YAMAHA MBK

# CS50/Z 2002

5RW1-AE1

# SERVICE MANUAL

EAS00001

**CS50/Z**
**SERVICE MANUAL**

**1st Edition, September 2002**

**Printed in Spain.**

EAS00002

# NOTICE

This manual was produced by the Yamaha Motor España, S.A., primarily for use by Yamaha/MBK 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/MBK vehicles should have a basic understanding of the 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 España, S.A., is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha/MBK dealers and will appear in future editions of this manual where applicabe.

**NOTE:**

Designs and specifications are subject to change without notice.

EAS00005

# IMPORTANT INFORMATION

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

⚠ — The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLDED!

**⚠ WARNING** — Failure to follow WARNING instructions could result in severe injury or death to the scooter operator, a bystander, or a person inspecting or repairing the scooter.

**CAUTION:** — 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.

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# HOW TO USE THIS MANUAL

## FORMAT OF THIS MANUAL

This manual consists of chapters for the main subject categories (See “Illustrated Symbols”).
First heading ①: This is a chapter with a symbol at the top right-hand side of each page.
Second heading ②: This title appears at the top of each page to the left of the chapter symbol. (For the “Inspection and periodic adjustments”, chapter the third heading appears.)
Third heading ③: This is a final heading.

## MANUAL FORMAT

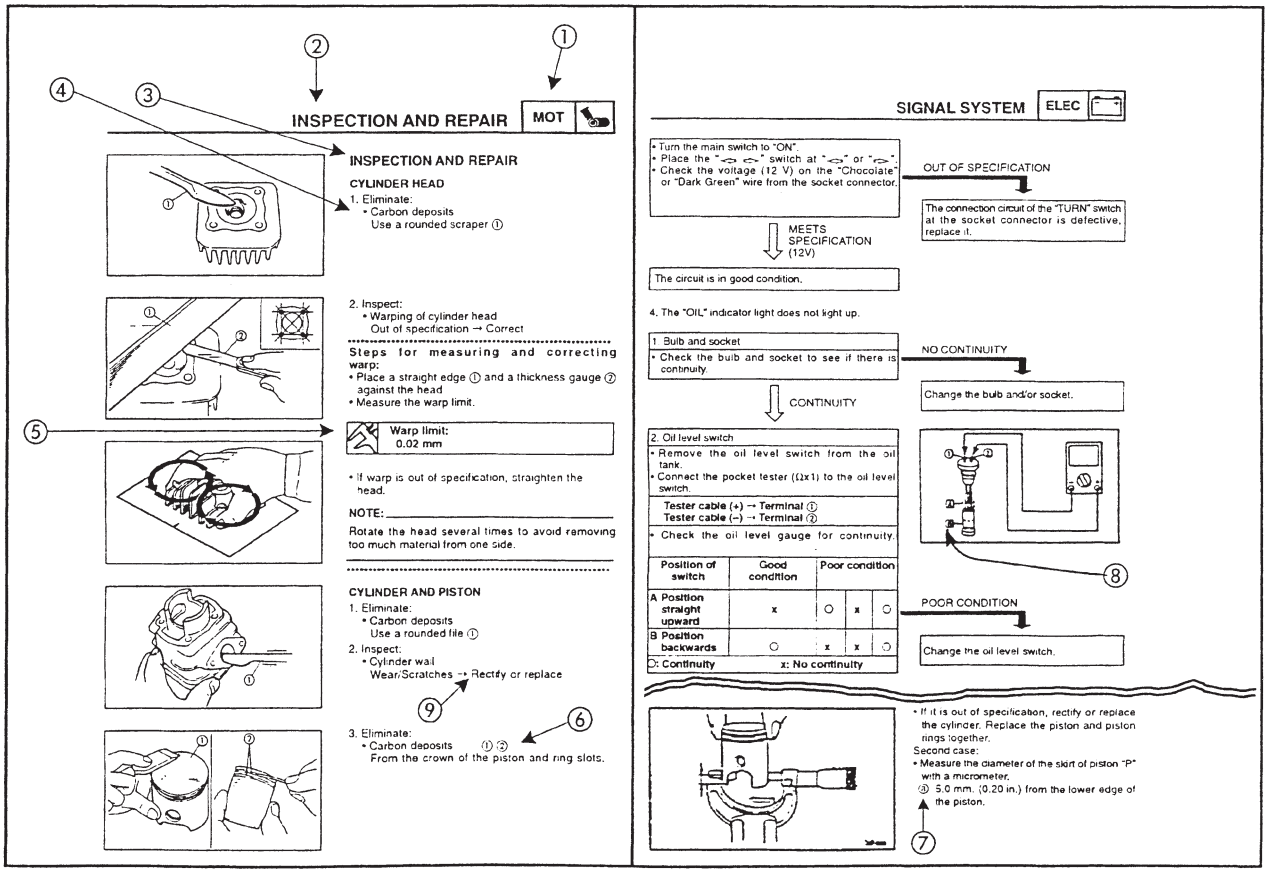
All the procedures in this manual are organized sequentially, step by step. The information has been compiled to make reading easy for the mechanic and to provide useful reference material which contains ample explanations of all disassembly, repair, assembly and inspection procedures. A particularly important procedure ④ is placed between a lines of asterisks “**” with each procedure preceded by “•”.

