

# YAMAHA

**Supplementary Service Information**

**RT1-MX360**

[www.legends-yamaha-enduros.com](http://www.legends-yamaha-enduros.com)

## NOTICE

This manual has been written by Yamaha Motor Company for use by Authorized Yamaha Dealers and their qualified mechanics. In light of this purpose it has been assumed that certain basic mechanical precepts and procedures inherent to our product are already known and understood by the reader.

Without such basic knowledge, repairs or service to this model may render the machine unsafe, and for this reason we must advise that all repairs and/or service be performed by an Authorized Yamaha dealer who is in possession of the requisite basic product knowledge. Other information is produced by the U. S. distributor, Yamaha International Corporation, and is necessary to provide total technical coverage regarding the product.

The Research, Engineering, and Service Departments of Yamaha are continually striving to further improve all models manufactured by the company. Modifications are therefore inevitable and changes in specifications or procedures will be forwarded to all Authorized Yamaha Dealers and will, where applicable, appear in future editions of this manual.

YAMAHA RT1-MX SERVICE MANUAL

1st. Edition

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August 1970

SERVICE DEPARTMENT

YAMAHA MOTOR CO., LTD.  
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## FOREWORD

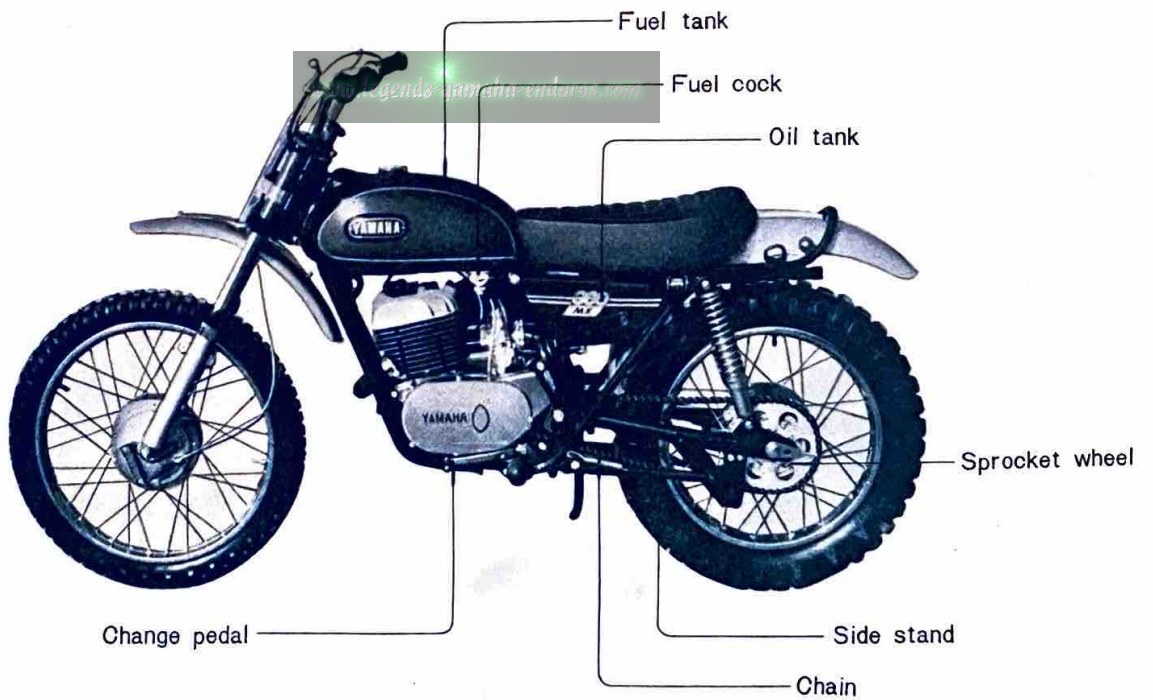
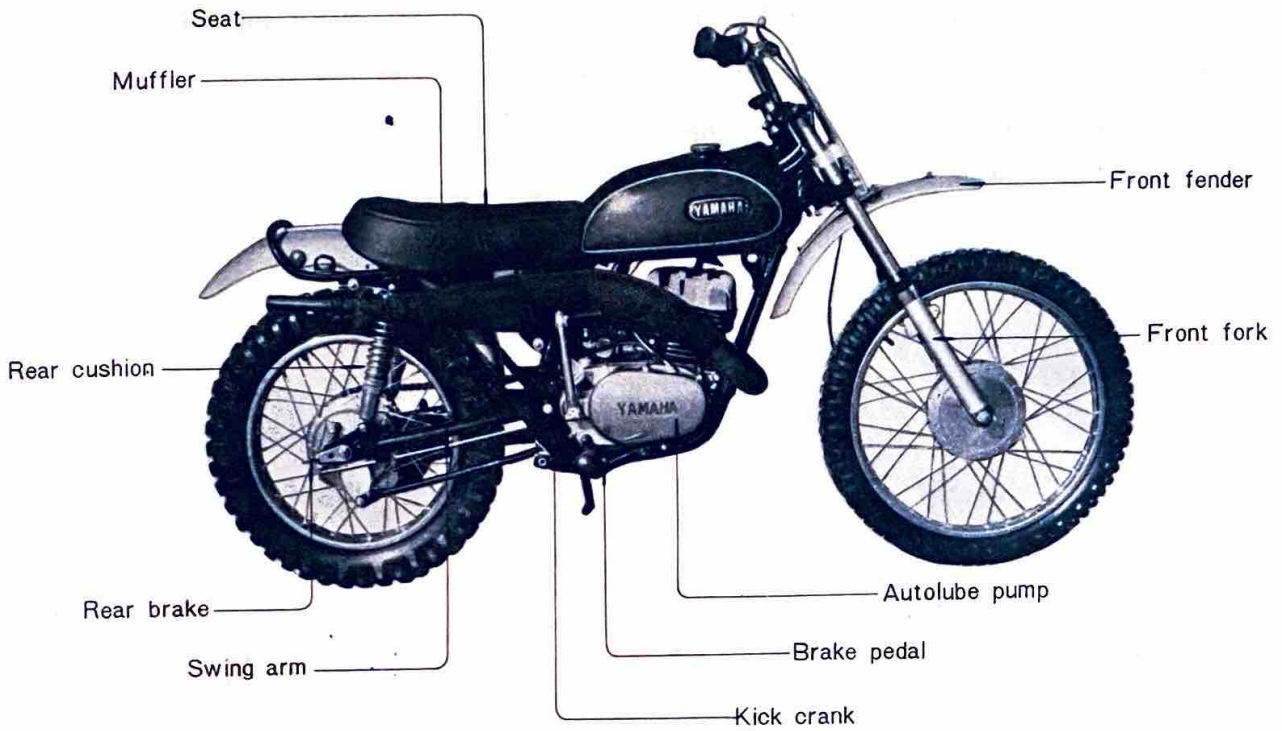
The New YAMAHA 360 RT1-MX is designed as a high-performance motocrosser for racing. The RT1-MX is converted into a fully-equipped motocrosser through the use of RT1-B G.Y.T. kit parts and a few slight changes in the running gear.

