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# XF50W

# SERVICE MANUAL

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**LIT-11616-20-58**

**3B3-F8197-10**

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**XF50W 2006  
SERVICE MANUAL**  
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LIT-11616-20-58

## NOTICE

This manual was produced by the Yamaha Motor Taiwan 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.

Yamaha Motor Taiwan 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:**

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 scooter operator, a bystander or a person checking or repairing the scooter.



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

**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.

⑥      ②      ①

CYLINDER AND PISTON **ENG**

**68190011**  
**CYLINDER AND PISTON**

④

⑤

⑦

Order	Job/Part	Qty	Remarks
<b>Removing the cylinder and piston</b>			
	Cylinder head		Remove the parts in the order listed. Refer to "CYLINDER HEAD".
1	Timing chain guide(exhaust side)	1	
2	Cylinder	1	
3	Dowel pin	2	
4	Cylinder gasket	1	
5	Piston pin clip	2	Refer to "REMOVING THE CYLINDER AND PISTON" and "INSTALLING THE PISTON AND CYLINDER".
6	Piston pin	1	
7	Piston	1	
8	Piston ring set	1	For installation, reverse the removal procedure.

**CYLINDER AND PISTON** **ENG**

**REMOVING THE CYLINDER AND PISTON**

1. Remove:

- piston pin clip ①
- piston pin ②
- piston ③

**CAUTION:**  
Do not use a hammer to drive the piston pin out.

**NOTE:**

- Before removing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- Before removing the piston pin, deburr the piston pin clip's groove and the piston's pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set ④.

**Piston pin puller set**  
90890-01304(YU-01304)

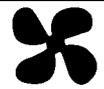
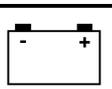
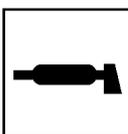
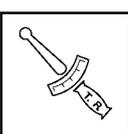
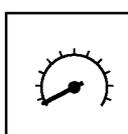
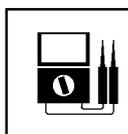
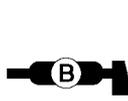
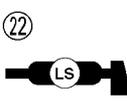
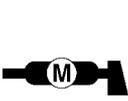
2. Remove:

- top ring
- 2nd ring
- oil ring

**NOTE:**  
When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.

5-31

5-32

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

EAS00008

## 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

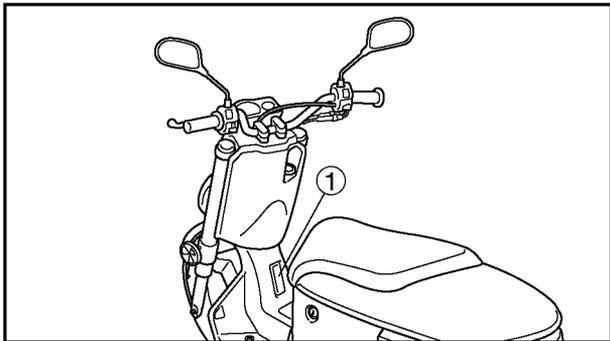
# TABLE OF CONTENTS

<b>GENERAL INFORMATION</b>		
	<b>GEN INFO</b>	<b>1</b>
<b>SPECIFICATIONS</b>		
	<b>SPEC</b>	<b>2</b>
<b>PERIODIC CHECKS AND ADJUSTMENTS</b>		
	<b>CHK ADJ</b>	<b>3</b>
<b>CHASSIS</b>		
	<b>CHAS</b>	<b>4</b>
<b>ENGINE</b>		
	<b>ENG</b>	<b>5</b>
<b>COOLING SYSTEM</b>		
	<b>COOL</b>	<b>6</b>
<b>FUEL INJECTION SYSTEM</b>		
	<b>FI</b>	<b>7</b>
<b>ELECTRICAL SYSTEM</b>		
	<b>ELEC</b>	<b>8</b>
<b>TROUBLESHOOTING</b>		
	<b>TRBL SHTG</b>	<b>9</b>

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## CHAPTER 1 GENERAL INFORMATION

<b>SCOOTER IDENTIFICATION</b> .....	<b>1-1</b>
VEHICLE IDENTIFICATION NUMBER .....	1-1
MODEL LABEL .....	1-1
<b>FEATURES</b> .....	<b>1-2</b>
OUTLINE OF THE FI SYSTEM .....	1-2
FI SYSTEM .....	1-3
<b>IMPORTANT INFORMATION</b> .....	<b>1-4</b>
PREPARATION FOR REMOVAL AND DISASSEMBLY .....	1-4
REPLACEMENT PARTS .....	1-4
GASKETS, OIL SEALS AND O-RINGS .....	1-4
LOCK WASHERS/PLATES AND COTTER PINS .....	1-5
BEARINGS AND OIL SEALS .....	1-5
CIRCLIPS .....	1-5
EQUIPMENT PREPARATION .....	1-6
<b>CHECKING THE CONNECTIONS</b> .....	<b>1-7</b>
<b>SPECIAL TOOLS</b> .....	<b>1-8</b>



