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YAMAHA MT-01 T 2005 SERVICE MANUAL

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YAMAHA 2005

MT-01(T)

SERVICE MANUAL

5YU1-AE1

EAS20040

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SERVICE MANUAL
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EAS20070

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.

EAS20080

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!
⚠ WARNING	Failure to follow WARNING instructions could result in severe injury or death to the motorcycle operator, a bystander or a person checking or repairing the motorcycle.
CAUTION:	A CAUTION indicates special precautions that must be taken to avoid damage to the motorcycle.
NOTE:	A NOTE provides key information to make procedures easier or clearer.

EAS20090

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

EAS20100

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. Wheel bearing grease
13. Lithium-soap-based grease
14. Molybdenum disulfide grease
15. Apply locking agent (LOCTITE®).
16. Replace the part with a new one.

EAS20110

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GEN INFO

1

GENERAL INFORMATION

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EAS20130
IDENTIFICATION

EAS20140
VEHICLE IDENTIFICATION NUMBER
The vehicle identification number “1” is stamped on the right side of the steering head pipe.

EAS20150
MODEL LABEL
The model label “1” is affixed to the lead holder under the seat. This information will be needed to order spare parts.

EAS20170
FEATURES

ET5YU1009
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. Air temperature sensor
2. Cylinder-#1 intake air pressure sensor
3. Cylinder-#2 intake air pressure sensor
4. Cylinder-#2 left ignition coil
5. Cylinder-#2 right ignition coil
6. Throttle position sensor
7. Intake solenoid
8. ISC (idle speed control) unit
9. Fuel pump
10. EXUP servo motor
11. Lean angle cut-off switch
12. Fuel pump relay
13. Muffler cooling fan motor relay
14. ECU (electronic control unit)
15. Relay unit (fuel pump relay)
16. Muffler cooling fan temperature sensor
17. Muffler cooling fan motor
18. Cylinder-#1 right ignition coil
19. Cylinder-#1 left ignition coil
20. Speed sensor
21. O_2 sensor
22. Spark plug
23. Decompression solenoid
24. Crankshaft position sensor
25. Injector #2
26. Injector #1
27. Engine temperature sensor

ET5YU1010

FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at only 392 kPa (3.92 kg/cm², 55.7 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

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, air temperature sensor, engine temperature sensor, speed sensor and O_2 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.

Illustration is for reference only.

1. Pressure regulator
2. Fuel pump
3. Fuel injector
4. Ignition coil
5. ECU (electronic control unit)
6. Air temperature sensor
7. ISC (idle speed control) unit
8. Throttle position sensor
9. O_2 sensor
10. Catalytic converter
11. Engine temperature sensor
12. Crankshaft position sensor
13. Intake air pressure sensor
14. Throttle body
15. Air filter case

A. Fuel system
B. Air system
C. Control system

ET5YU1011
INSTRUMENT FUNCTIONS

Multifunction display

EW5YU1005

WARNING

Be sure to stop the vehicle before making any setting changes to the multifunction display.

1. Clock
2. “RESET” button
3. Tachometer
4. “SELECT” button
5. Speedometer
6. Odometer/Tripmeter/Fuel reserve tripmeter

The multifunction display is equipped with the following:
- a speedometer (which shows the riding speed)
- a tachometer (which shows engine speed)
- an odometer (which shows the total distance traveled)
- two tripmeters (which show the distance traveled since they were last set to zero)
- a fuel reserve tripmeter (which shows the distance traveled since the fuel level warning light come on)
- a clock
- a self-diagnosis device
- a brightness control mode

NOTE:
- Be sure to turn the key to “ON” before using the “SELECT” and “RESET” buttons except for setting the brightness control.
- For the U.K. only: To switch the speedometer and odometer/tripmeter/fuel reserve tripmeter displays between kilometers and miles, press the “SELECT” button for at least two seconds.

Tachometer

1. Tachometer
2. Tachometer red zone

The electric tachometer allows the rider to monitor the engine speed and keep it within the ideal power range.
When the key is turned to “ON”, the tachometer needle will sweep once across the r/min range and then return to zero r/min in order to test the electrical circuit.

EC5YU1009

CAUTION:

Do not operate the engine in the tachometer red zone.
Red zone: 5500 r/min and above

The tachometer needle flashes when it reaches and exceeds the red zone.

Clock mode

1. Clock

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

Odometer and tripmeter modes

1. Odometer/Tripmeter/Fuel reserve tripmeter

Pushing the “SELECT” button switches the display between the odometer mode “ODO” and the tripmeter modes “TRIP 1” and “TRIP 2” in the following order:
ODO → TRIP 1 → TRIP 2 → ODO
If the fuel level warning light comes on, the odometer display will automatically change to the fuel reserve tripmeter mode “F-TRIP” and start counting the distance traveled from that point. In that case, pushing the “SELECT” button switches the display between the various tripmeter and odometer modes in the following order:
F-TRIP → TRIP 1 → TRIP 2 → ODO → F-TRIP
To reset a tripmeter, select it by pushing the “SELECT” button, and then push the “RESET” button for at least one second. 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).

Self-diagnosis device

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 multifunction display will indicate a two-digit error code (e.g., 12, 13, 14).
If the multifunction display indicates an error code, note the code number, and then check the vehicle. Refer to “FUEL INJECTION SYSTEM” on page 7-25.

EC5YU1010

CAUTION:

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

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 multifunction display will indicate a two-digit error code (e.g., 51, 52, 53) when the key is turned to “ON”.

NOTE:

If the multifunction display indicates error code 52, this could be caused by transponder interference. If this error 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 the standard keys.

If the multifunction display indicates an error code, note the code number, and then check the vehicle. Refer to “IMMOBILIZER SYSTEM” on page 7-75.

Brightness control mode

1. Tachometer panel
2. LCD

3. Tachometer needle

The brightness can be adjusted for the following:
• the tachometer panel (item number “1”)
• the LCD (item number “2”)
• the tachometer needle (item number “3”)
Select the brightness control mode as follows.
1. Turn the key to “OFF”.
2. Push and hold the “SELECT” button.
3. Turn the key to “ON”, and then release the “SELECT” button after five seconds.
   Item number “1” is displayed.

1. Tachometer panel
2. Item number
3. Brightness level

4. Adjust the tachometer panel brightness level by pushing the “RESET” button.
5. Push the “SELECT” button to select the LCD.
   Item number “2” is displayed.
   Adjust the LCD brightness level by pushing the “RESET” button.

1. LCD
2. Item number
3. Brightness level

6. Push the “SELECT” button to select the tachometer needle.
   Item number “3” is displayed.
   Adjust the tachometer needle brightness level by pushing the “RESET” button.

1. Tachometer needle
2. Item number
3. Brightness level

7. Push the “SELECT” button and the multi-function display will return to the odometer or tripmeter mode.

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 1-10.
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.

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.

EAS20200
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.

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.

1. Oil
2. Lip
3. Spring
4. 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.

EAS20230
BEARINGS AND OIL SEALS
Install bearings “1” and oil seals “2” so that the manufacturer’s marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

ECA13300
CAUTION:

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

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.

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.

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
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-9, 5-72, 7-91, 7-92, 7-93, 7-96, 7-97, 7-98, 7-99, 7-100, 7-101, 7-102, 7-103, 7-104, 7-106, 7-107, 7-108
Thickness gauge 90890-03079 Narrow gauge set YM-34483		3-4, 3-5, 5-56
Locknut wrench 90890-04150		3-5
Tappet adjusting tool 90890-04149		3-5
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	90890-03094 YU-44456 	3-6
Timing light 90890-03141 Inductive clamp timing light YU-03141		3-9

Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223		3-10
Extension 90890-04082		3-10
Oil filter wrench 90890-01426 YU-38411		3-12
Steering nut wrench 90890-01403 Spanner wrench YU-33975		3-26, 4-59
Vacuum/pressure pump gauge set 90890-06756		4-5, 6-9
Fork spring compressor 90890-01441 YM-01441		4-50, 4-55
Rod holder 90890-01434 Damper rod holder double ended YM-01434		4-50, 4-55
Damper rod holder 90890-01504		4-51, 4-52
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442		4-53

Tool name/Tool No.	Illustration	Reference pages
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703		4-53, 4-55
Rod puller attachment (M10) 90890-01436 Universal damping rod bleeding tool set YM-A8703		4-53, 4-55
Ring nut wrench 90890-01268 Spanner wrench YU-01268		4-59
Pivot shaft wrench 90890-01485 Frame mount insert wrench YM-01485		5-13
Valve spring compressor 90890-04019 YM-04019		5-35, 5-40
Valve guide remover (ø6) 90890-04064 Valve guide remover (6.0 mm) YM-04064-A		5-36
Valve guide installer (ø6) 90890-04065 Valve guide installer (6.0 mm) YM-04065-A		5-36

Tool name/Tool No.	Illustration	Reference pages
Valve guide reamer (ø6) 90890-04066 Valve guide reamer (6.0 mm) YM-04066		5-36
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304 YU-01304 	5-42
Universal clutch holder 90890-04086 YM-91042	90890-04086 YM-91042 	5-55, 5-58
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-55, 5-57, 5-68, 5-69, 5-77, 5-79
Yamaha bond No. 1215 90890-85505		5-57, 5-69, 5-78
Rotor puller 90890-01080 Stator rotor puller YM-01080-A	 	5-68
Pressure gauge 90890-03153		6-9

Tool name/Tool No.	Illustration	Reference pages
Fuel pressure adapter 90890-03176 YM-03176		6-9
Digital circuit tester 90890-03174		6-10
Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487		7-100

SPEC 2

SPECIFICATIONS

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EAS20280
GENERAL SPECIFICATIONS

Model	
Model	5YU1 (Europe) 5YU2 (AUS)
Dimensions	
Overall length	2185 mm (86.0 in)
Overall width	790 mm (31.1 in)
Overall height	1160 mm (45.7 in)
Seat height	825 mm (32.5 in)
Wheelbase	1525 mm (60.0 in)
Ground clearance	143 mm (5.63 in)
Minimum turning radius	3200 mm (126.0 in)
Weight	
With oil and fuel	259.0 kg (571 lb)
Maximum load	202 kg (445 lb)

EAS20290
ENGINE SPECIFICATIONS

Engine	
Engine type	Air cooled 4-stroke, OHV
Displacement	1670.0 cm^3 (101.90 cu.in)
Cylinder arrangement	V-type 2 cylinders
Bore × stroke	97.0 × 113.0 mm (3.82 × 4.45 in)
Compression ratio	8.40 :1
Standard compression pressure (at sea level)	1200 kPa/200 r/min (170.7 psi/200 r/min) (12.0 kgf/cm^2/200 r/min)
Minimum–maximum	1000–1400 kPa (142.2–199.1 psi) (10.0–14.0 kgf/cm^2)
Starting system	Electric starter
Fuel	
Recommended fuel	Regular unleaded gasoline only (Europe) Unleaded gasoline only (AUS)
Fuel tank capacity	15.0 L (3.96 US gal) (3.30 Imp.gal)
Fuel reserve amount	3.0 L (0.79 US gal) (0.66 Imp.gal)
Engine oil	
Lubrication system	Dry sump
Type	SAE20W40
Recommended engine oil grade	API standard: SE or higher grade ACEA standard: G4 or G5
Engine oil quantity	
Total amount	5.00 L (5.29 US qt) (4.40 Imp.qt)
Engine	2.2 L (2.33 US qt) (1.94 Imp.qt)
Oil tank	2.8 L (2.96 US qt) (2.46 Imp.qt)
Without oil filter cartridge replacement	3.70 L (3.91 US qt) (3.26 Imp.qt)
With oil filter cartridge replacement	4.10 L (4.33 US qt) (3.61 Imp.qt)
Oil filter	
Oil filter type	Cartridge (paper)
Oil pump	
Oil pump type	Trochoid
Inner-rotor-to-outer-rotor-tip clearance	0.12 mm (0.0047 in) or less
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.09–0.15 mm (0.0035–0.0059 in)
Limit	0.220 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.03–0.08 mm (0.0012–0.0031 in)
Limit	0.150 mm (0.0059 in)
Bypass valve opening pressure	80–120 kPa (11.4–17.1 psi) (0.80–1.20 kgf/cm^2)
Relief valve operating pressure	60 kPa (8.53 psi) (0.60 kgf/cm^2)

Spark plug (s)	
Manufacturer/model	NGK/DPR7EA-9
Manufacturer/model	DENSO/X22EPR-U9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)
Cylinder head	
Volume	98.60–103.60 cm^3 (6.02–6.32 cu.in)
Warpage limit*	0.03 mm (0.0012 in)

Camshaft	
Drive system	Gear drive
Camshaft to crankcase clearance	0.050–0.084 mm (0.0020–0.0033 in)
Camshaft lobe dimensions	
Intake A	38.241–38.341 mm (1.5055–1.5095 in) (cylinder #1) 38.243–38.343 mm (1.5056–1.5096 in) (cylinder #2)
Limit	38.141 mm (1.5016 in) (cylinder #1) 38.143 mm (1.5017 in) (cylinder #2)
Intake B	31.950–32.050 mm (1.2579–1.2618 in)
Limit	31.850 mm (1.2539 in)
Exhaust A	38.236–38.336 mm (1.5054–1.5093 in)
Limit	38.136 mm (1.5014 in)
Exhaust B	31.950–32.050 mm (1.2579–1.2618 in)
Limit	31.850 mm (1.2539 in)

Rocker arm/rocker arm shaft	
Rocker arm inside diameter	18.000–18.018 mm (0.7087–0.7094 in)
Limit	18.036 mm (0.7101 in)
Rocker arm shaft outside diameter	17.976–17.991 mm (0.7077–0.7083 in)
Rocker-arm-to-rocker-arm-shaft clearance	0.009–0.042 mm (0.0004–0.0017 in)
Limit	0.080 mm (0.0032 in)

Valve, valve seat, valve guide

Valve clearance (cold)	
Intake	0.00–0.04 mm (0.0000–0.0016 in)
Exhaust	0.00–0.04 mm (0.0000–0.0016 in)
Valve dimensions	
Valve head diameter A (intake)	33.90–34.10 mm (1.3346–1.3425 in)
Valve head diameter A (exhaust)	27.90–28.10 mm (1.0984–1.1063 in)

Valve face width B (intake)	1.300–2.300 mm (0.0512–0.0906 in)
Valve face width B (exhaust)	1.200–2.400 mm (0.0472–0.0945 in)

Valve seat width C (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	2.0 mm (0.08 in)
Valve seat width C (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	2.0 mm (0.08 in)

Valve margin thickness D (intake)	0.70–1.30 mm (0.0276–0.0512 in)
Limit	0.4 mm (0.02 in)
Valve margin thickness D (exhaust)	0.70–1.30 mm (0.0276–0.0512 in)
Limit	0.4 mm (0.02 in)

Valve stem diameter (intake)	5.975–5.990 mm (0.2352–0.2358 in)
Limit	5.945 mm (0.2341 in)
Valve stem diameter (exhaust)	5.960–5.975 mm (0.2346–0.2352 in)
Limit	5.930 mm (0.2335 in)
Valve guide inside diameter (intake)	6.000–6.012 mm (0.2362–0.2367 in)
Limit	6.050 mm (0.2382 in)
Valve guide inside diameter (exhaust)	6.000–6.012 mm (0.2362–0.2367 in)
Limit	6.050 mm (0.2382 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)

Valve spring

Inner spring	
Free length (intake)	38.26 mm (1.51 in)
Limit	36.26 mm (1.43 in)
Free length (exhaust)	38.26 mm (1.51 in)
Limit	36.26 mm (1.43 in)
Installed length (intake)	29.00 mm (1.14 in)
Installed length (exhaust)	29.00 mm (1.14 in)
Spring rate K1 (intake)	7.30 N/mm (41.68 lb/in) (0.74 kgf/mm)
Spring rate K2 (intake)	8.80 N/mm (50.25 lb/in) (0.90 kgf/mm)
Spring rate K1 (exhaust)	7.30 N/mm (41.68 lb/in) (0.74 kgf/mm)
Spring rate K2 (exhaust)	8.80 N/mm (50.25 lb/in) (0.90 kgf/mm)
Installed compression spring force (intake)	63.00–73.00 N (14.16–16.41 lb) (6.42–7.44 kgf)
Installed compression spring force (exhaust)	63.00–73.00 N (14.16–16.41 lb) (6.42–7.44 kgf)
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)	Counterclockwise
Winding direction (exhaust)	Counterclockwise
Outer spring	
Free length (intake)	43.25 mm (1.70 in)
Limit	41.26 mm (1.62 in)
Free length (exhaust)	43.25 mm (1.70 in)
Limit	41.26 mm (1.62 in)
Installed length (intake)	31.00 mm (1.22 in)
Installed length (exhaust)	31.00 mm (1.22 in)
Spring rate K1 (intake)	12.20 N/mm (69.66 lb/in) (1.24 kgf/mm)
Spring rate K2 (intake)	14.90 N/mm (85.08 lb/in) (1.52 kgf/mm)
Spring rate K1 (exhaust)	12.20 N/mm (69.66 lb/in) (1.24 kgf/mm)
Spring rate K2 (exhaust)	14.90 N/mm (85.08 lb/in) (1.52 kgf/mm)
Installed compression spring force (intake)	139.00–161.00 N (31.25–36.19 lb) (14.17–16.42 kgf)

Installed compression spring force (exhaust)	139.00–161.00 N (31.25–36.19 lb) (14.17–16.42 kgf)
Spring tilt (intake)	2.5°/1.9 mm (2.5°/0.075 in)
Spring tilt (exhaust)	2.5°/1.9 mm (2.5°/0.075 in)
Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise
Valve lifter	
Valve lifter outside diameter (intake)	22.962–22.974 mm (0.9040–0.9045 in)
Valve lifter outside diameter (exhaust)	22.962–22.974 mm (0.9040–0.9045 in)
Valve lifter hole inside diameter (intake)	23.000–23.021 mm (0.9055–0.9063 in)
Valve lifter hole inside diameter (exhaust)	23.000–23.021 mm (0.9055–0.9063 in)
Valve-lifter-to-valve-lifter-hole clearance	0.026–0.059 mm (0.0010–0.0023 in)
Valve push rod	
Valve push rod 1 length	288.5 mm (11.36 in)
Valve push rod 2 length	290.5 mm (11.44 in)
Valve push rod runout	0.3 mm (0.012 in)
Cylinder	
Bore	97.000–97.010 mm (3.8189–3.8193 in)
Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.050 mm (0.0020 in)
Piston	
Piston-to-cylinder clearance	0.025–0.050 mm (0.0010–0.0020 in)
Limit	0.15 mm (0.0059 in)
Diameter D	96.960–96.975 mm (3.8173–3.8179 in)
Height H	10.0 mm (0.39 in)

Offset	1.00 mm (0.0394 in)
Piston pin bore inside diameter	22.004–22.015 mm (0.8663–0.8667 in)
Limit	22.045 mm (0.8679 in)
Piston pin outside diameter	21.991–22.000 mm (0.8658–0.8661 in)
Limit	21.971 mm (0.8650 in)
Piston-pin-to-piston-pin-bore clearance	0.004–0.024 mm (0.00016–0.00094 in)
Limit	0.074 mm (0.00291 in)

Piston ring	
Top ring	
Ring type	Barrel
Dimensions (B × T)	1.20 × 3.80 mm (0.05 × 0.15 in)

End gap (installed)	0.30–0.50 mm (0.01–0.02 in)
Limit	0.70 mm (0.0276 in)
Ring side clearance	0.030–0.080 mm (0.0012–0.0032 in)
Limit	0.120 mm (0.0047 in)
2nd ring	
Ring type	Taper
Dimensions (B × T)	1.20 × 3.80 mm (0.05 × 0.15 in)

End gap (installed)	0.30–0.45 mm (0.01–0.02 in)
Limit	0.80 mm (0.0315 in)
Ring side clearance	0.030–0.070 mm (0.0012–0.0028 in)
Limit	0.12 mm (0.0047 in)
Oil ring	
Dimensions (B × T)	2.50 × 3.40 mm (0.10 × 0.13 in)

End gap (installed)	0.20–0.70 mm (0.01–0.03 in)

Connecting rod	
Oil clearance (using plastigauge®)	0.050–0.074 mm (0.0020–0.0029 in)
Bearing color code	1.Blue 2.Black 3.Brown 4.Green 5.Yellow

Crankshaft	
Width A	132.80–133.20 mm (5.23–5.24 in)
Runout limit C	0.040 mm (0.0016 in)
Big end side clearance D	0.320–0.474 mm (0.0126–0.0187 in)
Big end radial clearance E	0.037–0.074 mm (0.0015–0.0029 in)
Limit	0.09 mm (0.0035 in)

Journal oil clearance (using plastigauge®)	0.030–0.062 mm (0.0012–0.0024 in)
Limit	0.09 mm (0.0035 in)
Clutch	
Clutch type	Wet, multiple-disc
Clutch release method	Hydraulic inner push
Operation	Left hand operation
Clutch lever free play	2.7–15.9 mm (0.11–0.63 in)
Friction plate thickness	2.92–3.08 mm (0.11–0.12 in)
Wear limit	2.82 mm (0.1110 in)
Plate quantity	10 pcs
Clutch plate thickness	1.90–2.10 mm (0.07–0.08 in)
Plate quantity	9 pcs
Warpage limit	0.20 mm (0.0079 in)
Clutch spring free length	6.88 mm (0.27 in)
Minimum length	6.38 mm (0.25 in)
Spring quantity	1 pcs
Clutch housing thrust clearance	0.100–0.110 mm (0.0039–0.0043 in)
Clutch housing radial clearance	0.020–0.066 mm (0.0008–0.0026 in)
Transmission	
Transmission type	Constant mesh 5 speeds
Primary reduction system	Spur gear
Primary reduction ratio	71/48 (1.479)
Secondary reduction system	Chain drive
Secondary reduction ratio	39/17 (2.294)
Operation	Left foot operation
Gear ratio	
1st	38/16 (2.375)
2nd	30/19 (1.579)
3rd	29/25 (1.160)
4th	24/25 (0.960)
5th	24/30 (0.800)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)

Shifting mechanism	
Shift mechanism type	Guide bar
Shift fork guide bar bending limit	0.025 mm (0.0010 in)
Shift fork thickness	6.26–6.39 mm (0.2465–0.2516 in)
Air filter	
Air filter element	Oil-coated paper element
Fuel pump	
Pump type	Electrical
Model/manufacturer	5YU/DENSO
Maximum consumption amperage	4.6 A
Output pressure	392.0 kPa (56.8 psi) (3.92 kgf/cm²)
Fuel injection	
Model/quantity	INP-101/2
Manufacturer	NIPPON INJECTOR
Throttle body	
Type/quantity	AC40/2
Manufacturer	MIKUNI
ID mark	5YU1 00
Throttle valve size	#100
Throttle position sensor	
Resistance	4.0–6.0 kΩ/blue-black
Output voltage (at idle)	0.63–0.73 V
Fuel injection sensor	
Crankshaft position sensor resistance	248–372 Ω/gray-black
Intake pressure sensor output voltage	2.4 V
Engine temperature sensor resistance	0.90–1.10 kΩ at 100 °C (212 °F)
Idling condition	
Engine idling speed	850–950 r/min
Intake vacuum	26.6 kPa (7.9 inHg) (200 mmHg)
Oil temperature	80.0–90.0 °C (176.00–194.00 °F)
Throttle cable free play	3.0–5.0 mm (0.12–0.20 in)

EAS20300
CHASSIS SPECIFICATIONS

Chassis	
Frame type	Double cradle
Caster angle	25.00°
Trail	103.0 mm (4.06 in)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT3.50
Rim material	Aluminum
Wheel travel	120.0 mm (4.72 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Rear wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT6.00
Rim material	Aluminum
Wheel travel	117.0 mm (4.61 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Front tire	
Type	Tubeless
Size	120/70 ZR17 M/C (58W)
Manufacturer/model	METZELER/MEZ4J FRONT (Europe) MICHELIN/PILOT ROAD S (AUS)
Wear limit (front)	1.6 mm (0.06 in)
Rear tire	
Type	Tubeless
Size	190/50 ZR17 M/C (73W)
Manufacturer/model	METZELER/MEZ4 (Europe) MICHELIN/PILOT ROAD (AUS)
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/cm²) (2.50 bar)
Rear	290 kPa (42 psi) (2.90 kgf/cm²) (2.90 bar)
Loading condition	90–202 kg (198–445 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)

Front brake	
Type	Dual disc brake
Operation	Right hand operation
Front brake lever free play	7.0–19.0 mm (0.28–0.75 in)
Front disc brake	
Disc outside diameter × thickness	320.0 × 4.5 mm (12.60 × 0.18 in)
Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc deflection limit	0.10 mm (0.0039 in)
Brake pad lining thickness (inner)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	16.00 mm (0.63 in)
Caliper cylinder inside diameter	27.00 mm (1.06 in)
Caliper cylinder inside diameter	30.23 mm (1.19 in)
Recommended fluid	DOT 4

Rear brake	
Type	Single disc brake
Operation	Right foot operation
Brake pedal free play	7.9–19.0 mm (0.31–0.75 in)
Rear disc brake	
Disc outside diameter × thickness	267.0 × 6.0 mm (10.51 × 0.24 in)
Brake disc thickness limit	5.5 mm (0.22 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.5 mm (0.26 in)
Limit	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	6.5 mm (0.26 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	14.0 mm (0.55 in)
Caliper cylinder inside diameter	27.00 mm × 2 (1.06 in × 2)
Recommended fluid	DOT 4

Steering	
Steering bearing type	Angular bearing
Lock-to-lock angle (left)	33.0°
Lock-to-lock angle (right)	33.0°

Front suspension	
Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	120.0 mm (4.72 in)
Fork spring free length	251.0 mm (9.88 in)
Limit	246.0 mm (9.69 in)
Collar length	100.8 mm (3.97 in)
Installed length	235.0 mm (9.25 in)
Spring rate K1	9.30 N/mm (53.10 lb/in) (0.95 kgf/mm)
Spring stroke K1	0.0–120.0 mm (0.00–4.72 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
Quantity	583.0 cm^3 (19.71 US oz) (20.56 Imp.oz)
Level	65.0 mm (2.56 in)
Spring preload adjusting positions	
Minimum	0
Standard	2
Maximum	5
Rebound damping adjusting positions	
*With the adjusting screw fully turned in	
Minimum	17 click(s) out*
Standard	15 click(s) out*
Maximum	1 click(s) out*
Compression damping adjusting positions	
*With the adjusting screw fully turned in	
Minimum	16 click(s) out*
Standard	7 click(s) out*
Maximum	1 click(s) out*

Rear suspension	
Type	Swingarm (link suspension)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	50.0 mm (1.97 in)
Spring free length	159.5 mm (6.28 in)
Limit	156.0 mm (6.14 in)
Installed length	150.0 mm (5.91 in)
Spring rate K1	186.30 N/mm (1063.77 lb/in) (19.00 kgf/mm)
Spring stroke K1	0.0–50.0 mm (0.00–1.97 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1200 kPa (170.7 psi) (12.0 kgf/cm^2)
Spring preload adjusting positions	Installed spring length
Minimum	155.0 mm (6.10 in)
Standard	150.0 mm (5.91 in)
Maximum	145.0 mm (5.71 in)
Rebound damping adjusting positions	
*With the adjusting knob fully turned in	
Minimum	20 click(s) out*
Standard	12 click(s) out*
Maximum	3 click(s) out*
Compression damping adjusting positions	
*With the adjusting screw fully turned in	
Minimum	12 click(s) out*
Standard	10 click(s) out*
Maximum	1 click(s) out*
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	50VM3/DAIDO
Link quantity	114
Drive chain slack	40.0–50.0 mm (1.57–1.97 in)
15-link length limit	239.3 mm (9.42 in)

EAS20310
ELECTRICAL SPECIFICATIONS

Voltage	
System voltage	12 V
Ignition system	
Ignition system	Transistorized coil ignition (digital)
Advancer type	Electric
Ignition timing (B.T.D.C.)	10.0°/900 r/min
Engine control unit	
Model/manufacturer	F8T83071/MITSUBISHI
Ignition coil	
Model/manufacturer	2JN/MORIC
Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	2.16–2.64 Ω
Secondary coil resistance	8.64–12.96 kΩ
Spark plug cap	
Material	Resin
Resistance	10.0 kΩ
AC magneto	
Model/manufacturer	F5YU/MORIC
Standard output	14.0 V 430 W 5000 r/min
Stator coil resistance	0.1280–0.1920 Ω
Voltage regulator	
Rectifier/regulator	
Regulator type	Semi conductor-short circuit
Model/manufacturer	FH010AA/SHINDENGEN
No load regulated voltage	14.3–15.1 V
Rectifier capacity	50.0 A
Withstand voltage	40.0 V
Battery	
Model	GT14B-4
Voltage, capacity	12 V, 12.0 Ah
Specific gravity	1.32
Manufacturer	GS
Ten hour rate amperage	1.2 Ah
Headlight	
Bulb type	Halogen bulb

Bulb voltage, wattage × quantity	
Low beam headlight	12 V, 51.0 W × 1
High beam headlight	12 V, 55.0 W × 1
Auxiliary light	12 V, 5.0 W × 3
Tail/brake light	LED
Front turn signal light	12 V, 10.0 W × 2
Rear turn signal light	12 V, 10.0 W × 2
License plate light	12 V, 5.0 W × 1
Meter lighting	LED
Indicator light	
Neutral indicator light	LED
Turn signal indicator light	LED
High beam indicator light	LED
Fuel level warning light	LED
Engine trouble warning light	LED
Immobilizer system indicator light	LED
Electric starting system	
System type	Constant mesh
Starter motor	
Model/manufacturer	5YU/MORIC
Power output	0.90 kW
Armature coil resistance	0.0081–0.0099 Ω
Brush overall length	9.8 mm (0.39 in)
Limit	5.00 mm (0.20 in)
Brush spring force	7.36–11.04 N (26.49–39.74 oz) (750–1126 gf)
Commutator diameter	28.5 mm (1.12 in)
Limit	27.5 mm (1.08 in)
Mica undercut (depth)	1.50 mm (0.06 in)
Starter relay	
Model/manufacturer	2768093-A/JIDECO
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω
Horn	
Horn type	Plane
Quantity	1 pcs
Model/manufacturer	HF-12/NIKKO
Maximum amperage	3.0 A
Coil resistance	1.01–1.11 Ω at 20 °C (68 °F)
Performance	108–116 dB/2 m
Turn signal/hazard relay	
Relay type	Full transistor
Model/manufacturer	FE218BM/DENSO
Built-in, self-canceling device	No
Turn signal blinking frequency	75.0–95.0 cycles/min.
Wattage	10 W × 2.0 + 3.4 W

Starting circuit cut-off relay	
Model/manufacturer	G8R-30Y-U3/OMRON
Coil resistance	162–198 Ω
Headlight relay	
Model/manufacturer	ACM33211M05/MATSUSHITA
Coil resistance	86.40–105.60 Ω
Fuel pump relay	
Model/manufacturer	G8R-30Y-U3/OMRON
Coil resistance	162–198 Ω
Thermo unit	
Model/manufacturer	5PX/DENSO
Resistance at 100 °C	898.38–1098.02 Ω
Fuses	
Main fuse	50.0 A
Headlight fuse	15.0 A
Signaling system fuse	10.0 A
Ignition fuse	25.0 A
Parking lighting fuse	10.0 A
ECU fuse	10.0 A
Fuel injection system fuse	15.0 A
Backup fuse	10.0 A
Muffler cover fan fuse	15.0 A
Auto-decompression fuse	15.0 A
Reserve fuse	25.0 A
Reserve fuse	15.0 A
Reserve fuse	10.0 A

EAS20320
TIGHTENING TORQUES

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

EAS20340
ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Oil tank:				
Oil pipe bolt	M6	11	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Oil tank and oil tank bracket nut	M6	1	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Oil tank bolt	M6	2	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Oil tank and down tube bolt	M6	16	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Engine oil drain bolt (oil tank)	M14	1	35 Nm (3.5 m·kg, 25 ft·lb)	
Oil strainer cover bolt (oil tank)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil tank breather hose holder bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Muffler and exhaust pipe:				
Muffler bolt	M8	2	24 Nm (2.4 m·kg, 17 ft·lb)	
Front exhaust pipe and front exhaust pipe joint bolt	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Front exhaust pipe and rear exhaust pipe bolt	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Rear exhaust pipe and rear exhaust pipe joint bolt	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Rear exhaust pipe bolt	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Rear exhaust pipe and catalyst pipe bolt	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Catalyst pipe nut	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Catalyst pipe and muffler bolt	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Front exhaust pipe joint nut	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Rear exhaust pipe joint nut	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Rear exhaust pipe joint cover bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
EXUP valve pulley cover bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
O_2 sensor cover bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
O_2 sensor	M18	1	45 Nm (4.5 m·kg, 32 ft·lb)	
Locknut (EXUP cable)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Muffler cover bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Camshaft:				
Decompression solenoid cover bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Decompression solenoid bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Decompression solenoid lever bolt	M4	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Camshaft sprocket cover bolt	M6	6	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Tappet cover bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cylinder head cover bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Cylinder head cover bolt	M6	24	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Rocker arm base bolt	M6	8	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Rocker arm base bolt	M8	4	24 Nm (2.4 m·kg, 17 ft·lb)	
Locknut (rocker arm adjusting screw)	M7	4	20 Nm (2.0 m·kg, 14 ft·lb)	
Valve lifter case bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Camshaft cover bolt	M6	7	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Front cylinder camshaft end cover bolt	M5	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	LT
Camshaft drive gear bolt	M10	1	30 Nm (3.0 m·kg, 22 ft·lb)	
Camshaft driven gear nut	M14	1	52 Nm (5.2 m·kg, 37 ft·lb)	
Oil gallery bolt	M5	3	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Cylinder heads:				
Spark plug	M12	4	18 Nm (1.8 m·kg, 13 ft·lb)	
Oil pipe 1 union bolt	M10	2	21 Nm (2.1 m·kg, 15 ft·lb)	
Oil pipe 1 union bolt	M8	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Engine temperature sensor	-	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Cylinder head nut	M12	8	45 Nm (4.5 m·kg, 32 ft·lb)	E
Cylinder head nut	M10	4	39 Nm (3.9 m·kg, 28 ft·lb)	E
Cylinder head stud bolt (exhaust pipe)	M8	4	15 Nm (1.5 m·kg, 11 ft·lb)	
Clutch:				
Crankshaft end cover plug	M32	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Timing mark accessing screw	M16	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Clutch cover bolt	M6	17	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Crankshaft position sensor lead holder screw	M6	7	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Crankshaft position sensor screw	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Clutch spring plate retainer bolt	M6	6	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Clutch boss nut	M20	1	125 Nm (12.5 m·kg, 90 ft·lb)	Stake E
Primary drive gear bolt	M12	1	100 Nm (10.0 m·kg, 72 ft·lb)	LT
Clutch hose union bolt	M10	1	30 Nm (3.0 m·kg, 22 ft·lb)	
Clutch pipe union bolt	M10	1	26 Nm (2.6 m·kg, 19 ft·lb)	
Clutch release cylinder bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Bleed screw (clutch release cylinder)	M8	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Shift shaft:				
Shift shaft spring stopper bolt	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	LT

Item	Thread size	Q'ty	Tightening torque	Remarks
Stopper lever bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Generator and starter clutch:				
Oil pipe 2 bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Generator cover bolt	M6	11	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Stator coil assembly lead holder screw	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Stator coil assembly screw	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Generator rotor bolt	M12	1	80 Nm (8.0 m·kg, 58 ft·lb)	E
Starter clutch bolt	M8	6	24 Nm (2.4 m·kg, 17 ft·lb)	
Crankcase:				
Crankcase stud bolt	M12	8	See NOTE.	
Crankcase stud bolt	M10	4	See NOTE.	
Speed sensor bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil filter cartridge	M20	1	17 Nm (1.7 m·kg, 12 ft·lb)	
Oil filter cartridge bracket bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil filter cartridge union bolt	M20	1	30 Nm (3.0 m·kg, 22 ft·lb)	
Generator shaft end cover bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil delivery pipe 2/oil pump driven gear stopper bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil pump driven gear stopper bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Generator shaft bolt	M8	1	28 Nm (2.8 m·kg, 20 ft·lb)	
Crankcase bolt	M8	3	24 Nm (2.4 m·kg, 17 ft·lb)	
Crankcase bolt	M6	18	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Engine oil drain bolt (crankcase)	M14	1	43 Nm (4.3 m·kg, 31 ft·lb)	
Engine oil filler plug	M20	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil baffle plate bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Main axle bearing retainer bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Drive axle bearing retainer screw	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Shift drum segment bolt	M6	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil pump:				
Oil strainer bolt (crankcase)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil pump bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil pump housing cover 2 screw	M4	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Oil pump housing cover 1 screw	M4	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Spring retainer bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Crankshaft:				
Connecting rod bolt (1st)	M8	4	15 Nm (1.5 m·kg, 11 ft·lb)	See NOTE. M
Connecting rod bolt (final)	M8	4	Specified angle 120°–150°	See NOTE. M
Chain drive:				
Drive sprocket cover bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Drive chain guide bolt (drive sprocket side)	M8	3	24 Nm (2.4 m·kg, 17 ft·lb)	LT
Drive sprocket nut	M22	1	95 Nm (9.5 m·kg, 68 ft·lb)	Stake E
Fuel injection system (surrounding parts):				
Throttle body joint clamp screw	M4	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Throttle position sensor screw	M5	2	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Intake manifold assembly bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Injector joint screw	M6	4	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Fuel pipe bolt	M12	2	30 Nm (3.0 m·kg, 22 ft·lb)	
ISC (idle speed control) unit bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Others:				
Rectifier/regulator bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Horn nut	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
EXUP servo motor bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
EXUP servo motor bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	

NOTE:

- Tighten the connecting rod bolts to 15 Nm (1.5 m·kg, 11 ft·lb), and then tighten them further to reach the specified angle 120°–150°.
- Install the crankcase stud bolts (M12) so that their installed length is 217.5 mm (8.56 in).
- Install the crankcase stud bolts (M10) so that their installed length is 141.5 mm (5.57 in).

