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# YZF-R1S YZF-R1SC

## SERVICE MANUAL

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**YZF-R1S/YZF-R1SC  
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 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.

# 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.

②
①

CLUTCH
ENG

**CLUTCH CLUTCH COVER**

CLUTCH
ENG

**REMOVING THE CLUTCH**

1. Remove:

- clutch cover ①
- gasket

**NOTE:**  
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

2. Remove:

- compression spring bolts ①
- compression springs
- pressure plate ②
- pull rod ③

3. Remove:

- friction plate 1

4. Remove:

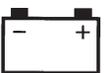
- clutch plate 1 ①
- friction plate 2

5. Straighten the clutch boss nut rib ①.

Order	Job/Part	Q'ty	Remarks
<b>Removing the clutch cover</b>			
	Right side cowl		Remove the parts in the order listed.
	Bottom cowl		Refer to "COWLINGS" in chapter 3.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
1	Cover	1	
2	Clutch cable	1	Disconnect.
3	Clutch cover	1	
4	Clutch cover gasket	1	
5	Dowel pin	2	
6	Oil filler cap	1	
For installation, reverse the removal procedure.			

5-46

5-50

① GEN INFO 	② SPEC 	
③ CHK ADJ 	④ CHAS 	
⑤ ENG 	⑥ COOL 	
⑦ FI 	⑧ ELEC 	
⑨ TRBL SHTG ?	⑩ 	
⑪ 	⑫ 	
⑬ 	⑭ 	
⑮ 	⑯ 	⑰ 
⑱ 	⑲ 	⑳ 
㉑ 	㉒ 	㉓ 
㉔ 	㉕ <b>New</b>	

## 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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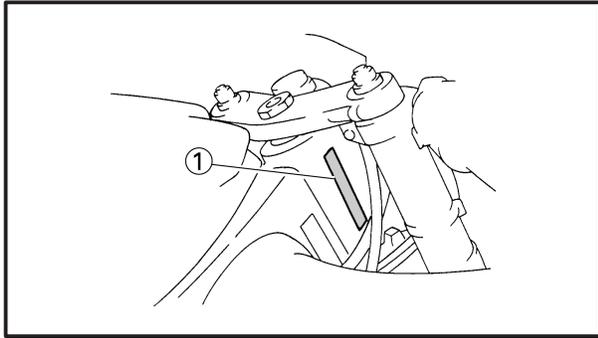
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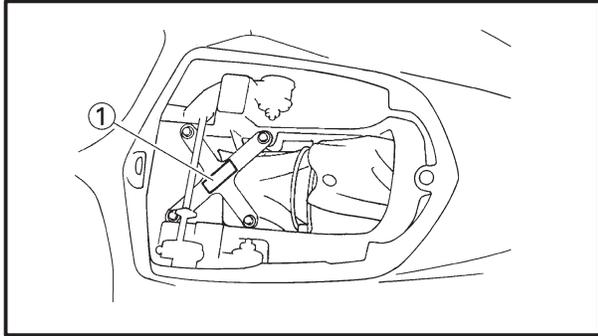
EAS00014

## GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

EAS00017

### VEHICLE IDENTIFICATION NUMBER

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

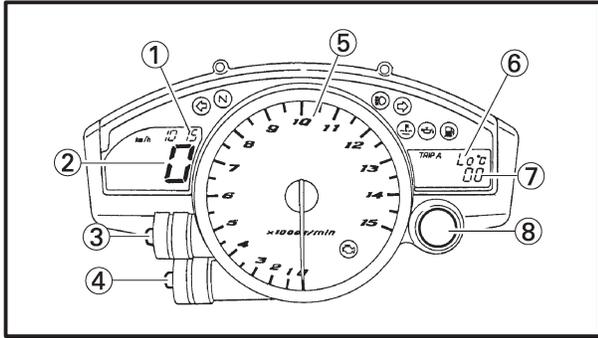


EAS00018

### MODEL LABEL

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

EAS00019



- 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

**FEATURES**  
**INSTRUMENT FUNCTIONS**

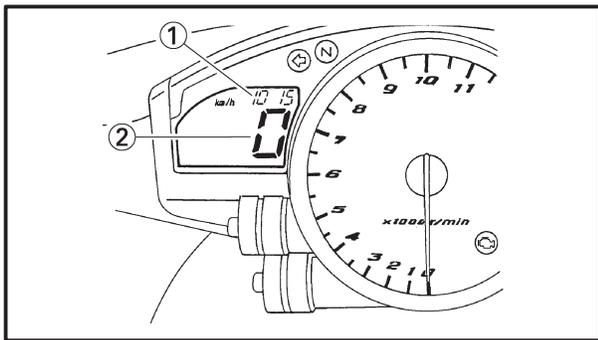
**Multi-function display**

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.



