



2007

XJR1300(W)

SERVICE MANUAL

5WM-28197-E0

EAS20040

**XJR1300(W) 2007
SERVICE MANUAL
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NOTICE

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

Yamaha Motor Company, Ltd. is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

NOTE:

Designs and specifications are subject to change without notice.

IMPORTANT MANUAL INFORMATION

Particularly important information is distinguished in this manual by the following.



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



Failure to follow WARNING instructions could result in severe injury or death to the vehicle operator, a bystander or a person checking or repairing the vehicle.



A CAUTION indicates special precautions that must be taken to avoid damage to the vehicle.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

HOW TO USE THIS MANUAL

This manual is intended as a handy, easy-to-read reference book for the mechanic. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and check procedures are laid out with the individual steps in sequential order.

- The manual is divided into chapters and each chapter is divided into sections. The current section title is shown at the top of each page “1”.
- Sub-section titles appear in smaller print than the section title “2”.
- To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section “3”.
- Numbers are given in the order of the jobs in the exploded diagram. A number indicates a disassembly step “4”.
- Symbols indicate parts to be lubricated or replaced “5”.
- Refer to “SYMBOLS”.
- A job instruction chart accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc “6”.
- Jobs requiring more information (such as special tools and technical data) are described sequentially “7”.

1 CLUTCH

3 Removing the clutch

4 13 N 70 Nm (7.0 kg·m)

5 14 **New**

6 15 **New**

7 16 **New**

8 17 **New**

9 18 **New**

10 19 **New**

11 20 **New**

12 21 **New**

13 22 **New**

14 23 **New**

15 24 **New**

16 N 8 Nm (0.8 kg·m)

Order	Job/Part	Qty	Remarks
1	Pressure plate ²	1	
2	Clutch spring	1	
3	Clutch spring seat	1	
4	Pressure plate ¹	1	
5	Short clutch push rod	1	
6	Ball	1	
7	Long clutch push rod	1	
8	Spring	1	
9	Friction plate 1 (narrow)	1	
10	Clutch plate	6	
11	Friction plate 2	3	
12	Friction plate 3	3	
13	Clutch boss nut	1	
14	Lock washer	1	
15	Clutch boss	1	
16	Ring	1	
17	Clutch plate	1	
18	Spring	1	
19	Spring seat plate	1	
20	Friction plate 1 (narrow)	1	

5-36

1 CLUTCH

2 Friction plate thickness
2.90±0.10 mm (0.114±0.122 in)
Wear limit
2.80 mm (0.1102 in)

3 Remove:
Spacer "1"
Bearing

NOTE:
Insert M6 bolts "2" into the spacer and then remove the spacer by pulling on the bolts.

7 A B C

2 CHECKING THE CLUTCH PLATES
The following procedure applies to inspection of clutch plates.

1. Check:
Clutch plate
Damage Replace.

2. Measure:
friction plate thickness
Clutch plate warpage (with a plate surface and thickness gauge "1")
Over warpage limit Replace.

NOTE:
Measure the friction plate at four places.

Warpage limit
0.10 mm (0.0039 in)

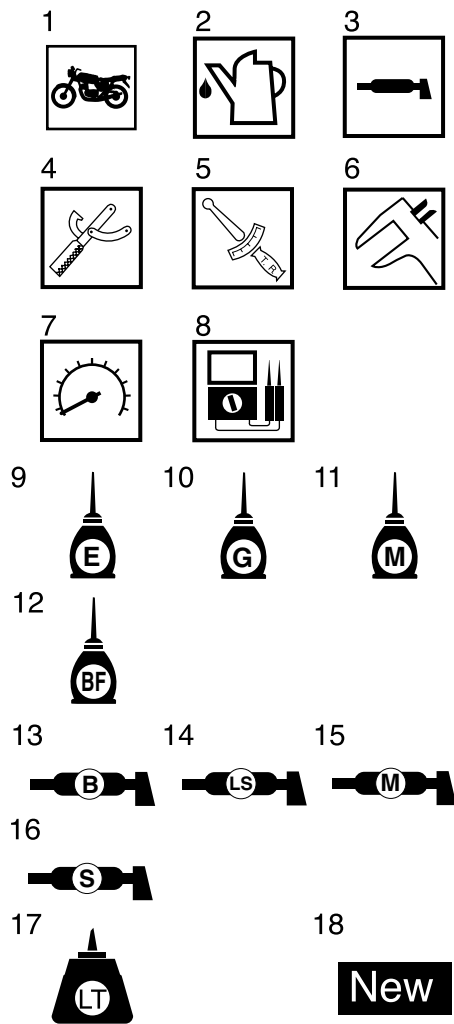
5-42

SYMBOLS

The following symbols are used in this manual for easier understanding.

NOTE:

The following symbols are not relevant to every vehicle.



1. Serviceable with engine mounted
2. Filling fluid
3. Lubricant
4. Special tool
5. Tightening torque
6. Wear limit, clearance
7. Engine speed
8. Electrical data
9. Engine oil
10. Gear oil
11. Molybdenum-disulfide oil
12. Brake fluid
13. Wheel-bearing grease
14. Lithium-soap-based grease
15. Molybdenum-disulfide grease
16. Silicon grease
17. Apply locking agent (LOCTITE®)
18. Replace the part

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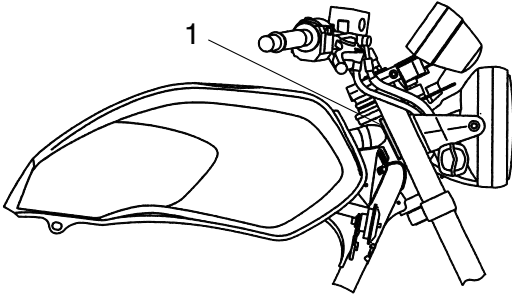
EAS20130

IDENTIFICATION

EAS20140

VEHICLE IDENTIFICATION NUMBER

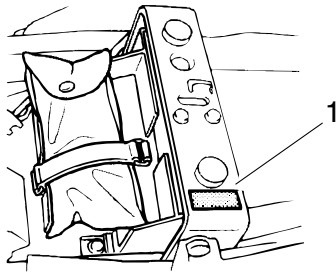
The vehicle identification number "1" is stamped into the right side of the steering head pipe.



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MODEL LABEL

The model label "1" is affixed to the frame. This information will be needed to order spare parts.



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FEATURES

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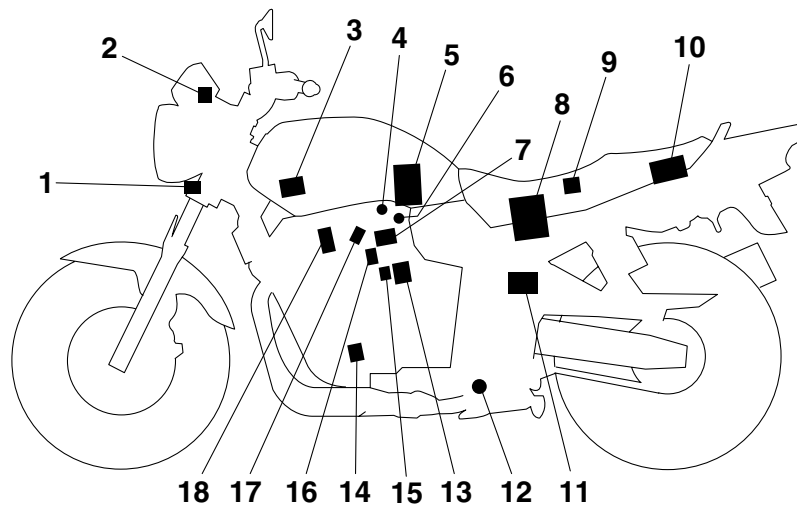
OUTLINE OF THE FI SYSTEM

The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions and the atmospheric temperature. In the conventional carburetor system, the air-fuel ratio of the mixture that is supplied to the combustion chamber is created by the volume of the intake air and the fuel that is metered by the jet used in the respective carburetor.

Despite the same volume of intake air, the fuel volume requirement varies by the engine operating conditions, such as acceleration, deceleration, or operating under a heavy load. Carburetors that meter the fuel through the use of jets have been provided with various auxiliary devices, so that an optimum air-fuel ratio can be achieved to accommodate the constant changes in the operating conditions of the engine.

As the requirements for the engine to deliver more performance and cleaner exhaust gases increase, it becomes necessary to control the air-fuel ratio in a more precise and finely tuned manner. To accommodate this need, this model has adopted an electronically controlled fuel injection (FI) system, in place of the conventional carburetor system. This system can achieve an optimum air-fuel ratio required by the engine at all times by using a microprocessor that regulates the fuel injection volume according to the engine operating conditions detected by various sensors.

The adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions.

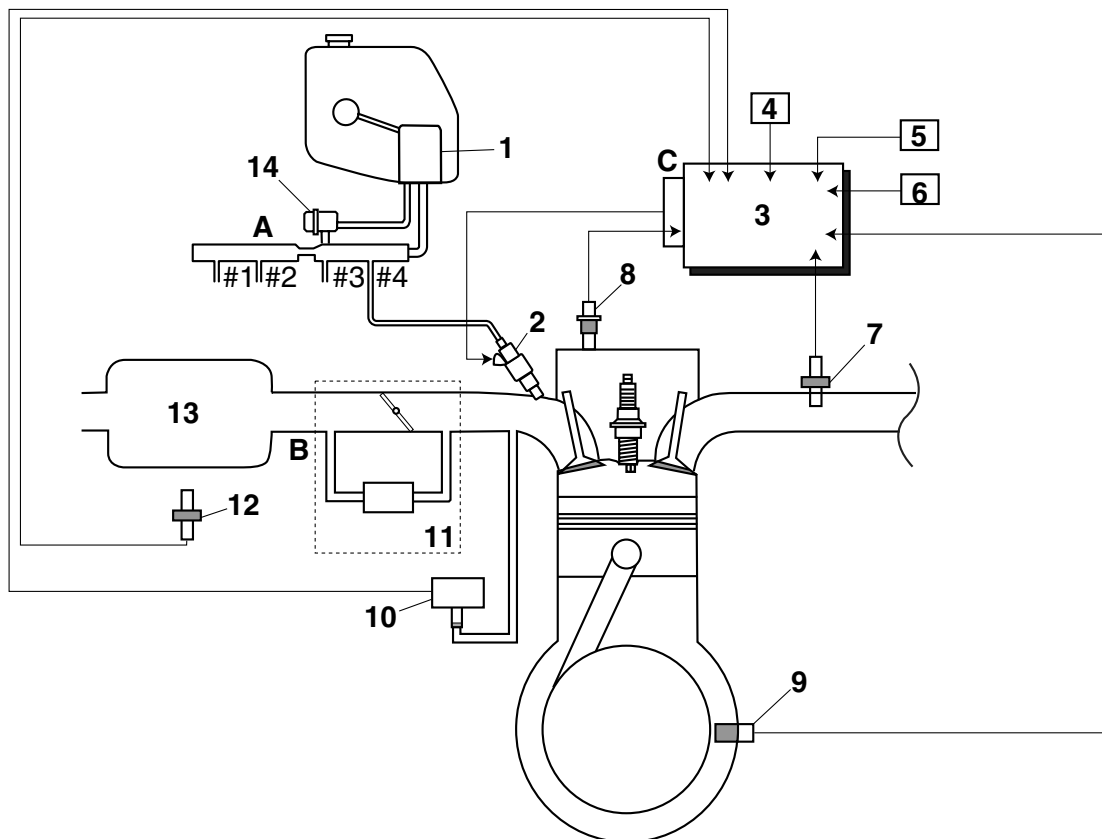


- | | |
|------------------------------------|------------------------------------|
| 1. Intake air temperature sensor | 14. Crankshaft position sensor |
| 2. Engine trouble warning light | 15. Sub-throttle position sensor |
| 3. Ignition coil | 16. Engine temperature sensor bolt |
| 4. Intake air pressure sensor 1 | 17. Fuel injector |
| 5. Fuel pump | 18. Spark plug |
| 6. Intake air pressure sensor 2 | |
| 7. Throttle position sensor | |
| 8. Battery | |
| 9. Lean angle sensor | |
| 10. ECU | |
| 11. EXUP servomotor | |
| 12. O ₂ sensor | |
| 13. ISC (idle speed control valve) | |

EAS5UXB016

FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator is installed in the fuel rail, and maintains the fuel pressure that is applied to the fuel injector at 387–397 kPa (3.87–3.97 kg/cm²). The fuel injector is operated due to signals from the ECU, and injects fuel into the intake manifold. Since fuel is supplied only for the duration of injection, good fuel economy is obtained. The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, crankshaft position sensor, intake air pressure sensor, intake temperature sensor O₂ sensor and engine temperature sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.



- | | |
|-----------------------------------|-------------------|
| 1. Fuel pump | A. Fuel system |
| 2. Injector | B. Intake system |
| 3. ECU | C. Control system |
| 4. Throttle position sensor | |
| 5. Sub-throttle position sensor | |
| 6. ISC (idle speed control valve) | |
| 7. O ₂ sensor | |
| 8. Engine temperature sensor | |
| 9. Crankshaft position sensor | |
| 10. Intake air pressure sensor | |
| 11. Throttle bodies | |
| 12. Intake air temperature sensor | |
| 13. Air filter case | |
| 14. Pressure regulator | |

EAS5UXB016

IMMOBILIZER SYSTEM

To help prevent theft, the XJR1300 is equipped with an “immobilizer system” that electronically prevents engine starting.

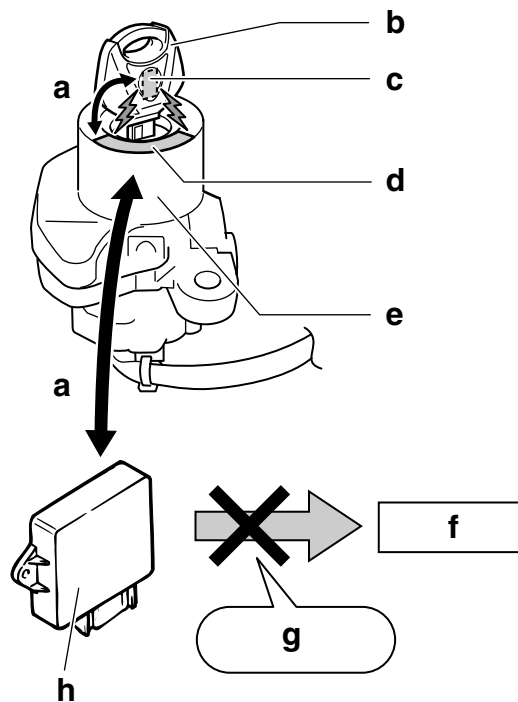
The key has a built-in microchip transponder that disables illegal duplicate keys by dual checking of code between key and immobilizer unit and between immobilizer unit and ECU, thereby improving security.

After turning the main switch “ON” the ECU checks the unique key identification code and random code through the immobilizer unit. The immobilizer unit and ECU computation results are checked with the 2 codes, and if the key is recognized as legal, the ECU releases ignition control (cutoff) and the engine can start.

With a copy key with only identical key grooves, code verification does not proceed correctly, the ECU fails to release ignition control and the engine cannot start.

NOTE:

While the code is being verified after the main switch is turned “ON” the immobilizer warning light is lit. Wait until the immobilizer warning light goes off before starting the engine.



- a. Recognizing electronic codes
- b. Sub key (black)
- c. Transponder
- d. Antenna
- e. Immobilizer unit
- f. Ignition control
- g. Cut off
- h. ECU

EAS5UXB003

INSTRUMENT FUNCTION

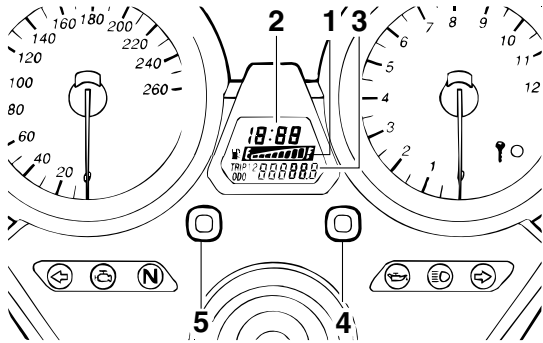
Multi-function display

EWA5UXB001



WARNING

Be sure to stop the motorcycle before making any setting change to the multi-function display.



1. Fuel meter
2. Clock
3. Odometer/Trip meter/Fuel reserve trip meter/
Self-diagnostic function
4. RESET button
5. SELECT button

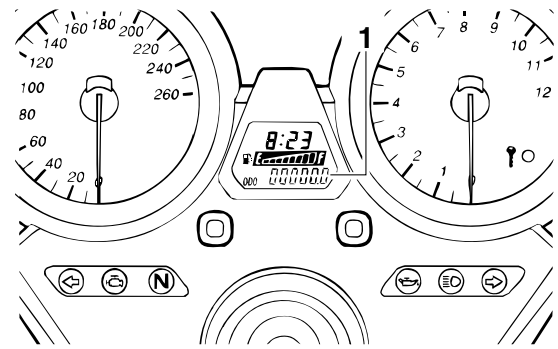
The multi-function display is equipped with the following:

- an odometer (which shows the total distance traveled)
- two trip meters (which show the distance traveled since they were last set to zero)
- a fuel reserve trip meter (which shows the distance traveled on the fuel reserve)
- a fuel meter
- a clock
- a self-diagnosis device

NOTE:

Be sure to turn the key to "ON" before using the "SELECT" and "RESET" buttons.

Odometer and trip meter modes



1. Odometer/Trip meter/Fuel trip meter

Pushing the "SELECT" button switches the display between the odometer mode "ODO" and the trip meter modes "TRIP 1" and "TRIP 2" in the following order:

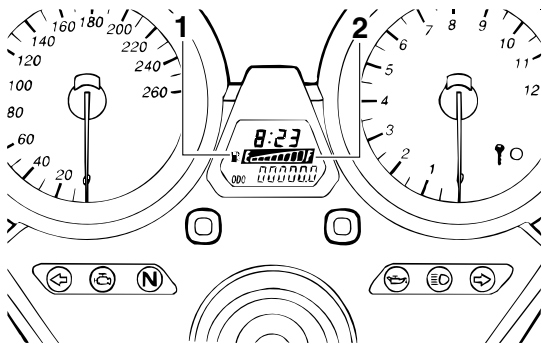
ODO → TRIP 1 → TRIP 2 → ODO

When approximately 4.5 L (1.19 US gal) (0.99 Imp.gal) of fuel remains in the fuel tank, the display will automatically change to the fuel reserve tripmeter mode "TRIP F" and start counting the distance traveled from that point. In that case, pushing the "SELECT" button switches the display between the various trip meter and odometer modes in the following order:


TRIP F → ODO → TRIP 1 → TRIP 2 → TRIP F

To reset a trip meter, select it by pushing the "SELECT" button, and then push the "RESET" button for at least two seconds. If you do not reset the fuel reserve tripmeter manually, it will reset itself automatically and the display will return to the prior mode after refueling and traveling 5 km (3 mi).


Fuel meter



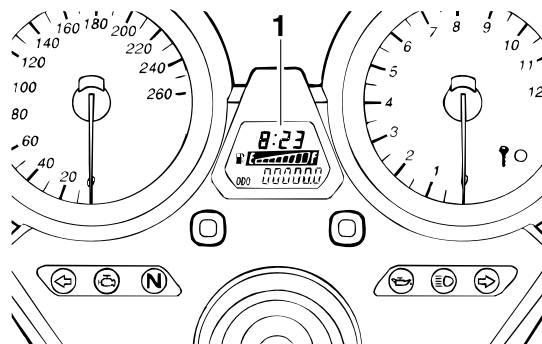
1. Fuel level warning indicator
2. Fuel meter

The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear towards “E” (Empty) as the fuel level decreases. When the fuel level warning indicator “” starts flashing, refuel as soon as possible.

NOTE:

This fuel meter is equipped with a self-diagnosis system. If the electrical circuit is defective, the following cycle will be repeated until the malfunction is corrected: All the display segments and symbol “” will flash eight times, then go off for approximately 3 seconds. If this occurs, refer to “SIGNALING SYSTEM” on page 7-19.

Clock mode

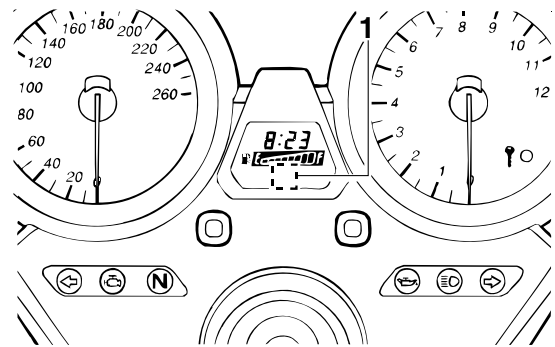


1. Clock

To set the clock:

1. Turn the key to “ON”.
2. Push the “SELECT” button and “RESET” button together for at least two seconds.
3. When the hour digits start flashing, push the “RESET” button to set the hours.
4. Push the “SELECT” button, and the minute digits will start flashing.
5. Push the “RESET” button to set the minutes.
6. Push the “SELECT” button and then release it to start the clock.

Self-diagnosis devices



1. Error code display

This model is equipped with a self-diagnosis device for various electrical circuits.

If any of those circuits are defective, the engine trouble warning light will come on, and then the odometer/tripmeter display will indicate a two-digit error code.

If the multi-function display indicates such a fault code, note the code number, and check the vehicle. Refer to “FUEL INJECTION SYSTEM” on page 7-25.

This model is also equipped with a self-diagnosis device for the immobilizer system.

If any of the immobilizer system circuits are defective, the immobilizer system indicator light will flash, and then the display will indicate a two-digit error code.

NOTE:

If the display indicates error code 52, this could be caused by transponder interference. If this error code appears, try the following.

1. Use the code re-registering key to start the engine.

NOTE:

Make sure there are no other immobilizer keys close to the main switch, and do not keep more than one immobilizer key on the same key ring! Immobilizer system keys may cause signal interference, which may prevent the engine from starting.

2. If the engine starts, turn it off and try starting the engine with the standard keys.
3. If one or both of the standard keys do not start the engine, re-register standard keys.

If the display indicates any error codes, note the code number, and then check the vehicle. Refer to “IMMOBILIZER SYSTEM” on page 7-69.

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CAUTION:

If the multi-function display indicates an error code, the vehicle should be checked as soon as possible in order to avoid engine damage.

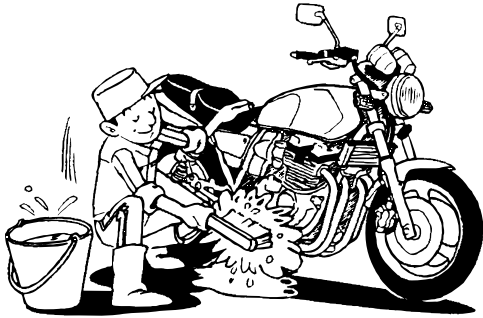
EAS20180

IMPORTANT INFORMATION

EAS20190

PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.



2. Use only the proper tools and cleaning equipment. Refer to "SPECIAL TOOLS" on page 1-11.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.



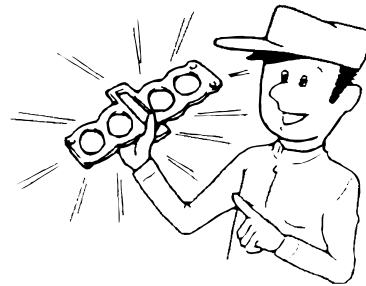
300-010

4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

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REPLACEMENT PARTS

Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



300-009

EAS20210

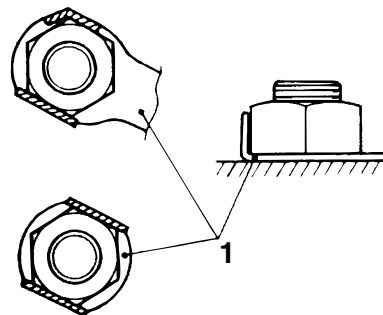
GASKETS, OIL SEALS AND O-RINGS

1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.

EAS20220

LOCK WASHERS/PLATES AND COTTER PINS

After removal, replace all lock washers/plates "1" and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.

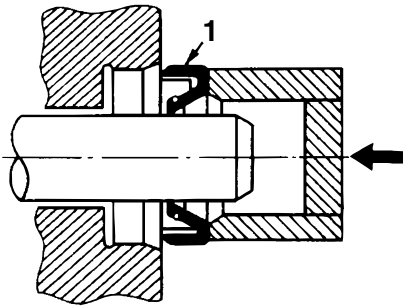


300-000

EAS20230

BEARINGS AND OIL SEALS

Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals "1", lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

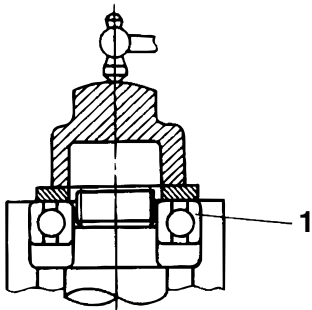


300 003

ECA13300

CAUTION:

Do not spin the bearing with compressed air because this will damage the bearing surfaces.



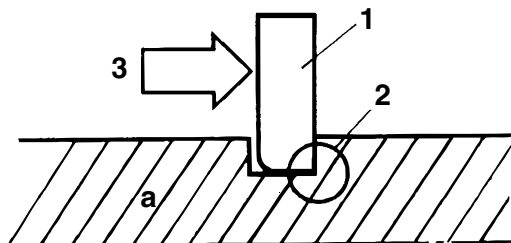
300-002

1. Bearings

EAS20240

CIRCLIPS

Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip "1", make sure the sharp-edged corner "2" is positioned opposite the thrust "3" that the circlip receives.



300-001

a. Shaft

CHECKING THE CONNECTIONS

EAS20250

CHECKING THE CONNECTIONS

Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:

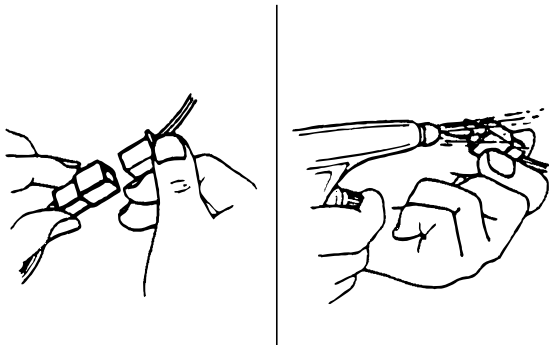
- Lead
- Coupler
- Connector

2. Check:

- Lead
- Coupler
- Connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.

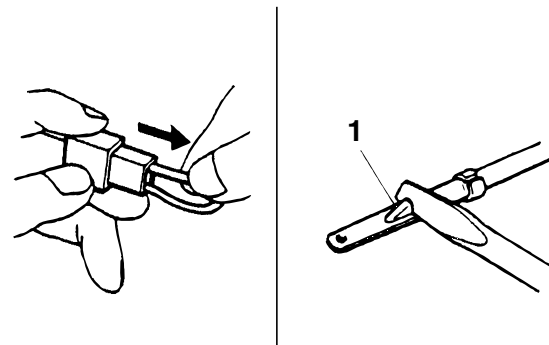


3. Check:

- All connections
- Loose connection → Connect properly.

NOTE:

If the pin "1" on the terminal is flattened, bend it up.



4. Connect:

- Lead
- Coupler
- Connector

NOTE:

Make sure all connections are tight.

5. Check:

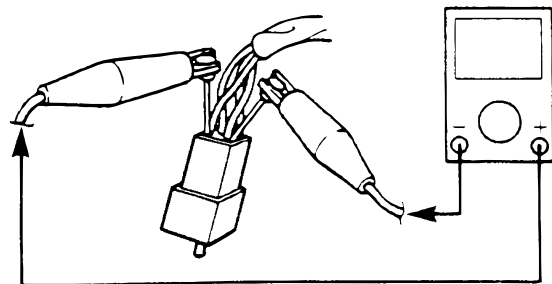
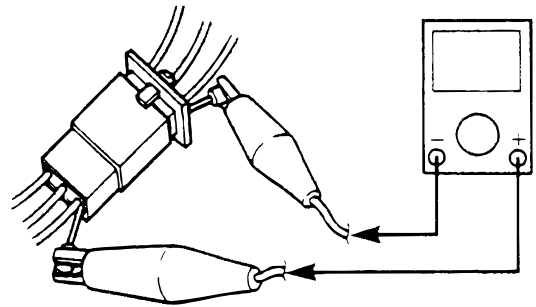
- Continuity
(with the pocket tester)



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

NOTE:

- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.



SPECIAL TOOLS

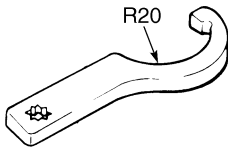
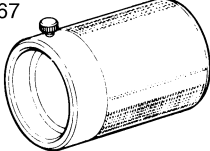
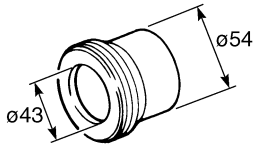
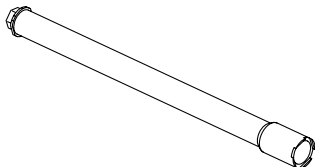
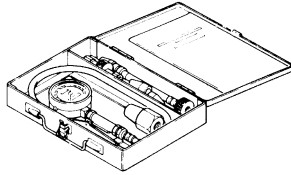
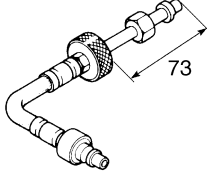
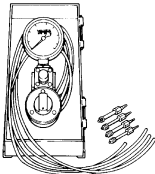
EAS20260

SPECIAL TOOLS

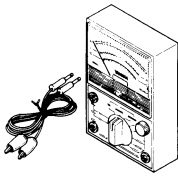
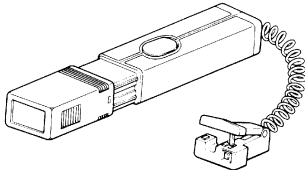
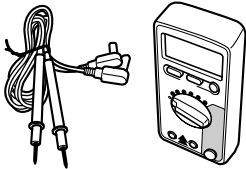
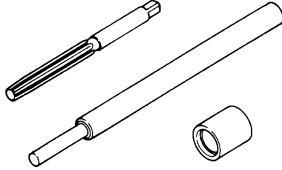
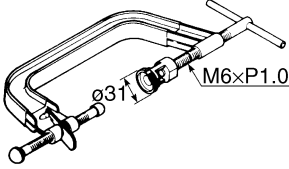
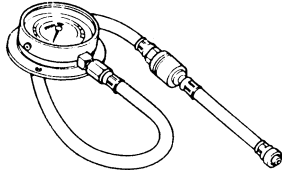
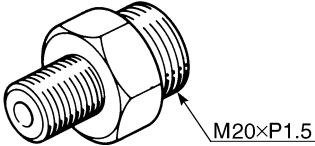
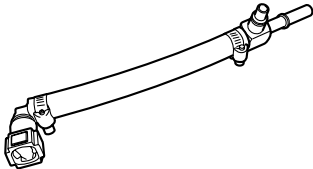
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country. When placing an order, refer to the list provided below to avoid any mistakes.

NOTE:


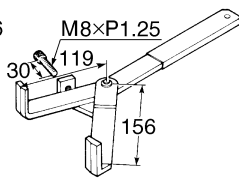

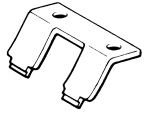
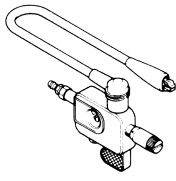
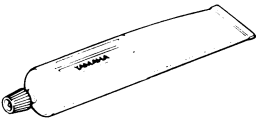
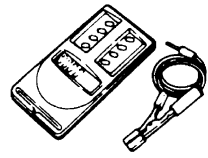
For U.S.A. and Canada, use part number starting with "YM-", "YU-", or "ACC-".
For others, use part number starting with "90890-".

Tool name/Tool No.	Illustration	Reference pages
Steering nut wrench 90890-01403 Spanner wrench YU-33975		3-26, 4-52
Fork seal driver weight 90890-01367 Replacement hammer YM-A9409-7	90890-01367 	4-47
Fork seal driver attachment (ø43) 90890-01374 Replacement 43 mm YM-A5142-3		4-47
Damper rod holder 90890-01513		4-45, 4-46
Compression gauge 90890-03081 Engine compression tester YU-33223		3-12
Extension 90890-04082		3-12
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	90890-03094 	3-7

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-10, 5-31, 5-35, 6-8, 7-83, 7-85, 7-86, 7-90, 7-91, 7-93, 7-94, 7-95, 7-96, 7-97, 7-98, 7-99
Timing light 90890-03141 Inductive clamp timing light YU-03141		3-11
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		6-8, 6-10
Valve guide remover & installer set (ø5.5) 90890-04016 Valve guide remover (5.5 mm) YM-01122		5-19
Valve spring compressor 90890-04019 YM-04019		5-17, 5-23
Pressure gauge 90890-03153		3-15, 6-7
Oil pressure adapter B 90890-03124		3-15
Fuel pressure adapter 90890-03176 YM-03176		6-7

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Vacuum/pressure pump gauge set 90890-06756 Mityvac brake bleeding tool YS-42423		6-7
Universal clutch holder 90890-04086 YM-91042	90890-04086 	5-44, 5-47
Valve lapper 90890-04101 Valve lapping tool YM-A8998		5-20
Tappet adjusting tool 90890-04110 Valve adjustment tool YM-33966		3-5
Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487		7-92
Yamaha bond No. 1215 (Three Bond No.1215®) 90890-85505		5-63
Digital tachometer 90890-06760 YU-39951-B		3-7, 3-9, 3-11

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GENERAL SPECIFICATIONS

EAS20280

GENERAL SPECIFICATIONS

Model

Model	5WMG (EUR) 5WMJ (OCE)
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Dimensions

Overall length	2175 mm (85.6 in)
Overall width	765 mm (30.1 in)
Overall height	1115 mm (43.9 in)
Seat height	795 mm (31.3 in)
Wheelbase	1500 mm (59.1 in)
Ground clearance	125 mm (4.92 in)
Minimum turning radius	2800 mm (110.2 in)

Weight

With oil and fuel	245.0 kg (540 lb)
Maximum load	205 kg (452 lb)

ENGINE SPECIFICATIONS

EAS20290

ENGINE SPECIFICATIONS

Engine

Engine type	Air cooled 4-stroke, DOHC
Displacement	1251.0 cm ³
Cylinder arrangement	Forward-inclined parallel 4-cylinder
Bore × stroke	79.0 × 63.8 mm (3.11 × 2.51 in)
Compression ratio	9.70 :1
Standard compression pressure (at sea level)	1050 kPa/400 r/min (149.3 psi/400 r/min) (10.5 kgf/cm ² /400 r/min)
Minimum–maximum	900–1200 kPa (128.0–170.7 psi) (9.0–12.0 kgf/cm ²)
Starting system	Electric starter

Fuel

Recommended fuel	Premium unleaded gasoline only
Fuel tank capacity	21.0 L (5.55 US gal) (4.62 Imp.gal)
Fuel reserve amount	4.5 L (1.19 US gal) (0.99 Imp.gal)

Engine oil

Lubrication system	Wet sump
Type	SAE10W30, SAE10W40, SAE15W40, SAE20W40 or SAE20W50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Engine oil quantity	
Total amount	4.20 L (4.44 US qt) (3.70 Imp.qt)
Without oil filter element replacement	2.80 L (2.96 US qt) (2.46 Imp.qt)
With oil filter element replacement	3.15 L (3.33 US qt) (2.77 Imp.qt)
Oil cooler capacity (including all routes)	0.2 L (0.21 US qt) (0.18 Imp.qt)
Oil pressure (hot)	80.0 kPa/1000 r/min (11.6 psi/1000 r/min) (0.80 kgf/cm ² /1000 r/min)
Oil filter type	Paper

Oil pump

Oil pump type	Trochoid
Inner-rotor-to-outer-rotor-tip clearance	0.120 mm or less (0.0047 in or less)
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.090–0.150 mm (0.0035–0.0059 in)
Limit	0.160 mm (0.0063 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.03–0.08 mm (0.0012–0.0032 in)
Limit	0.15 mm (0.0059 in)
Bypass valve opening pressure	180.0–220.0 kPa (26.1–31.9 psi) (1.80–2.20 kgf/cm ²)
Relief valve operating pressure	480.0–580.0 kPa (69.6–84.1 psi) (4.80–5.80 kgf/cm ²)
Pressure check location	MAIN GALLERY

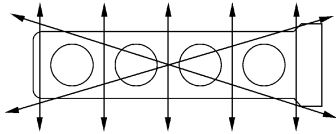
Spark plug (s)

Manufacturer/model	NGK/DPR8EA-9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)

Cylinder head

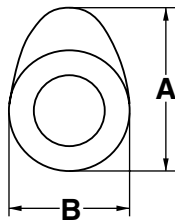
ENGINE SPECIFICATIONS

Volume	33.90–34.70 cm ³ (2.07–2.12 cu.in)
Warpage limit	0.20 mm (0.0079 in)



Camshaft

Drive system	Chain drive (center)
Camshaft cap inside diameter	25.000–25.021 mm (0.9843–0.9851 in)
Camshaft journal diameter	24.967–24.980 mm (0.9830–0.9835 in)
Camshaft-journal-to-camshaft-cap clearance	0.020–0.054 mm (0.0008–0.0021 in)
Camshaft lobe dimensions	
Intake A	35.849–35.949 mm (1.4114–1.4153 in)
Limit	35.749 mm (1.4074 in)
Intake B	28.010–28.110 mm (1.1023–1.1067 in)
Limit	27.910 mm (1.0988 in)
Exhaust A	35.950–36.050 mm (1.4154–1.4193 in)
Limit	35.850 mm (1.4114 in)
Exhaust B	28.045–28.145 mm (1.1041–1.1081 in)
Limit	27.945 mm (1.1002 in)



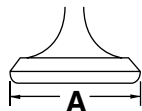
Camshaft runout limit	0.030 mm (0.0012 in)
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Timing chain

Model/number of links	79RH2015/156
Tensioning system	Automatic

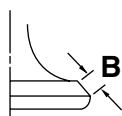
Valve, valve seat, valve guide

Valve clearance (cold)	
Intake	0.11–0.15 mm (0.0043–0.0059 in)
Exhaust	0.16–0.20 mm (0.0063–0.0079 in)
Valve dimensions	
Valve head diameter A (intake)	28.90–29.10 mm (1.1378–1.1457 in)
Valve head diameter A (exhaust)	24.90–25.10 mm (0.9803–0.9882 in)

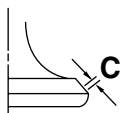


Valve face width B (intake)	1.980–2.550 mm (0.0780–0.1004 in)
Valve face width B (exhaust)	1.980–2.550 mm (0.0780–0.1004 in)

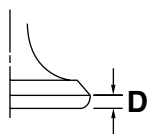
ENGINE SPECIFICATIONS



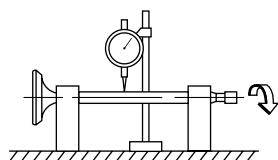
Valve seat width C (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Valve seat width C (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)



Valve margin thickness D (intake)	0.80–1.20 mm (0.0315–0.0472 in)
Valve margin thickness D (exhaust)	0.80–1.20 mm (0.0315–0.0472 in)



Valve stem diameter (intake)	5.475–5.490 mm (0.2156–0.2161 in)
Limit	5.445 mm (0.2144 in)
Valve stem diameter (exhaust)	5.460–5.475 mm (0.2150–0.2156 in)
Limit	5.430 mm (0.2138 in)
Valve guide inside diameter (intake)	5.500–5.512 mm (0.2165–0.2170 in)
Limit	5.552 mm (0.2186 in)
Valve guide inside diameter (exhaust)	5.500–5.512 mm (0.2165–0.2170 in)
Limit	5.552 mm (0.2186 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.025–0.052 mm (0.0010–0.0020 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)



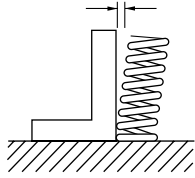
Cylinder head valve seat width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)
Cylinder head valve seat width (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)

Valve spring

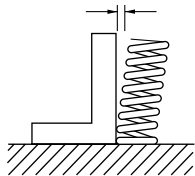
Inner spring	
Free length (intake)	39.65 mm (1.56 in)
Free length (exhaust)	39.65 mm (1.56 in)
Installed length (intake)	32.80 mm (1.29 in)
Installed length (exhaust)	32.80 mm (1.29 in)
Spring rate K1 (intake)	9.80 N/mm (55.96 lb/in) (1.00 kgf/mm)
Spring rate K2 (intake)	12.40 N/mm (70.80 lb/in) (1.26 kgf/mm)
Spring rate K1 (exhaust)	9.80 N/mm (55.96 lb/in) (1.00 kgf/mm)
Spring rate K2 (exhaust)	12.40 N/mm (70.80 lb/in) (1.26 kgf/mm)
Installed compression spring force (intake)	61.70–72.50 N (13.87–16.30 lbf) (6.29–7.39)

ENGINE SPECIFICATIONS

Installed compression spring force (exhaust)	kgf) 61.70–72.50 N (13.87–16.30 lbf) (6.29–7.39
Spring tilt (intake)	2.5 °/1.7 mm (2.5 °/0.067 in)
Spring tilt (exhaust)	2.5 °/1.7 mm (2.5 °/0.067 in)



Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise
Outer spring	
Free length (intake)	41.10 mm (1.62 in)
Free length (exhaust)	41.10 mm (1.62 in)
Installed length (intake)	34.80 mm (1.37 in)
Installed length (exhaust)	34.80 mm (1.37 in)
Spring rate K1 (intake)	22.60 N/mm (129.05 lb/in) (2.30 kgf/mm)
Spring rate K2 (intake)	28.80 N/mm (164.45 lb/in) (2.94 kgf/mm)
Spring rate K1 (exhaust)	22.60 N/mm (129.05 lb/in) (2.30 kgf/mm)
Spring rate K2 (exhaust)	28.80 N/mm (164.45 lb/in) (2.94 kgf/mm)
Installed compression spring force (intake)	130.40–154.00 N (29.31–34.62 lbf) (13.30–15.70 kgf)
Installed compression spring force (exhaust)	130.40–154.00 N (29.31–34.62 lbf) (13.30–15.70 kgf)
Spring tilt (intake)	2.5 °/1.8 mm (2.5 °/0.071 in)
Spring tilt (exhaust)	2.5 °/1.8 mm (2.5 °/0.071 in)



Winding direction (intake)	Counter clockwise
Winding direction (exhaust)	Counter clockwise

Valve lifter

Valve lifter outside diameter (intake)	27.978–28.002 mm (1.1015–1.1024 in)
Limit	27.958 mm (1.1007 in)
Valve lifter outside diameter (exhaust)	27.978–28.002 mm (1.1015–1.1024 in)
Limit	27.958 mm (1.1007 in)
Valve lifter hole inside diameter (intake)	27.996–28.020 mm (1.1022–1.1031 in)
Limit	28.050 mm (1.1043 in)
Valve lifter hole inside diameter (exhaust)	27.996–28.020 mm (1.1022–1.1031 in)
Limit	28.050 mm (1.1043 in)

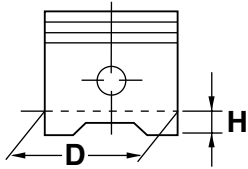
Cylinder

Bore	79.000–79.010 mm (3.1102–3.1106 in)
Wear limit	79.100 mm (3.1142 in)
Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.100 mm (0.0039 in)
Warp limit	0.03 mm (0.0012 in)

ENGINE SPECIFICATIONS

Piston

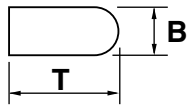
Piston-to-cylinder clearance	0.015–0.040 mm (0.0006–0.0016 in)
Limit	0.15 mm (0.0059 in)
Diameter D	78.970–78.985 mm (3.1090–3.1096 in)
Height H	5.0 mm (0.20 in)



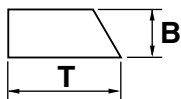
Offset	1.00 mm (0.0394 in)
Offset direction	Intake side
Piston pin bore inside diameter	18.004–18.015 mm (0.7088–0.7093 in)
Limit	18.045 mm (0.7104 in)
Piston pin outside diameter	17.991–18.000 mm (0.7083–0.7087 in)
Limit	17.971 mm (0.7075 in)

Piston ring

Top ring	
Ring type	Barrel

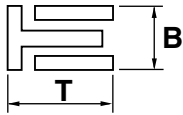


Dimensions (B × T)	1.00 × 3.05 mm (0.04 × 0.12 in)
End gap (installed)	0.20–0.35 mm (0.0079–0.0138 in)
Limit	0.60 mm (0.0236 in)
Ring side clearance	0.045–0.080 mm (0.0018–0.0032 in)
Limit	0.100 mm (0.0039 in)
2nd ring	
Ring type	Taper



ENGINE SPECIFICATIONS

Dimensions (B × T)	1.20 × 3.00 mm (0.05 × 0.12 in)
End gap (installed)	0.35–0.50 mm (0.0138–0.0197 in)
Limit	0.75 mm (0.0295 in)
Ring side clearance	0.030–0.070 mm (0.0012–0.0028 in)
Limit	0.100 mm (0.0039 in)
Oil ring	



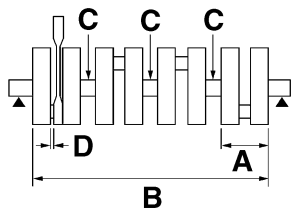
Dimensions (B × T)	2.50 × 2.90 mm (0.10 × 0.11 in)
End gap (installed)	0.20–0.50 mm (0.0079–0.0197 in)
Ring side clearance	0.050–0.155 mm (0.0020–0.0061 in)

Connecting rod

Oil clearance (using plastigauge®)	0.021–0.045 mm (0.0008–0.0018 in)
Limit	0.08 mm (0.0032 in)

Crankshaft

Width A	62.25–63.85 mm (2.451–2.514 in)
Width B	382.00–383.20 mm (15.04–15.09 in)
Runout limit C	0.020 mm (0.0008 in)
Big end side clearance D	0.160–0.262 mm (0.0063–0.0103 in)



Limit	0.50 mm (0.0197 in)
Big end radial clearance E	0.023–0.047 mm (0.0009–0.0019 in)
Journal oil clearance (using plastigauge®)	0.020–0.044 mm (0.0008–0.0017 in)
Limit	0.09 mm (0.0035 in)

Clutch

Clutch type	Wet, multiple-disc
Clutch release method	Hydraulic inner push
Friction plate thickness	2.90–3.10 mm (0.114–0.122 in)
Wear limit	2.80 mm (0.1102 in)
Plate quantity	8 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	7 pcs
Warping limit	0.15 mm (0.059 in)
Clutch spring height	6.78 mm (0.27 in)
Spring quantity	1 pcs
Push rod bending limit	0.300 mm (0.0118 in)

ENGINE SPECIFICATIONS

Transmission

Transmission type	Constant mesh 5-speed
Primary reduction system	Spur gear
Primary reduction ratio	98/56 (1.750)
Secondary reduction system	Chain drive
Secondary reduction ratio	38/17 (2.235)
Operation	Left foot operation
Gear ratio	
1st	40/14 (2.857)
2nd	36/18 (2.000)
3rd	33/21 (1.571)
4th	31/24 (1.292)
5th	29/26 (1.115)
Main axle runout limit	0.60 mm (0.0236 in)
Drive axle runout limit	0.60 mm (0.0236 in)

Shifting mechanism

Shift mechanism type	Guide bar
Shift fork guide bar bending limit	0.100 mm (0.0039 in)
Shift fork thickness	6.26–6.39 mm (0.2465–0.2516 in)

Air filter

Air filter element	Oil-coated paper element
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Fuel injector

Model/quantity	1150/4
Manufacturer	DENSO

Throttle body

Type/quantity	ACW34/2
Manufacturer	MIKUNI
ID mark	5UXB 00
Throttle valve size	#50

Throttle position sensor

Resistance	4.0–6.0 k Ω -B
Output voltage	0.63–0.74 V

Idling condition

Engine idling speed	970–1170 r/min
CO%	3.5–4.5 %
Intake vacuum	32.5 kPa (9.6 inHg) (244 mmHg)
Oil temperature	85.0–95.0 °C (185.00–203.00 °F)
Throttle cable free play	3.0–5.0 mm (0.12–0.20 in)
Fuel pressure	387–397 kPa (3.87–3.97 kg/cm ²)

CHASSIS SPECIFICATIONS

EAS20300

CHASSIS SPECIFICATIONS

Chassis

Frame type	Double cradle
Caster angle	25.30 °
Trail	100.0 mm (3.94 in)

Front wheel

Wheel type	Cast wheel
Rim size	17M/C x MT3.50
Rim material	Aluminum
Wheel travel	130.0 mm (5.12 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Wheel axle bending limit	0.25 mm (0.01 in)

Rear wheel

Wheel type	Cast wheel
Rim size	17M/C x MT5.50
Rim material	Aluminum
Wheel travel	110.0 mm (4.33 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Wheel axle bending limit	0.25 mm (0.01 in)

Front tire

Type	Tubeless
Size	120/70 ZR17M/C (58W)
Manufacturer/model	DUNLOP/D252F L
Wear limit (front)	1.6 mm (0.06 in)

Rear tire

Type	Tubeless
Size	180/55 ZR17M/C (73W)
Manufacturer/model	DUNLOP/D252 L
Wear limit (rear)	1.6 mm (0.06 in)

Tire air pressure (measured on cold tires)

Loading condition	0–90 kg (0–198 lb)
Front	250 kPa (36 psi) (2.50 kgf/cm ²) (2.50 bar)
Rear	250 kPa (36 psi) (2.50 kgf/cm ²) (2.50 bar)
Loading condition	90–205 kg (198–452 lb)
Front	250 kPa (36 psi) (2.50 kgf/cm ²) (2.50 bar)
Rear	290 kPa (42 psi) (2.90 kgf/cm ²) (2.90 bar)
High-speed riding	
Front	250 kPa (36 psi) (2.50 kgf/cm ²) (2.50 bar)
Rear	290 kPa (42 psi) (2.90 kgf/cm ²) (2.90 bar)

Front brake

Type	Dual disc brake
Operation	Right hand operation
Front disc brake	
Disc outside diameter × thickness	298.0 × 5.0 mm (11.73 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)

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Brake disc deflection limit	0.10 mm (0.0039 in)
Brake pad lining thickness (inner)	5.5 mm (0.22 in)
Limit	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	5.5 mm (0.22 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	15.00 mm (0.59 in)
Caliper cylinder inside diameter	30.23 mm (1.19 in)
Caliper cylinder inside diameter	27.00 mm (1.06 in)
Recommended fluid	DOT 4
Rear brake	
Type	Single disc brake
Operation	Right foot operation
Brake pedal position	40.0 mm (1.57 in)
Rear disc brake	
Disc outside diameter × thickness	267.0 × 5.0 mm (10.51 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	5.5 mm (0.22 in)
Limit	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	5.5 mm (0.22 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	42.85 mm (1.69 in)
Recommended fluid	DOT 4
Steering	
Steering bearing type	Angular bearing
Center to lock angle (left)	37.0 °
Center to lock angle (right)	37.0 °
Front suspension	
Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	130.0 mm (5.12 in)
Fork spring free length	284.0 mm (11.18 in)
Limit	275.5 mm (10.85 in)
Collar length	150.0 mm (5.91 in)
Installed length	273.0 mm (10.75 in)
Spring rate K1	9.00 N/mm (51.39 lb/in) (0.92 kgf/mm)
Spring stroke K1	0.0–130.0 mm (0.00–5.12 in)
Inner tube outer diameter	43.0 mm (1.69 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	No
Recommended oil	Suspension oil 01 or equivalent
Quantity	516.0 cm ³ (17.45 US oz) (18.20 Imp.oz)
Level	125.0 mm (4.92 in)
Spring preload adjusting positions	
Minimum	8
Standard	5
Maximum	1
Rebound damping adjusting positions	
Minimum	10
Standard	5

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Maximum	1
Compression damping adjusting positions	
Minimum	13
Standard	6
Maximum	1

Rear suspension

Type	Swingarm
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	91.0 mm (3.58 in)
Spring free length	205.0 mm (8.07 in)
Installed length	186.0 mm (7.32 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1200 kPa (170.7 psi) (12.0 kgf/cm ²)
Spring preload adjusting positions	
Minimum	0 mm (0 in)
Standard	17 mm (0.67 in)
Maximum	28 mm (1.10 in)
Rebound damping adjusting positions	
Minimum	36
Standard	10
Maximum	1
Compression damping adjusting positions	
Minimum	20
Standard	16
Maximum	1

Swingarm

Swingarm end free play limit (radial)	1.0 mm (0.04 in)
Swingarm end free play limit (axial)	1.0 mm (0.04 in)

Drive chain

Type/manufacturer	50VA8/DAIDO
Link quantity	110
Drive chain slack	20.0–30.0 mm (0.79–1.18 in)
15-link length limit	239.3 mm (9.42 in)

ELECTRICAL SPECIFICATIONS

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ELECTRICAL SPECIFICATIONS

Ignition system

Ignition system	Transistorized coil ignition (digital)
Advancer type	Digital
Ignition timing (B.T.D.C.)	5.0 °/1070 r/min

Engine control unit

Model/manufacturer	TBDF55/DENSO
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Transistorized coil ignition

Crankshaft position sensor resistance	248–372 Ω
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Ignition coil

Model/manufacturer	83R/MORIC
Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	1.92–2.88 Ω
Secondary coil resistance	9.52–14.28 kΩ

Spark plug cap

Material	Resin
Resistance	10.0 kΩ

AC generator

Model/manufacturer	B3GB/DENSO
Standard output	13.5 V, 28.0 A @ 5000 r/min
Field coil resistance	2.75–3.04 Ω
Armature coil resistance	0.19–0.21 Ω
Brush overall length	13.7 mm (0.54 in)
Limit	4.7 mm (0.19 in)
Brush spring pressure	5.10–5.69 N (18.36–20.48 oz) (520–580 gf)
Rectifier/regulator	
Regulator type	Semi conductor-field control
Model/manufacturer	B3GB/DENSO
No load regulated voltage	14.2–14.8 V

Battery

Model	YTZ14S
Voltage, capacity	12 V, 11.2 Ah
Specific gravity	1.310
Manufacturer	GYM
Ten hour rate amperage	1.12 A

Headlight

Bulb type	Halogen bulb
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Bulb voltage, wattage × quantity

Headlight	12 V, 60 W/55.0 W × 1
Auxiliary light	12 V, 4.0 W × 1
Tail/brake light	LED
Front turn signal light	12 V, 21.0 W × 2
Rear turn signal light	12 V, 21.0 W × 2
License plate light	12 V, 5.0 W × 1

Indicator light

Neutral indicator light	12 V, 1.7 W × 1
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ELECTRICAL SPECIFICATIONS

Turn signal indicator light	12 V, 1.7 W × 2
Oil level warning light	12 V, 1.7 W × 1
High beam indicator light	12 V, 1.7 W × 1
Engine trouble warning light	12 V, 1.7 W × 1
Immobilizer system indicator light	LED

Electric starting system	
System type	Constant mesh

Starter motor	
Model/manufacture	SM-13/MITSUBA
Power output	0.65 kW
Armature coil resistance	0.0020–0.0030 Ω
Brush overall length	12.5 mm (0.49 in)
Limit	5.00 mm (0.20 in)
Brush spring force	7.65–10.01 N (27.54–36.03 oz) (780–1021 gf)
Commutator diameter	28.0 mm (1.10 in)
Limit	27.0 mm (1.06 in)
Mica undercut (depth)	0.70 mm (0.03 in)

Starter relay	
Model/manufacture	MS5E-691/JIDECO
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω

Horn	
Horn type	Plane
Quantity	2 pcs
Model/manufacture	YF-12/NIKKO
Maximum amperage	3.0 A
Coil resistance	1.15–1.25 Ω
Performance	105–113 dB/2m

Turn signal/hazard relay	
Relay type	Full transistor
Model/manufacture	FE246BS/DENSO
Built-in, self-canceling device	No
Turn signal blinking frequency	75.0–95.0 cycles/min

Oil level gauge	
Model/manufacture	5LV/DENSO

Fuel sender unit	
Model/manufacture	5UX/DENSO
Sender unit resistance (full)	19.0–21.0 Ω
Sender unit resistance (empty)	139.0–141.0 Ω

Starting circuit cut-off relay	
Model/manufacture	G8R-30Y-V3/OMRON
Coil resistance	162.0–198.0 Ω
Diode	Yes

Fuses	
Main fuse	50.0 A
Headlight fuse	15.0 A
Taillight fuse	7.5 A
Signaling system fuse	7.5 A
Ignition fuse	15.0 A

ELECTRICAL SPECIFICATIONS

Fuel injection system fuse	15.0 A
Backup fuse	7.5 A
Spare fuse	15.0 A
Spare fuse	7.5 A

TIGHTENING TORQUE

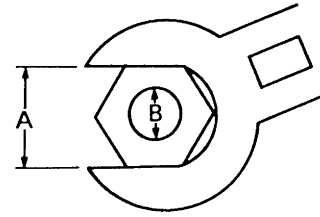
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TIGHTENING TORQUE

EAS20330

GENERAL TIGHTENING TORQUE SPECIFICATIONS

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.






- A. Distance between flats
- B. Outside thread diameter




A (nut)	B (bolt)	General tightening torques		
		Nm	m•kg	ft•lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94

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ENGINE

Item	Thread size	Q'ty	Tightening torque	Remarks
Camshaft cap bolt	M6	18	12 Nm (1.2 m•kg, 8.7 ft•lb)	
Timing chain insertion stud bolt (chamber front)	M6	2	5 Nm (0.5 m•kg, 3.6 ft•lb)	
Timing chain insertion stud bolt (chamber rear)	M6	2	5 Nm (0.5 m•kg, 3.6 ft•lb)	
Exhaust pipe stud bolt	M8	8	15 Nm (1.5 m•kg, 11 ft•lb)	
Oil passage plug	M6	1	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Spark plug	M12	4	18 Nm (1.8 m•kg, 13 ft•lb)	
Cylinder head nut	M10	12	35 Nm (3.5 m•kg, 25 ft•lb)	
Cylinder head cover bolt	M6	8	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Timing chain stud bolt (cylinder)	M8	1	8 Nm (0.8 m•kg, 5.8 ft•lb)	
Connecting rod nut	M8	8	36 Nm (3.6 m•kg, 26 ft•lb)	
Camshaft sprocket bolt	M7	4	20 Nm (2.0 m•kg, 15 ft•lb)	
Timing chain tensioner assembly bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Timing chain tensioner cap bolt	M11	1	20 Nm (2.0 m•kg, 15 ft•lb)	
Timing chain guide tap bolt	M10	1	10 Nm (1.0 m•kg, 7.2 ft•lb)	


TIGHTENING TORQUE

Item	Thread size	Q'ty	Tightening torque	Remarks
Timing chain guide stopper 2 bolt	M6	4	10 Nm (1.0 m•kg, 7.2 ft•lb)	
OIL pump assembly screw	M6	2	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Oil pump bolt	M6	3	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Oil strainer housing bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Oil filter bolt	M20	1	15 Nm (1.5 m•kg, 11 ft•lb)	
Oil pan bolt	M6	16	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Oil pan bolt	M6	1	10 Nm (1.0 m•kg, 7.2 ft•lb)	With copper washer
Oil drain bolt	M14	1	43 Nm (4.3 m•kg, 31 ft•lb)	
Oil passage plug	M16	1	8 Nm (0.8 m•kg, 5.8 ft•lb)	
Oil filter drain screw	M5	1	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Oil pipe bolt (oil pan side)	M6	4	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Oil pipe bolt cooler (oil side)	M6	4	10 Nm (1.0 m•kg, 7.2 ft•lb)	With washer 
Oil cooler bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Oil hose clamp bolt	M6	1	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Oil cooler cover bolt	M6	4	8 Nm (0.8 m•kg, 5.8 ft•lb)	
Oil pipe stay nut	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Throttle body joint 1, 2 bolt	M6	8	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Air filter case bolt	M6	3	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Throttle body joint clamp screw	M4	8	3 Nm (0.3 m•kg, 2.2 ft•lb)	
Air filter case joint clamp screw	M4	4	3 Nm (0.3 m•kg, 2.2 ft•lb)	
Engine temperature sensor	M14	1	17 Nm (1.7 m•kg, 12 ft•lb)	
Exhaust pipe nut	M8	8	25 Nm (2.5 m•kg, 18 ft•lb)	
Muffler bolt	M10	2	33 Nm (3.3 m•kg, 24 ft•lb)	
Exhaust pipe bolt	M8	1	20 Nm (2.0 m•kg, 15 ft•lb)	
EXUP valve protector bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Muffler joint bolt	M8	1	20 Nm (2.0 m•kg, 15 ft•lb)	
EXUP cable adjusting nut	M6	2	6 Nm (0.6 m•kg, 4.3 ft•lb)	
Servo motor bolt	M6	2	6 Nm (0.6 m•kg, 4.3 ft•lb)	
Servo motor cover screw	M5	—	2 Nm (0.2 m•kg, 1.4 ft•lb)	
Air induction system pipe joint clamp screw	—	4	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Air cut-off valve bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Bearing cover plate screw	M6	3	12 Nm (1.2 m•kg, 8.7 ft•lb)	
Timing plate cover bolt	M6	4	7 Nm (0.7 m•kg, 5.1 ft•lb)	

TIGHTENING TORQUE

Item	Thread size	Q'ty	Tightening torque	Remarks
Cover 2 screw	M5	2	3 Nm (0.3 m•kg, 2.2 ft•lb)	
Cover 1 bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Clutch cover bolt	M6	11	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Cover screw	M5	2	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Crankcase bolt	M6	14	12 Nm (1.2 m•kg, 8.7 ft•lb)	
Crankcase bolt	M8	17	24 Nm (2.4 m•kg, 17 ft•lb)	
Crankcase bolt	M12	5	35 Nm (3.5 m•kg, 25 ft•lb)	
Main gallery plug	M20	3	12 Nm (1.2 m•kg, 8.7 ft•lb)	
Oil guide plate bolt	M5	3	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Clamp bolt	M6	1	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Stopper plate bolt	M6	1	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Bearing housing 1 screw	M6	3	10 Nm (1.0 m•kg, 7.2 ft•lb)	
HY-VO chain upper guide bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Clutch boss nut	M20	1	70 Nm (7.0 m•kg, 51 ft•lb)	Lock washer use
Pressure plate bolt	M6	6	8 Nm (0.8 m•kg, 5.8 ft•lb)	
Push lever complete bolt	M6	3	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Bleed screw	M8	1	6 Nm (0.6 m•kg, 4.3 ft•lb)	
Drive sprocket nut	M22	1	85 Nm (8.5 m•kg, 62 ft•lb)	Lock washer use 
Stopper screw	M8	1	22 Nm (2.2 m•kg, 16 ft•lb)	
Stopper plate 1 bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Stopper plate bolt	M6	1	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Side plate 2 screw	M5	1	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Shift arm bolt	M6	1	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Shift rod nut	M6	1	8 Nm (0.8 m•kg, 5.8 ft•lb)	
Generator bolt	M8	2	25 Nm (2.5 m•kg, 18 ft•lb)	
Oil level sensor bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Timing plate bolt	M10	1	45 Nm (4.5 m•kg, 33 ft•lb)	
Neutral switch screw	M5	3	4 Nm (0.4 m•kg, 2.9 ft•lb)	

TIGHTENING TORQUE


Item	Thread size	Q'ty	Tightening torque	Remarks
Speed sensor screw	M6	1	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Fuel rail screw	M6	4	5 Nm (0.5 m•kg, 3.6 ft•lb)	
Pressure regulator	M5	1	4 Nm (0.4 m•kg, 2.9 ft•lb)	

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CHASSIS

Item	Thread size	Q'ty	Tightening torque	Remarks
Upper bracket pinch bolt	M8	2	30 Nm (3.0 m•kg, 22 ft•lb)	
Steering stem nut	M22	1	110 Nm (11.0 m•kg, 80 ft•lb)	
Handlebar lower holder nut	M10	2	40 Nm (4.0 m•kg, 29 ft•lb)	
Handlebar upper holder clamp bolt	M8	4	23 Nm (2.3 m•kg, 17 ft•lb)	
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m•kg, 17 ft•lb)	
Lower ring nut	M25	1	—	See NOTE
Front brake master cylinder holder bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Master cylinder cap screw	M4	4	2 Nm (0.2 m•kg, 1.4 ft•lb)	
Front brake hose union bolt	M10	2	30 Nm (3.0 m•kg, 22 ft•lb)	
Meter nut	M6	2	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Headlight stay lower bolt	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Handlebar and grip end	M16	2	26 Nm (2.6 m•kg, 19 ft•lb)	
Front flasher nut	M12	2	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Front fender bolt	M6	4	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Headlight stay upper cover bolt	M6	4	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Clutch hose union bolt	M10	2	30 Nm (3.0 m•kg, 22 ft•lb)	
Throttle cable and throttle body bolt	M6	2	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Temperature sensor and headlight stay bolt	M5	1	11 Nm (1.1 m•kg, 8.0 ft•lb)	
Engine bracket bolt (front)	M8	4	30 Nm (3.0 m•kg, 22 ft•lb)	
Engine mounting nut (front)	M10	1	64 Nm (6.4 m•kg, 46 ft•lb)	
Engine mounting nut (rear upper)	M10	1	55 Nm (5.5 m•kg, 40 ft•lb)	
Engine bracket bolt (rear upper)	M10	2	48 Nm (4.8 m•kg, 35 ft•lb)	
Engine bracket bolt (rear upper)	M12	2	88 Nm (8.8 m•kg, 64 ft•lb)	
Engine mounting nut (rear lower)	M10	2	64 Nm (6.4 m•kg, 46 ft•lb)	
Downtube bolt	M8	4	26 Nm (2.6 m•kg, 19 ft•lb)	
Ignition coil nut	M6	2	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Pivot shaft nut	M18	1	125 Nm (12.5 m•kg, 90 ft•lb)	
Front fork cap bolt	M40	2	23 Nm (2.3 m•kg, 17 ft•lb)	

TIGHTENING TORQUE

Item	Thread size	Q'ty	Tightening torque	Remarks
Damper rod assembly	M10	2	23 Nm (2.3 m•kg, 17 ft•lb)	
Rear shock absorber lower bolt	M8	2	23 Nm (2.3 m•kg, 17 ft•lb)	
Rear shock absorber upper bolt	M10	2	30 Nm (3.0 m•kg, 22 ft•lb)	
Seal guard bolt	M6	1	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Chain case bolt	M6	2	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Fuel tank rear bolt	M8	1	19 Nm (1.9 m•kg, 14 ft•lb)	
Fuel tank cap bolt	M5	4	6 Nm (0.6 m•kg, 4.3 ft•lb)	
Fuel pump bolt	M5	6	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Seat lock bolt	M6	2	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Side cover screw	M6	2	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Taillight cover screw	M5	2	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Rear fender and frame (front/rear)	M6	4	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Rear fender cover and taillight cover	M5	2	2 Nm (0.2 m•kg, 1.4 ft•lb)	
Rear fender cover and frame	M6	2	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Grab bar	M8	4	30 Nm (3.0 m•kg, 22 ft•lb)	
Fuse box bolt	M6	2	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Rollover valve bracket and frame	M6	1	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Rear flasher and fender	M12	2	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Side cover hook screw	M6	2	7 Nm (0.7 m•kg, 5.1 ft•lb)	
Helmet hanger bolt	M6	2	13 Nm (1.3 m•kg, 9.4 ft•lb)	
Taillight bracket and frame	M8	4	30 Nm (3.0 m•kg, 22 ft•lb)	
Taillight bracket and stay	M5	2	8 Nm (0.8 m•kg, 5.8 ft•lb)	
Taillight cover and stay	M5	2	2 Nm (0.2 m•kg, 1.4 ft•lb)	
EXUP bracket and frame	M6	2	10 Nm (1.0 m•kg, 7.2 ft•lb)	
Lean angle sensor and rear fender	M4	2	2 Nm (0.2 m•kg, 1.4 ft•lb)	
Sidestand bolt	M10	1	40 Nm (4.0 m•kg, 29 ft•lb)	
Sidestand nut	M10	1	40 Nm (4.0 m•kg, 29 ft•lb)	
Sidestand switch bolt	M5	2	4 Nm (0.4 m•kg, 2.9 ft•lb)	
Bracket 4, 5 bolt	M8	4	28 Nm (2.8 m•kg, 20 ft•lb)	
Bracket 2, 3 bolt	M8	2	30 Nm (3.0 m•kg, 22 ft•lb)	
Bracket 2, 3 footrest	M10	4	55 Nm (5.5 m•kg, 40 ft•lb)	
Rear brake reservoir tank and frame	M6	1	5 Nm (0.5 m•kg, 3.6 ft•lb)	
Rear master cylinder and bracket	M8	2	23 Nm (2.3 m•kg, 17 ft•lb)	
Center stand bolt and nut	M10	4/4	56 Nm (5.6 m•kg, 41 ft•lb)	
Front wheel axle	M18	1	72 Nm (7.2 m•kg, 52 ft•lb)	
Front wheel axle pinch bolt	M8	1	20 Nm (2.0 m•kg, 15 ft•lb)	

TIGHTENING TORQUE

Item	Thread size	Q'ty	Tightening torque	Remarks
Front brake caliper bolt	M10	4	40 Nm (4.0 m•kg, 29 ft•lb)	
Front brake disc bolt	M8	12	18 Nm (1.8 m•kg, 13 ft•lb)	
Front caliper bleed screw	M8	2	6 Nm (0.6 m•kg, 4.3 ft•lb)	
Front brake hose union bolt	M10	2	30 Nm (3.0 m•kg, 22 ft•lb)	
Tension bar bolt and nut	M8	2/2	23 Nm (2.3 m•kg, 17 ft•lb)	
Rear sprocket nut	M8	6	69 Nm (6.9 m•kg, 50 ft•lb)	
Chain puller lock nut	M8	2	16 Nm (1.6 m•kg, 12 ft•lb)	
Rear caliper and caliper bracket	M10	2	40 Nm (4.0 m•kg, 29 ft•lb)	
Rear wheel axle nut	M24	1	150 Nm (15.0 m•kg, 109 ft•lb)	
Rear brake hose union bolt	M10	2	30 Nm (3.0 m•kg, 22 ft•lb)	
Rear caliper bleed screw	M8	2	6 Nm (0.6 m•kg, 4.3 ft•lb)	
Rear brake disc bolt	M8	6	23 Nm (2.3 m•kg, 17 ft•lb)	
Rear master cylinder lock nut	M8	2	18 Nm (1.8 m•kg, 13 ft•lb)	

NOTE:

First tighten to 52 Nm (5.2 m•kg, 38 ft•lb), and after fully loosening, tighten to 18 Nm (1.8 m•kg, 13 ft•lb).


























LUBRICATION POINTS AND LUBRICANT TYPES

EAS20360



LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370

ENGINE








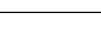
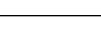


Lubrication point	Lubricant
Oil seal lips	
All O-ring	
Bearings	
Crankshaft big end	
Crankshaft journals	
Con rod bolt	
Piston surfaces	
Piston pins	
Valve stems (intake and exhaust)	
Valve stem ends (intake and exhaust)	
Valve lifter surfaces	
Camshaft lobes and camshaft journals	
Oil pump rotors (inner and outer) and oil pump shaft	
Idle gear 1 inner surface	
Starter clutch assembly	
Starter gear internal diameter	
Oil pump drive gear	
Primary driven gear	
Ball (for clutch)	
Transmission gears (wheel and pinion) and collar	
Shift cam bearing	
Shift fork bar	
Shift shaft assembly	
Ball left, right	
Shift boss inner diameter (change pedal)	

LUBRICATION POINTS AND LUBRICANT TYPES





Lubrication point	Lubricant
Push rod	
Crankcase mating surface	Yamaha bond No. 1215 (Three Bond No. 1215®)
Cylinder head cover gasket	Yamaha bond No. 1215 (Three Bond No. 1215®)
Cylinder head plug	
Breather grommet	Yamaha bond No. 1215 (Three Bond No. 1215®)
Hexagonal bolt with washer (oil guide plate)	Yamaha bond No. 1215 (Three Bond No. 1215®)
Crossless hexagonal screw (crankshaft cover 1 and cover 2)	Yamaha bond No. 1215 (Three Bond No. 1215®)
Hexagonal socket head bolt (clamp)	Yamaha bond No. 1215 (Three Bond No. 1215®)

EAS20380

CHASSIS

Lubrication point	Lubricant
Steering bearings and oil seal lip	
Front wheel oil seal lip (left/right)	
Rear wheel oil seal lip (left/right)	
Clutch hub and mating section	
Rear brake pedal shaft	
Shift pedal boss inner	
Rear footrest bolt shaft and ball	
Center stand, sidestand and bracket metal-to-metal moving parts and bolt shaft	
Throttle grip (guide tube) and throttle cable end	
Baggage hook (wire) pivoting point	
Pivot shaft	

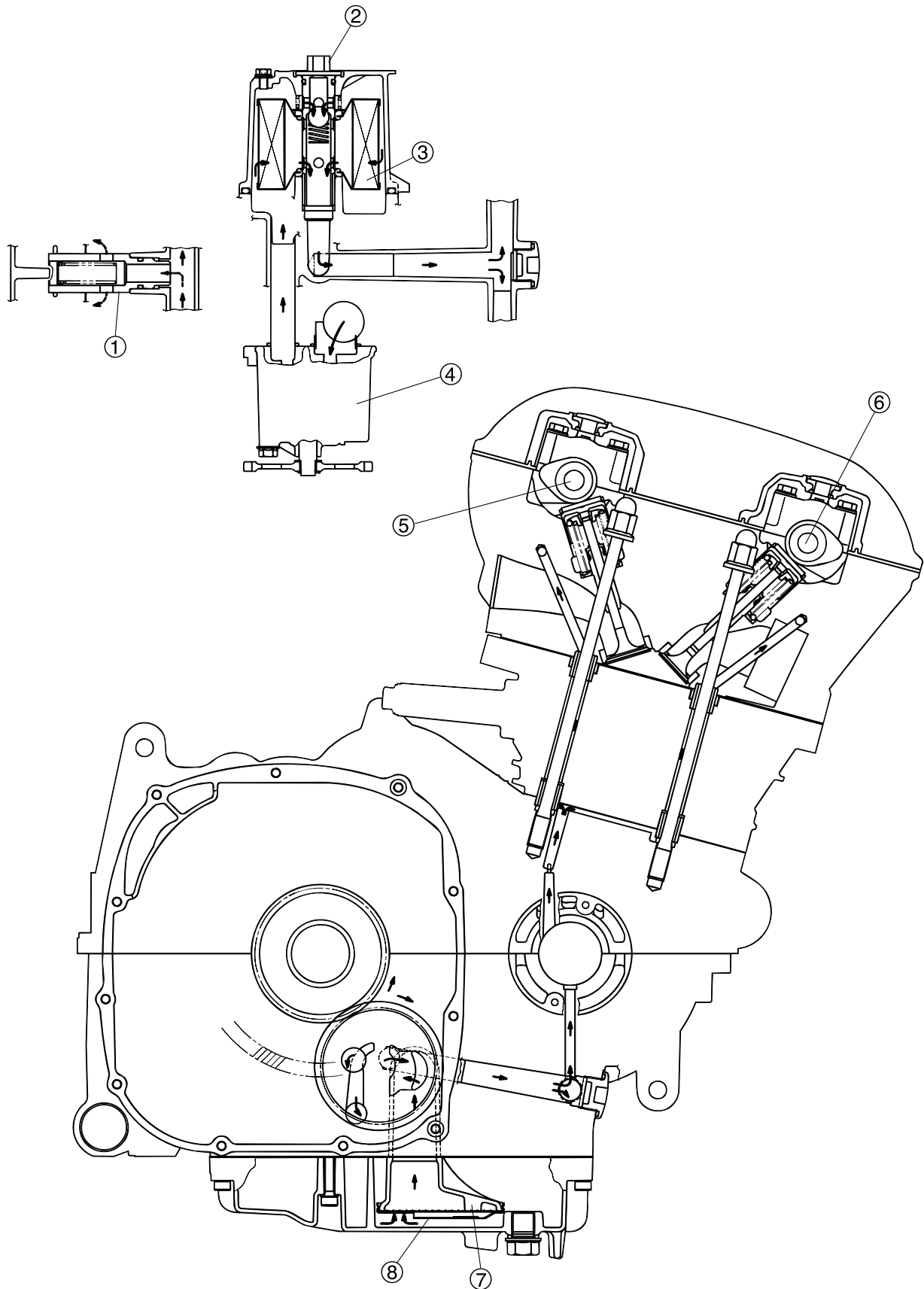
LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant
Swingarm head pipe bearing	
Swingarm head pipe left/right thrust cover oil seal lip	
Engine bracket bearing	
Crankcase rear end left side bearing	

LUBRICATION POINTS AND LUBRICANT TYPES

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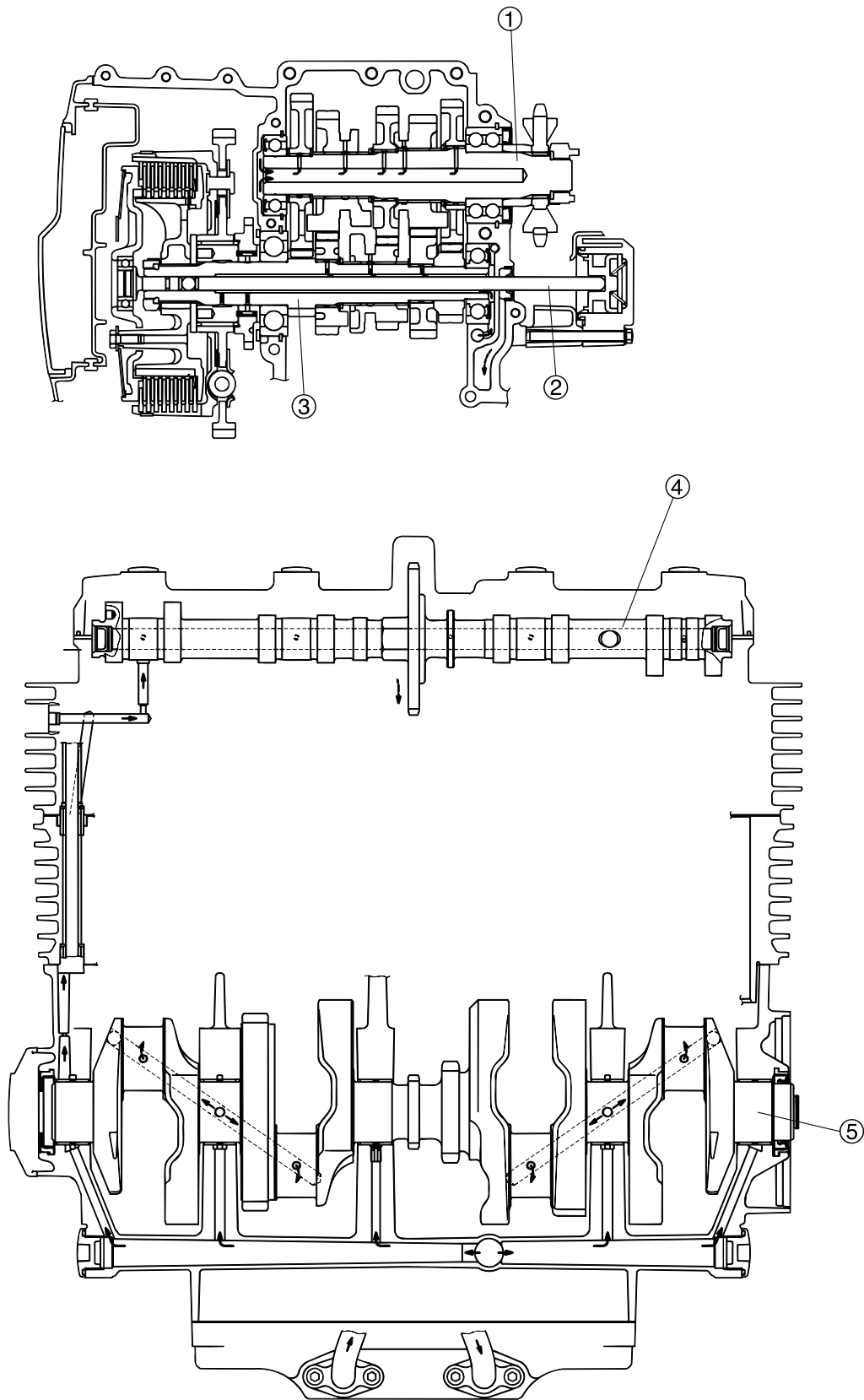
LUBRICATION DIAGRAMS



LUBRICATION DIAGRAMS

1. Relief valve
2. Bypass valve
3. Oil filter element
4. Oil pump
5. Camshaft (intake)
6. Camshaft (exhaust)
7. Oil strainer housing
8. Oil strainer

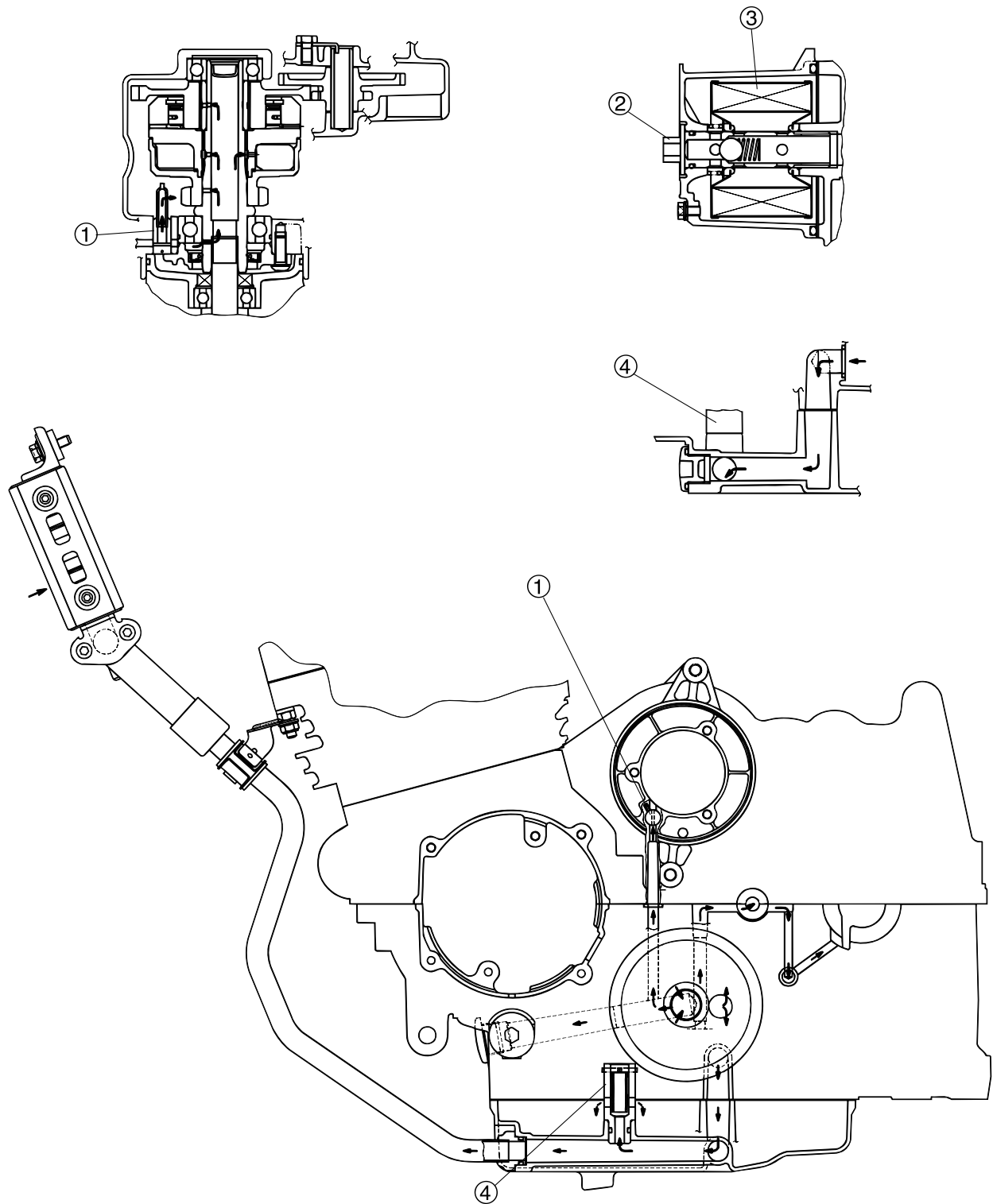
LUBRICATION DIAGRAMS



LUBRICATION DIAGRAMS

1. Drive axle
2. Push rod
3. Main axle
4. Camshaft
5. Crankshaft

LUBRICATION DIAGRAMS



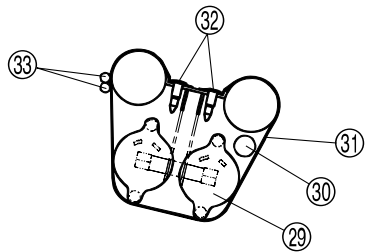
LUBRICATION DIAGRAMS

1. Nozzle
2. Bypass valve
3. Oil filter element
4. Relief valve

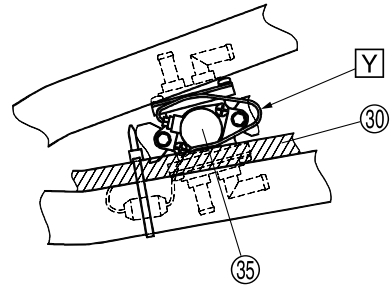
CABLE ROUTING

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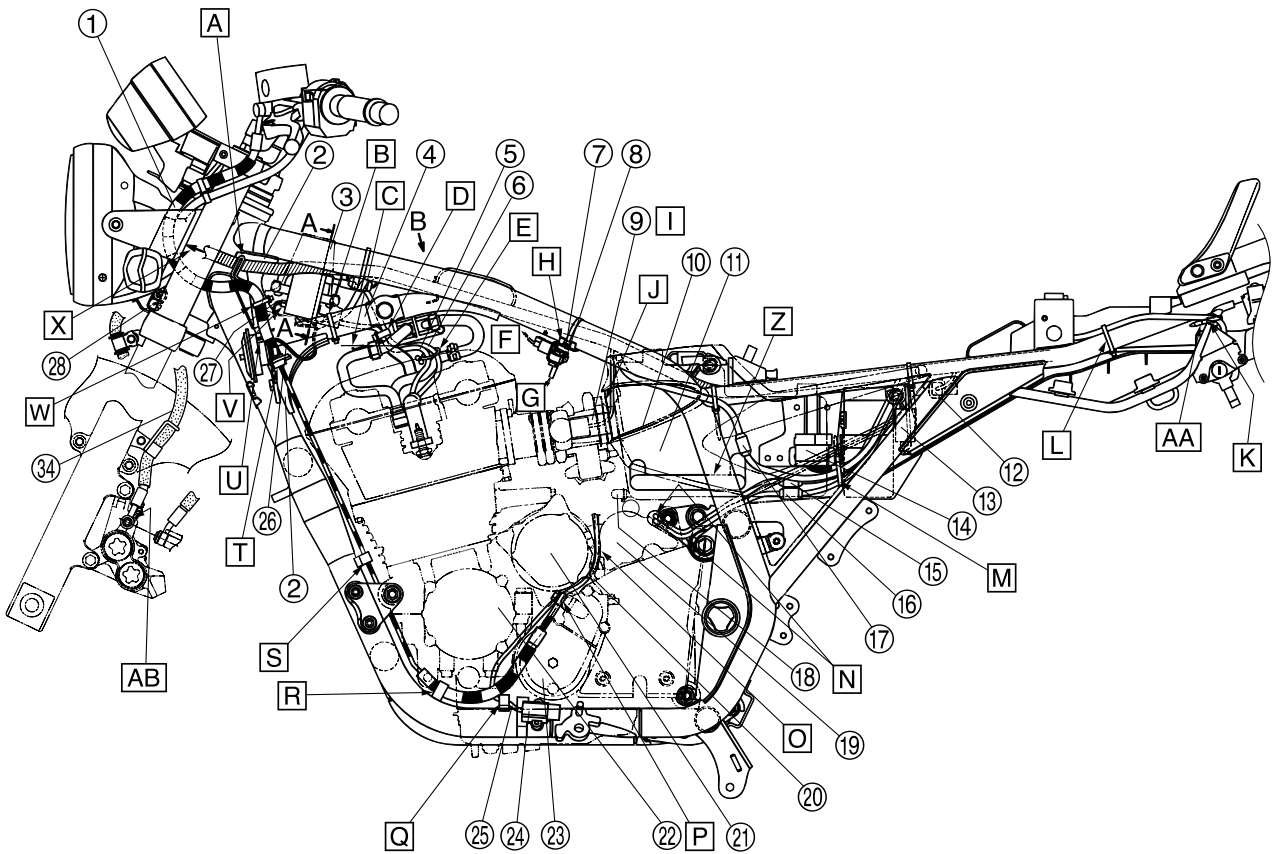
CABLE ROUTING



A-A

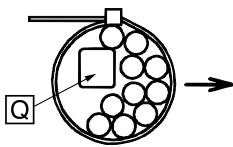
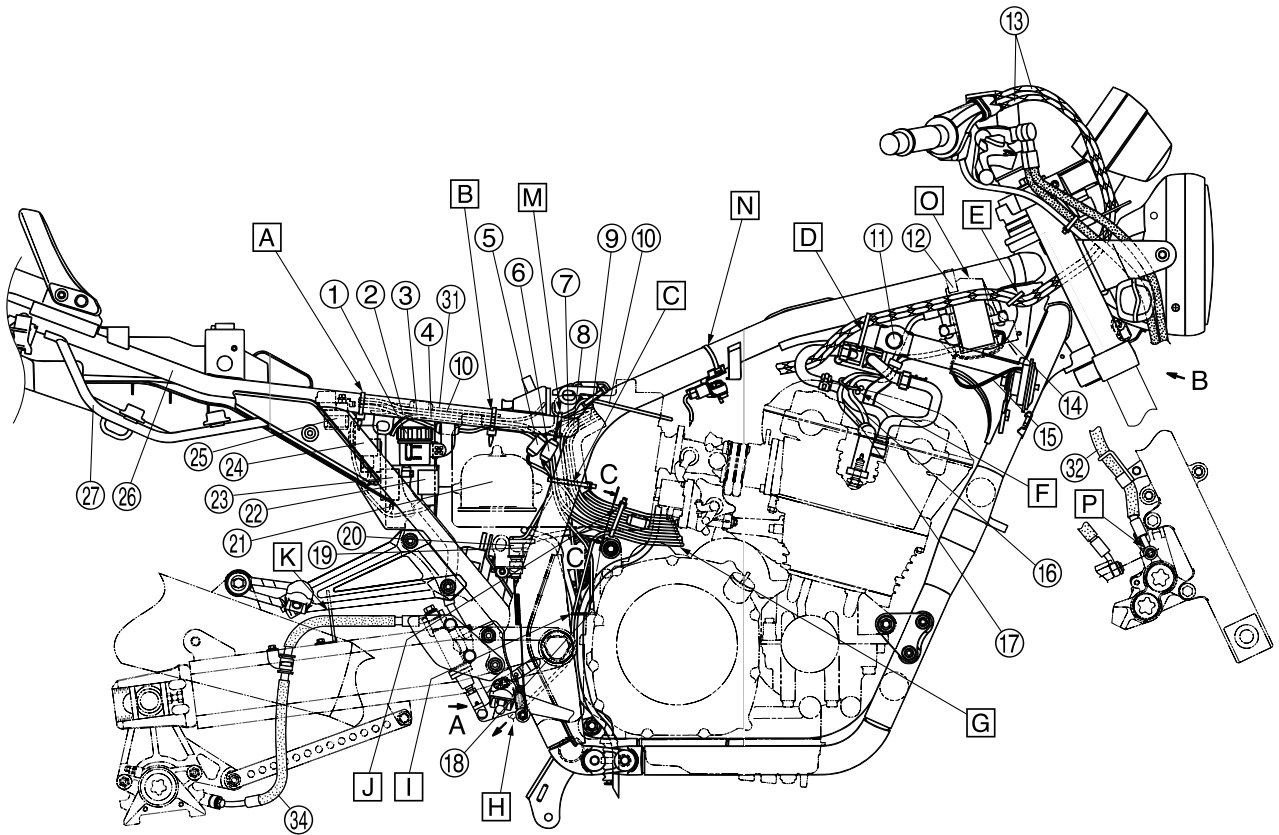


B

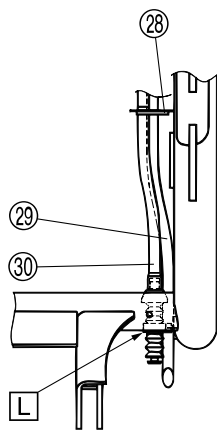


1. Clutch hose
 2. Gusset
 3. Protector
 4. Tension pipe 1
 5. High tension cord #2
 6. High tension cord #1
 7. Bracket
 8. Intake air pressure sensor
 9. Throttle position sensor lead cover
 10. Side cover
 11. Air filter case
 12. Lean angle sensor
 13. Main
 14. Fuse box
 15. O₂ sensor coupler
 16. EXUP coupler
 17. Throttle body (12P) coupler
 18. Air filter drain cap
 19. Starter motor
 20. Speed sensor lead
 21. Generator
 22. Timing plate cover
 23. Oil filter cover
 24. Sidestand switch
 25. Side stand switch lead
 26. Horn lead
 27. Ignition coil #2 and #3 leads
 28. Atmospheric temperature sensor
 29. Ignition coil
 30. Wire harness
 31. Protector
 32. Plastic rivet
 33. Throttle cable
 34. Brake hoses 1
 35. Air induction system assembly
- A. Wire harness should pass through gusset cable holder.
- B. Fasten the lead branching from the main harness to the inside of tension pipe 1 with a band. The band end should face downwards.
- C. Air induction system assembly bottom end
- D. Fasten high tension cords #1#2 at the top and #3#4 at the bottom with bands. The position is near the air induction system assembly front bottom edge and so that it does not protrude below the bottom edge.
- E. Clamp high tension cord #1 and high tension cord #2 with a clamp. Clamp position is over the #2 head cover mounting bolt.
- F. To sub-lead
- G. To intake manifold
- H. Insert projection on the frame to the intake air pressure sensor bracket hole, then fasten with a band. Cutting face should be downward. Set the tab in the sheet metal concavity.
- I. After connecting the throttle sensor lead coupler, cover the throttle sensor coupler with coupler cover.
- J. Front end of side cover.
- K. Apply protective film to the frame side. (Left side only)
- L. Fasten the seat lock cable to the seat rail with a band. Face the band clasp downwards and the band end along the top of the fender side.
- M. Fasten the O₂ sensor lead, EXUP sensor lead and throttle body lead together with the leads from the fuse box. Ends should face inwards, following the rear fender side surface.
- N. Flatten the EXUP lead and O₂ sensor lead against the engine bracket front side with the link, and pass through to the bottom of the engine bracket bolt.
- O. Pass the speed sensor lead along the side stand switch lead and through to the right side of the vehicle.
- P. The clutch hose clasp should be fitted in parallel with the cover.
- Q. After fastening the side stand switch lead with a clamp, pass between the timing plate cover, oil filter cover, generator and start motor, and through to the right side of the vehicle in the same way as the engine lead.
- R. Fasten the clutch hose with a clamp.
- S. Fasten the clutch pipe with a clamp. Insert the band end to the inside and cut.
- T. Fasten the clutch hose with the grommet gusset cable holder.
- U. Pass the horn lead between the clutch hose and frame, bring out to the front and connect to the horn.
- V. Connect the lead with black couplers to the ignition coil #1 and #4 sides.
- W. Pass a clamp through the hole at the bottom of the gusset and fasten the clutch hose. The band end should face inside the vehicle.
- X. Route the main harness through the inner side of the clutch hose and into the hole at the bottom of the headlight.
- Y. The air induction system lead should be routed around the rear of the air induction unit and connected to the wire harness coupler.
- Z. Route the EXUP lead and O₂ sensor lead under the air filter hose.
- AA. Fasten the seat lock cable to the frame via protective film. Place the bundle to the inner side and band end to the inner side towards the front.
- AB. The brake pipe should touch the positioning stopper.

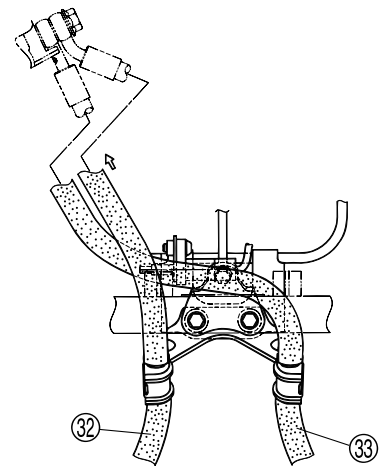
CABLE ROUTING



C-C



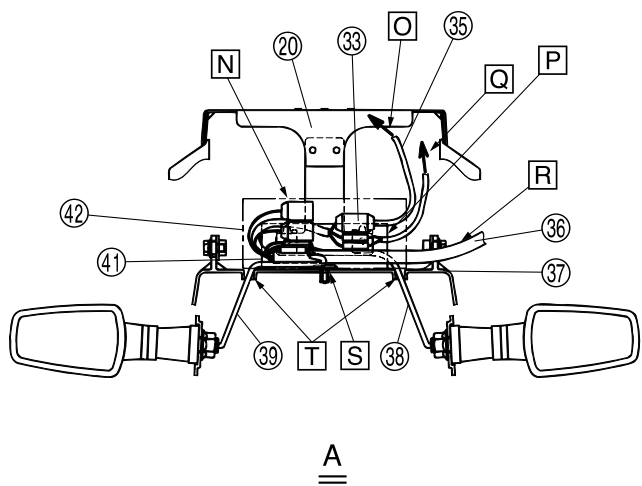
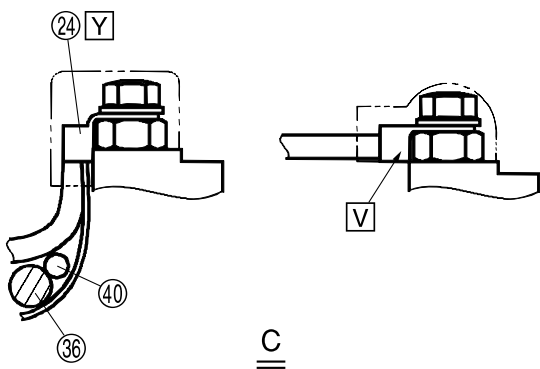
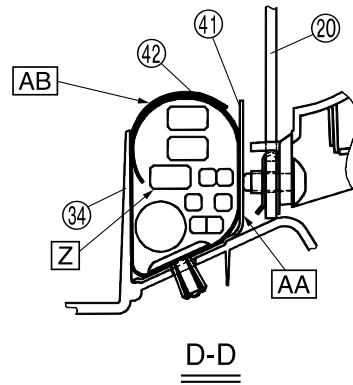
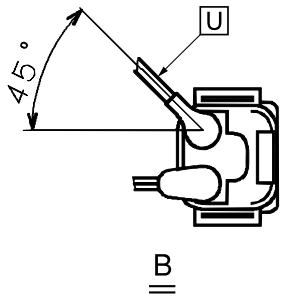
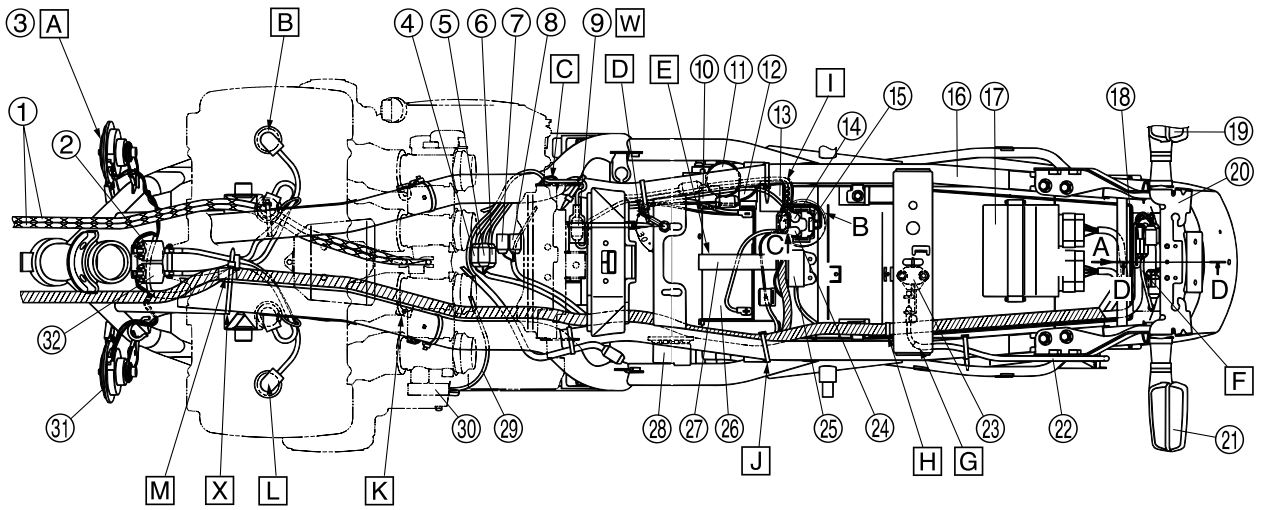
A



B

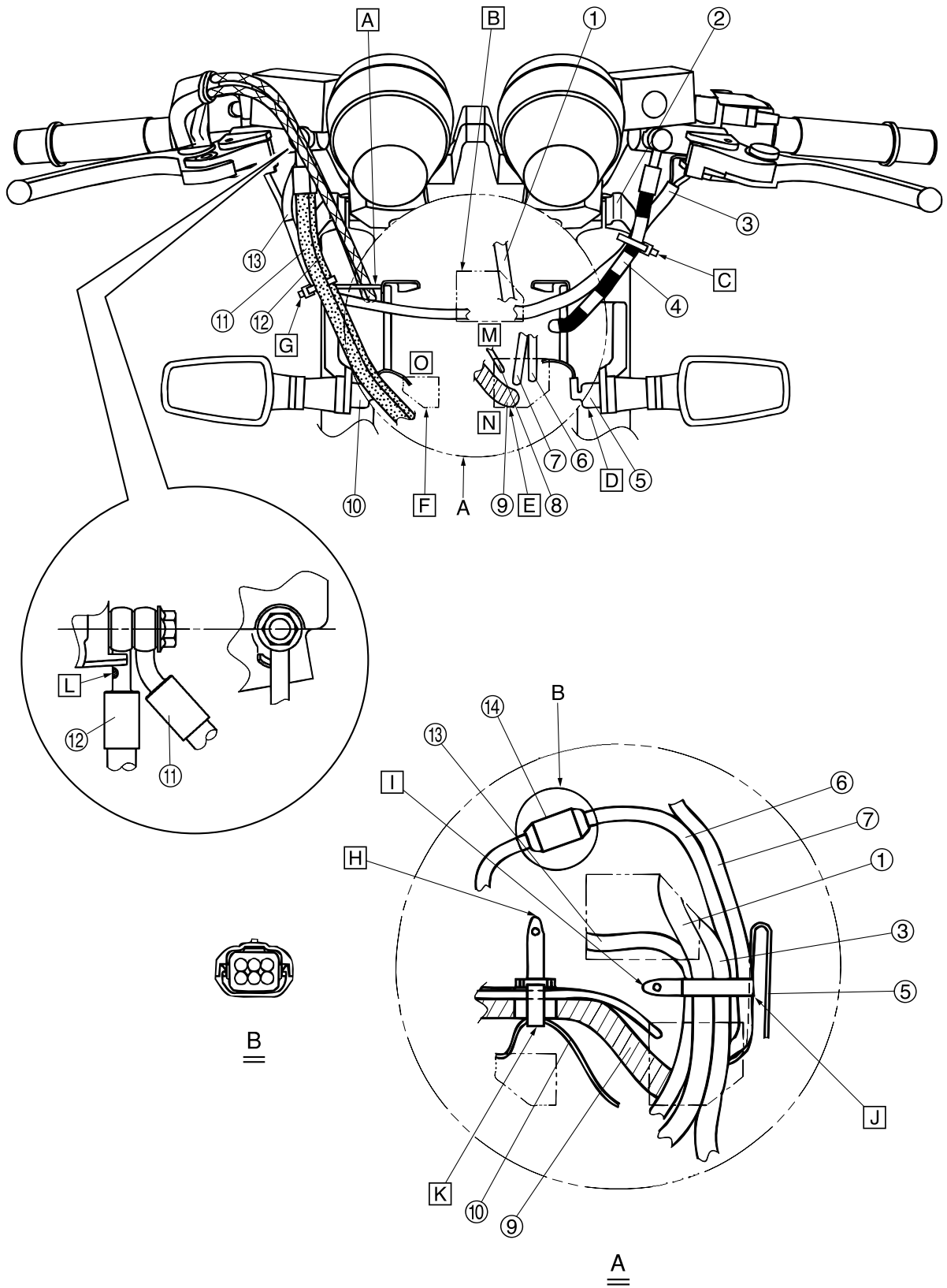
1. Reservoir tank
 2. Speed sensor lead
 3. Starter motor cable
 4. Negative battery lead
 5. Generator coupler
 6. Rear brake switch coupler
 7. Neutral lead
 8. Crankshaft position sensor lead
 9. Sidestand switch lead
 10. Throttle body lead (6P coupler)
 11. Fuel tank fitting
 12. Protector
 13. Throttle cable
 14. Ignition coil #1/#4 leads
 15. Horn lead
 16. High tension cord #3
 17. High tension cord #4
 18. Engine ground lead
 19. EXUP lead
 20. Rear brake switch
 21. Air filter
 22. Flasher relay
 23. Headlight relay
 24. Starting circuit cut-off relay
 25. Starter relay
 26. Seat rail
 27. Standing handle
 28. Cable guide
 29. Fuel tank drain hose
 30. Fuel tank breather hose
 31. Frame ground lead
 32. Brake hose 2
 33. Brake hoses 1
 34. Brake hoses 5
- A. The negative battery lead, speed sensor lead and throttle body lead (6P coupler) should be routed to inside of the seat rail.
- B. The starter motor cable, negative battery lead, speed sensor lead and throttle body lead (6P coupler) should be routed to inside of the seat rail. The band end should face the inside.
- C. Fasten the starter motor cable, negative battery lead, generator lead, neutral lead, sidestand switch lead, crankshaft position sensor lead, rear brake switch lead, throttle body sub-harness lead (9 leads) with a band close beside the air intake mounting screw. The band end should be cut facing towards the front of the vehicle.
- D. Fasten the throttle cable to the tension pipe with a band on the tank fitting. The band end should face downwards.
- E. Pass a clamp through the hole at the top of the gusset and fasten the 2 cables. The band end should face inside the vehicle.
- F. Clamp high tension cord #3 and high tension cord #4 with a clamp. Clamp position is over the #3 head cover mounting bolt.
- G. Leads and hoses should not be entangled. Leads and hoses should be arranged in an orderly manner, as shown in the illustration.
- H. To O₂ sensor
- I. Route the fuel tank drain hose and fuel tank breather hose (total of 2 hoses) through the engine cable guide.
- J. Fasten together with a band, the generator lead, pickup lead, side stand switch lead, starter motor cable, speed sensor lead, EXUP lead, engine temperature sensor lead, sub-throttle motor lead, ISC lead, starter motor lead and O₂ sensor lead. The band end should face inside. After bundling EXUP and O₂ sensor leads, route to the rear side of the breather hose.
- K. Brake hose 5 should be routed through the holder.
- L. Pass the plug through the clamp.
- M. The band end should face the frame and follow the air filter.
- N. The fastener should be to the outside and the ends should be cut.
- O. Align the protector with the 2 shape on the right side.
- P. The brake pipe should touch the positioning stopper.
- Q. The sub-throttle motor lead should be distributed further inside than other leads, and should not be exposed to the outside.

