2019-2020

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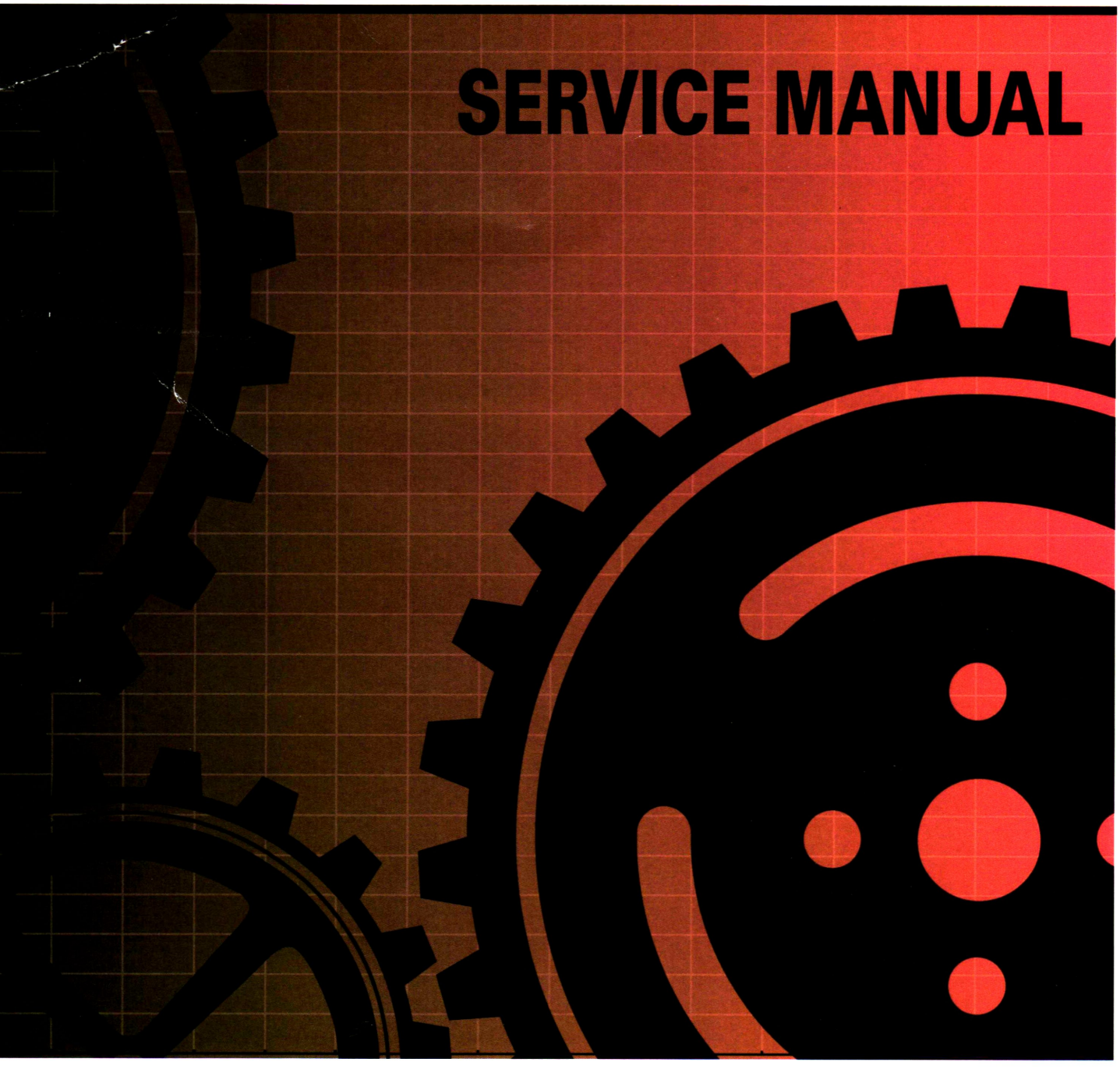

CB650R/RA
CBR650R/RA

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 Honda Genuine 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 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 manual describes the service procedures for the CBR650R/RA, CB650R/RA.

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.
Section 4 through 21 describe parts of the motorcycle, grouped according to location.
If you are not familiar with this motorcycle, read Technical Feature in Section 1.

Follow the Maintenance Schedule recommendations to ensure that the motorcycle is in peak operating condition.
Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

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

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

Refer to the troubleshooting in each section according to the malfunction or symptom. In case of an engine trouble, refer to PGM-FI section troubleshooting first.

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 judgment.
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.

SERVICE PUBLICATION OFFICE

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SYMBOLS

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

	Replace the part(s) with new one(s) before assembly.
	Use the recommend 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. • Pro Honda M-77 Assembly Paste (Moly) (U.S.A. only) • Rocol ASP manufactured by Rocol Limited, U.K. • Rocol Paste manufactured by Sumico Lubricant, Japan
	Use silicone grease.
	Apply locking agent. Use a medium 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.

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SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown in the Cable and Harness Routing (page 1-22).
9. Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

ABBREVIATION

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

Abbrev. term	Full term
ABS	Anti-lock Brake System
CKP sensor	Crankshaft Position sensor
DLC	Data Link Connector
DTC	Diagnostic Trouble Code
ECM	Engine Control Module
ECT sensor	Engine Coolant Temperature sensor
EEPROM	Electrically Erasable Programmable Read Only Memory
EOP switch	Engine Oil Pressure switch
EVAP	Evaporative Emission
HSTC	Honda Selectable Torque Control
IACV	Idle Air Control Valve
IAT sensor	Intake Air Temperature sensor
MAP sensor	Manifold Absolute Pressure sensor
MCS	Motorcycle Communication System
MIL	Malfunction Indicator Lamp
O_2 sensor	Oxygen sensor
OBD	On-Board Diagnostic
PAIR	Pulse Secondary Air Injection
PGM-FI	Programmed Fuel Injection
SCS service connector	Service Check Signal short connector
TP sensor	Throttle Position sensor
VS sensor	Vehicle Speed sensor

DESTINATION CODE

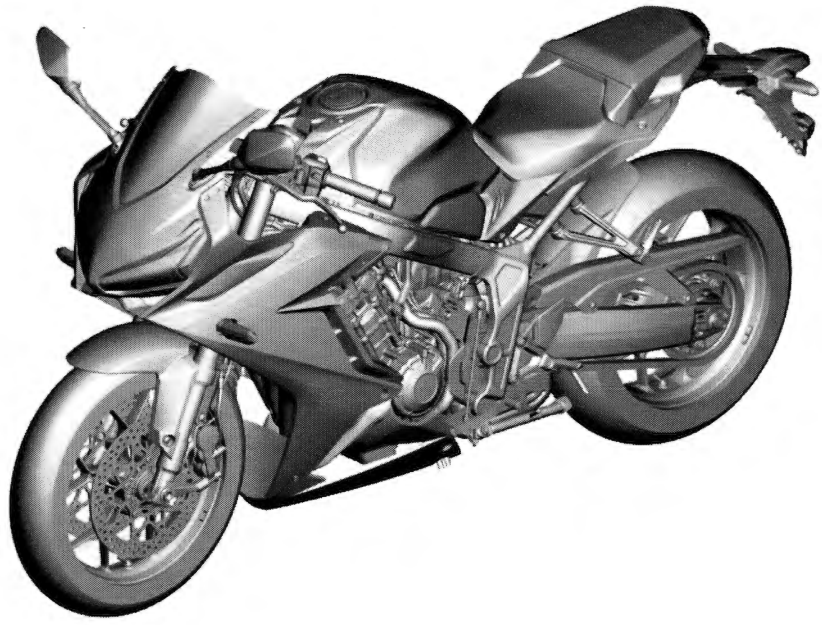
Throughout this manual, the following codes are used to identify individual types for each region.

DESTINATION CODE	REGION
AC	50-State (meets California)
CM	Canada

MODEL IDENTIFICATION

CBR650R/RA:

CBR650RA shown:



CB650R/RA:

CB650RA shown:

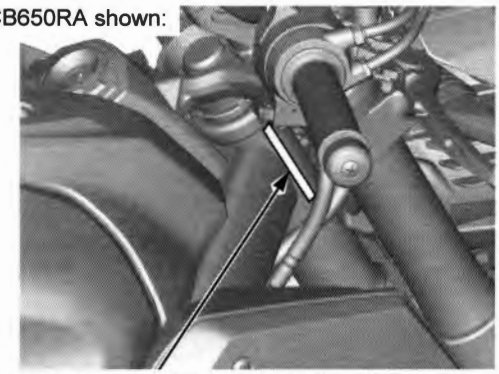
This manual covers following models:

TYPE	DESTINATION CODE	EVAP CONTROL SYSTEM	ABS
CBR650R	AC	O	–
CBR650RA	AC	O	O
	CM	–	
CB650R	AC	O	–
CB650RA	AC	O	O
	CM	–	

Be sure to refer to the procedure for the appropriate model.

SERIAL NUMBERS/LABELS

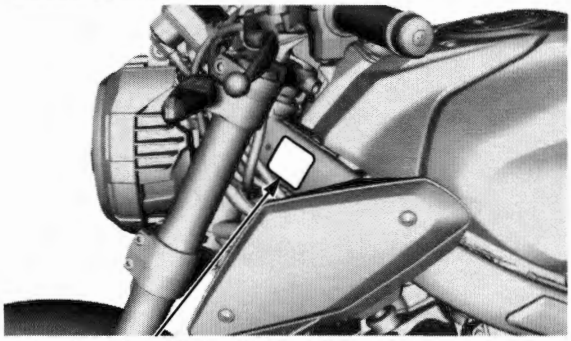
CB650RA shown:



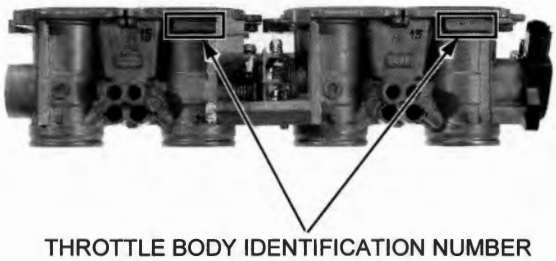
VEHICLE IDENTIFICATION NUMBER (V.I.N)

ENGINE SERIAL NUMBER

CB650RA shown:



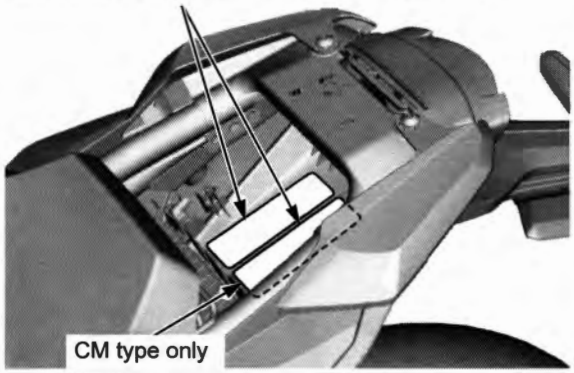
SAFETY CERTIFICATION LABEL



THROTTLE BODY IDENTIFICATION NUMBER

COLOR LABEL

EMISSION CONTROL INFORMATION LABEL



CM type only

SPECIFICATIONS

GENERAL SPECIFICATIONS

ITEM				SPECIFICATION
DIMENSIONS	Overall length			2,130 mm (83.9 in)
	Overall width		CBR650R/RA	750 mm (29.5 in)
			CB650R/RA	780 mm (30.7 in)
	Overall height		CBR650R/RA	1,150 mm (45.3 in)
			CB650R/RA	1,075 mm (42.3 in)
	Wheelbase			1,450 mm (57.1 in)
	Seat height			810 mm (31.9 in)
	Footpeg height			357 mm (14.1 in)
	Ground clearance		CBR650R/RA	130 mm (5.1 in)
			CB650R/RA	150 mm (5.9 in)
	Curb weight	CBR650R		207 kg (456 lbs)
		CBR650RA	AC type	208 kg (459 lbs)
			CM type	207 kg (456 lbs)
		CB650R		201 kg (443 lbs)
		CB650RA	AC type	202 kg (445 lbs)
			CM type	201 kg (443 lbs)
	Maximum weight capacity			154 kg (340 lbs)
FRAME	Frame type			Diamond
	Front suspension			Telescopic fork
	Front axle travel			108 mm (4.3 in)
	Rear suspension			Swingarm
	Rear axle travel			128 mm (5.0 in)
	Front tire size			120/70ZR17M/C (58W)
	Rear tire size			180/55ZR17M/C (73W)
	Front tire brand		CBR650R/RA	D214F Z (DUNLOP)
			CB650R/RA	ROADTEC 01 (METZELER)
	Rear tire brand		CBR650R/RA	D214 Q (DUNLOP)
			CB650R/RA	ROADTEC 01 E (METZELER)
	Front brake			Hydraulic double disc
	Rear brake			Hydraulic single disc
	Caster angle			25° 30'
	Trail length			101 mm (4.0 in)
	Fuel tank capacity			15.4 liters (4.07 US gal, 3.39 Imp gal)
ENGINE	Cylinder arrangement			4 cylinders in-line, inclined 30° from vertical
	Bore and stroke			67.0 x 46.0 mm (2.64 x 1.81 in)
	Displacement			649 cm^3 (39.6 cu-in)
	Compression ratio			11.6 : 1
	Valve train			Chain driven DOHC
	Intake valve	opens	at 1 mm (0.04 in) lift	0° TDC
		closes	at 1 mm (0.04 in) lift	33° ABDC
	Exhaust valve	opens	at 1 mm (0.04 in) lift	30° BBDC
		closes	at 1 mm (0.04 in) lift	0° TDC
	Lubrication system			Forced pressure and wet sump
	Oil pump type			Trochoid
	Cooling system			Liquid cooled
	Air filtration			Viscous paper element
	Engine dry weight			60.5 kg (133.4 lbs)
	Firing order			1 – 2 – 4 – 3
FUEL DELIVERY SYSTEM	Type			PGM-FI (Programmed Fuel Injection)
	Throttle bore			32 mm (1.3 in)

ITEM			SPECIFICATION
DRIVE TRAIN	Clutch system		Multi-plate, wet
	Clutch operation system		Cable operating
	Transmission		Constant mesh, 6 speeds
	Primary reduction		1.690 (71/42)
	Final reduction		2.800 (42/15)
	Gear ratio	1st	3.071 (43/14)
		2nd	2.352 (40/17)
		3rd	1.888 (34/18)
		4th	1.560 (39/25)
		5th	1.370 (37/27)
		6th	1.214 (34/28)
	Gearshift pattern		Left foot operated return system 1 - N - 2 - 3 - 4 - 5 - 6
ELECTRICAL	Ignition system		Full transistorized ignition
	Starting system		Electric starter motor
	Charging system		Triple phase output alternator
	Regulator/rectifier		FET shorted/triple phase full wave rectification
	Lighting system		Battery

PGM-FI SYSTEM SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine idle speed	1,250 ± 100 rpm
ECT senor resistance (40°C/104°F)	1.0 – 1.3 kΩ
IAT sensor resistance (40°C/104°F)	1.0 – 1.3 kΩ
Fuel injector resistance (20°C/68°F)	11 – 13 Ω
O_2 sensor heater resistance (20°C/68°F)	10 – 40 Ω
IACV resistance (25°C/77°F)	110 – 150 Ω

IGNITION SYSTEM SPECIFICATIONS

ITEM	SPECIFICATION
Spark plug	IMR9E-9HES (NGK), VUH27ES (DENSO)
Spark plug gap	0.8 - 0.9 mm (0.03 - 0.04 in)
Ignition coil peak voltage	100 V minimum
CKP sensor peak voltage	0.7 V minimum
Ignition timing ("F" mark)	5° BTDC at idle speed

FUEL SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle body identification number	AC type	GQ8KC
	CM type	GQ8KD
Throttle grip freeplay		2 – 6 mm (1/16 – 1/4 in)
Fuel pressure at idle		324 – 367 kPa (3.3 – 3.7 kgf/cm^2, 47 – 53 psi)
Fuel pump flow (at 12 V)		319 cm^3 (10.8 US oz, 11.2 Imp oz) minimum/10 seconds
PAIR control solenoid valve resistance (20°C/68°F)		23 – 27 Ω
EVAP purge control solenoid valve resistance (20°C/68°F)		30 – 34 Ω

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.5 liters (2.6 US qt, 2.2 Imp qt)
	Reserve tank (Upper level)	0.195 liter (0.206 US qt, 0.172 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm^2, 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		1:1 mixture with distilled water

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	2.3 liters (2.4 US qt, 2.0 Imp qt)	–
	At oil filter change	2.6 liters (2.7 US qt, 2.3 Imp qt)	–
	At disassembly	3.0 liters (3.2 US qt, 2.6 Imp qt)	–
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. & Canada) or equivalent motorcycle oil API service classification: SG or higher JASO T903 standard: MA Viscosity: SAE 10W-30	–
Oil pressure at EOP switch		490 kPa (5.0 kgf/cm^2, 71 psi) at 5000 rpm/80°C (176°F)	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)

CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 300 rpm			1,491 kPa (15.2 kgf/cm^2, 216 psi)	–
Valve clearance		IN	0.20 ± 0.03 (0.008 ± 0.001)	–
		EX	0.28 ± 0.03 (0.011 ± 0.001)	–
Camshaft	Cam lobe height	IN	34.5800 – 34.8200 (1.36141 – 1.37086)	34.55 (1.360)
		EX	34.3600 – 34.6000 (1.35275 – 1.36220)	34.33 (1.352)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Valve lifter	Valve lifter O.D.		25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.		26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.	IN	4.475 – 4.490 (0.1762 – 0.1768)	4.465 (0.1758)
		EX	4.465 – 4.480 (0.1758 – 0.1764)	4.455 (0.1754)
	Valve guide I.D.	IN/EX	4.500 – 4.512 (0.1772 – 0.1776)	4.54 (0.179)
	Valve guide height	IN/EX	12.70 – 13.00 (0.500 – 0.512)	–
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length			38.26 (1.506)	37.3 (1.47)
Cylinder head warpage			–	0.10 (0.004)

CLUTCH/GEARSHIFT LINKAGE/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever freeplay		10 – 20 (3/8 - 13/16)	–
Clutch	Spring free length	43.7 (1.72)	42.7 (1.68)
	Disc thickness	2.92 – 3.08 (0.115 – 0.121)	2.7 (0.11)
	Plate warpage	–	0.30 (0.012)
Clutch outer guide	I.D.	25.000 – 25.021 (0.9843 – 0.9851)	25.031 (0.9855)
	O.D.	34.984 – 35.000 (1.3773 – 1.3780)	34.974 (1.377)
Mainshaft O.D. at clutch outer guide		24.980 – 24.990 (0.9835 – 0.9839)	24.960 (0.9827)
Starter driven gear boss O.D.		45.657 – 45.673 (1.7975 – 1.7981)	45.642 (1.7969)

CRANKCASE/TRANSMISSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M5, M6, C1	28.000 – 28.021 (1.1024 – 1.1032)	–
		C2, C3, C4	33.000 – 33.025 (1.2992 – 1.3002)	–
	Bushing O.D.	M5, M6	27.959 – 27.980 (1.1007 – 1.1016)	–
		C2	32.955 – 32.980 (1.2974 – 1.2984)	–
		C3, C4	32.950 – 32.975 (1.2972 – 1.2982)	–
	Bushing I.D.	M5	25.000 – 25.021 (0.9843 – 0.9851)	–
		C2	29.985 – 30.006 (1.1805 – 1.1813)	–
	Mainshaft O.D.	at M5 bushing	24.967 – 24.980 (0.9830 – 0.9835)	–
	Countershaft O.D.	at C2 bushing	29.967 – 29.980 (1.1798 – 1.1803)	–
Shift fork, fork shaft	Shift fork shaft O.D.		11.957 – 11.968 (0.4707 – 0.4710)	–
	Shift fork I.D.		12.000 – 12.018 (0.4724 – 0.4731)	–
	Shift fork claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.83 (0.230)

CRANKSHAFT/PISTON/CYLINDER SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance		0.05 – 0.20 (0.002 – 0.008)	0.25 (0.010)
	Crankpin bearing oil clearance		0.032 – 0.052 (0.0013 – 0.0020)	0.06 (0.002)
	Main journal bearing oil clearance		0.017 – 0.035 (0.0007 – 0.0014)	0.05 (0.002)
	Runout		–	0.05 (0.002)
Cylinder	I.D.		67.000 – 67.015 (2.6378 – 2.6384)	67.10 (2.642)
	Out-of-round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.10 (0.004)
Piston, piston pin, piston ring	Piston O.D. at 7 mm (0.3 in) from bottom		66.965 – 66.985 (2.6364 – 2.6372)	66.89 (2.633)
	Piston pin hole I.D.		16.002 – 16.008 (0.6300 – 0.6302)	16.02 (0.631)
	Piston pin O.D.		15.994 – 16.000 (0.6297 – 0.6299)	15.98 (0.629)
	Piston ring end gap	Top	0.10 – 0.20 (0.004 – 0.008)	0.4 (0.02)
		Second	0.21 – 0.31 (0.008 – 0.012)	0.5 (0.02)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.0 (0.04)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.060 (0.0012 – 0.0024)	0.10 (0.004)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.08 (0.003)
Connecting rod small end I.D.			16.030 – 16.044 (0.6311 – 0.6317)	16.05 (0.632)

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cold tire pressure	Driver only		250 kPa (2.50 kgf/cm^2, 36 psi)	–
	Driver and passenger		250 kPa (2.50 kgf/cm^2, 36 psi)	–
Axle runout			–	0.2 (0.01)
Wheel rim runout	Radial		–	2.0 (0.08)
	Axial		–	2.0 (0.08)
Wheel balance weight			–	60 g (2.1 oz) max.
Fork	Recommended fork fluid		Fork Fluid (viscosity: 10W)	–
	Spring free length	Right	320.3 (12.61)	314 (12.4)
		Left	349.2 (13.75)	342 (13.5)
	Fluid level	Right	168 (6.6)	–
		Left	150 (5.9)	–
	Fluid capacity	Right	416 ± 2.5 cm^3 (14.1 ± 0.08 US oz, 14.6 ± 0.09 Imp oz)	–
		Left	507 ± 2.5 cm^3 (17.1 ± 0.08 US oz, 17.8 ± 0.09 Imp oz)	–
Steering bearing pre-load			9.8 – 14.7 N (1.0 – 1.5 kgf, 2.2 – 3.3 lbf)	–

REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cold tire pressure	Driver only	290 kPa (2.90 kgf/cm^2, 42 psi)	–
	Driver and passenger	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.
Drive chain	Size/link	DID525V11-118LE/RK525KRW-118LE	–
	Slack	25 – 35 (1 – 1 3/8)	–
Shock absorber pre-load adjuster standard position		3rd position from minimum	–

HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		DOT 4	–
	Brake disc thickness		4.5 (0.18)	3.5 (0.14)
	Brake disc warpage		–	0.3 (0.01)
	Master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	–
	Master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	–
	Caliper cylinder I.D.	A	30.23 – 30.28 (1.190 – 1.192)	–
		B	27.000 – 27.050 (1.0630 – 1.0650)	–
	Caliper piston O.D.	A	30.148 – 30.198 (1.1869 – 1.1889)	–
		B	26.918 – 26.968 (1.0598 – 1.0617)	–
Rear	Specified brake fluid		DOT 4	–
	Brake disc thickness		4.8 – 5.2 (0.19 – 0.20)	4.0 (0.16)
	Brake disc warpage		–	0.3 (0.01)
	Master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	–
	Master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	–
	Caliper cylinder I.D.		38.18 – 38.23 (1.503 – 1.505)	–
	Caliper piston O.D.		38.098 – 38.148 (1.4999 – 1.5019)	–

ANTI-LOCK BRAKE SYSTEM (ABS) SPECIFICATIONS

ITEM		SPECIFICATIONS
Air gap	Front (Between the wheel speed sensor guard and pulser ring)	0.73 – 1.40 mm (0.029 – 0.055 in)
	Rear (Between the caliper bracket and pulser ring)	0.40 – 1.22 mm (0.016 – 0.048 in)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Type		FTZ10S, YTZ10
	Capacity		12 V - 8.6 Ah (10 HR), 12 V - 9.1 Ah (20 HR)
	Current leakage		2.8 mA max.
	Voltage (20°C/68°F)	Fully charged	12.8 V minimum
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 – 10 h
		Quick	4.5 A/1 h
Alternator	Capacity		370 W/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM			SPECIFICATION
Bulbs	Headlight	Hi	LED
		Lo	LED
	Position light		LED
	Turn signal/position light		LED
	Brake/taillight		LED
	License light		LED
	Instrument light		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Neutral indicator		LED
	Engine oil pressure indicator		LED
	Torque control indicator (ABS type only)		LED
	Torque control off indicator (ABS type only)		LED
	Shift up indicator		LED
	MIL		LED
	ABS indicator (ABS type only)		LED
Fuse	Main fuse		30 A
	Sub fuse		20 A, 10 A x 2, 7.5 A x 5
	ABS motor fuse (ABS type only)		30 A
	ABS main fuse (ABS type only)		7.5 A
	ABS FSR fuse (ABS type only)		30 A
ECT sensor resistance		40°C (104°F)	1.0 – 1.3 kΩ
		100°C (212°F)	0.1 – 0.2 kΩ
Fuel level sensor resistance		FULL	6 – 10 kΩ
		EMPTY	384 – 396 kΩ

TORQUE VALUES

STANDARD TORQUE VALUES

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

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

ENGINE & FRAME TORQUE VALUES

FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rearview mirror mounting socket bolt (CBR650R/RA)	4	6	10 (1.0, 7)	
Rearview mirror lock nut (CB650R/RA)	2	10	20 (2.0, 15)	
Rearview mirror adaptor (CB650R/RA)	2	10	20 (2.0, 15)	
Windscreen special bolt (CBR650R/RA)	4	5	0.42 (0.04, 0.3)	
Middle cowl special bolt (CBR650R/RA)	4	5	0.42 (0.04, 0.3)	
Front cowl stay mounting nut	2	8	27 (2.8, 20)	
Shroud A mounting bolt (CB650R/RA)	4	5	0.42 (0.04, 0.3)	
Rear fender stay mounting bolt	4	8	27 (2.8, 20)	
License light mounting screw	2	4	0.9 (0.1, 0.7)	
Rear reflector mounting nut	1	5	1.8 (0.2, 1.3)	Self-lock nut
Rear side reflector mounting nut	2	6	1.8 (0.2, 1.3)	Self-lock nut
Sidestand pivot bolt	1	10	10 (1.0, 7)	See page 2-16
Sidestand pivot nut	1	10	30 (3.1, 22)	Self-lock nut, See page 2-16
Rider footpeg bracket socket bolt	4	8	27 (2.8, 20)	
Passenger footpeg bracket socket bolt	4	8	27 (2.8, 20)	
Muffler protector mounting bolt	2	6	12 (1.2, 9)	
Exhaust pipe joint nut	8	8	18 (1.8, 13)	
Muffler mounting bolt	2	8	21 (2.1, 15)	
Exhaust pipe stud bolt	8	8	–	See page 2-18

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Throttle cable adjuster lock nut (throttle body side)	1	6	5.5 (0.6, 4.1)	
Throttle cable adjuster lock nut (throttle grip side)	1	7	3.8 (0.4, 2.8)	
Air cleaner element tapping screw	2	5	1.1 (0.1, 0.8)	
Air cleaner lid tapping screw	9	5	1.1 (0.1, 0.8)	
Spark plug	4	10	16 (1.6, 12)	
Timing hole cap	1	45	18 (1.8, 13)	Apply grease to the threads.
Engine oil filter cartridge	1	20	26 (2.7, 19)	Apply engine oil to the threads.
Engine oil drain bolt	1	12	30 (3.1, 22)	
Engine oil filter boss	1	20	–	See page 3-11 Apply locking agent to the threads.
Rear axle nut	1	18	98 (10.0, 72)	Self-lock nut
Drive chain adjuster lock nut	2	8	27 (2.8, 20)	
Drive sprocket bolt	1	10	54 (5.5, 40)	
Driven sprocket nut	5	12	108 (11.0, 80)	Self-lock nut
Front master cylinder reservoir cap screw	2	4	1.5 (0.2, 1.1)	
Rear brake reservoir cap screw	2	4	1.5 (0.2, 1.1)	

PGM-FI SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
MAP sensor mounting screw	1	5	3.4 (0.3, 2.5)	
ECT sensor	1	10	12 (1.2, 9)	
IAT sensor screw	2	5	1.1 (0.1, 0.8)	
O_2 sensor	1	12	24.5 (2.5, 18)	
Gear position switch mounting bolt	1	6	7 (0.7, 5)	
Bank angle sensor nut	2	6	8.5 (0.9, 6.3)	

IGNITION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Timing hole cap	1	45	18 (1.8, 13)	Apply grease to the threads.

ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Positive brush terminal nut	1	6	10 (1.0, 7)	
Negative brush screw	1	5	3.7 (0.4, 2.7)	
Starter motor case bolt	2	5	4.9 (0.5, 3.6)	
Starter relay switch socket bolt	2	5	5.1 (0.5, 3.8)	

FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel tank mounting nut	1	6	12 (1.2, 9)	Self-lock nut
Fuel filler cap mounting socket bolt	3	4	1.8 (0.2, 1.3)	
Fuel pump mounting nut	6	6	12 (1.2, 9)	See page 7-10
Insulator band screw (throttle body side)	4	5	4.5 (0.5, 3.3)	
Throttle cable B lock nut	1	6	5.5 (0.6, 4.1)	
IACV body screw	3	5	3.4 (0.3, 2.5)	
IACV setting plate screw	2	4	2.1 (0.2, 1.5)	
IACV hose joint plate screw	1	4	2.1 (0.2, 1.5)	
Insulator band screw (cylinder head side)	4	5	4.5 (0.5, 3.3)	
Fuel injector joint bolt	4	5	5.1 (0.5, 3.8)	
PAIR check valve cover bolt	4	6	12 (1.2, 9)	Apply locking agent to the threads.

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Water pump drain bolt	1	6	13 (1.3, 10)	
Thermostat cover bolt	2	6	12 (1.2, 9)	
Fan motor shroud bolt	3	6	8.5 (0.9, 6.3)	
Fan motor nut	3	5	5.1 (0.5, 3.8)	
Cooling fan nut	1	5	2.7 (0.3, 2.0)	Apply locking agent to the threads.
Radiator reserve tank mounting bolt	1	6	12 (1.2, 9)	
Water pump mounting bolt	3	6	12 (1.2, 9)	
Water pump cover bolt	1	6	13 (1.3, 10)	

LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil cooler bolt	1	20	59 (6.0, 44)	Apply engine oil to the threads.

CYLINDER HEAD/VALVES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head cover bolt	4	6	10 (1.0, 7)	
Camshaft holder bolt	20	6	12 (1.2, 9)	Apply engine oil to the threads and seating surface.
Cam sprocket bolt	4	7	20 (2.0, 15)	Apply locking agent to the threads.
Air bleeding joint	1	8	12 (1.2, 9)	Apply locking agent to the threads.
Cam chain tensioner pivot bolt	1	6	10 (1.0, 7)	Apply locking agent to the threads.
Cylinder head bolt	10	9	47 (4.8, 35)	Apply molybdenum oil to the threads and seating surface.

CLUTCH/GEARSHIFT LINKAGE/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Right crankcase cover bolt	14	6	12 (1.2, 9)	
Oil pump driven sprocket washer-bolt	1	6	15 (1.5, 11)	Apply locking agent to the threads.
Clutch center lock nut	1	22	128 (13.1, 94)	Lock nut; replace with a new one and stake. Apply engine oil to the threads and seating surface.
Clutch set plate bolt	3	6	12 (1.2, 9)	
Starter clutch outer mounting bolt	1	10	83 (8.5, 61)	Apply engine oil to the threads and seating surface.
Shift drum stopper arm pivot bolt	1	6	12 (1.2, 9)	Apply locking agent to the threads.
Shift drum center socket bolt	1	8	23 (2.3, 17)	Apply locking agent to the threads.
Gearshift pedal pivot socket bolt	1	8	27 (2.8, 20)	
Gearshift pedal adjuster lock nut	2	6	10 (1.0, 7)	

ALTERNATOR

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Left crankcase cover bolt	8	6	12 (1.2, 9)	
Alternator stator bolt	4	6	12 (1.2, 9)	
Alternator wire clamp bolt	1	6	12 (1.2, 9)	Apply locking agent to the threads.
Flywheel bolt	1	10	113 (11.5, 83)	Apply engine oil to the threads and seating surface.

CRANKCASE/TRANSMISSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankcase main journal bolt	10	8	15 (1.5, 11) + 120°	See page 13-6 Replace with a new one.
Crankcase 10 mm bolt	1	10	39 (4.0, 29)	
Crankcase 8 mm bolt	1	8	24 (2.4, 18)	
Crankcase 6 mm bolt	14	6	12 (1.2, 9)	
Mainshaft bearing setting plate bolt	3	6	12 (1.2, 9)	Apply locking agent to the threads.
Shift drum bearing setting washer-bolt	2	6	12 (1.2, 9)	Apply locking agent to the threads.

CRANKSHAFT/PISTON/CYLINDER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankpin bearing cap nut	8	8	35.2 (3.6, 26)	Apply engine oil to the threads and seating surface. Self-lock nut
Crankcase main journal bolt	10	8	15 (1.5, 11) + 120°	See page 13-6 Replace with a new one.

ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear lower engine hanger nut	1	12	59 (6.0, 44)	See page 15-7
Rear upper engine hanger nut	1	10	40 (4.1, 30)	
Upper engine hanger bracket bolt	4	8	27 (2.8, 20)	
Upper engine hanger bolt	2	10	49 (5.0, 36)	
Front engine hanger bolt	2	12	59 (6.0, 44)	
Drive sprocket bolt	1	10	54 (5.5, 40)	
EOP switch terminal screw	1	4	2.0 (0.2, 1.5)	
Right crankcase cover bolt	14	6	12 (1.2, 9)	

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Steering stem nut	1	24	103 (10.5, 76)	
Top bridge pinch bolt	2	8	22 (2.2, 16)	
Handlebar pinch bolt (CBR650R/RA)	2	8	27 (2.8, 20)	
Handlebar switch housing screw	4	5	2.5 (0.3, 1.8)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Handlebar upper holder socket bolt (CB650R/RA)	4	8	27 (2.8, 20)	
Handlebar lower holder nut (CB650R/RA)	2	8	27 (2.8, 20)	
Front brake disc bolt	10	8	42 (4.3, 31)	ALOC bolt; replace with a new one.
Air valve nut	1	8	6.5 (0.7, 4.8)	
Front axle bolt	1	14	59 (6.0, 44)	
Front axle pinch bolt	4	8	22 (2.2, 16)	
Front brake caliper mounting bolt	4	10	45 (4.6, 33)	ALOC bolt; replace with a new one.
Fork cap	2	–	35 (3.6, 26)	
Bottom bridge pinch bolt (CBR650R/RA)	2	10	42 (4.3, 31)	
Bottom bridge pinch bolt (CB650R/RA)	4	8	27 (2.8, 20)	
Fork rod lock nut	2	10	20 (2.0, 15)	
Fork socket bolt	1	8	20 (2.0, 15)	Apply locking agent to the threads.
Steering bearing adjustment nut	1	26	31 (3.2, 23)	See page 16-44 Apply engine oil to the threads.
Steering bearing adjustment lock nut	1	26	–	See page 16-44

REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear axle nut	1	18	98 (10.0, 72)	Self-lock nut
Rear brake disc bolt	4	8	42 (4.3, 31)	ALOC bolt; replace with a new one.
Driven sprocket nut	5	12	108 (11.0, 80)	Self-lock nut
Driven sprocket stud bolt	5	12	–	See page 17-9
Shock absorber mounting nut	2	10	44 (4.5, 32)	Self-lock nut
Swingarm pivot nut	1	18	103 (10.5, 76)	Self-lock nut, Apply engine oil to the threads and seating surface.
Drive chain slider screw	2	5	4.2 (0.4, 3.1)	

HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake caliper bleed valve	3	8	5.4 (0.6, 4.0)	
Front master cylinder reservoir cap screw	2	4	1.5 (0.2, 1.1)	
Rear brake reservoir cap screw	2	4	1.5 (0.2, 1.1)	
Front brake caliper mounting bolt	4	10	45 (4.6, 33)	ALOC bolt; replace with a new one.
Rear brake caliper bolt	1	8	22 (2.2, 16)	ALOC bolt; replace with a new one.
Rear brake caliper pad pin	1	10	17 (1.7, 13)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Brake hose oil bolt	5	10	34 (3.5, 25)	
Front brake lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Front brake lever pivot nut	1	6	5.9 (0.6, 4.4)	
Front brake light switch screw	1	4	1.2 (0.1, 0.9)	
Rider footpeg bracket socket bolt	4	8	27 (2.8, 20)	
Rear master cylinder mounting socket bolt	2	6	12 (1.2, 9)	
Rear master cylinder hose joint screw	1	4	1.5 (0.2, 1.1)	Apply locking agent to the threads.
Rear master cylinder push rod joint nut	1	8	17 (1.7, 13)	
Front brake caliper assembly torx bolt	6	8	27 (2.8, 20)	ALOC bolt; replace with a new one.
Rear brake caliper pin bolt	1	12	27 (2.8, 20)	

ANTI-LOCK BRAKE SYSTEM (ABS)

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

LIGHTS/METERS/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake/tail light mounting nut	2	6	9 (0.9, 7)	
Combination meter mounting screw	3	5	1.0 (0.1, 0.7)	
EOP switch	1	PT 1/8	12 (1.2, 9)	Apply liquid sealant to the threads.
EOP switch terminal screw	1	4	2.0 (0.2, 1.5)	
Ignition switch mounting bolt	2	8	27 (2.8, 20)	One-way bolt; replace with a new one.
Sidestand switch mounting bolt	1	6	10 (1.0, 7)	ALOC bolt; replace with a new one.

OTHERS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front reflector mounting nut	2	6	1.8 (0.2, 1.3)	Self-lock nut
Rider footpeg bank sensor cap bolt	2	6	11 (1.1, 8)	
Throttle cable holder screw	2	5	3.4 (0.3, 2.5)	
Air bleed bolt	1	12	1.6 (0.2, 1.2)	
Cylinder head cover breather plate bolt	3	6	12 (1.2, 9)	Apply locking agent to the threads.
Cylinder head sealing bolt	1	14	18 (1.8, 13)	Apply locking agent to the threads.
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	Apply locking agent to the threads.
Clutch lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Clutch lever pivot nut	1	6	6 (0.6, 4.4)	Self-lock nut
Clutch switch screw	1	3	0.6 (0.1, 0.4)	
Lower crankcase sealing bolt	1	22	59 (6.0, 44)	Apply locking agent to the threads.
Lower crankcase sealing socket bolt	1	8	23 (2.3, 17)	Apply locking agent to the threads.
Throttle cable A joint nut (at switch housing)	1	10	1.5 (0.2, 1.1)	
Throttle cable B joint nut (at switch housing)	1	12	1.5 (0.2 1.1)	
Turn signal light stud stay screw	4	6	2.5 (0.3, 1.8)	

LUBRICATION & SEAL POINTS

ENGINE

MATERIAL	LOCATION	REMARKS
Sealant (TB1207B manufactured by ThreeBond or an equivalent)	Oil pan mating surface	See page 9-8
	Right crankcase cover mating area (cover side)	See page 11-5
	Crankcase mating area (right side of the case)	See page 11-5
	CKP sensor wire grommet seating surface	
	Left crankcase cover mating area (cover side)	See page 12-3
	Crankcase mating area (left side of the case)	See page 12-3
	Lower crankcase mating surface	See page 13-6
	EOP switch threads	See page 21-14
Sealant (TB5211C manufactured by ThreeBond, KE45 manufactured by Shin-Etsu Silicone or an equivalent)	Cylinder head cover packing semi-circular area	See page 10-6
Engine oil (without molybdenum additives)	Engine oil filter cartridge threads and packing	
	Fuel injector seal ring	
	Engine oil strainer seal ring	
	Valve stem seal fitting area	
	Clutch disc and plate entire surface	
	Starter one-way clutch contacting surface	
	Shift fork guide area and guide pin	
	Shift fork shaft outer surface	
	Piston ring entire surface	
	Piston ring grooves	
	Piston pin hole inner surface	
	Piston sliding surface	
	Cylinder inner surface	
	Each gear teeth and rotating surface	
	Each bearing rotating area	
	Each O-ring	Except IACV and water passage O-rings
	Other rotating and sliding areas	
Multi-purpose grease	Timing hole cap threads	
	Each oil seal lips	
Molybdenum oil solution (a mixture of engine oil and molybdenum disulfide grease in a ratio of 1:1)	Water pump shaft thrust washer sliding area	
	Valve stem sliding surface	
	Valve lifter sliding surface	
	Camshaft journals, lobes and thrust surfaces	
	Clutch outer guide entire surface	
	Clutch outer gear, friction spring and clutch outer sliding surface	
	Starter reduction gear sliding surface	
	Starter idle gear shaft outer surface	
	Transmission rotating gear inner surface	
	Transmission gear bushing entire surface (M5, C2)	
	Transmission gear spline bushing outer surface (M6, C3, C4)	
	Transmission gear inner spline surface (M3/4, C5, C6)	
	Transmission gear shifter groove (M3/4, C5, C6)	
	Crankshaft main journal bearing sliding surface	
	Crankshaft thrust surfaces	
	Crankpin bearing sliding surface	
	Connecting rod small end inner surface	
	Piston pin outer surface	
Heat-resistant locking agent (TB1360 or TB2440B manufactured by ThreeBond, DL-201 manufactured by LOCTITE or equivalent)	Shift drum center socket bolt threads	Coating width: 6.5 mm (0.26 in) from tip

MATERIAL	LOCATION	REMARKS
Medium strength locking agent (TB1322N or TB2415 manufactured by ThreeBond, LOCTITE 648 or DL-200 manufactured by LOCTITE or equivalent)	PAIR check valve cover bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	Engine oil filter boss threads	Coating width: 6.5 mm (0.26 in) from tip
	Oil pump driven sprocket washer-bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	Cylinder head cover breather plate bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	Cam sprocket bolt threads	Coating width: 6.5 mm (0.26 in)
	Water bleeding joint threads	Coating width: 6.5 mm (0.26 in)
	Cam chain tensioner pivot washer-bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	Gearshift spindle oil seal setting plate bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	Shift drum stopper arm pivot bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	Gearshift spindle setting plate bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	Alternator wire clamp bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	CKP sensor wire clamp bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	Right mainshaft bearing setting plate bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip
	Shift drum bearing setting washer-bolt threads	Coating width: 6.5 mm (0.26 in) except 2 mm (0.1 in) from tip

FRAME

MATERIAL	LOCATION	REMARKS
Urea based multi-purpose extreme pressure grease NLGI #2 (EXCELITE EP2 manufactured by KYODO YUSHI CO., LTD., STAMINA EP2 manufactured by Shell or equivalent)	Steering bearing race sliding surface	3 – 5 g (0.1 – 0.2 oz) per each bearing
	Steering bearing dust seal lips	
Multi-purpose grease	Seat catch sliding area	
	Throttle grip cable groove and roll-up area	
	Clutch lever pivot sliding area	
	Front wheel dust seal lips	
	Rear wheel dust seal lips	
	Rear wheel hub O-ring	
	Driven flange dust seal lips	
	Brake pedal pivot sliding area (grease groove)	
	Gearshift pedal pivot sliding area (grease groove)	
	Gearshift pedal pivot dust seal lips	
	Gearshift pedal tie-rod ball joint	
	Footpeg pivot sliding area	
	Passenger footpeg spring	
Molybdenum disulfide grease	Sidestand pivot sliding area	
	Rear shock absorber dust seal lips	
	Swingarm needle bearing rotating area	
	Swingarm ball bearing rotating area	
	Swingarm dust seal lips	
Engine oil	Steering bearing adjustment nut threads	
	Swingarm pivot nut threads and seating surface	

MATERIAL	LOCATION	REMARKS
Silicone grease	Front brake lever pivot sliding area	0.10 g (0.004 oz)
	Front brake lever-to-master piston contacting area	0.10 g (0.004 oz)
	Rear master cylinder push rod-to-master piston contacting area	0.10 g (0.004 oz)
	Rear master cylinder boot push rod fitting area	0.10 g (0.004 oz)
	Rear brake caliper pin bolt sliding area	0.20 – 0.25 g (0.007 – 0.009 oz)
	Rear brake caliper sleeve sliding area	0.4 g (0.01 oz) (inside of boot) minimum
	Brake caliper dust seal	
	Brake caliper pad pin stopper ring	
DOT 4 brake fluid	Brake master piston and cups	
	Rear master cylinder hose joint O-ring	
	Front brake caliper piston seal	
	Rear brake caliper piston seal	
	Brake caliper piston outer surface	
Fork Fluid (viscosity: 10W)	Fork oil seal lips	
	Fork dust seal lips	
	Fork cap O-ring	
Honda Bond A or Pro Honda Handgrip Cement (U.S.A. only) or equivalent	Left handlebar grip inner surface	
ThreeBond 1521 or an equivalent	Rear brake pad retainer mating surface	
Drive chain lubricant designed specifically for O-ring chains or SAE #80 – 90 gear oil	Drive chain entire surface	
High strength locking agent (LOCTITE 638 manufactured by LOCTITE, TB1305N manufactured by ThreeBond or equivalent)	Final driven sprocket stud bolt threads (driven flange side)	

SPECIAL TOOL LIST

TITLE	TOOL No	TOOL NAME
MAINTENANCE	07HAA-PJ70101 or 07AAA-PLCA100 (U.S.A. only)	Oil filter wrench
	07HMH-MR10103 or 07HMH-MR1010C (U.S.A. only)	Drive chain tool set
PGM-FI SYSTEM	070MZ-K530100	OBD adaptor harness
	070PZ-ZY30100	SCS service connector
	07ZAJ-RDJA110	Test probe, 2 pack
IGNITION SYSTEM	MTP07-0286 (U.S.A. only)	IgnitionMate peak voltage tester
	07HGJ-0020100 (Not available in U.S.A.)	Peak voltage adaptor
	07ZAJ-RDJA110	Test probe, 2 pack
FUEL SYSTEM	07406-0040004 or 07406-004000B or 07406-004000C (U.S.A. only)	Fuel pressure gauge
	070MJ-K260100	Pressure gauge attachment set
	07ZAJ-S5A0130	Hose attachment, 6 mm/9 mm
	07ZAJ-S7C0100	Hose attachment, 8 mm/9 mm
	07ZAJ-S7C0200	Attachment joint, 8 mm/9 mm
	07ZAJ-S5A0150	Attachment joint, 6 mm/9 mm
	07AMJ-HW3A100 (U.S.A. only)	Pressure manifold hose
	07AAJ-S6MA300 (U.S.A. only)	Adaptor C, male
	07AAJ-S6MA500 (U.S.A. only)	Adaptor C, female
LUBRICATION SYSTEM	07506-3000001 or MT37A (Snap-On) or equivalent commercially available in U.S.A.	Oil pressure gauge set
	07406-0030000 or equivalent commercially available in U.S.A.	Oil pressure gauge attachment
CYLINDER HEAD/VALVES	070MG-0010100 or 07AMG-001A100 (U.S.A. only)	Tensioner stopper
	07HMG-MR70002 (Not available in U.S.A.)	Tappet hole protector
	07757-0010000	Valve spring compressor
	07959-KM30101	Valve spring compressor attachment
	07HMD-ML00101	Valve guide driver, 4.5 mm
	07743-0020000 (Not available in U.S.A.)	Valve guide adjusting driver
	07HMH-ML00101 or 07HMH-ML0010B (U.S.A. only)	Valve guide reamer, 4.5 mm
	07781-0010600 or equivalent commercially available in U.S.A.	Cutter holder, 4.5 mm
	07780-0010200 or equivalent commercially available in U.S.A.	Seat cutter, 27.5 mm (IN, 45°)
	07780-0010600 or equivalent commercially available in U.S.A.	Seat cutter, 24 mm (EX, 45°)
	07780-0012100 or equivalent commercially available in U.S.A.	Flat cutter, 28 mm (IN, 32°)
	07780-0012500 or equivalent commercially available in U.S.A.	Flat cutter, 24 mm (EX, 32°)
	07780-0014500 or equivalent commercially available in U.S.A.	Interior cutter, 26 mm (IN, 60°)
	07780-0014202 or equivalent commercially available in U.S.A.	Interior cutter, 22 mm (EX, 60°)
CLUTCH/GEARSHIFT LINKAGE/STARTER CLUTCH	07724-0050002 or equivalent commercially available in U.S.A.	Clutch center holder
	07724-0010100 or 07724-001A100 (U.S.A. only)	Gear holder, M2.5
ALTERNATOR	07725-0040001	Flywheel holder
	07733-0020001 or 07933-3950000 (U.S.A. only)	Rotor puller
CRANKCASE/TRANSMISSION	07936-3710600	Bearing remover set, 20 mm
	07741-0010201 or 07936-371020A (U.S.A. only)	Remover weight
	07936-3710100	Remover handle
	07949-3710001	Driver, 15 x 280L
	07746-0010300	Attachment, 42 x 47 mm
	07746-0040500	Pilot, 20 mm

TITLE	TOOL No	TOOL NAME
FRONT WHEEL/SUSPENSION/ STEERING	07746-0050600	Bearing remover head, 20 mm
	07746-0050100	Bearing remover shaft
	07749-0010000	Driver
	07746-0010300	Attachment, 42 x 47 mm
	07746-0040500	Pilot, 20 mm
	070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)	Fork cap wrench
	070MF-MBZC110 or 07AMC-MFJA100 (U.S.A. only)	Spring collar holder
	070MF-MBZC130 or 07AMB-KZ3A100 (U.S.A. only)	Stopper plate
	07RMD-MW40100	Fork seal driver attachment
	07KMD-KZ30100	Fork seal driver, 45.2 mm
	07KMD-KZ3010A (U.S.A. only)	Fork seal driver, 45 mm
	070MF-MBZC120 or 070MF-MBZA120 (U.S.A. only)	Damper rod holder
	07916-3710101	Steering stem socket
	07953-MJ10000 or 07953-MJ1000B (U.S.A. only)	Ball race remover set
	07953-MJ10100	Remover attachment
	07953-MJ10200	Remover shaft
	07946-3710500	Bearing remover
	07946-MB00000	Steering stem driver
	07746-0010400	Attachment, 52 x 55 mm
REAR WHEEL/SUSPENSION	07746-0050600	Bearing remover head, 20 mm
	07GGD-0010100	Bearing remover shaft
	07749-0010000	Driver
	07746-0010300	Attachment, 42 x 47 mm
	07746-0040500	Pilot, 20 mm
	07746-0010800	Attachment, 22 x 24 mm
	07946-1870100	Attachment, 28 x 30 mm
	07746-0010400	Attachment, 52 x 55 mm
	07HMF-HC00100	Spherical Bearing Installer 10 x 19
	07965-GM00100	Crank assembly collar
	07949-3710001	Driver, 15 x 280L
	07746-0010700	Attachment, 24 x 26 mm
	07ZMD-MBW0200	Attachment, 37 mm
	07746-0040700	Pilot 30 mm
	07HMC-MR70100	Remover attachment, 28 mm
	07746-0040400	Pilot 17 mm
	07746-0041100	Pilot, 28 mm
ANTI-LOCK BRAKE SYSTEM (ABS)	070PZ-ZY30100	SCS service connector
	07ZAJ-RDJA110	Test probe, 2 pack
BATTERY/CHARGING SYSTEM	Honda MDX-604P (U.S.A. only)	Battery tester
	TMNTS53 (U.S.A. only)	Optimate PRO-4 Battery Charger
LIGHTS/METERS/SWITCHES	07ZAJ-RDJA110	Test probe, 2 pack
	MTP07-0286 (U.S.A. only)	IgnitionMate peak voltage tester
	07HGJ-0020100 (Not available in U.S.A.)	Peak voltage adaptor

CABLE & HARNESS ROUTING

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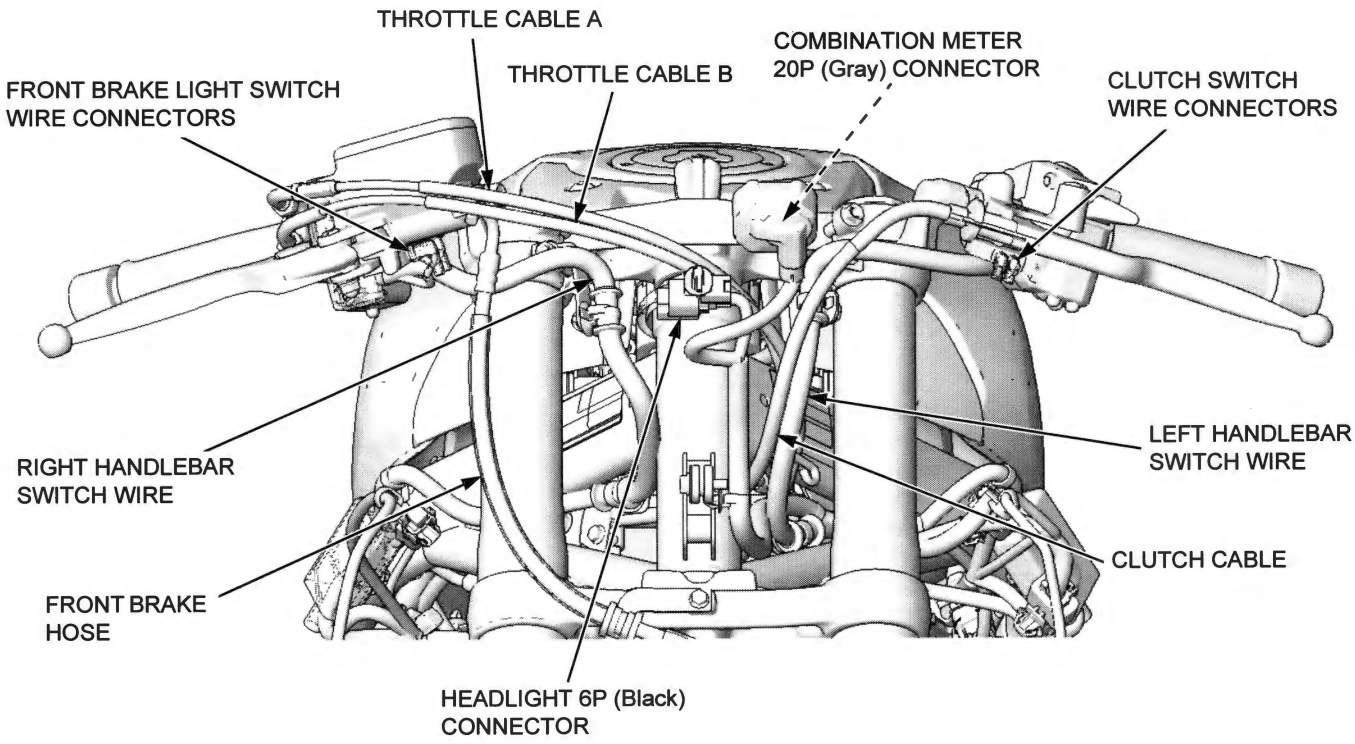

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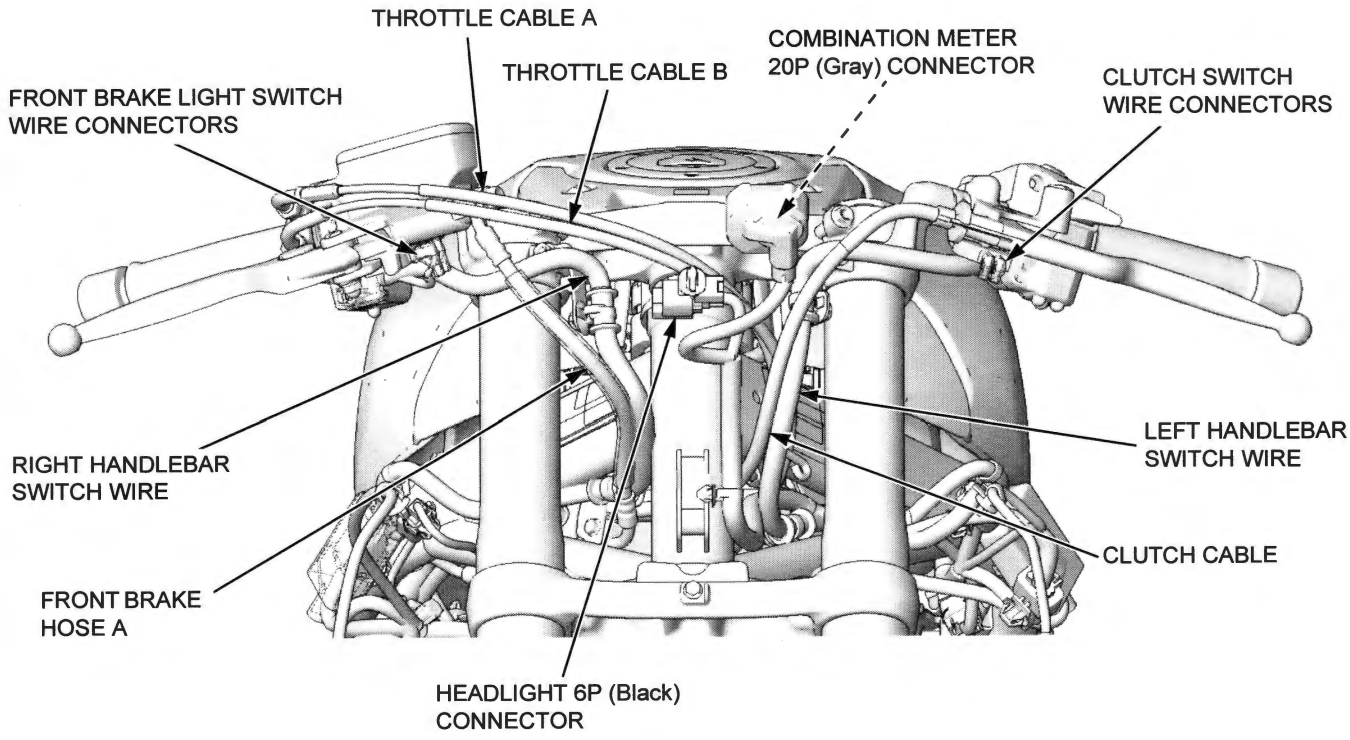

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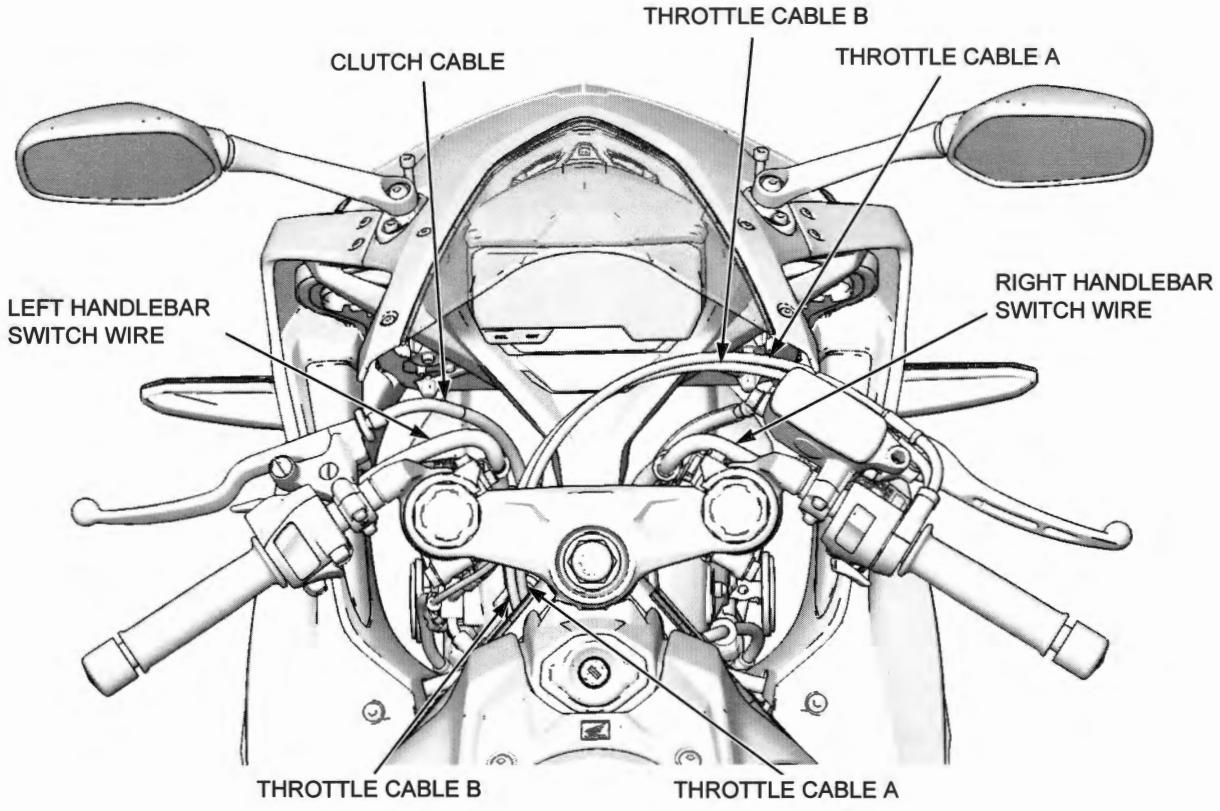

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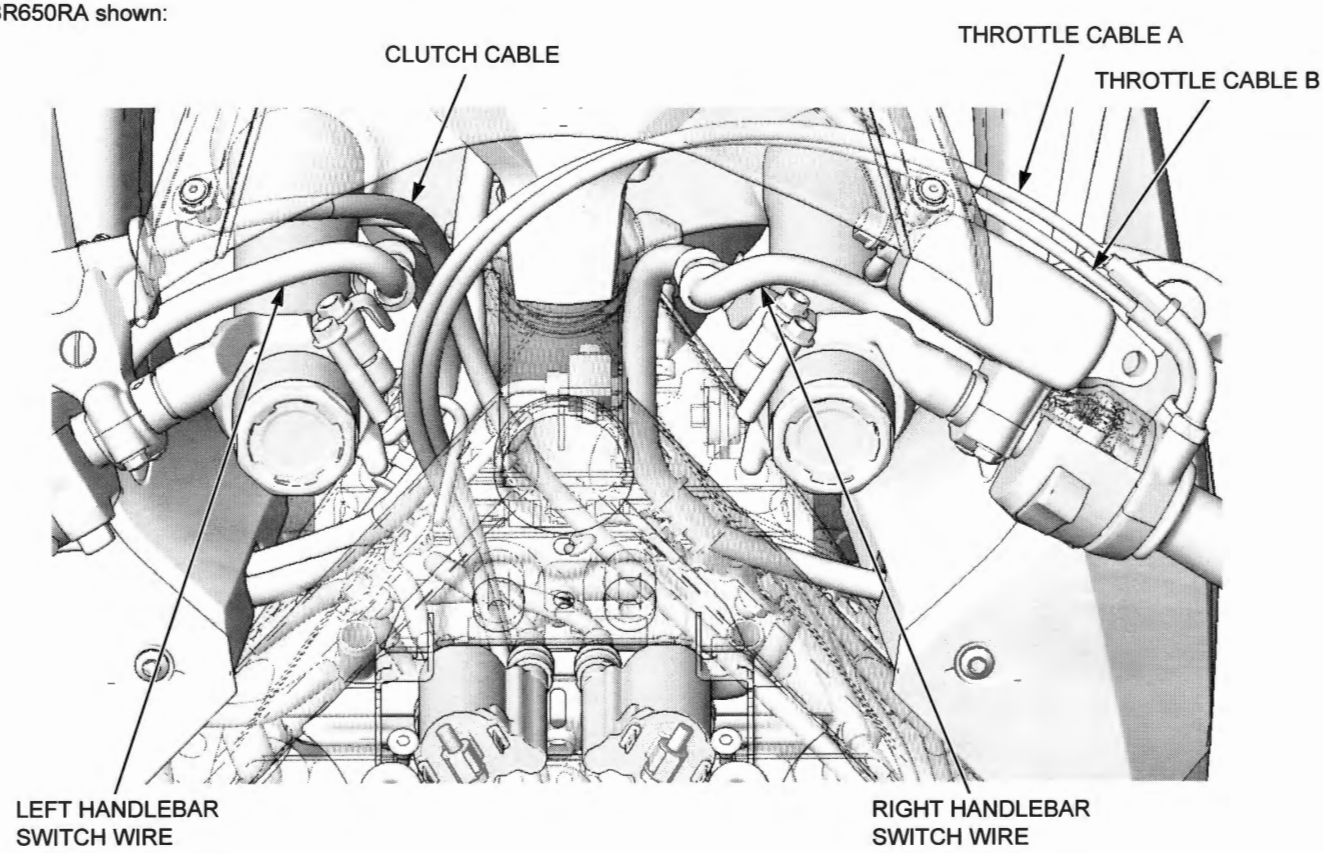

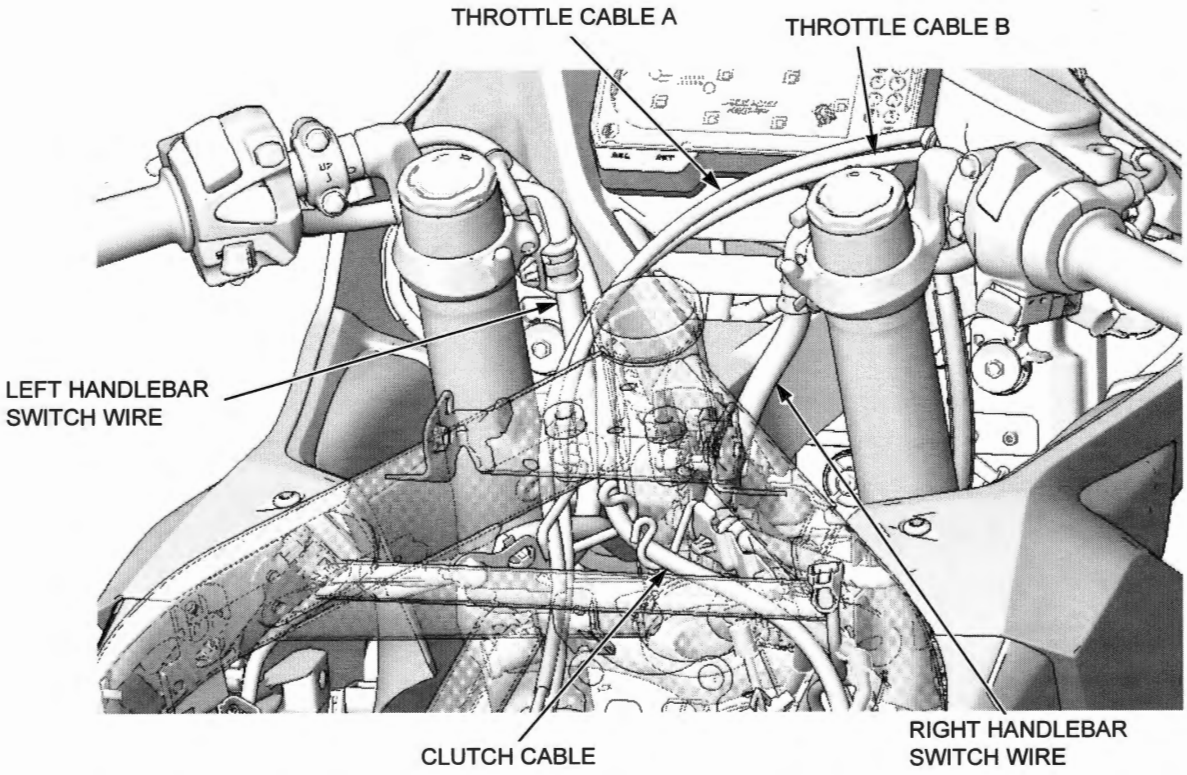

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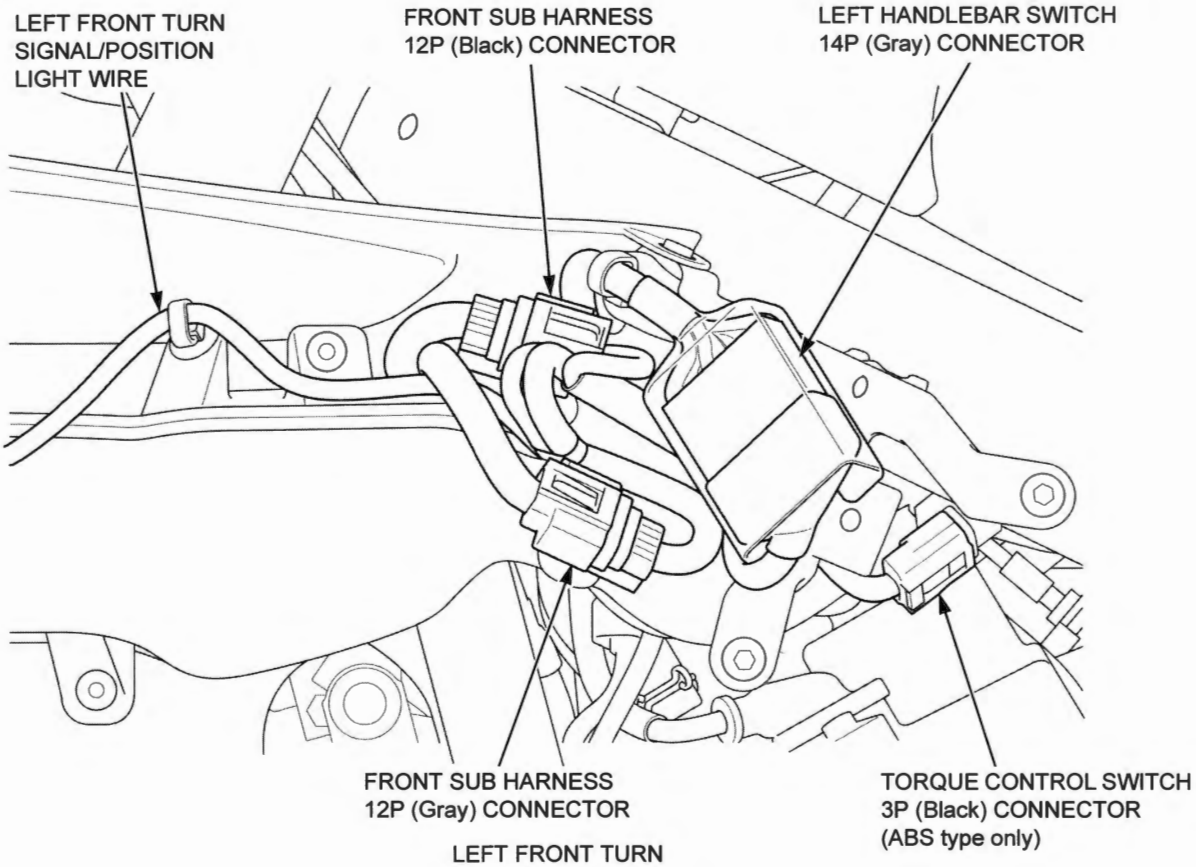
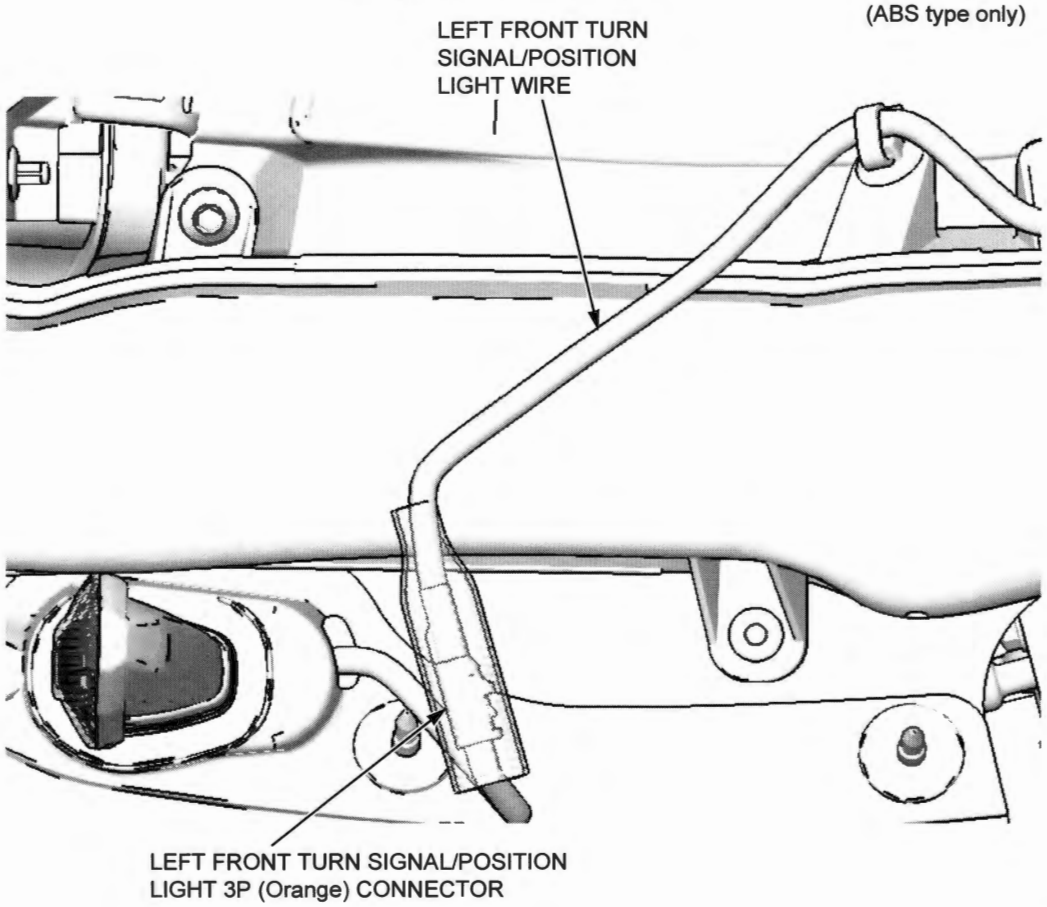
LEFT SIDE:

CBR650RA shown:





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RIGHT SIDE:

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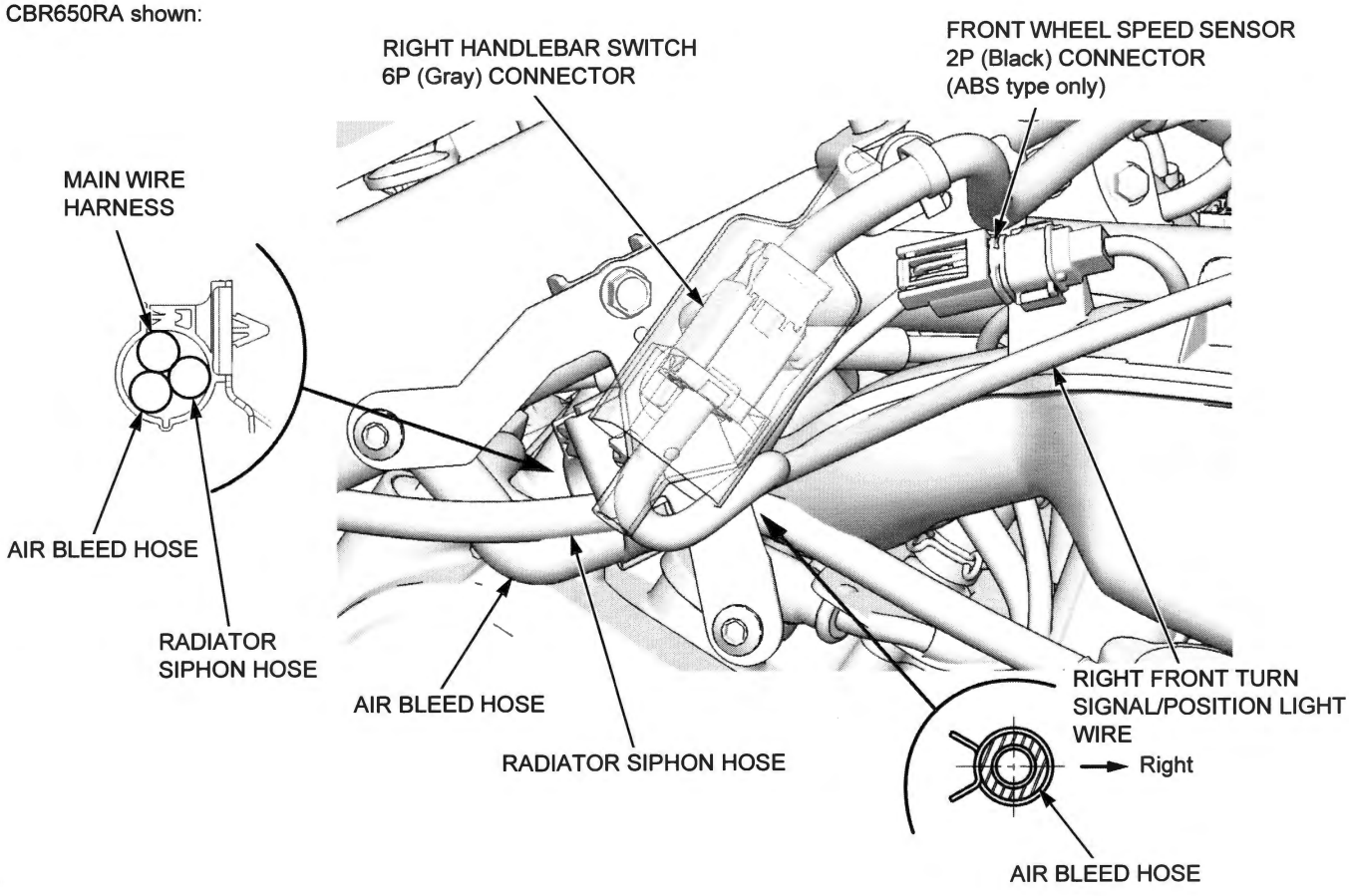

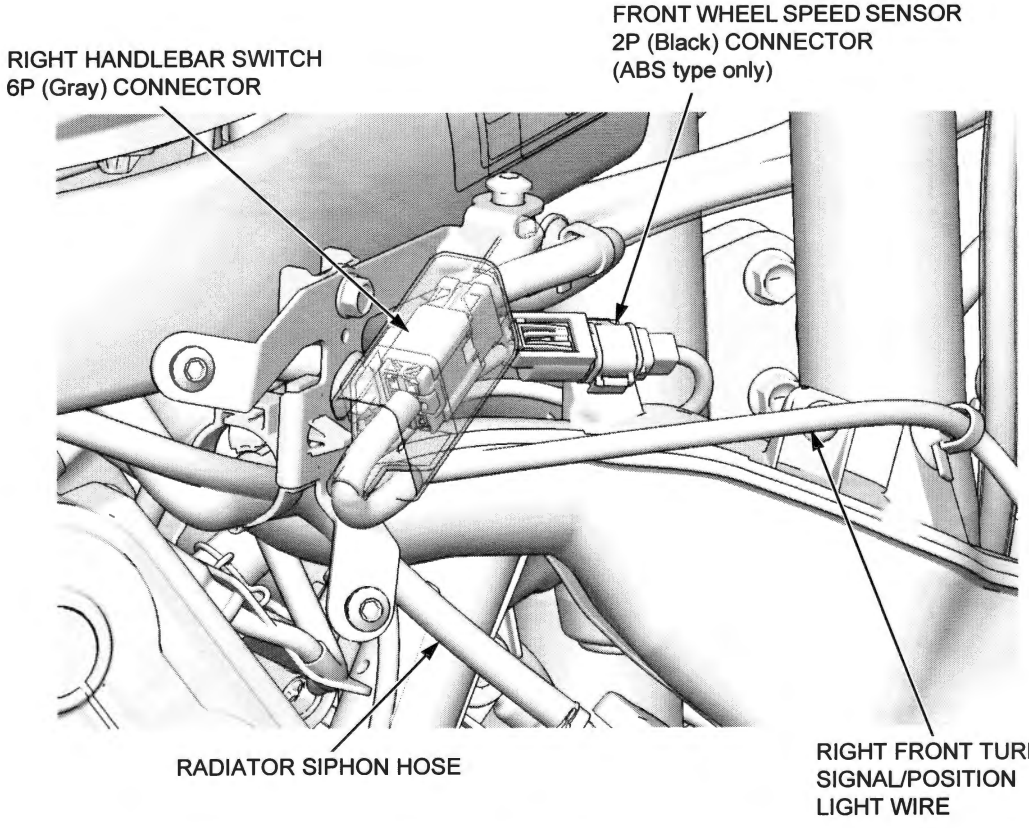

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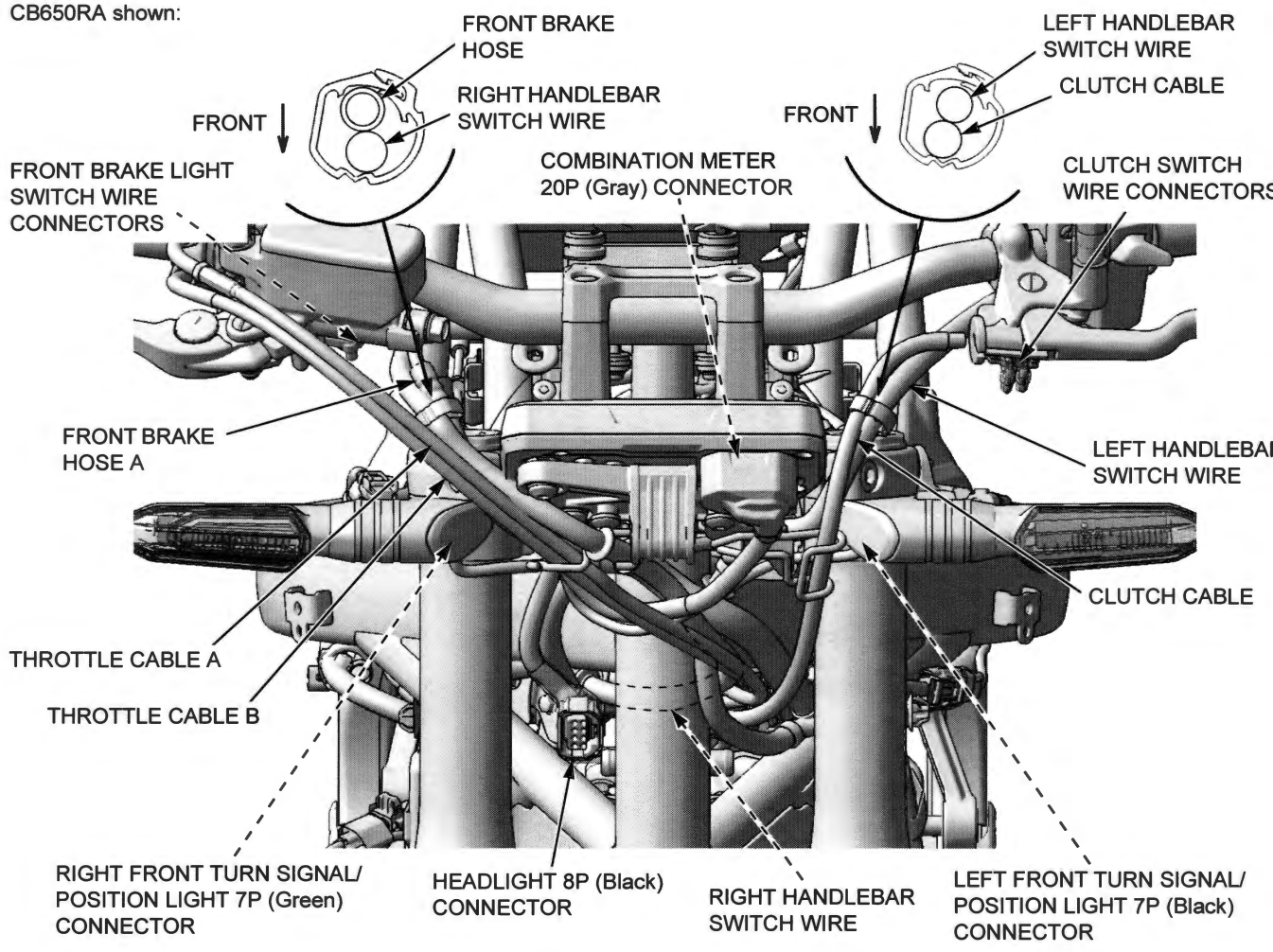

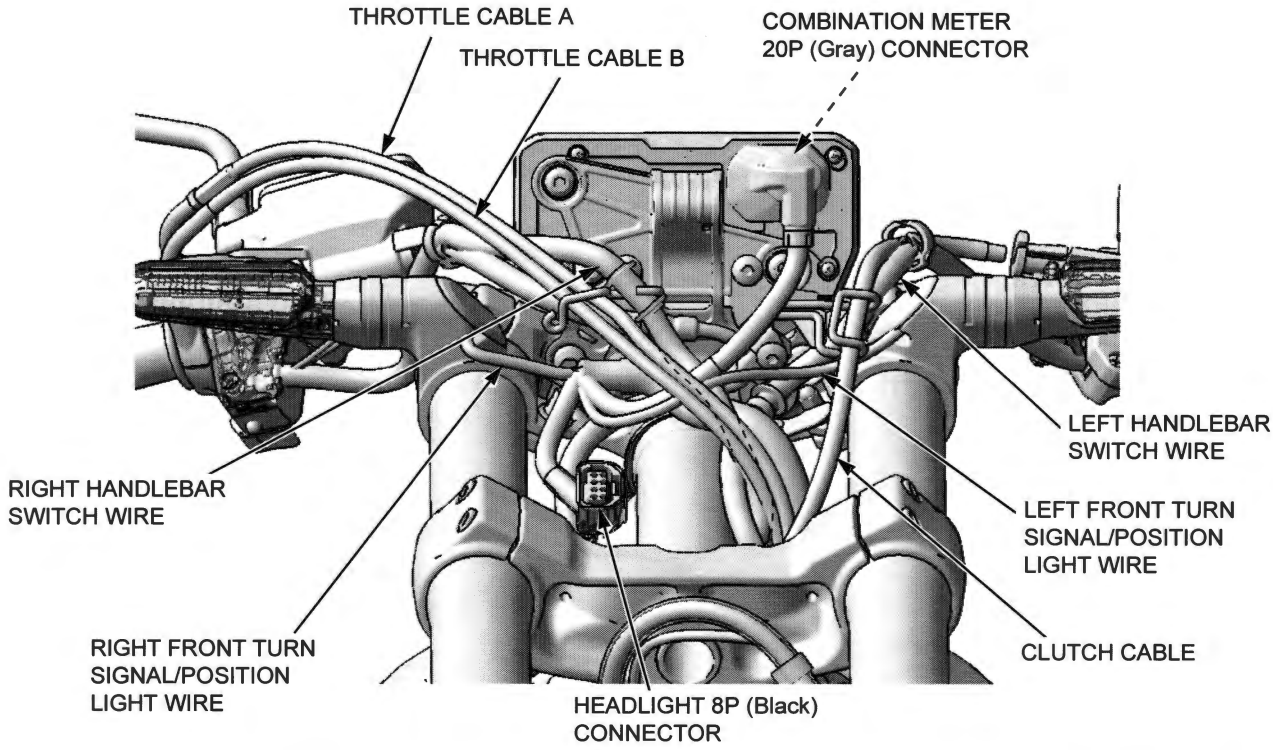

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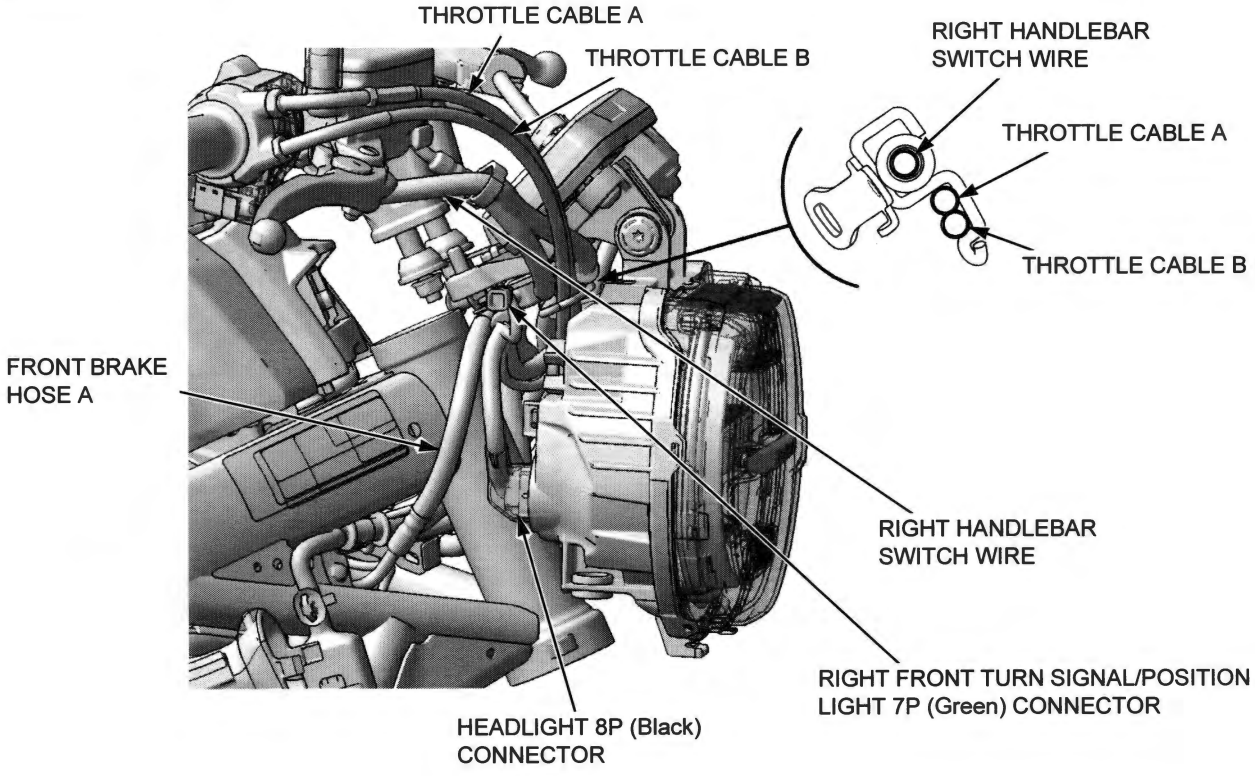

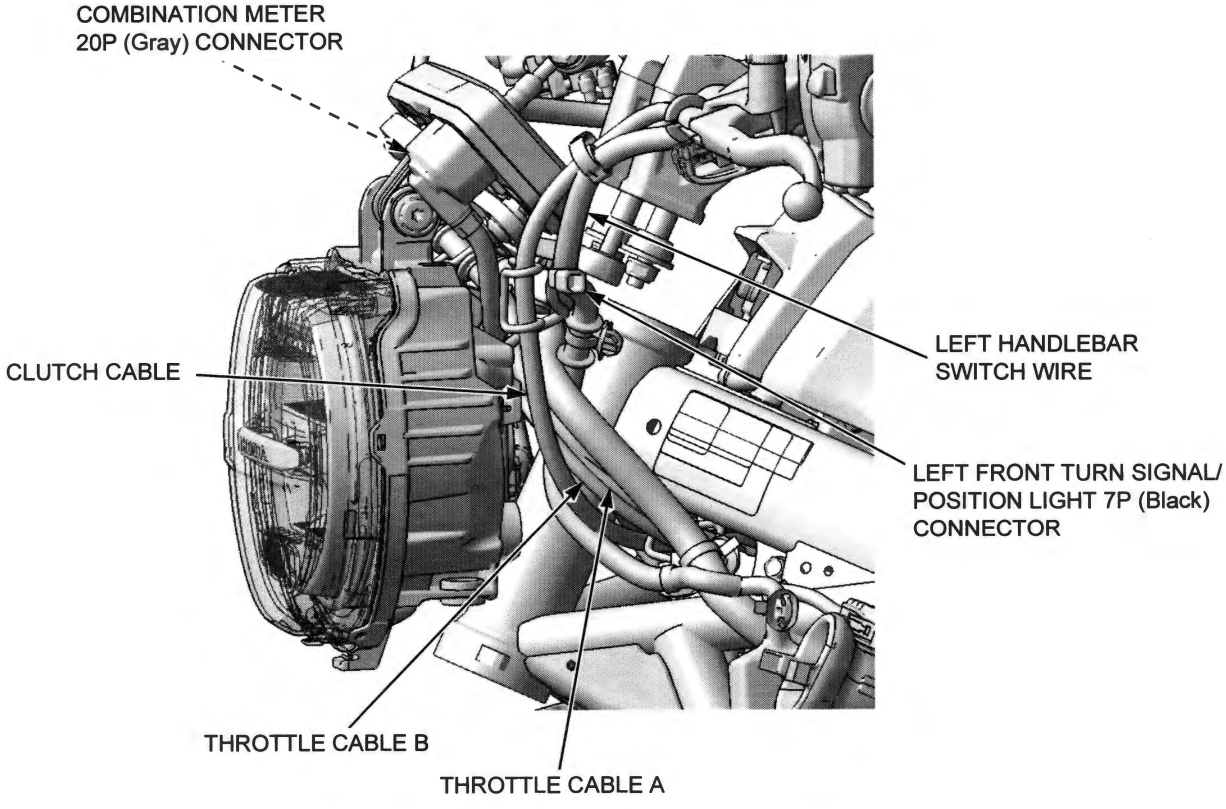

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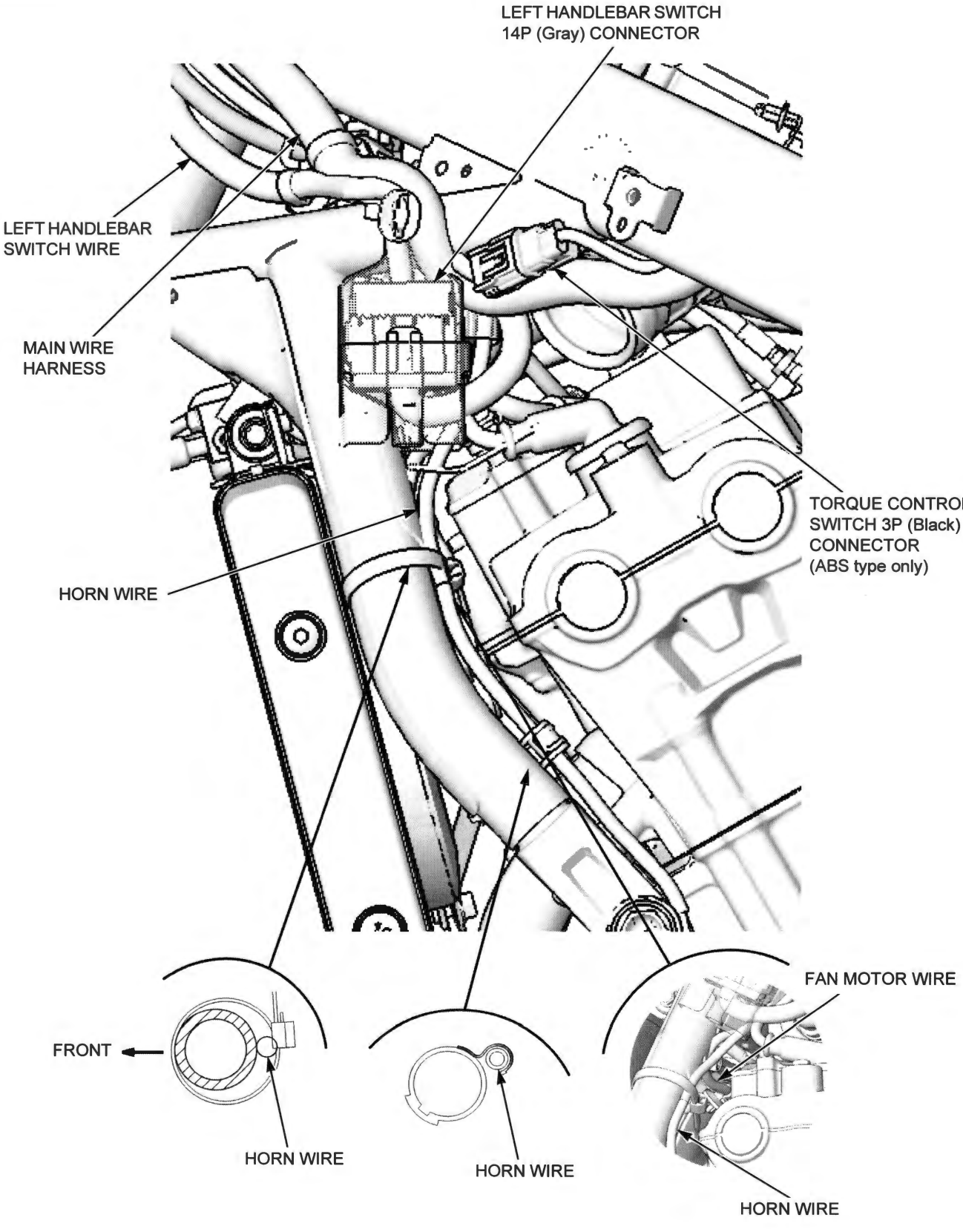

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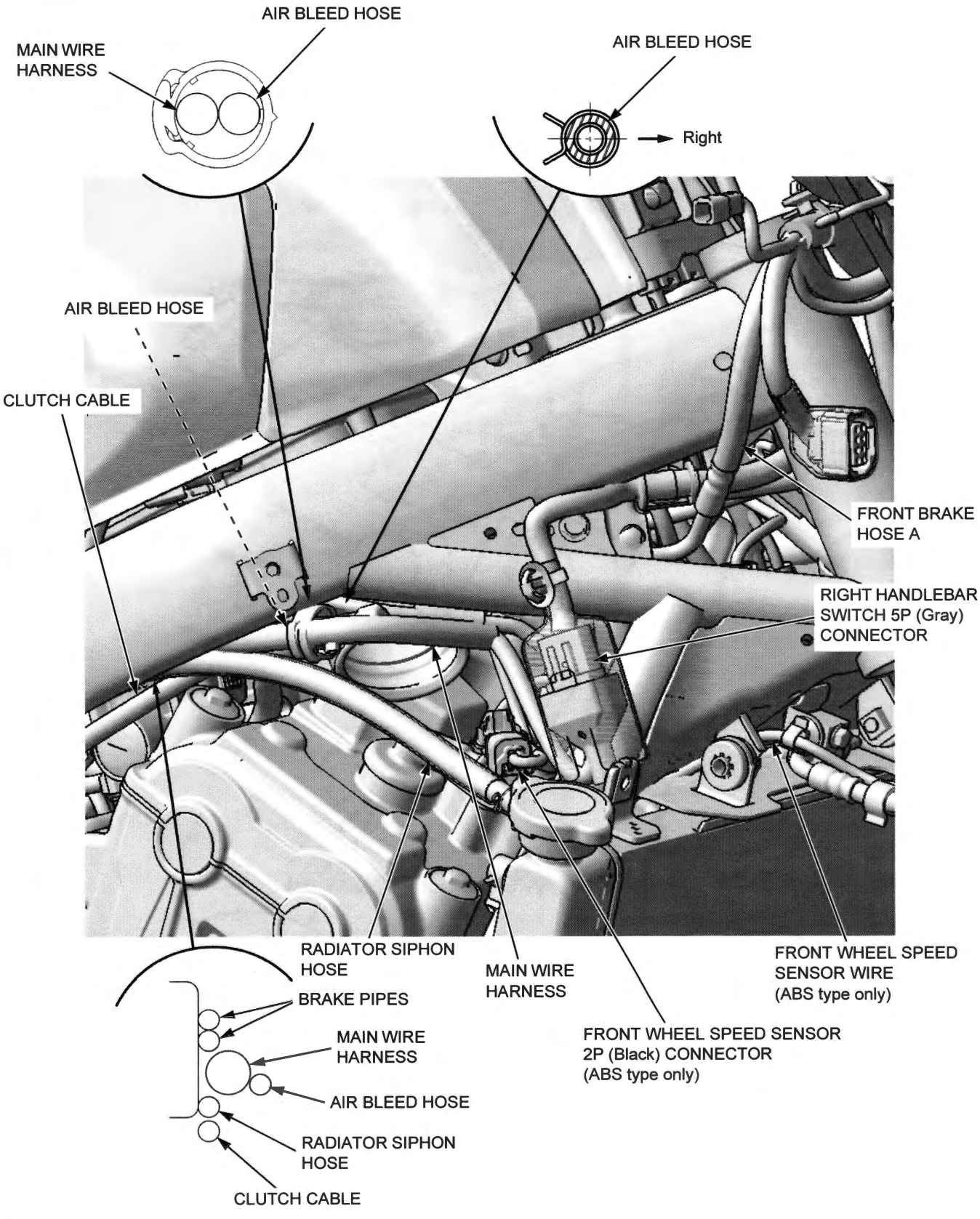
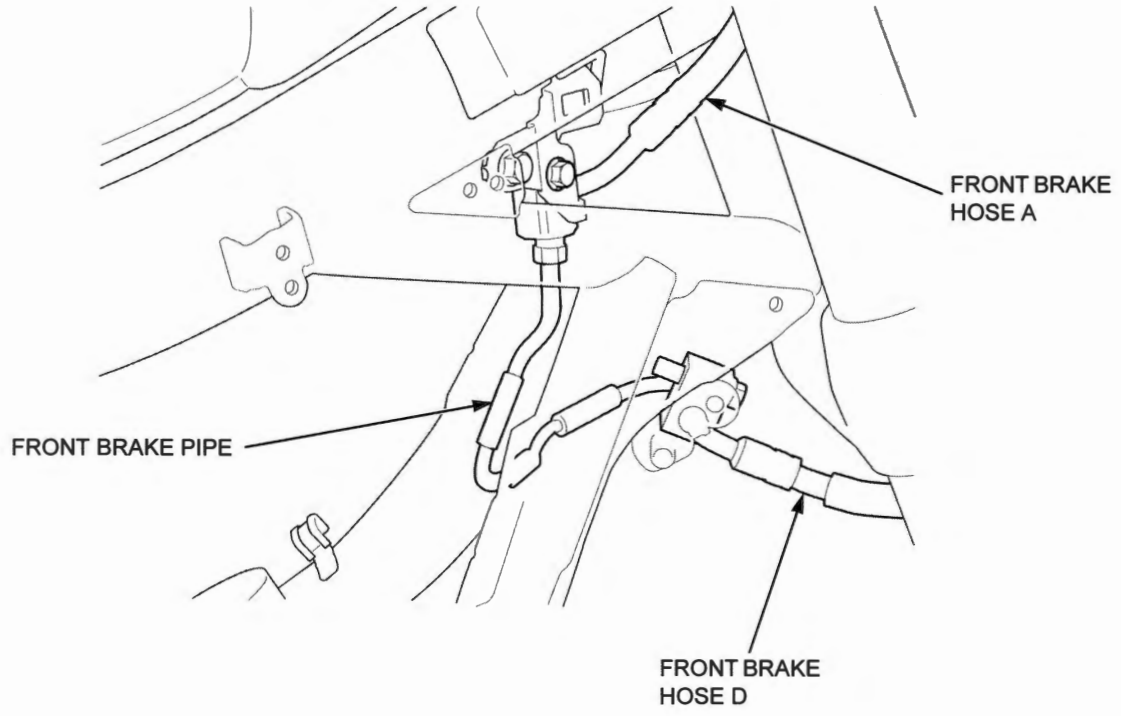


CB650R/RA:

CB650R:



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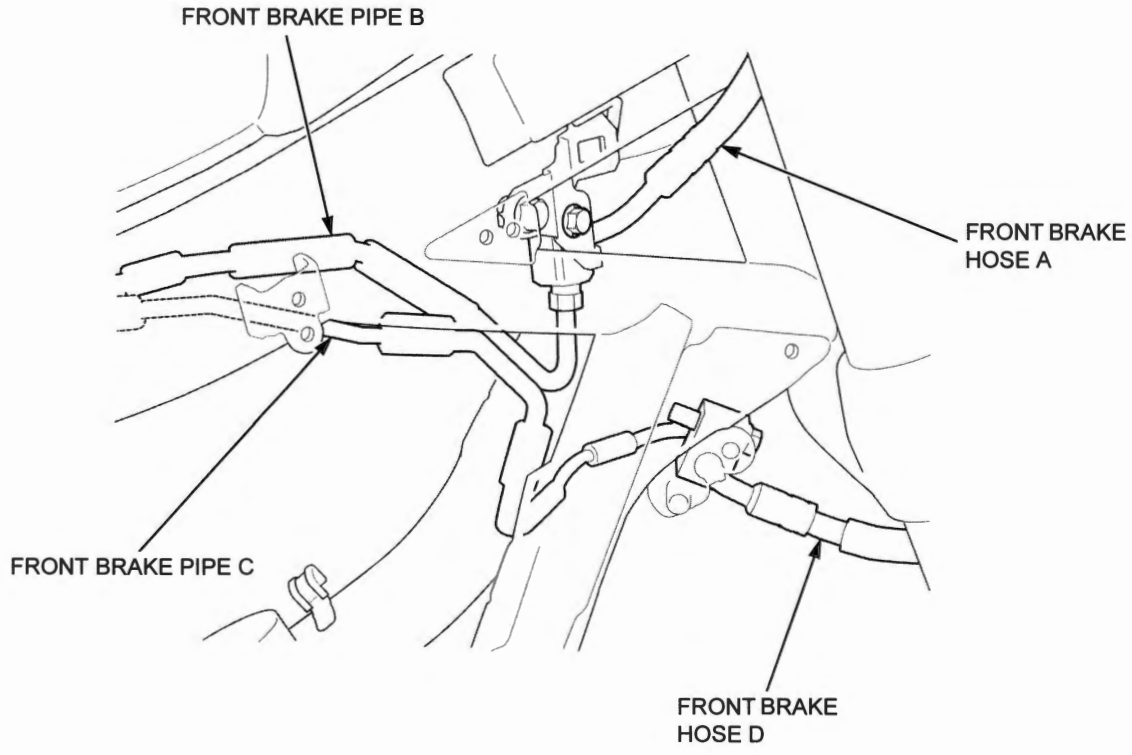
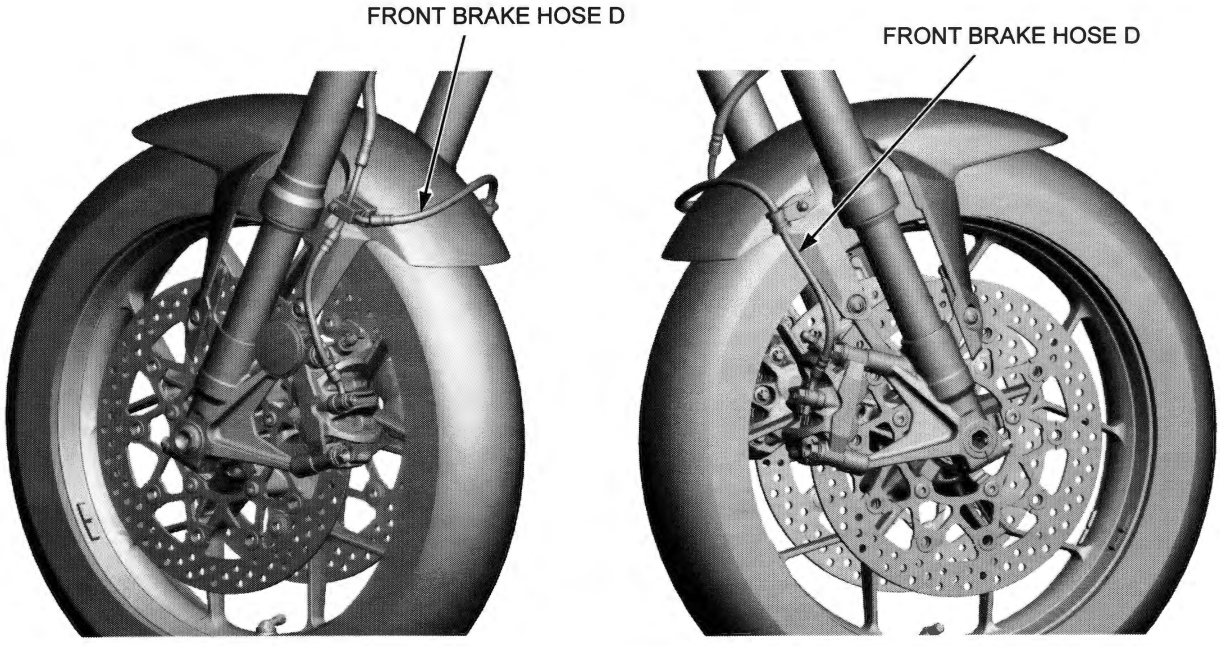


CBR650R, CB650R:



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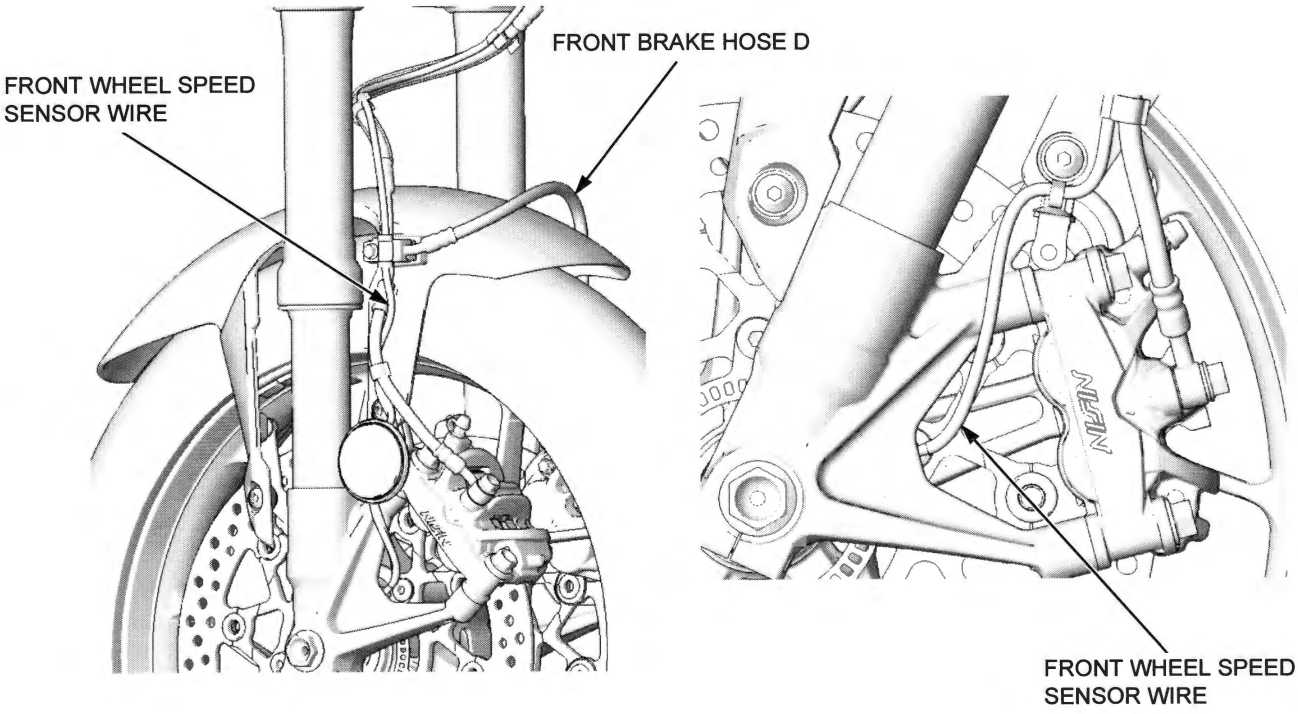
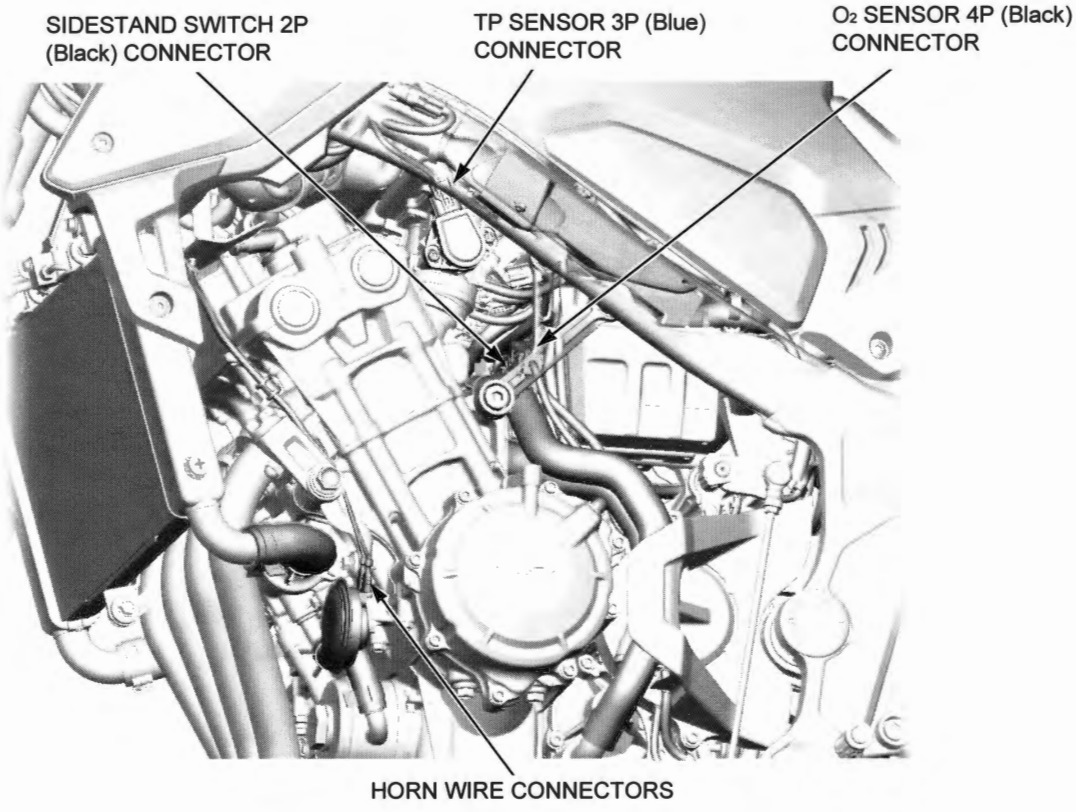
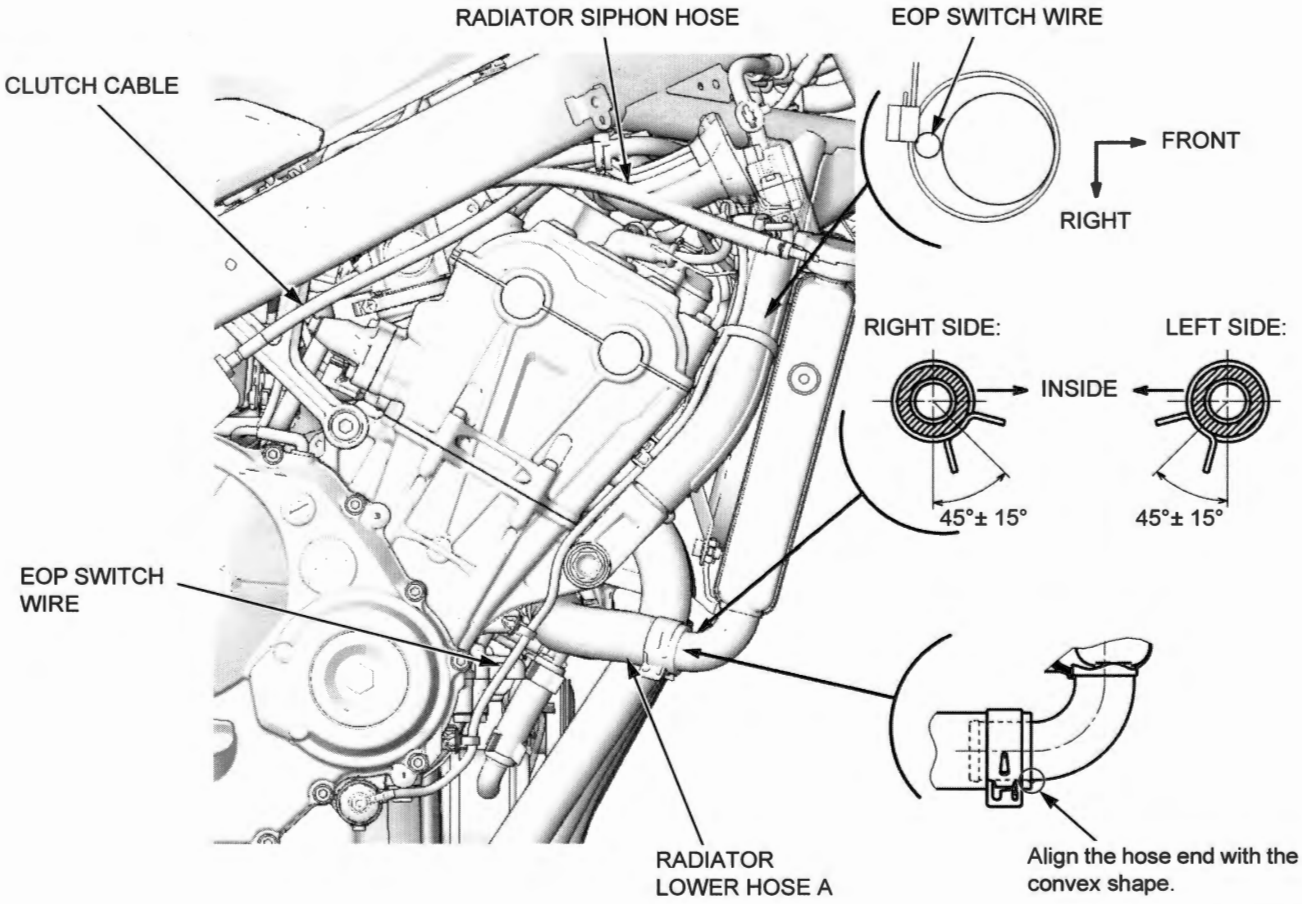


CBR650RA, CB650RA:

CB650RA shown:





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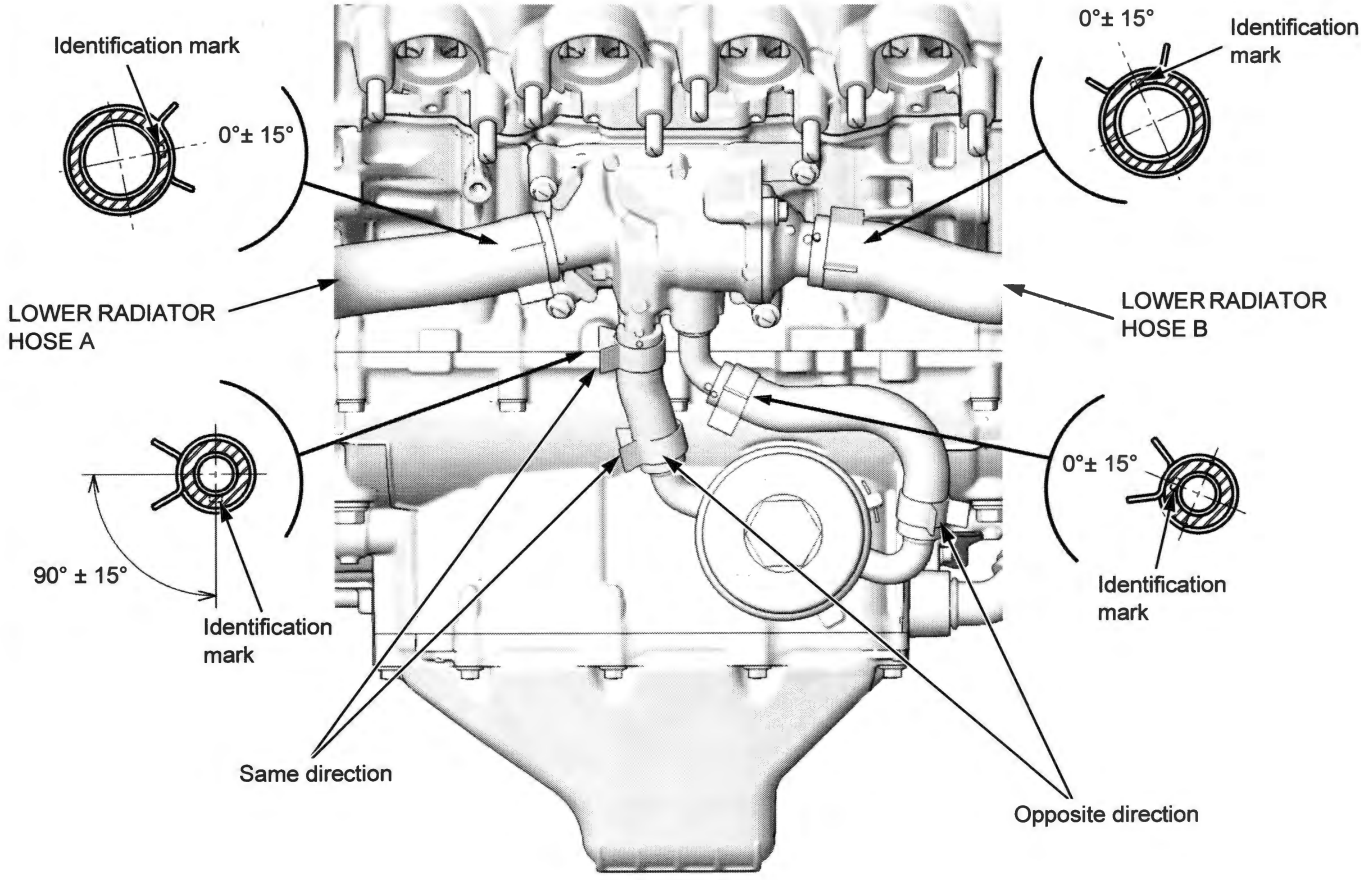

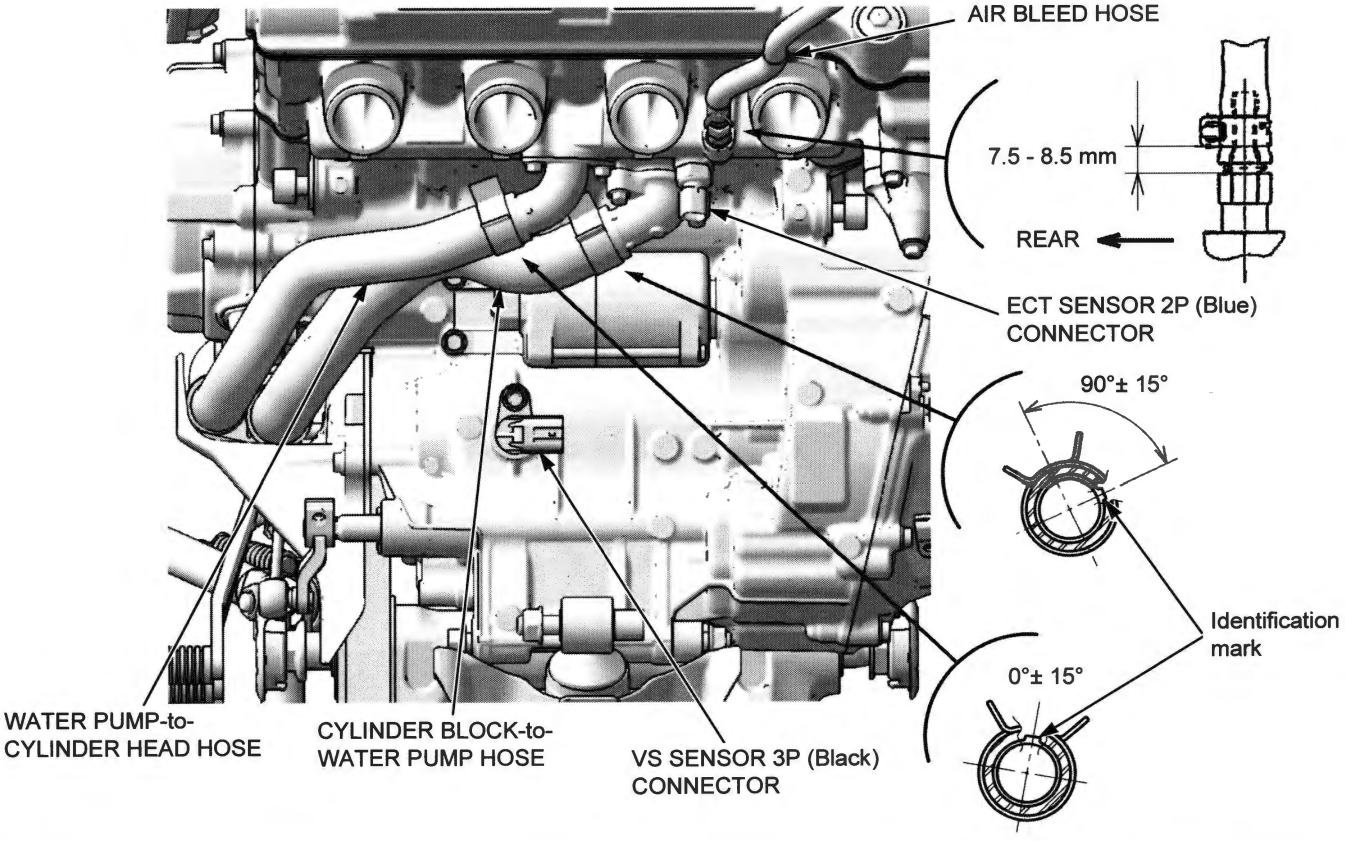

CBR650R/RA, CB650R/RA:

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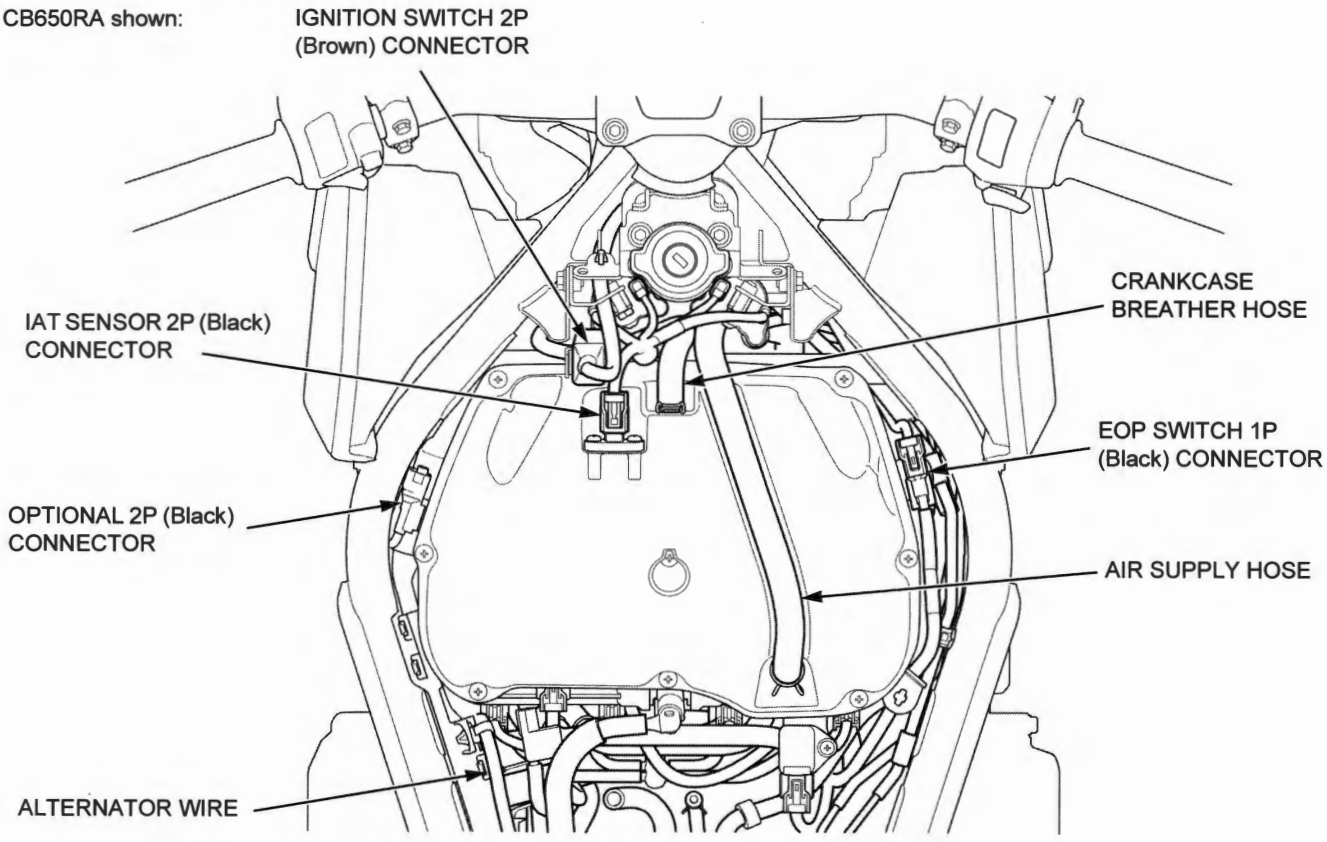
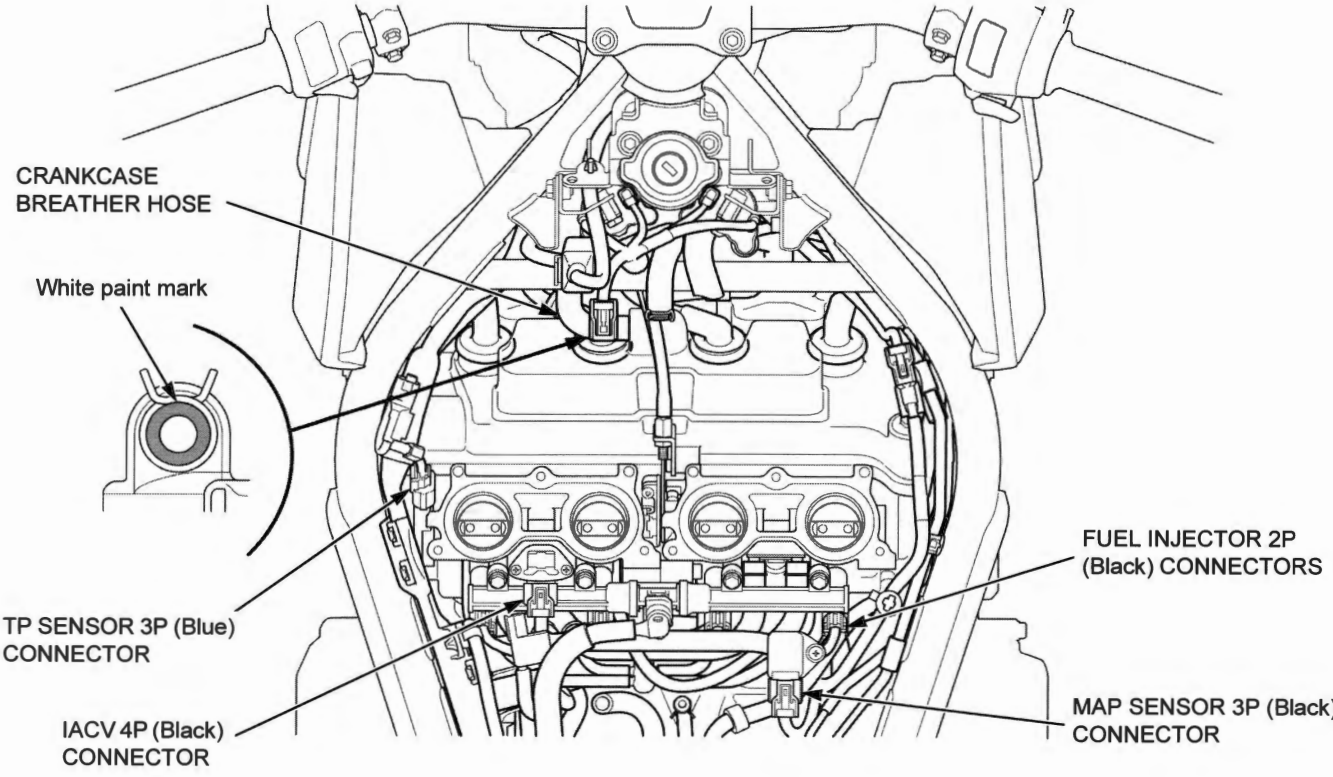
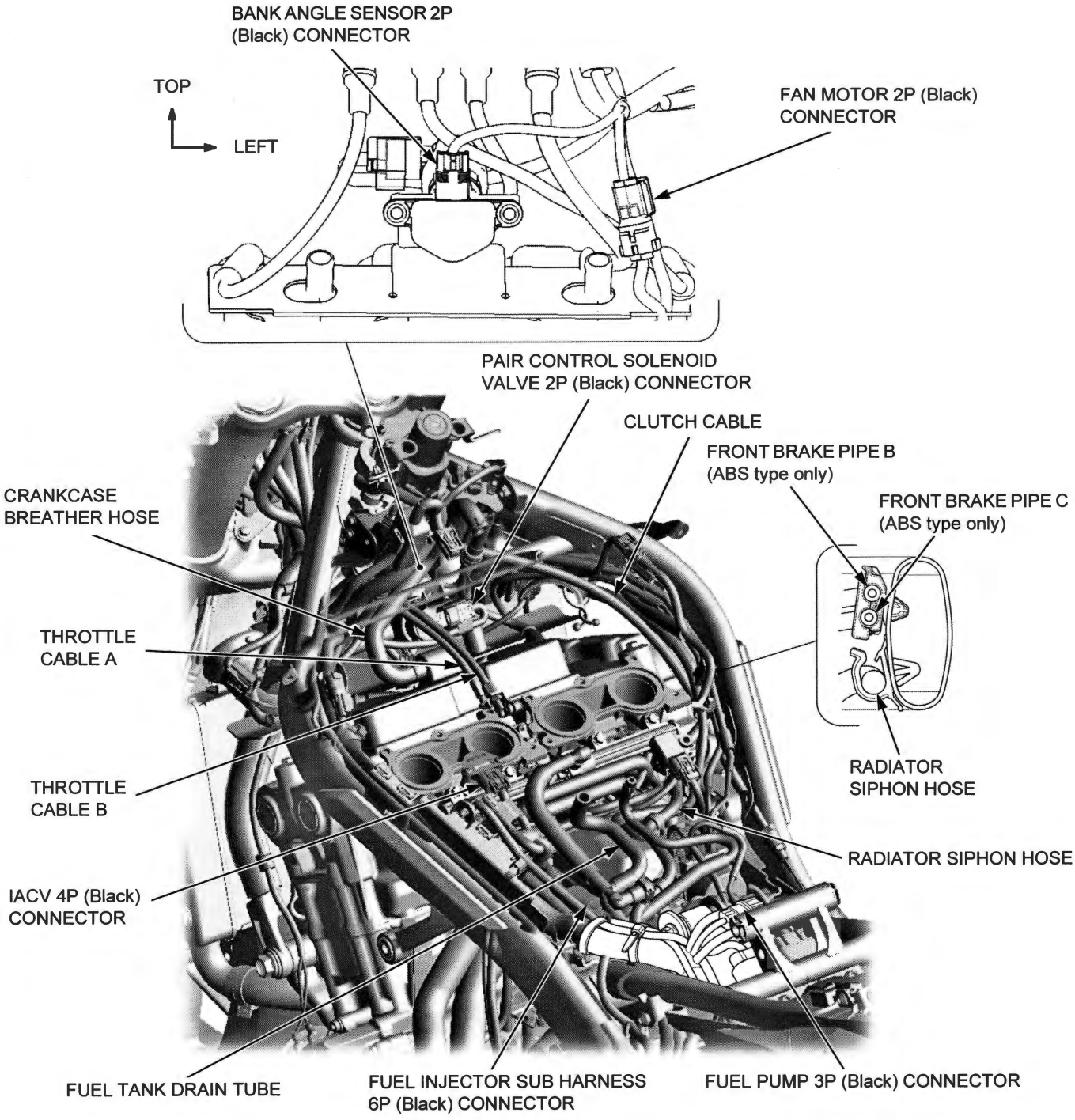




CBR650R/RA, CB650R/RA:

CB650RA shown:



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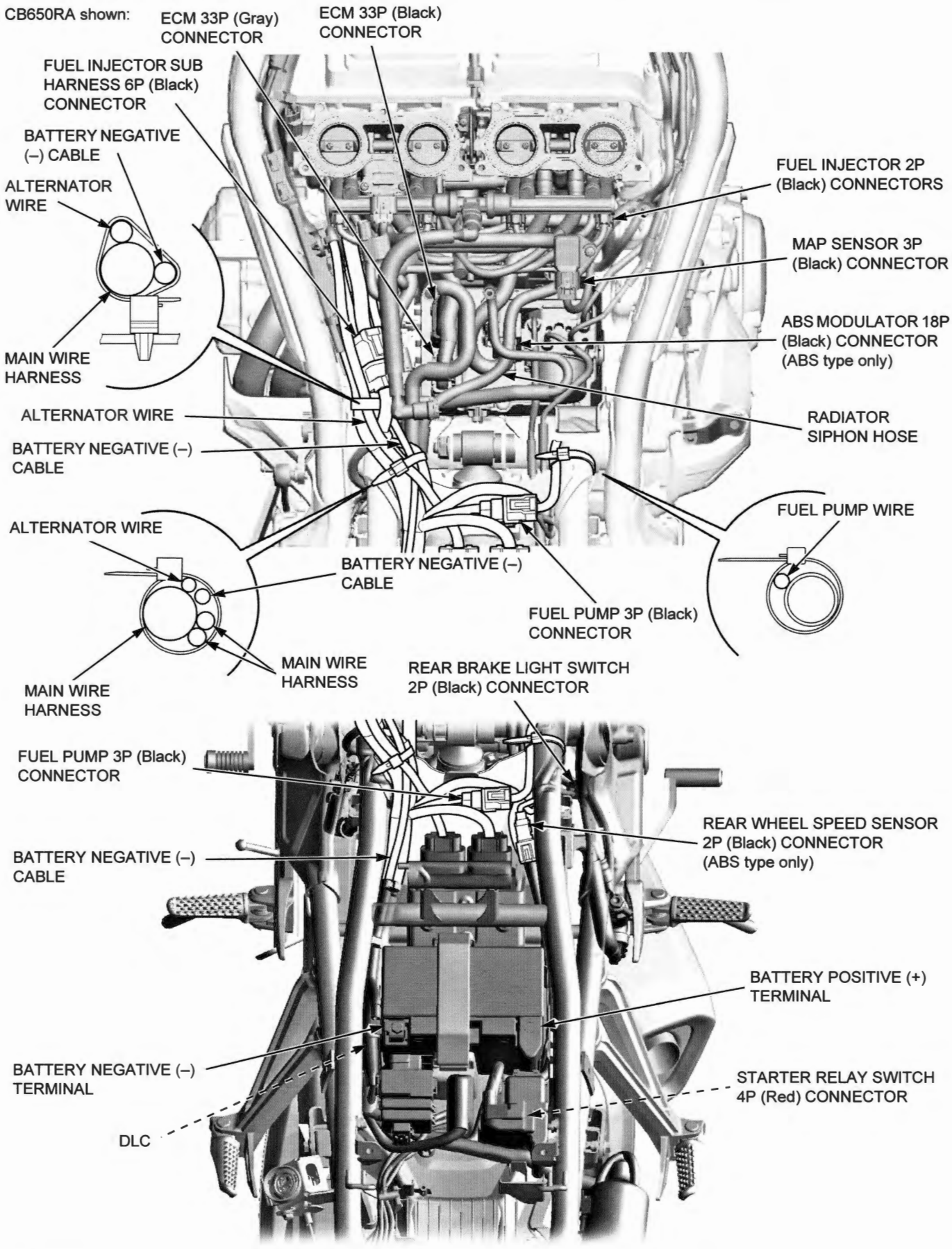

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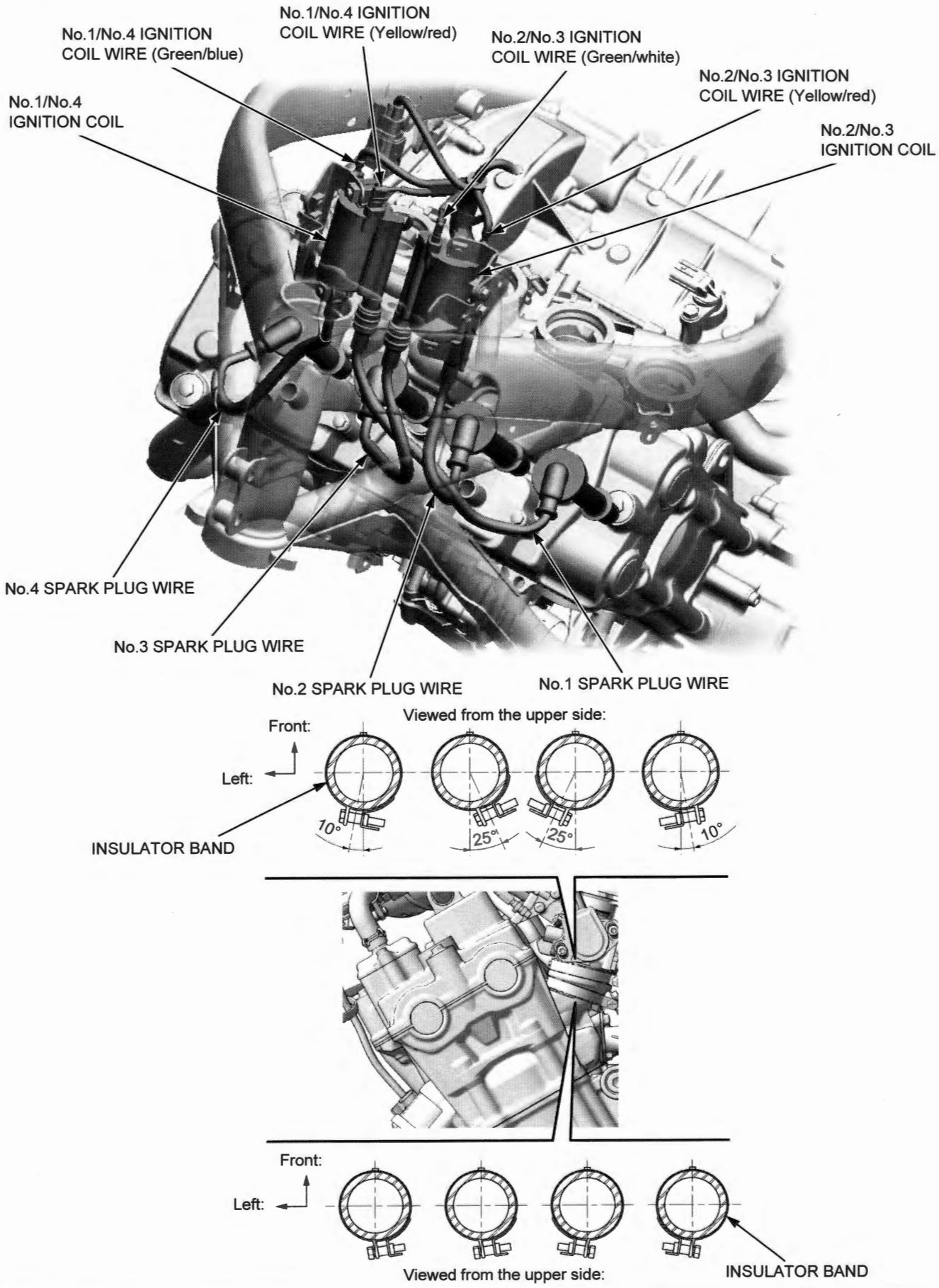

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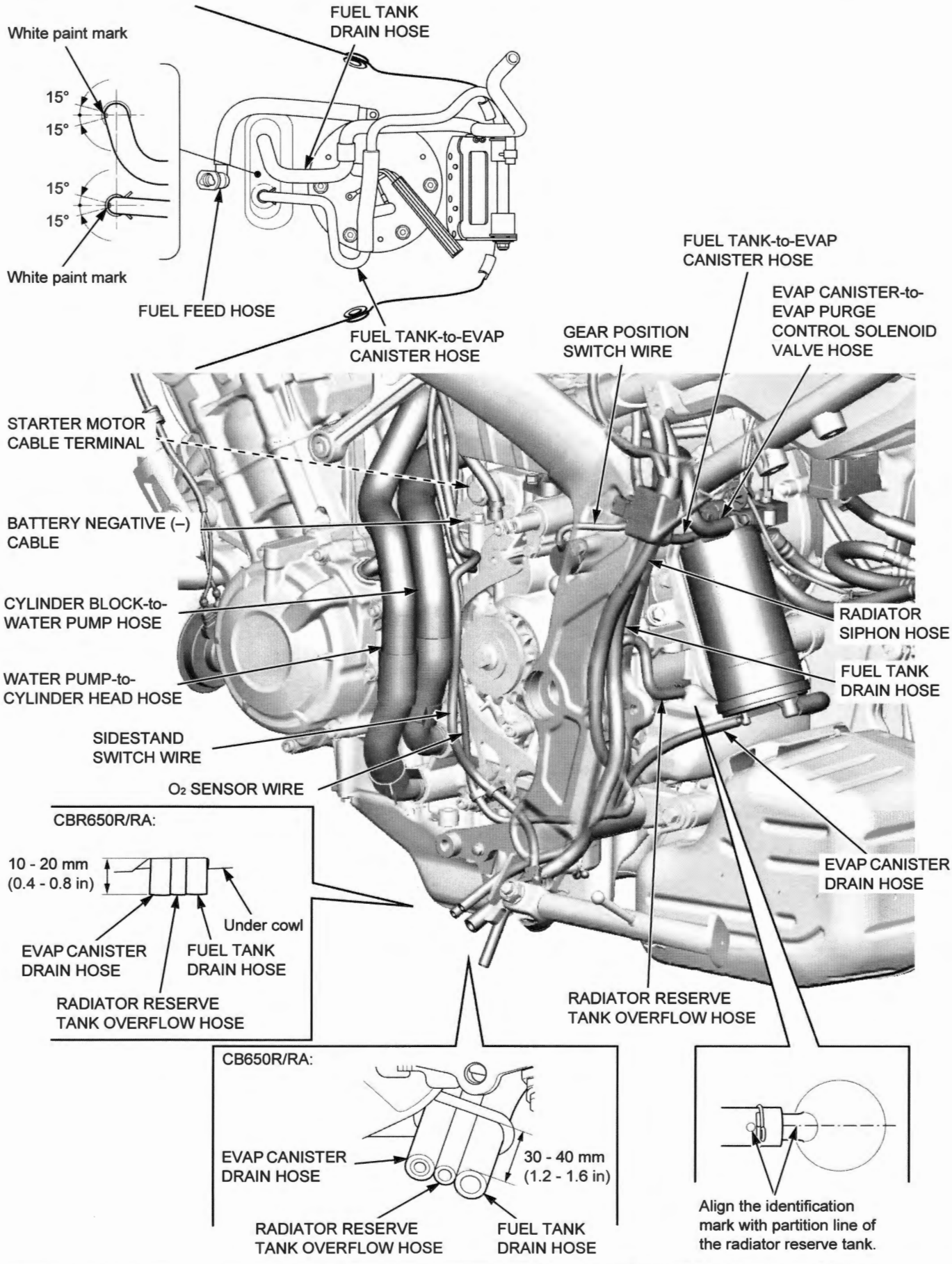
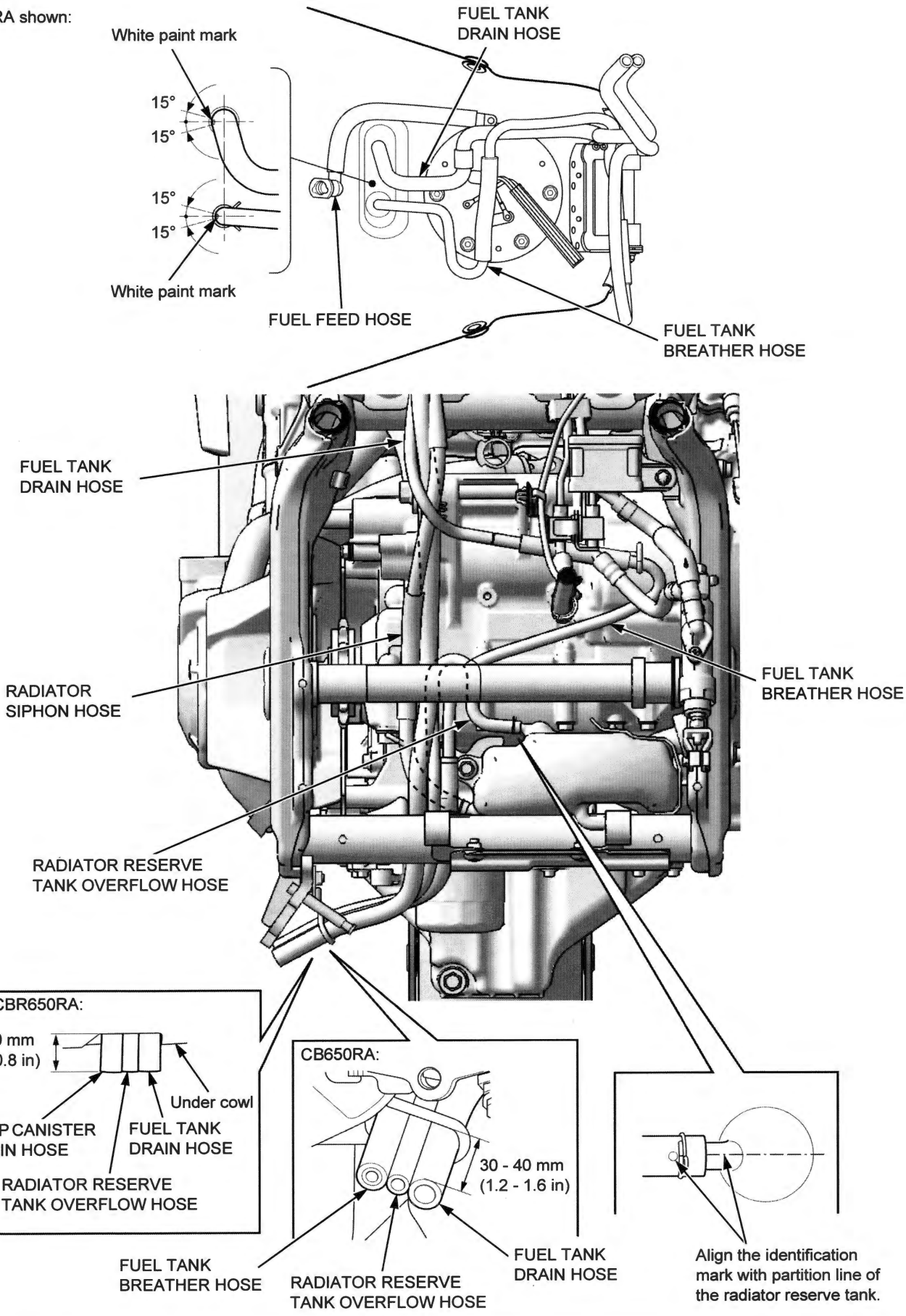

White paint mark
15°
15°
15°
15°
White paint mark
FUEL TANK DRAIN HOSE
FUEL FEED HOSE
FUEL TANK-to-EVAP CANISTER HOSE
FUEL TANK-to-EVAP CANISTER HOSE
GEAR POSITION SWITCH WIRE
EVAP CANISTER-to-EVAP PURGE CONTROL SOLENOID VALVE HOSE
STARTER MOTOR CABLE TERMINAL
BATTERY NEGATIVE (–) CABLE
CYLINDER BLOCK-to-WATER PUMP HOSE
WATER PUMP-to-CYLINDER HEAD HOSE
SIDESTAND SWITCH WIRE
O2 SENSOR WIRE
RADIATOR SIPHON HOSE
FUEL TANK DRAIN HOSE
EVAP CANISTER DRAIN HOSE
RADIATOR RESERVE TANK OVERFLOW HOSE
CBR650R/RA:
10 - 20 mm (0.4 - 0.8 in)
Under cowl
EVAP CANISTER DRAIN HOSE
FUEL TANK DRAIN HOSE
RADIATOR RESERVE TANK OVERFLOW HOSE
CB650R/RA:
EVAP CANISTER DRAIN HOSE
30 - 40 mm (1.2 - 1.6 in)
RADIATOR RESERVE TANK OVERFLOW HOSE
FUEL TANK DRAIN HOSE
Align the identification mark with partition line of the radiator reserve tank.

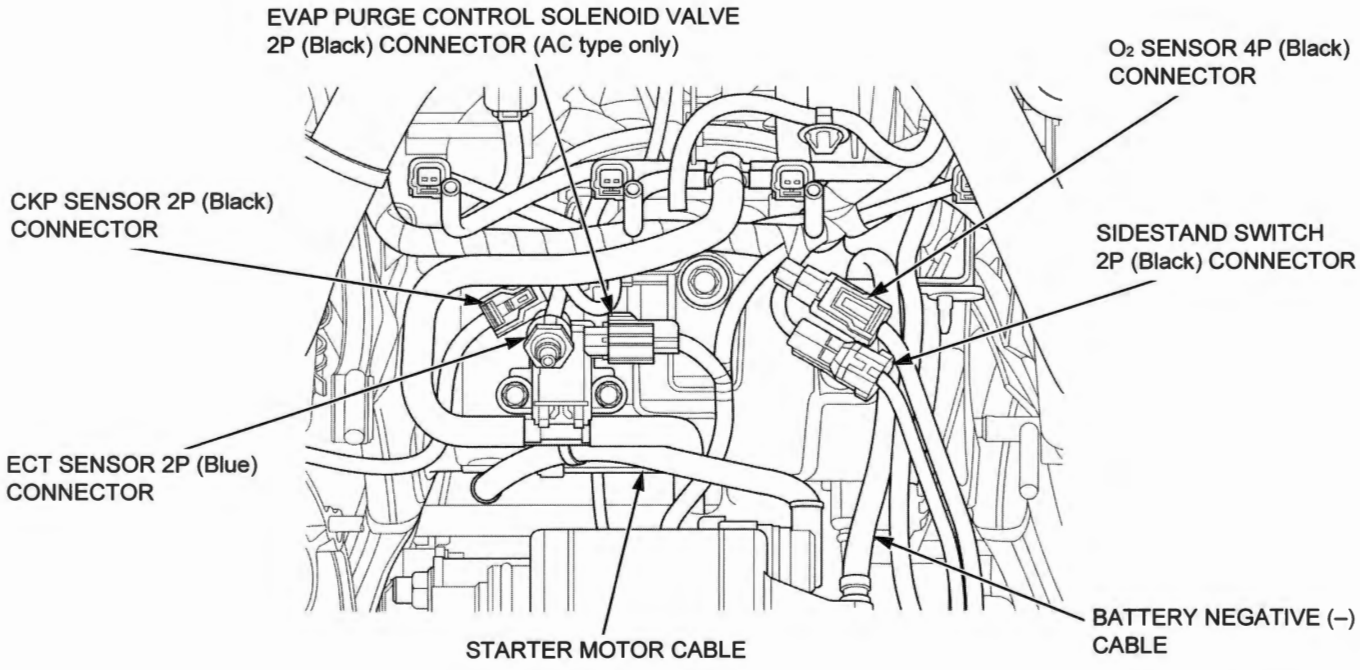
CM type:

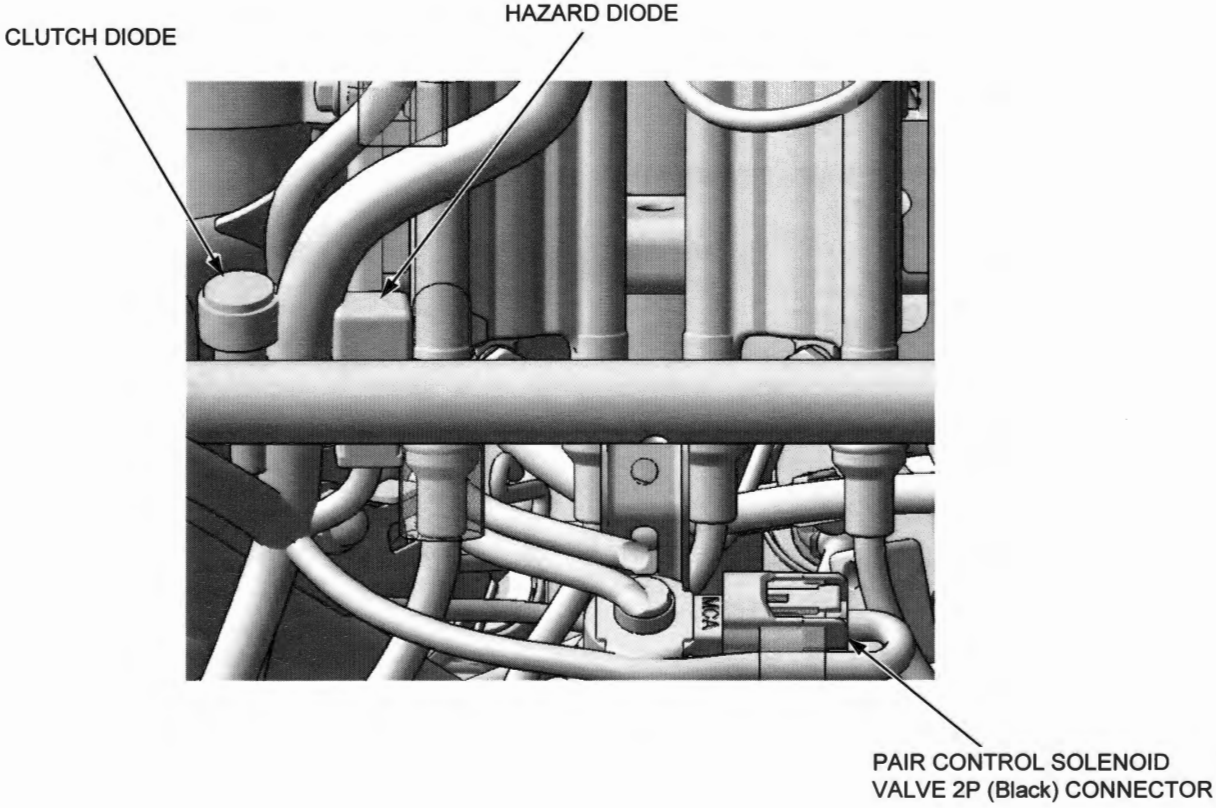
CB650RA shown:



CBR650R/RA, CB650R/RA:

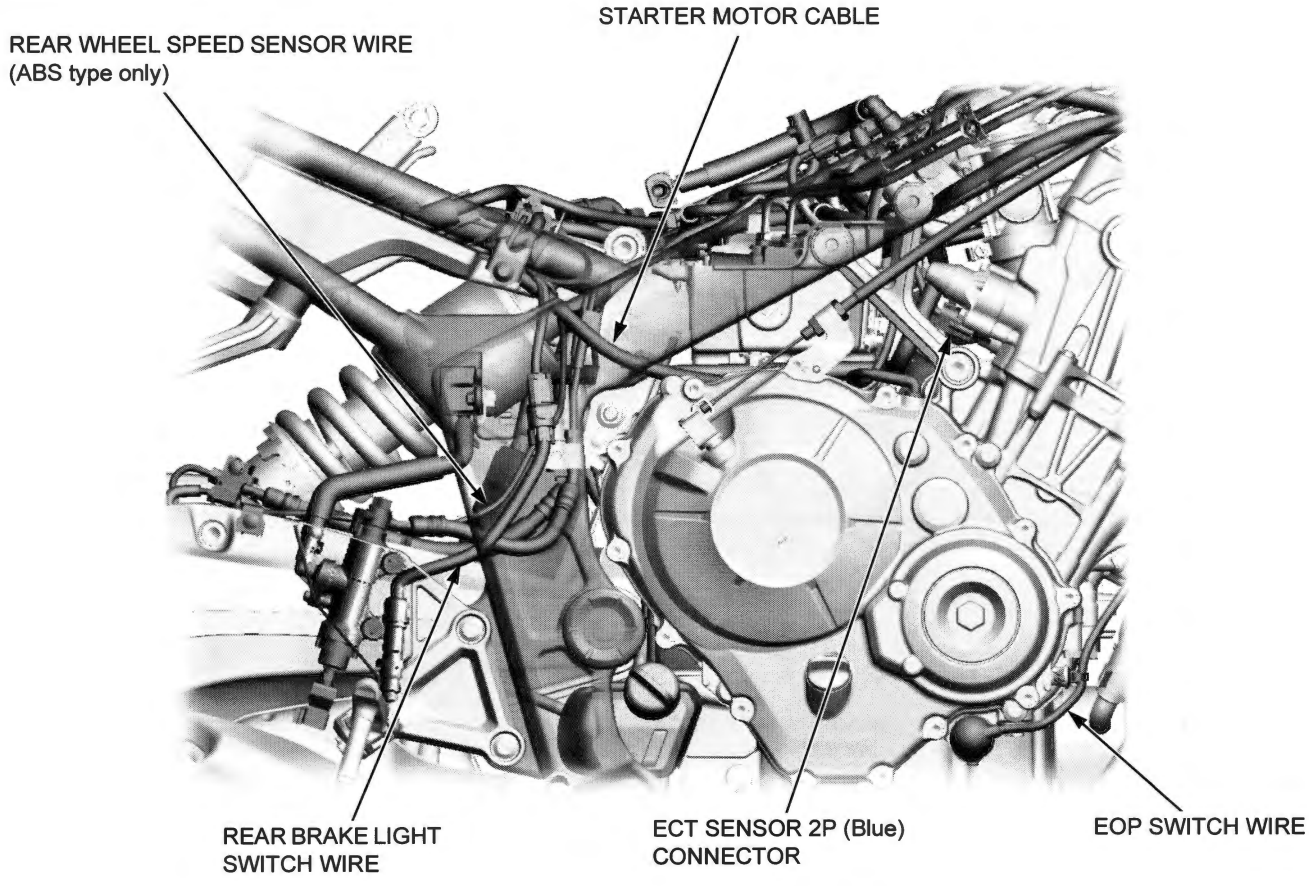
CB650RA shown:

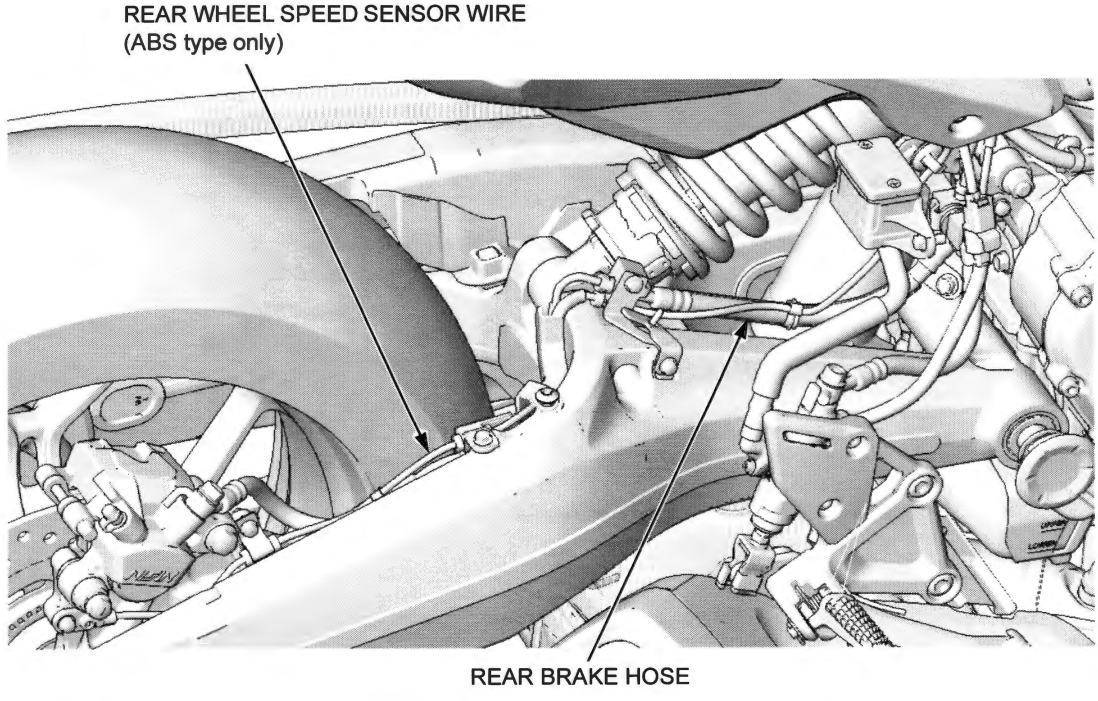




CBR650R/RA, CB650R/RA

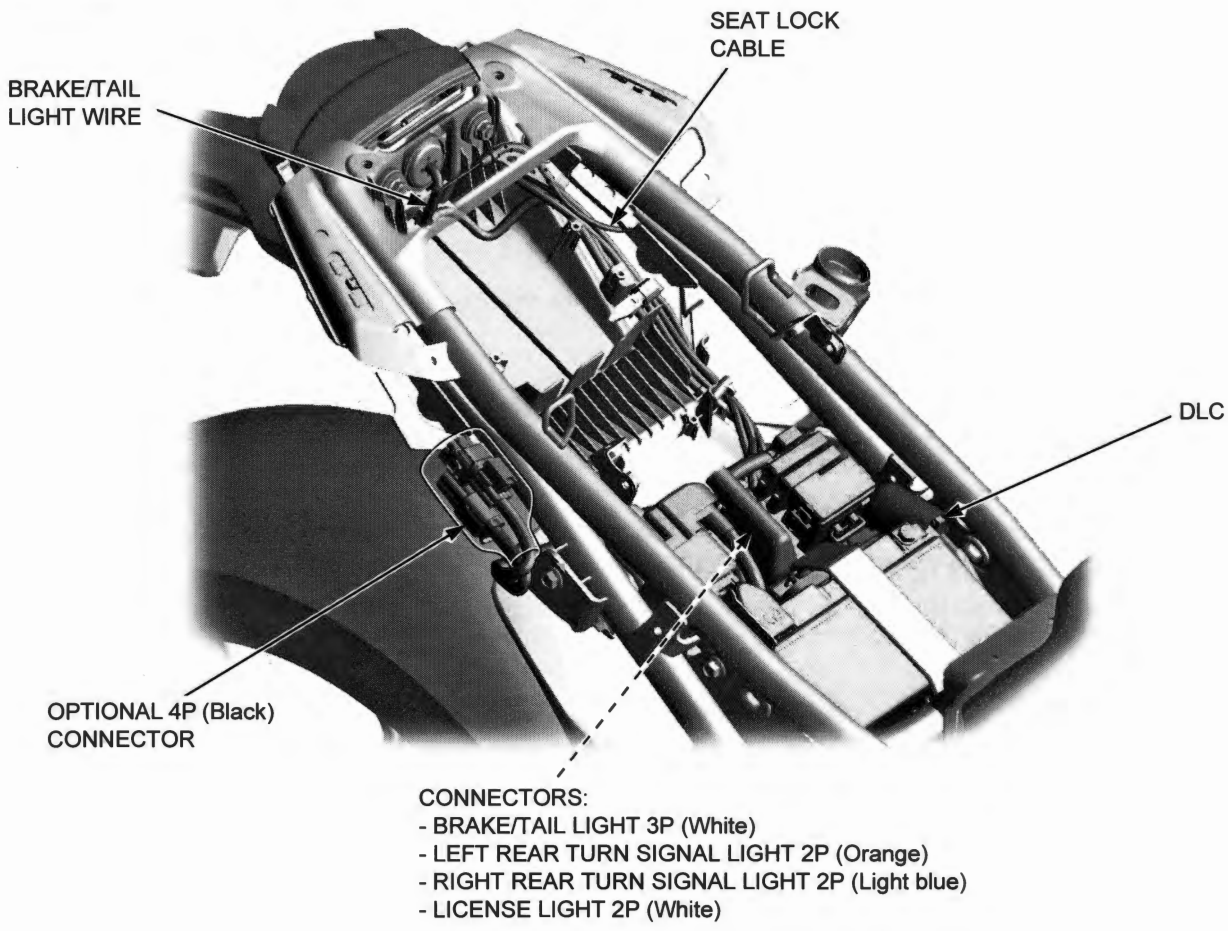
CB650RA shown:

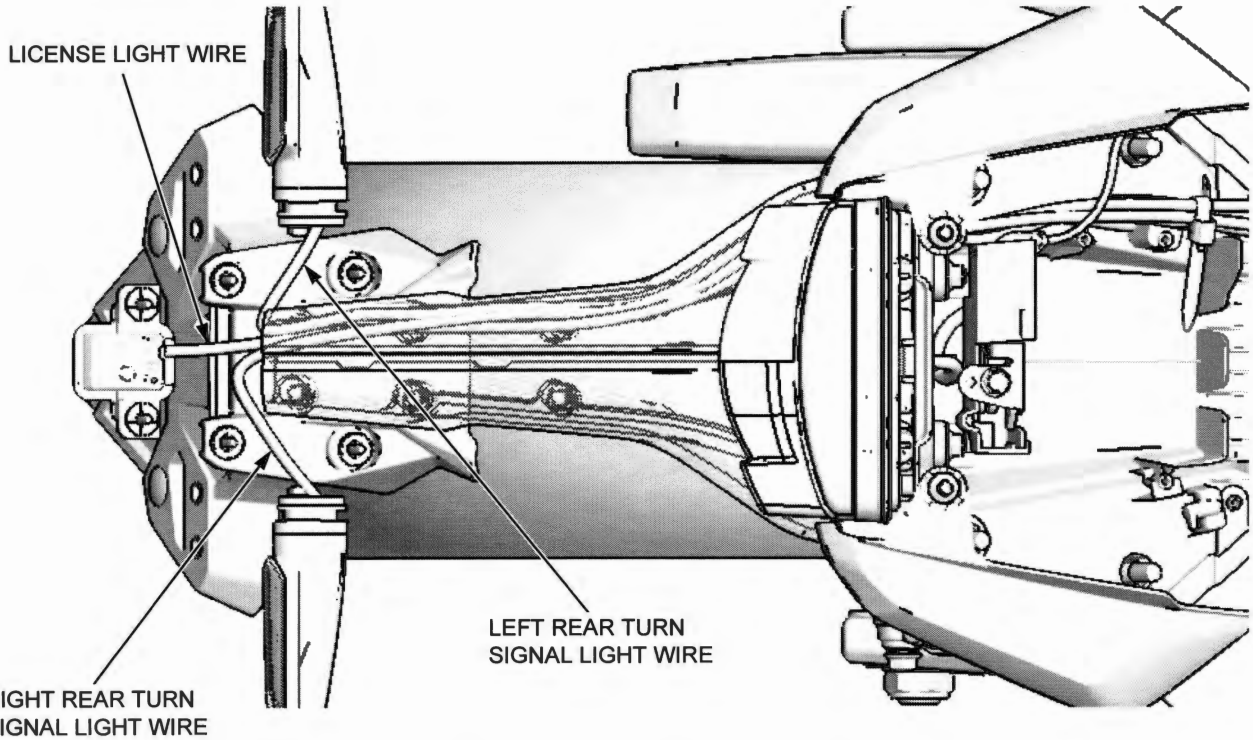




CBR650R/RA, CB650R/RA

CB650RA shown:





EMISSION CONTROL SYSTEMS

EXHAUST EMISSION REQUIREMENT

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

NOISE EMISSION REQUIREMENT

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

WARRANTY COMPLIANCE

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

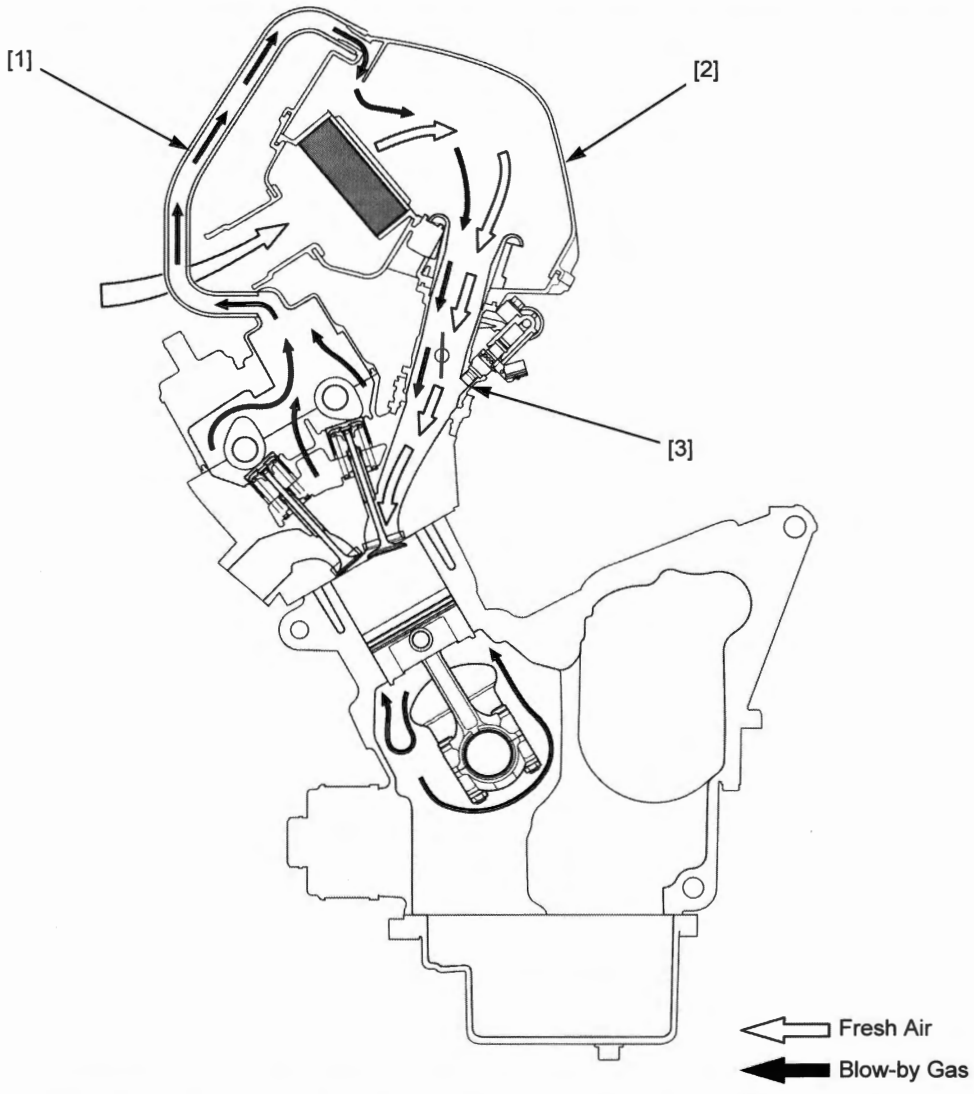
SOURCE OF EMISSIONS

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

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

CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the crankcase breather hose [1] air cleaner housing [2] and throttle body [3].



