



XVS13AW(C) XVS13CTW(C)

SERVICE MANUAL

EAS20050

**XVS13AW(C)/XVS13CTW(C)
SERVICE MANUAL
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NOTICE

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

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.

IMPORTANT MANUAL INFORMATION

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



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



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

CAUTION:

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

NOTE:

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

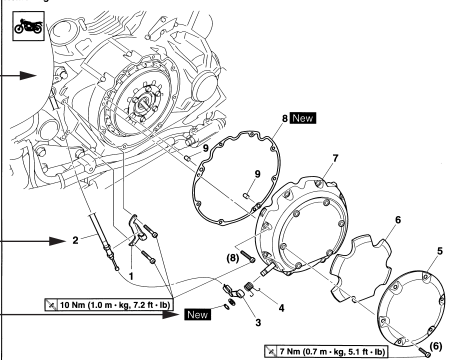
HOW TO USE THIS MANUAL

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

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

1
↓
CLUTCH

CLUTCH
Removing the clutch cover

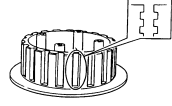


3 → 4 → 5 → 6 →

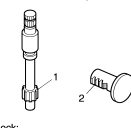
Order	Job/Parts to remove	Qty	Remarks
	Muffler/Coolant reservoir cover		Refer to "ENGINE REMOVAL" on page 5-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 5-12.
1	Clutch cable holder	1	
2	Clutch cable	1	Disconnect.
3	Pull lever	1	
4	Pull lever spring	1	
5	Damper cover	1	
6	Clutch cover damper	1	
7	Clutch cover	1	
8	Clutch cover gasket	1	
9	Dowel pin	2	For installation, reverse the removal procedure.

5-46

CLUTCH



CHECKING THE PRESSURE PLATE
1. Check:
• Pressure plate
Cracks/damage → Replace.
• Bearing
Damage/wear → Replace.



CHECKING THE OIL/WATER PUMP DRIVE SPROCKET AND OIL/WATER PUMP DRIVE CHAIN
1. Check:
• Oil/water pump drive sprocket
Cracks/damage/wear → Replace the oil/water pump drive chain, and oil/water pump drive and driven sprockets as a set.
2. Check:
• Oil/water pump drive chain
Damage/stiffness → Replace the oil/water pump drive chain, and oil/water pump drive and driven sprockets as a set.

7 →

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

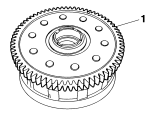
CHECKING THE PRIMARY DRIVEN GEAR
1. Check:
• Primary driven gear "1"
Damage/wear → Replace the primary drive and primary driven gears as a set.
Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

2 →

INSTALLING THE PRIMARY DRIVE GEAR
1. Install:
• Straight key
• Primary drive gear "1"
• Spacer "2"
• Lock washer "3"
• Primary drive gear nut

Primary drive gear nut
100 Nm (10.0 m·kg, 72 ft·lb)

NOTE:
• Make sure that the side of the primary drive gear "1" with the groove "a" is facing outward.
• Align the tab "b" on the lock washer "3" with the groove "c" in the spacer "2".
• While holding the generator rotor "4" with the sheave holder "5", tighten the primary drive gear nut.
• Do not allow the sheave holder to touch the projection on the generator rotor.



CHECKING THE PULL LEVER SHAFT AND PULL ROD
1. Check:
• Pull lever shaft pinion gear teeth "1"

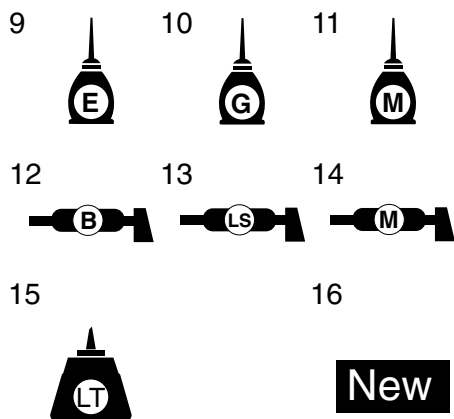
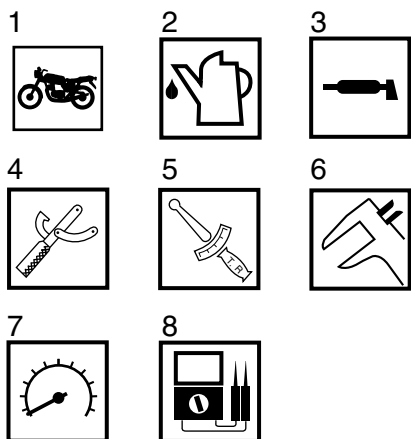
5-53

SYMBOLS

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

NOTE:

The following symbols are not relevant to every vehicle.



