YAMAHA

LT-MX-AT-MX
MX-250, 360 - SC500

Service Manual

FOREWORD

This year Yamaha has added four completely new motocrossers, LTMX, ATMX, MX250, MX360 and scrambler SC500. They incorporate some of Yamaha's latest technical refinements such as V-type reed valve and torque induction design aiming at easier starting and greater torque at low speeds. These new improvements require your special care in rendering your service work. This Supplementary Service Manual provides the technical details required for Yamaha servicemen so that they can service the LTMX, ATMX, MX250, MX360 and SC500 in a correct and skillful manner. It is advisable to use this manual together with the manuals for DT/RT or LT/AT/CT series.

YAMAHA MOTOR CO., LTD.
Service Department

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CHAPTER 1. SPECIFICATIONS

Model	LTMX
Dimensions:	
Overall length	74.0 in. (1,880 mm)
Overall width	34.1 in. (865 mm)
Overall height	42.5 in. (1,080 mm)
Wheelbase	49.6 in. (1,260 mm)
Ground clearance	8.3 in. (210 mm)
Weight (dry):	185 lbs. (84 kg)
Performance:	
Braking distance	50.5 ft. (15.4 m) 31 m.p.h. (50 km/h)
Min. turning radius	82.7 in. (2,100 mm)
Engine:	
Model	LT2
Type	Air cooled, 2-stroke, gasoline, Torque induction
Cylinders	Single cylinder
Displacement	5.92 cu. in. (97 cc)
Bore and stroke	2.047 x 1.795 in. (52 x 45.6 mm)
Max. output	16 bhp/10,500 rpm (16 ps/10,500 rpm)
Max. torque	8.1 lb-ft/9,500 rpm (1.12 m-kg/9,500 rpm)
Starting	Kick starter (primary kick)
Ignition - **Spark Plug**	Magneto ignition - **Spark Plug** = **NGK B9HV**
Transmission:	
Primary reduction	Gear, reduction ratio 74/19 = 3.894
Secondary reduction	Chain, reduction ratio 52/14 = 3.714
Clutch	Wet, multi-disc
Gear box	Constant mesh, 5 forward speeds
Gear ratio:	
Low	34/12 = 2.833
Second	30/16 = 1.875
Third	26/19 = 1.368
Fourth	24/22 = 1.090
Fifth	22/23 = 0.956
Chassis:	
Frame mode	LT2
Frame	Steel pipe, double-cradle
Suspension (Front)	Telescopic (coil spring oil damper)
Suspension (Rear)	Swing arm (coil spring oil damper)
Steering:	
Caster	59°
Trail	4.1 in. **(105 mm)**
Tire size	2.75 – 19 – 4PR
Tire size	3.00 – 18 – 4PR
Gasoline tank capacity	1.6 gal. (6.0 liters)
Oil tank capacity	1.3 qt. (1.2 liters)

Model	ATMX
Dimensions:	
Overall length	74.4 in. (1,965 mm)
Overall width	35.8 in. (910 mm)
Overall height	44.1 in. (1,120 mm)
Wheelbase	50.8 in. (1,290 mm)
Ground clearance	9.4 in. (240 mm)
Weight (dry):	202 lbs. (92 kg)
Performance:	
Braking distance	50.5 ft. (15.4 m) 31 m.p.h. (50 km/h)
Min. turning radius	74.8 in. (1,900 mm)
Engine:	
Model	AT1
Type	Air cooled, 1-stroke, Torque induction
Cylinder	Single cylinder
Displacement	7.51 cu. in. (123 cc)
Bore and stroke	2.205 x 1.969 in. (56 x 50 mm)
Max. output	20 bhp/8,500 rpm (20 ps/8,500 rpm)
Max. torque	12.3 lb-ft/8,000 rpm (1.7 m-kg/8,000 rpm)
Sarting	Kick starter (primary kick)
Ignition - **Spark Plug**	Magneto ignition - **Spark Plug** = NGK B9EN
Transmission:	
Primary reduction	Gear, reduction ratio 74/19 = 3.894
Secondary reduction	Chain, reduction ratio 45/14 = 3.214
Clutch	Wet, multi-disc
Gear box	Constant mesh, 5 forward speeds
Gear ratio:	
Low	34/12 = 2.833
Second	30/16 = 1.875
Third	26/19 = 1,368
Fourth	24/22 = 1.091
Fifth	22/23 = 0.956
Chassis:	
Frame model	AT1
Frame	High tension steel pipe, double-cradle
Suspension (Front)	Telescopic (coil spring oil damper)
Suspension (Rear)	Swing arm (coil spring oil damper)
Steering:	
Caster	60°30'
Trail	5.4 in. (137 mm)
Tire size	2.75 – 21 – 4PR
Tire size	3.50 – 18 – 4PR
Gasoline tank capacity	1.8 gal. (7.0 liters)
Oil tank capacity	1.3 qt. (1.2 liters)

Model	MX250
Dimensions:	
Overall length	83.1 in. (2,110 mm)
Overall width	37.4 in. (950 mm)
Overall height	44.5 in. (1,130 mm)
Wheelbase	55.9 in. (1,420 mm)
Ground clearance	8.9 in. (225 mm)
Weight (dry):	227 lbs. (101 kg)
Performance:	
Braking distance	50.5 ft. (15.4 m) 31 m.p.h. (50 km/h)
Min. turning radius	82.7 in. (2,100 mm)
Engine:	
Model	364
Type	Air cooled, 2-stroke, Torque induction
Cylinder	Single cylinder
Displacement	15.01 cu. in. (246 cc)
Bore and stroke	2.756 x 2.520 in. **(70 x 64 mm)**
Max. output	31 bhp/7,500 rpm (31 ps/7,500 rpm)
Max. torque	21.9 lb-ft/7,000 rpm (3.03 m-kg/7,000 rpm)
Sarting	Kick starter (primary kick)
Ignition - **Spark Plug**	Capacity discharge ignition - **Spark Plug** = NGK B8EV
Transmission:	
Primary reduction	Gear, reduction ratio 65/23 = 2.826
Secondary reduction	Chain, reduction ratio 51/14 = 3.642
Clutch	Wet, multi-disc
Gear box	Constant mesh, 5 forward speeds
Gear ratio:	
Low	36/16 = 2.250
Second	33/20 = 1.650
Third	29/23 = 1.260
Fourth	26/26 = 1.000
Fifth	23/29 = 0.793
Chassis:	
Frame model	364
Frame	High tension steel pipe, double-cradle
Suspension (Front)	Telescopic (coil spring oil damper)
Suspension (Rear)	Swing arm (coil spring oil damper)
Steering:	
Caster	60°
Trail	**5.8 in.** (129 mm)
Tire size	3.00 – 21 – 4PR
Tire size	4.00 – 18 – 4PR
Gasoline tank capacity	2.4 gal. (9.0 liters)
Oil tank capacity	0.6 qt. (0.5 liters)

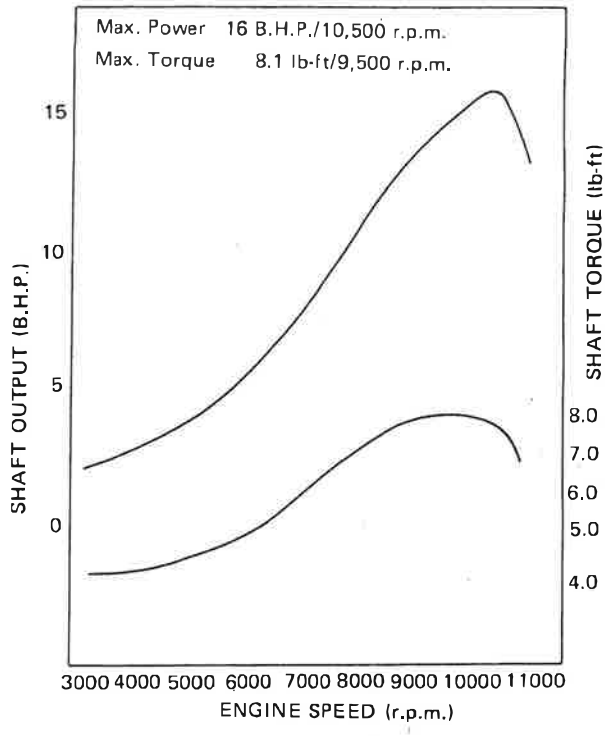
Model	MX360
Dimensions:	
Overall length	83.1 in. (2,110 mm)
Overall width	37.4 in. (950 mm)
Overall height	44.5 in. (1,130 mm)
Wheelbase	55.9 in. (1,420 mm)
Ground clearance	8.9 in. (225 mm)
Weight (dry):	
Performance:	
Braking distance	50.5 ft. (15.4 m) 31 m.p.h. (50 km/h)
Min. turning radius	82.7 in. (2,100 mm)
Engine:	
Model	365
Type	Air cooled, 2-stroke, gasoline, Torque induction
Cylinders	Single cylinder
Displacement	21.42 cu. in. (351 cc)
Bore and stroke	3.150 x 2.756 in. (80 x 70 mm)
Max. output	39 bhp/7,500 rpm (30 ps/7,500 rpm)
Max. torque	28.0 lb-ft/7,000 rpm (3.87 m-kg/7,500 rpm)
Starting	Kick starter (primary kick)
Ignition - **Spark Plug**	Capacity discharge ignition - **Spark Plug** = NGK B8EV
Transmission:	
Primary reduction	Gear, reduction ratio 64/24 = 2.666
Secondary reduction	Chain, reduction ratio 51/14 = 3.543
Clutch	Wet, multi-disc
Gear box	Constant mesh 4 forward speeds
Gear ratio:	
Low	36/16 = 2.250
Second	33/20 = 2.650
Third	29/23 = 1.260
Fourth	26/26 = 1.000
Fifth	23/29 = 0.793
Chassis:	
Frame model	365
Frame	High tension steel pipe, double-cradle
Suspension (Front)	Telescopic (coil spring oil damper)
Suspension (Rear)	Swing arm (coil spring oil damper)
Steering:	
Caster	60°
Trail	**5.8 in.** (129 mm)
Tire size	3.00 – 21 – 4PR
Trens size	4.00 – 18 – 4PR
Gasoline tank capacity	2.4 gal. (9.0 liters)
Oil tank capacity	0.6 qt. (0.5 liters)

Model	SC500
Dimensions:	
Overall length	83.1 in. (2,100 mm)
Overall width	37.4 in. (950 mm)
Overall height	44.5 in. (1,130 mm)
Wheelbase	55.9 in. (1,420 mm)
Ground clearance	8.9 in. (225 mm)
Weight (dry):	
Performance:	
Braking distance	50.5 ft. (15.4 m) 31 m.p.h. (50 km/h)
Min. turning radius	82.7 in. (2,100 mm)
Engine:	
Model	363
Type	Air cooled, 2-stroke, gasoline, Torque induction
Cylinders	Single cylinder
Displacement	30.27 cu. in (496 cc)
Bore and stroke	3.740 x 2.756 in. (95 x 70 mm)
Max. output	44 bhp/6,500 rpm (44 ps/6,500 rpm)
Max. torque	37.1 lb-ft/6,000 rpm (5.13 m-kg/6,000 rpm)
Starting	Kick starter (primary kick)
Ignition - Spark Plug	Capacity discharge ignition - Spark Plug = NGK B8EV
Transmission:	
Primary reduction	Gear, reduction ratio 64/24 = 2.660
Secondary reduction	Chain, reduction ratio 51/14 = 3.642
Clutch	Wet, multi-disc
Gear box	Constant mesh, 4 forward speeds
Gear ratio:	
Low	30/15 = 2.000
Second	26/19 = 1.368
Third	23/23 = 1.000
Fourth	21/26 = 0.807
Chassis:	
Frame model	363
Frame	High tension steel pipe, double-cradle
Suspension (Front)	Telescopic (coil spring oil damper)
Suspension (Rear)	Swing arm (coil spring oil damper)
Steering:	
Caster	60°
Trail	5.08 in. (129 mm)
Tire size	3.00 – 21 – 4PR
Tire size	4.60 – 18 – 4PR
Gasoline tank capacity	2.4 gal. (9 leters)
Oil tank capacity	0.6 qt. (0.5 liters)