EXHAUST EMISSION CONTROL SYSTEM

The exhaust emission control system is composed of a pulse secondary air supply system, 3-way catalytic converter and PGM-FI system.

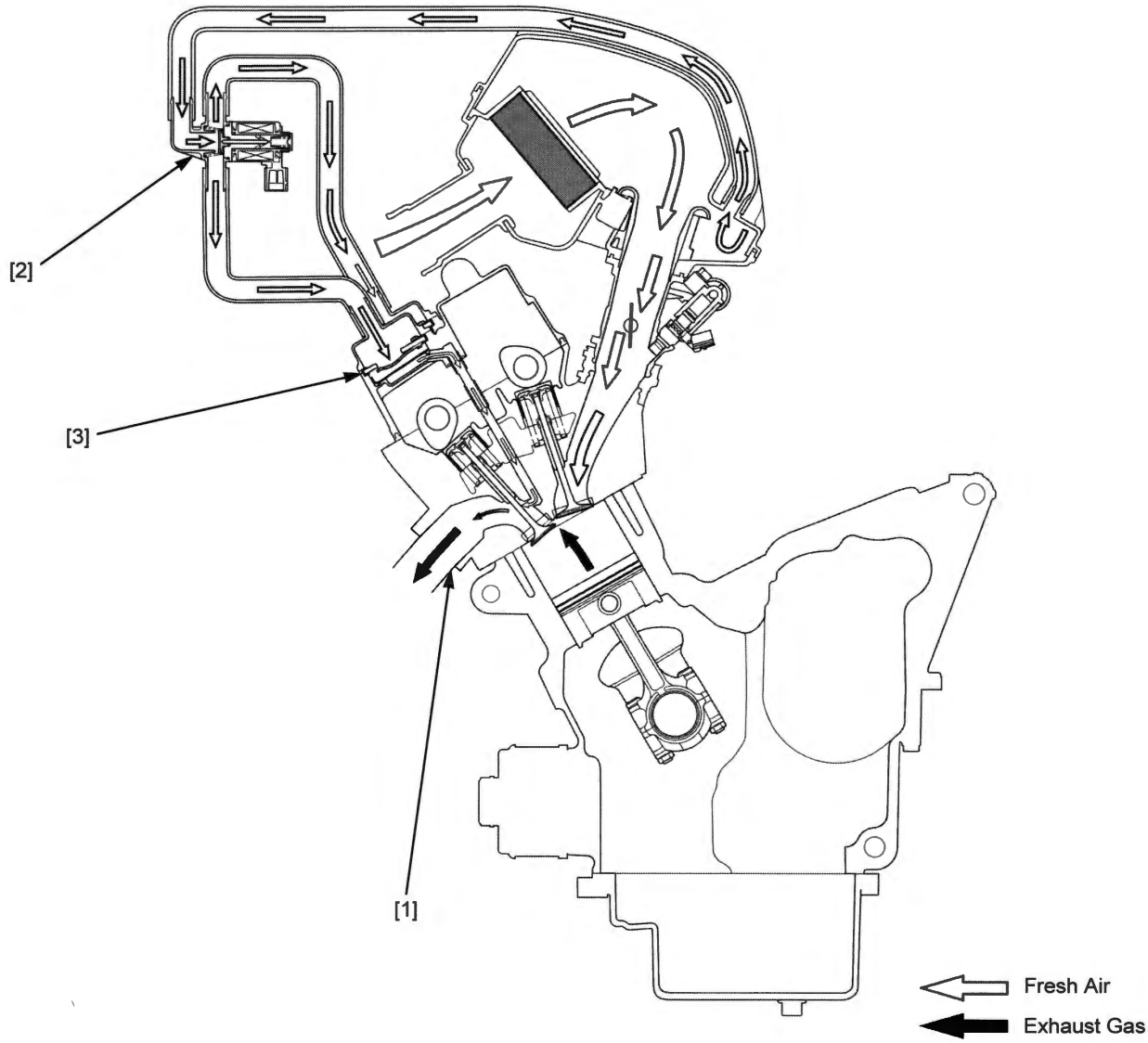
SECONDARY AIR SUPPLY SYSTEM

The pulse secondary air supply system introduces filtered air into the exhaust gases in the exhaust port [1]. Fresh air is drawn into the exhaust port by the function of the PAIR control solenoid valve [2].

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 PAIR check valve [3] prevents reverse air flow through the system. The PAIR control solenoid valve is controlled by the PGM-FI unit, and the fresh air passage is opened/closed according to running condition (ECT/IAT/TP/MAP sensor and engine revolution).

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

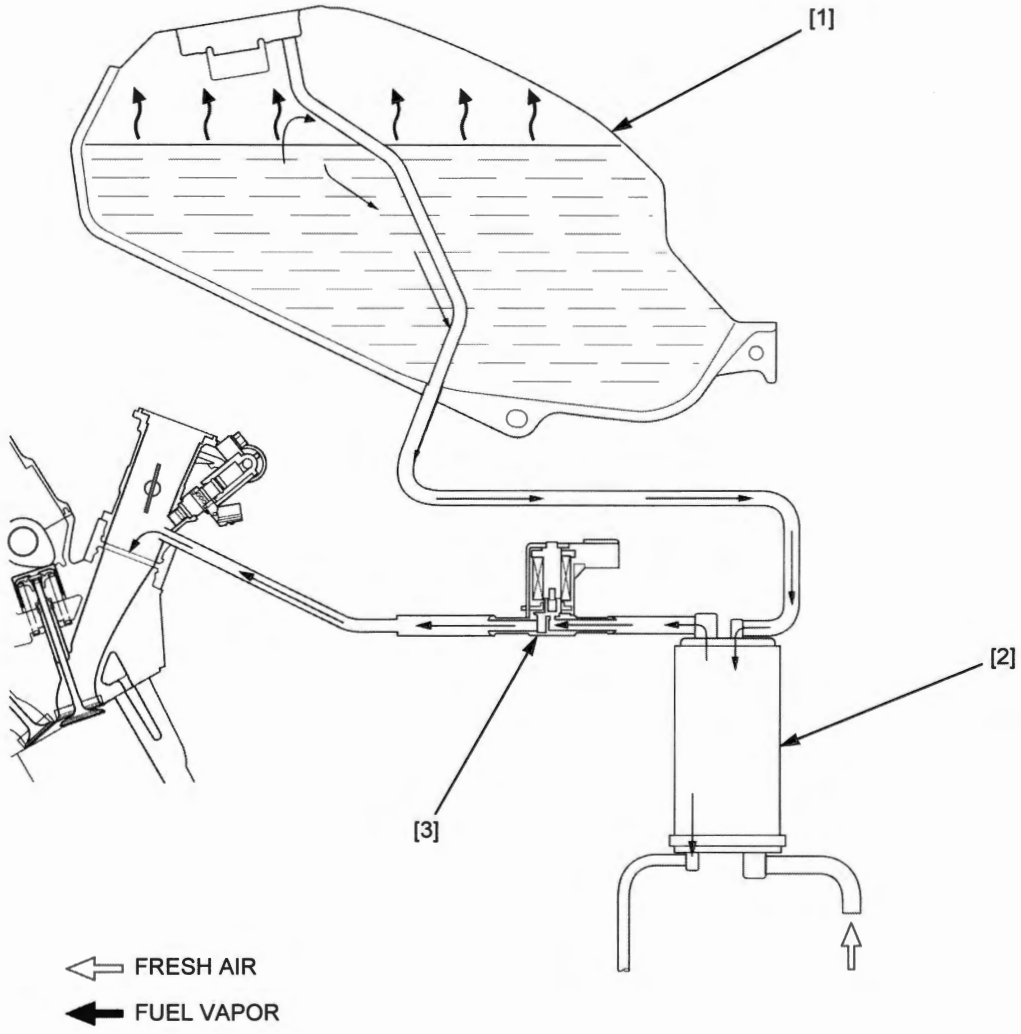


3-WAY CATALYTIC CONVERTER

This motorcycle is equipped with a 3-way catalytic converter. The 3-way catalytic converter is in the exhaust system. Through chemical reactions, they convert HC, CO and NOx in the engine's exhaust to carbon dioxide (CO_2), dinitrogen (N_2), and water vapor.

EVAPORATIVE EMISSION CONTROL SYSTEM (AC type)

Fuel vapor from the fuel tank [1] is routed into the evaporative emission (EVAP) canister [2] where is it absorbed and stored while the engine is stopped. When the engine is running and the evaporative emission (EVAP) purge control solenoid valve [3] is open, fuel vapor in the EVAP canister is drawn into the engine through the intake pipe.



NOISE EMISSION CONTROL SYSTEM

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

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

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

FUEL PERMEATION EMISSION CONTROL SYSTEM

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

TECHNICAL FEATURE

MIL SYSTEM

MIL INDICATION

In most previous PGM-FI systems, if a malfunction is present, the MIL blinks the number of the trouble code with idle engine speed or sidestand switch ON. But in this revised PGM-FI system, when the system detects a malfunction, it turns the MIL ON without blinking unless otherwise the SCS circuit short (reading DTC with DLC connector).

	Previous PGM-FI SYSTEM			This PGM-FI SYSTEM		
	At Idle	**Riding**	**SCS short**	**At Idle**	**Riding**	**SCS short**
Current trouble	Blinking	ON	Blinking	ON	ON	Blinking
Past trouble	OFF	OFF	Blinking	*ON	*ON	*Blinking

* This system turns off the MIL if the system does not detect the same trouble within three driving cycles (three times repeat of ignition-ON, riding, and ignition-OFF).

MEMO

2. FRAME/BODY PANELS/EXHAUST SYSTEM

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REMOVAL CHART ····· 2-3

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SIDESTAND ····· 2-16

FOOTPEG BRACKET ····· 2-17

EXHAUST PIPE/MUFFLER ····· 2-17

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the body panels and exhaust system.
- When disassembling, mark and store the mounting fasteners to ensure that they are reinstalled in their original locations.
- When installing the covers, make sure the mating areas are aligned properly before tightening the fasteners.
- Always replace the gaskets with new ones after removing the exhaust system.
- When installing the exhaust system, loosely install all of the fasteners. Always tighten the exhaust pipe joint nuts first, then tighten the mounting bolt.
- Always inspect the exhaust system for leaks after installation.

TROUBLESHOOTING

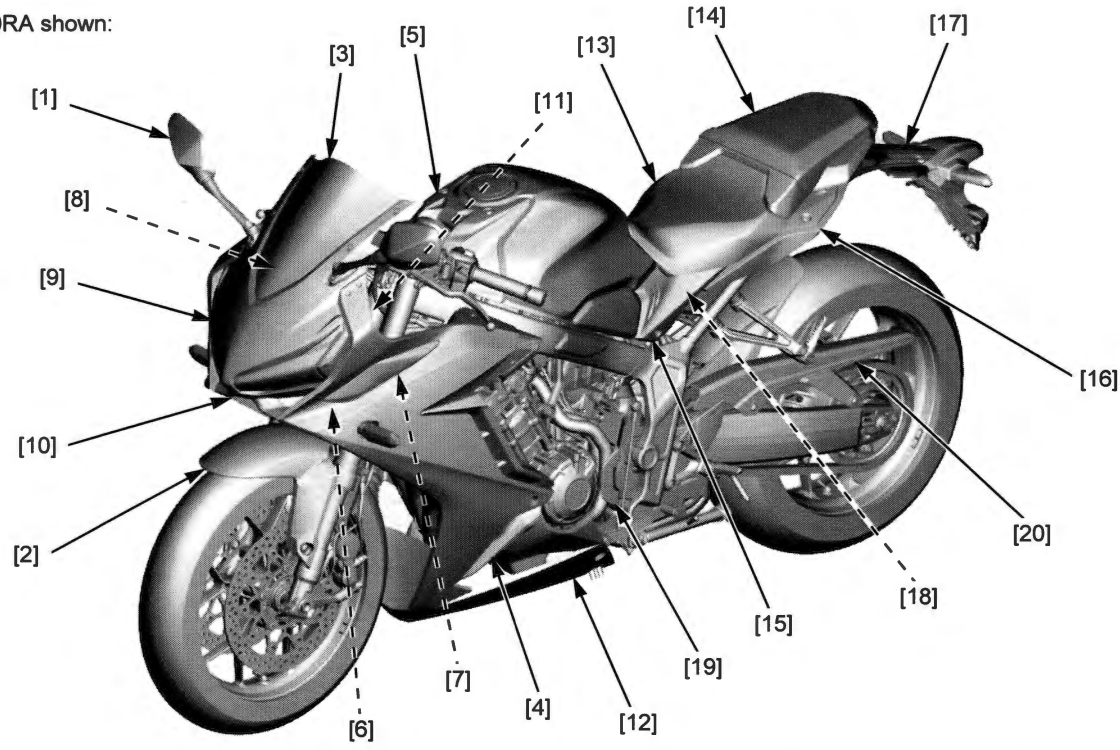
Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

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

BODY PANEL LOCATIONS/REMOVAL CHART

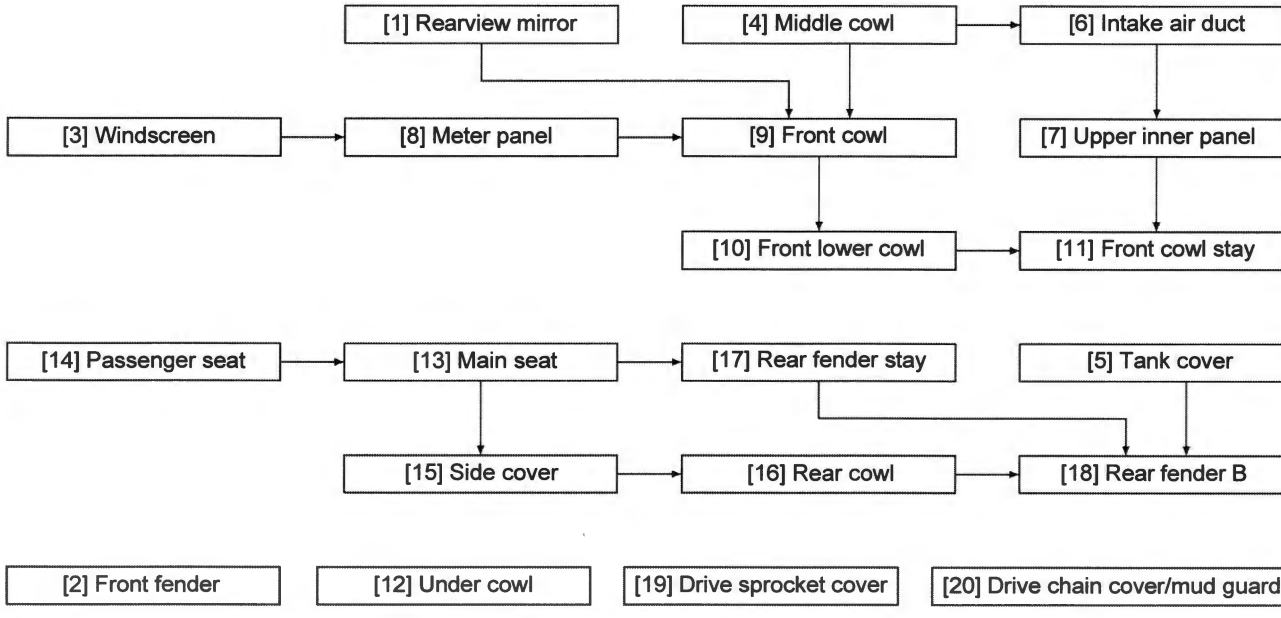
CBR650R/RA

CBR650RA shown:



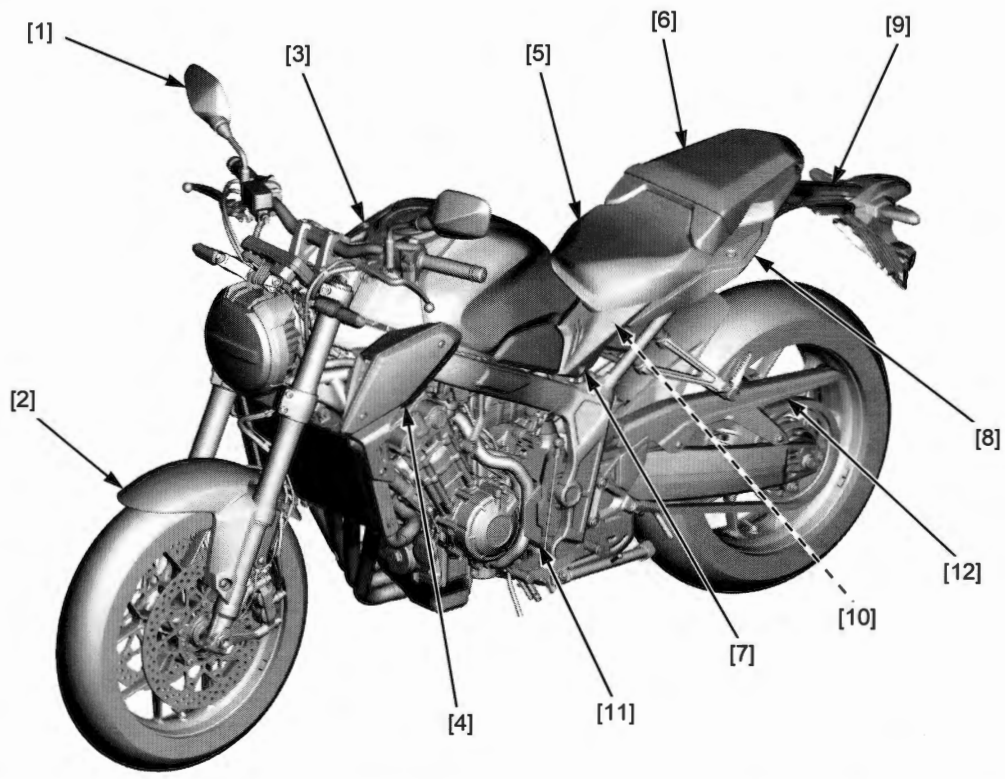
[1] Rearview mirror (page 2-5)
[2] Front fender (page 2-5)
[3] Windscreen (page 2-6)
[4] Middle cowl (page 2-7)
[5] Tank cover (page 2-7)
[6] Intake air duct (page 2-8)
[7] Upper inner panel (page 2-8)
[8] Meter panel (page 2-8)
[9] Front cowl (page 2-9)
[10] Front lower cowl (page 2-9)
[11] Front cowl stay (page 2-9)
[12] Under cowl (page 2-11)
[13] Main seat (page 2-11)
[14] Passenger seat (page 2-12)
[15] Side cover (page 2-12)
[16] Rear cowl (page 2-12)
[17] Rear fender stay (page 2-13)
[18] Rear fender B (page 2-14)
[19] Drive sprocket cover (page 2-15)
[20] Drive chain cover/mud guard (page 2-15)

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



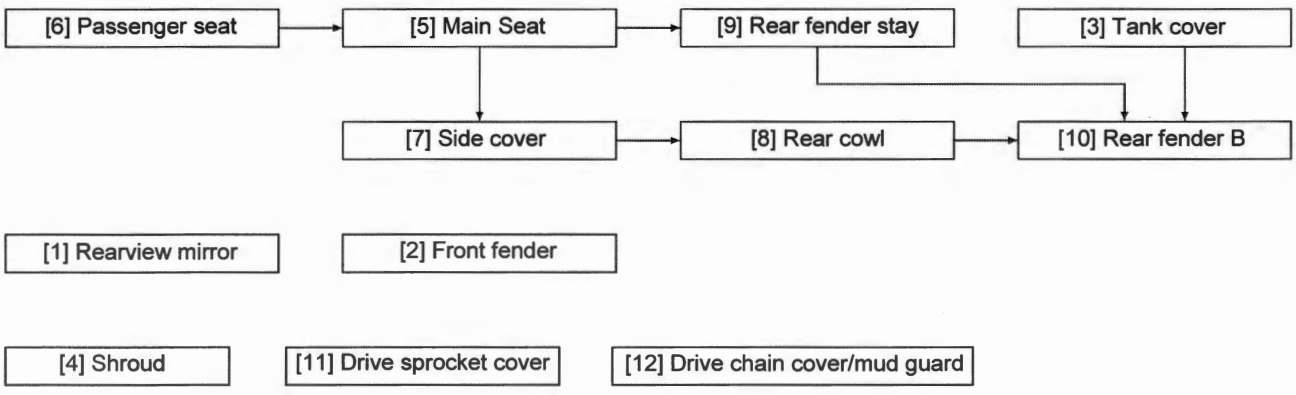
CB650R/RA

CB650RA shown:



[1] Rearview mirror (page 2-5)
[2] Front fender (page 2-5)
[3] Tank cover (page 2-7)
[4] Shroud (page 2-10)
[5] Main Seat (page 2-11)
[6] Passenger seat (page 2-12)
[7] Side cover (page 2-12)
[8] Rear cowl (page 2-12)
[9] Rear fender stay (page 2-13)
[10] Rear fender B (page 2-14)
[11] Drive sprocket cover (page 2-15)
[12] Drive chain cover/mud guard (page 2-15)

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



REARVIEW MIRROR

REMOVAL/INSTALLATION

CBR650R/RA

Remove the two socket bolts [1] and rearview mirror [2].

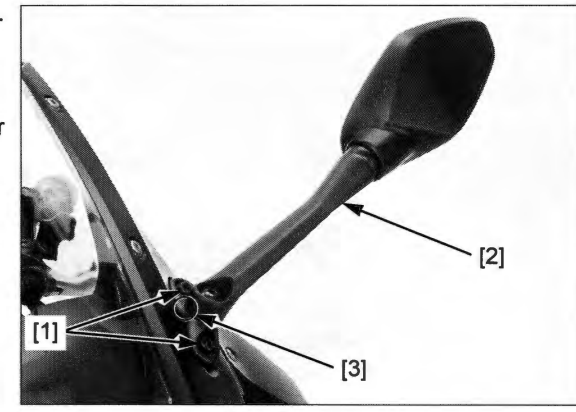
Installation is in the reverse order of removal.

NOTE:

- Install with the reference mark [3] facing the rear side.

TORQUE:

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



CB650R/RA

Slide the boot [1] off from the lock nut [2].

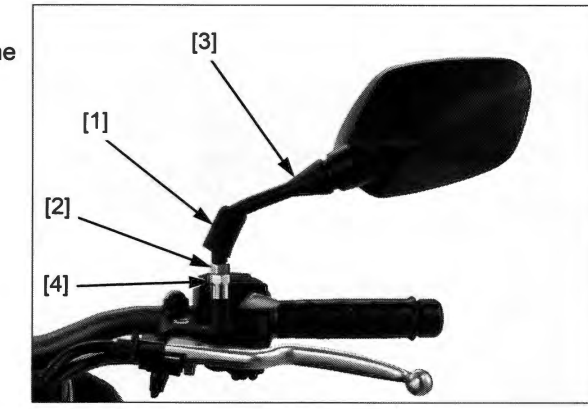
Loosen the lock nut (left-hand threads) and remove the rearview mirror [3].

Remove the mirror adaptor [4].

Installation is in the reverse order of removal.

TORQUE:

Rearview mirror lock nut:
20 N·m (2.0 kgf·m, 15 lbf·ft)
Rearview mirror adaptor:
20 N·m (2.0 kgf·m, 15 lbf·ft)



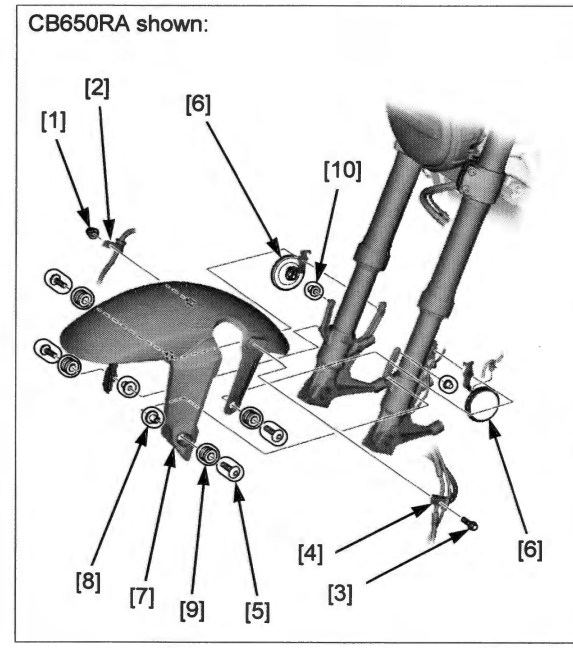
FRONT FENDER

REMOVAL/INSTALLATION

Remove the following:

- Front wheel (page 16-17)
- Cap nut [1] and brake hose clamp [2]
- Bolt [3] and brake hose clamp [4]
- Four socket bolts [5]
- Two reflex reflectors [6]
- Front fender [7]
- Two collars [8]
- Four rubber [9]
- Two rubber [10]

Installation is in the reverse order of removal.



WINDSCREEN (CBR650R/RA)

REMOVAL/INSTALLATION

Remove the following:

- Four special bolts [1]
- Four plastic washers [2]
- Four rubber washers [3]
- Windscreen [4]
- Four well nuts [5]

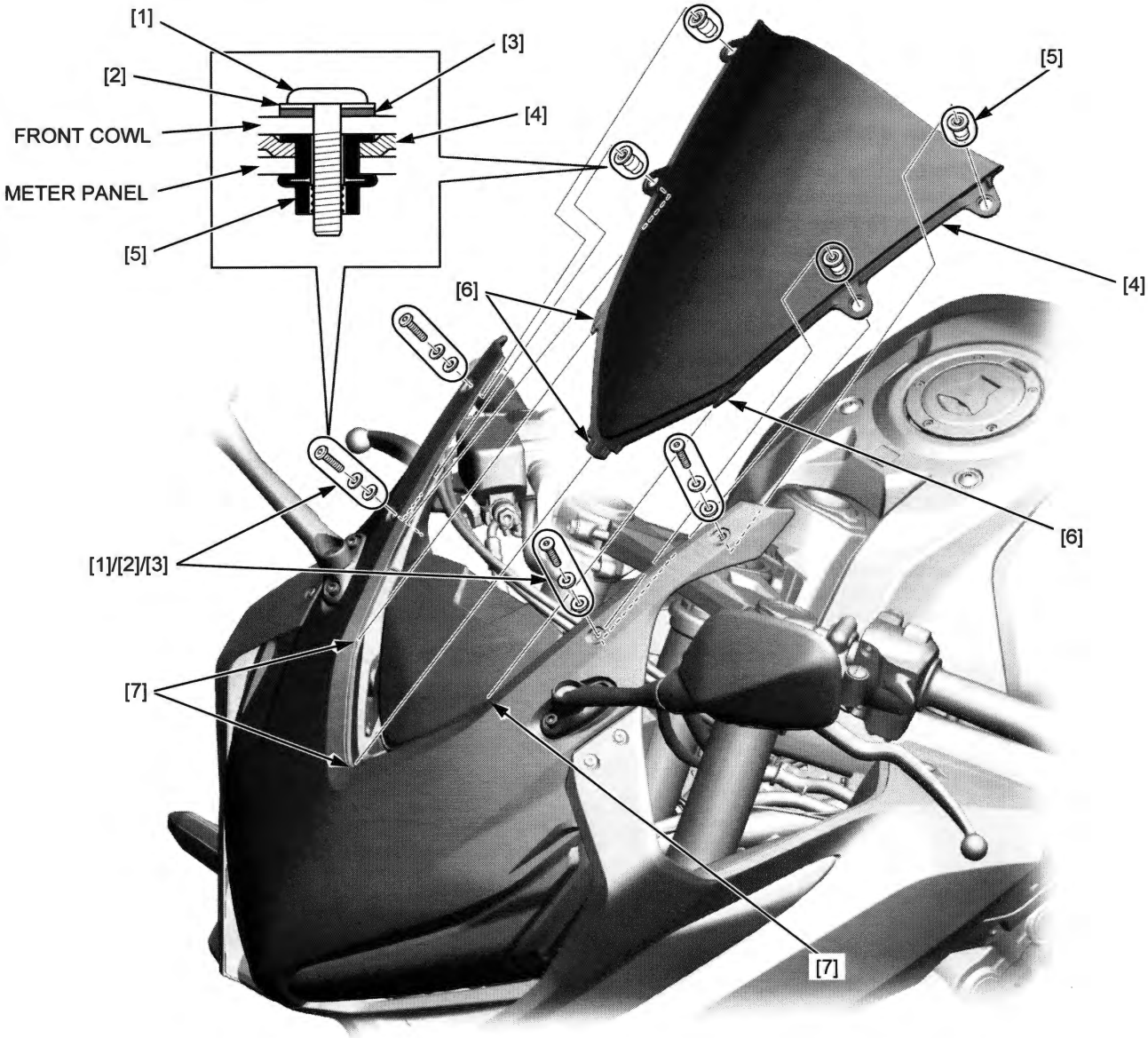
Installation is in the reverse order of removal.

NOTE:

- Be careful not to scratch the windscreen surface.
- Align the windscreen tabs [6] with the slots [7] in the front cowl.

TORQUE:

Windscreen special bolt:
0.42 N·m (0.04 kgf·m, 0.3 lbf·ft)



MIDDLE COWL (CBR650R/RA)

REMOVAL/INSTALLATION

Remove the following:

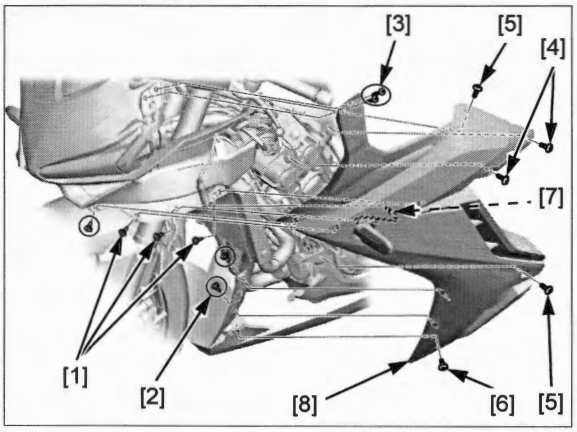
- Three trim clips (pin head) [1]
- Three trim clips [2]
- Two special bolts [3]
- Two socket bolts A (Black) [4]
- Two socket bolts A (Silver) [5]
- Socket bolt B [6]

Disconnect the front turn signal light 3P connector [7], then remove the middle cowl [8].

Installation is in the reverse order of removal.

TORQUE:

Middle cowl special bolt:
0.42 N·m (0.04 kgf·m, 0.3 lbf·ft)

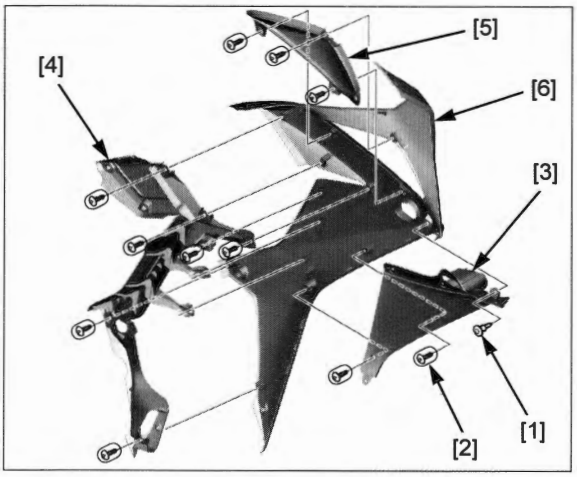


DISASSEMBLY/ASSEMBLY

Remove the following:

- Front turn signal light (page 21-5)
- Trim clip [1]
- Tapping screws [2]
- Inner panel [3]
- Middle cowl B [4]
- Air duct cover [5]
- Middle cowl A [6]

Assembly is in the reverse order of disassembly.



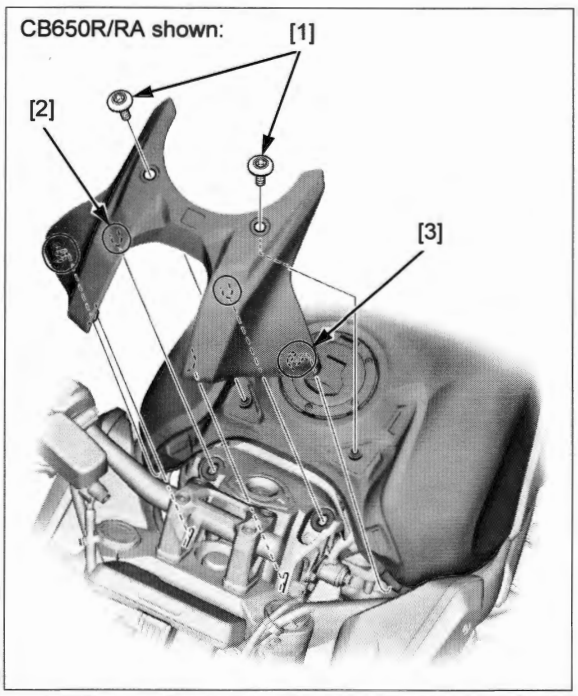
TANK COVER

REMOVAL/INSTALLATION

Remove the two socket bolts [1].

Remove the boss [2] and hook [3], remove the tank cover.

Install the socket bolts with the collars and tighten them.



INTAKE AIR DUCT (CBR650R/RA)

REMOVAL/INSTALLATION

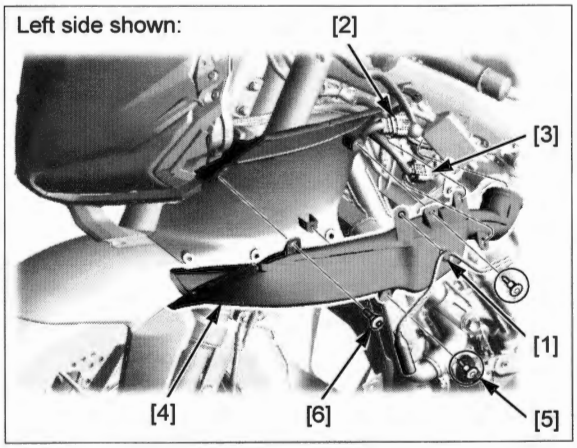
Remove the middle cowl (page 2-7).

Left side: Release the harness clip [1] and front sub harness 12P (Black) [2] and 12P (Gray) [3] connectors from the intake air duct [4].

Right side: Release the harness clip and front wheel speed sensor 2P (Black) connector from the intake air duct.

Remove the two trim clips [5], socket bolt [6] and intake air duct.

Installation is in the reverse order of removal.



UPPER INNER PANEL (CBR650R/RA)

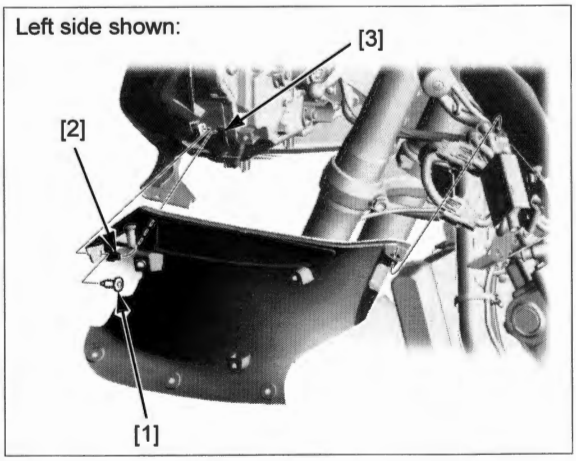
REMOVAL/INSTALLATION

Remove the intake air duct (page 2-8).

Remove the trim clip [1].

Release the tab [2] from the slot [3] of headlight and remove the upper inner panel.

Installation is in the reverse order of removal.



METER PANEL (CBR650R/RA)

REMOVAL/INSTALLATION

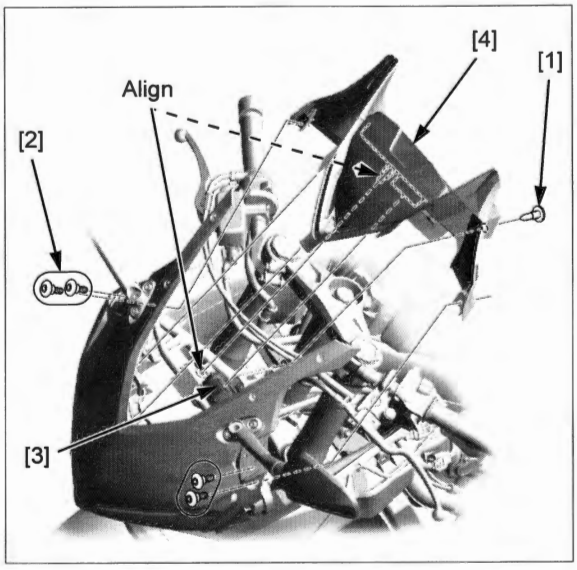
Remove the following:

- Windscreen (page 2-6)
- Middle cowls (page 2-7)
- Trim clip [1]
- Four socket bolts [2]

Disconnect the combination meter 20P (Gray) connector [3], then remove the meter panel [4].

Installation is in the reverse order of removal.

- Align the boss with the hole of the headlight stay.



FRONT COWL (CBR650R/RA)

REMOVAL/INSTALLATION

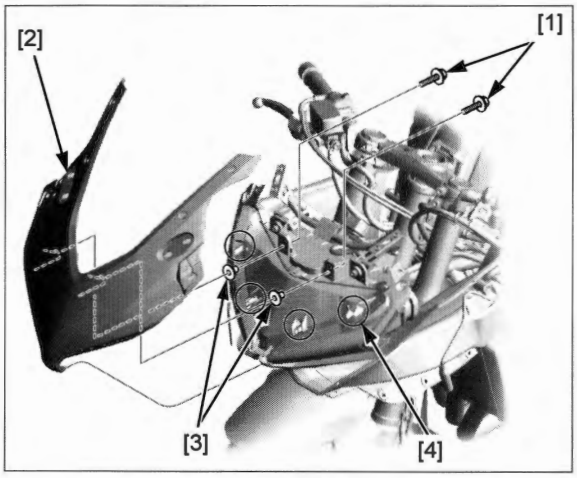
Remove the following:

- Rearview mirrors (page 2-5)
- Meter panel (page 2-8)
- Two bolts [1]
- Front cowl [2]
- Two collars [3]

Installation is in the reverse order of removal.

NOTE:

- Align the lugs [4] of the headlight with the locating ridges on the front cowl.



FRONT LOWER COWL (CBR650R/RA)

REMOVAL/INSTALLATION

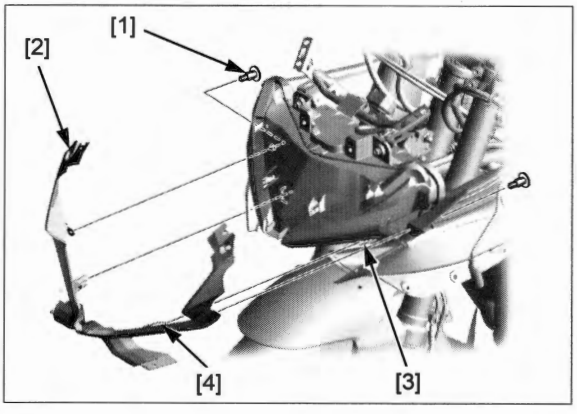
Remove the following:

- Front cowl (page 2-9)
- Two trim clips [1]
- Front lower cowl [2]

Installation is in the reverse order of removal.

NOTE:

- Align the lugs [3] of the headlight with the locating ridges [4] on the front lower cowl.



FRONT COWL STAY (CBR650R/RA)

REMOVAL/INSTALLATION

Remove the headlight (page 21-4).

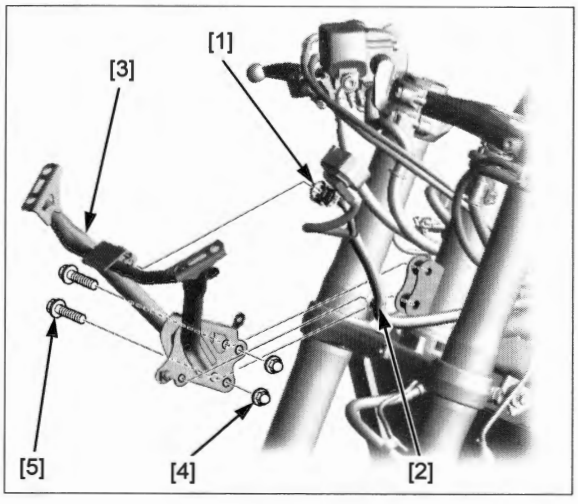
Release the headlight 6P (Black) connector [1] and harness clip [2] from the front cowl stay [3].

Remove the two nuts [4], bolts [5] and front cowl stay.

Installation is in the reverse order of removal.

TORQUE:

Front cowl stay mounting nut:
27 N·m (2.8 kgf·m, 20 lbf·ft)



SHROUD (CB650R/RA)

REMOVAL/INSTALLATION

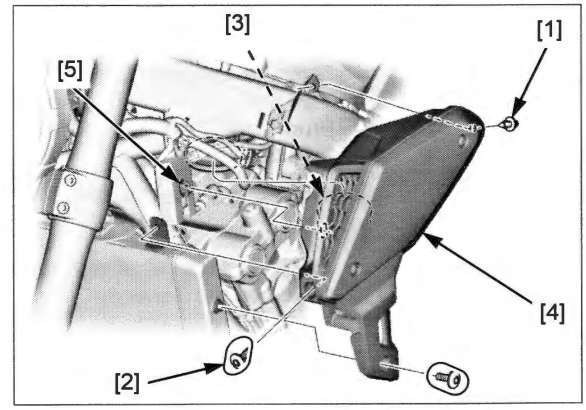
Remove the trim clip [1] and two socket bolts [2].

Release the duct [3] and remove the shroud [4].

Right side: Remove the two connector clips [5] from the shroud.

Left side: Remove the connector clip from the shroud.

Installation is in the reverse order of removal.



DISASSEMBLY/ASSEMBLY

Remove the following:

- Trim clip [1]
- Air duct [2]
- Trim clip (pin head) [3]
- Shroud A mounting bolts [4]
- Collar [5]
- Shroud C [6]
- Shroud A [7]
- Two tapping screws [8]
- Air duct box [9]
- Shroud B [10]

NOTE:

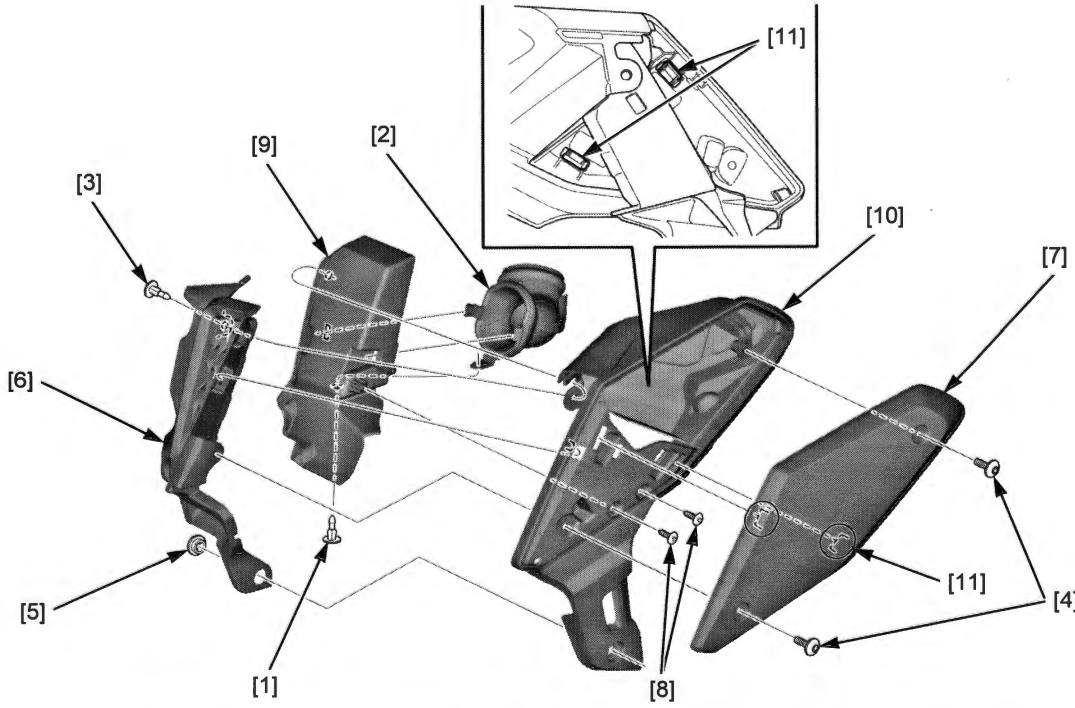
- Release the tabs [11] when removing shroud A.

Assembly is in the reverse order of disassembly.

TORQUE:

Shroud A mounting bolt:

0.42 N·m (0.04 kgf·m, 0.3 lbf·ft)



UNDER COWL (CBR650R/RA)

REMOVAL/INSTALLATION

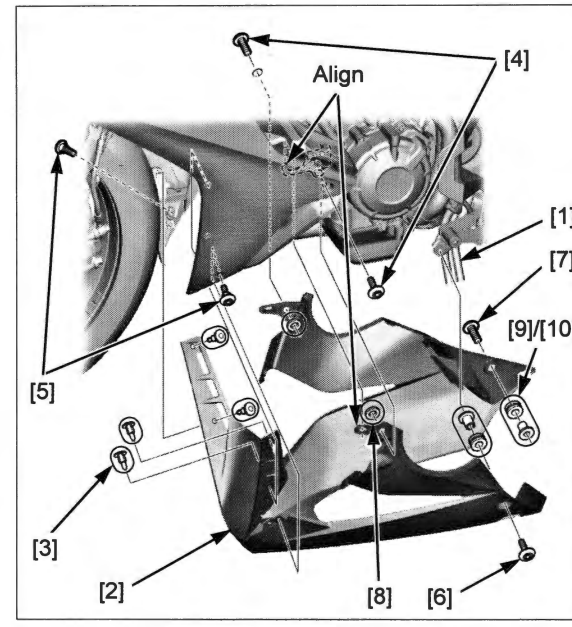
Release the hoses [1] from the under cowl [2].

Remove the following:

- Four trim clips [3]
- Two socket bolts A (Silver) [4]
- Two socket bolts B [5]
- Socket bolt (5mm Black) [6] (left side)
- Socket bolt (6mm Black) [7] (right side)
- Under cowl
- Two rubber washers [8]
- Two collars (left; small I.D./righe; large I.D.) [9]
- Two mounting rubbers [10]

Installation is in the reverse order of removal.

- Align the slots with the hook of the stay.



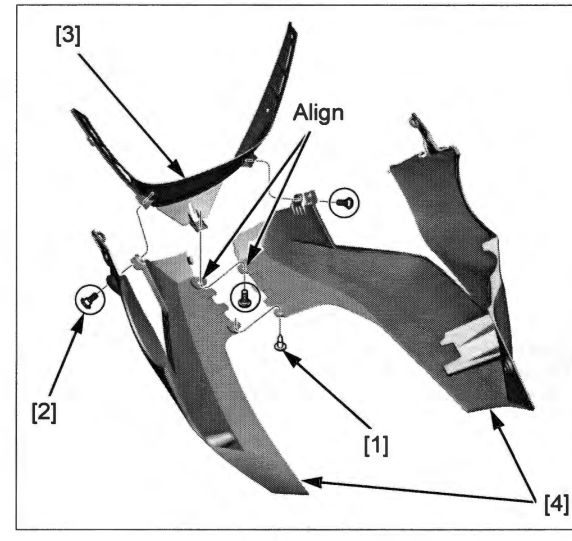
DISASSEMBLY/ASSEMBLY

Remove the following:

- Trim clip [1]
- Three socket bolt [2]
- Lower inner cowl [3]
- Under cowls [4]

Assembly is in the reverse order of disassembly.

- Align the holes with the bosses.



MAIN SEAT

REMOVAL/INSTALLATION

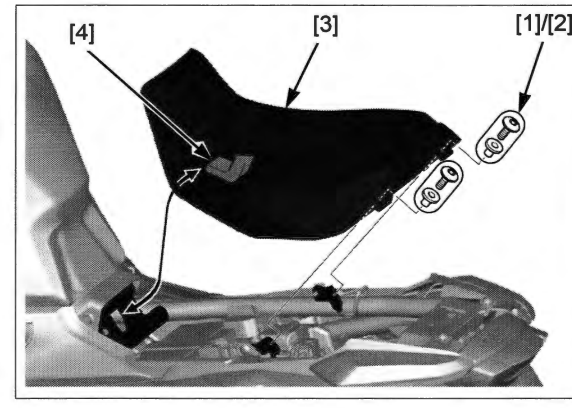
Remove the passenger seat (page 2-12).

Remove the two socket bolts [1] and collars [2].

Remove the main seat [3] by pulling it rearward.

Install the main seat by inserting its hook [4] into the under the frame.

Install the socket bolts with the collars and tighten them.



PASSENGER SEAT

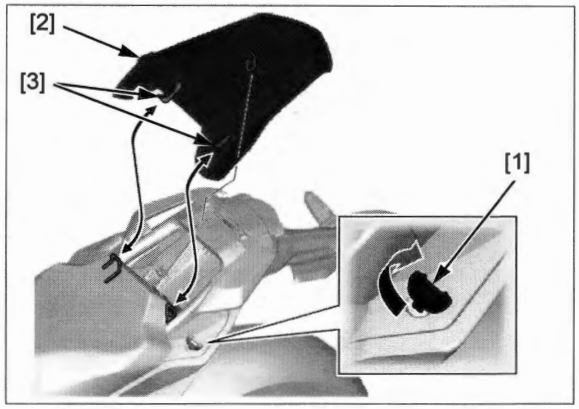
REMOVAL/INSTALLATION

Unhook the seat with the ignition key [1].

Remove the passenger seat [2] by pulling it rearward.

Install the passenger seat by inserting the prongs [3] under the frame.

Push down the rear of the seat securely to lock it.



SIDE COVER

REMOVAL/INSTALLATION

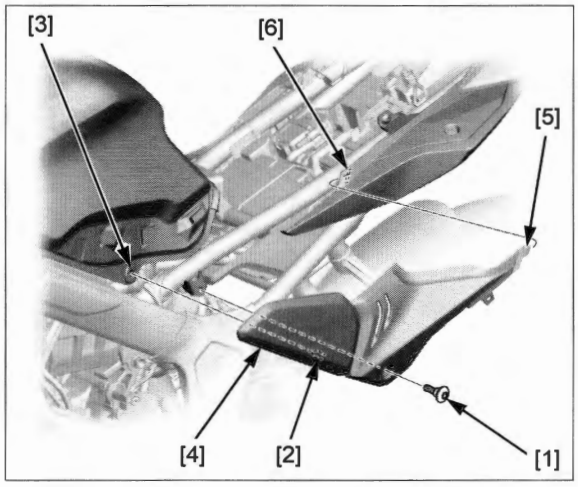
Remove the main seat (page 2-11).

Remove the socket bolts [1].

Release the boss [2] from the grommet [3] of the fuel tank.

Remove the side cover [4] by releasing the tab [5] from the slot [6] of the rear cowl.

Installation is in the reverse order of removal.



REAR COWL

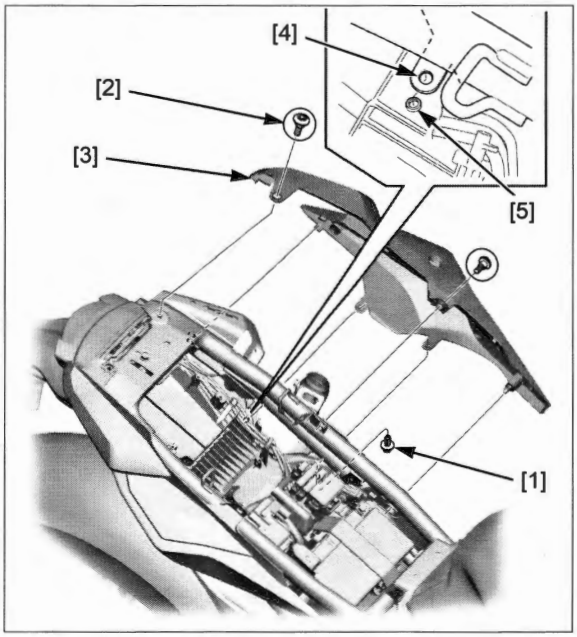
REMOVAL/INSTALLATION

Remove the following:

- Side cover (page 2-12)
- Clip [1]
- Two socket bolts [2]

Remove the rear cowl [3] while releasing its hole [4] from the tab [5] of the rear fender B.

Installation is in the reverse order of removal.



REAR FENDER STAY

REMOVAL/INSTALLATION

Remove the main seat (page 2-11).

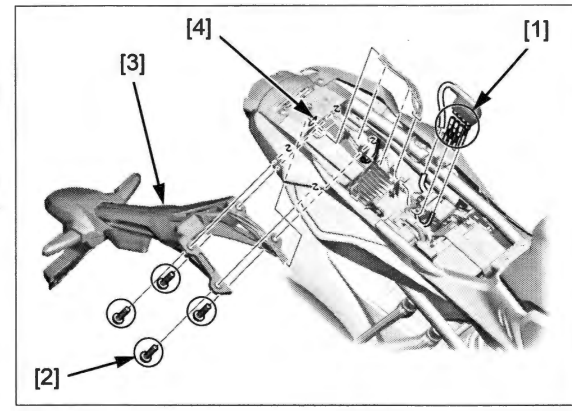
Disconnect the following connectors [1]:

- Rear turn signal light 2P (left: Orange, right: Light blue)
- License light 2P (White)

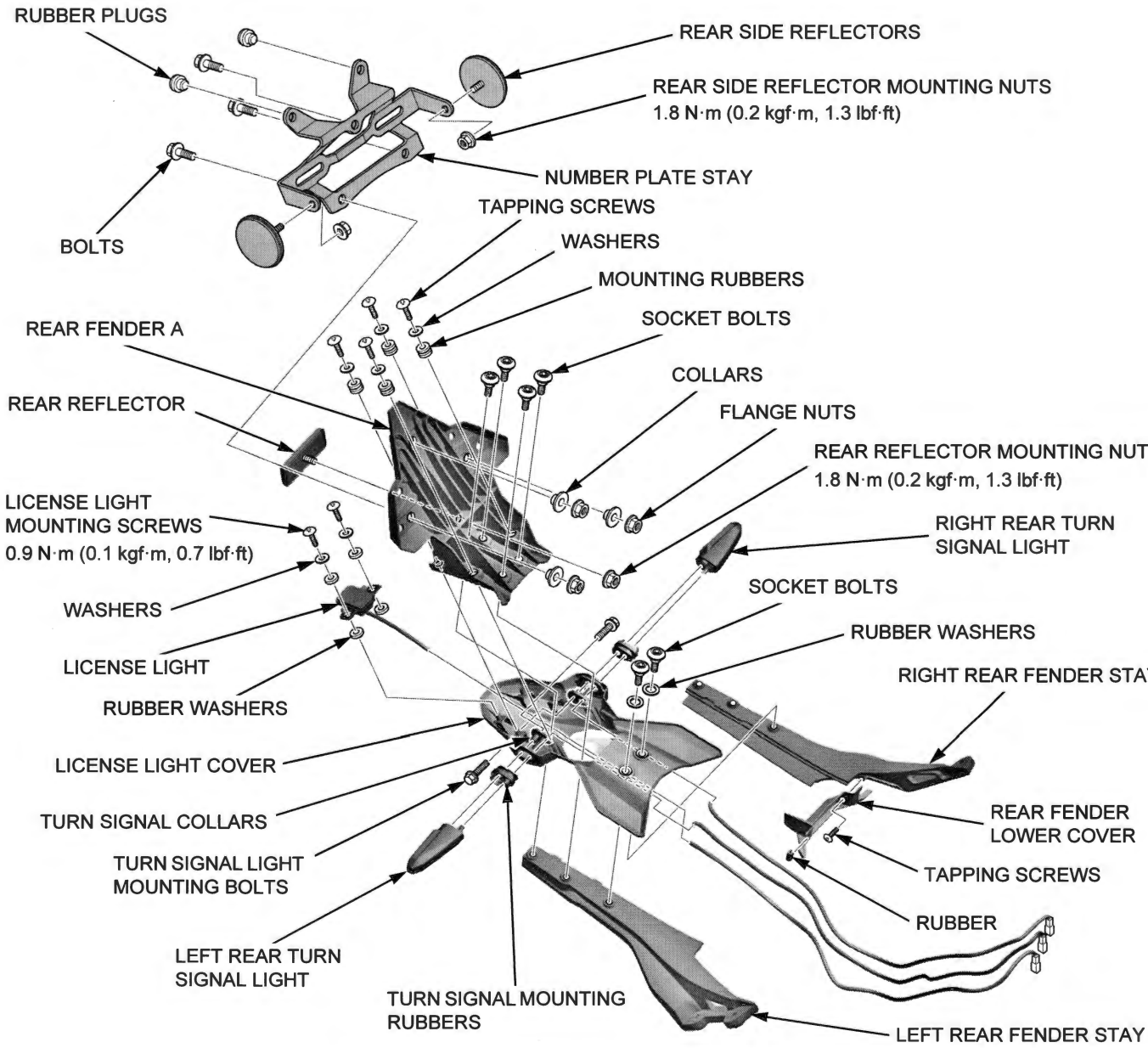
Remove the four socket bolts [2] and rear fender stay [3] by pulling the wires out from the hole [4] of the rear fender B.

Installation is in the reverse order of removal.

TORQUE:
Rear fender stay mounting bolt:
27 N·m (2.8 kgf·m, 20 lbf·ft)



DISASSEMBLY/ASSEMBLY



REAR FENDER B

REMOVAL/INSTALLATION

Remove the following:

- Fuel tank (page 7-8)
- Battery (page 20-5)
- Brake/tail light unit (page 21-6)
- Regulator/rectifier (page 20-7)

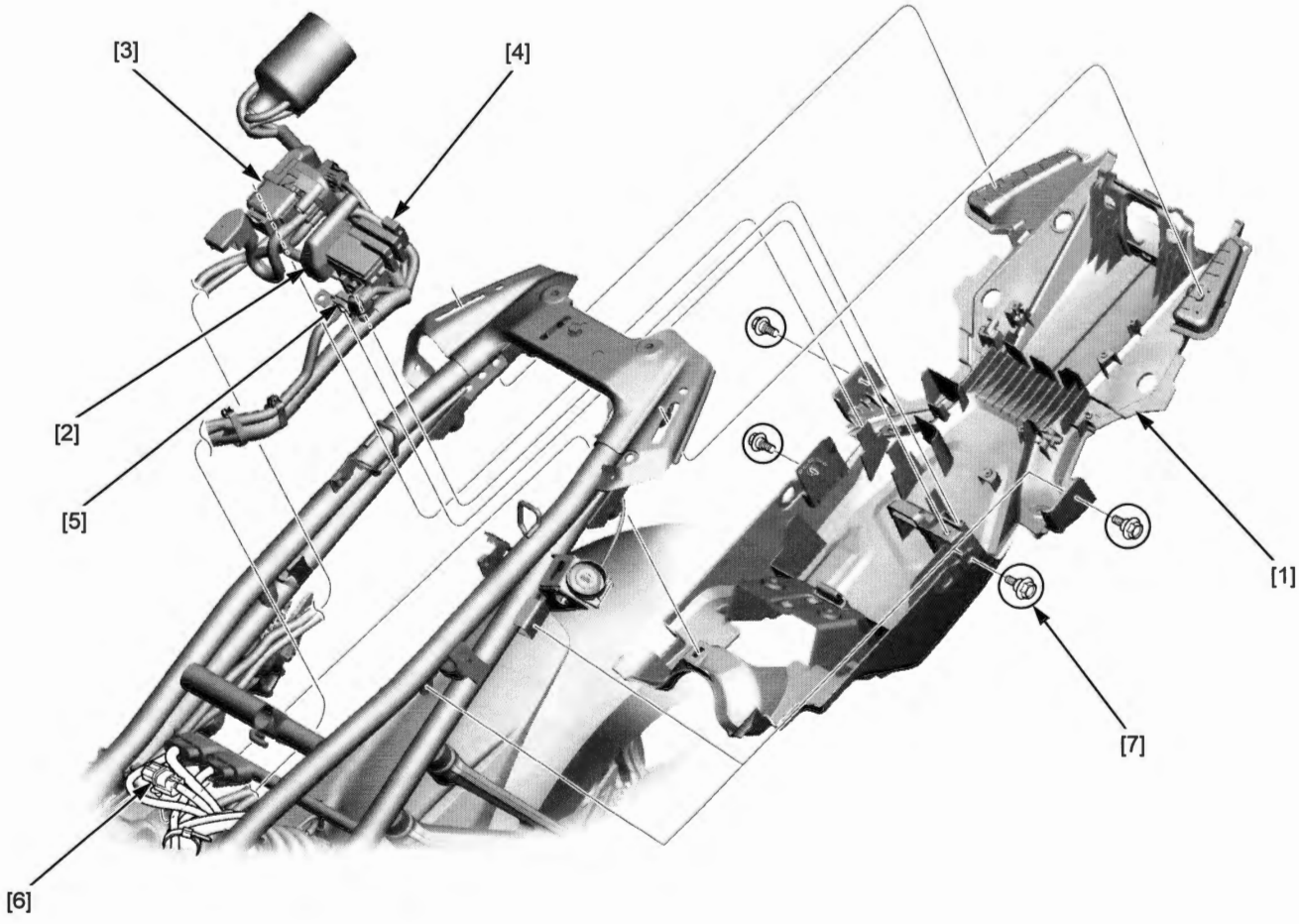
Release the following from the rear fender B [1]:

- Junction box cover [2]
- Starter relay switch [3]
- Fuse boxes [4]
- Wire clip [5]
- Fuel pump 3P (Black) connector [6]

Remove the four bolts [7].

Slide the rear fender B downward and remove it out of the frame.

Installation is in the reverse order of removal.



DRIVE SPROCKET COVER

REMOVAL/INSTALLATION

Remove the following:

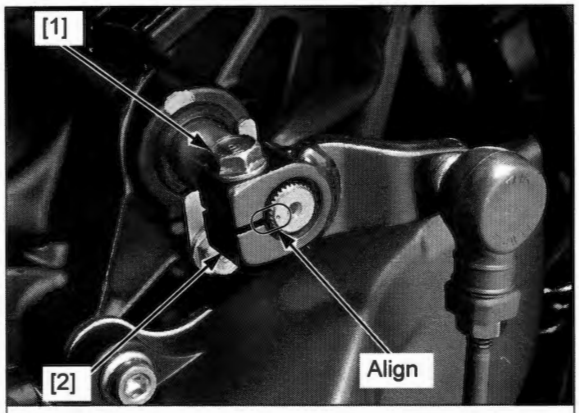
- Pinch bolt [1]
- Gearshift arm [2]
- Two socket bolts [3]
- Drive sprocket cover [4]

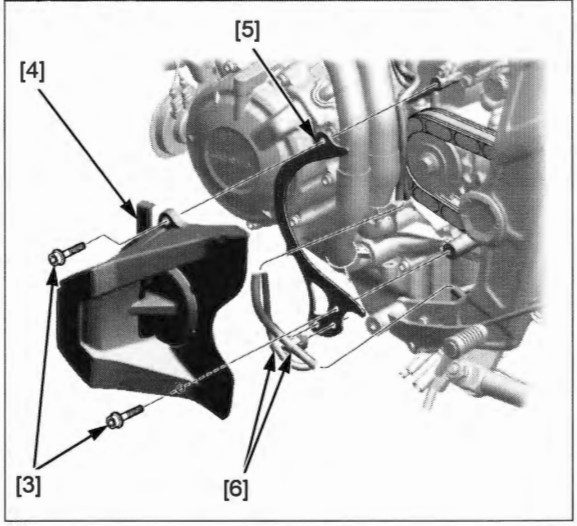
Remove the chain guide [5] by releasing the two wire clips [6].

Installation is in the reverse order of removal.

NOTE:

- Route the wires and hoses into the guide of the sprocket cover (page 1-22).
- Align the slit in the gearshift arm with the punch mark on the spindle.





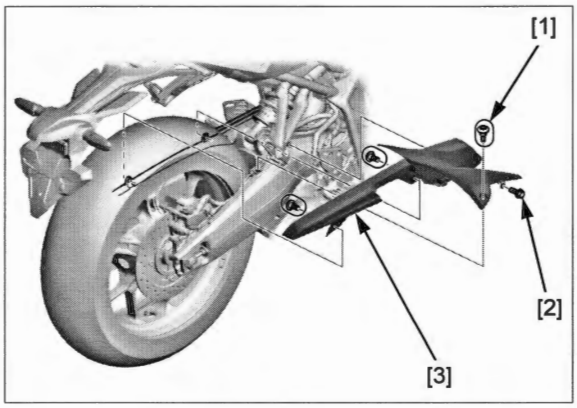
DRIVE CHAIN COVER/MUD GUARD

REMOVAL/INSTALLATION

Remove the following:

- Three socket bolts [1]
- Bolt [2]
- Drive chain cover/mud guard [3]

Installation is in the reverse order of removal.

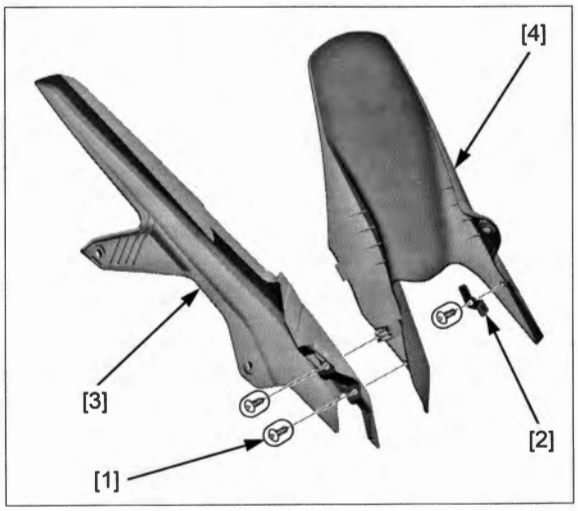


DISASSEMBLY/ASSEMBLY

Remove the following:

- Three tapping screws [1]
- Stay [2]
- Drive chain cover [3]
- Mud guard [4]

Assembly is in the reverse order of disassembly.



SIDESTAND

REMOVAL/INSTALLATION

Remove the sidestand switch from the sidestand pivot (page 21-19).

Remove the following:

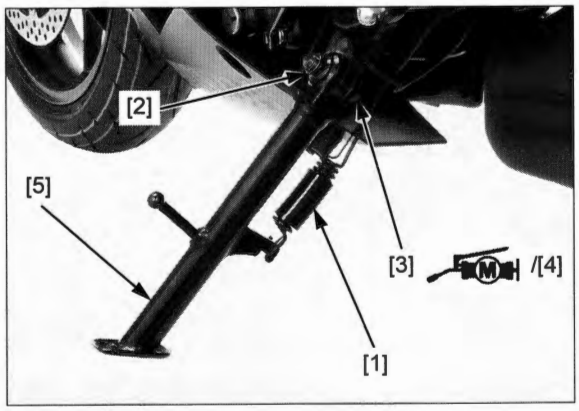
- Springs [1]
- Pivot nut [2]
- Pivot bolt [3] and Washer [4]
- Sidestand [5]

Apply molybdenum disulfide grease to the sidestand pivot bolt sliding surface.

Install the sidestand, washer and sidestand pivot bolt.

Tighten the sidestand pivot bolt to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Loosen the sidestand pivot bolt 45 – 90°.

Install and tighten the sidestand pivot nut to the specified torque while holding the pivot bolt.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Install the sidestand springs.

Install the sidestand switch (page 21-19).

FOOTPEG BRACKET

REMOVAL/INSTALLATION

NOTE:

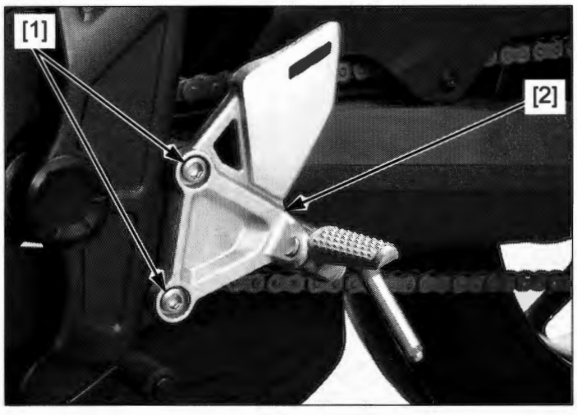
- For right rider footpeg bracket removal/installation, refer to following:
  - Brake pedal (page 18-16)
  - Rear master cylinder (page 18-12)

LEFT RIDER FOOTPEG BRACKET

Remove the two socket bolts [1] and footpeg bracket [2].

Installation is in the reverse order of removal.

TORQUE:
Rider footpeg bracket socket bolt:
27 N·m (2.8 kgf·m, 20 lbf·ft)

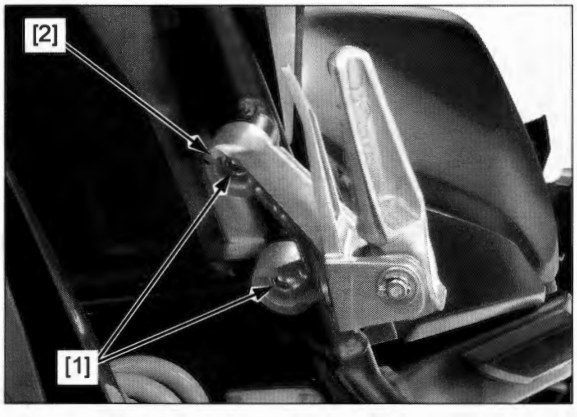


PASSENGER FOOTPEG BRACKET

Remove the two socket bolts [1] and footpeg bracket [2].

Installation is in the reverse order of removal.

TORQUE:
Passenger footpeg bracket socket bolt:
27 N·m (2.8 kgf·m, 20 lbf·ft)



EXHAUST PIPE/MUFFLER

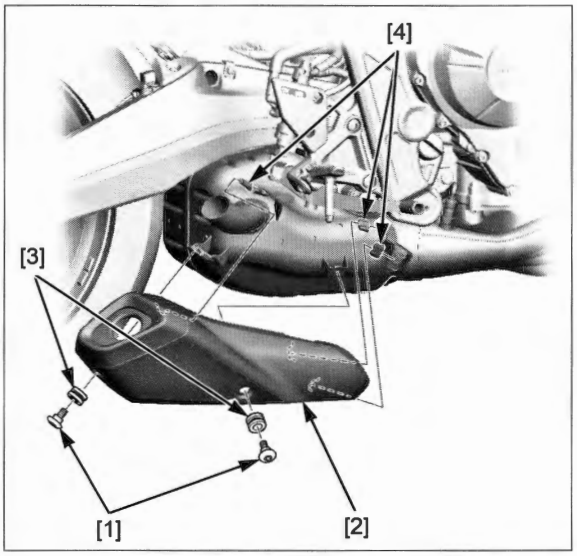
MUFFLER PROTECTOR REMOVAL/ INSTALLATION

Remove the following:

- Socket bolts [1]
- Muffler protector [2]
- Mounting rubbers [3]
- Protector rubbers [4]

Installation is in the reverse order of removal.

TORQUE:
Muffler protector mounting bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

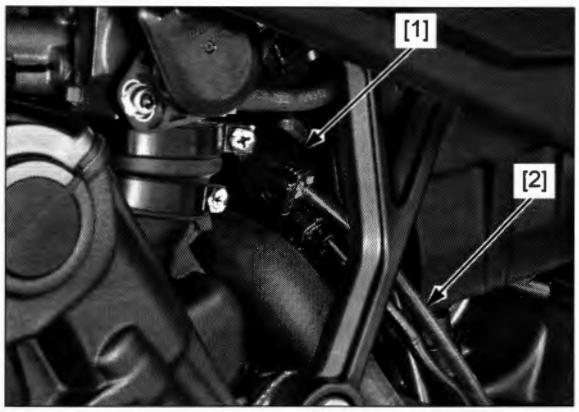


REMOVAL/INSTALLATION

Remove the drive sprocket cover (page 2-15).

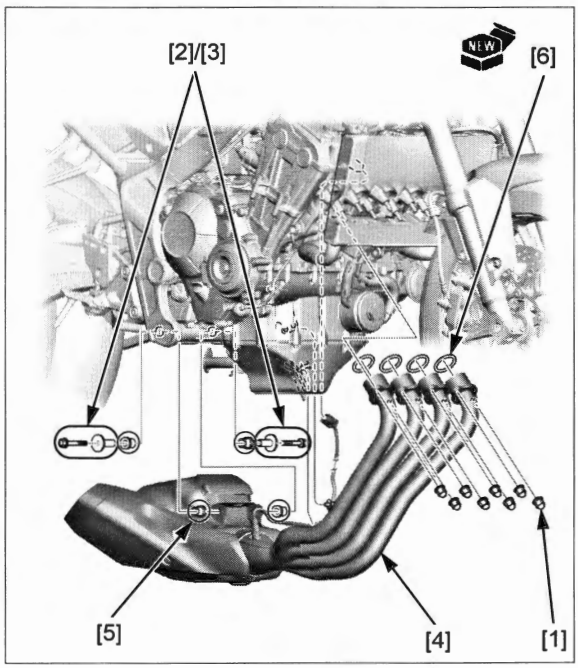
Pull down the radiator (page 8-7).

Disconnect the O_2 sensor 4P (Black) connector [1] and remove the O_2 sensor wire [2] out of the frame.



Remove the following:

- Joint nuts [1]
- Mounting bolts [2] collars (Right; short/Left; long) [3]
- Exhaust pipe/muffler [4]
- Mounting rubbers [5]
- Gaskets [6]



Be sure to verify the length from the stud bolt head to the cylinder head surface (page 2-18).

Install new gaskets and mounting rubbers.

Install the exhaust pipe/muffler with the collars, mounting bolts and joint nuts by setting the exhaust pipe flanges onto the stud bolts, and screw all the fasteners in fully.

Tighten the joint nuts first to the specified torque, then tighten the mounting bolts.

TORQUE:

Exhaust pipe joint nut: 18 N·m (1.8 kgf·m, 13 lbf·ft)
Muffler mounting bolt: 21 N·m (2.1 kgf·m, 15 lbf·ft)

Install the removed parts in the reverse order of removal.

STUD BOLT REPLACEMENT

Remove the exhaust pipe/muffler (page 2-18).

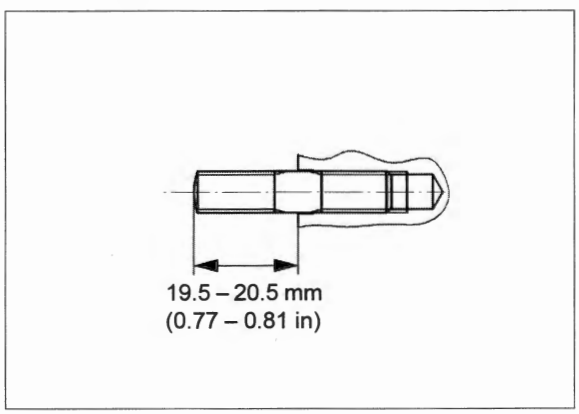
Thread two nuts onto the stud bolt and tighten them together, and use a wrench on them to turn the stud bolt out.

Install a new stud bolt with the short threads facing the cylinder head.

Tighten the stud bolt securely.

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

Install the exhaust pipe/muffler (page 2-18).



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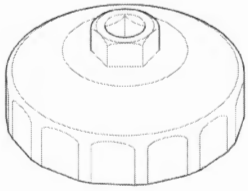
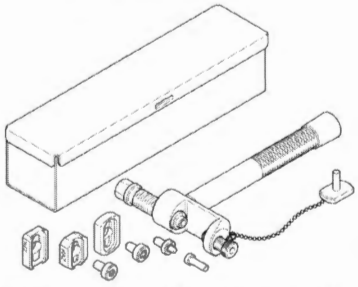
STEERING HEAD BEARINGS 3-23

SERVICE INFORMATION

GENERAL

- Place the motorcycle on a level surface before starting any work.

TOOLS

Oil filter wrench 07HAA-PJ70101  or 07AAA-PLCA100 (U.S.A. only)	Chain Tool Set 07HMH-MR10103  or 07HMH-MR1010C (U.S.A. only)

MAINTENANCE SCHEDULE

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

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

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

		ITEMS	NOTE	FREQUENCY (NOTE 1)								REGULAR REPLACE	REFER TO PAGE
				x 1,000 mi	0.6	4	8	12	16	20	24		
				x 1,000 km	1.0	6.4	12.8	19.2	25.6	32.0	38.4		
EMISSION RELATED ITEMS	*	FUEL LINE					I		I		I		3-4
	*	THROTTLE OPERATION					I		I		I		3-4
		AIR CLEANER	NOTE 2					R			R		3-5
	*	SPARK PLUG		EVERY 16,000 mi (25,600 Km) I, EVERY 32,000 mi (51,200 Km) R									3-6
	*	VALVE CLEARANCE									I		3-8
		ENGINE OIL			R		R		R		R	1 YEAR	3-10
		ENGINE OIL FILTER			R				R				3-10
	*	ENGINE IDLE SPEED					I		I		I		3-12
		RADIATOR COOLANT	NOTE 4				I		I		I	3 YEARS	3-12
	*	COOLING SYSTEM					I		I		I		3-13
	*	SECONDARY AIR SUPPLY SYSTEM							I				3-13
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 3						I				3-13
NON-EMISSION RELATED ITEMS		DRIVE CHAIN		EVERY 600 mi (1,000 Km) I, L									3-14
		BRAKE FLUID	NOTE 4			I	I	I	I	I	I	2 YEARS	3-17
		BRAKE PADS WEAR				I	I	I	I	I	I		3-19
		BRAKE SYSTEM					I		I		I		3-20
		BRAKE LIGHT SWITCH					I		I		I		3-20
		HEADLIGHT AIM					I		I		I		3-21
		CLUTCH SYSTEM				I	I	I	I	I	I		3-21
		SIDESTAND					I		I		I		3-22
	*	SUSPENSION					I		I		I		3-22
	*	NUTS, BOLTS, FASTENERS					I		I		I		3-23
	**	WHEELS/TIRES					I		I		I		3-23
	**	STEERING HEAD BEARINGS					I		I		I		3-23

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

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

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

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. AC type only.
4. Replacement requires mechanical skill.

FUEL LINE

FUEL TANK LIFTING/LOWERING

Remove the following:

- Ignition switch cover (page 21-15)
- Side cover (page 2-12)

Remove the two bolts [1] and collars [2].

Lift the front side of the fuel tank [3] slightly.

Disconnect the following:

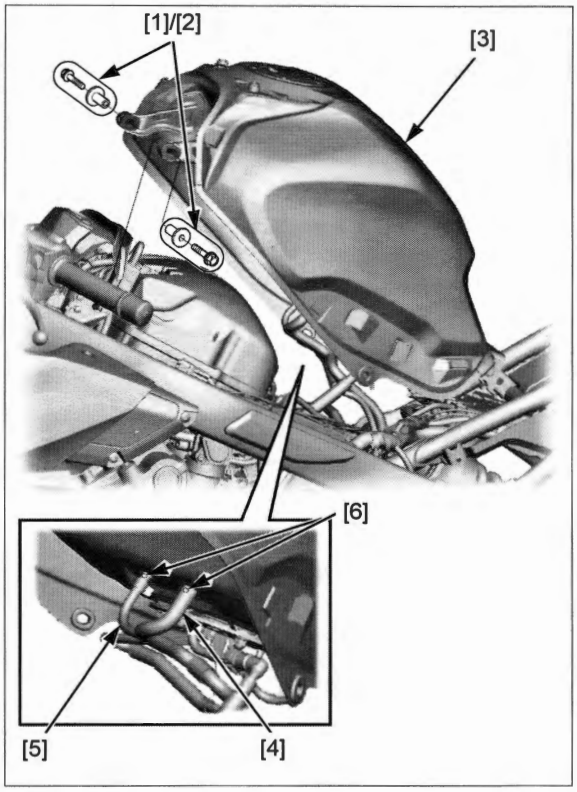
- Fuel tank drain hose [4]
- Fuel tank-to-EVAP canister hose [5] (AC type)
- Fuel tank breather hose [5] (CM type)

Support the fuel tank by placing a suitable support block between the frame (flat surface area) and tank.

Installation is in the reverse order of removal.

NOTE:

- Install so that the white paint mark [6] faces forward (page 1-22).
- Check that the fuel tank hoses are not bent or pinched.



INSPECTION

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

Check the fuel feed hose for deterioration, damage or leakage.

Also, check the hose fittings for damage or looseness.

Replace the fuel feed hose if necessary.

THROTTLE OPERATION

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

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

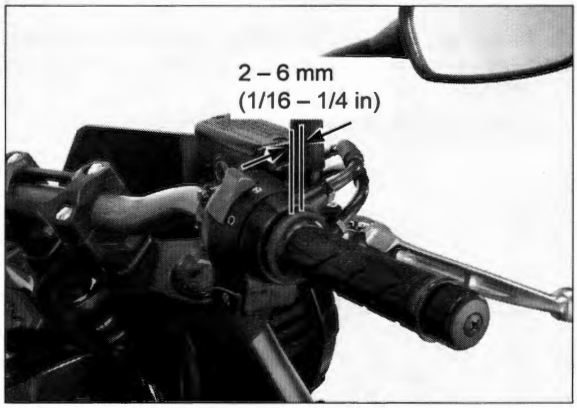
- CBR650R/RA: page 16-7
- CB650R/RA: page 16-11

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

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

Measure the throttle grip freeplay at the throttle grip flange.

FREEPLAY: 2 – 6 mm (1/16 – 1/4 in)



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

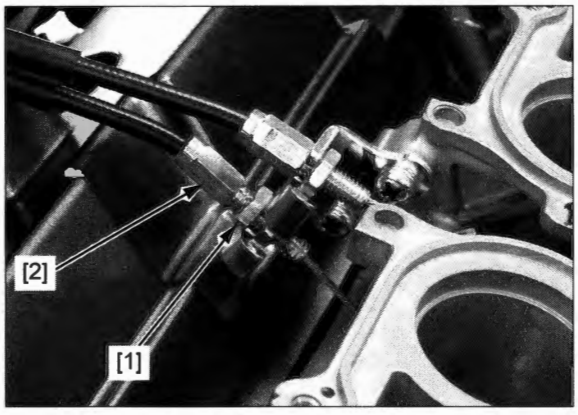
Major adjustment is made with the lower adjuster on the throttle body.

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

Loosen the lock nut [1] and turn the adjuster [2] as required.

Tighten the lock nut to the specified torque while holding the adjuster.

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



Minor adjustment is made with the upper adjuster of the throttle grip side.

Slide the boot [1] to remove it from the adjuster [2].

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

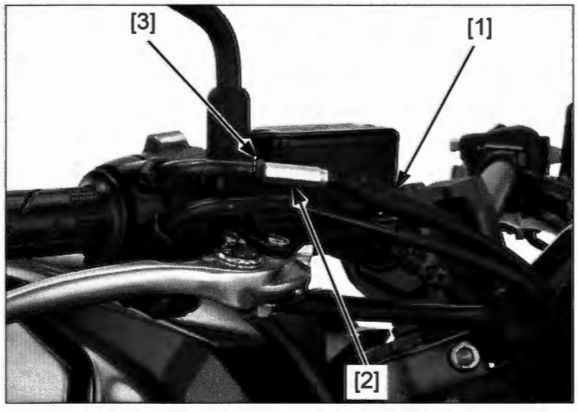
Tighten the lock nut to the specified torque while holding the adjuster.

TORQUE: 3.8 N·m (0.4 kgf·m, 2.8 lbf·ft)

Install the boot over the adjuster properly.

After adjustment, recheck the throttle operation.

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



AIR CLEANER

NOTE:

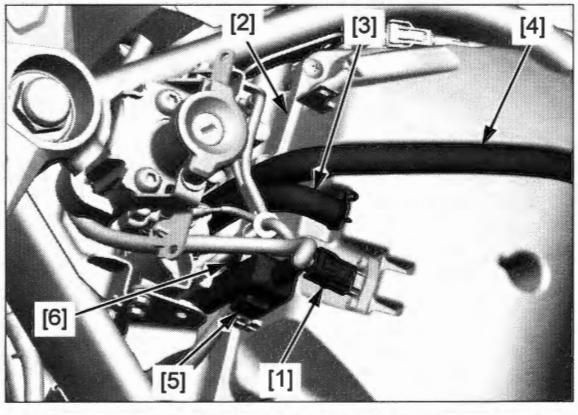
- The viscous paper element type air cleaner cannot be cleaned because the element contains a dust adhesive.
- If the motorcycle is used in unusually wet or dusty areas, more frequent inspections are required.

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

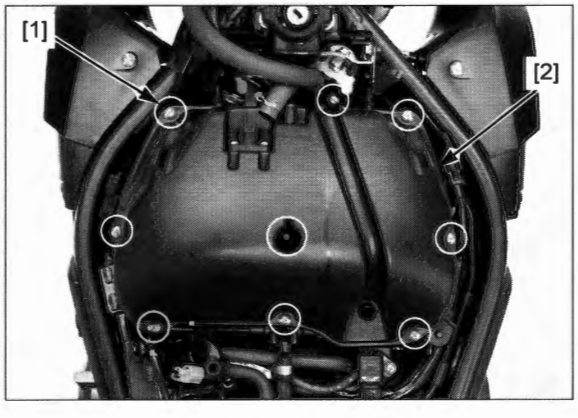
Disconnect the IAT sensor 2P (Black) connector [1].

Disconnect the following from the air cleaner lid [2]:

– Crankcase breather hose [3]
– Air supply hose [4]
– Ignition switch 2P (Brown) connector [5]
– Wire clip [6]



Remove the tapping screws [1] and air cleaner lid [2].



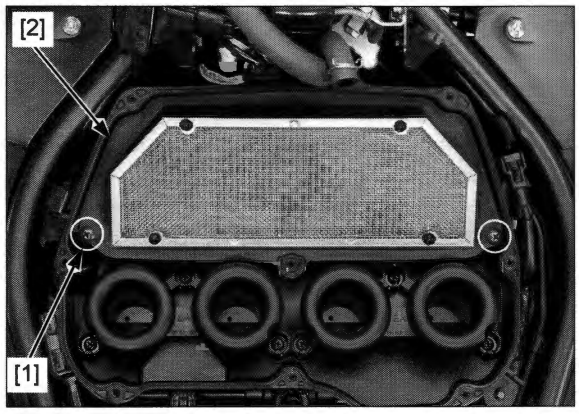
Remove the two tapping screws [1] and air cleaner element [2].

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

Clean the inside of the air cleaner lid and housing.
Make sure the rubber seals in the housing and lid is in position and in good condition.

Installation is in the reverse order of removal.

TORQUE:
Air cleaner element tapping screw:
1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)
Air cleaner lid tapping screw:
1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

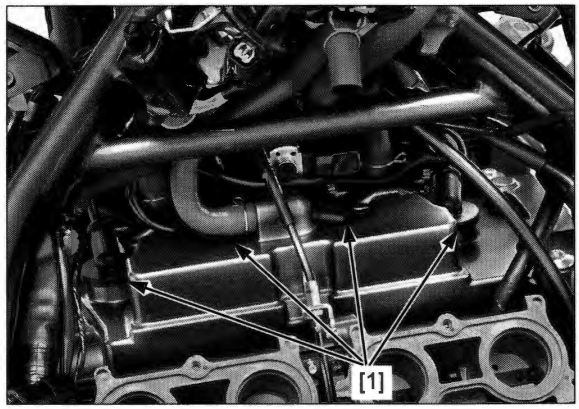


SPARK PLUG

REMOVAL/INSTALLATION

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

Disconnect the spark plug caps [1].



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

Remove the spark plug [1].

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

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

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

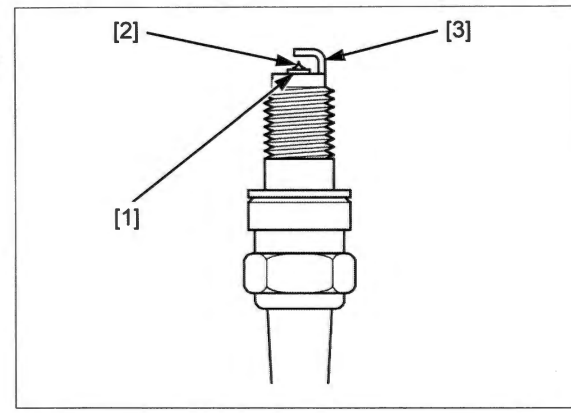
Install the air cleaner housing (page 7-13).

INSPECTION

This motorcycle's spark plug is equipped with an iridium center electrode. Do not clean the electrodes.

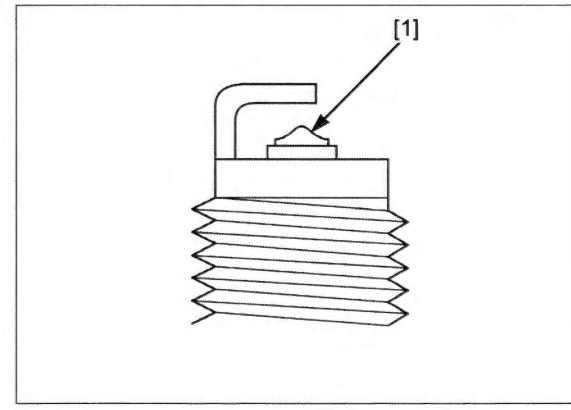
Check the insulator [1] for cracks or damage, and the electrodes [2]/[3] for wear, fouling or discoloration. Replace the spark plug with the specified one if necessary.

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



Always use specified spark plugs on this motorcycle.

Replace the plug with the specified one if the center electrode [1] is rounded as shown.



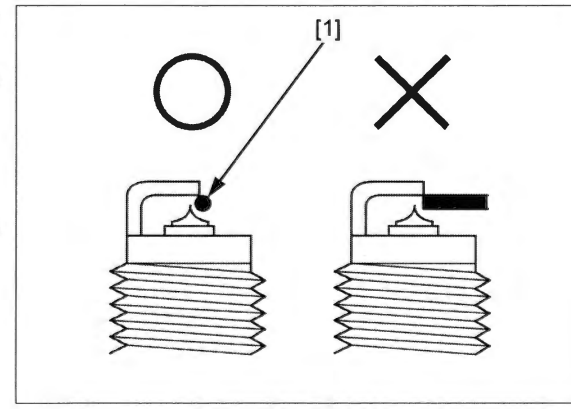
To prevent damaging the iridium center electrode, use a wire type feeler gauge to check the spark plug gap.

Check the spark plug gap between the center and side electrodes with a wire type feeler gauge [1].

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

Do not adjust the spark plug gap.

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



VALVE CLEARANCE

INSPECTION

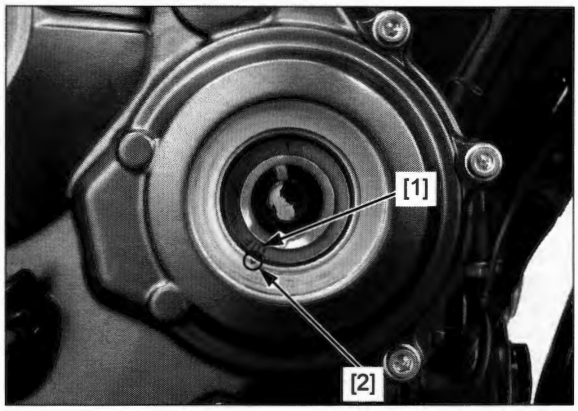
NOTE:

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

Remove the following:

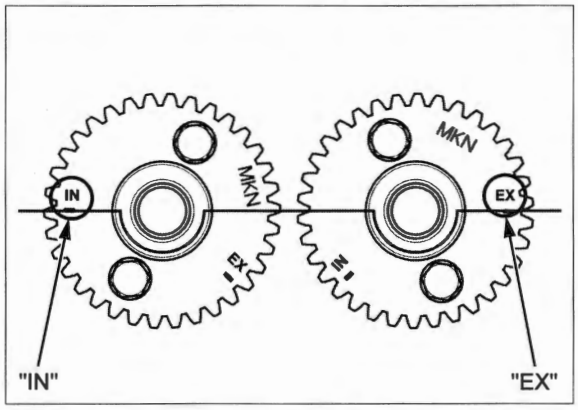
– Cylinder head cover (page 10-6)
– Timing hole cap and O-ring

Rotate the crankshaft clockwise slowly and align the "T" mark [1] with the index notch [2] in the crankcase cover.



Make sure the timing marks ("IN" and "EX") on the sprockets are flush with the cylinder head surface and facing outward as shown.

If the marks are not this position, turn the crankshaft clockwise one full turn (360°) and realign the "T" mark with the index notch.

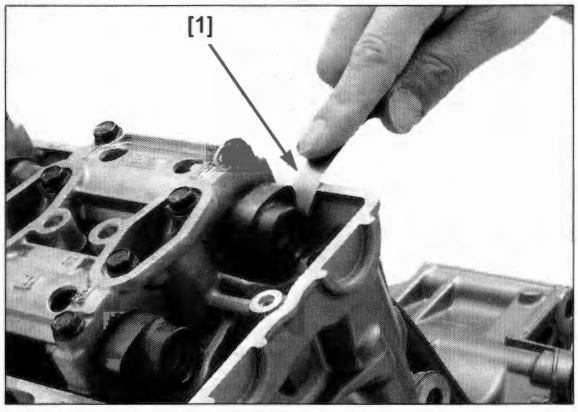


Insert the feeler gauge [1] between the valve lifter and the cam lobe.

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

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

VALVE CLEARANCE:
IN: 0.20 ± 0.03 mm (0.008 ± 0.001 in)

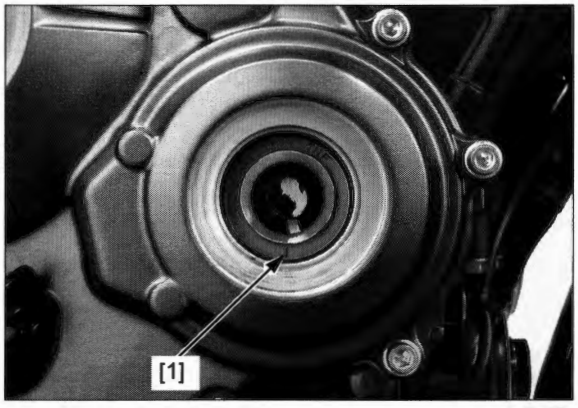


Turn the crankshaft clockwise 1/2 turn (180°), align the index line [1] on the CKP sensor rotor so that it is facing down as shown.

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

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

VALVE CLEARANCE:
EX: 0.28 ± 0.03 mm (0.011 ± 0.001 in)



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

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

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

VALVE CLEARANCE:
IN: 0.20 ± 0.03 mm (0.008 ± 0.001 in)

Turn the crankshaft clockwise 1/2 turn (180°), align the index line on the CKP sensor rotor so that it is facing down as shown.

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

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

VALVE CLEARANCE:
EX: 0.28 ± 0.03 mm (0.011 ± 0.001 in)

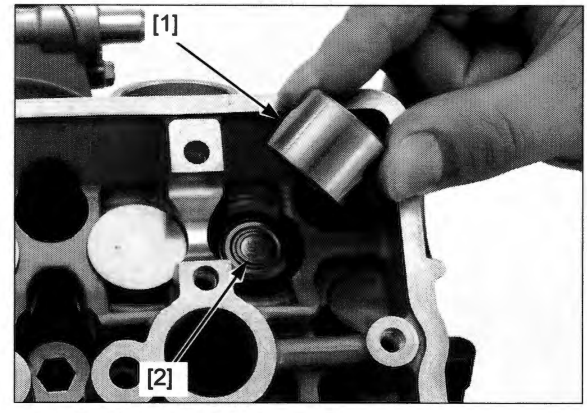
ADJUSTMENT

It is not necessary to remove the cam sprocket from the camshaft except when replacing the camshaft and/or cam sprocket.

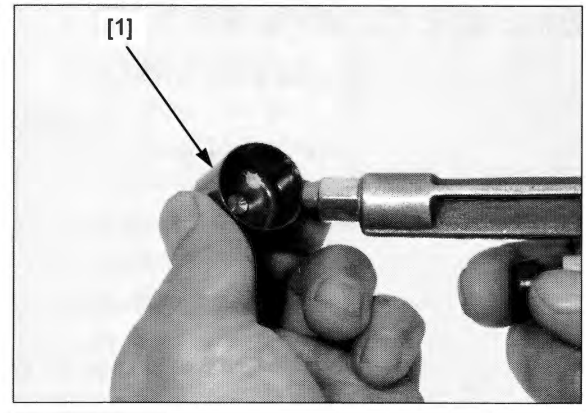
Remove the camshafts (page 10-7).

Remove the valve lifters [1] and shims [2].

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

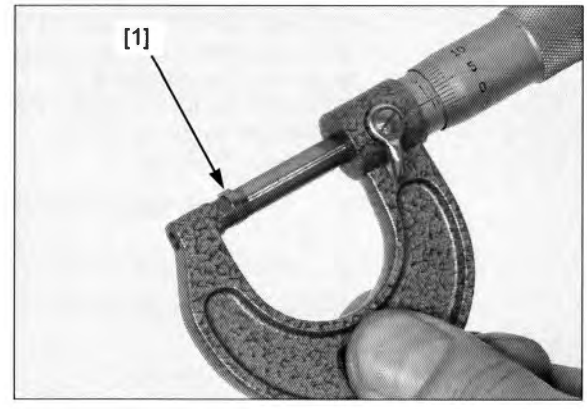


Clean the valve shim contact area in the valve lifter [1] with compressed air.



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

Measure the shim [1] thickness and record it.

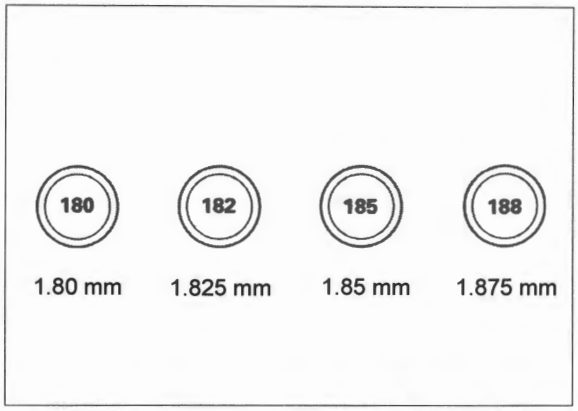


Calculate the new shim thickness using the equation below.

A = (B – C) + D

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

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



Install the shims and valve lifters in their original locations

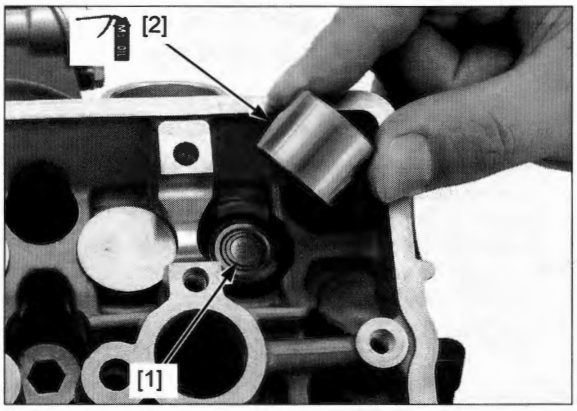
Install the newly selected shim [1] on the valve retainer.

Apply molybdenum disulfide oil to the valve lifter [2] sliding surface.

Install the valve lifters into the valve lifter holes.

Install the camshaft (page 10-10).

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



Check that the O-ring is in good condition, replace if necessary.

Apply engine oil to the timing hole cap O-ring.
Apply grease to the timing hole cap threads.

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

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the removed parts in the reverse order of removal.

ENGINE OIL/OIL FILTER

OIL LEVEL CHECK

Hold the motorcycle in an upright position.

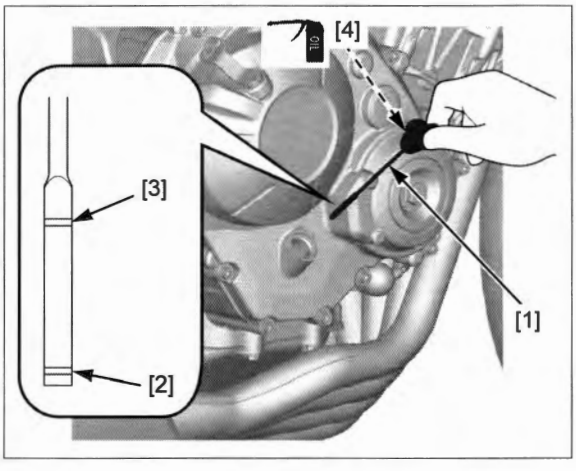
Start the engine and let it idle for 3 – 5 minutes.
Stop the engine and wait 2 – 3 minutes.

Remove the oil filler cap/dipstick [1] and wipe it clean.

Reinstall the oil filler cap/dipstick, but do not screw it.

Remove the oil filler cap/dipstick and check the oil level.

If the level is below or near the lower level [2] on the dipstick, fill the recommended engine oil to the upper level [3].



RECOMMENDED ENGINE OIL:
Pro Honda GN4 4-stroke oil (U.S.A. & Canada) or equivalent motorcycle oil
API service classification: SG or higher
JASO T903 standard: MA
Viscosity: SAE 10W-30

Check that the O-ring [4] is in good condition, replace it if necessary.

Apply engine oil to the O-ring.

Install the oil filler cap/dipstick.

ENGINE OIL & FILTER CHANGE

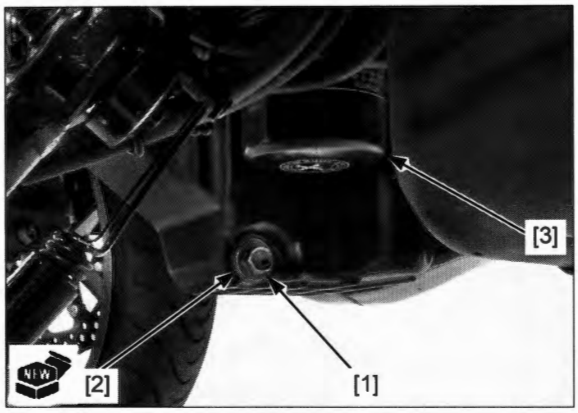
Warm up the engine.

Stop the engine and remove the oil filler cap/dipstick.

Remove the oil drain bolt [1] and sealing washer [2] to drain the engine oil.

Remove the oil filter cartridge [3] using the special tool.

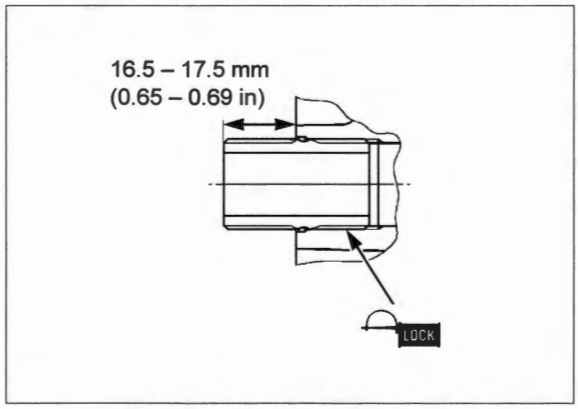
TOOL:
Oil filter wrench — **07HAA-PJ70101 or 07AAA-PLCA100 (U.S.A. only)**



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

SPECIFIED LENGTH: 16.5 - 17.5 mm (0.65 - 0.69 in)

NOTE:
- If the oil filter boss is removed, apply locking agent to the oil filter boss threads and install it (page 1-17).

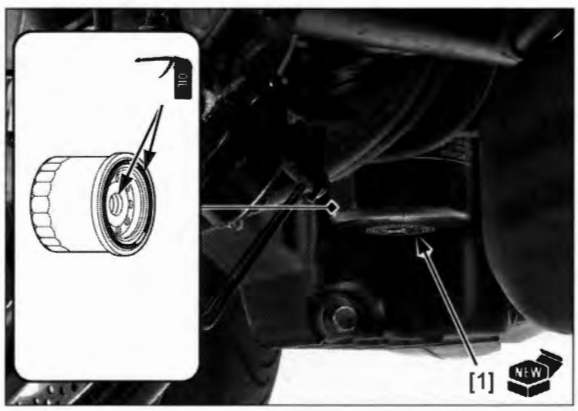


Apply engine oil to the threads and O-ring of a new oil filter cartridge [1].

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

TOOL:
Oil filter wrench — **07HAA-PJ70101 or 07AAA-PLCA100 (U.S.A. only)**

TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)



Install a new sealing washer onto the drain bolt.

Install and tighten the drain bolt/sealing washer to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Fill the crankcase with the recommended engine oil (page 3-10).

ENGINE OIL CAPACITY:
2.3 liters (2.7 US qt, 2.3 Imp qt) at draining
2.6 liters (3.1 US qt, 2.6 Imp qt) at oil filter change
3.0 liters (3.7 US qt, 3.1 Imp qt) at disassembly

Check the oil level (page 3-10).

Make sure there are no oil leaks.

ENGINE IDLE SPEED

NOTE:

- Inspect the idle speed after all other engine maintenance items have been performed and are within specifications.
- Before checking the idle speed, inspect the following items:
  – No MIL blinking
  – Throttle operation and throttle grip freeplay (page 3-4)
- The engine must be warm for accurate idle speed inspection.
- This system eliminates the need for manual idle speed adjustment.

Start the engine, warm it up to normal operation temperature and let it idle.

Check the idle speed.

IDLE SPEED: 1,250 ± 100 rpm

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

– Air cleaner element condition (page 3-5)
– Throttle operation and throttle grip freeplay (page 3-4)
– Spark plug condition (page 3-6)
– Intake air leak or engine top-end problem (page 10-6)
– IACV operation (page 7-18)

RADIATOR COOLANT

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

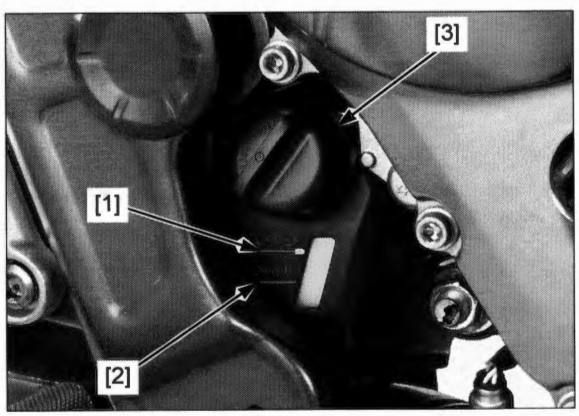
The level should be between the "UPPER" [1] and "LOWER" [2] level lines with the motorcycle in an upright position on a level surface.

If the level is low, fill as follows.

Remove the reserve tank cap [3] and fill the tank to the "UPPER" level line with the recommended coolant.

RECOMMENDED ANTIFREEZE:

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



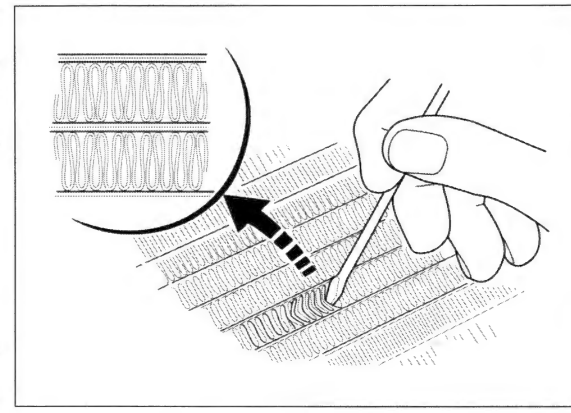
Check to see if there are any coolant leaks when the coolant level decreases very rapidly.

If the reserve tank becomes completely empty, there is a possibility of air getting into the cooling system.
Be sure to remove any air from the cooling system (page 8-4).

Install the reserve tank cap.

COOLING SYSTEM

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



Remove the following:

- Middle cowls (page 2-7) (CBR650R/RA)
- Under cowl (page 2-11) (CBR650R/RA)
- Shroud (page 2-10) (CB650R/RA)

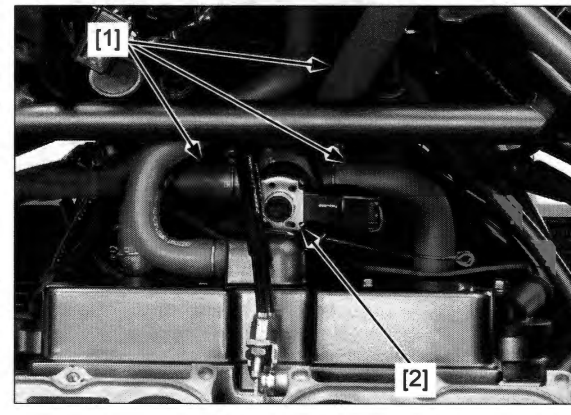
Check for any coolant leakage from the water hoses and hose joints.
Check the water hoses for cracks or deterioration and replace them if necessary.
Check that all hose clamps are tight.

Install the removed parts in the reverse order of removal.

SECONDARY AIR SUPPLY SYSTEM

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

Check the air supply hoses [1] between the air cleaner housing, PAIR control solenoid valve [2] and cylinder head cover for deterioration, damage or loose connections.



Also, check that the hoses are not kinked or pinched.

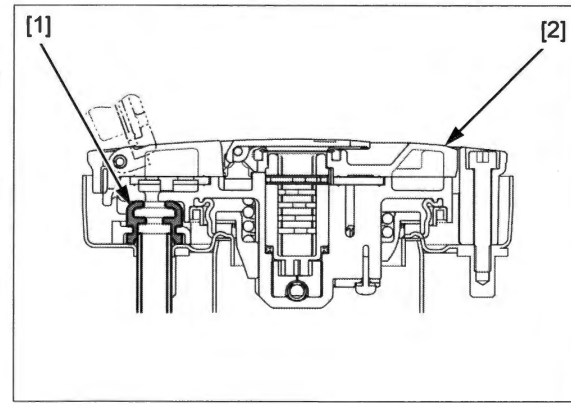
If the air supply hose show any signs of heat damage, inspect the PAIR check valves (page 7-23).

For secondary air supply system inspection (page 7-20).

EVAPORATIVE EMISSION CONTROL SYSTEM (AC type)

Open the fuel fill cap.

Check the breather seal [1] in the fuel fill cap [2] for deterioration, cracks or damage. Replace it if necessary.

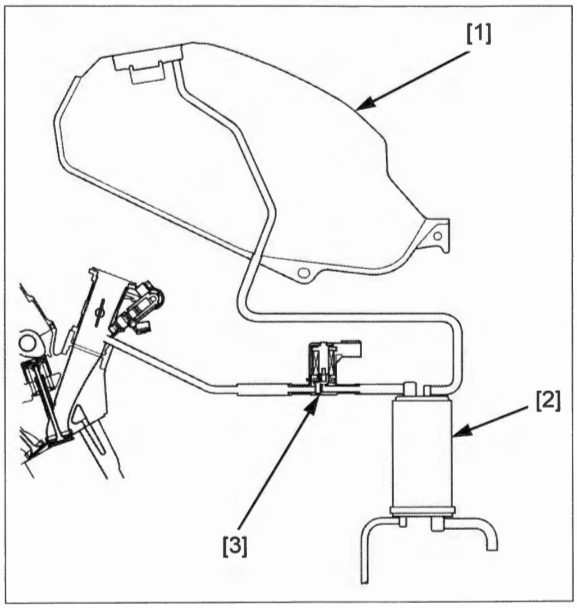


NOTE:

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

Check the hoses between the fuel tank [1], EVAP canister [2], EVAP purge control solenoid valve [3] for deterioration, damage or loose connection.

Check the EVAP canister for cracks or other damage.



DRIVE CHAIN

DRIVE CHAIN SLACK INSPECTION

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

Turn the ignition switch OFF.

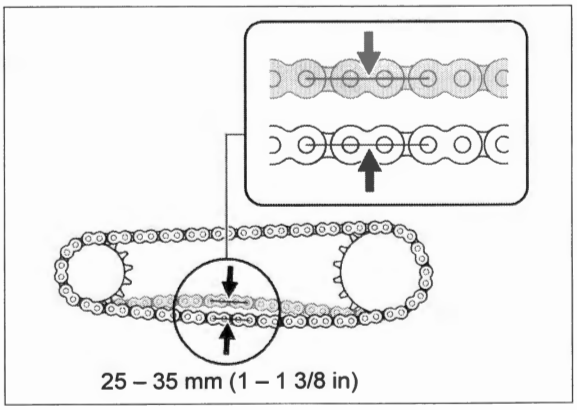
Place the motorcycle on its sidestand and shift the transmission into neutral.

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

DRIVE CHAIN SLACK: 25 – 35 mm (1 – 1 3/8 in)

NOTICE

Excessive chain slack, 50 mm (1 15/16 in) or more, may damage the frame.



ADJUSTMENT

Loosen the rear axle nut [1] and adjuster lock nuts [2].

Turn the adjusting bolts [3] an equal number of a turn until the correct drive chain slack is obtained.

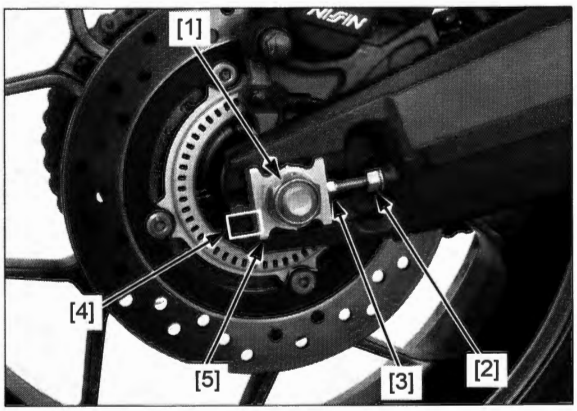
Make sure the scales [4] on both swingarm end are aligned with the end face of the adjusting plates [5].

Tighten the axle nut to the specified torque.

TORQUE: 98 N·m (10.0 kgf·m, 72 lbf·ft)

Tighten each lock nut while holding the adjusting bolt to the specified torque.

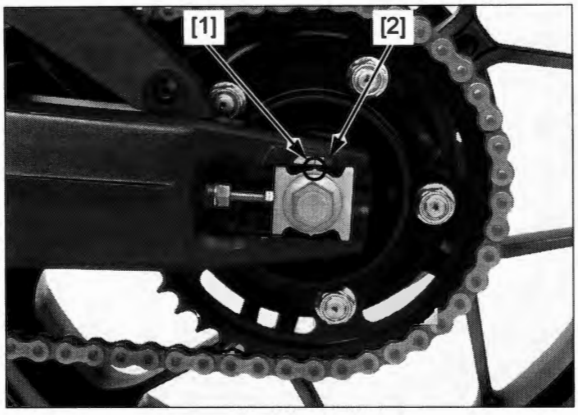
TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Recheck the drive chain slack and free wheel rotation.

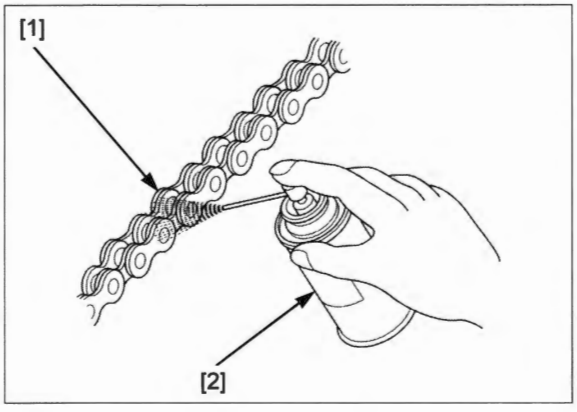
Check the drive chain wear indicator label attached on the left swingarm.

If the index notch [1] of the left adjusting plate reaches the red zone [2] of the wear indicator label, replace the drive chain with a new one (page 3-16).



CLEANING AND LUBRICATION

Clean the drive chain [1] with a chain cleaner designed specifically for O-ring chains or a neutral detergent. Use a soft brush if the drive chain is dirty.



NOTICE

Do not use a steam cleaner, high pressure cleaner, wire brush, volatile solvent such as gasoline and benzene, abrasive cleaner or a chain cleaner NOT designed specifically for O-ring chains to clean the drive chain.

Inspect the drive chain for possible damage or wear.

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

Be sure the drive chain has dried completely before lubricating.

Lubricate the drive chain with Pro Honda HP Chain Lube [2] or equivalent.

NOTICE

Do not use a chain lubricant NOT designed specifically for use with O-ring chains to lubricate the drive chain.

Wipe off the excess oil or drive chain lubricant.

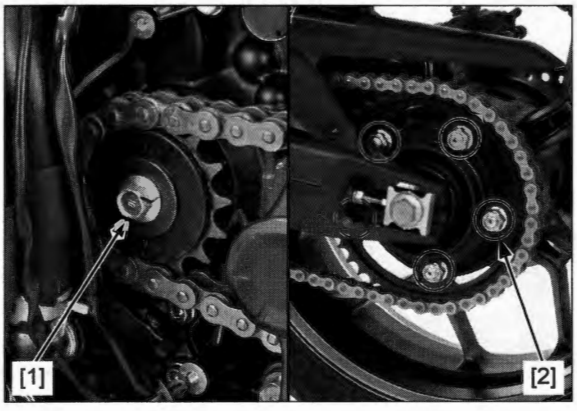
SPROCKET INSPECTION

Remove the drive sprocket cover (page 2-15).

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

Never use a new drive chain on worn sprockets.
Both chain and sprockets must be in good condition, or new replacement chain will wear rapidly.

Check the attaching bolt and nuts on the drive and driven sprockets.
If any are loose, torque them to the specified toque.



TORQUE:

[1] Drive sprocket bolt:
54 N·m (5.5 kgf·m, 40 lbf·ft)
[2] Driven sprocket nut:
108 N·m (11.0 kgf·m, 80 lbf·ft)

Install the drive sprocket cover (page 2-15).

REPLACEMENT

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

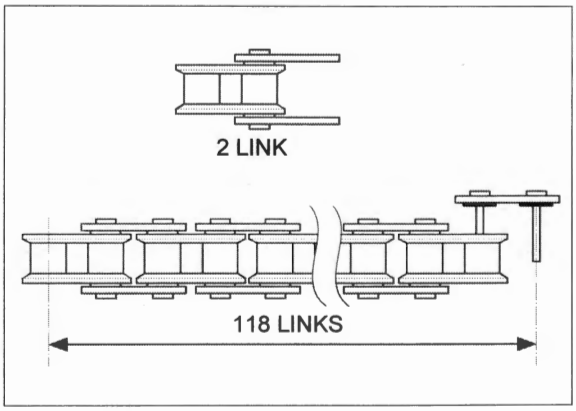
Fully slacken the drive chain (page 3-14).

Remove the drive chain using the special tool.

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

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

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



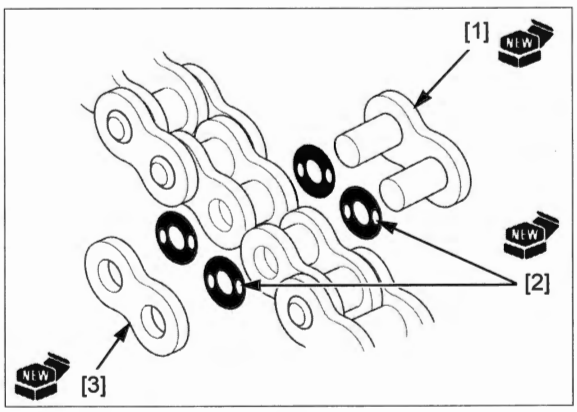
SPECIFIED LINKS: 118 LINKS
REPLACEMENT CHAIN: DID525V11-118LE
RK525KRW-118LE

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

Insert a new master link [1] with new O-rings [2] from the inside of the drive chain, and install a new plate [3] and O-rings with the identification mark facing out.

Assemble the master link, O-rings and plate.

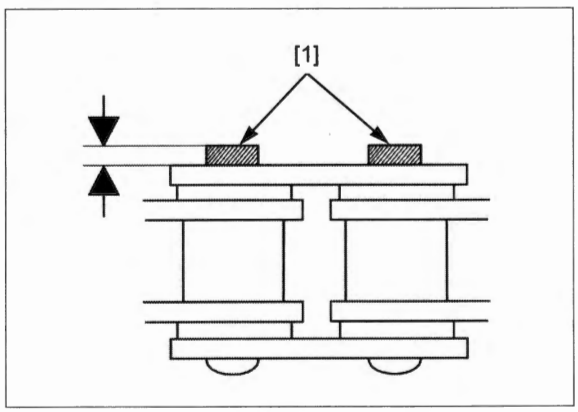
TOOL:
Drive chain tool set **07HMH-MR10103 or 07HMH-MR1010C (U.S.A. only)**



Make sure that the master link pins [1] are installed properly.
Measure the master link pin length projected from the plate.

STANDARD LENGTH: Approx. 1.3 mm (0.05 in)

Stake the master link pins with the drive chain tool set.

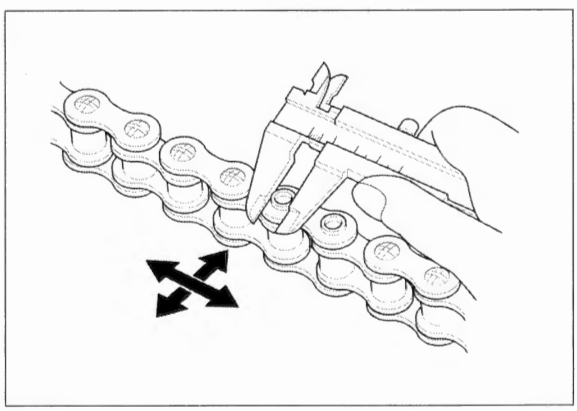


Make sure the pins are staked properly by measuring the diameter of the staked area.

DIAMETER OF STAKED AREA:
DID525V11: 5.50 – 5.80 mm (0.217 – 0.228 in)
RK525KRW: 5.30 – 5.70 mm (0.209 – 0.224 in)

After staking, check the staked area of the master link for cracks.

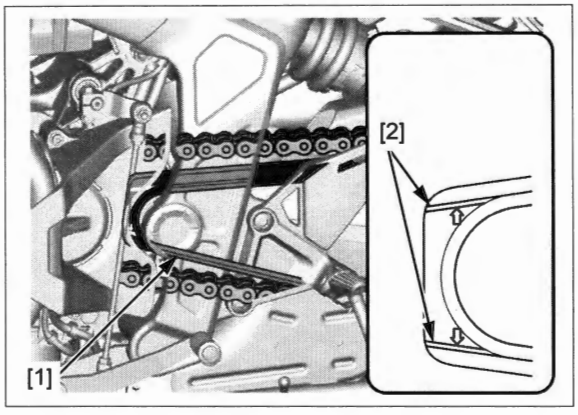
If there is any cracking, replace the master link, O-rings and plate.



DRIVE CHAIN SLIDER

Check the drive chain slider [1] for wear or damage.

The drive chain slider must be replaced if it is worn to the wear limit lines [2] (page 17-13).



BRAKE FLUID

NOTICE

Spilled 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 3-19).
  A low fluid level may be due to wear of the brake pads. If the brake pads are worn and caliper pistons are pushed out, this accounts for a low fluid level. If the brake pads are not worn and fluid level is low, check the entire system for leaks (page 3-20).

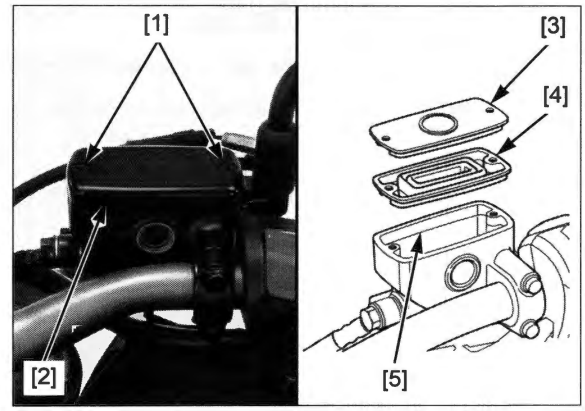
FRONT BRAKE

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

If the level is near the "LOWER" level line [1], fill the brake fluid as follows.

Remove the following:

- Two screws [1]
- Reservoir cap [2]
- Set plate [3]
- Diaphragm [4]



Fill the reservoir with DOT 4 brake fluid from a sealed container to the upper level line (casting ledge) [5].

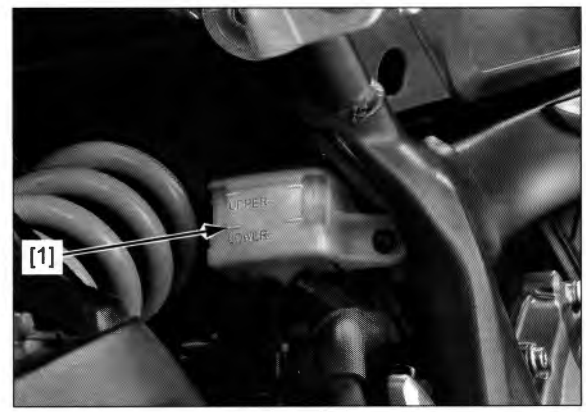
Install the diaphragm, set plate and reservoir cap, and tighten the screws to the specified torque.

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

REAR BRAKE

Support the motorcycle upright position on a level surface and check the rear brake fluid level.

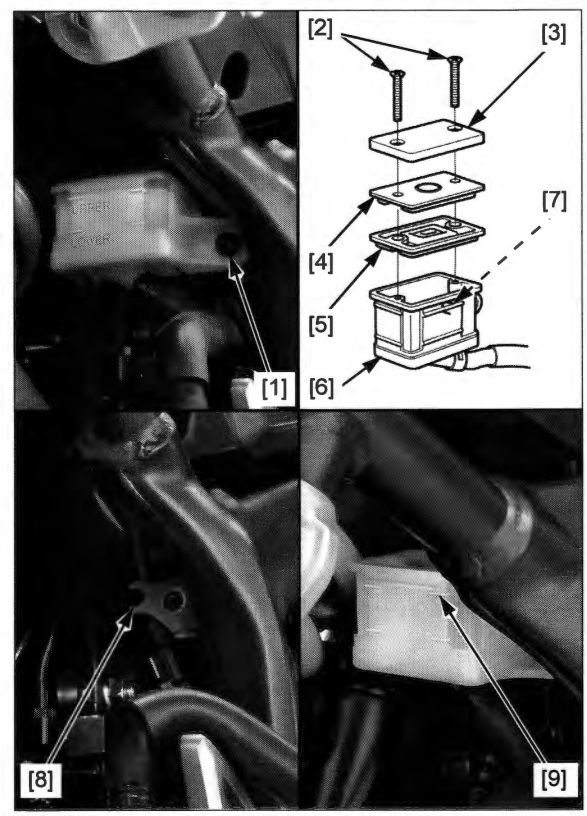
If the level is near the "LOWER" level line [1], fill the brake fluid as follows.



Take care not to spill the fluid out of the reservoir.

Remove the following:

- Reservoir mounting bolt [1]
- Two screws [2]
- Reservoir cap [3]
- Set plate [4]
- Diaphragm [5]



Temporarily install the reservoir [6] onto the reservoir stay with the mounting bolt secure it so the reservoir is level.

NOTE:

- Align the reservoir tab [7] with the reservoir stay cut-out [8].

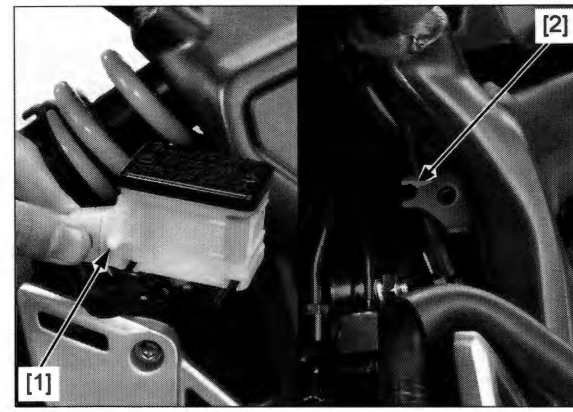
Fill the reservoir with DOT 4 brake fluid from a sealed container to the upper level line [9].

Carefully remove the reservoir from the stay by removing the mounting bolt.

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

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

Install the reservoir, aligning the locating tab [1] with the cutout [2] in the stay and tighten the mounting bolt.



BRAKE PADS WEAR

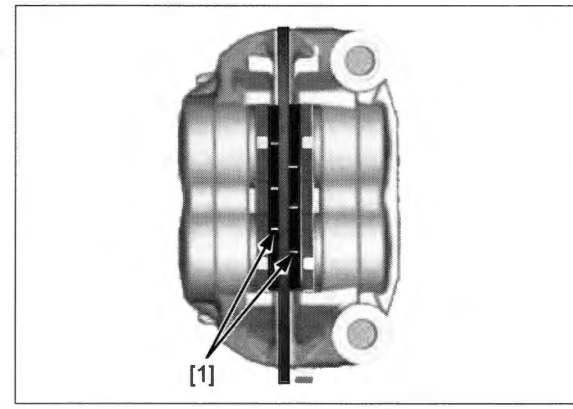
FRONT BRAKE PADS

Check the brake pads for wear.

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

Replace the brake pads if either pad is worn to the wear limit groove [1].

For brake pad removal/installation (page 18-8).



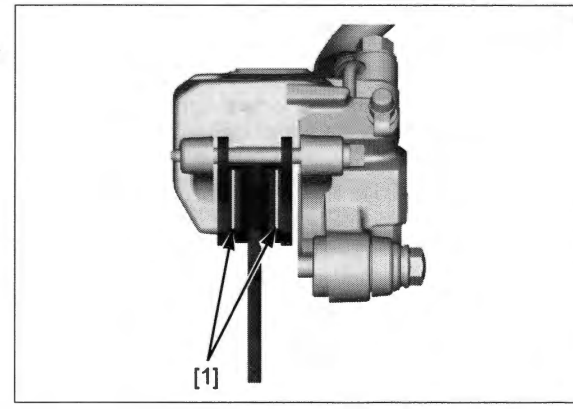
REAR BRAKE PADS

Check the brake pads for wear.

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

Replace the brake pads if either pad is worn to the wear limit groove [1].

For brake pad removal/installation (page 18-9).



BRAKE SYSTEM

INSPECTION

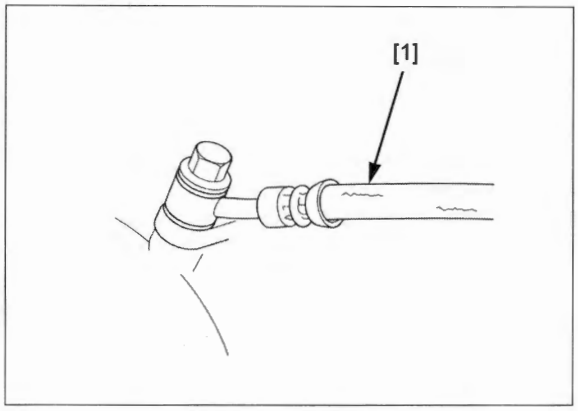
Firmly apply the brake lever or pedal, and check that no air has entered the system.

If the lever or pedal feels soft or spongy when operated, bleed the air from the system (page 18-5).

Inspect the brake hoses [1], pipes and fittings for deterioration, cracks, damage and signs of leakage.

Tighten any loose fittings.

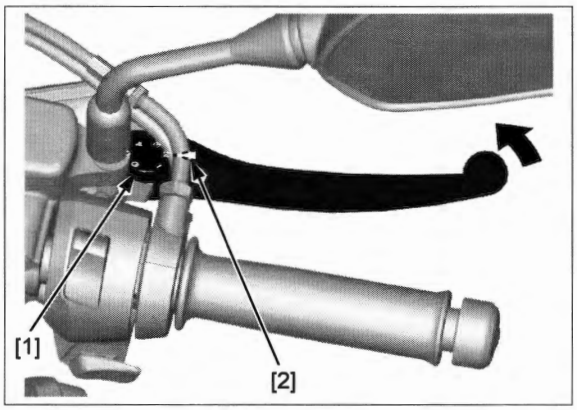
Replace hoses, pipes and fittings as required.



BRAKE LEVER ADJUSTMENT

The distance between the brake lever and the grip can be adjusted by turning the adjuster [1].

Align the "△" mark [2] on the brake lever with the index number on the adjuster.



BRAKE LIGHT SWITCH

NOTE:

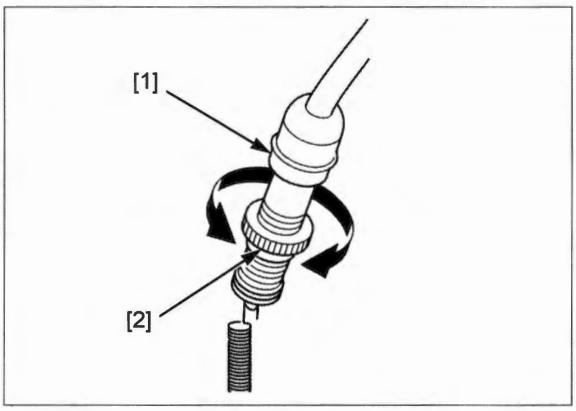
- The brake light switch on the front brake master cylinder cannot be adjusted. If the front brake light switch actuation and brake engagement are not synchronized, either replace the switch unit or the malfunctioning parts of the system.

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

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

Do not turn the switch body

Hold the switch body [1] and turn the adjuster [2].



HEADLIGHT AIM

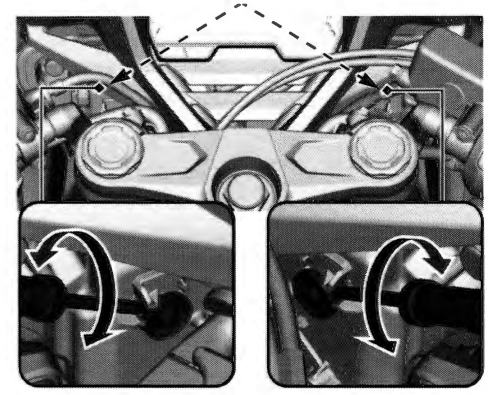
NOTE:

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

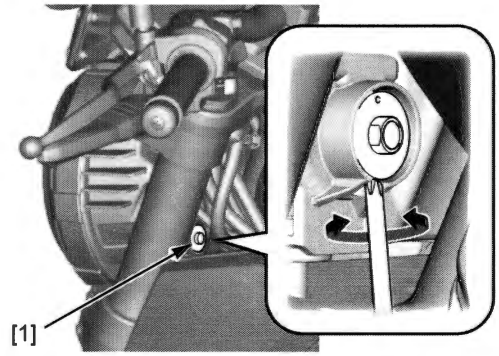
Support the motorcycle in an upright position on a level surface.

Adjust the headlight aim vertically by turning the pinion [1].
A counterclockwise rotation moves the beam up and clockwise rotation moves the beam down.

CBR650R/RA:



CB650R/RA:



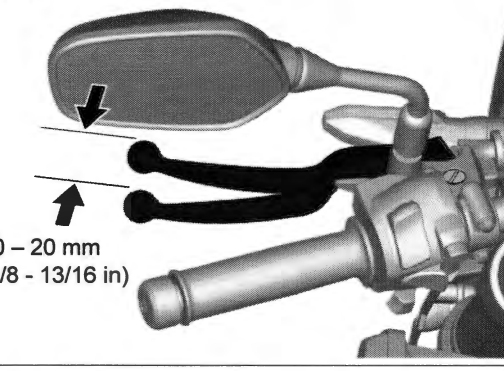
CLUTCH SYSTEM

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

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

FREEPLAY: 10 – 20 mm (3/8 - 13/16 in)

CB650RA shown:

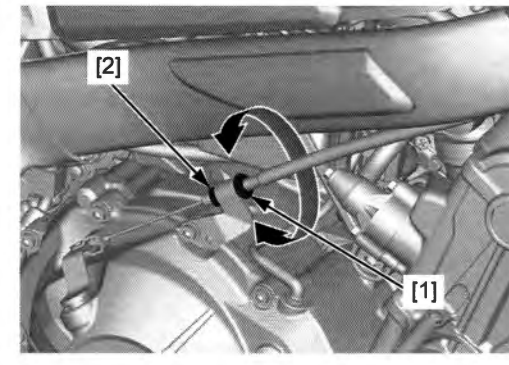


Clutch lever freeplay can be adjusted at either end of the clutch cable.

Major adjustment is made with the lower adjusting nut [1] at the clutch lifter arm.

Loosen the lock nut [2] and turn the adjusting nut as required.

Tighten the lock nut while holding the adjusting nut.



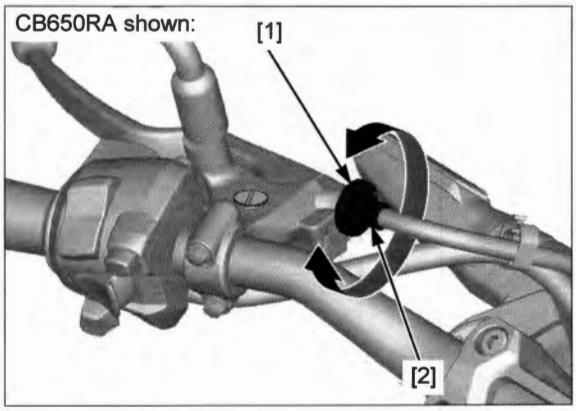
Minor adjustment is made with the upper adjuster at the clutch lever.

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

Loosen the lock nut [1] and turn the adjuster [2] as required.

Tighten the lock nut while holding the adjuster.

If the proper freeplay cannot be obtained, or the clutch slips during test-ride, disassemble and inspect the clutch (page 11-10).



SIDESTAND

Support the motorcycle using a safety stand or hoist.

Check the sidestand spring for damage or loss of tension.

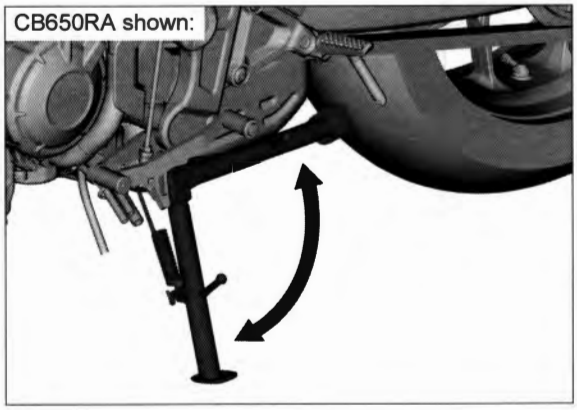
Check the sidestand for movement and lubricate the sidestand pivot if necessary.

For sidestand removal/installation (page 2-16).

Check the sidestand ignition cut-off system:

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

If there is a problem with the system, check the sidestand switch (page 21-18).



SUSPENSION

FRONT SUSPENSION INSPECTION

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

Replace damaged components which cannot be repaired.

Tighten all fasteners.

For fork service (page 16-23).

REAR SUSPENSION INSPECTION

Check the action of the shock absorber by compressing them several times.
Check the entire shock absorber assembly for leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all fasteners.

For shock absorber service (page 17-10).

Support the motorcycle using a hoist or equivalent and raise the rear wheel off the ground.

Check for worn swingarm bearings by grabbing the swingarm ends and attempting to move it side to side.

Replace the bearings if any looseness to noted.

For swingarm service (page 17-12).

REAR SUSPENSION ADJUSTMENT

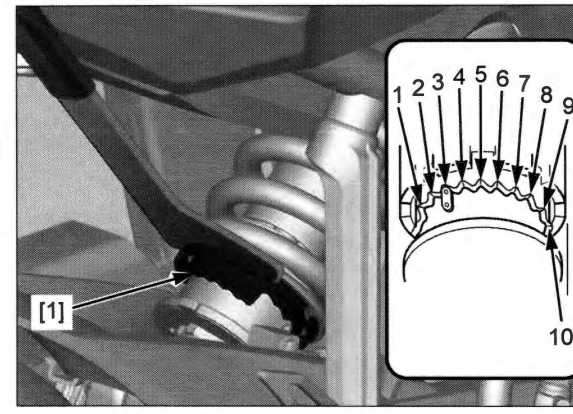
SPRING PRE-LOAD ADJUSTER

Spring pre-load can be adjusted by turning the adjuster [1].

ADJUSTABLE RANGE: 10 positions

Position 1 and 2 is for a decrease spring preload (soft), or turn the position 4 to 10 increase spring preload (hard).

The standard position is 3.



NUTS, BOLTS, FASTENERS

Check that all chassis nuts, screws and bolts are tightened to their correct torque values (page 1-10).

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

WHEELS/TIRES

Support the motorcycle using a hoist or equivalent and raise the front wheel off the ground.

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

For front wheel service (page 16-17).

Support the motorcycle using a hoist or equivalent and raise the rear wheel off the ground.

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

For rear wheel service (page 17-6).

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

- Front tire (page 1-8)
- Rear tire (page 1-8)

Check the tires for cuts, embedded nails, or other damage.
Check the front and rear wheels for trueness.

STEERING HEAD BEARINGS

Support the motorcycle using a hoist or equivalent and raise the front wheel off the ground.

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

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

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering bearings (page 16-41).

MEMO

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PGM-FI TROUBLESHOOTING INFORMATION 4-6
PGM-FI SYMPTOM TROUBLESHOOTING 4-9
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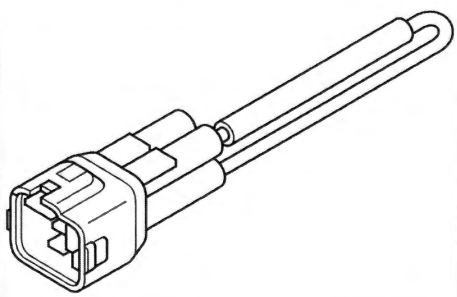
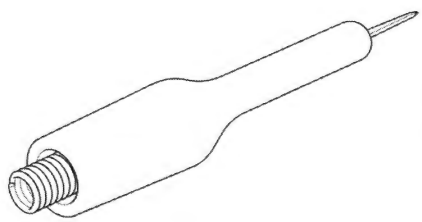
SERVICE INFORMATION

GENERAL

- This section covers electrical system service of the PGM-FI system. For other service and fuel supply system, see Fuel System section (page 7-2).
- The PGM-FI system is equipped with the self-diagnostic system. When performing the troubleshooting, read "PGM-FI Troubleshooting Information" carefully (page 4-6), and inspect and troubleshoot according to the DTC.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- Use a digital tester for PGM-FI system inspection.
- The following color codes are used throughout this section.

Bl = Black	G = Green	Lg = Light Green	R = Red	Y = Yellow
Br = Brown	Gr = Gray	O = Orange	V = Violet	
Bu = Blue	Lb = Light Blue	P = Pink	W = White	

TOOLS

SCS service connector 070PZ-ZY30100	Test probe, 2 pack 07ZAJ-RDJA110
	

ECM-to-COMBINATION METER TWO-WAY SERIAL COMMUNICATION

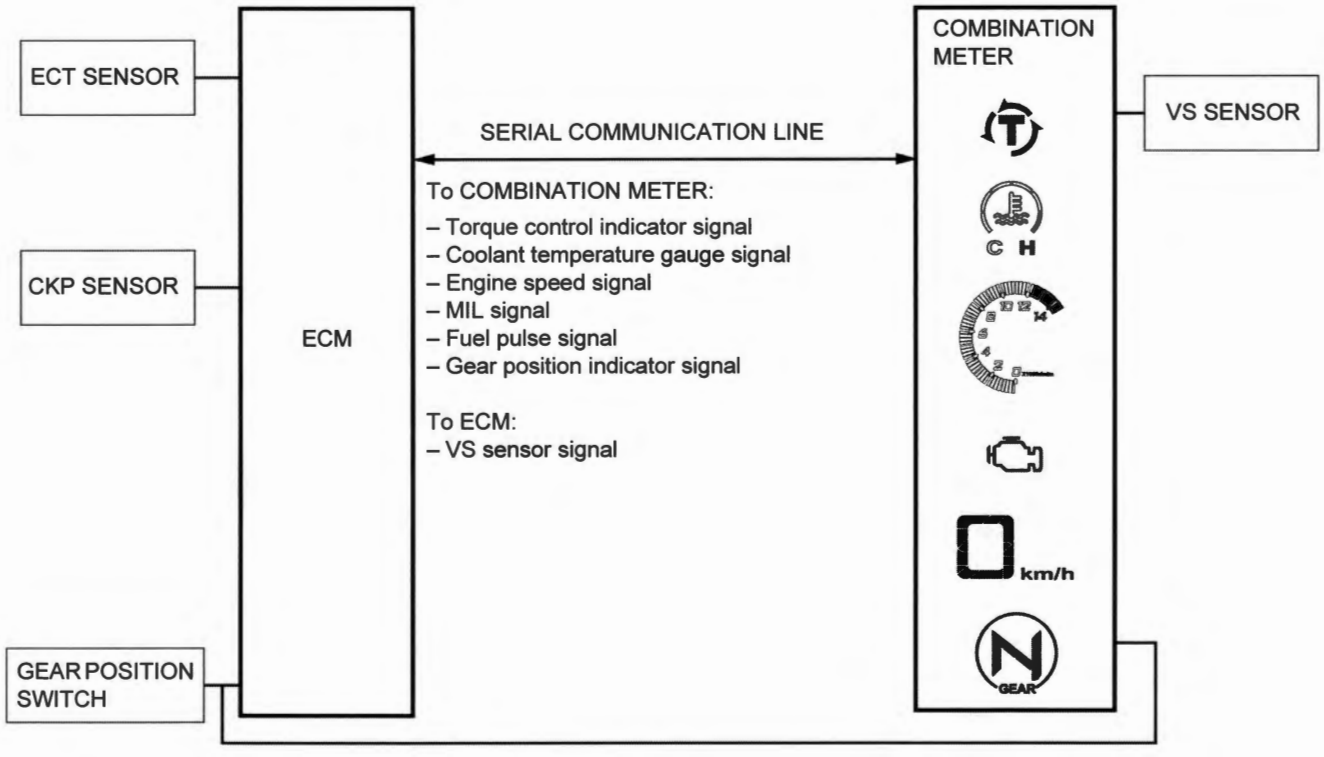
This motorcycle is equipped with the ECM-to-combination meter two-way serial communication system.

The ECM sends the following information to the combination meter.

- Coolant temperature gauge signal
- Engine speed signal
- MIL signal
- Fuel pulse signal (for fuel mileage meter)
- Gear position indicator signal

The combination meter sends the vehicle speed signal information to the ECM.

These signals are communicated between the ECM and combination meter via one wire. This wire is called the serial communication (TXD/RXD) line.



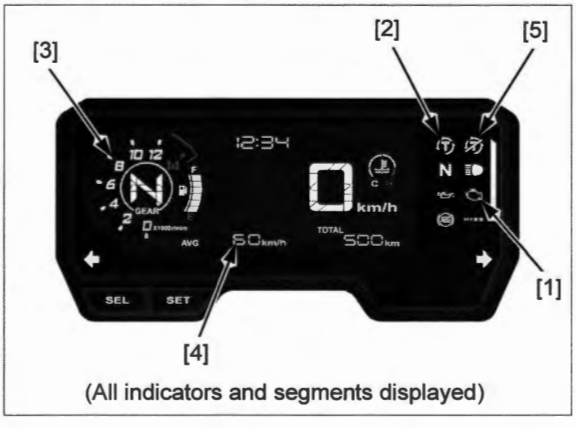
COMBINATION METER INDICATION WHEN THE SERIAL COMMUNICATION LINE IS ABNORMAL

If there is any problem in the serial communication line, the combination meter shows following:

- MIL [1] and torque control indicator [2] stays on
- Tachometer [3] does not operate (though the engine is running)
- Section A display [4] indicates "–"
- Torque control off indicator [5] does not come on

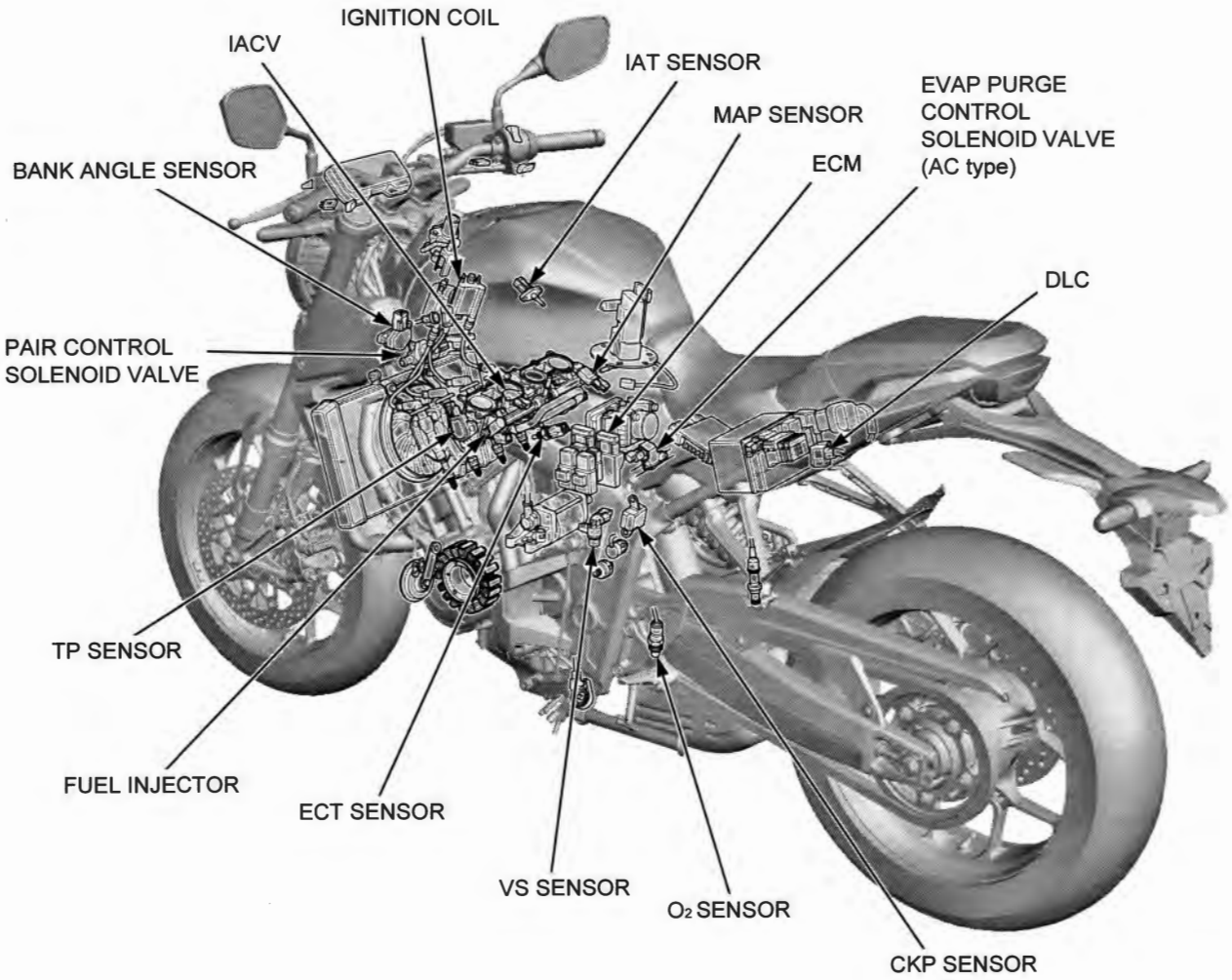
Serial communication line troubleshooting (page 21-8).

If there is any problem in the serial communication, the ECM stores the DTC 86-1 (page 4-34).

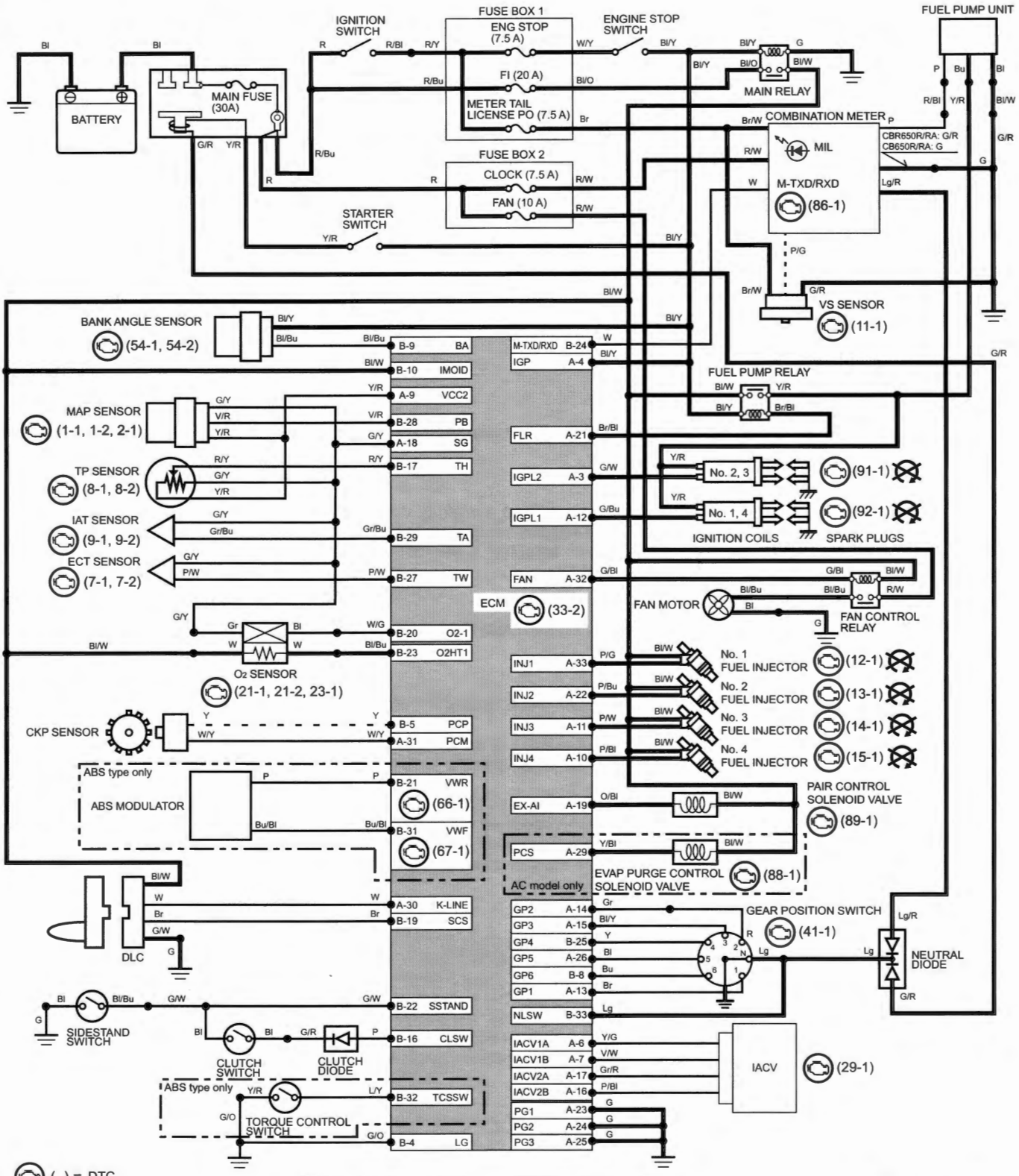


(All indicators and segments displayed)

SYSTEM LOCATION



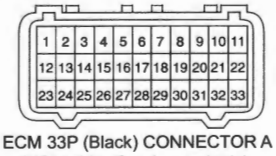
SYSTEM DIAGRAM



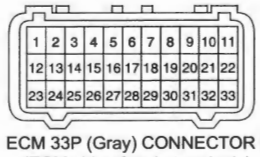
( ) = DTC

= Engine does not start when detecting DTC

= Short terminals for reading DTC



ECM 33P (Black) CONNECTOR A
(ECM side of male terminals)



ECM 33P (Gray) CONNECTOR B
(ECM side of male terminals)

Bl : Black
Br : Brown
Bu : Blue
G : Green
Gr : Gray
O : Orange
P : Pink
R : Red
V : Violet
W : White
Y : Yellow

PGM-FI TROUBLESHOOTING INFORMATION

GENERAL TROUBLESHOOTING

Intermittent Failure

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

Opens and Shorts

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

If the MIL has come on

Refer to DTC READOUT (page 4-7).

If the MIL did not stay on

If the MIL did not stay on, but there is a driveability problem, do the SYMPTOM TROUBLESHOOTING (page 4-9).

SYSTEM DESCRIPTION

SELF-DIAGNOSIS SYSTEM

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

FAIL-SAFE FUNCTION

The PGM-FI system is provided with a fail-safe function to secure a minimum running capability even when there is trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is maintained by pre-programed value in the simulated program map. When any abnormality is detected in the fuel injector, the fail-safe function stops the engine to protect it from damage.

MIL Check

When the ignition switch is turned ON, the MIL will stay on for a few seconds, then go off. If the MIL does not come on or stay on (No DTC set), inspect the MIL circuit (page 4-42).

DTC (Honda code)

- The DTC (Honda code) is composed of a main code and a sub code and it is displayed as a hyphenated number when retrieved from the ECM with the MCS.
  The digits in front of the hyphen are the main code, they indicate the component of function failure.
  The digits behind the hyphen are the sub code, they detail the specific symptom of the component or function failure.
  For example, in the case of the ECT sensor:
  – DTC 07 – 1 = (ECT sensor voltage) – (lower than the specified value)
  – DTC 07 – 2 = (ECT sensor voltage) – (higher than the specified value)
- The sensors diagnosis will be made according to the voltage output of the affected sensor.
  If a failure occurs, the ECM determines the Function Failure, compares the sensor voltage output to the standard value, and then outputs the corresponding DTC to the MCS.

MIL Blink Pattern

- If the MCS is not available, DTC can be read from the ECM memory by the MIL blink pattern.
- The number of MIL blinks is the equivalent the main code of the DTC (the sub code cannot be displayed by the MIL).
- The MIL will blink the freeze date of the DTC by shorting SCS circuit (reading DTC with DLC connector).
- The MIL has two types of blinks, a long blink and short blink. The long blinking lasts for 1.3 seconds, the short blinking lasts for 0.3 seconds. One long blink is the equivalent of ten short blinks. For example, when two long blinks are followed by five short blinks, the MIL is 25 (two long blinks = 20 blinks, plus five short blinks).
- When the ECM stores more than one DTC, the MIL will indicate them by blinking in the order from the lowest number to highest number.

CURRENT DTC/FREEZE DTC

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

- In case the ECM detects the problem at present, the MIL will come on.
- In case the ECM does not detect any problem at present but has a problem stored in its memory, the MIL will not come on. If it is necessary to retrieve the past problem, readout the freeze data by following the DTC readout procedure (page 4-7).

MCS INFORMATION

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

How to connect the MCS

Remove the main seat (page 2-11).

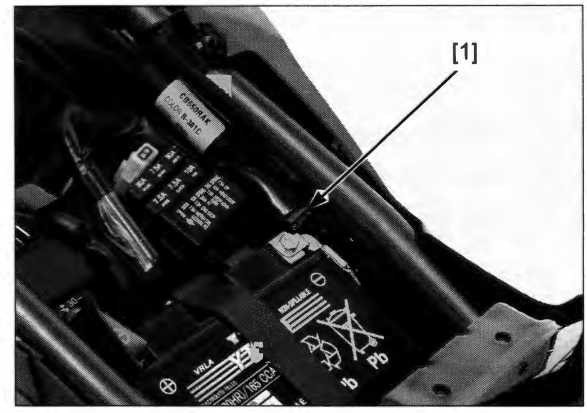
Turn the ignition switch OFF.

Remove the dummy connector [1] from the DLC.

Connect the MCS to the DLC.

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

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



DTC READOUT

Start the engine and check the MIL.

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

If the MIL turns on, connect the MCS to the DLC, read the DTC, freeze data and follow the troubleshooting index (page 4-10).

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

Reading DTC with the MIL

Remove the main seat (page 2-11).

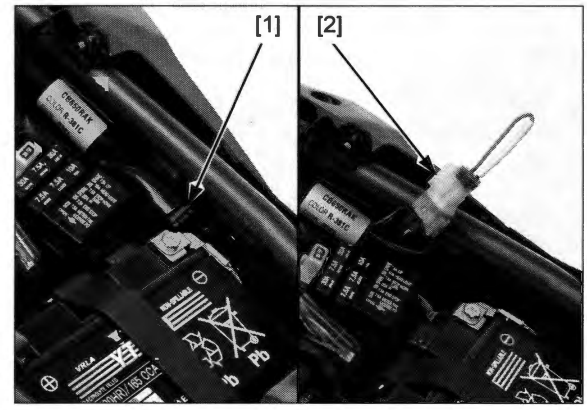
Turn the ignition switch OFF.

