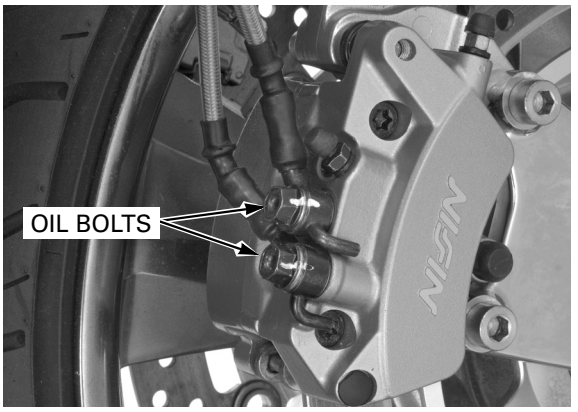
Remove the brake pads (page 16-14).
Remove the front fender (page 3-5).

Remove the following:
– bolt cap
– fender link nut and bolt (to disconnect the fender link)
– brake hose (from the hose guide and lower the fender stay)

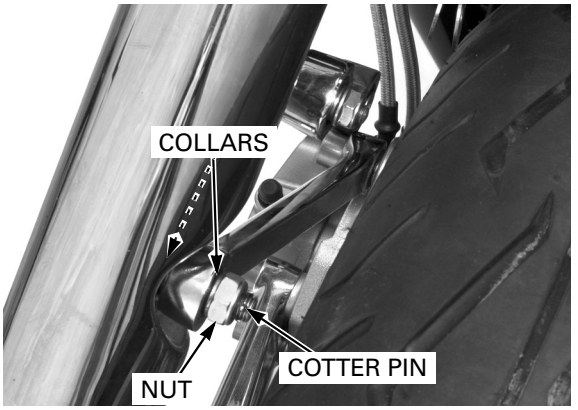


When removing the oil bolt, cover the ends of the hoses to prevent contamination.

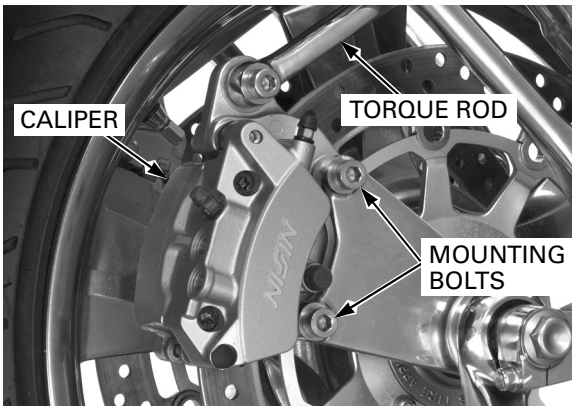
– oil bolts and sealing washers
– brake hoses



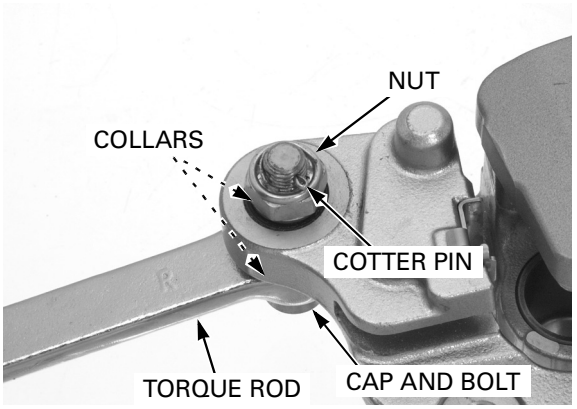
– cotter pin
– torque rod nut



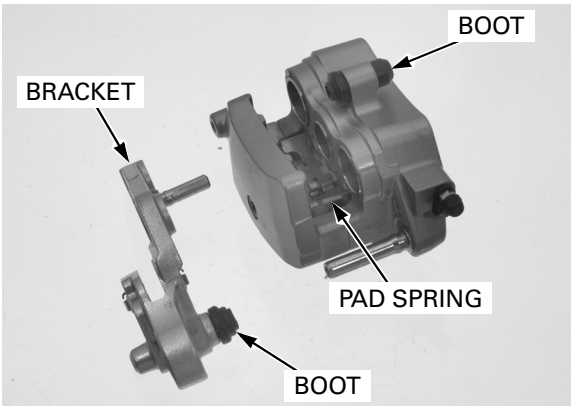
– two bolt caps and mounting bolts
– brake caliper (by disconnecting the torque rod from the fork tube)
– collars (from the torque rod pivot)



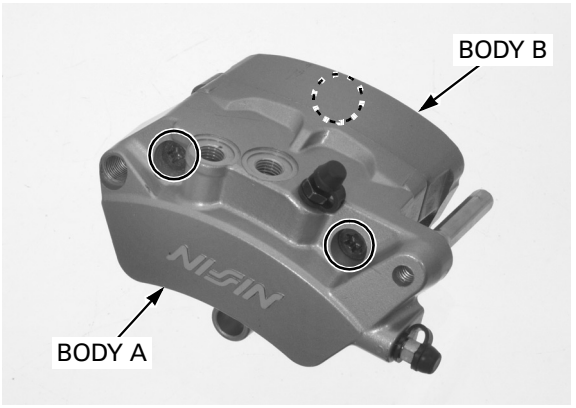
– cotter pin
– bolt cap, nut and bolt
– torque rod
– collars



– caliper bracket
– pad spring
– boots



– three assembly bolts
– caliper body B



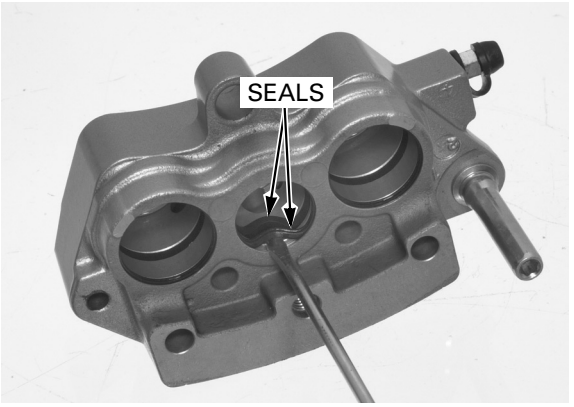
Do not use high pressure air or bring the nozzle too close the inlet.

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 inlets 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.

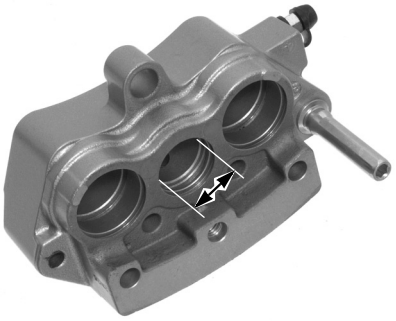


INSPECTION

Check the caliper cylinders and pistons for scoring, scratches or damage.

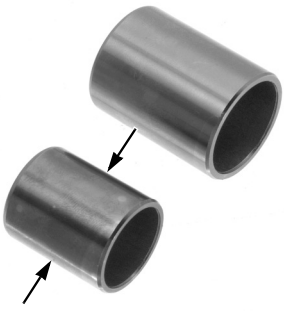
Measure the caliper cylinder I.D.

SERVICE LIMITS:
Upper/Lower: 27.06 mm (1.065 in)
Center: 22.71 mm (0.894 in)



Measure the caliper piston O.D.

SERVICE LIMITS:
Upper/Lower: 26.91 mm (1.059 in)
Center: 22.56 mm (0.888 in)

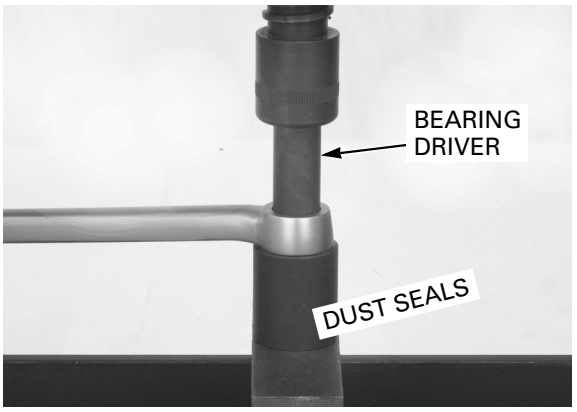


TORQUE ROD BEARING REPLACEMENT

Remove the dust seals and the stopper rings.

Press the bearing out of the torque rod and caliper bracket using the special tool.

TOOL:
Spherical bearing driver **07HMF-HC00100**



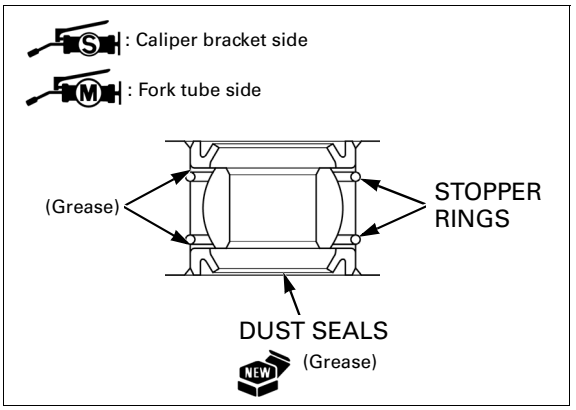
Install one of the stopper ring into the pivot groove properly/

Carefully press new bearing in each pivot until it contacts the stopper ring using the same tool.
Install the stopper ring in the opposite side.

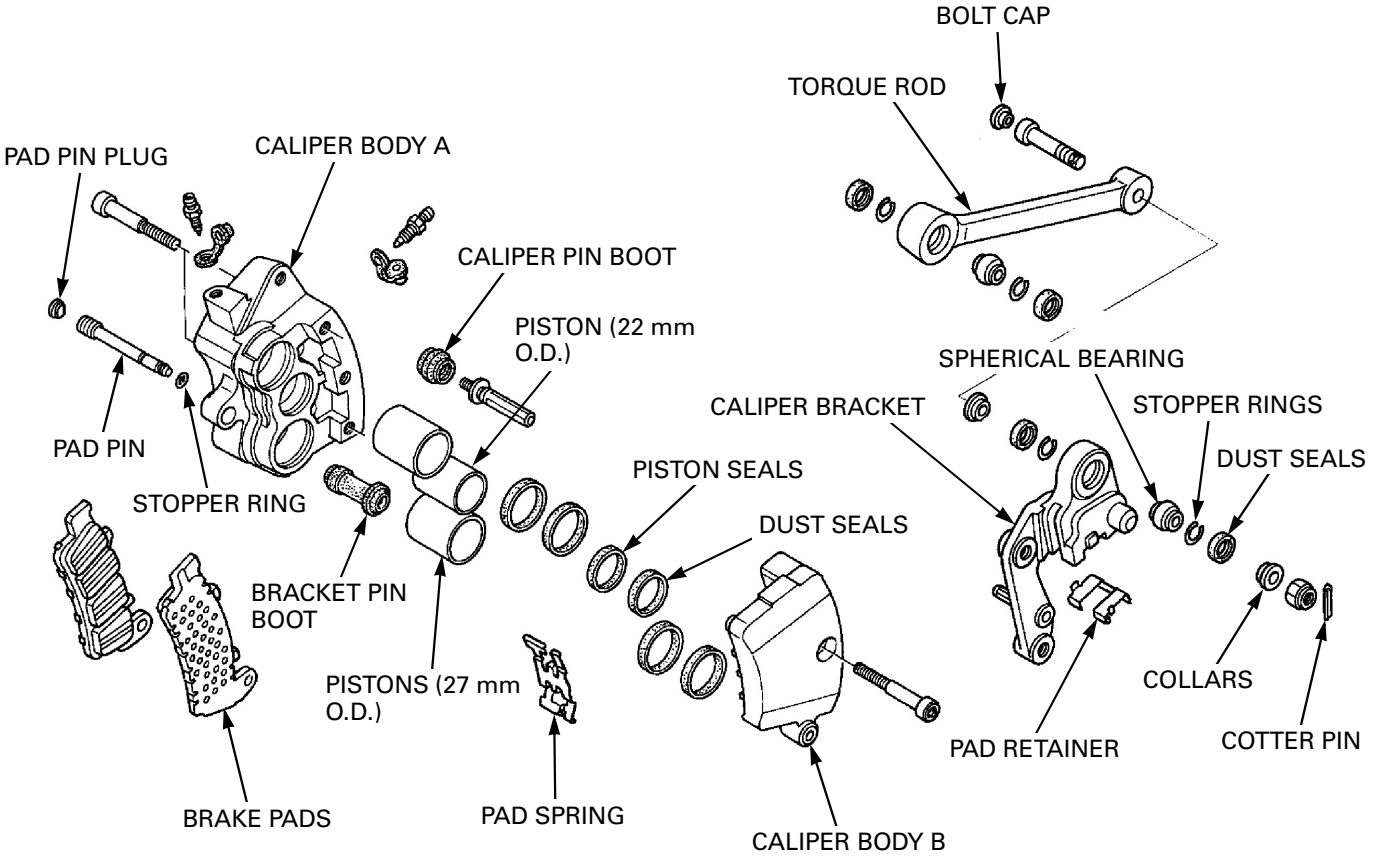
Caliper bracket: silicone grease
Torque rod (fork tube end): molybdenum disulfide grease

Pack grease between the bearing and dust seals.

Apply grease to new dust seal lips.
Install the dust seals with the lip facing out until they are flush with the pivot surfaces.



ASSEMBLY

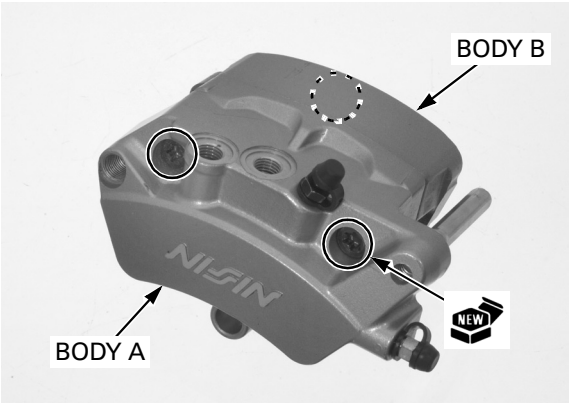


Coat new piston and dust seals with clean brake fluid and install them into the seal grooves in the caliper.

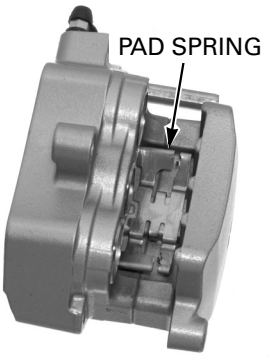
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.

Install the caliper body B onto the body A with new assembly bolts.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

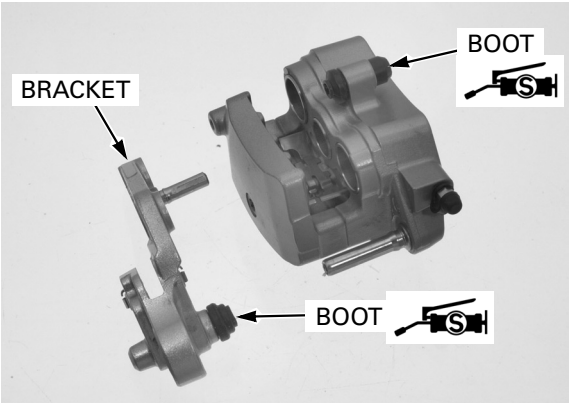


Install the pad spring onto the caliper body properly.

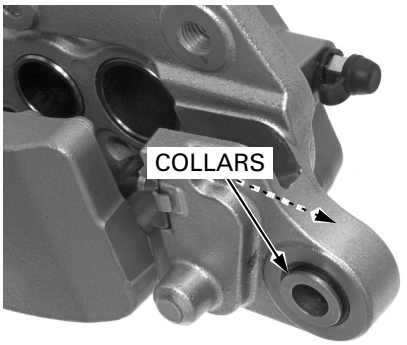


Check the caliper and bracket pin boots and replace them if they are hard, deteriorated or damaged. Install the boots into the caliper and bracket.

Apply silicone grease to the inside of the boots and install the caliper bracket over the caliper body.



Install the collars into the torque rod pivot in the caliper bracket.

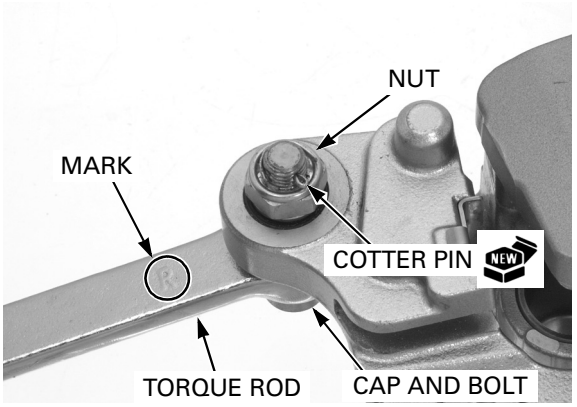


The torque rods have the following identification marks: L; left side / R; right side

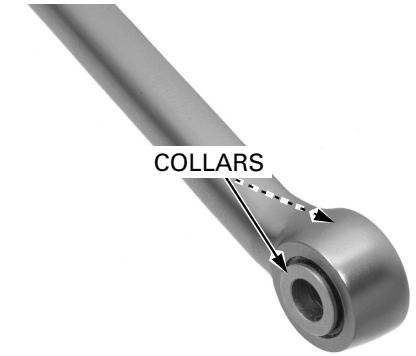
Install the torque rod with the bolt and nut, and temporarily tighten it.

Install a new cotter pin.

Install the brake pads (page 16-14).



Install the collars into the torque rod pivot.



Install the brake caliper by connecting the torque rod to the stud bolt on the fork tube with the nut, and it set so the disc is positioned between the pads, being careful not to damage the pads.

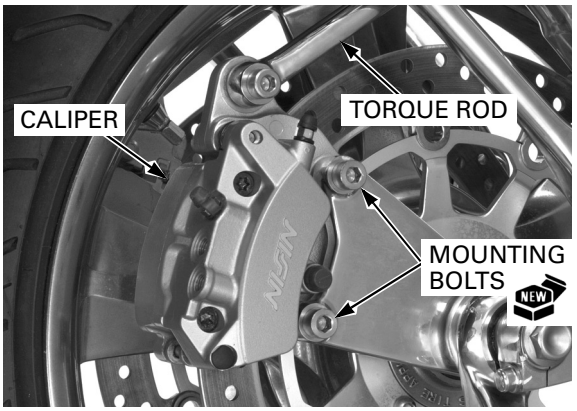
Install new mounting bolts and tighten them.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

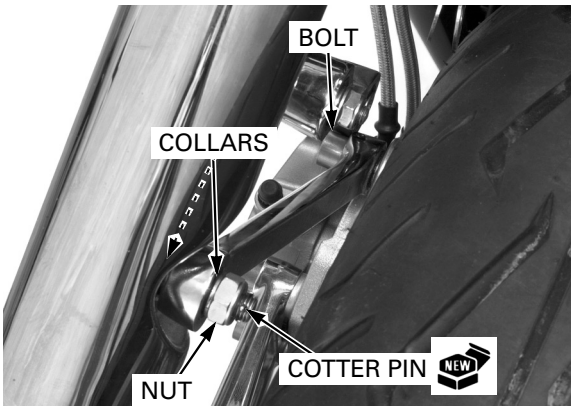
Install the pad pin plug securely.



Tighten the torque rod nut and bolt.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

Install a new cotter pin.

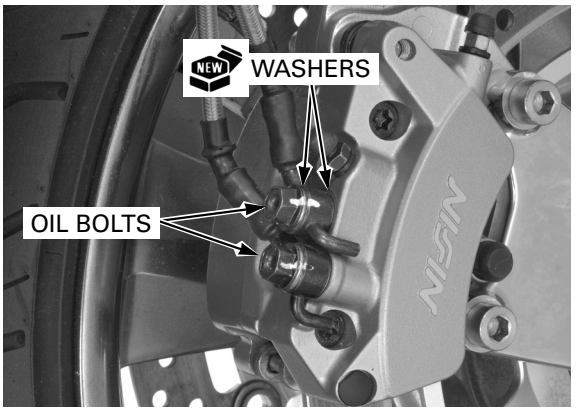


Connect the brake hoses to the caliper with the oil bolt and new sealing washers, and tighten the oil bolts.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the bolt caps onto the caliper mounting bolts and torque rod bolt.

Fill and bleed the lever and pedal hydraulic system (page 16-10 and 16-12).



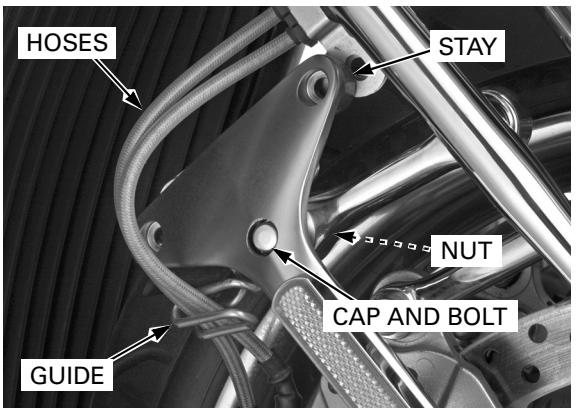
Raise the fender stay and install the brake hoses into the hose guide.

Connect the fender link to the fender stay with the bolt and nut, and tighten it.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

Install the bolt cap.

Install the front fender (page 3-5).

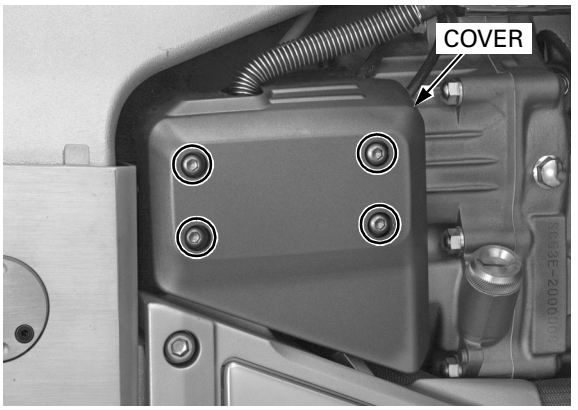


REAR MASTER CYLINDER/BRAKE PEDAL

REMOVAL

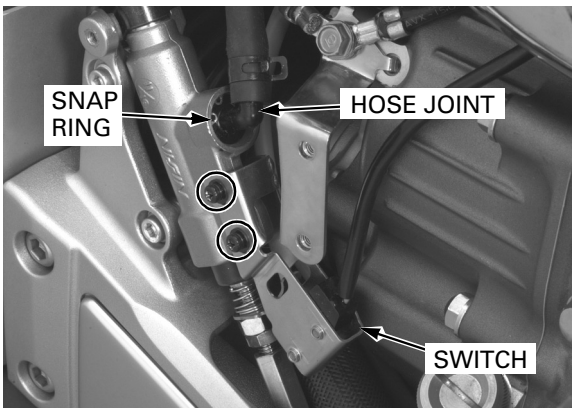
Drain the brake fluid front the pedal brake hydraulic system (page 16-8).

Remove the following:
– four socket bolts
– master cylinder cover

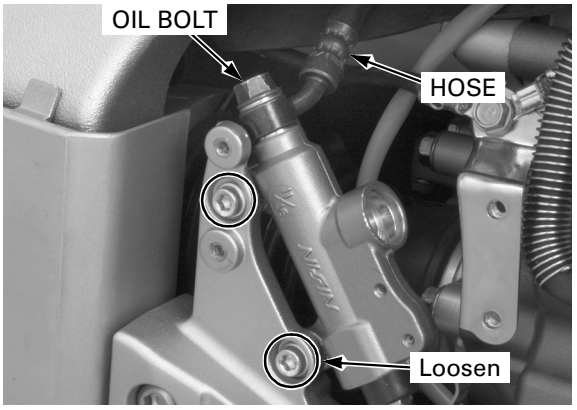


When removing the hose joint and oil bolt, cover the end of the hose to prevent contamination.

– two screws
– brake light switch assembly
– snap ring
– reservoir hose joint
– O-ring

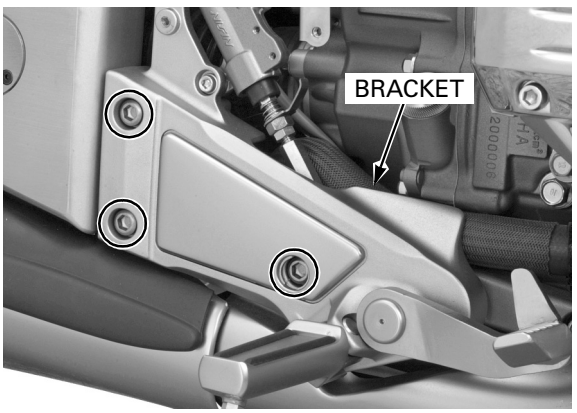


– oil bolt and sealing washers
– brake hose

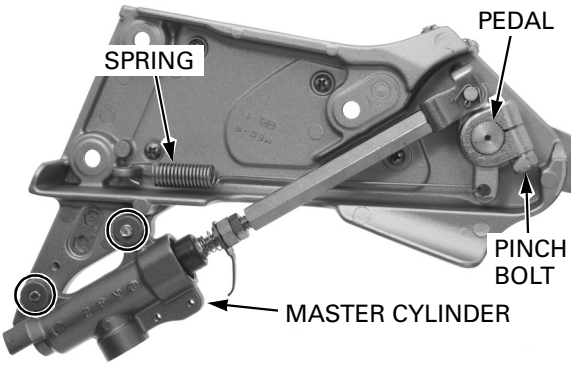


Before removing, loosen the two mounting bolts.

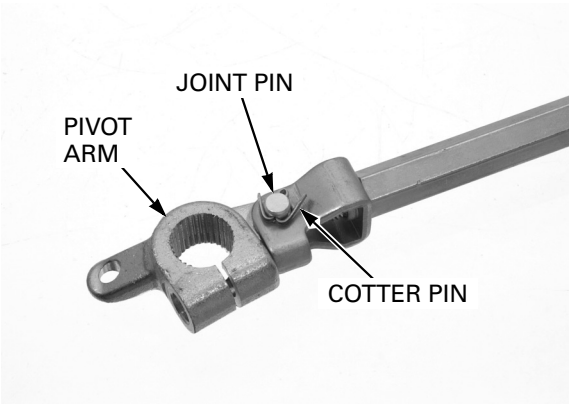
– three bolt caps and socket bolts
– footpeg bracket/master cylinder assembly



– return spring
– pinch bolt
– brake pedal and washer
– mounting bolts
– master cylinder



– cotter pin
– joint pin
– pivot arm

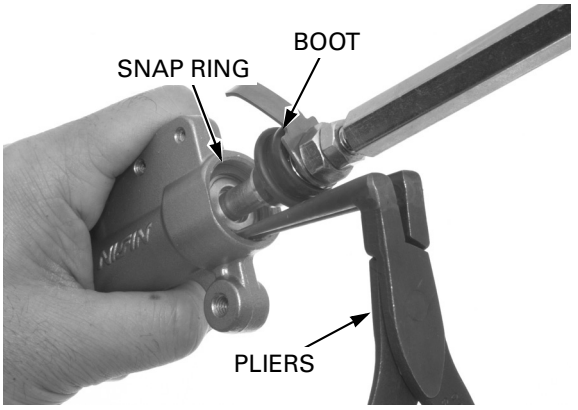


MASTER CYLINDER DISASSEMBLY

Remove the following:
– boot (from the master cylinder)
– snap ring

TOOL:
Snap ring pliers **07914-SA50001**

– piston/push rod assembly

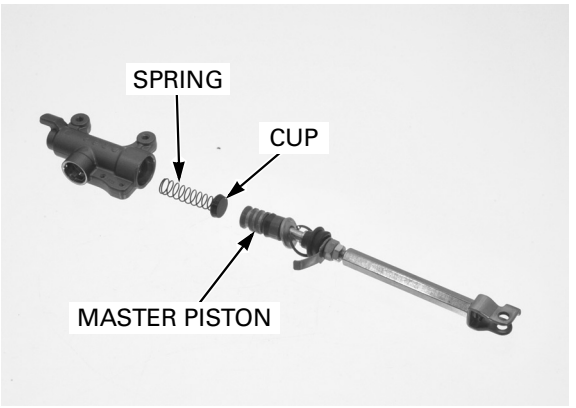


– primary cup
– spring

Clean the master cylinder and master piston in clean brake fluid.

INSPECTION

Check the piston cups and boot for wear, deterioration or damage.
Check the spring for damage.
Check the master cylinder and piston for scoring, scratches or damage.

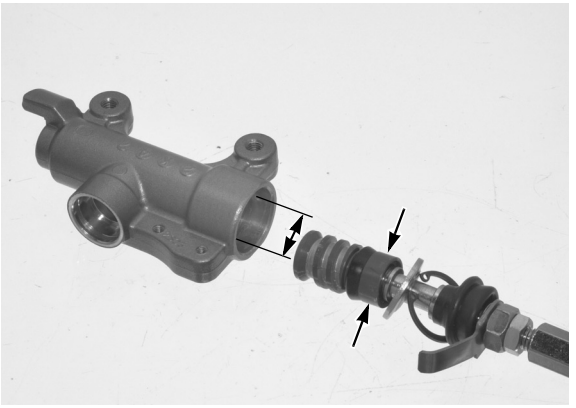


Measure the master cylinder I.D.

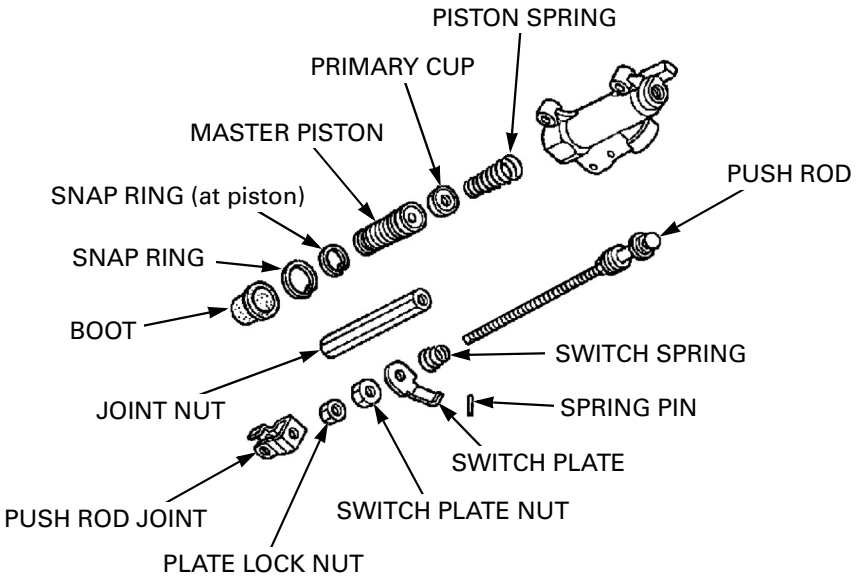
SERVICE LIMIT: 17.515 mm (0.6896 in)

Measure the master piston O.D.

SERVICE LIMIT: 17.405 mm (0.6852 in)



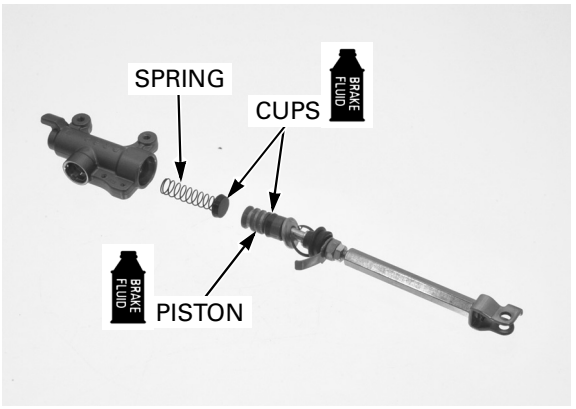
MASTER CYLINDER ASSEMBLY



Coat the master piston and piston cups with clean brake fluid.
Install the primary cup onto the spring.

Do not allow the piston cup lips to turn inside out.

Install the spring and piston/push rod assembly into the master cylinder.

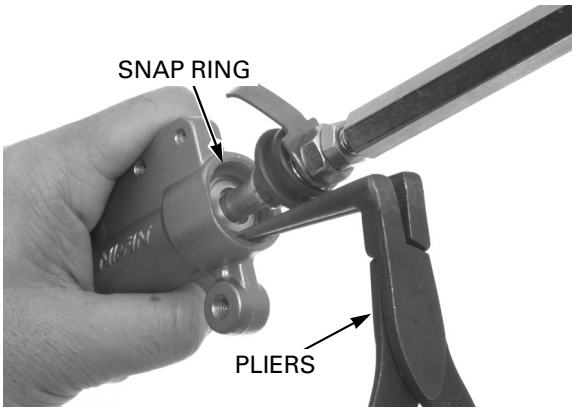


Make sure the snap ring is firmly seated in the groove.

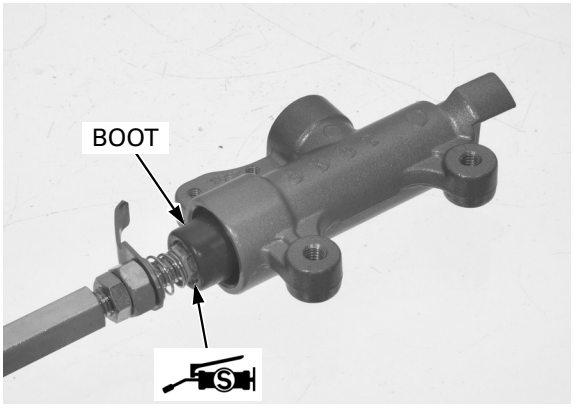
Install the snap ring into the groove in the master cylinder.

TOOL:

Snap ring pliers	**07914-SA50001**



Apply silicone grease to the boot groove in the push rod and install the boot into the master cylinder and boot groove.

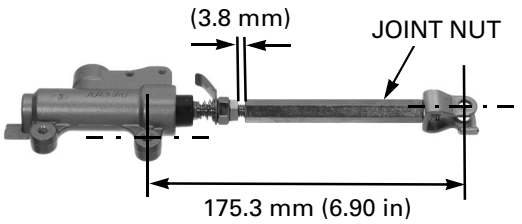


If the push rod joint is reinstalled, adjust the push rod length so the distance from the center of the lower mounting bolt hole to the center of the joint pin hole is 175.3 mm (6.90 in). After adjustment, tighten the joint nut.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

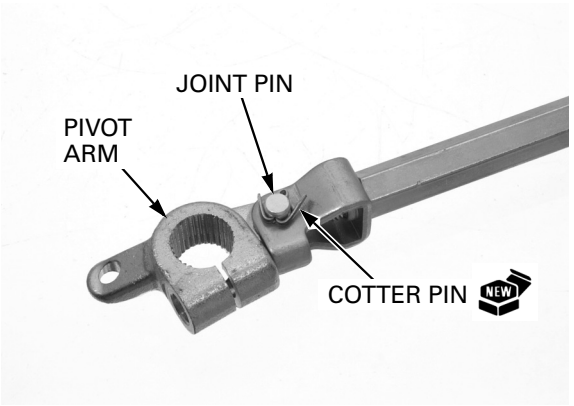
Make sure the clearance between the joint nut and plate lock nut is 3.8 mm (0.15 in).

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



INSTALLATION

Install the pivot arm into the push rod joint with the joint pin and a new cotter pin in the direction as shown.



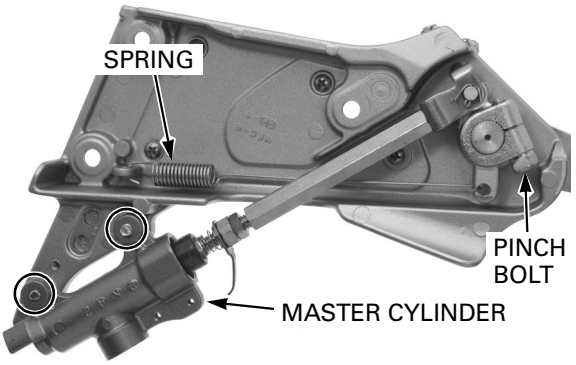
Install the master cylinder with the two bolts.

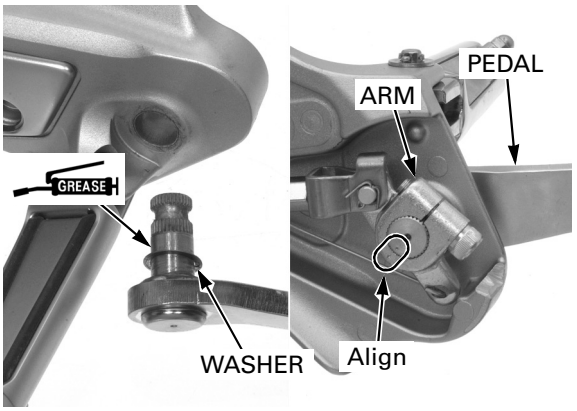
Apply grease to the brake pedal pivot.
Install the pedal with the washer into the pivot arm through the footpeg bracket by aligning the punch marks.

Install the pinch bolt and tighten it.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Hook the return spring in the bracket and pivot arm as shown.

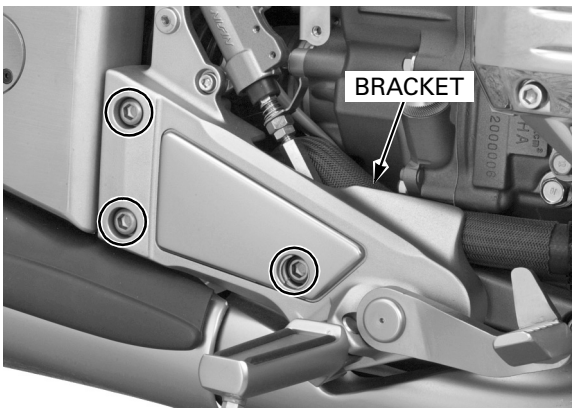




Install the footpeg bracket/master cylinder assembly and tighten the three socket bolts.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

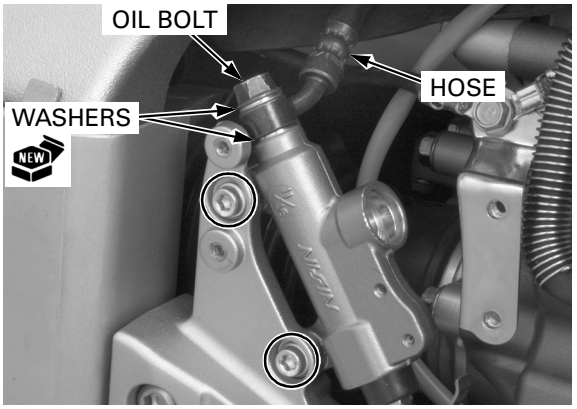
Install the bolt caps into the socket bolts.



Tighten the two master cylinder mounting bolts.

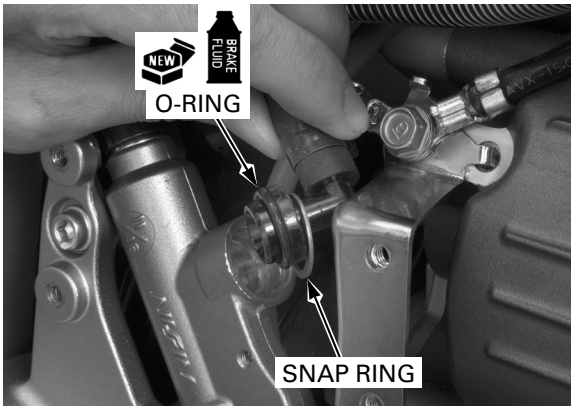
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the brake hose with the oil bolt and new sealing washers, and tighten the oil bolt.



Make sure the snap ring is firmly seated in the groove.

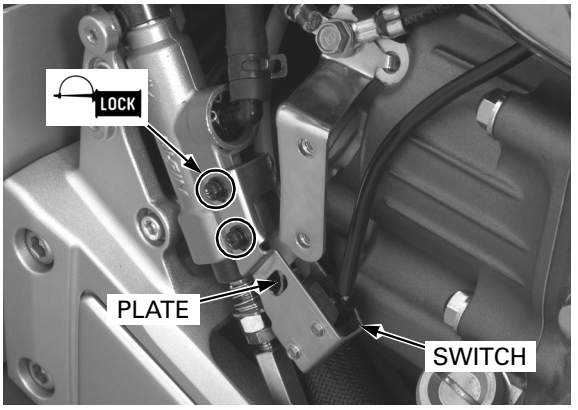
Apply brake fluid to a new O-ring and install it onto the reservoir hose joint.
Install the hose joint into the master cylinder and secure it with the snap ring.



Apply locking agent to the threads of the switch holder screw.
Install the brake light switch assembly over the master cylinder and switch plate with the screws.

Adjust the switch position so that the brake light comes on when pushing the brake pedal slightly and the push rod moves 0.7 – 1.7 mm.
Tighten the switch holder screws.

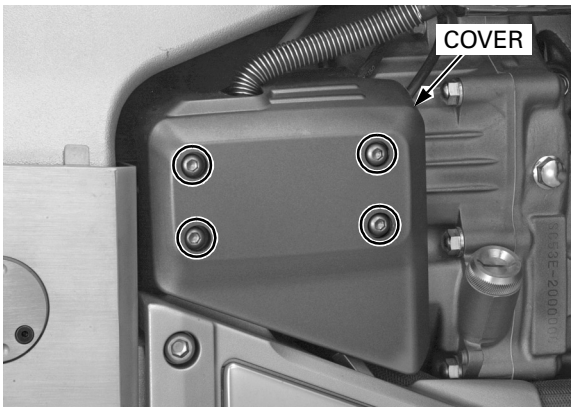
TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



Install the master cylinder cover and tighten the four socket bolts.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

Fill and bleed the pedal brake hydraulic system (page 16-12).