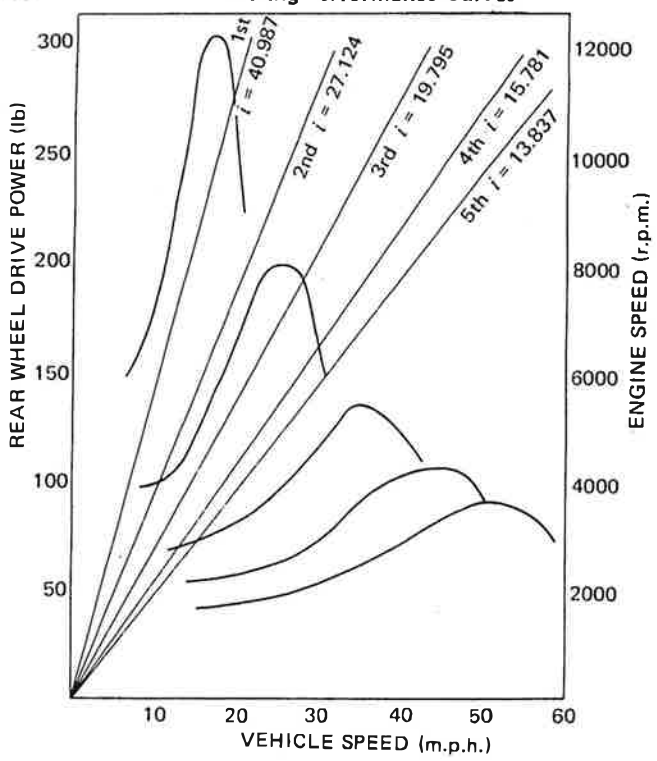
CHAPTER 2. PERFORMANCE CURVES

LTMX

Engine Performance Curves

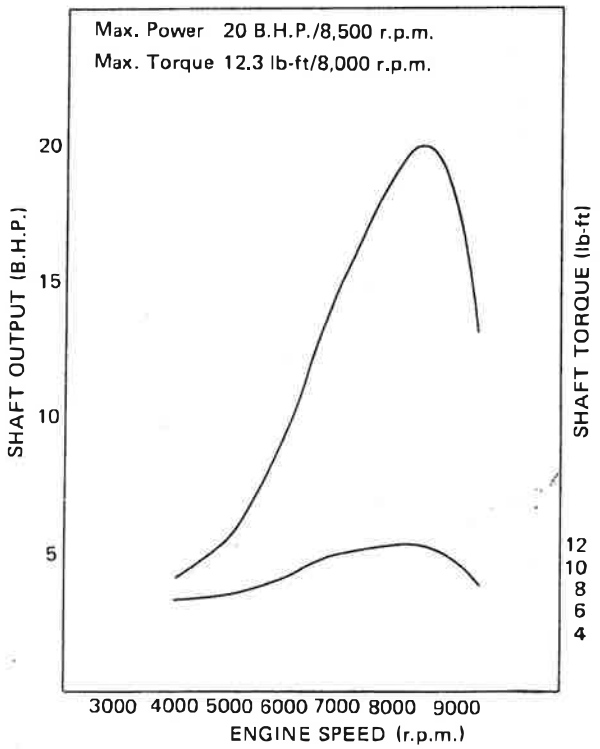


Driving Performance Curves

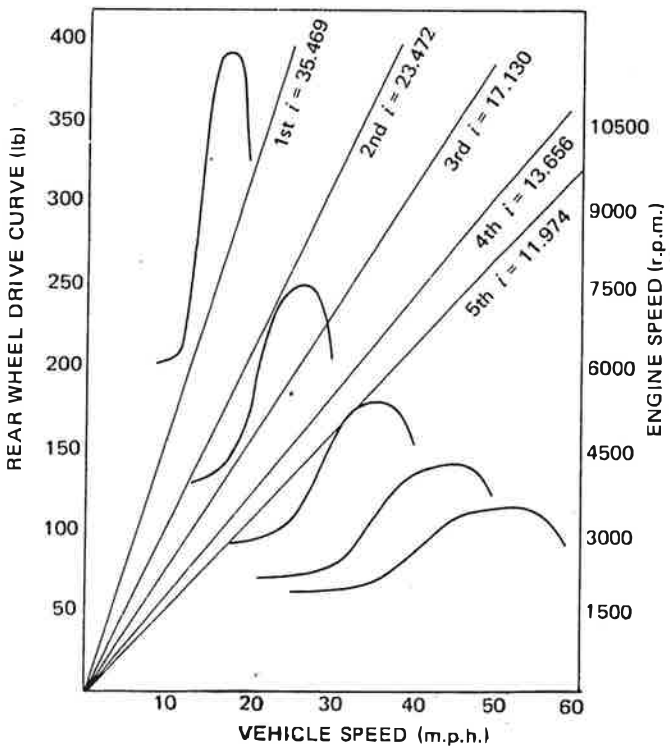


ATMX

Engine Performance Curves

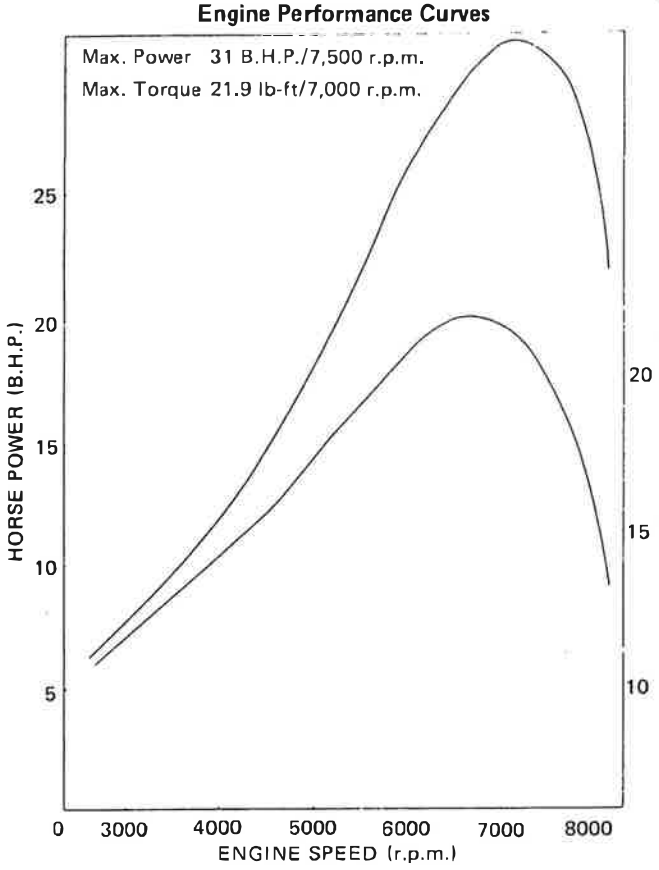


Driving Performance Curves



MX250

Engine Performance Curves



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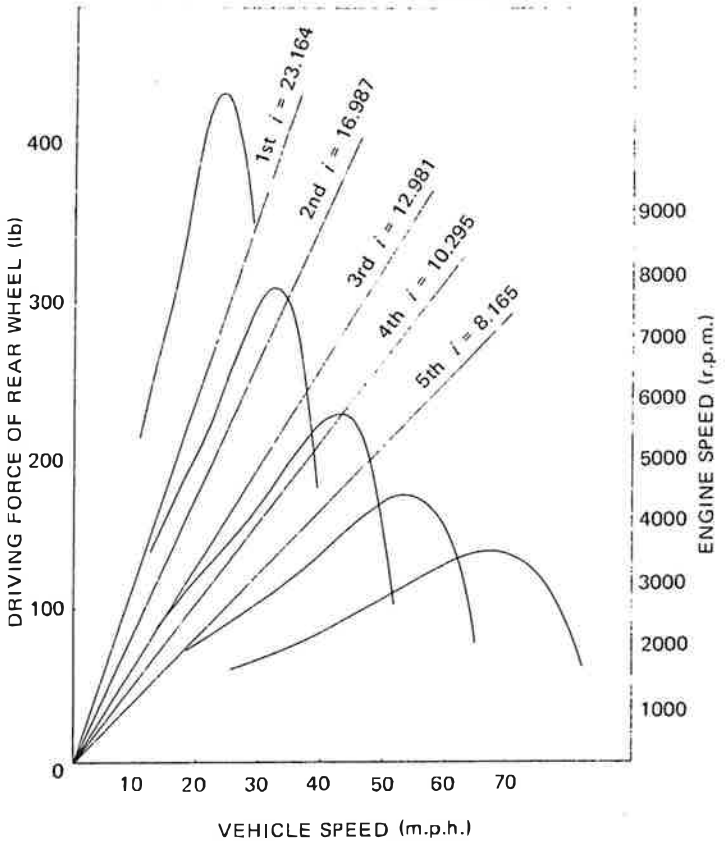
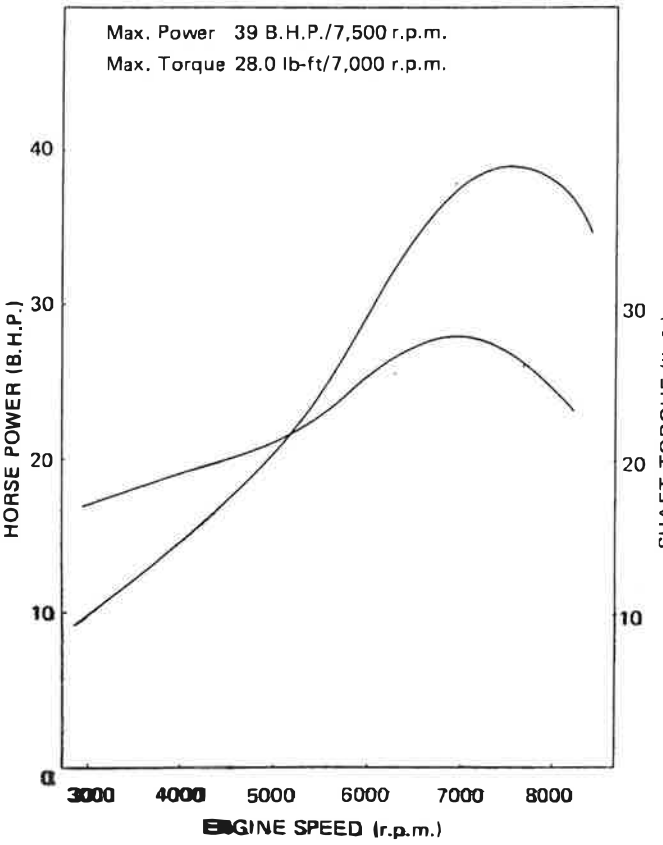
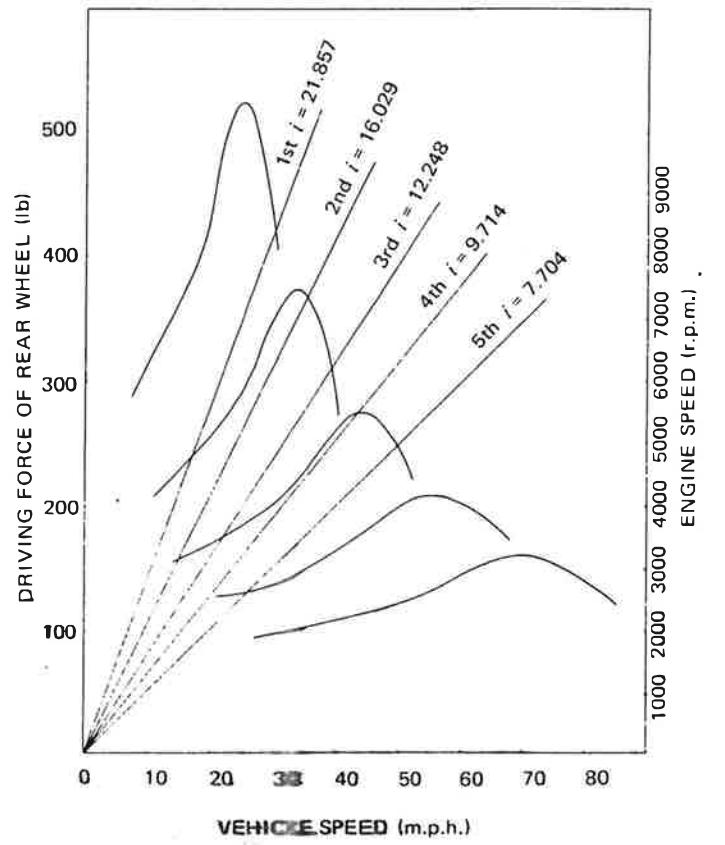


MX360

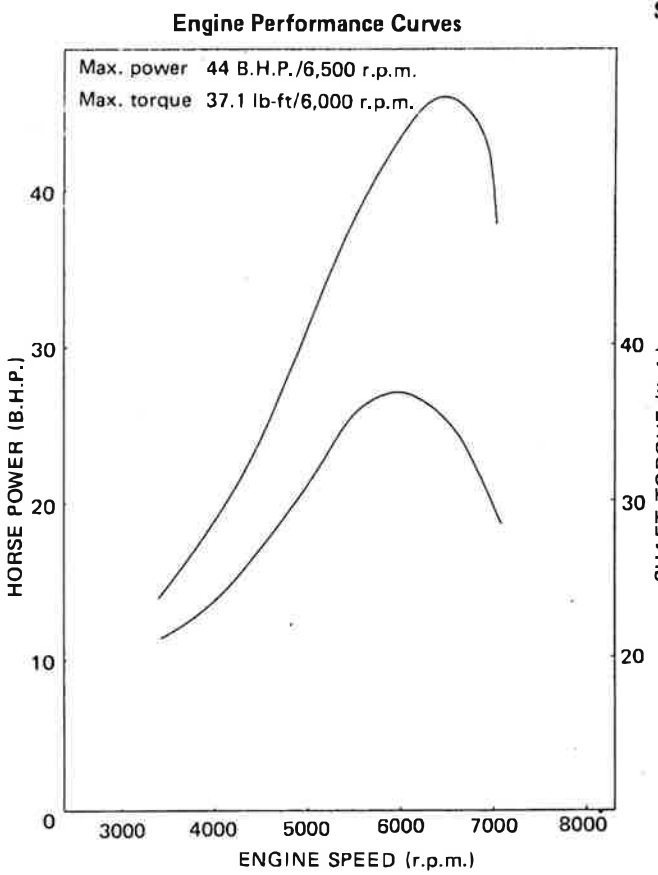
Engine Performance Curves

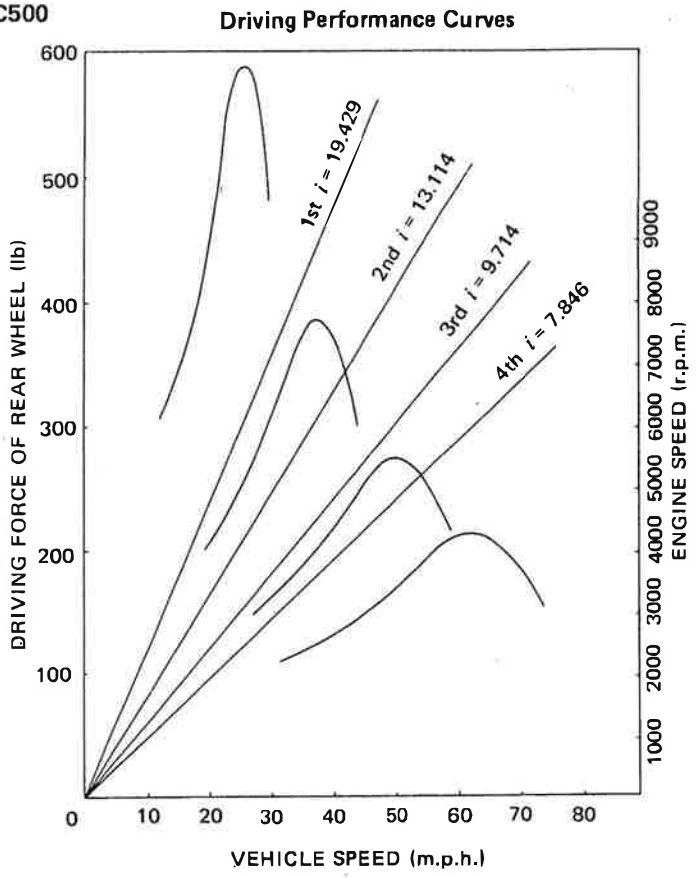


Driving Performance Curves



SC500


Engine Performance Curves
Max. power 44 B.H.P./6,500 r.p.m.
Max. torque 37.1 lb-ft/6,000 r.p.m.
HORSE POWER (B.H.P.)
SHAFT TORQUE (lb-ft)
ENGINE SPEED (r.p.m.)
0
10
20
30
40
3000
4000
5000
6000
7000
8000


Driving Performance Curves
DRIVING FORCE OF REAR WHEEL (lb)
ENGINE SPEED (r.p.m.)
VEHICLE SPEED (m.p.h.)
1st i = 19.429
2nd i = 13.114
3rd i = 9.714
4th i = 7.846
0
100
200
300
400
500
600
10
20
30
40
50
60
70
80
1000
2000
3000
4000
5000
6000
7000
8000
9000

CHAPTER 3. ENGINE

Procedures for the disassembly of the MX Series and SC500 are basically the same as those for the ENDURO Series, and therefore, reference is not made to disassembly.
They are built to run across a variety of rough terrain and must be maintained at best running condition through-out a race. With this in mind, the description is clip but limited to what is specially needed to check and service the MX Series and SC500.