Remove the dummy connector [1] from the DLC.

Short the DLC terminals using the special tool.

TOOL:
[2] SCS service connector 070PZ-ZY30100

CONNECTION: Brown – Green/white



Turn the ignition switch ON, read, note the MIL blinks and refer to the DTC index (page 4-10).

- The main code of Honda code (the number in front of hyphen) can be indicated as MIL blinking.
- The MIL has two types of blinks, a long blink and short blink. The long blinking lasts for 1.3 seconds, the short blinking lasts for 0.5 seconds. One long blink is the equivalent of ten short blinks. For example, when two long blinks are followed by five short blinks, the MIL is 25 (two long blinks = 20 blinks, plus five short blinks).

ERASING DTC

Connect the MCS to the DLC (page 4-7).

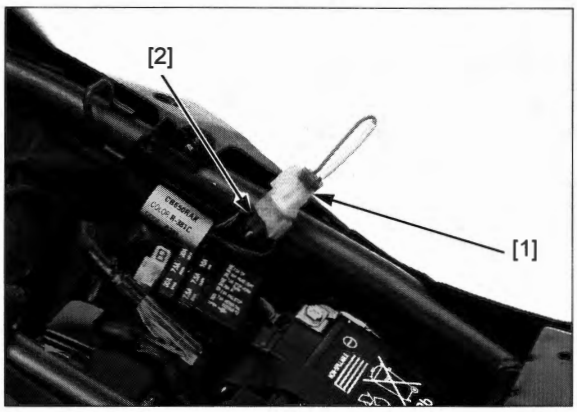
Erase the DTC with the MCS while the engine is stopped.

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

How to erase the DTC with SCS service connector

1. Connect the SCS service connector [1] to the DLC [2] (page 4-7).
2. Turn the ignition switch ON.
3. Disconnect the SCS service connector from the DLC.
4. The MIL will light for approximately 5 seconds. While the MIL lights, short the DLC terminals again with the special tool. The self-diagnostic memory is erased if the malfunction indicator goes off and starts blinking.

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



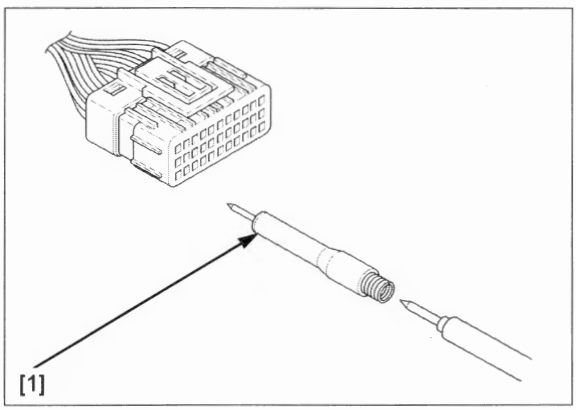
CIRCUIT INSPECTION

INSPECTION AT ECM CONNECTOR

- Always clean around and keep any foreign material away from the ECM 33P connectors before disconnecting it.
- A faulty PGM-FI system is often related to poorly connected or corroded connections. Check those connections before proceeding.
- In testing at ECM 33P connectors (wire side) terminal, always use the test probe [1]. Insert the test probe into the connector terminal, then attach the digital multimeter probe to the test probe.

TOOL:

Test probe, 2 pack	**07ZAJ-RDJA110**



PGM-FI SYMPTOM TROUBLESHOOTING

When the motorcycle has one of these symptoms, check the MIL lighting, refer to the DTC index (page 4-10) and begin the appropriate troubleshooting procedure. If there are no DTC stored in the ECM memory, do the diagnostic procedure for the symptom, in sequence listed below, until you find cause.

Symptom	Diagnosis procedure	Also check for
Engine cranks, but won't start (No MIL lighting)	1. Crank the engine for more than ten seconds and check the MIL (page 4-7) and execute the troubleshooting according to the DTC. 2. Inspect the ignition system (page 5-3). 3. Inspect the fuel supply system (page 7-5). 4. Check the spark plug condition (page 3-6). 5. Check the cylinder compression (page 10-6).	• No fuel to fuel injector – Clogged fuel filter – Pinched or clogged fuel tank breather hose – Pinched or clogged fuel feed hose – Faulty fuel pump – Faulty fuel pump circuits • Intake air leak • Contaminated/deteriorated fuel • Faulty fuel injector • IACV stuck
Engine cranks, but won't start (No fuel pump operation sound when turning the ignition ON)	1. ECM power/ground circuits malfunction (page 4-43). 2. Inspect the fuel pump system (page 7-9).	• Open circuit in the power input and/or ground line of the ECM • Faulty main relay and related circuit • Faulty fuel pump relay and related circuit • Blown FI fuse (20 A)
Engine stalls, hard to start, rough idling	1. Check the idle speed (page 3-12). 2. Check the IACV (page 7-18). 3. Inspect the fuel supply system (page 7-5).	• Restricted fuel feed hose • Contaminated/deteriorated fuel • Intake air leak • Restricted fuel tank breather hose • Faulty ignition system
Afterburn when engine braking is used	1. Inspect the secondary air supply system (page 7-20). 2. Inspect the ignition system (page 5-3).	
Backfiring or misfiring during acceleration	Inspect the ignition system (page 5-3).	
Poor performance (driveability) and poor fuel economy	Inspect the fuel supply system (page 7-5).	• Air cleaner element contaminated • Pinched or clogged fuel feed hose • Faulty pressure regulator (fuel pump) • Faulty fuel injector • Faulty ignition system
Idle speed is below specifications or fast idle too low (No MIL lighting)	1. Check the idle speed (page 3-12). 2. Check the IACV (page 7-18).	• Faulty fuel supply system • Faulty ignition system
Idle speed is above specifications or fast idle too high (No MIL lighting)	1. Check the idle speed (page 3-12). 2. Check the throttle operation and freeplay (page 3-4). 3. Check the IACV (page 7-18).	• Faulty ignition system • Intake air leak • Engine top-end problem • Air cleaner condition
MIL stays on (Engine operates normally and No DTC set)	Inspect the MIL circuit (page 4-42).	

DTC INDEX

NOTE:

- If the MCS is not used, perform all of the inspection on the corresponding main code (digits in front of hyphen) of the DTC.

DTC	Function Failure	Symptom/Fail-safe function	Refer to
1-1	MAP sensor circuit low voltage (less than 0.215 V) • MAP sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 60 kPa (450 mmHg)	4-12
1-2	MAP sensor circuit high voltage (more than 3.809 V) • Loose or poor contact of the MAP sensor connector • MAP sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 60 kPa (450 mmHg) • HSTC does not operate	4-13
2-1	MAP sensor performance problem • Loose or poor connection of the MAP sensor vacuum hose • MAP sensor malfunction	• Engine operates normally • Pre-program value: 60 kPa (450 mmHg) • HSTC does not operate	4-14
7-1	ECT sensor circuit low voltage (less than 0.059 V) • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 109.9°C (230°F) • HSTC does not operate	4-15
7-2	ECT sensor circuit high voltage (more than 4.922 V) • Loose or poor contact of the ECT sensor connector • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 109.9°C (230°F) • HSTC does not operate	4-15
8-1	TP sensor circuit low voltage (less than 0.313 V) • Loose or poor contact of the TP sensor connector • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-program value: 0° • HSTC does not operate • Quickshifter does not operate	4-17
8-2	TP sensor circuit high voltage (more than 4.966 V) • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-program value: 0° • HSTC does not operate • Quickshifter does not operate	4-18
9-1	IAT sensor circuit low voltage (less than 0.078 V) • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 34.80°C (95°F) • HSTC does not operate	4-19
9-2	IAT sensor circuit high voltage (more than 4.922 V) • Loose or poor contact of the IAT sensor connector • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 34.80°C (95°F) • HSTC does not operate	4-20
11-1	VS sensor malfunction • Loose or poor contact of the VS sensor connector • VS sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 5 km/h (3 mph) • HSTC does not operate • Quickshifter does not operate	4-21
12-1	No. 1 fuel injector malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injector, fuel pump and ignition coil shut down	4-22
13-1	No. 2 fuel injector malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injector, fuel pump and ignition coil shut down	4-22
14-1	No. 3 fuel injector malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injector, fuel pump and ignition coil shut down	4-22
15-1	No. 4 fuel injector malfunction • Loose or poor contact of the fuel injector connector • Fuel injector or its circuit malfunction	• Engine does not start • Fuel injector, fuel pump and ignition coil shut down	4-22
21-1	O_2 sensor circuit low voltage • O_2 sensor or its circuit malfunction	• Engine operates normally	4-23
21-2	O_2 sensor circuit high voltage • Loose or poor contact of the O_2 sensor connector • O_2 sensor or its circuit malfunction	• Engine operates normally	4-24
23-1	O_2 sensor heater malfunction • Loose or poor contact of the O_2 sensor connector • O_2 sensor or its circuit malfunction	• Engine operates normally	4-25
29-1	IACV malfunction • Loose or poor contact of the IACV connector • IACV or its circuit malfunction	• Engine stalls, hard to start, rough idling	4-27
33-2	ECM EEPROM malfunction	• Engine operates normally • Does not hold the self-diagnosis data	4-28
41-1	Gear position switch malfunction • Gear position switch or its circuit malfunction	• Engine operates normally • Quickshifter does not operate	4-29

DTC	Function Failure	Symptom/Fail-safe function	Refer to
54-1	Bank angle sensor circuit low voltage (less than 0.020 V) • Loose or poor contact of the bank angle sensor connector • Bank angle sensor or its circuit malfunction	• Engine operates normally • Engine stop function does not operate	4-30
54-2	Bank angle sensor circuit high voltage (more than 4.986 V) • Bank angle sensor or its circuit malfunction	• Engine operates normally • Engine stop function does not operate	4-31
66-1	Rear wheel speed sensor malfunction • Loose or poor contact of the rear wheel speed sensor connector • Faulty rear wheel speed sensor or its circuit malfunction	• Engine operates normally • HSTC does not operate • Quickshifter does not operate	4-32
67-1	Front wheel speed sensor malfunction • Loose or poor contact of the front wheel speed sensor connector • Faulty front wheel speed sensor or its circuit malfunction	• Engine operates normally • HSTC does not operate	4-33
86-1	Serial communication malfunction • Loose or poor contact of the related connector • Faulty combination meter or its circuit malfunction • Faulty ECM	• Engine operates normally	4-34
88-1	EVAP purge control solenoid valve malfunction • Loose or poor contact of the EVAP purge control solenoid valve connector • EVAP purge control solenoid valve or its circuit malfunction	• Engine operates normally	4-37
89-1	PAIR control solenoid valve malfunction • Loose or poor contact of the PAIR control solenoid valve connector • PAIR control solenoid valve or its circuit malfunction	• Engine operates normally	4-38
91-1	No.1 ignition coil primary circuit malfunction • Loose or poor contact of the ignition coil connector • Ignition coil or its circuit malfunction	• Engine stalls, hard to start, rough idling • No.1, No4 fuel injector, and No.1 ignition shut down • HSTC does not operate • Quickshifter does not operate	4-40
92-1	No.2 ignition coil primary circuit malfunction • Loose or poor contact of the ignition coil connector • Ignition coil or its circuit malfunction	• Engine stalls, hard to start, rough idling • No.2, No3 fuel injector, and No.2 ignition shut down • HSTC does not operate • Quickshifter does not operate	4-40

DTC TROUBLESHOOTING

DTC 1-1
(MAP SENSOR LOW VOLTAGE)

1. MAP Sensor System Inspection

Check the MAP sensor with the MCS.

Is about 0 V indicated?

YES – GO TO STEP 2.

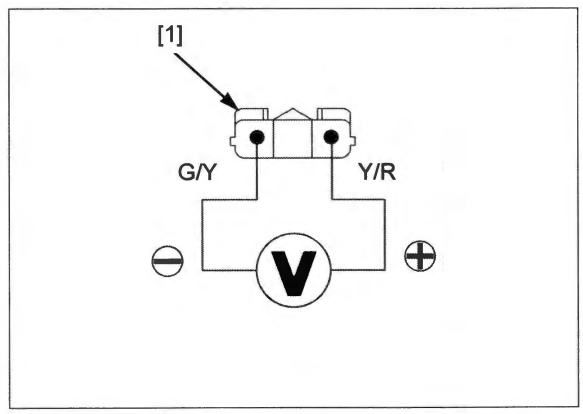
NO – Intermittent failure

2. MAP Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the MAP sensor 3P (Black) connector (page 4-43).
Turn the ignition switch ON with the engine stop switch "○".
Measure the voltage between the wire harness side MAP sensor 3P (Black) connector [1] terminals.

CONNECTION: Yellow/red (+) – Green/yellow (–)

STANDARD: 4.75 – 5.25 V



Is the voltage within standard value?

YES – GO TO STEP 4.

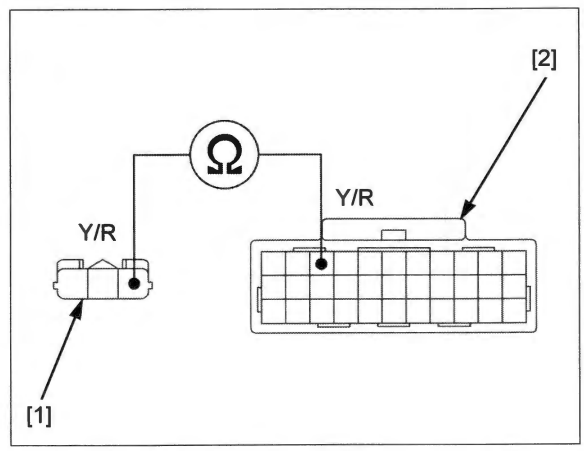
NO – GO TO STEP 3.

3. MAP Sensor Input Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector (page 4-42).
Check for continuity between the wire harness side MAP sensor 3P (Black) connector [1] and ECM 33P (Black) connector [2] terminals.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: Yellow/red – Yellow/red



Is there continuity?

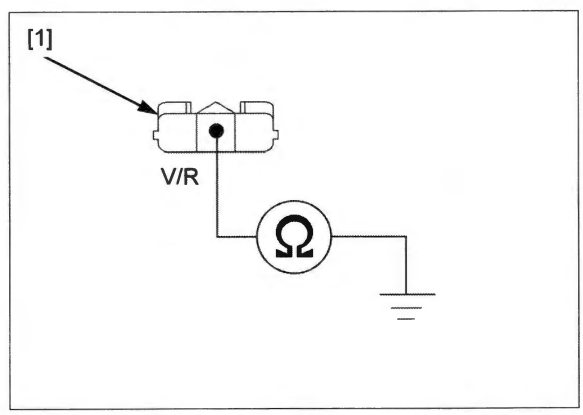
YES – Replace the ECM with a known good one, and recheck.

NO – Open circuit in Yellow/red wire

4. MAP Sensor Signal Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector (page 4-42).
Check for continuity between MAP sensor 3P (Black) connector [1] terminal and ground.

CONNECTION: Violet/red – Ground



Is there continuity?

YES – Short circuit in Violet/red wire

NO – GO TO STEP 5.

5. **MAP Sensor Inspection**

   Replace the MAP sensor with a known good one (page 4-43).
   Connect the ECM 33P (Black) connector.
   Erase the DTC (page 4-8).
   Check the MAP sensor with the MCS.

   Is DTC 1-1 indicated?

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

   NO – Faulty original MAP sensor

DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

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

1. **MAP Sensor System Inspection**

   Check the MAP sensor with the MCS.

   Is about 5 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. **MAP Sensor Input Voltage Inspection**

   Turn the ignition switch OFF.
   Disconnect the MAP sensor 3P (Black) connector (page 4-43).
   Turn the ignition switch ON with the engine stop switch "○".
   Measure the voltage between the wire harness side MAP sensor 3P (Black) connector [1] terminals.

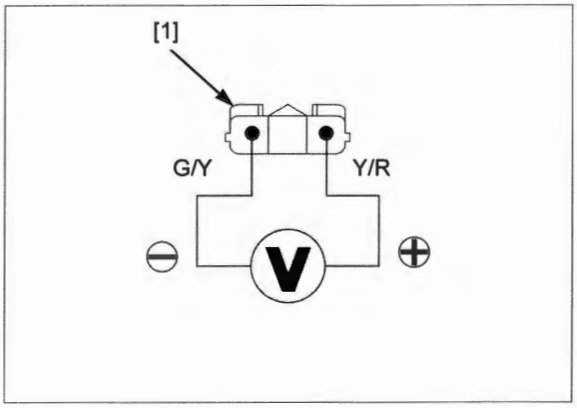
   CONNECTION: Yellow/red (+) – Green/yellow (–)

   STANDARD: 4.75 – 5.25 V

   Is the voltage within standard value?

   YES – GO TO STEP 3.

   NO – Open circuit in Green/yellow wire



3. **MAP Sensor System Inspection with Jumper Wire**

   Turn the ignition switch OFF.
   Connect the wire harness side MAP sensor 3P (Black) connector [1] terminals with a jumper wire [2].

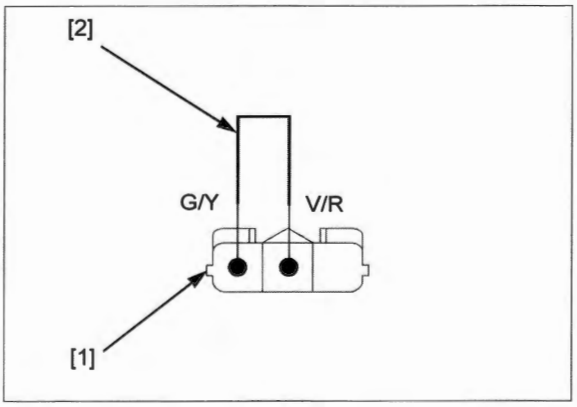
   CONNECTION: Violet/red – Green/yellow

   Check the MAP sensor with the MCS.

   Is about 0 V indicated?

   YES – Faulty MAP sensor

   NO – GO TO STEP 4.



4. MAP Sensor Signal Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector (page 4-42).
Check for continuity between the wire harness side MAP sensor 3P (Black) connector [1] and ECM 33P (Gray) connector [2] terminals.

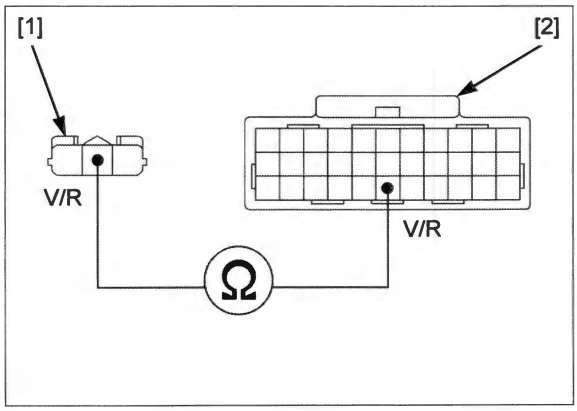
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: Violet/red – Violet/red

Is there continuity?

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

NO – Open circuit in Violet/red wire



DTC 2-1 (MAP sensor performance problem)

1. MAP Sensor System Inspection

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

Is the reading changed?

YES – Intermittent failure

NO – GO TO STEP 2.

2. Manifold Absolute Pressure Test

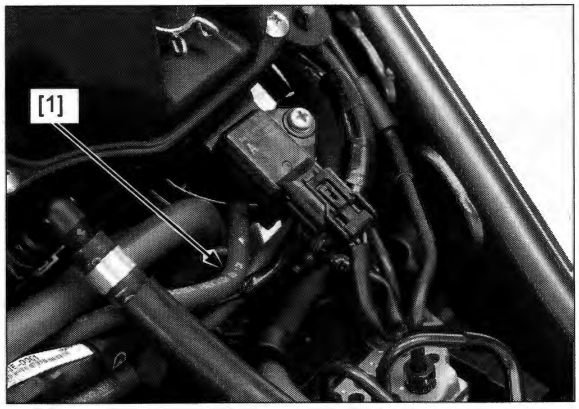
Stop the engine.
Lift the fuel tank and support it (page 3-4).

Check for connection and installation of the MAP sensor vacuum hose [1].

Is the MAP sensor vacuum hose connection correct?

YES – GO TO STEP 3.

NO – Correct the hose installation.



3. MAP Sensor System Inspection

Replace the MAP sensor with a known good one (page 4-43).
Start the engine.

Check the MAP sensor with the MCS at idle speed.

Is the reading changed?

YES – Faulty original MAP sensor

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

DTC 7-1
(ECT SENSOR LOW VOLTAGE)

1. **ECT Sensor System Inspection**

   Check the ECT sensor with the MCS.

   Is about 0 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. **ECT Sensor System Inspection with Connector Disconnected**

   Turn the ignition switch OFF.
   Disconnect the ECT sensor 2P (Blue) connector (page 4-44).
   Check the ECT sensor with the MCS.

   Is about 0 V indicated?

   YES – GO TO STEP 3.

   NO – Faulty ECT sensor

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

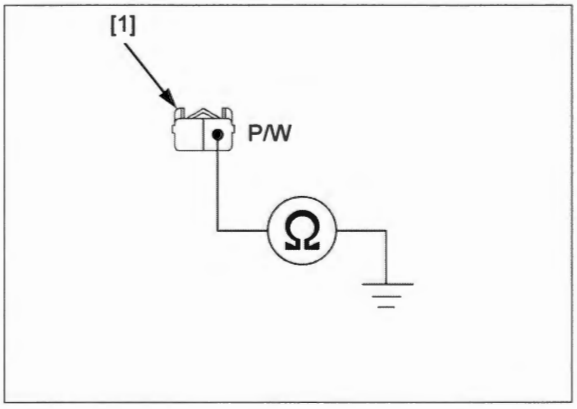
   Turn the ignition switch OFF.
   Disconnect the ECM 33P (Gray) connector (page 4-42).
   Check for continuity between the wire harness side ECT sensor 2P (Blue) connector [1] terminal and ground.

   CONNECTION: Pink/white – Ground

   Is there continuity?

   YES – Short circuit in Pink/white wire

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



DTC 7-2
(ECT SENSOR HIGH VOLTAGE)

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

1. **ECT Sensor System Inspection**

   Check the ECT sensor with the MCS.

   Is about 5 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. ECT Sensor System Inspection with Jumper Wire

Turn the ignition switch OFF.
Disconnect the ECT sensor 2P (Blue) connector (page 4-44).
Connect the wire harness side ECT sensor 2P (Blue) connector [1] terminals with a jumper wire [2].

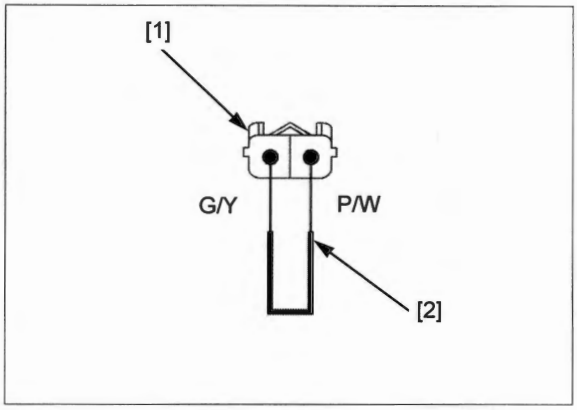
CONNECTION: Pink/white – Green/yellow

Check the ECT sensor with the MCS.

Is about 0 V indicated?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



3. ECT Sensor Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) and 33P (Gray) connectors (page 4-42).
Check for continuity between the wire harness side ECT sensor 2P (Blue) connector [1] and ECM 33P (Black) [2] and 33P (Gray) [3] connector terminals.

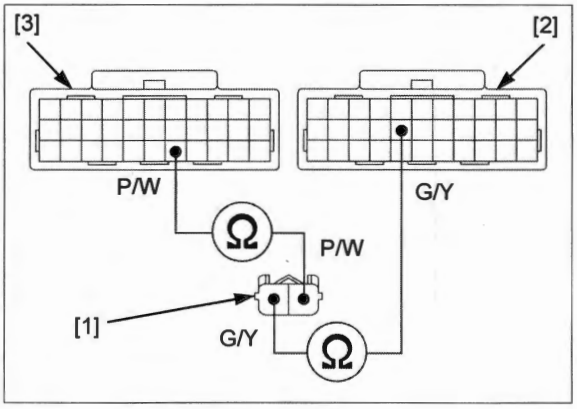
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION:
Pink/white – Pink/white
Green/yellow – Green/yellow

Is there continuity?

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

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



4. ECT Sensor Resistance Inspection

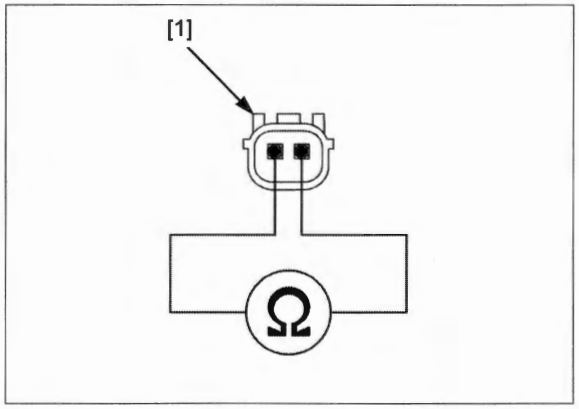
Turn the ignition switch OFF.
Remove the ECT sensor (page 4-44).
Measure the resistance between the 2P connector terminals of the ECT sensor [1].

STANDARD: 1.0 – 1.3 kΩ (40°C/104°F)

Is the resistance within standard value?

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

NO – Faulty ECT sensor



DTC 8-1
(TP SENSOR LOW VOLTAGE)

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

1. TP Sensor System Inspection

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

Is about 0 V indicated?

YES – GO TO STEP 2.

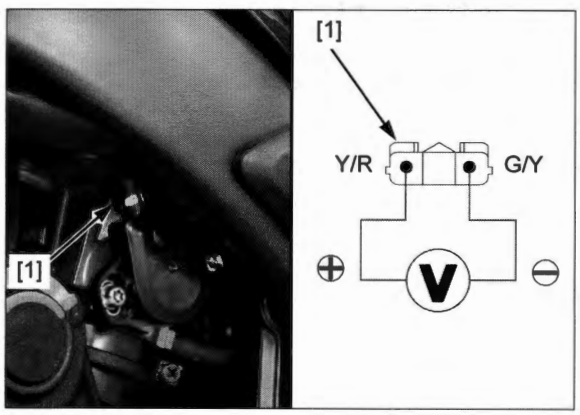
NO – Intermittent failure

2. TP Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the TP sensor 3P (Blue) connector [1].
Turn the ignition switch ON with the engine stop switch "○".
Measure the voltage between the wire harness side TP sensor 3P (Blue) connector terminals.

CONNECTION: Yellow/red (+) – Green/yellow (–)

STANDARD: 4.75 – 5.25 V



Is the voltage within standard value?

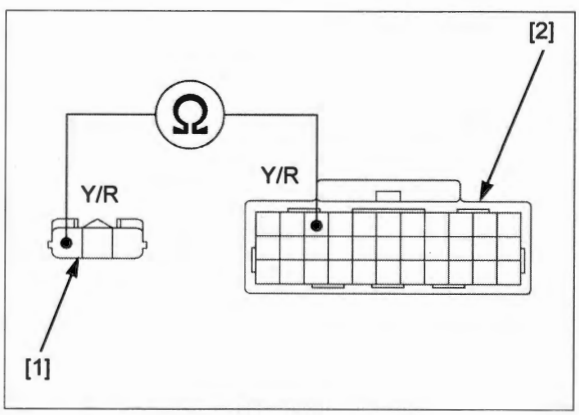
YES – GO TO STEP 4.

NO – GO TO STEP 3.

3. TP Sensor Input Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector (page 4-42).
Check for continuity between the wire harness side TP sensor 3P (Blue) connector [1] and ECM 33P (Black) connector [2] terminals.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**



CONNECTION: Yellow/red – Yellow/red

Is there continuity?

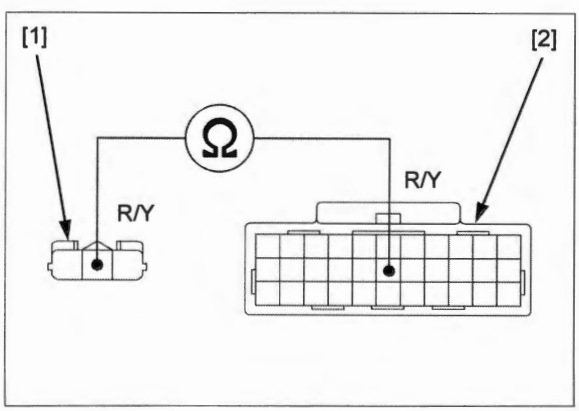
YES – Replace the ECM with a known good one, and recheck.

NO – Open circuit in Yellow/red wire

4. TP Sensor Signal Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector (page 4-42).
Check for continuity between the wire harness side TP sensor 3P (Blue) connector [1] and ECM 33P (Gray) connector [2] terminals.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**



CONNECTION: Red/yellow – Red/yellow

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Red/yellow wire

5. **TP Sensor Signal Line Short Circuit Inspection**

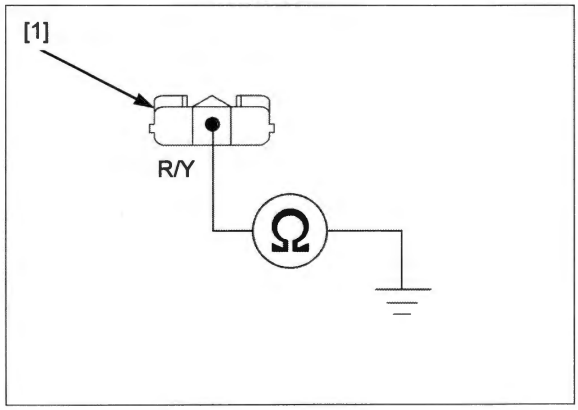
   Check for continuity between the wire harness side TP sensor 3P (Blue) connector [1] terminal and ground.

   CONNECTION: Red/yellow – Ground

   Is there continuity?

   YES – Short circuit in Red/yellow wire

   NO – GO TO STEP 6.



6. **TP Sensor Inspection**

   Replace the throttle body (TP sensor) with a known good one (page 7-14).
   Connect the ECM 33P (Gray) connector.
   Erase the DTC (page 4-8).
   Check the TP sensor with the MCS.

   Is DTC 8-1 indicated?

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

   NO – Faulty original TP sensor

DTC 8-2 (TP SENSOR HIGH VOLTAGE)

1. **TP Sensor System Inspection**

   Check the TP sensor with the MCS.

   Is about 5 V indicated?

   YES – GO TO STEP 3.

   NO – GO TO STEP 2.

2. **TP Sensor System Inspection with throttle operated**

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

   Is the voltage increase continuously?

   YES – Intermittent failure

   NO – Faulty TP sensor

3. **TP Sensor Input Voltage Inspection**

   Turn the ignition switch OFF.
   Disconnect the TP sensor 3P (Blue) connector [1].
   Turn the ignition switch ON with the engine stop switch "○".
   Measure the voltage between the wire harness side TP sensor 3P (Blue) connector terminals.

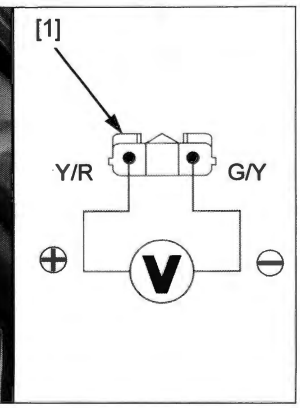
   CONNECTION: Yellow/red (+) – Green/yellow (–)

   STANDARD: 4.75 – 5.25 V

   Is the voltage within standard value?

   YES – GO TO STEP 4.

   NO – Open circuit in Green/yellow wire



4. TP Sensor Line Short Circuit Inspection

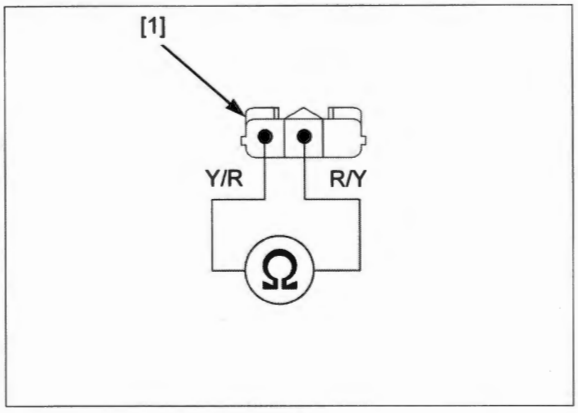
Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) and 33P (Gray) connectors (page 4-42).
Check for continuity between the wire harness side TP sensor 3P (Blue) connector [1] terminals.

CONNECTION: Yellow/red – Red/yellow

Is there continuity?

YES – Short circuit between Yellow/red and Red/yellow wires

NO – GO TO STEP 5.



5. TP Sensor Inspection

Replace the throttle body (TP sensor) with a known good one (page 7-14).
Connect the ECM 33P connectors.
Erase the DTC (page 4-8).
Check the TP sensor with the MCS.

Is DTC 8-2 indicated?

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

NO – Faulty original TP sensor

DTC 9-1 (IAT SENSOR LOW VOLTAGE)

1. IAT Sensor System Inspection

Check the IAT sensor with the MCS.

Is about 0 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. IAT Sensor System Inspection with Connector Disconnected

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P (Black) connector (page 4-44).
Check the IAT sensor with the MCS.

Is about 0 V indicated?

YES – GO TO STEP 3.

NO – Faulty IAT sensor

3. IAT Sensor Output Line Short Circuit Inspection

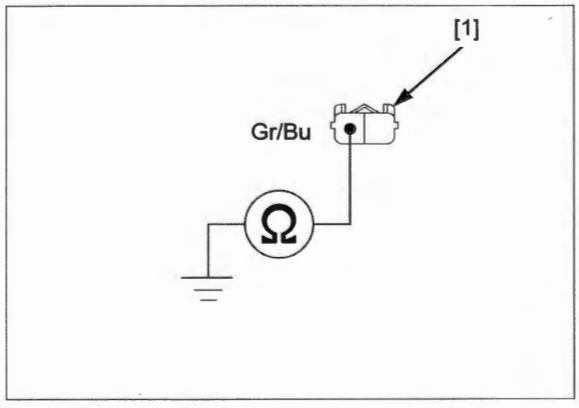
Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector (page 4-42).
Check for continuity between the wire harness side IAT sensor 2P (Black) connector [1] terminal and ground.

CONNECTION: Gray/blue – Ground

Is there continuity?

YES – Short circuit in Gray/blue wire

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



DTC 9-2
(IAT SENSOR HIGH VOLTAGE)

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

1. IAT Sensor System Inspection

Check the IAT sensor with the MCS.

Is about 5 V indicated?

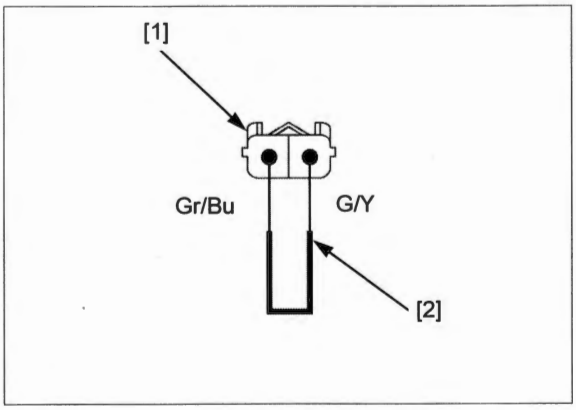
YES – GO TO STEP 2.

NO – Intermittent failure

2. IAT Sensor System Inspection with Jumper Wire

Turn the ignition switch OFF.
Disconnect the IAT sensor 2P (Black) connector (page 4-44).
Connect the wire harness side IAT sensor 2P (Black) connector [1] terminals with a jumper wire [2].

CONNECTION: Gray/blue – Green/yellow



Check the IAT sensor with the MCS.

Is about 0 V indicated?

YES – Faulty IAT sensor

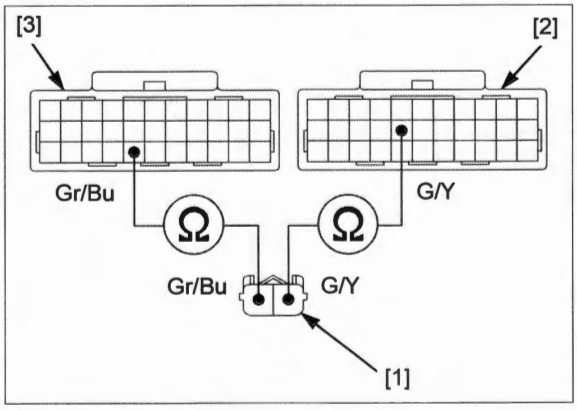
NO – GO TO STEP 3.

3. IAT Sensor Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) and 33P (Gray) connectors (page 4-42).
Check for continuity between the wire harness side IAT sensor 2P (Black) connector [1] and ECM 33P (Black) [2]/33P (Gray) [3] connector terminals.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION:
Gray/blue – Gray/blue
Green/yellow – Green/yellow



Is there continuity?

YES – GO TO STEP 4.

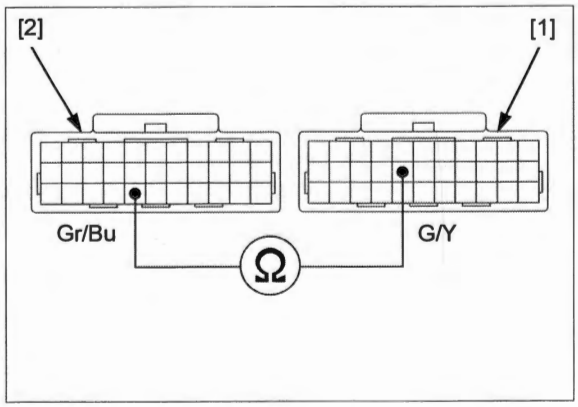
NO – • Open circuit in Gray/blue wire
• Open circuit in Green/yellow wire

4. IAT Sensor Resistance Inspection

Connect the IAT sensor 2P (Black) connector.
Measure the resistance between the wire harness side ECM 33P (Black) [1] and 33P (Gray) [2] connector terminals.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: Gray/blue – Green/yellow



STANDARD: 1.0 – 1.3 kΩ (40°C/104°F)

Is the resistance within standard value?

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

NO – Faulty IAT sensor

DTC 11-1 (VS SENSOR)

- Before starting the inspection, check for loose or poor contact on the VS sensor 3P (Black) and combination meter 20P (Gray) connectors, and recheck the DTC.

1. Recheck DTC

Erase the DTC (page 4-8).
Test-ride the motorcycle above 3,800 rpm.
Stop the engine.
Check the VS sensor with the MCS.

Is DTC 11-1 indicated?

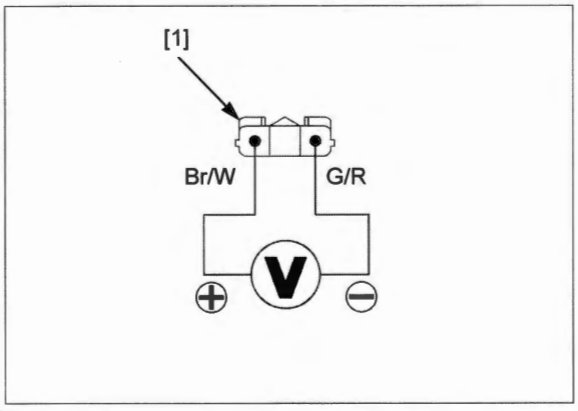
YES – GO TO STEP 2.

NO – Intermittent failure

2. VS Sensor Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the VS sensor 3P (Black) connector (page 4-44).
Turn the ignition switch ON with the engine stop switch "○".
Measure the voltage between the wire harness side VS sensor 3P (Black) connector [1] terminals.

CONNECTION: Brown/white (+) – Green/red (–)



Is there battery voltage?

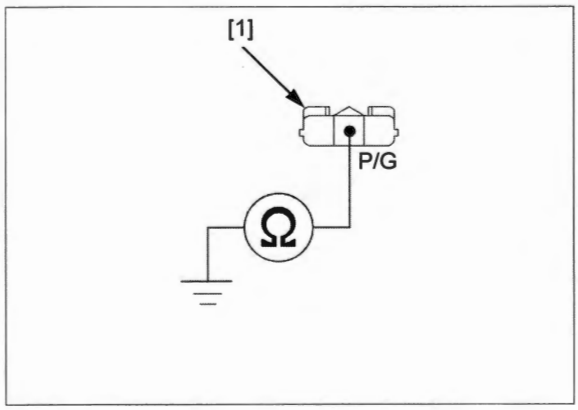
YES – GO TO STEP 3.

NO – • Open circuit in Brown/white wire
• Open circuit in Green/red wire

3. VS Sensor Signal Line Short Circuit Inspection

Turn the ignition switch OFF.
Check for continuity between the wire harness side VS sensor 3P (Black) connector [1] terminal and ground.

CONNECTION: Pink/green – Ground



Is there continuity?

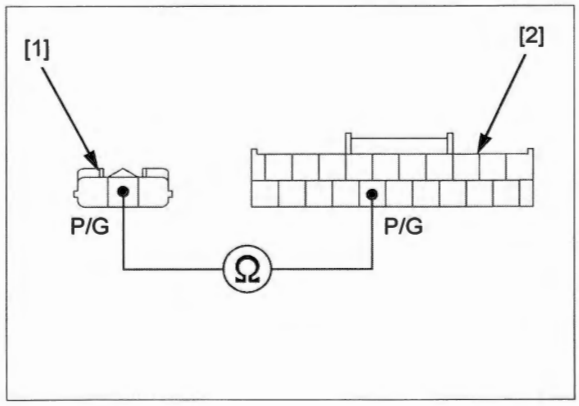
YES – Short circuit in Pink/green wire

NO – GO TO STEP 4.

4. VS Sensor Signal Line Open Circuit Inspection

Disconnect the combination meter 20P (Gray) connector as the combination meter power/ground line inspection (page 21-7).
Check for continuity between the wire harness side VS sensor 3P (Black) connector [1] and combination meter 20P (Gray) connector [2] terminals.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**



CONNECTION: Pink/green – Pink/green

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Pink/green wire

5. **VS Sensor Inspection**

Replace the VS sensor with a known good one (page 4-44).
Connect the combination meter 20P (Gray) connector.
Erase the DTC (page 4-8).
Test-ride the motorcycle above 3,800 rpm.
Stop the engine.
Check the DTC with the MCS.

Is DTC 11-1 indicated?

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

NO – Faulty original VS sensor

DTC 12-1 (No. 1 FUEL INJECTOR)/ DTC 13-1 (No. 2 FUEL INJECTOR)/ DTC 14-1 (No. 3 FUEL INJECTOR)/ DTC 15-1 (No. 4 FUEL INJECTOR)

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

1. **Recheck DTC**

Erase the DTC (page 4-8).
Start the engine and check the fuel injector with the MCS.

Is the DTC 12-1, 13-1, 14-1 or 15-1 indicated?

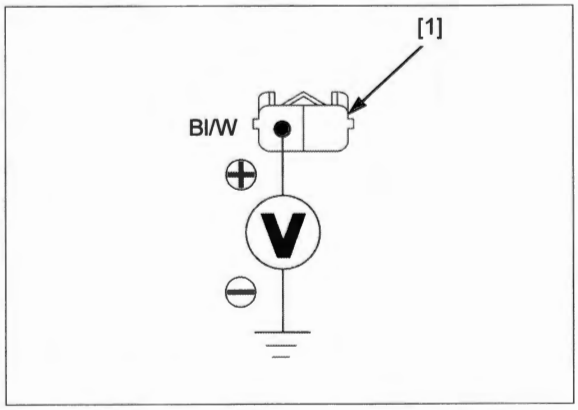
YES – GO TO STEP 2.

NO – Intermittent failure

2. **Fuel Injector Input Voltage Inspection**

Turn the ignition switch OFF.
Lift the fuel tank and support it (page 3-4).
Disconnect the fuel injector 2P (Black) connector.
Turn the ignition switch ON with the engine stop switch "○".
Measure the voltage between the wire harness side fuel injector 2P (Black) connector [1] terminal and ground.

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



Is there battery voltage?

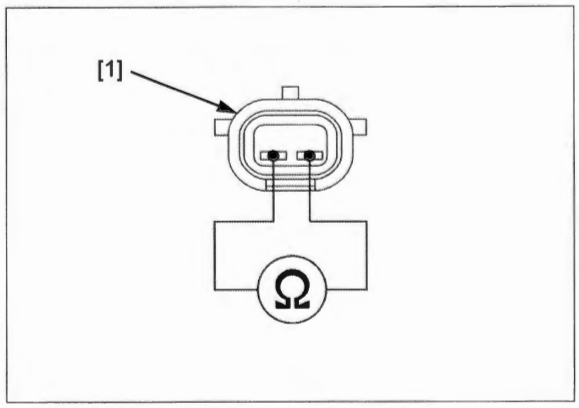
YES – GO TO STEP 3.

NO – Open circuit in Black/white wire

3. **Fuel Injector Resistance Inspection**

Turn the ignition switch OFF.
Measure the resistance between the 2P connector terminals of the fuel injector [1].

STANDARD: 11 – 13 Ω (20°C/68°F)



Is the resistance within standard value?

YES – GO TO STEP 4.

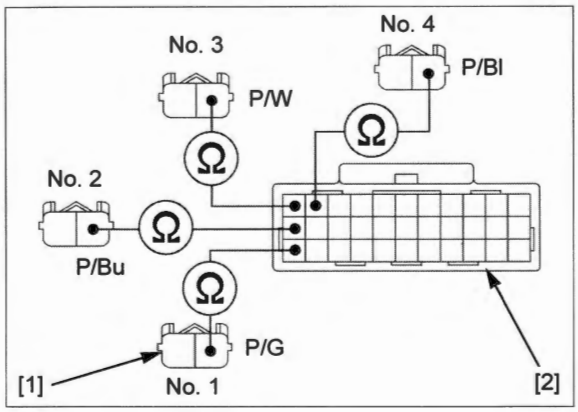
NO – Faulty fuel injector

4. Fuel Injector Signal Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector (page 4-42).
Check for continuity between the wire harness side fuel injector 2P (Black) connectors [1] and ECM 33P (Black) connector [2] terminals.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION:
No. 1: Pink/green – Pink/green
No. 2: Pink/blue – Pink/blue
No. 3: Pink/white – Pink/white
No. 4: Pink/black – Pink/black



Is there continuity?

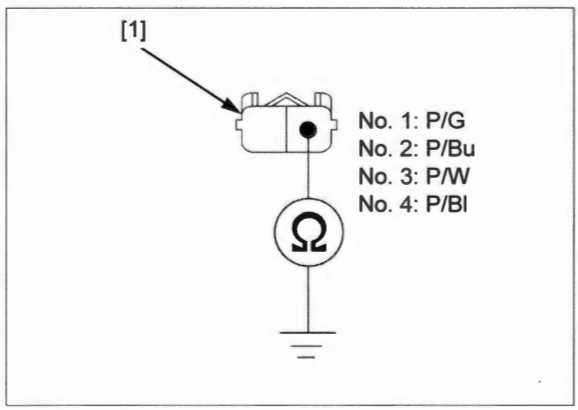
YES – GO TO STEP 5.

NO – • Open circuit in Pink/green wire
• Open circuit in Pink/blue wire
• Open circuit in Pink/white wire
• Open circuit in Pink/black wire

5. Fuel Injector Signal Line Short Circuit Inspection

Check for continuity between the wire harness side fuel injector 2P (Black) connectors [1] terminal and ground.

CONNECTION:
No. 1: Pink/green – Ground
No. 2: Pink/blue – Ground
No. 3: Pink/white – Ground
No. 4: Pink/black – Ground



Is there continuity?

YES – • Short circuit in Pink/green wire
• Short circuit in Pink/blue wire
• Short circuit in Pink/white wire
• Short circuit in Pink/black wire

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

DTC 21-1 (O_2 SENSOR LOW VOLTAGE)

1. Recheck DTC

Erase the DTC (page 4-8).
Start the engine and warm it up until the coolant temperature is 80°C (176°F).
Stop the engine.
Check the O_2 sensor with the MCS.

Is the DTC 21-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. O_2 Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the following:
- O_2 sensor 4P (Black) connector (page 2-18)
- ECM 33P (Black)/33P (Gray) connectors (page 4-42)

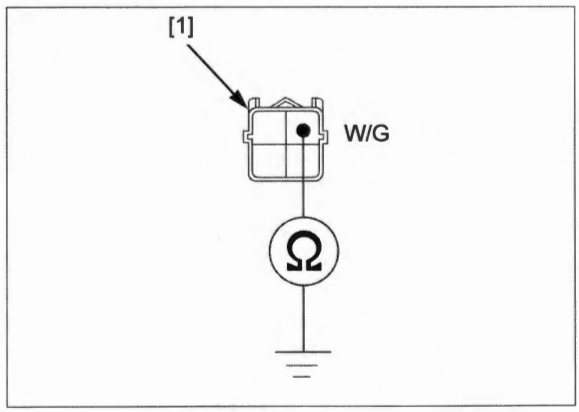
Check the continuity between the wire harness side O_2 sensor 4P (Black) connector [1] terminal and ground.

CONNECTION: White/green – Ground

Is there continuity?

YES – Short circuit in White/green wire

NO – GO TO STEP 3.



3. O_2 Sensor Inspection

Replace the O_2 sensor with a known good one (page 4-45).
Connect the ECM 33P connectors.
Erase the DTC (page 4-8).
Start the engine and warm it up until the coolant temperature is 80°C (176°F).
Stop the engine.
Check the O_2 sensor with the MCS.

Is the DTC 21-1 indicated?

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

NO – Faulty original O_2 sensor

DTC 21-2 (O_2 SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the O_2 sensor 4P (Black), ECM 33P (Black) and 33P (Gray) connectors, and recheck the DTC.

1. Recheck DTC

Erase the DTC (page 4-8).
Start the engine and warm it up until the coolant temperature is 80°C (176°F).
Stop the engine.
Check the O_2 sensor with the MCS.

Is the DTC 21-2 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. O_2 Sensor Line Open Circuit Inspection

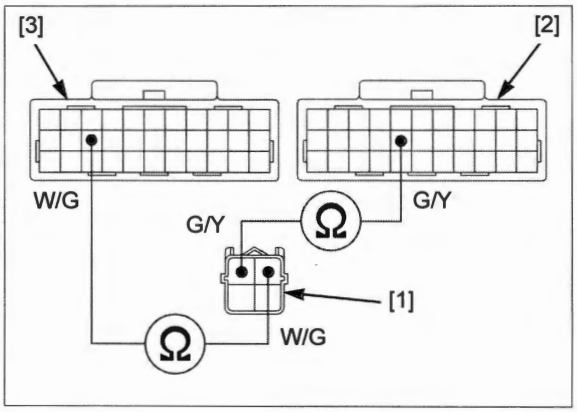
Turn the ignition switch OFF.

Disconnect the following:
- O_2 sensor 4P (Black) connector (page 2-18)
- ECM 33P (Black)/33P (Gray) connectors (page 4-42)

Check for continuity between the wire harness side O_2 sensor 4P (Black) connector [1] and ECM 33P (Black) [2]/33P (Gray) [3] connector terminals.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION:
White/green – White/green
Green/yellow – Green/yellow



Is there continuity?

YES – GO TO STEP 3.

NO – Open circuit in White/green or Green/yellow wire

3. O_2 Sensor Inspection

Replace the O_2 sensor with a known good one (page 4-45).
Connect the ECM 33P connectors.
Erase the DTC (page 4-8).
Start the engine and warm it up until the coolant temperature is 80°C (176°F).
Stop the engine.
Check the O_2 sensor with the MCS.

Is the DTC 21-2 indicated?

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

NO – Faulty original O_2 sensor

DTC 23-1 (O_2 SENSOR HEATER)

- Before starting the inspection, check for loose or poor contact on the O_2 sensor 4P (Black) and ECM 33P (Gray) connectors, and recheck the DTC.

1. Recheck DTC

Erase the DTC (page 4-8).
Start the engine and check the O_2 sensor heater with the MCS.

Is DTC 23-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. O_2 Sensor Heater Resistance Inspection

Turn the ignition switch OFF.
Disconnect the O_2 sensor 4P (Black) connector (page 2-18).
Measure the resistance between the sensor side O_2 sensor 4P (Black) connector [1] terminals.

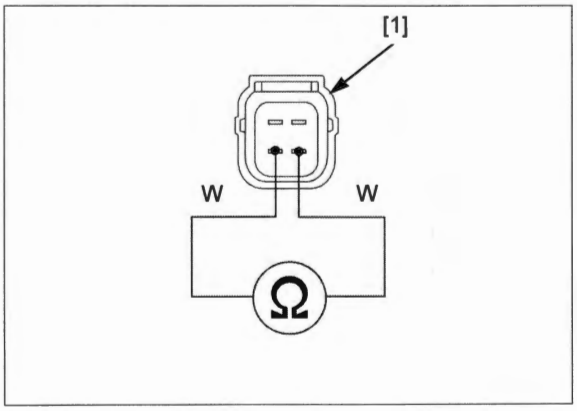
CONNECTION: White – White

STANDARD: 10 – 40 Ω (20°C/68°F)

Is the resistance within standard value?

YES – GO TO STEP 3.

NO – Faulty O_2 sensor



3. O_2 Sensor Heater Input Voltage Inspection

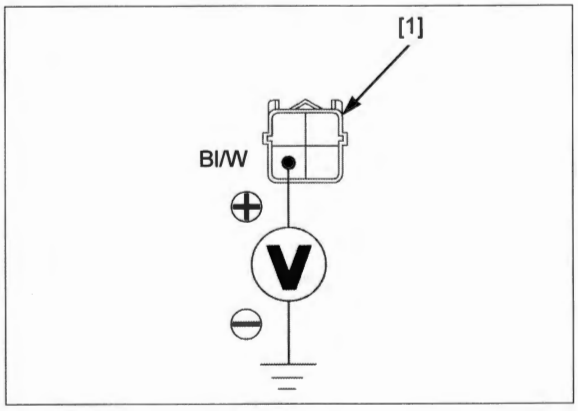
Turn the ignition switch ON with the engine stop switch "○".
Measure the voltage between the wire harness side O_2 sensor 4P (Black) connector [1] and ground.

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

Is there battery voltage?

YES – GO TO STEP 4.

NO – Open circuit in Black/white wire



4. O_2 Sensor Heater Line Open Circuit Inspection

Disconnect the ECM 33P (Gray) connector (page 4-42).
Check the continuity between the wire harness side O_2 sensor 4P (Black) connector [1] and ECM 33P (Gray) connector [2] terminals.

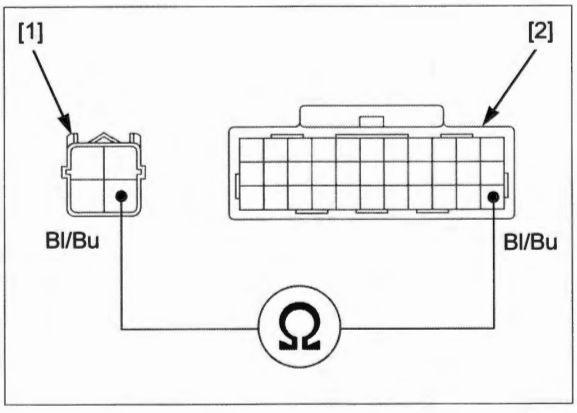
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: Black/blue – Black/blue

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Black/blue wire



5. O_2 Sensor Heater Line Short Circuit Inspection

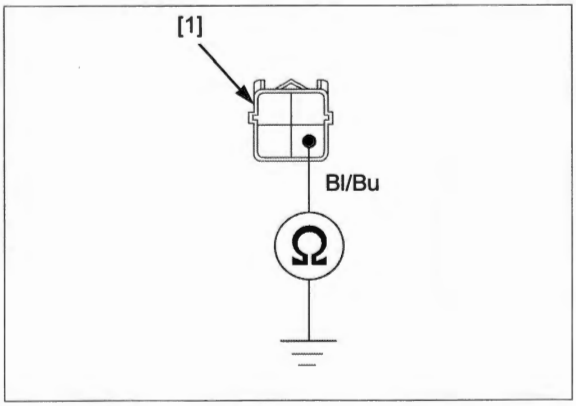
Check the continuity between the wire harness side O_2 sensor 4P (Black) connector [1] terminal and ground.

CONNECTION: Black/blue – ground

Is there continuity?

YES – Short circuit in Black/blue wire

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



DTC 29-1 (IACV)

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

1. Recheck DTC

Erase the DTC (page 4-8).
Check the IACV with the MCS.

Is the DTC 29-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

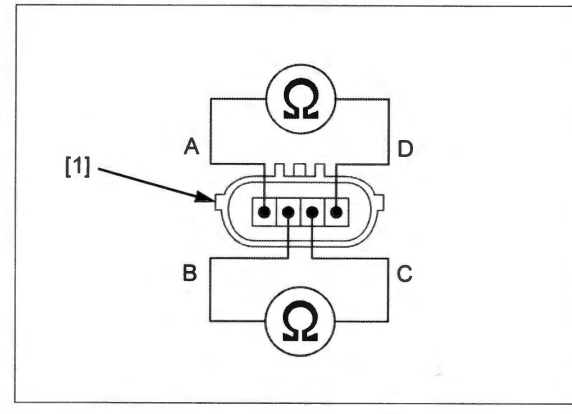
2. IACV Resistance Inspection

Turn the ignition switch OFF.
Lift the fuel tank and support it (page 3-4).
Disconnect the IACV 4P (Black) connector (page 7-19).
Measure the resistance between the 4P connector terminals of the IACV [1].

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: A – D
B – C

STANDARD: 110 – 150 Ω (25°C/77°F)



Is the resistance within standard value?

YES – GO TO STEP 3.

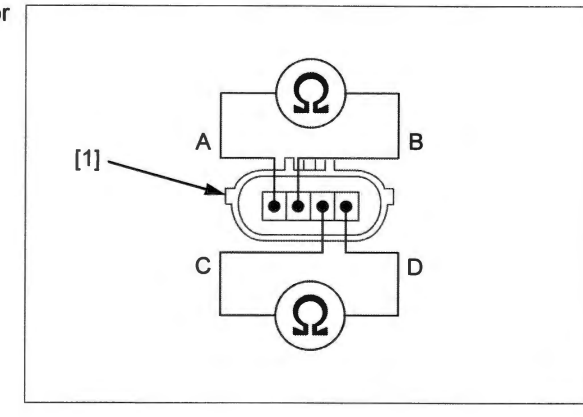
NO – Faulty IACV

3. IACV Internal Short Circuit Inspection

Check for continuity between the 4P connector terminals of the IACV [1].

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: A – B
C – D



Is there continuity?

YES – Faulty IACV

NO – GO TO STEP 4.

4. IACV Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector (page 4-42).
Check for continuity between the wire harness side ECM 33P (Black) connector [1] and IACV 4P (Black) connector [2] terminals.

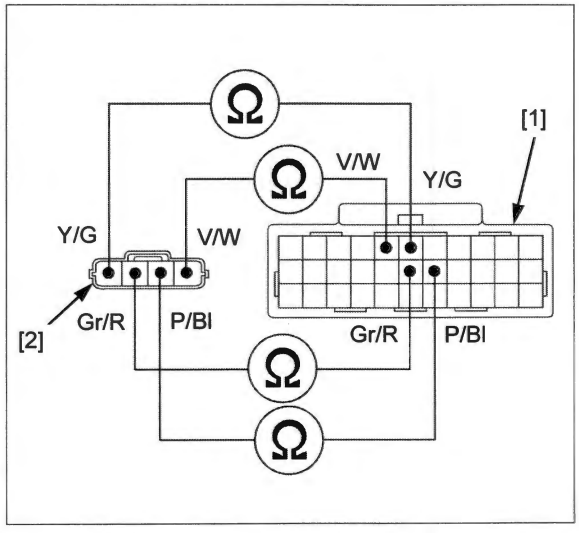
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION:
Yellow/green – Yellow/green
Violet/white – Violet/white
Gray/red – Gray/red
Pink/black – Pink/black

Is there continuity?

YES – GO TO STEP 5.

NO – • Open circuit in Yellow/green or Violet/white wire
• Open circuit in Gray/red or Pink/black wire



5. IACV Line Short Circuit Inspection

Check for continuity between the wire harness side IACV 4P (Black) connector [1] terminals and ground.

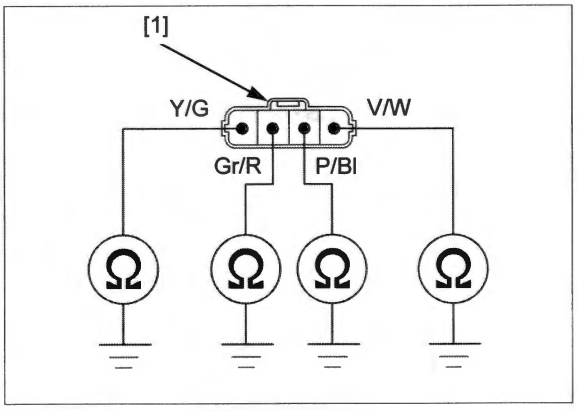
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION:
Yellow/green – Ground
Violet/white – Ground
Gray/red – Ground
Pink/black – Ground

Is there continuity?

YES – • Short circuit in Yellow/green or Violet/white wire
• Short circuit in Gray/red or Pink/black wire

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



DTC 33-2 (EEPROM)

1. Recheck DTC

Erase the DTC (page 4-8).
Recheck the ECM EEPROM with the MCS.

Is the DTC 33-2 indicated?

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

NO – Intermittent failure

DTC 41-1
(GEAR POSITION SWITCH)

1. Gear Position Switch System Inspection

Erase the DTC (page 4-8).
Check the gear position switch with the MCS.

Is the DTC 41-1 indicated?

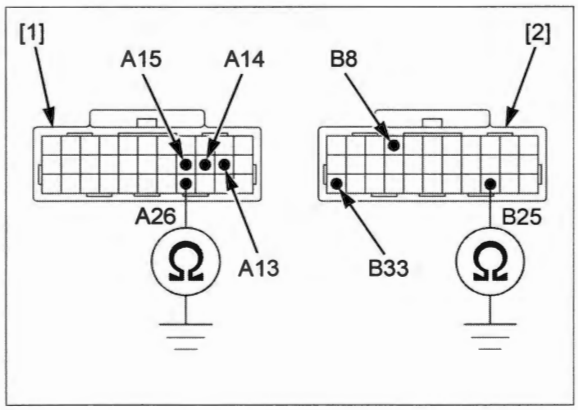
YES – GO TO STEP 2.

NO – Intermittent failure

2. Gear Position Switch Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) [1] and 33P (Gray) connectors [2] (page 4-42).
Check for continuity between the ECM connector terminals at the harness side and ground.
It is normal if there is continuity at each gear position as follows and no continuity at other gear position.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**



CONNECTION:
Neutral: B33 – Ground
1st gear: A13 – Ground
2nd gear: A14 – Ground
3rd gear: A15 – Ground
4th gear: B25 – Ground
5th gear: A26 – Ground
6th gear: B8 – Ground

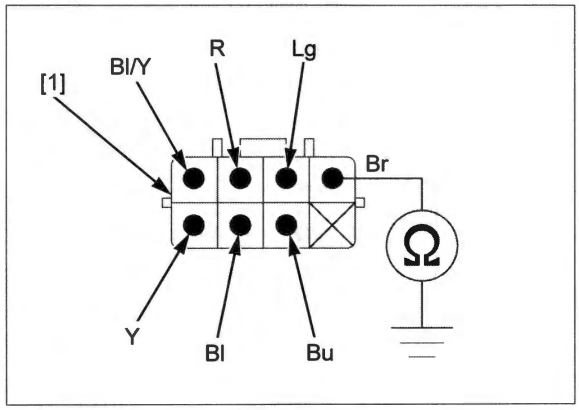
Is continuity normal?

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

NO – GO TO STEP 3.

3. **Gear Position Switch Inspection**

Disconnect the gear position switch 8P (Black) connector (page 4-45).
Check for continuity between the gear position switch 8P (Black) connector [1] terminals at the switch side and ground.
It is normal if there is continuity at each gear position as follows and no continuity at other gear position.



CONNECTION:

Neutral: Lightgreen – Ground
1st gear: Brown – Ground
2nd gear: Red – Ground
3rd gear: Black/yellow – Ground
4th gear: Yellow – Ground
5th gear: Black – Ground
6th gear: Blue – Ground

Is continuity normal?

YES – • Open or short circuit in following wire between the ECM and gear position switch.
– Lightgreen
– Brown
– Gray
– Black/yellow
– Yellow
– Black
– Blue

NO – Replace the gear position switch with a known good one, and recheck.

DTC 54-1 (BANK ANGLE SENSOR LOW VOLTAGE)

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

1. **Bank Angle Sensor System Inspection**

Erase the DTC (page 4-8).
Check the bank angle sensor with the MCS.

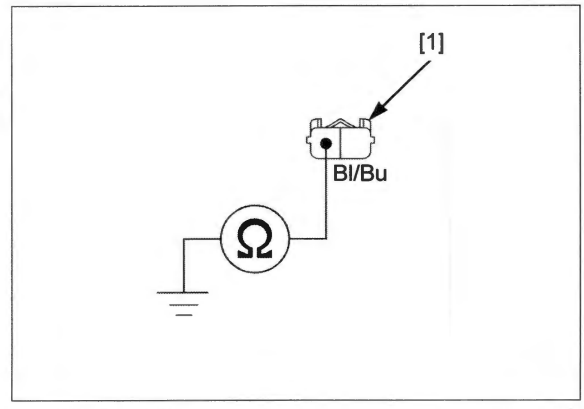
Is about 0 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. **Bank Angle Sensor Signal Line Short Circuit Inspection**

Turn the ignition switch OFF.
Disconnect the bank angle sensor 2P (Black) connector (page 4-46).
Check for continuity between the wire harness side bank angle sensor 2P (Black) connector [1] terminal and ground.



CONNECTION: Black/blue – Ground

Is there continuity?

YES – Short circuit in the Black/blue wire

NO – GO TO STEP 3.

3. **Bank Angle Sensor Signal Line Open Circuit Inspection**

Disconnect the ECM 33P (Gray) connector (page 4-42).
Check for continuity between the wire harness side bank angle sensor 2P (Black) connector [1] and ECM 33P (Gray) connector [2] terminals.

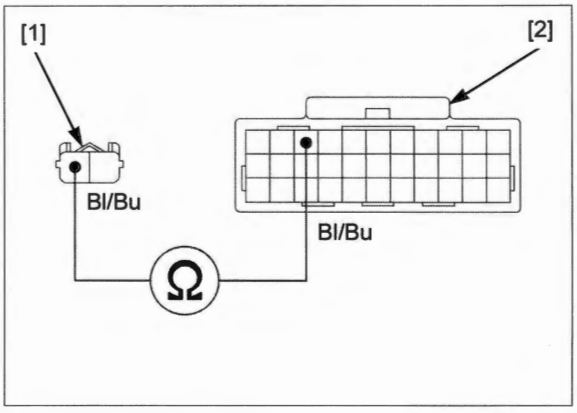
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: Black/blue – Black/blue

Is there continuity?

YES – GO TO STEP 4.

NO – Open circuit in the Black/blue wire



4. **Bank Angle Sensor Input Voltage Inspection**

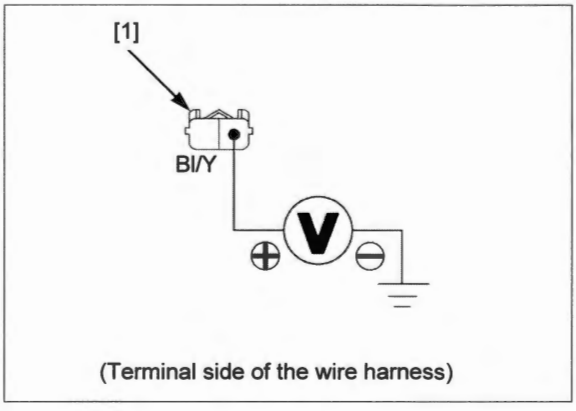
Temporarily install the ECM to the wire harness by connecting the 33P (Gray) connector.
Turn the ignition switch ON with the engine stop switch "○".
Measure the voltage between the wire harness side bank angle sensor 2P (Black) connector [1] terminal and ground.

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

Is there battery voltage?

YES – GO TO STEP 5.

NO – Open circuit in Black/yellow wire



(Terminal side of the wire harness)

5. **Bank Angle Sensor Inspection**

Check the bank angle sensor (page 4-46).

Is the bank angle sensor normal?

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

NO – Faulty bank angle sensor

DTC 54-2 (BANK ANGLE SENSOR HIGH VOLTAGE)

1. **Bank Angle Sensor System Inspection**

Erase the DTC (page 4-8).
Check the bank angle sensor with the MCS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. **Bank Angle Sensor Inspection**

Replace the bank angle sensor with a known good one (page 4-46).
Erase the DTC (page 4-8).
Check the bank angle sensor with the MCS.

Is DTC 54-2 indicated?

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

NO – Faulty original bank angle sensor

DTC 66-1 (REAR WHEEL SPEED SENSOR SIGNAL)

1. **DTC Recheck**

   Erase the DTC (page 4-8).
   Test-ride the motorcycle above 20 km/h (12 mph) for more than 20 seconds.
   Stop the engine.
   Check the DTC with the MCS.

   Is DTC 66-1 indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure.

2. **ABS DTC Check**

   Check the ABS DTC (page 19-5).

   Does the ABS modulator have any DTC?

   YES – Follow the ABS DTC index (page 19-9).

   NO – GO TO STEP 3.

3. **Rear Wheel Speed Sensor Signal Output Line Open Circuit Inspection**

   Turn the ignition switch OFF.

   Disconnect the following:
   - ABS modulator 18P (Black) connector (page 19-25)
   - ECM 33P (Gray) connector (page 4-42)

   Check for continuity between the wire harness side ABS modulator 18P (Black) connector [1] and ECM 33P (Gray) connector [2].

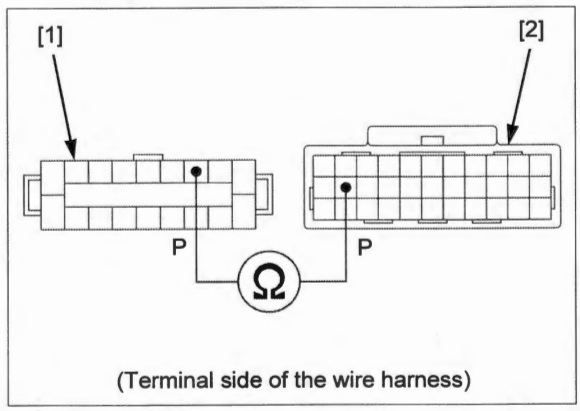
   TOOL:
   Test probe, 2 pack **07ZAJ-RDJA110**

   CONNECTION: Pink – Pink

   Is there continuity?

   YES – GO TO STEP 4.

   NO – Open circuit in the Pink wire



(Terminal side of the wire harness)

4. **Rear Wheel Speed Sensor Signal Output Line Short Circuit Inspection**

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

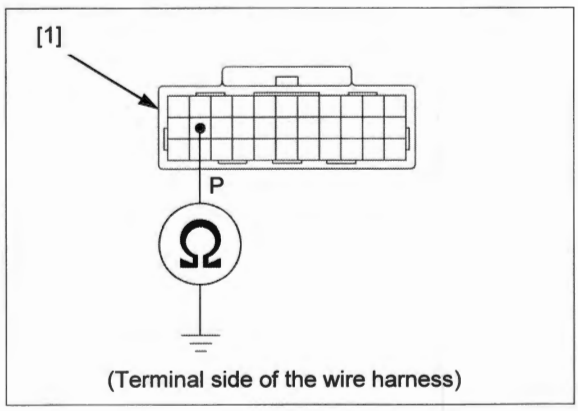
   TOOL:
   Test probe, 2 pack **07ZAJ-RDJA110**

   CONNECTION: Pink – Ground

   Is there continuity?

   YES – Short circuit in the Pink wire

   NO – GO TO STEP 5.



(Terminal side of the wire harness)

5. ECM Inspection

Replace the ECM with a known good one (page 4-42).
Connect the ABS modulator 18P (Black) connector.
Erase the DTC (page 19-25).
Test-ride the motorcycle above 20 km/h (12 mph) for more than 20 seconds.
Stop the engine.
Check the DTC with the MCS.

Is DTC 66-1 indicated?

YES – Replace the ABS modulator with a known good one and recheck (page 19-25).

NO – Faulty original ECM.

DTC 67-1 (FRONT WHEEL SPEED SENSOR SIGNAL)

1. DTC Recheck

Erase the DTC (page 4-8).
Test-ride the motorcycle above 20 km/h (12 mph) for more than 30 seconds.
Stop the engine.
Check the DTC with the MCS.

Is DTC 67-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure.

2. ABS DTC Check

Check the ABS DTC (page 19-5).

Does the ABS modulator have any DTC?

YES – Follow the ABS DTC index (page 19-9).

NO – GO TO STEP 3.

3. Front Wheel Speed Sensor Signal Output Line Open Circuit Inspection

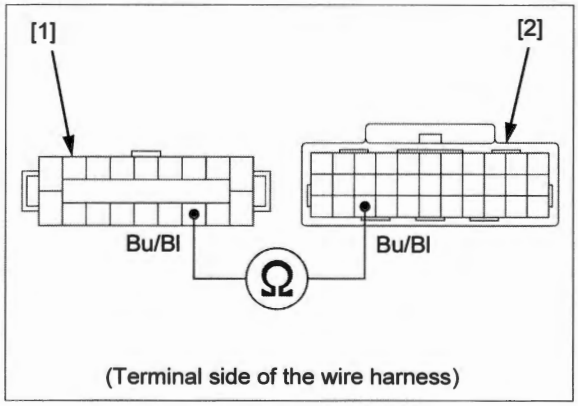
Turn the ignition switch OFF.

Disconnect the following:
- ABS modulator 18P (Black) connector (page 19-25)
- ECM 33P (Gray) connector (page 4-42)

Check for continuity between the wire harness side ABS modulator 18P (Black) connector [1] and ECM 33P (Gray) connector [2].

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: Blue/black – Blue/black



(Terminal side of the wire harness)

Is there continuity?

YES – GO TO STEP 4.

NO – Open circuit in the Pink/yellow wire

4. **Front Wheel Speed Sensor Signal Output Line Short Circuit Inspection**

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

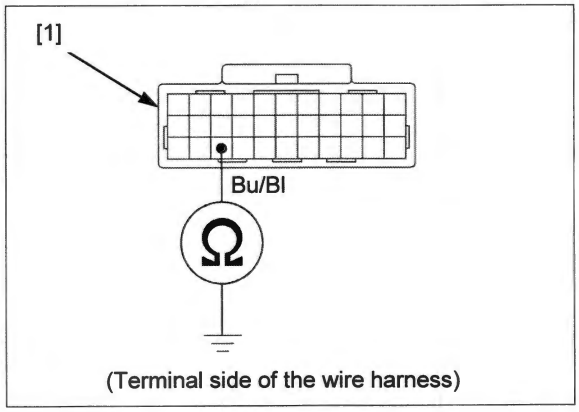
   TOOL:
   Test probe, 2 pack **07ZAJ-RDJA110**

   CONNECTION: Blue/black – Ground

   Is there continuity?

   YES – Short circuit in the Blue/black wire

   NO – GO TO STEP 5.



(Terminal side of the wire harness)

5. **ECM Inspection**

   Replace the ECM with a known good one (page 4-42).
   Connect the ABS modulator 18P (Black) connector.
   Erase the DTC (page 4-8).
   Test-ride the motorcycle above 20 km/h (12 mph) for more than 30 seconds.
   Stop the engine.
   Check the DTC with the MCS.

   Is DTC 67-1 indicated?

   YES – Replace the ABS modulator with a known good one and recheck (page 19-25).

   NO – Faulty original ECM.

DTC 86-1 (SERIAL COMMUNICATION)

NOTE:

- Before starting the inspection, check the following connectors for loose or poor contact.
  – Front sub harness 12P (Black) (CBR650R/RA)
  – ECM 33P (Gray)
  – Combination meter 20P (Gray)

1. **Recheck DTC**

   Erase the DTC (page 4-8).
   Check the serial communication with the MCS.

   Is DTC 86-1 indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. Combination Meter Serial Line Output Voltage Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P (Gray) connector (page 4-42).

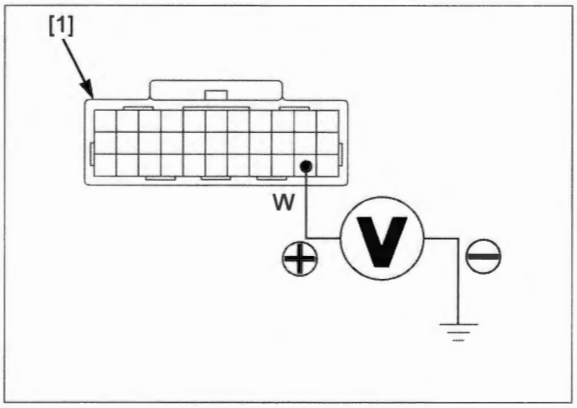
Turn the ignition switch ON while pushing and holding combination meter SEL button [1] and SET button [2] over 10 seconds.

NOTE:

The combination meter enters the communication diagnostic mode.

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

CONNECTION: White (+) – Ground (–)
STANDARD: 8 V or more (Every 5 seconds)



TOOL:
Test probe, 2 pack 07ZAJ-RDJA110

Does the standard voltage exist?

YES – GO TO STEP 3.

NO – Inspect the combination meter (page 21-7).

3. ECM Serial Line Output Voltage Inspection

Turn the ignition switch OFF.

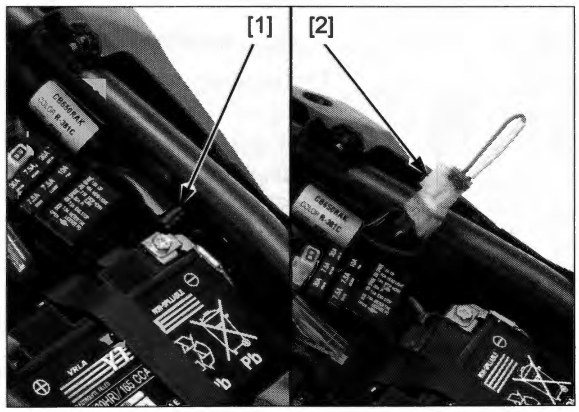
Disconnect the combination meter 20P (Gray) connector (page 21-7).

Connect the ECM 33P (Gray) connector (page 4-42).

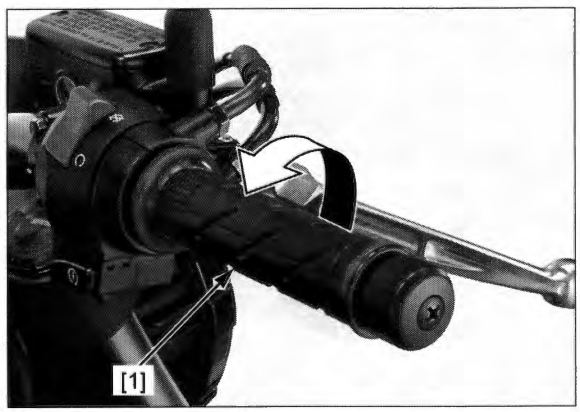
Remove the dummy connector [1] from the DLC. Short the DLC terminals using the special tool.

CONNECTION: Brown – Green/white

TOOL:
[2] SCS service connector 070PZ-ZY30100



Rotate and hold the throttle grip [1] to the fully open position.
Turn the ignition switch ON while holding the throttle grip at the fully open position over 10 seconds.



NOTE:
The ECM enters the communication diagnostic mode.

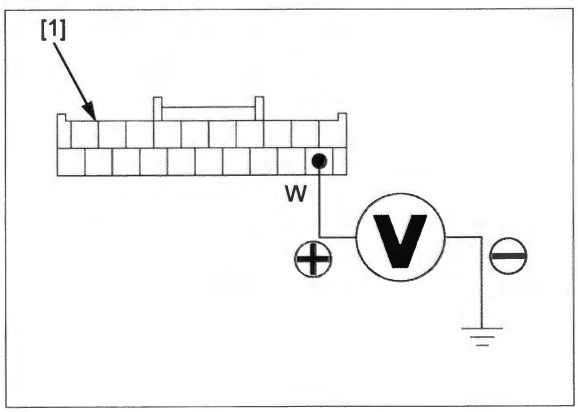
Measure the voltage at the combination meter 20P (Gray) connector [1] of the wire harness side and ground.

CONNECTION: White (+) – Ground (–)
STANDARD: 8 V or more (Every 5 seconds)

Does the standard voltage exist?

YES – Inspect the combination meter (page 21-7).

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



DTC 88-1 (EVAP PURGE CONTROL SOLENOID VALVE)

NOTE:

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

1. **EVAP Purge Control Solenoid Valve System Inspection**

   Erase the DTCs (page 4-8).

   Start the engine and check the EVAP purge control solenoid valve with the MCS.

   Is the DTC 88-1 indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. **EVAP Purge Control Solenoid Valve Input Voltage Inspection**

   Turn the ignition switch OFF.

   Disconnect the EVAP purge control solenoid valve 2P (Black) connector [1] (page 7-23).

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

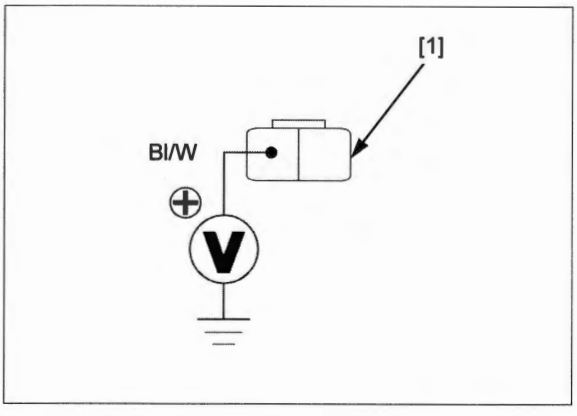
   Measure the voltage between the EVAP purge control solenoid valve 2P (Black) connector of the wire harness side and ground.

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

   Does the battery voltage exist?

   YES – GO TO STEP 3.

   NO – Open circuit in Black/white wire



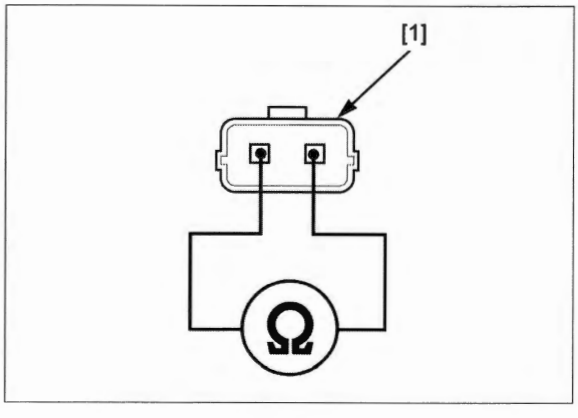
3. **EVAP Purge Control Solenoid Valve Resistance Inspection**

   Turn the ignition switch OFF.
   Measure the resistance at the EVAP purge control solenoid valve side of the EVAP purge control solenoid valve 2P (Black) connector [1] terminals.

   Is the resistance within 30 – 34 Ω (20°C/68°F)?

   YES – GO TO STEP 4.

   NO – Faulty EVAP purge control solenoid valve



4. **EVAP Purge Control Solenoid Valve Signal Line Open Circuit Inspection**

Disconnect the ECM 33P (Black) connector (page 4-42).
Check the continuity between the EVAP purge control solenoid valve 2P (Black) connector [1] and ECM 33P (Black) connector [2] of the wire harness side.

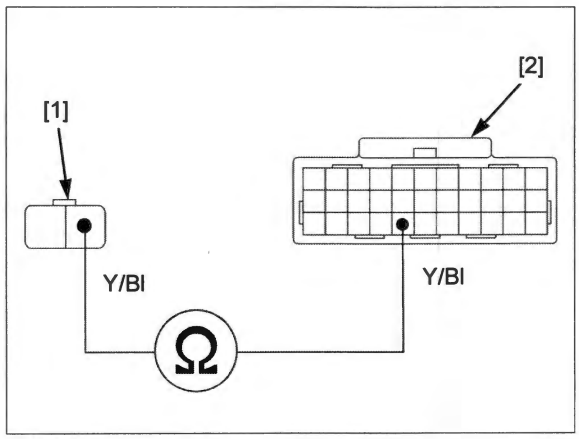
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: Yellow/black – Yellow/black

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Yellow/black wire



5. **EVAP Purge Control Solenoid Valve Signal Line Short Circuit Inspection**

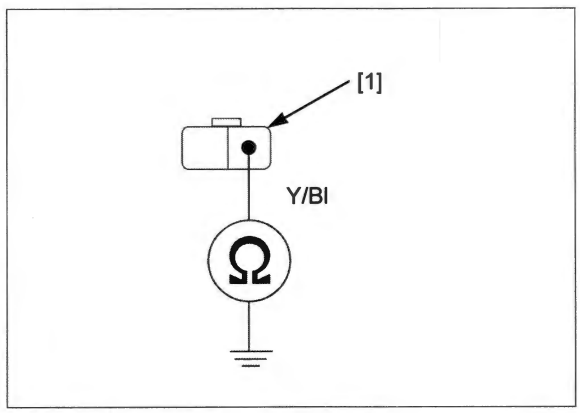
Check for continuity between the EVAP purge control solenoid valve 2P (Black) connector [1] and ground with the ECM 33P (Black) connector disconnected.

CONNECTION: Yellow/black – Ground

Is there continuity?

YES – Short circuit in Yellow/black wire

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



DTC 89-1 (PAIR CONTROL SOLENOID VALVE)

NOTE:

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

1. **PAIR Control Solenoid Valve System Inspection**

Erase the DTCs (page 4-8).

Start the engine and check the PAIR control solenoid valve with the MCS.

Is the DTC 89-1 indicated?

YES – GO TO STEP 2.

NO – Intermittent failure

2. PAIR Control Solenoid Valve Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the PAIR control solenoid valve 2P (Black) connector (page 7-20).

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

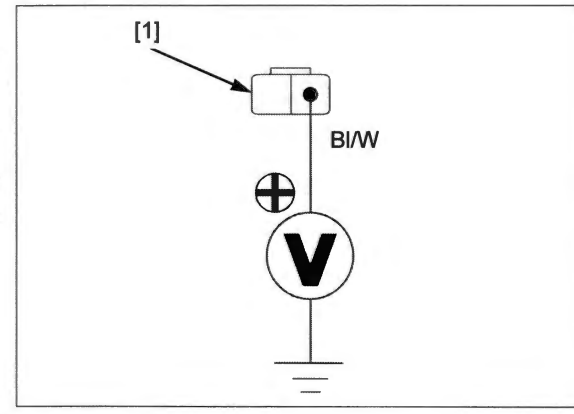
Measure the voltage between the PAIR control solenoid valve 2P (Black) connector [1] of the wire harness side and ground.

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

Does the battery voltage exist?

YES – GO TO STEP 3.

NO – Open circuit in Black/white wire



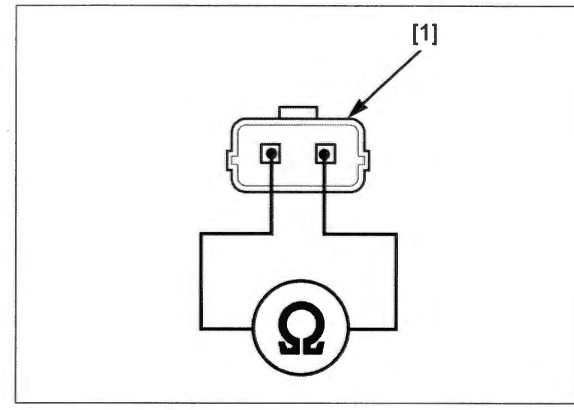
3. PAIR Control Solenoid Valve Resistance Inspection

Turn the ignition switch OFF.
Measure the resistance at the PAIR control solenoid valve side of the PAIR control solenoid valve 2P (Black) connector [1] terminals.

Is the resistance within 23 – 27 Ω (20°C/68°F)?

YES – GO TO STEP 4.

NO – Faulty PAIR control solenoid valve



4. PAIR Control Solenoid Valve Signal Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector (page 4-42).
Check the continuity between the PAIR control solenoid valve 2P (Black) connector [1] and ECM 33P (Black) connector [2] of the wire harness side.

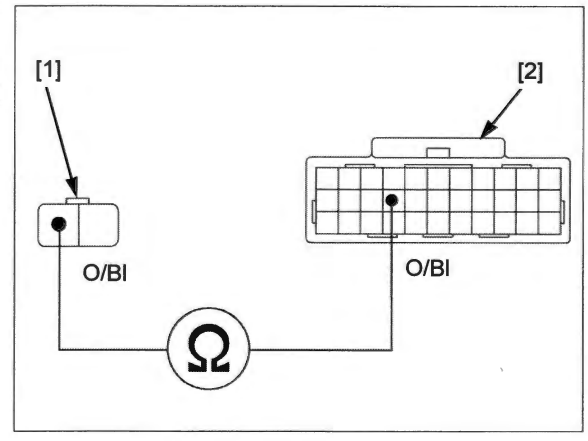
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: Orange/black – Orange/black

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in Orange/black wire



5. **PAIR Control Solenoid Valve Signal Line Short Circuit Inspection**

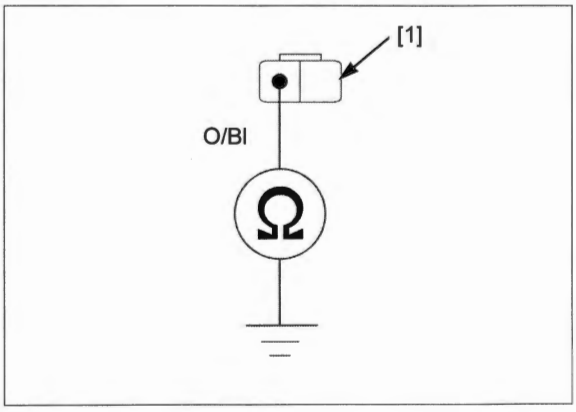
   Check for continuity between the PAIR control solenoid valve 2P (Black) connector [1] and ground with the ECM 33P (Black) connector disconnected.

   CONNECTION: Orange/black – Ground

   Is there continuity?

   YES – Short circuit in Orange/black wire

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



DTC 91-1 (No.1 IGNITION COIL PRIMARY CIRCUIT)/ DTC 92-1 (No.2 IGNITION COIL PRIMARY CIRCUIT)

NOTE:

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

1. **Ignition Coil Primary Circuit System Inspection**

   Erase the DTCs (page 4-8).

   Start the engine and check the ignition coil primary circuit with the MCS.

   Is the DTC 91-1 or 92-1 indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure

2. **Ignition Coil Primary Circuit Input Voltage Inspection**

   Turn the ignition switch OFF.

   Disconnect the ignition coil wire connector (page 5-8).

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

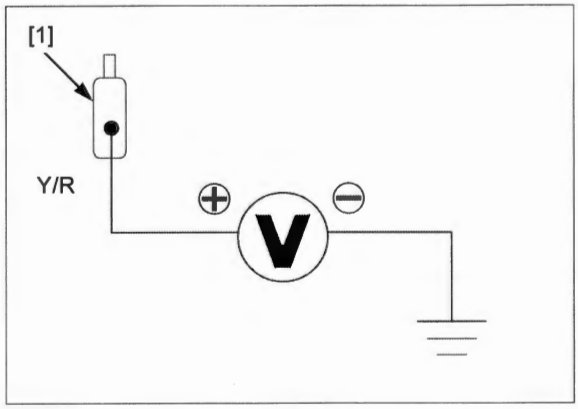
   Measure the voltage between the ignition coil wire connector [1] of the wire harness side and ground.

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

   Does the battery voltage exist?

   YES – GO TO STEP 3.

   NO – Open circuit in Yellow/red wire



3. Ignition Coil Primary Circuit Signal Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector (page 4-42).
Check the continuity between the ignition coil wire connector [1] and ECM 33P (Black) connector [2] of the wire harness side.

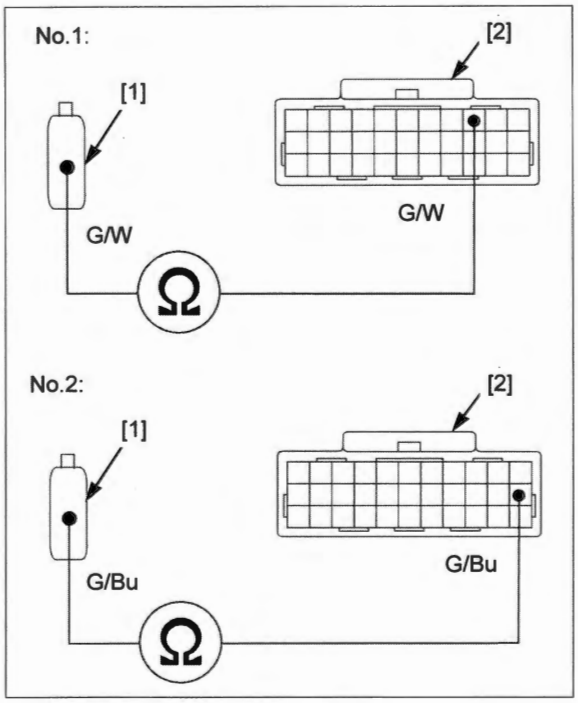
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION:
No. 1: Green/white – Green/white
No. 2: Green/blue – Green/blue

Is there continuity?

YES – GO TO STEP 4.

NO – • Open circuit in Green/white wire
• Open circuit in Green/blue wire



4. Ignition Coil Primary Circuit Signal Line Short Circuit Inspection

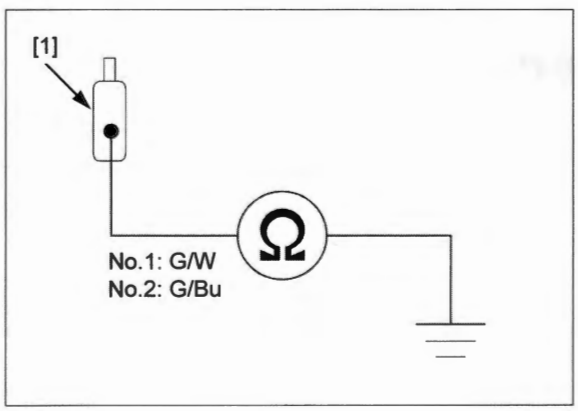
Check for continuity between the ignition coil wire connector [1] and ground with the ECM 33P (Black) connector disconnected.

CONNECTION:
No. 1: Green/white – Ground
No. 2: Green/blue – Ground

Is there continuity?

YES – • Short circuit in Green/white wire
• Short circuit in Green/blue wire

NO – GO TO STEP 5.



5. Ignition Coil Primary Peak Voltage Inspection

Connect the ECM 33P (Black) connector and ignition coil primary connectors.
Inspect the ignition coil primary peak voltage (page 5-5).

Is the peak voltage normal?

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

NO – GO TO STEP 6.

6. Ignition Coil Inspection

Replace the ignition coil with a known good one (page 5-8).
Erase the DTCs (page 4-8).
Check the ignition coil with the MCS.

Is DTC 91-1 or 92-1 indicated?

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

NO – Faulty original ignition coil

MIL CIRCUIT TROUBLESHOOTING

Check that the MIL [1] comes on for 2 seconds and goes off when the ignition switch is turned ON with the engine stop switch "○".

NOTE:

- If the MIL and digital display do not function at all, refer to combination meter initial operation check (page 21-7).

If the engine stop switch is in "⊗", the MIL will stay on even when the system is normal.

If the MIL stays on and the other indications function normally, check the combination meter indication when the serial communication line is abnormal (page 21-8).

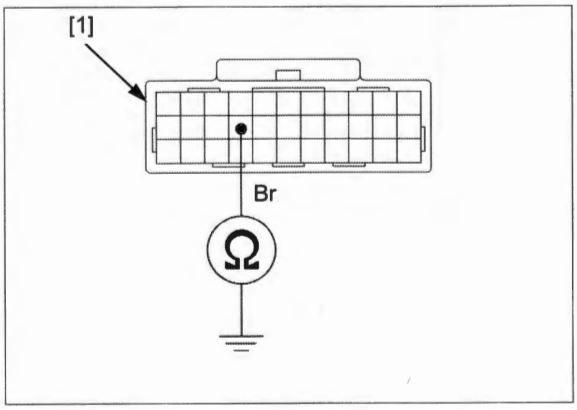
If the indication is not according to above condition, check as follows.

Turn the ignition switch OFF.
Disconnect the ECM 33P (Gray) connector (page 4-42).
Check for continuity between the wire harness side ECM 33P (Gray) connector [1] terminal and ground.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: Brown – Ground

If there is continuity, check for short circuit in the Brown wire between the DLC and ECM.
If there is no continuity, replace the ECM with a known good one, and recheck.



ECM

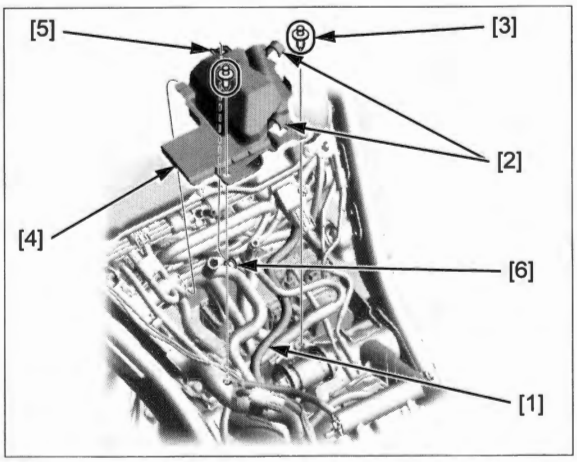
REMOVAL/ INSTALLATION

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

Release the radiator siphon hose [1] from the wire guides [2].

Remove the two clips [3].

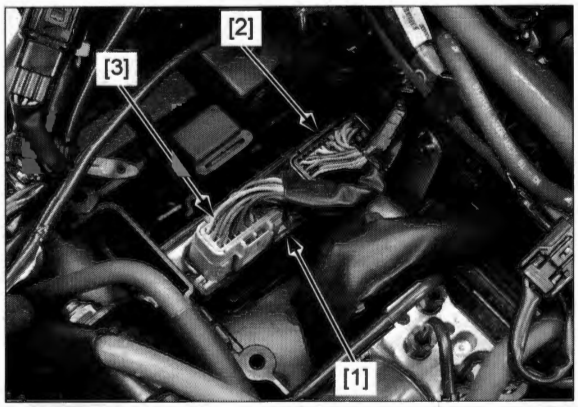
Remove the ABS modulator cover [4] by releasing the slot [5] from the tab [6] of the ABS modulator tray.



Turn the ignition switch OFF.

Pull out the ECM [1] from the ABS modulator tray, then disconnect the ECM 33P (Black) [2] and 33P (Gray) [3] connectors.

Installation is in the reverse order of removal.



POWER/GROUND LINE INSPECTION

POWER INPUT LINE

Disconnect the ECM 33P (Black) connector (page 4-42).

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

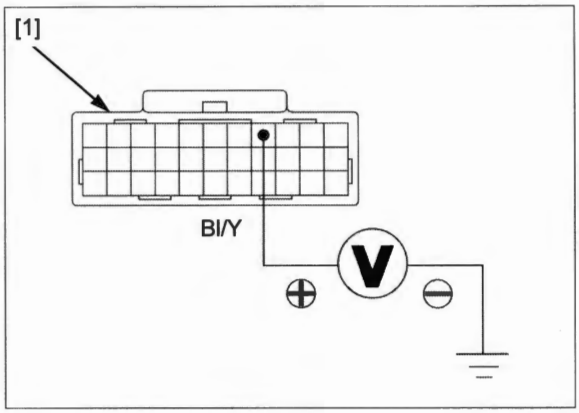
TOOL:
Test probe, 2 pack 07ZAJ-RDJA110

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

There should be battery voltage with the ignition switch turned ON and engine stop switch "○".

If there is no voltage, check the following:

– Black/yellow wire between the engine stop switch and ECM
– Engine stop switch (page 21-17)



GROUND LINE

Disconnect the ECM 33P (Black) and 33P (Gray) connectors (page 4-42).

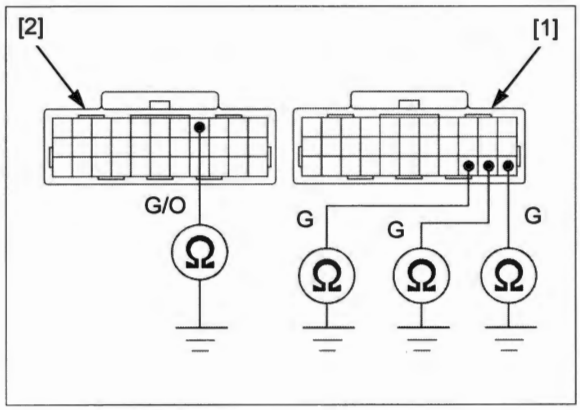
Check for continuity between the wire harness side ECM 33P (Black) [1] and 33P (Gray) [2] connector terminals and ground.

TOOL:
Test probe, 2 pack 07ZAJ-RDJA110

CONNECTION: Green/orange – Ground
Green – Ground

There should be continuity at all times.

If there is no continuity, check for open circuit in the Green/orange or Green wire.



MAP SENSOR

REMOVAL/INSTALLATION

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

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

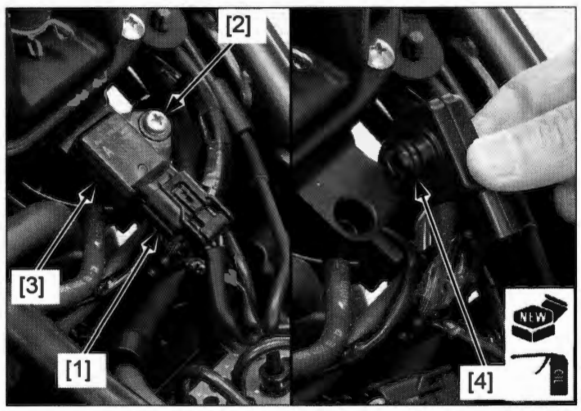
Remove the screw [2] and MAP sensor [3].

Remove the O-ring [4] from the MAP sensor.

Installation is in the reverse order of removal.

- Replace the O-ring with a new one and coat it with the engine oil.

TORQUE:
MAP sensor mounting screw:
3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)



ECT SENSOR

REMOVAL/INSTALLATION

Drain the coolant (page 8-4).

Remove the cam chain tensioner lifter (page 10-22).

Disconnect the ECT sensor 2P (Blue) connector [1].

Remove the ECT sensor [2] and O-ring [3].

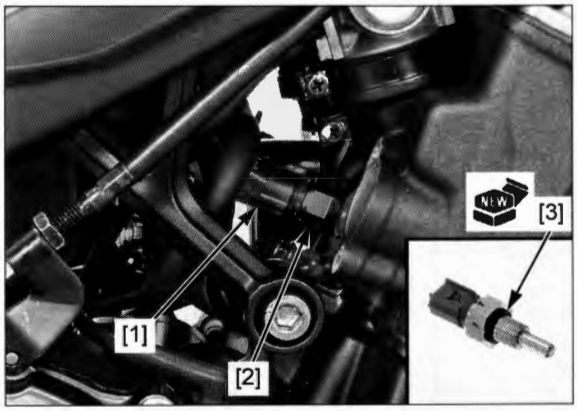
Installation is in the reverse order of removal.

NOTE:

- Replace the O-ring with a new one (do not apply oil).

TORQUE:
ECT sensor: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Fill and bleed the cooling system (page 8-4).



IAT SENSOR

REMOVAL/INSTALLATION

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

Disconnect the IAT sensor 2P (Black) connector [1].

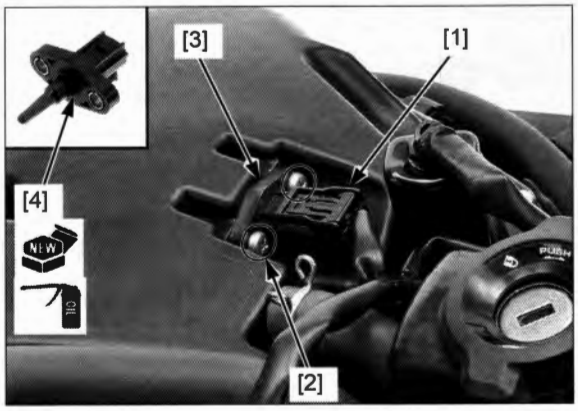
Remove the screws [2] and IAT sensor [3].

Remove the O-ring [4] from the IAT sensor.

Installation is in the reverse order of removal.

- Replace the O-ring with a new one and coat it with the engine oil.

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



VS SENSOR

REMOVAL/INSTALLATION

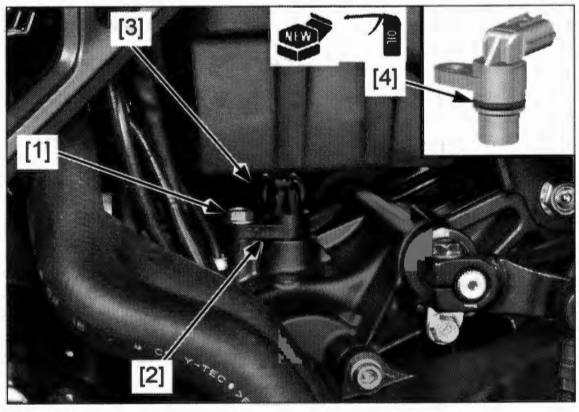
Remove the bolt [1] and VS sensor [2].

Disconnect the VS sensor 3P (Black) connector [3] and remove the O-ring [4] from the VS sensor.

Installation is in the reverse order of removal.

NOTE:

- Replace the O-ring with a new one and coat it with engine oil.
- Install the O-ring into the groove in the VS sensor.



O_2 SENSOR

REMOVAL/INSTALLATION

NOTICE

- *Do not get grease, oil or other materials in the O_2 sensor air hole.*
- *The O_2 sensor may be damaged if dropped. Replace it with a new one, if dropped.*

NOTE:

- Do not service the O_2 sensor while it is hot.
- Do not use an impact wrench while removing or installing the O_2 sensor, or it may be damaged.

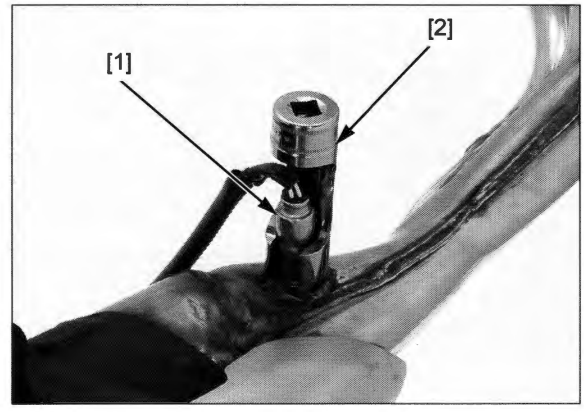
Remove the exhaust pipe/muffler (page 2-17).

Remove the O_2 sensor [1] using the special tool.

TOOL:
[2] FRXM17 (Snap on) or equivalent

Install and tighten the O_2 sensor to the specified torque.

TORQUE: 24.5 N·m (2.5 kgf·m, 18 lbf·ft)



GEAR POSITION SWITCH

REMOVAL/INSTALLATION

Remove the drive sprocket cover (page 2-15).

Disconnect the gear position switch 8P (Black) connector [1] and remove the wire clip [2].

Remove the socket bolt [3] and gear position switch [4].

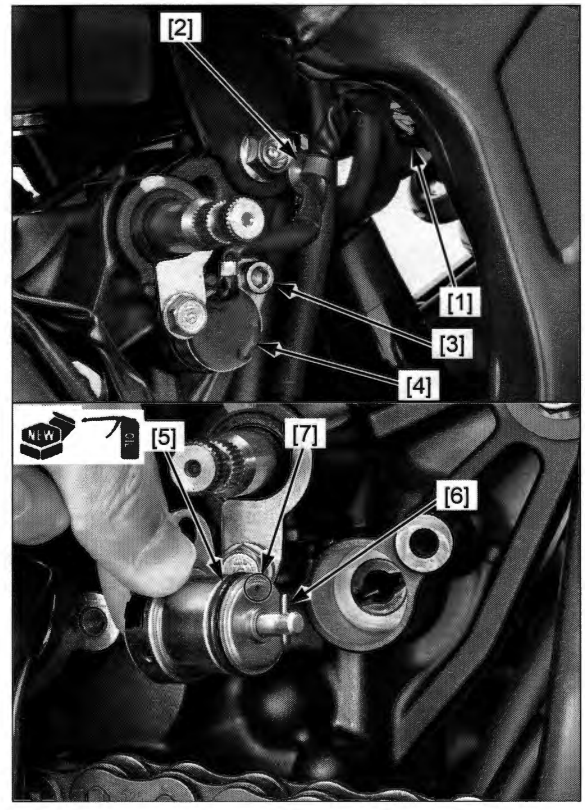
Remove the O-ring [5] from the gear position switch.

Installation is in the reverse order of removal.

NOTE:

- Apply engine oil to a new O-ring.
- Install the switch with the transmission in neutral.
- Align the long side of the pin [6] with the mark [7] before assembling.

TORQUE:
Gear position switch mounting bolt:
7 N·m (0.7 kgf·m, 5 lbf·ft)

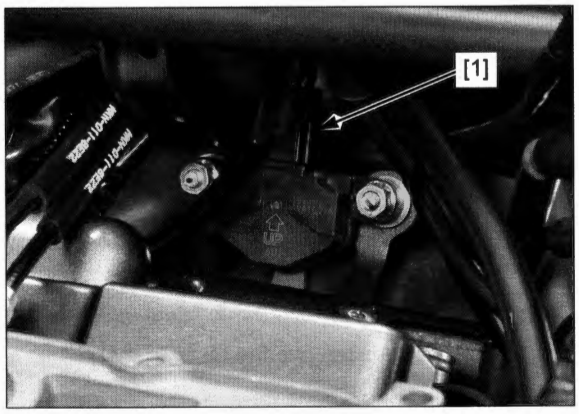


BANK ANGLE SENSOR

REMOVAL/INSTALLATION

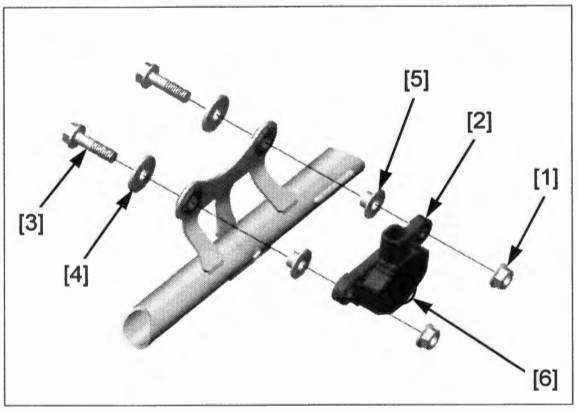
Remove the PAIR control solenoid valve (page 7-21).

Disconnect the bank angle sensor 2P (Black) connector [1].



Remove the following:

- Two nuts [1]
- Bank angle sensor [2]
- Two bolts [3] and washers [4]
- Two collars [5]



Installation is in the reverse order of removal.

NOTE:

- Install the bank angle sensor with the "UP" mark [6] facing up.

TORQUE:

Bank angle sensor nut:
8.5 N·m (0.9 kgf·m, 6.3 lbf·ft)

INSPECTION

SYSTEM INSPECTION WITH MCS

Remove the bank angle sensor without disconnecting its connector (page 4-46).

Connect the MCS to the DLC (page 4-7).

Check the output voltage at each position of the sensor with the MCS.

STANDARD:

Horizontal Position: 7.0 – 8.8 V
Approx. 60°: 0.40 – 0.84 V

FUNCTION CHECK

Remove the bank angle sensor without disconnecting its connector (page 4-46).

Pull out the bank angle sensor from the frame.

Temporarily install the following:

- Air cleaner housing (page 7-13)
- Fuel tank (page 7-8)

Place the bank angle sensor [1] horizontal.

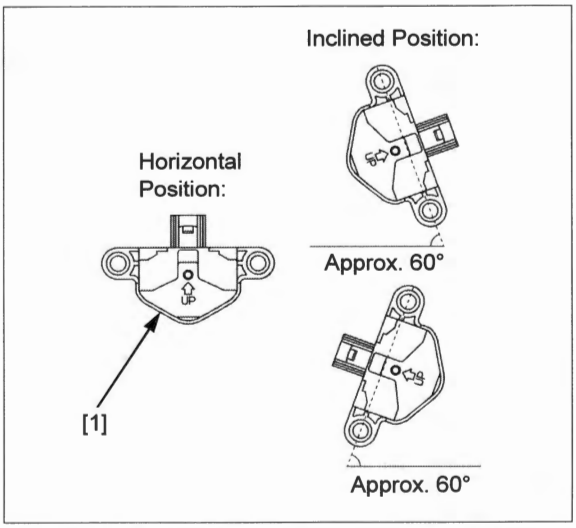
Start the engine.

NOTE:

- Do not crank the engine, when the air cleaner housing is not installed.

Incline the bank angle sensor approximately 60° to the left or right.

The bank angle sensor is normal if the engine stops after a few seconds.



MAIN RELAY

CIRCUIT INSPECTION

For relay inspection (page 21-23).

Remove the main relay (page 21-23).

RELAY COIL POWER INPUT LINE

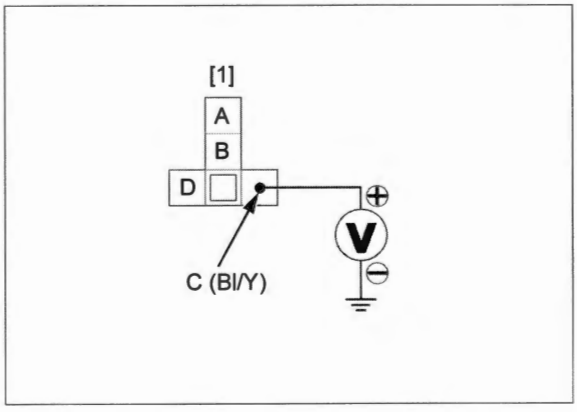
Measure the voltage between the main relay 4P connector [1] terminal and ground.

CONNECTION: C (+) – Ground (–)

There should be battery voltage when the ignition switch is turned ON with the engine stop switch "○".

If there is no voltage, check the following:

- Black/yellow wire between the relay connector and engine stop switch for open circuit
- Engine stop switch (page 21-17)
- White/yellow wire between the engine stop switch and fuse box 1 for open circuit
- ENG STOP (7.5 A) fuse



RELAY SWITCH POWER INPUT LINE

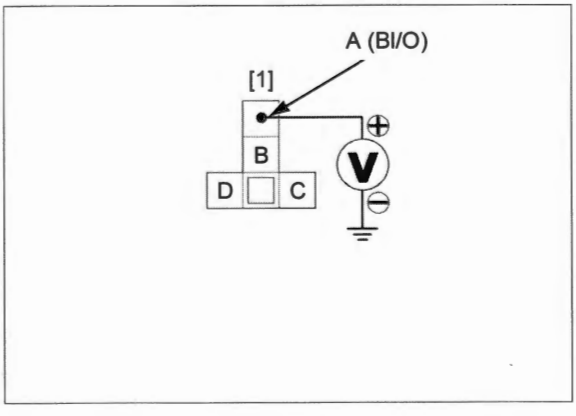
Measure the voltage between the main relay terminal of the relay box [1] and ground.

CONNECTION: A (+) – Ground (–)

There should be battery voltage at all times.

If there is no voltage, check the following:

- Black/orange wire between the main relay and fuse box 1 for open circuit
- FI (20 A) fuse



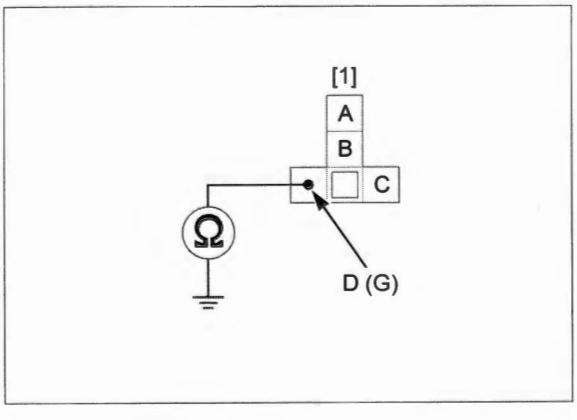
GROUND LINE

Check for continuity between the main relay terminal of the relay box [1] and ground.

CONNECTION: D – Ground

There should be continuity at all times.

If there is no continuity, check for open circuit in the Green wire.



MEMO

5. IGNITION SYSTEM

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

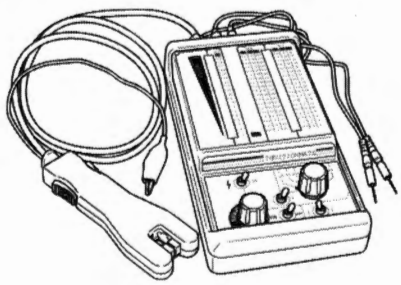
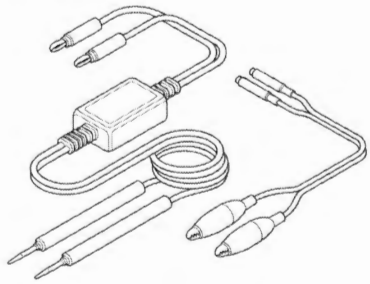
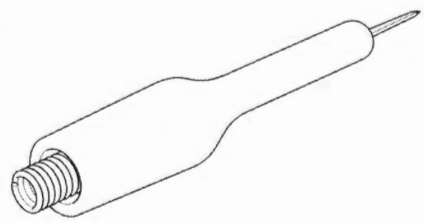
SERVICE INFORMATION

GENERAL

NOTICE

- *The ECM may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.*
- *Use spark plug of the correct heat range. Using a spark plug with an incorrect heat range can damage the engine.*
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned ON and current is present.
- A faulty ignition system is often related to poorly connected or corroded terminals. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- The ignition timing cannot be adjusted since the ECM is factory preset.
- When servicing the ignition system, always follow the steps in the troubleshooting table (page 5-3).
- For following components information, refer to each section.
  - Ignition switch (page 21-15)
  - Engine stop switch (page 21-17)
  - Main relay (page 21-23)
  - Bank angle sensor (page 4-46)
  - Sidestand switch (page 21-18)
  - Gear position switch (page 4-45)
  - Clutch switch (page 21-18)
  - Neutral diode (page 6-9)
  - Clutch diode (page 6-9)

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 probe, 2 pack 07ZAJ-RDJA110 

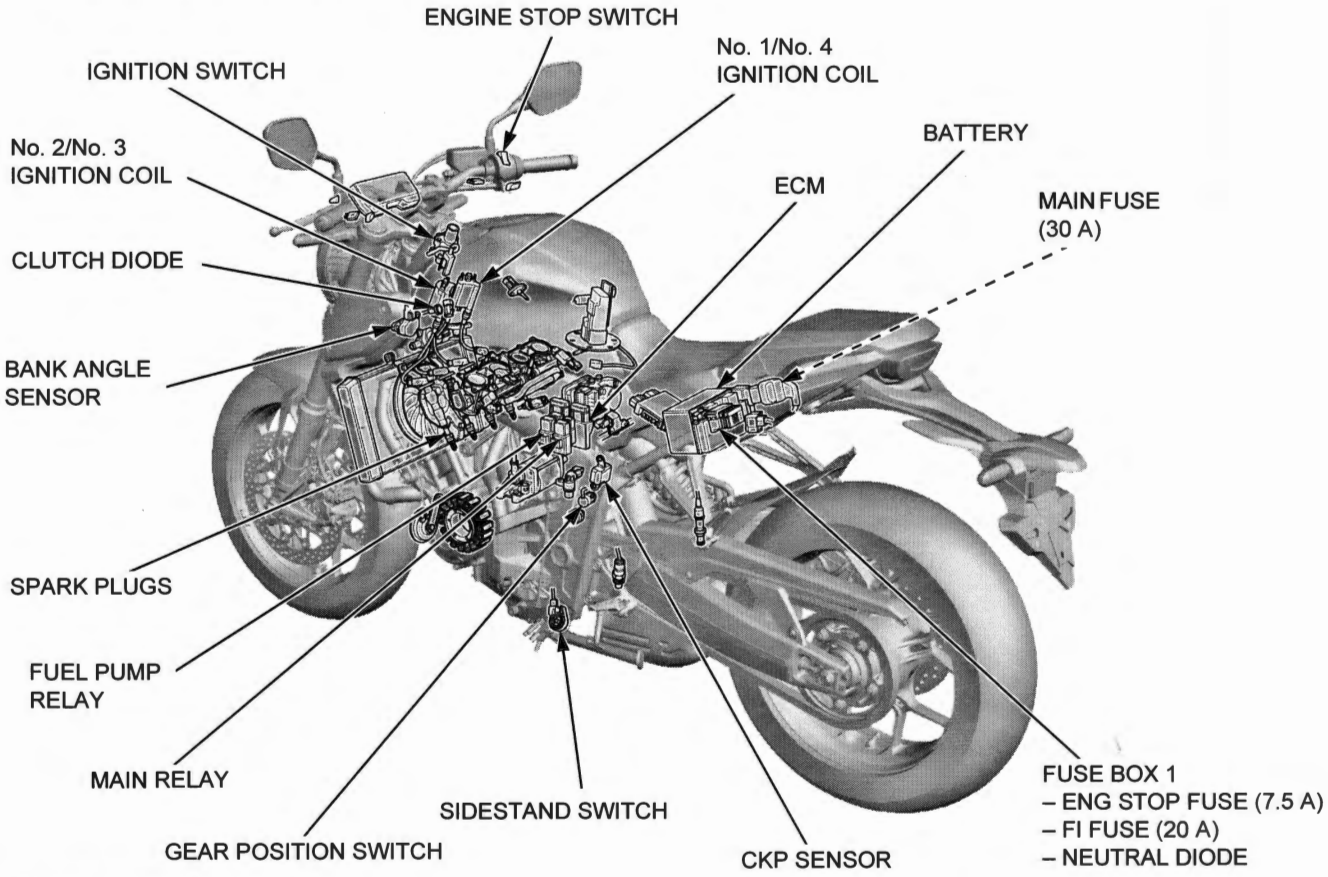
TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water got into the spark plug cap (Leaking the ignition coil secondary current)
- If there is no spark at cylinder, temporarily exchange the ignition coil with a known good one and perform the spark test. If there is spark, the original ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned ON and engine stop switch turned "○" (The engine is not cranked by the starter motor).

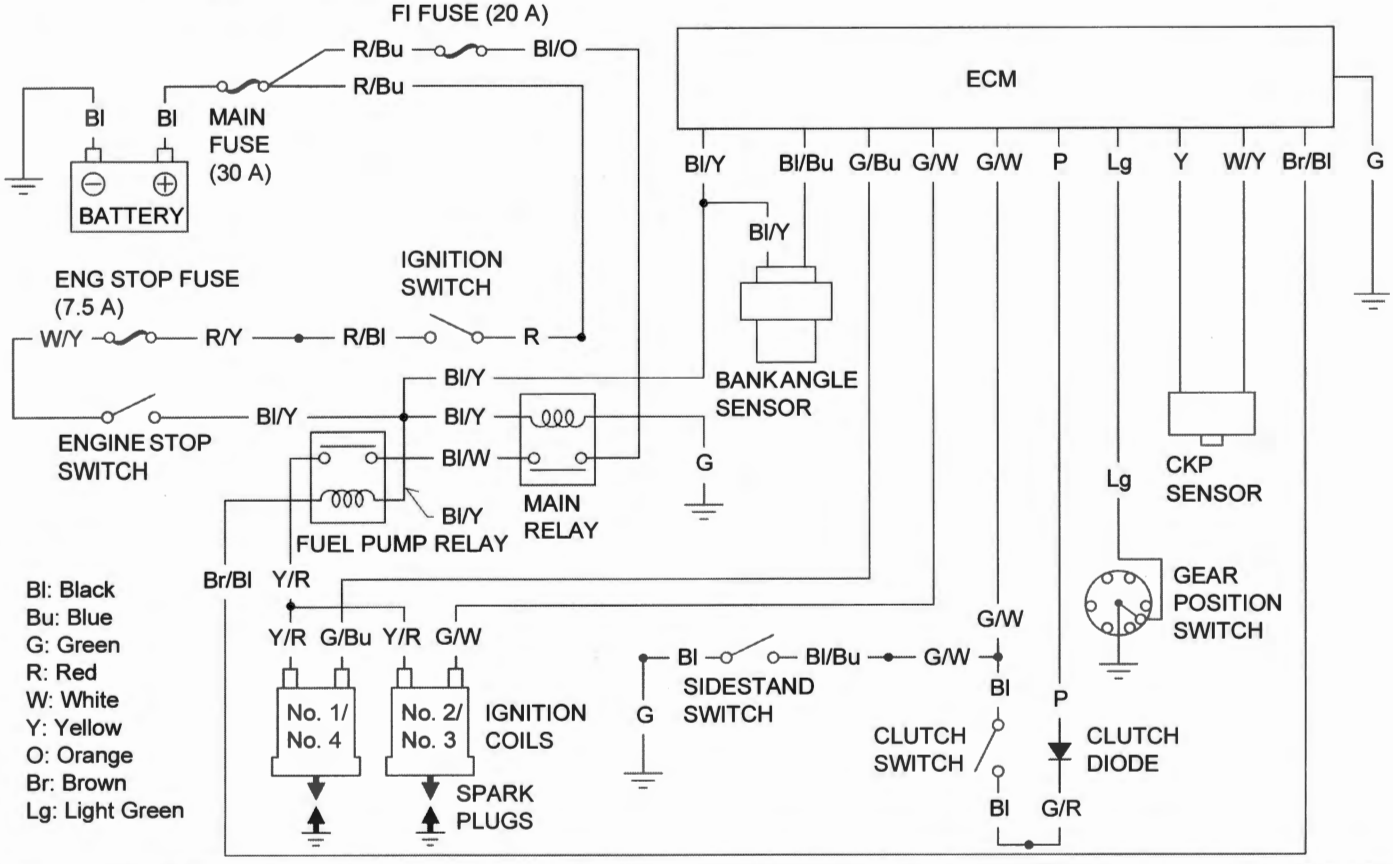
No spark at spark plug

Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch turned ON and engine stop switch turned "○" (Other electrical components are normal).	1. An open circuit in the Yellow/red wire between the fuel pump relay and ignition coil. 2. Faulty fuel pump relay or its related circuits. 3. Loose or poor connection of the primary terminal, or an open circuit in the primary coil. 4. Faulty ECM (in case when the initial voltage is normal with the ECM connector disconnected).
	Initial voltage is normal, but it drops by 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connections). 2. Battery is undercharged (Voltage drops largely when the engine is started). 3. No voltage between the Black/yellow (+) wire and body ground (–) at the ECM connector or loose ECM connection. 4. An open circuit or loose connection in the Green wire of the ECM. 5. An open circuit or loose connection in the Green/blue or Green/white wire between the ignition coil and ECM. 6. Faulty sidestand switch or gear position switch. 7. Loose or poor connection or an open circuit in No. 6 related wires. – Sidestand switch line: Green/white, Black/blue, Black and Green – Gear position switch line: Light Green 8. Faulty CKP sensor (Measure peak voltage). 9. Faulty ECM (in case when above No. 1 through 8 are normal).
	Initial voltage is normal, but there is no peak voltage while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty CKP sensor. 4. Faulty ECM (in case when above No. 1 through 3 are normal).
	Initial voltage is normal, but peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow (Battery is undercharged). 3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once). 4. Faulty ECM (in case when above No. 1 through 3 are normal).
	Initial and peak voltages are normal, but no spark jumps.	1. Faulty spark plug or leaking ignition coil secondary current. 2. Faulty ignition coil.
CKP sensor	Peak voltage is lower than standard value.	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 measured voltage is over the standard voltage at least once). 4. Faulty CKP sensor (in case when above No. 1 through 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty CKP sensor.

SYSTEM LOCATION



SYSTEM DIAGRAM

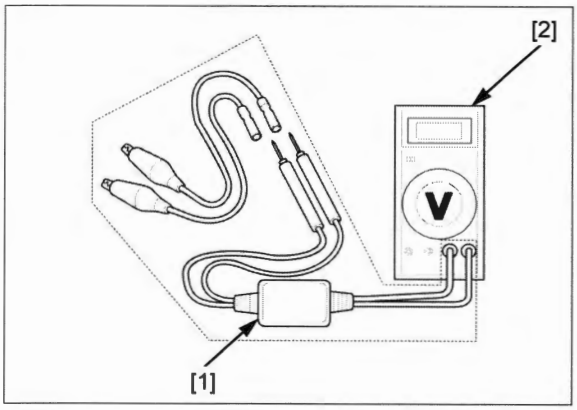


IGNITION SYSTEM INSPECTION

NOTE:

- If there is no spark at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use a commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using the Imrie diagnostic tester (model 625), follow the manufacturer's instructions.

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



TOOLS:

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

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

IGNITION COIL PRIMARY PEAK VOLTAGE

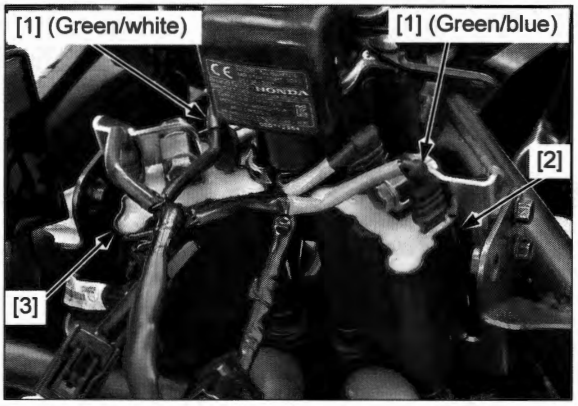
NOTE:

- Check all system connections before performing this inspection. Loose connectors can cause incorrect readings.
- Check the cylinder compression and check that the spark plugs are installed correctly in the cylinder head.

Disconnect the spark plug caps from the spark plugs (page 3-6).

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

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



CONNECTION:

No. 1/No. 4 ignition coil [2]:
Green/blue (+) – Ground (–)
No. 2/No. 3 ignition coil [3]:
Green/white (+) – Ground (–)

Turn the ignition switch ON with the engine stop switch "○" and check the initial voltage at this time.
The battery voltage should be measured.
If the initial voltage cannot be measured, follow the checks described in the troubleshooting table (page 5-3).

Shift the transmission into neutral.

Avoid touching the spark plug and tester probes to prevent electric shock.

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

PEAK VOLTAGE: 100 V minimum

NOTE:

- Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than the standard value, follow the checks described in the troubleshooting table (page 5-3).

Install the removed parts in the reverse order of removal.

CKP SENSOR PEAK VOLTAGE

NOTE:

- Check the cylinder compression and check that the spark plugs are installed correctly in the cylinder head.

Disconnect the ECM 33P (Black) and 33P (Gray) connectors (page 4-42).

Connect the peak voltage adaptor [1] or Imrie tester probes to the ECM 33P (Black) [2] and 33P (Gray) [3] connector terminals of the wire harness side, using the test probes (page 4-8).

TOOL:

Test probe, 2 pack	**07ZAJ-RDJA110**

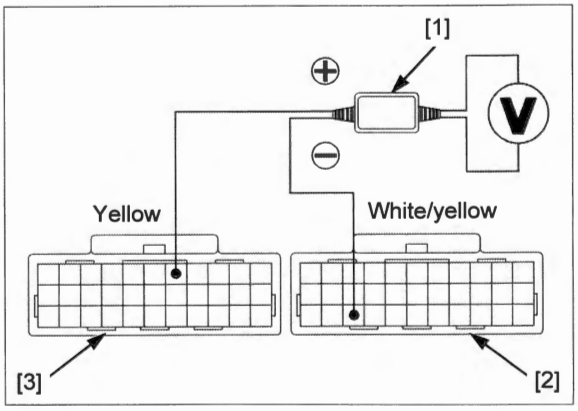
CONNECTION: Yellow (+) – White/yellow (–)

Shift the transmission into neutral and turn the ignition switch ON with the engine stop switch "○".

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

PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at the ECM 33P connectors is abnormal, measure the peak voltage at the CKP sensor connector.



Turn the ignition switch OFF.

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

Connect the peak voltage adaptor or Imrie tester probes to the 2P (Black) connector terminals of the CKP sensor side.

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

In the same manner as at the ECM 33P connectors, measure the peak voltage and compare it to the voltage measured at the ECM 33P connectors.

NOTE:

- If the peak voltage measured at the ECM is abnormal and the one measured at the CKP sensor is normal, the wire harness has an open or short circuit or loose connection.
- If the peak voltage of the CKP sensor side is lower than standard value, follow the checks described in the troubleshooting table (page 5-3).

For CKP sensor replacement (page 5-8).

Install the removed parts in the reverse order of removal.

IGNITION TIMING

NOTE:

- The ignition timing cannot be adjusted since the ECM is factory preset.

Remove the following:

– Left middle cowl (page 2-7) (CBR650R/RA)
– Left shroud (page 2-10) (CB650R/RA)

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

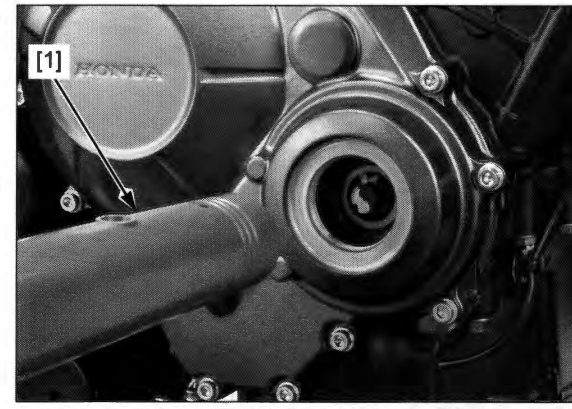
Stop the engine and remove the timing hole cap.

Read the instructions for timing light operation.

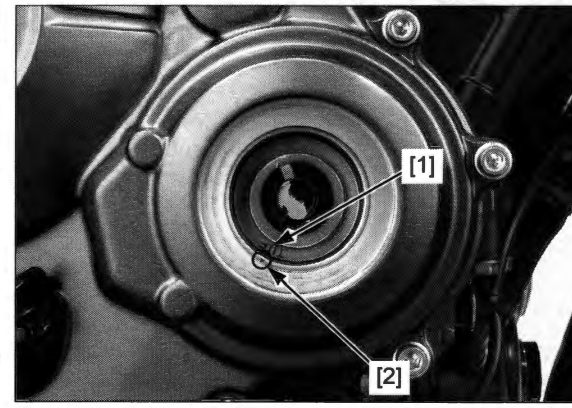
Connect the timing light [1] to the No.1 spark plug wire.

Start the engine and let it idle.

IDLE SPEED: 1,250 ± 100 rpm



The ignition timing is correct if the "F" mark [1] on the primary drive gear aligns with the index notch [2] in the right crankcase cover.



Coat a new O-ring with engine oil and install it into the groove in the timing hole cap.

Apply grease to the threads of the timing hole cap and install it.

Tighten the timing hole cap to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Remove the timing light.

Install the removed parts in the reverse order of removal.

IGNITION COIL

REMOVAL/INSTALLATION

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

Disconnect the ignition coil wire connectors [1]

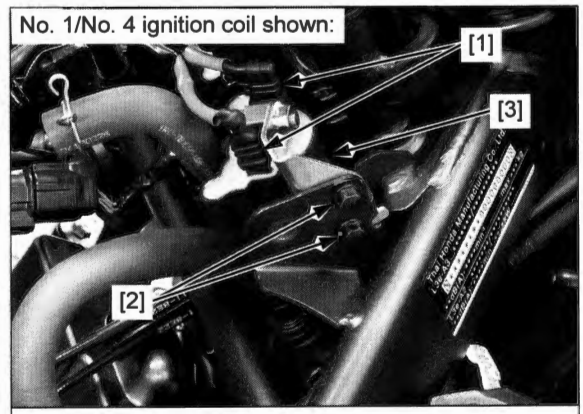
Remove the bolts [2] and release the ignition coil stay assembly [3] from the frame.

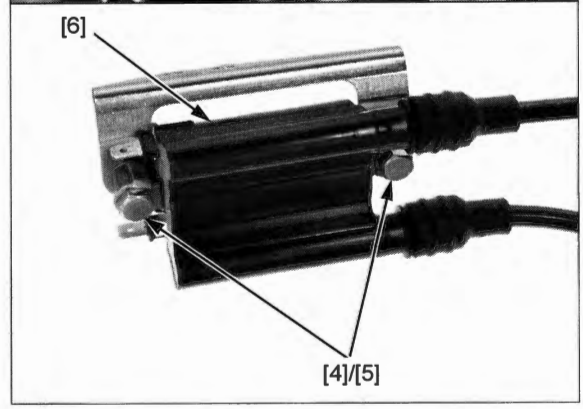
Remove the bolts [4], spacers [5] and ignition coil [6].

Installation is in the reverse order of removal.

NOTE:

- Do not interchange the ignition coils.





CKP SENSOR

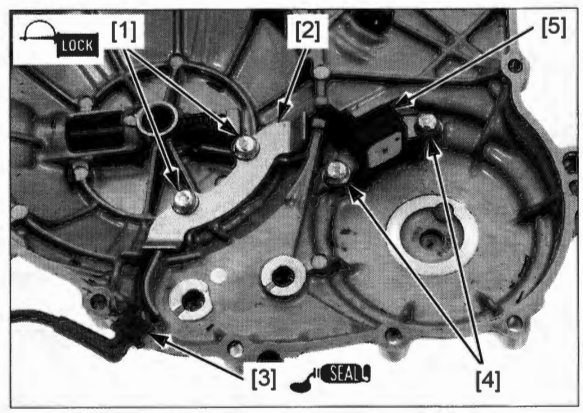
REMOVAL/INSTALLATION

Remove the right crankcase cover (page 11-5).

Remove the CKP sensor wire clamp bolts [1] and wire clamp [2].
Remove the wire grommet [3] from the right crankcase cover.
Remove the CKP sensor mounting bolts [4] and CKP sensor [5].

Installation is in the reverse order of removal.

- Apply locking agent to the CKP sensor wire clamp bolt threads (page 1-17).
- Apply sealant (TB1207B manufactured by ThreeBond or an equivalent) to the wire grommet seating surface.



6. ELECTRIC STARTER

SERVICE INFORMATION 6-2
TROUBLESHOOTING 6-3
SYSTEM LOCATION 6-4
SYSTEM DIAGRAM 6-4
STARTER MOTOR 6-5
STARTER RELAY SWITCH 6-7
DIODE 6-9

SERVICE INFORMATION

GENERAL

NOTICE

If current is kept flowing through the starter motor while the engine is not cranking over, the starter motor may be damaged.

- The starter motor can be serviced with the engine installed in the frame.
- Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- When servicing the starter system, always follow the steps in the troubleshooting flow chart (page 6-3).
- For following components information, refer to Lights/Meters/Switches section.
  - Ignition switch (page 21-15)
  - Engine stop switch (page 21-17)
  - Starter switch (page 21-17)
  - Clutch switch (page 21-18)
  - Sidestand switch (page 21-18)
  - Gear position switch (page 4-45)

TROUBLESHOOTING

NOTE:

- Make sure the battery is fully charged and in good condition.
- Check for a blown main fuse (30 A) and sub fuse (ENG STOP; 7.5 A). (Check for a short circuit in the related wires if the fuse is blown again)
- The starter motor should operate with the following conditions:
  - Transmission in neutral or clutch lever squeezed with sidestand retracted
  - Ignition switch turned ON with engine stop switch turned "○"
  - Starter switch pushed

Starter motor does not turn

1. **Starter Relay Switch Operation Inspection**

   Check the operation of the starter relay switch as above starting conditions (page 6-7).

   Does the starter relay switch click?

   YES – GO TO STEP 2.

   NO – GO TO STEP 3.

2. **Starter Motor Inspection**

   Apply battery voltage directly to the starter motor and check the operation. (A large amount of current flows, so do not use a thin wire)

   Does the starter motor turn?

   YES –
   - Poorly contacted starter motor cable
   - Faulty starter relay switch (page 6-8)

   NO – Faulty starter motor

3. **Relay Coil Power Input Line Inspection**

   Check the power input line of the starter relay switch (page 6-7).

   Is the input line normal?

   YES – GO TO STEP 4.

   NO –
   - Faulty ignition switch (page 21-15)
   - Faulty engine stop switch (page 21-17)
   - Faulty starter switch (page 21-17)
   - Loose or poor contact of the related connector terminal
   - Open circuit in wire harness

4. **Relay Coil Ground Line Inspection**

   Check the ground line of the starter relay switch (page 6-8).

   Is the ground line normal?

   YES – GO TO STEP 5.

   NO –
   - Faulty gear position switch (page 4-45)
   - Faulty neutral diode (page 6-9)
   - Faulty sidestand switch (page 21-18)
   - Faulty clutch switch (page 21-18)
   - Faulty clutch diode (page 6-9)
   - Loose or poor contact of the related connector terminal
   - Open circuit in wire harness

5. **Starter Relay Switch Inspection**

   Check the starter relay switch (page 6-8).

   Is the starter relay switch normal?

   YES – Loose or poor contact of the starter relay switch connector terminal

   NO – Faulty starter relay switch

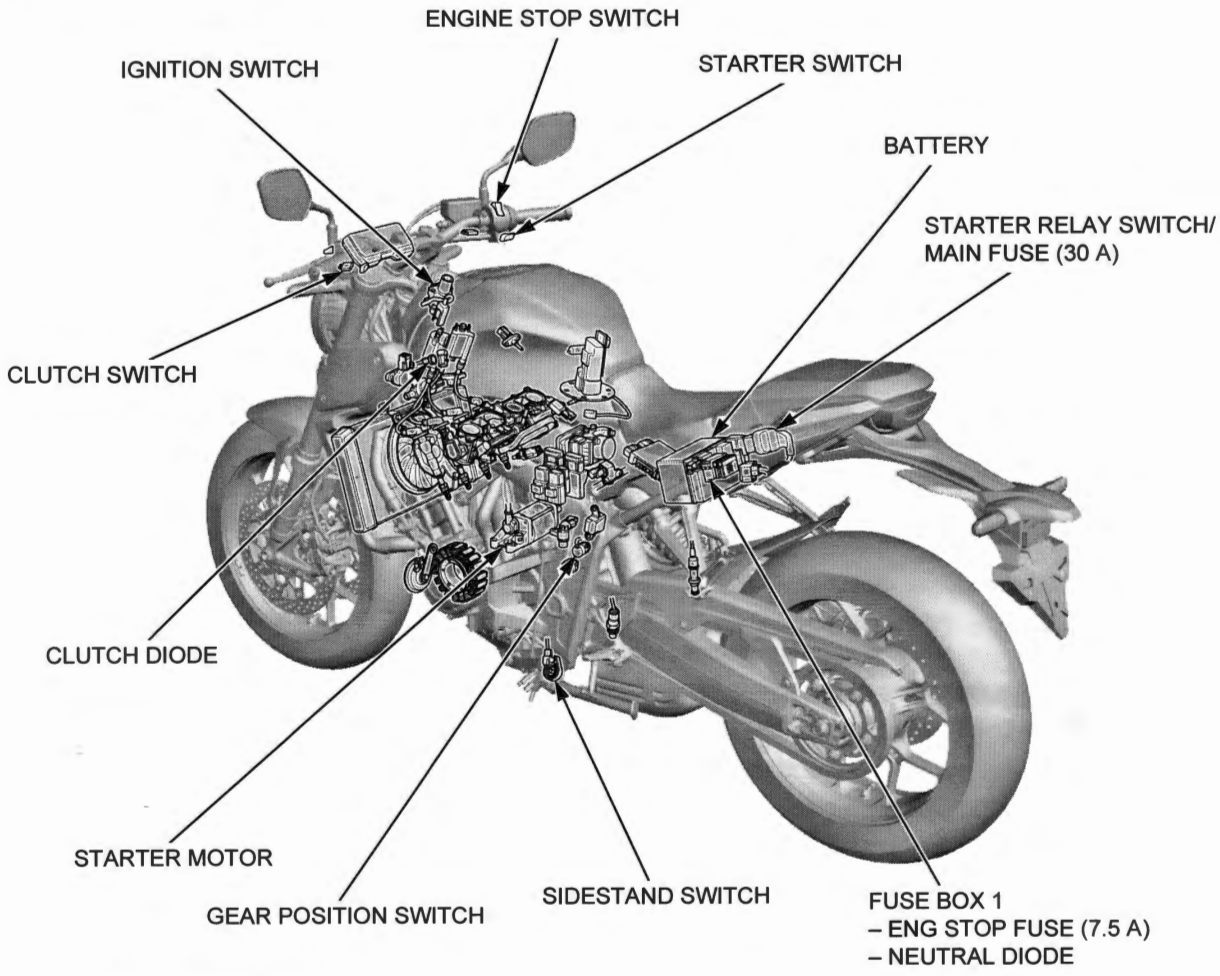
Starter motor turns slowly

- Low battery voltage
- Poorly connected battery cables or starter motor cable
- Faulty starter motor

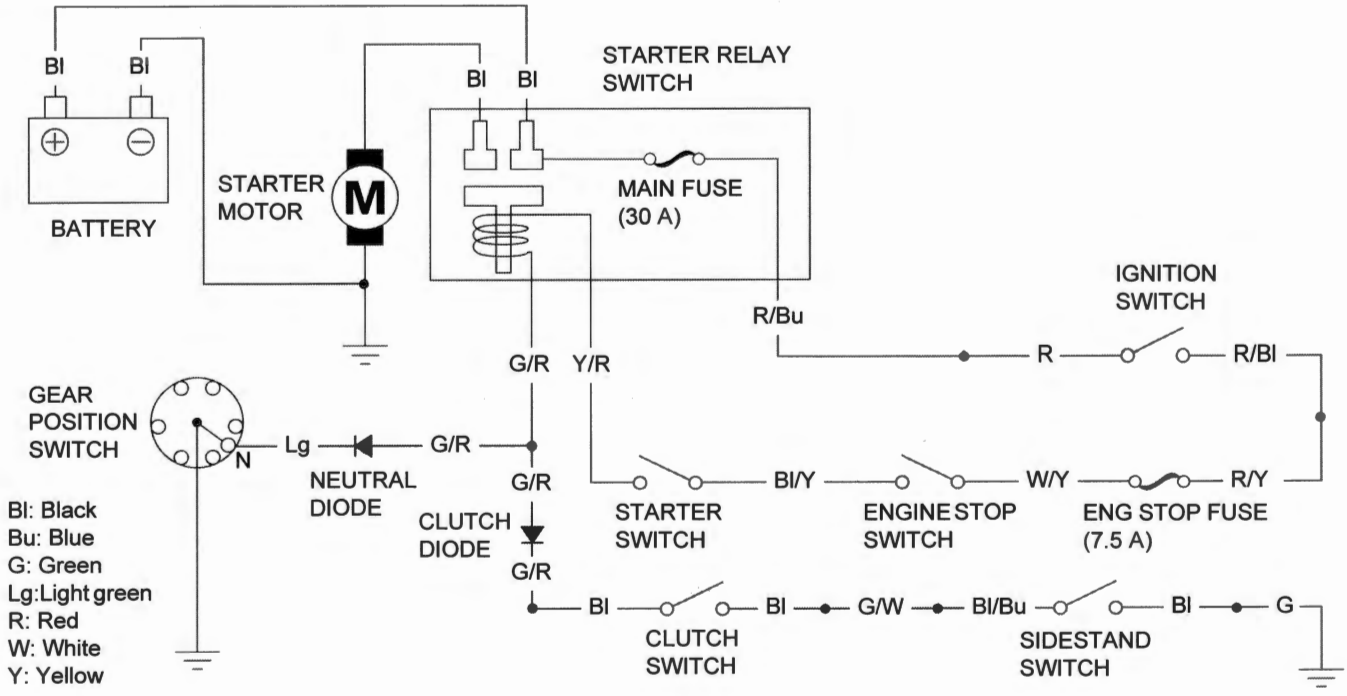
Starter motor turns, but engine does not turn

- Faulty starter clutch or starter gear train (page 11-17)
- Faulty ignition system (page 5-3)

SYSTEM LOCATION



SYSTEM DIAGRAM



STARTER MOTOR

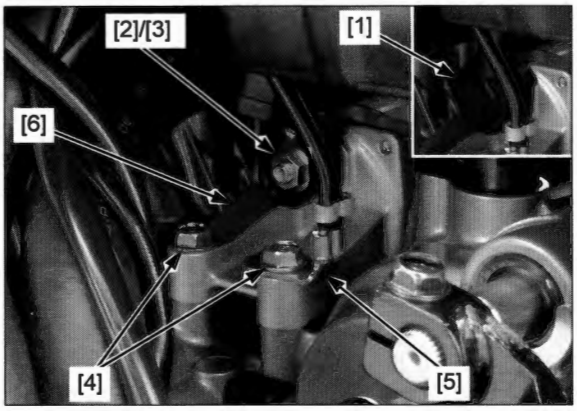
REMOVAL/INSTALLATION

Disconnect the negative (–) cable from the battery (page 20-5).

Release the terminal cap [1].
Remove the terminal nut [2] and disconnect the starter motor cable [3].

Remove the two mounting bolts [4] and negative (–) cable [5].

Remove the starter motor [6] from the crankcase.

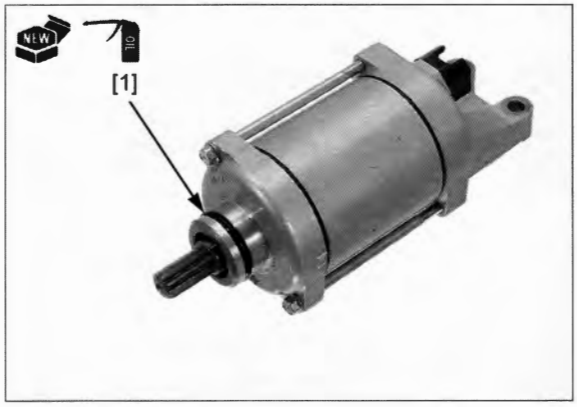


Remove the O-ring [1].

Installation is in the reverse order of removal.

NOTE:

- Replace the O-ring with a new one and coat it with engine oil.

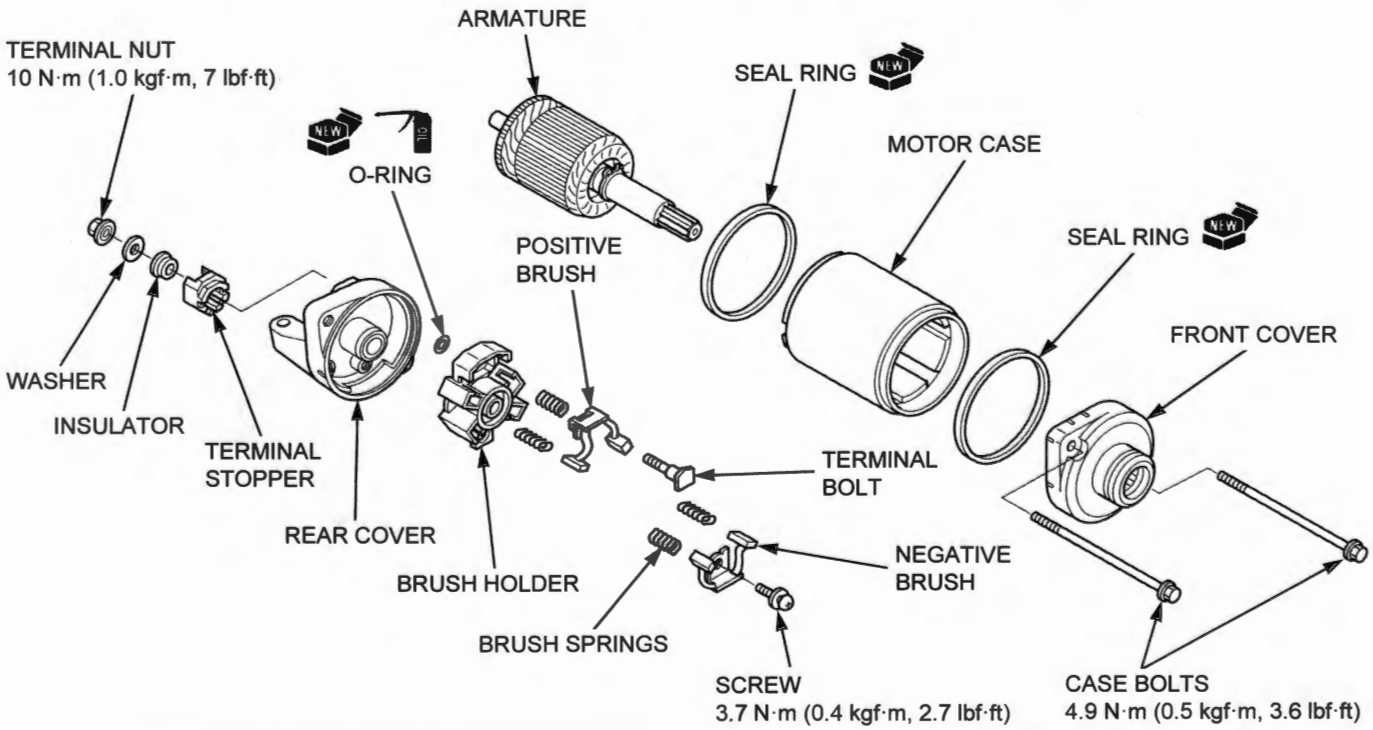


DISASSEMBLY/ASSEMBLY

Disassemble and assemble the starter motor as following illustration.

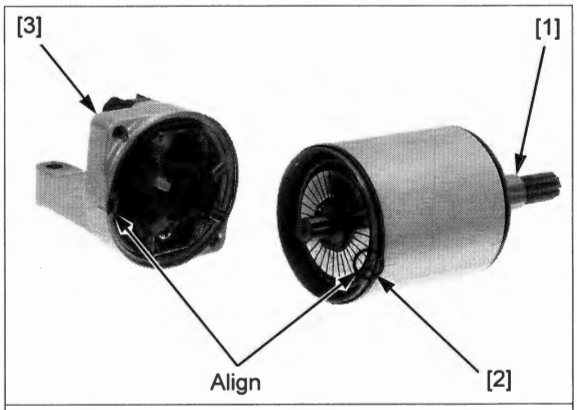
NOTICE

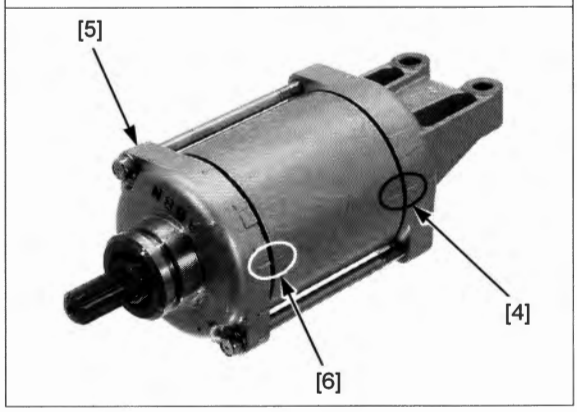
The coil may be damaged if the magnet pulls the armature against the motor case.



NOTE:

- Install the armature [1] into the motor case from the case groove [2] side so the commutator bars facing to the rear side.
- When installing the rear cover [3], align the tab with the groove (the index lines [4] are aligned).
- When installing the front cover [5], take care to prevent damaging the oil seal lip with the armature shaft. Align the index lines [6] on the front cover and motor case.





INSPECTION

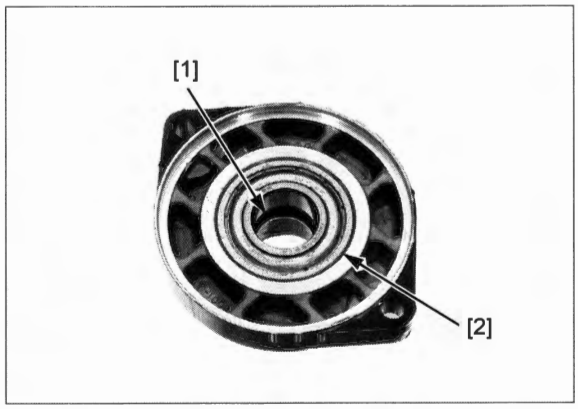
FRONT COVER

Check the oil seal [1] in the front cover for deterioration, wear or damage.

Turn the inner race of bearing [2] with your finger.

The bearings should turn smoothly and quietly.

Also check that the outer race fits tightly in the front cover.

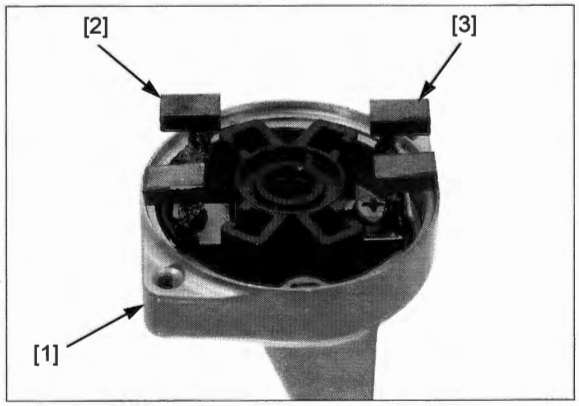


REAR COVER

Check for continuity or no continuity for each part of rear cover [1] as below:

Check for continuity on the rear cover as follows:

- Between the positive brush [2] and cable terminal; there should be continuity.
- Between the cable terminal and rear cover; there should be no continuity.
- Between negative brush [3] and rear cover; there should be continuity.
- Between positive brush and negative brush; there should be no continuity.



ARMATURE

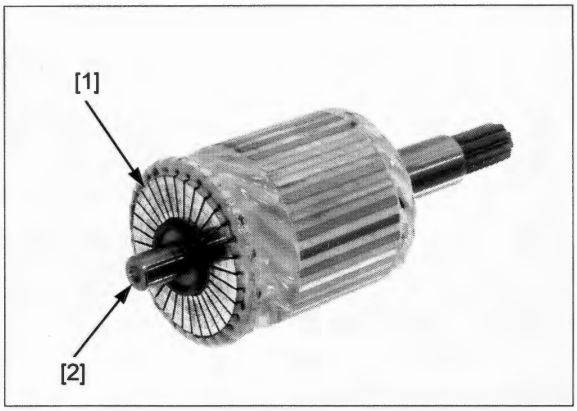
Do not use emery or sand paper on the commutator.

Clean the metallic debris off the commutator bars [1].

Check the commutator bars for discoloration.

Check for continuity on the armature as follows:

- Between pair of commutator bars; there should be continuity.
- Between each commutator bar and the armature shaft [2]; there should be no continuity.



STARTER RELAY SWITCH

OPERATION INSPECTION

Remove the main seat (page 2-11).

Shift the transmission into neutral or squeeze the clutch lever with the sidestand retracted.

Turn the ignition switch ON with the engine stop switch turned "○". Push the starter switch.

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

If you don't hear the starter relay switch "CLICK", inspect the relay coil circuits.

RELAY COIL CIRCUIT INSPECTION

POWER INPUT LINE

Release the connector boot from the starter relay switch 4P (Red) connector [1].

Turn the ignition switch ON with the engine stop switch turned "○".

Measure the voltage between the 4P (Red) connector terminal and ground.

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

There should be battery voltage when the starter switch is pushed.

GROUND LINE

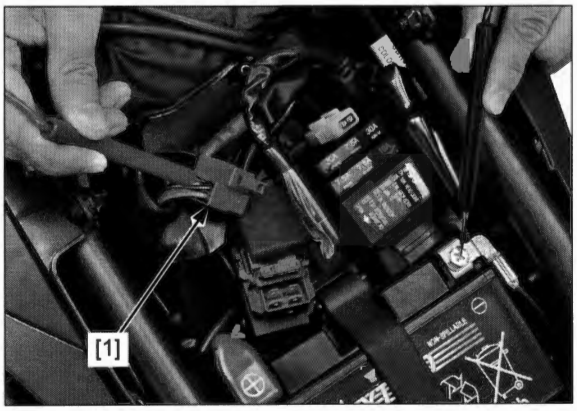
Turn the ignition switch OFF.

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

Check for continuity between the 4P (Red) connector terminal and ground.

CONNECTION: Green/red – Ground

There should be continuity when the transmission is in neutral or when the clutch lever is squeezed with the sidestand retracted (There is a slight resistance due to the diode).

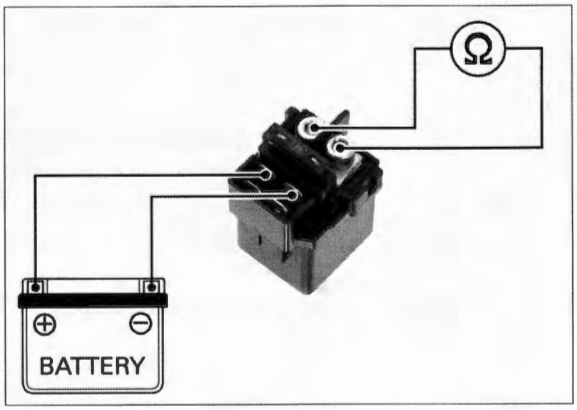


RELAY INSPECTION

Remove the starter relay switch (page 6-8).

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

There should be continuity between the cable terminals when the battery is connected, and no continuity when the battery is disconnected.



REMOVAL/INSTALLATION

Remove the main seat (page 2-11).

Disconnect the negative (–) cable from the battery (page 20-5).

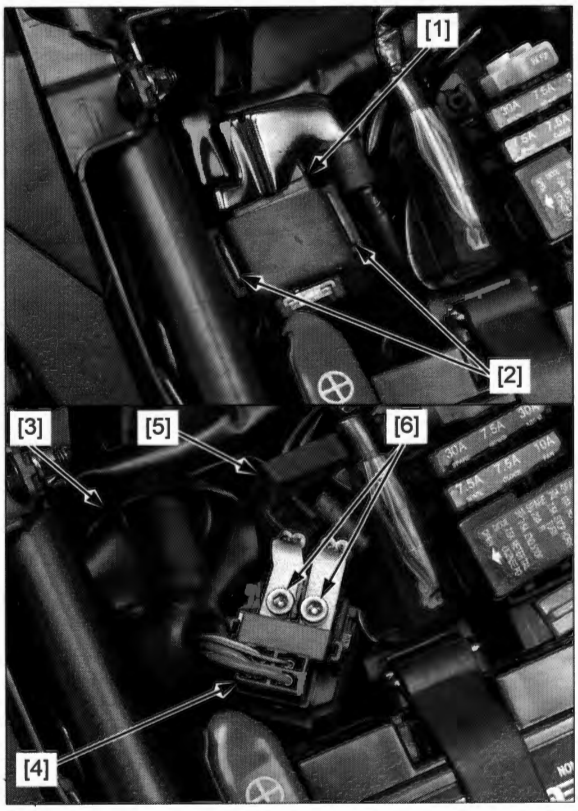
Remove the starter relay switch [1] from the stays [2].

Release the connector cover [3], and disconnect the starter relay switch 4P (Red) connector [4].

Release the terminal cover [5], and remove the socket bolts [6] to disconnect the cables.

Installation is in the reverse order of removal.

TORQUE:
Starter relay switch socket bolt:
5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)



DIODE

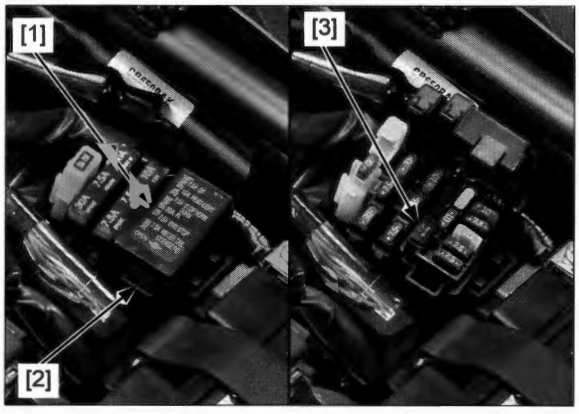
REMOVAL/INSTALLATION

NEUTRAL DIODE

Remove the main seat (page 2-11).

Open the cover [1] on the fuse box 1 by releasing the tab [2].

Remove the neutral diode [3].



CLUTCH DIODE

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

Remove the rubber cap [1] and clutch diode [2].

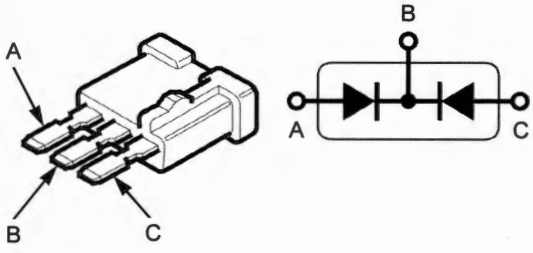
Installation is in the reverse order of removal.

INSPECTION

Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity in direction shown by the arrow, the diode is normal.

Neutral diode shown:



MEMO

7. FUEL SYSTEM

SERVICE INFORMATION 7-2

COMPONENT LOCATION 7-4

FUEL LINE INSPECTION 7-5

FUEL TANK 7-8

FUEL FILLER CAP 7-9

FUEL PUMP UNIT 7-9

AIR CLEANER HOUSING 7-13

THROTTLE BODY 7-14

INSULATOR 7-17

FUEL INJECTOR 7-17

IACV 7-18

FUEL PUMP RELAY 7-20

SECONDARY AIR SUPPLY SYSTEM 7-20

EVAP PURGE CONTROL SOLENOID VALVE (AC type) 7-23

EVAP CANISTER (AC type) 7-24

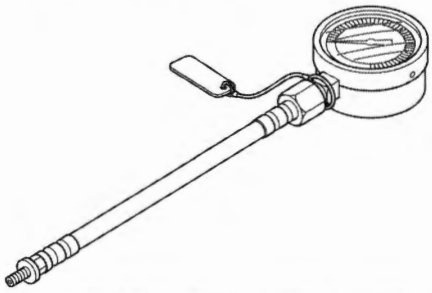
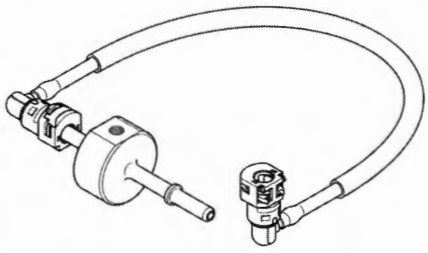
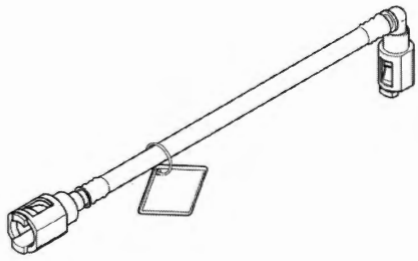
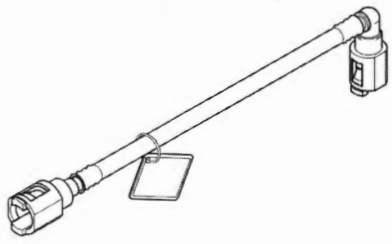
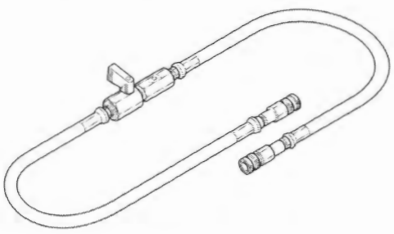
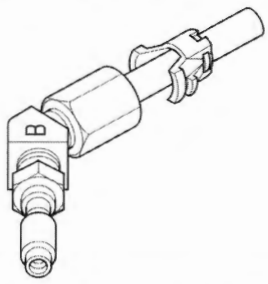
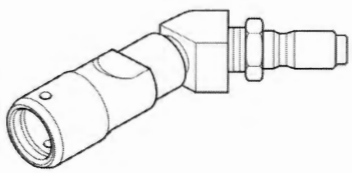
SERVICE INFORMATION

GENERAL

- Bending or twisting the control cable 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.
- Before disconnecting the fuel feed hose, relieve fuel pressure from the system (page 7-5).
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the intake port with a piece of tape or a clean cloth to keep dirt and debris from entering the engine after the throttle body has been removed.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Prevent dirt and debris from entering the throttle bore and air passages after the throttle body has been removed. Clean them using a compressed air if necessary.
- Do not loosen or tighten the white painted nut and screw of the throttle body. Loosening or tightening them can cause throttle valve and idle control failure.
- Do not apply commercially available carburetor cleaners to the inside of the throttle bore.
- The parts of the throttle body not shown in this manual should not be disassembled.
- For fuel level sensor inspection (page 21-14).
- The following color codes are used throughout this section.