Oil tank tightening sequence:

Cylinder head tightening sequence:

A. Front cylinder
B. Rear cylinder

EAS20350
CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Engine mounting:				
Engine mounting bolt (left upper side)	M10	2	53 Nm (5.3 m·kg, 38 ft·lb)	
Engine mounting bolt (right upper side)	M10	1	53 Nm (5.3 m·kg, 38 ft·lb)	L=80 mm (3.15 in)
Engine mounting bolt (right upper side)	M10	1	53 Nm (5.3 m·kg, 38 ft·lb)	L=65 mm (2.56 in)
Engine bracket bolt (left upper side)	M10	2	53 Nm (5.3 m·kg, 38 ft·lb)	
Engine bracket bolt (right upper side)	M10	2	53 Nm (5.3 m·kg, 38 ft·lb)	
Engine mounting nut (rear upper side)	M12	1	74 Nm (7.4 m·kg, 53 ft·lb)	
Engine bracket nut (rear upper side)	M10	2	53 Nm (5.3 m·kg, 38 ft·lb)	
Engine mounting nut (front upper side)	M12	1	94 Nm (9.4 m·kg, 68ft·lb)	
Engine bracket nut (front upper side)	M10	4	53 Nm (5.3 m·kg, 38 ft·lb)	
Down tube nut (front side)	M12	2	74 Nm (7.4 m·kg, 53 ft·lb)	
Down tube nut (rear side)	M10	2	55 Nm (5.5 m·kg, 40 ft·lb)	
Engine mounting nut (front lower side)	M12	1	94 Nm (9.4 m·kg, 68 ft·lb)	
Engine mounting nut (rear lower side)	M12	1	74 Nm (7.4 m·kg, 53 ft·lb)	
Down tube spacer bolt	M18	2	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Engine mounting spacer bolt (rear upper side)	M18	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Engine mounting spacer bolt (rear lower side)	M18	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Frame and engine (surrounding parts):				
Main frame and sub-frame nut (upper side)	M10	2	55 Nm (5.5 m·kg, 40 ft·lb)	
Main frame and sub-frame nut (lower side)	M12	1	75 Nm (7.5 m·kg, 54 ft·lb)	
Lead holder and down tube bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	LT
Lead holder and down tube bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Cylinder-#1 left ignition coil bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Cylinder-#1 right ignition coil bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Cylinder-#1 ignition coil bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Cylinder-#2 right ignition coil bracket bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cylinder-#2 left ignition coil bracket bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Engine bracket (right upper side) and holder bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Air filter case bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Air filter case bracket bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil catch tank bolt	M6	2	9 Nm (0.9 m·kg, 6.5 ft·lb)	
ISC (idle speed control) unit cover bolt	M6	2	9 Nm (0.9 m·kg, 6.5 ft·lb)	
Pressure regulator cover bolt	M6	2	9 Nm (0.9 m·kg, 6.5 ft·lb)	
Pressure regulator bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rollover valve bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Left side cover inner panel bolt	M6	3	9 Nm (0.9 m·kg, 6.5 ft·lb)	
Right side cover inner panel bolt	M6	3	9 Nm (0.9 m·kg, 6.5 ft·lb)	
Intake solenoid bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Air duct bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Air duct bracket bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Positive battery lead bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Starter motor lead bolt (starter relay side)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Battery box bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Lead holder and sub-frame bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Fuel pump bolt	M5	6	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Seat lock bracket bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake fluid reservoir nut	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake fluid reservoir cap holder bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Muffler cooling fan motor assembly bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Muffler cooling fan motor assembly bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Muffler cooling fan motor assembly and sub-frame bolt	M6	5	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Muffler cooling fan motor assembly, rear brake fluid reservoir bracket and sub-frame bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Locknut (shift rod)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Shift arm bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Left rider footrest assembly bolt	M8	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Right rider footrest assembly bolt	M8	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Footrest cover bracket	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Passenger footrest nut	M10	2	28 Nm (2.8 m·kg, 20 ft·lb)	
Front wheel:				
Front wheel axle	M18	1	72 Nm (7.2 m·kg, 52 ft·lb)	
Front wheel axle pinch bolt	M8	1	23 Nm (2.3 m·kg, 27 ft·lb)	
Front brake disc bolt	M6	12	18 Nm (1.8 m·kg, 13 ft·lb)	LT
Rear wheel:				
Rear wheel axle nut	M24	1	150 Nm (15.0 m·kg, 110 ft·lb)	
Rear brake disc bolt	M6	6	18 Nm (1.8 m·kg, 13 ft·lb)	LT
Rear wheel sprocket nut	M10	6	100 Nm (10.0 m·kg, 72 ft·lb)	LT
Front brake:				
Front brake master cylinder holder bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Front brake hose union bolt	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Front brake caliper bolt	M10	4	35 Nm (3.5 m·kg, 25 ft·lb)	
Bleed screw (front brake caliper)	M8	2	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Bleed screw (front brake master cylinder)	M8	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Front brake hose holder bolt	M6	2	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Rear brake:				
Rear brake master cylinder bolt	M8	2	23 Nm (2.3 m·kg, 27 ft·lb)	
Locknut (rear brake master cylinder)	M8	1	16 Nm (1.6 m·kg, 11 ft·lb)	
Rear brake hose union bolt	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear brake hose guide bolt 1	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake hose guide bolt 2	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Rear brake pad pin	M10	1	17 Nm (1.7 m·kg, 12 ft·lb)	
Rear brake screw plug	M10	1	3 Nm (0.3 m·kg, 2.2 ft·lb)	
Rear brake caliper bolt	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	LT
Rear brake caliper bolt	M12	1	27 Nm (2.7 m·kg, 19 ft·lb)	LS
Bleed screw (rear brake caliper)	M8	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Handlebar:				
Upper handlebar holder bolt	M8	4	20 Nm (2.0 m·kg, 14 ft·lb)	
Lower handlebar holder nut	M12	2	40 Nm (4.0 m·kg, 29 ft·lb)	
Main switch/immobilizer unit bolt	M8	2	32 Nm (3.2 m·kg, 23 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Grip end	M16	2	29 Nm (2.9 m·kg, 21 ft·lb)	
Clutch master cylinder holder bolt	M6	2	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Rearview mirror	M10	2	14 Nm (1.4 m·kg, 10 ft·lb)	
Front fork and steering head:				
Upper bracket pinch bolt	M8	2	26 Nm (2.6 m·kg, 19 ft·lb)	
Steering stem nut	M22	1	110 Nm (11.0 m·kg, 80 ft·lb)	
Lower ring nut (initial tightening torque)	M25	1	52 Nm (5.2m·kg, 37 ft·lb)	See NOTE.
Lower ring nut (final tightening torque)	M25	1	23 Nm (2.3 m·kg, 27 ft·lb)	See NOTE.
Cap bolt	M47	2	20 Nm (2.0 m·kg, 14 ft·lb)	LS
Cap bolt (damper rod assembly and nut)	M10	2	25 Nm (2.5 m·kg, 18 ft·lb)	
Damper rod assembly	M24	2	35 Nm (3.5 m·kg, 25 ft·lb)	
Lower bracket pinch bolt	M8	4	28 Nm (2.8 m·kg, 20 ft·lb)	
Front brake hose joint bracket bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front brake hose joint bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Headlight assembly bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Meter assembly bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Headlight assembly bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front fork guard bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front fender bolt	M6	4	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Swingarm and rear shock absorber:				
Swingarm pivot shaft nut	M18	1	125 Nm (12.5 m·kg, 90 ft·lb)	
Footrest bracket pinch bolt	M8	2	25 Nm (2.5 m·kg, 18 ft·lb)	
Relay arm nut (relay arm and swingarm)	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	
Relay arm nut (relay arm and connecting arm)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Rear shock absorber assembly nut (rear side)	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	
Rear shock absorber assembly nut (front side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Rear brake hose guide bolt 1	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake hose guide bolt 2	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Rear fender bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	LT
Locknut (rear shock absorber spring preload adjusting nut)	M20	1	42 Nm (4.2 m·kg, 30 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Drive chain guard bolt (swingarm side)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Drive chain guide bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Locknut (drive chain adjusting bolt)	M8	2	16 Nm (1.6 m·kg, 11 ft·lb)	

NOTE:

1. First, tighten the lower ring nut to approximately 52 Nm (5.2 m·kg, 37 ft·lb) with a torque wrench, then loosen the lower ring nut completely.
2. Retighten the lower ring nut to 23 Nm (2.3 m·kg, 17 ft·lb) with a torque wrench.

EAS20360
LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370
ENGINE

Lubrication point	Lubricant
Oil seal lips	LS
O-rings	LS
Bearings	E
Cylinder head nuts and washers	E
Connecting rod small end and big end	E
Crankshaft journals	E
Piston surfaces	E
Piston pins	E
Connecting rod bolts	M
Camshaft cam lobes and camshaft journals	M
Valve push rods	E
Valve push rod end balls	E
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	E
Valve lifters	E
Rocker arms	E
Rocker arm shafts	E
Oil pump rotors (inner and outer) and oil pump housing	E
Oil pump driven gear shaft	E
Crankcase stud bolt ends	E
Crankcase bush (generator shaft journal)	E
Starter clutch idle gear inner surface	E
Starter clutch idle gear shafts	E
Starter clutch roller and starter clutch gears outer surface	E
Crankshaft journal	E
Primary driven gear inner surface	E
Clutch push rods and ball	LS
Clutch boss nut and washer	E
Transmission gears (wheel and pinion) and collar	M
Drive sprocket nut and washer	E

Lubrication point	Lubricant
Shift forks and shift fork guide bars	E
Shift drum	E
Shift shaft and shift shaft oil seal lip	LS
Crankcase mating surface	Yamaha bond No.1215
Stator coil lead grommet	Yamaha bond No.1215
Crankshaft position sensor lead grommet	Yamaha bond No.1215

EAS20380
CHASSIS

Lubrication point	Lubricant
Down tube bolt (front and rear)	E
Steering bearings and upper bearing dust cover lip	LS
Lower bearing dust seal lip	LS
Steering ring nut thread (upper and lower)	LS
Main switch bracket spacer outer surfaces	LS
Front wheel oil seal lips (left and right)	LS
Rear wheel oil seal lips (left and right)	LS
Rear wheel drive hub oil seal lip	LS
Rear wheel drive hub mating surface	LS
Tube guide (throttle grip) inner surface and throttle cables	LS
Brake lever pivoting point and metal-to-metal moving parts	Silicon grease
Clutch lever pivoting point and metal-to-metal moving parts	LS
Brake pedal shaft pivoting point	LS
Passenger footrest pivoting point and ball	LS
Sidestand pivoting point and metal-to-metal moving parts	LS
Sidestand switch striker and sidestand switch contact point	LS
Sidestand hook and spring	LS
Swingarm pivot shaft	LS
Bearing, spacer and oil seal lips (swingarm pivot shaft)	LS
Bearing, spacer and oil seal lips (swingarm and relay arm)	LS
Bearing, spacer and oil seal lips (rear shock absorber)	LS
Bearing, spacer and oil seal lips (relay arm)	LS
Bearing, spacer and oil seal lips (connecting arm)	LS
Shift pedal pivoting point	LS
Shift rod pivoting point	LS
Seat lock lever pivoting point	LS
O-rings (oil delivery pipe and oil filler cap)	LS

EAS20390
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400
ENGINE OIL LUBRICATION CHART

1. Oil pan
2. Engine oil drain bolt (crankcase)
3. Oil strainer (crankcase)
4. Oil pump
5. Oil pump rotor 1
6. Oil pump rotor 2
7. Check ball
8. Relief valve
9. Oil tank
10. Oil strainer (oil tank)
11. Engine oil drain bolt (oil tank)
12. Drive axle
13. Drive axle gears
14. Main axle
15. Oil pump drive gear
16. Main axle gears
17. Clutch
18. Bypass valve
19. Oil filter cartridge
20. Generator shaft journal (left)
21. Generator shaft journal (right)
22. Starter clutch
23. Crankshaft journal (camshaft cover side)
24. Camshaft journal (camshaft cover side)
25. Camshaft lobe faces
26. Crankshaft journal (right)
27. Front cylinder
28. Crank pin
29. Connecting rod
30. Piston
31. Front camshaft
32. Valve lifter
33. Push rod
34. Rocker arm
35. Valve stem end
36. Crankshaft journal (left)
37. Rear cylinder
38. Rear camshaft
39. Front cylinder intake valve
40. Rear cylinder intake valve

A. Pressure feed

EAS20410
LUBRICATION DIAGRAMS

1. Oil delivery pipe
2. Push rod
3. Oil filter cartridge
4. Rocker arm shaft
5. Oil delivery pipe 2

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2

1. Rocker arm shaft
2. Crankshaft
3. Valve lifter
4. Push rod

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1. Oil pump
2. Oil strainer (crankcase)
3. Oil pipe 1

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1. Main axle
2. Drive axle
3. Oil pump
4. Oil strainer (crankcase)

A. To oil filter cartridge

EAS20430
CABLE ROUTING

1. Air temperature sensor coupler
2. Sub-wire harness 3 coupler
3. Front turn signal light coupler
4. Headlight assembly coupler
5. Headlight coupler (low beam)
6. Wire harness
7. Clutch fluid reservoir hose
8. Left handlebar switch lead
9. Starter motor lead
10. Rectifier/regulator
11. Stator coil assembly lead
12. Horn
13. Horn lead
14. Front brake hose
15. Throttle cable (accelerator cable)
16. Throttle cable (decelerator cable)
17. Front brake fluid reservoir hose

A. Fasten the air temperature sensor lead and sub-wire harness 3 with the harness holder.
B. Pass the brake hose through the guide on the meter assembly bracket, making sure to fit the grommet on the hose in the guide.
C. Make sure that the brake hose three-way joint contacts the tab on the front brake hose joint bracket.
D. Fasten the wire harness, stator coil assembly lead, rectifier regulator lead, and horn lead with the holder. Face the fastener of the holder forward.
E. Fasten the horn leads with the holder. Face the open ends of the holder upward.
F. There should be no slack in the horn leads between the holder and the guide on the horn bracket.
G. Pass the horn lead through the guide on the horn bracket.
H. Pass the wire harness through the guide.
I. Route the right handlebar switch lead behind the throttle cables.
J. Route the right handlebar switch lead and front brake light switch lead over and in front of the front brake hose.

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1. Meter assembly lead
2. Clutch hose
3. Left handlebar switch lead
4. Cylinder-#1 intake air pressure sensor
5. Cylinder-#1 intake air pressure sensor hose
6. Cylinder-#2 right spark plug lead
7. Cylinder-#2 right ignition coil
8. Cylinder-#2 right ignition coil lead
9. Cylinder-#1 left spark plug lead
10. EXUP servo motor lead
11. Cylinder-#1 left ignition coil
12. Negative battery lead
13. Crankshaft position sensor lead
14. Sidestand switch lead
15. Starter motor lead
16. Oil tank breather hose
17. Throttle cable (decelerator cable)
18. Throttle cable (accelerator cable)
19. Engine bracket (rear upper side)
20. Frame
21. Wire harness

A. To meter assembly
B. Route the cylinder-#1 intake air pressure sensor hose to the outside of the clutch hose, wire harness, meter assembly lead, cylinder-#2 right spark plug lead and left handlebar switch lead.
C. Route the cylinder-#2 right spark plug lead to the inside of the left handlebar switch lead and under the wire harness.
D. Route the cylinder-#1 intake air pressure sensor lead to the inside of the cylinder-#2 right spark plug lead, left handlebar switch lead, meter assembly lead, and wire harness.
E. Install the throttle cables so that the metal section of each outer cable is in a straight line when viewed from the side.
F. Fasten the cylinder-#2 right spark plug lead, left handlebar switch lead, meter assembly lead, and wire harness with the plastic band. Fasten the left handlebar switch lead and meter assembly lead at the white tape on each lead and face the end of the plastic band downward.
G. Route the cylinder-#1 intake air pressure sensor hose under the cylinder-#2 right spark plug lead.
H. Wrap the protective covering around the wire harness, left handlebar switch coupler, and meter assembly couplers, making sure to cover the leads that are not covered by their protective sleeves.
I. Fasten the wire harness by sliding the plastic holder on the wire harness onto the stud on the cylinder-#2 right ignition coil bracket.
J. White connector
K. Black connector
L. To throttle body
M. Pass the wire harness between the clutch hose bracket and the frame.
N. To engine
O. The wire harness should not protrude to the inside of the frame.
P. The rubber sheet should hang down over the wire harness, clutch hose, cylinder-#1 left spark plug lead, EXUP servo motor lead and negative battery lead. Be sure not to cover the fuel hose.
Q. Route the cylinder-#1 left spark plug lead under the frame boss and to the outside of the wire harness and clutch hose.
R. Route the clutch hose to the outside of the wire harness.
S. Fasten the clutch hose and EXUP servo motor lead with the plastic locking ties. Face the buckle of the plastic locking tie forward, with the end facing outward, and then cut off the excess end of the tie.
T. Fasten the EXUP servo motor lead at the white tape and the grommet on the clutch hose with a plastic band, making sure that the EXUP servo motor lead is routed towards the front of the vehicle.
U. Route the negative battery lead to the inside of the starter motor lead and over the battery box.
V. Route the sidestand switch lead and crankshaft position sensor lead to the outside of the engine bracket (rear upper side).
W. Route the crankshaft position sensor lead and sidestand switch lead behind the engine boss, making sure not to route the leads over the boss.
X. Fasten the starter motor lead, sidestand switch lead, and crankshaft position sensor lead with the lead holder.
Y. Fasten the sidestand switch lead and the starter motor lead together with the plastic clamp at the white paint mark on the sidestand switch lead.
Z. Pass the plastic band through the hole in the frame, and then fasten the starter motor lead with the band. Face the end of the plastic band inward.
AA. Align the white tape on the starter motor lead with the bend in the frame, and then fasten the lead at the white tape with the plastic band. Face the end of the plastic band inward.
AB. Fasten the starter motor lead with the plastic band.
AC. Route the wire harness to the inside of the left handlebar switch lead and meter assembly lead.
AD. Route the clutch hose under the left handlebar switch lead and meter assembly lead.
AE. Frame hole
AF. The starter motor lead should not protrude to the outside of the frame.
AG. The buckle of the plastic band should be under the frame.
AH. The starter motor lead should not protrude past the line shown in the illustration.
AI. Face the end of the plastic band inward.
AJ. Pass the plastic band through the hole in the engine bracket (front upper side).
AK. 90°
AL. Fasten the wire harness and oil tank breather hose with the holder.
AM. Align the lower edge of the white tape on the wire harness with the lower edge of the holder.
AN. Fasten the wire harness with the holder.

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1. Fuel pump lead
2. Cylinder-#1 right spark plug lead
3. Sub-wire harness 2
4. Cylinder-#2 left ignition coil lead
5. Sub-wire harness 2 coupler
6. Cylinder-#2 left ignition coil
7. Cylinder-#2 left spark plug lead
8. Cylinder-#2 intake air pressure sensor hose
9. Cylinder-#2 intake air pressure sensor
10. Main switch lead
11. Front brake fluid reservoir hose
12. Front brake hose
13. Throttle cable (decelerator cable)
14. Throttle cable (accelerator cable)
15. Right handlebar switch lead
16. Intake solenoid lead
17. ISC (idle speed control) unit lead
18. Stator coil assembly lead
19. Decompression solenoid lead
20. O_2 sensor lead
21. EXUP cables
22. Neutral switch lead
23. Rear brake light switch lead
24. Rear brake fluid reservoir hose
25. Rear brake hose
26. Right side panel
27. Speed sensor lead
28. Wire harness
29. Fuel hose
30. Throttle position sensor
31. Engine temperature sensor lead

A. Fasten the sidestand switch lead, decompression solenoid lead, crankshaft position sensor lead, neutral switch lead and speed sensor lead with the lead holder.
B. Route the cylinder-#1 right ignition coil lead under the frame boss and to the inside of the rear brake fluid reservoir hose.
C. Wrap the protective covering around the rear brake light switch coupler, sidestand switch coupler, O_2 sensor coupler, decompression solenoid coupler, crankshaft position sensor coupler, neutral switch coupler, and speed sensor coupler. Be sure to cover the sections of the leads that are not covered by the protective sleeves and cover the taped sections of the leads.
D. Pass the fuel pump lead through the hole in the rubber sheet.
E. To fuel tank
F. The rubber sheet should hang down over the wire harness, fuel pump lead, and cylinder-#1 right spark plug lead. Be sure not to cover the fuel hose.
G. Fasten the sub-wire harness 2, intake solenoid lead and ISC (idle speed control) unit lead with the lead holder.
H. Black connector
I. White connector
J. Fasten the wire harness with the plastic locking tie to the cylinder-#2 left ignition coil bracket.
K. Fasten the wire harness and sub-wire harness 2 with the plastic band at the section just before the split in the wire harness. Face the end of the plastic band outward.
L. Wrap the protective covering around the right handlebar switch coupler, headlight coupler, immobilizer unit coupler and main switch coupler, making sure to cover the sections of the leads that are not covered by the protective sleeves.
M. Route the cylinder-#2 intake air pressure sensor hose to the outside of the wire harness.
N. Route the cylinder-#2 intake air pressure sensor lead to the outside of the wire harness, headlight lead, right handlebar switch lead, main switch lead, and cylinder-#2 left spark plug lead.
O. Fasten the wire harness, headlight lead, right handlebar switch lead, main switch lead, and cylinder-#2 left spark plug lead with the plastic band. Fasten the wire harness where the cylinder-#2 intake air pressure sensor lead branches off from the wire harness. Fasten the headlight lead and right handlebar switch lead at the white tape on each lead. Face the end of the plastic band outward.
P. Route the wire harness under the throttle cables.
Q. To engine
R. Route the intake solenoid lead to the inside of the intake solenoid vacuum hose (air filter case valve to intake solenoid).
S. Route the stator coil assembly lead to the inside of the engine bracket (front upper side).
T. Fasten the stator coil assembly lead at the white tape with the holder.
U. Route the EXUP cables under the engine bracket (rear upper side).
V. Route the rear brake light switch lead and O_2 sensor lead to the outside of the engine bracket (rear upper side).
W. Fasten the rear brake light switch lead and brake fluid reservoir hose with the plastic clamp next to the bolt hole in the frame, making sure that the lead is fastened under the hose.
X. Route the O_2 sensor lead under the right side panel, making sure that the lead is not pinched between the panel and the right side panel bracket.
Y. Route the decompression solenoid lead, neutral switch lead, and speed sensor lead to the inside of the rear brake hose and engine bracket (rear upper side), making sure not to pinch the leads between the EXUP cables and the engine.
Z. Install the plastic band with its buckle facing rearward and its end facing downward.
AA. Route the sub-wire harness 2 in front of the cylinder-#2 ISC (idle speed control) unit outlet hose.
AB. Route the wire harness and right handlebar switch lead to the outside of the throttle cable holder.
AC. Fasten the throttle cables with the holder, making sure that the accelerator cable is routed above the decelerator cable.
AD. Route the fuel pump lead to the right of the fuel hose.
AE. Align the indentations in the throttle cables with the front edge of the holder.
AF. Fasten the sub-wire harness 2, ISC (idle speed control) unit lead, and ISC (idle speed control) unit inlet hose with the plastic band, making sure not to pinch the hose. Fasten the plastic band behind the hose clamp.

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1. Sub-wire harness 2
2. Intake solenoid lead
3. ISC (idle speed control) unit lead
4. Cylinder-#2 left ignition coil
5. Lean angle cut-off switch
6. Wire harness
7. Starter relay
8. ECU (electronic control unit)
9. Rear turn signal light couplers
10. Muffler cooling fan temperature sensor lead
11. Tail/brake light lead
12. Muffler cooling fan motor lead
13. License plate light coupler
14. Headlight relay
15. Relay unit
16. Turn signal/hazard relay
17. Muffler cooling fan motor relay
18. Fuse box
19. Cylinder-#2 right ignition coil
20. Throttle cable (accelerator cable)
21. Throttle cable (decelerator cable)
22. Positive battery lead
23. Sub-wire harness 1
24. Negative battery lead
25. Cylinder-#1 right ignition coil
26. Cylinder-#1 left ignition coil
27. Rear brake fluid reservoir hose
28. Seat lock cable
29. Starter motor lead

A. Route the cylinder-#2 left spark plug lead to the rear of the cylinder-#2 right spark plug lead.
B. Fasten the sub-wire harness 2, ISC (idle speed control) unit lead, and intake solenoid lead with the holder, making sure that the sub-wire harness 2 is fastened closest to the frame.
C. Route the wire harness along the frame so that the leads that branch off from the wire harness are routed inward.
D. Route the wire harness along the side of the battery, making sure that it does protrude past the top of the frame.
E. Fasten the wire harness, ECU leads, and sub-wire harness 1 with the plastic locking tie next to the starter relay. Face the end of the plastic locking tie outward, and then cut off the excess end of the tie. Be sure not to pinch the end of the plastic locking tie when installing the holder.
F. Route the sub-wire harness 1 below the ECU leads and starter relay lead. Place the sub-wire harness 1 coupler in the area shown in the illustration with oblique lines so that it does not rest on top of the fuse box lead that is not covered by its protective sleeve.
G. Fasten the relay unit lead, headlight relay lead, and turn signal/hazard relay lead (hazard) with the plastic band in front of the headlight relay. Face the end of the plastic band forward. Do not fasten the anti-theft alarm couplers (optional) and anti-theft alarm leads (optional).
H. Route the tail/brake light lead and rear turn signal light leads along the side of the rear brake fluid reservoir, making sure that “UPPER” on the reservoir is visible. There should be no slack in the tail/brake light lead and the rear turn signal light lead between the wire harness and the plastic locking tie next to the hole in the frame.
I. When installing the rear brake fluid reservoir, be sure not to pinch the tail/brake light lead and muffler cooling fan motor lead between the rear brake fluid reservoir and the rear brake fluid reservoir bracket. Route the leads under the damper that is attached to the frame.
J. Fasten the rear turn signal light leads, tail/brake light lead, muffler cooling fan motor lead and license plate light lead with the plastic locking tie. Face the end of the plastic locking tie rearward, and then cut off the excess end of the tie. Be sure to pass the plastic locking tie through the hole in the frame before installing the holder.
K. Fasten the rear turn signal light leads, tail/brake light lead, license plate light lead, muffler cooling fan motor lead, and muffler cooling fan temperature sensor lead with the plastic clamp, making sure to fasten the muffler cooling fan temperature sensor lead at the gray tape. Fasten the plastic clamp in front of the brake fluid reservoir and face the ends of the clamp inward.
L. Fasten the relay unit lead, anti-theft alarm coupler (optional), anti-theft alarm leads (optional), joint coupler lead, and turn signal/hazard relay lead (hazard) with the plastic locking tie near the right front corner of the relay unit. Face the end of the plastic locking tie forward, and then cut off the excess end of the tie.
M. Place the anti-theft alarm couplers (optional) under the relay unit lead.
N. Route the seat lock cable over the ECU, making sure that the cable is not pinched on the side of the ECU.
O. Route the fuse box leads over the wire harness.
P. Fasten the sub-wire harness 1, muffler cooling fan motor relay lead, wire harness, and lean angle cut-off switch lead with the plastic band in the range shown in the illustration. Face the end of the plastic band inward. Do not fasten the starter relay lead.
Q. Route the throttle cable (accelerator cable) over the throttle cable (decelerator cable).
R. Route the throttle cables over the cylinder-#2 right spark plug lead.
S. Fasten the negative battery lead and negative battery lead coupler with the battery band.
T. Install the positive battery lead terminal with the lead routed upward.
U. 40–50°
V. Route the positive battery lead under the main-fuse-starter-relay lead.
W. Route the main-fuse-to-starter-relay lead over the wire-harness-to-main-fuse lead.
X. Route the sub-wire harness 1 under the wire-harness-to-main-fuse lead.
Y. To cylinder-#1 right spark plug
Z. Route the rear brake fluid reservoir hose under the wire harness to the right of the battery box. Be sure not to pinch the rear brake fluid reservoir hose when installing the battery box.
AA. Route the starter motor lead under the lean angle cut-off switch lead.

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AB. Route the starter motor lead and sub-wire harness 1 under the battery box, making sure that they are routed between the bolt holes in the battery box.

AC. Route the seat lock cable under the wire harness to the left of the battery box. Be sure not to pinch the seat lock cable when installing the battery box.

AD. Fasten the sub-wire harness 1 at the white tape with the plastic locking tie. Face the end of the plastic locking tie rearward, and then cut off the excess end of the tie.

AE. To cylinder-#1 left spark plug

AF. Fasten the starter motor lead at the white tape with the holder on the cylinder-#1 left ignition coil bracket.

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1. Fuel tank
2. Pressure regulator
3. Fuel return hose
4. Fuel hose
5. Fuel return pipe
6. Fuel return hose (fuel return pipe to fuel pump)
7. Fuel pump
8. Fuel pipe
9. Fuel hose (intake manifold assembly to pressure regulator)

A. Face the ends of the hose clamps downward.
B. Install the fuel return hose onto the fuel return pipe until the hose contacts the paint mark on the pipe.
C. Connect the end of the fuel hose that has a black connector to the fuel pipe.
D. Face the end of the hose clamp inward, angled slightly downward.
E. Install the end of the fuel return hose (fuel return pipe to fuel pump) with a yellow paint mark onto the fuel return pipe until the hose contacts the yellow paint mark on the pipe.
F. Install the fuel return hose (fuel return pipe to fuel pump) with its white paint mark facing downward.
G. Connect the end of the fuel hose that has an orange connector to the fuel pump.

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1. Fuel tank overflow hose
2. Fuel tank breather hose
3. Rollover valve hose 1
4. Rollover valve hose 2
5. Rollover valve 1
6. Rollover valve 2
7. Rollover valve hose 3
8. Rollover valve hose 4
9. Fuel tank breather/overflow hose
10. Oil tank
11. Bottom cover

A. Face the ends of the hose clamps in the directions shown in the illustration.
B. Install the fuel tank overflow hose onto the front pipe of the fuel tank with its yellow paint mark facing outward.
C. Install the fuel tank breather hose onto the rear pipe of the fuel tank with its white paint mark facing rearward.
D. Install the rollover valve hoses with their paint marks facing outward.
E. Fasten the fuel tank breather hose at the white paint mark, fuel tank overflow hose at the yellow paint mark, and fuel return pipe with the holder. Fasten the hoses in the order listed with the fuel tank breather hose fastened towards the front of the vehicle.
F. Install the rollover valve hoses with their paint marks facing downward.
G. Face the ends of the hose clamps forward.
H. Face the ends of the hose clamp rearward.
I. Install the fuel tank overflow hose and fuel tank breather/overflow hose with their paint marks facing rearward.
J. Route the fuel tank breather/overflow hose behind the mounting boss on the oil tank.
K. The end of the fuel tank breather/overflow hose should protrude past the edge of the bottom cover.

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1. Cylinder-#2 intake air pressure sensor
2. Cylinder-#2 ISC (idle speed control) unit outlet hose
3. ISC (idle speed control) unit
4. Intake solenoid vacuum hose (one-way valve to throttle body)
5. Cylinder-#1 ISC (idle speed control) unit outlet hose
6. Throttle position sensor
7. Throttle body
8. Cylinder-#1 intake air pressure sensor hose
9. Fuel return hose
10. Pressure regulator
11. Cylinder-#1 intake air pressure sensor
12. Clutch hose
13. Cylinder-#2 intake air pressure sensor hose
14. Fuel hose
15. Air filter case
16. Pressure regulator joint
17. Fuel hose (intake manifold assembly to pressure regulator)

A. Face the ends of the hose clamp outward.
B. Face the ends of the hose clamp rearward.
C. Install the end of the cylinder-#1 ISC (idle speed control) unit outlet hose with a white paint mark onto the throttle body.
D. Face the ends of the hose clamp to the left, angled 45° towards the rear of the vehicle.
E. Face the ends of the hose clamp forward.
F. Install the end of the cylinder-#1 intake air pressure sensor hose with a white paint mark onto the throttle body.
G. Face the ends of the hose clamp inward.
H. Face the ends of the hose clamp forward.
I. Face the ends of the hose clamp to the right, angled 45° towards the front of the vehicle.
J. Face the ends of the hose clamp forward.
K. Face the ends of the hose clamp inward.
L. Install the end of the intake solenoid vacuum hose (one-way valve to throttle body) with a white paint mark onto the throttle body. Be sure to install the end of the hose all the way onto the throttle body and position the hose clamp as shown in the illustration.
M. 45°
N. 1 mm (0.04 in)

CHK
ADJ

3

PERIODIC CHECKS AND ADJUSTMENTS

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EAS20450
PERIODIC MAINTENANCE

EAS20460
INTRODUCTION
This chapter includes all information necessary to perform the 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.

EAU17705
PERIODIC 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**	• Check fuel hoses for cracks or damage.		√	√	√	√	√
2	*	**Spark plugs**	• Check condition. • Clean and regap.		√		√		
			• Replace.			√		√	
3	*	**Valves**	• Check valve clearance. • Adjust.			√		√	
4	*	**Air filter element**	• Replace.					√	
5	*	**Clutch**	• Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	
6	*	**Front brake**	• Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	√
			• Replace brake pads.	Whenever worn to the limit					
7	*	**Rear brake**	• Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	√
			• Replace brake pads.	Whenever worn to the limit					
8	*	**Brake hoses**	• Check for cracks or damage.		√	√	√	√	√
			• Replace.	Every 4 years					
9	*	**Wheels**	• Check runout and for damage.		√	√	√	√	
10	*	**Tires**	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
11	*	**Wheel bearings**	• Check bearing for looseness or damage.		√	√	√	√	
12	*	**Swingarm**	• Check operation and for excessive play.		√	√	√	√	
13		**Drive chain**	• 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 motorcycle or riding in the rain					
14	*	**Steering bearings**	• Check bearing play and steering for roughness.	√	√	√	√	√	
			• Lubricate with lithium-soap-based grease.	Every 20000 km					
15	*	**Chassis fasteners**	• Make sure that all nuts, bolts and screws are properly tightened.		√	√	√	√	√
16		**Sidestand**	• Check operation. • Lubricate.		√	√	√	√	√
17	*	**Sidestand switch**	• Check operation.	√	√	√	√	√	√
18	*	**Front fork**	• Check operation and for oil leakage.		√	√	√	√	

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (× 1000 km)					ANNUAL CHECK
				1	10	20	30	40	
19	*	**Shock absorber assembly**	• Check operation and shock absorber for oil leakage.		√	√	√	√	
20	*	**Rear suspension relay arm and connecting arm pivoting points**	• Check operation.		√	√	√	√	
21	*	**Fuel injection system**	• Adjust synchronization.		√	√	√	√	√
22		**Engine oil**	• Change. • Check oil level and vehicle for oil leakage.	√	√	√	√	√	√
23		**Engine oil filter cartridge**	• Replace.	√		√		√	
24	*	**Front and rear brake switches**	• Check operation.	√	√	√	√	√	√
25		**Moving parts and cables**	• Lubricate.		√	√	√	√	√
26	*	**Throttle grip housing and cable**	• Check operation and free play. • Adjust the throttle cable free play if necessary. • Lubricate the throttle grip housing and cable.		√	√	√	√	√
27	*	**Muffler and exhaust pipe**	• Check the screw clamp for looseness.	√	√	√	√	√	
28	*	**Lights, signals and switches**	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

EAU36771

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.

EAS20470
ENGINE

EAS20530
ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

NOTE:

- The valve clearance is automatically adjusted by the hydraulic valve lifter. However, there are times that the valve clearance needs to be adjusted manually. If this is the case, adjust the clearance of the two maladjusted or worn valves using the adjusting screw on the rocker arm.
  If clearance is on the slip side “1”, loosen the adjusting screw and bring the valve clearance “a” within specification. Check if the valve clearance “b” on the adjusting screw “2” side is within specification.

If clearance is on the adjusting screw “2” side, tighten the adjusting screw and bring the valve clearance “b” within specification.

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Disconnect:
   - Spark plug caps
3. Remove:
   - Spark plugs
4. Remove:
   - Oil catch tank “1”
   - Tappet covers “2”
   - Front cylinder head cover “3”

5. Remove:
   - Air duct “1”
   - Timing mark accessing screw “2”
   - Crankshaft end cover “3”

6. Remove:
   - Camshaft sprocket cover “1”

7. Measure:
   - Valve clearance
     Out of specification → Adjust.

Valve clearance (cold)
Intake
0.00–0.04 mm (0.0000–0.0016 in)
Exhaust
0.00–0.04 mm (0.0000–0.0016 in)

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Piston #1 TDC (rear cylinder)

a. Turn the crankshaft counterclockwise.

b. When piston #1 is at TDC on the compression stroke, align the TDC mark “a” on the crankshaft position sensor rotor with the pointer “b” on the clutch cover.

c. Check the camshaft drive gear mark “c” position and camshaft driven gear mark “d” position as shown.
If the marks are not aligned, turn the crankshaft counterclockwise 360 degrees and recheck step (b).

d. Measure the valve clearance with a thickness gauge.

Thickness gauge
90890-03079
Narrow gauge set
YM-34483

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Piston #2 TDC (front cylinder)

a. Turn the crankshaft counterclockwise from the piston #1 TDC by 408 degrees.
b. When piston #2 is at TDC on the compression stroke, align the TDC mark “e” on the crankshaft position sensor rotor with the pointer “b” on the clutch cover.

c. Check the camshaft drive gear mark “c” position and camshaft driven gear mark “d” position as shown.

d. Measure the valve clearance with a thickness gauge.

Thickness gauge
90890-03079
Narrow gauge set
YM-34483

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8. Adjust:
   - Valve clearance

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2. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
3. Disconnect:
   - Intake solenoid vacuum hose (one-way valve to throttle body) “1”
   - Cylinder-#1 intake air pressure sensor hose “2”

4. Install:
   - Fuel hose “1” (Parts No.: 5JW-24311-00)
   - 3-way joint “2” (Parts No.: 90413-05014)
   - Cylinder-#1 intake air pressure sensor hose “3”
   - Vacuum gauge hose for #1 “4”
   - Vacuum gauge hose for #2 “5”
   - Vacuum gauge
   - Digital tachometer

Vacuum gauge
90890-03094
Carburetor synchronizer
YU-44456

5. Install:
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
6. Adjust:
   - Throttle body synchronization

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9. Install:
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS20630
ADJUSTING THE THROTTLE CABLE FREE PLAY

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. Remove:
   - Pressure regulator cover “1”

3. Adjust:
   - Throttle cable free play

NOTE:
When the throttle is opened, the accelerator cable “1” is pulled.

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Throttle body side

a. Loosen the locknut “2” on the decelerator cable.
b. Turn the adjusting nut “3” in direction “a” or “b” to take up any slack on the decelerator cable.

NOTE:
Apply locking agent (LOCTITE®) to the threads of the adjusting nut “3”.

c. Loosen the locknut “4” on the accelerator cable.
d. Turn the adjusting nut “5” 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 “2”, “4”.