REAR BRAKE CALIPER

DISASSEMBLY

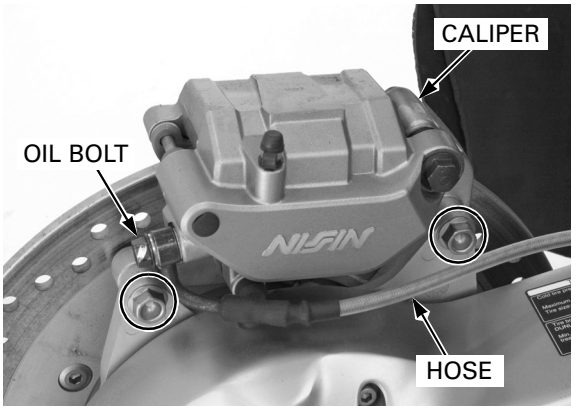
Remove the rear wheel (page 15-6).

Drain the brake fluid from the pedal brake hydraulic system (page 16-8).

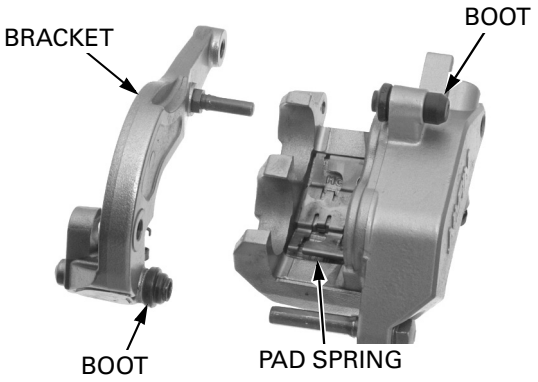
Remove the brake pads (page 16-14).

When removing the oil bolt, cover the end of the hose to prevent contamination.

Remove the following:
– oil bolt and sealing washers
– brake hose
– two mounting bolts
– brake caliper



– caliper bracket
– pad spring
– boots



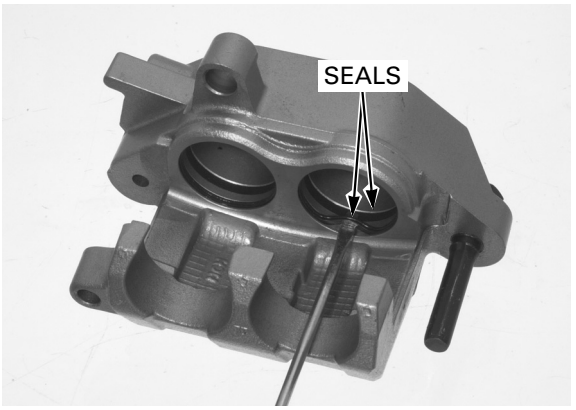
Do not use high pressure air or bring the nozzle too close the inlet.

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 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 cylinder and piston with clean brake fluid.



INSPECTION

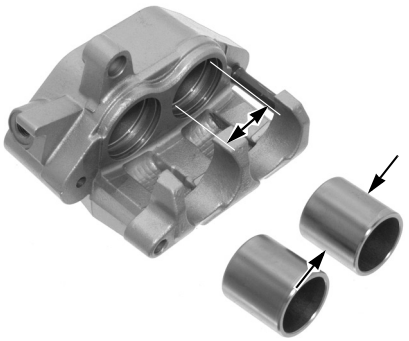
Check the caliper cylinder and piston for scoring, scratches or damage.

Measure the caliper cylinder I.D.

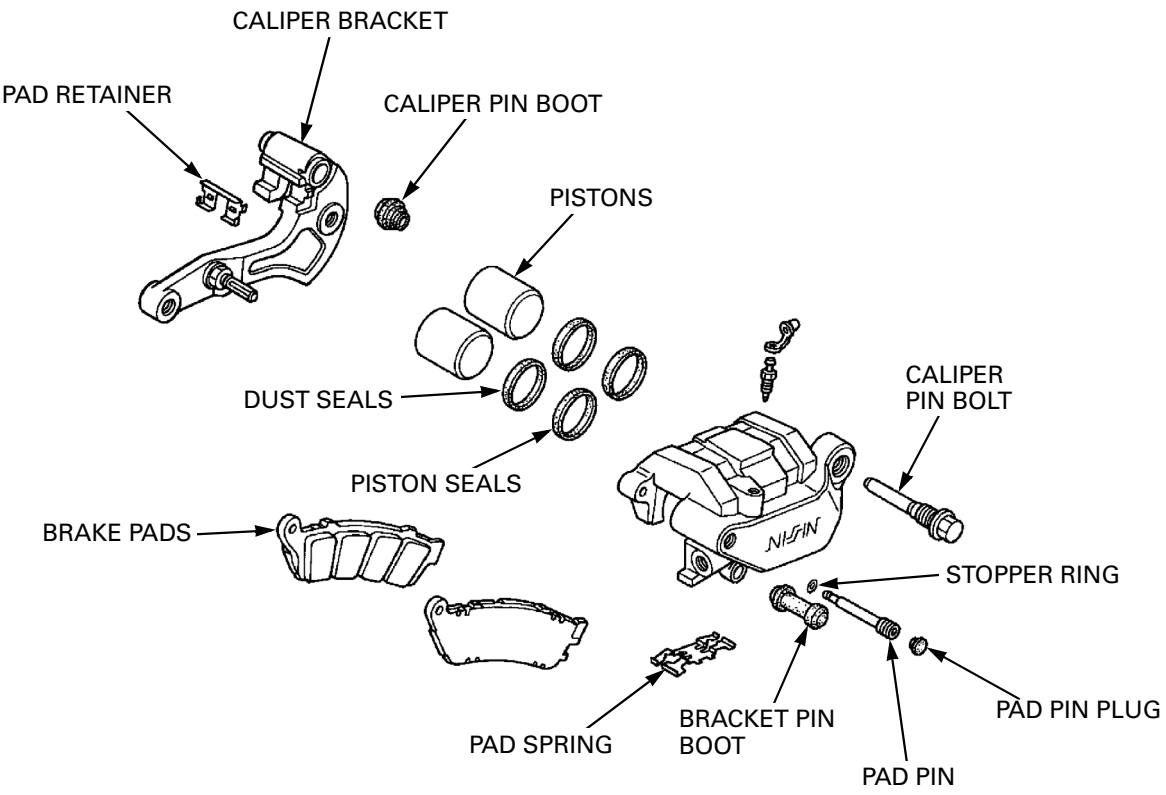
SERVICE LIMIT: 34.02 mm (1.340 in)

Measure the caliper piston O.D.

SERVICE LIMIT: 33.87 mm (1.333 in)

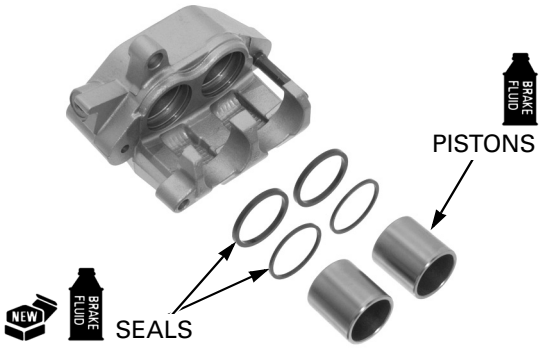


ASSEMBLY

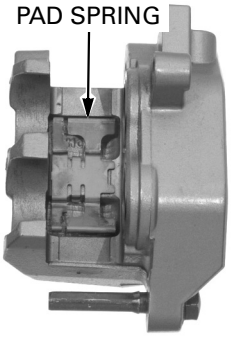


Coat new piston and dust seals with clean brake fluid and install them in the seal grooves in the caliper.

Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with the opening toward the pads.



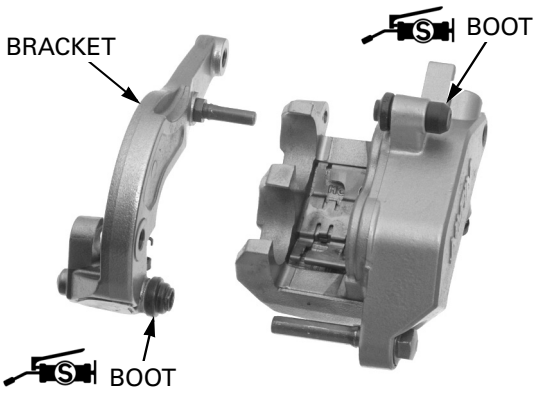
Install the pad spring onto the caliper body properly as shown.



Check the caliper and bracket pin boots and replace them if they are hard, deteriorated or damaged. Install the boots into the caliper and bracket.

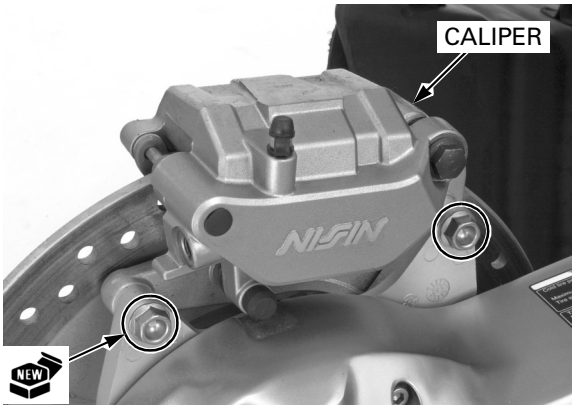
Apply silicone grease to the inside of the boots and install the caliper bracket over the caliper body.

Install the brake pads (page 16-14).



Install the brake caliper so the disc is positioned between the pads, being careful not to damage the pads. Install new mounting bolts and tighten them.

TORQUE: 50 N·m (5.1 kgf·m, 37 lbf·ft)



Connect the brake hose with the oil bolt and new sealing washers, and tighten the oil bolt.

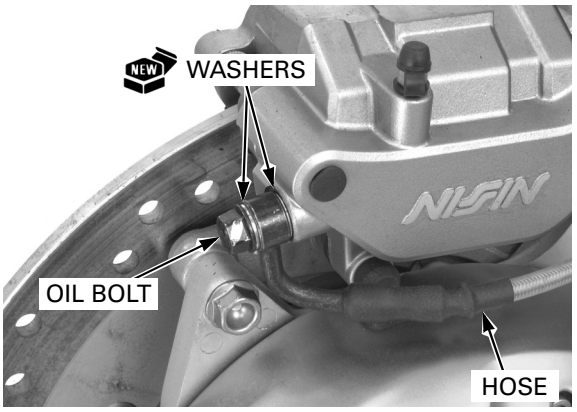
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Tighten the pad pin and install the pad pin plug.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Fill and bleed the pedal brake hydraulic system (page 16-12).

Install the rear wheel (page 15-7).



PROPORTIONAL CONTROL VALVE (PCV)

REMOVAL

Drain the brake fluid from the pedal brake hydraulic system (page 16-8).

Remove the engine control module (ECM) (page 19-6).

Release the battery (–) cable from the clamp on the PCV lower mounting bolt.

When removing the joint nut, cover the ends of the pipes to prevent fluid leakage.

Loosen the joint nuts to disconnect the brake pipes, being careful not to damage the nut.
Remove the stay bolt and the PCV from frame.

INSTALLATION

Install the PCV and tighten the stay bolt.

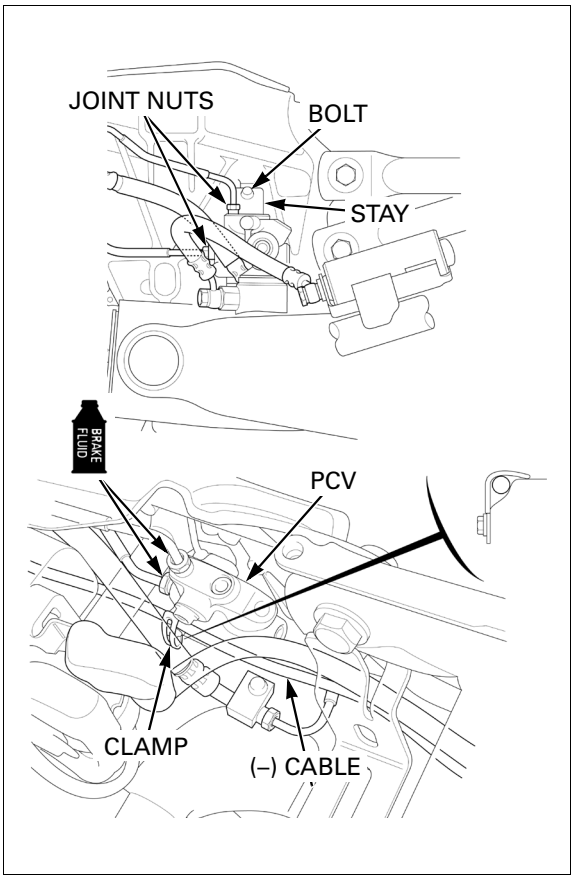
Apply brake fluid to the joint nut threads on the brake pipes.
Connect the brake pipes by tightening the brake joint nuts.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

Secure the (–) cable with the clamp.

Fill and bleed the pedal brake hydraulic system (page 16-12).

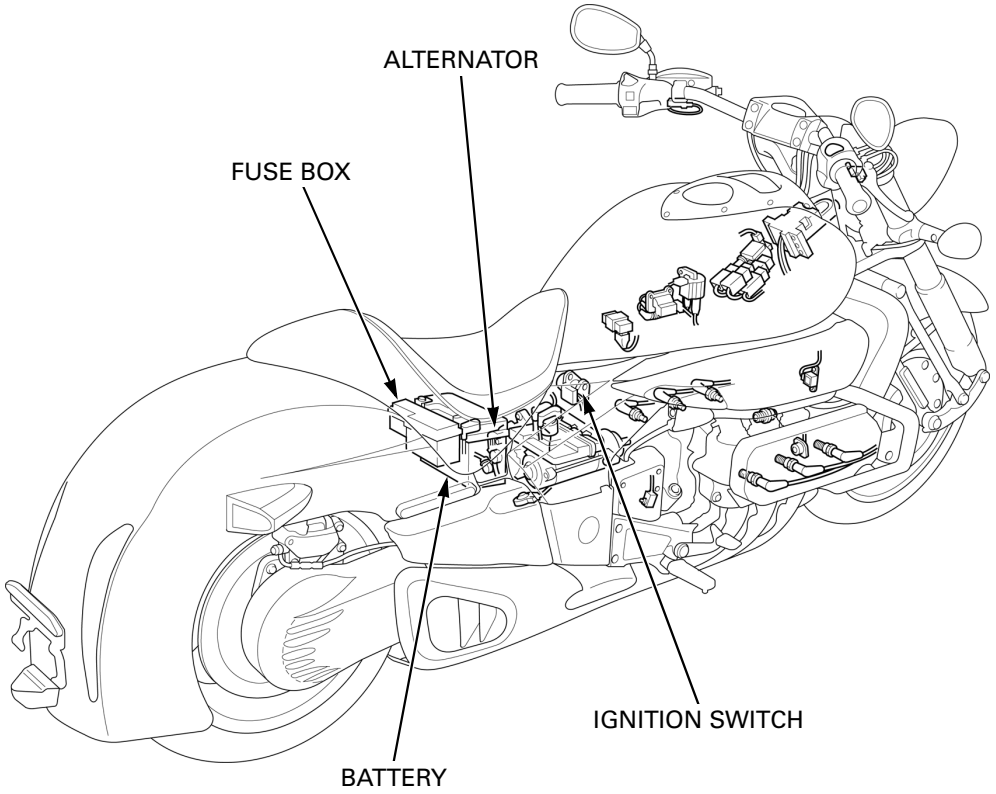
Install the ECM (page 19-13).



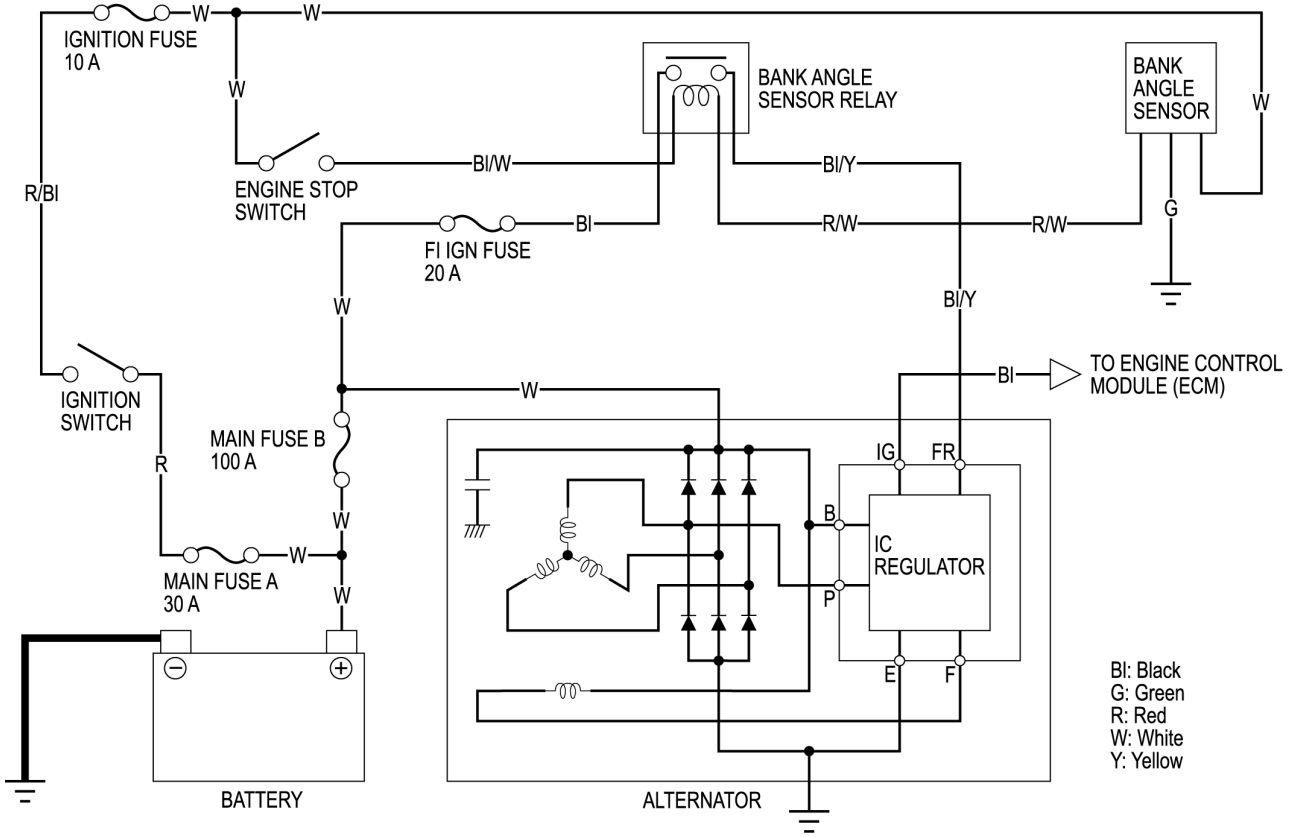
MEMO

17. BATTERY/CHARGING SYSTEM

COMPONENT LOCATION



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.

- Always turn the ignition switch to "OFF" before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "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 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 periods. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting (page 17-5).
- The alternator service may be done with the engine the frame.

BATTERY CHARGING

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  – Use only the electrolyte that comes with the battery.
  – Use all of the electrolyte.
  – Seal the battery properly.
  – Never open the seals after installation.
- For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or extending the charging time may damage the battery.

BATTERY TESTING

Refer to the instructions in the Operation Manual for the recommended battery tester. The recommended battery tester puts a "load" on the battery so that the actual battery condition can be measured.

Recommended battery tester: BM-210-AH (U.S.A. only), BM-210, BATTERY MATE or equivalent

SPECIFICATIONS

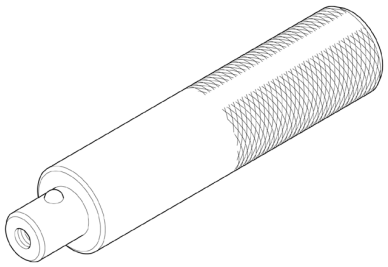
ITEM			STANDARD	SERVICE LIMIT
Battery	Capacity		12 V – 18 Ah	–
	Current leakage		5 mA max.	–
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V	–
		Needs charging	Below 12.3 V	–
	Charging current	Normal	1.8 A x 5 – 10 h	–
		Quick	9.0 A x 1.0 h	–
Alternator	Capacity		1 kW/2,400 rpm	–
	Stator coil resistance (20°C/68°F)		0.07 – 0.09 Ω	–
	Rotor coil resistance (20°C/68°F)		2.5 – 12.9 Ω	–
	Rotor coil slip ring O.D.		22.7 mm (0.89 in)	21.2 mm (0.83 in)

TORQUE VALUE

Alternator mounting bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)
Alternator terminal nut	8 N·m (0.8 kgf·m, 5.8 lbf·ft)

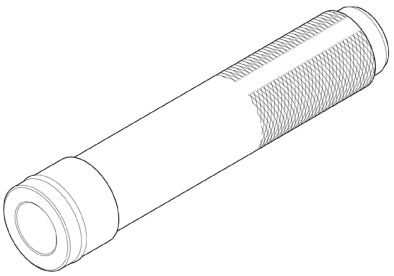
TOOLS

Driver
07749-0010000



Pilot, 20 mm
07746-0040500

Driver, 22 mm I.D.
07746-0020100



Attachment, 20 mm I.D.
07746-0020400

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. BATTERY TEST

Remove the battery (page 17-6).

Check the battery condition using the recommended battery tester.

Recommended battery tester: BM-210-AH (U.S.A. only), BM-210, BATTERY MATE or equivalent

Is the battery in good condition?

YES – GO TO STEP 2.

No – Faulty battery.

2. CURRENT LEAKAGE TEST

Install the battery (page 17-6).

Perform the battery current leakage test (Leak test; page 17-8).

Is the current leakage below 5 mA?

YES – GO TO STEP 3.

NO – Shorted wire harness.

3. BATTERY CONNECTION INSPECTION

Check the battery terminals, alternator cable terminal, and alternator 4P connector for loose or poor contacts.

Are all battery connections tight?

YES – GO TO STEP 4.

NO – Loose or poor contact terminal or connector.

4. CHARGING VOLTAGE INSPECTION

Measure and record the battery voltage using a digital multimeter (page 17-6).

Start the engine.

Measure the charging voltage (page 17-9).

Compare the measurement to the result of the following calculation.

STANDARD: Measured battery Voltage < Measured charging voltage < 15.5 V

Is the measured charging voltage within the standard voltage?

YES – Faulty battery.

NO – GO TO STEP 5.

5. WIRE HARNESS INSPECTION

Perform the wire harness inspection (page 17-9).

Is the battery voltage present when tested as described?

YES – GO TO STEP 6.

NO – Open circuit in the wire harness.

6. ALTERNATOR INSPECTION

Remove the alternator (page 17-10).

Disassemble the alternator (page 17-11) and inspect the following:

– rotor coil (page 17-11)
– brush length (page 17-12)
– stator coil (page 17-13)

Does the alternator test OK?

YES – Faulty regulator/rectifier.

NO – • Faulty rotor coil.
• Worn brush.
• Faulty stator coil.

BATTERY

REMOVAL/INSTALLATION

Remove the seat (page 3-3).

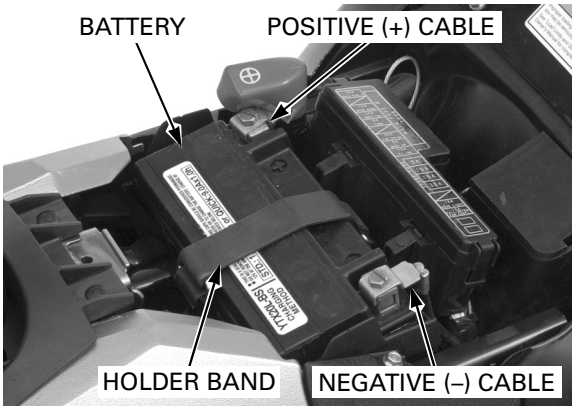
Remove the battery holder band.

With the ignition switch turned to "OFF", disconnect the battery negative (–) cable first, then disconnect the positive (+) cable.

Remove the battery from the battery case.

Connect the battery positive (+) cable first, then connect the negative (–) cable.

Install the battery in the reverse order of removal.



VOLTAGE INSPECTION

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 12.3 V

BATTERY TESTING

Remove the battery (page 17-6).

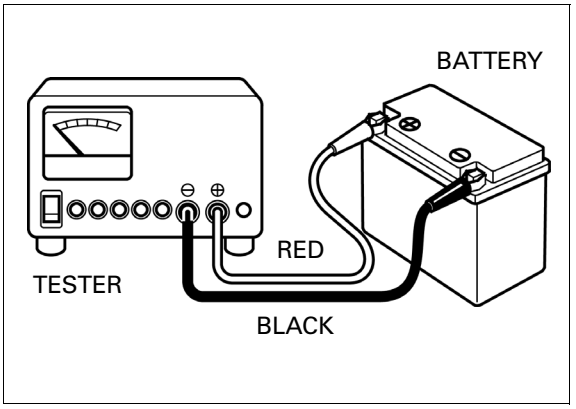
- Always clear the work area of flammable materials such as gasoline, brake fluid, electrolyte, or cloth towels when operating the tester, the heat generated by the tester may cause a fire.

For accurate test results, be sure the tester's cables and clamps are in good working condition and that a secure connection is made at the battery.

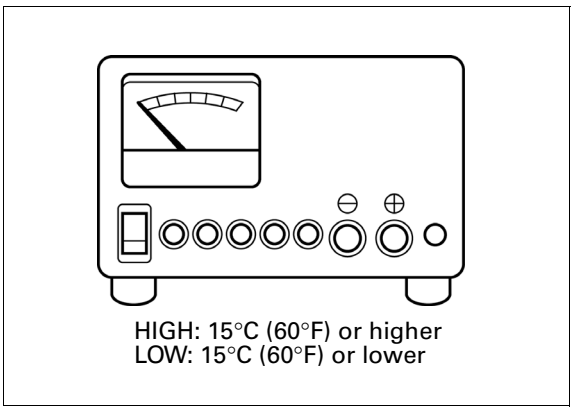
Securely connect the tester's positive (+) cable first, then connect the negative (–) cable.

TOOL:

Battery tester	**BM-210-AH (U.S.A. only), BM-210 or BATTERY MATE or equivalent**

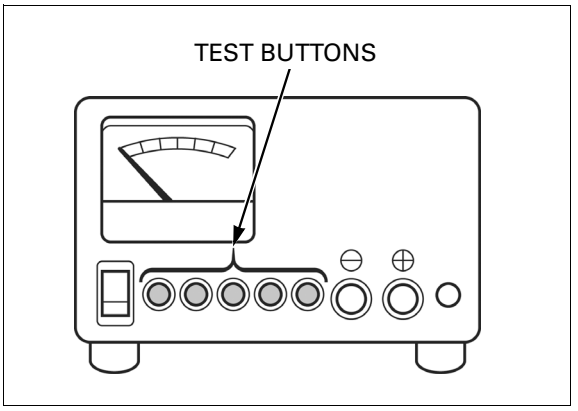


Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.



For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.

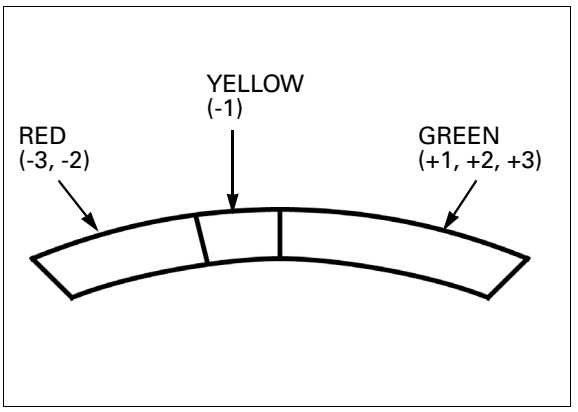
Push in the appropriate test button for 3 seconds and read the condition of the battery on the meter.



NOTICE

- *To avoid damaging the tester, only test batteries with an amperage rating of less than 30 Ah.*
- *Tester damage can result from overheating when:*
  - *The test button is pushed in for more than 3 seconds.*
  - *The tester is used without being allowed to cool for at least 1 minute when testing more than one battery.*
  - *More than ten consecutive tests are performed without allowing at least a 30-minute cool-down period.*

The result of a test on the meter scale is relative to the amp/hour rating of the battery. Any battery reading in the green zone is OK. Batteries should only be charged if they register in the YELLOW or RED zone.

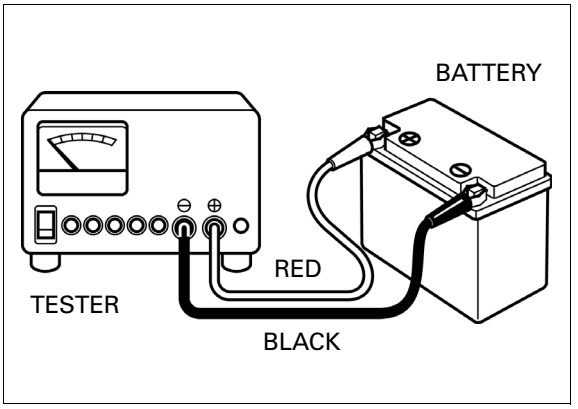


BATTERY CHARGING

Remove the battery (page 17-6).

NOTE:

- Make sure the area around the charger is well ventilated, clear of flammable materials, and free from heat, humidity, water and dust.
- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place batteries below the charger – gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents on the charger are not blocked.



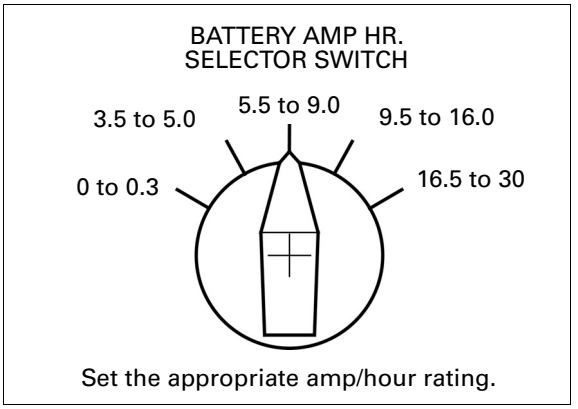
1. Turn the Power Switch to "OFF".

Turn the power ON/OFF at the charger, not at the battery terminal.

2. Set the "BATTERY AMP. HR. SELECTOR SWITCH" for the size of the battery being charged.

TOOL:

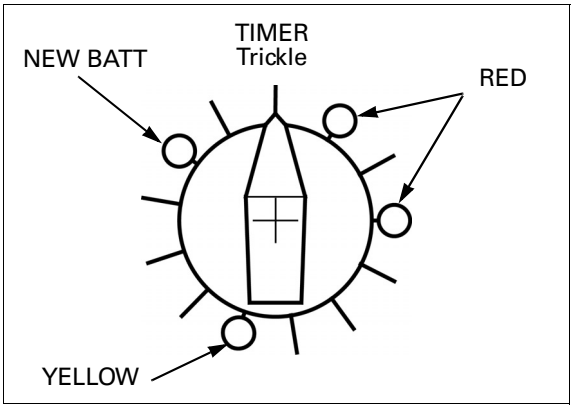
Christie battery charger MC1012/2 (U.S.A. only)



Set the appropriate amp/hour rating.

3. Set the "TIMER" to the position indicated by the Honda Battery Tester; RED –3, RED –2 or YELLOW –1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals; RED to Positive, BLACK to negative.

   Connect the battery cables only when the "POWER" switch is turned to "OFF".



5. Turn the Power Switch to the ON position.
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the "POWER" switch to "OFF" and disconnect the clamps.

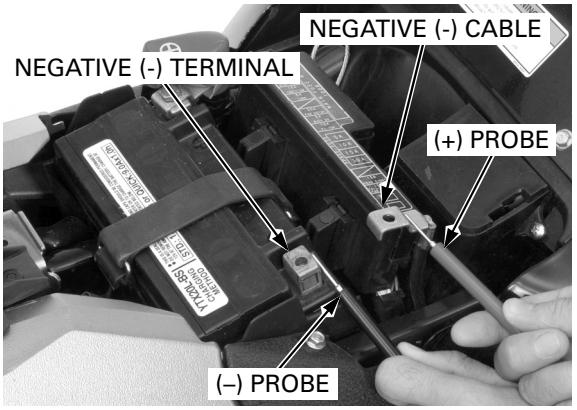
The charger will automatically switch to the "Trickle" mode after the set charging time has elapsed.

7. Let the battery cool for at least 10 minutes or until gassing subsides after charging.
8. Re-test the battery using the Honda Battery Tester and recharge if necessary using the above steps.

CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE INSPECTION

Turn the ignition switch to "OFF" and disconnect the negative (–) battery 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 to "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 out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

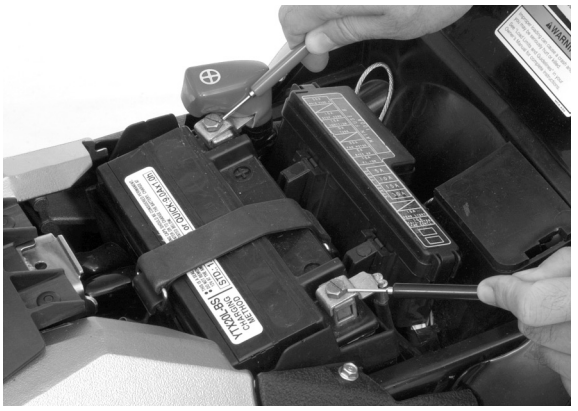
SPECIFIED CURRENT LEAKAGE: 5 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.
Locate the short by disconnecting connections one by one and measuring the current.

CHARGING VOLTAGE INSPECTION

Be 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.
Connect the multimeter between the positive and negative terminals of the battery.



NOTE:

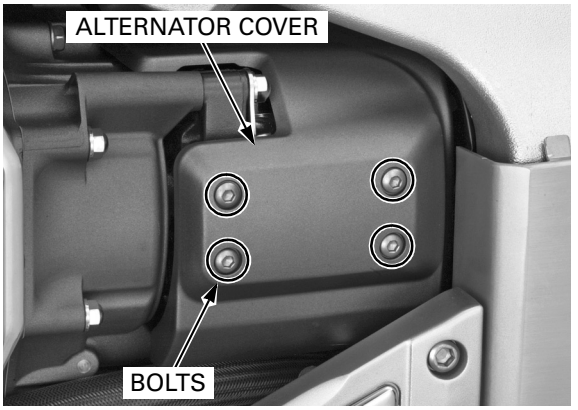
- To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

Restart the engine.
With the headlight on, measure the voltage on the multimeter with the engine at 2,000 rpm

STANDARD: Measured battery voltage < Measured charging voltage < 15.5 V

WIRE HARNESS INSPECTION

Remove the four bolts and the alternator cover.



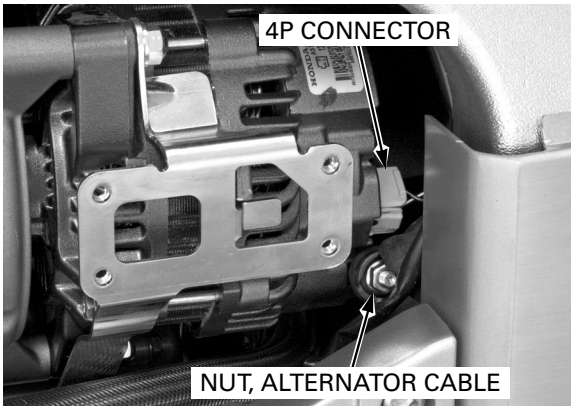
NOTICE

Do not disconnect the battery or any cable in the charging system without first turning the ignition switch to "OFF". Failure to follow this precaution can damage the tester or electrical components.

Be sure to disconnect the battery negative cable to prevent sparking when disconnecting or connecting the alternator cable.

Disconnect the battery negative (–) cable from the battery.

Pull the rubber cap off the alternator terminal, remove the nut and disconnect the alternator cable.
Disconnect the alternator 4P connector.



Connect the battery negative (–) cable to the battery and check the following at the wire harness side.

BATTERY CHARGING LINE

Measure the voltage between the alternator cable terminal (+) and ground (–).

There should be battery voltage at all times.

BATTERY VOLTAGE LINE

Measure the voltage between the Black/Yellow wire terminal (+) of the alternator 4P connector and ground (–).

There should be battery voltage with the ignition switch turned to "ON" and the engine stop switch turned to "".

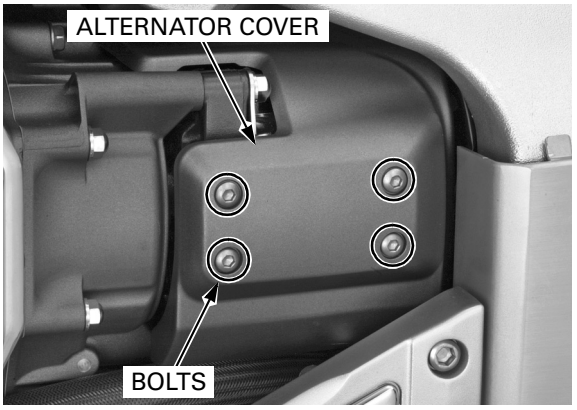
Install the removed parts in the reverse order of removal.

ALTERNATOR

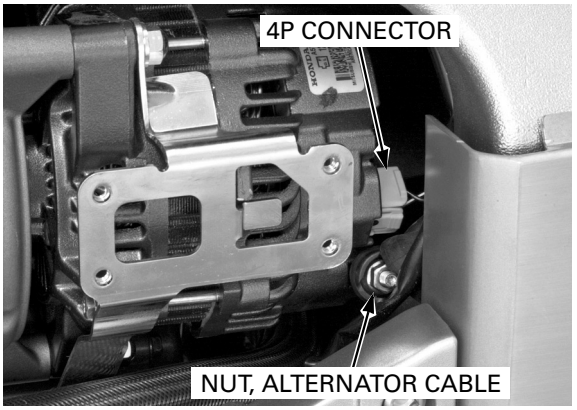
REMOVAL

Move the engine control module box rearward (page 19-6).

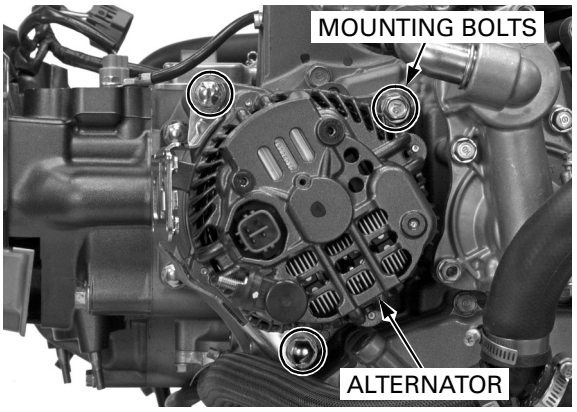
Remove the four bolts and the alternator cover.



Pull the rubber cap off the alternator terminal, remove the nut and disconnect the alternator cable. Disconnect the alternator 4P connector.



Remove the three mounting bolts and the alternator.

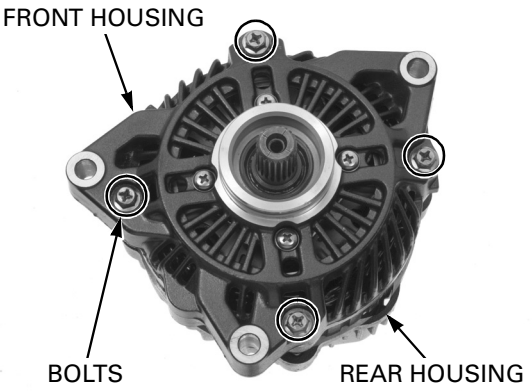


Remove the O-ring from the alternator.

DISASSEMBLY

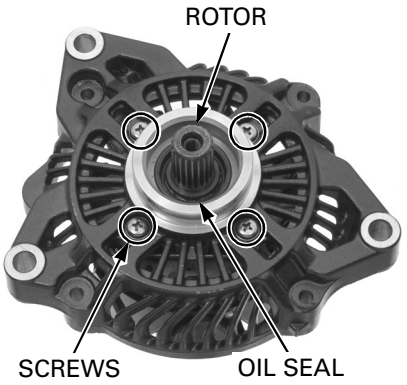
Mark the front and rear housings before disassembly to identify their original position.

Remove the four bolts and separate the front housing/rotor from the rear housing/stator.

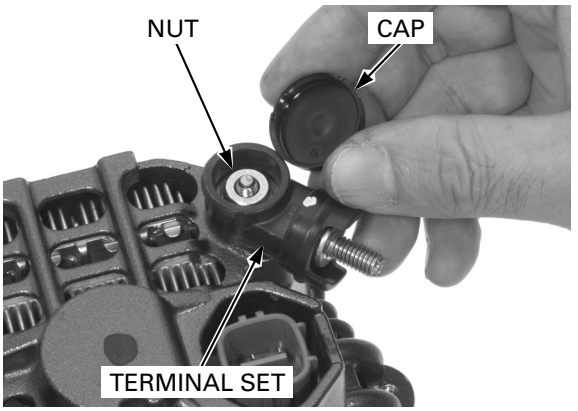


Remove the four screws and separate the rotor from the front housing.

Remove the oil seal from the front housing.



Remove the terminal cap, nut and terminal set from the rear housing.



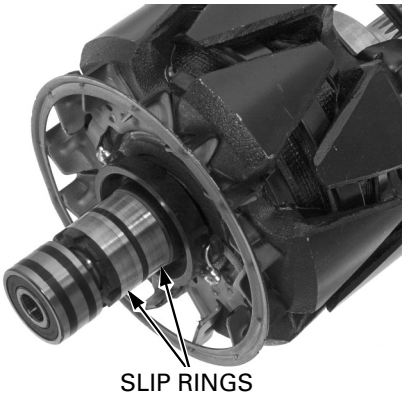
INSPECTION

ROTOR COIL

Inspect the slip rings for discoloration.

Measure the O.D. of the slip rings.

SERVICE LIMIT: 21.2 mm (0.83 in)



Measure the rotor coil resistance between the slip rings.

STANDARD: 2.5 – 2.9 Ω

Check for continuity between the slip ring and rotor shaft.
There should be no continuity.