You are kindly requested to use this supplementary information together with the RT1-B service manual to effectively service the model.

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YAMAHA MOTOR CO., LTD.

## Profile



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## 1. Features

### 1) High performance Single Cylinder Engine

The YAMAHA 360 RT1-MX utilizes a powerful two-stroke 351cc engine. The new five port cylinder, which is another Yamaha technical development, greatly improves engine efficiency and is responsible for high power output throughout a broad RPM range.

### 2) Highly dependable Yamaha Autolube

Yamaha Autolube provides superior engine lubrication that extends the life of the engine.

### 3) Easy Starting

The engine can be started by simply disengaging the clutch and kicking the kick pedal without shifting gears back to neutral. This is a valuable convenience to the rider. The RT1-MX is equipped with a magneto which decrease crank shaft inertia and increases high rpm ignition performance.

### 4) Powerful Brakes

Patented waterproof, dustproof brake drums provide safe, fade-free braking on wet or dusty roads.

### 5) Adjustable Rear Cushion

The rear cushions are adjustable to five different positions. The rider can adjust spring tension to compensate for varying weights, speeds, and course conditions.

### 6) Front Fork design

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The YAMAHA360RT1-MX employs an oil damper for better driving stability. The front fork design is well-known for its strength and superior handling characteristics.

