

# 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

CLUTCH

①

ENG

CLUTCH

ENG

④

⑤

⑥

⑦

Order	Job/Part	Q'ty	Remarks
<b>Removing the clutch cover</b>			
	Left side cover		Remove the parts in the order listed. Refer to "SEATS AND SIDE COVERS" in chapter 3.
	Engine left side cover		Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
	Engine oil		Drain.
1	Clutch cable	1	Disconnect.
2	Pull lever	1	
3	Pull lever spring	1	
4	Pickup coil coupler	1	Disconnect.
5	Shift arm	1	
6	Clutch cable holder	1	
7	Clutch cover	1	

③

**REMOVING THE CLUTCH**

1. Remove:

- clutch cable holder ①
- clutch cover ②

**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 ①

**NOTE:**

While holding the clutch boss ② with the universal clutch holder ③, loosen the clutch boss nut.

**Universal clutch holder**

YM-91042

4. Remove:

- clutch boss nut ①
- lock washer ②
- clutch boss assembly ③

**NOTE:**

There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip ④ and disassemble the built-in damper unless there is serious clutch chattering.

⑧























**REMOVING THE PRIMARY DRIVE GEAR**

1. Remove:

- pickup coil rotor bolt ①

5-60

5-65

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

## SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑧ indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic checks and adjustments
- ④ Chassis
- ⑤ Engine
- ⑥ Carburetor
- ⑦ Electrical system
- ⑧ Troubleshooting

Symbols ⑨ to ⑯ indicate the following.

- ⑨ Serviceable with engine mounted
- ⑩ Filling fluid
- ⑪ Lubricant
- ⑫ Special tool
- ⑬ Tightening torque
- ⑭ Wear limit, clearance
- ⑮ Engine speed
- ⑯ Electrical data

Symbols ⑰ to ㉒ in the exploded diagrams indicate the types of lubricants and lubrication points.









- ⑰ Engine oil
- ⑱ Gear oil
- ⑲ Molybdenum disulfide oil
- ⑳ Wheel bearing grease
- ㉑ Lithium soap base grease
- ㉒ Molybdenum disulfide grease

Symbols ㉓ to ㉔ in the exploded diagrams indicate the following.

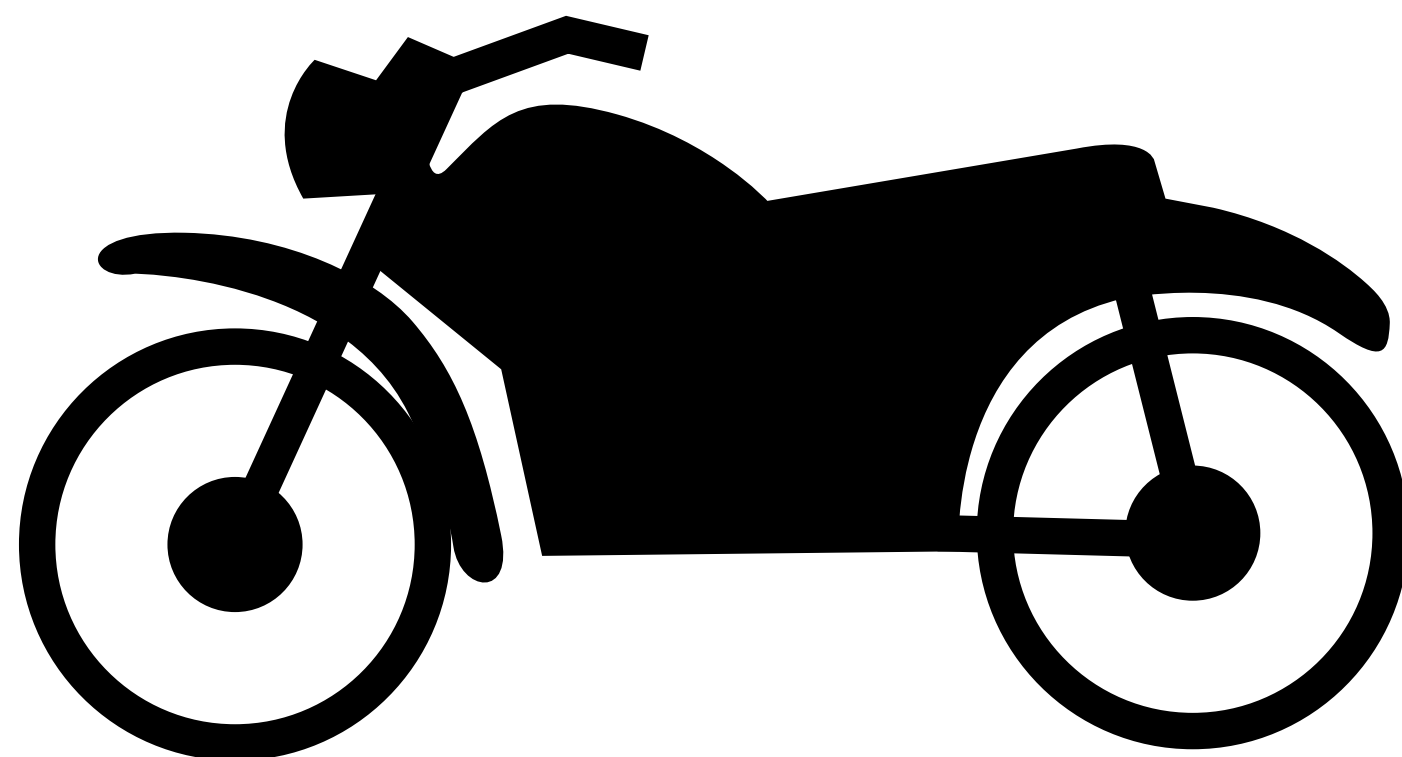
- ㉓ Apply locking agent (LOCTITE®)
- ㉔ Replace the part