ROTOR BEARING

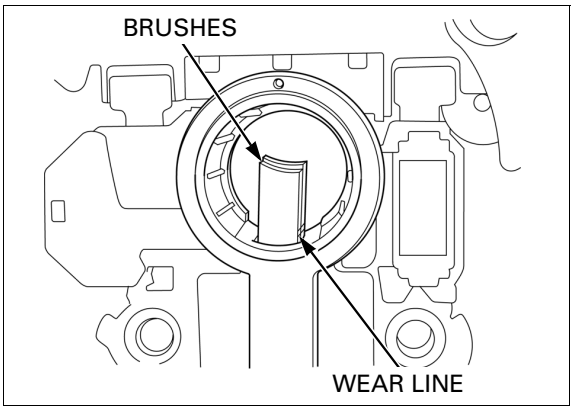
Turn the outer race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the rotor shaft.

Replace the bearings if the races do not turn smoothly, quietly, or if they fit loosely on the shaft (page 17-15).

BRUSH LENGTH

Always replace the brushes in pairs.

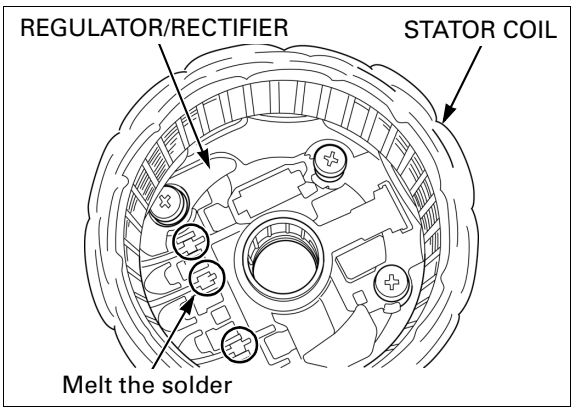
Replace the brushes (page 17-14) if they are worn to or near the wear lines.



STATOR COIL

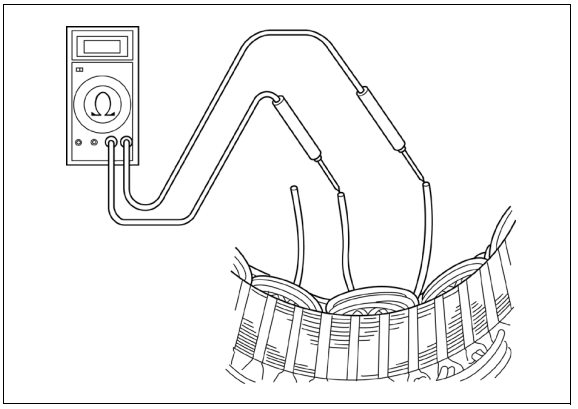
Work quickly to avoid heat damage to the regulator/rectifier. Hold the stator coil wire with pliers to dissipate heat.

Melt the solder and separate the stator coil from the regulator/rectifier.



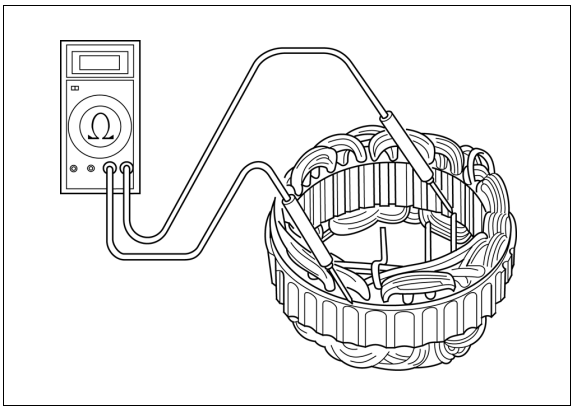
Measure the resistance between the stator coil wires.

STANDARD: 0.07 – 0.09 Ω at 20°C (68°F)



Place the tester probe on the silver color part of the core.

Check for continuity between the stator coil wire and stator core.
There should be no continuity.

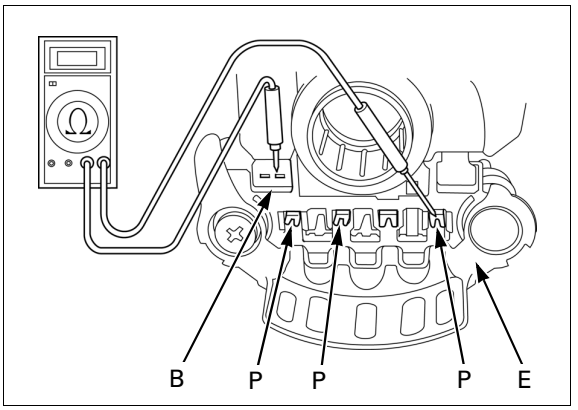


RECTIFIER

Check for continuity in each direction between:

– B and P terminals
– E (ground) and P terminals

All diodes should have continuity in only one direction.
If any of the diodes fail, replace the regulator/rectifier assembly.

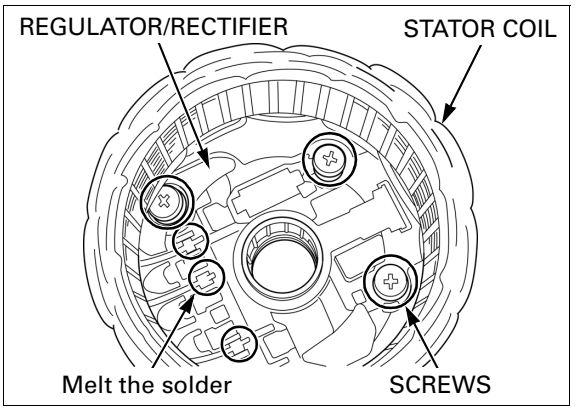


BRUSH REPLACEMENT

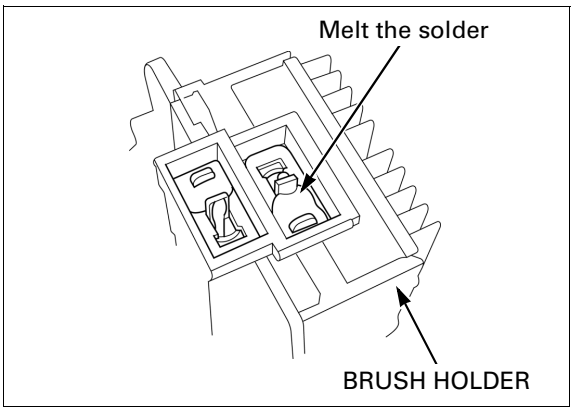
Work quickly to avoid heat damage to the regulator/rectifier. Hold the stator coil wire with pliers to dissipate heat.

Melt the solder and separate the stator coil from the regulator/rectifier.

Remove the three screws and the regulator/rectifier from the rear housing.

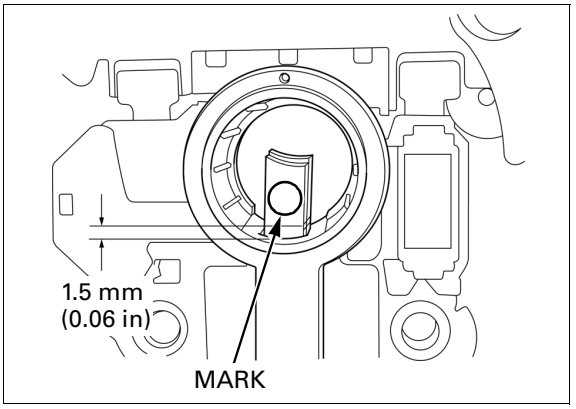


Remove the insulator and cap, melt the solder securing the brushes, and pull the brushes out of the brush holder.



Install new brushes in the brush holder with their marked side facing to the front housing.
Set the brushes at the installed length as shown.

INSTALLED LENGTH: 1.5 mm (0.06 in)



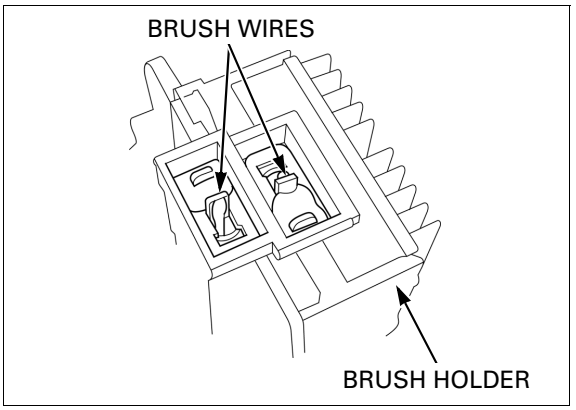
Work quickly to avoid heat damage to the regulator/rectifier.

Heat the soldering iron (capacity: about 32 W) and use a low-temperature (180° – 200°C) solder to solder the brushes.

NOTE:

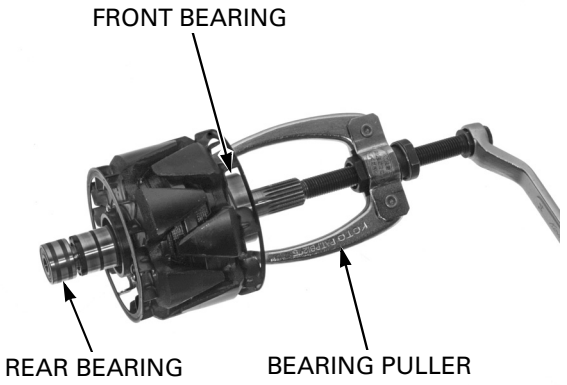
- Make sure that solder does not enter the brush holder or the brush will not operate properly.
- Do not apply excess solder; align the solder end with the brush holder surface as shown.

Cut off the surplus brush wires.



ROTOR BEARING REPLACEMENT

Remove the front and rear rotor bearings using a bearing puller.

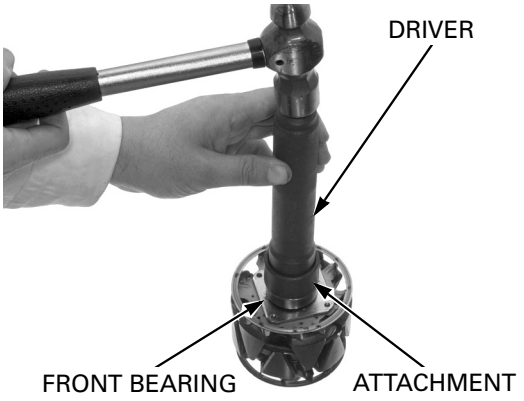


Drive a new front bearing onto the rotor shaft using the special tools.

TOOLS:

Driver, 22 mm I.D.	**07746-0020100**
Attachment, 20 mm I.D.	**07746-0020400**

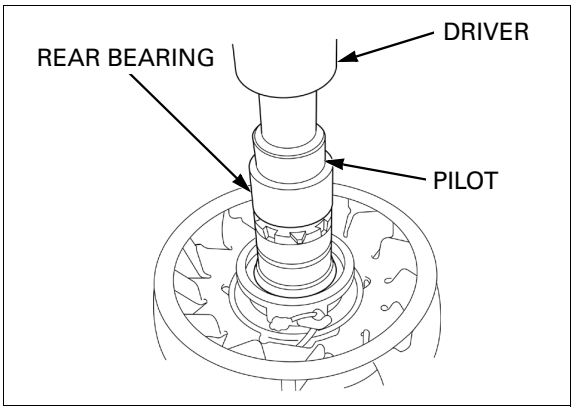
Be sure to center the attachment with the bearing.



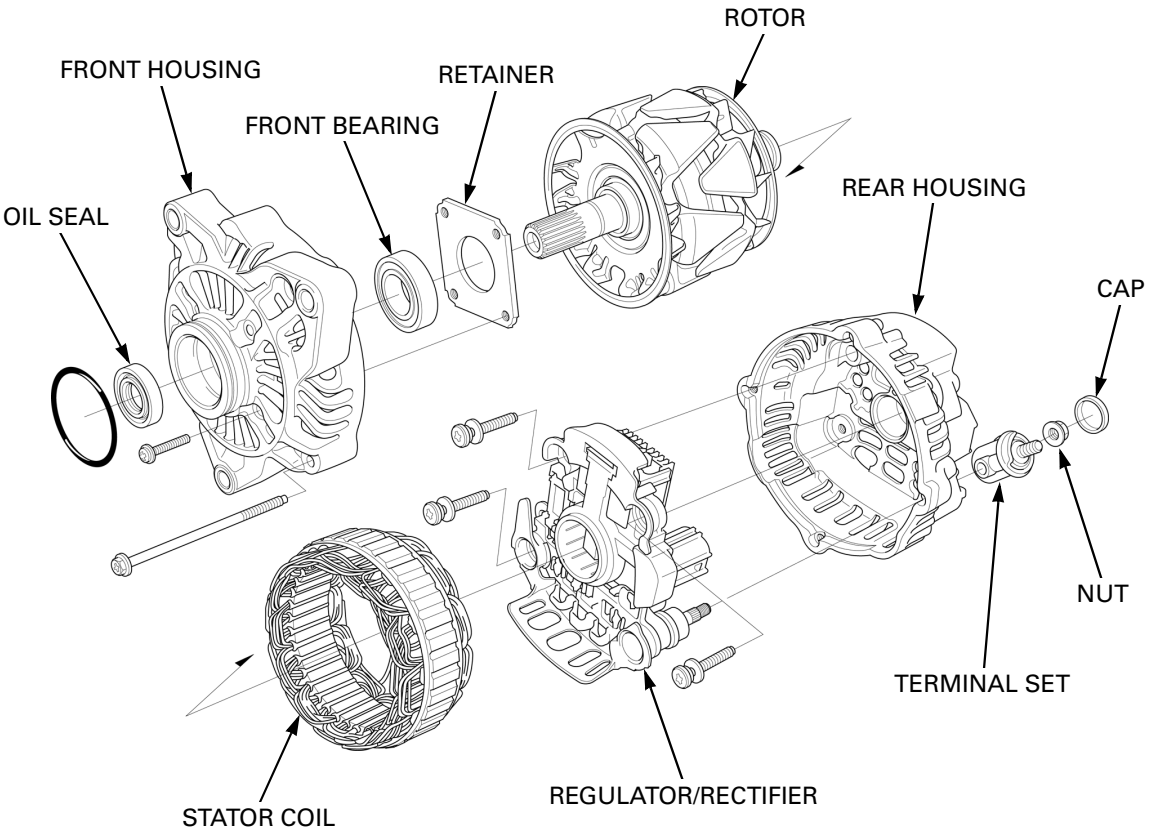
Drive a new rear bearing onto the rotor shaft using the special tools.

TOOLS:

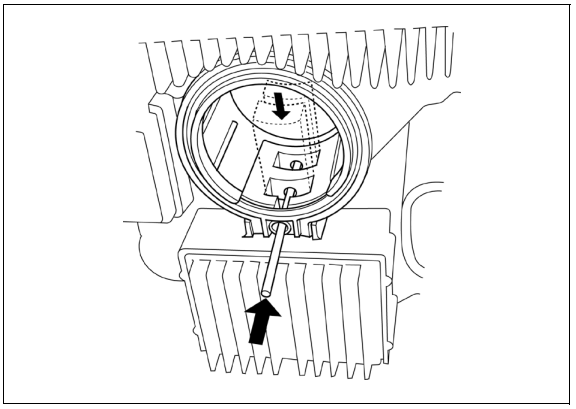
Driver	**07749-0010000**
Pilot, 20 mm	**07746-0040500**



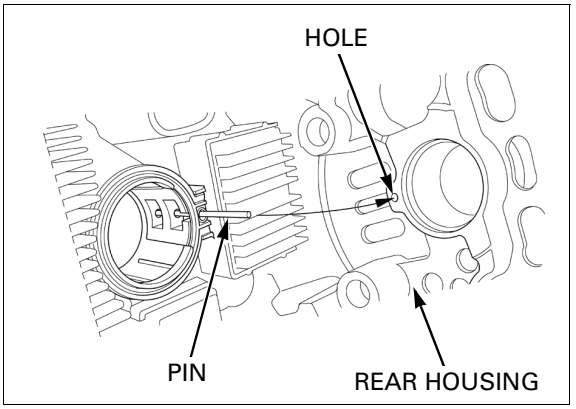
ASSEMBLY



Push the brushes in the brush holder and insert an appropriate pin into the brush holder to hold the brushes.



Install the regulator/rectifier assembly into the rear housing, while inserting the pin holding the brushes into the hole in the rear housing.



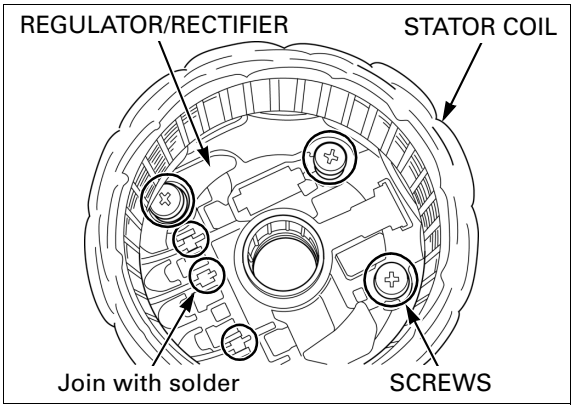
Install the three screws and tighten them securely.

Install the stator coil into the rear housing by aligning the marks on the stator and housing.

Heat a high-amperage soldering iron (capacity: about 110 W).

Work quickly to avoid heat damage to the regulator/rectifier.

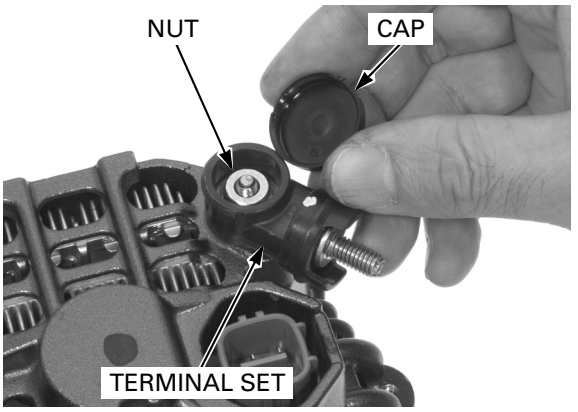
Using a high-temperature (300°C), high lead content solder, join the stator and regulator/rectifier by soldering the stator coil wires on the diode terminals.



Install the terminal set and nut, and tighten the nut.

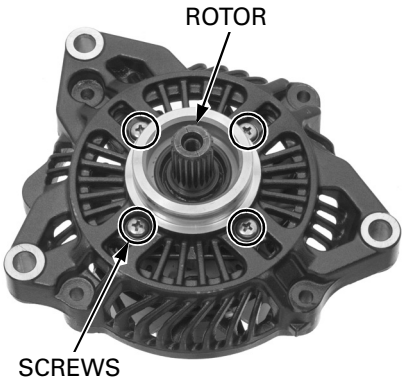
TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)

Install the terminal cap.



Apply grease to a new oil seal lip and install it into the front housing.

Install the rotor into the front housing.
Install the four screws and tighten them securely.

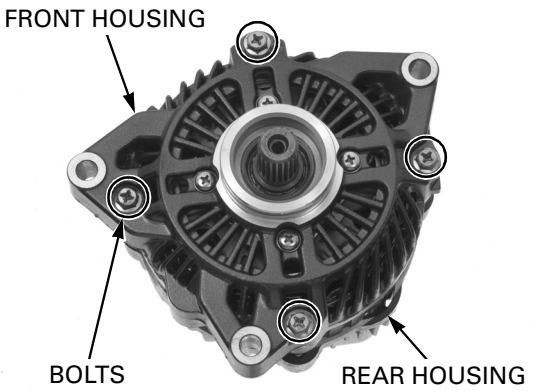


Install the front housing/rotor into the rear housing/stator, while aligning the marks on the front housing and stator.

Remove the pin holding the brushes from the rear housing.

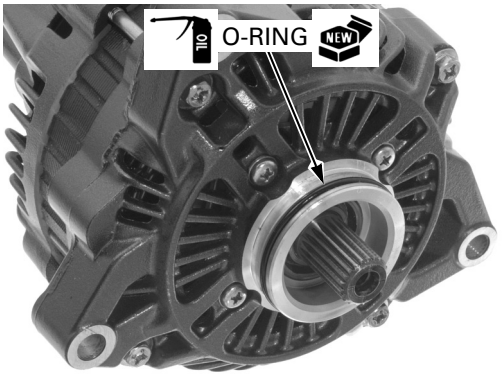
Install the four bolts and tighten them securely.

Make sure the bolt holes in the front and rear housings align with the gaps between the stator core ridges.



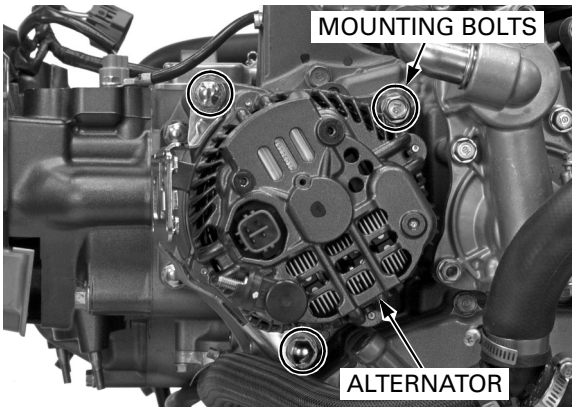
INSTALLATION

Coat a new O-ring with oil and install it into the alternator groove.

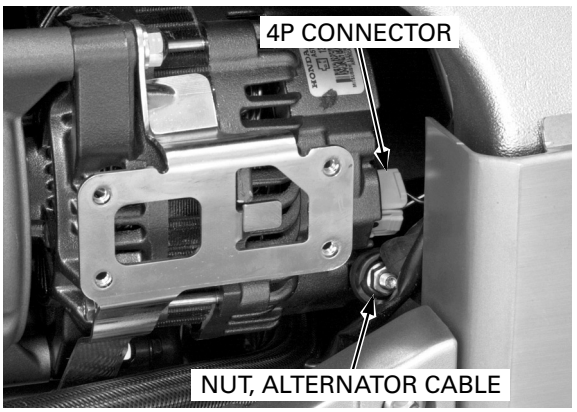


Install the alternator into the rear case and tighten the three mounting bolts.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

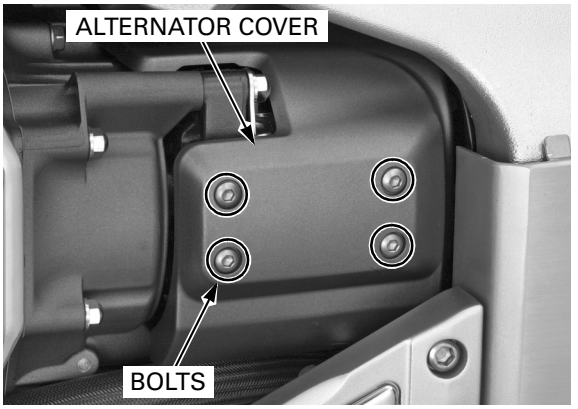


Connect the alternator cable and tighten the terminal nut securely.
Install the rubber cap properly.
Connect the alternator 4P connector.



Install the alternator cover and tighten the four bolts securely.

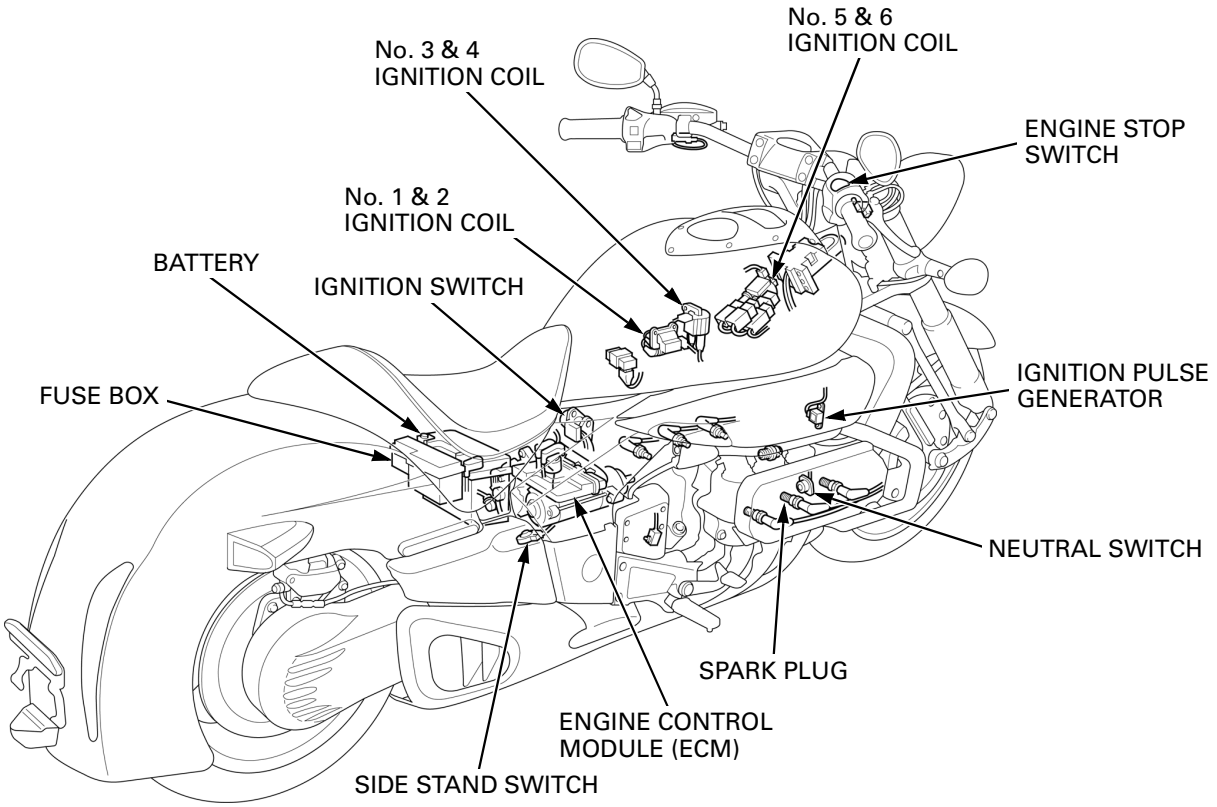
Install the engine control module box properly (page 19-12).



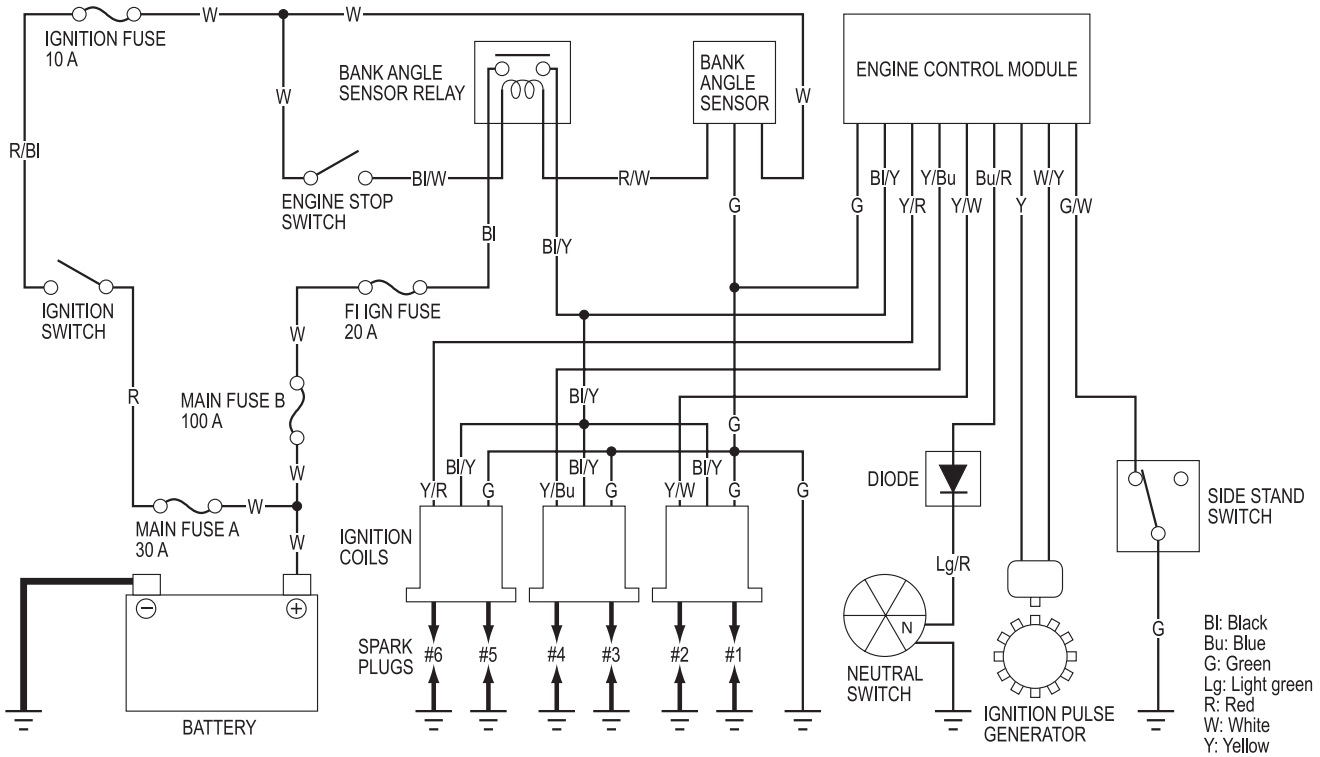
MEMO

18. IGNITION SYSTEM

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is "ON" and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting table (page 18-5).
- The Ignition Control Module (ICM) is built into the Engine Control Module (ECM).
- 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 ECM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ECM. Always turn the ignition switch to "OFF" before servicing.
- 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.
- The ignition coil is equipped with an ignitor. The ignition coil signal voltage from the ECM is converted to the high voltage in the ignition coil.
- Refer to page 4-7 for spark plug inspection.

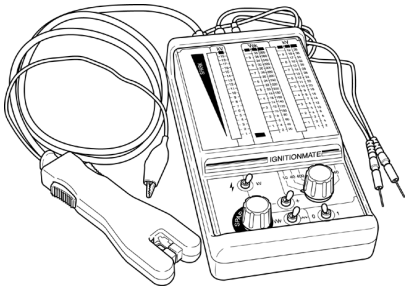
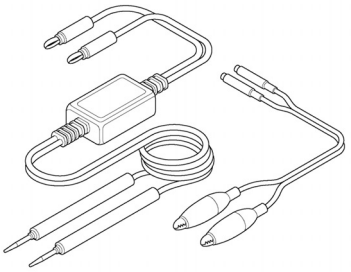
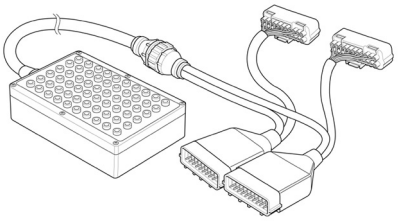
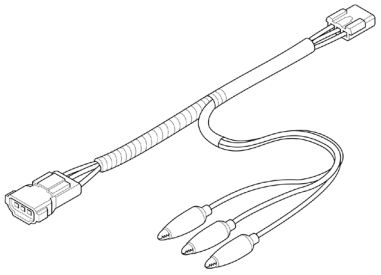
SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	BKR5E-11 (NGK), K16PR-U11 (DENSO)
	For extended high speed riding	BKR6E-11 (NGK), K20PR-U11 (DENSO)
Spark plug gap		1.0 – 1.0 mm (0.039 – 0.043 in)
Ignition coil peak voltage		2.5 – 5.0 V
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F"mark)		2° BTDC at idle

TORQUE VALUES

Spark plug	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads.
Ignition pulse generator flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Bank angle sensor screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	

TOOLS

IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) 	Peak voltage adaptor 07HGJ-0020100  (not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)	Test harness set 07WMZ-MBGA000 
Inspection adaptor 07GMJ-ML80100 		

TROUBLESHOOTING

- Inspect for the following before diagnosing the system.
  - Faulty spark plugs.
  - Loose spark plug cap or spark plug wire connections.
  - Water in the spark plug cap (Leaking the ignition coil secondary voltage).
- If there is no spark at any cylinder, temporarily exchange the ignition coil with a known-good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.

No spark at spark plugs

Unusual condition		Probable cause (Check in numerical order)
Ignition coil signal voltage	No peak voltage	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery is undercharged). 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if the measured voltage is over the standard voltage at least once.) 4. Faulty side stand switch or neutral switch. 5. An open circuit or loose connection in No. 4 related circuit wires. – Side stand switch line: Green/white wire – Neutral switch line: Blue/red and Light green/red wires 6. Open or short circuit in the ignition coil signal wire (No. 1 & 2: Yellow/white, No. 3 & 4: Yellow/blue, No. 5 & 6: Yellow/red). 7. Faulty peak voltage adaptor. 8. Faulty engine control module (ECM) (when No. 1 through 7 are normal).
	Peak voltage is normal, but no spark.	1. Open circuit in ignition coil power input or ground line 2. Ignition coil is leaking secondary current amperage. 3. Faulty spark plug wire.
Ignition pulse generator	Low peak voltage	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow (battery is under charged). 3. he sampling timing of the tester and measured pulse were not synchronized. (System is normal if the measured voltage is over the standard voltage at least once.) 4. Faulty ignition pulse generator (when causes No. 1 through 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION

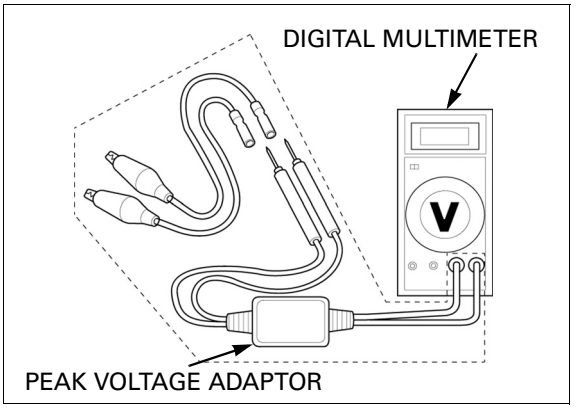
NOTE:

- Use this procedure for the ignition pulse generator and camshaft position sensor inspection.
- Use a commercially available digital multimeter (impedance 10 MΩ/DCV minimum).
- The display value differs depending upon the internal impedance of the multimeter.
- Check the cylinder compression of each cylinder and check that each spark plug is installed correctly.

Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

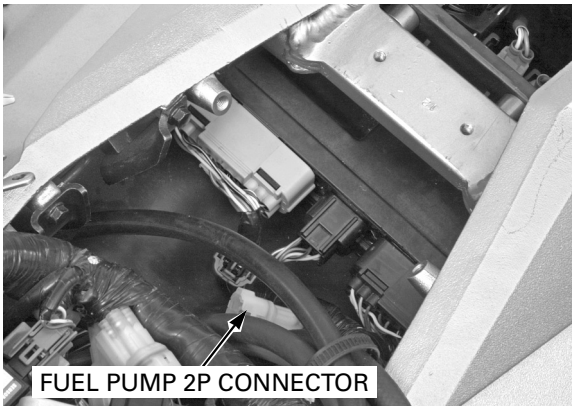
TOOLS:

IgnitionMate peak voltage tester (U.S.A. only) or	**MTP07-0286**
Peak voltage adaptor with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)	**07HGJ-0020100 (not available in U.S.A.)**



Raise the front of the fuel tank and support it (page 3-4).

Disconnect the fuel pump 2P connector.



IGNITION COIL SIGNAL PEAK VOLTAGE

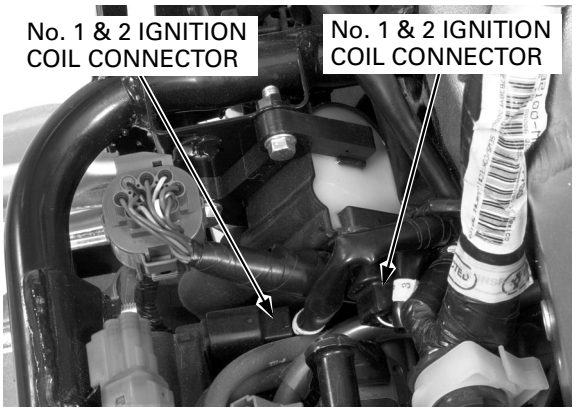
NOTE:

- 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 plug is installed correctly in the cylinder head

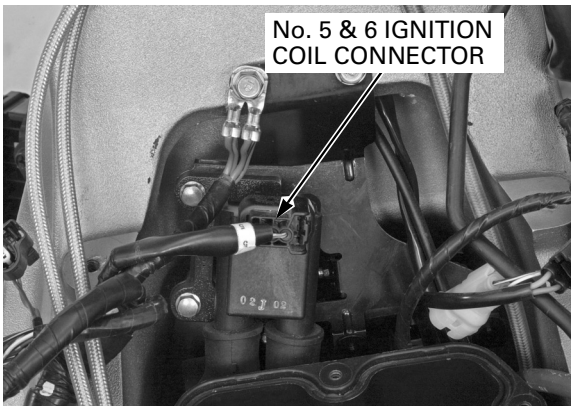
Remove the right front inner cover (page 3-4).

Turn the ignition switch to "OFF".

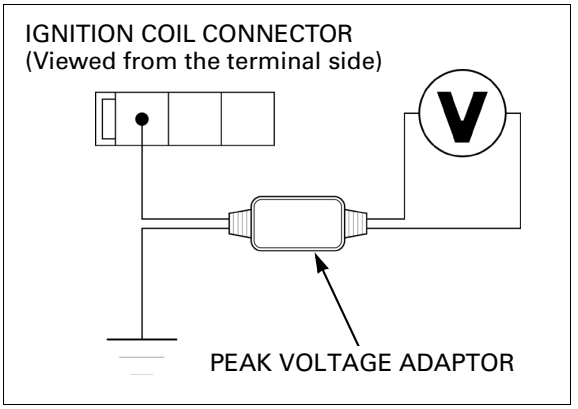
Disconnect the No. 1 & 2 and No. 3 & 4 ignition coil 3P connectors.



Disconnect the No. 5 & 6 ignition coil 3P connector.



Connect the peak voltage tester or adaptor probes to the wire harness side connector terminal and ground.



CONNECTIONS:

No. 1 & 2 ignition coil:
Yellow/white (+) – Ground (–)

No. 3 & 4 ignition coil:
Yellow/blue (+) – Ground (–)

No. 5 & 6 ignition coil:
Yellow/red (+) – Ground (–)

Shift the transmission into neutral.

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

Turn the ignition switch to "ON".

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

PEAK VOLTAGE: 2.5 – 5.0 V

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 described in the troubleshooting chart (page 18-5).

IGNITION PULSE GENERATOR PEAK VOLTAGE

NOTE:

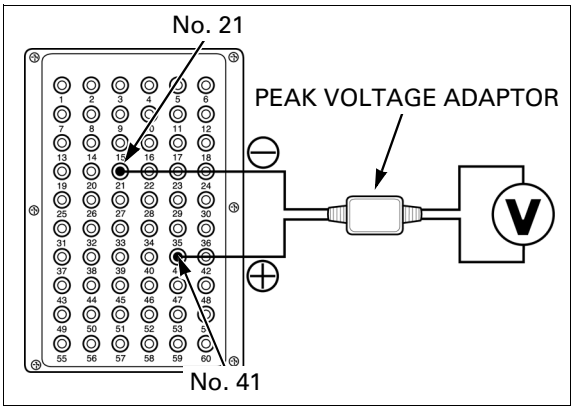
- Check that the cylinder compression is normal for each cylinder and the spark plug is installed correctly in the cylinder head.

Connect the ECM test harnesses to the ECM connectors (page 6-10).

TOOLS:

Test harness set	**07WMZ-MBGA000**

Connect the peak voltage tester or adaptor probes to the test pin box terminals.



CONNECTION: No. 41 (+) – No. 21 (–)

Shift the transmission into neutral.

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

Turn the ignition switch to "ON".

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

PEAK VOLTAGE: 0.7 V minimum

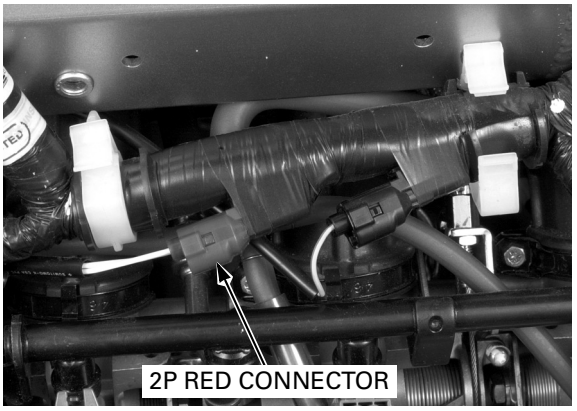
If the voltage measured at the ECM connector is abnormal, measure the peak voltage at the ignition pulse generator connector.

Remove the right front inner cover (page 3-4).

Turn the ignition switch to "OFF".

Disconnect the ignition pulse generator 2P red connector and connect the peak voltage tester or adaptor probes to the ignition pulse generator side connector terminals.

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



In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM connector is abnormal and the measurement at the ignition pulse generator connector is normal, the Yellow or White/yellow wire has an open or short circuit, or loose connections.
- If both peak voltages are abnormal, follow the checks described in the troubleshooting chart (page 18-5).

IGNITION COIL

POWER/GROUND LINE INSPECTION

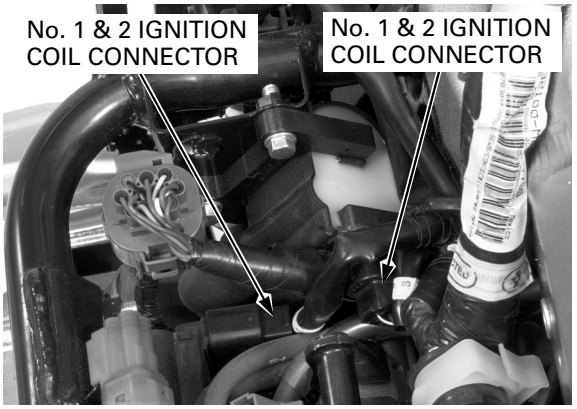
NOTE:

- If the ignition coil signal voltage is normal but there is no spark at the plug, perform this inspection.