### 7) Tires

The RT1-MX is fitted with tires having a knobby type tread pattern for more improved poor surface traction.

### 8) Carburetor Starter Feature

Yamaha's starter feature is already well-known for its easy starting. Equipped with this unique carburetor, the RT1-MX is quick starting under all conditions.

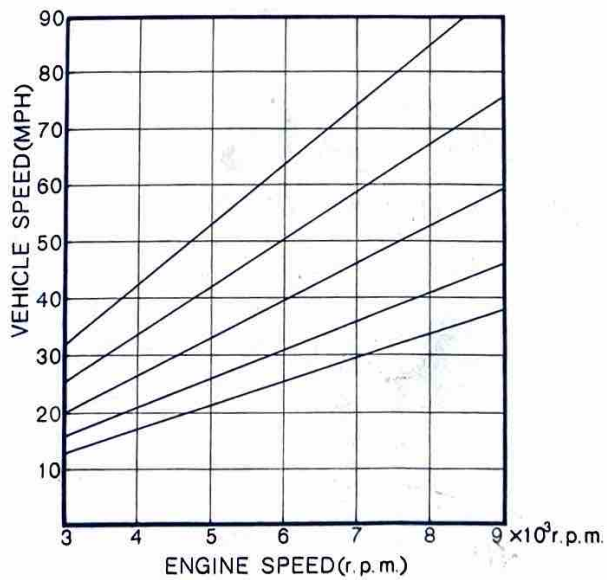
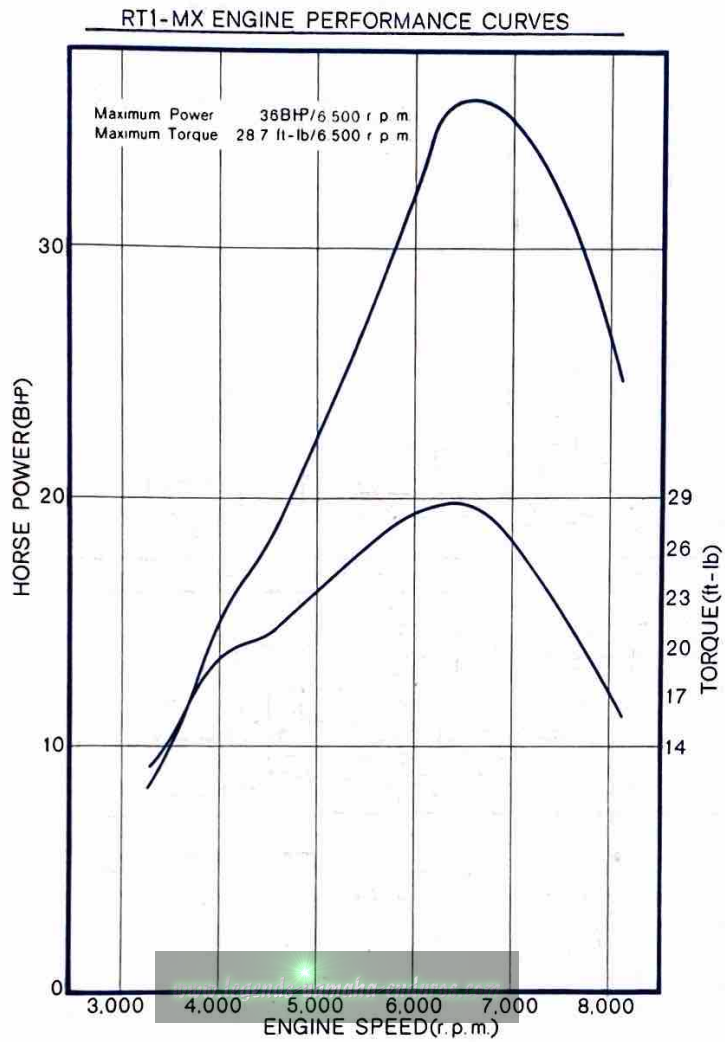
## 2. Specifications