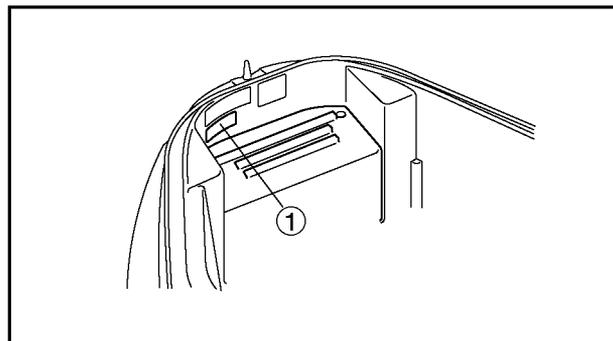
EAS00015

## GENERAL INFORMATION SCOOTER IDENTIFICATION

EAS00017

### VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the frame.



EAS00018

### MODEL LABEL

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

EAS00896

## FEATURES

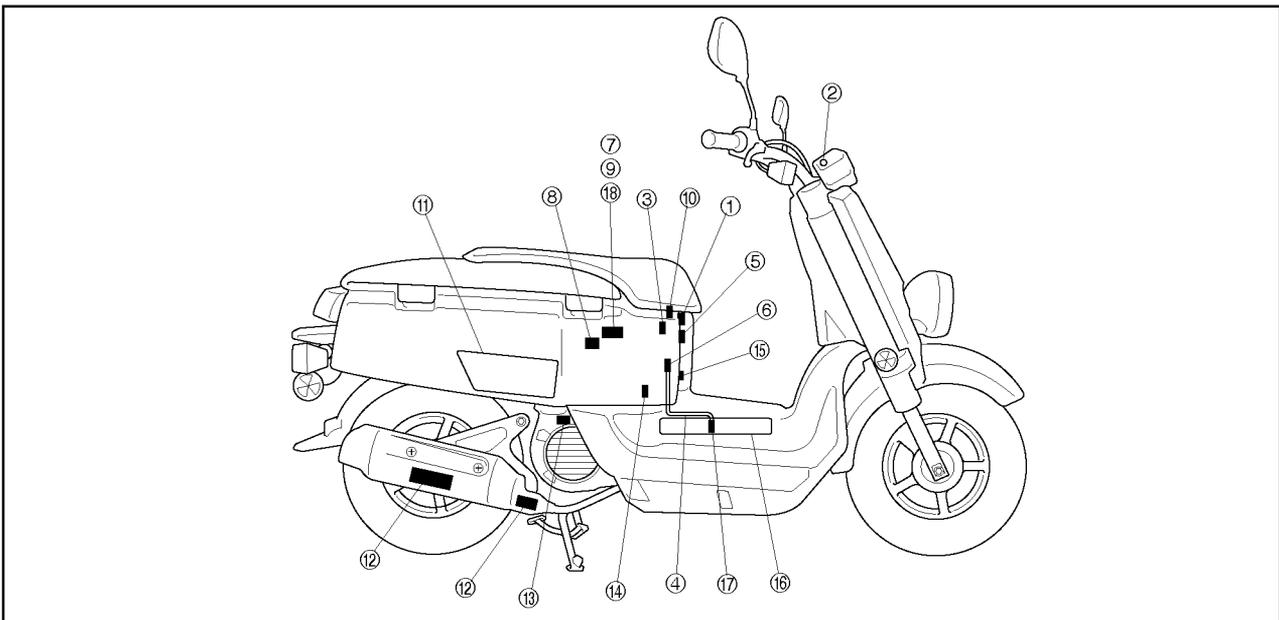
### OUTLINE OF THE FI SYSTEM

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 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 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 ECU                            | ⑩ Battery                    |
| ② Engine trouble warning light   | ⑪ Air filter case            |
| ③ Lean angle cut-off switch      | ⑫ Catalytic converter        |
| ④ Fuel hose                      | ⑬ Crankshaft position sensor |
| ⑤ Ignition coil                  | ⑭ Coolant temperature sensor |
| ⑥ Fuel injector                  | ⑮ Spark plug                 |
| ⑦ Intake air pressure sensor     | ⑯ Fuel tank                  |
| ⑧ ISC (idle speed control) valve | ⑰ Fuel pump                  |
| ⑨ Intake air temperature sensor  | ⑱ Throttle position sensor   |

EAS00897

**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 250 kPa (2.5 kg/cm<sup>2</sup>, 35.6 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 crankshaft position sensor, intake air pressure sensor, intake temperature sensor and engine temperature sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.

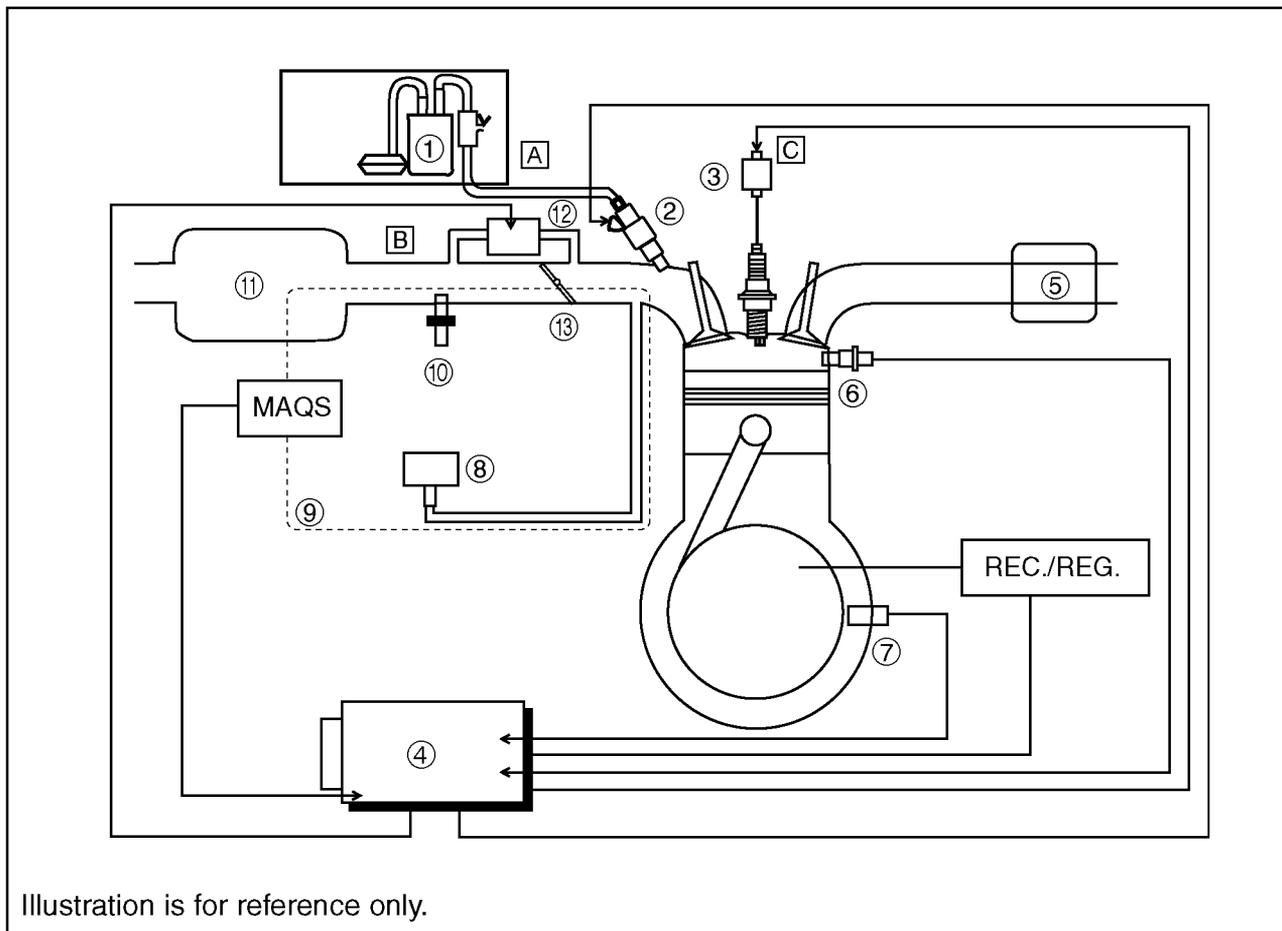
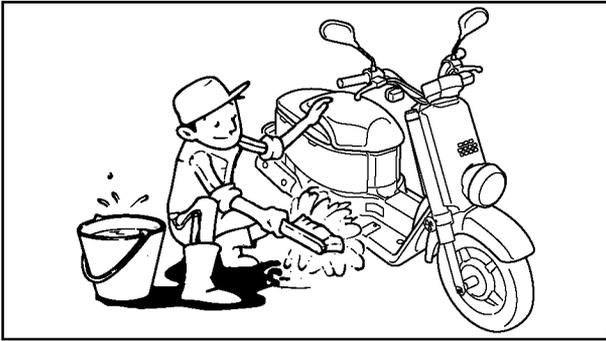