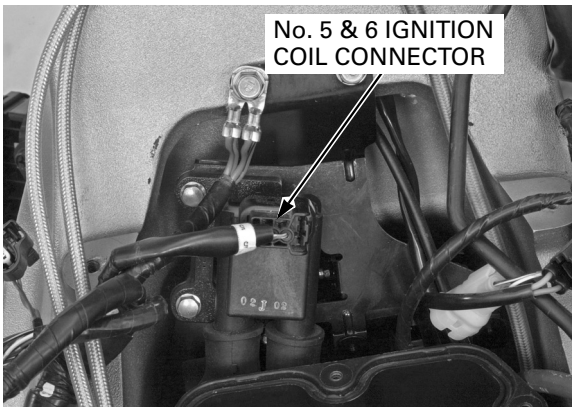
Remove the right front inner cover (page 3-4).

Turn the ignition switch to "OFF".

Disconnect the No. 1 & 2 and No. 3 & 4 ignition coil 3P connectors.



Disconnect the No. 5 & 6 ignition coil 3P connector.

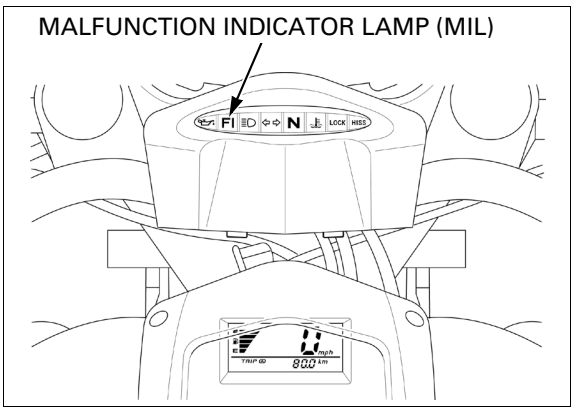


POWER INPUT LINE

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

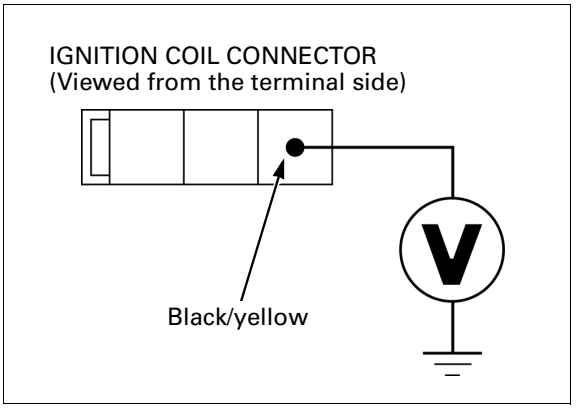
1. Turn the ignition switch to "ON" and check the PGM-FI malfunction indicator lamp (MIL).
   The MIL should light for a few seconds and go out.

- If the MIL stays on, check for open circuit in the Black/yellow wire between ECM and bank angle sensor relay. If the wire is OK, check the bank angle sensor relay circuits (page 18-11).
- If the MIL lights for a few seconds and goes out, go to step 2.



2. Measure the voltage between the Black/yellow wire terminal (+) of the ignition coil 3P connector and ground (–).
   There should be battery voltage.

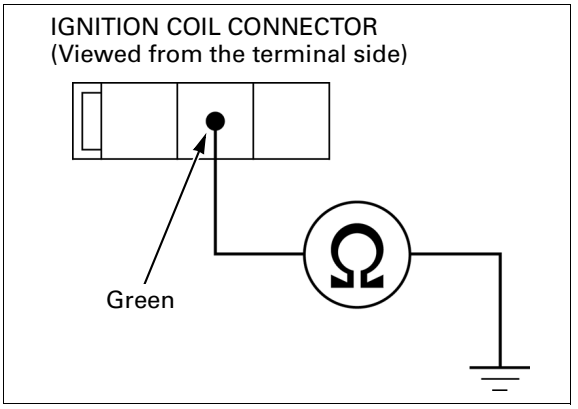
   If there is no voltage, repair the open circuit in the Black/yellow wire between the ignition coil and bank angle sensor relay.



GROUND LINE

Check for continuity between the Green wire terminal of the ignition coil 4P connector and ground.
There should be continuity.

If there is no continuity, repair the open circuit in the Green wire between the ignition coil and ground terminal.



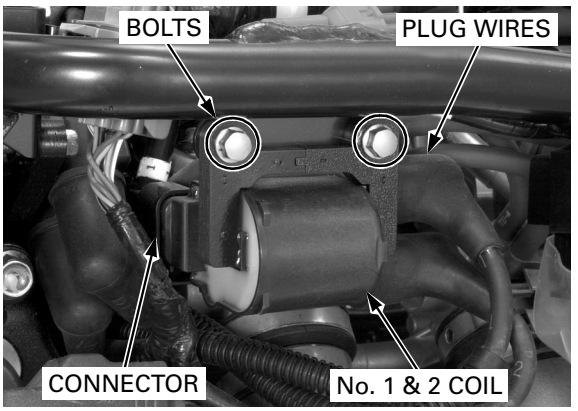
REPLACEMENT

Remove the right front inner cover (page 3-4).

No. 1 & 2 IGNITION COIL

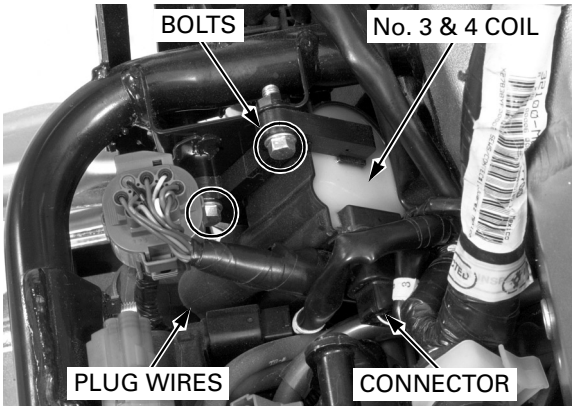
Remove the two mounting bolts and the ignition coil from the injector guard.
Disconnect the No. 1 & 2 ignition coil 3P connector.
Disconnect the No. 1 and No. 2 spark plug wires from the ignition coil.

Install the No. 1 & 2 ignition coil in the reverse order of removal.



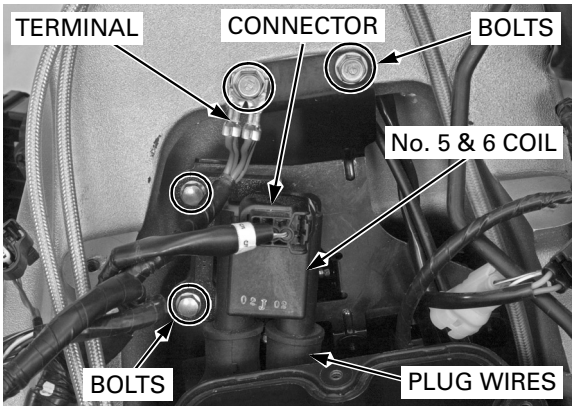
No. 3 & 4 IGNITION COIL

Disconnect the No. 3 & 4 ignition coil 3P connector.
Remove the two mounting bolts and the ignition coil from the injector guard.
Disconnect the No. 3 and No. 4 spark plug wires from the ignition coil.



No. 5 & 6 IGNITION COIL

Disconnect the No. 5 & 6 ignition coil 3P connector.
Remove the two bolts, ground terminal and the bracket from the frame.
Remove the two mounting bolts and the ignition coil from the bracket.
Disconnect the No. 5 and No. 6 spark plug wires from the ignition coil.



IGNITION PULSE GENERATOR

REPLACEMENT

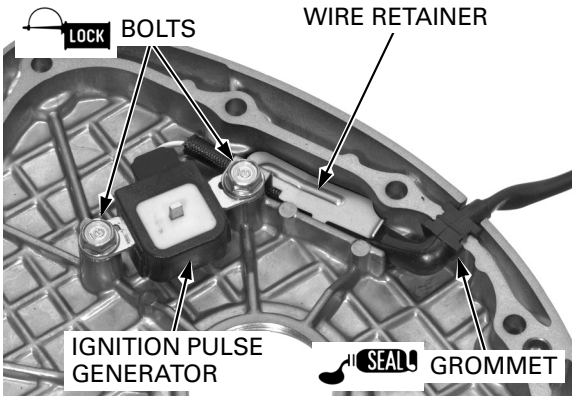
Remove the front crankcase cover (page 11-8).

Remove the two bolts, wire retainer, grommet and the ignition pulse generator from the front crankcase cover.

Apply sealant to the grommet seating surface of a new ignition pulse generator.
Apply locking agent to the bolt threads.
Install the ignition pulse generator, grommet and wire retainer onto the front crankcase cover and tighten the bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the front crankcase cover (page 11-10).



BANK ANGLE SENSOR RELAY

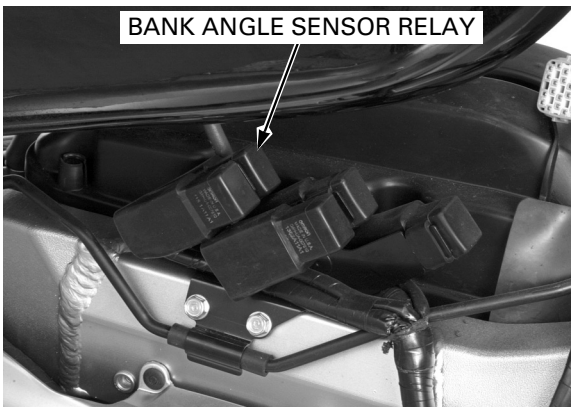
SYSTEM INSPECTION

NOTE:

- If the PGM-FI malfunction indicator lamp (MIL) stays on and there is no ignition coil input voltage, perform this inspection.

1. Raise the front of the fuel tank and support it (page 3-4).

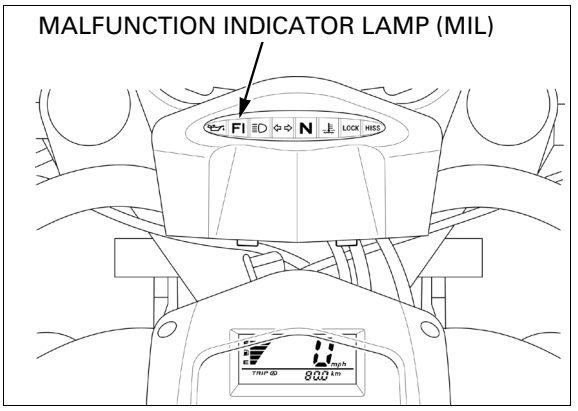
   Turn the ignition switch to "OFF".
   Exchange the bank angle sensor relay with a known good one.



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

2. Turn the ignition switch to "ON" and check the MIL.

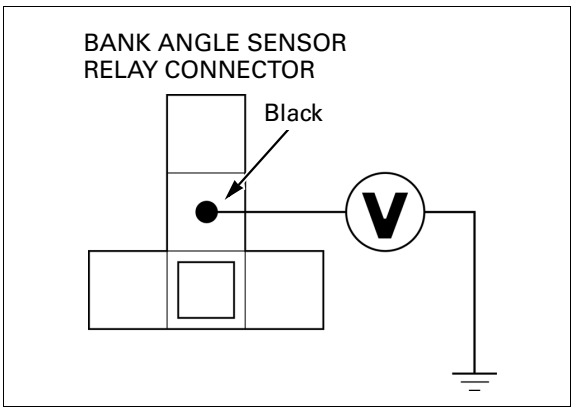
- If the MIL lights for a few seconds and goes out, replace the bank angle sensor relay with a new one.
- If the MIL stays lit, go to step 3.



3. Turn the ignition switch to "OFF" and remove the bank angle sensor relay.

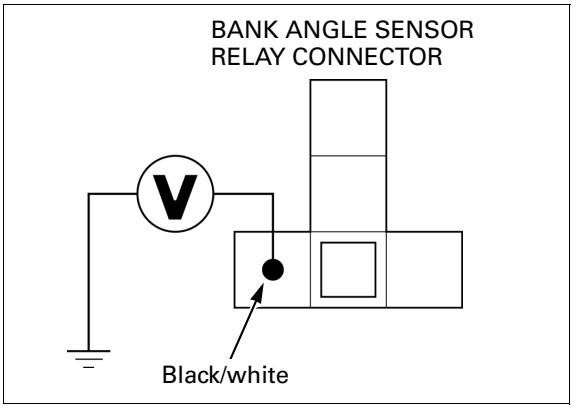
   Measure the voltage between the Black wire terminal (+) of the relay connector and ground (–). There should be battery voltage at all times.

- If there is no voltage, check the following:
  – Open circuit in the Black wire
  – 20 A (FI IGN) fuse
- If there is battery voltage, go to step 4.



4. Turn ignition switch to "ON".
   Measure the voltage between the Black/white wire terminal (+) of the relay connector and ground (–).
   There should be battery voltage with the ignition switch turned to "ON".

- If there is no voltage, check the following:
  – Open circuit in the Black/white wire
  – Engine stop switch
  – Open circuit in the White wire between the engine stop switch and 10 A (IGNITION) fuse
- If there is battery voltage, check the following:
  – Open circuit in the Red/white wire between the bank angle sensor and relay
  – bank angle sensor (page 18-12)

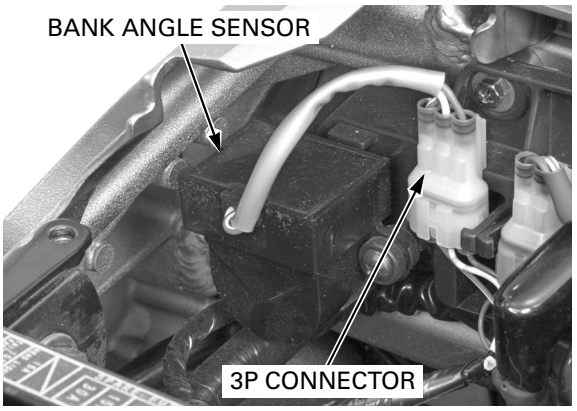


BANK ANGLE SENSOR

INSPECTION

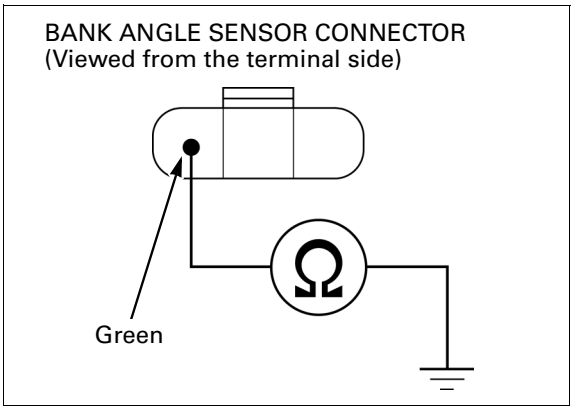
1. Remove the seat (page 3-3).

   Disconnect the bank angle sensor 3P connector.



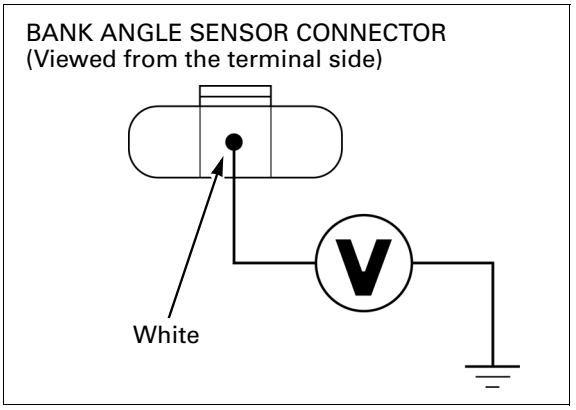
2. Check for continuity between the Green wire terminal of the wire harness side 3P connector and ground.
   There should be continuity at all times.

- If there is no continuity, check for an open circuit in the Green wire.
- If there is continuity, go to step 3.



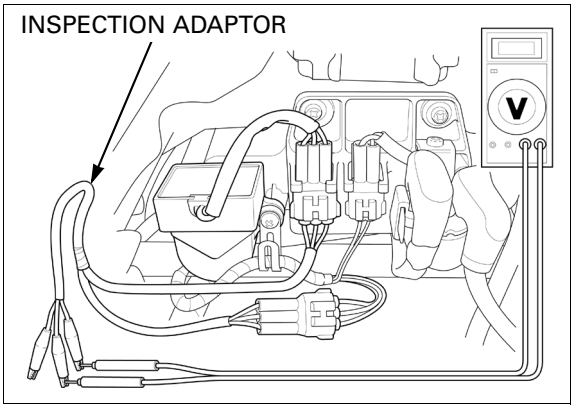
3. Turn the ignition switch to "ON".
   Measure the voltage between the White wire terminal (+) of the wire harness side connector and ground (–).
   There should be battery voltage.

- If there is no voltage, check for open circuit in the White wire.
- If there is battery voltage, go to step 4.



4. Turn the ignition switch to "OFF".
   Remove the two screws and bank angle sensor.
   Connect the inspection adaptor to the bank angle sensor connectors.

   TOOL:
   Inspection adaptor 07GMJ-ML80100



5. Measure the voltage between the Green clip (+) and Red clip (–) of the tool.

   Place the bank angle sensor horizontal and turn the ignition switch to "ON".
   There should be 0 – 1 V.

   Angle the sensor approximately 43 degrees to the left or right with the ignition switch to "ON".
   There should be battery voltage.

NOTE:

- If you repeat this test, first turn the ignition switch to "OFF", then back to "ON" before you try the test again.

6. Remove the special tool and connect the bank angle sensor 3P connector.
   Install the bank angle sensor and tighten the two screws.

   TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

   Install the seat (page 3-3).

IGNITION TIMING

Start the engine, warm it to normal operating temperature and stop it.

Remove the left or right cylinder head side cover (page 9-7).
Remove the timing hole cap (page 9-8).

Read the manufacturer's instructions for timing light operation.

Connect the timing light to the No. 1 or No. 2 spark plug wire.

Start the engine, let it idle and check the ignition timing.

Take care not to touch the cooling fan.

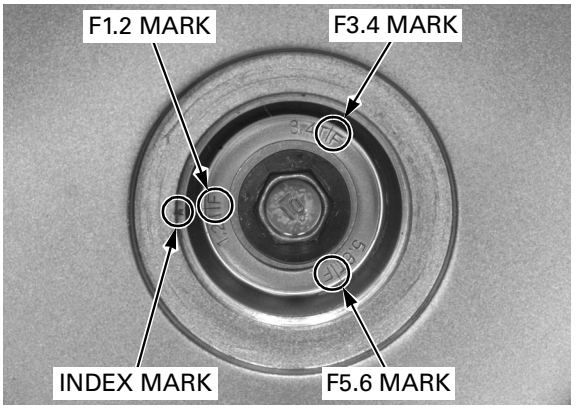
The timing is correct if the F1.2 mark on the ignition pulse generator rotor aligns with the index mark on the front crankcase cover.

Connect the timing light to the No. 3 or No. 4 spark plug wire and check the ignition timing by observing the F3.4 mark.

Check the No. 5 or No. 6 cylinder ignition timing in the same way, using the F5.6 mark.

Remove the timing light and install the following:

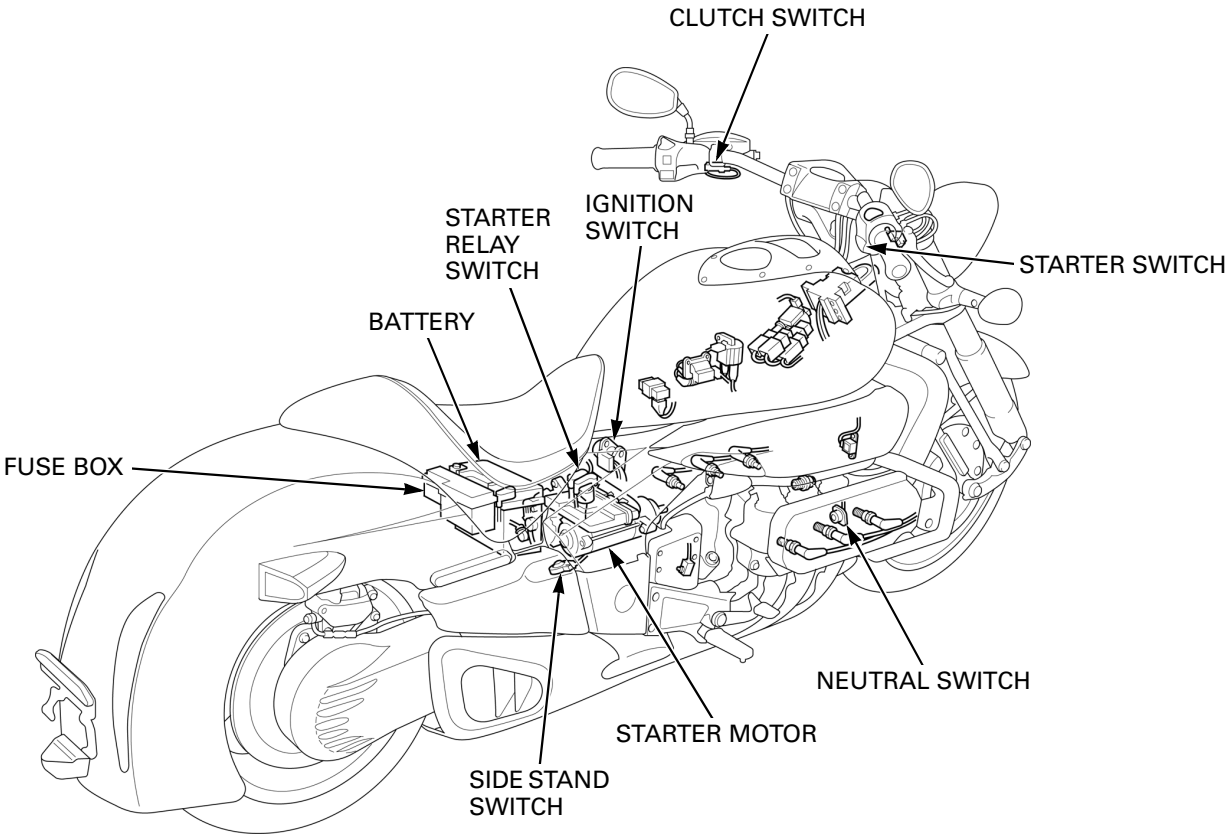
– cylinder head side cover (page 9-33)
– timing hole cap (page 9-30)



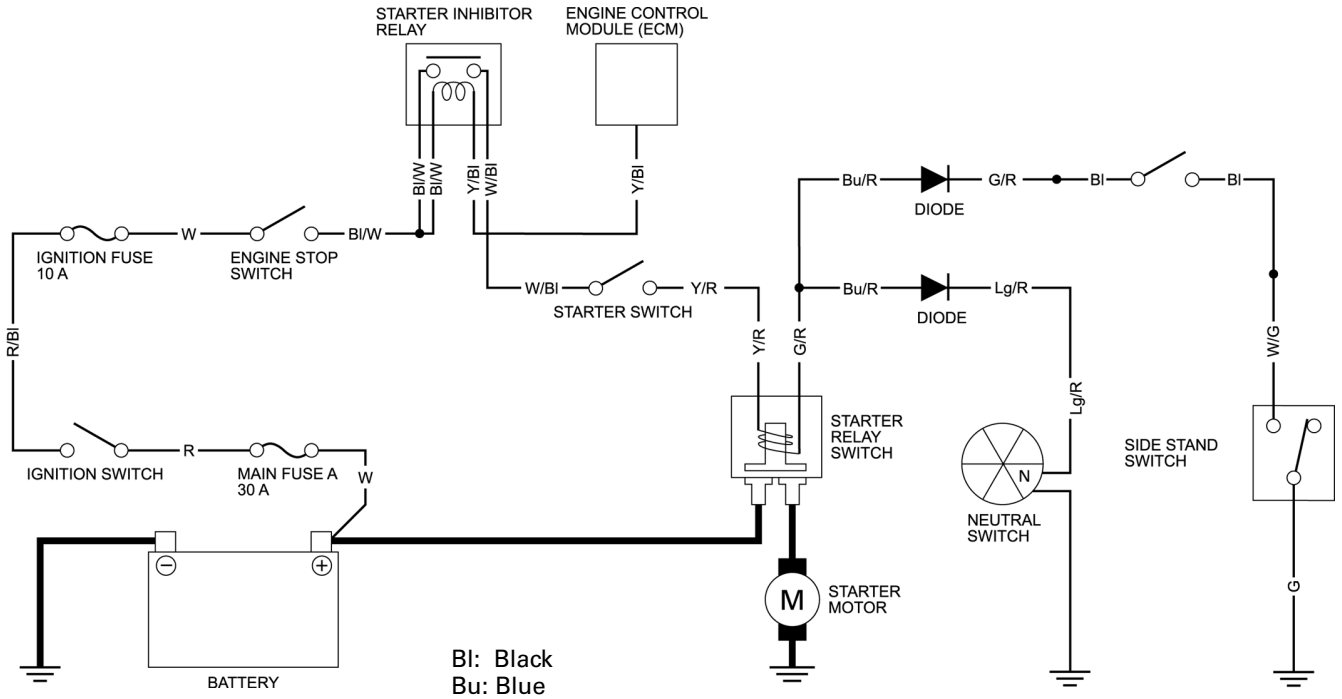
MEMO

19. ELECTRIC STARTER

COMPONENT LOCATION



SYSTEM DIAGRAM



Bl: Black
Bu: Blue
G: Green
Lg: Light green
R: Red
Y: Yellow
W: White

SERVICE INFORMATION

GENERAL

- Always turn the ignition switch to "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 (page 19-4).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- 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.

SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 mm (0.49 in)	6.5 mm (0.26 in)

TORQUE VALUES

Starter motor mounting bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)
ECM box bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)

TROUBLESHOOTING

NOTE:

- The starter motor will not turn if the steering lock pin is not retracted with the ignition switch turned to "ON" (page 21-15).

Starter motor does not turn

1. **Fuse Inspection**

   Check for blown IGNITION 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.

   Is the battery in good condition?

   YES – Charge or replace the battery.

   NO – GO TO STEP 3.

3. **Battery Cable Inspection**

   Check the battery cables for loose or poorly connected terminal, and for an open circuit.

   Is the battery cable in good condition?

   YES – • Loose or poorly connected battery cables.
   • Open circuit in the battery cable.

   NO – GO TO STEP 4.

4. **Starter Motor Cable Inspection**

   Check the starter motor cable for loose or poorly connected terminal, and for an open circuit.

   Is the starter motor cable in good condition?

   YES – • Loose or poorly connected starter motor cable.
   • Open circuit in the starter motor cable.

   NO – GO TO STEP 5.

5. **Starter Relay Switch Operation Inspection**

   Check the operation of the starter relay switch (page 19-13).

   Does the starter relay switch click?

   YES – GO TO STEP 6.

   NO – GO TO STEP 7.

6. **Starter Motor Inspection**

   Connect the starter motor terminal to the battery positive terminal directly. (A large amount of current flows, so do not use a thin wire.)

   Does the starter motor turn?

   YES – Faulty starter relay switch.

   NO – Faulty starter motor.

7. **Relay Coil Ground Line Inspection**

   Check the ground line of the starter relay switch (page 19-14).

   Is the ground line normal?

   YES – GO TO STEP 8.

   NO – • Faulty neutral switch.
   • Faulty diode.
   • Faulty clutch switch.
   • Faulty side stand switch.
   • Loose or poor contact of the related connector.
   • Open circuit in the wire harness.

8. Relay Coil Power Input Line Inspection

Check the power input line of the starter relay switch (page 19-14).

Is the power input line normal?

YES – GO TO STEP 9.

NO – • Faulty ignition switch.
• Faulty engine stop switch.
• Faulty starter inhibitor system.
• Faulty starter switch.
• Loose or poor contact of the related connector.
• Open circuit in the wire harness.

9. Starter Relay Switch Inspection

Check the function of the starter relay switch (page 19-14).

Does the starter relay switch function properly?

NO – Faulty starter relay switch.

YES – Loose or poor contact of the starter relay switch connector.

Starter motor turns slowly
- Weak battery
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor

Starter motor turns, but engine does not turn
- Faulty starter clutch

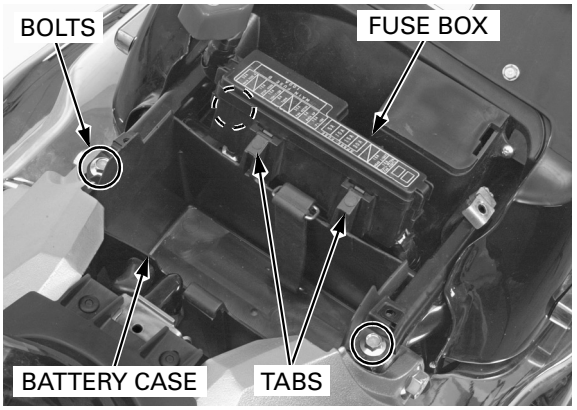
Starter relay switch clicks, but engine does not turn over
- Crankshaft does not turn due to engine problem
- Faulty starter torque limiter or idle gear

STARTER MOTOR

REMOVAL

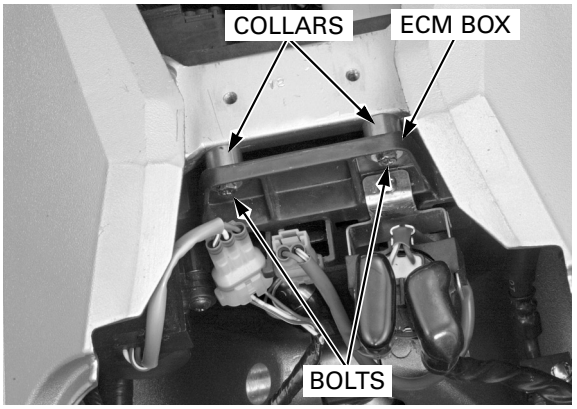
Remove the following:

- fuel tank (page 6-36)
- battery (page 17-6)
- fuse box by releasing the two tabs
- three bolts
- battery case



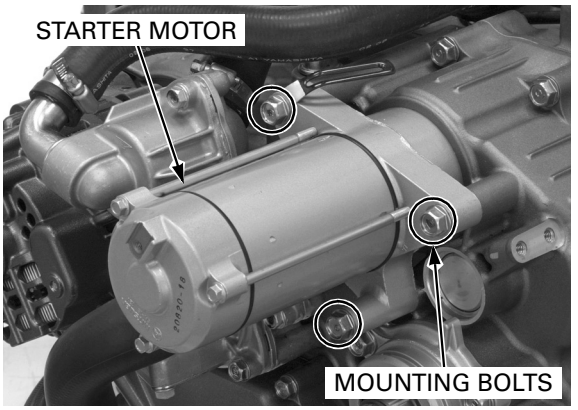
Disconnect the engine control module (ECM) connectors.

Remove the two bolts and collars, and move the ECM box rearward.

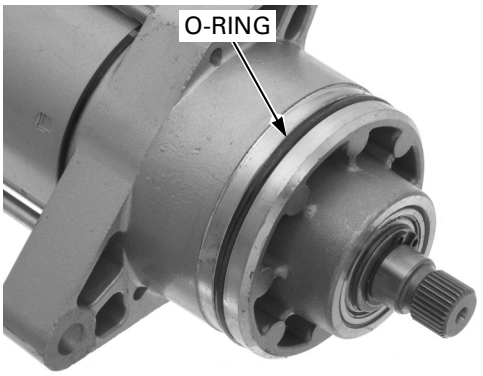


Slide the rubber cap off the starter motor terminal and remove the terminal nut and starter motor cable.

Remove the three mounting bolts and the starter motor from the rear crankcase.



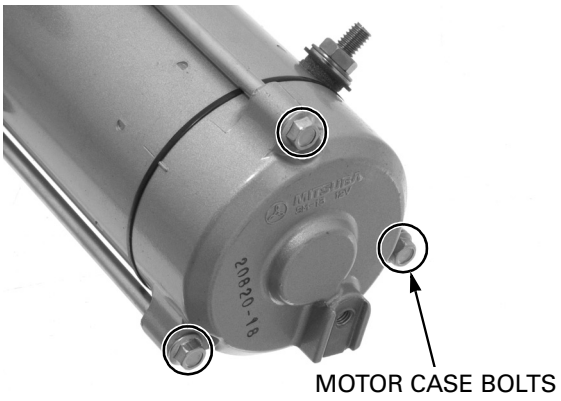
Remove the O-ring from the starter motor.



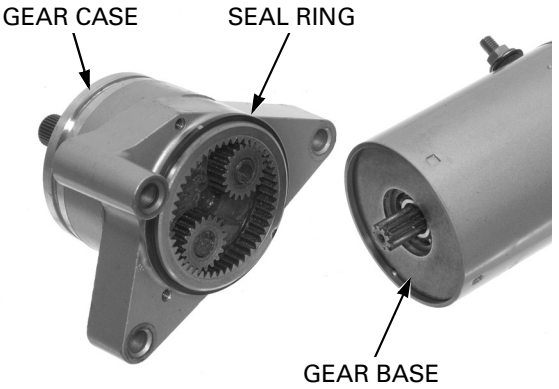
DISASSEMBLY

Remove the following:

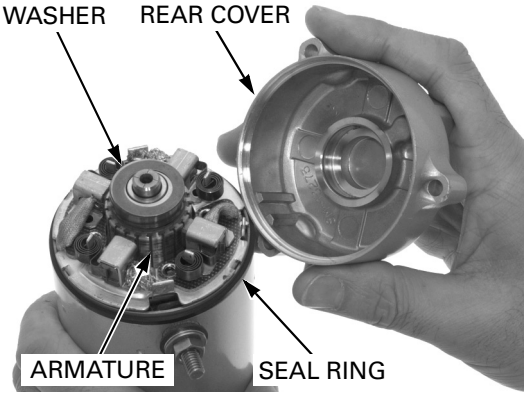
– three starter motor case bolts



– reduction gear case
– seal ring
– gear base washer
– gear base
– washer



– rear cover
– washer
– seal ring
– armature



INSPECTION

ARMATURE

Check the commutator bars of the armature for discoloration.

NOTE:

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

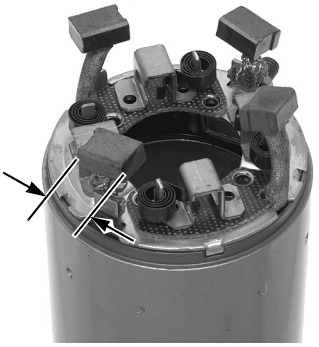
Check for continuity between pairs of commutator bars.
There should be continuity.

Check for continuity between each commutator bar and the armature shaft.
There should be no continuity.

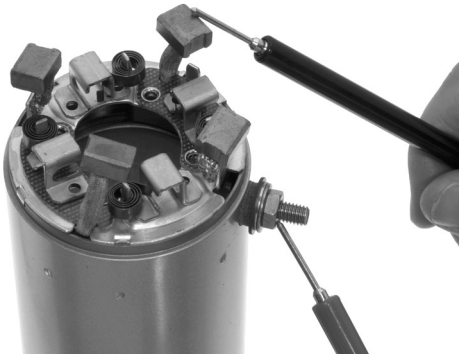
BRUSH/MOTOR CASE

Measure the brush length.

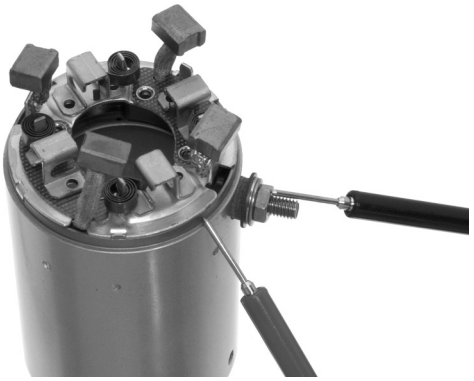
SERVICE LIMIT: 6.5 mm (0.26 in)



Check for continuity between the insulated brush and cable terminal.
There should be continuity.

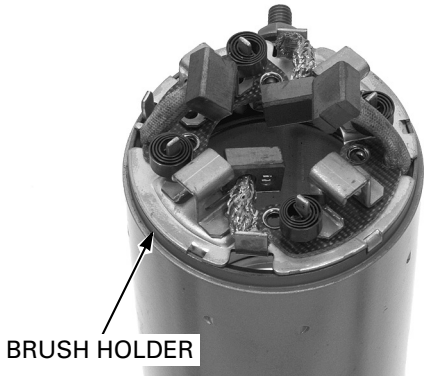


Check for continuity between the insulated brush and motor case.
There should be no continuity.

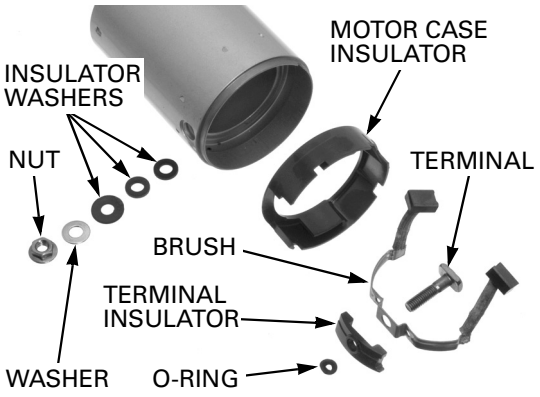


Remove the following if necessary:

– brush holder

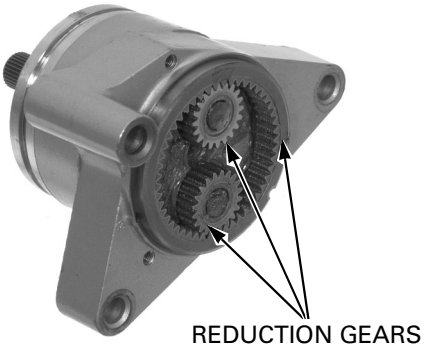


– nut
– washer
– insulator washers
– O-ring
– cable terminal
– insulated brush
– terminal insulator
– motor case insulator

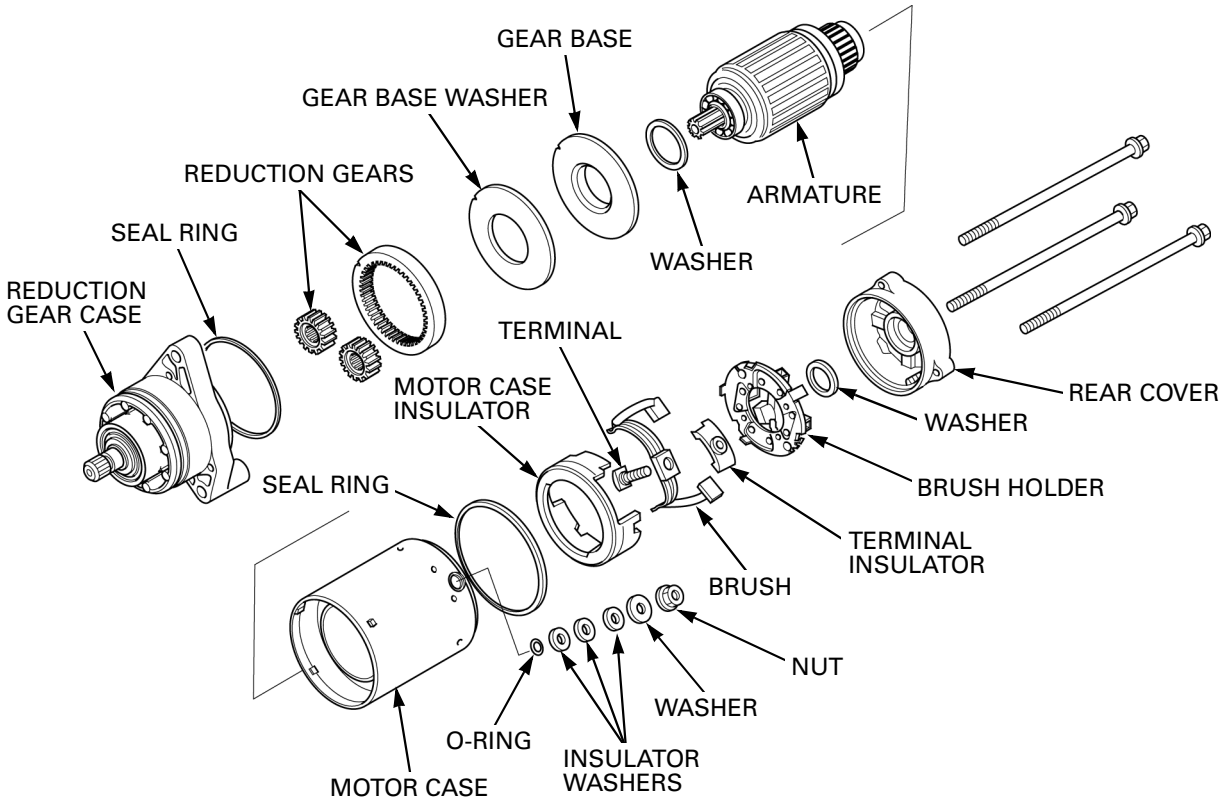


REDUCTION GEAR

Check the starter reduction gears for excessive or abnormal wear.

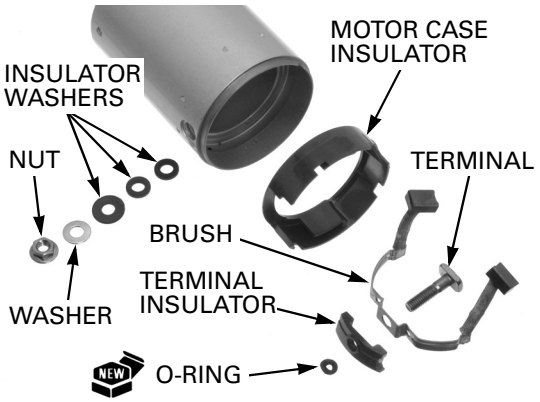


ASSEMBLY

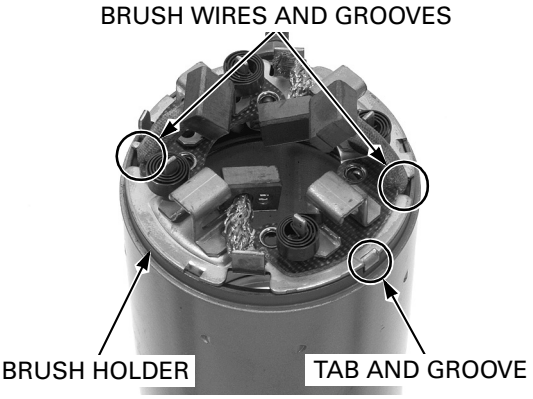


Install the following:

- motor case insulator
- terminal insulator
- insulated brush
- cable terminal
- O-ring
- insulator washers
- washer
- nut



Install the brush holder, aligning the tab with the groove in the case, and wire grooves with the insulated brush wires.

