



**YAMAHA**

**2004**

**XT660R(S)**  
**XT660X(S)**

5VK1-AE1

**SERVICE MANUAL**

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## NOTICE

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

Yamaha is continually striving to improve all 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:

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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.

# 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.

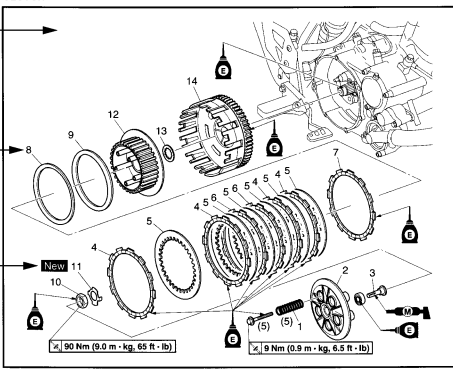
②

①

CLUTCH ENG

CLUTCH ENG

**CLUTCH**



④ →

⑤ →

⑥ →

⑦ →

Order	Job/Part	Qty	Remarks	
<b>Removing the clutch</b>				
1	Clutch spring	5	Remove the parts in the order listed.	
2	Pressure plate	1		
3	Pull rod	1		
4	Friction plate 1	4		Inside diameter (plate with notched tabs) = 119 mm (4.69 in)
5	Clutch plate	6		Refer to "INSTALLING THE CLUTCH".
6	Friction plate 2	2		
7	Friction plate 3	1		Inside diameter (plate with notched tabs) = 128 mm (5.04 in)
8	Clutch damper spring	1		
9	Clutch damper spring seat	1		

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**REMOVING THE CLUTCH**

1. Remove:

- clutch cover ①

**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. Straighten the lock washer tab.

3. Loosen:

- clutch boss nut ②

**NOTE:**  
While holding the clutch boss ③ with the universal clutch holder ⑧, loosen the clutch boss nut.

**Universal clutch holder**  
90890-04086

4. Remove:

- lock washer
- clutch boss

**CHECKING THE FRICTION PLATES**








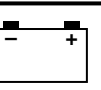



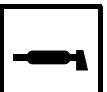

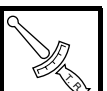











The following procedure applies to all of the friction plates.

1. Check:

- friction plate 1
- friction plate 2
- friction plate 3

Damage/wear → Replace the friction plates as a set.

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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 	

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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.

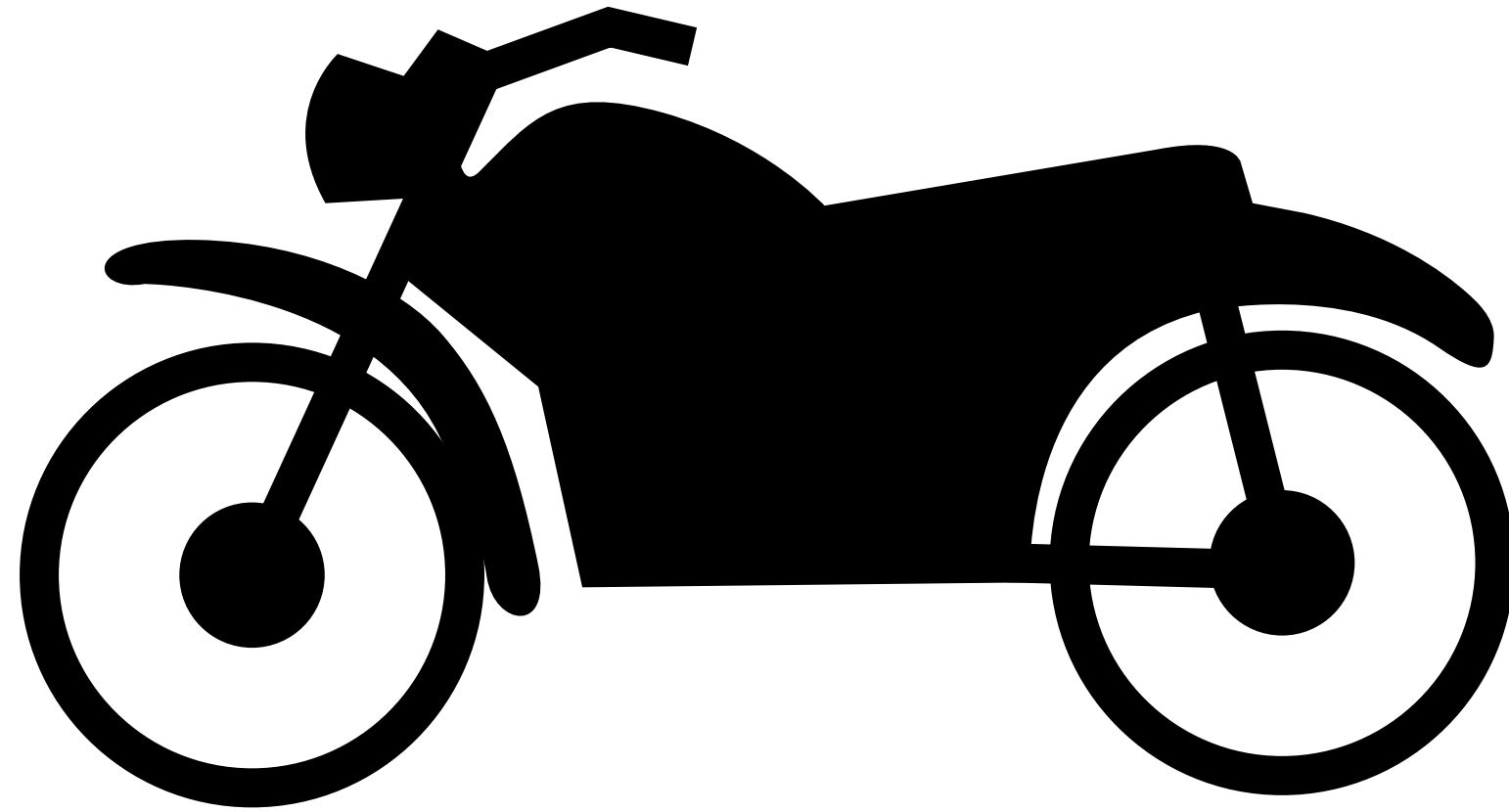
- ⑱ Engine oil
- ⑲ Gear oil
- ⑳ Molybdenum-disulfide oil
- ㉑ Wheel-bearing grease
- ㉒ Lithium-soap-based grease
- ㉓ Molybdenum-disulfide grease