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

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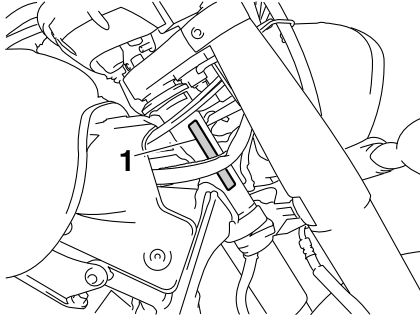
EAS20130

IDENTIFICATION

EAS20140

VEHICLE IDENTIFICATION NUMBER

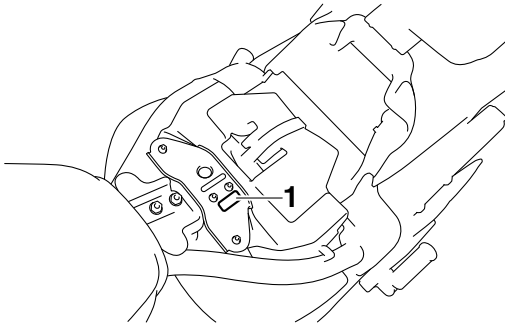
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



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MODEL LABEL

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



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FEATURES

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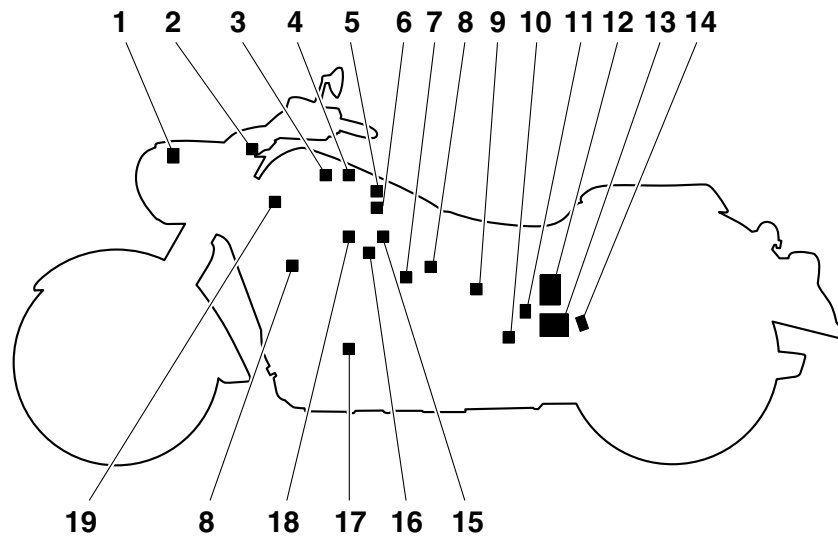
OUTLINE OF THE FI SYSTEM

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

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

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

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



- | | |
|--|-----------------------------------|
| 1. Air temperature sensor | 15. Rear cylinder injector |
| 2. Engine trouble warning light | 16. ISC (idle speed control) unit |
| 3. Front cylinder intake air pressure sensor | 17. Crankshaft position sensor |
| 4. Rear cylinder intake air pressure sensor | 18. Front cylinder injector |
| 5. Rear cylinder ignition coil | 19. Coolant temperature sensor |
| 6. Front cylinder ignition coil | |
| 7. Throttle position sensor | |
| 8. Spark plug | |
| 9. Speed sensor | |
| 10. Lean angle sensor | |
| 11. Relay unit (fuel pump relay) | |
| 12. Fuel pump | |
| 13. ECU (engine control unit) | |
| 14. O ₂ sensor | |