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.

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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”.

EWA12910

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.

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4. Install:
   - Pressure regulator cover

	Pressure regulator cover bolt 9 Nm (0.9 m·kg, 6.5 ft·lb)

EAS20680

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
2. Disconnect:
   - Spark plug cap
3. 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.

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

	Manufacturer/model NGK/DPR7EA-9 Manufacturer/model DENSO/X22EPR-U9

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

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

8. 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.

9. Connect:
   - Spark plug cap
10. Install:
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS20700

CHECKING THE IGNITION TIMING

NOTE:

Prior to checking the ignition timing, check the wiring connections of the entire ignition system. Make sure all connections are tight and free of corrosion.

1. Stand the vehicle on a level surface.
2. Remove:
   - Air duct “1”
   - Timing mark accessing screw “2”

3. Connect:
   - Timing light “1”
   - Digital tachometer

	Timing light **90890-03141** **Inductive clamp timing light** **YU-03141**

4. Check:
   - Ignition timing

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a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

	Engine idling speed **850–950 r/min**

b. Check that pointer “a” on the clutch cover is within the firing range “b” on the crankshaft position sensor.
   Incorrect firing range → Check the ignition system.

NOTE:

The ignition timing is not adjustable.

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5. Install:
   - Timing mark accessing screw

	Timing mark accessing screw **8 Nm (0.8 m·kg, 5.8 ft·lb)**

   - Air duct

	Air duct bolt **10 Nm (1.0 m·kg, 7.2 ft·lb)** **Air duct bracket bolt** **7 Nm (0.7 m·kg, 5.1 ft·lb)**

EAS20710

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

NOTE:

Insufficient compression pressure will result in a loss of performance.

1. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-3.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
4. Disconnect:
   - Decompression solenoid couplers “1”

5. Disconnect:
   - Spark plug cap
6. Remove:
   - Spark plug

ECA13340

CAUTION:

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

7. Install:
   - Compression gauge "1"
   - Extension "2"

Compression gauge
90890-03081
Engine compression tester
YU-33223
Extension
90890-04082

8. Measure:
   - Compression pressure
     Out of specification → Refer to steps (c) and (d).

Standard compression pressure (at sea level)
1200 kPa/200 r/min (170.7 psi/200 r/min) (12.0 kgf/cm²/200 r/min)
Minimum–maximum
1000–1400 kPa (142.2–199.1 psi) (10.0–14.0 kgf/cm²)

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a. Set the main switch to "ON".
b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

EWA12940

WARNING

To prevent sparking, ground all spark plug leads before cranking the engine.

NOTE:

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 14 psi).

c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
   Carbon deposits → Eliminate.
d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
   Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston ring(s) wear or damage → Repair.
Same as without oil	Piston ring(s), valves, cylinder head gasket or piston possibly defective → Repair.

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9. Install:
   - Spark plug

Spark plug
18 Nm (1.8 m·kg, 13 ft·lb)

10. Connect:
    - Spark plug cap
11. Connect:
    - Decompression solenoid couplers
12. Install:
    - Fuel tank
      Refer to "FUEL TANK" on page 6-1.
    - Seat
      Refer to "GENERAL CHASSIS" on page 4-1.

EAS20730
CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

NOTE:

- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

2. Start the engine, warm it up for approximately 15 minutes until the oil temperature rises to 60 °C (140 °F), and then turn it off.
3. Remove:
   - Dipstick “1”
4. Check:
   - Engine oil level
     The engine oil level should be between the minimum level mark “a” and maximum level mark “b”.
     Below the minimum level mark → Add the recommended engine oil to the proper level.

NOTE:

- Before checking the engine oil level, wait a few minutes until the oil has settled.
- Do not screw the dipstick in when inspecting the oil level.

Type
SAE20W40
Recommended engine oil grade
API standard:
SE or higher grade
ACEA standard:
G4 or G5

EC5YU1003
CAUTION:

- **Since engine oil also lubricates the clutch, the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives, or use engine oils with a grade of CD “a” or higher, and do not use oils labeled “ENERGY CONSERVING II” “b”.**
- **Do not allow foreign materials to enter the crankcase.**

5. Start the engine, warm it up for several minutes, and then turn it off.
6. Check the engine oil level again.

NOTE:

Before checking the engine oil level, wait a few minutes until the oil has settled.

7. Install:
   - Dipstick

EAS20780
CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Remove:
   - Bottom cover
     Refer to “GENERAL CHASSIS” on page 4-1.
3. Place a container under the engine oil drain bolts.
4. Remove:
   - Engine oil filler cap “1”

5. Remove:
   - Engine oil drain bolt (oil tank) “1”

6. Remove:
   • Engine oil drain bolt (crankcase) “1”

7. Drain:
   • Engine oil
     (completely from the oil tank and crankcase)
8. If the oil filter cartridge is also to be replaced, perform the following procedure.

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a. Remove the rectifier/regulator “1”.

b. Remove the oil filter cartridge “1” with an oil filter wrench “2”.

	Oil filter wrench **90890-01426** **YU-38411**

c. Lubricate the O-ring “1” of the new oil filter cartridge with a thin coat of engine oil.

EC5YU1019

CAUTION:

Make sure the O-ring “1” is positioned correctly in the groove of the oil filter cartridge.

d. Tighten the new oil filter cartridge to specification with an oil filter wrench.

	Oil filter cartridge **17 Nm (1.7 m·kg, 12 ft·lb)**

e. Install the rectifier/regulator.

	Rectifier/regulator bolt **7 Nm (0.7 m·kg, 5.1 ft·lb)**

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9. Check:
   • Engine oil drain bolt gaskets
     Damage → Replace.
10. Install:
   • Engine oil drain bolt (crankcase)
     (along with the gasket)

	Engine oil drain bolt (crankcase) **43 Nm (4.3 m·kg, 31 ft·lb)**

   • Engine oil drain bolt (oil tank)
     (along with the gasket)

	Engine oil drain bolt (oil tank) **35 Nm (3.5 m·kg, 25 ft·lb)**

11. Fill:
   • Oil tank
     (with the specified amount of the recommended engine oil)

	Engine oil quantity **Total amount** **5.00 L (5.29 US qt) (4.40 Imp.qt)** **Without oil filter cartridge replacement** **3.70 L (3.91 US qt) (3.26 Imp.qt)** **With oil filter cartridge replacement** **4.10 L (4.33 US qt) (3.61 Imp.qt)**

NOTE:

Pour the engine oil in two stages. First, pour in 2.5 L of oil, then start the engine and rev it 3 to 5 times. Stop the engine, and then pour in the remainder of the specified amount.

EC5YU1004

CAUTION:

When starting the engine make sure the dipstick is securely fitted into the oil tank.

12. Fill: (when engine is disassembled)
    - Crankcase and oil tank
      (with the specified amount of the recommended engine oil)

Engine oil quantity **Total amount** **5.00 L (5.29 US qt) (4.40 Imp.qt)** **Engine** **2.2 L (2.33 US qt) (1.94 Imp.qt)** **Oil tank** **2.8 L (2.96 US qt) (2.46 Imp.qt)**

NOTE:

After the engine has been disassembled, pour the specified amount of engine oil into the crankcase and the oil tank. When pouring engine oil into the crankcase, pour it into the hole of the removed bolt "1".

13. Install:
    - Engine oil filler cap
14. Start the engine, warm it up for several minutes, and then turn it off.
15. Check:
    - Engine
      (for engine oil leaks)
16. Check:
    - Engine oil level
      Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-11.
17. Check:
    - Engine oil pressure

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a. Slightly loosen the oil gallery bolts "1".

b. Start the engine and keep it idling until engine oil starts to seep from the oil gallery bolts. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
c. Check the engine oil passages, the oil filter cartridge and the oil pump for damage or leakage. Refer to "OIL PUMP" on page 5-81.
d. Start the engine after solving the problem(s) and check the engine oil pressure again.
e. Tighten the oil gallery bolts to specification.

Oil gallery bolt **4 Nm (0.4 m·kg, 2.9 ft·lb)**

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EAS20860

ADJUSTING THE CLUTCH LEVER

1. Adjust:
   - Clutch lever position
     (distance "a" from the handlebar grip to the clutch lever)

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a. While pushing the clutch lever forward, turn the adjusting dial "1" until the clutch lever is in the desired position.

NOTE:

Be sure to align the setting on the adjusting dial with the arrow mark "2" on the clutch lever holder.

Position #1 **Distance "a" increases.** **Position #4** **Distance "a" decreases.**

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EAS20890

CHECKING THE CLUTCH FLUID LEVEL

1. Stand the vehicle on a level surface.

NOTE:

- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

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

	Recommended clutch fluid **Brake fluid DOT4**

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.

EAS20910

BLEEDING THE HYDRAULIC CLUTCH SYSTEM

EWA13000

WARNING

Bleed the hydraulic clutch system whenever:

- **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 fluid 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. Bleed:
   - Hydraulic clutch system

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a. Add the recommended clutch fluid to the proper level.
b. Install the clutch fluid reservoir diaphragm.
c. Connect a clear plastic hose “1” tightly to the bleed screw “2”.

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 (clutch release cylinder)
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 3-14.

EWA13010

WARNING

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

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EAS20960

REPLACING THE AIR FILTER ELEMENT

1. Remove:
   • Seat
   Refer to "GENERAL CHASSIS" on page 4-1.
2. Lift the front of the fuel tank, and then tilt it back and away from the air filter case. (Do not disconnect the fuel hoses.)

3. Remove:
   • Air filter case cover "1"

4. Remove:
   • Air filter element "1"

5. Check:
   • Air filter element
   Damage → Replace.

NOTE:

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

6. Install:
   • Air filter case cover

EC5YU1005

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 throttle body synchronization, leading to poor engine performance and possible overheating.

NOTE:

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

7. Install:
   • Fuel tank
   • Seat
   Refer to "GENERAL CHASSIS" on page 4-1.

EAS21010
CHECKING THE THROTTLE BODY JOINTS

1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   - Throttle body joints “1”
     Cracks/damage → Replace.

3. Install:
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21030
CHECKING THE FUEL LINE

1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   - Fuel hoses “1”
   - Breather hose “2”
   - Vacuum hose
     Cracks/damage → Replace.
     Loose connection → Connect properly.

ECA14940
CAUTION:

Make sure the fuel tank breather hose is routed correctly.

3. Install:
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21050
CHECKING THE CYLINDER HEAD BREATHER HOSES

1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 6-1.
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   - Cylinder head breather hose (air filter case to oil catch tank) “1”
   - Cylinder head breather hose (cylinder head to oil catch tank) “2”
     Cracks/damage → Replace.
     Loose connection → Connect properly.

EC5YU1028
CAUTION:

Make sure the cylinder head breather hoses are routed correctly.

3. Install:
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.

- Fuel tank
  Refer to “FUEL TANK” on page 6-1.
- Seat
  Refer to “GENERAL CHASSIS” on page 4-1.

EAS21060
CHECKING THE OIL TANK BREATHER HOSE

1. Check:
   - Oil tank breather hose “1”
     Cracks/damage → Replace.
     Loose connection → Connect properly.

ECA14930
CAUTION:

Make sure the oil tank breather hose is routed correctly.

EAS21080
CHECKING THE EXHAUST SYSTEM

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

1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   - Front exhaust pipe “1”
   - Rear exhaust pipe “2”
   - Catalyst pipe “3”
   - Mufflers “4”
     Cracks/damage → Replace.
   - Gaskets “5”
     Exhaust gas leaks → Replace.
3. Check:
   Tightening torques
   - Front exhaust pipe and front exhaust pipe joint bolts “6”
   - Front exhaust pipe and rear exhaust pipe bolt “7”
   - Rear exhaust pipe and rear exhaust pipe joint bolt “8”
   - Rear exhaust pipe bolt “9”
   - Rear exhaust pipe and catalyst pipe bolt “10”
   - Catalyst pipe nut “11”
   - Catalyst pipe and muffler bolts “12”
   - Muffler bolts “13”

Front exhaust pipe and front exhaust pipe joint bolt
20 Nm (2.0 m·kg, 14 ft·lb)
Front exhaust pipe and rear exhaust pipe bolt
20 Nm (2.0 m·kg, 14 ft·lb)
Rear exhaust pipe and rear exhaust pipe joint bolt
20 Nm (2.0 m·kg, 14 ft·lb)
Rear exhaust pipe bolt
20 Nm (2.0 m·kg, 14 ft·lb)
Rear exhaust pipe and catalyst pipe bolt
20 Nm (2.0 m·kg, 14 ft·lb)
Catalyst pipe nut
20 Nm (2.0 m·kg, 14 ft·lb)
Catalyst pipe and muffler bolt
20 Nm (2.0 m·kg, 14 ft·lb)
Muffler bolt
24 Nm (2.4 m·kg, 17 ft·lb)

NOTE:

When installing the EXUP cables, make sure they are parallel and not twisted.
- Upper cable: Black metal section “14”
- Lower cable: White metal section “15”

4. Install:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21100
ADJUSTING THE EXUP CABLES

1. Remove:
   - EXUP valve pulley cover “1”

2. Check:
   - EXUP system operation

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a. Turn the main switch to “ON”.
b. Check that the EXUP valve operates properly.

NOTE:

Check that the projections “a” on the EXUP valve pulley contact the stopper “b” (fully-open position) and the stopper “c” (fully-closed position).

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

EXUP cable free play (at the EXUP valve pulley)
a: 3 mm (0.12 in) or less
b: 0 mm

4. Adjust:
   - EXUP cable free play

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a. Slide back the rubber cover.
b. Loosen both locknuts “1”.

c. Insert a 3.5 mm (0.14 in) pin “2” through the projections “a” in the EXUP valve pulley and into the hole “b” in the EXUP valve cover.

d. Turn both adjusting nuts “3” in or out until the specification.

Turn in “c” →
Free play is increased.
Turn out “d” →
Free play is decreased.

e. Tighten both locknuts and then slide the rubber cover to its original position.
f. Remove the pin.
g. Turn the main switch to “ON”, check that the EXUP valve pulley contacts the stoppers (fully-open and fully-closed positions), and then check that the notch in the EXUP valve pulley is aligned with the hole in the EXUP valve cover.

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5. Install:
   - EXUP valve pulley cover

	EXUP valve pulley cover bolt **10 Nm (1.0 m·kg, 7.2 ft·lb)**

EAS21140
CHASSIS

EAS21160
ADJUSTING THE FRONT DISC BRAKE

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

NOTE:

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

Direction “b”
Distance “a” increases.
Direction “c”
Distance “a” decreases.

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 DISC BRAKE

NOTE:

The brake pedal position is determined by the installed rear brake master cylinder length “a”.

1. Measure:
   - Installed rear brake master cylinder length “a”
     Incorrect → Adjust.

Installed rear brake master cylinder length
145.3–145.7 mm (5.72–5.74 in)

2. Adjust:
   - Installed rear brake master cylinder length

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EW5YU1001

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.

EC5YU1024

CAUTION:

After adjusting the installed rear master cylinder length, make sure there is no brake drag.

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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 suitable 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

B

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 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.

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 PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - Front brake pad
     Wear indicators “1” almost touch the brake disc → Replace the brake pads as a set.
     Refer to “FRONT BRAKE” on page 4-18.

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 indicator grooves “1” almost disappeared → Replace the brake pads as a set.
     Refer to “REAR BRAKE” on page 4-31.

EAS21280
CHECKING THE FRONT BRAKE HOSES

The following procedure applies to all of the brake hoses and brake hose clamps.

1. Check:
   - Brake hoses “1”
     Cracks/damage/wear → Replace.
2. Check:
   - Brake hose clamps “2”
     Loose → Tighten the clamp bolt.

3. Hold the vehicle upright and apply the brake several times.
4. Check:
   - Brake hoses
     Brake fluid leakage → Replace the damaged hoses.
     Refer to “FRONT BRAKE” on page 4-18.

EAS21290
CHECKING THE REAR BRAKE HOSE

1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   - Brake hoses “1”
     Cracks/damage/wear → Replace.
3. Check:
   - Brake hose guide “2”
     Loose → Tighten the clamp bolt.

4. Hold the vehicle upright and apply the brake several times.
5. Check:
   - Brake hoses
     Brake fluid leakage → Replace the damaged hose.
     Refer to “REAR BRAKE” on page 4-31.
6. Install:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21330
ADJUSTING THE REAR BRAKE LIGHT SWITCH

NOTE:

The rear brake light switch is operated by movement of the brake pedal. The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.

1. Check:
   - Rear brake light operation timing
     Incorrect → Adjust.
2. Adjust:
   - Rear brake light operation timing

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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 (front brake master cylinder)
6 Nm (0.6 m·kg, 4.3 ft·lb)
Bleed screw (front brake caliper)
6 Nm (0.6 m·kg, 4.3 ft·lb)
Bleed screw (rear brake caliper)
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.

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EAS21380

ADJUSTING THE SHIFT PEDAL

NOTE:

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

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

Installed shift rod length
309.2–311.2 mm (12.17–12.25 in)

2. Adjust:
   - Installed shift rod length

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a. Loosen both locknuts "1".
b. Turn the shift rod "2" in direction "a" or "b" until the specified installed shift rod length is obtained.

Direction "a"
Installed shift rod length increases.
Direction "b"
Installed shift rod length decreases.

c. Tighten both locknuts to specification.

Locknut (shift rod)
7 Nm (0.7 m·kg, 5.1 ft·lb)

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EAS21390

ADJUSTING THE DRIVE CHAIN SLACK

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 swingarm 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:

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

2. Check:
   - Drive chain slack "a"
   Out of specification → Adjust.

Drive chain slack
40.0–50.0 mm (1.57–1.97 in)

NOTE:

Measure the drive chain slack 85 mm (3.35 in) “b” from the end of the drive chain guide.

3. Adjust:
   - Drive chain slack

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a. Loosen the wheel axle nut “1”.
b. Loosen both locknuts “2”.
c. Turn both adjusting bolts “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.

d. Tighten the locknuts to specification.

Locknut (drive chain adjusting bolt)
16 Nm (1.6 m·kg, 11 ft·lb)

e. Tighten the wheel axle nut to specification.

Rear wheel axle nut
150 Nm (15.0 m·kg, 110 ft·lb)

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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. Therefore, use only kerosene to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for O-ring chains. Do not use any other lubricants on the drive chain since they may contain solvents that could damage the O-rings.

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:
   - Upper bracket
     Refer to “STEERING HEAD” on page 4-57.
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 the specified torque with a steering nut wrench “5”.

NOTE:

Set a 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, 37 ft·lb)

c. Loosen the lower ring nut completely, and then tighten it to specification with a steering nut wrench.

EWA13140

WARNING

Do not overtighten the lower ring nut.

Lower ring nut (final tightening torque)
23 Nm (2.3 m·kg, 17 ft·lb)

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 4-57.
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 tabs “a” sit correctly in the ring nut slots “b”.

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5. Install:
   - Upper bracket
     Refer to “STEERING HEAD” on page 4-57.

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 “1”
     Damage/scratches → Replace.
   - Oil seal “2”
     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 4-47.

EAS21580

ADJUSTING THE FRONT FORK LEGS

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

EW5YU1008

WARNING

- **Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.**
- **Securely support the vehicle 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

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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 adjusting positions
Minimum
0
Standard
2
Maximum
5

2. Current setting
3. Cap bolt collar

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

Rebound damping

ECA13590

CAUTION:

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - Rebound damping

▼▼▼

Spring preload adjusting positions
Installed spring length
Minimum
155.0 mm (6.10 in)
Standard
150.0 mm (5.91 in)
Maximum
145.0 mm (5.71 in)

c. Installed spring length

c. Tighten the locknut to specification.

Locknut (rear shock absorber spring preload adjusting nut)
42 Nm (4.2 m·kg, 30 ft·lb)

ECA13600
CAUTION:
Always tighten the locknut against the adjusting nut and torque it to specification.

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Rebound damping

ECA13590
CAUTION:
Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - Rebound damping

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

Direction “a” (turn in)
Rebound damping is increased (suspension is harder).
Direction “b” (turn out)
Rebound damping is decreased (suspension is softer).

Rebound damping adjusting positions
Minimum
20 click(s) out*
Standard
12 click(s) out*
Maximum
3 click(s) out*
*** With the adjusting knob fully turned in**

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Compression damping

ECA13590
CAUTION:
Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - Compression damping

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

Direction “a” (turn in)
Compression damping is increased (suspension is harder).
Direction “b” (turn out)
Compression damping is decreased (suspension is softer).

Compression damping adjusting positions
Minimum
12 click(s) out*
Standard
10 click(s) out*
Maximum
1 click(s) out*
*** With the adjusting screw fully turned in**

EAS21650
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
290 kPa (42 psi) (2.90 kgf/cm²) (2.90 bar)
Loading condition
90–202 kg (198–445 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
202 kg (445 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.

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

1. Tire tread depth

2. Side wall
3. Wear indicator

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.**

A. Tire
B. Wheel

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 ZR17 M/C (58W)
Manufacturer/model
METZELER/MEZ4J FRONT (Europe)
MICHELIN/PILOT ROAD S (AUS)

Rear tire
Size
190/50 ZR17 M/C (73W)
Manufacturer/model
METZELER/MEZ4 (Europe)
MICHELIN/PILOT ROAD (AUS)

EWA13210

WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

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**

EAS21740

LUBRICATING THE REAR SUSPENSION

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

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

EAS21750
ELECTRICAL SYSTEM

EAS21760
CHECKING AND CHARGING THE BATTERY
Refer to “ELECTRICAL COMPONENTS” on page 7-85.

EAS21770
CHECKING THE FUSES
Refer to “ELECTRICAL COMPONENTS” on page 7-85.

EAS21790
REPLACING THE HEADLIGHT BULBS
1. Remove:
   - Headlight assembly bolts “1”

2. Replace:
   - Low beam headlight bulb

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a. Disconnect:
   - Headlight coupler “1”
b. Remove:
   - 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.

c. 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.

d. Connect:
   - Headlight coupler

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3. Replace:
   - High beam headlight bulb

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a. Remove:
   - Headlight bulb cover “1”

b. Disconnect:
   - Headlight coupler “1”
c. Detach:
   - Headlight bulb holder “2”

d. Remove:
   - Headlight bulb

EWA13320
WARNING

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

e. 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.

f. Attach:
- Headlight bulb holder

g. Connect:
- Headlight coupler

h. Install:
- Headlight bulb cover

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4. Install:
- Headlight assembly

	Headlight assembly bolt **7 Nm (0.7 m·kg, 5.1 ft·lb)**

EAS21810

ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
- Headlight beam (vertically)

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

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

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2. Adjust:
- Headlight beam (horizontally)

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

Direction “a”
Headlight beam moves to the right.
Direction “b”
Headlight beam moves to the left.

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CHAS 4

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EAS21830
GENERAL CHASSIS

Removing the seat and battery

Order	Job/Parts to remove	Q'ty	Remarks
1	Seat	1	
2	Lead holder	1	
3	Negative battery lead	1	Disconnect.
4	Positive battery lead	1	Disconnect.
5	Main fuse	1	
6	Battery band	1	
7	Battery	1	
8	Battery seat	1	
9	Battery box	1	
			For installation, reverse the removal procedure.

Removing the side covers and headlight assembly

Order	Job/Parts to remove	Q'ty	Remarks
1	Left side cover	1	
2	Right side cover	1	
3	Left side cover inner panel	1	
4	Right side cover inner panel	1	
5	Air duct	1	
6	Bottom cover	1	
7	Sub-wire harness 3 coupler (wire harness side)	1	Disconnect.
8	Headlight assembly coupler	1	Disconnect.
9	Air temperature sensor coupler	1	Disconnect.
10	Headlight assembly	1	
			For installation, reverse the removal procedure.

Removing the tail/brake light assembly

Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Muffler cooling fan motor coupler	1	Disconnect.
2	Tail/brake light coupler	1	Disconnect.
3	Rear right turn signal light coupler	1	Disconnect.
4	Rear left turn signal light coupler	1	Disconnect.
5	License plate light coupler	1	Disconnect.
6	Tail/brake light assembly	1	
7	Muffler cooling fan motor assembly	1	
			For installation, reverse the removal procedure.

Removing the air filter case and oil catch tank

Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
1	Air filter case cover	1	
2	Air filter element	1	
3	Cylinder head breather hose (air filter case to oil catch tank)	1	
4	Cylinder head breather hose (cylinder head to oil catch tank)	1	
5	Air filter case joint clamp screw	2	Loosen.
6	Air filter case bracket	1	
7	ISC (idle speed control) unit inlet hose	1	Disconnect.
8	Intake solenoid vacuum hose (air filter case valve to intake solenoid)	1	Disconnect.
9	Air filter case	1	
10	Air filter case valve	1	
11	Oil catch tank breather hose	1	
12	Oil catch tank	1	
			For installation, reverse the removal procedure.

ET5YU1013

CHECKING THE AIR FILTER CASE VALVE

1. Check:
   - Air filter case valve operation

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a. Remove the air filter case (with the air filter case valve).
b. Connect the vacuum/pressure pump gauge set “1” to the air filter case valve “2”.

	Vacuum/pressure pump gauge set **90890-06756**

c. Check that the air filter case valve operates when vacuum pressure is applied to the valve using the vacuum/pressure pump gauge set. Faulty → Replace the air filter case valve.

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EAS21870

FRONT WHEEL

Removing the front wheel and brake discs

Order	Job/Parts to remove	Q'ty	Remarks
			NOTE: Place the vehicle on a suitable stand so that the front wheel is elevated.
1	Left front brake hose holder	1	
2	Right front brake hose holder	1	
3	Left front brake caliper	1	
4	Right front brake caliper	1	
5	Front wheel axle pinch bolt	1	Loosen.
6	Front wheel axle	1	
7	Front wheel	1	
8	Collar	2	
9	Dust cover	2	
10	Front brake disc	2	
			For installation, reverse the removal procedure.

Disassembling the front wheel

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

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:
   - Front brake calipers

NOTE:

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

EAS21910
DISASSEMBLING THE FRONT WHEEL
1. Remove:
   - Oil seals
   - Wheel bearings

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a. Clean the outside of the front wheel hub.
b. Remove the oil seals “1” with a flat-head 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.

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EAS21920
CHECKING THE FRONT WHEEL
1. Check:
   - Front 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 3-31.
3. Measure:
   - Radial wheel runout “1”
   - Lateral wheel runout “2”
     Over the specified limits → Replace.

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

4. Check:
   - Wheel bearings
     Front wheel turns roughly or is loose → Replace the wheel bearings.

- Oil seals
  Damage/wear → Replace.

EAS21960
ASSEMBLING THE FRONT WHEEL

1. Install:
   - Wheel bearings New
   - Oil seals New

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

EC5YU1001

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.

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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.

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a. Spin the front wheel.
b. When the front wheel stops, put an "X_1" mark at the bottom of the wheel.

c. Turn the front wheel 90° so that the "X_1" mark is positioned as shown.
d. Release the front wheel.
e. When the wheel stops, put an "X_2" mark at the bottom of the 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".

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3. Adjust:
   - Front wheel static balance

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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.

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4. Check:
   • Front wheel static balance

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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.

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ET5YU1001
CHECKING THE FRONT BRAKE DISCS

Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-24.

EAS22000
INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

The following procedure applies to both of the front brake discs.

1. Install:
   • Front brake disc

Front brake disc bolt
18 Nm (1.8 m·kg, 13 ft·lb)
LOCTITE®

NOTE:

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

2. Check:
   • Front brake discs
   Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-24.
3. Lubricate:
   • Oil seal lips
   • Collars

Recommended lubricant
Lithium-soap-based grease

4. Install:
   • Front wheel

NOTE:

Install the tire and wheel with the mark “1” pointing in the direction of wheel rotation.

5. Tighten:
   • Front wheel axle

	Front wheel axle **72 Nm (7.2 m·kg, 52 ft·lb)**

- Front wheel axle pinch bolt

	Front wheel axle pinch bolt **23 Nm (2.3 m·kg, 17 ft·lb)**

EC5YU1002

CAUTION:

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

6. Install:
   - Front brake calipers

	Front brake caliper bolt **35 Nm (3.5 m·kg, 25 ft·lb)**

EWA13500

WARNING

Make sure the brake hose is routed properly.

NOTE:

Make sure that there is enough space between the brake pads before installing the brake calipers onto the brake discs.

EAS22020
REAR WHEEL

Removing the rear wheel

Order	Job/Parts to remove	Q'ty	Remarks
			NOTE: Place the vehicle on a suitable stand so that the rear wheel is elevated.
1	Rear brake caliper	1	
2	Drive chain adjusting locknut	2	Loosen.
3	Drive chain adjusting bolt	2	Loosen.
4	Rear wheel axle nut	1	
5	Washer	1	
6	Rear wheel axle	1	
7	Left drive chain puller	1	
8	Right drive chain puller	1	
9	Rear brake caliper bracket	1	
10	Rear wheel	1	
			For installation, reverse the removal procedure.

Removing the rear brake disc and rear wheel sprocket

Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake disc	1	
2	Rear wheel sprocket	1	
3	Collar (brake disc side)	1	
4	Collar (wheel sprocket side)	1	
5	Dust cover	2	
6	Oil seal	1	
7	Bearing	1	
8	Rear wheel drive hub	1	
9	Rear wheel drive hub damper	6	
			For installation, reverse the removal procedure.

Disassembling the rear wheel

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

EAS22040
REMOVING THE REAR 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 rear wheel is elevated.

2. Remove:
   - Rear brake caliper “1”

NOTE:

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

3. Remove:
   - Rear wheel axle nut “1”
   - Rear wheel axle “2”
   - Rear wheel

NOTE:

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

EAS22080
DISASSEMBLING THE REAR WHEEL
1. Remove:
   - Oil seals
   - Wheel bearings
     Refer to “DISASSEMBLING THE FRONT WHEEL” on page 4-8.

EAS22090
CHECKING THE REAR WHEEL
1. Check:
   - Rear wheel axle
   - Rear wheel
   - Wheel bearings
   - Oil seals
     Refer to “CHECKING THE FRONT WHEEL” on page 4-8.
2. Check:
   - Tire
   - Rear wheel
     Damage/wear → Replace.
     Refer to “CHECKING THE TIRES” on page 3-30 and “CHECKING THE WHEELS” on page 3-31.
3. Measure:
   - Radial wheel runout
   - Lateral wheel runout
     Refer to “CHECKING THE FRONT WHEEL” on page 4-8.

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

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 AND REPLACING THE REAR WHEEL SPROCKET
1. Check:
   - Rear wheel sprocket
     More than 1/4 tooth “a” wear → Replace the rear wheel sprocket.
     Bent teeth → Replace the rear wheel sprocket.

b. Correct
1. Drive chain roller
2. Rear wheel sprocket

2. Replace:
   - Rear wheel sprocket

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a. Remove the self-locking nuts and the rear wheel sprocket.
b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
c. Install the new rear wheel sprocket.

	Rear wheel sprocket self-locking nut **100 Nm (10 m·kg, 72 ft·lb)**

NOTE:

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

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EAS22140

ASSEMBLING THE REAR WHEEL

1. Install:
   - Wheel bearings New
   - Oil seals New
     Refer to "ASSEMBLING THE FRONT WHEEL" on page 4-9.

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 4-9.

ET5YU1026

CHECKING THE REAR BRAKE DISC

Refer to "CHECKING THE REAR BRAKE DISC" on page 4-36.

EAS22160

INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

1. Install:
   - Rear brake disc

	Rear brake disc bolt **18 Nm (1.8 m·kg, 13 ft·lb)** **LOCTITE®**

NOTE:

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

2. Check:
   - Rear brake disc
     Refer to "CHECKING THE REAR BRAKE DISC" on page 4-36.
3. Lubricate:
   - Oil seal lips
   - Collars

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

4. Install:
   - Collar (wheel sprocket side) "1"

- Collar (brake disc side) “2”

NOTE:

The collar (brake disc side) has marks “a” to distinguish it from the collar (wheel sprocket side).

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

	Drive chain slack **40.0–50.0 mm (1.57–1.97 in)**

6. Install:
   - Rear brake caliper

	Rear brake caliper bolt (M12) **27 Nm (2.7 m·kg, 19 ft·lb)** **Rear brake caliper bolt (M8)** **22 Nm (2.2 m·kg, 16 ft·lb)** **LOCTITE®**

EWA13500

WARNING

Make sure the brake hose is routed properly.

EAS22210
FRONT BRAKE

Removing the front brake pads

Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake hose holder	1	
2	Front brake caliper	1	
3	Brake pad clip	2	
4	Brake pad pin	1	
5	Brake pad spring	1	
6	Front brake pad	2	
			For installation, reverse the removal procedure.

Removing the front brake master cylinder

Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-23.
1	Brake fluid reservoir cap holder	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir	1	
6	Brake fluid reservoir hose	1	
7	Right rearview mirror	1	
8	Brake fluid reservoir bracket	1	
9	Brake lever	1	
10	Front brake light switch connector	2	Disconnect.
11	Front brake light switch	1	
12	Front brake hose union bolt	1	
13	Copper washer	2	
14	Front brake hose	1	
15	Front brake master cylinder holder	1	

Removing the front brake master cylinder

Order	Job/Parts to remove	Q'ty	Remarks
16	Front brake master cylinder	1	
			For installation, reverse the removal procedure.

*Apply silicon grease

Disassembling the front brake master cylinder

Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Bleed screw	1	
3	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

Removing the front brake calipers

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

Disassembling the front brake calipers

Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake pad clip	2	
2	Brake pad pin	1	
3	Brake pad spring	1	
4	Front brake pad	2	
5	Brake caliper piston	4	
6	Brake caliper piston seal	8	
7	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 DISCS
The following procedure applies to both brake discs.
1. Remove:
   - Front wheel
     Refer to “FRONT WHEEL” on page 4-6.
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)

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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.

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

Brake disc thickness limit
4.0 mm (0.16 in)

5. Adjust:
   - Brake disc deflection

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

Front brake disc bolt
18 Nm (1.8 m·kg, 13 ft·lb)
LOCTITE®

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

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.

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6. Install:
   - Front wheel
     Refer to “FRONT WHEEL” on page 4-6.

EAS22270

REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

NOTE:

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

1. Measure:
   - Brake pad wear limit “a”
     Out of specification → Replace the brake pads as a set.

Brake pad lining thickness (inner)
4.5 mm (0.18 in)
Limit
0.5 mm (0.02 in)
Brake pad lining thickness (outer)
4.5 mm (0.18 in)
Limit
0.5 mm (0.02 in)

2. Install:
   - Brake pads
   - Brake pad spring

NOTE:

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

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a. Connect a clear plastic hose “1” tightly to the bleed screw “2”. Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.

c. Tighten the bleed screw.

Bleed screw (front brake caliper)
6 Nm (0.6 m·kg, 4.3 ft·lb)

d. Install new brake pads and a new brake pad spring.

NOTE:

The arrow mark “a” on the brake pad spring must point in the direction of disc rotation.

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3. Install:
   - Brake pad pin
   - Brake pad clips
   - Front brake caliper

	Front brake caliper bolt 35 Nm (3.5 m·kg, 25 ft·lb)

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.

EAS22300
REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

NOTE:

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

1. Remove:
   - Front brake hose union bolt "1"
   - Copper washers "2"
   - Front brake hose "3"

NOTE:

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

EAS22350
DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Remove:
   - Brake caliper pistons "1"
   - Brake caliper piston seals "2"

EW5YU1006

⚠ WARNING

Do not loosen the bolts "3".

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a. Blow compressed air into the brake hose joint opening "a" to force out the piston from the brake caliper.

EWA13580

⚠ WARNING

- **Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake master cylinder.**
- **Never try to pry out the brake caliper piston.**

b. Remove the brake caliper piston seals.

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EAS22390
CHECKING THE FRONT BRAKE CALIPERS

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two 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.

EWA13600
WARNING

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

EAS22410
ASSEMBLING THE FRONT BRAKE CALIPERS

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 piston seals.**

Recommended fluid
DOT 4

EAS22450
INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
   - Front brake caliper “1” (temporarily)
   - Copper washers New
   - Front brake hose “2”
   - Front brake hose union bolt “3”

Front 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 2-41.

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. Remove:
   - Front brake caliper

3. Install:
   - Front brake pads
   - Brake pad spring
   - Brake pad pin
   - Brake pad clips
   - Front brake caliper

	Front brake caliper bolt **35 Nm (3.5 m·kg, 25 ft·lb)**

Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-25.

4. Fill:
   - Brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

	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.

5. Bleed:
   - Brake system
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.
6. 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.

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

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. Remove:
   - Front brake hose union bolt “1”
   - Copper washers “2”
   - Front brake hose “3”

NOTE:

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

EAS22510

CHECKING THE FRONT BRAKE MASTER CYLINDER

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

2. Check:
   - Brake master cylinder kit
     Damage/scratches/wear → Replace.
3. Check:
   - Brake fluid reservoir
     Cracks/damage → Replace.
   - Brake fluid reservoir diaphragm
     Cracks/damage → Replace.
4. Check:
   - Brake hoses
     Cracks/damage/wear → Replace.

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

EAS22540
INSTALLING THE FRONT BRAKE MASTER CYLINDER

1. Install:
   - Front brake master cylinder "1"
   - Front brake master cylinder holder

Front brake master cylinder holder bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:

- 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
   - Front brake hose "1"
   - Front brake hose union bolt "2"

Front 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 2-41.

NOTE:

- Install the brake hose at a right angle to the front brake master cylinder as shown in the illustration.
- 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. Fill:
   - Brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

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 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.

EAS22550
REAR BRAKE

Removing the rear brake pads

Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad pin	1	
3	Rear brake caliper	1	
4	Brake pad shim	2	
5	Brake pad insulator	2	
6	Rear brake pad	2	
7	Brake pad spring	2	
			For installation, reverse the removal procedure.

Removing the rear brake master cylinder

Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-23.
	Seat/Battery box/Lead holder		Refer to "GENERAL CHASSIS" on page 4-1.
	Drive sprocket cover		Refer to "CHAIN DRIVE" on page 4-69.
1	Brake fluid reservoir cap holder	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir	1	
6	Brake fluid reservoir hose	1	
7	Rear brake hose union bolt	1	
8	Copper washer	2	
9	Rear brake hose	1	
10	Rear brake master cylinder	1	
			For installation, reverse the removal procedure.