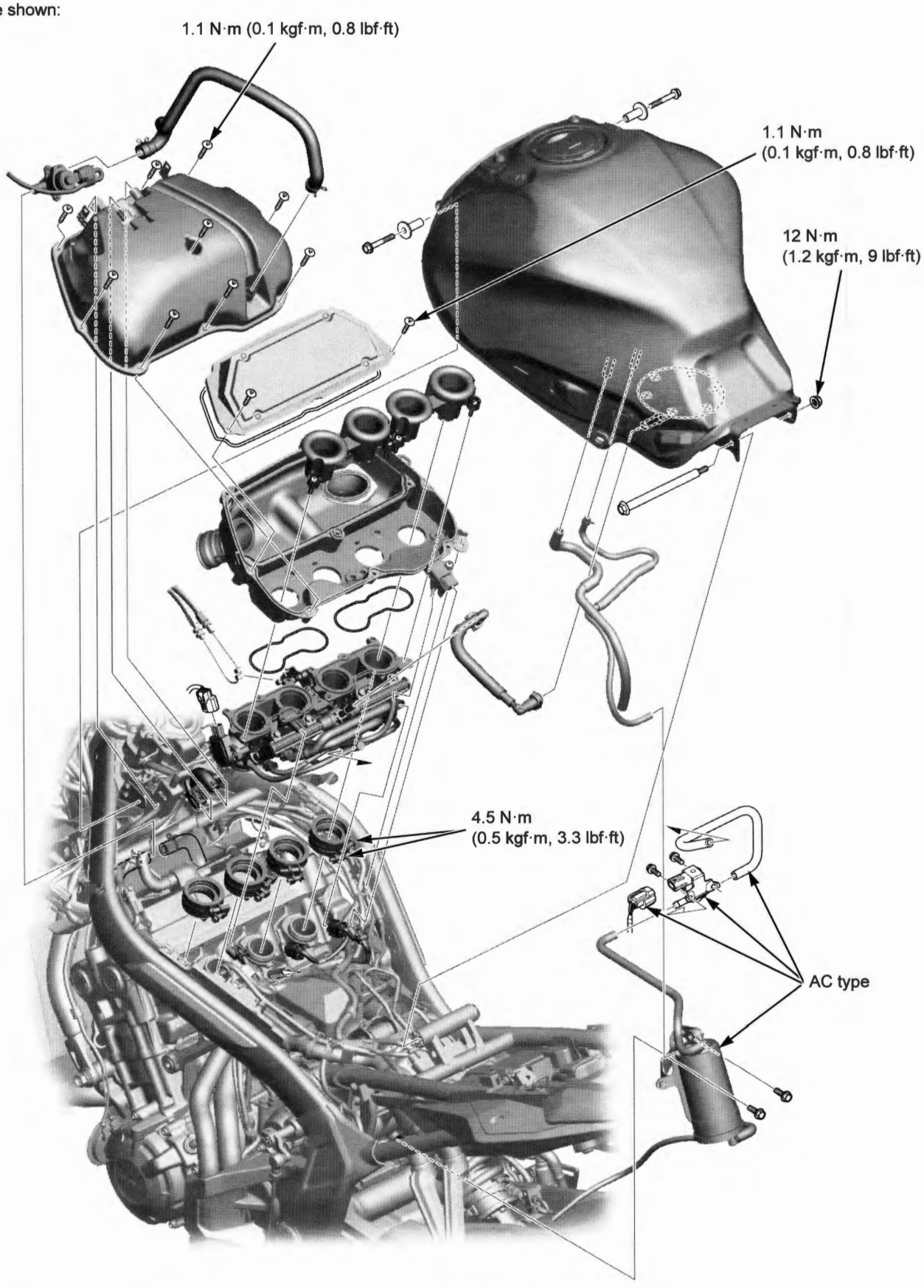
Bl = Black	G = Green	Lg = Light Green	R = Red	Y = Yellow
Br = Brown	Gr = Gray	O = Orange	V = Violet	
Bu = Blue	Lb = Light Blue	P = Pink	W = White	

TOOLS

Fuel pressure gauge 07406-0040004  or 07406-004000B or 07406-004000C (U.S.A. only)	Pressure gauge attachment set 070MJ-K260100  (Not available in U.S.A.)	Hose attachment, 6 mm/9 mm 07ZAJ-S5A0130  (Not available in U.S.A.)
Hose attachment, 8 mm/9 mm 07ZAJ-S7C0100  (Not available in U.S.A.)	Attachment joint, 8 mm/9 mm 07ZAJ-S7C0200  (Not available in U.S.A.)	Attachment joint, 6 mm/9 mm 07ZAJ-S5A0150  (Not available in U.S.A.)
Pressure manifold hose 07AMJ-HW3A100 (U.S.A. only) 	Adaptor C, male 07AAJ-S6MA300 (U.S.A. only) 	Adaptor C, female 07AAJ-S6MA500 (U.S.A. only) 

COMPONENT LOCATION

AC type shown:



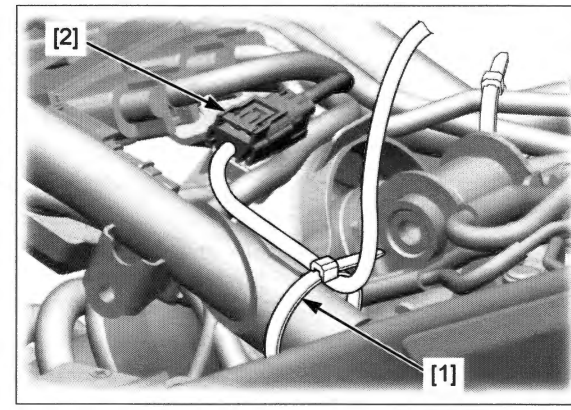
FUEL LINE INSPECTION

FUEL PRESSURE RELIEVING

NOTE:

- Before disconnecting fuel feed hose, relieve pressure from the system as follows.

1. Turn the ignition switch OFF.
2. Lift the fuel tank and support it (page 3-4).
3. Remove the wire band [1].
4. Disconnect the fuel pump 3P (Black) connector [2].
5. Start the engine, and let it idle until the engine stalls.
6. Turn the ignition switch OFF.



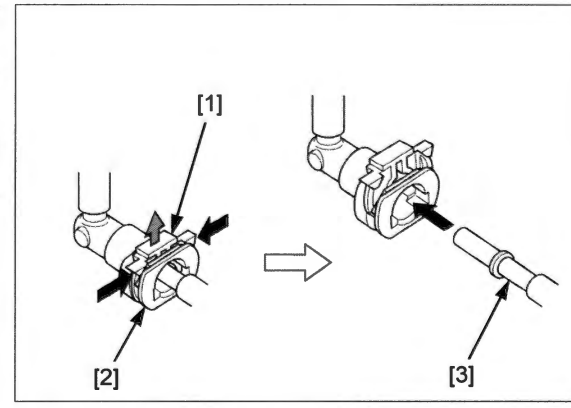
QUICK CONNECT FITTING REMOVAL

NOTE:

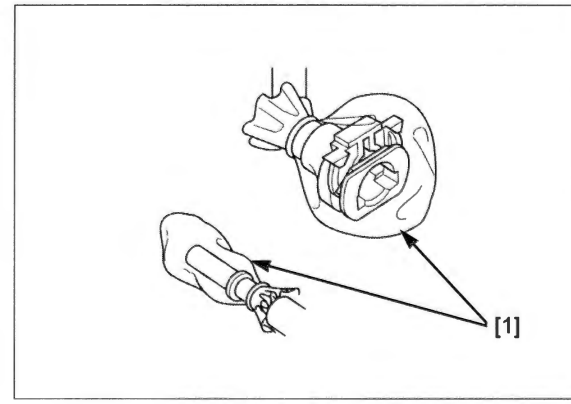
- Clean around the quick connect fitting before disconnecting the fuel feed hose, and be sure that no dirt is allowed to enter into the fuel system.
- Do not bend or twist the fuel feed hose.

1. Relieve the fuel pressure (page 7-5).
2. Disconnect the negative (–) cable from the battery (page 20-5).
3. Lift the fuel tank and support it (page 3-4).
4. Unlock the slide retainer [1] of the quick connect fitting [2] by completely pulling it up.
5. Release the quick connect fitting from the joint pipe [3] while holding the connector housing.

- Prevent the remaining fuel in the fuel feed hose from flowing out, using a shop towel.
- Be careful not to damage the slide retainer and hose.
- Do not use tools.



6. To prevent damage and keep foreign matter out, cover the disconnected connector and pipe end with the plastic bags [1].



QUICK CONNECT FITTING INSTALLATION

NOTE:

- Do not bent or twist the fuel feed hose.

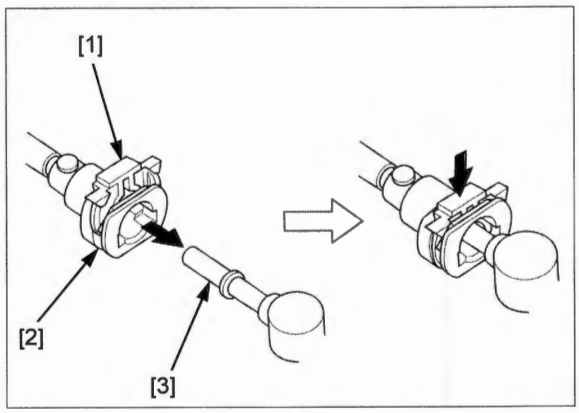
1. Be sure that the slide retainer [1] is completely pulled up before connecting the quick connect fitting.

   Connect the quick connect fitting [2] to the joint pipe [3] until you hear the "CLICK" while holding the connector housing.

   If it is hard to connect, put a small amount of engine oil on the pipe end.

   Lock the slide retainer by pushing it until you hear the "CLICK".

2. Make sure the connection is secure and that the slide retainer is firmly locked into place; check visually and by pulling the connector.
3. Connect the battery negative (–) cable (page 20-5).
4. Normalize the fuel pressure (page 7-6).



FUEL PRESSURE NORMALIZATION

1. Be sure the fuel pump 3P (Black) connector [1] is connected.
2. Install the wire band [2].
3. Turn the ignition switch ON with the engine stop switch "○".

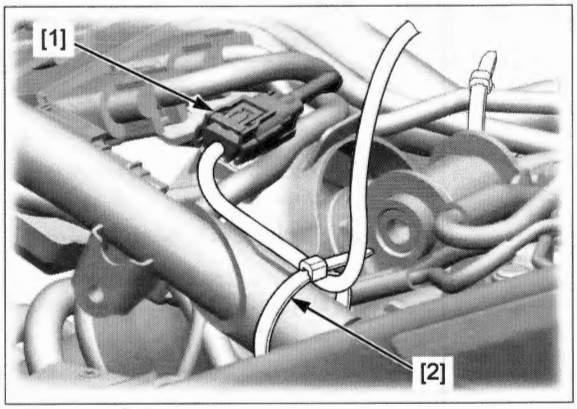
NOTE:

- Do not start the engine.

   The fuel pump will run for about 2 seconds, and fuel pressure will rise.

   Turn the ignition switch OFF.

4. Repeat step 2 two or three times, and check that there is no leakage.
5. Install the fuel tank properly (page 3-4).



FUEL PRESSURE TEST

NOTE:

- Check the fuel tank breather hose on the frame for pinch or clogs when the fuel tank is lifted.

Disconnect the quick connect fitting from the fuel pump (page 7-5).

Attach the special tools between the fuel feed hose and fuel pipe of the fuel pump.

TOOLS:

[1] Fuel pressure gauge	**07406-0040004**
[2] Pressure gauge attachment set	**070MJ-K260100**
[3] Hose attachment, 6 mm/9 mm	**07ZAJ-S5A0130**
[4] Hose attachment, 8 mm/9 mm	**07ZAJ-S7C0100**
[5] Attachment joint, 8 mm/9 mm	**07ZAJ-S7C0200**
[6] Attachment joint, 6 mm/9 mm	**07ZAJ-S5A0150**

U.S.A. TOOLS:

Fuel pressure gauge, 0 -100 psi	**07406-004000B or 07406-004000C**
Pressure manifold hose	**07AMJ-HW3A100**
Adaptor C, male	**07AAJ-S6MA300**
Adaptor C, female	**07AAJ-S6MA500**

Temporarily connect the fuel pump 3P (Black) connector, fuel tank breather hose and battery negative (–) cable.

Start the engine and let it idle.

Read the fuel pressure.

STANDARD: 324 – 367 kPa
(3.3 – 3.7 kgf/cm², 47 – 53 psi)

If the fuel pressure is higher than specified pressure, replace the fuel pump unit.
If the fuel pressure is lower than specified pressure, inspect the following:

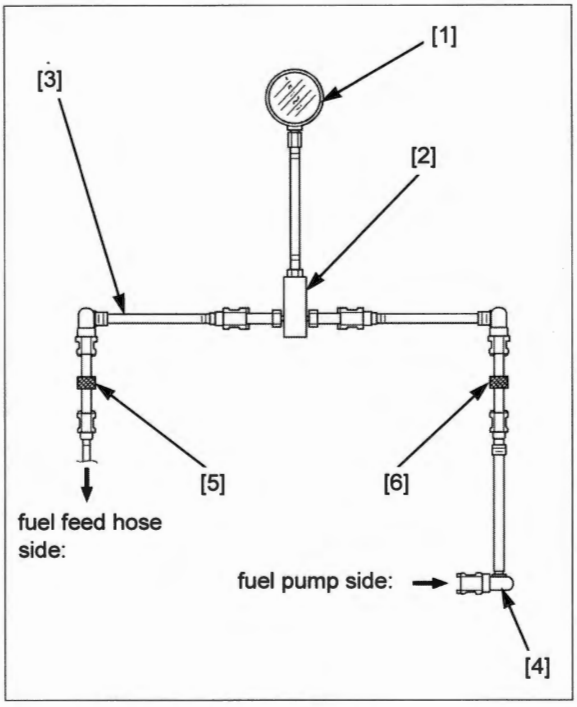
- Fuel line for leakage
- Fuel tank breather hose (tank side) for pinch or clogs
- Fuel filter for clogs
- Fuel pump (page 7-9)

After inspection, relieve the fuel pressure (page 7-5).

Disconnect the negative (–) cable from the battery (page 20-5).

Remove the special tools.

Connect the quick connect fitting (page 7-6).



FUEL FLOW INSPECTION

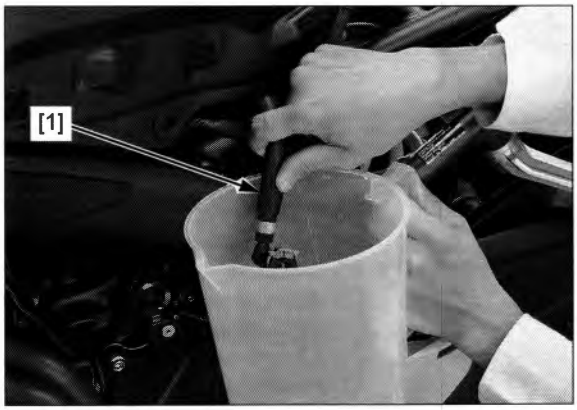
NOTE:

- Check the fuel tank breather hose on the frame for pinch or clogs when the fuel tank is lifted.

Disconnect the fuel injector side quick connect fitting (page 7-5).

Wipe off spilled out gasoline.

Place the end of the fuel feed hose [1] into an approved gasoline container.



Temporarily connect the fuel pump 3P (Black) connector and battery negative (–) cable.

Turn the ignition switch ON with engine stop switch "○". The fuel pump operates for 2 seconds. Repeat 5 times to meet the total measuring time.

NOTE:

- Return fuel to the fuel tank when the first fuel is flowed.

Measure the amount of fuel flow.

Amount of fuel flow:
319 cm3 (10.8 US oz, 11.2 Imp oz) minimum/ 10 seconds at 12 V

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

- Fuel feed hose for clogs
- Fuel tank breather hose (tank side) for pinch or clogs
- Fuel filter for clogs
- Fuel pump (page 7-9)

Connect the quick connect fitting (page 7-6).

FUEL TANK

REMOVAL/INSTALLATION

Disconnect the quick connect fitting from the fuel tank (page 7-5).

Lower the fuel tank, being careful not to pinch the wire and hoses.

Remove the nut [1], washer [2], bolt [3] and fuel tank [4].

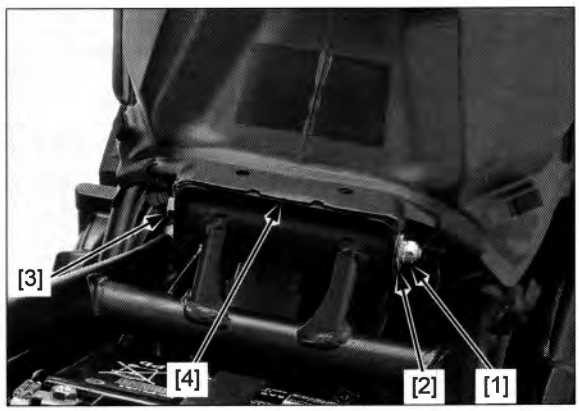
Installation is in the reverse order of removal.

NOTE:

- The mounting bolt is installed from the left side.

TORQUE:
Fuel tank mounting nut: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the quick connect fitting (page 7-6).



FUEL FILLER CAP

REMOVAL/INSTALLATION

Remove the following:

- Three socket bolts [1]
- Fuel filler cap [2]
- Breathe seal [3]

A pressure release can be heard when opening the fuel cap, but this is not blockage of the passage.

If checking for clog in the passage of the fuel tank side is necessary, apply air pressure to the breather hose end with the fuel filler cap opened.

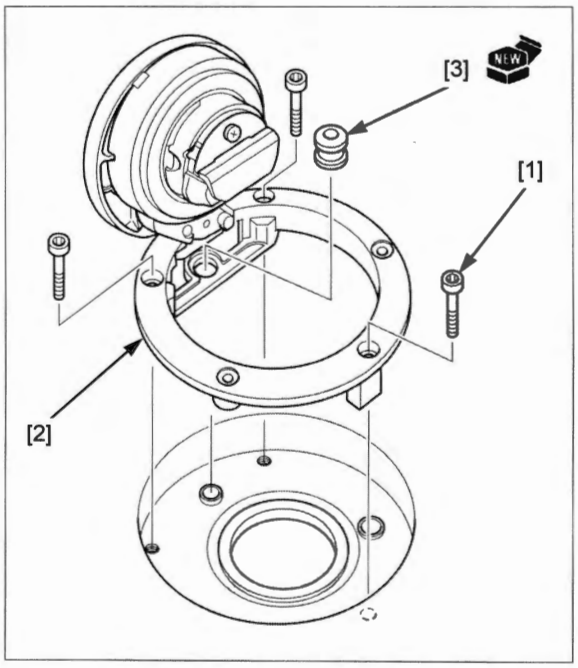
NOTE:

- Replace the breather seal with a new one.

Installation is in the reverse order of removal.

TORQUE:

Fuel filler cap mounting socket bolt:
1.8 N·m (0.2 kgf·m, 1.3 lbf·ft)



FUEL PUMP UNIT

INSPECTION

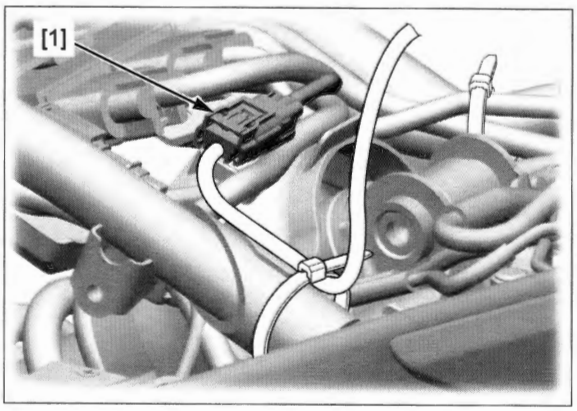
Turn the ignition switch ON with the engine stop switch "○" and confirm that the fuel pump operates for 2 seconds.

If the fuel pump does not operate, inspect as follows:

Turn the ignition switch OFF.

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

Disconnect the fuel pump 3P (Black) connector [1].



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

Measure the voltage between the terminals of the wire harness side fuel pump 3P (Black) connector [1].

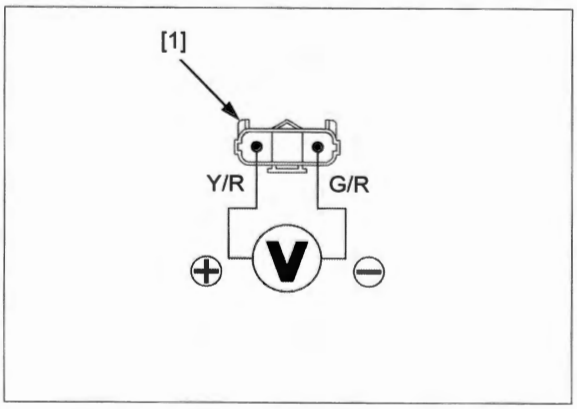
CONNECTION: Yellow/red (+) – Green/red (–)

There should be battery voltage for 2 seconds.

If there is battery voltage, replace the fuel pump unit.

If there is no voltage, inspect the following:

- Green/red wire between the fuel pump and ground for open circuit
- Yellow/red wire between the fuel pump relay and fuel pump for open circuit
- Fuel pump relay and its circuits (page 7-20)
- ECM (page 4-43)



REMOVAL/INSTALLATION

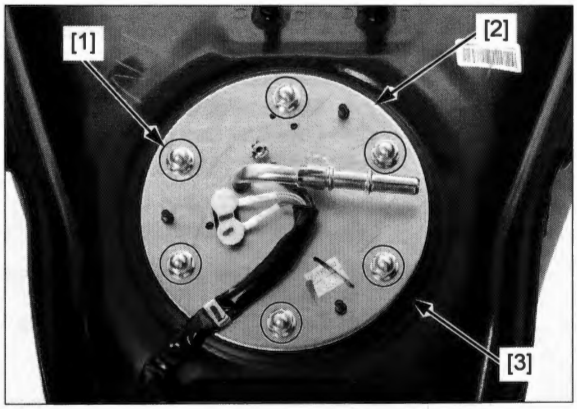
Remove the fuel tank (page 7-8).

Clean around the fuel pump.

Loosen the six mounting nuts [1] in a crisscross pattern in several steps and remove them.

Be careful not to deform the float arm of the fuel level sensor.

Remove the fuel pump unit [2] and rubber seal [3].



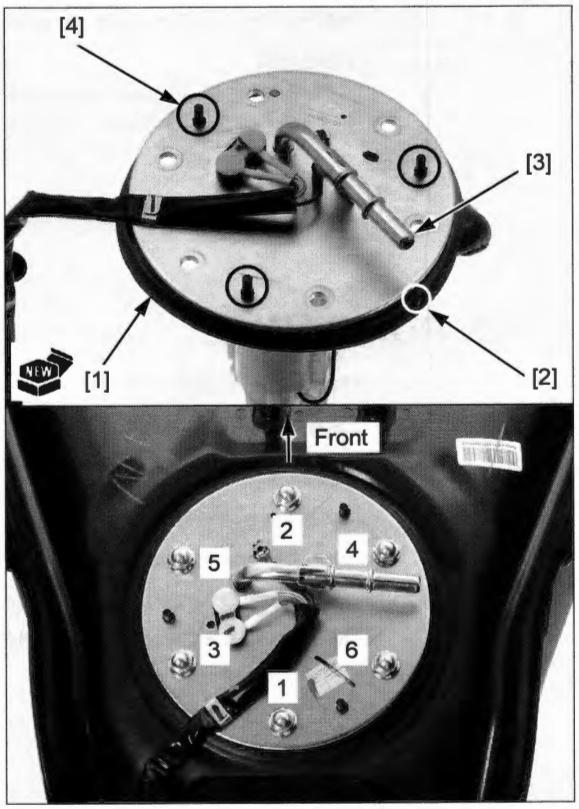
Installation is in the reverse order of removal.

NOTE:

- Replace the rubber seal [1] with a new one.
- Clean the rubber seal seating areas of the fuel tank and fuel pump base plate, and be sure that no foreign materials are allowed.
- Place the rubber seal with the boss [2] facing toward the fuel pipe [3] and pull the three retaining pins [4] in the holes securely to seat it on the base plate.
- Tighten the six mounting nuts to the specified torque in the sequence as shown.

TORQUE:

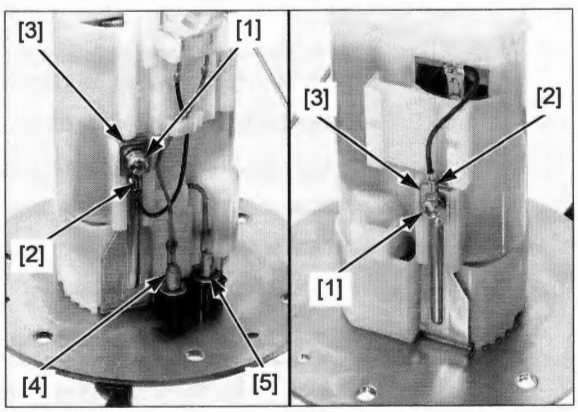
Fuel pump mounting nut:
12 N·m (1.2 kgf·m, 9 lbf·ft)



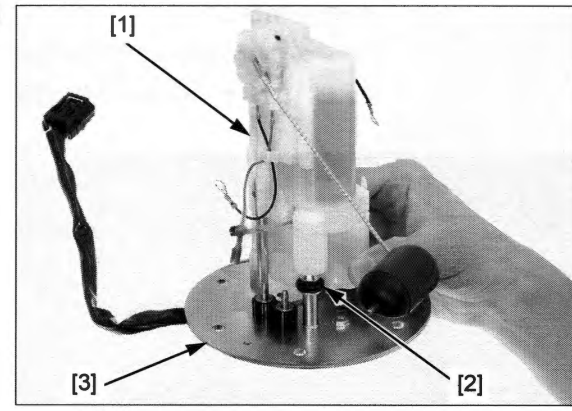
DISASSEMBLY/INSPECTION

Remove the screws [1], Black wire terminals [2] and stoppers [3].

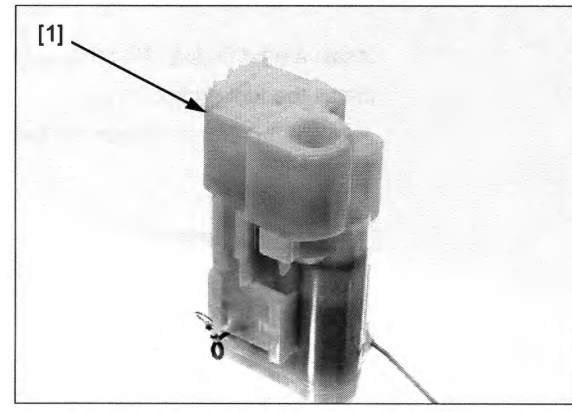
Disconnect the Pink wire connector [4] and Blue wire connector [5].



Remove the fuel pump unit assembly [1] and O-ring [2] from the fuel pump stay [3].



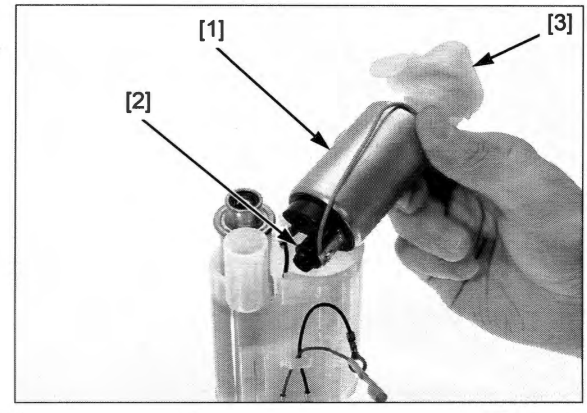
Remove the chamber [1].



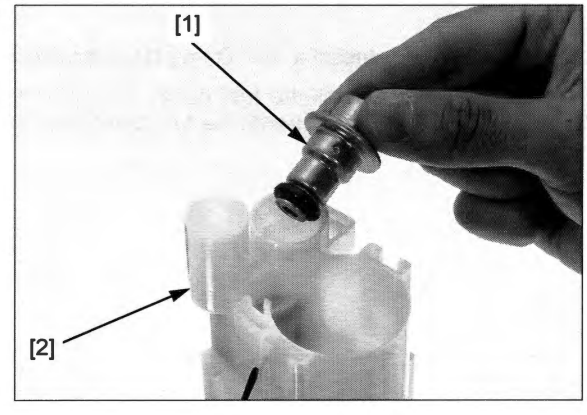
Remove the fuel pump [1] and O-ring [2].

Visually inspect the fuel pump filter [3] for dirt, debris or any clogging.

Replace fuel pump unit as an assembly if necessary.



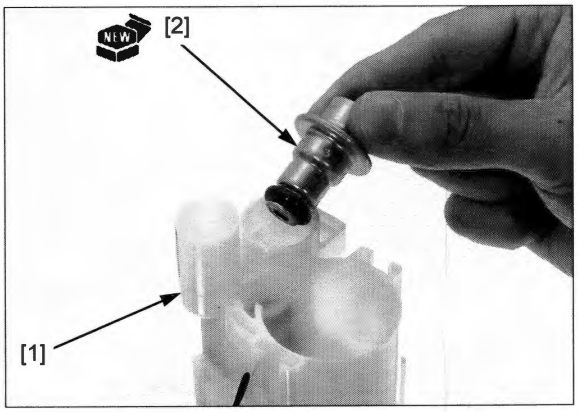
Remove the pressure regulator/O-ring [1] from the fuel filter [2].



ASSEMBLY

Replace the fuel filter [1] with a new one if necessary.

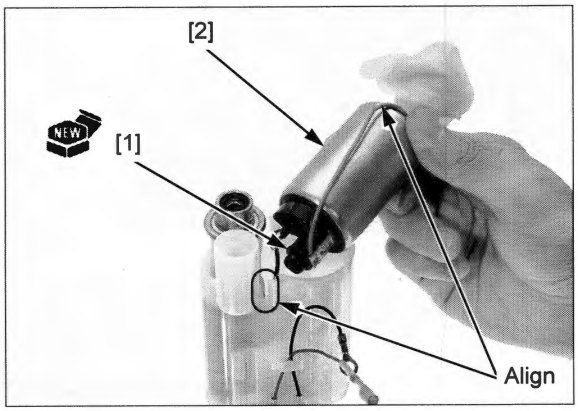
Install a new pressure regulator/O-ring [2].



Install a new O-ring [1] to the fuel pump [2].

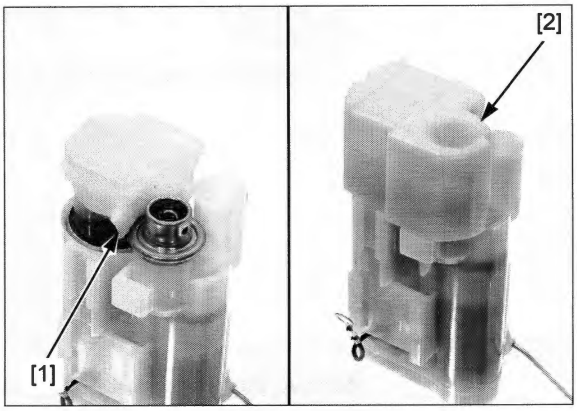
Install the fuel pump.

- Align the Blue wire with the fuel filter groove.



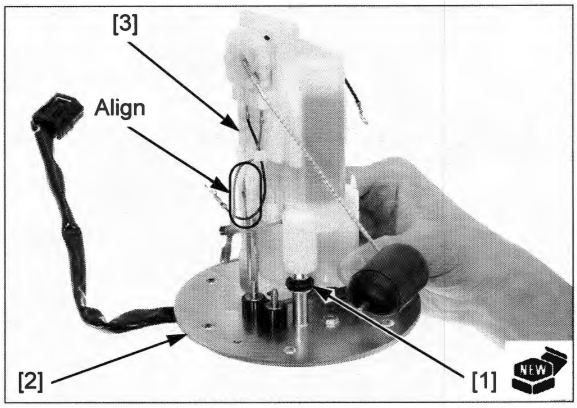
Insert the fuel pump filter edge [1] between the fuel pump and pressure regulator.

Install the chamber [2].



Install a new O-ring [1] to the fuel pump stay [2].

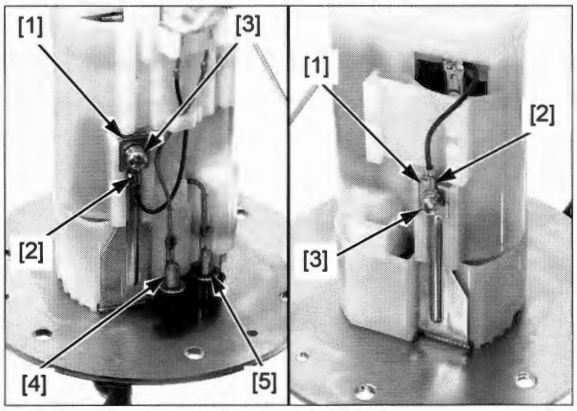
Install the fuel pump unit assembly [3] by aligning the grooves with the fuel pump stay tabs.



Install the stoppers [1], Black wire terminals [2] and screws [3].

Tighten the screws securely.

Connect the Pink wire connector [4] and Blue wire connector [5].



AIR CLEANER HOUSING

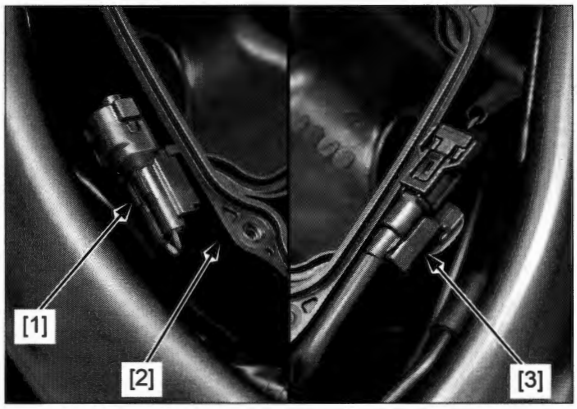
REMOVAL/INSTALLATION

Remove the following:

- Fuel tank (page 7-8)
- Air cleaner lid (page 3-5)
- Intake air duct (page 2-8) (CBR650R/RA)
- Shroud (page 2-10) (CB650R/RA)

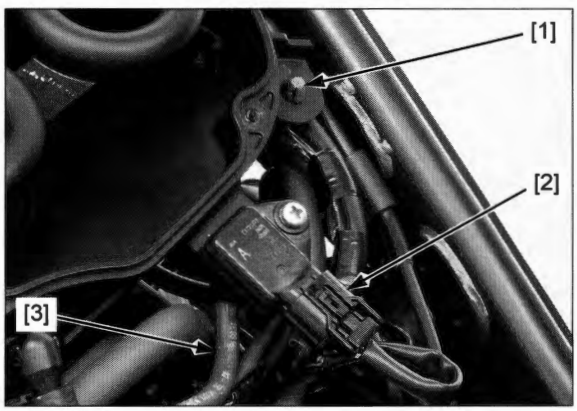
Release the following:

- Optional 2P (Black) connector [1] from the air cleaner housing [2]
- EOP switch 1P (Black) connector [3] from the slot



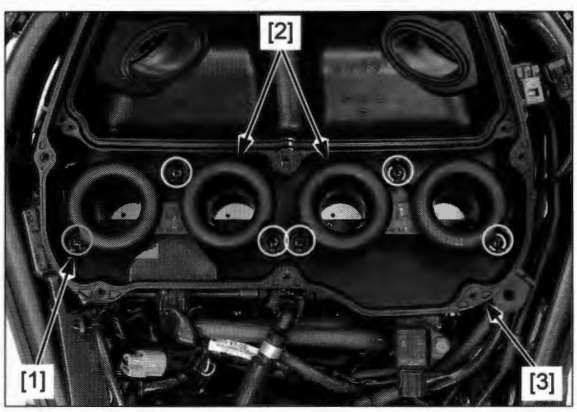
- Wire clip [1]

Disconnect the MAP sensor 3P (Black) connector [2] and vacuum hose [3] from the air cleaner housing.



Loosen the six screws [1] fully and remove the intake ducts [2].

Remove the air cleaner housing [3].



Remove the O-rings [1] from the air cleaner housing.

Installation is in the reverse order of removal.

- Replace the O-rings with new ones.

THROTTLE BODY

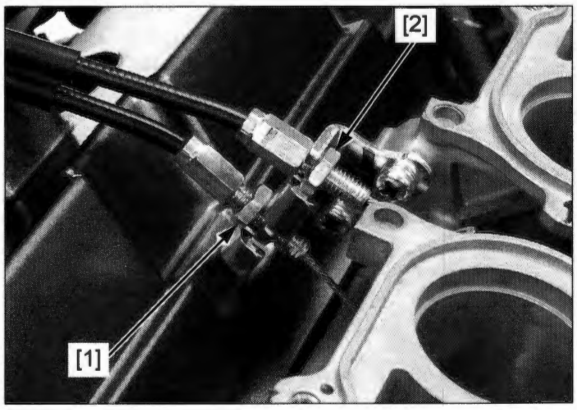
REMOVAL/INSTALLATION

NOTE:

- Always clean around the fuel system parts with compressed air before removing to prevent dirt and debris from entering the air passages in the throttle body.

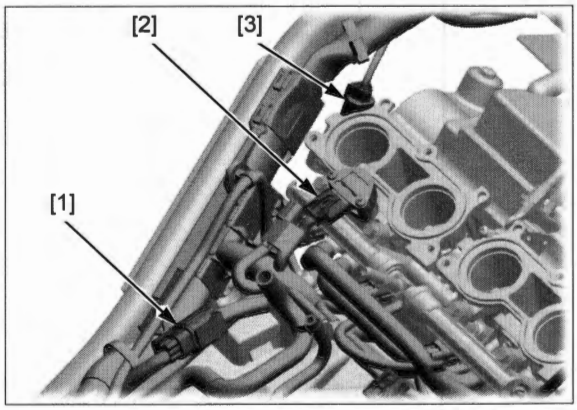
Remove the air cleaner housing (page 7-13).

Loosen the throttle cable A adjuster lock nut [1] and the throttle cable B lock nut [2].

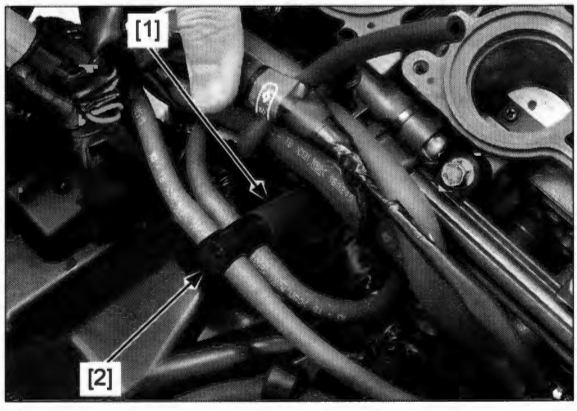


Disconnect the following:

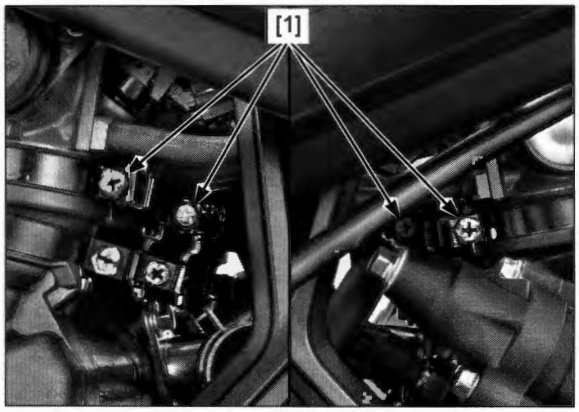
- Fuel injector sub harness 6P (Black) connector [1]
- IACV 4P (Black) connector [2]
- TP sensor 3P (Blue) connector [3]



AC type: – EVAP vacuum hose [1] from the hose joint [2]

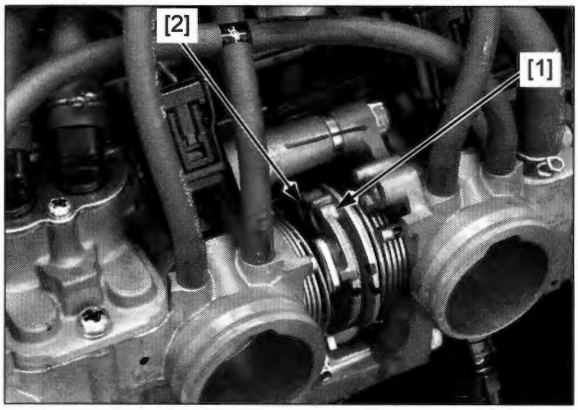


Loosen the four insulator band screws (throttle body side) [1].



Slide the throttle body assembly upward and release it off of the insulators.

Disconnect the throttle cable A [1] and the throttle cable B [2] from the throttle drum and cable stay.



Installation is in the reverse order of removal.

NOTE:

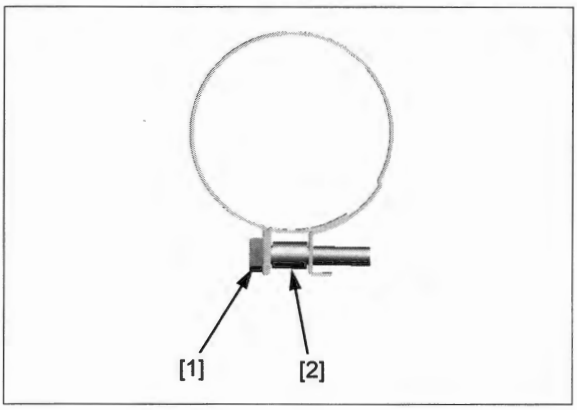
- Tighten the insulator band screw [1] until the band seats on the collar (9 mm) [2], then tighten it to the specified torque.

TORQUE:

Insulator band screw (throttle body side):
4.5 N·m (0.5 kgf·m, 3.3 lbf·ft)

Throttle cable B lock nut:
5.5 N·m (0.6 kgf·m, 4.1 lbf·ft)

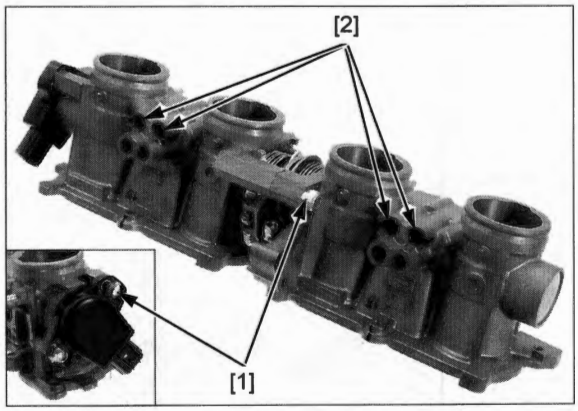
Adjust the throttle grip freeplay (page 3-4).



DISASSEMBLY/ASSEMBLY

NOTE:

- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Do not loosen or tighten the white painted [1] bolts, nuts, screws and air screws [2]. Loosening or tightening them can cause throttle body malfunction.



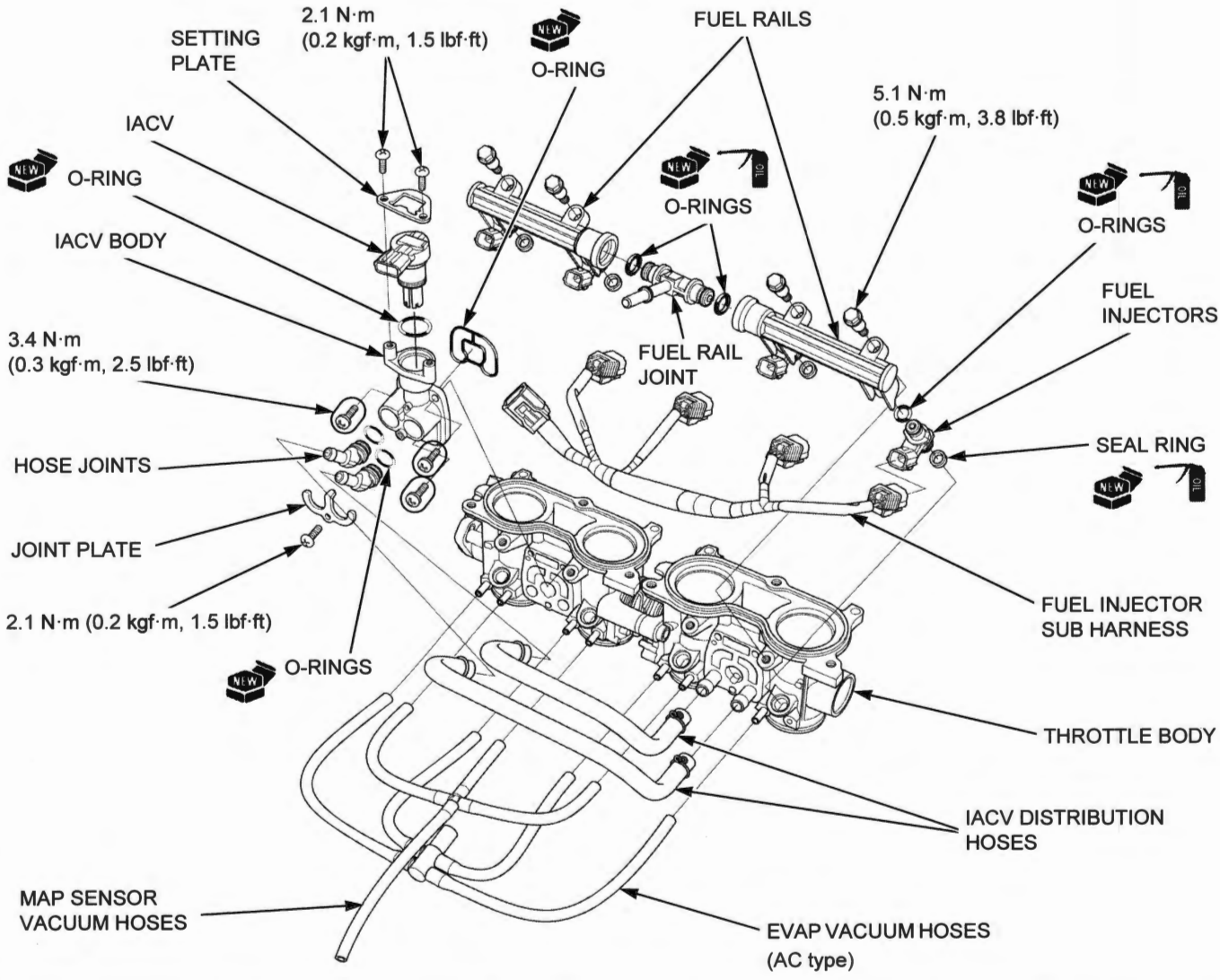
Remove the following:

- IACV (page 7-18)
- Fuel injector (page 7-17)

Clean the air passages in the throttle body and IACV body with compressed air.

NOTE:

- Cleaning with the a piece of wire will damage the throttle body.



INSULATOR

REMOVAL/INSTALLATION

Remove the following:

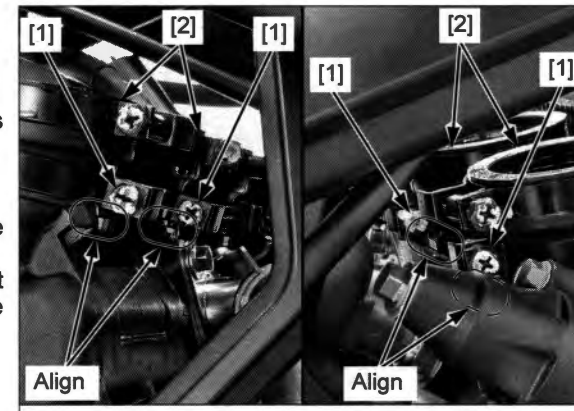
– Throttle body (page 7-14)
– Cam chain tensioner lifter (page 10-22)

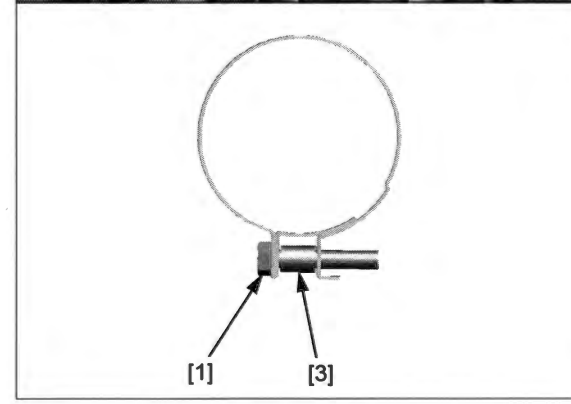
Loosen the band screws [1] and remove the insulators [2].

Installation is in the reverse order of removal.

- Align the insulator grooves with the tabs of the cylinder head.
- Tighten the insulator band screw until the band seat on the collar (7 mm) [3], then tighten it to the specified torque.

TORQUE:
Insulator band screw (cylinder head side):
4.5 N·m (0.5 kgf·m, 3.3 lbf·ft)





FUEL INJECTOR

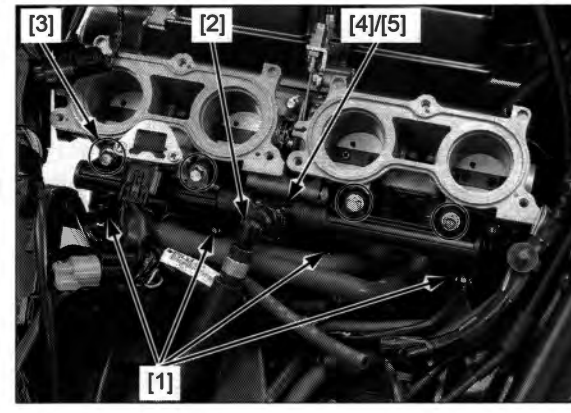
REMOVAL/INSTALLATION

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

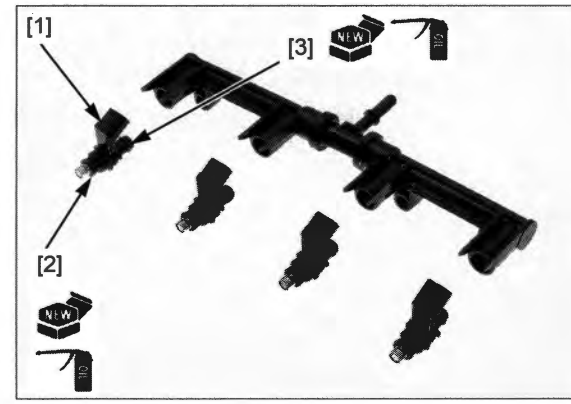
Disconnect the fuel injector 2P (Black) connectors [1]

Remove the following:

– Fuel feed hose [2]
– Four bolts [3]
– Fuel rails/joint [4] and fuel injectors [5] (as an assembly)

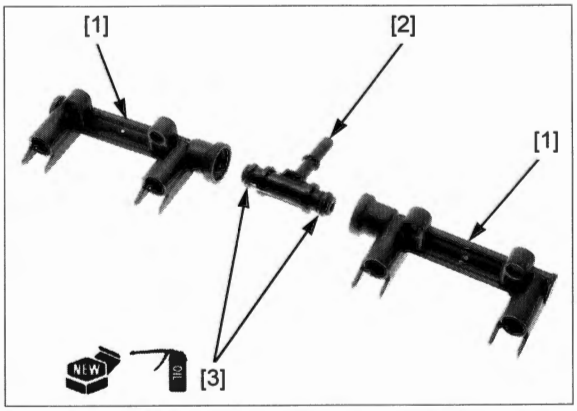


– Fuel injectors [1]
– Seal rings [2]
– O-rings [3]



- Fuel rails [1]
- Fuel rail joint [2]
- O-rings [3]

Check each part for wear or damage and replace it if necessary.



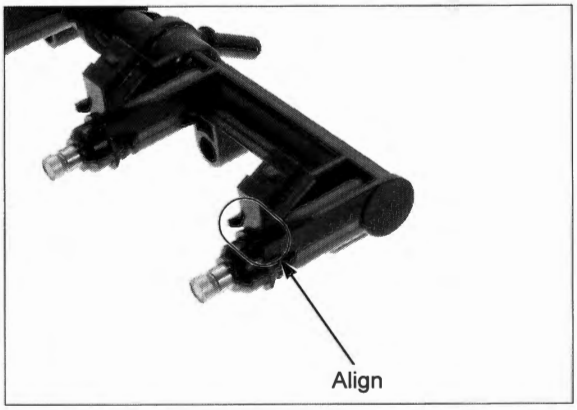
Installation is in the reverse order of removal.

NOTE:

- Replace the O-rings and seal rings with new ones and coat them with engine oil.
- Install the fuel injector by aligning the fuel injector connector with the groove of the fuel rail.
- When installing the fuel injector, be careful not to damage the O-ring and seal ring.

TORQUE:

Fuel injector joint bolt:
5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)



IACV

INSPECTION

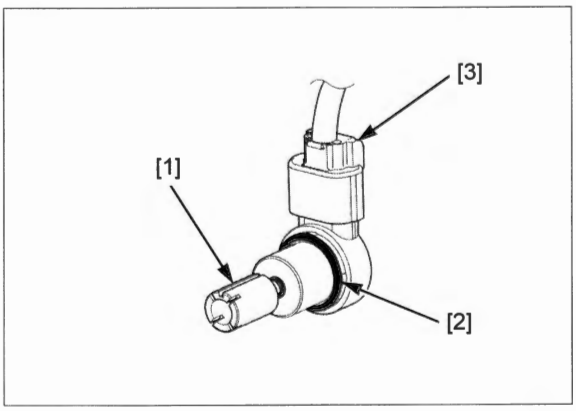
- The IACV is installed on the throttle body and is operated by the stepping motor. When the ignition switch is turned ON, the IACV operates for a few seconds.

Turn the ignition switch ON with the engine stop switch "○" and check the IACV.

If the operating sound is not heard with no MIL blinking, perform the following inspection.

Remove the IACV (page 7-19).

Check the IACV slide valve [1] and IACV air passage in the throttle body for carbon deposits.
Check the O-ring [2] on the IACV for deterioration or damage.



Temporarily connect the IACV 4P (Black) connector [3].

Turn the ignition switch ON with the engine stop switch "○" while holding the slide valve lightly.

The slide valve should move back and forth.

Turn the ignition switch OFF.

Install the removed parts in the reverse order of removal.

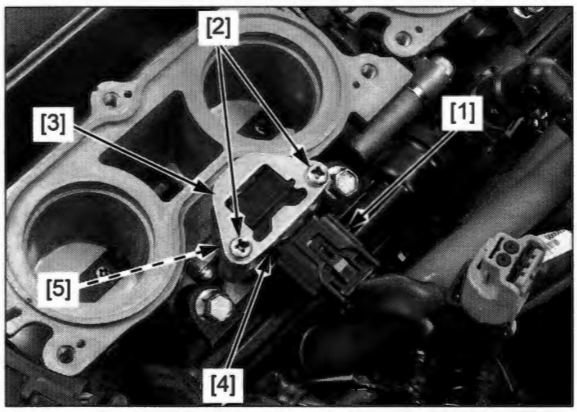
REMOVAL

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

Disconnect the IACV 4P (Black) connector [1].

Remove the following:

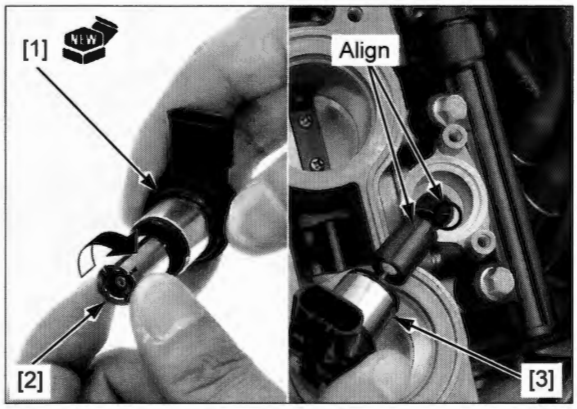
- Two screws [2]
- Setting plate [3]
- IACV [4]
- O-ring [5]



INSTALLATION

Replace the O-ring [1] with a new one (do not apply oil).

Turn the slide valve [2] clockwise until it is seated lightly and install the IACV [3] by aligning the long slot with the pin on the throttle body.



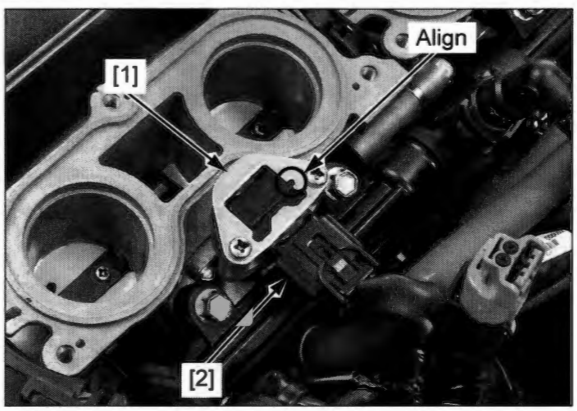
Install the setting plate [1] by aligning the cutout with the lug of the IACV body.

Install and tighten the screws to the specified torque.

TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)

Connect the IACV 4P (Black) connector [2].

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



FUEL PUMP RELAY

CIRCUIT INSPECTION

For relay inspection (page 21-23).

Remove the fuel pump relay (page 21-23).

RELAY SWITCH/COIL POWER INPUT LINE

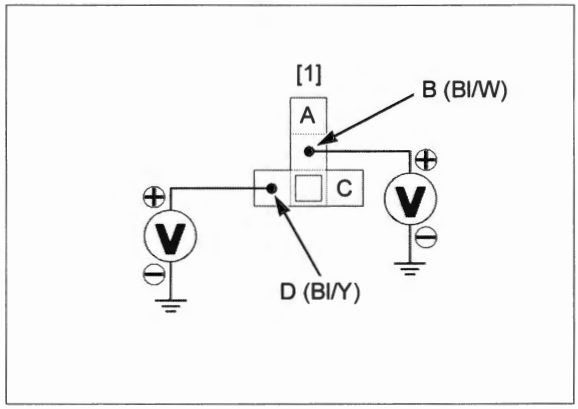
Measure the voltage between each fuel pump relay 4P connector [1] terminal and ground.

CONNECTION: B (+) – Ground (–)
D (+) – Ground (–)

There should be battery voltage when the ignition switch is turned ON with the engine stop switch "○".

If there is no voltage, check the following:

- Black/white wire in the relay connector between the main relay and fuel pump relay for open circuit
- Black/yellow wire between the engine stop switch and fuel pump relay for open circuit
- Main relay and its circuit (page 4-47)



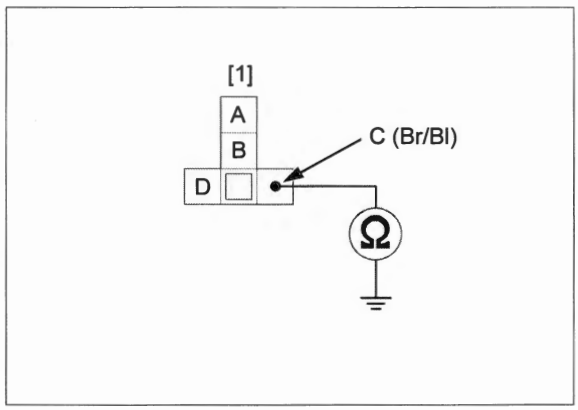
SIGNAL LINE

Check for continuity between the fuel pump relay 4P connector [1] terminal and ground.

CONNECTION: C – Ground

There should be no continuity with the ignition switch OFF.
If there is continuity, check for short circuit in the Brown/black wire between the relay connector and ECM.

There should be continuity for a few seconds when the ignition switch is turned ON with the engine stop switch "○".
If there is no continuity, check for open circuit in the Brown/black wire between the relay connector and ECM.



SECONDARY AIR SUPPLY SYSTEM

SYSTEM INSPECTION

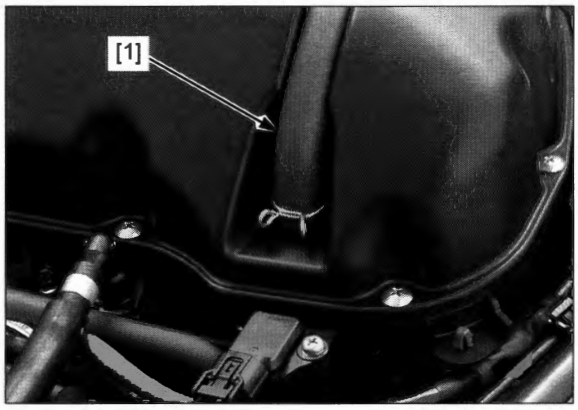
Start the engine and warm it up to normal operating temperature.

Stop the engine.

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

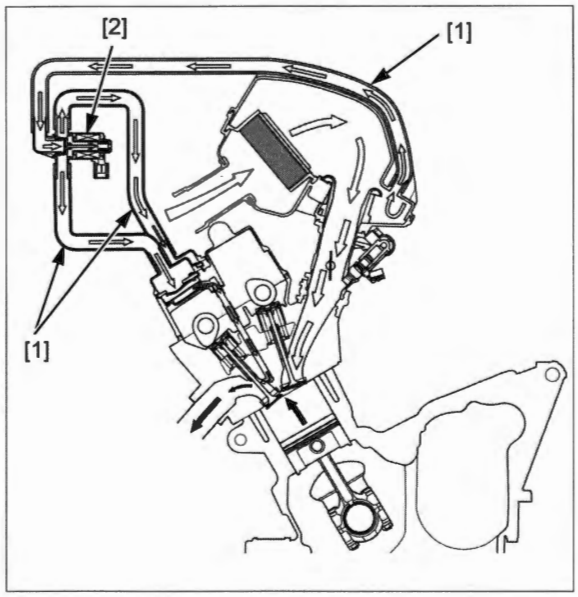
Disconnect the air supply hose [1] from the air cleaner lid.

Check that the hose joint (secondary air intake port) of the air cleaner lid is clean and free of carbon deposits. Check the PAIR check valve if the port is carbon fouled (page 7-23).



Start the engine and open the throttle slightly to be certain that air is sucked in through the disconnected air supply hose.

If the air is not drawn in, check the air supply hoses [1] for clogs and PAIR control solenoid valve [2] (page 7-22).

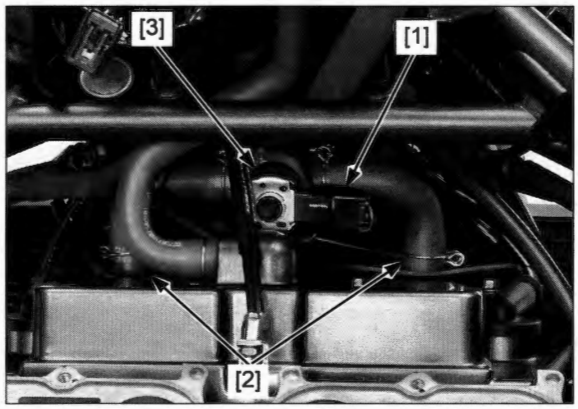


PAIR CONTROL SOLENOID VALVE REMOVAL/INSTALLATION

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

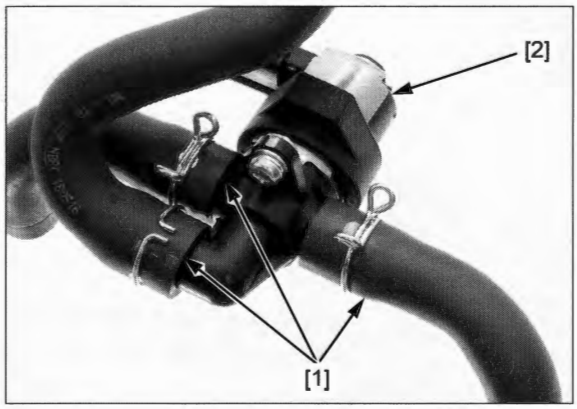
Disconnect the PAIR control solenoid valve 2P (Black) connector [1].

Disconnect the air supply hoses [2] from the cylinder head cover and remove the PAIR control solenoid valve assembly [3].



Disconnect the air supply hoses [1] from the PAIR control solenoid valve [2].

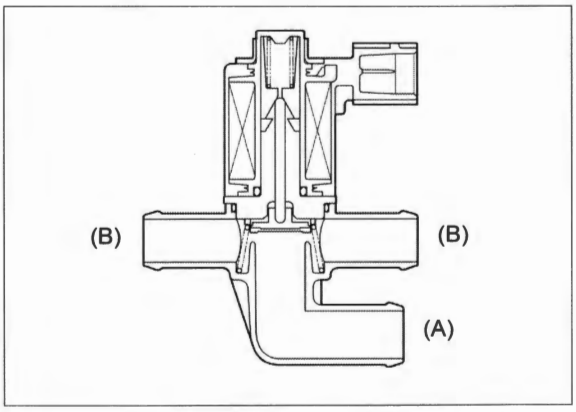
Installation is in the reverse order of removal.



PAIR CONTROL SOLENOID VALVE INSPECTION

Remove the PAIR control solenoid valve (page 7-21).

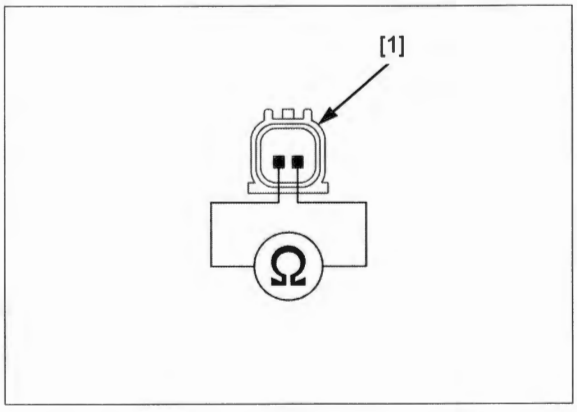
Check that air flows (A) to (B) when the 12 V battery is connected to the PAIR control solenoid valve terminals. Air should not flow (A) to (B) when the battery is disconnected.



Measure the resistance between the 2P connector [1] terminals of the PAIR control solenoid valve.

STANDARD: 23 – 27 Ω (20°C/68°F)

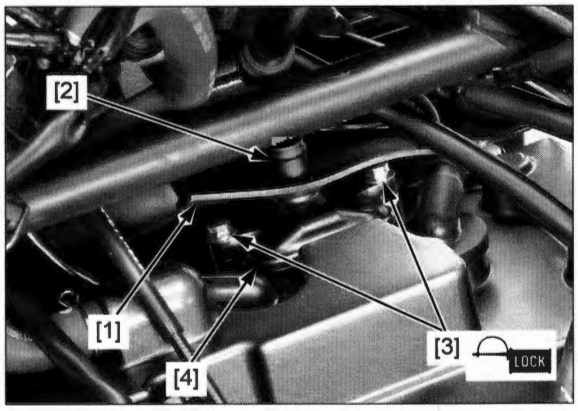
If the resistance is out of the specification, replace the PAIR control solenoid valve.



PAIR CHECK VALVE REMOVAL/ INSTALLATION

Pull off the heat guard rubber [1] from the check valve cover joint [2].

Remove the two bolts [3] and check valve cover [4].



Remove the PAIR check valves [1] and baffle plates [2].

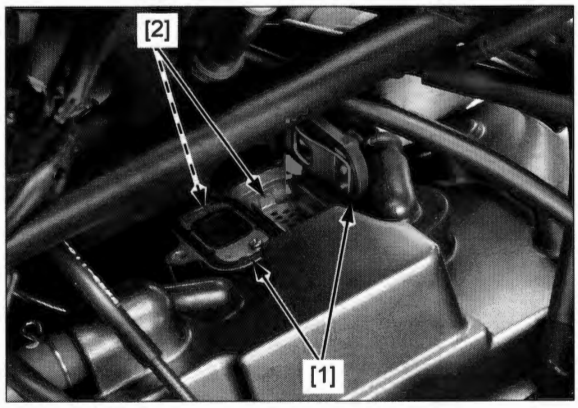
Installation is in the reverse order of removal.

NOTE:

- Apply locking agent to the threads of the PAIR check valve cover bolt (page 1-17).

TORQUE:

PAIR check valve cover bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

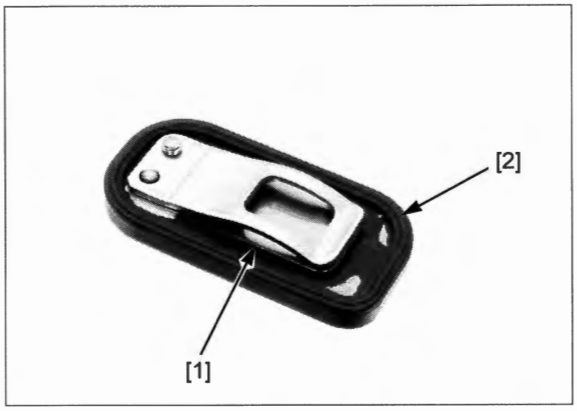


PAIR CHECK VALVE INSPECTION

Remove the PAIR check valves (page 7-22).

Check the reed [1] of the PAIR check valve for damage or fatigue. Replace if necessary.

Replace the PAIR check valve if the rubber seat [2] is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.



EVAP PURGE CONTROL SOLENOID VALVE (AC type)

REMOVAL/INSTALLATION

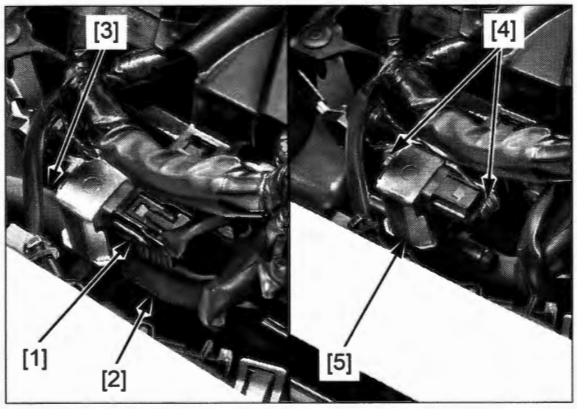
Remove the throttle body (page 7-14).

Disconnect the following:

- EVAP purge control solenoid valve 2P (Black) connector [1]
- Canister-to-EVAP purge control solenoid valve hose [2]
- EVAP vacuum hose [3]

Remove the two bolts [4] and EVAP purge control solenoid valve [5].

Installation is in the reverse order of removal.



INSPECTION

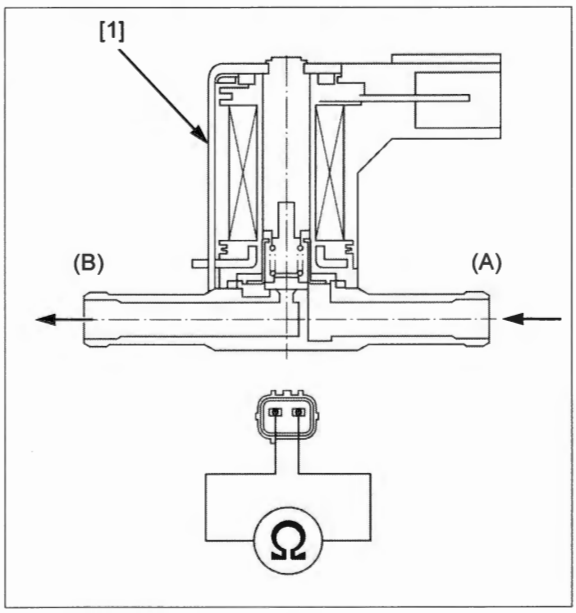
Remove the EVAP purge control solenoid valve [1] (page 7-23).

Check that air flows (A) to (B) when the 12 V battery is connected to the EVAP purge control solenoid valve terminals. Air should not flow (A) to (B) when the battery is disconnected.

Check the resistance between the terminals of the EVAP purge control solenoid valve.

STANDARD: 30 – 34 Ω (20°C/68°F)

If the resistance is out of specification, replace the EVAP purge control solenoid valve.

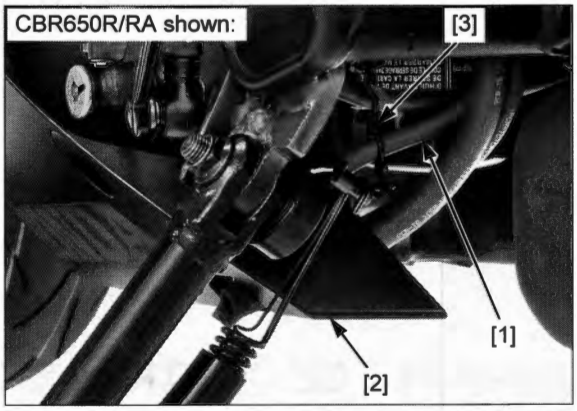


EVAP CANISTER (AC type)

REMOVAL/INSTALLATION

CBR650R/RA: Release the EVAP canister drain hose [1] from under cowl [2] and harness clip [3].

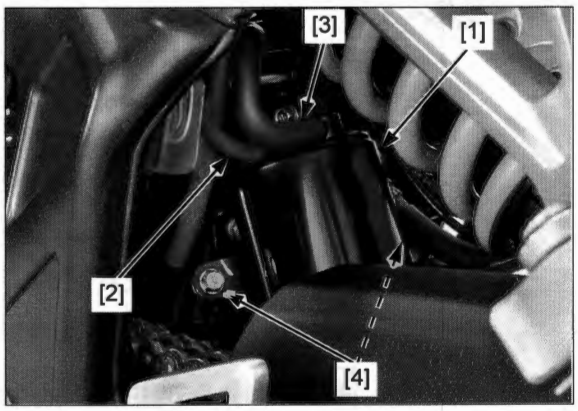
CB650R/RA: Release the EVAP canister drain hose from hose clamp and harness clip.



Disconnect the following from the EVAP canister [1]:

- Fuel tank-to-EVAP canister hose [2]
- Canister-to-EVAP purge control solenoid valve hose [3]

Remove the two mounting bolts [4] and EVAP canister.



Remove the heat guard [1] by releasing the tabs [2] from the grooves of the rubber mount [3].

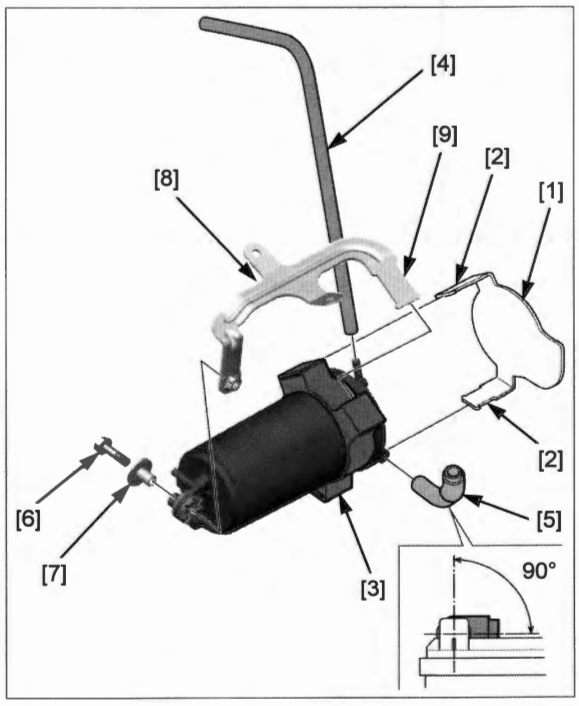
Disconnect the following:

- EVAP canister drain hose [4]
- EVAP canister breather hose [5]

Remove the bolt [6] and collar [7].

Remove the EVAP canister stay [8] by releasing the tab [9] from the groove of the rubber mount.

Installation is in the reverse order of removal.



8. COOLING SYSTEM

SERVICE INFORMATION 8-2

TROUBLESHOOTING 8-2

SYSTEM FLOW PATTERN 8-3

SYSTEM TESTING 8-4

COOLANT REPLACEMENT 8-4

THERMOSTAT 8-6

RADIATOR/COOLING FAN 8-7

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WATER PUMP 8-9

WATER HOSE JOINT B 8-11

THERMOSTAT CASE ASSEMBLY 8-11

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.

- The coolant should be inspected and replaced properly by following the maintenance schedule.
- DO NOT use non-ethylene glycol coolant, tap water, nor mineral water when adding or replacing the coolant.
  Use of improper coolant may cause damage, such as corrosion in the engine, blockage of the cooling passage or the radiator and premature wear of the water pump seal.
- Add cooling system at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- For coolant temperature gauge/ECT sensor inspection (page 21-12).
- For fan control relay inspection (page 21-23).

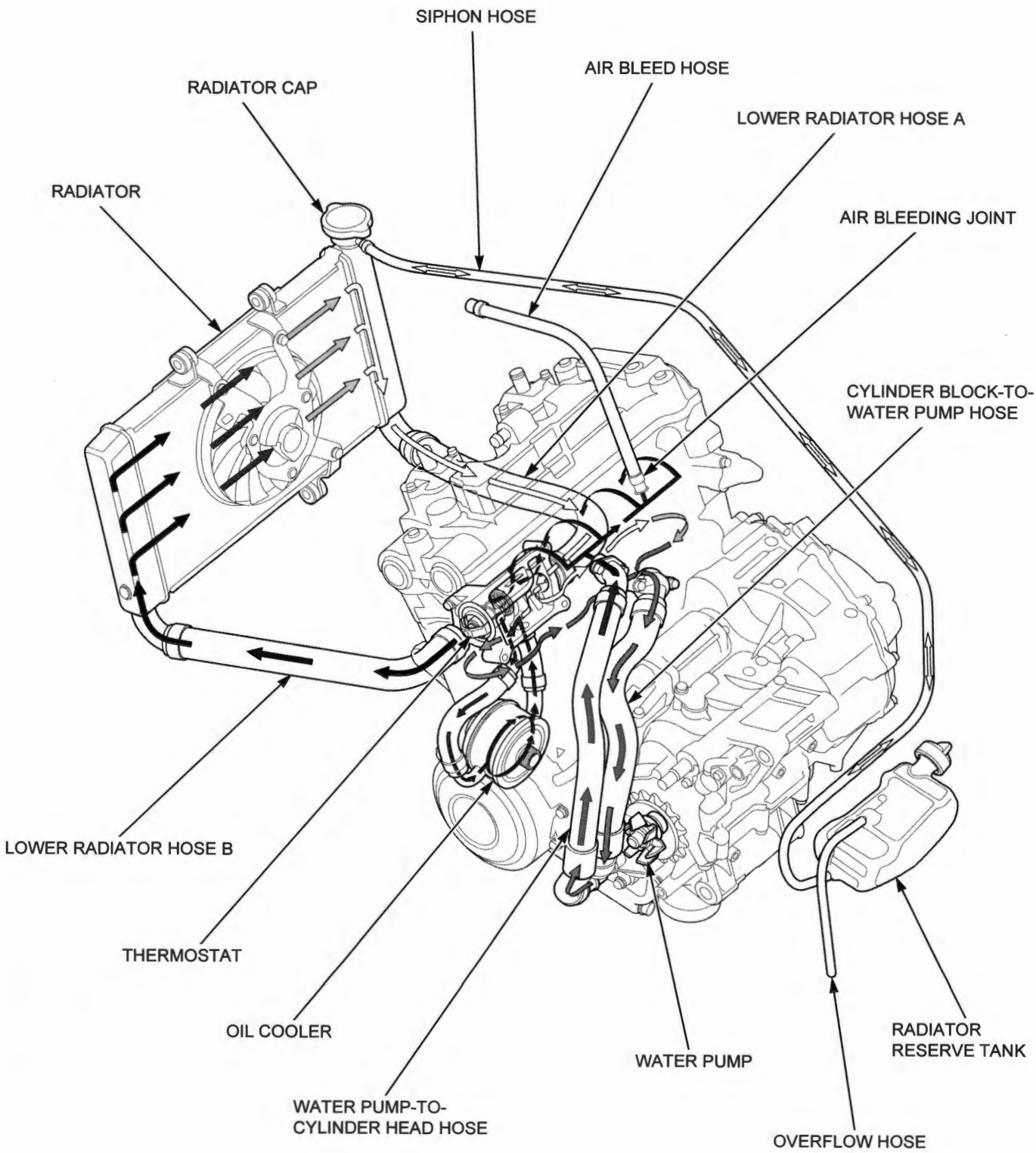
TROUBLESHOOTING

Engine temperature too high
- Faulty coolant temperature gauge or ECT sensor (page 21-12)
- 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 control relay (page 21-23)
- Faulty water pump

Engine temperature too low
- Faulty coolant temperature gauge or ECT sensor (page 21-12)
- Thermostat stuck open
- Faulty fan control relay

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

SYSTEM FLOW PATTERN



SYSTEM TESTING

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the following:

- Right middle cowl (page 2-7) (CBR650R/RA)
- Right shroud (page 2-10) (CB650R/RA)
- Radiator cap [1]

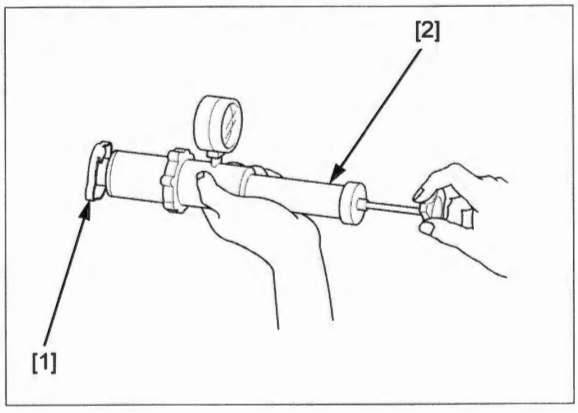
Wet the sealing surfaces of the cap [1], then install the cap onto the tester [2].

Pressurize the radiator cap using the tester.

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

The cap 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)



Connect the tester to the radiator.

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.

COOLANT REPLACEMENT

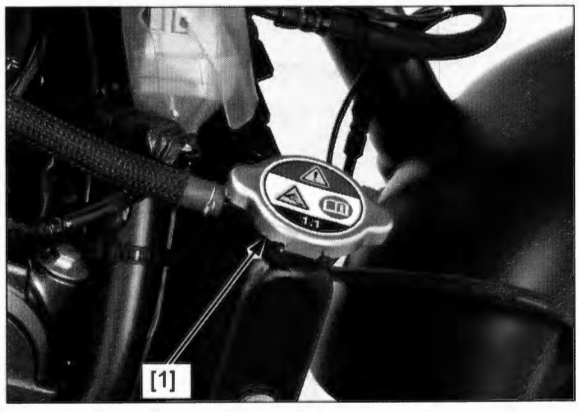
REPLACEMENT/AIR BLEEDING

NOTE:

- When filling the system or reserve tank with coolant, or checking the coolant level, place the motorcycle in an upright position on a flat, level surface.

Remove the following:

- Under cowl (page 2-11) (CBR650R/RA)
- Intake air duct (page 2-8) (CBR650R/RA)
- Shroud (page 2-10) (CB650R/RA)
- Radiator cap [1]

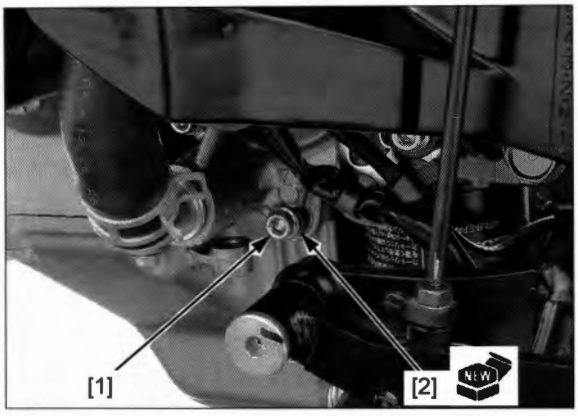


Remove the water pump drain bolt [1] and sealing washer [2], then drain the coolant.

Reinstall the drain bolt with new sealing washer.

Tighten the drain bolt to the specified torque.

TORQUE:
Water pump drain bolt:
13 N·m (1.3 kgf·m, 10 lbf·ft)

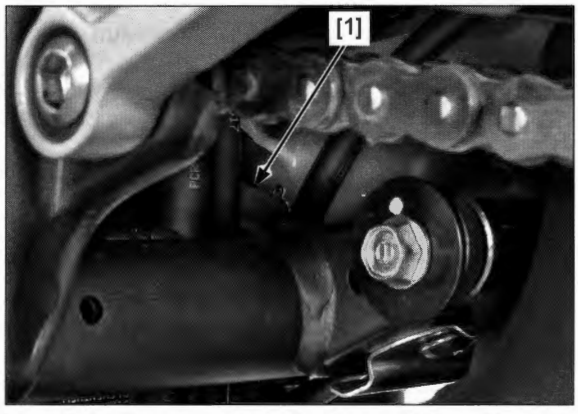


Disconnect the siphon hose [1] from the radiator reserve tank.

Empty the coolant and rinse the inside of the reserve tank with water.

Connect the siphon hose onto the radiator reserve tank.

Fill the reserve tank with the recommended coolant (page 3-12).



Remove the air bleed hose plug [1] from the air bleed hose.

Fill the system with the recommended coolant through the filler opening up to the filler neck [2].

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

Bleed air from the system as follow:

1. Shift the transmission into neutral and place the vehicle on the sidestand.

   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 recommended coolant up to the filler neck.
4. Install the radiator cap and air bleed hose plug.
5. Check the coolant level in the reserve tank (page 3-12).

NOTE:
- When air bleeding is insufficient, level of coolant in the reserve tank will decrease.

Check that there are no coolant leaks.

Install the following:

– Under cowl (page 2-11) (CBR650R/RA)
– Intake air duct (page 2-8) (CBR650R/RA)
– Shroud (page 2-10) (CB650R/RA)

THERMOSTAT

REMOVAL/INSTALLATION

Drain the coolant (page 8-4).

Remove the bolts [1] and thermostat cover [2].

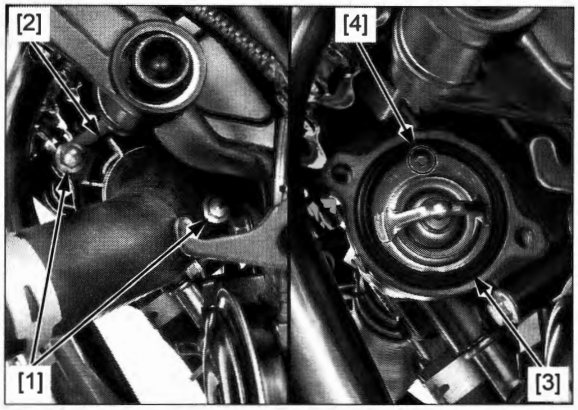
Remove the thermostat [3] from the thermostat housing.

Installation is in the reverse order of removal.

TORQUE:
Thermostat cover bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

NOTE:
- Install the thermostat with the air bleed hole [4] facing up.

Fill and bleed the cooling system (page 8-4).

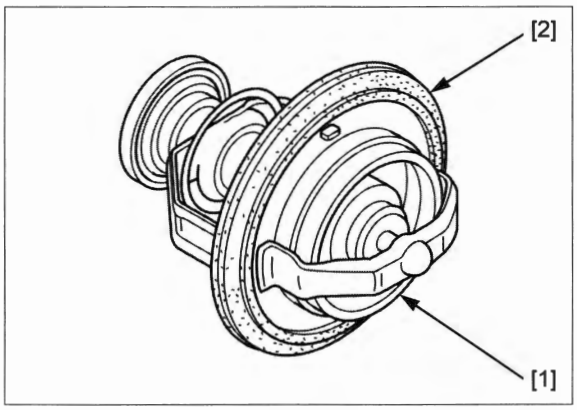


INSPECTION

Visually inspect the thermostat [1] for damage.

Replace the thermostat if the valve stays open at room temperature.

Check the seal ring [2] for damage and replace if necessary.



Wear insulated gloves and adequate eye protection. Keep flammable materials away from the electric heating element. Do not let the thermostat or thermometer [1] touch the pan, or you will get false reading.

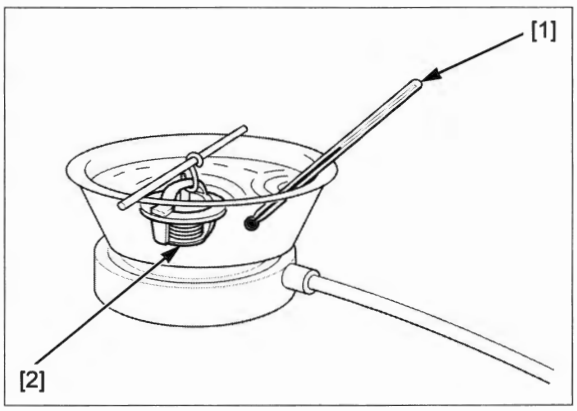
Heat the water with an electric heating element to operating temperature for 5 minutes.

Suspend the thermostat [2] in heated water to check its operation.

THERMOSTAT BEGIN TO OPEN:
80 – 84°C (176 – 183°F)

VALVE LIFT:
8 mm (0.3 in) minimum at 95°C (203°F)

Replace the thermostat if it responds at temperatures other than those specified.



RADIATOR/COOLING FAN

PULL DOWN THE RADIATOR

- Perform this procedure, before removing the following:
  - Radiator (page 8-7)
  - Exhaust pipe/muffler (page 2-17)
  - Front wheel speed sensor (page 19-22)

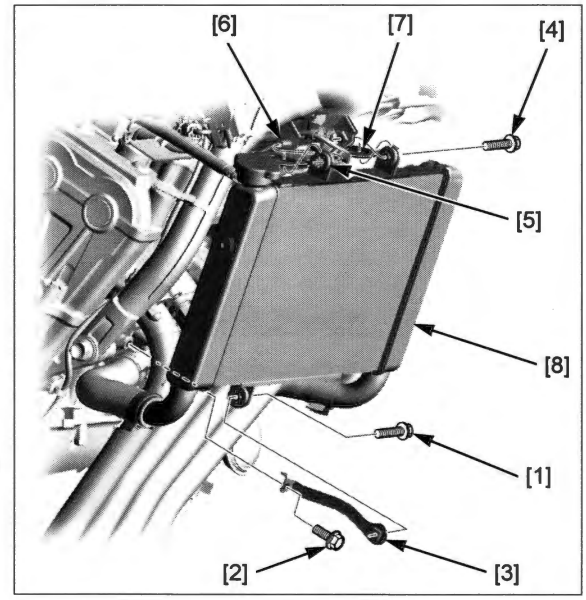
Remove the following:

- Middle cowl (page 2-7) (CBR650R/RA)
- Under cowl (page 2-11) (CBR650R/RA)
- Shroud (page 2-10) (CB650R/RA)
- Radiator lower mounting bolt [1]
- Radiator lower stay mounting bolt [2]
- Radiator lower stay [3]

Remove the radiator upper mounting bolt [4] and release the radiator mounting rubber [5] from the boss [6] of the frame.

Pull off the heat guard rubber [7] and pull down the radiator [8].

Installation is in the reverse order of removal.



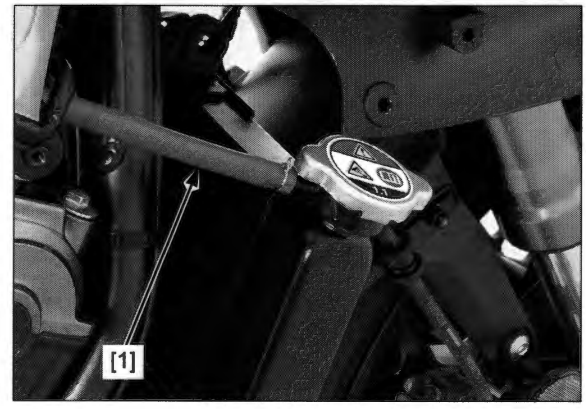
REMOVAL/INSTALLATION

Drain the coolant (page 8-4).

Pull down the radiator (page 8-7).

Disconnect the fan motor 2P (Black) connector [1].

Disconnect the siphon hose [1].



Disconnect lower radiator hose A [1] and lower hose B [2], then remove the radiator.

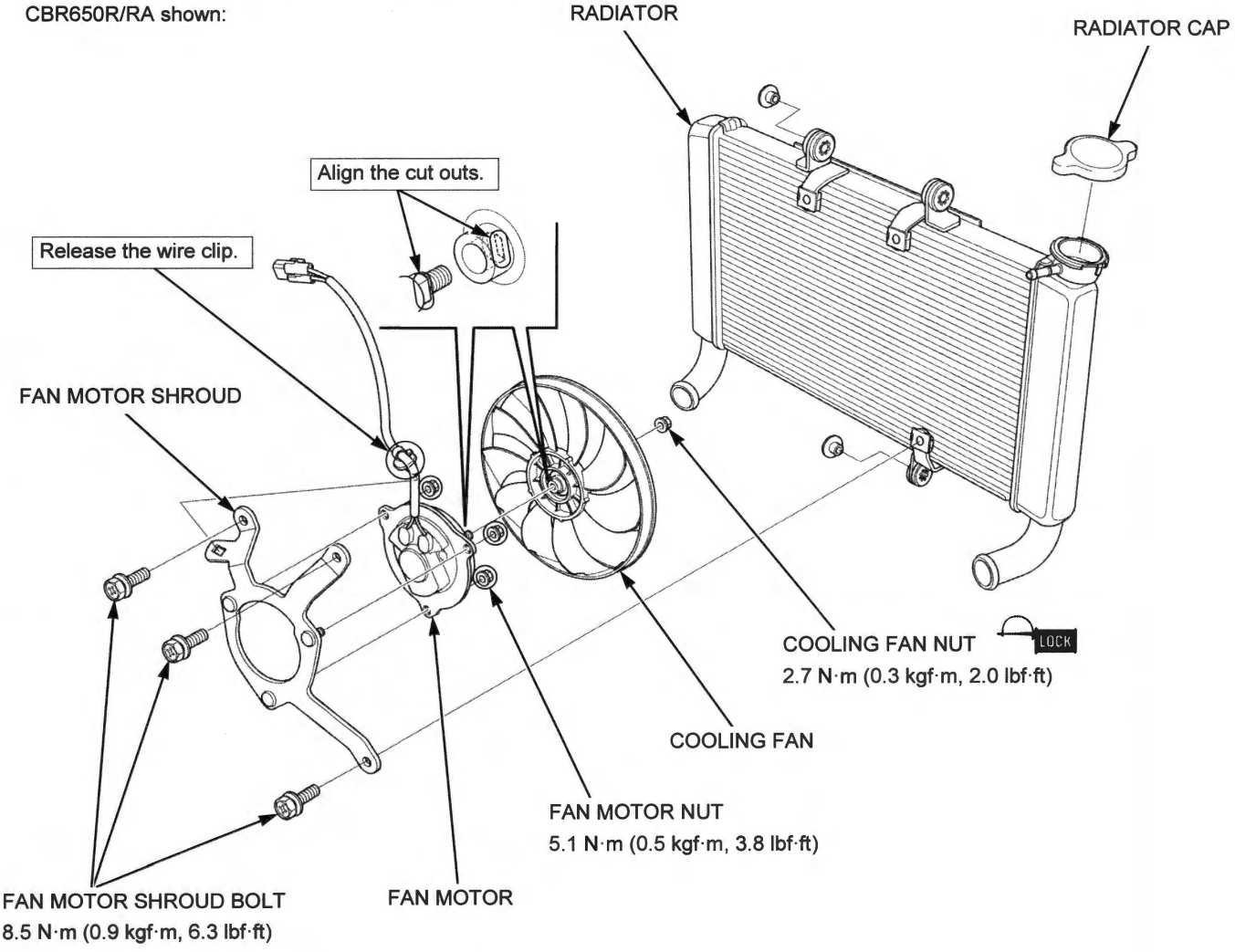
Installation is in the reverse order of removal.

Fill and bleed the cooling system (page 8-4).

DISASSEMBLY/ASSEMBLY

Disassemble and assemble the radiator as following illustration.

CBR650R/RA shown:



RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

Remove the exhaust pipe/muffler (page 2-17).

Remove the radiator reserve tank cap [1].

Remove the reserve tank stay mounting bolt [2] and release the boss [3] of the reserve tank [4] from the frame.

Disconnect the siphon hose [5] and drain the coolant.

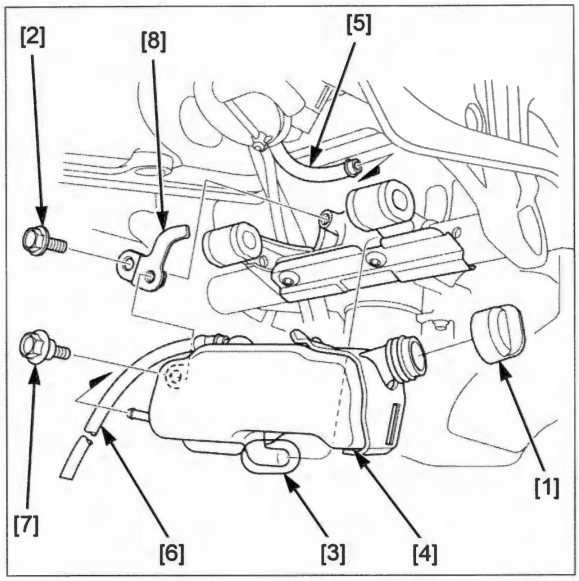
Remove the reserve tank by pulling the overflow hose [6] out from the frame.

Remove the radiator reserve tank mounting bolt [7] and stay [8].

Installation is in the reverse order of removal.

TORQUE:
Radiator reserve tank mounting bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

Fill the reserve tank with the recommended coolant (page 3-12).



WATER PUMP

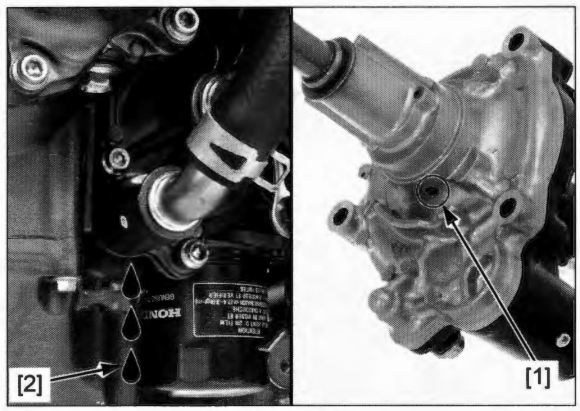
MECHANICAL SEAL INSPECTION

Remove the under cowl (page 2-11) (CBR650R/RA).

Check the bleed hole [1] of the water pump for signs of coolant leakage.

- A small amount of coolant weeping from the bleed hole is normal.
- Make sure that there are no continuous coolant leakage [2] from the bleed hole while operating the engine.

Replace the water pump body if necessary.



REMOVAL/INSTALLATION

NOTE:

- Place a clean oil pan under the engine because engine oil will flow out when removing the water pump body. Add the recommended engine oil to the specified level after installation (page 3-10).

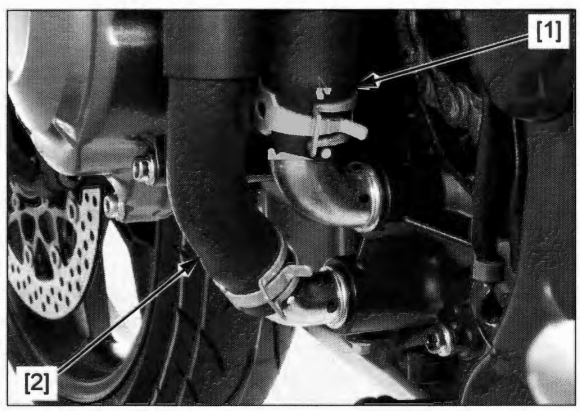
Drain the coolant (page 8-4).

Remove the drive sprocket cover (page 2-15).

Support the motorcycle in an upright position on a level surface.

Disconnect the following from the water pump cover:

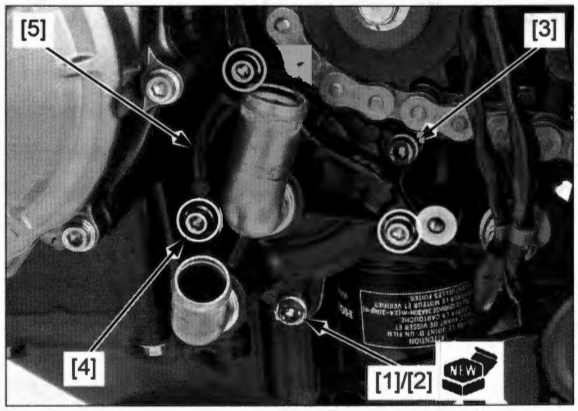
– Cylinder block-to-water pump hose [1]
– Water pump-to-cylinder head hose [2]



Remove the water pump drain bolt [1] and sealing washer [2].

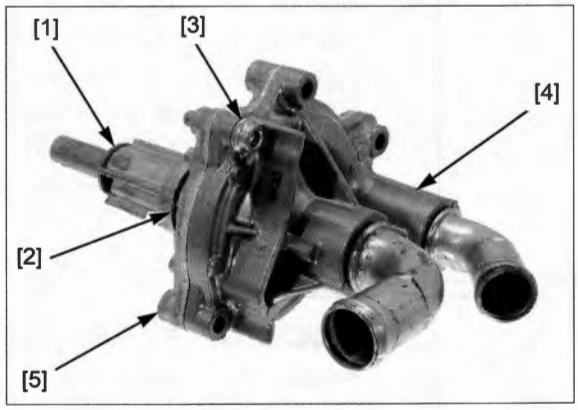
Loosen the cover bolt [3].

Remove the three mounting bolts [4] and water pump assembly [5].



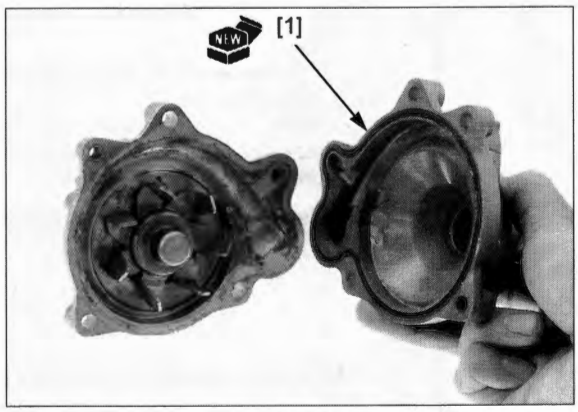
Remove the thrust washer [1] and O-ring [2].

Remove the cover bolt [3], then separate the water pump cover [4] and water pump body [5].



Remove the O-ring [1] from the water pump cover groove and replace it a new one.

- Do not apply engine oil to the cover O-ring.



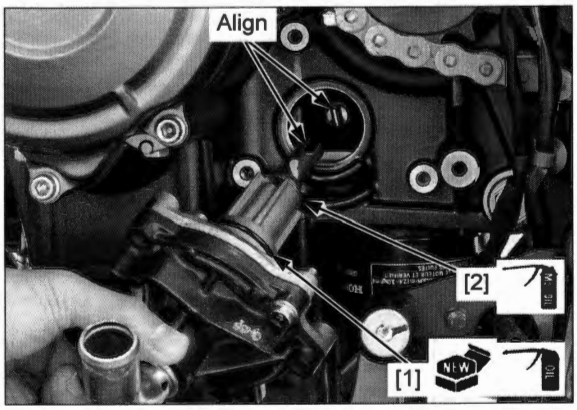
Installation is in the reverse order of removal.

TORQUE:

Water pump mounting bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

Water pump cover bolt:
13 N·m (1.3 kgf·m, 10 lbf·ft)

Water pump drain bolt:
13 N·m (1.3 kgf·m, 10 lbf·ft)



NOTE:

- Do not disassemble the water pump body.
- Replace the O-rings and sealing washer with new ones.
- Apply engine oil to the water pump body O-ring [1].
- Apply Molybdenum oil solution to the water pump shaft thrust washer [2] sliding area.
- Align the water pump shaft groove with the oil pump shaft end by turning the water pump impeller.

Check the oil level (page 3-10).

Fill and bleed the cooling system (page 8-4).

WATER HOSE JOINT B

REMOVAL/INSTALLATION

Drain the coolant (page 8-4).

Remove the throttle body (page 7-14).

Remove the bolts [1].

Remove the water hose joint B [2] from the cylinder block-to-water pump hose [3]

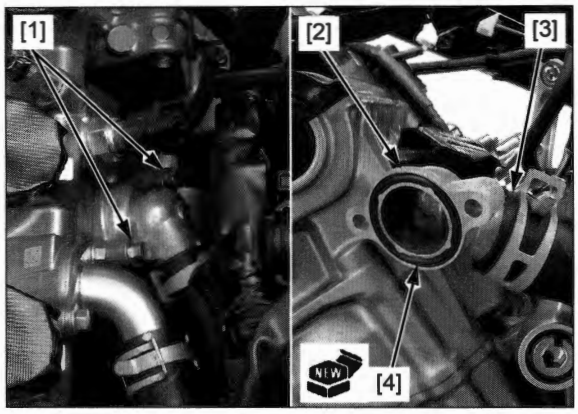
Remove the O-ring [4].

Installation is in the reverse order of removal.

NOTE:

- Replace the O-ring with a new one.
- Do not apply engine oil to the O-ring.

Fill and bleed the cooling system (page 8-4).



THERMOSTAT CASE ASSEMBLY

REMOVAL/INSTALLATION

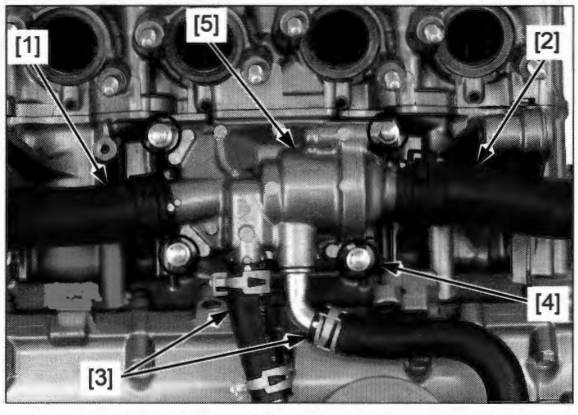
Remove the following:

- Radiator (page 8-7)
- Exhaust pipe/muffler (page 2-18)

Disconnect the following from the thermostat case joint:

- Lower radiator hose A [1]
- Lower radiator hose B [2]
- Oil cooler water hoses [3]

Remove the four bolts [4] and thermostat case assembly [5].



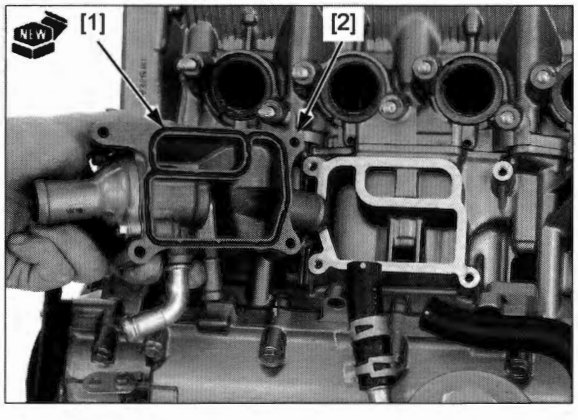
Remove the O-ring [1] from the thermostat case assembly [2].

Installation is in the reverse order of removal.

NOTE:

- Replace the O-ring with a new one.
- Do not apply engine oil to the O-ring.

Fill and bleed the cooling system (page 8-4).



MEMO

9. LUBRICATION SYSTEM

SERVICE INFORMATION ····· 9-2

TROUBLESHOOTING ····· 9-3

LUBRICATION SYSTEM DIAGRAM ····· 9-4

OIL PRESSURE INSPECTION ····· 9-5

OIL PUMP ····· 9-5

PRESSURE RELIEF VALVE ····· 9-7

OIL STRAINER ····· 9-7

OIL COOLER ····· 9-9

SERVICE INFORMATION

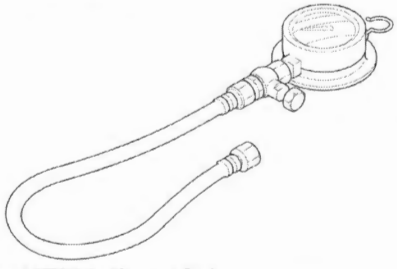
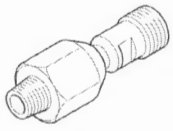
GENERAL

⚠CAUTION

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

- The oil pump can be serviced with the engine installed in the frame.
- The service procedures in this section must be performed with the engine oil drained.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks and that oil pressure is correct.
- For engine oil pressure indicator/EOP switch inspection (page 21-13).

TOOLS

Oil pressure gauge set 07506-3000001  or MT37A (Snap-On) or equivalent commercially available in U.S.A.	Oil pressure gauge attachment 07406-0030000  or equivalent commercially available in U.S.A.

TROUBLESHOOTING

Oil level too low
- Oil consumption
- External oil leak
- Worn piston rings (page 14-14)
- Improperly installed piston rings (page 14-14)
- Worn cylinders (page 14-14)
- Worn stem seals (page 10-14)
- Worn valve guide (page 10-15)

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

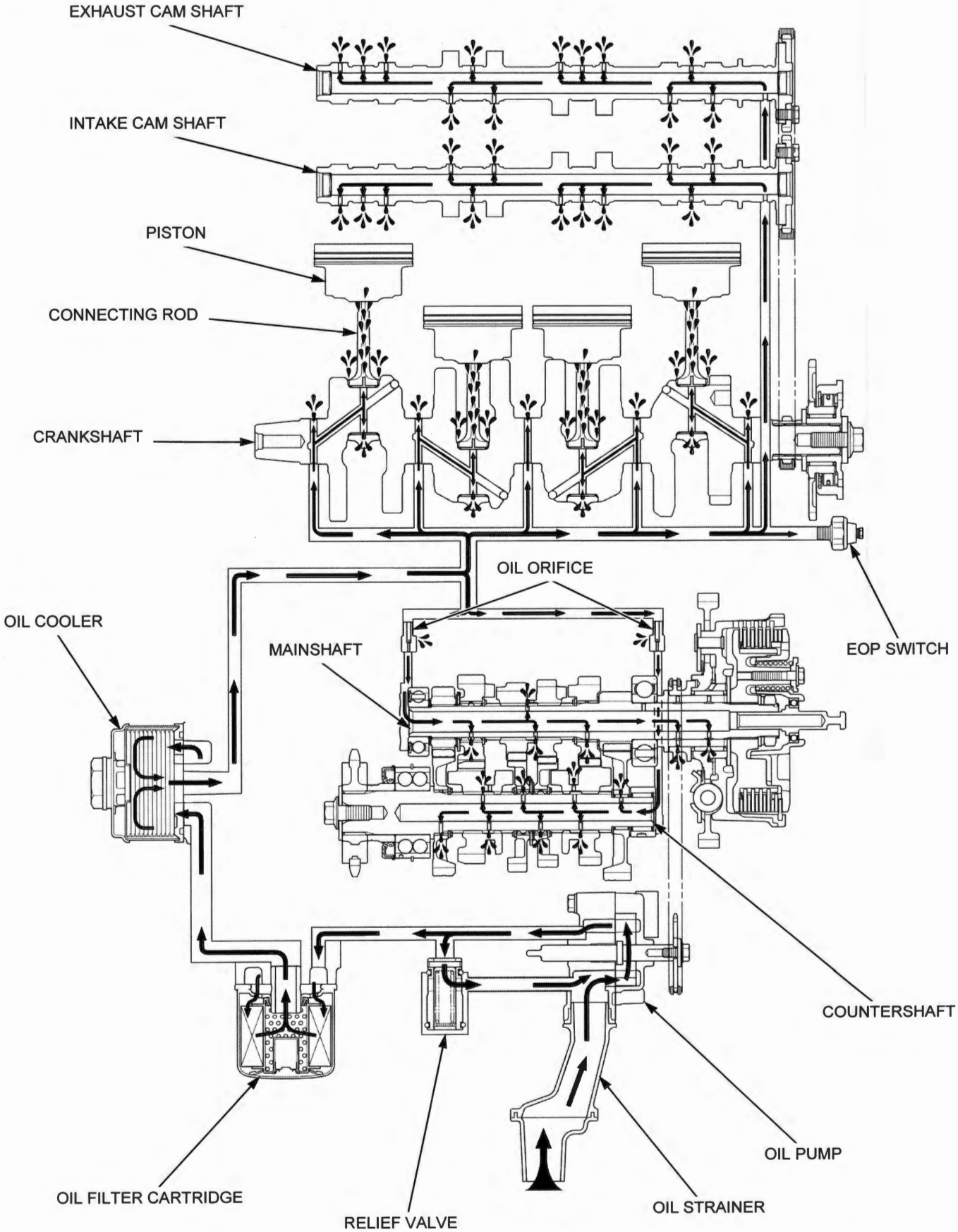
No oil pressure
- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive chain
- Broken oil pump drive or driven sprocket
- Damaged oil pump
- Internal oil leak

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

Oil contamination
- Oil or filter not changed often enough
- Worn piston rings (page 14-14)

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

LUBRICATION SYSTEM DIAGRAM



OIL PRESSURE INSPECTION

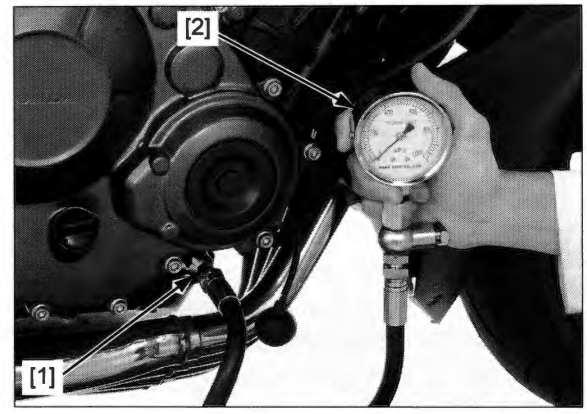
NOTE:

- If the engine oil pressure indicator remains on while the engine is running, check the indicator system before checking the oil pressure (page 21-13).

Remove the EOP switch (page 21-14).

Install the oil pressure gauge attachment [1] to the switch base.

Connect the oil pressure gauge [2] to the oil pressure gauge attachment.



TOOLS:

Oil pressure gauge set	**07506-3000001 or MT37A (Snap-On) or equivalent commercially available in U.S.A.**
Oil pressure gauge attachment	**07406-0030000 or equivalent commercially available in U.S.A.**

Check the oil level and add the recommended oil if necessary (page 3-10).

Warm the engine to normal operating temperature (approximately 80°C/176°F).

STANDARD:
490 kPa (5.0 kgf/cm², 71 psi)
at 5000 rpm/80°C (176°F)

Stop the engine and remove the tools.

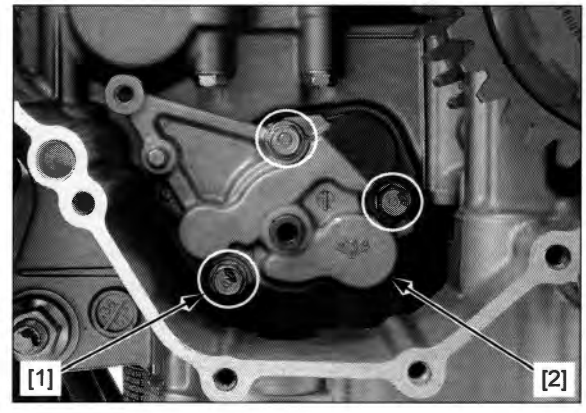
Install the EOP switch (page 21-14).

OIL PUMP

REMOVAL/INSTALLATION

Remove the clutch (page 11-7).

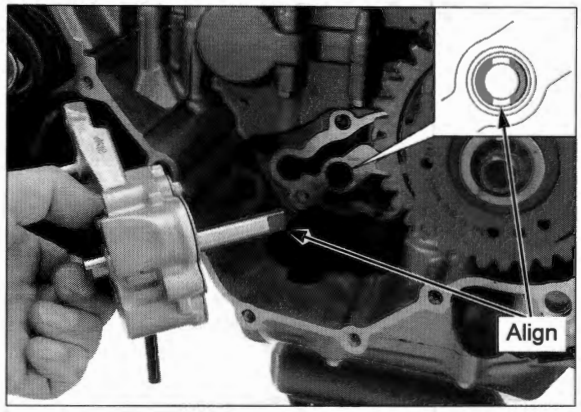
Remove the bolts [1] and oil pump [2].



Installation is in the reverse order of removal.

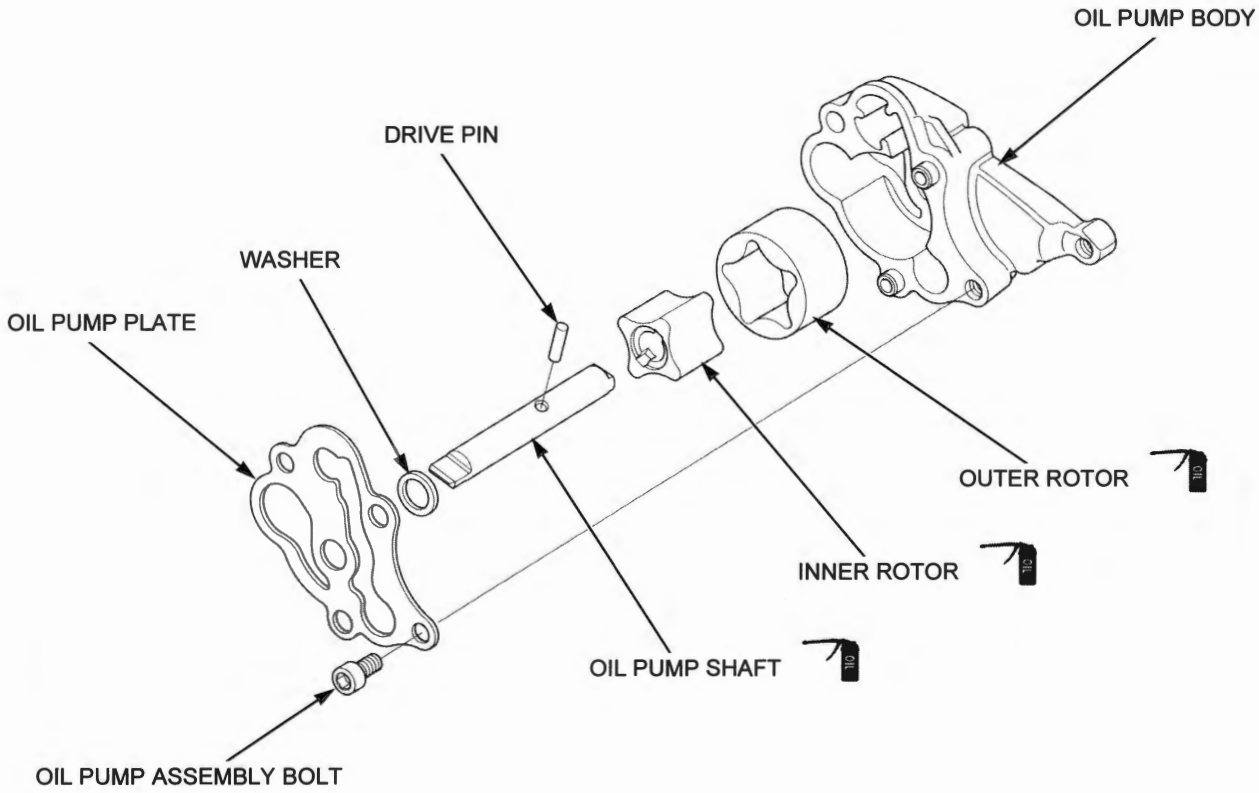
NOTE:

- Align the oil pump shaft end with the water pump shaft groove.



DISASSEMBLY/ASSEMBLY

Disassemble and assemble the oil pump as following illustration.



INSPECTION

- For oil pump drive sprocket, driven sprocket and drive chain inspection (page 11-10).

Inspect the following parts for damage, abnormal wear, deformation or burning.

- Oil pump shaft
- Drive pin
- Inner rotor
- Outer rotor
- Oil pump body

Measure the oil pump clearances according to LUBRICATION SYSTEM SPECIFICATIONS (page 1-7).

If any of the measurement is out of the service limit, replace the oil pump as an assembly.

PRESSURE RELIEF VALVE

REMOVAL/INSTALLATION

Remove the oil pump (page 9-5).

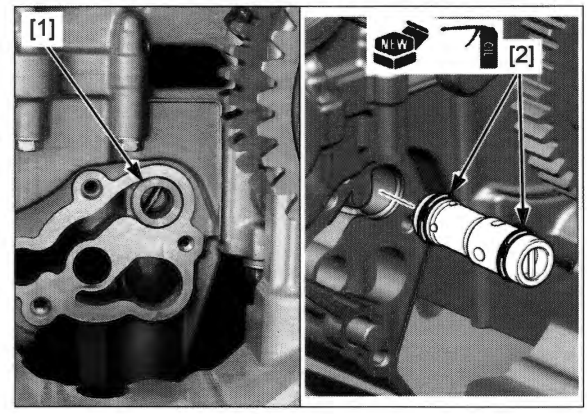
Remove the oil pressure relief valve [1] and O-rings [2].

Apply engine oil to a new O-rings.

Install the O-rings to the oil pressure relief valve grooves.

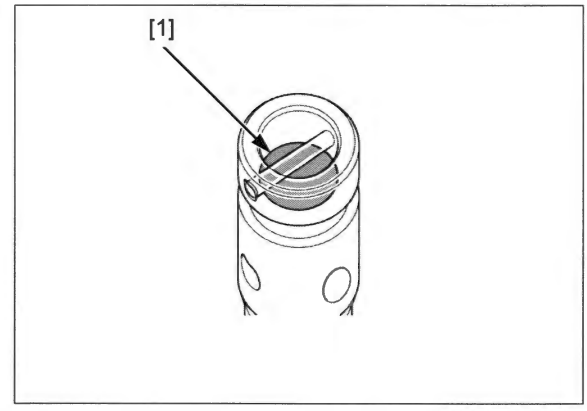
Install the oil pressure relief valve into the crankcase.

Install the oil pump (page 9-5).



INSPECTION

Check the operation of the pressure relief valve by pushing on the piston [1].



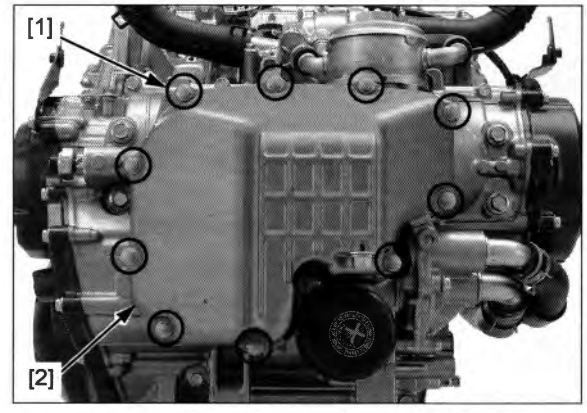
OIL STRAINER

REMOVAL

Drain the engine oil (page 3-11).

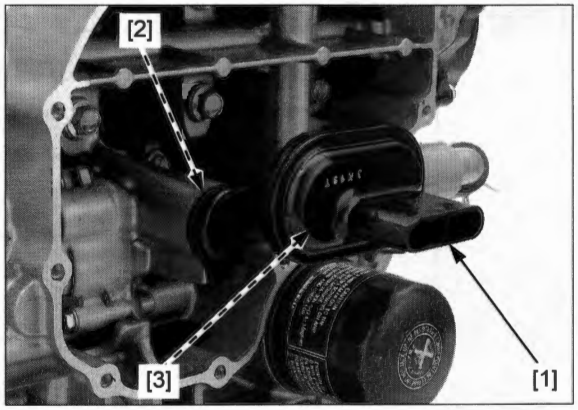
Remove the exhaust pipe/muffler (page 2-17).

Loosen the bolts [1] in a crisscross pattern in 2 or 3 steps and remove the bolts, oil pan [2].



Remove the oil strainer [1] and seal ring [2].

Clean the oil strainer screen [3] and check for damage.



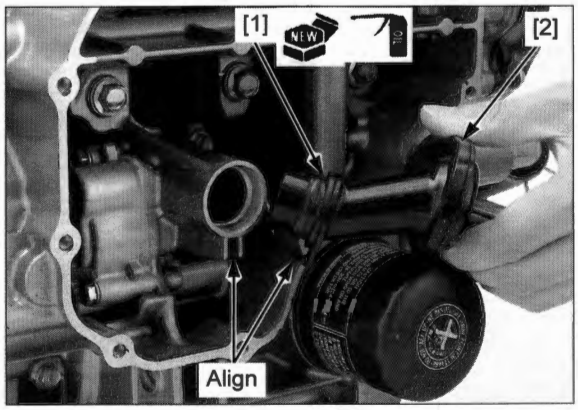
INSTALLATION

Be careful not to damage the mating surfaces.

Clean any gasket material from the mating surfaces of the oil pan.

Apply engine oil to a new seal ring [1] and install it onto the oil strainer [2].

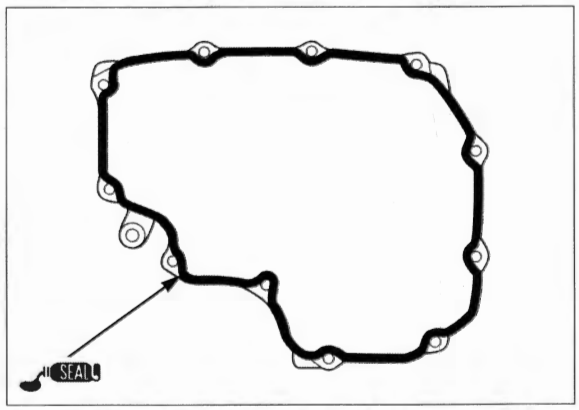
Install the oil strainer into the crankcase while aligning the oil strainer boss with the crankcase groove.



Clean the oil pan mating surface thoroughly.

Apply liquid sealant (TB1207B manufactured by Three Bond or equivalent) to the oil pan mating surface as shown.

- Do not apply more liquid sealant than necessary.

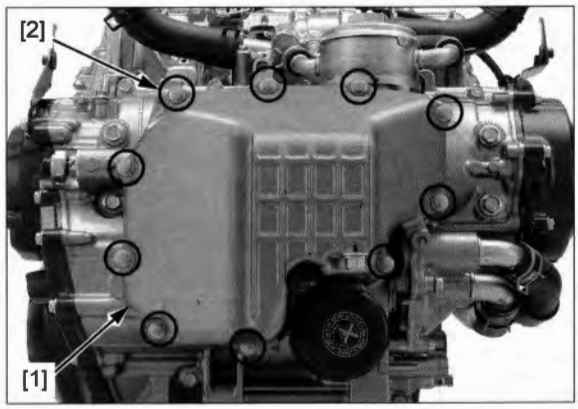


Install the oil pan [1] and bolts [2] to the crankcase.

Tighten the bolts in a crisscross pattern in 2 or 3 steps.

Install the exhaust pipe/muffler (page 2-17).

Fill the engine with the recommended engine oil and check that there are no oil leaks (page 3-10).



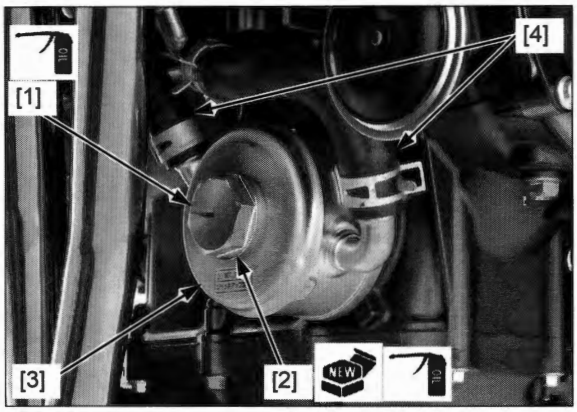
OIL COOLER

REMOVAL/INSTALLATION

Drain the engine oil (page 3-11).
Drain the coolant from the system (page 8-4).

Remove the bolt [1], sealing washer [2] and oil cooler [3].

Disconnect the oil cooler water hoses [4] from the oil cooler.



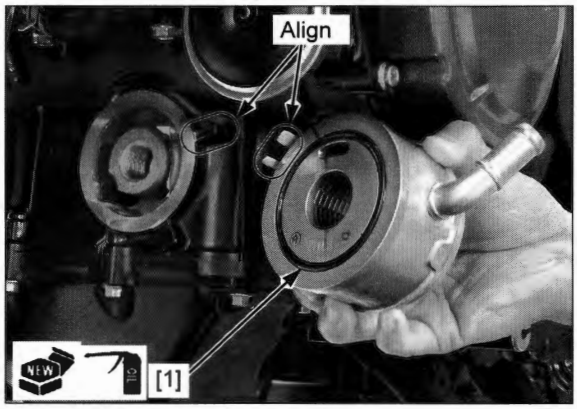
Remove the O-ring [1] from the oil cooler.

Installation is in the reverse order of removal.

- Apply engine oil to a new O-ring.
- Align the oil cooler groove with the crankcase boss.
- Apply engine oil to the oil cooler bolt threads and a new sealing washer seating surface.

TORQUE:
Oil cooler bolt: 59 N·m (6.0 kgf·m, 44 lbf·ft)

Fill the crankcase with the recommended oil (page 3-10).
Fill the cooling system and bleed any air (page 8-4).
Check that there is no oil leaks.



MEMO

10. CYLINDER HEAD/VALVES

SERVICE INFORMATION 10-2

TROUBLESHOOTING 10-4

COMPONENT LOCATION 10-5

CYLINDER COMPRESSION TEST 10-6

CYLINDER HEAD COVER 10-6

CAMSHAFT 10-7

CYLINDER HEAD 10-13

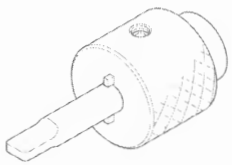
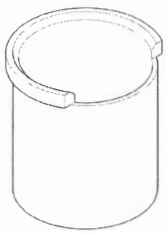
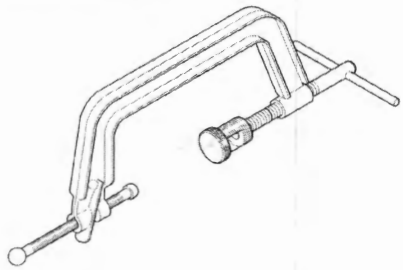
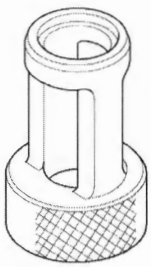
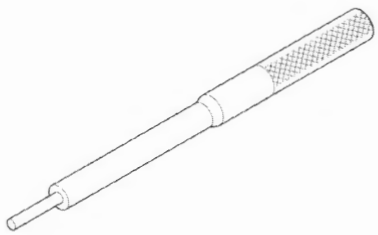
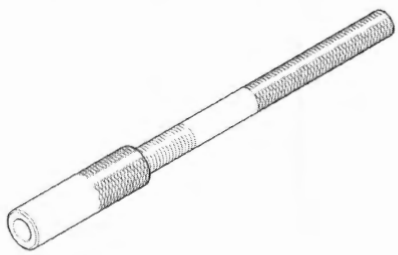
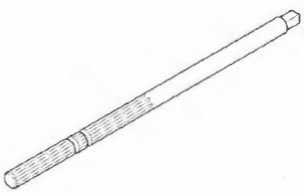
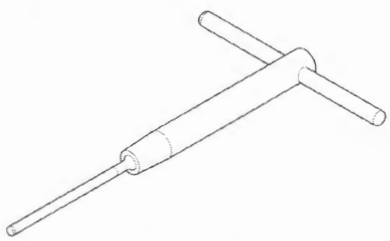
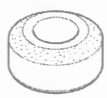
CAM CHAIN TENSIONER LIFTER 10-22

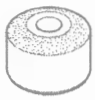
SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, valves and camshafts.
- All the services covered in this section can be done 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.
- Camshafts lubricating oil is fed through oil passages in the cylinder head and camshaft holder. Clean the oil passages before assembling them.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

TOOLS

Tensioner stopper 070MG-0010100  or 07AMG-001A100 (U.S.A. only)	Tappet hole Protector 07HMG-MR70002  (Not available in U.S.A.)	Valve spring compressor 07757-0010000 
Valve spring compressor attachment 07959-KM30101 	Valve guide driver, 4.5 mm 07HMD-ML00101 	Valve guide adjusting driver 07743-0020000  (Not available in U.S.A.)
Valve guide reamer, 4.5 mm 07HMH-ML00101  or 07HMH-ML0010B (U.S.A. only)	Cutter holder, 4.5 mm 07781-0010600  or equivalent commercially available in U.S.A.	Seat cutter, 27.5 mm (IN, 45°) 07780-0010200  or equivalent commercially available in U.S.A.

Seat cutter, 24 mm (EX, 45°) 07780-0010600  or equivalent commercially available in U.S.A.	Flat cutter, 28 mm (IN, 32°) 07780-0012100  or equivalent commercially available in U.S.A.	Flat cutter, 24 mm (EX, 32°) 07780-0012500  or equivalent commercially available in U.S.A.
Interior cutter, 26 mm (IN, 60°) 07780-0014500  or equivalent commercially available in U.S.A.	Interior cutter, 22 mm (EX, 60°) 07780-0014202  or equivalent commercially available in U.S.A.	

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for a seized piston ring (page 14-14).

Compression too low, hard starting or poor performance at low speed

- Valves:
  - Incorrect valve clearance adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head:
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Worn cylinder, piston or piston rings (page 14-14)

Compression too high, overheating or knocking

- Excessive carbon build-up on piston crown or on combustion chamber

Excessive smoke

- Cylinder head:
  - Worn valve stem or valve guide
  - Damaged stem seal
- Worn cylinder, piston or piston rings (page 14-14)

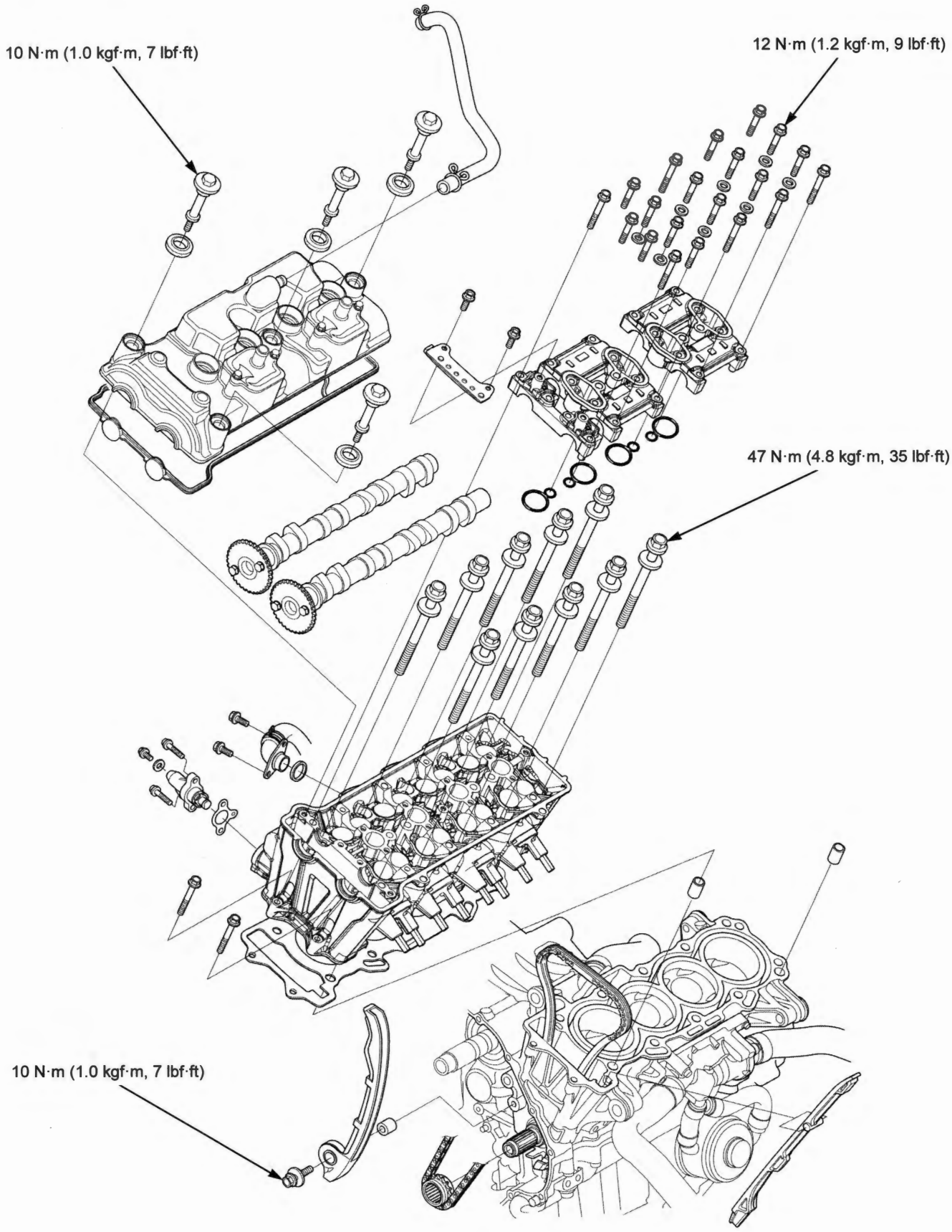
Excessive noise

- Cylinder head:
  - Incorrect valve clearance adjustment
  - Sticking valve or broken valve spring
  - Damaged or worn camshaft
  - Loose or worn cam chain
  - Worn or damaged cam chain
  - Worn or damaged cam chain tensioner
  - Worn cam sprocket teeth
- Worn cylinder, piston or piston rings (page 14-14)

Rough idle

- Low cylinder compression

COMPONENT LOCATION



CYLINDER COMPRESSION TEST

Warm the engine to normal operating temperature.

Stop the engine and remove the all spark plug caps and spark plugs (page 3-6).

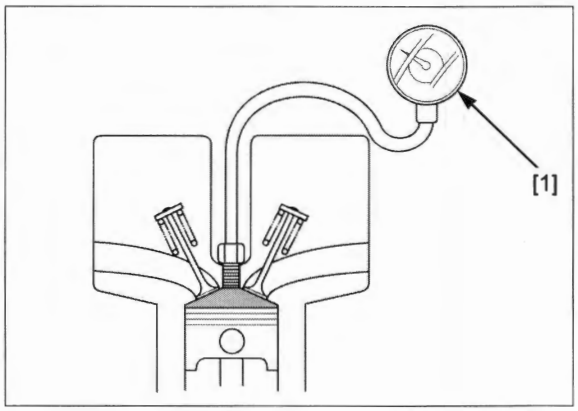
Install a compression gauge [1] into the spark plug hole.

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

Shift the transmission into 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:
1,491 kPa (15.2 kgf/cm², 216 psi) at 300 rpm

Low compression can be caused by:
- Blown cylinder head gasket
- Improper valve clearance adjustment
- Valve leakage
- Worn piston rings or cylinder

High compression can be caused by:
- Carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER

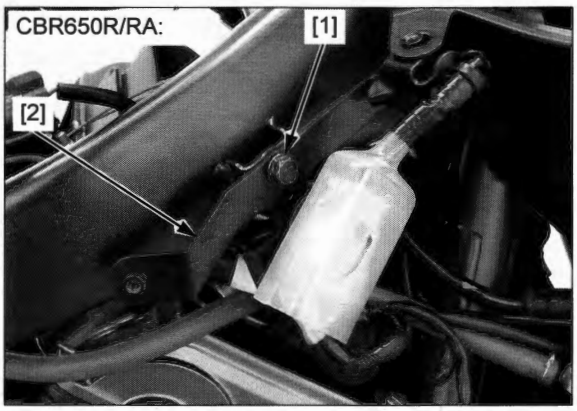
REMOVAL/INSTALLATION

NOTE:
- The cylinder head cover can be serviced with the engine installed in the frame.

Disconnect the spark plug caps from the spark plugs (page 3-6).

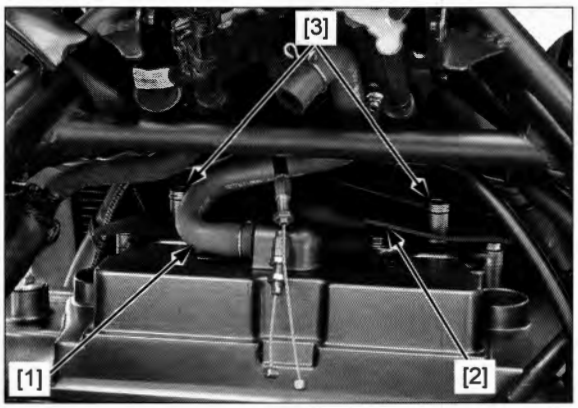
Remove the following:
- Throttle body (page 7-14)
- PAIR control solenoid valve assembly (page 7-21)

CBR650R/RA: Remove the bolt [1] and right middle cowl stay [2].



Disconnect the crankcase breather hose [1] from the cylinder head cover.

Pull off the heat guard rubber [2] from the PAIR check valve cover joints [3].

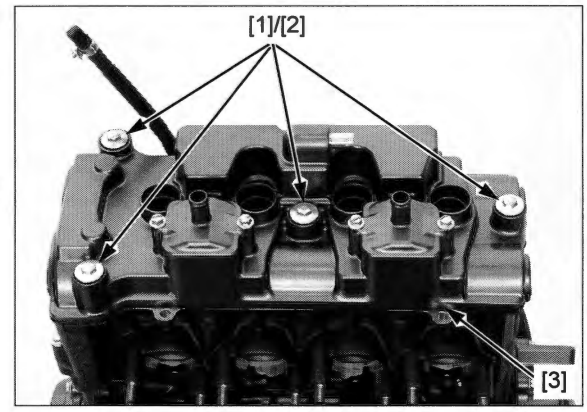


Remove the cylinder head cover bolts [1] and mounting rubbers [2].

Remove the cylinder head cover [3] from the cylinder head.

NOTE:

- Do not forcibly remove the dowel pins from the cylinder head cover.



Remove the cylinder head cover packing [1] from the cylinder head cover.

Installation is in the reverse order of removal.

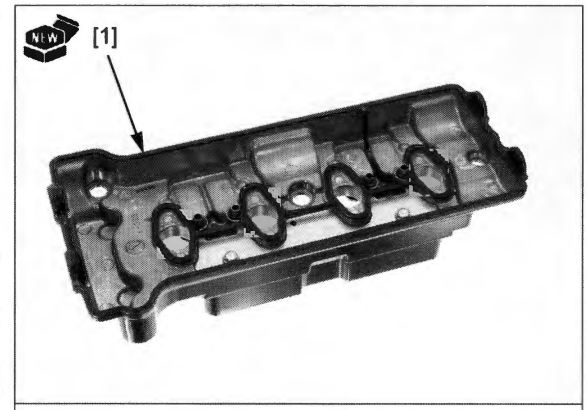
TORQUE:

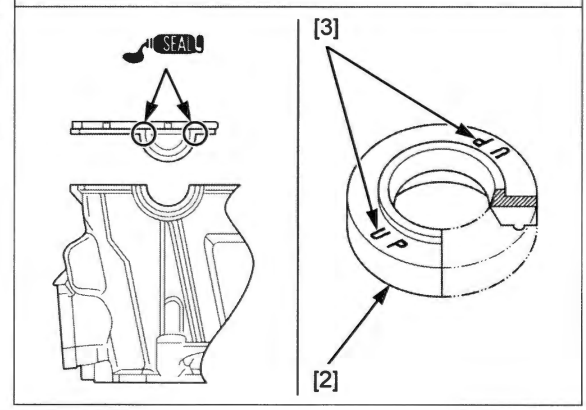
Cylinder head cover bolt:
10 N·m (1.0 kgf·m, 7 lbf·ft)

NOTE:

- Replace the cylinder head cover packing with a new one.
- Install the cylinder head cover packing into the groove in the cylinder head cover.
- Apply sealant (TB5211C manufactured by ThreeBond, KE45 manufactured by Shin-Etsu Silicone or an equivalent) to the cylinder head cover packing semi-circular areas as shown (8 places).
- Check the mounting rubbers [2] are in good condition, replace them if necessary.
- Install the mounting rubbers with their "UP" mark [3] facing up.

Adjust the throttle grip freeplay (page 3-4).





CAMSHAFT

REMOVAL

NOTE:

- The camshaft can be serviced with the engine installed in the frame.

Remove the cylinder head cover (page 10-6).

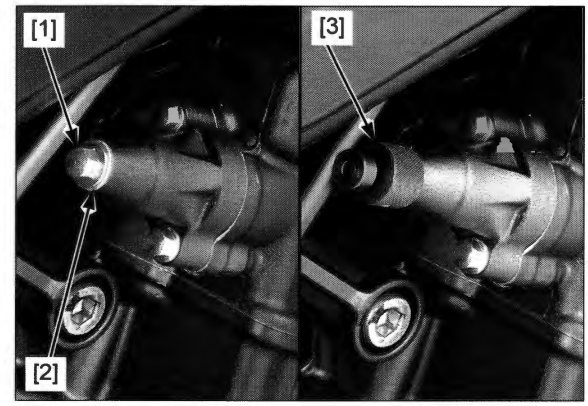
Make sure the No. 1 piston is at TDC (Top Dead Center) on the compression stroke (page 3-8).

Remove the sealing bolt [1] and sealing washer [2].

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

TOOL:

[3] Tensioner stopper	**070MG-0010100 or 07AMG-001A100 (U.S.A. only)**

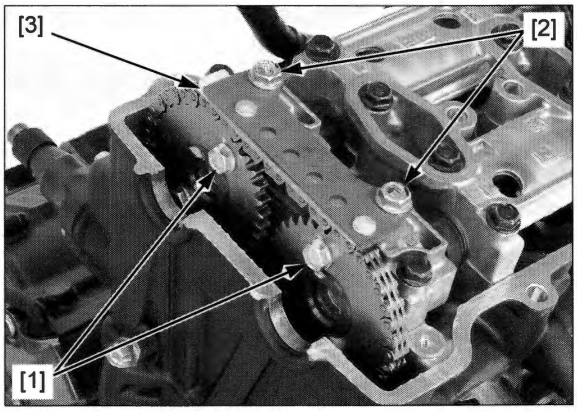


Be careful not to let the cam chain guide bolts fall into the crankcase.

If you replace the camshaft and/or cam sprocket, loosen the cam sprocket bolts [1].

- Turn the crankshaft clockwise one full turn (360°), loosen the other cam sprocket bolts, then reset the No.1 piston to the TDC (Top Dead Center) on the compression stroke (page 3-8).

Remove the bolts [2] and cam chain guide B [3].



NOTICE

From outside to inside, loosen the bolts in a crisscross pattern in several steps or the camshaft holder might break.

Be careful not to let the camshaft holder bolts fall into the crankcase.

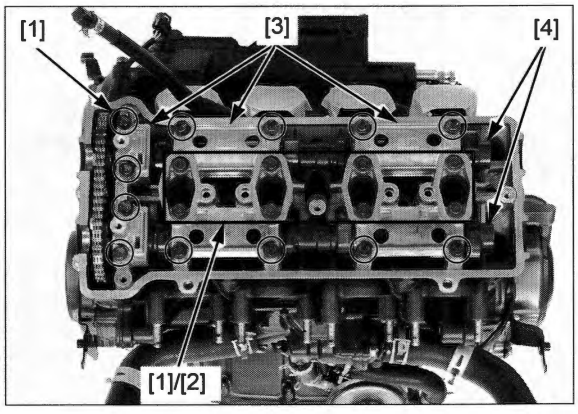
Loosen the camshaft holder bolts [1] gradually in a crisscross pattern in 2 or 3 steps, and remove them and washers [2].

Remove the camshaft holders [3] with the dowel pins from the cylinder head.

- Do not forcibly remove the dowel pins from the camshaft holders.

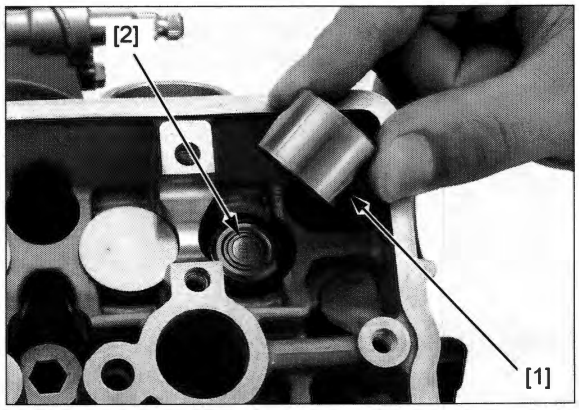
Remove the camshafts [4] by removing the cam chain from the cam sprockets.

- Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.



Remove the valve lifters [1] and shims [2].

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



INSPECTION

Inspect the following parts for damage, abnormal wear, deformation, burning or clogs in oil passages.

- Cam sprockets/camshafts
- Camshaft holders/dowel pins
- Cam chain guide B

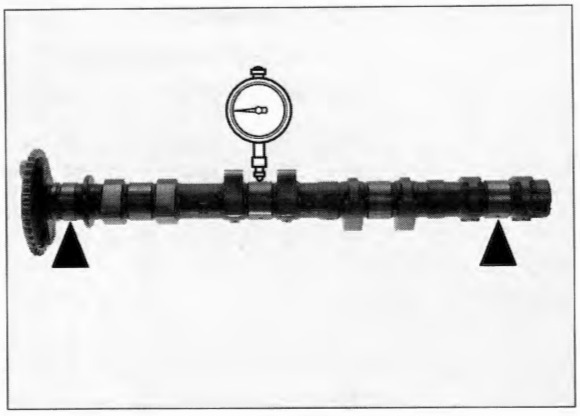
Measure each part according to CYLINDER HEAD/ VALVES SPECIFICATIONS (page 1-7).

Replace any part if it is out of service limit.

CAMSHAFT RUNOUT

Support both sides of the camshaft (at journals) with V-blocks and check the camshaft runout with a dial gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)



CAMSHAFT OIL CLEARANCE

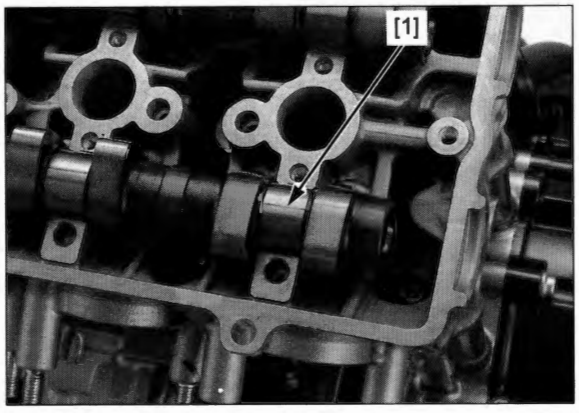
Wipe any oil from the journals of the camshaft, cylinder head and camshaft holders.

Install the camshafts onto the cylinder head.

Lay a strip of plastigauge [1] lengthwise on top of each camshaft journal avoiding the oil hole.

NOTE:

- Do not rotate the camshaft during inspection.



Be sure the dowel pins in the cam shaft holders are aligned with the holes in the cylinder head.

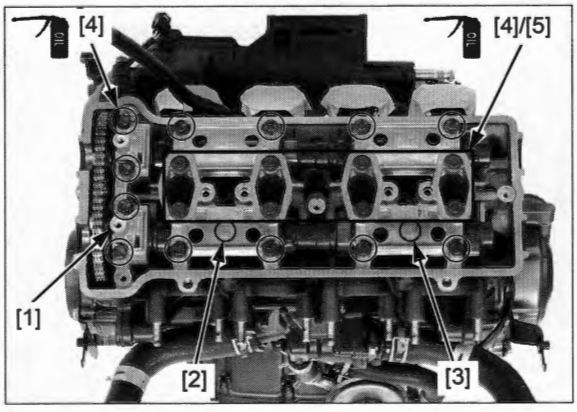
Install each camshaft holder to the correct locations with the identification marks.

- No mark: right camshaft holder [1]
- "R" mark: center camshaft holder [2]
- "L" mark: left camshaft holder [3]

Apply engine oil to the threads and seating surfaces of the camshaft holder bolts [4].

Install the holder bolts and sealing washers [5].

Finger tighten the bolts.



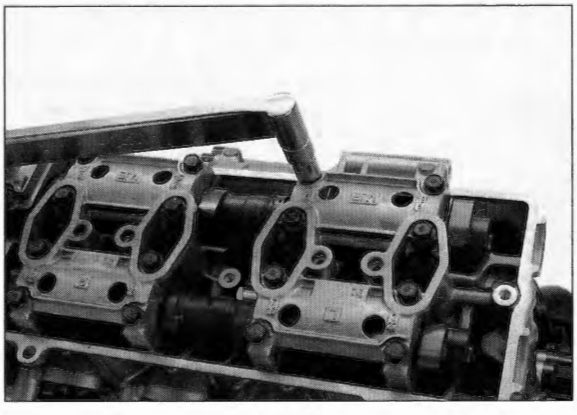
Gradually tighten the camshaft holder bolts until the camshaft holders lightly contact the cylinder head surface.

NOTICE

Failure to tighten the camshaft holder in a criss-cross pattern might cause a camshaft holder to break.

Tighten all camshaft holder bolts in the numerical order cast on the camshaft holders.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



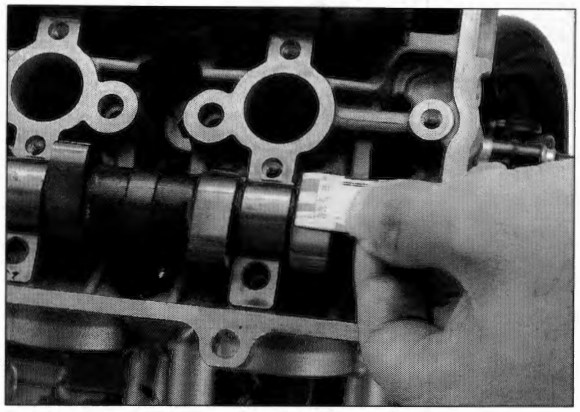
Remove the camshaft holders and measure the width of each plastigauge.

The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

When the service limits are exceeded, replace the camshaft and recheck the oil clearance.

Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.

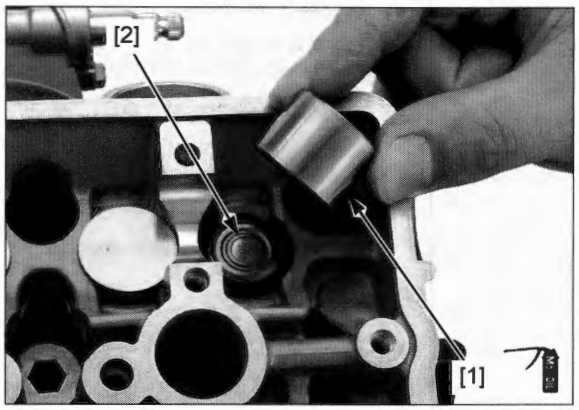


INSTALLATION

Apply molybdenum oil solution to the outer surface of each valve lifter [1].

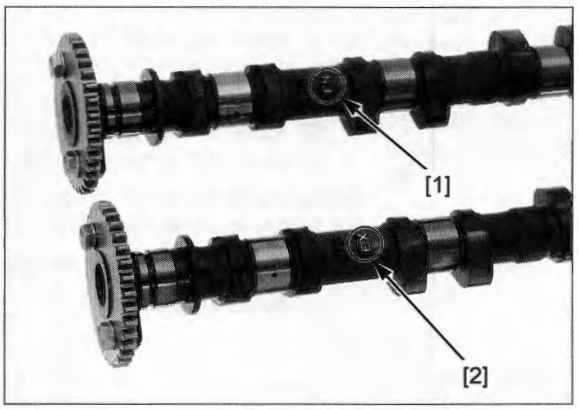
Install the shims and valve lifters in their original locations.

Install the shims [2] on the retainers and valve lifters into the valve lifter bores.



Each camshaft has an identification mark.

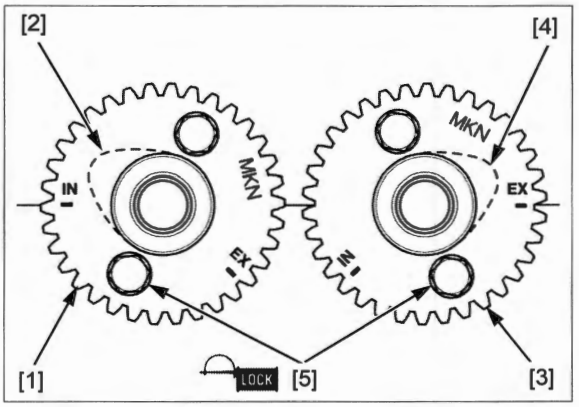
- "IN" mark [1]: Intake camshaft
- "EX" mark [2]: Exhaust camshaft



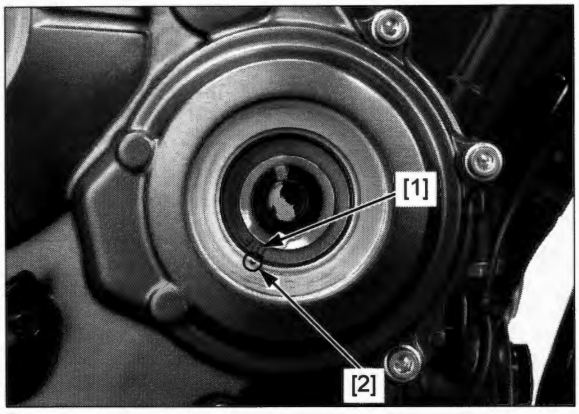
If the cam sprockets are removed, install the cam sprockets onto the camshafts.

- Install the intake cam sprocket [1] with the timing mark (IN) facing outward and the No.1 cam lobes [2] facing up and out as shown.
- Install the exhaust cam sprocket [3] with the timing mark (EX) facing outward and the No.1 cam lobes [4] facing up and out as shown.

Clean and apply a locking agent to the cam sprocket bolt threads.
Install the cam sprocket bolts [5].



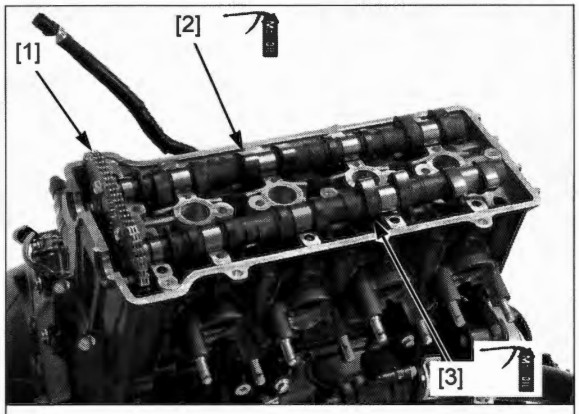
Rotate the crankshaft clockwise slowly and align the "T" mark [1] with the index notch [2] in the crankcase cover.

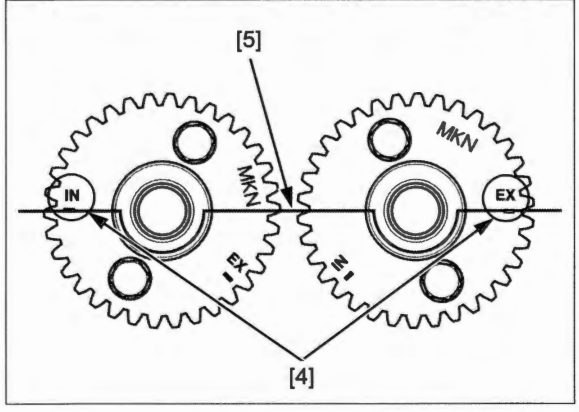


Apply molybdenum oil solution to the camshaft journals, lobes and thrust surfaces.

Install the cam chain [1] over the cam sprockets of the intake [2] and exhaust [3] camshafts, making sure that the timing marks [4] on the cam sprockets are flush with the top surface [5] of the cylinder head.

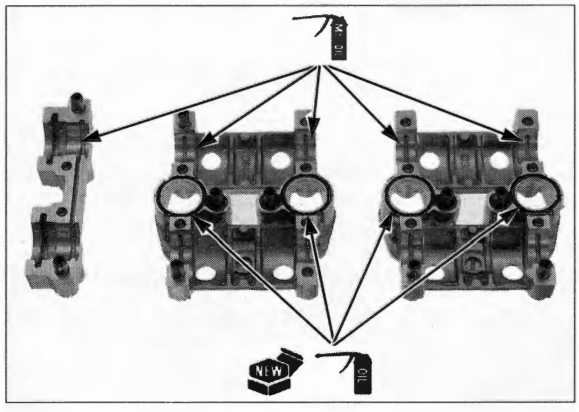
- Install each camshaft to the correct locations with the identification marks (page 10-10).
  "IN" mark: Intake camshaft
  "EX" mark: Exhaust camshaft





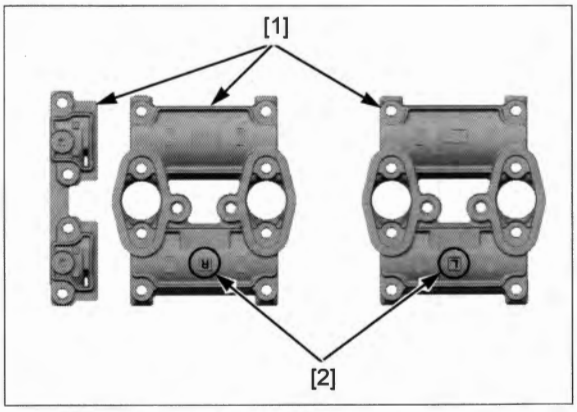
Coat new O-rings with oil and install them into the grooves in the camshaft holders.

Apply molybdenum oil solution to the camshaft journals of the camshaft holders.



Install each camshaft holder [1] to the correct locations with the identification marks [2].

- No mark: right camshaft holder
- "R" mark: center camshaft holder
- "L" mark: left camshaft holder



Apply engine oil to the camshaft holder bolt [1] threads and seating surface.

Install the camshaft holder bolts with new sealing washers [2].

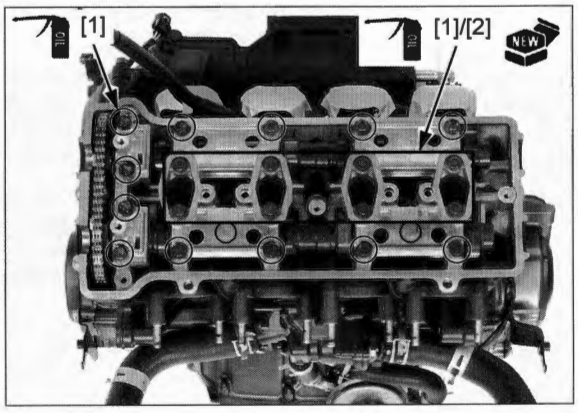
NOTICE

Failure to tighten the camshaft holder in a crisscross pattern may cause the camshaft holder to break.

From inside to outside tighten the camshaft holder bolts gradually until the camshaft holders seats on the cylinder head.

Tighten the camshaft holder bolts in a crisscross pattern in 2 or 3 steps to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the cam chain guide B [1].

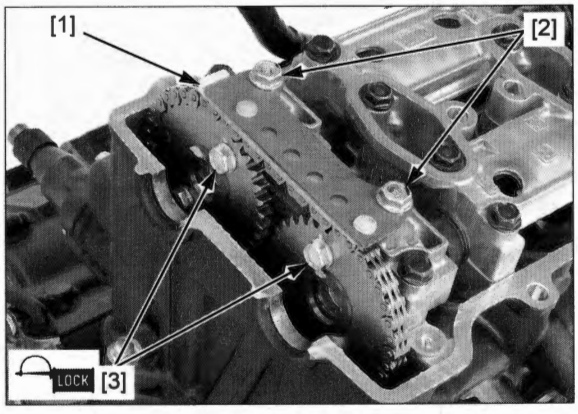
Be careful not to let the cam chain guide bolts fall into the crankcase.

Install and tighten the cam chain guide bolts [2] securely.

If the cam sprocket was removed from the camshaft, apply a locking agent to the cam sprocket bolt [3] threads.
Tighten the cam sprocket bolts to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)

Turn the crankshaft clockwise one full turn (360°) and tighten the other cam sprocket bolts.



Remove the tensioner stopper [1] from the cam chain tensioner lifter.

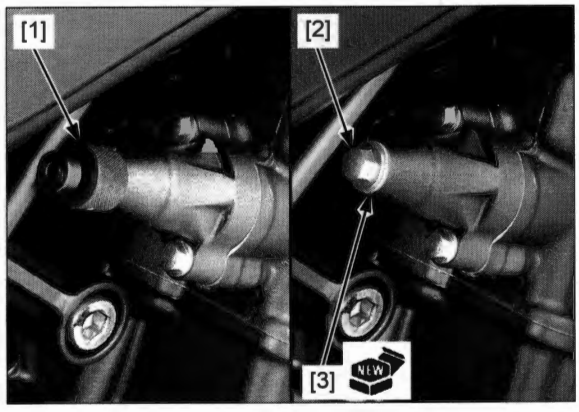
Turn the crankshaft clockwise several times, and align the "T" mark on the primary drive gear with the index notch on the right crankcase cover (page 10-10).

Recheck the valve timing.

Inspect the valve clearance (page 3-8).

Install the sealing bolt [2] with a new sealing washer [3] and tighten it securely.

Install the cylinder head cover (page 10-6).



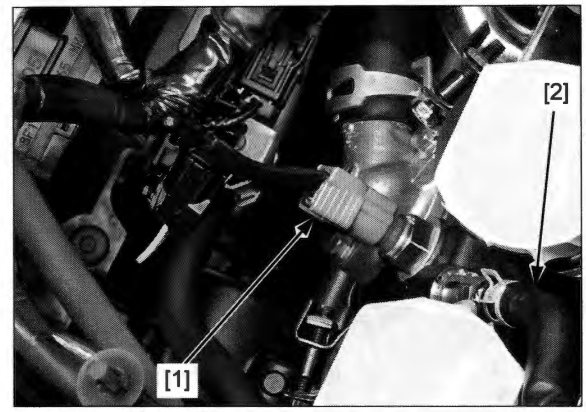
CYLINDER HEAD

REMOVAL

Remove the following:

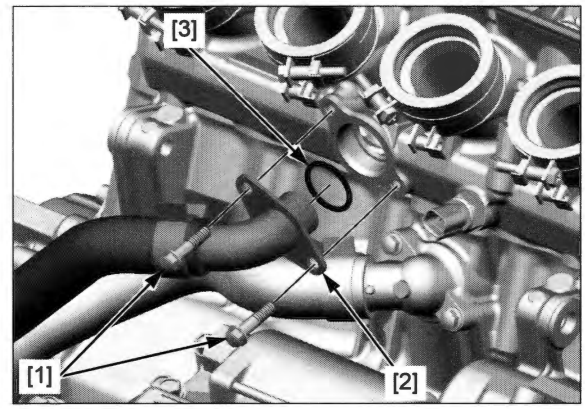
- Exhaust pipe/muffler (page 2-18)
- Throttle body (page 7-14)
- Camshaft (page 10-7)

Disconnect the ECT sensor 2P (Blue) connector [1] and bleeding hose [2].