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**GEN  
INFO**

**1**



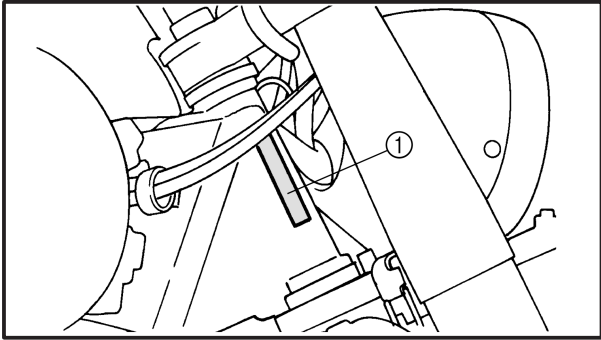
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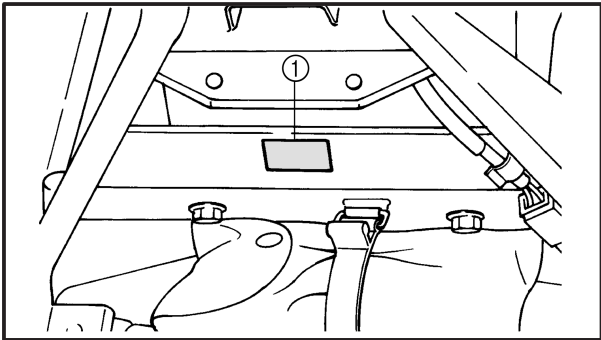
EAS00014

## GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

EAS00017

### VEHICLE IDENTIFICATION NUMBER

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

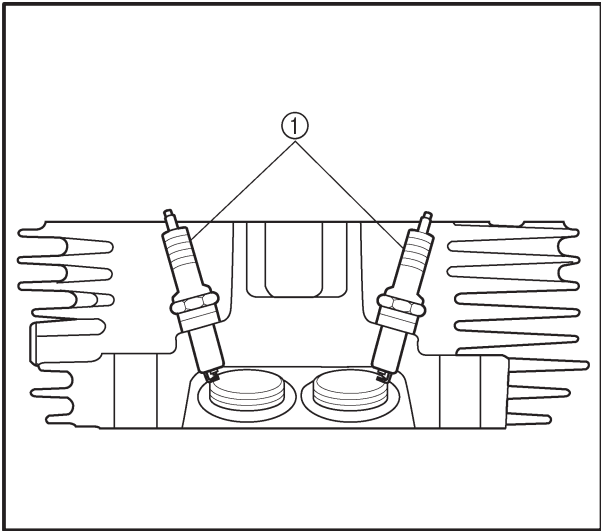


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### MODEL CODE

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





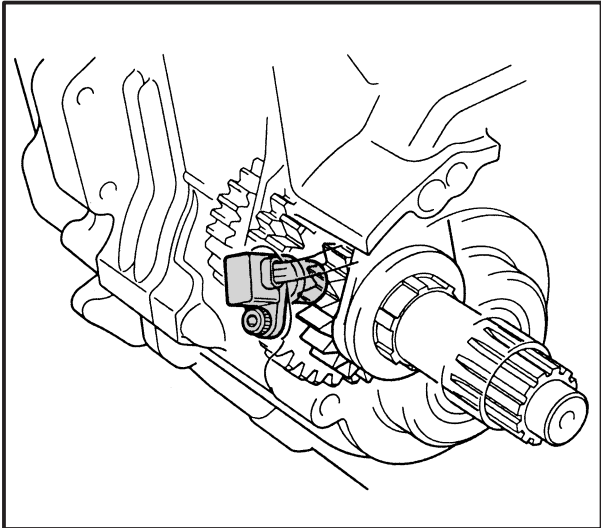
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**FEATURES**

**Twin spark plugs**

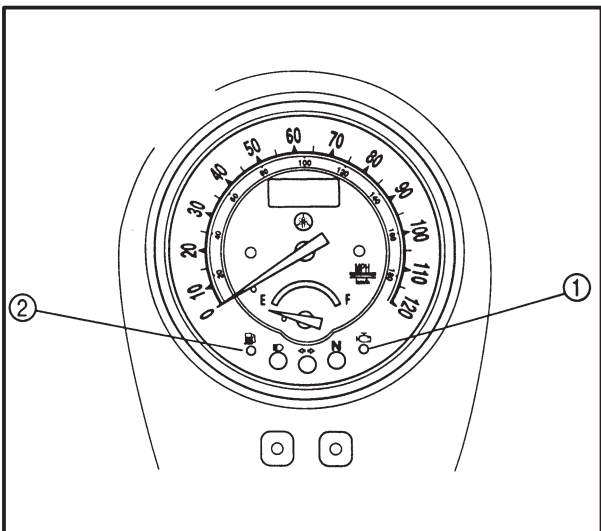
For this model, two spark plugs are incorporated per each cylinder.

By using two spark plugs, the combustion time in the combustion chamber is shortened in an attempt to improve torque.



**Speed sensor**

The speed sensor is installed to the crankcase and it detects the number of passing gears while the vehicle is running in 5th gear and sends the information out as an electrical signal to the ignitor unit.



