YAMAHA

FZ6-SS
FZ6-SSC

SERVICE MANUAL

LIT-11616-17-50 5VX-28197-10

EAS00010

FZ6-SS/FZ6-SSC
SERVICE MANUAL

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P/N LIT-11616-17-50

EAS00030

NOTICE

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

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the vehicle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his vehicle and to conform to federal environmental quality objectives.

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

NOTE:

- This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.
- Designs and specifications are subject to change without notice.

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IMPORTANT MANUAL INFORMATION

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

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

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

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

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

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HOW TO USE THIS MANUAL

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

① The manual is divided into chapters. An abbreviation and symbol in the upper right corner of each page indicate the current chapter.
Refer to “SYMBOLS”.

② Each chapter is divided into sections. The current section title is shown at the top of each page, except in Chapter 3 (“PERIODIC CHECKS AND ADJUSTMENTS”), where the sub-section title(s) appears.

③ Sub-section titles appear in smaller print than the section title.

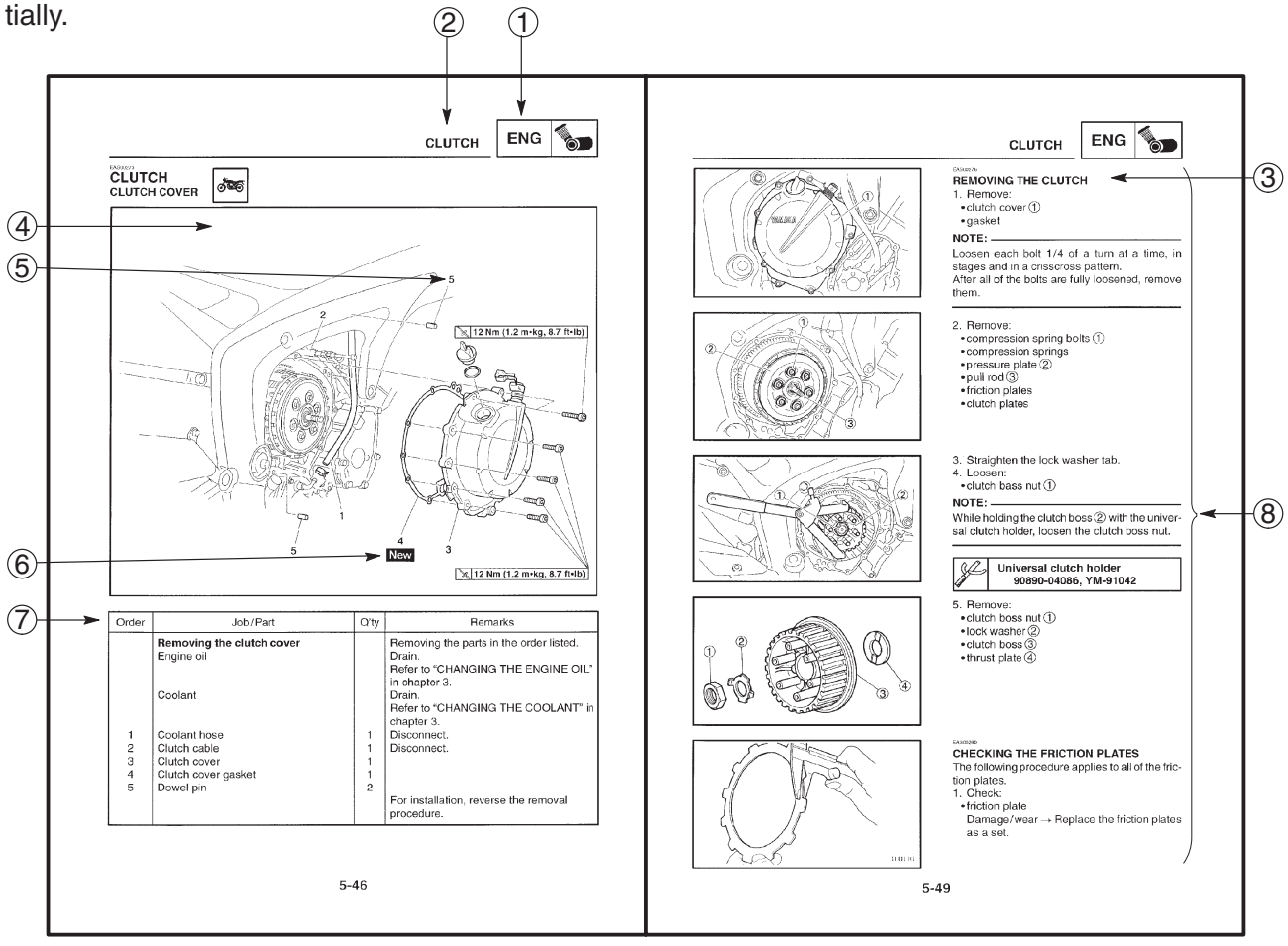
④ To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