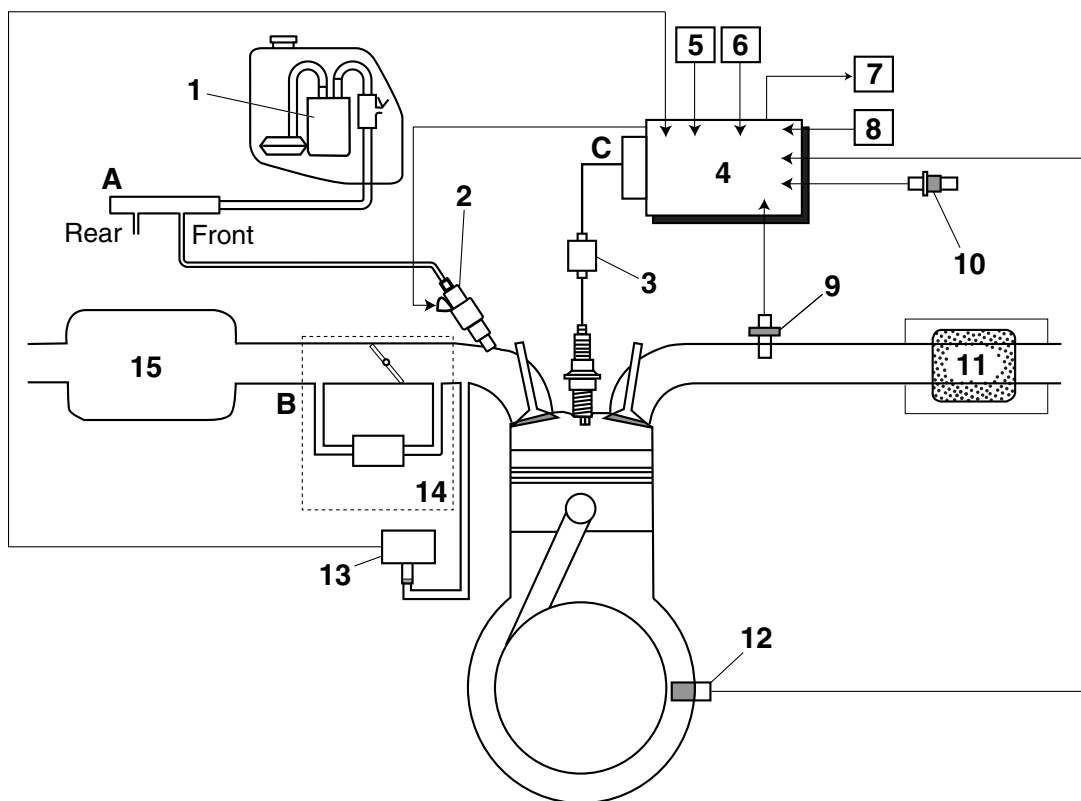
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FI SYSTEM

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, crankshaft position sensor, intake air pressure sensor, air temperature sensor, coolant temperature sensor, lean angle sensor, speed sensor and O₂ 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. Fuel injector
3. Ignition coil
4. ECU (engine control unit)
5. Air temperature sensor
6. Lean angle sensor
7. ISC (idle speed control) unit
8. Throttle position sensor
9. O₂ sensor
10. Coolant temperature sensor
11. Catalytic converter
12. Crankshaft position sensor
13. Intake air pressure sensor

14. Throttle body
15. Air filter case
- A. Fuel system
- B. Air system
- C. Control system

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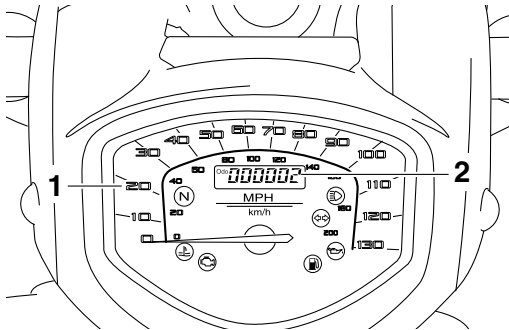
INSTRUMENT FUNCTIONS

Multi-function meter unit

EWA3D81011



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



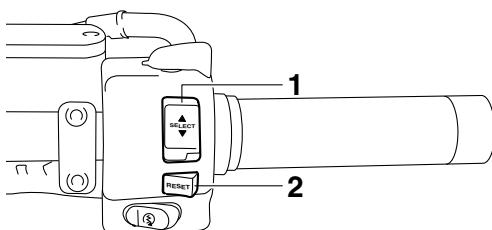
1. Speedometer
2. Odometer/tripmeter/fuel reserve tripmeter/clock