Disassembling the rear brake master cylinder

Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Brake hose joint	1	
3	Bush	1	
4	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

Removing the rear brake caliper

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

Disassembling the rear brake caliper

Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad pin	1	
3	Brake pad shim	2	
4	Brake pad insulator	2	
5	Rear brake pad	2	
6	Brake pad spring	2	
7	Brake caliper piston	2	
8	Brake caliper piston seal	4	
9	Bleed screw	1	
			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 4-12.
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 DISCS” on page 4-24.

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 DISCS” on page 4-24.

Brake disc thickness limit
5.5 mm (0.22 in)

5. Adjust:
   - Brake disc deflection
     Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-24.

Rear brake disc bolt
18 Nm (1.8 m·kg, 13 ft·lb)
LOCTITE®

6. Install:
   - Rear wheel
     Refer to “REAR WHEEL” on page 4-12.

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. Measure:
   - Brake pad wear limit “a”
     Out of specification → Replace the brake pads as a set.

Brake pad lining thickness (inner)
6.5 mm (0.26 in)
Limit
1.0 mm (0.04 in)
Brake pad lining thickness (outer)
6.5 mm (0.26 in)
Limit
1.0 mm (0.04 in)

2. Install:
   - Brake pad shims
     (onto the brake pads)
   - Brake pads
   - Brake pad spring

NOTE:

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

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a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.

c. Tighten the bleed screw.

	Bleed screw (rear brake caliper) **6 Nm (0.6 m·kg, 4.3 ft·lb)**

d. Install a new brake pad insulator and new brake pad shim "3" onto each new brake pad "4".

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3. Install:
   - Rear brake caliper
   - Brake pad pin
   - Screw plug

	Rear brake caliper bolt (M12) **27 Nm (2.7 m·kg, 19 ft·lb)** **Rear brake caliper bolt (M8)** **22 Nm (2.2 m·kg, 16 ft·lb)** **LOCTITE®**

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 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:
   - Rear brake hose union bolt "1"
   - Copper washers "2"
   - Rear brake hose "3"

NOTE:

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

EAS22610

DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:
   - Brake caliper pistons "1"
   - Brake caliper piston seals "2"

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a. Blow compressed air into the brake hose joint opening "a" to force out the pistons from the brake caliper.

EWA13550

WARNING

- **Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.**
- **Never try to pry out the brake caliper piston.**

b. Remove the brake caliper piston seals.

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EAS22640

CHECKING THE REAR BRAKE CALIPER

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two 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 seals.

2. Check:
   - Brake caliper bracket "1"
     Cracks/damage → Replace.

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 piston seals.**

Recommended fluid
DOT 4

EAS22670
INSTALLING THE REAR BRAKE CALIPER

1. Install:
   - Rear brake caliper "1" (temporarily)
   - Copper washers New
   - Rear brake hose "2"
   - Rear brake hose union bolt "3"

Rear 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 2-41.

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. Remove:
   - Rear brake caliper
3. Install:
   - Rear brake pads
   - Brake pad springs
   - Brake pad pin
   - Rear brake caliper
     Refer to "REPLACING THE REAR BRAKE PADS" on page 4-36.

Rear brake caliper bolt (M12)
27 Nm (2.7 m·kg, 19 ft·lb)
Rear brake caliper bolt (M8)
22 Nm (2.2 m·kg, 16 ft·lb)
LOCTITE®

4. Fill:
   - Brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

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.

5. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-23.
6. 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.

7. Check:
   - Brake pedal operation
     Soft 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

NOTE:

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

1. Remove:
   - Rear brake hose union bolt “1”
   - Copper washers “2”
   - Rear brake hose “3”

NOTE:

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

EAS22720
CHECKING THE REAR BRAKE MASTER CYLINDER

1. Check:
   - Brake master cylinder
     Damage/scratches/wear → Replace.
   - Brake fluid delivery passages
     (brake master cylinder body)
     Obstruction → Blow out with compressed air.
2. Check:
   - Brake master cylinder kit
     Damage/scratches/wear → Replace.
3. Check:
   - Brake fluid reservoir
     Cracks/damage → Replace.
   - Brake fluid reservoir diaphragm
     Cracks/damage → Replace.
4. Check:
   - Brake hoses
     Cracks/damage/wear → Replace.

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

EAS22740
INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:
   - Copper washers New
   - Rear brake hose “1”
   - Rear brake hose union bolt “2”

Rear 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 2-41.

ECA14160

CAUTION:

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

2. Fill:
   - Brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

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.

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 pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-23.
6. Adjust:
   - Brake pedal position
     Refer to “ADJUSTING THE REAR DISC BRAKE” on page 3-20.
7. Adjust:
   - Rear brake light operation timing
     Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-22.

EAS22840
HANDLEBAR

Removing the handlebar

Order	Job/Parts to remove	Q'ty	Remarks
1	Rearview mirror	2	
2	Front brake light switch connector	2	Disconnect.
3	Front brake master cylinder holder	1	
4	Front brake master cylinder assembly	1	
5	Right handlebar switch	1	
6	Throttle cable	2	Disconnect.
7	Grip end	2	
8	Throttle grip	1	
9	Clutch switch coupler	1	Disconnect.
10	Clutch master cylinder holder	1	
11	Clutch master cylinder assembly	1	
12	Left handlebar switch	1	
13	Handlebar grip	1	
14	Upper handlebar holder	2	
15	Handlebar	1	

Removing the handlebar

Order	Job/Parts to remove	Q'ty	Remarks
16	Lower handlebar holder	2	
			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 left handlebar grip, and gradually push the grip off the handlebar.

EAS22880
CHECKING THE HANDLEBAR
1. Check:
   - Handlebar
     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:
   - Lower handlebar holders “1”

NOTE:

Temporarily tighten the nuts “2”.

3. Install:
   - Handlebar “1”
   - Upper handlebar holders “2”

	Upper handlebar holder bolt 20 Nm (2.0 m·kg, 14 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:

- The upper handlebar holders should be installed with the punch marks “a” facing forward.
- Align the match mark “b” on the handlebar with the upper surface of the lower handlebar holder.

4. Tighten:
   - Lower handlebar holder nuts

	Lower handlebar holder nut 40 Nm (4.0 m·kg, 29 ft·lb)

5. Install:
   - Handlebar grip “1”
   - Grip end “2”

Grip end
29 Nm (2.9 m·kg, 21 ft·lb)

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a. Apply a thin coat of rubber adhesive onto the left end of the handlebar.
b. Slide the handlebar grip over the left end of the handlebar.
c. 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.

NOTE:

There should be 1–3 mm (0.04–0.12 in) of clearance “a” between the handlebar grip and the grip end.

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6. Install:
   - Left handlebar switch “1”

NOTE:

Align the projection “a” on the left handlebar switch with the hole “b” in the handlebar.

7. Install:
   - Clutch master cylinder assembly
   - Clutch master cylinder holder “1”

Clutch master cylinder holder bolt
13 Nm (1.3 m·kg, 9.4 ft·lb)

NOTE:

- Align the mating surfaces of the clutch master cylinder holder with the punch mark “a” on the handlebar.
- First, tighten the upper bolt, then the lower bolt.
- The clutch master cylinder holder has a punch mark “b” to distinguish it from the front brake master cylinder holder.

8. Install:
   - Throttle grip
   - Throttle cables
   - Right handlebar switch “1”
   - Grip end “2”

Grip end
29 Nm (2.9 m·kg, 21 ft·lb)

NOTE:

- Align the projection “a” on the right handlebar switch with the hole “b” in the handlebar.
- There should be 1–3 mm (0.04–0.12 in) of clearance “c” between the throttle grip and the grip end.

9. Install:
   - Front brake master cylinder assembly
   - Front brake master cylinder holder “1”

	Front brake master cylinder holder bolt **10 Nm (1.0 m·kg, 7.2 ft·lb)**

NOTE:
- 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.

10. Adjust:
   - Throttle cable free play
     Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” on page 3-7.

	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
			The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL" on page 4-6.
1	Front fork guard	2	
2	Front fender	1	
3	Cap bolt	1	Loosen.
4	Upper bracket pinch bolt	1	Loosen.
5	Lower bracket pinch bolt	2	Loosen.
6	Front fork leg	1	
			For installation, reverse the removal procedure.

Disassembling the front fork legs

Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
1	Cap bolt	1	
2	O-ring	1	
3	Washer	1	
4	Damper adjusting rod	1	
5	Spacer	1	
6	Nut	1	
7	Upper spring seat	1	
8	Fork spring	1	
9	Lower spring seat	1	
10	Outer tube	1	
11	Dust seal	1	
12	Oil seal clip	1	
13	Oil seal	1	
14	Washer	1	
15	Damper rod assembly	1	

Disassembling the front fork legs

Order	Job/Parts to remove	Q'ty	Remarks
16	Inner tube	1	
			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.

EAS22990
DISASSEMBLING THE FRONT FORK LEGS

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

1. Position the collar “1” as shown in the illustration by turning the spring preload adjusting bolt “2” counterclockwise until it stops.

2. Remove:
   - Cap bolt “1”
     (from the damper adjusting rod)
   - Spacer “2”
   - Nut “3”

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a. Press down on the spacer with the fork spring compressor “4”.
b. Install the rod holder “5” between the nut “3” and the spacer “2”.

Fork spring compressor
90890-01441
YM-01441
Rod holder
90890-01434
Damper rod holder double ended
YM-01434

NOTE:

Use the side of the rod holder that is marked “B”.

c. Hold the spring preload adjusting bolt “6” and loosen the nut “3”.

EC5YU1011
CAUTION:

When loosening the nut “3”, be sure not to break the projections “a” on the collar “7” of the cap bolt “1”.

NOTE:

Loosen the nut using a proper tool that has a thickness of 3 mm (0.12 in) or less.

d. Remove the cap bolt.
e. Remove the rod holder and fork spring compressor.
f. Remove the spacer and nut.

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3. Drain:
   - Fork oil

NOTE:

Stroke the damper rod "1" several times while draining the fork oil.

4. Remove:
   - Damper rod assembly

NOTE:

Remove the damper rod assembly with the damper rod holder "1".

Damper rod holder
90890-01504

5. Remove:
   - Oil seal clip "1"
     (with a flat-head screwdriver)

EAS23010

CHECKING THE FRONT FORK LEGS

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

1. Check:
   - Inner tube
   - Outer tube
     Bends/damage/scratches → Replace.

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
251.0 mm (9.88 in)
Limit
246.0 mm (9.69 in)

3. Check:
   - Damper rod
     Damage/wear → Replace.
     Obstruction → Blow out all of the oil passages with compressed air.
   - Damper adjusting rod
     Bends/damage → Replace.

ECA14200

CAUTION:

- **The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**

4. Check:
   - Cap bolt O-ring "1"
     Damage/wear → Replace.
   - Cap bolt collar projections "2"
     Cracks/damage → 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:
  - Oil seal
  - Dust seal
  - O-ring
- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:
   - Damper rod assembly "1"
   - Inner tube "2"

ECA14210

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

	Recommended oil **Suspension oil 01**

3. Tighten:
   - Damper rod assembly

	Damper rod assembly **35 Nm (3.5 m·kg, 25 ft·lb)**

NOTE:

Tighten the damper rod assembly with the damper rod holder "1".

	Damper rod holder **90890-01504**

4. Install:
   - Dust seal "1" New
   - Oil seal clip "2" New
   - Oil seal "3" New
   - Washer "4"

EC5YU1025

CAUTION:

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

NOTE:

- Before installing the oil seal, lubricate its lips with lithium-soap-based 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:
   - Outer tube
     (to the inner tube)
6. Install:
   - Washer
   - Oil seal “1”
     (with the fork seal driver “2”)

Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442

7. Install:
   - Oil seal clip “1”

NOTE:

Adjust the oil seal clip so that it fits into the outer tube’s groove.

8. Install:
   - Dust seal “1”
     (with the fork seal driver weight “2”)

Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442

9. Install:
   - Rod puller “1”
   - Rod puller attachment “2”
     (onto the damper rod “3”)

Rod puller
90890-01437
Universal damping rod bleeding tool set
YM-A8703
Rod puller attachment (M10)
90890-01436
Universal damping rod bleeding tool set
YM-A8703

10.Fully compress the front fork leg.
11.Fill:
- Front fork leg
  (with the specified amount of the recommended fork oil)

	Quantity **583.0 cm³ (19.71 US oz) (20.56 Imp.oz)** **Recommended oil** **Suspension oil 01**

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.**

12.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.

13.Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

NOTE:

Be sure to bleed the front fork leg of any residual air.

14.Measure:
- Front fork leg oil level “a”
  (from the top of the inner tube, with the outer tube fully compressed and without the fork spring)
  Out of specification → Correct.

	Level **65.0 mm (2.56 in)**

15.Install:
- Lower spring seat “1”
- Fork spring “2”
- Upper spring seat “3”
- Nut “4”
- Spacer “5”
- Damper adjusting rod “6”
- Washer “7”
- Cap bolt “8”
  (with O-ring)

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a. Remove the rod puller attachment.
b. Install the lower spring seat.
c. Install the fork spring.

NOTE:

Install the spring with the smaller pitch “a” facing up “A”.

d. Install the upper spring seat and nut.
e. Reinstall the rod puller attachment.
f. Install the spacer.
g. Press down on the spacer with the fork spring compressor “9”.
h. Pull up the rod puller and install the rod holder “10” between the nut “4” and the spacer “5”.

Rod puller
90890-01437
Universal damping rod bleeding tool set
YM-A8703
Rod puller attachment (M10)
90890-01436
Universal damping rod bleeding tool set
YM-A8703
Fork spring compressor
90890-01441
YM-01441
Rod holder
90890-01434
Damper rod holder double ended
YM-01434

NOTE:
Use the side of the rod holder that is marked “B”.

i. Remove the rod puller and rod puller attachment.

j. Install the nut “4” all the way onto the damper rod assembly.

k. Install the damper adjusting rod.
l. Install the washer and cap bolt, and then finger tighten the cap bolt.
m. Hold the nut and tighten the spring preload adjusting bolt “11” into the cap bolt to specification.

EWA13670
WARNING
Always use a new cap bolt O-ring.

EC5YU1012
CAUTION:
When tightening the spring preload adjusting bolt “11” into the cap bolt, be sure not to break the projections “c” on the collar “12”.

NOTE:
Hold the nut “4” using a proper tool that has a thickness of 3 mm (0.12 in) or less.

Nut and cap bolt
25 Nm (2.5 m·kg, 18 ft·lb)

n. Remove the rod holder and fork spring compressor.

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16. Install:
- Cap bolt
  (to the outer tube)

NOTE:
Temporarily tighten the cap bolt.

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:

Make sure the outer tube is flush with the top of the handlebar holder.

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

	Lower bracket pinch bolt **28 Nm (2.8 m·kg, 20 ft·lb)**

   - Cap bolt “2”

	Cap bolt **20 Nm (2.0 m·kg, 14 ft·lb)**

   - Upper bracket pinch bolt “3”

	Upper bracket pinch bolt **26 Nm (2.6 m·kg, 19 ft·lb)**

EWA13680

WARNING

Make sure the brake hoses are routed properly.

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

EAS23090
STEERING HEAD

Removing the lower bracket

Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case/Headlight assembly		Refer to "GENERAL CHASSIS" on page 4-1.
	Lower handlebar holder		Refer to "HANDLEBAR" on page 4-42.
	Front fork leg		Refer to "FRONT FORK" on page 4-47.
1	Meter assembly coupler	2	Disconnect.
2	Meter assembly	1	
3	Meter assembly bracket	1	
4	Steering stem nut	1	
5	Upper bracket	1	
6	Headlight assembly bracket	1	
7	Front brake hose joint	1	
8	Front brake hose joint bracket	1	
9	Lock washer	1	
10	Upper ring nut	1	
11	Rubber washer	1	
12	Lower ring nut	1	

Removing the lower bracket

Order	Job/Parts to remove	Q'ty	Remarks
13	Lower bracket	1	
14	Washer	1	
15	Lower bearing	1	
16	Lower bearing dust seal	1	
17	Lower bearing inner race	1	
18	Upper bearing cover	1	
19	Upper bearing inner race	1	
20	Upper bearing	1	
21	Bearing outer race	2	
			For installation, reverse the removal procedure.

EAS23110
REMOVING THE LOWER BRACKET
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:
   - Upper ring nut “1”
   - Rubber washer
   - Lower ring nut “2”
   - Lower bracket

EWA13730
WARNING

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

NOTE:

Hold the lower ring nut with the ring nut wrench “3”, and then remove the upper ring nut with the steering nut wrench “4”.

Ring nut wrench
90890-01268
Spanner wrench
YU-01268
Steering nut wrench
90890-01403
Spanner wrench
YU-33975

EAS23120
CHECKING THE STEERING HEAD
1. Wash:
   - Bearings
   - Bearing races

Recommended cleaning solvent
Kerosene

2. Check:
   - Bearings
   - Bearing races
     Damage/pitting → Replace.
3. Replace:
   - Bearings
   - Bearing races

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a. Remove the bearing races from the steering head pipe with a long rod “1” and hammer.
b. Remove the bearing race from the lower bracket with a floor chisel “2” and hammer.
c. Install 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.

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

EAS23140
INSTALLING THE STEERING HEAD
1. Lubricate:
   - Upper bearing
   - Lower bearing
   - Bearing races

Recommended lubricant
Lithium-soap-based grease

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:
   - Front brake hose joint bracket “1”
   - Front brake hose joint “2”

NOTE:

Make sure that the tab “a” on the front brake hose joint bracket “1” contacts the side “b” of the front brake hose joint “2”.

4. Install:
   - Upper bracket
   - Steering stem nut

NOTE:

Temporarily tighten the steering stem nut.

5. Install:
   - Front fork legs
     Refer to “FRONT FORK” on page 4-47.

NOTE:

Temporarily tighten the upper and lower bracket pinch bolts.

6. Tighten:
   - Steering stem nut

	Steering stem nut **110 Nm (11.0 m·kg, 80 ft·lb)**

EAS23160

REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly

Order	Job/Parts to remove	Q'ty	Remarks
1	Self-locking nut/Bolt	1/1	
2	Self-locking nut/Bolt/Spacer	1/1/1	
3	Self-locking nut/Bolt	1/1	
4	Rear shock absorber assembly	1	
5	Collar/Spacer/Oil seal/Bearing	2/1/2/1	
6	Self-locking nut/Bolt/Washer	1/1/2	
7	Spacer	1	
8	Oil seal/Bearing	2/1	
9	Relay arm	1	
10	Spacer/Oil seal/Bearing	2/8/4	
11	Connecting arm	1	
12	Collar/Spacer	2/1	
			For installation, reverse the removal procedure.

EAS23180
HANDLING THE REAR SHOCK ABSORBER

EWA13740
WARNING

This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, 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.
- **Do not tamper or attempt to open the rear shock absorber.**
- **Do not subject the rear shock absorber 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 in any way. Rear shock absorber damage will result in poor damping performance.**

EAS23190
DISPOSING OF A REAR SHOCK ABSORBER

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3-mm (0.079–0.118 in) hole through the rear shock absorber at a point 40 mm (1.57 in) from its end as shown.

EWA13760
WARNING

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

EAS23230
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 on a suitable stand so that the rear wheel is elevated.

2. Remove:
   - Relay arm bolt (relay arm and swingarm) “1”
   - Rear shock absorber assembly bolt (front side) “2”

NOTE:

While removing the relay arm bolt (relay arm and swingarm), hold the swingarm so that it does not drop down.

EAS23240
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
   - Rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.
   - Rear shock absorber
     Gas leaks/oil leaks → Replace the rear shock absorber assembly.
   - Spring
     Damage/wear → Replace the rear shock absorber assembly.
   - Bearing
   - Oil seals
     Damage/wear → Replace.
   - Collars
   - Spacer
     Damage/scratches → Replace.
   - Bolts
     Bends/damage/wear → Replace.

EAS23260
CHECKING THE CONNECTING ARM AND RELAY ARM

1. Check:
   - Connecting arm
   - Relay arm
     Damage/wear → Replace.
2. Check:
   - Bearings

- Oil seals
  Damage/pitting → Replace.

3. Check:
   - Collars
   - Spacers
     Damage/scratches → Replace.

EAS23270

INSTALLING THE CONNECTING ARM AND RELAY ARM

1. Lubricate:
   - Spacers
   - Bearings

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

2. Install:
   - Bearing “1”
     (to the relay arm)
   - Bearings “2”
     (to the connecting arm)
   - Oil seals “3”
     (to the relay arm)
   - Oil seals “4”
     (to the connecting arm)

	Installed depth “a” **8.0 mm (0.31 in)** **Installed depth “b”** **4.0 mm (0.16 in)** **Installed depth “c”** **7.0 mm (0.28 in)** **Installed depth “d”** **0.5–1.0 mm (0.02–0.04 in)**

5. Relay arm
6. Connecting arm
7. Rear shock absorber

A. Left side
B. Right side

3. Install:
   - Relay arm “1”
     (to the connecting arm)

NOTE:

Install the relay arm with its “R” mark “a” facing to the right and its arrow mark “b” facing upward.

4. Tighten:
   - Rear shock absorber assembly nut (rear side)

	Rear shock absorber assembly nut (rear side) **40 Nm (4.0 m·kg, 29 ft·lb)**

- Relay arm nut (relay arm and connecting arm)

	Relay arm nut (relay arm and connecting arm) **49 Nm (4.9 m·kg, 35 ft·lb)**

EAS23310

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
   - Spacers
   - Bearings

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

2. Install:
   - Relay arm
     (to the swingarm)

NOTE:

When installing the relay arm, lift up the swingarm.

3. Tighten:
   - Rear shock absorber assembly nut (front side)

	Rear shock absorber assembly nut (front side) **49 Nm (4.9 m·kg, 35 ft·lb)**

   - Relay arm nut (relay arm and swingarm)

	Relay arm nut (relay arm and swingarm) **40 Nm (4.0 m·kg, 29 ft·lb)**

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

	Drive chain slack **40.0–50.0 mm (1.57–1.97 in)**

EAS23330
SWINGARM

Removing the swingarm

Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "GENERAL CHASSIS" on page 4-1.
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-61.
	Drive chain guard (drive sprocket side)		Refer to "CHAIN DRIVE" on page 4-69.
1	Footrest cover	1	
2	Drive chain guard (swingarm side)	1	
3	Rear brake hose guide 1	1	
4	Rear brake hose holder	1	
5	Drive chain adjusting bolt/Locknut	2/2	
6	Footrest bracket pinch bolt	2	Loosen.
7	Swingarm pivot shaft nut	1	
8	Swingarm pivot shaft	1	
9	Collar	2	
10	Spacer	1	
11	Spacer	1	
12	Drive chain	1	

Removing the swingarm

Order	Job/Parts to remove	Q'ty	Remarks
13	Rear fender	1	
14	Drive chain guide	1	
15	Swingarm	1	
16	Spacer	1	
17	Oil seal	1	
18	Oil seal	1	
19	Oil seal	2	
20	Circlip	1	
21	Bearing	1	
22	Bearing	1	
23	Bearing	1	
24	Oil seal	2	
25	Bearing	1	
			For installation, reverse the removal procedure.

EAS23350
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 on a suitable stand so that the rear wheel is elevated.

2. Measure:
   - Swingarm side play
   - Swingarm vertical movement

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a. Measure the tightening torque of the 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, bearings, washers, and dust covers.

	Swingarm side play (at the end of the swingarm) **1.0 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, bearings, washers, and dust covers.

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3. Remove:
   - Drive chain
     Refer to “REMOVING THE DRIVE CHAIN” on page 4-70.

EAS23360
CHECKING THE SWINGARM

1. Check:
   - Swingarm
     Bends/cracks/damage → Replace.
2. Check:
   - Pivot shaft
     Roll the pivot shaft on a flat surface.
     Bends → Replace.

EWA13770
WARNING

Do not attempt to straighten a bent pivot shaft.

3. Wash:
   - Pivot shaft
   - Spacer
   - Washer
   - Bearings
   - Collars

	Recommended cleaning solvent **Kerosene**

4. Check:
   - Oil seals
     Damage/wear → Replace.
   - Bearings
     Damage/pitting → Replace.
   - Collars
   - Spacers
     Damage/scratches → Replace.

EAS23380
INSTALLING THE SWINGARM

1. Lubricate:
   - Bearings
   - Spacer
   - Pivot shaft

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

2. Install:
   - Bearings “1”
   - Oil seals “2”

- Bearing “3”
- Oil seal “4”

Installed depth of bearing “a”
6.3 mm (0.25 in)
Installed depth of bearing “b”
5.7 mm (0.22 in)
Installed depth of oil seal “c”
0.5–1.0 mm (0.02–0.04 in)
Installed depth of oil seal “d”
0.5 mm (0.02 in)
Installed depth of bearing “e”
4.0 mm (0.16 in)
Installed depth of oil seal “f”
1.0 mm (0.04 in)

5. Swingarm
6. Swingarm pivot shaft
7. Relay arm
8. Bolt

A. Left side
B. Right side

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

Drive chain slack
40.0–50.0 mm (1.57–1.97 in)

EAS23400
CHAIN DRIVE

Removing the drive sprocket and drive chain

Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-23.
1	Drive sprocket cover	1	
2	Clutch pipe union bolt cap	1	
3	Clutch pipe union bolt	1	
4	Copper washer	2	
5	Clutch pipe	1	
6	Clutch release cylinder	1	
7	Dowel pin	2	
8	Drive chain guard (drive sprocket side)	1	
9	Drive sprocket nut	1	
10	Washer	1	
11	Drive sprocket	1	
12	Drive chain	1	
			For installation, reverse the removal procedure.

EAS23410
REMOVING THE DRIVE CHAIN

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 rear wheel is elevated.

2. Remove:
   - Drive chain
     (with the drive chain cutter)

NOTE:

Only cut the drive chain if it or the swingarm is to be replaced.

EAS23440
CHECKING THE DRIVE CHAIN

1. Measure:
   - 15-link section “a” of the drive chain
     Out of specification → Replace the drive chain.

15-link length limit
239.3 mm (9.42 in)

NOTE:

- While measuring the 15-link section, push down on the drive chain to increase its tension.
- Measure the length between drive chain roller “1” and “16” as shown.
- Perform this measurement at two or three different places.

2. Check:
   - Drive chain
     Stiffness → Clean and lubricate or replace.

3. Clean:
   - Drive chain

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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 → Replace the drive chain.
     Cracks → Replace the drive chain and make sure the battery breather hose is properly routed away from the drive chain and below the swingarm.

5. Lubricate:
   - Drive chain

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

EAS23460
CHECKING THE DRIVE SPROCKET

1. Check:
   - Drive sprocket
     More than 1/4 tooth “a” wear → Replace the drive chain sprockets as a set.
     Bent teeth → Replace the drive chain sprockets as a set.

b. Correct
1. Drive chain roller
2. Drive chain sprocket

EAS23470
CHECKING THE REAR WHEEL SPROCKET

Refer to “CHECKING AND REPLACING THE REAR WHEEL SPROCKET” on page 4-15.

EAS23480
CHECKING THE REAR WHEEL DRIVE HUB

Refer to “CHECKING THE REAR WHEEL DRIVE HUB” on page 4-15.

EAS28800
INSTALLING THE DRIVE CHAIN

1. Lubricate:
   - Drive chain

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

2. Install:
   - Drive sprocket “1”
   - Washer “2”
   - Drive sprocket nut “3” New

	Drive sprocket nut **95 Nm (9.5 m·kg, 68 ft·lb)**

NOTE:
- While applying the rear brake, tighten the drive sprocket nut.
- Install the washer “2” with its “OUT” mark “a” facing outward.
- Stake the drive sprocket nut “3” at a cutout “b” in the drive axle.

3. Install:
   - Clutch release cylinder
     Refer to “INSTALLING THE CLUTCH RELEASE CYLINDER” on page 5-62.

ENG 5

ENGINE

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EAS23710
ENGINE REMOVAL

Removing the oil tank

Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-11.
	Air duct		Refer to "GENERAL CHASSIS" on page 4-1.
1	Oil tank breather hose	1	Disconnect.
2	Dipstick	1	
3	Oil tank inlet pipe	1	
4	Oil tank outlet pipe	1	
5	Oil tank	1	
6	Oil tank breather hose holder	1	
7	Oil tank gasket	1	
8	Oil strainer cover (oil tank)	1	
9	Oil strainer (oil tank)	1	
			For installation, reverse the removal procedure.

ET5YU1027
CHECKING THE OIL PIPES
1. Check:
   - Oil pipes
     Damage → Replace.
     Obstruction → Wash and blow out with compressed air.

ET5YU1028
CHECKING THE OIL STRAINER
1. Check:
   - Oil strainer (oil tank)
     Damage → Replace.
     Contaminants → Clean with engine oil.

ET5YU1019
INSTALLING THE OIL TANK
1. Install:
   - Oil tank

	Oil tank bolt **10 Nm (1.0 m·kg, 7.2 ft·lb)**

NOTE:
Tighten the oil tank bolts in the proper tightening sequence as shown.

Removing the exhaust pipe

Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	EXUP valve pulley cover	1	
2	EXUP cable	2	Disconnect.
3	O_2 sensor cover	1	
4	O_2 sensor	1	
5	Muffler end cover	2	
6	Muffler end cover plate	2	
7	Muffler cover	2	
8	Muffler	2	
9	Gasket	2	
10	Front exhaust pipe	1	
11	Gasket	2	
12	Rear exhaust pipe	1	
13	Gasket	2	
14	Catalyst pipe	1	
			For installation, reverse the removal procedure.

ET5YU1029
REMOVING THE MUFFLER END COVERS

1. Remove:
   - Muffler end covers “1”

NOTE:

Before removing a muffler end cover, turn it in the direction of the arrow shown in the illustration.

ET5YU1030
INSTALLING THE MUFFLER END COVERS

1. Install:
   - Muffler covers “1”
   - Muffler end cover plates “2”

NOTE:

When installing a muffler end cover plate, be sure to insert its hooks “a” (two locations) into the holes in the muffler cover and align its tabs “b” (four locations) with the grooves in the muffler cover.

2. Install:
   - Muffler end covers “1”

NOTE:

When installing a muffler end cover, align its projections “a” (four locations) with the grooves “b” in the muffler cover, and then turn it in the direction of the arrow shown in the illustration.

Removing the EXUP servo motor and rear exhaust pipe joint

Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Air filter case/Oil catch tank/Air duct		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle body/Intake manifold/Rollover valve bracket		Refer to "THROTTLE BODIES" on page 6-4.
	ISC (idle speed control) unit		Refer to "ISC (IDLE SPEED CONTROL) UNIT" on page 6-11.
	Shift arm		Refer to "CLUTCH" on page 5-46.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-70.
	Oil pipe 2		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-66.
	Drive sprocket		Refer to "CHAIN DRIVE" on page 4-69.
	Rear shock absorber assembly		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-61.
1	Rectifier/regulator coupler	1	Disconnect.
2	Stator coil assembly coupler	1	Disconnect.
3	Rectifier/regulator	1	
4	Oil filter cartridge	1	

Removing the EXUP servo motor and rear exhaust pipe joint

Order	Job/Parts to remove	Q'ty	Remarks
5	Horn connector	2	Disconnect.
6	Horn	1	
7	Oil pump outlet pipe	1	
8	Oil pump inlet pipe	1	
9	Sidestand switch coupler	1	Disconnect.
10	Shift rod	1	
11	Left rider footrest assembly	1	
12	Sidestand assembly	1	
13	Right rider footrest assembly	1	
14	Drive sprocket case assembly	1	
15	Left side panel assembly	1	
16	Right side panel	1	
17	EXUP servo motor coupler	1	Disconnect.
18	EXUP servo motor	1	
19	O_2 sensor coupler	1	
20	Neutral switch coupler	1	Disconnect.
21	Neutral switch	1	

Removing the EXUP servo motor and rear exhaust pipe joint

Order	Job/Parts to remove	Q'ty	Remarks
22	Rear exhaust pipe joint cover	1	
23	Rear exhaust pipe joint	1	
24	Gasket	1	
			For installation, reverse the removal procedure.

Removing the leads

Order	Job/Parts to remove	Q'ty	Remarks
1	Stator coil assembly lead	1	
2	Horn lead	1	
3	Wire harness	1	
4	Decompression solenoid coupler	2	Disconnect.
5	Speed sensor coupler	1	Disconnect.
6	Starter motor connector	1	
7	Starter motor lead	1	
8	Crankshaft position sensor coupler	1	Disconnect.
9	Negative battery lead	1	Disconnect.
10	Engine temperature sensor coupler	1	Disconnect.
11	Spark plug cap	4	
			For installation, reverse the removal procedure.

Removing the down tube

Order	Job/Parts to remove	Q'ty	Remarks
			NOTE: Place a suitable stand under the frame and engine.
1	Engine mounting bolt (right upper side)	1	l = 65 mm (2.56 in)
2	Engine mounting bolt (right upper side)	1	l = 80 mm (3.15 in)
3	Engine mounting bolt (left upper side)	2	
4	Engine bracket bolt (right upper side)	2	
5	Engine bracket bolt (left upper side)	2	
6	Engine bracket (right upper side)	1	
7	Engine bracket (left upper side)	1	
8	Engine mounting nut (front upper side)	1	
9	Engine mounting bolt (front upper side)	1	
10	Engine bracket nut (front upper side)	4	
11	Engine bracket bolt (front upper side)	4	
12	Engine bracket (front upper side)	2	
13	Down tube nut (rear side)	2	
14	Down tube bolt (rear side)	2	

Removing the down tube

Order	Job/Parts to remove	Q'ty	Remarks
15	Down tube nut (front side)	2	
16	Down tube spacer bolt	2	Loosen.
17	Down tube bolt (front side)	2	
18	Engine mounting nut (front lower side)	1	
19	Engine mounting bolt (front lower side)	1	
20	Down tube	1	
			For installation, reverse the removal procedure.

Removing the engine

Order	Job/Parts to remove	Q'ty	Remarks
			NOTE: Place a suitable stand under the frame and engine.
1	Engine mounting nut (rear upper side)	1	
2	Engine mounting spacer bolt (rear upper side)	1	Loosen.
3	Engine mounting bolt (rear upper side)	1	
4	Engine bracket nut (rear upper side)	2	
5	Engine bracket bolt (rear upper side)	2	
6	Engine mounting nut (rear lower side)	1	
7	Engine mounting spacer bolt (rear lower side)	1	Loosen.
8	Engine mounting bolt (rear lower side)	1	
9	Engine	1	
10	Right side panel bracket	1	
11	Cylinder-#1 right ignition coil	1	
12	Cylinder-#1 left ignition coil	1	
13	Ignition coil bracket	1	

Removing the engine

Order	Job/Parts to remove	Q'ty	Remarks
14	Engine bracket (rear upper side)	1	
			For installation, reverse the removal procedure.

ET5YU1031
REMOVING THE ENGINE

NOTE:

Pass a suitable rod through the hole in the swingarm pivot shaft and secure the rod to support the vehicle.

1. Loosen:
   - Down tube spacer bolts
   - Engine mounting spacer bolt (rear upper side)
   - Engine mounting spacer bolt (rear lower side)

NOTE:

Loosen the spacer bolts with the pivot shaft wrench “1”.

Pivot shaft wrench
90890-01485
Frame mount insert wrench
YM-01485

EAS23720
INSTALLING THE ENGINE

1. Loosen:
   - Engine mounting spacer bolt (rear upper side) “1”
   - Down tube spacer bolts “2”
   - Engine mounting spacer bolt (rear lower side) “3”
2. Install:
   - Engine bracket (rear upper side) “4” (with the ignition coils)
   - Engine bracket bolts (rear upper side) “5”
3. Position the engine “6” under the vehicle for installation.
4. Install:
   - Engine “6”
   - Engine mounting bolt (rear upper side) “7”
   - Engine mounting bolt (rear lower side) “8”
   - Down tube “9”
   - Down tube bolts (front side) “10”
   - Down tube bolts (rear side) “11”
   - Down tube nut (rear side) “12” (temporarily tighten)
   - Engine mounting bolt (front lower side) “13”

NOTE:

Do not fully tighten the bolts and nuts.

5. Tighten:
   - Down tube spacer bolt “2”
   - Engine mounting spacer bolt (rear lower side) “3”
   - Engine mounting spacer bolt (rear upper side) “1”
   - Down tube nut (rear side) “12”

Down tube spacer bolt
8 Nm (0.8 m·kg, 5.8 ft·lb)
Engine mounting spacer bolt (rear lower side)
8 Nm (0.8 m·kg, 5.8 ft·lb)
Engine mounting spacer bolt (rear upper side)
8 Nm (0.8 m·kg, 5.8 ft·lb)
Down tube nut (rear side)
55 Nm (5.5 m·kg, 40 ft·lb)

NOTE:

- Tighten the spacer bolts “1”, “2”, “3” to specification with a pivot shaft wrench.
- When tightened, the spacer bolts should be flat against the engine surface.

Pivot shaft wrench
90890-01485
Frame mount insert wrench
YM-01485

6. Install:
   - Down tube nut (front side) “14” (temporarily tighten)
   - Engine mounting nut (rear lower side) “15” (temporarily tighten)
   - Engine mounting nut (rear upper side) “16” (temporarily tighten)

NOTE:

Do not fully tighten the bolts and nuts.

7. Tighten:
   - Down tube nut (front side) “14”
   - Engine mounting nut (rear lower side) “15”
   - Engine mounting nut (rear upper side) “16”
   - Engine bracket nuts (rear upper side) “17”

Down tube nut (front side)
74 Nm (7.4 m·kg, 53 ft·lb)
Engine mounting nut (rear lower side)
74 Nm (7.4 m·kg, 53 ft·lb)
Engine mounting nut (rear upper side)
74 Nm (7.4 m·kg, 53 ft·lb)
Engine bracket nut (rear upper side)
53 Nm (5.3 m·kg, 38 ft·lb)

8. Install:
   - Engine brackets (front upper side) “18”
   - Engine bracket bolts (front upper side) “19”
   - Engine mounting bolt (front upper side) “20”
   - Engine mounting nut (front lower side) “21” (temporarily tighten)
   - Engine mounting nut (front upper side) “22” (temporarily tighten)
   - Engine bracket nuts (front upper side) “23” (temporarily tighten)
   - Engine bracket (left upper side) “24”
   - Engine bracket bolts (left upper side) “25” (temporarily tighten)
   - Engine mounting bolts (left upper side) “26” (temporarily tighten)
   - Engine bracket (right upper side) “27”
   - Engine bracket bolts (right upper side) “28” (temporarily tighten)
   - Engine mounting bolt (right upper side) “29” (temporarily tighten)
   - Engine mounting bolt (right upper side) “30” (temporarily tighten)

NOTE:

Do not fully tighten the bolts and nuts.