**Self-diagnosis device**

This model is equipped with a self-diagnosis device that has four functions.

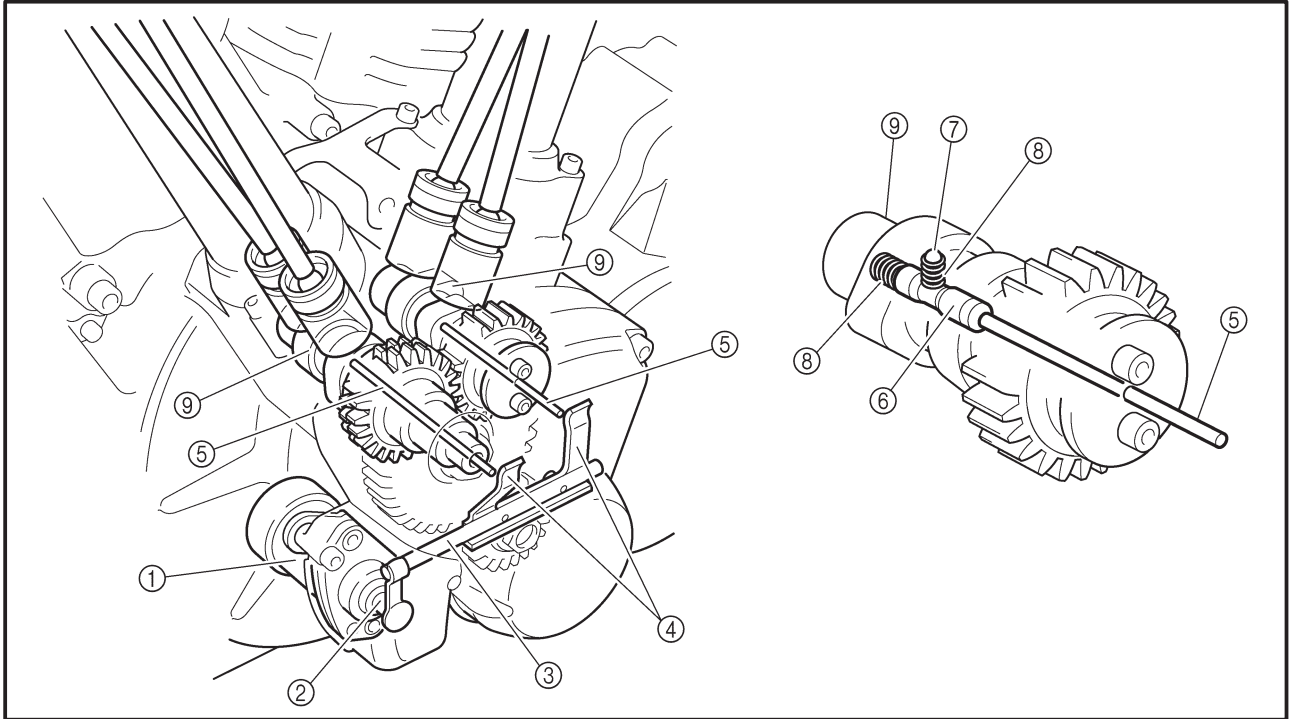
The engine trouble indicator light will come on or flash if trouble occurs in an engine monitoring circuit.

Circuit	Indicator lights	Number of flashes
Throttle position sensor	Engine trouble indicator light ①	3
Speed sensor	Engine trouble indicator light ①	4
Solenoid	Engine trouble indicator light ①	6
Fuel level meter	Fuel level indicator light ①	8

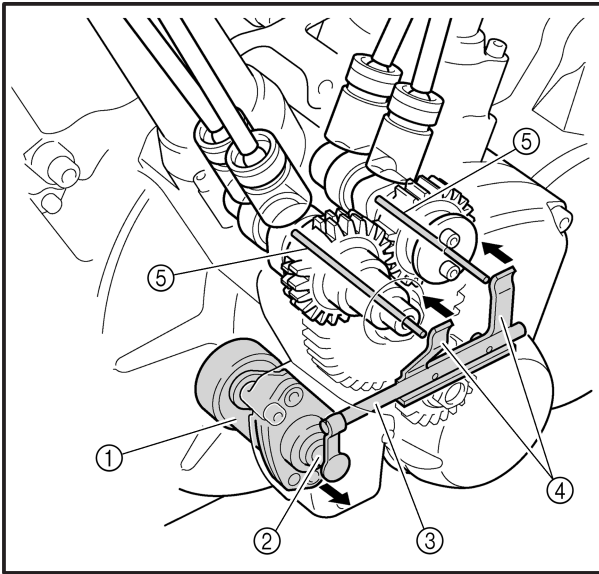
Refer to “SELF-DIAGNOSIS” in chapter 7.

**Auto decompression mechanism**

The auto decompression mechanism occurs when the engine is started. When the engine is started the decompression cam and pin raise the exhaust valve lifters, push the push rods, move the rocker arms, and lower the exhaust valves which compress the cylinder. When the cylinder is compressed, pressure is released immediately, resulting in smoother engine starting capabilities and smoother crankshaft revolutions.