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

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

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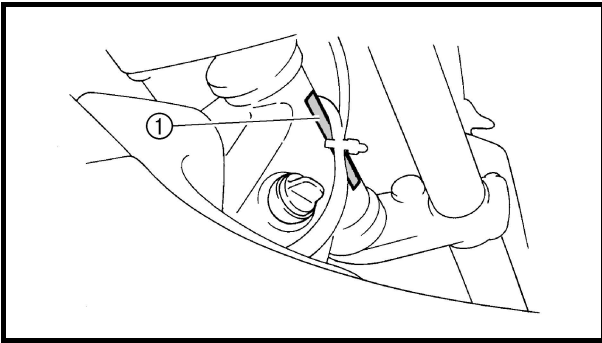
**GEN  
INFO**



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## CHAPTER 1 GENERAL INFORMATION

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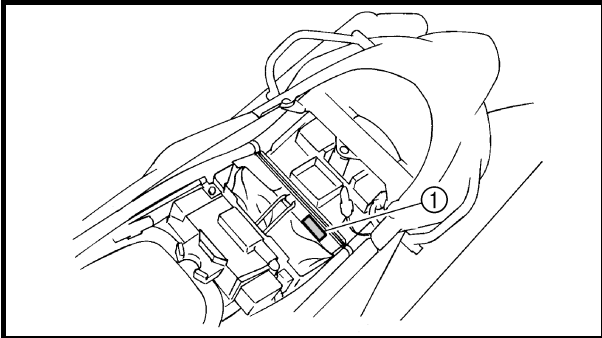
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## GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