9. Tighten:
   - Engine mounting nut (front lower side) “21”
   - Engine bracket nuts (front upper side) “23”
   - Engine mounting nut (front upper side) “22”
   - Engine bracket bolts (left upper side) “25”
   - Engine mounting bolts (left upper side) “26”
   - Engine bracket bolts (right upper side) “28”
   - Engine mounting bolts (right upper side) “29” and “30”

Engine mounting nut (front lower side)
94 Nm (9.4 m·kg, 68 ft·lb)
Engine bracket nut (front upper side)
53 Nm (5.3 m·kg, 38 ft·lb)
Engine mounting nut (front upper side)
94 Nm (9.4 m·kg, 68 ft·lb)
Engine bracket bolt (left upper side)
53 Nm (5.3 m·kg, 38 ft·lb)
Engine mounting bolt (left upper side)
53 Nm (5.3 m·kg, 38 ft·lb)
Engine bracket bolt (right upper side)
53 Nm (5.3 m·kg, 38 ft·lb)
Engine mounting bolt (right upper side)
53 Nm (5.3 m·kg, 38 ft·lb)

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EAS23750
CAMSHAFTS

Removing the camshaft sprocket cover

Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
1	Spark plug	4	
2	Timing mark accessing screw	1	
3	Crankshaft end cover	1	
4	Decompression solenoid cover	1	
5	Camshaft sprocket cover	1	
6	Camshaft sprocket cover gasket	1	
7	Dowel pin	2	
			For installation, reverse the removal procedure.

Removing cylinder head covers

Order	Job/Parts to remove	Q'ty	Remarks
1	Tappet cover bolt	4	
2	Tappet cover	2	
3	O-ring	2	
4	Cylinder head cover bolt	4	l = 60 mm (2.36 in)
5	Cylinder head cover bolt	2	l = 50 mm (1.97 in)
6	Cylinder head cover bolt	10	l = 50 mm (1.97 in)
7	Cylinder head cover bolt	12	l = 40 mm (1.57 in)
8	Rear cylinder head cover	1	
9	Front cylinder head cover	1	
10	Cylinder head cover gasket	2	
11	Dowel pin	4	
			For installation, reverse the removal procedure.

Removing the push rods and rocker arms

Order	Job/Parts to remove	Q'ty	Remarks
1	Rear rocker arm base assembly	1	
2	Front rocker arm base assembly	1	
3	Rocker arm base gasket	2	
4	Dowel pin	4	
5	Push rod 1	3	l = 288.5 mm (11.358 in) green painting
6	Push rod 2	1	l = 290.5 mm (11.437 in) yellow painting
7	Rear rocker arm base	1	
8	Front rocker arm base	1	
9	Rocker arm shaft	4	
10	Rocker arm 1	2	
11	Rocker arm 2	2	
12	Locknut	4	
13	Adjusting screw	4	
			For installation, reverse the removal procedure.

Removing the valve lifters

Order	Job/Parts to remove	Q'ty	Remarks
	Front cylinder		Refer to "CYLINDERS AND PISTONS" on page 5-41.
1	Push rod cover	2	
2	O-ring	4	
3	Seal	2	
4	Rear valve lifter case	1	
5	Front valve lifter case	1	
6	Valve lifter	4	
			For installation, reverse the removal procedure.

Removing the camshafts

Order	Job/Parts to remove	Q'ty	Remarks
1	Decompression solenoid	1	
2	Long decompression push rod	1	92 mm (3.6 in)
3	Short decompression push rod	1	78 mm (3.1 in)
4	Camshaft drive gear	1	
5	Straight key	1	
6	Camshaft driven gear	1	
7	Straight key	1	
8	Front cylinder camshaft end cover	1	
9	Oil delivery pipe	1	
10	Camshaft cover	1	
11	Camshaft cover gasket	1	
12	Dowel pin	2	
13	Front cylinder camshaft	1	
14	Rear cylinder camshaft	1	
			For installation, reverse the removal procedure.

EAS23790
REMOVING THE ROCKER ARMS, PUSH RODS AND VALVE LIFTERS

1. Align:
   - TDC mark “a” on the crankshaft position sensor rotor
     (with the pointer “b” on the clutch cover)

▼▼▼

3. Remove:
   - Camshaft drive gear “1”
   - Camshaft driven gear “2”
   - Straight keys
   - Front cylinder camshaft end cover

NOTE:

Cover the crankcase hole with a clean rag “3” to prevent the straight keys from falling into the crankcase.

4. Remove:
   - Oil delivery pipe “1”
   - Camshaft cover “2”
     (along with the camshafts)

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.

EAS23860

CHECKING THE CAMSHAFTS

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

Camshaft lobe dimensions
Intake A
38.241–38.341 mm (1.5055–1.5095 in) (cylinder #1)
38.243–38.343 mm (1.5056–1.5096 in) (cylinder #2)
Limit
38.141 mm (1.5016 in) (cylinder #1)
38.143 mm (1.5017 in) (cylinder #2)
Intake B
31.950–32.050 mm (1.2579–1.2618 in)
Limit
31.850 mm (1.2539 in)
Exhaust A
38.236–38.336 mm (1.5054–1.5093 in)
Limit
38.136 mm (1.5014 in)
Exhaust B
31.950–32.050 mm (1.2579–1.2618 in)
Limit
31.850 mm (1.2539 in)

3. Measure:
   - Camshaft journal diameter (crankcase side) “a”
     Out of specification → Replace the camshaft.

Camshaft journal diameter (crankcase side)
24.942–24.965 mm (0.9820–0.9829 in)

4. Measure:
   - Camshaft journal diameter (camshaft cover side) “a”
     Out of specification → Replace the camshaft.

Camshaft journal diameter (camshaft cover side)
27.967–27.980 mm (1.1011–1.1016 in)

5. Measure:
   - Crankcase hole inside diameter “a”
     Out of specification → Replace the crankcase.

Crankcase hole inside diameter
25.000–25.021 mm (0.9843–0.9851 in)

6. Measure:
   - Camshaft cover hole inside diameter “a”
     Out of specification → Replace the camshaft cover.

Camshaft cover hole inside diameter
28.000–28.021 mm (1.1024–1.1032 in)

7. Calculate:
   - Camshaft-to-crankcase clearance
     Out of specification → Replace the defective part(s).

NOTE:

Calculate the clearance by subtracting the crankcase side camshaft journal diameter (crankcase side) from the crankcase hole inside diameter.

Camshaft to crankcase clearance
0.050–0.084 mm (0.0020–0.0033 in)

8. Calculate:
   - Camshaft to camshaft cover clearance
     Out of specification → Replace the defective part(s).

NOTE:

Calculate the clearance by subtracting the camshaft journal diameter (camshaft cover side) from the camshaft cover hole inside diameter.

Camshaft to camshaft cover clearance
0.020–0.054 mm (0.0008–0.0021 in)

9. Check:
   - Camshaft drive gears
   - Camshaft driven gears
   Chips/pitting/roughness/wear → Replace the defective part(s).

EAS23890
CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

The following procedure applies to all of the rocker arms and rocker arm shafts.

1. Check:
   - Rocker arm
   Damage/wear → Replace.
2. Check:
   - Rocker arm shaft
   Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.
3. Measure:
   - Rocker arm inside diameter "a"
   Out of specification → Replace.

Rocker arm inside diameter
18.000–18.018 mm (0.7087–0.7094 in)
Limit
18.036 mm (0.7101 in)

4. Measure:
   - Rocker arm shaft outside diameter "a"
   Out of specification → Replace.

Rocker arm shaft outside diameter
17.976–17.991 mm (0.7077–0.7083 in)

5. Calculate:
   - Rocker arm to rocker arm shaft clearance

NOTE:

Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.

Above 0.08 mm (0.003 in) → Replace the defective part(s).

Rocker-arm-to-rocker-arm-shaft clearance
0.009–0.042 mm (0.0004–0.0017 in)

EAS23900
CHECKING THE ROCKER ARM BASES

1. Check:
   - Rocker arm base
   Cracks/damage → Replace.

EAS23910
CHECKING THE PUSH RODS

1. Check:
   - Push rod
   - Push rod end
   Bends/damage → Replace.
2. Measure:
   - Push rod runout
   Out of specification → Replace.

Valve push rod runout
0.3 mm (0.012 in)

EAS23920
CHECKING THE VALVE LIFTERS AND VALVE LIFTER CASES

1. Check:
   - Valve lifter
     Blue discoloration/excessive wear/pitting/scratches → Replace and check the lubrication system.
2. Check:
   - Valve lifter case “1”
     Damage/wear → Replace the valve lifter case.
   - Seal “2”
   - O-ring “3”
     Damage/wear → Replace the O-ring.

3. Measure:
   - Valve lifter outside diameter “a”
     Out of specification → Replace.

Valve lifter outside diameter (intake)
22.962–22.974 mm (0.9040–0.9045 in)
Valve lifter outside diameter (exhaust)
22.962–22.974 mm (0.9040–0.9045 in)

4. Measure:
   - Valve lifter case inside diameter “a”
     Out of specification → Replace.

Valve lifter hole inside diameter (intake)
23.000–23.021 mm (0.9055–0.9063 in)
Valve lifter hole inside diameter (exhaust)
23.000–23.021 mm (0.9055–0.9063 in)

5. Calculate:
   - Valve lifter-to-valve lifter case clearance

NOTE:
Calculate the clearance by subtracting the valve lifter case outside diameter.

Above 0.072 mm (0.0028 in) → Replace the defective part(s).

Valve-lifter-to-valve-lifter-hole clearance
0.026–0.059 mm (0.0010–0.0023 in)

EAS23930
CHECKING THE PUSH ROD COVER

1. Check:
   - Push rod cover
     Cranks/damage → Replace.
   - Seal

- O-ring
  Damage/wear → Replace the oil seal and O-ring as a set.

EAS23980
CHECKING THE DECOMPRESSION SYSTEM

1. Check:
   - Decompression system

NOTE:
- Check the decompression system while the decompression push rod is installed in the camshaft.
- Check that the decompression pin "1" projects from the camshaft.
- Check that the decompression push rod "2" moves smoothly.

2. Check:
   - Decompression push rods
     Bends/damage → Replace.

EAS23990
CHECKING THE OIL DELIVERY PIPE

1. Check:
   - Oil delivery pipe
     Damage → Replace.
     Obstruction → Wash and blow out with compressed air.
   - O-rings
     Damage/wear → Replace.

EAS24030
INSTALLING THE CAMSHAFTS

1. Install:
   - Camshafts
     (to the camshaft cover)

NOTE:
- Lubricate molybdenum disulfide oil onto the camshaft journals and lobes.
- Align the punch mark "a" on the rear cylinder camshaft with the punch mark "b" on the front cylinder camshaft.

2. Install:
   - Camshaft cover "1"
     (along with the camshafts)
   - Camshaft oil delivery pipe "2"

NOTE:
Tighten the camshaft cover bolts in stages and in a crisscross pattern.

3. Install:
   - Front cylinder camshaft end cover "1"

NOTE:
- Install the front cylinder camshaft end cover "1" with its punch marks "a" aligned vertically.
- Finger-tighten the bolts.

4. Install:
   - Straight keys
   - Camshaft drive gear "1"
   - Camshaft driven gear "2"

NOTE:
- Cover the crankcase hole with a clean rag "3" to prevent the straight keys from falling into the crankcase.

- Align the punch mark “a” on the camshaft drive gear “1” with the punch mark “b” on the camshaft driven gear “2”.
- Insert a cross-headed screwdriver into one of the holes in the outer camshaft driven gear and rotate the gear until the teeth of both driven gears are aligned. The teeth of both camshaft driven gears must be aligned for installation.

5. Tighten:
   - Camshaft driven gear nut “1”

	Camshaft driven gear nut **52 Nm (5.2 m·kg, 37 ft·lb)**

NOTE:
- Place a folded copper washer “2” between the teeth of the camshaft drive gear and camshaft driven gear in order to lock them.
- Do not damage the teeth of the camshaft drive and camshaft driven gear.
- After tightening the camshaft driven gear nut, remove the copper washer to clean the teeth of the camshaft drive gear and camshaft driven gear.

6. Tighten:
   - Camshaft drive gear bolt “1”
   - Front cylinder camshaft end cover bolts “2”

	Camshaft drive gear bolt **30 Nm (3.0 m·kg, 22 ft·lb)** **Front cylinder camshaft end cover bolt** **7 Nm (0.7 m·kg, 5.1 ft·lb)** **LOCTITE®**

NOTE:
- Place a folded copper washer “3” between the teeth of the camshaft drive gear and camshaft driven gear in order to lock them.
- Do not damage the teeth of the camshaft drive and camshaft driven gear.
- After tightening the camshaft drive gear bolt, remove the copper washer to clean the teeth of the camshaft drive gear and camshaft driven gear.

EAS24050
BLEEDING A VALVE LIFTER

A valve lifter must be bled in the following cases.
- When installing a new valve lifter
- When the valve lifter leaks oil

1. Bleed:
   - Valve lifter

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Fill a container with kerosene and place the valve lifter into the container as shown.
   Pump the plunger side of the valve lifter with a press a number of times to let in kerosene.

ECA14630

CAUTION:

- **Do not pump the valve lifter excessively.**
- **Kerosene is highly flammable.**

1. Kerosene
2. Valve lifter

b. Install the valve lifter into the engine.

ECA14650

CAUTION:

Be sure to install the valve lifter in its appropriate position.

c. Start the engine and warm it up.
d. Stop the engine.
e. Remove the camshaft sprocket cover.
f. Rotate the camshaft until the punch mark “1” on the camshaft driven gear aligns with the punch mark on the camshaft drive gear as shown. This is the condition in which piston #1 is at top dead center (TDC).

NOTE:

The crankshaft can be rotated smoothly when the spark plugs are removed.

EWA12880

WARNING

Be careful since the engine is hot.

g. With piston #1 at TDC, count the indicated number of gear teeth and place marks “2” through “5” on the camshaft driven gear as shown. When these marks align between the centers of the camshaft drive and driven gears, the corresponding valve lifter is at its highest point.

1. Piston #1 TDC punch mark
2. Cylinder-#2 intake valve at its highest point
3. Cylinder-#1 exhaust valve at its highest point
4. Cylinder-#1 intake valve at its highest point
5. Cylinder-#2 exhaust valve at its highest point

h. Rotate the crankshaft until the mark (on the camshaft driven gear) for the valve lifter to be bled aligns with the camshaft drive gear as shown.
   Example:
   For bleeding the cylinder-#2 intake valve lifter, align mark “2” as shown.

1. Piston #1 TDC punch mark
2. Cylinder-#2 intake valve at its highest point

i. Leave the camshaft drive and driven gears aligned for five minutes to allow the valve lifter to bleed.
j. If necessary, repeat steps (h) and (i) to bleed other valve lifters.

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EAS24060

INSTALLING THE VALVE LIFTERS

1. Install:
   - Front valve lifter case
   - Rear valve lifter case
   - Valve lifters

NOTE:

- Install the valve lifter in the correct place.
- After installing the valve lifters, fill the tops of them with engine oil.

EAS24070

INSTALLING THE ROCKER ARMS AND PUSH RODS

The following procedure applies to both cylinders.

1. Install:
   - Rocker arms “1”
   - Rocker arm shafts “2” (onto rocker arm base)

NOTE:

The thread hole “a” of the rocker arm shaft must face to the outside.

2. Install:
   - Rocker arm base (with rocker arms)
   - Push rods

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a. Put the rocker arm base on the cylinder head.
b. Install the push rods.

NOTE:

- Be sure to correctly install the push rods between the rocker arms and valve lifters as shown. The illustration is viewed from the right side of the vehicle.
- The lengths of push rod 1 and push rod 2 are different. Therefore, be sure to install them in the proper position.
- Lubricate the push rod end balls with engine oil.

A. Rear cylinder
B. Front cylinder
1. Intake side rocker arm
2. Exhaust side rocker arm
3. Intake valve lifter
4. Exhaust valve lifter
5. Push rod 1 l = 288.5 mm (11.358 in)
6. Push rod 2 l = 290.5 mm (11.437 in)

c. Install the rocker arm base bolts (M6) “1”, “2” and the rocker arm base bolts (M8) “3”.

NOTE:

Tighten the rocker arm base bolts in stages and in a crisscross pattern.

	Rocker arm base bolt (M6) **10 Nm (1.0 m·kg, 7.2 ft·lb)** **Rocker arm base bolt (M8)** **24 Nm (2.4 m·kg, 17 ft·lb)**

Bolts “1”: l = 36 mm (1.42 in)
Bolts “2”: l = 40 mm (1.57 in)

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EAS24080

INSTALLING THE CYLINDER HEAD COVERS

The following procedure applies to both cylinders.

1. Install:
   - Front cylinder head cover “1”
   - Rear cylinder head cover “2”

NOTE:

Apply locking agent (LOCTITE®) to the threads of the bolt “3”.

	Cylinder head cover bolt **10 Nm (1.0 m·kg, 7.2 ft·lb)**

Bolts “3”, “4”: l = 40 mm (1.57 in)
Bolts “5”: l = 50 mm (1.97 in)
Bolt with washer “6”: l = 50 mm (1.97 in)
Bolts “7”: l = 60 mm (2.36 in)

2. Install:
   - Tappet covers “1”

NOTE:

Install the tappet covers with their “UP” marks “a” facing each other.

	Tappet cover bolt **10 Nm (1.0 m·kg, 7.2 ft·lb)**

EAS24110
CYLINDER HEADS

Removing the cylinder heads

Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head covers/Rocker arms		Refer to "CAMSHAFTS" on page 5-16.
1	Front exhaust pipe joint	1	
2	Front exhaust pipe joint gasket	1	
3	Oil pipe 1	1	From crankcase to cylinder heads.
4	Copper washer	4	
5	Copper washer	2	
6	Engine temperature sensor	1	
7	Rear cylinder head	1	
8	Front cylinder head	1	
9	Cylinder head gasket	2	
10	Dowel pin	4	
			For installation, reverse the removal procedure.

EAS24140
REMOVING THE CYLINDER HEADS

1. 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.

A

B

A. Front cylinder
B. Rear cylinder

EAS24170
CHECKING THE CYLINDER HEADS

The following procedure applies to all of the cylinder heads.

1. 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

2. Check:
   - Cylinder head
     Damage/scratches → Replace.
3. Measure:
   - Cylinder head warpage
     Out of specification → Resurface the cylinder head.

	Warpage limit **0.03 mm (0.0012 in)**

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a. Place a straightedge and a thickness gauge across the cylinder head.
b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. 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.

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EAS24220
CHECKING THE OIL PIPE

1. Check:
   - Oil pipe
     Damage → Replace.
     Obstruction → Wash and blow out with compressed air.

EAS24250
INSTALLING THE CYLINDER HEADS

1. Tighten:
   - Cylinder head nuts (M12) “1”–“4”

	Cylinder head nut (M12) **45 Nm (4.5 m·kg, 32 ft·lb)**

   - Cylinder head nuts (M10) “5”, “6”

	Cylinder head nut (M10) **39 Nm (3.9 m·kg, 28 ft·lb)**

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.

A

B

A. Front cylinder
B. Rear cylinder

EAS24270

VALVES AND VALVE SPRINGS

Removing the valves and valve springs

Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both cylinders.
	Cylinder heads		Refer to "CYLINDER HEADS" on page 5-31.
1	Valve cotter	8	
2	Upper spring seat	4	
3	Outer valve spring	4	
4	Inner valve spring	4	
5	Intake valve	2	
6	Exhaust valve	2	
7	Valve stem seal	4	
8	Lower spring seat	4	
9	Valve guide	4	
			For installation, reverse the removal procedure.

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. 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 5-37.

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2. Replace:
   - Valve guide

NOTE:

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

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a. Remove the valve guide with the valve guide remover "1".

b. Install the new valve guide with the valve guide installer "2" and valve guide remover "1".

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.

NOTE:

After replacing the valve guide, reface the valve seat.

Valve guide remover (ø6)
90890-04064
Valve guide remover (6.0 mm)
YM-04064-A
Valve guide installer (ø6)
90890-04065
Valve guide installer (6.0 mm)
YM-04065-A
Valve guide reamer (ø6)
90890-04066
Valve guide reamer (6.0 mm)
YM-04066

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3. Eliminate:
   - Carbon deposits
     (from the valve face and valve seat)
4. Check:
   - Valve face
     Pitting/wear → Grind the valve face.
   - Valve stem end
     Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
   - Valve margin thickness D "a"
     Out of specification → Replace the valve.

Valve margin thickness D (intake)
0.70–1.30 mm (0.0276–0.0512 in)
Limit
0.4 mm (0.02 in)
Valve margin thickness D (exhaust)
0.70–1.30 mm (0.0276–0.0512 in)
Limit
0.4 mm (0.02 in)

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
0.010 mm (0.0004 in)

EAS24300

CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:
   - Carbon deposits
     (from the valve face and valve seat)
2. Check:
   - Valve seat
     Pitting/wear → Replace the cylinder head.
3. Measure:
   - Valve seat width C “a”
     Out of specification → Replace the cylinder head.

Valve seat width C (intake)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
2.0 mm (0.08 in)
Valve seat width C (exhaust)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
2.0 mm (0.08 in)

a. Apply Mechanic’s blueing dye (Dykem) “b” onto the valve face.

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.

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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.
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.

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.

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.

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EAS24310

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:
   - Valve spring free length “a”
     Out of specification → Replace the valve spring.

Inner spring
Free length (intake)
38.26 mm (1.51 in)
Limit
36.26 mm (1.43 in)
Free length (exhaust)
38.26 mm (1.51 in)
Limit
36.26 mm (1.43 in)
Outer spring
Free length (intake)
43.25 mm (1.70 in)
Limit
41.26 mm (1.62 in)
Free length (exhaust)
43.25 mm (1.70 in)
Limit
41.26 mm (1.62 in)

2. Measure:
   - Compressed valve spring force “a”
     Out of specification → Replace the valve spring.

Inner spring
Installed compression spring force (intake)
63.00–73.00 N (14.16–16.41 lb) (6.42–7.44 kgf)
Installed compression spring force (exhaust)
63.00–73.00 N (14.16–16.41 lb) (6.42–7.44 kgf)
Installed length (intake)
29.00 mm (1.14 in)
Installed length (exhaust)
29.00 mm (1.14 in)
Outer spring
Installed compression spring force (intake)
139.00–161.00 N (31.25–36.19 lb) (14.17–16.42 kgf)
Installed compression spring force (exhaust)
139.00–161.00 N (31.25–36.19 lb) (14.17–16.42 kgf)
Installed length (intake)
31.00 mm (1.22 in)
Installed length (exhaust)
31.00 mm (1.22 in)

b. Installed length

3. Measure:
   - Valve spring tilt “a”
     Out of specification → Replace the valve spring.

Inner spring
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
Spring tilt (intake)
2.5°/1.9 mm (2.5°/0.075 in)
Spring tilt (exhaust)
2.5°/1.9 mm (2.5°/0.075 in)

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)

2. Lubricate:
   - Valve stem “1”
   - Valve stem seal “2”
     (with the recommended lubricant)

Recommended lubricant
Molybdenum disulfide oil

3. Install:
   - Valve guide “1”
   - Lower spring seat “2”
   - Valve stem seal “3”
   - Valve “4”
   - Inner valve spring “5”
   - Outer valve spring “6”

- Upper spring seat “7”
  (into the cylinder head)

NOTE:

Install the valve springs with the larger pitch “a” facing up.

b. Smaller pitch

4. Install:
   - Valve cotters

NOTE:

Install the valve cotters by compressing the valve springs with the valve spring compressor set “1”.

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.

EAS24360
CYLINDERS AND PISTONS

Removing the cylinders and pistons

Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEADS" on page 5-31.
1	Front cylinder	1	
2	Rear cylinder	1	
3	Cylinder gasket	2	
4	Dowel pin	4	
5	Piston pin clip	4	
6	Piston pin	2	
7	Piston	2	
8	Top ring	2	
9	2nd ring	2	
10	Oil ring	2	
			For installation, reverse the removal procedure.

EAS24380
REMOVING THE PISTONS

The following procedure applies to all of the pistons.

1. 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.
- For reference during installation, put an identification mark on each piston crown.
- Before removing the piston pin, deburr the piston pin clip’s groove and the piston’s pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set “4”.

Piston pin puller set
90890-01304
Piston pin puller
YU-01304

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.

EAS24410
CHECKING THE CYLINDERS AND PISTONS

The following procedure applies to all of the cylinders and pistons.

1. Check:
   - Piston wall
   - Cylinder wall
     Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   - Piston-to-cylinder clearance

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b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.
c. Measure piston skirt diameter D “a” with the micrometer.

Piston
Diameter D
96.960–96.975 mm (3.8173–3.8179 in)

b. 10 mm (0.39 in) from the bottom edge of the piston

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
0.025–0.050 mm (0.0010–0.0020 in)
Limit
0.15 mm (0.0059 in)

f. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.

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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
Top ring
Ring side clearance
0.030–0.080 mm (0.0012–0.0032 in)
Limit
0.120 mm (0.0047 in)
2nd ring
Ring side clearance
0.030–0.070 mm (0.0012–0.0028 in)
Limit
0.12 mm (0.0047 in)

2. Install:
   - Piston ring
     (into the cylinder)

NOTE:

Level the piston ring into the cylinder with the piston crown.

a. 10 mm (0.39 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
Top ring
End gap (installed)
0.30–0.50 mm (0.01–0.02 in)
Limit
0.70 mm (0.0276 in)
2nd ring
End gap (installed)
0.30–0.45 mm (0.01–0.02 in)
Limit
0.80 mm (0.0315 in)
Oil ring
End gap (installed)
0.20–0.70 mm (0.01–0.03 in)

EAS24440
CHECKING THE PISTON PINS

The following procedure applies to all of the piston pins.

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
21.991–22.000 mm (0.8658–0.8661 in)
Limit
21.971 mm (0.8650 in)

3. Measure:
   - Piston pin bore diameter "b"
     Out of specification → Replace the piston.

Piston pin bore inside diameter
22.004–22.015 mm (0.8663–0.8667 in)
Limit
22.045 mm (0.8679 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-to-piston-pin-bore clearance
0.004–0.024 mm (0.00016–0.00094 in)
Limit
0.074 mm (0.00291 in)

EAS24460
INSTALLING THE PISTONS AND CYLINDERS

The following procedure applies to all of the pistons and cylinders.

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 or numbers face up.

2. Install:
   - Piston “1”
   - Piston pin “2”
   - Piston pin clips “3” New

NOTE:

- Apply engine oil onto the piston pin.
- Make sure the arrow mark “a” on the piston faces towards the front of the vehicle.
- Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #2).

3. Lubricate:
   - Piston
   - Piston rings
   - Cylinder
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

4. Offset:
   - Piston ring end gaps

a. Top ring
b. Upper oil ring rail
c. Oil ring expander
d. Lower oil ring rail
e. 2nd ring
A. forward

5. Install:
   - Cylinder “1”

NOTE:

- While compressing the piston rings with one hand, install the cylinder with the other hand.

EAS25060
CLUTCH

Removing the clutch cover

Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-11.
	Battery box/Air duct		Refer to "GENERAL CHASSIS" on page 4-1.
	Oil tank/Shift rod		Refer to "ENGINE REMOVAL" on page 5-1.
1	Crankshaft position sensor coupler	1	Disconnect.
2	Shift arm	1	
3	Oil tank bracket	1	
4	Clutch cover	1	
5	Clutch cover gasket	1	
6	Dowel pin	2	
			For installation, reverse the removal procedure.

Removing the crankshaft position sensor

Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	1	
2	Bearing	1	
3	Crankshaft position sensor lead holder	3	
4	Crankshaft position sensor	1	
			For installation, reverse the removal procedure.

Removing the clutch

Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch spring plate retainer	1	
2	Clutch spring plate	1	
3	Clutch spring plate seat	1	
4	Pressure plate	1	
5	Short clutch push rod	1	
6	Friction plate 1	9	
7	Clutch plate	8	
8	Conical spring washer	1	
9	Wire circlip	1	
10	Clutch plate	1	
11	Friction plate 2	1	
12	Clutch damper spring	1	
13	Clutch damper spring seat	1	
14	Clutch boss	1	
15	Thrust washer 1	1	
16	Bearing	1	
17	Clutch housing	1	

Removing the clutch

Order	Job/Parts to remove	Q'ty	Remarks
18	Washer	1	
19	Circlip	1	
20	Oil pump drive gear	1	
21	Dowel pin	1	
22	Collar	1	
23	Thrust washer 2	1	
24	Ball	1	
25	Long clutch push rod	1	
26	Spacer	1	
27	Crankshaft position sensor rotor	1	
28	Primary drive gear	1	
29	Straight key	1	
			For installation, reverse the removal procedure.

Removing the clutch master cylinder

Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-14.
1	Clutch fluid reservoir cap holder	1	
2	Clutch fluid reservoir cap	1	
3	Clutch fluid reservoir diaphragm holder	1	
4	Clutch fluid reservoir diaphragm	1	
5	Clutch fluid reservoir	1	
6	Clutch fluid reservoir hose	1	
7	Left rearview mirror	1	
8	Clutch fluid reservoir bracket	1	
9	Clutch lever	1	
10	Bushing	1	
11	Clutch switch coupler	1	Disconnect.
12	Clutch switch	1	
13	Clutch hose union bolt	1	
14	Copper washer	2	
15	Clutch hose	1	

Removing the clutch master cylinder

Order	Job/Parts to remove	Q'ty	Remarks
16	Clutch master cylinder holder	1	
17	Clutch master cylinder	1	
			For installation, reverse the removal procedure.

Disassembling the clutch master cylinder

Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch master cylinder push rod	1	
2	Clutch master cylinder kit	1	
3	Dust seal	1	
4	Circlip	1	
5	Clutch fluid reservoir hose joint	1	
6	O-ring	1	
7	Clutch master cylinder body	1	
			For assembly, reverse the disassembly procedure.

Removing the clutch release cylinder

Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-14.
1	Clutch pipe union bolt cap	1	
2	Clutch pipe union bolt	1	
3	Copper washer	2	
4	Clutch pipe	1	
5	Clutch release cylinder	1	
6	Dowel pin	2	
			For installation, reverse the removal procedure.

Disassembling the clutch release cylinder

Order	Job/Parts to remove	Q'ty	Remarks
1	Boots	1	
2	Clutch release cylinder piston	1	
3	Clutch release cylinder spring	1	
4	Clutch release cylinder piston seal	1	
5	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

EAS25080
REMOVING THE CLUTCH

1. Loosen:
   - Clutch boss nut “1”

NOTE:

While holding the clutch boss “2” with the universal clutch holder “3”, loosen the clutch boss nut.

Universal clutch holder
90890-04086
YM-91042

2. Remove:
   - Clutch boss nut “1”
   - Washer “2”
   - Clutch boss assembly “3”

NOTE:

There is a built-in damper between the clutch boss 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.

EAS25090
REMOVING THE PRIMARY DRIVE GEAR

1. Remove:
   - Primary drive gear bolt “1”

NOTE:

While holding the generator rotor “2” with the sheave holder “3”, loosen the primary drive gear bolt.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A

EAS25100
CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

1. Check:
   - Friction plate
     Damage/wear → Replace the friction plates as a set.
2. Measure:
   - Friction plate thickness
     Out of specification → Replace the friction plates as a set.

NOTE:

Measure the friction plate at four places.

Friction plate thickness
2.92–3.08 mm (0.11–0.12 in)
Wear limit
2.82 mm (0.1110 in)

EAS25110
CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:
   - Clutch plate
     Damage → Replace the clutch plates as a set.
2. Measure:
   - Clutch plate warpage
     (with a surface plate and thickness gauge "1")
     Out of specification → Replace the clutch plates as a set.

	Thickness gauge **90890-03079** **Narrow gauge set** **YM-34483**

	Clutch plate thickness **1.90–2.10 mm (0.07–0.08 in)** **Warpage limit** **0.20 mm (0.0079 in)**

EAS25130
CHECKING THE CLUTCH SPRING PLATE

1. Check:
   - Clutch plate spring
     Damage → Replace.
2. Check:
   - Clutch plate spring seat
     Damage → Replace.

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

1. Check:
   - Clutch boss splines
     Damage/pitting/wear → Replace the clutch boss.

NOTE:

Pitting on the clutch boss splines will cause erratic clutch operation.

EAS25170
CHECKING THE PRESSURE PLATE

1. Check:
   - Pressure plate
     Cracks/damage → Replace.
   - Bearing
     Damage/wear → Replace.

EAS25190
CHECKING THE CLUTCH PUSH RODS
1. Check:
   - O-ring
   - Short clutch push rod
   - Long clutch push rod
   - Ball
     Cracks/damage/wear → Replace the defective part(s).
2. Measure:
   - Long clutch push rod bending limit
     Out of specification → Replace the defective part(s).

Long clutch push rod bending limit
0.15 mm (0.0059 in)

EAS25200
CHECKING THE PRIMARY DRIVE GEAR
1. Check:
   - Primary drive gear
     Damage/wear → Replace the primary drive and primary driven gears as a set.
     Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

EAS25210
CHECKING THE PRIMARY DRIVEN GEAR
1. Check:
   - Primary driven gear "1"
     Damage/wear → Replace the primary drive and primary driven gears as a set.
     Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

EAS24540
INSTALLING THE CRANKSHAFT POSITION SENSOR
1. Apply:
   - Sealant
     (onto the crankshaft position sensor lead grommet)

Yamaha bond No. 1215
90890-85505

EAS25230
INSTALLING THE PRIMARY DRIVE GEAR
1. Install:
   - Straight key "1"
   - Primary drive gear "2"
   - Crankshaft position sensor rotor "3"
   - Spacer "4"
   - Primary drive gear bolt "5"

Primary drive gear bolt
100 Nm (10.0 m·kg, 72 ft·lb)
LOCTITE®

EC5YU1014
CAUTION:

The timing marks on the crankshaft position sensor rotor must face outside.

NOTE:

While holding the generator rotor "6" with the sheave holder "7", tighten the primary drive gear bolt.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A

EAS25260
INSTALLING THE CLUTCH

1. Install:
   - Clutch housing
   - Thrust washer

NOTE:
- Lubricate the clutch housing bearings with engine oil.
- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- Make sure that the oil pump drive gear teeth and oil pump driven gear teeth mesh correctly.

2. Install:
   - Clutch boss assembly “1”

NOTE:
- If the wire circlip “2” has been removed, carefully install a new one.
- Install the clutch damper spring “3” with the “OUTSIDE” mark facing out.

3. Install:
   - Clutch boss “1”
   - Conical spring washer “2”
   - Clutch boss nut “3” New

	Clutch boss nut **125 Nm (12.5 m·kg, 90 ft·lb)**

NOTE:
- Lubricate the clutch boss nut threads and conical spring washer mating surfaces with engine oil.
- Install the washer “2” with the “OUT” mark “a” facing out.
- While holding the clutch boss with the universal clutch holder “4”, tighten the clutch boss nut.
- Stake the clutch boss nut “3” at a cutout “b” in the main axle.

	Universal clutch holder **90890-04086** **YM-91042**

4. Lubricate:
   - Friction plates
   - Clutch plates
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

5. Install:
   - Friction plates
   - Clutch plates

NOTE:
- First, install a friction plate and then alternate between a clutch plate and a friction plate.
- Install the last friction plate “1” offset from the other friction plates “2”, making sure to align a projection on the friction plate with the punch mark “a” on the clutch housing.

6. Install:
   - Clutch spring plate "1"
   - Clutch spring plate retainer "2"

	Clutch spring plate retainer bolt 8 Nm (0.8 m·kg, 5.8 ft·lb)

NOTE:

Tighten the clutch spring bolts in stages and in a crisscross pattern.

7. Install:
   - Shift arm "1"

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

NOTE:

Install the shift arm "1" with its punch mark "a" aligned with the notch "b" in end of the shift shaft.

EAS25280

DISASSEMBLING THE CLUTCH MASTER CYLINDER

ECA13840

CAUTION:

- **Clutch components rarely require disassembly.**
- **Therefore, always follow these preventive measures:**
- **Never disassemble clutch components unless absolutely necessary.**
- **If any connection on the hydraulic clutch system is disconnected, the entire clutch system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.**
- **Never use solvents on internal clutch components.**
- **Use only clean or new clutch fluid for cleaning clutch components.**
- **Clutch fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt fluid immediately.**
- **Avoid clutch fluid coming into contact with the eyes as it can cause serious injury.**
- **First aid for clutch fluid entering the eyes:**
- **Flush with water for 15 minutes and get immediate medical attention.**

NOTE:

Before disassembling the clutch master cylinder, drain the clutch fluid from the entire clutch system.

1. Remove:
   - Clutch hose union bolt "1"
   - Copper washers "2"
   - Clutch hose "3"

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 two years
Clutch hose	Every four years
Clutch fluid	Every two years and whenever the clutch is disassembled

1. Check:
   - Clutch master cylinder body
     Cracks/damage → Replace the clutch master cylinder.
   - Clutch fluid delivery passage (clutch master cylinder body)
     Obstruction → Blow out with compressed air.
2. Check:
   - Clutch master cylinder kit
     Rust/scratches/wear → Replace the clutch master cylinder and clutch master cylinder kit as a set.
3. Check:
   - Clutch fluid reservoir hose joint
     Cracks/damage → Replace.
4. Check:
   - Clutch fluid reservoir
     Cracks/damage → Replace.
   - Clutch fluid reservoir diaphragm
     Damage/wear → Replace.
5. Check:
   - Clutch hose
     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 clutch fluid
Brake fluid DOT4

EAS25310
INSTALLING THE CLUTCH MASTER CYLINDER

1. Install:
   - Clutch master cylinder “1”
   - Clutch master cylinder holder “2”

Clutch master cylinder holder bolt
13 Nm (1.3 m·kg, 9.4 ft·lb)

NOTE:

- Align the end of the clutch master cylinder holder with the punch mark “a” on the handlebar.
- First, tighten the upper bolt, then the lower bolt.

2. Install:
   - Copper washers “1” New
   - Clutch hose “2”
   - Clutch hose union bolt “3”

Clutch hose union bolt
13 Nm (1.3 m·kg, 9.4 ft·lb)

EC5YU1006
CAUTION:

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

NOTE:

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

3. Fill:
   - Clutch fluid reservoir
     (with the specified amount of the recommended clutch fluid)

	Recommended clutch fluid **Brake fluid DOT4**

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.

4. Bleed:
   - Clutch system
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” on page 3-14.
5. 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 3-14.

6. Check:
   - Clutch lever operation
     Soft or spongy feeling → Bleed the clutch system.
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” on page 3-14.