<b>Dimensions:</b> Overall length Overall width Overall height Wheelbase Min. ground clearance	82.3 in. (2,090 mm) 35.0 in. ( 890 mm) 46.7 in. (1,185 mm) 55.1 in. (1,400 mm) 10.0 in. ( 255 mm)
<b>Weight:</b> Net	238 lbs. (108 kg)
<b>Handling performance</b> Min. turning radius Braking distance	78.7 in. (2,000 mm) 50.5 ft at 31 mph (15.4 m at 50 km/h)
<b>Engine:</b> Model Type Lubricating system Cylinder Displacement Bore x Stroke Compression ratio Max. power Max. torque Starting system Ignition system	RT1 2 stroke, gasoline Yamaha Autolube and/or Gas/Oil mixture Single, forward inclined, 5 port 21.42 cu. in. (351 cc) 3.156 x 2.756 in. (80 x 70 mm) 7.2 : 1 36 BHP/6,500 r.p.m. 28.7 ft-lbs/6,500 r.p.m. (3.97 kg-m/6,500 r.p.m.) Primary-coupled kick starter Flywheel magneto
<b>Carburetor:</b> Type M. J. J. N. Float level	VM34SH #320 6DPI-4th stages 0.84 in. (21.4 mm)
<b>Air cleaner:</b>	Wet, foam rubber
<b>Transmission:</b> Clutch Primary reduction system Primary reduction ratio	Wet, multiple-disk Gear 65/21 = 3.095

<b>Gear box:</b> Type Reduction ratio 1st 2nd 3rd 4th 5th Secondary reduction system Secondary reduction ratio	Constant mesh, 5-speed forward, close ratio $36/16 = 2.250$ $33/20 = 1.650$ $29/23 = 1.260$ $26/26 = 1.000$ $23/29 = 0.793$ Chain $44/15 = 2.933$
<b>Chassis:</b> Frame Suspension system, front Suspension system, rear Cushion system, front Cushion system, rear	Tubular-Double loop Telescopic fork Swinging arm Coil spring, Oil damper Coil spring, Oil damper
<b>Steering system:</b> Steering angle Caster Trail	$49^\circ$ both right and left $60^\circ 30'$ 5.39 in. (137 mm)
<b>Braking system:</b> Type of brake Operation system, front Operation system, rear	Internal expansion Right hand operation Right foot operation
<b>Tire size:</b> Front Rear	2.75-21-4PR 4.00-18-4PR
<b>Magneto:</b> Model Manufacturer	FZC-1A1L Mitsubishi Elec.
<b>Miscellaneous:</b> Gasoline tank capacity Oil tank capacity	2.5 U. S. gals (9.5 liters) 1.7 U. S. qts. (1.6 liters)
Front fork capacity Gear box capacity	5.85 fl. oz. (173 cc.) each 1.0 U.S. qts. (1,000 cc.)