The multi-function meter unit 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 on the fuel reserve)
- a clock
- a self-diagnosis device
- a brightness control mode

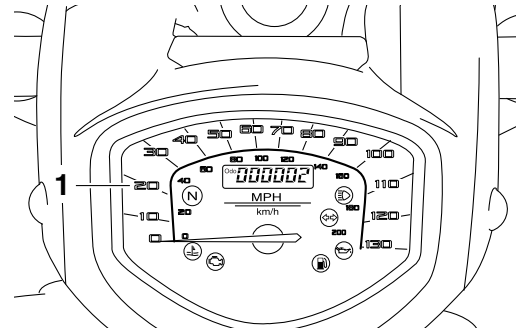
NOTE:

Be sure to turn the key to “ON” before using the “SELECT” switch “▲/▼” and “RESET” switch, except for setting the brightness control mode.



1. “SELECT” switch “▲/▼”
2. “RESET” switch

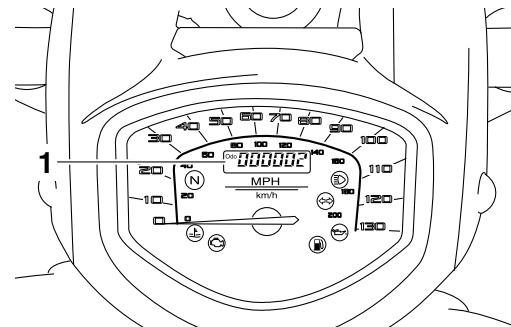
Speedometer



1. Speedometer

The speedometer shows the riding speed. When the key is turned to “ON”, the speedometer needle will sweep once across the speed range and then return to zero in order to test the electrical circuit.

Odometer, tripmeter, and fuel reserve tripmeter modes



1. Odometer/tripmeter/fuel reserve tripmeter/clock

Push the “▲” side of the “SELECT” switch to switch the display between the odometer mode “ODO”, the tripmeter modes “TRIP 1” and “TRIP 2” and the clock mode in the following order: ODO → TRIP 1 → TRIP 2 → Clock → ODO

NOTE:

Push the “▼” side of the “SELECT” switch to switch the display in the reverse order.

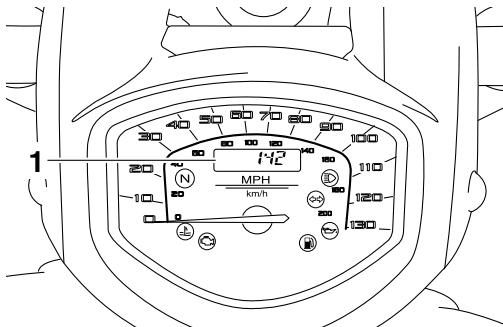
If the fuel level warning light comes on, the odometer display will automatically change to the fuel reserve tripmeter mode “F-TRIP” and start counting the distance traveled from that point. In that case, push the “▲” side of the “SELECT” switch to switch the display between the various tripmeter, odometer, and clock modes in the following order: F-TRIP → TRIP 1 → TRIP 2 → Clock → ODO → F-TRIP

NOTE:

Push the “▼” side of the “SELECT” switch to switch the display in the reverse order.

To reset a tripmeter, select it by pushing the “▲” or “▼” side of the “SELECT” switch, and then push the “RESET” switch 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).

Clock mode



1. Clock

Push the “RESET” switch for less than one second to display the clock for five seconds, regardless of the currently selected display mode.

To set the clock:

1. Push the “▲” or “▼” side of the “SELECT” switch to change the display to the clock mode.
2. Push the “▲” side of the “SELECT” switch and the “RESET” switch together for at least two seconds.
3. When the hour digits start flashing, push the “▲” or “▼” side of the “SELECT” switch to set the hours.
4. Push the “RESET” switch, and the minute digits will start flashing.
5. Push the “▲” or “▼” side of the “SELECT” switch to set the minutes.
6. Push the “RESET” switch and then release it to start the clock.