ET5YU1020

REMOVING THE CLUTCH RELEASE CYLINDER

1. Remove:
   - Clutch pipe union bolt “1”
   - Copper washers “2”
   - Clutch pipe “3”

NOTE:

Put the end of the clutch pipe into a container and pump out the clutch fluid carefully.

EAS25330

CHECKING THE CLUTCH RELEASE CYLINDER

Recommended clutch component replacement schedule	
Piston seals	Every two years
Clutch hose	Every four years
Clutch fluid	Every two years and whenever the clutch is disassembled

1. Check:
   - Clutch release cylinder body
     Cracks/damage → Replace the clutch release cylinder.
2. Check:
   - Clutch release cylinder
   - Clutch release cylinder piston
     Rust/scratches/wear → Replace the clutch release cylinder and clutch release cylinder piston as a set.

EAS25340
ASSEMBLING THE CLUTCH RELEASE CYLINDER

EW5YU1007
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 seal to swell and distort.**
- **Whenever a clutch release cylinder is disassembled, replace the piston seal.**

Recommended clutch fluid
Brake fluid DOT4

EAS25350
INSTALLING THE CLUTCH RELEASE CYLINDER

1. Check:
   - Copper washers "1" New
   - Clutch pipe "2"
   - Clutch pipe union bolt "3"

Clutch pipe union bolt
26 Nm (2.6 m·kg, 19 ft·lb)

EW5YU1010
WARNING

Proper clutch hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-41.

EC5YU1007
CAUTION:

When installing the clutch pipe onto the clutch release cylinder, make sure the pipe "a" touches the projection "b".

2. Fill:
   - Clutch fluid reservoir
     (with the specified amount of the recommended clutch fluid)

Recommended clutch fluid
Brake fluid DOT4

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 that the top of the reservoir is horizontal.

3. Bleed:
   - Clutch system
     Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-14.
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 3-14.

5. Check:
   - Clutch lever operation
     Soft or spongy feeling → Bleed the clutch system.
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” on page 3-14.

EAS25410
SHIFT SHAFT

Removing the shift shaft and stopper lever

Order	Job/Parts to remove	Q'ty	Remarks
	Clutch housing		Refer to "CLUTCH" on page 5-46.
1	Shift shaft	1	
2	Circlip	2	
3	Shift shaft spring	1	
4	Shift shaft spring stopper	1	
5	Washer	1	
6	Stopper lever	1	
7	Stopper lever spring	1	
			For installation, reverse the removal procedure.

EAS25420
CHECKING THE SHIFT SHAFT
1. Check:
   - Shift shaft
     Bends/damage/wear → Replace.
   - Shift shaft spring
     Damage/wear → Replace.

EAS25430
CHECKING THE STOPPER LEVER
1. Check:
   - Stopper lever
     Bends/damage → Replace.
     Roller turns roughly → Replace the stopper lever.
   - Stopper lever spring
     Damage/wear → Replace.

EAS25450
INSTALLING THE SHIFT SHAFT
1. Install:
   - Stopper lever “1”
   - Stopper lever bolt “2”
   - Stopper lever spring “3”

Stopper lever bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)
LOCTITE®

NOTE:
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss “4”.
- Install the stopper lever spring as shown in the illustration.
- Mesh the stopper lever with the shift drum segment assembly.

2. Install:
   - Shift shaft spring “1”
   - Circlips
   - Shift shaft “2”

NOTE:
- Lubricate the oil seal lips with lithium-soap-based grease.
- Hook the end of the shift shaft spring onto the shift shaft spring stopper “3”.

EAS24480
GENERATOR AND STARTER CLUTCH

Removing the stator coil assembly

Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-11.
	Oil tank/Front exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-1.
1	Stator coil assembly coupler	1	Disconnect.
2	Rectifier/regulator	1	
3	Oil pipe 2	1	From oil pump to generator cover.
4	Generator cover	1	
5	Generator cover gasket	1	
6	Dowel pin	2	
7	Stator coil assembly lead holder	1	
8	Stator coil assembly	1	
			For installation, reverse the removal procedure.

Removing the generator rotor

Order	Job/Parts to remove	Q'ty	Remarks
1	Starter clutch idle gear shaft #2	1	
2	Starter clutch idle gear shaft #1	1	
3	Starter clutch idle gear #2	1	
4	Starter clutch idle gear #1	1	
5	Generator rotor	1	
6	Woodruff key	1	
7	Starter clutch gear	1	
			For installation, reverse the removal procedure.

EAS24490
REMOVING THE GENERATOR

1. Remove:
   - Generator rotor bolt “1”
   - Washer

NOTE:

While holding the generator rotor “2” with the sheave holder “3”, loosen the generator rotor bolt.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A

2. Remove:
   - Generator rotor “1”
     (with the rotor puller “2”)
   - Woodruff key

Rotor puller
90890-01080
Stator rotor puller
YM-01080-A

EAS24570
CHECKING THE STARTER CLUTCH

1. Check:
   - Starter clutch idle gears
   - Starter clutch gear
     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

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a. Install the starter clutch gear “1” onto the generator rotor “2” and hold the generator rotor.
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 counterclockwise “B”, it should turn freely, otherwise the starter clutch is faulty and must be replaced.

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EAS24510
INSTALLING THE GENERATOR

1. Install:
   - Woodruff key
   - Generator rotor “1”
   - Washer
   - Generator rotor bolt “2”

NOTE:

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the rotor, make sure the woodruff key is properly seated in the key way of the crankshaft.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

2. Tighten:
   • Generator rotor bolt “1”

	Generator rotor bolt **80 Nm (8.0 m·kg, 58 ft·lb)**

NOTE:

Tighten the generator rotor bolt “1” while holding the generator rotor “2” with a sheave holder “3”.

	Sheave holder **90890-01701** **Primary clutch holder** **YS-01880-A**

3. Apply:
   • Sealant
   (onto the stator coil assembly lead grommet)

	Yamaha bond No. 1215 **90890-85505**

EAS24780
ELECTRIC STARTER

Removing the starter motor

Order	Job/Parts to remove	Q'ty	Remarks
	Oil tank		Refer to "ENGINE REMOVAL" on page 5-1.
1	Starter motor lead	1	Disconnect.
2	Starter motor assembly	1	
			For installation, reverse the removal procedure.

Disassembling the starter motor

Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	1	
2	Starter motor gear	1	
3	Starter motor rear cover	1	
4	Bearing	1	
5	Oil seal	1	
6	Circlip	1	
7	Starter motor front cover	1	
8	Brush	2	
9	Brush holder (along with the brushes)	1	
10	Brush seat (along with the brushes)	1	
11	Bearing	1	
12	Gasket	2	
13	Armature assembly	1	
14	Starter motor yoke	1	
			For assembly, reverse the disassembly procedure.

EAS24790
CHECKING THE STARTER MOTOR

1. Check:
   - Commutator
     Dirt → Clean with 600 grit sandpaper.
2. Measure:
   - Commutator diameter “a”
     Out of specification → Replace the starter motor.

Limit
27.5 mm (1.08 in)

3. Measure:
   - Mica undercut “a”
     Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

Mica undercut (depth)
1.50 mm (0.06 in)

NOTE:

The mica of the commutator must be undercut to ensure proper operation of the commutator.

4. Measure:
   - Armature assembly resistances (commutator and insulation)
     Out of specification → Replace the starter motor.

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a. Measure the armature assembly resistances with the pocket tester.

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

Armature coil
Commutator resistance “1”
0.0081–0.0099 Ω at 20°C (68°F)
Insulation resistance “2”
Above 1 MΩ at 20°C (68°F)

b. If any resistance is out of specification, replace the starter motor.

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5. Measure:
   - Brush length “a”
     Out of specification → Replace the brushes as a set.

Limit
5.00 mm (0.20 in)

6. Measure:
   - Brush spring force
     Out of specification → Replace the brush springs as a set.

Brush spring force
7.36–11.04 N (26.49–39.74 oz)
(750–1126 gf)

7. Check:
   - Gear teeth
     Damage/wear → Replace the gear.
8. Check:
   - Bearing
   - Oil seal
     Damage/wear → Replace the defective part(s).

EAS24800

ASSEMBLING THE STARTER MOTOR

1. Install:
   - Brush seat “1”

NOTE:

Align the slot “a” on the brush seat with the tab “b” in the starter motor front cover.

2. Install:
   - Starter motor yoke “1”

NOTE:

Align the tab “a” on the brush holder with the slot “b” in the starter motor yoke.

3. Install:
   - Starter motor yoke “1”
   - Starter motor front cover “2”
   - Starter motor rear cover “3”

NOTE:

Align the match mark “a” on the starter motor yoke with the match mark “b” on the starter motor rear cover.

EAS25540
CRANKCASE

Separating the crankcase

Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Camshafts		Refer to "CAMSHAFTS" on page 5-16.
	Pistons		Refer to "CYLINDERS AND PISTONS" on page 5-41.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-64.
	Generator rotor		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-66.
1	Speed sensor	1	
2	Oil filter cartridge bracket	1	
3	Generator shaft end cover	1	
4	Oil delivery pipe 2	1	
5	Oil pump driven gear stopper	1	
6	Oil pump driven gear	1	
7	Left crankcase	1	
8	Dowel pin	2	
9	Joint pipe	1	

Separating the crankcase

Order	Job/Parts to remove	Q'ty	Remarks
10	Right crankcase	1	
			For installation, reverse the removal procedure.

Removing the oil baffle plate and bearings

Order	Job/Parts to remove	Q'ty	Remarks
	Oil pump		Refer to "OIL PUMP" on page 5-81.
	Crankshaft		Refer to "CRANKSHAFT" on page 5-86.
	Transmission		Refer to "TRANSMISSION" on page 5-92.
1	Oil baffle plate	1	
2	Bearing retainer	1	
3	Bearing retainer	1	
4	Oil seal	1	
5	Bearing	4	
			For installation, reverse the removal procedure.

EAS25570
DISASSEMBLING THE CRANKCASE

NOTE:

Loosen the generator shaft bolt before removing the generator rotor.

1. Loosen:
   - Generator shaft bolt “1”

NOTE:

While the holding the generator rotor “2” with the primary sheave holder “3”, loosen the generator shaft bolt.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A

2. 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 the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.

- M8 × 100 mm bolts: “1”, “2”
- M8 × 80 mm bolt: “3”
- M6 × 105 mm bolt: “21”
- M6 × 85 mm bolt: “9”, “13”
- M6 × 75 mm bolts: “14”, “15”
- M6 × 60 mm bolts: “4”–“7”
- M6 × 40 mm bolts: “8”, “10”–“12”, “16”–“20”

A

B

A. Right crankcase
B. Left crankcase

3. Turn:
   - Shift drum segment

NOTE:

Turn the shift drum segment “1” to the position shown in the illustration. In this position, the shift drum segment’s teeth will not contact the crankcase during crankcase separation.

4. Remove:
   - Left crankcase

EC5YU1016

CAUTION:

- **First check that the shift drum segment’s teeth then remove the left crankcase.**

- **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.**

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.

ET5YU1022
CHECKING THE BEARINGS AND OIL SEAL
1. Check:
   - Bearings
     Clean and lubricate the bearings, then rotate the inner race with your finger.
     Rough movement → Replace.
   - Oil seal
     Damage/wear → Replace.

EAS25590
CHECKING THE OIL PIPE
1. Check:
   - Oil pipe
     Damage → Replace.
     Obstruction → Wash and blow out with compressed air.

EAS25610
CHECKING THE OIL PUMP DRIVE
1. Check:
   - Oil pump drive gear
   - Oil pump driven gear
     Chips/pitting/roughness/wear → Replace the defective part(s).

ET5YU1023
INSTALLING THE BEARING RETAINER
1. Install:
   - Bearing retainer “1”

NOTE:
- Install the bearing retainer “1” with its “OUT” mark “a” facing outward.
- Apply locking agent (LOCTITE®) to the threads of the bearing retainer bolt.

EAS25690
ASSEMBLING THE CRANKCASE
1. Apply:
   - Sealant
     (onto the crankcase mating surfaces)

	Yamaha bond No. 1215 **90890-85505**

NOTE:
Do not allow any sealant to come into contact with the oil gallery.

2. Install:
   - Dowel pins “1”
   - Joint pipe “2”

3. Install:
   - Left crankcase
     (onto the right crankcase)

NOTE:
- Turn the shift drum segment “1” to the position shown in the illustration. In this position, the shift drum segment’s teeth will not contact the crankcase during crankcase installation.

• Tap lightly on the left crankcase with a soft-face hammer.

4. Install:
   • Crankcase bolts (M8)
   • Crankcase bolts (M6)

Crankcase bolt (M8)
24 Nm (2.4 m·kg, 17 ft·lb)
Crankcase bolt (M6)
10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:

• Lubricate the bolt threads with engine oil.
• Tighten each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.
• Tighten the bolts in numerical order (refer to the numbers in the illustration).

• M8 × 100 mm bolts: “1”, “2”
• M8 × 80 mm bolt: “3”
• M6 × 105 mm bolt: “21”
• M6 × 85 mm bolts: “9”, “13”
• M6 × 75 mm bolts: “14”, “15”
• M6 × 60 mm bolts: “4”–“7”
• M6 × 40 mm bolts: “8”, “10”–“12”, “16”–“20”

A. Right crankcase
B. Left crankcase

5. Apply:
   • Engine oil
   (onto the crankshaft pins bearings and oil delivery holes)
6. Check:
   • Crankshaft and transmission operation
   Rough movement → Repair.
7. Install:
   • Generator shaft bolt “1”

Generator shaft bolt
28 Nm (2.8 m·kg, 20 ft·lb)

NOTE:

While the holding the generator rotor “2” with the primary sheave holder “3”, tighten the generator shaft bolt.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A

1

2
3

EAS24910
OIL PUMP

Removing the oil pump

Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-74.
1	Oil strainer (crankcase)	1	
2	Oil pump assembly	1	
			For installation, reverse the removal procedure.

Disassembling the oil pump

Order	Job/Parts to remove	Q'ty	Remarks
1	Spring retainer	1	
2	Spring	1	
3	Relief valve	1	
4	Oil pump housing cover 1	1	
5	Pin	2	
6	Spring	1	
7	Collar	1	
8	Ball	1	
9	Oil pump outer rotor 1	1	
10	Oil pump inner rotor 1	1	
11	Pin	1	
12	Oil pump housing cover 2	1	
13	Pin	2	
14	Oil pump shaft	1	
15	Pin	1	
16	Oil pump inner rotor 2	1	
17	Oil pump outer rotor 2	1	

Disassembling the oil pump

Order	Job/Parts to remove	Q'ty	Remarks
18	Oil seal	2	
19	Oil pump housing	1	
			For assembly, reverse the disassembly procedure.

EAS24960
CHECKING THE OIL PUMP

1. Check:
   - Oil pump housing
   - Oil pump housing cover
     Cracks/damage/wear → Replace the defective part(s).
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
0.12 mm (0.0047 in) or less
Limit
0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance
0.09–0.15 mm (0.0035–0.0059 in)
Limit
0.220 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance
0.03–0.08 mm (0.0012–0.0031 in)
Limit
0.150 mm (0.0059 in)

1. Inner rotor
2. Outer rotor
3. Oil pump housing

3. Check:
   - Oil pump operation
     Rough movement → Repeat steps (1) and (2) or replace the defective part(s).

EAS24970
CHECKING THE RELIEF VALVE

1. Check:
   - Relief valve body
   - Relief valve
   - Spring
     Damage/wear → Replace the defective part(s).
2. Check:
   - Ball
   - Collar
   - Spring
   - Oil seal
     Damage/wear → Replace the defective part(s).

EAS24990
CHECKING THE OIL STRAINER

1. Check:
   - Oil strainer (crankcase)
     Damage → Replace.
     Contaminants → Clean with solvent.

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 housing “1”
   - Oil seal “2” New
   - Oil pump outer rotor 2 “3”
   - Oil pump inner rotor 2 “4”
   - Pin “5”

- Oil pump shaft “6”
- Pins “7”
- Oil pump housing cover 2 “8”

	Oil pump housing cover 2 screw 2 Nm (0.2 m·kg, 1.4 ft·lb)

- Pin “9”
- Oil pump inner rotor 1 “10”
- Oil pump outer rotor 1 “11”
- Ball “12”
- Collar “13”
- Spring “14”
- Pins “15”
- Oil pump housing cover 1 “16”

	Oil pump housing cover 1 screw 2 Nm (0.2 m·kg, 1.4 ft·lb)

- Relief valve “17”
- Spring “18”
- Spring retainer “19”

	Spring retainer bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:

When installing the inner rotor, align the pin in the oil pump shaft with the groove in the inner rotor.

3. Check:
   - Oil pump operation
     Refer to “CHECKING THE OIL PUMP” on page 5-84.

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.

EAS25960
CRANKSHAFT

Removing the crankshaft

Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-74.
1	Crankshaft	1	
2	Generator shaft	1	
3	Connecting rod cap	2	
4	Big end lower bearing	2	
5	Connecting rod	2	
6	Big end upper bearing	2	
			For installation, reverse the removal procedure.

EAS26010
REMOVING THE CONNECTING RODS

The following procedure applies to all of the connecting rods.

1. Remove:
   - Connecting rod caps “1”
   - Connecting rod
   - Big end bearings

NOTE:

Identify the position of each big end bearing so that it can be reinstalled in its original place.

EAS26090
CHECKING THE CRANKSHAFT AND CONNECTING RODS

1. Measure:
   - Crankshaft runout
     Out of specification → Replace the crankshaft.

Runout limit C
0.040 mm (0.0016 in)

2. Check:
   - Crankshaft journal surfaces
   - Crankshaft pin surfaces
   - Bearing surfaces
     Scratches/wear → Replace the crankshaft.
   - Generator shaft drive gear “1”
     Damage/wear → Replace the crankshaft.

3. Measure:
   - Crankshaft-pin-to-big-end-bearing clearance
     Out of specification → Replace the big end bearings.

Journal oil clearance (using plastigauge®)
0.030–0.062 mm (0.0012–0.0024 in)

The following procedure applies to all of the connecting rods.

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.

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a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rod halves.
b. 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.

c. Put a piece of Plastigauge® "1" on the crankshaft pin.

d. Assemble the connecting rod halves.

NOTE:

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolts threads and nut seats with molybdenum disulfide grease.
- Make sure the projection "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.

e. Tighten the connecting rod bolts.

EWA12890

WARNING

- **Replace the connecting rod bolts with new ones.**
- **Clean the connecting rod bolts.**

NOTE:

The tightening procedure of the connecting rod bolts is angle controlled, therefore tighten the bolts using the following procedure.

f. Tighten the connecting rod bolts to the specified torque.

	Connecting rod bolt (1st) 15 Nm (1.5 m·kg, 11 ft·lb)

g. Put a mark "1" on the connecting rod bolts "2" and the connecting rod cap "3".

h. Tighten the connecting rod bolts further to reach the specified angle 120°–150°.

	Connecting rod bolt (final) Specified angle 120°–150°

EWA12900

WARNING

When the bolts are tightened more than the specified angle, do not loosen the bolt and then retighten it.
Replace the bolt with a new one and perform the procedure again.

EC5YU1008

CAUTION:

- **Do not use a torque wrench to tighten the bolt to the specified angle.**
- **Tighten the bolt until it is the specified angle.**

i. Remove the connecting rod and big end bearings.
Refer to "REMOVING THE CONNECTING RODS" on page 5-87.

j. 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.

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4. Select:
   - Big end bearings ("P_1"–"P_2")

NOTE:

- The numbers "a" stamped into the crankshaft web and the numbers "b" on the connecting rods are used to determine the replacement big end bearing sizes.
- "P_1"–"P_2" refer to the bearings shown in the crankshaft illustration.

For example, if the connecting rod "P_1" and the crankshaft web "P" numbers are "5" and "2" respectively, then the bearing size for "P_1" is:

"P_1" (connecting rod) - "P" (crankshaft) = 5 - 2 = 3 (brown)

Bearing color code
1.Blue 2.Black 3.Brown 4.Green 5.Yellow

5. Measure:
   - Crankshaft journal diameter "a"
     Out of specification → Replace the crankshaft.

NOTE:

Measure the diameter of each crankshaft journal at two places.

Crankshaft journal diameter
49.968–49.980 mm (1.9672–1.9677 in)

6. Measure:
   - Crankshaft journal bearing inside diameter "a"
     Out of specification → Replace the crankcase assembly.

NOTE:

Measure the inside diameter of each crankshaft journal bearing at two places.

Crankshaft journal bearing inside diameter
50.010–50.030 mm (1.9689–1.9697 in)

7. Calculate:
   - Crankshaft journal-to-crankshaft journal bearing clearance
     Out of specification → Replace the crankshaft and crankshaft journal bearings as a set.

NOTE:

Calculate the clearance by subtracting the crankshaft journal diameter from the crankshaft journal bearing inside diameter.

	Crankshaft journal-to-crankshaft journal bearing clearance **0.030–0.062 mm (0.0012–0.0024 in)**

EAS26150

INSTALLING THE CONNECTING RODS

1. Lubricate:
   - Bolt threads
   - Nut seats
     (with the recommended lubricant)

	Recommended lubricant **Molybdenum disulfide grease**

2. Lubricate:
   - Crankshaft pins
   - Big end bearings
   - Connecting rod inner surface
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

3. Install:
   - Big end bearings
   - Connecting rods
   - Connecting rod caps
     (onto the crankshaft pins)

NOTE:

- Align the projections “a” on the big end bearings with the notches “b” in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- Make sure the projections “c” on the connecting rods face towards the left side of the crankshaft.
- Make sure the characters “d” on both the connecting rod and connecting rod cap are aligned.

4. Tighten:
   - Connecting rod bolts “1”

EWA12890

WARNING

- **Replace the connecting rod bolts with new ones.**
- **Clean the connecting rod bolts.**

NOTE:

The tightening procedure of the connecting rod bolts is angle controlled, therefore tighten the bolts using the following procedure.

a. Tighten the connecting rod bolts to the specified torque.

	Connecting rod bolt (1st) **15 Nm (1.5 m·kg, 11 ft·lb)**

b. Put a mark “1” on the connecting rod bolts “2” and the connecting rod cap “3”.

c. Tighten the connecting rod bolts further to reach the specified angle 120°–150°.

	Connecting rod bolt (final) **Specified angle 120°–150°**

EWA12900

WARNING

When the bolts are tightened more than the specified angle, do not loosen the bolt and then retighten it.
Replace the bolt with a new one and perform the procedure again.

EC5YU1008

CAUTION:

- **Do not use a torque wrench to tighten the bolt to the specified angle.**
- **Tighten the bolt until it is the specified angle.**

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EAS26210

INSTALLING THE CRANKSHAFT ASSEMBLY

1. Install:
   - Crankshaft assembly

ECA13970

CAUTION:

To avoid scratching the crankshaft and to ease the installation procedure, lubricate the oil seal lips with lithium-soap-based grease and each bearing with engine oil.

NOTE:

- Make sure that the generator shaft drive gear teeth and generator shaft driven gear teeth mesh correctly.
- Align the right connecting rod with the front cylinder sleeve hole.

EAS26240
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks

Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-74.
1	Shift fork guide bar	2	
2	Shift drum assembly	1	
3	Shift fork-L	1	
4	Shift fork-R	1	
5	Shift fork-C	1	
6	Drive axle assembly	1	
7	Main axle assembly	1	
8	Spacer	1	
			For installation, reverse the removal procedure.

Disassembling the main axle assembly

Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	1	
2	Washer	1	
3	5th pinion gear	1	
4	Collar	1	
5	Washer	1	
6	2nd/3rd pinion gear	1	
7	Circlip	1	
8	Washer	1	
9	4th pinion gear	1	
10	Collar	1	
11	Main axle/1st pinion gear	1	
			For assembly, reverse the disassembly procedure.

Disassembling the drive axle assembly

Order	Job/Parts to remove	Q'ty	Remarks
1	5th wheel gear	1	
2	Circlip	1	
3	Washer	1	
4	2nd wheel gear	1	
5	Collar	1	
6	Circlip	1	
7	Washer	1	
8	1st wheel gear	1	
9	Collar	1	
10	Washer	1	
11	4th wheel gear	1	
12	Circlip	1	
13	Washer	1	
14	3rd wheel gear	1	
15	Collar	1	
16	Drive axle	1	
			For assembly, reverse the disassembly procedure.

EAS26260
CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

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 DRUM ASSEMBLY

1. Check:
   - Shift drum groove
     Damage/scratches/wear → Replace the shift drum assembly.
   - Shift drum segment “1”
     Damage/wear → Replace the shift drum assembly.
   - Shift drum bearing “2”
     Damage/pitting → 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
0.08 mm (0.0032 in)

2. Measure:
   - Drive axle runout
     (with a centering device and dial gauge “1”)
     Out of specification → Replace the drive axle.

Drive axle runout limit
0.08 mm (0.0032 in)

3. Check:
   - Transmission gears
     Blue discoloration/pitting/wear → Replace the defective gear(s).

- Transmission gear dogs
  Cracks/damage/rounded edges → Replace the defective gear(s).

4. Check:
   - Transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   - Transmission gear movement
     Rough movement → Replace the defective part(s).
6. Check:
   - Circlips
     Bends/damage/looseness → Replace.

ET5YU1024

ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:
   - Washer “1”
   - Circlip “2” New

NOTE:

- Be sure the circlip sharp-edged corner “a” is positioned opposite side to the toothed washer and gear.
- Install the circlip so that both ends “b” rest on the sides of a spline “c” with both axles aligned.

EAS26320

INSTALLING THE SHIFT FORKS AND SHIFT DRUM ASSEMBLY

1. Install:
   - Shift fork-R “1”
   - Shift fork-C “2”
   - Shift fork-L “3”
   - Shift drum assembly “4”
   - Shift fork guide bars “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”, “L”.

2. Check:
   - Transmission
     Rough movement → Repair.

NOTE:

Oil each gear, shaft, and bearing thoroughly.

FUEL 6

FUEL SYSTEM

FUEL TANK 6-1
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EAS26620
FUEL TANK

Removing the fuel tank and fuel pump

Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel tank cover	1	
2	Fuel pump coupler	1	Disconnect.
3	Fuel sender coupler	1	Disconnect.
4	Fuel tank overflow hose	1	Disconnect.
5	Fuel tank breather hose	1	Disconnect.
6	Fuel hose	1	Disconnect.
7	Fuel return hose	1	Disconnect.
8	Fuel tank	1	
9	Fuel pump	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. Disconnect:
   - Fuel hose
   - Fuel return hose

EC5YU1029
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 them.

NOTE:
- To remove the fuel hose from the fuel pump, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown, press the two buttons “2” on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hoses, place a few rags in the area under where they will be removed.

3. Remove:
   - Fuel tank

NOTE:

Do not set the fuel tank down on the installation surface of the fuel pump. Be sure to lean the fuel tank against a wall or the like.

EAS26640
REMOVING THE FUEL PUMP
1. Remove:
   - Fuel pump

ECA14720
CAUTION:
- **Do not drop the fuel pump or give it a strong shock.**
- **Do not touch the base section of the fuel sender.**

EAS26670
CHECKING THE FUEL PUMP BODY
1. Check:
   - Fuel pump body
     Obstruction → Clean.
     Cracks/damage → Replace fuel pump assembly.
2. Check:
   - Diaphragms and gaskets
     Tears/fatigue/cracks → Replace fuel pump assembly.

EAS26690
CHECKING THE FUEL PUMP OPERATION
1. Check:
   - Fuel pump operation
     Refer to “CHECKING THE FUEL PUMP” on page 7-104.

EAS26710
INSTALLING THE FUEL PUMP
1. Tighten:
   - Fuel pump

	Fuel pump bolt **4 Nm (0.4 m·kg, 2.9 ft·lb)**

NOTE:
- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump as shown in the illustration.
- Align the projection “a” on the fuel pump with the slot in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.

ET5YU1025
INSTALLING THE FUEL TANK
1. Connect:
   - Fuel return hose
   - Fuel hose

EC5YU1017

CAUTION:

When installing the fuel hose and the fuel return hose, make sure that they are securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

NOTE:

- Install the fuel hose securely onto the fuel pump until a distinct “click” is heard.
- To install the fuel hose onto the fuel pump, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown.

EAS26970
THROTTLE BODIES

Removing the pressure regulator and rollover valves

Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Air duct		Refer to "GENERAL CHASSIS" on page 4-1.
1	Pressure regulator cover	1	
2	Fuel hose (intake manifold assembly to pressure regulator)	1	Disconnect.
3	Pressure regulator	1	
4	Fuel return hose	1	
5	Fuel pipe holder	2	
6	Fuel return hose (fuel return pipe to fuel pump)	1	
7	Fuel return pipe	1	
8	Fuel tank breather hose	1	
9	Fuel tank overflow hose	1	
10	Fuel tank breather/overflow hose holder	1	
11	Fuel tank breather/overflow hose	1	
12	Rollover valve hose	4	
13	Rollover valve 1	1	

Removing the pressure regulator and rollover valves

Order	Job/Parts to remove	Q'ty	Remarks
14	Rollover valve 2	1	
15	Rollover valve bracket	1	
			For installation, reverse the removal procedure.

Removing the throttle bodies

Order	Job/Parts to remove	Q'ty	Remarks
	Seat/Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
1	Throttle position sensor coupler	1	Disconnect.
2	Cylinder-#1 intake air pressure sensor hose	1	Disconnect.
3	Cylinder-#2 intake air pressure sensor hose	1	Disconnect.
4	Intake solenoid vacuum hose (one-way valve to throttle body)	1	Disconnect.
5	Throttle cable	2	Disconnect.
6	Throttle body joint clamp screw	2	Loosen.
7	Throttle body	1	EC5YU1030 **CAUTION:** **The throttle body should not be disassembled.**
8	Throttle position sensor	1	
			For installation, reverse the removal procedure.

Removing the intake manifolds

Order	Job/Parts to remove	Q'ty	Remarks
1	Fuel hose	1	
2	Fuel hose (intake manifold assembly to pressure regulator)	1	
3	Cylinder-#2 ISC (idle speed control) unit outlet hose	1	
4	Cylinder-#1 ISC (idle speed control) unit outlet hose	1	
5	Intake manifold assembly	1	
6	Cylinder-#2 injector coupler	1	Disconnect.
7	Cylinder-#1 injector coupler	1	Disconnect.
8	Gasket	2	
			For installation, reverse the removal procedure.

Removing the injectors

Order	Job/Parts to remove	Q'ty	Remarks
1	Fuel pipe	1	
2	Injector joint 1	1	
3	Injector joint 2	1	
4	Injector	2	
5	Intake manifold	2	
			For installation, reverse the removal procedure.

EAS26980
CHECKING THE INJECTORS
1. Check:
   - Injectors
     Damage → Replace.

EAS26990
CHECKING THE THROTTLE BODIES
1. Check:
   - Throttle bodies
     Cracks/damage → Replace the throttle bodies as a set.
2. Check:
   - Fuel passages
     Obstructions → Clean.

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a. Wash the throttle bodies in a petroleum-based solvent.
   Do not use any caustic carburetor cleaning solution.
b. Blow out all of the passages with compressed air.

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ET5YU1014
CHECKING THE ROLLOVER VALVES
1. Check:
   - Rollover valve 1 “1”
   - Rollover valve 2 “2”
     Damage/faulty → Replace.

NOTE:
- Check that air flows smoothly only in the direction of the arrow shown in the illustration.
- The rollover valves must be in an upright position when checking the airflow.

EAS27000
CHECKING THE PRESSURE REGULATOR
1. Check:
   - Pressure regulator
     Damage → Replace.

EAS27010
CHECKING THE PRESSURE REGULATOR OPERATION
1. Check:
   - Pressure regulator operation

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a. Remove the pressure regulator cover.
   Refer to “THROTTLE BODIES” on page 6-4.
b. Disconnect the fuel hose “1” from the pressure regulator “2”.
c. Connect the fuel pressure adapter “3” between the fuel hose “1” and pressure regulator “2”.
d. Connect the pressure gauge “4” to the fuel pressure adapter “3”.
e. Connect the vacuum/pressure pump gauge set “5” to the pressure regulator.

Vacuum/pressure pump gauge set
90890-06756
Pressure gauge
90890-03153
Fuel pressure adapter
90890-03176
YM-03176

f. Start the engine.
g. Measure the fuel pressure.

Fuel pressure
392 kPa (3.92 kg/cm², 55.7 psi)

h. Use the vacuum/pressure pump gauge set to adjust the fuel pressure in relation to the vacuum pressure as described below.

NOTE:

The vacuum pressure should not exceed 100 kPa (760 mm Hg).

• Increase the vacuum pressure → Fuel pressure is decreased • Decrease the vacuum pressure → Fuel pressure is increased

Faulty → Replace the pressure regulator.

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EAS27030

ADJUSTING THE THROTTLE POSITION SENSOR

1. Check:
   - Throttle position sensor
     Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 7-104.
2. Adjust:
   - Throttle position sensor angle

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a. Connect the throttle position sensor coupler to the throttle position sensor.
b. Connect the digital circuit tester to the throttle position sensor coupler.

• Positive tester probe yellow terminal "1" • Negative tester probe black terminal "2"

	Digital circuit tester **90890-03174**

c. Measure the throttle position sensor voltage.
d. Adjust the throttle position sensor angle so that the voltage is within the specified range.

	Throttle position sensor voltage **0.63–0.73 V**

e. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws "3".

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ET5YU1016

INSTALLING THE FUEL PIPE

1. Install:
   - Fuel pipe "1"

	Fuel pipe bolt **30 Nm (3.0 m·kg, 22 ft·lb)**

NOTE:

Install the fuel pipe "1" so that it contacts the projections "a" on the injector joints.

ET5YU1012

ISC (IDLE SPEED CONTROL) UNIT

Removing the ISC (idle speed control) unit and intake solenoid

Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
1	ISC (idle speed control) unit cover	1	
2	Surge tank	1	
3	Surge tank hose	1	
4	Intake solenoid vacuum hose (one-way valve to throttle body)	1	Disconnect.
5	One-way valve	1	
6	Intake solenoid vacuum hose (intake solenoid to one-way valve)	1	
7	Intake solenoid vacuum hose (air filter case valve to intake solenoid)	1	
8	Intake solenoid coupler	1	Disconnect.
9	Intake solenoid	1	
10	Intake solenoid holder	1	
11	Intake solenoid bracket	1	

Removing the ISC (idle speed control) unit and intake solenoid

Order	Job/Parts to remove	Q'ty	Remarks
12	ISC (idle speed control) unit coupler	1	Disconnect.
13	Cylinder-#1 ISC (idle speed control) unit outlet hose	1	Disconnect.
14	Cylinder-#2 ISC (idle speed control) unit outlet hose	1	Disconnect.
15	ISC (idle speed control) unit inlet hose	1	
16	ISC (idle speed control) unit	1	
			For installation, reverse the removal procedure.

ET5YU1015

CHECKING THE ISC (IDLE SPEED CONTROL) SYSTEM

1. Check:
   - Hoses
     Loose connections → Connect properly.
     Cracks/damage → Replace.
2. Check:
   - Surge tank
     Cracks/damage → Replace.
3. Check:
   - One-way valve
     Cracks/damage/faulty → Replace.

NOTE:

Check that air flows smoothly only in the direction of the arrow shown in the illustration.

4. Check:
   - Intake solenoid
     Damage → Replace.

ELEC 7

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EAS27090
IGNITION SYSTEM

EAS27110
CIRCUIT DIAGRAM

3. Main switch
4. Battery
8. Main fuse
10. ECU fuse
13. Relay unit
14. Starting circuit cut-off relay
16. Neutral switch
19. Sidestand switch
20. Crankshaft position sensor
24. Lean angle cut-off switch
29. ECU (electronic control unit)
32. Spark plug
33. Cylinder-#2 right ignition coil
34. Cylinder-#2 left ignition coil
35. Cylinder-#1 left ignition coil
36. Cylinder-#1 right ignition coil
56. Clutch switch
73. Engine stop switch
81. Ignition fuse

EAS27150
TROUBLESHOOTING

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. Air filter case
4. Battery box
5. Engine

1. Check the fuses. (Main, ignition, and ECU) Refer to "CHECKING THE FUSES" on page 7-93.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-94.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-8.	NG →	Re-gap or replace the spark plug(s).
OK ↓		
4. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 7-100.	OK →	Ignition system is OK.
NG ↓		
5. Check the spark plug caps. Refer to "CHECKING THE SPARK PLUG CAPS" on page 7-99.	NG →	Replace the spark plug cap(s).
OK ↓		
6. Check the ignition coils. Refer to "CHECKING THE IGNITION COILS" on page 7-99.	NG →	Replace the ignition coil(s).
OK ↓		
7. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 7-100.	NG →	Replace the crankshaft position sensor.
OK ↓		

8. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
9. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the right handlebar switch.
OK ↓		
10. Check the neutral switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the neutral switch.
OK ↓		
11. Check the sidestand switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the sidestand switch.
OK ↓		
12. Check the clutch switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the clutch switch.
OK ↓		
13. Check the relay unit (starting circuit cut-off relay). Refer to “CHECKING THE RELAYS” on page 7-96.	NG →	Replace the relay unit.
OK ↓		
14. Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 7-98.	NG →	Replace the relay unit.
OK ↓		
15. Check the lean angle cut-off switch. Refer to “CHECKING THE LEAN ANGLE CUT-OFF SWITCH” on page 7-100.	NG →	Replace the lean angle cut-off switch.
OK ↓		
16. Check the entire ignition system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-1.	NG →	Properly connect or repair the ignition system wiring.
OK ↓		
Replace the ECU.		

EAS27160
ELECTRIC STARTING SYSTEM

EAS27170
CIRCUIT DIAGRAM

3. Main switch
4. Battery
6. Starter relay
7. Starter motor
8. Main fuse
10. ECU fuse
13. Relay unit
14. Starting circuit cut-off relay
16. Neutral switch
19. Sidestand switch
29. ECU (electronic control unit)
38. Decompression solenoid
56. Clutch switch
70. Auto decompression fuse
73. Engine stop switch
74. Start switch
81. Ignition fuse

EAS27180
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the engine stop switch is set to "◯" and the main switch is turned "ON" (both switch circuits 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 circuit is closed).
- The clutch lever is pulled to the handlebar (the clutch switch circuit is closed) and the sidestand is up (the sidestand switch circuit 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 stays 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 pushing the start switch "⊛".

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 fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Relay unit (starting circuit cut-off relay)
7. Relay unit (diode)
8. Clutch switch
9. Sidestand switch
10. Neutral switch
11. Start switch
12. Starter relay
13. Starter motor
14. ECU fuse
15. Auto decompression fuse
16. Decompression solenoid
17. ECU (electronic control unit)

EAS27190
TROUBLESHOOTING

The starter motor fails to turn.