Remove the bolts [1] and water hose joint A [2] from the cylinder head.

Remove the O-ring [3] from the water hose joint A.



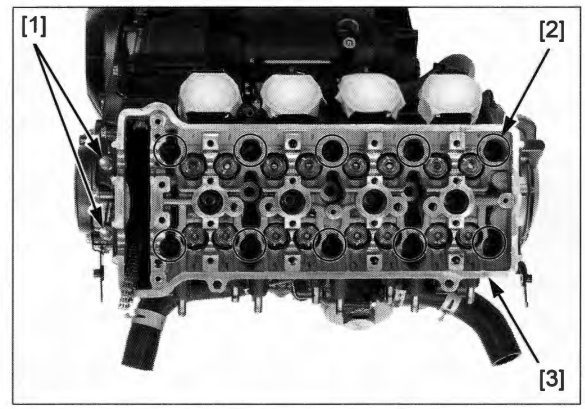
Remove the 6 mm bolts [1].

Loosen the 9 mm washer-bolts [2] in a crisscross pattern in 2 or 3 steps, then remove them.

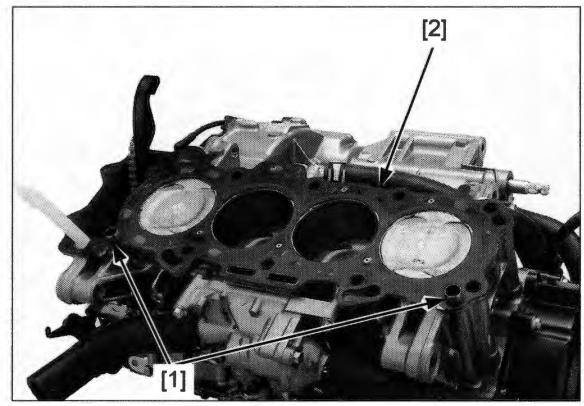
Remove the cylinder head [3].

NOTE:

- Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.
- Do not tap the cylinder head too hard and do not damage the mating surface with a screwdriver.



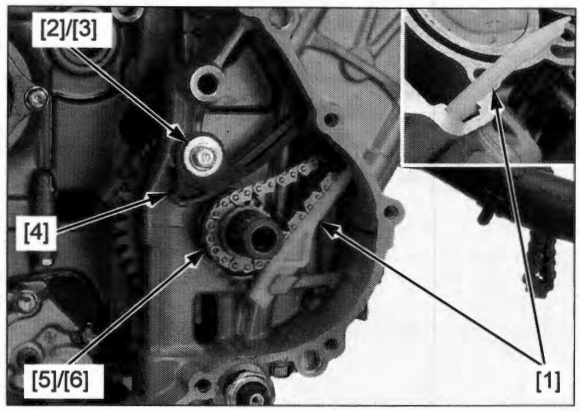
Remove the dowel pins [1] and gasket [2].



Remove the starter clutch (page 11-15).

Remove the cam chain guide A [1].
Remove the washer bolt [2], collar [3] and cam chain tensioner [4].

Remove the cam chain [5] and timing sprocket [6] from the crankshaft.

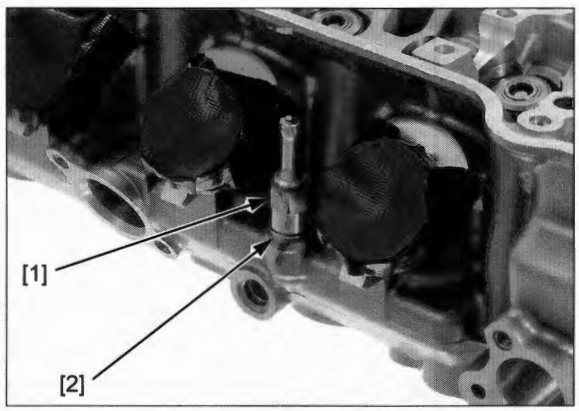


DISASSEMBLY

Remove the following:

- Insulator (page 7-17)
- ECT sensor (page 4-44)
- Spark plugs (page 3-6)

Remove the air bleeding joint [1] and sealing washer [2] from the cylinder head.

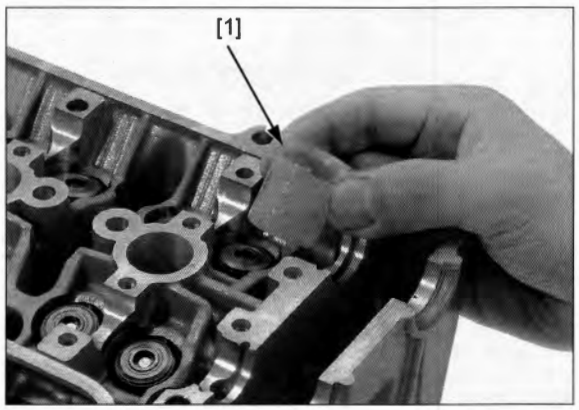


Remove the spark plugs from the cylinder head.

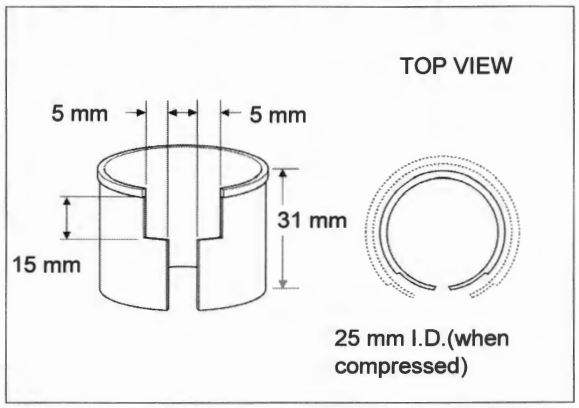
Install the tappet hole protector [1] into the valve lifter bore.

TOOL:

[1] Tappet hole protector **07HMG-MR70002**
(Not available in U.S.A.)



An equivalent tool can easily be made from a plastic 35 mm film container as shown.

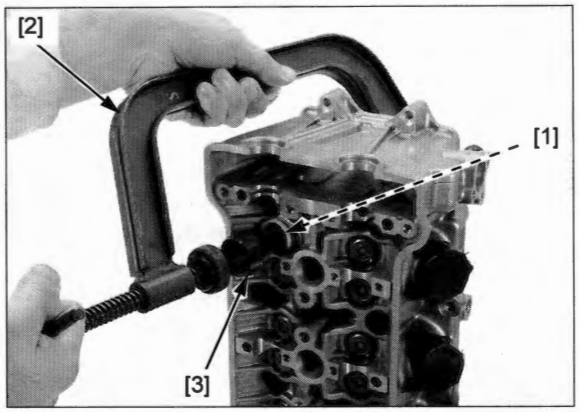


To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

Remove the valve spring cotters [1] using the special tools as shown.

TOOLS:

[2] Valve spring compressor	**07757-0010000**
[3] Valve spring compressor attachment	**07959-KM30101**



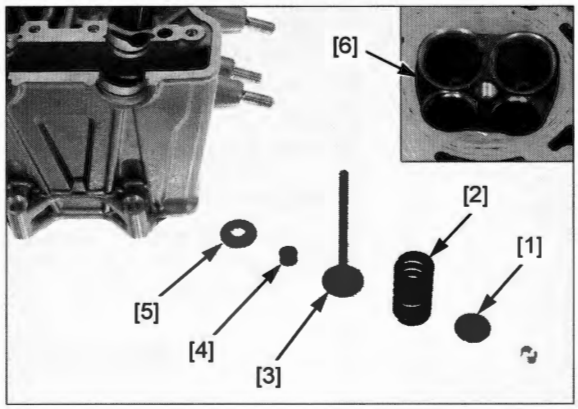
Mark all parts during disassembly so they can be placed back in their original locations.

Remove the valve spring compressor and remove the following:

- Valve spring retainers [1]
- Valve springs [2]
- Valves [3]
- Valve stem seals [4]
- Valve spring seats [5]

Avoid damaging the cylinder mating surface and valve seat surfaces.

Remove the carbon deposits from the combustion chamber [6] and clean off the cylinder head gasket surface.



INSPECTION

Inspect the following parts for damage, abnormal wear, deformation, burning or clogs in oil passages.

- Cylinder head
- Valve springs
- Valves
- Valve guides
- Cam chain
- Cam chain timing sprocket
- Cam chain guide A
- Cam chain tensioner

Measure each part and clearance according to CYLINDER HEAD/VALVES SPECIFICATIONS (page 1-7).

Replace any part if it is out of service limit.

- Ream the valve guide using the valve guide reamer to remove any carbon build up before measuring the guide (page 10-16).
- Refer to valve seat inspection (page 10-17).

VALVE GUIDE REPLACEMENT

Disassemble the cylinder head (page 10-14).

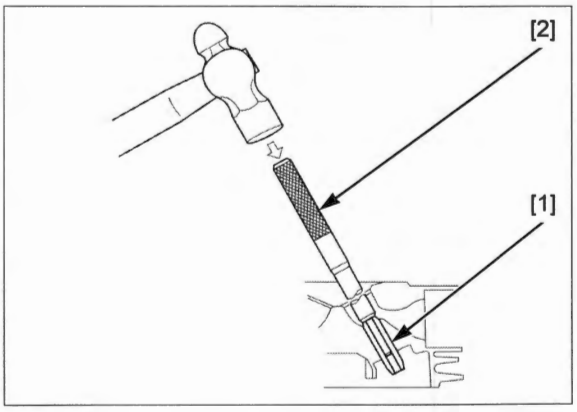
Chill new valve guides in a freezer for about 1 hour.

NOTE:

- 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 (266 – 284°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (302°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 [1] out of the cylinder head from the combustion chamber side.

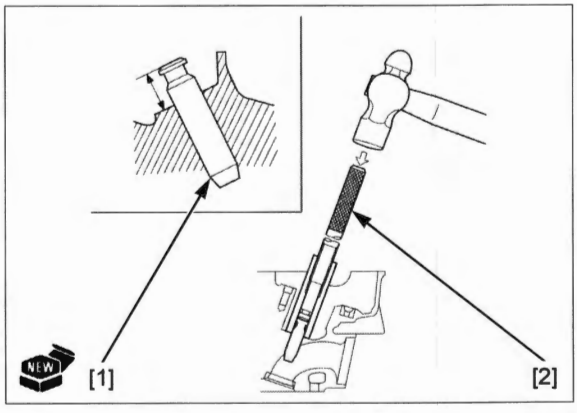


TOOL:

[2] Valve guide driver, 4.5 mm 07HMD-ML00101

Take out new valve guides [1] from the freezer.

While the cylinder head is still heated, drive new valve guides from the camshaft side until the exposed height is specified value.



TOOL:

[2] Valve guide adjusting driver 07743-0020000

SPECIFIED HEIGHT:

IN/EX: 12.70 – 13.00 mm (0.500 – 0.512 in)

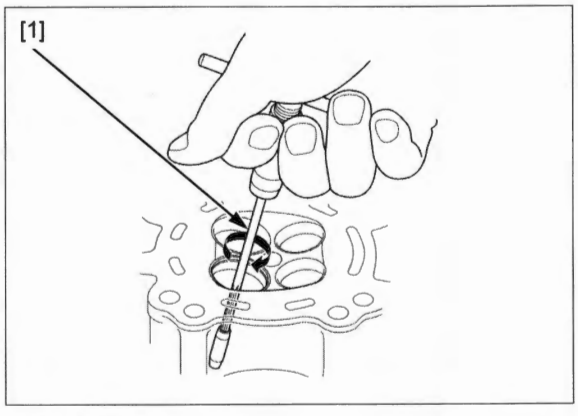
Let the cylinder head cool to room temperature.

Ream new valve guides after installation.

NOTE:

- Take care not to tilt or lean the reamer [1] in the guide while reaming.
- Use cutting oil on the reamer during this operation.

Insert the reamer from the combustion chamber side of the cylinder head and always rotate the reamer clockwise.



TOOL:

Valve guide reamer, 4.5 mm 07HMH-ML00101 or 07HMH-ML0010B (U.S.A. only)

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat (page 10-17).

VALVE SEAT INSPECTION/REFACING

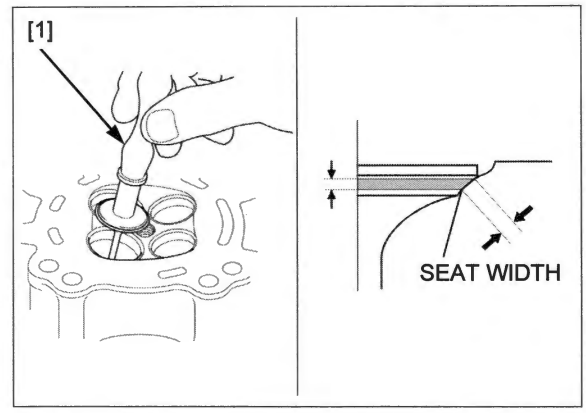
INSPECTION

Disassemble the cylinder head (page 10-14).

Clean the intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coat of Prussian Blue to the valve seats.

Tap the valve against the valve seat several times using a hand-lapping tool [1], without rotating the valve to make a clear pattern.



The valves cannot be ground. If the valve face is burned, 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: 0.90 – 1.10 mm (0.035 – 0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

If the valve seat width is not within specification, reface the valve seat (page 10-17).

Inspect the valve seat face for:

- Damaged face:
  – Replace the valve and reface the valve seat
- Uneven seat width:
  – Bent or collapsed valve stem; Replace the valve and reface the valve seat
- Contact area (too low or too high):
  – Reface the valve seat

REFACING

Reface the valve seat using the following tools.

TOOLS:

Cutter holder, 4.5 mm	**07781-0010600**
Seat cutter, 27.5 mm (IN, 45°)	**07780-0010200**
Seat cutter, 24 mm (EX, 45°)	**07780-0010600**
Flat cutter, 28 mm (IN, 32°)	**07780-0012100**
Flat cutter, 24 mm (EX, 32°)	**07780-0012500**
Interior cutter, 26 mm (IN, 60°)	**07780-0014500**
Interior cutter, 22 mm (EX, 60°)	**07780-0014202**

or equivalent commercially available in U.S.A.

VALVE SEAT WIDTH:
0.90 – 1.10 mm (0.035 – 0.043 in)

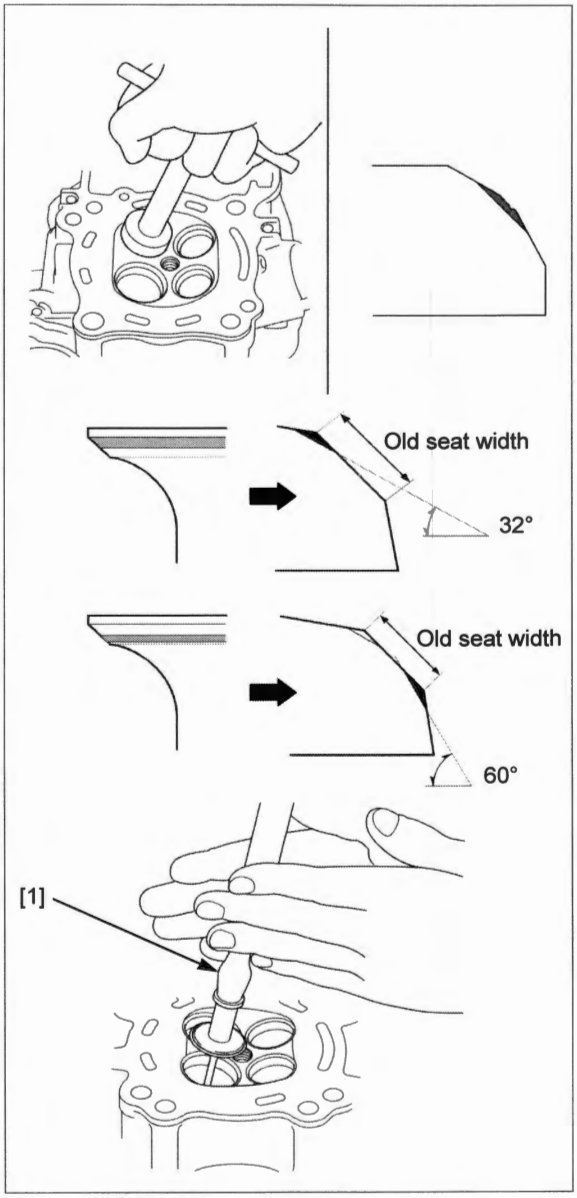
NOTE:
- Follow the refacer manufacturer's operating instructions.
- Be careful not to grind the seat more than necessary.

1. Use a 45° seat cutter, remove any roughness or irregularities from the seat.
2. Use a 32° flat cutter, remove the top 1/4 of the existing valve seat material.
3. Use a 60° interior cutter, remove the bottom 1/4 of the existing valve seat material.
4. Using a 45° seat cutter, cut the seat to the proper width.
   Make sure that all pitting and irregularities are removed.
5. After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

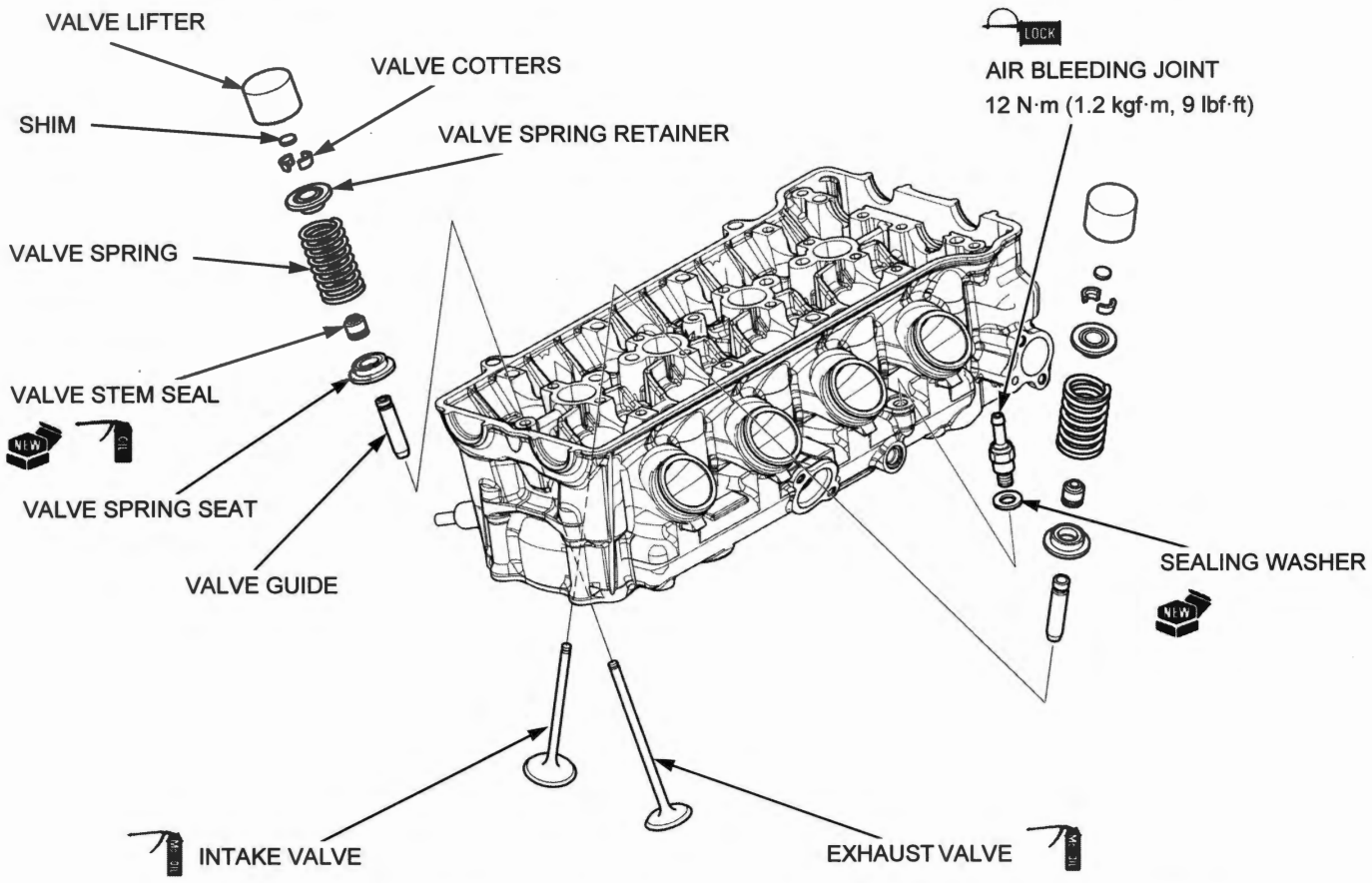
NOTE:
- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool [1] frequently to prevent uneven seat wear.
- Do not allow lapping compound to enter the guides.

After lapping, wash any residual compound off the cylinder head and valve and recheck the seat contact.

Assemble the cylinder head (page 10-19).



ASSEMBLY



Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Apply engine oil to the fitting area of new valve stem seals [1].

Install the valve spring seats [2] and valve stem seals.

Apply molybdenum oil solution to each valve stem end and sliding surface.

Insert the valves [3] into the valve guides while turning them slowly to avoid damage to the valve stem seals.

Install the valve spring [4] with the tightly wound coils facing the combustion chamber.

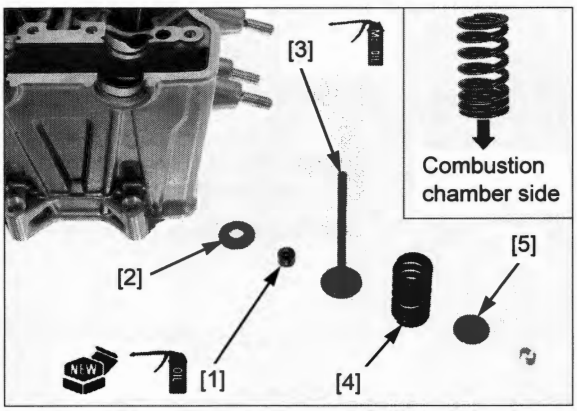
Install the valve spring retainers [5].

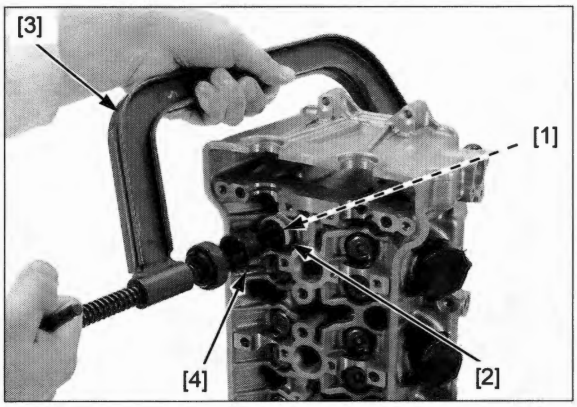
Install the valve cotters [1] using the special tool.

Grease the cotters to ease installation. To prevent loss of tension, do not compress the valve spring more than necessary.

TOOLS:

[2] Tappet hole protector	**07HMG-MR70002 (Not available in U.S.A.)**
[3] Valve spring compressor	**07757-0010000**
[4] Valve spring compressor attachment	**07959-KM30101**

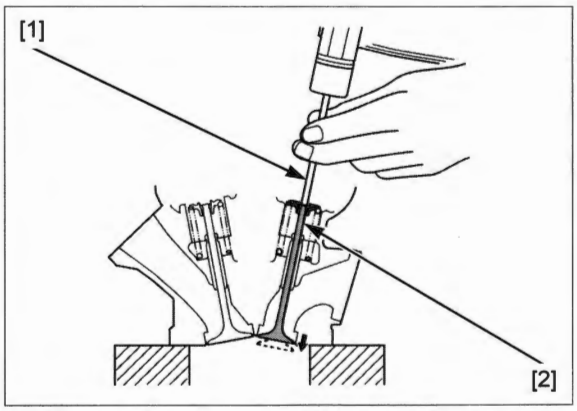




Support the cylinder head above the work bench surface to prevent valve damage.

Place a suitable tool [1] onto the valve stem [2].

Tap the tool gently to seat the valve cotters firmly using a hammer.



Apply a locking agent to the bleeding joint [1] threads.

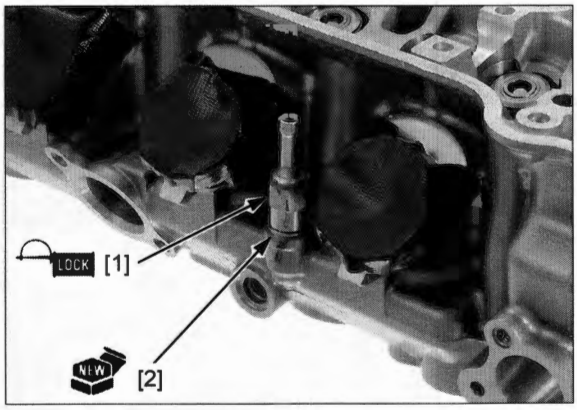
Install the bleeding joint with a new sealing washer [2] to the cylinder head.

Tighten the bleeding joint to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the following:

- Insulator (page 7-17)
- ECT sensor (page 4-44)
- Spark plugs (page 3-6)



INSTALLATION

Install the timing sprocket [1] by aligning the wide teeth between the crankshaft and sprocket.

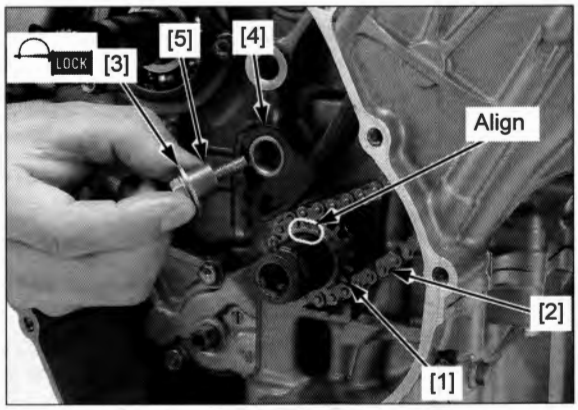
Install the cam chain [2].

Apply locking agent to the cam chain tensioner pivot bolt [3] threads.

Install the cam chain tensioner [4], collar [5] and pivot bolt.

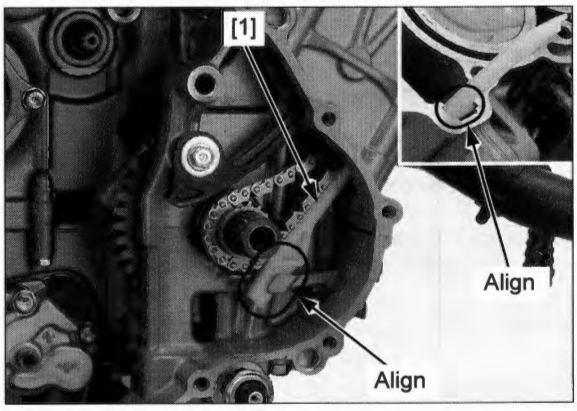
Tighten the cam chain tensioner pivot bolt to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

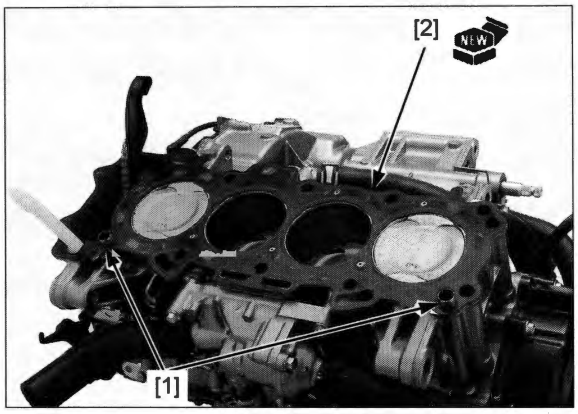


Install the cam chain guide A [1] while aligning its pins with the grooves in the cylinder and its end with the groove in the crankcase.

Install the starter clutch (page 11-18).



Install the dowel pins [1] and a new gasket [2].



Route the cam chain through the cylinder head and install the cylinder head [1] onto the cylinder.

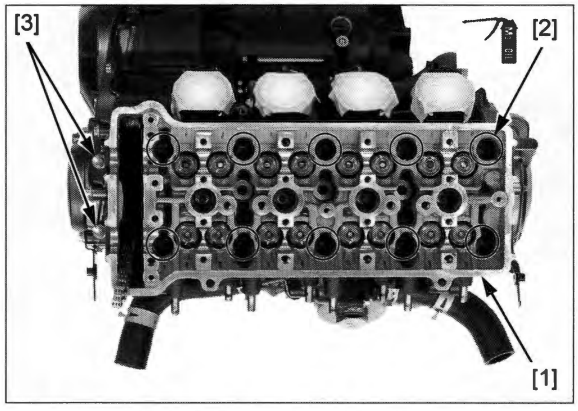
Clean the cylinder head 9 mm washer-bolts [2] in solvent, and dry them thoroughly.

Apply molybdenum oil to the 9 mm washer-bolt threads and seating surfaces.

Install and tighten the 9 mm washer-bolt in a crisscross pattern in 2 or 3 steps to the specified torque.

TORQUE: 47 N·m (4.8 kgf·m, 35 lbf·ft)

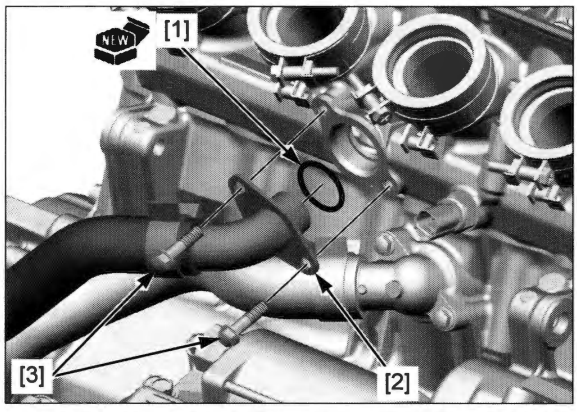
Install and tighten the 6 mm bolts [3] securely.



Install a new O-ring [1] to the water hose joint A [2].

- Do not apply engine oil to the O-ring.

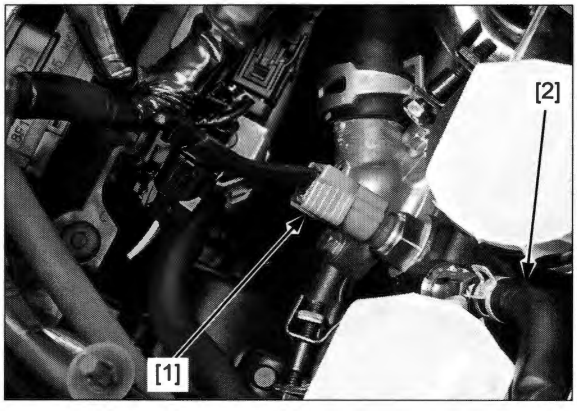
Install the water hose joint A into the cylinder head and tighten the bolts [3].



Connect the ECT sensor 2P (Blue) connector [1] and bleeding hose [2].

Install the following:

- Camshaft (page 10-10)
- Throttle body (page 7-14)
- Exhaust pipe/muffler (page 2-18)



CAM CHAIN TENSIONER LIFTER

REMOVAL/INSTALLATION

NOTE:

- The cam chain tensioner lifter can be serviced with the engine installed in the frame.

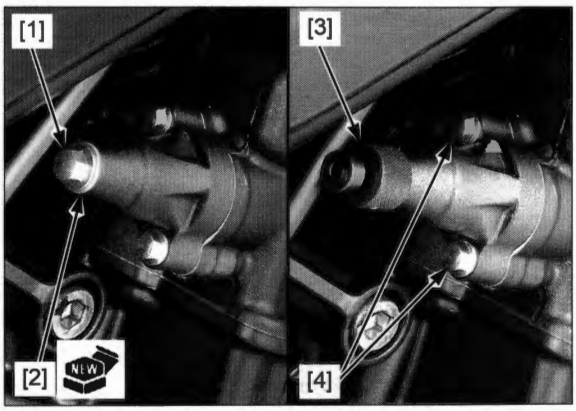
Remove the sealing bolt [1] and sealing washer [2].

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

TOOL:

[3] Tensioner stopper	**070MG-0010100 or 07AMG-001A100 (U.S.A. only)**

Remove the cam chain tensioner lifter mounting bolts [4].

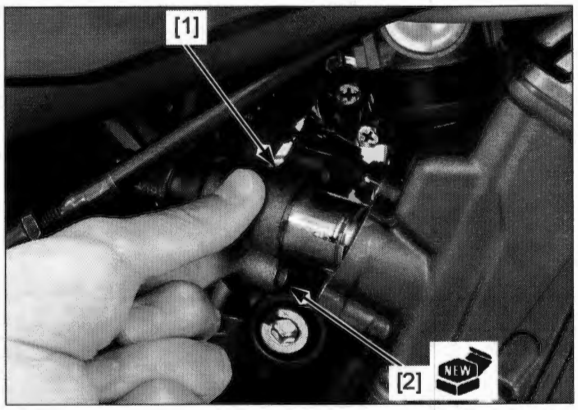


Remove the cam chain tensioner lifter [1] and gasket [2].

Installation is in the reverse order of removal.

NOTE:

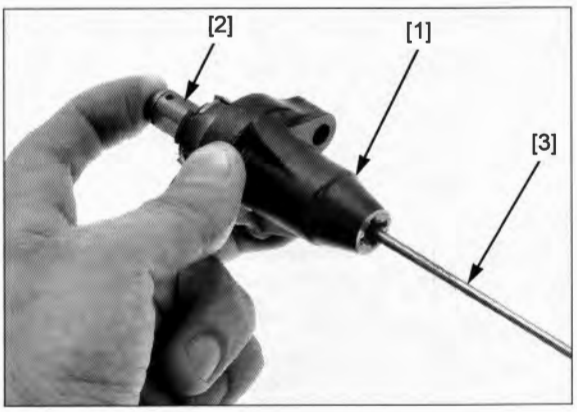
- Replace the gasket and sealing washer with new ones.



INSPECTION

Check the cam chain tensioner lifter [1] operation:

- The cam chain tensioner lifter shaft [2] should not go into the cam chain tensioner lifter body when it is pushed.
- When it is turned clockwise with a tensioner stopper or a screwdriver [3], the cam chain tensioner lifter shaft should be pulled into the cam chain tensioner lifter body. The cam chain tensioner lifter shaft should spring out of the cam chain tensioner lifter body as soon as the stopper tool is released.



11. CLUTCH/GEARSHIFT LINKAGE/STARTER CLUTCH

SERVICE INFORMATION 11-2

TROUBLESHOOTING 11-3

COMPONENT LOCATION 11-4

RIGHT CRANKCASE COVER 11-5

CLUTCH 11-7

STARTER CLUTCH 11-15

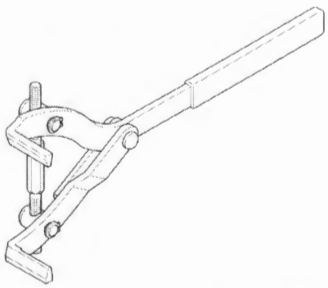
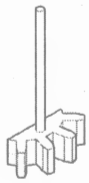
GEARSHIFT LINKAGE 11-20

SERVICE INFORMATION

GENERAL

- This section covers service of the clutch, gearshift linkage and starter clutch. All service can be done with the engine installed in the frame.
- Engine oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the engine oil level before servicing the clutch system.
- For starter motor service (page 6-5).

TOOLS

Clutch center holder 07724-0050002  or equivalent commercially available in U.S.A.	Gear holder, M2.5 07724-0010100  or 07724-001A100 (U.S.A. only)

TROUBLESHOOTING

Clutch lever is too hard to pull in
- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter pin installed improperly

Clutch slips when accelerating
- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- No clutch lever freeplay
- Engine oil mixed with molybdenum or graphite additive

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Excessive clutch lever freeplay (page 3-21)
- Clutch plate warped
- Engine oil level too high, improper engine oil viscosity or additive used
- Loose clutch center lock nut
- Damaged clutch lifter mechanism
- Clutch lifter pin installed improperly
- Worn clutch outer slot and clutch center grooves
- Improper clutch operation

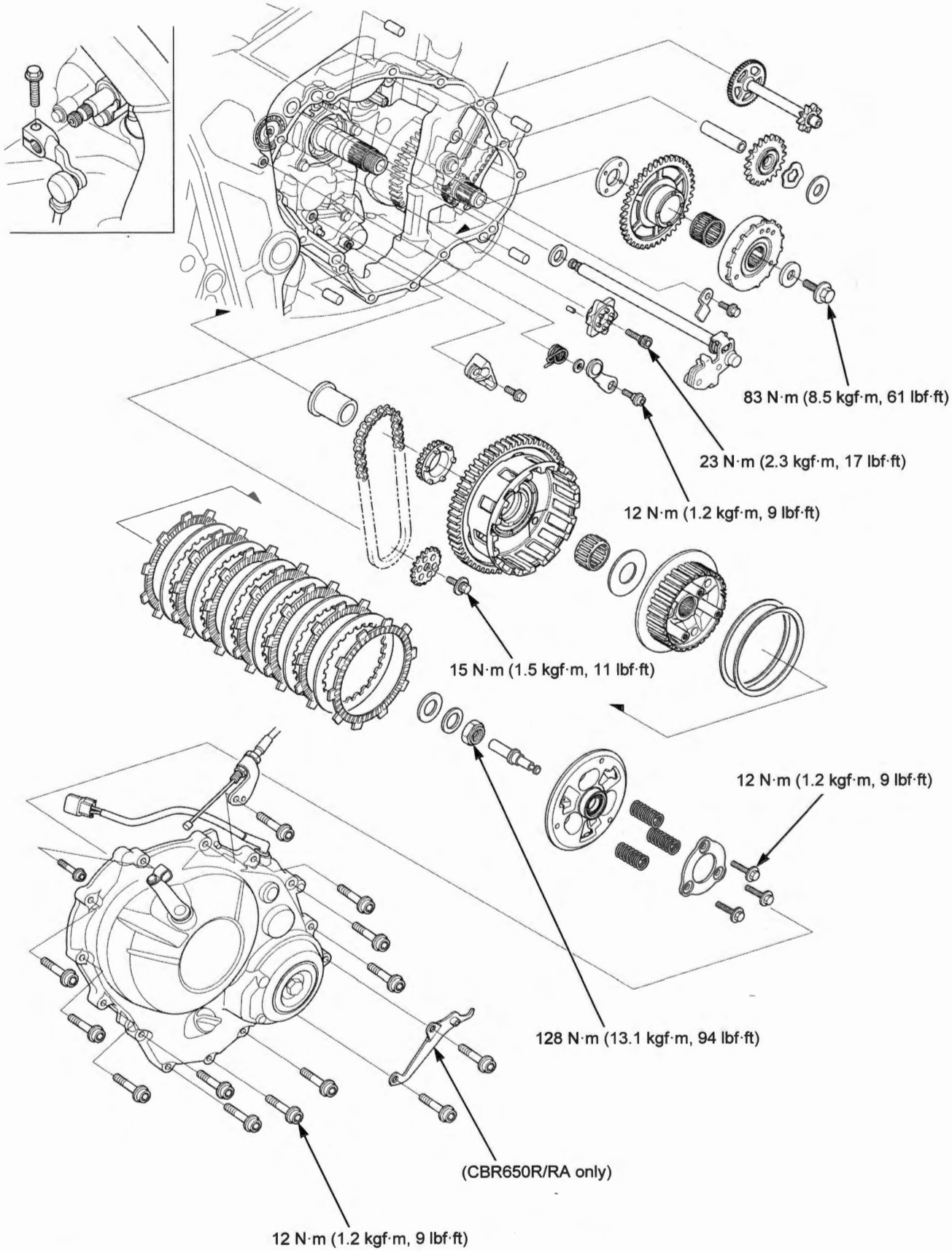
Hard to shift
- Incorrect clutch cable adjustment
- Improper clutch operation
- Improper engine oil viscosity
- Damaged or bent shift forks (page 13-9)
- Bent shift fork shaft (page 13-9)
- Bent shift fork claw (page 13-9)
- Loose shift drum center bolt
- Damaged shift drum center
- Damaged shift drum guide grooves (page 13-9)
- Damaged or bent gearshift spindle

Transmission jumps out of gear
- Worn shift drum stopper arm
- Weak or broken shift drum stopper arm return spring
- Loose shift drum center bolt
- Damaged shift drum center
- Bent shift fork shaft (page 13-9)
- Damaged or bent shift forks (page 13-9)
- Worn gear engagement dogs or slots (page 13-9)

Gearshift pedal will not return
- Weak or broken gearshift spindle return spring
- Damaged or bent gearshift spindle

Starter motor turns, but engine does not turn
- Faulty starter clutch
- Damaged starter reduction gear/shaft
- Damaged or faulty starter motor pinion gear
- Damaged starter driven gear

COMPONENT LOCATION



RIGHT CRANKCASE COVER

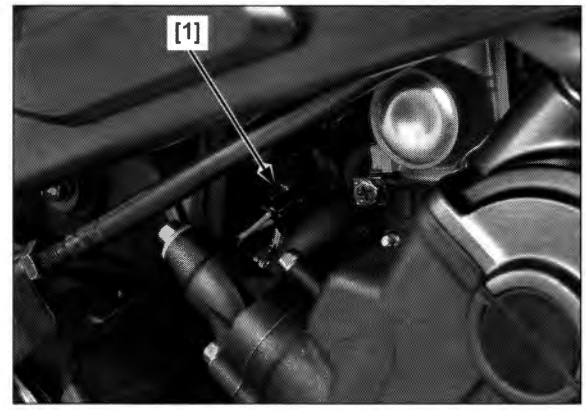
REMOVAL/INSTALLATION

Remove the following (CBR650R/RA only):

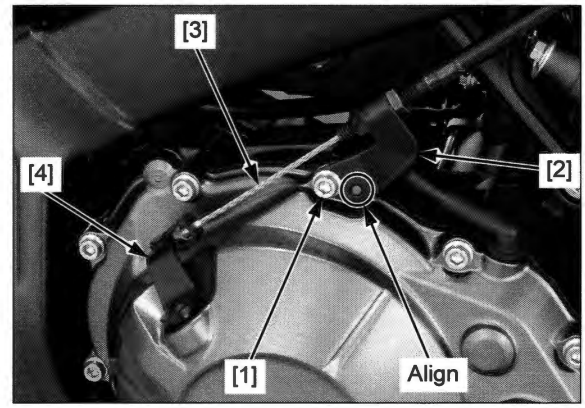
- Under cowl (page 2-11)
- Right middle cowl (page 2-7)

Drain the engine oil (page 3-11).

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

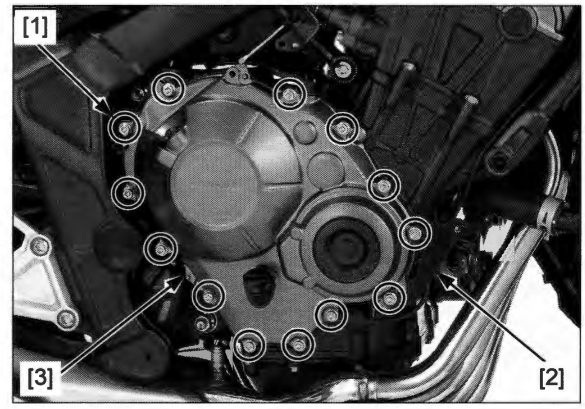


Remove the bolt [1] and clutch cable holder [2], then disconnect the clutch cable [3] from the clutch lifter arm [4].



Remove the following:

- Right crankcase cover bolts [1]
- Under cowl stay (CBR650R/RA only) [2]
- Right crankcase cover [3]



Remove the dowel pins [1].

Be careful not to damage the mating surfaces.

Clean any sealant off from the right crankcase cover mating surfaces.

Installation is in the reverse order of removal.

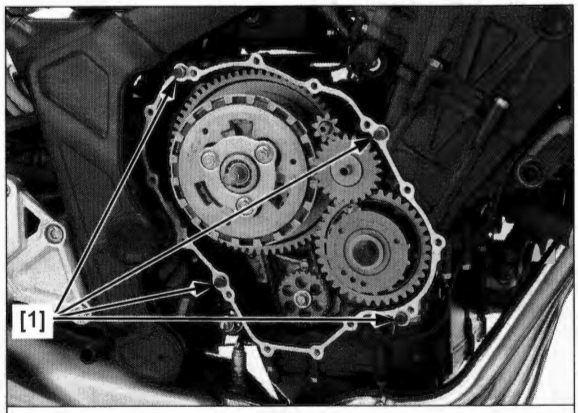
TORQUE:
Right crankcase cover bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

NOTE:

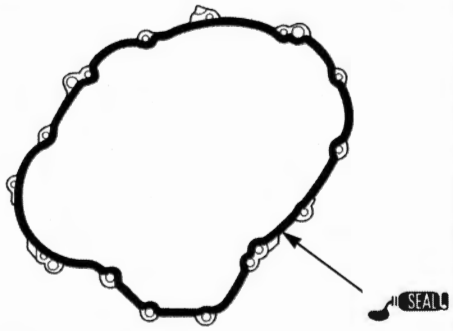
- Apply sealant (TB1207B manufactured by ThreeBond or an equivalent) to the mating areas of crankcase cover and crankcase as shown.
- Align the clutch cable holder hole with the right crankcase cover boss.

Adjust the clutch lever freeplay (page 3-21).

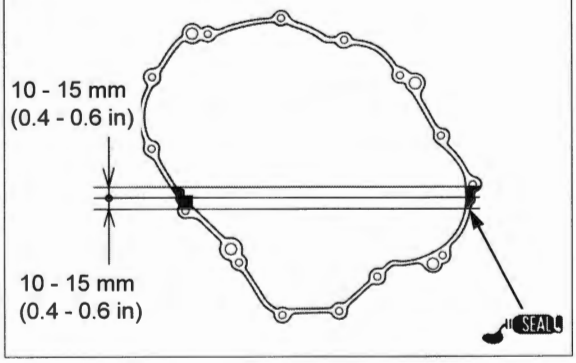
Fill the engine with the recommended engine oil and check that there are no oil leaks (page 3-10).



Cover side:



Crankcase side:

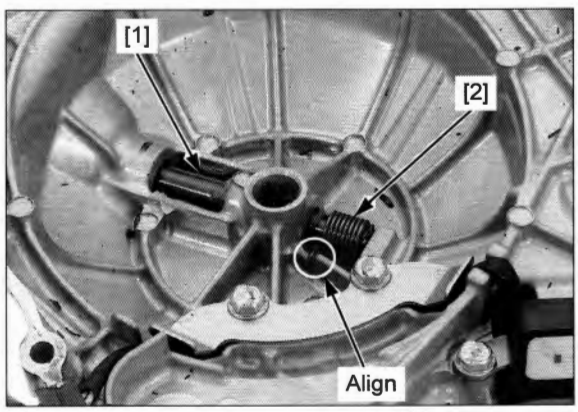


DISASSEMBLY/ASSEMBLY

Remove the clutch lifter arm [1] and return spring [2] from the right crankcase cover.

Check the clutch lifter arm and return spring for scratch, damage, abnormal wear and deformation.

Replace if necessary.



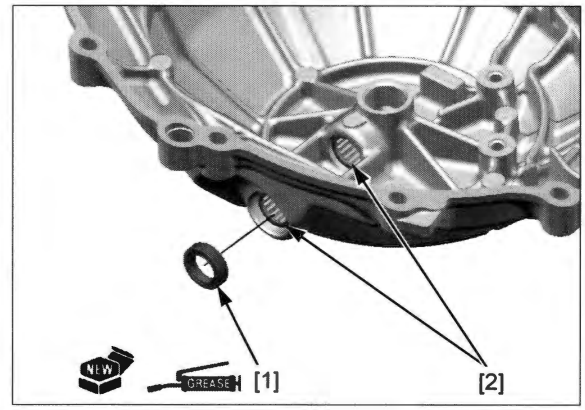
Remove the oil seal [1] from the right crankcase cover.

Check the needle bearings [2] for wear or damage, replace them if necessary.

Assembly is in the reverse order of disassembly.

NOTE:

- Apply grease to a new oil seal lips.
- Align the return spring hook with right crankcase cover.



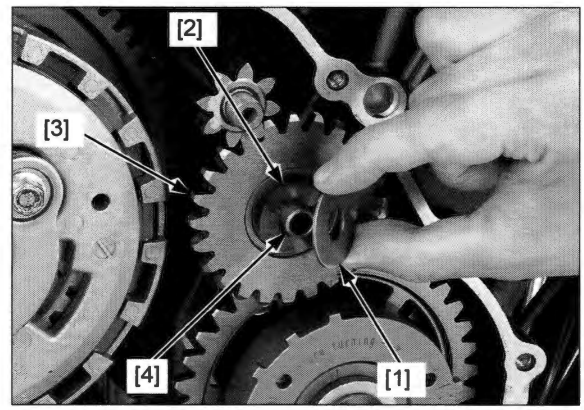
CLUTCH

REMOVAL

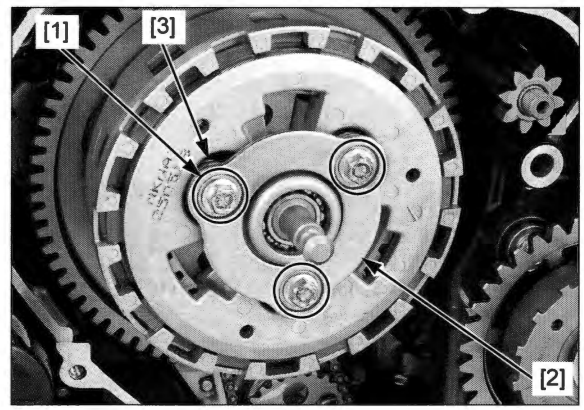
Remove the right crankcase cover (page 11-5).

Remove the following:

- Thrust washer [1]
- Wave washer [2]
- Starter idle gear [3]
- Shaft [4]

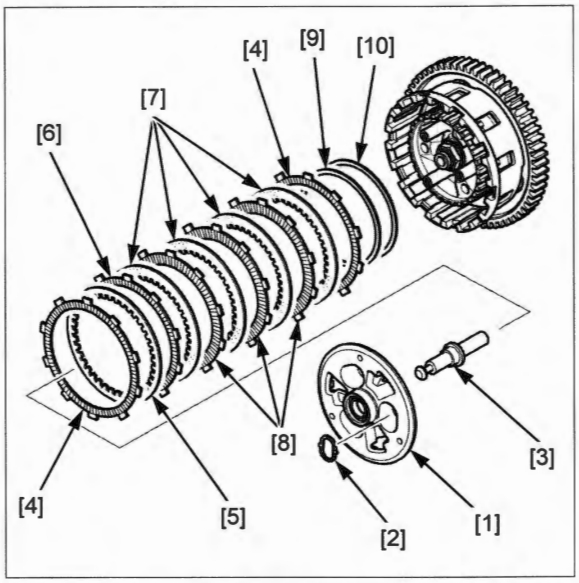


Loosen the set plate bolts [1] in a crisscross pattern in two or three steps, and remove the bolts, set plate [2], and clutch springs [3].



Remove the following:

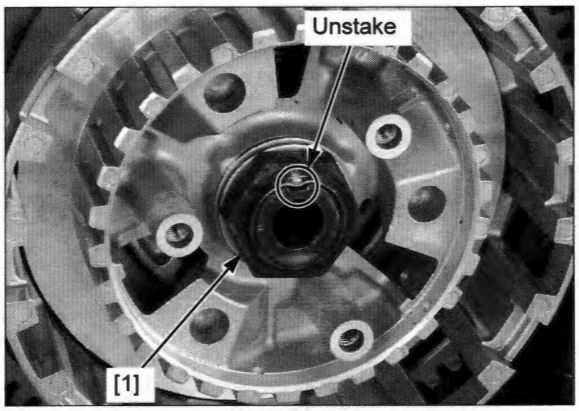
- Clutch pressure plate [1]
- Clutch spring seats [2]
- Clutch lifter pin [3]
- Clutch discs B [4] (2 pcs)
- Clutch plate B [5]
- Clutch disc C [6]
- Clutch plates A [7] (4 pcs)
- Clutch discs A [8] (3 pcs)
- Judder spring [9]
- Judder spring seat [10]



NOTE:

- When removing the clutch discs and plates, note the number of the clutch discs and plates.

Unstake the clutch center lock nut [1].

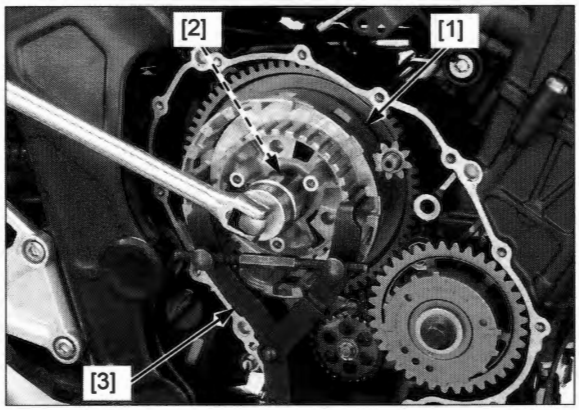


Hold the clutch center [1] with the special tool and remove the clutch center lock nut [2].

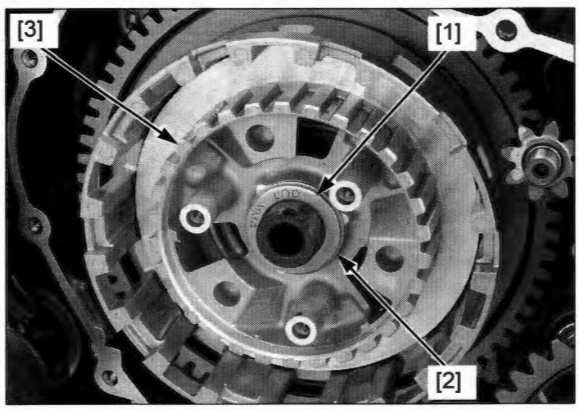
TOOL:

[3] Clutch center holder **07724-0050002 or equivalent commercially available in U.S.A.**

Discard the lock nut.

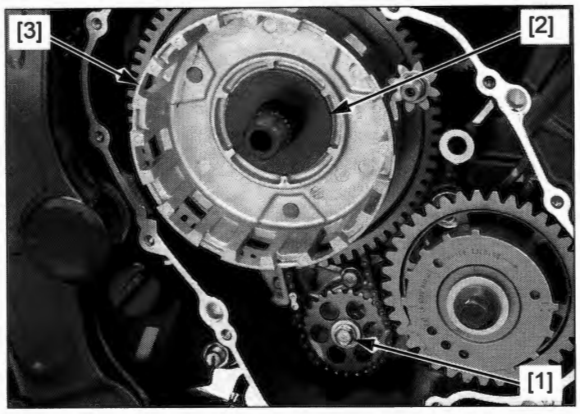


Remove the lock washer [1], thrust washer [2] and clutch center [3].

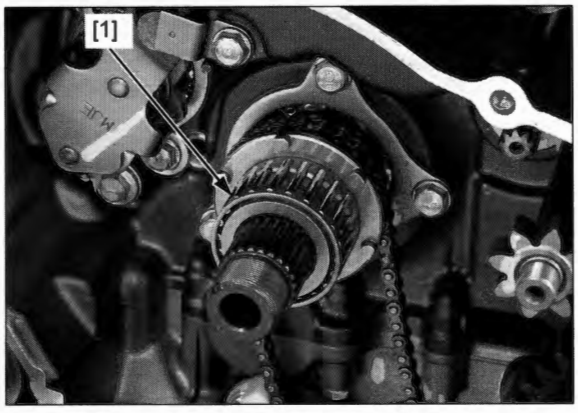


Loosen the oil pump driven sprocket washer-bolt [1], but do not remove it yet.

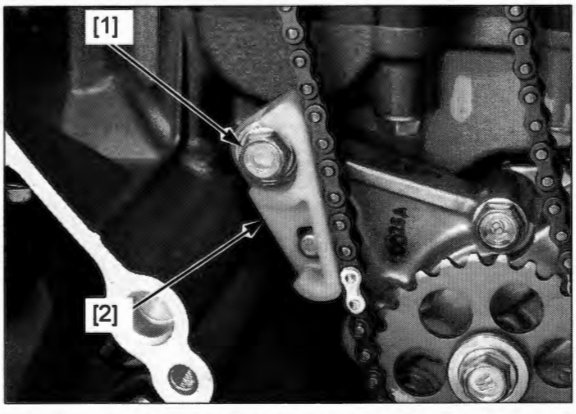
Remove the thrust washer [2] and clutch outer [3].



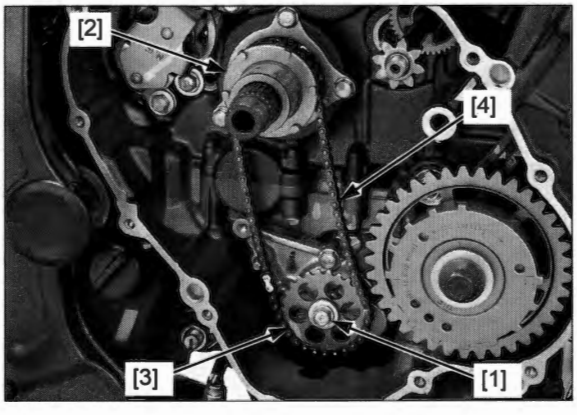
Remove the needle bearing [1].



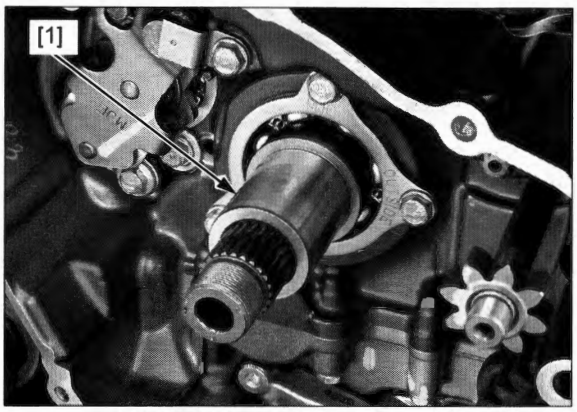
Remove the bolt [1] and oil pump drive chain guide [2].



Remove the oil pump driven sprocket washer-bolt [1].
Remove the oil pump drive sprocket [2], driven sprocket [3] and drive chain [4] as an assembly.



Remove the clutch outer guide [1].

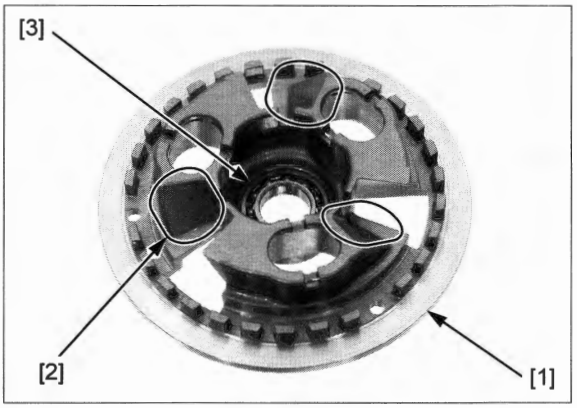


INSPECTION

Check the following of the clutch pressure plate [1] for scratches, damage, abnormal wear and deformation.

- Cam areas [2]
- Grooves
- Disc sliding surface
- Bearing [3]

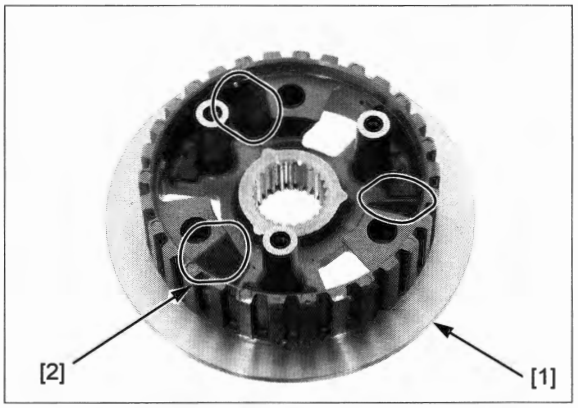
Replace the clutch pressure plate if necessary.



Check the following of the clutch center [1] for scratches, damage, abnormal wear and deformation.

- Cam areas [2]
- Grooves
- Disc sliding surface

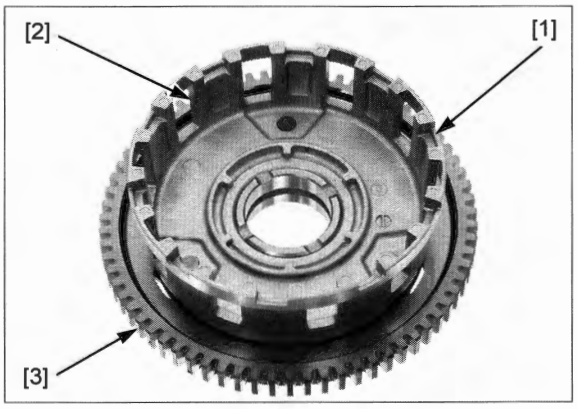
Replace the clutch center if necessary.



Check the following of the clutch outer [1] for scratches, damage, abnormal wear and deformation.

- Slots [2]
- Primary driven gear [3]

Replace the clutch outer if necessary.



Inspect the following parts for scratch, damage, abnormal wear and deformation.

- Clutch lifter bearing
- Clutch lifter pin
- Clutch springs
- Spring seats
- Judder spring
- Clutch discs/plates
- needle bearing
- Clutch outer guide
- Oil pump drive/driven sprocket
- Oil pump drive chain
- Mainshaft

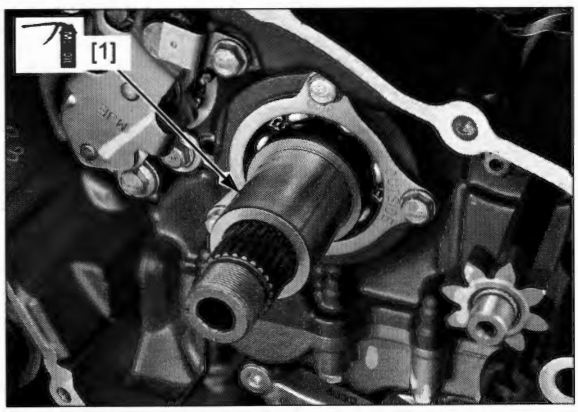
Measure each part according to CLUTCH/GEARSHIFT LINKAGE/STARTER CLUTCH SPECIFICATIONS (page 1-7).

Replace any if it is out of service limit.

- Replace the clutch springs as a set.
- Replace the clutch discs and plates as a set.

INSTALLATION

Apply molybdenum oil solution to the clutch outer guide [1] sliding surface and install it to the mainshaft.



Apply oil to the oil pump drive sprocket [1] and driven sprocket [2] teeth.

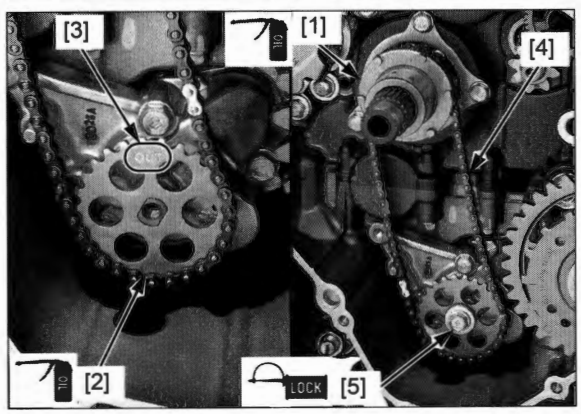
Install the oil pump driven sprocket with its "OUT" mark [3] facing out.

Install the oil pump drive/driven sprocket and drive chain [4] as an assembly.

Apply a locking agent to the oil pump driven sprocket washer-bolt [5] threads.

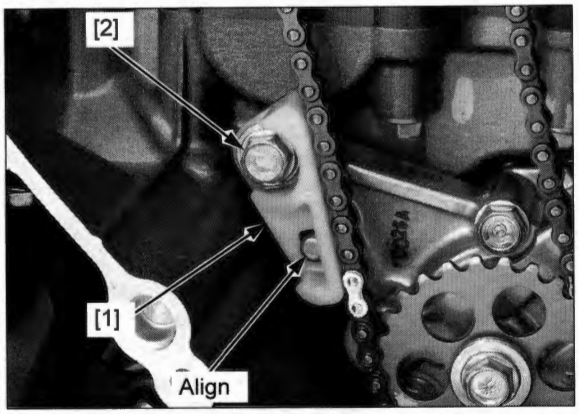
Be careful not to drop the parts into the oil pan.

Temporarily install the oil pump driven sprocket washer-bolt.



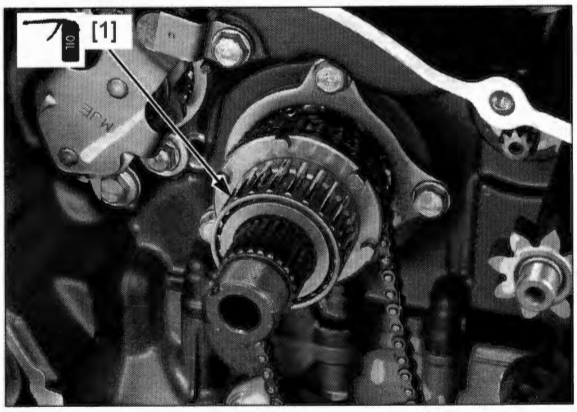
Be careful not to drop the parts into the oil pan.

Install the oil pump drive chain guide [1] by aligning the hole with boss of crankcase.
Tighten the bolt [2] securely.



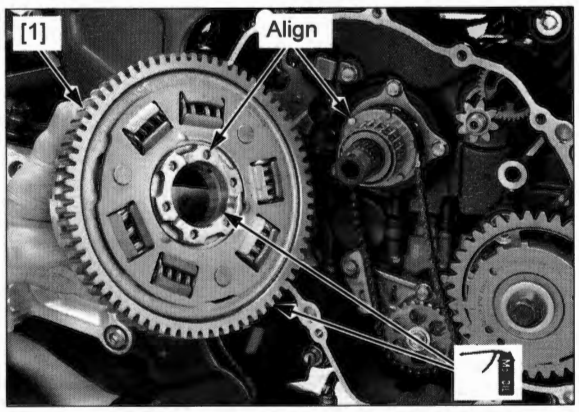
Apply engine oil to the rotating area of the needle bearing [1].

Install the needle bearing onto the mainshaft.



Apply molybdenum oil solution to the clutch outer [1] gear and sliding surface.

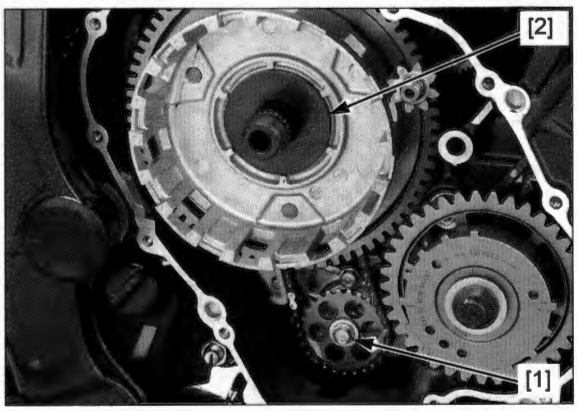
Install the clutch outer by aligning the holes with the tabs of the oil pump drive sprocket.



Tighten the oil pump driven sprocket washer-bolt [1] to the specified torque.

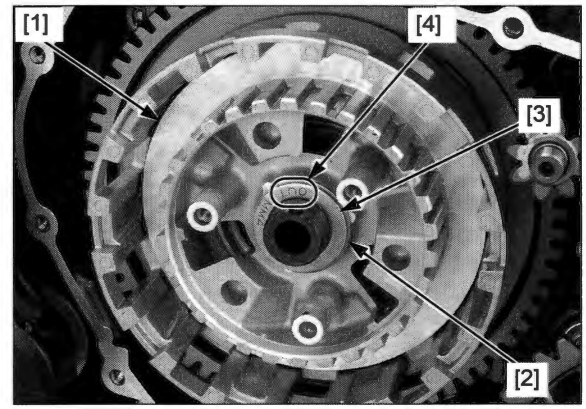
TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the thrust washer [2].



Install the clutch center [1] and thrust washer [2].

Install the lock washer [3] with its "OUT" mark [4] facing out.



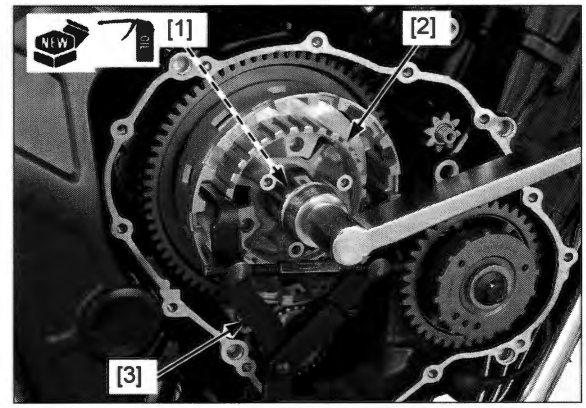
Apply engine oil to the threads and seating surface of a new clutch center lock nut [1], then install it onto the mainshaft.

Hold the clutch center [2] with the special tool and tighten the lock nut to the specified torque.

TOOL:

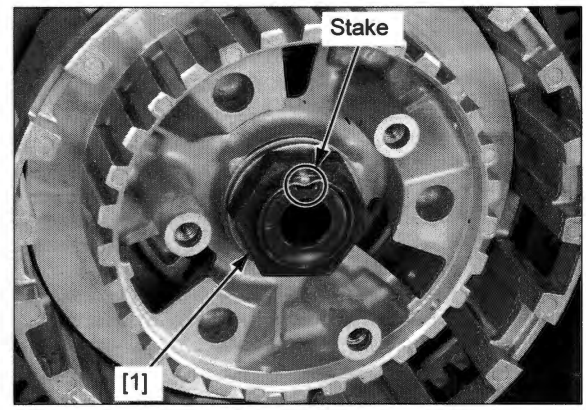
[3] Clutch center holder 07724-0050002 or equivalent commercially available in U.S.A.

TORQUE: 128 N·m (13.1 kgf·m, 94 lbf·ft)



Be careful not to damage the mainshaft threads.

Stake the lock nut [1] into the mainshaft groove with a punch.



Apply molybdenum oil solution to the entire surface of judder spring seat and judder spring.

Install the judder spring seat [1] and judder spring [2] onto the clutch center [3] as shown.

Apply engine oil to the entire surface of clutch discs.

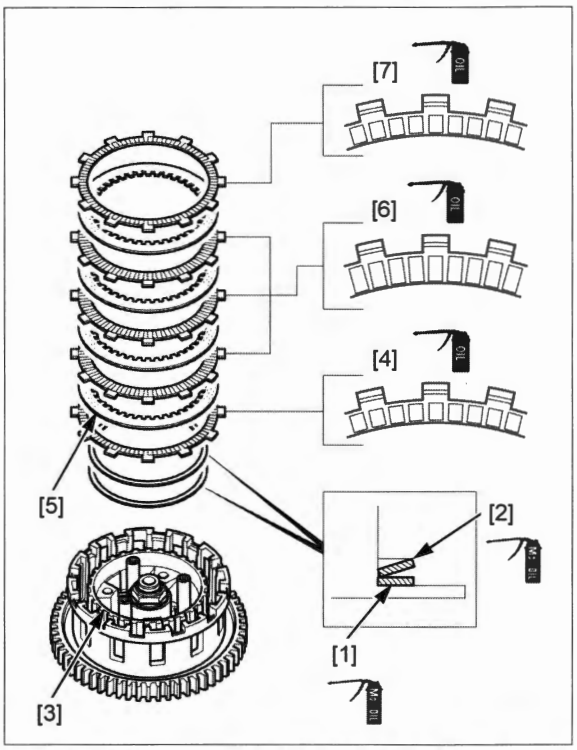
Install the clutch disc B [4] onto the clutch center.

Install the clutch plates A [5] (4 pcs) and discs A [6] (3 pcs) alternately, starting with the plate A.

Install the clutch disc C [7].

NOTE:

- Clutch disc B: lining color is black
- Clutch plate A: Small I.D.



Install the clutch lifter pin [1].

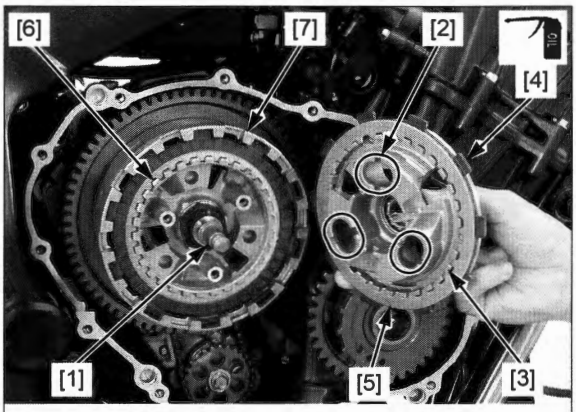
Install the spring seats [2] onto the clutch pressure plate [3] grooves.

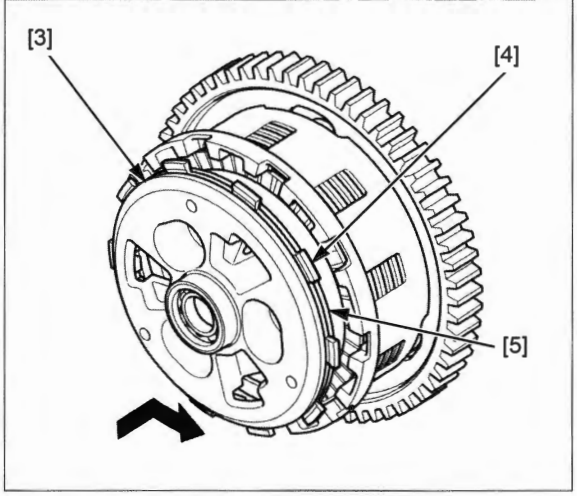
NOTE:

- Make sure that the spring seats are fully seated in the pressure plate grooves.

Apply engine oil to the entire surface of clutch disc B.
Install the clutch disc B [4] onto the clutch pressure plate.
Install the clutch plate B [5] by aligning its tabs with the pressure plate grooves.

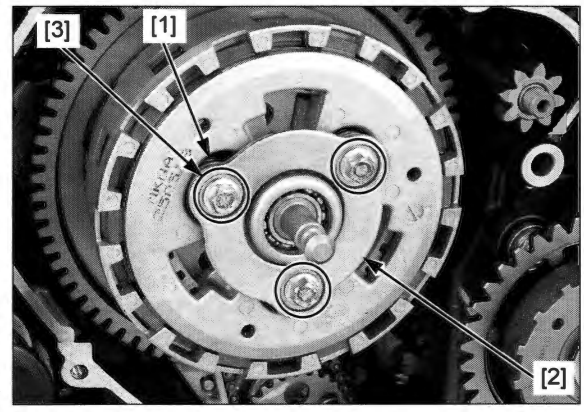
Put the clutch pressure plate assembly onto the clutch center [6] by aligning each cam area and insert them by rotating counterclockwise.
Install the clutch disc B tabs into the shallow slots of the clutch outer [7].





Install the clutch springs [1], set plate [2] and set plate bolts [3].
Tighten the set plate bolts in a crisscross pattern in two or three steps.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

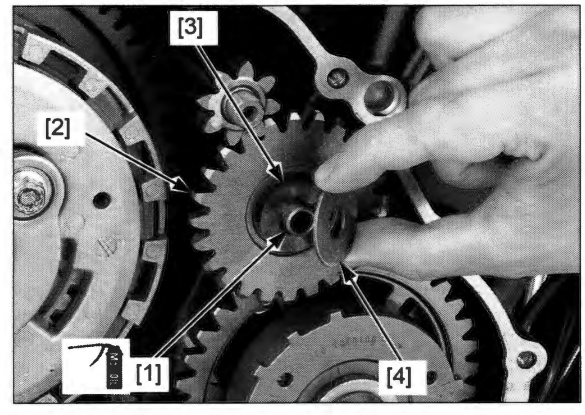


Apply molybdenum oil solution to the starter idle gear shaft [1] outer surface.

Install the starter idle gear [2] and shaft.

Install the wave washer [3] and thrust washer [4] onto the starter idle gear.

Install the right crankcase cover (page 11-5).

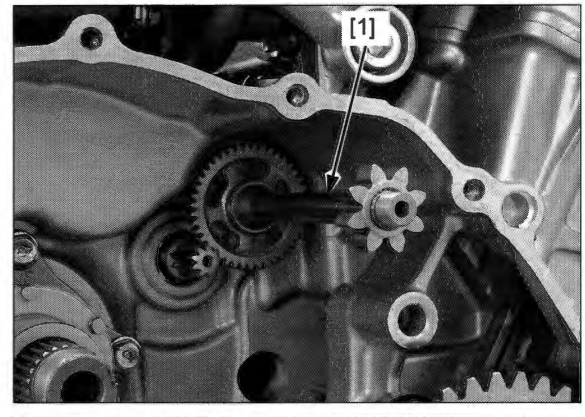


STARTER CLUTCH

REMOVAL

Remove the clutch (page 11-7).

Remove the starter reduction gear [1] from the crankcase.



Temporarily install the following:

- Starter idle gear [1]
- Starter idle gear shaft [2]

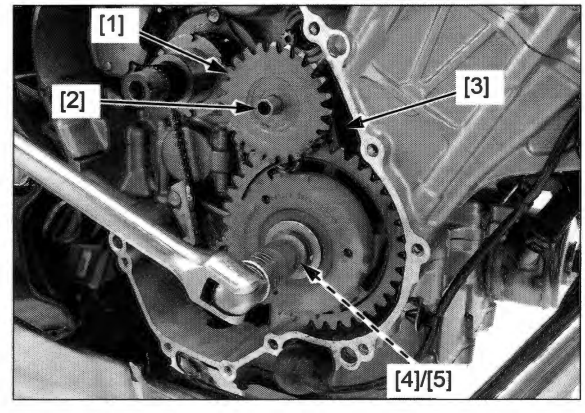
Insert the special tool between the starter idle gear and driven gear as shown.

TOOL:

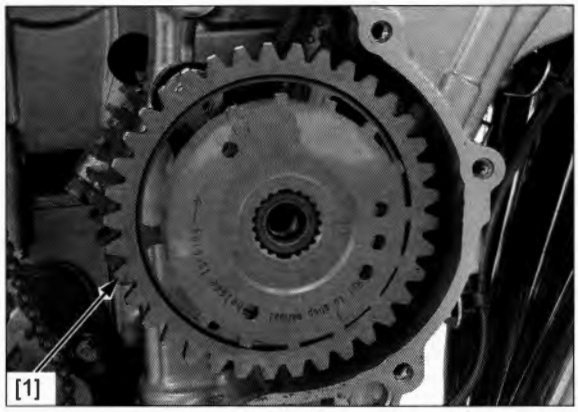
[3] Gear holder, M2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**

Remove the starter clutch mounting bolt [4] and washer [5].

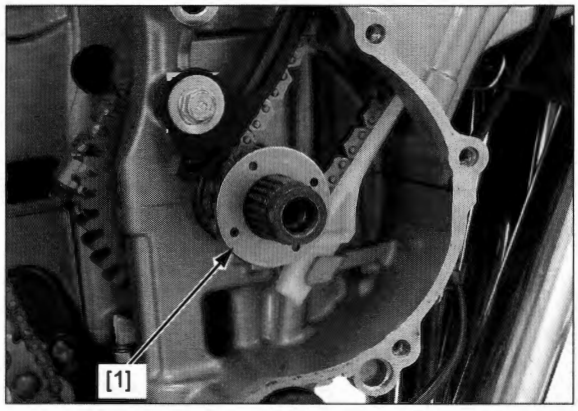
Remove the temporarily installed parts.



Remove the starter clutch outer assembly [1].



Remove the thrust washer [1].

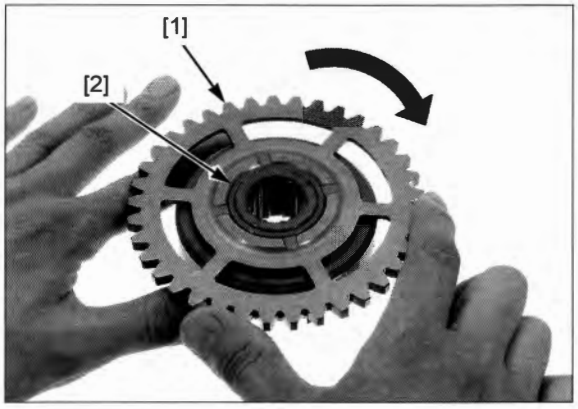


DISASSEMBLY

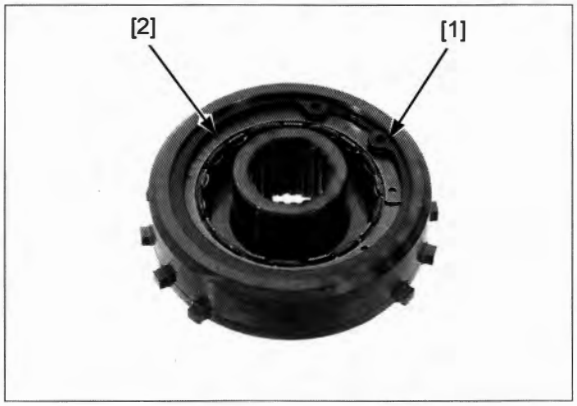
Check the operation of the one-way clutch by turning the driven gear [1].
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.

Remove the starter driven gear by turning it clockwise.

Remove the needle bearing [2].



Remove the snap ring [1] and one-way clutch [2].



INSPECTION

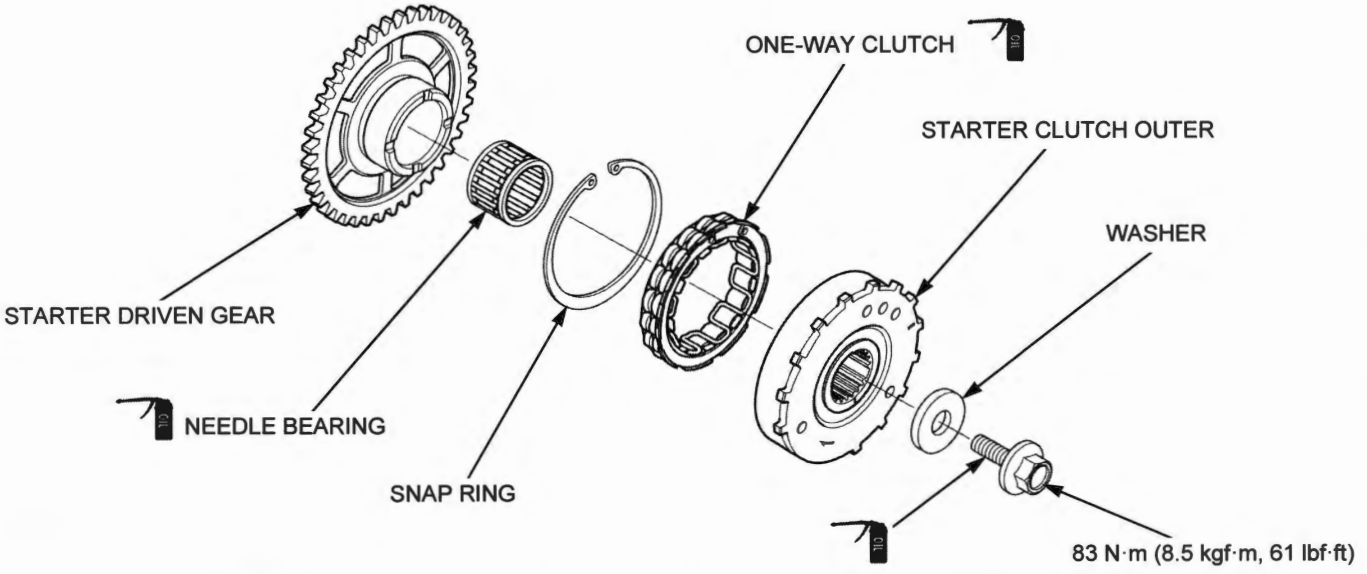
Inspect the following parts for scratch, damage, abnormal wear and deformation.

- Starter driven gear
- Starter reduction gear
- Starter clutch outer
- Starter one-way clutch

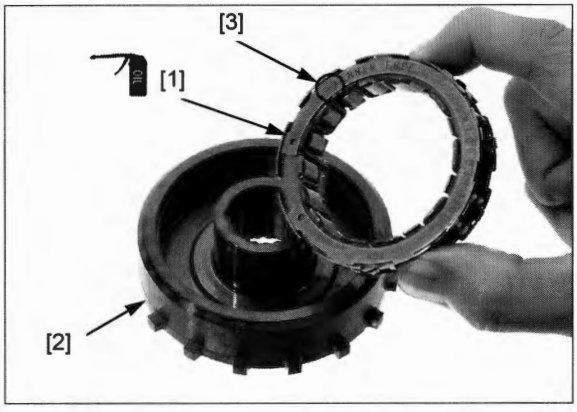
Measure each part according to CLUTCH/GEARSHIFT LINKAGE/STARTER CLUTCH SPECIFICATIONS (page 1-7).

Replace any part if it is out of service limit.

ASSEMBLY



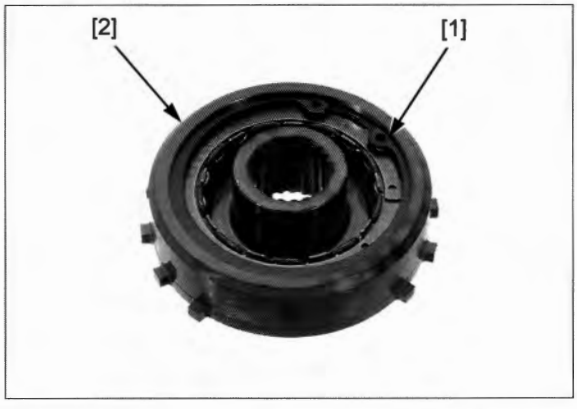
Apply engine oil to the one-way clutch [1] contacting surface.
Install the one-way clutch into the starter clutch outer [2] with its arrow mark [3] facing out.



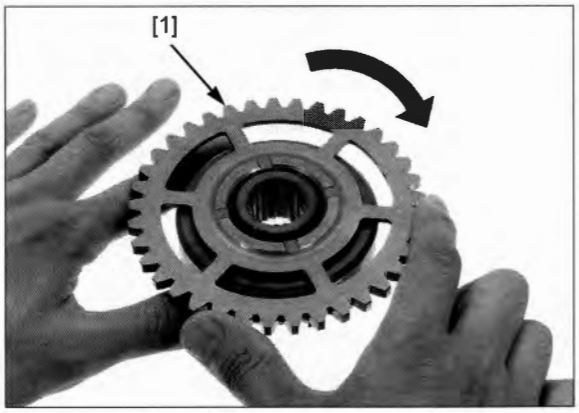
Install the snap ring [1] into the starter clutch outer [2] groove securely.

NOTE:

- Do not reuse worm snap ring which could easily spin in the groove.



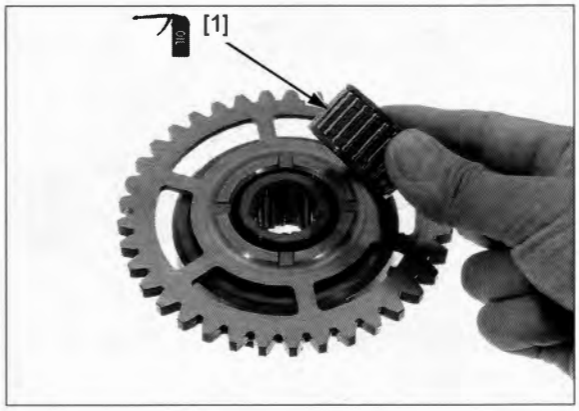
Install the starter driven gear [1] into the starter clutch outer while turning the starter driven gear clockwise.



Apply engine oil to the rotating area of the needle bearing [1].

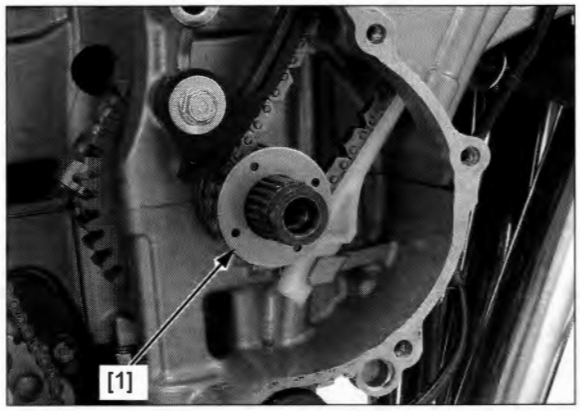
Install the needle bearing into the starter clutch outer.

Recheck the one-way clutch operation (page 11-16).

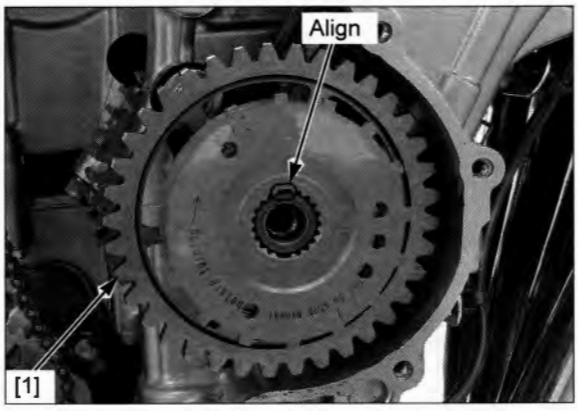


INSTALLATION

Install the thrust washer [1] to the crankshaft.

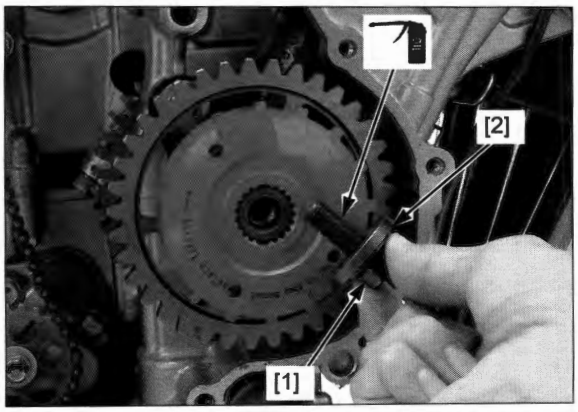


Install the starter clutch outer assembly [1] to the crankshaft while aligning the tab of the crankshaft with the wide groove of the starter clutch outer assembly.



Apply engine oil to the starter clutch outer mounting bolt [1] threads and seating surface.

Install the washer [2] and starter clutch mounting bolt.



Temporarily install the following:

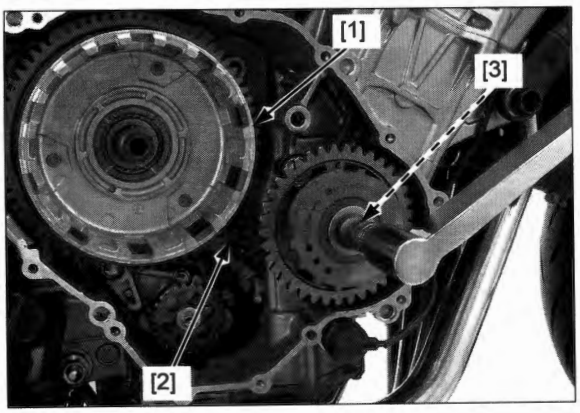
- Oil pump drive sprocket guide
- Oil pump drive sprocket
- Clutch outer guide
- Clutch outer [1]
- Clutch outer needle bearing

Be careful not to drop the gear holder into the crankcase.

Attach the special tool between the primary drive gear and driven gear.

TOOL:

[2] Gear holder, M2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**



Tighten the starter clutch outer mounting bolt [3] to the specified torque.

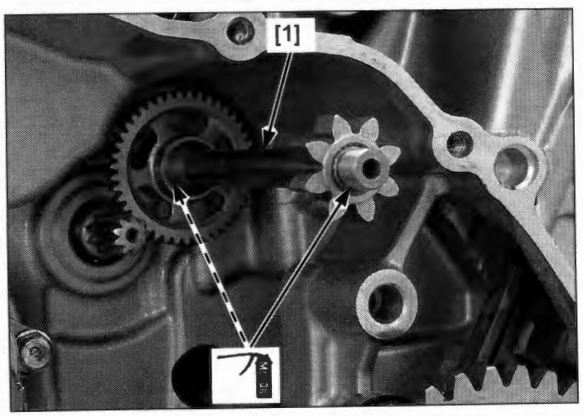
TORQUE: 83 N·m (8.5 kgf·m, 61 lbf·ft)

Remove the temporarily installed parts.

Apply molybdenum oil solution to the starter reduction gear [1] sliding surface.

Install the starter reduction gear into the crankcase.

Install the clutch (page 11-11).

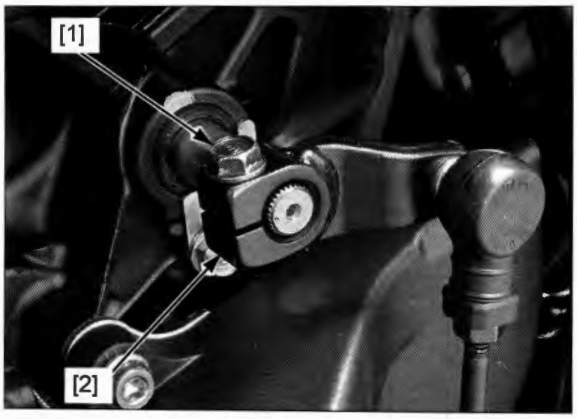


GEARSHIFT LINKAGE

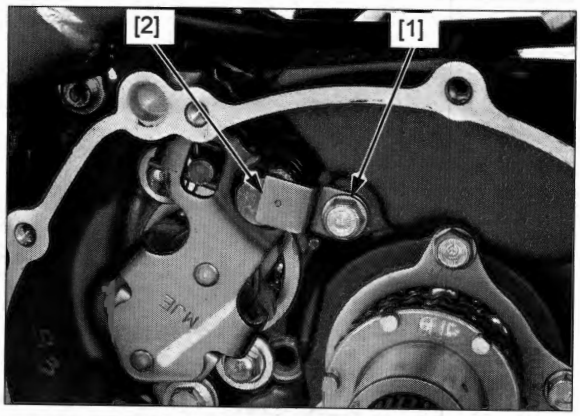
REMOVAL

Remove the clutch (page 11-7).

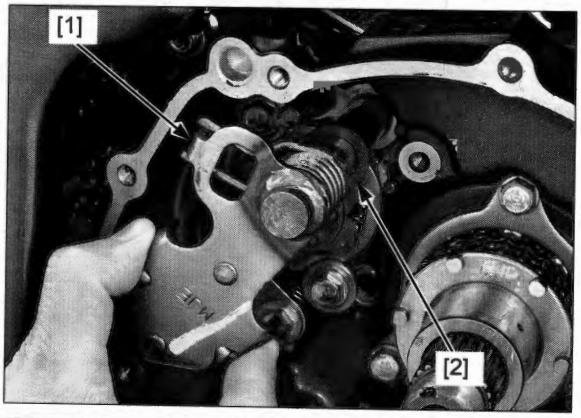
Remove the pinch bolt [1] and disconnect the gearshift arm [2] from the gearshift spindle.



Remove the bolt [1] and setting plate [2].

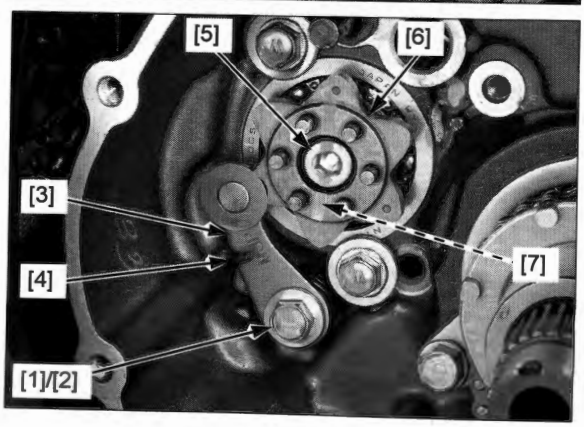


Pull the gearshift spindle assembly [1] and thrust washer [2] out of the crankcase.



Remove the following:

- Stopper arm pivot bolt [1]
- Washer [2]
- Stopper arm [3]
- Return spring [4]
- Shift drum center socket bolt [5]
- Gearshift cam [6]
- Dowel pin [7]



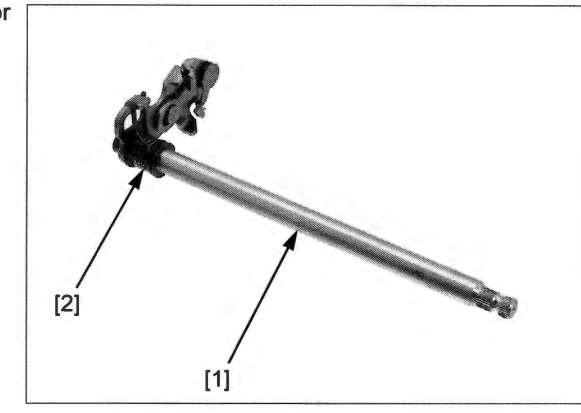
INSPECTION

Inspect the following parts for scratch, damage, abnormal wear and deformation.

- Shift drum stopper plate
- Shift drum stopper arm
- Shift drum stopper arm return spring

Replace if necessary.

Check the gearshift spindle [1] for wear, damage or bending.
Check the return spring [2] for fatigue or damage.



GEARSHIFT SPINDLE NEEDLE BEARING REPLACEMENT

Remove the gearshift spindle (page 11-20).

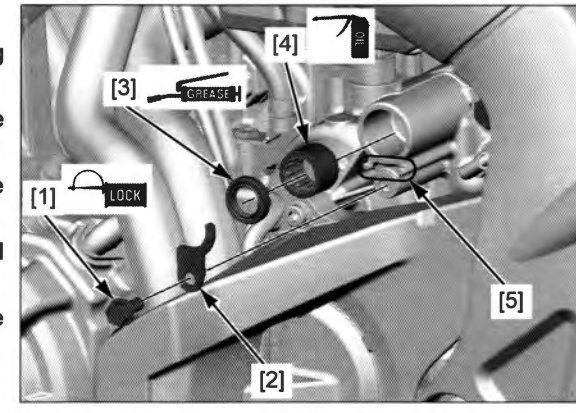
Remove the bolt [1], gearshift spindle oil seal setting plate [2], oil seal [3] and needle bearing [4].

Apply engine oil to a new gearshift spindle needle bearing, then install it into the crankcase.

Apply grease to a new oil seal lips, then install it into the crankcase until it is flush with the crankcase surface.

Apply locking agent to the gearshift spindle oil seal setting plate bolt threads (page 1-17).

Install the gearshift spindle oil seal setting plate between the crankcase tabs [5], then tighten the bolt.



INSTALLATION

Apply a locking agent to the stopper arm pivot bolt [1] threads.

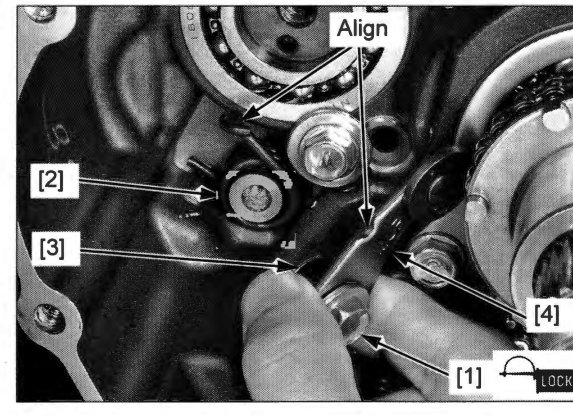
Install the following:

- Return spring [2]
- Washer [3]
- Stopper arm [4]
- Pivot bolt

• Align the stopper arm groove with the spring end.

Tighten the stopper arm pivot bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

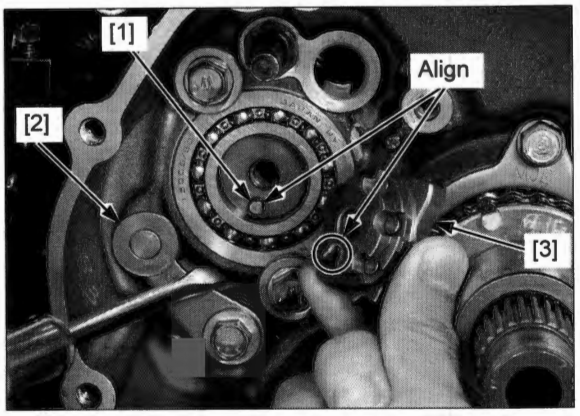


Install the dowel pin [1] onto the shift drum.

Align the dowel pin on the shift drum with the wide groove on the gearshift cam.

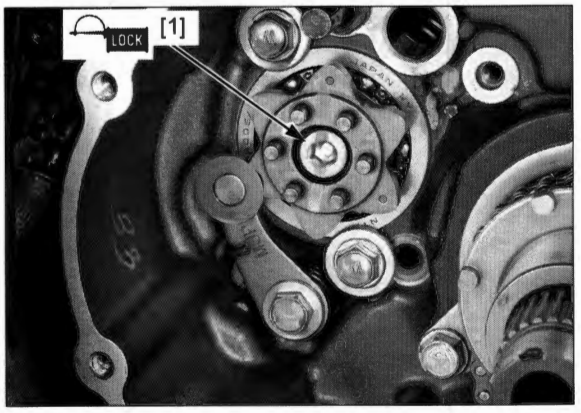
Hold the stopper arm [2] using a screwdriver as shown.

Install the gearshift cam [3] while aligning its slot with the dowel pin.

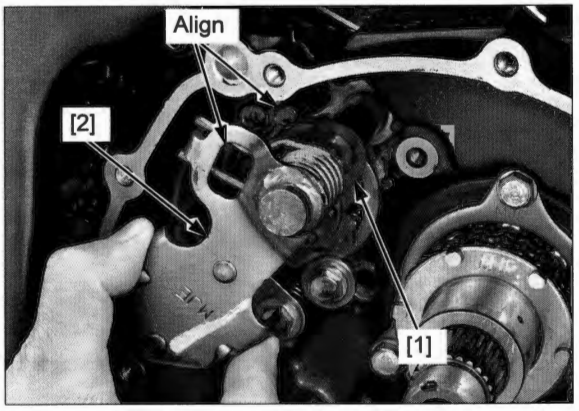


Apply a locking agent to the shift drum center socket bolt [1] threads.
Tighten the socket bolt to the specified torque.

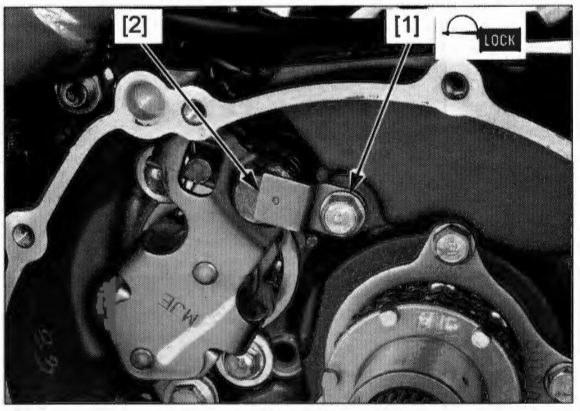
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Install the thrust washer [1] and gearshift spindle assembly [2] into the crankcase while aligning the return spring ends with the crankcase stopper pin.



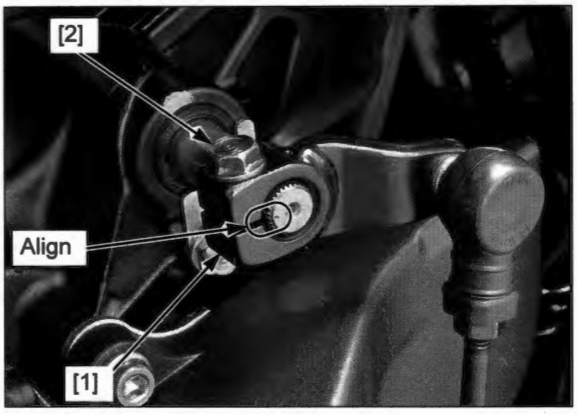
Apply a locking agent to the setting plate bolt [1] threads.
Install the setting plate [2] and tighten the bolt securely.



Install the gearshift arm [1] to the gearshift spindle by aligning the arm slit with the punch mark on the gearshift spindle.

Install and tighten the pinch bolt [2].

Install the clutch (page 11-11).



GEARSHIFT PEDAL REMOVAL/ INSTALLATION

Remove the pinch bolt [1] and gearshift arm [2] from the gearshift spindle.

Remove the pivot socket bolt [3] and gearshift pedal [4].

Remove the dust seals [5].

Check the dust seals and tie-rod ball joint dust cover [6] for deterioration or damage, replace them if necessary.

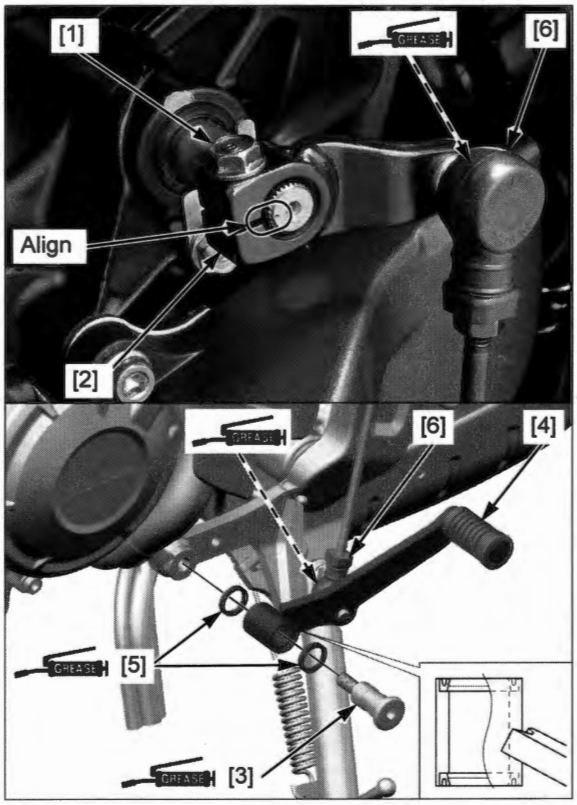
Installation is in the reverse order of removal.

TORQUE:

Gearshift pedal pivot socket bolt:
27 N·m (2.8 kgf·m, 20 lbf·ft)

NOTE:

- Apply grease to the dust seal lips.
- Install the dust seals with the seal lip side facing out.
- Apply grease to the gearshift pedal pivot sliding area (grease groove) of the pivot bolt.
- Apply grease to the gearshift pedal tie-rod ball joint.
- Align the slit of the gearshift arm with the punch mark on the spindle



When adjusting the gearshift pedal height, perform by loosing the lock nuts [1] and it must be noted as follows.

NOTE:

- The gearshift arm side lock nut has left hand threads.

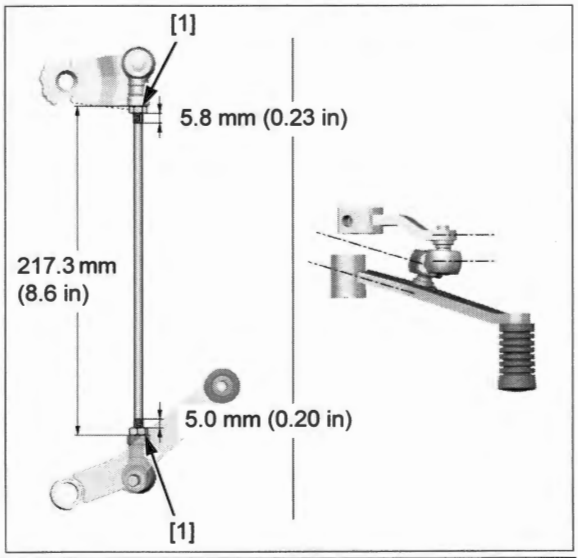
Adjust the tie-rod length so that the distance between the ball joint ends is standard length as shown.

After adjustment tighten the gearshift pedal adjuster lock nuts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

NOTE:

- Tighten the lock nuts with the position of each ball joint in parallel to the gearshift arm and gearshift pedal as shown.



MEMO

12. ALTERNATOR

SERVICE INFORMATION 12-2

COMPONENT LOCATION 12-2

LEFT CRANKCASE COVER 12-3

STATOR 12-4

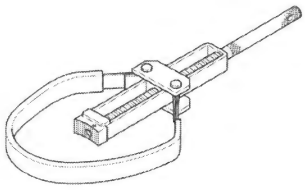
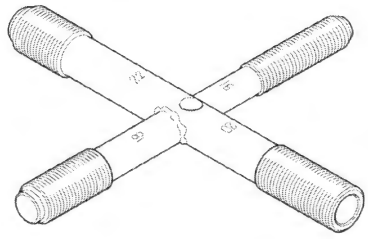
FLYWHEEL 12-5

SERVICE INFORMATION

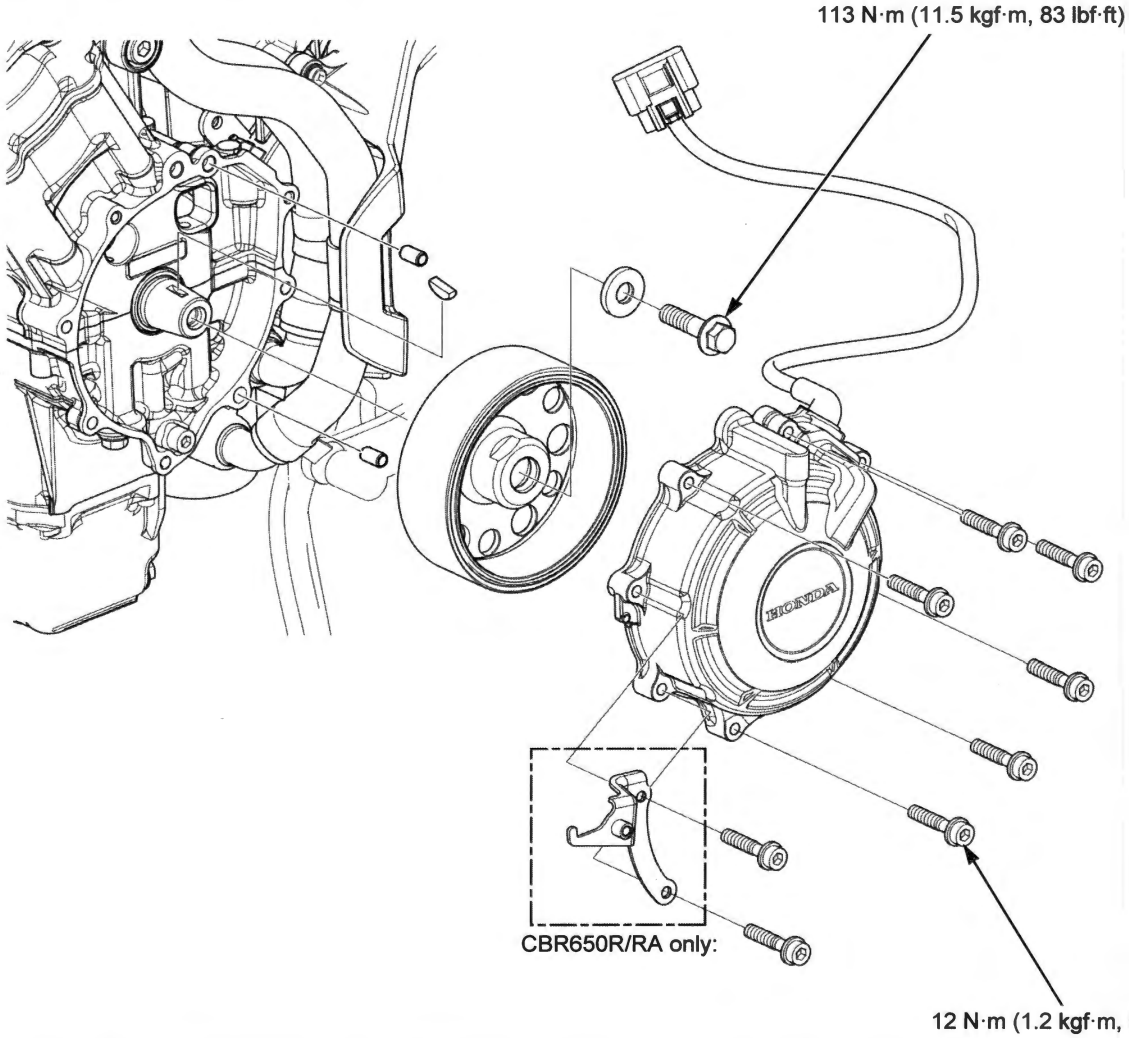
GENERAL

- This section covers service of the alternator stator and flywheel. All service can be done with the engine installed in the frame.
- For alternator charging coil inspection (page 20-7).
- For CKP sensor inspection (page 5-6).

TOOLS

Flywheel holder 07725-0040001 	Rotor puller 07733-0020001  or 07933-3950000 (U.S.A. only)

COMPONENT LOCATION



LEFT CRANKCASE COVER

REMOVAL/INSTALLATION

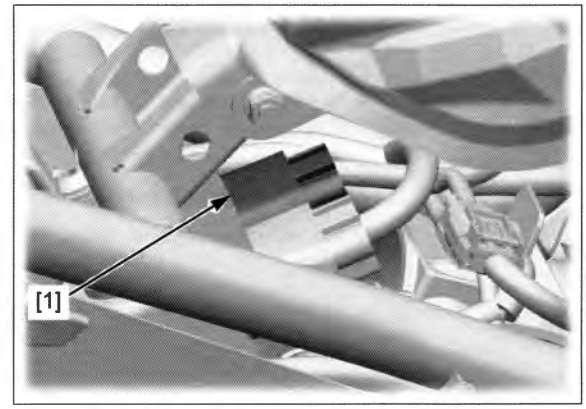
Support the motorcycle in an upright position on a level surface.

Remove the following:

- Left middle cowl (page 2-7) (CBR650R/RA)
- Under cowl (page 2-11) (CBR650R/RA)

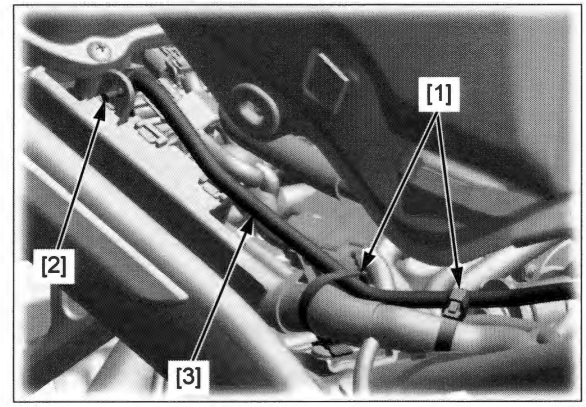
Lift the fuel tank and support it (page 3-4).

Disconnect the alternator 3P (Gray) connector [1].



Release the wire bands [1] and alternator wire clip [2].

Remove the alternator wire [3] out of the frame.



NOTE:

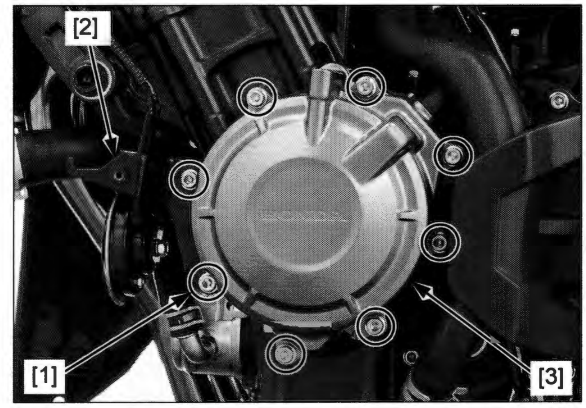
- Place a clean oil pan under the engine because engine oil will flow out when removing the left crankcase cover. Add the recommended engine oil to the specified level after installation (page 3-10).

Remove the following:

- Left crankcase cover bolts [1]
- Under cowl stay (CBR650R/RA only) [2]
- Left crankcase cover [3]

NOTE:

- The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during removal and installation.



Remove the dowel pins [1].

Be careful not to damage the mating surfaces.

Clean any sealant off from the alternator cover mating surfaces.

Installation is in the reverse order of removal.

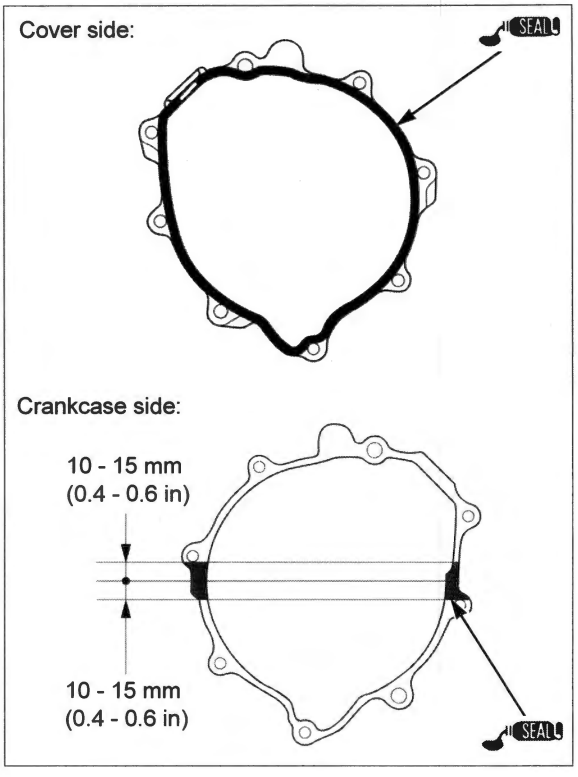
TORQUE:
Left crankcase cover bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

NOTE:

- Apply sealant (TB1207B manufactured by ThreeBond or an equivalent) to the mating areas of crankcase cover and crankcase as shown.

Check the oil level (page 3-10).

Make sure there are no oil leaks.



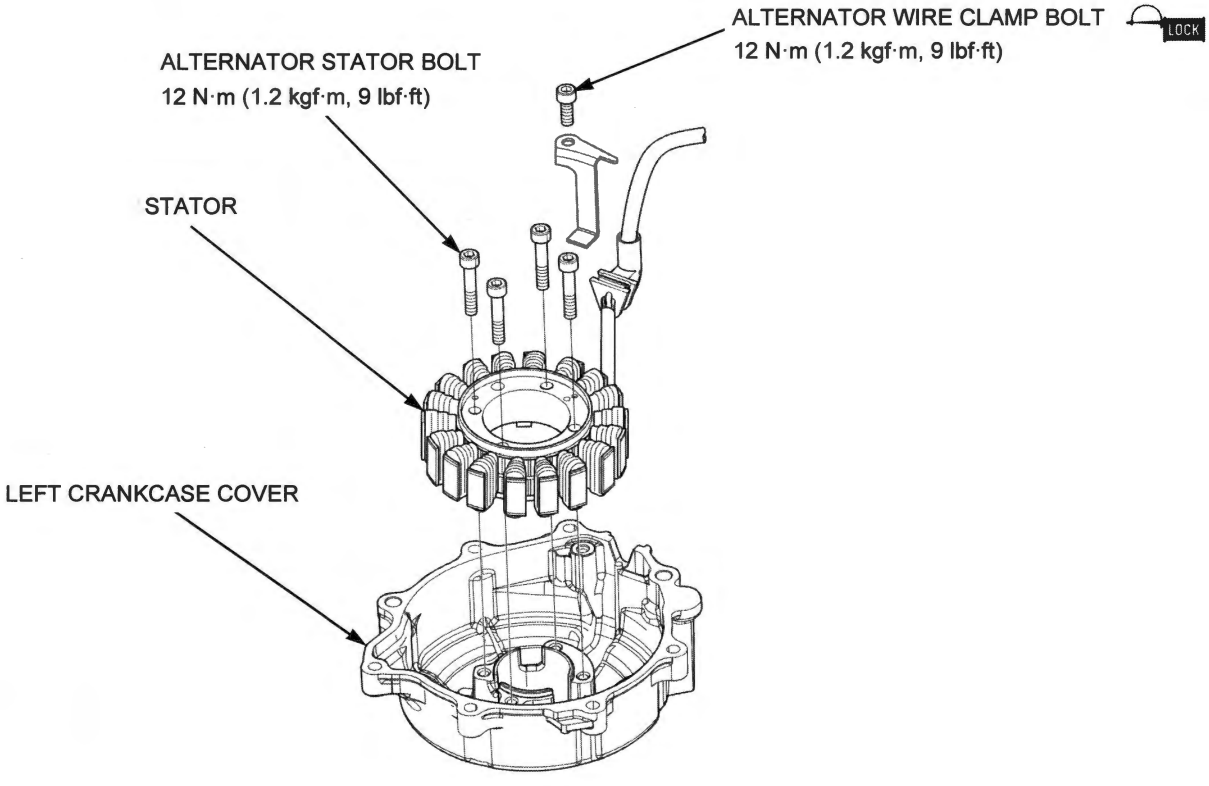
STATOR

REMOVAL/INSTALLATION

Remove the left crankcase cover (page 12-3).

Remove and install the stator as following illustration.

Installation is in the reverse order of removal.



FLYWHEEL

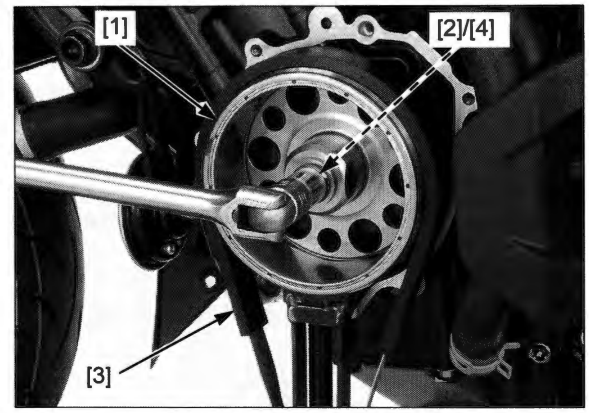
REMOVAL

Remove the left crankcase cover (page 12-3).

Hold the flywheel [1] using the special tool and loosen the flywheel bolt [2].

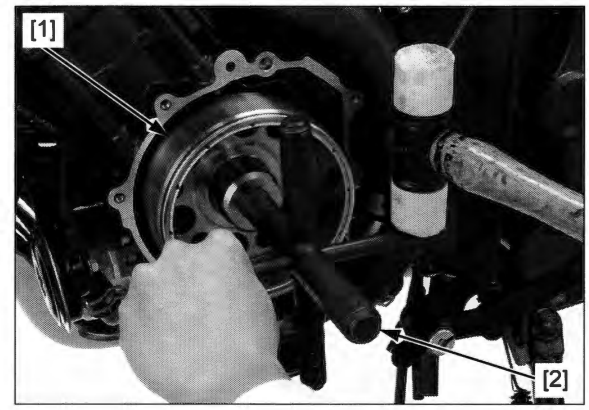
TOOL:
[3] Flywheel holder **07725-0040001**

Remove the flywheel bolt and washer [4].



Remove the flywheel [1] using the special tool.

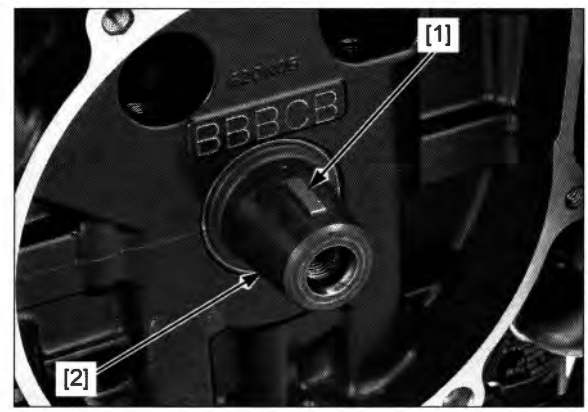
TOOL:
[2] Rotor puller **07733-0020001 or 07933-3950000 (U.S.A. only)**



INSTALLATION

Inspect the woodruff key [1] for scratch, damage, abnormal wear and deformation.
Replace if necessary.

Clean any oil off from the crankshaft taper area [2].



Install the flywheel [1] while aligning the woodruff key on the crankshaft with flywheel keyway.

Apply engine oil to the flywheel bolt [1] threads and seating surface.

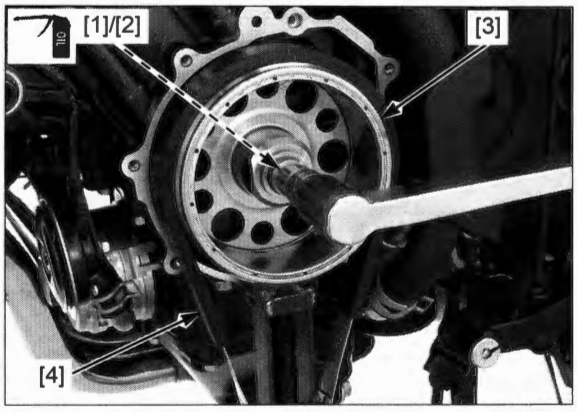
Install the washer [2] and flywheel bolt.

Hold the flywheel [3] using the special tool and tighten the flywheel bolt to the specified torque.

TOOL:
[4] Flywheel holder 07725-0040001

TORQUE: 113 N·m (11.5 kgf·m, 83 lbf·ft)

Install the left crankcase cover (page 12-3).



13. CRANKCASE/TRANSMISSION

SERVICE INFORMATION 13-2

TROUBLESHOOTING 13-3

COMPONENT LOCATION 13-4

CRANKCASE 13-5

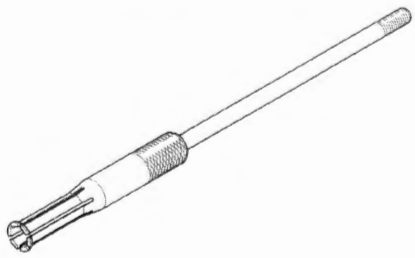
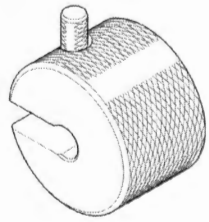
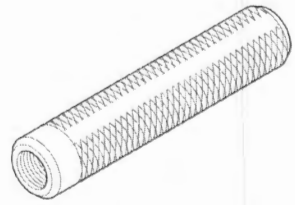
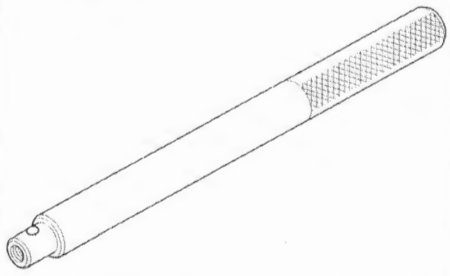
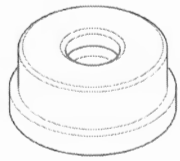
TRANSMISSION 13-8

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
  - Transmission
  - Crankshaft (page 14-4)
  - Piston/connecting rod/cylinder (page 14-13)
- The following components must be removed before separating the crankcase:
  - Engine (page 15-4)
  - Clutch (page 11-7)
  - Gearshift linkage (page 11-20)
  - Starter clutch (page 11-15)
  - Flywheel (page 12-5)
  - Cylinder head (page 10-13)
  - Oil pan (page 9-7)
  - Oil pump (page 9-5)
  - Oil cooler (page 9-9)
  - Starter motor (page 6-5)
  - Water pump (page 8-9)
  - EOP switch (page 21-14)
  - VS sensor (page 4-44)
  - Gear position switch (page 4-45)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.

TOOLS

Bearing remover set, 20 mm 07936-3710600 	Remover weight 07741-0010201  or 07936-371020A (U.S.A. only)	Remover handle 07936-3710100 
Driver, 15 x 280L 07949-3710001 	Attachment, 42 x 47 mm 07746-0010300 	Pilot, 20 mm 07746-0040500 

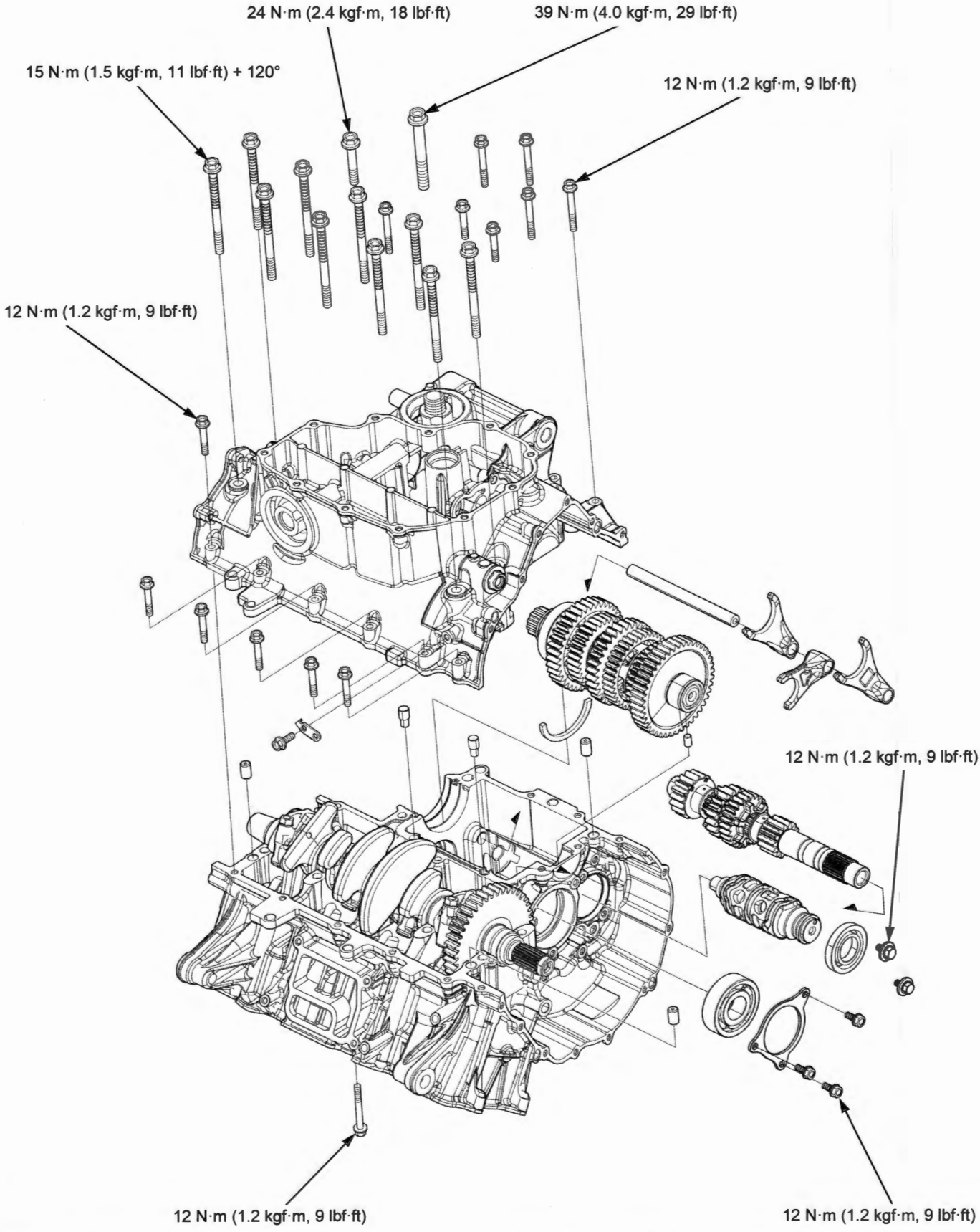
TROUBLESHOOTING

Hard to shift
- Improper clutch operation
- Improper engine oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum guide groove
- Bent gearshift spindle (page 11-21)

Transmission jumps out of gear
- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm (page 11-21)
- Broken shift drum stopper arm return spring (page 11-21)
- Worn or bent shift forks
- Broken gearshift spindle return spring (page 11-21)

Excessive engine noise
- Worn or damaged transmission gear
- Worn or damaged transmission bearings

COMPONENT LOCATION



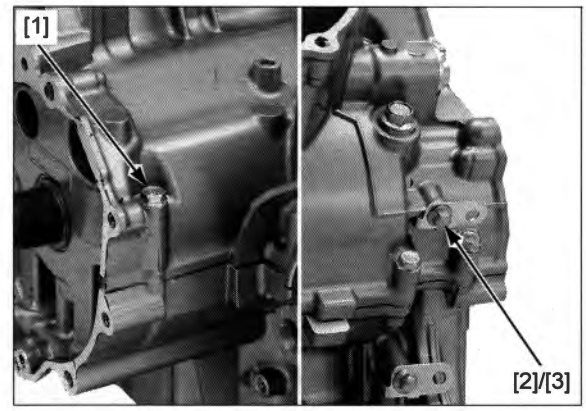
CRANKCASE

SEPARATION

Refer to Service Information for removal of necessary parts before separating the crankcase (page 13-2).

Remove the crankcase 6 x 50 mm bolt [1] on the upper side of the crankcase.

Remove the bolt [2] and wire stay [3] on the lower side of the crankcase.

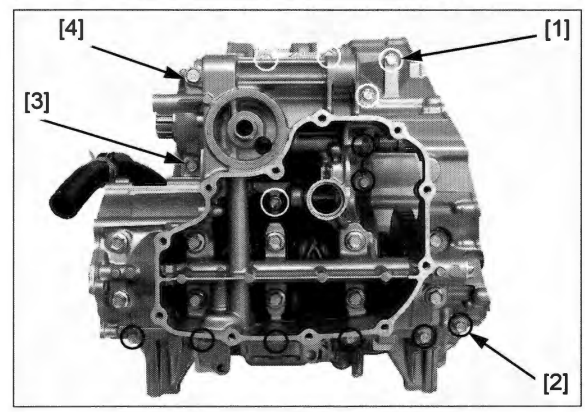


Place the engine upside down.

Loosen the following in a crisscross pattern in 2 or 3 steps:

- Five 6 x 50 mm bolts [1]
- Eight 6 x 35 mm bolts [2]
- 8 mm bolt [3]
- 10 mm bolt [4]

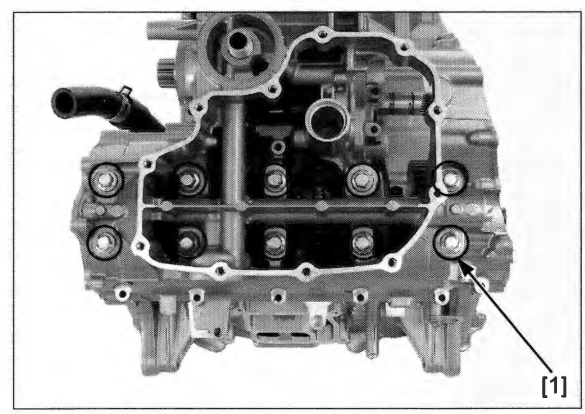
Remove the all bolts.



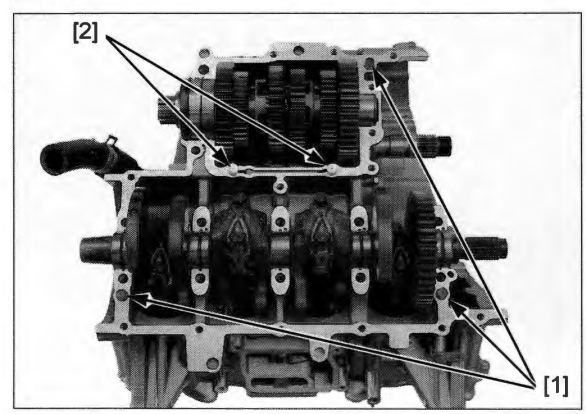
Loosen the crankcase main journal bolt [1] in a crisscross pattern in 2 or 3 steps, and remove them.

Do not pry the crankcase halves with a screwdriver.

Separate the lower crankcase from the upper crankcase.



Remove the dowel pins [1] and oil orifices [2].

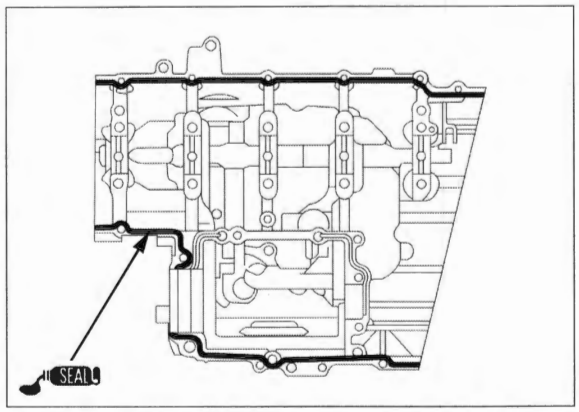


ASSEMBLY

Clean the upper and lower crankcase mating surfaces thoroughly, being careful not to damage them.

Check the crankcase oil passages for clogs, and clean them if necessary.

Apply sealant (TB1207B manufactured by ThreeBond or an equivalent) to the crankcase mating surface as shown.



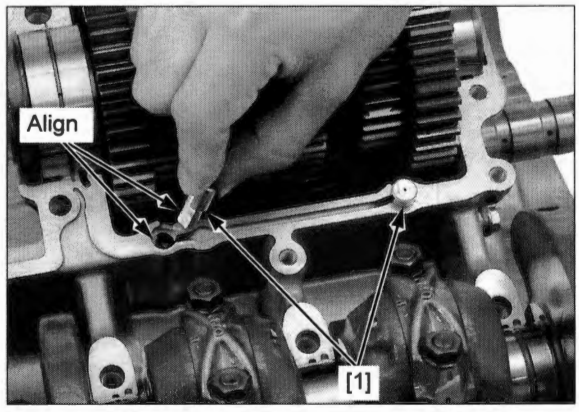
NOTE:

- Do not apply liquid sealant more than necessary.
- Do not apply liquid sealant to the crankcase main journal bolts area and the oil passage area.

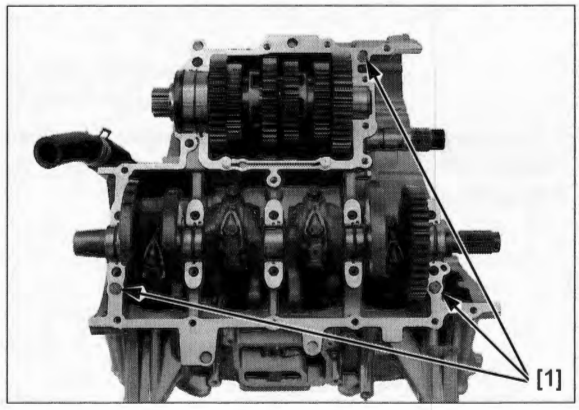
Clean the oil orifices in solvent thoroughly.

Check the oil orifices for clogs, and replace them if necessary.

Install the oil orifices [1] by aligning its cut-out with the groove of upper crankcase.



Install the dowel pins [1] into the upper crankcase.



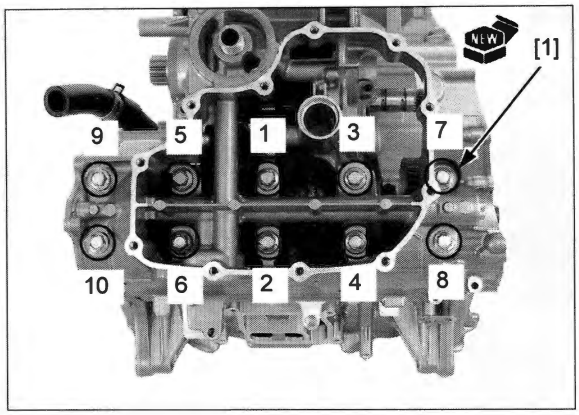
Apply molybdenum oil solution to the main journal bearing sliding surfaces on the lower crankcase.

Install the lower crankcase onto the upper crankcase.

Install new crankcase main journal bolts [1].

NOTE:

- Tighten the crankcase main journal bolts using the Plastic Region Tightening Method.
- Do not reuse the crankcase main journal bolts, because the correct axial tension will not be obtained.
- The crankcase main journal bolts are pre-coated with an oil additive for axial tension stability. Do not remove the oil additive from the new crankcase main journal bolt surfaces.



Make sure the upper and lower crankcase are seated securely.

Tighten the crankcase main journal bolts in numerical order as shown in a crisscross pattern in 2 or 3 steps to the specified torque.

Further tighten the crankcase main journal bolts 120°.

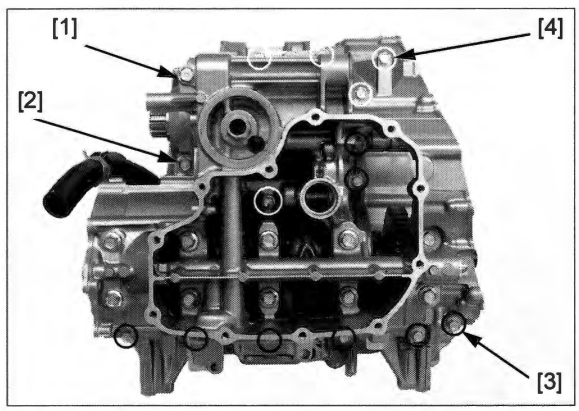
TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft) + 120°

Install the all crankcase bolts.

Tighten the crankcase bolts in a crisscross pattern in 2 or 3 steps to the specified torque.

TORQUE:

Crankcase 10 mm bolt [1]:
39 N·m (4.0 kgf·m, 29 lbf·ft)
Crankcase 8 mm bolt [2]:
24 N·m (2.4 kgf·m, 18 lbf·ft)
Crankcase 6 x 35 mm bolt [3]
12 N·m (1.2 kgf·m, 9 lbf·ft)
Crankcase 6 x 50 mm bolt [4]:
12 N·m (1.2 kgf·m, 9 lbf·ft)

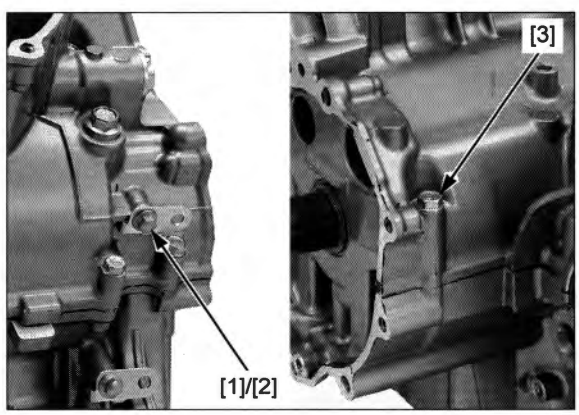


Install the wire stay [1] and bolt [2], then tighten the bolt.

Tighten the crankcase 6 x 50 mm bolt [3] to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the removed parts in the reverse order of removal (page 13-2).

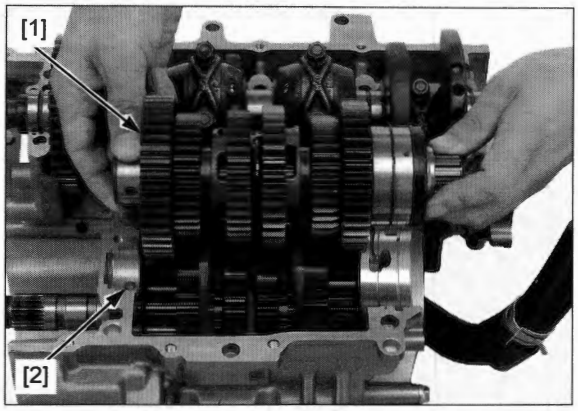


TRANSMISSION

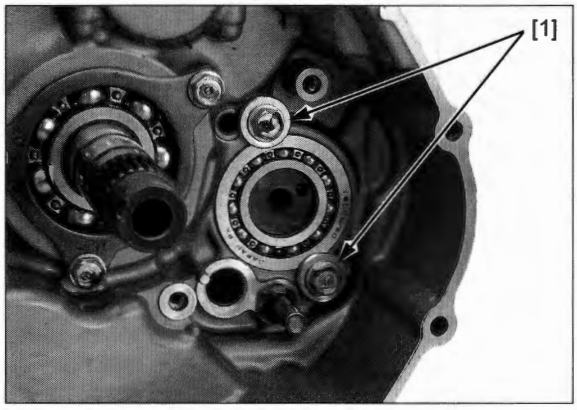
REMOVAL

Separate the crankcase halves (page 13-5).

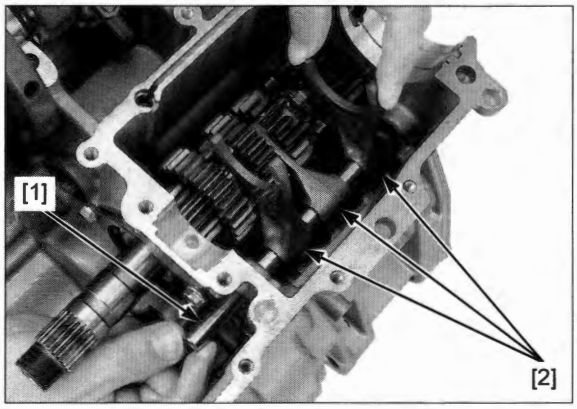
Remove the countershaft assembly [1] and dowel pin [2].



Remove the shift drum bearing setting washer-bolts [1].

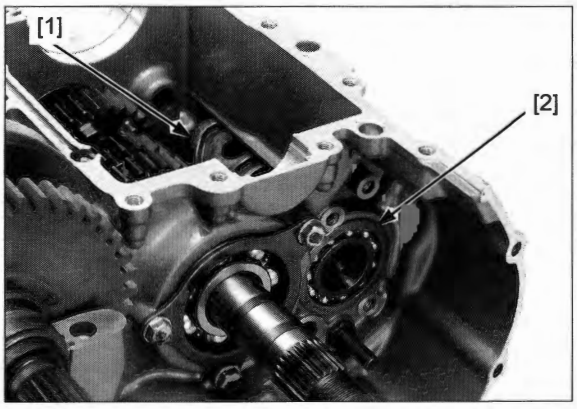


Remove the shift fork shaft [1] and shift forks [2].



Remove the shift drum [1]/bearing [2] assembly.

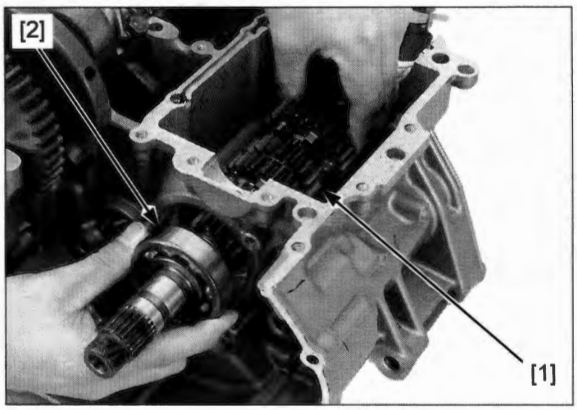
Remove the shift drum bearing from the shift drum.



Remove the bolts [1] and mainshaft bearing setting plate [2].

Slide the mainshaft assembly [1] off the upper crankcase and remove the right mainshaft bearing [2].

Remove the mainshaft assembly.



INSPECTION

Inspect the following parts for scratch, damage, abnormal wear and deformation. Replace if necessary.

- Transmission gears
- Transmission bushings
- Transmission bearings
- Shift drum/bearing
- Shift forks
- Shift fork shaft

Measure each part and calculate the clearance according to CRANKCASE/TRANSMISSION SPECIFICATIONS (page 1-7).

Replace any part if it is out of service limit.

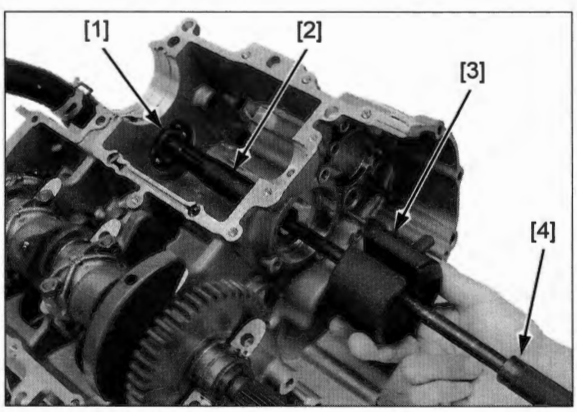
MAINSHAFT BEARING REPLACEMENT

Remove the transmission (page 13-8).

Remove the mainshaft bearing [1] using the special tools as shown.

TOOLS:

[2] Bearing remover set, 20 mm	**07936-3710600**
[3] Remover weight	**07741-0010201 or 07936-371020A (U.S.A. only)**
[4] Remover handle	**07936-3710100**



Drive in a new bearing squarely with the marking side facing down.

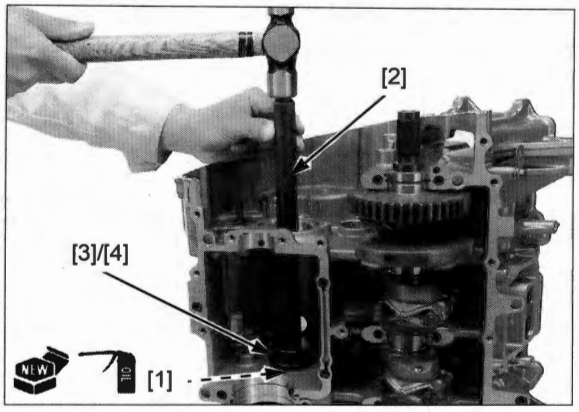
Apply engine oil to a new main shaft bearing [1].

Drive a new bearing into the crankcase until it is fully seated using the special tools.

TOOLS:

[2] Driver, 15 x 280L	**07949-3710001**
[3] Attachment, 42 x 47 mm	**07746-0010300**
[4] Pilot, 20 mm	**07746-0040500**

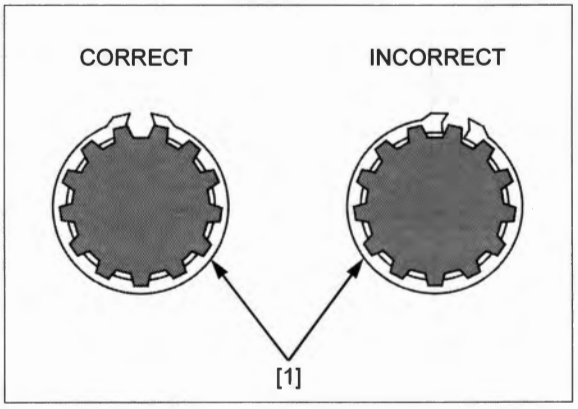
Install the transmission (page 13-11).



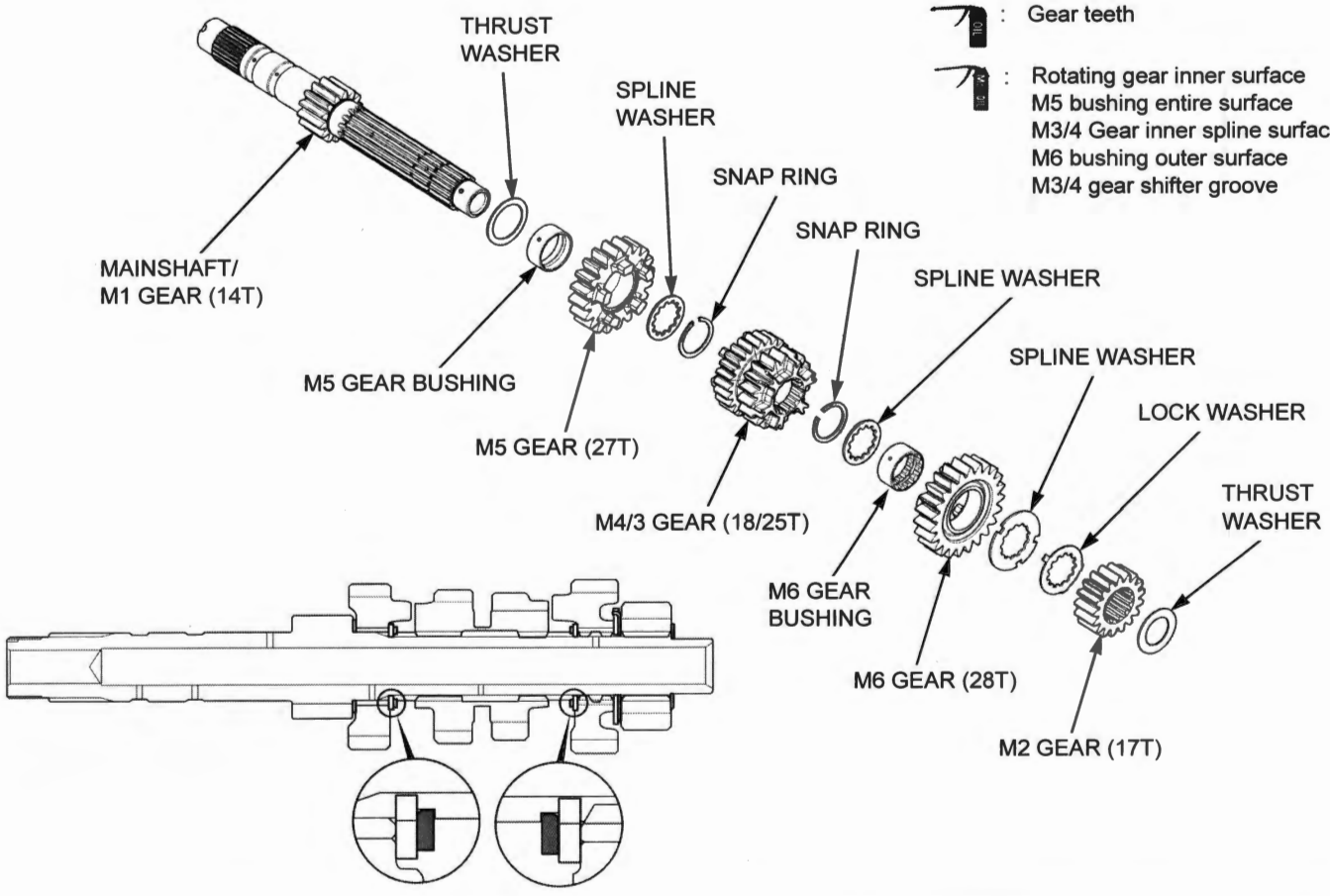
DISASSEMBLY/ASSEMBLY

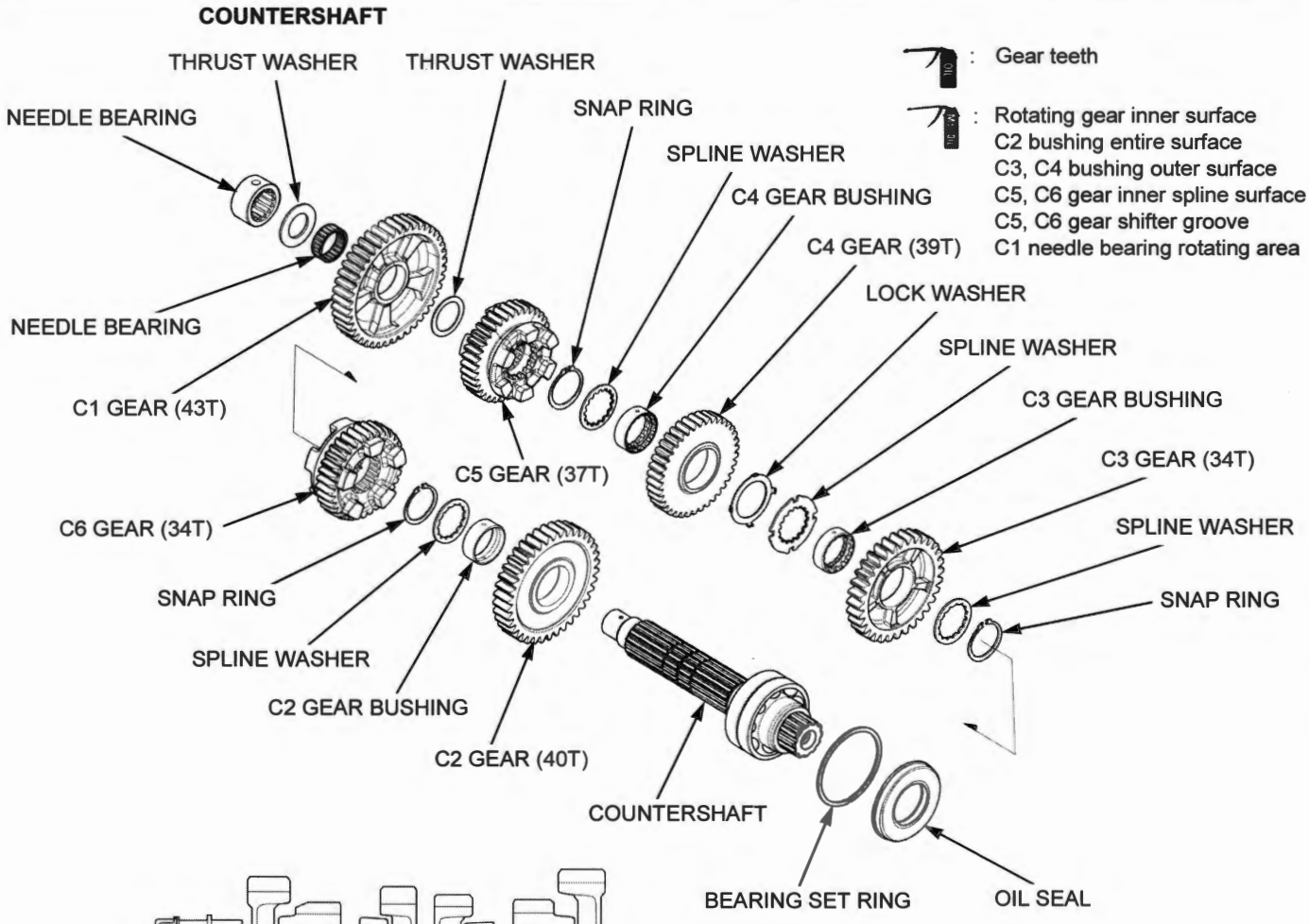
NOTE:

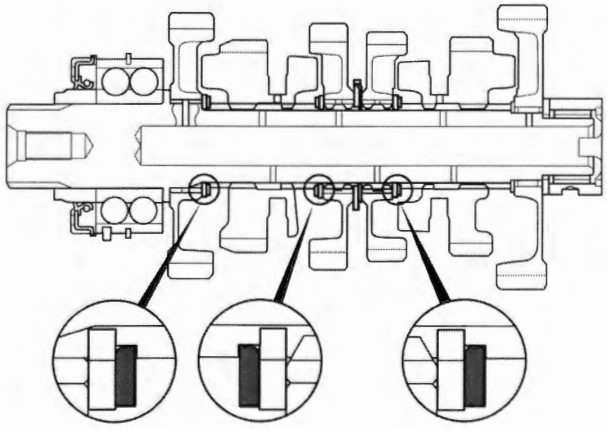
- Coat each gear with clean engine oil and check for smooth movement.
- Align the lock washer tabs with the spline washer grooves.
- Always install the thrust washers and snap rings with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap rings [1] so that the end gap aligns with the groove of the splines.
- Make sure that the snap rings are fully seated in the shaft groove after installing them.
- Do not reuse worm snap ring which could easily spin in the groove.



MAINSHAFT







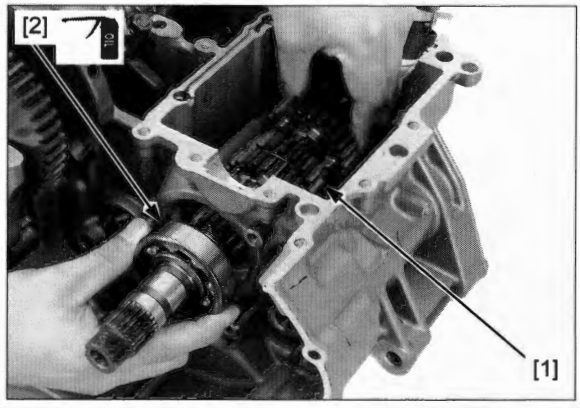
INSTALLATION

Install the mainshaft assembly [1] into the upper crankcase.

Apply engine oil to the mainshaft bearing.

Install the bearing into the crankcase with the marked side facing out.

Install the mainshaft bearing [2] into the upper crankcase.

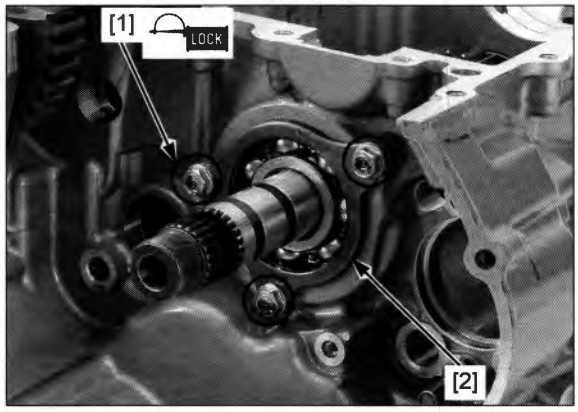


Apply locking agent to the mainshaft bearing setting plate bolts [1] threads (page 1-17).

Install the mainshaft bearing setting plate [2] and setting plate bolts.

Tighten the setting plate bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

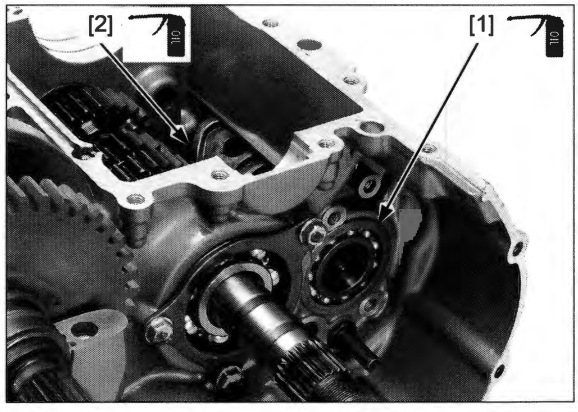


Apply engine oil to the shift drum bearing [1] and shift drum [2] journal outer surface.

Install the bearing onto the shift drum with the marked side facing out.

Install the shift drum bearing onto the shift drum.

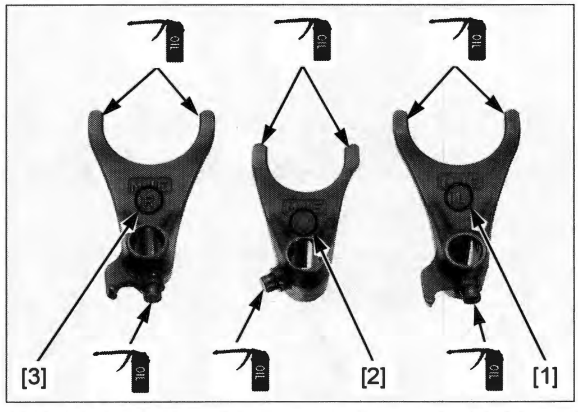
Install the shift drum/bearing assembly into the upper crankcase.



The shift forks have the following identification marks:

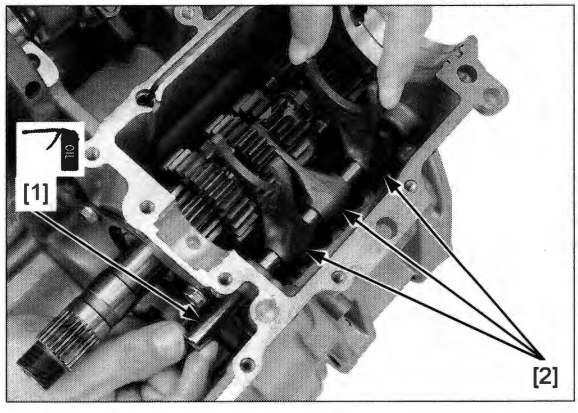
- "L" mark [1]: left shift fork
- "C" mark [2]: center shift fork
- "R" mark [3]: right shift fork

Apply engine oil to the shift fork guide area and guide pin.



Apply engine oil to the shift fork shaft [1] outer surface.

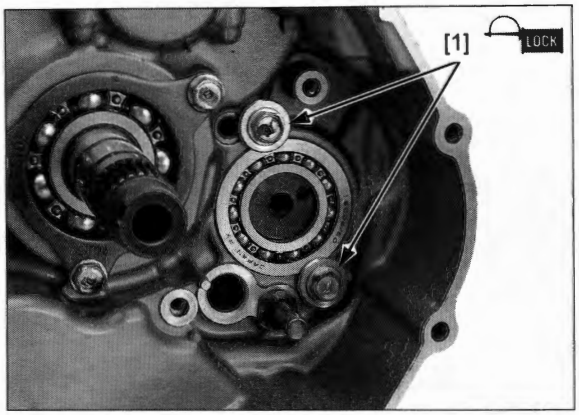
Install the shift forks [2] into the shift drum guide grooves and shifter groove (center shift fork) with the identification marks facing toward the right side of the engine, then insert the fork shaft.



Apply locking agent to the shift drum bearing setting washer-bolt [1] threads (page 1-17).

Install and tighten the shift drum bearing setting washer-bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

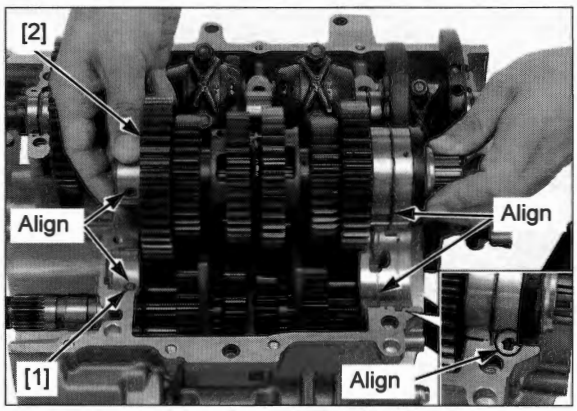


Install the dowel pin [1] onto the upper crankcase hole.

Install the countershaft [2] by aligning the following:

- Set ring with the groove of the upper crankcase
- Bearing cap hole with the dowel pin
- Countershaft bearing stopper pin with the groove of the upper crankcase

Assemble the crankcase halves (page 13-6).



MEMO

14. CRANKSHAFT/PISTON/CYLINDER

SERVICE INFORMATION 14-2

TROUBLESHOOTING 14-2

COMPONENT LOCATION 14-3

CRANKSHAFT 14-4

MAIN JOURNAL BEARING 14-7

CRANKPIN BEARING 14-10

PISTON/CYLINDER 14-13

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the crankshaft, cylinder, piston/connecting rod and piston oil jet. Refer to procedures for crankcase separation (page 13-5).
- Mark and store the connecting rods, bearing caps and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with a plastigauge. Incorrect oil clearance can cause major engine damage.