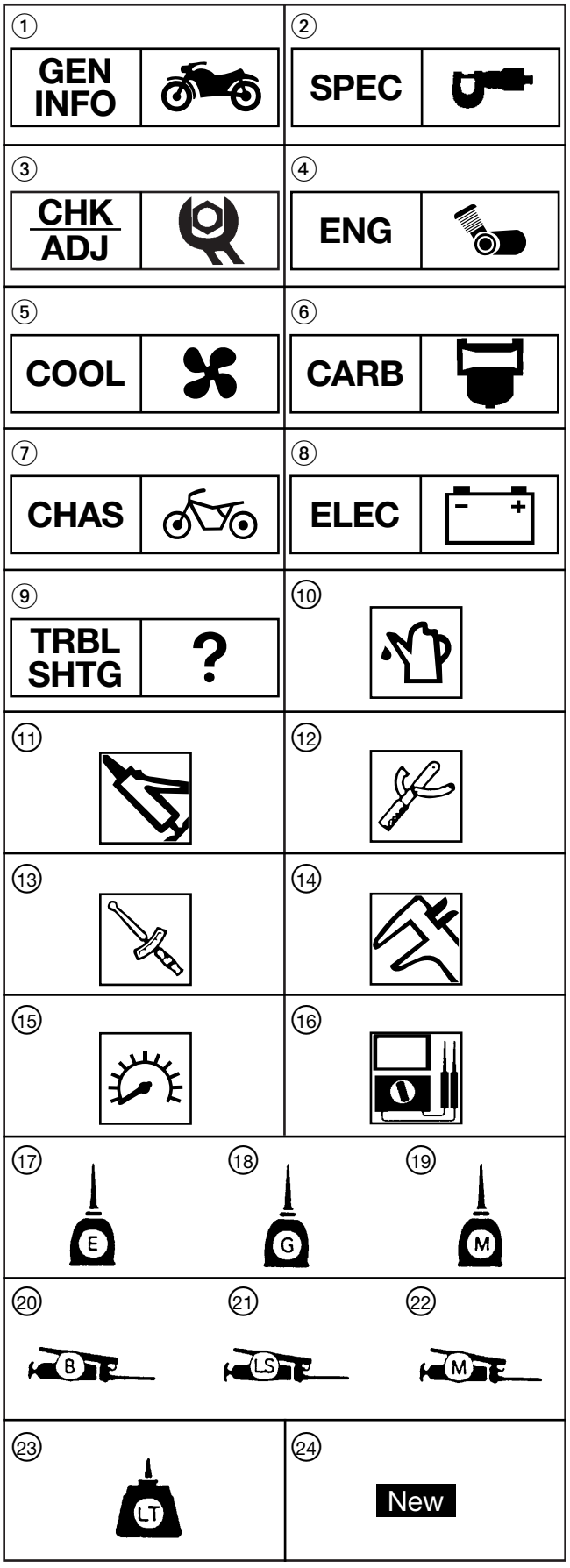
## IMPORTANT CHARACTERISTICS

- Data and special tools are put in a box preceded by a corresponding symbol ⑤.
- A number within a circle ⑥ indicates the number of a part, and a alphabetical letter within a circle indicates data or an alignment mark ⑦, everything else is indicated by a letter within a box ⑧.
- The conditions of defective components will precede an arrow symbol and the course of action to be followd will follow the symbol ⑨.

## DETAILED DIAGRAM

Each chapter provides detailed diagrams before each disassembly section, for the easy identification of disassembly/assembly procedures.



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# ILLUSTRATED SYMBOLS

(See illustration)
The symbols from ① to ⑨ are designed as thumb indices, to indicate the chapter number and index.

① General information
② Specifications
③ Periodic checks and adjustments
④ General motor revision
⑤ Cooling system
⑥ Carburetor
⑦ Chassis
⑧ Electrical system
⑨ Troubleshooting

The illustrated symbols from ⑩ to ⑯ are used to identify the specifications that appear in the text.