CABLE ROUTING



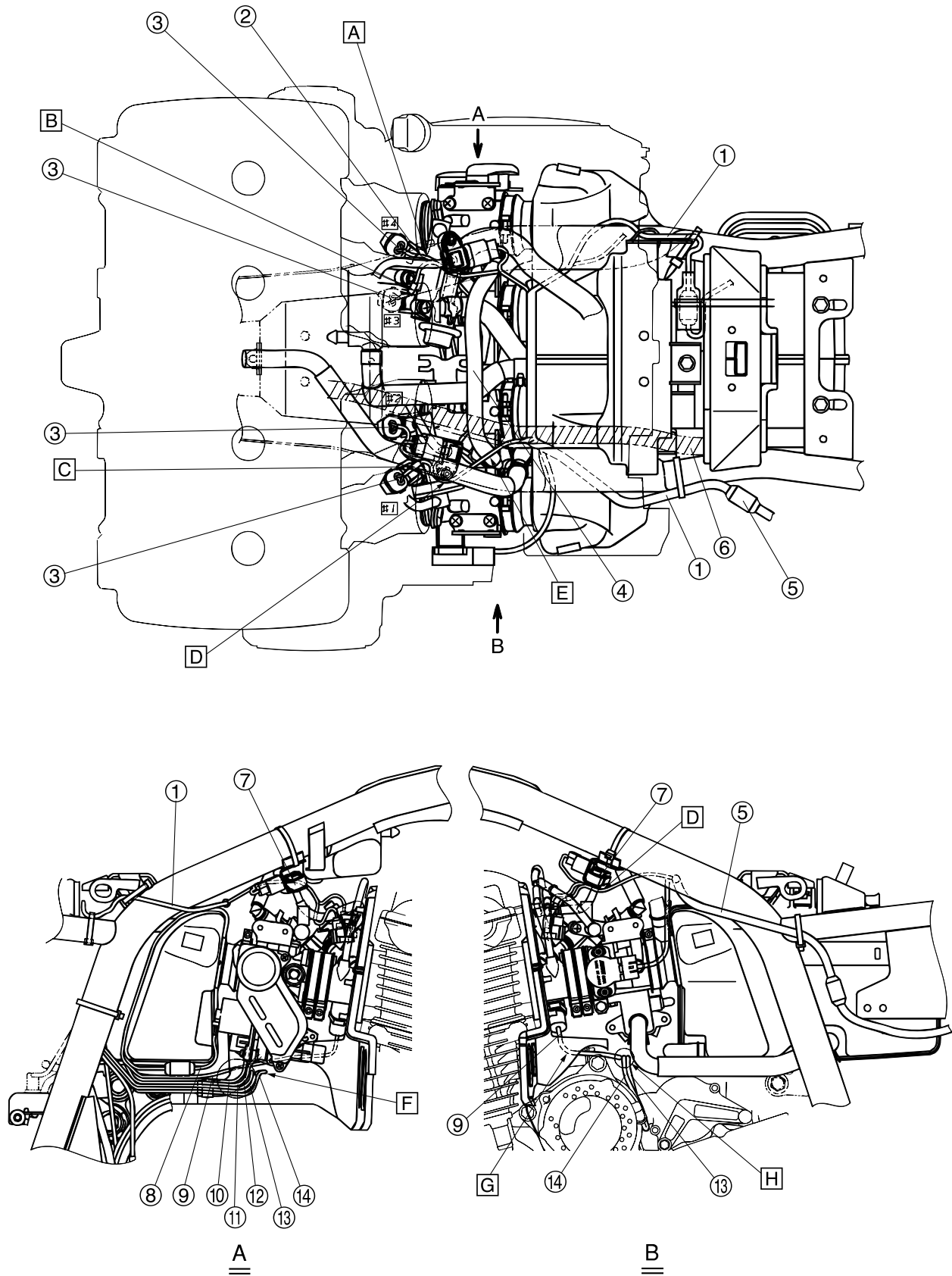
1. Throttle cable
 2. Ignition coil #1, #4
 3. Horn (right side)
 4. Neutral switch coupler
 5. Pickup coupler
 6. Sidestand switch coupler
 7. Fuel sender coupler
 8. Fuel pump coupler
 9. Throttle body (6P) coupler
 10. Flasher relay
 11. Reservoir tank
 12. Headlight relay
 13. Starting circuit cut-off relay
 14. Starter motor cable
 15. Starter relay
 16. Seat rail
 17. ECU
 18. Rear fender rib
 19. Rear flasher right
 20. Taillight bracket
 21. Rear flasher left
 22. Seat lock cable
 23. Seat lock
 24. Positive battery lead
 25. Lean angle sensor
 26. Battery
 27. Battery band
 28. Fuse box
 29. Throttle position sensor lead
 30. Throttle position sensor
 31. Horn (left side)
 32. Ignition coil #2, #3
 33. Tail/brake light coupler
 34. Rear fender rib
 35. Taillight lead
 36. Wire harness
 37. Rear fender
 38. Rear flasher left lead
 39. Rear flasher right lead
 40. Starter relay lead
 41. Protector
 42. Wire harness protector
- A. Horn (H mark sticker) should be attached to the right.
 - B. Install high tension cords #1~#4 without mistaking the numbers.
 - C. Fasten the throttle body (6P) coupler lead to the cross tube of the frame with a band.
 - D. The ground lead should be tightened together with air filter installation.
 - E. Fasten the positive battery leads (x 2) to the wire harness with the battery band.
 - F. The wire harness, taillight lead, and rear flasher leads left and right should be set between the tail light bracket and rear fender rib.
 - G. The seat lock cable should not protrude from the bracket.
 - H. Fasten the wire harness clamp to the rear fender.
 - I. Route the sub harness past the front side of the starting circuit cutoff relay.
 - J. Fasten the wire harness to the seat rail immediately to the back of the seat rail side cover mounting bracket. Fasten forward of the EXUP lead and O₂ sensor lead branch point. Band end should face downward to the inside of the back stay.
 - K. Fit the wire harness plug clamp to the T stud.
 - L. High tension cords in the order #1~#4 from the left.
 - M. Fasten the wire harness and starter cable on the harness positioning tape to the tank rail with a band. The band end should face downwards. The wire harness should not be entangled with the T stud clamp.
 - N. Fasten the taillight lead and license plate light lead to the taillight bracket with a clamp.
 - O. To taillight
 - P. The wire harness, taillight lead and rear flasher leads left/right should not protrude above rear fender rib height.
 - Q. To license plate light
 - R. Route the wire harness between the mounting position of the rear fender to the frame and the rib of the storage space.
 - S. Fasten the protector and wire harness protector to the rear fender with rivets.
 - T. Route the left/right rear flasher through the holes in the rear fender.
 - U. The starter motor cable should be fitted pulling it at about 45 degrees towards the outside.
 - V. The positive battery lead should be fitted with the crimping side facing downward.
 - W. Set the connector cover between frame cross members with its opening facing the inside of the vehicle. The fasten should be on the inside with the ends following the air filter.
 - X. Fasten the throttle body lead to the seat rail with a band. The fasten with a band should face downwards with the ends following the air filter surface.
 - Y. Install the positive battery lead so that the wiring protrudes facing downward.
 - Z. The wire harness, taillight lead, left rear flasher light lead and right generator coupler should be stowed in the wire harness protector.
 - AA. The protector should be installed at the front of the taillight bracket.
 - AB. After including all leads, bind the wire harness protector with a Velcro strip (hooks facing upwards).

CABLE ROUTING



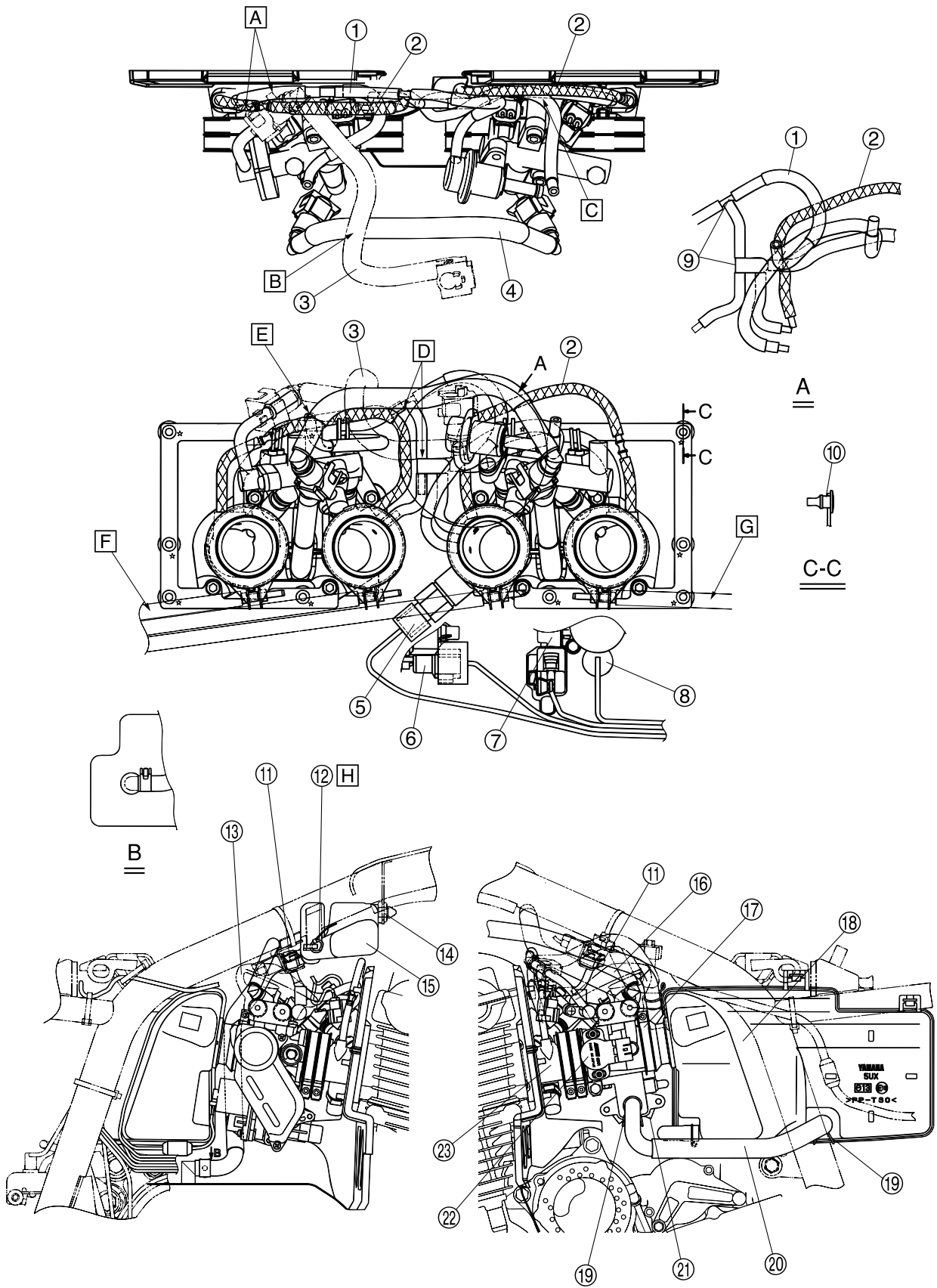
1. Meter leads
 2. Handle crown
 3. Left handlebar switch lead
 4. Clutch hose
 5. Left front flasher lead
 6. Immobilizer unit lead
 7. Left main switch lead
 8. Atmospheric temperature sensor lead
 9. Wire harness
 10. Right front flasher lead
 11. Brake hose 2
 12. Brake hoses 1
 13. Right handlebar switch lead
 14. Immobilizer unit coupler
-
- A. The throttle cable should be routed through the headlight stay bracket guide.
 - B. Insert the meter lead, left handlebar switch lead and the right handlebar switch lead in the top hole of the headlight.
 - C. Clamp the left handlebar switch lead and clutch hose below the handle crown with a band. The left handlebar switch lead should be routed to the inner side of the clutch hose.
 - D. The front flasher lead should be routed to the front of the headlight stay. Right and left caps should be installed facing the rear, and securely fastened.
 - E. Insert the left front flasher lead, main switch lead, immobilizer unit lead and wire harness into the left hole in the bottom of the headlight.
 - F. Insert the right front flasher lead in the right hole at the bottom of the headlight.
 - G. Clamp the right handlebar switch lead and brake hose 2 with a band to the side of the cable guide.
 - H. The band end should be clamped facing upwards.
 - I. The band end should be clamped facing inside.
 - J. Clamp the main switch lead, immobilizer unit lead, left handlebar switch lead, right handlebar switch lead, left front flasher lead and meter lead.
 - K. Clamp the right front flasher lead and wire harness atmospheric temperature sensor lead. The wire harness should be aligned with the positioning tape and clamped.
 - L. Fit the brake hose 1 to the painted section on the master cylinder side. Put brake hose 1 against the master cylinder hose stopper and tighten brake hose 2 at the same angle.
 - M. To the top hole.
 - N. To the right hole at the bottom.
 - O. To the left hole at the bottom.

CABLE ROUTING

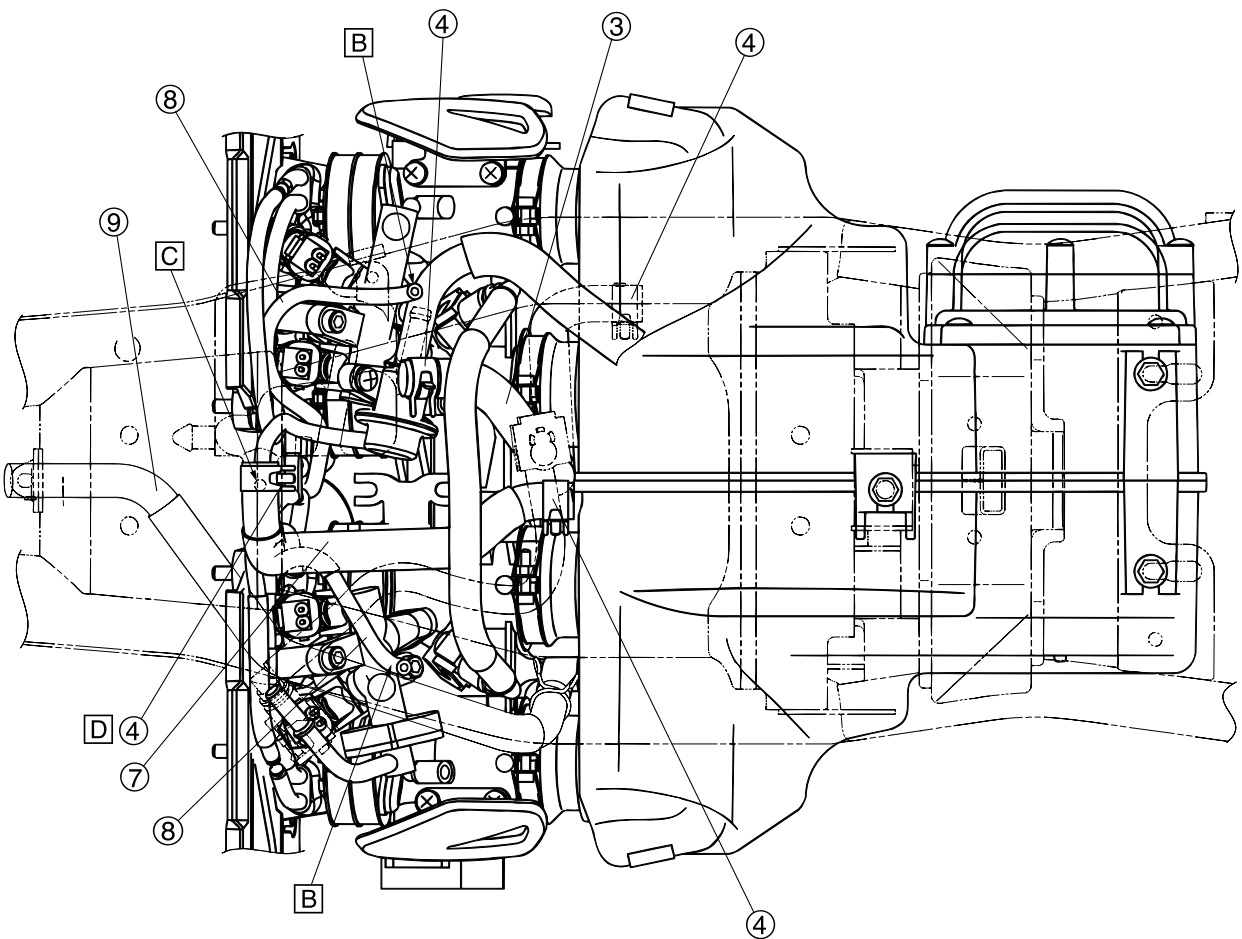
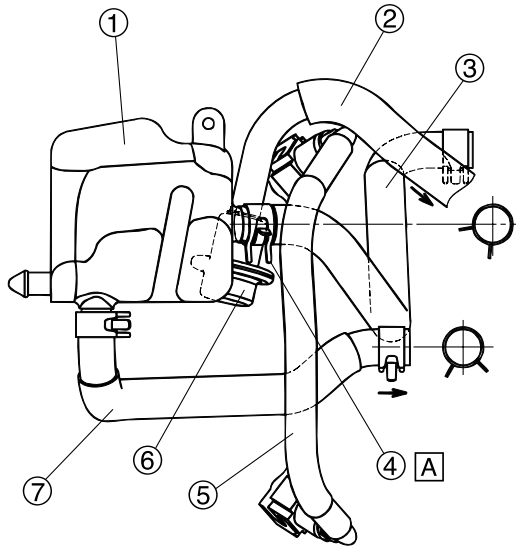


1. Sub-wire harness
 2. Vacuum hose
 3. Fuel injector coupler
 4. Fuel hoses
 5. Throttle body (12P) coupler
 6. Wire harness
 7. Intake air pressure sensor
 8. Sub-throttle motor lead
 9. Engine temperature sensor lead
 10. ISC motor lead
 11. Throttle position sensor lead
 12. Starter motor lead
 13. Crankshaft position sensor lead
 14. Generator lead
-
- A. The sub-wire harness to #3 should be routed under the vacuum hose.
 - B. Fit the white mark to #3.
 - C. Fit the white mark to #1.
 - D. The sub-wire harness should be routed under the suction pressure sensor.
 - E. The sub-wire harness should be routed over the fuel hose.
 - F. Leads and hoses should be routed so as not to get entangled.
 - G. Should be routed under the protector.
 - H. Should be routed to the right side of the vehicle.

CABLE ROUTING

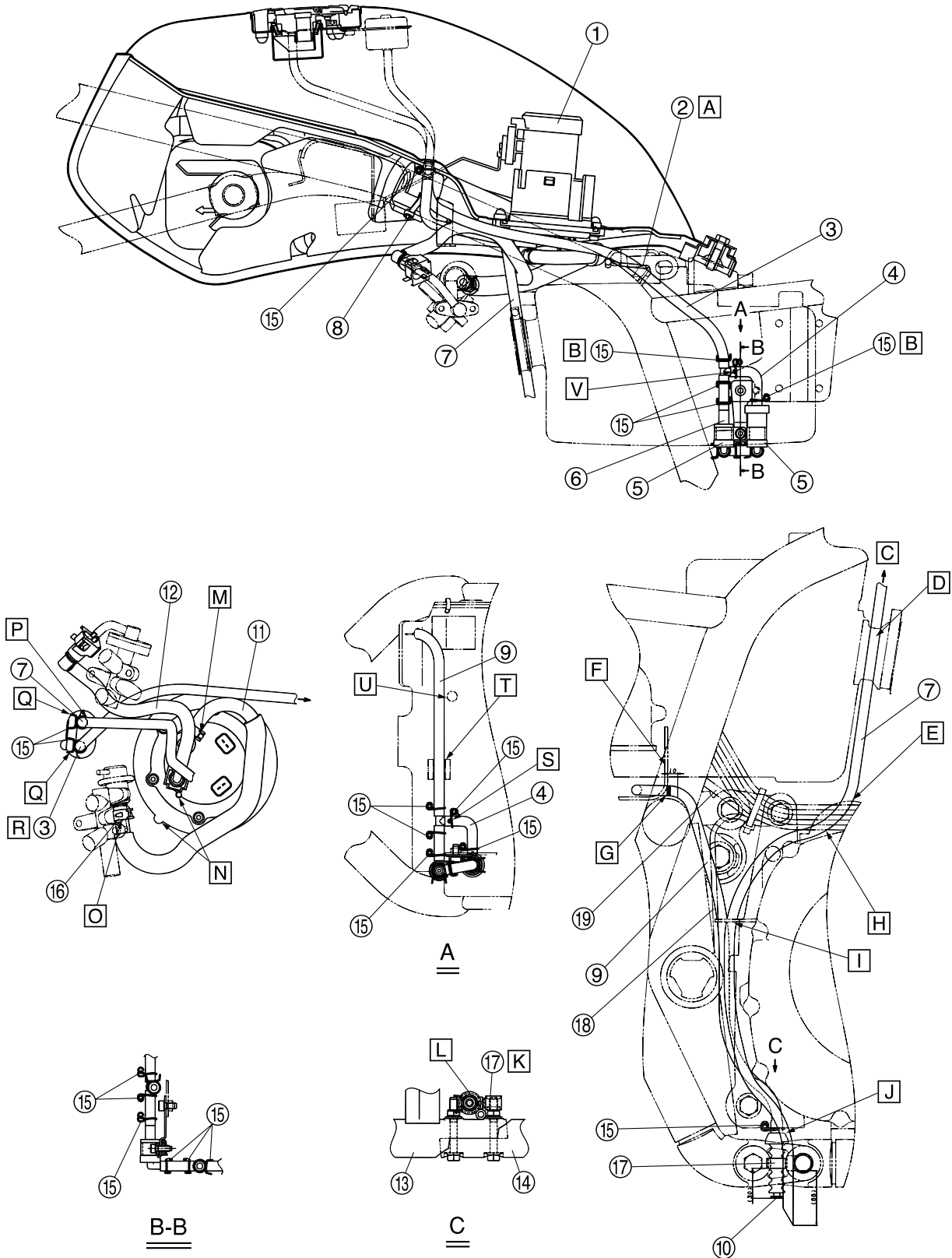


1. Vacuum hose 1
 2. Vacuum hose 2
 3. Fuel hose 1
 4. Fuel hose 2
 5. Engine temperature sensor
 6. ISC motor
 7. Sub-throttle position sensor
 8. Sub-throttle motor
 9. Joint
 10. Plug
 11. Intake air pressure sensor
 12. Clamp
 13. Right throttle body side cover
 14. Grommet
 15. Breather assembly
 16. Left throttle body side cover
 17. Clamp
 18. Air filter case
 19. Clip
 20. ISC hose
 21. ISC motor
 22. Throttle bodies
 23. Intake manifold
-
- A. Vacuum hose 1 should be routed under the connector.
 - B. Fuel hose 1 should be routed over fuel hose 2.
 - C. Should be routed over right fuel rail collar.
 - D. Install vacuum hose 1 in this position.
 - E. To suction pressure sensor.
 - F. Install hose 1, 2 and 3 clamps from the left side of the vehicle.
 - G. Install #4 hose clamp from the right side of the vehicle.
 - H. After fitting the clamp in the breather assembly and frame hole, leave the remainder along the frame, without cutting.



1. Breather assembly
 2. Fuel return hose
 3. Breather hose 1
 4. Clip
 5. Fuel hoses
 6. Pressure regulator
 7. Breather hose 2
 8. Vacuum hose
 9. Air induction system hose
-
- A. Direct the claw of the clip upwards on the left of the vehicle.
 - B. Fit the vacuum hose to the suction pressure sensor.
 - C. Fit with the white paint facing upwards.
 - D. Direct the claw of the clip towards the rear of the vehicle.

CABLE ROUTING



1. Fuel pump Comp.
 2. Clamp
 3. Pipe 2
 4. Pipe 4
 5. Rollover valve
 6. Fuel hoses
 7. Pipe 5
 8. Clamp
 9. Pipe 3
 10. Plug
 11. Fuel hose 2
 12. Fuel hose 1
 13. Frame
 14. Down tube
 15. Clip
 16. Clamp
 17. Clamp
 18. O₂ sensor lead
 19. EXUP motor lead
- A. Press the clamp tab against the frame and install facing the front of the vehicle.
 - B. Install the clip tab in the direction shown in the illustration.
 - C. To fuel tank.
 - D. Route pipe 5 between joints #3 and #4.
 - E. Route pipe 5 to the left side of the leads.
 - F. Set painted section of pipe 3 within this range.
 - G. Align the painted section of pipe 3 with the front of seal 2, and install.
 - H. Pipe 5 should be routed under the EXUP motor lead and O₂ sensor lead.
 - I. Route pipe 3 to the left side together with pipe 5 to the wire guide.
 - J. Insert pipe 3 to the end.
 - K. The bolt should be inserted until the clamp touches the nut.
 - L. Pipe 5 should be routed between clamp and frame.
 - M. The tab of the clip faces the rear of the vehicle.
 - N. When installing the pump, align the cut end on the damper with the projection on the pump.
 - O. The tab of the clip faces the rear of the vehicle.
 - P. Install pipe 5 with the white paint facing the rear of the vehicle.
 - Q. The tab of the clip faces the front of the vehicle.
 - R. Fit pipe 2 to the right side tube.
 - S. Install pipe 4 with the yellow paint facing upwards.
 - T. Route pipe 3 between seal 2 ribs. Note that if pipe 3 is not sandwiched between seal 2 rib and air filter case, this is permissible, even if it is out of the rib.
 - U. Route pipe 3 in front of seal 2 lug.
 - V. Install pipe 4 with the yellow paint facing the left side of the vehicle.

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PERIODIC MAINTENANCE

EAS20450

PERIODIC MAINTENANCE

EAS20460

INTRODUCTION

This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EAS17707

GENERAL MAINTENANCE AND LUBRICATION CHART

NOTE:

- The annual checks must be performed every year, except if a kilometer-based maintenance is performed instead.
- From 50000 km, repeat the maintenance intervals starting from 10000 km.
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (× 1000 km)					ANNUAL CHECK
			1	10	20	30	40	
1	* Fuel line	<ul style="list-style-type: none"> ● Check fuel hoses for cracks or damage. 		√	√	√	√	√
2	Spark plugs	<ul style="list-style-type: none"> ● Check condition. ● Clean and regap. 		√		√		
		<ul style="list-style-type: none"> ● Replace. 			√		√	
3	* Valves	<ul style="list-style-type: none"> ● Check valve clearance. ● Adjust. 	Every 20000 km					
4	Air filter element	<ul style="list-style-type: none"> ● Replace. 					√	
5	* Clutch	<ul style="list-style-type: none"> ● Check operation, fluid level and vehicle for fluid leakage. 	√	√	√	√	√	
6	* Front brake	<ul style="list-style-type: none"> ● Check operation, fluid level and vehicle for fluid leakage. 	√	√	√	√	√	√
		<ul style="list-style-type: none"> ● Replace brake pads. 	Whenever worn to the limit					
7	* Rear brake	<ul style="list-style-type: none"> ● Check operation, fluid level and vehicle for fluid leakage. 	√	√	√	√	√	√
		<ul style="list-style-type: none"> ● Replace brake pads. 	Whenever worn to the limit					
8	* Brake hoses	<ul style="list-style-type: none"> ● Check for cracks or damage. 		√	√	√	√	√
		<ul style="list-style-type: none"> ● Replace. 	Every 4 years					
9	* Wheels	<ul style="list-style-type: none"> ● Check runout and for damage. 		√	√	√	√	
10	* Tires	<ul style="list-style-type: none"> ● Check tread depth and for damage. ● Replace if necessary. ● Check air pressure. ● Correct if necessary. 		√	√	√	√	√
11	* Wheel bearings	<ul style="list-style-type: none"> ● Check bearing for looseness or damage. 		√	√	√	√	
12	* Swingarm	<ul style="list-style-type: none"> ● Check operation and for excessive play. 		√	√	√	√	
		<ul style="list-style-type: none"> ● Lubricate with lithium-soap-based grease. 	Every 50000 km					

PERIODIC MAINTENANCE

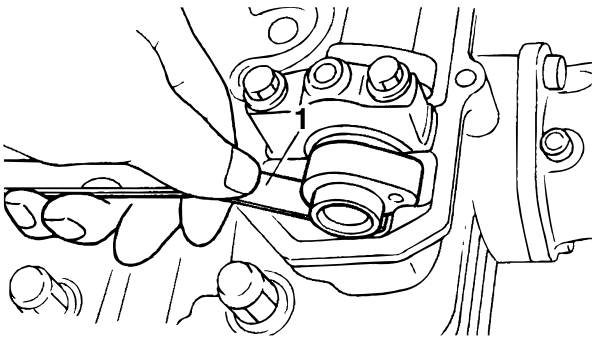
NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (× 1000 km)					ANNUAL CHECK
			1	10	20	30	40	
13	Drive chain	<ul style="list-style-type: none"> ● Check chain slack, alignment and condition. ● Adjust and lubricate chain with a special O-ring chain lubricant thoroughly. 	Every 1000 km and after washing the vehicle or riding in the rain					
14	* Steering bearings	<ul style="list-style-type: none"> ● Check bearing play and steering for roughness. 	√	√	√	√	√	
		<ul style="list-style-type: none"> ● Lubricate with lithium-soap-based grease. 	Every 20000 km					
15	* Chassis fasteners	<ul style="list-style-type: none"> ● Make sure that all nuts, bolts and screws are properly tightened. 		√	√	√	√	√
16	Brake and clutch lever pivot shafts	<ul style="list-style-type: none"> ● Lubricate with lithium-soap-based grease. 		√	√	√	√	√
17	Brake and shift pedal pivot shafts	<ul style="list-style-type: none"> ● Lubricate with lithium-soap-based grease. 		√	√	√	√	√
18	Sidestand, centerstand	<ul style="list-style-type: none"> ● Check operation. ● Lubricate. 		√	√	√	√	√
19	* Sidestand switch	<ul style="list-style-type: none"> ● Check operation. 	√	√	√	√	√	√
20	* Front fork	<ul style="list-style-type: none"> ● Check operation and for oil leakage. 		√	√	√	√	
21	* Shock absorber assemblies	<ul style="list-style-type: none"> ● Check operation and shock absorbers for oil leakage. 		√	√	√	√	
22	* Fuel injection system	<ul style="list-style-type: none"> ● Adjust synchronization. 		√	√	√	√	√
23	Engine oil	<ul style="list-style-type: none"> ● Change. ● Check oil level and vehicle for oil leakage. 	√	√	√	√	√	√
24	Engine oil filter element	<ul style="list-style-type: none"> ● Replace. 	√		√		√	
25	* Front and rear brake switches	<ul style="list-style-type: none"> ● Check operation. 	√	√	√	√	√	√
26	Moving parts and cables	<ul style="list-style-type: none"> ● Lubricate. 		√	√	√	√	√
27	* Throttle grip housing and cable	<ul style="list-style-type: none"> ● Check operation and free play. ● Adjust the throttle cable free play if necessary. ● Lubricate the throttle grip housing and cable. 		√	√	√	√	√
28	* Air induction system	<ul style="list-style-type: none"> ● Check the air cut-off valve, reed valve, and hose for damage. ● Replace any damaged parts if necessary. 		√	√	√	√	√
29	* Muffler and exhaust pipe	<ul style="list-style-type: none"> ● Check the screw clamp for looseness. 	√	√	√	√	√	
30	* Lights, signals and switches	<ul style="list-style-type: none"> ● Check operation. ● Adjust headlight beam. 	√	√	√	√	√	√

PERIODIC MAINTENANCE

EAS36771

NOTE:

- Air filter
 - This model's air filter is equipped with a disposable oil-coated paper element, which must not be cleaned with compressed air to avoid damaging it.
 - The air filter element needs to be replaced more frequently when riding in unusually wet or dusty areas.
 - Hydraulic brake and clutch service
 - Regularly check and, if necessary, correct the brake fluid and clutch fluid levels.
 - Every two years replace the internal components of the brake master cylinders and calipers as well as clutch master and release cylinders, and change the brake and clutch fluids.
 - Replace the brake and clutch hoses every four years and if cracked or damaged.
-



NOTE:

- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.


Valve clearance measuring sequence
Cylinder #1 → #2 → #4 → #3

Cylinder #2	180°
Cylinder #4	360°
Cylinder #3	540°

3. Adjust:

- Valve clearance

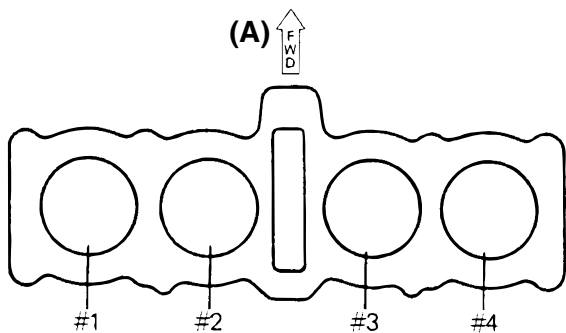
- Align the intake and exhaust valve lifter slots with each other.
- Install the tappet adjusting tool "1" between the camshaft and the valve lifter "2".



Tappet adjusting tool
90890-04110
Valve adjustment tool
YM-33966

NOTE:

Make sure the tappet adjusting tool touches only the valve lifter "2", not the valve pad "3".

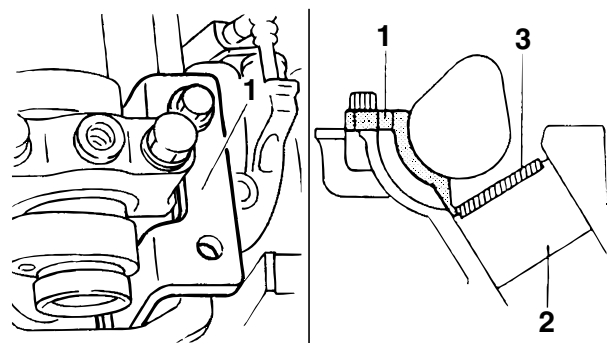
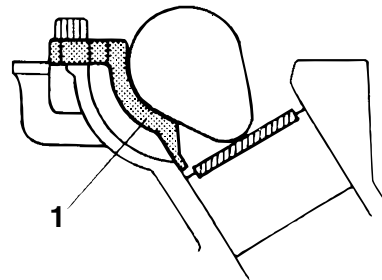


A. Front

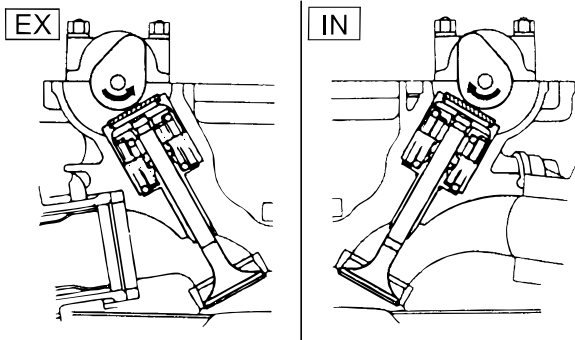
- To measure the valve clearances of the other cylinders, starting with cylinder #1 at TDC, turn the crankshaft counterclockwise as specified in the following table.

(a) →		0°	180°	360°	540°	720°
(b)	#1	(c)				
	#2		(c)			
	#3				(c)	
	#4			(c)		

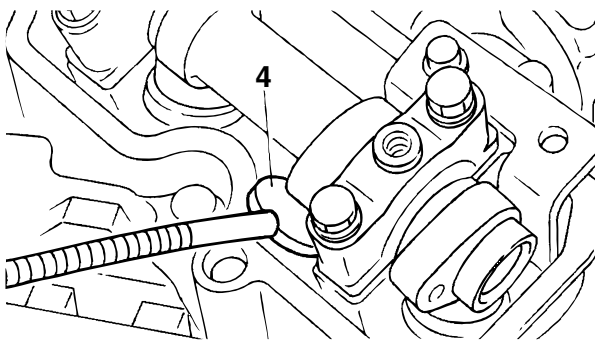
- Degrees that the crankshaft is turned counterclockwise
- Cylinder
- Combustion cycle



- Slowly turn the tappet adjusting tool so that the valve pad can be removed.



d. Remove the valve pad “4” from the valve lifter. For reassembly purposes, take note of the valve pad position and its number.

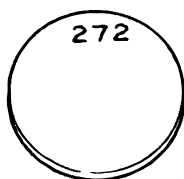


e. Select the proper valve pad from the following table.

Valve pad thickness range	No. 200–320
Available valve pads	2.00–3.20 mm (0.079–0.126 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

NOTE:

- The thickness of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.
- Since valve pads of various sizes are originally installed, the valve pad number must be rounded in order to reach the closest equivalent to the original.



f. Round off the original valve pad number according to the following table.

Last digit	Available valve pads
0 or 2	0
5	5
8	10

EXAMPLE:

When the valve pad installed was 248 (thickness 2.48 mm)

Applied number = 250

g. Locate the rounded number of the original valve pad and the measured valve clearance in the valve pad selection table. The point where the column and row intersect is the new valve pad number.

NOTE:

The new valve pad number is only an approximation. The valve clearance must be measured again and the above steps should be repeated if the measurement is still incorrect.

- h. Install a new valve pad with the numbered surface facing downward.
- i. Remove the tappet adjusting tool.
- j. Measure the valve clearance again.
- k. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.



4. Install:
- Timing plate cover
 - CYLINDER HEAD COVERS
Refer to “CAMSHAFTS” on page 5-5.
 - Spark plug
 - Air induction system
Refer to “AIR INDUCTION SYSTEM” on page 6-13.
 - Air scoop
 - OIL COOLER
Refer to “ENGINE REMOVAL” on page 5-1.

EAS20570

SYNCHRONIZING THE THROTTLE BODIES

NOTE:

Prior to synchronizing the throttle bodies, the valve clearance and engine idling speed should be properly adjusted and ignition timing should be checked.

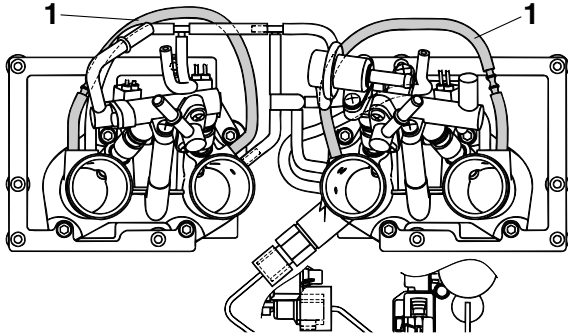
1. Stand the vehicle on a level surface.

NOTE:

Place the vehicle on the center stand.

2. Remove:

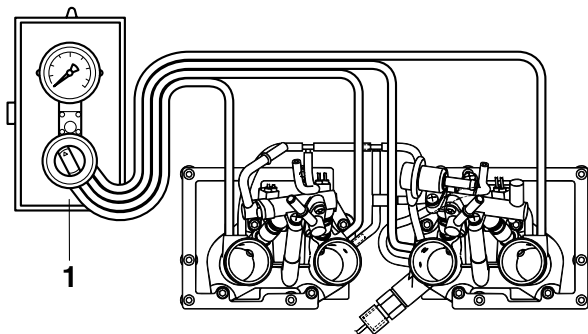
- FUEL TANK
- Refer to "FUEL TANK" on page 6-1.
- Vacuum hose "1"



3. Install:

- Vacuum gauge "1"
- (to vacuum hose in illustration)
- Digital tachometer
- (to high tension cord)

	<p>Vacuum gauge 90890-03094</p> <p>Carburetor synchronizer YU-44456</p> <p>Digital tachometer 90890-06760</p> <p>YU-39951-B</p>
--	---



4. Install the fuel tank.

NOTE:

Do not install the bolt at the rear of the fuel tank.

5. Start the engine and let it warm up for several minutes.

6. Check:

- Standard idling speed
- Refer to "CHECKING THE ENGINE IDLING SPEED" on page 3-9.

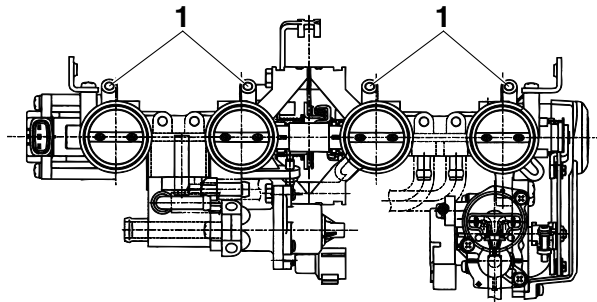
	<p>Engine idling speed 970–1170 r/min</p>
--	--

7. Adjust:

- SYNCHRONIZING THE THROTTLE BODIES



a. Take throttle body #3 as standard, and turn adjusting screw "1" so that throttle bodies #1 and #2 are adjusted to the same value.



NOTE:

- After each step, rev the engine two or three times, each time for less than a second, and check the throttle bodies.
 - When the adjusting screw has been removed, turn the screw fully, and then turn it out 3/4 turn.
- Then, synchronize the throttle bodies.

ECA14900

CAUTION:

Do not use the throttle valve adjusting screws to adjust the throttle body synchronization.

	<p>Intake vacuum 32.5 kPa (9.6 inHg) (244 mmHg)</p>
--	--

NOTE:

The pressure difference between 2 throttle bodies should not exceed 1.3 kPa(10 mmHg).



8. Check:


- Standard idling speed
- Pressure difference should be within the specified range.

9. Stop the engine and remove the fuel tank and measuring equipment.

10. Adjust:

- Throttle cable free play

Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” on page 3-9.

	<p>Throttle cable free play 3.0–5.0 mm (0.12–0.20 in)</p>
---	--

11. Install:

- FUEL TANK

Refer to “FUEL TANK” on page 6-1.

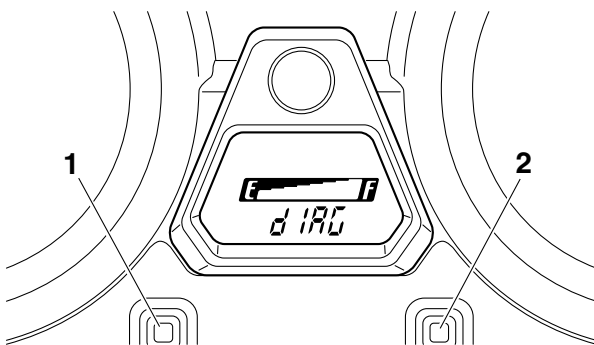
EAS20600

ADJUSTING THE EXHAUST GAS VOLUME

NOTE:

Be sure to set the CO density level to standard, and then adjust the exhaust gas volume.

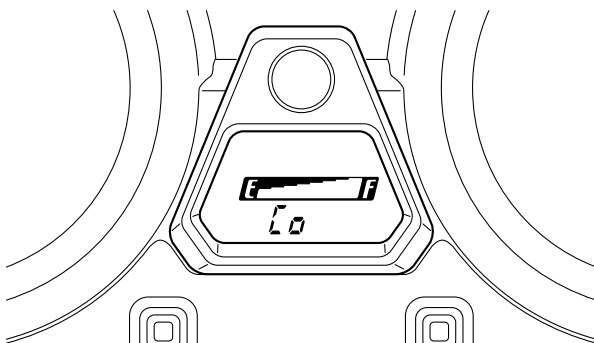
1. Turn the main switch to “OFF” and set the engine stop switch to “ON”.
2. Simultaneously press and hold the “SELECT” and “RESET” buttons, turn the main switch to “ON”, and continue to press the buttons for 8 seconds or more.



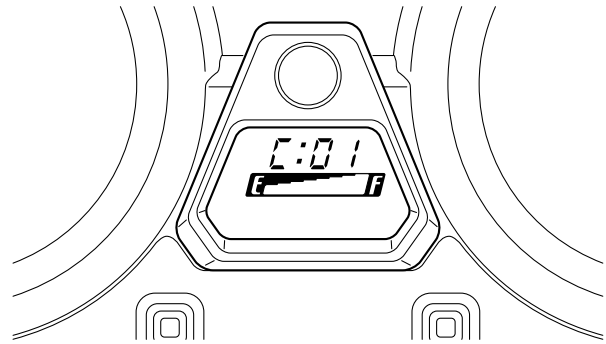
NOTE:

- All displays on the meter disappear except the clock and tripmeter displays.
- “dIAG” appears on the clock LCD.

3. Press the “SELECT” button to select the CO adjustment mode “CO”.



4. After selecting “CO”, press the SELECT and RESET buttons simultaneously for at least 2 seconds.
5. Press the “SELECT” and “RESET” buttons to select a cylinder.

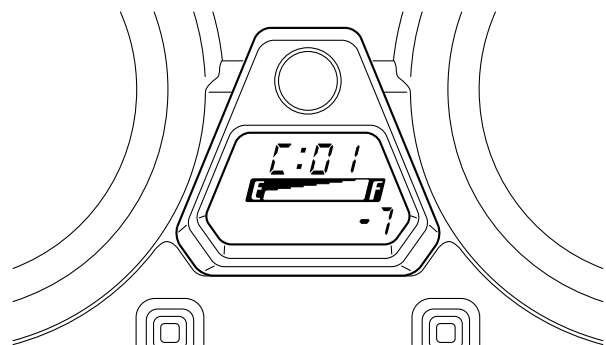


NOTE:

The selected cylinder number appears on the clock LCD.

- To decrease the selected cylinder number, press the “RESET” button.
- To increase the selected cylinder number, press the “SELECT” button.

6. After selecting the cylinder, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to execute the selection.



7. Change the CO adjustment volume by pressing the “SELECT” and “RESET” buttons.

NOTE:

The CO adjustment volume appears on the tripmeter LCD.

- To decrease the CO adjustment volume, press the RESET button.
- To increase the CO adjustment volume, press the SELECT button.

8. Release the switch to execute the selection.
9. Simultaneously press the “SELECT” and “RESET” buttons to return to the cylinder selection (step 5).
10. Turn the main switch to “OFF” to cancel the mode.


EAS20590

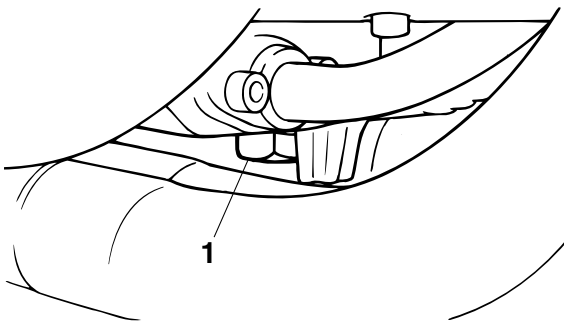
CHECKING THE ENGINE IDLING SPEED

NOTE:


Prior to checking the engine idling speed, the throttle body synchronization should be adjusted properly, the air filter element should be clean, and the engine should have adequate compression.

1. Start the engine and let it warm up until it reaches specified oil temperature.
2. Use a temperature probe tester "1" and contact it to the drain bolt thread.


	Oil temperature 85.0–95.0 °C (185.00–203.00 °F)
---	---



3. Install:
 - Digital tachometer (onto the spark plug lead of cylinder #1)

	Digital tachometer 90890-06760 YU-39951-B
---	--

4. Check:
 - Engine idling speed

	Engine idling speed 970–1170 r/min
---	--

NOTE:

Idling speed is not adjustable.

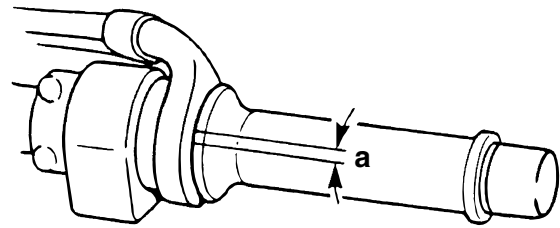
EAS20630

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE:

Prior to adjusting the throttle cable free play, the engine idling speed and throttle body synchronization should be adjusted properly.

1. Check:
 - Throttle cable free play "a"
Out of specification → Adjust.



Throttle cable free play
3.0–5.0 mm (0.12–0.20 in)

2. Adjust:
 - Throttle cable free play

NOTE:

Pull the cable to the acceleration side to accelerate.

Throttle body side

- a. Loosen the locknut "1" on the decelerator cable.
- b. Turn the adjusting nut "2" in direction "a" or "b" to take up any slack on the decelerator cable.
- c. Loosen the locknut "3" on the accelerator cable.
- d. Turn the adjusting nut "4" in direction "a" or "b" until the specified throttle cable free play is obtained.

Direction "a"

Throttle cable free play is increased.

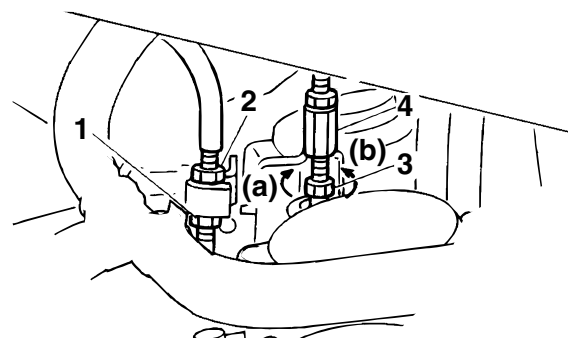
Direction "b"

Throttle cable free play is decreased.

- e. Tighten the locknuts "1", "3".

NOTE:

If the specified throttle cable free play cannot be obtained on the throttle body side of the cable, use the adjusting nut on the handlebar side.



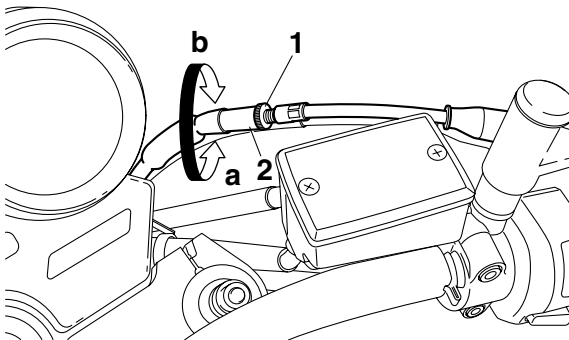


Handlebar side

- a. Loosen the locknut "1".
- b. Turn the adjusting nut "2" in direction "a" or "b" until the specified throttle cable free play is obtained.

Direction "a"
Throttle cable free play is increased.
Direction "b"
Throttle cable free play is decreased.

- c. Tighten the locknut "1".



EWA12920

WARNING

After adjusting the throttle cable free play, start the engine and turn the handlebar to the right and to the left to ensure that this does not cause the engine idling speed to change.



EAS20680

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Disconnect:
 - Spark plug cap
2. Remove:
 - Spark plug

ECA13320

CAUTION:

Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

3. Check:
 - Spark plug type
Incorrect → Change.

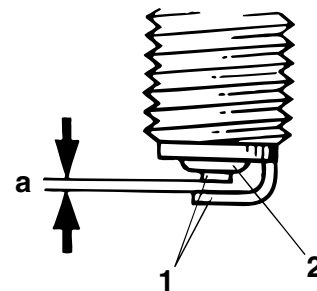


Manufacturer/model
NGK/DPR8EA-9

4. Check:
 - Electrode "1"
Damage/wear → Replace the spark plug.
 - Insulator "2"
Abnormal color → Replace the spark plug.
Normal color is medium-to-light tan.
5. Clean:
 - Spark plug
(with a spark plug cleaner or wire brush)
6. Measure:
 - Spark plug gap "a"
Out of specification → Regap.



Spark plug gap
0.8–0.9 mm (0.031–0.035 in)



377-000

7. Install:
 - Spark plug



Spark plug
18 Nm (1.8 m•kg, 13 ft•lb)


NOTE:

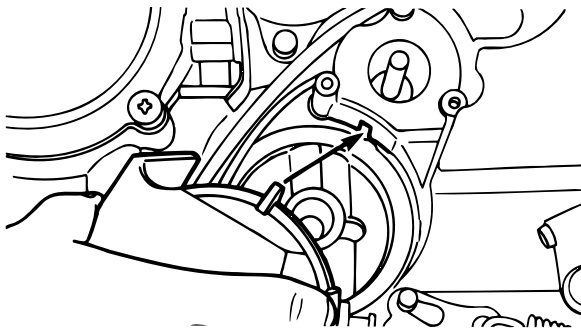
Before installing the spark plug, clean the spark plug and gasket surface.

- d. Install the new oil filter element, oil filter element cover and union bolt.


NOTE:

- Align the projection on the oil filter case with the slot in the crankcase, and install.
- Make sure the side stand switch lead does not get entangled.

	Oil filter element cover bolt 15 Nm (1.5 m•kg, 11 ft•lb)
---	---




- e. Install the oil filter drain screw and clutch push lever complete.


	Oil filter drain screw 7 Nm (0.7 m•kg, 5.1 ft•lb) Clutch push lever Comp. 10 Nm (1.0 m•kg, 7.2 ft•lb)
---	--



6. Install:
- Engine oil drain bolt (along with the gasket)
 - Oil filter element drain bolt (along with the gasket)

	Engine oil drain bolt 43 Nm (4.3 m•kg, 31 ft•lb)
---	---

7. Add the recommended engine oil to the proper level.
- Crankcase

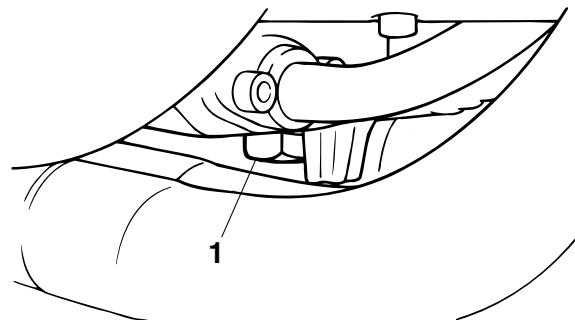
	Engine oil quantity Total amount 4.20 L (4.44 US qt) (3.70 Imp.qt) Without oil filter element replacement 2.80 L (2.96 US qt) (2.46 Imp.qt) With oil filter element replacement 3.15 L (3.33 US qt) (2.77 Imp.qt)
---	--

8. Install:
- O-ring **New**
 - Engine oil filler cap
9. Start the engine, warm it up for several minutes, and then turn it off.
10. Check:
- Engine (for engine oil leaks)
11. Check:
- Engine oil level
- Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-12.

EAS20820

MEASURING THE ENGINE OIL PRESSURE

1. Check:
- Engine oil level
Below the minimum level mark → Add the recommended engine oil to the proper level.
2. Install a pocket tester with temperature probe in the oil drain bolt "1".




3. Start the engine, warm it up for several minutes, and then turn it off.

ECA13410

CAUTION:

When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

	Oil temperature 85.0–95.0 °C (185.00–203.00 °F)
---	--

4. Remove:
- Main gallery bolt "1"

EWA12980

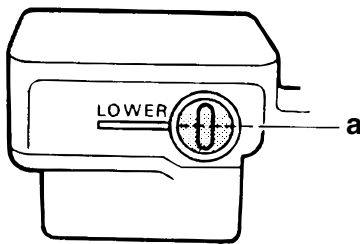
WARNING

The engine, muffler and engine oil are extremely hot.

NOTE: _____
Place the vehicle on a suitable stand.

2. Check:
- Clutch fluid level
Below the minimum level mark "a" → Add the recommended clutch fluid to the proper level.

	Specified clutch fluid DOT 4
---	---



346 012

EWA13370

⚠ WARNING _____

- Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.
- Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.
- When refilling, be careful that water does not enter the clutch fluid reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.

ECA13420

CAUTION: _____

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilled clutch fluid immediately.

NOTE: _____
In order to ensure a correct reading of the clutch fluid level, make sure the top of the reservoir is horizontal.

EAS20900

BLEEDING THE HYDRAULIC CLUTCH SYSTEM

EWA13000

⚠ WARNING _____

Bleed the hydraulic clutch system whenever:

- er:**
- the system was disassembled,
 - a clutch hose was loosened or removed,
 - the clutch fluid level is very low,
 - clutch operation is faulty.

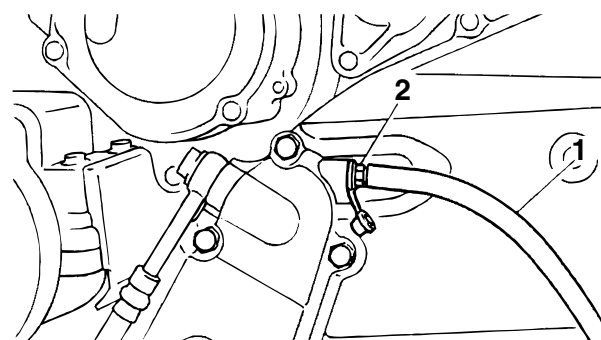
NOTE: _____

- Be careful not to spill any clutch fluid or allow the clutch master cylinder reservoir to overflow.
- When bleeding the hydraulic clutch system, make sure there is always enough clutch fluid before applying the clutch lever. Ignoring this precaution could allow air to enter the hydraulic clutch system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the clutch fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

1. Remove:
 - Crankcase cover (left)
Refer to "ENGINE REMOVAL" on page 5-1.
2. Bleed:
 - Hydraulic clutch system



- a. Add the recommended clutch fluid to the proper level.
- b. Install the clutch master cylinder reservoir diaphragm.
- c. Connect a clear plastic hose "1" tightly to the bleed screw "2", and place an oil pan under the vinyl hose end on one side.



- d. Place the other end of the hose into a container.
- e. Slowly squeeze the clutch lever several times.
- f. Fully squeeze the clutch lever without releasing it.
- g. Loosen the bleed screw. This will release the tension and cause the clutch lever to contact the handlebar grip.

- h. Tighten the bleed screw and then release the clutch lever.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the clutch fluid in the plastic hose.
- j. Tighten the bleed screw to specification.

	Bleed screw 6 Nm (0.6 m•kg, 4.3 ft•lb)
---	---

- k. Add the recommended clutch fluid to the proper level.
Refer to “CHECKING THE CLUTCH FLUID LEVEL” on page 3-15.

EWA13010

⚠ WARNING

After bleeding the hydraulic clutch system, check the clutch operation.

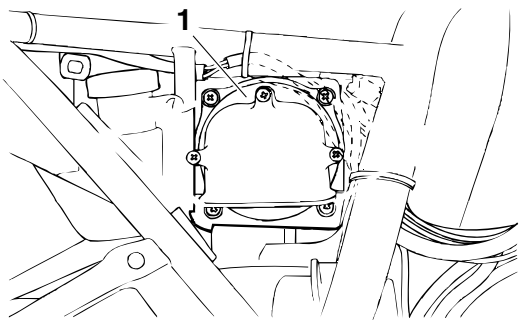


- 3. Install:
 - Crankcase cover (left)
Refer to “ENGINE REMOVAL” on page 5-1.

EAS20960

REPLACING THE AIR FILTER ELEMENT

- 1. Remove:
 - Side cover (right)
Refer to “GENERAL CHASSIS” on page 4-1.
 - Air filter case cover “1”
 - Air filter element



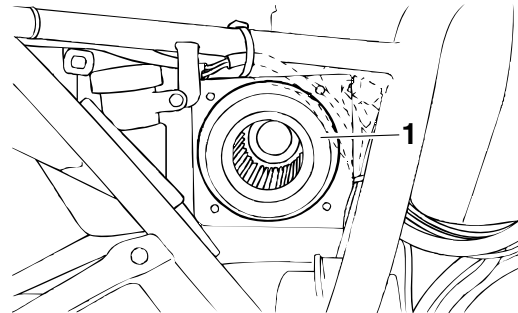
- 2. Check:
 - Air filter element
Damage → Replace.

NOTE:

- Replace the air filter element every 40000 km (24000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

- 3. Install:
 - Air filter element “1”
 - Air filter case cover

- Side cover (right)
Refer to “GENERAL CHASSIS” on page 4-1.



ECA14400

CAUTION:

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect the carburetor tuning, leading to poor engine performance and possible overheating.

NOTE:

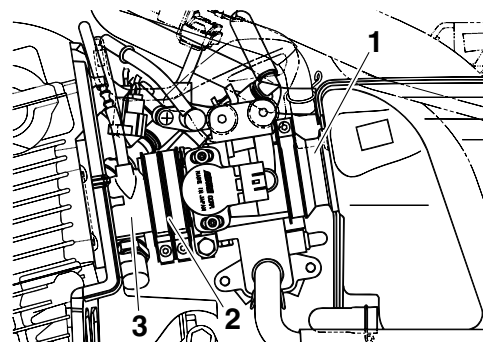
When installing the air filter element into the air filter case cover, make sure that the sealing surfaces are aligned to prevent any air leaks.

EAS21010

CHECKING THE THROTTLE BODY JOINT

The following procedure applies to all of the throttle body joints and intake manifolds.

- 1. Check:
 - Air filter case joints “1”
 - Throttle body joints “2”
 - Intake manifold “3”
Cracks/damage → Replace.



EAS21030

CHECKING THE FUEL LINE

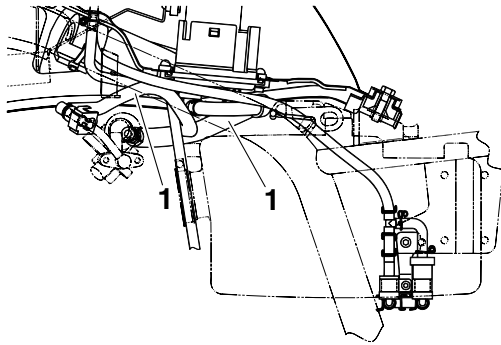
- 1. Remove:
 - Fuel tank
Refer to “FUEL TANK” on page 6-1.
- 2. Check:
 - Fuel hose “1”

Cracks/damage → Replace.
Loose connection → Connect properly.

ECA14940

CAUTION:

Make sure the fuel tank breather hose is routed correctly.



3. Install:
 - Fuel tank
Refer to “FUEL TANK” on page 6-1.

EAS21070

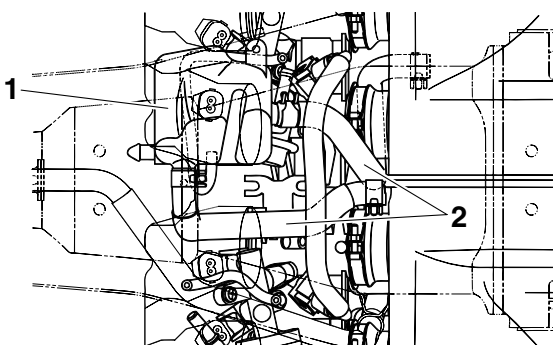
CHECKING THE CRANKCASE BREATHER HOSE

1. Remove:
 - Fuel tank
Refer to “FUEL TANK” on page 6-1.
2. Check:
 - Breather assembly “1”
 - Crankcase breather hose “2”
Cracks/damage → Replace.
Loose connection → Connect properly.

ECA13450

CAUTION:

Make sure the crankcase breather hose is routed correctly.



3. Install:
 - Fuel tank
Refer to “FUEL TANK” on page 6-1.

EAS21080

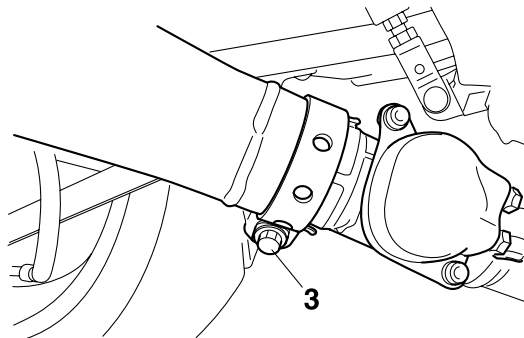
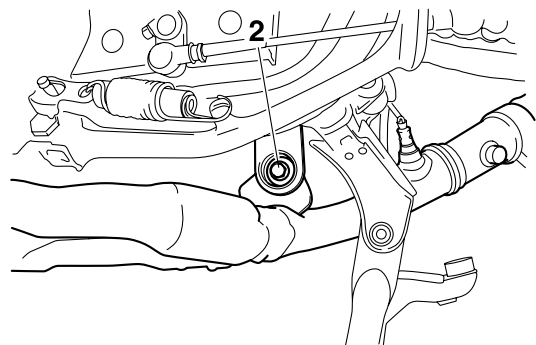
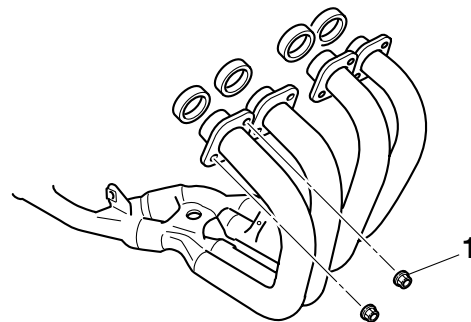
CHECKING THE EXHAUST SYSTEM

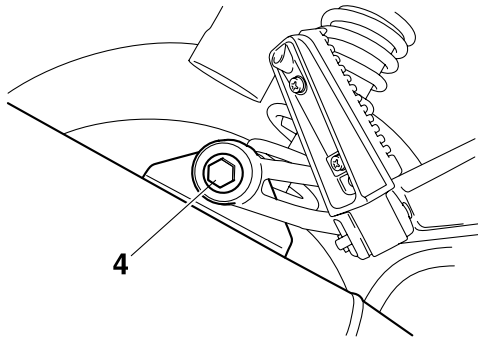
The following procedure applies to all of the exhaust pipes and gaskets.

1. Check:
 - Exhaust pipe
Cracks/damage → Replace.
 - Muffler
Exhaust gas leaks → Replace.
 - Gasket
Exhaust gas leaks → Replace.
2. Check:
 - Tightening torque



Exhaust pipe nut “1”
25 Nm (2.5 m•kg, 18 ft•lb)
Exhaust pipe bolt “2”
20 Nm (2.0 m•kg, 15 ft•lb)
Muffler joint bolt “3”
20 Nm (2.0 m•kg, 15 ft•lb)
Muffler bolt “4”
33 Nm (3.3 m•kg, 24 ft•lb)

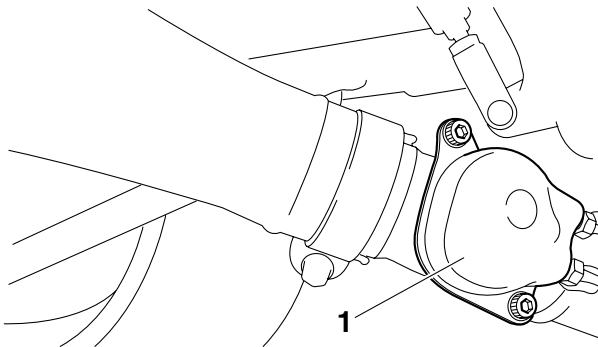




EAS21100

ADJUSTING THE EXUP CABLES

1. Remove:
 - EXUP valve pulley cover "1"



2. Check:
 - EXUP system operation

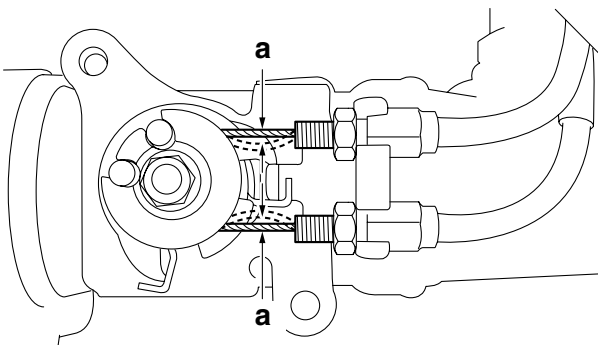
NOTE:

Check operation by self-diagnostics diagnosis mode No."53".
Refer to "FUEL INJECTION SYSTEM" on page 7-25.

3. Check:
 - EXUP cable free play (at the EXUP valve pulley) "a"



**Maximum EXUP cable free play
(at the EXUP valve pulley)
Within 1.5 mm (0.06 in)**

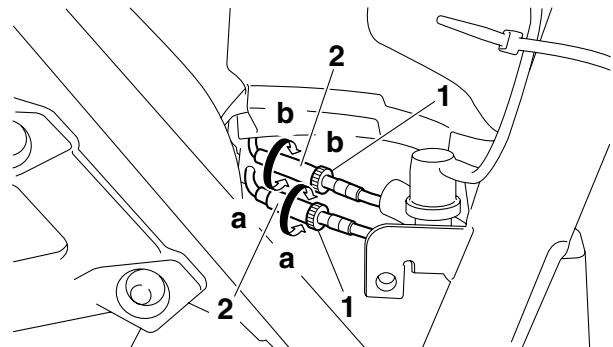


4. Adjust:
 - EXUP cable free play



- a. Turn the main switch to "ON".
- b. Check the EXUP pulley position.
- c. Remove right side cover
- d. Loosen both locknuts "1".
- e. Turn both adjusting bolts "2" to adjust free play in EXUP cable.

**Direction "a"
Increase EXUP cable free play
Direction "b"
Decrease EXUP cable free play**



- f. Install the right side cover



5. Install:
 - EXUP valve pulley cover

EAS21140

CHASSIS

EAS21160

ADJUSTING THE FRONT BRAKE

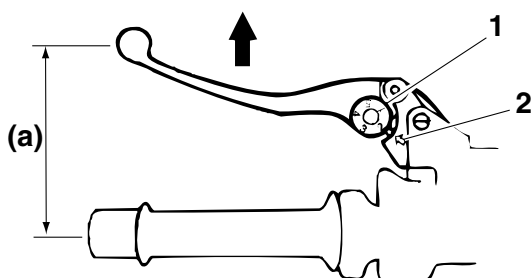
1. Adjust:

- Brake lever position
(distance “a” from the throttle grip to the brake lever)

NOTE:

- While pushing the clutch lever forward, turn the adjusting dial “1” until the clutch lever is in the desired position.
- Be sure to align the setting on the adjusting dial with the arrow mark “2” on the brake lever holder.

Position #1
Distance “a” is the largest.
Position #5
Distance “a” is the smallest.



EWA13050

WARNING

A soft or spongy feeling in the brake lever can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake system. Air in the brake system will considerably reduce braking performance.

ECA13490

CAUTION:

After adjusting the brake lever position, make sure there is no brake drag.

EAS21190

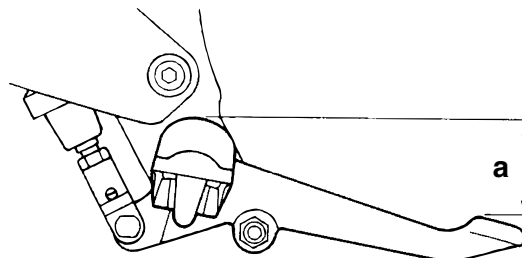
ADJUSTING THE REAR BRAKE

1. Check:

- Brake pedal position
(distance “a” from the top of the rider footrest to the top of the brake pedal)
Out of specification → Adjust.



Brake pedal position
40.0 mm (1.57 in)



2. Adjust:

- Brake pedal position



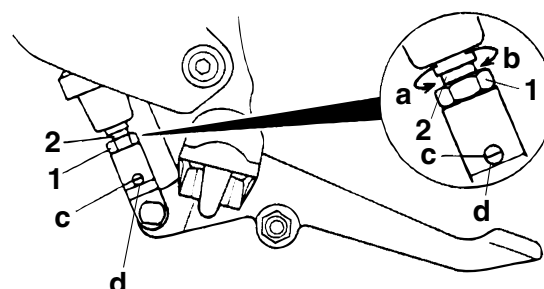
- Loosen the locknut “1”.
- Turn the adjusting bolt “2” in direction “a” or “b” until the specified brake pedal position is obtained.

Direction “a”
Brake pedal is lowered.
Direction “b”
Brake pedal is raised.

EWA13070

WARNING

After adjusting the brake pedal position, check that the end of the adjusting bolt “c” is visible through the hole “d”.



- Tighten the locknut “1” to specification.



Locknut
18 Nm (1.8 m•kg, 13 ft•lb)

EWA5UXB005

WARNING

A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake

system. Air in the brake system will considerably reduce braking performance and could result in loss of control and possibly an accident. Therefore, check and, if necessary, bleed the brake system.

ECA13510

CAUTION:

After adjusting the brake pedal position, make sure there is no brake drag.



3. Adjust:
- Rear brake light switch
Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-22.

EAS21240

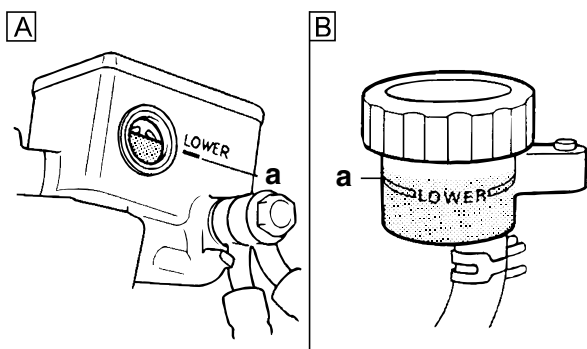
CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

NOTE:

- Place the vehicle on a center stand.
 - Make sure the vehicle is upright.
2. Check:
 - Brake fluid level
Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.

	Recommended fluid DOT 4
--	------------------------------------



A. Front brake
B. Rear brake

EWA13090

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reac-

tion, leading to poor brake performance.

- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

CAUTION:

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilled brake fluid immediately.

NOTE:

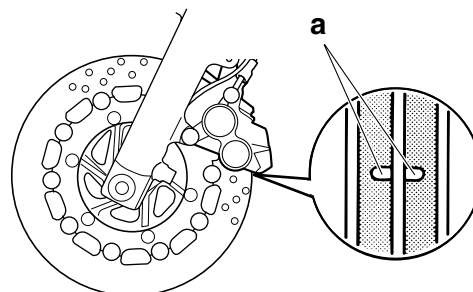
In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

EAS21250

CHECKING THE FRONT BRAKE PAD

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
 - Front brake pad
Wear indicators "a" almost touch the brake disc. → Replace the brake pads as a set.
Refer to "FRONT BRAKE" on page 4-14.

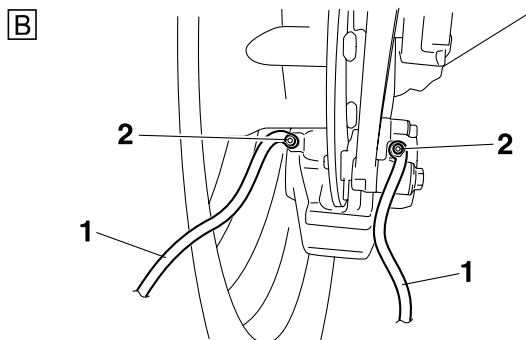
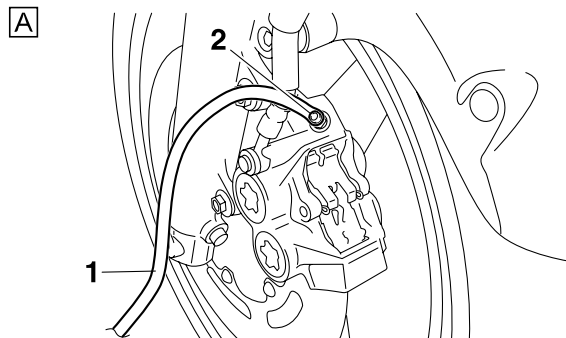
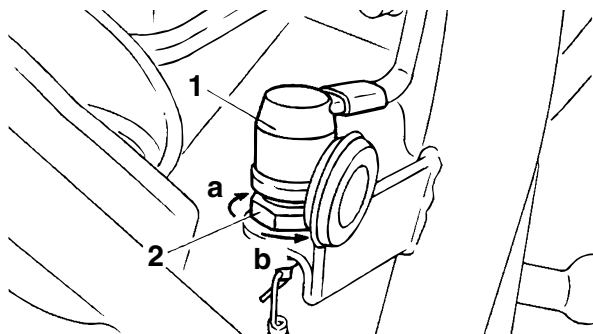


EAS21260

CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
 - Rear brake pad
Wear indicators "a" almost touch the brake disc. → Replace the brake pads as a set.
Refer to "REAR BRAKE" on page 4-27.



A. Front
B. Rear

EAS21350

BLEEDING THE HYDRAULIC BRAKE SYSTEM

EWA13100

WARNING

Bleed the hydraulic brake system whenever:

- the system is disassembled.
- a brake hose is loosened, disconnected or replaced.
- the brake fluid level is very low.
- brake operation is faulty.

NOTE:

- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir to overflow.
- When bleeding the hydraulic brake system, make sure there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic clutch system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

1. Bleed:
 - Hydraulic brake system

- a. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
- b. Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir). (Brake master cylinder reservoir or brake fluid reservoir)
- c. Connect a clear plastic hose “1” tightly to the bleed screw “2”, and place an oil pan under the vinyl hose end on one side.

- d. Place the other end of the hose into a container.
- e. Slowly apply the brake several times.
- f. Fully pull the brake lever or fully press down the brake pedal and hold it in position.
- g. Loosen the bleed screw.

NOTE:

Loosening the bleed screw will release the pressure and cause the brake lever to contact the throttle grip or the brake pedal to fully extend.

- h. Tighten the bleed screw and then release the brake lever or brake pedal.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Tighten the bleed screw to specification.



Bleed screw
6 Nm (0.6 m•kg, 4.3 ft•lb)

- k. Fill the brake fluid reservoir to the proper level with the recommended brake fluid. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-21.

EWA13110

WARNING

After bleeding the hydraulic brake system, check the brake operation.

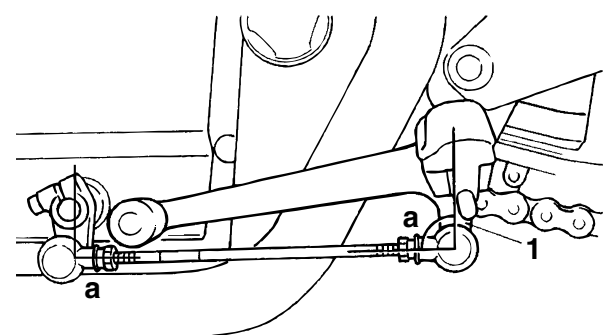
EAS21380

ADJUSTING THE SHIFT PEDAL

NOTE:

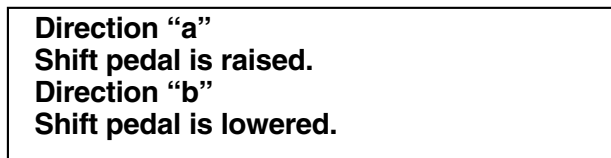
The shift pedal position is determined by the installed shift rod length "a".

1. Measure:
 - Installed shift rod angle "a"
 Incorrect → Adjust.

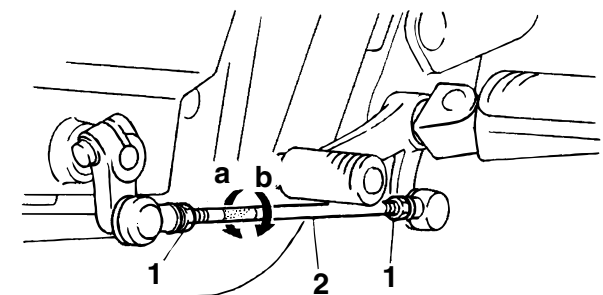


2. Adjust:
 - Installed shift rod angle

- a. Loosen both locknuts "1".
- b. Turn the shift rod "2" in direction "a" or "b" to obtain the correct shift pedal position.



Direction "a"
Shift pedal is raised.
Direction "b"
Shift pedal is lowered.



- c. Tighten both locknuts.
- d. Make sure the installed shift rod angle is within specification.

EAS21390

ADJUSTING THE DRIVE CHAIN SLACK

NOTE:

The drive chain slack must be checked at the tightest point on the chain.

ECA13550

CAUTION:

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swing-arm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

1. Stand the vehicle on a level surface.

EWA13120

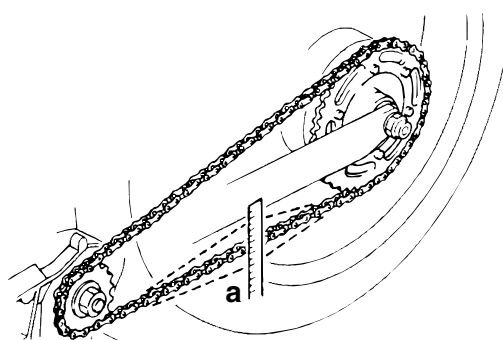
WARNING

Securely support the vehicle so that there is no danger of it falling over.

NOTE:

Both wheels should be on the ground without a rider on the vehicle.

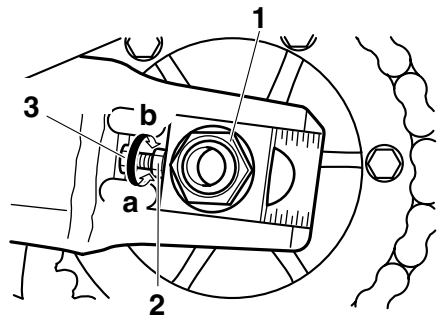
2. Move the rear wheel several times and find the tightest position of drive chain.
3. Check:
 - Drive chain slack "a"
 Out of specification → Adjust.



4. Loosen:
 - Wheel axle nut "1"
5. Adjust:
 - Drive chain slack


- a. Loosen both locknuts "2".
- b. Turn both adjusting nuts "3" in direction "a" or "b" until the specified drive chain slack is obtained.

Direction "a"
Drive chain is tightened.
Direction "b"
Drive chain is loosened.




- NOTE:**
- To maintain the proper wheel alignment, adjust both sides evenly.
 - Push the rear wheel forward to make sure there is no clearance between the swingarm end plates and the ends of the swingarm.

c. Tighten the locknut to specification.

	Locknut 16 Nm (1.6 m•kg, 12 ft•lb)
---	---


d. Tighten the wheel axle nut to specification.

	Wheel axle nut 150 Nm (15.0 m•kg, 109 ft•lb)
---	---

EAS21440
LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out quickly. Therefore, the drive chain should be serviced, especially when the vehicle is used in dusty areas.

This vehicle has a drive chain with small rubber O-rings between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings. Use only kerosene to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with chain lubricant that is suitable for O-ring chains.

	Recommended lubricant Engine oil or chain lubricant suitable for O-ring chains
---	---

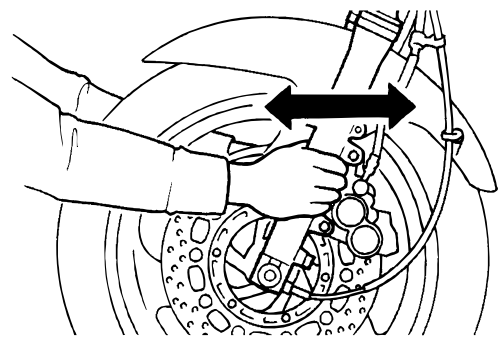
EAS21510
CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120
WARNING
Securely support the vehicle so that there is no danger of it falling over.

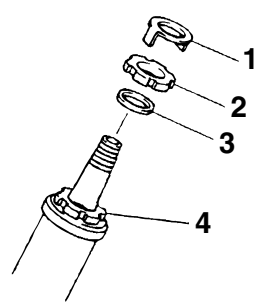
NOTE:
 Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Check:
- **Steering head**
 Grasp the bottom of the front fork legs and gently rock the front fork.
 Binding/looseness → Adjust the steering head.



3. Remove:
- **Handlebar**
 Refer to "HANDLEBAR" on page 4-38.
 - **Upper bracket**
 Refer to "STEERING HEAD" on page 4-50.
4. Adjust:
- **Steering head**

a. Remove the lock washer "1", the upper ring nut "2", and the rubber washer "3".



b. Loosen the lower ring nut "4" and then tighten it to specification with a steering nut wrench "5".

NOTE:

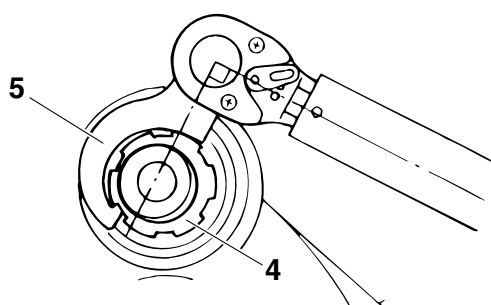
Set the torque wrench at a right angle to the steering nut wrench.



Steering nut wrench
90890-01403
Spanner wrench
YU-33975



Lower ring nut (initial tightening torque)
52 Nm (5.2 m•kg, 38 ft•lb)



- c. Loosen the lower ring nut “4” completely, then tighten it to specification.
- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.

Refer to “STEERING HEAD” on page 4-50.

EWA13140



WARNING

Do not overtighten the lower ring nut.

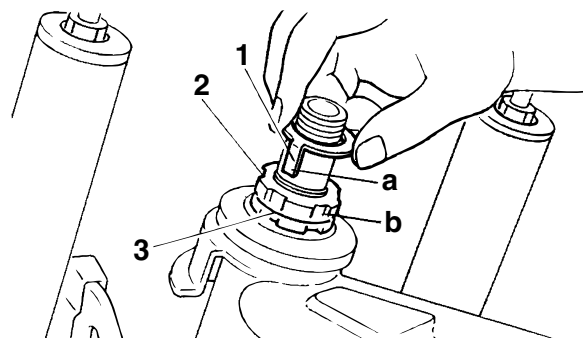


Lower ring nut (final tightening torque)
18 Nm (1.8 m•kg, 13 ft•lb)

- e. Install the rubber washer “3”.
- f. Install the upper ring nut “2”.
- g. Finger tighten the upper ring nut “2”, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer “1”.

NOTE:

Make sure the lock washer “1” tabs “a” sit correctly in the ring nut slots “b”.



5. Install:
 - Upper bracket
Refer to “STEERING HEAD” on page 4-50.
 - Handlebar
Refer to “HANDLEBAR” on page 4-38.

EAS21530

CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

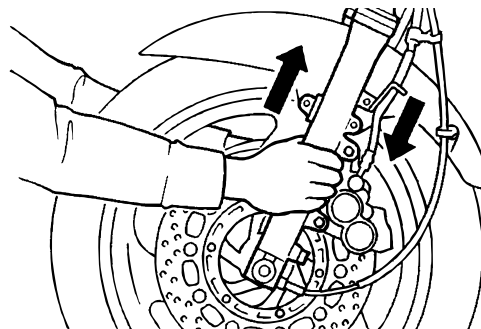
EWA13120



WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Check:
 - Inner tube
Damage/scratches → Replace.
 - Oil seal
Oil leakage → Replace.
3. Hold the vehicle upright and apply the front brake.
4. Check:
 - Front fork operation
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
Rough movement → Repair.
Refer to “FRONT FORK” on page 4-41.



EAS21580

ADJUSTING THE FRONT FORKS

The following procedure applies to both of the front fork legs.

EWA13150

WARNING

- Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.
- Securely support the motorcycle so that there is no danger of it falling over.

Spring preload

ECA13570

CAUTION:

- Grooves are provided to indicate the adjustment position.
- Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Spring preload


- a. Turn the adjusting bolt "1" in direction "a" or "b".

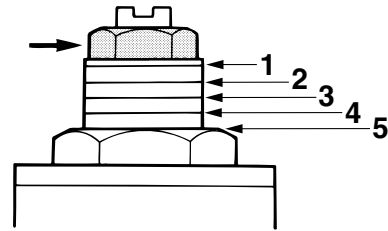
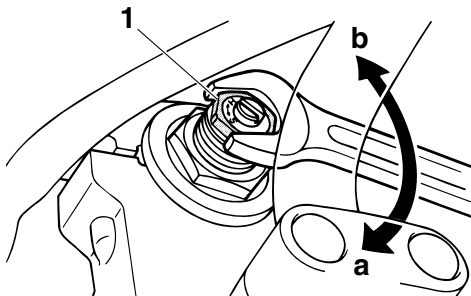
Direction "a"

Spring preload is increased (suspension is harder).

Direction "b"

Spring preload is decreased (suspension is softer).

	Spring preload
	Minimum (soft)
	8
	Standard
	5
	Maximum (hard)
	1



Rebound damping

ECA13590

CAUTION:

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Rebound damping


- a. Turn the adjusting screw "1" in direction "a" or "b".

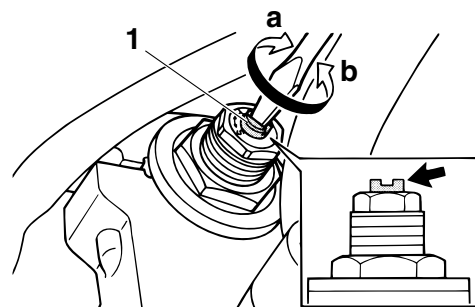
Direction "a"

Rebound damping is increased (suspension is harder).

Direction "b"

Rebound damping is decreased (suspension is softer).

	Rebound damping
	Maximum (hard)
	1 click(s) out*
	Standard
	5 click(s) out*
	Minimum (soft)
	10 click(s) out*
	*With the adjusting screw fully turned in





Compression damping

ECA13590

CAUTION: _____


Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Compression damping

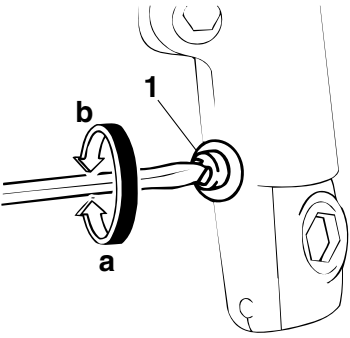


- a. Turn the adjusting screw "1" in direction "a" or "b".

Direction "a"
 Compression damping is increased (suspension is harder).
Direction "b"
 Compression damping is decreased (suspension is softer).



Compression damping
 Maximum (hard)
 1 click(s) out*
 Standard
 6 click(s) out*
 Minimum (soft)
 13 click(s) out*
 *With the adjusting screw fully turned in



ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

The following procedure applies to both of the rear shock absorber assemblies.

EWA13170

WARNING _____

- Securely support the motorcycle so that

there is no danger of it falling over.

- Always adjust both rear shock absorber assemblies evenly. Uneven adjustment can result in poor handling and loss of stability.

Spring preload

ECA13590

CAUTION: _____


Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Spring preload

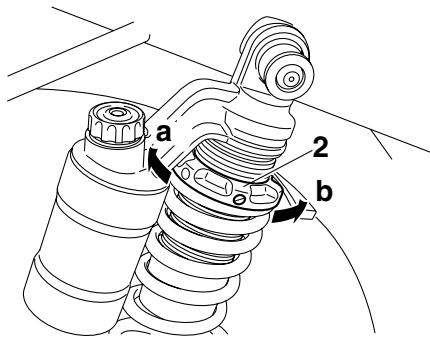
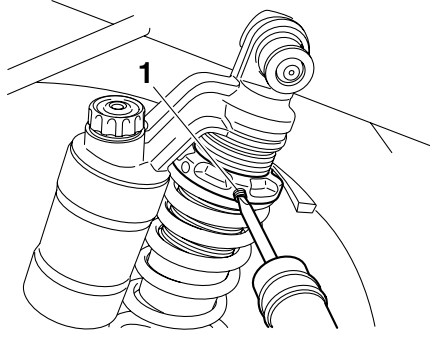


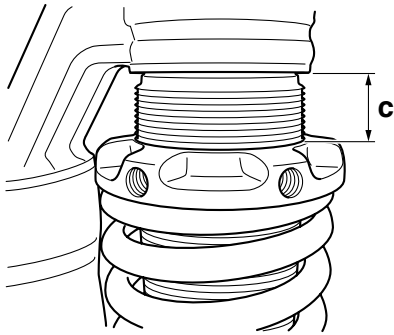
- a. Loosen the lock screw "1" by 1/2 turn.
- b. Insert a screwdriver into the hole in the spring seat.
- c. Turn the spring seat "2" in direction "a" or "b".

Direction "a"
 Spring preload is increased (suspension is harder).
Direction "b"
 Spring preload is decreased (suspension is softer).




Spring preload
 Minimum (soft)
 Distance "c" = 0 mm (0 in)
 Standard
 Distance "c" = 17 mm (0.67 in)
 Maximum (hard)
 Distance "c" = 28 mm (1.10 in)





d. Tighten the bleed screw.

	Lock screw 0.1 Nm (0.01 m•kg, 0.07 ft•lb)
---	--

ECA5UXB004

CAUTION: _____

- Do not strike to insert with unreasonable force a flat head screwdriver in the spring seat adjustment hole.
- The spring seat is made of plastic is can be easily damaged.
- Do not over-tighten the lock screw.
- The lock screw is made of plastic. Take care, therefore, to avoid damaging the head.



Rebound damping

ECA13590

CAUTION: _____


Never go beyond the maximum or minimum adjustment positions.

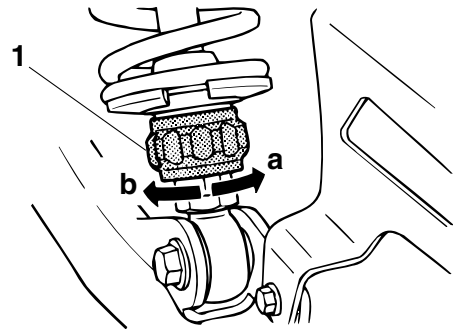
1. Adjust:
 - Rebound damping



- a. Turn the adjusting knob "1" in direction "a" or "b".

Direction "a" Rebound damping is increased (suspension is harder). Direction "b" Rebound damping is decreased (suspension is softer).
--

	Rebound damping Minimum (soft) 36 click(s) out* Standard 10 click(s) out* Maximum (hard) 1 click(s) out* *With the adjusting knob fully turned in
---	---



Compression damping

ECA13590

CAUTION: _____


Never go beyond the maximum or minimum adjustment positions.

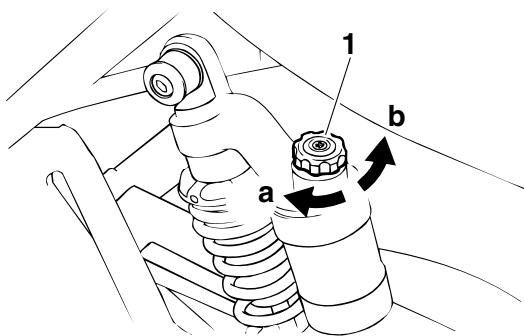
1. Adjust:
 - Compression damping



- a. Turn the adjusting knob "1" in direction "a" or "b".

Direction "a" Compression damping is increased (suspension is harder). Direction "b" Compression damping is decreased (suspension is softer).
--

	Compression damping Minimum (soft) 20 click(s) out* Standard 16 click(s) out* Maximum (hard) 1 click(s) out* *With the adjusting knob fully turned in
---	---

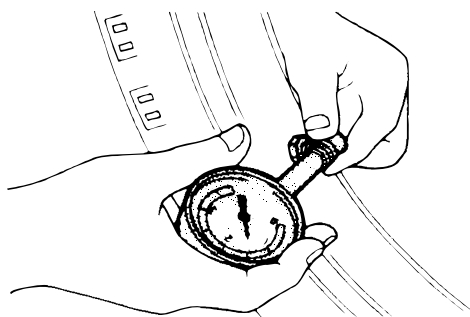


EAS21660

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:
 - Tire pressure
Out of specification → Regulate.



EWA13180

⚠ WARNING

- The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
- The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
- Operation of an overloaded vehicle could cause tire damage, an accident or an injury. **NEVER OVERLOAD THE VEHICLE.**



Tire air pressure (measured on cold tires)

Loading condition
0–90 kg (0–198 lb)

Front
250 kPa (36 psi) (2.50 kgf/cm²)
(2.50 bar)

Rear
250 kPa (36 psi) (2.50 kgf/cm²)
(2.50 bar)

Loading condition
90–205 kg (198–452 lb)

Front
250 kPa (36 psi) (2.50 kgf/cm²)
(2.50 bar)

Rear
290 kPa (42 psi) (2.90 kgf/cm²)
(2.90 bar)

High-speed riding

Front
250 kPa (36 psi) (2.50 kgf/cm²)
(2.50 bar)

Rear
290 kPa (42 psi) (2.90 kgf/cm²)
(2.90 bar)

Maximum load
205 kg (452 lb)

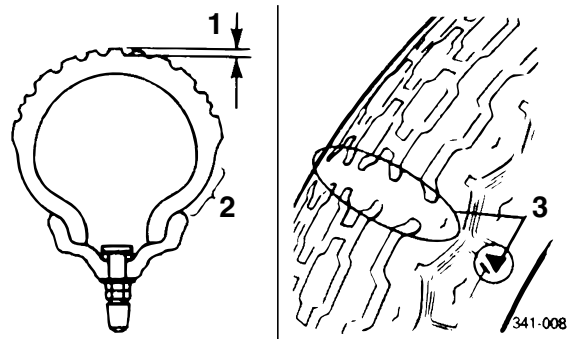
* Total weight of rider, passenger, cargo and accessories

EWA13190


⚠ WARNING

It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.

2. Check:
 - Tire surfaces
Damage/wear → Replace the tire.



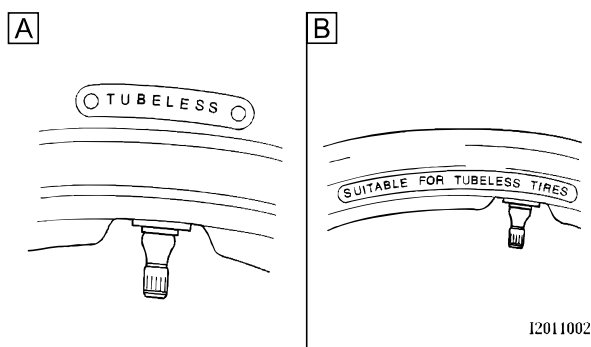
1. Tire tread depth
2. Sidewall
3. Wear indicator

	Wear limit (front)
	1.6 mm (0.06 in)
	Wear limit (rear)
	1.6 mm (0.06 in)

EWA14080

WARNING

- Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.
- When using a tube tire, be sure to install the correct tube.
- Always replace a new tube tire and a new tube as a set.
- To avoid pinching the tube, make sure the wheel rim band and tube are centered in the wheel groove.
- Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.



12011002


- A. Tire(s)
B. Wheel(s)


Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

EWA14090

WARNING

After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this vehicle.

	Front tire
	Size
	120/70 ZR17M/C (58W)
	Manufacturer/model
	DUNLOP/D252F L

	Rear tire
	Size
	180/55 ZR17M/C (73W)
	Manufacturer/model
	DUNLOP/D252 L

EWA5UXB003

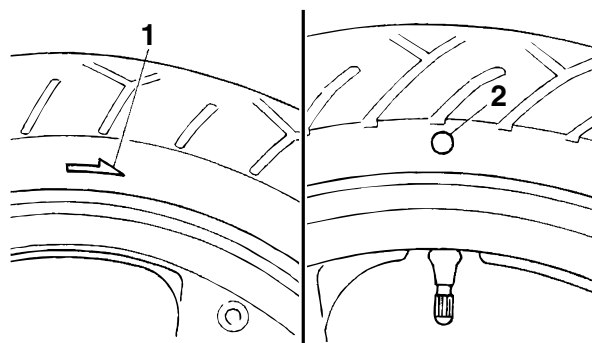
WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Failure to do so could lead to an accident with possible injury to the rider or damage to the motorcycle.

NOTE:

For tires with a direction of rotation mark "1":

- Install the tire with the mark pointing in the direction of wheel rotation.
- Align the mark "2" with the valve installation point.



EAS21670

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

1. Check:
 - Wheel
Damage/out-of-round → Replace.

EWA13260

WARNING

Never attempt to make any repairs to the wheel.

NOTE:

After a tire or wheel has been changed or replaced, always balance the wheel.

EAS21690

CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the inner and outer cables.

EWA13270

WARNING

Damaged outer cable may cause the cable to corrode and interfere with its movement. Replace damaged outer cable and inner cables as soon as possible.

1. Check:
 - Outer cable
Damage → Replace.
2. Check:
 - Cable operation
Rough movement → Lubricate.

	Recommended lubricant Engine oil or a suitable cable lubricant
---	---

NOTE:

Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.

EAS21700

LUBRICATING THE LEVERS

Lubricate the pivoting point and metal-to-metal moving parts of the levers.

	Recommended lubricant Lithium-soap-based grease
---	--

EAS21710

LUBRICATING THE PEDAL

Lubricate the pivoting point and metal-to-metal moving parts of the pedal.

	Recommended lubricant Lithium-soap-based grease
---	--

EAS21720

LUBRICATING THE SIDESTAND

Lubricate the pivoting point and metal-to-metal moving parts of the sidestand.

	Recommended lubricant Lithium-soap-based grease
---	--

EAS21730

LUBRICATING THE CENTER STAND

Lubricate the pivoting point and metal-to-metal moving parts of the mainstand.

	Recommended lubricant Lithium-soap-based grease
---	--

EAS21740

LUBRICATING THE REAR SUSPENSION

Lubricate the pivoting point and metal-to-metal moving parts of the rear suspension.

	Recommended lubricant Molybdenum disulfide grease
---	--

EAS21750

ELECTRICAL SYSTEM

EAS21760

CHECKING AND CHARGING THE BATTERY

Refer to “ELECTRICAL COMPONENTS” on page 7-79.