NOTE:

• Before troubleshooting, remove the following part(s):
1. Seat
2. Fuel tank
3. Air filter case
4. Oil tank

1. Check the fuses. (Main, ignition, auto decompression, and ECU) Refer to "CHECKING THE FUSES" on page 7-93.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-94.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the starter motor. Refer to "CHECKING THE STARTER MOTOR" on page 5-72.	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 7-96.	NG →	Replace the relay unit.
OK ↓		
5. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 7-98.	NG →	Replace the relay unit.
OK ↓		
6. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 7-96.	NG →	Replace the starter relay.
OK ↓		
7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-89.	NG →	Replace the main switch/immobilizer unit.
OK ↓		

8. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the right handlebar switch.
OK ↓		
9. Check the neutral switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the neutral switch.
OK ↓		
10. Check the sidestand switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the sidestand switch.
OK ↓		
11. Check the clutch switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the clutch switch.
OK ↓		
12. Check the start switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the right handlebar switch.
OK ↓		
13. Check the decompression solenoid. Refer to “CHECKING THE DECOMPRESSION SOLENOID” on page 7-105.	NG →	Replace the decompression solenoid.
OK ↓		
14. Check the entire starting system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-5.	NG →	Properly connect or repair the starting system wiring.
OK ↓		
The starting system circuit is OK.		

EAS27200
CHARGING SYSTEM

EAS27210
CIRCUIT DIAGRAM

1. AC magneto
2. Rectifier/regulator
4. Battery
8. Main fuse

EAS27220
TROUBLESHOOTING

The battery is not being charged.

NOTE:

• Before troubleshooting, remove the following part(s):
1. Seat

1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 7-93.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-94.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 7-101.	NG →	Replace the stator assembly.
OK ↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 7-101.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-11.	NG →	Properly connect or repair the charging system wiring.
OK ↓		
This circuit is OK.		

EAS27240
LIGHTING SYSTEM

EAS27250
CIRCUIT DIAGRAM

3. Main switch
4. Battery
8. Main fuse
10. ECU fuse
29. ECU (electronic control unit)
47. High beam indicator light
50. Meter light
54. Headlight relay
57. Pass switch
58. Dimmer switch
67. Auxiliary light
68. Headlight (high beam)
69. Headlight (low beam)
75. Tail/brake light
76. License plate light
80. Headlight fuse
82. Signaling system fuse
83. Parking lighting fuse

EAS27260
TROUBLESHOOTING

Any of the following fail to light: headlight (high beam), headlight (low beam), high beam indicator light, taillight, license plate light, auxiliary light or meter light.

NOTE:

• Before troubleshooting, remove the following part(s):
1. Seat
2. Fuel tank
3. Air filter case
4. Headlight assembly

1. Check the condition of each bulb and bulb socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 7-92.	NG →	Replace the bulb(s) and bulb socket(s).
OK ↓		
2. Check the fuses. (Main, headlight, signaling system, parking lighting, and ECU) Refer to "CHECKING THE FUSES" on page 7-93.	NG →	Replace the fuse(s).
OK ↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-94.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-89.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 7-89.	NG →	Replace the left handlebar switch.
OK ↓		
6. Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 7-89.	NG →	Replace the left handlebar switch.
OK ↓		
7. Check the headlight relay. Refer to "CHECKING THE RELAYS" on page 7-96.	NG →	Replace the headlight relay.
OK ↓		

8. Check the entire lighting system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-15.	NG →	Properly connect or repair the lighting system wiring.
OK ↓		
This circuit is OK.		

EAS27270
SIGNALING SYSTEM

EAS27280
CIRCUIT DIAGRAM

3. Main switch
4. Battery
8. Main fuse
10. ECU fuse
12. Backup fuse (odometer, clock and immobilizer system)
13. Relay unit
16. Neutral switch
18. Fuel sender
25. Speed sensor
29. ECU (electronic control unit)
42. Fuel level warning light
43. Neutral indicator light
44. Multi-function meter
45. Engine trouble warning light
48. Left turn signal indicator light
49. Right turn signal indicator light
52. Horn
53. Turn signal/hazard relay
59. Hazard switch
60. Turn signal switch
61. Horn switch
62. Front left turn signal light
63. Front right turn signal light
64. Rear right turn signal light
65. Rear left turn signal light
72. Front brake light switch
75. Tail/brake light
77. Rear brake light switch
81. Ignition fuse
82. Signaling system fuse
83. Parking lighting fuse

EAS27290
TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or indicator light.
- The horn fails to sound.
- The speedometer fails to operate.

NOTE:

- Before troubleshooting, remove the following part(s):
1. Seat
2. Fuel tank
3. Air filter case
4. Headlight assembly

1. Check the fuses. (Main, ignition, signaling system, parking lighting, and ECU) Refer to "CHECKING THE FUSES" on page 7-93.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-94.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-89.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
4. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-19.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
Check the condition of each of the signaling system's circuits. Refer to "Checking the signaling system".		

Checking the signaling system

The horn fails to sound.

1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 7-89.	NG →	Replace the left handlebar switch.
OK ↓		
2. Check the horn. Refer to "CHECKING THE HORN" on page 7-102.	NG →	Replace the horn.
OK ↓		

3. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-19.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
This circuit is OK.		

The tail/brake light fails to come on.

1. Check the front brake light switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the front brake light switch.
OK ↓		
2. Check the rear brake light switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the rear brake light switch.
OK ↓		
3. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-19.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
This circuit is OK.		

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the turn signal light bulbs and sockets. Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 7-92.	NG →	Replace the turn signal light bulb, socket or both.
OK ↓		
2. Check the turn signal switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the left handlebar switch.
OK ↓		
3. Check the hazard switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the left handlebar switch.
OK ↓		
4. Check the turn signal/hazard relay. Refer to “CHECKING THE TURN SIGNAL/HAZARD RELAY” on page 7-97.	NG →	Replace the turn signal/hazard relay.
OK ↓		

5. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-19.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
This circuit is OK.		

The neutral indicator light fails to come on.

1. Check the neutral switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the neutral switch.
OK ↓		
2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-19.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
This circuit is OK.		

The fuel level warning light fails to come on.

1. Check the fuel sender. Refer to “CHECKING THE FUEL SENDER” on page 7-103.	NG →	Replace the fuel pump assembly.
OK ↓		
2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-19.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
This circuit is OK.		

The speedometer fails to operate.

1. Check the speed sensor. Refer to “CHECKING THE SPEED SENSOR” on page 7-103.	NG →	Replace the speed sensor.
OK ↓		
2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-19.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
Replace the meter assembly.		

EAS27330
FUEL INJECTION SYSTEM

EAS27340
CIRCUIT DIAGRAM

3. Main switch
4. Battery
5. Fuel injection system fuse
8. Main fuse
10. ECU fuse
15. Fuel pump relay
16. Neutral switch
17. Fuel pump
19. Sidestand switch
20. Crankshaft position sensor
21. Throttle position sensor
22. Cylinder-#1 intake air pressure sensor
23. Cylinder-#2 intake air pressure sensor
24. Lean angle cut-off switch
25. Speed sensor
26. Muffler cooling fan temperature sensor
27. Air temperature sensor
28. Engine temperature sensor
29. ECU (electronic control unit)
30. ISC (idle speed control) unit
31. Intake solenoid
32. Spark plug
33. Cylinder-#2 right ignition coil
34. Cylinder-#2 left ignition coil
35. Cylinder-#1 left ignition coil
36. Cylinder-#1 right ignition coil
37. EXUP servo motor
38. Decompression solenoid
39. Injector #1
40. Injector #2
44. Multi-function meter
45. Engine trouble warning light
51. O_2 sensor
70. Auto decompression fuse
73. Engine stop switch
81. Ignition fuse

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, the lowest fault code number appears on the odometer/tripmeter/fuel reserve tripmeter LCD. 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 fuel injection system operation

Warning light indication	ECU operation	Fuel injection operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
	Fault code No. 63 detected	Operates	Can 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

19: Blue/yellow ECU lead (broken or disconnected)

30: Lean angle cut-off switch (latch up detected)

41: Lean angle cut-off switch (open or short-circuit)

50: ECU internal malfunction (memory check error)

Checking the 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 it comes on while 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”
b. Main switch “ON”
c. Engine trouble warning light off
d. Engine trouble warning light on for 1.4 seconds

EAS27380
SELF-DIAGNOSTIC FUNCTION TABLE

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.

Self-Diagnostic Function table

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	Cylinder-#1 intake air pressure sensor (open or short circuit)	Cylinder-#1 intake air pressure sensor: open or short circuit detected.	Able	Able
14	Cylinder-#1 intake air pressure sensor (hose line)	Cylinder-#1 intake air pressure sensor: hose 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
17	EXUP servo motor circuit (open or short circuit)	EXUP servo motor circuit: open or short circuit detected.	Able	Able
18	EXUP servo motor (lock)	EXUP servo motor is stuck.	Able	Able
19	Blue/yellow ECU lead (broken or disconnected)	A break or disconnection of the blue/yellow lead of the ECU is detected.	Unable	Unable
22	Air temperature sensor (open or short circuit)	Air temperature sensor: open or short circuit detected.	Able	Able

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
24	O_2 sensor	No normal signal is received from the O_2 sensor.	Able	Able
25	Cylinder-#2 intake air pressure sensor (open or short circuit)	Cylinder-#2 intake air pressure sensor: open or short circuit detected.	Able	Able
26	Cylinder-#2 intake air pressure sensor (hose system)	Cylinder-#2 intake air pressure sensor: hose system malfunction (clogged or detached hose).	Able	Able
28	Engine temperature sensor (open or short circuit)	Engine temperature sensor: open or short circuit detected.	Able	Able
29	Decompression solenoid (thermistor) (open or short circuit)	Decompression solenoid (thermistor): open or short circuit detected.	Able	Able
30	Lean angle cut-off switch (latch up detected)	The vehicle has overturned.	Unable	Unable
33	Cylinder-#1 left or right ignition coil (faulty ignition)	Malfunction detected in the primary wire of the cylinder-#1 left or right ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
34	Cylinder-#2 left ignition coil (faulty ignition)	Malfunction detected in the primary wire of the cylinder-#2 left ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
35	Cylinder-#1 left or right ignition coil (faulty ignition)	Malfunction detected in the primary wire of the cylinder-#1 left or right ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
36	Cylinder-#2 right ignition coil (faulty ignition)	Malfunction detected in the primary wire of the cylinder-#2 right ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
37	ISC valve (stuck fully open)	Engine speed is high when the engine is idling.	Able	Able
38	Decompression solenoid	Decompression solenoid: open or short circuit detected.	Able	Able
41	Lean angle cut-off switch (open or short circuit)	Lean angle cut-off switch: open or short circuit detected.	Unable	Unable

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
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.		
43	Fuel system voltage (monitoring voltage)	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).	Able	Able
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 (Monitoring voltage)	Power supply to the fuel injection system is not normal.	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
62	Muffler cooling fan temperature sensor (open or short circuit)	Muffler cooling fan temperature sensor: open or short circuit detected.	Able	Able
63	Muffler cooling fan temperature sensor (ambient temperature abnormally high)	Engine trouble warning light is flashing. (Abnormally high temperature is detected by muffler cooling fan temperature sensor.)	Able	Able

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.	Unable	Unable
Er-2	ECU internal malfunction (output signal error)	No signals are received from the ECU within the specified duration.	Unable	Unable
Er-3	ECU internal malfunction (output signal error)	Data from the ECU cannot be received correctly.	Unable	Unable
Er-4	ECU internal malfunction (input signal error)	Non-registered data has been received from the meter.	Unable	Unable

EAS27400
TROUBLESHOOTING METHOD

The engine operation is not normal and the engine trouble warning light comes on.

1. Check:
   - Fault code number

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a. Check the fault code number displayed on the meter.
b. Identify the faulty system with the fault code. Refer to “Self-Diagnostic Function table”.
c. Identify the probable cause of the malfunction. Refer to “Diagnostic code table”.

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2. Check and repair the probable cause of malfunction.

Fault code No.	No fault code No.
Check and repair. Refer to “TROUBLESHOOTING DETAILS” on page 7-39. Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to “Sensor operation table” and “Actuator operation table”.	Check and repair. Refer to “Self-Diagnostic Function table”.

3. Perform ECU reinstatement action.
   Refer to “Reinstatement method” of table in “TROUBLESHOOTING DETAILS”.
4. Turn the main switch to “OFF” and back to “ON”, then check that no fault code number is displayed.

NOTE:

If fault codes are displayed, repeat steps (1) to (4) until no fault code number is displayed.

5. Erase the malfunction history in the diagnostic mode. Refer to “Sensor operation table (Diagnostic code No. 62)”.

NOTE:

Turning the main switch to “OFF” will not erase the malfunction history.

The engine operation is not normal but the engine trouble warning light does not come on.

1. Check the operation of following sensors and actuators in the Diagnostic mode. Refer to “Sensor operation table” and “Actuator operation table”.

01: Throttle position sensor (throttle angle) 30: Cylinder-#1 left ignition coil 31: Cylinder-#2 left ignition coil 32: Cylinder-#1 right ignition coil 33: Cylinder-#2 right ignition coil 36: Injector #1 37: Injector #2

   If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.
   If no malfunction is detected in the sensors and actuators, check and repair inner parts of the engine.

EAS27420
DIAGNOSTIC MODE

Setting the diagnostic mode

1. Turn the main switch to “OFF” and set the engine stop switch to “◯”.
2. Disconnect the wire harness coupler from the fuel pump.
3. Press and hold the “RESET” button, turn the main switch to “ON”, and continue to press the button for 8 seconds or more.

NOTE:

- All displays on the meter disappear except the clock and odometer/trip meter/fuel reserve trip meter displays.
- “dIAG” appears on the odometer/trip meter/fuel reserve trip meter LCD.

4. Press the “SELECT” button to select the diagnostic mode “dIAG”.
5. After selecting “dIAG”, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to activate the diagnostic mode. The diagnostic code number “d01” appears on the clock LCD.
6. Set the engine stop switch to “⊗”.
7. Select the diagnostic code number corresponding to the fault code number by pressing the “SELECT” and “RESET” buttons.

NOTE:

- To decrease the selected diagnostic code number, press the “RESET” button. Press the “RESET” button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the “SELECT” button. Press the “SELECT” button for 1 second or longer to automatically increase the diagnostic 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 odometer/trip meter/fuel reserve trip meter 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 mode.

Diagnostic code table

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
12	No normal signals are received from the crankshaft position sensor.	• Open or short circuit in wire harness. • Defective crankshaft position sensor. • Malfunction in pickup rotor. • Malfunction in ECU. • Improperly installed sensor.	—
13	Cylinder-#1 intake air pressure sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective cylinder-#1 intake air pressure sensor. • Malfunction in ECU.	03

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
14	Cylinder-#1 intake air pressure sensor: hose system malfunction (clogged or detached hose).	• Cylinder-#1 intake air pressure sensor hose is detached, clogged, kinked, or pinched. • Malfunction in ECU.	03
15	Throttle position sensor: open or short circuit detected.	• Open or short circuit in wire sub lead. • Open or short circuit in wire harness. • Defective throttle position sensor. • Malfunction in ECU. • Improperly installed throttle position sensor.	01
17	EXUP servo motor circuit: open or short circuit detected.	• Open or short circuit in wire harness. • Defective EXUP servo motor (potentiometer circuit).	53
18	EXUP servo motor is stuck.	• Open or short circuit in wire harness. • Stuck EXUP servo motor (mechanism). • Stuck EXUP servo motor (motor).	53
19	A break or disconnection of the blue/yellow lead of the ECU is detected.	• Open circuit in wire harness (ECU coupler). • Malfunction in ECU.	20
22	Air temperature sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective air temperature sensor. • Malfunction in ECU. • Improperly installed air temperature sensor.	05
24	No normal signal is received from the O_2 sensor.	• Open or short circuit in wire harness. • Defective O_2 sensor. • Malfunction in ECU. • Improperly installed sensor.	—
25	Cylinder-#2 intake air pressure sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective cylinder-#2 intake air pressure sensor. • Malfunction in ECU.	04
26	Cylinder-#2 intake air pressure sensor: hose system malfunction (clogged or detached hose).	• Cylinder-#2 intake air pressure sensor hose is detached, clogged, kinked, or pinched. • Malfunction in ECU.	04
28	Engine temperature sensor: open or short circuit detected.	• Open or short circuit in wire sub lead. • Open or short circuit in wire harness. • Defective engine temperature sensor. • Malfunction in ECU. • Improperly installed sensor.	11
29	Decompression solenoid (thermistor): open or short circuit detected.	• Open or short circuit in wire harness. • Defective decompression solenoid (thermistor). • Malfunction in ECU. • Improperly installed sensor.	55
30	The vehicle has overturned.	• Overturned. • Malfunction in ECU.	08

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
33	Malfunction detected in the primary wire of the cylinder-#1 left or right ignition coil.	• Open or short circuit in wire sub lead. • Open or short circuit in wire harness. • Malfunction in cylinder-#1 left or right ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition cut-off circuit system.	30 32
34	Malfunction detected in the primary wire of the cylinder-#2 left ignition coil.	• Open or short circuit in wire harness. • Malfunction in cylinder-#2 left ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition cut-off circuit system.	31
35	Malfunction detected in the primary wire of the cylinder-#1 left or right ignition coil.	• Open or short circuit in wire sub lead. • Open or short circuit in wire harness. • Malfunction in cylinder-#1 left or right ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition cut-off circuit system.	30 32
36	Malfunction detected in the primary wire of the cylinder-#2 right ignition coil.	• Open or short circuit in wire harness. • Malfunction in cylinder-#2 right ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition cut-off circuit system.	33
37	Engine speed is high when the engine is idling.	• Open circuit in wire harness. • Malfunction in throttle body. • Malfunction in throttle cables. • ISC valve is stuck fully open due to disconnected ISC unit hose or coupler. (High engine idle speed is detected with the ISC valve stuck fully open even though signals for the valve to close are continuously being transmitted by the ECU.) • Malfunction in ECU. • ECU fuse is blown.	54
38	Decompression solenoid: open or short circuit detected.	• Open or short circuit in wire harness. • Defective decompression solenoid. • Malfunction in ECU. • Improperly installed sensor.	55
41	Lean angle cut-off switch: open or short circuit detected.	• Open or short circuit in wire harness. • Defective lean angle cut-off switch. • Malfunction in ECU.	08

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
42	No normal signals are received from the speed sensor. Open circuit is detected in the neutral switch.	• Open circuit in wire harness. • Defective speed sensor. • Malfunction in vehicle speed sensor detected. • Defective neutral switch. • Malfunction in the engine side of the neutral switch. • Malfunction in ECU.	07 21
43	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).	• Open or short circuit in wire harness. • Malfunction in ECU.	09
44	Error is detected while reading or writing on EEPROM (CO adjustment value).	• Malfunction in ECU. (The CO adjustment value is not properly written on or read from the internal memory).	60
46	Power supply to the fuel injection system is not normal.	Malfunction in the charging system. Refer to “CHARGING SYSTEM” on page 7-11.	—
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	• Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.)	—
62	Muffler cooling fan temperature sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective muffler cooling fan temperature sensor. • Malfunction in ECU. • Improperly installed sensor.	12
63	Engine trouble warning light is flashing. (Abnormally high temperature is detected by muffler cooling fan temperature sensor.)	• Muffler cover fan fuse or ECU fuse is blown. • Defective muffler cooling fan temperature sensor or muffler cooling fan motor relay • Positions of muffler cooling fan temperature sensor and its surrounding parts changed due to deformed parts near sensor • Muffler cooling fan temperature sensor detected a temperature of 120 °C (248 °F) or higher.	63
Er-1	No signals are received from the ECU.	• Open or short circuit in wire harness. • Malfunction in meter. • Malfunction in ECU. • Defective wire connection of the ECU coupler.	—
Er-2	No signals are received from the ECU within the specified duration.	• Improper connection in wire harness. • Malfunction in meter. • Malfunction in ECU.	—
Er-3	Data from the ECU cannot be received correctly.	• Improper connection in wire harness. • Malfunction in meter. • Malfunction in ECU.	—

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
Er-4	Non-registered data has been received from the meter.	• Improper connection in wire harness. • Malfunction in meter. • Malfunction in ECU.	—

Sensor operation table

Diagnostic code No.	Item	Meter display	Checking method
01	Throttle angle • Fully closed position • Fully opened position	 15–20 95–100	 Check with throttle fully closed. Check with throttle fully open.
03	Pressure difference (atmospheric pressure and cylinder-#1 intake air pressure)	Displays the cylinder-#1 intake air pressure.	Set the engine stop switch to "◯", then operate the throttle while pushing the start switch "⊛". (If the display value changes, the performance is OK.)
04	Pressure difference (atmospheric pressure and cylinder-#2 intake air pressure)	Displays the cylinder-#2 intake air pressure.	Set the engine stop switch to "◯", then operate the throttle while pushing the start switch "⊛". (If the display value changes, the performance is OK.)
05	Air temperature	Displays the air temperature.	Compare the actually measured air temperature with the meter display value.
07	Vehicle speed pulse	0–999	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
08	Lean angle cut-off switch • Upright • Overturned	 0.4–1.4 3.7–4.4	Remove the lean angle cut-off switch and incline it more than 65 degrees.
09	Fuel system voltage (battery voltage)	Approximately 12.0	Set the engine stop switch to "◯", and then compare with the actually measured battery voltage. (If the battery voltage is lower, perform recharging.)

Diag-nostic code No.	Item	Meter display	Checking method
11	Engine temperature	Displays the engine temperature.	Compare the actually measured engine temperature with the meter display value.
12	Muffler cooling fan temperature	Displays the muffler cooling fan temperature.	Compare the actually measured muffler cooling fan temperature with the meter display value.
20	Sidestand switch • Stand retracted • Stand extended	 ON OFF	Set ON/OFF the Sidestand switch. (with the transmission in gear.)
21	Neutral switch • Neutral • In gear	 ON OFF	Shift the transmission.
53	EXUP servo motor	Displays the operating angle. Engine trouble warning light comes on twice: once when the EXUP valve is closing and once when it is opening.	—
60	EEPROM fault code display • No history • History exists	 00 01 or 02 (Cylinder fault code) • (If both cylinders are defective, the display alternates every two seconds.)	—
61	Malfunction history code display • No history • History exists	 00 Fault codes 12-63 • (If more than one code number is 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.)	—
62	Malfunction history code erasure • No history • History exists	 0 Up to 28 fault codes	 — To erase the history, set the engine stop switch to "◯".

Diag-nostic code No.	Item	Meter display	Checking method
63	Stopping the flashing of the engine trouble warning light (erasing the muffler cooling fan temperature sensor fault code)	00	To stop the flashing of the engine trouble warning light, set the engine stop switch to "◯".
70	Control number	0–255	—

Actuator operation table

Diag-nostic code No.	Item	Actuation	Checking method
30	Cylinder-#1 left or right ignition coil	Actuates the cylinder-#1 left or right ignition coil for five times every second. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
31	Cylinder-#2 left ignition coil	Actuates the cylinder-#2 left ignition coil for five times every second. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
32	Cylinder-#1 left or right ignition coil	Actuates the cylinder-#1 left or right ignition coil for five times every second. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
33	Cylinder-#2 right ignition coil	Actuates the cylinder-#2 right ignition coil for five times every second. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
36	Injector #1	Actuates the injector #1 for five times every second. Illuminates the engine trouble warning light.	Check the operating sound of the injector #1 five times.
37	Injector #2	Actuates the injector #2 for five times every second. Illuminates the engine trouble warning light.	Check the operating sound of the injector #2 five times.
49	Intake solenoid	Actuates the intake solenoid for five times every second. Illuminates the engine trouble warning light.	Check the operating sound of the intake solenoid five times.

Diagnostic code No.	Item	Actuation	Checking method
50	Fuel pump relay	Actuates the fuel pump relay for five times every second. 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 fuel pump relay five times.
51	Muffler cooling fan motor relay	Actuates the muffler cooling fan motor relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the muffler cooling fan motor relay five times.
52	Headlight relay	Actuates the headlight relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the headlight relay five times.
54	ISC valve	Actuates and fully closes the ISC valve, then opens it to the standby opening position when the engine is started. This operation takes approximately 12 seconds until it is completed. Illuminates the engine trouble warning light.	The ISC unit vibrates when the ISC valve operates.
55	Decompression solenoid	Actuates the decompression solenoid for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light. **NOTE:** Be sure to push the start switch, otherwise the above mentioned operation will not be possible.	Check the operating sound of the decompression solenoid five times. **NOTE:** Disconnect the starter motor lead before performing this procedure.

EAS27460

TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Check and service the items or components that are the probable cause of the malfunction following the order given. After the check and service of the malfunctioning part has been completed, reset the meter display according to the reinstatement method.

Fault code No.:

Code number displayed on the meter when the engine failed to work normally. Refer to “Self-Diagnostic Function table”.
Diagnostic code No.:
Diagnostic code number to be used when the diagnostic mode is operated. Refer to “DIAGNOSTIC MODE” on page 7-31.

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 • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between the crankshaft position sensor coupler and ECU coupler. (gray–gray) (black/blue–black/blue)	
4	Defective crankshaft position sensor.	• Replace if defective. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 7-100.	

Fault code No.	13	Symptom	Cylinder-#1 intake air pressure sensor: open or short circuit detected.
Diagnostic code No.		03	Cylinder-#1 intake air pressure sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Cylinder-#1 intake air pressure sensor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning 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 cylinder-#1 intake air pressure sensor coupler and ECU coupler (black/blue–black/blue) (pink/white–pink/white) (blue–blue)	
3	Defective cylinder-#1 intake air pressure sensor.	• Execute the diagnostic mode. (Code No.03) • Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSORS” on page 7-106.	

Fault code No.	14	Symptom	Cylinder-#1 intake air pressure sensor: hose system malfunction (clogged or detached hose).
Diagnostic code No.		03	Cylinder-#1 intake air pressure sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Cylinder-#1 intake air pressure sensor hose	• Check the cylinder-#1 intake air pressure sensor hose condition. • Repair or replace the sensor hose.	Starting the engine and operating it at idle.
2	Cylinder-#1 intake air pressure sensor malfunction at intermediate electrical potential.	• Check and repair the connection. • Replace it if there is a malfunction.	
3	Connections • Cylinder-#1 intake air pressure sensor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
4	Defective cylinder-#1 intake air pressure sensor.	• Execute the diagnostic mode. (Code No.03) • Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSORS” on page 7-106.	

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		Reinstatement method
1	Installed condition of throttle position sensor.	• Check for looseness or pinching. • Check that the sensor is installed in the specified position.		Turning the main switch to “ON”.
2	Connections • Throttle position sensor coupler • Main wire harness ECU coupler • Sub-wire harness 2 coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.		
3	Open or short circuit in wire harness and/or sub lead.	• Repair or replace if there is an open or short circuit. • Between throttle position sensor coupler and ECU coupler (blue–blue) (yellow–yellow) (back–black)		
4	Throttle position sensor lead wire open circuit output voltage check.	• Check for open circuit and replace the throttle position sensor. (black–yellow)		
		Open circuit item	Output voltage	
		Ground wire open circuit	5 V	
		Output wire open circuit	0 V	
		Power supply wire open circuit	0 V	
5	Defective throttle position sensor.	• Execute the diagnostic mode. (Code No.01) • Replace if defective. Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 7-104.		

Fault code No.	17	Symptom	EXUP servo motor circuit: open or short circuit detected.
Diagnostic code No.		53	EXUP servo motor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • EXUP servo motor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning 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 servo motor coupler and ECU coupler (blue–blue) (white/red–white/red) (black/blue–black/blue)	
3	Defective EXUP servo motor (potentiometer circuit).	• Execute the diagnostic mode. (Code No.53) • Replace if defective. Refer to "CHECKING THE EXUP SERVO MOTOR" on page 7-105.	

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
1	Connections • EXUP servo motor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to "ON". It takes 120 seconds at the maximum before the original state returns.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between the EXUP servo motor coupler and the ECU coupler. (black/green–black/green) (black/red–black/red)	
3	Defective EXUP servo motor.	• Execute the diagnostic mode. (Code No.53) • Replace if defective. Refer to "CHECKING THE EXUP SERVO MOTOR" on page 7-105.	
4	Defective EXUP valve, pulley, cables.	Replace if defective.	

Fault code No.	19	Symptom	A break or disconnection of the blue/yellow lead of the ECU is detected.
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	• Execute the diagnostic mode. (Code No.20) • Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler 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.	• Repair or replace if there is an open or short circuit. • Between ECU and blue/yellow lead	
3	Defective sidestand switch.	• Replace if defective. Refer to “CHECKING THE SWITCHES” on page 7-89.	

Fault code No.	22	Symptom	Air temperature sensor: open or short circuit detected.
Diagnostic code No.		05	Air temperature sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed condition of air temperature sensor.	Check for looseness or pinching.	Turning the main switch to “ON”.
2	Connections • Air temperature sensor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between air temperature sensor coupler and ECU coupler (brown/white–brown/white) (black/blue–black/blue)	
4	Defective air temperature sensor.	• Execute the diagnostic mode. (Code No.05) • Replace if defective. Refer to “CHECKING THE AIR TEMPERATURE SENSOR” on page 7-107.	

Fault code No.	24	Symptom	No normal signal is received from the O_2 sensor.
Diagnostic code No.		—	—

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed state of O_2 sensor.	Check for looseness or pinching.	Starting the engine and operating it at idle.
2	Connections • O_2 sensor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between O_2 sensor coupler and ECU coupler. (gray/white–gray/white) (red/blue–red/blue) (gray/green–gray/green) (black/blue–black/blue)	
4	Check fuel pressure.	• Refer to “THROTTLE BODIES” on page 6-4.	
5	Defective O_2 sensor.	• Replace if defective.	

Fault code No.	25	Symptom	Cylinder-#2 intake air pressure sensor: open or short circuit detected.
Diagnostic code No.		04	Cylinder-#2 intake air pressure sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Cylinder-#2 intake air pressure sensor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning 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 cylinder-#2 intake air pressure sensor coupler and ECU coupler (black/blue–black/blue) (pink/yellow–pink/yellow) (blue–blue)	
3	Defective cylinder-#2 intake air pressure sensor.	• Execute the diagnostic mode. (Code No.04) • Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSORS” on page 7-106.	

Fault code No.	26	Symptom	Cylinder-#2 intake air pressure sensor: hose system malfunction (clogged or detached hose).
Diagnostic code No.		04	Cylinder-#2 intake air pressure sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Cylinder-#2 intake air pressure sensor hose	• Check the cylinder-#2 intake air pressure sensor hose condition. • Repair or replace the sensor hose.	Starting the engine and operating it at idle.
2	Cylinder-#2 intake air pressure sensor malfunction at intermediate electrical potential.	• Check and repair the connection. • Replace it if there is a malfunction.	
3	Connections • Cylinder-#2 intake air pressure sensor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
4	Defective cylinder-#2 intake air pressure sensor.	• Execute the diagnostic mode. (Code No.04) • Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSORS” on page 7-106.	

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
1	Installed state of engine temperature sensor.	Check for looseness or pinching.	Turning the main switch to “ON”.
2	Connections • Engine temperature sensor coupler • Main wire harness ECU coupler • Sub-wire harness 2 coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness and/or sub lead.	• Repair or replace if there is an open or short circuit. • Between engine temperature sensor coupler and ECU coupler (brown–brown) (black–black)	
4	Defective engine temperature sensor.	• Execute the diagnostic mode. (Code No.11) • Replace if defective. Refer to “CHECKING THE ENGINE TEMPERATURE SENSOR” on page 7-102.	

Fault code No.	29	Symptom	Decompression solenoid (thermistor): open or short circuit detected.
Diagnostic code No.		55	Decompression solenoid

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed state of decompression solenoid.	Check for looseness or pinching.	Turning the main switch to “ON”.
2	Connections • Decompression solenoid (thermistor) coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between decompression solenoid (thermistor) coupler and ECU coupler (green/red–green/red) (black/blue–black/blue)	
4	Defective decompression solenoid (thermistor).	• Execute the diagnostic mode. (Code No.55) • Replace if defective. Refer to “CHECKING THE DECOMPRESSION SOLENOID” on page 7-105.	

Fault code No.	30	Symptom	The vehicle has overturned.
Diagnostic code No.		08	Lean angle cut-off switch

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	The vehicle has overturned.	Raise the vehicle upright.	Turning the main switch to “ON” (however, the engine cannot be restarted unless the main switch is first turned “OFF”).
2	Installed condition of the lean angle cut-off switch.	Check for looseness or pinching.	
3	Connections • Lean angle cut-off switch coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
4	Defective lean angle cut-off switch.	• Execute the diagnostic mode. (Code No.08) • Replace if defective. Refer to “CHECKING THE LEAN ANGLE CUT-OFF SWITCH” on page 7-100.	

Fault code No.	33	Symptom	Malfunction detected in the primary wire of the cylinder-#1 left or right ignition coil.
Diagnostic code No.		30, 32	Cylinder-#1 left or right ignition coil

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Cylinder-#1 left or right ignition coil connector (primary coil side) • Main wire harness ECU coupler • Sub-wire harness 1 coupler	• Check the connector and coupler for any pins that may be pulled out. • Check the locking condition of the connector and coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub lead.	• Repair or replace if there is an open or short circuit. • Between cylinder-#1 left or right ignition coil connector and ECU coupler/main wire harness. (black/red–blue/red) (orange–orange)	
3	Defective cylinder-#1 left or right ignition coil.	• Execute the diagnostic mode. (Code No.30 or 32) • Test the primary and secondary coils for continuity. • Replace if defective. Refer to “CHECKING THE IGNITION COILS” on page 7-99.	

Fault code No.	34	Symptom	Malfunction detected in the primary wire of the cylinder-#2 left ignition coil.
Diagnostic code No.		31	Cylinder-#2 left ignition coil

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Cylinder-#2 left ignition coil connector (primary coil side) • Main wire harness ECU coupler	• Check the connector and coupler for any pins that may be pulled out. • Check the locking condition of the connector and coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between cylinder-#2 left ignition coil connector and ECU coupler/main wire harness. (black/red–blue/red) (gray/red–gray/red)	
3	Defective cylinder-#2 left ignition coil.	• Execute the diagnostic mode. (Code No.31) • Test the primary and secondary coils for continuity. • Replace if defective. Refer to “CHECKING THE IGNITION COILS” on page 7-99.	

Fault code No.	35	Symptom	Malfunction detected in the primary wire of the cylinder-#1 left or right ignition coil.
Diagnostic code No.		30, 32	Cylinder-#1 left or right ignition coil

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Cylinder-#1 left or right ignition coil connector (primary coil side) • Main wire harness ECU coupler • Sub-wire harness 1 coupler	• Check the connector and coupler for any pins that may be pulled out. • Check the locking condition of the connector and coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub lead.	• Repair or replace if there is an open or short circuit. • Between cylinder-#1 left or right ignition coil connector and ECU coupler/main wire harness. (black/red–blue/red) (orange–orange)	
3	Defective cylinder-#1 left or right ignition coil.	• Execute the diagnostic mode. (Code No.30 or 32) • Test the primary and secondary coils for continuity. • Replace if defective. Refer to “CHECKING THE IGNITION COILS” on page 7-99.	

Fault code No.	36	Symptom	Malfunction detected in the primary wire of the cylinder-#2 right ignition coil.
Diagnostic code No.		33	Cylinder-#2 right ignition coil

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Cylinder-#2 right ignition coil connector (primary coil side) • Main wire harness ECU coupler	• Check the connector and coupler for any pins that may be pulled out. • Check the locking condition of the connector and coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between cylinder-#2 right ignition coil connector and ECU coupler/main wire harness. (black/red–blue/red) (gray/black–gray/black)	
3	Defective cylinder-#2 right ignition coil.	• Execute the diagnostic mode. (Code No.33) • Test the primary and secondary coils for continuity. • Replace if defective. Refer to “CHECKING THE IGNITION COILS” on page 7-99.	

Fault code No.	37	Symptom	Engine speed is high when the engine is idling.
Diagnostic code No.		54	ISC valve

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	ECU fuse is blown.	• Check the ECU fuse. Refer to “CHECKING THE FUSES” on page 7-93.	ISC valve returns to its original position by turning the main switch to “ON” and back to “OFF”. Reinstated if the engine idle speed is within specification after starting the engine.
2	Throttle valve does not fully close.	• 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 3-7.	
3	ISC valve is stuck fully open due to disconnected ISC unit hose or coupler. (High engine idle speed is detected with the ISC valve stuck fully open even though signals for the valve to close are continuously being transmitted by the ECU.)	• Check that the ISC unit hose is not disconnected. • 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.)	
4	ISC valve is not moving correctly.	• Execute the diagnostic mode. (Code No.54) • After the ISC valve is fully closed, it opens to the standby opening position when the engine is started. This operation takes approximately 12 seconds. Start the engine. If the error recurs, replace the throttle body assembly.	

Fault code No.	38	Symptom	Decompression solenoid: open or short circuit detected.
Diagnostic code No.		55	Decompression solenoid

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed state of decompression solenoid.	Check for looseness or pinching.	Turning the main switch to "ON".
2	Connections • Decompression solenoid coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between decompression solenoid coupler and ECU coupler (light green–light green) • Between decompression solenoid coupler and auto decompression fuse (gray/red–gray/red)	
4	Defective decompression solenoid.	• Execute the diagnostic mode. (Code No.55) • Replace if defective. Refer to "CHECKING THE DECOMPRESSION SOLENOID" on page 7-105.	

Fault code No.	41	Symptom	Lean angle cut-off switch: open or short circuit detected.
Diagnostic code No.		08	Lean angle cut-off switch

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Lean angle cut-off switch coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “ON”.
2	Open or short circuit in lead wire.	• Repair or replace if there is an open or short circuit. • Between lean angle cut-off switch coupler and ECU coupler. (blue–blue) (yellow/green–yellow/green) (black/blue–black/blue)	
3	Defective lean angle cut-off switch.	• Execute the diagnostic mode. (Code No.08) • Replace if defective. Refer to “CHECKING THE LEAN ANGLE CUT-OFF SWITCH” on page 7-100.	