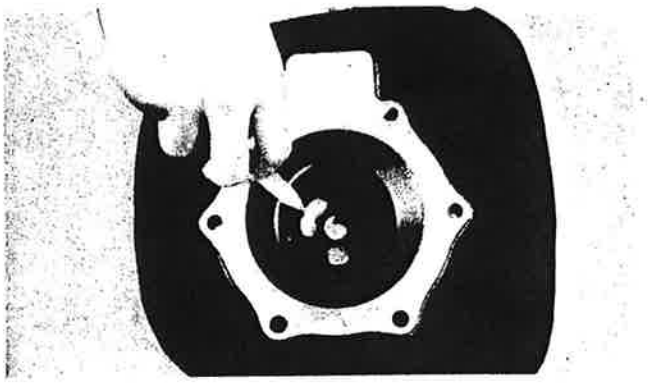
3–1 CYLINDER HEAD

1) Combustion chamber volume

LTMX	ATMX	MX250	MX360	SC500
9.4 ± 0.2 cc	11.9 ± 0.2 cc	27 ± 0.5 cc	36.6 ± 0.5 cc	57.5 ± 0.5 cc

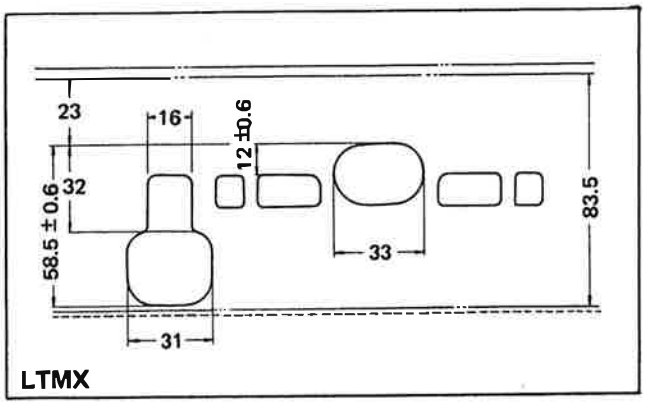
2) Removing Cylinder Head Carbon

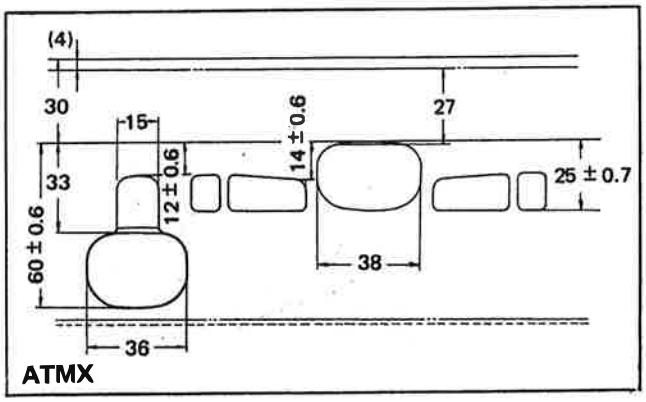
If carbon accumulates in the cylinder head, the compression ratio increases to such an extent that detonation will occur. The result will be power loss. It is necessary, therefore, to periodically remove the carbon from the cylinder head.
To remove the carbon, a saw blade may be used, but the serrated side should not be used. Exercise special care not to scratch the cylinder head.
To remove the carbon from the piston head and exhaust port, follow the same as above.

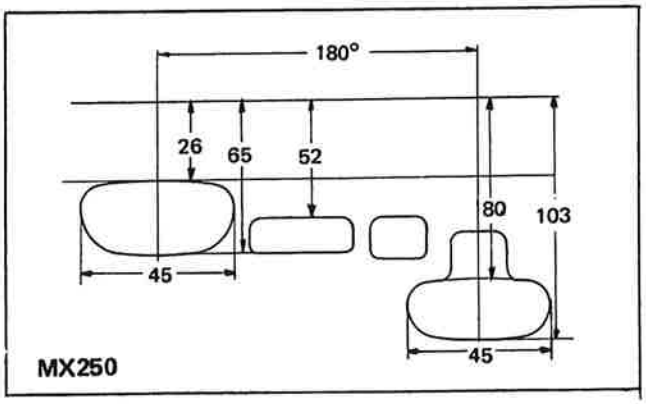


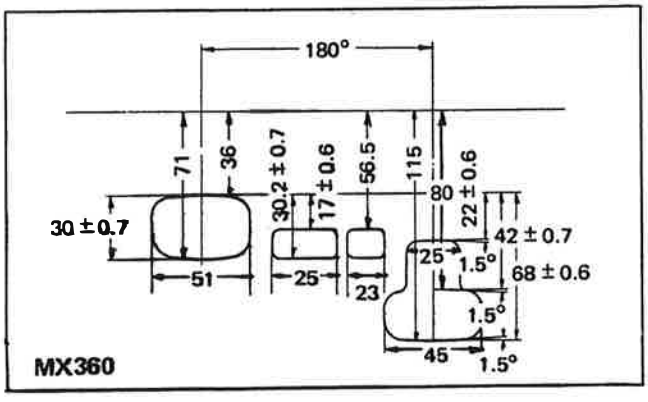
3–2 CYLINDER

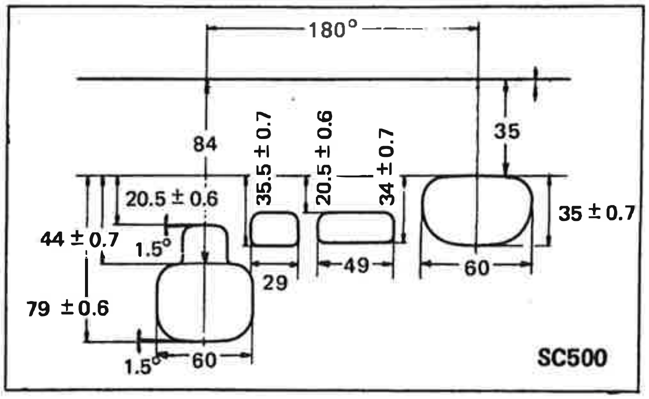
1) Port timing diagram









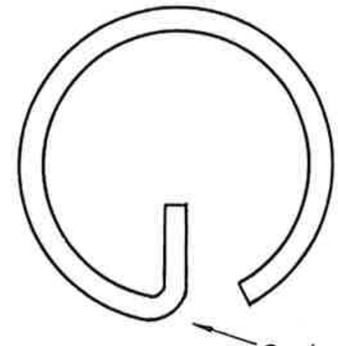


2) **Examine the cylinder**

Examine the cylinder for high spots (bright area) at the surface contacting the piston wall. Smooth out any high spot with #600 wet and dry sandpaper.

3–3 PISTON PIN CLIP

The piston pin clip is not ever lasting. It is found excessively wear or cracked, replace it with a new one.

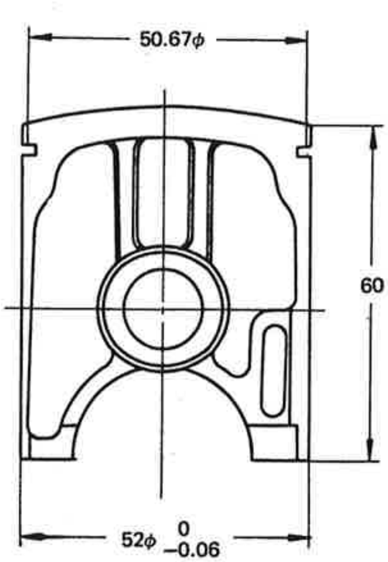


☆☆

3–4 PISTON

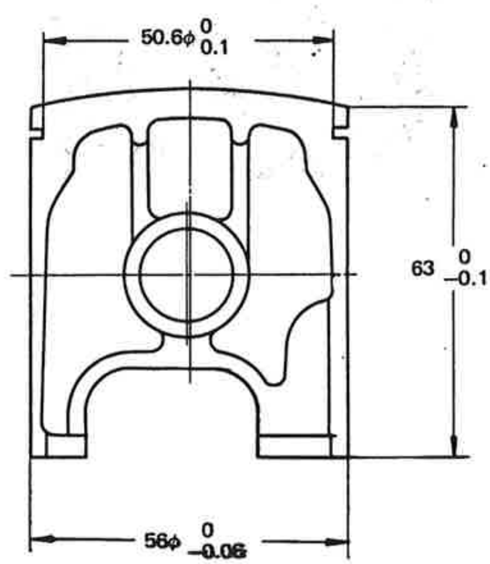
1) **Dimensions**

LTMX



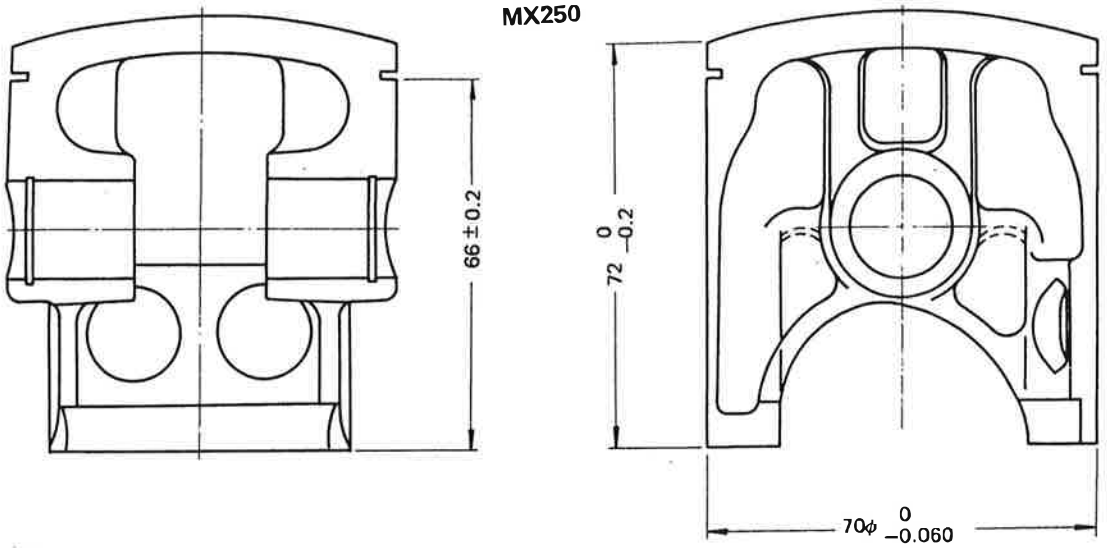
LTMX

ATMX

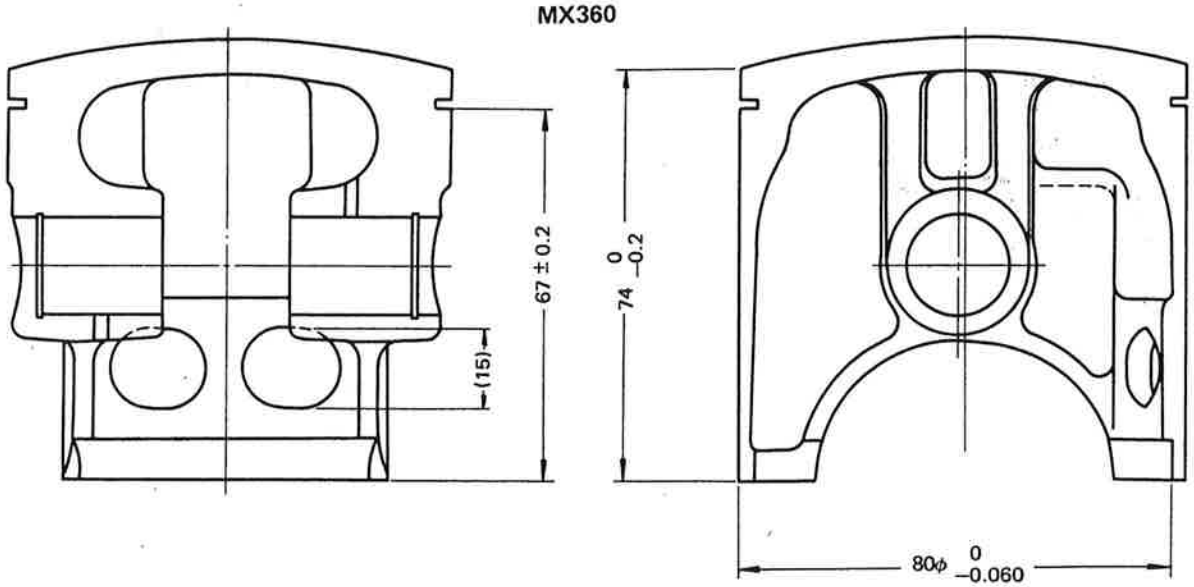


ATMX

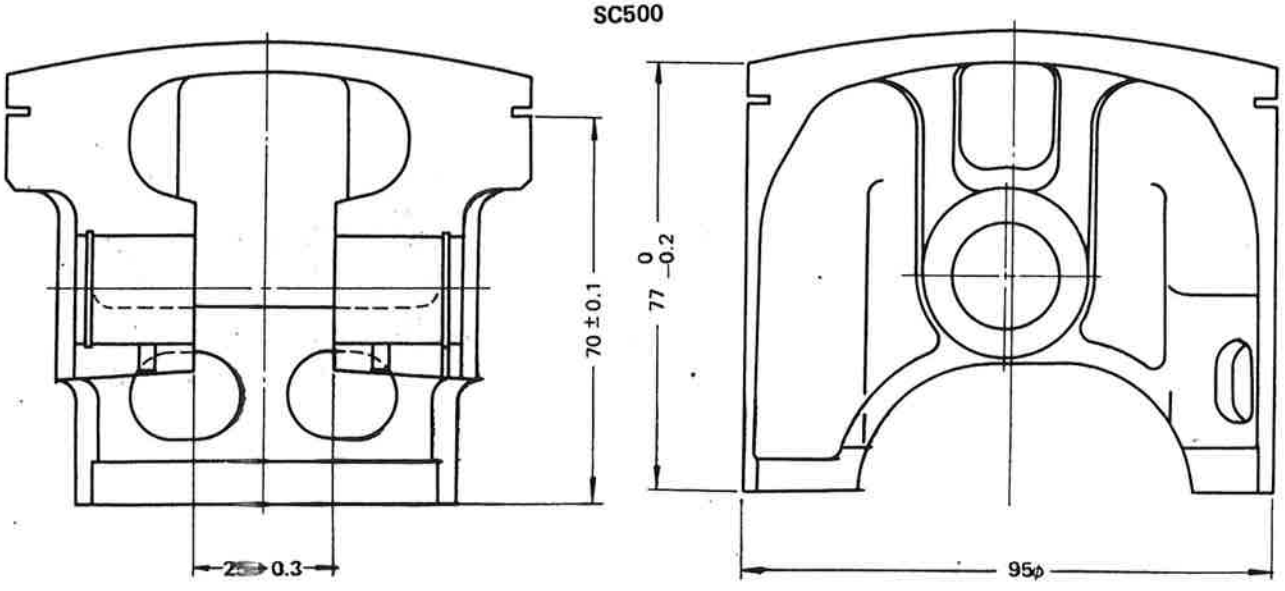
MX250



MX360



SC500



Crancked or Worn Piston

Check the piston from its inside for cracking if any crack is found, replace it.

Examine the piston for high spots (bright areas) at the surface contacting the cylinder wall. Smooth out any high spot with #600 wet and dry sandpaper.

3–5 PISTON RINGS

Check each piston ring carefully. If any scuff or score is found, smooth it away with fine sandpaper. Or if it can not be corrected with sandpaper, replace the ring.
If the carbon attached to the ring becomes harden, the ring may get stuck. In this case, both piston and rings should be replaced.

1) Piston clearance

Piston clearance is the difference between the minimum cylinder bore diameter and the maximum outside diameter of the piston.
As described in the cylinder, piston clearance should be specified below:

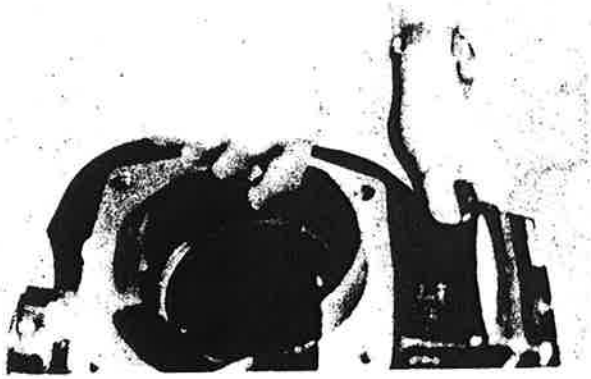
LTMX	ATMX	MX250	MX360	SC500
0.040 ~ 0.045 mm	0.040 ~ 0.050 mm	0.045 ~ 0.050 mm	0.045 ~ 0.050 mm	0.050 ~ 0.060 mm

To determine the maximum piston diameter, measure the piston with a micrometer at right angles to the skirt 10 mm (3/8 in) from its bottom edge.

2) Piston ring end gap

Piston rings will have weakened tension after a long time of use as a result of up and down motion of the piston. The result is poor sealing between the piston rings and the cylinder wall, allowing "blow-by." In addition, if a ring is worn excessively, the ring gap will widen, and this also permits the compression pressure to go pass the ring.