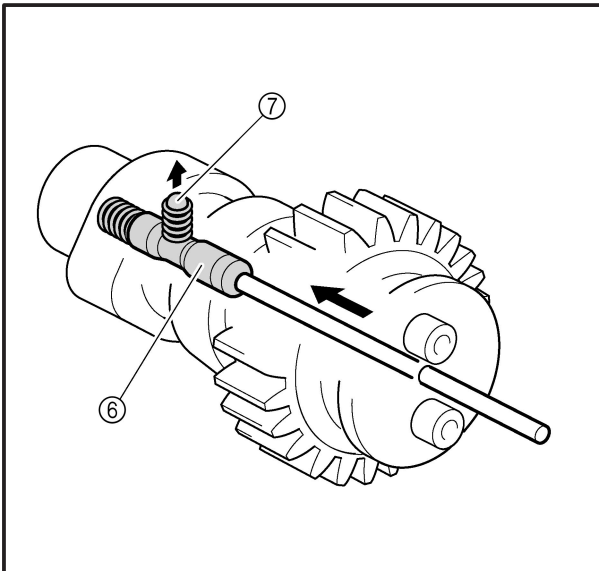


- ① Decompression solenoid
- ② Decompression solenoid rod
- ③ Decompression connector
- ④ Decompression lever
- ⑤ Decompression push rod
- ⑥ Decompression cam
- ⑦ Pin
- ⑧ Spring
- ⑨ Camshaft

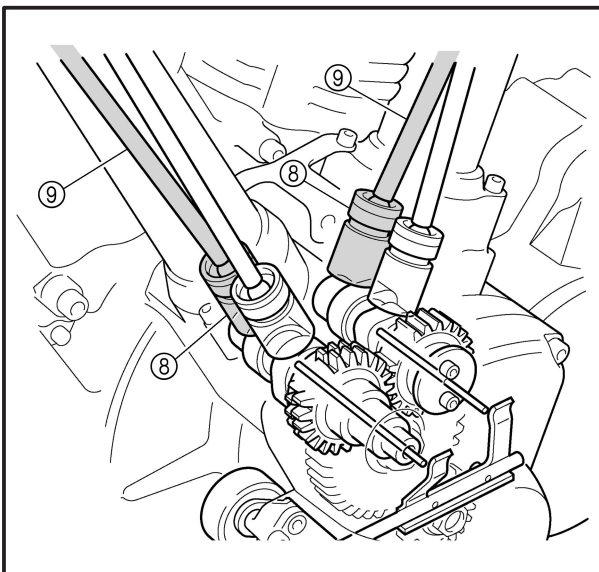


### Operation

1. When the starter switch is pushed, electricity is run to the decompression solenoid ① causing it to push out the decompression solenoid rod ②.
2. When the decompression solenoid rod is pushed out, the decompression connector ③ moves the decompression levers ④ in the direction indicated by the arrows, and then the levers push the decompression rods ⑤ toward the camshaft side.



3. The decompression cam ⑥ is pushed in the direction indicated by the arrow, and then the pin ⑦ raises the projection of the decompression cam.

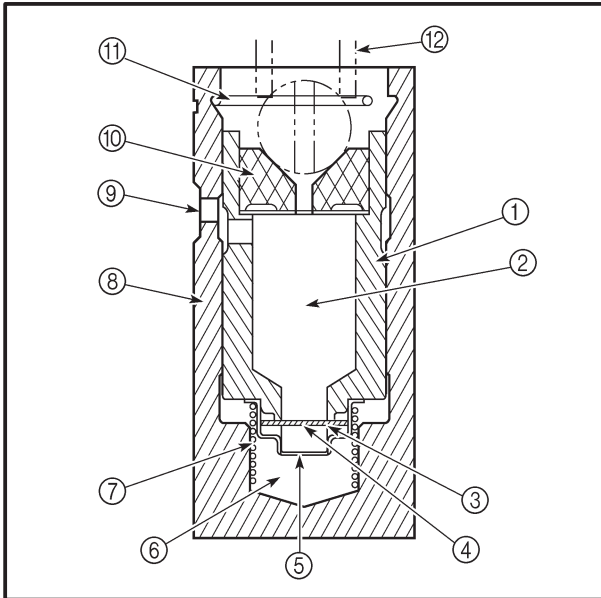


4. When the camshaft is rotated by the self-timing motor, the exhaust valve lifters ⑧ are lifted by the pin just before top dead center (TDC) and the exhaust valve push rod ⑨ and valve rocker arms are operated. Thus, opening the exhaust valve becomes easy.
5. When the engine starts and reaches a specific engine speed the decompression solenoid is turned off and the decompression system stops operating.

**Oil-pressure-operated valve lifters**

Since the oil-pressure-operated valve-lifting mechanism maintains a valve clearance of zero, periodic valve clearance adjustments are unnecessary.

The advantages of this system as compared to conventional techniques include the following: mechanical noise is reduced, the camshaft action on the valves remains unaffected by engine speed or temperature, and the valve timing is kept stable.

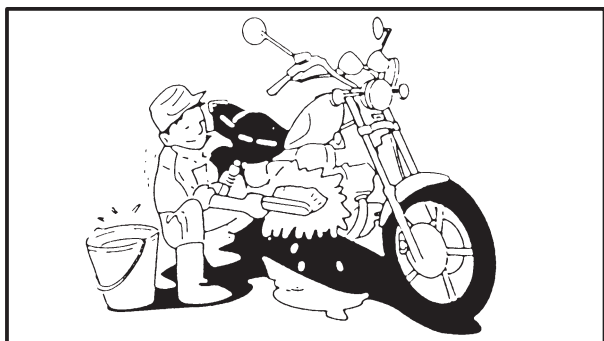


- ① Plunger
- ② Oil reservoir
- ③ Check valve spring
- ④ Check valve
- ⑤ Spring retainer
- ⑥ High-pressure chamber
- ⑦ Plunger spring
- ⑧ Valve lifter body
- ⑨ Oil supply inlet
- ⑩ Push rod cup
- ⑪ Plunger retaining clip
- ⑫ Valve push rod

The oil-pressure-operated valve-lifting system functions as follows:

1. As the camshaft rotates, the valve lifter is pushed up by the passing cam lobe.
2. Since the check valve ④ prevents the engine oil contained inside the high-pressure chamber from escaping, the plunger ① moves up along with the valve lifter body ⑧ and pushes up the push rods, causing the valve to be lifted.
3. As the camshaft continues to rotate, the valve lifter moves back down to its original position, where it remains while the cam heel passes.