EAS00017

### 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.



EAS00019

## FEATURES

EAS00896

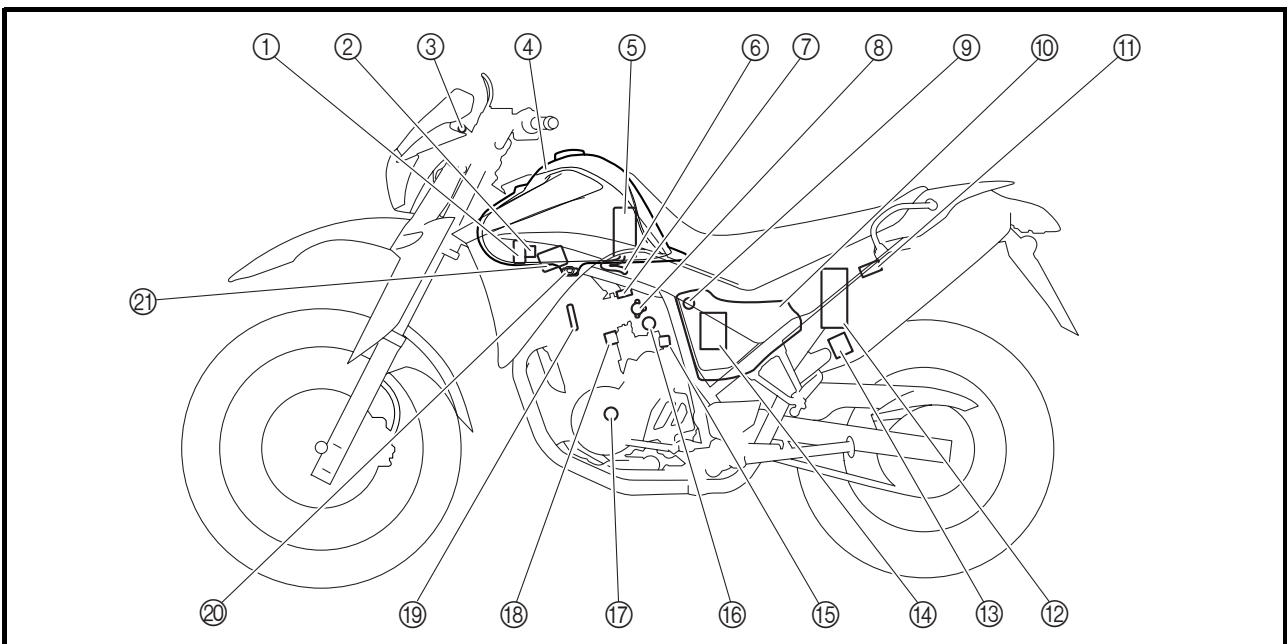
### OUTLINE

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 a 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 chamber.

Despite the same volume of intake air, the fuel volume requirement varies with the engine operating conditions, such as acceleration, deceleration, or operation 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 engines 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 a 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.

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 Air cut-off valve             | ⑦ Fuel injector                 | ⑫ Battery                    | ⑱ Coolant temperature sensor |
| ② Air induction system solenoid | ⑧ Throttle position sensor      | ⑬ Catalytic converter        | ⑲ Spark plug                 |
| ③ Engine trouble warning light  | ⑨ Intake air temperature sensor | ⑭ ECU                        | ⑳ Intake air pressure sensor |
| ④ Fuel tank                     | ⑩ Air filter case               | ⑮ Lean angle cut-off switch  | ㉑ Ignition coil              |
| ⑤ Fuel pump                     | ⑪ Fuel injection system relay   | ⑯ Fast idle unit             |                              |
| ⑥ Fuel hose                     |                                 | ⑰ Crankshaft position sensor |                              |

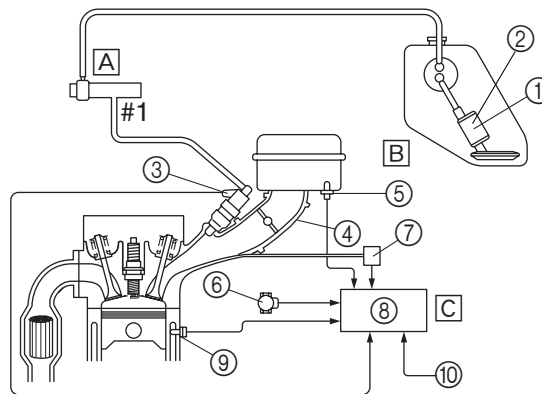
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**FI SYSTEM**