LTMX	ATMX	MX250	MX360	SC500
0.15~0.35 mm	0.4~0.6 mm	0.4~0.5 mm	0.4~0.5 mm	0.3~0.5 mm



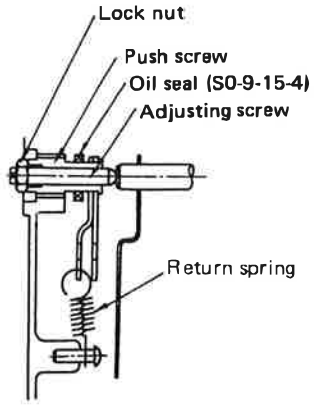
3–6 CLUTCH

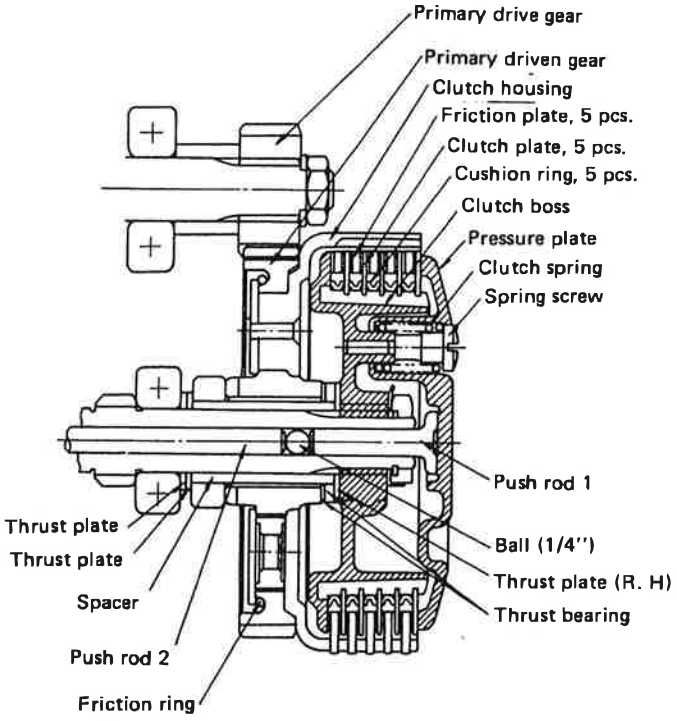
1) Construction

The push lever axle is locked to the push lever at one end, and the other end is shaped like a semi-circle.
A groove is cut around the push lever axle at its center, and the adjusting screw is so positioned that its protuberance fits in the groove. The protuberance is positioned 3 mm off the center line of the adjusting screw. Therefore, when the adjusting screw is turned in or out 180°, the push lever axle is moved axially in either direction. The tapered portion of the push lever is at right angles to the push rod. Therefore, the play of the push rod can be adjusted by moving the push lever axle with the adjusting screw.

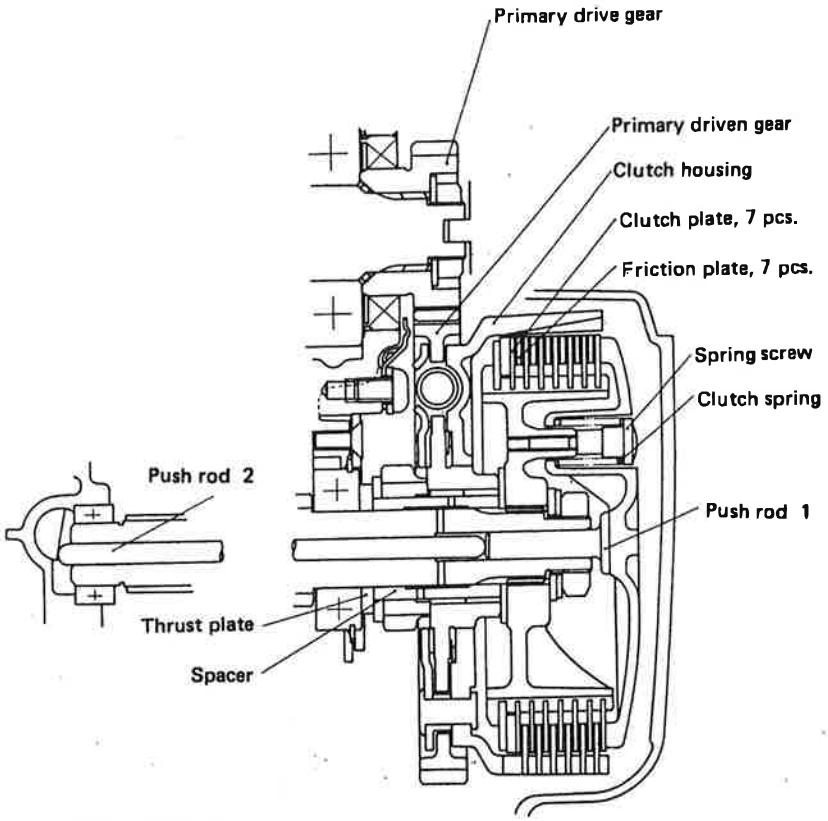
2) Operation

When the clutch lever is operated, the push lever axle is turned by means of the push lever. The push lever axle contacts the push rod at one end, and as the push lever turns, it pushes the push rod.

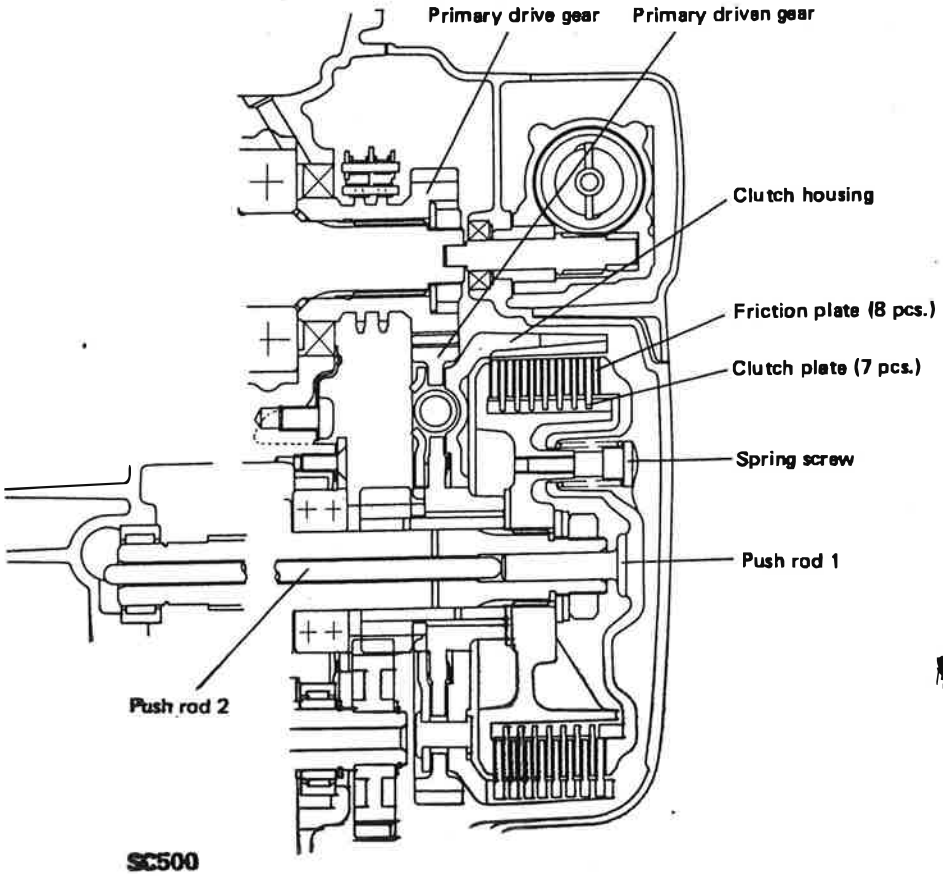




LTMX · ATMX



MX250 · MX360



SC500

3) Adjustment

On the MX250, 360 and SC500, the clutch push lever is so designed that it is positioned 10° behind the push lever axle before it is operated and 10° ahead after it is operated. Therefore, if the clutch push lever does not move as specified, adjustment is necessary.

Adjustment can be made by turning the clutch adjusting screw located in the generator cover. To adjust, loosen the lock nut, and turn in or out the adjusting screw so that the push lever is 10° behind the main axle center line before it is operated.

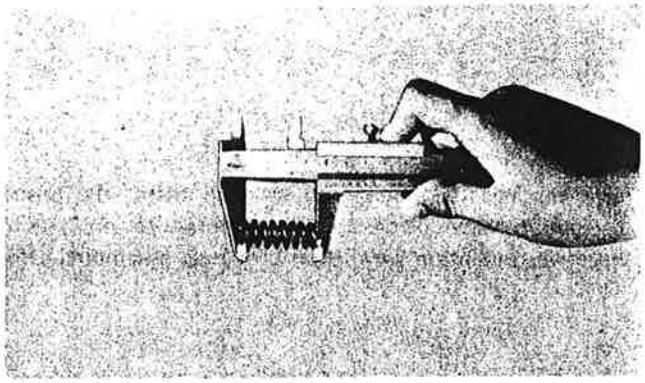
After the adjustment, be sure to tighten the lock nut.

4) Clutch Springs

Measure the free length of each clutch spring. If the measurement is less than the specific value, replace the spring.

Free length:

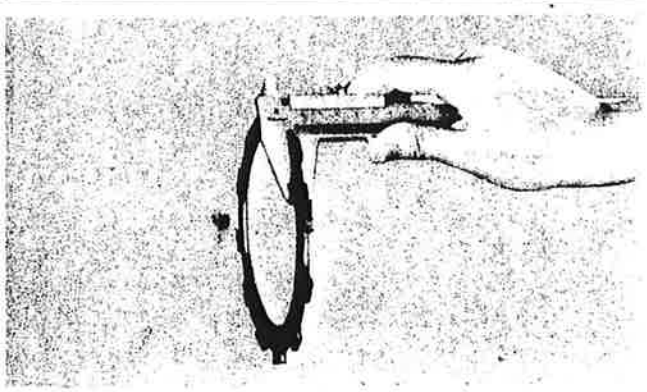
LTMX	ATMX	MX250	MX360	MX500
34.0mm	31.5mm	36 mm	36mm	36mm



5) Friction Plates

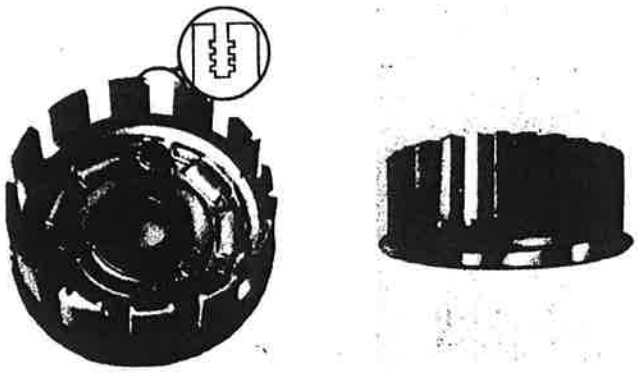
Friction plates are liable to wear. If friction plates are worn excessively, the clutch tends to slip. If any friction plate is found worn less than the specific value, replace it.

LTMX	ATMX	MX250	MX360	MX500
4.0 ± 0.1 mm	4.0 ± 0.1 mm	3.0 ± 0.1 mm	3.0 ± 0.1 mm	3.0 ± 0.1 mm



6) Clutch Housing

The clutch housing will have stepped wear at the area contacting the friction plate after a long time of use. If the clutch has such wear on its surface, it tends to drag. It should be smoothed out with sandpaper, or the clutch housing should be replaced.

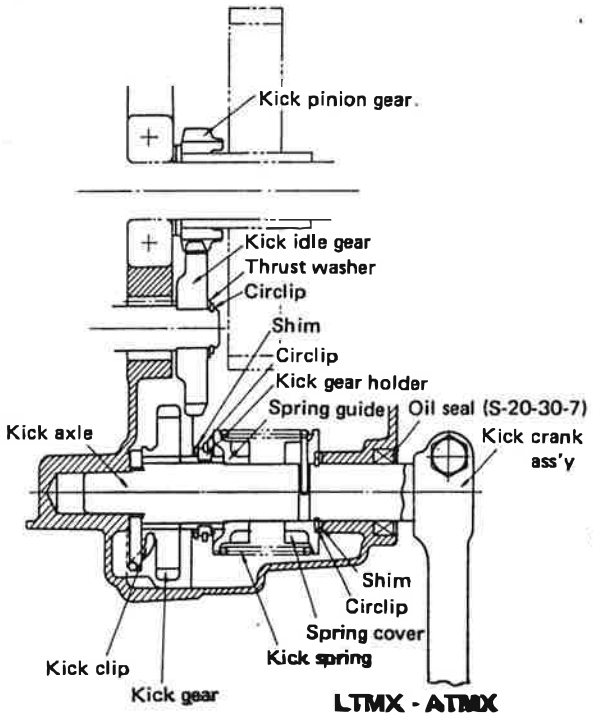


3–7 KICK MECHANISM

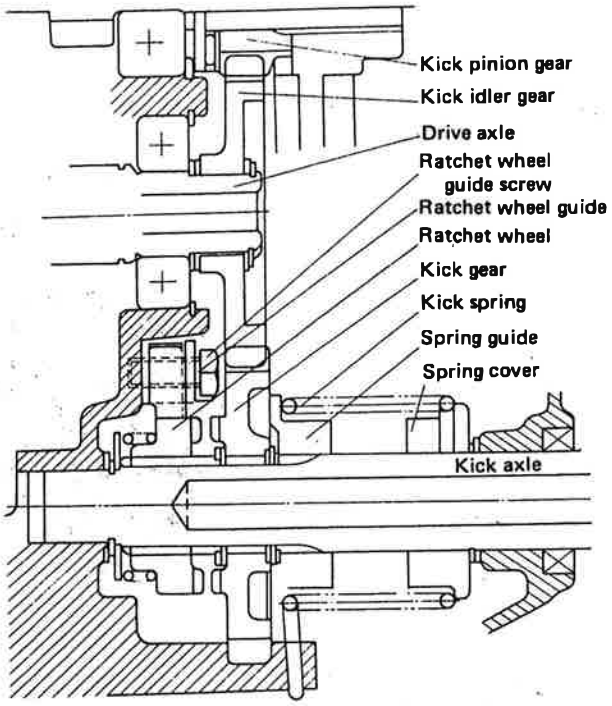
On the LTMX and ATMX, the kick mechanism is of kick-and-mesh type, while for the MX250, MX360 and SC500, the ratchet type is employed. In addition, on the MX360 and SC500, the kick mechanism is interlocked to the decompression mechanism. That is, when the kick crank is depressed, it causes the decompression mechanism to operate.

The kick axle is provided with a cam. When the kick crank is kicked, the kick axle begins to rotate, and the lever in contact with the cam causes the lever to move, by which the decompressor wire is pulled. As the decompressor wire is pulled, the decompressor, which is installed in the front part of the cylinder, operates to reduce the compression pressure in the cylinder.

This makes the kick much easier.



