YAMAHA 2008

SERVICE MANUAL

YZFR6X(C)

R6

LIT-11616-21-61 13S-28197-10

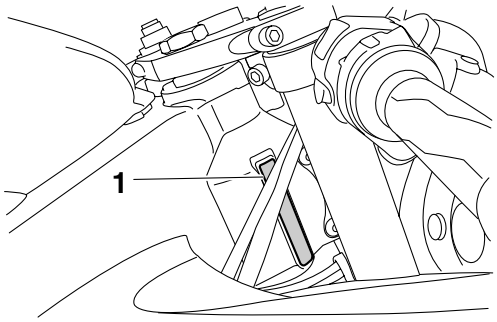
EAS20110

TABLE OF CONTENTS

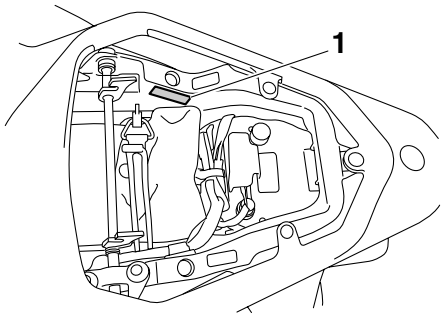
GENERAL INFORMATION

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 frame under the passenger seat. This information will be needed to order spare parts.



EAS20170
FEATURES

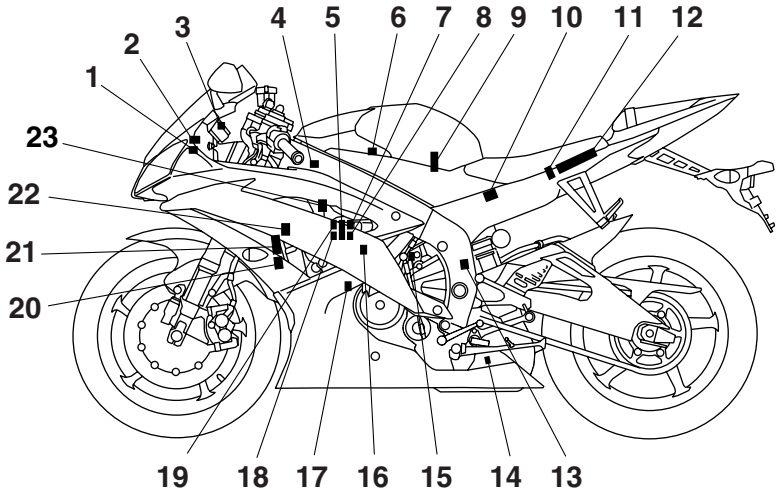
ET2C01025
OUTLINE OF THE FI SYSTEM

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

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

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

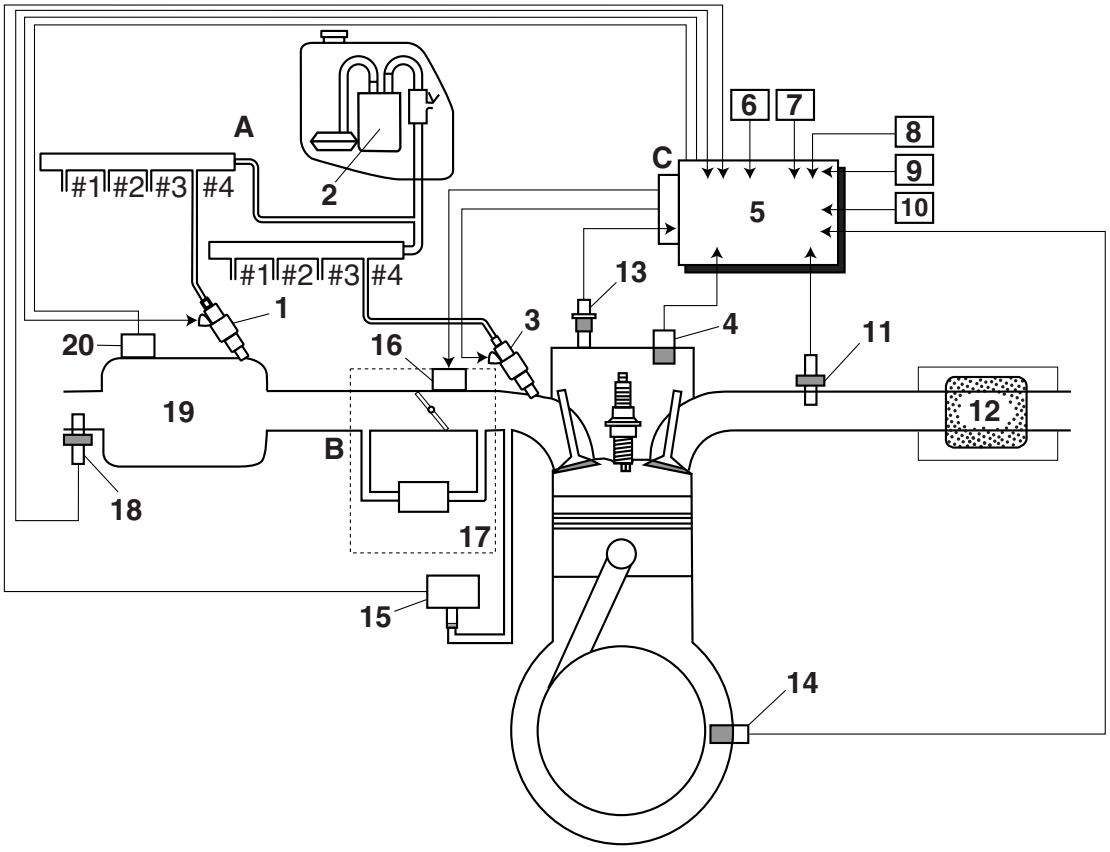
The adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions.



1. Intake air temperature sensor
2. Atmospheric pressure sensor
3. Engine trouble warning light
4. Air induction system solenoid
5. Throttle servo motor
6. Secondary injectors
7. Primary injectors
8. Intake air pressure sensor
9. Fuel pump
10. Relay unit (fuel pump relay)
11. Lean angle sensor
12. ECU (engine control unit)
13. EXUP servo motor
14. O_2 sensor
15. Speed sensor
16. Coolant temperature sensor
17. Crankshaft position sensor
18. Throttle position sensor (for throttle cable pulley)
19. Throttle position sensor (for throttle valves)
20. Spark plug
21. Ignition coil
22. Cylinder identification sensor
23. Intake funnel servo motor

ET2C01019
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 324 kPa (3.24 kg/cm², 46.1 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 (for throttle cable pulley), throttle position sensor (for throttle valves), coolant temperature sensor, atmospheric pressure sensor, cylinder identification sensor, lean angle sensor, crankshaft position sensor, intake air pressure sensor, air 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.



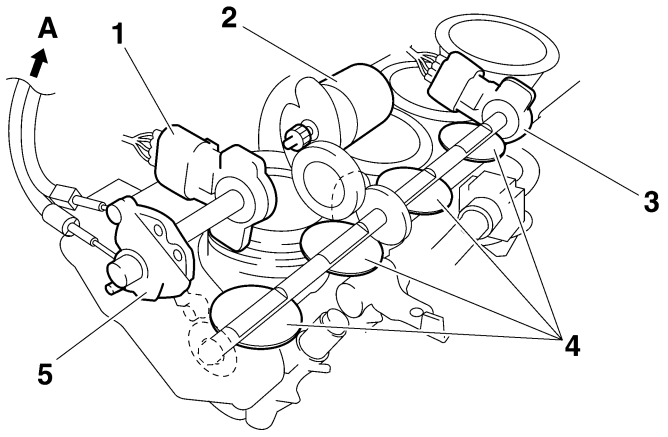
1. Secondary injector
2. Fuel pump
3. Primary injector
4. Cylinder identification sensor
5. ECU (engine control unit)
6. Throttle position sensor (for throttle cable pulley)
7. Throttle position sensor (for throttle valves)
8. Speed sensor
9. Air temperature sensor
10. Lean angle sensor
11. O_2 sensor
12. Catalytic converter
13. Coolant temperature sensor
14. Crankshaft position sensor
15. Intake air pressure sensor
16. Throttle servo motor
17. Throttle body
18. Atmospheric pressure sensor
19. Air filter case
20. Intake funnel servo motor

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

EAS4C81011
YCC-T (Yamaha Chip Controlled Throttle)
YCC-I (Yamaha Chip Controlled Intake)

Mechanism characteristics
Yamaha developed the YCC-T and YCC-I system employing the most advanced electronic control technologies. Electronic control throttle systems have been used on automobiles, but Yamaha has developed a faster, more compact system specifically for the needs of a sports motorcycle. The Yamaha-developed system has a high-speed calculating capacity that produces computations of running conditions every 1/1000th of a second.
The YCC-T system is designed to respond to the throttle action of the rider by having the ECU instantaneously calculate the ideal throttle valve opening and generate signals to operate the motor-driven throttle valves and thus actively control the intake air volume.
The ECU contains three CPUs with a capacity about five times that of conventional units, making it possible for the system to respond extremely quickly to the slightest adjustments made by the rider. In particular, optimized control of the throttle valve opening provides the optimum volume of intake air for easy-to-use torque, even in a high-revving engine.
The YCC-I system calculates the value from the engine revolution number and throttle opening rate, activates the intake air funnel with the electronic control motor drive to control the intake pipe length in order to gain the high power output in all revolution ranges from low speeds to high speeds.

Aims and advantages of using YCC-T system
- Increased engine power
  By shortening the air intake path, higher engine speed is possible → Increased engine power.
- Improved driveability
  Air intake volume is controlled according to the operating conditions → Improved throttle response to meet engine requirement.
  Driving force is controlled at the optimal level according to the transmission gear position and engine speed → Improved throttle control.
- Engine braking control
  Due to the throttle control, optimal engine braking is made possible.
- Simplified idle speed control (ISC) mechanism
  The bypass mechanism and ISC actuator are eliminated → A simple mechanism is used to maintain a steady idle speed.
- Reduced weight
  Compared to using a sub-throttle mechanism, weight is reduced.

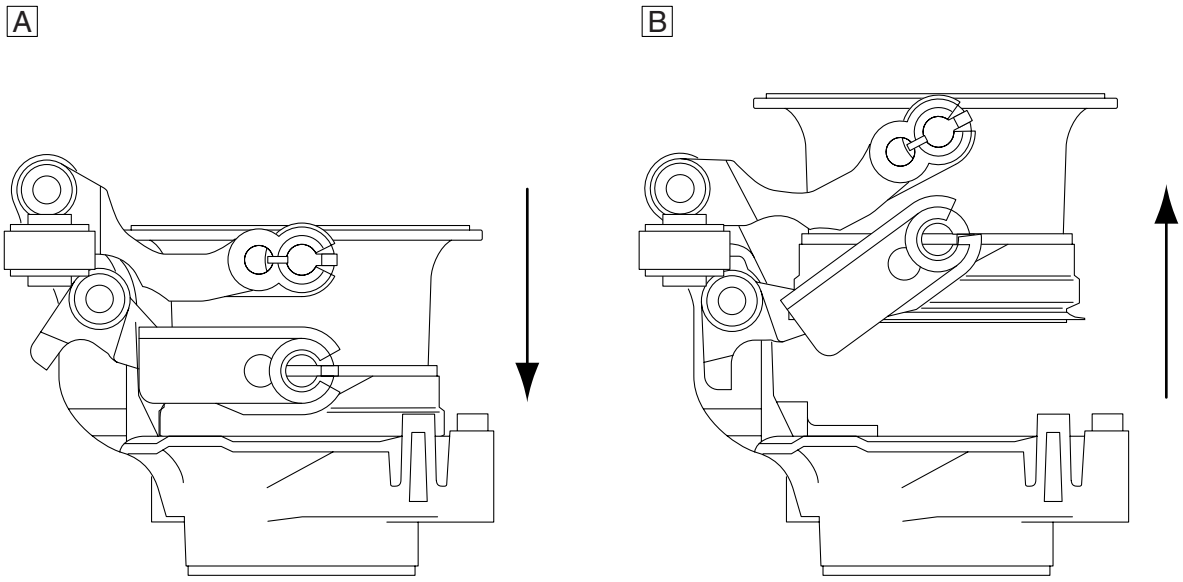


1. Throttle position sensor (for throttle cable pulley)
2. Throttle servo motor
3. Throttle position sensor (for throttle valves)
4. Throttle valves
5. Throttle cable pulley with linkage guard

A. To throttle grip

Aims and advantages of using YCC-I system

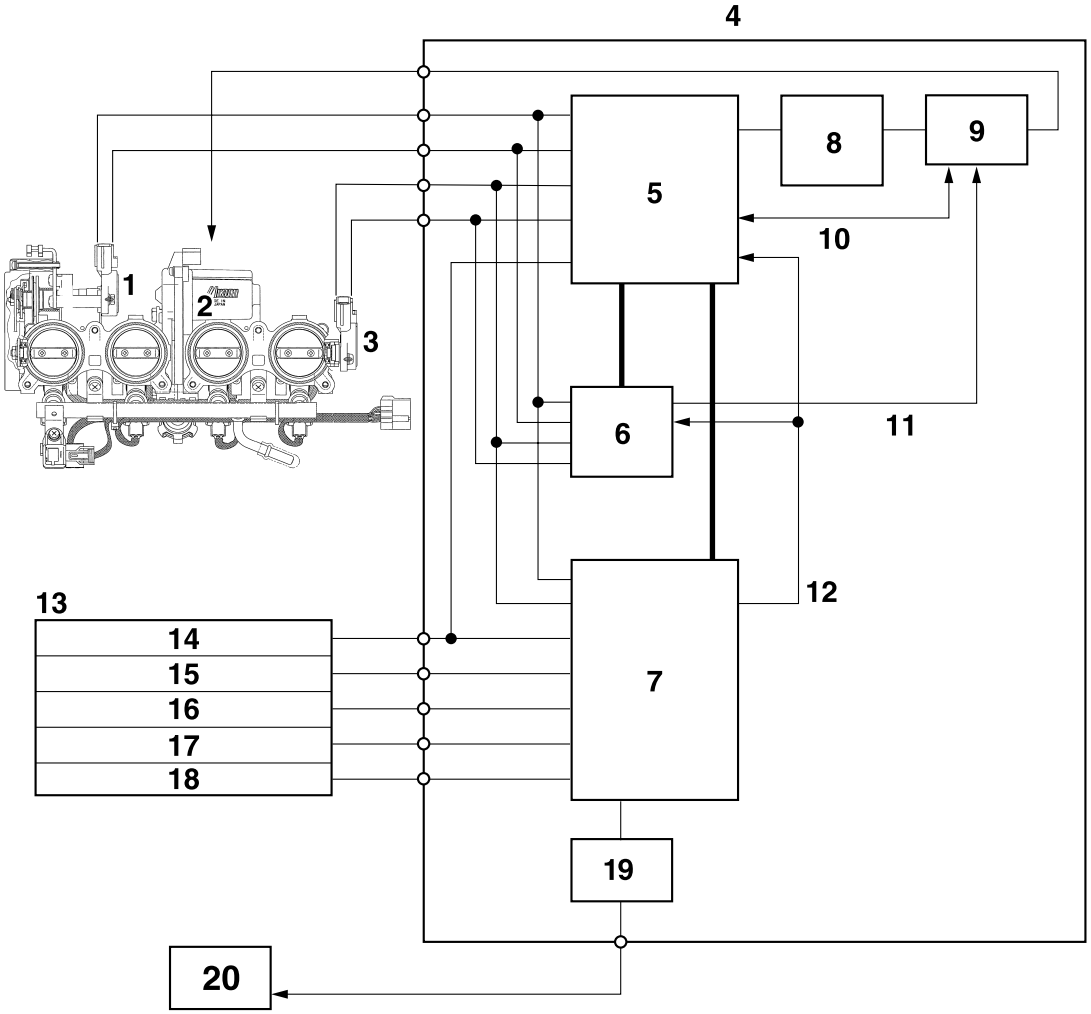
- Improvement of the engine power characteristics
  The high power design in all ranges is now provided by having both two features of the short intake function to ensure the power at the high speed revolution of engine, and the long intake function to ensure the power in the practical use range.
- Intake pipe length switching control using the motor
  The intake pipe length switching operation in a minute time is now available by means of the motor drive using the electronic control.The smooth power characteristic is provided, which does not let an operator feel the switching action by the optimization of its switching revolution number and the most suitable application of engine at the time of changing the revolution.



A. Down position (long intake)
(Low rpm to Mid rpm)

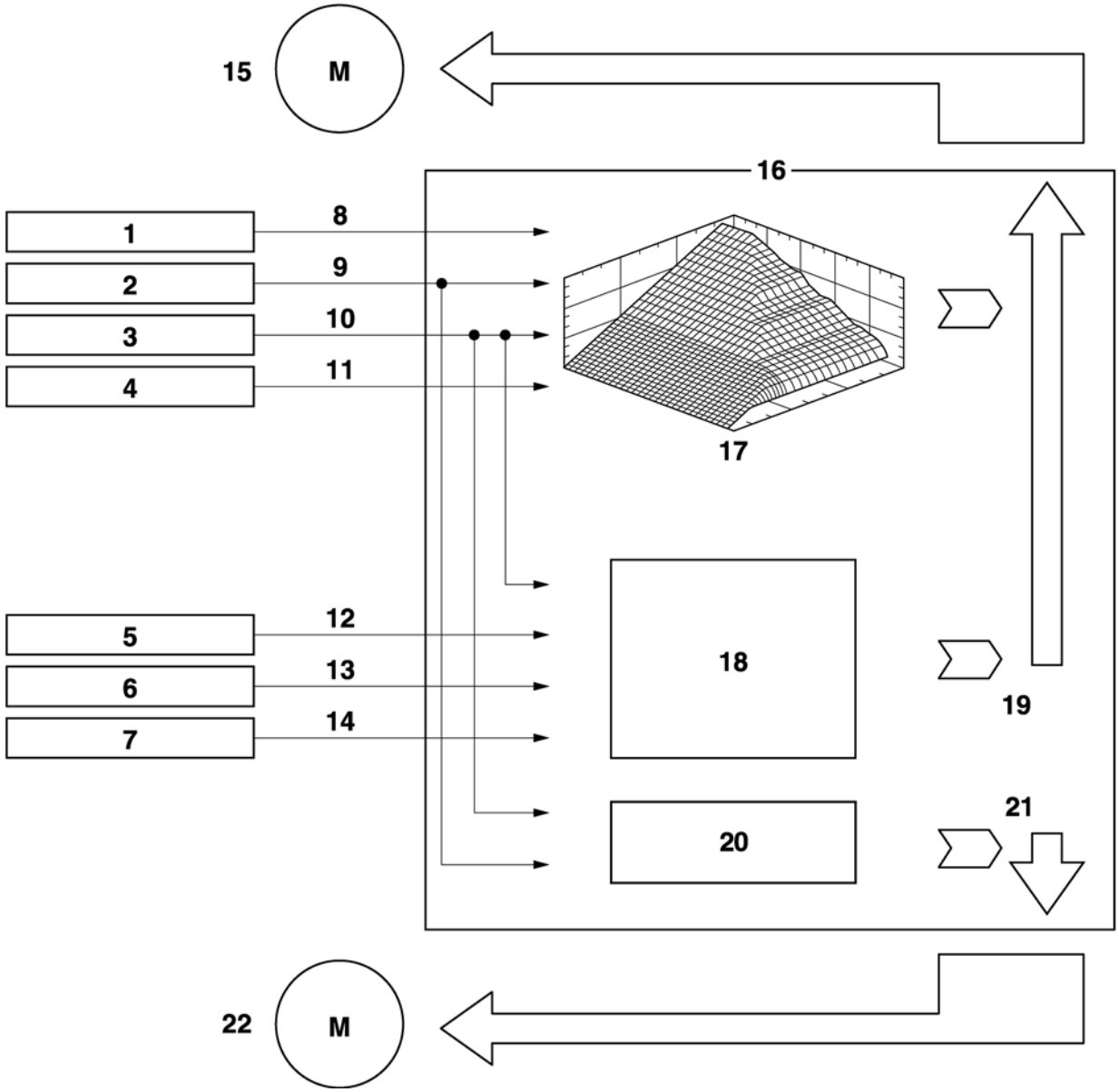
B. Up position (short intake)
(High rpm)

YCC-T/YCC-I system outline



1. Throttle position sensor (for throttle cable pulley)
2. Throttle servo motor
3. Throttle position sensor (for throttle valves)
4. ECU (engine control unit)
5. ETV main CPU (32 bit)
6. ETV sub CPU (16 bit)
7. FI CPU (32 bit)
8. Throttle servo motor driver
9. Throttle servo motor driver operation sensing/shut off circuit
10. Throttle servo motor driver operation sensing feedback/emergency stop
11. Emergency stop
12. Engine revolution (pulse signal)
13. Sensor input
14. Neutral switch
15. Crankshaft position sensor
16. Speed sensor
17. Coolant temperature sensor
18. Atmospheric pressure sensor
19. Intake funnel servo motor driver
20. Intake funnel servo motor

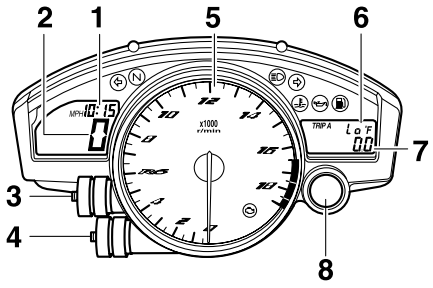
YCC-T/YCC-I control outline



1. Throttle position sensor (for throttle cable pulley)
2. Throttle position sensor (for throttle valves)
3. Crankshaft position sensor
4. Speed sensor
5. Coolant temperature sensor
6. Neutral switch
7. Atmospheric pressure sensor
8. Accelerator position (two signals)
9. Throttle position (two signals)
10. Engine revolution
11. Vehicle speed
12. Coolant temperature
13. Neutral/In gear
14. Atmospheric pressure
15. Throttle servo motor
16. ECU (engine control unit)
17. Base map
18. Idle speed control
19. Calculated throttle valve opening angle
20. Base map
21. Air funnel position (Calculation value)
22. Intake funnel servo motor

ET2C01020
INSTRUMENT FUNCTIONS

Multi-function meter unit



1. Clock
2. Speedometer
3. “SELECT” button
4. “RESET” button
5. Tachometer
6. Coolant temperature display/air intake temperature display
7. Odometer/tripmeters/fuel reserve tripmeter/stopwatch
8. Shift timing indicator light

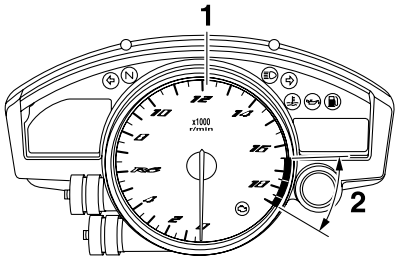
EWA13S1006
⚠ WARNING

Be sure to stop the vehicle before making any setting changes to the multi-function meter unit.

The multi-function meter unit 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 came on)
- a stopwatch
- a clock
- a coolant temperature display
- an air intake temperature display
- a self-diagnosis device
- a display brightness and shift timing indicator light control mode

NOTE:
- Be sure to turn the key to “ON” before using the “SELECT” and “RESET” buttons, except for setting the display brightness and shift timing indicator light control mode.
- To switch the speedometer and odometer/tripmeter displays between kilometers and miles, press the “SELECT” button for at least one second.