- ① Clock
- ② Speedometer

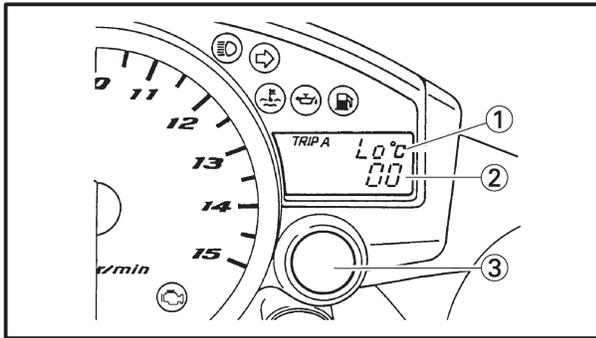
**Clock mode**

Turn the key to “ON”.

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.

1



- ① Coolant temperature display/air intake temperature display
- ② Odometer/tripmeters/fuel reserve tripmeter/stopwatch
- ③ Shift timing indicator light

**Odometer, tripmeter, and stopwatch modes**

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**

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 to measure split-times. (The colon “:” will start flashing.)
3. Push the “RESET” button 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.

**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 before the coolant temperature.

**Air intake temperature display**

The air intake temperature display indicates the temperature of the air drawn into the air filter case. 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 before the temperature.

### Self-diagnosis devices

The 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 (e.g.,11,12,13).

### Display brightness and shift timing indicator light control mode

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:

- To make any settings in this mode, you have to cycle through all of its functions. However, if the key is turned to “OFF” or the engine is started before completing the procedure, only the settings made before the “SELECT” button was last pushed will be applied.
- 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 7000 r/min and 15000 r/m. From 7000 r/min to 12000 r/min, the indicator light can be set in increments of 500 r/min. From 12000 r/min to 15000 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

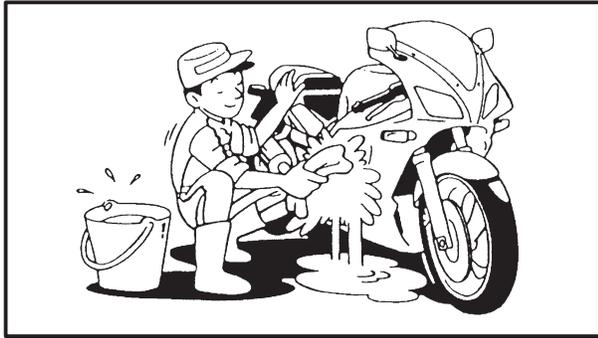
**NOTE:** \_\_\_\_\_

- The shift timing indicator light activation function can be set between 7000 r/min and 15000 r/min. From 7000 r/min to 12000 r/min, the indicator light can be set in increments of 500 r/min. From 12000 r/min to 15000 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

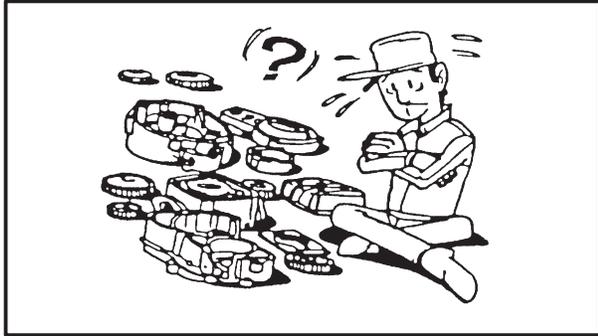
1. Push the “RESET” button to select the desired indicator light brightness level.
2. Push the “SELECT” button to confirm the selected indicator light brightness level. The right display will return to the odometer or tripmeter mode