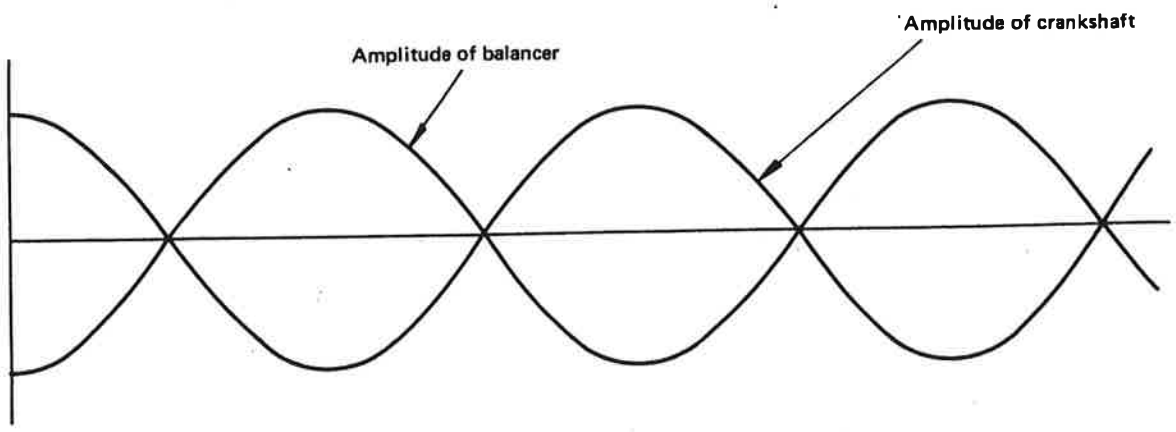
LTMX - ATMX



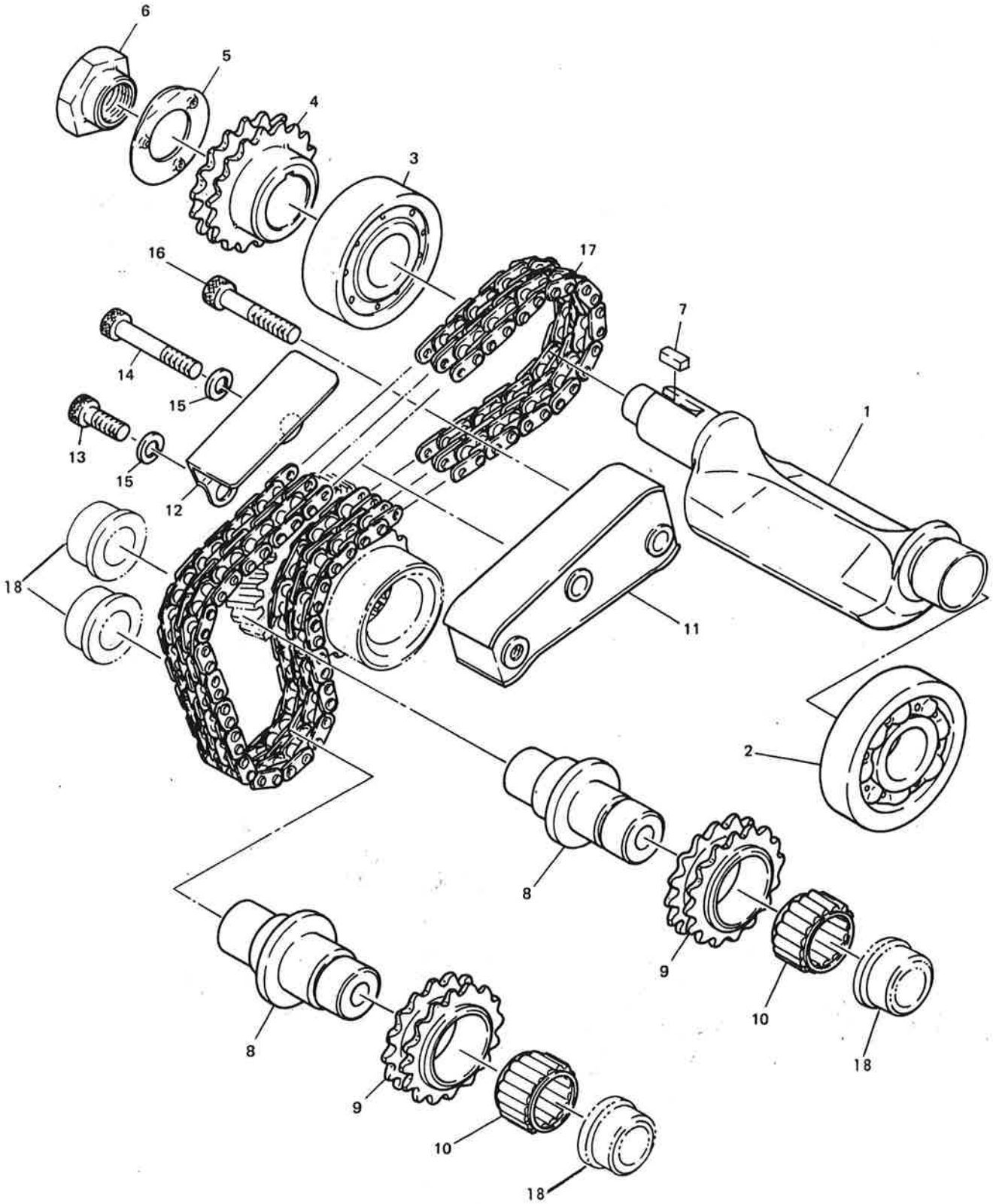
MX250 · MX360 · SC500

3-8 OMNI PHASE BALANCER (MX360 & SC500)

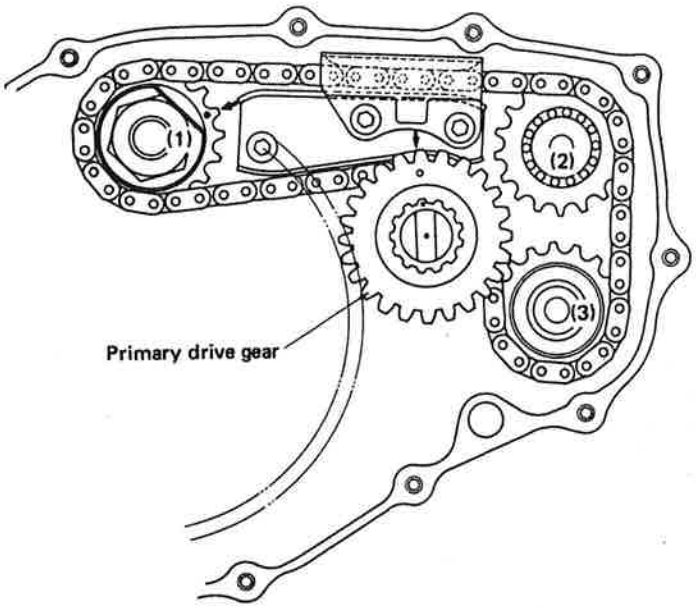
As the crankshaft begins turning vibration will occur. To minimize this vibration, the crankshaft is provided with a "balance cut". But this balance cut alone is not enough to damp the vibration. For this reason, it is necessary to give the negative oscillation wave to offset the positive oscillation wave. The balancer is used to produce the negative oscillation wave, thus providing a damping effect.

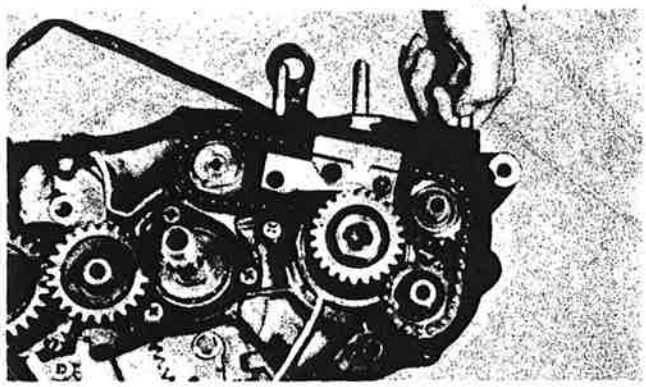


NOTE: The balancer is installed separately from the crankshaft and driven by the crankshaft through the chain so that the engine can be made compact.



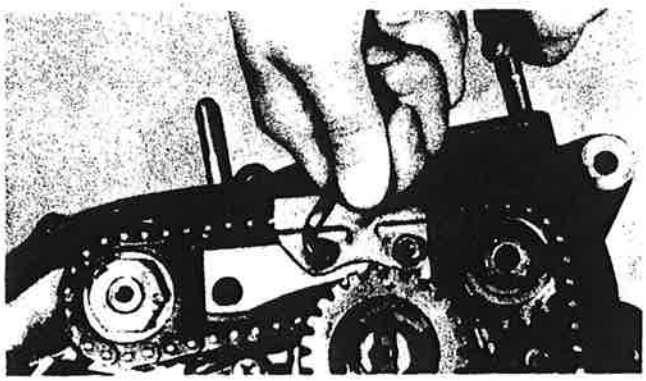
1. WEIGHT
2. BEARING (B6204 special)
3. BEARING (B9000 special)
4. SPROCKET
5. WASHER, lock
6. NUT, special
7. KEY
8. SHAFT
9. SPROCKET, idle
10. BEARING
11. GUIDE, stopper
12. GUIDE, upper
13. BOLT
14. BOLT
15. WASHER, spring
16. BOLT
17. CHAIN (RK109-2 66L)
18. BUSHING





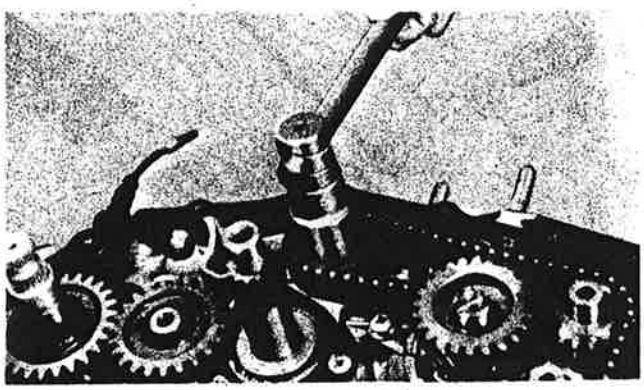
1) Removing the Balancer

1. Remove the chain guide.

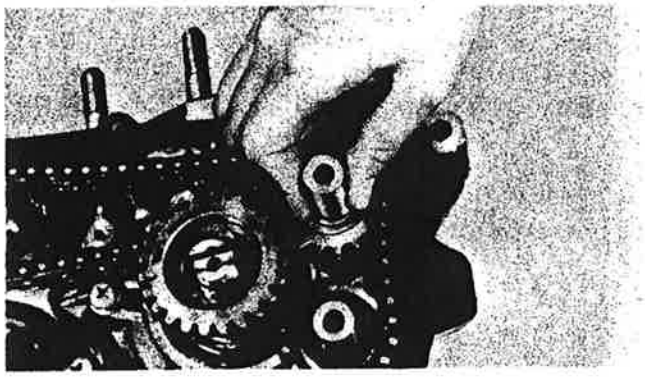


2. Flatten the lock washer of the sprocket (1) with chisel.

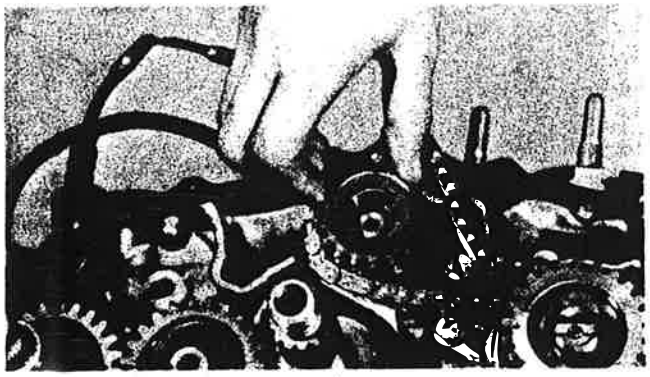
3. Remove the sprocket nut.



4. Pull out the sprocket (2) shaft and remove the sprocket (2).



5. Take off the sprocket (1).

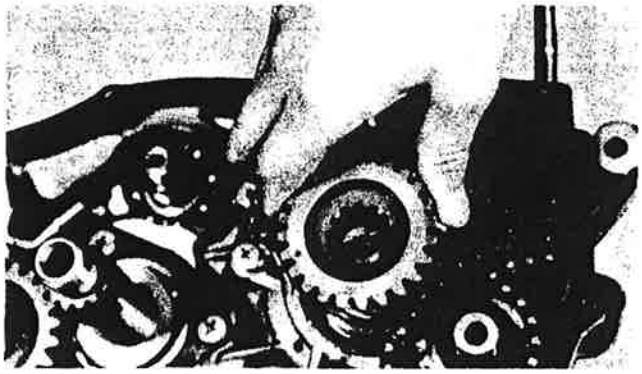


6. Remove the chain and sprocket (3).

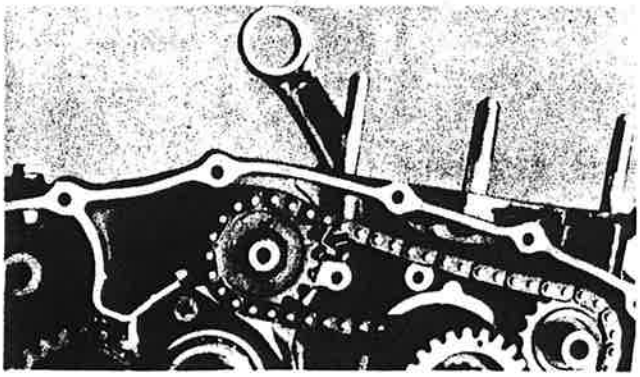
7. After above procedure, separate the crankcase, so balancer, can be removed.

2) Installation

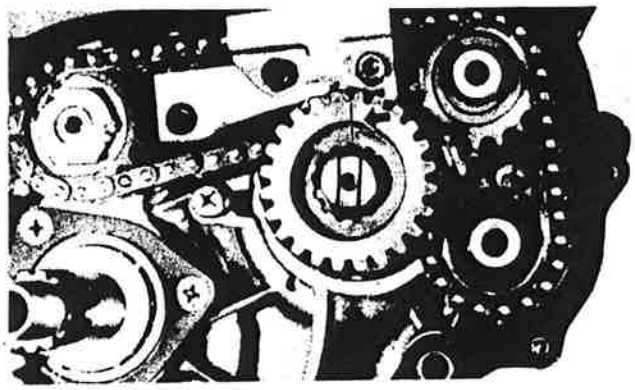
1. Install sprocket 1 on the balancer.
2. Align the punched mark on the crankshaft with that on the primary drive gear, and install the primary drive gear.



3. Align the punched mark on sprocket 1 with the arrow mark on the crankcase.



4. Align the punched mark on the primary drive gear with the arrow mark on the crankcase. (In this case, the crankshaft should be at TDC.)

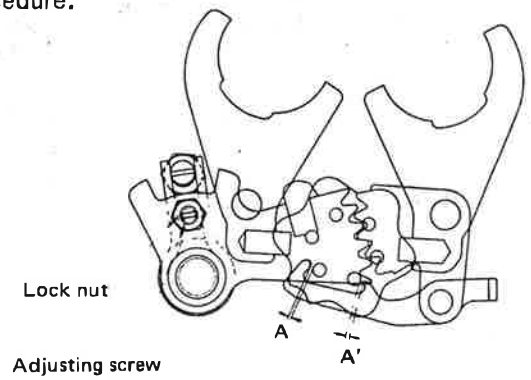


5. Install sprockets (2) and (3) in the crankcase with the chain placed around it.
6. While holding both sprocket (1) and primary drive gear in position, place the chain around the primary drive gear and sprocket (1).
7. Next, engage sprockets (2) and (3) with the chain and insert sprocket shafts through sprockets and into crankcase.
8. Install lock washer and nut on end of balancer (sprocket 1).
9. Tighten balancer nut and bend up the lock washer.