Tachometer



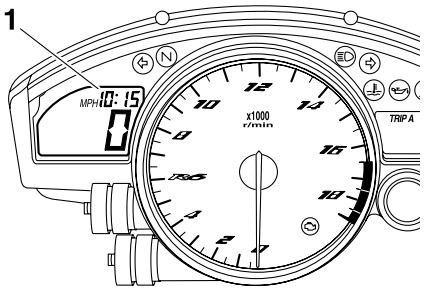
1. Tachometer
2. Tachometer red zone

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.

ECA13S1001
CAUTION:

Do not operate the engine in the tachometer red zone.
Red zone: 16500 r/min and above

Clock

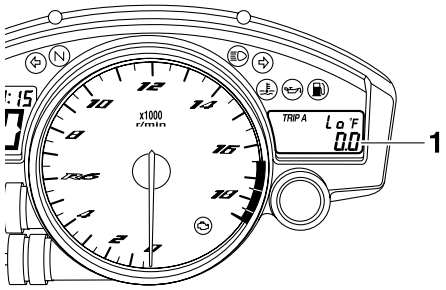


1. Clock

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

5. Push the “RESET” button to set the minutes.
6. Push the “SELECT” button and then release it to start the clock.

Odometer, tripmeter, and stopwatch modes



1. Odometer/tripmeters/fuel reserve tripmeter/ stopwatch

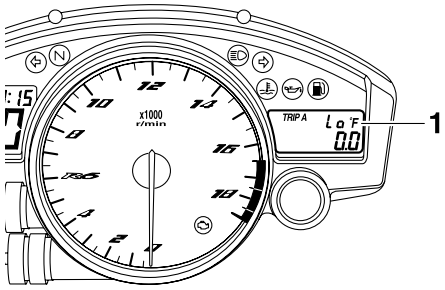
Push the “SELECT” button to switch the display between the odometer mode “ODO”, the tripmeter modes “TRIP A” and “TRIP B” and the stopwatch mode in the following order:
TRIP A → TRIP B → ODO → Stopwatch → TRIP A
If the fuel level warning light comes on, the odometer display will automatically change to the fuel reserve tripmeter mode “F-TRIP” and start counting the distance traveled from that point. In that case, push the “SELECT” button to switch the display between the various tripmeter, odometer, and stopwatch modes in the following order:
F-TRIP → Stopwatch → TRIP A → TRIP B → 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).

Stopwatch mode
To change the display to the stopwatch mode, select it by pushing the “SELECT” button. (The stopwatch digits will start flashing.) Release the “SELECT” button, and then push it again for a few seconds until the stopwatch digits stop flashing.
Standard measurement
1. Push the “RESET” button to start the stopwatch.
2. Push the “SELECT” button to stop the stopwatch.
3. Push the “SELECT” button again to reset the stopwatch.

Split-time measurement
1. Push the “RESET” button to start the stopwatch.
2. Push the “RESET” button or start switch “ ” to measure split-times.
   (The colon “:” will start flashing.)
3. Push the “RESET” button or start switch “ ” to display the final split-time or push the “SELECT” button to stop the stopwatch and display total elapsed time.
4. Push the “SELECT” button to reset the stopwatch.

NOTE:
To change the display back to the prior mode, push the “SELECT” button for a few seconds until the stopwatch digits flash.

Coolant temperature display



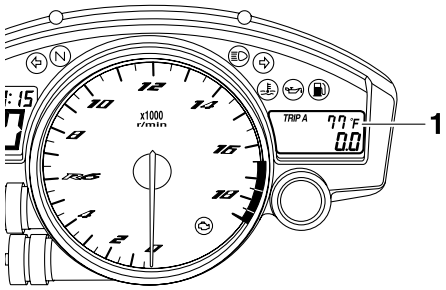
1. Coolant temperature display

The coolant temperature display indicates the temperature of the coolant.
Push the “RESET” button to switch the coolant temperature display to the air intake temperature display.

NOTE:
When the coolant temperature display is selected, “C” is displayed for one second, and then the coolant temperature is displayed.

ECA13S1002
CAUTION:
Do not operate the engine if it is overheated.

Air intake temperature display



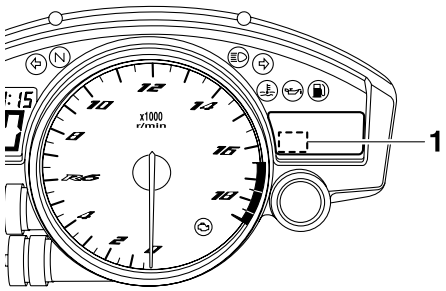
1. Air intake temperature display

The air intake temperature display indicates the temperature of the air drawn into the air intake duct. Push the “RESET” button to switch the coolant temperature display to the air intake temperature display.

NOTE:

- Even if the air intake temperature is set to be displayed, the coolant temperature warning light comes on when the engine overheats.
- When the key is turned to “ON”, the coolant temperature is automatically displayed, even if the air intake temperature was displayed prior to turning the key to “OFF”.
- When the air intake temperature display is selected, “A” is displayed for one second, and then the air intake temperature is displayed.

Self-diagnosis device



1. Error code display

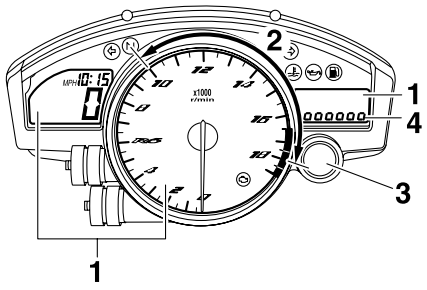
This model is equipped with a self-diagnosis device for various electrical circuits.
If any of those circuits are defective, the engine trouble warning light will come on, and then the right display will indicate a two-digit error code. If the right display indicates any error codes, note the code number, and then have a Yamaha dealer check the vehicle.

ECA13S1003

CAUTION:

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

Display brightness and shift timing indicator light control mode



1. Display brightness
2. Shift timing indicator light activation/deactivation
3. Shift timing indicator light
4. Brightness level

This mode cycles through five control functions, allowing you to make the following settings in the order listed below.

- Display brightness:
  This function allows you to adjust the brightness of the displays and tachometer to suit the outside lighting conditions.
- Shift timing indicator light activity:
  This function allows you to choose whether or not the indicator light should be activated and whether it should flash or stay on when activated.
- Shift timing indicator light activation:
  This function allows you to select the engine speed at which the indicator light will be activated.
- Shift timing indicator light deactivation:
  This function allows you to select the engine speed at which the indicator light will be deactivated.
- Shift timing indicator light brightness:
  This function allows you to adjust the brightness of the indicator light to suit your preference.

NOTE:

In this mode, the right display shows the current setting for each function (except the shift timing indicator light activity function).

To adjust the brightness of the multifunction meter displays and tachometer

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.
4. Push the “RESET” button to select the desired brightness level.
5. Push the “SELECT” button to confirm the selected brightness level. The control mode changes to the shift timing indicator light activity function.

To set the shift timing indicator light activity function

1. Push the “RESET” button to select one of the following indicator light activity settings:
   - The indicator light will stay on when activated. (This setting is selected when the indicator light stays on.)
   - The indicator light will flash when activated. (This setting is selected when the indicator light flashes four times per second.)
   - The indicator light is deactivated; in other words, it will not come on or flash. (This setting is selected when the indicator light flashes once every two seconds.)
2. Push the “SELECT” button to confirm the selected indicator light activity. The control mode changes to the shift timing indicator light activation function.

To set the shift timing indicator light activation function

NOTE:

The shift timing indicator light activation function can be set between 10000 r/min and 18000 r/min. From 10000 r/min to 13000 r/min, the indicator light can be set in increments of 500 r/min. From 13000 r/min to 18000 r/min, the indicator light can be set in increments of 200 r/min.

1. Push the “RESET” button to select the desired engine speed for activating the indicator light.
2. Push the “SELECT” button to confirm the selected engine speed. The control mode changes to the shift timing indicator light deactivation function.

To set the shift timing indicator light deactivation function

NOTE:

- The shift timing indicator light deactivation function can be set between 10000 r/min and 18000 r/min. From 10000 r/min to 13000 r/min, the indicator light can be set in increments of 500 r/min. From 13000 r/min to 18000 r/min, the indicator light can be set in increments of 200 r/min.
- Be sure to set the deactivation function to a higher engine speed than for the activation function, otherwise the shift timing indicator light will remain deactivated.

1. Push the “RESET” button to select the desired engine speed for deactivating the indicator light.
2. Push the “SELECT” button to confirm the selected engine speed. The control mode changes to the shift timing indicator light brightness function.

To adjust the shift timing indicator light brightness

1. Push the “RESET” button to select the desired indicator light brightness level.
2. Push the “SELECT” button to confirm the selected indicator light brightness level. The right display will return to the odometer or tripmeter mode.

EAS20180
IMPORTANT INFORMATION

EAS20190
PREPARATION FOR REMOVAL AND DISASSEMBLY

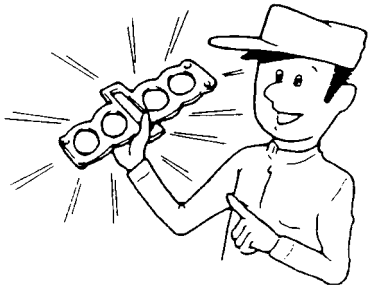
1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.

2. Use only the proper tools and cleaning equipment.
   Refer to “SPECIAL TOOLS” on page 1-15.
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.

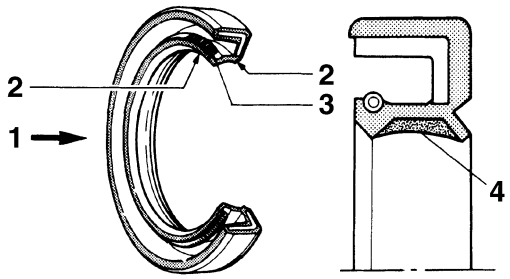
EAS20200
REPLACEMENT PARTS

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

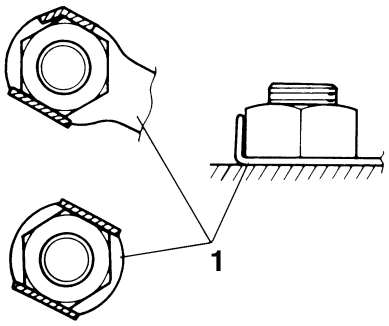
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



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

EAS20220
LOCK WASHERS/PLATES AND COTTER PINS

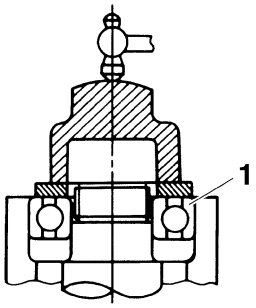
After removal, replace all lock washers/plates “1” and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.

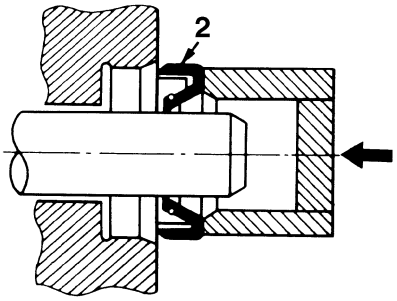


EAS20230
BEARINGS AND OIL SEALS
Install bearings “1” and oil seals “2” so that the manufacturer’s marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

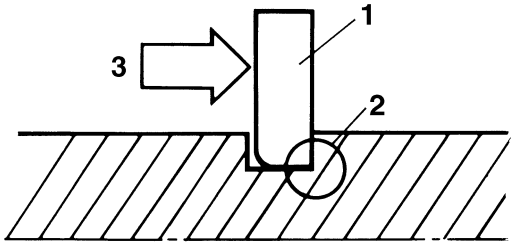
ECA13300
CAUTION:

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.

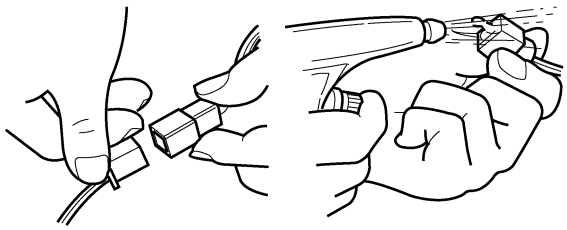


EAS20250
CHECKING THE CONNECTIONS

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

1. Disconnect:
   - Lead
   - Coupler
   - Connector
2. Check:
   - Lead
   - Coupler
   - Connector

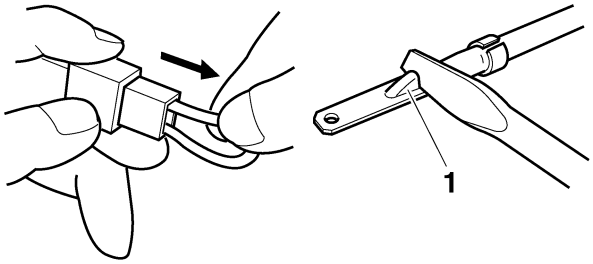
   Moisture → Dry with an air blower.
   Rust/stains → Connect and disconnect several times.



3. Check:
   - All connections

   Loose connection → Connect properly.

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



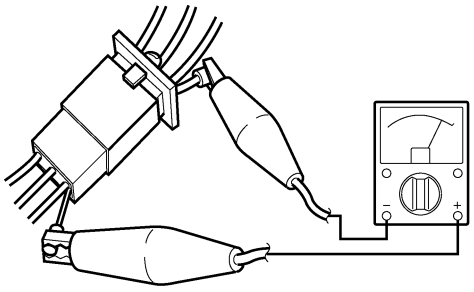
4. Connect:
   - Lead
   - Coupler
   - Connector

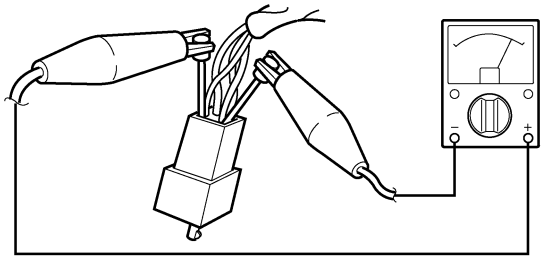
NOTE:
Make sure all connections are tight.

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.

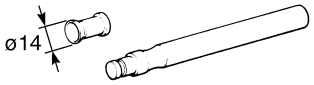
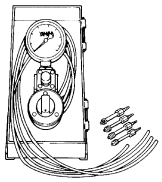
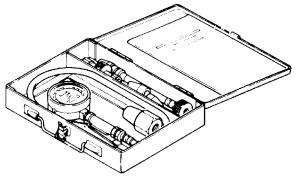


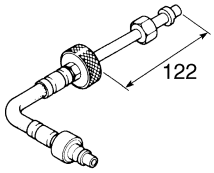
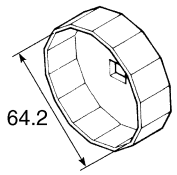
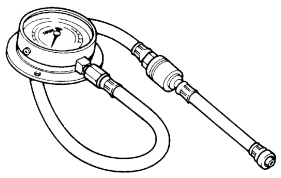
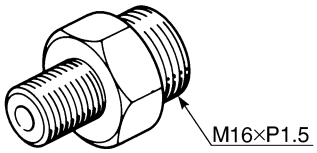
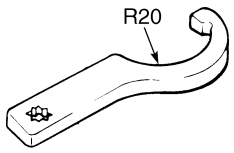
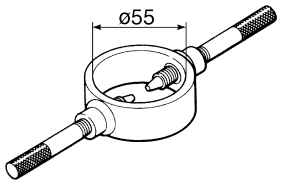
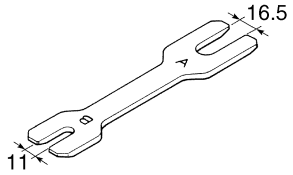
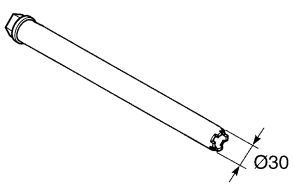


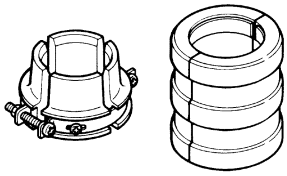
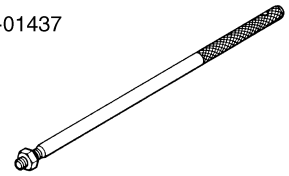
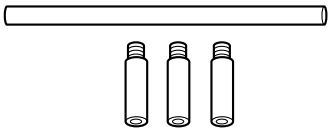
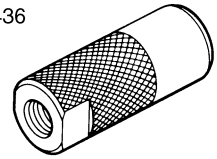
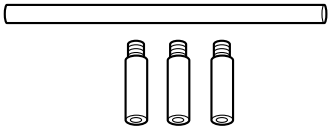
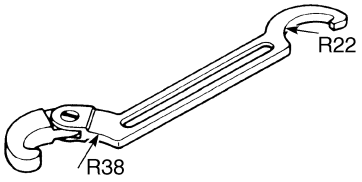
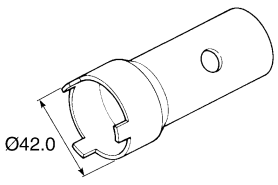
EAS20260
SPECIAL TOOLS

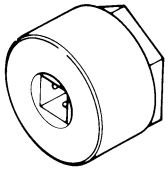
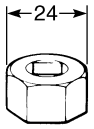
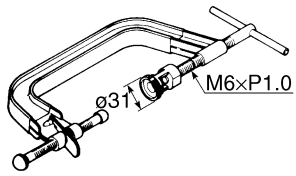
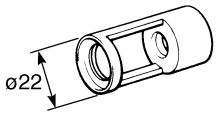
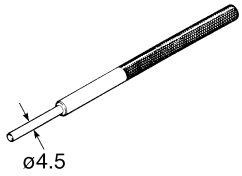
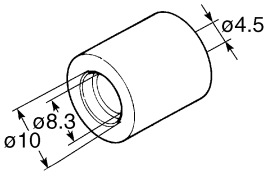
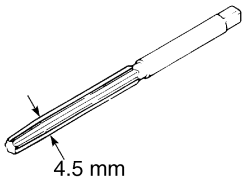
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

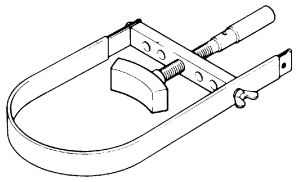
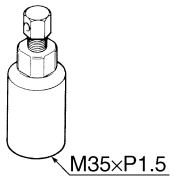
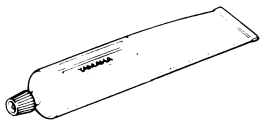
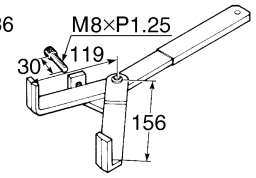
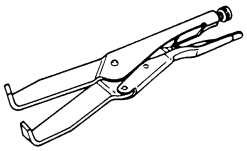
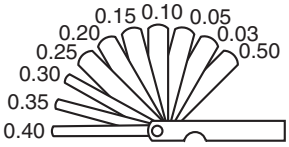
NOTE:
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

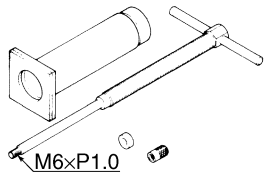
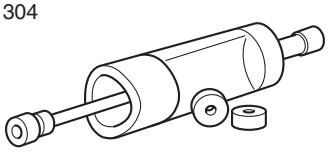
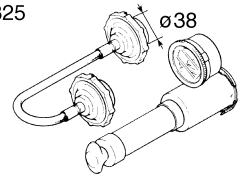
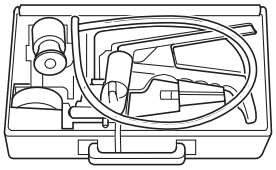
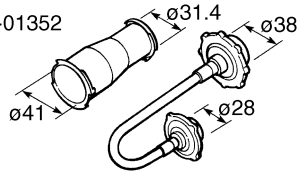
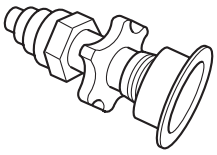
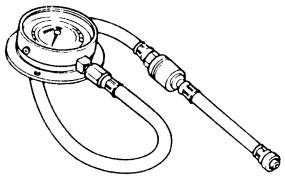
Tool name/Tool No.	Illustration	Reference pages
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-14, 5-34, 8-83, 8-84, 8-85, 8-89, 8-90, 8-91, 8-92, 8-93, 8-94, 8-95, 8-96, 8-97, 8-98, 8-99, 8-100, 8-101
Valve lapper 90890-04101 Valve lapping tool YM-A8998		3-5
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	90890-03094  YU-44456 	3-7
Compression gauge 90890-03081 Engine compression tester YU-33223		3-10

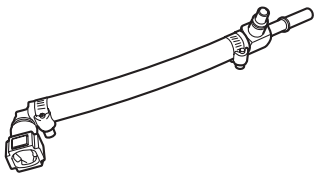
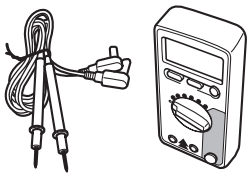
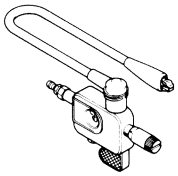
Tool name/Tool No.	Illustration	Reference pages
Extension 90890-04136		3-10
Oil filter wrench 90890-01426 YU-38411		3-12
Oil pressure gauge set 90890-03120		3-13
Oil pressure adapter H 90890-03139		3-13
Steering nut wrench 90890-01403 Spanner wrench YU-33975		3-28, 4-57
Fork spring compressor 90890-01441 YM-01441		4-47, 4-52
Rod holder 90890-01434 Damper rod holder double ended YM-01434		4-47, 4-52
Damper rod holder 90890-01506		4-48, 4-49

Tool name/Tool No.	Illustration	Reference pages
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442		4-50
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437  YM-A8703 	4-51, 4-52
Rod puller attachment (M10) 90890-01436 Universal damping rod bleeding tool set YM-A8703	90890-01436  YM-A8703 	4-51, 4-52
Ring nut wrench 90890-01268 Spanner wrench YU-01268		4-57
Ring nut wrench 90890-01507		4-65, 4-67

Tool name/Tool No.	Illustration	Reference pages
Damper rod holder (24 mm) 90890-01328 YM-01328	90890-01328  YM-01328 	4-65, 4-66
Valve spring compressor 90890-04019 YM-04019		5-19, 5-24
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108		5-19, 5-24
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-21
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-21
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-21

Tool name/Tool No.	Illustration	Reference pages
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-27, 5-28, 5-30
Flywheel puller 90890-01404 Flywheel puller YM-01404		5-27
Yamaha bond No. 1215 90890-85505 (Three Bond No.1215®)		5-28, 5-30, 5-55, 6-11
Universal clutch holder 90890-04086 YM-91042	90890-04086  YM-91042 	5-40, 5-44
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		5-41

Tool name/Tool No.	Illustration	Reference pages
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-58
Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01	90890-01325  YU-24460-01 	6-2
Radiator cap tester adapter 90890-01352 Radiator pressure tester adapter YU-33984	90890-01352  YU-33984 	6-2
Pressure gauge 90890-03153 Pressure gauge YU-03153		7-12

Tool name/Tool No.	Illustration	Reference pages
Fuel pressure adapter 90890-03176 YM-03176		7-12
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		7-13, 7-14
Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487		8-92

SPECIFICATIONS

EAS20280
GENERAL SPECIFICATIONS

Model	
Model	13S4/13S7 (USA) 13S5/13S8 (California)
Dimensions	
Overall length	2040 mm (80.3 in)
Overall width	705 mm (27.8 in)
Overall height	1100 mm (43.3 in)
Seat height	850 mm (33.5 in)
Wheelbase	1380 mm (54.3 in)
Ground clearance	130 mm (5.12 in)
Minimum turning radius	3600 mm (141.7 in)
Weight	
With oil and fuel	188 kg (414 lb)
Maximum load	187 kg (412 lb)