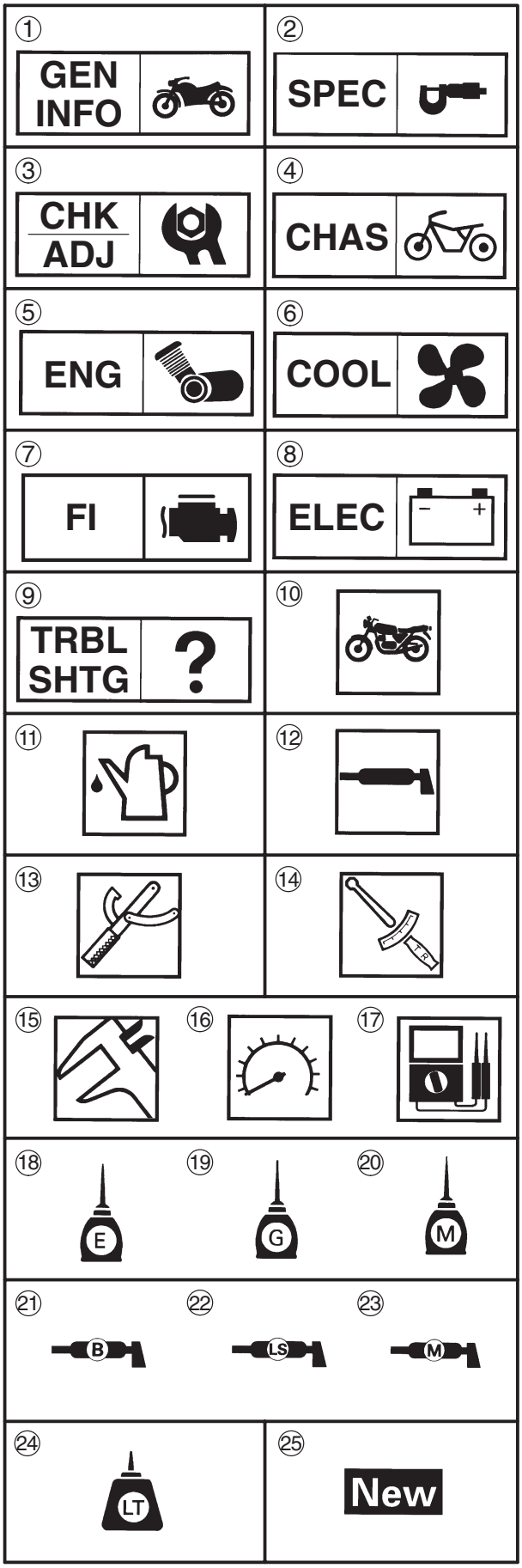
⑤ Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.

⑥ Symbols indicate parts to be lubricated or replaced.
Refer to “SYMBOLS”.

⑦ A job instruction chart accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.

⑧ Jobs requiring more information (such as special tools and technical data) are described sequentially.





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SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑨ indicate the subject of each chapter.

① General information
② Specifications
③ Periodic checks and adjustments
④ Chassis
⑤ Engine
⑥ Cooling system
⑦ Fuel injection system
⑧ Electrical system
⑨ Troubleshooting

Symbols ⑩ to ⑰ indicate the following.

⑩ Serviceable with engine mounted
⑪ Filling fluid
⑫ Lubricant
⑬ Special tool
⑭ Tightening torque
⑮ Wear limit, clearance
⑯ Engine speed
⑰ Electrical data

Symbols ⑱ to ㉓ in the exploded diagrams indicate the types of lubricants and lubrication points.

⑱ Engine oil
⑲ Gear oil
⑳ Molybdenum-disulfide oil
㉑ Wheel-bearing grease
㉒ Lithium-soap- based grease
㉓ Molybdenum-disulfide grease

Symbols ㉔ to ㉕ in the exploded diagrams indicate the following.

㉔ Apply locking agent (LOCTITE®)
㉕ Replace the part

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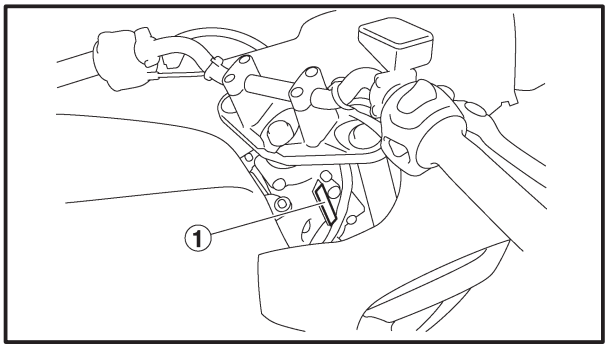
CHAPTER 7
FUEL INJECTION SYSTEM

CHAPTER 8
ELECTRICAL SYSTEM

CHAPTER 9
TROUBLESHOOTING



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GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

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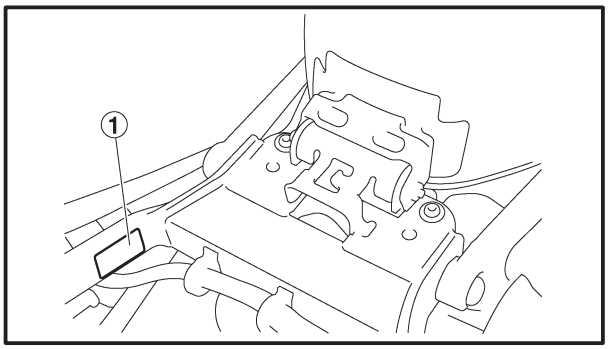
VEHICLE IDENTIFICATION NUMBER