TROUBLESHOOTING

Cylinder compression is too low, hard to starting or poor performance at low speed
- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

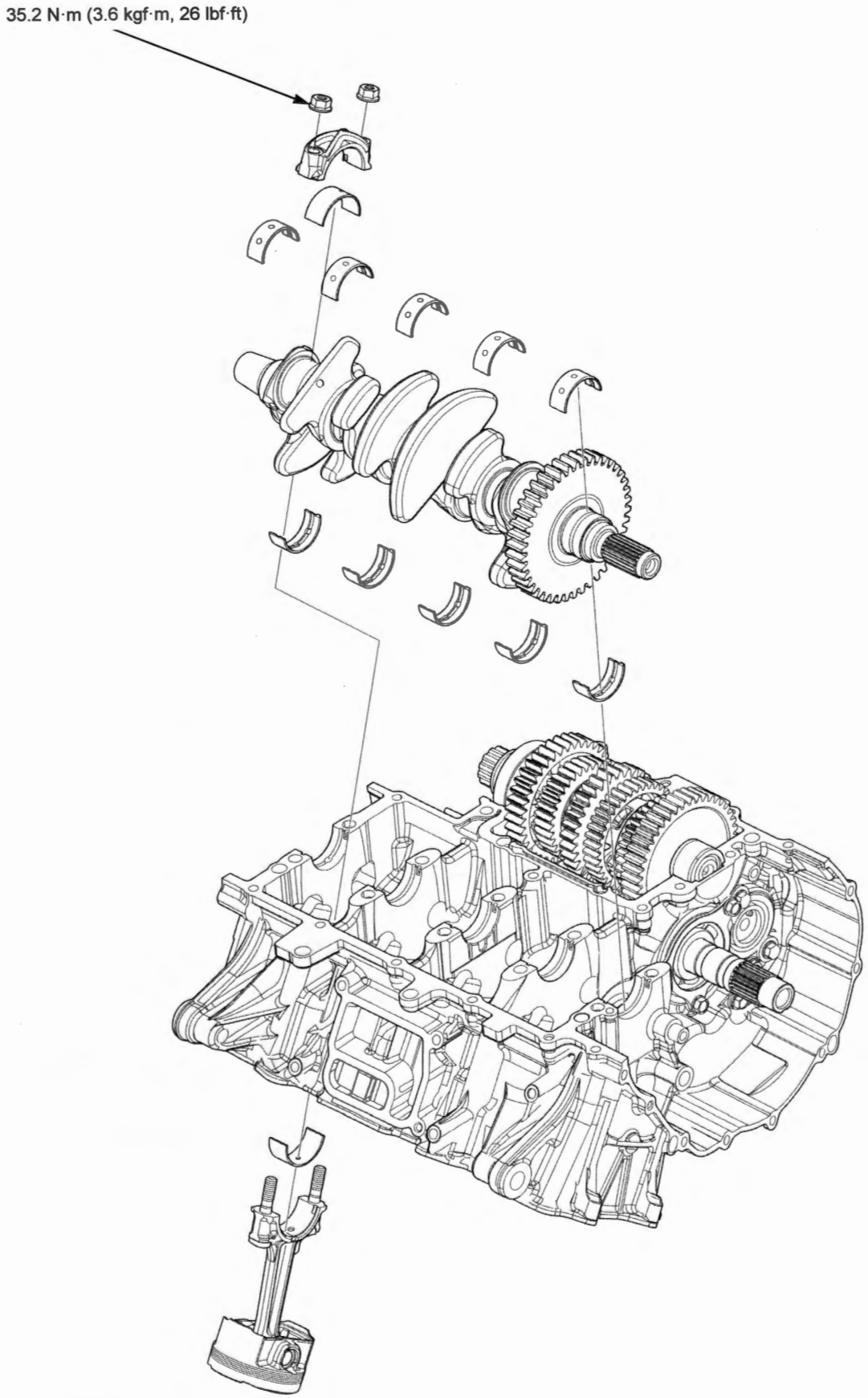
Cylinder compression too high, overheating or knocking
- Excessive carbon built-up on piston head or combustion chamber

Excessive smoke
- Worn cylinder, piston or piston ring
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings
- Worn main journal bearings
- Worn crankpin bearings

Engine vibration
- Excessive crankshaft runout

COMPONENT LOCATION



CRANKSHAFT

SIDE CLEARANCE INSPECTION

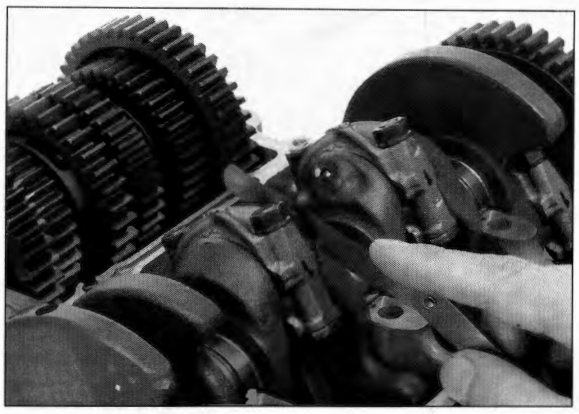
Separate the crankcase halves (page 13-5).

Measure the connecting rod side clearance.

SERVICE LIMIT: 0.25 mm (0.010 in)

If the clearance exceeds the service limit, replace the connecting rod (page 14-4).

Recheck and if still out of limit, replace the crankshaft (page 14-4).



REMOVAL

NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Separate the crankcase halves (page 13-5).

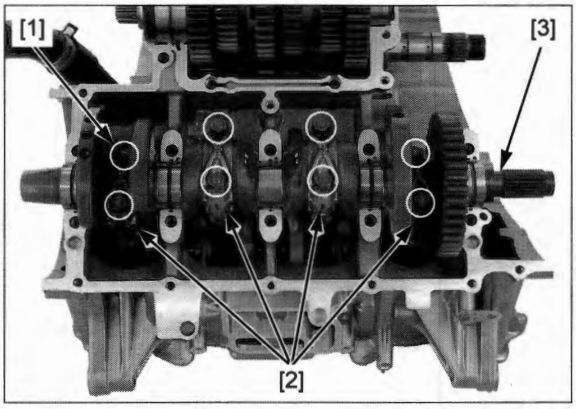
Mark the bearing caps and bearings as you remove them to indicate the correct cylinder for reassembly.

Be careful not to damage the crankpin, main journal and bearing inserts.

Remove the crankpin bearing cap nuts [1] and bearing caps [2].

- Tap the side of the cap lightly if the bearing cap is hard to remove.

Remove the crankshaft [3].

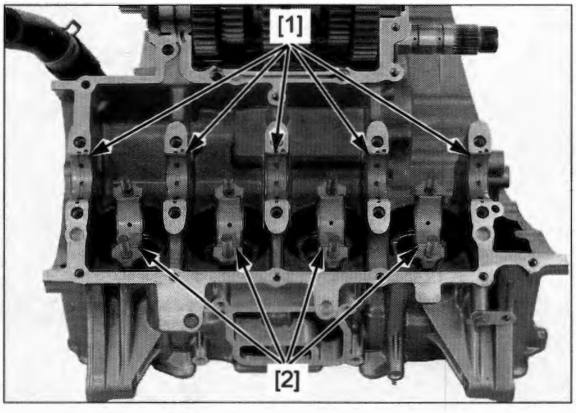


NOTICE

Before removal, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod.

Remove the main journal bearings [1] from both crankcase halves.

Remove the crankpin bearings [2] from the connecting rods and bearing caps.



NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

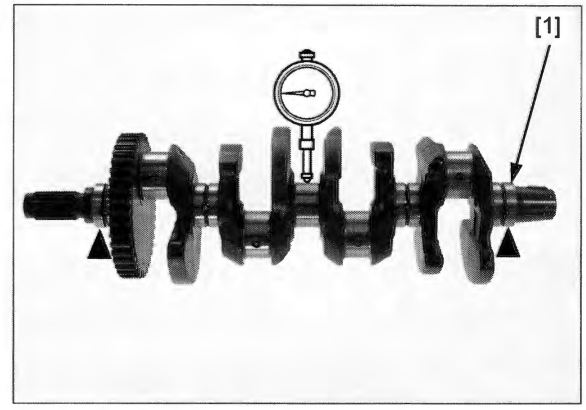
INSPECTION

Support the crankshaft [1] on both end journals.

Set a dial gauge on the center main journal of the crankshaft avoiding the oil groove and hole.

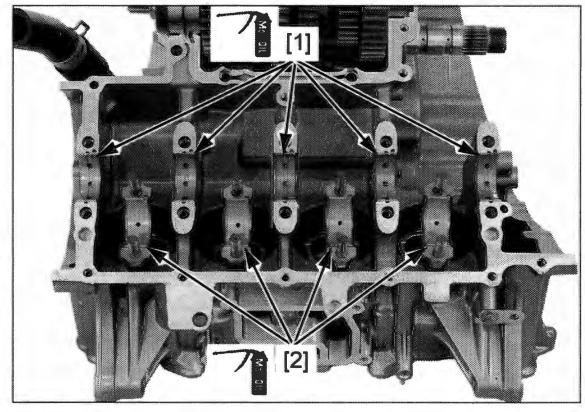
Rotate the crankshaft two revolutions (720°) and read the runout.

SERVICE LIMIT: 0.05 mm (0.002 in)



INSTALLATION

Apply molybdenum oil solution to the main journal bearing [1] sliding surfaces on the upper crankcase and crankpin bearing [2] sliding surfaces on the connecting rods.



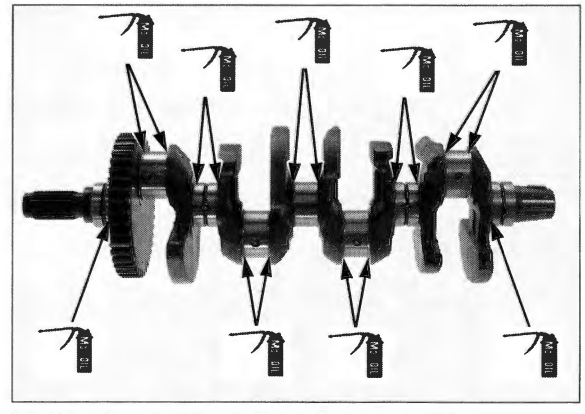
The bearing tabs should be aligned with the grooves in the crankcase.

Install the main journal bearings and crankpin bearings in the original locations.

NOTICE

Do not interchange the bearing inserts. they must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

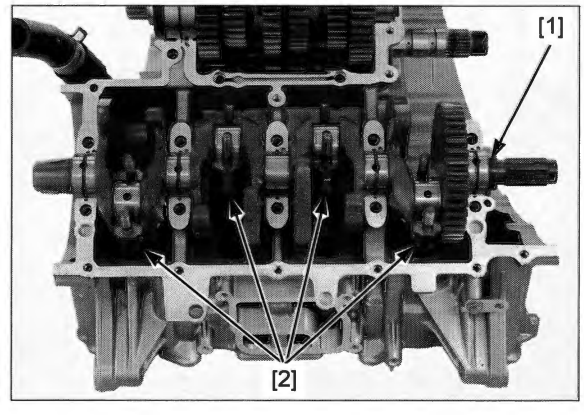
Apply molybdenum oil solution to the thrust surfaces of the crankshaft as shown.



NOTICE

Position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod.

Install the crankshaft [1] onto the upper crankcase.
Set the connecting rods [2] onto the crankpins.



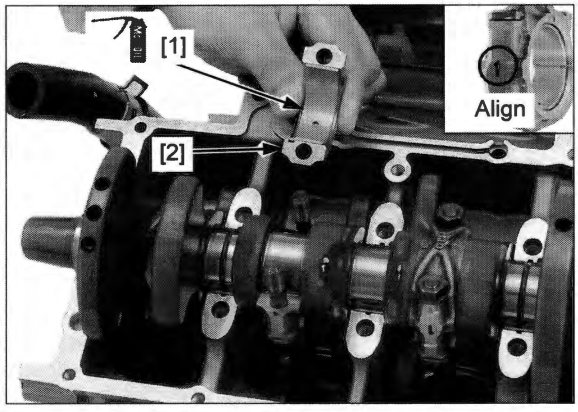
Clean the mating surface of the connecting rods and crankpin bearing caps with solvent and blow them with compressed air.

Apply molybdenum oil solution to the crankpin bearing [1] sliding surfaces on the crankpin bearing caps [2].

Install the crankpin bearing caps by aligning the I.D. code number on the connecting rod and bearing cap.

NOTICE

Be sure to install each part in its original position, as noted during removal.

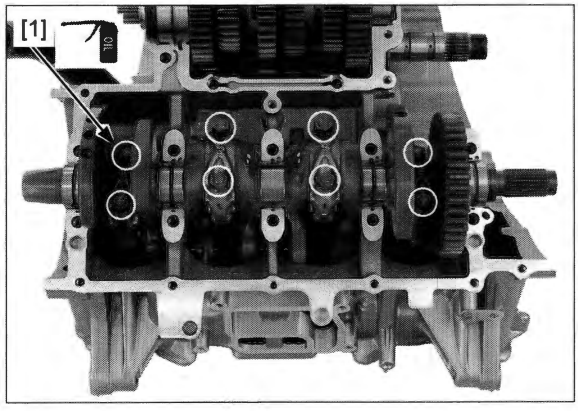


Apply engine oil to the crankpin bearing cap nut [1] threads and seating surfaces.

Install and tighten the crankpin bearing cap nuts in 2 or 3 steps alternately to the specified torque.

TORQUE: 35.2 N·m (3.6 kgf·m, 26 lbf·ft)

Assemble the crankcase halves (page 13-6).



MAIN JOURNAL BEARING

NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

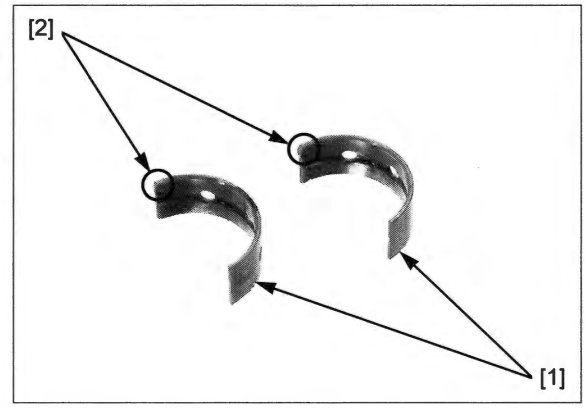
BEARING INSPECTION

Remove the crankshaft (page 14-4).

Check the main journal bearing inserts [1] for unusual wear or peeling.

Check the bearing tabs [2] for damage.

If the main journal bearing is damaged, select a replacement bearing (page 14-8).



OIL CLEARANCE INSPECTION

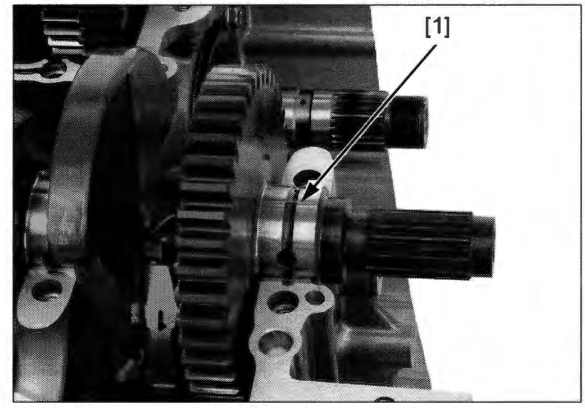
Remove the crankshaft (page 14-4).

Clean off any oil from the bearing inserts and main journals.

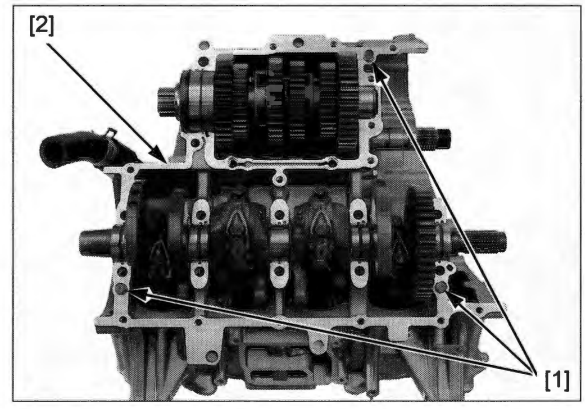
Install the crankshaft onto the upper crankcase (page 14-5).

Do not rotate the crankshaft during inspection.

Put a strip of plastigauge [1] lengthwise on each main journal avoiding the oil hole.



Install the dowel pins [1] onto the upper crankcase [2].



Install the lower crankcase onto the upper crankcase.

Clean the crankcase main journal bolts (reuse) in solvent, and dry them thoroughly.

Apply engine oil to the crankcase main journal bolt threads and seating surfaces.

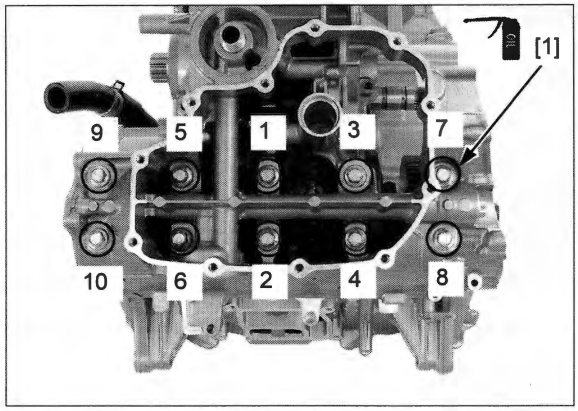
Install the crankcase main journal bolts [1].

Make sure the upper and lower crankcase are seated securely.

Tighten the crankcase main journal bolts in numerical order as shown in a crisscross pattern in 2 or 3 steps to the specified torque.

Further tighten the crankcase main journal bolts 120°.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft) + 120°

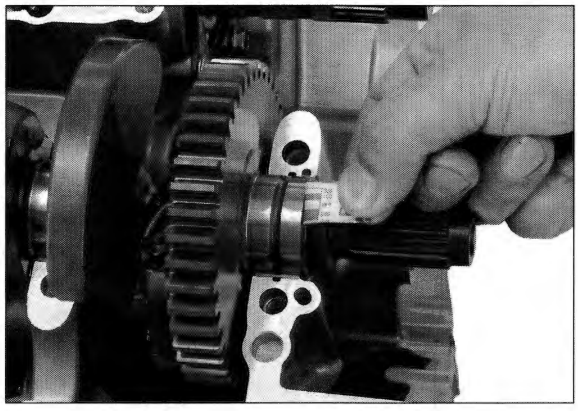


Remove the crankcase main journal bolt and lower crankcase.

Measure the compressed plastigauge at its widest point on each main journal to determine the oil clearance.

SERVICE LIMIT: 0.05 mm (0.002 in)

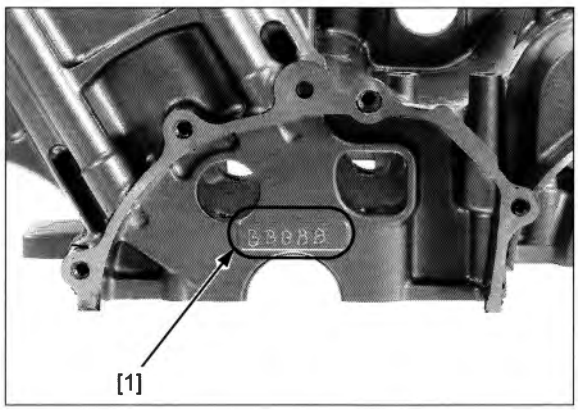
If the oil clearance exceeds the service limit, select a replacement bearing (page 14-8).



BEARING SELECTION

Letters (A, B or C) on the left side of upper crankcase are bearing support I.D. codes from left to right.

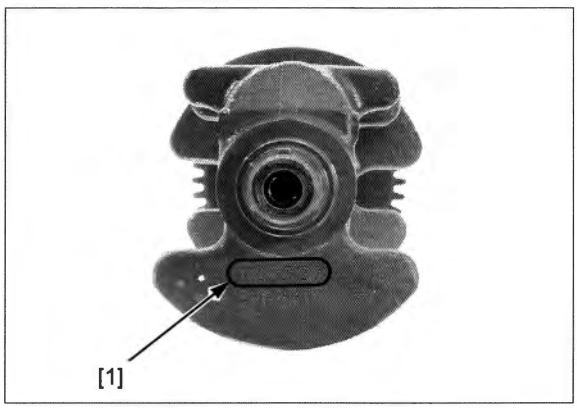
Record the crankcase bearing support I.D. code letters [1] from left side of the upper crankcase as shown.



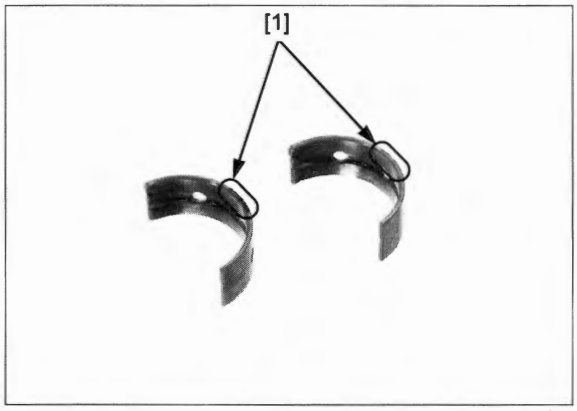
Numbers (1, 2 or 3) on the crank weight are main journal O.D. codes from left to right.

If you are replacing the crankshaft, record the corresponding main journal O.D. code numbers [1] from the crank weight.

If you are reusing the crankshaft, measure the crankpin O.D. with a micrometer.



Cross-reference the main journal and bearing support codes to determine the replacement bearing color code [1].



MAIN JOURNAL BEARING THICKNESS:

A: Black: Thickest
B: Brown:
C: Green: ↕
D: Yellow:
E: Pink: Thinnest

MAIN JOURNAL BEARING SELECTION TABLE:

			BEARING SUPPORT I.D. CODE		
			A	B	C
			37.000 – 37.006 mm (1.4567 – 1.4569 in)	37.006 – 37.012 mm (1.4569 – 1.4572 in)	37.012 – 37.018 mm (1.4572 – 1.4574 in)
MAIN JOURNAL O.D. CODE	1	34.000 – 34.006 mm (1.3386 – 1.3388 in)	E (Pink)	D (Yellow)	C (Green)
	2	33.994 – 34.000 mm (1.3383 – 1.3386 in)	D (Yellow)	C (Green)	B (Brown)
	3	33.988 – 33.994 mm (1.3381 – 1.3383 in)	C (Green)	B (Brown)	A (Black)

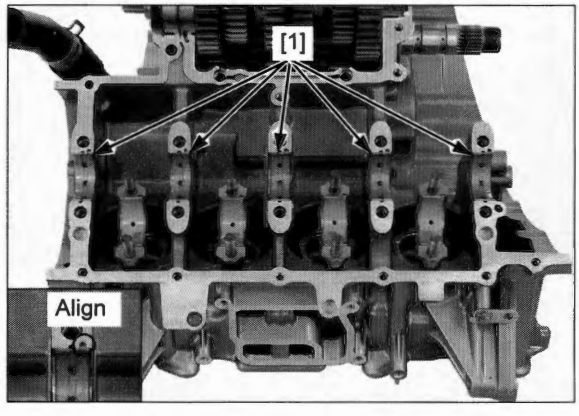
NOTICE

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.

BEARING INSTALLATION

Clean the bearing outer surfaces and crankcase bearing supports.

Install the main journal bearing inserts [1] onto the crankcase bearing supports, aligning each tab with each groove.



CRANKPIN BEARING

NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

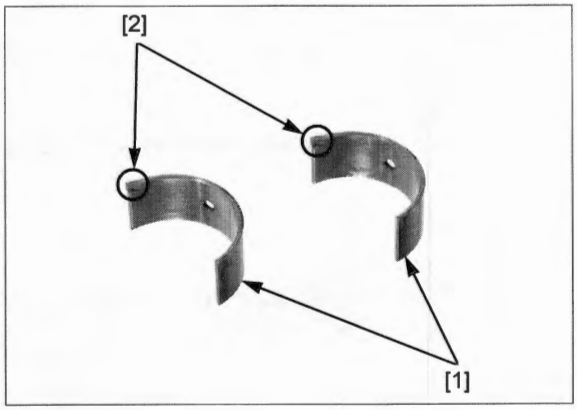
BEARING INSPECTION

Remove the crankshaft (page 14-4).

Check the crankpin bearing inserts [1] for unusual wear or peeling.

Check the bearing tabs [2] for damage.

If the crankpin bearing is damaged, select a replacement bearing (page 14-11).



OIL CLEARANCE INSPECTION

Remove the crankshaft (page 14-4).

Clean the mating surface of the connecting rod and crankpin bearing cap with solvent and blow them with compressed air.

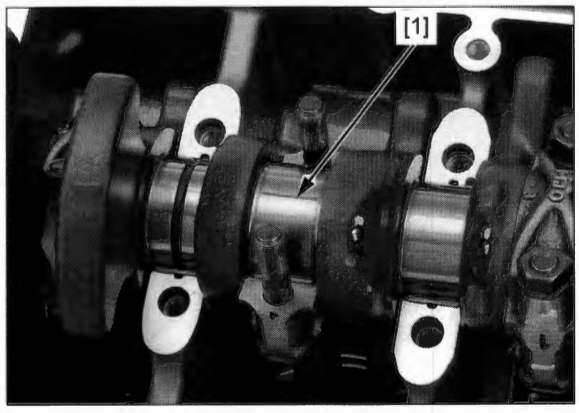
Clean off any oil from the bearing inserts and crankpins.

Install the crankshaft onto the upper crankcase (page 14-5).

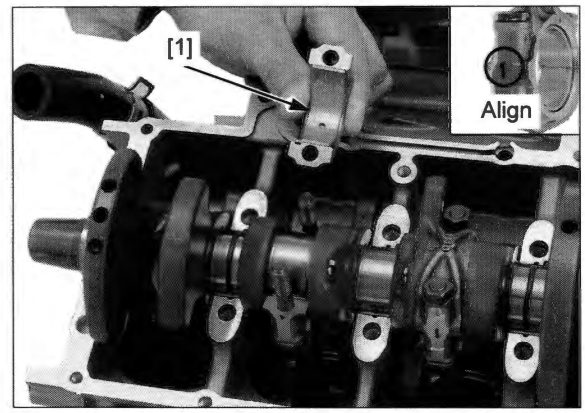
Set the connecting rods onto the crankpins.

Do not rotate the crankshaft during inspection.

Put a strip of plastigauge [1] lengthwise on each crankpin avoiding the oil hole.



Install the crankpin bearing caps [1] by aligning the I.D. code number on the connecting rod and bearing cap.



NOTICE

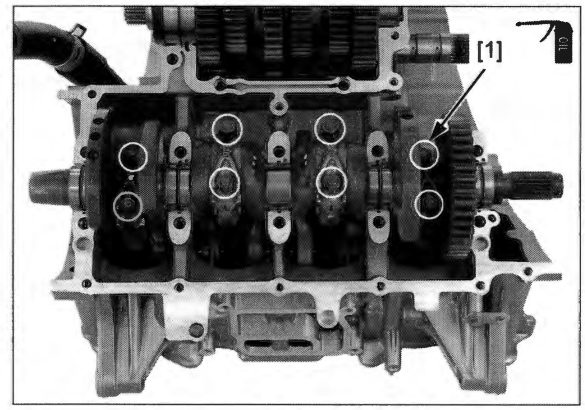
Be sure to install each part in its original position, as noted during removal.

Apply engine oil to the crankpin bearing cap nut [1] threads and seating surfaces.

Install and tighten the crankpin bearing cap nuts in 2 or 3 steps alternately to the specified torque.

TORQUE: 35.2 N·m (3.6 kgf·m, 26 lbf·ft)

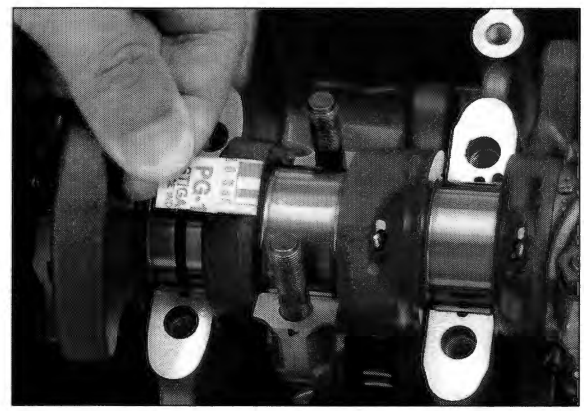
Remove the bearing caps.



Measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)

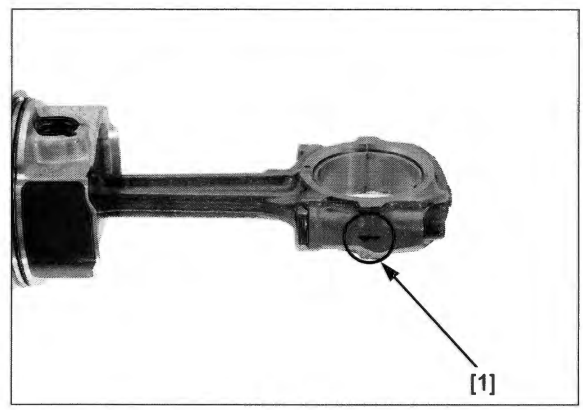
If the oil clearance exceeds the service limit, select the correct replacement bearings (page 14-11).



BEARING SELECTION

Numbers on the connecting rods are the codes for the connecting rod I.D.

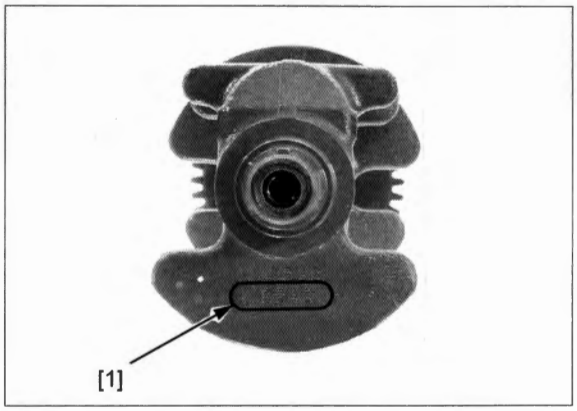
Record the connecting rod I.D. code number [1] or measure the I.D. with the crankpin bearing cap installed without bearing inserts.



Letters (A, B or C) on the crank weight are the crankpin O.D. codes from left to right.

If you are replacing the crankshaft, record the corresponding crankpin O.D. code letter [1].

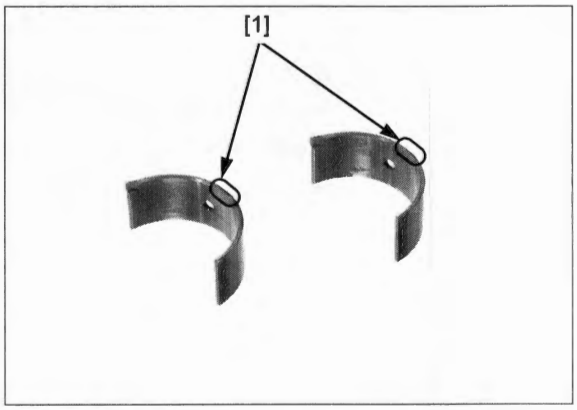
If you are reusing the crankshaft, measure the crankpin O.D. with a micrometer.



Cross-reference the connecting rod and crankpin codes to determine the replacement bearing color code [1].

CRANKPIN BEARING THICKNESS:

A: Blue: Thickest
B: Black:
C: Brown: ↕
D: Green:
E: Yellow: Thinnest



CRANKPIN BEARING SELECTION TABLE:

			CONNECTING ROD I.D. CODE		
			1	2	3
			39.000 – 39.006 mm (1.5354 – 1.5357 in)	39.006 – 39.012 mm (1.5357 – 1.5359 in)	39.012 – 39.018 mm (1.5359 – 1.5361 in)
CRANKPIN O.D. CODE	A	35.994 – 36.000 mm (1.4171 – 1.4173 in)	E (Yellow)	D (Green)	C (Brown)
	B	35.988 – 35.994 mm (1.4168 – 1.4171 in)	D (Green)	C (Brown)	B (Black)
	C	35.982 – 35.988 mm (1.4166 – 1.4168 in)	C (Brown)	B (Black)	A (Blue)

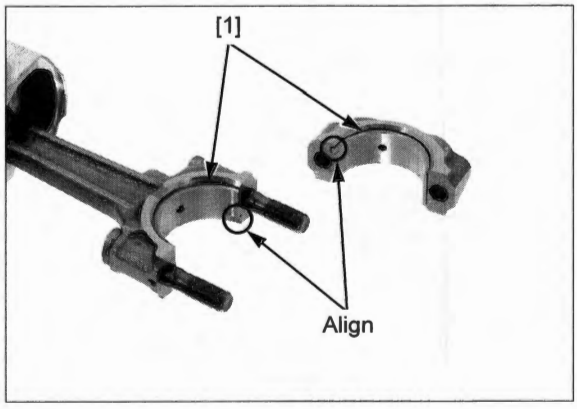
NOTICE

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.

BEARING INSTALLATION

Clean the bearing outer surfaces, crankpin bearing cap and connecting rod.

Install the crankpin bearing inserts [1] onto the bearing cap and connecting rod, aligning each tab with each groove.



PISTON/CYLINDER

PISTON/CONNECTING ROD REMOVAL

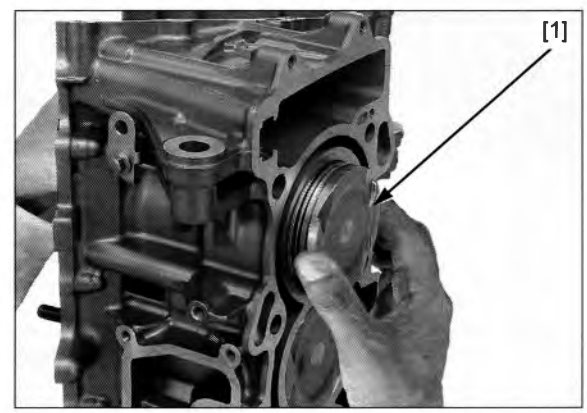
NOTICE

- *Before piston removal, place a clean shop towel around the connecting rod to prevent damaging the cylinder sleeve.*
- *Do not try to remove the piston/connecting rod assembly from bottom of the cylinder; the assembly will get stuck in the gap between the cylinder liner and the upper crankcase.*
- *Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.*

Remove the following:

– Transmission (page 13-8)
– Crankshaft (page 14-4)

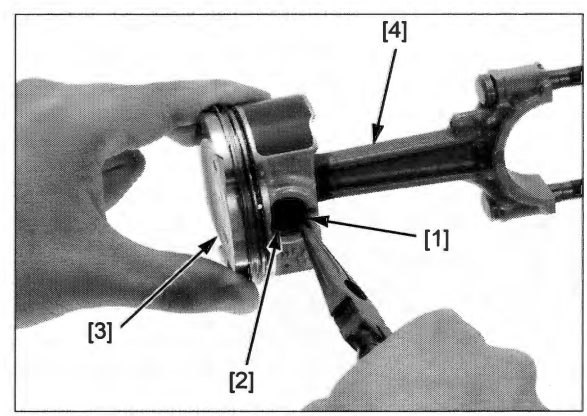
Remove the piston/connecting rod assembly [1] from the top of the cylinder.



PISTON REMOVAL

Remove the piston pin clips [1] with pliers.

Push the piston pin [2] out of the piston [3] and connecting rod [4], then remove the piston.

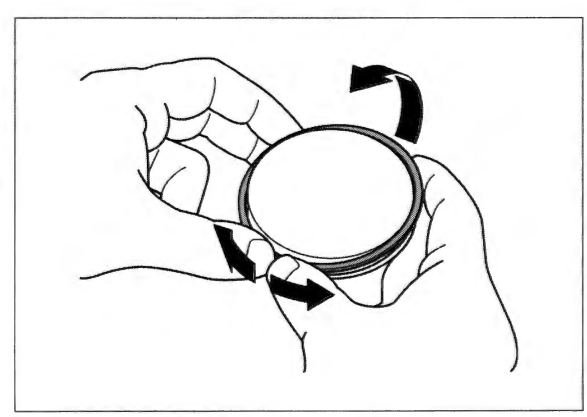


PISTON RING REMOVAL

Spread each piston ring ends and remove them by lifting up at a point opposite the gap.

NOTE:

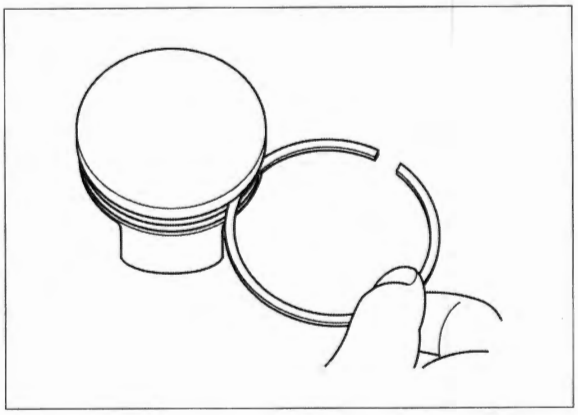
- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston when removing the piston ring.



Clean carbon deposits from the piston ring grooves with a ring that will be discarded.

NOTE:

- Never use a wire brush; it will scratch the groove.



INSPECTION

Inspect the following parts for scratch, damage, abnormal wear, deformation, burning or clogs in oil passages.

- Cylinder
- Piston
- Piston rings
- Piston pin
- Connecting rod small end

Measure each part and calculate the clearance according to CRANKSHAFT/PISTON/CYLINDER SPECIFICATIONS (page 1-8).

Replace any part if it is out of service limit.

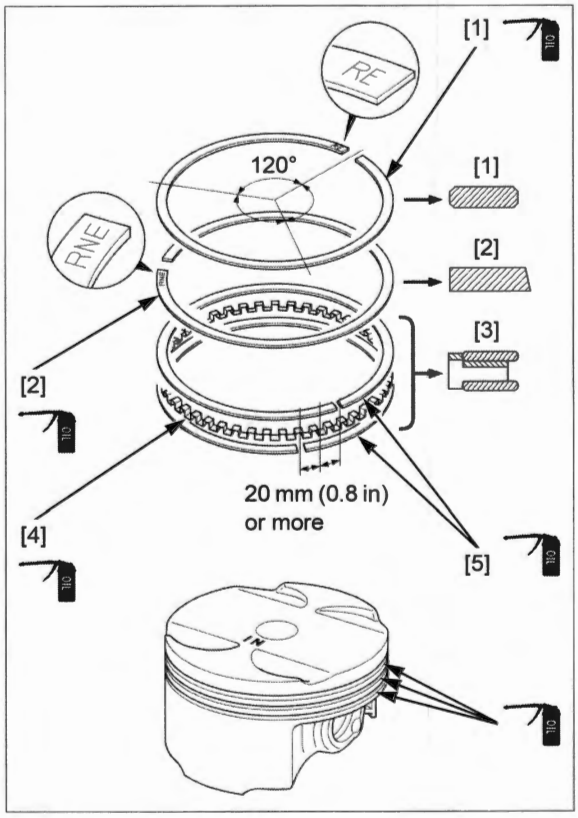
PISTON RING INSTALLATION

Clean the piston ring grooves thoroughly and install the piston rings.

- Apply engine oil to the piston ring entire surface and piston ring grooves.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marked side facing up.
  - "RE" mark: top ring [1]
  - "RNE" mark: second ring [2]
- To install the oil ring [3], install the spacer [4] first, then install the side rails [5].

Stagger the piston ring end gaps 120° apart from each other.
Stagger the side rail end gaps as shown.

After installation, the rings should rotate freely in the ring groove.



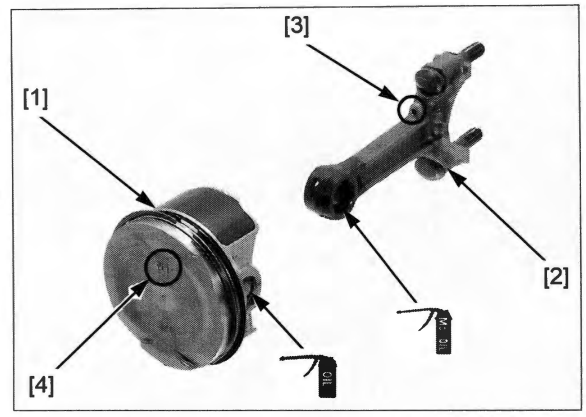
PISTON INSTALLATION

Install the crankpin bearings in the original locations (page 14-5).

Apply engine oil to the piston pin hole inner surface.

Apply molybdenum oil solution to the connecting rod small end inner surface.

Assemble the piston [1] and connecting rod [2] with the oil passage hole [3] facing to the piston "IN" mark [4].

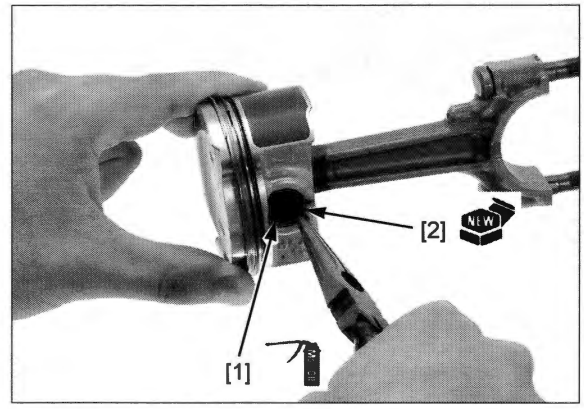


Apply molybdenum oil solution to the piston pin [1] outer surface.

Install the piston pin and secure it using new piston pin clips [2].

NOTE:

- Make sure that the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cutout.



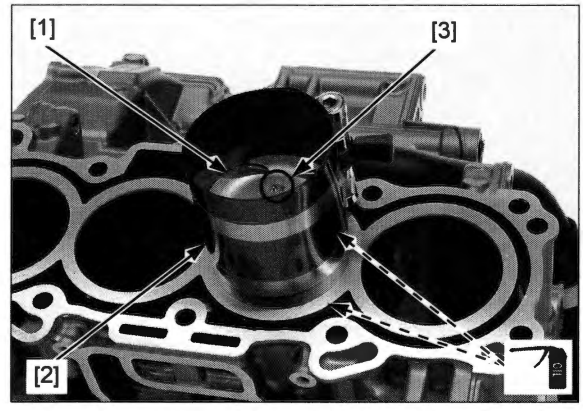
PISTON/CONNECTING ROD INSTALLATION

Apply engine oil to the cylinder inner surface and piston sliding surface.

Install the piston/connecting rod assembly with the piston "IN" mark [3] facing the intake side.

Install the piston/connecting rod assembly [1] into the cylinder using a commercially available piston ring compressor tool [2].

When reusing the connecting rods, they must be installed in their original locations.



NOTICE

- *While installing the piston, be careful not to damage the top surface of the cylinder, especially around the cylinder bore.*
- *Be careful not to damage the cylinder sleeve and crankpin with the connecting rod.*

Make sure the piston ring compressor tool sits flush on the top surface of the cylinder.

Use the handle of a plastic hammer or equivalent tool to tap the piston into the cylinder.

Install the following:

– Crankshaft (page 14-5)
– Transmission (page 13-11)

MEMO

15. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION 15-2

COMPONENT LOCATION 15-3

ENGINE REMOVAL 15-4

ENGINE INSTALLATION 15-7

SERVICE INFORMATION

GENERAL

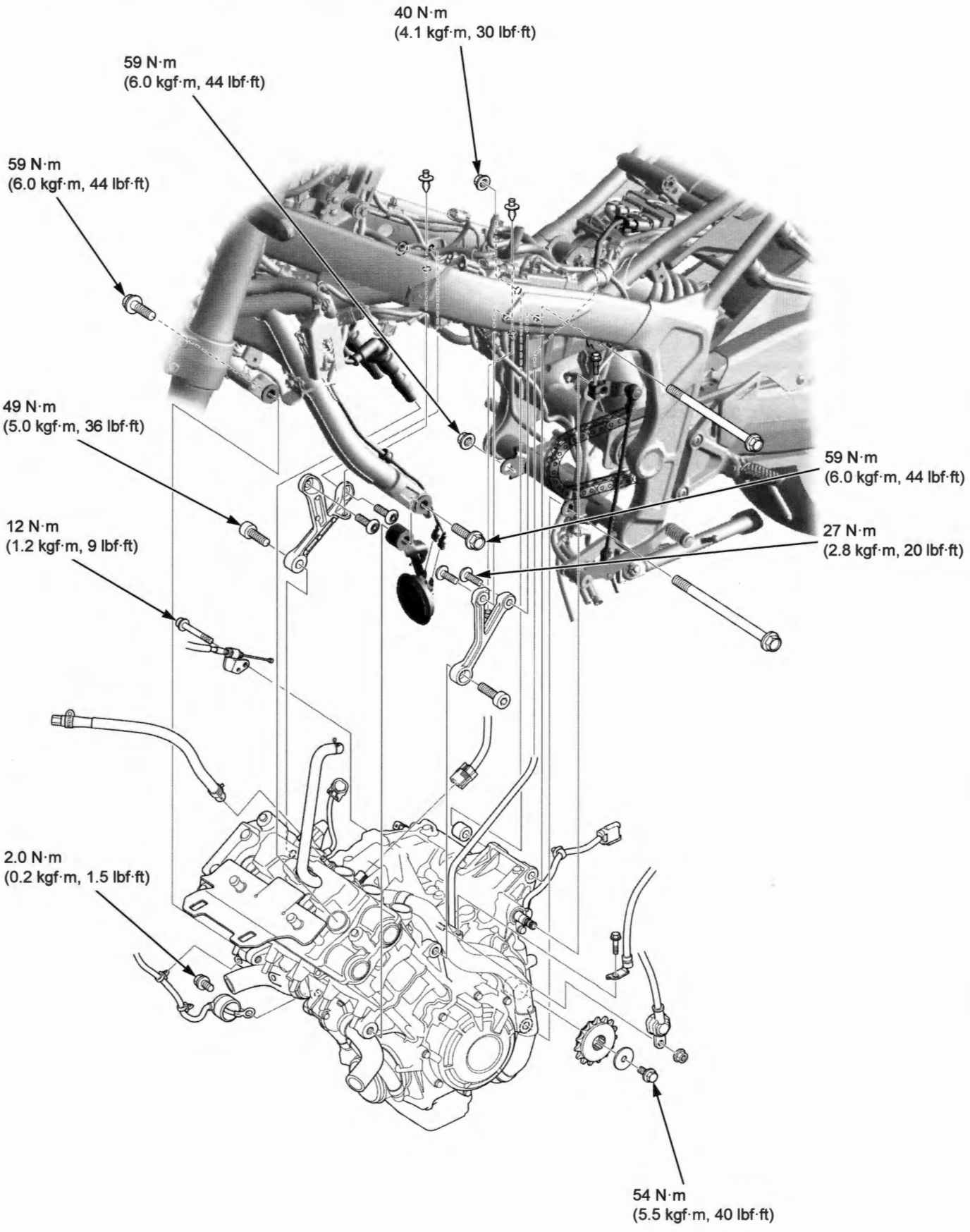
- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.

NOTICE

Do not use the oil filter as a jacking point.

- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.
- The following components can be serviced with the engine installed in the frame.
  - Starter motor (page 6-5)
  - Throttle body (page 7-14)
  - Air cleaner housing (page 7-13)
  - Water pump (page 8-9)
  - Oil pump (page 9-5)
  - Oil strainer (page 9-7)
  - Camshaft (page 10-7)
  - Cam chain tensioner lifter (page 10-22)
  - Clutch (page 11-7)
  - Gearshift linkage (page 11-20)
  - Stator (page 12-4)
  - Flywheel (page 12-5)
  - Starter clutch (page 11-15)
  - Cylinder head/valves (page 10-13)
- The following components require engine removal for service.
  - Transmission (page 13-8)
  - Crankshaft (page 14-4)
  - Piston/cylinder (page 14-13)

COMPONENT LOCATION



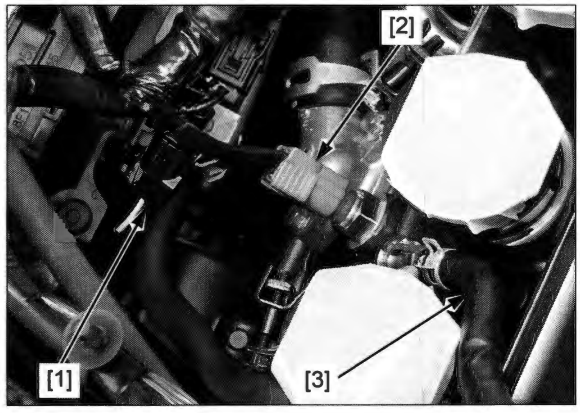
ENGINE REMOVAL

Drain the engine oil (page 3-11).
Drain the coolant (page 8-4).

Fully slacken the drive chain (page 3-14).

Remove the following:

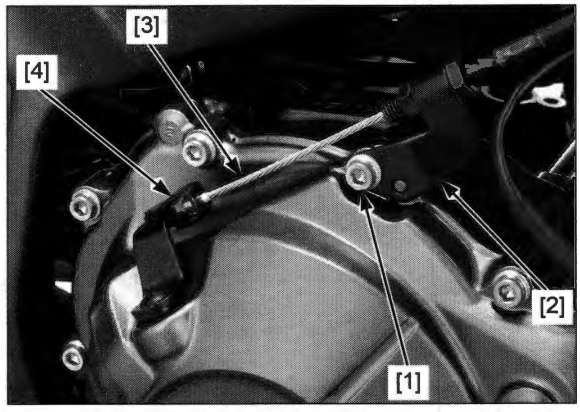
- Drive sprocket cover (page 2-15)
- Radiator (page 8-7)
- Exhaust pipe/muffler (page 2-18)
- Throttle body (page 7-14)
- VS sensor (page 4-44)
- Radiator reserve tank (page 8-9)
- ABS modulator cover (page 4-42)
- EVAP canister (AC type) (page 7-24)
- PAIR control solenoid valve assembly (page 7-21)
- Spark plug caps (page 3-6)



Disconnect the following:

- CKP sensor 2P (Black) connector [1]
- ECT sensor 2P (Blue) connector [2]
- Water bleeding hose [3]

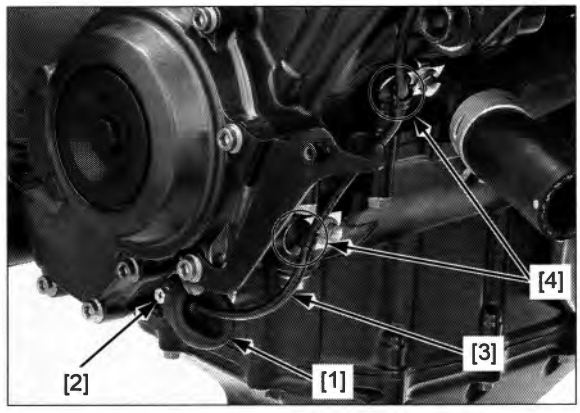
Remove the bolt [1] and clutch cable holder [2], then disconnect the clutch cable [3] from the clutch lifter arm [4].



Release the rubber cap [1] from the EOP switch.

Remove the terminal screw [2] and disconnect the switch wire [3].

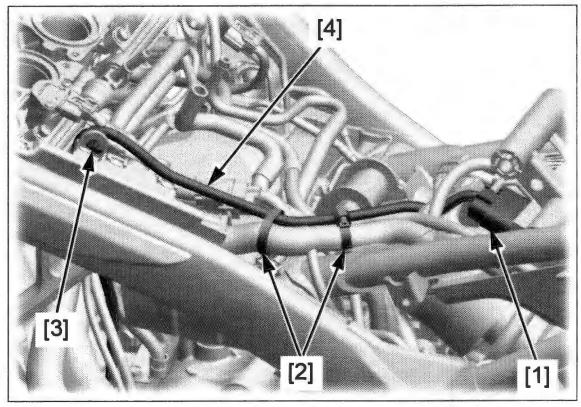
Release the wire clips [4].



Disconnect the alternator 3P (Gray) connector [1].

Release the wire bands [2] and alternator wire clip [3].

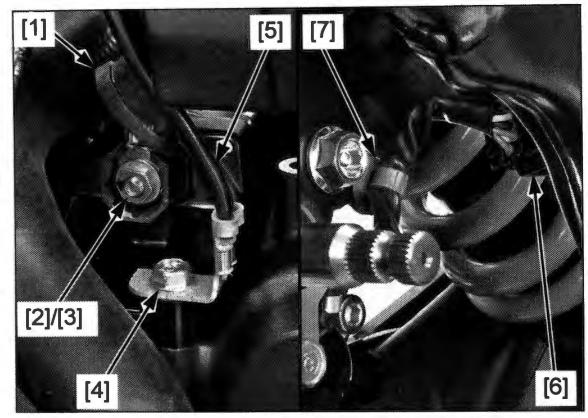
Remove the alternator wire [4] out of the frame.



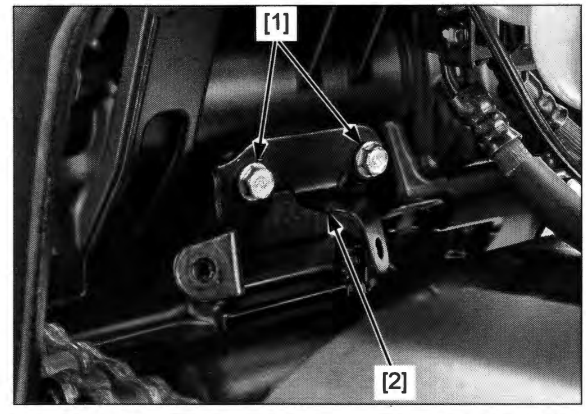
Release the terminal cap [1].
Remove the terminal nut [2] and disconnect the starter motor cable [3].

Remove the starter motor mounting bolt [4] and negative (–) cable [5].

Disconnect the gear position switch 8P (Black) connector [6] and remove the wire clip [7].



AC type: Remove the bolts [1] and EVAP canister stay A [2].



Remove the drive sprocket bolt [1], washer [2] and drive sprocket [3].

Support the motorcycle securely with a hoist or equivalent.

Do not use the oil filter as a jacking point.

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

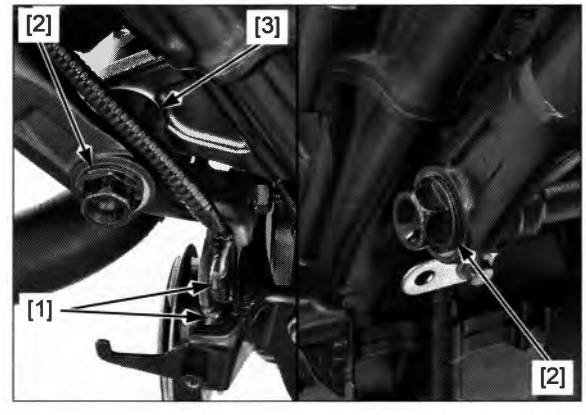
NOTE:

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

Disconnect the horn connectors [1] from the horn.

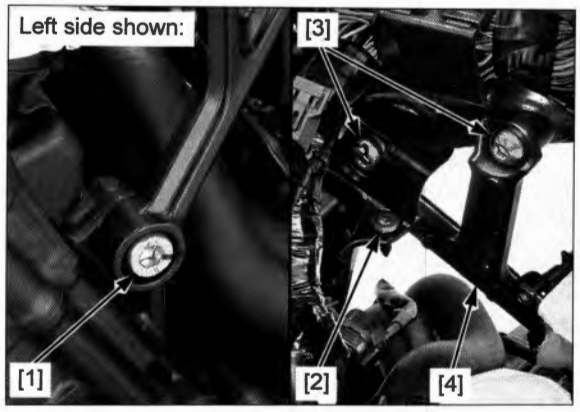
Remove the following:

– Front engine hanger bolts [2]
– Collar [3] (left side only)



Remove the following:

- Upper engine hanger bolts [1]
- Clips [2]
- Engine hanger bracket bolts [3]
- Both engine hangers [4]



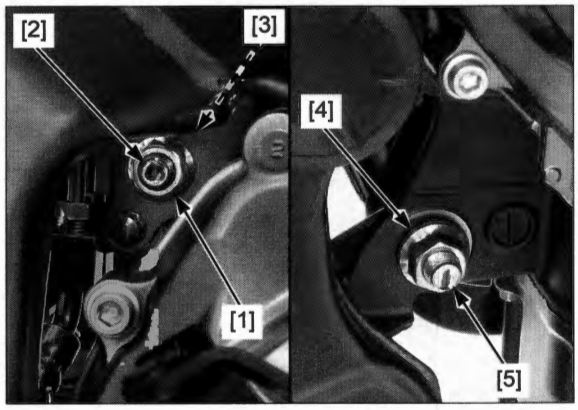
ABS type: Loosen the rear brake pipe stay bolt [1].

Remove the rear upper engine hanger nut [1], bolt [2] and collar [3].

Remove the rear lower engine hanger nut [4] and bolt [5].

During engine removal, hold the engine securely and be careful not to damage the frame and engine.

Carefully lower the jack or adjustable support, then remove the engine from the frame.



ENGINE INSTALLATION

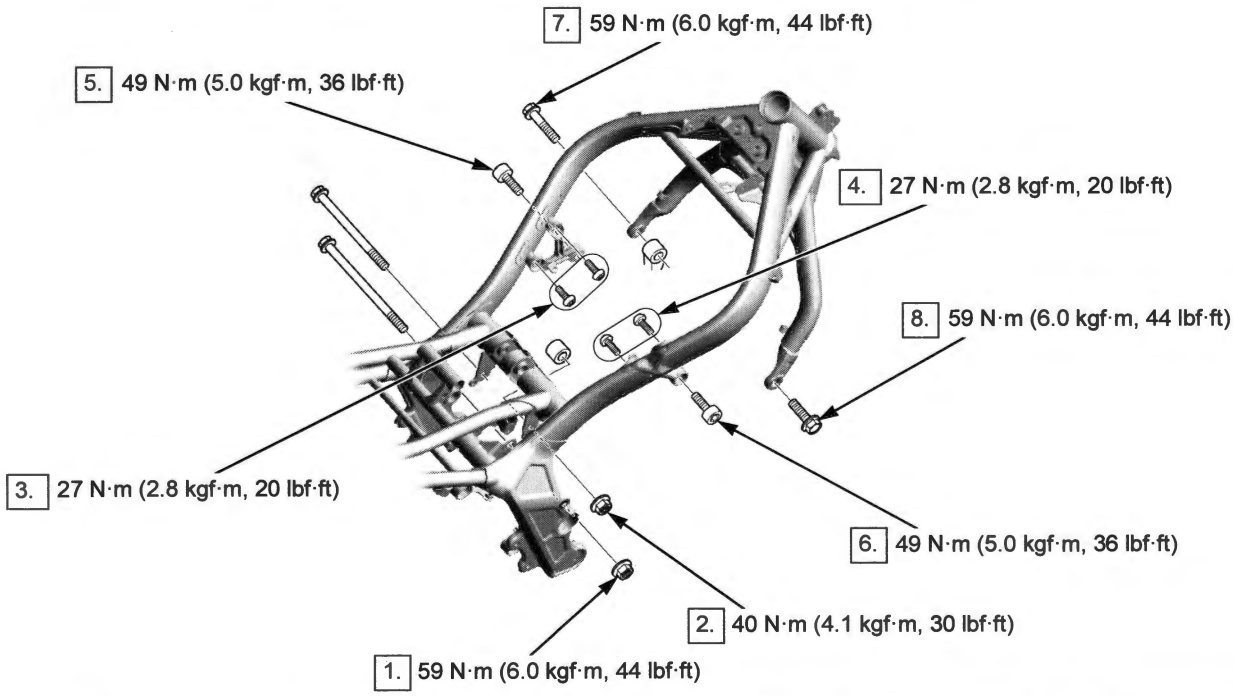
During engine installation, hold the engine securely and be careful not to damage the frame and engine.

Place the engine in the frame, then loosely install all the bolts, collars and nuts.

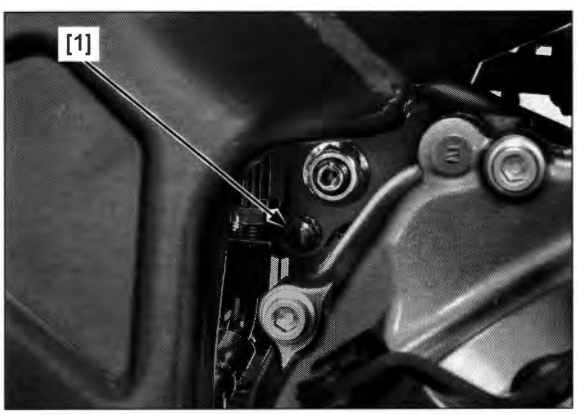
NOTE:

- Place the jack or other adjustable support under the engine.
- Do not use the oil filter as a jacking point.
- The jack height must be continually adjusted to relieve stress for ease bolt installation.
- Carefully align the mounting points with the jack to prevent damage to engine, frame, radiator hoses, wires and cables.

Tighten the bolts and nuts to the specified torque in the specified sequence as shown.



ABS type: Tighten the rear brake pipe stay bolt [1] securely.



Install the removed parts in the reverse order of removal.

NOTE:

- Install the drive sprocket [1] with its marked [2] side facing out.
- Align the clutch cable holder hole with the right crankcase cover boss.

TORQUE:

Drive sprocket bolt:
54 N·m (5.5 kgf·m, 40 lbf·ft)

EOP switch terminal screw:
2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Right crankcase cover bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

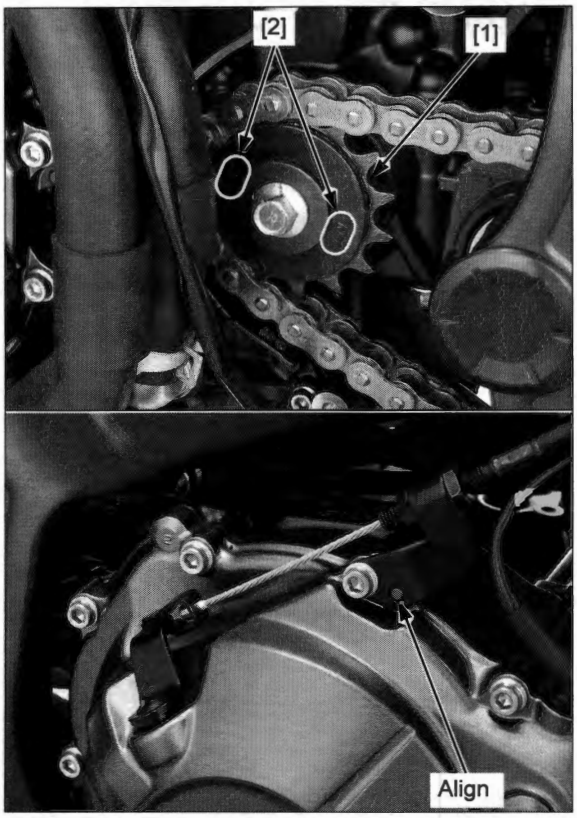
Adjust the following:

– Throttle grip freeplay (page 3-4)
– Clutch lever freeplay (page 3-21)
– Drive chain slack (page 3-14)

Fill the engine with the recommended engine oil (page 3-10).

Fill and bleed the cooling system (page 8-4).

Check the exhaust system and cooling system for leaks.



16. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION 16-2

TROUBLESHOOTING 16-4

COMPONENT LOCATION 16-5

HANDLEBAR 16-7

FRONT WHEEL 16-17

FORK 16-23

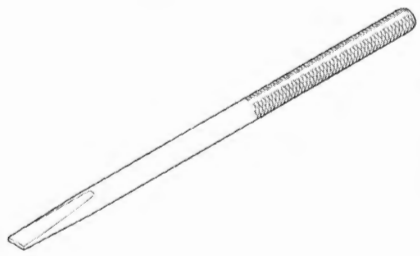
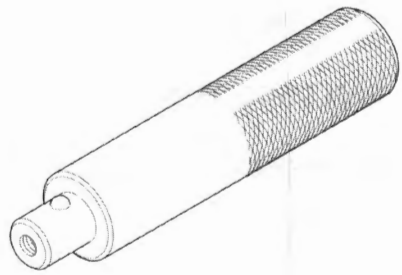
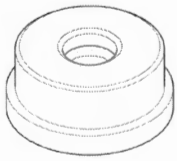
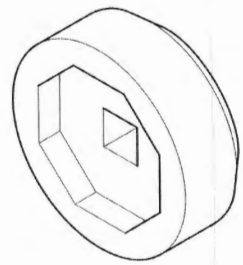
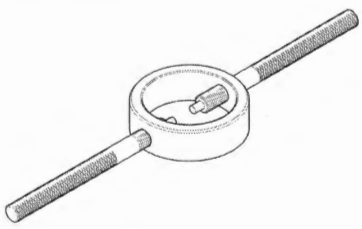
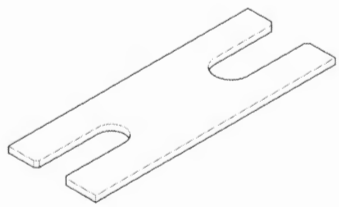
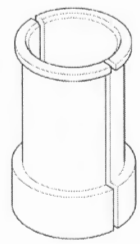
STEERING STEM 16-41

SERVICE INFORMATION

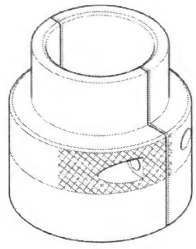
GENERAL

- A hoist or equivalent is required to support the motorcycle when servicing the front wheel, fork and steering stem.
- 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 operate the brake lever after removing the front wheel.
- After the front wheel installation, check the brake operation by applying the brake lever.
- For brake system service (page 18-2).

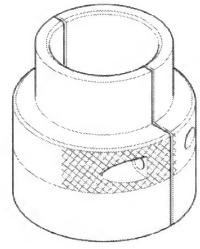
TOOLS

Remover head, 20 mm 07746-0050600 	Bearing remover shaft 07746-0050100 	Driver 07749-0010000 
Attachment, 42 x 47 mm 07746-0010300 	Pilot, 20 mm 07746-0040500 	Fork cap wrench 070MA-MGP0100  or 07AMA-MGPA100 (U.S.A. only)
Spring collar holder 070MF-MBZC110  or 07AMC-MFJA100 (U.S.A. only)	Stopper plate 070MF-MBZC130  or 07AMB-KZ3A100 (U.S.A. only)	Fork seal driver attachment 07RMD-MW40100 

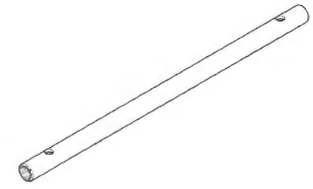
Fork seal driver, 45.2 mm
07KMD-KZ30100



Fork seal driver, 45 mm
07KMD-KZ3010A (U.S.A. only)

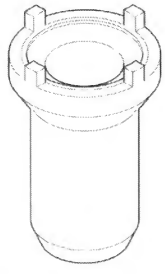


Damper rod holder
070MF-MBZC120

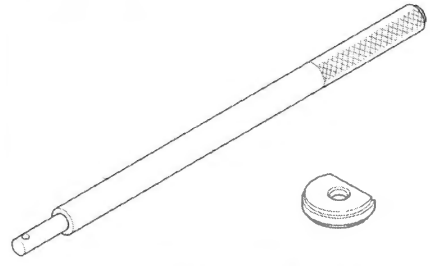


or 070MF-MBZA120 (U.S.A. only)

Steering stem socket
07916-3710101



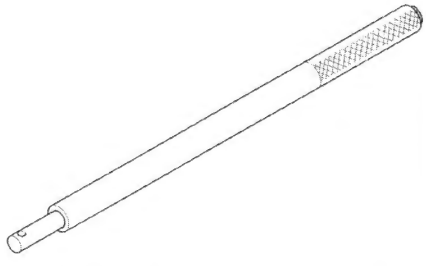
Ball race remover set
07953-MJ10000



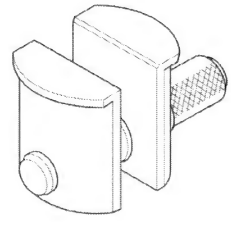
or 07953-MJ1000B (U.S.A. only)

Remover attachment
07953-MJ10100

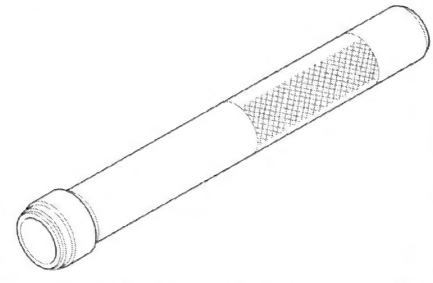
Remover handle
07953-MJ10200



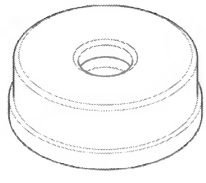
Bearing remover
07946-3710500



Steering stem driver
07946-MB00000



Attachment, 52 x 55 mm
07746-0010400



TROUBLESHOOTING

Hard steering
- Insufficient tire pressure
- Faulty tire
- Steering stem adjustment nut too tight
- Worn or damaged steering beatings
- Worn or damaged steering beating races
- Bent steering stem

Steers to one side or does not track straight
- Bent axle
- Wheel installed incorrectly
- Worn or damaged wheel bearings
- Bent fork leg
- Damaged or loose steering bearings
- Damaged frame
- Faulty wheel bearing

Front wheel wobbles
- Bent rim
- Faulty tire
- Worn or damaged wheel bearings
- Loose axle
- Unbalanced tire and wheel

Wheel hard to turn
- Faulty wheel bearings
- Bent axle
- Brake drag (page 18-2)

Soft suspension
- Low tire pressure
- Weak fork spring
- Low fluid level in fork
- Incorrect fork fluid weight (low viscosity)

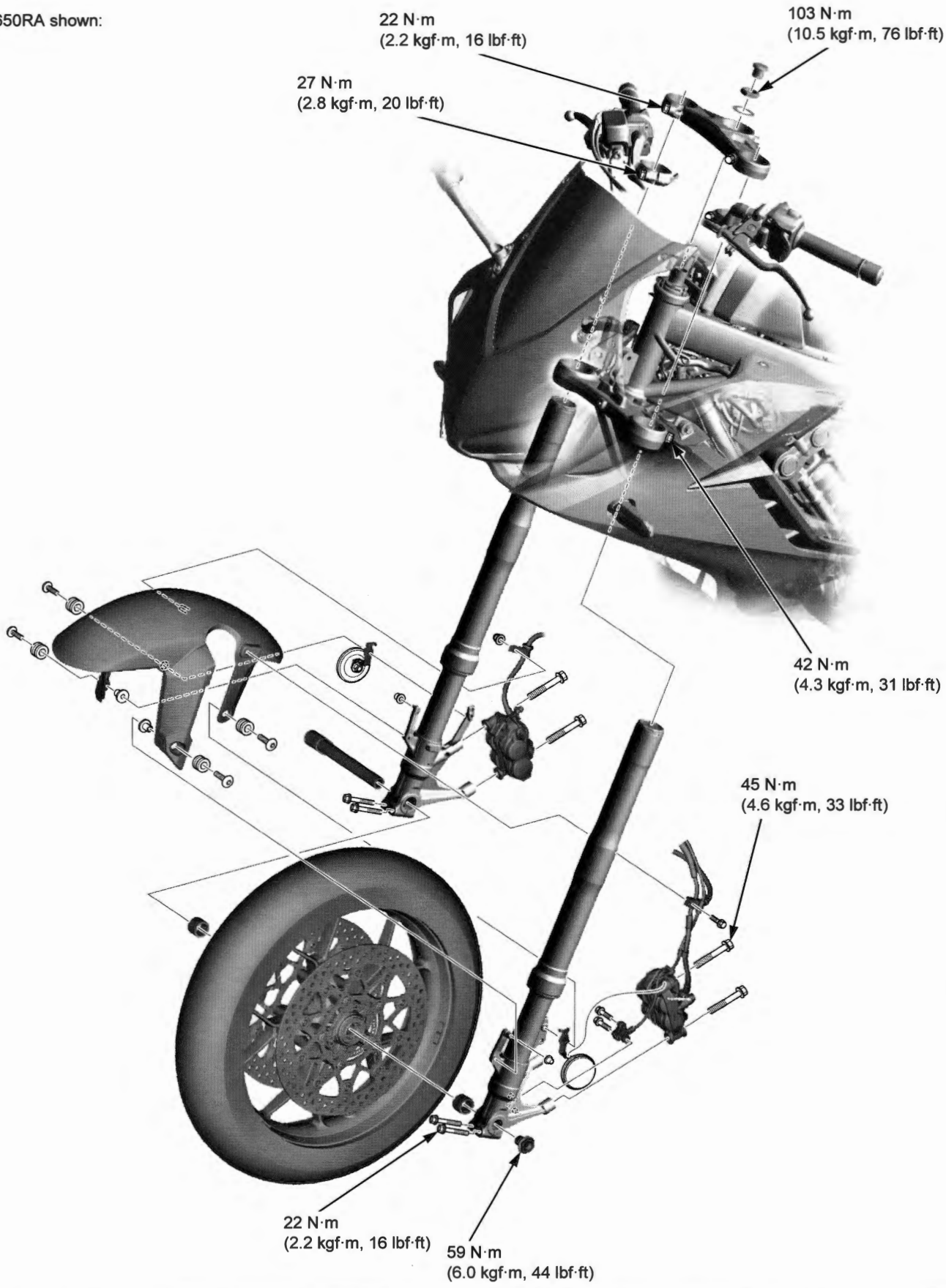
Stiff suspension
- High tire pressure
- Bent fork tube
- Fork slider binds
- High fluid level in fork
- Incorrect fork fluid weight (high viscosity)
- Clogged fork fluid passage

Front suspension noise
- Loose fork fasteners
- Incorrect fork fluid weight (low viscosity)
- Worn slider of fork tube bushing

COMPONENT LOCATION

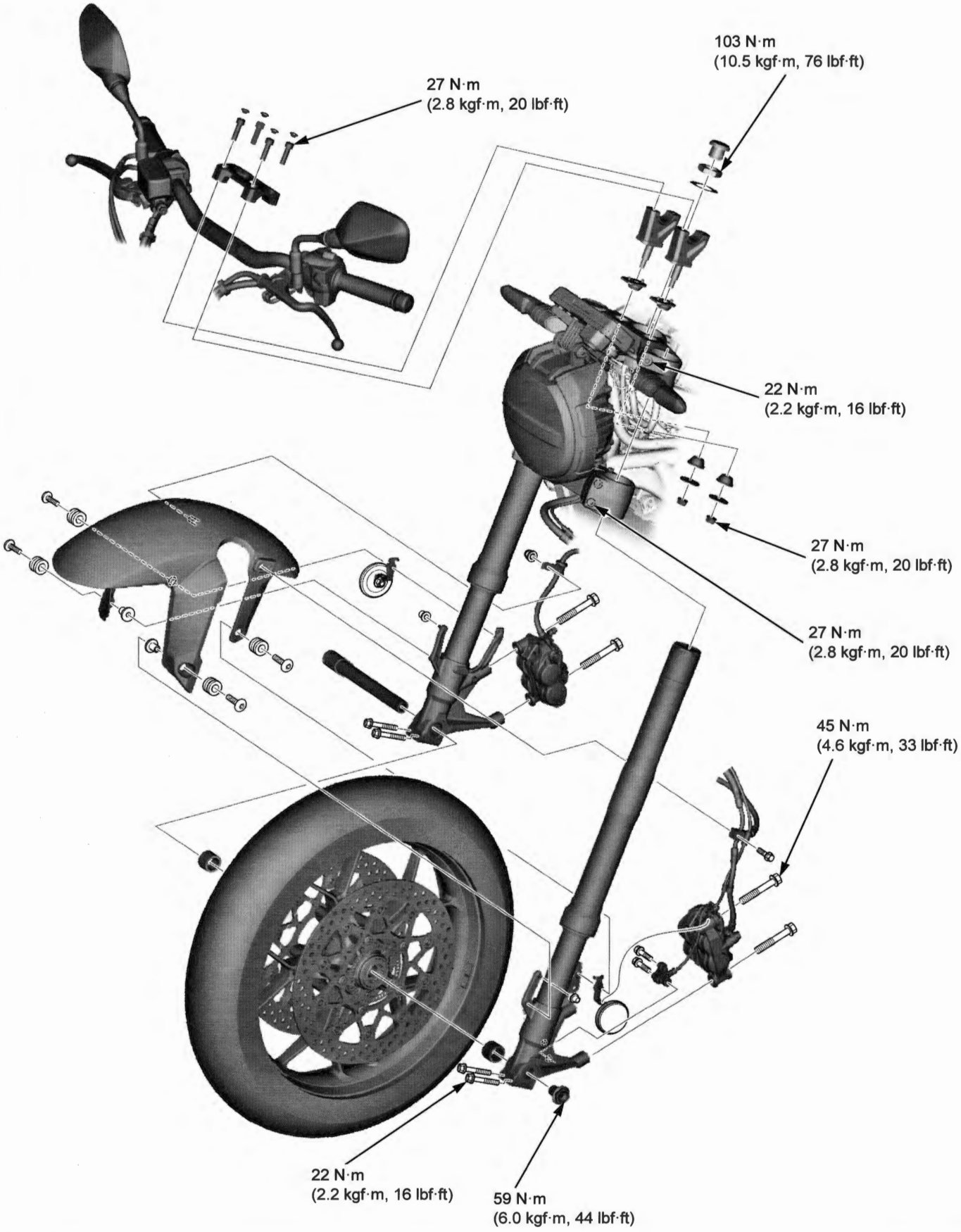
CBR650R/RA

CBR650RA shown:



CB650R/RA

CB650RA shown:

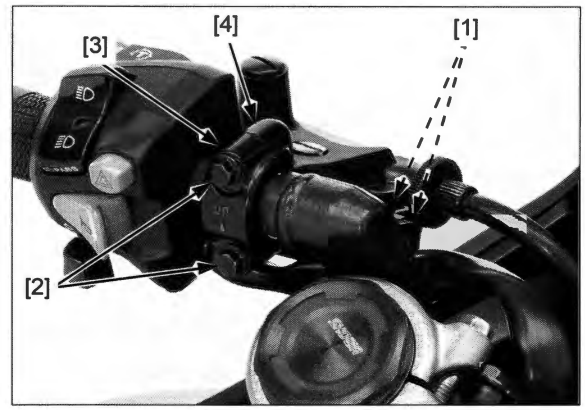


HANDLEBAR

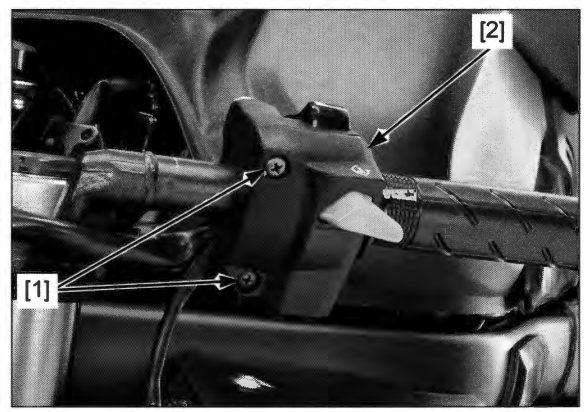
REMOVAL (CBR650R/RA)

Remove the following:

- Ignition switch cover (page 21-15)
- Clutch switch connectors [1]
- Two bolts [2]
- Bracket holder [3]
- Clutch lever bracket [4]

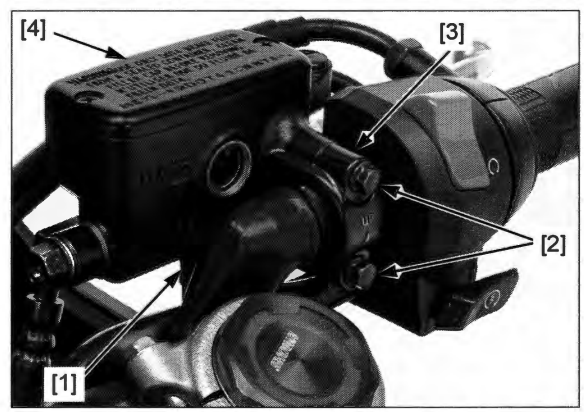


- Two screws [1]
- Left handlebar switch housings [2]

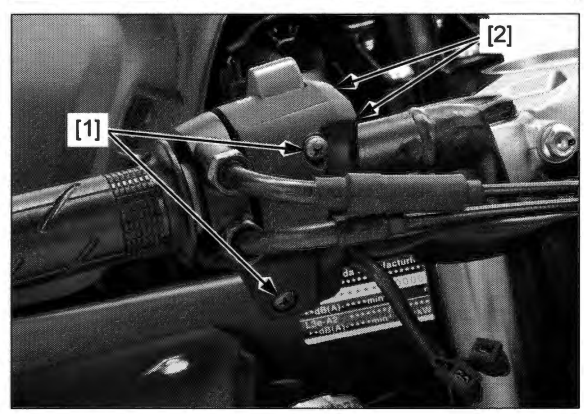


Keep the reservoir upright to prevent air from entering the hydraulic system.

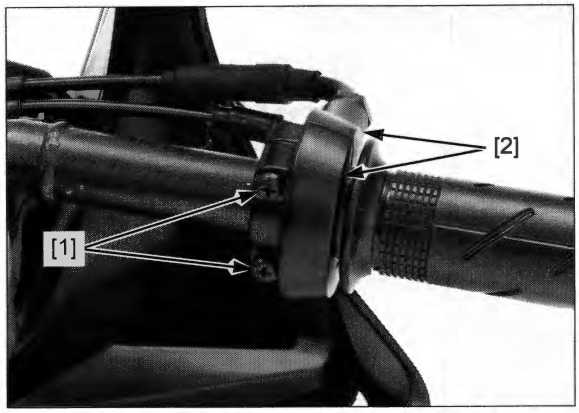
- Right handlebar weight (page 16-15)
- Brake light switch connectors [1]
- Two bolts [2]
- Master cylinder holder [3]
- Front master cylinder [4]



- Two screws [1]
- Right handlebar switch housing [2]

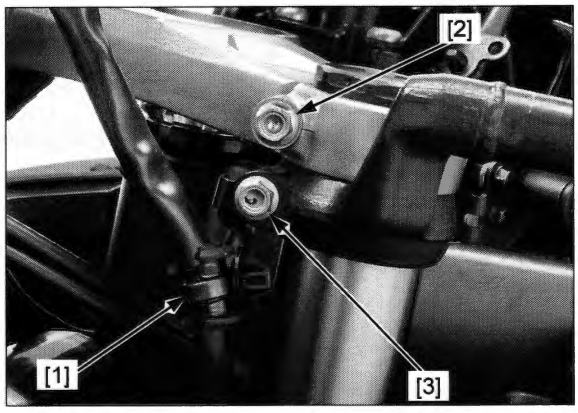


– Two screws [1]
– Throttle housing [2]



Release the wire clip [1] from the stay.

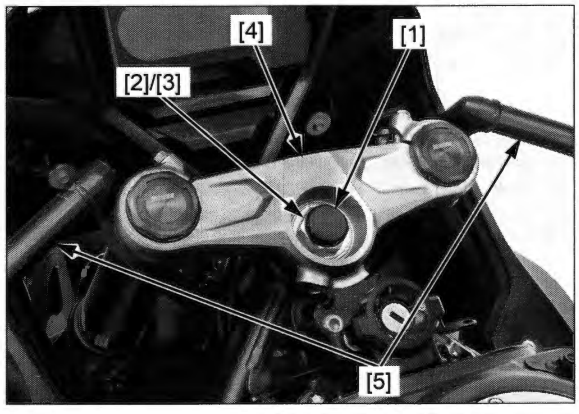
Loosen the top bridge pinch bolt [2] and handlebar pinch bolt [3].



Remove the following:

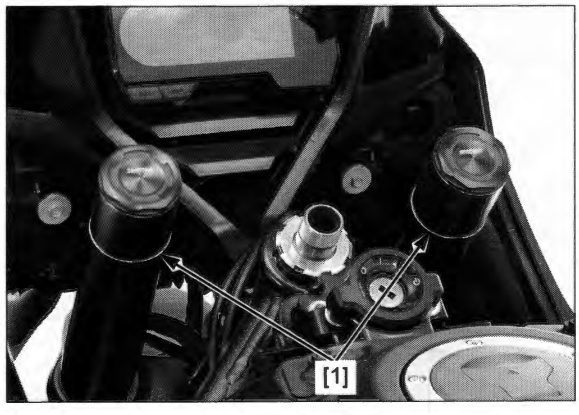
– Cap [1]
– Steering stem nut [2]
– Washer [3]
– Top bridge [4]

Remove the handlebars [5] from the fork sliders.



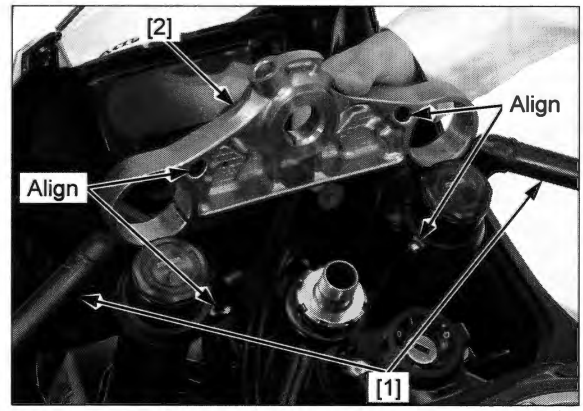
INSTALLATION (CBR650R/RA)

Make sure the stopper ring [1] is installed in position.



Install the handlebars [1] onto the fork sliders.

Install the top bridge [2] while aligning its holes with the handlebar stopper pins.



Install the washer [1] and steering stem nut [2].

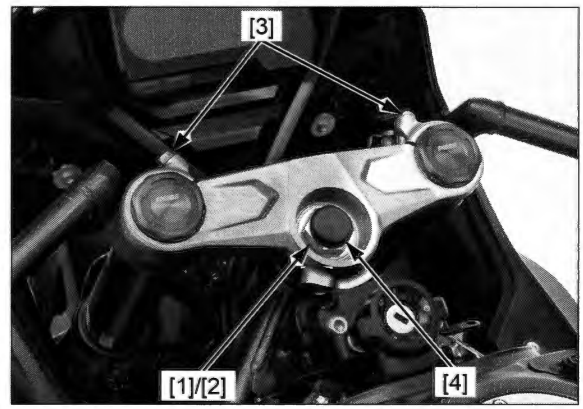
Do not fully tighten the top bridge pinch bolts.

Temporarily tighten the top bridge pinch bolts [3] until the seating surfaces contact with each other.

Tighten the steering stem nut to the specified torque.

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

Install the cap [4].



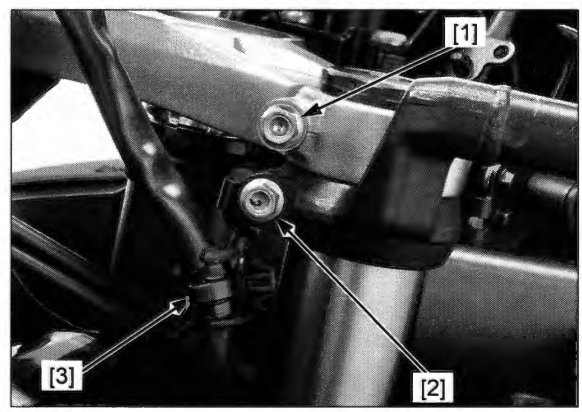
Tighten the top bridge pinch bolts [1] to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the handlebar pinch bolts [2] to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

Install the wire clip [3] onto the stay.

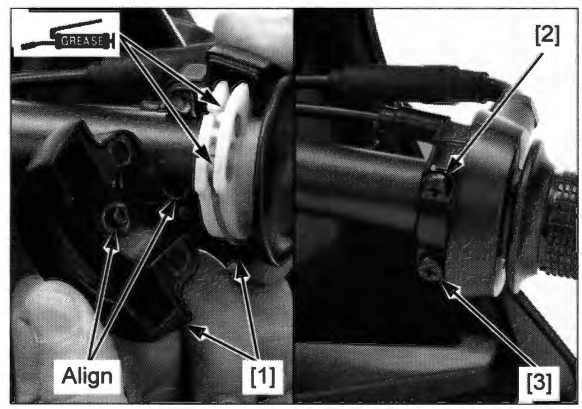


Apply grease to the cable groove and roll-up area of the throttle grip.

Install the throttle housing assembly onto the right handlebar.

Install the throttle housing [1] by aligning the locating pin with the hole in the handlebar.

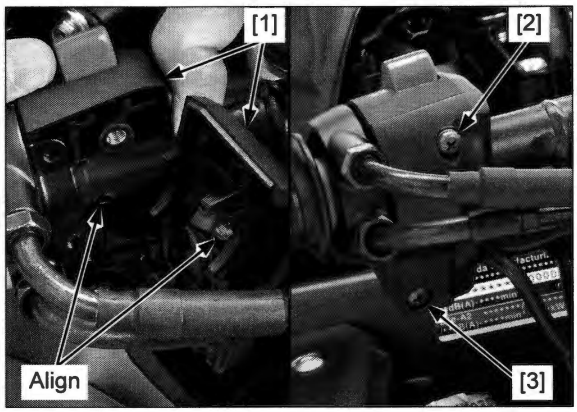
Tighten the upper screw first [2], then tighten the lower screw [3] securely.



Install the right handlebar switch housings [1] by aligning the locating pin with the hole in the handlebar.

Tighten the upper screw first [2], then tighten the lower screw [3] to the specified torque.

TORQUE: 2.5 N·m (0.3 kgf·m, 1.8 lbf·ft)



Align the edge of the master cylinder with the punch mark on the handlebar.

Install the master cylinder [1] and holder [2] with the "UP" mark [3] facing up.

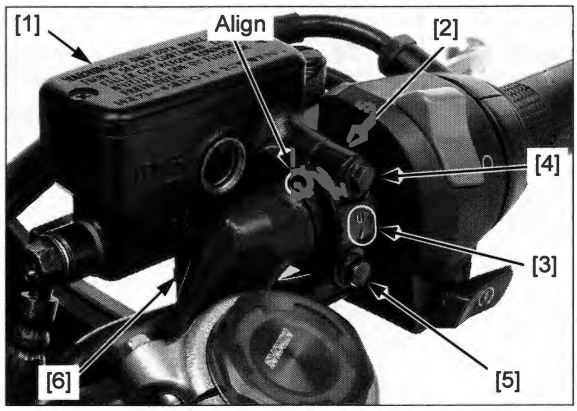
Tighten the upper bolt [4] first, then the lower bolt [5] to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the brake light switch connectors [6].

Install the right handlebar weight (page 16-15).

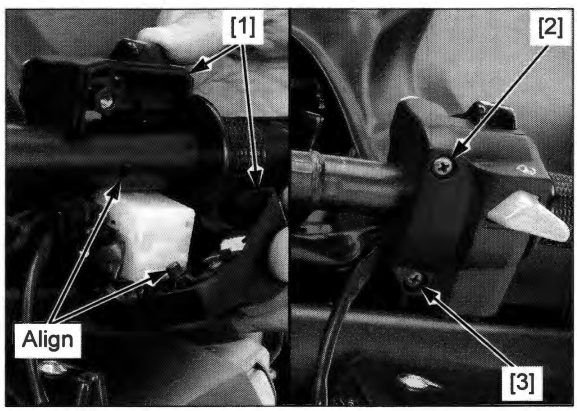
Check the throttle grip freeplay (page 3-4).



Install the left handlebar switch housings [1] by aligning the locating pin with the hole in the handlebar.

Tighten the upper screw [2] first, then tighten the lower screw [3] to the specified torque.

TORQUE: 2.5 N·m (0.3 kgf·m, 1.8 lbf·ft)



Align the edge of the bracket with the punch mark on the handlebar.

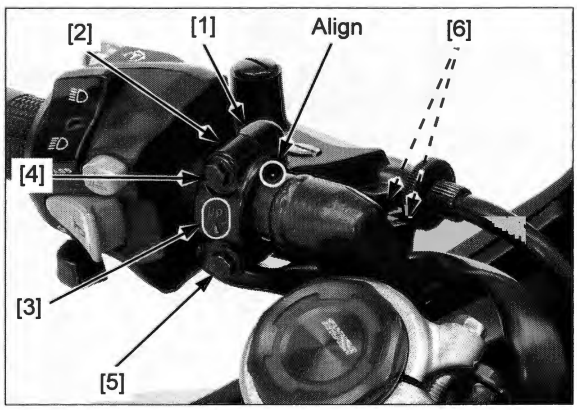
Install the clutch lever bracket [1] and holder [2] with the "UP" mark [3] facing up.

Tighten the upper bolt first [4], then the lower bolt [5].

Connect the clutch switch connectors [6].

Check the clutch lever freeplay (page 3-21).

Install the ignition switch cover (page 21-15).

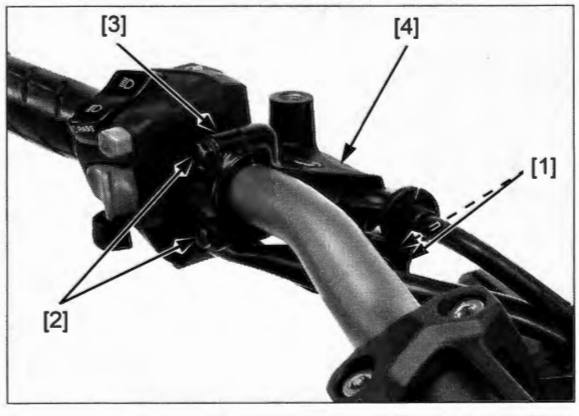


REMOVAL (CB650R/RA)

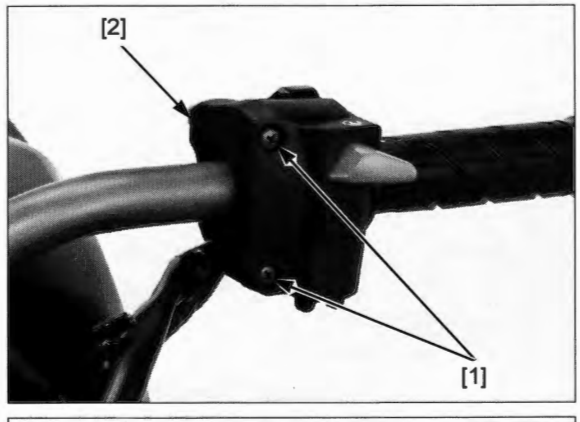
Remove the following:

- Rearview mirrors (page 2-5)
- Handlebar weights (page 16-15)
- Bolt caps [1]

- Clutch switch connectors [1]
- Two bolts [2]
- Bracket holder [3]
- Clutch lever bracket [4]

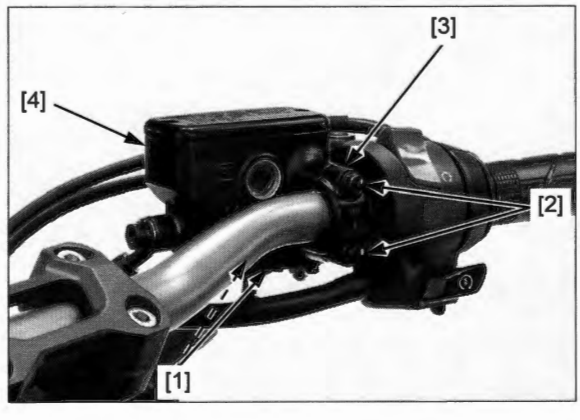


- Two screws [1]
- Left handlebar switch housing [2]

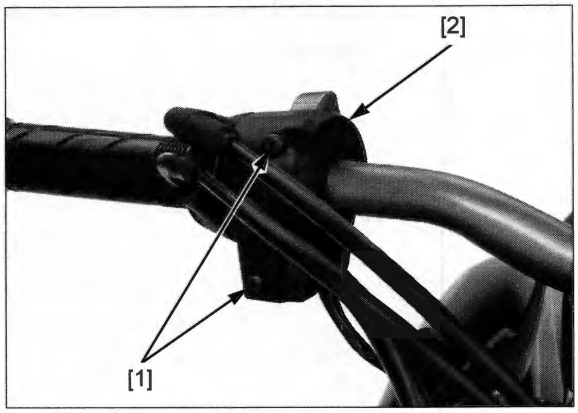


Keep the reservoir upright to prevent air from entering the hydraulic system.

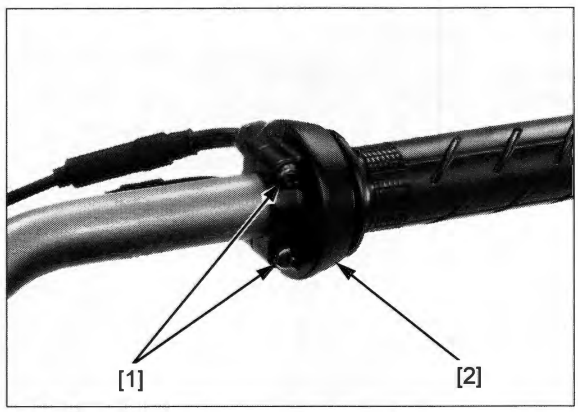
- Brake light switch connectors [1]
- Two bolts [2]
- Master cylinder holder [3]
- Front master cylinder [4]



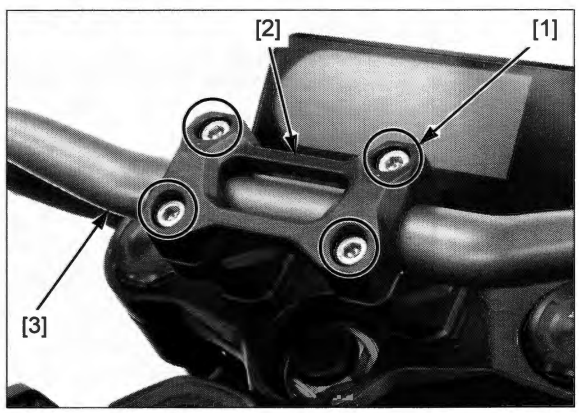
– Two screws [1]
– Right handlebar switch housing [2]



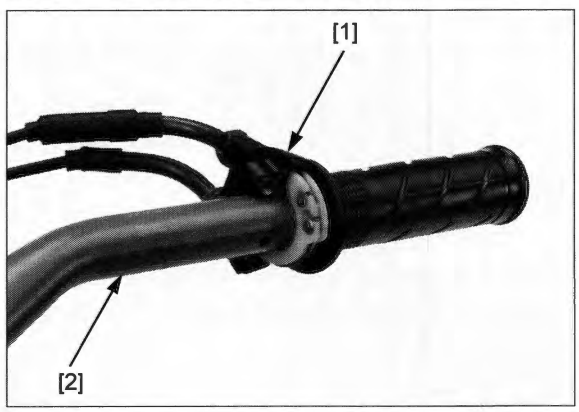
– Two screws [1]
– Rear throttle housing [2]



– Four socket bolts [1]
– Handlebar upper holder [2]
– Handlebar [3]



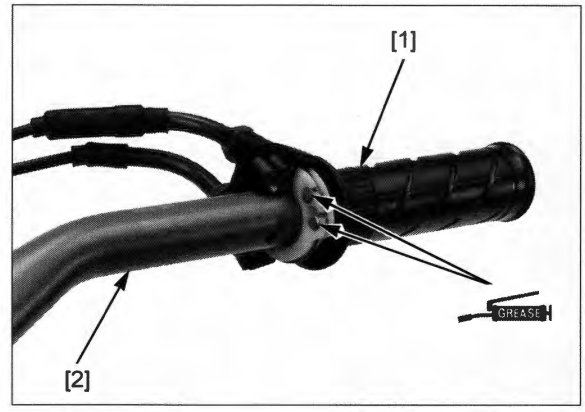
– Throttle grip/housing assembly [1] (from the handlebar [2])



INSTALLATION (CB650R/RA)

Apply grease to the cable groove and roll-up area of the throttle grip [1].

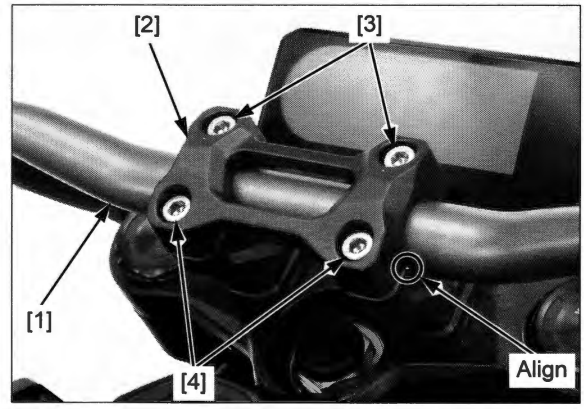
Install the throttle grip/housing assembly onto the handlebar [2].



Align the punch mark with the edge of the top bridge.

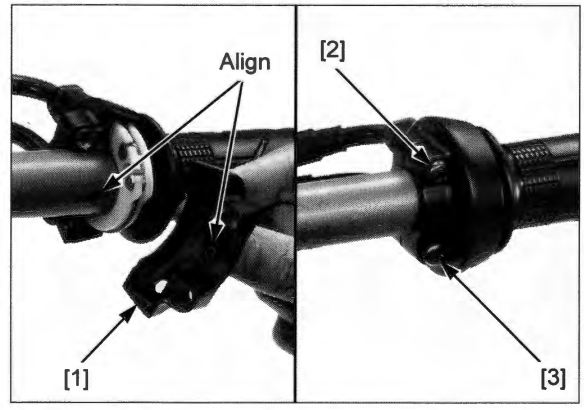
Install the handlebar [1] and upper holder [2]. Tighten the front socket bolts [3] first, then tighten the rear socket bolts [4] to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Install the rear throttle housing [1] by aligning the locating pin with the hole in the handlebar.

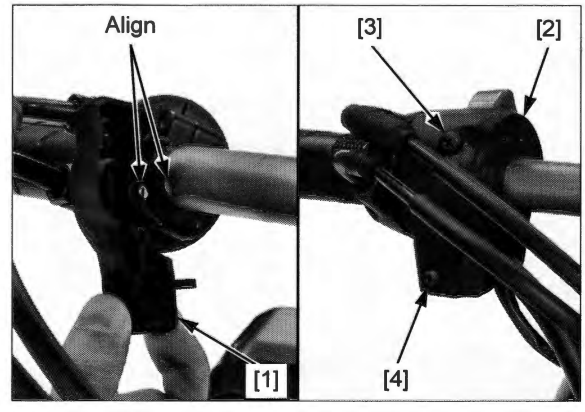
Tighten the upper screw [2] first, then tighten the lower screw [3] securely.



Install the front right handlebar switch housing [1] by aligning the locating pin with the hole in the handlebar.

Install the rear right handlebar switch housing [2]. Tighten the upper screw [3] first, then tighten the lower screw [4] to the specified torque.

TORQUE: 2.5 N·m (0.3 kgf·m, 1.8 lbf·ft)

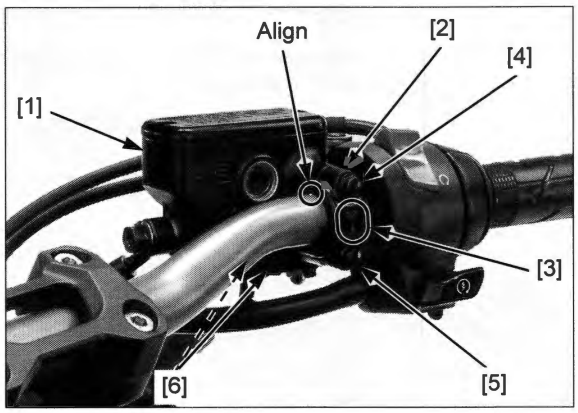


Align the edge of the master cylinder with the punch mark on the handlebar.

Install the master cylinder [1] and holder [2] with the "UP" mark [3] facing up. Tighten the upper bolt [4] first, then the lower bolt [5] to the specified torque.

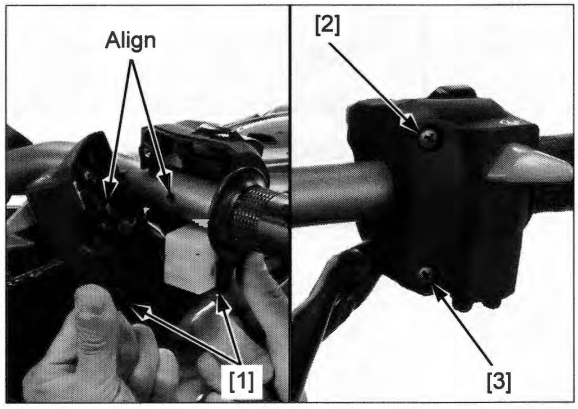
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the brake light switch connectors [6].



Install the left handlebar switch housings [1] by aligning the locating pin with the hole in the handlebar. Tighten the upper screw [2] first, then tighten the lower screw [3] to the specified torque.

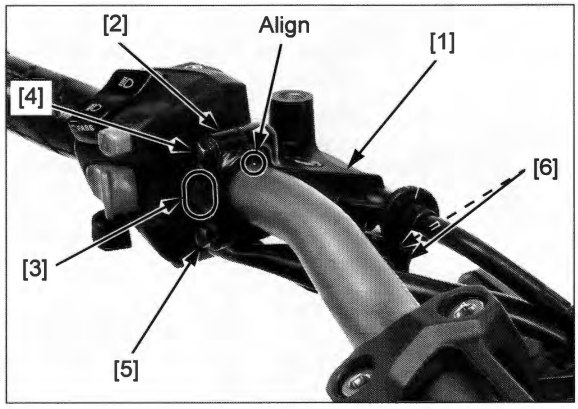
TORQUE: 2.5 N·m (0.3 kgf·m, 1.8 lbf·ft)



Align the edge of the bracket with the punch mark on the handlebar.

Install the clutch lever bracket [1] and holder [2] with the "UP" mark [3] facing up. Tighten the upper bolt [4] first, then the lower bolt [5].

Connect the clutch switch connectors [6].

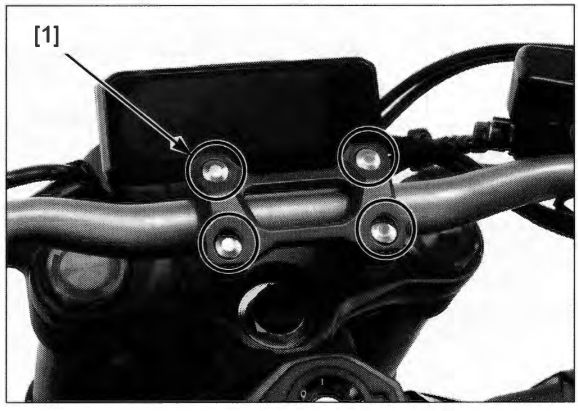


Install the following:

- Bolt caps [1]
- Handlebar weights (page 16-15)
- Rearview mirrors (page 2-5)

Check the following:

- Clutch lever freeplay (page 3-21)
- Throttle grip freeplay (page 3-4)



HANDLEBAR LOWER HOLDER REMOVAL/INSTALLATION (CB650R/RA)

Loosen the handlebar lower holder nuts [1].

Remove the Bolt caps [2], handlebar mounting socket bolts [3], handlebar upper holder [4] and handlebar [5] (page 16-11).

Remove the lower holder nuts, washers [6], handlebar lower holders [7] and lower mount rubbers [8].

Remove the upper mount rubbers [9] from lower holders.

Install the upper mount rubbers onto the lower holders.

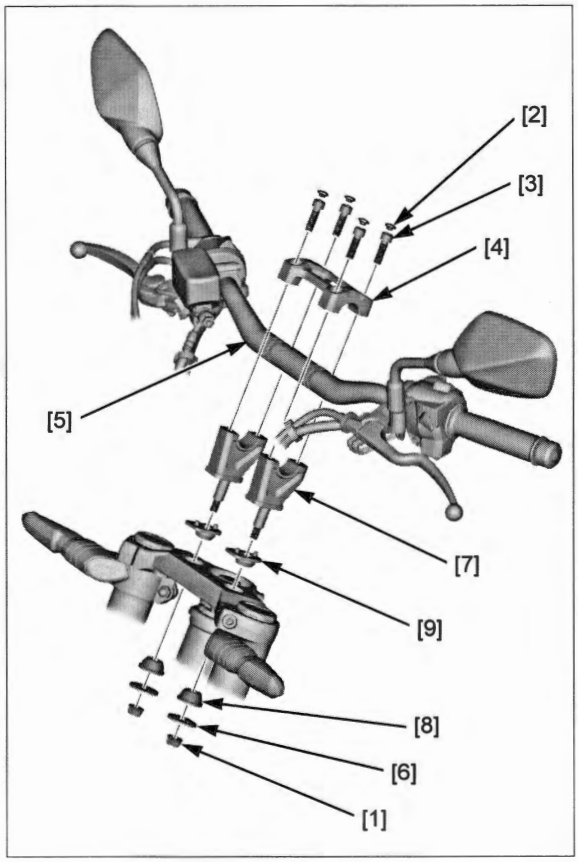
Install the handlebar lower holders, lower mount rubbers, washers and lower holder nuts.

Temporarily install the handlebar, handlebar upper holders and mounting bolts (page 16-13).

Tighten the lower holder nut to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

Install the removed parts in the reverse order of removal.



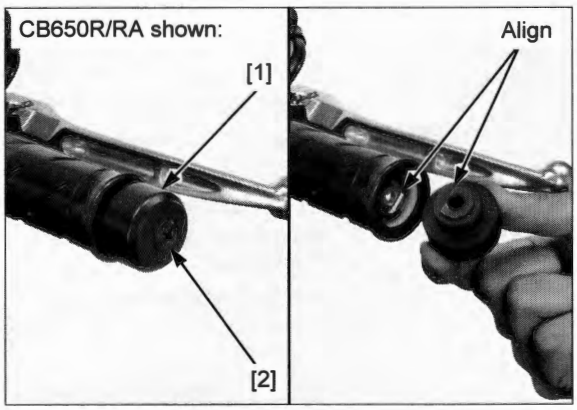
HANDLEBAR WEIGHT REMOVAL/ INSTALLATION

Hold the handlebar weight [1] and remove the handlebar weight mounting screw [2], then remove both handlebar weights.

Install the handlebar weight to the handlebar by aligning each cutout.

Hold the handlebar weight.

Install and tighten the handlebar weight mounting screw securely.



HANDLEBAR INNER WEIGHT REPLACEMENT

CBR650R/RA

Remove the left handlebar grip and throttle grip (page 16-17).

Straighten the retainer tab [1] with a screwdriver or punch.

Apply soapy water through the tab locking hole [2] for easy removal.

Temporarily install the handlebar weight [3] with the screw [4], aligning the flats, and then remove the inner weight [5] by turning the handlebar weight.

Remove the following from the from the inner weight:

- Screw
- Handlebar weight
- Weight retainer [6]
- Rubber cushion (with MB6 mark) [7]
- Rubber cushion [8]

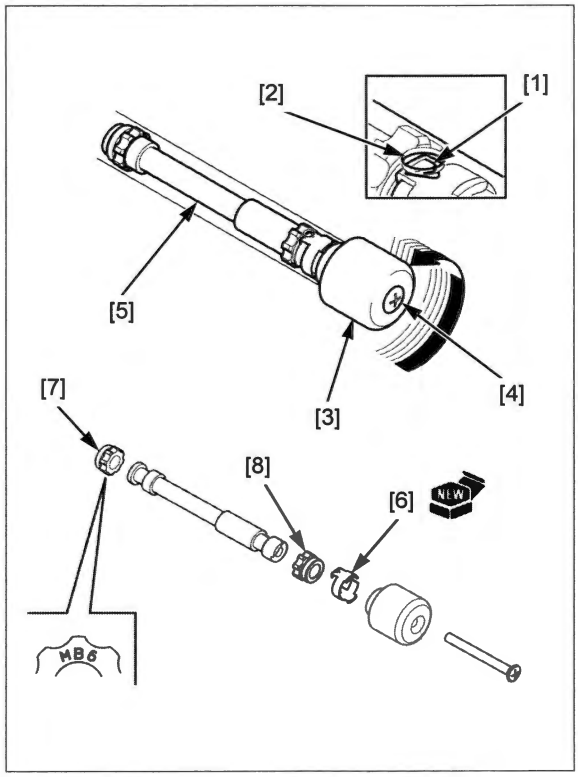
Install the rubber cushions and a new retainer onto the inner weight, aligning the retainer inner tabs with the cushion slit.

Temporarily install the handlebar weight with the screw, aligning the flats.

Insert the weight assembly into the handlebar. Turn the handlebar weight and hook the retainer tab with the hole in the handlebar to secure the inner weight.

Remove the screw while holding the handlebar weight securely.

Install the left handlebar grip and throttle grip (page 16-17).



CB650R/RA

Remove the left handlebar grip and throttle grip (page 16-17).

Straighten the retainer tab [1] with a screwdriver or punch.

Apply soapy water through the tab locking hole [2] for easy removal.

Temporarily install the handlebar weight [3] with the screw [4], aligning the flats, and then remove the inner weight [5] by turning the handlebar weight.

Remove the following from the from the inner weight:

- Screw
- Handlebar weight
- Weight retainer [6]
- Rubber cushions [7]

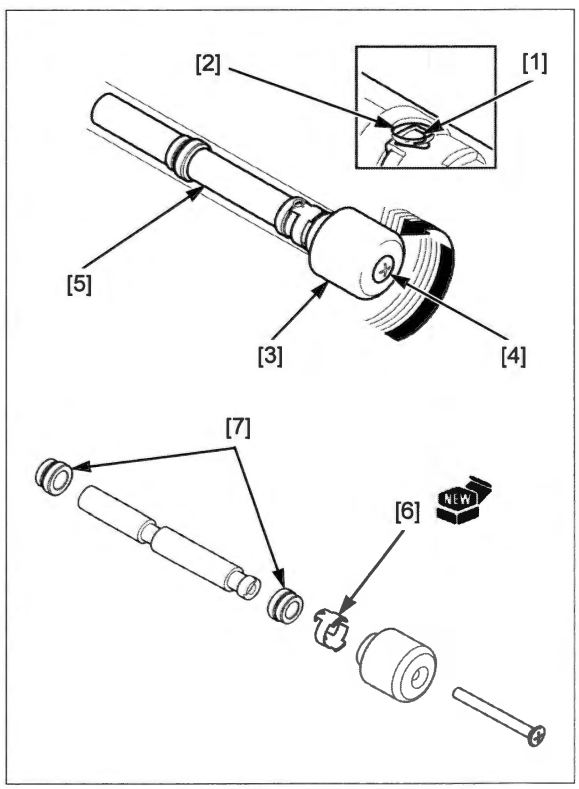
Install the rubber cushions and a new retainer onto the inner weight, aligning the retainer inner tabs with the cushion slit.

Temporarily install the handlebar weight with the screw, aligning the flats.

Insert the weight assembly into the handlebar. Turn the handlebar weight and hook the retainer tab with the hole in the handlebar to secure the inner weight.

Remove the screw while holding the handlebar weight securely.

Install the left handlebar grip and throttle grip (page 16-17).



HANDLEBAR GRIP REPLACEMENT

Remove the handlebar weight (page 16-15).

Remove the handlebar grip [1].

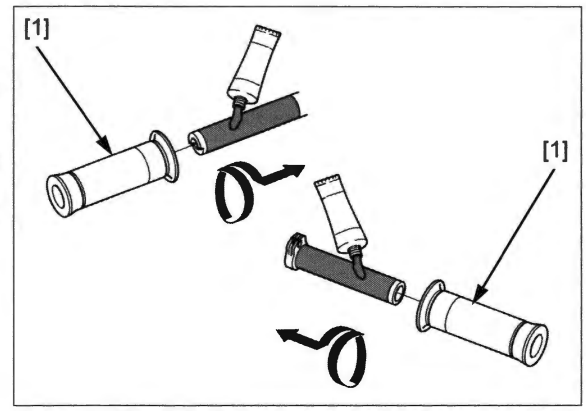
Clean the inside surface of the handlebar grip and outside surface of the handlebar and throttle pipe.

Apply Honda Bond A or Pro Honda Handgrip Cement (U.S.A. only) or equivalent to the inside surface of the grips and to the clean surface of the left handlebar and throttle pipe.

Allow the adhesive to dry for 1 hour before using.

Wait 3 – 5 minutes and install the grip.
Rotate the grips for even application of the adhesive.

Install the handlebar weight (page 16-15).



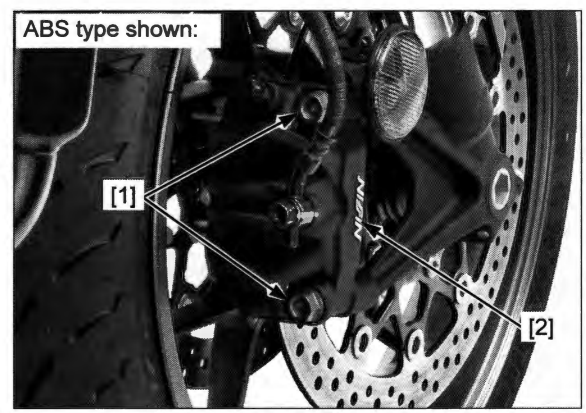
FRONT WHEEL

REMOVAL

Remove the bolts [1] and brake calipers [2].

Do not operate the brake lever after the brake caliper is removed.

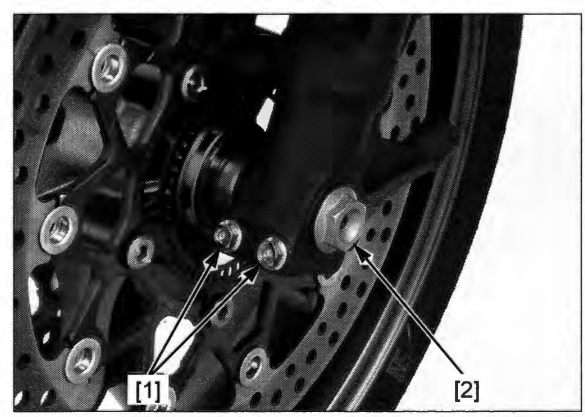
Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.



Loosen the left axle holder bolts [1].

Remove the axle bolt [2].

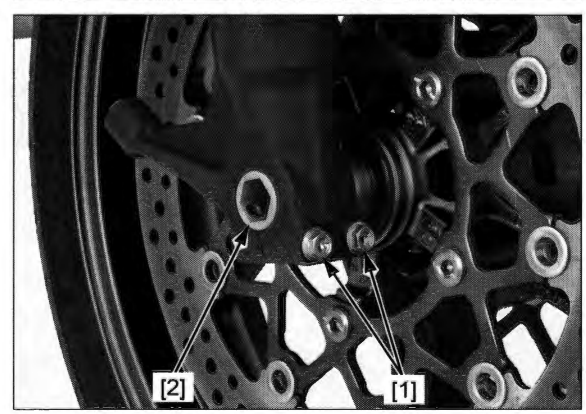
Support the motorcycle securely and raise the front wheel off the ground using a safety stand or a hoist.



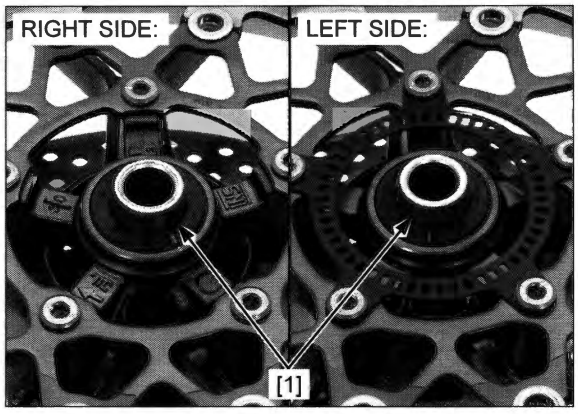
Loosen the right axle holder bolts [1].

Be careful not to damage the pulser ring.

Remove the axle [2] and front wheel.



Remove the right and left side collars [1].



INSPECTION

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Replace the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Inspect the following parts for damage, abnormal wear, deformation or bend.

- Front axle
- Front wheel

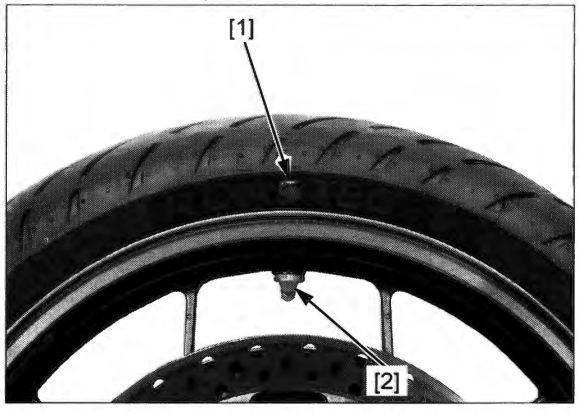
Measure each part according to FRONT WHEEL/ SUSPENSION/STEERING SPECIFICATIONS (page 1-8).

Replace any part if it is out of service limit.

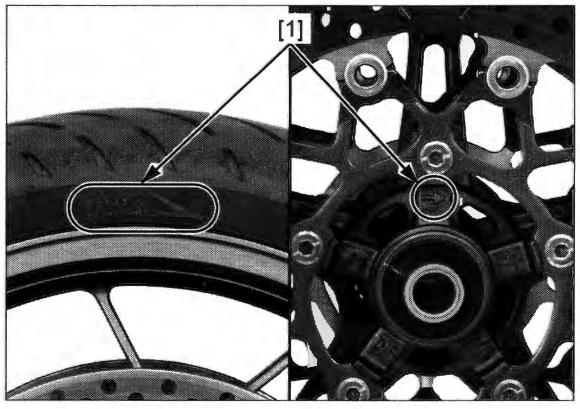
WHEEL BALANCE

NOTE:

- Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance whenever the tire has been removed from the rim.
- For optimum balance, the tire balance mark [1] (a paint dot on the side wall) must be located next to the valve stem [2]. Remount the tire if necessary.



Note the rotating direction (arrow) marks [1] on the tire and wheel upon tire mounting. Always mount the tire onto the wheel with the marks facing in the same direction.

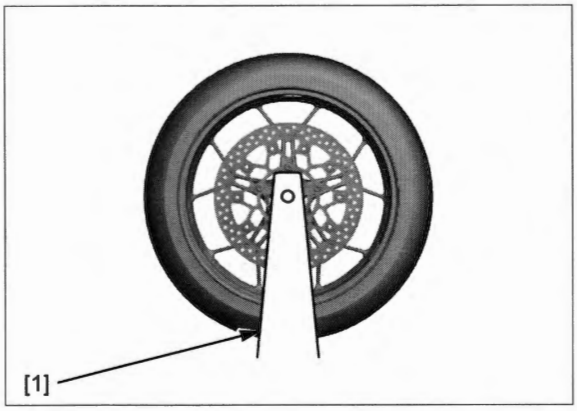


Mount the wheel, tire and brake discs assembly in an inspection stand [1].

Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.

Do this two or three times to verify the heaviest area.

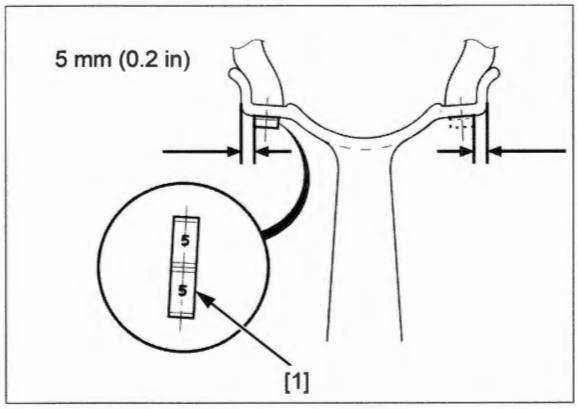
If the wheel is balanced, it will not stop consistently in the same position.



To balance the wheel, install the balance weights [1] on the highest side of the rim, on the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.

Do not add more than 60 g (2.1 oz) to the wheel.

Press the weights by your hands firmly and make sure they are not come off the rim.



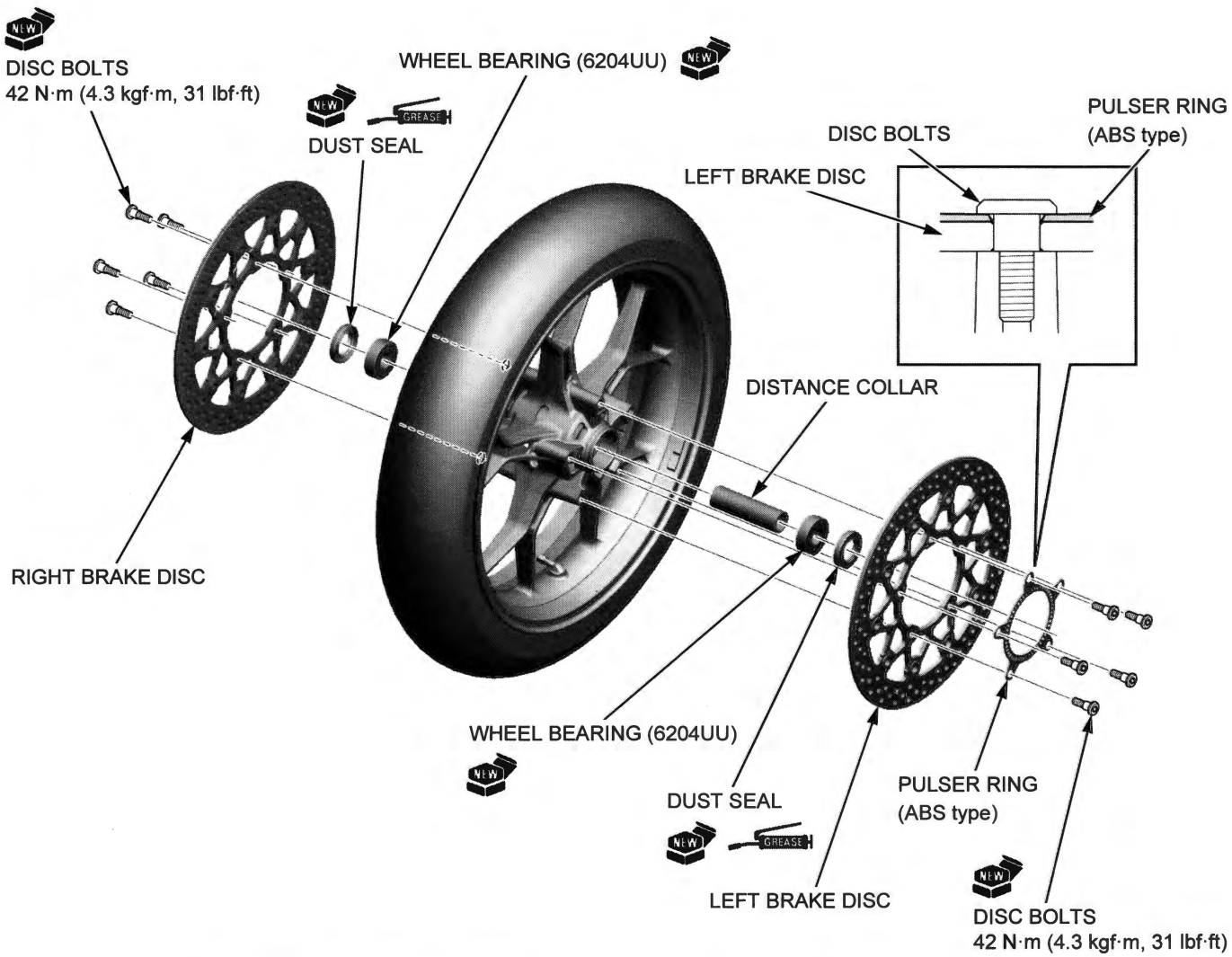
NOTE:

- Stick-type balance weights should be used on this motorcycle. Use genuine Honda balance weights.
  - Before installing the weights, remove any adhesive from the rim thoroughly and clean the area where new weights are to be placed with degreasing agent. Take care not to scratch the rim surface.
  - Do not touch the adhesive surface of the weight with your bare hands when installing.
  - The balance weights are always replaced with new ones whenever they are removed. Do not reuse them.
- The weights are attached to the position at 5 mm (0.2 in) from the side surface of the rim in the direction as shown.
- If the weight exceeds 10 g, install same amount of the balance weights on the right and left symmetrical position.

DISASSEMBLY/ASSEMBLY

Disassemble and assemble the front wheel as following illustration.

- Install each dust seal with the flat side facing out so that it is flush with the wheel hub.
- Install the brake disc with the rotation mark (arrow) facing out.
- Install the pulsar ring with the tapered surface of the bolt hole facing out.



WHEEL BEARING REPLACEMENT

Install the remover head [1] into the bearing.

From the opposite side of the wheel, install the bearing remover shaft [2] and drive the bearing out of the wheel hub.

TOOLS:

Bearing remover head, 20 mm	**07746-0050600**
Bearing remover shaft	**07746-0050100**

Remove the distance collar and drive out the other bearing.

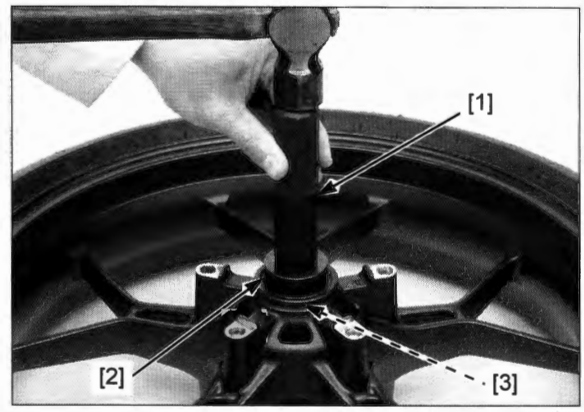
Drive in a new left side bearing squarely with the marked side facing up until it is fully seated.

Install the distance collar.

Drive in a new right side bearing squarely with the marked side facing up until it is fully seated.

TOOLS:

[1] Driver	**07749-0010000**
[2] Attachment, 42 x 47 mm	**07746-0010300**
[3] Pilot, 20 mm	**07746-0040500**



TIRE VALVE REMOVAL/ INSTALLATION

Remove the tire.

Remove the nut [1], tire valve [2] and O-ring [3].

If a puncture repair product was used, thoroughly clean the inside of the wheel rim.

Clean the valve installation area of the rim with a degreasing agent.

Do not apply grease to the O-ring.

Install a new O-ring onto the tire valve.

Gradually screw in the tire valve and position it with the valve neck facing the right of the motorcycle and parallel with the axle.

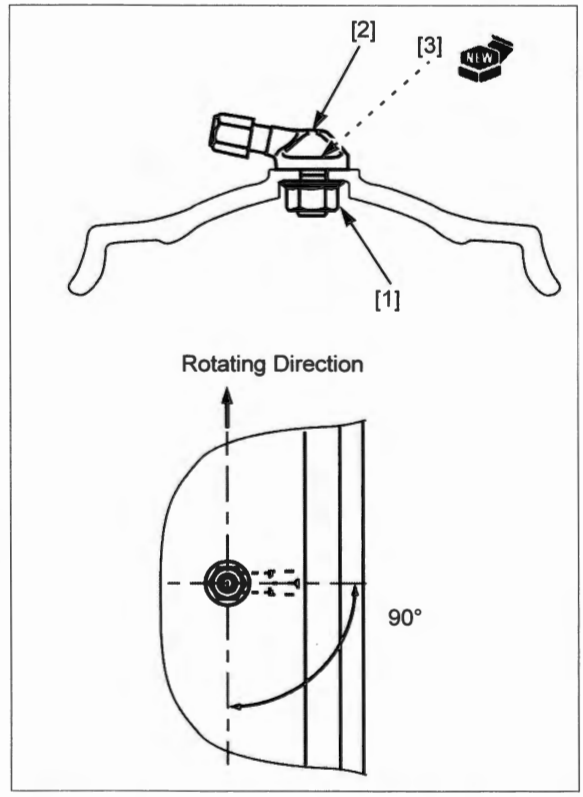
Make sure the valve seating surface is fully seated on the wheel and tighten the valve nut while holding the tire valve.

TORQUE: 6.5 N·m (0.7 kgf·m, 4.8 lbf·ft)

After the tire valve installation, confirm the following items.

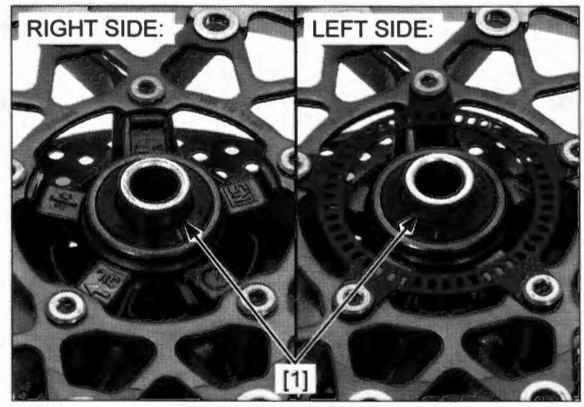
– The tire valve neck is facing to the right side and parallel to the axle direction.

Install the tire.



INSTALLATION

Install the right and left side collars [1].

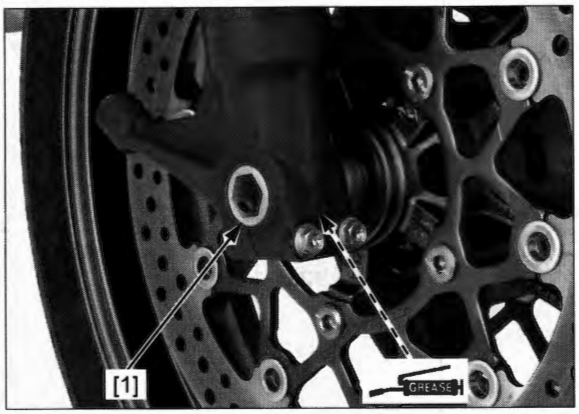


Be careful not to damage the pulser ring.

Install the front wheel between the fork legs.

Apply a thin layer of grease to the front axle surface.

Install the front axle [1] from the right side.



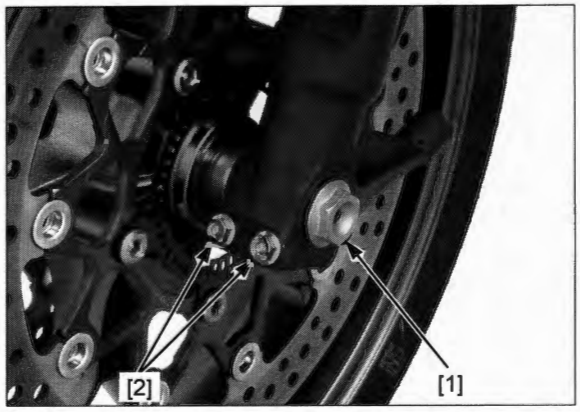
Install the axle bolt [1].

Hold the axle and tighten the axle bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)

Tighten the left axle holder bolts [2] to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Be careful not to damage the brake pads.

Install the brake caliper [1] onto the fork leg so that the disc is positioned between the pads.

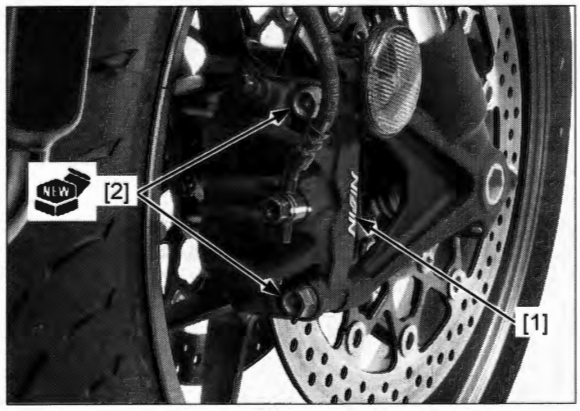
Install new mounting bolts [2] and tighten them to the specified torque.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

Install the other brake caliper.

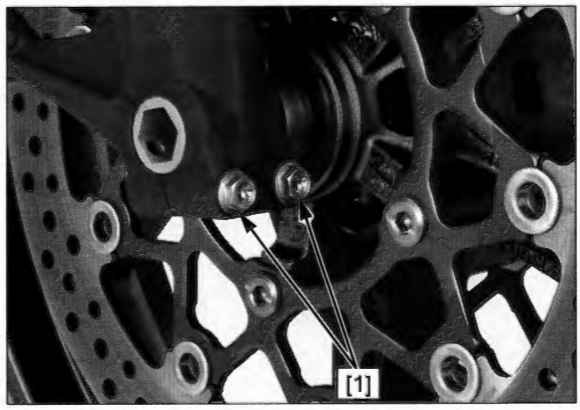
Check the brake operation by applying the brake lever.

With the front brake applied, pump the fork up and down several times to seat the axle.



Tighten the right axle holder bolts [1] to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



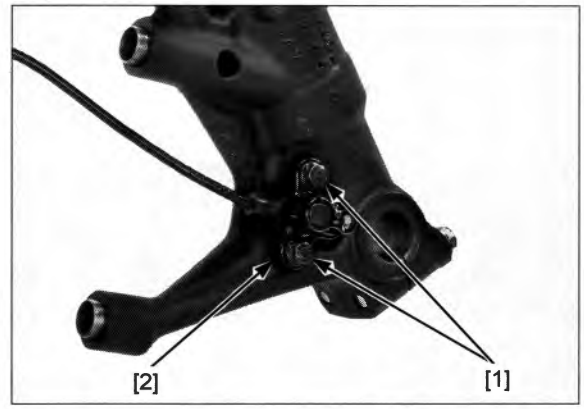
FORK

REMOVAL (CBR650R/RA)

Remove the following:

- Front wheel (page 16-17)
- Front fender (page 2-5)

ABS type: Remove the bolts [1] and front wheel speed sensor guard [2] from the left fork.



Loosen the pinch bolts [1] of the handlebar and top bridge.

Take care not to scratch the cap head.

When the fork leg will be disassembled, loosen the fork cap [1], but do not remove it yet.

Loosen the fork cap, but do not remove it yet.

TOOL:

[2] Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**

Keep the master cylinder reserve tank upright to prevent air from entering the hydraulic system.

While holding the fork leg, loosen the bottom bridge pinch bolts [1]. Pull the fork leg down and remove it out of the fork bridges.

INSTALLATION (CBR650R/RA)

When the fork is disassembled:

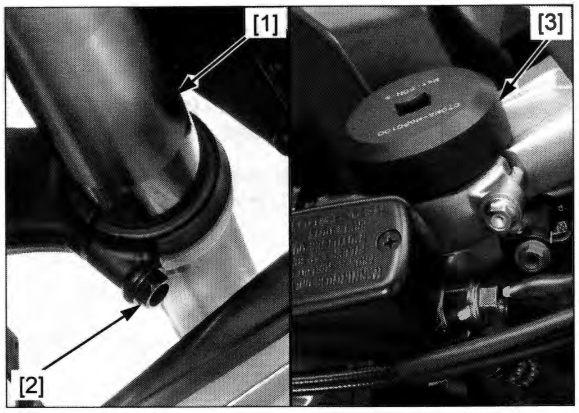
Insert the fork leg [1] into the bottom bridge, handlebar, top bridge and temporarily tighten the pinch bolt [2].

Tighten the fork cap to the specified torque using the special tools.

TOOL:

[3] Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**

TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)



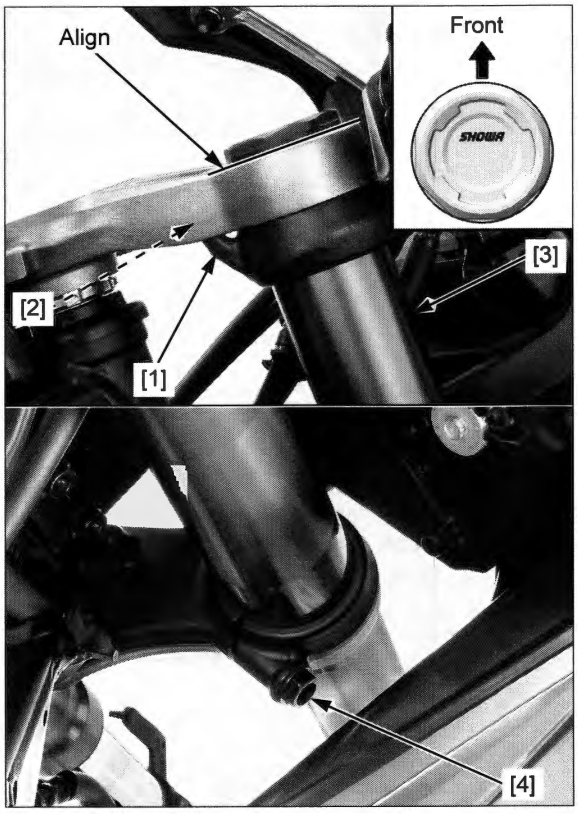
Route the wires, cables and hose properly (page 1-22).

Install the fork leg into the bottom bridge, handlebar and top bridge. Be sure to align the handlebar stopper pin [1] with the hole [2] in the top bridge.

Align the top end of the fork pipe [3] with the upper surface of the top bridge as shown.

Tighten the bottom bridge pinch bolts [4] to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Tighten the top bridge pinch bolt [1] to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the handlebar pinch bolts [2] to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

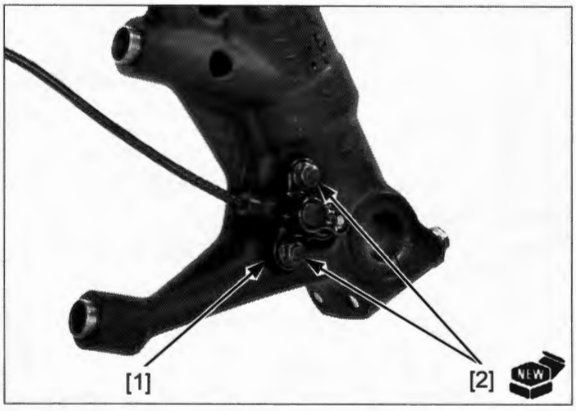
ABS type: Install the front wheel speed sensor guard [1] and new mounting bolts [2] onto the left fork.

NOTE:

- Always replace the front wheel speed sensor guard mounting bolts with new ones.

Install the following:

– Front fender (page 2-5)
– Front wheel (page 16-17)

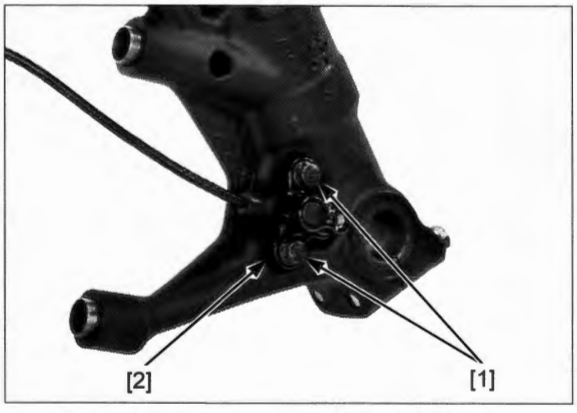


REMOVAL (CB650R/RA)

Remove the following:

– Front wheel (page 16-17)
– Front fender (page 2-5)
– Front turn signal light (page 21-5)

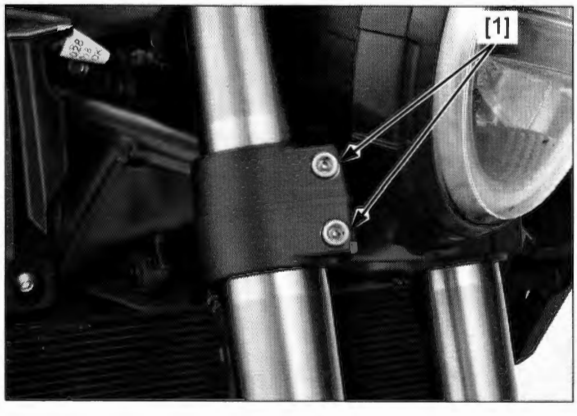
ABS type: Remove the bolts [1] and front wheel speed sensor guard [2] from left fork.



Loosen the pinch bolt [1] of the top bridge.

Keep the master cylinder reserve tank upright to prevent air from entering the hydraulic system.

While holding the fork leg, loosen the bottom bridge pinch bolts [1]. Pull the fork leg down and remove it out of the fork bridges.



If it is necessary to disassemble the fork leg, perform the following procedure:

Keep the master cylinder reserve tank upright to prevent air from entering the hydraulic system.

- Remove the handlebar (page 16-11)
- Loosen the pinch bolt of the top bridge (page 16-25)

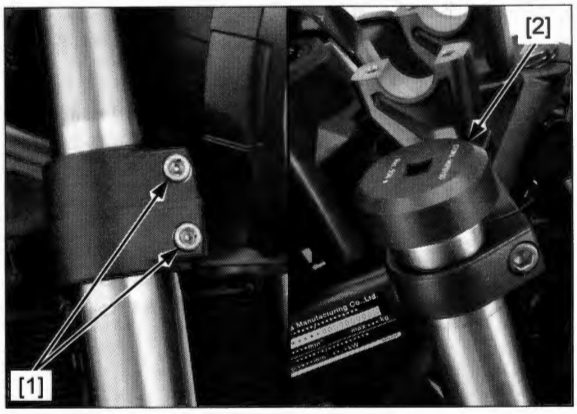
While holding the fork leg, loosen the bottom bridge pinch bolts [1]. Lift up the fork leg and tighten the pinch bolts.

Take care not to scratch the cap head.

Loosen the fork cap, but do not remove it yet.

TOOL:

[2] Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**



INSTALLATION (CB650R/RA)

When the fork is disassembled:

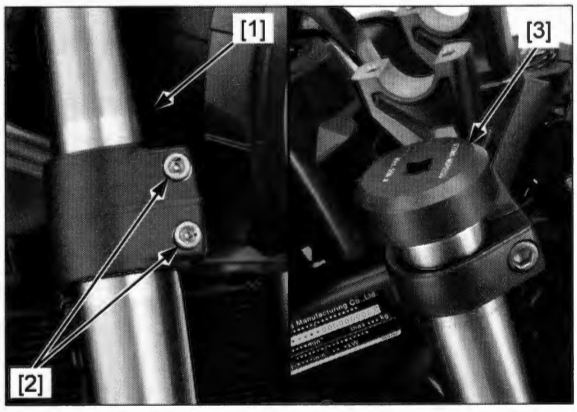
Insert the fork leg [1] into the bottom bridge, top bridge and temporarily tighten the pinch bolt [2].

Tighten the fork cap to the specified torque using the special tools.

TOOL:

[3] Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**

TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)



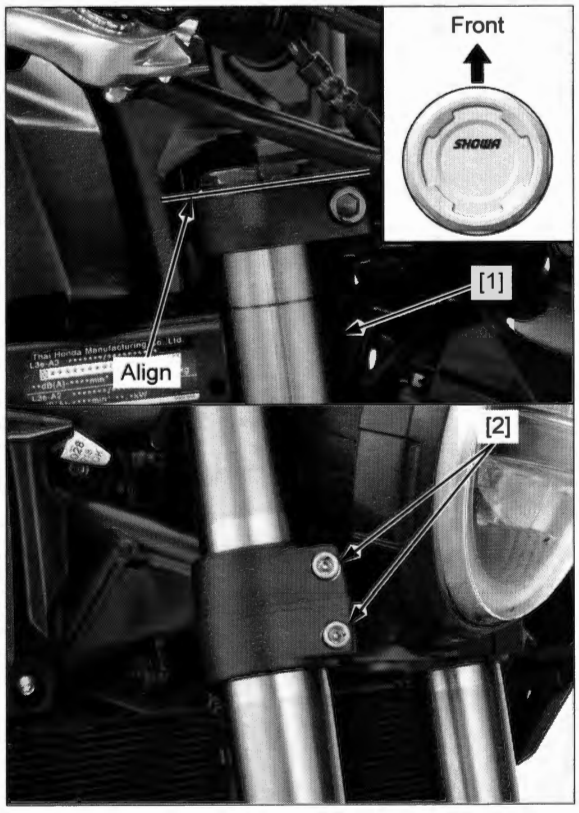
Route the wires, cables and hose properly (page 1-22).

Install the fork leg into the bottom bridge and top bridge.

Align the top end of the fork pipe [1] with the upper surface of the top bridge as shown.

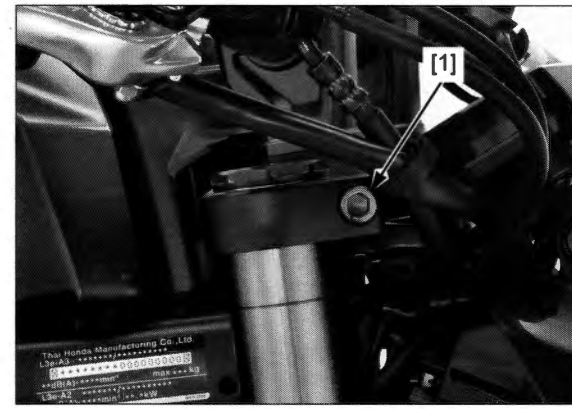
Tighten the bottom bridge pinch bolts [2] to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Tighten the top bridge pinch bolt [1].

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



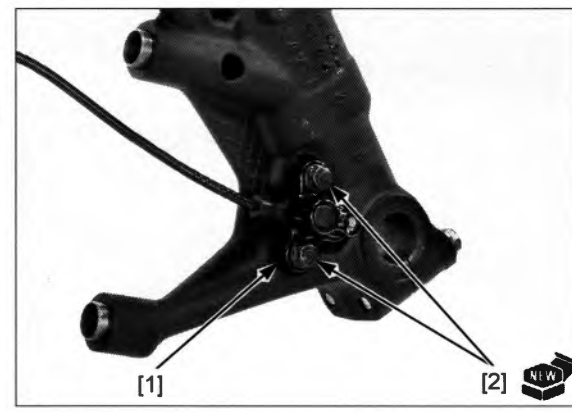
ABS type: Install the front wheel speed sensor guard [1] and new mounting bolts [2] onto the left fork.

NOTE:

- Always replace the front wheel speed sensor guard mounting bolts with new ones.

Install the following:

- Front fender (page 2-5)
- Front wheel (page 16-17)
- Front turn signal light (page 21-5)
- Handlebar (page 16-13)



DISASSEMBLY

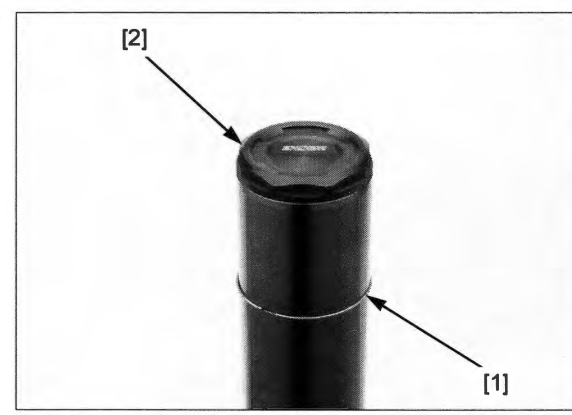
RIGHT SIDE

Remove the stopper ring [1] being careful not to scratch the outer tube (CBR650R/RA).

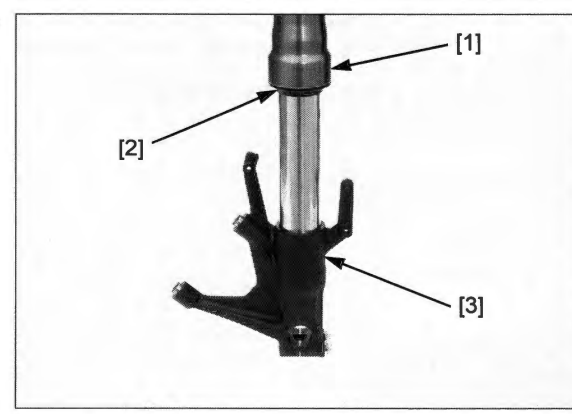
Remove the fork cap [2] with the special tool.

TOOL:

Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**



Push the outer tube [1] slowly down, and gently seat the dust seal [2] onto the axle holder [3].



Attach the special tool to the spring collar holes [1].

TOOL:

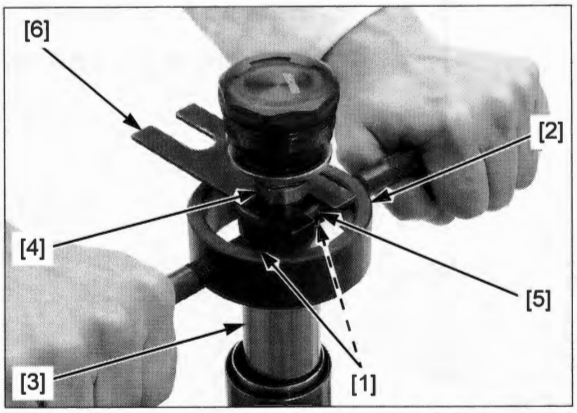
[2] Spring collar holder	**070MF-MBZC110 or 07AMC-MFJA100 (U.S.A. only)**

Compress the spring collar [3] with the spring collar holder.

Insert the special tool between the lock nut [4] and spring seat stopper [5].

TOOL:

[6] Stopper plate	**070MF-MBZC130 or 07AMB-KZ3A100 (U.S.A. only)**

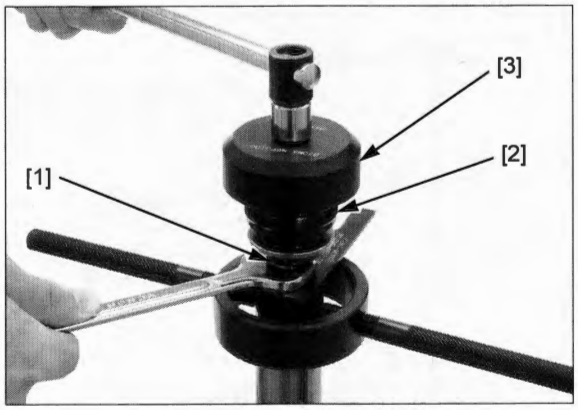


Be careful not to damage the fork cap when loosening it.

Loosen the lock nut [1] while holding the fork cap [2] with the special tool.

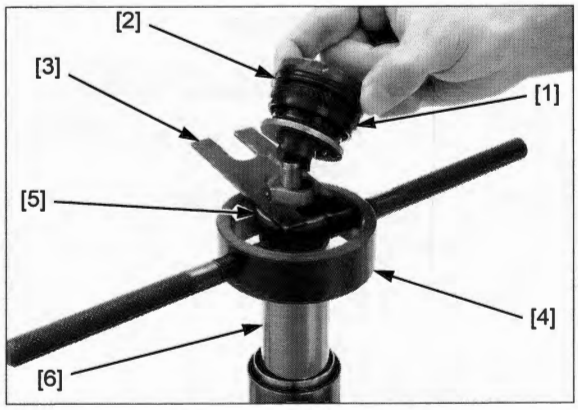
TOOL:

[3] Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**



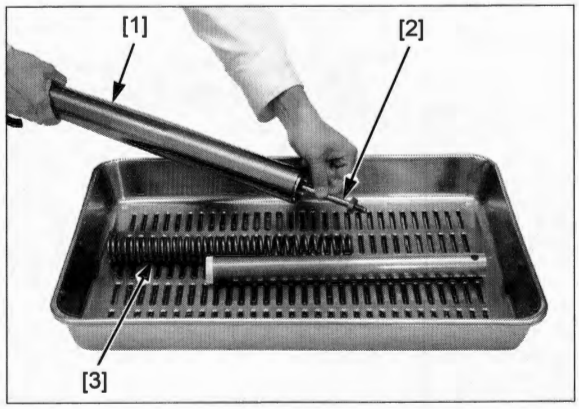
Remove the following:

- Fork cap assembly [1]
- O-ring [2]
- Stopper plate [3]
- Spring collar holder [4]
- Spring seat stopper [5]
- Spring collar [6]



Pour out the fork fluid by pumping the outer tube [1] several times.
Pour out the fork fluid from the fork damper by pumping the damper rod [2] several times.

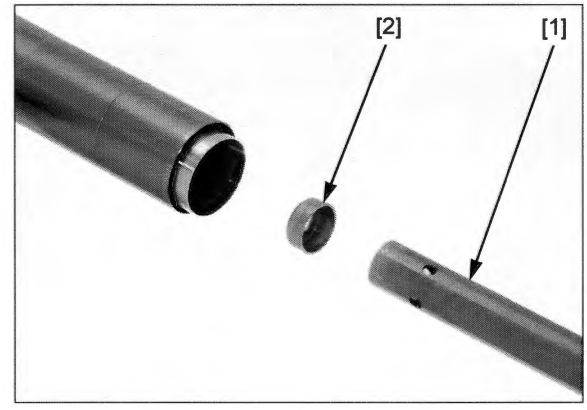
Remove the Fork spring [3].



Hold the axle holder in a vise with soft jaws or a shop towel.

Remove the fork socket bolt [1] and sealing washer [2].

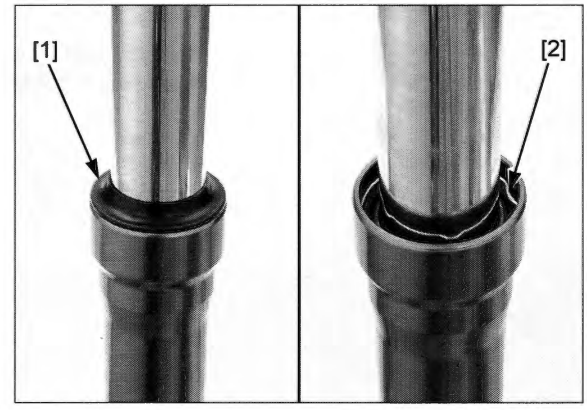
Remove the fork damper assembly [1] and centering plate [2].



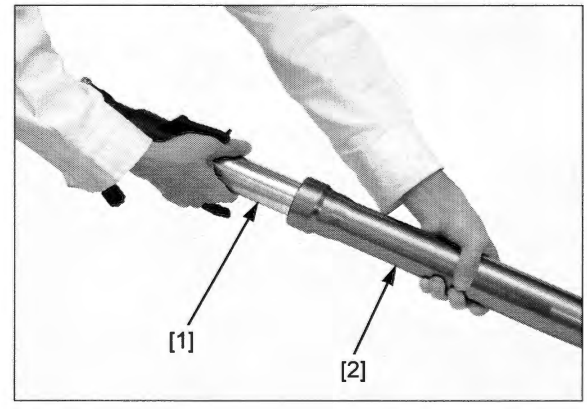
Remove the dust seal [1].

Be careful not to scratch the slide pipe sliding surface.

Remove the oil seal stopper ring [2].



Pull the slide pipe assembly [1] out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the outer tube [2] separates from the slide pipe assembly.
The guide bushing will be forced out by the slider bushing.

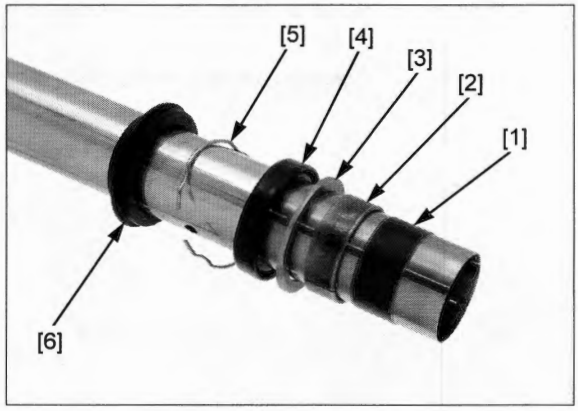


Do not damage the slider bushing, especially the sliding surface. To prevent loss of tension, do not open the slider bushing more than necessary.

Carefully remove the slider bushing [1] by prying the slot with a screwdriver until the slider bushing can be pulled off by hand.

Remove the following:

- Guide bushing [2]
- Back-up ring [3]
- Oil seal [4]
- Stopper ring [5]
- Dust seal [6]



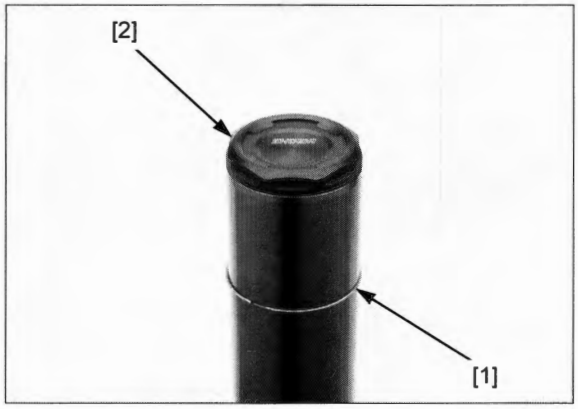
LEFT SIDE

Remove the stopper ring [1] being careful not to scratch the outer tube (CBR650R/RA).

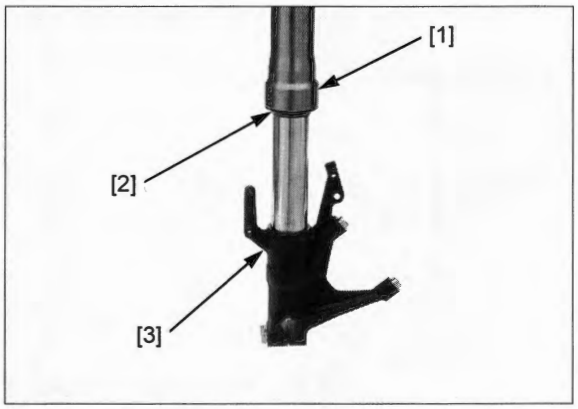
Remove the fork cap [2] with the special tool.

TOOL:

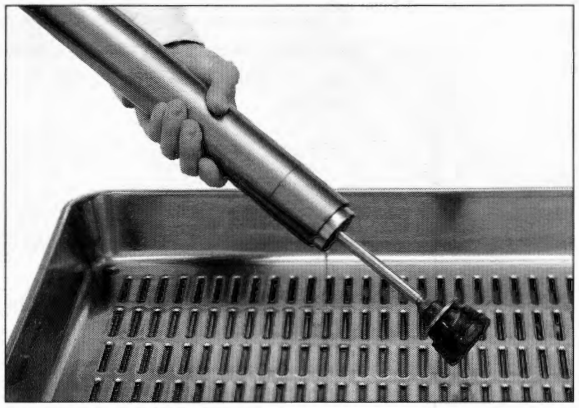
Fork cap wrench	**070MA-MGP0100 or 07AMA-MGPA100 (U.S.A. only)**



Push the outer tube [1] slowly down, and gently seat the dust seal [2] onto the axle holder [3].

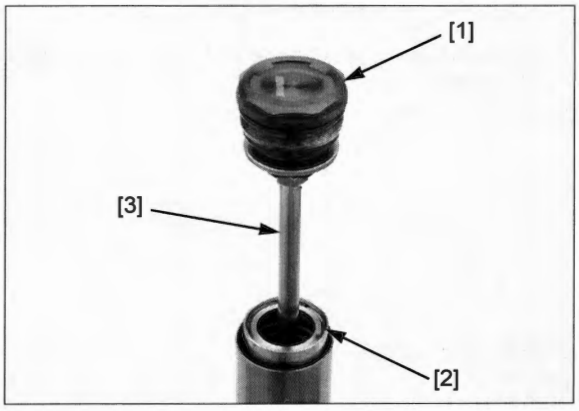


Pour out the fork fluid by pumping the outer tube up and down several times.



Push the fork cap [1] down and compress the fork spring, then remove the stopper ring [2] from the groove in the fork pipe.

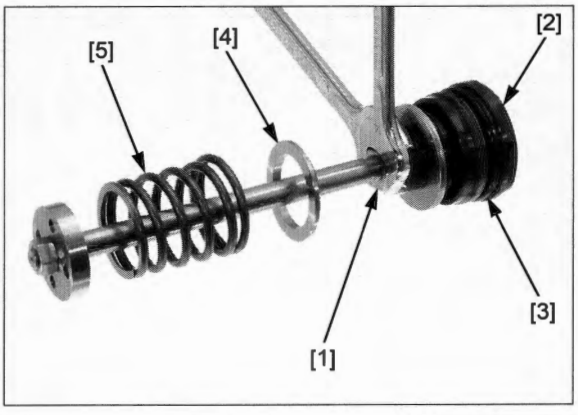
Remove the fork rod assembly [3].



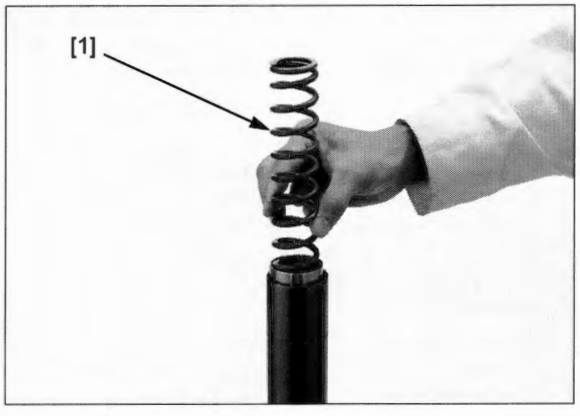
Loosen the lock nut [1] while holding the fork cap [2], then remove the fork cap.

Remove the O-ring [3] from the fork cap groove.

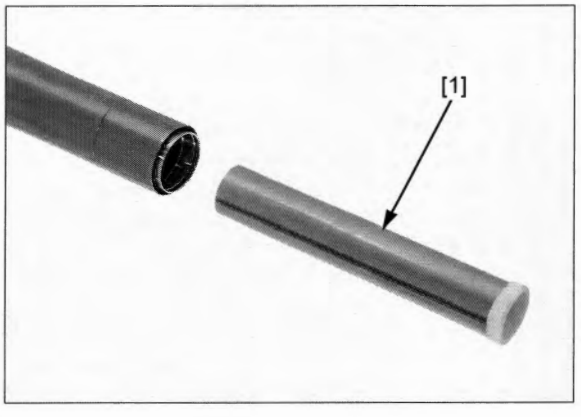
Remove the spring seat [4] and rebound spring [5].



Remove the fork spring [1].



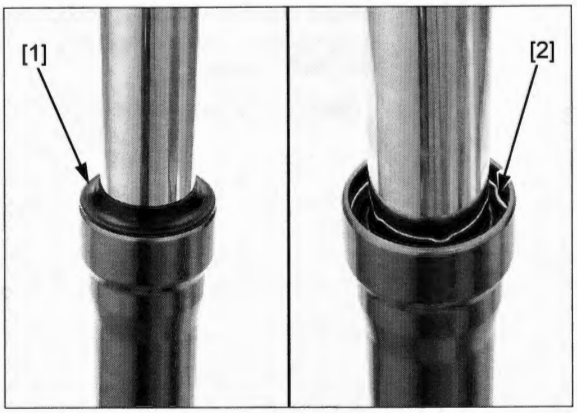
Remove the spring collar [1].



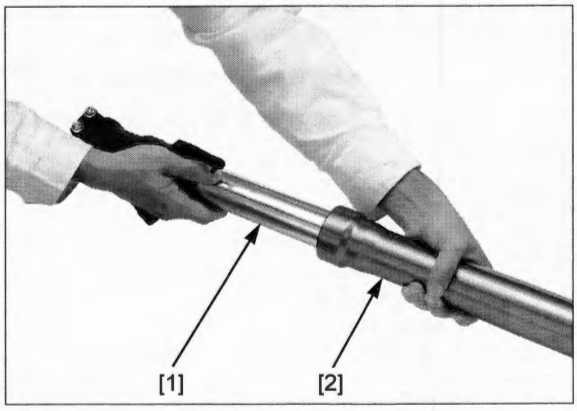
Remove the dust seal [1].

Be careful not to scratch the slide pipe sliding surface.

Remove the oil seal stopper ring [2].



Pull the slide pipe assembly [1] out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the outer tube [2] separates from the slide pipe assembly.
The guide bushing will be forced out by the slider bushing.

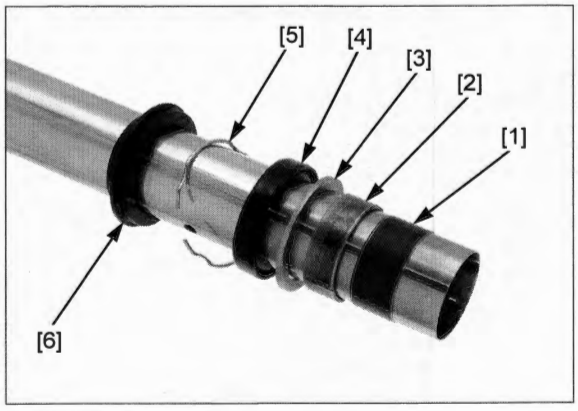


Do not damage the slider bushing, especially the sliding surface. To prevent loss of tension, do not open the slider bushing more than necessary.

Carefully remove the slider bushing [1] by prying the slot with a screwdriver until the slider bushing can be pulled off by hand.