EAS20290
ENGINE SPECIFICATIONS

Engine	
Engine type	Liquid-cooled 4-stroke, DOHC
Displacement	599 cm³ (36.55 cu.in)
Cylinder arrangement	Forward-inclined parallel 4-cylinder
Bore × stroke	67.0 × 42.5 mm (2.64 × 1.67 in)
Compression ratio	13.1:1
Standard compression pressure (at sea level)	1600 kPa/400 r/min (227.6 psi/400 r/min) (16.0 kgf/cm²/400 r/min)
Minimum–maximum	1350–1650 kPa (195.8–239.3 psi) (13.5–16.5 kgf/cm²)
Starting system	Electric starter
Fuel	
Recommended fuel	Premium unleaded gasoline only
Fuel tank capacity	17.3 L (4.57 US gal) (3.81 Imp.gal)
Fuel reserve amount	3.5 L (0.92 US gal) (0.77 Imp.gal)
Engine oil	
Lubrication system	Wet sump
Type	YAMALUBE 4, SAE10W-30 or SAE20W-40
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Engine oil quantity	
Total amount	3.40 L (3.59 US qt) (2.99 Imp.qt)
Without oil filter cartridge replacement	2.40 L (2.54 US qt) (2.11 Imp.qt)
With oil filter cartridge replacement	2.60 L (2.75 US qt) (2.29 Imp.qt)
Oil cooler capacity (including all routes)	0.20 L (0.21 US qt) (0.18 Imp.qt)
Oil pressure (hot)	80.0 kPa/1300 r/min (11.6 psi/1300 r/min) (0.80 kgf/cm²/1300 r/min)
Oil filter	
Oil filter type	Formed
Oil pump	
Oil pump type	Trochoid
Inner-rotor-to-outer-rotor-tip clearance	Less than 0.12 mm (less than 0.0047 in)
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.090–0.150 mm (0.0035–0.0059 in)
Limit	0.220 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.06–0.11 mm (0.0024–0.0043 in)
Limit	0.18 mm (0.0071 in)
Bypass valve opening pressure	78.4–117.6 kPa (11.4–17.1 psi) (0.78–1.18 kgf/cm²)
Relief valve operating pressure	660.0–740.0 kPa (95.7–107.3 psi) (6.60–7.40 kgf/cm²)
Pressure check location	MAIN GALLERY
Cooling system	
Radiator capacity (including all routes)	2.30 L (2.43 US qt) (2.02 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)	0.25 L (0.26 US qt) (0.22 Imp.qt)
Radiator cap opening pressure	107.9–137.3 kPa (15.6–19.9 psi) (1.08–1.37 kgf/cm²)

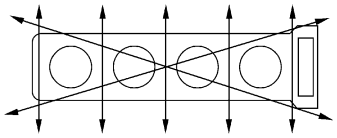
Thermostat	
Valve opening temperature	71 °C (159.8 °F)
Valve full open temperature	85 °C (185 °F)
Valve lift (full open)	More than 8 mm (0.31 in)
Radiator core	
Width	374.0 mm (14.72 in)
Height	257.8 mm (10.15 in)
Depth	24.0 mm (0.94 in)
Water pump	
Water pump type	Single-suction centrifugal pump
Reduction ratio	85/41 × 29/31 (1.939)
Impeller shaft tilt limit	0.15 mm (0.006 in)

Spark plug (s)

Manufacturer/model	NGK/CR10EK
Spark plug gap	0.6–0.7 mm (0.024–0.028 in)

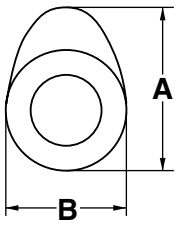
Cylinder head

Volume	7.40–8.20 cm³ (0.45–0.50 cu.in)
Warpage limit	0.05 mm (0.0020 in)

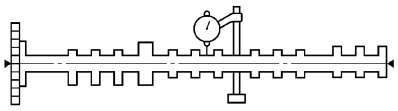


Camshaft

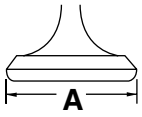
Drive system	Chain drive (right)
Camshaft cap inside diameter	22.500–22.521 mm (0.8858–0.8867 in)
Camshaft journal diameter	22.459–22.472 mm (0.8842–0.8847 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Intake A	33.725–33.875 mm (1.3278–1.3337 in)
Limit	33.675 mm (1.3258 in)
Intake B	25.225–25.325 mm (0.9931–0.9970 in)
Limit	25.175 mm (0.9911 in)
Exhaust A	32.925–33.075 mm (1.2963–1.3022 in)
Limit	32.875 mm (1.2943 in)
Exhaust B	25.082–25.182 mm (0.9875–0.9914 in)
Limit	25.032 mm (0.9855 in)



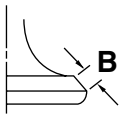
Camshaft runout limit	0.030 mm (0.0012 in)



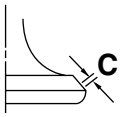
Timing chain	
Model/number of links	98XRH2015/118
Tensioning system	Automatic
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.12–0.19 mm (0.0047–0.0075 in)
Exhaust	0.16–0.23 mm (0.0063–0.0091 in)
Valve dimensions	
Valve head diameter A (intake)	26.90–27.10 mm (1.0591–1.0669 in)
Valve head diameter A (exhaust)	22.90–23.10 mm (0.9016–0.9094 in)



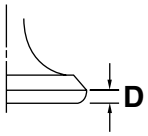
Valve face width B (intake)	1.410–2.550 mm (0.0555–0.1004 in)
Valve face width B (exhaust)	1.400–2.670 mm (0.0551–0.1051 in)



Valve seat width C (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)
Valve seat width C (exhaust)	1.10–1.30 mm (0.0433–0.0512 in)
Limit	1.8 mm (0.07 in)

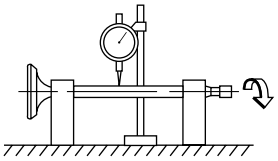


Valve margin thickness D (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	0.8 mm (0.03 in)
Valve margin thickness D (exhaust)	1.10–1.30 mm (0.0433–0.0512 in)
Limit	1.0 mm (0.04 in)



Valve stem diameter (intake)	4.475–4.490 mm (0.1762–0.1768 in)
Limit	4.460 mm (0.1756 in)
Valve stem diameter (exhaust)	4.460–4.475 mm (0.1756–0.1762 in)
Limit	4.445 mm (0.1750 in)
Valve guide inside diameter (intake)	4.500–4.512 mm (0.1772–0.1776 in)
Limit	4.542 mm (0.1788 in)
Valve guide inside diameter (exhaust)	4.500–4.512 mm (0.1772–0.1776 in)
Limit	4.542 mm (0.1788 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	0.095 mm (0.0037 in)

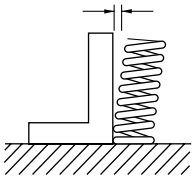
Valve stem runout	0.040 mm (0.0016 in)



Cylinder head valve seat width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)
Cylinder head valve seat width (exhaust)	1.10–1.30 mm (0.0433–0.0512 in)
Limit	1.8 mm (0.07 in)

Valve spring

Free length (intake)	37.47 mm (1.48 in)
Limit	35.60 mm (1.40 in)
Free length (exhaust)	37.67 mm (1.48 in)
Limit	35.79 mm (1.42 in)
Installed length (intake)	32.80 mm (1.29 in)
Installed length (exhaust)	32.80 mm (1.29 in)
Spring rate K1 (intake)	38.11 N/mm (217.61 lb/in) (3.89 kgf/mm)
Spring rate K2 (intake)	52.40 N/mm (299.20 lb/in) (5.34 kgf/mm)
Spring rate K1 (exhaust)	36.36 N/mm (207.62 lb/in) (3.71 kgf/mm)
Spring rate K2 (exhaust)	53.40 N/mm (304.91 lb/in) (5.45 kgf/mm)
Installed compression spring force (intake)	166.00–190.00 N (37.32–42.71 lbf) (16.93–19.37 kgf)
Installed compression spring force (exhaust)	165.00–189.00 N (37.09–42.49 lbf) (16.83–19.27 kgf)
Spring tilt (intake)	2.5°/1.6 mm
Spring tilt (exhaust)	2.5°/1.6 mm



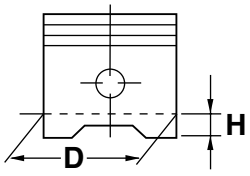
Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise

Cylinder

Bore	67.000–67.010 mm (2.6378–2.6382 in)
Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.050 mm (0.0020 in)

Piston

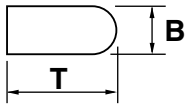
Piston-to-cylinder clearance	0.010–0.035 mm (0.0004–0.0014 in)
Limit	0.05 mm (0.0022 in)
Diameter D	66.975–66.990 mm (2.6368–2.6374 in)
Height H	10.0 mm (0.39 in)



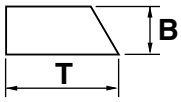
Offset	0.50 mm (0.0197 in)
Offset direction	Intake side
Piston pin bore inside diameter	15.002–15.013 mm (0.5906–0.5911 in)
Limit	15.043 mm (0.5922 in)
Piston pin outside diameter	14.991–15.000 mm (0.5902–0.5906 in)
Limit	14.971 mm (0.5894 in)
Piston-pin-to-piston-pin-bore clearance	0.002–0.022 mm (0.00007–0.00068 in)

Piston ring

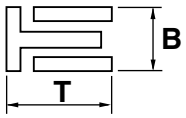
Top ring	
Ring type	Barrel
Dimensions (B × T)	0.80 × 2.40 mm (0.03 × 0.09 in)



End gap (installed)	0.25–0.35 mm (0.0098–0.0138 in)
Limit	0.60 mm (0.0236 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
2nd ring	
Ring type	Taper
Dimensions (B × T)	0.80 × 2.50 mm (0.03 × 0.10 in)



End gap (installed)	0.70–0.80 mm (0.0276–0.0315 in)
Limit	1.15 mm (0.0453 in)
Ring side clearance	0.020–0.055 mm (0.0008–0.0022 in)
Oil ring	
Dimensions (B × T)	1.50 × 2.00 mm (0.06 × 0.08 in)



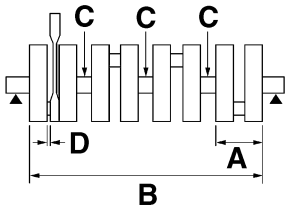
End gap (installed)	0.10–0.35 mm (0.0039–0.0138 in)

Connecting rod

Oil clearance (using plastigauge®)	0.037–0.061 mm (0.0015–0.0024 in)
Bearing color code	1.Blue 2.Black 3.Brown 4.Green

Crankshaft

Width A	Cylinders #1 and #2: 48.20–48.25 mm (1.898–1.900 in) Cylinders #3 and #4: 47.90–47.95 mm (1.886–1.888 in)
Width B	268.80–270.00 mm (10.58–10.63 in)
Runout limit C	0.030 mm (0.0012 in)
Big end side clearance D	0.160–0.262 mm (0.0063–0.0103 in)



Small end free play F	0.32–0.50 mm (0.01–0.02 in)
Journal oil clearance (using plastigauge®)	0.020–0.044 mm (0.0008–0.0017 in)
Bearing color code	0.White 1.Blue 2.Black 3.Brown 4.Green

Clutch

Clutch type	Wet, multiple-disc
Clutch release method	Outer pull, rack and pinion pull
Clutch lever free play	10.0–15.0 mm (0.39–0.59 in)
Friction plate thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.80 mm (0.1102 in)
Plate quantity	9 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	8 pcs
Warpage limit	0.10 mm (0.0039 in)
Clutch spring free length	55.00 mm (2.17 in)
Minimum length	54.00 mm (2.13 in)
Spring quantity	6 pcs

Transmission

Transmission type	Constant mesh 6-speed
Primary reduction system	Spur gear
Primary reduction ratio	85/41 (2.073)
Secondary reduction system	Chain drive
Secondary reduction ratio	45/16 (2.813)
Operation	Left foot operation
Gear ratio	
1st	31/12 (2.583)
2nd	32/16 (2.000)
3rd	30/18 (1.667)
4th	26/18 (1.444)
5th	27/21 (1.286)
6th	23/20 (1.150)
Main axle runout limit	0.02 mm (0.0008 in)
Drive axle runout limit	0.02 mm (0.0008 in)

Shifting mechanism

Shift mechanism type	Shift drum
Shift fork guide bar bending limit	0.050 mm (0.0020 in)
Shift fork thickness (L, R)	5.76–5.89 mm (0.2268–0.2319 in)
Shift fork thickness (C)	5.795–5.868 mm (0.2281–0.2310 in)

Air filter

Air filter element	Oil-coated paper element

Fuel pump

Pump type	Electrical
Model/manufacturer	4C8/DENSO
Maximum consumption amperage	6.0 A

Output pressure	319.0–329.0 kPa (46.3–47.7 psi) (3.19–3.29 kgf/cm²)
Fuel injector	
Model/quantity	297500–0640/4, 297500–1250/4
Manufacturer	DENSO
Throttle body	
Type/quantity	41EIDW/1
Manufacturer	MIKUNI
ID mark	13S1 00 (USA) 13S5 10 (California)
Throttle valve size	#50
Throttle position sensor	
Resistance	2.0–3.0 kΩ
Output voltage (at idle)	0.68 V
Fuel injection sensor	
Crankshaft position sensor resistance	248–372 Ω at 20 °C (68 °F)
Cylinder identification sensor output voltage (ON)	Less than 0.8 V
Cylinder identification sensor output voltage (OFF)	More than 4.8 V
Intake air pressure sensor output voltage	3.15–4.15 V
Atmospheric pressure sensor output voltage	3.15–4.15 V
Idling condition	
Engine idling speed	1250–1350 r/min
Intake vacuum	20.0 kPa (5.9 inHg) (150 mmHg)
Water temperature	95.0–105.0 °C (203.0–221.0 °F)
Oil temperature	85.0–95.0 °C (185.0–203.0 °F)
Throttle cable free play	3.0–5.0 mm (0.12–0.20 in)
Air induction system	
Reed valve bending limit	0.4 mm (0.016 in)
Solenoid resistance	18–22 Ω at 20 °C (68 °F)

EAS20300
CHASSIS SPECIFICATIONS

Chassis	
Frame type	Diamond
Caster angle	24.00°
Trail	97.0 mm (3.82 in)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT3.50
Rim material	Aluminum
Wheel travel	115.0 mm (4.53 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 × MT5.50
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)
Front tire	
Type	Tubeless
Size	120/70 ZR17M/C (58W)
Manufacturer/model	DUNLOP/Qualifier PT M
Wear limit (front)	1.0 mm (0.04 in)
Rear tire	
Type	Tubeless
Size	180/55 ZR17M/C (73W)
Manufacturer/model	DUNLOP/Qualifier PT M
Wear limit (rear)	1.0 mm (0.04 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)
Rear	290 kPa (42 psi) (2.90 kgf/cm²)
Loading condition	90–187 kg (198–412 lb)
Front	250 kPa (36 psi) (2.50 kgf/cm²)
Rear	290 kPa (42 psi) (2.90 kgf/cm²)
High-speed riding	
Front	250 kPa (36 psi) (2.50 kgf/cm²)
Rear	290 kPa (42 psi) (2.90 kgf/cm²)
Front brake	
Type	Dual disc brake
Operation	Right hand operation
Front brake lever free play	6.7–18.1 mm (0.26–0.71 in)
Front disc brake	
Disc outside diameter × thickness	310.0 × 5.0 mm (12.20 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 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	30.20 mm × 1 (1.19 in × 1)
Caliper cylinder inside diameter	27.00 mm × 1 (1.06 in × 1)
Recommended fluid	DOT 4
Rear brake	
Type	Single disc brake
Operation	Right foot operation
Brake pedal free play	4.3–9.0 mm (0.17–0.35 in)
Rear disc brake	
Disc outside diameter × thickness	220.0 × 5.0 mm (8.66 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	38.10 mm (1.50 in)
Recommended fluid	DOT 4
Steering	
Steering bearing type	Angular bearing
Center to lock angle (left)	25.0°
Center to lock angle (right)	25.0°
Front suspension	
Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	115.0 mm (4.53 in)
Fork spring free length	254.0 mm (10.00 in)
Limit	248.9 mm (9.80 in)
Collar length	77.0 mm (3.03 in)
Installed length	243.5 mm (9.59 in)
Spring rate K1	9.00 N/mm (51.39 lb/in) (0.92 kgf/mm)
Spring stroke K1	0.0–115.0 mm (0.00–4.53 in)
Inner tube outer diameter	41.0 mm (1.61 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	No
Recommended oil	Ohlins R & T43
Quantity	482.0 cm^3 (16.30 US oz) (17.00 Imp.oz)
Level	103.0 mm (4.06 in)
Spring preload adjusting positions	
Minimum	0
Standard	2
Maximum	5
Rebound damping adjusting positions	
Minimum	25
Standard	20
Maximum	1
Rear suspension	
Type	Swingarm (link suspension)

Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	60.0 mm (2.36 in)
Spring free length	161.5 mm (6.36 in)
Installed length	152.5 mm (6.00 in)
Spring rate K1	103.00 N/mm (588.13 lb/in) (10.50 kgf/mm)
Spring stroke K1	0.0–60.0 mm (0.00–2.36 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1200 kPa (174.1 psi) (12.0 kgf/cm^2)
Spring preload adjusting positions	
Minimum	1
Standard	4
Maximum	9
Rebound damping adjusting positions	
Minimum	20
Standard	16
Maximum	3

Drive chain

Type/manufacturer	525V8/DAIDO
Link quantity	114
Drive chain slack	30.0–45.0 mm (1.18–1.77 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	Throttle position sensor and electrical
Ignition timing (B.T.D.C.)	10.0°/1300 r/min
Engine control unit	
Model/manufacturer	TBDF61/DENSO
Ignition coil	
Model/manufacturer	F6T568/MITSUBISHI
Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	0.85–1.15 Ω
Secondary coil resistance	5.01–6.78 kΩ
AC magneto	
Model/manufacturer	LMX62/DENSO
Standard output	14.0 V 420 W 5000 r/min
Stator coil resistance	0.12–0.18 Ω at 20 °C (68 °F)
Rectifier/regulator	
Regulator type	Semi conductor-short circuit
Model/manufacturer	SH678–11/SHINDENGEN
Regulated voltage (DC)	14.1–14.9 V
Rectifier capacity	22.0 A
Withstand voltage	200.0 V
Battery	
Model	YTZ10S
Voltage, capacity	12 V, 8.6 Ah
Manufacturer	GS YUASA
Ten hour rate amperage	0.86 A
Headlight	
Bulb type	Halogen bulb
Bulb voltage, wattage × quantity	
Headlight	12 V, 55.0 W × 2
Tail/brake light	LED
Front turn signal/position light	12 V, 21.0 W/5.0 W × 2
Rear turn signal light	12 V, 21.0 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
Oil level warning light	LED
High beam indicator light	LED
Fuel level warning light	LED
Coolant temperature warning light	LED
Engine trouble warning light	LED
Shift timing indicator light	LED

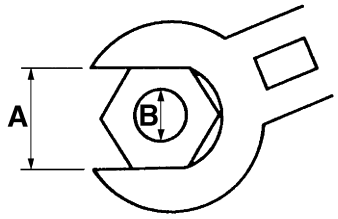
Electric starting system	
System type	Constant mesh
Starter motor	
Model/manufacturer	SM14/MITSUBA
Power output	0.60 kW
Armature coil resistance	0.0012–0.0022 Ω at 20 °C (68 °F)
Brush overall length	10.0 mm (0.39 in)
Limit	3.50 mm (0.14 in)
Brush spring force	7.16–9.52 N (25.77–34.27 oz) (730–971 gf)
Commutator diameter	28.0 mm (1.10 in)
Limit	27.0 mm (1.06 in)
Mica undercut (depth)	0.70 mm (0.03 in)
Starter relay	
Model/manufacturer	S537726-A/JIDECO
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω
Horn	
Horn type	Plane
Quantity	1 pc
Model/manufacturer	YF-12/NIKKO
Maximum amperage	3.0 A
Coil resistance	1.15–1.25 Ω at 20 °C (68 °F)
Performance	105–113 dB/2m
Turn signal relay	
Relay type	Full transistor
Model/manufacturer	FE246BH/DENSO
Built-in, self-canceling device	No
Turn signal blinking frequency	75.0–95.0 cycles/min
Wattage	(21, 23, 27) W × 2.0 + 3.4 W
Oil level gauge	
Model/manufacturer	5VX/SOMIC ISHIKAWA
Fuel gauge	
Model/manufacturer	4C8/DENSO
Sender unit resistance (full)	750.0–1100.0 Ω
Starting circuit cut-off relay	
Model/manufacturer	G8R-30Y-V4/OMRON
Coil resistance	162.0–198.0 Ω
Headlight relay	
Model/manufacturer	ACA12115/MATSUSHITA
Coil resistance	72.0–88.0 Ω
Fuel pump relay	
Model/manufacturer	G8R-30Y-V4/OMRON
Coil resistance	162.0–198.0 Ω
Thermo sensor	
Model/manufacturer	K003T20191/MITSUBISHI
Resistance at 80 °C	290–354 Ω