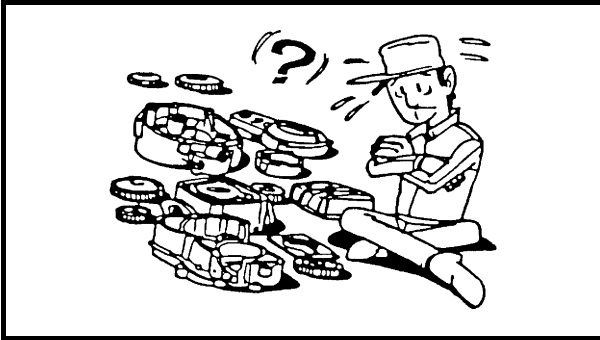
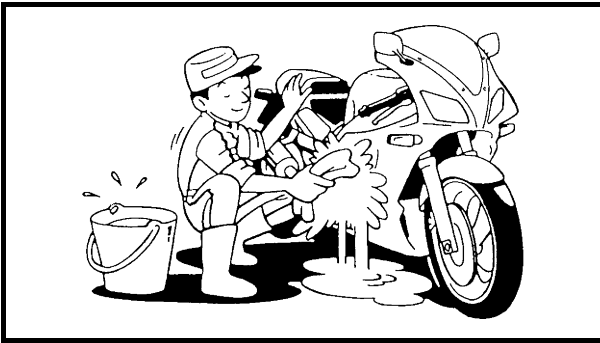
The fuel pump delivers fuel to the injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the injector at 324 kPa (3.24 kg/cm<sup>2</sup>, 46.1 psi) higher than the intake manifold pressure. Accordingly, when the energizing signal from the ECU energizes the 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 air temperature sensor, and coolant temperature sensor enable the ECU to determine the injection duration. The injection timing is determined through the signal 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.



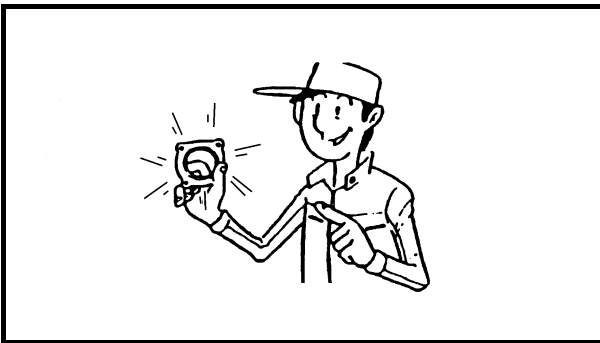
- |                      |                                 |                              |                  |
|----------------------|---------------------------------|------------------------------|------------------|
| ① Fuel pump          | ⑤ Intake air temperature sensor | ⑧ ECU                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



EAS00020

## IMPORTANT INFORMATION 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".
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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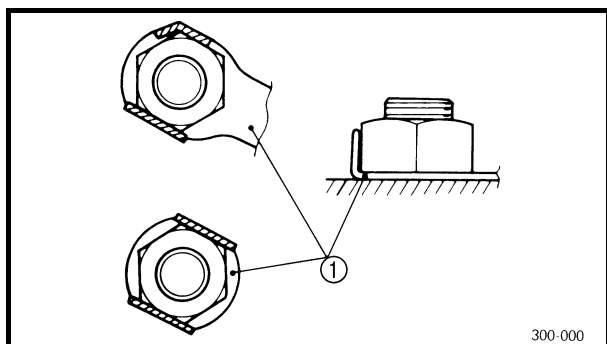
## REPLACEMENT PARTS

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

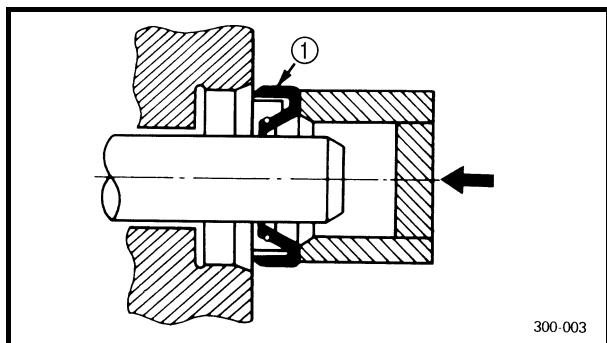
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



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.



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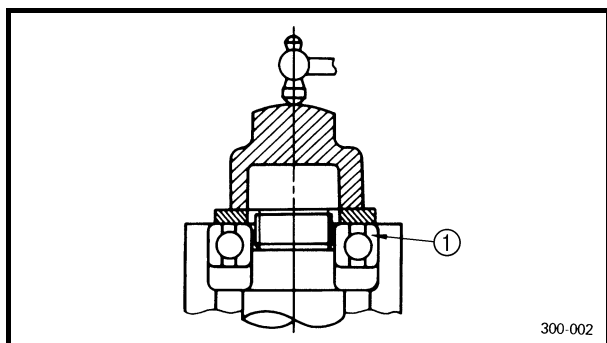
## BEARINGS AND OIL SEALS

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.