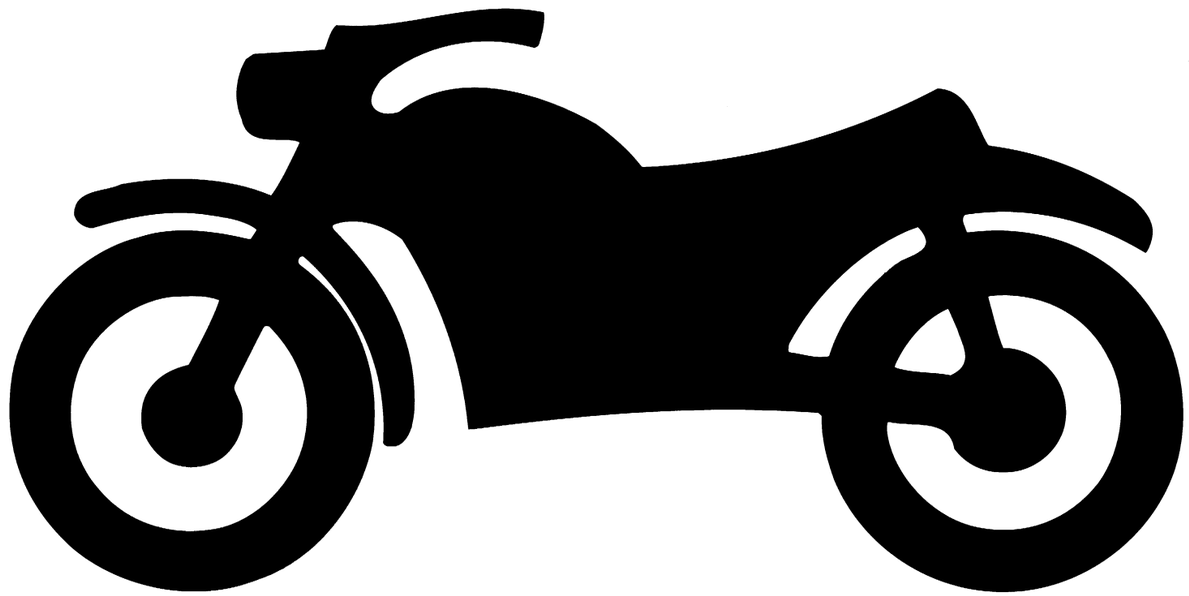
⑩ Refill liquid
⑪ Lubricant
⑫ Special tool
⑬ Torque
⑭ Wear, play limit
⑮ Motor speed
⑯ Ω, V, A

The illustrated symbols from ⑰ to ㉔ of the detailed diagrams indicate the grade of lubricant and the site of the lubrication point.

⑰ Apply motor oil
⑱ Apply gear oil
⑲ Apply molybdenum disulphide oil
⑳ Apply wheel bearing grease
㉑ Apply lightweight lithium soap base grease
㉒ Apply molybdenum disulphide grease
㉓ Apply blocking agent (LOCTITE®)
㉔ Use a new one

EAS00010

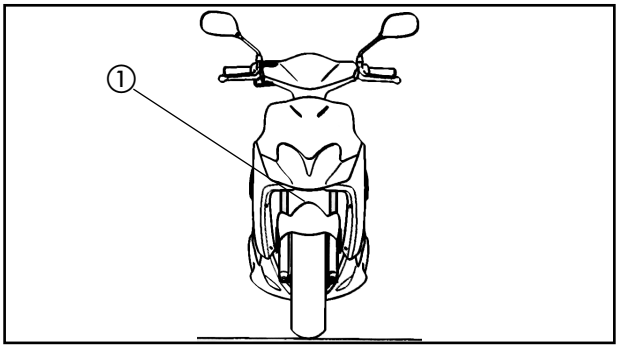
# TABLE OF CONTENTS



# GEN INFO

# 1

# CHAPTER 1
# GENERAL INFORMATION



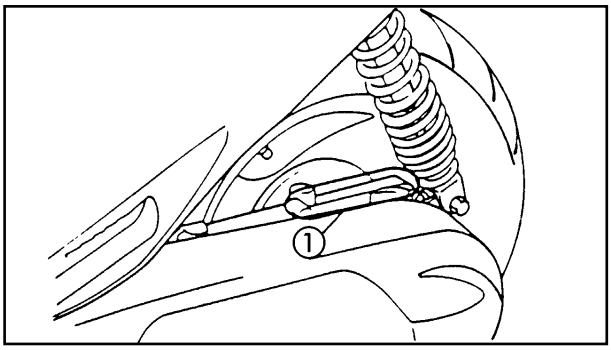

EAS00015

# GENERAL INFORMATION

## SCOOTER IDENTIFICATION

### FRAME SERIAL NUMBER

The frame serial number ① is stamped on the chassis.