Fan motor relay	
Model/manufacturer	ACM33211M05/MATSUSHITA
Fuses	
Main fuse	50.0 A
Headlight fuse	15.0 A
Signaling system fuse	10.0 A
Ignition fuse	15.0 A
Radiator fan fuse	15.0 A × 2
Fuel injection system fuse	15.0 A
Backup fuse	7.5 A
Electric throttle valve fuse	7.5 A
Reserve fuse	15.0 A
Reserve fuse	10.0 A
Reserve fuse	7.5 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
Camshaft cap bolt (intake and exhaust)	M6	20	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Cylinder head stud bolt (exhaust pipe assembly)	M8	8	15 Nm (1.5 m·kg, 11 ft·lb)	
Cylinder head nut (1st)	M10	8	25 Nm (2.5 m·kg, 18 ft·lb)	E
Cylinder head nut (final)	M10	8	42 Nm (4.2 m·kg, 31 ft·lb)	E
Cylinder head cap nut (1st)	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	E
Cylinder head cap nut (final)	M10	2	60 Nm (6.0 m·kg, 44 ft·lb)	E
Cylinder head bolt	M6	2	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Spark plug	M10	4	13 Nm (1.3 m·kg, 9.6 ft·lb)	
Cylinder head cover bolt	M6	6	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Oil check bolt	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Reed valve cover bolt	M6	4	10 Nm (1.0 m·kg, 7.4 ft·lb)	LT
Camshaft sprocket bolt	M7	4	24 Nm (2.4 m·kg, 18 ft·lb)	
Coolant temperature sensor	M12	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Throttle body joint bolt	M6	8	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Connecting rod nut (1st)	M7	8	15 Nm (1.5 m·kg, 11 ft·lb)	See NOTE M
Connecting rod nut (final)	M7	8	Specified angle 175°–185°	See NOTE M
Generator rotor bolt	M12	1	70 Nm (7.0 m·kg, 52 ft·lb)	E
Timing chain tensioner bolt	M6	2	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Thermostat cover bolt	M6	2	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Water jacket joint bolt	M6	2	10 Nm (1.0 m·kg, 7.4 ft·lb)	LT
Water pump assembly bolt	M6	2	12 Nm (1.2 m·kg, 8.9 ft·lb)	LT
Water pump housing cover bolt	M6	2	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Oil pump assembly bolt	M6	3	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Oil pan bolt	M6	13	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kg, 32 ft·lb)	
Oil filter cartridge bolt	M20	1	70 Nm (7.0 m·kg, 52 ft·lb)	
Oil filter cartridge	M20	1	17 Nm (1.7 m·kg, 13 ft·lb)	
Oil pump drive chain guide	M6	2	12 Nm (1.2 m·kg, 8.9 ft·lb)	LT
Oil pipe bolt	M6	2	12 Nm (1.2 m·kg, 8.9 ft·lb)	LT
Oil cooler union bolt	M20	1	63 Nm (6.3 m·kg, 47 ft·lb)	E
Upper air filter case to secondary injector holder bolt	M6	4	5 Nm (0.5 m·kg, 3.7 ft·lb)	
Upper air filter case to lower air filter case bolt	M5	10	2 Nm (0.2 m·kg, 1.5 ft·lb)	
Air filter bolt	M5	1	2 Nm (0.2 m·kg, 1.5 ft·lb)	
Secondary injector fuel rail	M6	2	5 Nm (0.5 m·kg, 3.7 ft·lb)	LT
Throttle body joint clamp	M5	4	2 Nm (0.2 m·kg, 1.5 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Intake funnel to throttle body	M5	6	4 Nm (0.4 m·kg, 3.0 ft·lb)	
Intake funnel bolt	M5	2	3 Nm (0.3 m·kg, 2.2 ft·lb)	
Locknut (throttle cable)	M6	2	5 Nm (0.5 m·kg, 3.7 ft·lb)	
Exhaust pipe assembly nut	M8	8	20 Nm (2.0 m·kg, 15 ft·lb)	
Exhaust pipe assembly bolt	M8	2	20 Nm (2.0 m·kg, 15 ft·lb)	
Exhaust pipe assembly bracket bolt (left lower side)	M8	1	34 Nm (3.4 m·kg, 25 ft·lb)	
Muffler clamp bolt	M6	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Muffler bolt	M8	1	20 Nm (2.0 m·kg, 15 ft·lb)	
Locknut (EXUP cable adjusting bolt)	M6	2	6 Nm (0.6 m·kg, 4.4 ft·lb)	
EXUP servo motor drive pulley bolt	M5	1	7 Nm (0.7 m·kg, 5.2 ft·lb)	
EXUP servo motor bolt	M6	2	8 Nm (0.8 m·kg, 5.9 ft·lb)	
EXUP servo motor bracket bolt	M6	2	8 Nm (0.8 m·kg, 5.9 ft·lb)	
EXUP valve pulley cover bolt (front side)	M6	1	8 Nm (0.8 m·kg, 5.9 ft·lb)	LT
EXUP valve pulley cover bolt (rear side)	M6	2	7 Nm (0.7 m·kg, 5.2 ft·lb)	LT
EXUP valve nut	M6	1	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Crankcase bolt	M8	2	See NOTE	l=115 mm (4.53 in) E
Crankcase bolt	M8	8	See NOTE	l=85 mm (3.35 in) E
Crankcase bolt	M8	2	24 Nm (2.4 m·kg, 18 ft·lb)	l=65 mm (2.56 in) E
Crankcase bolt	M6	16	10 Nm (1.0 m·kg, 7.4 ft·lb)	E
Generator cover bolt	M6	9	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Clutch cover bolt	M6	7	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Clutch cover bolt	M6	2	12 Nm (1.2 m·kg, 8.9 ft·lb)	LT
Pickup rotor cover bolt	M6	7	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Timing mark accessing bolt	M8	1	15 Nm (1.5 m·kg, 11 ft·lb)	
Oil baffle plate 1 bolt	M6	1	12 Nm (1.2 m·kg, 8.9 ft·lb)	LT
Oil baffle plate 2 bolt	M6	3	12 Nm (1.2 m·kg, 8.9 ft·lb)	LT
Stator coil assembly bolt	M6	3	10 Nm (1.0 m·kg, 7.4 ft·lb)	LT
Stator coil assembly lead holder bolt	M6	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	LT
Drive sprocket cover bolt	M6	3	10 Nm (1.0 m·kg, 7.4 ft·lb)	LT
Main gallery plug	M16	2	8 Nm (0.8 m·kg, 5.9 ft·lb)	
Ventilation chamber cover bolt	M6	5	12 Nm (1.2 m·kg, 8.9 ft·lb)	
Oil pipe	M6	2	12 Nm (1.2 m·kg, 8.9 ft·lb)	LT
Crankshaft position sensor bolt	M6	2	10 Nm (1.0 m·kg, 7.4 ft·lb)	LT

Item	Thread size	Q'ty	Tightening torque	Remarks
Crankcase stud bolt	M10	10	See NOTE	
Pressure plate bolt	M6	6	8 Nm (0.8 m·kg, 5.9 ft·lb)	
Clutch boss nut	M20	1	115 Nm (11.5 m·kg, 85 ft·lb)	Stake (E)
Clutch boss plate stud bolt	M8	6	25 Nm (2.5 m·kg, 18 ft·lb)	LT
Drive sprocket nut	M20	1	85 Nm (8.5 m·kg, 63 ft·lb)	Stake LT
Main axle screw	M6	3	12 Nm (1.2 m·kg, 8.9 ft·lb)	Stake LT
Shift drum retainer bolt	M6	2	10 Nm (1.0 m·kg, 7.4 ft·lb)	LT
Shift shaft spring stopper	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	LT
Shift arm bolt	M6	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Pickup rotor bolt	M8	1	35 Nm (3.5 m·kg, 26 ft·lb)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kg, 7.4 ft·lb)	LT
Neutral switch	M10	1	20 Nm (2.0 m·kg, 15 ft·lb)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Speed sensor bolt	M6	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Cylinder identification sensor bolt	M6	1	8 Nm (0.8 m·kg, 5.9 ft·lb)	LT
Negative battery terminal/engine ground terminal bolt	M6	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	
O_2 sensor	M18	1	45 Nm (4.5 m·kg, 33 ft·lb)	

NOTE:

Connecting rod nut

Tighten the connecting rod nuts to 15 Nm (1.5 m·kg, 11 ft·lb), and then tighten them further to reach the specified angle 175°–185°.

NOTE:

Crankcase bolt

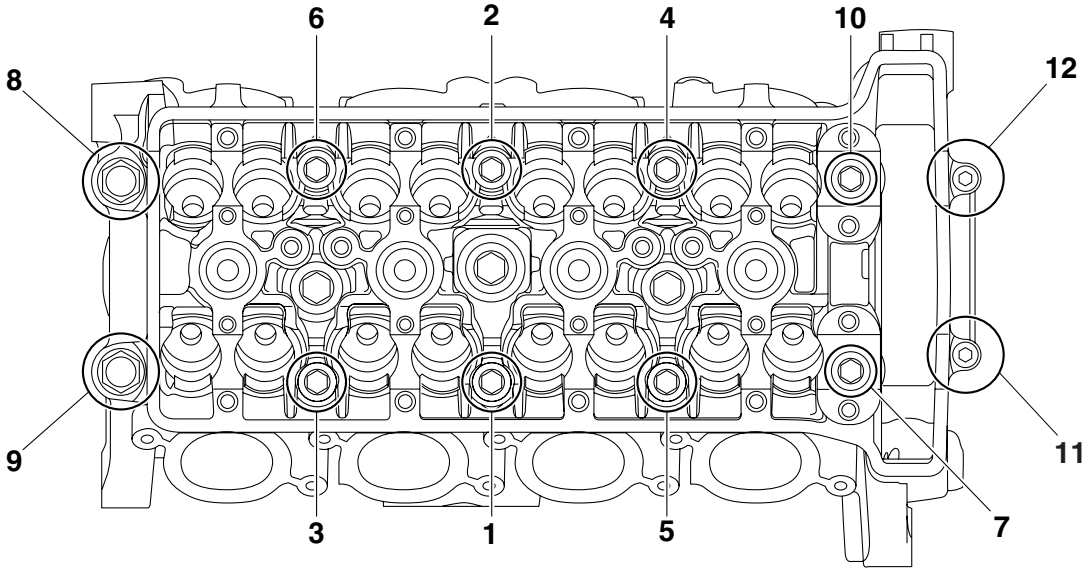
1. First, tighten the bolts to approximately 20 Nm (2.0 m·kg, 14 ft·lb) with a torque wrench.
2. Loosen all bolts one by one following the tightening order and then retighten the bolts 12 Nm (1.2 m·kg, 8.8 ft·lb) with a torque wrench.
3. Tighten at 45°–55° angle according to the tightening order.
4. Tighten at 70°–80° angle according to the tightening order.

NOTE:

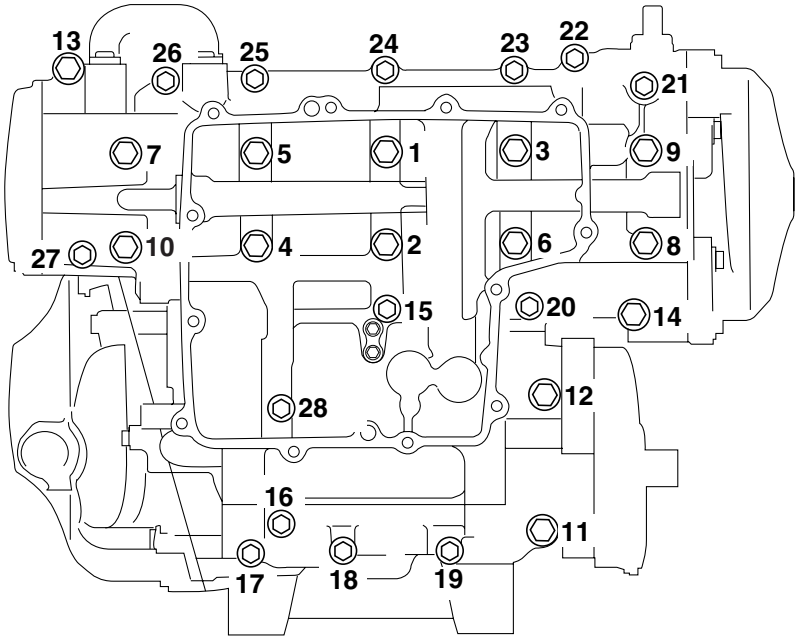
Crankcase stud bolt

Install the crankcase stud bolts (M10) so that their installed length is 68.2 mm (2.69 in).

Cylinder head tightening sequence:



Crankcase tightening sequence:



EAS20350
CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Engine mounting bolt (front right side)	M10	2	45 Nm (4.5 m·kg, 33 ft·lb)	
Engine mounting bolt (front left side)	M10	2	45 Nm (4.5 m·kg, 33 ft·lb)	
Engine mounting nut (rear upper side)	M12	1	64 Nm (6.4 m·kg, 47 ft·lb)	
Engine mounting nut (rear lower side)	M12	1	64 Nm (6.4 m·kg, 47 ft·lb)	
Front wheel axle	M14	1	91 Nm (9.1 m·kg, 67 ft·lb)	
Front wheel axle pinch bolt	M8	4	21 Nm (2.1 m·kg, 16 ft·lb)	See NOTE
Front brake disc bolt	M6	10	18 Nm (1.8 m·kg, 13 ft·lb)	LT
Rear wheel axle nut	M24	1	110 Nm (11.0 m·kg, 81 ft·lb)	LS
Rear wheel sprocket nut	M10	6	100 Nm (10.0 m·kg, 74 ft·lb)	LT
Rear brake disc bolt	M8	5	30 Nm (3.0 m·kg, 22 ft·lb)	LT
Front brake hose union bolt	M10	3	30 Nm (3.0 m·kg, 22 ft·lb)	
Front brake caliper bolt	M10	4	35 Nm (3.5 m·kg, 26 ft·lb)	
Brake caliper bleed screw (front and rear)	M8	3	5 Nm (0.5 m·kg, 3.7 ft·lb)	
Front brake hose holder bolt	M6	2	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Rear brake hose union bolt	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear brake caliper bolt	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	LT, S
Rear brake caliper bolt	M12	1	27 Nm (2.7 m·kg, 20 ft·lb)	S
Rear brake pad pin	M10	1	17 Nm (1.7 m·kg, 13 ft·lb)	
Rear brake screw plug	–	1	2 Nm (0.2 m·kg, 1.5 ft·lb)	
Handlebar pinch bolt	M8	2	32 Nm (3.2 m·kg, 24 ft·lb)	
Handlebar bolt	M6	2	13 Nm (1.3 m·kg, 9.6 ft·lb)	
Front brake master cylinder bolt	M6	2	13 Nm (1.3 m·kg, 9.6 ft·lb)	
Front brake master cylinder bleed screw	M8	1	6 Nm (0.6 m·kg, 4.4 ft·lb)	
Rear view mirror nut	M6	4	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Clutch lever assembly bolt	M6	1	11 Nm (1.1 m·kg, 8.1 ft·lb)	
Clutch cable locknut (engine side)	M8	1	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Upper bracket pinch bolt	M8	2	26 Nm (2.6 m·kg, 19 ft·lb)	
Steering stem nut	M28	1	115 Nm (11.5 m·kg, 85 ft·lb)	
Lower ring nut (initial tightening torque)	M30	1	52 Nm (5.2 m·kg, 38 ft·lb)	See NOTE
Lower ring nut (final tightening torque)	M30	1	14 Nm (1.4 m·kg, 10 ft·lb)	See NOTE
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m·kg, 17 ft·lb)	See NOTE

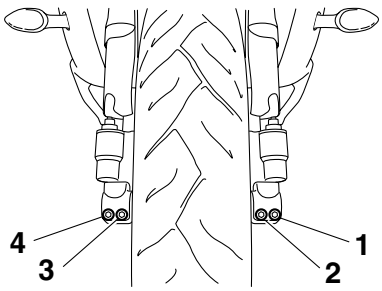
Item	Thread size	Q'ty	Tightening torque	Remarks
Lower bracket and front brake hose joint bracket bolt	M6	2	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Front brake hose joint and front brake hose joint bracket bolt	M6	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Cap bolt	M47	2	20 Nm (2.0 m·kg, 15 ft·lb)	
Cap bolt (damper rod assembly and nut)	M10	2	25 Nm (2.5 m·kg, 18 ft·lb)	
Damper rod assembly	M24	2	35 Nm (3.5 m·kg, 26 ft·lb)	
Front fender bolt	M6	2	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Relay arm and frame nut	M10	1	40 Nm (4.0 m·kg, 30 ft·lb)	
Connecting arm and relay arm nut	M12	1	40 Nm (4.0 m·kg, 30 ft·lb)	
Connecting arm and swingarm nut	M12	1	40 Nm (4.0 m·kg, 30 ft·lb)	
Rear shock absorber assembly upper nut	M12	1	44 Nm (4.4 m·kg, 33 ft·lb)	
Rear shock absorber assembly lower nut	M12	1	40 Nm (4.0 m·kg, 30 ft·lb)	
Rear shock absorber assembly spacer bolt	M22	1	16 Nm (1.6 m·kg, 12 ft·lb)	
Rear shock absorber assembly bracket nut	M14	1	52 Nm (5.2 m·kg, 38 ft·lb)	
Swingarm pivot shaft	M32	1	16 Nm (1.6 m·kg, 12 ft·lb)	LS
Swingarm pivot shaft ring nut	M32	1	95 Nm (9.5 m·kg, 70 ft·lb)	LS
Swingarm pivot shaft nut	M22	1	70 Nm (7.0 m·kg, 52 ft·lb)	LS
Drive chain guide (swingarm side) bolt	M6	1	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Drive chain guard bolt	M6	1	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Drive chain adjusting locknut	M8	2	16 Nm (1.6 m·kg, 12 ft·lb)	
Drive chain adjusting bolt	M8	2	2 Nm (0.2 m·kg,1.5 ft·lb)	
Rear fender bolt	M6	3	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Fuel pump bolt	M5	6	4 Nm (0.4 m·kg, 3.0 ft·lb)	
Fuel tank upper cover and frame bolt	M6	1	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Fuel tank bolt	M6	2	9 Nm (0.9 m·kg, 6.6 ft·lb)	
Fuel tank bracket and frame bolt	M6	4	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Fuel tank bracket and fuel tank bolt	M6	1	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Radiator bolt	M6	2	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Radiator and radiator bracket bolt	M6	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Radiator bracket and frame bolt	M6	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	
Radiator outlet hose holder bolt	M10	1	13 Nm (1.3 m·kg, 9.6 ft·lb)	
Radiator and rectifier/regulator bracket bolt	M6	2	5 Nm (0.5 m·kg, 3.7 ft·lb)	
Coolant reservoir bolt	M6	2	5 Nm (0.5 m·kg, 3.7 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Front cowling assembly bolt	M6	4	13 Nm (1.3 m·kg, 9.6 ft·lb)	
Seat lock assembly bolt	M6	2	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Rider seat and frame	M6	2	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Battery box and frame	M6	2	4 Nm (0.4 m·kg, 3.0 ft·lb)	
Rear upper cowling damper plate and frame	M6	4	7 Nm (0.7 m·kg, 5.2 ft·lb)	
License plate light assembly bolt	M6	4	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Rider footrest (left and right) assembly bolt	M8	4	28 Nm (2.8 m·kg, 21 ft·lb)	
Passenger footrest (left and right) bolt	M8	4	28 Nm (2.8 m·kg, 21 ft·lb)	
Rear brake master cylinder bolt	M6	2	13 Nm (1.3 m·kg, 9.6 ft·lb)	
Sidestand assembly and frame bolt	M8	3	26 Nm (2.6 m·kg, 19 ft·lb)	LS LT
Coupler holder (left and right) and frame bolt	M6	4	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Shift arm bolt	M6	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	LT
Locknut (shift rod upper side)	M6	1	7 Nm (0.7 m·kg, 5.2 ft·lb)	
Locknut (shift rod lower side)	M8	1	10 Nm (1.0 m·kg, 7.4 ft·lb)	

NOTE:

Front wheel axle pinch bolt

1. Insert the front wheel axle from the right side and tighten it with the flange bolt from the left side to 91 Nm (9.1 m·kg, 66 ft·lb) without performing temporary tightening.
2. In the order pinch bolt "2" → pinch bolt "1" → pinch bolt "2", tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.
3. Check that the right end of the front axle is flush with the front fork. If necessary, manually push the front axle or lightly tap it with a soft hammer until its end is flush with the front fork. However, if the surface of the front axle end is not parallel to the surface of the front fork, align a point on the outer edge of the axle with the fork, making sure that the axle does not protrude past the fork.
4. In the order pinch bolt "4" → pinch bolt "3" → pinch bolt "4", tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.



NOTE:

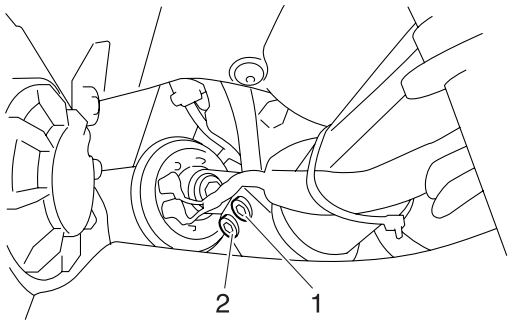
Lower ring nut

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 14 Nm (1.4 m·kg, 10 ft·lb) with a torque wrench.

NOTE:

Lower bracket pinch bolt

Tighten each bolt to 23 Nm (2.3 m·kg, 17 ft·lb) in the order pinch bolt "1" → pinch bolt "2" → pinch bolt "1" → pinch bolt "2".



EAS20360
LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370
ENGINE

Lubrication point	Lubricant
Oil seal lips	LS
O-rings	LS
Bearings	E
Crankshaft pins	E
Piston surface	E
Piston pins	E
Connecting rod bolts and nuts	M
Crankshaft journals	E
Generator rotor bolt and washer	E
Camshaft cam lobes and camshaft journals	M
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	M
Valve lifter surface	E
Oil pump rotors (inner and outer) and oil pump housing	E
Oil strainer screen (inside oil strainer)	E
Oil strainer seal	LS
Oil cooler bolt	E
Oil nozzle (O-ring)	LS
Starter clutch idle gear shaft	E
Starter clutch roller and starter clutch idle gear outer surface	E
Primary driven gear inner surface	E
Clutch boss nut	E
Clutch pull rod	LS
Transmission gears (wheel and pinion) and collars	M
Main axle and drive axle	M
Shift forks and shift fork guide bars	E
Shift shaft	E
Cylinder head cover mating surface	Yamaha bond No.1215 (Three Bond No.1215®)
Cylinder head cover gasket	Bond TB1215B
Crankcase mating surface	Yamaha bond No.1215 (Three Bond No.1215®) Three Bond No.1280B

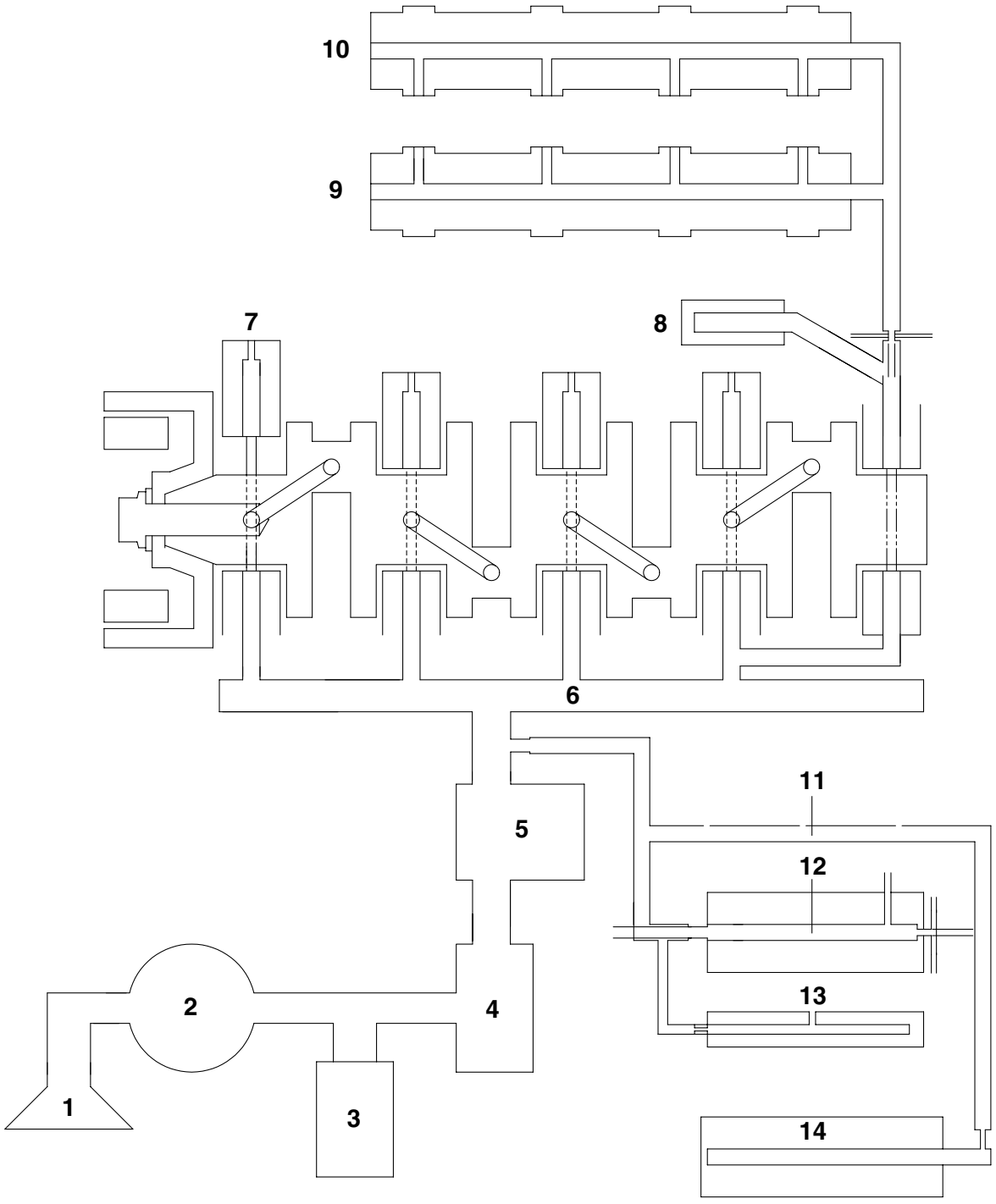
Lubrication point	Lubricant
Crankshaft position sensor lead grommet	Yamaha bond No.1215 (Three Bond No.1215®)
Stator coil lead grommet	Yamaha bond No.1215 (Three Bond No.1215®)