EAS21770

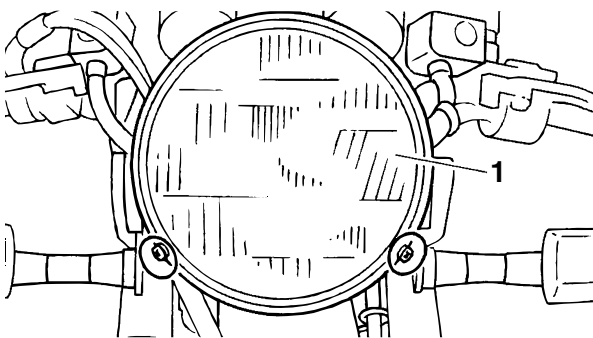
CHECKING THE FUSES

Refer to “ELECTRICAL COMPONENTS” on page 7-79.

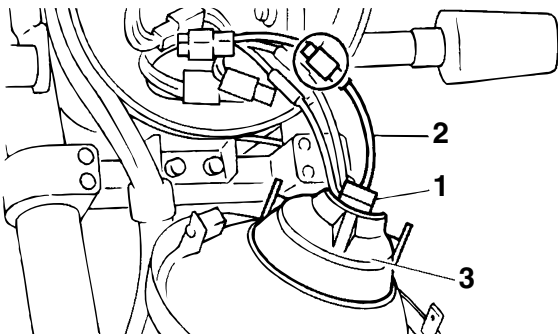
EAS21780

REPLACING THE HEADLIGHT BULB

1. Disconnect:
 - Headlight unit “1”



2. Remove:
 - Headlight bulb holder cover “1”
 - Ground lead “2”
 - Headlight cover “3”

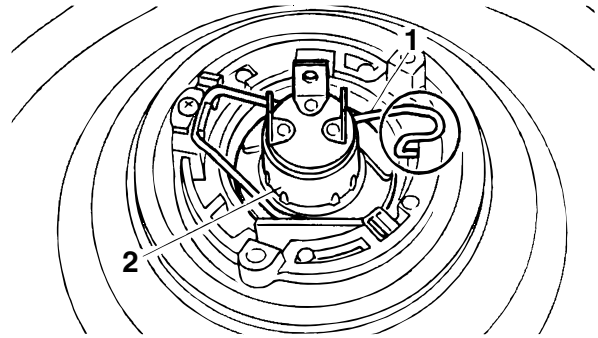


3. Remove:
 - Headlight bulb holder “1”
 - Headlight bulb “2”

EWA13320

⚠ WARNING

Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.



4. Install:
 - Headlight bulb **New**

Secure the new headlight bulb with the headlight bulb holder.

ECA13690

CAUTION:

Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

5. Install:
 - Headlight bulb holder
 - Headlight coupler
 - Ground lead
 - Headlight bulb holder cover
 - Headlight unit

EAS21800

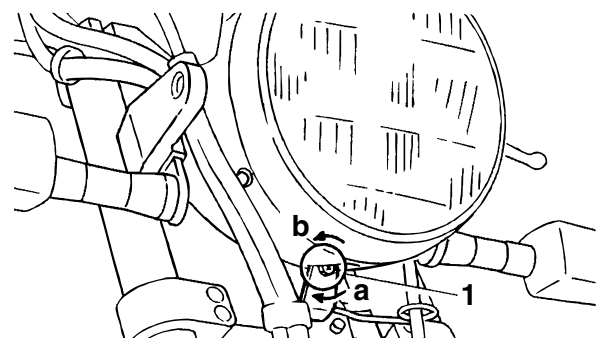
ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
 - Headlight beam (vertically)



- a. Turn the adjusting screw “1” in direction “a” or “b”.

Direction “a”
Headlight beam is raised.
Direction “b”
Headlight beam is lowered.



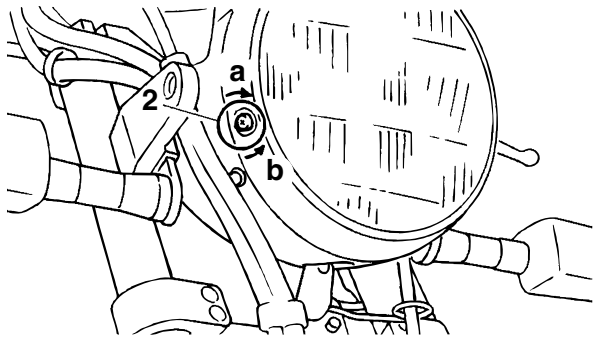


2. Adjust:
- Headlight beam (horizontally)



- a. Turn the adjusting screw "2" in direction "a" or "b".

Direction "a"
Headlight beam moves to the right.
Direction "b"
Headlight beam moves to the left.



CHASSIS

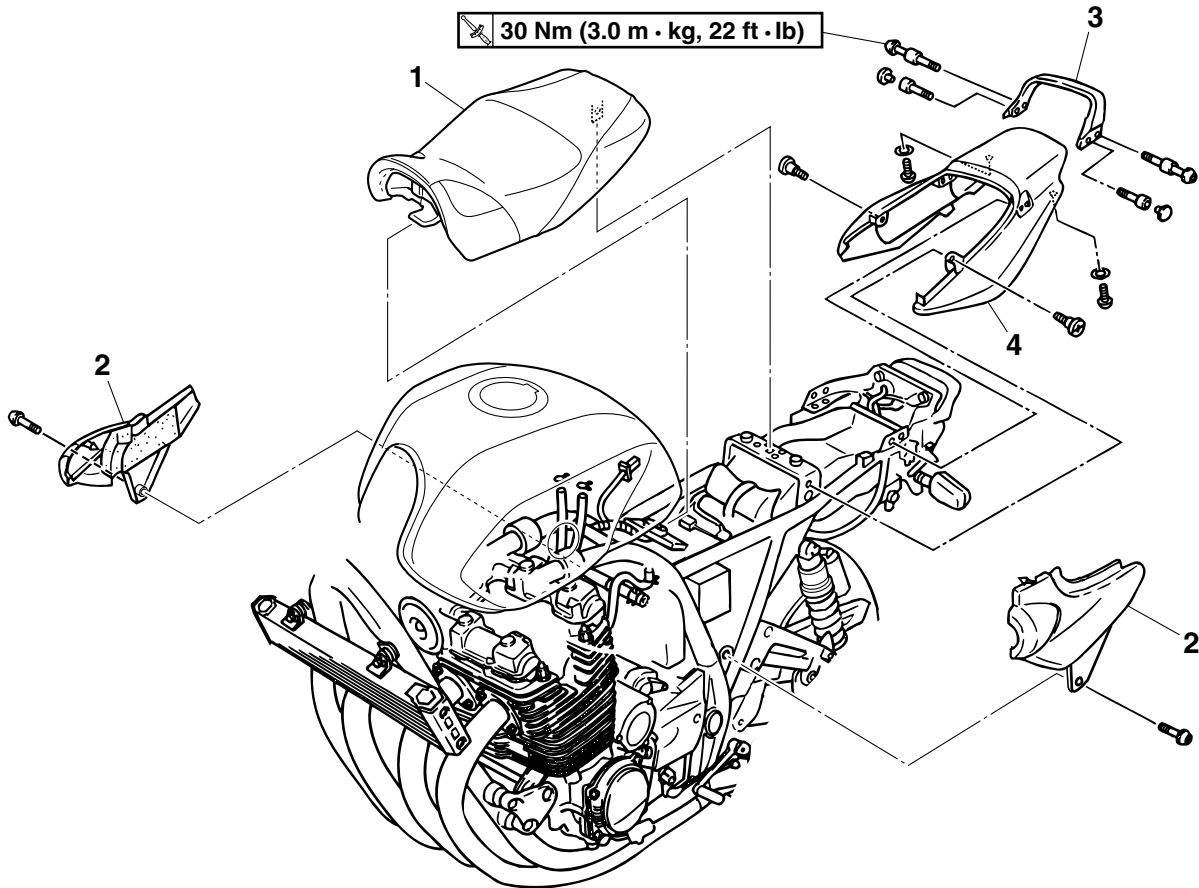
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EAS21830

GENERAL CHASSIS

Removing the passenger seat and side cover



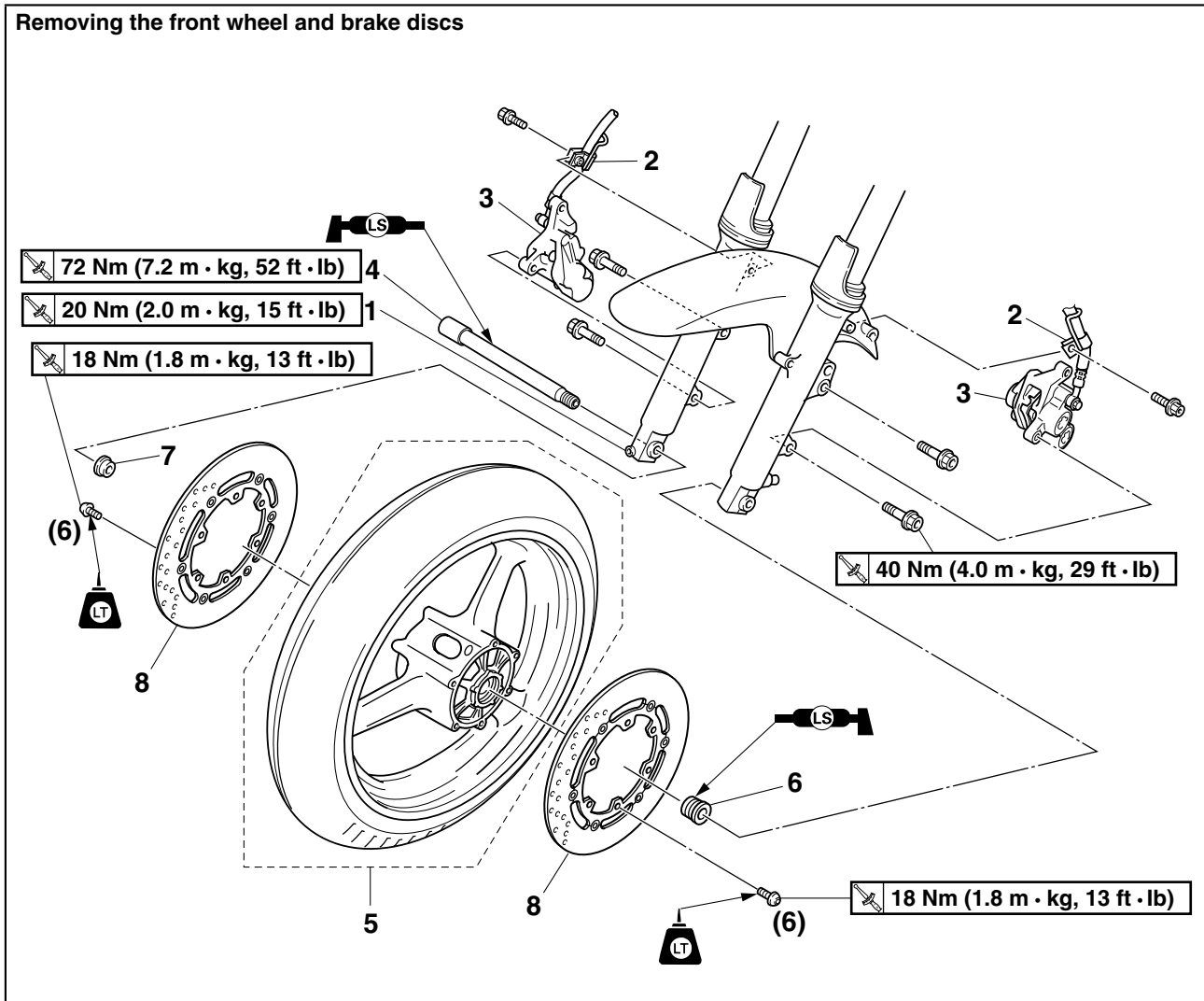
Order	Job/Parts to remove	Q'ty	Remarks
1	Seat	1	
2	Side cover (left/right)	1/1	
3	Grab bar	1	
4	Rear fender cover	1	
			For installation, reverse the removal procedure.

FRONT WHEEL

EAS21870

FRONT WHEEL

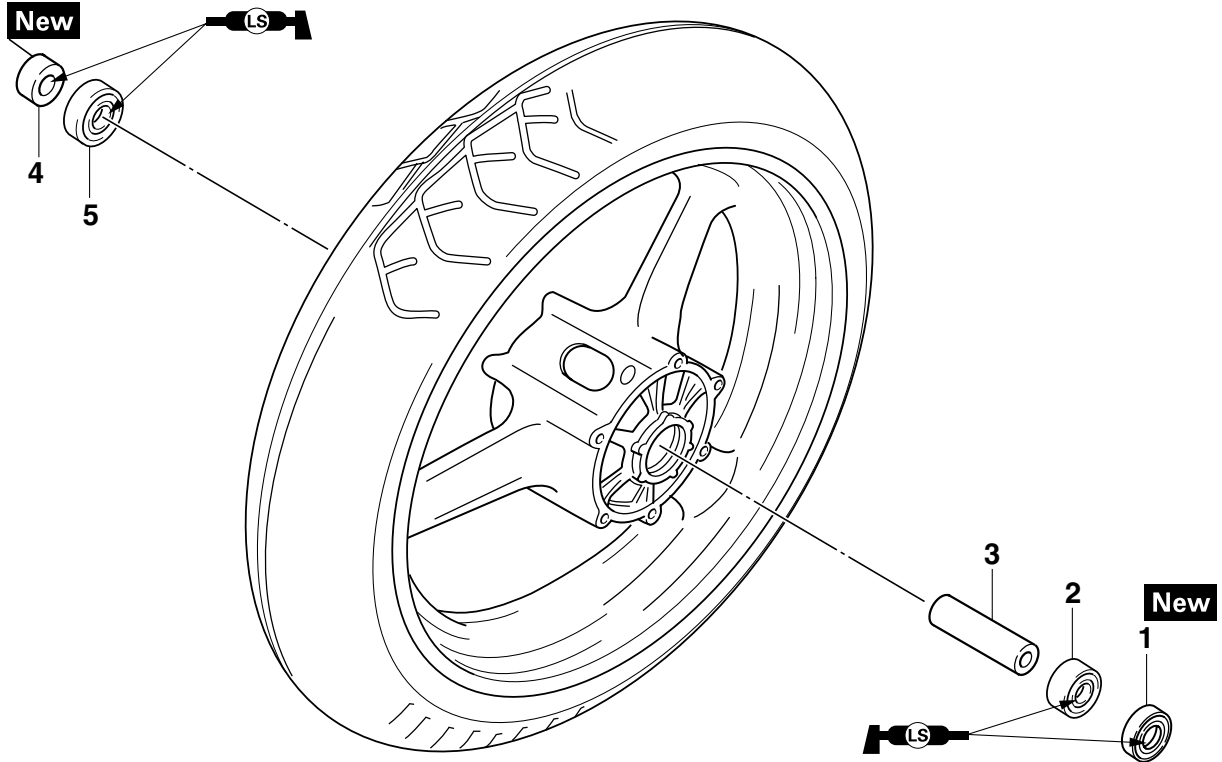
Removing the front wheel and brake discs



Order	Job/Parts to remove	Q'ty	Remarks
			NOTE: Use a suitable stand to raise the front wheel off the ground.
1	Wheel axle pinch bolt	1	Loosen
2	Brake hose holder (left/right)	1/1	
3	Front brake caliper left/right	1/1	
4	Wheel axle	1	
5	Front wheel assembly	1	
6	Spacer	1	
7	Collar	1	
8	Brake disc (left/right)	1/1	
			For installation, reverse the removal procedure.

FRONT WHEEL

Disassembling the front wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	1	
2	Bearing	1	
3	Spacer	1	
4	Oil seal	1	
5	Bearing	1	
			For assembly, reverse the disassembly procedure.

FRONT WHEEL

EAS21900

REMOVING THE FRONT WHEEL

1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

NOTE:

Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Remove:
 - Left brake caliper
 - Right brake caliper

NOTE:

Do not apply the brake lever when removing the brake calipers.

3. Elevate:
 - Front wheel

NOTE:

Place the vehicle on a suitable stand so that the front wheel is elevated.

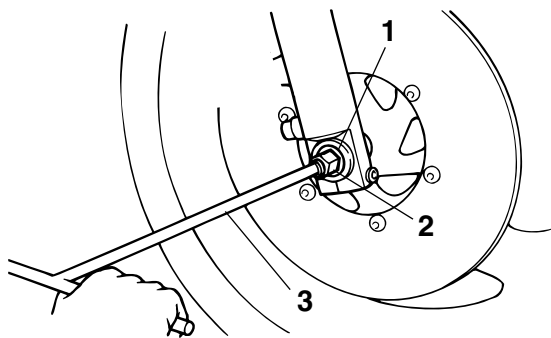
4. Remove:
 - Front wheel axle "1"

NOTE:

Remove the front wheel axle using a 19 mm hexagonal wrench "2" and T handle "3".



T-handle
90890-01326
T-handle 3/8" drive 60 cm long
YM-01326



EAS21910

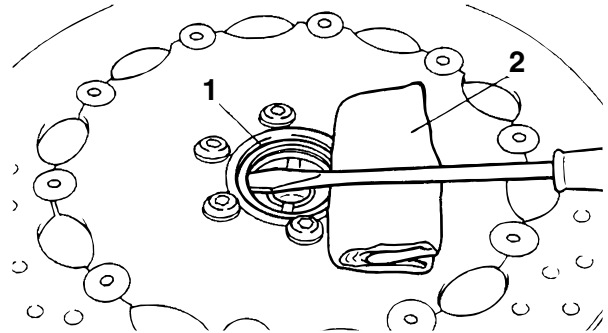
DISASSEMBLING THE FRONT WHEEL

1. Remove:
 - Oil seals
 - Wheel bearings

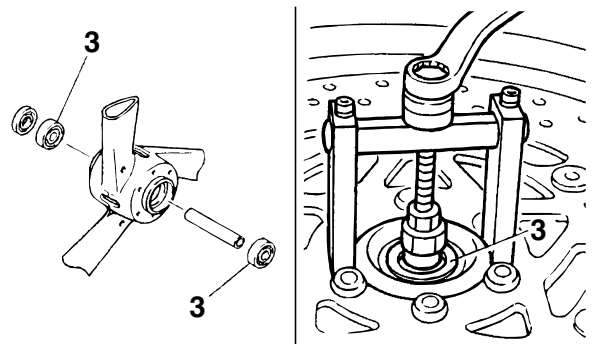
- a. Clean the outside of the front wheel hub.
- b. Remove the oil seals "1" with a flathead screwdriver.

NOTE:

To prevent damaging the wheel, place a rag "2" between the screwdriver and the wheel surface.



- c. Remove the wheel bearings "3" with a general bearing puller.



EAS21920

CHECKING THE FRONT WHEEL

1. Check:
 - Wheel axle
 Roll the wheel axle on a flat surface.
 Bends → Replace.

EWA13460

⚠ WARNING

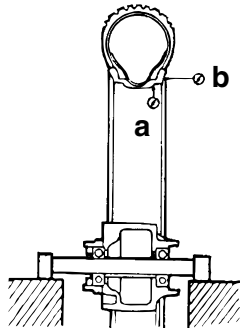
Do not attempt to straighten a bent wheel axle.

2. Check:
 - Tire
 - Front wheel
 Damage/wear → Replace.
 Refer to "CHECKING THE TIRES" on page 3-30 and "CHECKING THE WHEELS" on page 3-32.
3. Measure:
 - Radial wheel runout "a"
 - Lateral wheel runout "b"
 Over the specified limits → Replace.

FRONT WHEEL



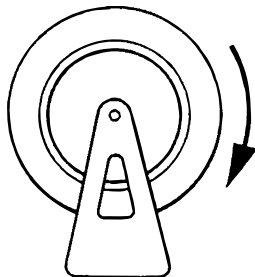
Radial wheel runout limit
1.0 mm (0.04 in)
Lateral wheel runout limit
0.5 mm (0.02 in)



340-000

4. Check:

- Wheel bearings
Front wheel turns roughly or is loose → Replace the wheel bearings.
- Oil seals
Damage/wear → Replace.



340-012

EAS21960

ASSEMBLING THE FRONT WHEEL

1. Install:

- Wheel bearings
- Oil seals **New**

- a. Install the new wheel bearings and oil seals in the reverse order of disassembly.

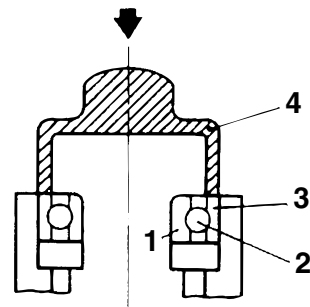
ECA5UXB008

CAUTION:

Do not contact the wheel bearing inner race "1" or balls "2". Contact should be made only with the outer race "3".

NOTE:

Use a socket "4" that matches the diameter of the wheel bearing outer race and oil seal.



EAS21970

ADJUSTING THE FRONT WHEEL STATIC BALANCE

NOTE:

- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.

1. Remove:

- Balancing weight(s)

2. Find:

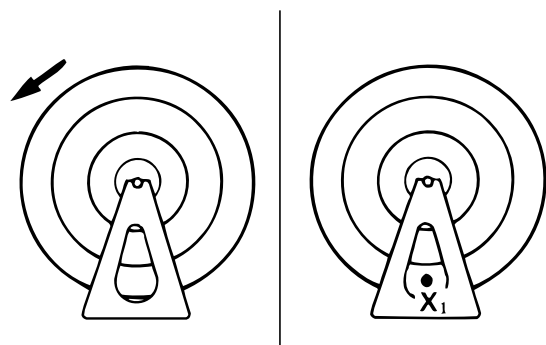
- Front wheel's heavy spot

NOTE:

Place the front wheel on a suitable balancing stand.

- a. Spin the front wheel.

- b. When the front wheel stops, put an "X₁" mark at the bottom of the wheel.

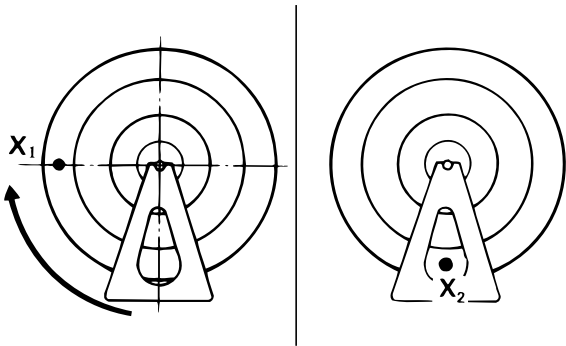


- c. Turn the front wheel 90° so that the "X₁" mark is positioned as shown.

- d. Release the front wheel.

- e. When the front wheel stops, put an "X₂" mark at the bottom of the wheel.

FRONT WHEEL



- f. Repeat steps (d) through (f) several times until all the marks come to rest at the same spot.
- g. The spot where all the marks come to rest is the front wheel's heavy spot "X".



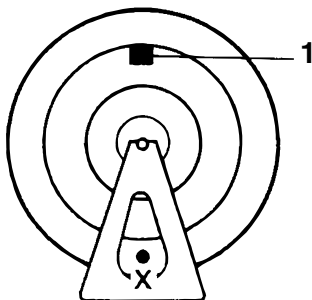
3. Adjust:
 - Front wheel static balance



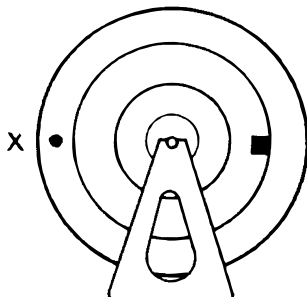
- a. Install a balancing weight "1" onto the rim exactly opposite the heavy spot "X".

NOTE: _____

Start with the lightest weight.



- b. Turn the front wheel 90° so that the heavy spot is positioned as shown.



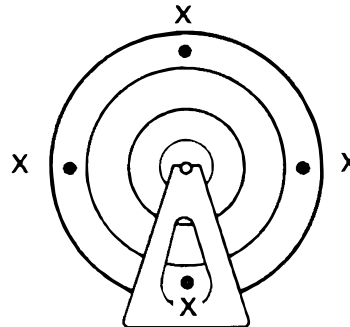
- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the front wheel is balanced.



4. Check:
 - Front wheel static balance



- a. Turn the front wheel and make sure it stays at each position shown.



- b. If the front wheel does not remain stationary at all of the positions, rebalance it.



EAS5UXB010

INSTALLING THE FRONT WHEEL (DISC)

1. Stand the vehicle on a level surface.

EWA13120


WARNING _____


Securely support the vehicle so that there is no danger of it falling over.

2. Install:
 - Front wheel axle "1"

NOTE: _____

- Align the tire rotation mark "a" with the wheel rotation direction, and install the wheel.
- Remove the front wheel axle using a 19 mm hexagonal wrench "2" and T handle "3".

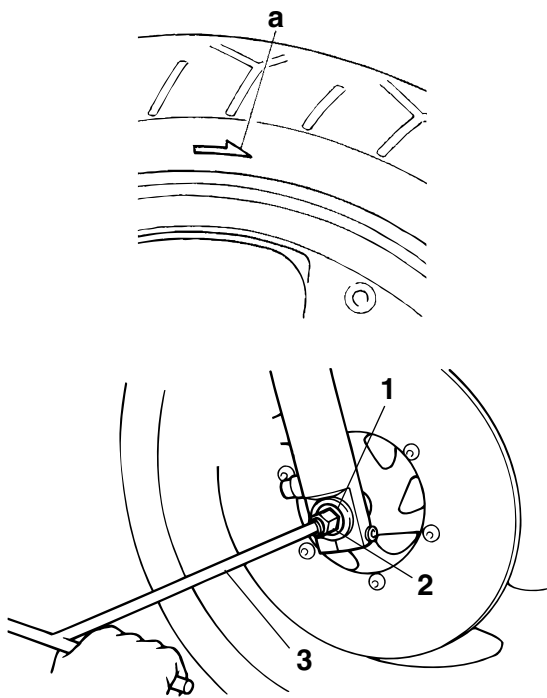
	Front wheel axle 72 Nm (7.2 m•kg, 52 ft•lb)
---	---

	T-handle 90890-01326 T-handle 3/8" drive 60 cm long YM-01326
---	--

ECA5UXB014

CAUTION: _____

Before tightening the wheel axle, push down on the handlebars several times and check if the front fork rebounds smoothly.



3. Install:

- Right brake caliper
- Left brake caliper

	Brake caliper bolt 40 Nm (4.0 m•kg, 29 ft•lb)
---	---

EWA13530

⚠ WARNING

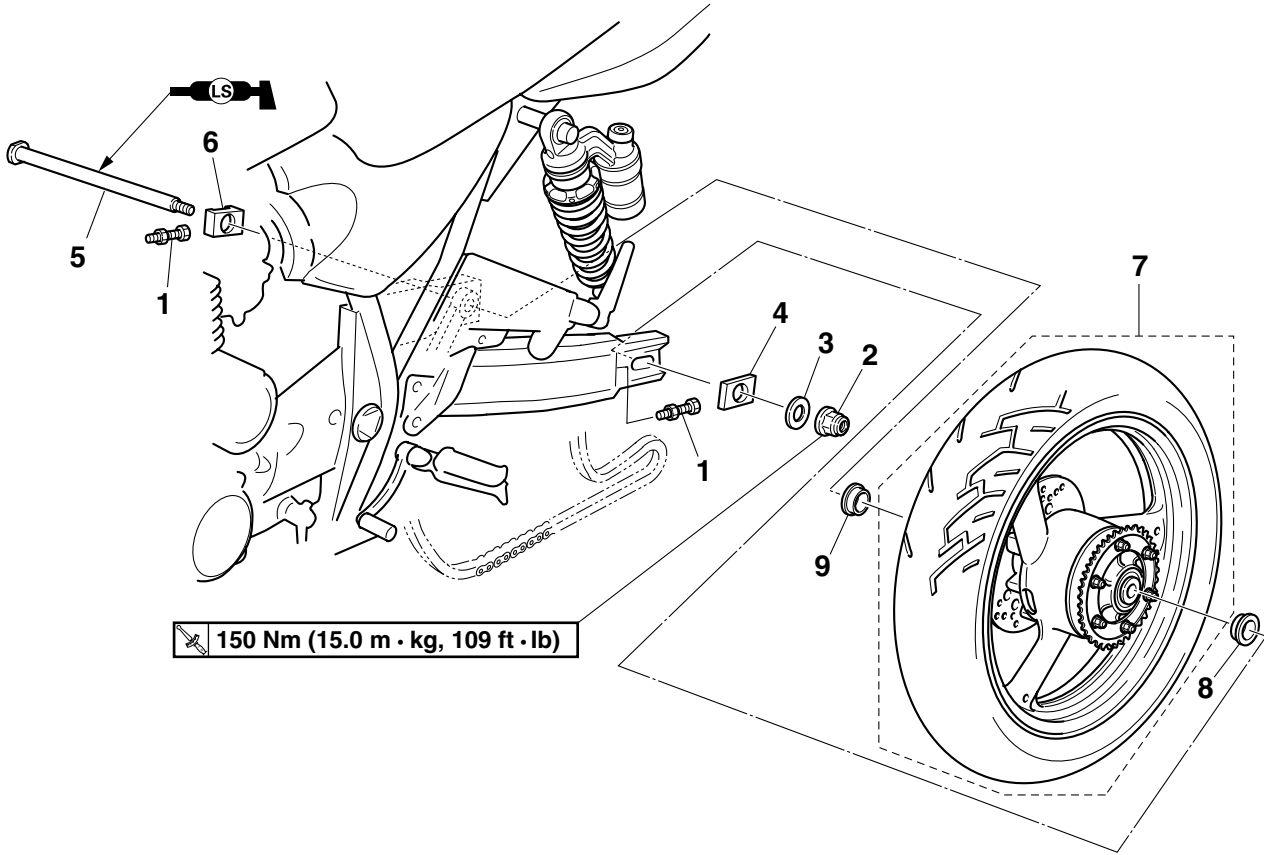
Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-31.


REAR WHEEL

EAS22020

REAR WHEEL

Removing the rear wheel

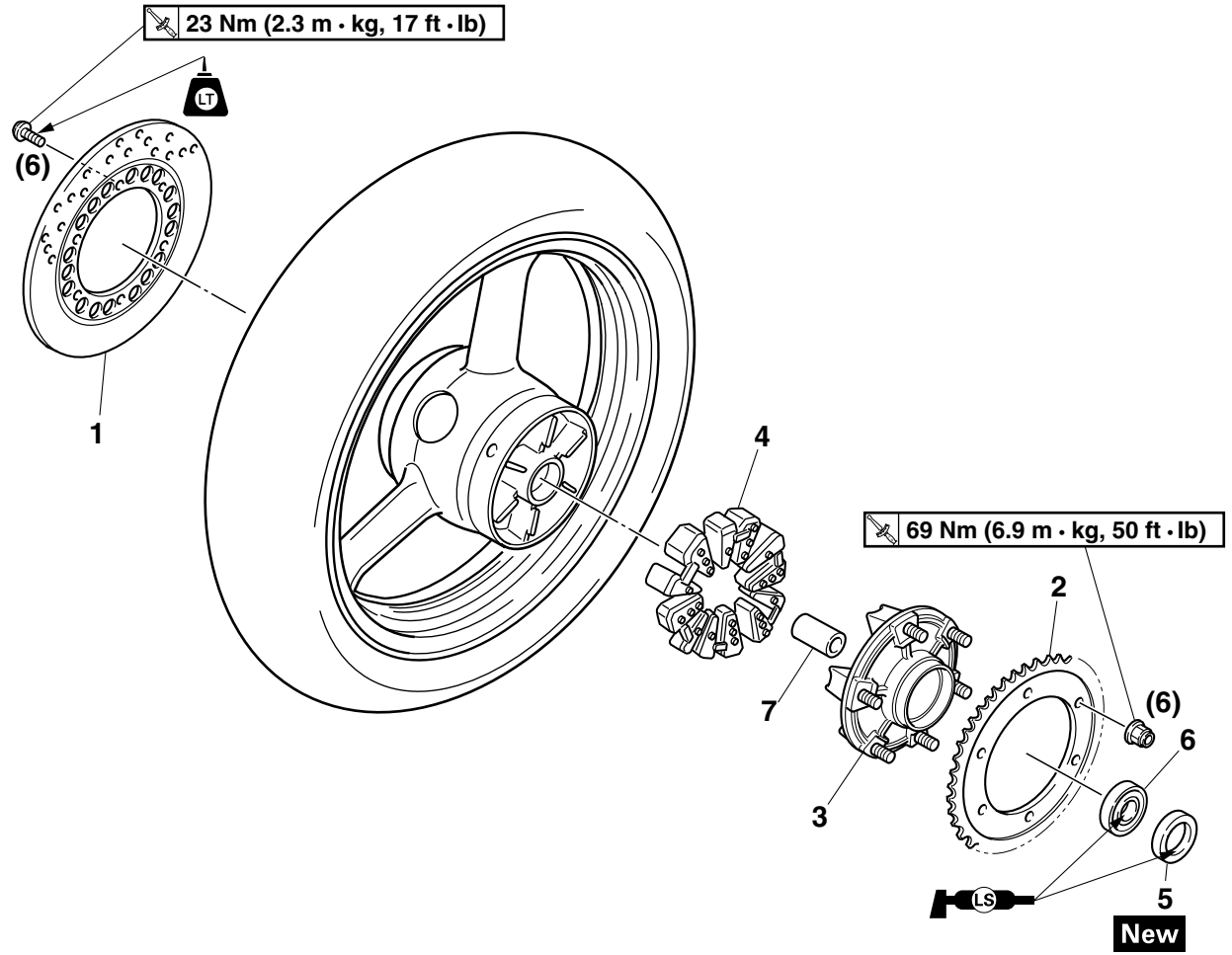


 150 Nm (15.0 m · kg, 109 ft · lb)

Order	Job/Parts to remove	Q'ty	Remarks
1	Chain adjuster	1	
2	Nut	2	
3	Washers	1	
4	Left chain puller	1	
5	Wheel axle	1	
6	Right chain puller	1	
7	Rear wheel assembly	1	
8	Spacer (left)	1	
9	Spacer (right)	1	
			For installation, reverse the removal procedure.

REAR WHEEL

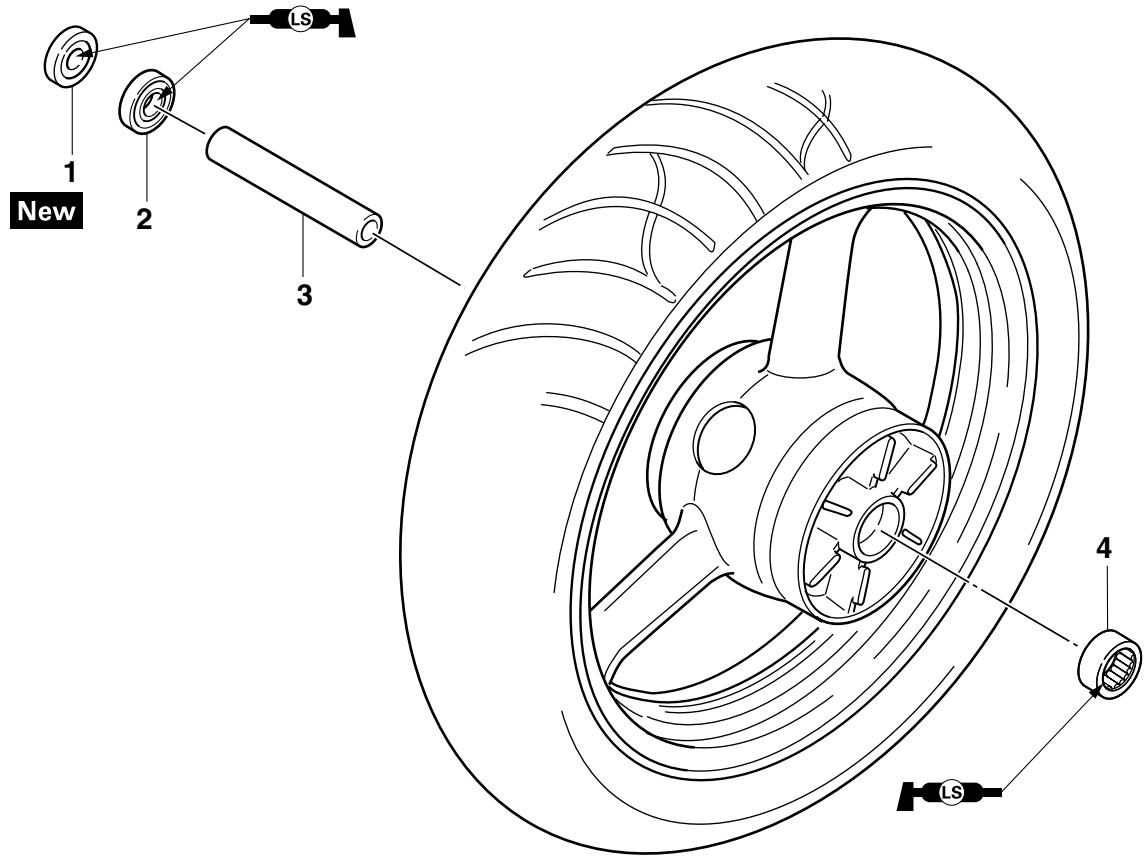
Removing the brake disc and rear wheel sprocket



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake disc	1	
2	Rear wheel sprocket	1	
3	Rear wheel drive hub	1	
4	Rear wheel drive hub damper	5	
5	Oil seal	1	
6	Bearing	1	
7	Collars	1	
			For installation, reverse the removal procedure.

REAR WHEEL

Disassembling the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	1	
2	Bearing	1	
3	Spacer	1	
4	Bearing	1	
			For assembly, reverse the disassembly procedure.

EAS22040

REMOVING THE REAR WHEEL (DISC)

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
 - Rear wheel

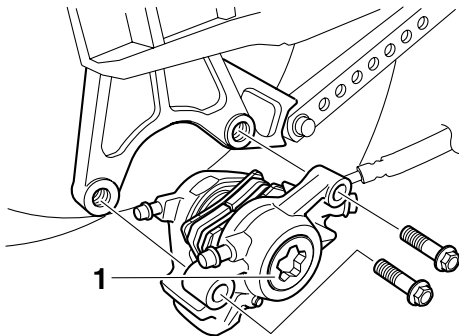
NOTE:

Place the vehicle on a suitable stand so that the rear wheel is elevated.

3. Remove:
 - Brake caliper "1"

NOTE:

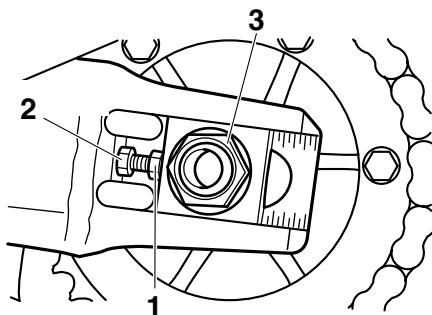
Do not depress the brake pedal when removing the brake caliper.



4. Loosen:
 - Locknut "1"
 - Adjusting nut "2"
5. Remove:
 - Wheel axle nut "3"
 - Wheel axle
 - Rear wheel

NOTE:

Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.



6. Remove:
 - Spacer (left)
 - Spacer (right)

EAS22080

DISASSEMBLING THE REAR WHEEL

1. Remove:
 - Oil seals
 - Wheel bearingsRefer to "DISASSEMBLING THE FRONT WHEEL" on page 4-4.

EAS22090

CHECKING THE REAR WHEEL

1. Check:
 - Wheel axle
 - Rear wheel
 - Wheel bearings
 - Oil sealsRefer to "CHECKING THE FRONT WHEEL" on page 4-4.
2. Check:
 - Tire
 - Rear wheelDamage/wear → Replace.
Refer to "CHECKING THE TIRES" on page 3-30 and "CHECKING THE WHEELS" on page 3-32.
3. Measure:
 - Radial wheel runout
 - Lateral wheel runoutRefer to "CHECKING THE FRONT WHEEL" on page 4-4.

EAS22110

CHECKING THE REAR WHEEL DRIVE HUB

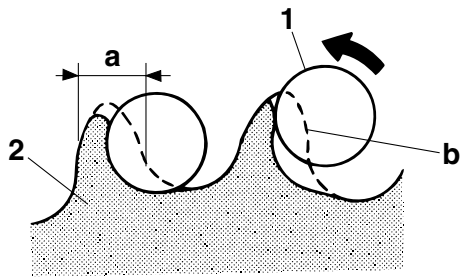
1. Check:
 - Rear wheel drive hub
 - Cracks/damage → Replace.
 - Rear wheel drive hub dampers
 - Damage/wear → Replace.

EAS22120

CHECKING THE REAR WHEEL SPROCKET

1. Check:
 - Rear wheel sprocket
 - Tooth face "a" is worn above 1/4 → replace drive chain, drive sprocket, rear wheel sprocket as a set.
 - Bends → Replace the drive chain, drive sprocket and rear wheel sprocket as a set.


REAR WHEEL



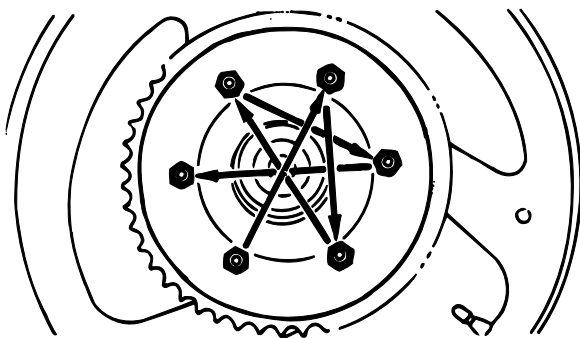
- a. Tooth face
- b. Correct
- 1. Drive chain roller
- 2. Rear wheel sprocket

2. Replace:
 - Rear wheel sprocket

- a. Remove the self-locking nuts and the rear wheel sprocket.
- b. Wipe the rear wheel drive hub with a clean cloth. Thoroughly clean the portion that contacts the sprocket.
- c. Install the new rear wheel sprocket.

	<p>Rear wheel sprocket self-locking nut</p> <p>69 Nm (6.9 m•kg, 50 ft•lb)</p>
---	---

NOTE: Tighten the self-locking nuts in stages and in a crisscross pattern.



ASSEMBLING THE REAR WHEEL

1. Install:
 - Bearing "1"

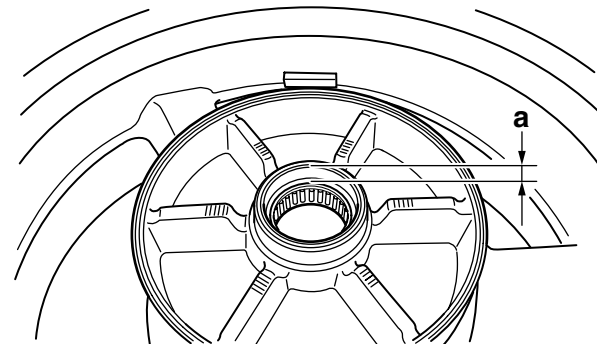
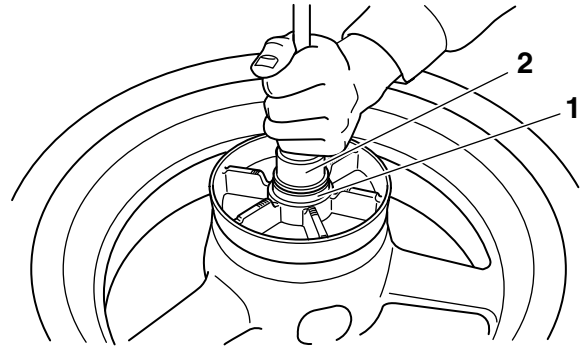
Use a socket "2" with an outer diameter slightly smaller than the bearing outer diame-

ter, and knock in the bearing.

ECA5UXB005

CAUTION: Do not tap in the bearing at an angle.

NOTE: Knock in the bearing so that dimension "a" is 7 mm, as in the illustration.



EAS22150

ADJUSTING THE REAR WHEEL STATIC BALANCE

- NOTE:**
- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
 - Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.


1. Adjust:
 - Rear wheel static balance

Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE" on page 4-5.

EAS22160

INSTALLING THE REAR WHEEL

1. Lubricate:
 - Wheel axle
 - Wheel bearings
 - Oil seal lips

	<p>Recommended lubricant</p> <p>Lithium-soap-based grease</p>
---	---

2. Tighten:
 - Wheel axle nut



Wheel axle nut
150 Nm (15.0 m•kg, 109 ft•lb)

3. Adjust:

- Drive chain slack
Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-24.



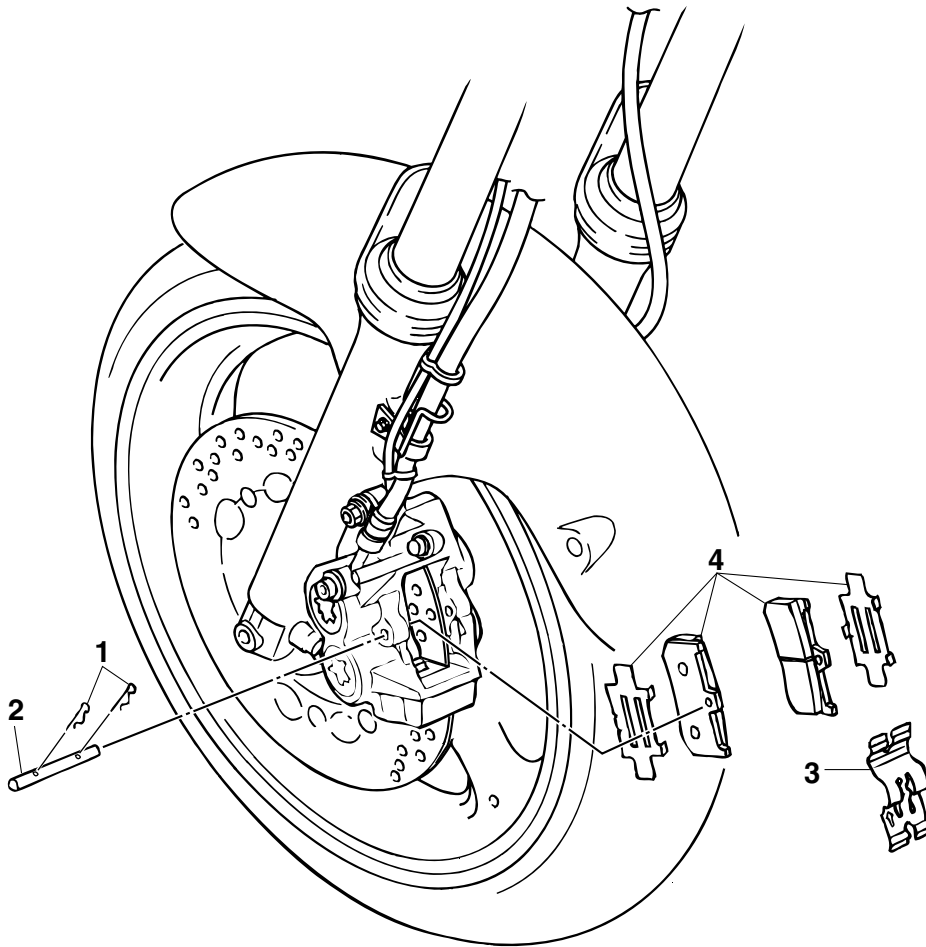
Drive chain slack
20.0–30.0 mm (0.79–1.18 in)

FRONT BRAKE

EAS22210

FRONT BRAKE

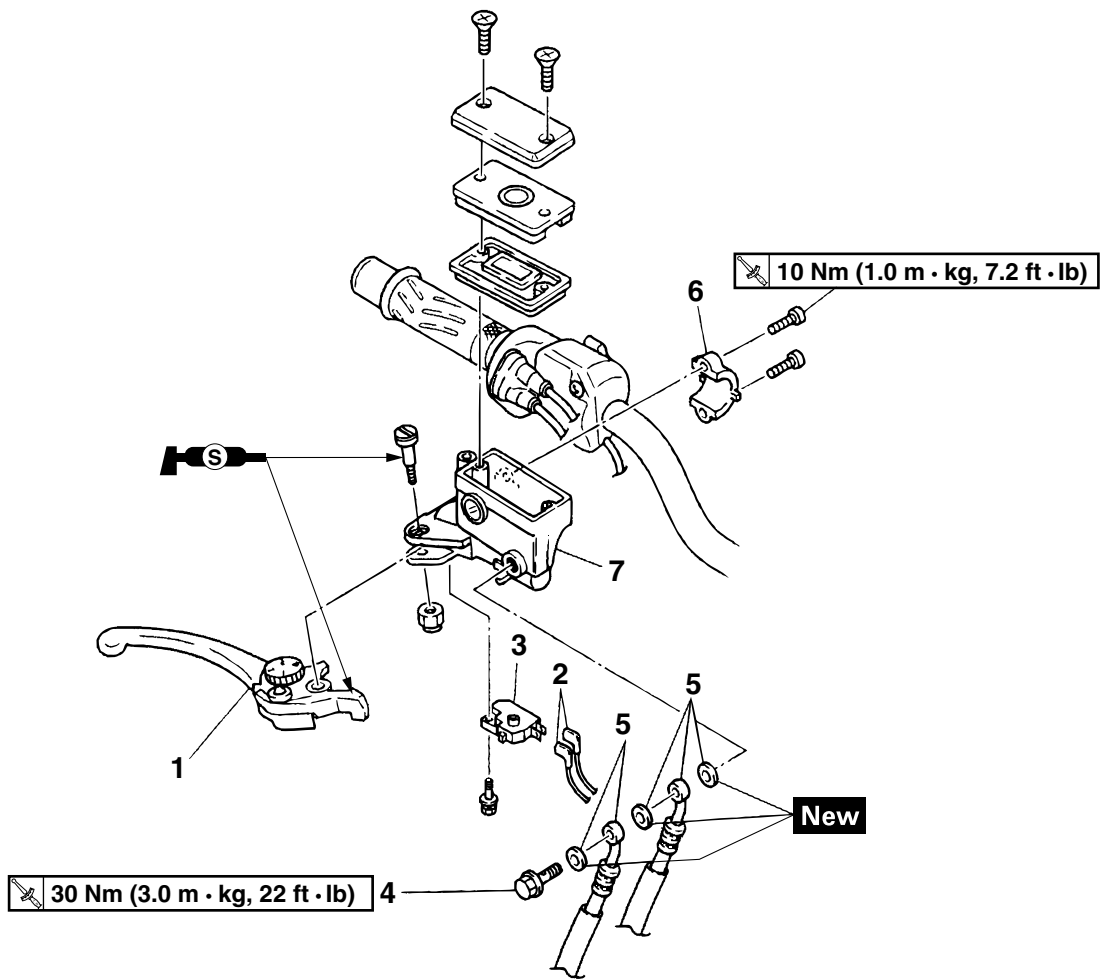
Removing the front brake pads



Order	Job/Parts to remove	Q'ty	Remarks
1	Clip	2	
2	Pad pin	1	
3	Pad support	1	
4	Brake pad/Brake pad shim	2/2	
			For installation, reverse the removal procedure.

FRONT BRAKE

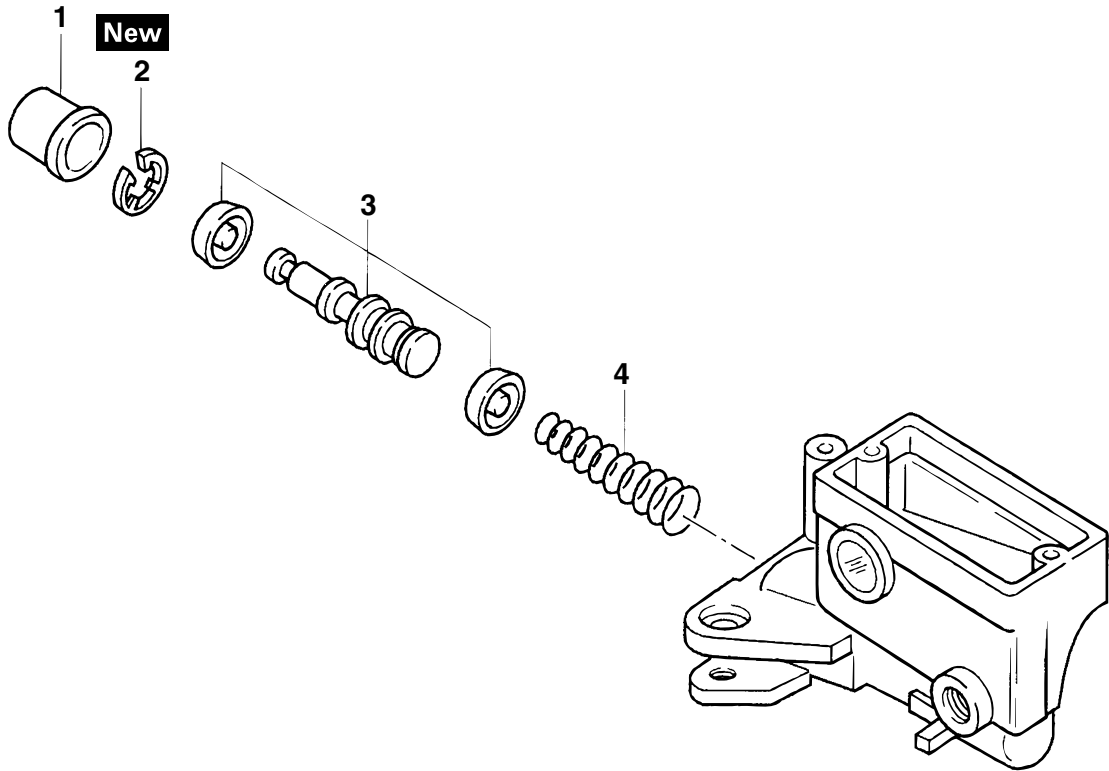
Removing the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Drain the brake fluid		Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-23.
1	Brake lever	1	
2	Front brake switch lead	2	Disconnect.
3	Front brake switch	1	
4	Brake hose union bolt	1	
5	Copper washer/front brake hose	3/2	
6	Brake master cylinder holder	1	
7	Brake master cylinder	1	
			For installation, reverse the removal procedure.

FRONT BRAKE

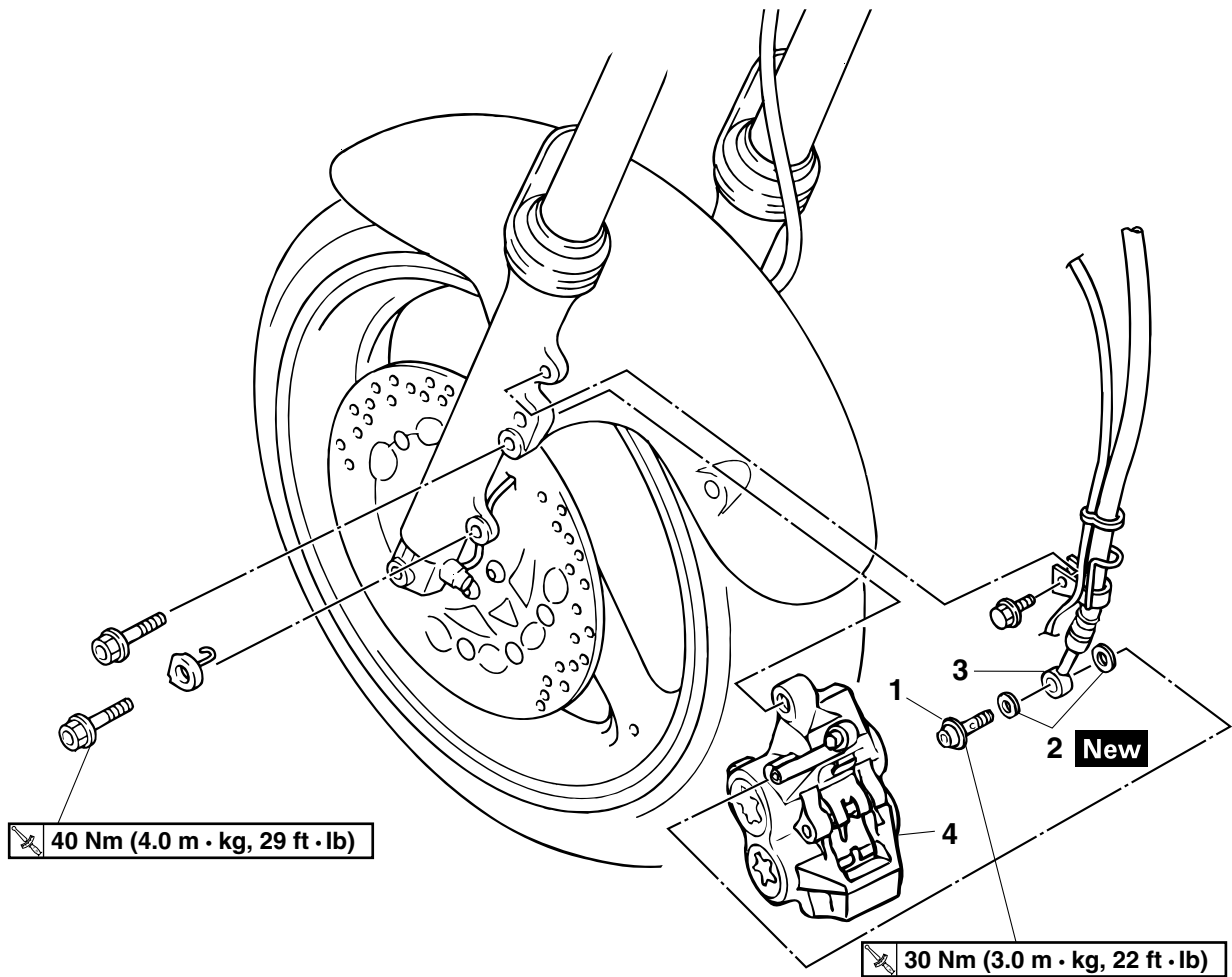
Disassembling the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Master cylinder boots	1	
2	Circlip	1	
3	Master cylinder kit	1	
4	Spring	1	
			For assembly, reverse the disassembly procedure.

FRONT BRAKE

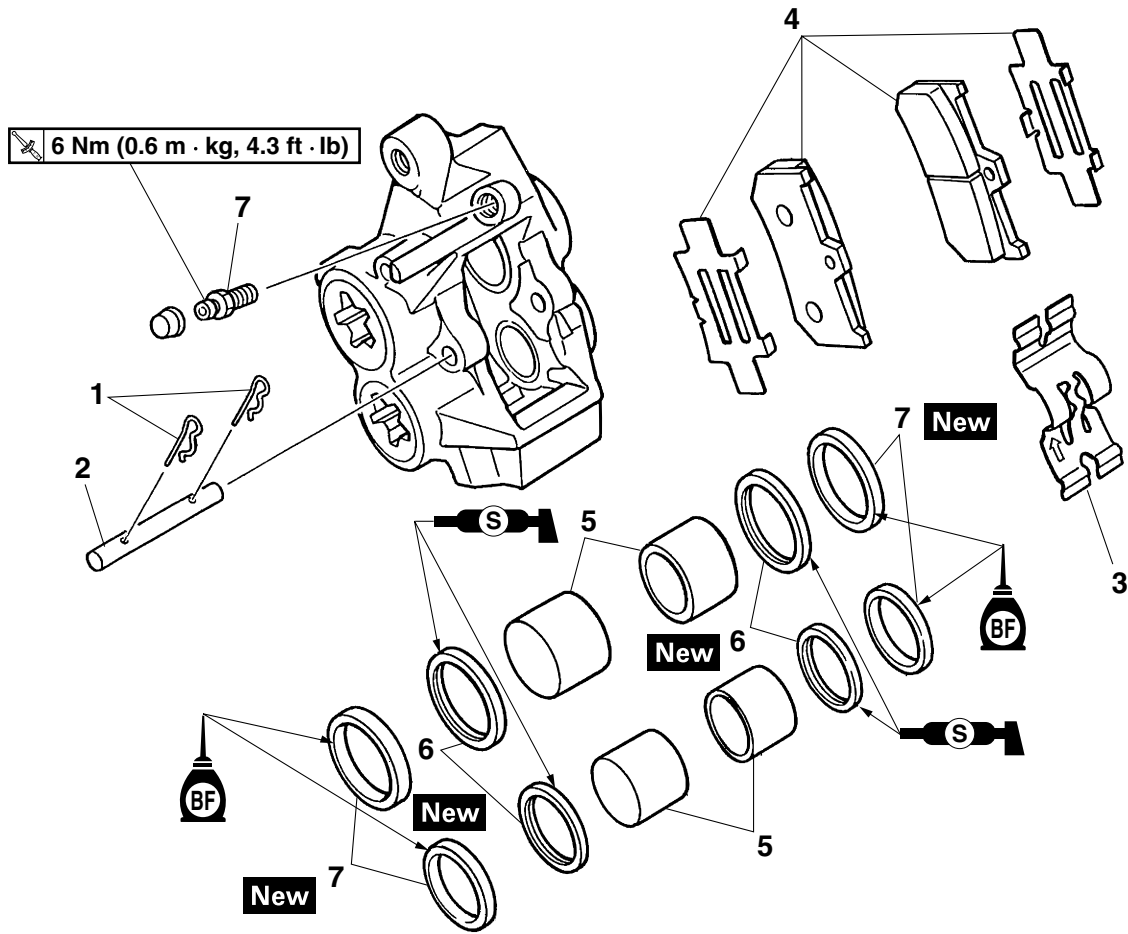
Removing the front brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Drain the brake fluid		Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-23.
1	Brake hose union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Front brake caliper	1	
			For installation, reverse the removal procedure.

FRONT BRAKE

Disassembling the front brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Clip	2	
2	Pad pin	1	
3	Pad support	1	
4	Brake pad/Brake pad shim	2/2	
5	Brake caliper piston	4	
6	Brake caliper dust seal	4	
7	Brake caliper piston seal	4	
8	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

EAS22220

INTRODUCTION

EWA14100



WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury.
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS22240

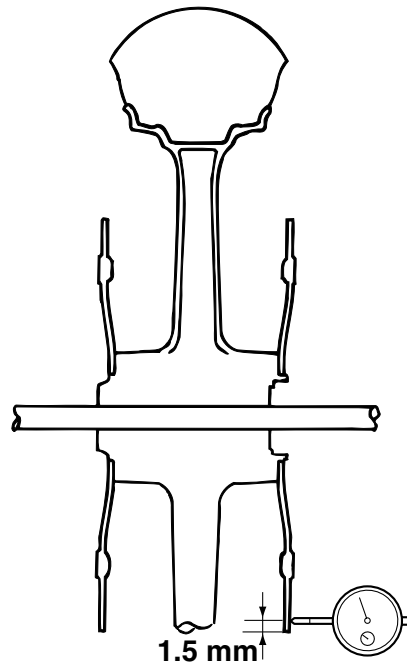
CHECKING THE FRONT BRAKE DISC

The following procedure applies to both brake disc.

1. Remove:
 - Front wheel
Refer to "FRONT WHEEL" on page 4-2.
2. Check:
 - Brake disc
Damage/galling → Replace.
3. Measure:
 - Brake disc deflection
Out of specification → Correct the brake disc deflection or replace the brake disc.



**Brake disc deflection limit
0.10 mm (0.0039 in)**

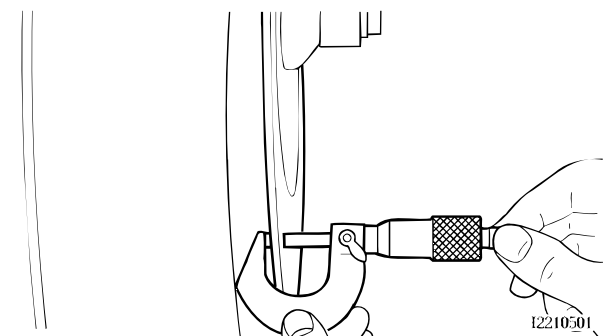


- a. Place the vehicle on a suitable stand so that the front wheel is elevated.
- b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
- c. Remove the brake caliper.
- d. Hold the dial gauge at a right angle against the brake disc surface.
- e. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.

4. Measure:
 - Brake disc thickness
Measure the brake disc thickness at a few different locations.
Out of specification → Replace.



**Brake disc thickness limit
4.5 mm (0.18 in)**



FRONT BRAKE

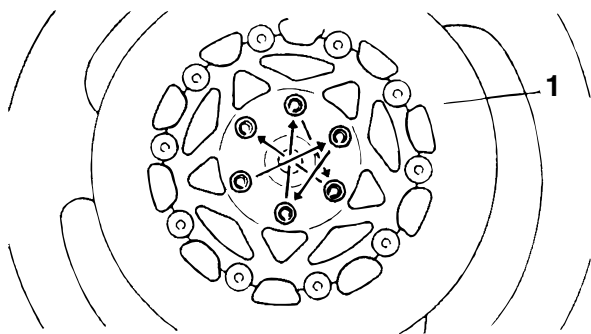
5. Adjust:
- Brake disc deflection



- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.
- c. Install the brake disc "1".

NOTE: Tighten the brake disc bolts in stages and in a crisscross pattern.

	Brake disc bolt 18 Nm (1.8 m•kg, 13 ft•lb) (Apply the LOCTITE®)
--	--



- d. Measure the brake disc deflection.
- e. If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
- f. If the brake disc deflection cannot be brought within specification, replace the brake disc.



6. Install:
- Front wheel
- Refer to "FRONT WHEEL" on page 4-2.

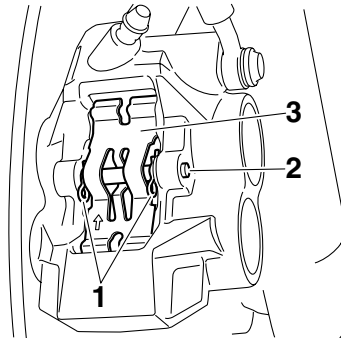
EAS22270

REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake pad.

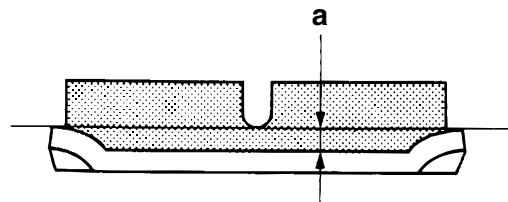
NOTE: When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Remove:
 - Clip "1"
 - Turn the pad pin with pliers to change to a position for easy removal of the clip.
 - Pad pin "2"
 - Pad support "3"



2. Remove:
 - Brake pads
3. Measure:
 - Brake pad wear limit "a"
 - Out of specification → Replace the brake pads as a set.

	Brake pad lining thickness (inner) 5.5 mm (0.22 in) Limit 0.5 mm (0.02 in) Brake pad lining thickness (outer) 5.5 mm (0.22 in) Limit 0.5 mm (0.02 in)
--	--



346-022

4. Install:
 - Brake pad shims (onto the brake pads)
 - Brake pads
 - Pad support

NOTE: Always install new brake pads, brake pad shims, and a brake pad spring as a set.



- a. Use a caliper piston presser "1" to push back the caliper piston.

FRONT BRAKE

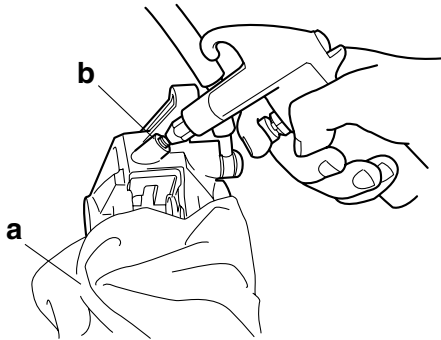
a piece of wood "a".

- b. Blow compressed air into the brake hose joint opening "b" to force out the left side piston from the brake caliper.

EWA5UXB002

WARNING

Never try to pry out the brake caliper piston.



- c. Remove the brake caliper dust seals and piston seals.
- d. Repeat the previous steps to force out the right side piston from the brake caliper.



EAS22390

CHECKING THE FRONT BRAKE CALIPER

Recommended brake component replacement schedule	
Brake pads	If necessary
Dust seals Piston seals	Every four years
Brake hose	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

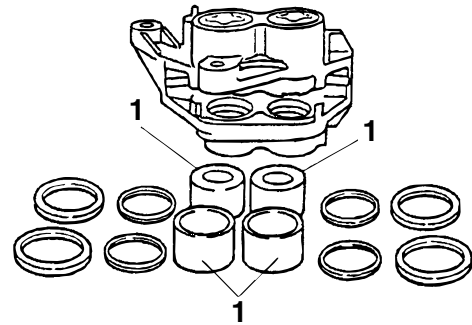
1. Check:
 - Brake caliper pistons "1"
Rust/scratches/wear → Replace the brake caliper pistons.
 - Brake caliper cylinders
Scratches/wear → Replace the brake caliper assembly.
 - Brake caliper body
Rust/scratches/wear → Replace the brake caliper pistons.
 - Brake fluid delivery passage (brake caliper body)
Obstruction → Blow out with compressed air.

EWA13600

WARNING

Whenever a brake caliper is disassembled,

replace the dust seals and piston seals.



2. Check:
 - Brake caliper brackets
Cracks/damage → Replace.

EAS22410

ASSEMBLING THE FRONT BRAKE CALIPER

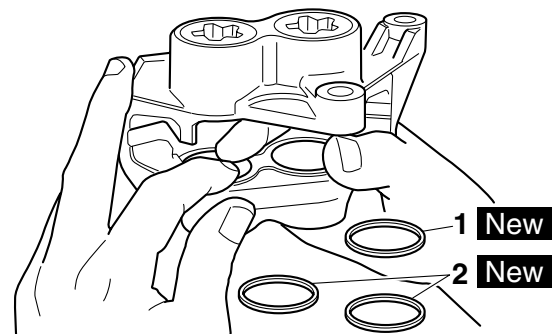
EWA13620

WARNING

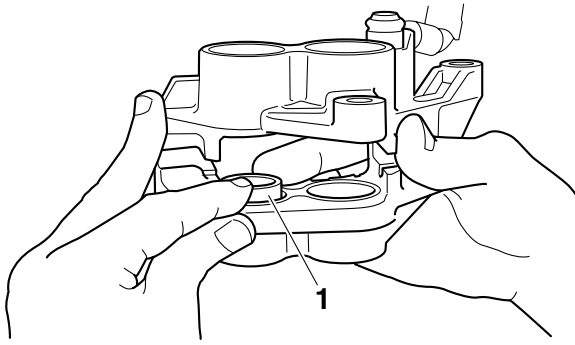
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper dust seals and piston seals.

	Recommended fluid DOT 4
---	------------------------------------

1. Install:
 - Brake caliper piston seal "1" **New**
 - Dust seals "2" **New**



2. Install:
 - Brake caliper piston "1"



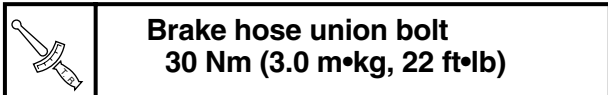
3. Install:
- Brake pads
 - Pad support
 - Brake pad pins
- Install with the arrow in the direction of rotation.

EAS22440

INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
- Brake caliper “1” (temporarily)
 - Copper washers “2” **New**
 - Brake hose “3”
 - Union bolt “4”



EWA13530

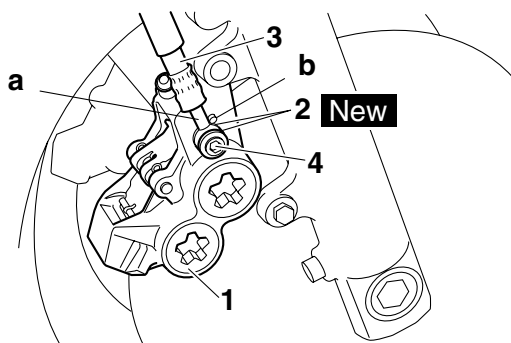
WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-31.

ECA14170

CAUTION:

When installing the brake hose onto the brake caliper “1”, make sure the brake pipe “a” touches the projection “b” on the brake caliper.



2. Install:
- Brake caliper
 - Brake hose holder



Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-20.

3. Add the recommended brake fluid to the proper level.
- Brake master cylinder reservoir



EWA13090

WARNING

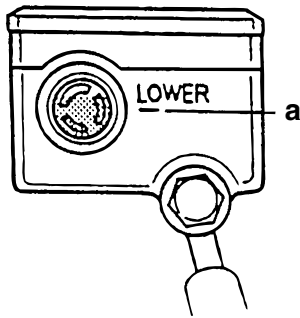
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

CAUTION:

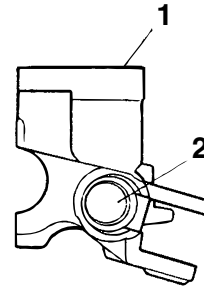
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:
- Brake system
- Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.
5. Check:
- Brake fluid level
- Below the minimum level mark “a” → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-21.



(brake master cylinder body)

Obstruction → Blow out with compressed air.



6. Check:

- Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.

2. Check:

- Brake master cylinder kit “1”
Damage/scratches/wear → Replace.

EAS22490

REMOVING THE FRONT BRAKE MASTER CYLINDER

NOTE: _____

Before removing the front brake master cylinder, drain the brake fluid from the entire brake system.

1. Disconnect:

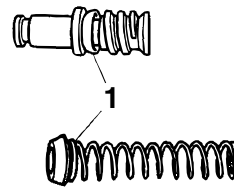
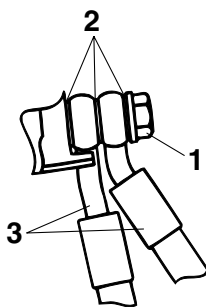
- Brake switch lead
(from the brake switch)

2. Remove:

- Union bolt “1”
- Copper washers “2”
- Brake hoses “3”

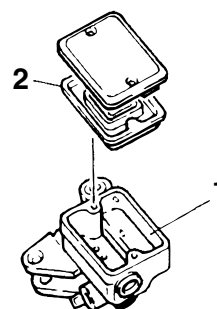
NOTE: _____

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



3. Check:

- Brake master cylinder reservoir “1”
Cracks/damage → Replace.
- Brake master cylinder reservoir diaphragm “2”
Damage/wear → Replace.



4. Check:

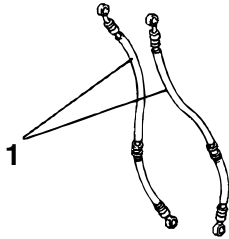
- Brake hoses “1”
Cracks/damage/wear → Replace.

EAS22500

CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:

- Brake master cylinder “1”
Damage/scratches/wear → Replace.
- Brake fluid delivery passages “2”



EAS22520

ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

⚠ WARNING

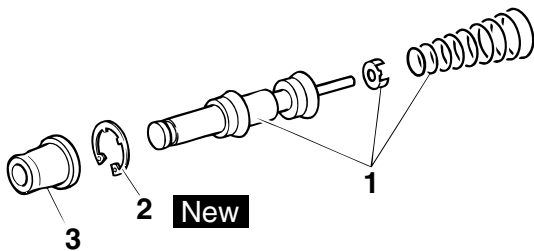
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.



Recommended fluid
DOT 4

1. Install:

- Master cylinder kit "1"
- Circlip "2" **New**
- Dust boot "3"



EAS22530

INSTALLING THE FRONT BRAKE MASTER CYLINDER

1. Install:

- Brake master cylinder "1"

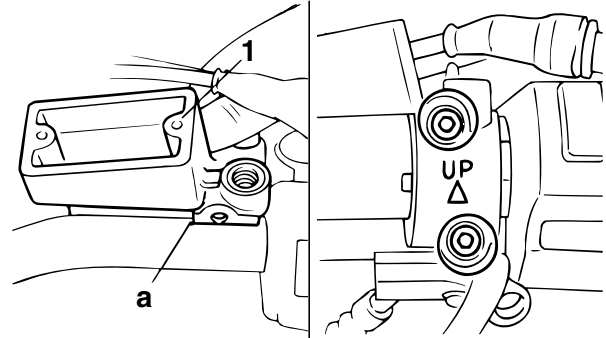


Brake master cylinder bracket bolt
10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

- Install the brake master cylinder holder with the "UP" mark facing up.
- Align the end of the brake master cylinder holder with the punch mark "a" on the handlebar.

- First, tighten the upper bolt, then the lower bolt.



2. Install:

- Copper washers **New**
- Brake hose
- Union bolt



Brake hose union bolt
30 Nm (3.0 m•kg, 22 ft•lb)

EWA13530

⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-31.

NOTE:

- While holding the brake hose, tighten the union bolt.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.

- 3. Add the recommended brake fluid to the proper level.

- Brake master cylinder reservoir



Recommended fluid
DOT 4

EWA13540

⚠ WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake master cylinder reservoir. Water will significantly lower the boiling point of the brake fluid and could cause

vapor lock.

ECA13540

CAUTION:

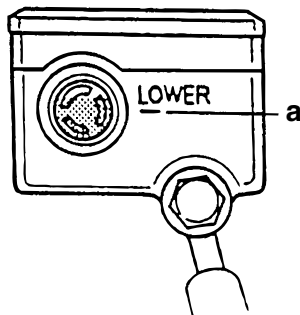
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:

- Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.

5. Check:

- Brake fluid level
Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-21.



6. Check:

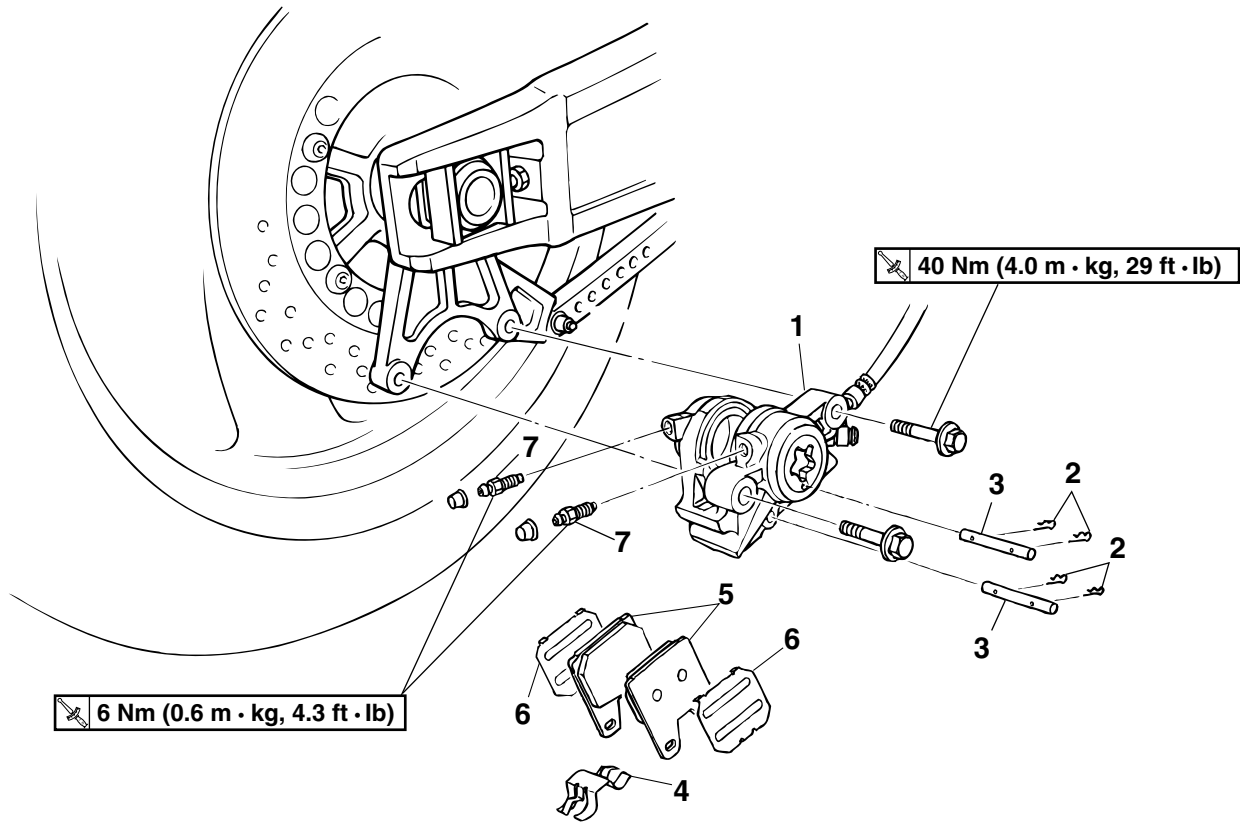
- Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.

REAR BRAKE

EAS22550

REAR BRAKE

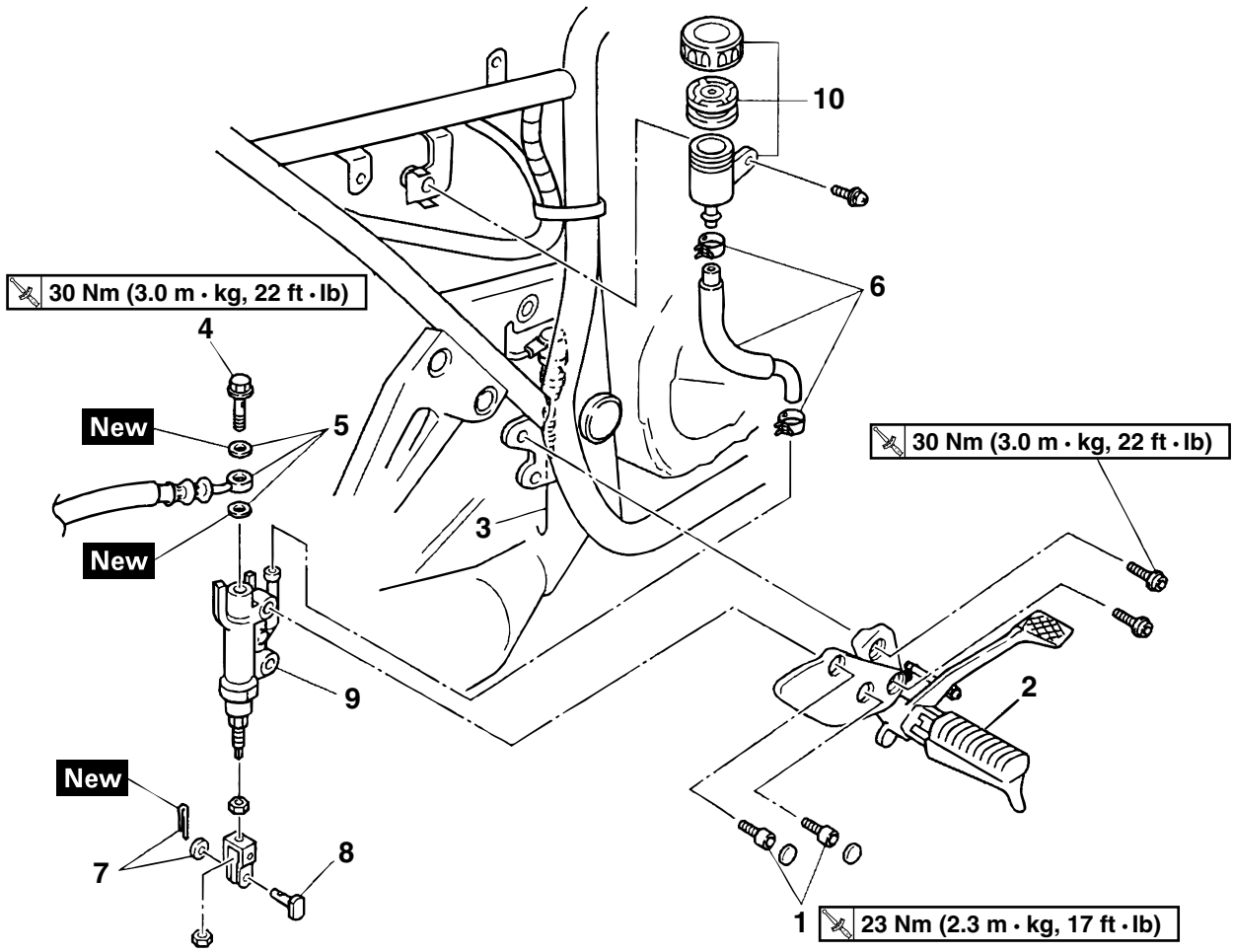
Removing the rear brake pads



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake caliper	1	
2	Clip	4	
3	Pad pin	2	
4	Pad support	1	
5	Brake pad	2	
6	Brake caliper shim	2	
7	Bleed screw	2	
			For installation, reverse the removal procedure.

REAR BRAKE

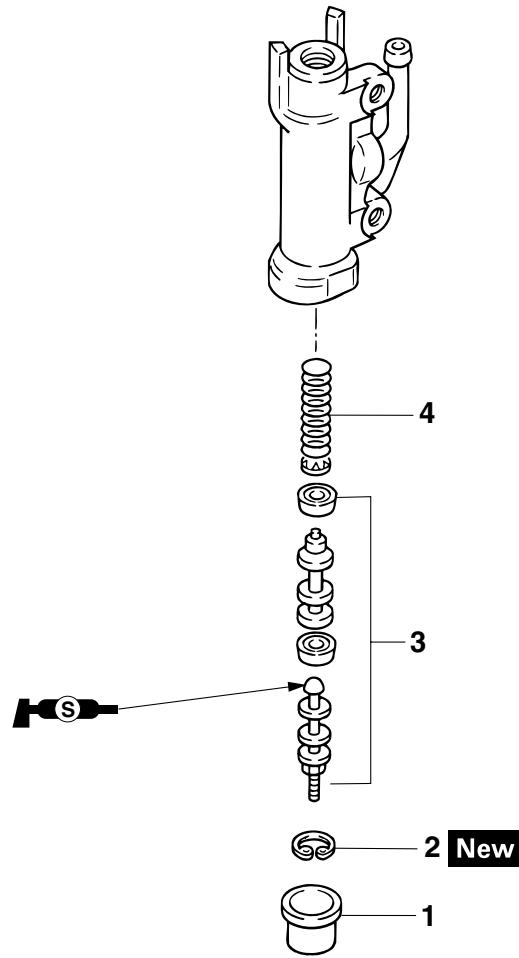
Removing the rear brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Drain the brake fluid		Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-23.
	Seat/guide cover (right)		
1	Footrest bracket bolt	2	
2	Right footrest assembly	1	
3	Rear brake switch hook	1	
4	Brake hose union bolt	1	
5	Copper washer	2	
6	Clip/hose	2/1	
7	Clip/washer	1/1	
8	Pin	1	
9	Rear brake master cylinder	1	
10	Rear brake fluid reservoir/brake fluid reservoir diaphragm/brake fluid reservoir cap	1/1/1	
			For installation, reverse the removal procedure.

REAR BRAKE

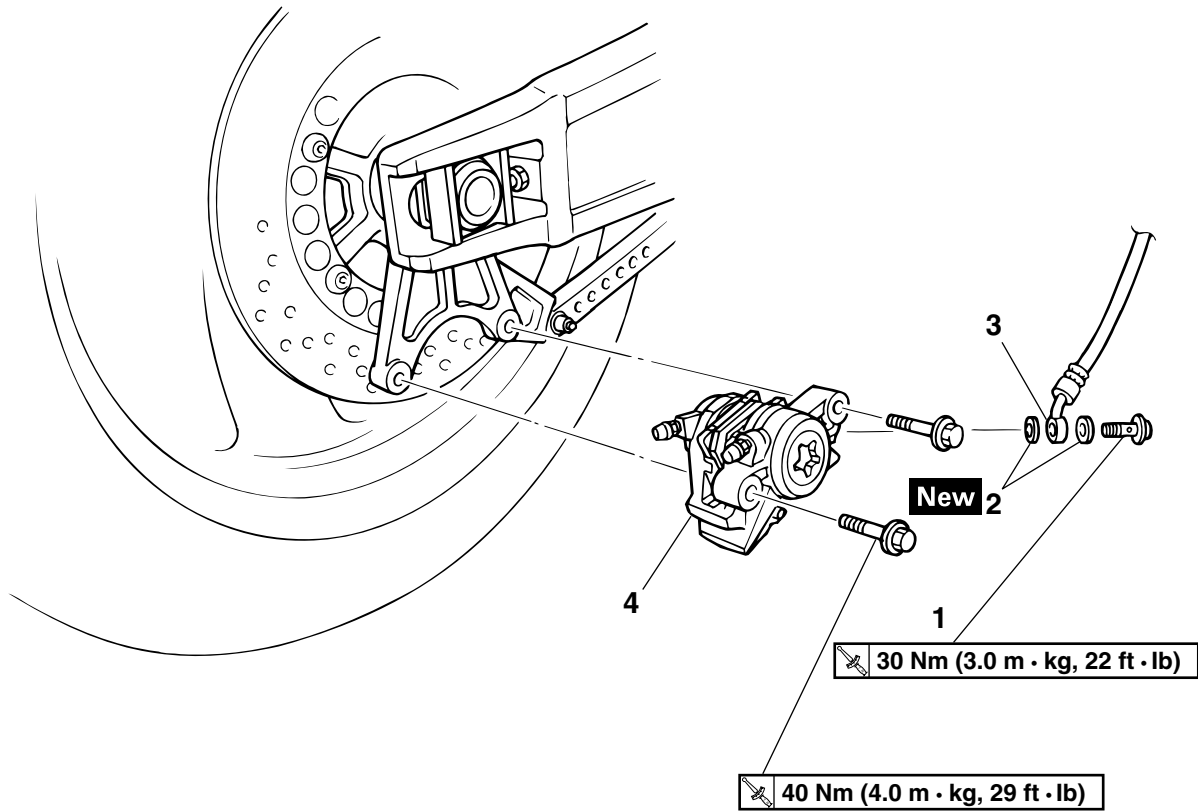
Disassembling the rear brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder boots	1	
2	Circlip	1	
3	Brake master cylinder kit	1	
4	Spring	1	
			For assembly, reverse the disassembly procedure.

REAR BRAKE

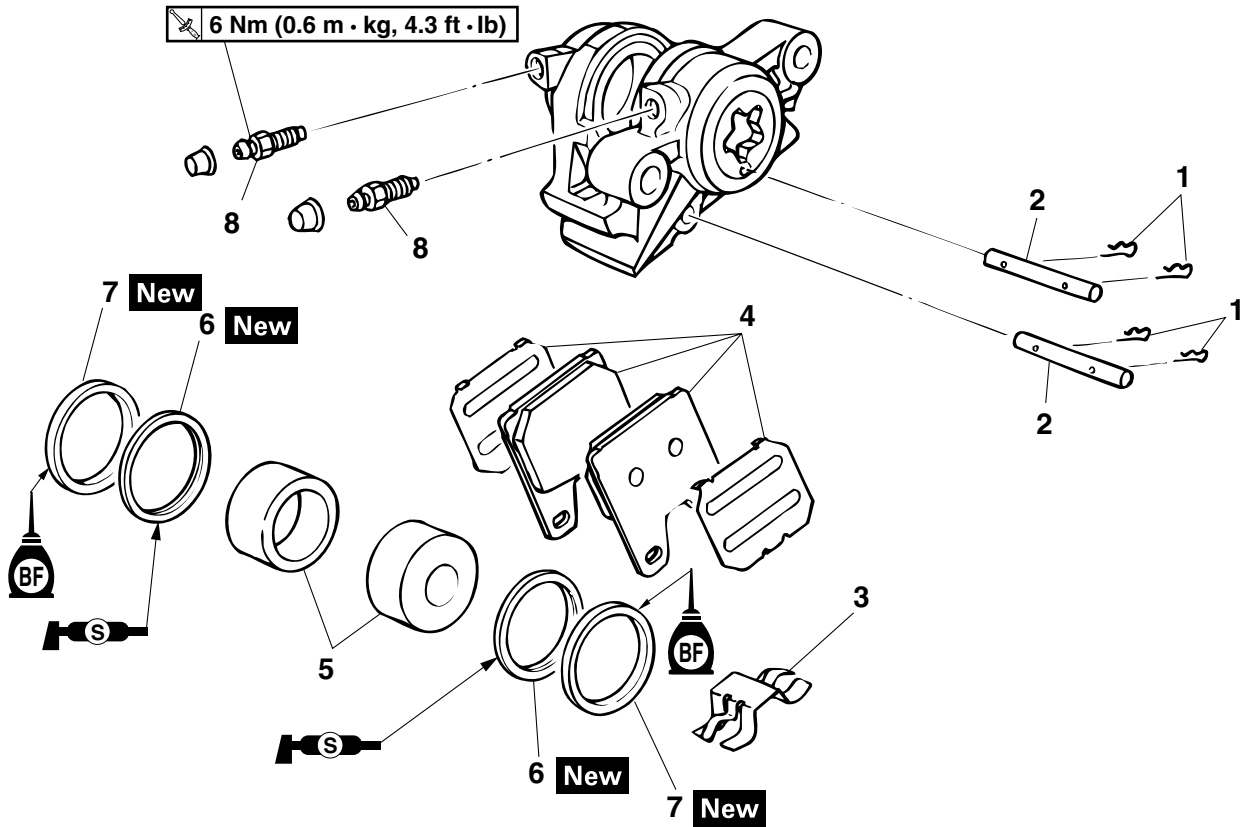
Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Drain the brake fluid		Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-23.
1	Brake hose union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Front brake caliper	1	
			For installation, reverse the removal procedure.

REAR BRAKE

Disassembling the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Clip	4	
2	Pad pin	2	
3	Pad support	1	
4	Brake pad/Brake pad shim	2/2	
5	Brake caliper piston	2	
6	Brake caliper dust seal	2	
7	Brake caliper piston seal	2	
8	Bleed screw	2	
			For assembly, reverse the disassembly procedure.

EAS22560

INTRODUCTION

EWA14100

WARNING


Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury.
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- Flush with water for 15 minutes and get immediate medical attention.

EAS22570

CHECKING THE REAR BRAKE DISC

1. Remove:
 - Rear wheel
Refer to "REAR WHEEL" on page 4-8.
2. Check:
 - Brake disc
Damage/galling → Replace.
3. Measure:
 - Brake disc deflection
Out of specification → Correct the brake disc deflection or replace the brake disc.
Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-19.

	Brake disc deflection limit 0.15 mm (0.0059 in)
---	---

4. Measure:
 - Brake disc thickness
Measure the brake disc thickness at a few different locations.
Out of specification → Replace.
Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-19.



Brake disc thickness limit
4.5 mm (0.18 in)

5. Adjust:
 - Brake disc deflection
Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-19.



Brake disc bolt
23 Nm (2.3 m•kg, 17 ft•lb)
(Apply the LOCTITE®)

6. Install:
 - Rear wheel
Refer to "REAR WHEEL" on page 4-8.

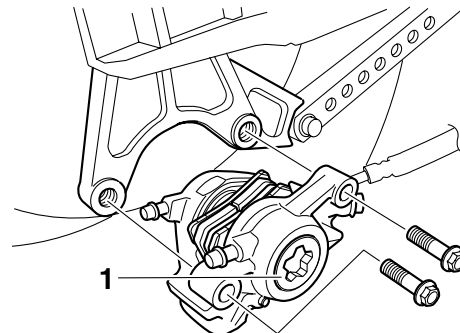
EAS22580

REPLACING THE REAR BRAKE PADS

NOTE:

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

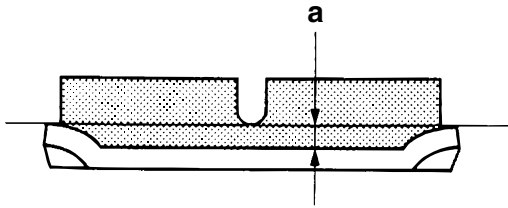
1. Remove:
 - Brake caliper "1"



2. Remove:
 - Pad pin
 - Brake pads
 - Brake pad shims
 - Pad support
3. Measure:
 - Brake pad wear limit "a"
Out of specification → Replace the brake pads as a set.



Brake pad lining thickness (inner)
5.5 mm (0.22 in)
Limit
0.5 mm (0.02 in)
Brake pad lining thickness (outer)
5.5 mm (0.22 in)
Limit
0.5 mm (0.02 in)



346-022

4. Install:

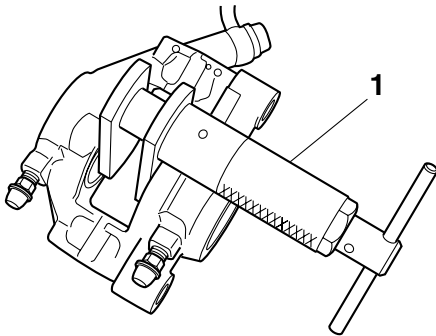
- Brake pad shims
(onto the brake pads)
- Brake pads
- Pad support

NOTE:

Always install new brake pads, brake pad shims, and a brake pad spring as a set.



- Use a caliper piston presser "1" to push back the caliper piston.

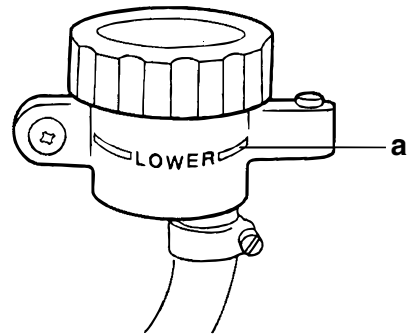


- Install a new brake pad shim onto each new brake pad.
- Install new brake pads and a new brake pad support.
- Install pad pin and clip.



5. Check:

- Brake fluid level
Below the minimum level mark "a" → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-21.



6. Check:

- Brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-23.

EAS22590

REMOVING THE REAR BRAKE CALIPER

NOTE:

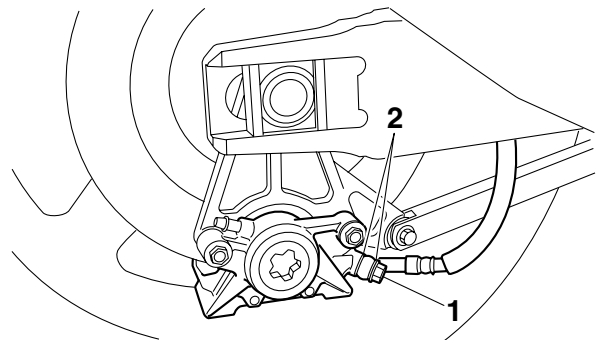
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:

- Union bolt "1"
- Copper washers "2"
- Brake hose
- Brake caliper

NOTE:

Put the end of the brake hose into a container and pump out the brake fluid carefully.

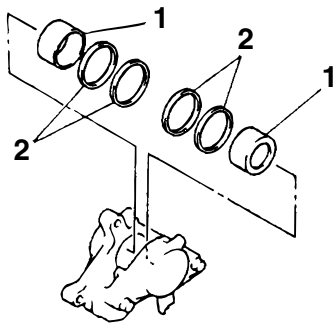


EAS22620

DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:

- Brake caliper pistons "1"
- Brake caliper dust seal/brake caliper piston seal "2"



- a. Secure the right side brake caliper piston with a waste cloth.
- b. Blow compressed air into the brake hose joint opening to force out the left side piston from the brake caliper.

EWA5UXB002

⚠ WARNING

Never try to pry out the brake caliper piston.

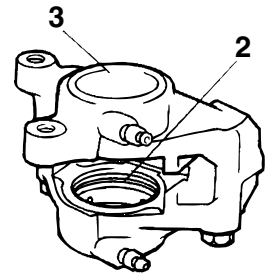
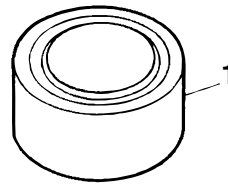
- c. Remove the brake caliper dust seals and piston seals.
- d. Repeat the previous steps to force out the right side piston from the brake caliper.

EAS22640

CHECKING THE REAR BRAKE CALIPER

Recommended brake component Replacement schedule	
Brake pads	If necessary
Dust seals Piston seals	Every four years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

1. Check:
 - Brake caliper pistons “1”
Rust/scratches/wear → Replace the brake caliper pistons.
 - Brake caliper cylinders “2”
Scratches/wear → Replace the brake caliper assembly.
 - Brake caliper body “3”
Cracks/damage → Replace the brake caliper assembly.
 - Brake fluid delivery passages (brake caliper body)
Obstruction → Blow out with compressed air.



EWA13610

⚠ WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston/dust seals.

EAS22650

ASSEMBLING THE REAR BRAKE CALIPER

EWA13620

⚠ WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper dust seals and piston seals.



**Recommended fluid
DOT 4**

1. Install:
 - Brake caliper piston seal
 - Brake caliper dust seal
2. Install:
 - Brake caliper piston
3. Install:
 - Brake pads
 - Pad support
 - Brake pad pins
 - Clip

EAS22670

INSTALLING THE REAR BRAKE CALIPER

1. Install:
 - Brake caliper “1” (temporarily)
 - Brake hose “2”
 - Copper washers “3” **New**
 - Union bolt “4”

REAR BRAKE



Brake hose union bolt
30 Nm (3.0 m•kg, 22 ft•lb)

EWA13530

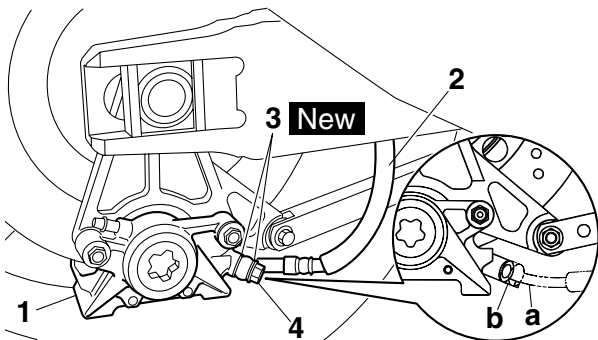
WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-31.

ECA5UXB013

CAUTION:

When installing the brake hose onto the brake master cylinder, make sure the brake pipe “a” touches the projection “b” as shown.



2. Install:

- Brake caliper
 - Brake hose holder
- Refer to “REPLACING THE REAR BRAKE PADS” on page 4-32.



Brake caliper bolt
40 Nm (4.0 m•kg, 29 ft•lb)

3. Fill the brake fluid with the specified amount.

- Brake fluid reservoir



Recommended fluid
DOT 4

EWA13090

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of

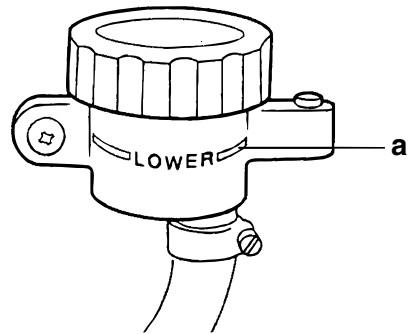
the brake fluid and could cause vapor lock.

ECA13540

CAUTION:

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:
 - Brake systemRefer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.
5. Check:
 - Brake fluid levelBelow the minimum level mark “a” → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-21.

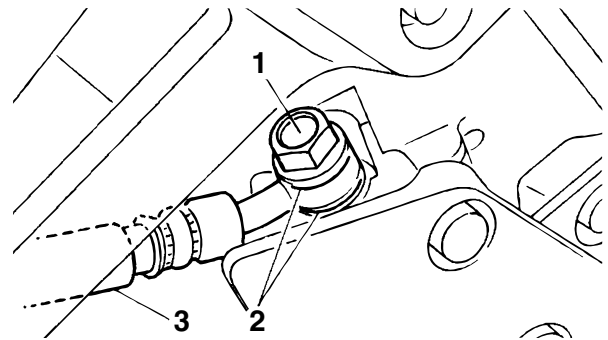


6. Check:
 - Brake pedal operationSoft or spongy feeling → Bleed the brake system. Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.

EAS22700

REMOVING THE REAR BRAKE MASTER CYLINDER

1. Remove:
 - Union bolt “1”
 - Copper washers “2”
 - Brake hose “3”



NOTE:

To collect any remaining brake fluid, place a

container under the master cylinder and the end of the brake hose.

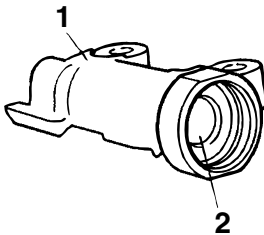
Cracks/damage/wear → Replace.

EAS22710

CHECKING THE REAR BRAKE MASTER CYLINDER

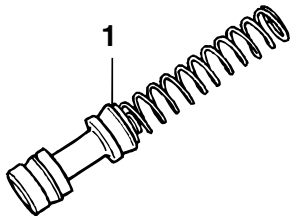
1. Check:

- Brake master cylinder “1”
Damage/scratches/wear → Replace.
- Brake fluid delivery passages “2”
(brake master cylinder body)
Obstruction → Blow out with compressed air.



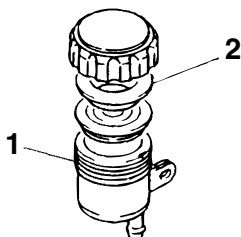
2. Check:

- Brake master cylinder kit “1”
Damage/scratches/wear → Replace.