10. Finally, install the chain guide.

3–9 ADJUSTING THE GEAR SHIFT ARM

Adjusting or correcting the travel of the gear shift arm to prevent improper shifting progression (excess feed or insufficient feed of the gear shift arm) is accomplished by turning the gear shift return spring stop screw (eccentric bolt) in or out. Adjust the eccentric bolt until distance A and A' are equal. See Chap. 12, P. 40, for LT/AT adjust procedure.



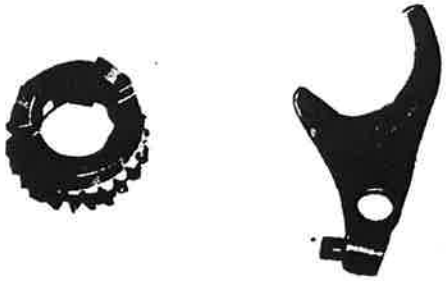
MX250/360, SC500

3–10 CHANGE SHAFT

If shifting is hard or if the change pedal will not return smoothly to its original position, check the change shaft carefully. If it is found bent, it should be replaced.

3–11 TRANSMISSION GEARS AND SHIFT FORKS

Examine the transmission gear teeth for wear or breakage. Check the shift forks for bend and wear. If bend or wear is excessive, replace it.



3–12 CRANK

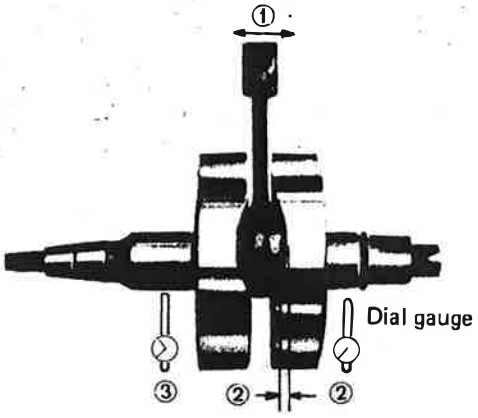
1) Checking the Crankshaft Components

(1) Check connecting rod axial play at small end (to determine the amount of wear of crank pin and bearing at large end).
- Small end deflection should not exceed 2 mm.
- If measured more than 2 mm, disassemble the crankshaft, and check connecting rod, crank pin and bearing. Replace any faulty one.
  After reassembly, small end deflection should be within 0.8 ~ 1.0 mm.

(2) Check connecting rod for side play at large end.
- Move connecting rod to one side and insert a feeler gauge. Large end side play should be within 0.4~0.5 mm.
- If excessive side play is present, disassemble the crankshaft and replace worn parts.

(3) Check crankshaft for accuracy of assembling. (Check crankshaft for alignment.)
- Dial gauge readings at indicated positions should be 0.05 mm.
- Correct by tapping the flywheel with a brass hammer and by using a wedge.

LTMX	ATMX	MX250	MX360	SC500
50 $^{+0.05}_{-0.10}$ mm	56 $^{+0.05}_{-0.10}$ mm	64 $^{+0}_{-0.05}$ mm	64 $^{+0}_{-0,05}$ mm	64 $^{+0}_{-0.05}$ mm

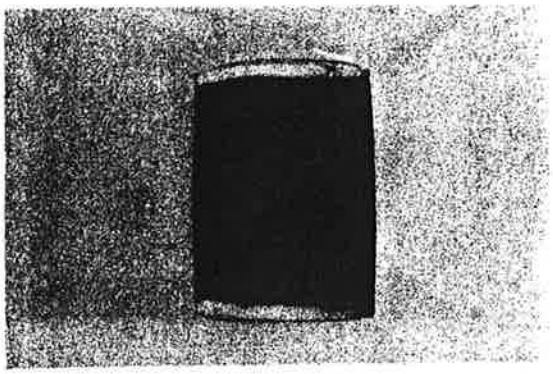


3–13 BEARINGS

Check bearing for smooth move. Examine if both inner and outer races snugly fit together.

3–14 AIR CLEANER

Motocrossers are used in dusty places, and therefore, the air cleaner must be washed more often, usually daily.



How to Wash

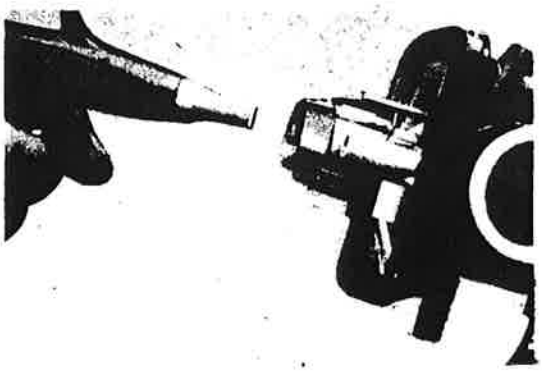
Remove the element, and thoroughly wash it in a mixed oil. Then, fully squeeze it and dry it.

Pour two to three tablespoons of oil onto element. Work thoroughly in, squeeze excess out. Filter should be damp at all times to function properly, but not "dripping."

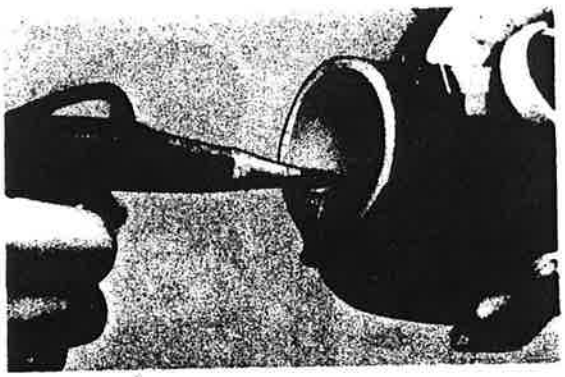
3–15 CARBURETOR

Item \ Model	LTMX	ATMX	MX250	MX360	SC500
Type	VM26SC	VM26SC	VM30SC	VM34SC	VM38SC
Mark	335M1	318M1	364E1	365E2	363E1
M.J.	#160	#190	#250	#310	#400
J.N.	4F15-3	4F15-3	6F5-3	6F15-3	6F16-2
N.J.	0-2	N-8	P-5	P-8	0-8
C.A.	1.0	2.5	2.5	3.0	3.5
B.P.	1.4	1.4	1.8	1.8	1.8
P.O.	0.6	0.6	0.8	0.8	0.8
P.J.	#40	#60	#60	#50	#80
A.S.	1-1/4	1.0	1.0	1.0	1-1/2
V.S.	2.5	2.5	3.3	3.3	3.5
S.J.	#40	#30	#80	#80	#80

When a carburetor is disassembled, it should be checked for clogging. Clean it with compressed air.



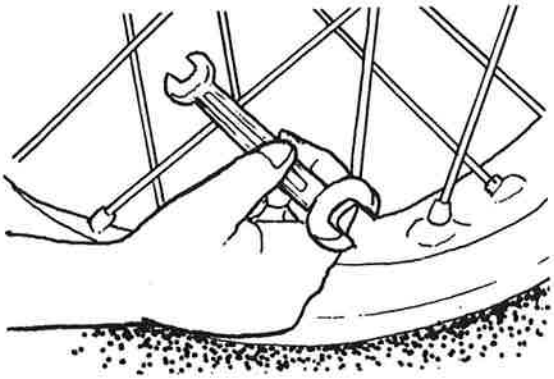
If the primary air circuit is clogged, hard starting will result.



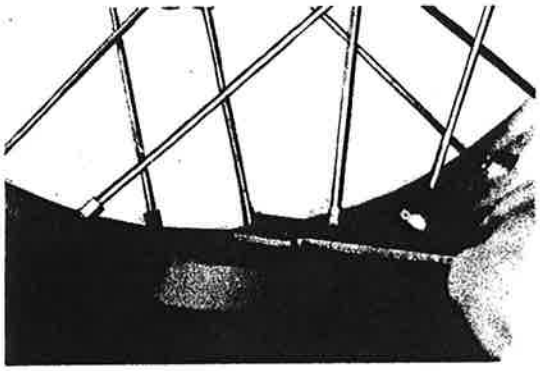
CHAPTER 4. CHASSIS

4–1 SPOKES

If spokes become loose, the rim may be distorted, thus adversely affecting riding comfort. Before setting out on a ride, check the spokes. If any spoke is found loose, it should be fixed by tightening the spoke nipple.
Spokes can be examined by lightly striking each with a wrench or by shaking it with the hand.

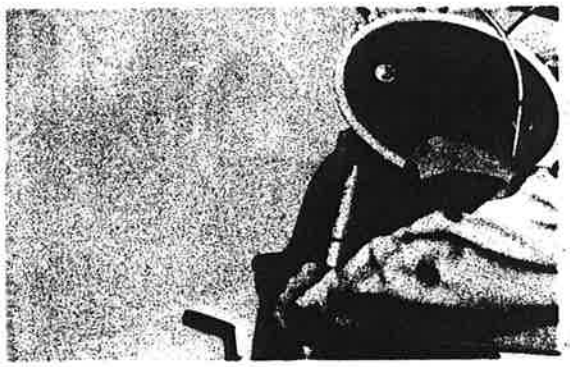


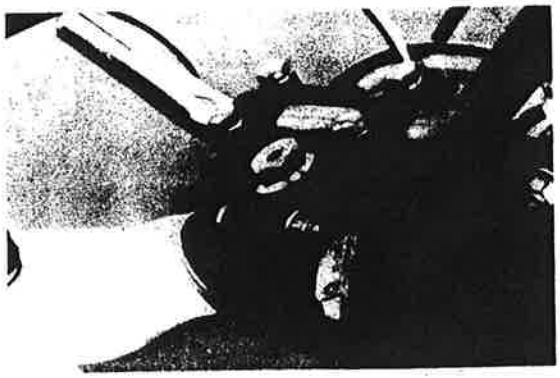
To tighten the spoke, screw in the spoke nipple.



4–2 STEERING

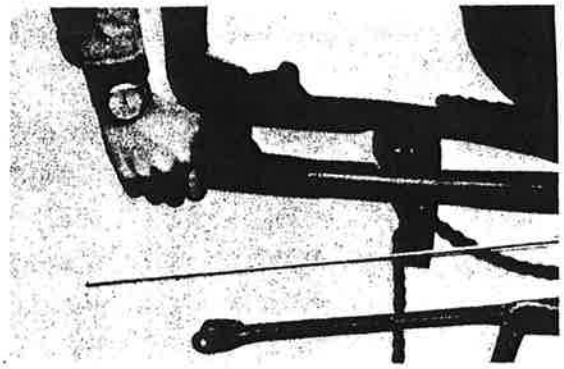
Hold the front wheel off the ground, and try to move the steering stem up and down. If it moves, tighten the fitting nut.



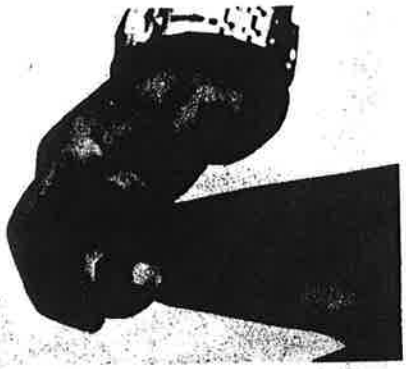


4–3 REAR ARM

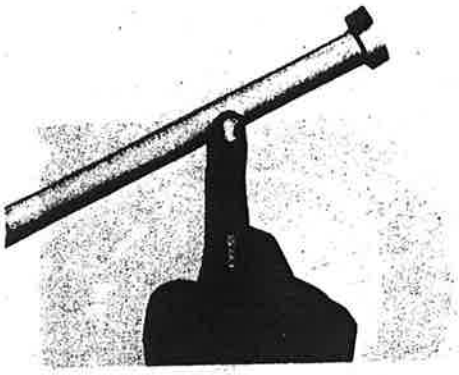
With rear wheel and shock absorbers removed, shake swingarm sideways to check for freeplay.



The freeplay can be removed by adding a shim or shims. But if freeplay is excessive, replace the rear arm bushings or shaft.

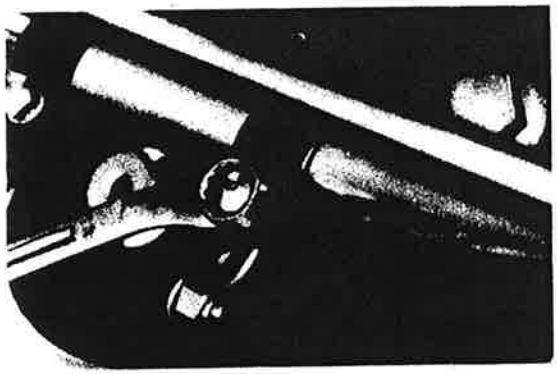


Grease the rear arm shaft frequently.



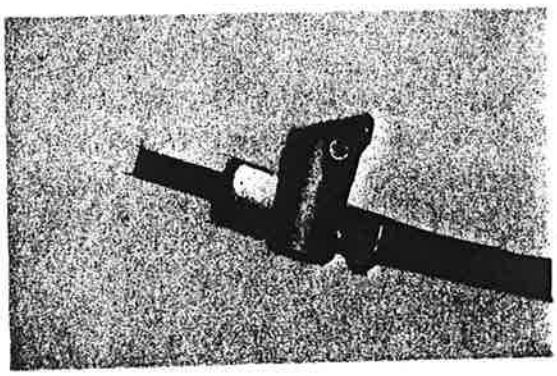
4–4 HANDLEBAR

The handlebar mounting bolts must be tight; otherwise, hard steering will result.

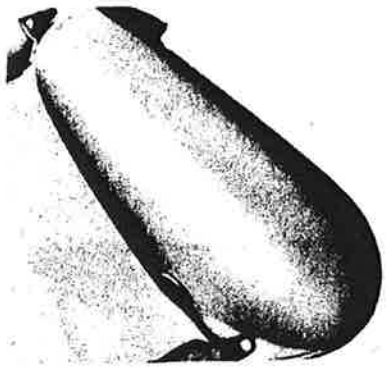


4–5 FUEL COCK

The fuel cock tends to clog particularly in earlier stages of use of a new machine. Wash the strainer with gasoline.



If the fuel cock strainer is frequently clogged with dust, it is advisable to wash the fuel tank thoroughly.

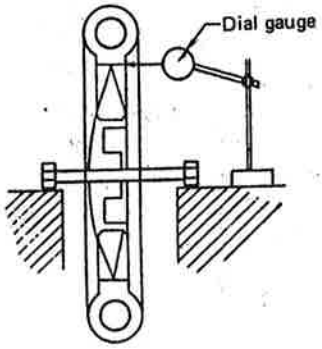


4–6 WIRES

All wires must be oiled periodically so that they will operate smoothly.

4–7 TIRE RIMS

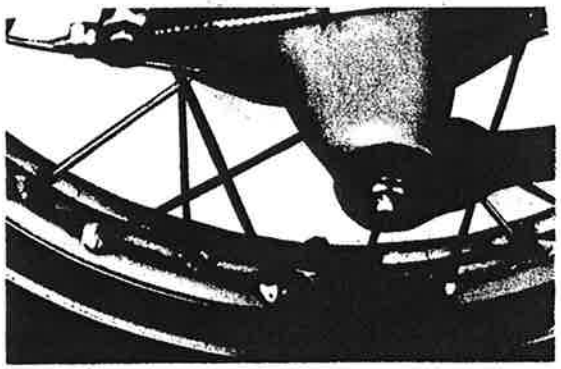
Remove the wheel from the machine, and check for rim deflection. If the deflection is more than 2 mm, adjust spokes.