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



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MODEL LABEL

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

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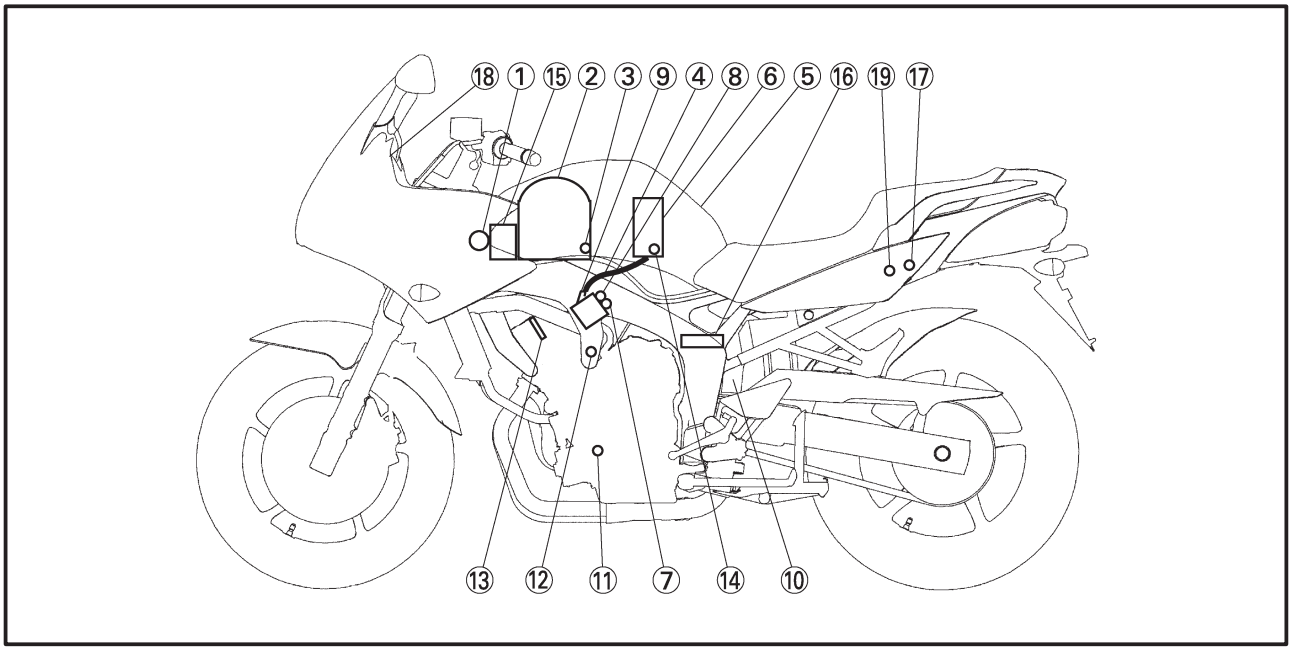
FEATURES
OUTLINE OF FI SYSTEM
The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions and the atmospheric temperature.
In the conventional carburetor system, the air-fuel ratio of the mixture 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. Furthermore, the air induction system (AI system) has been placed under computer control together with the FI system in order to realize cleaner exhaust gases.



① Ignition coil
② Air filter case
③ Intake air temperature sensor
④ Fuel delivery hose
⑤ Fuel tank
⑥ Fuel pump
⑦ Intake air pressure sensor
⑧ Throttle position sensor
⑨ Fuel injector
⑩ Catalytic converter
⑪ Crankshaft position sensor
⑫ Coolant temperature sensor
⑬ Spark plug
⑭ Pressure regulator
⑮ Battery
⑯ ECU
⑰ Fuel injection system relay
⑱ Engine trouble warning light
⑲ Lean angle cut-off switch