### ENGINE SERIAL NUMBER

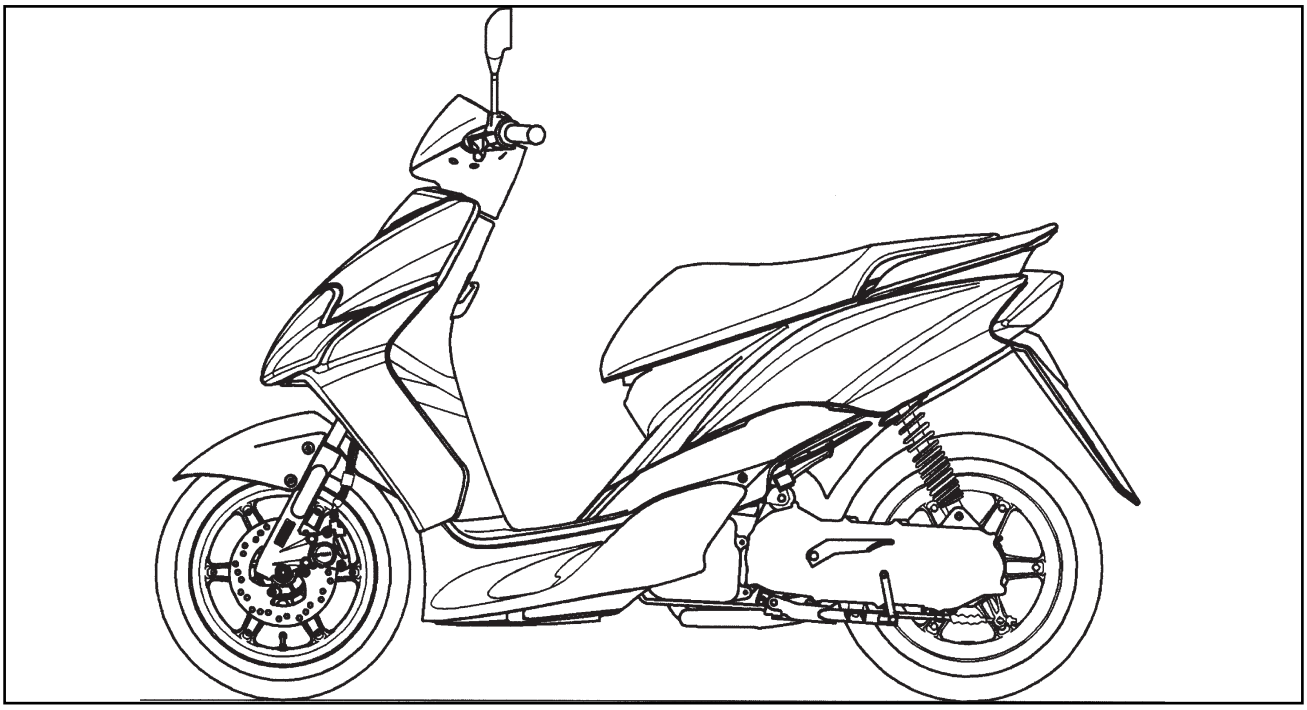
The serial number of the engine ① is stamped on the raised portion of the rear left section of the transmission box.

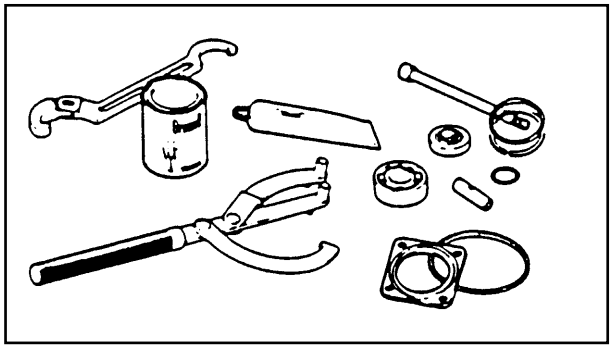
**NOTE:**

The first three digits of these numbers are for identifying the model; the remaining digits constitute the production number of the unit.

**NOTE:**

Designs and specifications are subject to change without notice.





# IMPORTANT INFORMATION

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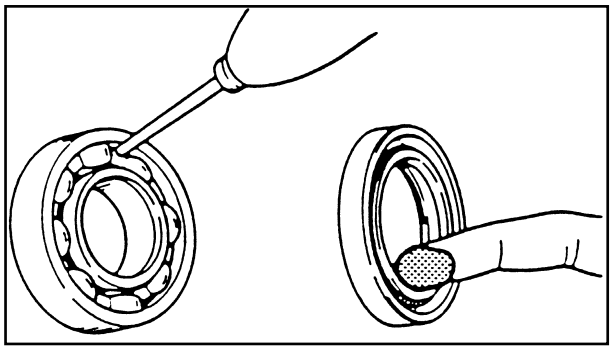
## REPLACEMENT PARTS

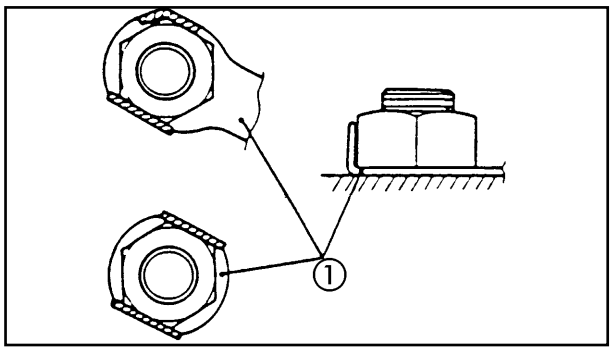
1. Use only genuine Yamaha/MBK parts for all replacements. Use the oil and/or grease recommended by Yamaha/MBK for assembly and adjustment.