### 3. Performance Curves

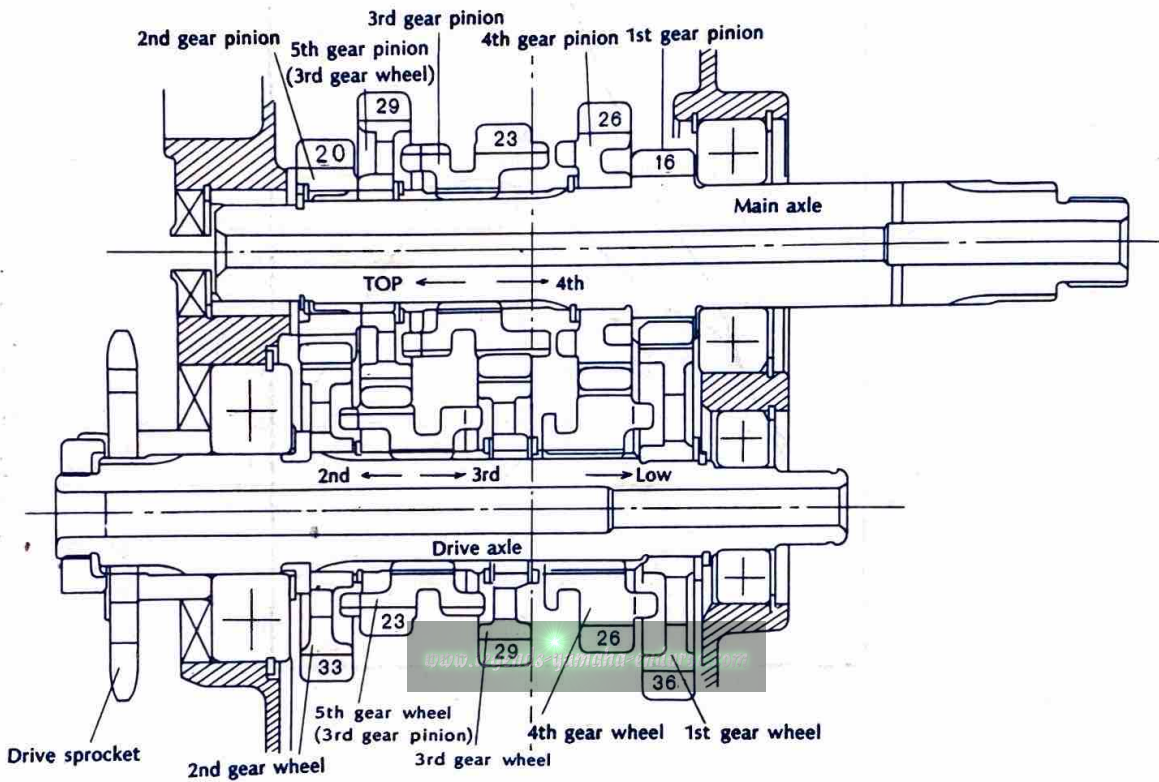


#### 4. Transmission Gear Assembly

The constant mesh, close ratio, 5-speed transmission makes it possible to fully utilize the steady performance of the engine throughout the entire speed range from low to high speed.

The transmission gear reduction ratio between is closer than the RT1-B.

For layout of the transmission and related parts, refer to Fig. 1 and 2.



Main shaft over-all width (Including shims) : 83.5 mm

Drive axle over-all width (Including shims) :  $87.5_{-0.15}^0$  mm

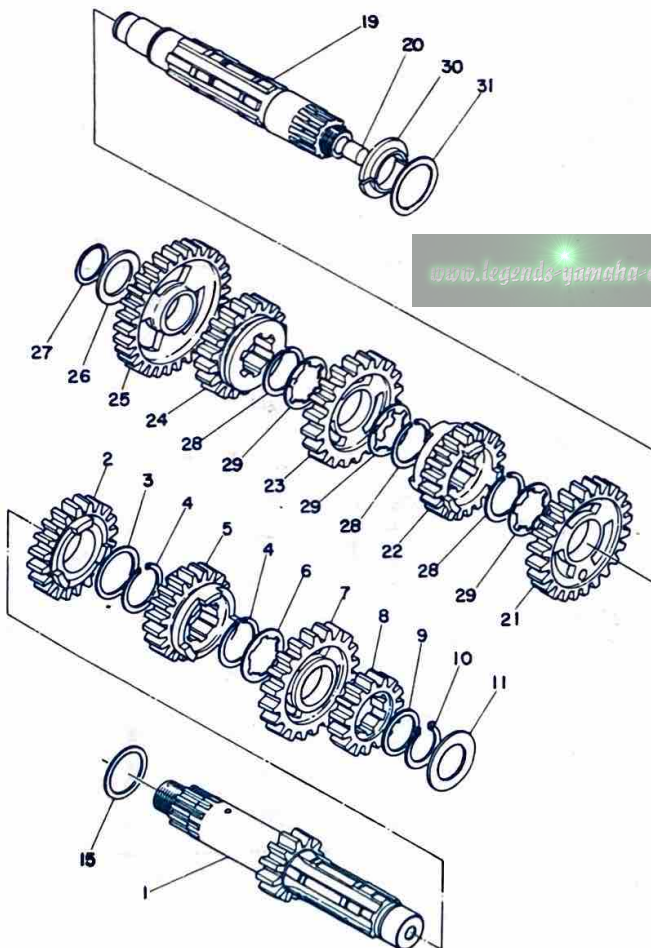
The primary reduction ratio is  $65/21 = 3.095$

The secondary reduction ratio is  $44/15 = 2.933$

Therefore the total reduction ratios will be:

Primary reduction ratio  $\times$  Transmission gear reduction ratio  $\times$  Secondary reduction ratio = Total reduction ratio.