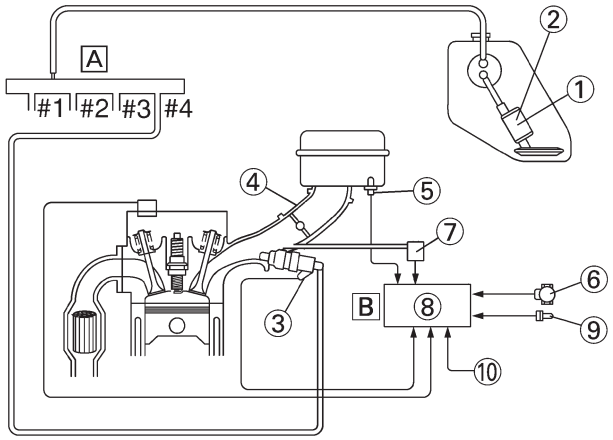
EAS00897

FI SYSTEM

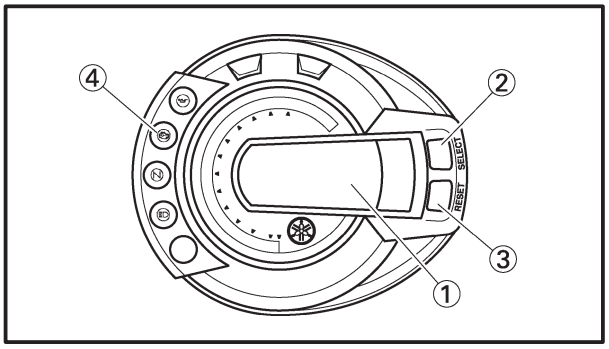
The fuel pump delivers fuel to the injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the injector at only 250 kPa (2.5 kg/cm^2). Accordingly, when the energizing signal from the ECU energizes the injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, crankshaft position sensor, intake air pressure sensor, intake temperature sensor and coolant temperature sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.

Illustration is for reference only.



① Fuel pump
② Pressure regulator
③ Fuel injector
④ Throttle body
⑤ Intake air temperature sensor
⑥ Throttle position sensor
⑦ Intake air pressure sensor
⑧ ECU
⑨ Coolant temperature sensor
⑩ Crankshaft position sensor
A Fuel system
B Control system



① Multi-function display
② "SELECT" button
③ "RESET" button
④ Engine trouble warning light

INSTRUMENT FUNCTION
Multi-function display
The multi-function display is equipped with the following:
- a speedometer (which shows the riding 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 bottom segment of the fuel meter started flashing)
- a tachometer (which shows the engine speed)
- a fuel meter
- a water temperature
- a clock
- a intake air temperature
- a self-diagnosis device

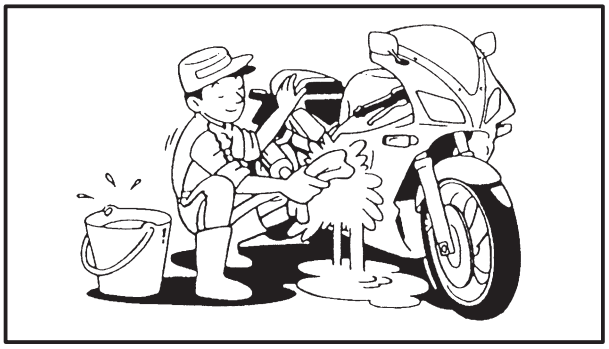
NOTE:
- Be sure to turn the key to "ON" before using the "SELECT" and "RESET" buttons.
- For the U.K. only: To switch the speedometer and odometer/tripmeter display between kilometers and miles, press the "SELECT" button for at least two seconds.

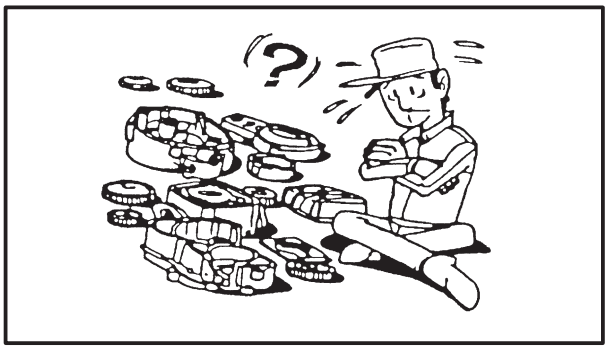
Odometer, tripmeter and tachometer modes
Pushing the "SELECT" button switches the display between the odometer mode "ODO" and the tripmeter modes "TRIP 1" and "TRIP 2" and the tachometer mode "E" is the following order:
ODO → TRIP 1 → TRIP 2 → (TRIP F) → E → ODO
When approximately 3.6 L of fuel remain in the fuel tank, the bottom segment of the fuel meter will start flashing, and the odometer display will automatically change to the fuel reserve tripmeter mode "TRIP F" and start counting the distance traveled from that point. In that case, pushing the "SELECT" button switches the display between the various tripmeter and odometer modes in the following order:
TRIP-F → E → ODO → TRIP 1 → TRIP 2 → TRIP F
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 (3.1 mi).
Tachometer mode
Displays the digital indication of the engine speed on the odometer section.
Air intake temperature indicator.
When "ODO" is displayed, pressing the "RESET" for a long time allows the indicator to switch displays between Clock and Air intake temperature. (It activates the clock indication when the main switch is turned OFF.)
In the Co adjustment mode, the indication automatically changes from clock (Air intake temperature) to the engine speed.

Clock mode

To set the clock:

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





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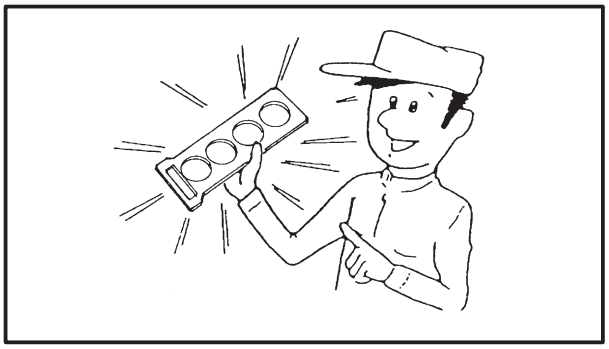
IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, eliminate all dirt, mud, dust and foreign material.
2. Use only the proper tools and cleaning equipment.
   Refer to the “SPECIAL TOOLS”.
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.