Illustration is for reference only.

- ① Fuel pump
- ② Fuel injector
- ③ Ignition coil
- ④ ECU
- ⑤ Catalytic converter
- ⑥ Coolant temperature sensor
- ⑦ Crankshaft position sensor
- ⑧ Intake air pressure sensor
- ⑨ Throttle body assembly
- ⑩ Intake air temperature sensor
- ⑪ Air filter case
- ⑫ ISC (idle speed control) valve
- ⑬ Throttle position sensor
- A Fuel system
- B Air system
- C Control system

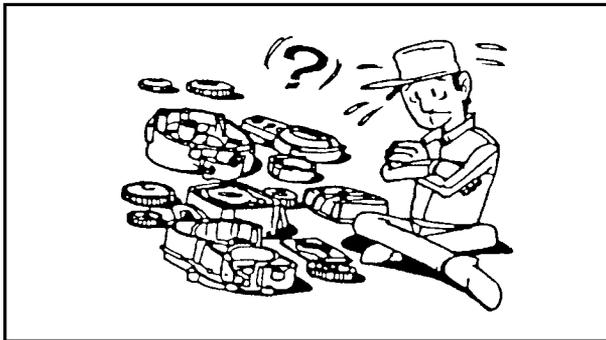


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**IMPORTANT INFORMATION**

**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 the "SPECIAL TOOLS".
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.
4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.



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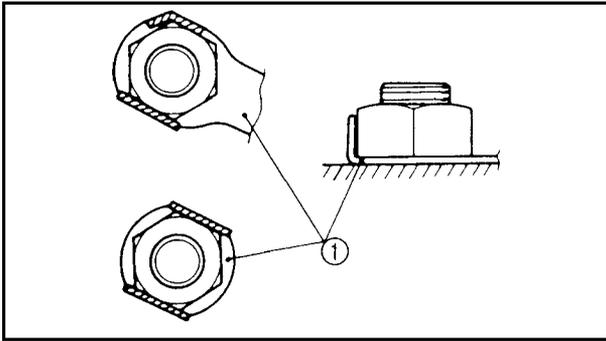
**REPLACEMENT PARTS**

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

EAS00022

**GASKETS, OIL SEALS AND O-RINGS**

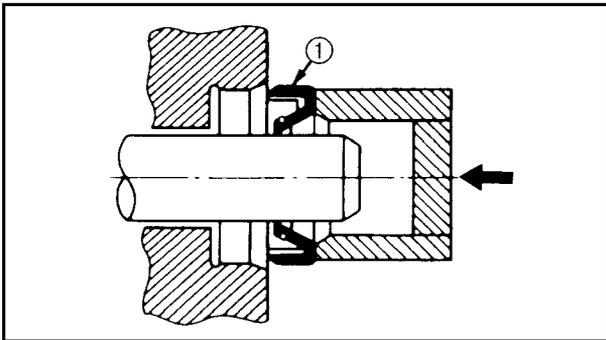
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



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.