EAS00020

**IMPORTANT INFORMATION  
PREPARATION FOR REMOVAL AND  
DISASSEMBLY**

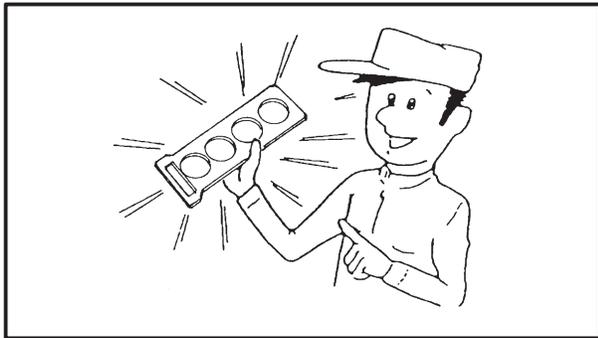
1. Before removal and disassembly, eliminate all dirt, mud, dust and foreign material.
2. Use only the proper tools and cleaning equipment.  
Refer to the "SPECIAL TOOLS".
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" 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.



EAS00021

**REPLACEMENT PARTS**

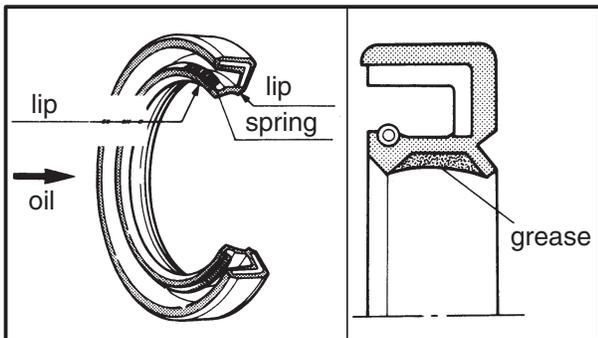
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

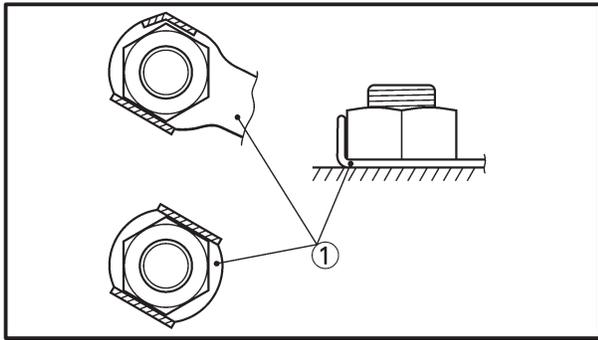


EAS00022

**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.

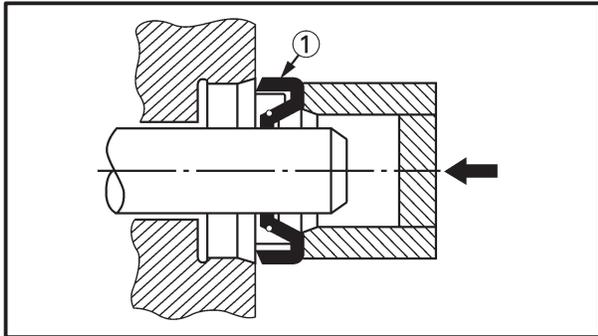




EAS00023

**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.



EAS00024

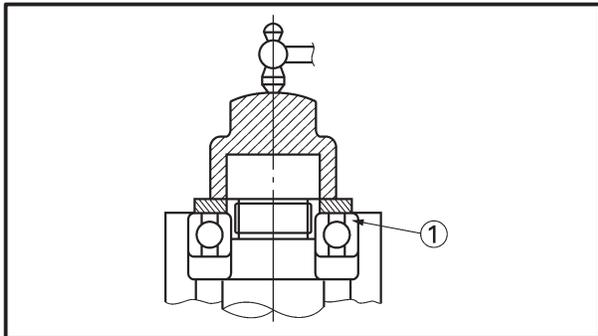
**BEARINGS AND OIL SEALS**

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.