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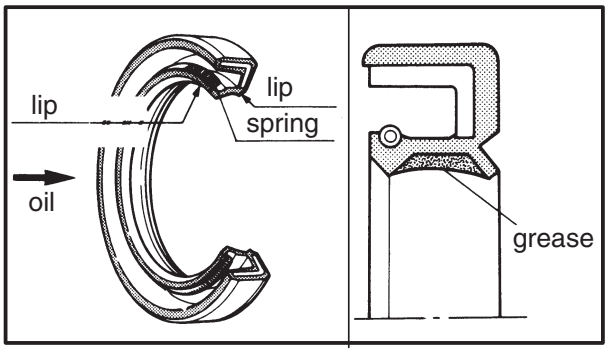
REPLACEMENT PARTS

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



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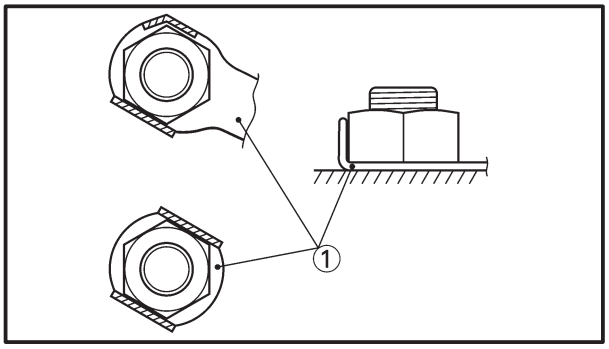
GASKETS, OIL SEALS AND O-RINGS

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.



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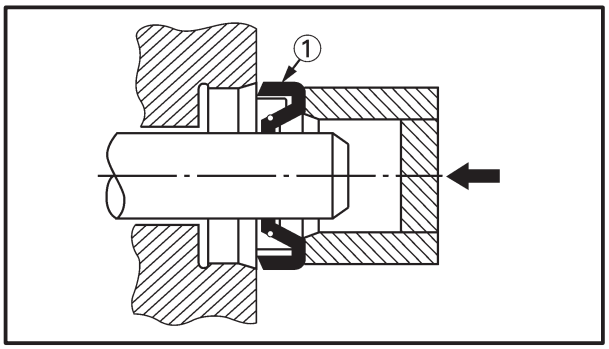
LOCK WASHERS/PLATES AND COTTER PINS

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.



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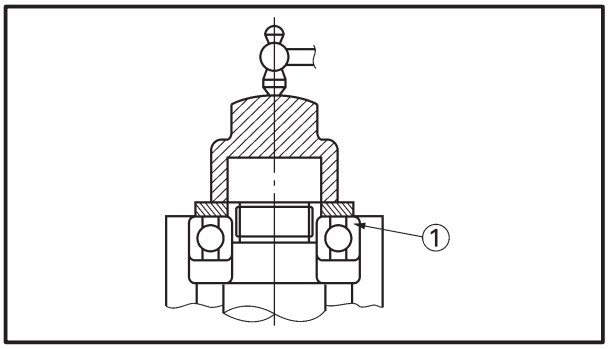
BEARINGS AND OIL SEALS

Install bearings and oil seals 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.

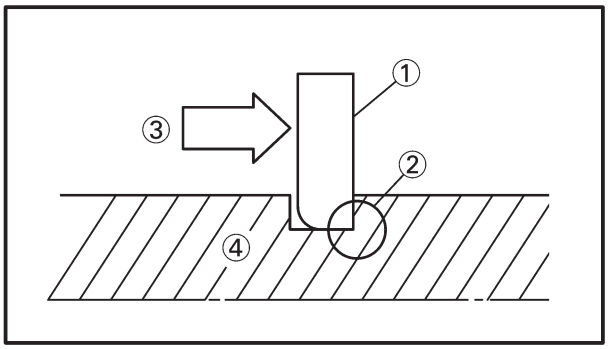
① Oil seal

CAUTION:

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



① Bearing



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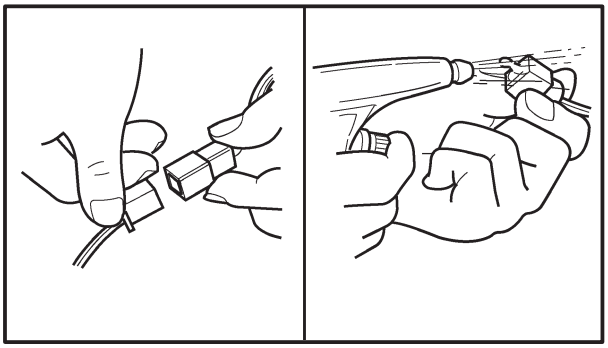
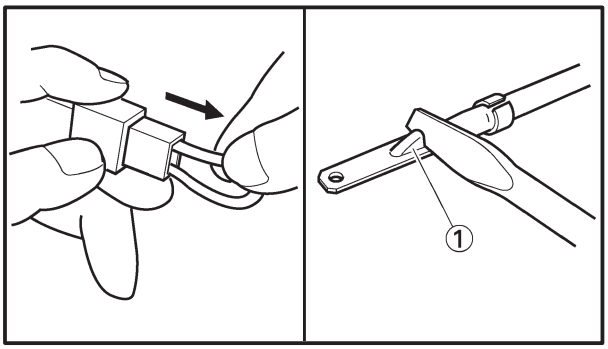
CIRCLIPS

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.