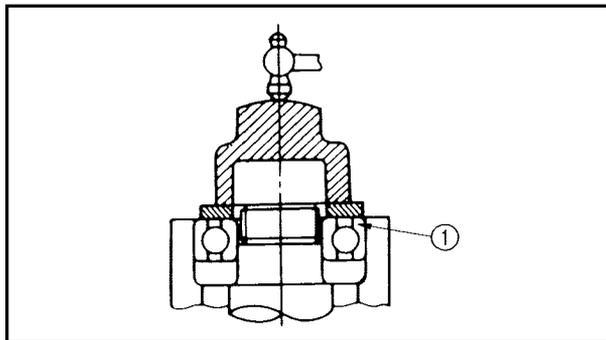


EAS00024

**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.

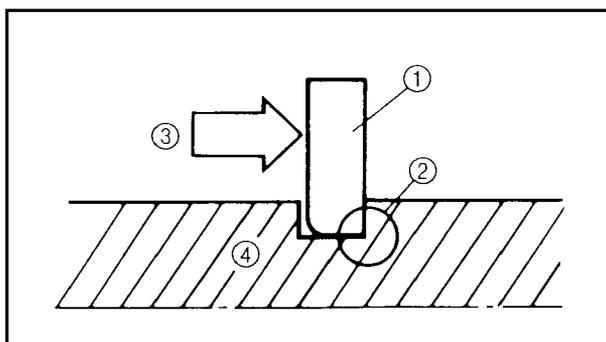
① Oil seal



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

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

① Bearing

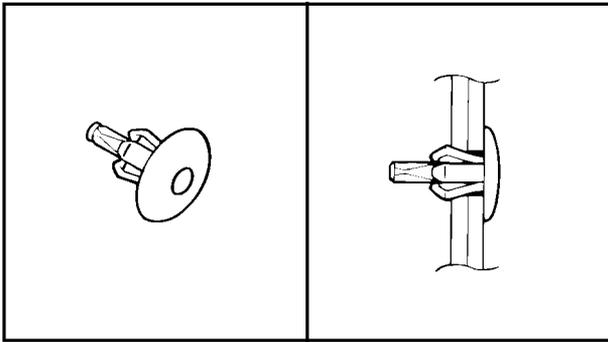


EAS00025

**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

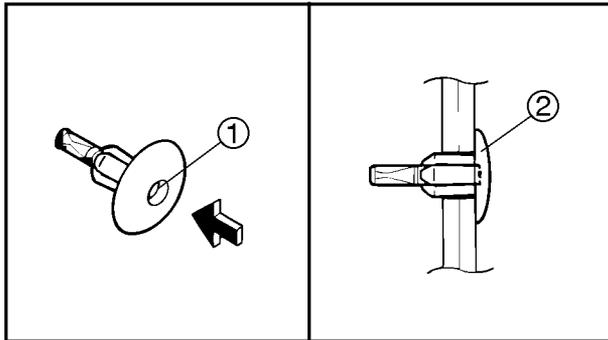


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**EQUIPMENT PREPARATION**

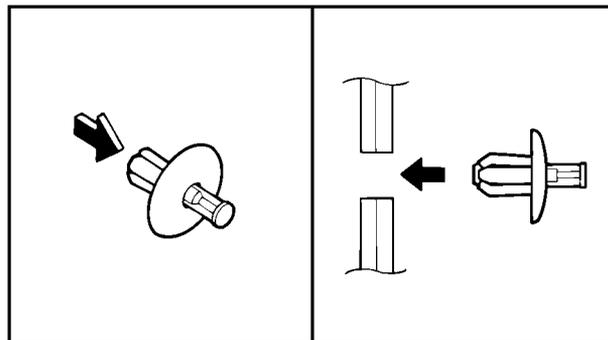
**Push Rivet (Push type)**

Assembly status of the push rivet(push type).



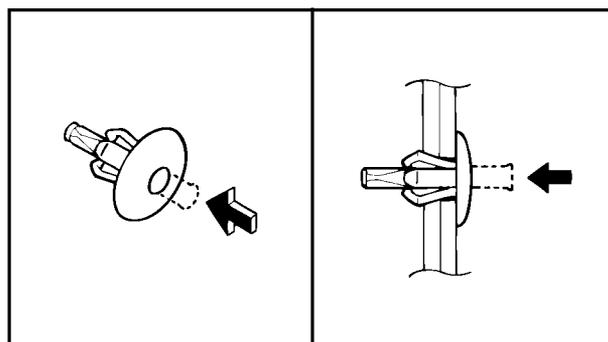
**Disassembling**

1. Press center pin① inward to release the lock.
2. Remove the push rivet main body②.



**Assembling**

1. Restore the center pin, replace the push rivet main body.



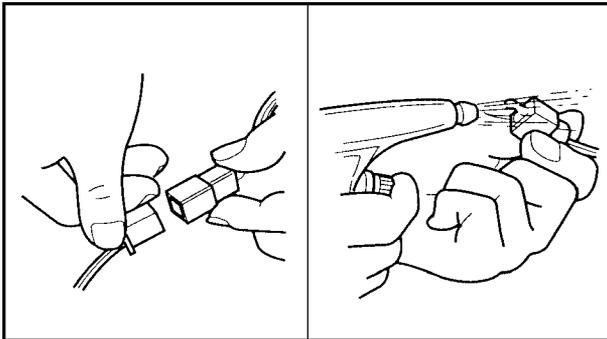
2. Push in the center pin until leveling off with the surface position of the push rivet main body.

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## CHECKING THE CONNECTIONS

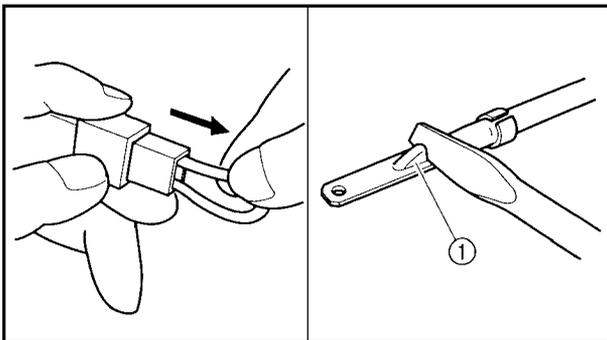
Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
  - lead
  - coupler
  - connector



2. Check:
  - lead
  - coupler
  - connector

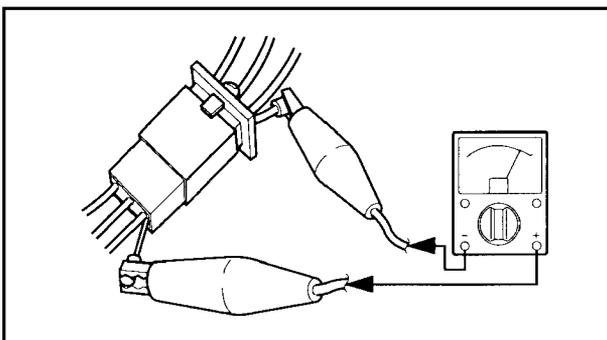
Moisture → Dry with an air blower.  
Rust/stains → Connect and disconnect several times.