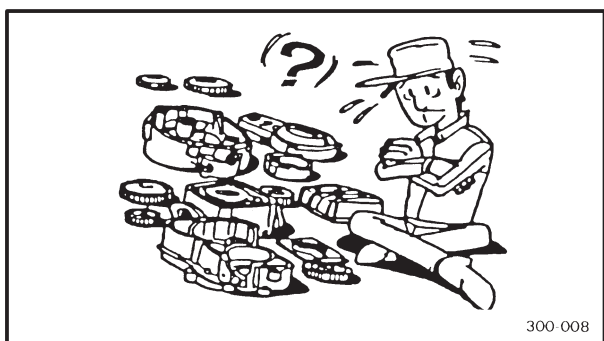
When a positive valve clearance is caused by either heat expansion of the cylinder head or engine oil leaking from the valve lifter during stage 2, the plunger, which no longer receives pressure from the push rod, is pushed up by the plunger spring ⑦. As a result, the valve clearance is zeroed and engine oil is allowed to return to the high-pressure chamber from the reservoir ② through the check valve ④. When, on the contrary, a negative valve clearance occurs (this is the case when the cam heel is passing the valve lifter, but the rocker arm, pushed by the push rods, is lifting the valve), the plunger ① continues to receive pressure from the valve push rod. As engine oil contained inside the high-pressure chamber leaks from the gaps between the valve lifter body ⑧ and the plunger ① as well as between the valve lifter body ⑧ and the check valve ④, the plunger ① moves down and the valve clearance is zeroed.



EAS00020

## IMPORTANT INFORMATION PREPARATION FOR REMOVAL AND DIS- ASSEMBLY

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



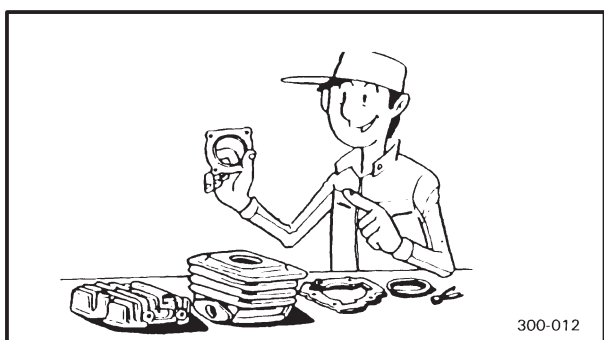
300-008

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.



300-012

EAS00021

## REPLACEMENT PARTS

Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs.

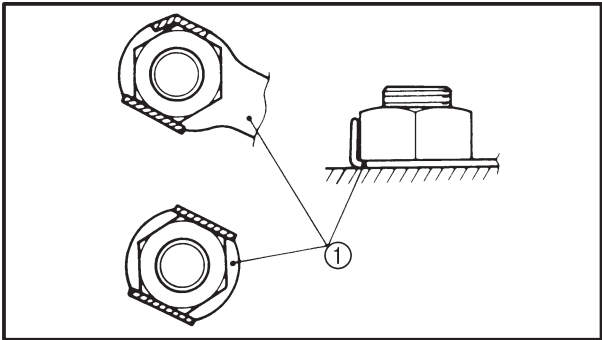
Other brands may be similar in function and appearance, but inferior in quality.

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.

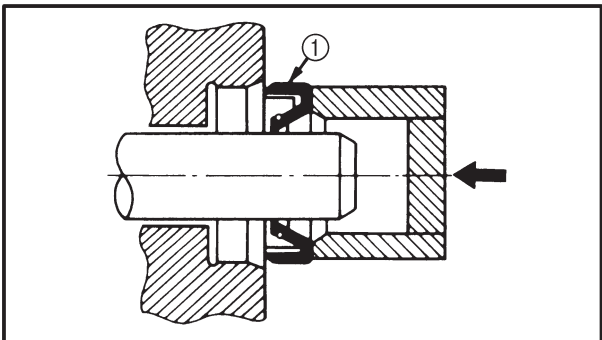
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



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 washer tabs and the cotter pin ends along a flat of the bolt or nut.

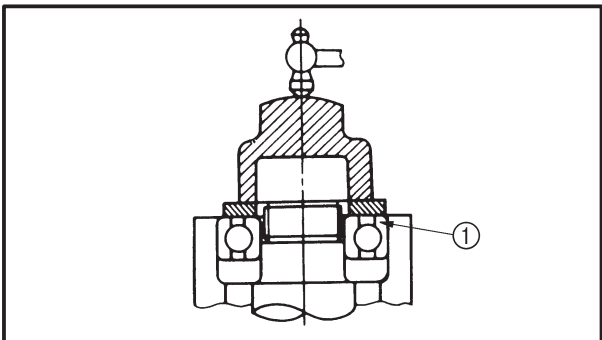


EAS00024

## BEARINGS AND OIL SEALS

1. 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 base grease. Oil bearings liberally when installing, if appropriate.