④ Shaft





EAS00026

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.

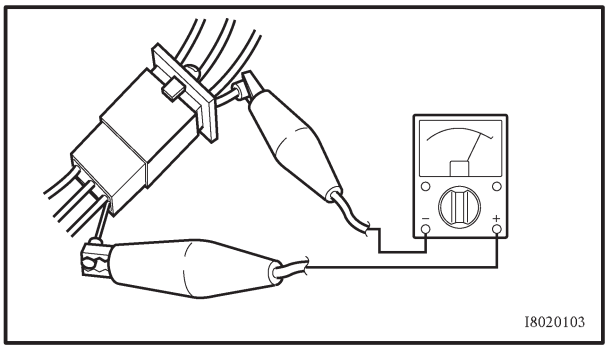
NOTE:

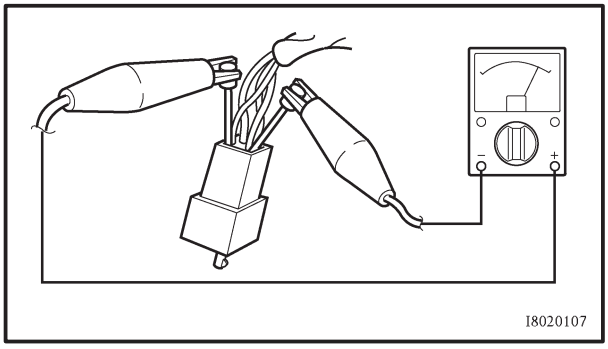
If the pin ① on the terminal is flattened, bend it up.

4. Connect:
   - lead
   - coupler
   - connector

NOTE:

Make sure all connections are tight.





5. Check:
   - continuity

   (with the pocket tester)

Pocket tester
90890-03112, YU-3112

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.

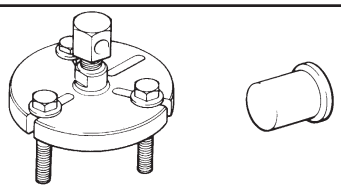
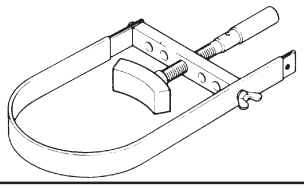
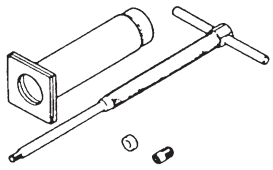
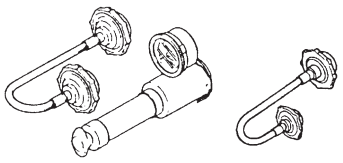
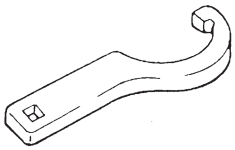
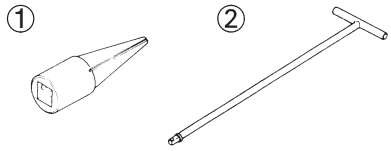
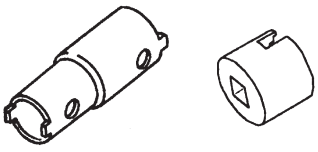
EAS00027

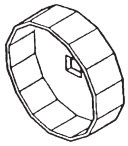
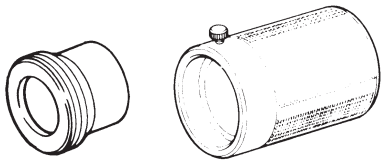
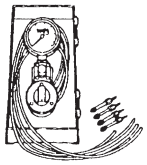
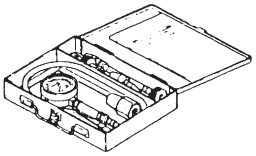
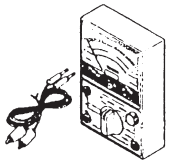
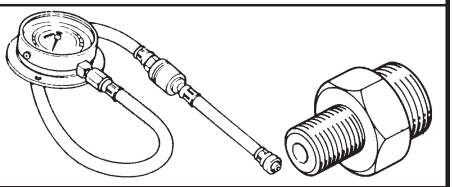
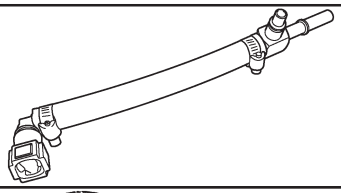
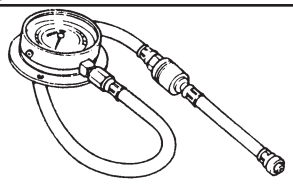
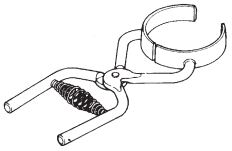
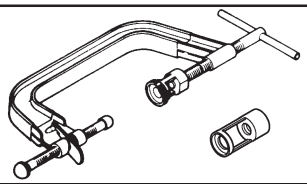
SPECIAL TOOLS