EAS00022

## GASKETS, OIL SEALS AND O-RINGS

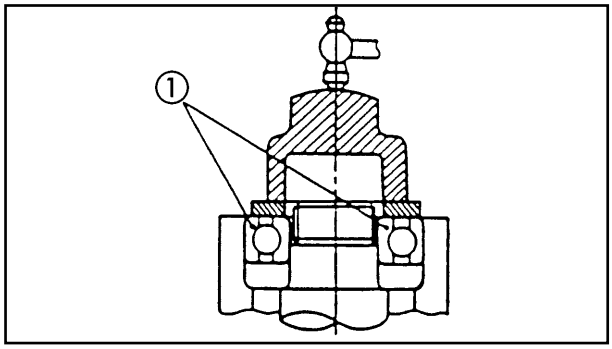
1. Replace all gaskets, seals and O-rings when overhauling the engine. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.




EAS00023

## LOCK WASHERS/PLATES AND COTTER PINS

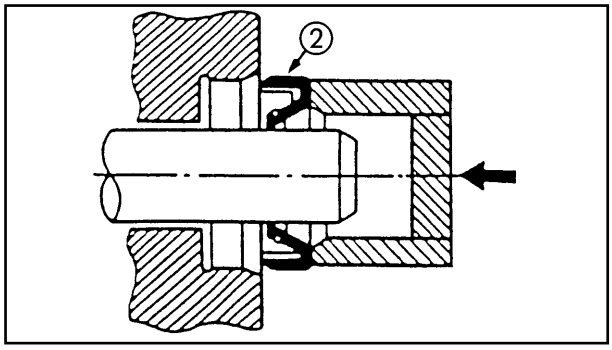
1. Replace all lock washers/plates ① and cotter pins after removal. Bend lock tabs along the bolt or nut flats after the bolt or nut has been tightened to specification.




EAS00024

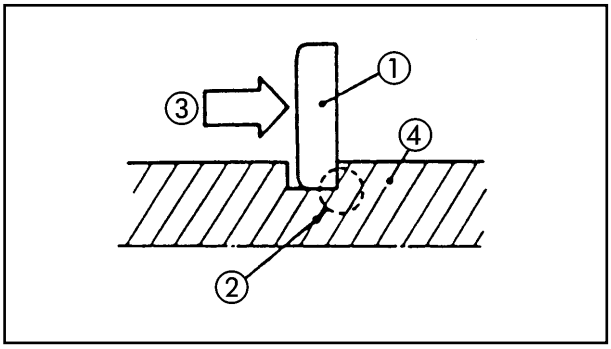
## BEARINGS AND OIL SEALS

1. Install the bearings ① and oil stops ② with their manufacturer brands or numbers facing outwards. (In other words, the stamped letters should be on the side exposed to view.) When installing oil seals, apply a light coating of lightweight lithium base grease to the seal lips. Put oil on the bearings when installing.




**CAUTION:**

Do not use compressed air to spin the bearings dry. This will damage the bearing surface.




EAS00025

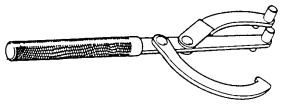
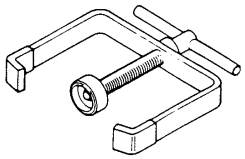
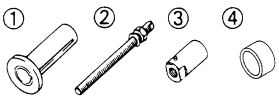
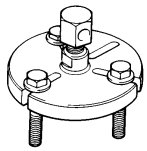
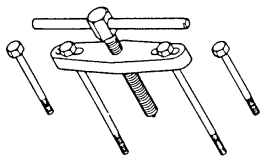
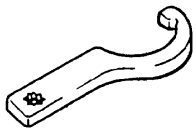
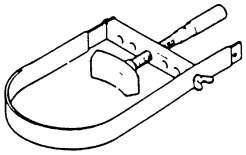
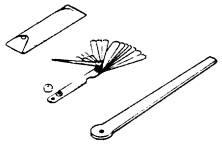
## CIRCLIPS