EAS20380
CHASSIS

Lubrication point	Lubricant
Steering bearings and upper bearing cover lip	LS
Lower bearing dust seal lip	LS
Tube guide (throttle grip) inner surface and throttle cables	LS
Brake lever pivoting point and metal-to-metal moving parts	S
Brake caliper piston seal	BF
Brake caliper piston dust seal	S
Clutch cable end	LS
Clutch lever pivoting point and metal-to-metal moving parts	LS
Relay arm, connecting arm and rear shock absorber spacer	LS
Swingarm pivot shaft	LS
Swingarm pivot shaft bearings	LS
Swingarm dust cover lips	LS
Swingarm pivot shaft nut	LS
Oil seals (rear shock absorber, relay arm and connecting arm)	LS
Seat lock lever pivoting point	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
Sidestand bracket and sidestand bolt	LS
Shift rod pivoting point	LS
Shift pedal pivoting point	LS
Brake pedal shaft pivoting point	LS
Front wheel oil seal lips (left and right)	LS
Front wheel axle bolt	LS
Rear wheel oil seal lips (left and right)	LS
Rear wheel drive hub oil seal	LS
Rear wheel drive hub mating surface	LS
Rear wheel axle	LS
Engine mounting bolts (rear upper and lower side)	LS

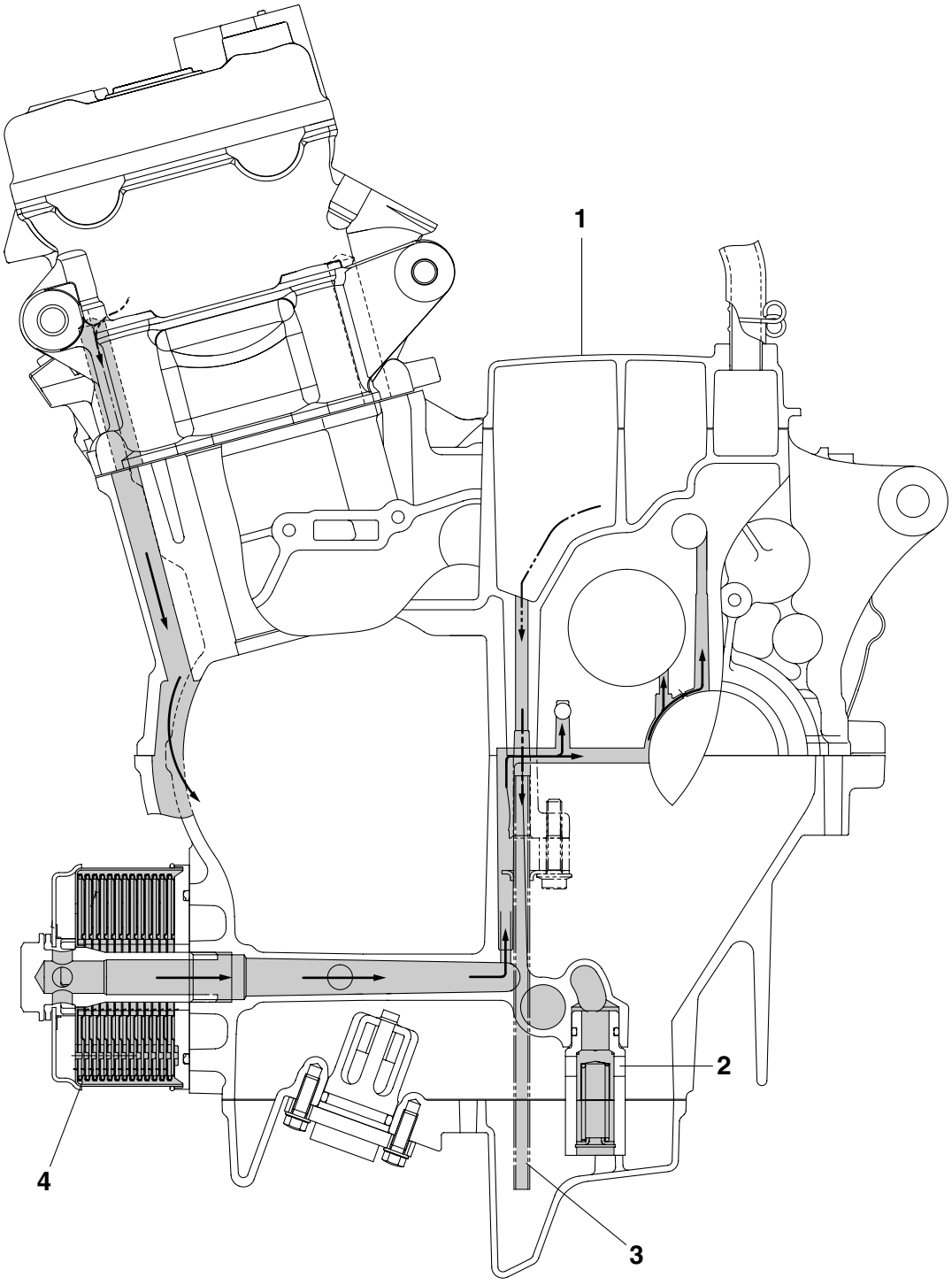
EAS20390
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400
ENGINE OIL LUBRICATION CHART

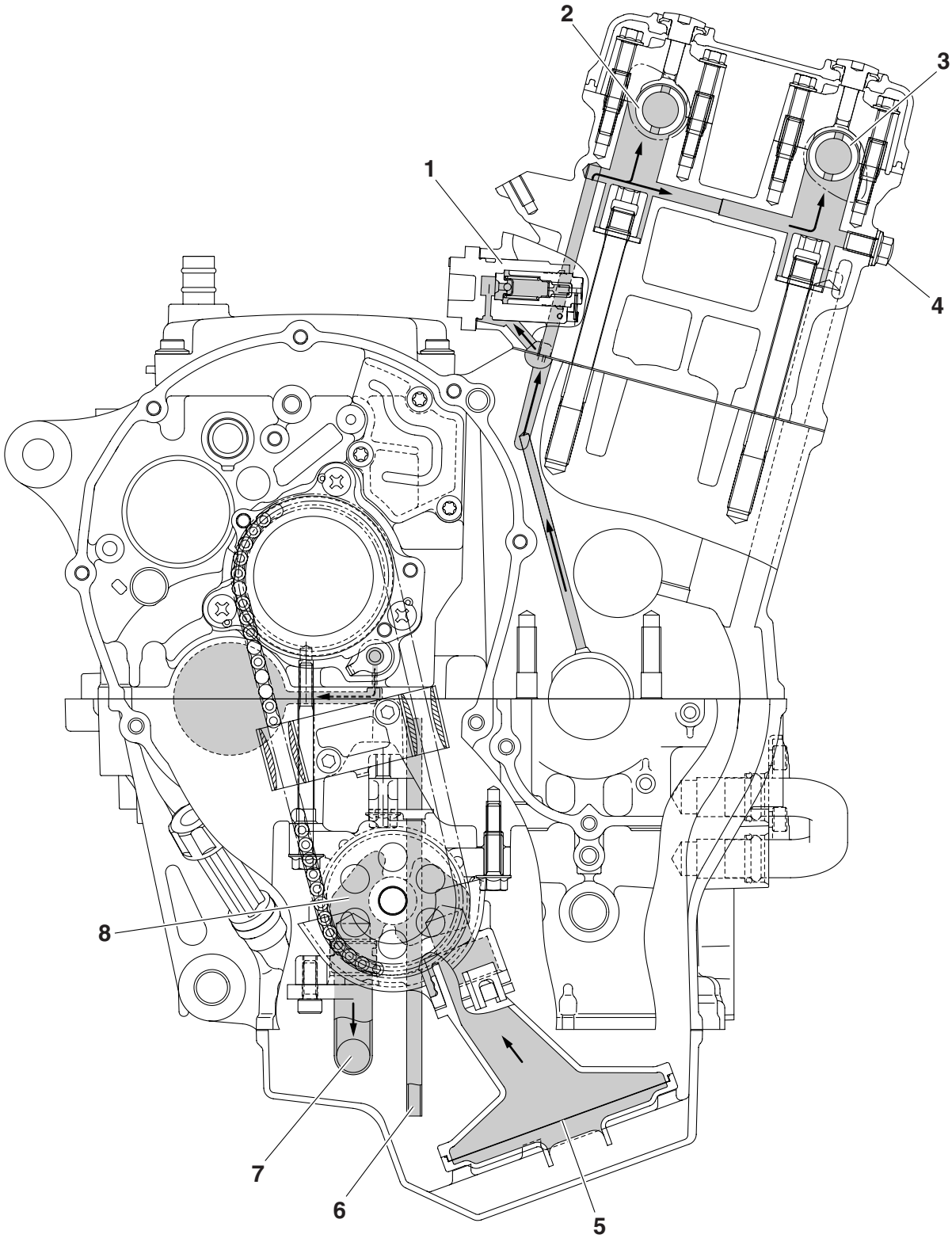


1. Oil strainer
2. Oil pump
3. Relief valve
4. Oil filter
5. Oil cooler
6. Main gallery
7. Oil nozzle
8. Timing chain tensioner
9. Intake camshaft
10. Exhaust camshaft
11. Oil pipe
12. Main axle
13. Shift fork
14. Drive axle

EAS20410
LUBRICATION DIAGRAMS



1. Ventilation chamber cover
2. Relief valve
3. Ventilation chamber oil drain pipe
4. Oil cooler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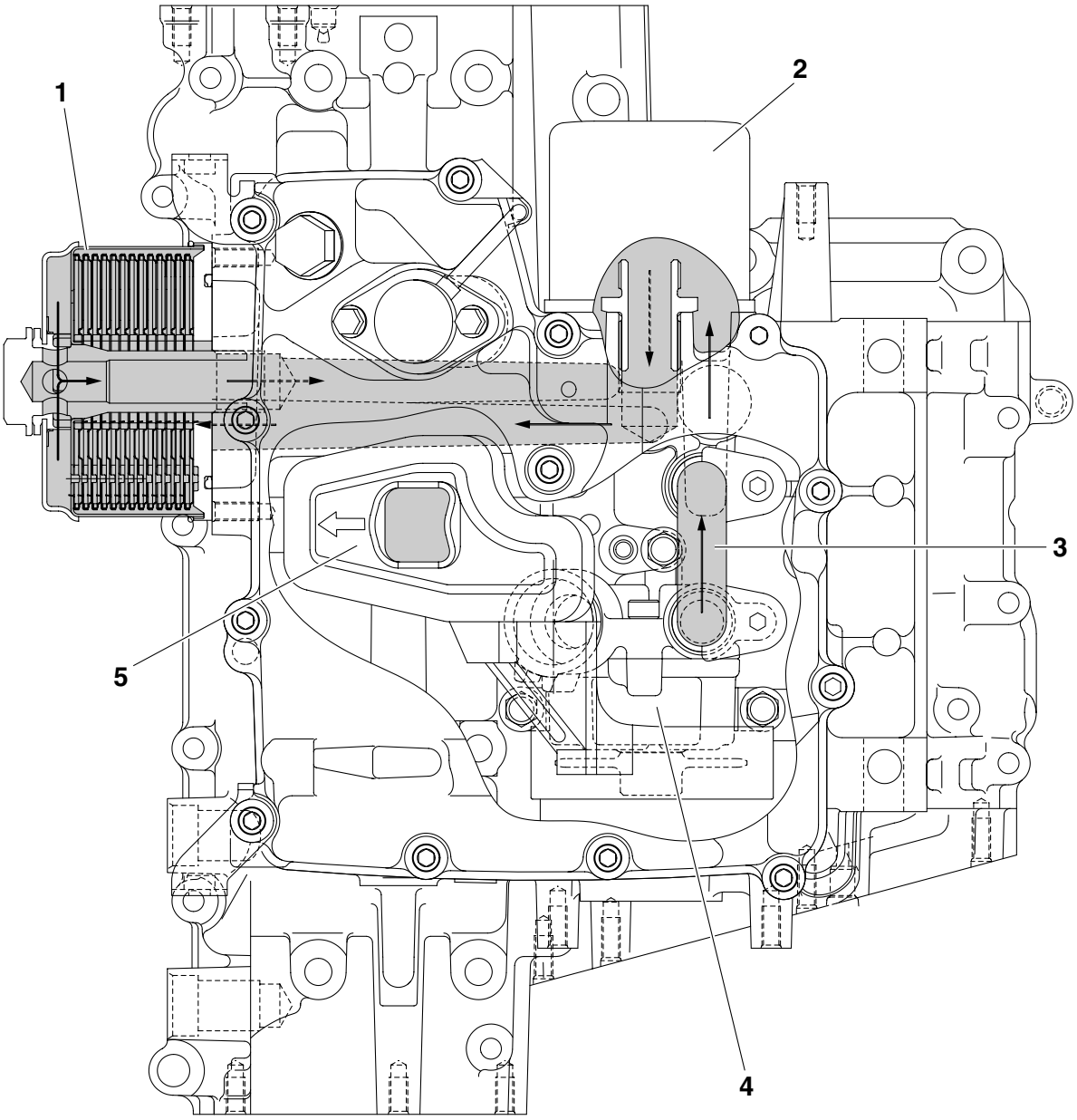
1. Timing chain tensioner
2. Intake camshaft
3. Exhaust camshaft
4. Oil check bolt
5. Oil strainer
6. Ventilation chamber oil drain pipe
7. Oil pipe
8. Oil pump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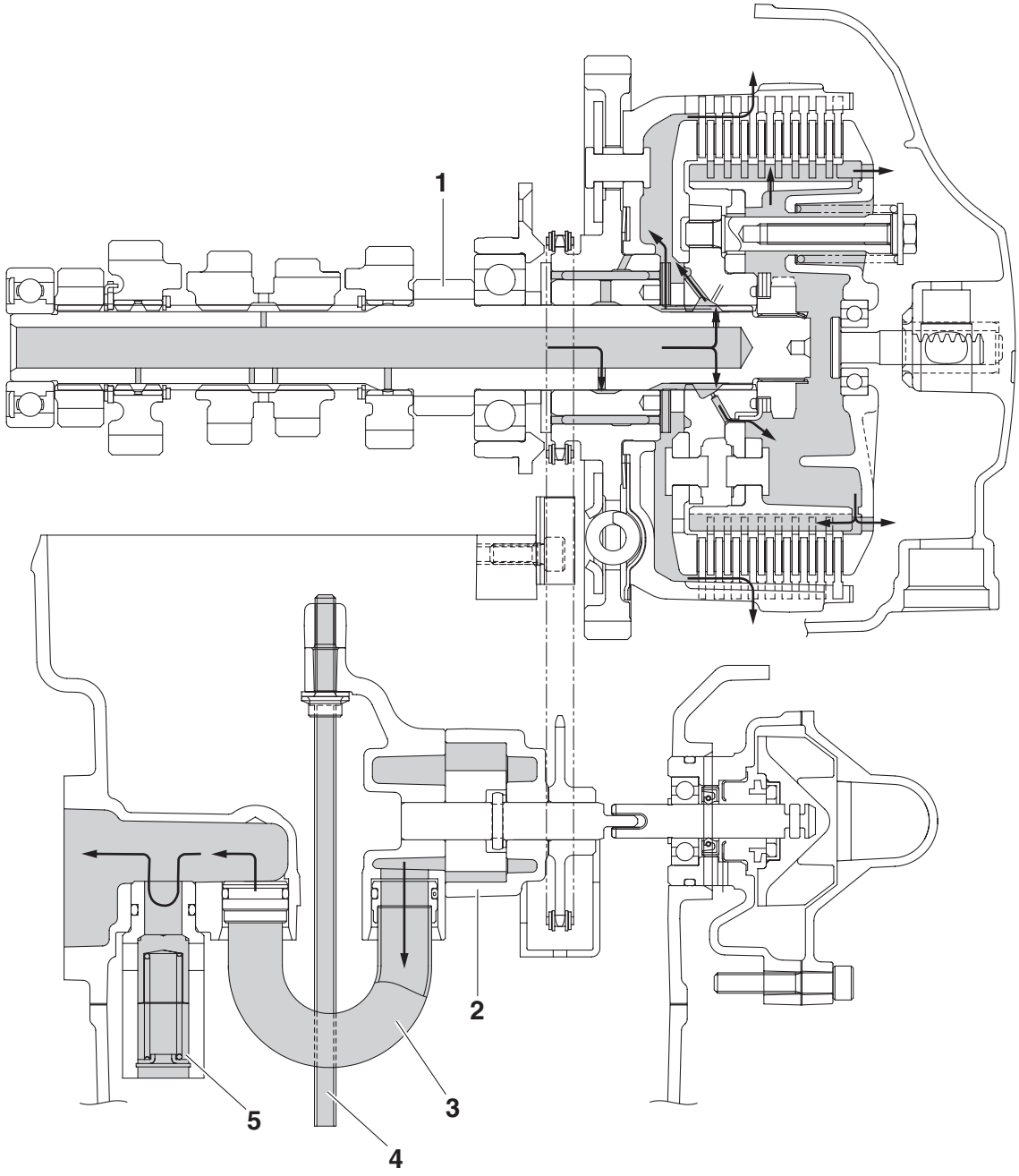
1. Oil cooler
2. Oil filter
3. Oil pipe
4. Oil pump
5. Oil strainer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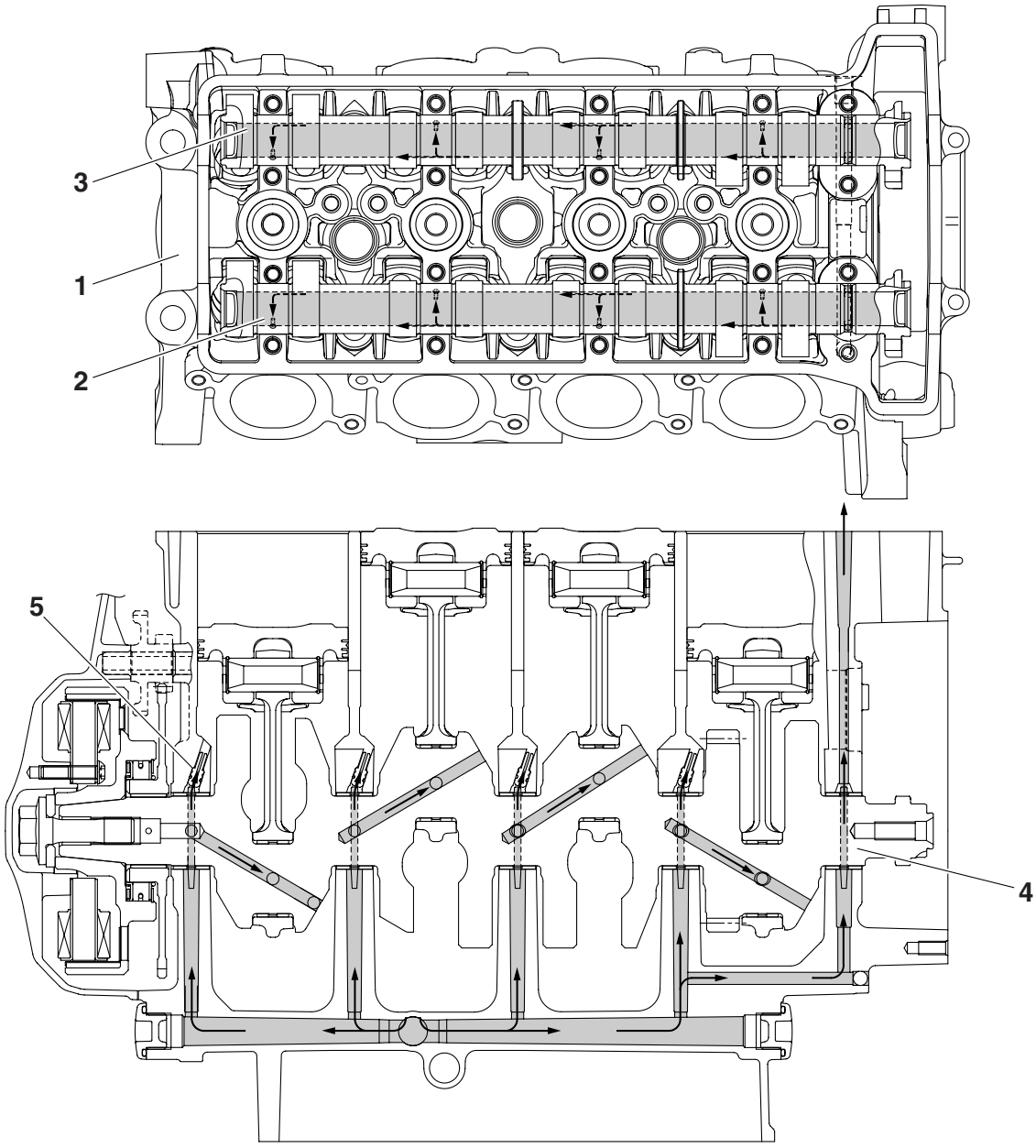
1. Main axle
2. Oil pump
3. Oil pipe
4. Ventilation chamber oil drain pipe
5. Relief valve


3
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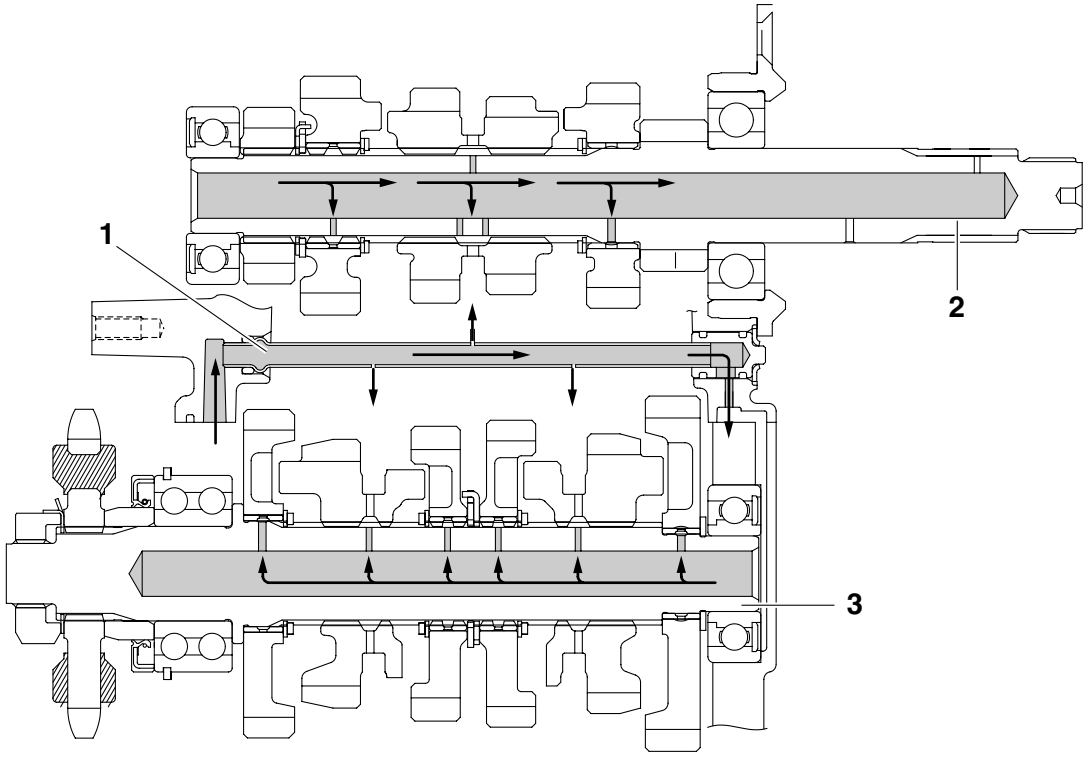
1. Cylinder head
2. Intake camshaft
3. Exhaust camshaft
4. Crankshaft
5. Oil nozzle