Fault code No.	42	Symptom		A. No normal signals are received from the speed sensor. B. Open 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	Connections • Speed sensor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine, and activating the vehicle speed sensor by operating the vehicle at 20 to 30 km/h.
A-2	Open or short circuit in speed sensor lead.	• Repair or replace if there is an open or short circuit. • Between speed sensor coupler and ECU coupler. (blue–blue) (white/yellow–white/yellow) (black/blue–black/blue)	
A-3	Gear for detecting vehicle speed has broken.	• Replace if defective. Refer to “TRANSMISSION” on page 5-92.	
A-4	Defective speed sensor.	• Execute the diagnostic mode. (Code No.07) • Replace if defective. Refer to “CHECKING THE SPEED SENSOR” on page 7-103.	

Fault code No.	42	Symptom		A. No normal signals are received from the speed sensor. B. Open 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	Connections • Neutral switch coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine, and activating the vehicle speed sensor by operating the vehicle at 20 to 30 km/h.
B-2	Open circuit in neutral switch lead.	• Repair or replace if there is an open circuit. • Between neutral switch coupler and fuel pump relay coupler. (sky blue–sky blue) • Between fuel pump relay coupler and ECU coupler. (blue/yellow–blue/yellow)	
B-3	Faulty shift drum (neutral detection area).	• Replace if defective. Refer to “TRANSMISSION” on page 5-92.	
B-4	Defective neutral switch.	• Execute the diagnostic mode. (Code No.21) • Replace if defective. Refer to “CHECKING THE SWITCHES” on page 7-89.	

Fault code No.	43	Symptom	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).
Diagnostic code No.		09	Fuel system voltage

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Relay unit coupler (fuel pump relay) • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in the wire harness.	• Repair or replace if there is an open or short circuit. • Between fuel pump relay coupler and ECU coupler. (blue/red–blue/red) (red/blue–red/blue) • Between fuel pump relay coupler and battery terminal. (red–red) • Between fuel pump relay coupler and engine stop switch coupler. (black/red–black/red)	
3	Malfunction or open circuit in fuel pump relay.	• Execute the diagnostic mode. (Code No. 09) • Replace if defective. • If there is no malfunction with the 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.	• Execute the diagnostic mode. (Code No. 60) 1. Check the faulty cylinder. (If multiple cylinders are defective, the number of the faulty cylinders appears alternately at 2-second intervals.) • Replace ECU if defective.	Turning the main switch to “ON”.

Fault code No.	46	Symptom	Power supply to the fuel injection system is not normal.
Diagnostic code No.		—	—

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Faulty battery.	• Replace or change the battery Refer to “CHECKING AND CHARGING THE BATTERY” on page 7-94.	
3	Malfunction in rectifier/regulator	• Replace if defective. 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. • Between battery and main switch (red–red) • Between main switch and ignition fuse (brown/blue–brown/blue) • Between ignition fuse and ECU (red/white–red/white)	

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. **NOTE:** Do not perform this procedure with the main switch turned to “ON”.	Turning the main switch to “ON”.

Fault code No.	62	Symptom	Muffler cooling fan temperature sensor: open or short circuit detected.
Diagnostic code No.		12	Muffler cooling fan temperature sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed condition of muffler cooling fan temperature sensor.	Check for looseness or pinching.	Turning the main switch to “ON”.
2	Connections • Muffler cooling fan temperature sensor coupler • Main wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between muffler cooling fan temperature sensor coupler and ECU coupler. (black/blue–black/blue) (brown/yellow–brown/yellow)	
4	Defective muffler cooling fan temperature sensor.	• Execute the diagnostic mode. (Code No.12) • Replace if defective. Refer to “CHECKING THE MUFFLER COOLING FAN TEMPERATURE SENSOR” on page 7-108.	

Fault code No.	63	Symptom	Engine trouble warning light is flashing. (Abnormally high temperature is detected by muffler cooling fan temperature sensor.)
Diagnostic code No.		12 51 63	Muffler cooling fan temperature sensor Muffler cooling fan motor relay Stopping the flashing of the engine trouble warning light (erasing the muffler cooling fan temperature sensor fault code)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Muffler cover fan fuse or ECU fuse is blown.	• Check the muffler cover fan fuse and ECU fuse. Refer to “CHECKING THE FUSES” on page 7-93.	Turning the main switch to “ON”. Execute the diagnostic mode. (Code No.63)
2	Defective muffler cooling fan temperature sensor or motor relay	• Execute the diagnostic mode. (Code No.12 and 51) • Replace if defective. Refer to “CHECKING THE MUFFLER COOLING FAN TEMPERATURE SENSOR” on page 7-108 and “CHECKING THE RELAYS” on page 7-96.	
3	• Positions of muffler cooling fan temperature sensor and its surrounding parts changed due to deformed parts near sensor • Muffler cooling fan temperature sensor detected a temperature of 120 °C (248 °F) or higher.	• Check that the parts near the muffler cooling fan temperature sensor are not deformed and that the sensor and its surrounding parts are in their correct positions. Repair or replace if necessary.	

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 • Main wire harness ECU coupler • Main wire harness meter assembly coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning 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 meter assembly coupler and ECU coupler (yellow/blue–yellow/blue)	
3	Malfunction in meter assembly.	Replace the meter assembly.	
4	Malfunction in ECU.	Replace the ECU.	

Fault code No.	Er-2	Symptom	No signals are received from the ECU within the specified duration.
Diagnostic code No.		—	—

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Main wire harness ECU coupler • Main wire harness meter assembly coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning 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 meter assembly coupler and ECU coupler (yellow/blue–yellow/blue)	
3	Malfunction in meter assembly.	Replace the meter assembly.	
4	Malfunction in ECU.	Replace the ECU.	

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 • Main wire harness ECU coupler • Main wire harness meter assembly coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning 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 meter assembly coupler and ECU coupler (yellow/blue–yellow/blue)	
3	Malfunction in meter assembly.	Replace the meter assembly.	
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 • Main wire harness ECU coupler • Main wire harness meter assembly coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning 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 meter assembly coupler and ECU coupler (yellow/blue–yellow/blue)	
3	Malfunction in meter assembly.	Replace the meter assembly.	
4	Malfunction in ECU.	Replace the ECU.	

EAS27550
FUEL PUMP SYSTEM

EAS27560
CIRCUIT DIAGRAM

3. Main switch
4. Battery
5. Fuel injection system fuse
8. Main fuse
10. ECU fuse
15. Fuel pump relay
17. Fuel pump
29. ECU (electronic control unit)
73. Engine stop switch
81. Ignition fuse

EAS27570
TROUBLESHOOTING

If the fuel pump fails to operate.

NOTE:

• Before troubleshooting, remove the following part(s):
1. Seat
2. Fuel tank
3. Air filter case

1. Check the fuses. (Main, ignition, fuel injection system, and ECU) Refer to “CHECKING THE FUSES” on page 7-93.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 7-94.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
4. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the right handlebar switch.
OK ↓		
5. Check the relay unit (fuel pump relay). Refer to “CHECKING THE RELAYS” on page 7-96.	NG →	Replace the relay unit.
OK ↓		
6. Check the fuel pump. Refer to “CHECKING THE FUEL PUMP” on page 7-104.	NG →	Replace the fuel pump.
OK ↓		
7. Check the entire fuel pump system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-67.	NG →	Properly connect or repair the fuel pump system wiring.
OK ↓		
Replace the ECU.		

ET5YU1002
MUFFLER COOLING SYSTEM

ET5YU1003
CIRCUIT DIAGRAM

4. Battery
8. Main fuse
9. Muffler cover fan fuse
10. ECU fuse
26. Muffler cooling fan temperature sensor
29. ECU (electronic control unit)
78. Muffler cooling fan motor
79. Muffler cooling fan motor relay

ET5YU1004

TROUBLESHOOTING

The muffler cooling fan motor fails to turn.

NOTE:

- Before troubleshooting, remove the following part(s):

1. Seat

1. Check the fuses. (Main, muffler cover fan, and ECU) Refer to "CHECKING THE FUSES" on page 7-93.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-94.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the muffler cooling fan motor. Refer to "CHECKING THE MUFFLER COOLING FAN MOTOR" on page 7-107.	NG →	Replace the muffler cooling fan motor.
OK ↓		
4. Check the muffler cooling fan motor relay. Refer to "CHECKING THE RELAYS" on page 7-96.	NG →	Replace the muffler cooling fan motor relay.
OK ↓		
5. Check the muffler cooling fan temperature sensor. Refer to "CHECKING THE MUFFLER COOLING FAN TEMPERATURE SENSOR" on page 7-108.	NG →	Replace the muffler cooling fan temperature sensor.
OK ↓		
6. Check the entire muffler cooling system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-71.	NG →	Properly connect or repair the muffler cooling system wiring.
OK ↓		
Replace the ECU.		

EAS27640
IMMOBILIZER SYSTEM

EAS27650
CIRCUIT DIAGRAM

3. Main switch
4. Battery
8. Main fuse
10. ECU fuse
11. Immobilizer unit
12. Backup fuse (odometer, clock and immobilizer system)
29. ECU (electronic control unit)
44. Multi-function meter
46. Immobilizer system indicator light
81. Ignition fuse

EAS27670
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.

EC5YU1026
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 submerse 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.**

EAS27690
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.

	Parts to be replaced					Key registration requirement
	Main switch/immobilizer unit		Standard key	ECU	Accessory lock* and key	
	Main switch	Immobilizer 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 on
d. LED 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 7-81).

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 he 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 on
d. LED off
e. Less than 5.0 s
f. Code re-registering key
g. First standard key
h. Second standard key
i. Registration mode

A. Registration of the second standard key is complete.
B. Immobilizer system indicator light stops flashing when the registration of the second standard key is complete.

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 on
d. LED off
e. Less than 5.0 s
f. Code re-registering key
g. Remaining standard key
h. Registration mode

A. If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the second standard key cannot be registered.

EAS27700
TROUBLESHOOTING

When the main switch is turned to “ON”, the immobilizer system indicator light does not come on nor flashes.

1. Check the fuses. (Main, ignition, backup, and ECU) Refer to “CHECKING THE FUSES” on page 7-93.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 7-94.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 7-89.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
4. Check the entire immobilizer system wiring. Refer to “CIRCUIT DIAGRAM” on page 7-75.	NG →	Properly connect or repair the immobilizer system wiring.
OK ↓		
• Check the condition of the each immobilizer system circuits. • Refer to “SELF-DIAGNOSIS FAULT CODE INDICATION” on page 7-81.		

EAS27720
SELF-DIAGNOSIS FAULT CODE INDICATION

When a system malfunction occurs, the fault code number is signaled by the immobilizer system indicator light.

Fault code	Part	Symptom	Cause	Action
51	IMMOBILIZER UNIT	Code cannot be transmitted between the key and the immobilizer unit.	1. Radio wave interference caused by objects around the keys and antenna. 2. Immobilizer unit malfunction. 3. Key malfunction.	1. Keep magnets, metal objects, and other immobilizer system keys away from the keys and antennas. 2. Replace the main switch/immobilizer unit. 3. Replace the key.

Fault code	Part	Symptom	Cause	Action
52	IMMOBILIZER UNIT	Codes between the key and immobilizer unit do not match.	1. Signal received from other transponder (failed to recognize code after ten consecutive attempts). 2. Signal received from unregistered standard key.	1. Place the immobilizer unit at least 50 mm away from the transponder of other vehicles. 2. Register the standard key.
53	IMMOBILIZER UNIT	Codes cannot be transmitted between the ECU and the immobilizer unit.	Noise interference or disconnected lead/cable. 1. Interference due to radio wave noise. 2. Disconnected communication harness. 3. Immobilizer unit malfunction. 4. ECU malfunction.	1. Check the wire harness and connector. 2. Replace the main switch/immobilizer unit. 3. Replace the ECU.
54	IMMOBILIZER UNIT	Codes transmitted between the ECU and the immobilizer unit do not match.	Noise interference or disconnected lead/cable. 1. Interference due to radio wave noise. 2. Disconnected communication harness. 3. Immobilizer unit malfunction. 4. ECU failure. (The ECU or immobilizer unit was replaced with a used unit from another vehicle.)	1. Register the code re-registering key. 2. Check the wire harness and connector. 3. Replace the main switch/immobilizer unit. 4. Replace the ECU.
55	IMMOBILIZER UNIT	Key code registration malfunction.	Same standard key was attempted to be registered two consecutive times.	Register another standard key.
56	ECU	Unidentified code is received.	Noise interference or disconnected lead/cable.	1. Check the wire harness and connector. 2. Replace the main switch/immobilizer unit. 3. Replace the ECU.

Immobilizer system indicator light fault code indication
Units of 10: Cycles of on for 1 second and off for 1.5 seconds.
Units of 1: Cycles of on for 0.5 second and off for 0.5 second.

Example: fault code 52

a. Light on
b. Light off

EAS27970
ELECTRICAL COMPONENTS

1. Air temperature sensor
2. Cylinder-#2 left ignition coil
3. Cylinder-#2 right ignition coil
4. ISC (idle speed control) unit
5. Intake solenoid
6. Cylinder-#1 right ignition coil
7. Cylinder-#1 left ignition coil
8. Muffler cooling fan temperature sensor
9. Muffler cooling fan motor
10. Speed sensor
11. Rear brake light switch
12. Neutral switch
13. Decompression solenoid
14. Rectifier/regulator
15. Horn

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1. Cylinder-#1 intake air pressure sensor
2. Cylinder-#2 intake air pressure sensor
3. Immobilizer unit
4. Throttle position sensor
5. Main fuse
6. Fuse box
7. Muffler cooling fan motor relay
8. ECU (electronic control unit)
9. Headlight relay
10. Relay unit
11. Turn signal/hazard relay
12. Fuel injection system fuse
13. Starter relay
14. Lean angle cut-off switch
15. Battery
16. EXUP servo motor
17. Crankshaft position sensor
18. Engine temperature sensor

EAS27980
CHECKING THE SWITCHES

1. Front brake light switch
2. Engine stop switch
3. Start switch
4. Main switch
5. Neutral switch
6. Sidestand switch
7. Rear brake light switch
8. Hazard switch
9. Turn signal switch
10. Horn switch
11. Clutch switch
12. Pass switch
13. Dimmer switch

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.

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

NOTE:

- Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.
- When checking for continuity, switch back and forth between the switch positions a few times.

The switches and their terminal connections are illustrated as in the following example of the main switch.
The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.
The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indication by " ○——○ " There is continuity between red, brown/blue, and brown/red when the switch is set to "ON" and between red and brown/red when the switch is set to "P≦".

EAS27990
CHECKING THE BULBS AND BULB SOCKETS

NOTE:

Do not check any of the lights that use LEDs.

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.
Damage/wear → Repair or replace the bulb, bulb socket or both.
Improperly connected → Properly connect.
No continuity → Repair or replace the bulb, bulb socket or both.

Types of bulbs

The bulbs used on this vehicle are shown in the following illustration.

- Bulbs “a” and “b” are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulbs “c” are used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs “d” and “e” are used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.

Checking the condition of the bulbs

The following procedure applies to all of the bulbs.

1. Remove:
   - Bulb

EW5YU1009

WARNING

Since headlight bulbs get extremely hot, keep flammable products and your hands away from them until they have cooled down.

EC5YU1020

CAUTION:

- **Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.**
- **Avoid touching the glass part of a 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 a headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.**

2. Check:
   - Bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.

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

NOTE:

Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.

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a. Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “2”, and check the continuity.
b. Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “3”, and check the continuity.
c. If either of the readings indicate no continuity, replace the bulb.

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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.

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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.

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EAS28000
CHECKING THE FUSES
The following procedure applies to all of the fuses.

EC5YU1013
CAUTION:
To avoid a short circuit, always turn the main switch to "OFF" when checking or replacing a fuse.

1. Remove:
   - Seat
   - Lead holder
     Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
   - Fuse

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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.

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3. Replace:
   - Blown fuse

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a. Turn 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
Ignition	25 A	1
Headlight	15 A	1
Fuel injection system	15 A	1
Muffler cover fan	15 A	1
Auto decompression	15 A	1
Signaling system	10 A	1
Parking lighting	10 A	1
ECU	10 A	1
Backup (odometer, clock and immobilizer system)	10 A	1
Spare	25 A	1
Spare	15 A	1
Spare	10 A	1

EWA13310
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 electri-

cal system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

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4. Install:
   - Lead holder
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS28030

CHECKING AND CHARGING THE BATTERY

EWA13290

WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- **Wear protective eye gear when handling or working near batteries.**
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**

FIRST AID IN CASE OF BODILY CONTACT:
EXTERNAL

- **Skin — Wash with water.**
- **Eyes — Flush with water for 15 minutes and get immediate medical attention.**

INTERNAL

- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

ECA13660

CAUTION:

- **This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.**
- **Charging time, charging amperage and charging voltage for an MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.**

NOTE:

Since MF batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Disconnect:
   - Battery leads
     (from the battery terminals)

ECA13640

CAUTION:

First, disconnect the negative battery lead “1”, and then positive battery lead “2”.

3. Remove:
   - Battery band
   - Battery
4. Check:
   - Battery charge

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a. Connect a pocket tester to the battery terminals.

- Positive tester probe → positive battery terminal
- Negative tester probe → negative battery terminal

NOTE:

- The charge state of an MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

b. Check the charge of the battery, as shown in the charts and the following example.

Example Open-circuit voltage = 12.0 V Charging time = 6.5 hours Charge of the battery = 20–30%

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5. Charge:
   - Battery
     (refer to the appropriate charging method)

EWA13300

WARNING

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.**

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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 engine is stopped.

b. Connect a charger and ammeter to the battery and start charging.

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.

• Standard charging current is reached Battery is good. • Standard charging current is not reached 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.

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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 engine is stopped.

b. Connect a charger and ammeter 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.

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6. Install:
   - Battery
   - Battery band
7. Connect:
   - Battery leads
     (to the battery terminals)

ECA13630

CAUTION:

First, connect the positive battery lead "1", and then the negative battery lead "2".

8. Check:
   - Battery terminals
     Dirt → Clean with a wire brush.
     Loose connection → Connect properly.
9. Lubricate:
   - Battery terminals

	Recommended lubricant **Dielectric grease**

10. Install:
    - Seat
      Refer to "GENERAL CHASSIS" on page 4-1.

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 (Ω × 1) and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

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 relay)

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")

Muffler cooling fan motor relay

1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

ET5YU1021

CHECKING THE TURN SIGNAL/HAZARD RELAY

1. Check:
   - Turn signal/hazard relay input voltage
     Out of specification → The wiring circuit from the main switch to the turn signal/hazard relay coupler is faulty and must be repaired.

Turn signal/hazard relay input voltage
DC 12 V

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a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

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

- Positive tester probe →
  brown/green "1"
- Negative tester probe →
  ground

b. Turn the main switch to “ON”.
c. Measure the turn signal/hazard relay input voltage.

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2. Check:
   - Turn signal/hazard relay output voltage
     Out of specification → Replace.

Turn signal/hazard relay output voltage
DC 12 V

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a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

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

- Positive tester probe → brown/white “1”
- Negative tester probe → ground

b. Turn the main switch to “ON”.
c. Measure the turn signal/hazard relay output voltage.

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EAS28050

CHECKING THE RELAY UNIT (DIODE)

1. Check:
   - Relay unit (diode)
     Out of specification → Replace.

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

NOTE:

The pocket tester and the analog pocket tester readings are shown in the following table.

Continuity
Positive tester probe → sky blue “1”
Negative tester probe → black/yellow “2”
No continuity
Positive tester probe → black/yellow “2”
Negative tester probe → sky blue “1”
Continuity
Positive tester probe → sky blue “1”
Negative tester probe → blue/yellow “3”
No continuity
Positive tester probe → blue/yellow “3”
Negative tester probe → sky blue “1”
Continuity
Positive tester probe → sky blue “1”
Negative tester probe → sky blue/white “4”
No continuity
Positive tester probe → sky blue/white “4”
Negative tester probe → sky blue “1”
Continuity
Positive tester probe → blue/green “5”
Negative tester probe → blue/yellow “3”
No continuity
Positive tester probe → blue/yellow “3”
Negative tester probe → blue/green “5”

3
1
5
4
2
Sb/W B/R L R/L L/R
L/G L/Y Sb B/Y L/W R

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- Positive tester probe → black/red “1”
- Negative tester probe → spark plug lead “2”

c. Measure the secondary coil resistance.

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ET5YU1032

CHECKING THE IGNITION SPARK GAP

1. Check:
   - Ignition spark gap
     Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to “TROUBLESHOOTING” on page 7-3.

Minimum ignition spark gap
6.0 mm (0.24 in)

NOTE:

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

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a. Disconnect the spark plug cap from the spark plug.
b. Connect the ignition checker “1” as shown.

Ignition checker
90890-06754
Opama pet-4000 spark checker
YM-34487

2. Spark plug cap

c. Turn the main switch to “ON” and engine stop switch to “○”.
d. Measure the ignition spark gap “a”.
e. Crank the engine by pushing the start switch “⊛” and gradually increase the spark gap until a misfire occurs.

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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/gray-black

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a. Connect the pocket tester (Ω × 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.

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EAS28130

CHECKING THE LEAN ANGLE CUT-OFF SWITCH

1. Remove:
   - Lean angle cut-off switch

2. Check:
   - Lean angle cut-off switch output voltage
     Out of specification → Replace.

Lean angle cut-off switch output voltage
Less than 65°: 0.4–1.4 V
More than 65°: 3.7–4.4 V

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a. Connect the lean angle cut-off switch coupler to the lean angle cut-off switch.
b. Connect the pocket tester (DC 20 V) to the lean angle cut-off switch coupler as shown.

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

- Positive tester probe → yellow/green "1"
- Negative tester probe → black/blue "2"

c. Turn the lean angle cut-off switch to 65°.
d. Measure the lean angle cut-off switch output voltage.

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EAS28150
CHECKING THE STATOR COIL

1. Disconnect:
   - Stator coil coupler
     (from the wire harness)
2. Check:
   - Stator coil resistance
     Out of specification → Replace the stator assembly.

Stator coil resistance
0.1280–0.1920 Ω

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a. Connect the pocket tester (Ω × 1) to the stator coil coupler as shown.

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

- Positive tester probe → black "1"
- Negative tester probe → black "2"

- Positive tester probe → black "1"
- Negative tester probe → black "3"

- Positive tester probe → black "2"
- Negative tester probe → black "3"

b. Measure the stator coil resistance.

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EAS28170
CHECKING THE RECTIFIER/REGULATOR

1. Check:
   - Charging voltage
     Out of specification → Replace the rectifier/regulator.

Charging voltage
14 V at 5000 r/min

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a. Set the engine tachometer to the cylinder-#1 left spark plug lead or right spark plug lead.
b. Connect the pocket tester (DC 20 V) to the rectifier/regulator coupler as shown.

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

- Positive tester probe → red "1"
- Negative tester probe → black "2"

c. Start the engine and let it run at approximately 5000 r/min.
d. Measure the charging voltage.

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EAS28180

CHECKING THE HORN

1. Check:
   - Horn resistance
     Out of specification → Replace.

Coil resistance
1.01–1.11 Ω at 20 °C (68 °F)

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a. Disconnect the horn leads from the horn terminals.
b. Connect the pocket tester (Ω × 1) to the horn terminals.

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

- Positive tester probe → horn terminal "1"
- Negative tester probe → horn terminal "2"

c. Measure the horn resistance.

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2. Check:
   - Horn sound
     Faulty sound → Adjust or replace.

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a. Connect a battery (12 V) to the horn.
b. Turn the adjusting screw in direction "a" or "b" until the horn sound is obtained.

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EAS28210

CHECKING THE ENGINE TEMPERATURE SENSOR

1. Remove:
   - Engine temperature sensor
     (from the front cylinder head)

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
0.90–1.10 kΩ at 100 °C (212 °F)

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a. Connect the pocket tester (Ω × 1k) to the engine temperature sensor terminal as shown.

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

b. Immerse the engine temperature sensor "1" in a container filled with water "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.

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3. Install:
   - Engine temperature sensor

Engine temperature sensor
20 Nm (2.0 m·kg, 14 ft·lb)

EAS28230

CHECKING THE FUEL SENDER

1. Disconnect:
   - Fuel pump coupler
   - Fuel sender coupler (from the wire harness)
2. Remove:
   - Fuel tank
3. Remove:
   - Fuel pump (from the fuel tank)
4. Check:
   - Fuel sender resistance
     Out of specification → Replace the fuel pump assembly.

Fuel sender resistance
1.35–1.65 kΩ at 25 °C (77 °F)

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a. Connect the pocket tester (Ω × 1k) to the fuel sender terminal as shown.

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

- Positive tester probe → green "1"
- Negative tester probe → black "2"

b. Measure the fuel sender resistance.

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EAS28240

CHECKING THE SPEED SENSOR

1. Check:
   - Speed sensor output voltage
     Out of specification → Replace.

Output voltage reading cycle
0.6 V to 4.8 V to 0.6 V to 4.8 V

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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. Turn the main switch to “ON”.
c. Elevate the rear wheel and slowly rotate it.
d. Measure the voltage of white/yellow and black/blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.

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EAS28300
CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
   - Throttle position sensor (from the throttle body)
2. Check:
   - Throttle position sensor maximum resistance
     Out of specification → Replace the throttle position sensor.

	Resistance **4.0–6.0 kΩ/blue-black**

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a. Connect the pocket tester (Ω × 1k) to the throttle position sensor terminal as shown.

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

- Positive tester probe →
  blue “1”
- Negative tester probe →
  black “2”

b. Measure the throttle position sensor maximum resistance.

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3. Install:
   - Throttle position sensor

NOTE:

When installing the throttle position sensor, adjust its angle properly. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 6-10.

EAS28350
CHECKING THE FUEL PUMP

EWA13850

WARNING

Gasoline is extremely flammable and under certain circumstances there can be a danger of an explosion or fire. Be extremely careful and note the following points:
- **Stop the engine before refueling.**
- **Do not smoke, and keep away from open flames, sparks, or any other source of fire.**
- **If you do accidentally spill gasoline, wipe it up immediately with dry rags.**
- **If gasoline touches the engine when it is hot, a fire may occur. Therefore, make sure the engine is completely cool before performing the following test.**

1. Disconnect:
   - Fuel pump coupler
   - Fuel sender coupler (from the wire harness)
2. Remove:
   - Fuel tank
3. Check:
   - Fuel pump operation
     Faulty/rough movement → Replace.

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a. Insert a plug “1” into the fuel return hose end.
b. Fill the fuel tank.
c. Put the end of the fuel hose “2” into an open container.
d. Connect the battery (DC 12 V) to the fuel pump terminal as shown.

- Positive battery lead → red/blue “3”
- Negative battery lead → black “4”

e. Check the fuel pump operation.

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EAS28360

CHECKING THE EXUP SERVO MOTOR

1. Check:
   - EXUP servo motor operation
     Out of specification → Replace.

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a. Disconnect the EXUP cables from the EXUP servo motor pulley.
b. Disconnect the EXUP servo motor coupler from the EXUP servo motor.
c. Connect the battery leads to the EXUP servo motor terminal as shown.

For counterclockwise rotation “a”
- Positive battery lead → black/green “1”
- Negative battery lead → black/red “2”

For clockwise rotation “b”
- Positive battery lead → black/red “2”
- Negative battery lead → black/green “1”

d. Check that the EXUP servo motor pulley rotates several times in directions “a” and “b”.

EC5YU1023

CAUTION:

To prevent damaging the EXUP servo motor, perform this test within a few seconds of connecting the battery.

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EAS28400

CHECKING THE DECOMPRESSION SOLENOID

1. Check:
   - Decompression solenoid (thermistor) resistance
     Out of specification → Replace.

Decompression solenoid (thermistor) resistance
56–84 Ω at 25 °C (77 °F)

NOTE:

The resistance value for the thermistor changes when the temperature changes; therefore, measure the decompression solenoid (thermistor) resistance at the specified temperature.

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a. Disconnect the decompression solenoid couplers from the wire harness.
b. Connect the pocket tester (Ω × 10) to the decompression solenoid coupler as shown.

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

- Positive tester probe → green "1"
- Negative tester probe → green "2"

c. Measure the decompression solenoid (thermistor) resistance.

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2. Check:
   - Decompression solenoid resistance
     Out of specification → Replace.

Decompression solenoid resistance
0.96–1.44 Ω at 20 °C (68 °F)

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a. Connect the pocket tester (Ω × 1) to the decompression solenoid coupler as shown.

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

- Positive tester probe → black "1"
- Negative tester probe → black "2"

b. Measure the decompression solenoid resistance.

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EAS28410

CHECKING THE INTAKE AIR PRESSURE SENSORS

The following procedure applies to both of the intake air pressure sensors.

1. Check:
   - Intake air pressure sensor output voltage
     Out of specification → Replace.

Intake pressure sensor output voltage
2.4 V

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a. Connect the pocket tester (DC 20 V) to the intake air pressure sensor coupler as shown.

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

- Positive tester probe → pink/white "1" or pink/yellow
- Negative tester probe → black/blue "2"

b. Turn the main switch to "ON".
c. Measure the intake air pressure sensor output voltage.

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ET5YU1007
CHECKING THE AIR TEMPERATURE SENSOR

1. Remove:
   - Air temperature sensor

EW5YU1002
WARNING

- **Handle the air temperature sensor with special care.**
- **Never subject the air temperature sensor to strong shocks. If the air temperature sensor is dropped, replace it.**

2. Check:
   - Air temperature sensor resistance
     Out of specification → Replace.

Air temperature sensor resistance
290–390 Ω at 80 °C (176 °F)

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a. Connect the pocket tester (Ω × 100) to the air temperature sensor terminal as shown.

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

b. Immerse the air temperature sensor "1" in a container filled with water "2".

NOTE:

Make sure that the air 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 air temperature sensor resistance.

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ET5YU1008
CHECKING THE INTAKE SOLENOID

1. Check:
   - Intake solenoid resistance
     Out of specification → Replace.

Intake solenoid resistance
42–48 Ω at 20 °C (68 °F)

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a. Disconnect the intake solenoid coupler from the intake solenoid.
b. Connect the pocket tester (Ω × 10) to the intake 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"

c. Measure the intake solenoid resistance.

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ET5YU1005
CHECKING THE MUFFLER COOLING FAN MOTOR

1. Check:
   - Muffler cooling fan motor
     Faulty/rough movement → Replace.

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a. Disconnect the muffler cooling fan motor coupler from the wire harness.
b. Connect the battery (DC 12 V) as shown.

- Positive tester probe →
  blue "1"
- Negative tester probe →
  black "2"

c. Check the muffler cooling fan motor movement.

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ET5YU1006

CHECKING THE MUFFLER COOLING FAN TEMPERATURE SENSOR

1. Remove:
   - Muffler cooling fan temperature sensor

EW5YU1003

WARNING

- **Handle the muffler cooling fan temperature sensor with special care.**
- **Never subject the intake muffler cooling fan temperature sensor to strong shocks. If the intake muffler cooling fan temperature sensor is dropped, replace it.**

2. Check:
   - Muffler cooling fan temperature sensor resistance
     Out of specification → Replace.

Muffler cooling fan temperature sensor resistance
1.82–2.24 kΩ at 75 °C (167 °F)

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a. Connect the pocket tester (Ω × 1k) to the muffler cooling fan temperature sensor terminal as shown.

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

- Positive tester probe → black “1”
- Negative tester probe → black “2”

b. Immerse the muffler cooling fan temperature sensor “3” in a container filled with water “4”.

NOTE:

Make sure that the muffler cooling fan temperature sensor terminals do not get wet.

c. Place a thermometer “5” in the water.
d. Slowly heat the water, then let it cool down to the specified temperature.
e. Measure the muffler cooling fan temperature sensor resistance.

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3. Install:
   - Muffler cooling fan temperature sensor

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TRBL
SHTG

8

TROUBLESHOOTING

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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
   - Incorrect valve timing
   - 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 drain hose
   - Clogged rollover valve
   - Clogged rollover valve hose
   - Deteriorated or contaminated fuel
2. Fuel pump
   - Faulty fuel pump
   - Faulty fuel pump relay
3. Throttle body(-ies)
   - Deteriorated or contaminated fuel
   - Sucked-in air

Electrical system

1. Battery
   - Discharged battery
   - Faulty battery
2. Fuse(s)
   - Blown, damaged or incorrect fuse
   - Improperly installed fuse
3. Spark plug(s)
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
   - Faulty spark plug cap
4. Ignition coil(s)
   - Cracked or broken ignition coil body
   - 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
   - Faulty main switch
   - Faulty engine stop switch
   - Broken or shorted wiring
   - Faulty neutral switch
   - Faulty start switch
   - Faulty sidestand switch
   - Faulty clutch switch
   - Improperly grounded circuit
   - Loose connections
7. Starting system
   - Faulty starter motor
   - Faulty starter relay
   - Faulty 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 body(-ies)
   - Damaged or loose throttle body joint
   - Improperly synchronized throttle bodies
   - Improper throttle cable free play
   - Flooded throttle body

Electrical system
1. Battery
   • Discharged battery
   • Faulty battery
2. Spark plug(s)
   • Incorrect spark plug gap
   • Incorrect spark plug heat range
   • Fouled spark plug
   • Worn or damaged electrode
   • Worn or damaged insulator
   • Faulty spark plug cap
3. Ignition coil(s)
   • Broken or shorted primary or secondary coils
   • Faulty spark plug lead
   • Cracked or broken ignition coil
4. Ignition system
   • Faulty ECU
   • Faulty crankshaft position sensor
   • Broken generator rotor woodruff key

EAS28510
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

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 bushing
   • Damaged clutch release cylinder
   • Match marks not aligned
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 body(-ies)
   - Faulty throttle body(-ies)
   - Damaged or loose throttle body joint
2. Air filter
   - Clogged air filter element

Chassis
1. Brake(s)
   - Dragging brake

Electrical system
1. Spark plug(s)
   - 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
- 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)
- Cracked or damaged cap bolt O-ring

Malfunction
- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS28670
UNSTABLE HANDLING
1. Handlebar
   - Bent or improperly installed handlebar
2. Steering head components
   - Improperly installed upper bracket
   - Improperly installed lower bracket (improperly tightened ring nut)
   - Bent steering stem
   - Damaged ball bearing or bearing race
3. Front fork leg(s)
   - Uneven oil levels (both front fork legs)
   - Unevenly tensioned fork spring (both front fork legs)
   - Broken fork spring
   - Bent or damaged inner tube
   - Bent or damaged outer tube
4. Swingarm
   - Worn bearing or bushing
   - Bent or damaged swingarm
5. Rear shock absorber assembly
   - Faulty rear shock absorber spring
   - Leaking oil or gas
6. Tire(s)
   - Uneven tire pressures (front and rear)
   - Incorrect tire pressure
   - Uneven tire wear
7. Wheel(s)
   - Incorrect wheel balance
   - Deformed cast wheel
   - Damaged wheel bearing
   - Bent or loose wheel axle
   - Excessive wheel runout
8. Frame
   - Bent frame
   - Damaged steering head pipe
   - Improperly installed bearing race

EAS28710
FAULTY LIGHTING OR SIGNALING SYSTEM

Headlight does not come on
- Wrong headlight bulb
- Too many electrical accessories
- Hard charging

- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

Headlight bulb burnt out
- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

Tail/brake light does not come on
- Wrong tail/brake light LED
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light LED

Tail/brake light LED burnt out
- Wrong tail/brake light LED
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light LED life expired

Turn signal does not come on
- Faulty turn signal switch
- Faulty turn signal/hazard 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 flashes slowly
- Faulty turn signal/hazard relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

Turn signal remains lit
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

Turn signal flashes quickly
- Incorrect turn signal bulb
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

Horn does not sound
- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

EAS28740

WIRING DIAGRAM

MT-01(T) 2005

1. AC magneto
2. Rectifier/regulator
3. Main switch
4. Battery
5. Fuel injection system fuse
6. Starter relay
7. Starter motor
8. Main fuse
9. Muffler cover fan fuse
10. ECU fuse
11. Immobilizer unit
12. Backup fuse (odometer, clock and immobilizer system)
13. Relay unit
14. Starting circuit cut-off relay
15. Fuel pump relay
16. Neutral switch
17. Fuel pump
18. Fuel sender
19. Sidestand switch
20. Crankshaft position sensor
21. Throttle position sensor
22. Cylinder-#1 intake air pressure sensor
23. Cylinder-#2 intake air pressure sensor
24. Lean angle cut-off switch
25. Speed sensor
26. Muffler cooling fan temperature sensor
27. Air temperature sensor
28. Engine temperature sensor
29. ECU (electronic control unit)
30. ISC (idle speed control) unit
31. Intake solenoid
32. Spark plug
33. Cylinder-#2 right ignition coil
34. Cylinder-#2 left ignition coil
35. Cylinder-#1 left ignition coil
36. Cylinder-#1 right ignition coil
37. EXUP servo motor
38. Decompression solenoid
39. Injector #1
40. Injector #2
41. Meter assembly
42. Fuel level warning light
43. Neutral indicator light
44. Multi-function meter
45. Engine trouble warning light
46. Immobilizer system indicator light
47. High beam indicator light
48. Left turn signal indicator light
49. Right turn signal indicator light
50. Meter light
51. O_2 sensor
52. Horn
53. Turn signal/hazard relay
54. Headlight relay
55. Left handlebar switch
56. Clutch switch
57. Pass switch
58. Dimmer switch
59. Hazard switch
60. Turn signal switch
61. Horn switch
62. Front left turn signal light
63. Front right turn signal light
64. Rear right turn signal light
65. Rear left turn signal light
66. Headlight assembly
67. Auxiliary light
68. Headlight (high beam)
69. Headlight (low beam)
70. Auto decompression fuse
71. Right handlebar switch
72. Front brake light switch
73. Engine stop switch
74. Start switch
75. Tail/brake light
76. License plate light
77. Rear brake light switch
78. Muffler cooling fan motor
79. Muffler cooling fan motor relay
80. Headlight fuse
81. Ignition fuse
82. Signaling system fuse
83. Parking lighting fuse
84. Anti-theft alarm (OPTION)

EAS28750

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/Br	Black/Brown
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/Y	Black/Yellow
Br/B	Brown/Black
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
Br/Y	Brown/Yellow
G/L	Green/Blue
G/R	Green/Red
G/Y	Green/Yellow
Gy/B	Gray/Black
Gy/G	Gray/Green
Gy/R	Gray/Red
Gy/W	Gray/White

L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
P/L	Pink/Blue
P/W	Pink/White
P/Y	Pink/Yellow
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/G	White/Green
W/R	White/Red
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue

YAMAHA

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2500 SHINGAI IWATA SHIZUOKA JAPAN

MT-01(T) 2005 WIRING DIAGRAM