	Transmission Gear Reduction Ratio	Total Reduction Ratio
1st	$36/16 = 2.250$	18.159
2nd	$33/20 = 1.650$	14.981
3rd	$29/23 = 1.260$	11.548
4th	$26/26 = 1.000$	9.079
5th	$23/29 = 0.793$	7.201



1. AXLE main
2. GEAR 4th pinion
3. WASHER gear hold (25-32-1)
4. CIRCLIP
5. GEAR, 3rd pinion
6. WACHER, gear hold
7. GEAR, 3rd wheel
8. GEAR, 2nd pinion
9. WASHER, gear hold (20-25-1)
10. CIRCLIP
11. SHIM (20.2-33-1)
12. BEARING
13. CIRCLIP
14. OIL SEAL
15. SHIM, main axle (25.1-31-0.1, 0.2, 0.3)
16. BEARING
17. CIRCLIP
18. GEAR, kick pinion
19. AXLE, drive
20. PLUG, blind
21. GEAR, 2nd wheel
22. GEAR, 3rd pinion
23. GEAR, 3rd wheel
24. GEAR, 4th wheel
25. GEAR, 1st wheel
26. WASHER, gear hold (20-30-1.5)
27. CIRCLIP
28. CIRCLIP
29. WASHER, gear hold
30. SPACER, drive axle
31. SHIM, drive axle (25-34-0.3, 0.4, 0.5)

## 5. Service Data

\* Piston clearance.....0.0020~0.0022 in. (0.050~0.055 mm)

\* Piston ring end gap.....0.012~0.020 in. (0.3~0.5 mm)  
(when piston is fitted in cylinder)

\* Spark plug..... Standard: B-9EN

\* Ignition timing..... 3.4 mm B.T.D.C.

\* Oil pump

Minimum stroke : 0.25~0.30 mm(0.010~0.012 in.)

Maximum stroke : 1.90~2.10 mm(0.075~0.083 in.)

\* Fuel mixing ratio

The RT1-MX, equipped with Yamaha Autolube system, uses mixed gasoline as fuel.  
The fuel mixing ratio is 30:1 for RT1-MX equipped with a Yamaha Autolube pump,  
and 15:1 when not using the Autolube pump.

\* Gasoline and Oil

Gasoline: Use high-octane gasoline (more than 98~100 octane)

Oil : Use Shell Super 2-stroke oil or oil of similar quality.

\* Transmission oil

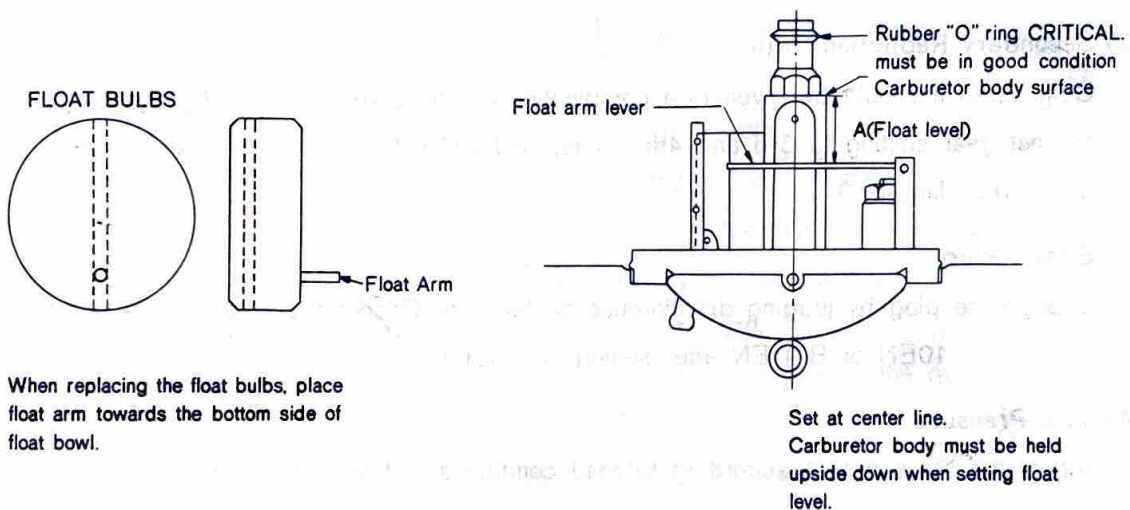
Volume of oil: 1.0 U.S. qt (1,000 cc.) SAE 10W/30