1
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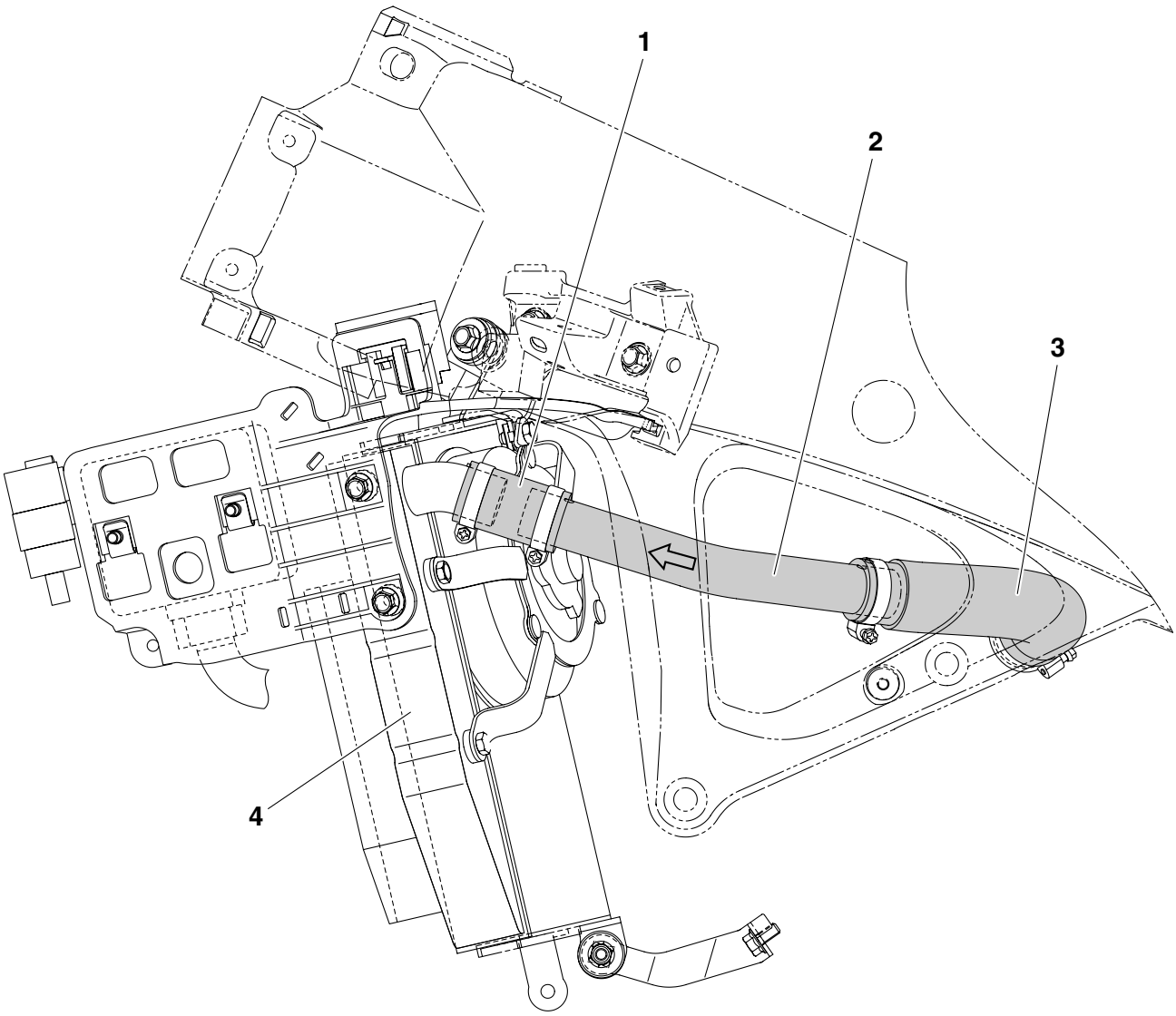
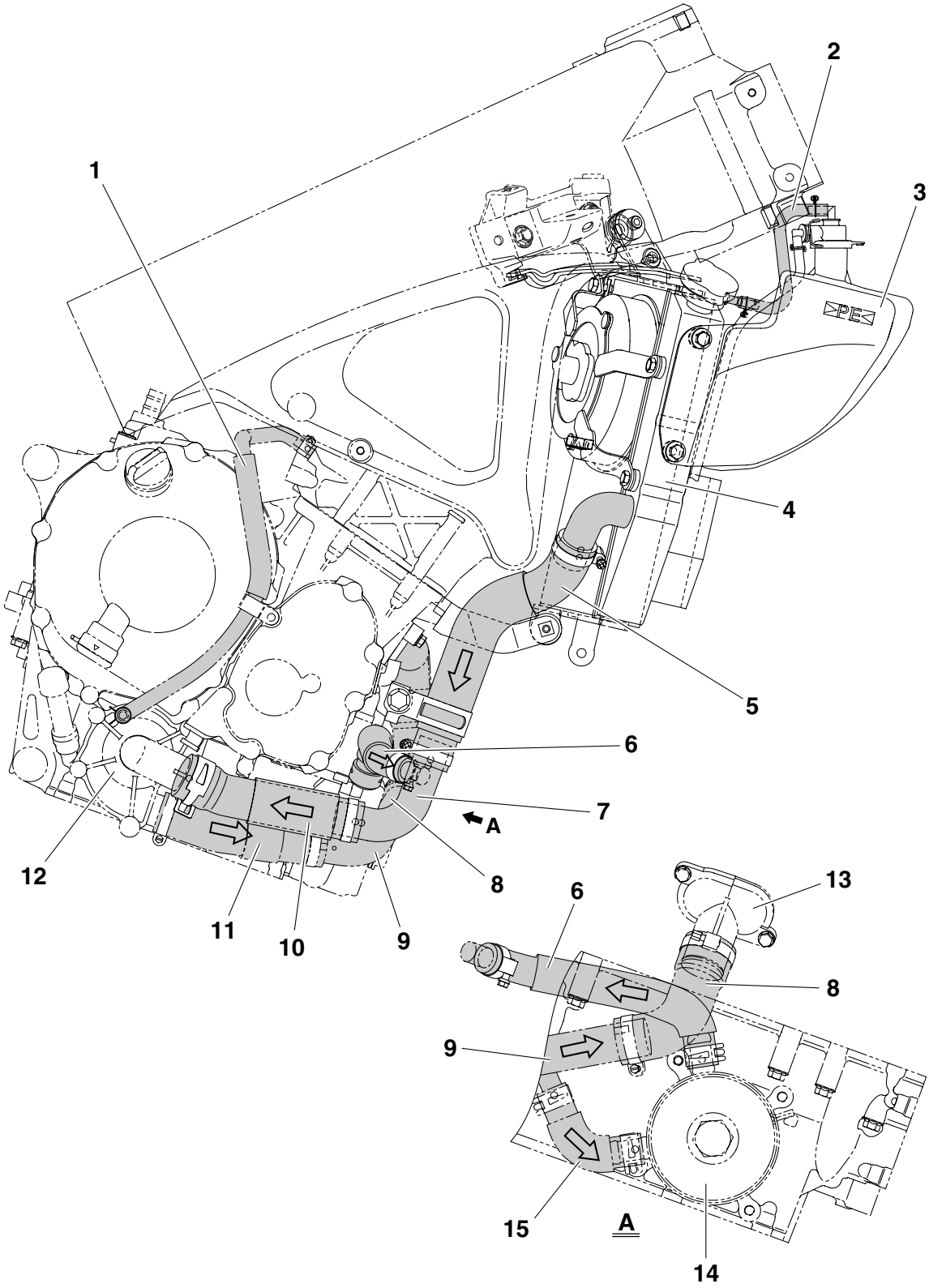
1. Oil pipe
2. Main axle
3. Drive axle

EAS20420
COOLING SYSTEM DIAGRAMS



1. Radiator inlet hose
2. Radiator inlet pipe
3. Thermostat outlet hose
4. Radiator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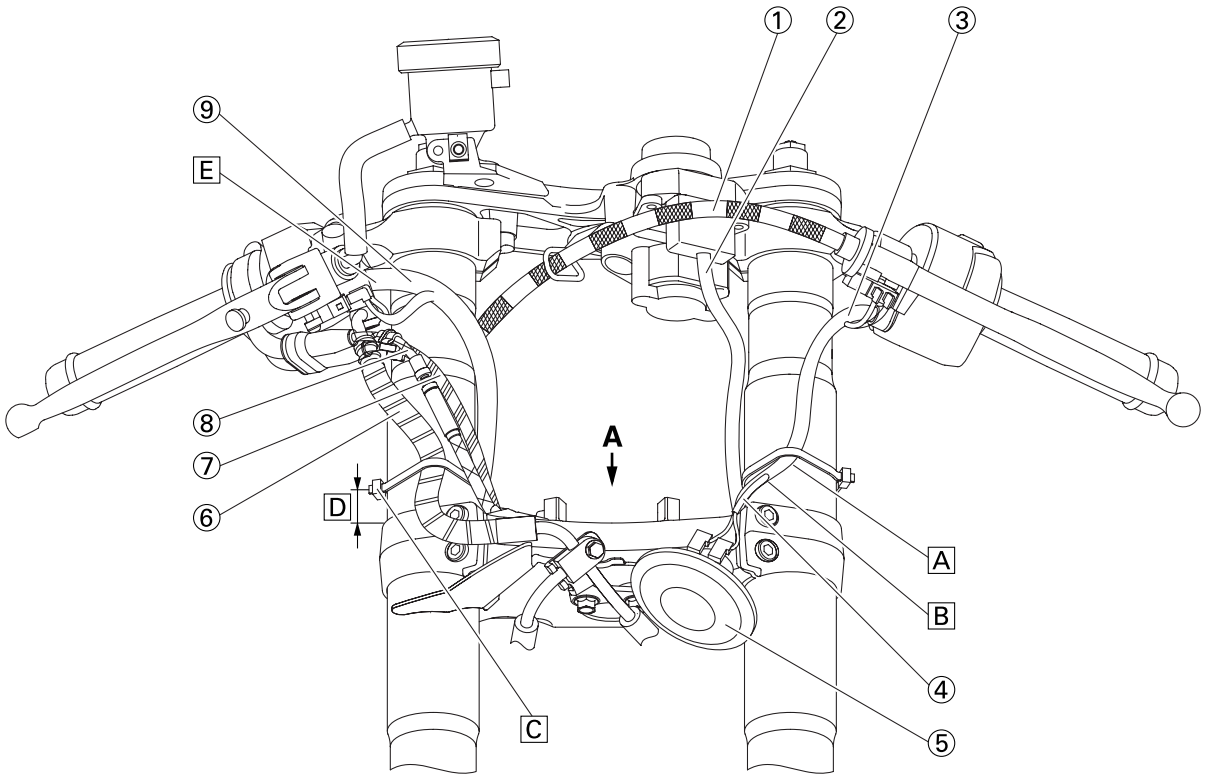
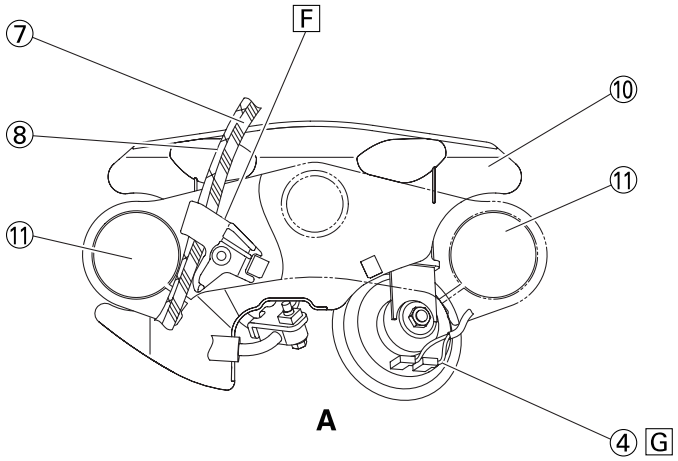
1. Water pump breather hose
2. Coolant reservoir hose
3. Coolant reservoir
4. Radiator
5. Radiator outlet hose
6. Oil cooler outlet hose
7. Radiator outlet pipe
8. Water jacket joint inlet hose
9. Water pump outlet pipe
10. Water pump inlet hose
11. Water pump outlet hose
12. Water pump
13. Water jacket joint
14. Oil cooler
15. Oil cooler inlet hose

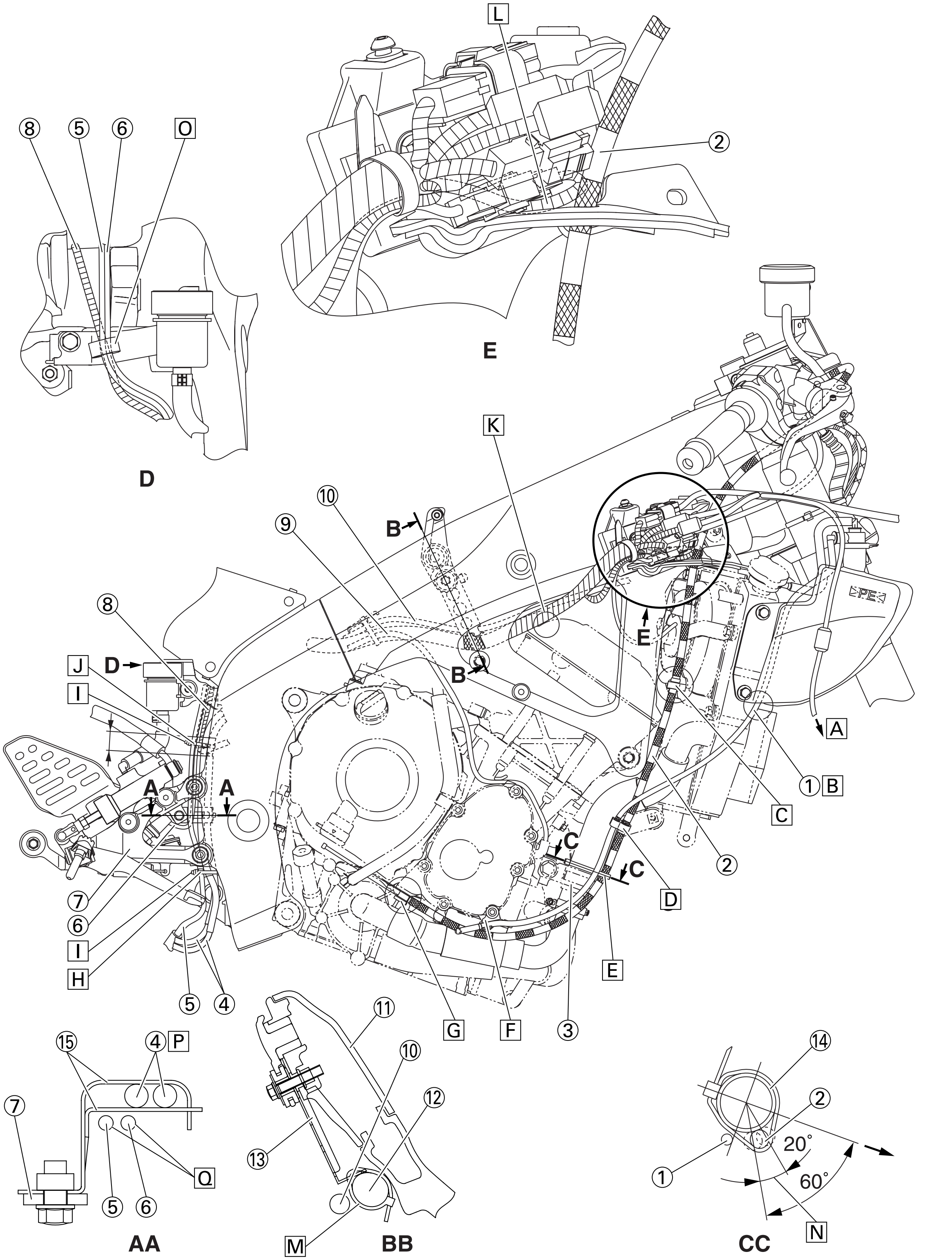
EAS20430
CABLE ROUTING





1. Clutch cable
2. Main switch lead
3. Left handlebar switch lead
4. Horn lead
5. Horn
6. Front brake hose
7. Throttle cable (return side)
8. Throttle cable (pull side)
9. Right handlebar switch lead
10. Steering cover
11. Front fork

A. Fasten the left handlebar switch lead in front of the front fork with a plastic locking tie. Face the end of the plastic locking tie outward and cut off the excess end of the tie to 1–5 mm (0.04–0.20 in).
B. Be sure to position the plastic locking tie above where the horn leads branch off from the other leads.
C. Set the front brake hose in front of the vehicle and outward and secure it between 2–22 degrees angle. Direct the tip of the plastic locking tie to outer side of the vehicle and cut it by leaving the tip 2–4 mm (0.08–0.16 in).
D. 20–30 mm (0.79–1.18 in)
E. Route the right handlebar switch lead between the front brake master cylinder, front fork and handlebar and above the front brake hose union bolt.
F. Route the throttle cable through the cable guide so that the throttle cable (pull side) is under the throttle cable (return side).
G. Install the horn lead L-shaped connectors so that the leads are routed outward.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60°
⑤ ⑥
M
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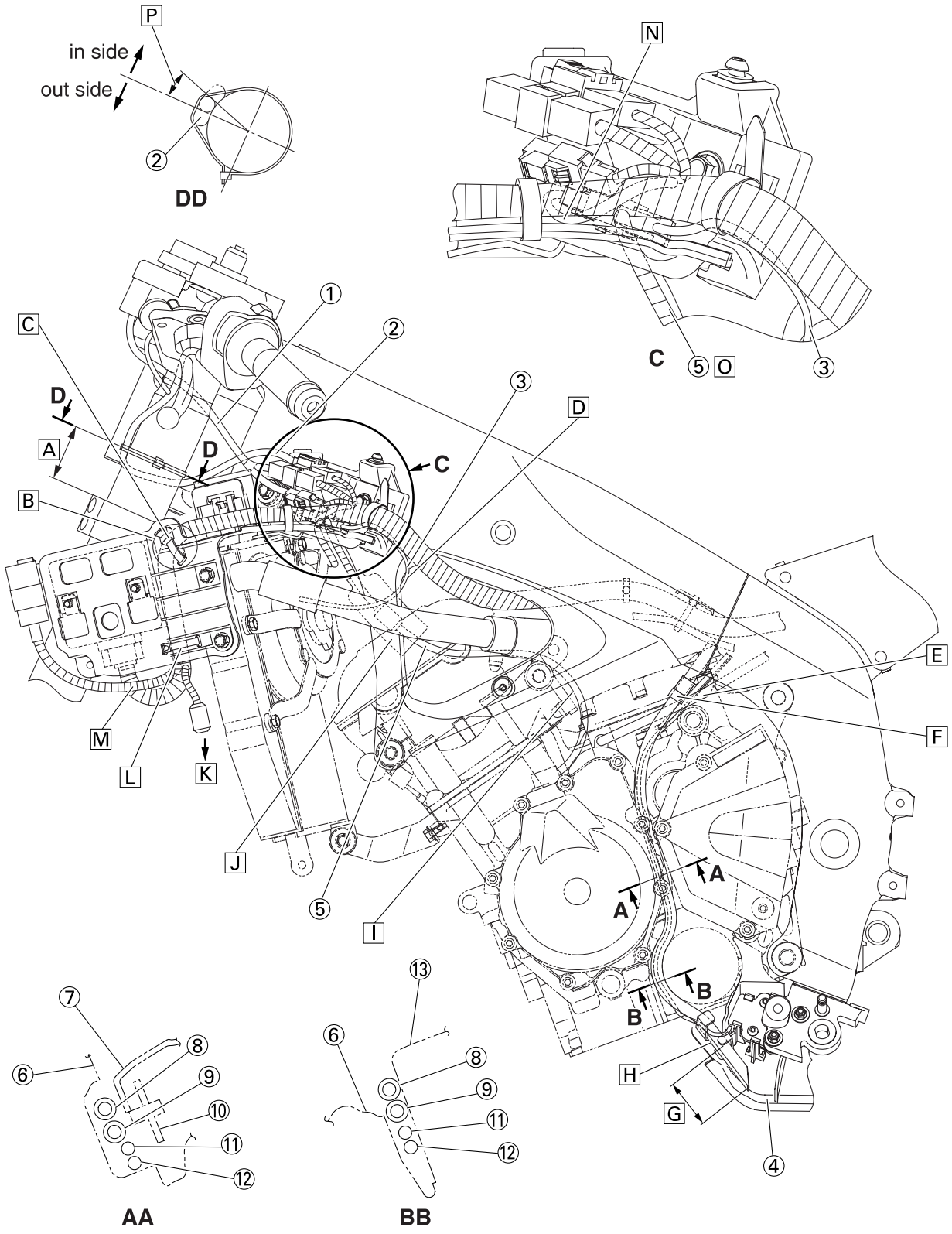
AA
BB
CC

1. Coolant reservoir breather hose
2. Clutch cable
3. Hose clamp
4. EXUP cable
5. O_2 sensor lead
6. Rear brake light switch lead
7. Footrest bracket
8. EXUP servo motor lead
9. Pickup coil lead
10. Ignition coil lead
11. Frame
12. Main harness
13. Guide bars
14. Radiator outlet hose
15. Bracket