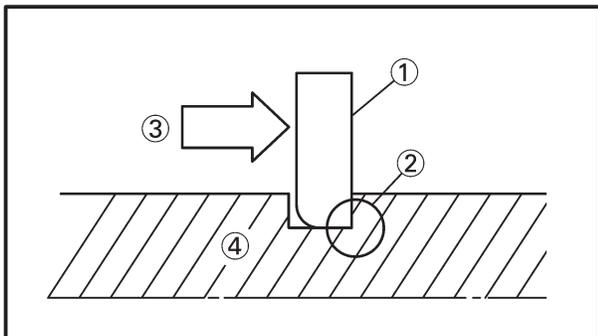
① Oil seal

**CAUTION:**

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



① Bearing



EAS00025

**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.

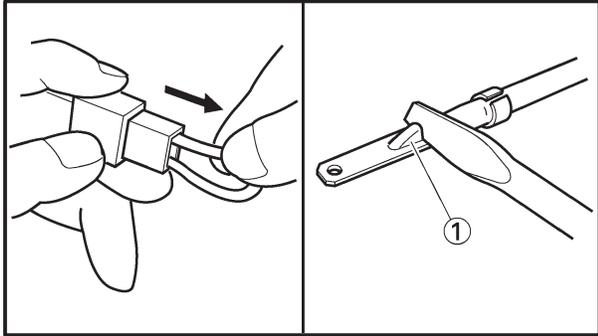
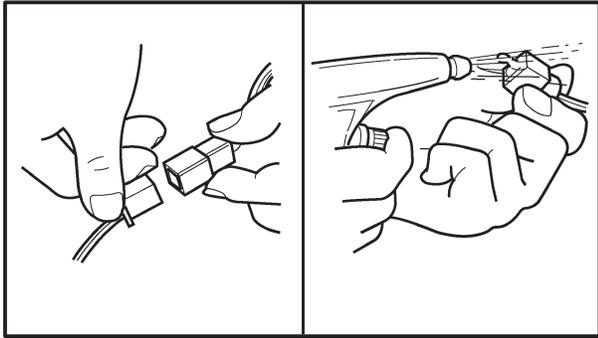
3. Check:

- all connections

Loose connection → Connect properly.

**NOTE:** \_\_\_\_\_

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

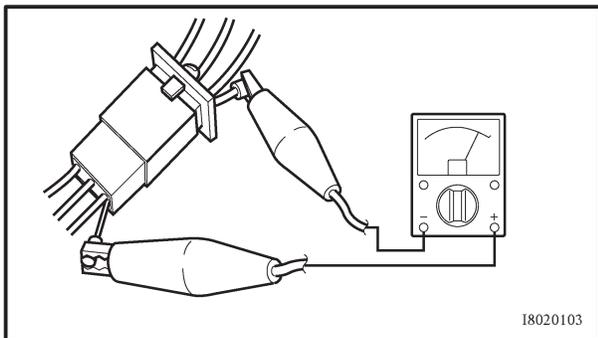


4. Connect:

- lead
- coupler
- connector

**NOTE:** \_\_\_\_\_

Make sure all connections are tight.



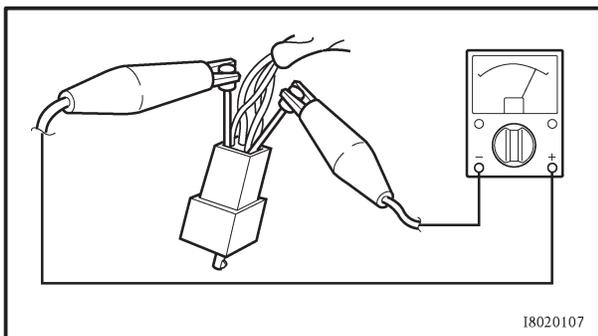
5. Check:

- continuity  
(with the pocket tester)

	<p><b>Pocket tester</b> 90890-03112, YU-3112</p>
---	--

**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

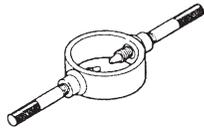
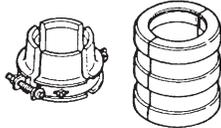
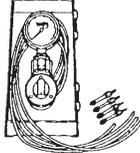
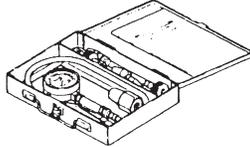
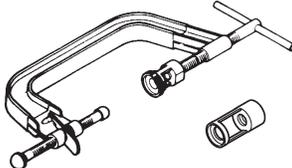
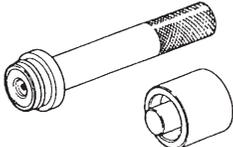
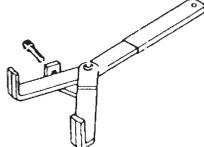
## SPECIAL TOOLS

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.