Self-diagnosis device

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

If any of those circuits are defective, the engine trouble warning light will come on, and then the odometer/tripmeter/clock display will indicate a two-digit error code (e.g., 12, 13, 14).

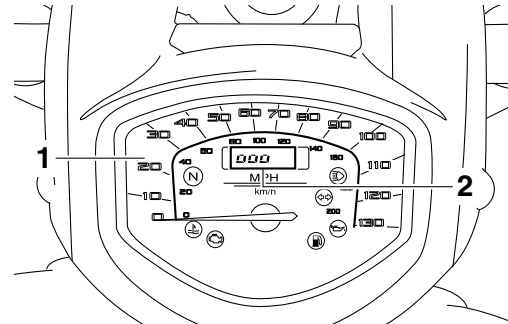
If the odometer/tripmeter/clock display indicates any error codes, note the code number, and then check the vehicle. Refer to “FUEL INJECTION SYSTEM” on page 8-31.

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CAUTION:

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

Brightness control mode



1. Speedometer panel
2. Brightness level

This function allows you to adjust the brightness of the speedometer panel to suit the outside lighting conditions.

To set the brightness:

1. Turn the key to “OFF”.
2. Push and hold the “▲” side of the “SELECT” switch.
3. Turn the key to “ON”, and then release the “SELECT” switch after five seconds or more.
4. Push the “▲” or “▼” side of the “SELECT” switch to select the desired brightness level.
5. Push the “RESET” switch to confirm the selected brightness level. The display will return to the odometer, tripmeter or clock mode.

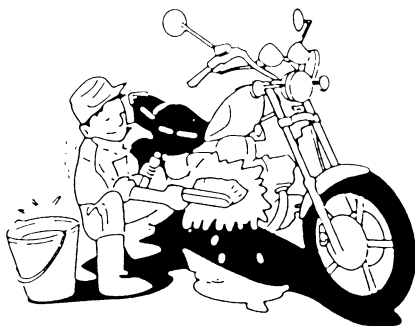
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IMPORTANT INFORMATION

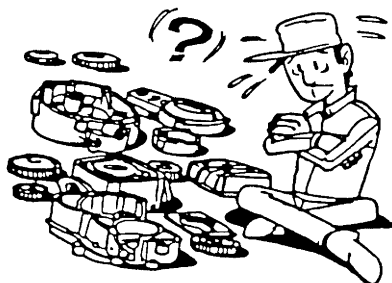
EAS20190

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 1-9.
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.

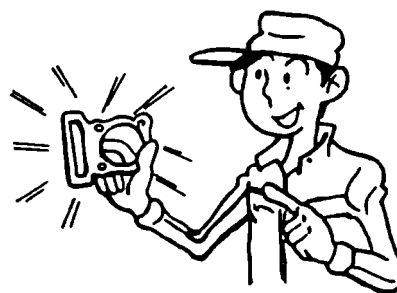


4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS20200

REPLACEMENT PARTS

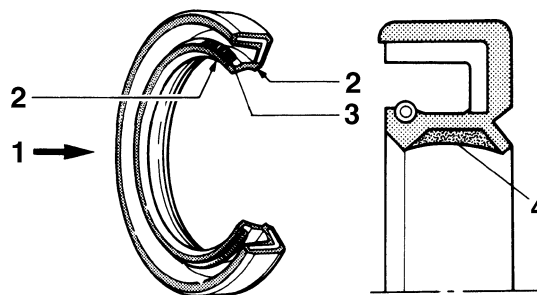
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



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.

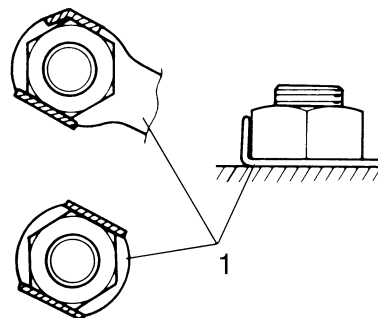


1. Oil
2. Lip
3. Spring
4. Grease

EAS20220

LOCK WASHERS/PLATES AND COTTER PINS

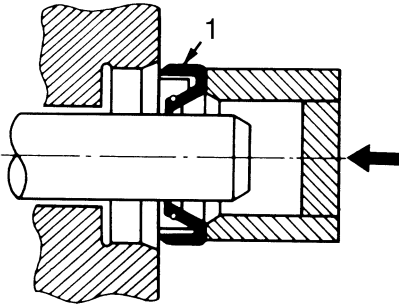
After removal, replace all lock washers/plates "1" and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.