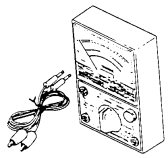
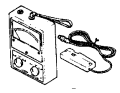
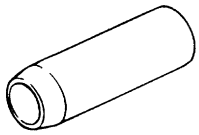
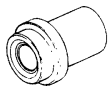
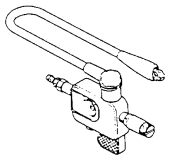
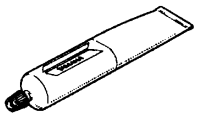
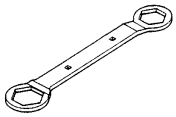
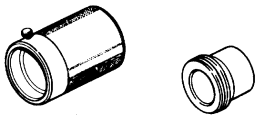
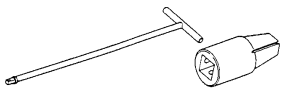
1. Check all circlips carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip ①, make sure that the sharp-edged corner ② is positioned opposite the thrust ③ it receives. See sectional view.
   ④ Shaft.

EAS00027

# SPECIAL TOOLS

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

| Tool No. | Tool name / Usage | Illustration |
|---|---|---|
| 90890-01235 | Rotor holding tool<br><br>This tool is used to remove the flywheel magneto. |  |
| 90890-01337 | Clutch spring bracket<br><br>This tool is used to remove the clutch nut while holding the compression spring. |  |
| 90890-01274<br>-01275<br>-01277<br>-01288 | Container of the crankshaft installer a<br>Bolt of the crankshaft installer b<br>Adapter c, Spacer d<br>These tools are used to install the crankshaft. |  |
| 90890-01362<br>. | Flywheel puller<br><br>For removing the flywheel. |  |
| 90890-01135 | Crankcase separation tool<br><br>This tool is used to remove the crankshaft or separate the crankcase. |  |
| 90890-01384 | Oil seal guide<br><br>Protects the edge of the oil seal during the installation of the secondary sliding pulley wheel. |  |
| 90890-01403 | Ring nut wrench<br><br>This tool is used to loosen and tighten the steering ring nut. |  |
| 90890-01701 | Pulley bracket<br><br>This tools is used to disassemble and assemble the secondary pulley. |  |
| 90890-03079 | Thickenss gauge<br><br>This tool is used to measure the clearance. |  |

| Tool No. | Tool name / Usage | Illustration |
|---|---|---|
| 90890-03112 | Pocket tester<br><br>This instrument is very important for checking the electrical system. |  |
| 90890-03113 | Engine tachometer<br><br>This tool is necessary for detecting the engine rpm. |  |
| 90890-01409 | Oil seals guide<br><br>This tool is used to install the left oil guide of the crankcase. |  |
| 90890-01410 | Oil seals installer<br><br>This tool is used to install the left oil seal of the crankcase. |  |
| 90890-06754 | Ignition checker<br><br>This instrument is necessary to check the components of the ignition system. |  |
| 90890-85505 | Yamaha bond No. 1215<br><br>This bond (sealant) is used for crankcase mating surface, etc. |  |
| 90890-01348 | Locknut wrench<br><br>This tool is used to loosen and tighten the secondary sheave nut. |  |
| 90890-01367 ①<br>-01400 ②<br>Counterweight a<br>Adapter b | Front oil seals inserter<br>These tools are used in the installation of seals. |  |
| 90890-01326<br>-01294 | T-handle<br>Damper rod holder<br><br>These tool are used for holding the damper rod holder when removing or installing the damper rod holder. |  |

# SPEC 2

# CHAPTER 2
# SPECIFICATIONS

# SPECIFICATIONS

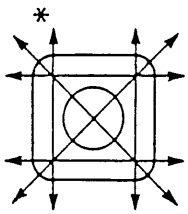
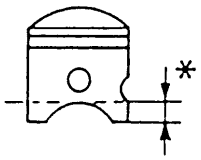
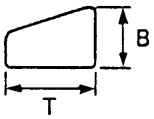
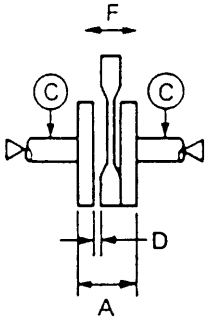
## GENERAL SPECIFICATIONS