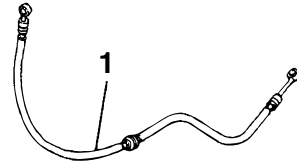
3. Check:

- Brake fluid reservoir “1”
Cracks/damage → Replace.
- Brake fluid reservoir diaphragm “2”
Cracks/damage → Replace.



4. Check:

- Brake hoses “1”



EAS22730

ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520

⚠ WARNING

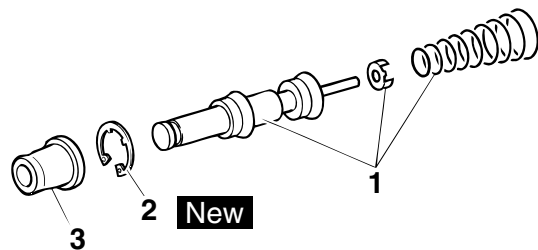
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.



Recommended fluid
DOT 4

1. Install:

- Master cylinder kit “1”
- Circlip “2” **New**
- Dust boot “3”



EAS22750

INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:

- Copper washers “1” **New**
- Brake hoses “2”
- Union bolt “3”



Brake hose union bolt
30 Nm (3.0 m•kg, 22 ft•lb)

EWA13530

⚠ WARNING

Proper brake hose routing is essential to in-

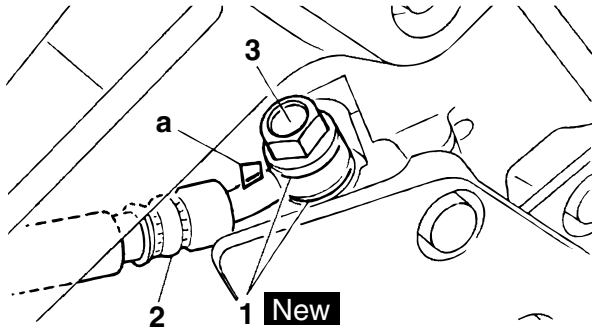
REAR BRAKE

sure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-31.

ECA14160

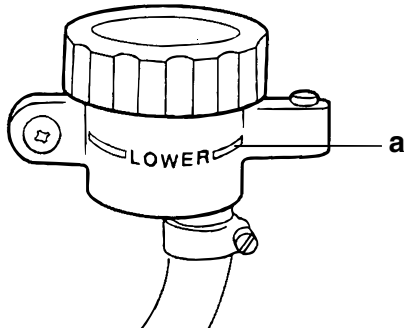
CAUTION:

When installing the brake hose onto the brake master cylinder, make sure the brake pipe touches the projection “a” as shown.



2. Add the recommended brake fluid to the proper level.

- Brake fluid reservoir (LOWER level mark “a” or over)



EWA13090

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

CAUTION:

Brake fluid may damage painted surfaces

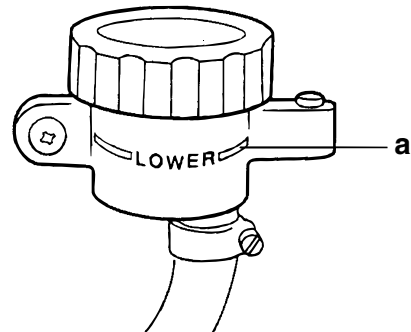
and plastic parts. Therefore, always clean up any spilled brake fluid immediately.

3. Bleed:

- Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.

4. Check:

- Brake fluid level
Below the minimum level mark “a” → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-21.



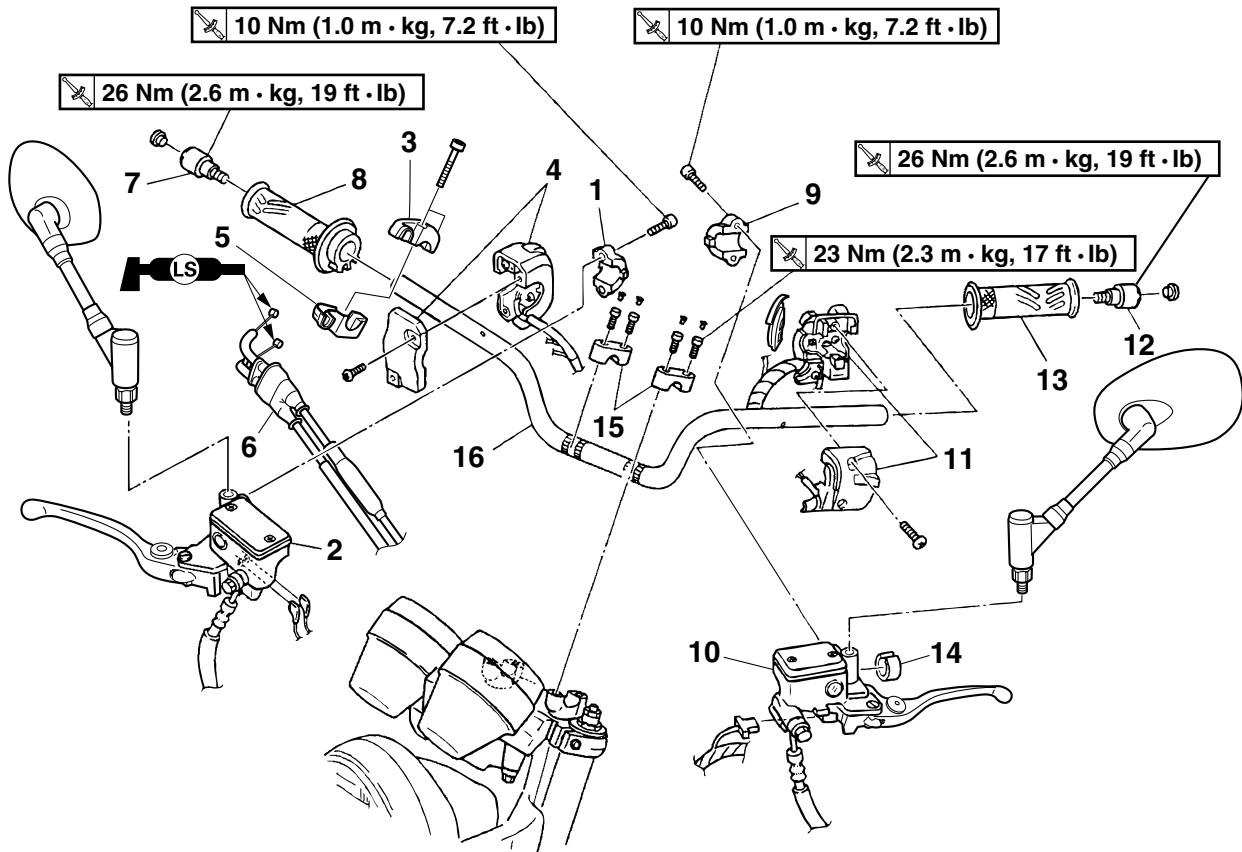
5. Check:

- Brake lever operation
Soft or spongy feeling → Bleed the brake system. Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.

EAS22840

HANDLEBAR

Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
1	Master cylinder holder	1	
2	Brake master cylinder	1	
3	Throttle cable housing	1	
4	Right handle switch	1	
5	Throttle cable housing	1	
6	Throttle cable	2	
7	Grip end	1	
8	Throttle grip	1	
9	Master cylinder holder	1	
10	Clutch master cylinder	1	
11	Left handlebar switch	1	
12	Grip end	1	
13	Handlebar grip	1	
14	Collars	1	
15	Handlebar upper holder	2	
16	Handlebar	1	
			For installation, reverse the removal procedure.

EAS22860

REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

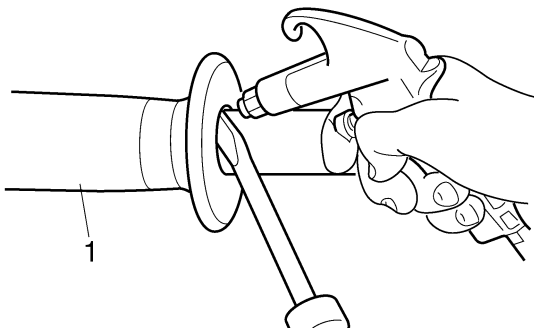
⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
 - Handlebar grip "1"

NOTE:

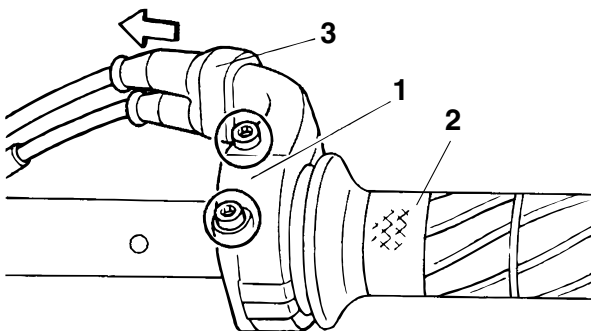
Blow compressed air between the handlebar and the handlebar grip, and gradually push the grip off the handlebar.



3. Remove:
 - Throttle cable housing "1"
 - Throttle grip "2"

NOTE:

While removing the throttle cable housing, pull back the rubber cover "3".



EAS22880

CHECKING THE HANDLEBAR

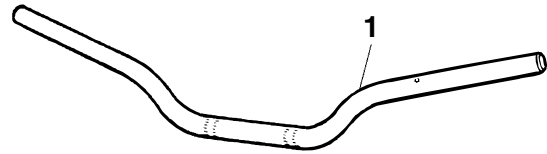
1. Check:
 - Handlebar "1"

Bends/cracks/damage → Replace.

EWA13690

⚠ WARNING

Do not attempt to straighten a bent handlebar as this may dangerously weaken it.



EAS22930

INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Install:
 - Handlebar "1"
 - Handlebar upper holder "2"



Handle upper holder
23 Nm (2.3 m•kg, 17 ft•lb)

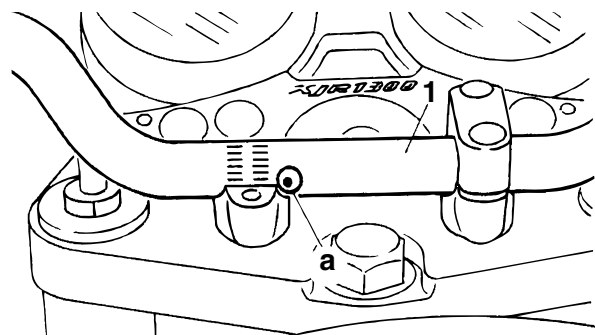
ECA14250

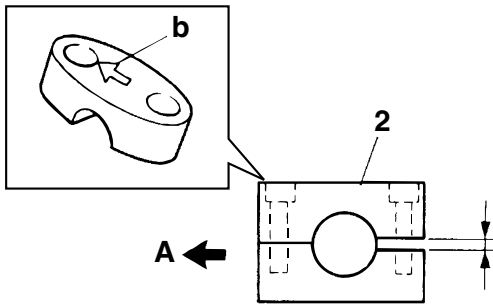
CAUTION:

- First, tighten the bolts on the front side of the handlebar holder, and then on the rear side.
- Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.

NOTE:

- Align the match mark "a" on the handlebar with the upper surface of the lower handlebar holders.
- Install with the handlebar arrow mark "b" facing forward "A".





3. Install:

- Handlebar grip



- Apply a thin coat of rubber adhesive onto the left end of the handlebar.
- Slide the handlebar grip over the left end of the handlebar.
- Wipe off any excess rubber adhesive with a clean rag.

EWA13700

WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

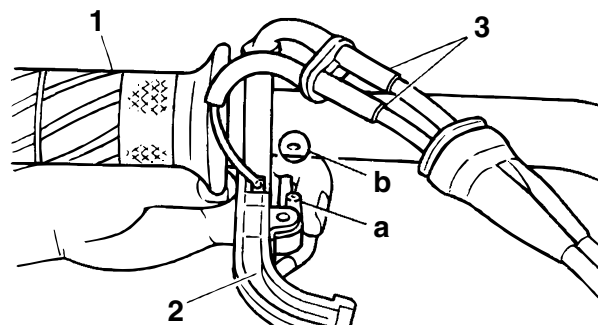


4. Install:

- Throttle grip "1"
- Throttle cable housing "2"
- Throttle cables "3"

NOTE:

Align the projections "a" on the handlebar switches with the holes "b" in the handlebar.

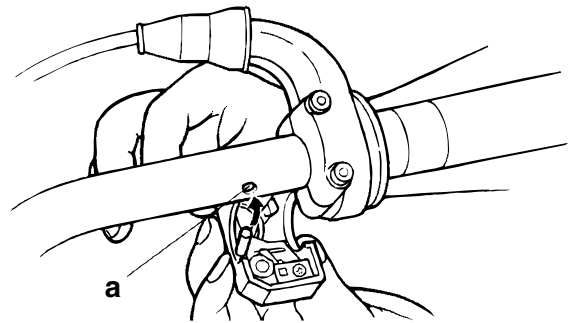


5. Install:

- Right handlebar switch "1"

NOTE:

Align the projection on the handlebar switch with the hole "a" on the handlebar.

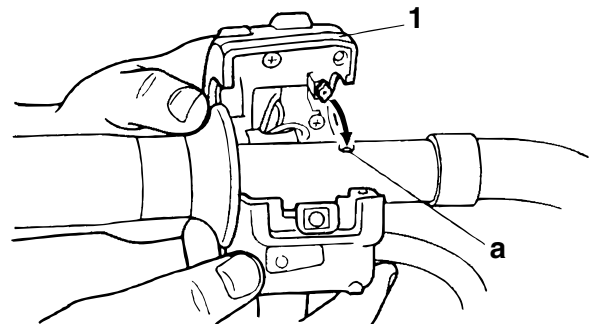


6. Install:

- Left handlebar switch "1"

NOTE:

Align the projection on the left handlebar switch with the hole "a" on the handlebar.



7. Install:

- Brake master cylinder
Refer to "INSTALLING THE FRONT BRAKE MASTER CYLINDER" on page 4-25.

8. Adjust:

- Throttle cable free play
Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" on page 3-9.

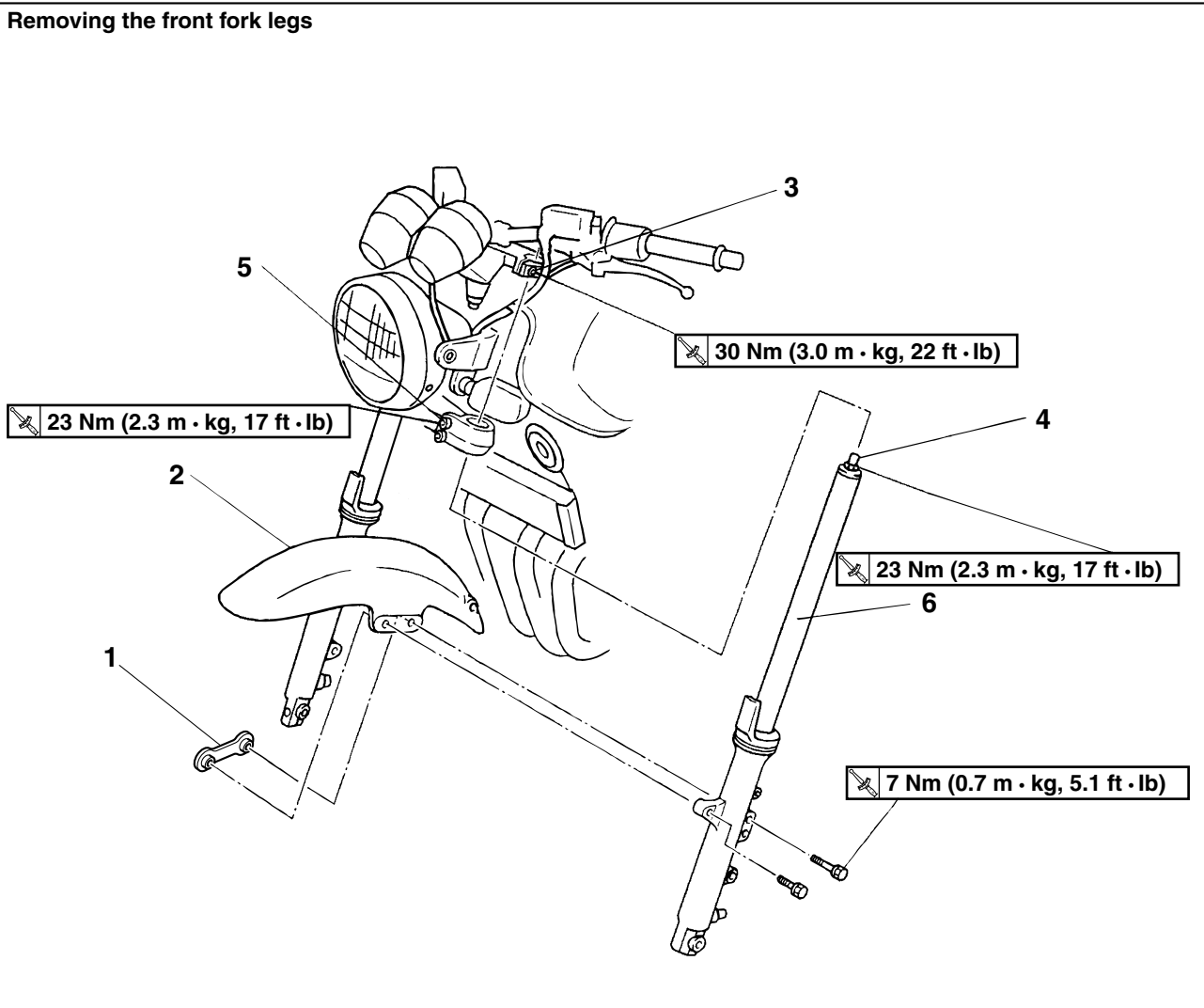


Throttle cable free play
3.0-5.0 mm (0.12-0.20 in)

EAS22950

FRONT FORK

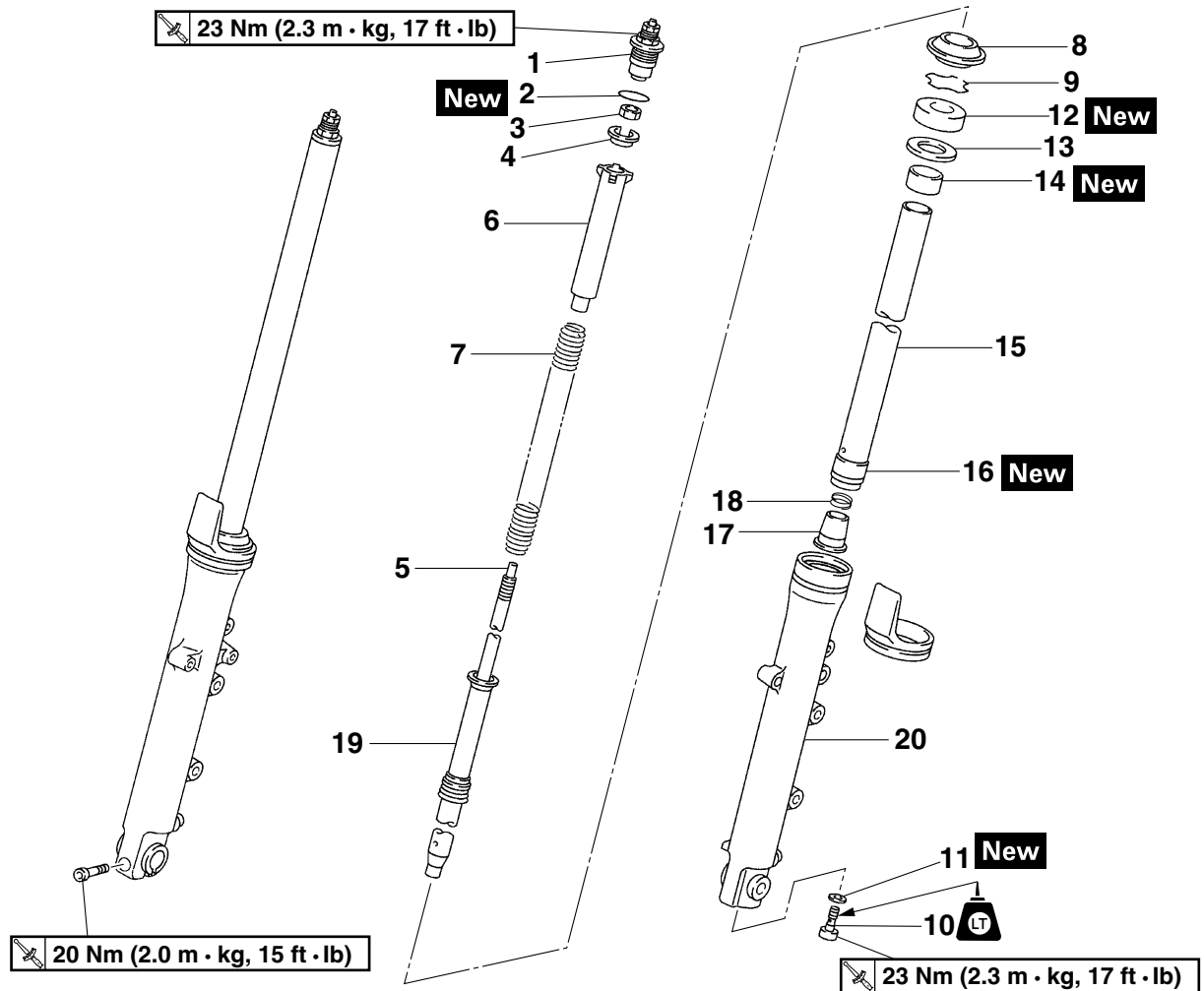
Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
	Front wheel		Refer to "FRONT WHEEL" on page 4-2.
1	Bracket	2	
2	Front fender	1	
3	Upper bracket pinch bolt	2	Loosen.
4	Cap bolt	2	Loosen.
5	Lower bracket pinch bolt	4	Loosen.
6	Fork leg (left/right)	1/1	
			For installation, reverse the removal procedure.

FRONT FORK

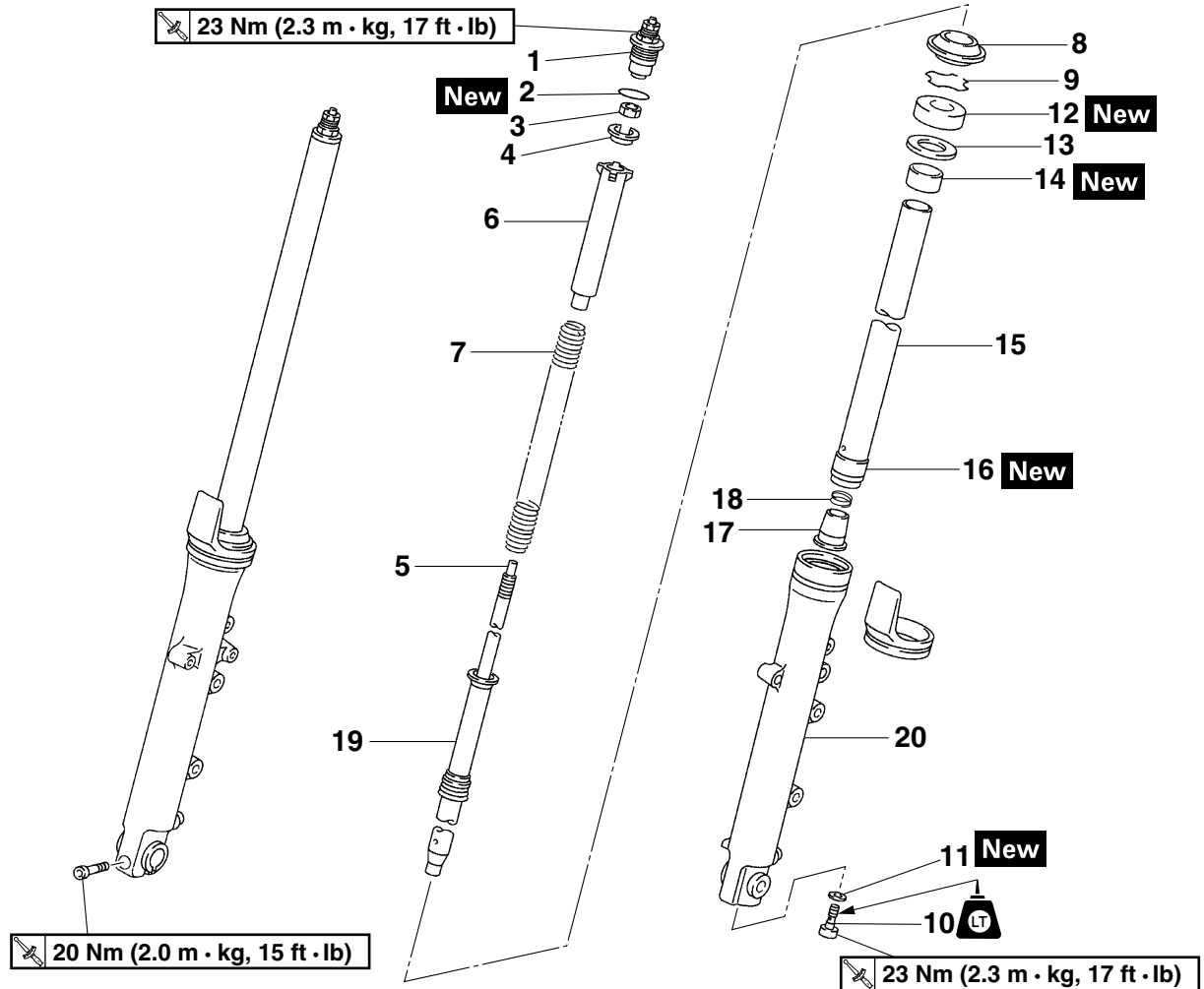
Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
1	Cap bolt	1	
2	O-ring	1	
3	Valve stem lock nut	1	
4	Spring guide	1	
5	Push rod	1	
6	Spacer	1	
7	Spring	1	
8	Dust seal	1	
9	Stopper ring	1	
10	Bolt	1	
11	Gasket	1	
12	Oil seal	1	
13	Oil seal washer	1	
14	Slide metal	1	
15	Inner tube	1	
16	Piston metal	1	
17	Tapered spindle	1	
18	Spring	1	
19	Damper rod assembly	1	
20	Outer tube	1	

FRONT FORK

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			For assembly, reverse the disassembly procedure.

EAS22960

REMOVING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

NOTE:

Place the vehicle on a suitable stand so that the front wheel is elevated.

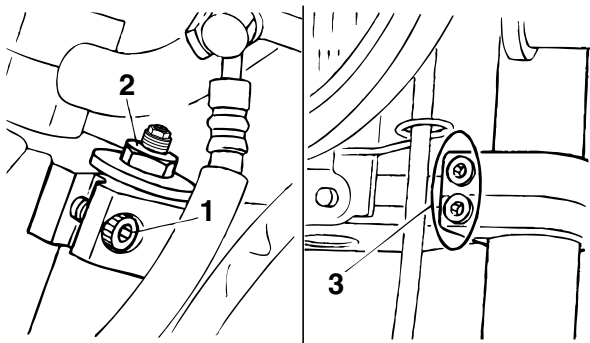
2. Loosen:

- Upper bracket pinch bolt "1"
- Cap bolt "2"
- Lower bracket pinch bolt "3"

EWA13640

WARNING

Before loosening the upper and lower bracket pinch bolts, support the front fork leg.



3. Remove:

- Front fork leg

EAS22990

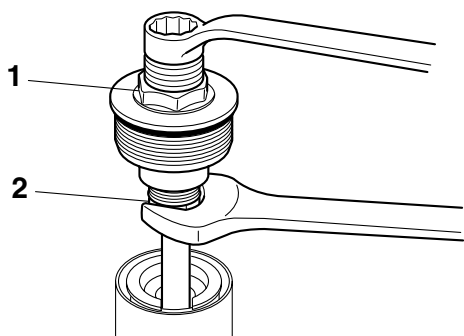
DISASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Remove:

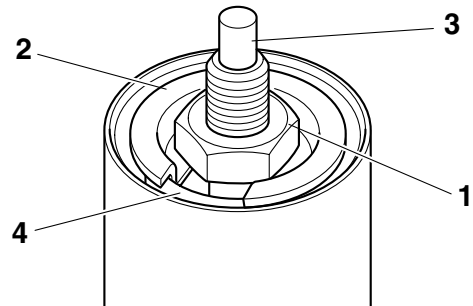
- Cap bolt "1"
(from inner tube)

Loosen "2" and remove.



2. Remove:

- Nut "1"
- Spring guide "2"
- Push rod "3"
- Spacer "4"
- Front fork spring



3. Drain:

- Fork oil

4. Remove:

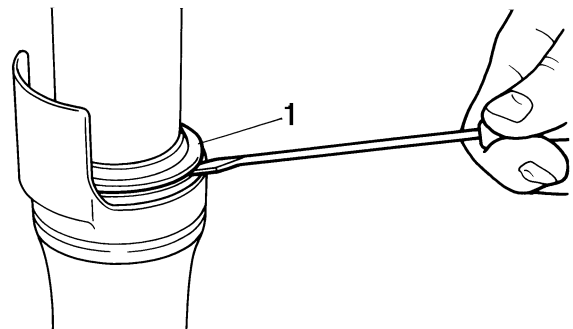
- Dust seal "1"

(with a flat-head screwdriver)

ECA14180

CAUTION:

Do not scratch the inner tube.



5. Remove:

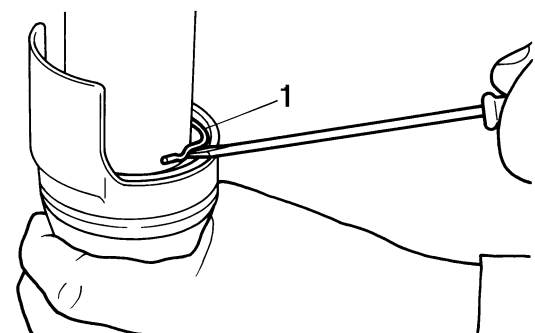
- Stopper ring "1"

(with a flat-head screwdriver)

ECA14180

CAUTION:

Do not scratch the inner tube.



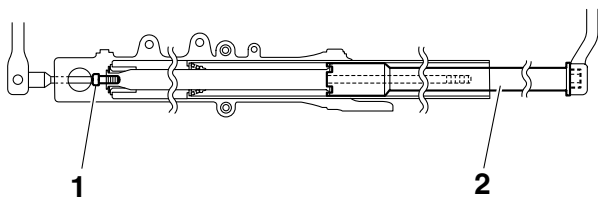
6. Remove:

- Damper rod assembly bolt "1"

- Damper rod assembly

NOTE:

While holding the damper rod with the damper rod holder "2", loosen the damper rod assembly bolt.



7. Remove:

- Inner tube

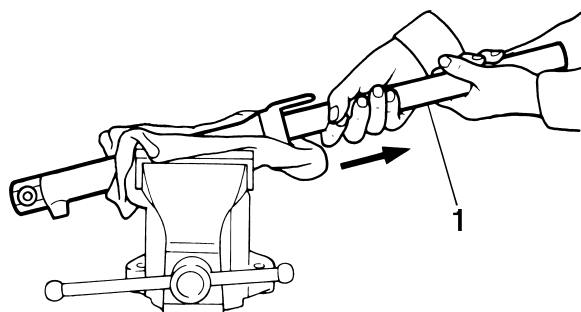


- Hold the front fork leg horizontally.
- Securely clamp the brake caliper bracket in a vise with soft jaws.
- Take care and pull the inner tube "1" with some force, and knock it out from the outer tube.

ECA5UXB006

CAUTION:

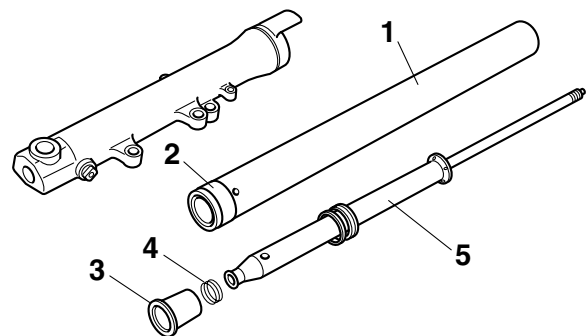
- Excessive force will damage the oil seal and bushing. A damaged oil seal or bushing must be replaced.
- Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.



8. Remove:

- Inner tube "1"
- Piston metal "2"

- Tapered spindle "3"
- Spring "4"
- Damper rod assembly "5"



EAS23010

CHECKING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

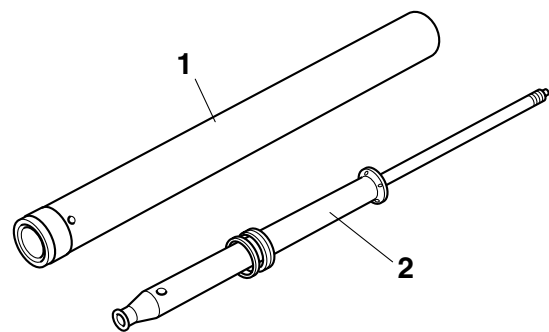
1. Check:

- Inner tube "1"
- Outer tube
Bends/damage/scratches → Replace.
- Damper rod assembly "2"
Damage/wear → Replace.
Obstruction → Blow out all of the oil passages with compressed air.

EWA13650


WARNING

Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

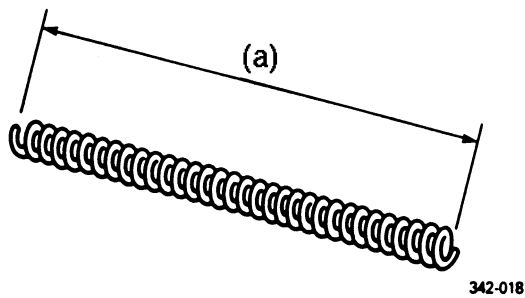


2. Measure:

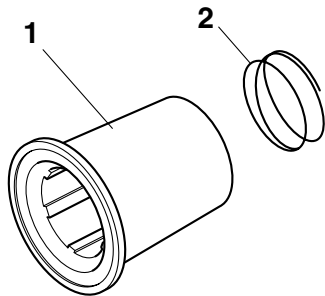
- Spring free length "a"
Out of specification → Replace.

	Fork spring free length
	284.0 mm (11.18 in)
	Limit
	275.5 mm (10.85 in)

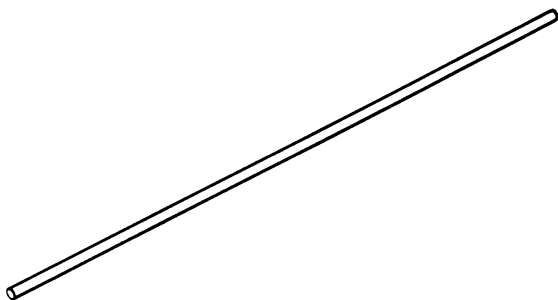
FRONT FORK



3. Check:
- Tapered spindle "1"
 - Spring "2"
- Damage → Replace.



4. Check:
- Cap bolt O-ring
- Damage/wear → Replace.
5. Check:
- Push rod
- Bends/damage/clog → Replace.



EAS23040

ASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

EWA13660

WARNING

- Make sure the oil levels in both front fork legs are equal.
- Uneven oil levels can result in poor handling and a loss of stability.

NOTE:

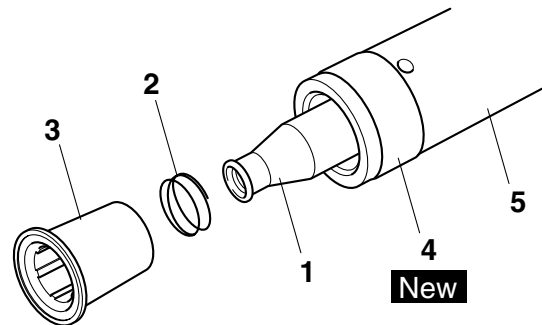
- When assembling the front fork leg, be sure to replace the following parts:
 - Slide metal
 - Piston metal
 - Oil seal
 - Dust seal
- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:
- Damper rod assembly "1"
 - Spring "2"
 - Tapered spindle "3"
 - Piston metal "4" **New**
 - Inner tube "5"

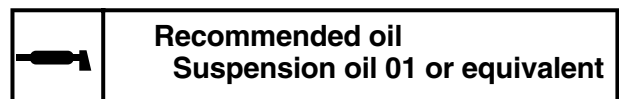
ECA5UXB009

CAUTION:

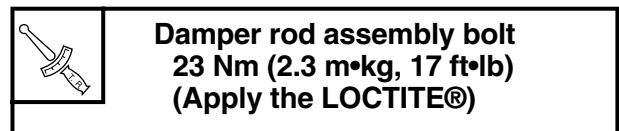
Allow the damper rod assembly to slide slowly down the inner tube "2" until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.



2. Lubricate:
- Inner tube's outer surface



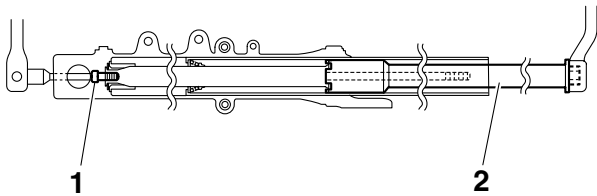
3. Install:
- Gasket
 - Damper rod assembly bolt "1"



NOTE:

While holding the damper rod assembly with the damper rod holder "2", tighten the damper rod assembly bolt.





4. Install:

- Slide metal "1" **New**
- Oil seal washer "2"
- Oil seal "3" **New**
(with the fork seal driver "4" and attachment "5")

	<p>Fork seal driver weight 90890-01367</p> <p>Replacement hammer YM-A9409-7</p> <p>Fork seal driver attachment (ø43) 90890-01374</p> <p>Replacement 43 mm YM-A5142-3</p>
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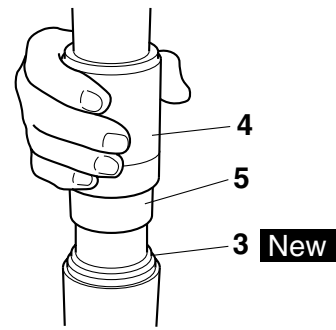
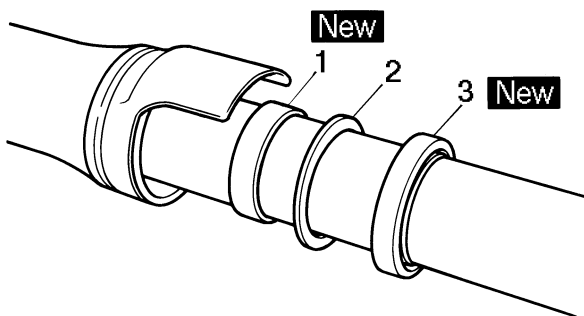
ECA5UXB015

CAUTION:

Make sure the numbered side of the oil seal faces up.

NOTE:

- Before installing the oil seal, lubricate its lips with lithium soap base grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.



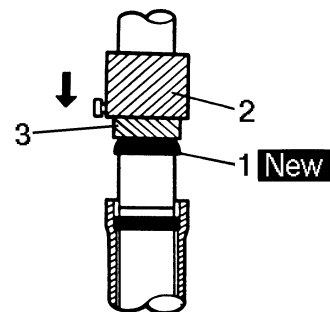
5. Install:

- Stopper ring
- Dust seal "1" **New**
(with the fork seal driver "2" and attachment "3")

	<p>Fork seal driver weight 90890-01367</p> <p>Replacement hammer YM-A9409-7</p> <p>Fork seal driver attachment (ø43) 90890-01374</p> <p>Replacement 43 mm YM-A5142-3</p>
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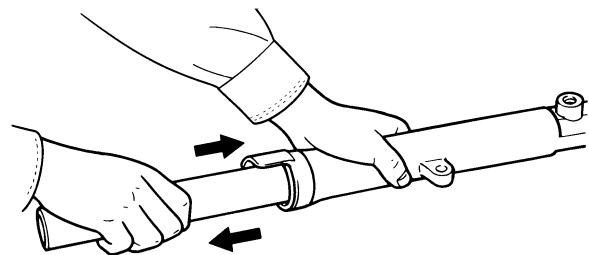
NOTE:

Fit the stopper ring into the outer tube.



6. Check:


- Inner tube operation
Not operating smoothly → Disassemble and check again.



7. Fully compress the front fork leg.

FRONT FORK

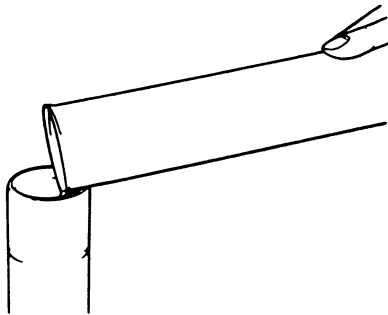
8. Fill the fork oil with the specified amount of the recommended.
- Front fork leg

	Recommended oil Suspension oil 01 or equivalent Quantity 516.0 cm³ (17.45 US oz) (18.20 Imp.oz)
---	---

ECA14230

CAUTION:

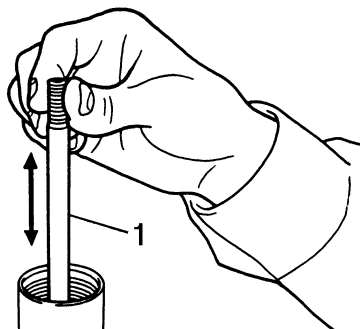
- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.



9. After filling the front fork leg, slowly stroke the damper rod "1" up and down (at least ten times) to distribute the fork oil.

NOTE:

Be sure to stroke the damper rod slowly because the fork oil may spurt out.



10. Slowly stroke the inner tube "1" up and down to distribute the fork oil once more. (1 stroke = approx. 150 mm)

NOTE:

Be careful not to stroke the inner tube over 150 mm (8.12 in) as this will cause air to enter.

11. Before measuring the fork oil level, wait ten

minutes until the oil has settled and the air bubbles have dispersed.


ECA5UXB007

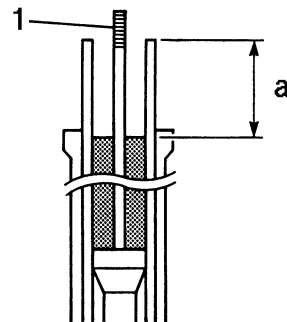
CAUTION:

Be sure to fill to the top of the inner tube with fork oil and remove air. If the inner tube is not filled to the top, the fork oil will not circulate outside the tube, resulting in incorrect spring performance.

12. Measure:

- Front fork leg oil level "a" (at max. pressure)
Out of specification → Correct.


	Level 125.0 mm (4.92 in)
---	---

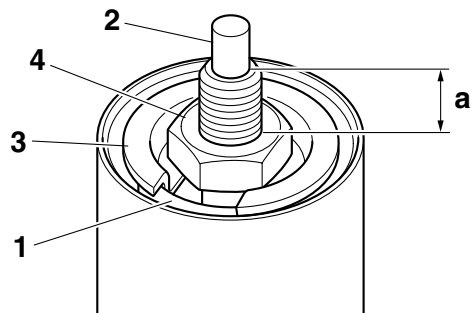


13. Install:

- Fork spring
- Spacer "1"
- Push rod "2"
- Spring guide "3"
- Nut "4"
- Cap bolt

- a. Install the nut "4" and locate in the specified position "a".

	Nut location (from top of damper rod to top of nut) "a". 11 mm
---	---

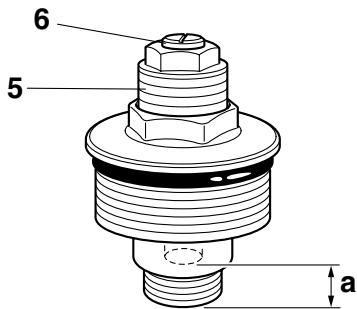


- b. Adjust the adjuster "5" to the standard position.

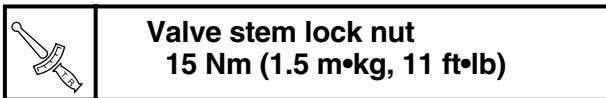
FRONT FORK

Refer to “ADJUSTING THE FRONT FORKS” on page 3-27.

- c. Measure the distance from the adjuster “5” bottom end to the adjuster “6” bottom end.



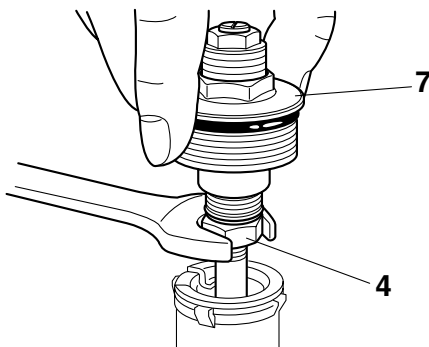
- d. When not “a”, turn adjuster “6”. Refer to “ADJUSTING THE FRONT FORKS” on page 3-27.
 e. Install the cap bolt “7” and finger tighten it.
 f. Hold the cap bolt and tighten the damper adjusting rod locknut “4” to specification.



EWA13670

WARNING

Always use a new cap bolt O-ring.



- g. Fit the cap bolt to the inner tube and temporarily tighten.



EAS23050

INSTALLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Install:
- Front fork leg
- Temporarily tighten the upper and lower

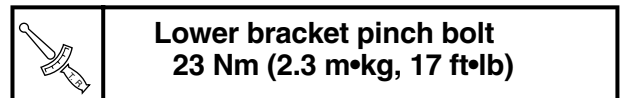
bracket pinch bolts.

NOTE:

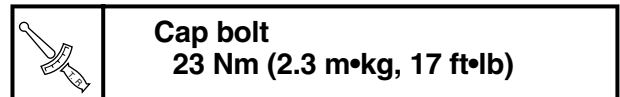
Check that the top end of the inner tube is level with the upper bracket’s top end.



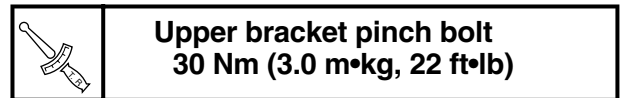
2. Tighten:
- Lower bracket pinch bolt “1”



- Cap bolt “2”



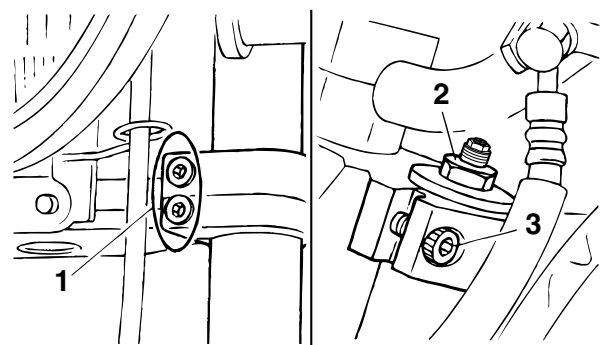
- Upper bracket pinch bolt “3”



EWA13680

WARNING

Make sure the brake hoses are routed properly.

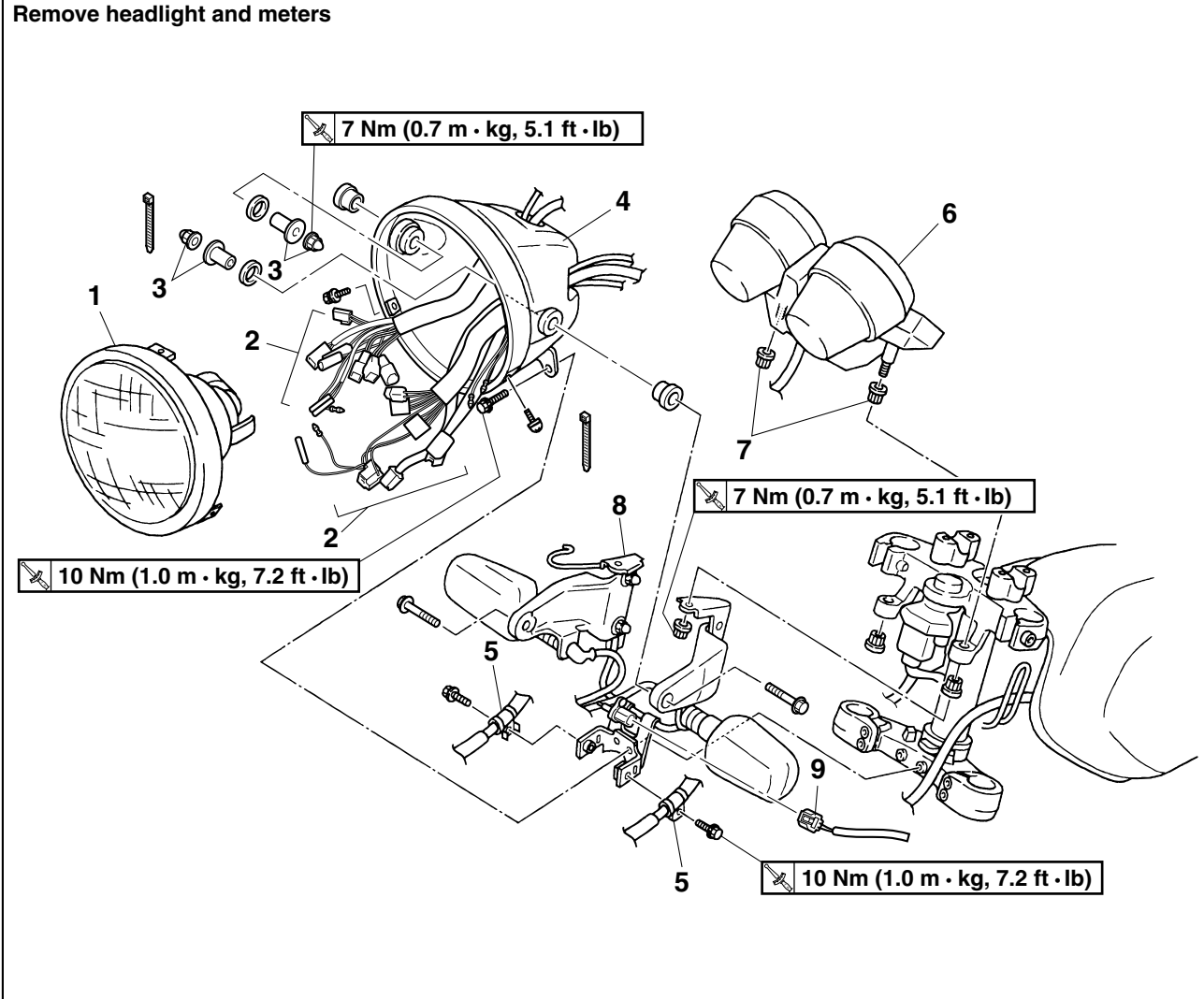


3. Adjust:
- Spring preload
 - Rebound damping
 - Compression damping
- Refer to “ADJUSTING THE FRONT FORKS” on page 3-27.

STEERING HEAD

EAS23090

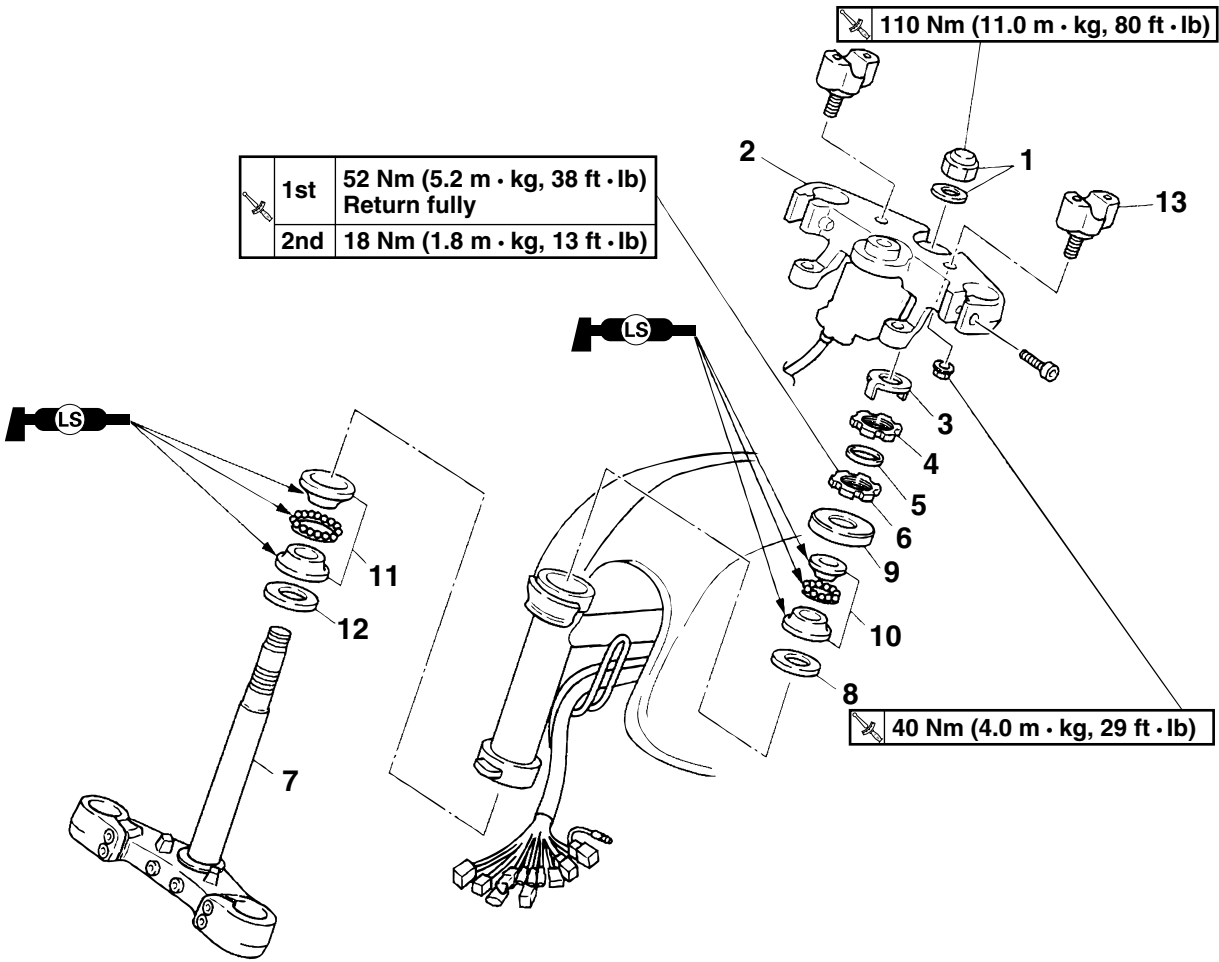
STEERING HEAD



Order	Job/Parts to remove	Q'ty	Remarks
	Front fork leg(s)		Refer to "FRONT FORK" on page 4-41.
1	Headlight unit	1	
2	Headlight body internal connections	—	Disconnect.
3	Nut/Collar	2/2	
4	Headlight body	1	
5	Brake hose holder	2	
6	Meter assemblies	1	
7	Damper	4	
8	Headlight bracket	1	
9	Temperature sensor lead coupler	1	Disconnect.
			For installation, reverse the removal procedure.

STEERING HEAD

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Headlight unit/meter assembly		
1	Steering stem nut/plate washer	1/1	
2	Upper bracket	1	
3	Special washer	1	
4	Upper ring nut	1	
5	Rubber washer	1	
6	Lower ring nut	1	
7	Lower bracket	1	
8	Dust seal	1	
9	Ball race cover	1	
10	Bearing set (upper)	1	
11	Bearing set (lower)	1	
12	Dust seal	1	
13	Handlebar lower holder	2	
			For installation, reverse the removal procedure.

EAS23100

REMOVING THE LOWER BRACKET

- Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

- Remove:
 - Ring nut "1"
 - (with a steering nut wrench "2")

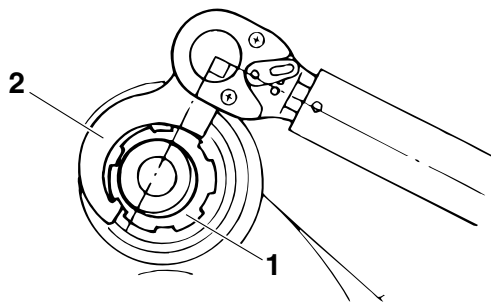


Steering nut wrench
90890-01403
Spanner wrench
YU-38975

EWA13730

WARNING

Securely support the lower bracket so that there is no danger of it falling.



EAS23120

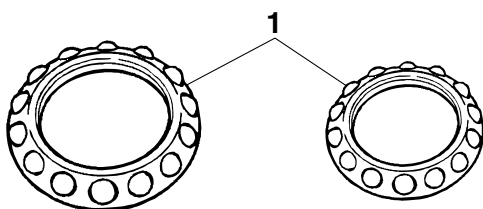
CHECKING THE STEERING HEAD

- Wash:
 - Bearings
 - Bearing races



Recommended cleaning solvent
Kerosene

- Check:
 - Bearings "1"
 - Bearing races
 - Damage/pitting → Replace.



- Replace:
 - Bearings
 - Bearing races

- Remove the bearing races from the steering head pipe with a long rod "1" and hammer.
- Remove the bearing race from the lower bracket with a floor chisel "2" and hammer.
- Install a new dust seal and new bearing races.

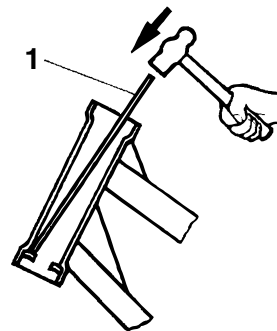
ECA14270

CAUTION:

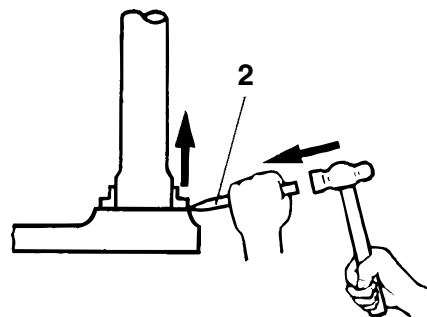
If the bearing race is not installed properly, the steering head pipe could be damaged.

NOTE:

- Always replace the bearings and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.



354-005



354-007

- Check:
 - Upper bracket
 - Lower bracket (along with the steering stem)
 - Bends/cracks/damage → Replace.

EAS23140

INSTALLING THE STEERING HEAD

- Lubricate:
 - Upper bearing

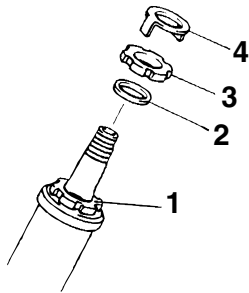
- Lower bearing
- Bearing races



2. Install:

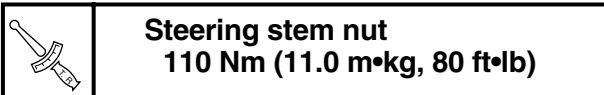
- Lower ring nut “1”
- Rubber washer “2”
- Upper ring nut “3”
- Lock washer “4”

Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” on page 3-25.



3. Install:

- Upper bracket
- Steering stem nut



4. Install:

- Front fork legs

Refer to “FRONT FORK” on page 4-41.

NOTE:

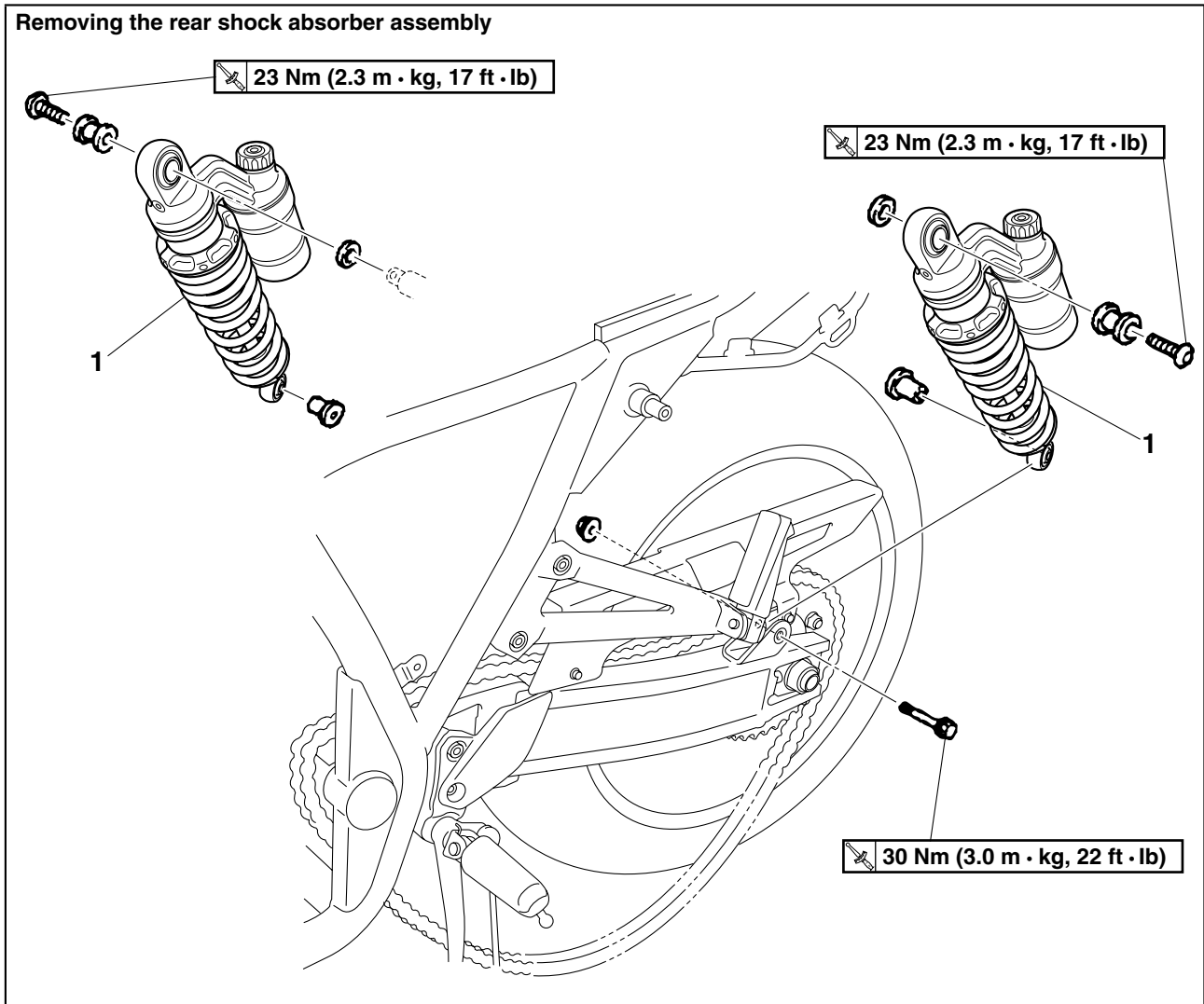
Temporarily tighten the upper and lower bracket pinch bolts.

REAR SHOCK ABSORBER ASSEMBLY

EAS23160

REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Right/left rear shock absorber assembly	1/1	
			For installation, reverse the removal procedure.

REAR SHOCK ABSORBER ASSEMBLY

EAS23170

HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

EWA13750

WARNING

This rear shock absorber and gas cylinder contain highly compressed nitrogen gas. Before handling the rear shock absorber or gas cylinder, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber and gas cylinder.

- Do not tamper or attempt to open the rear shock absorber or gas cylinder.
- Do not subject the rear shock absorber or gas cylinder to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber or gas cylinder in any way. If the rear shock absorber, gas cylinder or both are damaged, damping performance will suffer.

EAS23200

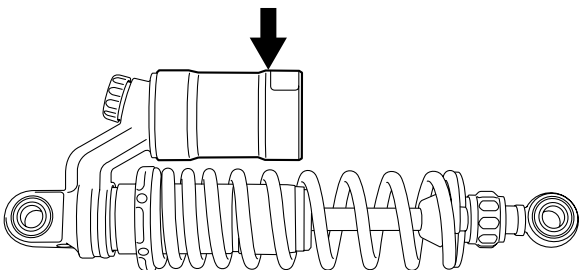
DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER

1. Gas pressure must be released before disposing of a rear shock absorber and gas cylinder. To release the gas pressure, drill a 2-3 mm hole through the rear shock absorber at a point 15-20mm from its end as shown.

EWA13760

WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS23220

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

NOTE:

Place the vehicle the mainstand so that the rear wheel is elevated.

2. Remove:

- Rear shock absorber assembly

NOTE:

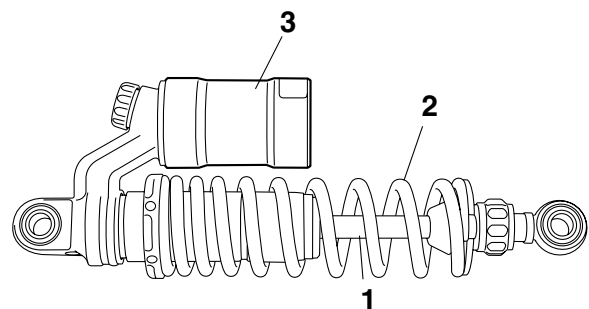
Remove left and right upper bolts, fully lower the rear arm, and remove the lower bolts of the rear shock absorber assembly.

EAS23250

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:

- Rear shock absorber rod "1"
Bends/damage → Replace the rear shock absorber assembly.
- Rear shock absorber
Gas leaks/oil leaks → Replace the rear shock absorber assembly.
- Spring "2"
Damage/wear → Replace the rear shock absorber assembly.
- Gas cylinder "3"
Damage/gas leaks → Replace the rear shock absorber assembly.
- Bushings
Damage/wear → Replace.
- Dust seals
Damage/wear → Replace.
- Bolts
Bends/damage/wear → Replace.



REAR SHOCK ABSORBER ASSEMBLY

EAS23320

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:

- Rear shock absorber assembly

NOTE:

With the rear shock absorber assembly, tighten in the order: left/right lower bolts, then upper bolts.



**Rear shock absorber assembly
lower bolt**

30 Nm (3.0 m•kg, 22 ft•lb)

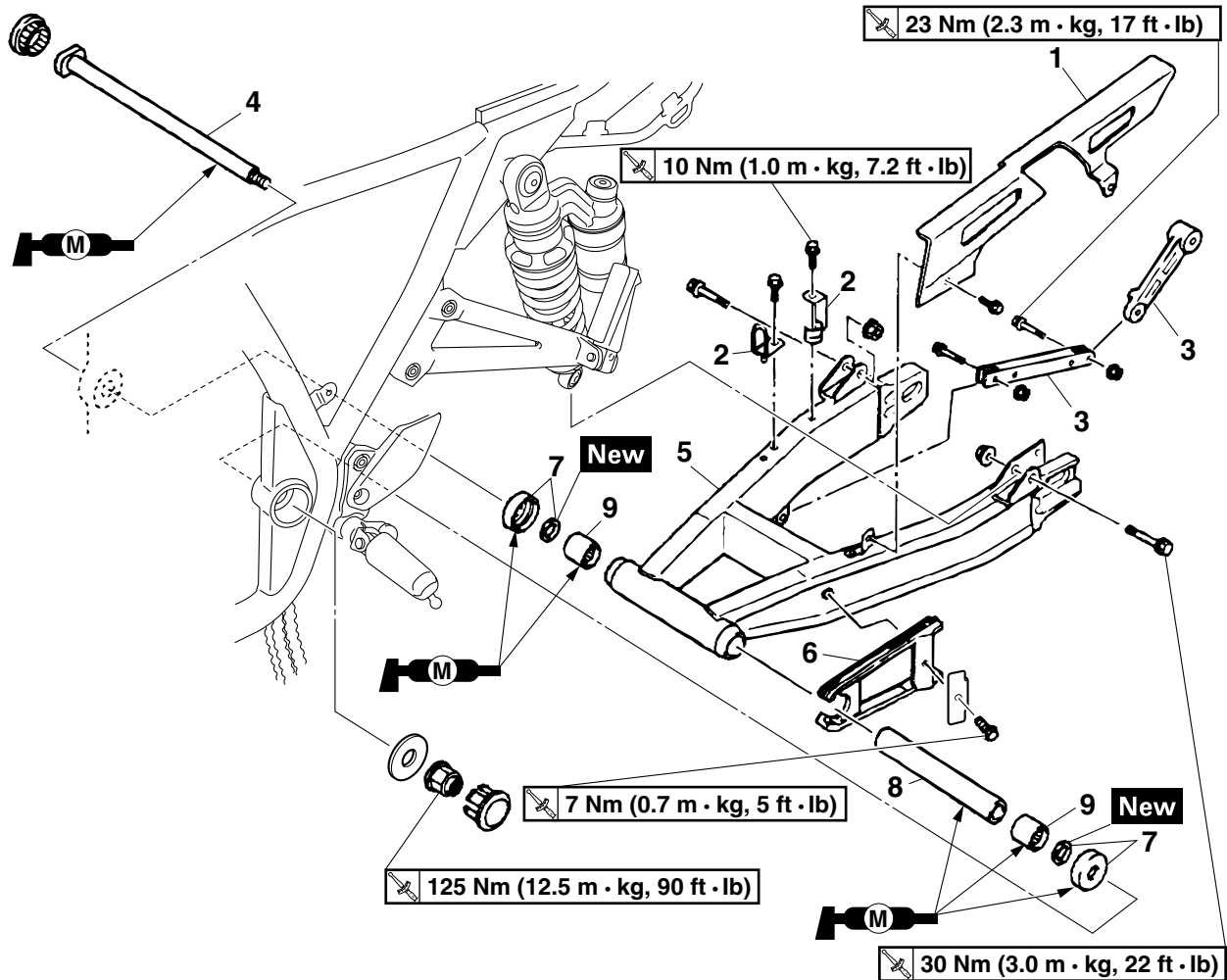
**Rear shock absorber assembly
upper bolt**

23 Nm (2.3 m•kg, 17 ft•lb)

EAS23330

SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-8.
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-54.
1	Chain case	1	
2	Brake hose clamp	2	
3	Brake torque rod/brake caliper bracket	1/1	
4	Pivot shaft	1	
5	Swingarm	1	
6	Seal guard	1	
7	Thrust cover/oil seal	2/2	
8	Bushing	1	
9	Bearing	2	
			For installation, reverse the removal procedure.

EAS23340

REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.


NOTE:

Place the vehicle the suitable stand so that the rear wheel is elevated.

2. Measure:


- Swingarm side play
- Swingarm up/down stroke

a. Measure the tightening torque of the swingarm pivot shaft nut.

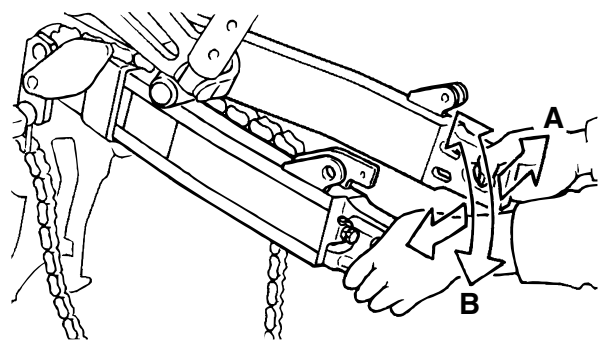
	Swingarm pivot shaft nut 125 Nm (12.5 m•kg, 90 ft•lb)
---	---

b. Measure the swingarm side play “A” by moving the swingarm from side to side.

c. If the swingarm side play is out of specification, check the spacers and bearings.

	Swingarm side play (at the end of the swingarm) 1 mm (0.04 in)
---	--

d. Check the swingarm vertical movement “B” by moving the swingarm up and down. If swingarm vertical movement is not smooth or if there is binding, check the spacers and bearings.

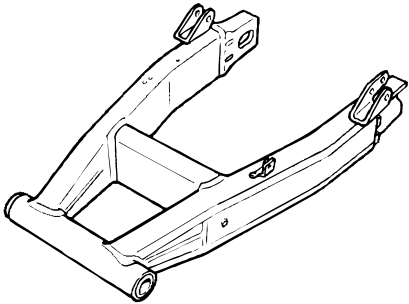


EAS23370

CHECKING THE SWINGARM

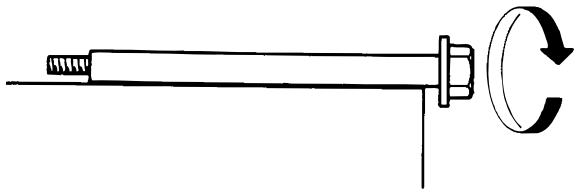
1. Check:

- Swingarm
- Bends/cracks/damage → Replace.



2. Check:

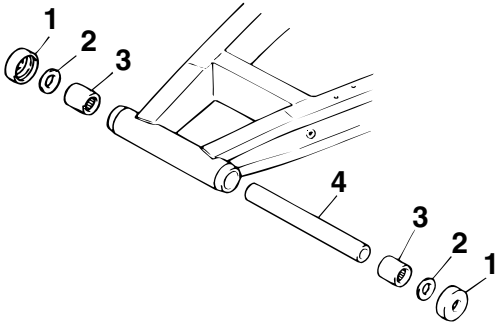
- Pivot shaft
- Bends/damage → Replace.



340-008

3. Check:

- Thrust cover “1”
 - Oil seals “2”
 - Bearings “3”
 - Spacer “4”
- Damage/wear → Replace.




EAS23380

INSTALLING THE SWINGARM

1. Lubricate:

- Bearings
- Spacers
- Thrust cover
- Pivot shaft

	Recommended lubricant Molybdenum disulfide grease
---	---

2. Install:

- Bearings

- Spacers
- Oil seals **New**
- Thrust cover
- Swingarm
- Pivot shaft

3. Install:

- Rear shock absorber assembly
- Rear wheel

Refer to “REAR SHOCK ABSORBER ASSEMBLY” on page 4-54 and “REAR WHEEL” on page 4-8.

4. Adjust:

- Drive chain slack
Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-24.

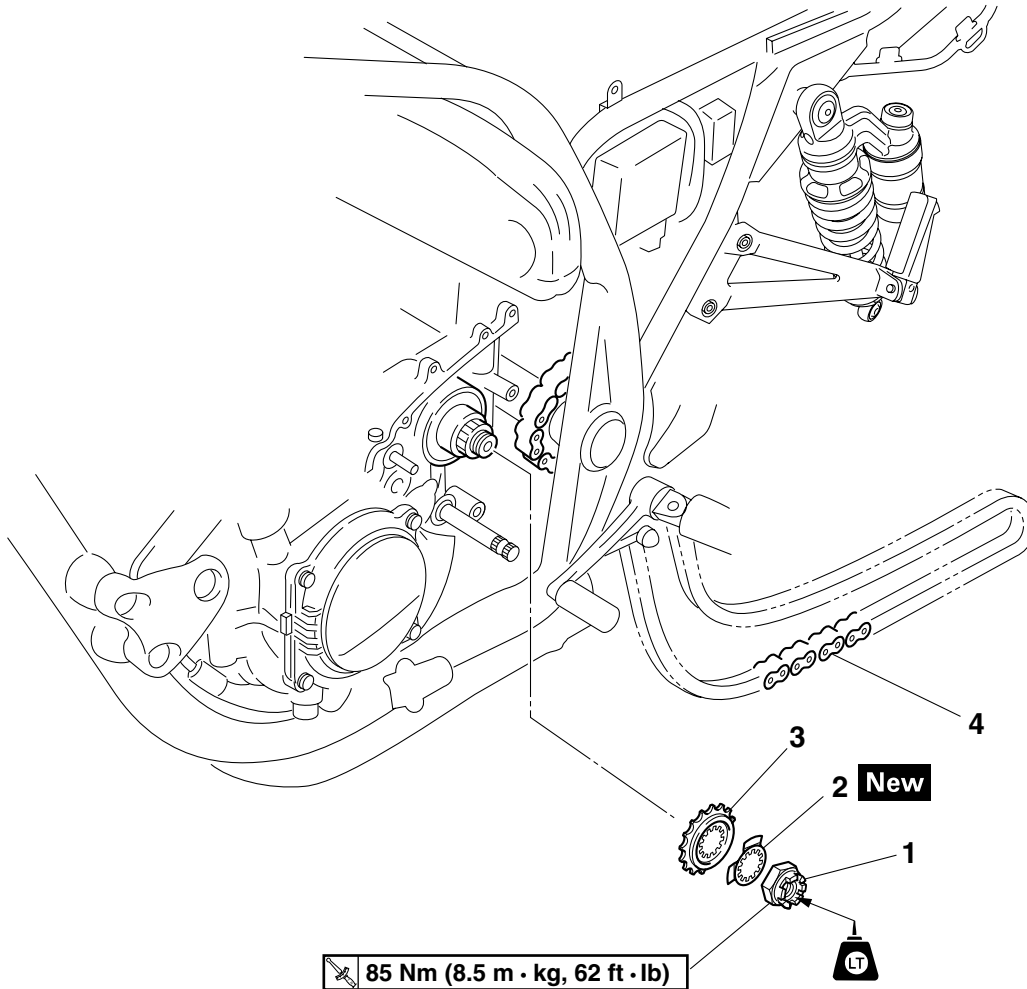


Drive chain slack
20.0–30.0 mm (0.79–1.18 in)

EAS23400

CHAIN DRIVE

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket nut		Loosen Refer to "ENGINE REMOVAL" on page 5-1.
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-54.
	Rear wheel		Refer to "REAR WHEEL" on page 4-8.
	Swingarm		Refer to "SWINGARM" on page 4-57.
1	Drive sprocket nut	1	
2	Lock washer	1	
3	Drive sprocket	1	
4	Drive chain	1	
			For installation, reverse the removal procedure.

EAS23410

REMOVING THE DRIVE CHAIN

- Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

NOTE:

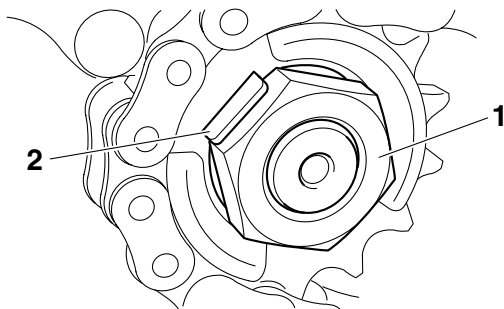
Place the vehicle on a suitable stand so that the rear wheel is elevated.

- Remove:

- Drive sprocket nut “1”
- Lock washer “2”

NOTE:

- Straighten the lock washer tab.
- Operate the rear brake, and loosen the drive sprocket.
- After loosening the drive sprocket, remove the rear wheel and swingarm.



- Remove:

- REAR WHEEL
Refer to “REAR WHEEL” on page 4-8.
- Swingarm
Refer to “SWINGARM” on page 4-57.

EAS23440

CHECKING THE DRIVE CHAIN

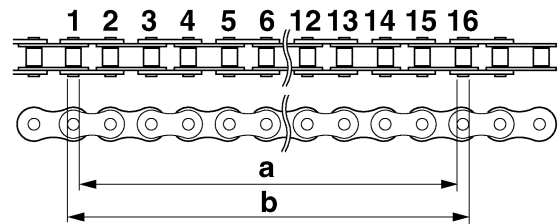
- Measure:

- 15-link length of the drive chain
Out of specification → Replace the drive chain.



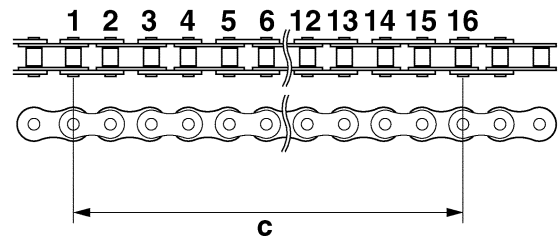
15-link length limit
239.3 mm (9.42 in)

- Measure the 15-link section inside length “a” and pin outer length “b”.



- Measure the drive chain’s 15-link length “c” using the following formula.

15-link section “a” of the drive chain = (Pin inside length “a” + pin outer length “b”)/2

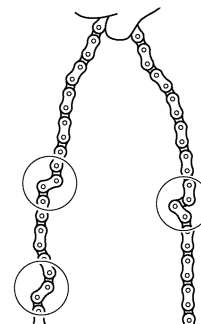


NOTE:

- While measuring the 15-link section, push down on the drive chain to increase its tension.
- Perform this measurement at two or three different places.

- Check:

- Drive chain
Stiffness → Clean and lubricate or replace.



- Clean:

- Drive chain

- Wipe the drive chain with a clean cloth.

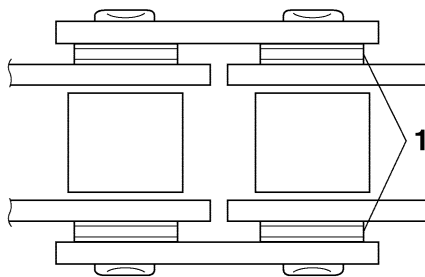
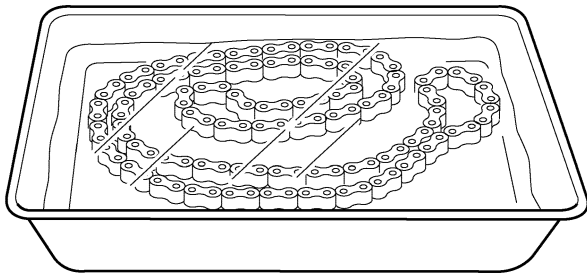
- Put the drive chain in kerosene and remove any remaining dirt.

c. Remove the drive chain from the kerosene and completely dry it.

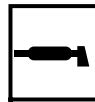
ECA5C11003

CAUTION:

This vehicle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings.



- Drive chain



Recommended lubricant
Engine oil or chain lubricant suitable for O-ring chains

EAS23460

CHECKING THE DRIVE SPROCKET

1. Check:
 - Drive sprocket
 Refer to "CHECKING THE REAR WHEEL SPROCKET" on page 4-11.

EAS23470

CHECKING THE REAR WHEEL SPROCKET

1. Check:
 - Rear wheel sprocket
 Refer to "CHECKING THE REAR WHEEL SPROCKET" on page 4-11.

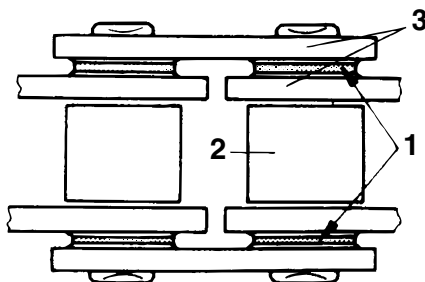
EAS23480

CHECKING THE REAR WHEEL DRIVE HUB

Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-11.



4. Check:
 - O-rings "1"
 - Damage → Replace the drive chain.
 - Drive chain rollers "2"
 - Damage/wear → Replace the drive chain.
 - Drive chain side plates "3"
 - Damage/wear/cracks → Replace the drive chain.



343 003

5. Lubricate:

ENGINE

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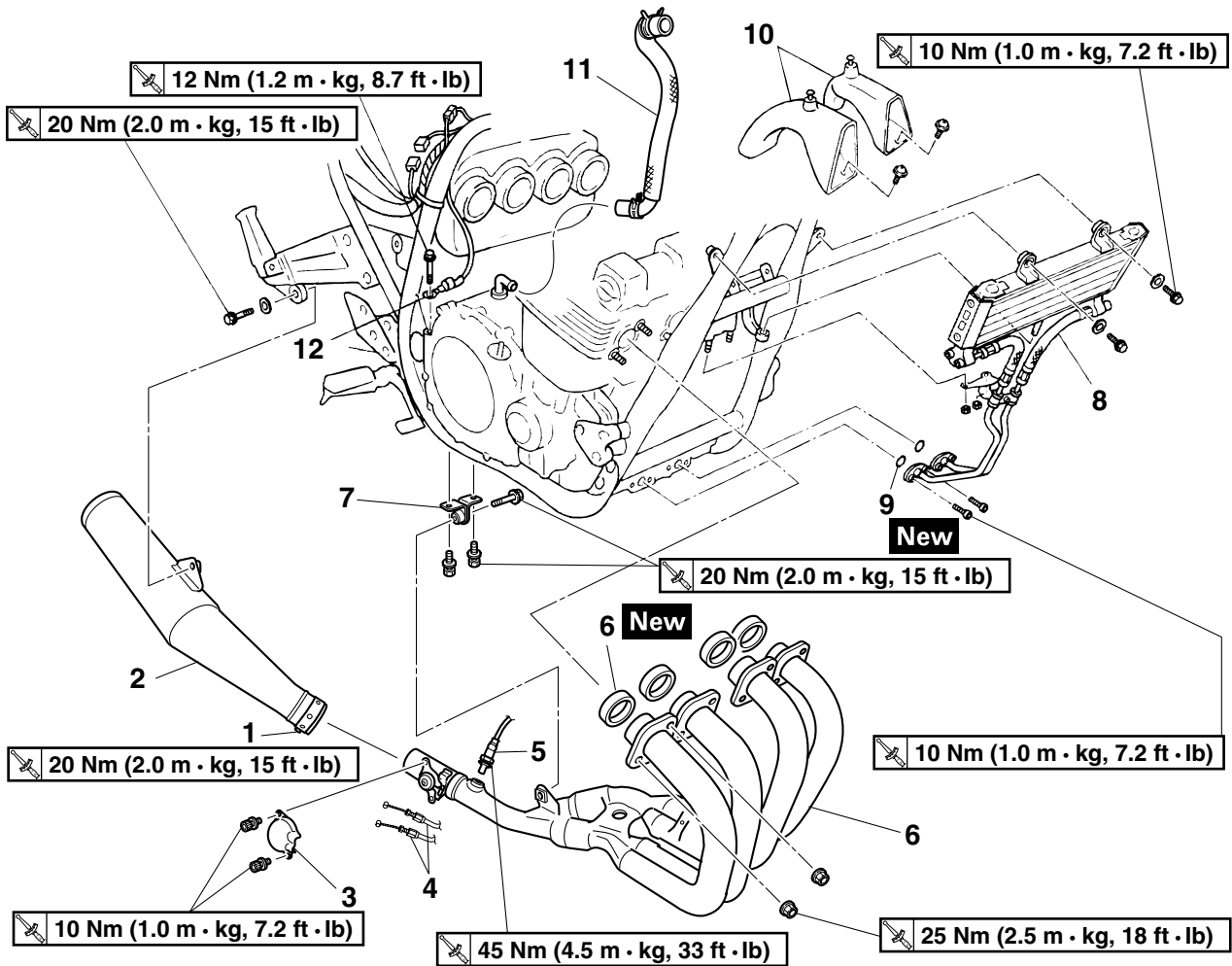
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ENGINE REMOVAL

EAS23710

ENGINE REMOVAL

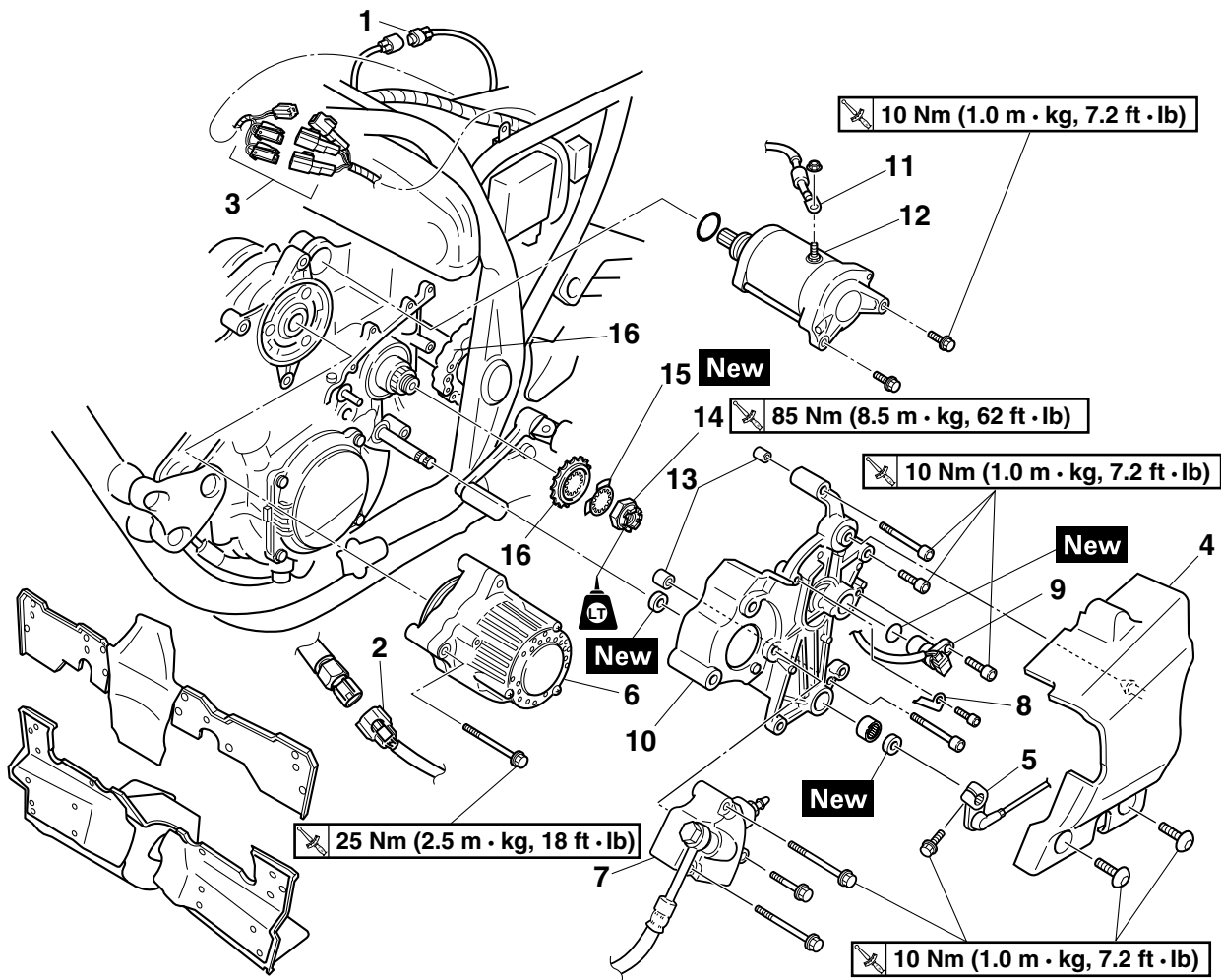
Removing the exhaust pipe



Order	Job/Parts to remove	Q'ty	Remarks
	Seat/side cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 6-4.
	Drain the engine oil.		Refer to "ENGINE" on page 3-4.
1	Exhaust band	1	Loosen
2	Muffler	1	
3	EXUP cover	1	
4	EXUP cable	2	
5	O ₂ sensor	1	
6	Exhaust pipe/exhaust gasket	1/4	
7	Exhaust pipe bracket	1	
8	Oil cooler	1	
9	O-ring	2	
10	Air scoop (left/right)	1/1	
11	Crankcase breather hose	1	
12	Ground lead	1	Disconnect.
			For installation, reverse the removal procedure.

ENGINE REMOVAL

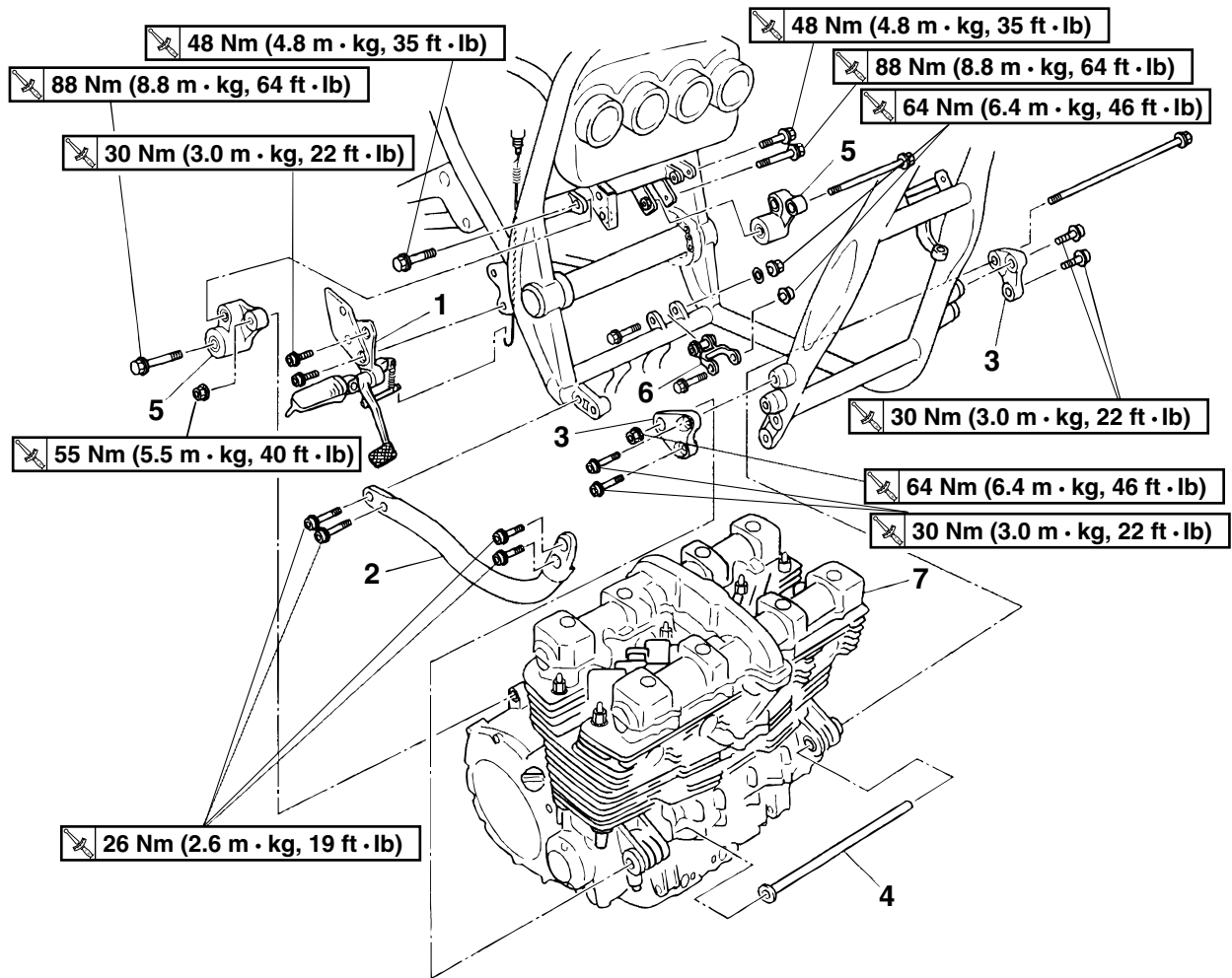
Removing the starter motor, generator and drive chain



Order	Job/Parts to remove	Q'ty	Remarks
1	Starter motor lead	1	
2	Engine temperature sensor coupler	1	
3	Crankshaft position sensor lead/Oil level gauge lead/neutral lead	1/1/1	Disconnect.
4	Crankcase cover 1	1	
5	Shift arm	1	
6	Generator	1	
7	Clutch push lever Comp.	1	
8	Cover stay 1	1	
9	Speed sensor	1	
10	Drive sprocket cover	1	
11	Starter motor lead	1	
12	Starter motor	1	
13	Dowel pin	2	
14	Drive sprocket nut	1	
15	Lock washer	1	
16	Drive sprocket/Drive chain	1/1	
			For installation, reverse the removal procedure.

ENGINE REMOVAL

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
1	Right foot rest assembly	1	
2	Down tube	1	
3	Engine bracket (front)	2	
4	Spacer	1	
5	Engine bracket (rear upper left/rear upper right)	1/1	
6	Engine bracket (rear lower)	1	
7	Engine	1	
			For installation, reverse the removal procedure.

ENGINE REMOVAL

EAS23720

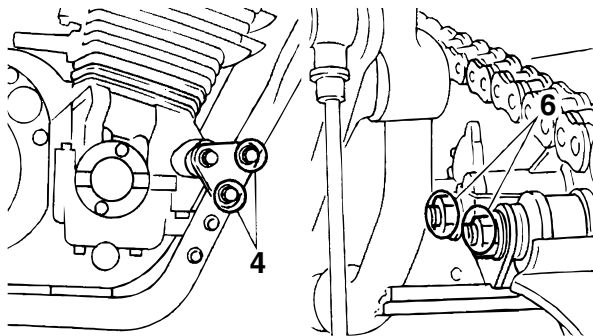
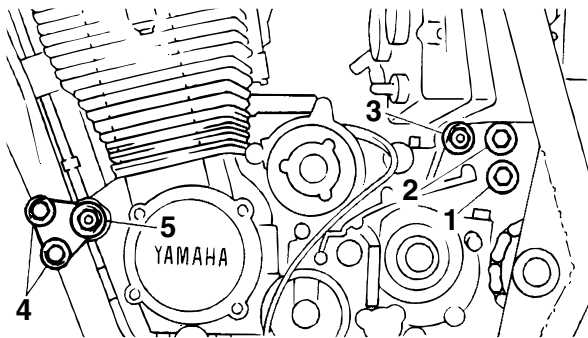
INSTALLING THE ENGINE

1. Install:

- Engine bracket bolt (rear upper) "1"
- Engine bracket bolt (rear upper) "2"
- Engine mounting nut (rear upper) "3"
- Engine bracket bolt (front) "4"
- Engine mounting nut (front) "5"
- Engine mounting nut (rear lower) "6"

NOTE:

Do not fully tighten the bolts. Temporarily tighten)



2. Tighten:

- Engine bracket bolt (rear upper)
- Engine bracket bolt (rear upper)
- Engine mounting nut (rear upper)
- Engine bracket bolt (front)
- Engine mounting nut (front)
- Engine mounting nut (rear lower)



- Engine bracket bolt (rear upper)
88 Nm (8.8 m•kg, 64 ft•lb)
- Engine bracket bolt (rear upper)
48 Nm (4.8 m•kg, 35 ft•lb)
- Engine mounting nut (rear upper)
55 Nm (5.5 m•kg, 40 ft•lb)
- Engine bracket bolt (front)
30 Nm (3.0 m•kg, 22 ft•lb)
- Engine mounting nut (front)
64 Nm (6.4 m•kg, 46 ft•lb)
- Engine mounting nut (rear lower)
64 Nm (6.4 m•kg, 46 ft•lb)

3. Install:

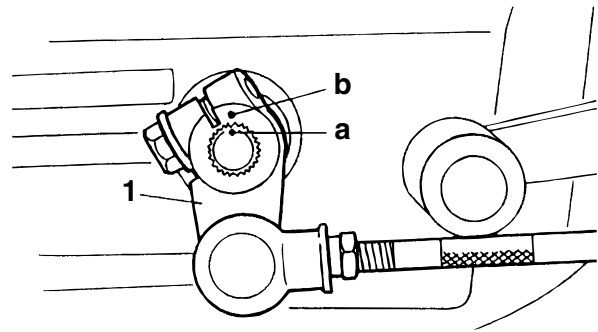
- Shift arm "1"



Shift arm mounting bolt
10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

Align the punch mark "a" in the shift shaft with the punch mark "b" in the shift arm.



4. Adjust:

- Shift pedal position
Refer to "ADJUSTING THE SHIFT PEDAL" on page 3-24.

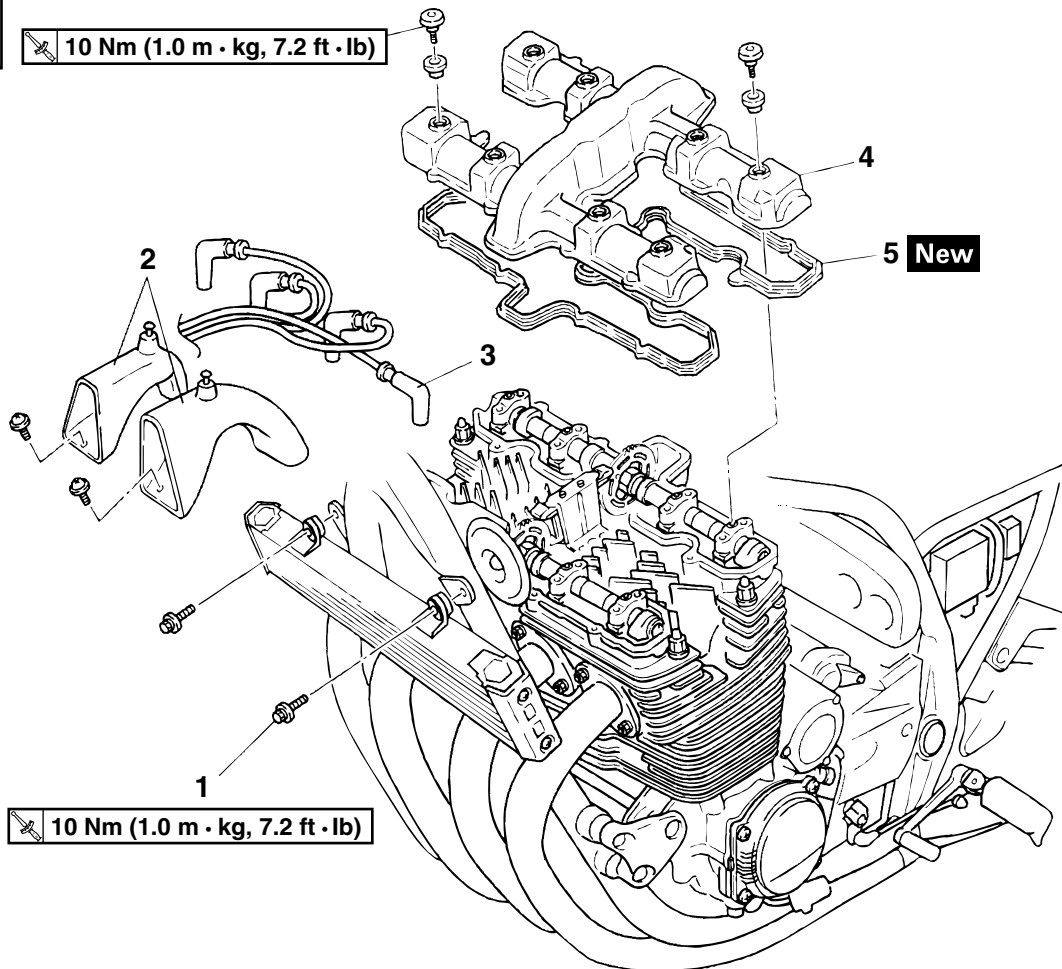
EAS23760

CAMSHAFTS

Removing the cylinder head cover



10 Nm (1.0 m · kg, 7.2 ft · lb)

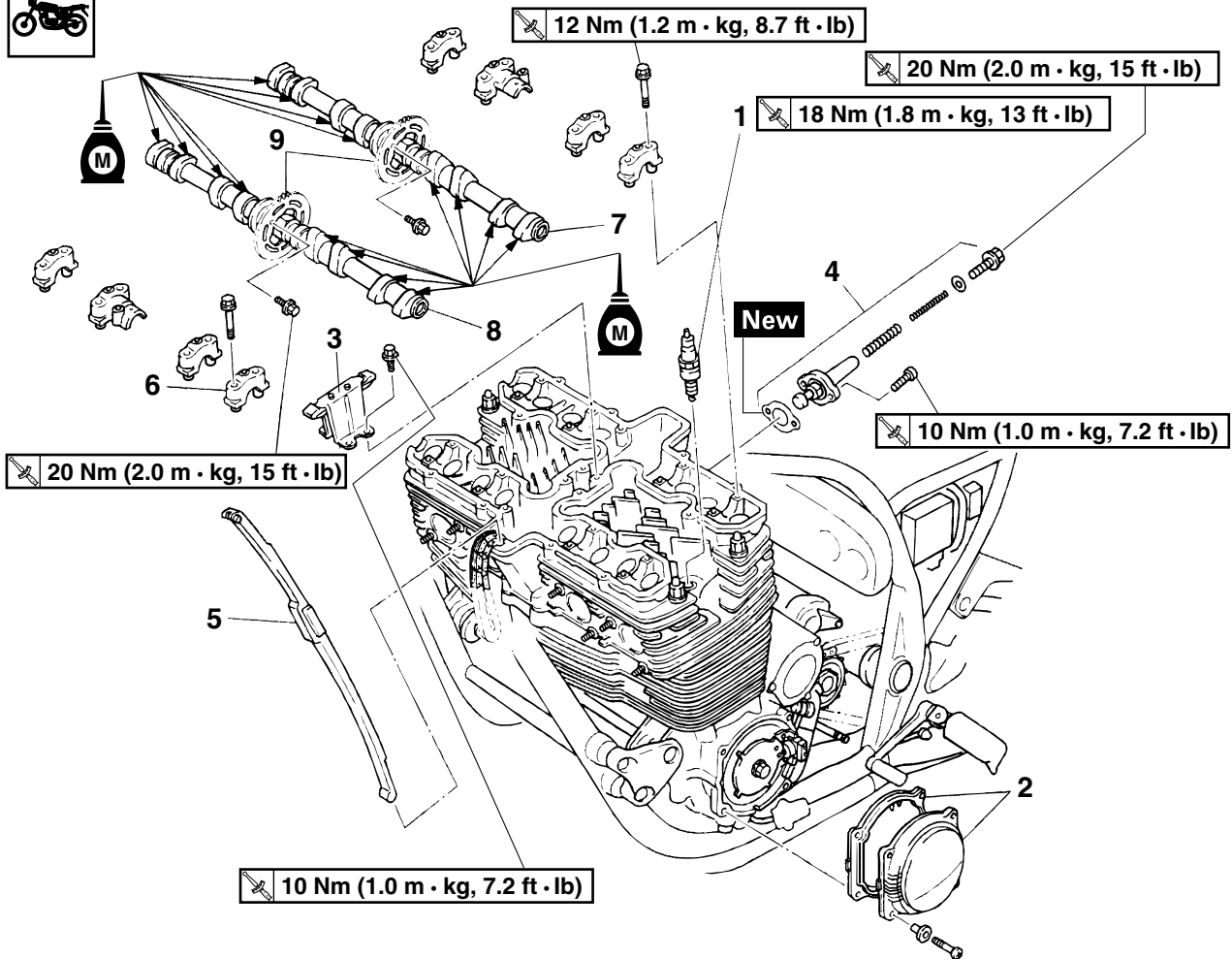


10 Nm (1.0 m · kg, 7.2 ft · lb)

Order	Job/Parts to remove	Q'ty	Remarks
	Air induction system		Refer to "AIR INDUCTION SYSTEM" on page 6-13.
1	Oil cooler bolt	2	
2	Air scoop (left/right)	1/1	
3	Plug cap	4	Disconnect.
4	Cylinder head cover	1	
5	Gasket	1	
			For installation, reverse the removal procedure.