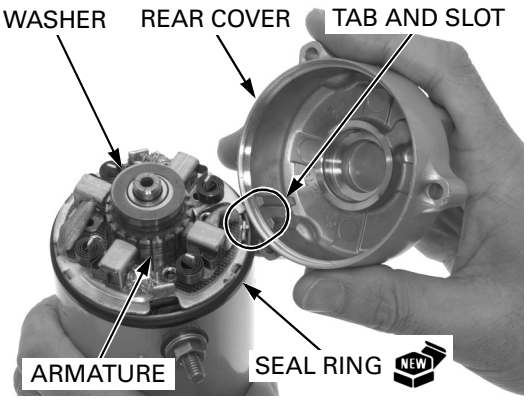


The coil may be damaged if the magnet pulls the armature against the case.

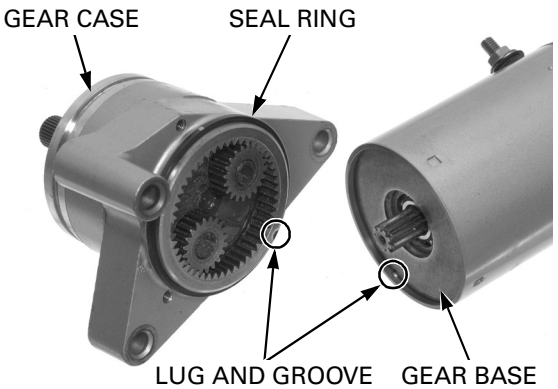
Push and hold the brushes inside the brush holder, and install the armature through the motor case and brush holder.
When installing the armature into the motor case, hold the armature tightly to prevent the magnet of the case from pulling the armature against it.

Install the washer and a new seal ring.

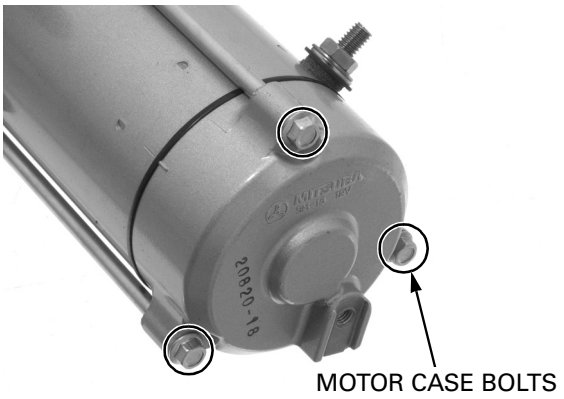
Install the rear cover, aligning the slot with the brush holder tab.



Install the washer.
Install the gear base and gear base washer, aligning the grooves with the motor case lug.
Install a new seal ring.
Install the reduction gear case, aligning the groove in the large outer gear with the motor case lug.



Install the three case bolts and tighten them securely.

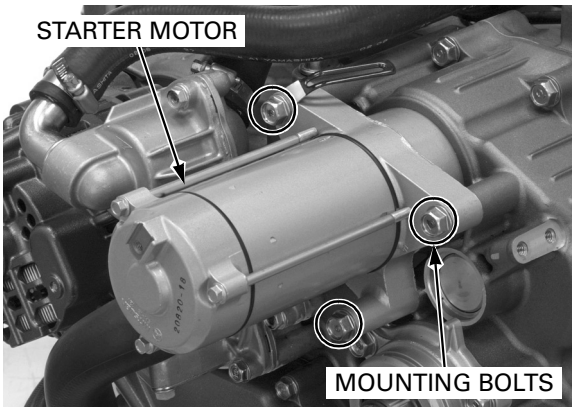


INSTALLATION

Coat a new O-ring with oil and install it into the starter motor groove.

Install the starter motor into the rear crankcase cover.
Install the three mounting bolts and tighten them.

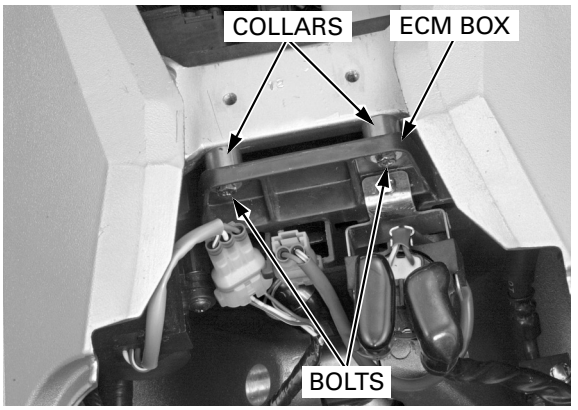
TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)



Connect the starter motor cable.
Install and tighten the terminal nut securely.
Pull the rubber cap onto the terminal securely.

Install the ECM box with the two collars and bolts, and tighten the bolts.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)



Connect the ECM connectors.

Install the battery case and tighten the two bolts securely.

Install the following:

– battery (page 17-6)
– fuel tank (page 6-37)

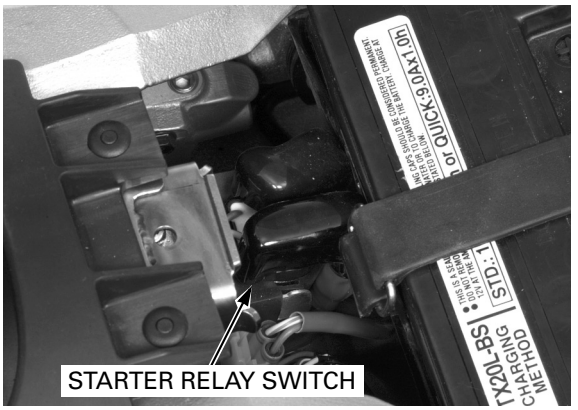
STARTER RELAY SWITCH

OPERATION INSPECTION

Remove the seat (page 3-3).

Shift the transmission into neutral.
Turn the ignition switch to "ON" and the engine stop switch to "".
Push the starter switch.
The coil is normal if the starter relay switch clicks.

If you don't hear the switch "CLICK", inspect the relay switch and its circuits.



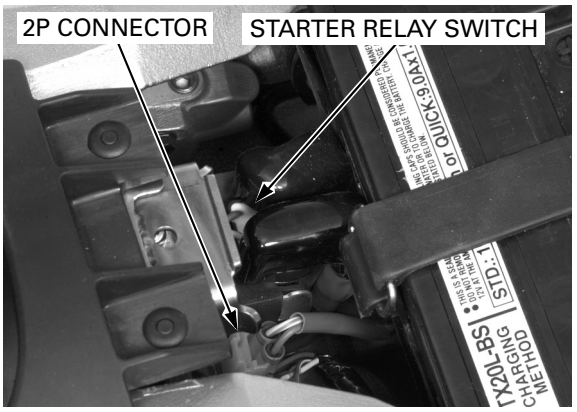
RELAY COIL GROUND LINE INSPECTION

Remove the seat (page 3-3).

Disconnect the starter relay switch 2P connector.

Check for continuity between the Green/red wire (ground line) and ground.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand switch is retracted, the ground circuit is normal. (There is a slight resistance due to the diode.)



RELAY COIL INPUT VOLTAGE INSPECTION

Remove the seat (page 3-3).

Disconnect the starter relay switch 2P connector.

Shift the transmission into neutral.
Turn the ignition switch to "ON" and the engine stop switch to "".
Measure the voltage between the Yellow/red wire terminal (+) and ground (–).

If the battery voltage appears only when the starter switch is pushed, it is normal.

CONTINUITY INSPECTION

Remove the seat (page 3-3).

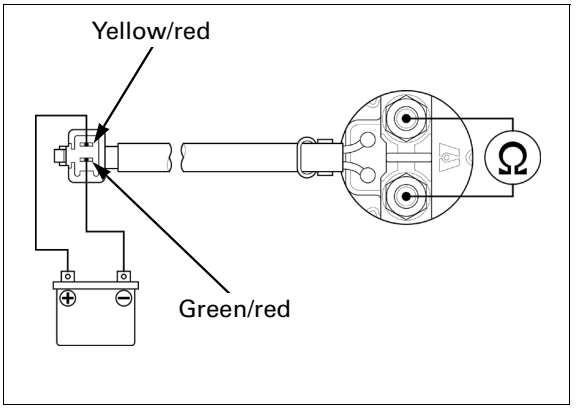
Disconnect the starter relay switch 2P connector, battery (+) cable and starter motor cable.

Connect a fully charged 12-V battery to the starter relay switch 2P connector terminals.

CONNECTION:

Battery (+) terminal – Yellow/red wire terminal
Battery (–) terminal – Green/red wire terminal

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.



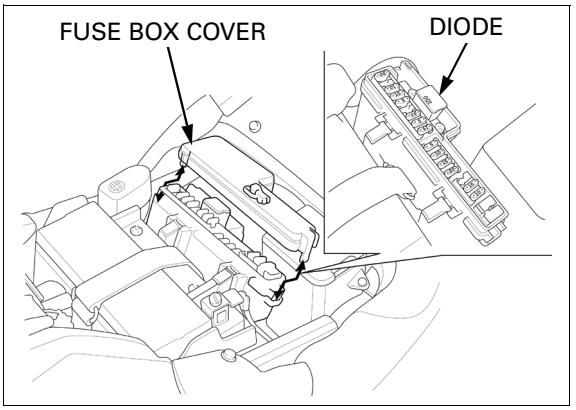
DIODE

REMOVAL/INSTALLATION

Remove the seat (page 3-3).

Remove the fuse box cover.
Remove the diode from the fuse box.

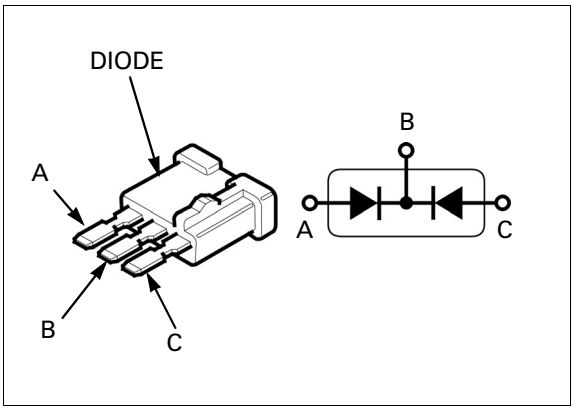
Install the diode in the reverse order of removal.



INSPECTION

Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.



STARTER INHIBITOR RELAY

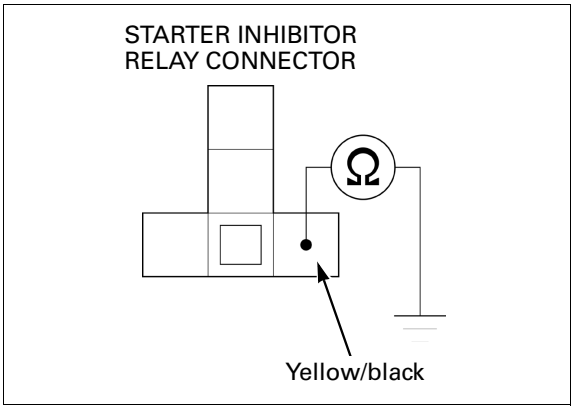
SYSTEM INSPECTION

Raise the front of the fuel tank and support it (page 3-4).

Turn the ignition switch to "OFF"
Remove the starter inhibitor relay.

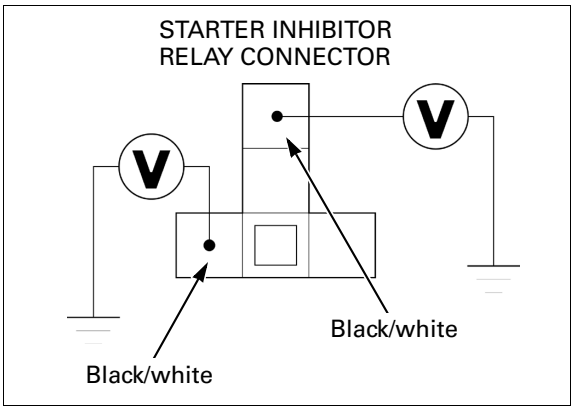
Check for continuity between the Yellow/black wire terminal of the starter inhibitor relay connector and ground.
There should be no continuity.

Turn the ignition switch to "ON" and the engine stop switch to "Ω".
Check for continuity between the Yellow/black wire terminal of the starter inhibitor relay connector and ground.
There should be continuity.



Measure the voltage between the Black/white wire terminals (+) of the relay connector and ground (–).
There should be battery voltage.

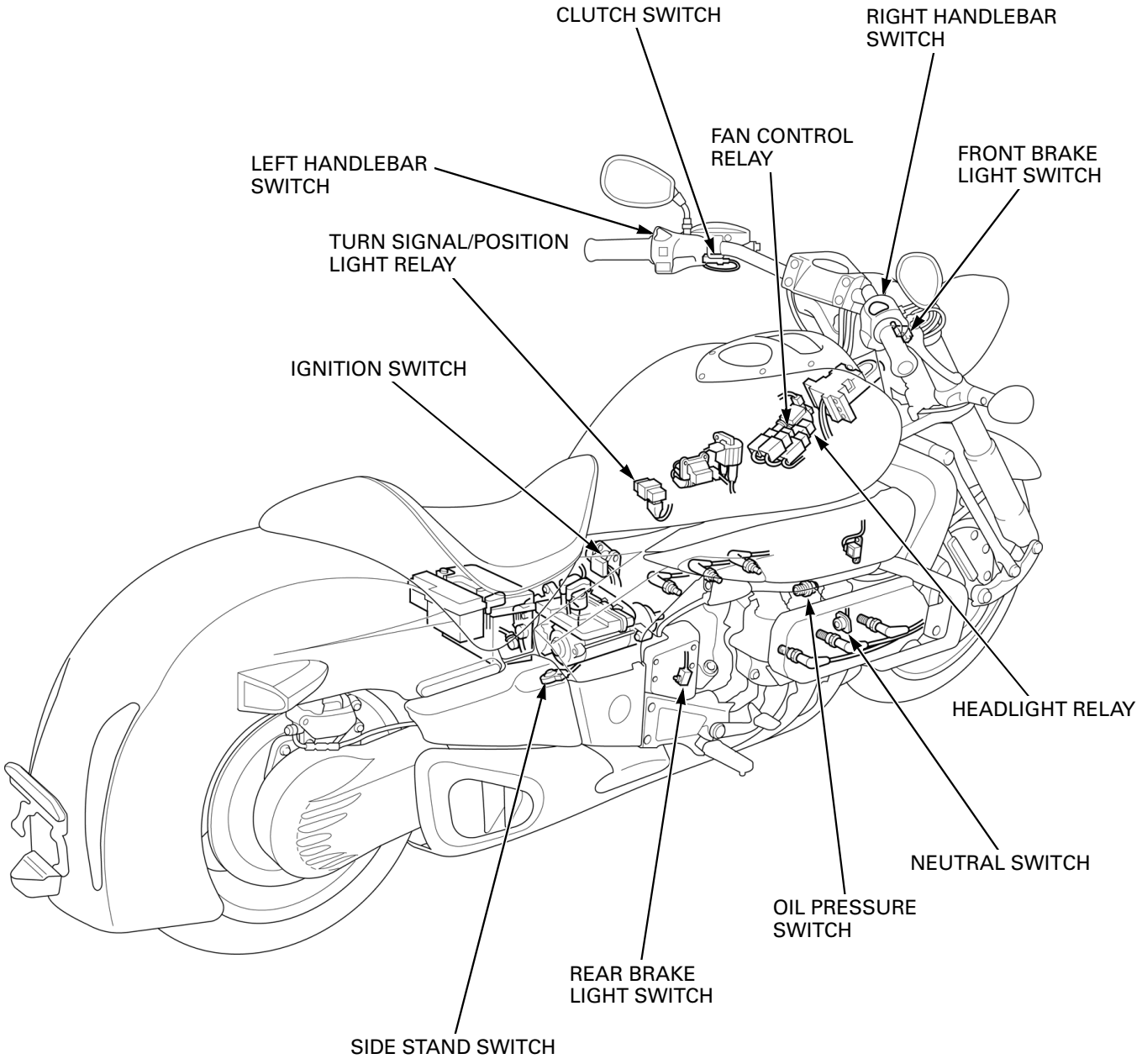
If the relay circuits are normal, replace the relay with a new one.



MEMO

20. LIGHTS/METERS/SWITCHES

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- 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.
- Use an electric heating element to heat the water/coolant mixture for the thermosensor inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- Note the following when replacing the halogen headlight bulb.
  – Wear clean gloves while replacing the bulb. Do not put fingerprints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  – If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  – Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes are used throughout this section.

Bl: Black	G: Green	Lg: Light green	R: Red
Br: Brown	Gr: Gray	O: Orange	W: White
Bu: Blue	Lb: Light blue	P: Pink	Y: Yellow

SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	High beam	12V – 55 W
		Low beam	12V – 55 W
	Turn signal light		12V – 21 W x 4
	Brake/tail light		LED
	License light		12V – 5 W
	Instrument light		LED
	Indicator		LED
Fuse	Main fuse A		30 A
	Main fuse B		100 A
	Sub-fuse		30 A x 1, 20 A x 2, 10 A x 3, 5 A x 2
Thermosensor (ECT sensor) resistance		at 80°C (176°F)	2.1 – 2.6 kΩ
		at 120°C (248°F)	0.65 – 0.75 kΩ

TORQUE VALUE

Speedometer mounting bolt	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Speedometer visor tapping screw	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
License light bolt	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Brake/taillight cover tapping screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Headlight upper cover bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Front shock absorber upper bracket cover bolt (front)	1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Front shock absorber upper bracket cover bolt (rear)	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Handlebar lower holder bolt	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
ECT sensor	25 N·m (2.5 kgf·m, 18 lbf·ft)
Ignition switch mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Ignition switch stay bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Fuel level sensor nut	12 N·m (1.2 kgf·m, 9 lbf·ft)

TROUBLESHOOTING

- Check the following before troubleshooting:
  – faulty or under-charged battery
  – blown main fuse B (100 A) and main fuse A (30 A)
  – Check the ignition switch and its circuit if all systems do not function when the ignition switch is turned to "ON".
- Check for open circuit in the Green (ground) wire for each part.

LIGHTING SYSTEM

NOTE:

- The headlight goes off when the starter switch is pushed for starting.

Low beam headlight does not light with the ignition switch turned to "ON"

- Faulty bulb
- Faulty headlight relay (page 20-27)
- Faulty starter switch (page 20-22)
- Blown HEAD LIGHT fuse (20 A) (Check for short circuit in the related wires if the fuse is blown again.)
- Loose or poor contact of the related connectors.
- Open circuit in the related wires

High beam headlight does not light with the dimmer switch pushed to "≡D"

- Faulty bulb
- Faulty dimmer switch
- Open circuit in the White wire between the 22P black connector and dimmer switch
- Open circuit in the Blue wire between the dimmer switch and high beam headlight bulb

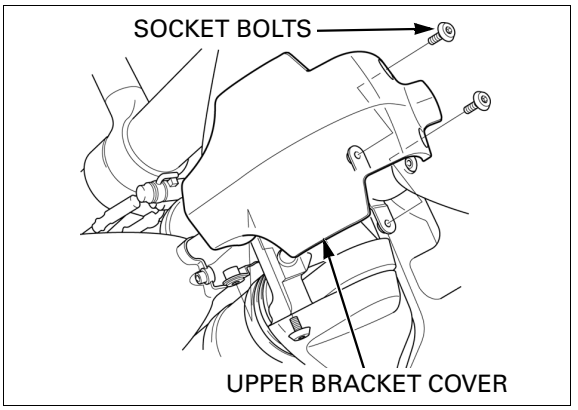
HEADLIGHT

BULB REPLACEMENT

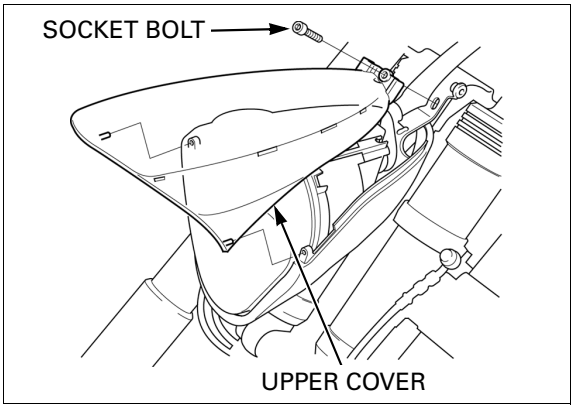
NOTE:

- A halogen headlight bulb becomes very hot while the headlight is on, and will remain hot for a while after it is turned off. Be sure to let it cool down before servicing.

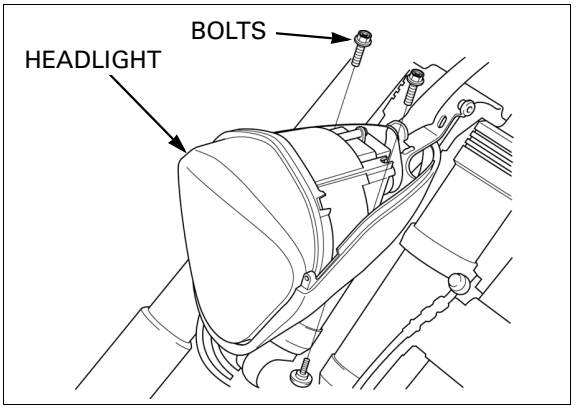
Remove the three socket bolts and the shock absorber upper bracket cover.



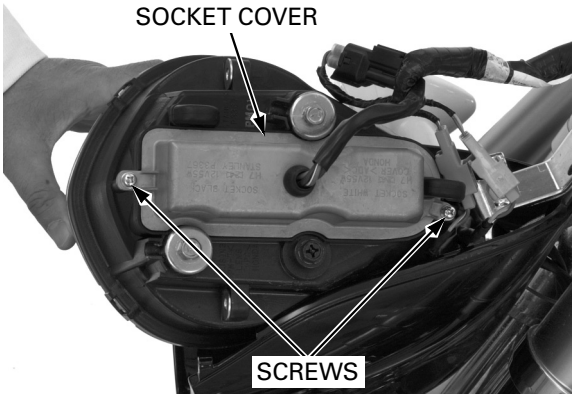
Remove the socket bolt and the headlight upper cover.



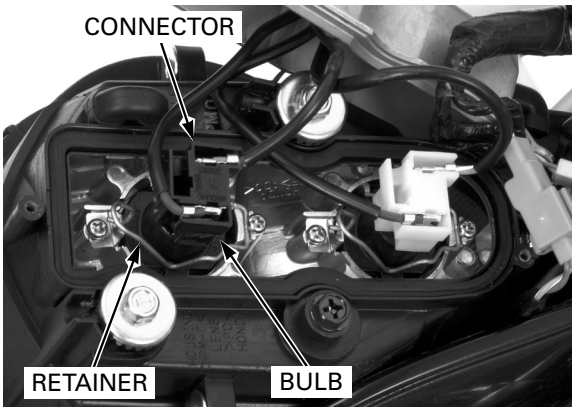
Remove the three bolts and the headlight unit from the headlight case.



Remove the two screws and the bulb socket cover.



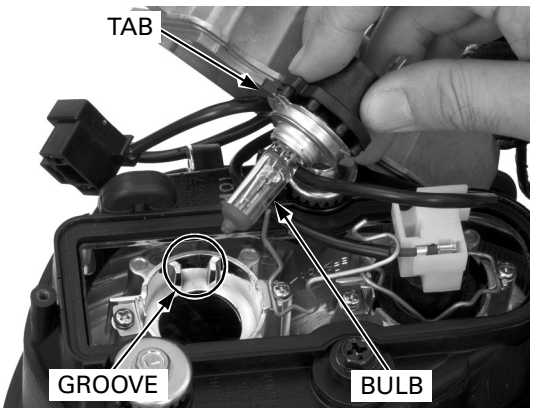
Disconnect the headlight connector.
Unhook the bulb retainer and remove the headlight bulb.



Avoid touching the halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

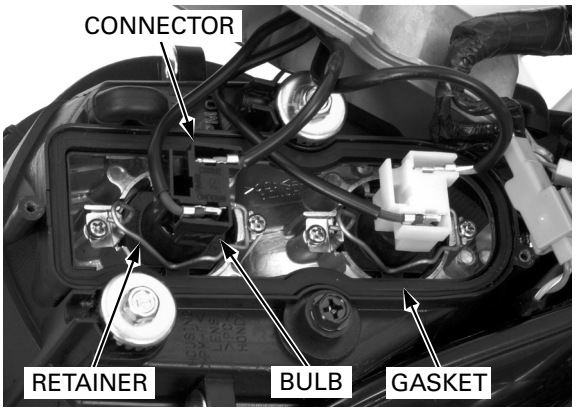
If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent early bulb failure.

Install the new headlight bulb aligning its tabs with the groove in the headlight unit.

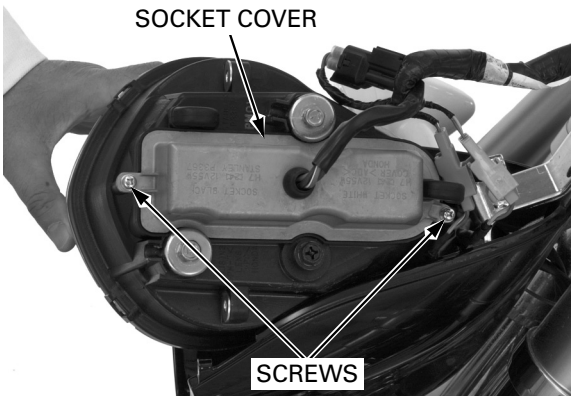


Hook the bulb retainer properly.
Connect the headlight connector.

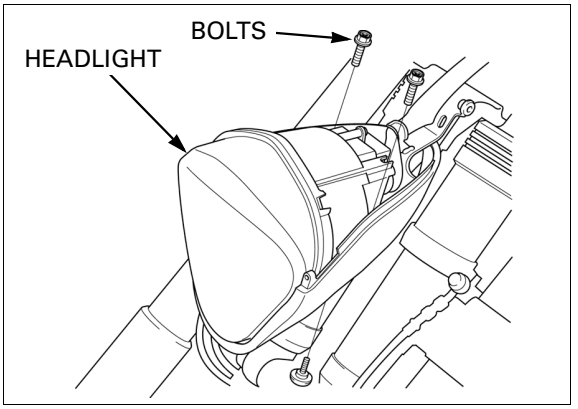
Make sure the socket cover gasket is in good condition and replace it if necessary.



Install the bulb socket cover and tighten the two screws securely.

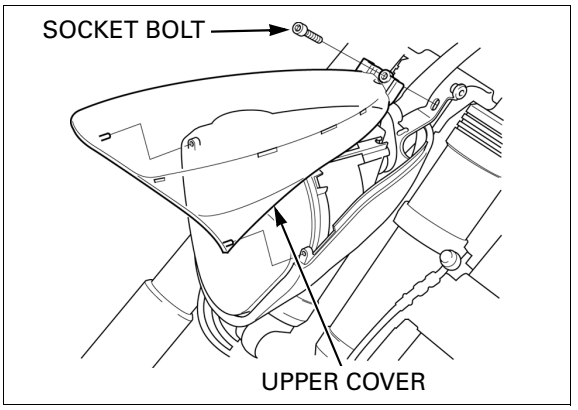


Install the headlight unit into the headlight case and tighten the three bolts securely.



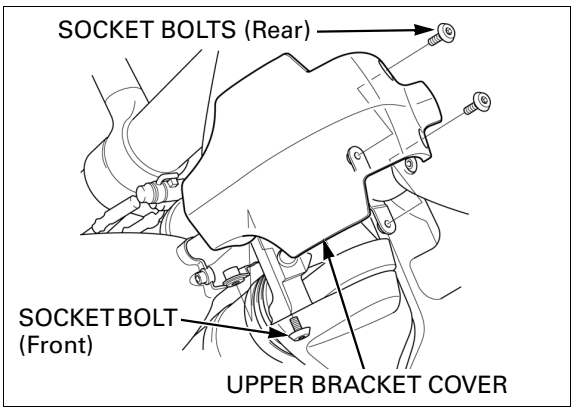
Install the headlight upper cover by aligning the pins with the holes in the headlight case, and tighten the socket bolt.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)



Install the shock absorber upper bracket cover and tighten the three socket bolts.

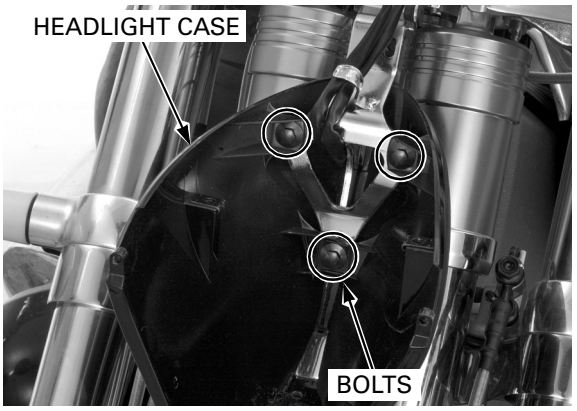
TORQUE: Front: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Rear: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



CASE REMOVAL/INSTALLATION

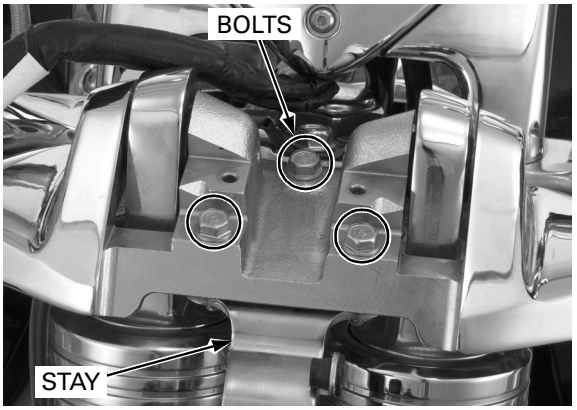
Remove the headlight from the headlight case (page 20-5).

Remove the three bolts and the headlight case from the stay.



Remove the three bolts and the headlight case stay from the upper bracket.

Install the headlight case stay and case in the reverse order of removal.

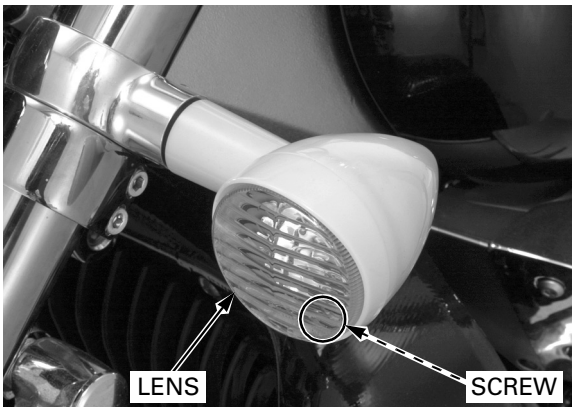


TURN SIGNAL LIGHT

BULB REPLACEMENT

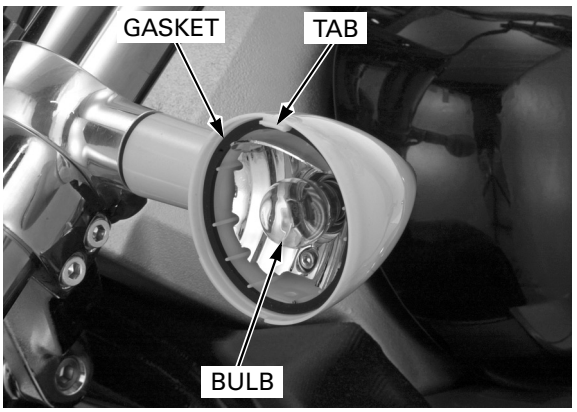
FRONT

Remove the screw and turn signal light lens.



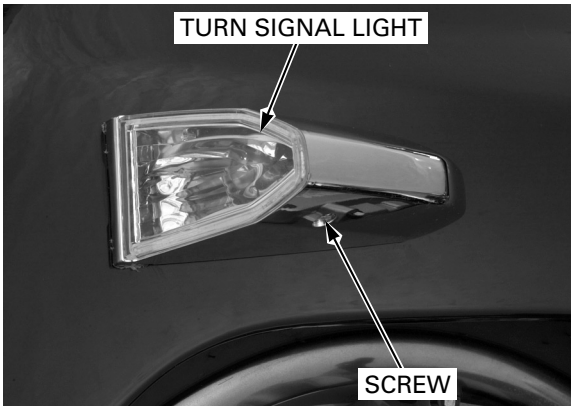
While pushing the bulb in, turn it counterclockwise to remove it, and replace it with a new one.

Make sure the lens gasket is installed in position and is in good condition, and replace it with a new one if necessary.
Install the lens by aligning the slot with the tab of the turn signal light, and tighten the screw.

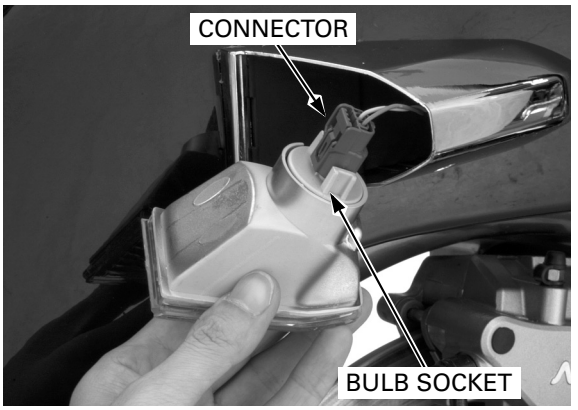


REAR

Remove the screw, push the rear turn signal light inward and pull it out of the case.



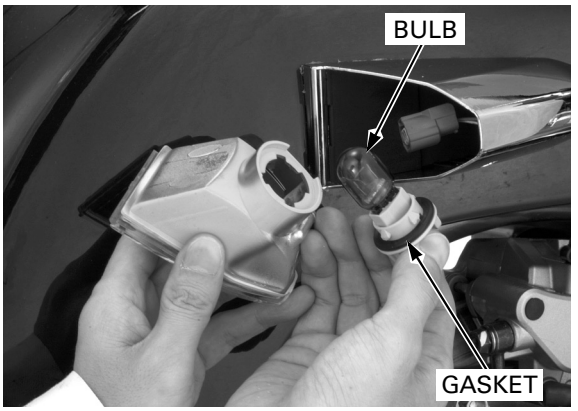
Disconnect the turn signal light connector.
Turn the bulb socket counterclockwise and remove it from the turn signal light.



Pull the bulb out of the socket and replace it with a new one.

Check the gasket is in good condition and replace it with a new one if necessary.

Install the removed parts in the reverse order of removal.

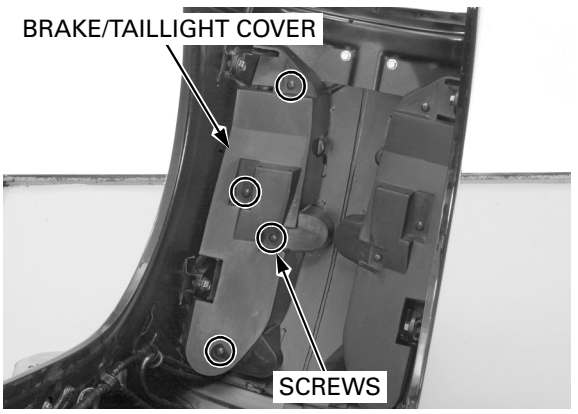


BRAKE/TAILLIGHT

REPLACEMENT

Remove the rear fender (page 3-6).

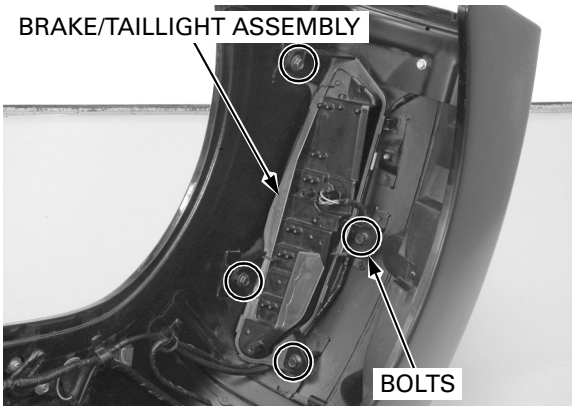
Remove the four screws and the brake/taillight cover.



Disconnect the brake/taillight connector.
Remove four bolts and the brake/taillight assembly.

Install the brake/taillight assembly in the reverse order of removal.

TORQUE: Tapping screw: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



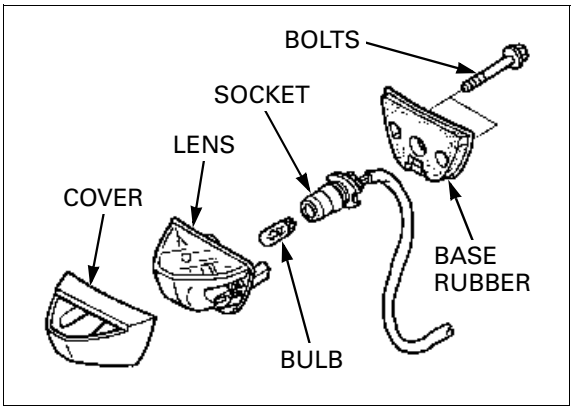
LICENSE LIGHT

BULB REPLACEMENT

Remove the two bolts and the license light assembly from the rear fender.
Remove the license light cover and base rubber.
Pull the bulb socket out of the lens.
Pull the bulb out of the socket and replace it with a new one.

Install the removed parts in the reverse order of removal.

TORQUE: Bolt: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)

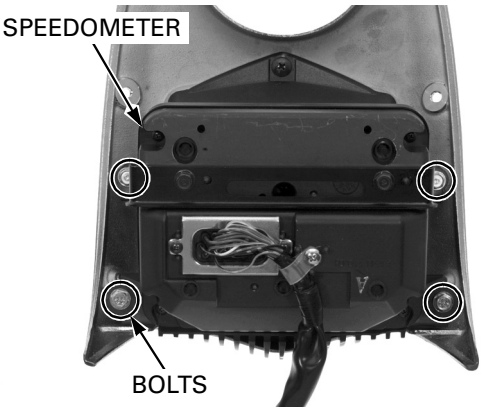


SPEEDOMETER

REMOVAL/INSTALLATION

Remove the fuel tank top cover (page 3-4).

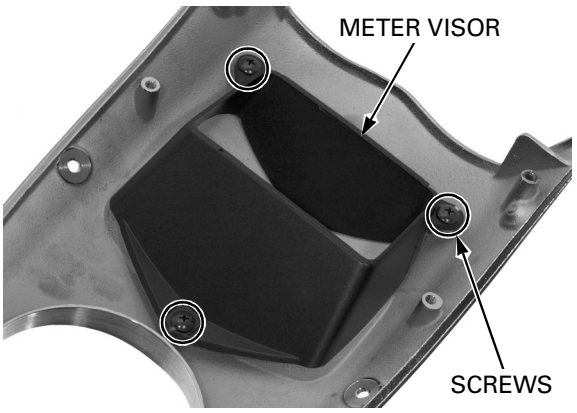
Remove the four mounting bolts and the speedometer from the fuel tank top cover.



Remove the three screws and the meter visor from the fuel tank top cover.

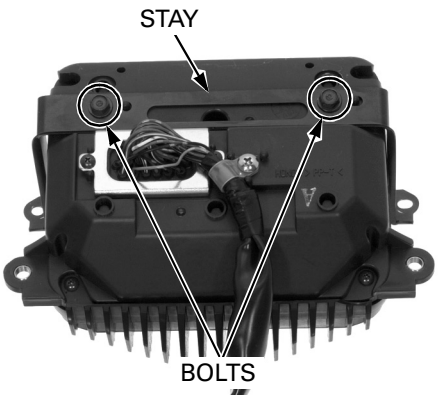
Install the meter visor and speedometer in the reverse order of removal.

TORQUE:
Mounting bolt: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Tapping screw: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)

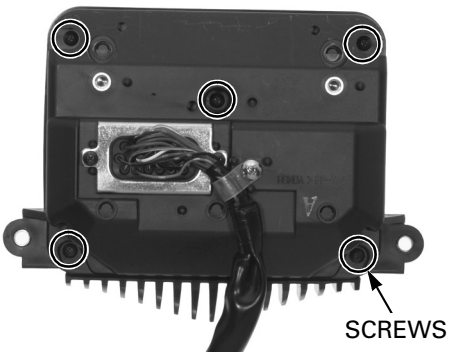


DISASSEMBLY

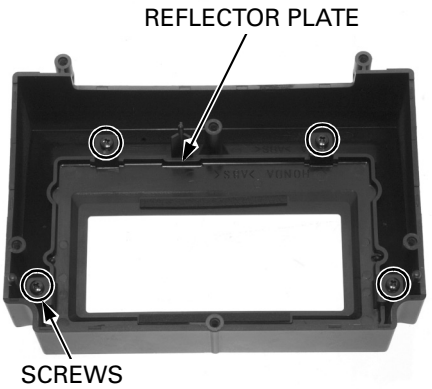
Remove the two bolts and meter stay from the lower case.



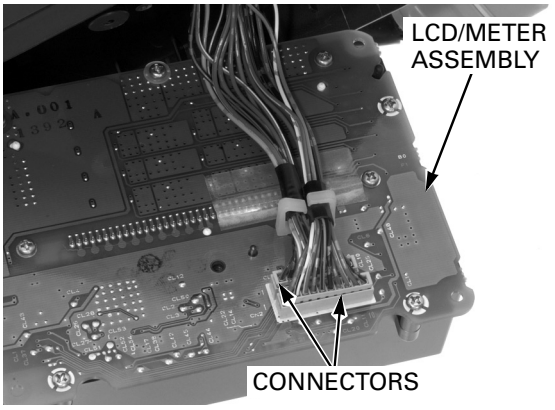
Remove the five screws and upper case from the lower case.