| Model | CS50 | CS50Z |
|---|---|---|
| **Dimensions:** | | |
| Overall lenght | 1.740 mm | |
| Overall widht | 675 mm | |
| Overall height | 1.065 mm | |
| Seat height | 770 mm / 776 mm | |
| Wheelbase | 1.210 mm | |
| Minimum ground clearance | 132 mm | |
| **Basic weight** (With oil and full fuel tank): | 80,5 kg | 83,7 kg |
| **Engine:** | | |
| Engine type | Plate valve, gasoline, 2-strokes | |
| | air-cooled | Liquid cooled |
| Cylinder arrangement | Forward-inclined single cylinder | |
| Displacement | 49,3 cc | |
| Bore x stroke | 40,0 x 39,2 mm | |
| Compression ratio | 10,2 : 1 | 11,4 : 1 |
| Starting system | Electric and kickstarter | |
| **Lubrication system:** | Yamaha autolube | |
| **Oil type or grade:** | | |
| Engine oil | 2-strokes motor oil (JASO grade FC) | |
| Transmission oil | SE type 10W30 SAE motor oil | |
| **Oil capacity:** | | |
| Oil tank (motor oil) | 1,4 L | |
| Transmission fluid | | |
| Periodic fluid change | 0,10 L | |
| Total amount | 0,11 L | |
| **Cooling system capacity:** (Total amount) | – | 0,910 L |
| **Air filter:** | Wet type element | |
| **Fuel:** | | |
| Type | Unleaded gasoline | |
| Fuel tank capacity | 5,5 L | |
| **Carburetor:** | | |
| Type/quantity | PHVA12ZS/1, PY12/1 | PHVA12ZS/1 |
| Manufacturer | DELL'ORTO, GURTNER | DELL'ORTO |
| **Spark plug:** | | |
| Type/Manufacturer | BR8HS/N.G.K. | |
| Spark plug gap | 0,6 ~ 0,7 mm | |
| **Clutch type:** | Dry, centrifugal automatic | |
| **Transmission:** | | |
| Primary reduction system | Helical gear | |
| Primary reduction ratio | 52/13 (4.000) | |
| Secondary reduction system | Straight gearing | |
| Secondary reduction ratio | 42/13 (3.230) | 43/13 (3.310) |
| Transmission type | Single speed automatic (V-belt type) | |
| Operation | Centrifugal automatic type | |

| Model | CS50 | CS50Z |
|---|---|---|
| **Chassis:** | | |
| Frame type | Steel tube underbone | |
| Front axle incline angle | 25° | |
| Steering angle base | 80 mm | |
| **Tire:** | | |
| Size/Type (Front) | 110/70-12 / 47 L | |
| Size/Type (Rear) | 120/70-12 / 51 L, 130/70-12 / 56 L | |
| **Tire pressure (cold tire):** | | |
| Front | 175 KPa (1,75 kg/cm$^2$) | |
| Rear | 200 KPa (2,00 kg/cm$^2$) | |
| **Maximum Load:** | | |
| Front | 175 KPa (1,75 Kg/cm$^2$) | |
| Rear | 225 KPa (2,25 Kg/cm$^2$) | |
| **Brake:** | | |
| Type of front brake | Disk brake | |
| Activation | Right hand operation | |
| Type of rear brake | Drum brake | |
| Activation | Left hand operation | |
| **Suspension:** | | |
| Front suspension | Telescopic fork | |
| Rear suspension | Unit swing | |
| **Shock absorber:** | | |
| Front shock absorber | Coil spring/Oil damper | |
| Rear shock absorber | Coil spring/Oil damper | |
| **Wheel travel:** | | |
| Front wheel travel | 70 mm | |
| Rear wheel travel | 60 mm | |
| **Electrical:** | | |
| Ignition system | DC-CDI | |
| Generator system | Magnetic flywheel | |
| Battery type or model | Maintenance free | |
| Battery capacity | 12V 4AH | |
| **Type of headlamp:** | Bulb | |
| **Bulb wattage/quantity:** | | |
| Headlight | 12V, 35W / 35Wx1 | |
| Tail/brake light | 12V, 5W / 21Wx1 | |
| Turn signal light | 12V, 10Wx2 (rear) / 12V, 16Wx2 (front) | |
| Auxiliary light | 12V, 5W x 2 | |
| License plate light | 12V, 5W x 1 | |
| Meter lighting | 12V, 1,2W x 2 | |
| **Indicator light voltage/quantity:** | | |
| Oil level warning light | LED | |
| Turn signal indicator light | 12V, 2W x 2 | |
| High beam indicator light | 12V, 2W x 1 | |
| Coolant temperature warning light | – | LED |

# MAINTENANCE SPECIFICATIONS

## ENGINE

| Model | CS50 | CS50Z |
|---|---|---|
| **Cylinder head:** | | |
| Warp limit  | 0,02 mm<br>* The lines indicate measurement with straight edge | |
| **Cylinder:** | | |
| Bore size | 39,993 ~ 40,012 mm | |
| <Limit> | <40,1 mm> | |
| Taper limit | 0,05 mm | |
| Out of round limit | 0,01 mm | |
| **Piston:** | | |
| Piston size | 39,952 - 39,972 mm | 39,957 - 39,997 mm |
| Measuring point  | 5 mm | |
| Piston clearance | 0,034 - 0,047 mm | 0,029 - 0,042 mm |
| On measurement 1st | 40,25 mm | |
| **Piston rings:** | | |
| Cut-away section (BXT)/TYPE | | |
| Top ring  | 1.5 x 1.8 mm/Keystone | |
| 2nd ring | 1.5 x 1.8 mm/Keystone | |
| End gap (installed) | | |
| Top ring | 0,15 ~ 0,35 mm | |
| 2nd ring | 0,15 ~ 0,35 mm | |
| <Limit> | <0,6 mm> | |
| Sice clearance | | |
| Top ring | 0,03 ~ 0,05 mm | |
| 2nd ring | 0,03 ~ 0,05 mm | |
| **Crankshaft:**  | | |
| Crank width “A” | 37,90 ~ 37,95 mm | |
| Runout limit “C” | 0,03 mm | |
| Large end of rod side clearance “D” | 0,2 ~ 0,5 mm | |
| Small end of rod clerance “F” | 0,4 ~ 0,8 mm | |