EAS20230

BEARINGS AND OIL SEALS

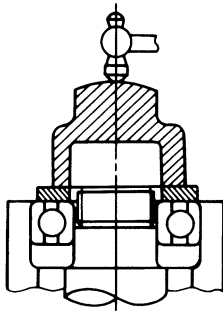
Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals "1", lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.



ECA13300

CAUTION:

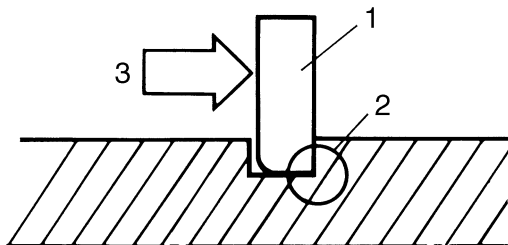
Do not spin the bearing with compressed air because this will damage the bearing surfaces.



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.



CHECKING THE CONNECTIONS

EAS20250

CHECKING THE CONNECTIONS

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

1. Disconnect:

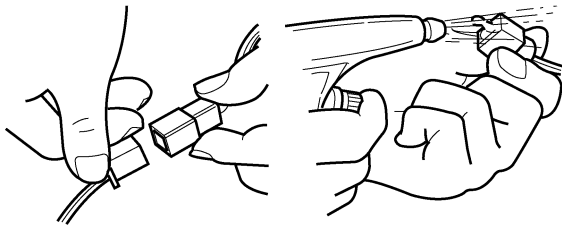
- Lead
- Coupler
- Connector

2. Check:

- Lead
- Coupler
- Connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.



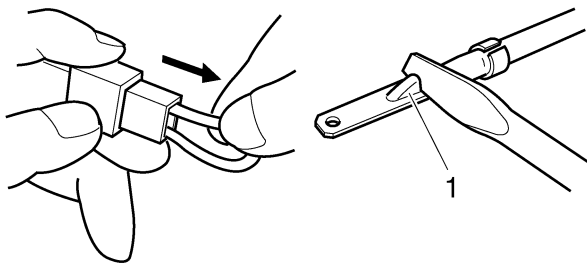
3. Check:

- All connections

Loose connection → Connect properly.

NOTE:

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



4. Connect:

- Lead
- Coupler
- Connector

NOTE:

Make sure all connections are tight.

5. Check:

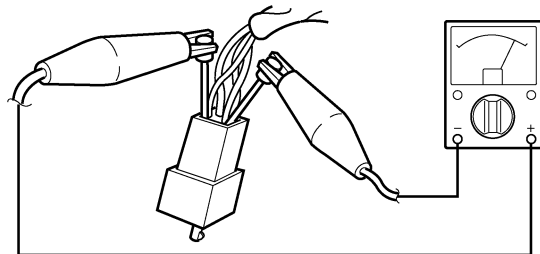
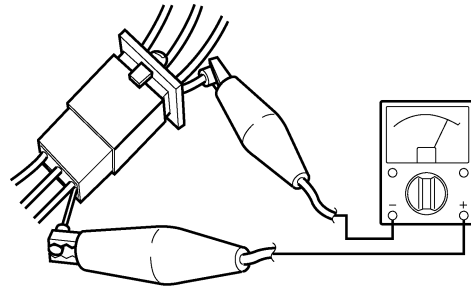
- Continuity
(with the pocket tester)



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

NOTE:

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



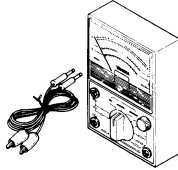
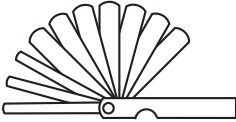
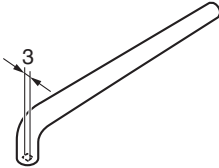
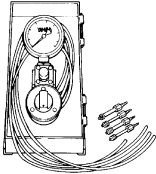