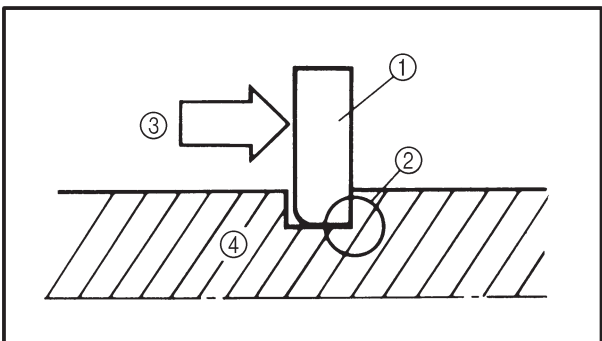
① Oil seal



## 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

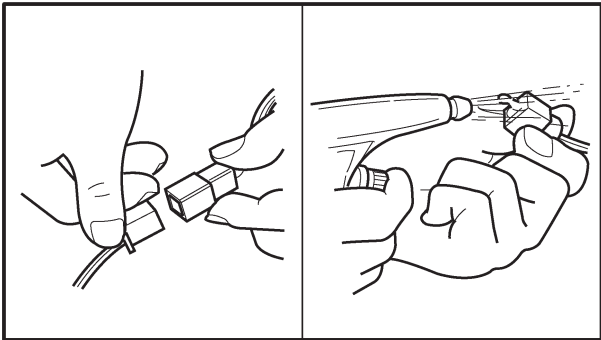
EAS00026

## CHECKING THE CONNECTIONS

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

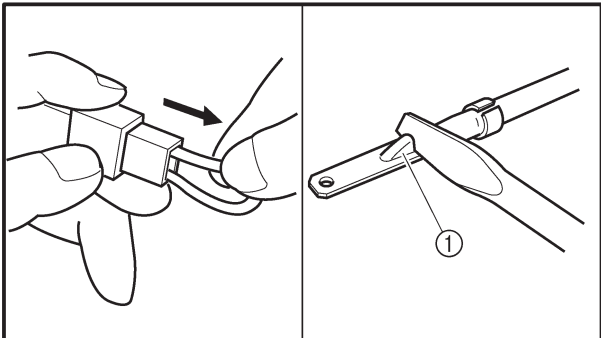
### 1. Disconnect:

- lead
- coupler
- connector



### 2. Check:

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

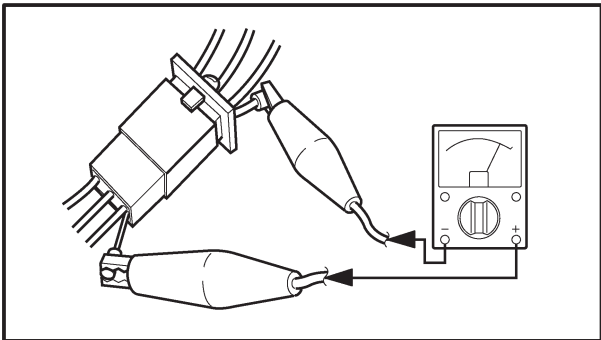


### 3. Check:

- all connections
- Loose connection → Connect properly.

### NOTE:

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

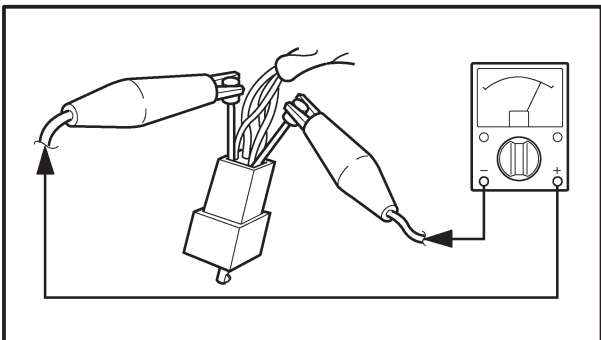


### 4. Connect:

- lead
- coupler
- connector


### NOTE:

Make sure all connections are tight.



### 5. Check:

- continuity
- (with the pocket tester)

	<b>Pocket tester 90890-03112</b>
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### NOTE:

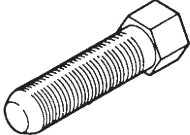
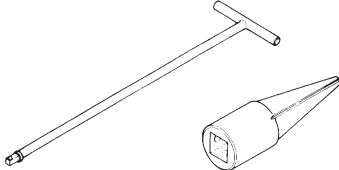

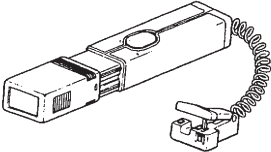

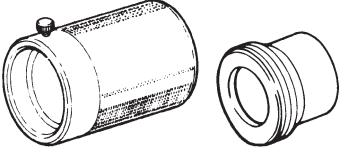
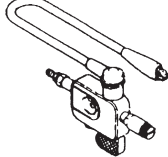
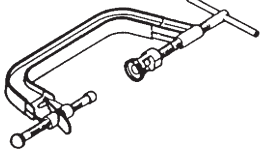
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.



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.