CAMSHAFTS

Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
1	Spark plug	4	
2	Timing plate cover/gasket	1/1	
3	Timing chain guide (top side)	1	
4	Timing chain tensioner assembly	1	
5	Chain guide	1	
6	Camshaft cap	8	
7	Intake camshaft	1	
8	Exhaust camshaft	1	
9	Camshaft sprockets	2	
			For installation, reverse the removal procedure.

EAS23810

REMOVING THE CAMSHAFTS

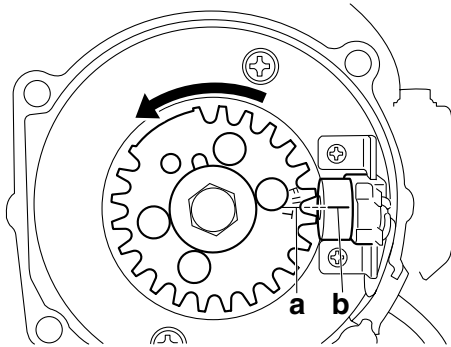
1. Remove:
 - Timing plate cover
2. Align:
 - “T” mark on timing plate
(align with crankshaft position sensor stationary pointer)



- a. Turn the crankshaft clockwise.
- b. When piston #1 is at TDC on the compression stroke, align the “T” mark “a” with the stationary pointer “b”. (TDC)

NOTE:

TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.



3. Loosen:
 - Camshaft sprocket bolts
4. Remove:
 - Timing chain tensioner cap bolt
 - Timing chain tensioner
 - Gasket
5. Remove:
 - Timing chain guide (top side) “1”
 - Camshaft sprockets “2”
 - Camshaft caps “3”
 - Timing chain guide (exhaust side)

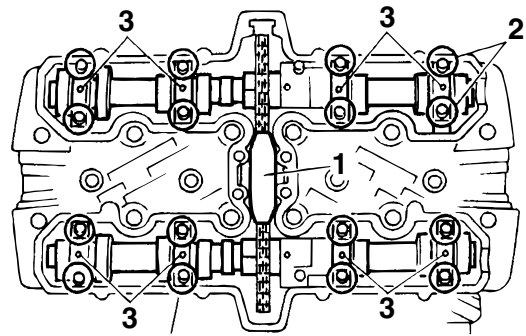
NOTE:

For reference during installation, put identification marks on each camshaft cap.

ECA13720

CAUTION:

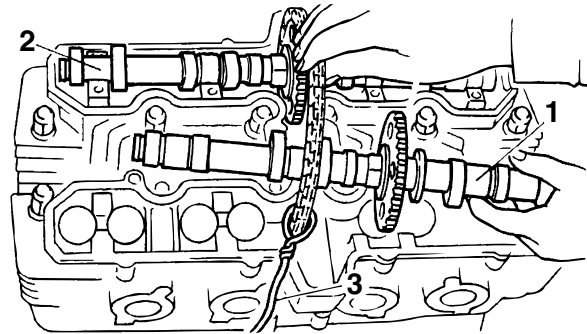
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.



6. Remove:
 - Intake camshaft “1”
 - Exhaust camshaft “2”

NOTE:

To prevent the timing chain from falling into the crankcase, fasten it with a wire “3” to it.



EAS23850

CHECKING THE CAMSHAFTS

1. Check:
 - Camshaft lobes
Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
 - Camshaft lobe dimensions “a” and “b”
Out of specification → Replace the camshaft.



Camshaft lobe dimension limit

Intake A

35.849–35.949 mm
(1.4114–1.4153 in)

Limit

35.749 mm (1.4074 in)

Intake B

28.010–28.110 mm
(1.1023–1.1067 in)

Limit

27.910 mm (1.0988 in)

Exhaust A

35.950–36.050 mm
(1.4154–1.4193 in)

Limit

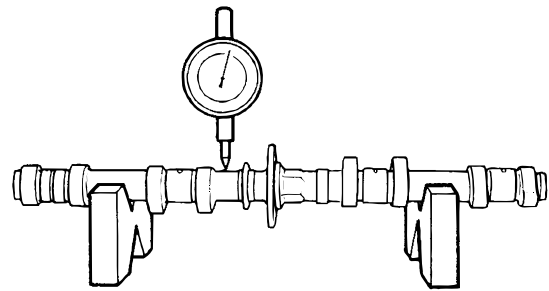
35.850 mm (1.4114 in)

Exhaust B

28.045–28.145 mm
(1.1041–1.1081 in)

Limit

27.945 mm (1.1002 in)



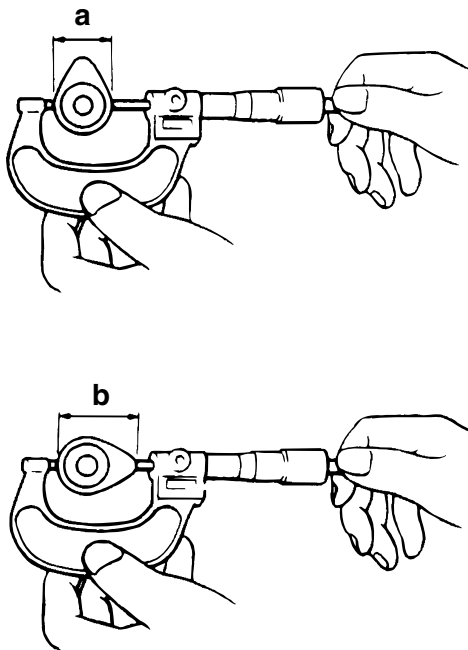
4. Measure:

- Camshaft-journal-to-camshaft-cap clearance
Out of specification → Measure the camshaft journal diameter.



Camshaft-journal-to-camshaft-cap clearance

0.020–0.054 mm
(0.008–0.0021 in)

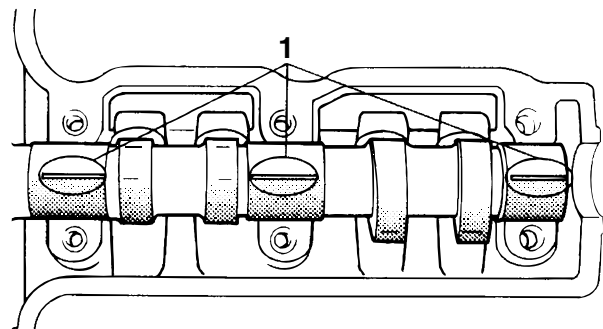


3. Measure:

- Camshaft runout
Out of specification → Replace.



Camshaft runout limit
0.030 mm (0.0012 in)



c. Install the dowel pins and camshaft caps.

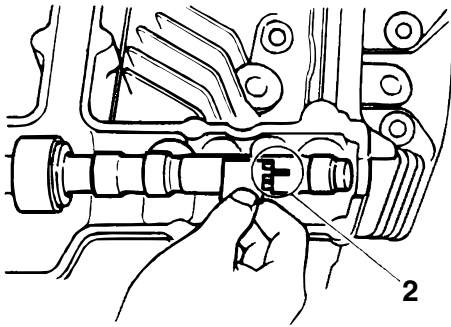
NOTE:

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.

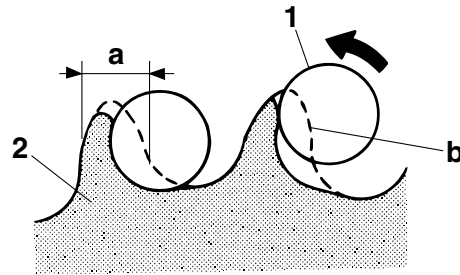


Camshaft cap bolt
12 Nm (1.2 m•kg, 8.7 ft•lb)

- d. Remove the camshaft caps and then measure the width of the Plastigauge® "2".



305 001



- a. Tooth face
- b. Correct

1. Timing chain roller
2. Camshaft sprockets

EAS23950

CHECKING THE TIMING CHAIN GUIDES

1. Check:
 - Timing chain guide (exhaust side)
 - Timing chain guide (top side)
 Damage/wear → Replace.

EAS23960

CHECKING THE TIMING CHAIN TENSIONER

1. Check:
 - Timing chain tensioner
 Cracks/damage → Replace.
2. Check:
 - One-way cam operation
 Rough movement → Replace the timing chain tensioner housing.
3. Check:
 - Cap bolt
 - Spring
 - One-way cam
 - Timing chain tensioner rod
 Damage/wear → Replace.

EAS24000

INSTALLING THE CAMSHAFTS

1. Install:
 - Intake camshaft sprocket
 - Exhaust camshaft sprocket
 (with the camshaft sprockets temporarily tightened)

NOTE:

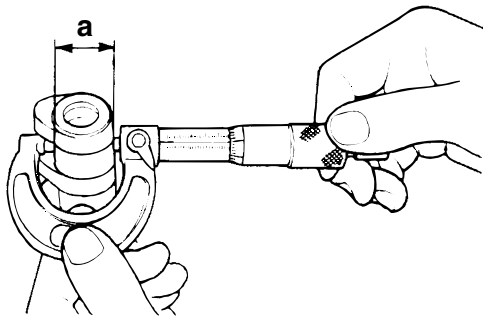
- Align the camshaft position mark “a” to the stamped mark “E” “b” on the exhaust side, and “I” “c” on the intake side when installing (see illustration).
- Do not tighten the camshaft cap bolts yet.

5. Measure:

- Camshaft journal diameter “a”
- Out of specification → Replace the camshaft.
 Within specification → Replace the cylinder head and the camshaft caps as a set.



Camshaft journal diameter “a”
24.967–24.980 mm
(0.9830–0.9835 in)

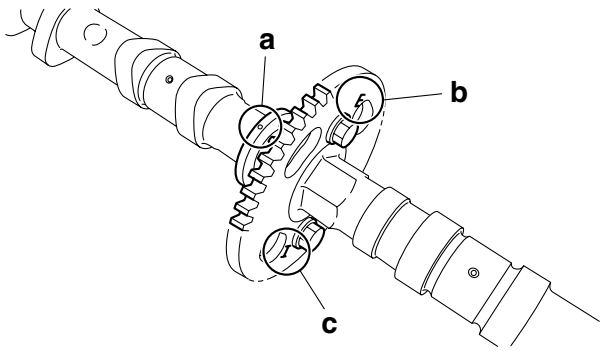


EAS23870

CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

1. Check:
 - Timing chain
 Damage/stiffness → Replace the timing chain and camshaft and camshaft sprocket as a set.
2. Check:
 - Camshaft sprocket
 More than 1/4 tooth wear “a” → Replace the camshaft sprocket and the timing chain as a set.

CAMSHAFTS

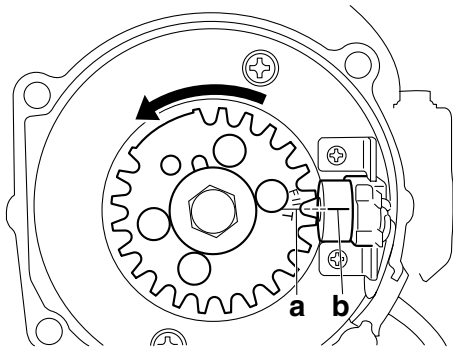


2. Install:

- Intake camshaft
- Exhaust camshaft



- Turn the crankshaft clockwise.
- When piston #1 is at TDC on the compression stroke, align the "T" mark "a" with the stationary pointer "b". (Compression stroke TDC)



- Install the timing chain onto both camshaft sprockets and then install the camshaft sprockets onto the camshafts.

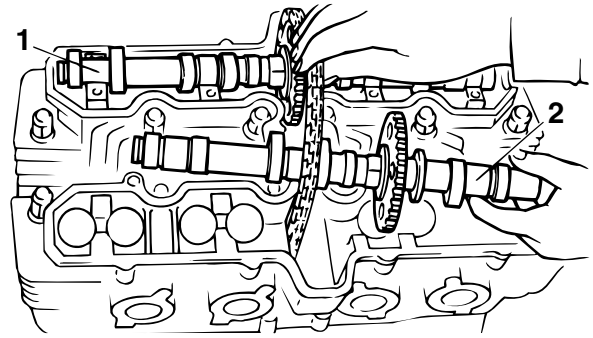
NOTE:

- Install the exhaust camshaft "1" first, then the intake camshaft "2".
- Install each camshaft with the punch mark facing upwards.
- Be sure to keep the timing chain as tight as possible on the exhaust side.

ECA13740

CAUTION:

Do not turn the crankshaft when installing the camshaft(s) to avoid damage or improper valve timing.



- Install the camshaft caps "3".

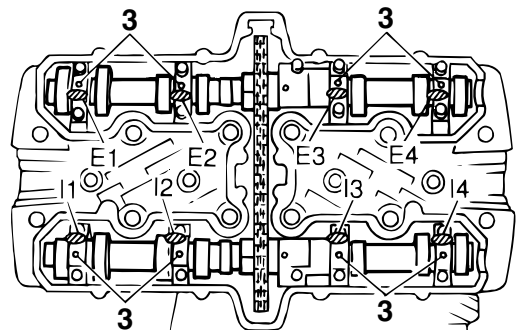
NOTE:

- Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:
"I": Intake
"E": Exhaust
- Make sure the arrow mark on each camshaft points towards the right side of the engine.
- Do not tighten the camshaft cap bolts yet.

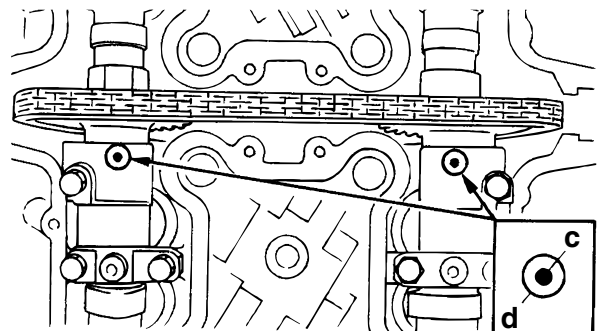
ECA13730

CAUTION:

The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.



- Turn both camshafts opposite each other so that the punch mark "c" on the camshaft is aligned with the hole "d" in the camshaft cap as shown. When out of alignment, re-install each camshaft.



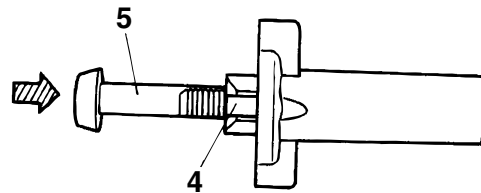
- Tighten the camshaft cap bolts.



Camshaft cap bolt
12 Nm (1.2 m•kg, 8.7 ft•lb)

NOTE:

Tighten the camshaft cap bolts in a crisscross pattern, working from the inside out.



3. Install:

- Timing chain guide (exhaust side)

4. Install:

- Timing chain tensioner
- Timing chain tensioner gasket **New**

a. Remove the cap bolt "1", washer "2", and springs "4".

b. Release the timing chain tensioner one-way cam "4" and push the timing chain tensioner rod "5" all the way into the timing chain tensioner housing.

c. Install the timing chain tensioner and new gasket "6" onto the cylinder block.

NOTE:

The timing chain tensioner teeth should face down.



Timing chain tensioner bolt
10 Nm (1.0 m•kg, 7.2 ft•lb)

d. Install the springs "3", washer "2", and cap bolt "1".



Timing chain tensioner cap bolt
20 Nm (2.0 m•kg, 15 ft•lb)

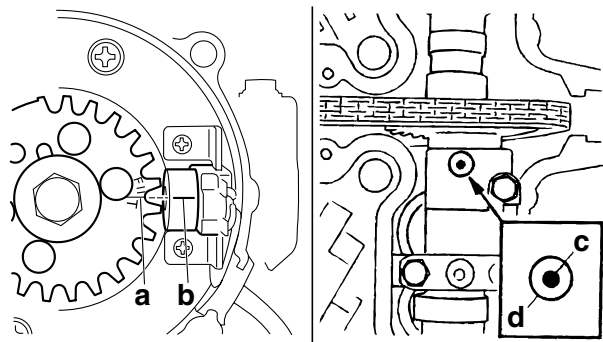


5. Turn:

- Crankshaft
(several turns counterclockwise)

6. Check:

- "T" mark "a"
"T" mark should be aligned with the stationary pointer "b".
- Camshaft punch mark "c"
Make sure the punch mark on the camshaft is aligned with the camshaft cap hole "d".
When out of alignment → re-install.
Refer to the installation steps above.



7. Tighten:

- Camshaft sprocket bolts



Camshaft sprocket bolts
20 Nm (2.0 m•kg, 15 ft•lb)

ECA13750

CAUTION:

Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

8. Install:

- Timing chain guide (top side)

9. Measure:

- Valve clearance
Out of specification → Adjust.

Refer to "ADJUSTING THE VALVE CLEAR-
ANCE" on page 3-4.

10. Install:

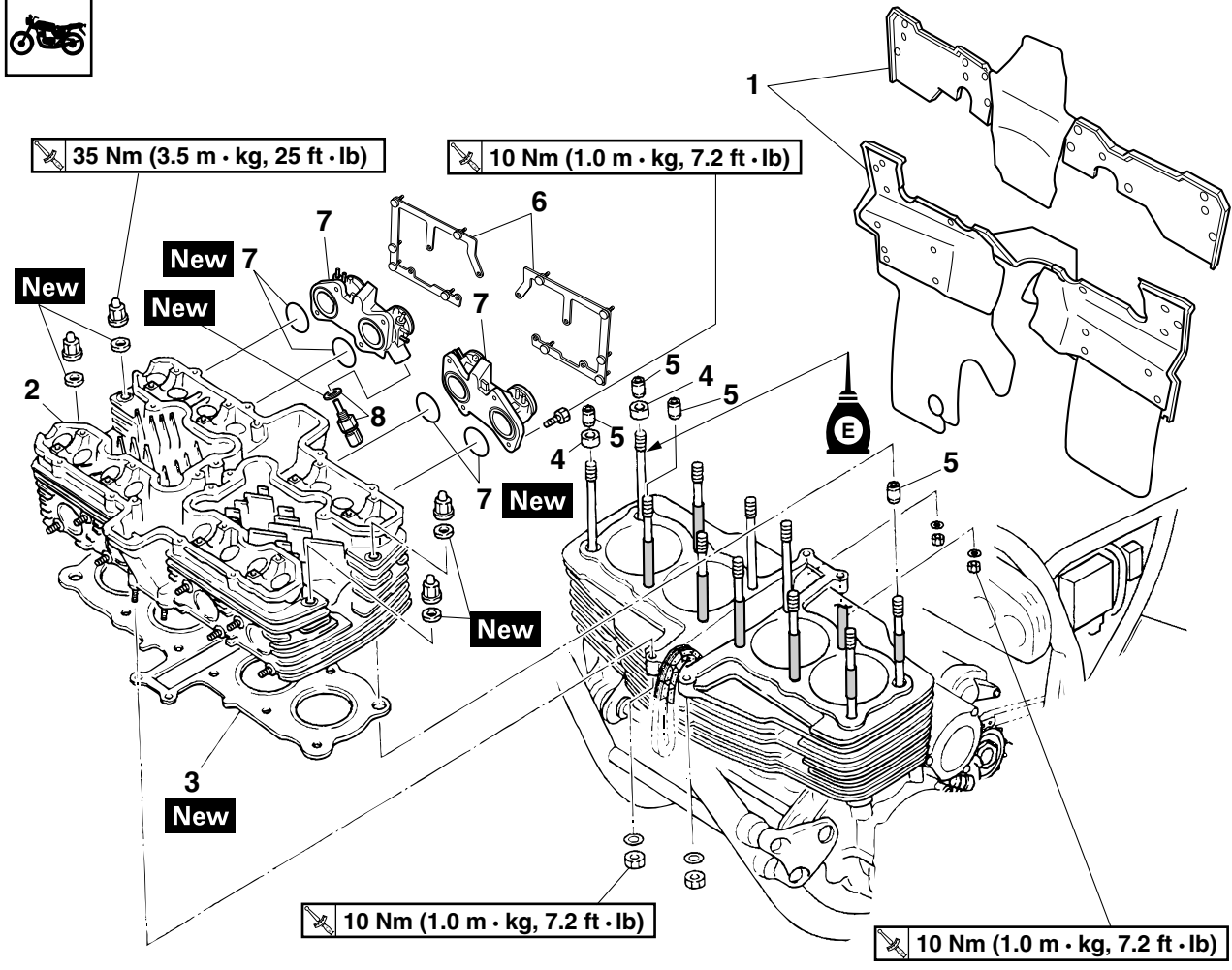
- Timing plate cover

CYLINDER HEAD

EAS24100

CYLINDER HEAD

Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
	Camshaft		Refer to "CAMSHAFTS" on page 5-5.
1	Protector assembly ¹ /protector assembly ²	1/1	
2	Cylinder head	1	
3	Cylinder head gasket	1	
4	Gasket	2	
5	Dowel pin	4	
6	Left/right protector bracket	1/1	
7	Intake manifold/O-ring	2/4	
8	Engine temperature sensor/gasket	1/1	
			For installation, reverse the removal procedure.

CYLINDER HEAD

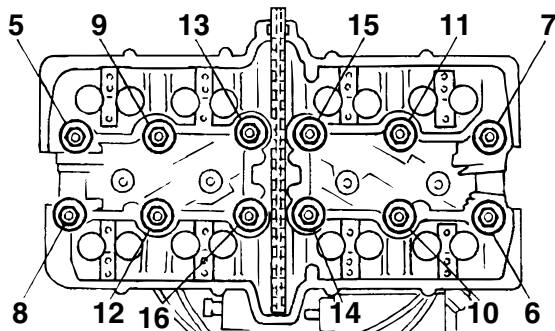
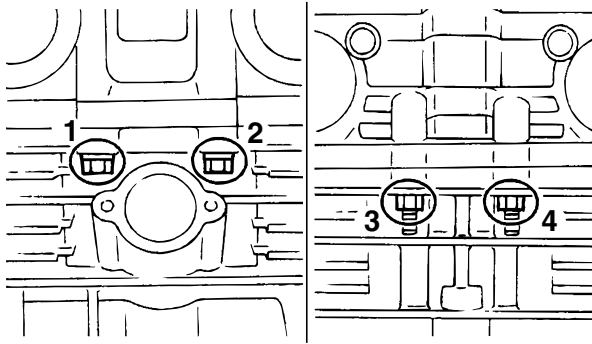
EAS24120

REMOVING THE CYLINDER HEAD

- Remove:
 - Cylinder head nuts

NOTE:

- Loosen the nuts in the proper sequence as shown.
- Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.



EAS24160

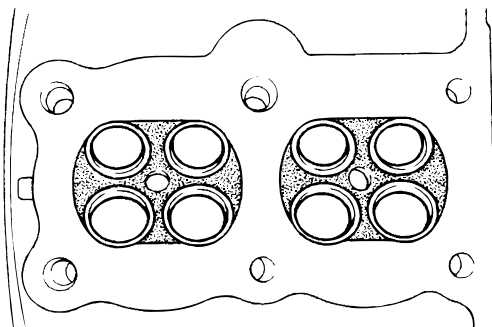
CHECKING THE CYLINDER HEAD

- Eliminate:
 - Combustion chamber carbon deposits (with a rounded scraper)

NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug bore threads
- Valve seats



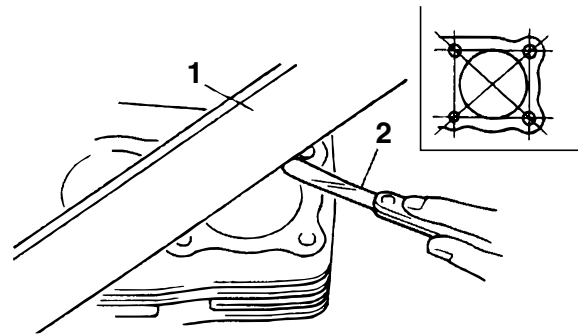
- Check:
 - Cylinder head

- Damage/scratches → Replace.
- Measure:
 - Cylinder head warpage
 - Out of specification → Resurface the cylinder head



Warpage limit
0.20 mm (0.0079 in)

- Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



- Measure the warpage.
- If the limit is exceeded, resurface the cylinder head as follows.
- 400 Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

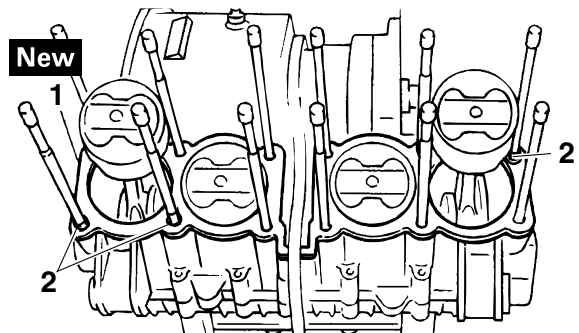
NOTE:

To ensure an even surface, rotate the cylinder head several times.

EAS24240

INSTALLING THE CYLINDER HEAD

- Install:
 - Cylinder head gasket "1" **New**
 - Gasket
 - Dowel pins "2"



CYLINDER HEAD

2. Install:

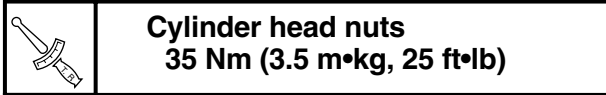
- Cylinder head

NOTE:

Pass the timing chain through the timing chain cavity.

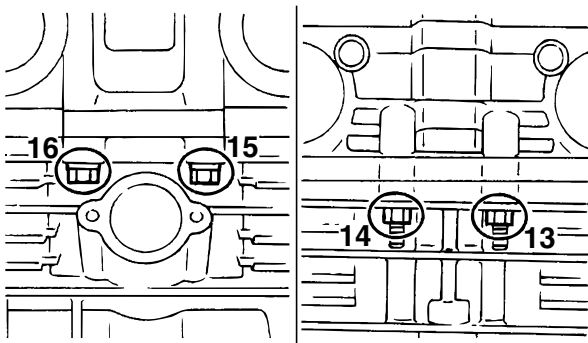
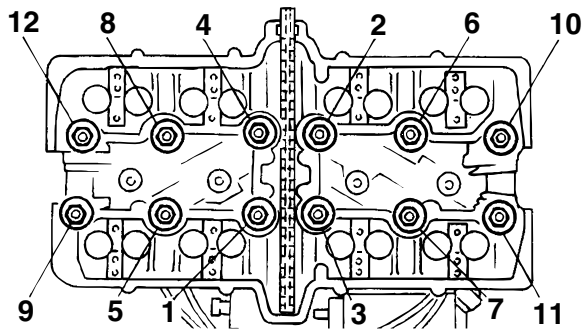
3. Tighten:

- Cylinder head nuts



NOTE:

- Lubricate the cylinder head nuts with engine oil.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages.



4. Install:

- Exhaust camshaft
- Intake camshaft

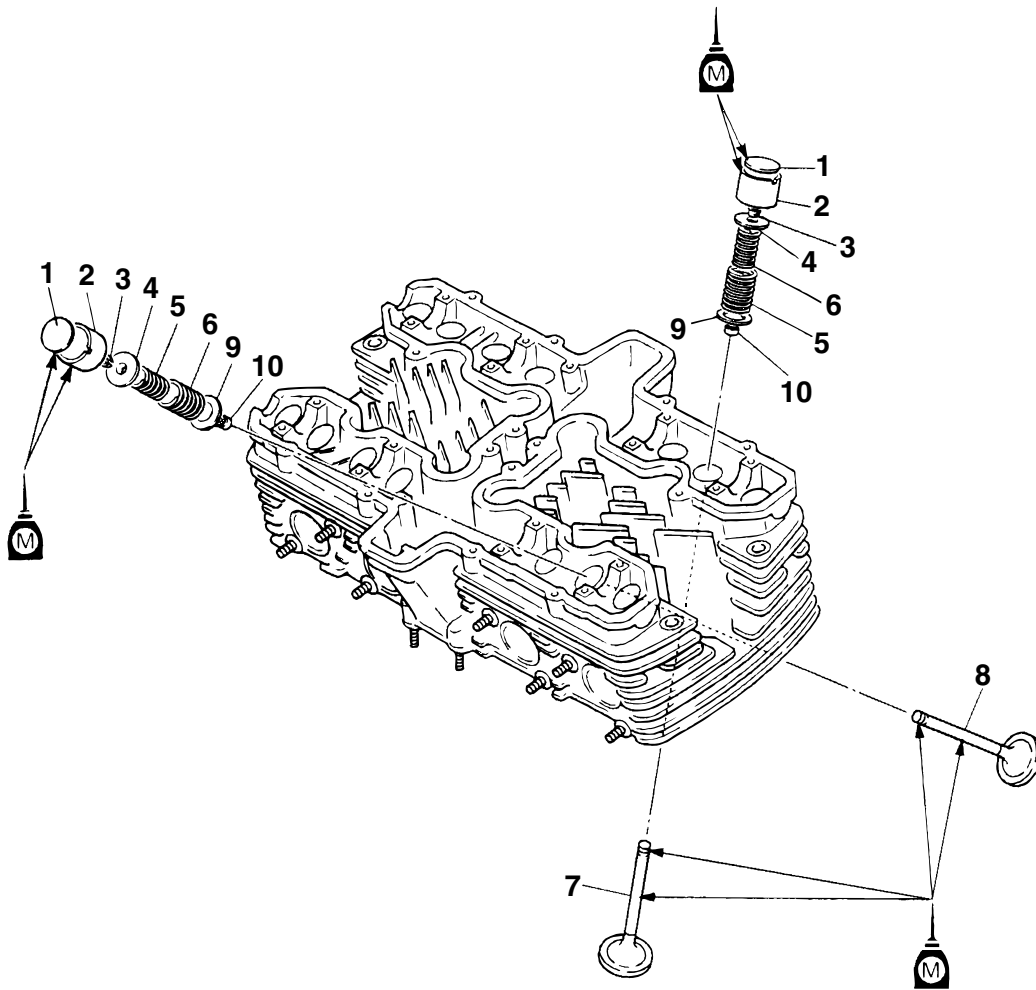
Refer to "CAMSHAFTS" on page 5-5.

VALVES AND VALVE SPRINGS

EAS24270

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-13.
1	Valve pad	16	
2	Valve lifter	16	
3	Valve cotter	32	
4	Valve spring retainer	16	
5	Valve spring (inner)	16	
6	Valve spring (outer)	16	
7	Intake valve	8	
8	Exhaust valve	8	
9	Valve stem seal	16	
10	Valve spring seat	16	
			For installation, reverse the removal procedure.

VALVES AND VALVE SPRINGS

EAS24280

REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

NOTE:

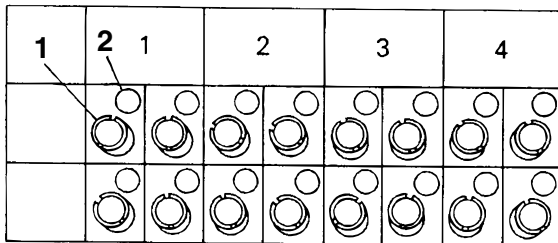
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Remove:

- Valve lifter "1"
- Valve pad "2"

NOTE:

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.



2. Check:

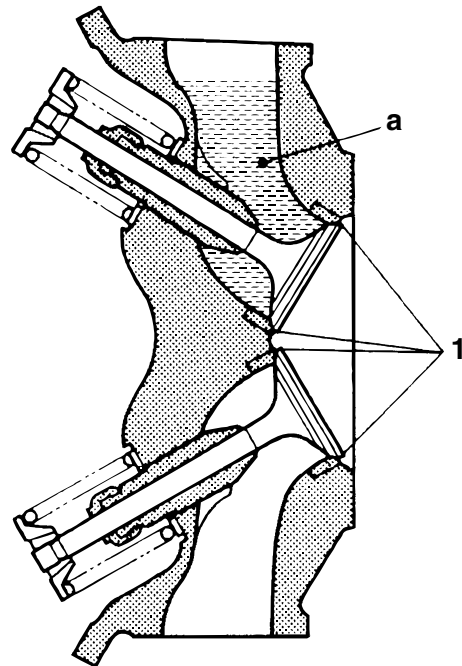
- Valve sealing
Leakage at the valve seat → Check the valve face, valve seat, and valve seat width. Refer to "CHECKING THE VALVE SEATS" on page 5-19.

a. Pour a clean solvent "a" into the intake and exhaust ports.

b. Check that the valves properly seal.

NOTE:

There should be no leakage at the valve seat "1".

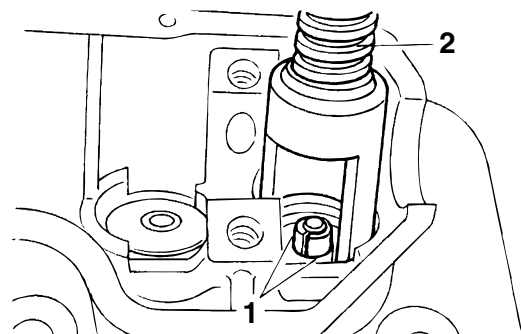


3. Remove:

- Valve cotters "1"

NOTE:

Remove the valve cotters by compressing the valve spring with the valve spring compressor "2".



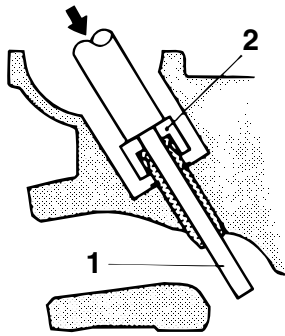
4. Remove:

- Upper spring seat "1"
- Valve spring (inner)/(outer) "2"
- Valve stem seal "3"
- Valve spring seat "4"
- Valve "5"

NOTE:

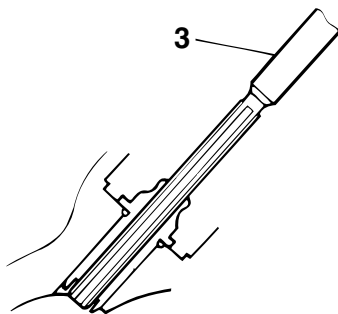
Identify the position of each part very carefully

VALVES AND VALVE SPRINGS



302-020

c. After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



302-013

NOTE:

After replacing the valve guide, reface the valve seat.

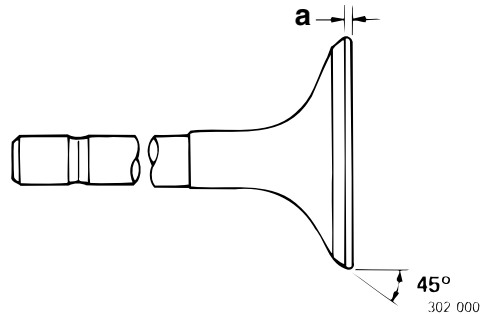


Valve guide remover & installer set (ø5.5)
 90890-04016
Valve guide remover (5.5 mm)
 YM-01122
Valve guide remover & installer set (ø5.5)
 90890-04016
Valve guide installer (5.5 mm)
 YM-04015
Valve guide remover & installer set (ø5.5)
 90890-04016
Valve guide reamer (5.5 mm)
 YM-01196

- Valve stem end
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
- Valve margin thickness "a"
Out of specification → Replace the valve.



Valve margin thickness "a"
 0.8 mm–1.2 mm
 (0.0315–0.0472 in)



302 000

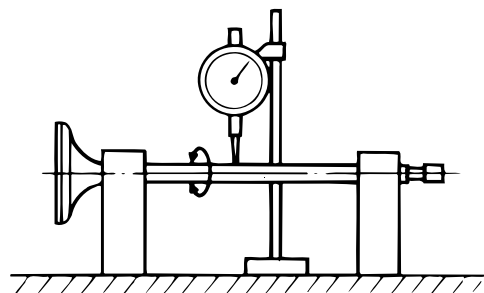
6. Measure:
- Valve stem runout
Out of specification → Replace the valve.

NOTE:

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.



valve stem runout
 Valve stem runout
 0.010 mm (0.0004 in)



302 004

EAS24300

CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.


1. Clean: Eliminate:
- Carbon deposits
(from the valve face and valve seat)

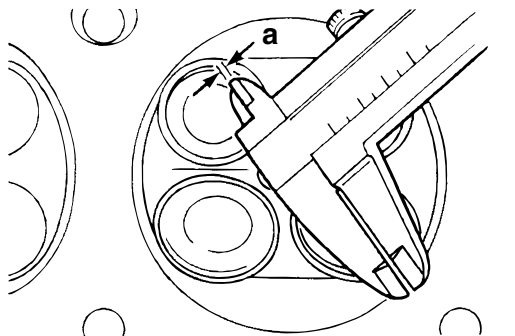


3. Eliminate:
- Carbon deposits
(from the valve face and valve seat)
4. Check:
- Valve face
Pitting/wear → Grind the valve face.

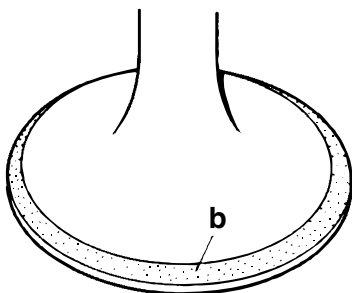
VALVES AND VALVE SPRINGS

2. Check:
 - Valve seat
Pitting/wear → Replace the cylinder head.
3. Measure:
 - Valve seat width “a”
Out of specification → Replace the cylinder head.

	Valve seat width
	0.90–1.10 mm (0.0354–0.0433 in)
	Wear limit
	1.6 mm (0.06 in)



- a. Apply Mechanic’s blueing dye (Dykem) “b” onto the valve face.



302-017

- b. Install the valve into the cylinder head.
- c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- d. Measure the valve seat width.

NOTE:
Where the valve seat and valve face contacted one another, the blueing will have been removed.

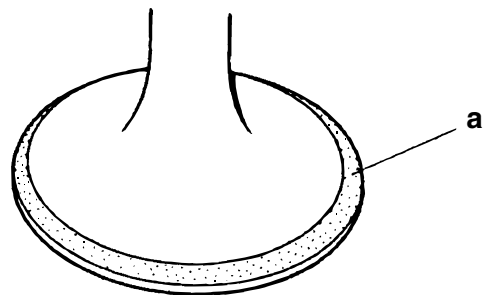
4. Lap:
 - Valve face
 - Valve seat

NOTE:
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

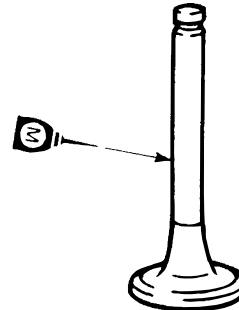
- a. Apply a coarse lapping compound “a” to the valve face.

ECA13790

CAUTION:
Do not let the lapping compound enter the gap between the valve stem and the valve guide.




- b. Apply molybdenum disulfide oil onto the valve stem.



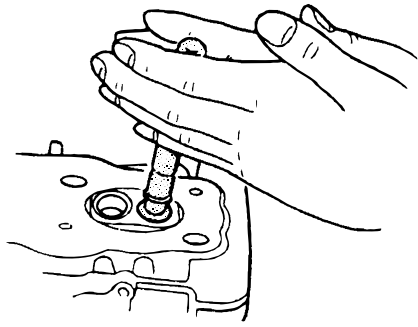
302 024

- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

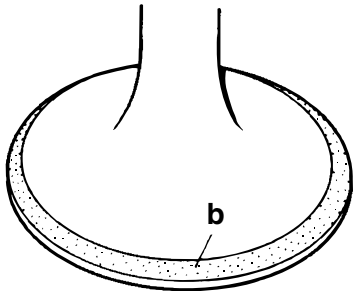
NOTE:
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.

	Valve lapper
	90890-04101
	Valve lapping tool
	YM-A8998

VALVES AND VALVE SPRINGS

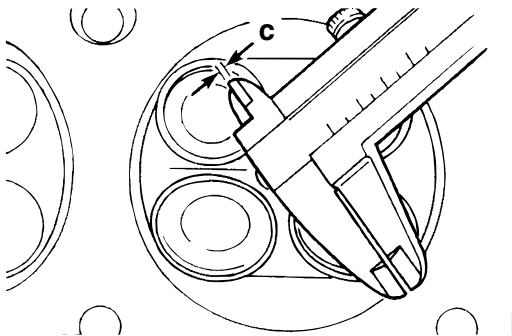


- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



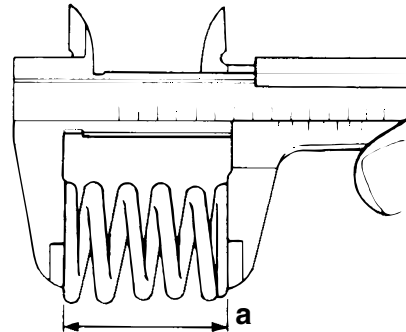
302-017

- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.



1. Measure:
 - Valve spring free length "a"
 - Out of specification → Replace the valve spring.

	Valve spring free length
	Inner
	Free length (intake)
	39.65 mm (1.56 in)
	Free length (exhaust)
	39.65 mm (1.56 in)
Outer	
Free length (intake)	
41.10 mm (1.62 in)	
Free length (exhaust)	
41.10 mm (1.62 in)	



302-005

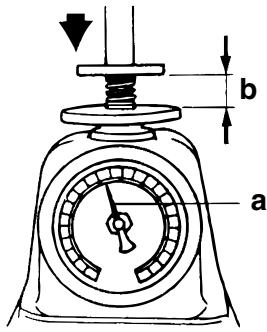
2. Measure:
 - Compressed valve spring force "a"
 - Out of specification → Replace the valve spring.

	Installed compression spring force
	Inner (intake and exhaust)
	61–72 N (13.87–16.30 lbf/ 6.29–7.39 kgf)
	Outer (intake and exhaust)
	130–154 N (29.31–34.62 lbf/ 13.30–15.70 kgf)
	Installed length (intake and exhaust)
	Inner
	32.80 mm (1.29 in)
	Outer
	34.80 mm (1.37 in)

EAS24310

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.



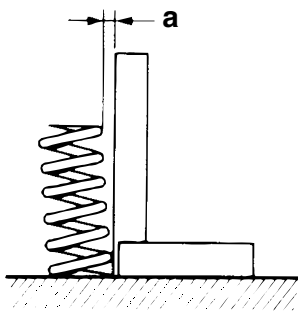
302 006

b. Installed length

3. Measure:

- Valve spring tilt "a"
Out of specification → Replace the valve spring.

	Spring tilt limit
	Inner
	Spring tilt (intake) 2.5 °/1.7 mm (2.5 °/0.067 in)
	Spring tilt (exhaust) 2.5 °/1.7 mm (2.5 °/0.067 in)
	Outer
	Spring tilt (intake) 2.5 °/1.8 mm (2.5 °/0.071 in) Spring tilt (exhaust) 2.5 °/1.8 mm (2.5 °/0.071 in)



302-028

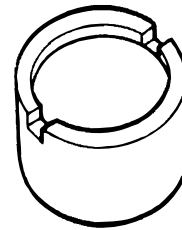
EAS24320

CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

1. Check:

- Valve lifter
Damage/scratches → Replace the valve lifters and cylinder head.



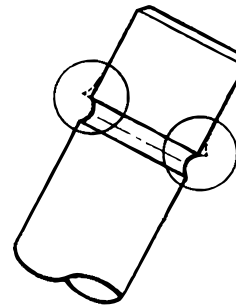
EAS24340

INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

1. Deburr:

- Valve stem end
(with an oil stone)

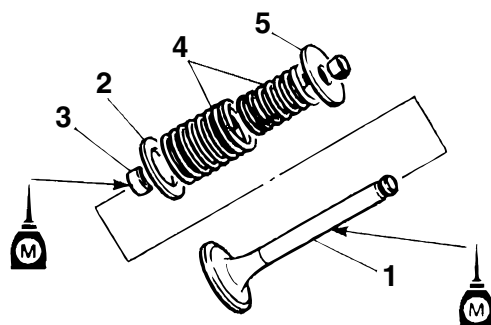


302-003

2. Lubricate:

- Valve stem "1"
- Valve stem seal "3"
(with the recommended lubricant)

	Recommended lubricant Molybdenum disulfide oil
--	--



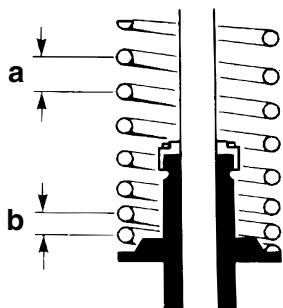
3. Install:

- Valve "1"
- Lower spring seat "2"
- Valve stem seal "3"
- Valve spring "4"
- Upper spring seat "5"
(into the cylinder head)

VALVES AND VALVE SPRINGS

NOTE:

- Make sure each valve is installed in its original place.
- Install the valve spring with the larger pitch “a” facing up.



302-007

- a. Larger pitch
- b. Smaller pitch

4. Install:

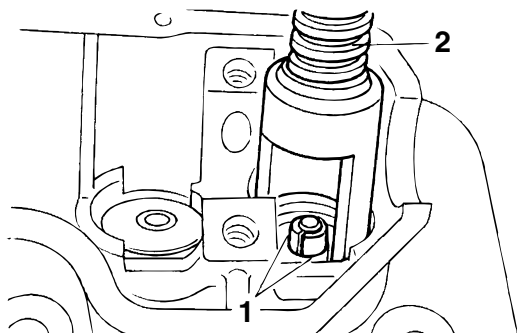
- Valve cotters “1”

NOTE:

Install the valve cotters by compressing the valve springs with the valve spring compressor “2” and the valve spring compressor attachment.



Valve spring compressor
90890-04019
YM-04019



5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

CAUTION:

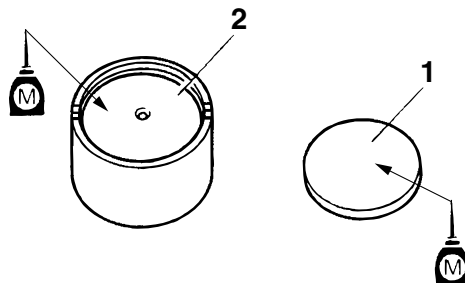
Hitting the valve tip with excessive force could damage the valve.

6. Lubricate:

- Valve pad “1”
- Valve lifter “2”
(with the recommended lubricant)



Recommended lubricant
Molybdenum disulfide oil



7. Install:

- Valve pad
- Valve lifter

NOTE:

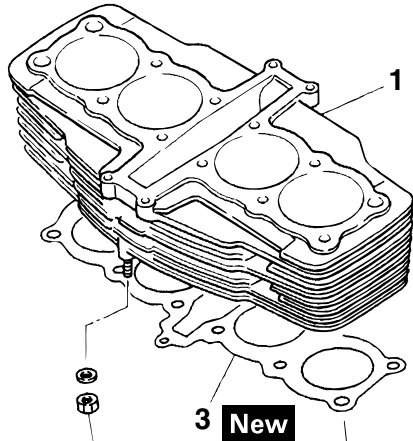
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

CYLINDER AND PISTON

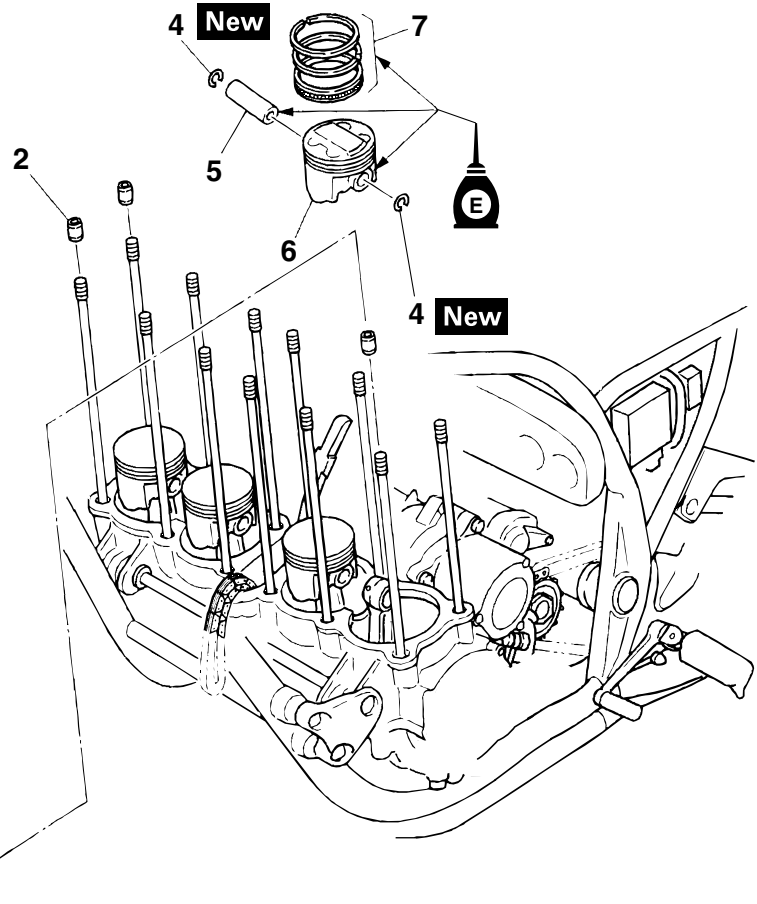
EAS24370

CYLINDER AND PISTON

Removing the cylinder and piston



20 Nm (2.0 m · kg, 15 ft · lb)



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-13.
1	Cylinder	1	
2	Dowel pin	3	
3	Cylinder gasket	1	
4	Piston pin clip	8	
5	Piston pin	4	
6	Piston	4	
7	Piston ring set	4	
			For installation, reverse the removal procedure.

CYLINDER AND PISTON

EAS24380

REMOVING THE PISTON

- Remove:
 - Piston pin clips "1"
 - Piston pin "2"
 - Piston "3"

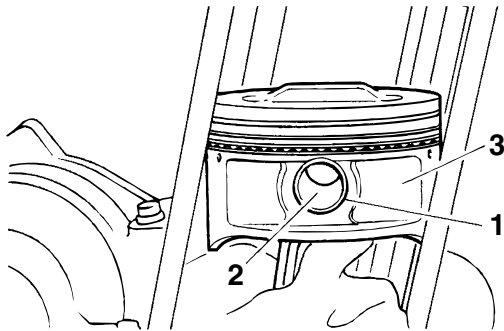
ECA13810

CAUTION:

Do not use a hammer to drive the piston pin out.

NOTE:

- Before removing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- Before removing the piston pin, deburr the piston pin clip's groove and the piston's pin bore area.

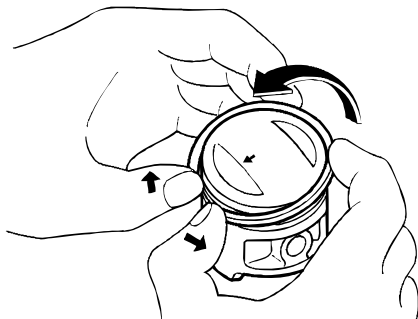


2. Remove:

- Top ring
- 2nd ring
- Oil ring

NOTE:

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



I1221502

EAS24400

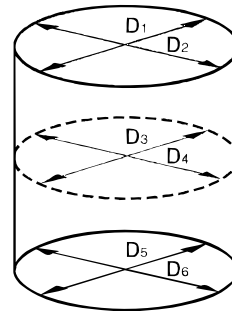
CHECKING THE CYLINDER AND PISTON

- Check:
 - Piston wall
 - Cylinder wall

Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.

- Measure:
 - Piston-to-cylinder clearance

- Measure cylinder bore "C" with the cylinder bore gauge.



NOTE:

Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.



Cylinder bore "C" - Bore

79.000–79.010 mm
(3.1102–3.1106 in)

Taper limit

0.05 mm (0.0020 in)

Out of round limit

0.100 mm (0.0039 in)

Warp limit

0.03 mm (0.0012 in)

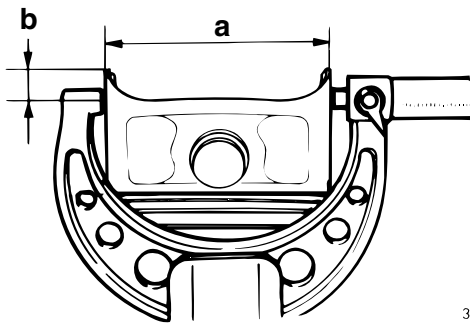
"C"=maximum of D1–D6

"T"=maximum of D1 or D2—maximum of D5 or D6

"R"=maximum of D1, D3 or D5—minimum of D2, D4 or D6

- If out of specification, replace the cylinder, and the piston and piston rings as a set.
- Measure piston skirt diameter "D" with the micrometer.

CYLINDER AND PISTON



307 001

b. 5 mm (0.20 in) from the bottom edge of the piston

	Piston diameter "D" 78.970–78.985 mm (3.1090–3.1096 in)
--	--

- d. If out of specification, replace the piston and piston rings as a set.
 e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance Cylinder bore "C" - Piston skirt diameter "D"
--

	Piston-to-cylinder clearance 0.015–0.040 mm (0.0006–0.0016 in) Limit 0.15 mm (0.0059 in)
--	---

- f. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.



EAS24430

CHECKING THE PISTON RINGS

1. Measure:

- Piston ring side clearance
 Out of specification → Replace the piston and piston rings as a set.

NOTE:

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.



piston ring side clearance

Top ring

Ring side clearance

0.045–0.080 mm (0.0018–0.0032 in)

Limit

0.100 mm (0.0039 in)

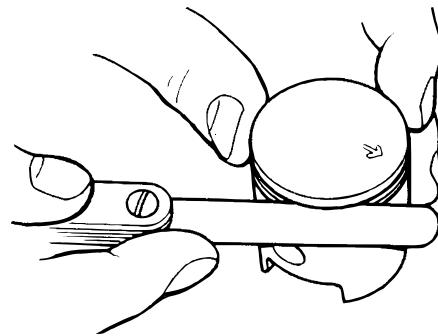
2nd ring

Ring side clearance

0.030–0.070 mm (0.0012–0.0028 in)

Limit

0.100 mm (0.0039 in)



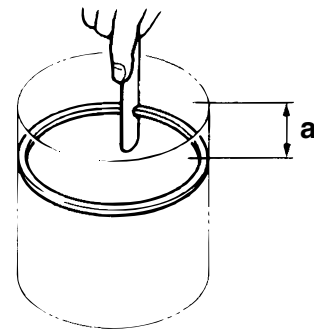
307-005

2. Install:

- Piston ring
 (into the cylinder)

NOTE:

Level the piston ring into the cylinder with the piston crown.



307 027

a. 30 mm (1.18 in)


3. Measure:

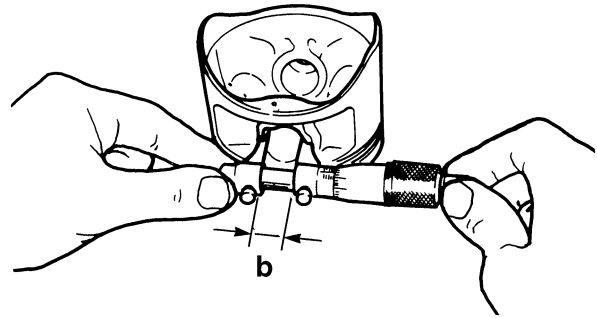
- Piston ring end gap

Out of specification → Replace the piston ring.

NOTE:

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

	piston ring end gap
	Top ring
	End gap (installed) 0.20–0.35 mm (0.0079–0.0138 in)
	Limit 0.60 mm (0.0236 in)
	2nd ring
	End gap (installed) 0.35–0.50 mm (0.0138–0.0197 in)
	Limit 0.75 mm (0.0295 in)
	Oil ring
	End gap (installed) 0.20–0.50 mm (0.0079–0.0197 in)



4. Calculate:
- Piston-pin-to-piston-pin-bore clearance
Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston-pin-bore clearance =
Piston pin bore diameter “b” -
Piston pin outside diameter “a”




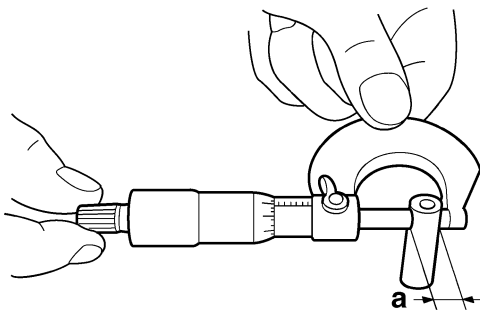
Piston pin/piston pin hole clearance
0.004–0.024 mm
(0.00016–0.00094 in)

EAS24440


CHECKING THE PISTON PIN

1. Check:
 - Piston pin
Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
 - Piston pin outside diameter “a”
Out of specification → Replace the piston pin.

	Piston pin outside diameter
	17.991–18.000 mm (0.7083–0.7087 in)
	Limit 17.971 mm (0.7075 in)



3. Measure:
 - Piston pin bore inside diameter “b”
Out of specification → Replace the piston.

	Piston pin bore inside diameter
	18.004–18.015 mm (0.7088–0.7093 in)
	Limit 18.045 mm (0.7104 in)

EAS24470

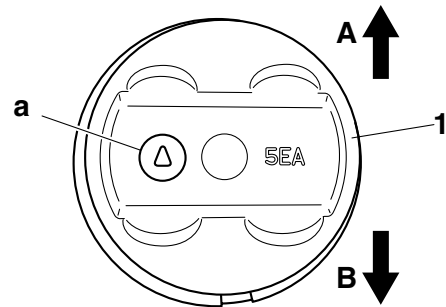
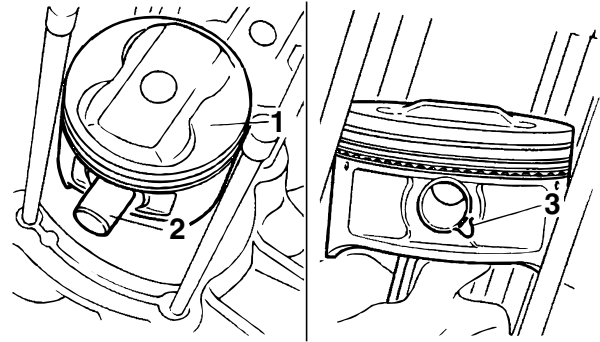
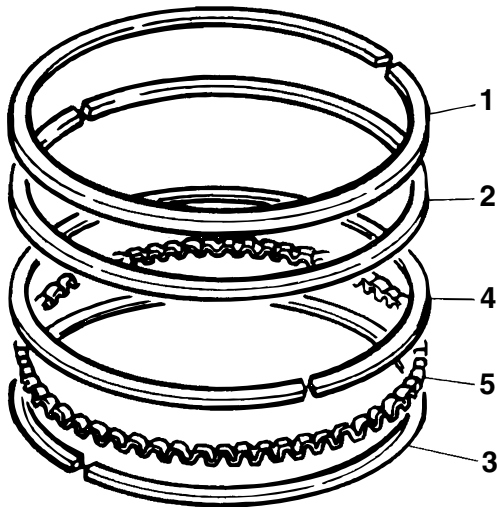
INSTALLING THE PISTON AND CYLINDER

1. Install:
 - Top ring “1”
 - 2nd ring “2”
 - Lower oil ring rail “3”
 - Upper oil ring rail “4”
 - Oil ring expander “5”

NOTE:

Be sure to install the piston rings so that the manufacturer’s marks face up.

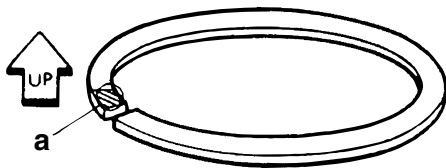
CYLINDER AND PISTON



A. Exhaust side
B. Intake side

3. Install:

- Cylinder gasket "1" **New**
- Dowel pins "2"



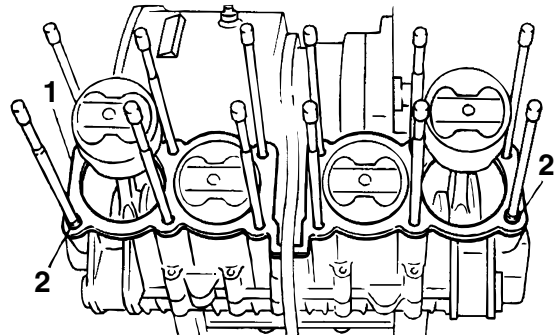
307-026

2. Install:

- Piston "1"
- Piston pin "2"
- Piston pin clips "3" **New**

NOTE:

- Apply engine oil the piston pin.
- Make sure the arrow mark "a" on the piston points towards the exhaust side of the engine.
- Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- Reinstall each piston into its original cylinder. (In order from left #1-#4).



CYLINDER AND PISTON

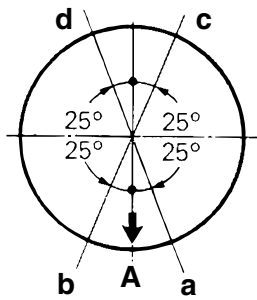
4. Lubricate:

- Piston
 - Piston rings
 - Cylinder
- (Apply recommended lubricant)



5. Offset:

- Piston ring end gap



307-024

- a. Top ring
- b. Lower oil ring rail
- c. Upper oil ring rail
- d. 2nd ring

A. Forward

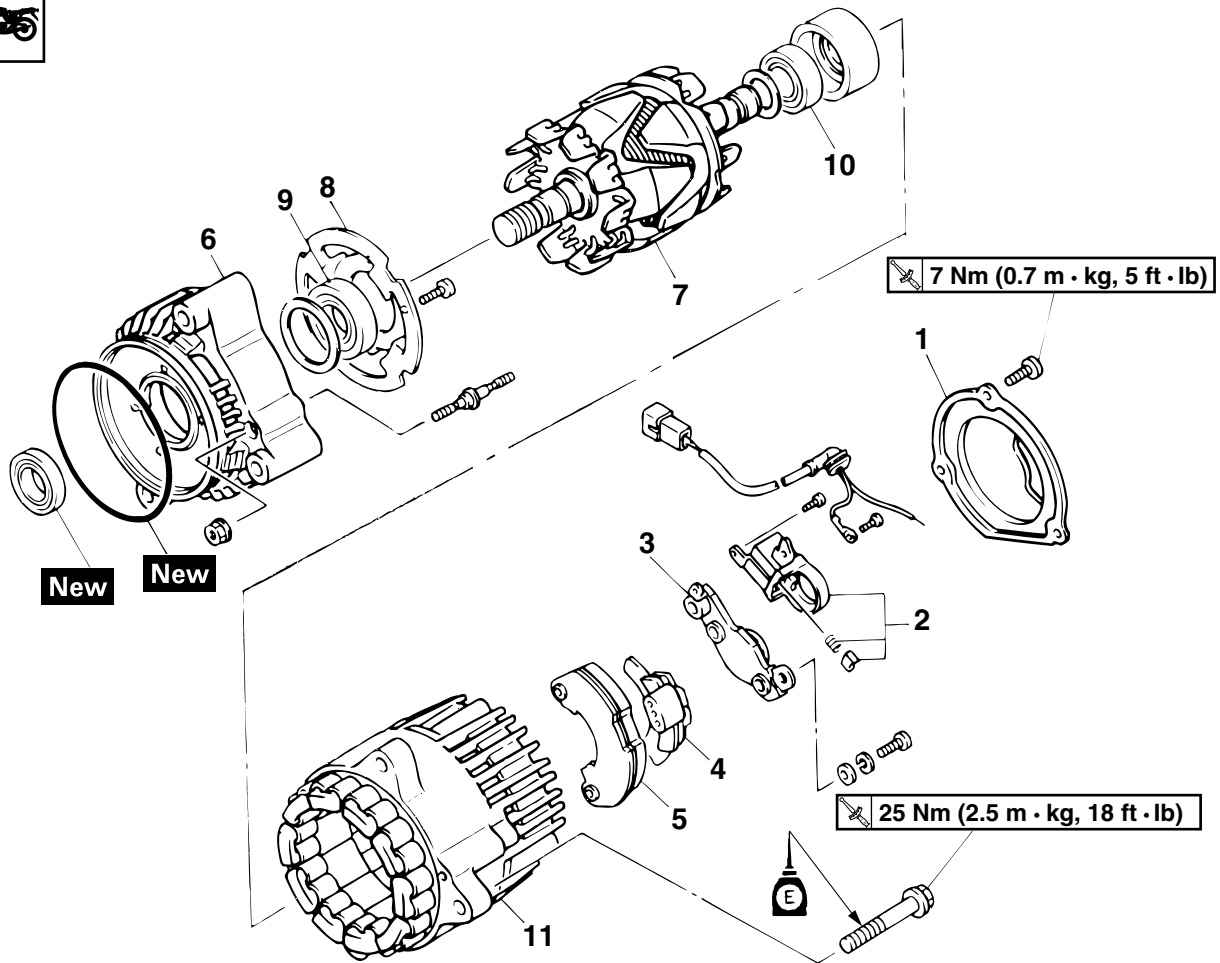
6. Install:

- Cylinder

EAS24480

GENERATOR

Generator Disassembly



Order	Job/Parts to remove	Q'ty	Remarks
	Generator		Refer to "ENGINE REMOVAL" on page 5-1.
1	End cover	1	
2	Brush holder	1	
3	Regulator	1	
4	Rectifier cover	1	
5	Rectifier	1	
6	Rear cover	1	
7	Rotor assembly	1	
8	Bearing cover plate	1	
9	Bearing (drive side)	1	
10	Bearing (slip ring side)	1	
11	Stator assembly	1	
			For installation, reverse the removal procedure.

EAS5UXB004

CHECKING THE GENERATOR

1. Remove:
 - End cover
2. Measure:
 - Stator coil resistance
 Out of specification → Replace the stator coil.



Stator coil resistance
0.19– 0.21 Ω at 20°C

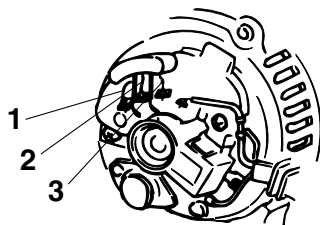
- a. Connect the pocket tester (Ω × 1) to the stator coil terminals as shown.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Tester positive probe
White “1”
Negative tester probe
Black “2”

Tester positive probe
White “1”
Negative tester probe
Black “3”



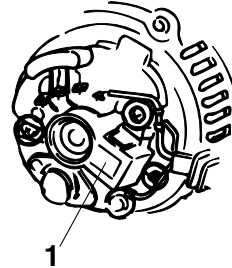
- b. Measure the stator coil resistances.

3. Check:
 - Brush dimensions
 - Brush spring force
 Over limit of use, off specification → Replace the brush and brush spring.



Brush use limit
4.7mm (0.19 in)
Brush spring force
5.10–5.69 N (18.36–20.48 oz)
(520–580 gf)

- a. Remove the brush holder “1”



- b. Check the brush length.
- c. Check the brush spring force.

4. Measure:
 - Field coil (rotor) resistance
 Out of specification → Replace the rotor coil.



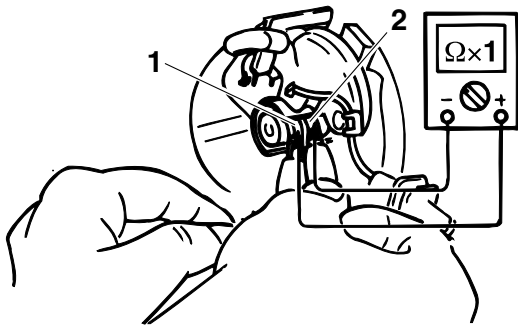
Field coil (rotor) resistance
2.75–3.04 Ω

- a. Connect the pocket tester (Ω × 1) to the stator coil terminals as shown.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Tester positive probe
Inside spring “1”
Negative tester probe
Outside spring “2”



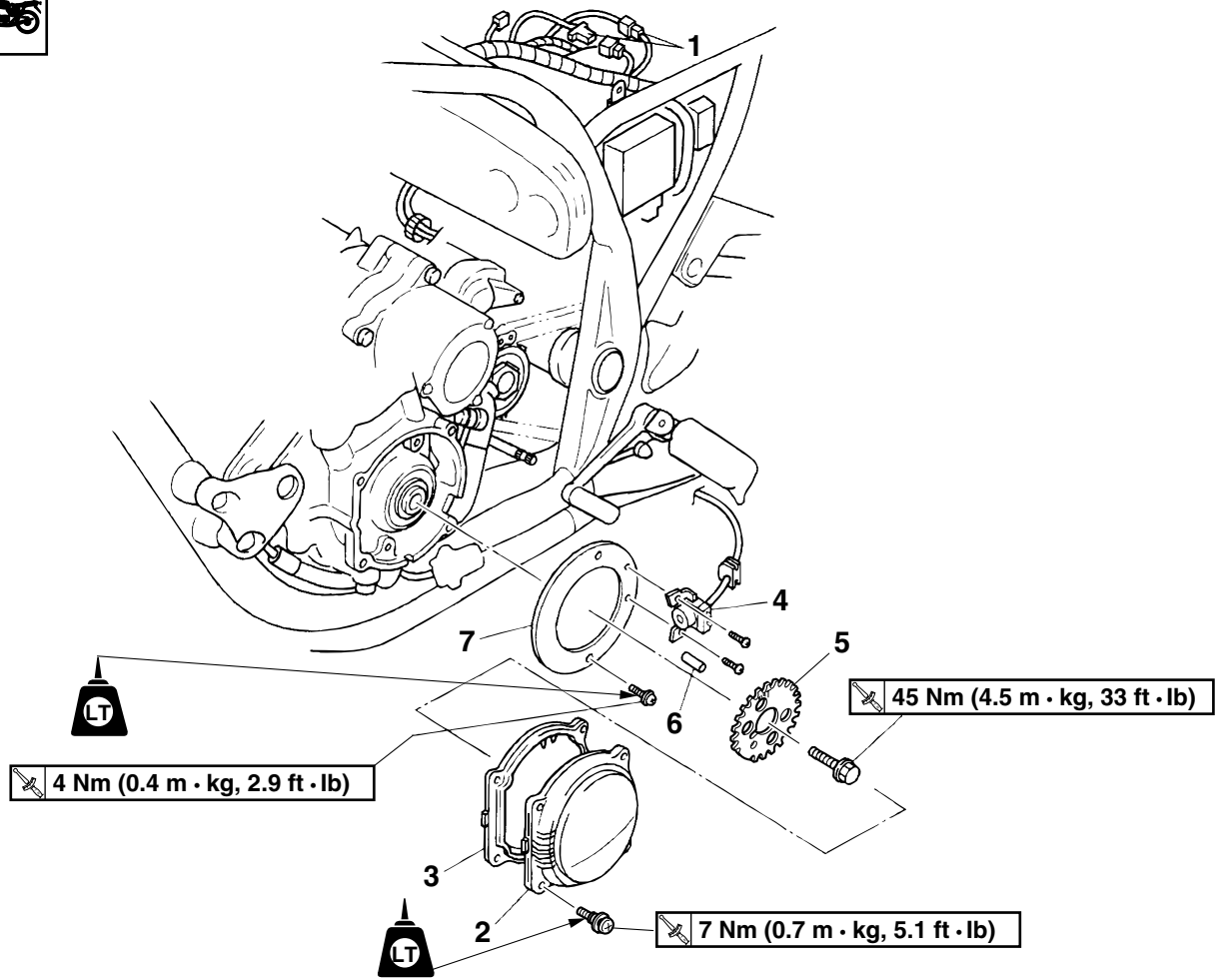
b. Measure the stator coil resistances.



EAS5UXB001

TIMING PLATE

Removing the timing plate



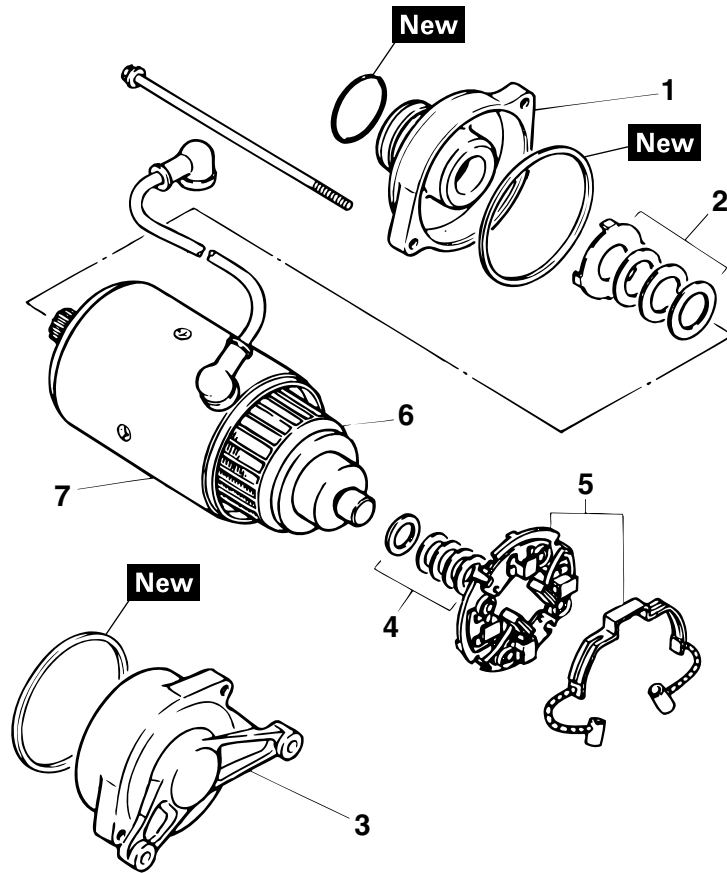
Order	Job/Parts to remove	Q'ty	Remarks
	Seat/side cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
1	Crankshaft position sensor lead coupler	1	Disconnect.
2	Timing plate cover	1	
3	Gasket	1	
4	Crankshaft position sensor	1	
5	Timing plate	1	
6	Dowel pin	1	
7	Pickup base	1	
			For installation, reverse the removal procedure.

ELECTRIC STARTER

EAS24780

ELECTRIC STARTER

Disassembling the starter motor

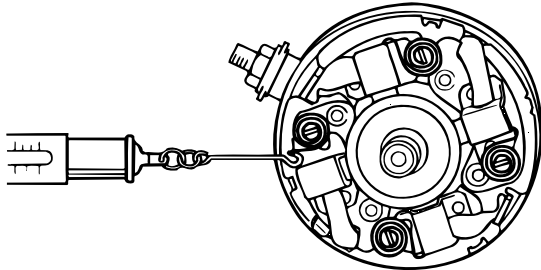


Order	Job/Parts to remove	Q'ty	Remarks
	Starter motor		Refer to "ENGINE REMOVAL" on page 5-1.
1	Front bracket	1	
2	Washer kit	1	
3	Rear bracket	1	
4	Washer kit	1	
5	Brush holder/Brush1	1/1	
6	Armature coil	1	
7	Stator assembly	1	
			For assembly, reverse the disassembly procedure.

ELECTRIC STARTER



Brush spring force
 7.65–10.01 N (27.54–36.03 oz)
 (780–1021 gf)



I8210602

7. Check:

- Gear teeth
 Damage/wear → Replace the gear.

EAS24800

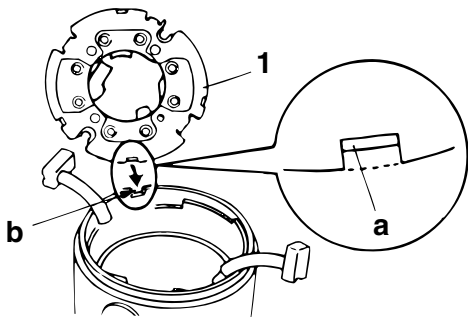
ASSEMBLING THE STARTER MOTOR

1. Install:

- Brush seat “1”

NOTE:

Align the tab “a” on the brush seat with the slot “b” in the starter motor rear cover.

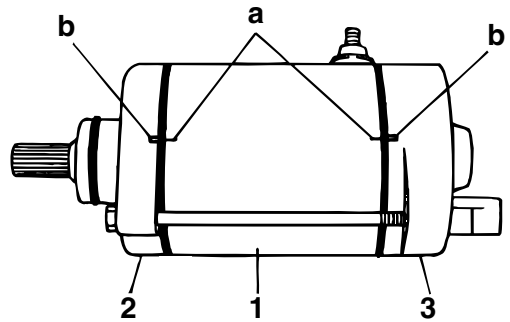


2. Install:

- Starter motor yoke “1”
- Front bracket “2”
- Rear bracket “3”

NOTE:

Align the match marks “a” on the starter motor yoke with the match marks “b” on the front and rear brackets.



EAS24810

INSTALLING THE STARTER MOTOR

1. Install:

- Starter motor
- Starter motor bolts



Starter motor

10 Nm (1.0 m•kg, 7.2 ft•lb)

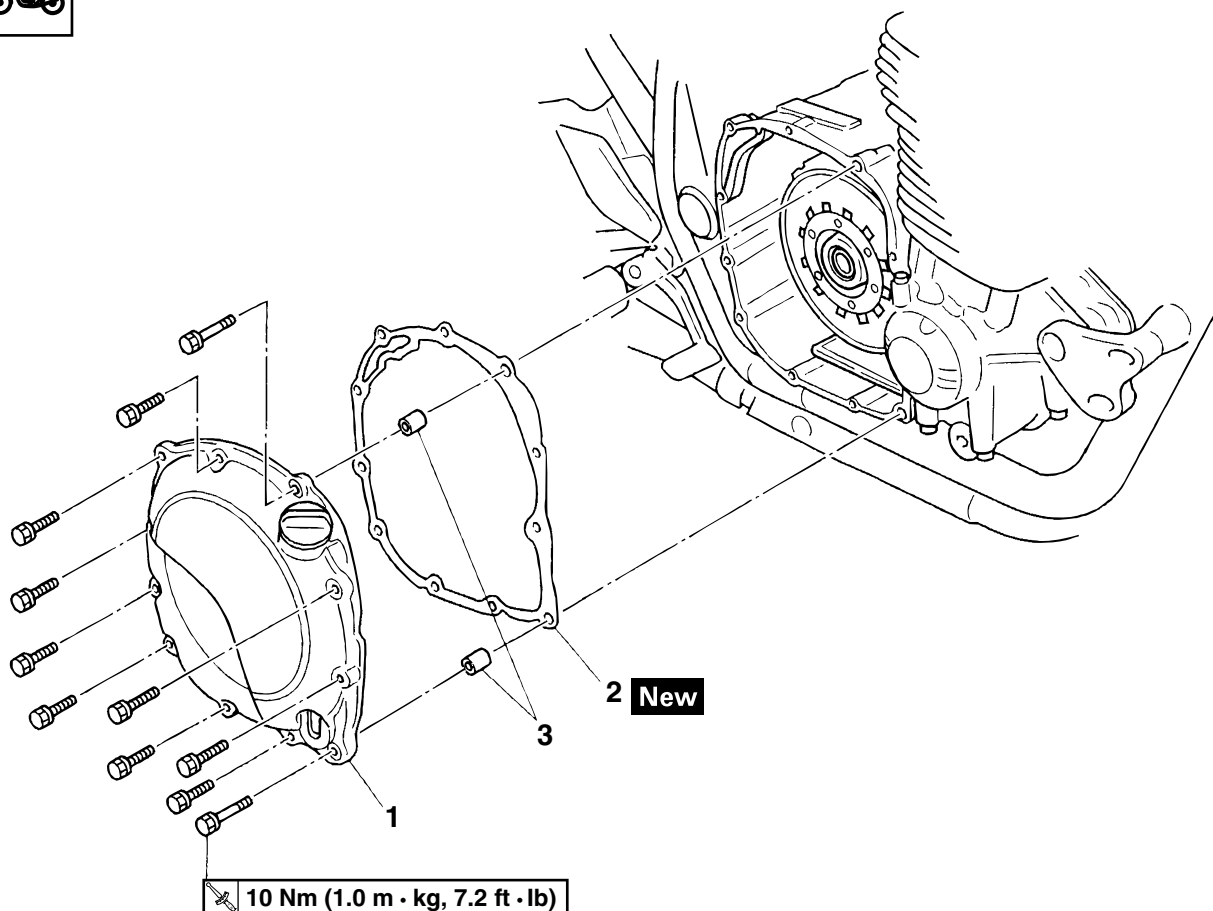
2. Connect:

- Starter motor lead

EAS25060

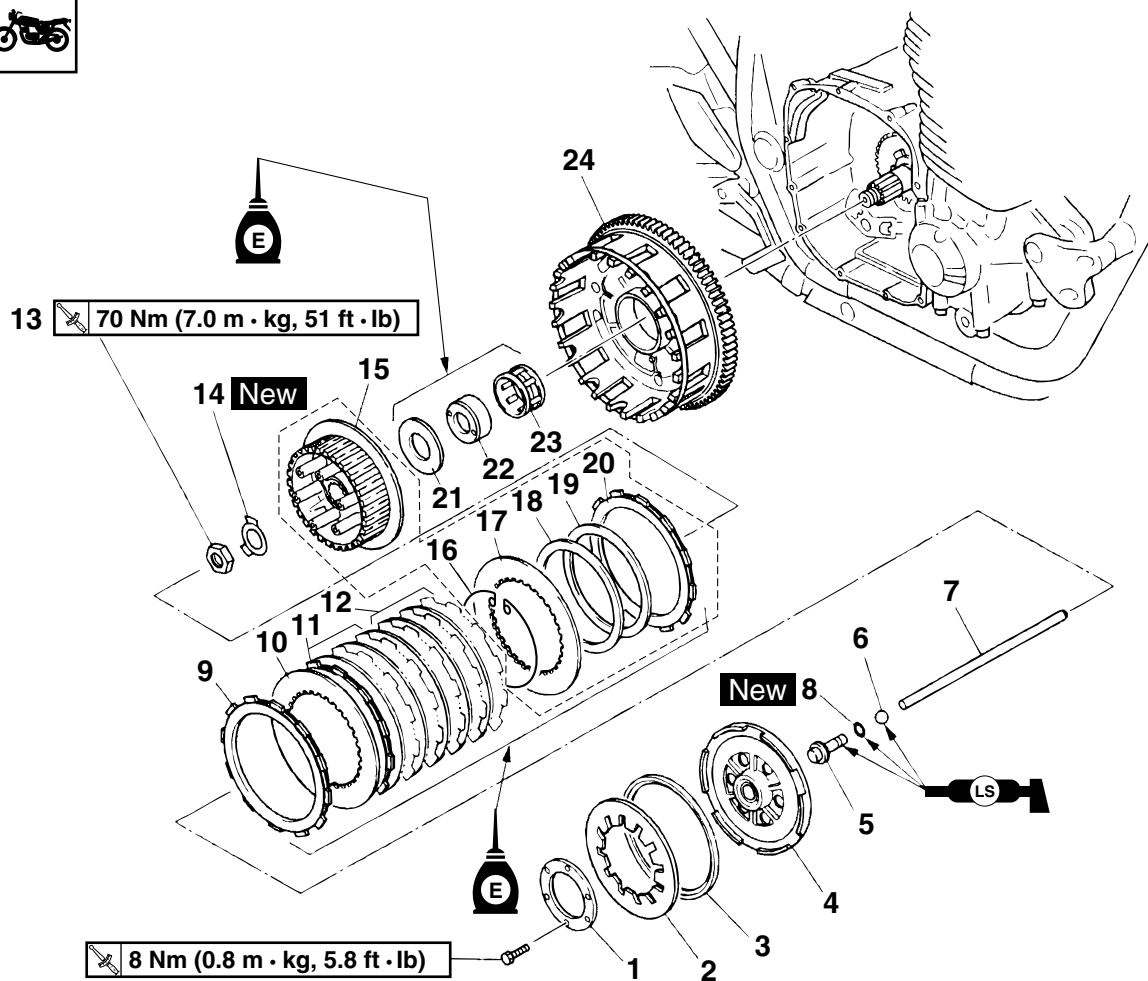
CLUTCH

Removing the crankcase cover



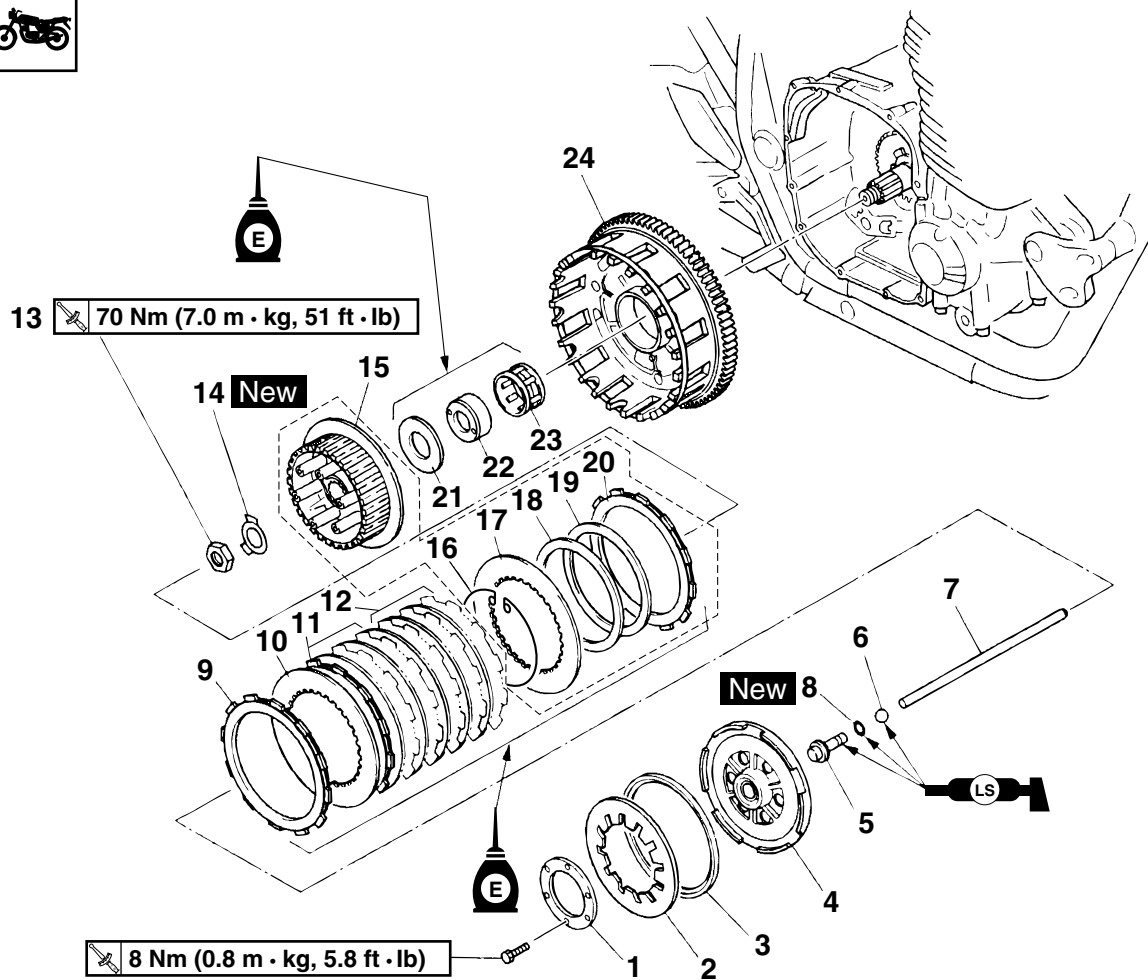
Order	Job/Parts to remove	Q'ty	Remarks
	Drain the engine oil.		Refer to "ENGINE" on page 3-4.
1	Crankcase cover (right)	1	
2	Crankcase cover gasket (right)	1	
3	Dowel pin	2	
			For installation, reverse the removal procedure.

Removing the clutch



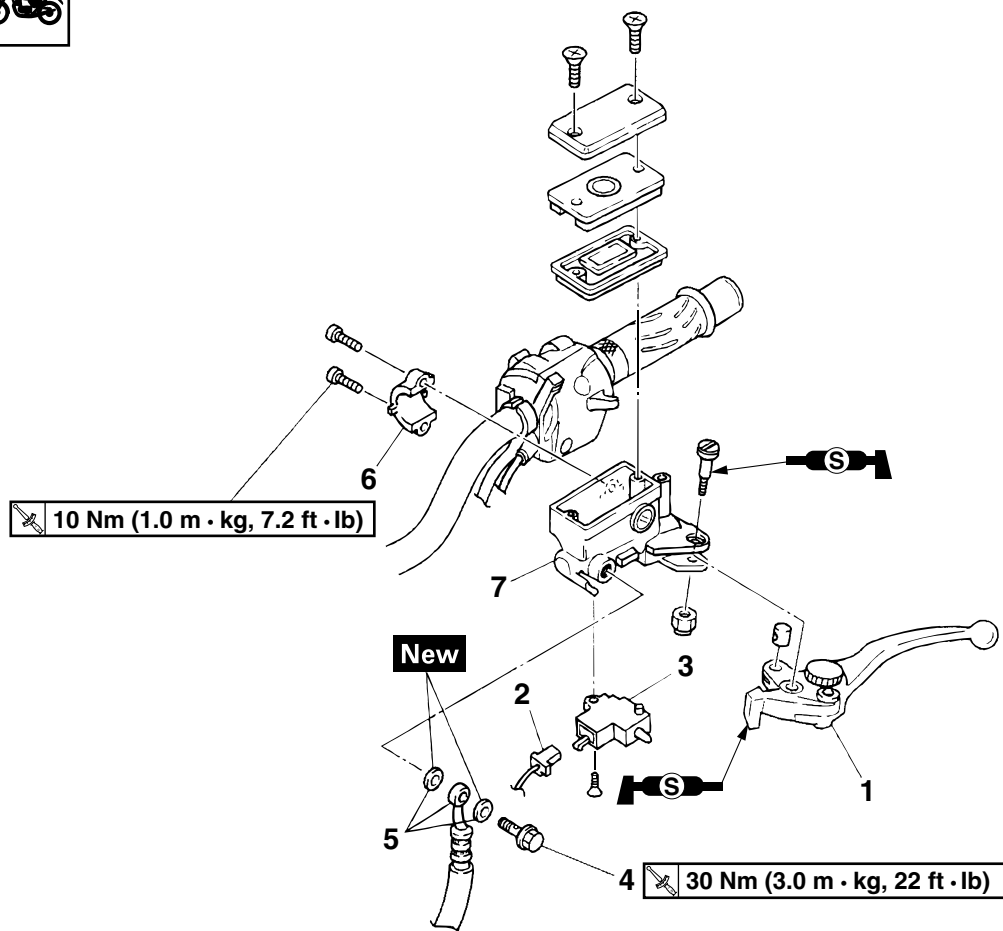
Order	Job/Parts to remove	Q'ty	Remarks
1	Pressure plate 2	1	
2	Clutch spring	1	
3	Clutch spring seat	1	
4	Pressure plate 1	1	
5	Short clutch push rod	1	
6	Ball	1	
7	Long clutch push rod	1	
8	O-ring	1	
9	Friction plate 1 (narrow)	1	
10	Clutch plate	6	
11	Friction plate 2	3	
12	Friction plate 3	3	
13	Clutch boss nut	1	
14	Lock washer	1	
15	Clutch boss	1	
16	Wire circlip	1	
17	Clutch plate	1	
18	Spring	1	
19	Spring seat plate	1	
20	Friction plate 1 (narrow)	1	

Removing the clutch



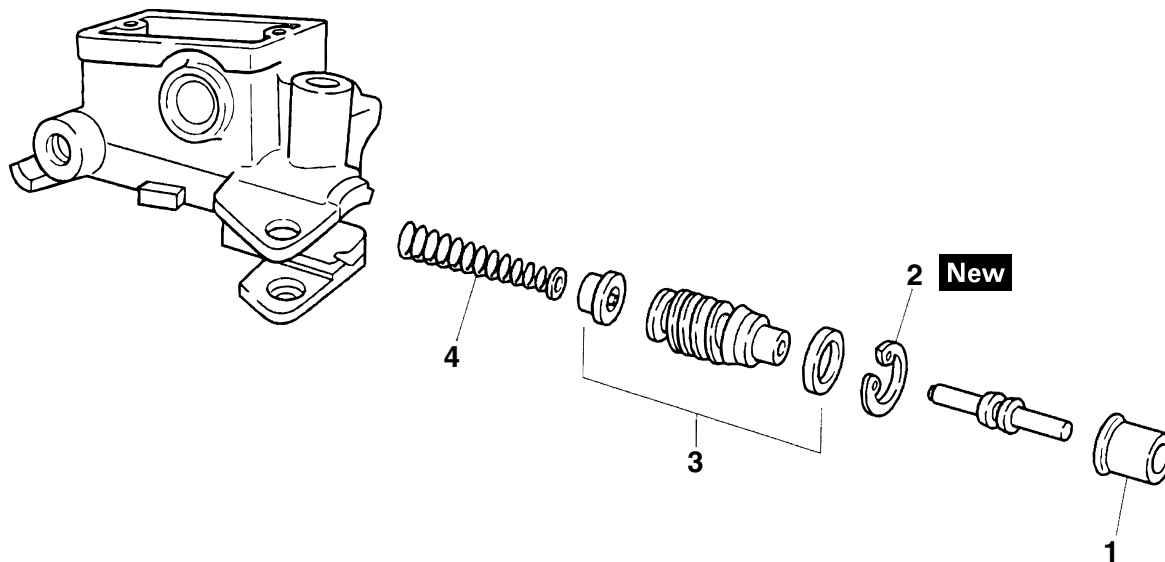
Order	Job/Parts to remove	Q'ty	Remarks
21	Thrust plate	1	
22	Spacer	1	
23	Bearing	1	
24	Primary driven gear	1	
			For installation, reverse the removal procedure.

Removing the clutch master cylinder



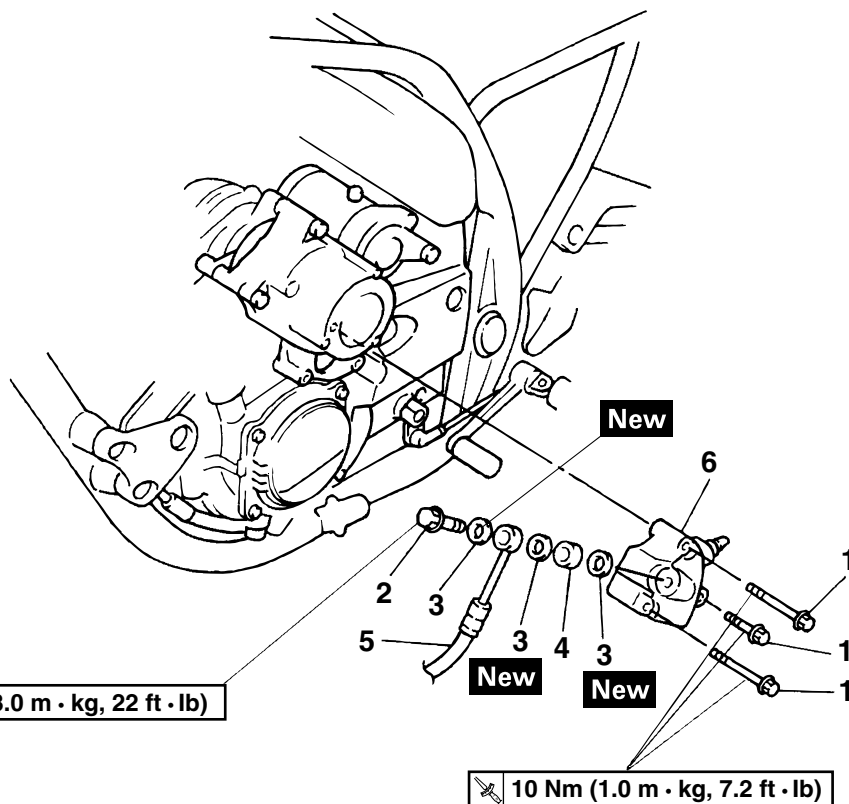
Order	Job/Parts to remove	Q'ty	Remarks
	Drain the clutch fluid		Refer to "ENGINE" on page 3-4.
1	Clutch lever	1	
2	Clutch switch lead	1	
3	Clutch switch	1	
4	Union bolt	1	
5	Copper washer/ Clutch hose	2/1	
6	Master cylinder bracket	1	
7	Master cylinder	1	
			For installation, reverse the removal procedure.

Disassembling the clutch master cylinder



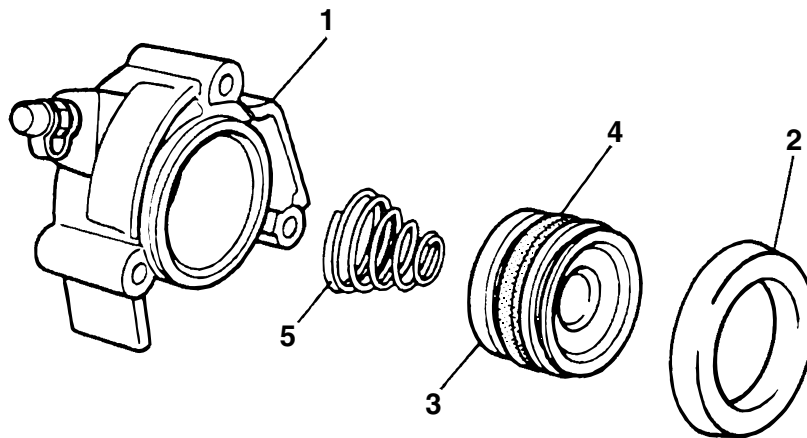
Order	Job/Parts to remove	Q'ty	Remarks
1	Master cylinder boot	1	
2	Circlip	1	
3	Master cylinder kit	1	
4	Spring	1	
			For assembly, reverse the disassembly procedure.

Removing the clutch release cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Drain the clutch fluid		Refer to "ENGINE" on page 3-4.
1	Clutch release cylinder bolt (long)/(short)	2/1	
2	Clutch hose union bolt	1	
3	Copper washer	3	
4	Spacers	1	
5	Clutch hose	1	
6	Clutch release cylinder	1	
			For installation, reverse the removal procedure.

Disassembling the clutch release cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch release cylinder	1	
2	Piston seals	1	
3	Clutch release cylinder piston	1	
4	Piston seals	1	
5	Spring	1	
			For assembly, reverse the disassembly procedure.

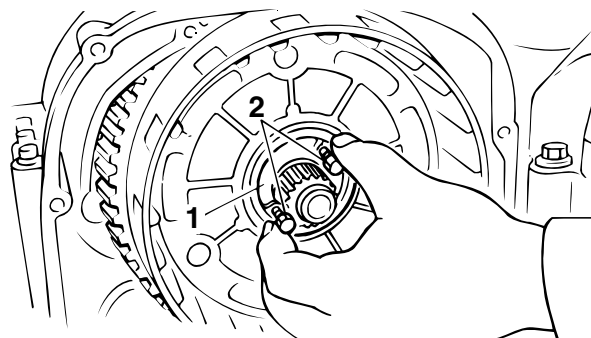
EAS25070

REMOVING THE CLUTCH

1. Straighten the lock washer tab.
2. Loosen:
 - Clutch boss nut "1"

NOTE:

- While holding the clutch boss "3" with the universal clutch holder "2", loosen the clutch boss nut.
- There is a built-in damper between the clutch boss "3" and the clutch plate. It is not necessary to remove the wire circlip "4" and disassemble the built-in damper unless there is serious clutch chattering.



EAS25100

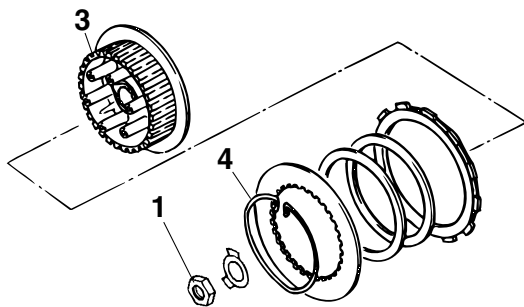
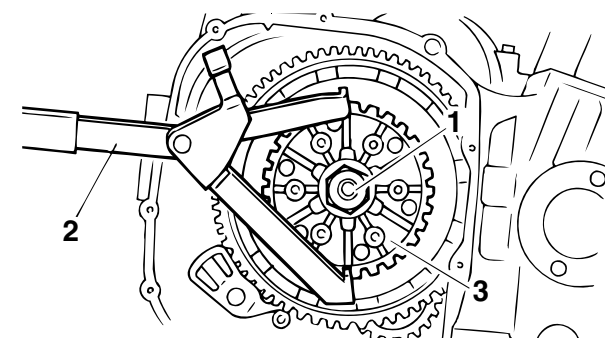
CHECKING THE FRICTION PLATES

The following procedure applies to inspection of all friction plates.

1. Check:
 - Friction plate
 - Damage/wear → Replace the friction plate as a set.
2. Measure:
 - Friction plate thickness
 - Out of specification → Replace the friction plate as a set.

NOTE:

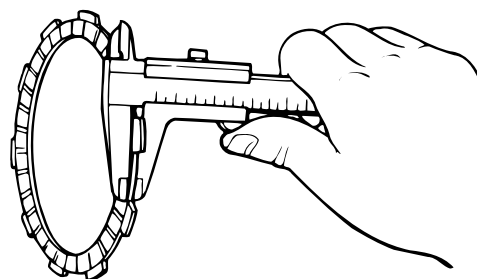
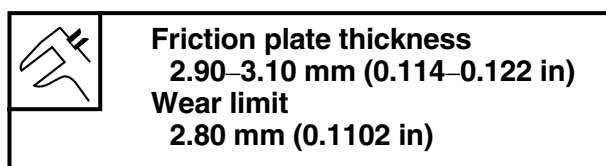
Measure the friction plate at four places.



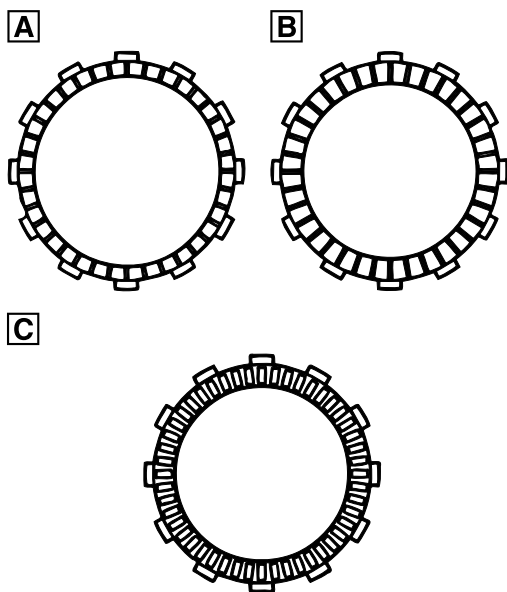
3. Remove:
 - Spacer "1"
 - Bearing

NOTE:

Insert M6 bolts "2" into the spacer and then remove the spacer by pulling on the bolts.



311-000




A. Friction plate 1 (narrow)
 B. Friction plate 2
 C. Friction plate 3

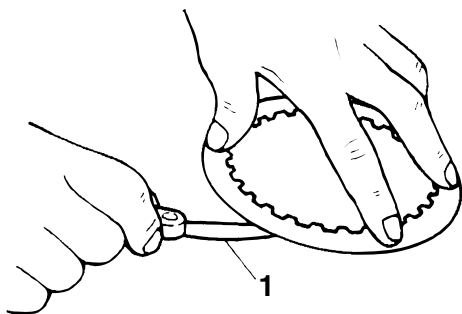
EAS25110

CHECKING THE CLUTCH PLATES

The following procedure applies to inspection of clutch plates.