Remove the following:

- Guide bushing [2]
- Back-up ring [3]
- Oil seal [4]
- Stopper ring [5]
- Dust seal [6]



INSPECTION

Inspect the following parts for damage, abnormal wear, bend, deformation, scoring and teflon coating wear.

- Fork tube
- Fork slider
- Fork spring
- Rebound spring
- Spring collar
- Fork piston
- Centering plate
- Guide bushing
- Fork tube bushing
- Back-up ring

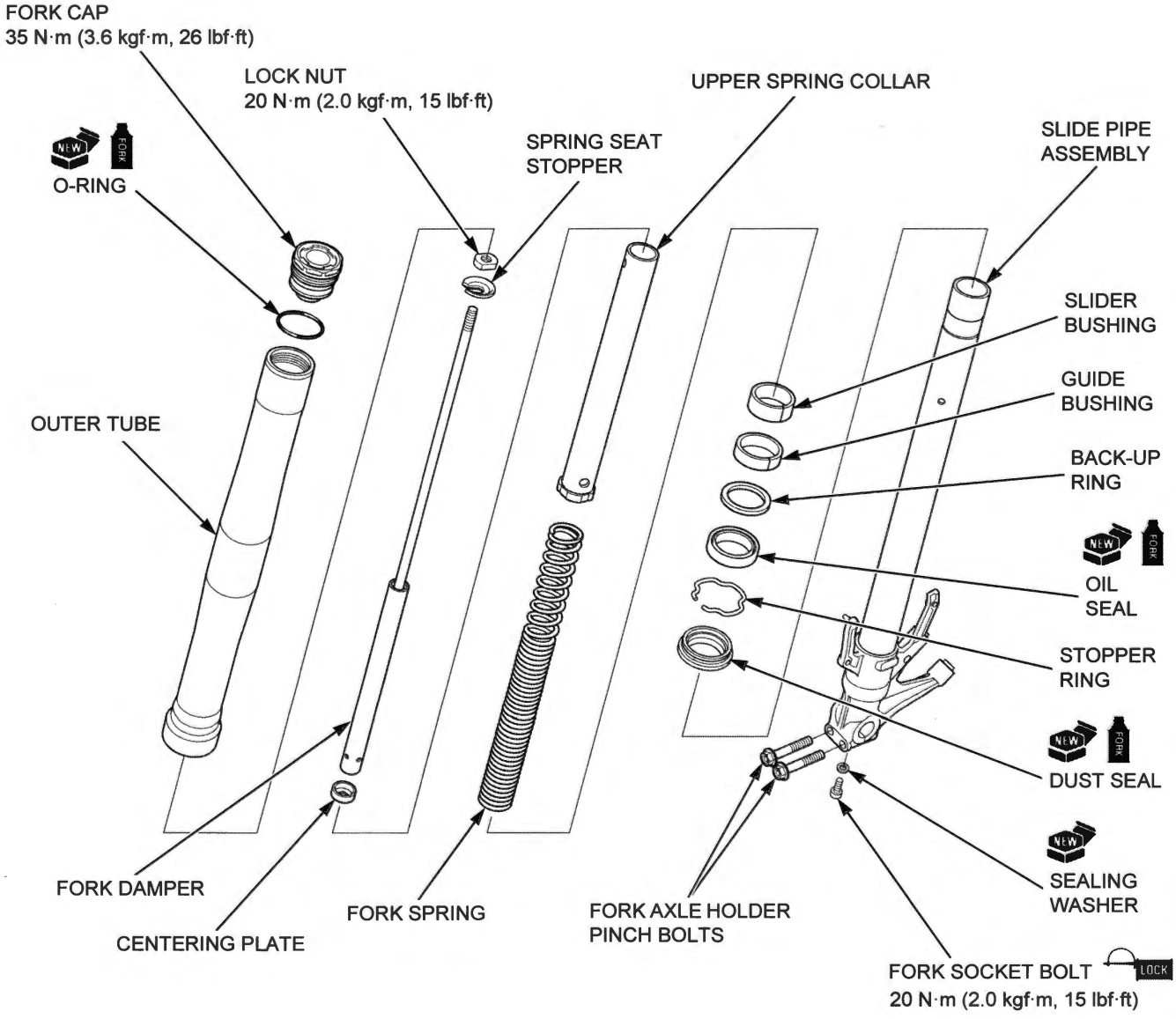
Measure each part according to FRONT WHEEL/ SUSPENSION/STEERING SPECIFICATIONS (page 1-8).

Replace any part if it is out of service limit.

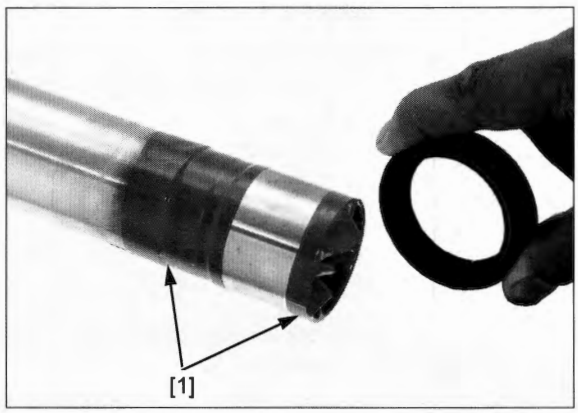
ASSEMBLY

RIGHT SIDE

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



- Before assembly, wash all parts with a high flash point or non-flammable solvent and blow them dry.
- When installing the fork dust seal and oil seal, wrap the edge and groove of the slide pipe with tape [1].



Apply fork fluid to new dust seal and oil seal lips.

Install the oil seal with its marked side facing toward the axle holder.

Install the dust seal [1], stopper ring [2] and oil seal [3].

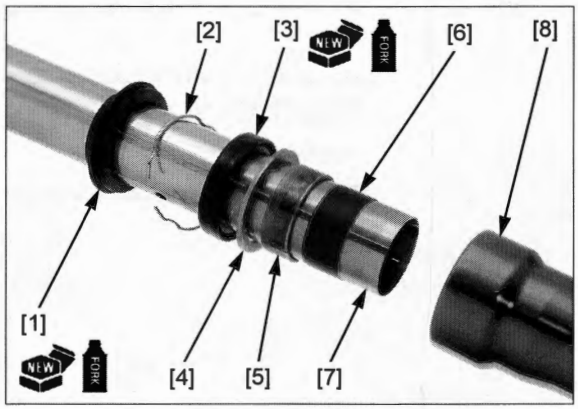
Install the back-up ring [4], guide bushing [5].

Install the slider bushing [6] if it is removed.

NOTE:

- Remove any burrs from the bushing mating surface, being careful not to peel off the coating.
- Do not open the slider bushing slit more than necessary.

Install the slide pipe assembly [7] into the outer tube [8].



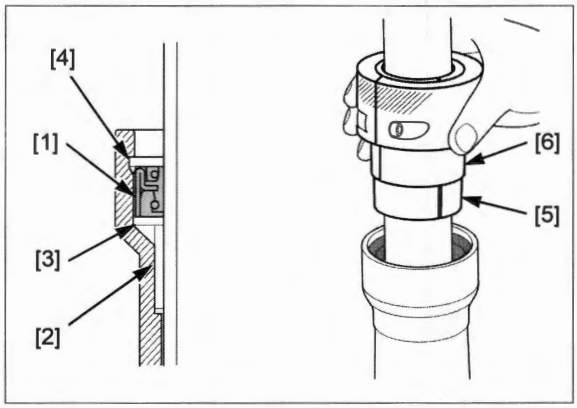
Drive the oil seal [1] with the guide bushing [2] and back-up ring [3] into the outer tube until the stopper ring groove [4] is visible using the special tools.

TOOL:

[5] Fork seal driver attachment	**07RMD-MW40100**
[6] Fork seal driver, 45.2 mm	**07KMD-KZ30100**

U.S.A. TOOLS:

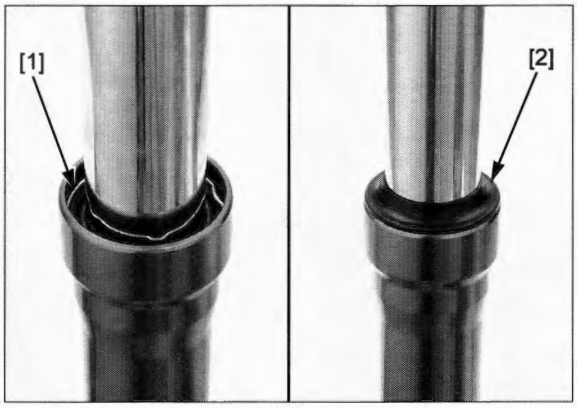
Fork seal driver, 45 mm	**07KMD-KZ3010A**



Do not scratch the fork pipe sliding surface.

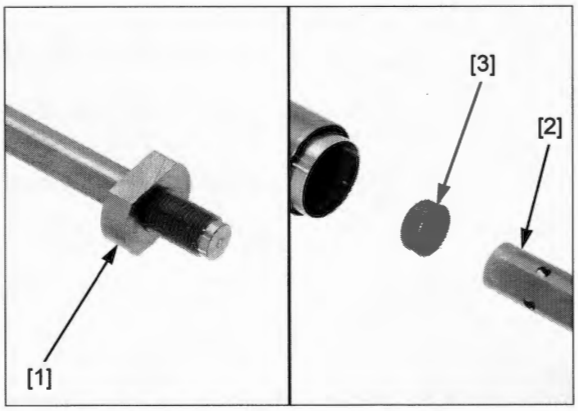
Install the stopper ring [1] into the groove securely.

Install the dust seal [2].



Install and tighten the lock nut [1] until it stops.

Install the fork damper assembly [2] and centering plate [3].



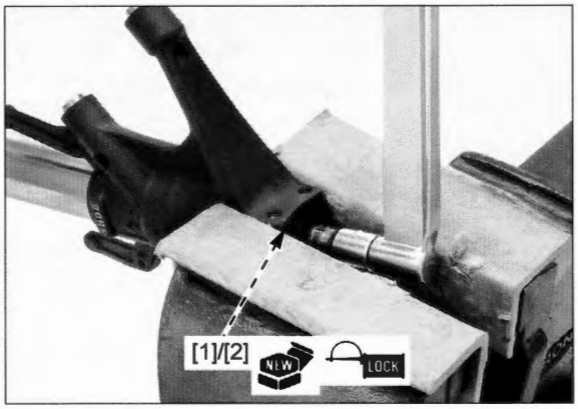
Clean and apply looking agent to the fork socket bolt threads.

Install the socket bolt [1] with a new sealing washer [2].

Hold the axle holder in a vise with soft jaws or a shop towel.

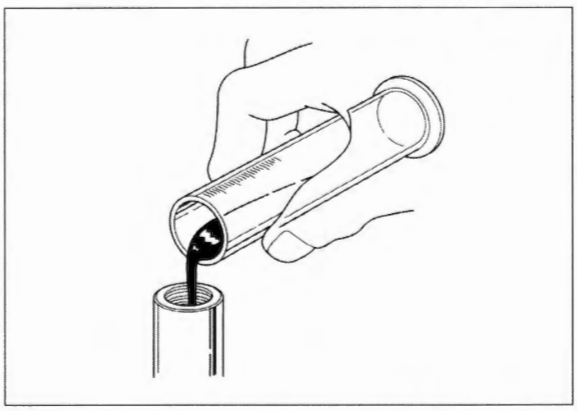
Tighten the socket bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)



Pour the specified amount of recommended fork fluid.

RECOMMENDED FORK FLUID:
Fork Fluid (viscosity: 10W)
FORK FLUID CAPACITY:
416 ± 2.5 cm³ (14.1 ± 0.08 US oz, 17.8 ± 0.09 Imp oz)



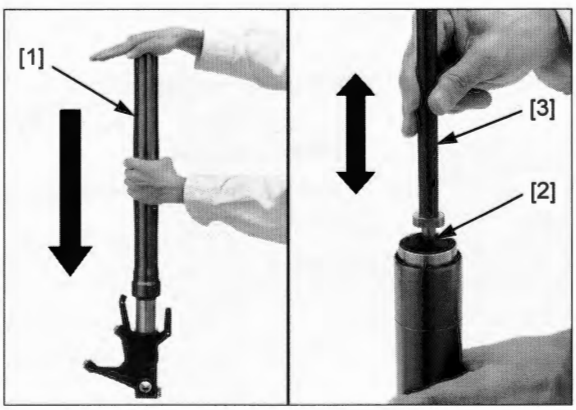
Bleed the air from the fork as follows:

1. Extend the fork, cover the top of the outer tube [1] with your hand and compress the fork slowly.
2. Remove your hand and extend the fork slowly.

   Repeat above procedure 2 or 3 times.
3. Install the special tool to the fork damper rod [2].

   TOOL:
   [3] Damper rod holder **070MF-MBZC120 or 070MF-MBZA120 (U.S.A. only)**

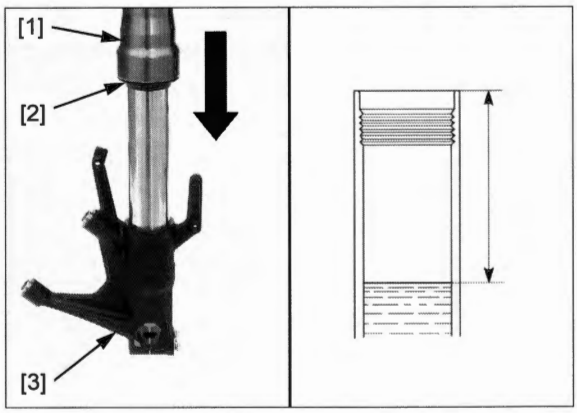
   Pump the fork damper rod slowly 8 – 10 times.



Slowly push the outer tube [1], and gently seat the dust seal [2] onto the axle holder [3] and leave it for 5 minutes.

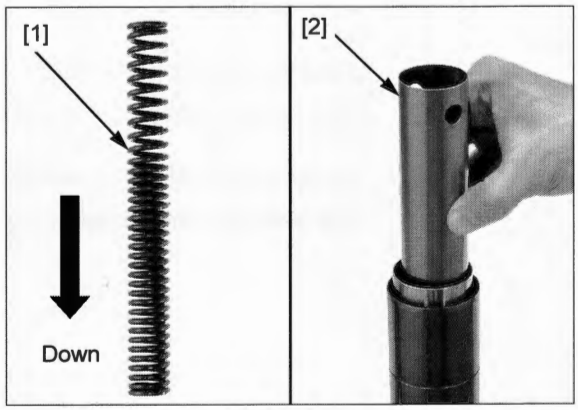
After the oil level stabilizes, measure the oil level from the top of the outer tube.

FORK FLUID LEVEL: 168 mm (6.6 in)



Install the fork spring [1] into the slide pipe assembly with the tightly wound side facing down.

Install the spring collar [2].



Attach the special tool to the spring collar holes [1].

TOOL:

[2] Spring collar holder	**070MF-MBZC110 or 07AMC-MFJA100 (U.S.A. only)**

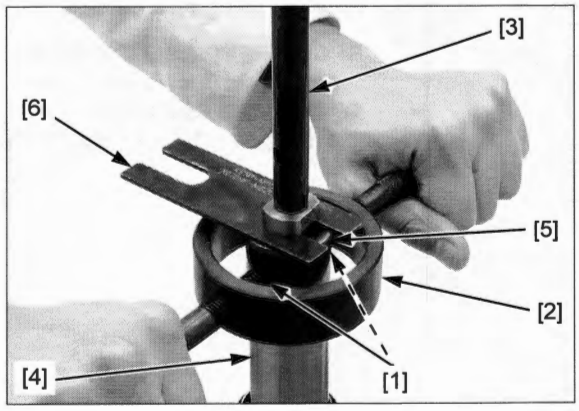
While pulling the damper rod holder [3] up, compress the spring collar [4] with the special tool.

Install the spring seat stopper [5].

Insert the special tool between the lock nut and spring seat stopper.

TOOL:

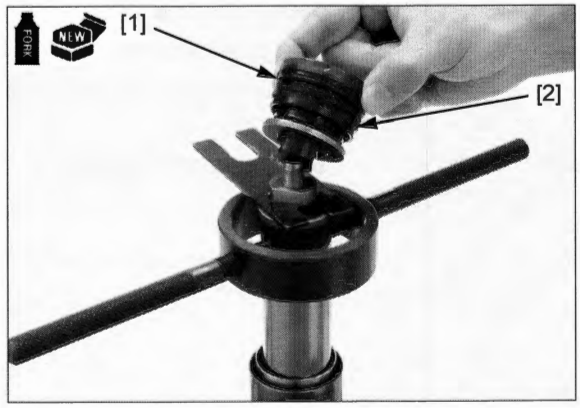
[6] Stopper plate	**070MF-MBZC130 or 07AMB-KZ3A100 (U.S.A. only)**



Remove the damper rod holder.

Apply fork fluid to a new O-ring [1] and install it to the fork cap assembly.

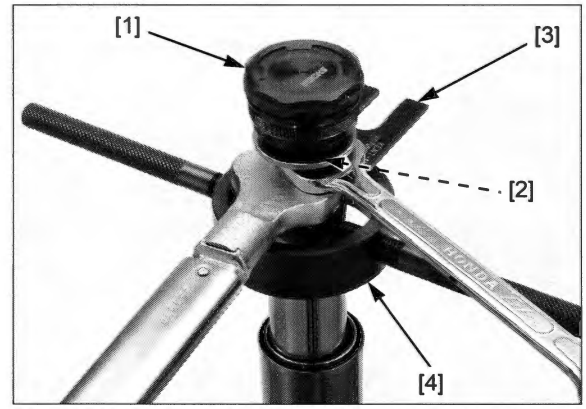
Install the fork cap [2] assembly to the fork damper until it is fully seated.



Hold the fork cap [1] then tighten the fork rod lock nut [2] to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)

Remove the stopper plate [3] and spring collar holder [4].

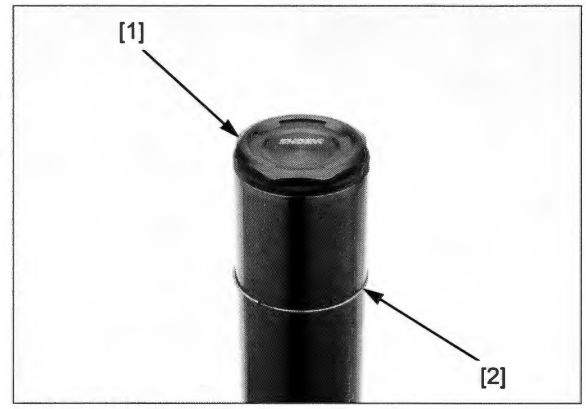


Completely extend the outer tube.

Install and tighten the fork cap [1] into the outer tube.

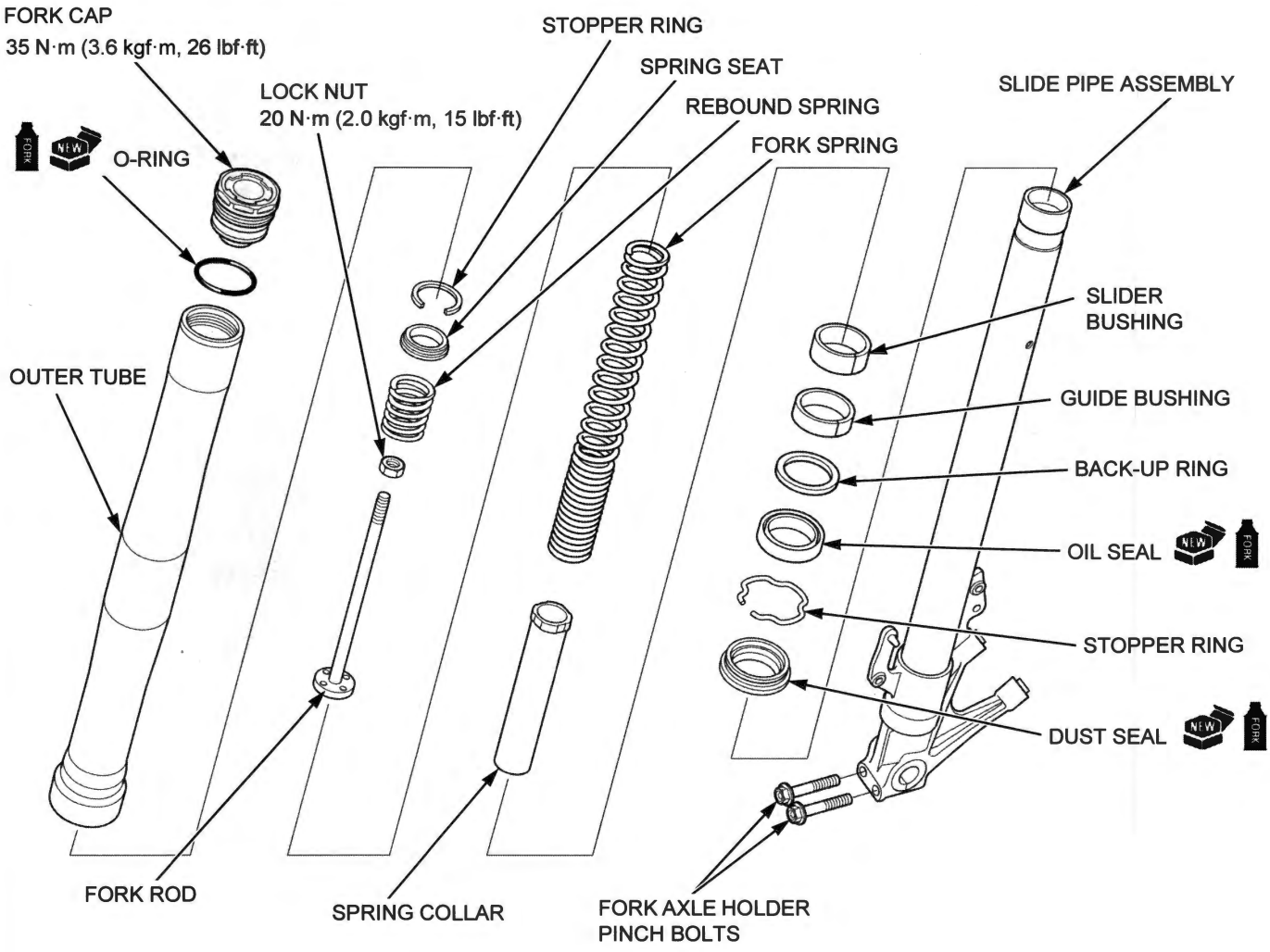
Install the stopper ring [2] being careful not to scratch the outer tube (CBR650R/RA).

Tighten the fork cap to the specified torque after installing the fork leg into the steering stem (page 16-23).

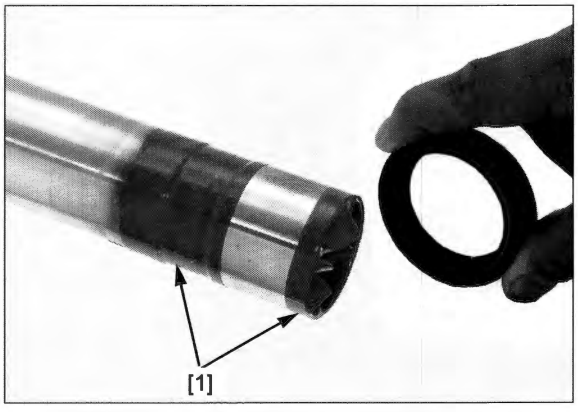


LEFT SIDE

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



When installing the fork dust seal and oil seal, wrap the edge and groove of the slide pipe with tape [1].



Apply fork fluid to new dust seal and oil seal lips.

Install the oil seal with its marked side facing toward the axle holder.

Install the dust seal [1], stopper ring [2] and oil seal [3].

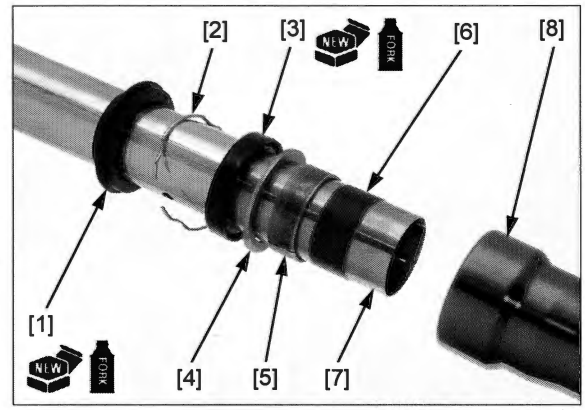
Install the back-up ring [4], guide bushing [5].

Install the slider bushing [6] if it is removed.

NOTE:

- Remove any burrs from the bushing mating surface, being careful not to peel off the coating.
- Do not open the slider bushing slit more than necessary.

Install the slide pipe assembly [7] into the outer tube [8].



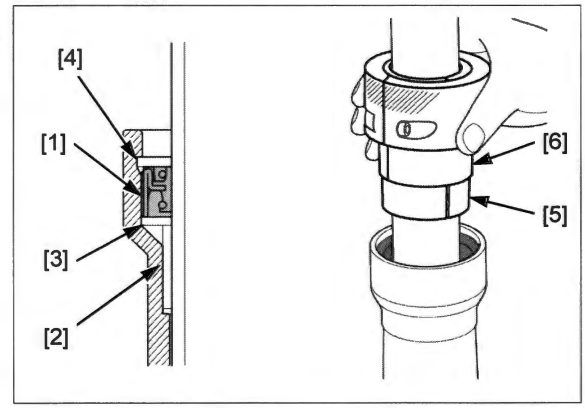
Drive the oil seal [1] with the guide bushing [2] and back-up ring [3] into the outer tube until the stopper ring groove [4] is visible using the special tools.

TOOL:

[5] Fork seal driver attachment	**07RMD-MW40100**
[6] Fork seal driver, 45.2 mm	**07KMD-KZ30100**

U.S.A. TOOLS:

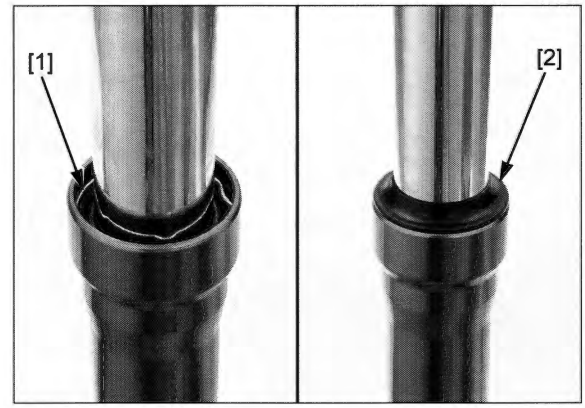
Fork seal driver, 45 mm	**07KMD-KZ3010A**



Do not scratch the fork pipe sliding surface.

Install the stopper ring [1] into the groove securely.

Install the dust seal [2].



Pour the specified amount of recommended fork fluid into the fork pipe.

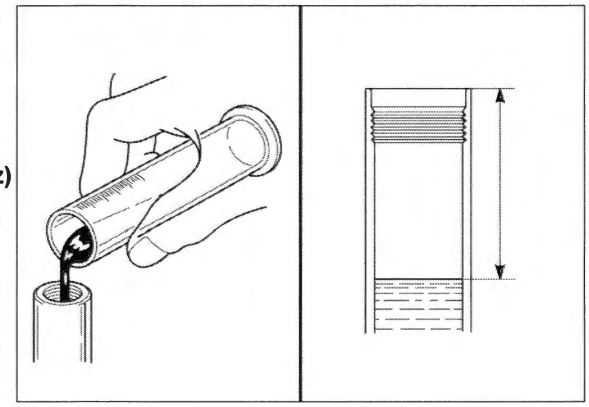
RECOMMENDED FORK FLUID:
Fork Fluid (viscosity: 10W)
FORK FLUID CAPACITY:
507 ± 2.5 cm³ (17.1 ± 0.08 US oz, 17.8 ± 0.09 Imp oz)

Slowly pump the fork pipe several times to remove the trapped air from the lower portion of the fork pipe.

Compress the fork pipe fully and leave it for 5 minutes to remove air bubbles from the fluid.

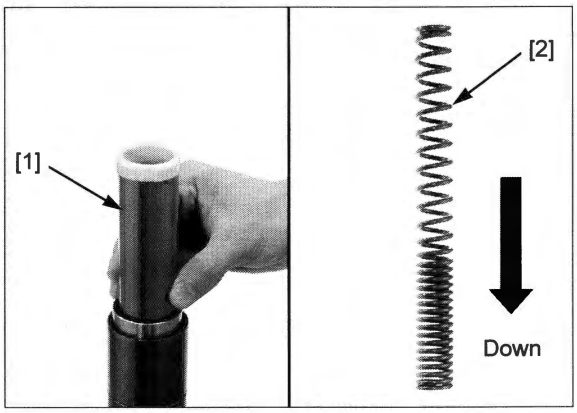
Measure the oil level from the top of the fork pipe by supporting the fork leg vertically.

FORK OIL LEVEL: 150 mm (5.9 in)



Install the spring collar [1].

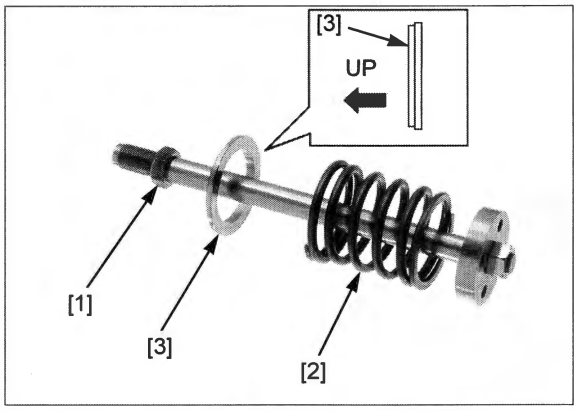
Install the fork spring [2] into the slide pipe assembly with the tightly wound side facing down.



Tighten the lock nut [1] until it stops.

Install the rebound spring [2] to the fork rod.

Install the spring seat [3] in the shown direction.

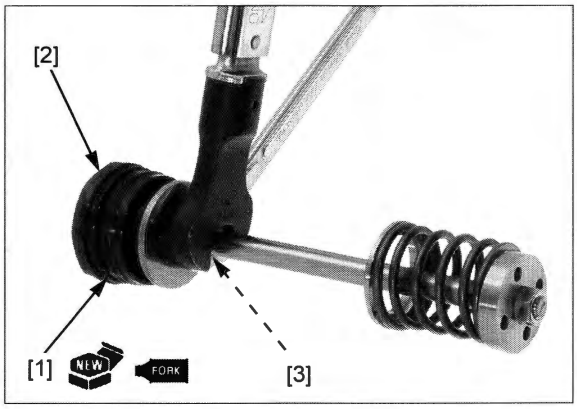


Apply recommended fork oil to a new O-ring [1], and install it to the fork cap [2].

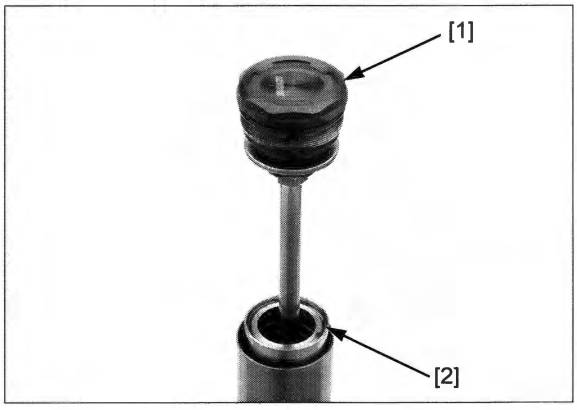
Install the fork cap to the fork rod and tighten it until it stops.

Hold the fork cap then tighten the fork rod lock nut [3] to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)



Push the fork cap [1] down and compress the fork spring, then install the stopper ring [2] into the groove in the fork pipe.

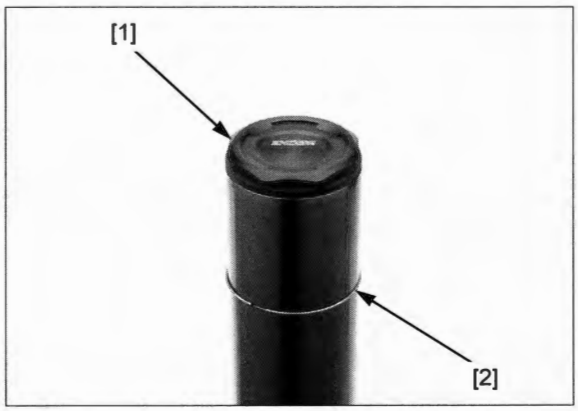


Completely extend the outer tube.

Install and tighten the fork cap [1] into the outer tube.

Install the stopper ring [2] being careful not to scratch the outer tube (CBR650R/RA).

Tighten the fork cap to the specified torque after installing the fork leg into the steering stem (page 16-23).



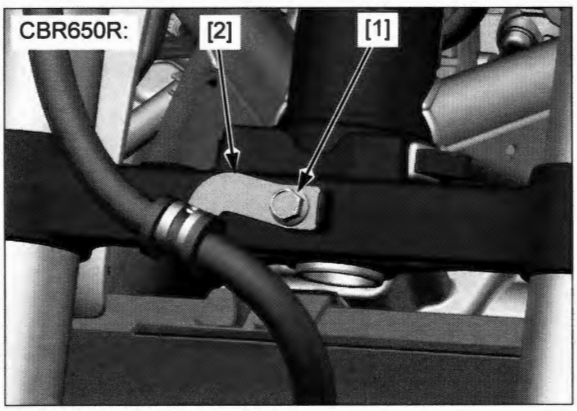
STEERING STEM

REMOVAL

CBR650R: Remove the bolt [1] and brake hose clamp [2] from the bottom bridge.

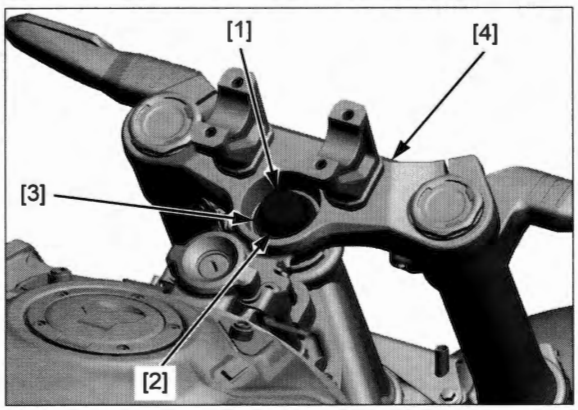
CBR650R/RA: Remove the following:

- Handlebars (page 16-7)
- Fork legs (page 16-23)

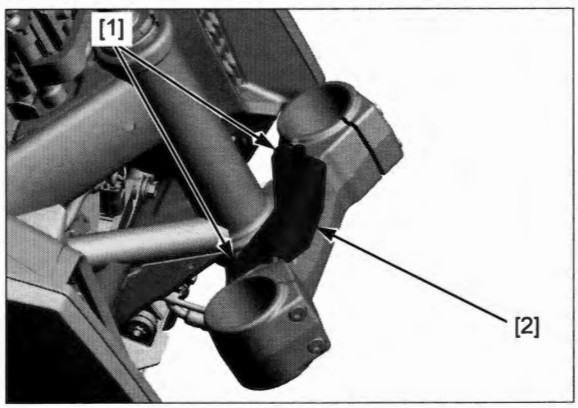


CB650R/RA: Remove the following:

- Handlebar (page 16-7)
- Headlight (page 21-4)
- Combination meter (page 21-7)
- Ignition switch cover (page 21-15)
- Cap [1]
- Steering stem nut [2]
- Washer [3]
- Top bridge [4]
- Fork legs (page 16-25)

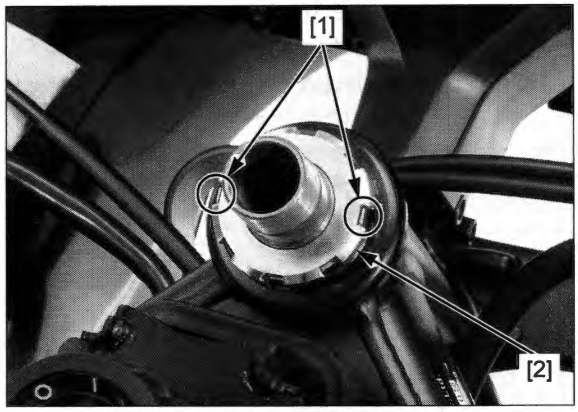


CB650R/RA: Remove the bolts [1] and headlight lower stay [2].



Straighten the lock washer tabs [1].

Remove the lock nut [2] and lock washer.

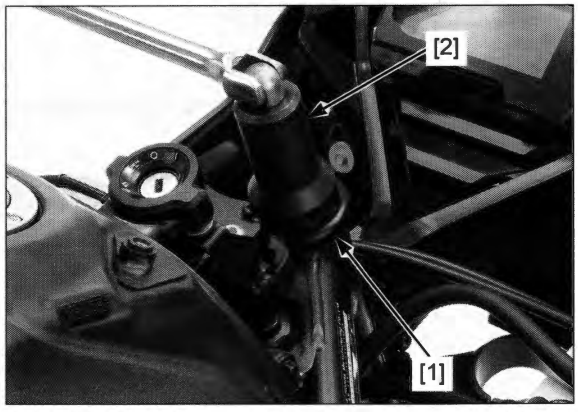


Loosen the steering bearing adjustment nut [1] using the special tool.

TOOL:

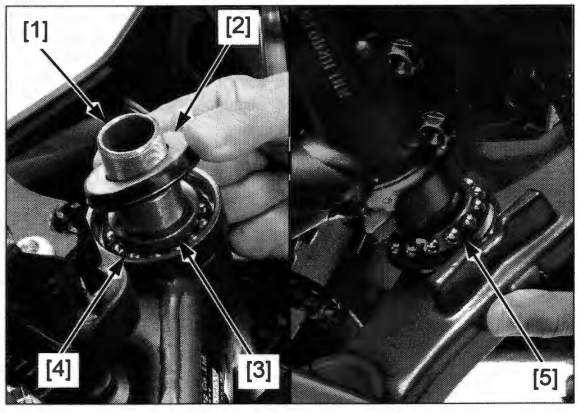
[2] Steering stem socket	**07916-3710101**

While holding the steering stem, remove the adjustment nut.



Remove the following:

- Steering stem [1]
- Upper dust seal [2]
- Upper inner race [3]
- Upper steering bearing [4]
- Lower steering bearing [5]



BEARING REPLACEMENT

Always replace the bearing and races as a set.

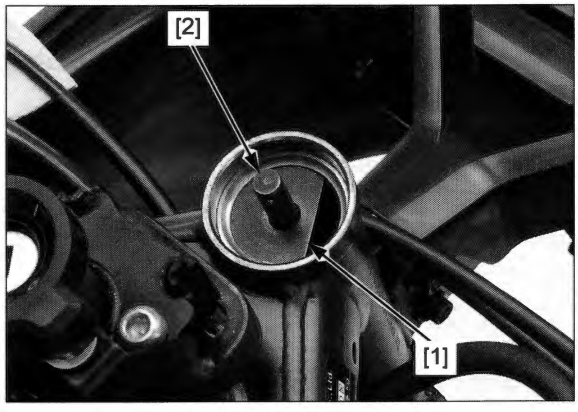
Remove the upper outer race using the special tools.

TOOLS:

Ball race remover set	**07953-MJ10000**
– [1] Remover attachment	**07953-MJ10100**
– [2] Remover handle	**07953-MJ10200**

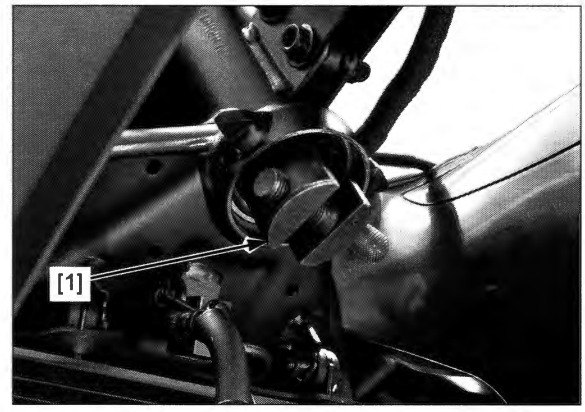
U.S.A. TOOL:

Ball race remover attachment	**07953-MJ1000B (U.S.A. only)**



Remove the lower outer race using the special tool and a suitable shaft.

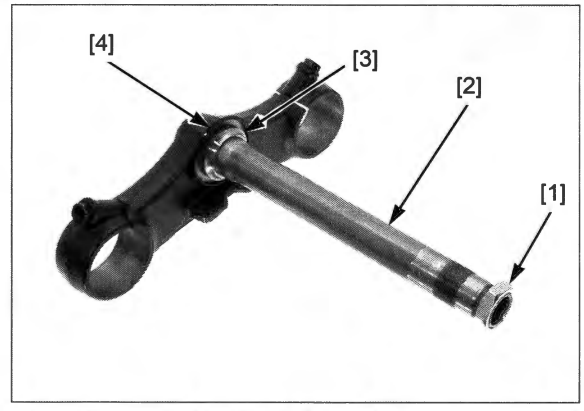
TOOL:
[1] Bearing remover 07946-3710500



Install the stem nut [1] onto the steering stem [2] to prevent the threads from being damaged when removing the lower inner race [3].

Remove the lower inner race with a chisel or equivalent tool, being careful not to damage the stem.

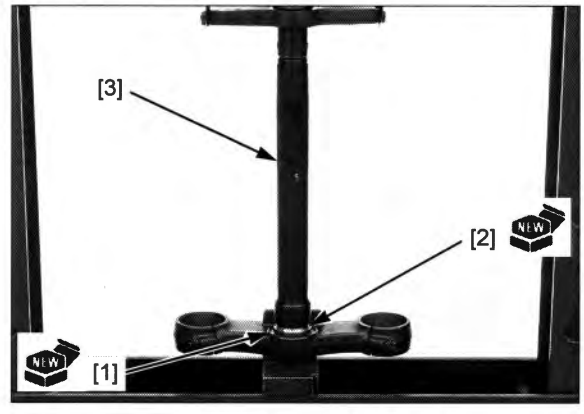
Remove the lower dust seal [4].



Install a new lower dust seal [1] onto the steering stem.

Press a new lower inner race [2] using the special tool.

TOOL:
[3] Steering stem driver 07946-MB00000

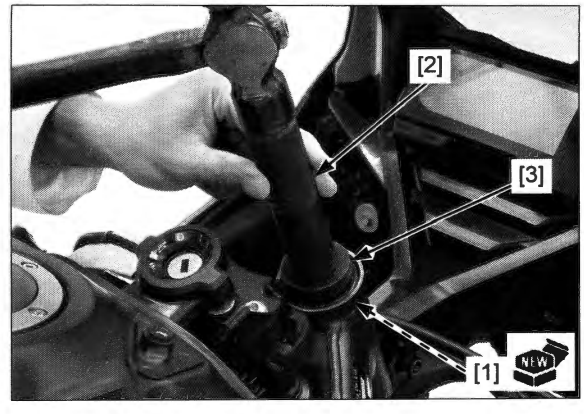


Drive in a new upper outer race [1] into the steering head pipe using the special tool.

TOOLS:
[2] Driver 07749-0010000
[3] Attachment, 42 x 47 mm 07746-0010300

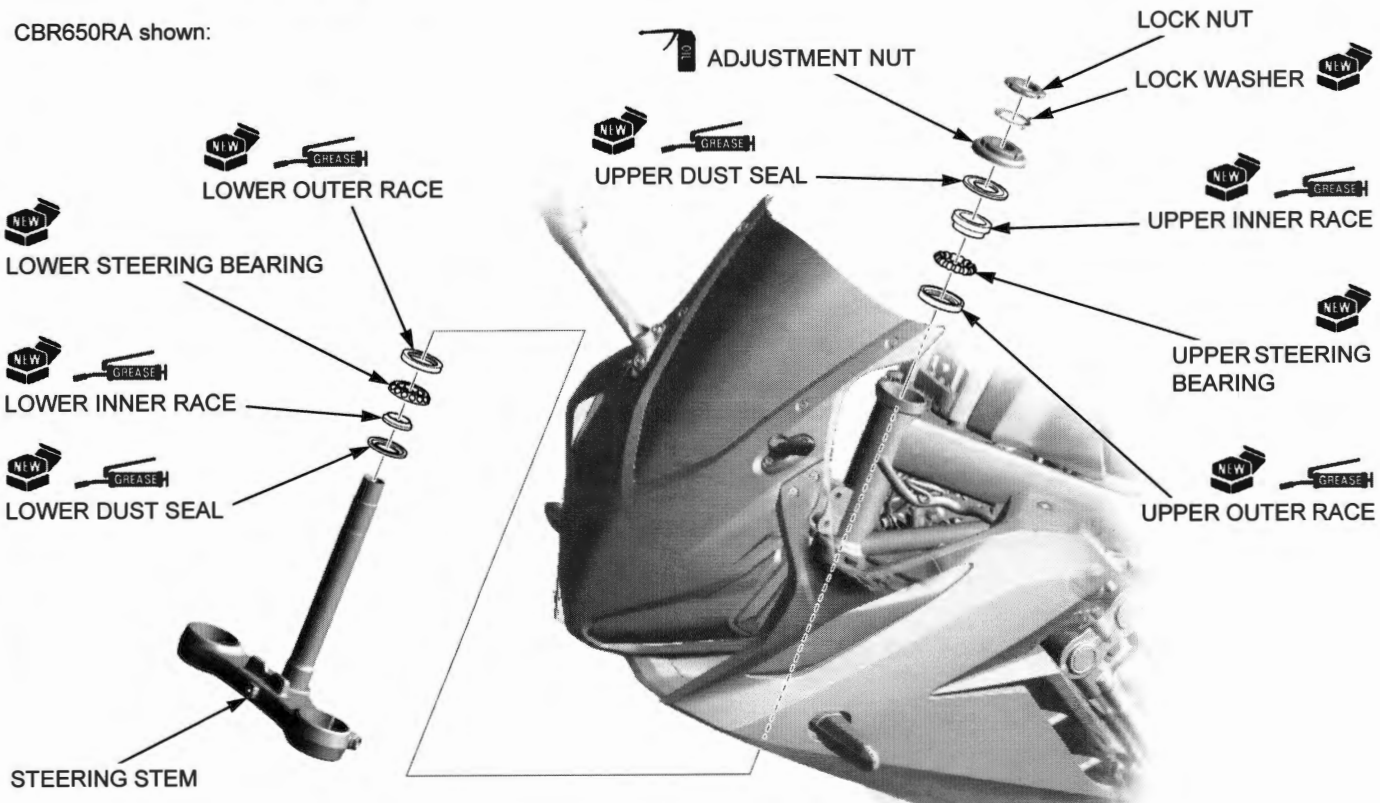
Drive in a new lower outer race.

TOOLS:
Driver 07749-0010000
Attachment, 52 x 55 mm 07746-0010400



INSTALLATION

CBR650RA shown:



NOTE:

- Use urea based multi-purpose extreme pressure grease NLGI #2 (EXCELITE EP2 manufactured by KYODO YUSHI CO., LTD., STAMINA EP2 manufactured by Shell or equivalent) for the bearing race sliding surface and dust seals.

Apply grease to the lip of the lower dust seal [1].

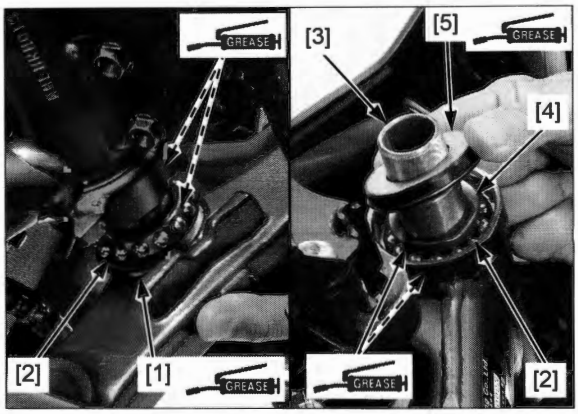
Apply 3 – 5 g (0.1 – 0.2 oz) (per each bearing) of grease to the bearing race sliding surfaces.

Install the bearings [2] in the lower inner race and upper outer race.

Install the steering stem [3] and upper inner race [4].

Apply grease to the lip of a new upper dust seal [5].

Install the upper dust.



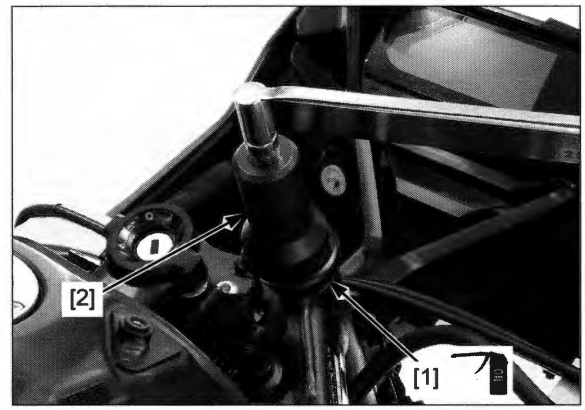
Apply engine oil to the threads of the adjustment nut [1].

Install the adjusting nut.

Tighten the adjustment nut to the specified torque using the special tool.

TOOL:
[2] Steering stem socket 07916-3710101

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

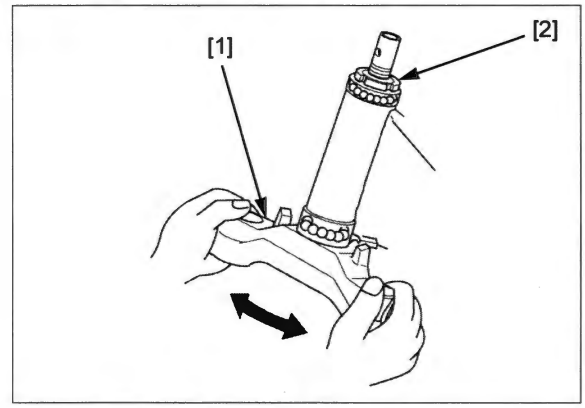


Turn the steering stem [1] left and right, lock-to-lock five times to seat the bearings.

Completely loosen the adjustment nut [2].

Retighten the adjustment nut to the same torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

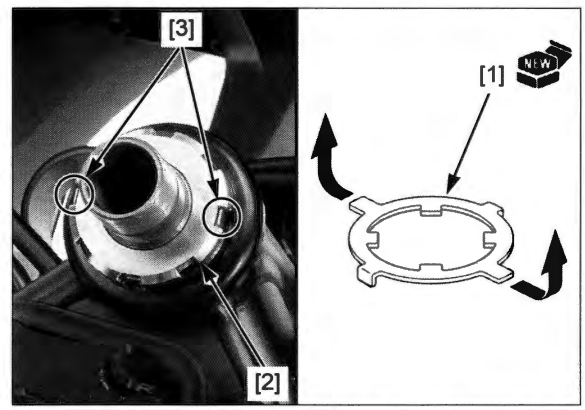


Install a new lock washer [1], aligning its bent tabs with the grooves in the adjustment nut.

Install the lock nut [2] and finger tighten it all the way.

Do not over tighten the lock nut, this will flatten the lock washer.

Further tighten the lock nut, within 90°, to align its grooves with the tabs of the lock washer.
Bend the lock washer tabs [3] up into the grooves in the lock nut.



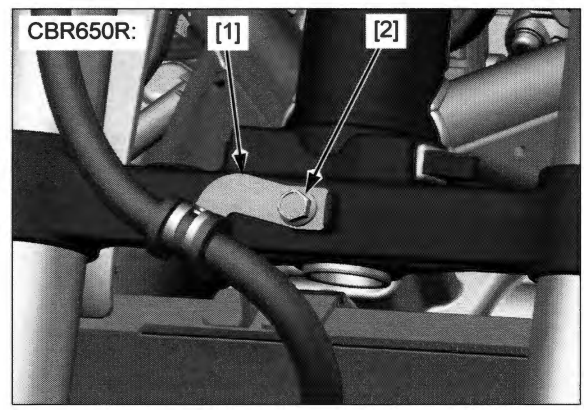
CBR650R/RA: Clean the threads of the stem with a degreasing agent.

Install the following:

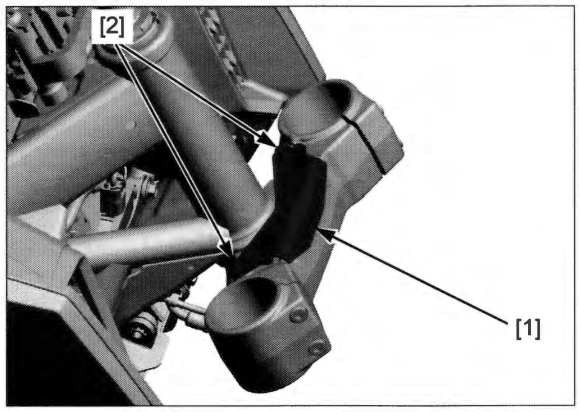
- Handlebars (page 16-7)
- Fork legs (page 16-23)

CBR650R: Install the brake hose clamp [1] and bolt [2] onto the bottom bridge.

Make sure the steering stem moves smoothly, without play or binding.



CB650R/RA: Install the headlight lower stay [1] and bolts [2].



CB650R/RA: Clean the threads of the stem with a degreasing agent.

Install the top bridge [1], washer [2] and steering stem nut [3].

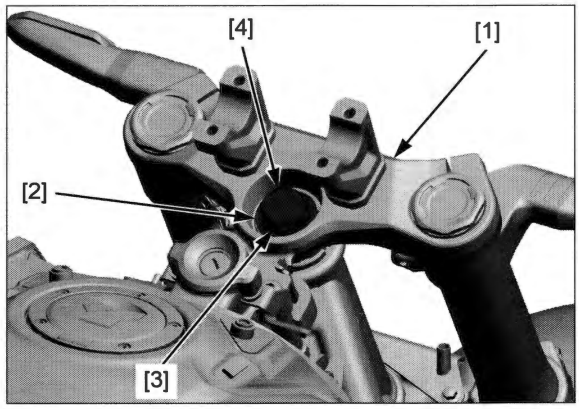
Do not tighten the top bridge pinch bolts.

Temporarily install the fork legs into the bottom and top bridges by tightening the bottom bridge pinch bolts.

Tighten the stem nut to the specified torque.

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

Make sure the steering stem moves smoothly, without play or binding.



Install the following:

- Stem cap [4]
- Fork legs (page 16-26)
- Handlebar (page 16-7)
- Ignition switch cover (page 21-15)
- Combination meter (page 21-7)
- Headlight (page 21-4)

17. REAR WHEEL/SUSPENSION

SERVICE INFORMATION 17-2

TROUBLESHOOTING 17-4

COMPONENT LOCATION 17-5

REAR WHEEL 17-6

SHOCK ABSORBER 17-10

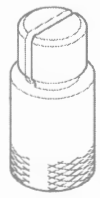
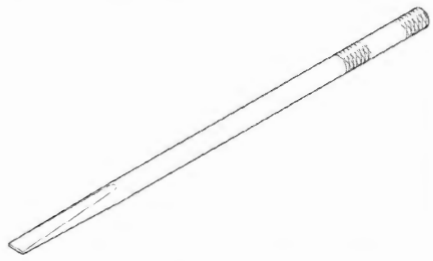
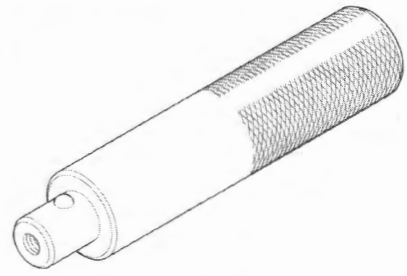
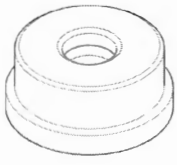
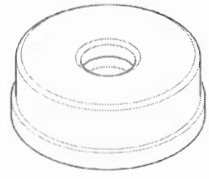
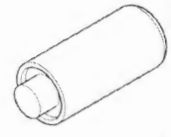
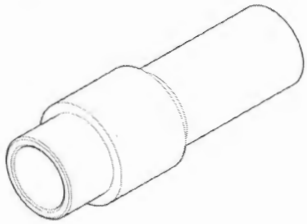
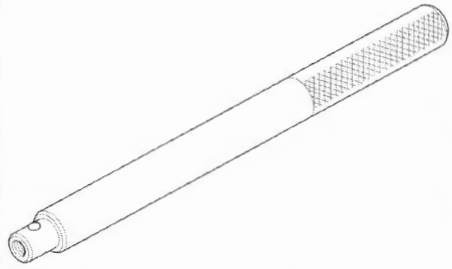
SWINGARM 17-12

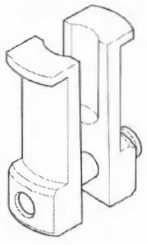
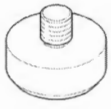
SERVICE INFORMATION

GENERAL

- A hoist or equivalent is required to support the motorcycle when servicing the rear wheel and suspension.
- 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 operate the brake pedal after removing the rear wheel.
- After the rear wheel installation, check the brake operation by applying the brake pedal.
- Use only genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- For brake system service (page 18-2).

TOOLS

Bearing remover head, 20 mm 07746-0050600 	Bearing remover shaft 07GGD-0010100 	Driver 07749-0010000 
Attachment, 42 x 47 mm 07746-0010300 	Pilot, 20 mm 07746-0040500 	Attachment, 22 x 24 mm 07746-0010800 
Attachment, 28 x 30 mm 07946-1870100 	Attachment, 52 x 55 mm 07746-0010400 	Spherical Bearing Installer 10 x 19 07HMF-HC00100 
Crank assembly collar 07965-GM00100 	Driver, 15 x 280L 07949-3710001 	Attachment, 24 x 26 mm 07746-0010700 

Attachment, 37mm 07ZMD-MBW0200 	Pilot, 30 mm 07746-0040700 	Remover attachment, 28 mm 07HMC-MR70100 
Pilot, 17 mm 07746-0040400 	Pilot, 28 mm 07746-0041100 or 07JAD-PH80400 	

TROUBLESHOOTING

Steers to one side or does not track straight
- Drive chain adjusters not adjusted equally
- Bent axle
- Damaged frame
- Worn swingarm pivot components

Rear wheel wobbles
- Bent rim
- Faulty tire
- Worn or damaged wheel bearings
- Worn or damaged driven flange bearing
- Axle not tightened properly
- Faulty swingarm pivot bearings
- Suspension fasteners not tightened properly
- Unbalanced tire and wheel

Wheel hard to turn
- Faulty wheel bearings
- Bent axle
- Faulty driven flange bearing
- Drive chain too tight (page 3-14)
- Brake drag (page 18-2)

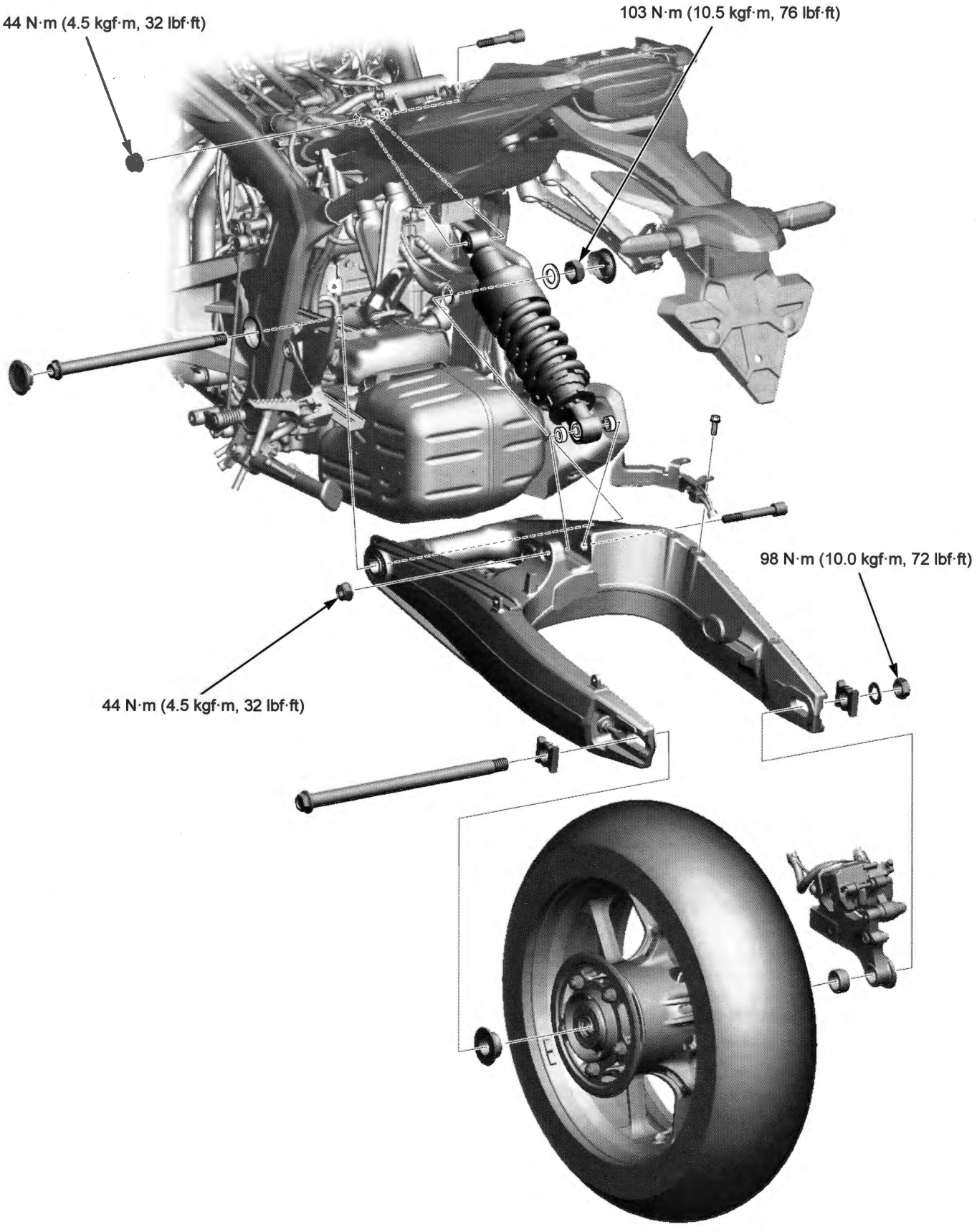
Soft suspension
- Low tire pressure
- Incorrect suspension adjustment
- Weak shock absorber spring
- Oil leakage from damper unit

Stiff suspension
- High tire pressure
- Incorrect suspension adjustment
- Bent shock absorber damper rod
- Damaged suspension or swingarm pivot bearings
- Improperly tightened swingarm pivot

Rear suspension noise
- Loose suspension fasteners
- Worn or damaged suspension pivot bearings
- Faulty shock absorber

COMPONENT LOCATION

AC type shown:



REAR WHEEL

REMOVAL/INSTALLATION

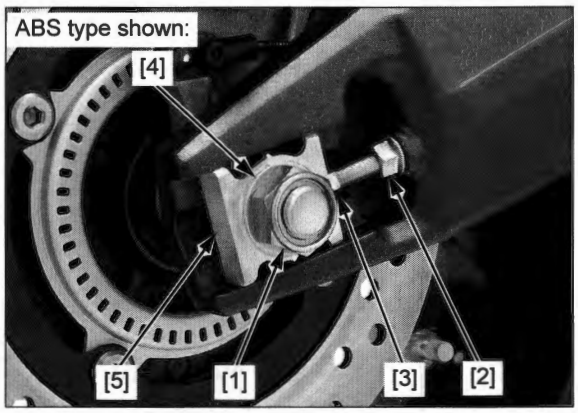
Loosen the axle nut [1].

Support the motorcycle using a hoist or equivalent and raise the rear wheel off the ground.

Loosen the lock nuts [2] and turn the adjusting bolts [3] so the wheel can be moved forward all the way.

Support the caliper so it does not hang from the brake hose. Do not twist the brake hose

Remove the axle nut, washer [4] and right adjusting plate [5].



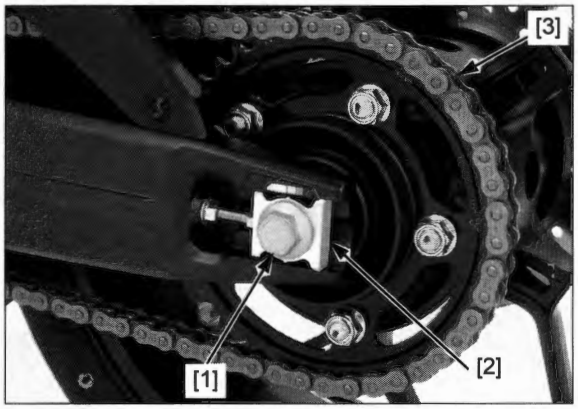
Push the rear wheel forward.

Remove the axle [1] and left adjusting plate [2].

Derail the drive chain [3] from the driven sprocket and remove the rear wheel.

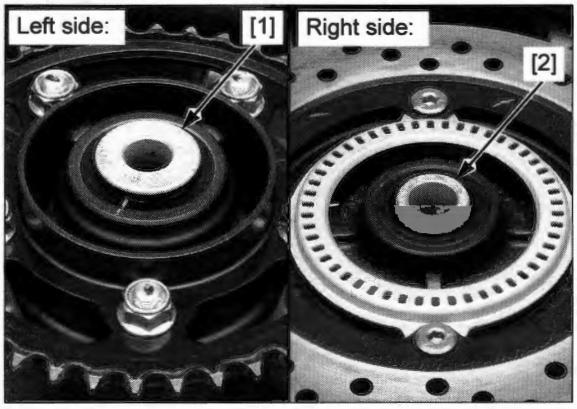
NOTE:

- Do not operate the brake pedal after removing the wheel.



Remove the following:

– Left side collar (flange) [1]
– Right side collar [2]



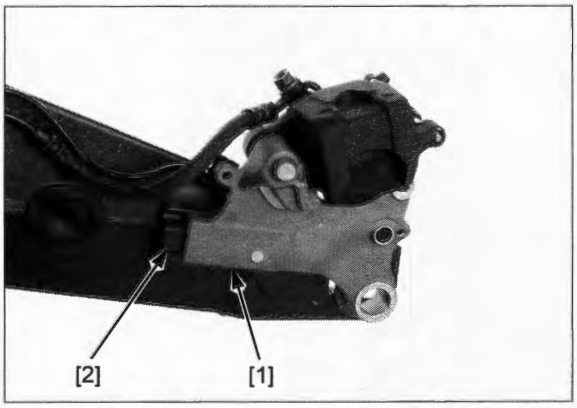
Installation is in the reverse order of removal.

NOTE:

- When installing the wheel, take care not to let the caliper bracket [1] come off the swingarm boss [2] and not to damage the brake pads.
- The axle is installed from the left side.

Adjust the drive chain slack (page 3-14).

TORQUE:
Rear axle nut: 98 N·m (10.0 kgf·m, 72 lbf·ft)



INSPECTION

Turn the inner race of each bearing with your finger.
The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Replace the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Inspect the following parts for damage, abnormal wear, deformation or bend.

- Rear axle
- Wheel hub
- Wheel rim
- Driven sprocket (page 3-15)
- Damper rubbers (page 17-7)

Measure each part according to REAR WHEEL/SUSPENSION SPECIFICATIONS (page 1-8).

Replace any part if it is out of service limit.

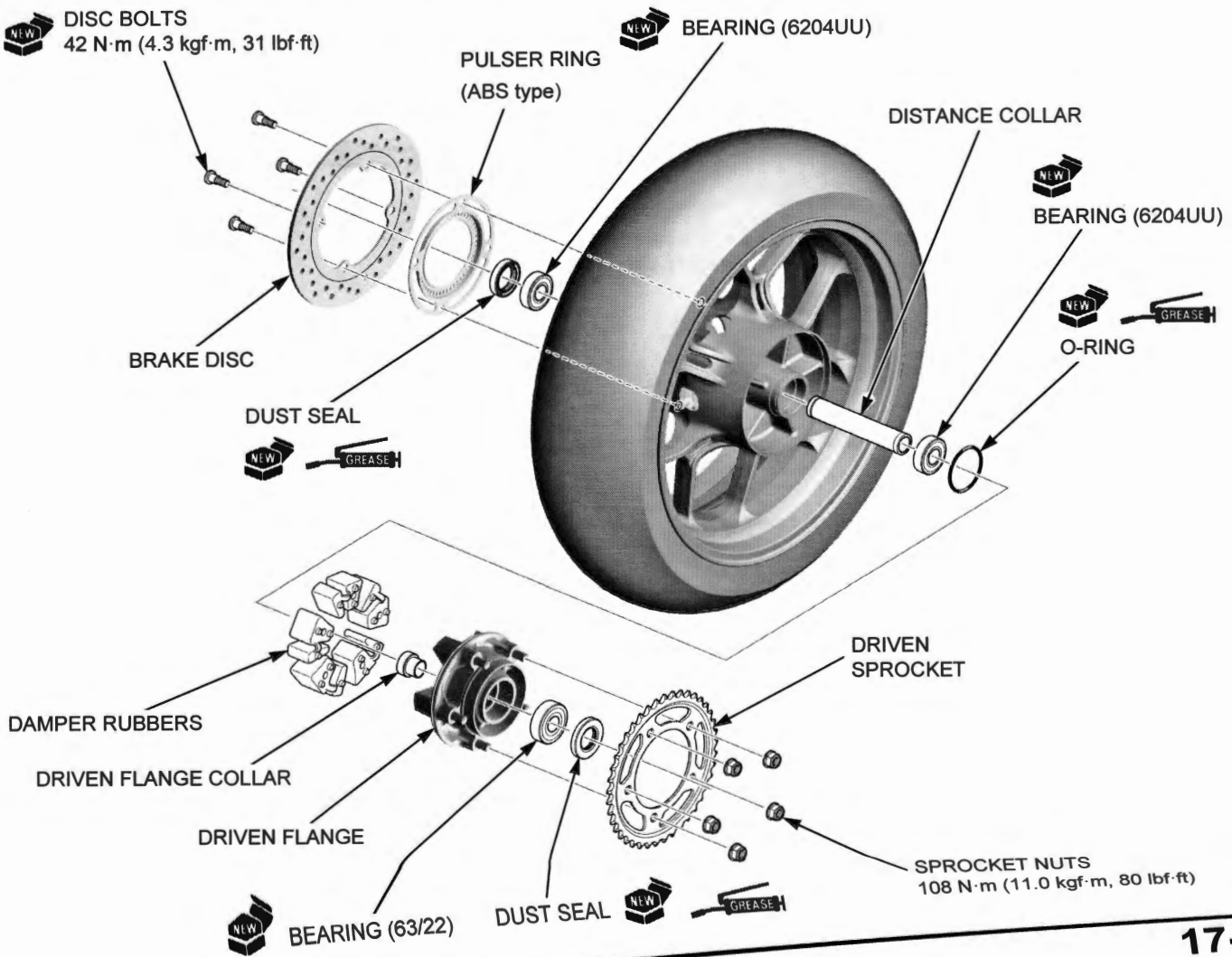
Refer to following:

- Wheel balance service (page 16-18)
- Tire valve service (page 16-21)

DISASSEMBLY/ASSEMBLY

Disassemble and assemble the rear wheel as following illustration.

- For wheel balance service (page 16-18).
- Install the rear wheel dust seal with the flat side facing out so that it is flush with the wheel hub.
- Install driven flange dust seal with the flat side facing out so that it is flush with the driven flange end face.
- Install the brake disc with the rotation mark (arrow) facing out.



BEARING REPLACEMENT

WHEEL BEARING

Install the bearing remover head [1] into the bearing.

From the opposite side of the wheel, install the bearing remover shaft [2] and drive the bearing out of the wheel hub.

TOOLS:

Bearing remover head, 20 mm	**07746-0050600**
Bearing remover shaft	**07GGD-0010100**

Remove the distance collar and drive out the other bearing.

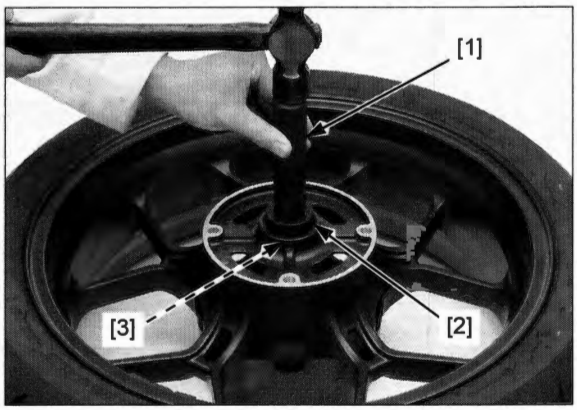
Drive in a new right side bearing (brake disc side) squarely with the marked side facing up until it is fully seated.

Install the distance collar.

Drive in a new left side bearing squarely with the marked side facing up until it is fully seated.

TOOLS:

[1] Driver	**07749-0010000**
[2] Attachment, 42 x 47 mm	**07746-0010300**
[3] Pilot, 20 mm	**07746-0040500**

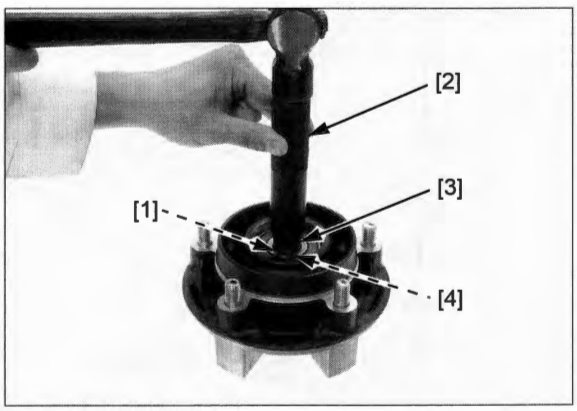


DRIVEN FLANGE BEARING

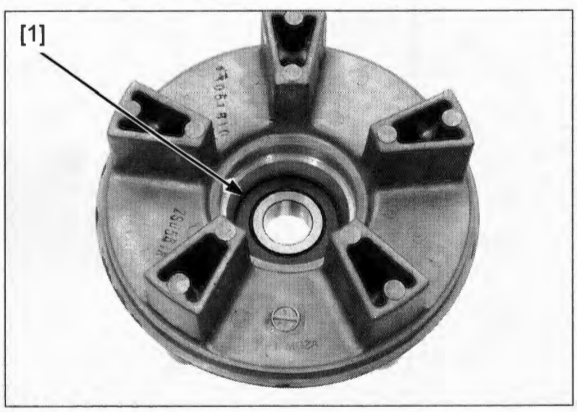
Drive out the driven flange collar [1] from the bearing.

TOOLS:

[2] Driver	**07749-0010000**
[3] Attachment, 22 x 24 mm	**07746-0010800**
[4] Pilot, 20 mm	**07746-0040500**



Drive out the driven flange bearing [1].



Place a new bearing [1] with the marked side facing down. Install the driven flange collar [2] into the bearing until it is fully seated.

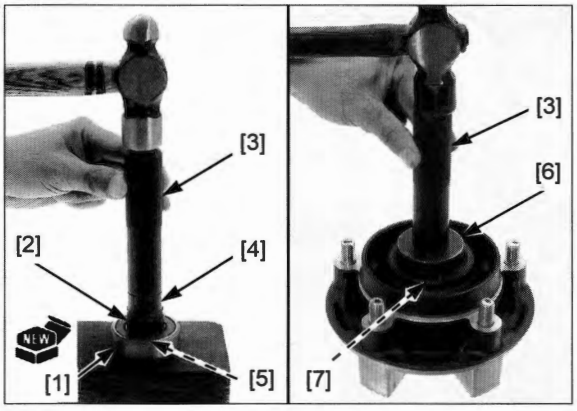
TOOLS:

[3] Driver	**07749-0010000**
[4] Attachment, 28 x 30 mm	**07946-1870100**
[5] Pilot, 20 mm	**07746-0040500**

Drive in the driven flange bearing/collar squarely with the collar side facing down until it is fully seated.

TOOLS:

Driver	**07749-0010000**
[6] Attachment, 52 x 55 mm	**07746-0010400**
[7] Pilot, 20 mm	**07746-0040500**



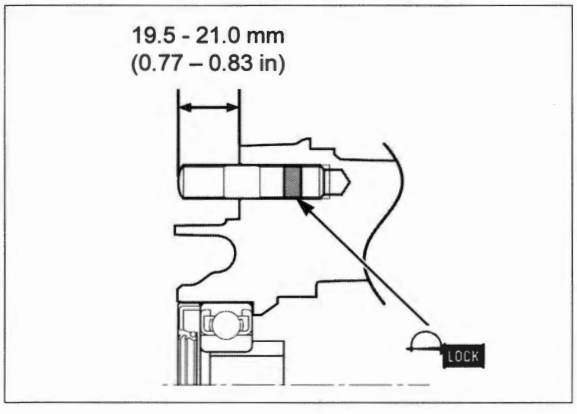
DRIVEN FLANGE STUD BOLT REPLACEMENT

Check that the length from the bolt head to the driven flange surface is within specifications.

STANDARD: 19.5 – 21.0 mm (0.77 – 0.83 in)

When removing the driven flange stud bolts, install and tighten new stud bolts into the driven flange so that the length from the bolt head to the driven flange surface is within specifications.

- When installing the driven flange stud bolt, Apply locking agent to the stud bolt as shown.



SHOCK ABSORBER

REMOVAL/INSTALLATION

Remove the drive chain cover/mud guard (page 2-15).

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

Remove the shock absorber upper mounting nut [1] and bolt [2].

Remove the shock absorber lower mounting nut [1] and bolt [2].

Remove the shock absorber [3] and collars [4], out of the frame.

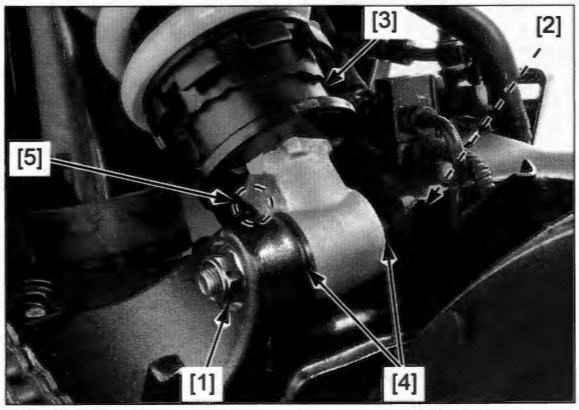
Installation is in the reverse order of removal.

NOTE:

- Turn the slit [5] to the lower side.
- The mounting bolt is installed from the right side.

TORQUE:

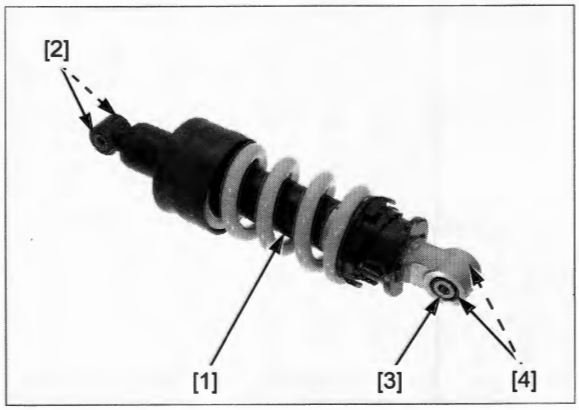
Shock absorber mounting nut:
44 N·m (4.5 kgf·m, 32 lbf·ft)



INSPECTION

Inspect the following parts of the shock absorber for damage, abnormal wear, oil leakage or bend.

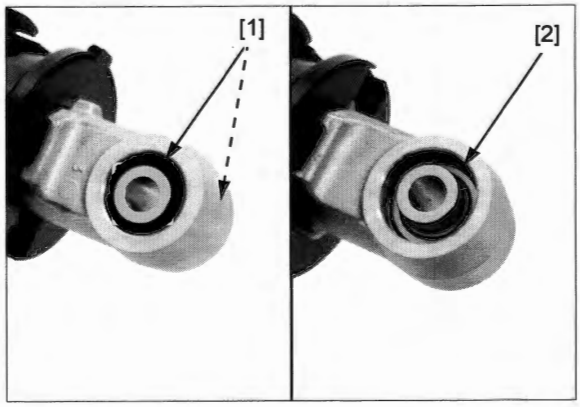
- Damper unit [1]
- Pivot bushing [2]
- Spherical bearing [3]
- Dust seal [4]



BEARING REPLACEMENT

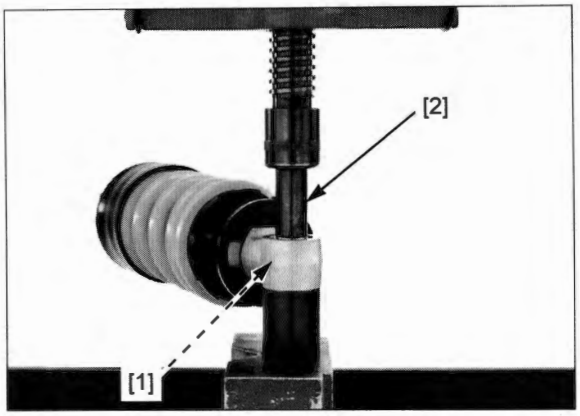
Remove the following:

- Dust seals [1]
- Stopper ring [2]



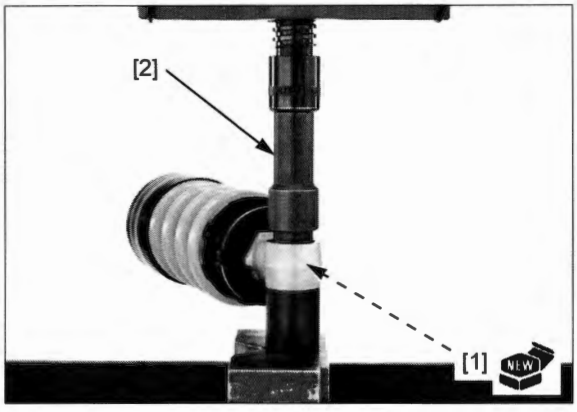
Press the spherical bearing [1] out of the shock absorber using the special tools.

TOOLS:
[2] Spherical Bearing Installer 07HMF-HC00100
10 x 19



Install the spherical bearing [1] into the shock absorber until it is fully seated using a hydraulic press and special tools as shown.

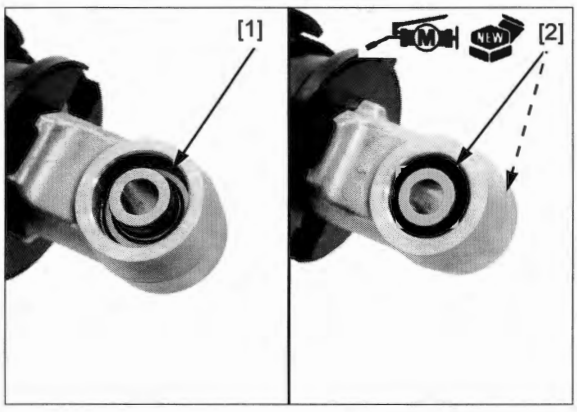
TOOLS:
[2] Crank assembly collar 07965-GM00100



Securely attach the stopper ring [1] to the stopper ring groove.

Apply molybdenum disulfide grease to new dust seal lips.

Install the dust seal [2] with the flat surface facing outward and push until it is fully seated in the bearing.



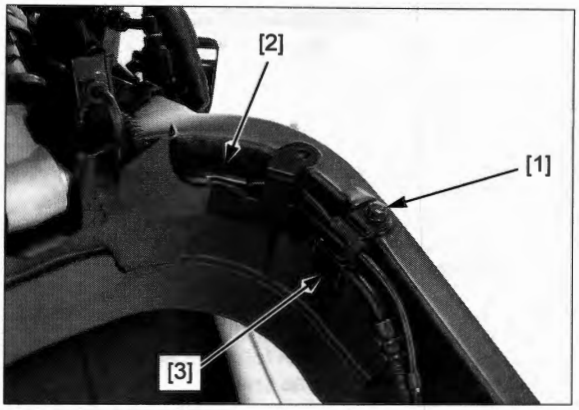
SWINGARM

REMOVAL/INSTALLATION

Remove the following:

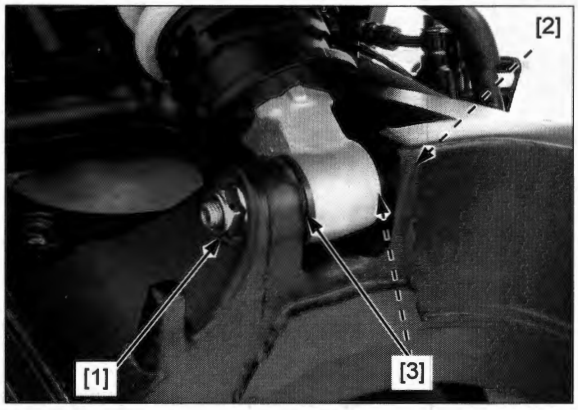
- Drive chain cover/mud guard (page 2-15)
- Rear wheel (page 17-6)
- EVAP canister (AC type) (page 7-24)

Remove the bolt [1], brake pipe stay [2] and brake pipe [3].



Remove the shock absorber lower mounting nut [1] and bolt [2].

Slide the shock absorber up and remove the collars [3].



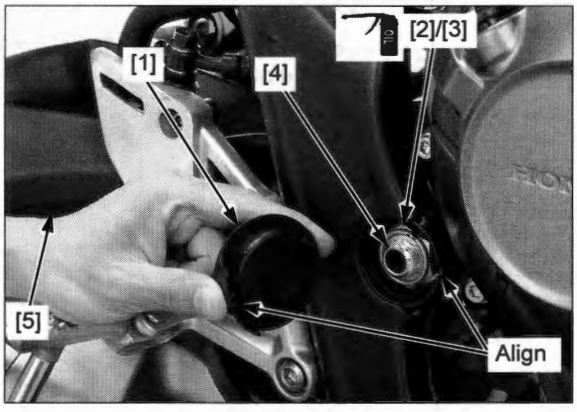
Remove the following:

- Pivot caps [1]
- Pivot nut [2]
- Washer [3]
- Pivot bolt [4]

Support the caliper so it does not hang from the brake hose. Do not twist the brake hose

Move the brake hose, speed sensor wire and drive chain out of the way and remove the swingarm [5] from the frame.

Installation is in the reverse order of removal.



NOTE:

- The pivot bolt is installed from the left side.
- Apply engine oil to the threads and seating surface of the pivot nut.
- Install the pivot cap by aligning the tabs with the cut-out of the frame.

TORQUE:

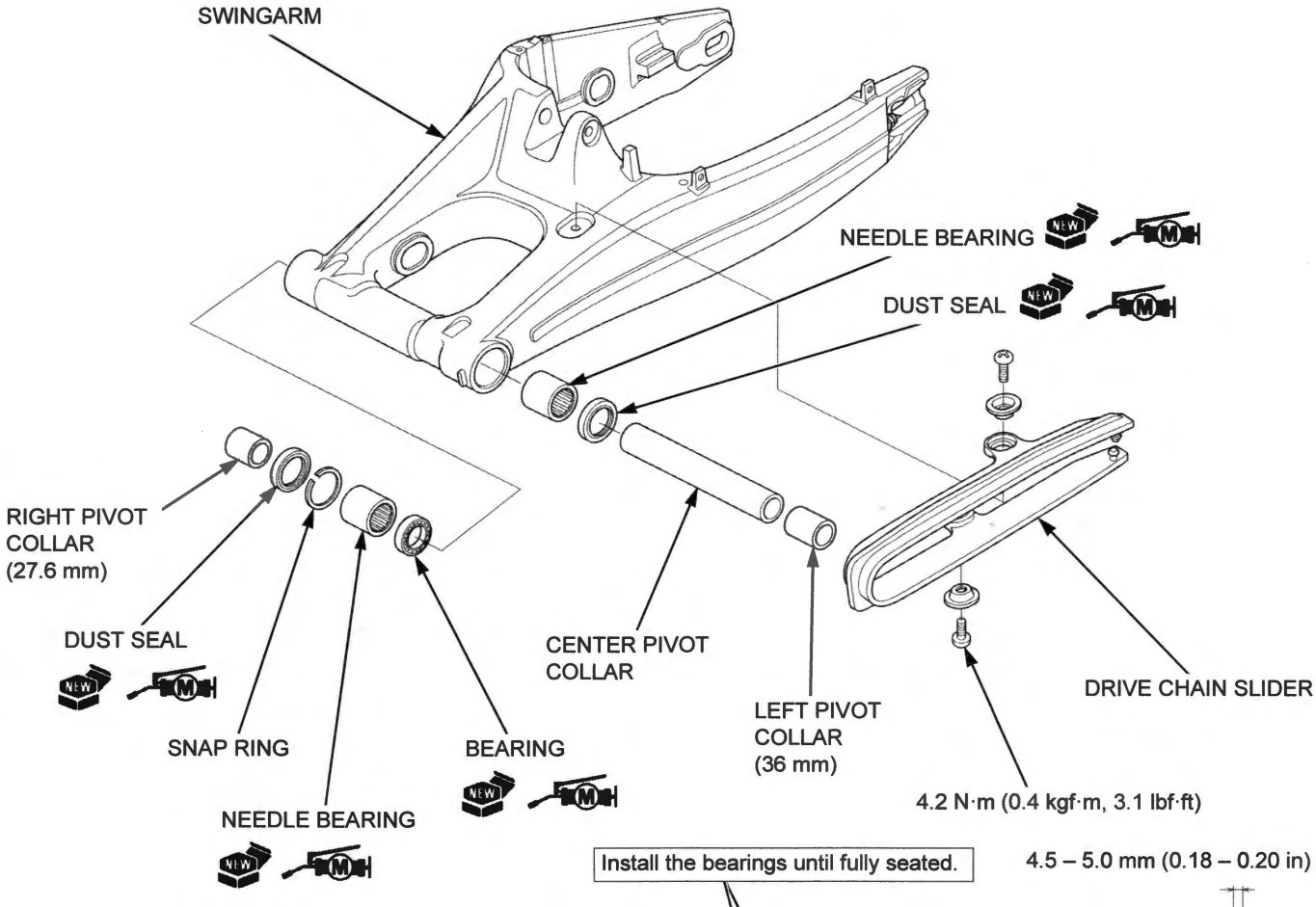
Swingarm pivot nut:
103 N·m (10.5 kgf·m, 76 lbf·ft)

Shock absorber mounting nut:
44 N·m (4.5 kgf·m, 32 lbf·ft)

DISASSEMBLY/ASSEMBLY

Disassemble and assemble the swingarm as following illustration.

- Install each dust seal with the flat side facing out so that it is flush with the pivot end surface.



INSPECTION

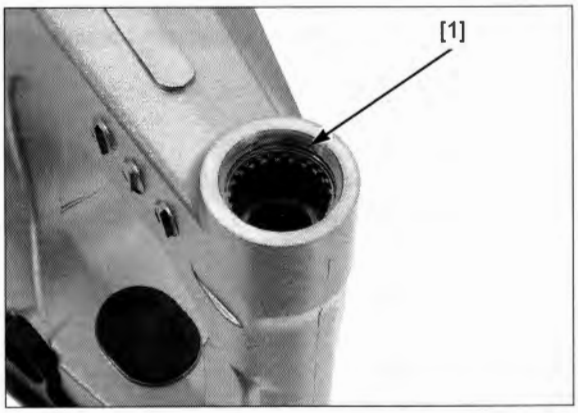
Inspect the following parts for damage, abnormal wear, deformation.

- Swingarm
- Pivot collars
- Bearings
- Drive chain slider (page 3-17)

SWINGARM PIVOT BEARING REPLACEMENT

RIGHT SIDE

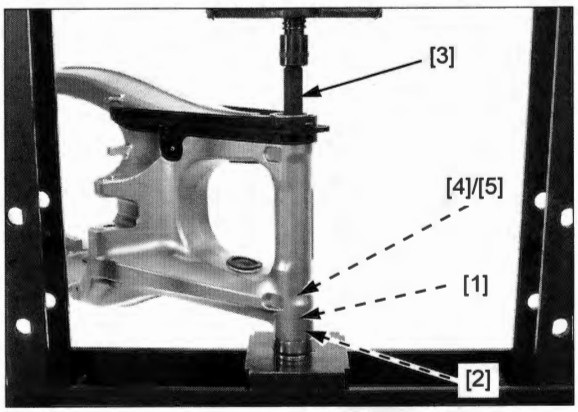
Remove the snap ring [1].



Press the ball bearing [1] and needle bearing [2] out of the right pivot using the special tools.

TOOLS:

[3] Driver, 15 x 280L	**07949-3710001**
[4] Attachment, 24 x 26 mm	**07746-0010700**
[5] Pilot 20 mm	**07746-0040500**

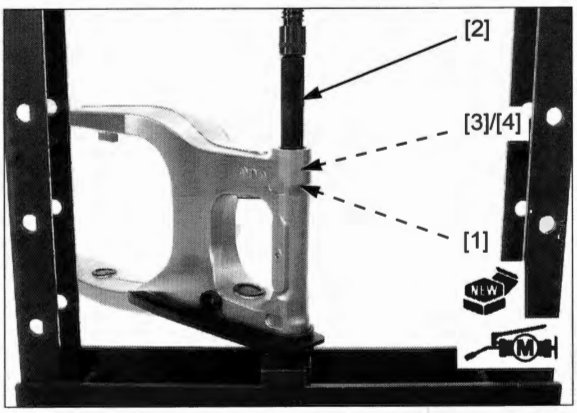


Apply molybdenum disulfide grease to the rotating area of a new ball bearing.

Install the ball bearing [1] into the right pivot with the marked side facing out until it is fully seated using a hydraulic press and special tools as shown.

TOOLS:

[2] Driver	**07749-0010000**
[3] Attachment, 37 mm	**07ZMD-MBW0200**
[4] Pilot 20 mm	**07746-0040500**

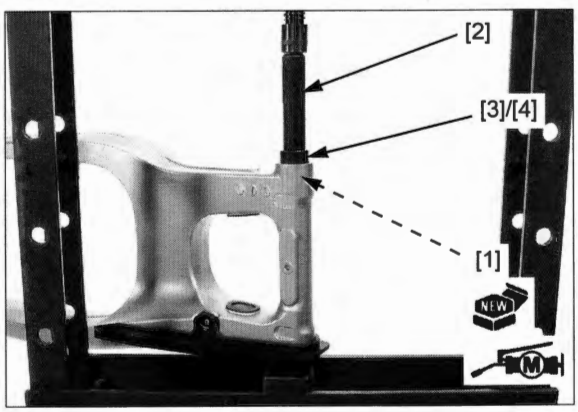


Apply molybdenum disulfide grease to a new needle bearing rotating area.

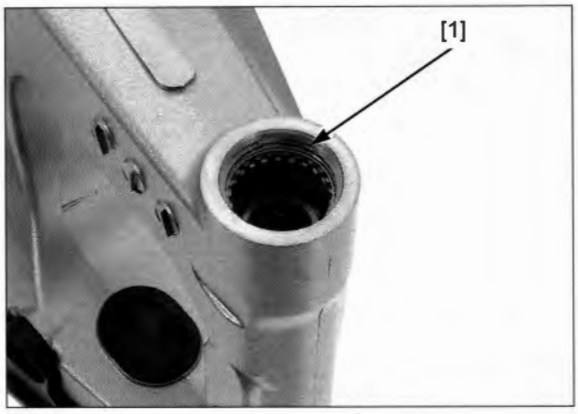
Install the needle bearing [1] into the right pivot with the marked side facing out until it is fully seated using a hydraulic press and special tools as shown.

TOOLS:

[2] Driver	**07749-0010000**
[3] Attachment, 37 mm	**07ZMD-MBW0200**
[4] Pilot 30 mm	**07746-0040700**



Install the snap ring [1] into the right pivot groove securely.



NOTE:

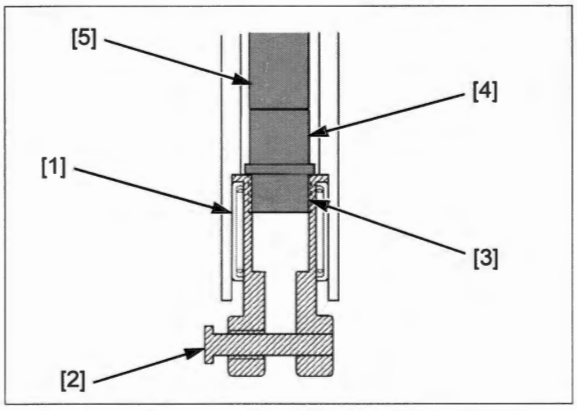
- Do not reuse worm snap ring which could easily spin in the groove.
- Make sure that the snap ring is firmly seated in the groove.

LEFT SIDE

Press the needle bearing [1] out of the swingarm using the special tools.

TOOLS:

[2] Remover attachment, 28 mm	**07HMC-MR70100**
[3] Pilot 17 mm	**07746-0040400**
[4] Attachment, 22 x 24 mm	**07746-0010800**
[5] Driver, 15 x 280L	**07949-3710001**

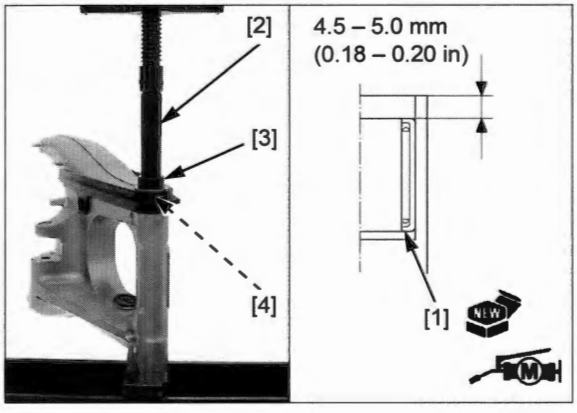


Apply molybdenum disulfide grease to the rotating area of a new needle bearing [1].

Carefully press the bearing in the left pivot with the marked side facing up until the depth from the pivot end surface is 4.5 – 5.0 mm (0.18 – 0.20 in), using the special tools.

TOOLS:

[2] Driver	**07749-0010000**
[3] Attachment, 37 mm	**07ZMD-MBW0200**
[4] Pilot, 28 mm	**07746-0041100 or 07JAD-PH80400**



MEMO

18. HYDRAULIC BRAKE

SERVICE INFORMATION 18-2

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SERVICE INFORMATION

GENERAL

⚠CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

NOTICE

Spilling brake fluid will severely damage instrument lenses and painted surface. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cover; make sure the front reservoir is horizontal first.

- This section covers service of the conventional brake components of the brake system. For Anti-lock Brake System (ABS; CBR650RA, CB650RA) service (page 19-2).
- The CBR650RA, CB650RA models is equipped with the ABS, however, the brake fluid replacement procedure is performed in the same manner as in the ordinary air bleeding procedure. Note that replacement and bleeding air from the brake fluid in the ABS modulator is not necessary, as it is sealed in the modulator.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid, they may not be compatible.
- Never allow contaminates (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always check brake operation before riding the motorcycle.
- CBR650RA, CB650RA: When the wheel speed sensor is removed, be sure to check the air gap between the wheel speed sensor and pulser ring after installing it (page 19-22).

TROUBLESHOOTING

Brake lever/pedal soft or spongy
- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master 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

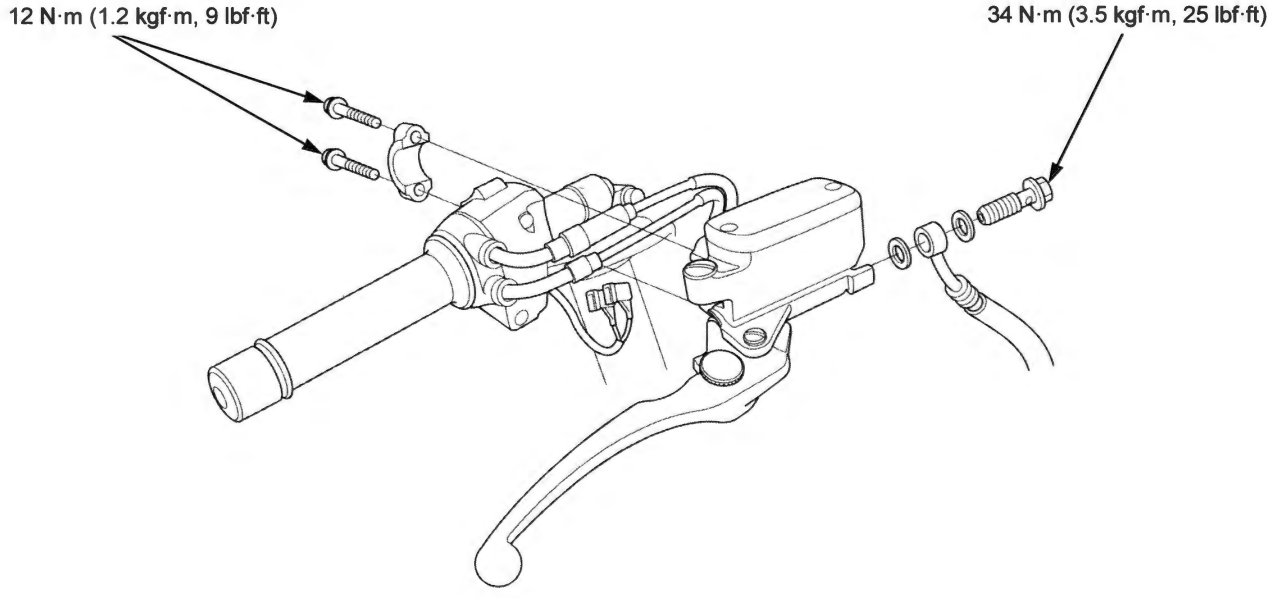
Brake lever/pedal hard
- Clogged/restricted fluid passage
- Sticking/worn caliper piston
- Caliper not sliding properly
- Worn caliper piston seal
- Sticking/worn master piston
- Bent brake lever/pedal

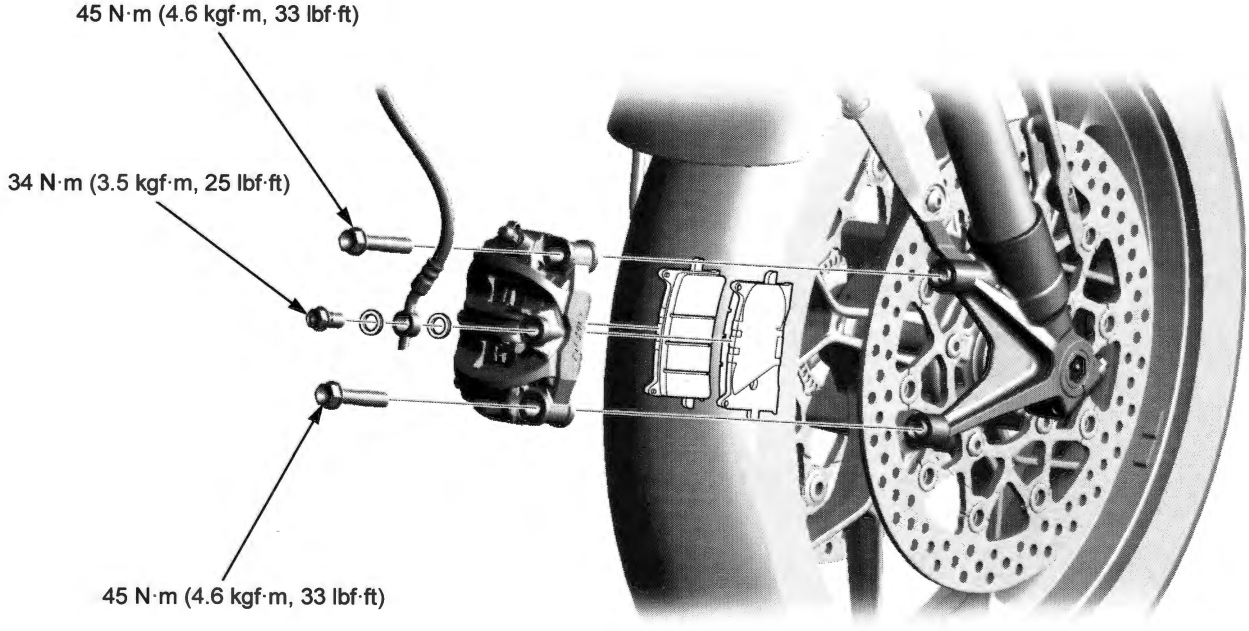
Brake drags
- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper piston

COMPONENT LOCATION

FRONT:

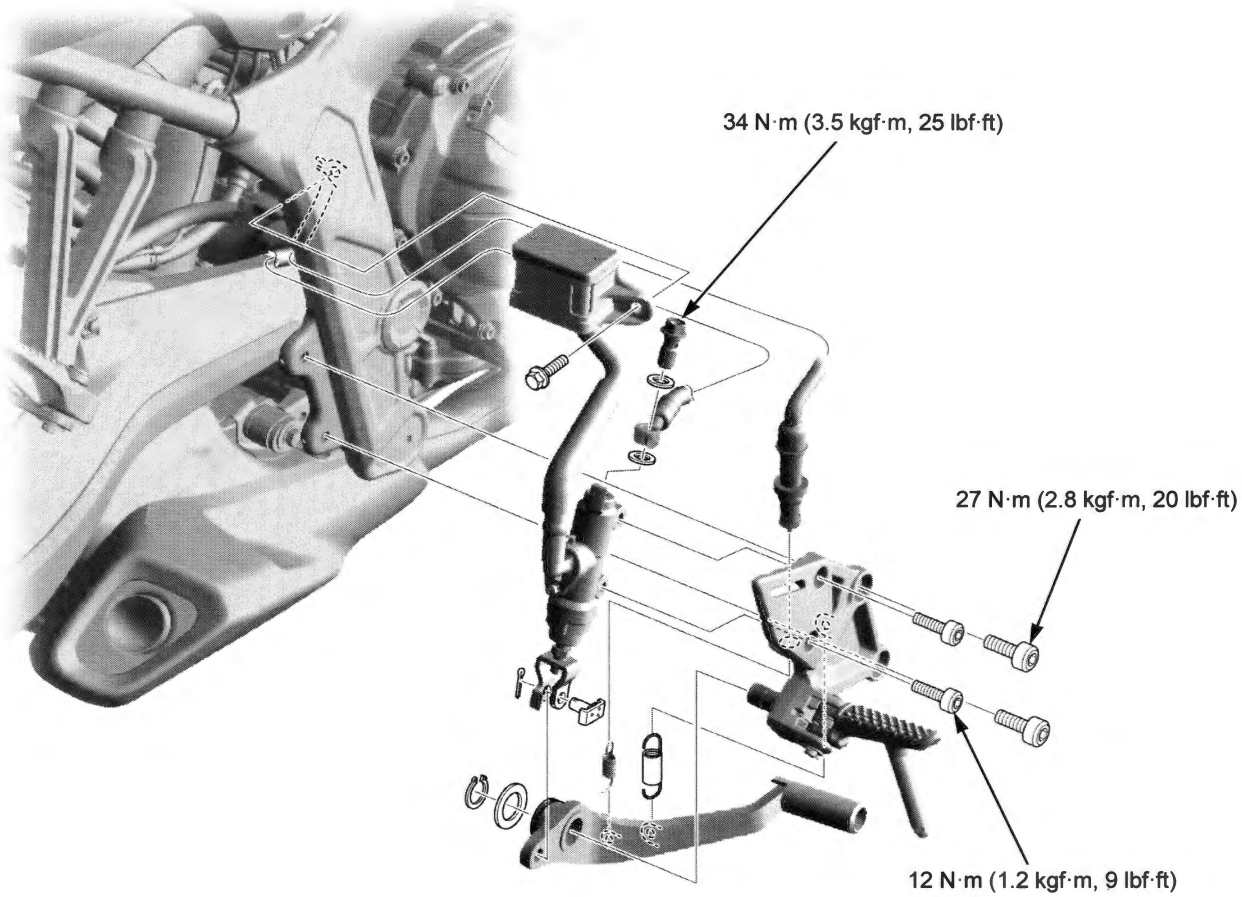
CBR650RA shown:

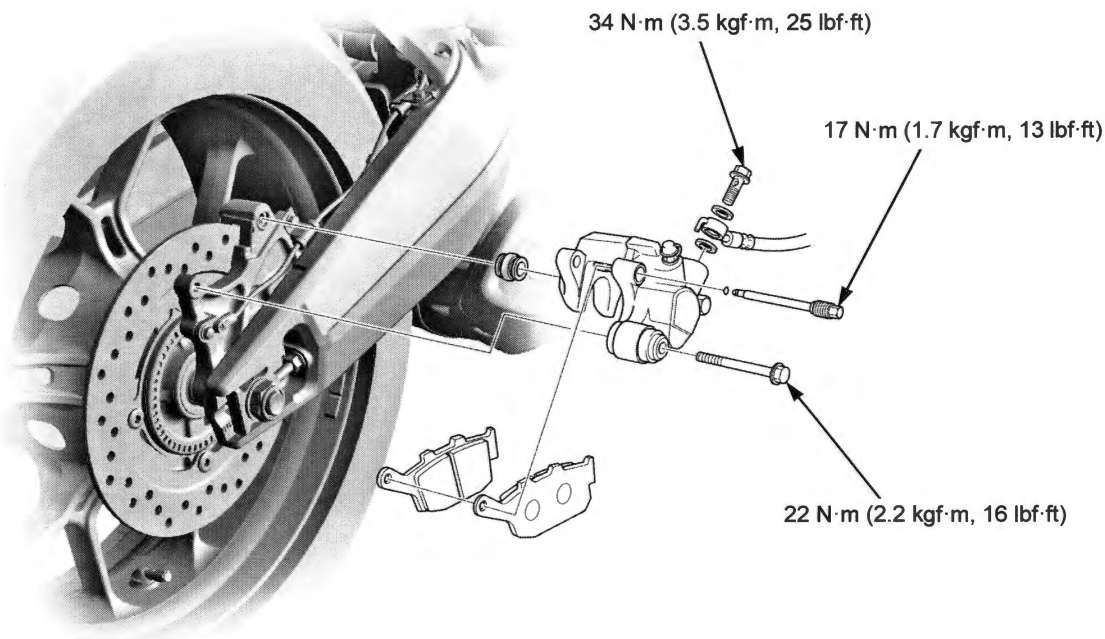




REAR:

ABS type shown:





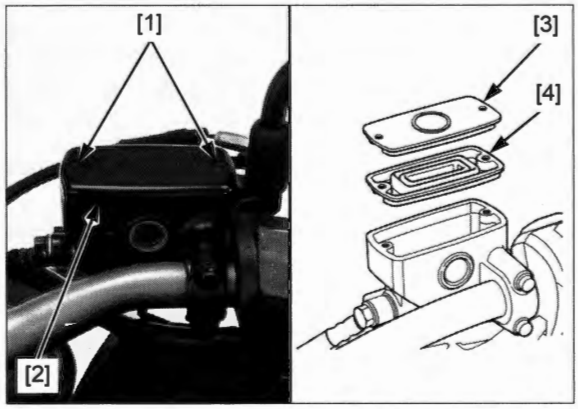
BRAKE FLUID REPLACEMENT/AIR BLEEDING

BRAKE FLUID DRAINING

For front brake: Turn the handlebar so the reservoir is level.

Remove the following:

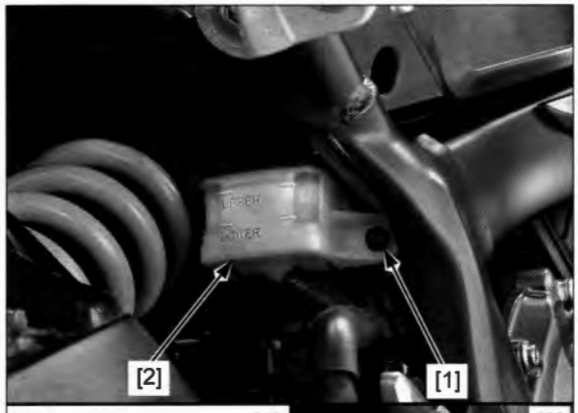
- Two screws [1]
- Reservoir cap [2]
- Set plate [3]
- Diaphragm [4]



For rear brake: Remove the bolt [1] and reservoir [2] from the stay.

Remove the following:

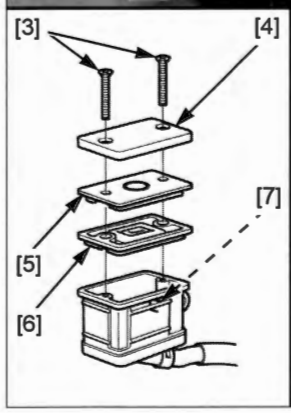
- Two screws [3]
- Reservoir cap [4]
- Set plate [5]
- Diaphragm [6]



Take care not to spill the fluid out of the reservoir. Temporarily install the reservoir onto the stay with the mounting bolt.

NOTE:

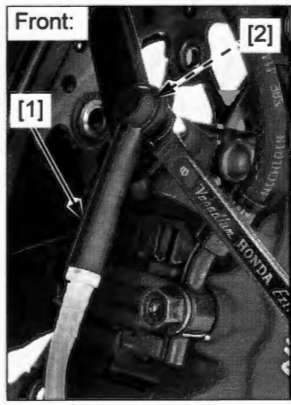
- Align the reservoir tab [7] with the reservoir stay cut-out [8].



Connect a bleed hose [1] to the caliper bleed valve [2].

Loosen the bleed valve and pump the brake lever or pedal until no more fluid flows out of the bleed valve.

Close the bleed valve.



BRAKE FLUID FILLING/AIR BLEEDING

Fill the reservoir to the upper level line [1] with DOT 4 brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve [2].

Operate the brake bleeder and loosen the bleed valve.

Check the fluid level often while bleeding to prevent air from being pumped into the system.

If an automatic refill system is not used, add fluid when the fluid level in the reservoir is low.

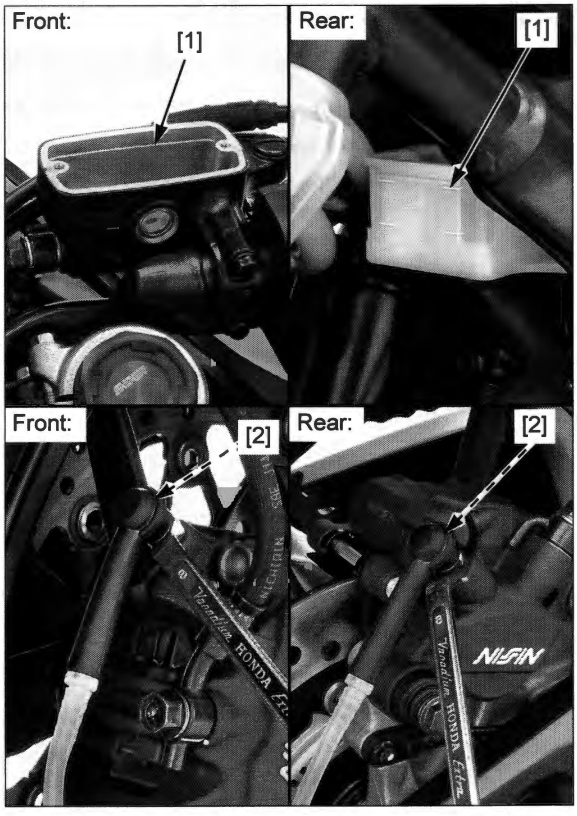
Perform the bleeding procedure until the system is completely flushed/bled.

Close the bleed valve and operate the brake lever or pedal. If it still feels spongy, bleed the system again.

After bleeding the system completely, tighten the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Fill the reservoir to the upper level line with DOT 4 brake fluid.



If the brake bleeder is not available, use the following procedure.

Fill the reservoir to the upper level line [1] with DOT 4 brake fluid from a sealed container.

Connect a bleed hose to the bleed valve [2].

Pump up the system pressure with the brake lever/pedal until the lever/pedal resistance is felt.

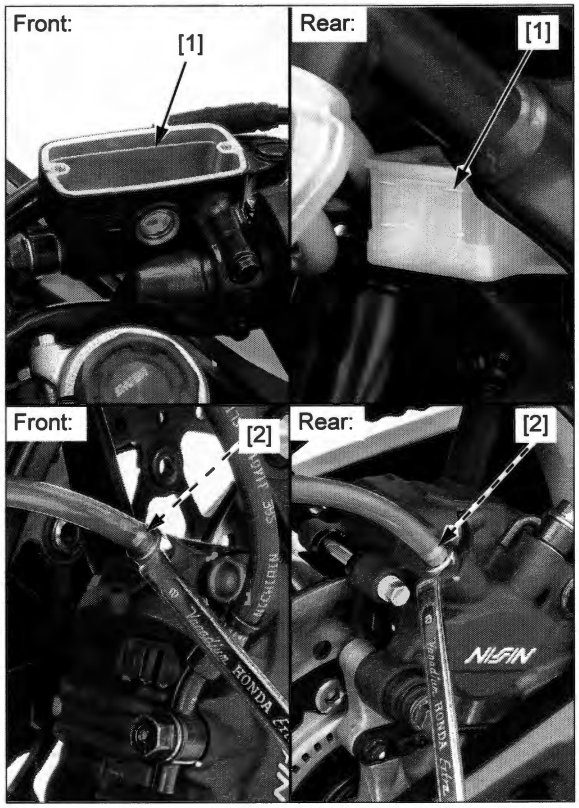
Do not release the brake lever or pedal until the bleed valve has been closed.

1. Squeeze the brake lever or depress the brake pedal all the way, and loosen the bleed valve 1/4 of a turn. Wait several seconds and then close it.
2. Release the brake lever/pedal slowly and wait several seconds after it reaches the end of its travel.
3. Repeat the steps 1 and 2 until there are no air bubbles in the bleed hose.

After bleeding the system completely, tighten the bleed valve to the specified torque.

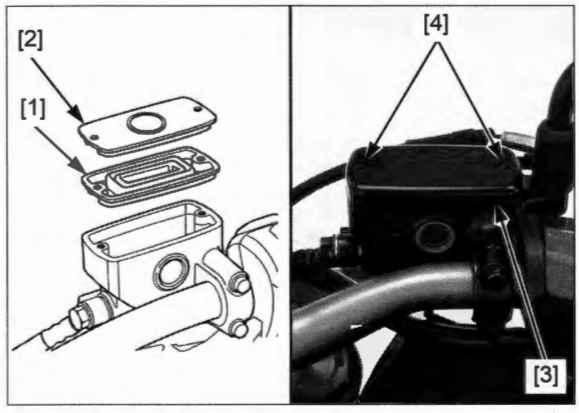
TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

Fill the reservoir to the upper level line with DOT 4 brake fluid.



For front brake: Install the diaphragm [1], set plate [2], reservoir cap [3] and tighten the screws [4] to the specified torque.

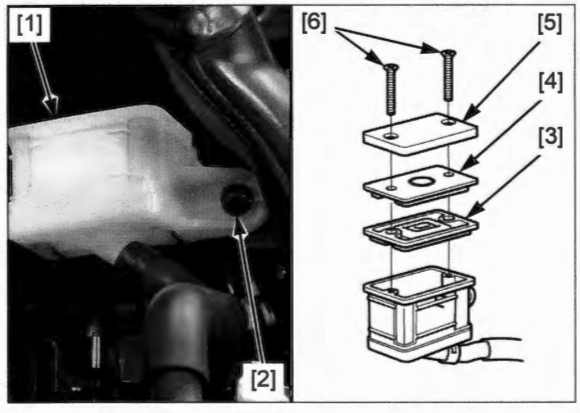
TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)



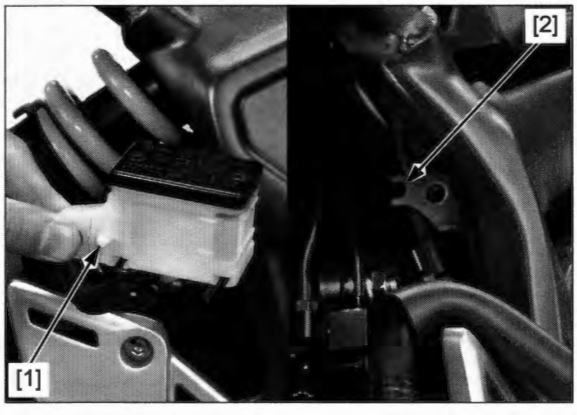
For rear brake: Carefully remove the reservoir [1] from the stay by removing the mounting bolt [2].

Install the diaphragm [3], set plate [4], reservoir cap [5] and tighten the screws [6] to the specified torque.

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



Install the reservoir, aligning the locating tab [1] with the cutout [2] in the stay and tighten the mounting bolt.



BRAKE PAD/DISC

BRAKE PAD REMOVAL/ INSTALLATION

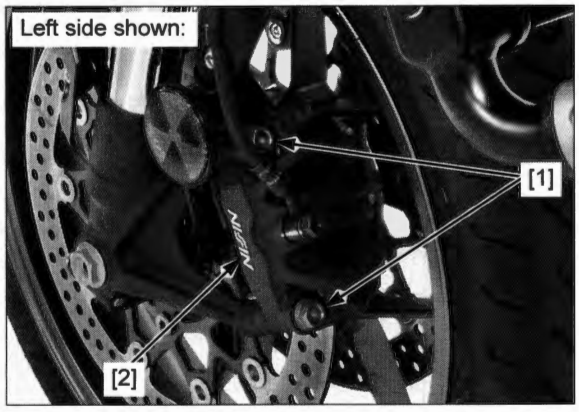
NOTE:

- Always replace the brake pads in pairs to ensure even disc pressure.
- Check the fluid level in the reservoir as this operation causes the fluid level to rise.

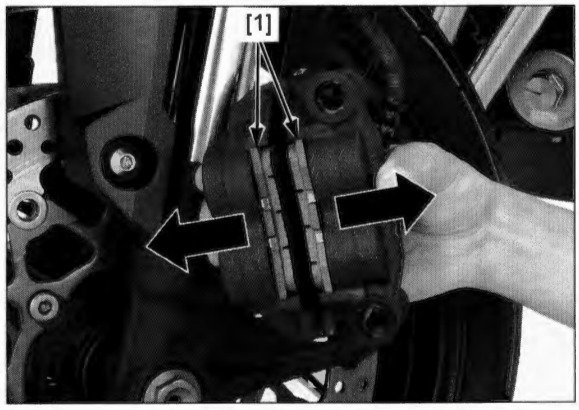
FRONT

Do not operate the brake lever after removing the brake caliper.

Remove the brake caliper mounting bolts [1] and brake caliper [2].



Push the caliper pistons all the way in to allow installation of new brake pads by pushing the brake pads [1] with a screwdriver or equivalent.



NOTE:

- Check the fluid level in the reservoir as this operation causes the fluid level to rise.

Slide the one pad [1] inward to release its tabs [2] from the grooves in the caliper body, and remove it.

Remove the other pad in the same manner.

Remove the pad spring [3].

Clean the inside of the caliper body especially around the caliper pistons.

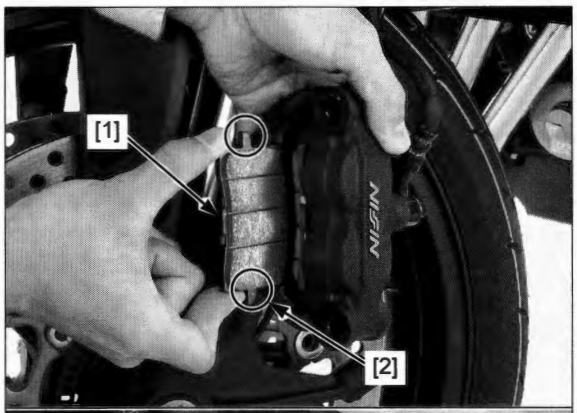
Set the pad spring into the caliper body as shown.

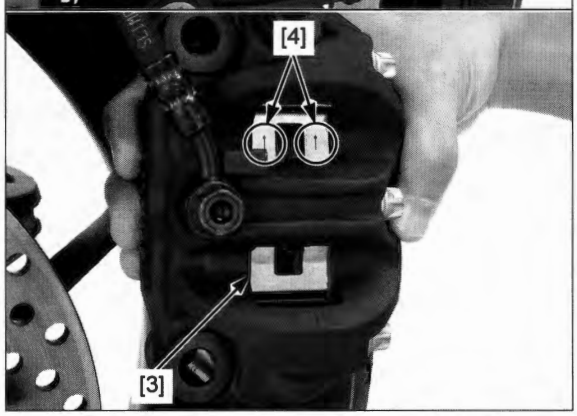
NOTE:

- Install the pad spring with the arrows [4] facing up.

Install the one pad by setting the tabs into the grooves in the caliper body while pushing in the pad against the pad spring straight. Slide the pad to seat it on the caliper pistons.

Install the other pad in the same manner.





Install the brake caliper [1] to the fork leg so that the disc is positioned between the pads.

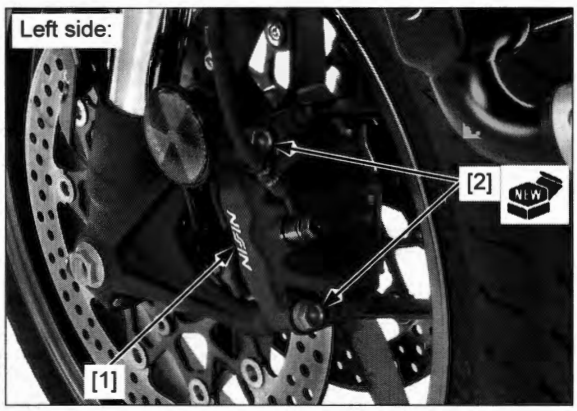
Install new mounting bolts [2] and tighten them to the specified torque.

NOTE:

- Do not to damage the brake pads.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

Operate the brake lever to seat the caliper pistons against the pads.

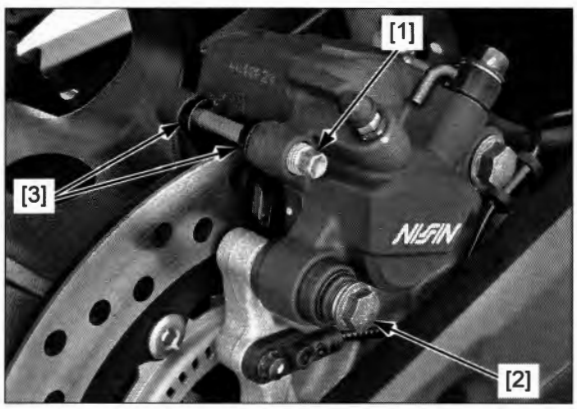


REAR

Loosen the pad pin [1] and remove the caliper bolt [2].

Do not operate the brake pedal after removing the pads.

Pivot the caliper body up, and remove the pad pin and brake pads [3].



Make sure the pad spring [1] is installed in position (page 18-15).

Be sure the stopper ring [2] on the pad pin is in good condition, and replace it with a new one if necessary.

Coat the stopper ring with silicone grease.

Install the pads [3] so that their ends are rest on the pad retainer [4] properly.

Lower the caliper body and loosely install a new caliper bolt [5].

Install the pad pin [6] by pushing the pads against the pad spring to align the pad pin holes in the pads and caliper body.

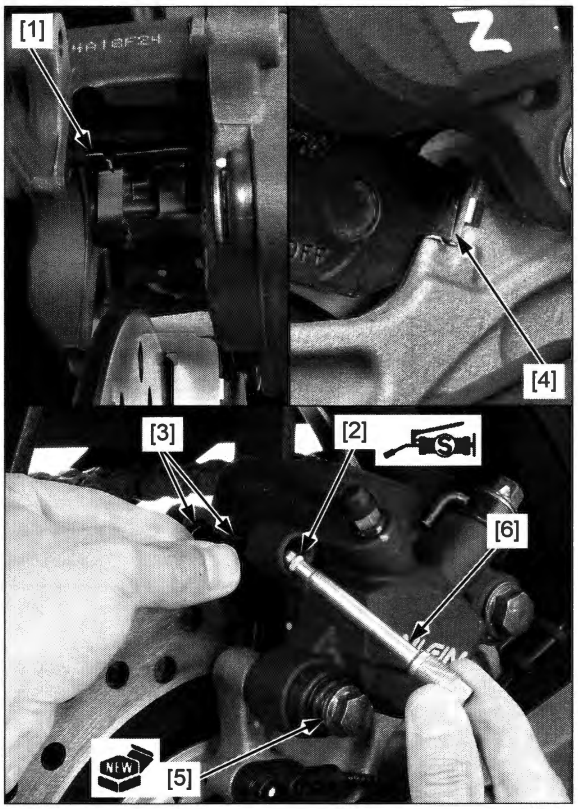
Tighten the caliper bolt to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the pad pin to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 13 lbf·ft)

Operate the brake pedal to seat the caliper piston against the pads.



BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.

Measure the brake disc according to HYDRAULIC BRAKE SPECIFICATIONS (page 1-9) and replace if necessary.

FRONT MASTER CYLINDER

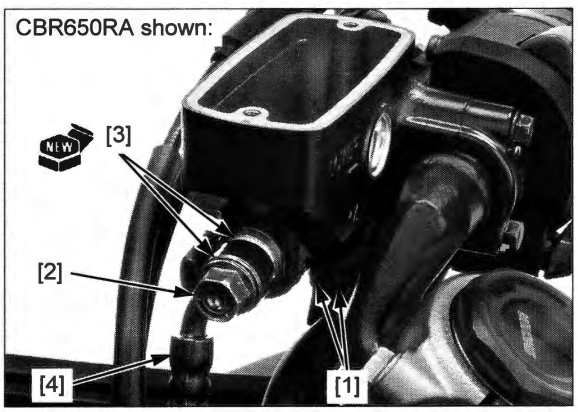
REMOVAL/INSTALLATION

Drain the brake fluid from the front brake hydraulic system (page 18-5).

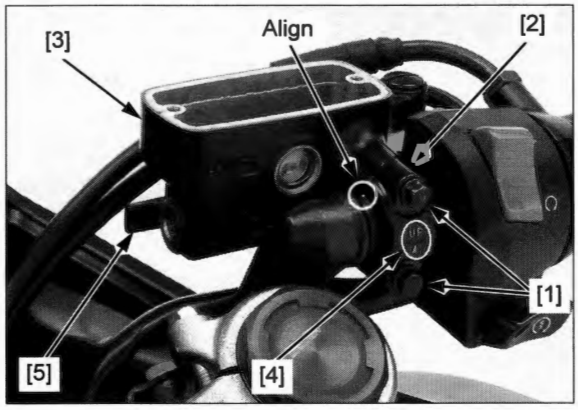
When removing the oil bolt, cover the end of the brake hose to prevent contamination.

Remove the following:

- Brake light switch connectors [1]
- Oil bolt [2]
- Sealing washers [3]
- Brake hose [4]



– Two bolts [1]
– Master cylinder holder [2]
– Master cylinder [3]



Installation is in the reverse order of removal.

NOTE:

- Replace the sealing washers with new ones.
- Install the master cylinder holder with the "UP" mark [4] facing up.
- Align the edge of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first then tighten the lower bolt.
- Be sure to set the eyelet joint onto the stopper [5] when connecting the brake hose.

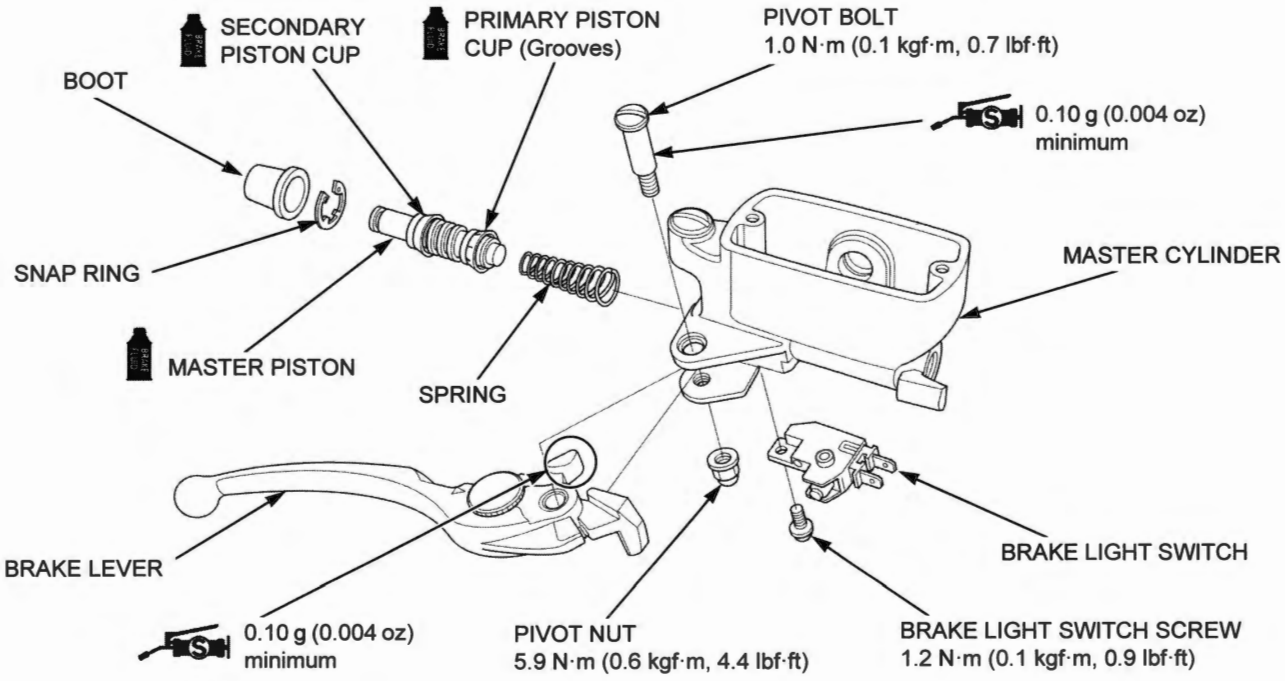
TORQUE:
Front master cylinder holder bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)
Oil bolt: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the front brake hydraulic system (page 18-6).

DISASSEMBLY/ASSEMBLY

Disassemble and assemble the front master cylinder as following illustration.

- Do not allow the piston cup lips to turn inside out.
- Install the snap ring with the chamfered edge facing the thrust load side and be certain it is firmly seated in the groove. Do not reuse worm snap ring which could easily spin in the groove.
- Align the switch boss with the master cylinder hole properly.
- When tightening the pivot nut, hold the pivot bolt securely.



INSPECTION

Check the following parts for scoring, scratches, deterioration or damage.

– Master cylinder
– Master piston
– Piston cups
– Spring
– Boot

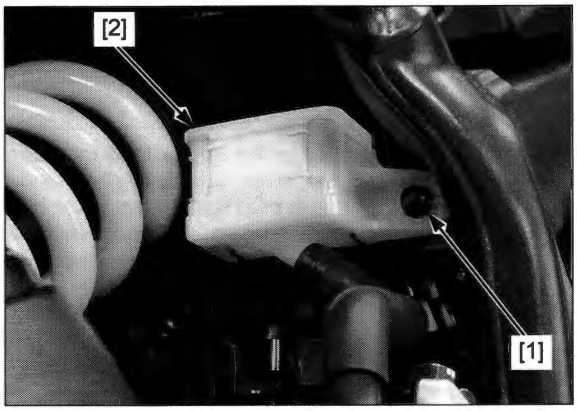
Measure the parts according to HYDRAULIC BRAKE SPECIFICATIONS (page 1-9) and replace if necessary.

REAR MASTER CYLINDER

REMOVAL/INSTALLATION

Drain the brake fluid from the rear brake hydraulic system (page 18-5).

Remove the stay bolt [1] and rear brake reservoir [2].

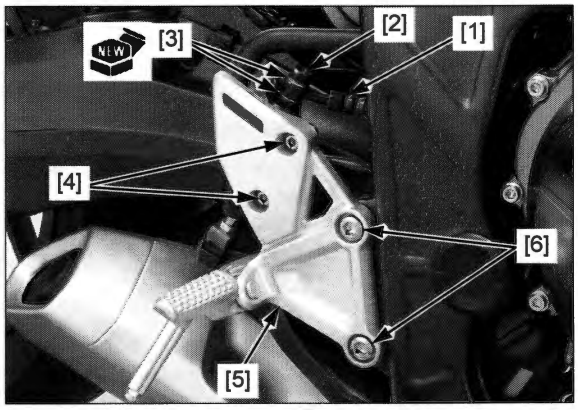


When removing the oil bolt, cover the end of the brake hose to prevent contamination.

Disconnect the brake hose [1] by removing the oil bolt [2] and sealing washers [3].

Loosen the master cylinder mounting socket bolts [4].

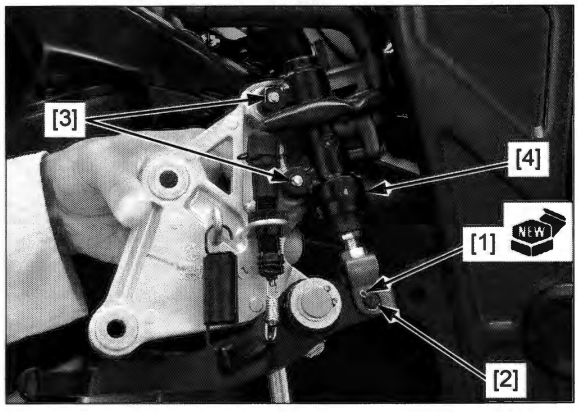
Support the right rider footpeg bracket [5] securely and remove the bracket socket bolts [6].



Remove the following.

- Cotter pin [1]
- Joint pin [2]
- Mounting socket bolts [3]
- Master cylinder [4]

Installation is in the reverse order of removal.



NOTE:

- Replace the sealing washers and cotter pin with new ones.
- Be sure to rest the eyelet stopper pin against the stopper when tightening the oil bolt.

TORQUE:

Rider footpeg bracket socket bolt:
27 N·m (2.8 kgf·m, 20 lbf·ft)

Rear master cylinder mounting socket bolt:
12 N·m (1.2 kgf·m, 9 lbf·ft)

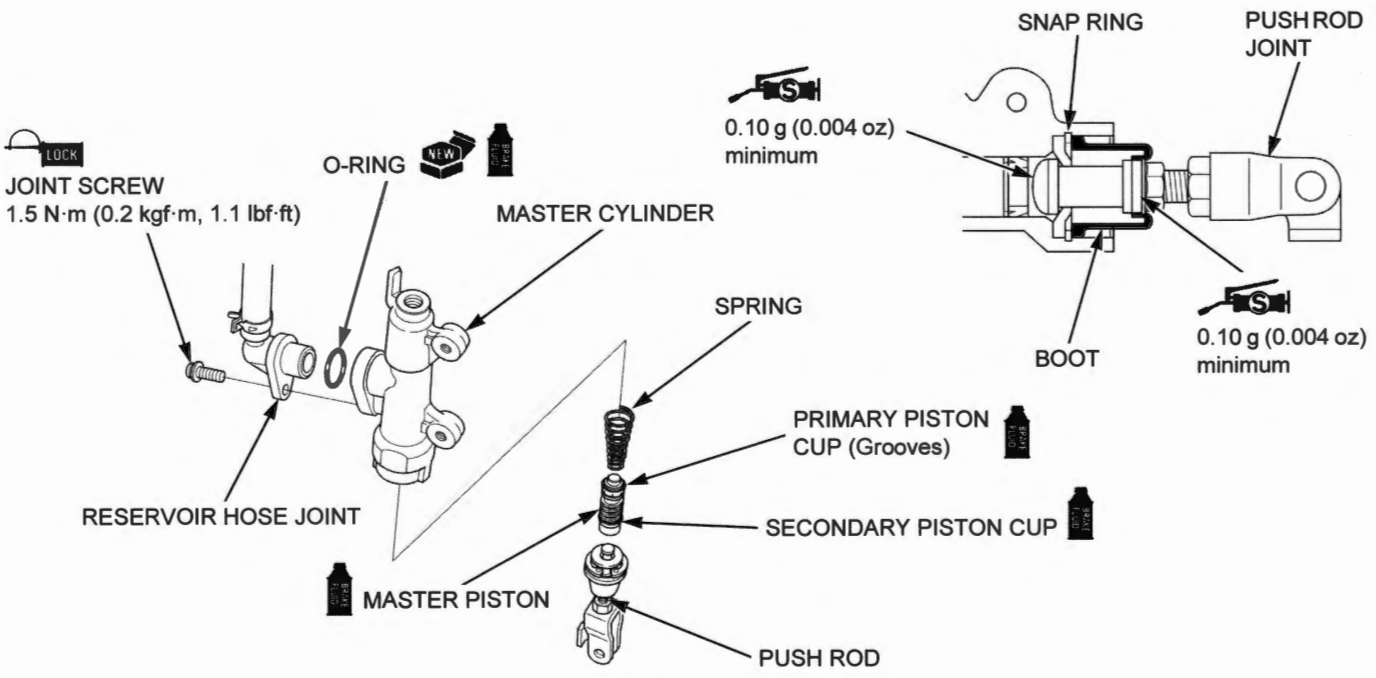
Oil bolt:
34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the rear brake hydraulic system (page 18-6).

DISASSEMBLY/ASSEMBLY

Disassemble and assemble the rear master cylinder as following illustration.

- Adjust the push rod length between the center of the lower mounting bolt hole and center of the joint pin hole when installing the push rod joint.
- Do not allow the piston cup lips to turn inside out.
- Install the snap ring with the chamfered edge facing the thrust load side and be certain it is firmly seated in the groove. Do not reuse worm snap ring which could easily spin in the groove.



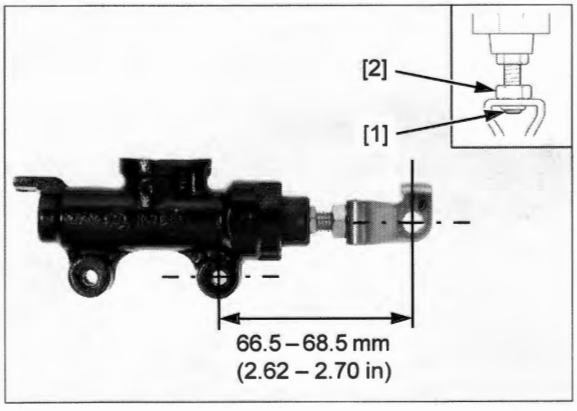
When the push rod has been disassembled, adjust the push rod length so that the distance from the center of the master cylinder lower mounting bolt hole to the center of the joint pin hole is standard length as shown.

If the length is adjusted to the longer position, make sure that the lower end of the push rod thread [1] is visible inside the joint.

After adjustment, tighten the joint nut [2] to the specified torque.

TORQUE:

Rear master cylinder push rod joint nut:
17 N·m (1.7 kgf·m, 13 lbf·ft)



INSPECTION

Check the following parts for scoring, scratches, deterioration or damage.

- Master cylinder
- Master piston
- Piston cups
- Spring
- Boot

Measure the parts according to HYDRAULIC BRAKE SPECIFICATIONS (page 1-9) and replace if necessary.

FRONT BRAKE CALIPER

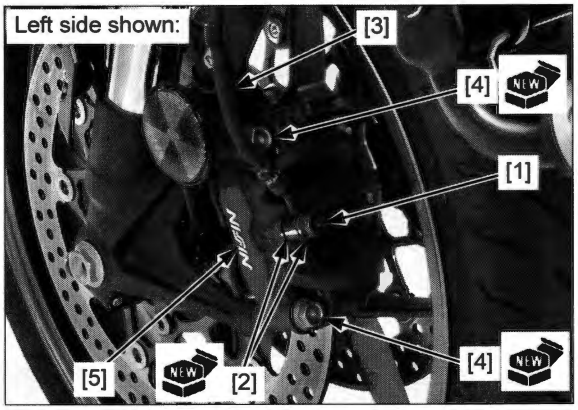
REMOVAL/INSTALLATION

Drain the brake fluid from the front brake hydraulic system (page 18-5).

Remove the following:

When removing the oil bolt, cover the end of brake hose to prevent contamination.

- Oil bolt [1]
- Sealing washers [2]
- Brake hose [3]
- Mounting bolts [4]
- Brake caliper [5]



Installation is in the reverse order of removal.

NOTE:

- Replace the sealing washers and brake caliper mounting bolts with new ones.
- Be sure to rest the eyelet joint against the stopper when tightening the oil bolt.

TORQUE:

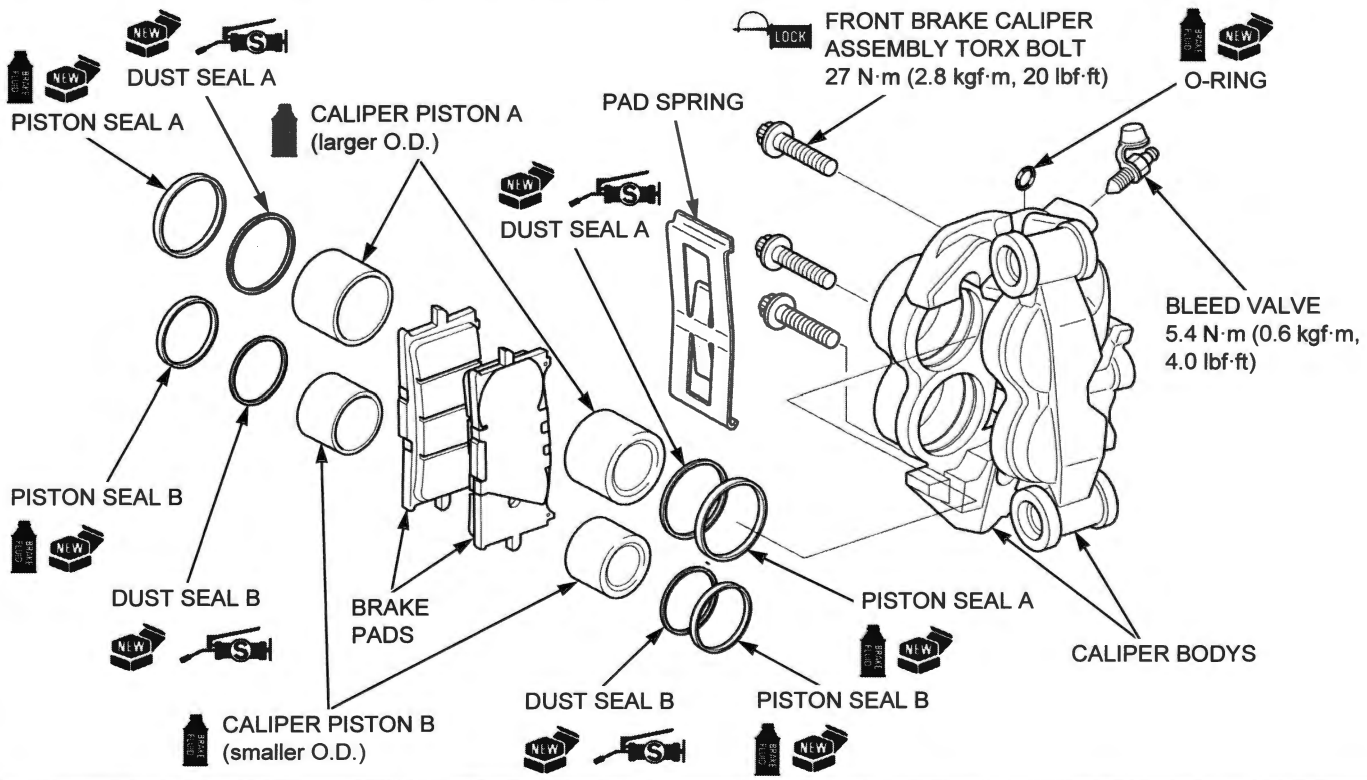
Front brake caliper mounting bolt: 45 N·m (4.6 kgf·m, 33 lbf·ft)
Oil bolt: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the front brake hydraulic system (page 18-6).

DISASSEMBLY/ASSEMBLY

Disassemble and assemble the front brake caliper as following illustration.

- Be careful not to damage each piston.
- Mark the pistons to ensure that they are reinstalled in their original locations.
- When removing the caliper pistons with compressed air, place a shop towel over the pistons to prevent damaging the pistons and caliper body. Do not use high pressure or bring the nozzle too close to the fluid inlet.
- Install each caliper piston in their proper locations.
  - Piston A: larger O.D.
  - Piston B: smaller O.D.
- Do not disassemble the caliper bodies unless necessary.



INSPECTION

Check the following parts for scoring, scratches, deterioration or damage.

- Caliper cylinders
- Caliper pistons

Measure the parts according to HYDRAULIC BRAKE SPECIFICATIONS (page 1-9) and replace if necessary.

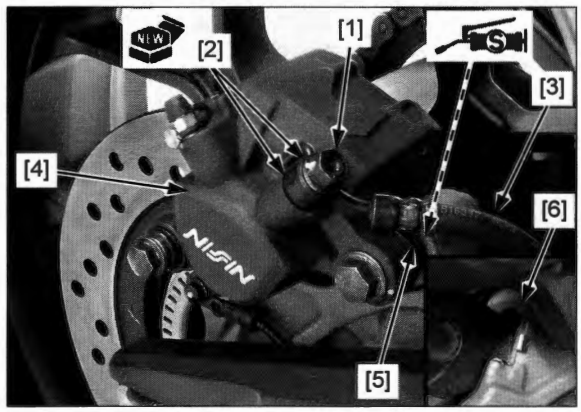
REAR BRAKE CALIPER

REMOVAL/INSTALLATION

Drain the brake fluid from the rear brake hydraulic system (page 18-5).

When removing the oil bolt, cover the end of brake hose to prevent contamination.

- Oil bolt [1]
- Sealing washers [2]
- Brake hose [3]
- Brake pads (page 18-8)
- Brake caliper [4]
- Caliper pin boot [5]



Installation is in the reverse order of removal.

NOTE:

- Replace the sealing washers with new ones.
- If the pad retainer [6] was removed, apply Honda Bond A or equivalent to the retainer seating surface.
- Apply silicone grease to the sliding area of the caliper pin bolt.
- Be sure to rest the eyelet stopper pin against the caliper body when tightening the oil bolt.

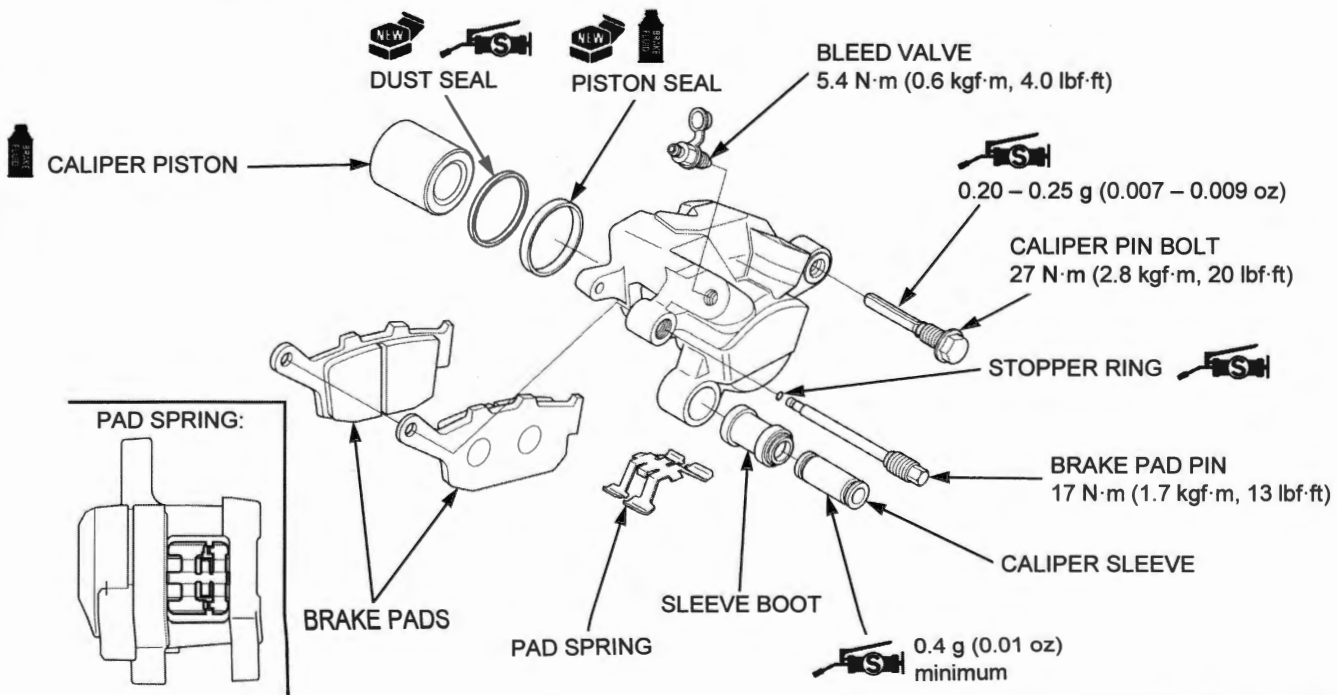
TORQUE: Oil bolt: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the rear brake hydraulic system (page 18-6).

DISASSEMBLY/ASSEMBLY

Disassemble and assemble the rear brake caliper as following illustration.

- When removing the caliper piston with compressed air, place a shop towel over the piston to prevent damaging the piston and caliper body. Do not use high pressure or bring the nozzle too close to the fluid inlet.
- Install the piston with the opening toward the pads.



INSPECTION

Check the following parts for scoring, scratches, deterioration or damage.

- Caliper cylinder
- Caliper piston

Measure the parts according to HYDRAULIC BRAKE SPECIFICATIONS (page 1-9) and replace if necessary.

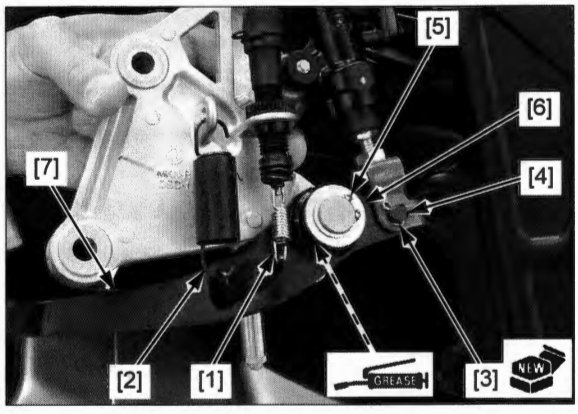
BRAKE PEDAL

REMOVAL/INSTALLATION

Support the right rider footpeg bracket [1] securely and remove the bracket socket bolts [2].

Remove the following:

- Switch spring [1]
- Return spring [2]
- Cotter pin [3]
- Joint pin [4]
- Snap ring [5]
- Washer [6]
- Brake pedal [7]



Installation is in the reverse order of removal.

NOTE:

- Apply grease to the pedal pivot sliding area (grease groove).
- Install the snap ring with the chamfered edge facing the thrust load side and be certain it is firmly seated in the groove. Do not reuse worm snap ring which could easily spin in the groove.
- Replace the cotter pin with a new one.
- Install each spring in the direction as shown.

TORQUE:

Rider footpeg bracket socket bolt:
27 N·m (2.8 kgf·m, 20 lbf·ft)

19. ANTI-LOCK BRAKE SYSTEM (ABS)

SERVICE INFORMATION 19-2

SYSTEM LOCATION 19-3

SYSTEM DIAGRAM 19-4

ABS TROUBLESHOOTING INFORMATION 19-5

DTC INDEX 19-9

ABS INDICATOR CIRCUIT TROUBLESHOOTING 19-11

ABS TROUBLESHOOTING 19-13

WHEEL SPEED SENSOR 19-22

ABS MODULATOR 19-25

SERVICE INFORMATION

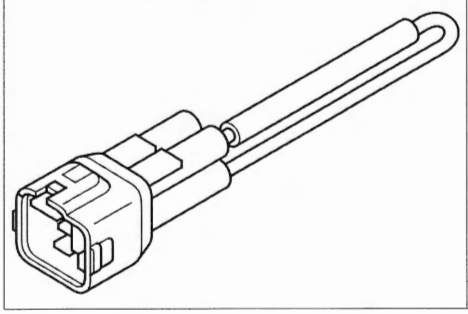
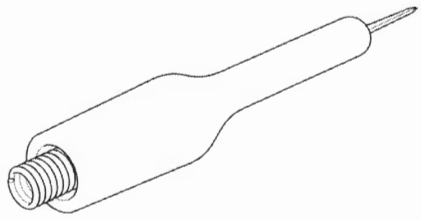
GENERAL

NOTICE

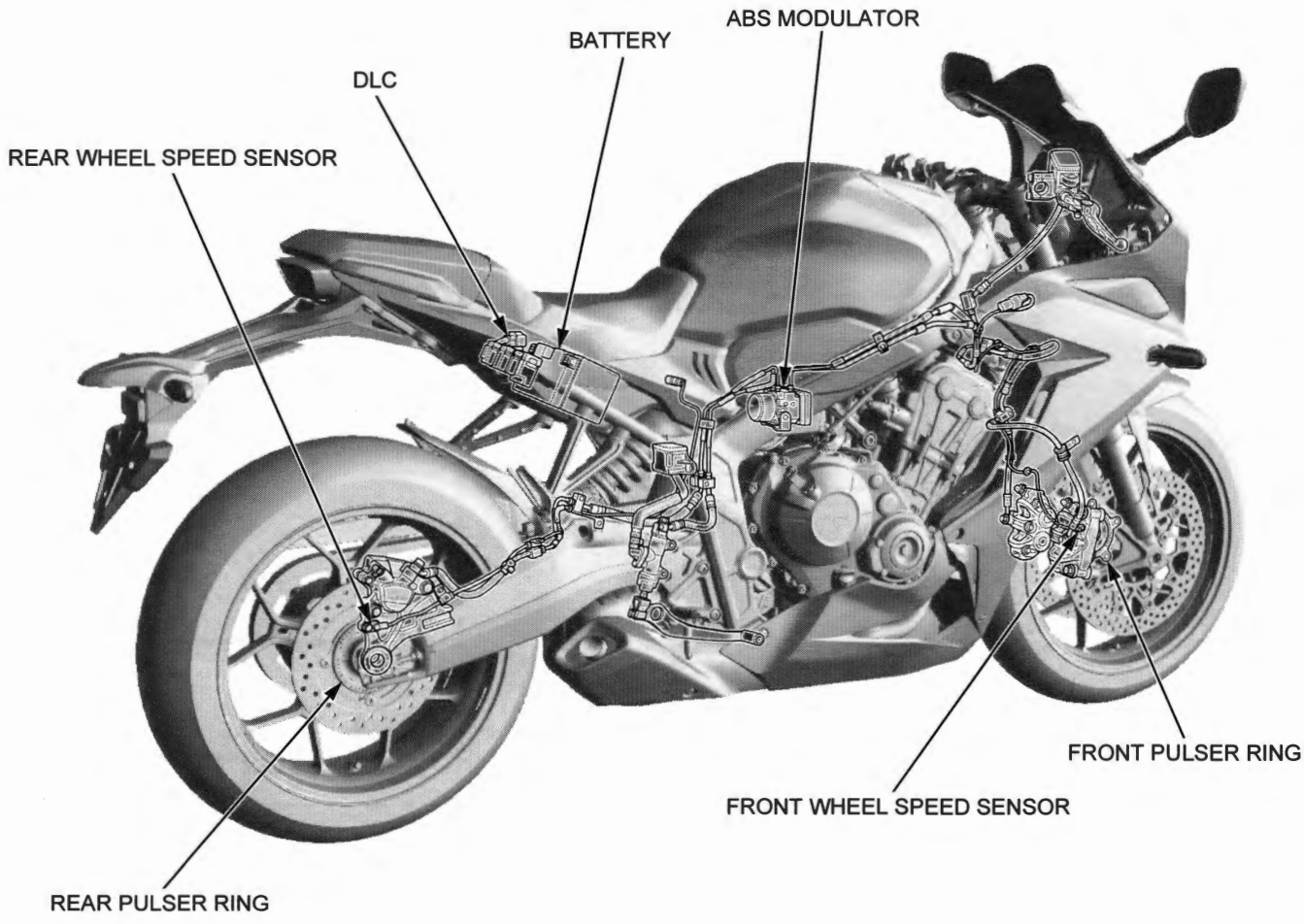
- *The ABS modulator may be damaged if dropped. Also if a connector is disconnected when current is flowing, the excessive voltage may damage the control unit. Always turn off the ignition switch before servicing.*
- *Spilling brake fluid will severely damage plastic parts and painted surfaces. It is also harmful to some rubber parts.*
- This section covers service of the Anti-lock Brake System (ABS). For other service of the brake system, see Hydraulic Brake section (page 18-2).
- The ABS control unit is integrated in the modulator. Do not disassemble the ABS modulator. Replace the ABS modulator as an assembly when the it is faulty.
- The ABS control unit performs pre-start self-diagnosis to check whether the ABS functions normally until the vehicle speed reaches 10 km/h (6 mph). After pre-start self-diagnosis, the ABS control unit monitors the ABS functions and vehicle running condition constantly until the ignition switch is turned OFF (ordinary self-diagnosis).
- When the ABS control unit detects a problem, it stops the ABS function and switches back to the conventional brake operation, and the ABS indicator blinks or stays on. Take care during the test-ride.
- Read "ABS Troubleshooting Information" carefully, inspect and troubleshoot the ABS system according to the troubleshooting flow chart. Observe each step of the procedures one by one. Write down the DTC and probable faulty part before starting diagnosis and troubleshooting.
- Use a fully charged battery. Do not diagnose with a charger connected to the battery.
- After troubleshooting, erase the DTC and perform the pre-start self-diagnosis to be sure that the ABS indicator is operating normally (page 19-5).
- Troubles not resulting from a faulty ABS (e.g. brake disc squeak, unevenly worn brake pad) cannot be recognized by the ABS diagnosis system.
- When the wheel speed sensor and/or pulser ring is replaced, be sure to check the air gap (page 19-22).
- The following color codes are used throughout this section.

Bl = Black	G = Green	Lg = Light Green	R = Red	Y = Yellow
Br = Brown	Gr = Gray	O = Orange	V = Violet	
Bu = Blue	Lb = Light Blue	P = Pink	W = White	

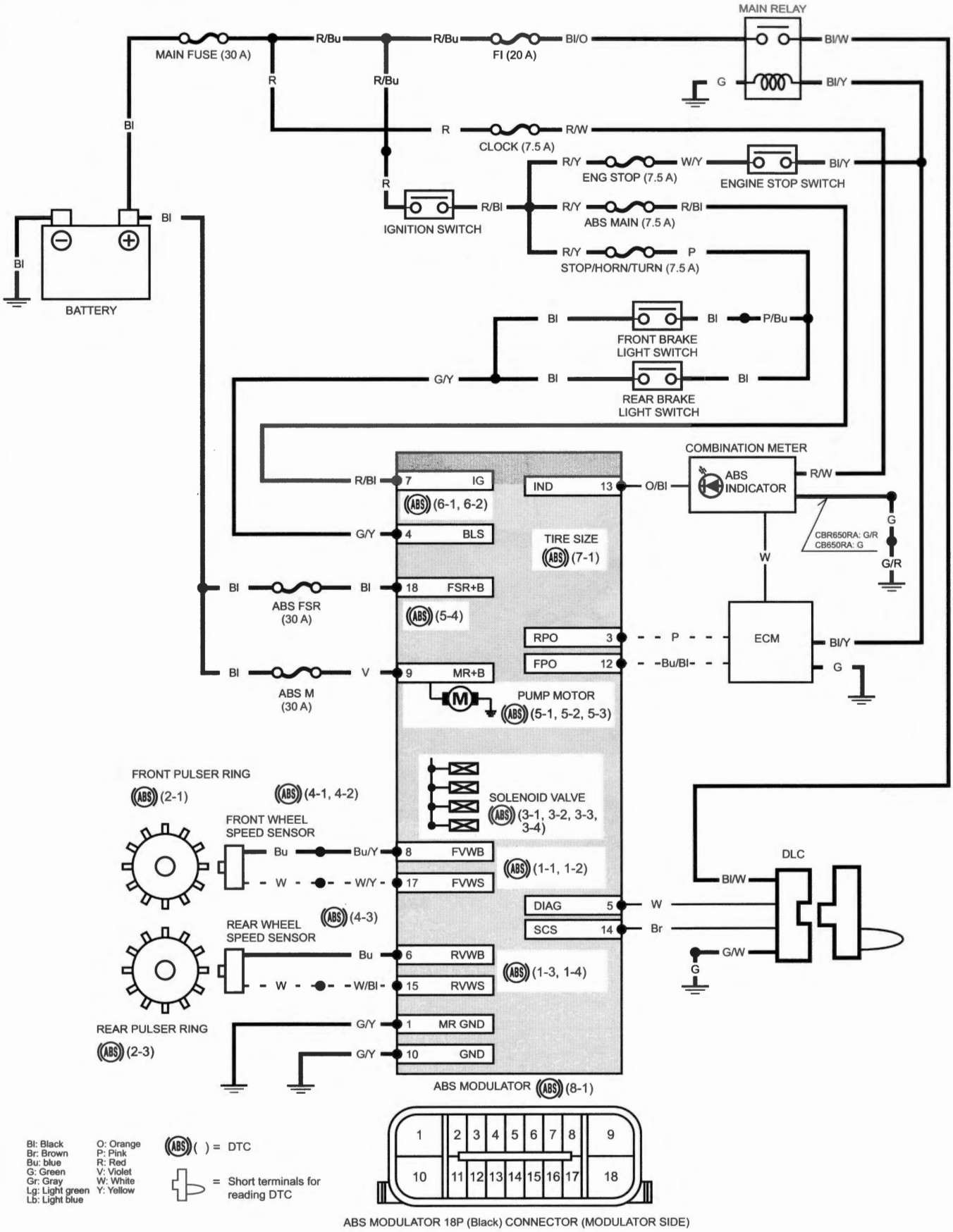
TOOLS

SCS service connector 070PZ-ZY30100	Test probe, 2 pack 07ZAJ-RDJA110
	

SYSTEM LOCATION



SYSTEM DIAGRAM



ABS TROUBLESHOOTING INFORMATION

SYSTEM DESCRIPTION

SUMMARY OF ABS PRE-START SELF-DIAGNOSIS SYSTEM

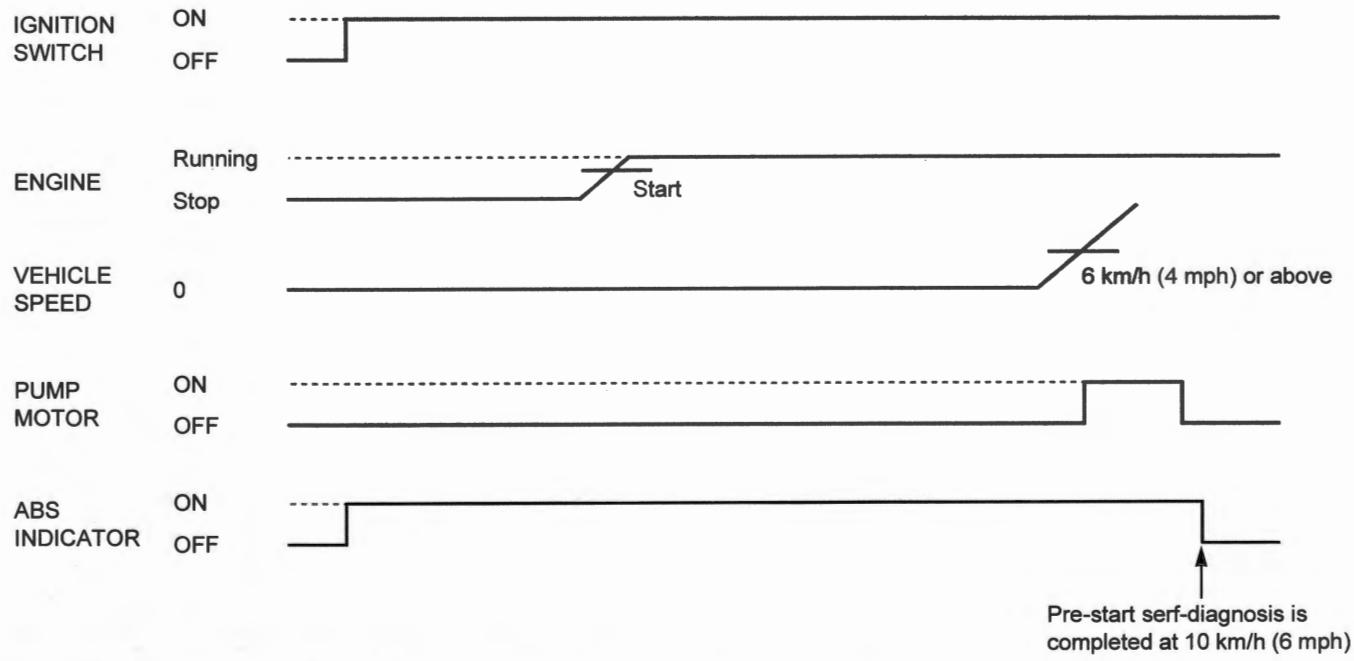
The ABS pre-start self-diagnosis system diagnoses the electrical system as well as the operating status of the modulator. When there is any abnormality, the problem and the associated part can be detected by reading the DTC.