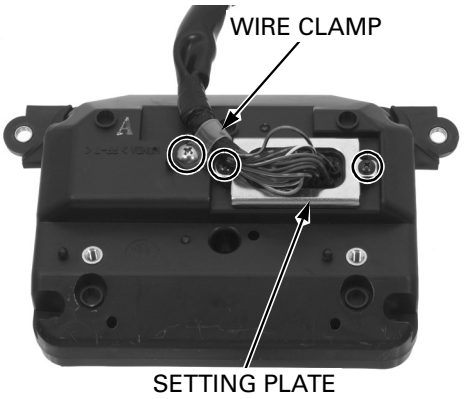
Remove the four screws and reflector plate from the upper case.



Disconnect the connectors and remove the LCD/meter assembly from the lower case.



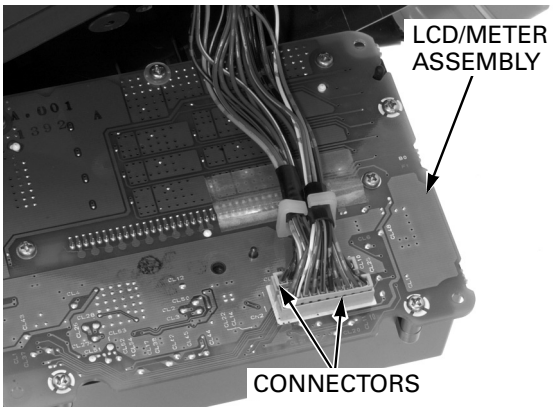
Remove the screw and wire clamp from the lower case.
Remove the two screws, setting plate and speedometer wire from the lower case.



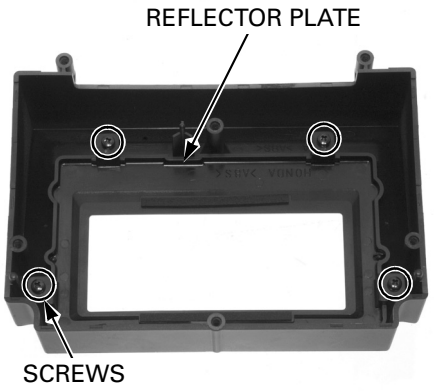
ASSEMBLY

Install the speedometer wire into the lower case and set the wire grommet onto the lower case.
Install the setting plate and tighten the two screws.
Install the wire clamp and tighten the screw.

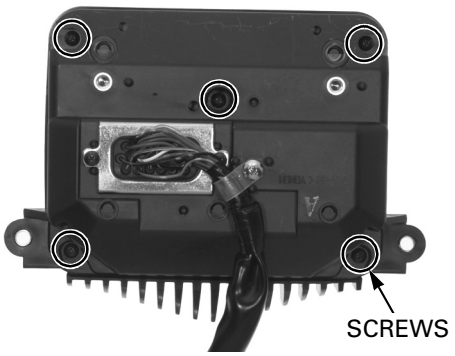
Connect the connectors and install the LCD/meter assembly into the lower case.



Install the reflector plate onto the upper case and tighten the four screws.

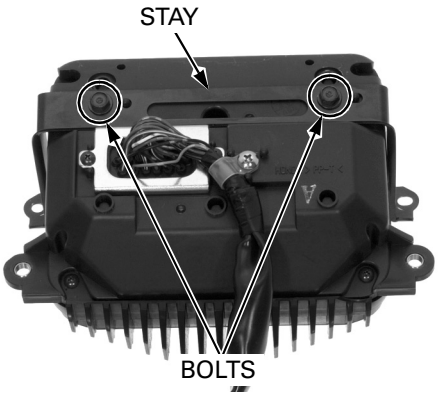


Install the upper case onto the lower case and tighten the five screws.



Install the meter stay onto the lower case and tighten the two bolts.

TORQUE: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)



POWER/GROUND LINE INSPECTION

Remove the fuel tank top cover (page 3-4).

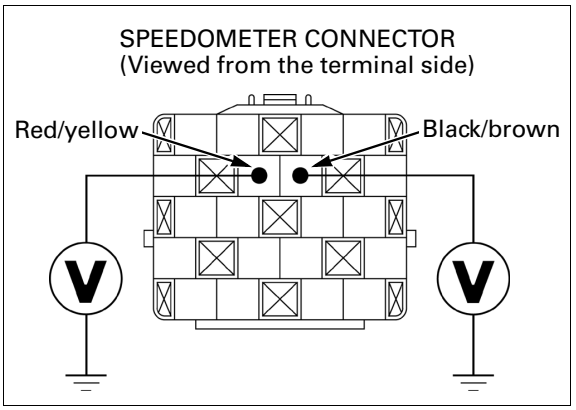
Check the following at the wire harness side connector terminals of the speedometer.

POWER INPUT LINE

Measure the voltage between the Black/brown wire terminal (+) and ground (–).
There should be battery voltage with the ignition switch turned to "ON".
If there is no voltage, check for an open circuit in the Brown/brown wire.

BACK-UP VOLTAGE LINE

Measure the voltage between the Red/yellow wire terminal (+) and ground (–).
There should be battery voltage at all times.
If there is no voltage, check for an open circuit in the Red/yellow wire.

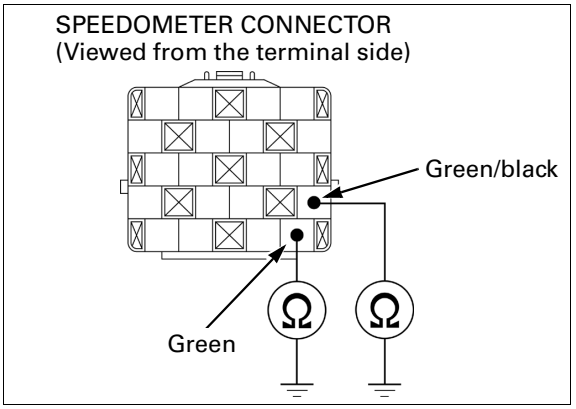


GROUND LINE

Check for continuity between the Green wire terminal and ground.
There should be continuity at all times.
If there is no continuity, check for an open circuit in the Green wire.

SENSOR 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.



SPEEDOMETER LINE INSPECTION

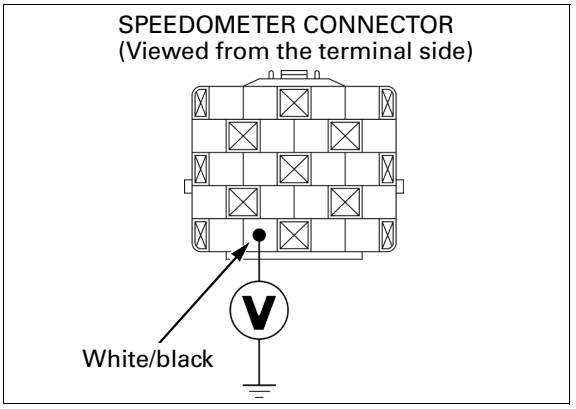
Check that the engine control module (ECM) stores failure code 11 (page 6-8).
If the ECM stores failure code 11, perform the troubleshooting (page 6-22).

Remove the fuel tank top cover (page 3-4).

Raise the rear wheel off the ground and support the motorcycle securely.
Shift the transmission into neutral and turn the ignition switch to "ON".
Measure the voltage between the White/black wire terminal (+) of the wire harness side speedometer connector and ground (–).
There should be 0 V to 5 V pulse voltage while slowly turning the rear wheel by hand.

If the pulse voltage does not appear, check the following

– open circuit in the White/black wire between the speedometer and speed sensor
– loose or poor contact in the related connectors

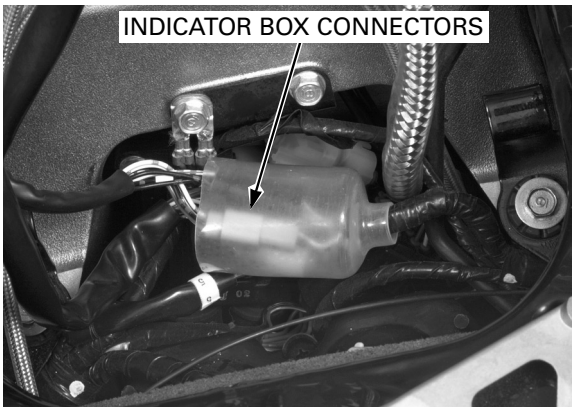


INDICATOR BOX

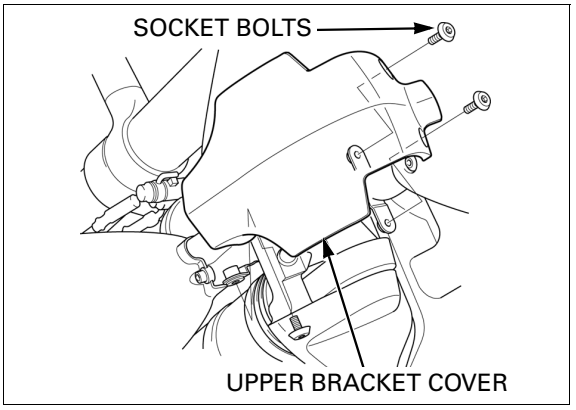
REMOVAL

Remove the fuel tank top cover (page 3-4).

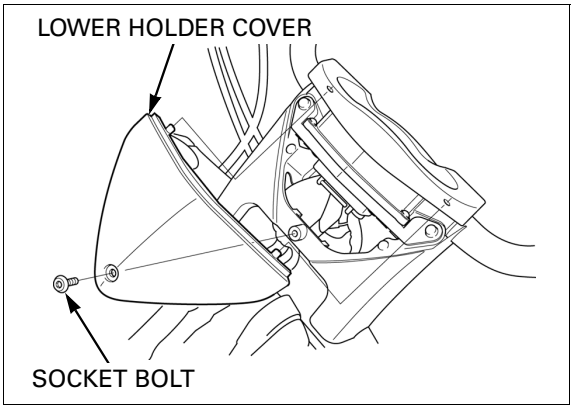
Turn the ignition switch to "OFF".
Disconnect the indicator box 7P green and yellow connectors.



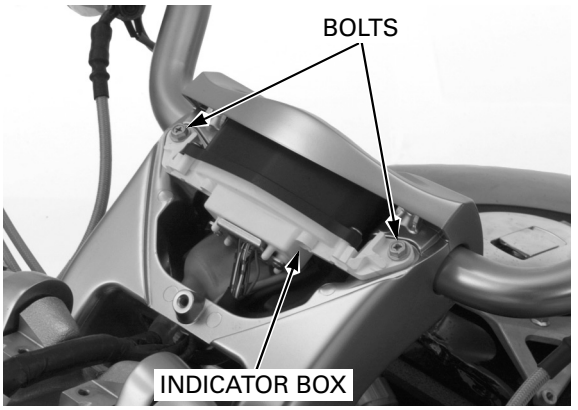
Remove the three socket bolts and the shock absorber upper bracket cover.



Remove the socket bolt and the lower holder cover.



Remove the two bolts and the indicator box.



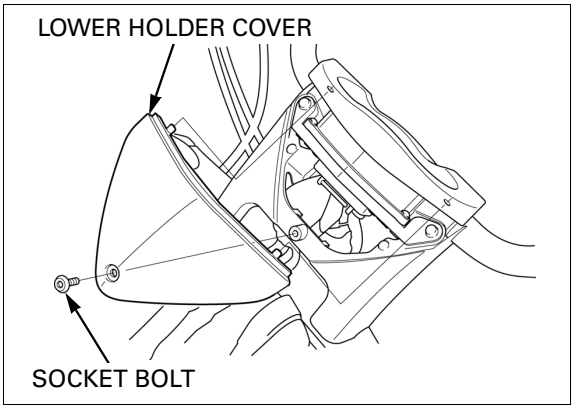
INSTALLATION

Route the indicator box wire properly (page 1-22).

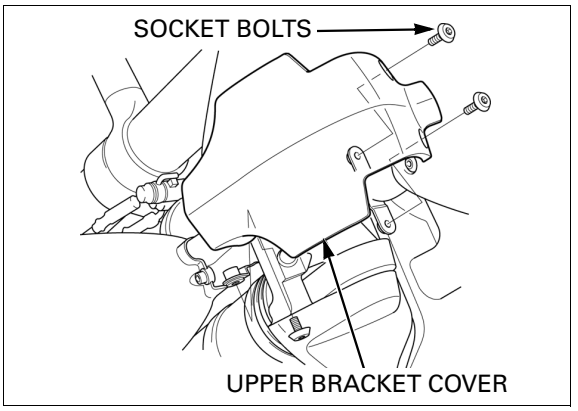
Install the indicator box and tighten the two bolts.

Install the lower holder cover by aligning the pins with holes in the upper holder, then tighten the socket bolt.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

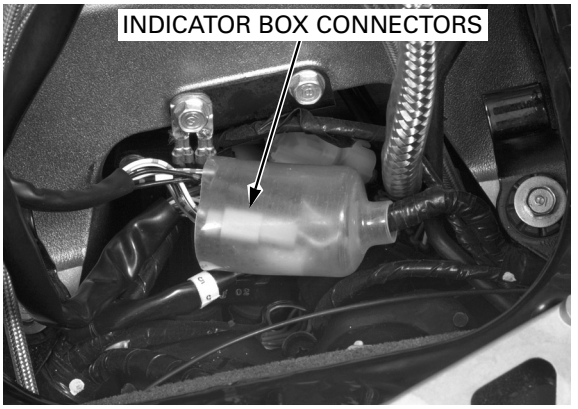


Install the shock absorber upper bracket cover and tighten the three socket bolts.



Connect the indicator box 7P green and yellow connectors.

Install the fuel tank top cover (page 3-4).



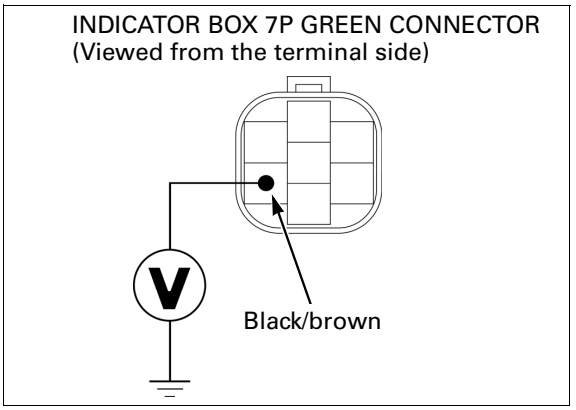
POWER/GROUND LINE INSPECTION

Remove the fuel tank top cover (page 3-4).

Turn the ignition switch to "OFF".
Disconnect the indicator box 7P green and yellow connectors.
Check the following at the wire harness side connector terminals:

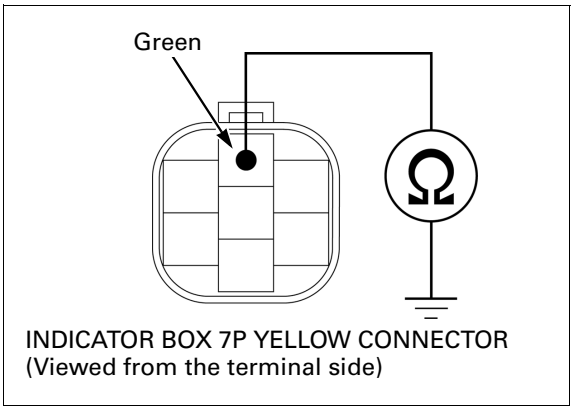
POWER INPUT LINE

Measure the voltage between the Black/brown wire terminal (+) and ground (–).
There should be battery voltage with the ignition switch turned to "ON".
If there is no voltage, check for an open circuit in the Brown/brown wire.



GROUND LINE

Check for continuity between the Green wire terminal and ground.
There should be continuity at all times.
If there is no continuity, check for an open circuit in the Green wire.



COOLANT TEMPERATURE INDICATOR/ THERMOSENSOR

SYSTEM INSPECTION

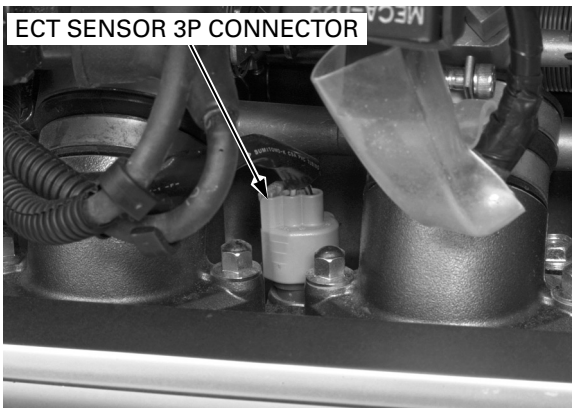
NOTE:

- Before inspection, check that all other indicators function properly. If they do not function, check the power input and ground lines of the indicator box.

1. Remove the left front side cover (page 3-4).

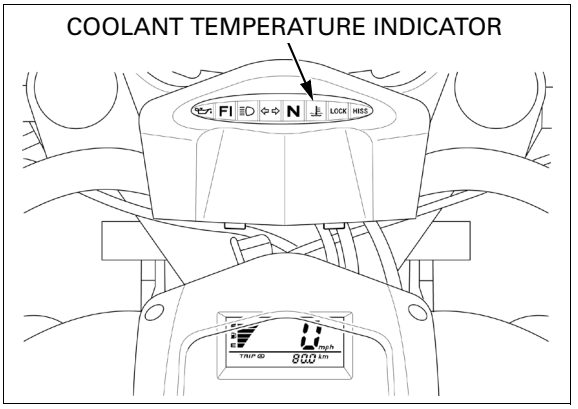
   Turn the ignition switch to "OFF".
   Disconnect the ECT sensor 3P connector.

   Ground the Black/blue wire (thermosensor) terminal of the wire harness side connector with a jumper wire.



2. Turn the ignition switch to "ON" and check the coolant temperature indicator.
   The indicator should come on.

- If the indicator comes on, the system is OK.
- If the indicator does not come on, go to step 3.

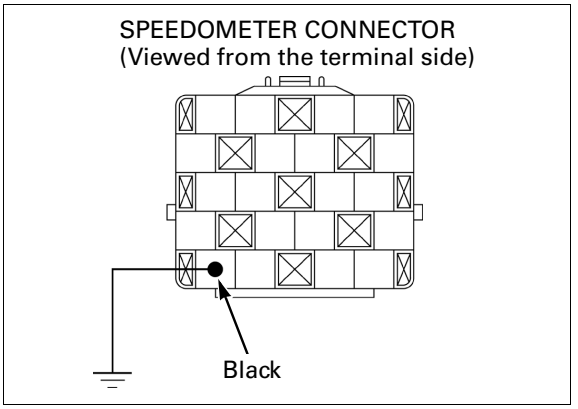


3. Turn the ignition switch to "OFF".
   Remove the fuel tank top cover (page 3-4).

   Ground the Black wire terminal of the wire harness side speedometer connector with a jumper wire.

   Turn the ignition switch to "ON" and check the coolant temperature indicator.
   The indicator should come on.

- If the indicator comes on, check for open circuit in the Black/blue wire.
- If the indicator does not come on, check for open circuit in the Black wire.

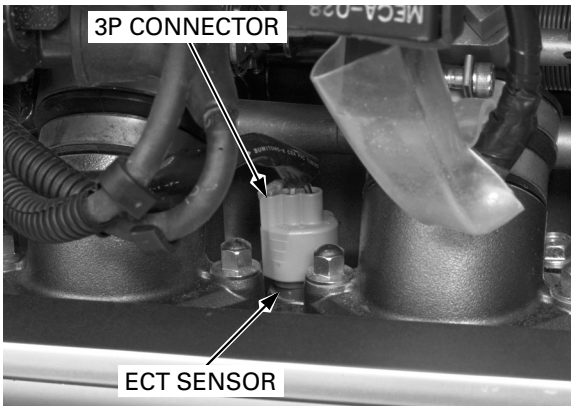


THERMOSENSOR INSPECTION

Remove the left front side cover (page 3-4).

Turn the ignition switch to "OFF".
Disconnect the ECT sensor 3P connector.

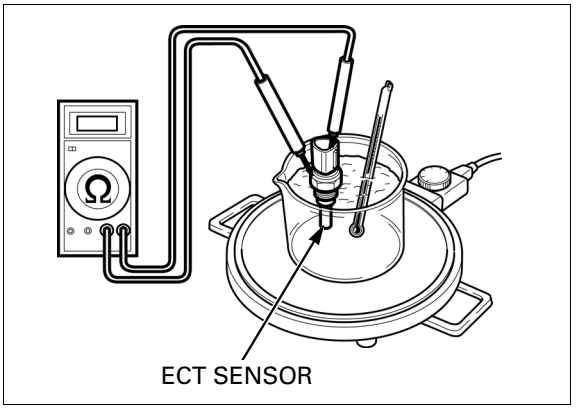
Remove the ECT sensor and sealing washer from the left cylinder head.



Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.

Suspend the ECT sensor in a pan of coolant (1:1 mixture) on an electric heating element and measure the resistance between the thermosensor terminal and body as the coolant heats up.

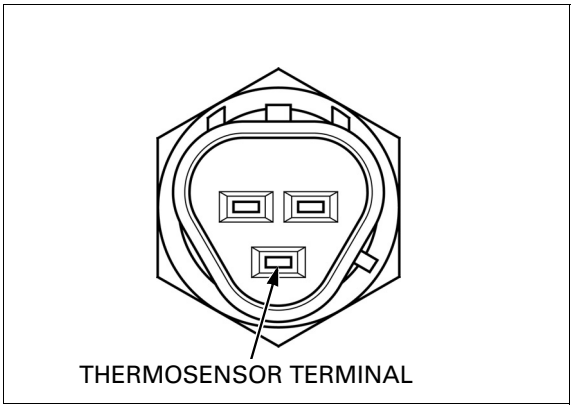
- Soak the ECT sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT sensor touch the pan.



The thermosensor terminal is shown in the illustration.

Replace the sensor if it is out of specification by more than 10% at any temperature listed.

Temperature	80°C (176°F)	120°C (248°F)
Resistance	2.1 – 2.6 kΩ	0.65 – 0.73 kΩ



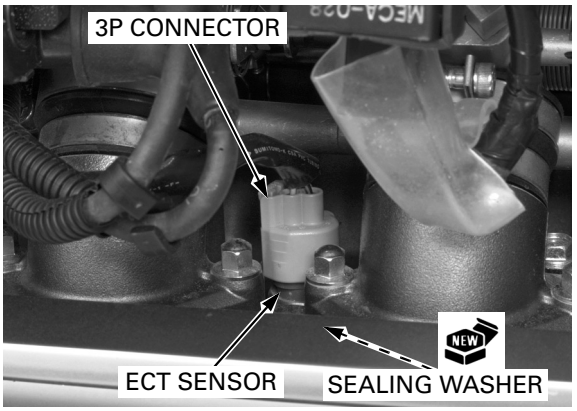
Install the ECT sensor with a new sealing washer and tighten it.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Connect the ECT sensor 3P connector.

Install the removed parts.

Fill and bleed the cooling system (page 7-7).



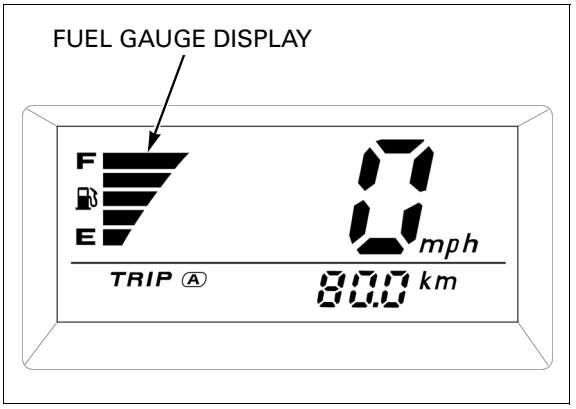
FUEL GAUGE/FUEL LEVEL SENSOR

INSPECTION

Remove the fuel tank (page 6-36).

Connect the speedometer connector.

Turn the ignition switch to "ON" and check the fuel gauge.
All segments should come on for two seconds, then start blinking.

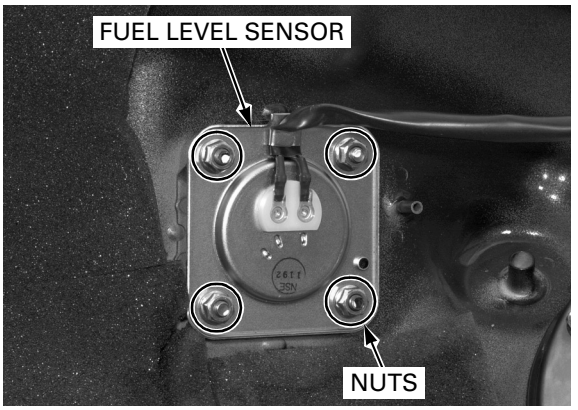


Turn the ignition switch to "OFF".
Short the fuel level sensor 2P blue connector terminals with a jumper wire.

Turn the ignition switch to "ON" and check the fuel gauge.
All segments should come on for two seconds, then start blinking.

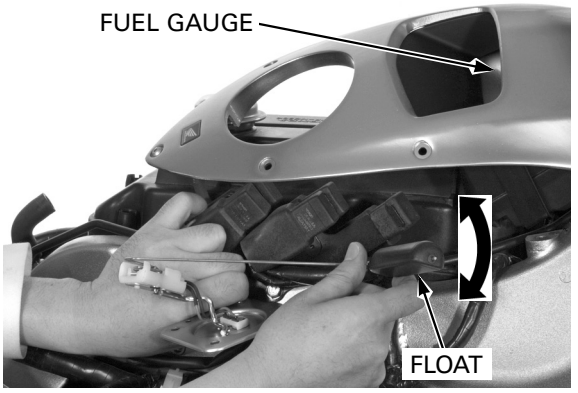
If the fuel gauge does not operate properly, replace the LCD/meter assembly (page 20-11).

Remove the four nuts and fuel level sensor from the fuel tank.
Remove the O-ring.



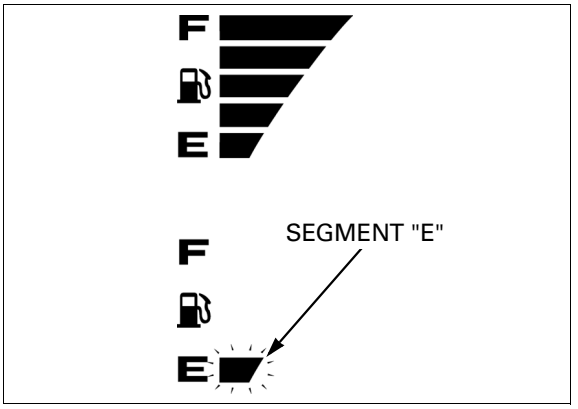
Turn the ignition switch to "OFF" and connect the fuel level sensor 2P blue connector.

Move the fuel level sensor float to the top (FULL) position, then turn the ignition switch to "ON" and check the fuel gauge.



All segments up to segment "F" should come on and stay on.

Turn the ignition switch to "OFF".
Move the float to the bottom (EMPTY) position, then turn the ignition switch to "ON" and check the fuel level gauge.
All segments should come on for two seconds and go off, then segment "E" should blink.



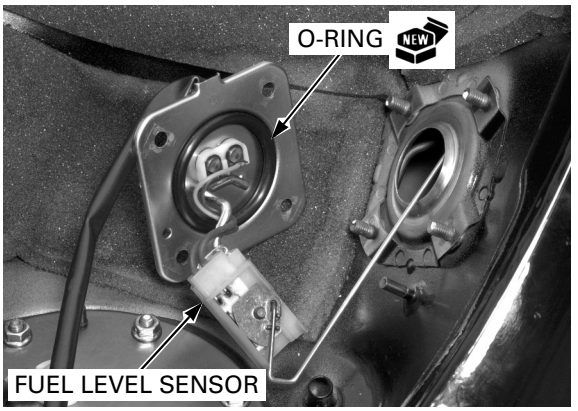
- If the fuel gauge does not operate properly, check the fuel level sensor (page 20-20).
  If the fuel level sensor is OK, replace the LCD/meter assembly (page 20-11).
- If all segments blink during inspection, check for an open or short circuit in the Gray/black wire and for open circuit in the Green/black wire.

Turn the ignition switch to "OFF" and disconnect the fuel level sensor connector.

Install the fuel level sensor into the fuel tank with a new O-ring.
Install and tighten the four nuts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

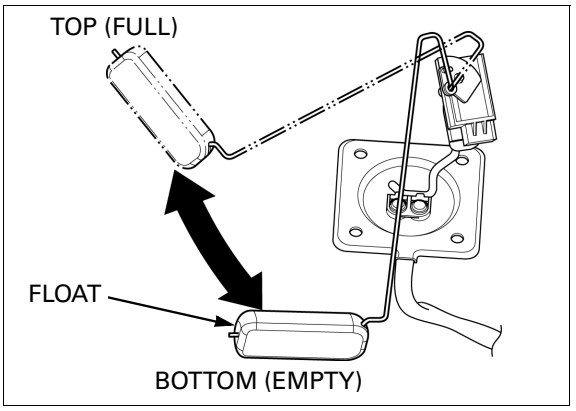
Install the fuel tank (page 6-37).



FUEL LEVEL SENSOR INSPECTION

Measure the fuel level sensor resistance between the connector terminals with the float at the top and bottom position.

FLOAT POSITION	RESISTANCE (20°C/68°)
TOP (FULL)	8 – 12 Ω
BOTTOM (EMPTY)	213 – 219 Ω



OIL PRESSURE SWITCH

INSPECTION

NOTE:

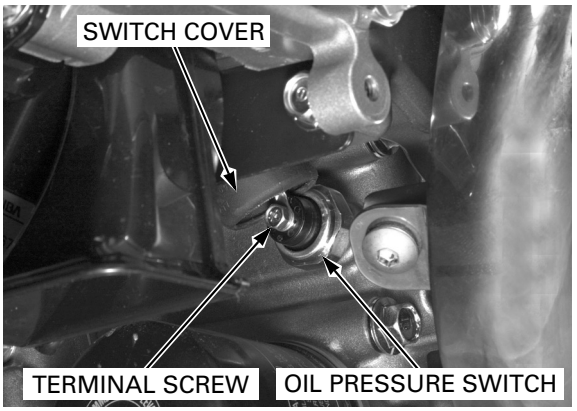
- Before inspection, check that all other indicators function properly. If they do not function, check the power input and ground lines of the indicator box.

Remove the radiator covers (page 3-6).

Remove the switch cover and disconnect to the oil pressure switch wire by removing the terminal screw.

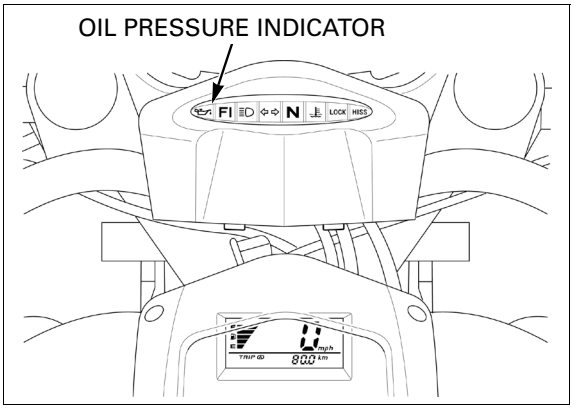
Indicator does not come on with the ignition switch turned to "ON"

1. Ground the oil pressure switch wire terminal with a jumper wire.



2. Turn the ignition switch to "ON" and check the oil pressure indicator.
   The indicator should come on.

- If the indicator comes on, replace the oil pressure switch.
- If the indicator does not come on, go to step 3.

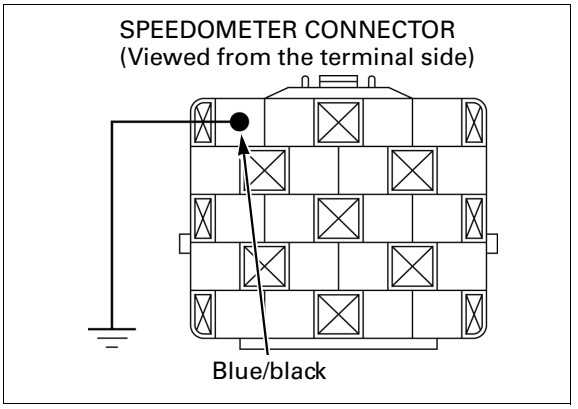


3. Turn the ignition switch to "OFF".
   Remove the fuel tank top cover (page 3-4).

   Ground the Blue/black wire terminal of the wire harness side speedometer connector with a jumper wire.

   Turn the ignition switch to "ON" and check the oil pressure indicator.
   The indicator should come on.

- If the indicator comes on, check for open circuit in the Blue/red wire.
- If the indicator does not come on, check for open circuit in the Blue/black wire.



Indicator stays on while the engine is running

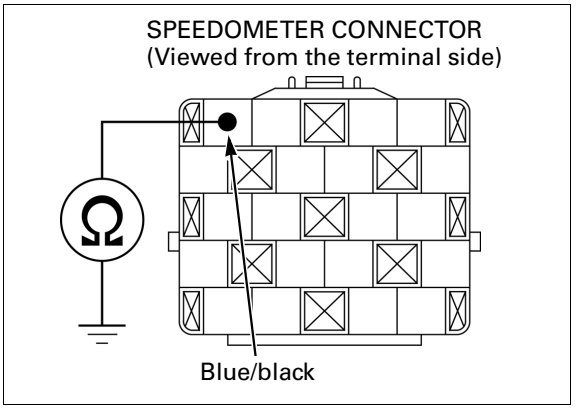
1. Check for continuity between the oil pressure switch wire terminal and ground.
   There should be no continuity.

- If there is continuity, check for short circuit in the Blue/red wire.
- If there is no continuity, go to step 2.

2. Remove the fuel tank top cover (page 3-4).

   Check for continuity between the Blue/black wire terminal of the wire harness side speedometer connector and ground.

- If there is continuity, check for short circuit in the Blue/black wire.
- If there is no continuity, replace the LCD/meter assembly (page 20-11).

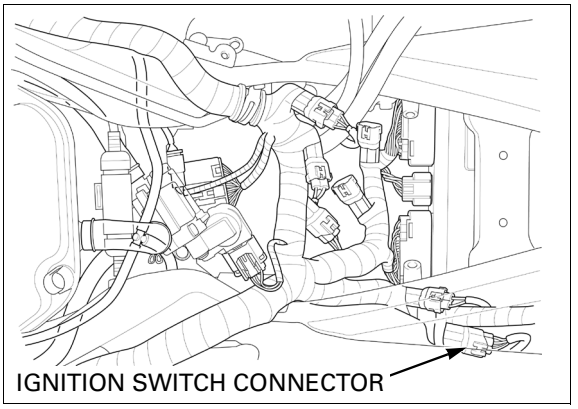


IGNITION SWITCH

INSPECTION

Remove the fuel tank (page 6-36).

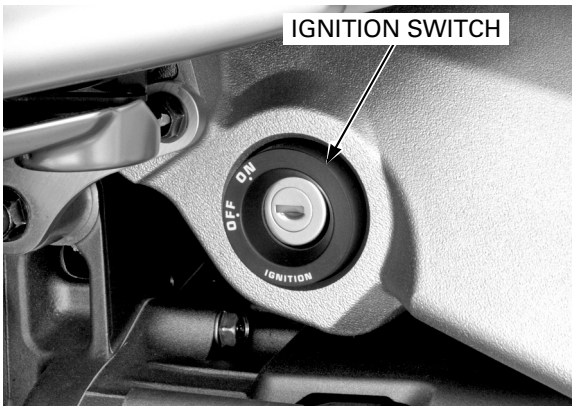
Disconnect the ignition switch 4P white connector.



Check for continuity between the wire terminals of the ignition switch connector in each switch position.
Continuity should exist between the color coded wires as follows:

IGNITION SWITCH

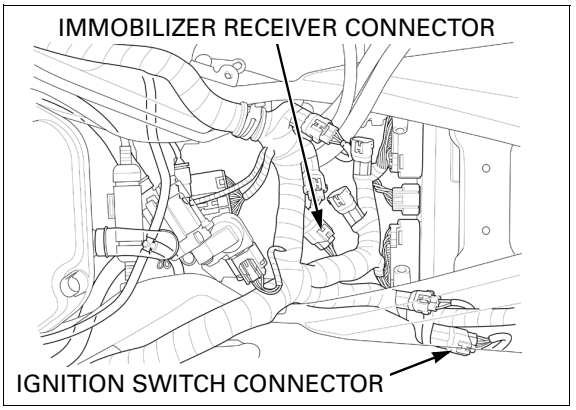
COLOR	R	R/Bl	Bu/O	R	R/W
ON	○	○	○	○	○
OFF					



REPLACEMENT

Remove the fuel tank (page 6-36).

Disconnect the immobilizer receiver and ignition switch 4P connectors.

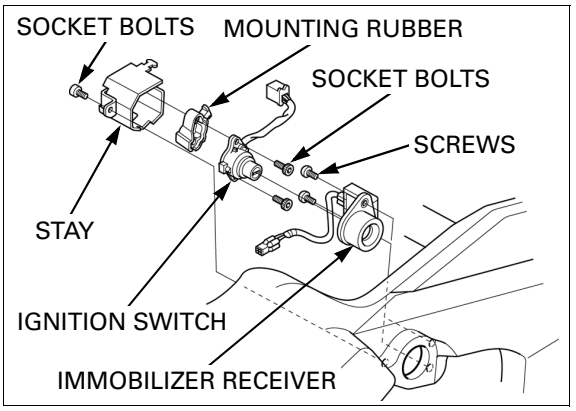


Remove the two socket bolts and ignition switch stay from the frame.
Remove the two socket bolts, ignition switch and mounting rubber from the stay.

Remove the two screws and immobilizer receiver from the frame.

Install the immobilizer receiver and ignition switch in the reverse order of removal.

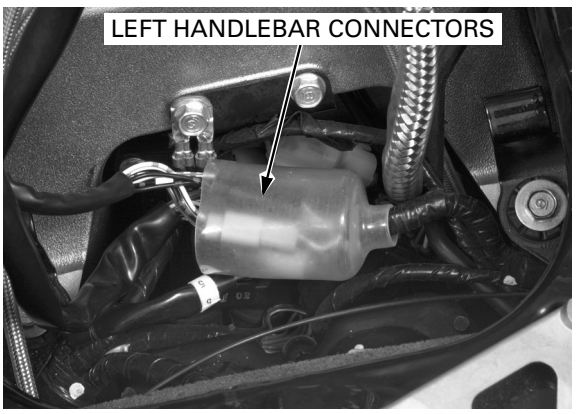
TORQUE:
Ignition switch mounting bolt:
10 N·m (1.0 kgf·m, 7 lbf·ft)
Ignition switch stay bolt:
10 N·m (1.0 kgf·m, 7 lbf·ft)



HANDLEBAR SWITCHES

Remove the fuel tank top cover (page 3-4).

Disconnect the right handlebar switch 7P gray and black connectors.

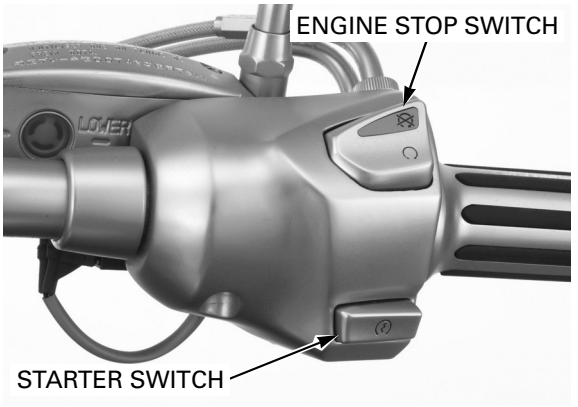


Check for continuity between the wire terminals of the right handlebar switch connectors.
Continuity should exist between the color coded wire terminals as follows:

ENGINE STOP/STARTER SWITCHES

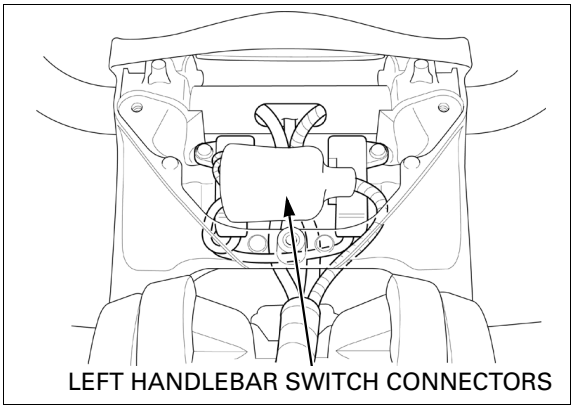
COLOR	W	Bl/W
OFF	○	○
RUN		

COLOR	Y/R	W/Bl	Bl/R	Bu/W
FREE			○	○
PUSH	○	○		



Remove the indicator box (page 20-14).

Disconnect the left handlebar switch 7P white and gray connectors.



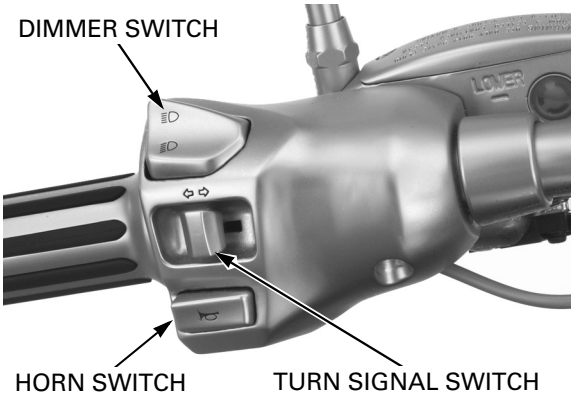
Check for continuity between the wire terminals of the left handlebar switch connectors.
Continuity should exist between the color coded wire terminals as follows:

TURN SIGNAL/DIMMER/HORN SWITCHES

COLOR	P	Lb	O
R	○	○	
N			
L	○		○

COLOR	W	Bu	
Lo			
(N)	○	○	
Hi	○	○	

COLOR	Bl/Br	Lg
FREE		
PUSH	○	○

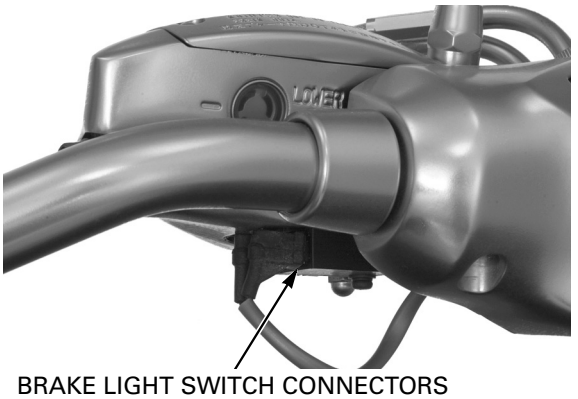


BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors and check for continuity between the switch terminals.