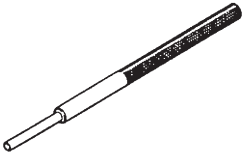
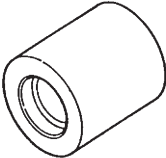
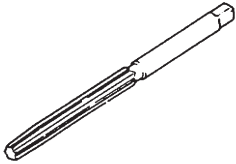
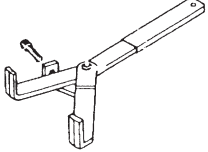
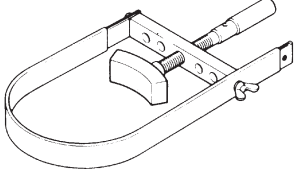
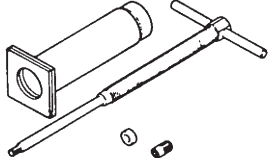

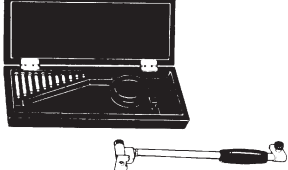
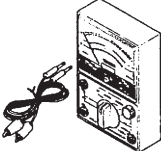
Tool No.	Tool name/Function	Illustration
90890-01080	<p>Flywheel puller</p> <p>This tool is used to remove the generator rotor.</p>	
<p>T-handle 90890-01326 Damper rod holder 90890-01294</p>	<p>T-handle Damper rod holder These tools are used to hold the cartridge cylinder when loosening or tightening the cartridge cylinder bolt.</p>	
90890-01312	<p>Fuel level gauge</p> <p>This tool is used to measure the fuel level in the float chamber.</p>	
90890-03141	<p>Timing light</p> <p>This tool is used to check the ignition timing.</p>	
90890-03170	<p>Belt tension gauge</p> <p>This tool is used to measure the drive belt slack.</p>	
<p>Fork seal driver weight 90890-01367 Adapter 90890-01374</p>	<p>Fork seal driver weight Adapter These tools are used to install the front fork's oil seal and dust seal.</p>	
90890-06754	<p>Ignition checker</p> <p>This tool is used to check the ignition system components.</p>	
90890-04019	<p>Valve spring compressor</p> <p>This tool is used to remove or install the valve assemblies.</p>	



## SPECIAL TOOLS

**GEN  
INFO**

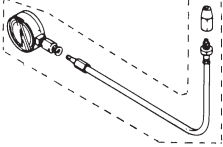
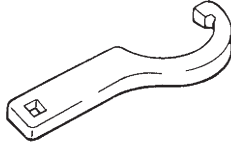
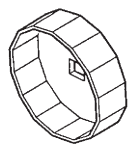
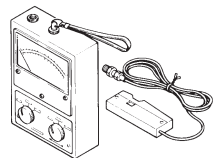
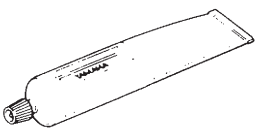
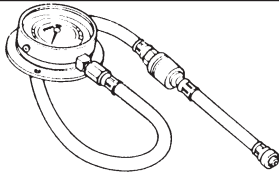
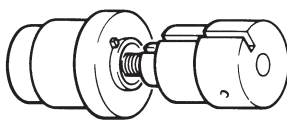
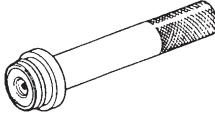


Tool No.	Tool name/Function	Illustration
90890-04064	Valve guide remover (6 mm)  This tool is used to remove or install the Valve guides.	
90890-04065	Valve guide installer  This tool is used to install the valve guides.	
90890-04066	Valve guide reamer  This tool is used to rebores the new valve guides.	
90890-04086	Clutch holding tool  This tool is used to hold the clutch boss when removing or installing the clutch boss nut.	
90890-01701	Sheave holder This tool is used to hold the generator rotor when removing or installing the generator rotor bolt, generator shaft bolt or pickup coil rotor bolt.	
90890-01304	Piston pin puller set  This tool is used to remove the piston pins.	
90890-03009	Micrometer (75 ~ 100 mm)  This tool is used to measure the piston skirt diameter.	
90890-03017	Cylinder bore gauge (50 ~ 100 mm)  This tool is used to measure the cylinder bore.	
90890-03112	Pocket tester  This tool is used to check the electrical system.	

## SPECIAL TOOLS

**GEN  
INFO**



Tool No.	Tool name/Function	Illustration
Compression gauge 90890-03081 Compression gauge adapter 90890-04082	Compression gauge  These tools are used to measure engine compression.	
90890-01443	Steering nut wrench  This tool is used to loosen or tighten the steering stem ring nuts.	
90890-01426	Oil filter wrench  This tool is needed to loosen or tighten the oil filter cartridge.	
90890-03113	Engine tachometer  This tool is used to check engine speed.	
90890-85505	Yamaha bond No.1215  This sealant is used to seal two mating surfaces (e.g., crank case mating surfaces).	
90890-03153	Oil pressure gauge  This tool is used to measure the engine oil pressure.	
90890-04095	Plane bearing installer/remover  This tool is used to install or remove the bearing.	
90890-04058	Middle driver shaft bearing driver  This tool is used to install the seal	





**SPEC**

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SPEC




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## GENERAL SPECIFICATIONS

**SPEC**

### SPECIFICATIONS

#### GENERAL SPECIFICATIONS

Item	Standard	Limit
<b>Dimensions</b>		
Overall length	2,500 mm	...
Overall width	980 mm	...
Overall height	1,140 mm	...
Seat height	710 mm	...
Wheelbase	1,685 mm	...
Minimum ground clearance	145 mm	...
Minimum turning radius	3,200 mm	...
<b>Weight</b>		
Wet (with oil and a full fuel tank)	332 kg	...
Dry (without oil and fuel)	307 kg	...
Maximum load (total of cargo, rider, passenger, and accessories)	196 kg	...