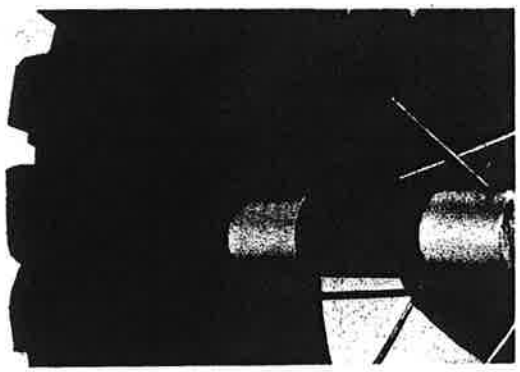
4–8 BEAD SPACERS

A motocrosser has lower tire pressures and is usually driven at high speeds over a rough, tortuous terrain. Therefore, the tire tube tends to slip around the tire rim. To prevent this, a bead spacer is used. If the bead spacer is found tilting, it should be corrected in the following manner:

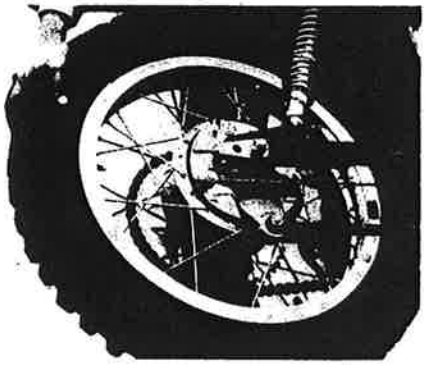
(1) Deflate the tire, and loosen the tire valve lock nut.



(2) Lightly strike the tire wall with a hammer.



(3) Turn the tire in the reverse direction and apply quick brake. By using the inertia of the turning tire, the bead spacer position can be corrected.

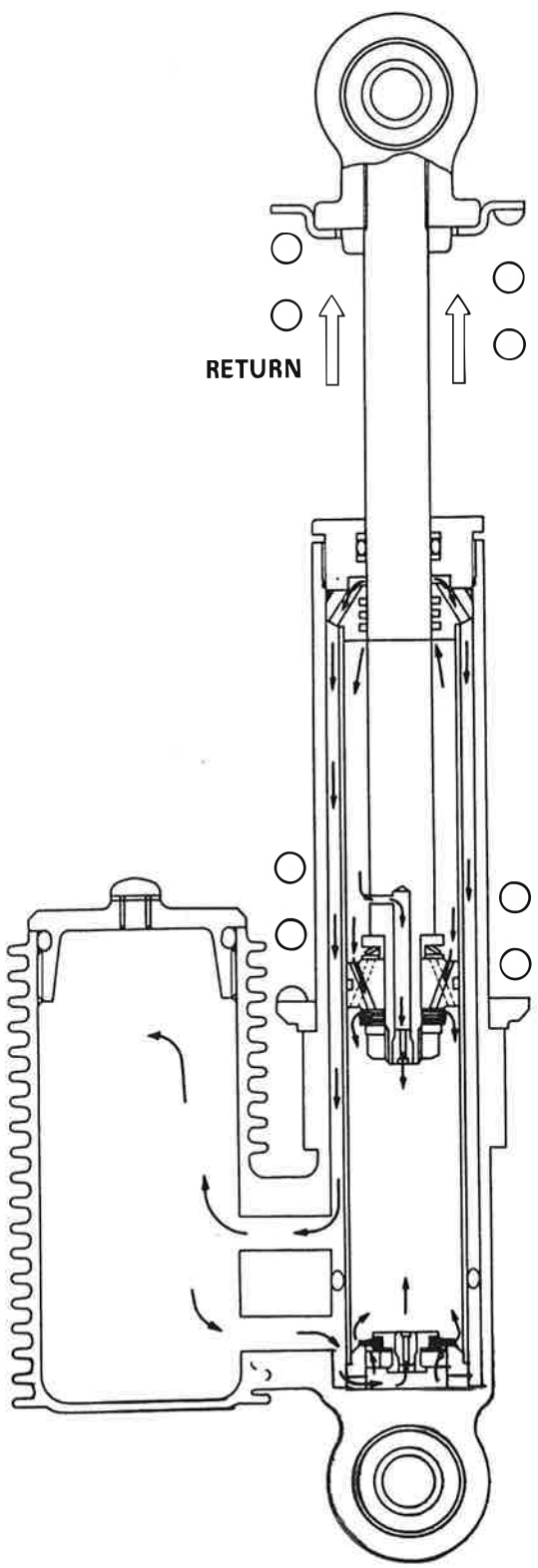


4–9 THERMAL FLOW SHOCK ABSORBER

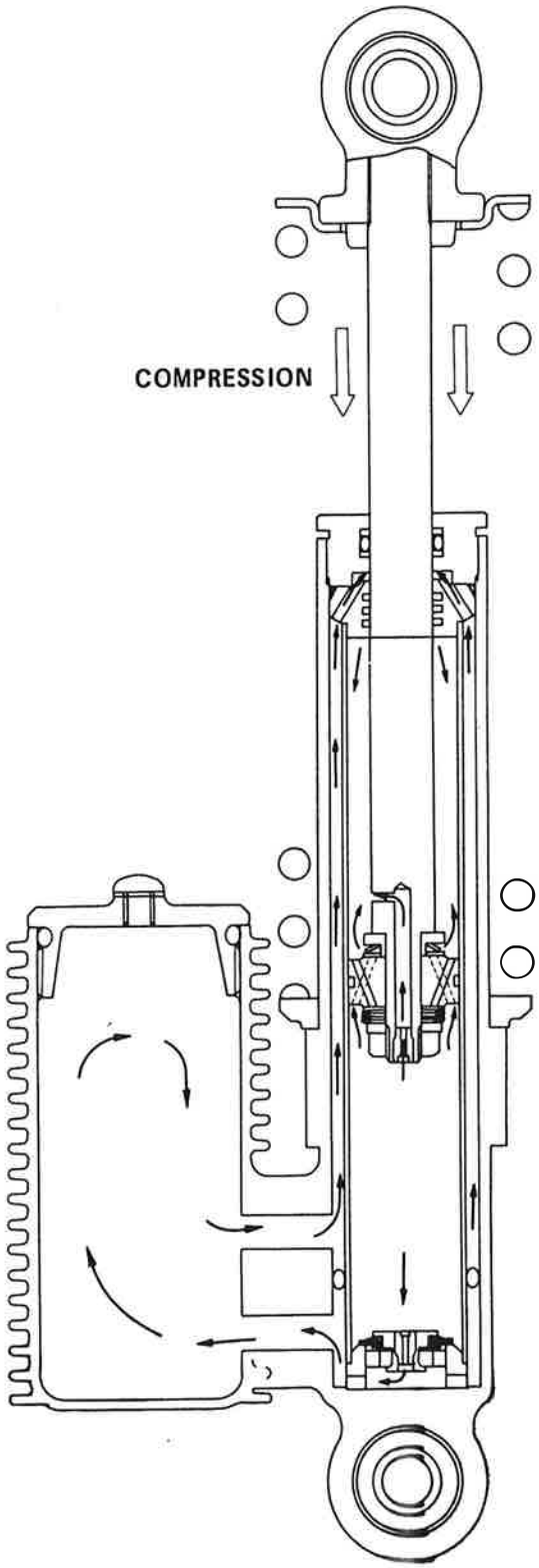
The MX250, 360 and SC500 rear cushion employs a "thermal flow shock absorber" having a separate oil tank. This shock absorber is designed to slow the rise of oil temperature and ensure better heat dissipation. As a result, there will be no decline of cushioning action due to a rise in oil temperature. Accordingly, the performance of the cushion is maintained.

Operation

Oil movement when the shock absorber stretches



Oil movement when the shock absorber contracts

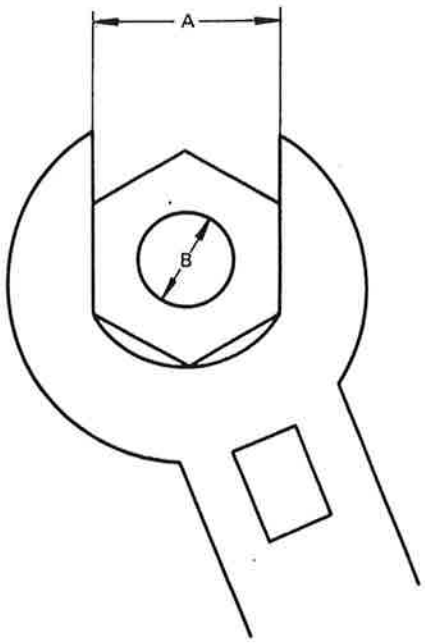


CHAPTER 5. RETIGHTEN THE BOLTS AND NUTS

The following torque specifications must be adhered to on every machine. Tightening torque, on multi-secured components, should be in gradual stages and in a pattern that will avoid warpage to the item being secured. Torque settings are for dry, clean threads. Torquing should always be done to the nut, never the bolt head.

Note:

Certain items with other than standard thread pitches may require differing torque. Consult the model Service Manual or distributor if a question arises.



A (Nut)	B (Bolt)	m-kg	lb -ft	lb-in
13 mm 14 mm	8 mm	2.0	15	180
17 mm	10 mm	3.5 ~ 4.0	20 ~ 29	300 ~ 350
19 mm	12 mm	4.0 ~ 4.5	29 ~ 33	350 ~ 400
22 mm	14 mm	4.5 ~ 5.0	33 ~ 37	400 ~ 450
26 mm	17 mm	5.8 ~ 7.0	40 ~ 50	500 ~ 600
27 mm	18 mm	5.8 ~ 7.0	40 ~ 50	500 ~ 600
30 mm	20 mm	7.0 ~ 8.3	50 ~ 60	600 ~ 700

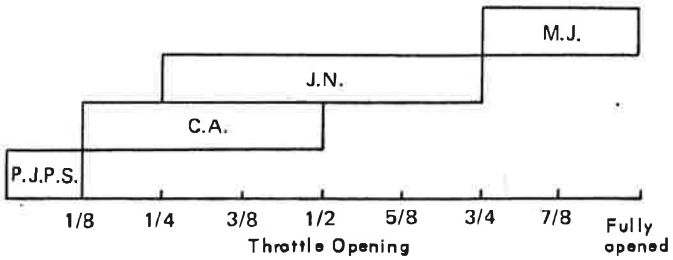
Spark Plug 230-250 in - lb.

CHAPTER 6. TUNING UP

The MX series models are tuned up to a great extent. Accordingly, in order to run these well tuned up machines in top condition, the engines must be tuned up again according to the conditions of racing courses and weather. For the best result, the carburetor must be correctly set, **and in addition, the spark plugs and secondary reduction ratio must be properly selected.**

6–1 CARBURETOR SETTING

The carburetor has many different precision parts which function separately according to throttle openings. The following diagram shows the relationship between the throttle openings and other carburetor parts.



6–2 SELECTION OF PILOT JETS AND AIR SCREWS

The calibration number of a pilot jet indicates the flow rate of fuel. That is, the larger the calibration number, the richer the air-fuel mixture. On the other hand, the air screw regulates the air flow rate. Screwing it in makes the **mixture richer, and screwing out makes it leaner. The carburetor setting chart generally specifies how much the air screw must be backed out from a fully seated position.**

6–3 THROTTLE VALVE CUTAWAY

The throttle valve cutaway affects the air flow rate in the carburetor air horn when the engine speed is in the range from low to mid, but in this range, the fuel is controlled by the jet needle.

The amount of cutaway is indicated by a number, representing the height of the cutaway. If the mixture is too rich, the cutaway should be replaced with one having a larger cutway number. If too lean, the cutaway number should be smaller.

6–4 JET NEEDLE CLIP POSITION

The jet needle has a close relation with speed pick-up in the mid-speed range.

To check whether the jet needle position is proper or not, start the engine, and open the throttle quickly. Observe how the engine picks up speed with response. Too rich in the mid-speed range:

Bring down the needle one position to make the mixture lean. (Move up the clip one position.)

Too lean in the mid-speed range:

Bring up the needle one position to make the mixture rich. (Move down the clip one position.)

In order to enable you to judge correctly whether the mixture is too rich or too lean, you should make tests with a machine in top operating condition.

To test, run the engine or ride the machine by changing the jet needle position one by one, and study how the response of the engine changes accordingly.

CHAPTER 7. SETTINGS AT RACING COURSES

7–1 SELECTION OF MAIN JETS (M.J.)

The main jet greatly affects the performance of the engine with full throttle. If the main jet is improper, the engine tends to lose power or seize up, or the spark plug becomes wet with gasoline. The fuel plays a role of cooling the engine, in addition to the generation of power. In a two-stroke engine, it also serves as a lubricant. If it is too lean, the engine may overheat or seize up due to lack of lubrication.

If the fuel is too rich, the spark plug tends to wet, causing misfires. In the worst case, no spark will be produced, thus stalling the engine. The condition of the spark plug should be carefully checked before selecting a main jet.

a. General suggestions

Higher altitudes	A leaner mixture is required.	M.J. number should be smaller.
Lower altitudes	A richer mixture is required.	M.J. number should be larger.

b. How to "read" spark plugs (condition)

- The spark plug overheats:

If the porcelain is burnt white:

The mixture should be enriched.

The spark plug is wet:

If the porcelain is oily and black:

The mixture should be made leaner.

If the porcelain is a light tan color, the spark plug is in the best condition. But note that spark plugs show slightly different colors, according to their manufacturers and types of oils in use.

Note:

To find a proper main jet, it is advisable to first try a main jet having a larger calibration No. (for a richer mixture, and then change it a smaller calibration (for a leaner mixture) in steps. Otherwise, overheating may result.

CHAPTER 8. SPARK PLUG SELECTION

8–1 DESCRIPTION

As noted already, by changing the main jet, the spark plug can be maintained in good operating condition. But instead of replacing the main jet, the spark plug may be changed, if it shows improper condition. One of the following three methods can be chosen to achieve the same purpose.

a. Instead of changing the spark plug, replace the main jet.
b. Instead of changing the main jet, replace the spark plug with a hotter or a colder type.
c. Replace both spark plug and main jet.

Notes:

a. Avoid replacing the spark plug with one differing greatly in the heat range.
   If a hotter type spark plug is used in a high speed engine, the electrodes tend to melt.
b. Before checking the spark plug for condition, run the engine with full throttle. The check should be made immediately after the engine is stopped.
c. As for NGK spark plugs, colder types (for high-speed engines) have a larger number indicated.

The strength of the air-fuel mixture tends to vary according to atmospheric conditions. It is often unnecessary to change spark plugs for models for which tuning kit parts are provided or for modified racing machines, because tuning specifications are clearly specified. In this case, it is advisable to replace main jets instead of spark plugs. Only when the main jet has to be changed to one differing 30 or more in calibration number, the spark plug should be replaced with a proper one.
Then, select a proper main jet which is suitable for the spark plug.