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

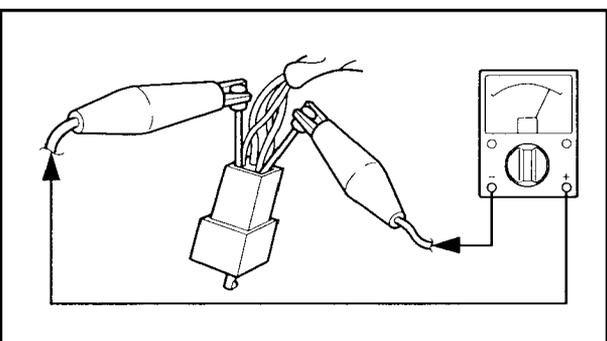
**NOTE:** \_\_\_\_\_  
Make sure all connections are tight.

5. Check:
  - continuity  
(with the pocket tester)

	<p><b>Pocket tester</b> 90890-03112(YU-03112-C)</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.



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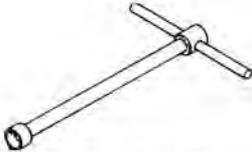
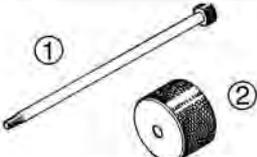
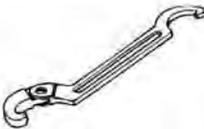
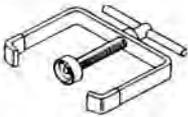
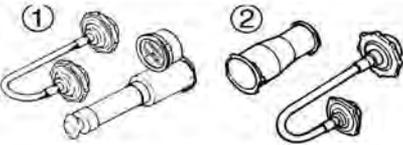
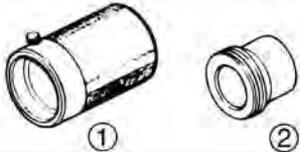
## SPECIAL TOOLS

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.

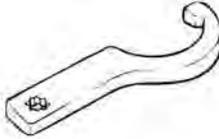
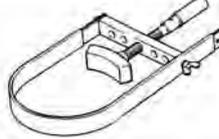
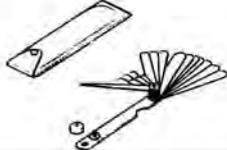
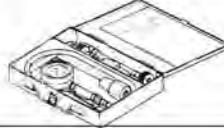
When placing an order, refer to the list provided below to avoid any mistakes.

**NOTE:**

- For U.S.A. and Canada, use part number starting with "YM-", "YU-", or "ACC-".
- For others, use part number starting with "90890-".

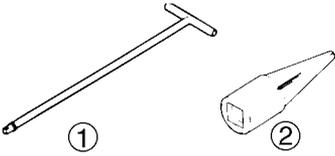
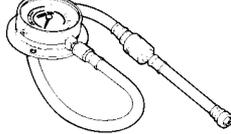
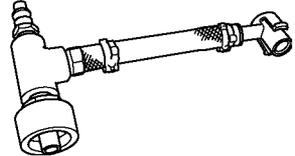
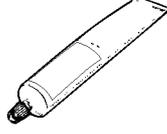
Tool NO.	Tool name / Function	Illustration
90890-01052	Meter gear bush tool  This tool is used when removing or installing the meter gear.	
90890-01085 YU-01083-2 90890-01084 YU-01083-3	Slide hammer bolt(8mm)① Weight②  These tools are needed to remove the camshaft.	
90890-01235 YU-01235	Rotor holding tool  This tool is used to hold the primary fixed sheave and secondary sheave assembly.	
90890-01268 YU-01268	Ring nut wrench  This tool is used to loosen and tighten the exhaust and steering ring nut.	
90890-01304 YU-01304	Piston pin puller set  This tool is used to remove the piston pin.	
90890-01337 YM-33285 YM-33285-6	Clutch spring holder  These tool are used for removing the nut with holding the compression spring.	
90890-01325 YU-24460-01 90890-01352 YU-33984	Radiator cap tester① Radiator cap tester adapter②  This tester and its adapter are needed for checking the cooling system.	
90890-01367 YM-A9409-7 90890-01400 YM-A9409-3	Fork seal driver weight① Fork seal driver attachment②  This tool is used when installing the fork seal.	



Tool NO.	Tool name / Function	Illustration
90890-01384 YM-33299	<p>Oil seal guide</p> <p>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</p>	
90890-01403 YU-A9472	<p>Steering nut wrench</p> <p>This tool is used to loosen and tighten the steering ring nut.</p>	
90890-01444 YM-A9409-7	<p>Steering nut wrench(45mm)</p> <p>This tool is used to loosen and tighten the upper bearing inner race.</p>	
90890-01468 YU-33270-B	<p>Flywheel puller set</p> <p>This tool is used to remove the AC magneto rotor.</p>	
90890-01493	<p>Socket wrench(39mm)</p> <p>This tool is used when removing or installing the secondary sheave nut.</p>	
90890-01701 YS-01880-A	<p>Sheave holder</p> <p>This tool is used for holding the secondary sheave.</p>	
90890-03079 YM-34483	<p>Thickness gauge</p> <p>This tool is used to measure the valve clearance.</p>	
90890-03081 YU-33223	<p>Compression gauge</p> <p>This tool is used to measure the engine compression.</p>	
90890-03112 YU-03112-C	<p>Pocket tester</p> <p>This instrument is invaluable for checking the electrical system.</p>	
90890-03174  90890-03141 YU-03141	<p>Digital circuit tester</p> <p>This instrument is invaluable for checking the electrical system.</p>	