### Carburetor Setting Table

Name of Parts	Abbreviation	Specifications
Main Jet	M. J	#320
Air Jet	A. J	2.5
Jet Needle	J. N	6DP1-4th
Needle Jet	N. J	P-O
Throttle Valve Cutaway	C. A	#1.5
Bypass Port Diameter	B. P	1.4
Pilot Outlet Diameter	P. O	0.6
Pilot Jet	P. J	#40
Air Screw	A. S	1 1/4
Valve Seat Diameter	V. S	3.3
Starter Jet	G. S	#60

### \* Float Level Adjustment

The carburetor float level is checked by the Yamaha factory during assembly and testing. But rough riding, a worn needle valve, or bent float arm can cause the float level to fluctuate. If the float level raises, this will cause a rich fuel/air mixture that can cause poor performance and spark plug fouling. If the float level decreases, this can cause a lean fuel/air mixture that can result in engine damage. If the machine is subjected to continuous rough riding or many miles of travel, the float level should be checked and set regularly and in the following manner.



When replacing the float bulbs, place float arm towards the bottom side of float bowl.

Set at center line.  
Carburetor body must be held upside down when setting float level.

- 1) Remove the float chamber body, and turn over the mixing body. Let the float arm rest on the needle valve with the spring fully expanded.
- 2) Then measure the distance "A" from the float arm lever to the float chamber joint surface. Standard measurement of A: 0.84 in. (21.4 mm)
- 3) When the A distance measured is less than recommended bend the tang up. If it is greater, bend the tang down. (with carburetor body upside down.)

### \* CLEANING THE AIR FILTER

Wash the foam filter thoroughly in solvent until all dirt has been removed. Squeeze all solvent out. Pour oil onto the filter (any grade of 20 or 30 wt.), work it completely in, and then squeeze out the surplus oil. The filter should be impregnated with oil, but not "dripping" with it.

## 6. Change in Specifications

Participants in racing must change specifications of the machine depending on conditions of the racing course, road surface, soil, length of straight aways, angles of curves, number of curves, slopes, weather, temperature, and skill of the rider. These factors and conditions must be determined by the rider himself after trial running over the whole race course.

### Main Points to be Modified

#### 1) Carburetor Setting

In addition to the specified Main Jet, the rider should carry with him spare M.J.s whose size numbers are larger and smaller than specified by increment of 10 respectively.

#### 2) Secondary Reduction Ratio

Consideration should be given to a combination of the drive sprocket and sprocket wheel so that gear shifting to 3rd and 4th is easy and will not cause an undue load on the engine (i.e. "lugging").

#### 3) Spark Plug

Change the plug by judging discoloration of the plug. Choose the most suitable one from B-9EN, B-10EN or B-11EN after setting carburetion.

#### 4) Tire Pressure

Adjust the tire pressure according to road conditions and the rider's choice.

#### 5) Front Fork

Adjust the front fork by adjusting the quantity or weight of oil. The oil amount is in the range of 170 to 175 cc. (5 $\frac{3}{4}$  to 6 fl. oz.) Weight is normally SAE #30.

#### 6) Rear Cushions

Adjust the spring setting depending on the rider's choice.

#### 7) Handlebar

Loosen the handle lever holders before racing. This will protect the rider's hands or fingers from getting injured in case of an accidental crash during the race.

(The lever can easily turn when the machine turns over.)

## 7. Adjusting Ignition Timing

### 1) Tools and instruments for adjusting

Dial gauge (accuracy  $\pm 1/100$  mm)

Dial gauge stand 1

Continuity testing lamp, YAMAHA electro tester or YAMAHA point checker.

Thickness gauge.

Slot-head and Phillips-head screw driver.