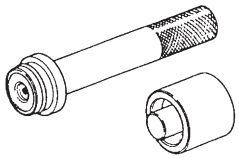
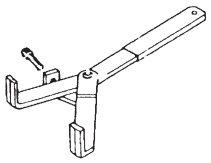
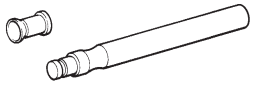
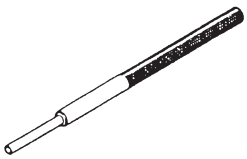
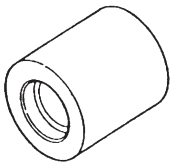
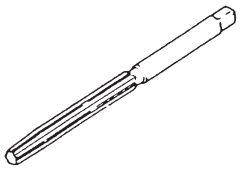
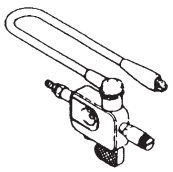
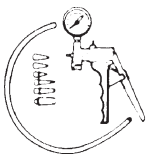
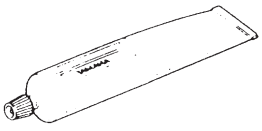
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country. 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 No.	Tool name/Function	Illustration
Flywheel puller 90890-01362 YU-33270-B Adapter 90890-04089 YM-33282	Flywheel puller Adapter This tool is used to remove the generator rotor.	
90890-01701 YS-01880-A	Sheave holder This tool is used to hold the generator rotor when removing or installing the generator rotor bolt or pickup coil rotor bolt.	
90890-01304 YU-01304	Piston pin puller This tool is used to remove the piston pins.	
Radiator cap tester 90890-01325 YU-24460-01 Adapter 90890-01352 YU-33984	Radiator cap tester Adapter These tools are used to check the cooling system.	
90890-01403 YU-33975	Steering nut wrench This tool is used to loosen or tighten the steering stem ring nuts.	
90890-01460 -01326	Damper rod holder ① T-handle ② These tool are used for holding the damper rod when removing or installing the damper rod.	
Pivot shaft wrench 90890-01471 YM-01471 Pivot shaft wrench adapter 90890-01476	Pivot shaft wrench Pivot shaft wrench adapter This tool is used to loosen or tighten the pivot adjust bolt and engine mount adjust bolt.	

Tool No.	Tool name/Function	Illustration
90890-01426 YU-38411	Oil filter wrench This tool is needed to loosen or tighten the oil filter cartridge.	
Fork seal driver 90890-01367 YM-33963 Fork seal driver attachment 90890-01374 YM-8020-A	Fork seal driver weight Fork seal driver attachment This tool is used to install the front fork's oil seal and dust seal.	
Vacuum gauge 90890-03094 YU-08030	Vacuum gauge This gauge is used to synchronize the carburetors.	
Compression gauge 90890-03081 YU-33223 Adapter 90890-04136	Compression gauge Adapter These tools are used to measure engine compression.	
90890-03112 YU-3112	Pocket tester This tool is used to check the electrical system.	
Oil pressure gauge 90890-03153 YU-03153 Adapter 90890-03139	Oil pressure gauge Adapter These tools are used to measure engine oil pressure.	
90890-03176 YM-03176	Fuel pressure adapter This tool is needed to measure fuel pressure.	
90890-03153 YU-03153	Pressure gauge This tool used is to measure fuel pressure.	
90890-04044 YM-04044	Piston ring compressor This tool is used to compress piston rings when installing the cylinder.	
Valve spring compressor 90890-04019 YM-04019 Attachment 90890-04108 YM-01253	Valve spring compressor Attachment These tools are used to remove or install the valve assemblies.	

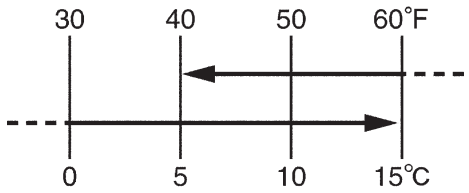
Tool No.	Tool name/Function	Illustration
Middle driven shaft bearing driver 90890-04058 YM-4058 Mechanical seal installer 90890-04078 YM-33221	Middle driven shaft bearing driver Mechanical seal installer These tools are used to install the water pump seal.	
90890-04086 YM-91042	Clutch holding tool This tool is used to hold the clutch boss when removing or installing the clutch boss nut.	
90890-04101	Valve lapper This tool is needed to remove and install the valve lifter.	
90890-04111	Valve guide remover (ϕ4) This tool is used to remove or install the valve guides.	
90890-04112	Valve guide installer (ϕ4) This tool is used to install the valve guides.	
90890-04113 YM-04113	Valve guide reamer (ϕ4) This tool is used to rebore the new valve guides.	
90890-06754 YM-34487	Ignition checker This tool is used to check the ignition system components.	
90890-06756 YB-35956	Vacuum/pressure pump gauge set This tool used to measure the vacuum pressure.	
90890-85505 ACC-11001-05-01	Yamaha bond No. 1215 This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces).	

SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Standard	Limit
Model code	5VX3 (USA except for CAL) 5VX4 (CAL)	•••
Dimensions		
Overall length	2,095 mm (82.5 in)	•••
Overall width	750 mm (29.5 in)	•••
Overall height	1,215 mm (47.8 in)	•••
Seat height	795 mm (31.3 in)	•••
Wheelbase	1,440 mm (56.7 in)	•••
Minimum ground clearance	145 mm (5.71 in)	•••
Minimum turning radius	2,800 mm (110.2 in)	•••
Weight		
Wet (with oil and a full fuel tank)	207 kg (456 lb) (USA except for CAL) 208 kg (459 lb) (CAL)	••• •••
Maximum load (except motorcycle)	190 kg (419 lb) (USA except for CAL) 189 kg (417 lb) (CAL)	

ENGINE SPECIFICATIONS

Item	Standard	Limit
Engine		
Engine type	Liquid-cooled, 4-stroke, DOHC	•••
Displacement	600 cm^3 (36.61 cu.in)	•••
Cylinder arrangement	Forward-inclined parallel 4-cylinder	•••
Bore × stroke	65.5 × 44.5 mm (2.58 × 1.75 in)	•••
Compression ratio	12.2 : 1	•••
Engine idling speed	1,250 ~ 1,350 r/min	•••
Vacuum pressure at engine idling speed	29 kPa (218 mmHg, 8.6 inHg)	•••
Standard compression pressure (at sea level)	1,550 kPa (15.50 kg/cm^2,15.50 bar, 220.46 psi) at 400 r/min	•••
Fuel		
Recommended fuel	Unleaded gasoline only	•••
Fuel tank capacity		
Total (including reserve)	19.4 L (4.25 Imp gal, 5.1 US gal)	•••
Reserve only	3.6 L (0.79 Imp gal, 0.9 US gal)	•••
Engine oil		
Lubrication system	Wet sump	•••
Recommended oil		
	At 5°C (40°F) or higher	•••
	Yamalube 4 (20W40) or SAE 20W40 type SE motor oil	•••
	At 15°C (60°F) or lower	•••
	Yamalube 4 (10W30) or SAE 10W30 type SE motor oil	•••
Quantity	3.4 L (2.99 Imp qt, 3.59 US qt)	•••
Total amount	2.5 L (2.20 Imp qt, 2.64 US qt)	•••
Without oil filter cartridge replacement	2.8 L (2.47 Imp qt, 2.96 US qt)	•••
With oil filter cartridge replacement	240 kPa at 6,600 r/min	•••
Oil pressure	(2.4 kg/cm^2 at 6,600 r/min)	
	(2.4 bar at 6,600 r/min)	
	(34.1 psi at 6,600 r/min)	
	96°C (205°F)	•••
Engine oil temperature	450 ~ 550 kPa (4.5 ~ 5.5 kg/cm^2,	
Relief valve opening pressure	4.5 ~ 5.5 bar, 65.3 ~ 79.8 psi)	

Item	Standard	Limit
Oil filter		
Oil filter type	Formed	•••
Bypass valve opening pressure	80 ~ 120 kPa (0.8 ~ 1.2 kg/cm^2, 0.8 ~ 1.2 bar, 11.6 ~ 17.4 psi)	•••
Oil pump		
Oil pump type	Trochoid	•••
Inner-rotor-to-outer-rotor-tip clearance	0.03 ~ 0.09 mm (0.0012 ~ 0.0035 in)	0.15 mm (0.0059 in)
Outer-rotor-to-oil-pump-housing clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0032 in)	0.15 mm (0.0059 in)
Cooling system		
Radiator capacity	2.0 L (1.76 Imp pt, 2.11 US qt)	
Radiator cap opening pressure	93.3 ~ 122.7 kPa (0.93 ~ 1.23 kg/cm^2, 0.93 ~ 1.23 bar, 13.5 ~ 17.8 psi)	•••
Radiator core		
Width	300 mm (11.81 in)	•••
Height	188 mm (7.4 in)	•••
Depth	24 mm (0.94 in)	•••
Coolant reservoir		
Capacity	0.27 L (0.24 Imp qt, 0.29 US qt)	•••
Water pump		
Water pump type	Single suction centrifugal pump	•••
Reduction ratio	86/44 × 31/31 (1.955)	•••
Max. impeller shaft tilt	•••	0.15 mm (0.006 in)
Starting system type	Electric starter	
Spark plugs		
Model (manufacturer) × quantity	CR9EK (NGK) × 4	•••
Spark plug gap	0.6 ~ 0.7 mm (0.0236 ~ 0.0276 in)	•••
Cylinder head		
Volume	10.3 ~ 10.9 cm^3 (0.63 ~ 0.67 cu.in)	•••
Max. warpage	•••	0.05 mm (0.002 in)