Tool NO.	Tool name / Function	Illustration
90890-03141 YU-03141	Timing light  This tool is used to check the ignition timing.	
90890-03182 YU-03182	FI diagnostic tool  Execute CO adjustment, confirm fault Code, self diagnosis tool	
90890-04101	Valve lapper  This tool is needed to remove and install the valve lifters.	
90890-04058 YM-04058 90890-04145	Middle driven shaft bearing driver <sup>①</sup> Mechanical seal installer <sup>②</sup>  These tools are used to install the water pump seal.	
90890-04019 YM-04019 90890-04148 YM-04148	Valve spring compressor Compressor adapter(Ø16.5mm)  These tools are used when removing or installing the valve and the valve spring.	
90890-06760	Digital tachometer  This tool is needed for detecting engine rpm.	
90890-06754 YM-34487	Ignition checker  This tool is used to check the ignition system components.	
90890-04111 YM-04111	Valve guide remover(4.0mm)  This tool is used to remove or install the valve guides.	
90890-04112 YM-04112	Valve guide installer(4.0mm)  This tool is used to install the valve guides.	
90890-04113 YM-04113	Valve guide remover(4.0mm)  This tool is used to rebore the new valve guides.	

Tool NO.	Tool name / Function	Illustration
90890-01326 YM-01326 90890-01294 YM-01300-1	T-handle① Damper rod holder② These tools are used to hold the damper rod when removing or installing the damper rod.	
90890-03153 YU-03153	Pressure gauge  This tool is used to measure fuel pressure.	
90890-03181	Fuel pressure adapter  This tool is used to measure fuel pressure.	
90890-85505 ACC-11001-05-01	Yamaha bond NO.1215 Sealant (Quick Gasket®) This sealant (bond) is used on crankcase mating surfaces(e.g., crankcase mating surfaces).	

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**CHAPTER 2  
SPECIFICATIONS**

**GENERAL SPECIFICATIONS ..... 2-1**  
**ENGINE SPECIFICATIONS ..... 2-2**  
**CHASSIS SPECIFICATIONS ..... 2-12**  
**ELECTRICAL SPECIFICATIONS ..... 2-15**  
**CONVERSION TABLE / GENERAL TIGHTENING TORQUE SPECIFICATIONS ..... 2-18**  
**TIGHTENING TORQUES..... 2-19**  
    ENGINE ..... 2-19  
    CHASSIS ..... 2-21  
**LUBRICATION POINTS AND LUBRICANT TYPES ..... 2-23**  
    ENGINE ..... 2-23  
    CHASSIS ..... 2-25  
**COOLING SYSTEM DIAGRAMS ..... 2-26**  
**CABLE ROUTING ..... 2-29**



**SPECIFICATIONS**

**GENERAL SPECIFICATIONS**

Item	Standard	Limit
<b>Model code</b>	3B32(USA) 3B33(CAN)	... ...
<b>Dimensions</b>		
Overall length	1905mm(75.00in)	...
Overall width	685mm(26.97in)	...
Overall height	1045mm(41.14in)	...
Seat height	735mm(28.94in)	...
Wheelbase	1280mm(50.39in)	...
Minimum ground clearance	115mm(4.53in)	...
Minimum turning radius	2000mm(78.74in)	...
<b>Weight</b>		
Wet(without oil and a full fuel tank)	90kg(198lb)	...
Dry(without oil and fuel)	85kg(187lb)	...
Maximun load(total of cargo, rider, passenger, and accessories)	175kg(386lb)	...



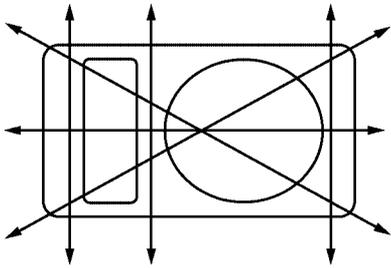
## ENGINE SPECIFICATIONS

Item	Standard	Limit
<b>Engine</b>		
Engine type	Liquid-cooled, 4-stroke, SOHC	...
Displacement	0.049L(49cm <sup>3</sup> , 2.99cu-in)	...
Cylinder arrangement	Forward inclined single cylinder	...
Borexstroke	38.0×43.5mm(1.496×1.713in)	...
Compression ratio	12:1	...
Engine idle speed	2000~2200r/min	...
Vacuum pressure at engine idle speed	34.7kPa(260mmHg, 10.24inHg)	...
Standard compression pressure(at sea level)	1450kPa(14.5kg/cm <sup>2</sup> ) at 700r/min	...
<b>Fuel</b>		
Recommended fuel	Unleaded gasoline only(USA) Regular unleaded gasoline only(CAN)	...
Fuel tank capacity Total	4.5L(0.98 Imp gal, 1.18 US gal)	...
<b>Engine oil</b>		
Lubrication system	Wet sump	...
Recommended oil	YAMALUBE4, SAE10W30 or SAE20W40 API service SG type or higher JASO stand MA	...
Quantity		
Periodic oil change	0.73~0.83L(0.67~0.76 Imp qt, 0.80~0.90 US qt)	...
Total amount	0.80~0.90L(0.74~0.83 Imp qt, 0.87~0.98 US qt)	...
<b>Final gear oil</b>		
Recommended oil	SAE10W30 hypoid gear oil	...
Periodic oil change	0.09~0.11L(0.08~0.10 Imp qt, 0.10~0.12 US qt)	...
Total amount	0.11~0.13L(0.10~0.12 Imp qt, 0.12~0.14 US qt)	...
<b>Oil filter</b>		
Oil filter type	Wire mesh	...