A. To the front right turn signal light.
B. Route the coolant reservoir breather hose between the radiator and coolant reservoir and outside of the damper to be attached to the radiator.
C. The clutch cable position should be at the top of the clutch.
D. Cross the clutch cable and coolant reservoir breather hose and then fasten them with a holder. Make sure the clamp is positioned below the white paint mark.
E. Fasten the clutch cable with a plastic locking tie along the top of the radiator outlet hose holder. Face the end of the plastic locking tie inward.
F. Clamp the coolant reservoir breather hose, making sure to position the white paint mark behind the clamp.
G. Route the clutch cable through the guide on the engine.
H. Fasten the EXUP cable and O_2 sensor lead under the O_2 sensor lead insulator lock within 20mm (0.79 in) from insulator lock position. Face the end of the plastic locking tie backward. Cut off the excess end of the plastic locking tie to 1–5 mm (0.04–0.20 in).
I. Make sure that the EXUP cable and O_2 sensor lead between the top and bottom plastic locking ties are not twisted or crossed.
J. Clamp the EXUP servo motor lead, EXUP cable, rear brake light switch lead and O_2 sensor. Clamp position should be above the EXUP cable holder and within 20mm (0.79 in) from the bottom of the EXUP cable holder. Face the tip of the plastic locking tie to back of the vehicle and cut off the excess end of the plastic locking tie to 1–5 mm (0.04–0.20 in).
K. Route the main harness on the heat protector, and making sure to push the main harness inward.
L. Bend the lead on the side of the fan motor main harness toward the back of the vehicle as shown in the illustration and insert it into the right coupler holder. Route the bended part inside of the fan lead coupler.
M. Fasten the main harness with a plastic locking tie, making sure to align the positioning tape of the main harness with the holes and groove of the guide bar. Face the end of the plastic locking tie to downward and cut off the excess end of the plastic locking tie to 1–5 mm (0.04–0.20 in).
N. Fasten the clutch cable with a plastic tie, making sure the clutch cable positioned within 20° as shown in the illustration.
O. Clamp the EXUP servo motor lead, rear brake light switch lead and O_2 sensor lead.
P. Temporally install the EXUP cable by aligning the paint on the cable to the hole of the bracket. The paint mark can be anywhere after installing the bracket to the footrest bracket.
Q. There is no order for placing the O_2 sensor lead and rear brake light switch lead.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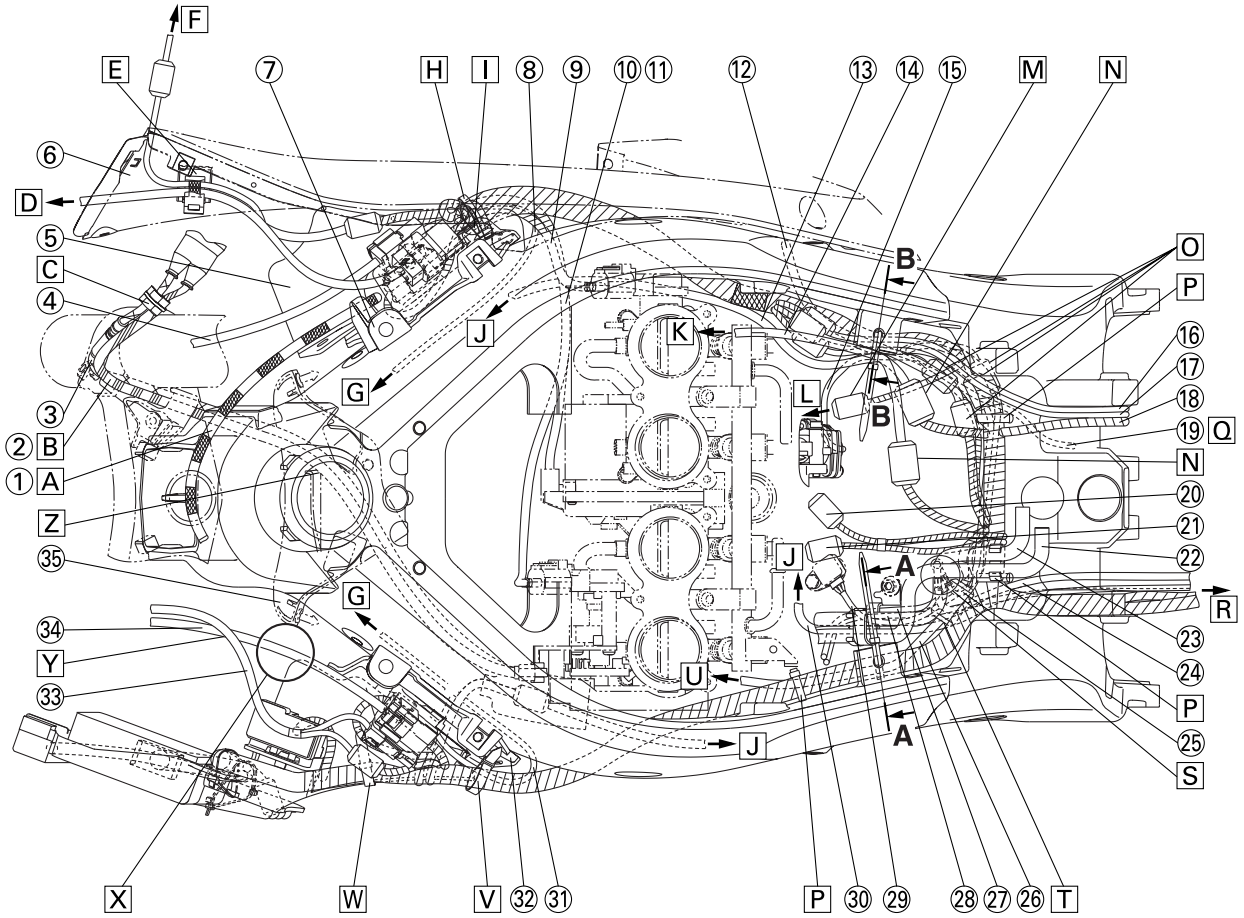
1. Main switch lead
2. Left handlebar switch lead
3. Left radiator fan motor lead
4. Sidestand bracket cover
5. AC magneto lead
6. Crankcase
7. Drive sprocket cover
8. Fuel tank breather hose
9. Fuel tank drain hose
10. Drive chain guide
11. Sidestand switch lead
12. Oil level switch lead
13. Oil filter

A. 45–55 mm (1.77–2.17 in)
B. Bend the main harness as shown in the illustration.
C. Route the plastic locking tie through the hole of the rectifier/regulator bracket and fasten the main harness. Face the end of the plastic locking tie outward. Cut off the excess end of the plastic locking tie to 1–5 mm (0.04–0.20 in).
D. Route the left radiator fan motor lead from where engine is suspended to under the main harness.
E. Route the starter motor lead, speed sensor lead, sidestand switch lead and oil level switch lead between the clamp and crankcase shift boss. When routing, set the starter motor lead outside. There is no order for placing other leads.
F. The clamp on the fuel tank drain hose and fuel tank breather hose should be below the engine clamp.
G. 30–50 mm (1.18–1.97 in)
H. Route the fuel tank drain hose and fuel tank breather hose through the guide of the sidestand bracket cover. Route the sidestand switch lead from between the guides to inside of the hose.
I. Route the AC magneto lead between the frame and throttle body and under the hose.
J. After connecting the connector of the AC magneto lead, put a cover on.
K. To the front left turn signal light.
L. Route the plastic locking tie through the hole of the rectifier/regulator bracket and fasten the main harness. Face the end of the plastic locking tie outward. Cut off the excess end of the plastic locking tie to 1–5 mm (0.04–0.20 in).
M. There is no order of setting which harness front or back.
N. Fold back the radiator fan motor lead (main harness side) toward back of the vehicle as shown in the illustration and insert it into the left coupler holder. The folded part can be either outside or inside of the radiator fan motor lead coupler.
O. Route the AC magneto lead under the left radiator fan motor lead.
P. Fasten the left handle bar switch lead with a plastic locking tie, making sure the left handle bar switch lead is positioned as shown in the illustration.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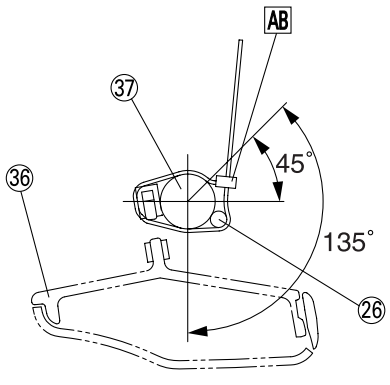
AB
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45°
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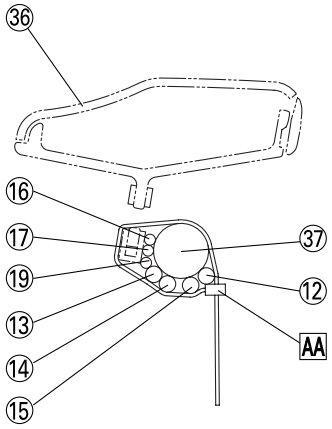
AA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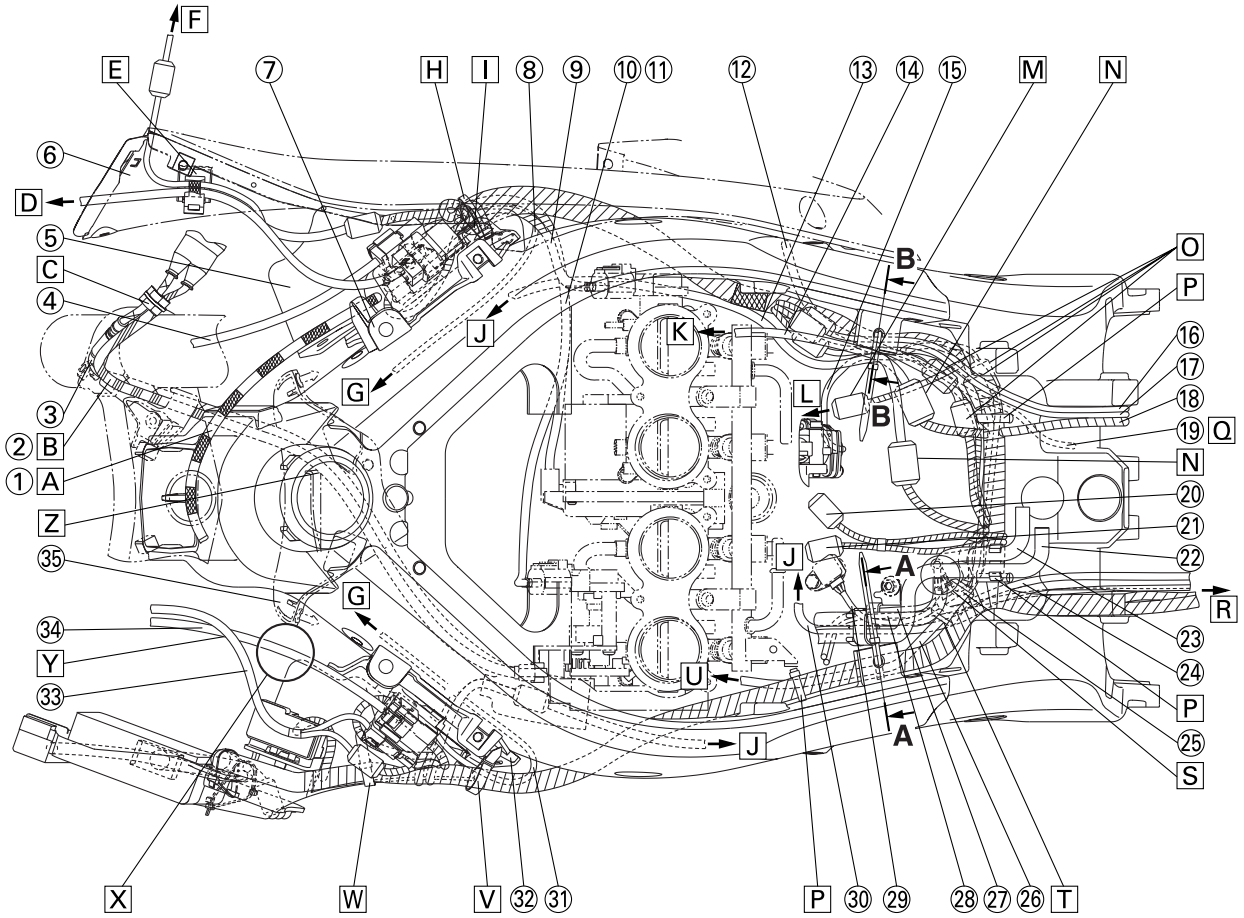
AA

BB

1. Clutch cable
2. Throttle cable (return side)
3. Throttle cable (pull side)
4. Right handlebar switch lead
5. Right radiator cover
6. Right upper side cowling
7. Right coupler holder
8. Right radiator fan motor lead
9. TPS lead
10. Throttle servo motor lead
11. Accelerator position sensor lead
12. Pickup coil lead
13. Ignition coil lead
14. Throttle body lead
15. Intake funnel servo motor lead
16. Rear brake light switch lead
17. O_2 sensor lead
18. EXUP servo motor lead
19. Neutral switch lead
20. Fuel pump coupler
21. Fuel sender coupler
22. Fuel tank breather hose
23. Fuel tank drain hose
24. Battery negative lead
25. Engine ground lead
26. Sub-wire harness (secondary injector)
27. Oil level switch lead
28. Sidestand switch lead
29. Speed sensor lead
30. Starter motor lead
31. Left radiator fan motor lead
32. Left coupler holder
33. Main switch lead
34. Left handlebar switch lead
35. Radiator plate
36. Frame
37. Main harness

A. Route the clutch cable above the cover and from the space next to the right coupler holder to bottom of the vehicle.
B. Make sure that the throttle cable is not twisted or crossed.
C. Route the throttle cable along the edge of the protector on the return side of the throttle cable and fit in the clamp on the cable from upper side of the vehicle to the bottom.
D. To the headlight.
E. Fasten the headlight harness and right front turn signal light lead at the positioning tape with a clamp.
F. To the front right turn signal light.
G. To the radiator.
H. Fasten the main harness, right radiator fan motor lead, throttle position sensor lead, throttle servo motor lead and accelerator position sensor lead with a plastic locking tie. Face the plastic locking tie to upward and insert it into the hole of the right coupler holder.
I. Route the right radiator fan motor lead through the inside of the main harness. There is no order for placing the throttle position sensor lead and throttle servo motor lead.
J. To the engine.
K. To the throttle body.
L. To the coolant temperature sensor.
M. Route the coolant temperature sensor lead above the pickup coil lead, neutral switch lead, oil level switch lead and speed sensor lead.
N. Push the throttle body lead inward and place the ignition coil lead coupler so that it does not overlap or underlap with the throttle body lead coupler.
O. The oil level switch lead, speed sensor lead, pickup coil lead coupler and intake funnel servo motor lead coupler should be at inner and under the main harness. There is no order for placing the neutral switch lead.
P. Insert the plastic locking tie on the main harness to the hole of the frame securely so that it does not float.
Q. Route the neutral switch lead between the frame and engine.
R. To the rear fender.
S. Install both the negative battery lead and engine ground lead to the crankcase with the bolt. There is no order for placing the leads and install so that projection on each lead are facing up. Route the oil level switch lead and speed sensor lead under the negative battery lead and engine ground lead.
T. Sub-wire harness (secondary injector) coupler must be under the main harness.
U. To the secondary injector.
V. Fasten the main harness and left radiator fan motor lead with a plastic locking tie. Face the tip of the plastic locking tie to upward and insert it into the hole of the left coupler holder.
W. Face the end of the plastic locking tie inward, route the hole of the rectifier/regulator bracket, then fasten the main harness.
X. When turning the handle fullest to the right, make sure that the left handlebar switch lead is not strained.
Y. The left handlebar switch lead and main switch lead can either be on top or bottom.
Z. Route the throttle cable through the right side of the rib on the plate above the radiator. Make sure that it is not twisted.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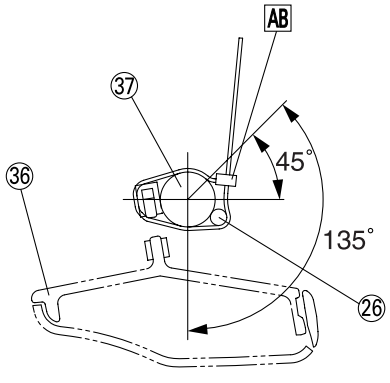
AB
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45°
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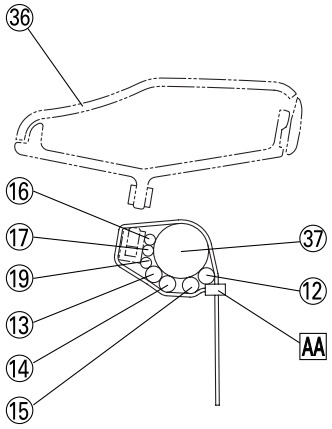
AA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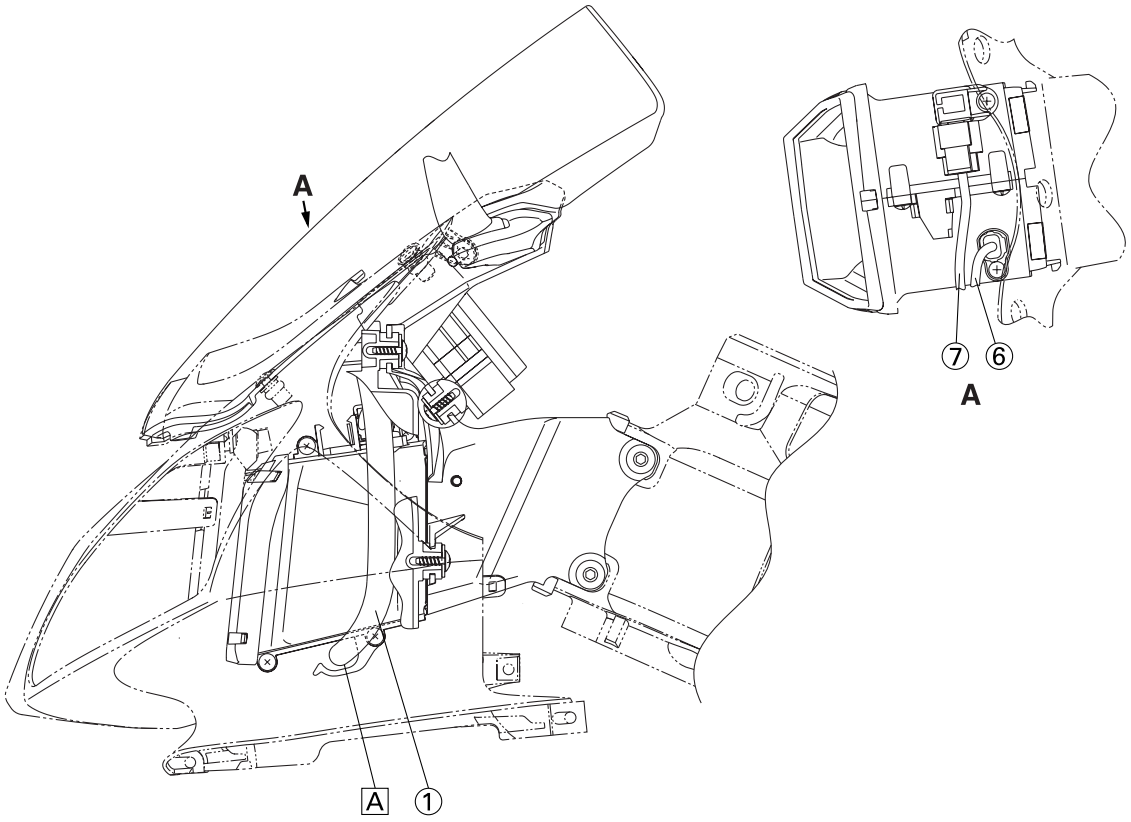
AA

BB

AA. Route each lead under the frame plate. There is no order for placing each lead. Insert the plastic locking tie from upper part of the frame and direct the remaining part of the tip toward inner side of the vehicle.

AB. Route the sub-wire harness (secondary injector) through the area shown in the illustration. Insert the plastic locking tie from upper part of the frame and direct the remaining part of the tip toward inner side of the vehicle.


A
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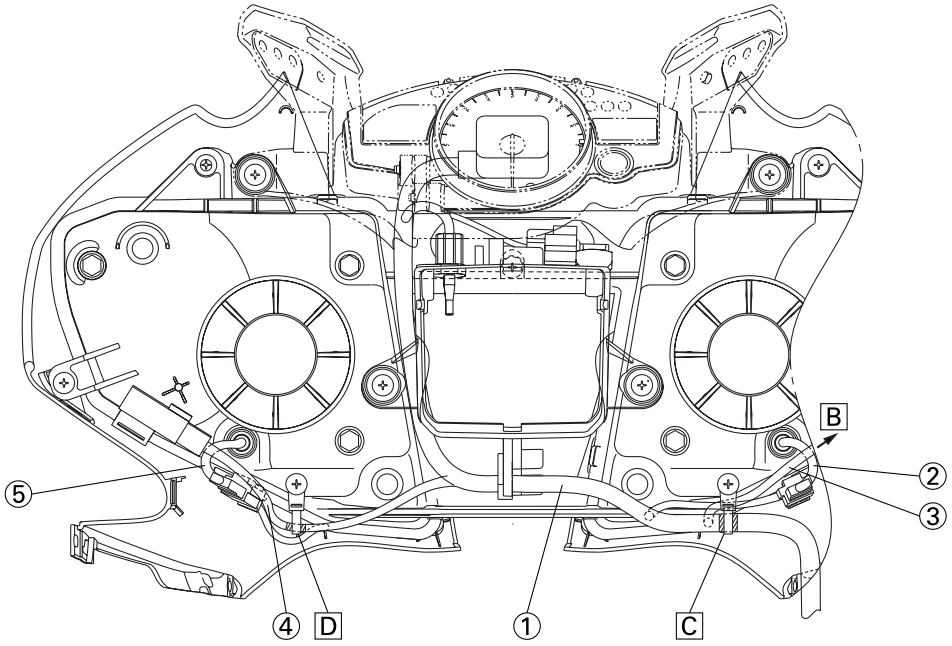
B
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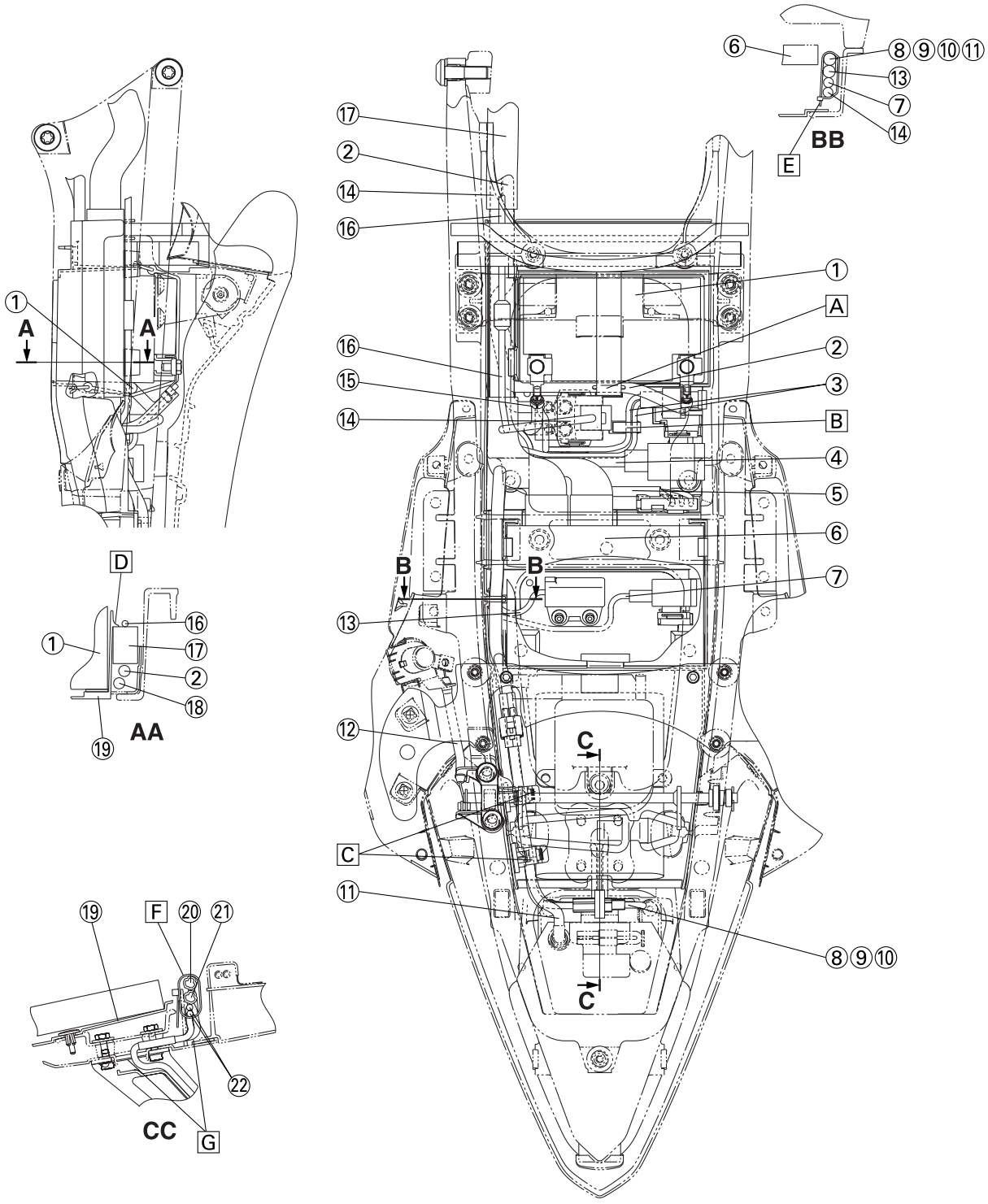
C

1. Headlight sub-wire harness
2. Headlight lead (low beam)
3. Headlight relay lead (on/off)
4. Headlight relay lead (dimmer)
5. Headlight lead (high beam)
6. Air temperature sensor lead
7. Atmospheric pressure sensor lead

A. Secure the headlight sub-wire harness with the air duct hook.
B. To the headlight relay (on/off)
C. Clamp the white tape part on the headlight sub-wire harness.
D. Clamp the white tape part only on the lead connecting to the headlight relay (dimmer).