1. Check:
 - Clutch plate
 Damage → Replace the clutch plate as a set.
2. Measure:
 - Clutch plate warpage
 (with a plate surface and thickness gauge "1")
 Out of specification → Replace the clutch plate as a set.

	Warpage limit 0.10 mm (0.0039 in)
---	--



311-002


EAS25130

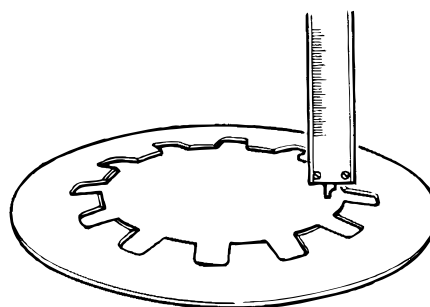
CHECKING THE CLUTCH SPRING PLATE

1. Check:
 - Clutch spring

Damage → Replace.

2. Check:
 - Clutch spring seat
 Damage → Replace.
3. Measure:
 - Clutch spring free height
 Out of specification → Replace the clutch spring plate.

	Clutch spring height 6.78 mm (0.27 in) Limit 6.40 mm (0.25 in)
---	---

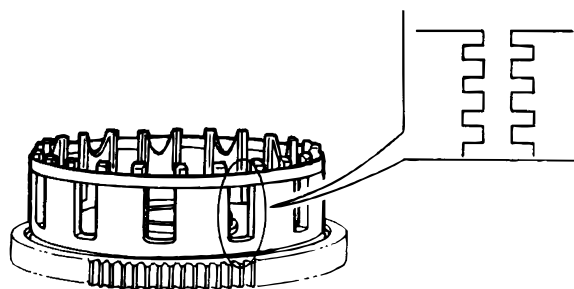


EAS25150

CHECKING THE CLUTCH HOUSING

1. Check:
 - Clutch housing dogs
 Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

NOTE:
 Pitting on the clutch housing dogs will cause erratic clutch operation.



2. Check:
 - Bearing
 Damage/wear → Replace the bearing and clutch housing.

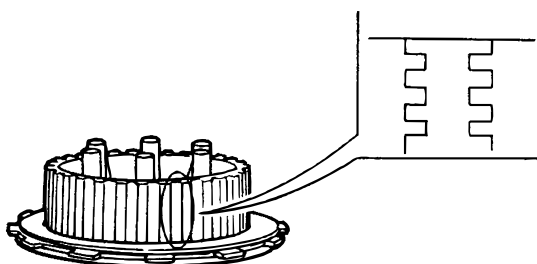
EAS25160

CHECKING THE CLUTCH BOSS

- Check:
 - Clutch boss splines
Damage/pitting/wear → Replace the clutch boss.

NOTE:

Pitting on the clutch boss spline will cause erratic clutch operation.



EAS25170

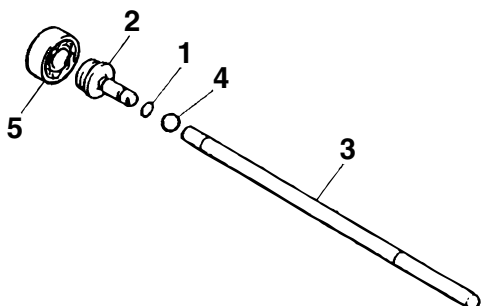
CHECKING THE PRESSURE PLATE

- Check:
 - Pressure plate
Cracks/damage → Replace.
 - Bearing
Damage/wear → Replace.

EAS25190

CHECKING THE CLUTCH PUSH RODS

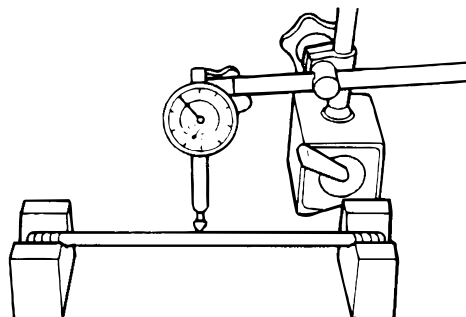
- Check:
 - O-ring "1"
 - Short clutch push rod "2"
 - Long clutch push rod "3"
 - Ball "4"
 - Bearing "5"
 - Cracks/damage/wear → Replace the defective part(s).



- Measure:
 - Long clutch push rod bending limit
Out of specification → Replace.



Long clutch push rod bending limit
0.3 mm (0.0118 in)



311-003

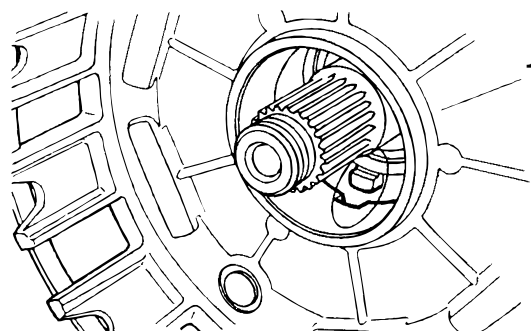
EAS25250

INSTALLING THE CLUTCH

- Install:
 - Clutch housing "1"

NOTE:

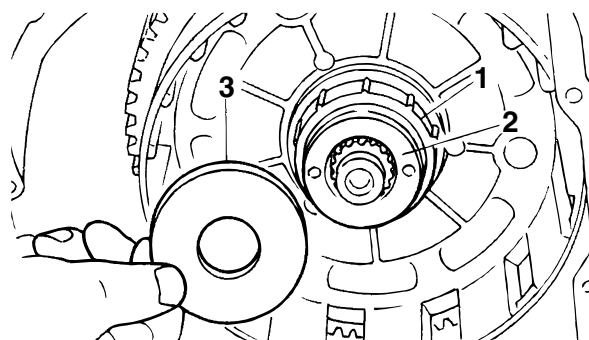
Make sure the oil pump drive gear and primary driven gear are installed with the two projections meshed into the two slots respectively.



- Install:
 - Bearing "1"
 - Spacer "2"
 - Thrust plate "3"

NOTE:

Install the spacer with the two screw holes facing towards the clutch boss.

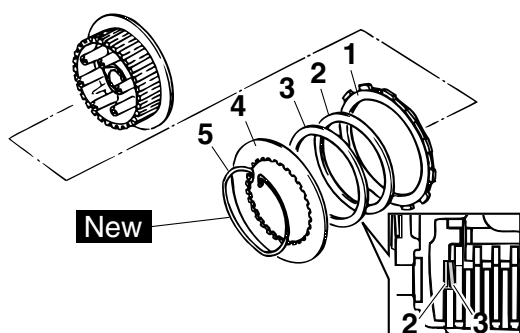


3. Install:

- Friction plate 1 (narrow) "1"
- Spring seat plate "2"
- Spring "3"
- Clutch plate "4"
- Wire circlip "5"

NOTE:

Install spring "3" as shown in the illustration.



4. Install:

- Clutch boss nut "1"



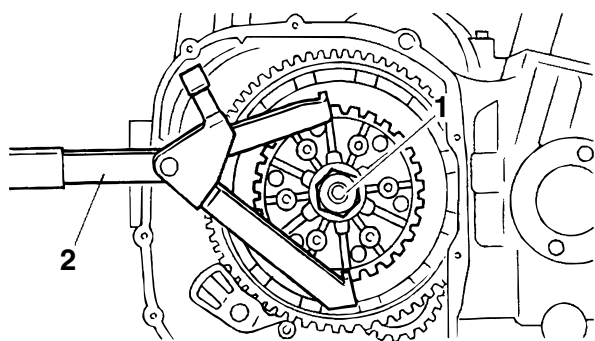
Clutch boss nut
70 Nm (7.0 m•kg, 51 ft•lb)

NOTE:

While holding the clutch boss with the universal clutch holder "2", loosen the clutch boss nut.



Universal clutch holder
90890-04086
YM-91042



5. Bend the lock washer tab along a flat side of the nut.

6. Lubricate:

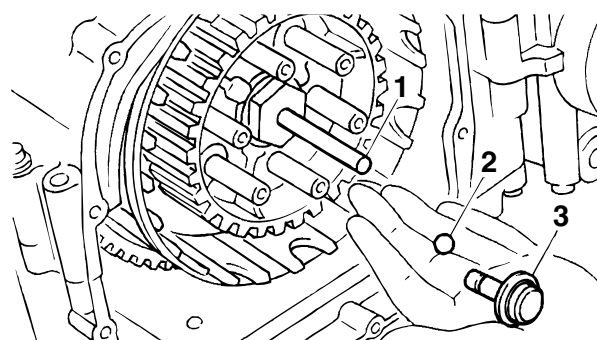
- Long clutch push rod "1"
- Ball "2"
- Short clutch push rod "3"
(with the recommended lubricant)



Recommended lubricant
Lithium-soap-based grease

NOTE:

Insert the rounded end of the long clutch push rod into the clutch boss first.



7. Lubricate:

- Friction plates 1, 2, 3
- Clutch plates
(with the recommended lubricant)



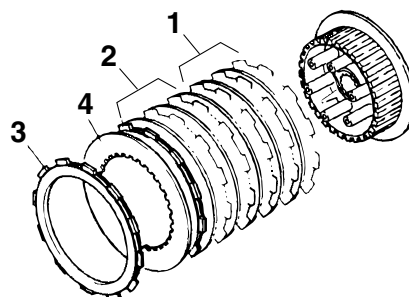
Recommended lubricant
Engine oil

8. Install:

- Friction plates 3 "1"
- Friction plates 2 "2"
- Friction plates 1 "3"
- Clutch plates "4"

NOTE:

First, install a friction plate and then alternate between a clutch plate and a friction plate.



9. Install:

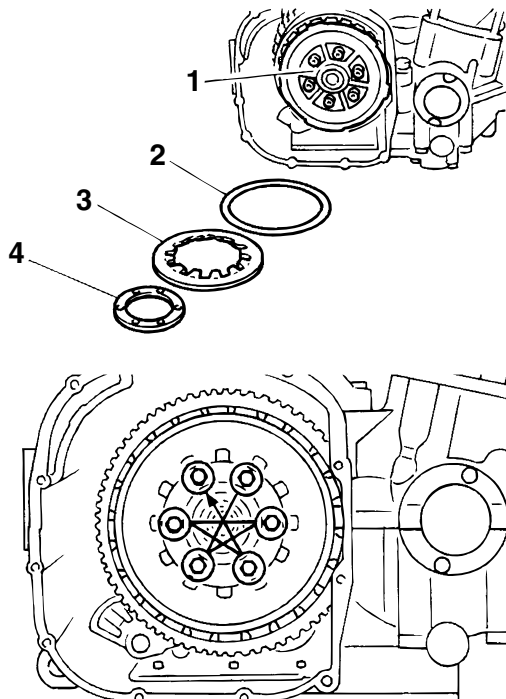
- Pressure plate "1"
- Clutch plate spring "2"
- Clutch springs "3"
- Clutch spring bolts "4"



Clutch spring bolts
8 Nm (0.8 m•kg, 5.8 ft•lb)


NOTE:

Tighten the clutch spring bolts in stages and in a crisscross pattern.



10. Install:

- Right crankcase cover
- Right crankcase cover gasket **New**

	Right crankcase cover bolt 10 Nm (1.0 m•kg, 7.2 ft•lb)
---	---

EAS25280

DISASSEMBLING THE CLUTCH MASTER CYLINDER

NOTE:

Before disassembling the clutch master cylinder, drain the clutch fluid from the entire clutch system.

1. Remove:

- Union bolt
- Copper washers
- Clutch hose

NOTE:

To collect any remaining clutch fluid, place a container under the master cylinder and the end of the clutch hose.

EAS25290

CHECKING THE CLUTCH MASTER CYLINDER

Recommended clutch component replacement schedule	
Piston seals	Every four years
Clutch hose	Every four years

Recommended clutch component replacement schedule

Clutch fluid	Every two years and whenever the clutch is disassembled
--------------	---

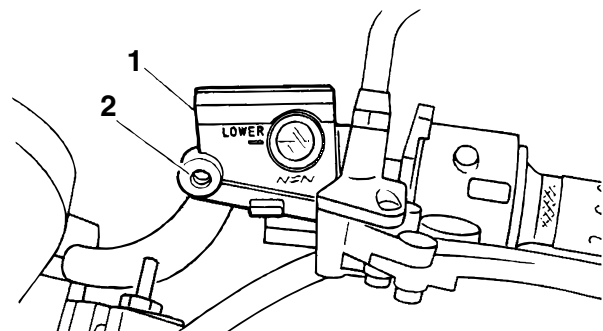
1. Check:

- Clutch master cylinder body "1"
Cracks/damage → Replace the clutch master cylinder.
- Clutch fluid delivery passage "2"
(clutch master cylinder body)
Obstruction → Blow out with compressed air.

EWA13330

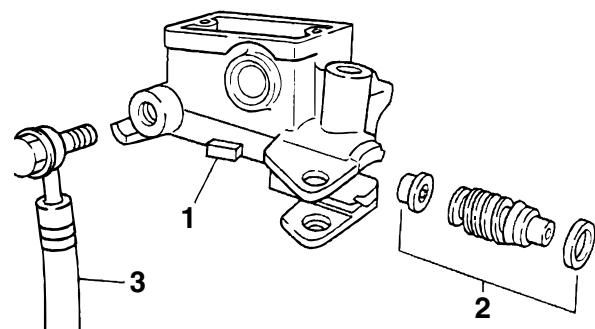
⚠ WARNING

Whenever a clutch master cylinder is disassembled, replace the piston seals.



2. Check:

- Clutch master cylinder "1"
- Clutch master cylinder kit "2"
Rust/scratches/wear → Replace the clutch master cylinder and clutch master cylinder kit as a set.
- Clutch hose "3"
Cracks/damage/wear → Replace.



EAS25300

ASSEMBLING THE CLUTCH MASTER CYLINDER

EWA13340

⚠ WARNING

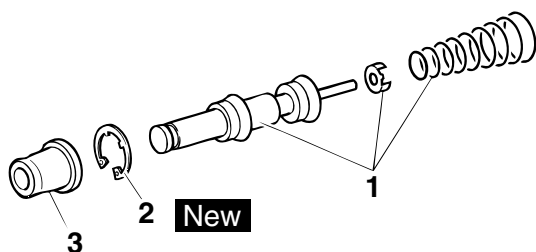
• Before installation, all internal clutch components must be cleaned and lubricated

with clean or new clutch fluid.

- Never use solvents on internal clutch components as they will cause the piston seals to swell and distort.
- Whenever a clutch master cylinder is disassembled, replace the piston seals.

	Recommended fluid DOT 4
---	------------------------------------

1. Install:
 - Master cylinder kit "1"
 - Circlip "2" **New**
 - Dust boot "3"



EAS25310

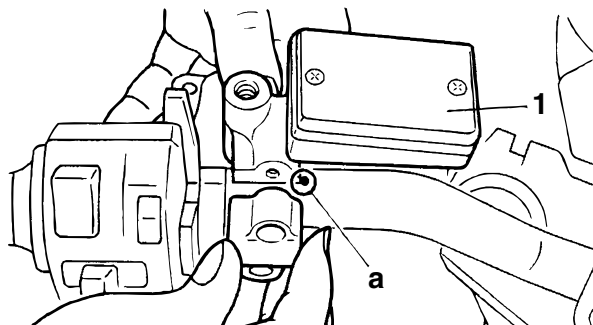
INSTALLING THE CLUTCH MASTER CYLINDER

1. Install:
 - Clutch master cylinder "1"

EWA13350

WARNING

- Install the clutch lever holder with the "UP" mark facing up.
- Align the end of the clutch lever holder with the punch mark "a" in the handlebar.
- First, tighten the upper bolt, then the lower bolt.



2. Install:
 - Copper washers **New**
 - Clutch hose "1"
 - Union bolt "2"



**Clutch hose union bolt
30 Nm (3.0 m•kg, 22 ft•lb)**

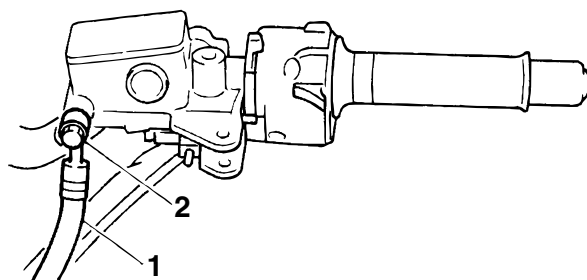
EWA13360

WARNING

Proper clutch hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING" on page 2-31.

NOTE:

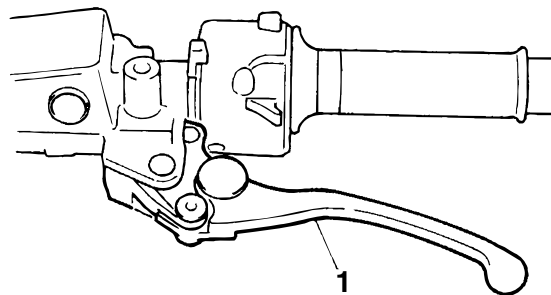
While holding the clutch hose, tighten the union bolt.



3. Install:
 - Clutch lever "1"

NOTE:

Lubricate the clutch lever pivot bolt with silicon grease.



4. Fill:
 - Fill with the specified amount of recommended clutch fluid.
 - Clutch master cylinder reservoir

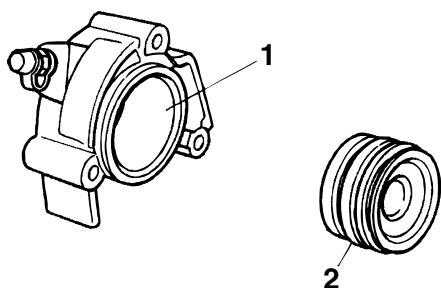


**Recommended fluid
DOT 4**

EWA13370

WARNING

- Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.
- Refill with the same type of clutch fluid that



Clutch hose union bolt
30 Nm (3.0 m•kg, 22 ft•lb)

EWA13360

WARNING

Proper clutch hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING” on page 2-31.

EAS25340

ASSEMBLING THE CLUTCH RELEASE CYLINDER

EWASUXB007

WARNING

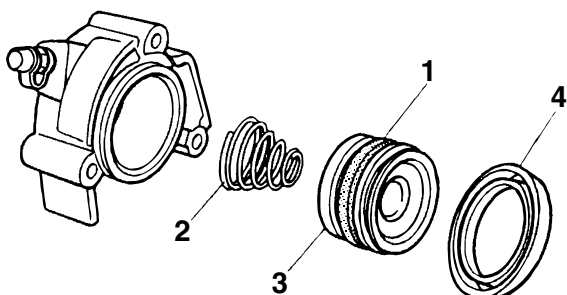
- Before installation, all internal clutch components must be cleaned and lubricated with clean or new clutch fluid.
- Never use solvent on internal clutch components as they will cause the piston seal to swell and distort.
- Whenever a clutch release cylinder is disassembled, replace the piston seal.



Recommended fluid
DOT 4

1. Install:

- Piston seal “1” **New**
- Spring “2”
- Release cylinder piston “3”
- Oil seal “4” **New**

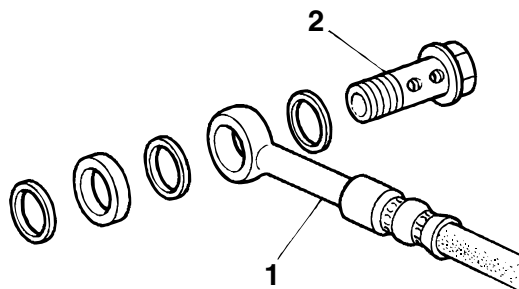


EAS25350

INSTALLING THE CLUTCH RELEASE CYLINDER

1. Check:

- Copper washers **New**
- Clutch hose “1”
- Union bolt “2”



2. Fill:

- Fill with the specified amount of recommended clutch fluid.
- Clutch master cylinder reservoir



Recommended fluid
DOT 4

EWA13370

WARNING

- Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.
- Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.
- When refilling, be careful that water does not enter the clutch fluid reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.

ECA13420

CAUTION:

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

NOTE:

In order to ensure a correct reading of the clutch fluid level, make sure the top of the reservoir is horizontal.

3. Bleed:

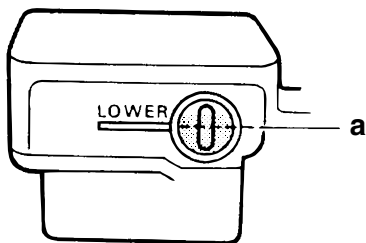
- Clutch system

Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” on page 3-16.

4. Check:

- Clutch fluid level

Below the minimum level mark “a” → Add the recommended clutch fluid to the proper level. Refer to “CHECKING THE CLUTCH FLUID LEVEL” on page 3-15.



346-012

5. Check:

- Clutch lever operation

Soft or spongy feeling → Bleed the clutch system.

Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” on page 3-16.

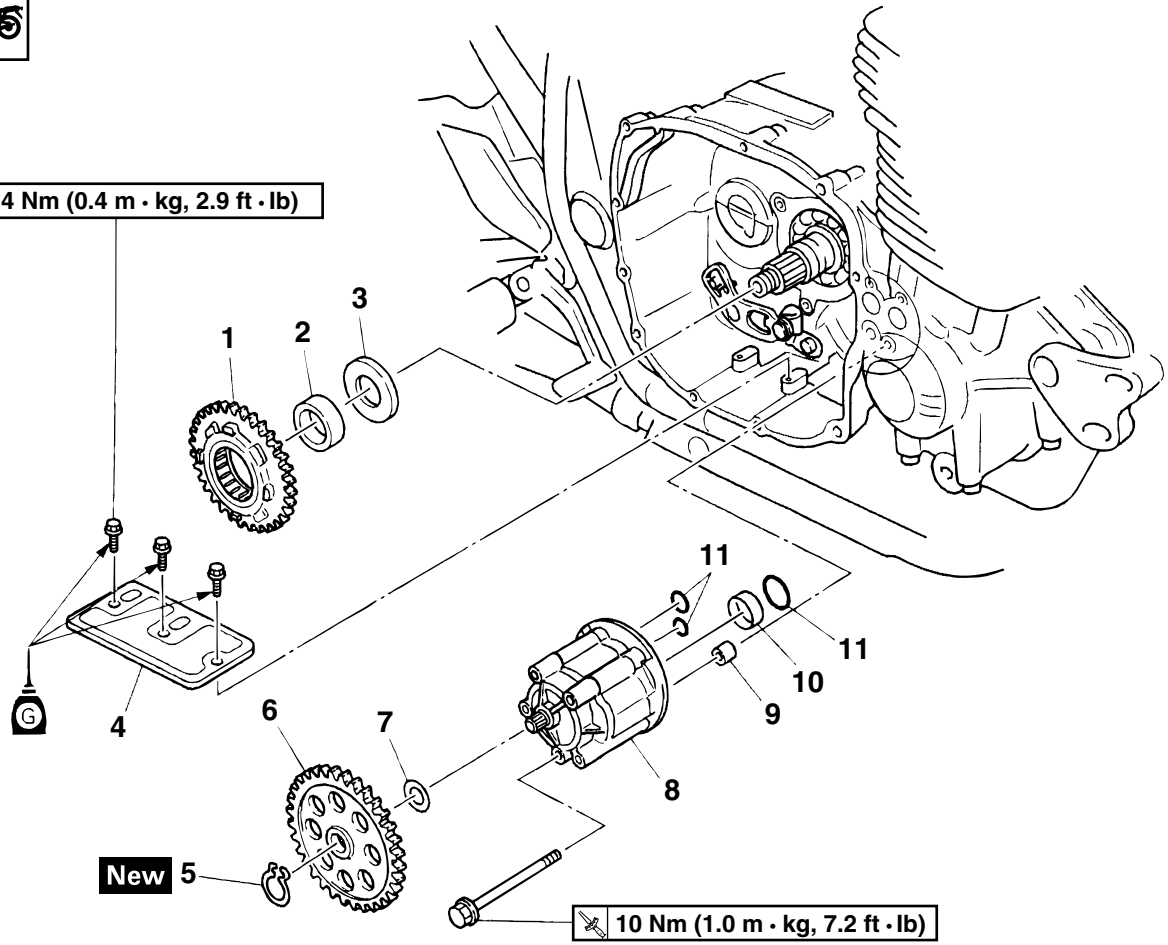
EAS24910

OIL PUMP

Removing the oil pump



4 Nm (0.4 m · kg, 2.9 ft · lb)



New 5

10 Nm (1.0 m · kg, 7.2 ft · lb)

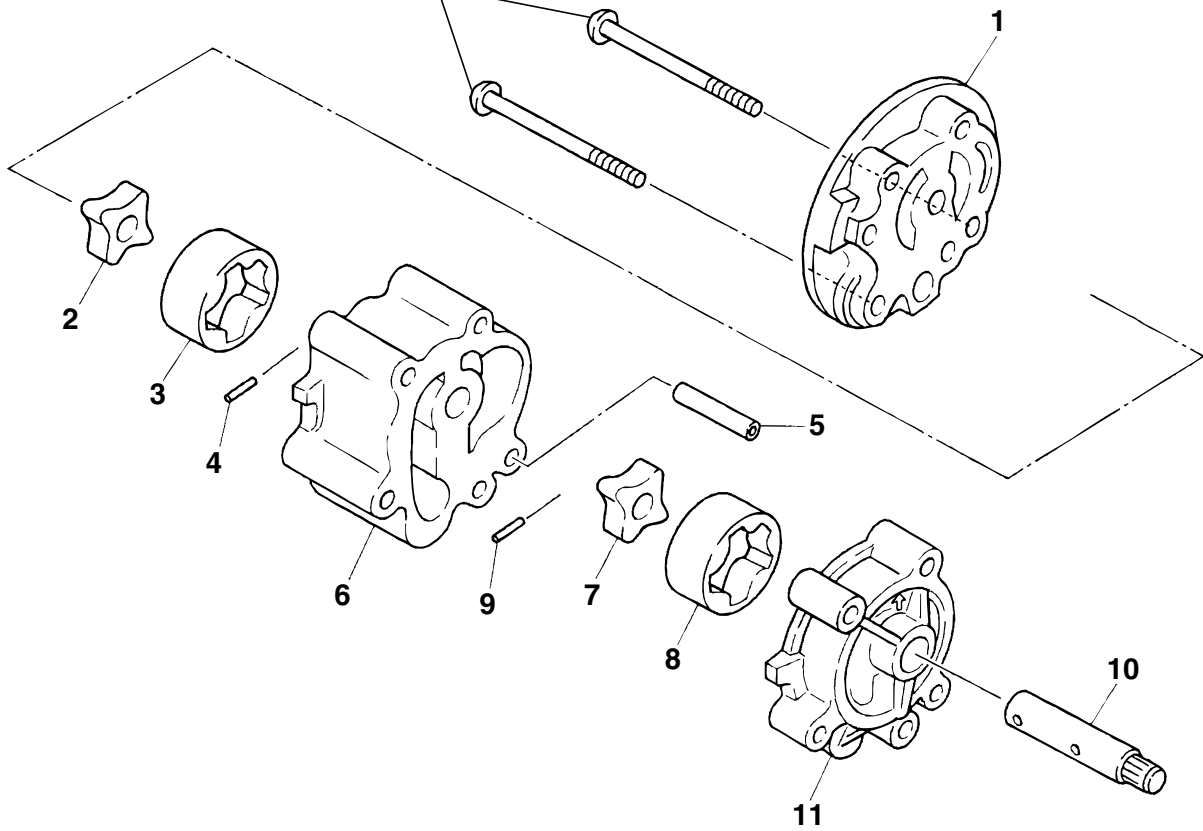
Order	Job/Parts to remove	Q'ty	Remarks
	Clutch		Refer to "CLUTCH" on page 5-37.
1	Oil pump drive gear	1	
2	Collar	1	
3	Washer	1	
4	Oil buffer plate	1	
5	Circlip	1	
6	Oil pump driven gear	1	
7	Plate washer	1	
8	Oil pump assembly	1	
9	Dowel pin	1	
10	Collar	1	
11	O-ring	3	
			For installation, reverse the removal procedure.

OIL PUMP

Disassembling the oil pump



7 Nm (0.7 m · kg, 5.2 ft · lb)



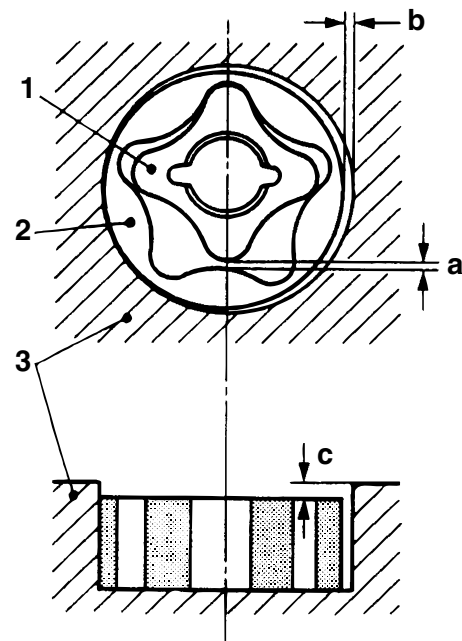
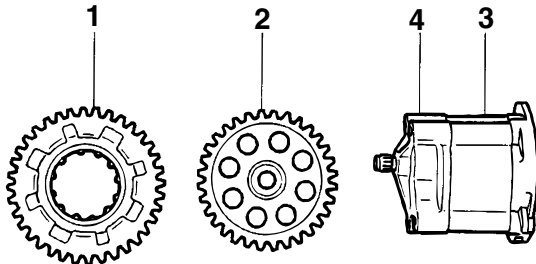
Order	Job/Parts to remove	Q'ty	Remarks
1	Rotor housing	1	
2	Inner rotor	1	
3	Outer rotor	1	
4	Dowel pin	1	
5	Dowel pin	1	
6	Housing	1	
7	Inner rotor	1	
8	Outer rotor	1	
9	Dowel pin	1	
10	Pump shaft	1	
11	Pump cover	1	
			For installation, reverse the removal procedure.

EAS24950

DISASSEMBLING THE OIL PUMP

1. Remove:

- Screw
- Oil pump drive gear "1"
- Oil pump driven gear "2"
- Oil pump housing "3"
- Oil pump housing cover "4"



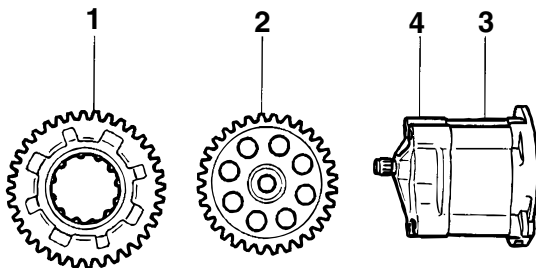
1. Inner rotor
2. Outer rotor
3. Oil pump housing

EAS24960

CHECKING THE OIL PUMP

1. Check:

- Oil pump drive gear "1"
 - Oil pump driven gear "2"
 - Oil pump housing "3"
 - Oil pump housing cover "4"
- Cracks/damage/wear → Replace.



2. Measure:

- Inner-rotor-to-outer-rotor-tip clearance "a"
 - Outer-rotor-to-oil-pump-housing clearance "b"
 - Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance "c"
- Out of specification → Replace the oil pump.



Inner-rotor-to-outer-rotor-tip clearance

0.120 mm or less (0.0047 in or less)

Limit

0.20 mm (0.0079 in)

Outer-rotor-to-oil-pump-housing clearance

0.090–0.150 mm (0.0035–0.0059 in)

Limit

0.160 mm (0.0063 in)

Oil-pump-housing-to-inner-and-outer-rotor clearance

0.03–0.08 mm (0.0012–0.0032 in)

Limit

0.15 mm (0.0059 in)

3. Check:

- Oil pump operation
- Rough movement → Replace the defective part(s).

EAS25000

ASSEMBLING THE OIL PUMP

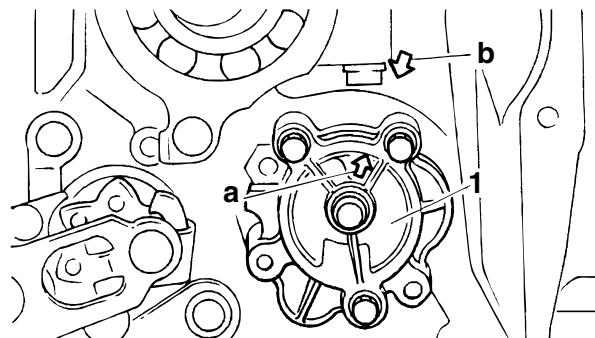
1. Lubricate:


- Inner rotor
 - Outer rotor
 - Oil pump shaft
- (with the recommended lubricant)

	Recommended lubricant Engine oil
---	---

2. Install:

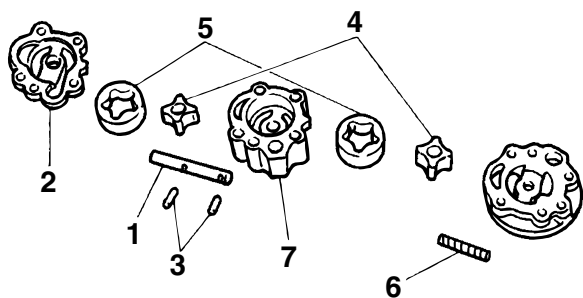
- Oil pump shaft “1”
(to the oil pump cover “2”)
- Pin “3”
- Inner rotor “4”
- Outer rotor “5”
- Pin “6”
- Oil pump housing “7”



	Oil pump cover screw 7 Nm (0.7 m•kg, 5.1 ft•lb)
---	--

NOTE:

When installing the inner rotor, align the pin “3” in the oil pump shaft with the groove “a” in the inner rotor “4”.



3. Check:


- Oil pump operation
Refer to “CHECKING THE OIL PUMP” on page 5-55.

EAS25020

INSTALLING THE OIL PUMP

1. Install:

- Oil pump “1”

	Oil pump bolt 10 Nm (1.0 m•kg, 7.2 ft•lb)
---	--

ECA13890

CAUTION:

After tightening the bolts, make sure the oil pump turns smoothly.

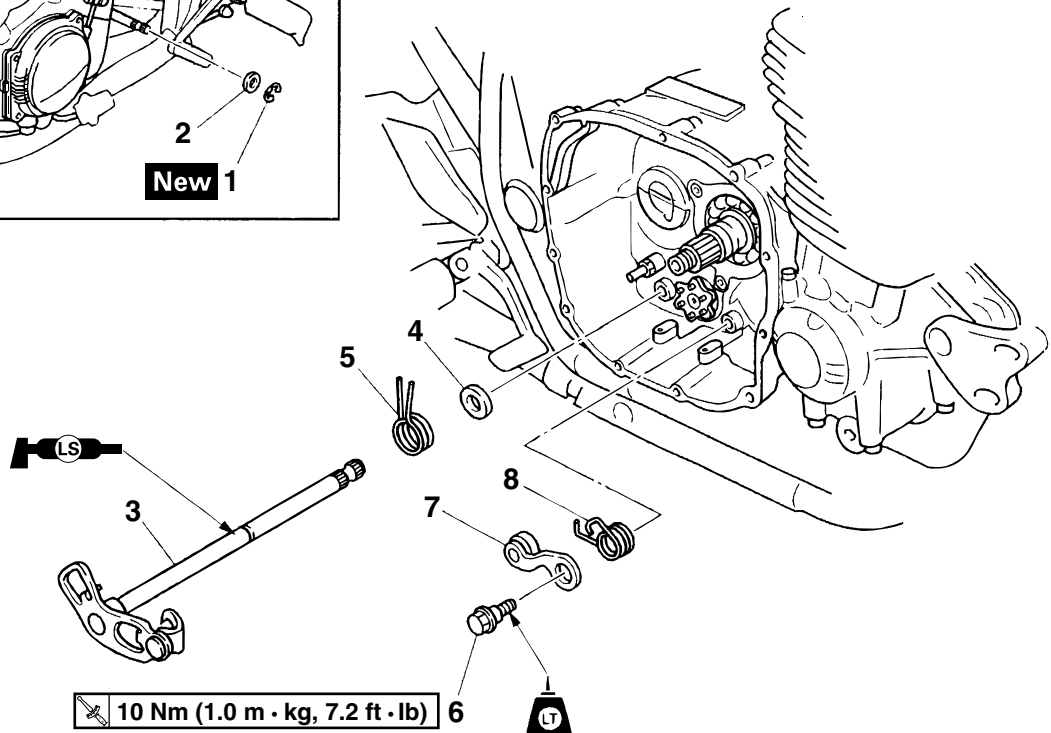
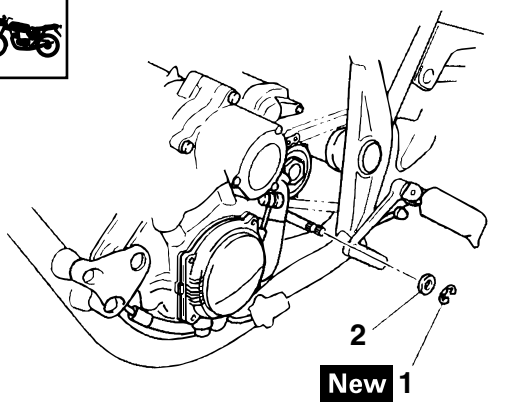
NOTE:

Align the arrow mark “a” on the oil pump with the arrow mark “b” on the crankcase.

EAS25410

SHIFT SHAFT

Removing the shift shaft and stopper lever

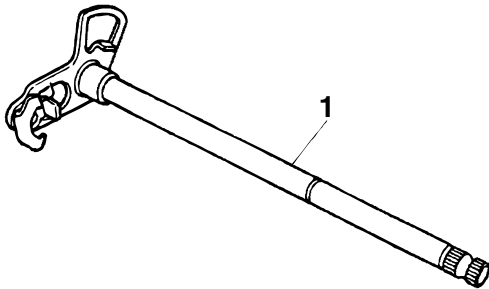


Order	Job/Parts to remove	Q'ty	Remarks
	Oil pump		Refer to "OIL PUMP" on page 5-53.
	Drive sprocket cover		Refer to "ENGINE REMOVAL" on page 5-1.
1	Circlip	1	
2	Plate washer	1	
3	Shift shaft	1	
4	Plate washer	1	
5	Torsion spring	1	
6	Bolt	1	
7	Stopper lever	1	
8	Torsion spring	1	
			For installation, reverse the removal procedure.

EAS25420

CHECKING THE SHIFT SHAFT

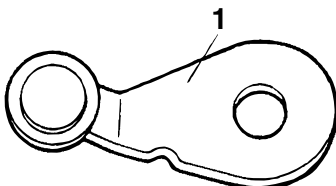
- Check:
 - Shift shaft "1"
 - Shift shaft lever
Bends/damage/wear → Replace.
 - Shift shaft lever spring
Damage/wear → Replace.



EAS25430

CHECKING THE STOPPER LEVER

- Check:
 - Stopper lever "1"
 - Bends/damage → Replace.
 - Roller turns roughly → Replace the stopper lever.



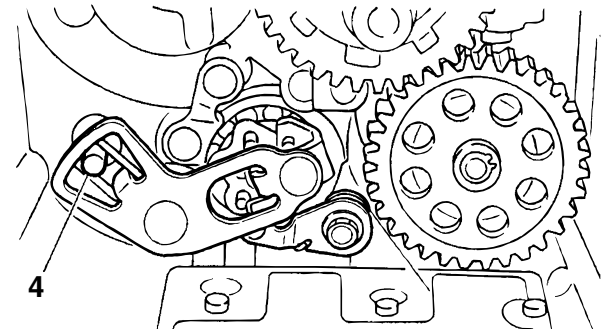
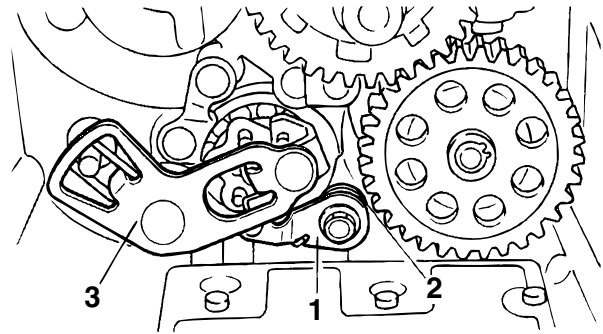
EAS25450

INSTALLING THE SHIFT SHAFT

- Install:
 - Stopper lever "1"
 - Stopper lever spring "2"
 - Shift shaft lever "3"

NOTE:

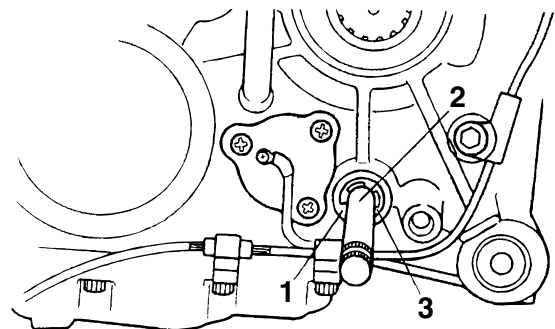
- Hook the ends "4" of the stopper lever spring onto the stopper lever and the crankcase boss.
- Mesh the stopper lever with the shift drum segment assembly.



- Install:
 - Washer "1"
 - Shift shaft "2"
 - Circlip "3"

NOTE:

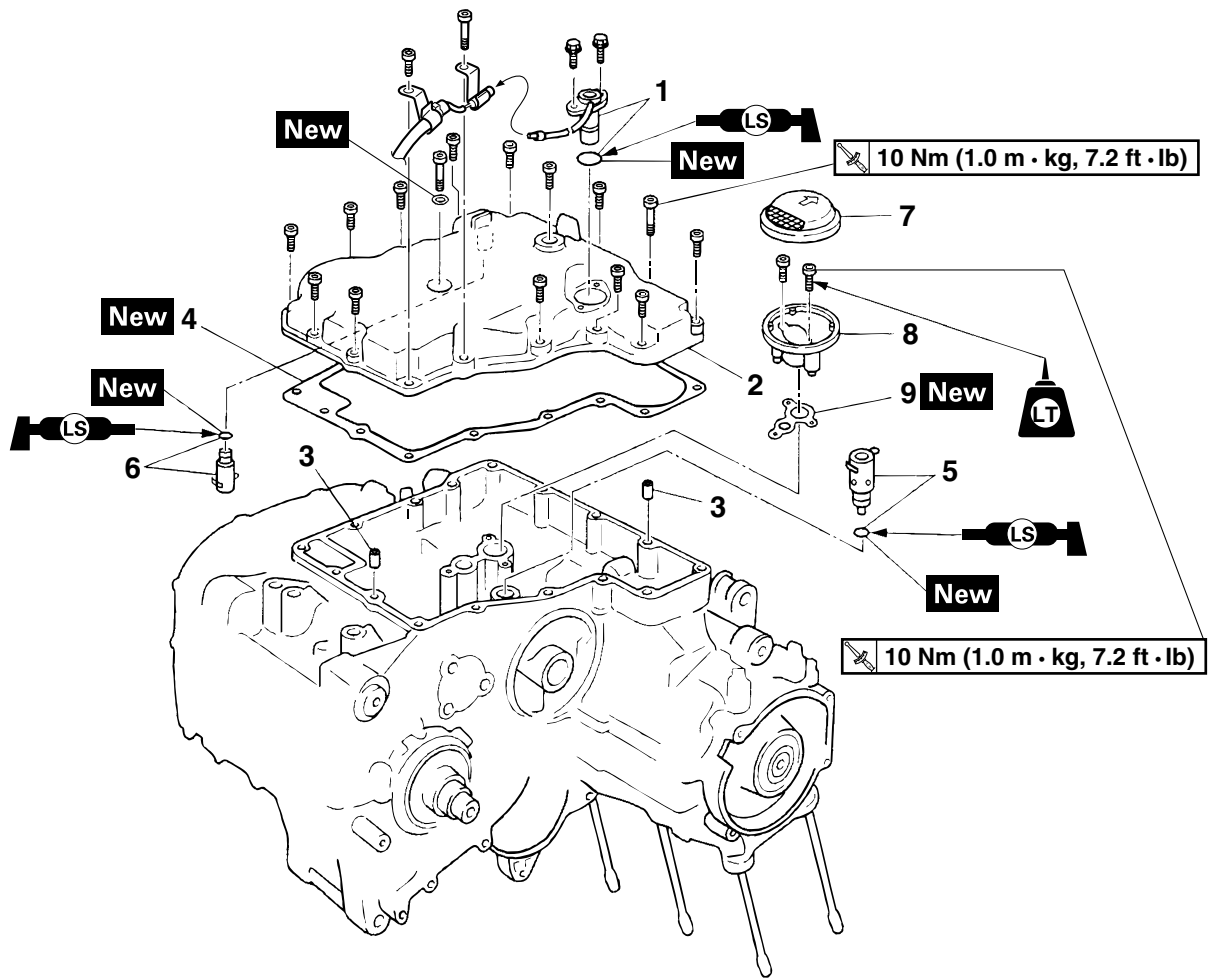
- Lubricate the oil seal lips with lithium-soap-based grease.



EAS5UXB002

OIL PAN

REMOVING THE OIL PAN



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
1	Oil level switch/O-ring	1/1	
2	Oil pan	1	
3	Dowel pin	2	
4	Oil pan gasket	1	
5	Relief valve (Large) /O-ring	1/1	
6	Relief valve (Small)/O-ring	1/1	
7	Oil strainer	1	
8	Oil strainer housing	1	
9	Gasket	1	
			For installation, reverse the removal procedure.

EAS5UXB005

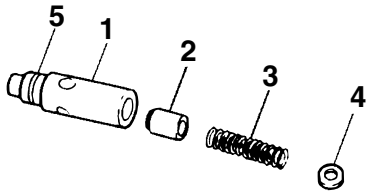
REMOVING THE OIL PAN

- Remove:
 - Oil level switch
 - Oil pan
 - Gasket
 - Dowel pins

EAS24970

CHECKING THE RELIEF VALVE

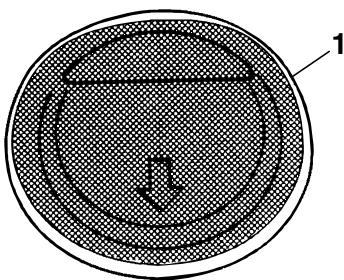
- Check:
 - Relief valve body "1"
 - Relief valve "2"
 - Spring "3"
 - Cover "4"
 - O-ring "5"
 Damage/wear → Replace.



EAS24990

CHECKING THE OIL STRAINER

- Check:
 - Oil strainer "1"
 Damage → Replace.
 Contaminants → Clean with solvent.



EAS5UXB006

INSTALLING THE OIL STRAINER

- Install:
 - Oil strainer housing "1"

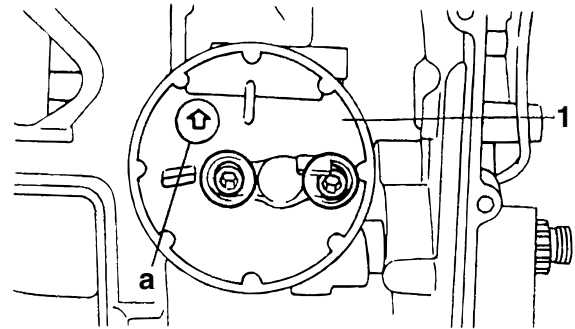


Oil strainer housing
10 Nm (1.0 m•kg, 7.2 ft•lb)
(Apply the LOCTITE®)

NOTE:

Install with the oil strainer housing arrow mark

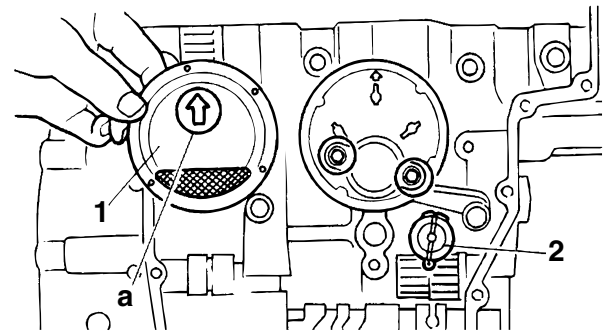
"a" facing forward.



- Install:
 - Oil strainer "1"
 - Relief valve (large) "2"

NOTE:

Install with the oil strainer arrow mark "a" facing forward.



EAS5UXB007

INSTALLING THE OIL PAN

- Install:
 - Dowel pins
 - Gasket
 - Oil pan
 - Oil level switch
 - Engine oil drain bolt



Oil pump mounting bolt
10 Nm (1.0 m•kg, 7.2 ft•lb)

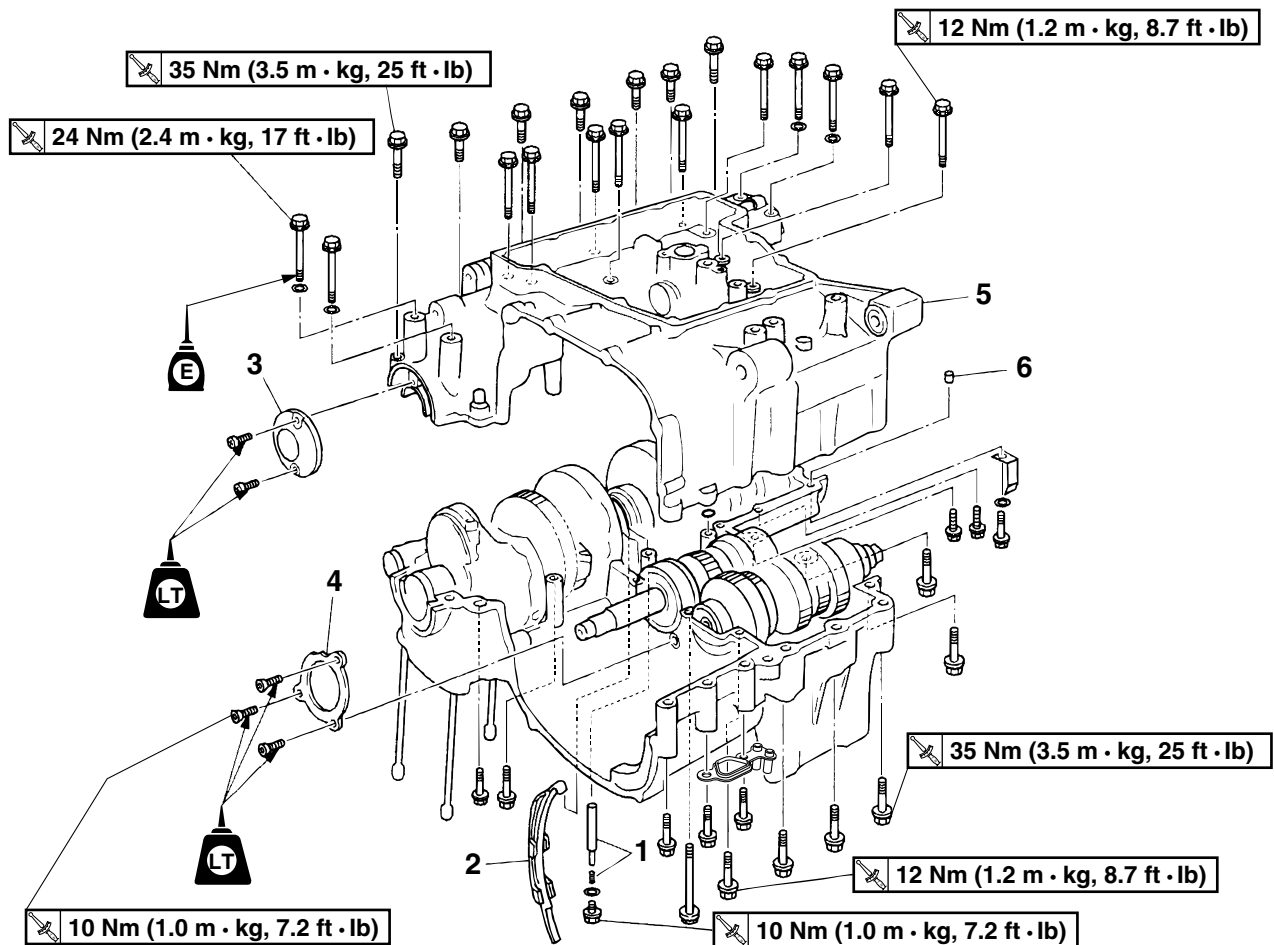
NOTE:

Tighten the oil pump mounting bolts in two stages and in a crisscross pattern.

EAS25540

CRANKCASE

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Camshaft		Refer to "CAMSHAFTS" on page 5-5.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-13.
	Cylinder(s) and piston(s)		Refer to "CYLINDER AND PISTON" on page 5-24.
	Clutch		Refer to "CLUTCH" on page 5-37.
	Oil pump		Refer to "OIL PUMP" on page 5-53.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-57.
	Timing plate/crankshaft position sensor		Refer to "TIMING PLATE" on page 5-33.
	Oil pan		Refer to "OIL PAN" on page 5-59.
1	Spring/Rod	1/1	
2	Timing chain guide (intake side)	1	
3	Cover	1	
4	Bearing cover plate	1	
5	Lower crankcase	1	
6	Dowel pin	1	
			For installation, reverse the removal procedure.

CRANKCASE

EAS25550

DISASSEMBLING THE CRANKCASE

1. Remove:
 - Crankcase bolts

NOTE:

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order. (Refer to illustration)
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.

2. Place the engine upside down.

3. Remove:
 - Lower crankcase

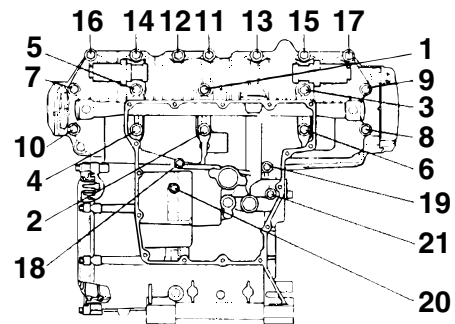
ECA13900

CAUTION:

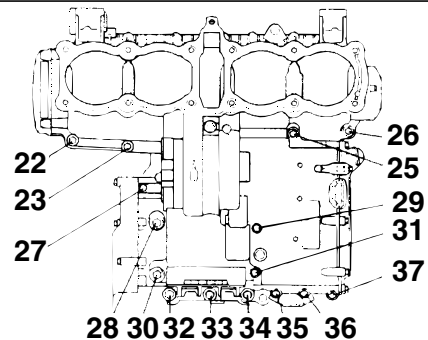
Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

- M8×100mm bolt “1”–“10”
- M8×45mm bolt “11”–“15”
- M10×50mm bolt “16”, “17”
- M6 ×110mm bolt “18”
- M6 ×95mm bolt “19”, “21”
- M6 ×40mm bolt “20”, “23”
- M6 ×50mm bolt “22”, “26”
- M6 ×65mm bolt “25”, “37”
- M6 ×30mm bolt “27”
- M8×55mm bolt “28”, “30”
- M6 ×125mm bolt “24”
- M6 ×70mm bolt “31”
- M10×60mm bolt “32”, “34”
- M6 ×55mm bolt “35”, “36”

A



B



- A. Lower crankcase
B. Upper crankcase

4. Remove:
 - Dowel pins

EAS25580

CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
 - Crankcase
Cracks/damage → Replace.
 - Oil delivery passages
Obstruction → Blow out with compressed air.

EAS25650

ASSEMBLING THE CRANKCASE

1. Lubricate:
 - Crankshaft journal bearings
(with the recommended lubricant)



2. Apply:
 - Yamaha bond No. 1215 (Three Bond No. 1215®)
(onto the crankcase mating surfaces)

CRANKCASE

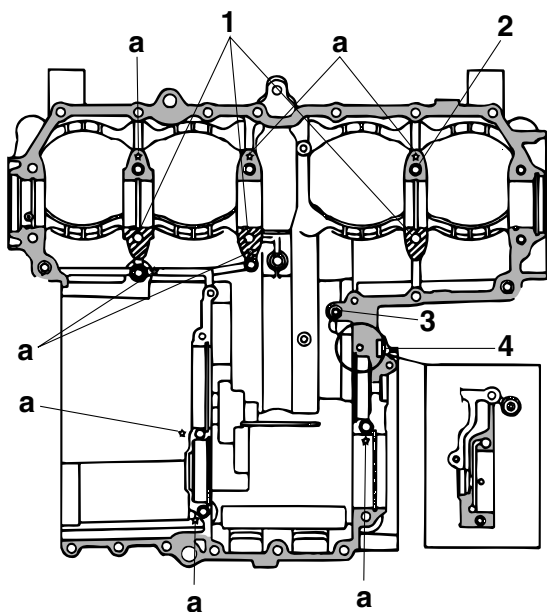


Yamaha bond No. 1215 (Three Bond No.1215®)
90890-85505

NOTE:

Apply a thin, even layer of Yamaha Bond 1215 to the upper crankcase

- No application required “1”(slanted line section)
- Apply all around the top and bottom case tightening bolts (star mark “a”) “2”
- Keep out of the lower case O-ring groove “3”.
- Crankcase oil passages “4”



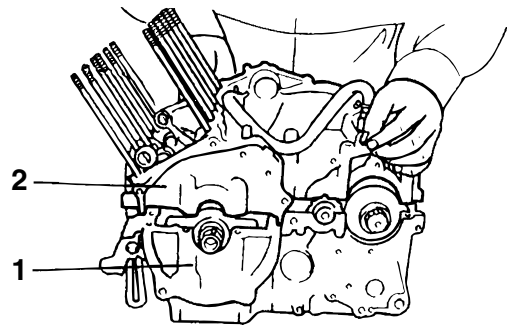
3. Install:

- Dowel pin

4. Set the shift drum assembly and transmission gears in the neutral position.

5. Install:

- Lower crankcase “1” (onto the upper crankcase “2”)



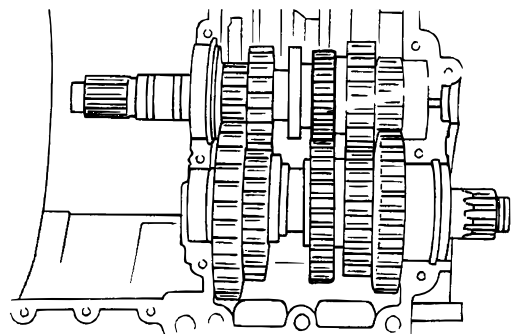
ECA13980

CAUTION:

Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.

NOTE:

Carefully position the shift forks so that they are installed correctly into the transmission gears. Refer to “TRANSMISSION” on page 5-77.



6. Install:

- Crankcase bolts



Crankcase bolt “1”-“15”, “28”, “30”(M8)

24 Nm (2.4 m•kg, 17 ft•lb)

Crankcase bolt “16”, “17”, “32”, “34” (M10)

35 Nm (3.5 m•kg, 25 ft•lb)

Crankcase bolt “18”-“27”, “29”, “31”, “35”-“37” (M6)

12 Nm (1.2 m•kg, 8.7 ft•lb)

NOTE:

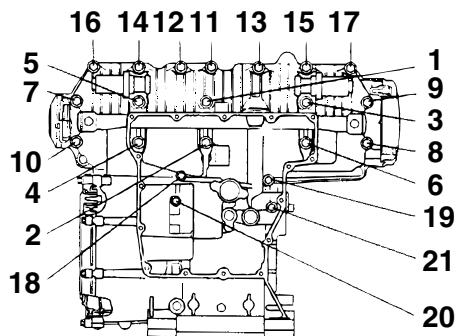
- Tighten the bolts in the tightening sequence cast on the crankcase.
- “35” and “36” tighten with clamp, “1”, “3”, “5”, “7”-“ and 10” have washers “37” is tightened with negative lead and “2”, “4” and “6” have no washers.

- M8×100mm bolt “1”-“10”
- M8×45mm bolt “11”, “15”

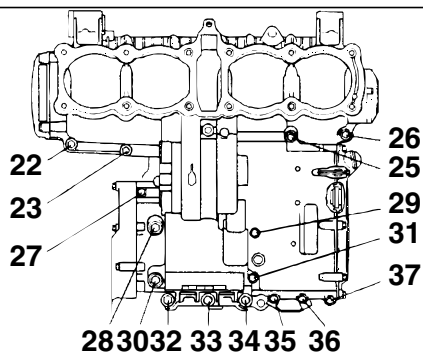
CRANKCASE

- M10×50mm bolt “16”, “17”
- M6 ×110mm bolt “18”
- M6 ×95mm bolt “19”, “ 21”
- M6 ×40mm bolt “20”, “ 23”
- M6 ×50mm bolt “22”, “ 26”
- M6 ×65mm bolt “25”, “ 37”
- M6 ×30mm bolt “27”
- M8×55mm bolt “28”, “30”
- M6 ×125mm bolt “24”
- M6 ×70mm bolt “31”
- M10×60mm bolt “32”, “34”
- M6 ×55mm bolt “35”, “ 36”

A



B



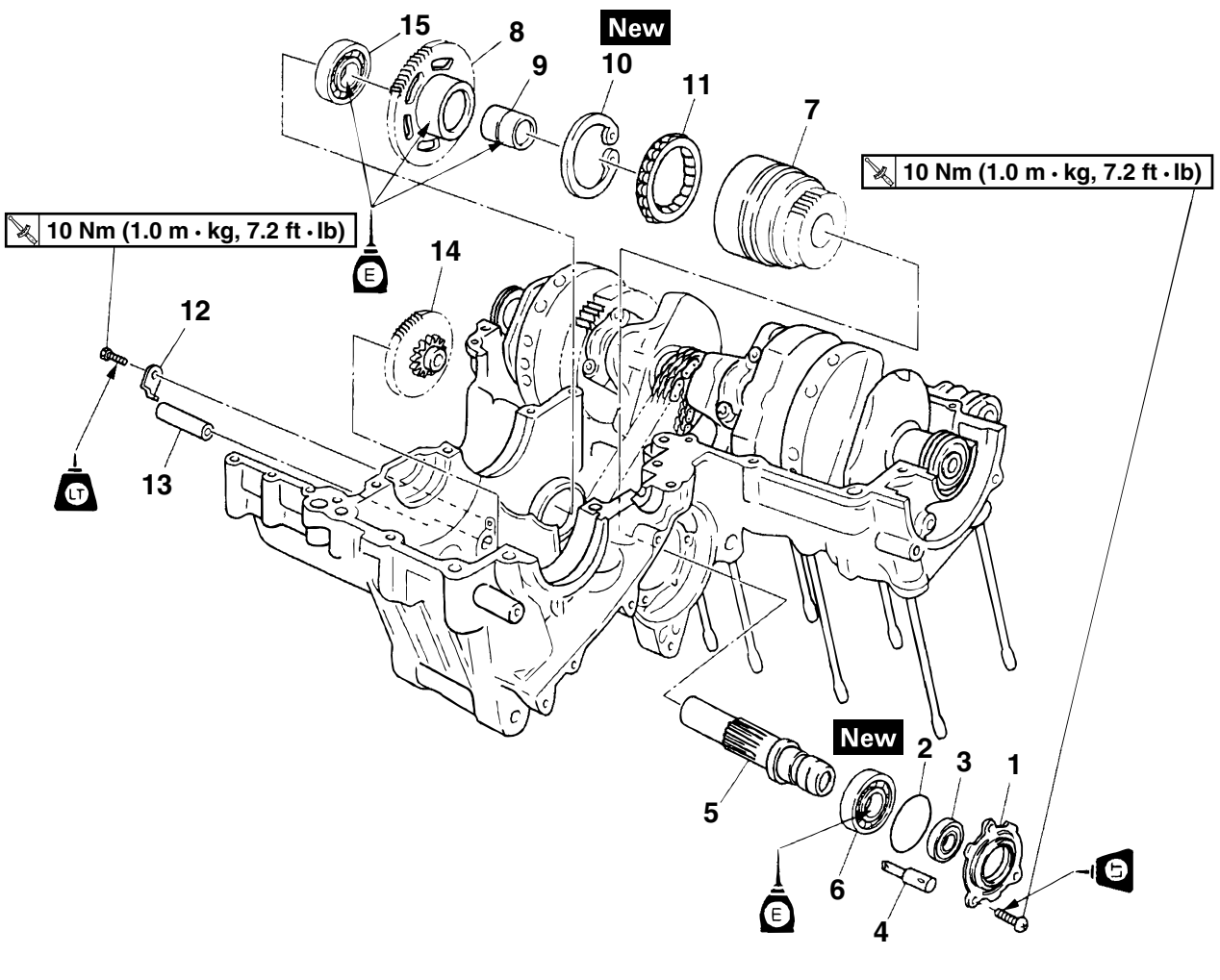
- A. Upper crankcase
B. Lower crankcase

STARTER CLUTCH

EAS24550

STARTER CLUTCH

Removing the starter clutch



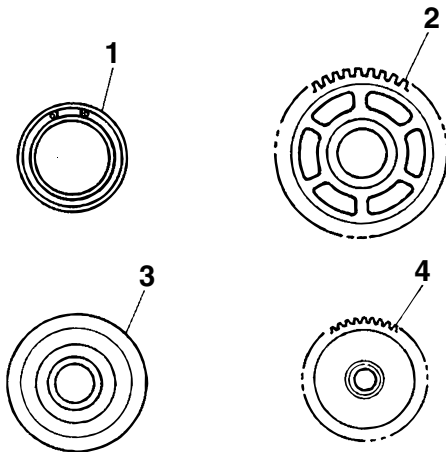
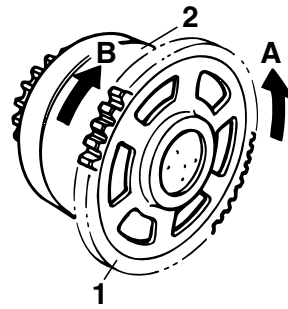
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate Refer to "CRANKCASE" on page 5-61.
1	Bearing housing	1	
2	O-ring	1	
3	Oil seal	1	
4	Nozzle	1	
5	Shaft 2	1	
6	Bearing	1	
7	Starter clutch drive gear	1	
8	Starter clutch gear	1	
9	Collar	1	
10	Circlip	1	
11	Starter clutch roller	1	
12	Stopper plate	1	
13	Shaft 1	1	
14	Starter clutch idle gear	1	
15	Bearing	1	
			For installation, reverse the removal procedure.

STARTER CLUTCH

EAS24570

CHECKING THE STARTER CLUTCH

1. Check:
 - Starter clutch rollers "1"
 - Starter clutch gear "2"
 - Starter clutch drive gear "3"
 - Starter clutch idle gear "4"
 Burrs/chips/roughness/wear → Replace the defective part(s).



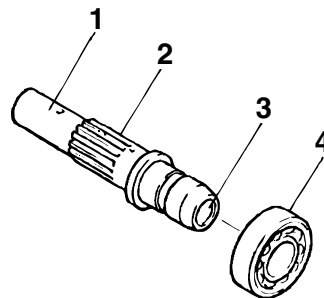
2. Check:
 - Starter clutch gear's contacting surfaces
 Damage/pitting/wear → Replace the starter clutch gear.
3. Check:
 - Starter clutch operation

- a. Install the starter clutch drive gear "1" onto the starter clutch "2" and hold the starter clutch.
- b. When turning the starter clutch gear clockwise "A", the starter clutch and the starter clutch gear should engage. Otherwise the starter clutch is faulty and must be replaced.
- c. When turning the starter clutch gear counter-clockwise "B", it should turn freely. Otherwise the starter clutch is faulty and must be replaced.

EAS24580

CHECKING THE STARTER CLUTCH SHAFT

1. Check:
 - Starter clutch shaft "1"
 - Starter clutch shaft spline "2"
 - Oil passages "3"
 - Bearing "4"
 Damage/wear → Replace the starter clutch shaft.
 Dirt/obstruction → Wash the generator shaft and then blow out the oil passages with compressed air.
 Incorrect → Change.

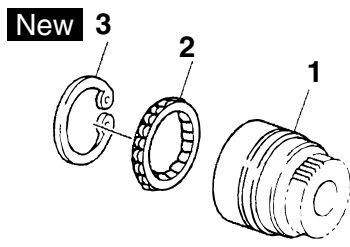


EAS24590

INSTALLING THE STARTER CLUTCH ROLLER

1. Install:
 - Starter clutch drive gear "1"
 - Starter clutch roller "2"
 - Circlip "3"

STARTER CLUTCH

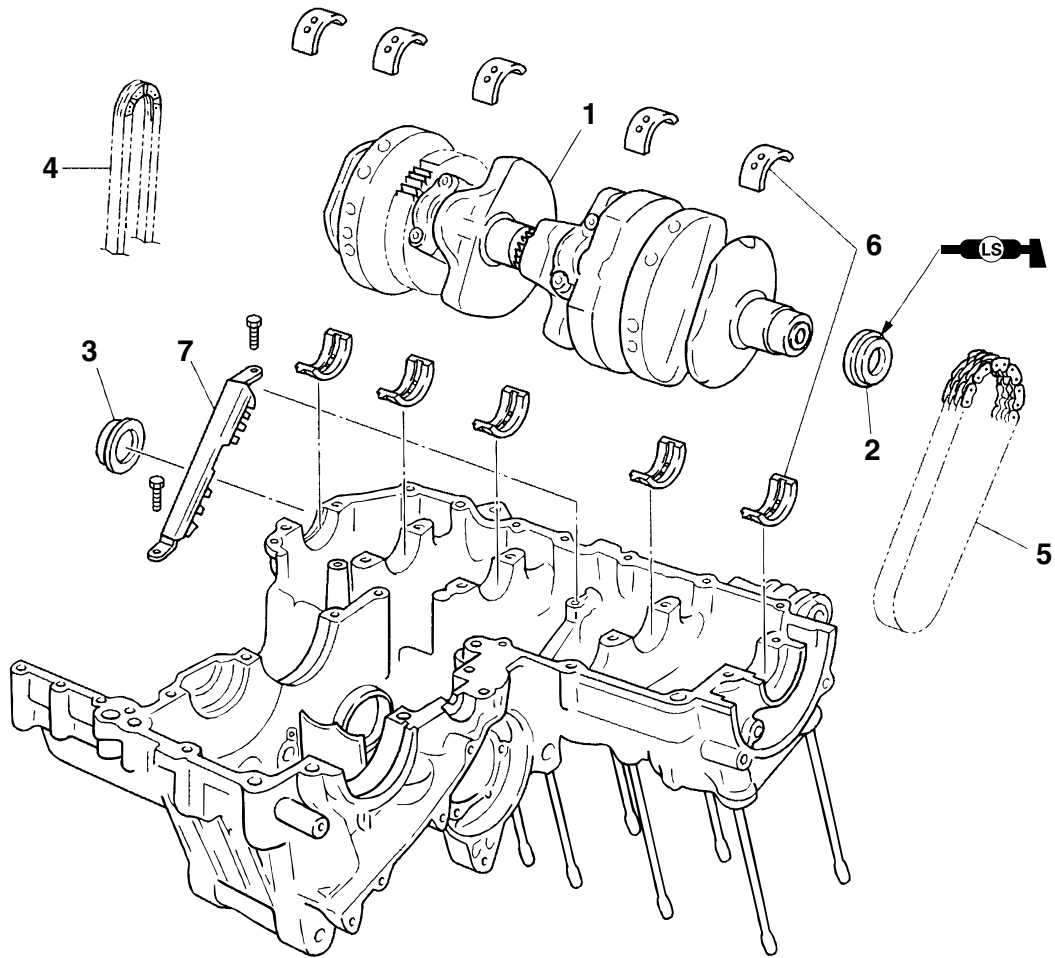


CRANKSHAFT ASSEMBLY

EAS25970

CRANKSHAFT ASSEMBLY

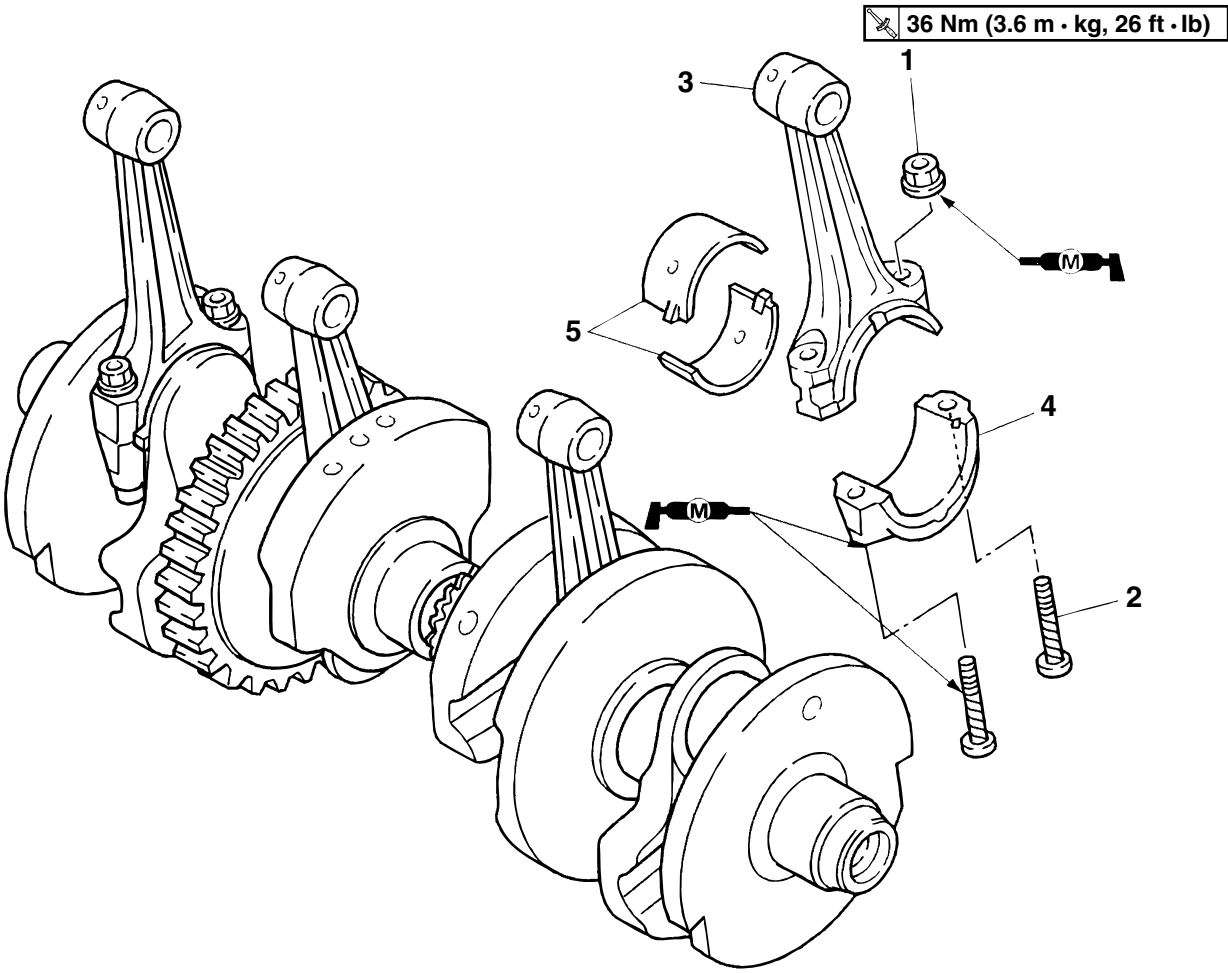
Removing the crankshaft assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Starter clutch		Refer to "STARTER CLUTCH" on page 5-65.
1	Crankshaft assembly	1	
2	Oil seal (left)	1	
3	Cover	1	
4	Timing chain	1	
5	HY-VO chain	1	
6	Crankshaft plane bearing	10	
7	Upper guide	1	
			For installation, reverse the removal procedure.

CRANKSHAFT ASSEMBLY

Removing the connecting rod



Order	Job/Parts to remove	Q'ty	Remarks
1	Nut	8	
2	Connecting bolt	8	
3	Connecting rod	4	
4	Connecting rod cap	4	
5	Connecting rod bearing	8	
			For installation, reverse the removal procedure.

CRANKSHAFT ASSEMBLY

EAS25980

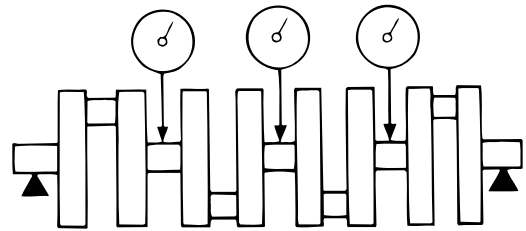
REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:

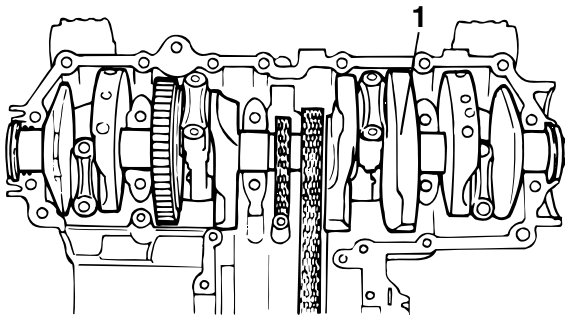
- Crankshaft assembly "1"
- Crankshaft journal upper bearings (from the upper crankcase)

NOTE:

Identify the position of each crankshaft journal lower bearing so that it can be reinstalled in its original place.



308 005



EAS26010

REMOVING THE CONNECTING RODS

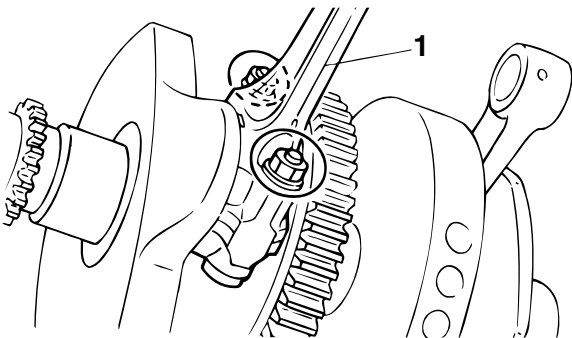
The following removal procedure applies to both connecting rods.

1. Remove:

- Connecting rod "1"
- Big end bearings

NOTE:

Identify the position of each big end bearing so that it can be reinstalled in its original place.



EAS26070

CHECKING THE CRANKSHAFT AND CONNECTING RODS

1. Measure:

- Crankshaft runout
Out of specification → Replace the crankshaft.

	Crankshaft runout 0.020 mm (0.0008 in)
--	--

2. Check:

- Crankshaft journal surfaces
- Crankshaft pin surfaces
- Bearing surfaces
Scratches/wear → Replace the crankshaft.

3. Measure:

- Crankshaft journal-to-crankshaft journal bearing clearance
Out of specification → Replace the crankshaft journal bearings.



Journal oil clearance (using plastigauge®)
0.020–0.044 mm (0.0008–0.0017 in)
Wear limit
0.09 mm (0.0035 in)

ECA13920

CAUTION:

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

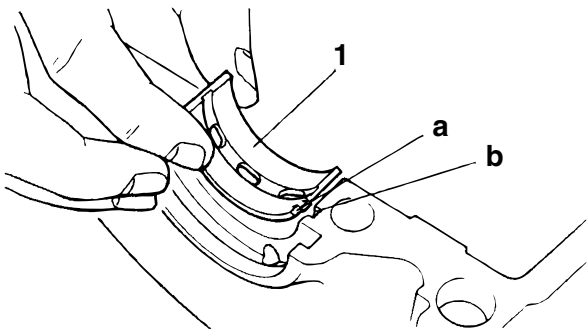


- Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
- Place the upper crankcase upside down on a bench.
- Install the crankshaft journal upper bearings "1" and the crankshaft into the upper crankcase.

NOTE:

Align the projections "a" on the crankshaft journal upper bearings with the notches "b" in the upper crankcase.

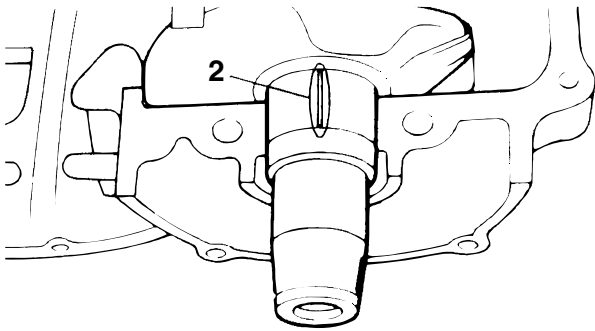
CRANKSHAFT ASSEMBLY



d. Put a piece of Plastigauge® “2” on each crankshaft journal.

NOTE:

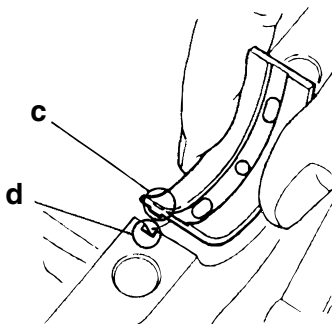
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



e. Install the crankshaft journal lower bearings into the lower crankcase and assemble the crankcase halves.

NOTE:

- Align the projections “c” of the crankshaft journal lower bearings with the notches “d” in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



f. Assemble the crankcase and tighten bolts to the specified torque.



Crankcase bolt “1”–“15”, “28”, “30”(M8)

24 Nm (2.4 m•kg, 17 ft•lb)

Crankcase bolt “16”“17”, “32”, “34”(M10)

35 Nm (3.5 m•kg, 25 ft•lb)

Crankcase bolt “18”–“27”, “29”, “31” “35”–“37” (M6)

12 Nm (1.2 m•kg, 8.7 ft•lb)

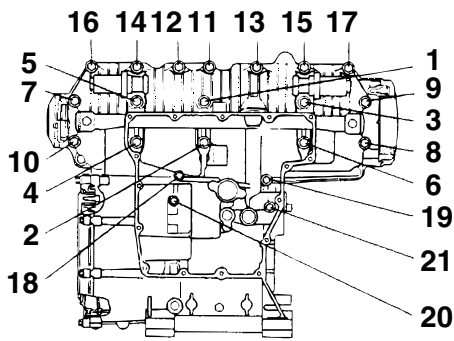
NOTE:

- Tighten the bolts in the tightening sequence cast on the crankcase.
- “35” and “36” tighten with clamp, “1”, “3”, “5”, “7”–“ and 10” have copper washers, “37” is tightened with negative lead, and “2”, “4” and “6” have no washers.

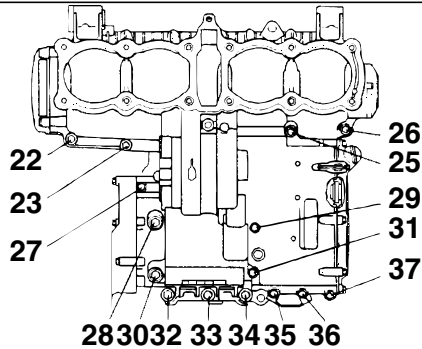
- M8×100mm bolt “1”–“10”
- M8×45mm bolt “11”–“15”
- M10×50mm bolt “16”, “17”
- M6 ×110mm bolt “18”
- M6 ×95mm bolt “19”, “ 21”
- M6 ×40mm bolt “20”, “ 23”
- M6 ×50mm bolt “22”, “ 26”
- M6 ×65mm bolt “25”, “ 37”
- M6 ×30mm bolt “27”
- M8×55mm bolt “28”, “30”
- M6 ×125mm bolt “24”
- M6 ×70mm bolt “31”
- M10×60mm bolt “32”, “34”
- M6 ×55mm bolt “35”, “ 36”

CRANKSHAFT ASSEMBLY

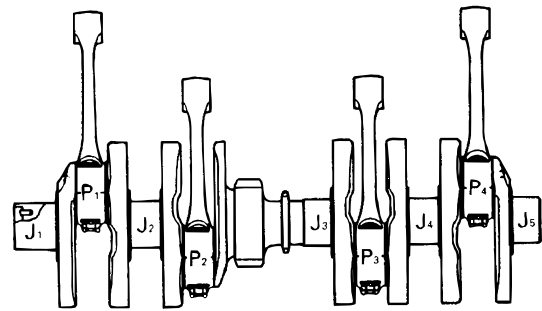
A



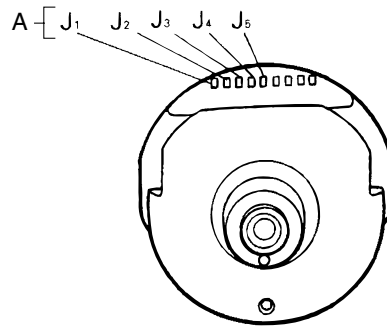
B



of the bearings.

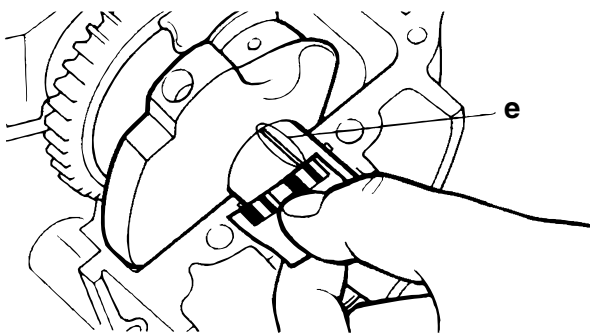
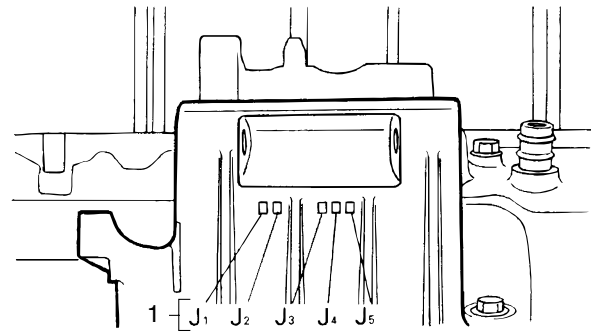


308-003



A. Upper crankcase
B. Lower crankcase

- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- h. Measure the compressed Plastigauge® width “e” on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.



For example, if the crankcase J_1 and crankshaft web J_1 ; numbers are 6 and 2 respectively, then the bearing size for J_1 is as follows: J_1 bearing size:

J_1 (crankcase) - J_1 (crankshaft web)
=
$6 - 2 = 4$ (green)

- i. Select:
 - Crankshaft journal bearings (J_1 - J_5)

NOTE:


- The numbers “A” stamped into the crankshaft web and the numbers “1” on the crankcase are used to determine the replacement big end bearing sizes.
- J_1 - J_5 refer to the bearings shown in the crankshaft illustration.
- If J_1 - J_5 are the same, use the same size for all

Bearing color code	
1	Blue
2	Black
3	Brown
4	Green
5	Yellow



CRANKSHAFT ASSEMBLY

4. Measure:
- Crankshaft pin-to-big end bearing clearance
Out of specification → Replace the big end bearings.

	Crankshaft pin-to-big end bearing clearance
	0.021–0.045 mm (0.0008–0.0018 in)
	Wear limit
	0.08 mm (0.0032 in)



ECA13930

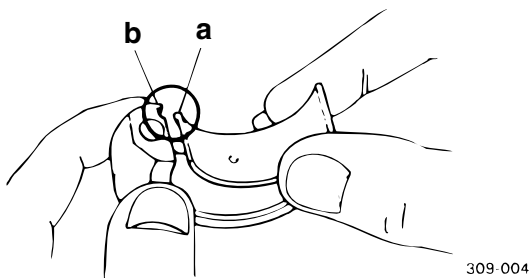
CAUTION:

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

- Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
- Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

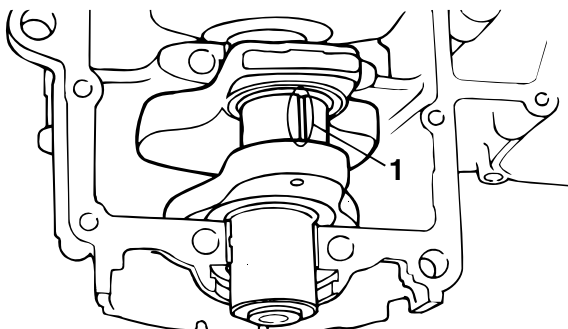
NOTE:

Align the projections “a” on the big end bearings with the notches “b” in the connecting rod and connecting rod cap.



309-004

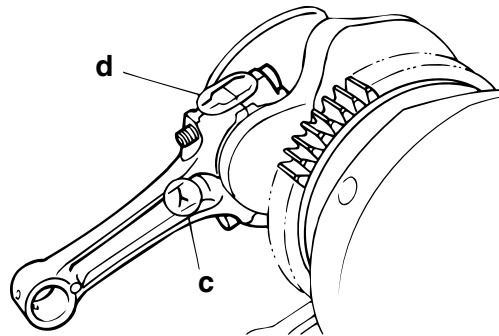
- Put a piece of Plastigauge® “1” on the crankshaft pin.



- Assemble the connecting rod halves.

NOTE:

- Do not move the connecting rod and crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads and nut seats with molybdenum disulfide grease.
- Make sure the “Y” mark “c” on the connecting rod faces towards the left side of the crankshaft.
- Make sure the characters “d” on both the connecting rod and connecting rod cap are aligned.




- Tighten the connecting rod nuts.

ECA5UXB017

CAUTION:

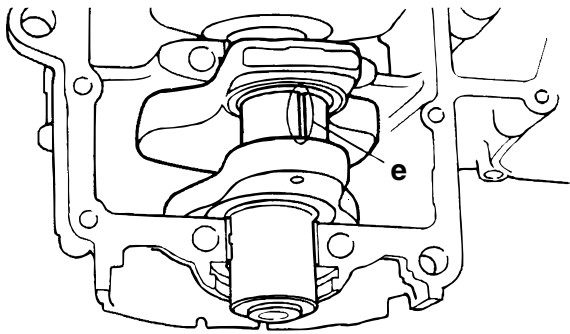
- **When tightening the connecting rod nuts, be sure to use an F-type torque wrench.**
- **Without pausing, tighten the connecting rod nuts to the specified torque. Tighten to a torque of 30 Nm (3.0 m•kg). When the gauge reading reaches 30 Nm (3.0 m•kg), tighten in one to specification. If tightening is interrupted, tighten again from the beginning.**

Refer to “INSTALLING THE CONNECTING RODS” on page 5-74.

	Connecting rod nut
	36 Nm (3.6 m•kg, 26 ft•lb)

- Remove the connecting rod and big end bearings.
Refer to “REMOVING THE CONNECTING RODS” on page 5-70.
- Measure the compressed Plastigauge® width “e” on the crankshaft pin.
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.

CRANKSHAFT ASSEMBLY

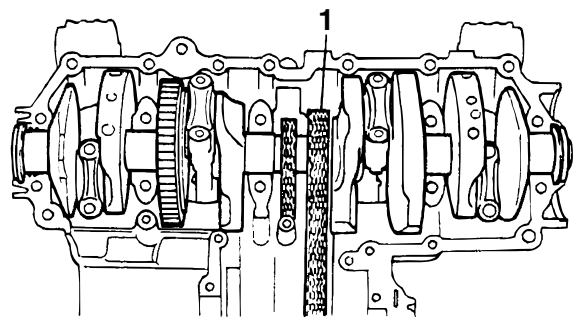


Bearing color code	
0	P
1	Blue
2	Black
3	Brown

EAS26110

CHECKING THE HY-VO CHAIN

- Check:
 - HY-VO chain "1"
 - Damage/stiffness → Replace the HY-VO chain and sprockets as a set.

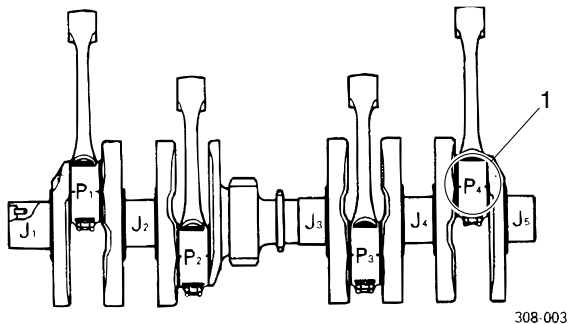


5. Select:

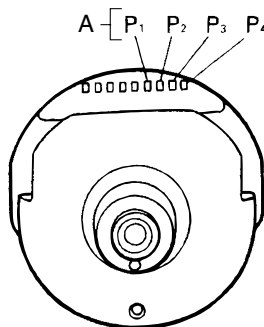
- Big end bearings (P₁-P₄)

NOTE:

- The numbers "A" stamped into the crankshaft web and the numbers "1" on the connecting rod big ends are used to determine the replacement big end bearing sizes.
- P₁-P₄ refer to the bearings shown in the crankshaft illustration.



308-003



For example, if the connecting rod P₁ and the crankshaft web P₁ numbers are 4 and 1 respectively, then the bearing size for P₁ is as follows: J1 bearing size:

P₁ (connecting rod) - P₁ (crankshaft)
4 - 1 = 3 (brown)

- Check:
 - HY-VO chain guide
 - Damage/wear → Replace.

EAS26140

INSTALLING THE CONNECTING RODS

- Lubricate:
 - Bolt threads
 - Nut seats
 - (with the recommended lubricant)

Recommended lubricant

Molybdenum disulfide grease

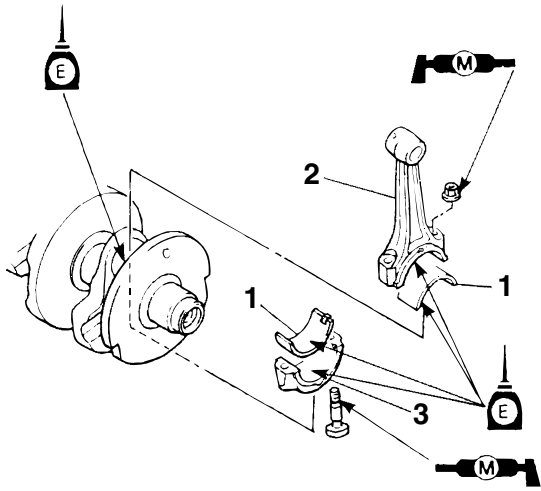
- Lubricate:
 - Crankshaft pins
 - Big end bearings
 - Connecting rod inner surface
 - (with the recommended lubricant)

Recommended lubricant

Engine oil

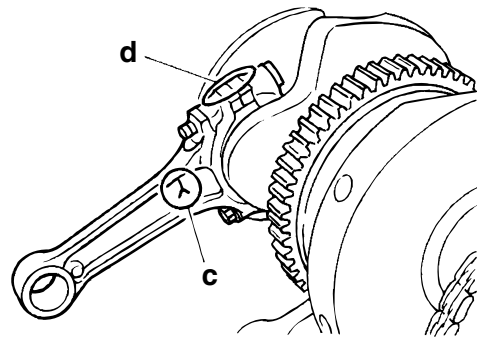
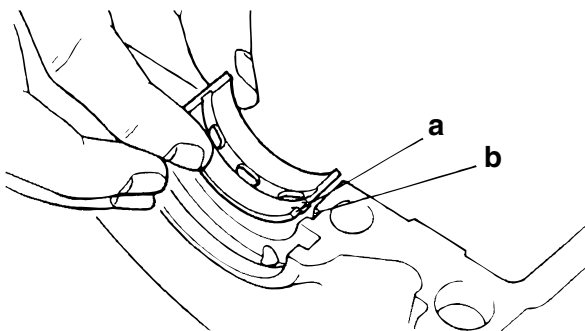
- Install:
 - Big end bearings "1"
 - Connecting rods "2"
 - Connecting rod bolt "3"

CRANKSHAFT ASSEMBLY

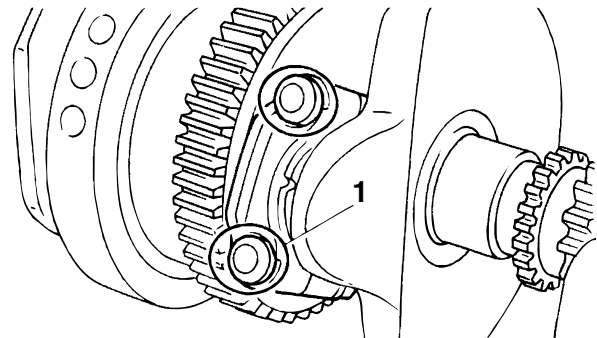


NOTE:

- Align the projections “a” on the big end bearings with the notches “b” in the connecting rod and connecting rod cap.
- Be sure to reinstall each big end bearing in its original place.
- Make sure the “Y” mark “c” on the connecting rod faces towards the left side of the crankshaft.
- Make sure the characters “d” on both the connecting rod and connecting rod cap are aligned.



4. Align:
- Bolt heads “1” (with the connecting rod caps)



5. Tighten:
- Connecting rod nuts

	Connecting rod nut 36 Nm (3.6 m•kg, 26 ft•lb)
--	--

ECA5UXB017

CAUTION:

- When tightening the connecting rod nuts, be sure to use an F-type torque wrench.
- Without pausing, tighten the connecting rod nuts to the specified torque. Tighten to a torque of 30 Nm (3.0 m•kg). When the gauge reading reaches 30 Nm (3.0 m•kg), tighten in one to specification. If tightening is interrupted, tighten again from the beginning.

EAS25630

INSTALLING THE CRANKSHAFT JOURNAL BEARING

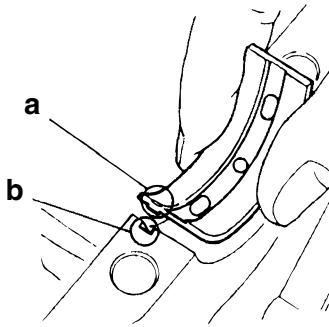
1. Install:
- Crankshaft journal bearings

NOTE:

Align the projections “a” on the crankshaft journal lower bearings with the slots “b” in the lower crankcase.

CRANKSHAFT ASSEMBLY

crankcase, fasten it with a wire.



EAS26200

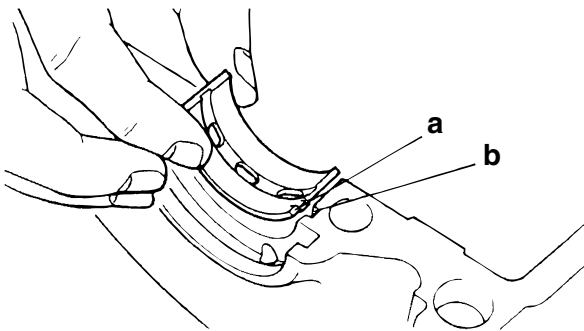
INSTALLING THE CRANKSHAFT

1. Install:

- Crankshaft journal upper bearings
(into the upper crankcase)

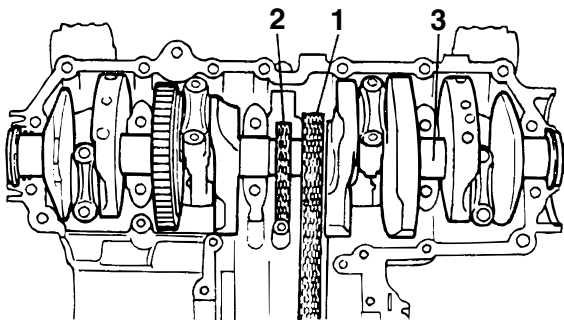
NOTE:

- Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the upper crankcase.
- Be sure to install each crankshaft journal upper bearing in its original place.



2. Install:

- HY-VO chain “1”
(onto the crankshaft sprocket)
- Timing chain “2”
(onto the crankshaft sprocket)
- Crankshaft assembly “3”



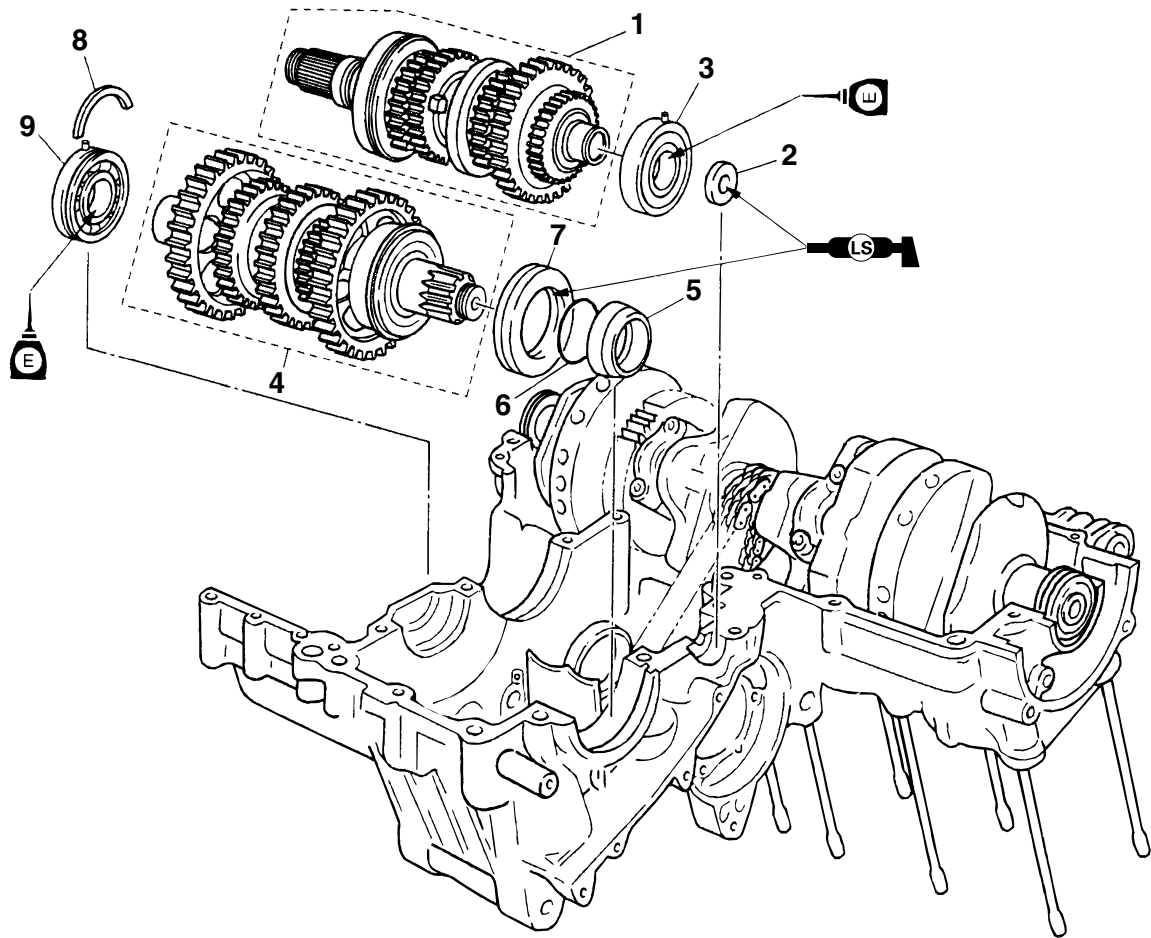
NOTE:

- Pass the timing chain through the timing chain cavity.
- To prevent the timing chain from falling into the

EAS26240

TRANSMISSION

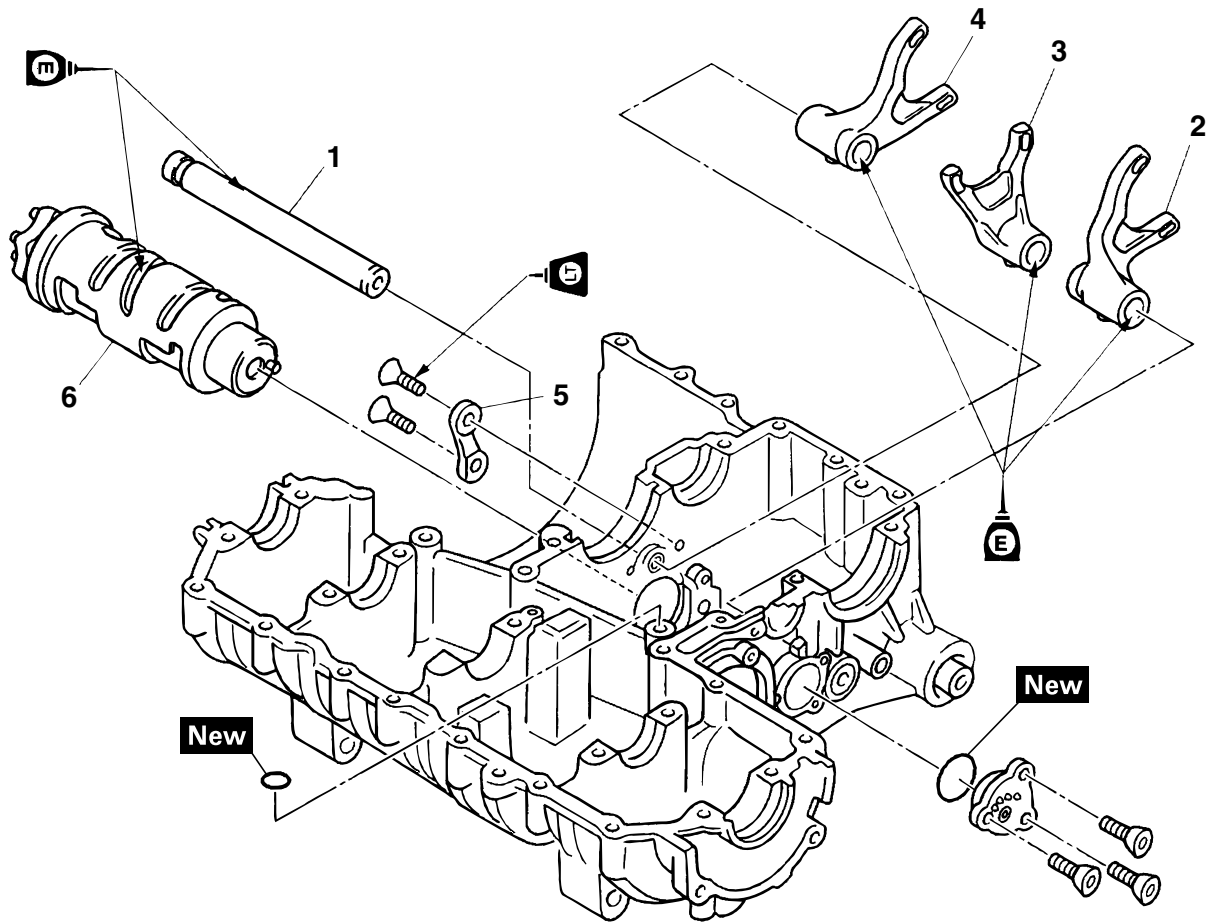
REMOVING THE TRANSMISSION



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate Refer to "CRANKCASE" on page 5-61.
1	Main axle assembly	1	
2	Oil seal	1	
3	Bearing	1	
4	Drive axle assembly	1	
5	Collar	1	
6	O-ring	1	
7	Oil seal	1	
8	Circlip	1	
9	Bearing	1	
			For installation, reverse the removal procedure.