There should be continuity with the brake lever squeezed, and there should be no continuity with the brake lever released.

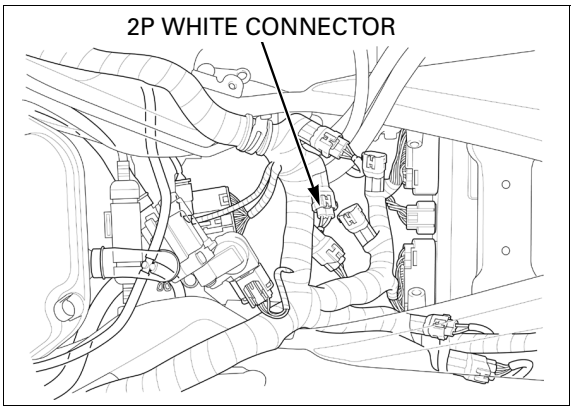


REAR

Raise the front of the fuel tank and support it (page 3-4).

Disconnect the rear brake light switch 2P white connector and check for continuity between the switch side connector terminals.

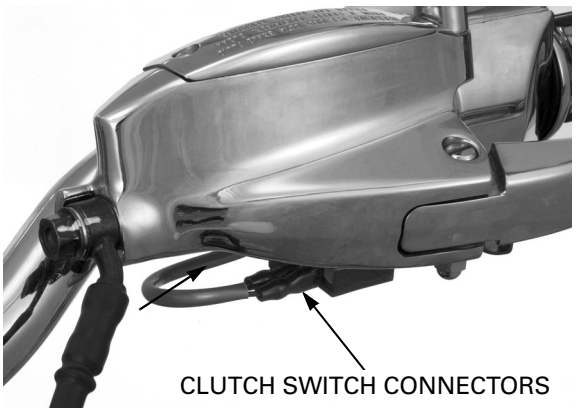
There should be continuity with the brake pedal depressed, and there should be no continuity with the brake pedal released.



CLUTCH SWITCH

Disconnect the clutch switch connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed, and there should be no continuity with the clutch lever released.

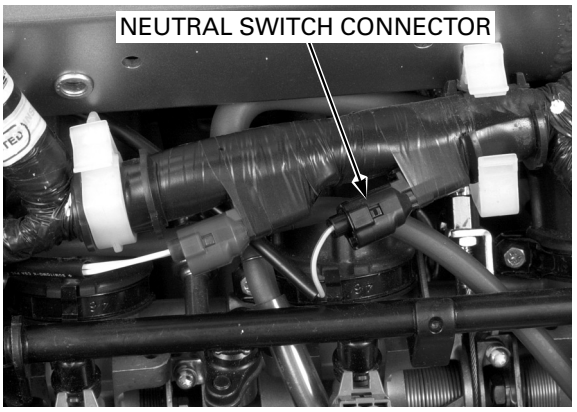


NEUTRAL SWITCH

INSPECTION

Remove the left front inner cover (page 3-4).

Disconnect the neutral switch 2P black connector.
Check for continuity between the Light green/red wire terminal of the switch side connector and ground.
There should be continuity when the transmission is in neutral, and no continuity when the transmission is in gear.

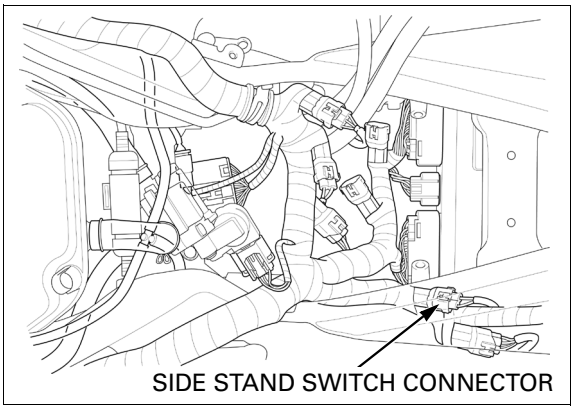


SIDE STAND SWITCH

INSPECTION

Remove the fuel tank (page 6-36).

Disconnect the side stand switch 2P green connector.
Check for continuity between the wire terminals of the side stand switch connector.
There should be continuity when the side stand is retracted, and no continuity when the side stand is lowered.



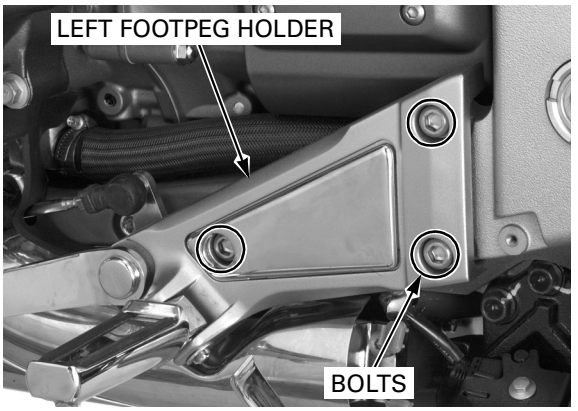
REMOVAL

Remove the following:

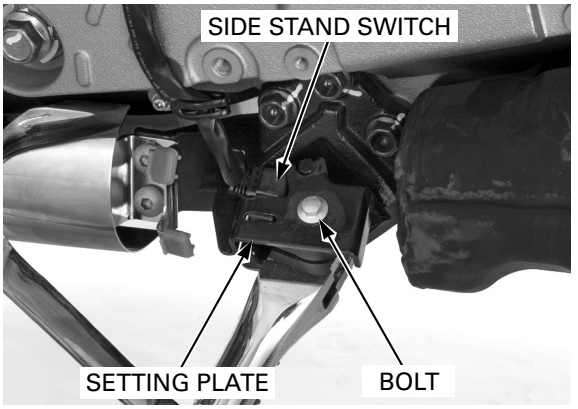
– fuel tank (page 6-36)
– left muffler cover (page 3-7)

Disconnect the side stand switch 2P green connector.

Remove the three socket bolts and the left footpeg holder.

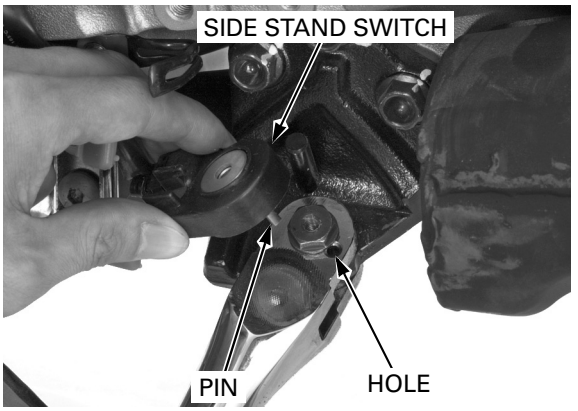


Remove the bolt, setting plate and side stand switch.



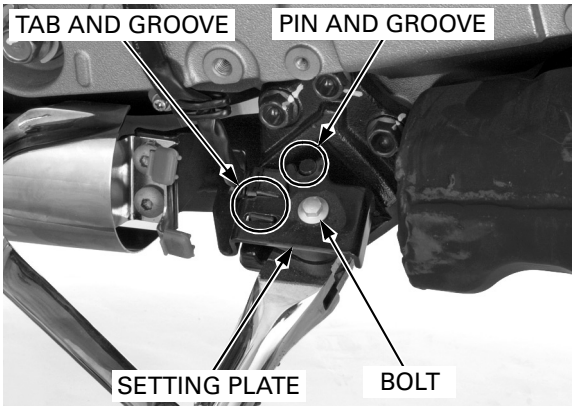
INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole.

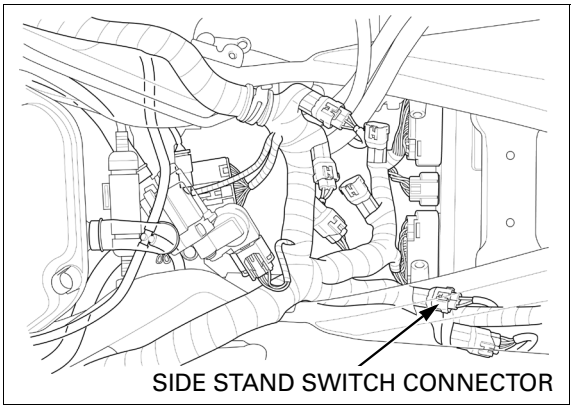


Install the setting plate by aligning its tab with the switch groove and its groove with the bracket pin. Install and tighten the bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



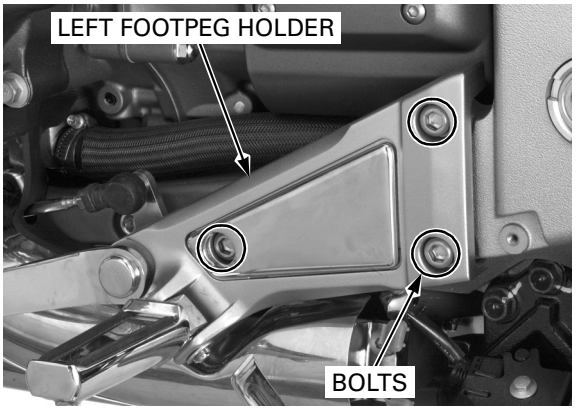
Route the side stand switch wire properly (page 1-22).
Connect the side stand switch 2P green connector.



Install the left footpeg holder and tighten the three socket bolt securely.

Install the following:

– left muffler cover (page 3-8)
– fuel tank (page 6-37)

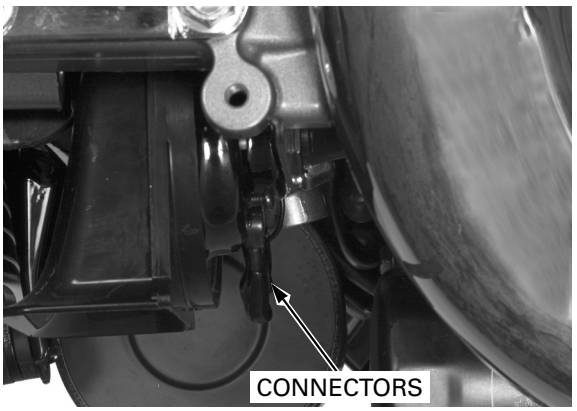


HORN

Remove the radiator covers (page 3-6).

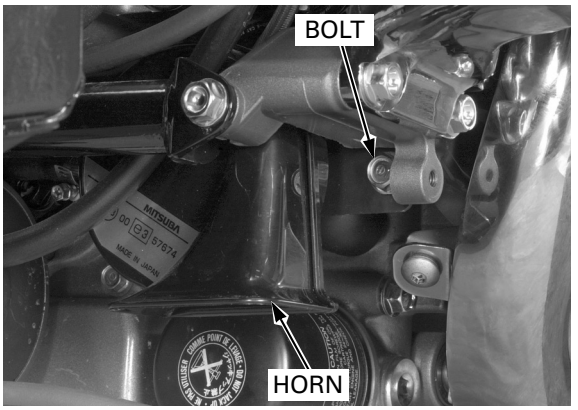
Disconnect the wire connectors from the horn.

Connect the 12-V battery to the horn terminals directly.
The horn is normal if it sounds when the 12-V battery is connected across the horn terminals.



If horn is abnormal, remove the bolt and replace the horn with a new one.

Install the removed parts in the reverse order of removal.



HEADLIGHT RELAY

SYSTEM INSPECTION

NOTE:

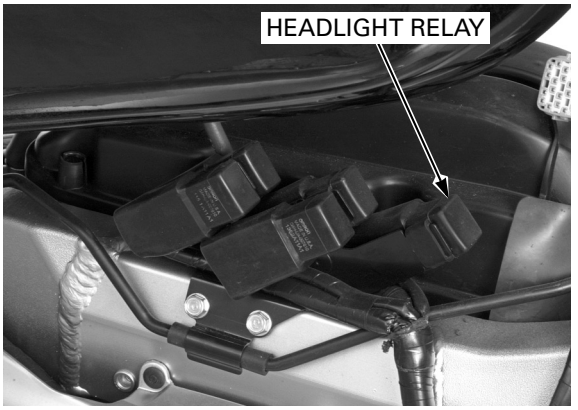
- Perform this inspection if the headlight does not light with the ignition switch turned to "ON".

1. Raise the front of the fuel tank and support it (page 3-4).

   Exchange the headlight relay with the other good one.

   Turn the ignition switch to "ON".

- If the headlight comes on, replace the headlight relay with a new one.
- If the headlight does not come on, go to step 2.



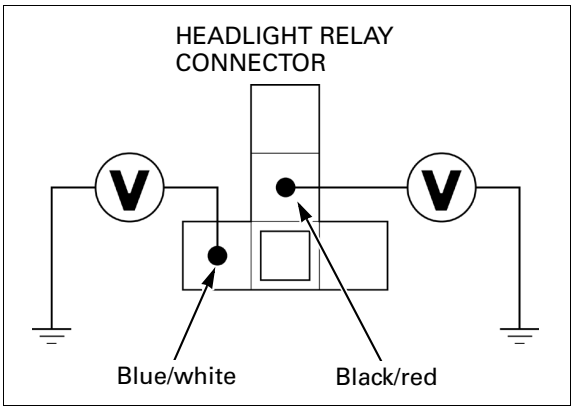
2. Turn the ignition switch to "OFF" and remove the relay.

   Turn the ignition switch to "ON" and measure the voltage between the Black/red wire terminal (+) of the headlight relay connector and ground (–). There should be battery voltage.

- If there is no voltage, check the following:
  – open circuit in the Black/red wire between the relay connector and fuse box
  – blown HEADLIGHT fuse (20 A)
- If there is battery voltage, go to step 3.

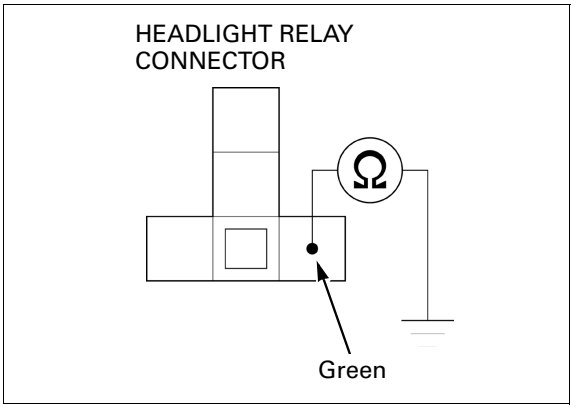
3. Measure the voltage between the Blue/white wire terminal (+) of the headlight relay connector and ground (–).
   There should be battery voltage.

- If there is no voltage, check the following:
  – open circuit in the Blue/white wire between the relay connector and starter switch
  – starter switch (page 20-22)
  – open circuit in the Black/red wire between the starter switch and fuse box
- If there is battery voltage, go to step 4.



4. Turn the ignition switch to "OFF" and check for continuity between the Green wire terminal of the headlight relay connector and ground.
   There should be continuity at all times.

- If there is no continuity, repair the open circuit in the Green wire.
- If there is continuity, check for open circuit in the White wire between the relay connector and headlight.



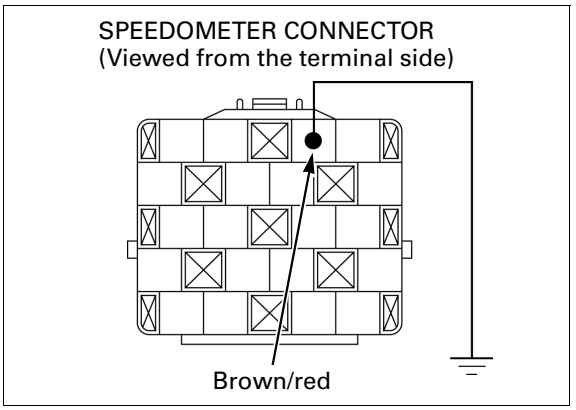
FAN CONTROL RELAY

SYSTEM INSPECTION

1. Remove the fuel tank top cover (page 3-4).

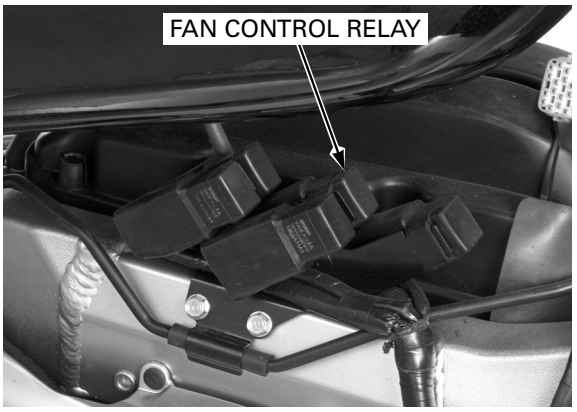
   Ground the Brown/red wire terminal of the wire harness side speedometer connector with a jumper wire.
   Turn the ignition switch to "ON".
   The cooling fans should start.

- If the cooling fans start, the system is OK.
- If the cooling fans do not start, go to step 2.



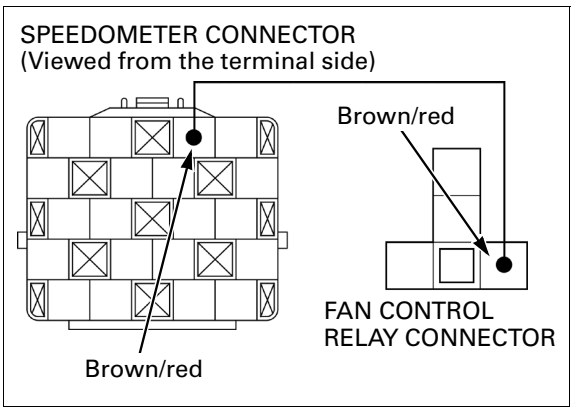
2. Raise the front of the fuel tank and support it (page 3-4).

   Turn the ignition switch to "OFF" and remove the fan control relay.



3. Check for continuity between the Brown/red wire terminals of the fan control relay connector and speedometer connector.
   There should be continuity.

- If there is no continuity, repair the open circuit in the Brown/red wire.
- If there is continuity, go to step 4.

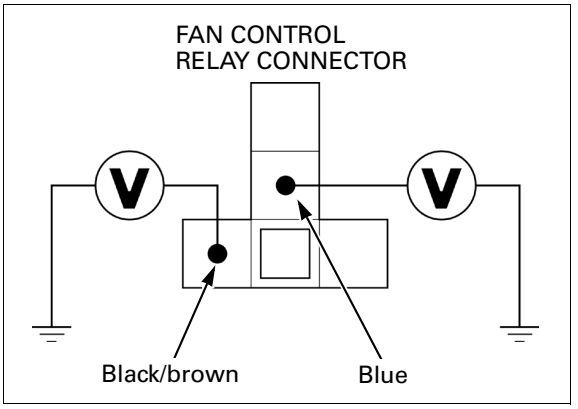


4. Measure the voltage between the Blue wire terminal of the fan control relay connector (+) and ground (–).
   There should be battery voltage at all times.

- If there is no voltage, check the following:
  – open circuit in the Blue wire
  – blown FAN MOTOR fuse (30 A)
- If there is battery voltage, go to step 5.

5. Turn the ignition switch to "ON" and measure the voltage between the Black/brown wire terminal of the fan control relay connector (+) and ground (–).
   There should be battery voltage.

- If there is no voltage, check the following:
  – open circuit in the Black/brown wire
  – blown TAIL/METER/FAN CONTL fuse (10 A)
- If there is battery voltage, check the following:
  – open circuit in the Black/blue wire between the fan control relay connector and cooling fan connectors
  – Faulty cooling fan motors

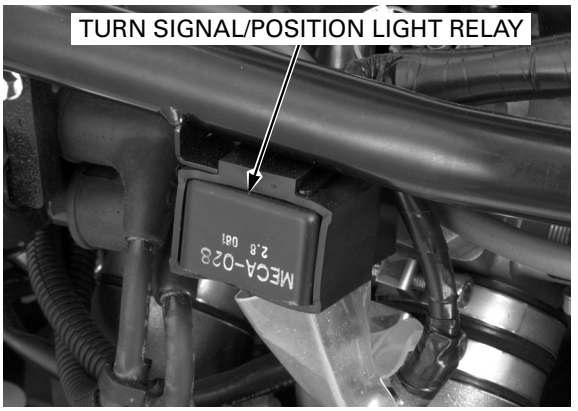


TURN SIGNAL/POSITION LIGHT RELAY

SYSTEM INSPECTION

Remove the left front side cover (page 3-4).

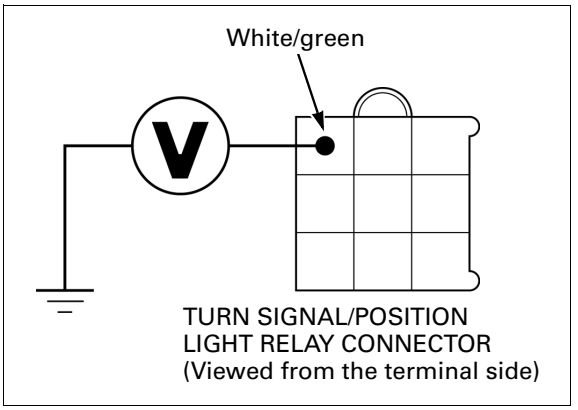
Remove the turn signal/position light relay from the stay of the injector guard.
Disconnect the 9P black connector from the turn signal/position light relay.
Check the following at the main wire harness side connector terminals:



POWER INPUT LINE

Turn the ignition switch to "ON" and measure the voltage between the White/green terminal (+) and ground (–).
There should be battery voltage.

If there is no voltage, check the following:
– open circuit in the White/green wire between the relay connector and fuse box
– blown TURN fuse (5 A)

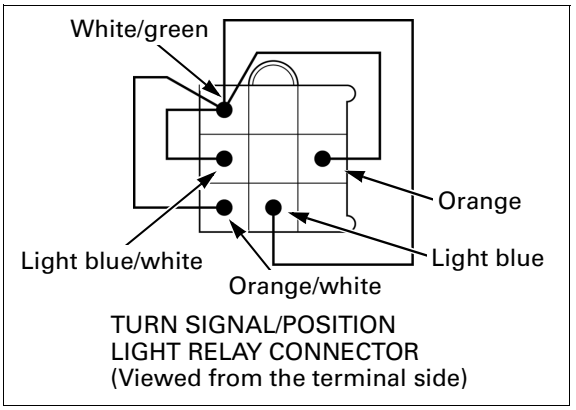


TURN SIGNAL LIGHT LINES

Connect the White/green wire terminal and following terminal with a jumper wire and turn the ignition switch to "ON".
The appropriate turn signal light should come on.

Right front: White/green – Light blue/white
Right rear: White/green – Light blue
Left front: White/green – Orange/white
Left rear: White/green – Orange/

If the turn signal light does not come on, check the following:
– open circuit in the wire between the relay connector and turn signal light
– faulty turn signal light bulb
– open circuit in the Green wire between the turn signal light and ground terminal
– loose or poor contact in the related connectors



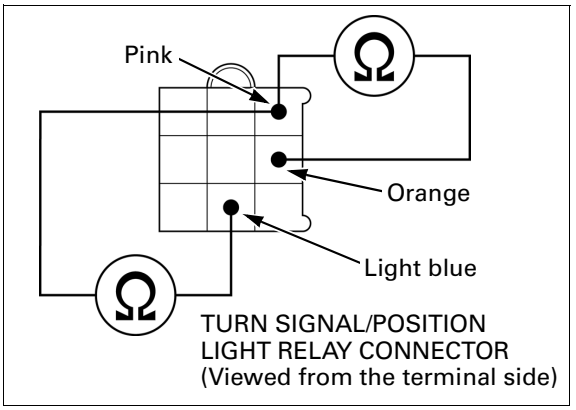
TURN SIGNAL/POSITION LIGHT RELAY CONNECTOR
(Viewed from the terminal side)

TURN SIGNAL SWITCH LINES

Check for continuity between the Pink and Light blue wire terminals.
There should be continuity with the turn signal switch turned to "⇨", and no continuity with the switch pushed in (OFF).

Check for continuity between the Pink and Orange wire terminals.
There should be continuity with the turn signal switch turned to "⇦", and no continuity with the switch pushed in (OFF).

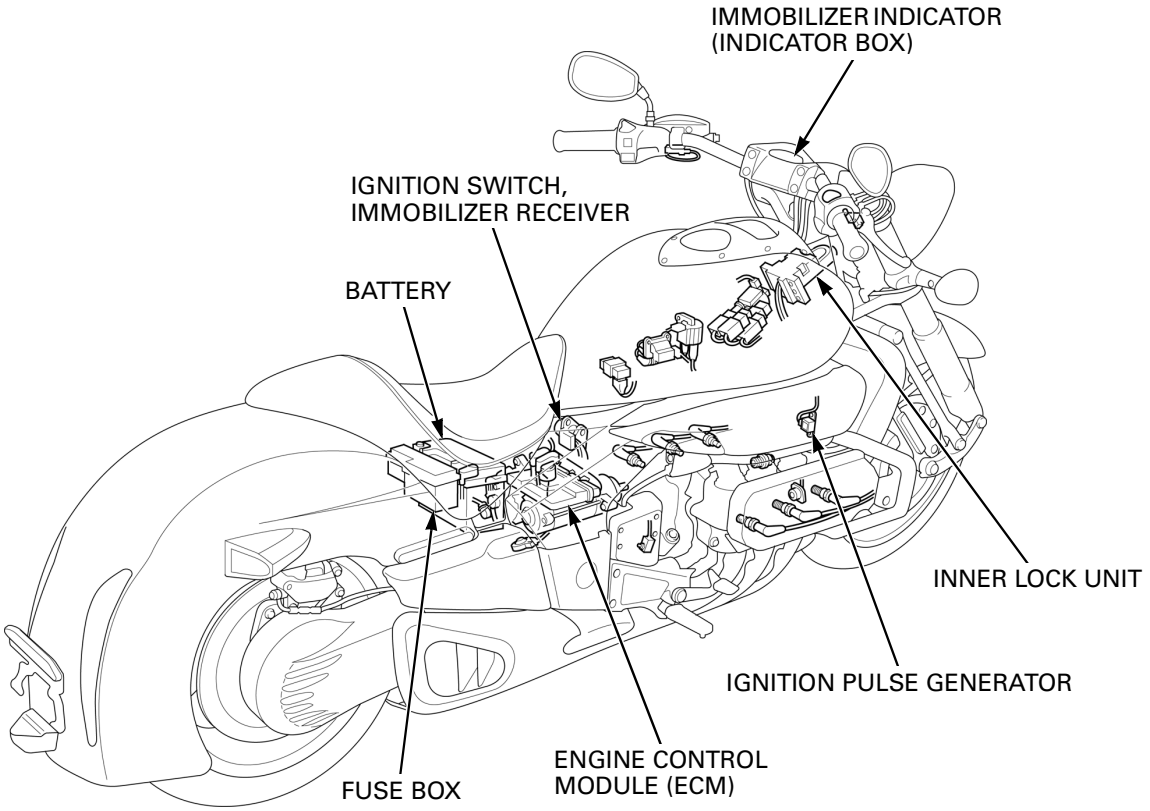
If the turn signal light does not come on, check the following:
– open circuit in the wire between the relay connector and turn signal switch
– faulty turn signal switch
– loose or poor contact in the related connectors



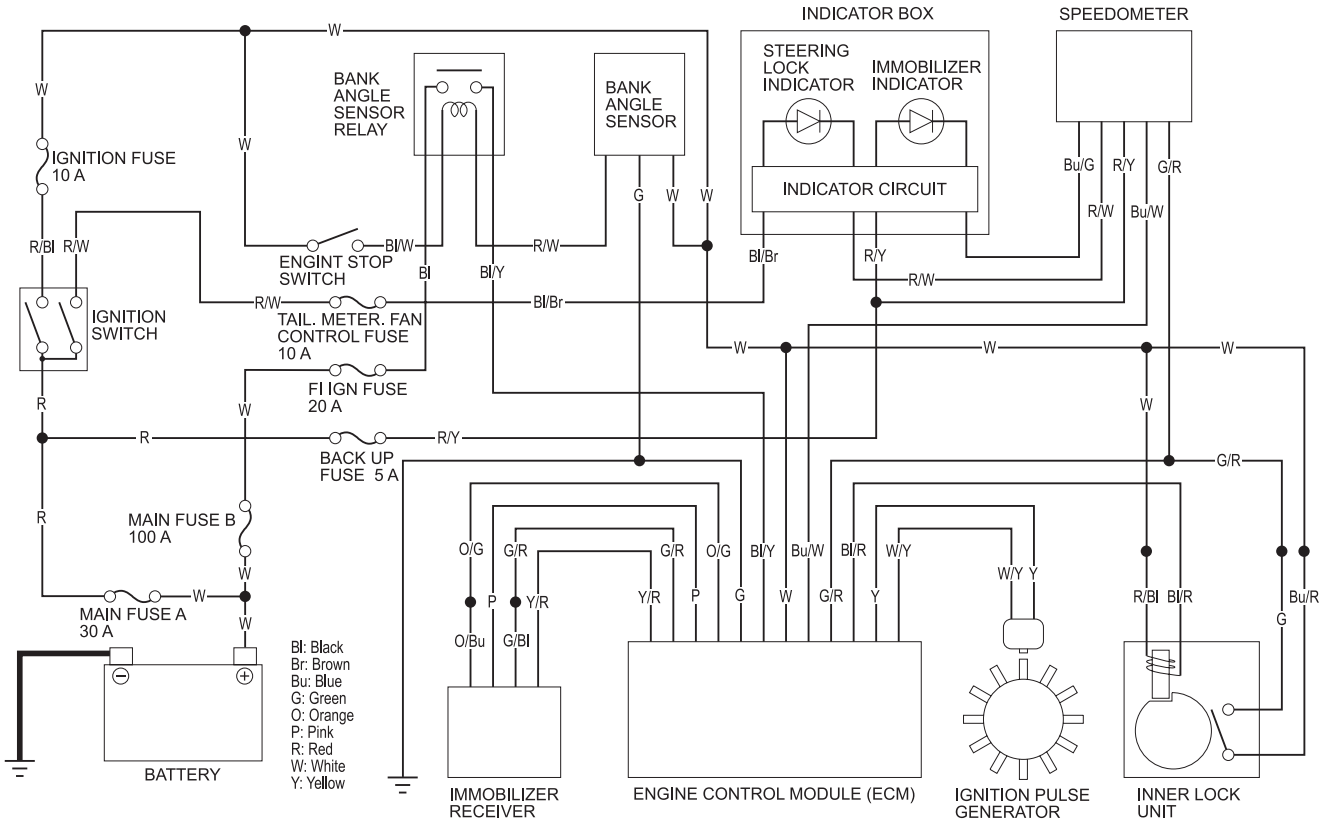
TURN SIGNAL/POSITION LIGHT RELAY CONNECTOR
(Viewed from the terminal side)

21. IMMOBILIZER SYSTEM (HISS)

COMPONENT LOCATION



SYSTEM DIAGRAM



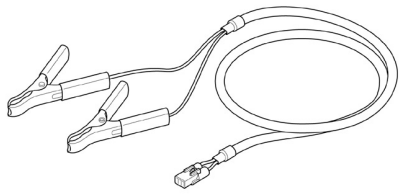
SERVICE INFORMATION

GENERAL

- HISS is the abbreviation of Honda Ignition Security System.
- The immobilizer system (HISS) on this motorcycle is integrated with the steering lock system. The steering is locked by operating the lock lever with the ignition switch turned to "OFF" and it is unlocked by turning the ignition switch to "ON" with the properly registered key.
- When checking the immobilizer system, follow the steps in the troubleshooting (page 21-9).
- Keep the immobilizer key away from another 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 a built-in electronic transponder. Do not drop or 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 water for a prolonged time, i.e. swimming, laundry, etc...
- The engine control module (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 unless the code is registered into the transponder with the immobilizer system.
- 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 system failure. (The engine cannot be started.)
- For ECM inspection, see section 6.
- For ignition system inspection, see section 18.
- For ignition switch and combination meter servicing, see section 20.

TOOL

Immobilizer test harness
07AMZ-MECA100



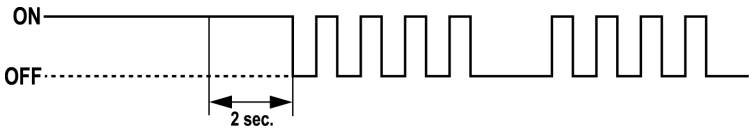
KEY REGISTRATION PROCEDURES

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 ignition pulse generator lines of the Engine Control Module (ECM) using the special tool (page 21-7).
4. Make sure the engine stop switch is turned to "Ω" and turn the ignition switch to "ON" with the original key. The immobilizer indicator comes on and it remains on.

- The code of the original key is recognized by the ECM.
- If there is any problem in the immobilizer system, 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).

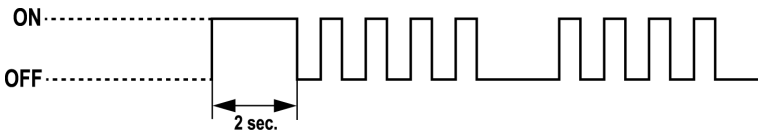
5. Disconnect the red clip of the special tool from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds, then it blinks four times repeatedly.



- The immobilizer system enters the registration mode. Registration of all keys 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 to "OFF" and remove the key.
7. Turn the ignition switch to "ON" with a new key or the spare key. 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 on for approx. ten seconds, then it will indicate the diagnostic code (page 21-8).

NOTICE

Keep any invalid transponder key more than 50 mm (2.0 in) away from the immobilizer receiver.

8. Repeat steps 6 and 7 when you continuously register another new key.

NOTE:

- The ECM can store up to four key codes. (Four keys can be registered.)

9. Turn the ignition switch to "OFF", remove the special tools and connect the ignition pulse generator connector.
10. Turn the ignition switch to "ON" with the registered key.

- The immobilizer system returns to the normal mode.

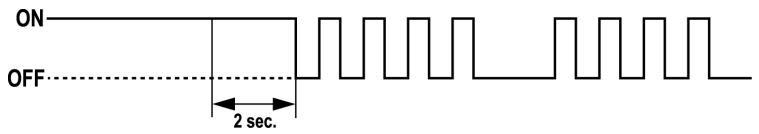
11. Check that the engine can be started using all registered keys.

When the ignition switch is faulty:

1. Obtain a new ignition switch and two new transponder keys.
2. Remove the ignition switch (page 20-22).
3. Apply 12 V battery voltage to the ignition pulse generator lines of the Engine Control Module (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. Make sure the engine stop switch is turned to "$\circlearrowright$" and turn the ignition switch to "ON" with a new transponder key. (Keep the ignition switch away from the receiver.) The immobilizer indicator comes on and it remains on.

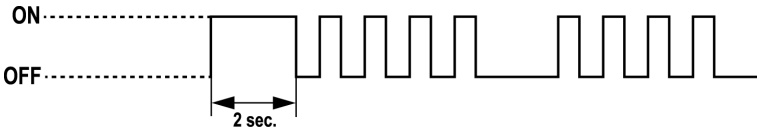
- The code of the original key is recognized by the ECM.
- If there is any problem in the immobilizer system, the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 21-7).

6. Disconnect the red clip of the special tool 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 enters the registration mode. Registration of all keys except the original key set near the receiver are cancelled.

7. Turn the ignition switch to "OFF" and remove the key.
8. Install the ignition switch (page 20-22).
9. Turn the ignition switch to "ON" with the first new key. The 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).

10. Turn the ignition switch to "OFF" and disconnect the red clip of the special tool from the battery positive (+) terminal.
11. Turn the ignition switch to "ON" (with the first key registered in step 9). The immobilizer indicator comes on for two seconds then it goes off.

- The immobilizer system returns to the normal mode.

12. Turn the ignition switch to "OFF" and connect the red clip of the special tool to the battery positive (+) terminal.
13. Turn the ignition switch to "ON" (with the first key registered in step 9). The immobilizer 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, 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 special tool 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 enters the registration mode. Registration of the original key used in step 4 is cancelled.

15. Turn the ignition switch to "OFF" and remove the key.
16. Turn the ignition switch to "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 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 on for approx. ten seconds, then it will indicate the diagnostic code (page 21-8).

NOTICE

Keep any invalid transponder key more than 50 mm (2.0 in) away from the immobilizer receiver.

17. Repeat steps 15 and 16 when you continuously register another new key.

NOTE:

- The ECM can store up to four key codes. (Four keys can be registered.)

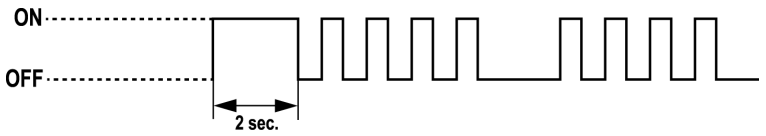
18. Turn the ignition switch to "OFF", remove the special tools and connect the ignition pulse generator connector.
19. Turn the ignition switch to "ON" with the registered key.

- The immobilizer system returns to the normal mode.

20. Check that the engine can be started using all registered keys.

When all keys have been lost, or the Engine Control Module (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 keys have been lost).
3. Replace the ECM with a new one.
4. Make sure the engine stop switch is turned to "Ω" and turn the ignition switch to "ON" with the first new key. The immobilizer 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 on for approx. ten seconds, then it will indicate the diagnostic code (page 21-8).

5. Turn the ignition switch to "OFF" and remove the first key.
6. Turn the ignition switch to "ON" with a second new key. The immobilizer 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 on for approx. ten seconds, then it will indicate the diagnostic code (page 21-8).

7. Turn the ignition switch to "OFF" and remove the second key.

- The system (ECM) will not enter the normal mode unless two keys are registered in the ECM.
- A third new key cannot be continuously registered. When it is necessary to register a third key, follow the procedures "When the key has been lost, or additional key is required" (page 21-4).

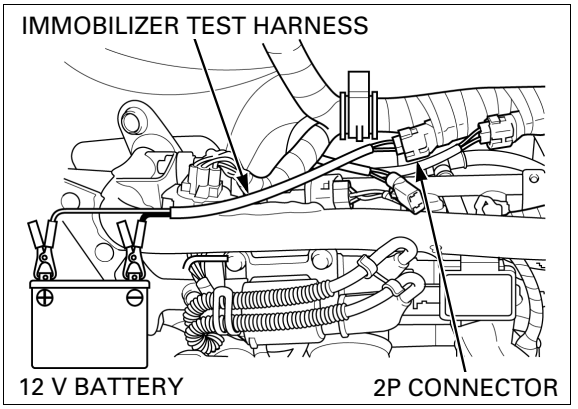
8. Check that the engine can be started using all registered keys.

DIAGNOSTIC CODE INDICATION

Remove the left front inner cover (page 3-4).

Disconnect the ignition pulse generator 2P connector.
Connect the special tool to the wire harness side 2P connector.
Connect the Red clip of the special tool to the 12 V battery positive (+) terminal and black clip to the negative (–) terminal.

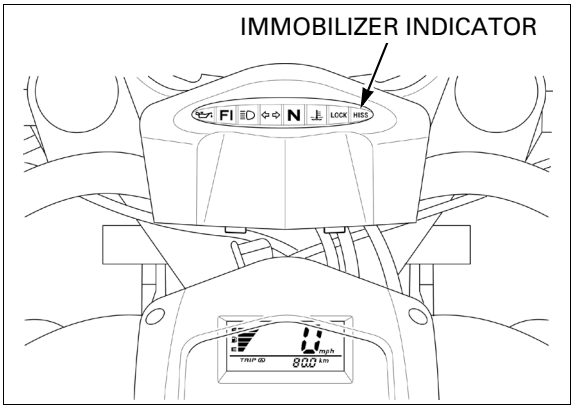
TOOL:
Immobilizer test harness 07AMZ-MECA100



Connect the speedometer connector.

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

Turn the ignition switch to "ON" with the properly registered key.
The immobilizer 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 pattern is repeated.

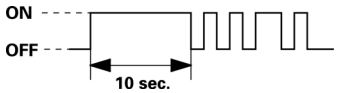


NOTE:

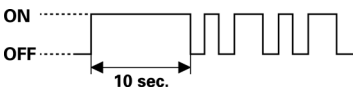
- The immobilizer indicator remains on when the system is normal. (The system is in the normal mode and the diagnostic code does not appear.)
- After servicing, reset the PGM-FI self-diagnostic memory of the ECM (page 6-9).

DIAGNOSTIC CODE

When the system (ECM) enters the diagnostic mode from the normal mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
	ECM data is abnormal	Faulty ECM	Replace the ECM.
	Code signals cannot send or receive	Faulty receiver or wire harness	Follow the trouble-shooting (page 21-13).
	Identification code disagreement	Jamming by another transponder	Keep the other vehicle's transponder key away from the immobilizer receiver more than 50 mm (2.0 in).
	Secret code disagreement		

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 failure	Follow the trouble-shooting (page 21-13)
	Registration is impossible	The key is already registered on another system	Use a new key

TROUBLESHOOTING

IMMOBILIZER SYSTEM

NOTE:

- The immobilizer indicator lights for approx. two seconds then it goes out, when the ignition switch is turned to "ON" with the properly registered key and the immobilizer system functions normally. If there is any problem or the properly registered key is not used, the indicator will remain lit.