⑥
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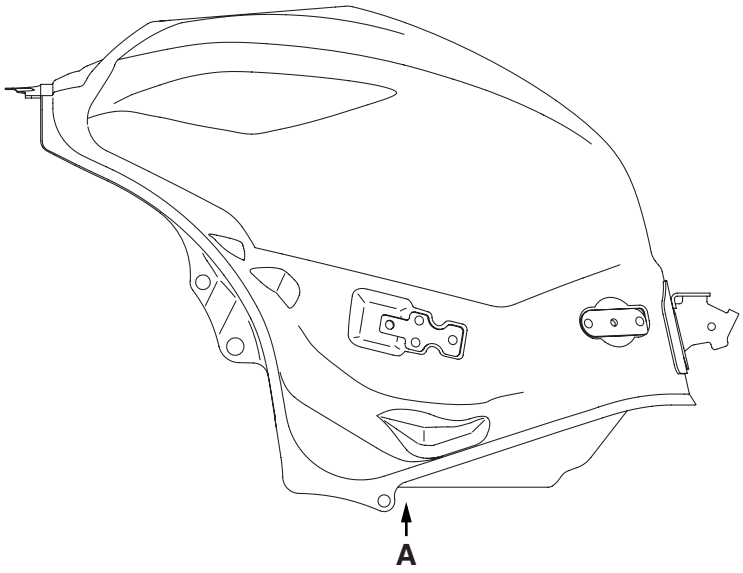
1. Battery
2. Battery negative lead
3. Main fuse lead
4. Starting circuit cut-off relay lead
5. Fuse box lead
6. ECU (engine control unit)
7. Turn signal relay lead
8. Rear left turn signal light lead
9. Rear right turn signal light lead
10. License plate light lead
11. Tail/brake light lead
12. Seat lock cable
13. Lean angle sensor lead
14. Starter relay lead
15. Battery positive lead
16. Sidestand switch lead
17. Main harness
18. Starter motor lead
19. Battery box assembly
20. Rear left turn signal light coupler
21. Rear right turn signal light coupler
22. License plate light connector

A. Route the battery negative lead through the inside of the battery band.
B. Make sure to fit in the main fuse lead to the hook on the battery box assembly.
C. Fasten the left rear turn signal light lead, right rear turn signal light lead, license plate light lead and tail/brake light lead with a clamp.
D. Make sure to hook the main harness case to the tab on the battery box assembly. Be careful not to pinch the leads.
E. When securing each lead with the plastic locking tie, the leads should not touch the ECU (engine control unit). Face the end of the plastic locking tie downward. There is no order for placing each lead.
F. Insert the plastic locking tie attaching to the left rear turn signal light coupler, right rear turn signal light coupler and license connector from the front of the vehicle to the back and secure it to the rib of the rear fender. Insert the tip of the plastic locking tie between the rear frame and the rib of the rear fender. There is no order for placing each lead.
G. Route the left rear turn signal light lead, right rear turn signal light lead and license plate light lead through the hole of the rib of the rear fender. There is no order for placing each lead.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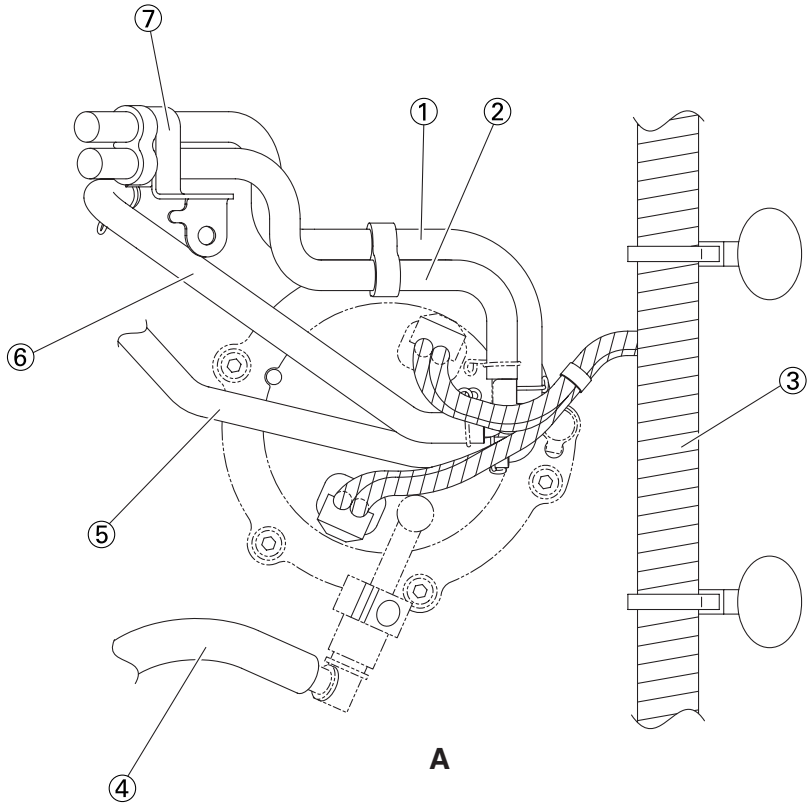
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1. Fuel tank breather hose (Except for California)
2. Fuel tank drain hose
3. Main harness
4. Fuel hoses
5. Fuel tank breather hose (Except for California)
6. Fuel tank drain hose
7. Clamp

PERIODIC CHECKS AND ADJUSTMENTS

EAS20450
PERIODIC MAINTENANCE

EAS20460
INTRODUCTION
This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EAS13S1007
PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

NO.		ITEM	ROUTINE	INITIAL	ODOMETER READING				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	**Fuel line**	• Check fuel hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
2	*	**Spark plugs**	• Check condition. • Adjust gap and clean. • Replace every 8000 mi (13000 km) or 12 months.		√	Replace.	√	Replace.	√
3	*	**Valve clearance**	• Check and adjust valve clearance when engine is cold.	Every 26600 mi (42000 km)					
4	*	**Crankcase breather system**	• Check breather hose for cracks or damage. • Replace if necessary.		√	√	√	√	√
5		**Fuel injection**	• Adjust synchronization.		√	√	√	√	√
6	*	**Exhaust system**	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.		√	√	√	√	√
7	*	**Evaporative emission control system (For California only)**	• Check control system for damage. • Replace if necessary.				√		
8	*	**Air induction system**	• Check the air cut-off valve, reed valve, and hose for damage. • Replace any damaged parts.			√		√	

EAS13S1008
GENERAL MAINTENANCE AND LUBRICATION CHART

NO.		ITEM	ROUTINE	INITIAL	ODOMETER READING				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	**Air filter element**	• Replace.	Every 24000 mi (37000 km)					
2	*	**Clutch**	• Check operation. • Adjust or replace cable.	√	√	√	√	√	√
3	*	**Front brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
4	*	**Rear brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√

NO.		ITEM	ROUTINE	INITIAL	ODOMETER READING				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
5		Brake hoses	• Check for cracks or damage.		√	√	√	√	√
			• Replace.	Every 4 years					
6	*	Wheels	• Check runout and for damage. • Replace if necessary.		√	√	√	√	√
7	*	Tires	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
8	*	Wheel bearings	• Check bearings for smooth operation. • Replace if necessary.		√	√	√	√	√
9	*	Swingarm pivot bearings	• Check operation and for excessive play.		√	√	√	√	√
			• Lubricate with lithium-soap-based grease.	Every 30000 mi (50000 km)					
10		Drive chain	• Check chain slack, alignment and condition. • Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.	Every 500 mi (800 km) and after washing the motorcycle or riding in the rain					
11	*	Steering bearings	• Check bearing assemblies for looseness.	√	√	√	√	√	√
			• Moderately repack with lithiumsoap-based grease.	Every 12000 mi (19000 km)					
12	*	Chassis fasteners	• Check all chassis fitting and fasteners. • Correct if necessary.		√	√	√	√	√
13		Brake lever pivot shaft	• Apply silicone grease lightly.		√	√	√	√	√
14		Brake pedal pivot shaft	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
15		Clutch lever pivot shaft	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
16		Shift pedal pivot shaft	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
17		Sidestand pivot	• Check operation. • Apply lithium-soap-based grease lightly.		√	√	√	√	√
18	*	Sidestand switch	• Check operation and replace if necessary.	√	√	√	√	√	√
19	*	Front fork	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
20	*	Shock absorber assembly	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
21	*	Rear suspension link pivots	• Check operation. • Correct if necessary.			√		√	
22		Engine oil	• Change (warm engine before draining).	√	√	√	√	√	√
23	*	Engine oil filter cartridge	• Replace.	√		√		√	

NO.		ITEM	ROUTINE	INITIAL	ODOMETER READING				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
24	*	**Cooling system**	• Check hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
			• Change with ethylene glycol antifreeze coolant every 24 months.					Change.	
25	*	**Front and rear brake switches**	• Check operation.	√	√	√	√	√	√
26	*	**Control cables**	• Apply Yamaha chain and cable lube or engine oil SAE 10W-30 thoroughly.	√	√	√	√	√	√
27	*	**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.		√	√	√	√	√
28	*	**Lights, signals and switches**	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

NOTE:

From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.

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 service
  - After disassembling the brake master cylinders and calipers, always change the fluid. Regularly check the brake fluid levels and fill the reservoirs as required.
  - Every two years replace the internal components of the brake master cylinders and calipers, and change the brake fluid.
  - Replace the brake hoses every four years and if cracked or damaged.

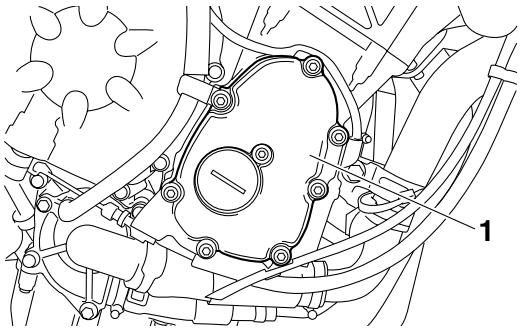
EAS20470
ENGINE

EAS20490
ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

NOTE:
- 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.

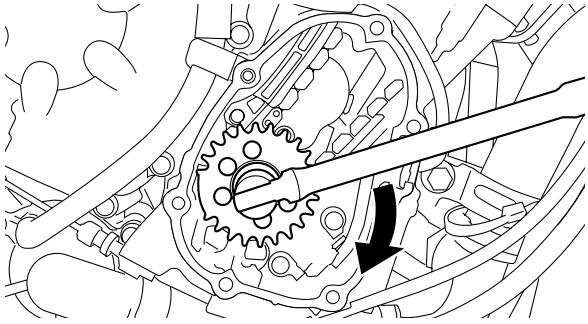
1. Remove:
   - Rider seat
   - Side cowling assembly
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Air filter case
     Refer to "AIR FILTER CASE" on page 7-4.
   - Throttle body
     Refer to "THROTTLE BODIES" on page 7-9.
   - Air cut-off valve
     Refer to "AIR INDUCTION SYSTEM" on page 7-15.
   - Radiator
     Refer to "RADIATOR" on page 6-1.
2. Remove:
   - Ignition coils
   - Spark plugs
   - Cylinder head cover
     Refer to "CAMSHAFTS" on page 5-7.
3. Remove:
   - Pickup rotor cover "1"



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

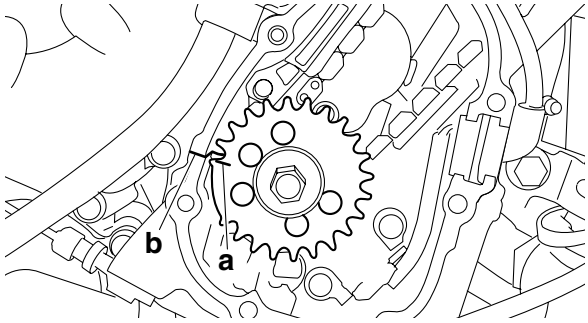
Valve clearance (cold)
Intake
0.12–0.19 mm (0.0047–0.0075 in)
Exhaust
0.16–0.23 mm (0.0063–0.0091 in)

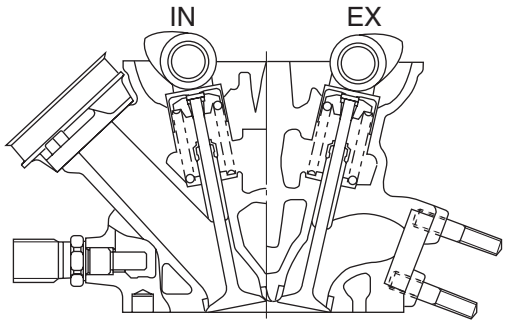
a. Turn the crankshaft clockwise.



b. When piston #1 is at TDC on the compression stroke, align the TDC mark "a" on the pickup rotor with the crankcase mating surface "b".

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

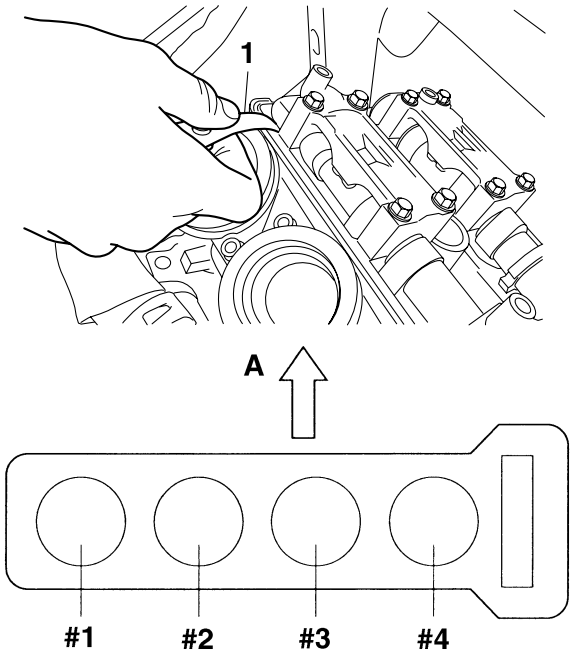




c. Measure the valve clearance with a thickness gauge "1".

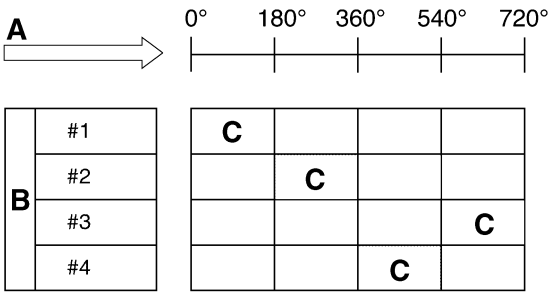
NOTE:
- If the valve clearance is incorrect, note the measured reading.
- Measure the valve clearance in the following sequence.

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



A. Front

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



A. Degrees that the crankshaft is turned clockwise
B. Cylinder
C. Combustion cycle

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

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5. Remove:
   - Camshafts

NOTE:
- Refer to "CAMSHAFTS" on page 5-7.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

6. Adjust:
   - Valve clearance

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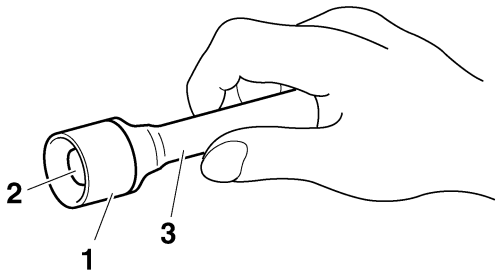
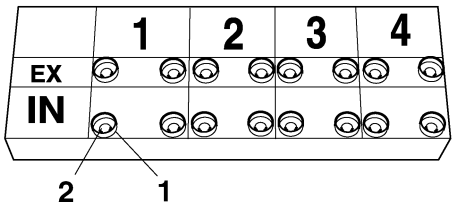
a. Remove the valve lifter "1" and the valve pad "2" with a valve lapper "3".

Valve lapper
90890-04101
Valve lapping tool
YM-A8998

NOTE:
- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter "1" and valve pad "2" so that they can be installed in the correct place.





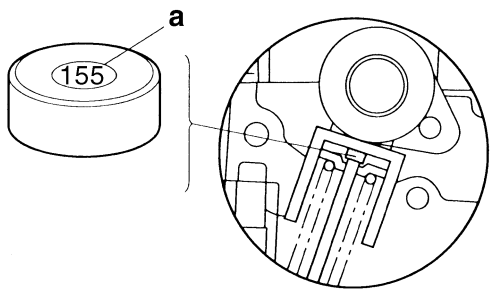
b. Calculate the difference between the specified valve clearance and the measured valve clearance.
Example:
Specified valve clearance = 0.11–0.20 mm (0.004–0.008 in)

Measured valve clearance = 0.23 mm (0.009 in)
0.23 mm (0.009 in) – 0.20 mm (0.008 in) = 0.03 mm (0.001 in)

c. Check the thickness of the current valve pad.

NOTE:
The thickness "a" of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.

Example:
If the valve pad is marked "155", the pad thickness is 1.55 mm (0.061 in).



d. Calculate the sum of the values obtained in steps (b) and (c) to determine the required valve pad thickness and the valve pad number.
Example:
1.55 mm (0.061 in) + 0.03 mm (0.001 in) = 1.58 mm (0.062 in)
The valve pad number is 158.

e. Round off the valve pad number according to the following table, and then select the suitable valve pad.

Last digit	Rounded value
0, 1, 2	0
3, 4, 5, 6	5
7, 8, 9	10

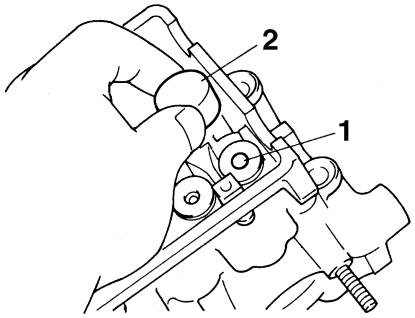
NOTE:
Refer to the following table for the available valve pads.

Valve pad range	Nos. 150–240
Valve pad thickness	1.50–2.40 mm (0.0591–0.0945 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

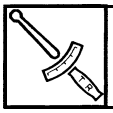
Example:
Valve pad number = 158
Rounded value = 160
New valve pad number = 160

f. Install the new valve pad "1" and the valve lifter "2".

NOTE:
- Lubricate the valve lifter with engine oil.
- The valve lifter must turn smoothly when rotated by hand.
- Install the valve lifter and the valve pad in the correct place.



g. Install the exhaust and intake camshafts, timing chain and camshaft caps.



Camshaft cap bolt
10 Nm (1.0 m·kg, 7.4 ft·lb)

NOTE:
- Refer to "CAMSHAFTS" on page 5-7.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshaft marks with the camshaft cap marks.
- Turn the crankshaft clockwise several full turns to seat the parts.

h. Measure the valve clearance again.
i. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

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7. Install:
   - All removed parts

NOTE:
For installation, reverse the removal procedure.

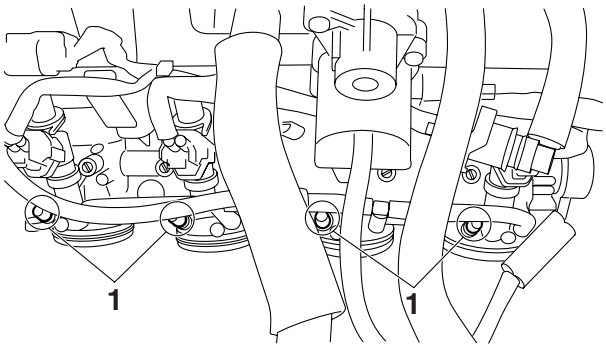
EAS20570
SYNCHRONIZING THE THROTTLE BODIES

NOTE:
Prior to synchronizing the throttle bodies, the valve clearance and the engine idling speed should be properly adjusted.

1. Stand the vehicle on a level surface.

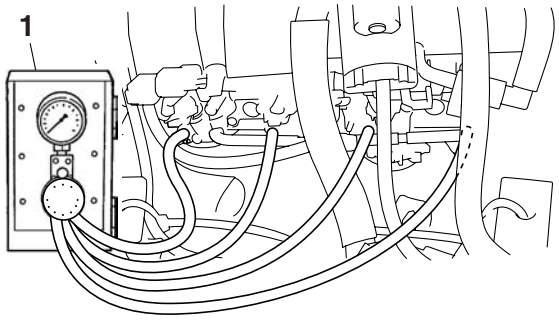
NOTE:
Place the vehicle on a suitable stand.

2. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
3. Remove:
   - Caps "1"



4. Install:
   - Vacuum gauge "1"
   - Digital tachometer

Vacuum gauge
90890-03094
Carburetor synchronizer
YU-44456



5. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
6. Adjust:
   - Throttle body synchronization

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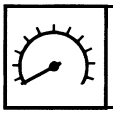
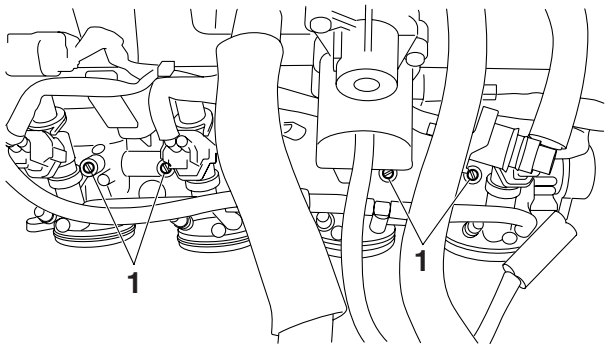
Basic procedure

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



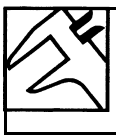
Engine idling speed
1250–1350 r/min

b. Turn the bypass air screw "1" with a white paint mark out a little, and then turn it in fully.



c. Using the throttle body that has the bypass air screw with a white paint mark as the standard, turn the bypass air screws without white paint marks in or out to the adjust the other throttle bodies.

NOTE:
- If more than one throttle body has a bypass air screw with a white paint mark, use the one with the lowest vacuum pressure as the standard.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If an air screw was removed, turn the screw 3/4 turn in and be sure to synchronize the throttle body.



Intake vacuum
20.0 kPa (5.9 inHg) (150 mmHg)

NOTE:
- The difference in vacuum pressure between two throttle bodies should not exceed 1.33 kPa (10 mmHg).