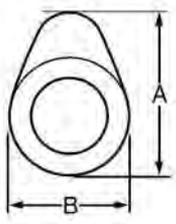
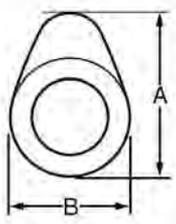
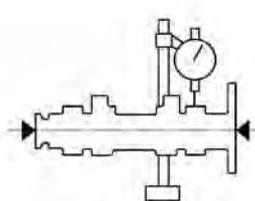
# ENGINE SPECIFICATIONS

**SPEC**



Item	Standard	Limit
<b>Oil pump</b>		
Oil pump type	Trochoid	...
Inner rotor to outer rotor tip clearance	0.15mm(0.006in) or less	0.23mm (0.009in)
Outer rotor to pump housing clearance	0.13~0.18mm(0.005~0.007in)	0.25mm (0.010in)
Oil pump housing to inner rotor and outer rotor clearance	0.07~0.12mm(0.003~0.005in)	0.19mm (0.008in)
<b>Cooling system</b>		
Radiator capacity	0.26L(0.23 Imp gal, 0.28 US gal)	...
Radiator cap opening pressure	107.9~137.3kPa (1.1~1.4kg/cm <sup>2</sup> , 15.6~19.9psi)	...
Valve relief pressure	1.1kPa(0.01kg/cm <sup>2</sup> , 0.16psi)	...
Radiator core		
Width	127.4mm(5.016in)	...
Height	87mm(3.425in)	...
Depth	16mm(0.630in)	...
Coolant reservoir		
Capacity(up to the maximum level mark)	0.25L(0.22 Imp gal, 0.27 US gal)	...
<From low to full level>	0.15L(0.13 Imp gal, 0.16 US gal)	...
Water pump		
Water pump type	Single-suction centrifugal pump	...
Max. impeller shaft tilt	...	0.15mm (0.0059in)
<b>Starting system type</b>	Electric and kick starter	...
<b>Electric fuel injection</b>		
Type	3B3	...
Manufacturer	AISAN	...
<b>Spark plug</b>		
Model(manufacturer)×quantity	CR7E(NGK)×1	...
Spark plug gap	0.7~0.8mm(0.028~0.031in)	...
<b>Cylinder head</b>		
Volume	3.1~3.5cm <sup>3</sup> (0.19~0.21cu-in)	...
Maximum warpage	...	0.05mm (0.0020in)
		
11110304		

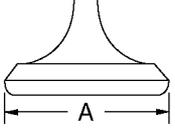
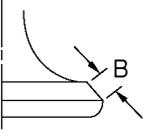
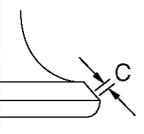
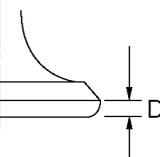


Item	Standard	Limit
<b>Camshaft</b>		
Drive system	Chain drive(left)	...
Intake camshaft lobe dimensions		
		
Measurement A	30.158~30.258mm (1.1873~1.1913in)	30.058mm (1.1834in)
Measurement B	25.082~25.182mm (0.9875~0.9914in)	24.982mm (0.9835in)
Exhaust camshaft lobe dimensions		
		
Measurement A	30.158~30.258mm (1.1873~1.1913in)	30.058mm (1.1834in)
Measurement B	25.020~25.120mm (0.9850~0.9890in)	24.920mm (0.9811in)
Maximum camshaft runout	...	0.03mm (0.0012in)
		

# ENGINE SPECIFICATIONS

**SPEC**

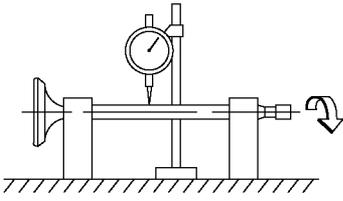


Item	Standard	Limit
<b>Timing chain</b>		
Model/number of links	Morse 92RH2005/82	...
Tensioning system	Automatic	...
<b>Valve, valve seats, valve guides</b>		
Valve clearance(cold)		
Intake	0.10~0.16mm (0.0039~0.0063in)	...
Exhaust	0.18~0.24mm (0.0071~0.0094in)	...
Valve dimensions		
 Head Diameter	 Face Width	 Seat Width
 Margin Thickness		
Valve head diameter A		
Intake	15.4~15.6mm (0.6063~0.6142in)	...
Exhaust	16.4~16.6mm (0.6457~0.6535in)	...
Valve face width B		
Intake	1.48~2.19mm (0.0583~0.0862in)	...
Exhaust	1.48~2.19mm (0.0583~0.0862in)	...
Valve seat width C		
Intake	0.9~1.1mm (0.0354~0.0433in)	1.6mm (0.0630in)
Exhaust	0.9~1.1mm (0.0354~0.0433in)	1.6mm (0.0630in)
Valve margin thickness D		
Intake	0.70mm(0.0276in)	...
Exhaust	0.70mm(0.0276in)	...
Valve stem diameter		
Intake	3.975~3.990mm (0.1565~0.1571in)	3.945mm (0.1553in)
Exhaust	3.975~3.990mm (0.1565~0.1571in)	3.930mm (0.1547in)
Valve guide inside diameter		
Intake	4.000~4.012mm (0.1575~0.1580in)	4.050mm (0.1594in)
Exhaust	4.000~4.012mm (0.1575~0.1580in)	4.050mm (0.1594in)

# ENGINE SPECIFICATIONS

**SPEC**

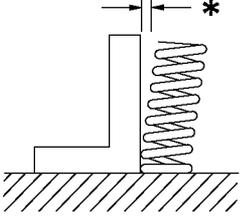


Item	Standard	Limit
Valve stem to valve guide clearance Intake  Exhaust	0.010~0.037mm (0.0004~0.0015in)  0.025~0.052mm (0.0010~0.0020in)	0.080mm (0.0031in)  0.100mm (0.0039in)
Valve stem runout  	...	0.010mm (0.0004in)
Valve seat width Intake  Exhaust	0.9~1.1mm (0.0354~0.0433in)  0.9~1.1mm (0.0354~0.0433in)	1.6mm (0.0630in)  1.6mm (0.0630in)

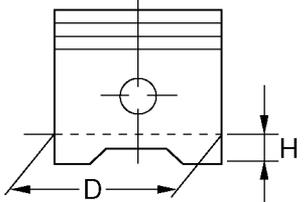
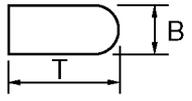
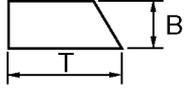
# ENGINE SPECIFICATIONS

**SPEC**



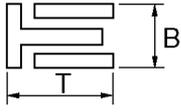
Item	Standard	Limit
<b>Valve springs</b>		
Free length		
Intake	39.35mm(1.5492in)	37.38mm
Exhaust	41.57mm(1.6366in)	(1.4717in)
		39.49mm
		(1.5547in)
Installed length(valve closed)		
Intake	28.0mm(1.1024in)	...
Exhaust	30.0mm(1.1811in)	...
Compressed spring force(installed)		
Intake	91.1~104.9N	...
	(9.3~10.7kg, 20.48~23.58lb)	
Exhaust	107.9~124.1N	...
	(11.0~12.7kg, 24.26~27.90lb)	
Spring tilt		
	Intake	...
	Exhaust	2.5°/1.7mm
		(2.5°/0.0669in)
		2.5°/1.8mm
		(2.5°/0.0709in)
Winding direction(top view)		
Intake	Clockwise	...
Exhaust	Clockwise	...
		