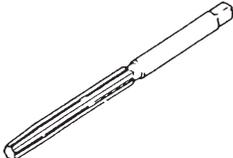
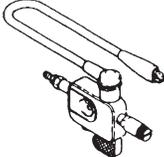
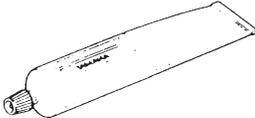
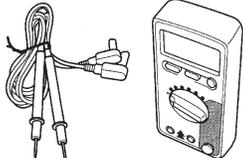
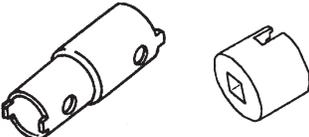
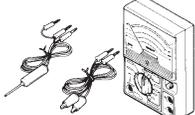
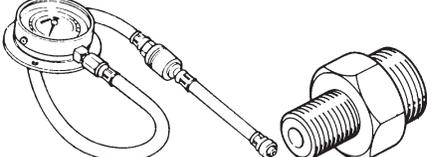
### NOTE:

- 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
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 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.	
90890-01423 YM-01423	Damper rod holder  This tool is used to hold the damper rod assembly when loosening or tightening the damper rod assembly bolt.	
90890-01426 YU-38411	Oil filter wrench  This tool is needed to loosen or tighten the oil filter cartridge.	
90890-01434 YM-01434	Rod holder  This tool is used to support the damper adjusting rod.	
Rod puller 90890-01437 YM-01437 Rod puller attachment 90890-01436 YM-01436	Rod puller Rod puller attachment  These tools are used to pull up the front fork damper rod.	

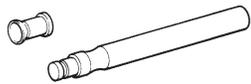
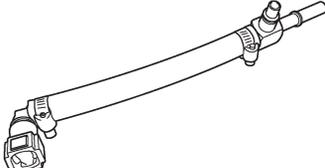
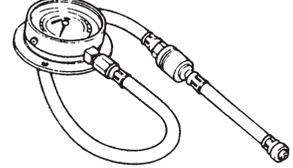
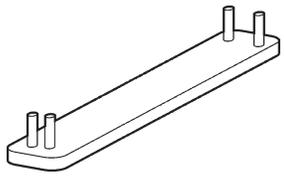
Tool No.	Tool name/Function	Illustration
90890-01441 YM-01441	<p>Fork spring compressor</p> <p>This tool is used to disassemble or assemble the front fork legs.</p>	
90890-01442 YM-01442	<p>Fork seal driver</p> <p>This tool is used to install the front fork's oil seal and dust seal.</p>	
90890-03094 YU-08030	<p>Vacuum gauge</p> <p>This guide is used to synchronize the carburetors.</p>	
Compression gauge 90890-03081 YU-33223 Adapter 90890-04136	<p>Compression gauge Compression gauge adapter</p> <p>These tools are used to measure engine compression.</p>	
Valve spring compressor 90890-04019 YM-04019 Attachment 90890-04108 YM-01253 90890-04114 YM-4114	<p>Valve spring compressor Valve spring compressor attachment</p> <p>These tools are used to remove or install the valve assemblies.</p>	
Middle driven shaft bearing driver 90890-04058 YM-4058 Mechanical seal installer 90890-04078 YM-33221	<p>Middle driven shaft bearing driver Mechanical seal installer</p> <p>These tools are used to install the water pump seal.</p>	
90890-04086 YM-91042	<p>Clutch holding tool</p> <p>This tool is used to hold the clutch boss when removing or installing the clutch boss nut.</p>	
90890-04111 90890-04116 YM-4116	<p>Valve guide remover</p> <p>This tool is used to remove or install the valve guides.</p>	
90890-04112 90890-04117 YM-4117	<p>Valve guide installer</p> <p>This tool is used to install the valve guides.</p>	