| Model | CS50 | | CS50Z |
|---|---|---|---|
| **Automatic centrifugal clutch:** | | | |
| Clutch shoe thickness | 2,0 mm | | |
| <Limit> | <1,0 mm> | | |
| Clutch shoe spring free length | 29,9 mm | | |
| Clutch - in revolution | 3.350 - 3.850 r/min. | | 3.950 - 4.450 r/min. |
| Clutch - stall revolution | 5.200 - 6.000 r/min. | | 6.900 - 7.700 r/min. |
| **V-belt:** | | | |
| V-belt width | 16,5 mm | | |
| <Limit> | <15,7 mm> | | |
| **Transmission:** | | | |
| Main axle eccentricity limit | 0,08 mm | | |
| Drive axle eccentricity limit | 0,08 mm | | |
| **Pedal starting:** | | | |
| Type | Ratchet | | |
| Strength of pedal spring | 150 ~ 250 g | | |
| **Air filter oil grade:** | For foam air filter or air-cooled 2-stroke motor oil | | |
| **Carburetor:** | | | |
| Type / Manufacturer / Amount | PHVA12ZS/1 DELL'ORTO | PY12/1 GURTNER | PHVA12ZS/1 DELL'ORTO |
| Main jet / Model (M.J.) | #65 | #62 | #65 |
| Jet needle (J.N.) | A20-3/5 | B10A-2/3 | A35-4/5 |
| Main air jet (M.A.J.) | ø 2.5 | ø 2.0 | ø 2.5 |
| Pilot jet (P.J.) | #36 | #38 | #36 |
| Pilot screw (P.A.S.) | 2 - $2^1/_4$ | $1^3/_4$ - 2 | $1^3/_4 \pm {}^1/_8$ |
| Valve seat size | 1.2 | 1.4 | 1.2 |
| Engine idling speed | 1650 ~ 1950 r/min | | |
| Starter jet | #50 | #42 | #50 |

## CHASSIS

| Model | | CS50 | CS50Z |
|---|---|---|---|
| **Steering system:** | | | |
| Steering bearing type | Upper | Ball bearing | |
| | Lower | Ball bearing | |
| **Front suspension:** | | | |
| Front fork travel | | 70 mm | |
| Fork spring free length | | 224 mm | |
| Spring rate | ($K_1$) | 1,33 Kgf/mm | |
| | ($K_2$) | 2,0 Kgf/mm | |
| Oil capacity | | 45 cc ± 1 | |
| Oil grade | | Fork oil: 10W or equivalent | |
| **Rear suspension:** | | | |
| Shock absorber stroke | | 60 mm | |
| Spring free length | | 220 mm | |
| Spring rate | ($K_1$) | 4,58 Kgf/mm | |
| | ($K_2$) | 6,12 Kgf/mm | |
| **Wheels:** | | | |
| Type of front wheel | | Alloy rim | |
| Type of rear wheel | | Alloy rim | |
| Size/material of front tyre | | 2,75 x 12 / aluminium | |
| Size/material of rear tyre | | 3,00 x 12 / aluminium | |
| Rim runout limit | | | |
| | Radial | 1,0 mm | |
| | Lateral | 1,0 mm | |
| **Front disc brake:** | | | |
| Type | | Single | |
| Disc outside diameter x thickness | | ø 190 x 3,5 mm | |
| Pad thickness | | 4,5 mm | |
| <Limit> | | <0,5 mm> | |
| Interior diameter of pump | | 11 mm | |
| Calliper interior diameter | | 30 mm | |
| Brake fluid type | | DOT #4 | |
| **Rear drum brake:** | | | |
| Type | | Single cam | |
| Drum inside diameter | | ø 110 mm | |
| <Limit> | | <ø 110,5 mm> | |
| Shoe thickness | | 4 mm | |
| <Limit> | | <2 mm> | |
| **Brake levers:** | | | |
| Free play of the front brake lever (right)/measurement | | 2 ~ 5 mm / At the end of the lever | |
| Free play of the rear brake lever (left)/measurement | | 5 ~ 10 mm / At the end of the lever | |