Valve seat reformed	Yes	...
<b>Cylinder</b>		
Cylinder arrangement	Forward inclined single cylinder	...
Borexstroke	38.0×43.5mm(1.496×1.713in)	...
Compression ratio	12:1	...
Bore	38.000~38.010mm	...
	(1.496~1.497in)	
Maximum taper	...	0.05mm
Maximum out-of-round	...	(0.0020in)
		0.05mm
		(0.0020in)



Item	Standard	Limit
<b>Piston</b>		
Piston-to-cylinder clearance	0.010~0.035mm	0.150mm
(0.0004~0.0014in)	(0.0004~0.0014in)	(0.0059in)
Diameter D	37.975~37.990mm	...
(1.4951~1.4957in)	(1.4951~1.4957in)	...
		
Height H	5.0mm(0.1969in)	...
Piston pin bore(in the piston)		
Diameter	10.002~10.013mm	10.043mm
(0.3938~0.3942in)	(0.3938~0.3942in)	(0.3954in)
Offset	0.35~0.65mm	...
(0.0138~0.0256in)	(0.0138~0.0256in)	...
Offset direction	Intake side	...
Piston pin		
Outside diameter	9.996~10.000mm	9.976mm
(0.3935~0.3937in)	(0.3935~0.3937in)	(0.3928in)
Piston rings		
Top ring		
Ring type	Barrel	...
Dimensions(BxT)	0.8x1.65mm	...
(0.0315x0.0650in)	(0.0315x0.0650in)	...
	0.05~0.15mm	0.40mm
End gap(installed)	(0.0020~0.0059in)	(0.0157in)
Ring side clearance	0.03~0.07mm	0.12mm
(0.0012~0.0028in)	(0.0012~0.0028in)	(0.0047in)
2nd ring		
		
Ring type	Taper	...
Dimensions(BxT)	0.8x1.5mm	...
(0.0315x0.0591in)	(0.0315x0.0591in)	...
End gap(installed)	0.05~0.17mm	0.52mm
(0.0020~0.0067in)	(0.0020~0.0067in)	(0.0205in)
Ring side clearance	0.02~0.06mm	0.12mm
(0.0008~0.0024in)	(0.0008~0.0024in)	(0.0047in)

# ENGINE SPECIFICATIONS



Item	Standard	Limit
Oil ring 		
Dimensions(B×T)	1.5×1.6mm (0.0591×0.0630in)	...
End gap(installed)	0.2~0.7mm (0.0079~0.0276in)	...
Ring side clearance	0.03~0.15mm (0.0012~0.0059in)	...

# ENGINE SPECIFICATIONS

**SPEC**



Item	Standard	Limit
<b>Rocker arm/rocker arm shaft</b>		
Rocker arm inside diameter	10.000~10.015mm (0.3937~0.3943in)	10.030mm (0.3949in)
Rocker arm shaft outside diameter	9.981~9.991mm (0.3930~0.3933in)	9.950mm (0.3917in)
Arm-to-shaft clearance	0.009~0.034mm (0.0004~0.0013in)	...
<b>Connecting rod</b>		
Connecting rod length	79.95~80.05mm (3.1476~3.1516in)	...
Small end inside diameter	10.015~10.028mm (0.3943~0.3948in)	...
<b>Crankshaft</b>		
Width A	42.45~42.50mm (1.671~1.673in)	...
Maximum runout C	...	0.03mm (0.0012in)
Big end side clearance D	0.15~0.45mm (0.006~0.018in)	1.00mm (0.0394in)
Big end radial clearance E	0~0.010mm (0~0.0004in)	...

## ENGINE SPECIFICATIONS

**SPEC**



Item	Standard	Limit
<b>Clutch</b>		
Clutch type	Automatic centrifugal	...
Clutch shoe thickness	3.7mm(0.146in)	2.0mm (0.079in)
Clutch shoe spring free length	30.1mm(1.185in)	...
Clutch housing inside diameter	107mm(4.213in)	107.5mm (4.232in)
Compression spring free length	76.4mm(3.008in)	...
Weight outside diameter	15.0mm(0.591in)	14.5mm (0.571in)
Clutch-in revolution	3050~3450r/min	...
Clutch-stall revolution	5000~6000r/min	...
<b>V-belt</b>		
V-belt width	17.9mm(0.705in)	16.1mm (0.634in)
<b>Transmission</b>		
Transmission type	V-belt automatic	...
Primary reduction system	Helical gear	...
Primary reduction ratio	50/13(3.846)	...
Secondary reduction system	Helical gear	...
Secondary reduction ratio	43/12(3.583)	...
Single speed automatic	3.087~0.945:1	...
Maximum main axle runout	...	0.04mm (0.002in)
Maximum drive axle runout	...	0.04mm (0.002in)
<b>Air filter type</b>		
	Wet element	...
<b>Fuel pump</b>		
Pump type	Electrical	...
Model(manufacturer)	3B3(AISAN)	...
Output pressure	250kPa(2.5kg/cm <sup>2</sup> , 35.6psi)	...
<b>Throttle body</b>		
Throttle cable free play (at the flange of the throttle grip)	1.5~3.5mm(0.06~0.14in)	...
ID mark	3B31 00	...