Immobilizer indicator does not light when the ignition switch is turned to "ON"

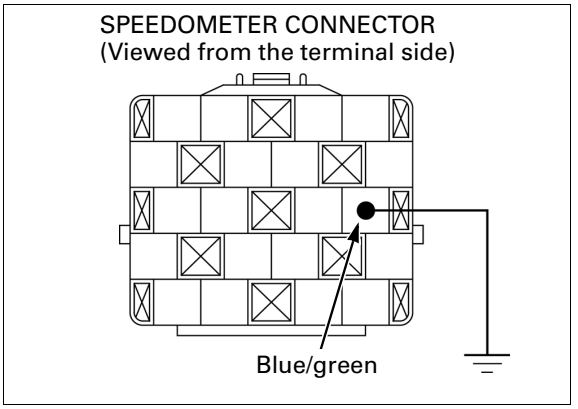
1. Immobilizer Indicator Line Inspection at the Speedometer Connector

Turn the ignition switch to "OFF".
Disconnect the speedometer connector.
Ground the Blue/green wire terminal of the wire harness side speedometer connector and check the immobilizer indicator.

Is the indicator lit?

YES – GO TO STEP 4.

NO – GO TO STEP 2.



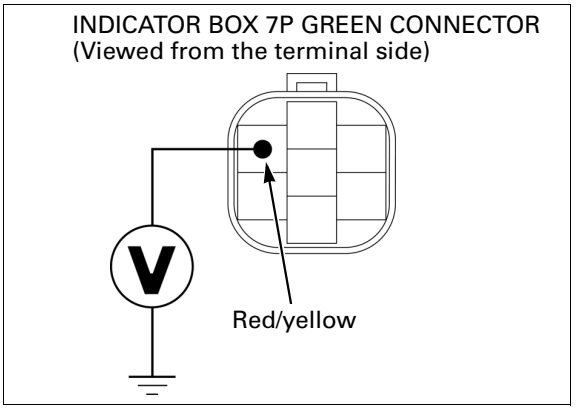
2. Power Input Line Inspection at the Indicator Box Connector

Disconnect the indicator box 7P green connector.
Measure the voltage between the Red/yellow wire terminal (+) of the wire harness side indicator box connector and ground (–).

Is there battery voltage?

YES – GO TO STEP 3.

NO – • Open circuit in the Red/yellow wire between the indicator box connector and fuse box.
• Blown BACK-UP fuse (5 A).



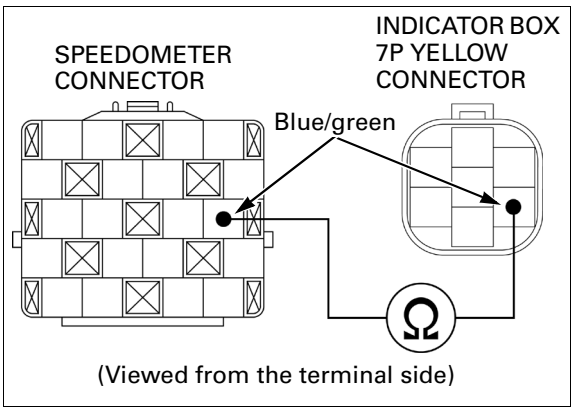
3. Immobilizer Indicator Line Open Circuit Inspection

Check the Blue/green wire for continuity between the indicator box 7P yellow connector and speedometer connector.

Is there continuity?

YES – Faulty indicator box.

NO – Open circuit in the Blue/green wire.



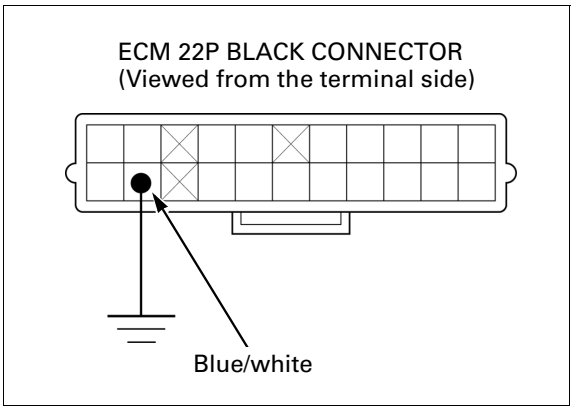
4. Immobilizer Indicator Line Inspection at the Engine Control Module (ECM) Connector

Disconnect the ECM 22P connectors.
Ground the Blue/white wire terminal of the wire harness side ECM 22P black connector and check the immobilizer indicator.

Is the indicator lit?

YES – GO TO STEP 6.

NO – GO TO STEP 5.



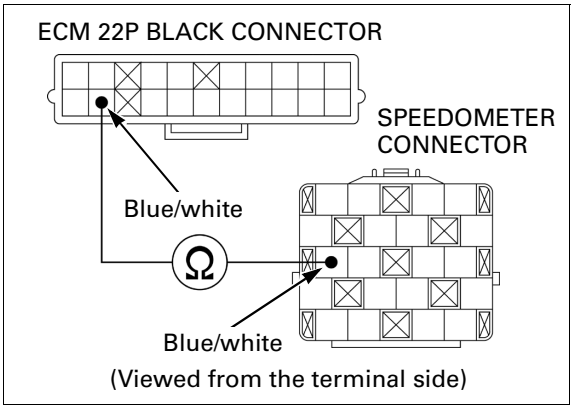
5. Immobilizer Indicator Line Open Circuit Inspection

Check the Blue/white wire for continuity between the speedometer and ECM 22P black connectors.

Is there continuity?

YES – Faulty speedometer.

NO – Open circuit in the Blue/white wire.



6. Engine Stop Switch Line Inspection at the ECM Connector

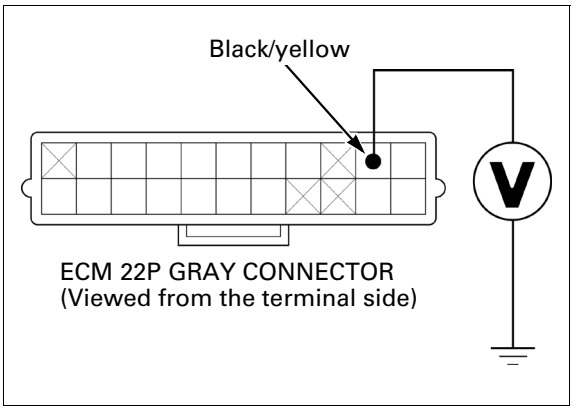
Make sure the engine stop switch is turned to "Ω".

Turn the ignition switch to "ON".
Measure the voltage between the Black/yellow wire terminal (+) of the wire harness side ECM 22P gray connector and ground (–).

Is there battery voltage?

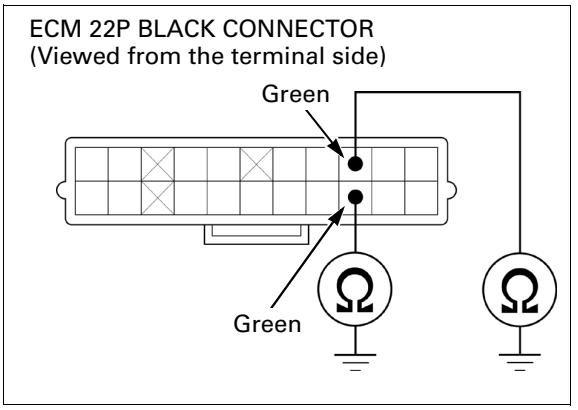
YES – GO TO STEP 7.

NO – • Open circuit in the Black/yellow wire.
• Faulty bank angle relay circuits (page 18-11).



7. Ground Line Inspection at the ECM Connector

Check the Green wires for continuity between the wire harness side ECM 22P black connector and ground.



Is there continuity?

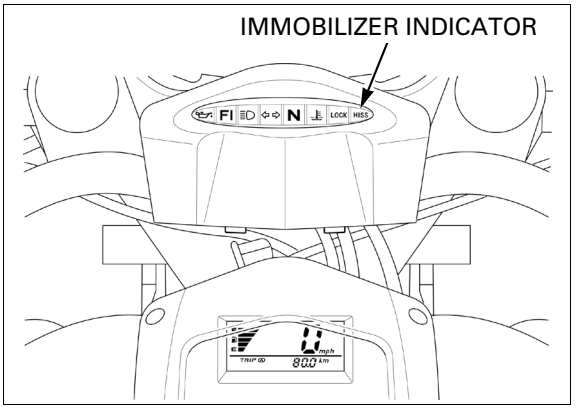
YES – Faulty ECM.

NO – Open circuit in the Green wire.

Immobilizer indicator remains lit with the ignition switch turned to "ON"

1. First Transponder Key Inspection

Turn the ignition switch to "ON" with the spare transponder key and check the immobilizer indicator.
The indicator should light for two seconds then go out.



Does the indicator go out?

YES – Faulty first transponder key.

NO – GO TO STEP 2.

2. Diagnostic Code Inspection

Perform the diagnostic code indication procedure (page 21-7) and check that the immobilizer indicator lights then it starts blinking.

Does the indicator start blinking?

YES – Read the diagnostic code (page 21-7).

NO – GO TO STEP 3.

3. Immobilizer Indicator Line Inspection at the Speedometer Connector

Turn the ignition switch to "OFF".
Disconnect the speedometer 20P gray connector and check the immobilizer indicator.

Does the indicator go out?

YES – GO TO STEP 5.

NO – GO TO STEP 4.

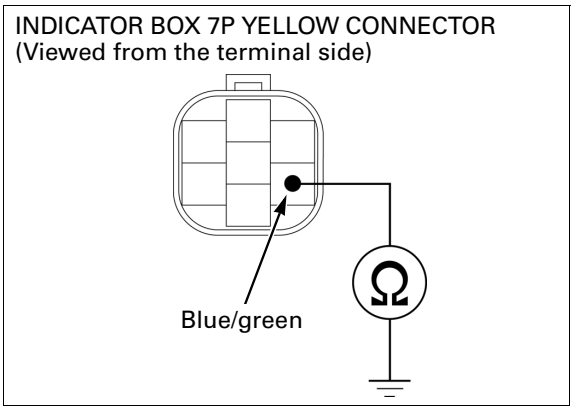
4. Immobilizer Indicator Line Short Circuit Inspection

Disconnect the indicator box 7P yellow connector.
Check the Blue/green wire for continuity to the ground.

Is there continuity?

YES – Short circuit in the Blue/green wire between the indicator box and speedometer.

NO – Faulty indicator box.



5. Immobilizer Indicator Line Inspection at the ECM Connector

Connect the speedometer 20P gray connector.
Disconnect the ECM 22P black connector and check the immobilizer indicator.

Does the indicator go out?

YES – GO TO STEP 6.

NO – GO TO STEP 7.

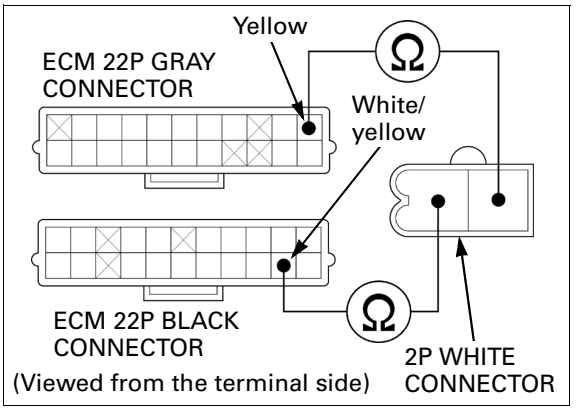
6. Ignition Pulse Generator Line Inspection

Check the Yellow and White/yellow wires for continuity between the ECM and ignition pulse generator 2P white connectors.

Is there continuity?

YES – Faulty ECM.

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



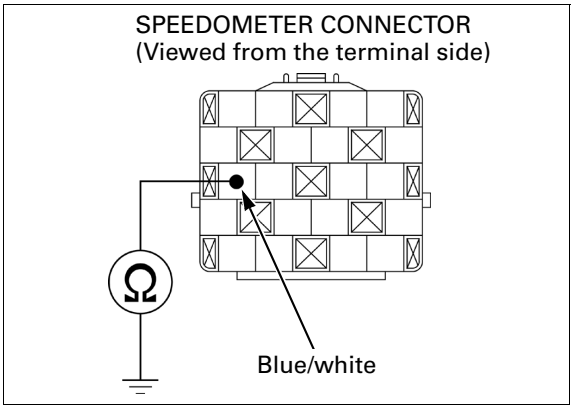
7. Immobilizer Indicator Line Short Circuit Inspection

Disconnect the speedometer 20P gray connector.
Check the Blue/white wire for continuity to the ground.

Is there continuity?

YES – Short circuit in the Blue/white wire between the speedometer and ECM.

NO – Faulty speedometer.



Diagnostic code ⌐¬⌐¬⌐¬⌐¬ is indicated (Code signals cannot send or receive)

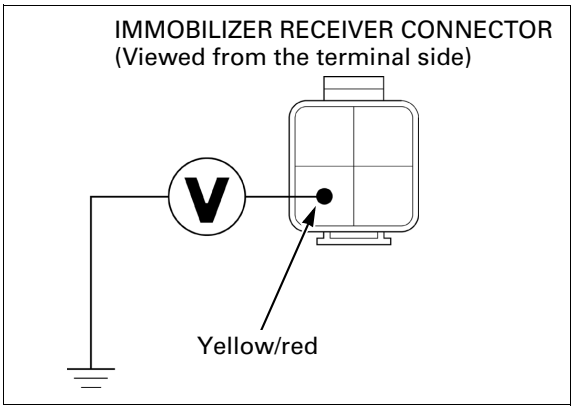
1. Immobilizer Receiver Power Input Line Inspection

Turn the ignition switch to "OFF".
Disconnect the immobilizer receiver 4P connector.
Turn the ignition switch to "ON".
Measure the voltage between the Yellow/red wire terminal (+) of the wire harness side connector and ground (–).

Is the voltage approx. 5 V?

YES – GO TO STEP 2.

NO – Open or short circuit in the Yellow/red wire.



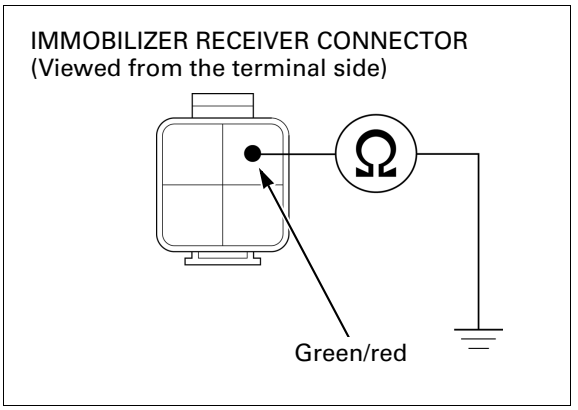
2. Immobilizer Receiver Ground Line Inspection

Turn the ignition switch to "OFF".
Check for continuity between the Green/red wire terminal and ground.

Is there continuity?

YES – GO TO STEP 3.

NO – Open circuit in the Green/red wire.



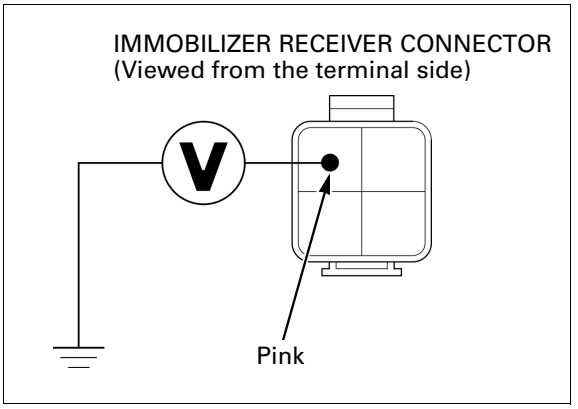
3. Immobilizer Receiver Signal Line A Inspection

Turn the ignition switch to "ON".
Measure the voltage between the Pink wire terminal (+) of the wire harness side connector and ground (–).

Is the voltage approx. 5 V?

YES – GO TO STEP 4.

NO – Open or short circuit in the Pink wire.



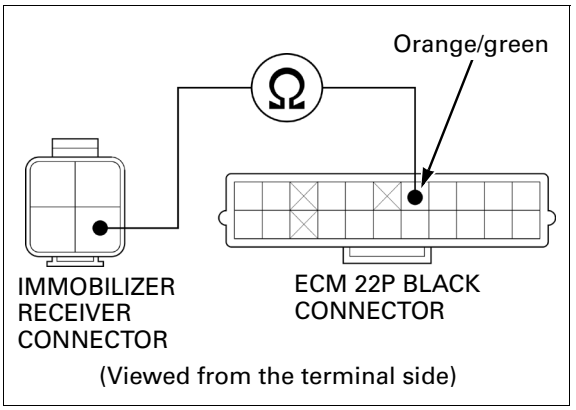
4. Immobilizer Receiver Signal Line B Open Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the ECM 22P connector.
Check the Orange/green wires for continuity between the immobilizer receiver and ECM connectors.

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the Orange/green wire.



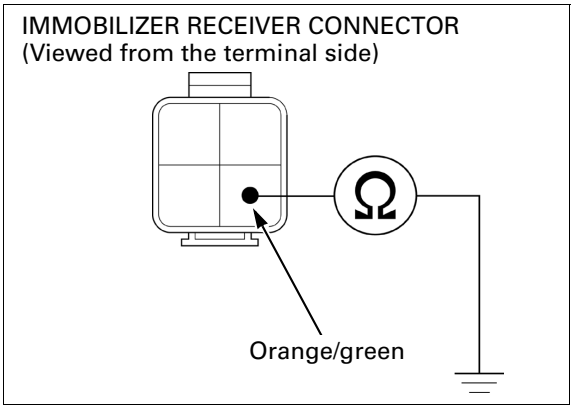
5. Immobilizer Receiver Signal Line B Short Circuit Inspection

Check the Orange/green wires for continuity to the ground.

Is there continuity?

YES – Short circuit in the Orange/green wire.

NO – Faulty immobilizer receiver.



STEERING LOCK SYSTEM

NOTE:

- The steering lock indicator lights for two seconds minimum when the ignition switch is turned to "ON", and goes off when the registered code of the key is recognized by the immobilizer system and steering lock pin is retracted.
  The indicator will remain on if the steering lock pin is not retracted after the ignition switch is turned to "ON".
  The indicator will blink if the steering lock lever is operated with the ignition switch turned to "ON".
- Make sure that the immobilizer system functions properly before troubleshooting.

Steering lock indicator does not light when the ignition switch is turned to "ON" with the steering locked

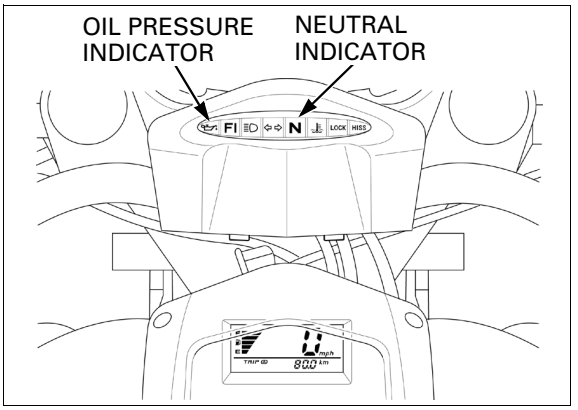
1. Indicator Power Input Line Inspection

Turn the ignition switch to "ON" and check the neutral and oil pressure indicators.

Do indicators come on?

YES – GO TO STEP 2.

NO – Open circuit in the Black/brown wire between the indicator box and fuse box.



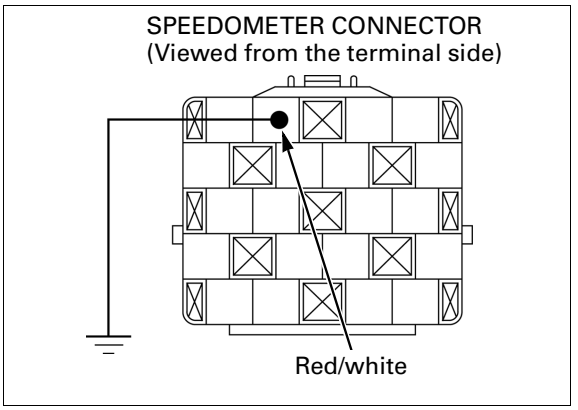
2. Steering Lock Indicator Line Inspection at the Speedometer Connector

Turn the ignition switch to "OFF".
Disconnect the speedometer 20P gray connector.
Ground the Red/white wire terminal of the wire harness side speedometer connector.
Turn the ignition switch to "ON" and check the steering lock indicator.

Does the indicator come on?

YES – Faulty speedometer.

NO – GO TO STEP 3.



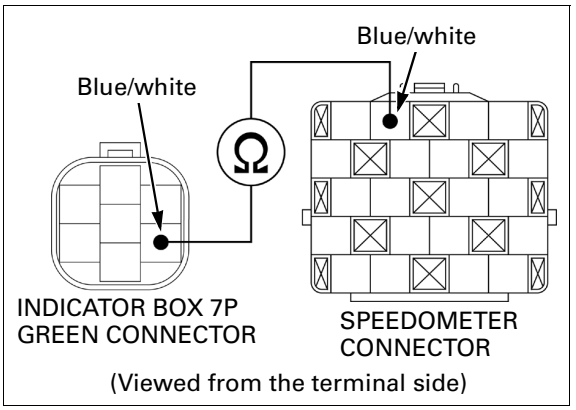
3. Steering Lock Indicator Line Open Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the indicator box 7P green connector.
Check the Red/white wire for continuity between the indicator box and speedometer connectors.

Is there continuity?

YES – Faulty indicator box.

NO – Open circuit in the Red/white wire.



Steering lock indicator does not go out after the steering is unlocked

1. Steering Lock Indicator Line Inspection at the Speedometer Connector

Turn the ignition switch to "OFF".
Disconnect the speedometer 20P gray connector.
Turn the ignition switch to "ON" and check the steering lock indicator.

Is the indicator lit?

YES – GO TO STEP 2.

NO – GO TO STEP 3.

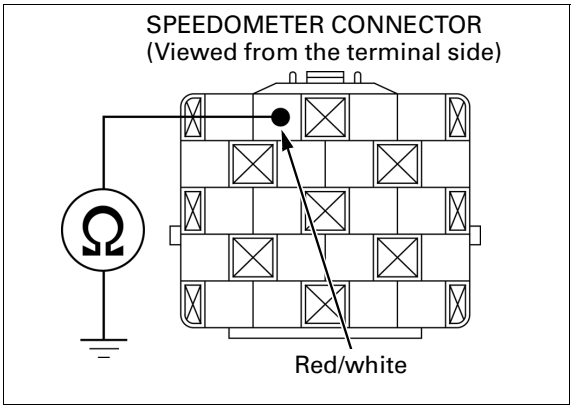
2. Steering Lock Indicator Line Short Circuit Inspection

Turn the ignition switch to "OFF".
Check the Red/white wire for continuity to the ground.

Is there continuity?

YES – Short circuit in the Red/white wire between the speedometer and indicator box.

NO – Faulty indicator box.



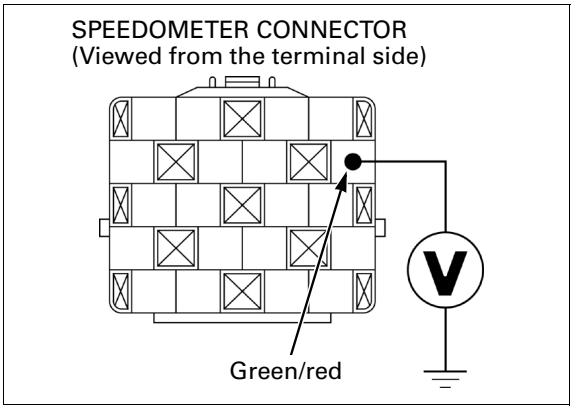
3. Inner Lock Switch Line Inspection at the Speedometer Connector

Measure the voltage between the Green/red wire terminal (+) of the wire harness side speedometer connector and ground (–).

Is there battery voltage?

YES – Faulty speedometer.

NO – GO TO STEP 4.



4. Inner Lock Switch Power Input Line Inspection at the Inner Lock Unit Connector

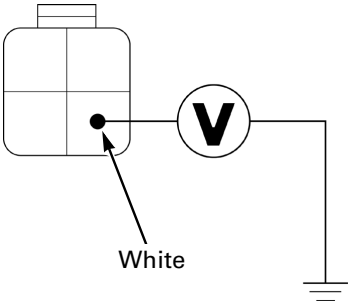
Turn the ignition switch to "OFF".
Disconnect the inner lock unit 4P black connector.
Turn the ignition switch to "ON".
Measure the voltage between the White wire terminal (+) of the wire harness side inner lock unit connector and ground (–).

Is there battery voltage?

YES – GO TO STEP 5.

NO – Open circuit in the White wire between the inner lock unit connector and fuse box.

WIRE HARNESS SIDE INNER LOCK UNIT CONNECTOR (Viewed from the terminal side)



5. Inner Lock Switch Inspection at the Inner Lock Unit Connector

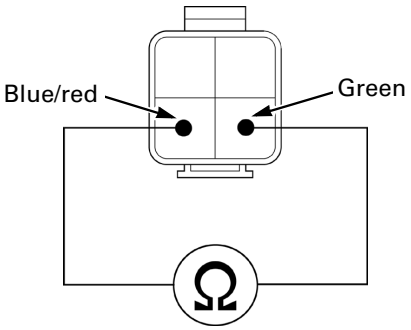
Check the inner lock switch for continuity between the Blue/red and Green wire terminals of the switch side connector with the ignition switch turned to "ON".

Is there continuity?

YES – Open circuit in the Green/red wire between the inner lock unit connector and speedometer.

NO – Faulty inner lock switch.

SWITCH SIDE INNER LOCK UNIT CONNECTOR (Viewed from the terminal side)



Steering is not unlocked when the ignition switch is turned to "ON"

1. Inner Lock Solenoid Operation Inspection

Turn the ignition switch to "ON" and check that the inner lock solenoid clicks.

Does the solenoid click?

YES – • Disassemble and inspect the steering stem.
• Faulty inner lock unit.

NO – GO TO STEP 2.

2. Inner Lock Solenoid Line Inspection at the Engine Control Module (ECM) Connector

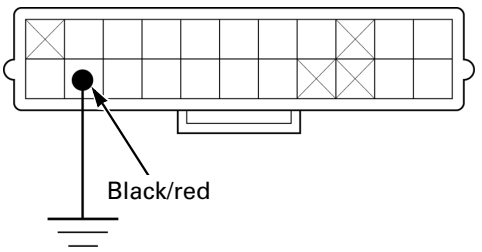
Turn the ignition switch to "OFF".
Disconnect the ECM 22P gray connector.
Turn the ignition switch to "ON".
Ground the Black/red wire terminal of the wire harness side ECM 22P gray connector and check that the inner lock solenoid clicks.

Does the solenoid click?

YES – GO TO STEP 3.

NO – GO TO STEP 4.

ECM 22P GRAY CONNECTOR (Viewed from the terminal side)



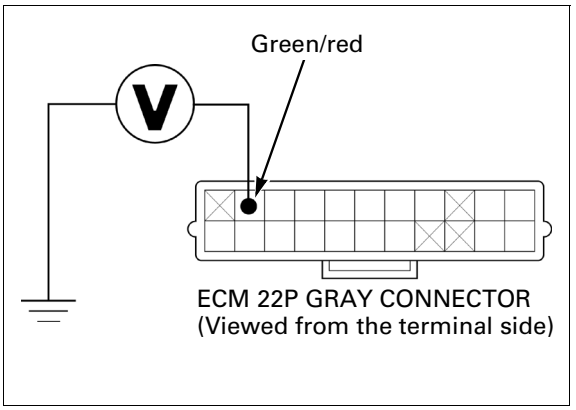
3. Inner Lock Switch Line Inspection at the ECM Connector

Measure the voltage between the Green/red wire terminal (+) of the wire harness side ECM connector and ground (–).

Is there battery voltage?

YES – Faulty inner lock switch.

NO – Faulty ECM.



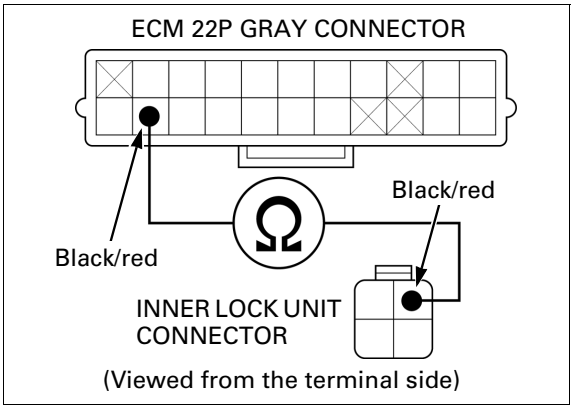
4. Inner Lock Solenoid Signal Line Open Circuit Inspection

Turn the ignition switch to "OFF".
Disconnect the inner lock unit 4P black connector.
Check the Black/red wire for continuity between the ECM 22P gray connector and inner lock unit connector.

Are there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the Black/red wire.



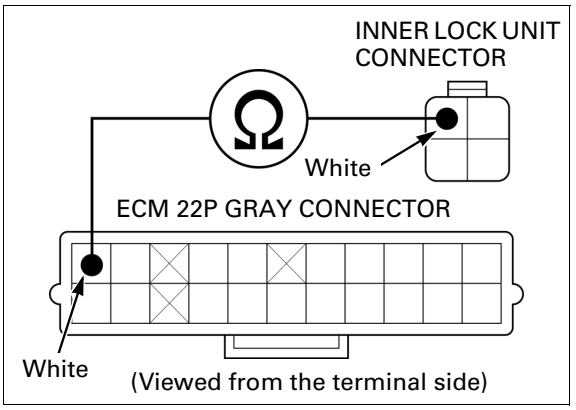
5. Inner Lock Solenoid Power Input Line Open Circuit Inspection

Check the White wire for continuity between the ECM 22P black connector and inner lock unit connector.

Are there continuity?

YES – Faulty inner lock unit.

NO – Open circuit in the White wire.



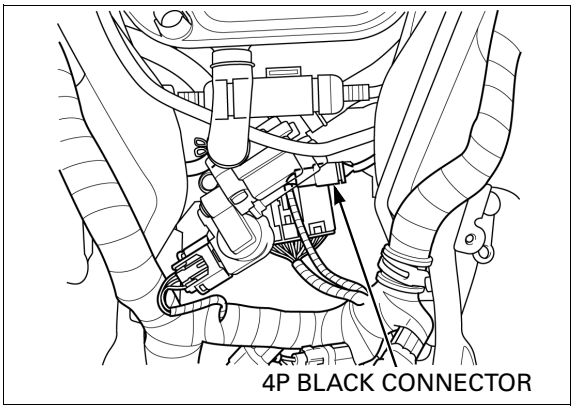
INNER LOCK UNIT

REMOVAL/INSTALLATION

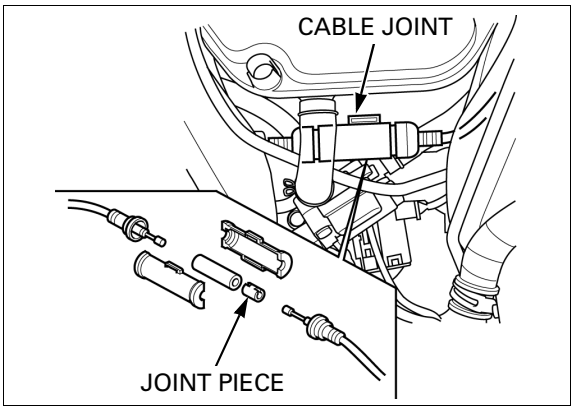
Remove the following:

- right front inner cover (page 3-4)
- air cleaner housing (page 6-42)
- steering stem (page 14-30)
- No. 5 & 6 ignition coil and its bracket (page 18-10)

Disconnect the inner lock unit 4P black connector.

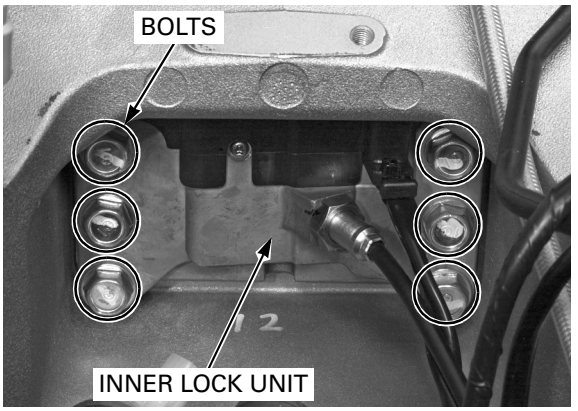


Disassemble the inner lock cable joint and disconnect the cable from the joint piece.



Remove the six bolts and the inner lock unit from the frame.

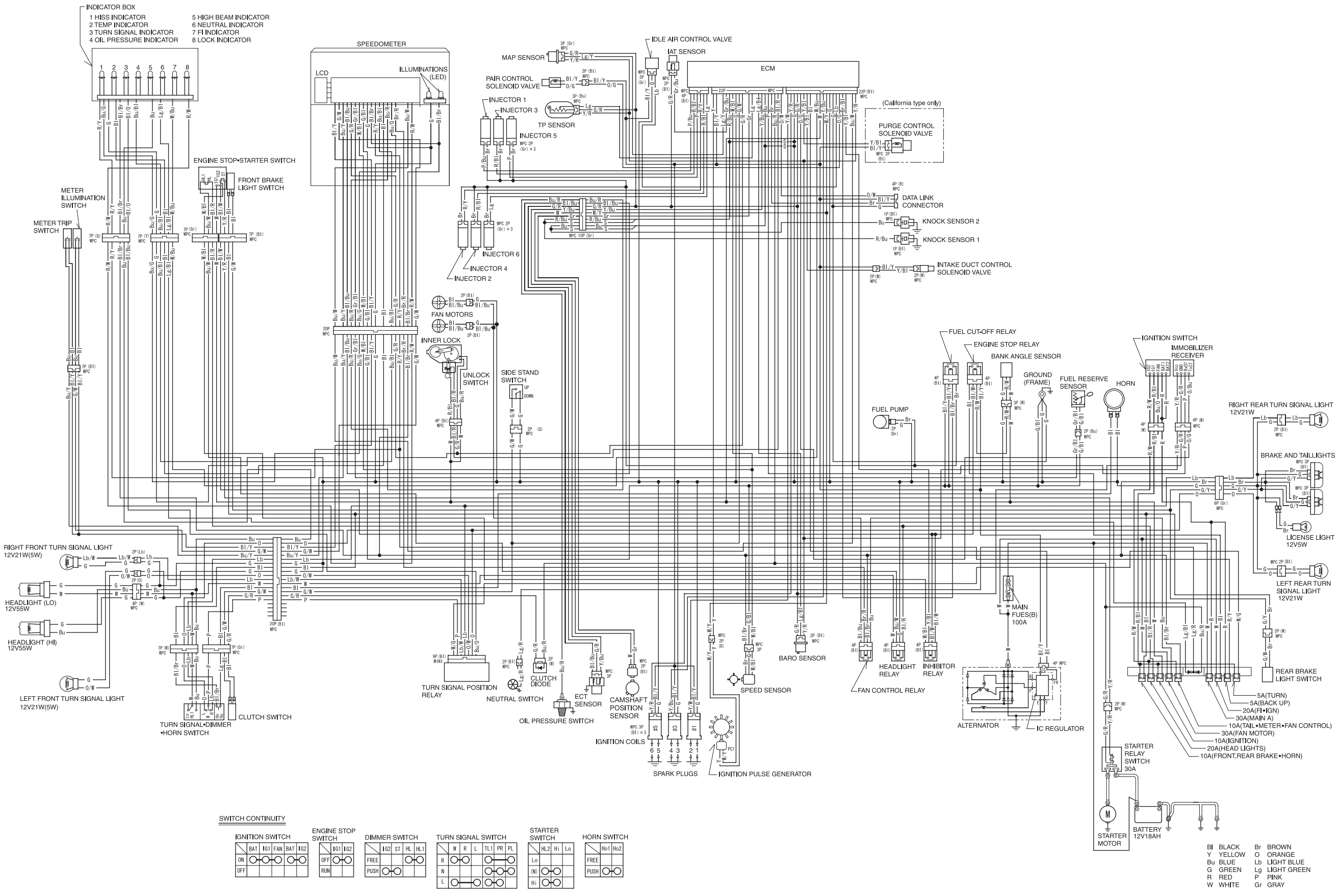
Install the inner lock unit and removed parts in the reverse order of removal.



MEMO

22. WIRING DIAGRAM

WIRING DIAGRAM



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MEMO

23. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

NOTE:

- The starter motor will not turn if the steering lock pin is not retracted with the ignition switch turned to "ON" (page 21-15).

1. **Spark Plug Inspection**

   Remove and inspect spark plugs.

   Is the spark plug wet?

   YES – • Incorrect spark plug heat range
   • Incorrect spark plug gap
   • Dirty air cleaner

   NO – GO TO STEP 2.

2. **Spark Test**

   Perform spark test.

   Is there weak or no spark?

   YES – • Faulty spark plug
   • Loose or disconnected ignition system wires
   • Faulty ignition coil
   • Broken or shorted spark plug wire
   • Faulty ignition pulse generator
   • Faulty engine stop switch
   • Faulty bank angle sensor or sensor relay
   • Faulty engine control module (ECM)

   NO – GO TO STEP 3.

3. **Programmed Fuel Injection System Inspection**

   Check the fuel injection system (page 6-5).

   Is the fuel injection system normal?

   NO – Faulty fuel injection system.

   YES – GO TO STEP 4.

4. **Cylinder Compression**

   Test cylinder compression.

   Is the compression low?

   YES – • Valve stuck open
   • Worn cylinder and piston rings
   • Damaged cylinder head gasket
   • Seized valve
   • Improper valve timing

   NO – GO TO STEP 5.

5. **Engine Starting Condition**

   Start engine by following normal procedure.

   Does the engine start but then stop?

   Yes – • Leaking intake manifold
   • Faulty idle air control valve
   • Improper ignition timing (Faulty ECM or ignition pulse generator)
   • Contaminated fuel

ENGINE LACKS POWER

1. **Drive Train Inspection**

   Raise wheel off the ground and spin by hand.

   Does the wheel spin freely?

   NO – • Brake dragging
   • Worn or damaged wheel bearings
   • Final drive gear bearing damaged

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 from low to second.

   Does the engine speed change accordingly when the clutch is engaged?

   NO – • Clutch slipping
   • Worn clutch discs/plates
   • Warped clutch discs/plates
   • Weak clutch spring
   • Faulty hydraulic assist system
   • Additive in engine oil

   YES – GO TO STEP 4.

4. **Engine Condition Inspection**

   Accelerate lightly.

   Does the engine speed increase?

   NO – • Clogged air cleaner
   • Restricted fuel flow
   • Clogged muffler

   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 the spark plugs.

   Is the spark plug fouled or discolored?

   YES – • Plugs not serviced frequently enough
   • Incorrect spark plug heat range

   NO – GO TO STEP 7.

7. **Engine Oil Inspection**

   Check oil level and condition.

   Is the level correct and oil in good condition?

   NO – • Oil level too high
   • Oil level too low
   • Contaminated oil

   YES – GO TO STEP 8.

8. **Ignition Timing Inspection**

   Check the ignition timing.

   Is the ignition timing correct?

   NO – • Faulty engine control module (ECM)
   • Faulty ignition pulse generator

   YES – GO TO STEP 9.

9. Cylinder Compression

Test cylinder compression.

Is the compression low?

YES – • Valve clearance too small
• Worn cylinder and piston rings
• Damaged cylinder head gasket
• Improper valve timing

NO – GO TO STEP 10.

10. Programmed Fuel Injection System Inspection

Check the fuel injection system (page 6-5).

Is the fuel injection system normal?

NO – Faulty fuel injection system.

YES – GO TO STEP 11.

11. Lubrication Inspection

Remove the cylinder head cover and inspect for proper lubrication.

Is the valve train lubricated properly?

NO – • Clogged oil passage
• Clogged oil orifice

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. Intake Air Leak Inspection

Check for leaking intake manifold gasket or insulator.

Is there leaking?

YES – • Loose manifold mounting bolts
• Damaged manifold gasket
• Loose insulator band
• Damaged insulator

NO – GO TO STEP 2.

2. Spark Test

Perform the spark test.

Is there weak or intermittent spark?

YES – • Faulty spark plug
• Fouled spark plug
• Loose ignition system wires
• Broken or shorted spark plug wire
• Faulty ignition pulse generator
• Faulty ignition coil
• Faulty engine control module (ECM)

NO – GO TO STEP 3.

3. Ignition Timing Inspection

Check ignition timing.

Is the ignition timing correct?

NO – • Faulty engine control module (ECM)
• Faulty ignition pulse generator

YES – GO TO STEP 4.

4. **Programmed Fuel Injection System Inspection**

   Check the fuel injection system (page 6-5).

   Is the fuel injection system normal?

   NO – Faulty fuel injection system.

POOR PERFORMANCE AT HIGH SPEED

1. **Ignition Timing Inspection**

   Check the ignition timing.

   Is the ignition timing correct?

   NO – • Faulty engine control module (ECM)
   • Faulty ignition pulse generator

   YES – GO TO STEP 2.

2. **Programmed Fuel Injection System Inspection**

   Check the fuel injection system (page 6-5).

   Is the fuel injection system normal?

   NO – Faulty fuel injection system.

   YES – GO TO STEP 3.

3. **Valve Timing Inspection**

   Check the valve timing.

   Is the valve timing correct?

   NO – Camshafts not installed properly

   YES – GO TO STEP 4.

4. **Valve Spring Inspection**

   Check the valve springs.

   Are the valve springs weak?

   NO – • Faulty valve spring

POOR HANDLING

Steering is heavy
- Steering bearing adjustment nut too tight
- Damaged steering head bearings

Either wheel is wobbling
- Bent rim
- Excessive wheel bearing play
- Excessively worn swingarm pivot bearings
- Excessively final drive bearing play
- Bent frame

Motorcycle pulled to one side
- Front and rear wheel not aligned
- Incorrect axle alignment
- Loose or damaged front suspension components
- Bent front axle
- Damaged swingarm
- Damaged frame

MEMO

24. INDEX