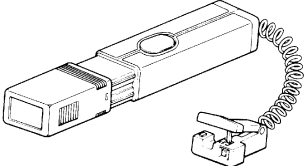
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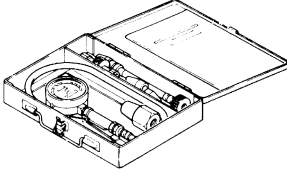
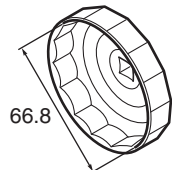

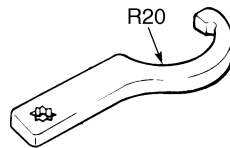
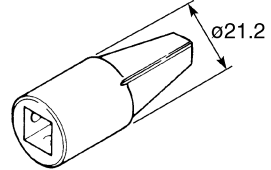
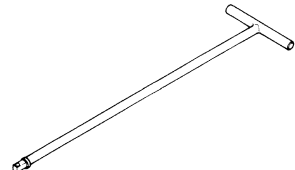
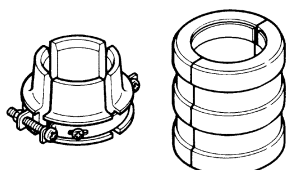
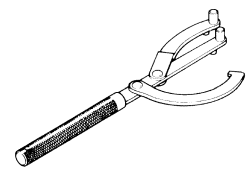
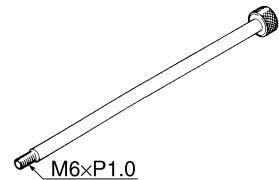
SPECIAL TOOLS

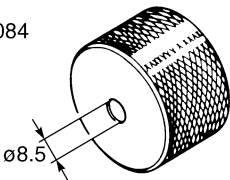

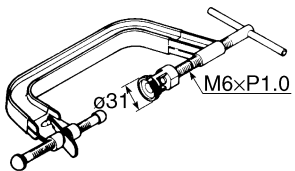
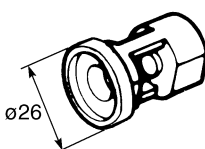
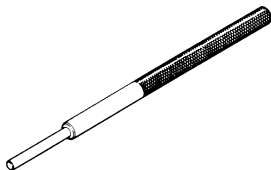
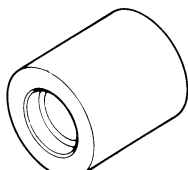
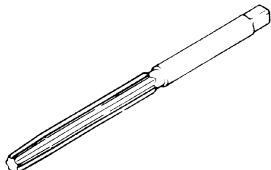
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

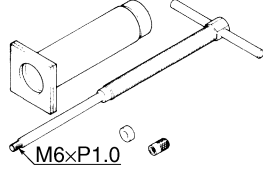
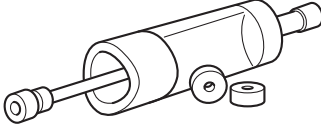
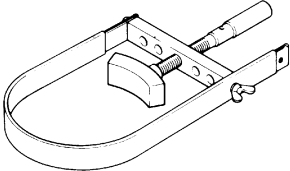
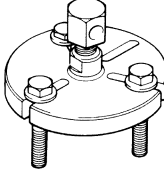
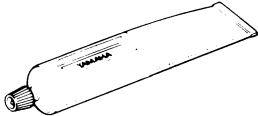
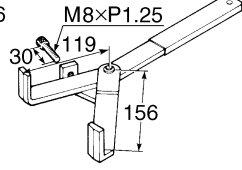
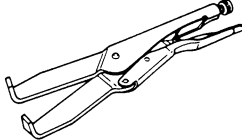
NOTE:

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

Tool name/Tool No.	Illustration	Reference pages
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-8, 5-64, 8-73, 8-74, 8-75, 8-79, 8-80, 8-81, 8-82, 8-83, 8-84, 8-85, 8-86, 8-87, 8-88, 8-89, 8-90
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		3-5, 3-6
Tappet adjusting tool 90890-04154 YM-04154		3-6
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	<div>90890-03094</div>  <div>YU-44456</div> 	3-7
Timing light 90890-03141 Inductive clamp timing light YU-03141		3-10

Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223		3-11
Oil filter wrench 90890-01469 YM-01469		3-12
Belt tension gauge 90890-03170 Rear drive belt tension gauge YM-03170		3-25
Steering nut wrench 90890-01403 Spanner wrench YU-33975		3-26, 4-61
Damper rod holder 90890-01460		4-54, 4-56
T-handle 90890-01326 T-handle 3/8" drive 60 cm long YM-01326		4-54, 4-56
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442		4-56, 4-57
Rotor holding tool 90890-01235 Universal magneto & rotor holder YU-01235		5-15, 5-21, 5-22
Slide hammer bolt 90890-01083 Slide hammer bolt 6 mm YU-01083-1		5-16

Tool name/Tool No.	Illustration	Reference pages
Weight 90890-01084 YU-01083-3	<p>90890-01084</p>  <p>YU-01083-3</p> 	5-16
Valve spring compressor 90890-04019 YM-04019		5-28, 5-33
Valve spring compressor attachment 90890-01243 Valve spring compressor adapter (26 mm) YM-01253-1		5-28, 5-33
Valve guide remover (ø6) 90890-04064 Valve guide remover (6.0 mm) YM-04064-A		5-29
Valve guide installer (ø6) 90890-04065 Valve guide installer (6.0 mm) YM-04065-A		5-29
Valve guide reamer (ø6) 90890-04066 Valve guide reamer (6.0 mm) YM-04066		5-29

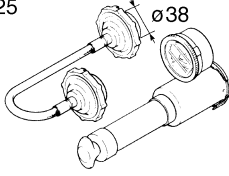
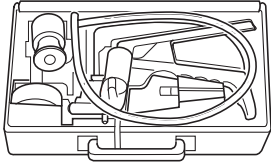
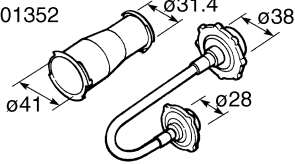
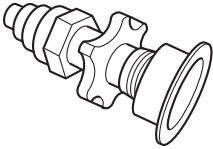
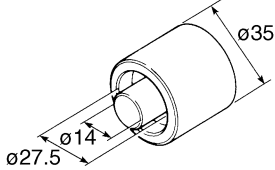
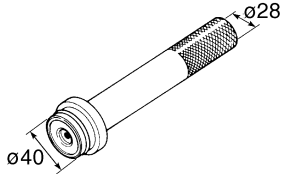
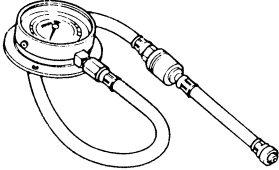
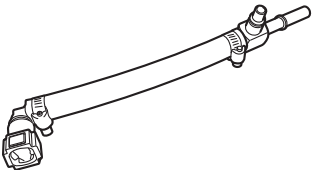
Tool name/Tool No.	Illustration	Reference pages
Piston pin puller set 90890-01304 Piston pin puller YU-01304	<p>90890-01304</p>  <p>M6xP1.0</p> <p>YU-01304</p> 	5-35
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-43, 5-44, 5-51, 5-54
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-43
Yamaha bond No. 1215 90890-85505 (Three Bond No.1215®)		5-45, 5-71, 6-10
Universal clutch holder 90890-04086 YM-91042	<p>90890-04086</p>  <p>M8xP1.25</p> <p>30°</p> <p>119</p> <p>156</p> <p>YM-91042</p> 	5-51, 5-55

**Thank you very much
for your reading.**

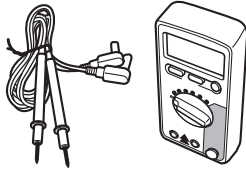
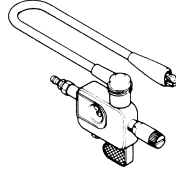
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Tool name/Tool No.	Illustration	Reference pages
Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01	<p>90890-01325</p>  <p>YU-24460-01</p> 	6-3
Radiator cap tester adapter 90890-01352 Radiator pressure tester adapter YU-33984	<p>90890-01352</p>  <p>YU-33984</p> 	6-3
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A		6-10
Middle driven shaft bearing driver 90890-04058 Bearing driver 40 mm YM-04058		6-10
Pressure gauge 90890-03153 YU-03153		7-11
Fuel pressure adapter 90890-03176 YM-03176		7-11

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		7-11
Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487		8-83