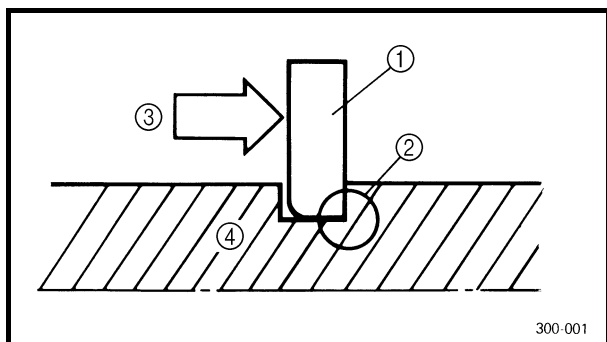
① Oil seal

### CAUTION:

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



① Bearing

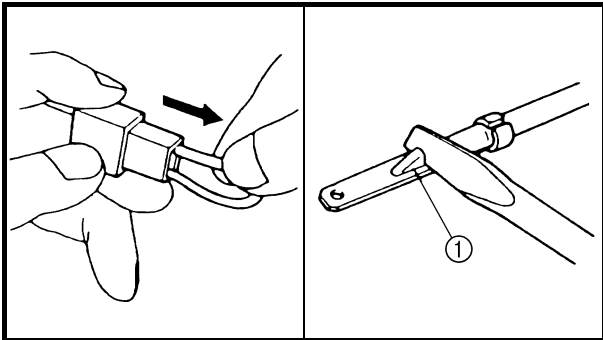
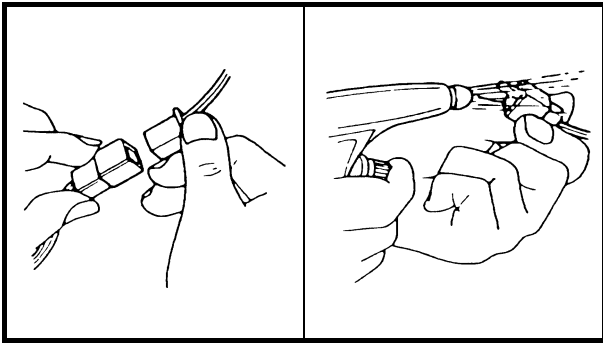


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## CIRCLIPS

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

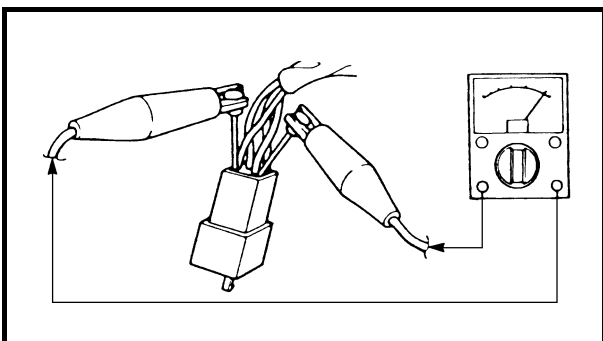
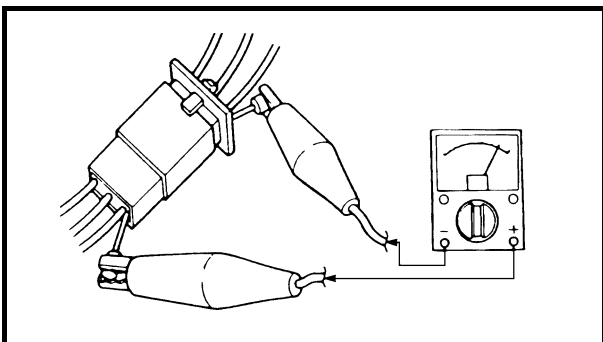
If the pin ① on the terminal is flattened, bend it up.

4. Connect:

- lead
- coupler
- connector


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

Make sure all connections are tight.



5. Check:

- continuity  
(with the pocket tester)

	<b>Pocket tester 90890-03112</b>
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**NOTE:** \_\_\_\_\_