When the motorcycle is running, pulse signals generated at the front and rear wheel speed sensors are sent to the ABS control unit. When the vehicle speed reaches approximately 6 km/h (4 mph), the ABS control unit operates the pump motor to check it. When the vehicle speed reaches 10 km/h (6 mph), the ABS control unit turns off the ABS indicator if the system is normal and the pre-start self-diagnosis is completed.

If any problem is detected, the ABS indicator blinks or comes on and stays on to notify the rider of the problem. The self-diagnosis is also made while the motorcycle is running, and the ABS indicator blinks when a problem is detected.
When the ABS indicator blinks, the cause of the problem can be identified by reading the DTC (page 19-6).

If the ABS indicator does not come on when the ignition switch is turned ON, or the ABS indicator stays on after the pre-start self-diagnosis is completed although the ABS system is normal, the ABS indicator circuit may be faulty. Follow the troubleshooting (page 19-13).

Pre-start serf-diagnosis when the system is normal:



PRE-START SELF-DIAGNOSIS PROCEDURE (Daily check)

1. Turn the ignition switch ON with the engine stop switch "○".
2. Make sure the ABS indicator comes on.
3. Start the engine.
4. Ride the motorcycle and increase the vehicle speed to approximately 10 km/h (6 mph).
5. The ABS is normal if the ABS indicator goes off.

MCS INFORMATION

- The MCS can read out and erase the DTC.

How to connect the MCS

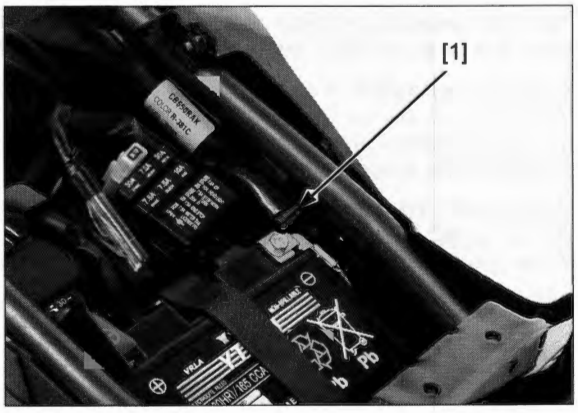
Remove the main seat (page 2-11).

Turn the ignition switch OFF.

Remove the dummy connector [1] from the DLC.

Connect the MCS to the DLC.

Turn the ignition switch ON with the engine stop switch "○" and check the DTC.



DTC READOUT

NOTE:

- The DTC is not erased by turning the ignition switch OFF while the DTC is being output. Note that turning the ignition switch ON again does not indicate the DTC. To show the DTC again, repeat the DTC readout procedures from the beginning.
- Be sure to record the indicated DTC(s).
- After diagnostic troubleshooting, erase the DTC and perform the pre-start self-diagnosis procedure to be sure that there is no problem in the ABS (page 19-5).
- Do not apply the brake during DTC readout.

Connect the MCS to the DLC (page 19-6).

Read the DTC and follow the DTC index (page 19-9).

- If the MCS is not available, perform the following.

Reading DTC with the ABS indicator

Remove the main seat (page 2-11).

Turn the ignition switch OFF.

Remove the dummy connector [1] from the DLC.

Short the DLC terminals using the special tool.

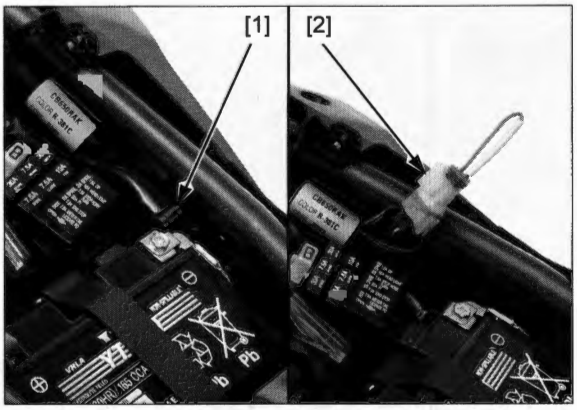
TOOL:
[2] SCS service connector 070PZ-ZY30100

CONNECTION: Brown – Green

Turn the ignition switch ON with the engine stop switch to "○".

The ABS indicator should come on 2 seconds (start signal) (then goes off 3.6 seconds) and starts DTC indication.

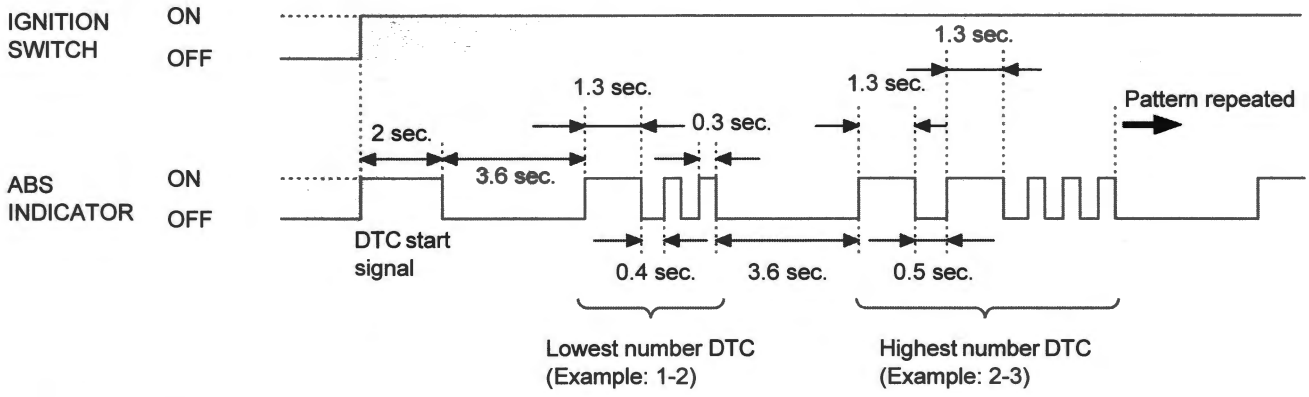
The DTC is indicated by the number of the times of the ABS indicator blinking.
If the DTC is not stored, the ABS indicator stays on.



DTC INDICATION PATTERN

NOTE:

- The ABS indicator indicates the DTC by blinking a specified number of times. The indicator has two types of blinking, a long blink and short blink. The long blink lasts for 1.3 seconds, the short blink lasts for 0.3 seconds. For example, when one long blink is followed by two short blinks, the DTC is 1-2 (one long blink = 1 blink, plus two short blinks = 2 blinks).
- When the ABS control unit stores some DTCs, the ABS indicator shows the DTCs in the order from the lowest number to highest number. For example, when the ABS indicator indicates DTC 1-2, then indicates DTC 2-3, two failures have occurred.



When the DTC is not stored:

ERASING STORED DTC

NOTE:

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

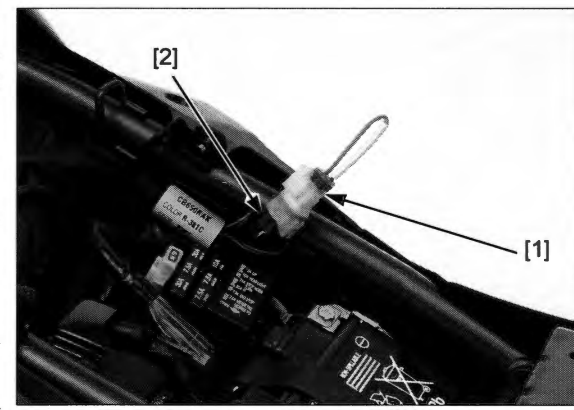
Erase the DTC with the MCS while the engine is stopped.

How to erase the DTC without MCS

1. Connect the SCS service connector [1] to the DLC [2] (page 19-6).
2. While squeezing the brake lever, turn the ignition switch ON with the engine stop switch to "○". The ABS indicator should come on for 2 seconds and go off.
3. Release the brake lever immediately after the ABS indicator goes off. The ABS indicator should come on.
4. Squeeze the brake lever immediately after the ABS indicator comes on. The ABS indicator should go off.
5. Release the brake lever immediately after the ABS indicator goes off.

   When the DTC is erased, the ABS indicator blinks 2 times and stays on. If the ABS indicator does not blink 2 times, the self-diagnostic memory has not been erased, so try again.
6. Turn the ignition switch OFF and remove the SCS service connector from the DLC.

   Install the main seat (page 2-11).



CIRCUIT INSPECTION

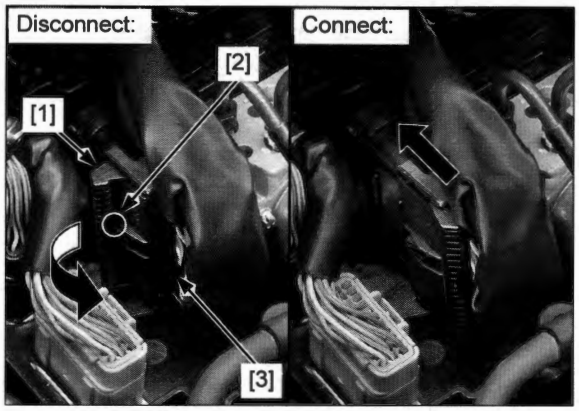
INSPECTION AT ABS MODULATOR CONNECTOR

Remove the ABS modulator cover (page 4-42).

Turn the ignition switch OFF.

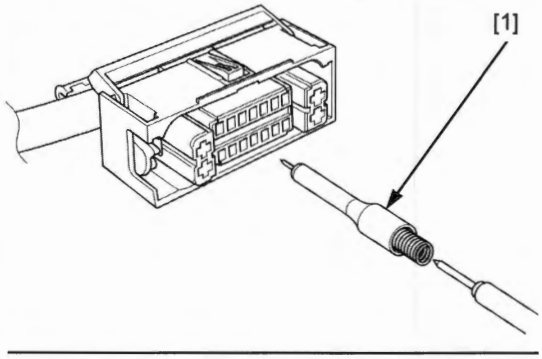
Disconnecting procedure:
Turn the lock lever [1] to this side while pressing the lock tab [2] to release it. Be sure the lock lever is turned all the way and disconnect the ABS modulator 18P (Black) connector [3].

Connecting procedure:
Be sure to seat the lock lever against the wire side of the connector fully. Connect the ABS modulator 18P (Black) connector by pressing it straight at the area as shown (arrow) until the lock tab clicks.
Make sure the connector is locked securely.

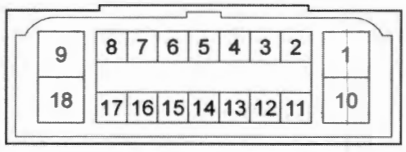


- Always clean around and keep any foreign material away from the connector before disconnecting it.
- A faulty ABS is often related to poorly connected or corroded connections. Check those connections before proceeding.
- In testing at ABS modulator 18P (Black) connector terminals (wire harness side; except No. 9 and No. 18 terminals), always use the test probe [1]. Insert the test probe into the connector terminal, then connect the digital multimeter probe to the test probe.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**



TERMINAL LAYOUT:



(Terminal side of the wire harness)

DTC INDEX

NOTE:

- The ABS indicator might blink in the following cases. Correct the faulty part.
  - Incorrect tire pressure.
  - Tires not recommended for the motorcycle were installed (incorrect tire size).
  - Deformation of the wheel or tire.
- The ABS indicator might blink while riding under the following conditions. This is temporary failure. Be sure to erase the DTC (page 19-7).
  Then, test-ride the motorcycle above 30 km/h and check the DTC (page 19-6). Ask the rider for the riding conditions in detail when the motorcycle is brought in for inspection.
  - The motorcycle has continuously run bumpy roads.
  - The front wheel leaves the ground for a long time when riding (wheelie).
  - Only either the front or rear wheel rotates.
  - The ABS operates continuously.
  - The ABS control unit has been disrupted by an extremely powerful radio wave (electromagnetic interference).

DTC	Function failure	Detection		Symptom/Fail-safe function	Refer to
		A	B		
–	ABS indicator malfunction • ABS modulator voltage input line • Indicator related wires • speedometer • ABS modulator • ABS MAIN fuse (7.5 A)			• ABS indicator never comes ON at all	19-11
				• ABS indicator stays ON at all	19-11
1-1	Front wheel speed sensor circuit malfunction • Wheel speed sensor or related wires	O	O	• Stops ABS operation	19-13
1-2	Front wheel speed sensor malfunction • Wheel speed sensor, pulser ring or related wires • Electromagnetic interference		O	• Stops ABS operation	19-13
1-3	Rear wheel speed sensor circuit malfunction • Wheel speed sensor or related wires	O	O	• Stops ABS operation	19-15
1-4	Rear wheel speed sensor malfunction • Wheel speed sensor, pulser ring or related wires • Electromagnetic interference		O	• Stops ABS operation	19-15
2-1	Front pulser ring • Pulser ring or related wires		O	• Stops ABS operation	19-13
2-3	Rear pulser ring • Pulser ring or related wires		O	• Stops ABS operation	19-15
3-1	Solenoid valve malfunction (ABS modulator)	O	O	• Stops ABS operation	19-17
3-2					
3-3					
3-4					
4-1	Front wheel lock • Riding condition		O	• Stops ABS operation	19-13
4-2	Front wheel lock (Wheelie) • Riding condition		O		
4-3	Rear wheel lock • Riding condition		O	• Stops ABS operation	19-15
5-1	Pump motor lock • Pump motor (ABS modulator) or related wires • ABS M. fuse (30 A)	O	O	• Stops ABS operation	19-17
5-2	Pump motor stuck off • Pump motor (ABS modulator) or related wires • ABS M. fuse (30 A)	O	O	• Stops ABS operation	19-17
5-3	Pump motor stuck on • Pump motor (ABS modulator) or related wires • ABS M. fuse (30 A)	O	O	• Stops ABS operation	19-17
5-4	Fail safe relay malfunction • Fail safe relay (ABS modulator) or related wires • ABS FSR fuse (30 A)	O	O	• Stops ABS operation	19-19

DTC	Function failure	Detection		Symptom/Fail-safe function	Refer to
		A	B		
6-1	Power circuit under voltage • Input voltage (too low) • ABS MAIN fuse (7.5 A)	O	O	• Stops ABS operation	19-20
6-2	Power circuit over voltage • Input voltage (too high)	O	O	• Stops ABS operation	
7-1	Tire malfunction • Tire size		O	• Stops ABS operation	19-21
8-1	ABS control unit • ABS control unit malfunction (ABS modulator)	O	O	• Stops ABS operation	19-21

(A) Pre-start self-diagnosis (page 19-5).

(B) Ordinary self-diagnosis: diagnoses while the motorcycle is running (after pre-start self-diagnosis)

ABS INDICATOR CIRCUIT TROUBLESHOOTING

ABS INDICATOR DOES NOT COME ON (when the ignition switch turned ON)

NOTE:

- Before starting this inspection, check the initial operation of the combination meter (page 21-7).

1. Indicator Operation Inspection

Turn the ignition switch OFF.
Disconnect the ABS modulator 18P (Black) connector (page 19-8).
Turn the ignition switch ON with the engine stop switch "Ω".
Check the ABS indicator.

Does the ABS indicator come on?

YES – Faulty ABS modulator

NO – GO TO STEP 2.

2. Indicator Signal Line Short Circuit Inspection

Turn the ignition switch OFF.
Check for continuity between the wire harness side ABS modulator 18P (Black) connector [1] terminal and ground.

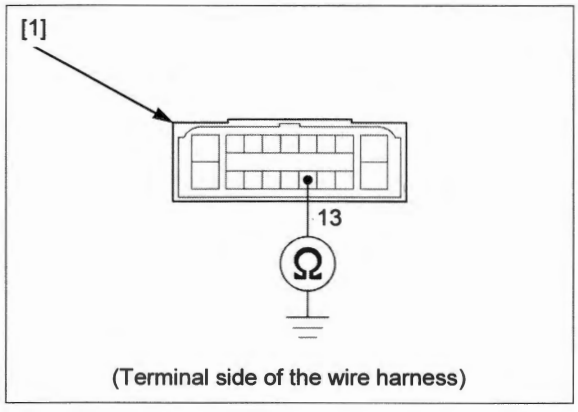
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 13 – Ground

Is there continuity?

YES – Short circuit in the Orange/black wire

NO – Faulty combination meter



(Terminal side of the wire harness)

ABS INDICATOR STAYS ON (Indicator does not go off when the motorcycle is running)

1. Service Check Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ABS modulator 18P (Black) connector (page 19-8).
Check for continuity between the wire harness side ABS modulator 18P (Black) connector [1] terminal and ground.

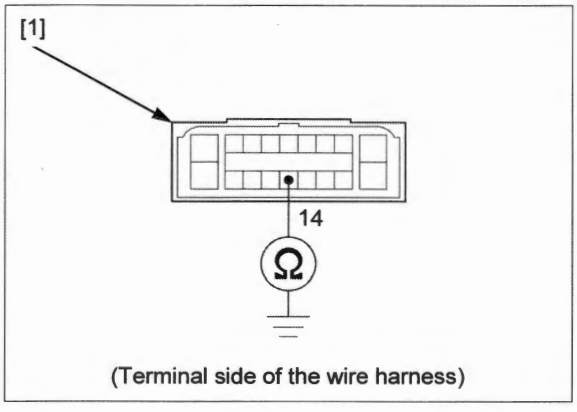
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 14 – Ground

Is there continuity?

YES – Short circuit in the Brown wire

NO – GO TO STEP 2.



(Terminal side of the wire harness)

2. Indicator Signal Line Open Circuit Inspection

Short the wire harness side ABS modulator 18P (Black) connector [1] terminal to the ground with a jumper wire [2].

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

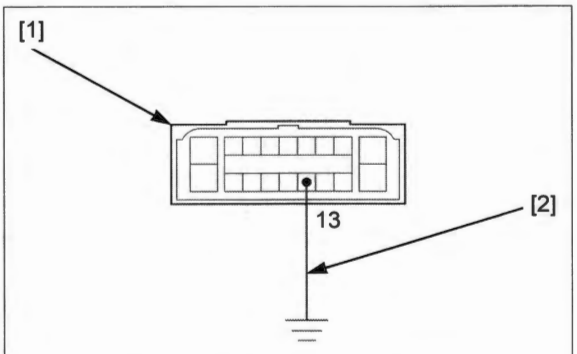
CONNECTION: 13 – Ground

Turn the ignition switch ON with the engine stop switch "○".
Check the ABS indicator.

Does it go off?

YES – GO TO STEP 3.

NO – • Open circuit in the Orange/black wire
• Faulty combination meter (if the Orange/black wire is OK)



(Terminal side of the wire harness)

3. Modulator Ground Line Open Circuit Inspection

Turn the ignition switch OFF.
Check for continuity between the wire harness side ABS modulator 18P (Black) connector [1] terminal and ground.

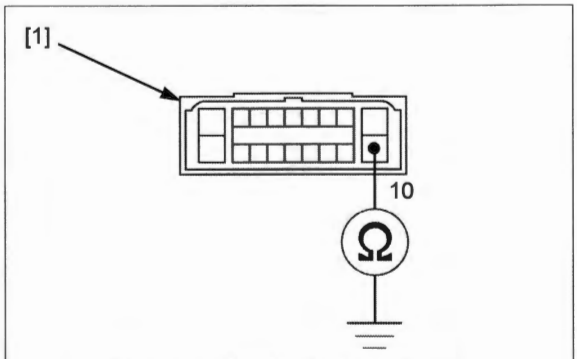
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 10 – Ground

Is there continuity?

YES – GO TO STEP 4.

NO – Open circuit in the Green/yellow wire



(Terminal side of the wire harness)

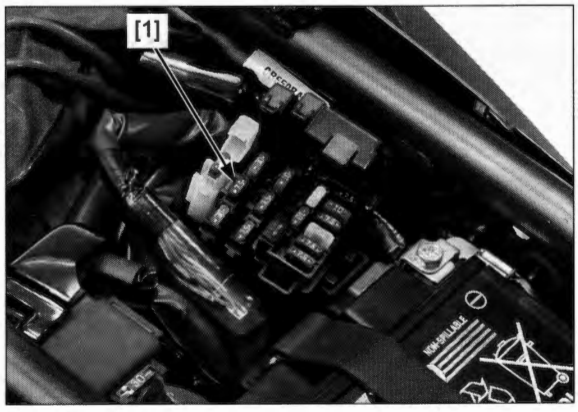
4. Fuse Inspection

Check the ABS MAIN fuse (7.5 A) [1] for blown.

Is the fuse blown?

YES – GO TO STEP 5.

NO – GO TO STEP 6.



5. Power Input Line Short Circuit Inspection

With the ABS MAIN fuse (7.5 A) removed, check for continuity between the wire harness side ABS modulator 18P (Black) connector [1] and ground.

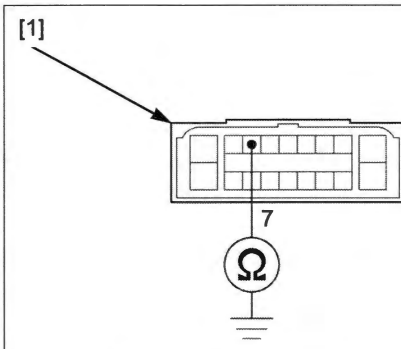
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 7 – Ground

Is there continuity?

YES – Short circuit in Red/black wire

NO – Intermittent failure. Replace the ABS MAIN fuse (7.5 A) with a new one, and recheck.



(Terminal side of the wire harness)

6. Power Input Line Open Circuit Inspection

Install the ABS MAIN fuse (7.5 A).
Turn the ignition switch ON with the engine stop switch "⟳".
Measure the voltage between the wire harness side ABS modulator 18P (Black) connector [1] terminal and ground.

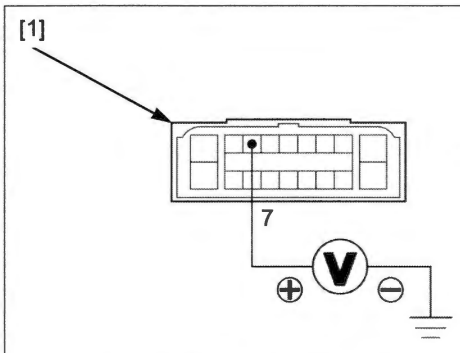
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 7 (+) – Ground (–)

Is there battery voltage?

YES – Faulty ABS modulator

NO – Open circuit in Red/black wire



(Terminal side of the wire harness)

ABS TROUBLESHOOTING

NOTE:
- Perform inspection with the ignition switch OFF, unless otherwise specified.
- All connector diagrams in the troubleshooting are viewed from the terminal side.
- Use a fully charged battery. Do not diagnose with a charger connected to the battery.
- When the ABS modulator assembly is detected to be faulty, recheck the wire harness and connector connections closely before replacing it.
- After diagnostic troubleshooting, erase the DTC (page 19-7) and test-ride the motorcycle to check that the ABS indicator operates normally during pre-start self-diagnosis (page 19-5).

DTC 1-1, 1-2, 2-1, 4-1 or 4-2 (Front Wheel Speed Sensor Circuit/Front Wheel Speed Sensor/Front Pulser Ring/Front Wheel Lock)

NOTE:
- The ABS indicator might blink under unusual riding or conditions (page 19-9). This is temporary failure. Erase the DTC (page 19-7) then test-ride the motorcycle above 30 km/h check that the ABS indicator operates normally (page 19-6).
- If the DTC 4-1 is indicated, check the front brake for drag.

1. **Speed Sensor Air Gap Inspection**

   Measure the air gap between the speed sensor and pulser ring (page 19-22).

   Is the air gap correct?

   YES – GO TO STEP 2.

   NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.

2. **Speed Sensor Condition Inspection**

   Inspect the area around the front wheel speed sensor:
   Check that there is iron or other magnetic deposits between the pulser ring [1] and wheel speed sensor [2], and the pulser ring slots for obstructions.
   Check the installation condition of the pulser ring or wheel speed sensor for looseness.
   Check the pulser ring and sensor tip for deformation or damage (e.g., chipped pulser ring teeth).

   Are the sensor and pulser ring in good condition?

   YES – GO TO STEP 3.

   NO – Remove any deposits. Install properly or replace faulty part.

3. **Front Wheel Speed Sensor Line Short Circuit Inspection (at sensor side)**

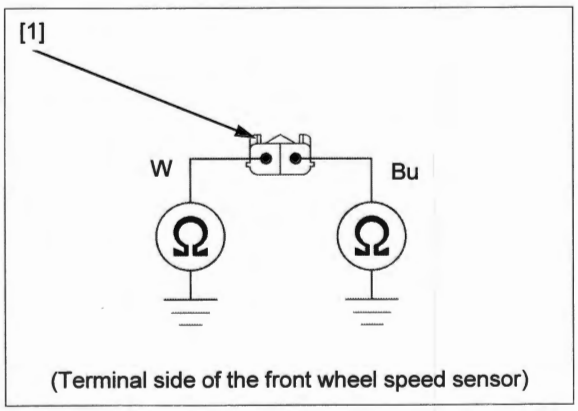
   Turn the ignition switch OFF.
   Disconnect the front wheel speed sensor 2P (Black) connector (page 19-22).
   Check for continuity between each terminal of the sensor side front wheel speed sensor 2P (Black) connector [1] and ground.

   CONNECTION: White – Ground
   Blue – Ground

   Is there continuity?

   YES – Faulty front wheel speed sensor

   NO – GO TO STEP 4.



(Terminal side of the front wheel speed sensor)

4. **Front Wheel Speed Sensor Line Short Circuit Inspection**

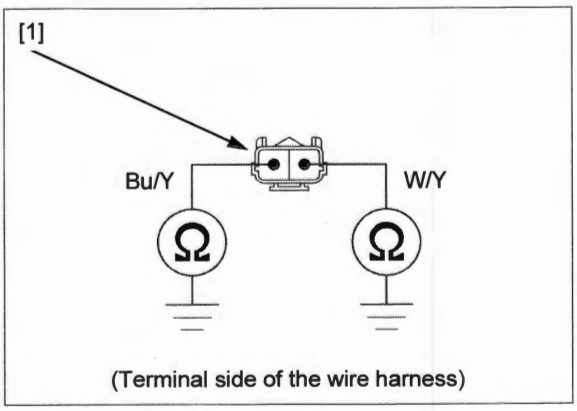
   Disconnect the ABS modulator 18P (Black) connector (page 19-8).
   Check for continuity between each terminal of the wire harness side front wheel speed sensor 2P (Black) connector [1] and ground.

   CONNECTION: Blue/yellow – Ground
   White/yellow – Ground

   Is there continuity?

   YES – • Short circuit in the Blue/yellow wire
   • Short circuit in the White/yellow wire

   NO – GO TO STEP 5.



(Terminal side of the wire harness)

5. Front Wheel Speed Sensor Line Open Circuit Inspection

Short the wire harness side ABS modulator 18P (Black) connector [1] terminals with a jumper wire [2].

CONNECTION: 8 – 17

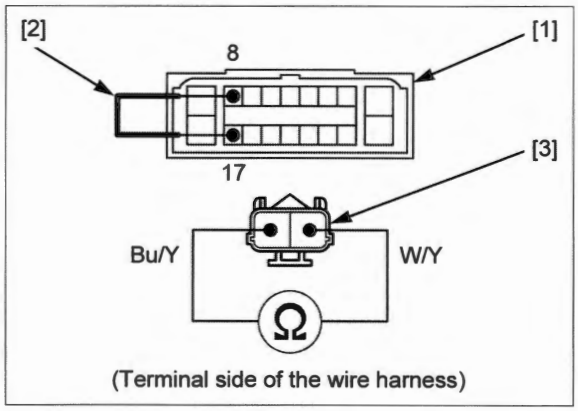
Check for continuity between the wire harness side front wheel speed sensor 2P (Black) connector [3] terminals.

CONNECTION: Blue/yellow – White/yellow

Is there continuity?

YES – GO TO STEP 6.

NO – Open circuit in the Blue/yellow or White/yellow wire



(Terminal side of the wire harness)

6. Failure Reproduction with a New Speed Sensor

Replace the front wheel speed sensor with a new one (page 19-22).
Connect the ABS modulator 18P (Black) and front wheel speed sensor 2P (Black) connectors.
Erase the DTC (page 19-7).
Test-ride the motorcycle above 30 km/h.
Recheck the DTC (page 19-6).

Is the DTC 1-1, 1-2, 2-1, 4-1 or 4-2 indicated?

YES – Faulty ABS modulator

NO – Faulty original wheel speed sensor

DTC 1-3, 1-4, 2-3, or 4-3 (Rear Wheel Speed Sensor Circuit/Rear Wheel Speed Sensor/Rear Pulser Ring/Rear Wheel Lock)

NOTE:

- The ABS indicator might blink under unusual riding or conditions (page 19-9). This is temporary failure. Erase the DTC (page 19-7) then test-ride the motorcycle above 30 km/h check that the ABS indicator operates normally (page 19-6).
- If the DTC 4-3 is indicated, check the front brake for drag.

1. Speed Sensor Air Gap Inspection

Measure the air gap between the speed sensor and pulser ring (page 19-22).

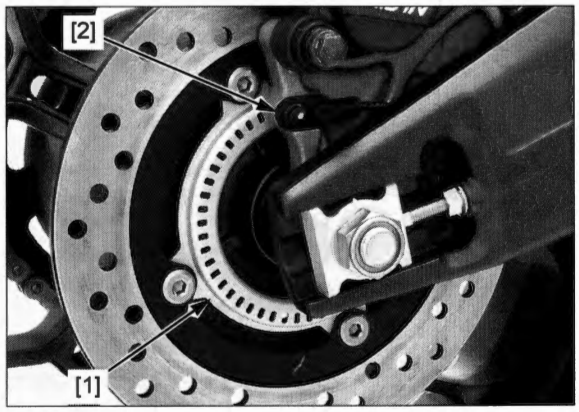
Is the air gap correct?

YES – GO TO STEP 2.

NO – Check each part for deformation and looseness and correct accordingly. Recheck the air gap.

2. Speed Sensor Condition Inspection

Inspect the area around the rear wheel speed sensor:
Check that there is iron or other magnetic deposits between the pulser ring [1] and wheel speed sensor [2], and the pulser ring slots for obstructions.
Check the installation condition of the pulser ring or wheel speed sensor for looseness.
Check the pulser ring and sensor tip for deformation or damage (e.g., chipped pulser ring teeth).



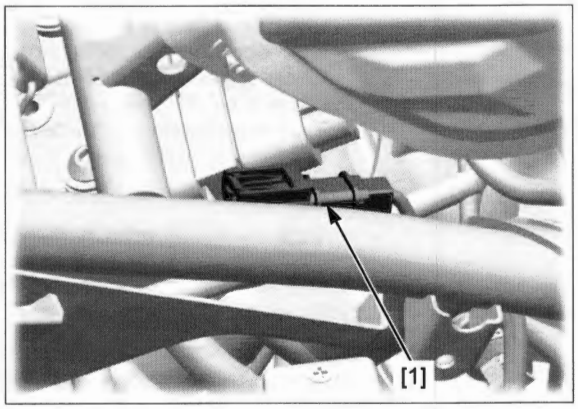
Are the sensor and pulser ring in good condition?

YES – GO TO STEP 3.

NO – Remove any deposits. Install properly or replace faulty part.

3. Rear Wheel Speed Sensor Line Short Circuit Inspection (at sensor side)

Turn the ignition switch OFF.
Lift the fuel tank and support it (page 3-4).
Disconnect the rear wheel speed sensor 2P (Black) connector [1].



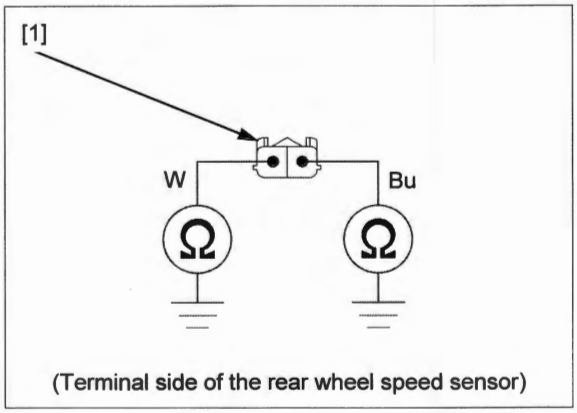
Check for continuity between each terminal of the sensor side rear wheel speed sensor 2P (Black) connector [1] and ground.

CONNECTION: White – Ground
Blue – Ground

Is there continuity?

YES – Faulty rear wheel speed sensor

NO – GO TO STEP 4.



(Terminal side of the rear wheel speed sensor)

4. Rear Wheel Speed Sensor Line Short Circuit Inspection

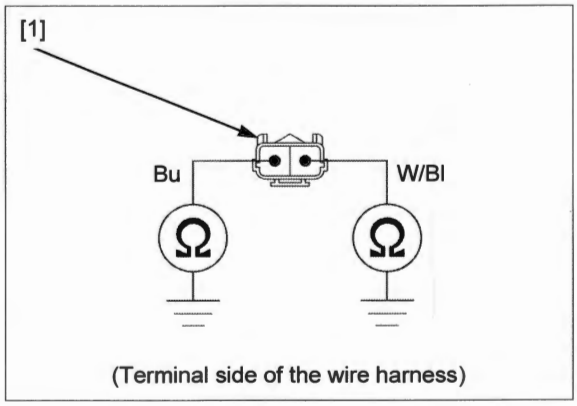
Disconnect the ABS modulator 18P (Black) connector (page 19-8).
Check for continuity between each terminal of the wire harness side rear wheel speed sensor 2P (Black) connector [1] and ground.

CONNECTION: Blue – Ground
White/black – Ground

Is there continuity?

YES – • Short circuit in the Blue wire
• Short circuit in the White/black wire

NO – GO TO STEP 5.



(Terminal side of the wire harness)

5. Rear Wheel Speed Sensor Line Open Circuit Inspection

Short the wire harness side ABS modulator 18P (Black) connector [1] terminals with a jumper wire [2].

CONNECTION: 6 – 15

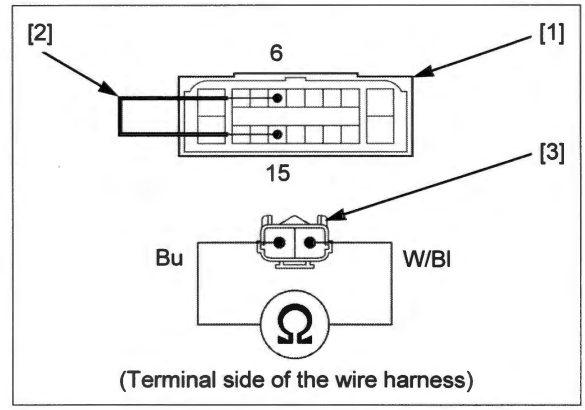
Check for continuity between the wire harness side rear wheel speed sensor 2P (Black) connector [3] terminals.

CONNECTION: Blue – White/black

Is there continuity?

YES – GO TO STEP 6.

NO – Open circuit in the Blue or White/black wire



(Terminal side of the wire harness)

6. Failure Reproduction with a New Speed Sensor

Replace the rear wheel speed sensor with a new one (page 19-22).
Connect the ABS modulator 18P (Black) and rear wheel speed sensor 2P (Black) connectors.
Erase the DTC (page 19-7).
Test-ride the motorcycle above 30 km/h.
Recheck the DTC (page 19-6).

Is the DTC 1-3, 1-4, 2-3, or 4-3 indicated?

YES – Faulty ABS modulator

NO – Faulty original wheel speed sensor

DTC 3-1, 3-2, 3-3 or 3-4 (Solenoid Valve)

1. Failure Reproduction

Erase the DTC (page 19-7).
Test-ride the motorcycle above 30 km/h.
Recheck the DTC (page 19-6).

Is the DTC 3-1, 3-2, 3-3 or 3-4 indicated?

YES – Faulty ABS modulator

NO – Solenoid valve is normal (intermittent failure).

DTC 5-1, 5-2 or 5-3 (Pump Motor Lock/ Stuck Off/stuck On)

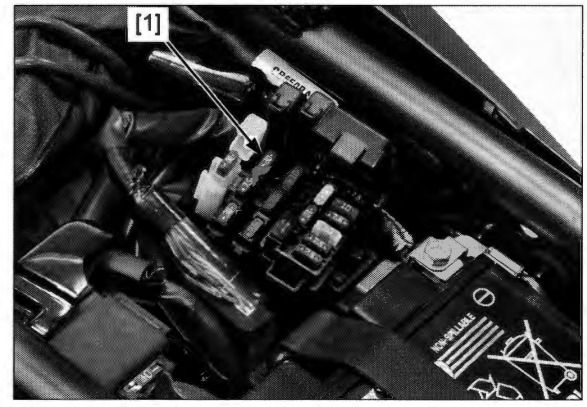
1. Fuse Inspection

Turn the ignition switch OFF.
Remove the main seat (page 2-11).
Check the ABS M fuse (30 A) [1] for blown.

Is the fuse blown?

YES – GO TO STEP 2.

NO – GO TO STEP 3.



2. Motor Power Input Line Short Circuit Inspection

Disconnect the ABS modulator 18P (Black) connector (page 19-8).
With the ABS M fuse (30 A) removed, check for continuity between the wire harness side ABS modulator 18P (Black) connector [1] terminal and ground.

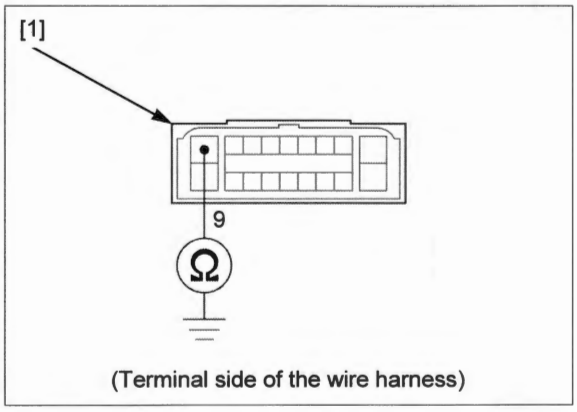
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 9 – Ground

Is there continuity?

YES – Short circuit in the Violet wire between the fuse box and ABS modulator 18P (Black) connector

NO – Intermittent failure. Replace the ABS M fuse (30 A) with a new one, and recheck.



(Terminal side of the wire harness)

3. Motor Power Input Line Open Circuit Inspection

Install the ABS M fuse (30 A).
Disconnect the ABS modulator 18P (Black) connector (page 19-8).
Measure the voltage between the wire harness side ABS modulator 18P (Black) connector [1] terminal and ground.

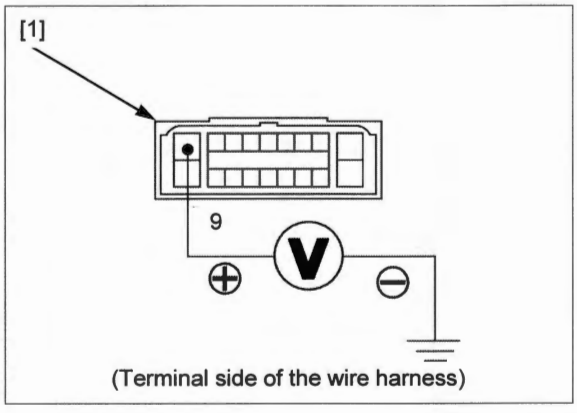
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 9 (+) – Ground (–)

Is there battery voltage?

YES – GO TO STEP 4.

NO – Open circuit in the Black or Violet wire between the battery and ABS modulator 18P (Black) connector



(Terminal side of the wire harness)

4. Motor Power Ground Line Open Circuit Inspection

Check for continuity between the wire harness side 18P (Black) connector [1] and ground.

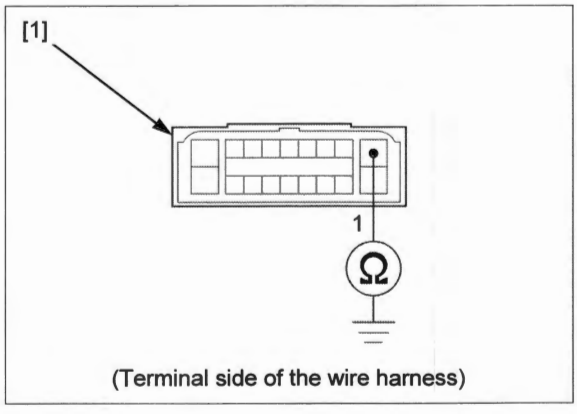
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 1 – Ground

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the Green/yellow wire



(Terminal side of the wire harness)

5. Failure Reproduction

Turn the ignition switch OFF.
Connect the ABS modulator 18P (Black) connector.
Erase the DTC (page 19-7).
Test-ride the motorcycle above 30 km/h.
Recheck the DTC (page 19-6).

Is the DTC 5-1, 5-2 or 5-3 indicated?

YES – Faulty ABS modulator

NO – Pump motor is normal (intermittent failure).

DTC 5-4 (Fail Safe Relay)

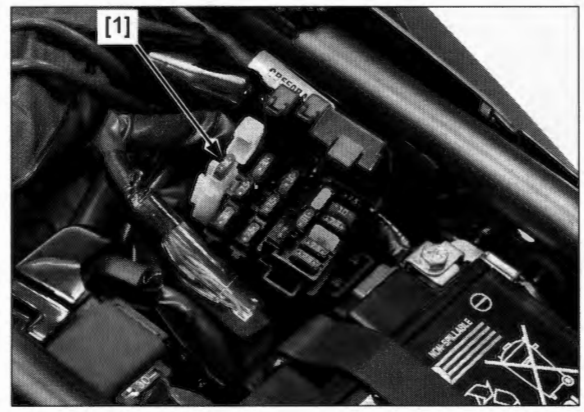
1. Fuse Inspection

Turn the ignition switch OFF.
Remove the main seat (page 2-11).
Check the ABS FSR fuse (30 A) [1] for blown.

Is the fuse blown?

YES – GO TO STEP 2.

NO – GO TO STEP 3.



2. Relay Input Line Short Circuit Inspection

Disconnect the ABS modulator 18P (Black) connector (page 19-8).
With the ABS FSR fuse (30 A) removed, check for continuity between the wire harness side ABS modulator 18P (Black) connector [1] terminal and ground.

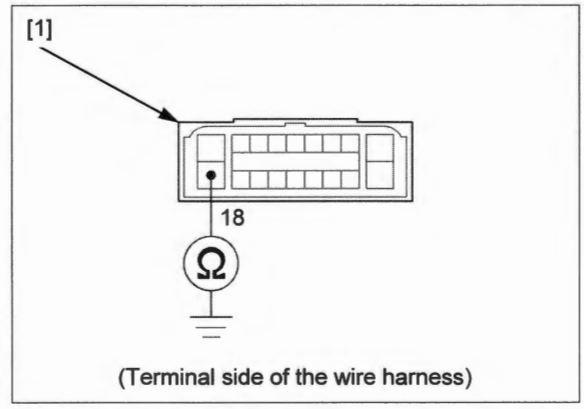
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 18 – Ground

Is there continuity?

YES – Short circuit in the Black wire between the fuse box and ABS modulator 18P (Black) connector

NO – Intermittent failure. Replace the ABS FSR fuse (30 A) with a new one, and recheck.



(Terminal side of the wire harness)

3. Relay Input Line Open Circuit Inspection

Install the ABS FSR fuse (30 A).
Disconnect the ABS modulator 18P (Black) connector (page 19-8).
Measure the voltage between the wire harness side ABS modulator 18P (Black) connector [1] terminal and ground.

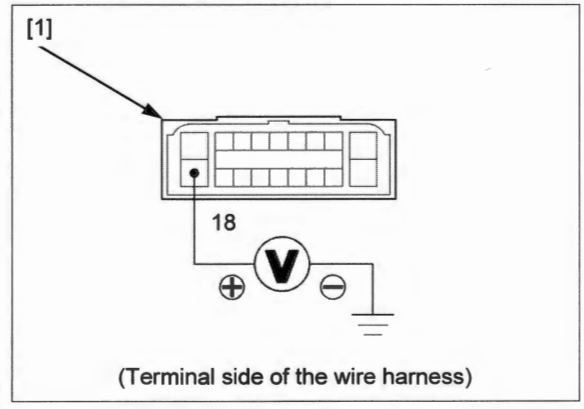
TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 18 (+) – Ground (–)

Is there battery voltage?

YES – GO TO STEP 4.

NO – Open circuit in the Black wire between the battery and ABS modulator 18P (Black) connector



(Terminal side of the wire harness)

4. Failure Reproduction

Turn the ignition switch OFF.
Connect the ABS modulator 18P (Black) connector.
Erase the DTC (page 19-7).
Test-ride the motorcycle above 30 km/h.
Recheck the DTC (page 19-6).

Is the DTC 5-4 indicated?

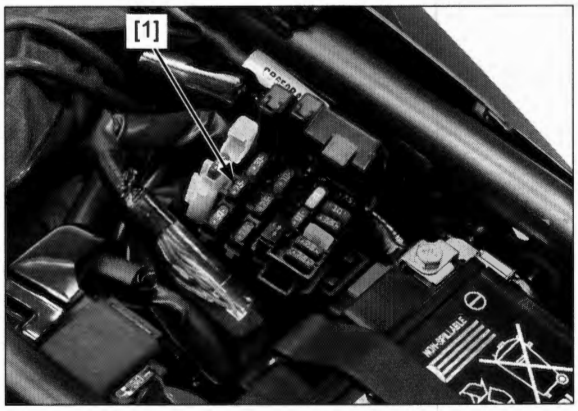
YES – Faulty ABS modulator

NO – Fail safe relay is normal (intermittent failure).

DTC 6-1 or 6-2 (Power Circuit)

1. Fuse Inspection

Turn the ignition switch OFF.
Remove the main seat (page 2-11).
Check the ABS MAIN fuse (7.5 A) [1] for blown.



Is the fuse blown?

YES – GO TO STEP 2.

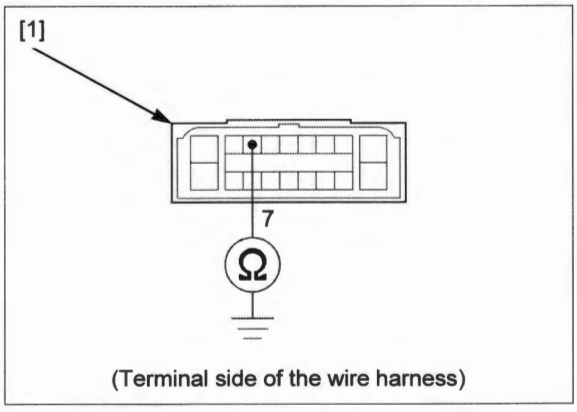
NO – GO TO STEP 3.

2. Power Input Line Short Circuit Inspection

Disconnect the ABS modulator 18P (Black) connector (page 19-8).
With the ABS MAIN fuse (7.5 A) removed, check for continuity between the wire harness side ABS modulator 18P (Black) connector [1] and ground.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 7 – Ground



(Terminal side of the wire harness)

Is there continuity?

YES – Short circuit in Red/black wire

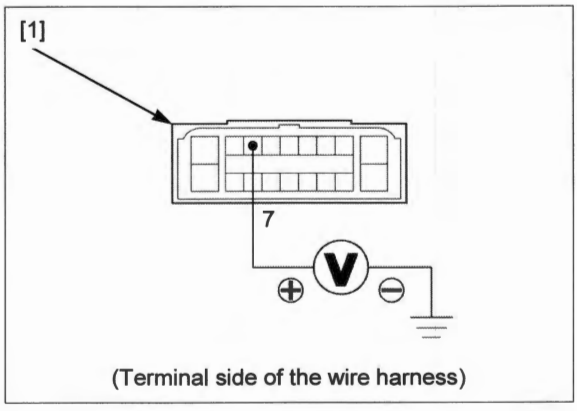
NO – Intermittent failure. Replace the ABS MAIN fuse (7.5 A) with a new one, and recheck.

3. Power Input Line Open Circuit Inspection

Install the ABS MAIN fuse (7.5 A).
Disconnect the ABS modulator 18P (Black) connector (page 19-8).
Turn the ignition switch ON with the engine stop switch "∩".
Measure the voltage between the wire harness side ABS modulator 18P (Black) connector [1] terminal and ground.

TOOL:
Test probe, 2 pack **07ZAJ-RDJA110**

CONNECTION: 7 (+) – Ground (–)



(Terminal side of the wire harness)

Is there battery voltage?

YES – GO TO STEP 4.

NO – Open circuit in Red/black wire

4. Failure Reproduction

Turn the ignition switch OFF.
Connect the ABS modulator 18P (Black) connector.
Erase the DTC (page 19-7).
Test-ride the motorcycle above 30 km/h.
Recheck the DTC (page 19-6).

Is the DTC 6-1 or 6-2 indicated?

YES – Faulty ABS modulator

NO – Power circuit is normal (intermittent failure)

DTC 7-1 (Tire Size)

NOTE:

- Check the following and correct the faulty part.
  - Incorrect tire pressure.
  - Tires not recommended for the motorcycle were installed (incorrect tire size).
  - Deformation of the wheel or tire.

1. Failure Reproduction

If the above items are normal, recheck the DTC indication:
Erase the DTC (page 19-7).
Test-ride the motorcycle above 30 km/h.
Recheck the DTC (page 19-6).

Is the DTC 7-1 indicated?

YES – Faulty ABS modulator

NO – Tire size is normal (intermittent failure)

DTC 8-1 (ABS Control Unit)

1. Failure Reproduction

Erase the DTC (page 19-7).
Test-ride the motorcycle above 30 km/h.
Recheck the DTC (page 19-6).

Is the DTC 8-1 indicated?

YES – Faulty ABS modulator

NO – ABS control unit is normal (intermittent failure)

WHEEL SPEED SENSOR

AIR GAP INSPECTION

Support the motorcycle securely using a hoist or equivalent and raise the wheel off the ground.

Measure the air gap at several points by turning the wheel slowly.

- Front: Between the wheel speed sensor guard and pulser ring
- Rear: Between the caliper bracket and pulser ring

It must be within specification.

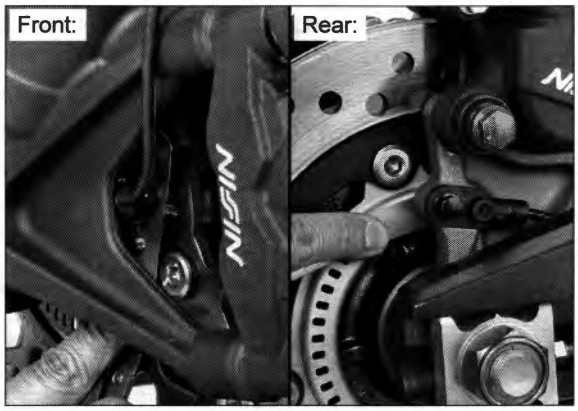
STANDARD:
Front: 0.73 – 1.40 mm (0.029 – 0.055 in)
Rear: 0.40 – 1.22 mm (0.016 – 0.048 in)

The clearance (air gap) cannot be adjusted.
If it is not within specification, check each part for deformation, looseness or damage.

Check the wheel speed sensor for damage, and replace if necessary.

Check the pulser ring for deformation or damage, and replace if necessary.

- Front pulser ring (page 16-20)
- Rear pulser ring (page 17-7)



REMOVAL/INSTALLATION

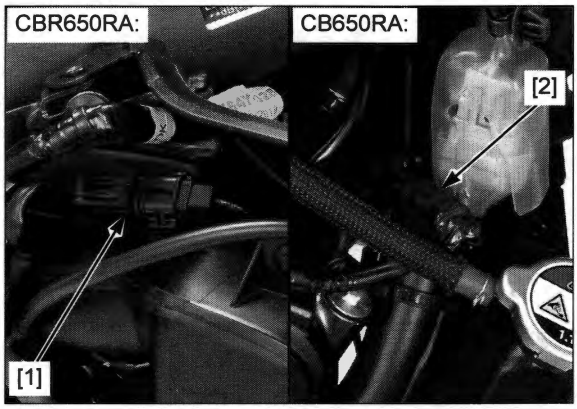
FRONT WHEEL SPEED SENSOR

Pull down the radiator (page 8-7).

Remove the front wheel (page 16-17).

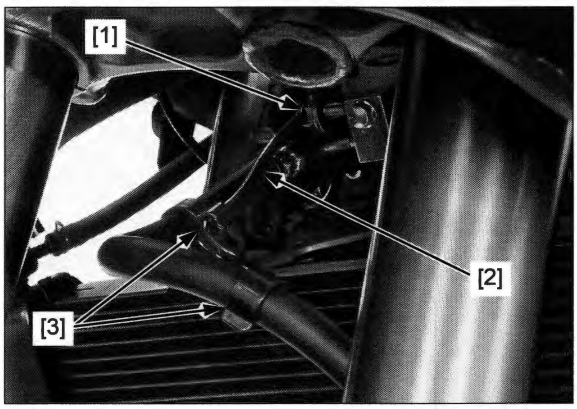
CBR650RA: Release the front wheel speed sensor 2P (Black) connector [1] from the right intake air duct and disconnect it.

CB650RA: Disconnect the front wheel speed sensor 2P (Black) connector [2].



Remove the wire clip [1].

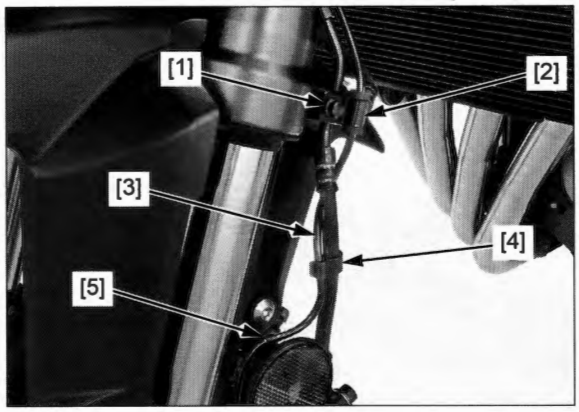
Release the front wheel speed sensor wire [2] from the clamps [3].



Remove the bolt [1] and front wheel speed sensor wire guide [2].

Release the front wheel speed sensor wire [3] from the clamp [4].

Remove the wire clip [5].



Remove the front wheel speed sensor guard bolts [1].

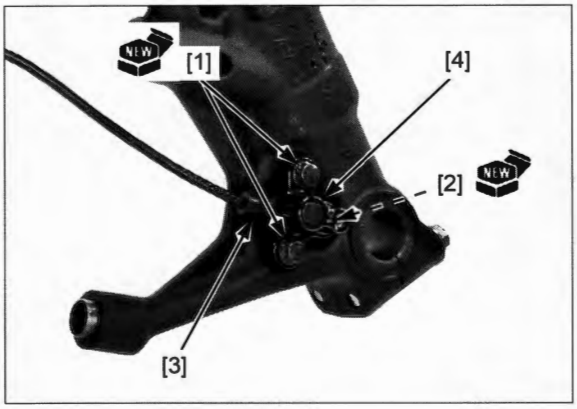
Remove the bolt [2] and front wheel speed sensor [3] from wheel speed sensor guard [4].

Installation is in the reverse order of removal.

NOTE:

- Clean around the sensor tip and sensor installation area (front wheel speed sensor guard) thoroughly, and be sure that no foreign material is allowed to enter the mounting hole.
- Always replace the front wheel speed sensor mounting bolt and front wheel speed sensor guard mounting bolts with new ones.
- The clearance gap cannot be adjusted.
  If it is not within specification, check related part for deformation, looseness, or damage.

After installation, check the air gap (page 19-22).

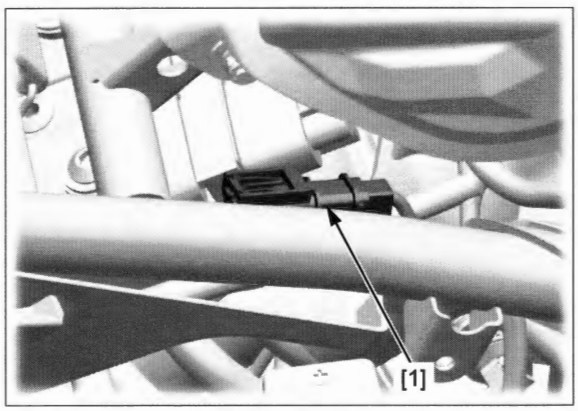


REAR WHEEL SPEED SENSOR

Remove the drive chain cover/mud guard (page 2-15).

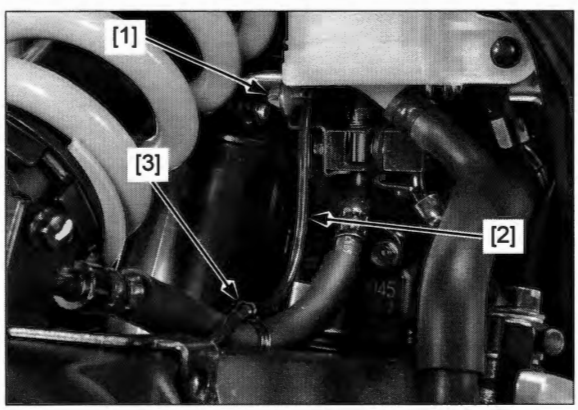
Lift the fuel tank and support it (page 3-4).

Disconnect the rear wheel speed sensor 2P (Black) connector [1].



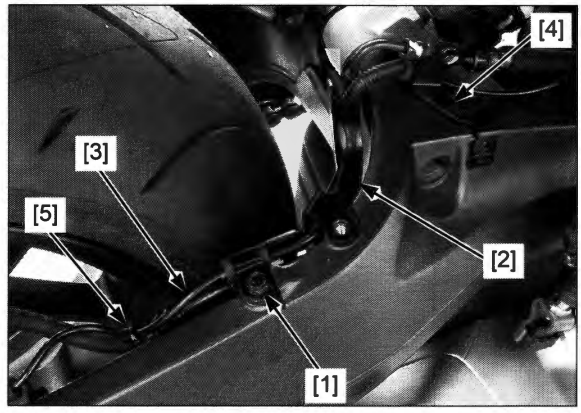
Remove the wire clip [1].

Release the rear wheel speed sensor wire [2] from the clamp [3].



Remove the bolt [1] and brake pipe stay [2].

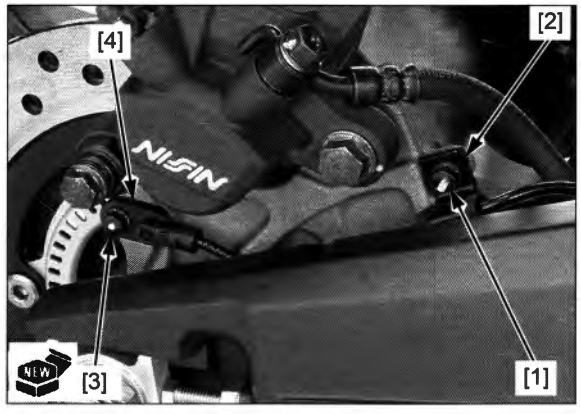
Release the rear wheel speed sensor wire [3] from the stay [4] and clamp [5].



Remove the following:

- Bolts [1]
- Clamp [2]
- Sensor bolt [3]
- Rear wheel speed sensor [4]

Installation is in the reverse order of removal.



NOTE:

- Clean the sensor tip and sensor installation area (caliper bracket) thoroughly, and be sure that no foreign materials are allowed.
- Always replace the rear wheel speed sensor mounting bolt with new a one.
- The clearance gap cannot be adjusted.
  If it is not within specification, check related part for deformation, looseness, or damage.

After installation, check the air gap (page 19-22).

ABS MODULATOR

REMOVAL/INSTALLATION

Drain the brake fluid from the rear brake hydraulic systems (page 18-5).

Remove the following:

- Throttle body (page 7-14)
- ABS modulator cover (page 4-42)

Disconnect the ABS modulator 18P (Black) connector (page 19-8).

Pull the ECM [1] upward as shown.

Loosen the brake pipe joint nuts [2] to disconnect the brake pipes.

- When disconnecting, cover the end of the brake pipes to prevent contamination.

Remove the trim clips [3] and slightly pull the ABS modulator tray [4] upward.

Remove the following:

- Three bolts [5] and washers [6]
- ABS modulator [7] and stay [8]
- Three collars [9]

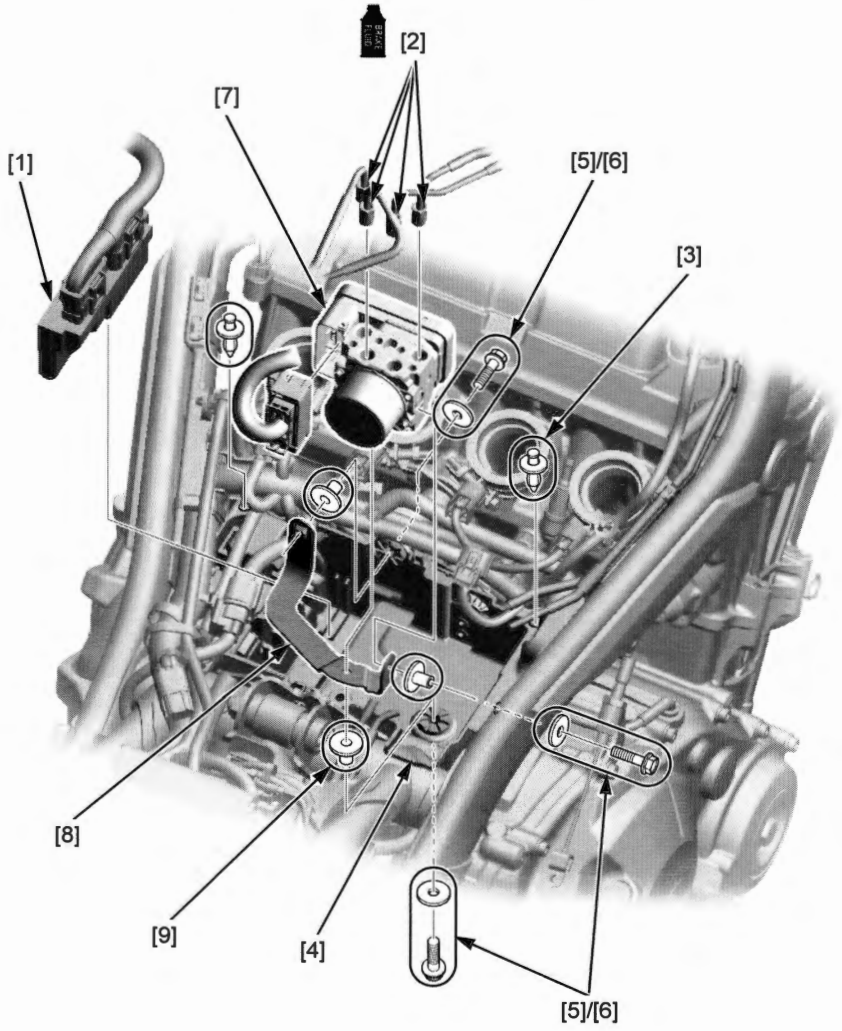
Installation is in the reverse order of removal.

- Apply brake fluid to the threads of the brake pipe joint nuts.

TORQUE:

Brake pipe joint nut: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Fill and bleed the front and rear brake hydraulic systems (page 18-6).



MEMO

20. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION ····· 20-2

TROUBLESHOOTING ····· 20-3

SYSTEM LOCATION ····· 20-4

SYSTEM DIAGRAM ····· 20-4

BATTERY ····· 20-5

CHARGING SYSTEM INSPECTION ····· 20-6

ALTERNATOR CHARGING COIL ····· 20-7

REGULATOR/RECTIFIER ····· 20-7

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 physician immediately.

NOTICE

- *Always turn OFF the ignition switch before disconnecting any electrical component.*
- *Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.*

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every 2 weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for a long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2 – 3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and tail light ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 20-3).
- For alternator service (page 12-2).

BATTERY CHARGING

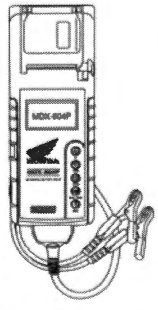
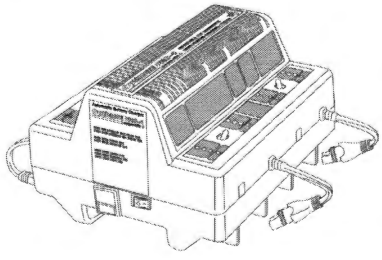
- Turn power ON/OFF at the charger, not at the battery terminal.
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.
- Quick charging should only be done in an emergency; slow charging is preferred.

BATTERY TESTING

Refer to the instruction of the Operation Manual for the recommended battery tester for details about battery testing.

RECOMMENDED BATTERY TESTER: Honda MDX-604P Battery Tester (U.S.A. only)

TOOLS

Motorcycle Battery tester Honda MDX-604P (U.S.A. only)	Optimate PRO-4 Battery Charger TMNTS53 (U.S.A. only)
	

TROUBLESHOOTING

Battery is damaged or weak

1. **Battery Test**

   Remove the battery (page 20-5).
   Check the battery condition using the recommended battery tester.

   RECOMMENDED BATTERY TESTER: Honda MDX-604P Battery Tester (U.S.A. only).

   Is the battery in good condition?

   YES – GO TO STEP 2.

   NO – Faulty battery

2. **Current Leakage Test**

   Install the battery (page 20-5).
   Check the battery current leakage using a digital multimeter. (page 20-6)

   Is the current leakage below 2.8 mA?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.

3. **Current Leakage Test with Regulator/rectifier Connector Disconnected**

   Disconnect the regulator/rectifier 3P (Black) connector (page 20-7).
   Recheck the battery current leakage.

   Is the current leakage below 2.8 mA?

   YES – Faulty regulator/rectifier

   NO – • Shorted wire harness
   • Faulty ignition switch

4. **Charging Voltage Inspection**

   Measure and record the battery voltage using a digital multimeter (page 20-5).
   Start the engine.
   Measure the charging voltage (page 20-6).
   Compare the measurements to the results of the following calculation.

   STANDARD:
   Measured BV < Measured CV < 15.5 V
   - **BV = Battery Voltage**
   - **CV = Charging Voltage**

   Do the battery and charging voltages satisfy the calculation?

   YES – Faulty battery

   NO – GO TO STEP 5.

5. **Alternator Charging Coil Inspection**

   Check the alternator charging coil (page 20-7).

   Is the alternator charging coil resistance within 0.1 – 1.0 Ω (20°C/68°F)?

   YES – GO TO STEP 6.

   NO – Faulty charging coil

6. **Regulator/rectifier Wire Harness Inspection**

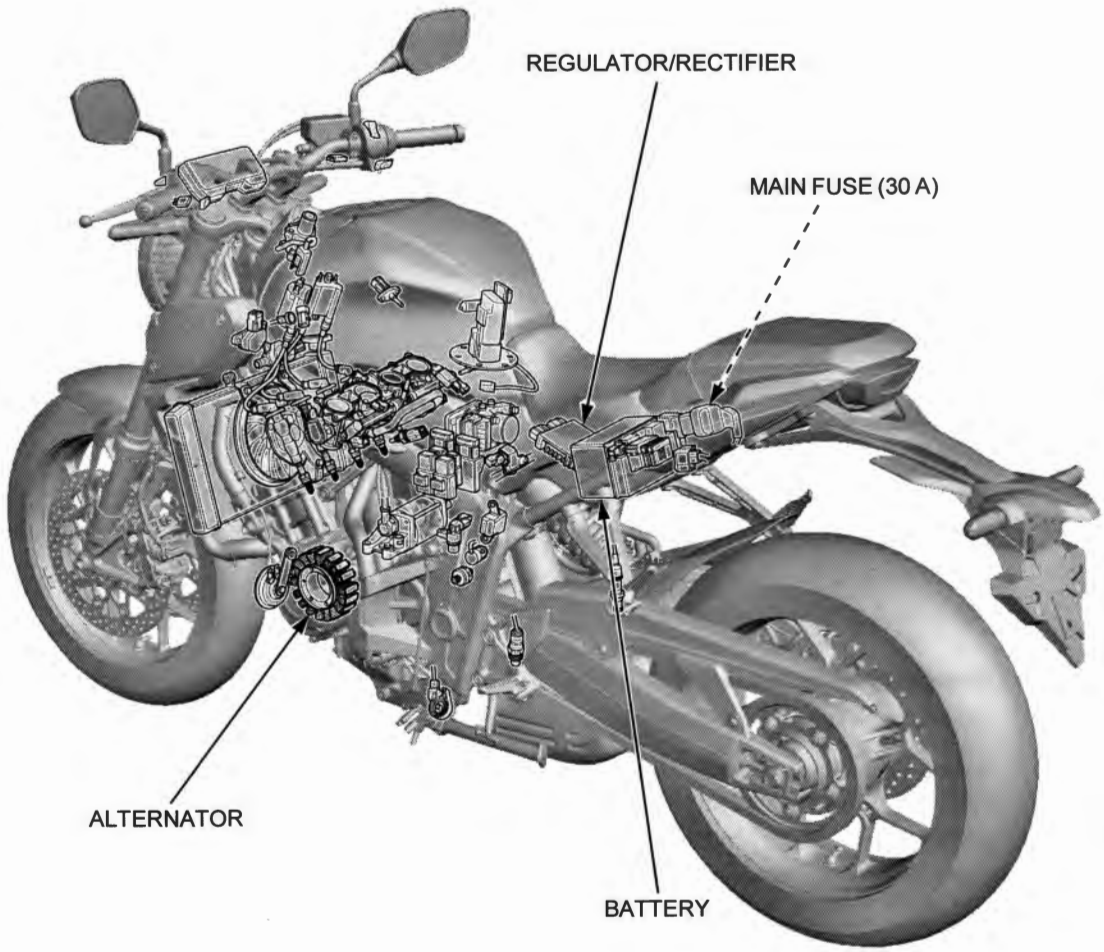
   Check the regulator/rectifier wire harness (page 20-7).

   Are the results of checked voltage and continuity correct?

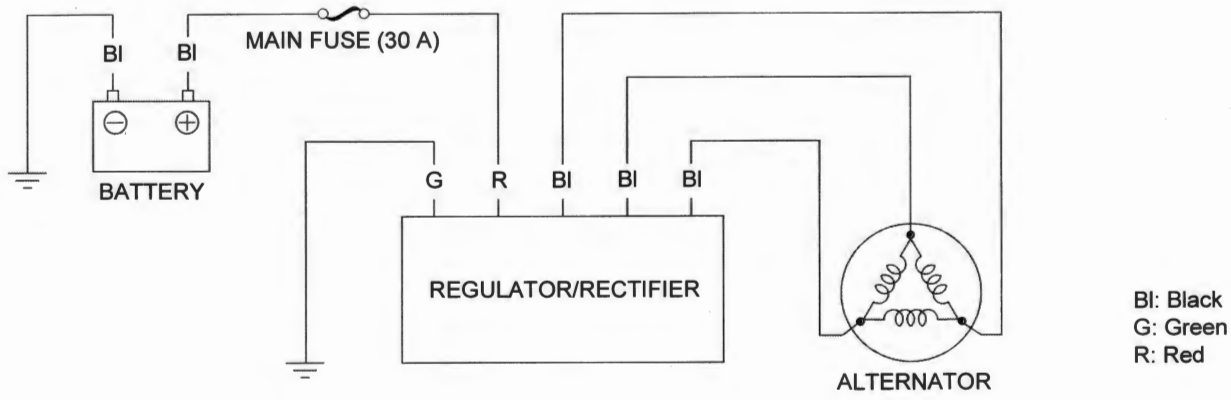
   YES – Faulty regulator/rectifier

   NO – • Open circuit in related wire
   • Loose or poor contacts of related terminal
   • Shorted wire harness

SYSTEM LOCATION



SYSTEM DIAGRAM



BATTERY

REMOVAL/INSTALLATION

Remove the main seat (page 2-11).

Turn the ignition switch OFF.

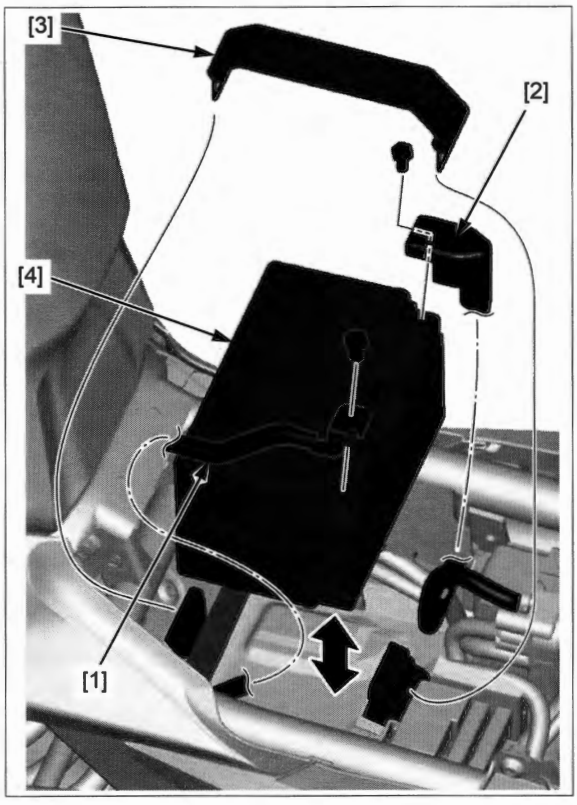
Disconnect the negative (–) cable [1] first and then disconnect the positive (+) cable [2] by removing the terminal bolts.

Remove the rubber strap [3] and the battery [4].

Installation is in the reverse order of removal.

NOTE:

- Connect the positive (+) cable first, then connect the negative (–) cable.
- For digital clock setting procedure (page 21-11).



VOLTAGE INSPECTION

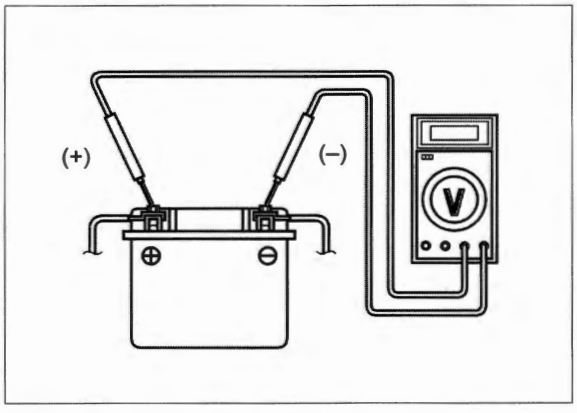
Remove the main seat (page 2-11).

Measure the battery voltage using a digital multimeter.

VOLTAGE (20°C/68°F):
Fully charged: 12.8 V minimum
Needs charging: Below 12.3 V

NOTE:

- When measuring the battery voltage after charging, leave it for least 30 minutes, or the accurate results cannot be obtained because the battery voltage fluctuates just after charging.



BATTERY TESTING

Refer to the instructions that are appropriate to the battery testing equipment available to you.

TOOL:

Battery tester	**Honda MDX-604P Battery Tester (U.S.A. only).**

BATTERY CHARGING (U.S.A. only)

Remove the battery (page 20-5).

Refer to the instructions that are appropriate to the battery charging equipment available to you.

TOOL:

Optimate PRO-4 battery charger	**TMNTS53 (U.S.A. only)**

CHARGING SYSTEM INSPECTION

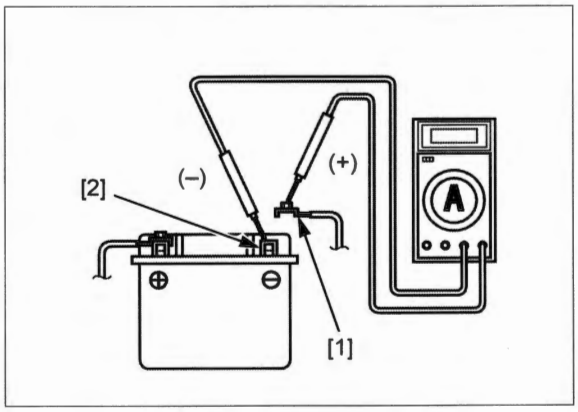
CURRENT LEAKAGE TEST

Remove the main seat (page 2-11).

Turn the ignition switch OFF.

Remove the terminal bolt and disconnect the negative (–) cable [1] from the battery.

Connect the ammeter (+) probe to the negative (–) cable and ammeter (–) probe to the battery negative (–) terminal [2].
With the ignition switch turned OFF, check for current leakage.



NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 2.8 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

NOTE:

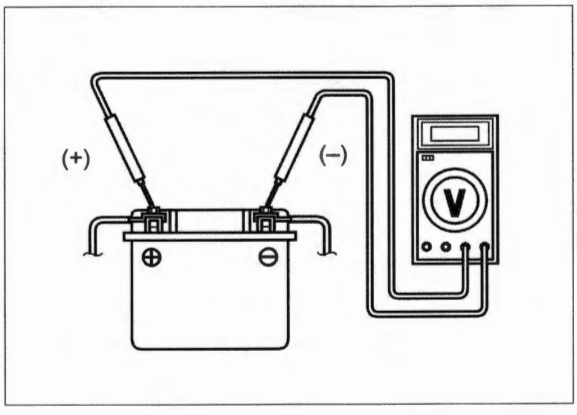
- Be sure the battery is in good condition before performing this test.
- Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.

Warm up the engine to normal operating temperature. Stop the engine.

Remove the main seat (page 2-11).

To prevent a short, make absolutely certain which are the positive (+) and negative (–) terminals or cables.

Connect the multimeter between the battery positive (+) terminal and negative (–) terminal of the battery.



With the headlight on high beam, restart the engine.
Measure the voltage on the multimeter when the engine runs at 5,000 rpm.

STANDARD:

Measured BV < Measured CV < 15.5 V

- **BV = Battery Voltage (page 20-5)**
- **CV = Charging Voltage**

ALTERNATOR CHARGING COIL

INSPECTION

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

Disconnect the alternator 3P (Gray) connector [1] from the regulator/rectifier.
Check the connector for loose contacts or corroded terminals.

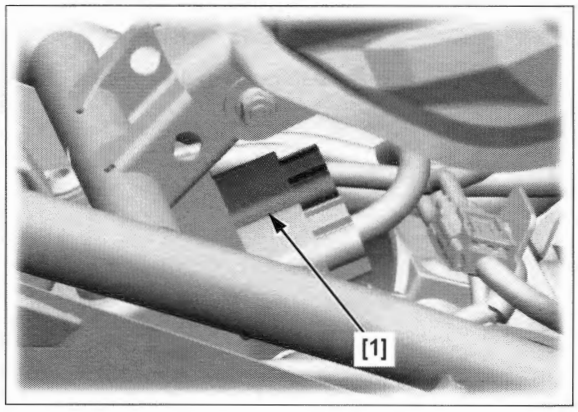
Measure the resistance between the Black wire terminals of the alternator side 3P (Gray) connector.

STANDARD: 0.1 – 1.0 Ω (20°C/68°F)

Check for continuity between each wire terminal of the alternator side 3P (Gray) connector and ground.
There should be no continuity.

Replace the alternator stator if the resistance is out of specification, or if any wire has continuity to ground.

For alternator stator replacement (page 12-4).



REGULATOR/RECTIFIER

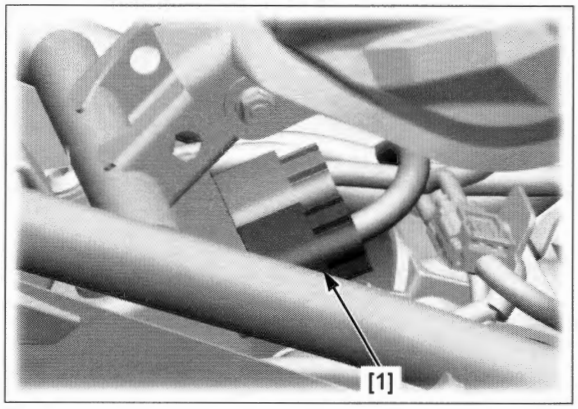
WIRE HARNESS INSPECTION

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

Disconnect the regulator/rectifier 3P (Black) connector [1].
Check the connector for loose contacts or corroded terminals.

Check the following at the wire harness side 3P (Black) connector.

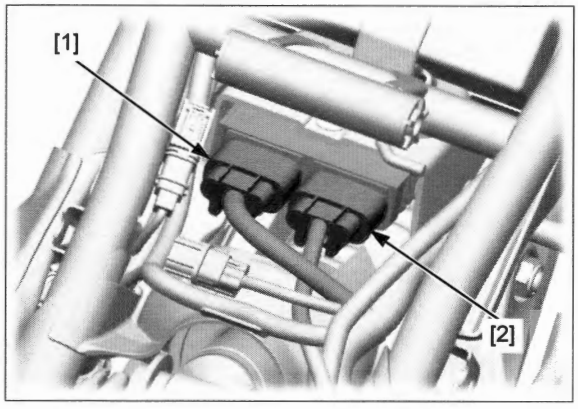
- Battery Line:
  Measure the voltage between the Red wire terminal (+) and ground (–).
  There should be battery voltage at all times.
- Ground Line:
  Check for continuity between the Green wire terminal and ground.
  There should be continuity at all times.



REMOVAL/INSTALLATION

Remove the fuel tank (page 7-8).

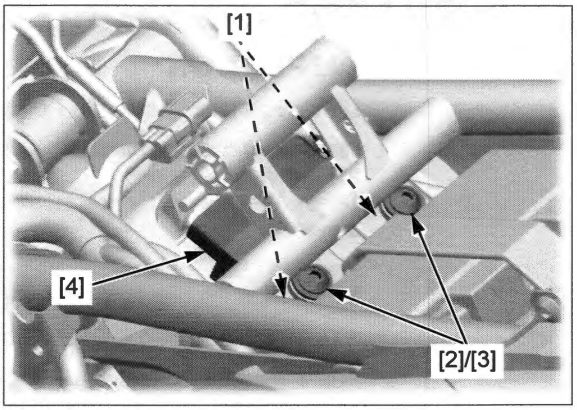
Disconnect the regulator/rectifier 3P (Black) [1] and alternator 3P (Gray) [2] connectors.



Remove the following:

- Two nuts [1]
- Two socket bolts [2]
- Two washers [3]
- Regulator/rectifier [4]

Installation is in the reverse order of removal.



21. LIGHTS/METERS/SWITCHES

SERVICE INFORMATION 21-2

SYSTEM LOCATION 21-3

HEADLIGHT 21-4

TURN SIGNAL LIGHT 21-5

BRAKE/TAIL LIGHT 21-6

LICENSE LIGHT 21-6

COMBINATION METER 21-7

SPEEDOMETER 21-12

TACHOMETER 21-12

COOLANT TEMPERATURE GAUGE/
ECT SENSOR 21-12

ENGINE OIL PRESSURE INDICATOR/
EOP SWITCH 21-13

FUEL GAUGE/FUEL LEVEL SENSOR ... 21-14

IGNITION SWITCH 21-15

HANDLEBAR SWITCH 21-16

BRAKE LIGHT SWITCH 21-17

CLUTCH SWITCH 21-18

SIDESTAND SWITCH 21-18

HORN 21-19

HSTC (Honda Selectable Torque
Control) SYSTEM (ABS type) 21-20

TURN SIGNAL RELAY 21-21

CONTROL RELAY 21-23

HAZARD DIODE 21-24

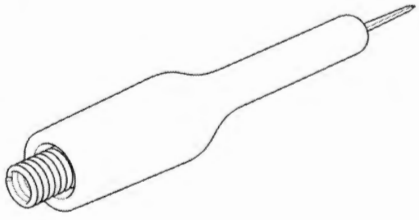
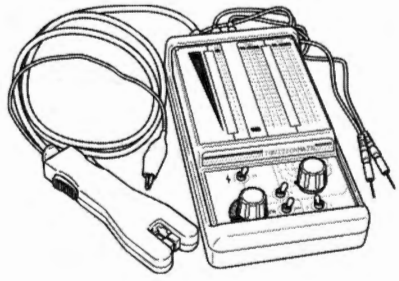
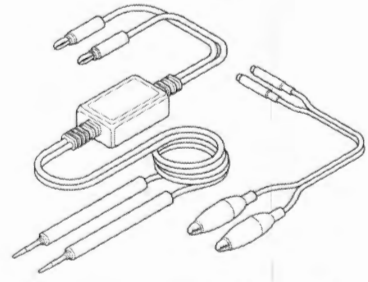
SERVICE INFORMATION

GENERAL

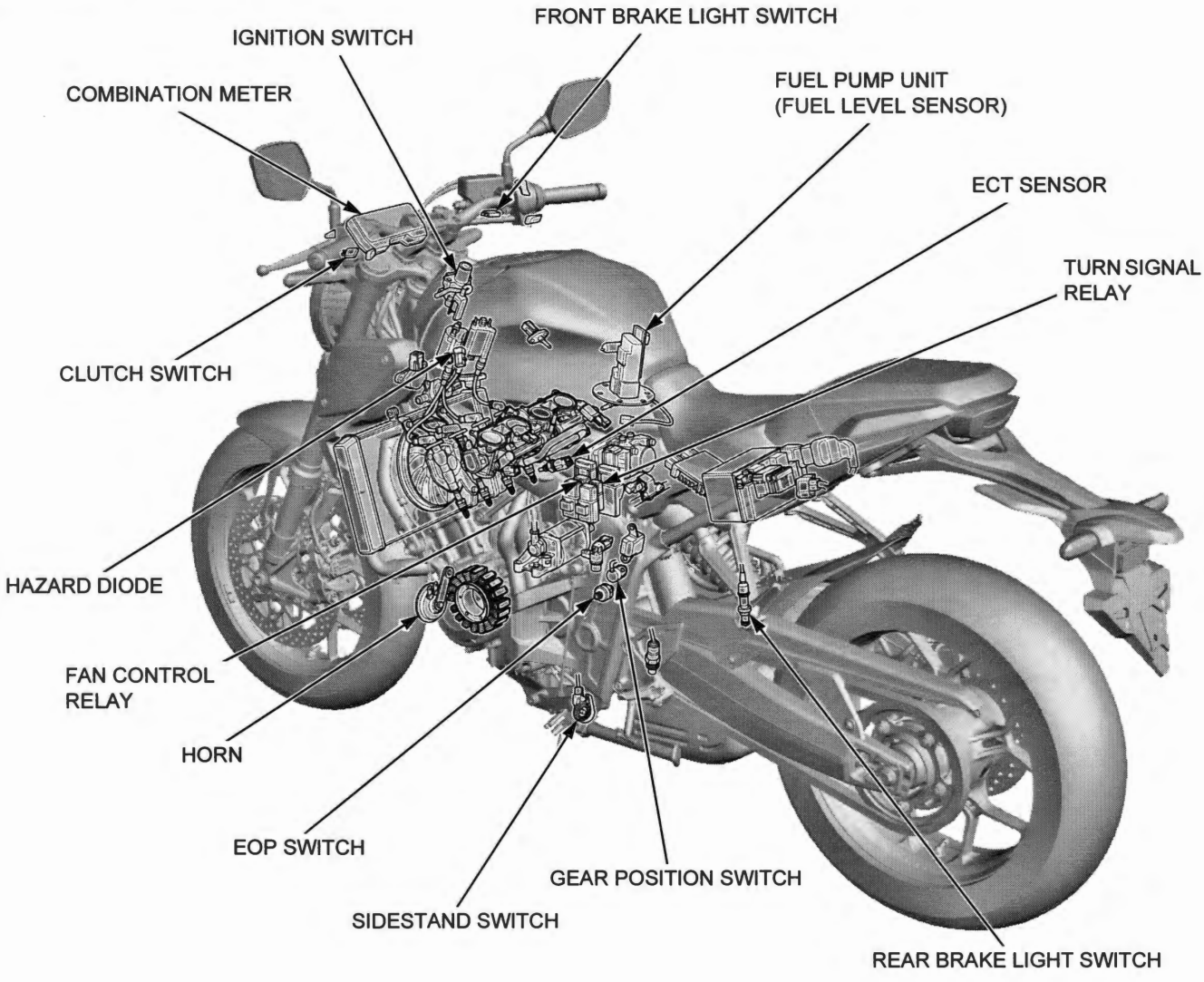
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- Use an electric heating element to heat the coolant for the ECT sensor inspection. Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- The following color codes are used throughout this section.

Bl = Black	G = Green	Lg = Light Green	R = Red	Y = Yellow
Br = Brown	Gr = Gray	O = Orange	V = Violet	
Bu = Blue	Lb = Light Blue	P = Pink	W = White	

TOOLS

Test probe, 2 pack 07ZAJ-RDJA110 	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)

SYSTEM LOCATION



HEADLIGHT

REMOVAL/INSTALLATION

CBR650R/RA:

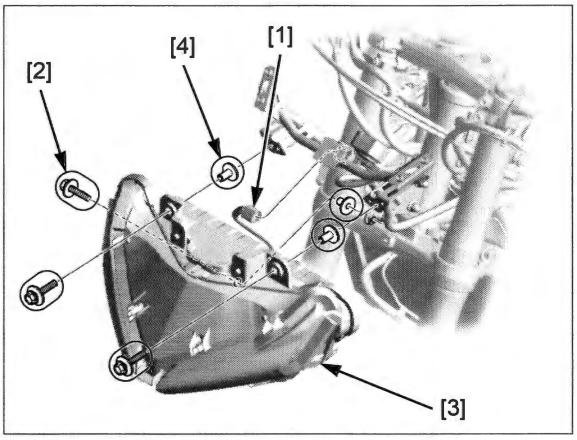
Remove the Upper inner panel (page 2-8).
Remove the Front lower cowl (page 2-9).

Disconnect the headlight 6P (Black) connector [1].

Remove the following.

- Three bolts [2]
- Headlight [3]
- Three collars [4]

Installation is in the reverse order of removal.



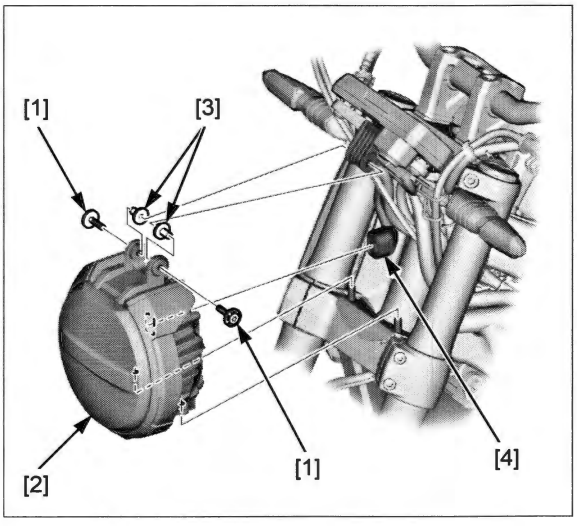
CB650R/RA:

Remove the following.

- Two torx bolts [1]
- Headlight [2]
- Two collars [3]

Disconnect the headlight 8P (Black) connector [4].

Installation is in the reverse order of removal.



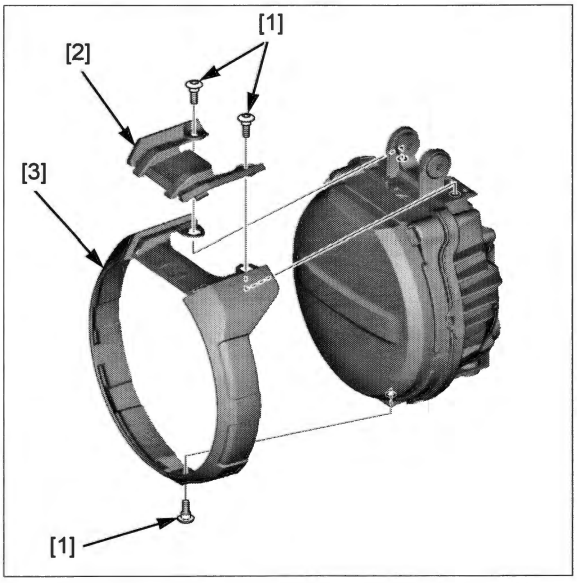
DISASSEMBLY/ASSEMBLY

CB650R/RA:

Remove the following.

- Three socket bolts [1]
- Headlight upper cover [2]
- Headlight rim [3]

Assembly is in the reverse order of disassembly.



TURN SIGNAL LIGHT

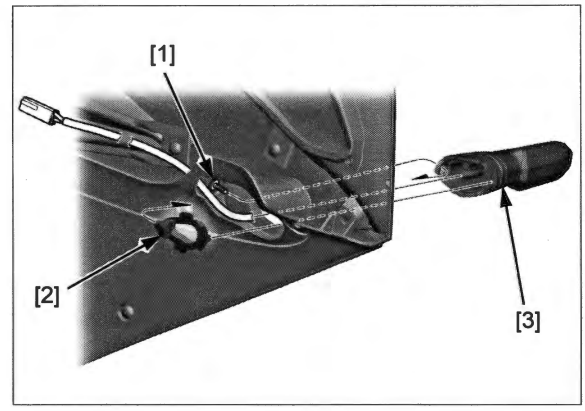
FRONT TURN SIGNAL LIGHT REMOVAL/INSTALLATION

CBR650R/RA:

Remove the following:

- Middle cowl (page 2-7)
- Screw [1]
- Turn signal holder [2]
- Front turn signal light [3]

Installation is in the reverse order of removal.



CB650R/RA:

Remove the following:

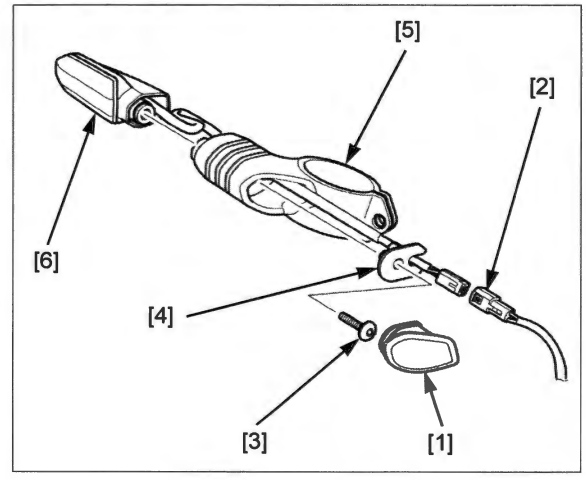
- Socket bolt [1]
- Front turn signal unit [2]

Remove the cover [1] and disconnect the turn signal 7P connector (right; Green/left; Black) [2].

Remove the following:

- Socket bolt [3]
- Collar [4]
- Turn signal mount rubber [5]
- Front turn signal light [6]

Installation is in the reverse order of removal.



REAR TURN SIGNAL LIGHT REMOVAL/INSTALLATION

Remove the rear turn signal light (page 2-13).

BRAKE/TAIL LIGHT

INSPECTION

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

Check the brake/tail light operation.

Check that tail light LEDs in the brake/tail light unit illuminate with the ignition switch ON.

Check that brake light LEDs in the brake/tail light unit illuminate with the front brake lever and/or rear brake pedal applied.

If any LED does not turn on, replace the rear combination light unit.

BRAKE/TAIL LIGHT UNIT REMOVAL/ INSTALLATION

Remove the rear cowl (page 2-12).
Remove the rear fender stay (page 2-13).

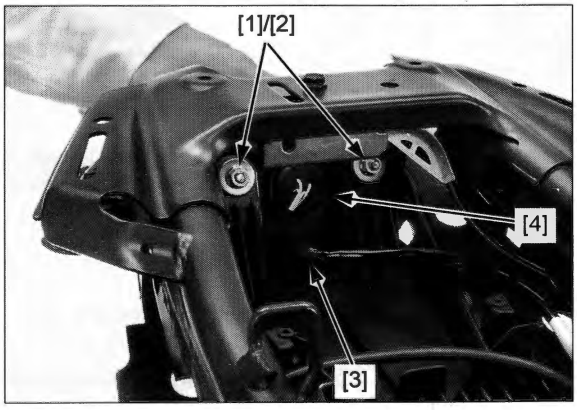
Disconnect the brake/tail light 3P (White) connector [1] .

Remove the tabs [2] and shift the rear fender B [3] down.

Remove the two nuts [1], washers [2], wire clip [3] and brake/tail light unit [4].

Installation is in the reverse order of removal.

TORQUE:
Brake/tail light mounting nut:
9 N·m (0.9 kgf·m, 7 lbf·ft)



LICENSE LIGHT

REMOVAL/INSTALLATION

Remove the license light (page 2-13).

COMBINATION METER

INITIAL OPERATION CHECK

When the ignition switch is turned ON with the engine stop switch "○", the combination meter will show the entire digital display and the tachometer segments [1] will increase to full scale, then reduce from full scale to zero.

NOTE:

- If the MIL [2] stays on and it does not go off, refer to MIL circuit troubleshooting (page 4-42).

If the digital display does not function at all, inspect the combination meter power/ground line (page 21-7).

If the power and ground lines are OK, replace the combination meter (page 21-9).

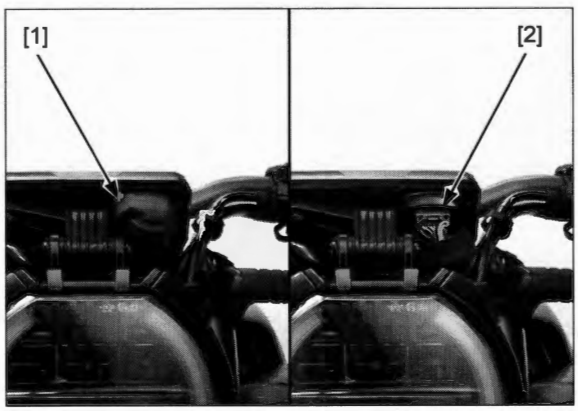
POWER/GROUND LINE INSPECTION

NOTE:

- The DTC 86-1 (serial communication malfunction) will be stored in the ECM if the power or ground line is abnormal. After the service is completed, check the DTC and erase it (page 4-8).

CBR650R/RA: Remove the meter panel (page 2-8).

CB650R/RA: Remove the dust cover [1], disconnect the 20P (Gray) connector [2] from the combination meter and check the following:



POWER INPUT LINE

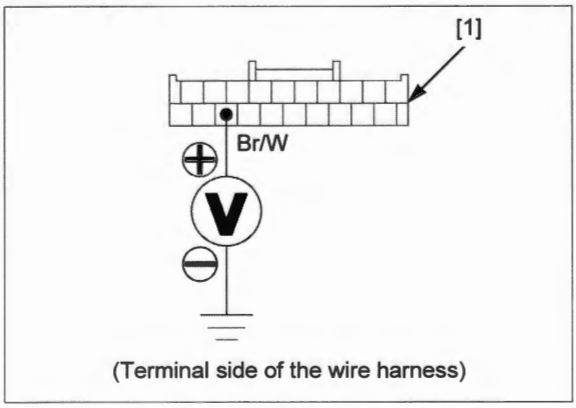
Measure the voltage between the combination meter 20P (Gray) connector [1] terminal and ground.

CONNECTION: Brown/white (+) – Ground (–)

There should be battery voltage with the ignition switch turned ON.

If there is no battery voltage, check the following:

– Brown/white wire between the fuse box 1 and combination meter for open circuit
– METER TAIL LICENSE PO fuse (7.5 A)



(Terminal side of the wire harness)

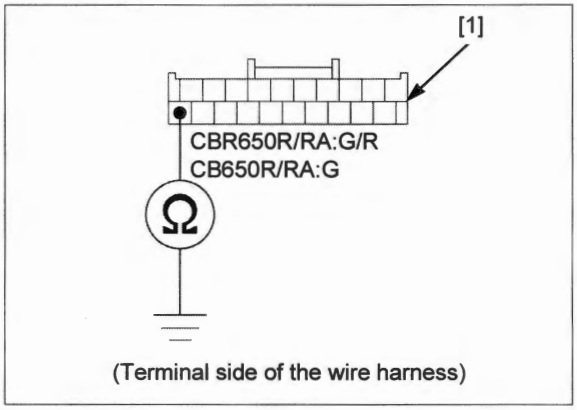
GROUND LINE

Check for continuity between the combination meter 20P (Gray) connector [1] terminal and ground.

CONNECTION:
CBR650R/RA: Green/Red – Ground
CB650R/RA: Green – Ground

There should be continuity at all times.

If there is no continuity, check for open circuit in the Green/red wire.



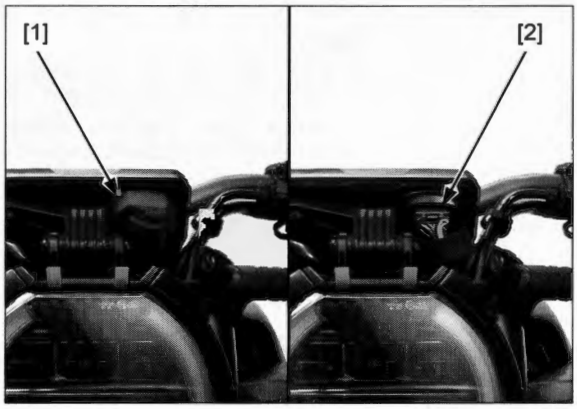
(Terminal side of the wire harness)

SERIAL COMMUNICATION LINE INSPECTION

Disconnect the ECM 33P (Gray) connector (page 4-42).

CBR650R/RA: Remove the meter panel (page 2-8).

CB650R/RA: Remove the dust cover [1], disconnect the 20P (Gray) connector [2] from the combination meter and check the following:



1. Serial Communication Line Short Circuit Inspection

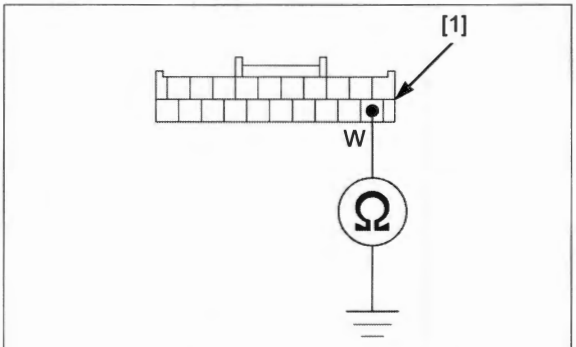
Check for continuity between the combination meter 20P (Gray) connector [1] terminal and ground.

CONNECTION: White – Ground

Is there continuity?

YES – Short circuit in the White wire between the combination meter and ECM

NO – GO TO STEP 2.



(Terminal side of the wire harness)

2. Serial Communication Line Open Circuit Inspection

Check for continuity between the combination meter 20P (Gray) connector [1] and ECM 33P (Gray) connector [2] terminals.

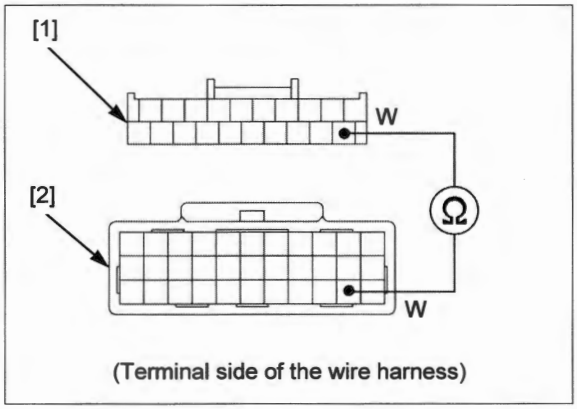
TOOL:
Test probe, 2 pack 07ZAJ-RDJA110

CONNECTION: White – White

Is there continuity?

YES – Loose or poor contact on the related connectors.

NO – Open circuit in the White wire between the combination meter and ECM



(Terminal side of the wire harness)

REMOVAL/INSTALLATION

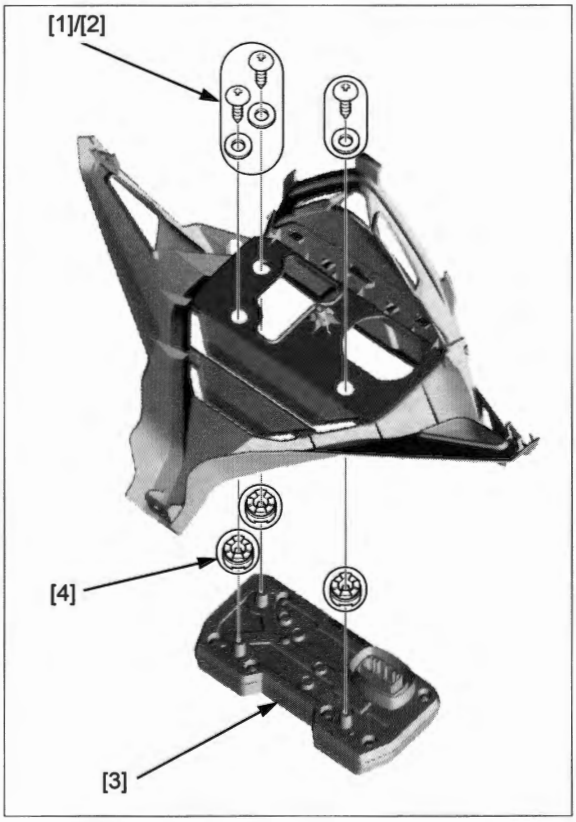
CBR650R/RA:

Remove the following:

- Meter panel (page 2-8)
- Three tapping screws [1]
- Three washers [2]
- Combination meter [3]
- Three grommets [4]

Installation is in the reverse order of removal.

TORQUE:
Combination meter mounting screw:
1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)



CB650R/RA:

Remove the headlight (page 21-4).

Remove the dust cover [1] and disconnect the 20P (Gray) connector [2].

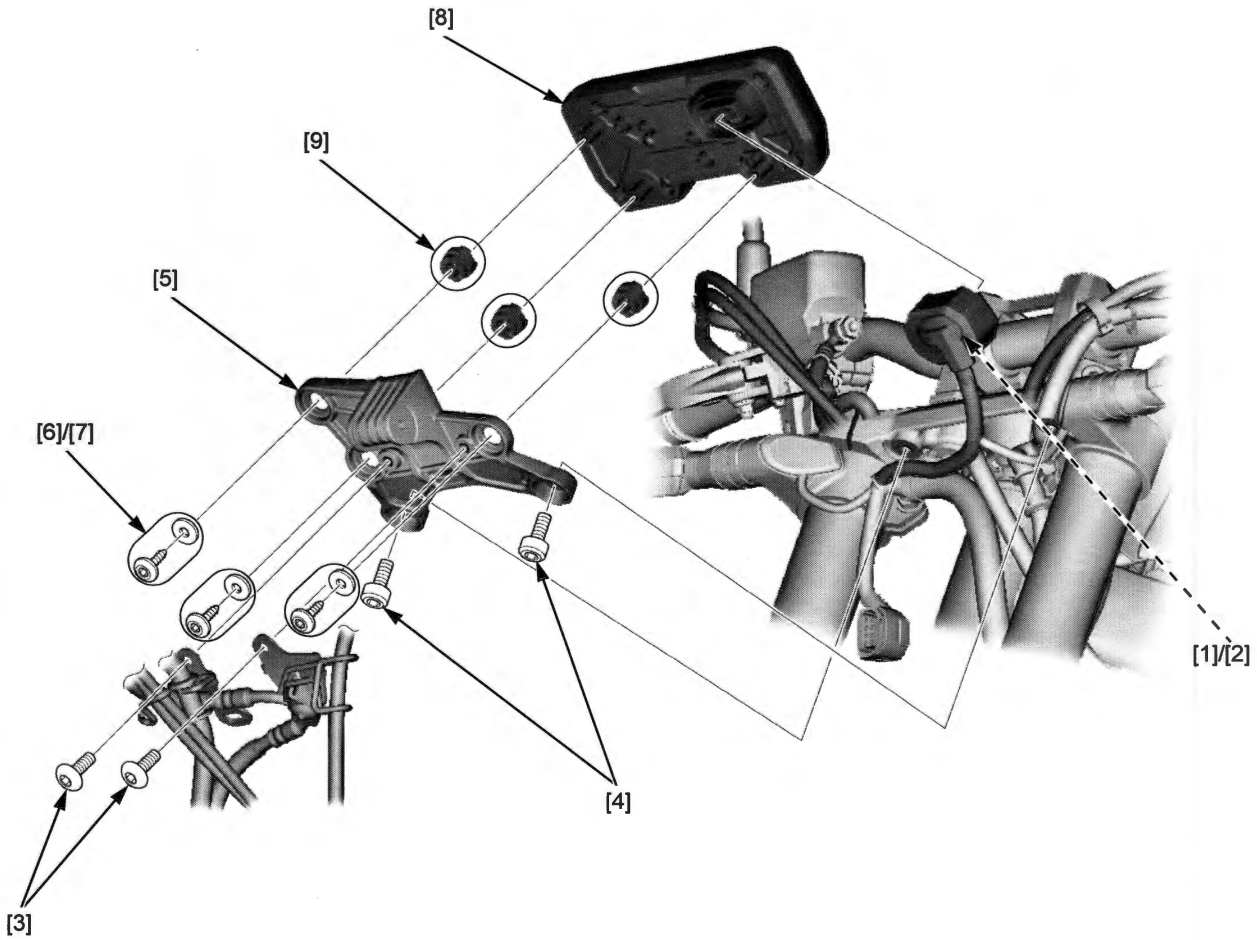
Remove the following:

- Two cable guide mounting socket bolts [3]
- Two meter stay mounting bolts [4], and meter stay [5]
- Three meter mounting screws [6], washers [7] and combination meter [8]
- Three grommets [9]

Installation is in the reverse order of removal.

TORQUE:

Combination meter mounting screw:
1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

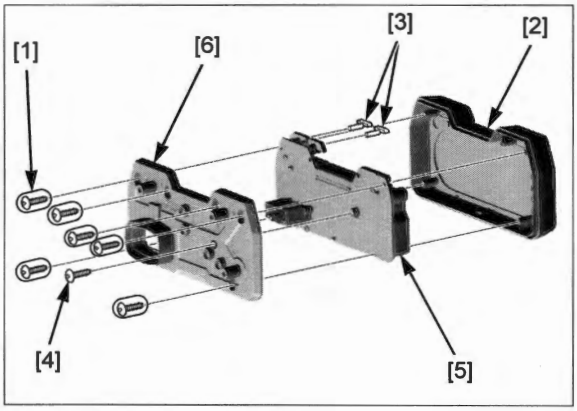


DISASSEMBLY/ASSEMBLY

Remove the following:

- Six tapping screws [1]
- Upper case [2]
- Key tops [3]
- Tapping screw [4]
- Meter assembly [5]
- Lower case [6]

Assembly is in the reverse order of disassembly.

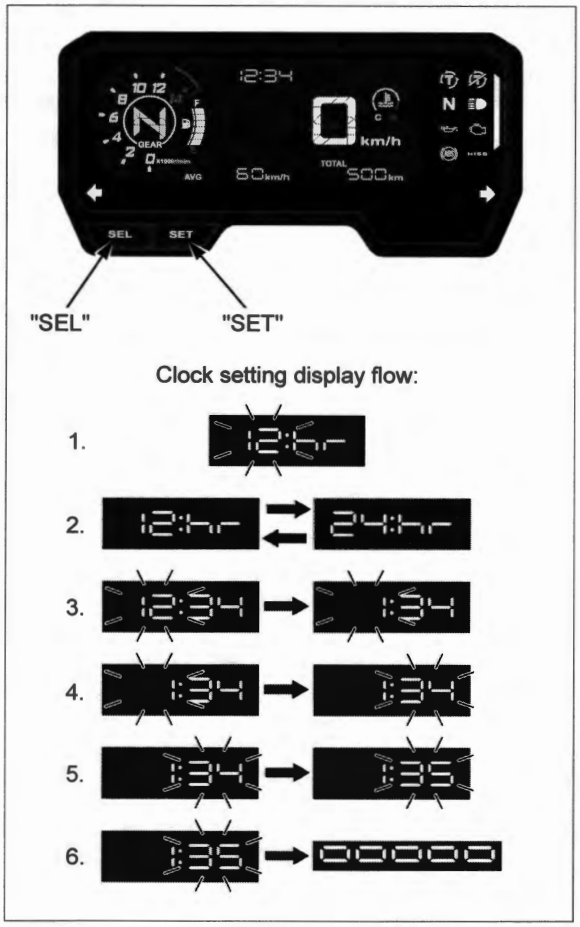


DIGITAL CLOCK SETTING PROCEDURE

Turn the ignition switch ON.

The control is automatically switched from the setting mode to the ordinary display if the button is not pressed for about 30 seconds.

1. Press and hold the SEL and SET buttons until the hour digits starts flashing.
2. Press SEL button to select "12hr" or "24hr". Press SET button. The time format is set, and then the display moves to the clock adjustment.
3. Press the SEL button until the desired hour is displayed (press and hold to advance the hour fast).
4. Press the SET button. The minute digits start flashing.
5. Press the SEL button until the desired minute is displayed (press and hold to advance the minute fast).
6. Press the SET button. The clock is set, and then the display moves to the backlight brightness adjustment ("ooooo" – "o" is indicated).
   Turn the ignition switch OFF.



SPEEDOMETER

SYSTEM INSPECTION

If the speedometer does not operate, check the following:

- Combination meter initial operation (page 21-7)
- MIL blinking: If the MIL blinks 11, check the VS sensor system (page 4-21)

If the above items are OK, replace the combination meter (page 21-7).

TACHOMETER

SYSTEM INSPECTION

If the tachometer does not operate, check the following:

- Combination meter initial operation (page 21-7)
- Combination meter indication when the serial communication line is abnormal (page 4-3)
- CKP sensor (page 5-6)

If the above items are OK, replace the combination meter (page 21-7).

COOLANT TEMPERATURE GAUGE/ECT SENSOR

SYSTEM INSPECTION

NOTE:

- If the coolant temperature gauge does not operate, refer to combination meter initial operation check (page 21-7).

If the coolant temperature gauge does not operate properly, check the following:

- MIL blinking: If the blinks 7 (DTC P0117, P0118), check the ECT sensor system (page 4-15)
- Combination meter indication when the serial communication line is abnormal (page 4-3)
- ECT sensor (page 21-12)

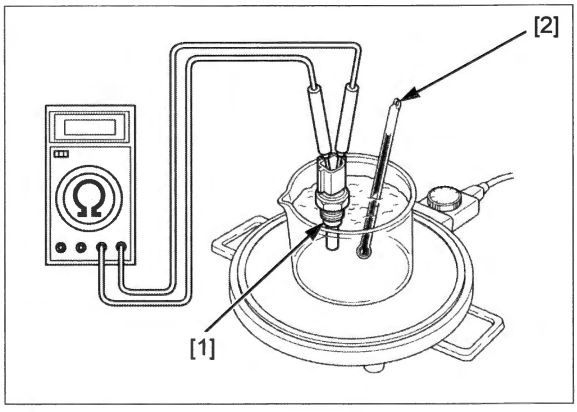
If the above items are OK, replace the combination meter (page 21-7).

ECT SENSOR INSPECTION

Remove the ECT sensor (page 4-44).

Suspend the ECT sensor [1] in a pan of coolant (1:1 antifreeze and distilled water mixture) on an electric heating element and measure the resistance between the sensor terminals 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 [2] or ECT sensor touch the pan.



TEMPERATURE	40°C (104°F)	100°C (212°F)
RESISTANCE	1.0 – 1.3 kΩ	0.1 – 0.2 kΩ

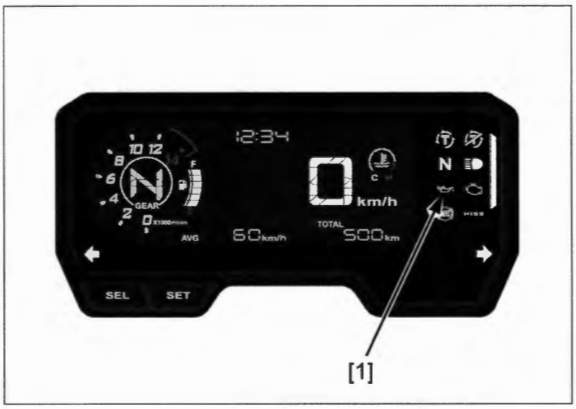
Replace the ECT sensor if it is out of specification by more than 10% at any temperature listed.

Install the ECT sensor (page 4-44).

ENGINE OIL PRESSURE INDICATOR/ EOP SWITCH

SYSTEM INSPECTION

When the system is normal, the engine oil pressure indicator [1] comes on when the ignition switch is turned ON with the engine stop switch "○", and then goes off when the engine is started.



NOTE:

- If the oil pressure indicator and digital display do not function at all, refer to combination meter initial operation check (page 21-7).

If the engine oil pressure indicator comes on for about 2 seconds and goes off when the ignition switch is turned ON, check the EOP switch line for open circuit (page 21-13).

If the engine oil pressure indicator stays on after the engine is started, stop the engine immediately and confirm the indication conditions:

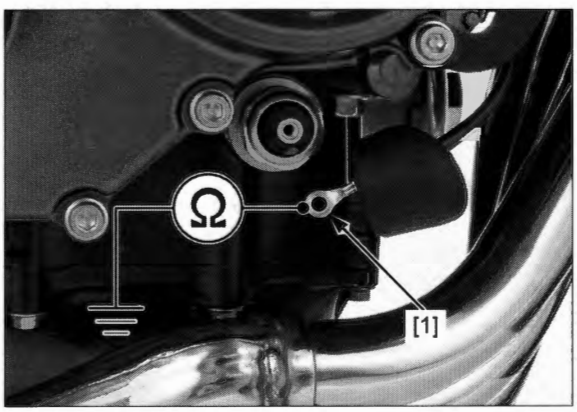
- The engine oil pressure indicator stays on and the other indications function normally, check the following:
  – Engine oil level (page 3-10)
  – EOP switch line for short circuit (page 21-13)
  – Engine oil pressure (page 9-5)

If the above items are OK, replace the combination meter (page 21-7).

EOP SWITCH LINE INSPECTION

Turn the ignition switch OFF.

Disconnect the EOP switch wire (page 21-14).



Open Circuit Inspection

Check for continuity between the wire terminal [1] and ground.

There should be continuity.

– If there is no continuity, the EOP switch wire (Black or Light green) has a open circuit.
– If there is continuity, replace the EOP switch (page 21-14).

Short Circuit Inspection

Disconnect the combination meter 20P (Gray) connector.

– CBR650R/RA: See page 2-8
– CB650R/RA: See page 21-7

Check for continuity between the wire terminal and ground as same manner as above.

There should be no continuity.

– If there is continuity, the EOP switch wire (Black or Light green) has a short circuit.
– If there is no continuity, replace the EOP switch (page 21-14).

EOP SWITCH REMOVAL/ INSTALLATION

Remove the under cowl (page 2-11) (CBR650R/RA).

Place the motorcycle on its sidestand on a level surface.

Release the rubber cap [1].

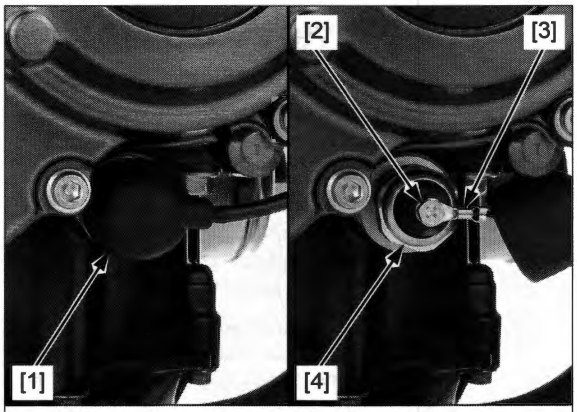
Remove the terminal screw [2] and disconnect the switch wire [3].

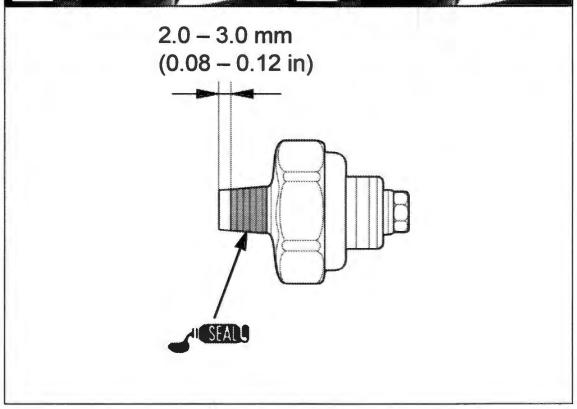
Remove the EOP switch [4].

Installation is in the reverse order of removal.

NOTE:

- Before installing the EOP switch, clean the threads in the crankcase with a degreasing agent thoroughly.
- Apply sealant (TB1207B manufactured by ThreeBond or an equivalent) to the EOP switch threads. Do not apply to the sensor tip in the area as shown.





TORQUE:
EOP switch:
12 N·m (1.2 kgf·m, 9 lbf·ft)
EOP switch terminal screw:
2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Check the engine oil level (page 3-10).

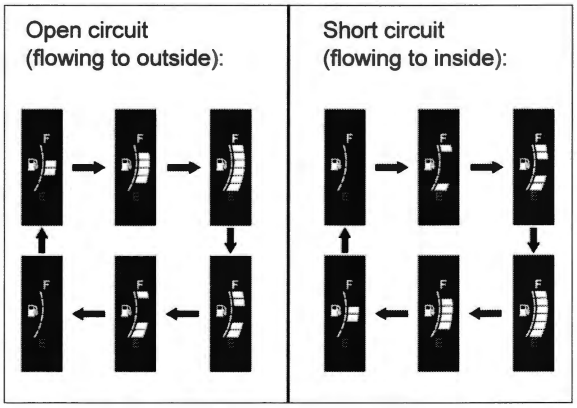
FUEL GAUGE/FUEL LEVEL SENSOR

FUEL GAUGE INSPECTION

When the circuit malfunction occurs, the combination meter displays the flow pattern in the fuel gauge. If it is indicated, check for open or short circuit in the Pink wire between the combination meter and fuel pump unit.

If the Pink wire is OK, check the fuel level sensor (page 21-14).

If the fuel level sensor is OK, replace the combination meter (page 21-7).



FUEL LEVEL SENSOR INSPECTION

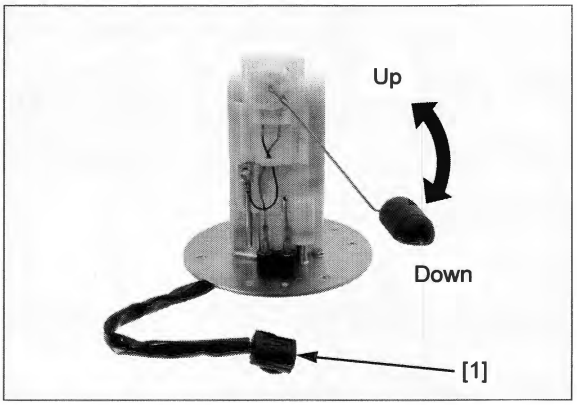
Remove the fuel pump unit (page 7-10).

Measure the resistance between the fuel pump unit 3P (Black) connector [1] terminals.

CONNECTION: Red/black – Black/white

FLOAT POSITION	Up (Full)	Down (Empty)
RESISTANCE (20°C/68°F)	6 – 10 Ω	384 – 396 Ω

If the resistance is out of specification, replace the fuel level sensor (page 21-15).



REMOVAL/INSTALLATION

Remove the fuel pump unit (page 7-10).

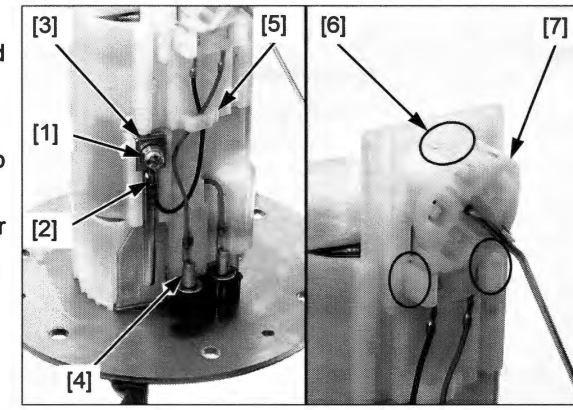
Remove the screw [1], Black wire terminal [2] and stopper [3].

Disconnect the Pink wire connector [4].

Release the wires from the guides [5] of the fuel pump unit.

Press the tabs [6] and remove the fuel level sensor assembly [7] from the fuel pump unit.

Installation is in the reverse order of the removal.



IGNITION SWITCH

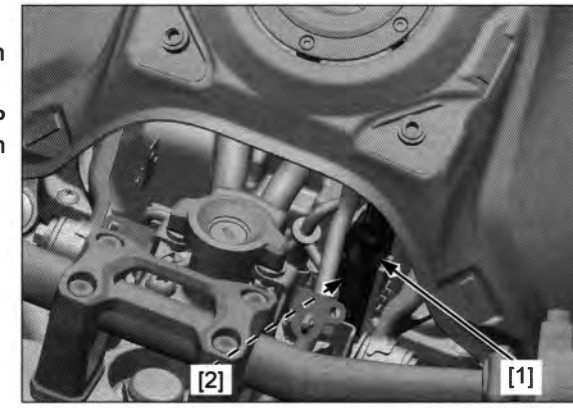
INSPECTION

Remove the ignition switch cover (page 21-15).

Remove the dust cover [1] and disconnect the ignition switch 2P (Brown) connector [2].

Check for continuity between the switch side 2P (Brown) connector terminals in each switch position according to the continuity chart.

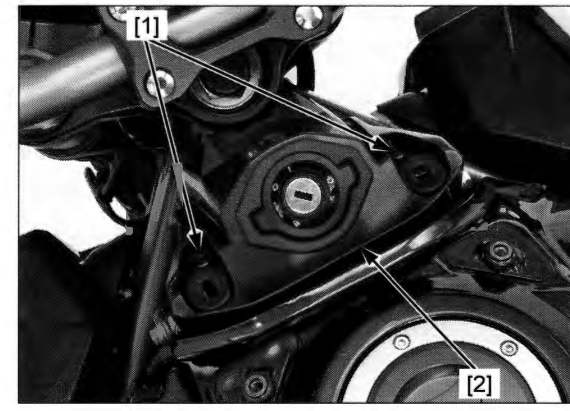
- CBR650R/RA (page 22-2)
- CB650R/RA (page 22-3)



REMOVAL/INSTALLATION

Remove the tank cover (page 2-7).

Remove the two clips [1] and ignition switch cover [2].

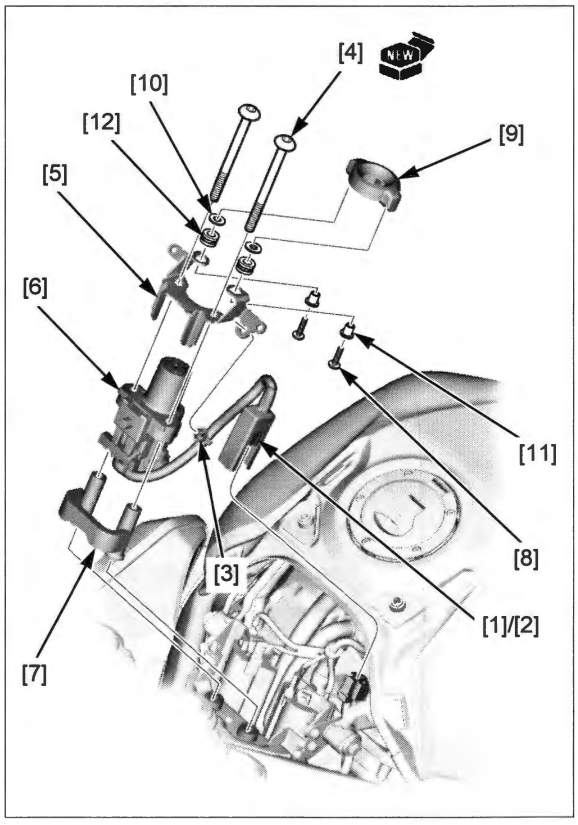


Remove the dust cover [1] and disconnect the ignition switch 2P (Brown) connector [2].

Remove the wire clip [3]

Remove the following:

- Two socket bolts [4]
- Ignition switch cover mount stay [5]
- Ignition switch [6]
- Ignition switch mount stay [7]
- Two screws [8]
- Ignition switch cover [9]
- Two washers [10]
- Two collars [11]
- Two grommets [12]



Route the wires properly (page 1-22)

Install the removed parts in the reverse order of removal.

TORQUE:
Ignition switch mounting bolt:
27 N·m (2.8 kgf·m, 20 lbf·ft)

NOTE:

- Replace the switch mounting socket bolts with new ones.

HANDLEBAR SWITCH

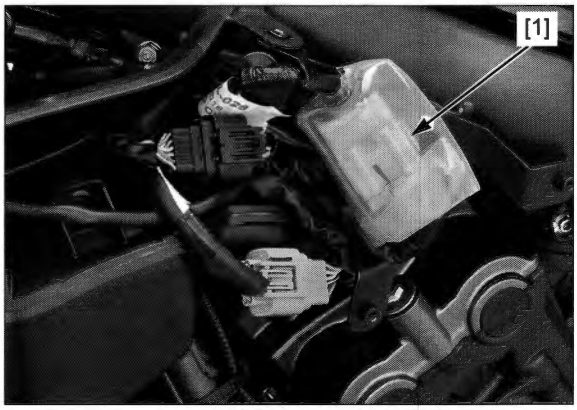
LEFT HANDLEBAR SWITCH

CBR650R/RA:

Remove the left middle cowl (page 2-7).

Disconnect the left handlebar switch 14P (Gray) connector [1].

Check for continuity between the switch side 14P (Gray) connector terminals in each switch position according to the continuity chart (page 22-2).



CB650R/RA:

Remove the left shroud (page 2-10).

Disconnect the left handlebar switch 14P (Gray) connector [1].

Check for continuity between the switch side 14P (Gray) connector terminals in each switch position according to the continuity chart (page 22-3).

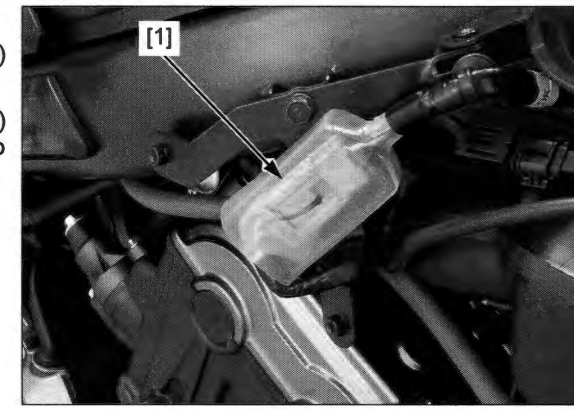
RIGHT HANDLEBAR SWITCH

CBR650R/RA:

Remove the right middle cowl (page 2-7).

Disconnect the right handlebar switch 6P (Gray) connector [1].

Check for continuity between the switch side 6P (Gray) connector terminals in each switch position according to the continuity chart (page 22-2).



CB650R/RA:

Remove the right shroud (page 2-10).

Disconnect the right handlebar switch 5P (Gray) connector [1].

Check for continuity between the switch side 5P (Gray) connector terminals in each switch position according to the continuity chart (page 22-3).

BRAKE LIGHT SWITCH

FRONT

Disconnect the brake light switch connectors [1] and check for continuity between the switch terminals.

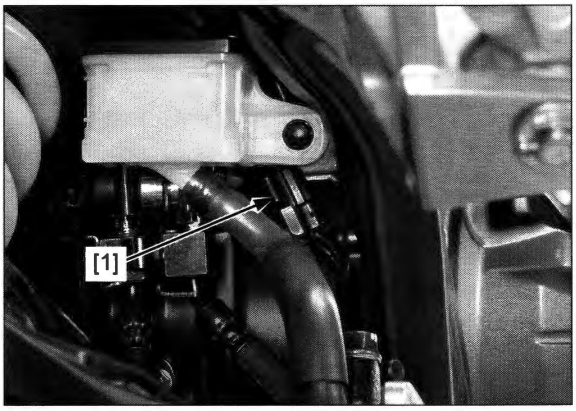
There should be continuity with the brake lever squeezed, and no continuity when the brake lever is released.

REAR

Disconnect the rear brake light switch 2P (Black) connector [1].

Check for continuity between the switch side connector terminals.

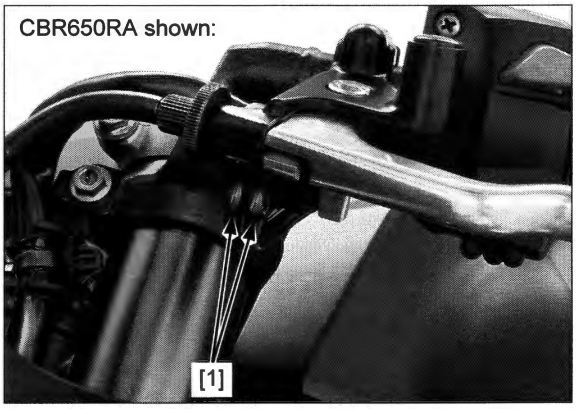
There should be continuity with the brake pedal depressed, and no continuity when the brake pedal is released.



CLUTCH SWITCH

Disconnect the clutch switch connectors [1] and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed, and no continuity when the clutch lever is released.



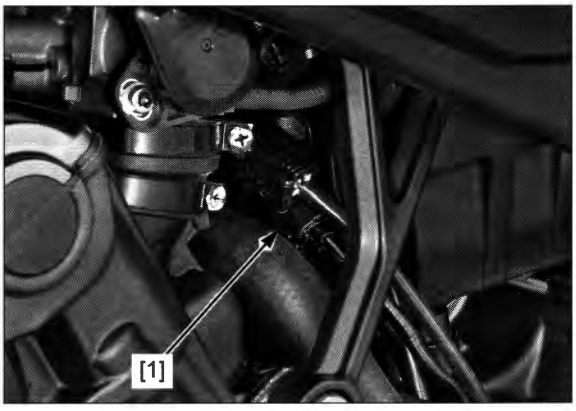
SIDESTAND SWITCH

INSPECTION

Disconnect the sidestand switch 2P (Black) connector [1].

Check for continuity between the switch side connector terminals.

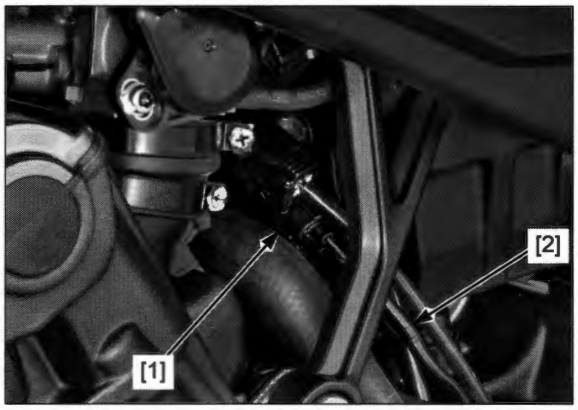
There should be continuity with the sidestand retracted, and, no continuity when the sidestand is lowered.



REMOVAL/INSTALLATION

Remove the drive sprocket cover (page 2-15).

Disconnect the sidestand switch 2P (Black) connector [1] and remove the sidestand switch wire [2] out of the frame.



Remove the bolt [1] and sidestand switch [2].

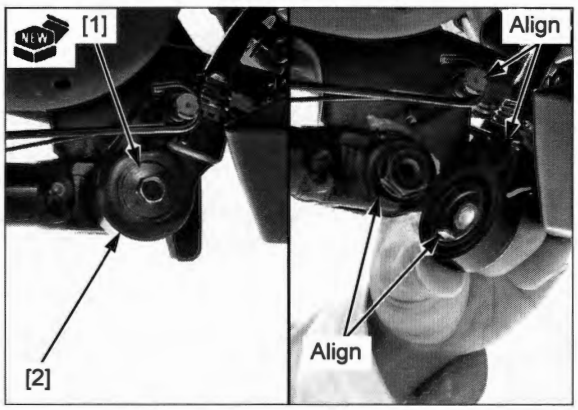
Installation is in the reverse order of removal.

NOTE:

- Align the switch pin with the hole in the sidestand and the switch groove with the return spring pin.
- Replace the switch bolt with a new one.

TORQUE:

Sidestand switch mounting bolt:
10 N·m (1.0 kgf·m, 7 lbf·ft)



HORN

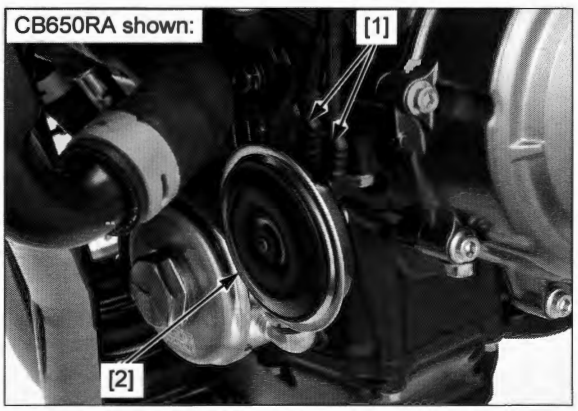
INSPECTION

Remove the left middle cowl (page 2-7) (CBR650R/RA).

Disconnect the connectors [1] from the horn [2].

Connect a 12 V battery to the horn terminals.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



REMOVAL/INSTALLATION

Remove the left middle cowl (page 2-7) (CBR650R/RA).

Disconnect the connectors [1].

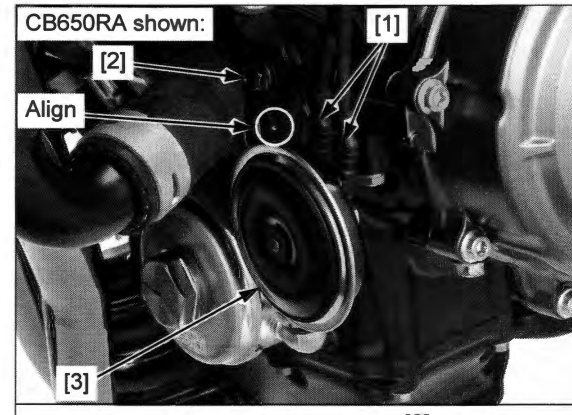
Remove the mounting bolt [2] and horn assembly [3].

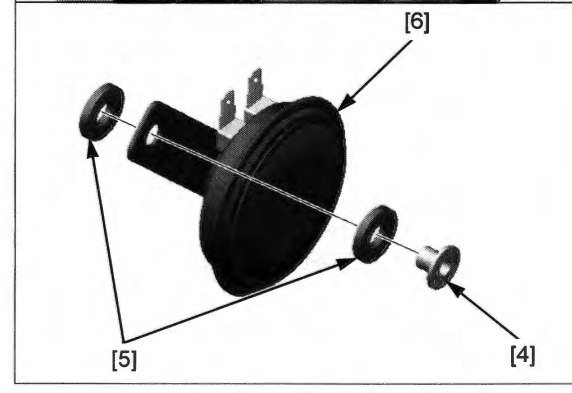
Remove the collar [4], two rubber mounts [5] from the horn [6].

Installation in the reverse order of removal.

NOTE:

- When tightening the mounting bolt, align the stay end of the horn with the stopper of the frame.





HSTC (Honda Selectable Torque Control) SYSTEM (ABS type)

NOTE:

- The HSTC system utilizes various PGM-FI/ABS components. If any of the related items and/or circuit has problem, the system will fail and the torque control indicator remains on in order to notify the rider of the problem.
- If any DTC is indicated, repair the malfunctioned part(s) first.

SYSTEM INSPECTION

PRE-START SELF-DIAGNOSIS PROCEDURE

1. Turn the ignition switch ON and engine stop switch "○".
2. The torque control indicator turns ON.
3. Start the engine.
4. Test ride the motorcycle and increase the motorcycle speed to approximately 10 km/h (6 mph).
5. The system is normal if the indicator goes off.

TORQUE CONTROL INDICATOR REMAINS ON AFTER THE PRE-START SELF DIAGNOSIS IS COMPLETED, OR IT TURNS AND REMAINS ON WHILE RIDING.

Check the following:

– No PGM-FI DTC (page 4-7)
– No ABS DTC (page 19-6)
– Combination meter serial communication line (page 21-8)

If all of the above items are normal, replace the combination meter with a known good one (page 21-7) and recheck the torque control indicator.

TORQUE CONTROL CAN NOT BE TURNED OFF BY PRESSING THE TORQUE CONTROL SWITCH

Check the following:

– Blue/yellow wire between the torque control switch and ECM for open or short circuit.
– Green/orange wire between the torque control switch and ground for open circuit.
– Torque control switch (page 21-21)
– Combination meter serial communication line (page 21-8)

If all of the above items are normal, replace the ECM with a known good one and recheck.

TORQUE CONTROL SWITCH INSPECTION

CBR650RA:

Remove the left middle cowl (page 2-7).

Disconnect the Torque control switch 3P (Black) connector [1].

Check for continuity between the switch side 3P (Black) connector terminals in each switch position according to the continuity chart (page 22-2).

CB650RA:

Remove the left shroud (page 2-10).

Disconnect the Torque control switch 3P (Black) connector [1].

Check for continuity between the switch side 3P (Black) connector terminals in each switch position according to the continuity chart (page 22-3).

TURN SIGNAL RELAY

REMOVAL/INSTALLATION

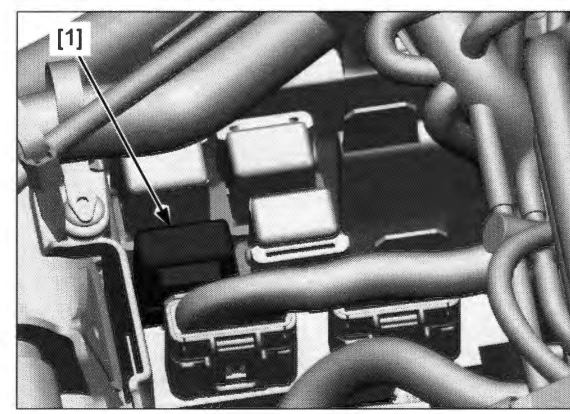
Remove the ABS modulator cover (page 4-42).

Turn the ignition switch OFF.

Remove the turn signal relay [1] from the stay.

Disconnect the 3P (Black) connector.

Installation is in the reverse order of removal.



SYSTEM INSPECTION

Check the following:

- Battery condition
- Ignition switch and turn signal light switch function
- Loose connectors
- Fuse

If above items are all normal, check the following:

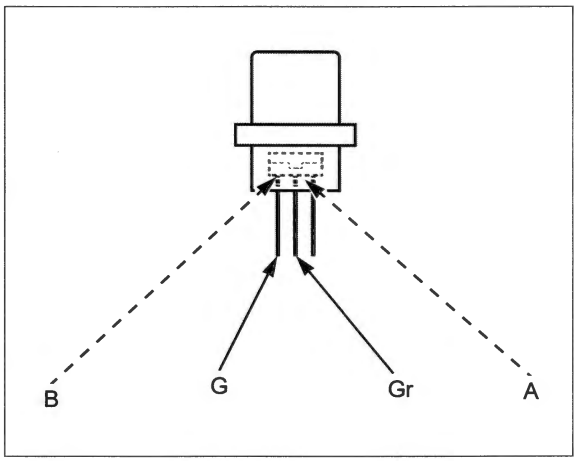
Connect the peak voltage adaptor to the digital multimeter, or use the Imrie diagnostic tester.

Turn the ignition switch ON and turn signal light switch ON.

Check the voltage between the following terminals of the wire harness side connector.

NOTE:

- Measure with the connector connected.



CONNECTION: A (Gray) (+) – B (Green) (–)
STANDARD:
Battery voltage – peak voltage = 1.5 V maximum

TOOL:

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

If there is no standard voltage, inspect the open or short circuit in Gray and Green wires.

If there is standard voltage, replace the turn signal light relay with a known good one (page 21-21), and recheck.

CONTROL RELAY

RELAY REMOVAL/INSTALLATION

MAIN RELAY/FUEL PUMP RELAY/FAN CONTROL RELAY

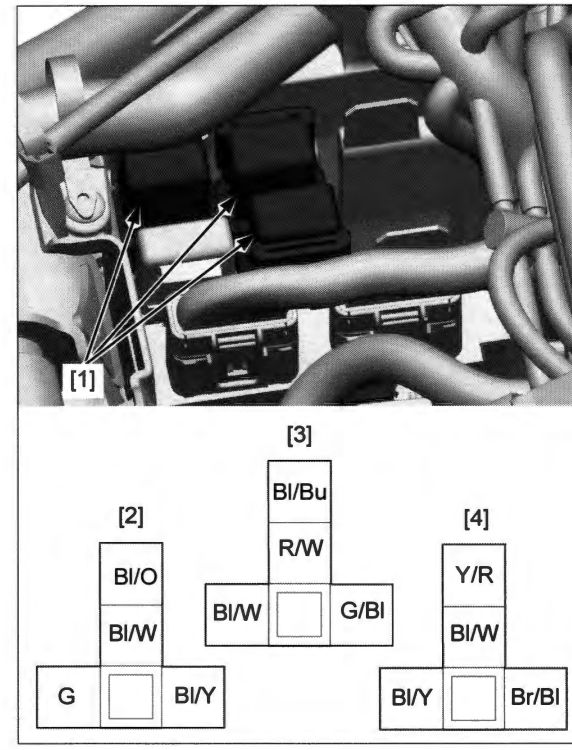
Remove the ABS modulator cover (page 4-42).

Turn the ignition switch OFF.

Remove the following relays [1] by pulling it up.

- Main relay [2]
- Fan control relay [3]
- Fuel pump relay [4]

Installation is in the reverse order of removal.



RELAY INSPECTION

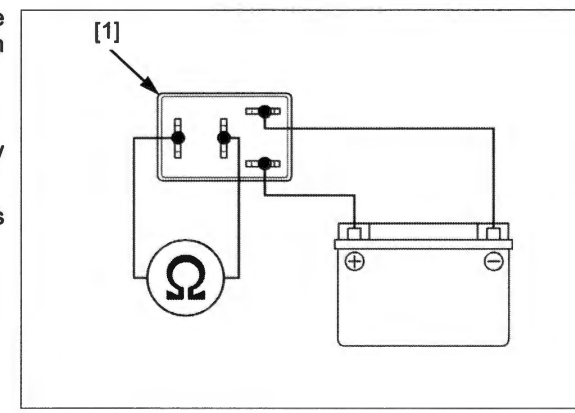
NOTE:

- All the relays in the relay box are same parts. The relay function can be checked by exchanging it with a known good one (except main relay) temporarily.

Remove the relay (page 21-23).

Connect an ohmmeter and a 12 V battery to the relay [1] terminals as shown.

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

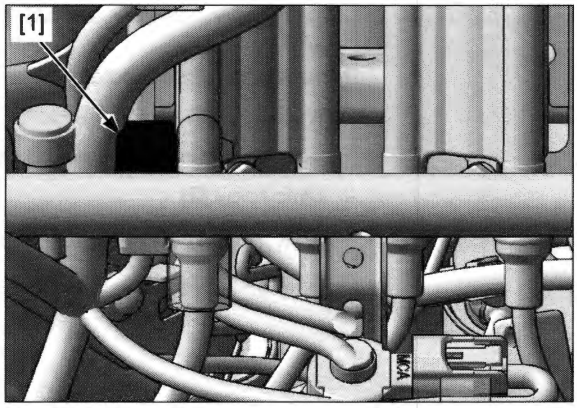


HAZARD DIODE

INSPECTION

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

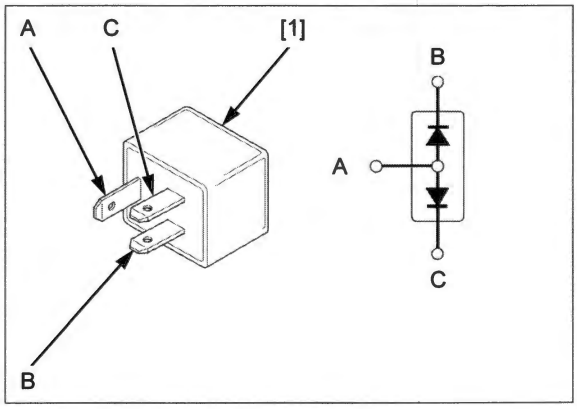
Remove the hazard diode [1].



Check for continuity between the diode [1] terminals.

When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.

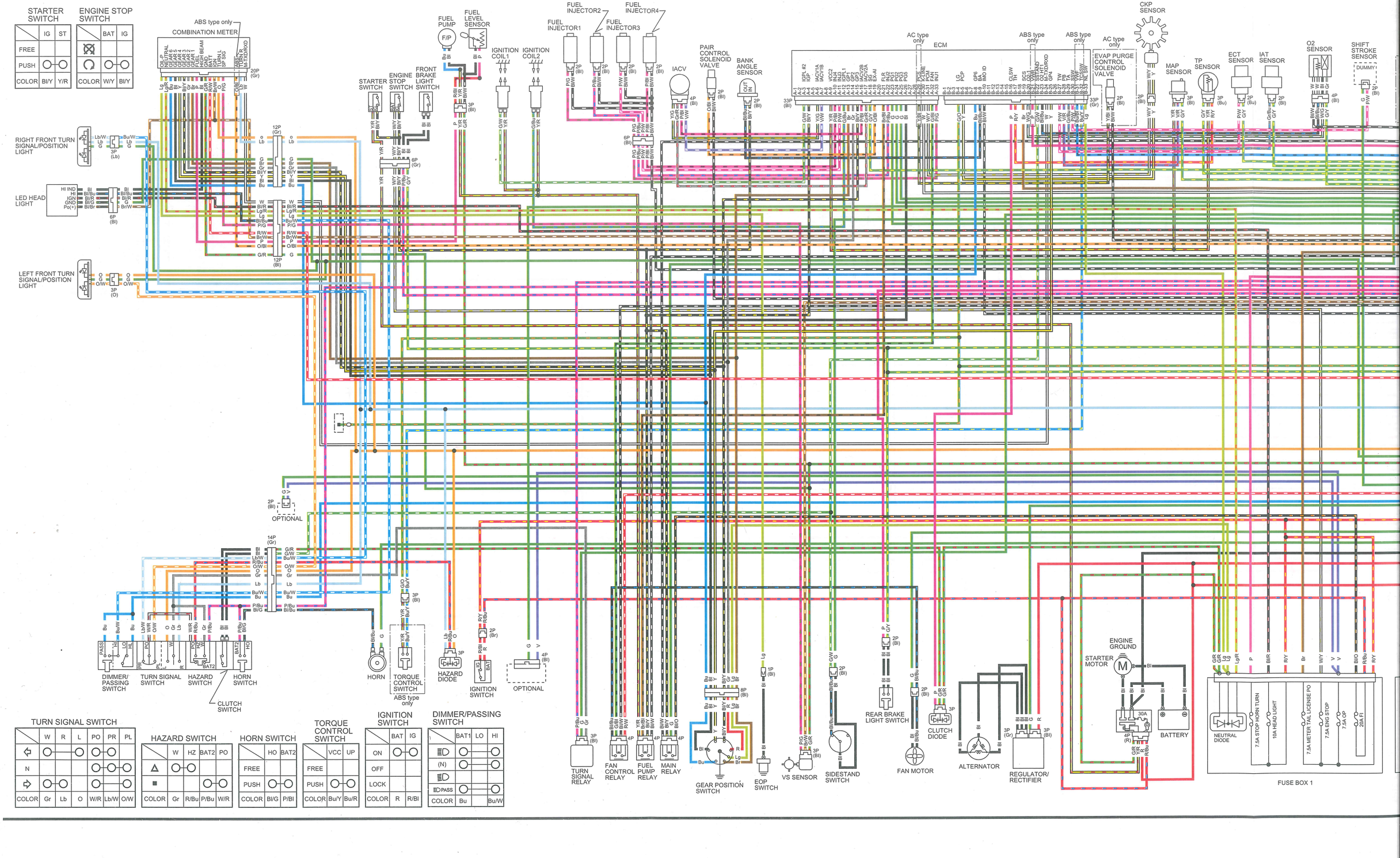


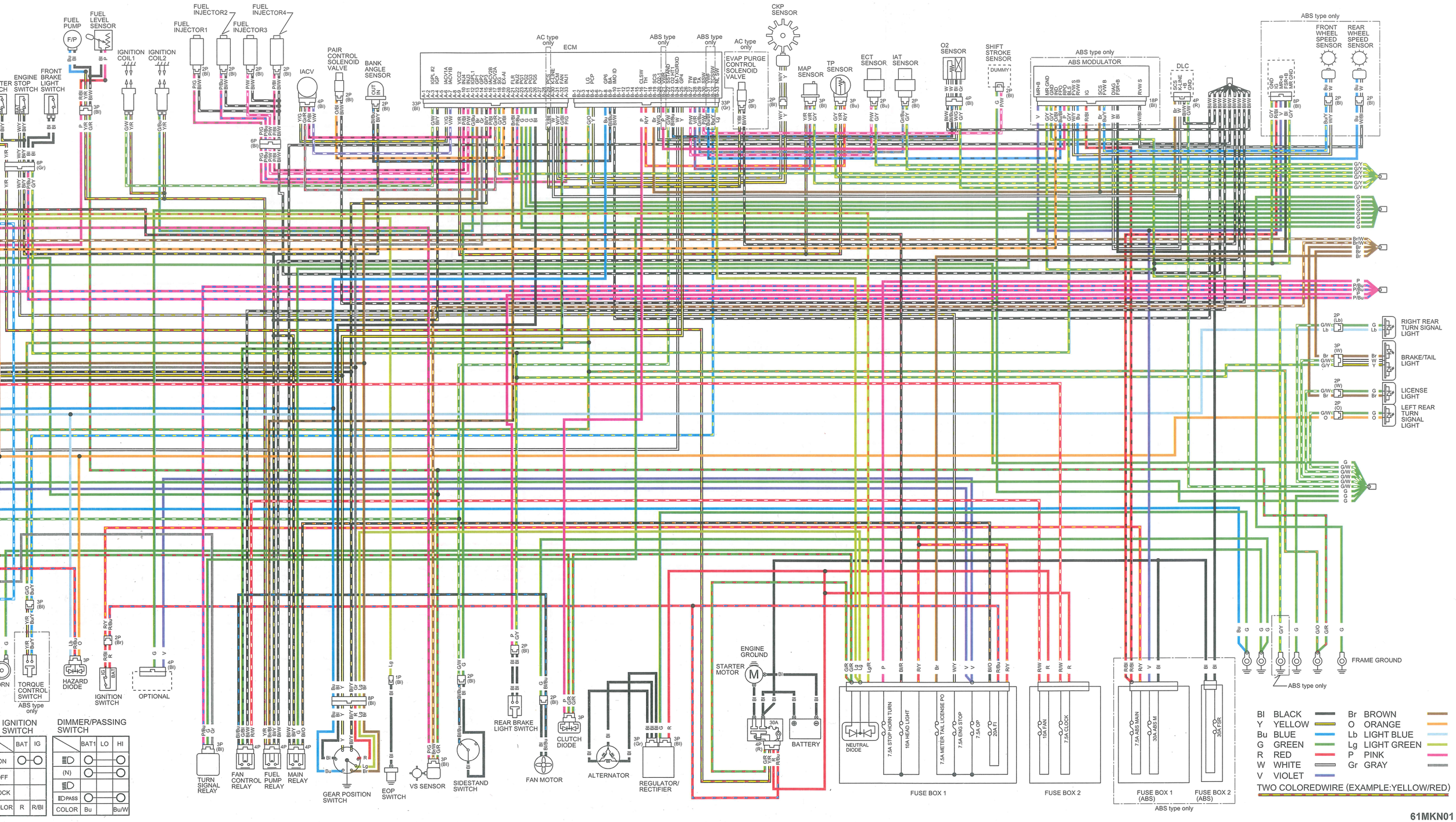
22. WIRING DIAGRAMS

CBR650R/RA 22-2

CB650R/RA 22-3

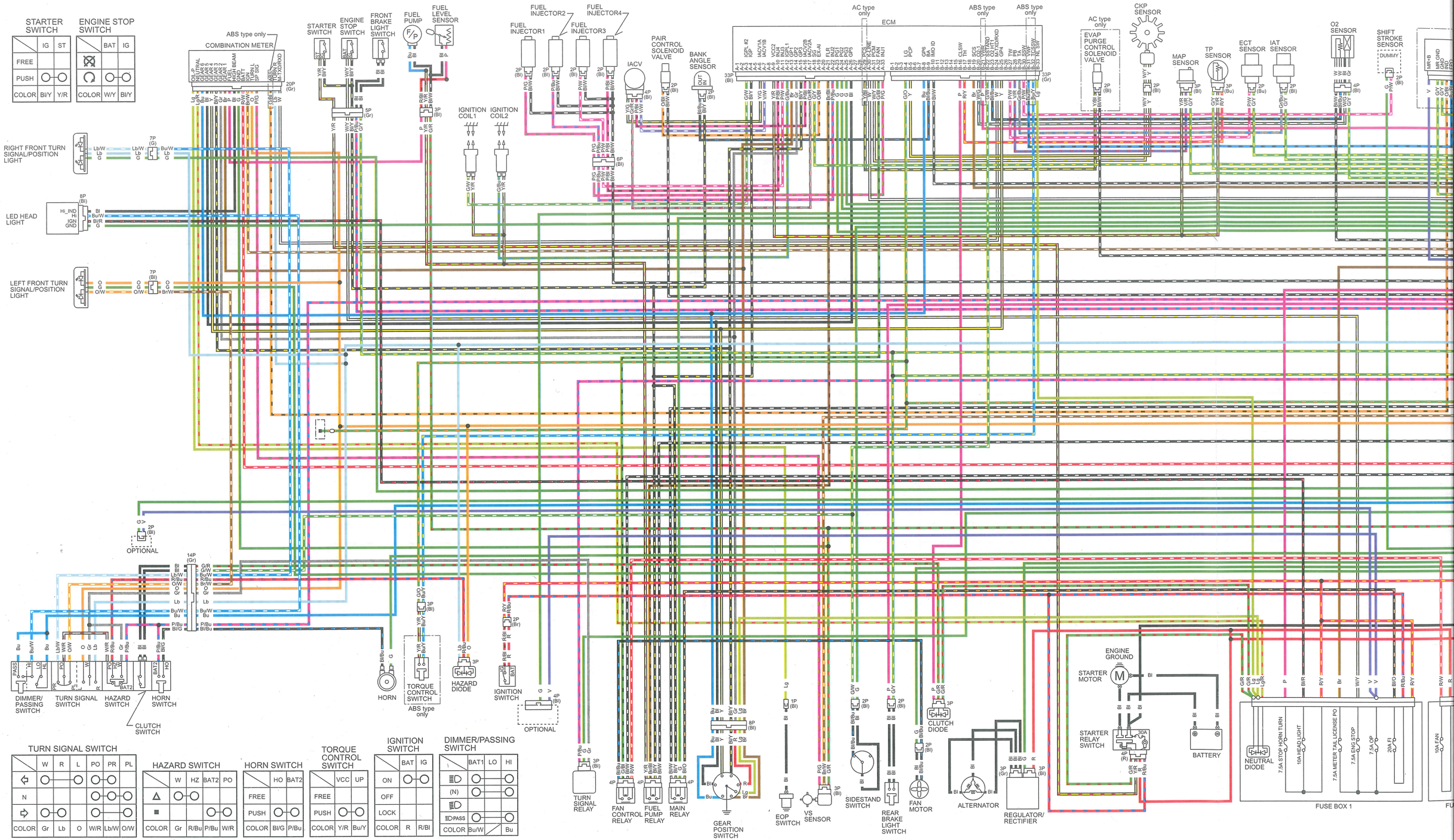
CBR650R/RA


STARTER SWITCH
ENGINE STOP SWITCH
ABS type only
COMBINATION METER
20P (Gr)
FUEL PUMP
FUEL LEVEL SENSOR
FUEL INJECTOR1
FUEL INJECTOR2
FUEL INJECTOR3
FUEL INJECTOR4
IGNITION COIL1
IGNITION COIL2
IACV
PAIR CONTROL SOLENOID VALVE
BANK ANGLE SENSOR
AC type only
ECM
ABS type only
ABS type only
AC type only
EVAP PURGE CONTROL SOLENOID VALVE
CKP SENSOR
MAP SENSOR
TP SENSOR
ECT SENSOR
IAT SENSOR
O2 SENSOR
SHIFT STROKE SENSOR
STARTER SWITCH
ENGINE STOP SWITCH
FRONT BRAKE LIGHT SWITCH
RIGHT FRONT TURN SIGNAL/POSITION LIGHT
LED HEAD LIGHT
LEFT FRONT TURN SIGNAL/POSITION LIGHT
OPTIONAL
DIMMER/ PASSING SWITCH
TURN SIGNAL SWITCH
HAZARD SWITCH
HORN SWITCH
CLUTCH SWITCH
HORN
TORQUE CONTROL SWITCH
ABS type only
HAZARD DIODE
IGNITION SWITCH
OPTIONAL
TURN SIGNAL RELAY
FAN CONTROL RELAY
FUEL PUMP RELAY
MAIN RELAY
GEAR POSITION SWITCH
EOP SWITCH
VS SENSOR
SIDESTAND SWITCH
REAR BRAKE LIGHT SWITCH
FAN MOTOR
CLUTCH DIODE
ALTERNATOR
REGULATOR/ RECTIFIER
ENGINE GROUND
STARTER MOTOR
BATTERY
NEUTRAL DIODE
FUSE BOX 1
7.5A STOP HORN TURN
10A HEAD LIGHT
7.5A METER TAIL LICENSE PO
7.5A ENG STOP
7.5A CKP
20A FI
TURN SIGNAL SWITCH
HAZARD SWITCH
HORN SWITCH
TORQUE CONTROL SWITCH
IGNITION SWITCH
DIMMER/PASSING SWITCH


FUEL PUMP
F/P
FUEL LEVEL SENSOR
FUEL INJECTOR1
FUEL INJECTOR2
FUEL INJECTOR3
FUEL INJECTOR4
IGNITION COIL1
IGNITION COIL2
IACV
PAIR CONTROL SOLENOID VALVE
BANK ANGLE SENSOR
AC type only
ECM
ABS type only
EVAP PURGE CONTROL SOLENOID VALVE
CKP SENSOR
MAP SENSOR
TP SENSOR
ECT SENSOR
IAT SENSOR
O2 SENSOR
SHIFT STROKE SENSOR
ABS MODULATOR
DLC
FRONT WHEEL SPEED SENSOR
REAR WHEEL SPEED SENSOR
ENGINE STOP SWITCH
FRONT BRAKE LIGHT SWITCH
TORQUE CONTROL SWITCH
HAZARD DIODE
IGNITION SWITCH
OPTIONAL
IGNITION SWITCH
DIMMER/PASSING SWITCH
TURN SIGNAL RELAY
FAN CONTROL RELAY
FUEL PUMP RELAY
MAIN RELAY
GEAR POSITION SWITCH
EOP SWITCH
VS SENSOR
SIDESTAND SWITCH
REAR BRAKE LIGHT SWITCH
FAN MOTOR
CLUTCH DIODE
ALTERNATOR
REGULATOR/ RECTIFIER
ENGINE GROUND
STARTER MOTOR
BATTERY
NEUTRAL DIODE
FUSE BOX 1
FUSE BOX 2
FUSE BOX 1 (ABS)
FUSE BOX 2 (ABS)
RIGHT REAR TURN SIGNAL LIGHT
BRAKE/TAIL LIGHT
LICENSE LIGHT
LEFT REAR TURN SIGNAL LIGHT
FRAME GROUND
BI BLACK
Y YELLOW
Bu BLUE
G GREEN
R RED
W WHITE
V VIOLET
Br BROWN
O ORANGE
Lb LIGHT BLUE
Lg LIGHT GREEN
P PINK
Gr GRAY
TWO COLOREDWIRE (EXAMPLE:YELLOW/RED)

61MKN01

CB650R/RA


STARTER SWITCH
ENGINE STOP SWITCH
FRONT BRAKE LIGHT SWITCH
FUEL PUMP
FUEL LEVEL SENSOR
ABS type only
COMBINATION METER
FUEL INJECTOR1
FUEL INJECTOR2
FUEL INJECTOR3
FUEL INJECTOR4
IACV
PAIR CONTROL SOLENOID VALVE
BANK ANGLE SENSOR
ECM
AC type only
ABS type only
EVAP PURGE CONTROL SOLENOID VALVE
CKP SENSOR
MAP SENSOR
TP SENSOR
ECT SENSOR
IAT SENSOR
O2 SENSOR
SHIFT STROKE SENSOR
IGNITION COIL1
IGNITION COIL2
RIGHT FRONT TURN SIGNAL/POSITION LIGHT
LED HEAD LIGHT
LEFT FRONT TURN SIGNAL/POSITION LIGHT
OPTIONAL
DIMMER/ PASSING SWITCH
TURN SIGNAL SWITCH
HAZARD SWITCH
HORN SWITCH
CLUTCH SWITCH
HORN
TORQUE CONTROL SWITCH
ABS type only
HAZARD DIODE
IGNITION SWITCH
OPTIONAL
TURN SIGNAL RELAY
FAN CONTROL RELAY
FUEL PUMP RELAY
MAIN RELAY
GEAR POSITION SWITCH
EOP SWITCH
VS SENSOR
SIDESTAND SWITCH
REAR BRAKE LIGHT SWITCH
FAN MOTOR
CLUTCH DIODE
ALTERNATOR
REGULATOR/ RECTIFIER
ENGINE GROUND
STARTER MOTOR
STARTER RELAY SWITCH
BATTERY
NEUTRAL DIODE
FUSE BOX 1
TURN SIGNAL SWITCH
HAZARD SWITCH
HORN SWITCH
TORQUE CONTROL SWITCH
IGNITION SWITCH
DIMMER/PASSING SWITCH

FUEL PUMP
FUEL LEVEL SENSOR
FUEL INJECTOR1
FUEL INJECTOR2
FUEL INJECTOR3
FUEL INJECTOR4
IACV
PAIR CONTROL SOLENOID VALVE
BANK ANGLE SENSOR
IGNITION COIL1
IGNITION COIL2
ECM
AC type only
ABS type only
EVAP PURGE CONTROL SOLENOID VALVE
CKP SENSOR
MAP SENSOR
TP SENSOR
ECT SENSOR
IAT SENSOR
O2 SENSOR
SHIFT STROKE SENSOR
ABS MODULATOR
DLC
FRONT WHEEL SPEED SENSOR
REAR WHEEL SPEED SENSOR
TORQUE CONTROL SWITCH
HAZARD DIODE
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OPTIONAL
DIMMER/PASSING SWITCH
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EOP SWITCH
VS SENSOR
SIDESTAND SWITCH
REAR BRAKE LIGHT SWITCH
FAN MOTOR
CLUTCH DIODE
ALTERNATOR
REGULATOR/ RECTIFIER
ENGINE GROUND
STARTER MOTOR
STARTER RELAY SWITCH
BATTERY
NEUTRAL DIODE
FUSE BOX 1
FUSE BOX 2
FUSE BOX 1 (ABS)
FUSE BOX 2 (ABS)
RIGHT REAR TURN SIGNAL LIGHT
BRAKE /TAIL LIGHT
LICENSE LIGHT
LEFT REAR TURN SIGNAL LIGHT
FRAME GROUND

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY
V	VIOLET		

TWO COLOREDWIRE (EXAMPLE:YELLOW/RED)

MEMO

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