### 2) Adjust ignition timing

- a. Set the point gap at 0.30~0.35mm(0.012~0.014 in.)Inspect the breaker points for any pittings. Excessive pitting should be smoothed off with sandpaper (#400 ~600) and wiped off with hard, clean, white paper.
- b. Remove the cylinder head and attach the dial gauge stand 1.  
Next, insert the dial indicator into the gauge stand 1. Bring the piston up to T.D.C. and set the zero on the dial face to line up exactly with the dial indicator needle.  
Connect the positive (+) tester lead to the primary ignition terminal.  
Connect the negative (-) lead to the engine case (ground).
- c. Turn the crankshaft back well past 3.4 mm, to eliminate play in the gears, and then bring the piston up to exactly 3.4 mm B.T.D.C.
- d. Loosen the breaker plate holding screws and turn the breaker plate. When the points just start to open (the testing lamp lights up) tighten the holding screws. (Do not fully loosen the breaker plate holding screw as the breaker plate tends to shift its position). Turning the breaker plate in the engine rotation direction causes ignition timing to retard, and turning it in the opposite direction advances ignition timing.
- e. After tightening the set screw, recheck timing.

## 8. Checks and Service Prior to Racing

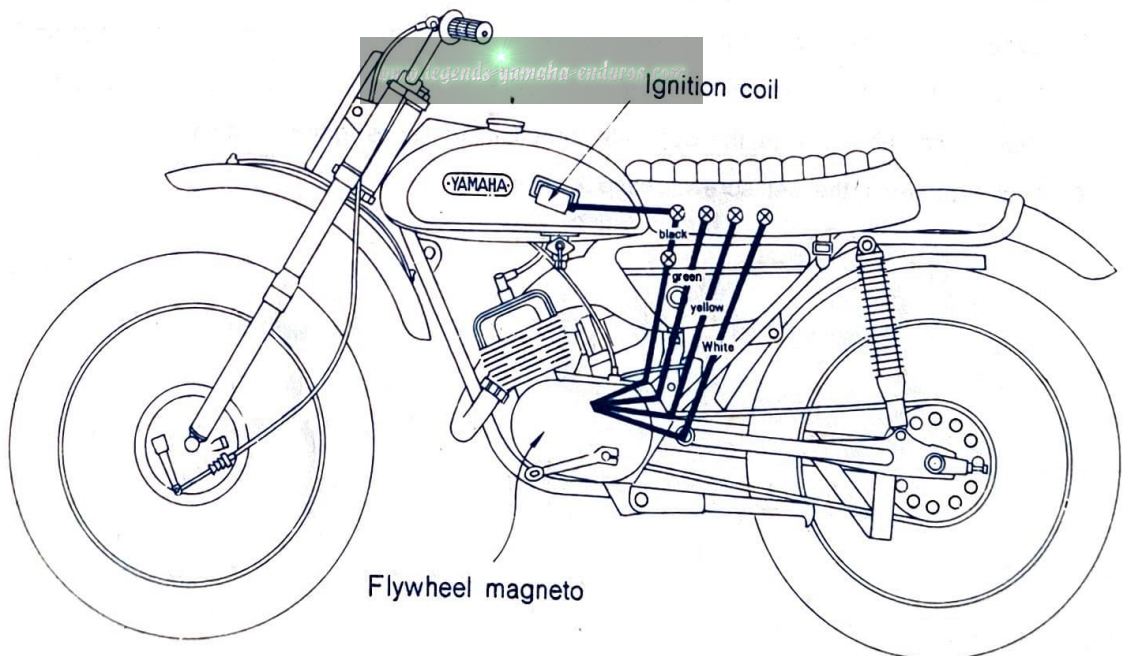
The following items should be checked and serviced before racing.

- 1) Check the cylinder, piston, and crankshaft ass'y for any defects.
- 2) Make sure that the carburetor is clean and correctly set.
- 3) Check ignition timing, lead wire connection, and insulation.
- 4) Retighten screws, bolts and nuts on all parts.
- 5) Check the cables for wear and correct adjustment.
- 6) Clean the gas tank and petcock.
- 7) Adjust and oil the chain.

Adjust the drive chain so that it has free play of approximately 1 in. (25 mm.) up and down at the center of the lower section with the rear wheel on the ground.

The racer should devote the maximum possible time to inspection and service of the machine prior to racing. "Thorough inspection and service are the first step to victory"

## 9. Wiring Diagram





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