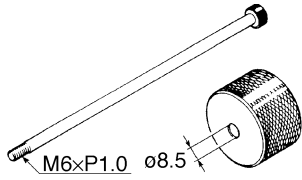
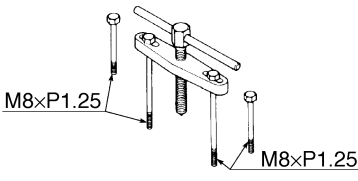
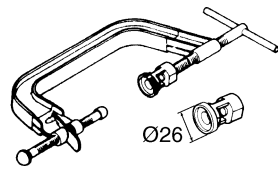
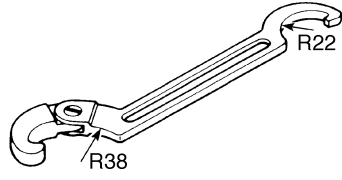
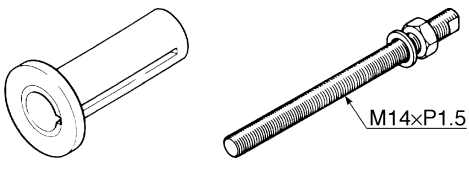
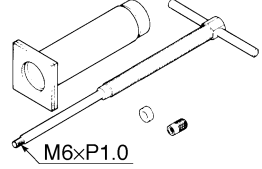
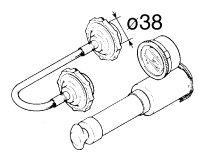
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.

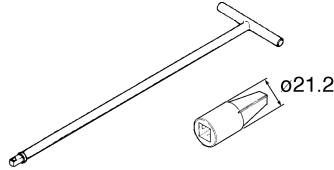
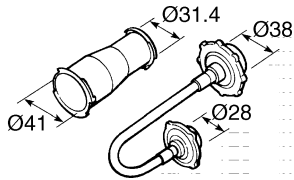
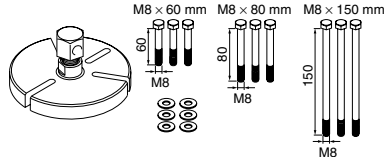
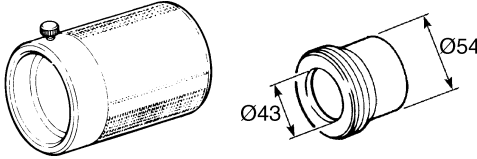
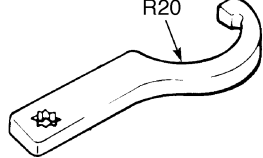
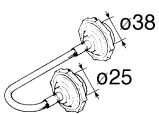
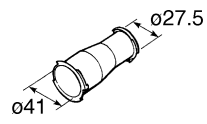
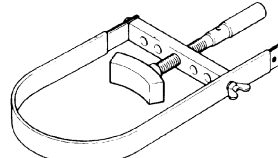
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**SPECIAL TOOLS**

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.

Tool No.	Tool name/Function	Illustration
Slide hammer bolt 90890-01083 Weight 90890-01084	Slide hammer bolt Weight  These tools are used to remove or install the rocker arm shafts.	
90890-01135	Crankcase separating tool  This tool is used to remove the crankshaft.	
Attachment 90890-01243 Compressor 90890-04019	Valve spring compressor attachment Valve spring compressor  These tools are used to remove or install the valve assemblies.	
90890-01268	Ring nut wrench  This tool is used to loosen or tighten the steering ring nuts.	
Pot 90890-01274 Bolt 90890-01275	Crankshaft installer pot Crankshaft installer bolt  These tools are used to install the crankshaft.	
90890-01304	Piston pin puller set  This tool is used to remove the piston pin.	
90890-01325	Radiator cap tester  This tool is used to check the cooling system.	

Tool No.	Tool name/Function	Illustration
<p>T-handle 90890-01326 Holder 90890-01460</p>	<p>T-handle Damper rod holder</p> <p>These tools are used to hold the damper rod holder when removing or installing the damper rod.</p>	
<p>90890-01352</p>	<p>Radiator cap tester adaptor</p> <p>This tool is used to check the cooling system.</p>	
<p>90890-01362</p>	<p>Flywheel puller</p> <p>This tool is used to remove the A.C. magneto rotor.</p>	
<p>Weight 90890-01367 Attachment 90890-01374</p>	<p>Fork seal driver weight Fork seal driver attachment (ø43)</p> <p>These tools are used to install the oil seal, dust seal, and the outer tube bushing of the front fork legs.</p>	
<p>90890-01403</p>	<p>Steering nut wrench</p> <p>This tool is used to loosen or tighten the steering ring nuts.</p>	
<p>90890-01496</p>	<p>Radiator tester adapter</p> <p>This tool is used to check the cooling system.</p>	
<p>90890-01497</p>	<p>Radiator cap tester adapter</p> <p>This tool is used to check the cooling system.</p>	
<p>90890-01701</p>	<p>Sheave holder</p> <p>This tool is used to hold the A.C. magneto rotor when loosen or tighten the A.C. magneto rotor nut.</p>	

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for your reading.**

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