## ENGINE SPECIFICATIONS

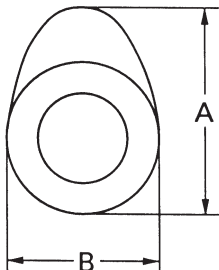
Item	Standard	Limit
<b>Engine</b> Engine type Displacement Cylinder arrangement Bore × stroke Compression ratio Engine idling speed Vacuum pressure at engine idling speed Standard compression pressure (at sea level)	Air-cooled, 4-stroke, OHV 1,602 cm <sup>3</sup> V-type 2-cylinder 95 × 113 mm 8.3:1 850 ~ 950 r/min 52 kPa (390 mm Hg) 1,200 kPa 12.0 kg/cm <sup>2</sup> , at 200 r/min	... ... ... ... ... ... ...
<b>Fuel</b> Recommended fuel Fuel tank capacity Total (including reserve) Reserve only	Regular unleaded gasoline 20 L 3.5 L	... ... ...
<b>Engine oil</b> Lubrication system Recommended oil  Quantity Total amount Without oil filter cartridge replacement With oil filter cartridge replacement Oil pressure (hot) Relief valve opening pressure	Dry sump SAE20W40SE or SAE10W30SE 5.0 L 3.7 L 4.1 L 60 kPa (0.6 kg/cm <sup>2</sup> ) at 900 r/min 600 kPa (6.0 kg/cm <sup>2</sup> )	... ... ... ... ...
<b>Transfer gear oil</b> Recommended oil Quantity	SAE80API "GL-4" hypoid gear oil 0.4 L	... ...
<b>Oil filter</b> Oil filter type Bypass valve opening pressure	Cartridge (paper) 80 ~ 120 kPa (0.8 ~ 1.2 kg/cm <sup>2</sup> )	... ...



# ENGINE SPECIFICATIONS

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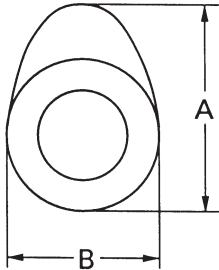
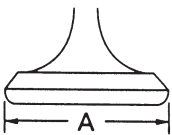
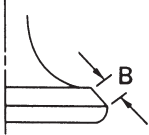
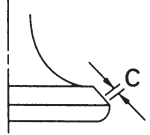
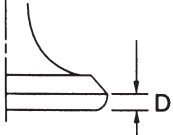


Item	Standard	Limit
<b>Engine oil pump</b> Oil pump type Inner rotor to outer rotor tip clearance Inner rotor outer rotor 2 to oil pump housing clearance (feed pump) Inner rotor outer rotor 1 to oil pump housing clearance (scavenging pump)	Trochoidal 0.00 ~ 0.12 mm 0.03 ~ 0.08 mm 0.06 ~ 0.11 mm	... 0.17 mm 0.13 mm 0.16 mm
Transfer oil pump Oil pump type Inner rotor to outer rotor tip clearance Inner rotor outer rotor to oil pump housing clearance	Trochoid 0.07 ~ 0.12 mm 0.03 ~ 0.08 mm	0.17 mm 0.16 mm
<b>Starting system type</b>	Electric starter	
<b>Spark plugs</b> Model Manufacturer Quantity Spark plug gap	DPR7EA-9/X22EPR-U9 NGK/DENSO 4 0.8 ~ 0.9 mm	... ... ... ...
<b>Cylinder heads</b> Max. warpage	...	0.10 mm
<b>Camshafts</b> Drive system Crankcase hole inside diameter Camshaft cover hole inside diameter Camshaft journal diameter (crankcase side) Camshaft journal diameter (camshaft cover side) Camshaft to crankcase clearance Camshaft to camshaft cover clearance Camshaft intake lobe dimensions 	Gear drive 25.000 ~ 25.021 mm 28.000 ~ 28.021 mm 24.937 ~ 24.950 mm 27.967 ~ 27.980 mm 0.050 ~ 0.084 mm 0.020 ~ 0.054 mm	... ... ... ... ... ... ...

# ENGINE SPECIFICATIONS

**SPEC**



Item	Standard	Limit
Measurement A Measurement B Camshaft exhaust lobe dimensions 	36.594 ~ 36.649 mm 31.950 ~ 32.050 mm	36.494 mm 31.850 mm
Measurement A Measurement B	36.554 ~ 36.654 mm 31.950 ~ 32.050 mm	36.454 mm 31.850 mm
<b>Rocker arms, Rocker arm shafts</b> Rocker arm inside diameter Rocker arm shaft outside diameter Rocker arm to rocker arm shaft clearance	15.000 ~ 15.018 mm 14.981 ~ 14.991 mm 0.009 ~ 0.037 mm	15.036 mm 14.97 mm 0.08 mm
<b>Valves, valve seats, valve guides</b> Valve clearance (cold) Intake Exhaust Valve dimensions	0 ~ 0.04 mm 0 ~ 0.04 mm	... ...
   		
Head Diameter Face Width Seat Width Margin Thickness		
Valve head diameter A Intake Exhaust Valve face width B Intake Exhaust Valve seat width C Intake Exhaust	33.9 ~ 34.1 mm 27.9 ~ 28.1 mm 1.3 ~ 2.3 mm 1.2 ~ 2.4 mm 0.9 ~ 1.1 mm 0.9 ~ 1.1 mm	... ... ... ... 2.0 mm 2.0 mm