TRANSMISSION

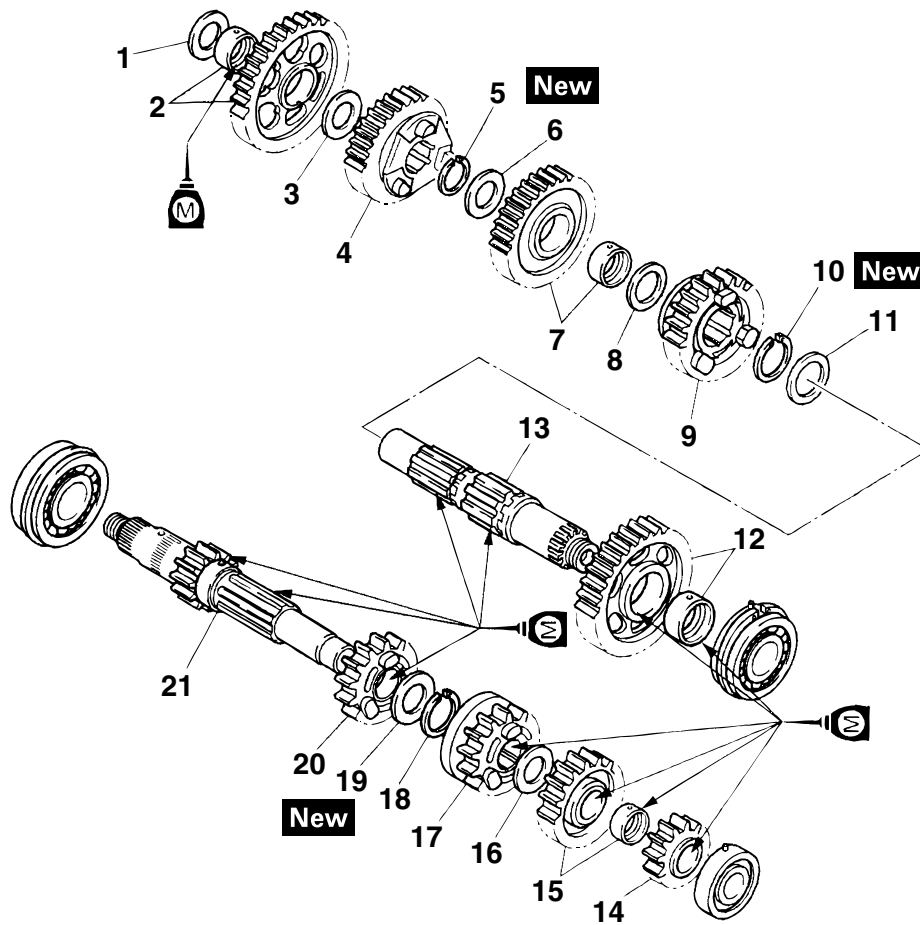
Removing the shift drum assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Shift fork guide bar	1	
2	Shift fork 1 (L)	1	
3	Shift fork 2 (C)	1	
4	Shift fork 3 (R)	1	
5	Stopper plate	1	
6	Shift cam	1	
			For installation, reverse the removal procedure.

TRANSMISSION

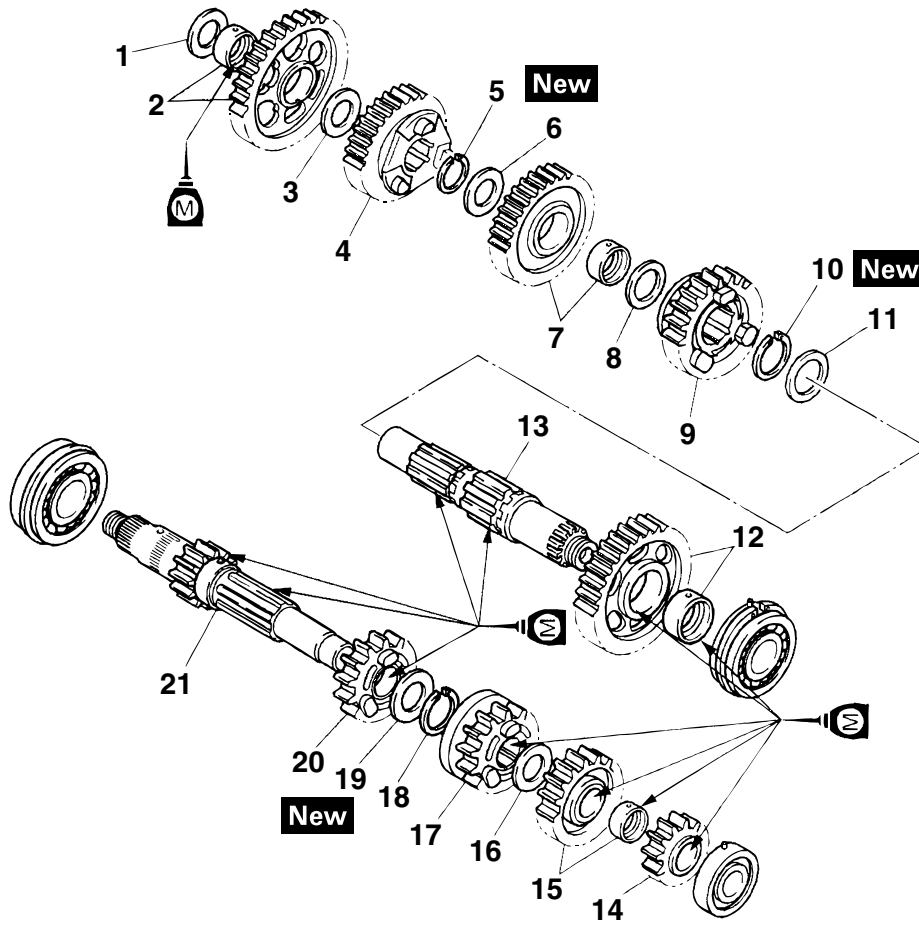
Disassembling the transmission



Order	Job/Parts to remove	Q'ty	Remarks
1	Plate washer	1	
2	1st wheel gear/Collar	1/1	
3	Plate washer	1	
4	4th wheel gear	1	
5	Circlip	1	
6	Plate washer	1	
7	3rd wheel gear/Collar	1/1	
8	Plate washer	1	
9	5th wheel gear	1	
10	Circlip	1	
11	Plate washer	1	
12	2nd wheel gear/Collar	1/1	
13	Drive axle	1	
14	2nd Pinion gear	1	
15	5th Pinion gear/Collar	1/1	
16	Plate washer	1	
17	3rd Pinion gear	1	
18	Circlip	1	
19	Plate washer	1	
20	4th Pinion gear	1	
21	Main axle	1	

TRANSMISSION

Disassembling the transmission



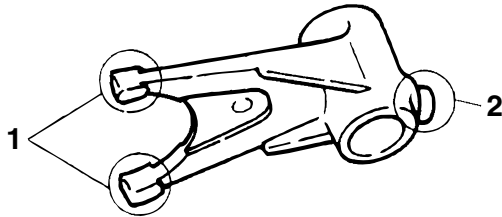
Order	Job/Parts to remove	Q'ty	Remarks
			For installation, reverse the removal procedure.

EAS26260

CHECKING THE SHIFT FORKS

The following procedure applies to checks and adjustments of all shift fork related parts.

1. Check:
 - Shift fork cam follower "1"
 - Shift fork pawl "2"
 Bends/damage/scoring/wear → Replace the shift fork.



2. Check:
 - Shift fork guide bar
 Roll the shift fork guide bar on a flat surface.
 Bends → Replace.

EWA12840



WARNING

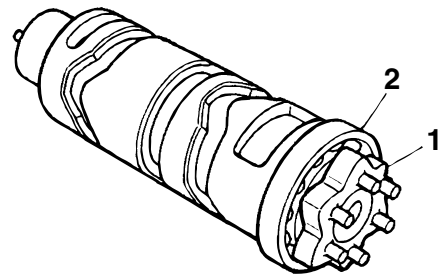
Do not attempt to straighten a bent shift fork guide bar.

3. Check:
 - Shift fork movement
(along the shift fork guide bar)
 Rough movement → Replace the shift forks and shift fork guide bar as a set.

EAS26270

CHECKING THE SHIFT FORKS

1. Check:
 - Shift drum groove
Scratches/wear → Replace the shift drum assembly.
 - Shift drum segment "1"
Scratches/wear → Replace the shift drum assembly.
 - Shift drum bearing "2"
Scratches/wear → Replace the shift drum assembly.



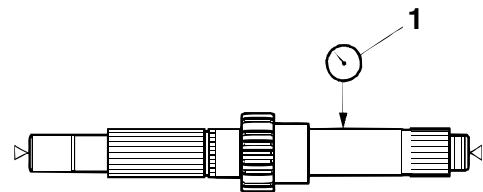
EAS26300

CHECKING THE TRANSMISSION

1. Measure:
 - Main axle runout
(with a centering device and dial gauge "1")
 Out of specification → Replace the main axle.



Main axle runout limit
0.60 mm (0.0236 in)

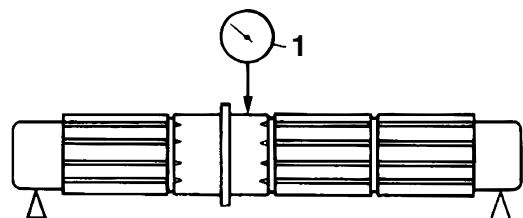


11650702

2. Measure:
 - Drive axle runout
(with a centering device and dial gauge "1")
 Out of specification → Replace the drive axle.

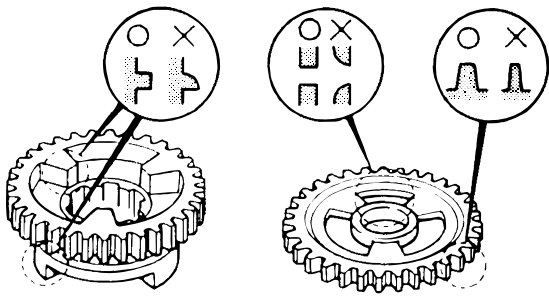


Drive axle runout limit
0.60 mm (0.0236 in)



319-001

3. Check:
 - Transmission gears
Blue discoloration/pitting/wear → Replace.
 - Transmission gear dogs
Cracks/damage/wear → Replace.



4. Check:
 - Transmission gear engagement (each pinion gear to its respective wheel gear)
Rough operation → Reassemble the transmission axle assemblies.
5. Check:
 - Transmission gear movement
Rough movement → Replace the defective part(s).
6. Check:
 - Circlips
Bends/damage/looseness → Replace.

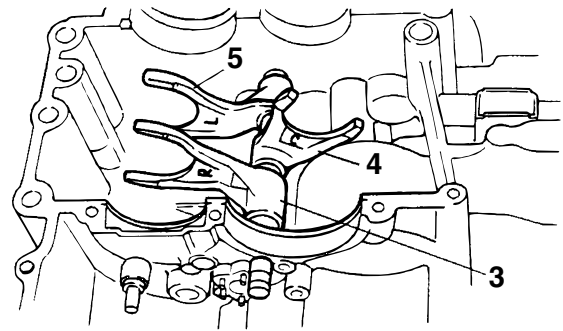
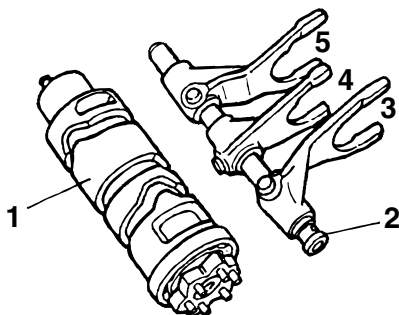
EAS26320

INSTALLING THE SHIFT FORKS AND SHIFT DRUM

1. Install:
 - Shift drum assembly "1"
 - Shift fork guide bars "2"
 - Shift fork-R "3"
 - Shift fork-C "4"
 - Shift fork-L "5"

NOTE:

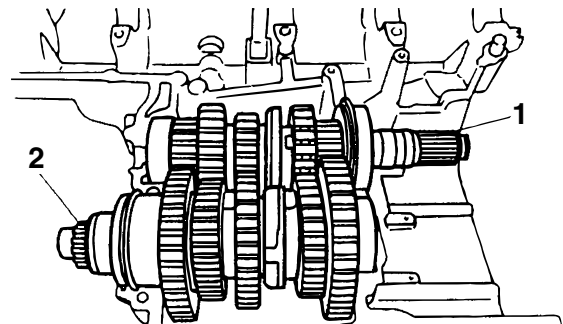
The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence. "R", "C" and "L".



EAS26350

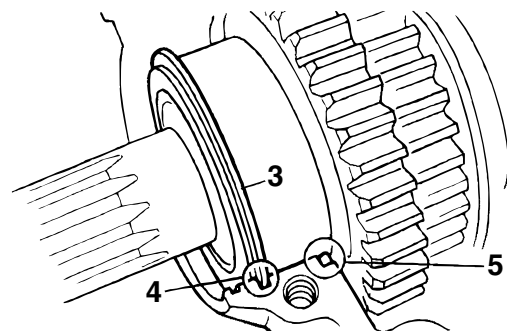
INSTALLING THE TRANSMISSION

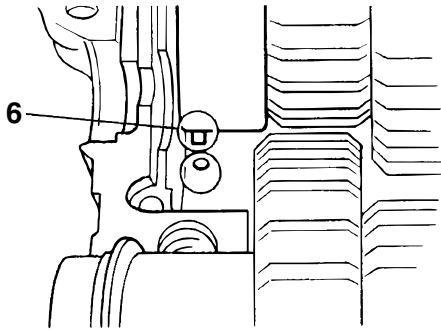
1. Install:
 - Main axle assembly "1"
 - Drive axle assembly "2"



NOTE:

- Check that the drive axle bearing circlip "3" is aligned with the slot in the "4" upper crankcase.
- Check that the drive axle bearing pin "5" is aligned with the notch in the upper crankcase.
- Check that the main axle bearing pin "6" is aligned with the hole in the upper crankcase.





2. Check:

- Transmission gear movement
Rough movement → Repair.

NOTE:

Oil each gear, shaft, and bearing thoroughly.

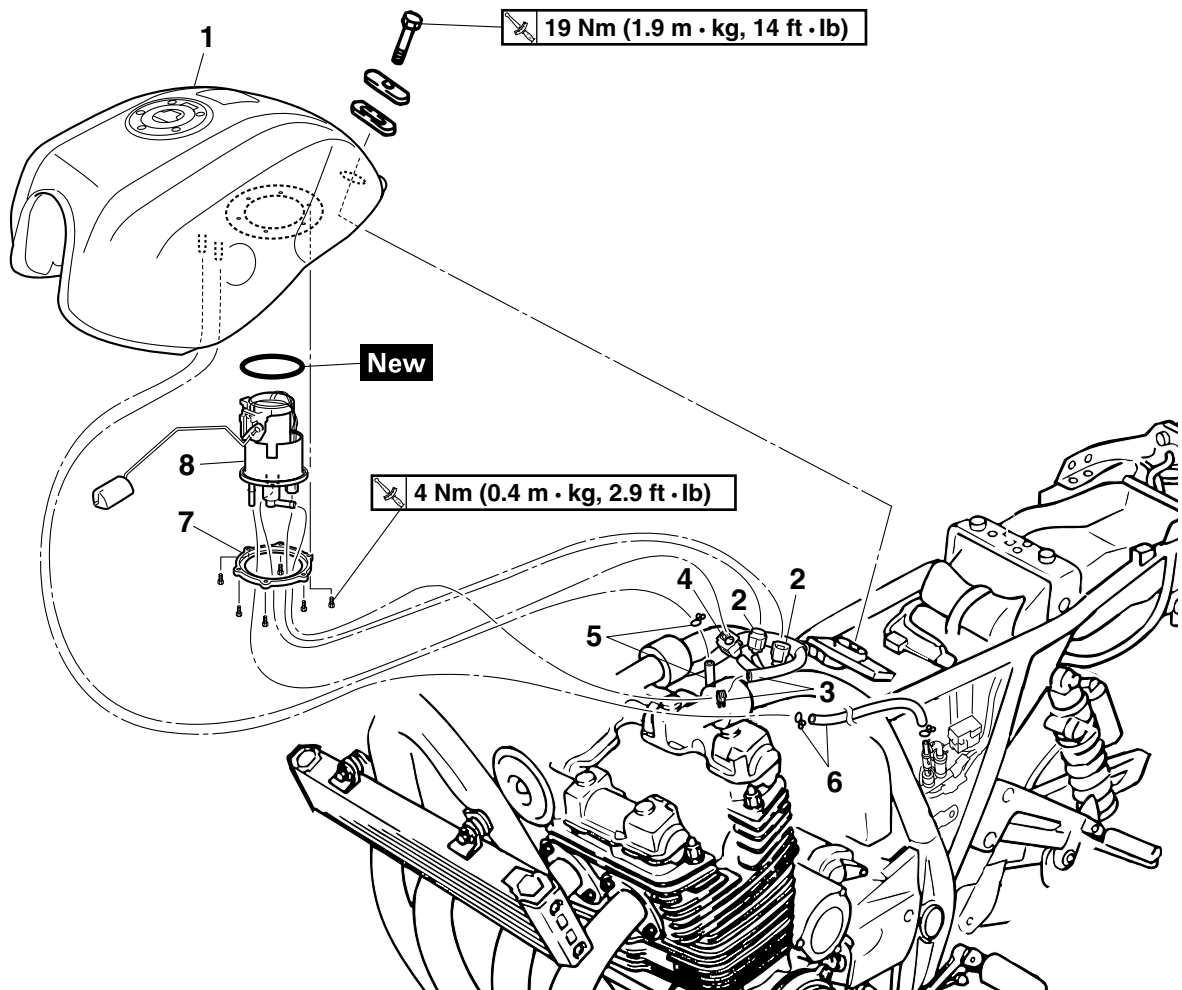
FUEL SYSTEM

FUEL TANK	6-1
REMOVING THE FUEL TANK	6-2
REMOVING THE FUEL PUMP	6-2
CHECKING THE FUEL PUMP BODY	6-2
INSTALLING THE FUEL PUMP	6-2
INSTALLING THE FUEL TANK.....	6-2
THROTTLE BODIES	6-4
CHECKING THE INJECTORS	6-7
CHECKING THE THROTTLE BODIES	6-7
CHECKING THE PRESSURE REGULATOR	6-7
CHECKING THE PRESSURE REGULATOR OPERATION	6-7
ADJUSTING THE THROTTLE POSITION SENSOR.....	6-8
CHECKING AND ADJUSTING THE SUB-THROTTLE POSITION SENSOR	6-8
CHECKING THE SUB-THROTTLE SERVO MOTOR.....	6-10
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CHECKING THE AIR INDUCTION SYSTEM.....	6-16
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EAS26620

FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Seat/side cover (right/left)		Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel tank	1	
2	Fuel pump coupler/fuel sender coupler	1/1	
3	Fuel return hose/clip	1/1	
4	Fuel hoses	1	
5	Fuel drain hose/clip	1/1	
6	Fuel breather hose/clip	1/1	
7	Stopper ring	1	
8	Fuel pump assembly	1	
			For installation, reverse the removal procedure.

EAS26630

REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
 - Fuel return hose
 - Fuel hose

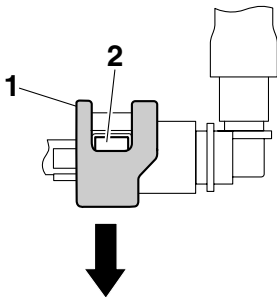
ECA14700

CAUTION:

Although the fuel has been removed from the fuel tank be careful when removing the fuel hoses, since there may be fuel remaining in it.

NOTE:

- Slide the fuel hose connector cover “1” in the direction of the arrow mark, and press the buttons “2” on both sides of the connector to remove the fuel hose.
- Disconnecting the hose is done by hand. There is no need to use tools.
- Before removing the hoses, place a few rags in the area under where it will be removed.



3. Remove:
 - Fuel tank

NOTE:

Do not set the fuel tank down so that the installation surface of the fuel pump is directly under the tank. Be sure to lean the fuel tank in an upright position.

EAS26640

REMOVING THE FUEL PUMP

1. Remove:
 - Fuel pump

ECA5UXB010

CAUTION:

Do not drop the fuel pump or subject it to a strong shock.

EAS26670

CHECKING THE FUEL PUMP BODY

1. Check:
 - Fuel pump body


Contaminants → Clean the fuel pump passage.

Rust/scratches/wear → Replace the fuel pump assembly.

EAS26710

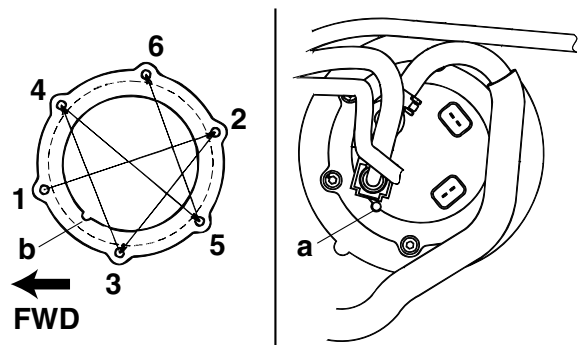
INSTALLING THE FUEL PUMP

1. Install:
 - Fuel pump
 - Fuel hose holders

	Fuel pump bolts 4 Nm (0.4 m•kg, 2.9 ft•lb)
---	--

NOTE:

- When assembling the fuel pump, take care not to damage the assembly surface with the fuel tank.
- Always use a new fuel pump gasket.
- Face the fuel pump in the direction shown in the illustration for assembly.
- Align the fuel pump projection “a” with the notch “b” in the stopper ring before assembling.
- Tighten the fuel pump bolts using the procedure shown in the illustration.



EAS5UXB008

INSTALLING THE FUEL TANK

1. Install:
 - Fuel hose
 - Fuel return hose

ECA14740

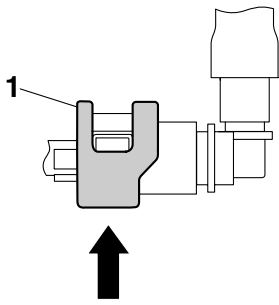
CAUTION:

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holders are in the correct position, otherwise the fuel hose will not be properly installed.

NOTE:

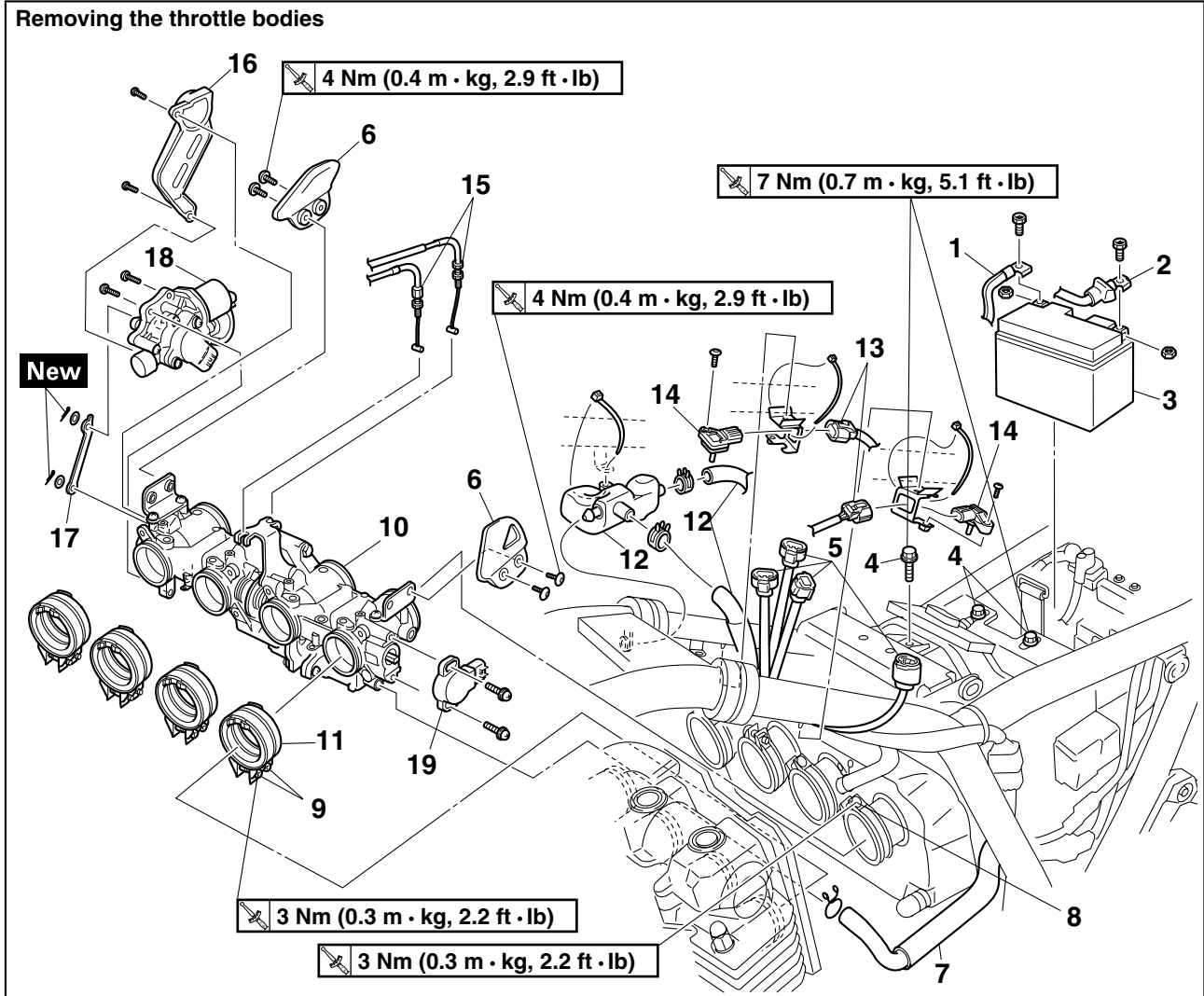
- Insert the fuel hose on the fuel pipe until you hear a definite “click”.
- Slide the fuel hose connector cover “1” at the

fuel hose end in the direction of the arrow.



EAS26970

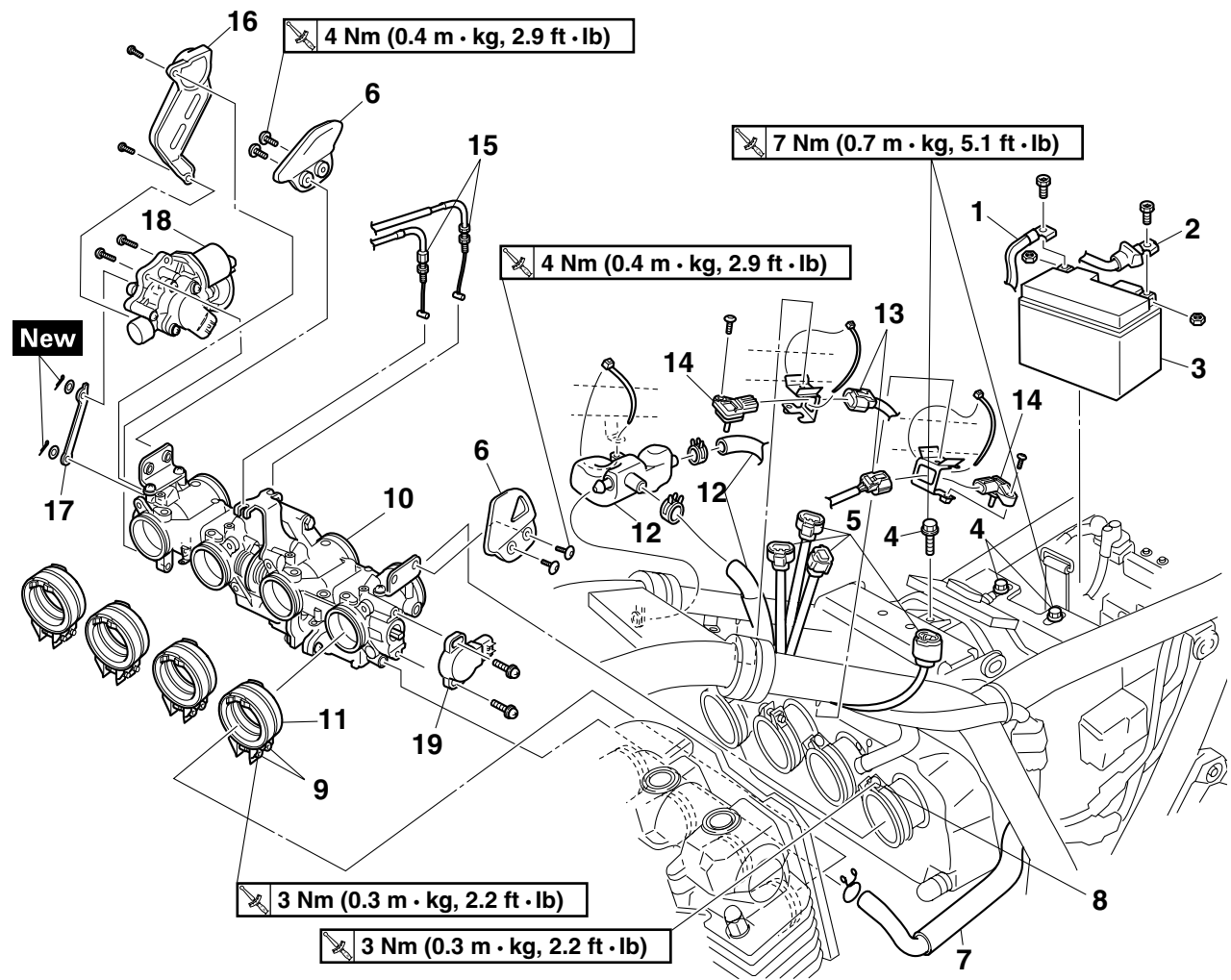
THROTTLE BODIES



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
1	Battery negative lead	1	Disconnect.
2	Battery positive lead	1	Disconnect.
3	Battery	1	
4	Air filter mounting bolt	3	Loosen the 2 rear bolts.
5	Throttle position sensor coupler/ISC motor coupler/Sub-throttle motor coupler/Sub-throttle position sensor coupler	1/1/1/1	Disconnect.
6	Throttle body side cover left/right	1/1	
7	ISC hose	1	
8	Throttle body joint clamp screw	4	Loosen
9	Throttle body joint clamp screw	8	Loosen
10	Throttle body assembly	1	
11	Throttle body joint	4	
12	Breather hose/breather assembly	2/1	
13	Intake air pressure sensor 1 coupler/intake air pressure sensor 2 coupler	1/1	Disconnect.
14	Intake air pressure sensor 1/intake air pressure sensor 2	1/1	

THROTTLE BODIES

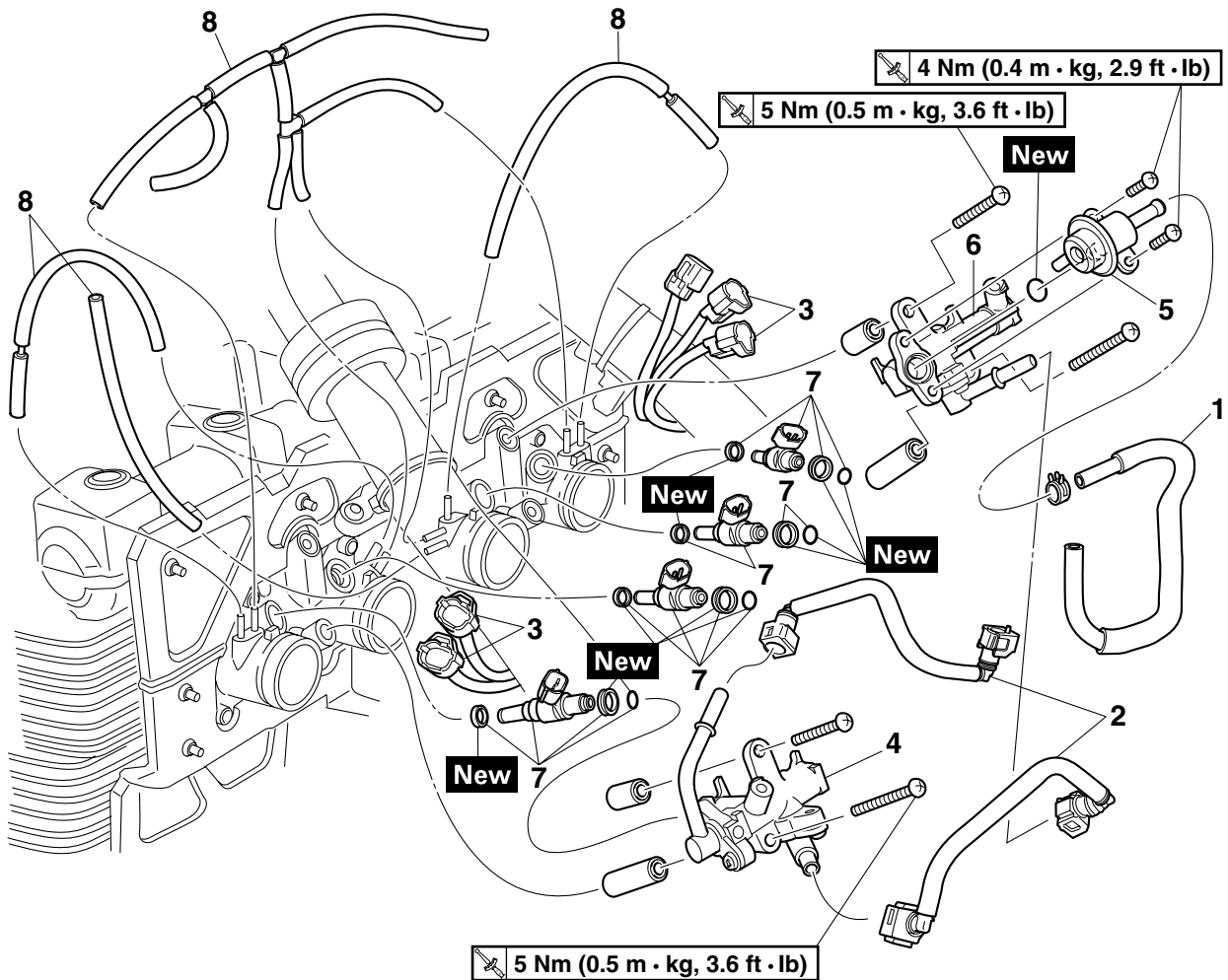
Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
15	Throttle cable	2	
16	Sub-throttle cover	1	
17	Sub-throttle link	1	
18	Sub-throttle motor assembly	1	
19	Throttle position sensor	1	
			For installation, reverse the removal procedure.

THROTTLE BODIES

Removing the fuel hoses and injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	Fuel return hose	1	
2	Fuel hose 1/fuel hose 2	1/1	
3	Injector coupler	4	Disconnect.
4	Left fuel rail	1	
5	Pressure regulator	1	
6	Right fuel rail	1	
7	Injector	4	
8	Vacuum hose	—	
			For installation, reverse the removal procedure.

**Vacuum pressure increase →
Fuel pressure too low.
Vacuum pressure decrease →
Fuel pressure too high.**

Faulty → Replace the pressure regulator.



EAS27020

ADJUSTING THE THROTTLE POSITION SENSOR

NOTE:

Before adjusting the throttle position sensor, the engine idling speed should be checked.

1. Check:
 - Throttle position sensor
Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 7-97.
2. Adjust:
 - Throttle position sensor angle



- a. Reconnect the throttle position sensor coupler.
- b. Connect the digital circuit tester (DC 20 V) to the throttle position sensor coupler.

**Tester positive probe
Yellow
Negative tester probe
Black/Blue**



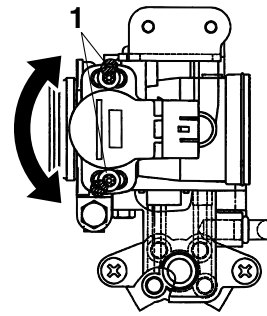
**Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927**

- c. Set the main switch to "ON".
- d. Measure the throttle position sensor output voltage.



**Throttle position sensor output voltage (during idling)
0.63–0.73 V**

- e. Loosen the throttle position sensor bolt "1".
- f. Adjust the throttle position sensor angle so that the output voltage is within the specified range.



- g. After adjusting the throttle position sensor angle, tighten the throttle position sensor bolt.



**Throttle position sensor bolt
3.5 Nm (0.35 m•kg, 2.5 ft•lb)**



EAS5UXB009

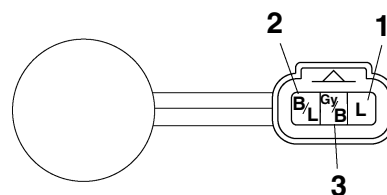
CHECKING AND ADJUSTING THE SUB-THROTTLE POSITION SENSOR

1. Check:
 - Sub-throttle position sensor
- a. Remove the sub-throttle position sensor coupler.
 - b. Remove the sub-throttle position sensor from the sub-throttle servo motor.
 - c. Connect the pocket tester ($\Omega \times 1k$) to the sub-throttle position sensor as shown.

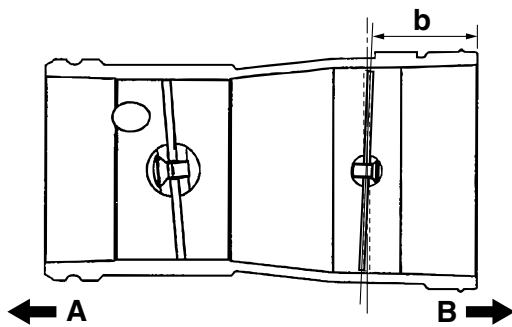
**Tester positive probe
Blue "1"
Negative tester probe
Black/Blue "2"**



**Pocket tester
90890-03112
Analog pocket tester
YU-03112-C**



THROTTLE BODIES



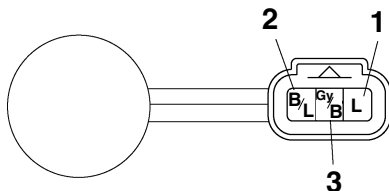
A. Forward
B. Rearward

- d. Connect the sub-throttle position sensor coupler.
- e. Connect the pocket tester ($\Omega \times 1$) to the throttle position sensor coupler as shown.

Tester positive probe
Gray/Black "3"
Negative tester probe
Blue "1"



Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

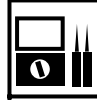


- f. Disconnect the sub-throttle servo motor coupler.
- g. Set the main switch to "ON".

NOTE:

If ECU control information and sub-throttle position sensor output is not match, error code 48 (sub-throttle motor lockup) will be detected. After adjustment, there is a normal condition when the sub-throttle motor coupler is connected. Erase the failure history.

- h. Measure the sub-throttle position sensor output voltage.



Sub-throttle position sensor output voltage
0.91–1.01 V

- i. Loosen the sub-throttle position sensor bolt.
- j. Adjust the sub-throttle position sensor angle so that the output voltage is within the specified range.
- k. After adjusting the sub-throttle position sensor angle, tighten the sub-throttle position sensor bolt.



Sub-throttle position sensor bolt
3.5 Nm (0.35 m•kg, 2.5 ft•lb)

NOTE:

- On setting the sub-throttle position sensor, turn the worm shaft nut towards fully closed until it contacts the stopper, and check whether the sub-throttle position sensor output voltage is 0.4 V or more.
- If the sub-throttle position sensor output voltage is 0.4 V or more, turn the worm shaft nut towards fully open until it stops, and check whether the sub-throttle position sensor output voltage is 4.5 V or more.

EAS5UXB013

CHECKING THE SUB-THROTTLE SERVO MOTOR

1. Check:

- Sub-throttle servo motor operation
Incorrect → Replace.

- a. Check whether the sub-throttle valve is locked or not.

- 1) Turn the worm shaft nut of the sub-throttle servo motor by hand, and check that the sub-throttle valve operates smoothly.
- 2) When the valve does not operate smoothly, remove the sub-throttle link between the sub-throttle servo motor and sub-throttle valve, and check whether the sub-throttle valve operates smoothly by hand. Refer to "THROTTLE BODIES" on page 6-4 .
- 3) When the sub-throttle valve does not operate smoothly, the cause is locking of the sub-throttle valve itself. Repair or replace the valve. If there is a smooth operation in either step 1) or step 2), replace the

sub-throttle servo motor.

- b. Execute diagnostic mode, and make a visual inspection of sub-throttle valve operation (Code No. 56). Operate the sub-throttle valve in the full open direction for five seconds, stop for two seconds, and operate in the full close direction for five seconds.

NOTE: _____

Do not place the finger between the valve when the sub-throttle valve operates and do not crowd.



EASSUXB019

FUEL SUPPLY SYSTEM AIR BLEEDING

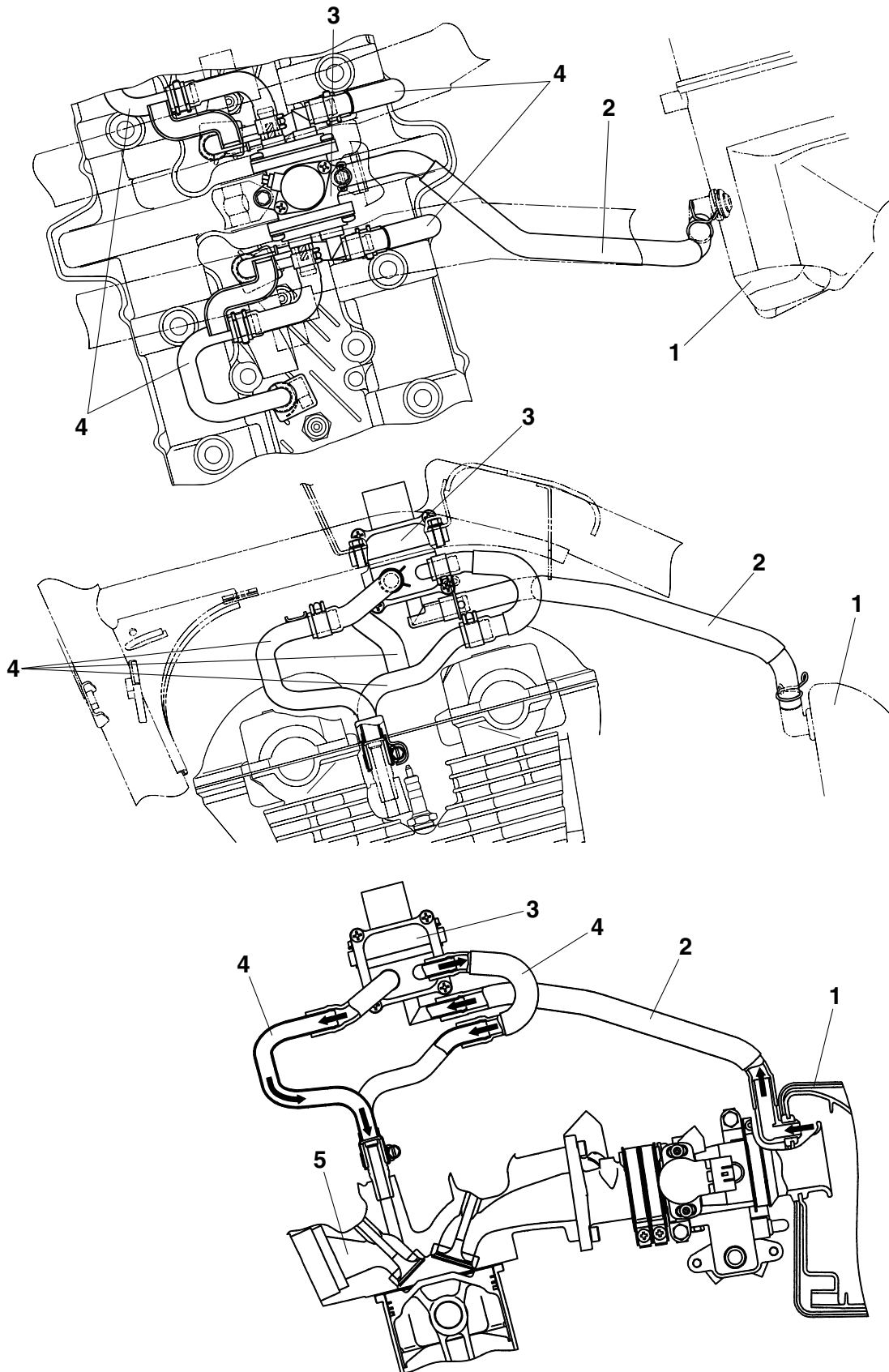
After disassemble the fuel injectors, fuel rail and fuel hose, according to the following method, and bleed the system of air.

1. Check the injectors, fuel rail and fuel hose have been correctly installed.
2. Turn the main switch "ON", "OFF" repeatedly several times for several seconds.
3. Check that the fuel path is free of leaks and smears.
4. Start the engine and idling for about five minutes.

AIR INDUCTION SYSTEM

EAS27040

AIR INDUCTION SYSTEM

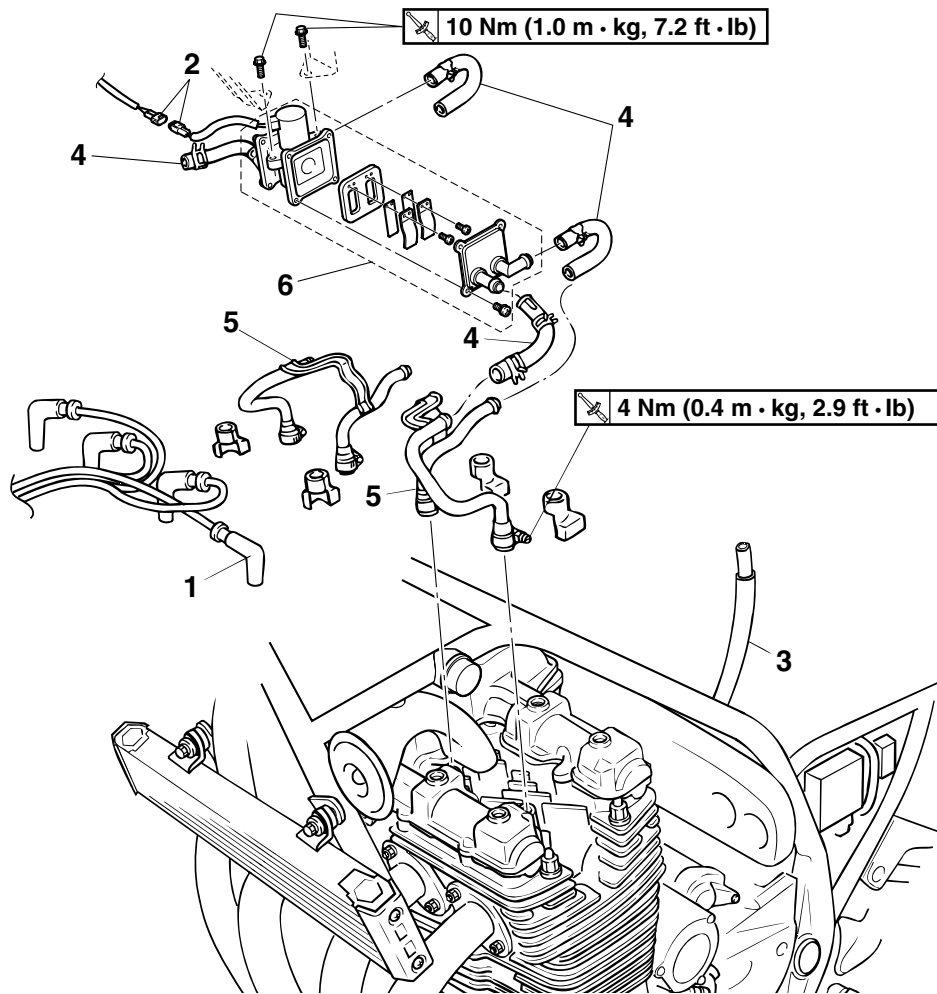


AIR INDUCTION SYSTEM

1. Air filter case
2. Air induction system hose (Air filter case—Air cut-off valve)
3. Air cut-off valve
4. Air induction system hose (Air cut-off valve—Cylinder head)
5. Exhaust port

AIR INDUCTION SYSTEM

Removing the air cut-off valve assembly and hoses



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
1	Spark plug cap	4	
2	Air induction system solenoid coupler	1	Disconnect.
3	Air induction system hose (Air filter case—Air cut-off valve)	1	
4	Air induction system hose (Air cut-off valve—Cylinder head)	4	
5	Air induction system pipe left/right	1	
6	Air cut-off valve	1	
			For installation, reverse the removal procedure.

EAS27060

CHECKING THE AIR INDUCTION SYSTEM

Air induction system

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons. When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700°C.

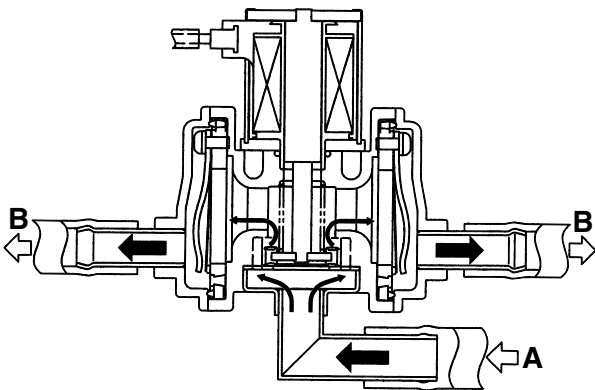
Air cut-off valve

The air cut-off valve is controlled by the signals from the ECU. The air cut-off valve is normally open during idling, but shuts off when the vehicle starts to move, to prevent reverse flow.

EAS27070

INSTALLING THE AIR INDUCTION SYSTEM

1. Install:
 - Reed valves
 - Reed valve stoppers
2. Install:
 - Reed valve cover



- A. From the air filter
B. To the cylinder head

1. Check:
 - Hoses
Loose connection → Connect properly.
Cracks/damage → Replace.
 - Pipes
Cracks/damage → Replace.
2. Check:
 - Reed valve
 - Reed valve stopper
 - Reed valve seat
Cracks/scratches → Replace the air cut-off valve assembly.
3. Check:
 - Air cut-off valve
Cracks/damage → Replace.

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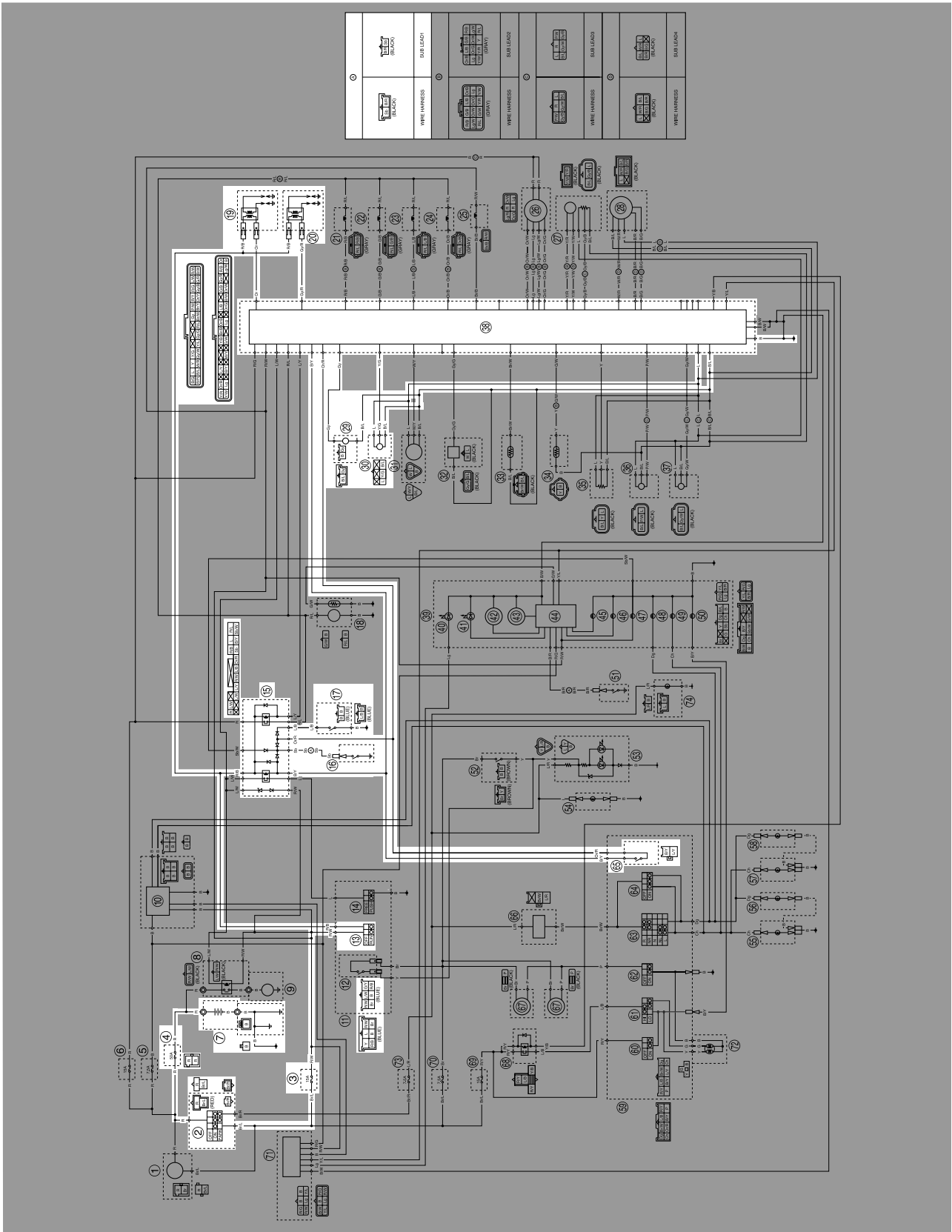
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EAS27090

IGNITION SYSTEM

EAS27110

CIRCUIT DIAGRAM



- 2. Main switch
- 3. Ignition fuse
- 4. Main fuse
- 7. Battery
- 13. Engine stop switch
- 15. Relay unit
- 16. Neutral switch
- 17. Sidestand switch
- 19. Ignition coil 1
- 20. Ignition coil 2
- 29. Crankshaft position sensor
- 30. Lean angle sensor
- 38. ECU
- 65. Clutch switch

EAS27140

TROUBLE SHOOTING

The ignition system fails to operate. (no spark or intermittent spark).

NOTE:

Before troubleshooting, remove the following part(s):

- 1.Seat
- 2.Fuel tank
- 3.Headlight unit
- 4.Left side cover

<p>1. Check the fuse (Main fuse, Ignition fuse) Refer to "CHECKING THE FUSES" on page 7-86.</p>	NG→	<p>Replace the fuse(s).</p>
OK↓		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-87.</p>	NG→	<p>Clean the battery terminals. Recharge or replace the battery.</p>
OK↓		
<p>3. Check the spark plug. Refer to "CHECKING THE SPARK PLUGS" on page 3-10.</p>	NG→	<p>Re-gap or replace the spark plug.</p>
OK↓		
<p>4. Check the spark plug cap. Refer to "CHECKING THE SPARK PLUG CAPS" on page 7-93.</p>	NG→	<p>Replace the spark plug cap.</p>
OK↓		
<p>5. Check the ignition coil. Refer to "CHECKING THE IGNITION COIL" on page 7-93.</p>	NG→	<p>Replace the ignition coil.</p>
OK↓		
<p>6. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 7-94.</p>	NG→	<p>Replace the crankshaft position sensor</p>
OK↓		
<p>7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-81.</p>	NG→	<p>Replace the main switch.</p>
OK↓		
<p>8. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-81.</p>	NG→	<p>Replace the right handlebar switch.</p>
OK↓		
<p>9. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-81.</p>	NG→	<p>Replace the neutral switch.</p>
OK↓		

IGNITION SYSTEM

10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the sidestand switch.
OK↓		
11. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the clutch switch.
OK↓		
12. Check the relay unit (starting circuit cut-off relay). Refer to "CHECKING THE RELAYS" on page 7-90.	NG→	Replace the relay unit (starting circuit cut-off relay)
OK↓		
13. Check the diode. Refer to "CHECKING THE DIODE" on page 7-91.	NG→	Replace the relay unit (diode).
OK↓		
14. Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 7-94.	NG→	Replace the lean angle sensor.
OK↓		
15. Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM" on page 7-1.	NG→	Properly connect or repair the ignition system's wiring.
OK↓		
Replace the ECU.		

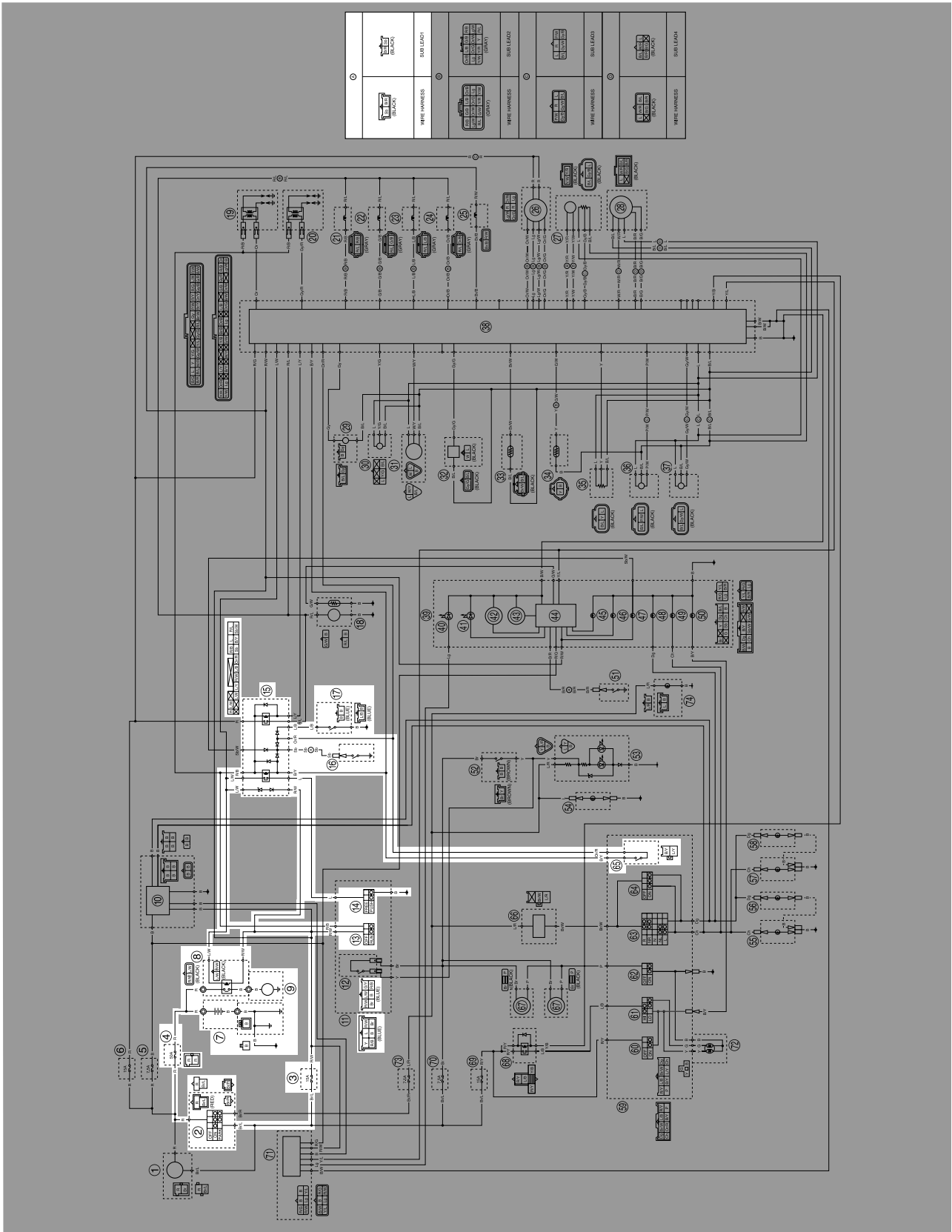
ELECTRIC STARTING SYSTEM

EAS27160

ELECTRIC STARTING SYSTEM

EAS27170

CIRCUIT DIAGRAM



ELECTRIC STARTING SYSTEM

- 2. Main switch
- 3. Ignition fuse
- 4. Main fuse
- 7. Battery
- 8. Starter relay
- 9. Starter motor
- 13. Engine stop switch
- 14. Start switch
- 15. Relay unit
- 16. Neutral switch
- 17. Sidestand switch
- 65. Clutch switch

ELECTRIC STARTING SYSTEM

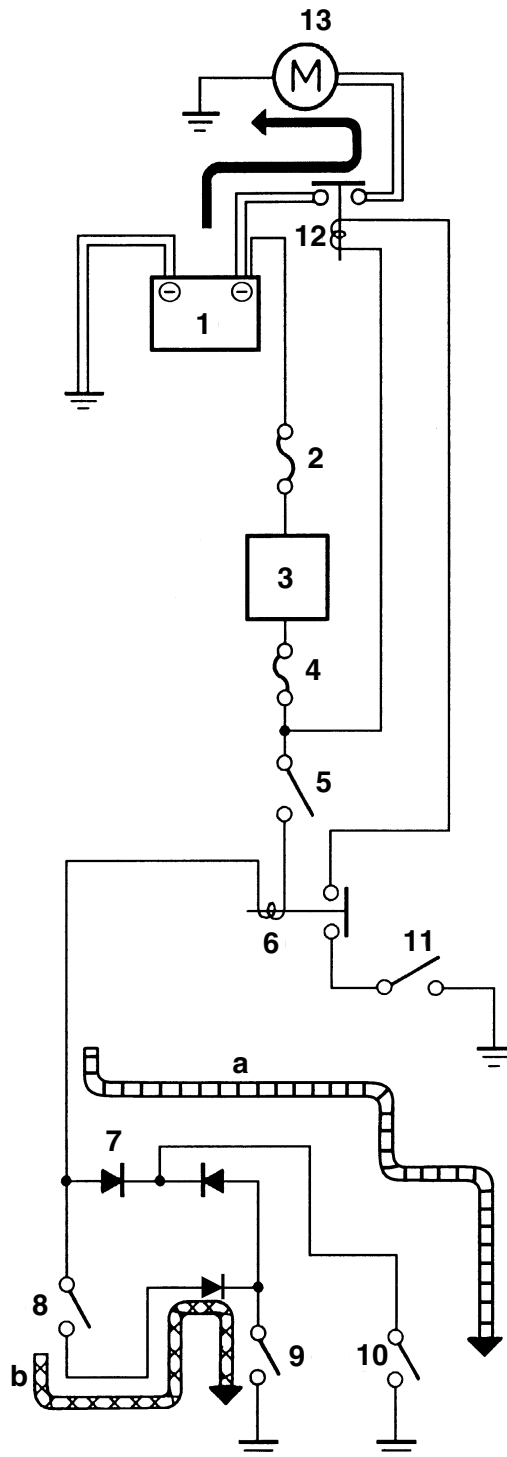
EAS27180

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the engine stop switch is set to “○” and the main switch is set to “ON” (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cut-off relay is closed and the engine can be started by pressing the starter switch.



ELECTRIC STARTING SYSTEM

- a. WHEN THE TRANSMISSION IS IN NEUTRAL
 - b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR
1. Battery
 2. Main
 3. Main switch
 4. Ignition
 5. Engine stop switch
 6. Starting circuit cut-off relay
 7. Diode
 8. Clutch switch coupler
 9. Sidestand switch
 10. Neutral switch
 11. Start switch
 12. Starter relay
 13. Starter motor

ELECTRIC STARTING SYSTEM

EAS27190

TROUBLE SHOOTING

The starter motor fails to turn.

NOTE:

Before troubleshooting, remove the following part(s):

- 1.Seat
- 2.Fuel tank
- 3.Headlight unit

1. Check the fuse (Main fuse, Ignition fuse) Refer to "CHECKING THE FUSES" on page 7-86.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARG- ING THE BATTERY" on page 7-87.	NG→	Clean the battery terminals. Recharge or replace the battery.
OK↓		
3. Check the starter motor Refer to "CHECKING THE STARTER MOTOR" on page 5-35.	NG→	Repair or replace the starter motor.
OK↓		
4. Check the relay unit (starting circuit cut-off relay). Refer to "CHECKING THE RELAYS" on page 7-90.	NG→	Replace the relay unit (starting circuit cut-off relay)
OK↓		
5. Check the diode. Refer to "CHECKING THE DIODE" on page 7-91.	NG→	Replace the relay unit (diode)
OK↓		
6. Replace the starter relay. Refer to "CHECKING THE RELAYS" on page 7-90.	NG→	Replace the starter relay.
OK↓		
7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the main switch.
OK↓		
8. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the right handlebar switch.
OK↓		
9. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the neutral switch.
OK↓		
10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the sidestand switch.

ELECTRIC STARTING SYSTEM

OK↓

11. Check the clutch switch.
Refer to "CHECKING THE SWITCHES" on page 7-81.

NG→

Replace the clutch switch.

OK↓

12. Check the start switch.
Refer to "CHECKING THE SWITCHES" on page 7-81.

NG→

Replace the right handlebar switch.

OK↓

13. Check the entire starting system's wiring.
Refer to "CIRCUIT DIAGRAM" on page 7-5.

NG→

Properly connect or repair the starting system's wiring

OK↓

The starting system circuit is OK.

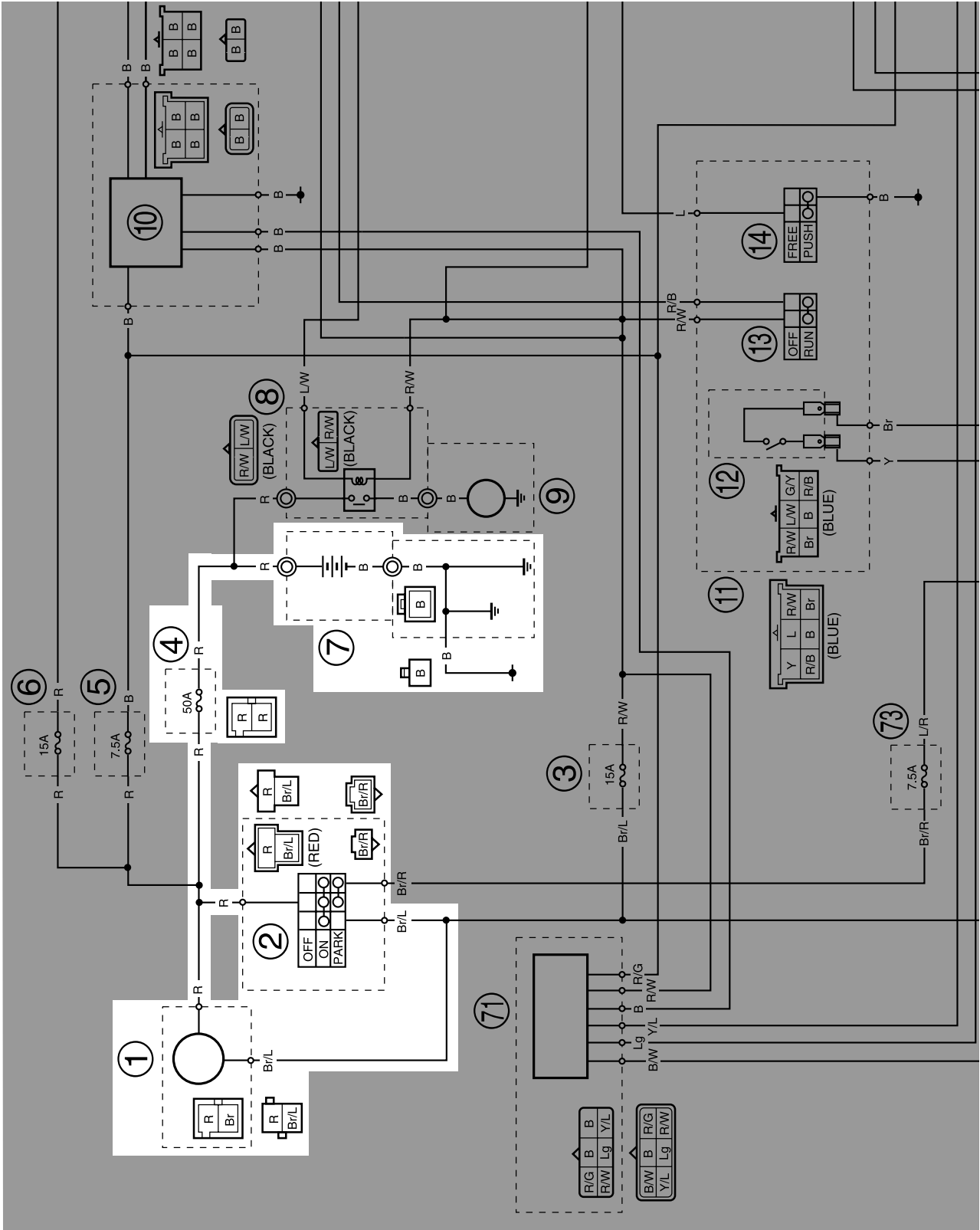
CHARGING SYSTEM

EAS27200

CHARGING SYSTEM

EAS27210

CIRCUIT DIAGRAM



CHARGING SYSTEM

1. Generator
2. Main switch
4. Main fuse
7. Battery

CHARGING SYSTEM

EAS27230

TROUBLE SHOOTING

The battery is not being charged.

NOTE:

Before troubleshooting, remove the following part(s):

1. Seat
2. Fuel tank
3. Headlight unit

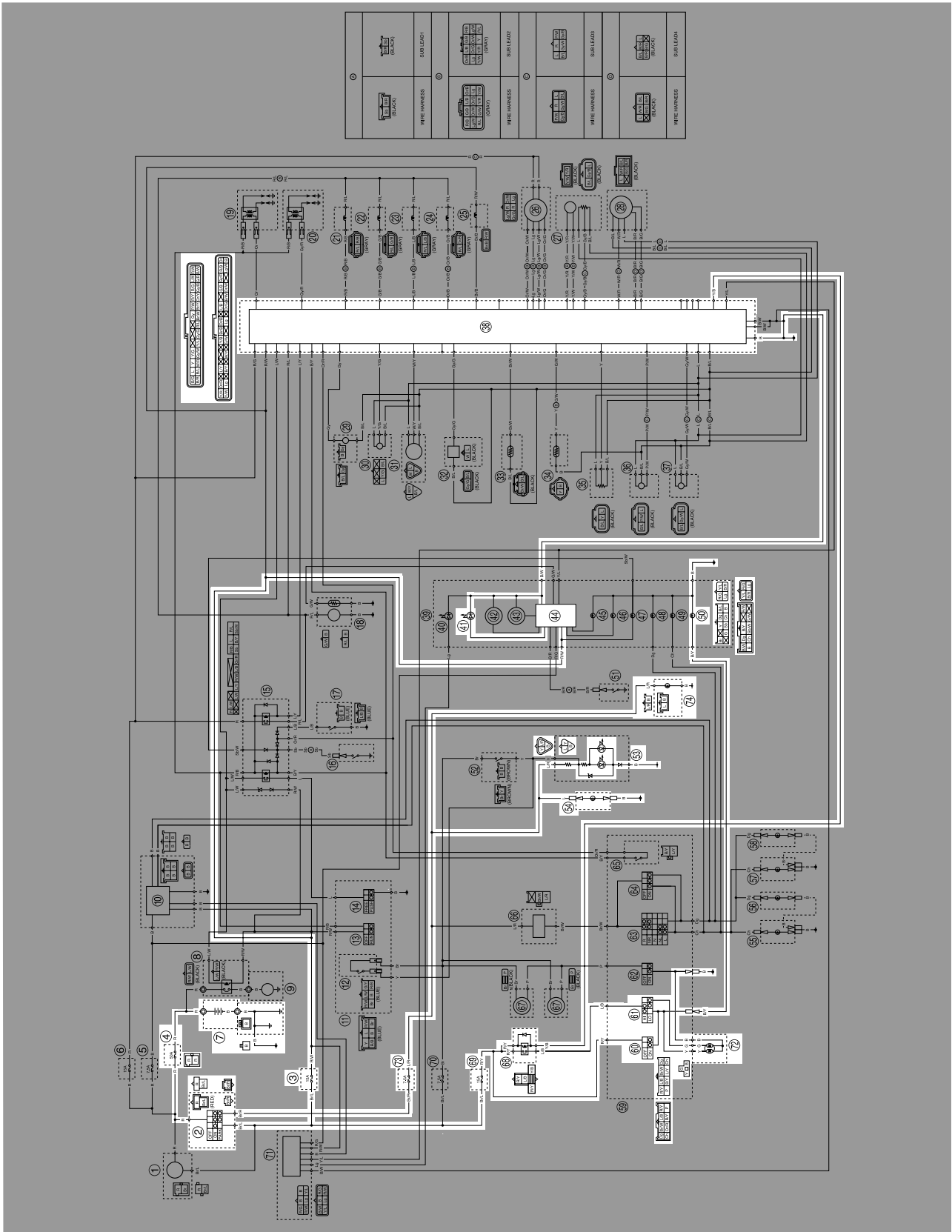
1. Check the fuse (Main fuse) Refer to "CHECKING THE FUSES" on page 7-86.	NG→	Replace the fuse.
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-87.	NG→	Clean the battery terminals. Recharge or replace the battery.
OK↓		
3. Check the generator Refer to "CHECKING THE GENERATOR" on page 5-31.	NG→	Replace the brushes and brush springs as a set. Replace the stator coil assembly. Replace the field coil.
OK↓		
4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the main switch.
OK↓		
5. Check the entire charging system's wiring. Refer to "CIRCUIT DIAGRAM" on page 7-11.	NG→	Properly connect or repair the charging system's wiring.
OK↓		
Replace the rectifier/regulator		

EAS27240

LIGHTING SYSTEM

EAS27250

CIRCUIT DIAGRAM



- 2. Main switch
- 3. Ignition fuse
- 4. Main fuse
- 7. Battery
- 38. ECU
- 41. Meter light
- 44. Multi-function display
- 50. High beam indicator
- 53. Tail/brake light
- 54. Licence light
- 60. Pass switch
- 61. Dimmer switch
- 68. Headlight relay
- 69. Headlight fuse
- 72. Headlight
- 73. Taillight fuse
- 74. Auxiliary light

EAS27260

TROUBLE SHOOTING

Any of the following fail to light: Headlight, high beam indicator light, taillight, license plate light or meter light.

NOTE:

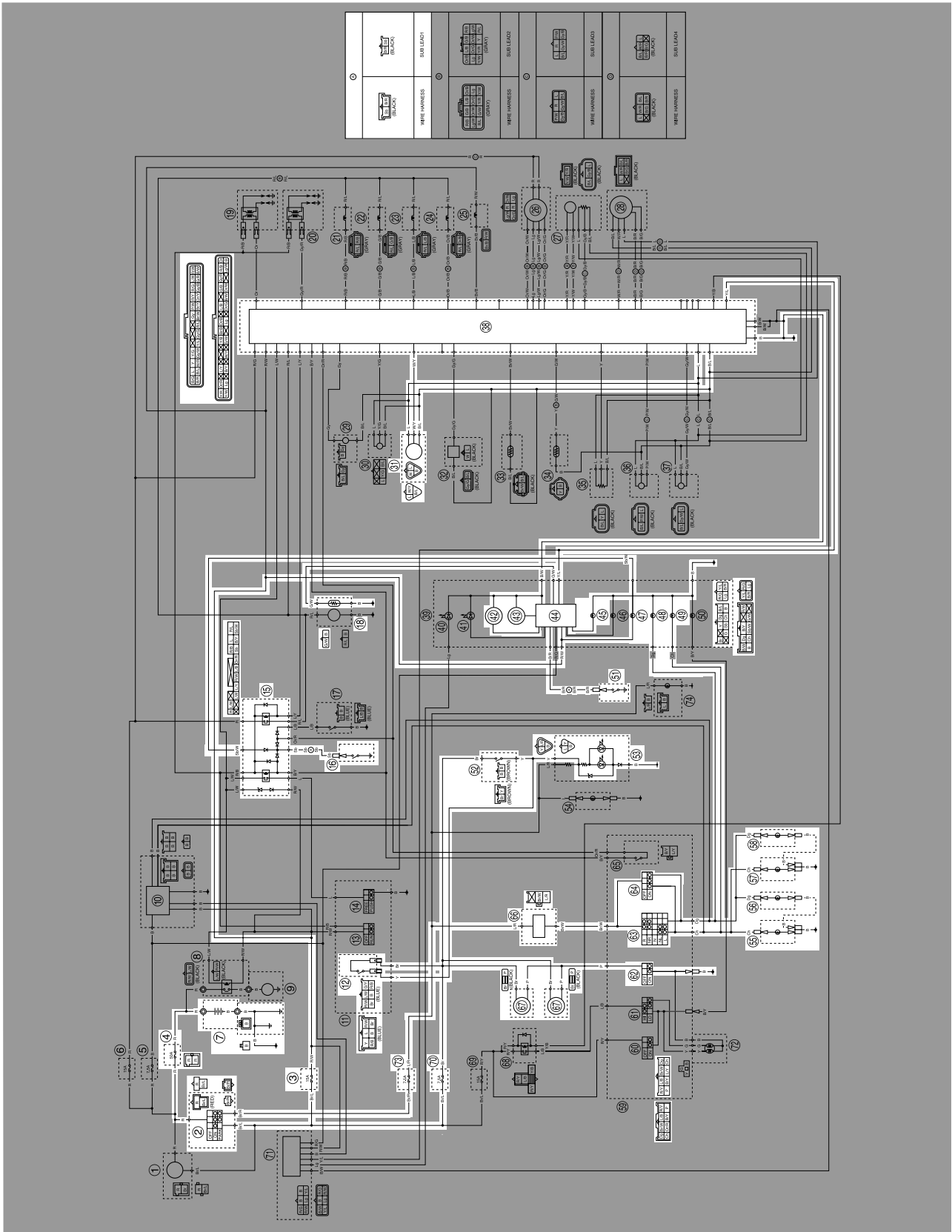
Before troubleshooting, remove the following part(s):

1. Seat
2. Fuel tank
3. Headlight unit

<p>1. Check the each bulbs and bulb sockets condition. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 7-85.</p>	NG→	Replace the bulb(s) and bulb socket(s).
OK↓		
<p>2. Check the fuse (Main, headlight, ignition, taillight) Refer to "CHECKING THE FUSES" on page 7-86.</p>	NG→	Replace the fuse.
OK↓		
<p>3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-87.</p>	NG→	Clean the battery terminals. Recharge or replace the battery.
OK↓		
<p>4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-81.</p>	NG→	Replace the main switch.
OK↓		
<p>5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 7-81.</p>	NG→	Replace the left handlebar switch.
OK↓		
<p>6. Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 7-81.</p>	NG→	Replace the left handlebar switch.
OK↓		
<p>7. Check the headlight relay. Refer to "CHECKING THE RELAYS" on page 7-90.</p>	NG→	Replace the headlight relay.
OK↓		
<p>8. Check the entire lighting system's wiring. Refer to "CIRCUIT DIAGRAM" on page 7-15.</p>	NG→	Properly connect or repair the lighting system's wiring.
OK↓		
<p>Replace the ECU.</p>		

EAS27270
SIGNALING SYSTEM

EAS27280
CIRCUIT DIAGRAM



2. Main switch
3. Ignition fuse
4. Main fuse
7. Battery
12. Front brake switch
15. Relay unit
16. Neutral switch
18. Fuel pump
31. Speed sensor
38. ECU
42. Speedometer
43. Tachometer
44. Multi-function display
45. Oil level warning light
47. Neutral indicator light
48. Left turn signal indicator
49. Right turn signal indicator light
51. Oil level switch
52. Rear brake switch
53. Tail/brake light
55. Front left turn signal light
56. Front right turn signal light
57. Rear left turn signal light
58. Rear right turn signal light
62. Horn switch
63. Turn signal switch
64. Hazard switch
66. Turn signal relay
67. Horn
70. Signal fuse
73. Taillight fuse

EAS27290

TROUBLE SHOOTING

- Any of the following fail to light:
Flasher light, brake light and indicator light.
- The horn fails to sound.

NOTE:

Before troubleshooting, remove the following part(s):

1. Seat
2. Fuel tank
3. Headlight unit

1. Check the fuse (Main, ignition, signal, taillight) Refer to "CHECKING THE FUSES" on page 7-86.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARG- ING THE BATTERY" on page 7-87.	NG→	Clean the battery terminals. Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the main switch.
OK↓		
4. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 7-19.	NG→	Properly connect or repair the signaling sys- tem's wiring.
OK↓		
This circuit is OK.		

CHECKING THE SIGNALING SYSTEM

The horn fails to sound.

1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the handlebar switch.
OK↓		
2. Check the horn. Refer to "CHECKING THE HORN" on page 7-95.	NG→	Replace the horn.
OK↓		
3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 7-19.	NG→	Properly connect or repair the signaling sys- tem's wiring.
OK↓		
This circuit is OK.		

SIGNALING SYSTEM

The tail/brake light fails to come on.

1. Check the brake light switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the brake light switch
OK↓		
2. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 7-19.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
Replace the tail/brake light assembly (LED)		

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the flasher, flasher indicator light bulb and socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 7-85.	NG→	Replace the flasher, flasher indicator light bulb, socket or both.
OK↓		
2. Check the turn signal switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the handlebar switch.
OK↓		
3. Check the hazard switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the handlebar switch.
OK↓		
4. Check the turn signal relay. Refer to "CHECKING THE RELAYS" on page 7-90.	NG→	Replace the turn signal relay.
OK↓		
5. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 7-19.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		

SIGNALING SYSTEM

The neutral indicator light fails to come on.

1. Check the neutral indicator light bulb and socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 7-85.	NG→	Replace the neutral indicator light bulb, socket or both.
OK↓		
2. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the neutral switch.
OK↓		
3. Check the diode. Refer to "CHECKING THE DIODE" on page 7-91.	NG→	Replace the relay unit (diode)
OK↓		
4. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 7-19.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		

The oil level warning light fails to come on.

1. Check the oil level warning light bulb and socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 7-85.	NG→	Replace the oil level warning light bulb, socket or both.
OK↓		
2. Check the oil level switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the oil level switch.
OK↓		
3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 7-19.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		

SIGNALING SYSTEM

The speedometer fails to operate.

1. Check the speed sensor.
Refer to "CHECKING THE SPEED
SENSOR" on page 7-96.

NG→

Replace the speed sensor.

OK↓

2. Check the entire signaling system's
wiring.
Refer to "CIRCUIT DIAGRAM" on page
7-19.

NG→

Properly connect or repair the signaling sys-
tem's wiring.

OK↓

Replace the meter assembly.

The fuel meter fails to operate.

1. Check the fuel level sender.
Refer to "CHECKING THE SPEED
SENSOR" on page 7-96.

NG→

Replace the fuel pump.

OK↓

2. Check the entire signaling system's
wiring.
Refer to "CIRCUIT DIAGRAM" on page
7-19.

NG→

Properly connect or repair the signaling sys-
tem's wiring.

OK↓

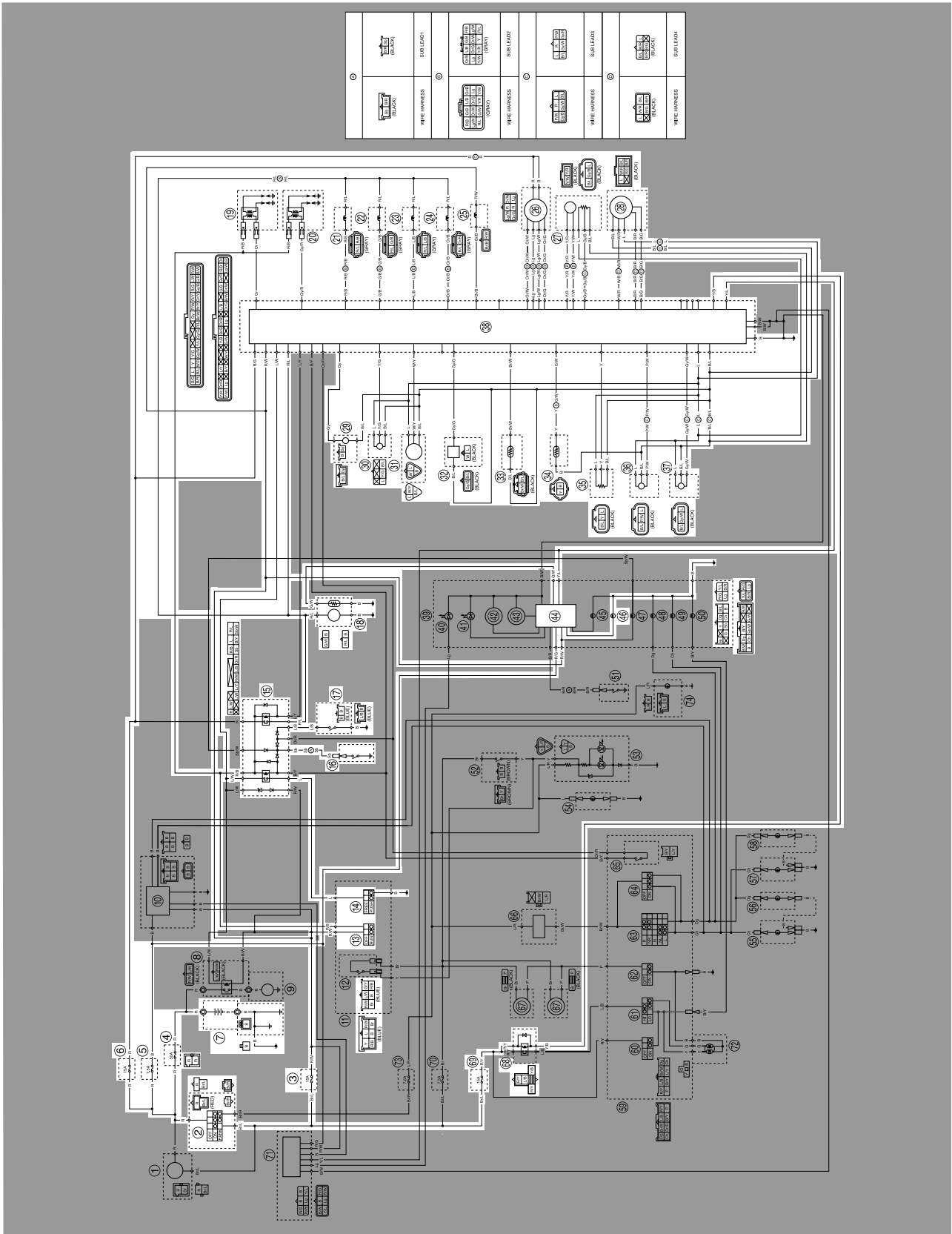
Replace the meter assembly.

EAS27330

FUEL INJECTION SYSTEM

EAS27340

CIRCUIT DIAGRAM



FUEL INJECTION SYSTEM

2. Main switch
3. Ignition fuse
4. Main fuse
5. Backup fuse
6. EFI fuse
7. Battery
13. Engine stop switch
14. Start switch
15. Relay unit
16. Neutral switch
17. Sidestand switch
18. Fuel pump
19. Ignition coil 1
20. Ignition coil 2
21. Injector 1
22. Injector 2
23. Injector 3
24. Injector 4
25. AI solenoid
26. ISC (idle speed control) valve
27. Sub throttle servo motor
28. EXUP servo motor
29. Crankshaft position sensor
30. Lean angle sensor
31. Speed sensor
32. O₂ sensor
33. Intake air temperature sensor
34. Engine temperature sensor
35. Throttle position sensor
36. Intake air pressure sensor 1
37. Intake air pressure sensor 2
38. ECU
44. Multi-function display
46. Engine trouble warning light
68. Headlight relay
69. Headlight fuse

FUEL INJECTION SYSTEM

EAS27350

ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, errors are displayed on the LCD of the odometer in order from the latest error code number. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

Engine trouble warning light indication and FI system operation

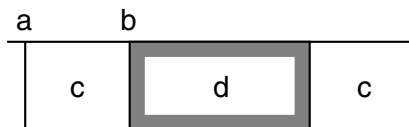
Warning light indication	ECU operation	FI operation	Vehicle operation
Flashing	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

* The warning light flashes when any one of the conditions listed below is present and the start switch is pushed:

- | | |
|--|--|
| 12: Crankshaft position sensor (Normal signal not emitted) | 41: Lean angle sensor (open or short-circuit) |
| 19: Sidestand switch (Open circuit wireharness to ECU) | 50: ECU internal malfunction (faulty ECU memory) |
| 30: Lean angle sensor (Latch up detected) | |

Checking for a defective engine trouble warning light bulb

The engine trouble warning light comes on for 1.4 seconds after the main switch has been turned to "ON". And when the start switch is being pushed. If the warning light does not come on under these conditions, the warning light bulb may be defective.



- | | |
|--------------------|-----------------------------|
| a. Main switch OFF | d. Light ON for 1.4 seconds |
| b. Main switch ON | |
| c. Light OFF | |

FUEL INJECTION SYSTEM

EAS27390

FAIL-SAFE ACTIONS (SUBSTITUTE CHARACTERISTICS OPERATION CONTROL)

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

The ECU takes fail-safe actions in two ways: one in which the sensor output is set to a prescribed value, and the other in which the ECU directly operates an actuator. Details on the fail-safe actions are given in the table below.

Self-Diagnostic Function

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	Unable	Unable
13	Intake air pressure sensor 1 (open or short-circuit)	Intake air pressure sensor-open or short circuit	Able	Able
14	Intake air pressure sensor 1 (pipe system)	Intake air pressure sensor-pipe system malfunction (clogged or detached hose).	Able	Able
15	Throttle position sensor (open or short-circuit)	Throttle position sensor-open or short circuit detected.	Able	Able
16	Throttle position sensor (stuck)	Stuck throttle position sensor is detected.	Able	Able
17	EXUP servo motor circuit (Open or short-circuit)	EXUP servo motor circuit open or short circuit is detected.	Able	Able
18	EXUP servo-motor (stuck)	EXUP servo motor is stuck.	Able	Able
19	Sidestand switch (Open circuit wire harness to ECU)	Open circuit is detected in the input line from the sidestand switch to the ECU.	Unable	Unable
20	Intake air pressure sensor 1 or intake air pressure sensor 2	When the main switch is "ON ", the voltage varies substantially between intake air pressure sensor 1 and intake air pressure sensor 2.	Able	Able
22	Intake air temperature sensor	Intake air temperature sensor-open or short circuit detected.	Able	Able
24	O ₂ sensor	No normal signal is received from the O ₂ sensor.	Able	Able

FUEL INJECTION SYSTEM

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
25	Intake air pressure sensor 2 (open or short-circuit)	Intake air pressure sensor-open or short circuit is detected.	Able	Able
26	Intake air pressure sensor 2 (pipe system)	Intake air pressure sensor-pipe system malfunction (clogged or detached hose).	Able	Able
28	Engine temperature sensor (Open or short-circuit)	Engine temperature sensor open or short circuit is detected.	Able	Able
30	Lean angle sensor	Latch up detected. No normal signals received from the lean angle sensor.	Unable	Unable
33	Ignition coil (#1 and #4) (faulty ignition)	Malfunction detected in the primary lead of the ignition coil. (#1 and #4)	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
34	Ignition coil (#2 and #3) (faulty ignition)	Malfunction detected in the primary lead of the ignition coil. (#2 and #3)	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
37	ISC (Idle speed control) valve	Engine speed is high when the engine is idling.	Able	Able
39	Injector	Injector open or short-circuit is detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
41	Lean angle sensor (open or short-circuit)	Lean angle sensor open or short circuit is detected.	Unable	Unable
42	Speed sensor	No normal signals are received from the speed sensor.	Able	Able
	Neutral switch	Open or short circuit is detected in the neutral switch.		

FUEL INJECTION SYSTEM

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
43	Fuel system voltage (monitor voltage)	Voltage supplied to the fuel injector and fuel pump is not normal.	Impossible, depending on case	Impossible, depending on case
44	Error in writing the amount of CO adjustment on EEPROM	Error is detected while reading or writing on EEPROM (CO adjustment value).	Able	Able
46	Vehicle system power supply (monitor voltage)	Power supply to the ECU is not normal.	Able	Able
47	Sub-throttle position sensor (open or short-circuit)	Throttle position sensor-open or short circuit detected.	Able	Able
48	Sub-throttle servo motor (stuck)	Sub-throttle servo motor is stuck.	Able	Able
50	ECU internal malfunction (memory check error)	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	Unable	Unable
70	Left idle control	After 20 minutes left idling, the ECU automatically stops the engine.	Able	Able
—	Start unable warning	Relay is not turned ON even if the crank signal is input while the start switch is turned ON. When the start switch is turned ON while an error is detected with the error code No.12, 19, 30, 41 or 50 displayed.	Unable	Unable

Communication error with the meter

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
Er-1	ECU internal malfunction (output signal error)	No signals are received from the ECU.	*Able	*Able
Er-2	ECU internal malfunction (output signal error)	Not within the specified signal time from the ECU.	*Able	*Able
Er-3	ECU internal malfunction (output signal error)	Data from the ECU cannot be received correctly.	*Able	*Able

FUEL INJECTION SYSTEM

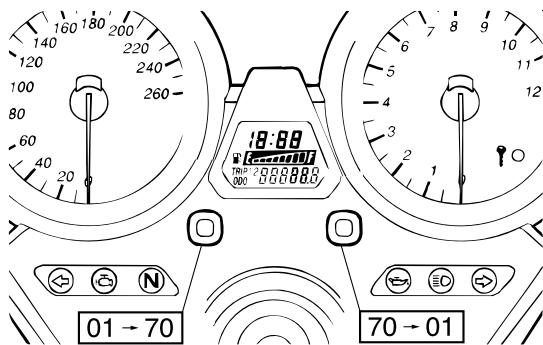
Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
Er-4	ECU internal malfunction (input signal error)	Non-registered data has been received from the meter.	*Able	*Able

*If multiple malfunctions have been detected for the ECU or immobilizer unit, you may not be able to start or drive the vehicle.

NOTE:

The diagnostic monitoring code number appears on the clock LCD (01–70).

- To decrease the selected diagnostic monitoring code number, press the RESET button. Press the RESET button for 1 second or longer to automatically decrease the diagnostic monitoring code numbers.
- To increase the selected diagnostic monitoring code number, press the SELECT button. Press the RESET button for 1 second or longer to automatically increase the diagnostic monitoring code numbers.



8. Verify the operation of the sensor or actuator.
 - Sensor operation
The data representing the operating conditions of the sensor appears on the trip LCD.
 - Actuator operation
Set the engine stop switch to “○” to operate the actuator.

NOTE:

If the engine stop switch is set to “○”, set it to “⊗”, and then set it to “○” again.

9. Turn the main switch to “OFF” to cancel the diagnostic monitoring mode.

NOTE:

To perform a reliable diagnosis, make sure to turn “OFF” the power supply before every check and then start right from the beginning.

FUEL INJECTION SYSTEM

Diagnostic monitoring code table

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
12	No normal signals are received from the crankshaft position sensor.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Defective crankshaft position sensor. ● Faulty timing plate. ● Malfunction in ECU. ● Improperly installed crankshaft position sensor. 	—
13	Intake air pressure sensor-open or short circuit	<ul style="list-style-type: none"> ● Open or short circuit in wire harness. ● Defective intake air pressure sensor. ● Malfunction in ECU. 	03
14	Intake air pressure sensor-pipe system malfunction (clogged or detached hose).	<ul style="list-style-type: none"> ● Intake air pressure sensor hose is detached, clogged, kinked, or pinched. ● Malfunction in ECU. 	03
15	Throttle position sensor-open or short circuit detected.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Defective throttle position sensor. ● Malfunction in ECU. ● Improperly installed throttle position sensor. 	01
16	Stuck throttle position sensor.	<ul style="list-style-type: none"> ● Stuck throttle position sensor. ● Malfunction in ECU. 	01
17	EXUP servo motor circuit open or short circuit	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Defective EXUP servo motor ● Malfunction in ECU. 	53
18	EXUP servo motor is stuck	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Stuck EXUP servo motor (mechanism/motor) 	53
19	Open circuit is detected in the side stand switch input line to the ECU.	<ul style="list-style-type: none"> ● Wire harness open circuit ● Malfunction in ECU. 	20
20	Intake air pressure sensor 1 and intake air pressure sensor 2 differ greatly.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Defective intake vacuum sensor 1 or intake vacuum sensor 2 ● Malfunction in ECU. ● Intake air pressure sensor hose is detached, clogged, kinked, or pinched. ● Defective intake air pressure sensor 1 or intake air pressure sensor 2 	03/04
22	Intake air temperature sensor-open or short circuit detected.	<ul style="list-style-type: none"> ● Defective intake air temperature sensor ● Malfunction in ECU. 	05

FUEL INJECTION SYSTEM

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
24	No normal signal is received from the O ₂ sensor.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Defective O₂ sensor. ● Malfunction in ECU. ● Improperly installed O₂ sensor. 	—
25	Intake air pressure sensor 2-open or short circuit	<ul style="list-style-type: none"> ● Open or short circuit in wire harness. ● Defective intake vacuum sensor 2. ● Malfunction in ECU. 	04
26	Intake air pressure sensor 2-pipe system malfunction (clogged or detached hose).	<ul style="list-style-type: none"> ● Intake air pressure sensor hose is detached, clogged, kinked, or pinched. ● Malfunction in ECU. 	04
28	Engine warm-up sensor open or short circuit	<ul style="list-style-type: none"> ● Open or short circuit in wire harness. ● Defective engine temperature sensor. ● Malfunction in ECU. ● Improperly installed engine temperature sensor. 	11
30	Vehicle has overturn	<ul style="list-style-type: none"> ● Overturned. ● Defective lean angle sensor. ● Malfunction in ECU. 	08
33	Malfunction detected in the primary lead of the ignition coil (#1 and #4)	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Malfunction in ignition coil. ● Malfunction in ECU. ● Defective ignition circuit cut-off circuit 	30
34	Malfunction detected in the primary lead of the ignition coil (#2 and #3)	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Malfunction in ignition coil. ● Malfunction in ECU. ● Defective ignition circuit cut-off circuit 	31
37	Engine speed is high when the engine is idling.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Malfunction in throttle body. ● Malfunction in throttle cables. ● ISC (Idle Speed Control) valve stuck in fully open state due to disconnected ISC hose or coupler. ● Malfunction in ECU. 	54
39	Injector-open or short-circuit	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Defective injector. ● Improperly installed injector ● Malfunction in ECU. 	36/37/38/39
41	Lean angle sensor open or short circuit detected	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Defective lean angle sensor ● Malfunction in ECU. 	08

FUEL INJECTION SYSTEM

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
42	No normal signals are received from the speed sensor.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Defective speed sensor. ● Malfunction in ECU. 	07
	Open or short circuit is detected in the neutral switch.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Defective neutral switch. ● Malfunction in ECU. 	21
43	Supplied power to the fuel injector and fuel pump is not normal.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Malfunction in ECU. ● Defective relay unit (fuel pump relay) 	09
44	Error is detected while reading or writing on EEPROM (code re-registering key code and throttle valve fully closed notification value).	<ul style="list-style-type: none"> ● Malfunction in ECU. (CO concentration adjustment value cannot be correctly written to or read from internal memory) 	60
46	Power supply to the ECU is not normal.	<ul style="list-style-type: none"> ● Malfunction in charging system. 	—
47	Sub-throttle position sensor-open or short circuit detected.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Improperly installed sub-throttle position sensor. ● Malfunction in ECU. 	56
48	Sub-throttle servo motor stuck	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Sub-throttle servo motor is stuck (mechanical) ● Sub-throttle servo motor is stuck (motor) 	56
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	<ul style="list-style-type: none"> ● Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.) 	—
70	Left idle control	<ul style="list-style-type: none"> ● When approximately 20 minutes has elapsed in idling state 	—
Er-1	No signals are received from the ECU.	<ul style="list-style-type: none"> ● Open circuit or short circuit in wire harness. ● Malfunction in meter unit. ● Malfunction in ECU. 	—
Er-2	No signals are received from the ECU within the specified duration.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Malfunction in meter unit. ● Malfunction in ECU. 	—
Er-3	Data from the ECU cannot be received correctly.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Malfunction in meter unit. ● Malfunction in ECU. 	—
Er-4	Non-registered data has been received from the meter.	<ul style="list-style-type: none"> ● Open circuit in wire harness. ● Malfunction in meter unit. ● Malfunction in ECU. 	—



FUEL INJECTION SYSTEM

Sensor operation table

Switch the meter display from the regular mode to the diagnostic mode. To switch the display, refer to "DIAGNOSTIC MONITORING MODE".

Diagnostic code No.	Item	Meter display	Checking method
01	Throttle angle		
	<ul style="list-style-type: none"> ● Fully closed position ● Fully opened position 	15–18 100–105	Check with throttle fully closed. Check with throttle fully open.
03	Intake air pressure sensor 1 (atmospheric pressure and intake air pressure)	Displays the intake air pressure.	Set the engine stop switch to "○", then operate the throttle while pressing the start switch. (If the display value changes, the performance is OK.)
04	Intake air pressure sensor 2 (atmospheric pressure and intake air pressure)	Displays the intake air pressure.	Set the engine stop switch to "○", then operate the throttle while pressing the start switch. (If the display value changes, the performance is OK.)
05	Intake air temperature	Displays the intake air temperature.	Compare the actually measured intake air temperature with the meter display value.
07	Vehicle speed pulse	0–999	Check that the number increase when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
08	Lean angle sensor		
	<ul style="list-style-type: none"> ● Upright ● Overturned 	0.4–1.4V 3.7–4.4V	Remove the lean angle sensor and incline the vehicle more than 65 degrees.
09	Fuel system voltage (battery voltage)	Approximately 12.0	Turn the engine stop switch "⊗", and compare to battery voltage (recharge if battery voltage is low).
11	Engine temperature	Engine temperature display	Compare displayed value to ambient temperature.
20	Sidestand switch		
	<ul style="list-style-type: none"> ● Stand retracted ● Stand extended 	ON OFF	Set ON/OFF the Sidestand switch. (with the transmission in gear)
21	Neutral switch		
	<ul style="list-style-type: none"> ● Neutral ● In gear 	ON OFF	Shift the transmission

FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Meter display	Checking method
60	EEPROM fault cylinder display <ul style="list-style-type: none"> ● No history ● History exists 	00 01–04 (display defective cylinder number) <ul style="list-style-type: none"> ● (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.) 	—
61	Malfunction history code display <ul style="list-style-type: none"> ● No history ● History exists 	0 12–70 (Fault detection code) <ul style="list-style-type: none"> ● If more than one code number is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all code numbers are shown, the display repeats the same process.) 	—
62	Malfunction history code erasure <ul style="list-style-type: none"> ● No history ● History exists 	0 0–28 <ul style="list-style-type: none"> ● Displays the total number of malfunctions, including the current malfunction, that have occurred since the history was last erased. (For example, if there have been three malfunctions, “03” is displayed.) 	— To erase the history, set the engine stop switch from “  ” to “  ”.

FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Meter display	Checking method
63	Malfunction history code re-display <ul style="list-style-type: none"> ● No malfunction code ● Malfunction code exists 	0 Fault detection code 24 <ul style="list-style-type: none"> ● (If code numbers more than one are detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.) 	—
70	Control number	00–255	—

Actuator operation table

Diagnostic code No.	Item	Actuation	Checking method
30	Ignition coil (#1 and #4)	Actuates the ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check the spark five times. ● Connect an ignition checker.
31	Ignition coil (#2 and #3)	Actuates the ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check the spark five times. ● Connect an ignition checker.
36	Injector (#1)	Actuates the injector five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector five times.
37	Injector (#2)	Actuates the injector five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector five times.
38	Injector (#3)	Actuates the injector five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector five times.
39	Injector (#4)	Actuates the injector five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector five times.

FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Actuation	Checking method
48	Air induction system solenoid	Actuates the air induction system solenoid five times at one-second intervals. Illuminates the engine trouble warning light. (Light OFF: Air induction system solenoid "ON" Light ON: Air induction system solenoid "OFF")	Check the operating sound of the air induction system solenoid five times.
50	Fuel injection system relay	Actuates the fuel pump relay five times at one-second intervals. Illuminates the engine trouble warning light. (The engine trouble warning light is OFF when the relay is ON, and the engine trouble warning light is ON when the relay is OFF).	Check the operating sound of the relay five times.
52	Headlight relay	Actuates the headlight relay (on/off) for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light and headlight.	Check the operating sound of the headlight relay five times.
53	EXUP servomotor	Turn the servo motor once in the open direction and then in the close direction. Illuminates the engine trouble warning light.	Check the operating sound of the EXUP servo motor.
54	ISC (idle speed control) valve	When the ISC (idle speed control) valve fully closes, and then it opens until it is at the standby opening position when the engine is started. This operation takes approximately 12 seconds until it is completed.	Motor drive noise during ISC (Idle Speed Control) valve operation.
56	Sub-throttle servo motor	Turn servo motor towards close and open. Engine warning light goes on during servo motor operation.	Check the operating sound of the sub-throttle servo motor.

FUEL INJECTION SYSTEM

EAS27480

TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Carry out check and maintenance on items or components that could be a cause of malfunction in accordance with the order.

When the check and maintenance of malfunctioned part is completed, restore the meter display according to the "Reinstatement method".

Fault code No.

Fault code number displayed on the meter when the engine failed to work normally. Refer to "DIAGNOSTIC MONITORING MODE" on page 7-32.

Diagnostic monitoring code No.:

Code number to be used when the diagnostic monitoring mode is operated. Refer to "DIAGNOSTIC MONITORING MODE" on page 7-32.

Fault code No.	12	Symptom	No normal signals are received from the crankshaft position sensor.	
Diagnostic code No.	—	—	—	
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Installed condition of crankshaft position sensor	Check for looseness or pinching.	Cranking the engine.	
2	Connections. ● Crankshaft position sensor coupler ● Wire harness ECU coupler	<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 		
3	Open or short circuit in wire harness.	<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between crankshaft position sensor coupler and ECU coupler. (Gray–Gray) (Black/Blue–Black/Blue) 		
4	Installed condition of crankshaft position sensor.	<ul style="list-style-type: none"> ● Replace if defective. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 7-94. 		

FUEL INJECTION SYSTEM

Fault code No.	13	Symptom	Intake air pressure sensor 1 open or short circuit detected.	
Diagnostic code No.	03	Intake air pressure sensor 1		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	When error code Nos. 13 and 14 are displayed simultaneously, first check and repair No.13.			
1	Connections. ● Intake air pressure sensor 1 coupler ● Wire harness ECU coupler ● Sub-wire harness coupler		● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely.	Set the main switch to "ON".
2	Open or short circuit in wire harness and/or sub-wire harness.		● Repair or replace if there is an open or short circuit. ● Between intake air pressure sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Pink/White–Pink/White) (Blue–Blue)	
3	Defective intake air pressure sensor 1.		● Execute the diagnostic mode. (Code No.03) ● Replace if defective. Refer to "CHECKING INTAKE AIR PRESSURE SENSORS 1 AND 2" on page 7-98.	

FUEL INJECTION SYSTEM

Fault code No.	14	Symptom	Intake air pressure sensor 1 hose system malfunction (clogged or detached hose).	
Diagnostic code No.	03	Intake air pressure sensor 1		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
	<ul style="list-style-type: none"> ● When error code Nos. 13 and 14 are displayed simultaneously, first check and repair No.13. ● When error code Nos. 14 and 25 are displayed simultaneously, first check and repair No.25. 			
1	Intake air pressure sensor hose.	<ul style="list-style-type: none"> ● Check the intake air pressure sensor 1 hose condition. ● Repair or replace the sensor hose. 	Starting the engine and operating it at idle.	
2	Intake air pressure sensor malfunction at intermediate electrical potential.	<ul style="list-style-type: none"> ● Check and repair the connection. ● Replace it if there is a malfunction. 		
3	Connections. <ul style="list-style-type: none"> ● Intake air pressure sensor 1 coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 	<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 		
4	Defective intake air pressure sensor 1	<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.03) ● Replace if defective. Refer to "THROTTLE BODIES" on page 6-4.		

FUEL INJECTION SYSTEM

Fault code No.	15	Symptom	Throttle position sensor-open or short circuit detected.	
Diagnostic code No.	01	Throttle position sensor		
Order	Item/components and probable cause		Check or maintenance job	
	<ul style="list-style-type: none"> ● When error code Nos. 15 and 16 are displayed simultaneously, first check and repair No.15. ● When error code Nos. 15 and 37 are displayed simultaneously, first check and repair No.15. 			
1	Installed condition of throttle position sensor.		<ul style="list-style-type: none"> ● Check for looseness or pinching. ● Check that is installed in the specified position. 	
2	Connections. <ul style="list-style-type: none"> ● Throttle position sensor coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	
3	Open or short circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between throttle position sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Yellow–Yellow) (Blue–Blue) 	
4	Throttle position sensor lead, output voltage.		<ul style="list-style-type: none"> ● Check for output voltage and replace the throttle position sensor. (Black/Blue–Yellow/Blue) 	
			Open circuit item	Output voltage
			Ground wire open circuit	5 V
			Open circuit on signal line	0 V
			Power supply wire open circuit	0 V
5	Defective throttle position sensor.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.01) ● Replace if defective. Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 7-97	

FUEL INJECTION SYSTEM

Fault code No.	16	Symptom	Stuck throttle position sensor detected.	
Diagnostic code No.	01	Throttle position sensor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	<ul style="list-style-type: none"> ● When error code Nos. 15 and 16 are displayed simultaneously, first check and repair No.15. ● When error code Nos. 16 and 37 are displayed simultaneously, first check and repair No.16. 			
1	Installed condition of throttle position sensor.		<ul style="list-style-type: none"> ● Check for looseness or pinching. ● Check that is installed in the specified position. 	Reinstated by starting the engine, operating it at idle. And then racing it.
2	Defective throttle position sensor.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.01) ● Replace if defective. Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 7-97.	

Fault code No.	17	Symptom	EXUP servo motor circuit open or short circuit	
Diagnostic code No.	53	EXUP servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	When error code Nos. 17 and 18 are displayed simultaneously, first check and repair No.17.			
1	Connections. <ul style="list-style-type: none"> ● EXUP servo motor coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Set the main switch to "ON".
2	Open or short circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between EXUP servo motor coupler and ECU coupler. (Black/Blue–Black/Blue) (White/Red–White/Red) (Blue–Blue) 	
3	Defective EXUP servo motor.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.53) ● Replace if defective. 	

FUEL INJECTION SYSTEM

Fault code No.	18	Symptom	EXUP servo motor is stuck.	
Diagnostic code No.	53	EXUP servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	When error code Nos. 17 and 18 are displayed simultaneously, first check and repair No.17.			
1	Connections. ● EXUP servo motor coupler ● Wire harness ECU coupler ● Sub-wire harness coupler		● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely.	Set the main switch to "ON". And then racing it.
2	Open or short circuit in wire harness and/or sub-wire harness.		● Repair or replace if there is an open or short circuit. ● Between EXUP servo motor coupler and ECU coupler. (Black/Red-Black/Red) (Black/Green-Black/Green)	
3	Defective EXUP servo motor.		● Execute the diagnostic mode. (Code No.53) ● Replace if defective.	
4	Defective EXUP valve, pulley and cable.		● Replace if defective.	

FUEL INJECTION SYSTEM

Fault code No.	19	Symptom	Open circuit is detected in the input line from the sidestand switch to the ECU.	
Diagnostic code No.	20	Sidestand switch		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. ● Main wire harness ECU coupler (Orange/Red)		<ul style="list-style-type: none"> ● Execute the diagnostic monitoring mode. (Code No.20) ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	If the transmission is in gear, retracting the sidestand. If the transmission is in neutral, reconnecting the wiring.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between ECU and starting circuit cut-off relay. (Orange/Red) 	
3	Defective sidestand switch.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.20) ● Replace if defective. Refer to "CHECKING THE SWITCHES" on page 7-81.	

Fault code No.	20	Symptom	Intake air pressure sensor 1 and intake air pressure sensor 2 differ greatly.	
Diagnostic code No.	03/04	Intake air pressure sensor 1/Intake air pressure sensor 2		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Defective intake air pressure sensor 1 or intake air pressure sensor 2.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.03/04) ● Replace if defective. Refer to "CHECKING INTAKE AIR PRESSURE SENSORS 1 AND 2" on page 7-98.	Set the main switch to "ON".

FUEL INJECTION SYSTEM

Fault code No.	22	Symptom	Intake air temperature sensor-open or short circuit detected.	
Diagnostic code No.	05	Intake air temperature sensor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	When error code Nos. 22 and 37 are displayed simultaneously, first check and repair No.22.			
1	Connections. ● Intake air temperature sensor coupler ● Wire harness ECU coupler		● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely.	Set the main switch to "ON".
2	Open or short circuit in wire harness.		● Repair or replace if there is an open or short circuit. ● Between intake air temperature sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Brown/White–Brown/White)	
3	Installed condition of intake air temperature sensor.		● Execute the diagnostic mode. (Code No.05) ● Replace if defective. Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 7-99.	

FUEL INJECTION SYSTEM

Fault code No.	24	Symptom	O ₂ sensor open or short circuit detected.	
Diagnostic code No.	—	—		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed condition of O ₂ sensor.		<ul style="list-style-type: none"> ● Check for looseness or pinching. 	Engine starts and races after warm up. Or reset with diagnosis code 63.
2	Connections. <ul style="list-style-type: none"> ● O₂ sensor coupler ● Wire harness ECU coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between O₂ sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Gray/Green–Gray/Green) 	
4	Check fuel pressure.		Refer to “THROTTLE BODIES” on page 6-4.	
5	Defective O ₂ sensor.		<ul style="list-style-type: none"> ● Replace if defective. Refer to “ENGINE REMOVAL” on page 5-1.	

FUEL INJECTION SYSTEM

Fault code No.	25	Symptom	Intake air pressure sensor 2 open or short circuit detected.	
Diagnostic code No.	04	Intake air pressure sensor 2		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	<ul style="list-style-type: none"> ● When error code Nos. 25 and 37 are displayed simultaneously, first check and repair No.25. ● When error code Nos. 25 and 14 are displayed simultaneously, first check and repair No. 25. 			
1	Connections. <ul style="list-style-type: none"> ● Intake air pressure sensor 2 coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Set the main switch to "ON".
2	Open or short circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between intake air pressure sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Gray/White–Gray/White) (Blue–Blue) 	
3	Defective intake air pressure sensor 2.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.04) ● Replace if defective. Refer to "CHECKING INTAKE AIR PRESSURE SENSORS 1 AND 2" on page 7-98.	

FUEL INJECTION SYSTEM

Fault code No.	26	Symptom	Intake air pressure sensor 2 hose system malfunction (clogged or detached hose).	
Diagnostic code No.	04	Intake air pressure sensor 2		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	When error code Nos. 26 and 37 are displayed simultaneously, first check and repair No.26.			
1	Intake air pressure sensor hose.		<ul style="list-style-type: none"> ● Check the intake air pressure sensor 2 hose condition. ● Repair or replace the sensor hose. 	Starting the engine and operating it at idle.
2	Intake air pressure sensor malfunction at intermediate electrical potential.		<ul style="list-style-type: none"> ● Check and repair the connection. ● Replace it if there is a malfunction. 	
3	Connections. <ul style="list-style-type: none"> ● Intake air pressure sensor 2 coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	
4	Defective intake air pressure sensor 2.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.03) ● Replace if defective. Refer to "THROTTLE BODIES" on page 6-4.	

FUEL INJECTION SYSTEM

Fault code No.	28	Symptom	Engine temperature sensor-open or short circuit detected.	
Diagnostic code No.	11	Engine temperature sensor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	When error code Nos. 28 and 37 are displayed simultaneously, first check and repair No.28.			
1	Connections. <ul style="list-style-type: none"> ● Engine temperature sensor coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Set the main switch to "ON".
2	Open or short circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between engine temperature sensor coupler and ECU coupler. (Black-Black/Blue) (Yellow-Green/White) 	
3	Defective engine temperature sensor.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.11) ● Replace if defective. Refer to "CHECKING THE ENGINE TEMPERATURE SENSOR" on page 7-96.	

Fault code No.	30	Symptom	The vehicle has over turned.	
Diagnostic code No.	08	Lean angle sensor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	The vehicle has overturned.		Raise the vehicle upright.	Set the main switch ON (However, the engine cannot be restarted unless the main switch is first set to "OFF").
2	Installed condition of lean angle sensor.		Check for looseness or pinching.	
3	Connections. <ul style="list-style-type: none"> ● Lean angle sensor coupler ● Wire harness ECU coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	
4	Defective lean angle sensor.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.08) ● Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 7-94.	

FUEL INJECTION SYSTEM

Fault code No.	33	Symptom	Malfunction detected in the primary lead of the ignition coil (#1 and #4).	
Diagnostic code No.	30	Ignition coil (#1 and #4)		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connection. <ul style="list-style-type: none"> ● Ignition coil (#1/#4) primary lead coupler (orange) ● Wire harness ECU coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Starting the engine and operating it at idle.
2	Open circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open circuit. ● Between ignition coil (#1/#4) coupler and ECU coupler. (Orange–Orange) 	
3	Defective ignition coil (#1 and #4).		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.30) ● Test the primary and secondary coils for continuity. ● Replace if defective. Refer to “CHECKING THE IGNITION COIL” on page 7-93.	

Fault code No.	34	Symptom	Malfunction detected in the primary lead of the ignition coil (#2 and #3).	
Diagnostic code No.	31	Ignition coil (#2 and #3)		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. <ul style="list-style-type: none"> ● Ignition coil (#2/#3) primary lead coupler (gray/red) ● Wire harness ECU coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Starting the engine and operating it at idle.
2	Open circuit wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open circuit. ● Between ignition coil (#2/#3) coupler and ECU coupler. (Gray/Red–Gray/Red) 	
3	Defective ignition coil (#2 and #3).		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.31) ● Test the primary and secondary coils for continuity. ● Replace if defective. Refer to “CHECKING THE IGNITION COIL” on page 7-93.	

FUEL INJECTION SYSTEM

Fault code No.	37	Symptom	Engine speed is high when the engine is idling.	
Diagnostic code No.	54	ISC (idle speed control) valve		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
	<ul style="list-style-type: none"> ● When error code Nos. 15 and 37 are displayed simultaneously, first check and repair No.15. ● When error code Nos. 16 and 37 are displayed simultaneously, first check and repair No.16. ● When error code Nos. 22 and 37 are displayed simultaneously, first check and repair No.22. ● When error code Nos. 25 and 37 are displayed simultaneously, first check and repair No.25. ● When error code Nos. 26 and 37 are displayed simultaneously, first check and repair No.26. ● When error code Nos. 28 and 37 are displayed simultaneously, first check and repair No.28. 			

FUEL INJECTION SYSTEM

Fault code No.	37	Symptom	Engine speed is high when the engine is idling.	
Diagnostic code No.	54	ISC (idle speed control) valve		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	EFI fuse		<ul style="list-style-type: none"> ● Check the EFI fuse. Refer to “CHECKING THE FUSES” on page 7-86. 	Starting the engine and operating it at idle.
2	Connections. <ul style="list-style-type: none"> ● ISC sensor coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	
3	Open circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open circuit. ● Between ISC coupler and ECU coupler. (Orange/White–Orange/White) (Light green–Light green) (Light green/White–Light green/White) (Orange/Green–Orange/Green) ● Between ISC coupler and battery. (Red–Red) 	
4	Throttle valve does not fully close.		<ul style="list-style-type: none"> ● Check the throttle body. Refer to “THROTTLE BODIES” on page 6-4. ● Check the throttle cables. Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” on page 3-9. 	
5	ISC hose disconnect. (Abnormally intake noise)		<ul style="list-style-type: none"> ● Check the ISC hose. Refer to “THROTTLE BODIES” on page 6-4. 	
6	ISC (idle speed control) valve stuck fully open.		<ul style="list-style-type: none"> ● Check that the ISC unit coupler is not disconnected. ● The ISC valve is stuck fully open if it does not operate when the main switch is turned “OFF”. (Touch the ISC unit with your hand and check if it is vibrating to confirm if the ISC valve is operating.) 	
7	ISC (idle speed control) valve is not moving correctly.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.54) ● When the ISC (idle speed control) valve fully closes, and then it opens until it is at the standby opening position when the engine is started. This operation takes approximately 12 seconds until it is completed. ● Start the engine. Start the engine. If the error recurs, replace the throttle body assembly. 	

FUEL INJECTION SYSTEM

Fault code No.	39	Symptom	Injector-open circuit detected	
Diagnostic code No.	36/37/38/39	Injector #1/#2/#3/#4		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. <ul style="list-style-type: none"> ● Fuel injector coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● Repair or replace if there is an open or short circuit. 	Start the engine.
2	Open or short circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuits. ● Between fuel injector coupler and ECU coupler. (Red/Black–Red/Black) (Green/Black–Green/Black) (Blue/Black–Blue/Black) (Orange/Black–Orange/Black) 	
3	Defective injector.		<ul style="list-style-type: none"> ● Execute the diagnosis mode. (Code No.36/37/38/39) ● Replace if defective. 	

Fault code No.	41	Symptom	Lean angle sensor open or short circuit detected.	
Diagnostic code No.	08	Lean angle sensor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. <ul style="list-style-type: none"> ● Lean angle sensor coupler ● Wire harness ECU coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Set the main switch to “ON”.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between lean angle sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Yellow/Green–Yellow/Green) (Blue–Blue) 	
3	Defective lean angle sensor.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.08) ● Replace if defective. Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 7-94.	

FUEL INJECTION SYSTEM

Fault code No.	42	Symptom	A. No normal signals are received from the speed sensor. B. Open or short circuit is detected in the neutral switch.	
Diagnostic code No.	A	07	Speed sensor	
	B	21	Neutral switch	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
A-1	Installed condition of speed sensor		<ul style="list-style-type: none"> ● Check for looseness or pinching. 	Starting the engine, and inputting the vehicle speed signals by operating the vehicle at a low speed of 20–30 km/h.
A-2	Connections. <ul style="list-style-type: none"> ● Speed sensor coupler ● Wire harness ECU coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	
A-3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between sensor coupler and ECU coupler. (Blue–Blue) (White/Yellow–White/Yellow) (Black/Blue–Black/Blue) 	
A-4	Defective speed sensor.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.07) ● Replace if defective. Refer to “CHECKING THE SPEED SENSOR” on page 7-96.	

FUEL INJECTION SYSTEM

Fault code No.	42	Symptom	A. No normal signals are received from the speed sensor. B. Open or short circuit is detected in the neutral switch.	
Diagnostic code No.	A	07	Speed sensor	
	B	21	Neutral switch	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
B-1	Installed condition of neutral switch		<ul style="list-style-type: none"> ● Check for looseness or pinching. 	Starting the engine, and inputting the vehicle speed signals by operating the vehicle at a 20 to 30 km/h.
B-2	Connections. <ul style="list-style-type: none"> ● Neutral switch coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	
B-3	Open or short circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between relay unit coupler and ECU coupler. (Black/Yellow–Black /Yellow) ● Between neutral switch and relay unit coupler (Sky blue–Sky blue) 	
B-4	Defective neutral switch.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.21) ● Replace if defective. Refer to “CHECKING THE SWITCHES” on page 7-81. 	
B-5	Defective shift drum (neutral position)		<ul style="list-style-type: none"> ● Replace if defective. Refer to “TRANSMISSION” on page 5-77. 	

FUEL INJECTION SYSTEM

Fault code No.	43	Symptom	Supplied power to the fuel injector and fuel pump is not normal.	
Diagnostic code No.	09	Fuel system voltage		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. <ul style="list-style-type: none"> ● Starting circuit cut-off relay coupler ● Fuel pump coupler ● Injector coupler ● Wire harness ECU coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between relay unit and ECU coupler. (Red/Blue–Red/Blue) ● Between battery and relay unit (Red–Red) 	
3	Defective unit (fuel pump relay).		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No. 09) ● Replace if defective. Refer to “CHECKING THE RELAYS” on page 7-90. ● If there is no malfunction with the relay unit (fuel pump relay), replace the ECU. 	

Fault code No.	44	Symptom	Error is detected while reading or writing on EEPROM. (CO adjustment value)	
Diagnostic code No.	60	EEPROM improper cylinder indication		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Malfunction in ECU.		<ul style="list-style-type: none"> ● Set the faulty cylinder's exhaust gas volume. <ol style="list-style-type: none"> 1. Execute the diagnostic mode (Code No. 60) to check the faulty cylinder number. (If multiple cylinders are defective, the numbers of the faulty cylinders are displayed alternately at 2-second intervals.) 2. Execute the CO adjustment mode and set the exhaust gas volume of the faulty cylinder to “0”. Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 3-8. ● Replace the ECU if it does not recover from the malfunction. 	Set the main switch to “ON”. Volume after it is reinstated. Readjust the exhaust gas.

FUEL INJECTION SYSTEM

Fault code No.	46	Symptom	Power supply to the ECU is not normal.	
Diagnostic code No.	—	—		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Connections. ● Wire harness ECU coupler	<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Starting the engine and operating it at idle.	
2	Faulty battery.	<ul style="list-style-type: none"> ● Replace or change the battery Refer to “CHECKING AND CHARGING THE BATTERY” on page 7-87. 		
3	Defective generator.	<ul style="list-style-type: none"> ● Replace if defective. ● Check the output voltage of generator. Refer to “CHARGING SYSTEM” on page 7-11. 		
4	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. <ul style="list-style-type: none"> ● Between battery and main switch. (Red–Red) ● Between main switch and fuse (ignition). (Brown/Blue–Brown/Blue) ● Between Fuse (ignition) and ECU. (Red/White–Red/White) 		

FUEL INJECTION SYSTEM

Fault code No.	47	Symptom	Sub-throttle position sensor-open or short circuit detected.	
Diagnostic code No.	56	Sub-throttle servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	When error code Nos. 47 and 48 are displayed simultaneously, first check and repair No.47.			
1	Installed condition of sub-throttle position sensor.		<ul style="list-style-type: none"> ● Check for looseness or pinching. ● Check that is installed in the specified position. 	Set the main switch to "ON".
2	Connections. <ul style="list-style-type: none"> ● Sub-throttle position sensor coupler ● Wire harness ECU coupler ● Sub-wire harness coupler 		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	
3	Open or short circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between sub-throttle position sensor coupler and ECU coupler. (Black/Blue-Black/Blue) (Gray/Black-Gray/Black) (Blue-Blue) 	
4	Installed condition of sub-throttle position sensor.		<ul style="list-style-type: none"> ● Execute the diagnostic mode. (Code No.56) ● Replace if defective. Refer to "CHECKING AND ADJUSTING THE SUB-THROTTLE POSITION SENSOR" on page 6-8.	

FUEL INJECTION SYSTEM

Fault code No.	48	Symptom	Sub-throttle servo motor is stuck.	
Diagnostic code No.	56	Sub-throttle servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
	When error code Nos. 47 and 48 are displayed simultaneously, first check and repair No.47.			
1	Connections. ● Sub-throttle position sensor coupler ● Wire harness ECU coupler ● Sub-wire harness coupler		● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely.	Set the main switch to "ON".
2	Open or short circuit in wire harness and/or sub-wire harness.		● Repair or replace if there is an open or short circuit. ● Between sub-throttle position sensor coupler and ECU coupler. (Yellow/Red–Yellow/Red) (Yellow/White–Yellow/White)	
3	Defective sub-throttle servo motor		● Execute the diagnostic mode. (Code No.56) ● When the abnormality is detected at diagnostic mode (Code No.56), inspect. Refer to "CHECKING THE SUB-THROTTLE SERVO MOTOR" on page 6-10.	

Fault code No.	50	Symptom	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	
Diagnostic code No.	—	—		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Malfunction in ECU.		Replace the ECU.	Set the main switch to "ON".

FUEL INJECTION SYSTEM

Fault code No.	Er-1	Symptom	No signals are received from the ECU.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. ● Wire harness ECU coupler		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● Repair or replace if there is an open or short circuit. 	Reinstated automatically when it receives a normal signal.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between meter coupler and ECU coupler (Yellow/Blue–Yellow/Blue) 	
3	Malfunction in meter unit.		Replace the meter unit.	
4	ECU is defective		Replace the ECU.	

Fault code No.	Er-2	Symptom	Not within the specified signal time from the ECU	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. ● Wire harness ECU coupler		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Reinstated automatically when it receives a normal signal.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between meter coupler and ECU coupler (Yellow/Blue–Yellow/Blue) 	
3	Malfunction in meter unit.		Replace the meter unit.	
4	Malfunction in ECU.		Replace the ECU.	

FUEL INJECTION SYSTEM

Fault code No.	Er-3	Symptom	Data from the ECU cannot be received correctly.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. ● Wire harness ECU coupler		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Reinstated automatically when it receives a normal signal.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between meter coupler and ECU coupler. (Yellow/Blue–Yellow/Blue) 	
3	Malfunction in meter unit.		Replace the meter unit.	
4	Malfunction in ECU.		Replace the ECU.	

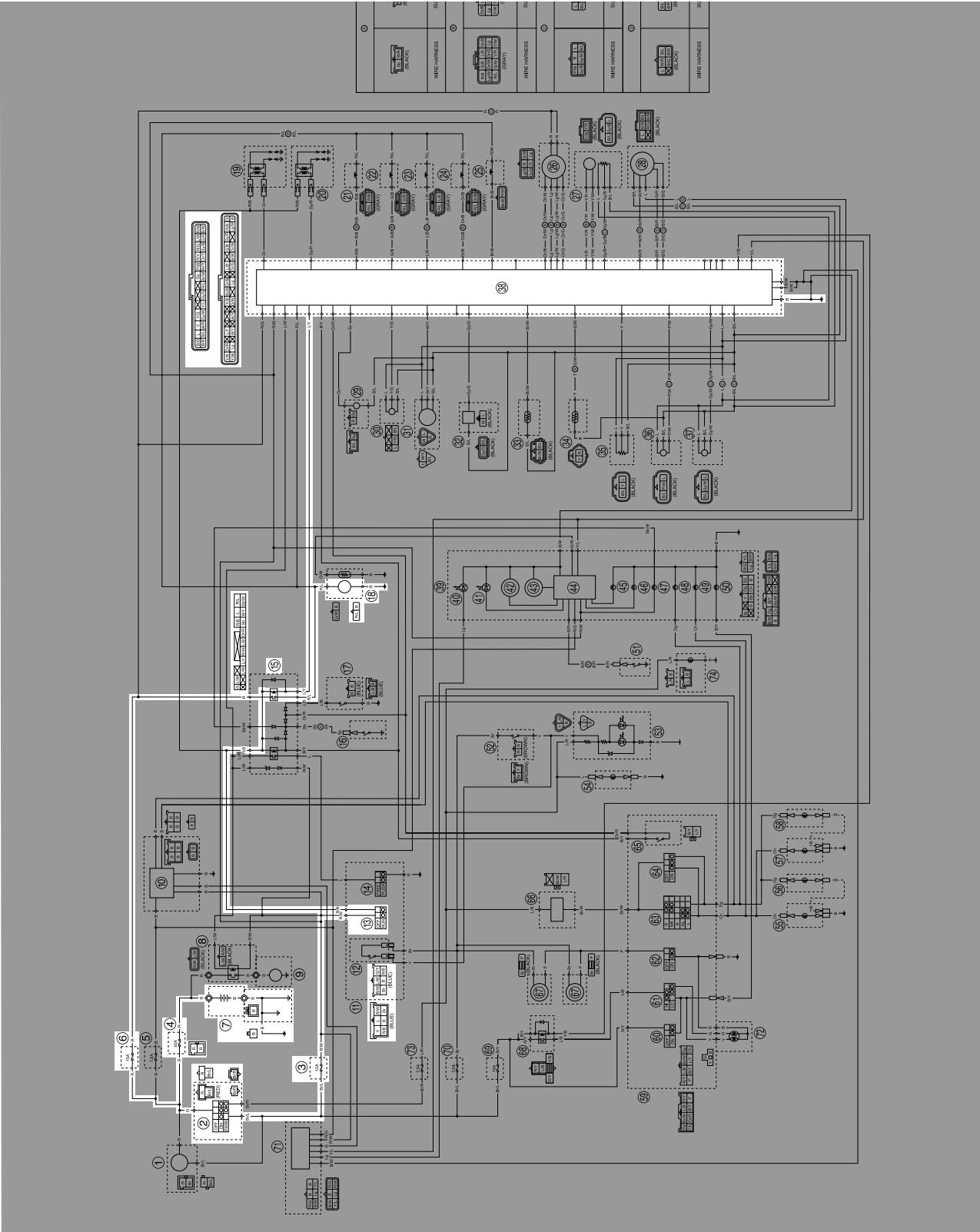
Fault code No.	Er-4	Symptom	Non-registered data has been received from the meter.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. ● Wire harness ECU coupler		<ul style="list-style-type: none"> ● Check the coupler for any pins that may have pulled out. ● Check the locking condition of the coupler. ● If there is a malfunction, repair it and connect it securely. 	Reinstated automatically when it receives a normal signal.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> ● Repair or replace if there is an open or short circuit. ● Between meter coupler and ECU coupler. (Yellow/Blue–Yellow/Blue) 	
3	Malfunction in meter unit.		Replace the meter unit.	
4	Malfunction in ECU.		Replace the ECU.	

EAS27580

FUEL PUMP SYSTEM

EAS27590

CIRCUIT DIAGRAM



FUEL PUMP SYSTEM

- 2. Main switch
- 3. Ignition fuse
- 4. Main fuse
- 5. EFI fuse
- 7. Battery
- 13. Engine stop switch
- 15. Relay unit
- 18. Fuel pump
- 38. ECU

FUEL PUMP SYSTEM

EAS27600

TROUBLE SHOOTING

The fuel pump fails to operate.

NOTE:

Before troubleshooting, remove the following part(s):

- 1.Seat
- 2.Side cover (right)
- 3.Headlight unit

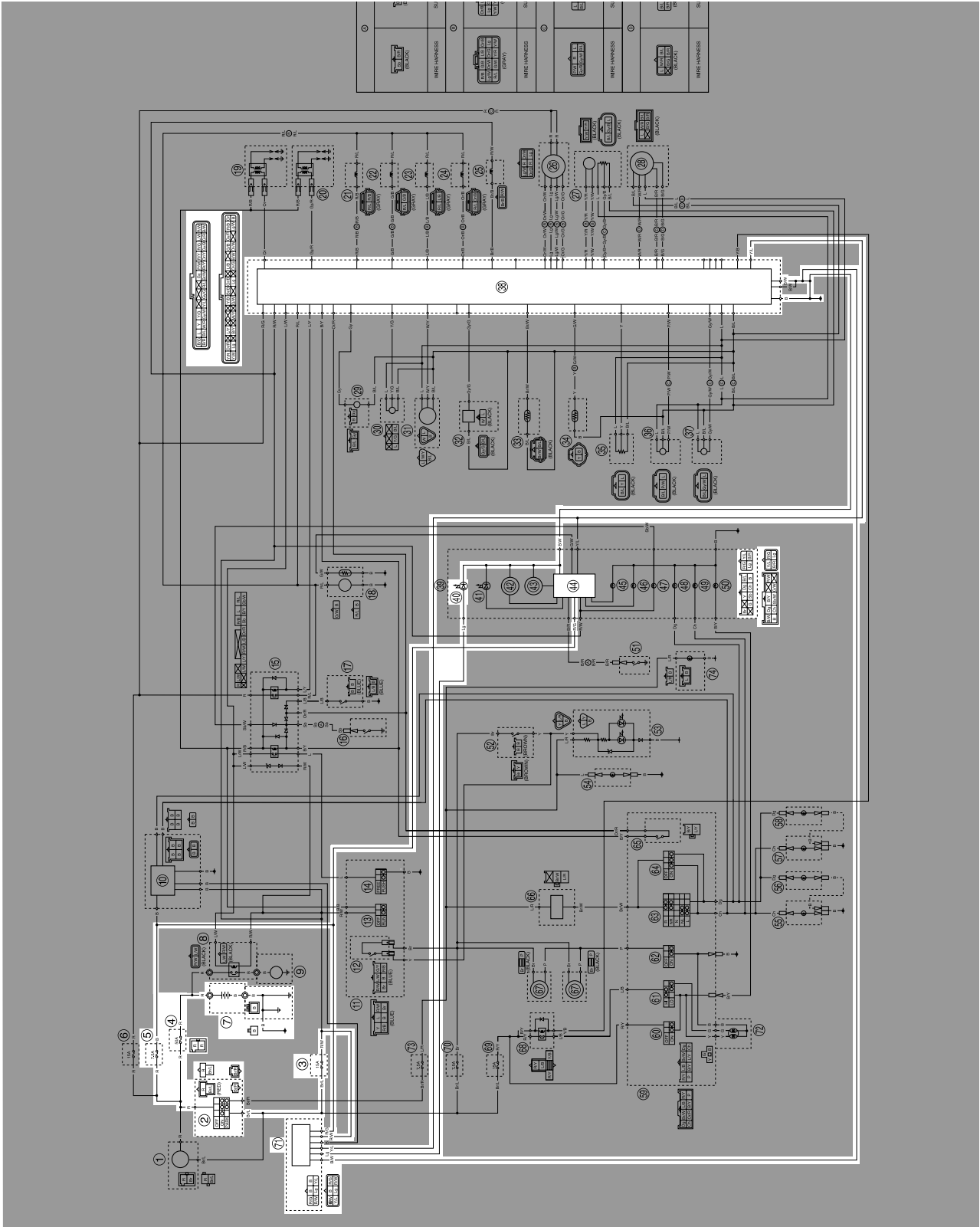
1. Check the fuse (Main fuse, ignition fuse, EFI fuse) Refer to "CHECKING THE FUSES" on page 7-86.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-87.	NG→	Clean the battery terminals. Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the main switch.
OK↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the right handlebar switch.
OK↓		
5. Check the relay unit (fuel pump relay). Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace relay unit (fuel pump relay)
OK↓		
6. Check fuel pressure Refer to "CHECKING THE PRESSURE REGULATOR" on page 6-7.	NG→	Replace the fuel pump.
OK↓		
7. Check the fuel pump system wire harness connections. Refer to "CIRCUIT DIAGRAM" on page 7-65.	NG→	Properly connect or repair the fuel pump system's wiring.
OK↓		
Replace the ECU.		

EAS27640

IMMOBILIZER SYSTEM

EAS27650

CIRCUIT DIAGRAM



IMMOBILIZER SYSTEM

- 2. Main switch
- 3. Ignition fuse
- 4. Main fuse
- 5. Backup fuse
- 7. Battery
- 38. ECU
- 40. Immobilizer system warning light
- 44. Multi-function display
- 71. Immobilizer unit

EAS27671

GENERAL INFORMATION

This vehicle is equipped with an immobilizer system to help prevent theft by re-registering codes in the standard keys. This system consists of the following:

- a code re-registering key (with a red bow)
- two standard keys (with a black bow) that can be re-registered with new codes
- a transponder (installed in the red key bow)
- an immobilizer unit
- the ECU
- an immobilizer system indicator light

The key with the red bow is used to register codes in each standard key. Do not use the key with the red bow for driving. It should only be used for re-registering new codes in the standard keys. The immobilizer system cannot be operated with a new key until the key registered with a code. If you lose the code re-registering key, the ECU and main switch (equipped with the immobilizer unit) need to be replaced.

Therefore, always use a standard key for driving. (See caution below.)

NOTE:

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

ECA14971

CAUTION:

- **DO NOT LOSE THE CODE RE-REGISTERING KEY!** If the code re-registering key is lost, registering new codes in the standard keys is impossible. The standard keys can still be used to start the vehicle. However, if code re-registering is required (e.g., if a new standard key is made or all keys are lost) the entire immobilizer system must be replaced. Therefore, it is highly recommended to use either standard key for driving, and to keep the code re-registering key in a safe place.
 - Do not submerge the keys in water.
 - Do not expose the keys to excessively high temperatures.
 - Do not place the keys close to magnets (this includes, but is not limited to, products such as speakers, etc.).
 - Do not place heavy items on the keys.
 - Do not grind the keys or alter their shape.
 - Do not disassemble the key bows.
 - Do not put two keys of any immobilizer system on the same key ring.
 - Keep the standard keys as well as other immobilizer system keys away from the code re-registering key.
 - Keep other immobilizer system keys away from the main switch as they may cause signal interference.
-

EAS27691

PART REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS

In the course of use, you may encounter the following cases where replacement of parts and registration of code re-registering/standard keys are required.

NOTE:

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

IMMOBILIZER SYSTEM

	Parts to be replaced					Key registration requirement
	Main switch/ immobilizer unit		Standard key	ECU	Accessory lock* and key	
	Main switch	Immobilize r unit				
Standard key is lost			√			New standard key
All keys have been lost (including code re-registering key)		√	√	√	√	Code re-registering key and standard keys
ECU is defective				√		Code re-registering key and standard keys
Immobilizer unit is defective		√				Code re-registering key and standard keys
Main switch is defective		√	√	√	√	Code re-registering key and standard keys
Accessory lock* is defective					√	Not required

* Accessory locks mean the seat lock and fuel tank cap.

Code re-registering key registration:

When the immobilizer unit or ECU is replaced, the code re-registering key must be registered to the unit.

To register a code re-registering key:

1. Turn the main switch to "ON" with the code re-registering key.

NOTE:

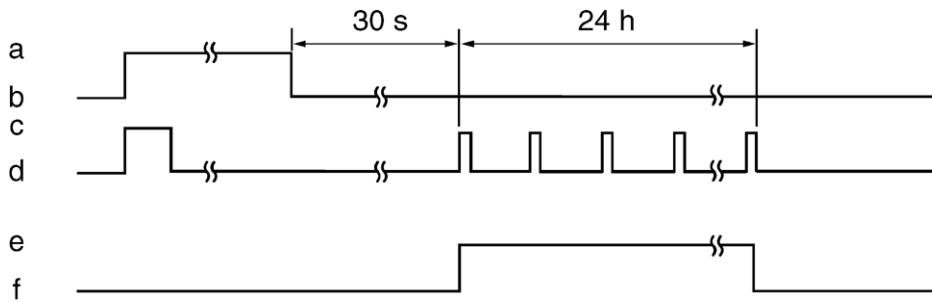
Check that the immobilizer system indicator light comes on for one second, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

2. Check that the engine can be started.
3. Register the standard key, following the instructions in the section below.

Standby mode:

To enable the immobilizer system, turn the ignition key to "OFF". 30 seconds later, the indicator light will start flashing continuously in the standby flashing mode pattern for up to 24 hours. After that time, the indicator light will stop flashing, but the immobilizer system is still enabled.

Standby mode:



- a. Main switch "ON".
- b. Main switch "OFF".
- c. LED lights

- d. LED goes off
- e. Standby mode ON
- f. Standby mode OFF

Standard key registration:

Standard key registration is required when a standard key is lost and needs to be replaced, or when the code re-registering key is re-registered after the immobilizer unit or ECU are replaced.

NOTE:

Do not start the engine with a standard key that has not been registered. If the main switch is turned "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate fault code "52". (Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 7-76).

1. Check that the immobilizer system indicator light signals the standby mode.
2. Using the code re-registering key, turn the main switch to "ON", then "OFF", and then remove the key within 5 seconds.
3. Insert the first standard key to be registered into the main switch, then turn the key to "ON" within 5 seconds to activate the key registration mode.

NOTE:

The existing standard key code is erased from the memory when the key registration mode is activated. When the key registration mode is activated, the immobilizer system indicator light flashes rapidly.

4. While the indicator light is flashing, turn the main switch to "OFF", remove the key, and within 5 seconds, insert the second standard key to be registered into the main switch.

NOTE:

If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, and steps 2 to 4 need to be repeated to register both standard keys.

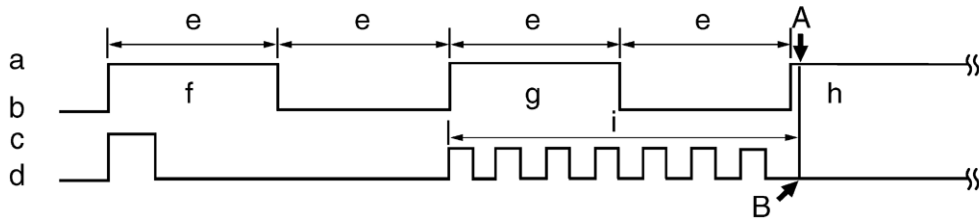
5. Turn the main switch to "ON".

NOTE:

When the indicator light goes off, the registration is complete.

6. Check that the engine can be started with the two registered standard keys.

Standard key registration

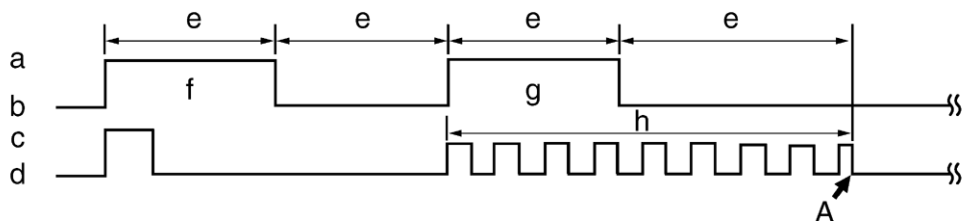


- a. Main switch "ON".
- b. Main switch "OFF".
- c. LED lights
- d. LED goes off
- e. Within 5 seconds
- f. Code re-registering key
- g. Standard key (1st)
- h. Standard key (2nd)
- i. Registration mode
- A. Standard key (2nd) registration complete
- B. When the 2nd standard key registration is completed, immobilizer light stops flashing.

Voiding the standard key code:

If a standard key has been lost, it is possible to disable its use by re-registering the remaining standard key. Standard key registration erases the stored standard key code from the memory, thus disabling the lost standard key. To re-register, refer to "Standard key registration".

Standard key code voiding method



- a. Main switch "ON".
- b. Main switch "OFF".
- c. LED lights
- d. LED goes off
- e. Within 5 seconds
- f. Code re-registering key
- g. Remaining standard key
- h. Registration mode
- A. After five seconds has elapsed since registration of the 1st standard key, when the immobilizer light stops flashing, registration of the 2nd key is not possible.

EAS27701

TROUBLE SHOOTING

When the main switch is turned "ON", the immobilizer system light goes on or flashes.

1. Check the fuse (Main, ignition and back up) Refer to "CHECKING THE FUSES" on page 7-86.	NG→	Replace the fuse.
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-87.	NG→	<ul style="list-style-type: none">● Clean the battery terminals.● Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-81.	NG→	Replace the main switch/immobilizer unit.
OK↓		
4. Check the entire immobilizer systems wiring. Refer to "CIRCUIT DIAGRAM" on page 7-69.	NG→	Properly connect or repair the immobilizer system's wiring.
OK↓		
<ul style="list-style-type: none">● Check the condition of the each immobilizer system's circuits.● Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 7-76.		

IMMOBILIZER SYSTEM

EAS27721

SELF-DIAGNOSIS FAULT CODE INDICATION

When a system failure occurs, the error code number is indicated in the LCD display of meter and the immobilizer system indicator light blinks at the same time. The pattern of blinking also shows the error code.

Fault code	Part	Symptom	Cause	Action
51	IMMOBILIZER UNIT	Code cannot be transmitted between the key and immobilizer unit.	<ul style="list-style-type: none"> ● Radio wave interference caused by objects around the keys and antennas. ● Immobilizer unit malfunction. ● Key malfunction. 	<ul style="list-style-type: none"> ● Keep magnets, metal objects, and other immobilizer system keys away from the keys and antennas. ● Replace the main switch/immobilizer unit. ● Replace the key.
52	IMMOBILIZER UNIT	Codes between the key and immobilizer unit do not match.	<ul style="list-style-type: none"> ● Signal received from other transponder (failed to recognize code after ten consecutive attempts). ● Signal received from unregistered standard key. 	<ul style="list-style-type: none"> ● Place the immobilizer unit at least 50 mm away from the transponder of other vehicles. ● Register the standard key.
53	IMMOBILIZER UNIT	Codes cannot be transmitted between the ECU and the immobilizer unit.	<ul style="list-style-type: none"> ● Noise interference or disconnected lead/cable. ● Interference due to radio wave noise. ● Disconnected communication harness. ● Immobilizer unit malfunction. ● ECU malfunction. 	<ul style="list-style-type: none"> ● Check the wire harness and connector. ● Replace the main switch/immobilizer unit. ● Replace the ECU.
54	IMMOBILIZER UNIT	Codes transmitted between the ECU and the immobilizer unit do not match.	<ul style="list-style-type: none"> ● Noise interference or disconnected lead/cable. ● Interference due to radio wave noise. ● Disconnected communication harness. ● Immobilizer unit malfunction. ● ECU failure. ● (The ECU or immobilizer unit was replaced with a used unit from another vehicle.) 	<ul style="list-style-type: none"> ● Register the code re-registering key. ● Check the wire harness and connector. ● Replace the main switch/immobilizer unit. ● Replace the ECU.

IMMOBILIZER SYSTEM

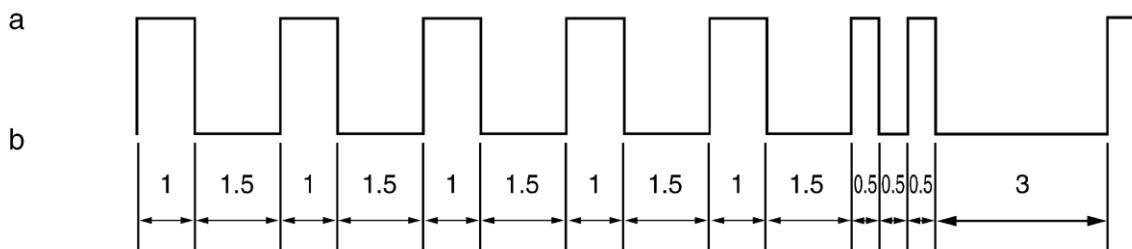
Fault code	Part	Symptom	Cause	Action
55	IMMOBILIZER UNIT	Key code registration malfunction.	Same standard key was attempted to be registered two consecutive times.	Register another standard key.
56	ECU	Undefinition code is received.	Noise interference or disconnected lead/cable.	<ul style="list-style-type: none"> ● Check the wire harness and connector. ● Replace the main switch/immobilizer unit. ● Replace the ECU.

Immobilizer system indicator light fault code indication

Digit of 10 : Cycles of 1 sec. ON and 1.5 sec. OFF.

Digit of 1 : Cycles of 0.5 sec. ON and 0.5 sec. OFF.

Example: fault code 52



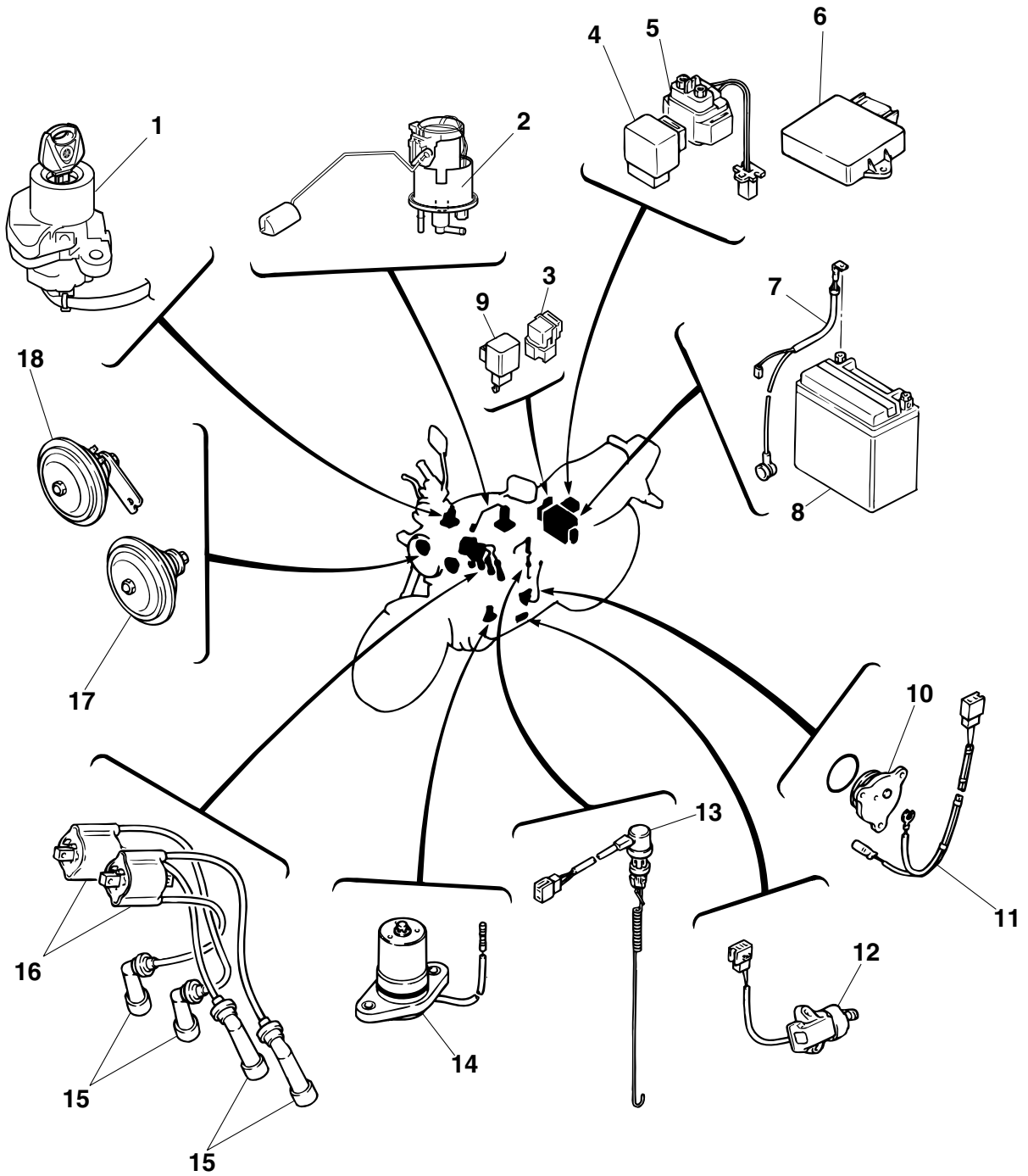
- a. Remains on
- b. Light goes off

ELECTRICAL COMPONENTS

EAS27970

ELECTRICAL COMPONENTS

EAS5UXB011



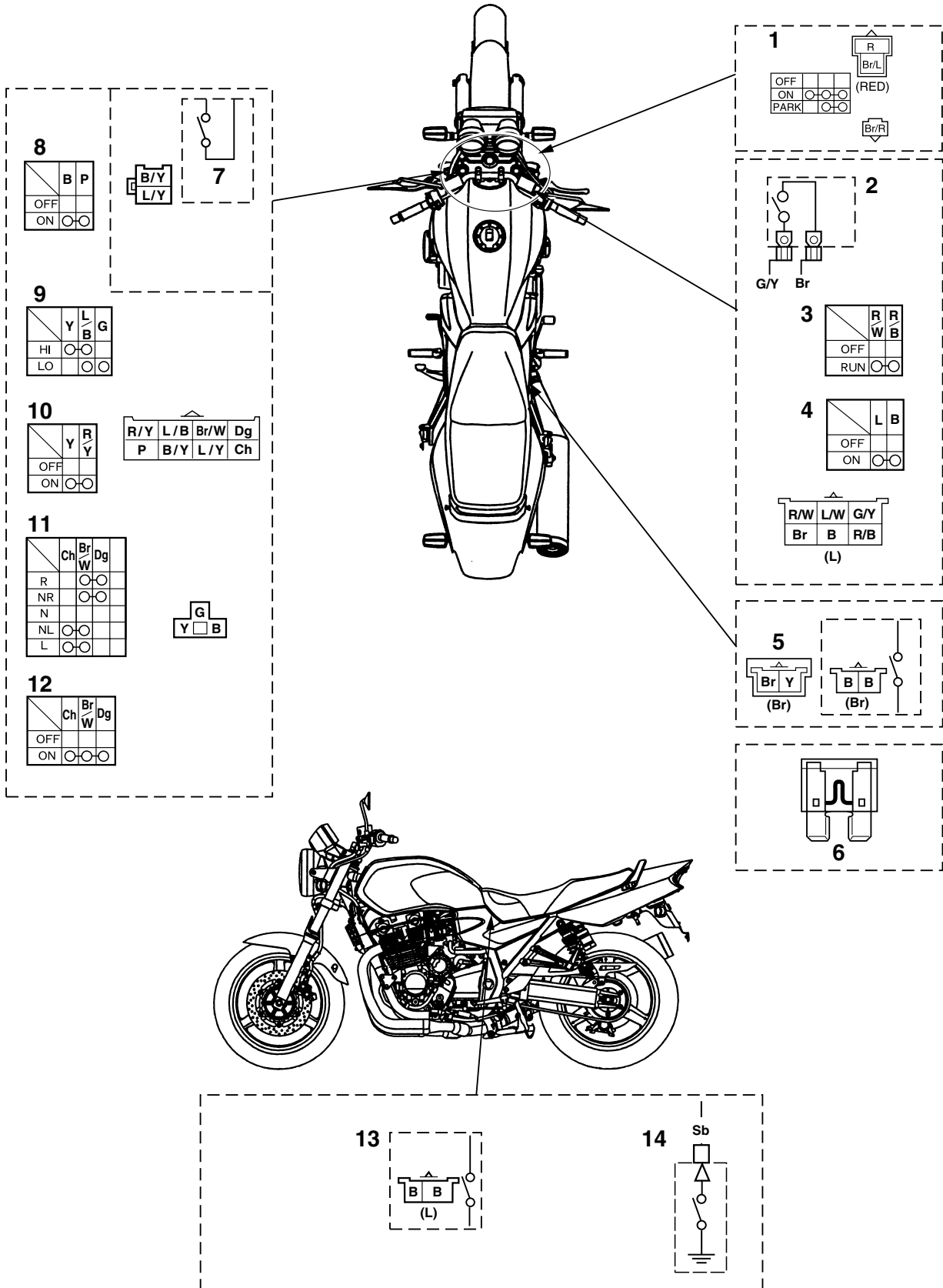
ELECTRICAL COMPONENTS

1. Main switch
2. Fuel pump
3. Headlight relay
4. Starting circuit cut-off relay
5. Starter relay
6. ECU
7. Negative battery lead
8. Battery
9. Turn signal relay
10. Neutral switch
11. Neutral switch lead
12. Sidestand switch
13. Rear brake switch
14. Oil level gauge
15. Spark plug cap
16. Ignition coil
17. Horn
18. Horn

ELECTRICAL COMPONENTS

EAS27980

CHECKING THE SWITCHES



ELECTRICAL COMPONENTS

1. Main switch
2. Front brake switch
3. Engine stop switch
4. Starter switch
5. Rear brake switch
6. Fuse
7. Clutch switch
8. Horn switch
9. Dimmer switch
10. Pass switch
11. Turn signal switch
12. Hazard switch
13. Sidestand switch
14. Neutral switch

ELECTRICAL COMPONENTS

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

ECA14370

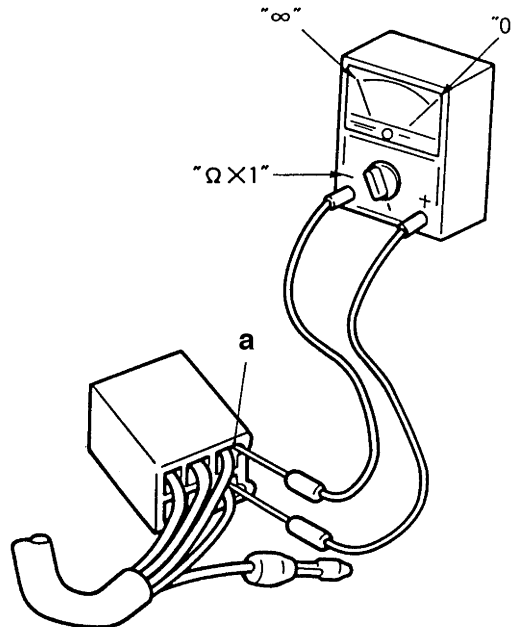
CAUTION:

Never insert the tester probes into the coupler terminal slots "a". Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



NOTE:

- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.



The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left.

The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row in the switch illustration.

NOTE:

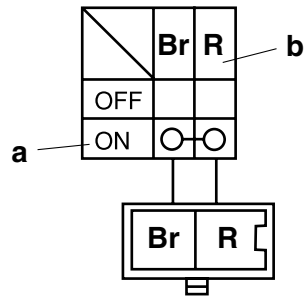
"○—○" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

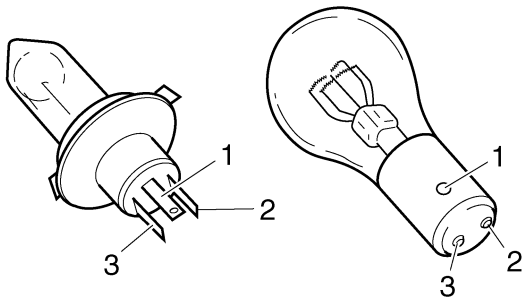
The example illustration on the left shows that:

There is continuity between black and black/white when the switch is set to "OFF".

There is continuity between red and brown when the switch is set to "ON".

ELECTRICAL COMPONENTS





Checking the condition of the bulb sockets

The following procedure applies to all of the bulb sockets.

1. Check:
 - Bulb socket (for continuity) (with the pocket tester)
 No continuity → Replace.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

NOTE: Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

- a. Install a good bulb into the bulb socket.
- b. Connect the pocket tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

EAS28000

CHECKING THE FUSES

The following procedure applies to all of the fuses.

ECA13680

CAUTION: To avoid a short circuit, always set the main switch to “OFF” when checking or replacing a fuse.

1. Remove:
 - SEAT
Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
 - Fuse

- a. Connect the pocket tester to the fuse and

check the continuity.

NOTE: Set the pocket tester selector to “Ω × 1”.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- b. If the pocket tester indicates “∞”, replace the fuse.

3. Replace:
 - Blown fuse

- a. Set the main switch to “OFF”.
- b. Install a new fuse of the correct amperage rating.
- c. Set on the switches to verify if the electrical circuit is operational.
- d. If the fuse immediately blows again, check the electrical circuit.

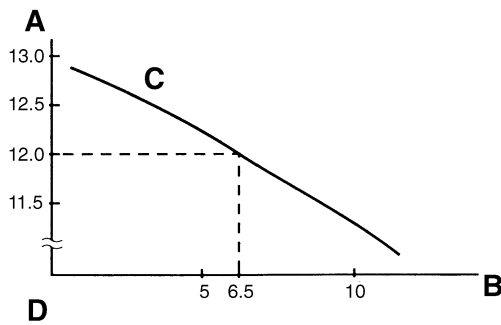
Fuses	Amperage rating	Q'ty
Main	50 A	1
Headlight	15 A	1
Taillight fuse	7.5 A	1
Signal	7.5 A	1
Ignition	15 A	1
Fuel injector	15 A	1
Backup	7.5 A	1
Reserve	15 A	1
Reserve	7.5 A	1

EWA5UXB004

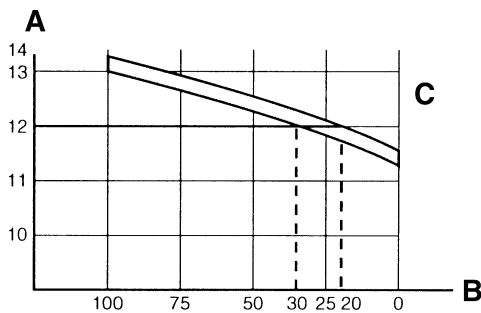


WARNING: Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, causing the lighting and ignition systems to malfunction and could possibly cause a fire.

ELECTRICAL COMPONENTS



- A. Open-circuit voltage (V)
- B. Charging time (hours)
- C. Relationship between the open-circuit voltage and the charging time at 20°C (68°F)
- D. These values vary with the temperature, the condition of the battery plates, and the electrolyte level.



- A. Open-circuit voltage (V)
- B. Charging condition of the battery (%)
- C. Ambient temperature 20°C (68°F)



- 5. Charge:
 - Battery (refer to the appropriate charging method illustration)

EWA13300



Do not quick charge a battery.

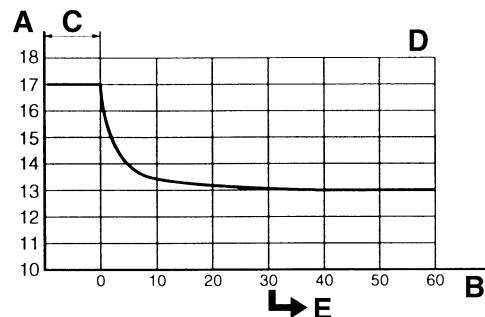
ECA13670

CAUTION:

- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the vehicle. (If charging has to

be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)

- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



- A. Open-circuit voltage (V)
- B. Time (minutes)
- C. Charging
- D. Ambient temperature 20°C (68°F)
- E. Check the open-circuit voltage.

Charging method using a variable-current (voltage) charger

- a. Measure the open-circuit voltage prior to charging.

NOTE:

Voltage should be measured 30 minutes after the machine is stopped.

- b. Connect a charged and AMP meter to the battery and start charging.

ELECTRICAL COMPONENTS

NOTE: _____

Set the charging voltage at 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

- c. Make sure that the current is higher than the standard charging current written on the battery.

NOTE: _____

If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

**Reach the standard charging current
Battery is good.
Does not reach the standard charging current
Replace the battery.**

- d. Adjust the voltage so that the current is at the standard charging level.
- e. Set the time according to the charging time suitable for the open-circuit voltage. Refer to “Battery condition checking steps”.
- f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.
- g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.



Charging method using a constant voltage charger

- a. Measure the open-circuit voltage prior to charging.

NOTE: _____

Voltage should be measured 30 minutes after the machine is stopped.

- b. Connect a charger and AMP meter to the battery and start charging.
- c. Make sure that the current is higher than the standard charging current written on the battery.

NOTE: _____

If the current is lower than the standard charging current written on the battery, This type of battery charger cannot charge the MF battery. A variable voltage charger is recommended.

- d. Charge the battery until the battery’s charging voltage is 15 V.

NOTE: _____

Set the charging time at 20 hours (maximum).

- e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

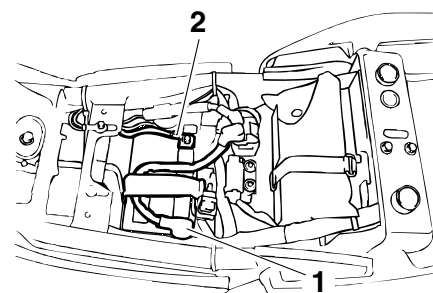


- 6. Check:
 - Battery terminals
Dirt → Clean with a wire brush.
Loose connection → Connect properly.
- 7. Install:
 - Battery
- 8. Connect:
 - Battery leads
(to the battery terminals)

ECA13630

CAUTION: _____

First, connect the positive battery lead “1”, and then the negative battery lead “2”.



- 9. Lubricate:
 - Battery terminals

**Recommended lubricant
Terminal grease**

- 10. Install:
 - SEAT
Refer to “GENERAL CHASSIS” on page 4-1.

ELECTRICAL COMPONENTS

EAS28040

CHECKING THE RELAYS

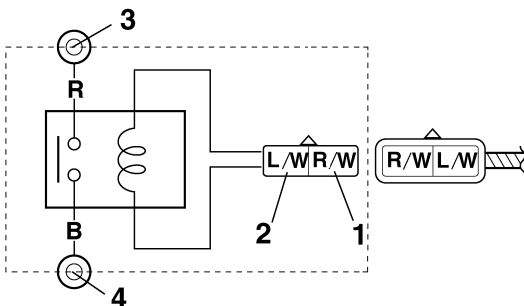
Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

1. Disconnect the relay from the wire harness.
2. Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the relay terminal as shown. Check the relay operation. Rough movement → Replace the defective part(s).

Starter relay

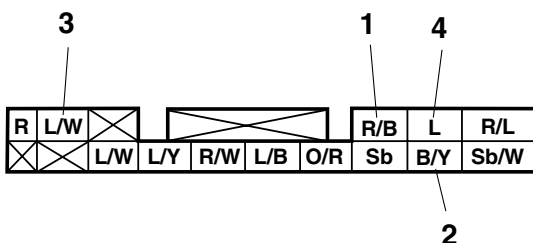


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

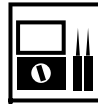


Result
Continuity (between “3” and “4”)

Relay unit (starting circuit cut-off relay)

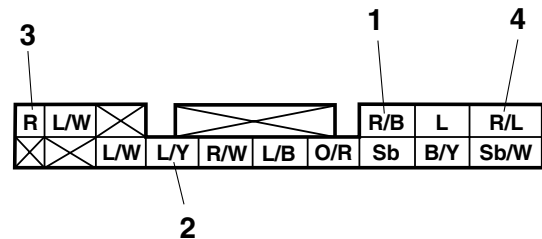


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

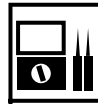


Result
Continuity (between “3” and “4”)

Relay unit (fuel pump)

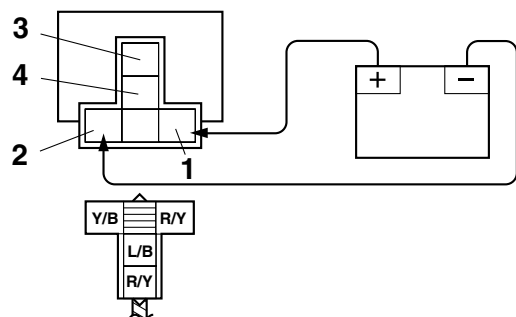


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

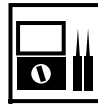


Result
Continuity (between “3” and “4”)

Headlight relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



Result
Continuity (between “3” and “4”)

EAS5UXB018

CHECKING THE TURN SIGNAL RELAY

1. Check:
 - Flasher relay input voltage
 Off specification → Repair wire harness connection failure from main switch to flasher relay coupler.



Continuity
Positive tester lead → Sky blue “1”
Negative tester lead → Sky blue/White “2”

No continuity
Positive tester lead → Sky blue/White “2”
Negative tester lead → Sky blue “1”

Continuity
Positive tester lead → Blue/Black “3”
Negative tester lead → Orange/Red “4”

No continuity
Positive tester lead → Orange/Red “4”
Negative tester lead → Blue/Black “3”

Continuity
Positive tester lead → Sky blue “1”
Negative tester lead → Orange/Red “4”

No continuity
Positive tester lead → Orange/Red “4”
Negative tester lead → Blue/Black “3”

Continuity
Positive tester lead → Sky blue “1”
Negative tester lead → Black/Yellow “5”

No continuity
Positive tester lead → Black/Yellow “5”
Negative tester lead → Sky blue “1”

Continuity
Positive tester lead → Red/Black “6”
Negative tester lead → Blue/Yellow “7”

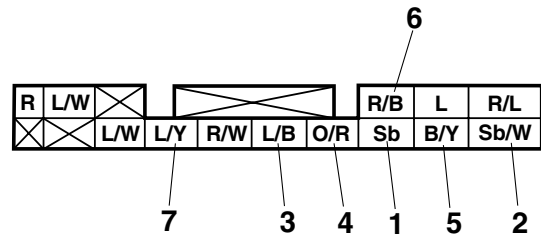
No continuity
Positive tester lead → Blue/Yellow “7”
Negative tester lead → Red/Black “6”

Continuity
Positive tester lead → Red/Black “6”
Negative tester lead → Black/Yellow “5”

No continuity
Positive tester lead → Black/Yellow “5”
Negative tester lead → Red/Black “6”



- Disconnect the starting circuit cut-off relay from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the relay unit coupler as shown.
- Check whether the diode for continuity.
- Check whether the diode for not continuity.



EAS28930

CHECKING THE IGNITION SPARK GAP

- Check:
 - Ignition spark gap
 Out of specification → Follow the ignition system troubleshooting procedure from step 5. Refer to “TROUBLE SHOOTING” on page 7-3.

	<p>Minimum ignition spark gap 6.0 mm (0.24 in)</p>
--	---

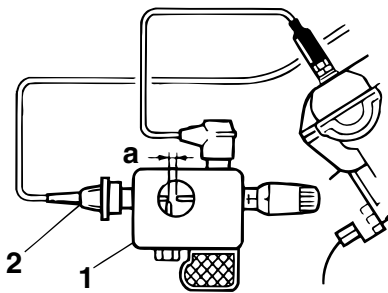
NOTE:

If the spark gap is within specification, the ignition system operates normally.



- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker/dynamic spark tester “1” as shown.

	<p>Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487</p>
--	--



18110202

1. Ignition checker
 2. Spark plug cap
- c. Turn the main switch to “ON” and set the engine stop switch to “○”.
- d. Measure the ignition spark gap “a”.
- e. Crank the engine by pushing the start switch gradually increase the spark gap until a mis-fire occurs.



EAS28070

CHECKING THE SPARK PLUG CAPS

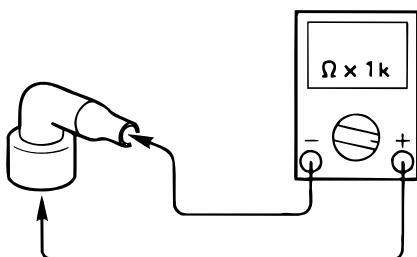
The following procedure applies to all of the spark plug caps.

1. Check:
 - Spark plug cap resistance
 Out of specification → Replace.

	Spark plug cap resistance 10.0 kΩ
--	---

- a. Remove the spark plug cap from the spark plug lead.
- b. Connect the pocket tester ($\Omega \times 1k$) to the spark plug cap as shown.

	Pocket tester 90890-03112 Analog pocket tester YU-03112-C
--	--



18040101

- c. Measure the spark plug cap resistance.



EAS28100

CHECKING THE IGNITION COIL

The following checking procedure applies to all of the ignition coils.

1. Check:
 - Primary coil resistance
 Out of specification → Replace.

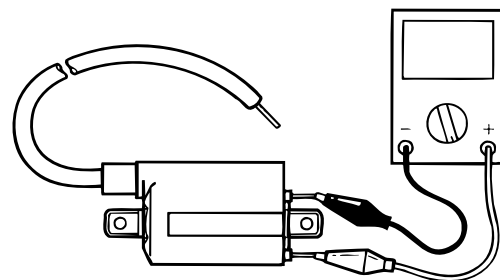
	Primary coil resistance 1.92–2.88 Ω
--	---



- a. Disconnect the ignition coil from wire harness.
- b. Connect the pocket tester ($\Omega \times 1$) to the ignition coil as shown.

	Pocket tester 90890-03112 Analog pocket tester YU-03112-C
--	--

Positive tester probe → Red/Black terminal
Negative tester probe → Orange (Gray/Red) terminal



18110104

- c. Measure the primary coil resistance.



2. Check:
 - Secondary coil resistance
 Out of specification → Replace.

	Secondary coil resistance 9.52–14.28 kΩ
--	---



- a. Disconnect the spark plug cap from the igni-

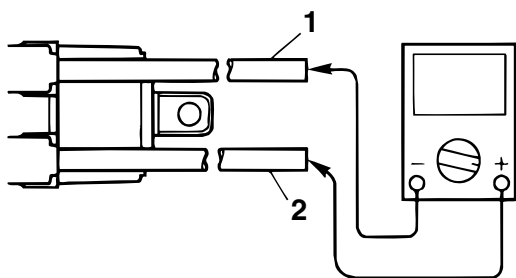
tion coil.

- b. Connect the pocket tester ($\Omega \times 1k$) to the ignition coil as shown.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Negative tester probe →
High tension code "1"
Positive tester probe →
High tension code "2"



I8110102


- c. Measure the secondary coil resistance.



EAS28120

CHECKING THE CRANKSHAFT POSITION SENSOR


1. Disconnect:
 - Crankshaft position sensor coupler (from the wire harness)
2. Check:
 - Crankshaft position sensor resistance
Out of specification → Replace the crankshaft position sensor.



Crankshaft position sensor resistance
248–372 Ω

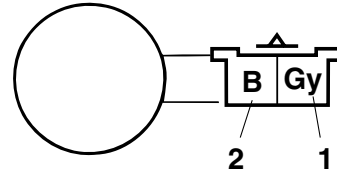


- a. Connect the pocket tester ($\Omega \times 100$) to the crankshaft position sensor coupler as shown.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Positive tester probe →
Gray "1"
Negative tester probe →
Black "2"




- b. Measure the crankshaft position sensor resistance.



EAS28130

CHECKING THE LEAN ANGLE SENSOR


1. Remove:
 - Lean angle sensor (from the bracket.)
2. Check:
 - Lean angle sensor output voltage
Out of specification → Replace.



Lean angle sensor output voltage
Less than 65° "a": 0.4 – 1.4V
More than 65° "b": 3.7 – 4.4V

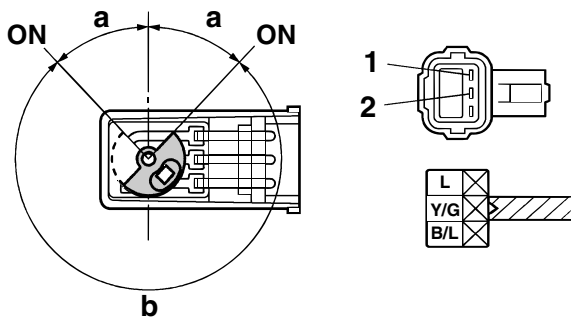


- a. Connect the lean angle sensor coupler to the wire harness.
- b. Connect the pocket tester (DC 20 V) to the lean angle sensor coupler as shown.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Positive tester probe →
Blue "1"
Negative tester probe →
Yellow/Green "2"



- c. Turn the lean angle sensor to 65°.
- d. Measure the lean angle sensor output voltage.

EAS28180

CHECKING THE HORN

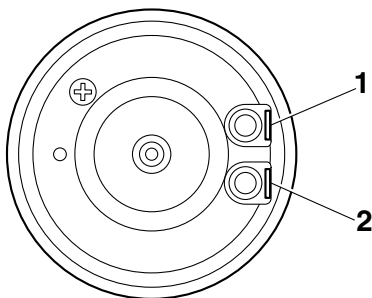
1. Check:
 - Horn resistance value
 Out of specification → Replace.

	Coil resistance 1.15–1.25 Ω
--	---------------------------------------

- a. Disconnect the horn leads from the horn terminal.
- b. Connect the pocket tester ($\Omega \times 1$) to the horn terminals.

	Pocket tester 90890-03132
--	-------------------------------------

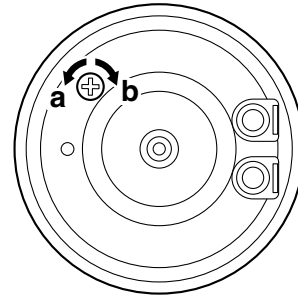
Positive tester probe →
Horn terminal "1"
Negative tester probe →
Horn terminal "2"



- c. Measure the horn resistance.

2. Check:
 - Horn sound
 Faulty sound → Adjust or replace.

- a. Connect a battery (12 V) to the horn.
- b. Turn the adjusting screw in direction "a" or "b" until the specified horn sound is obtained.



EAS28190

CHECKING THE ENGINE OIL LEVEL GAUGE

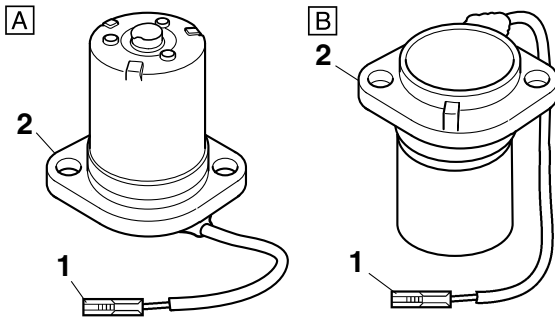
1. Drain:
 - Engine oil
2. Remove:
 - Engine oil level gauge (from the oil pan)
3. Check:
 - Oil level switch continuity
 Out of specification → Replace.

	Engine oil level gauge Minimum level position "A" No continuity Maximum level position "B" Continuity
--	--

- a. Connect the pocket tester ($\Omega \times 1$) to the engine oil level gauge terminals as shown.

	Pocket tester 90890-03112 Analog pocket tester YU-03112-C
--	--

Positive tester probe →
Connector "1"
Negative tester probe →
Body ground "2"



b. Measure the oil level gauge resistance.



EAS28210

CHECKING THE ENGINE TEMPERATURE SENSOR

1. Remove:
 - Engine temperature sensor (From intake manifold)

EWA14140



WARNING

- Handle the engine temperature sensor with special care.
- Never subject the engine temperature sensor to strong shocks. If the engine temperature sensor is dropped, replace it.

2. Check:
 - Engine temperature sensor resistance
Out of specification → Replace.



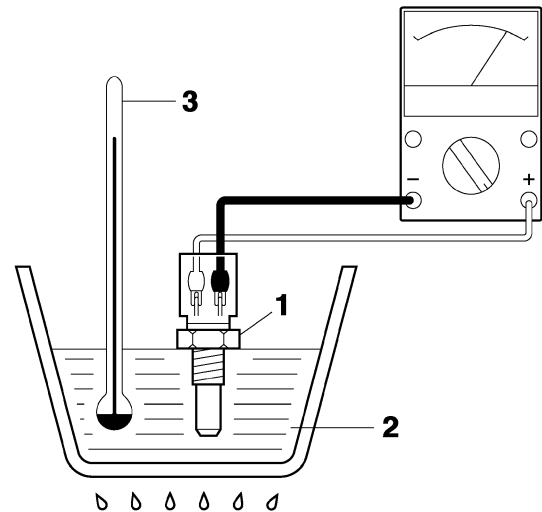
Engine temperature sensor resistance
 9–11 kΩ (25°C)
 0.898–1.098 kΩ (100°C)



- a. Connect the pocket tester ($\Omega \times 1k$) to the engine temperature sensor terminal “1” as shown.



Pocket tester
 90890-03112
Analog pocket tester
 YU-03112-C



- b. Immerse the engine temperature sensor in a container filled with coolant “2”.

NOTE:

Make sure that the engine temperature sensor terminals do not get wet.

- c. Place a thermometer “3” in the water.
- d. Slowly heat the water, then let it cool down to the specified temperature.
- e. Measure the engine temperature sensor resistance.



3. Install:
 - Engine temperature sensor

EAS28240

CHECKING THE SPEED SENSOR

1. Check:
 - Speed sensor output voltage
Out of specification → Replace.



Output voltage reading cycle
 0 V–5 V–0 V–5 V–0 V

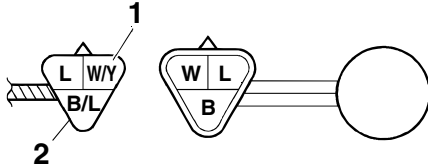


- a. Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.



Pocket tester
 90890-03112
Analog pocket tester
 YU-03112-C

Positive tester probe →
White/Yellow “1”
Negative tester probe →
Black/blue “2”



- b. Set the main switch to “ON”.
- c. Elevate the rear wheel and slowly rotate it.
- d. Measure the voltage (5 V) of White and Black/Blue. With the rear wheel slowly rotating, voltage alternates between 0 V and 5 V.



EAS28300

CHECKING THE THROTTLE POSITION SENSOR

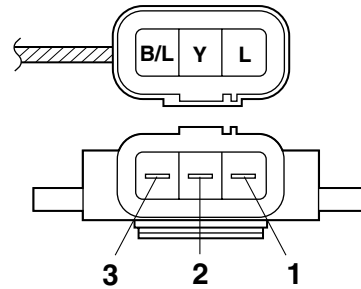
1. Remove:
 - Throttle position sensor (from the throttle body)
2. Check:
 - Throttle position sensor



- a. Connect the pocket tester to the throttle position sensor as shown.

	<p>Pocket tester 90890-03112 Analog pocket tester YU-03112-C</p>
--	--

Positive tester probe →
Blue “1”
Negative tester probe →
Black/Blue “3”



- b. Check the throttle position sensor resistance. Out of specification → Replace the throttle position sensor.

	<p>Resistance 4.0–6.0 kΩ</p>
--	---



EAS5UXB012

CHECKING THE FUEL SENDER

1. Disconnect:
 - Fuel pump coupler
 - Fuel sender coupler
2. Remove:
 - Fuel tank
3. Remove:
 - Fuel pump
4. Check:
 - Fuel sender resistance
 Out of specification → Replace the fuel pump.

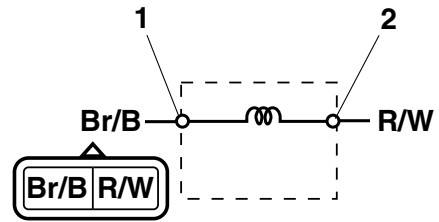
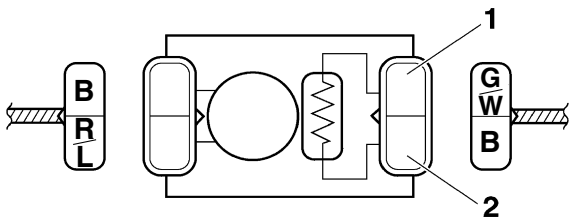
	<p>Fuel sender resistance Full 19.0–21.0Ω Empty 139.0–141.0Ω</p>
--	---



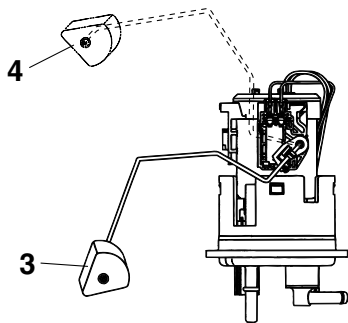
- a. Connect the pocket tester ($\Omega \times 10$) to the terminals of the fuel sender.

	<p>Pocket tester 90890-03112 Analog pocket tester YU-03112-C</p>
--	--

Positive tester probe →
Green/white “1”
Negative tester probe →
Black “2”



b. Move the fuel sender float to the empty “3” and full “4” positions.



c. Measure the fuel sender resistances.

c. Measure the AI system solenoid resistance.



EAS28410

CHECKING INTAKE AIR PRESSURE SENSORS 1 AND 2

1. Check:

- Intake air pressure sensor output voltage
Out of specification → Replace.

	Intake air pressure sensor output voltage 3.75–4.25V
--	--



a. Connect the pocket tester (DC 20 V) to the intake air pressure sensor coupler (wire harness side) as shown.

	Pocket tester 90890-03112 Analog pocket tester YU-03112-C
--	--

Intake air pressure sensor 1 Positive tester probe → Pink/White “1” Negative tester probe → black/blue “2”

Intake air pressure sensor 2 Positive tester probe → Gray/White “3” Negative tester probe → black/blue “4”

EAS28370

CHECKING THE AI SYSTEM SOLENOID

1. Check:

- AI system solenoid resistance
Out of specification → Replace.

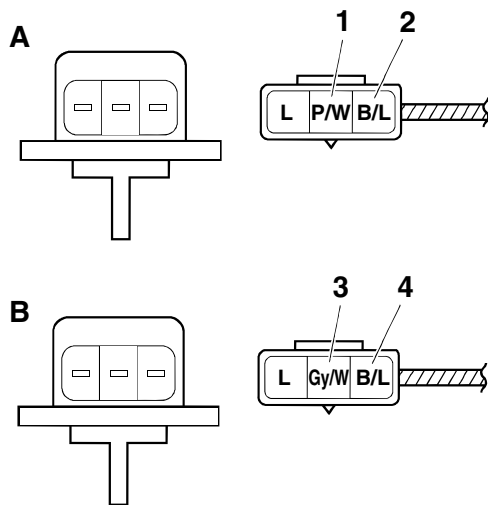
	Solenoid resistance 20.5–23.5Ω
--	--



- Remove the AI system solenoid coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the AI system solenoid terminal as shown.

	Pocket tester 90890-03112 Analog pocket tester YU-03112-C
--	--

Positive tester probe → Brown/Black “1” Negative tester probe → Red/White “2”
--

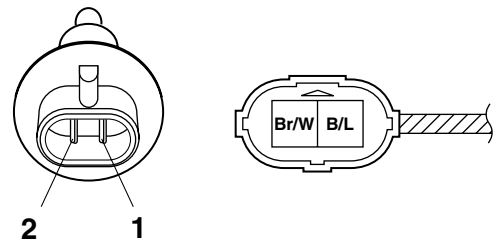


A. Intake air pressure sensor 1
B. Intake air pressure sensor 2

- b. Set the main switch to "ON".
- c. Measure the intake air pressure sensor output voltage.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Positive tester probe →
Brown/white "1"
Negative tester probe →
Black/blue "2"



- b. Measure the intake air temperature sensor resistance.



EAS28420

CHECKING THE INTAKE AIR TEMPERATURE SENSOR

1. Remove:
 - Intake air temperature sensor
(From headlight stay)

EWA14110

WARNING

- **Handle the intake air temperature sensor with special care.**
- **Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.**

2. Check:
 - Intake air temperature sensor resistance
Out of specification → Replace.

Intake air temperature sensor resistance
5.4 – 6.6kΩ (0°C)
0.29 – 0.39kΩ (80°C)



- a. Connect the pocket tester ($\Omega \times 1k$) to the intake air temperature sensor terminal as shown.

TROUBLESHOOTING

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FAULTY FRONT FORK LEGS	8-3
FAULTY LIGHTING OR SIGNALING SYSTEM	8-3

EAS28450

TROUBLESHOOTING

EAS28460

GENERAL INFORMATION

NOTE:

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS28470

STARTING FAILURES

Engine

1. Cylinder(s) and cylinder head(s)
 - Loose spark plug
 - Loose cylinder head or cylinder
 - Damaged cylinder head gasket
 - Damaged cylinder gasket
 - Worn or damaged cylinder
 - Incorrect valve clearance
 - Improperly sealed valve
 - Incorrect valve-to-valve-seat contact
 - Valve timing deviation
 - Faulty valve spring
 - Seized valve
2. Piston(s) and piston ring(s)
 - Improperly installed piston ring
 - Damaged, worn or fatigued piston ring
 - Seized piston ring
 - Seized or damaged piston
3. Air filter
 - Improperly installed air filter
 - Clogged air filter element
4. Crankcase and crankshaft
 - Improperly assembled crankcase
 - Seized crankshaft

Fuel system

1. Fuel tank
 - Empty fuel tank
 - Clogged fuel tank breather hose
 - Clogged rollover valve
 - Clogged rollover valve hose
 - Deteriorated or contaminated fuel
2. Fuel pump
 - Faulty fuel pump
3. Fuel hoses
 - Clogged or damaged fuel hose
4. Throttle bodies
 - Clogged pilot air passage

Electrical system

1. Battery

- Discharged battery
 - Faulty battery
2. Fuses
 - Blown, damaged or incorrect fuse
 - Improperly installed fuse
 3. Spark plug
 - Incorrect spark plug gap
 - Incorrect spark plug heat range
 - Fouled spark plug
 - Worn or damaged electrode
 - Insulator damage
 - Faulty spark plug cap
 4. Ignition coil
 - Cracked or broken ignition coil
 - Broken or shorted primary or secondary coils
 - Faulty spark plug lead
 5. Ignition system
 - Faulty ECU.
 - Faulty crankshaft position sensor
 - Broken generator rotor woodruff key
 6. Switches and wiring
 - Defective lean angle sensor
 - Faulty main switch
 - Faulty engine stop switch
 - Open or short circuit of lead or harness
 - Faulty neutral switch
 - Faulty start switch
 - Faulty sidestand switch
 - Faulty clutch switch
 - Improperly grounded circuit
 - Loose coupler and/or connector connections
 - Defective oil level gauge
 7. Starting system
 - Faulty starter motor
 - Faulty starter relay
 - Defective starting circuit cut-off relay
 - Faulty starter clutch

EAS28490

INCORRECT ENGINE IDLING SPEED

Engine

1. Cylinder(s) and cylinder head(s)
 - Incorrect valve clearance
 - Damaged valve train components
2. Air filter
 - Clogged air filter element

Fuel system

1. Throttle bodies
 - Air intake in throttle body joint
 - Defective throttle bodies synchronization
 - Improper throttle cable free play
 - Defective air induction system

Electrical system

1. Battery

- Discharged battery
- Faulty battery
- 2. Spark plug
 - Incorrect spark plug gap
 - Incorrect spark plug heat range
 - Fouled spark plug
 - Worn or damaged electrode
 - Insulator damage
 - Faulty spark plug cap
- 3. Ignition coil
 - Faulty spark plug lead
 - Cracked or broken ignition coil
- 4. IGNITION SYSTEM
 - Faulty ECU.
 - Faulty crankshaft position sensor

EAS28520

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURES” on page 8-1.

ENGINE

1. Air filter
 - Clogged air filter element

Fuel system

1. Fuel pump
 - Faulty fuel pump
2. Throttle bodies
 - Defective throttle body
3. ECU
 - Faulty ECU.

EAS28530

FAULTY GEAR SHIFTING

Shifting is difficult

Refer to “Clutch drags”.

EAS28540

SHIFT PEDAL DOES NOT MOVE

Shift shaft

- Improperly adjusted shift rod
- Bent shift shaft.

Shift drum and shift forks

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission

- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

EAS28550

JUMPS OUT OF GEAR

Shift shaft

- Incorrect shift pedal position
- Improperly returned stopper lever

Shift forks

- Worn shift fork

Shift drum

- Incorrect axial play
- Worn shift drum groove

Transmission

- Worn gear dog

EAS28570

FAULTY CLUTCH

Clutch slips

1. Clutch
 - Improperly assembled clutch
 - Improperly assembled clutch master cylinder
 - Improperly assembled clutch release cylinder
 - Incorrect clutch fluid level
 - Damaged clutch hose
 - Loose or fatigued clutch spring
 - Loose union bolt
 - Worn friction plate
 - Worn clutch plate
 - Damaged clutch release cylinder
2. Engine oil
 - Incorrect oil level
 - Incorrect oil viscosity (low)
 - Deteriorated oil

Clutch drags

1. Clutch
 - Air in hydraulic clutch system
 - Unevenly tensioned clutch springs
 - Warped pressure plate
 - Bent clutch plate
 - Swollen friction plate
 - Bent clutch push rod
 - Damaged clutch boss
 - Burnt primary driven gear
 - Damaged clutch release cylinder
2. Engine oil
 - Incorrect oil level
 - Incorrect oil viscosity (high)
 - Deteriorated oil

EAS28590

OVERHEATING

Engine

1. Cylinder head(s) and piston(s)
 - Heavy carbon buildup
2. Engine oil
 - Incorrect oil level
 - Incorrect oil viscosity
 - Inferior oil quality

Fuel system

1. Throttle bodies
 - Air intake in throttle body joint

2. Air filter

- Clogged air filter element

Chassis

1. Brake

- Dragging brake

Electrical system

1. Spark plug

- Incorrect spark plug gap
- Incorrect spark plug heat range

2. Ignition system

- Faulty ECU.

EAS28620

POOR BRAKING PERFORMANCE

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Defective master cylinder kit
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EAS28660

FAULTY FRONT FORK LEGS

Leaking oil

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

Malfunction

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Slide metal wear, damage
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS28710

FAULTY LIGHTING OR SIGNALING SYSTEM

Headlight does not come on

- Fuse open circuit
- Wrong headlight bulb
- Too many electrical accessories
- Hard charging

- Incorrect connection
- Improperly grounded circuit
- Poor switch contacts (main switch)
- Burnt-out headlight bulb

Headlight bulb burnt out

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Headlight bulb life expired

Tail/brake light does not come on

- Fuse open circuit
- Too many electrical accessories
- Incorrect connection

Turn signal does not come on

- Fuse open circuit
- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

Turn signal blinks slowly

- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

Turn signal remains lit

- Faulty turn signal relay
- Burnt-out turn signal bulb

Turn signal blinks quickly

- Incorrect turn signal bulb
- Faulty turn signal relay
- Burnt-out turn signal bulb

Horn does not sound

- Fuse open circuit
- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

XJR1300(W) 2007 WIRING DIAGRAM

1. Generator
 2. Main switch
 3. Ignition fuse
 4. Main fuse
 5. Backup fuse
 6. EFI fuse
 7. Battery
 8. Starter relay
 9. Starter motor
 10. Alarm
 11. Right handlebar switch
 12. Front brake switch
 13. Engine stop switch
 14. Start switch
 15. Relay unit
 16. Neutral switch
 17. Sidestand switch
 18. Fuel pump
 19. Ignition coil (#1 and #4)
 20. Ignition coil (#2 and #3)
 21. Injector 1
 22. Injector 2
 23. Injector 3
 24. Injector 4
 25. AI solenoid
 26. ISC (idle speed control) valve
 27. Sub throttle servo motor
 28. EXUP servo motor
 29. Crankshaft position sensor
 30. Lean angle sensor
 31. Speed sensor
 32. O₂ sensor
 33. Intake air temperature sensor
 34. Engine temperature sensor
 35. Throttle position sensor
 36. Intake air pressure sensor 1
 37. Intake air pressure sensor 2
 38. ECU
 39. Meter
 40. Immobilizer system warning light
 41. Meter light
 42. Speedometer
 43. Tachometer
 44. Multi-function display
 45. Oil level warning light
 46. Engine trouble warning light
 47. Neutral indicator light
 48. Right turn signal indicator light

49. Left turn signal indicator light
 50. High beam indicator
 51. Oil level switch
 52. Rear brake switch
 53. Tail/brake light
 54. Licence light
 55. Front left turn signal light
 56. Front right turn signal light
 57. Rear left turn signal light
 58. Rear right turn signal light
 59. Left handlebar switch
 60. Pass switch
 61. Dimmer switch
 62. Horn switch
 63. Turn signal switch
 64. Hazard switch
 65. Clutch switch
 66. Turn signal relay
 67. Horn
 68. Headlight relay
 69. Headlight fuse
 70. Signal fuse
 71. Immobilizer unit
 72. Headlight
 73. Taillight fuse
 74. Auxiliary light

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
G/B	Green/Black
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/G	Gray/Green
Gy/R	Gray/Red
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
O/B	Orange/Black
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/B	White/Black
W/R	White/Red
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/R	Yellow/Red



YAMAHA MOTOR CO., LTD.
2500 SHINGAI IWATA SHIZUOKA JAPAN

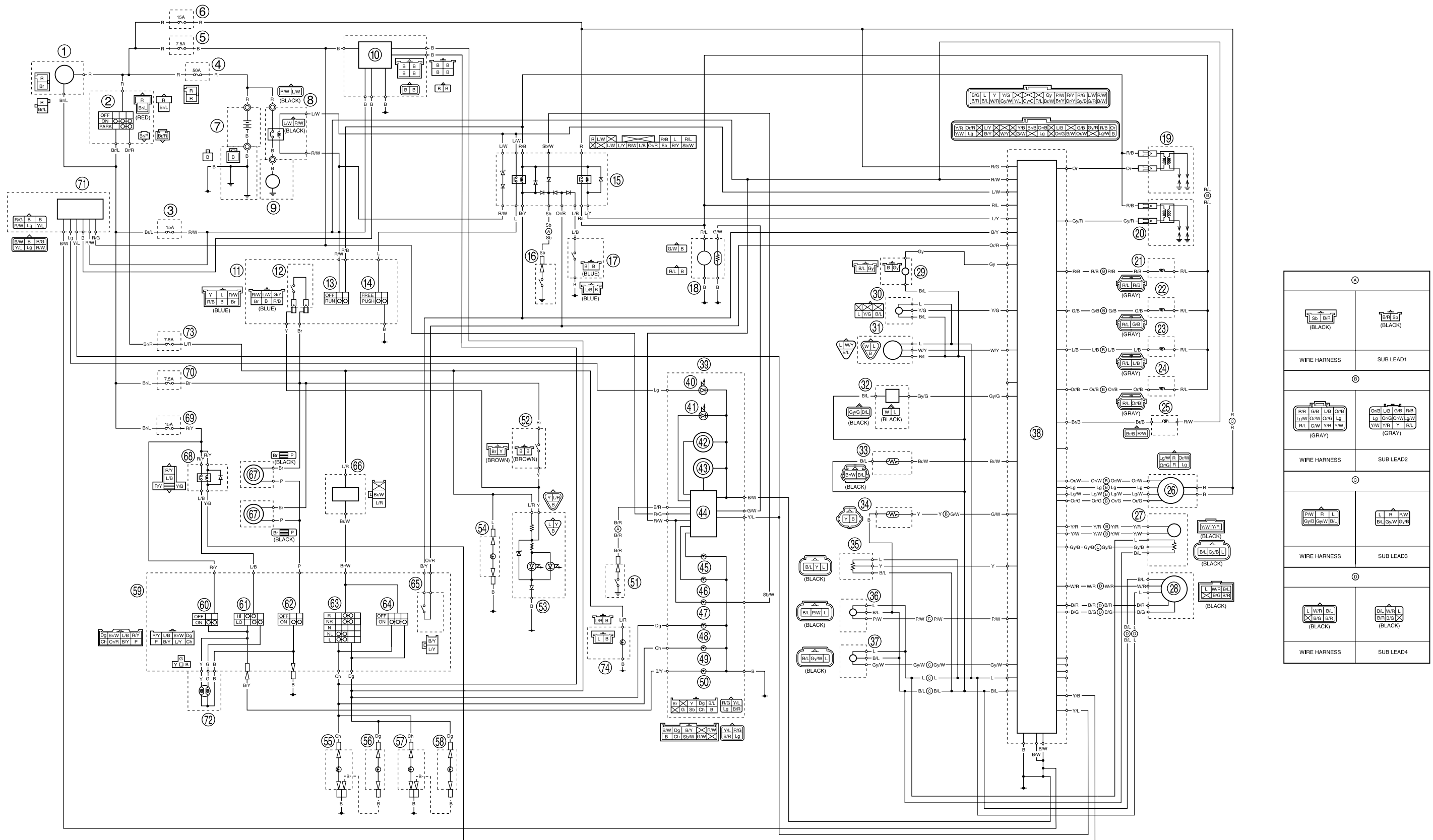
**XJR1300(W) 2007
WIRING DIAGRAM**

**XJR1300(W) 2007
SCHÉMA DE CÂBLAGE**

**XJR1300(W) 2007
SCHALTPLAN**

**SCHEMA ELETTRICO
XJR1300(W) 2007**

**DIAGRAMA ELÉCTRICO DE LA
XJR1300(W) 2007**



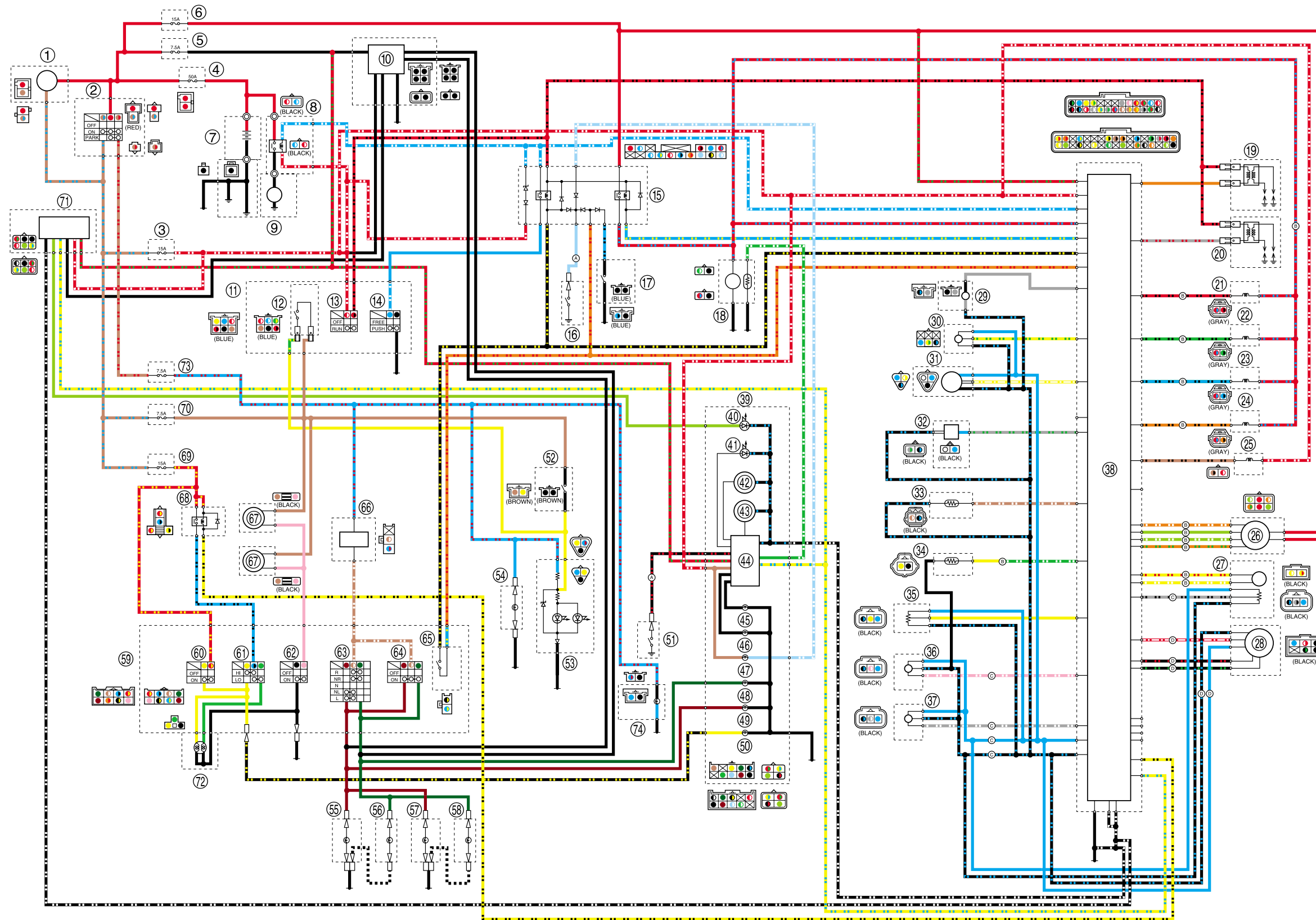
**XJR1300(W) 2007
WIRING DIAGRAM**

**XJR1300(W) 2007
SCHÉMA DE CÂBLAGE**

**XJR1300(W) 2007
SCHALTPLAN**

**SCHEMA ELETTRICO
XJR1300(W) 2007**

**DIAGRAMA ELÉCTRICO DE LA
XJR1300(W) 2007**



④	(BLACK)	(BLACK)
WIRE HARNESS	SUB LEAD1	
⑤	(GRAY)	(GRAY)
WIRE HARNESS	SUB LEAD2	
⑥	(BLACK)	(BLACK)
WIRE HARNESS	SUB LEAD3	
⑦	(BLACK)	(BLACK)
WIRE HARNESS	SUB LEAD4	