Tool No.	Tool name/Function	Illustration
90890-04113 YM-04113 90890-04118 YM-4118	Valve guide reamer  This tool is used to rebores the new valve guides.	
90890-06754 YM-34487	Ignition checker  This tool is used to check the ignition system components.	
90890-85505 ACC-1109-0501	Yamaha bond No. 1215  This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces).	
90890-03174	Digital circuit tester  This tool is used to check the electrical system.	
Pivot shaft wrench 90890-01471 YM-01471 Pivot shaft wrench adapter 90890-01476	Pivot shaft wrench Pivot shaft wrench adapter  This tool is needed to loosen or tighten the spacer bolt.	
90890-03132 YU-3112	Pocket tester  This instrument is needed for checking the engine oil temperature.	
Oil pressure gauge 90890-03153 YU-03153 Adapter 90890-03139	Oil pressure gauge Adapter  These tools are used to measure engine oil pressure.	
90890-06756	Vacuum/pressure pump gauge set  This tool used to measure the vacuum pressure.	
90793-80009	Engine tachometer  This tool is needed for observing engine rpm.	

# SPECIAL TOOLS

<b>GEN INFO</b>	
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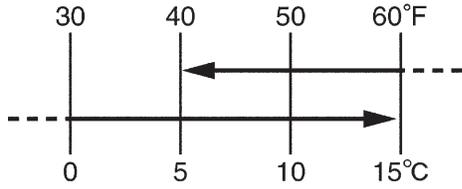
Tool No.	Tool name/Function	Illustration
90890-04101	<p>Valve lapper</p> <p>This tool is needed to remove and install the valve lifter.</p>	
90890-03176 YM-03176	<p>Fuel pressure adapter</p> <p>This tool is needed to measure fuel pressure.</p>	
90890-03153 YU-03153	<p>Pressure gauge</p> <p>This tool is used to measure fuel pressure.</p>	
90890-04143 YM-04143	<p>Camshaft wrench</p> <p>This tool is used to hold and rotate the camshaft sprocket.</p>	



## SPECIFICATIONS

### GENERAL SPECIFICATIONS

Item	Standard	Limit
<b>Model code</b>	5VY4 (USA), 5VY5 (CAL)	...
<b>Dimensions</b>		
Overall length	2,065 mm (8.13 in)	...
Overall width	720 mm (28.3 in)	...
Overall height	1,105 mm (43.5 in)	...
Seat height	835 mm (32.9 in)	...
Wheelbase	1,395 mm (54.9 in)	...
Minimum ground clearance	135 mm (5.31 in)	...
Minimum turning radius	3,400 mm (133.9 in)	...
<b>Weight</b>		
Wet (with oil and a full fuel tank)	193 kg (425 lb) (USA) 194 kg (428 lb) (CAL)	...
Maximum load (except motorcycle)	202 kg (445 lb) (USA) 201 kg (443 lb) (CAL)	...

Item	Standard	Limit
<b>Engine</b> Engine type Displacement Cylinder arrangement Bore × stroke Compression ratio Engine idling speed Vacuum pressure at engine idling speed Standard compression pressure (at sea level)	Liquid-cooled, 4-stroke, DOHC 998 cm <sup>3</sup> (60.90 cu.in) Forward-inclined parallel 4-cylinder 77.0 × 53.6 mm (3.03 × 2.11 in) 12.4 : 1 1,150 ~ 1,250 r/min 22 kPa (165 mmHg, 6.5 inHg) 1,480 kPa (14.80 kg/cm <sup>2</sup> , 14.80 bar, 210.5 psi) at 350 r/min	... ... ... ... ... ... ...
<b>Fuel</b> Recommended fuel Fuel tank capacity Total (including reserve) Reserve only	Premium unleaded gasoline only 18 L (3.96 Imp gal, 4.76 US gal) 3.4 L (0.75 Imp gal, 0.90 US gal)	... ... ...
<b>Engine oil</b> Lubrication system Recommended oil  Quantity Total amount Without oil filter cartridge replacement With oil filter cartridge replacement Oil pressure Engine oil temperature Relief valve opening pressure	Wet sump 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 3.8 L (3.35 Imp qt, 4.02 US qt) 2.9 L (2.55 Imp qt, 3.07 US qt) 3.1 L (2.73 Imp qt, 3.28 US qt) 230 kPa at 5,000 r/min (2.3 kg/cm <sup>2</sup> at 5,000 r/min) (2.3 bar at 5,000 r/min) (32.7 psi at 5,000 r/min) 100°C (212°F) 600 ~ 680 kPa (6.0 ~ 6.8 kg/cm <sup>2</sup> , 6.0 ~ 6.8 bar, 87.0 ~ 98.6 psi)	... ... ... ... ... ...