Thread Size	Heat Range	NGK	Champion	Autolite	Bosh	KLG	Lodge
14 mm x 18.0 mm (19.0 mm PB) (3/4") Reach x 20.6 mm Hex 0.5 mm $^{+0.00}_{-0.05}$ Gap	Hot	B-8EN (P, PB)	N62R N60R	AG23 AG903	W240T17 W370T17	FE220	RL47
		B-9EN (P, PB)	N57R	AG603	W290T17 W310T17	FE260	RL49 RL50
		B-10EN (P, PB)	N54R	AG403	W340T17 W370T17	FE280	RL51
		B-11EN (P)		AG203	W400T17	FE310	RL52
	Cold	B-12EN (P)	N52R	AG103	W440T17	FE340	RL53

CHAPTER 9. MISCELLANEOUS PARTS

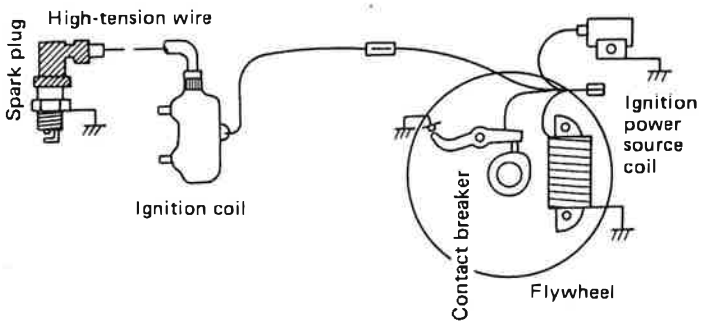
For the MX series and SC500 model, several types of parts are available in varying sizes in order that adjustments may be made to suit all driving conditions.

Model	Main jet	Part No.
LTMX	#150	137-14143-30
	#160	137-14143-32
	#170	137-14143-34
ATMX	#180	137-14143-36
	#190	137-14143-38
	#200	137-14143-40
MX250	#240	137-14143-48
	#250	137-14143-50
	#260	137-14143-52
MX360	#300	137-14143-60
	#310	137-14143-62
	#320	137-14143-64
SC500	#390	137-14143-78
	#400	137-14143-80
	#410	137-14143-82

CHAPTER 10. ELECTRICAL SYSTEM (ATMX · LTMX)

10–1 IGNITION SYSTEM – FUNCTION AND SERVICE

As the flywheel rotates, the contact breaker points open and close. This make-and-brake operation develops an electromotive force in the ignition source coil, and produces a voltage in the ignition coil primary windings. The ignition coil is a kind of transformer, with a 1:50 turn ratio of the primary to the secondary winding. The voltage (150 ~ 300 V) which is produced in the primary coil, is stepped up to 12,000 ~ 14,000 V by mutual-induction and the electric spark jumps across the spark plug electrodes.



10–2 IGNITION TIMING

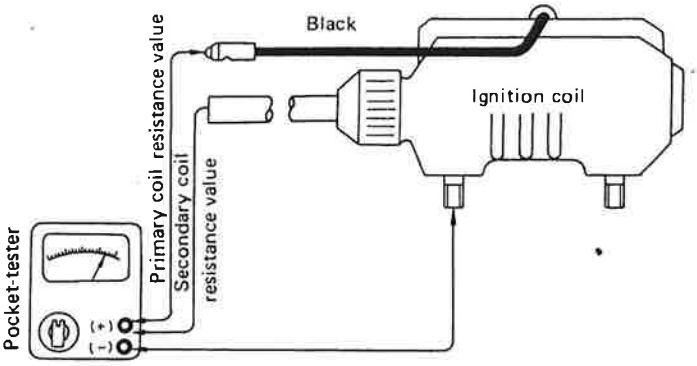
Remove the spark plug and screw the dial indicator holder into the plug hole. Next, insert the dial indicator into the holder. Bring the piston up to T.D.C. and set the zero on the dial face to line up exactly with the dial indicator needle. The crankshaft should then be turned backwards, so that the piston travels down past 2.0mm B.T.D.C. and slowly brought back up to precisely 2.0mm B.T.D.C. (This removes any slack in the gears). Adjust the points so that they are just beginning to open with the piston in this position. A low resistance point checker (100 ohms or less) should be used to determine the opening and closing of the ignition points.

Ignition Timing, 2.0mm. B.T.D.C.

Maximum ignition point gap:

LTMX – 0.25~0.30 mm (0.01"~0.012")
ATMX – 0.30~0.40 mm (0.012"~0.015")

10–3 IGNITION COIL



Set the tester on the "Resistance" position

Note:

When measuring the secondary coil resistance value, disconnect the plug cap.

Otherwise, the resistance of the 5 kΩ noise suppressor incorporated in the plug will be added to the tester reading.

Spark Test:

Remove the spark plug from the cylinder head and reconnect the high voltage lead.

Then hold the spark plug approximately 7 mm away from the head and see if it sparks as you crank the kickstarter.

If it sparks at 7 mm or so, and has blue white color, the ignition coil should be considered to be in good condition.

10–4 CONDENSER

The condenser instantly stores a static electric charge as the contact breaker points separate, and the energy stored in the condenser discharges instantly when the points are closed. If it were not for the condenser, an electric are would jump across the separating contact points, causing them to burn.

Burned contact points greatly affect the flow of current in the primary winding of the ignition coil.

If the contact points show excessive wear, or the spark is weak (the ignition coil is in good condition) check the condenser.

	Model		ATMX	LTMX
1	Ignition System		Magneto ignition	Magneto ignition
2	Ignition Timing	(mm B.T.D.C.)	2.0 ± 0.15 mm	2.0 ± 0.15 mm
3	Spark Plug Type & Gap		N.G.K. B-9EN, 0.5 ~ 0.6 mm	N.G.K B-9HV, 0.5 ~ 0.6 mm
4	Dynamo & Magneto Type		Flywheel magneto	Flywheel magneto
	Model & Manufacturer		F136-06, Hitachi	F136-07, Hitachi
	Voltage		6 V	6 V
	Source Coil Resistance	(Black)	2.1Ω ± 10% at 20°C	2.1Ω ± 10% at 20°C
	* Lighting Coil Resistance	(Green/Red)	0.41Ω ± 10% at 20°C	0.58Ω ± 10% at 20°C
		(Green)	0.20Ω ± 10% at 20°C	0.31Ω ± 10% at 20°C
		(Yellow)	0.35Ω ± 10% at 20°C	0.60Ω ± 10% at 20°C
5	Ignition Coil Type & Manufacturer		CM61-20H, Hitachi	CM61-20H, Hitachi
	Spark Gap Test		7 mm or more/500 r.p.m.	7 mm or more/500 r.p.m
	Primary Winding Resistance		1.7Ω at 20°C	1.7Ω at 20°C
	Secondary Winding Resistance		6.0kΩ at 20°C	6.0kΩ at 20°C
6	Contact Breaker Point Gap		0.30 ~ 0.40 mm	0.25 ~ 0.30 mm
7	Breaker Contact Pressure		650 ~ 850 g	650 ~ 850 g
8	Condenser Capacity		0.30μF	0.30μF
	Condenser Insulation Resistance		3 MΩ or more	3 MΩ or more

* NOTE: Lights are not standard equipment. - But lighting source coil is tied into ignition circuit and therefore not dismounted on LTMX, ATMX.

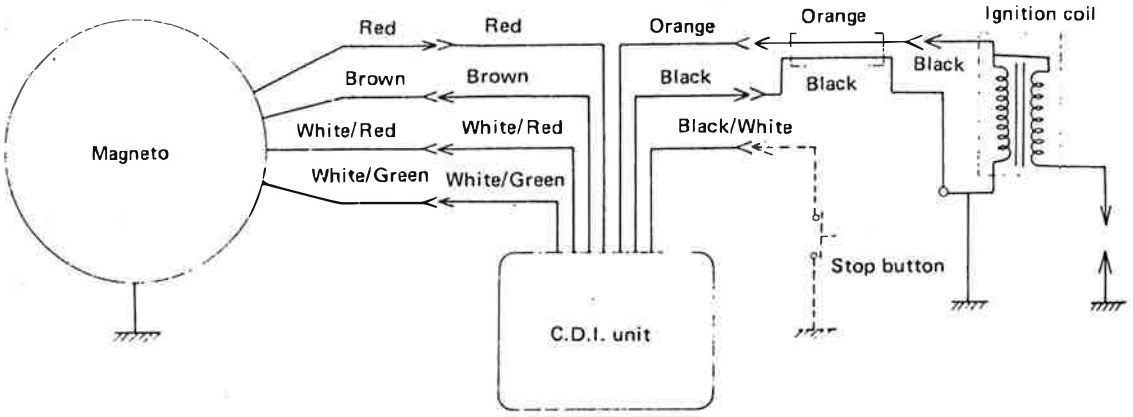
CHAPTER 11. ELECTRICAL SYSTEM (MX250 · MX360 · SC500)

11–1 C.D.I. (CONDENSER DISCHARGE IGNITION)

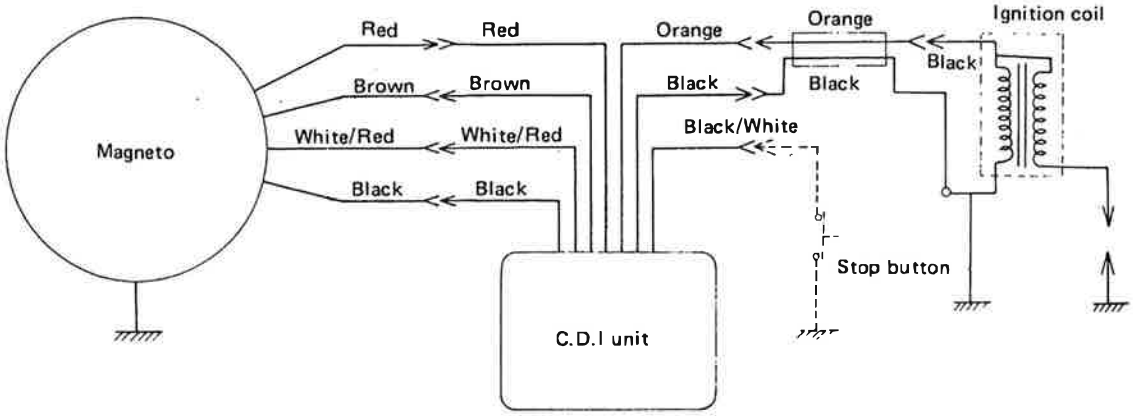
A conventional ignition system, most commonly adopted for motorcycles, uses a contact breaker to interrupt the flow or current in the primary winding of the ignition coil. When the current flow is cut, a surge of high voltage is produced in the secondary winding, thus causing a spark to jump across the spark gap.
In contrast, the condenser discharge ignition (C.D.I.) uses a condenser in place of the contact breaker. That is, the magneto charges the ignition condenser up to a few hundred volts. When the pulse coil incorporated in the magneto emits a signal, almost instantly the semi-conductor element (diode) allows the electric charge to flow from the condenser to the ignition coil, thus inducting a surge of high voltage in the secondary winding. In short, the C.D.I. is an electronic ignition system to produce a spark in the spark plug without using a mechanical contact breaker.

1) Features of the C.D.I.

(1) Spark takes place once per revolution of the crankshaft per cylinder.
(2) No contact points are in use, and therefore, steady spark performance is ensured from low to high speed.
(3) The pulser is movable, so the ignition timing can be adjusted in the similar manner as in the case of the **contact breaker ignition system.**
(4) The C.D.I. unit incorporates a regulator of the charging voltage to the ignition condenser.
This prevents the ignition coil insulation from being damaged.
(5) The spark keeps going for a longer duration, thus improving the efficiency of fuel combustion.



OUTER WIRING DRAWING (MX250, MX360)



OUTER WIRING DRAWING (SC500)

11–2 CONSTRUCTION

1) Magneto

The magneto has an ignition condenser charge coil and an ignition timing detecting pulse coil on an aluminum die casting base. The rotor is made of aluminum die casting, and the magnet on the charge coil side is made in a one-piece assembly with the magnet on the pulse coil side. The rotor is held to the crankshaft by means of a taper key.

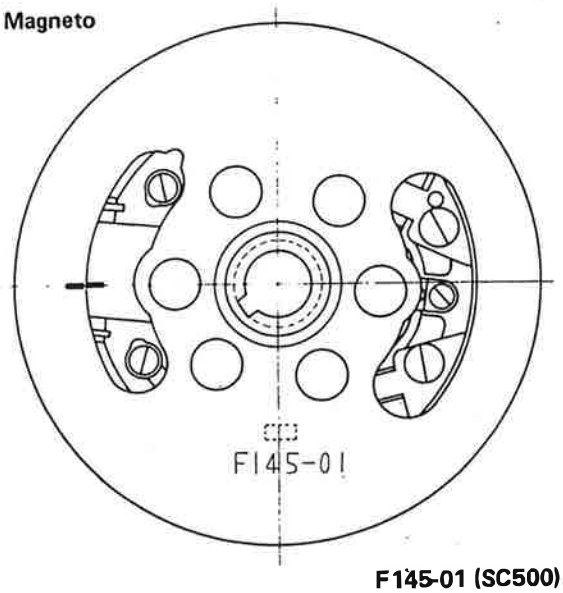
2) C.D.I. Unit

The C.D.I. unit incorporates a diode (to rectify the current produced by the magneto), an ignition condenser and a thyristor. These are arranged on the printed circuit board. For better water-resistance, vibration-resistance, heat resistance and corrosion-resistance, a polyurethane resin is used as a filler.

3) Ignition Coil

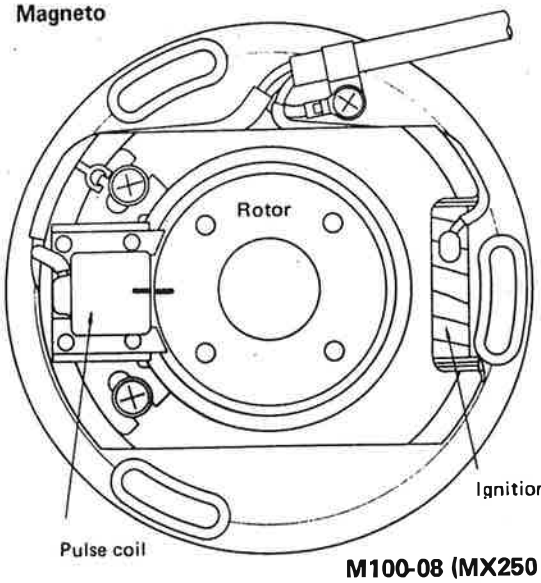
The ignition coil is of a conventional closed, magnetic circuit type. The secondary winding is wound around the soft iron core, and the primary winding surrounds the secondary. This assembly is placed in a steel case filled with polypropylene.

Magneto



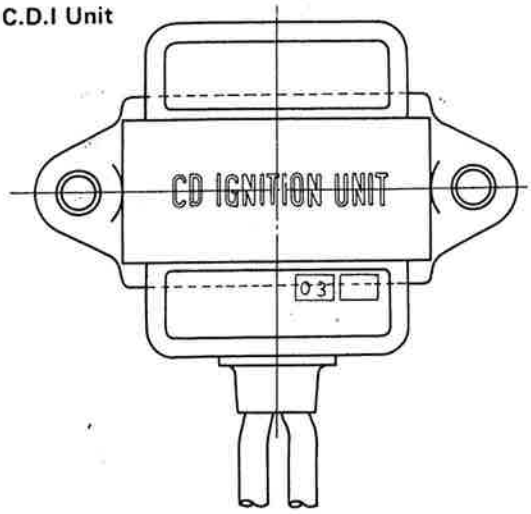
F145-01 (SC500)

Magneto



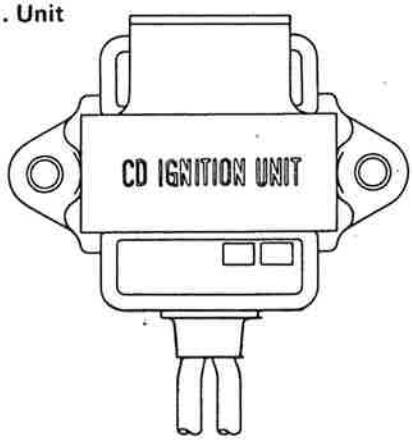
M100-08 (MX250 · MX360)

C.D.I Unit



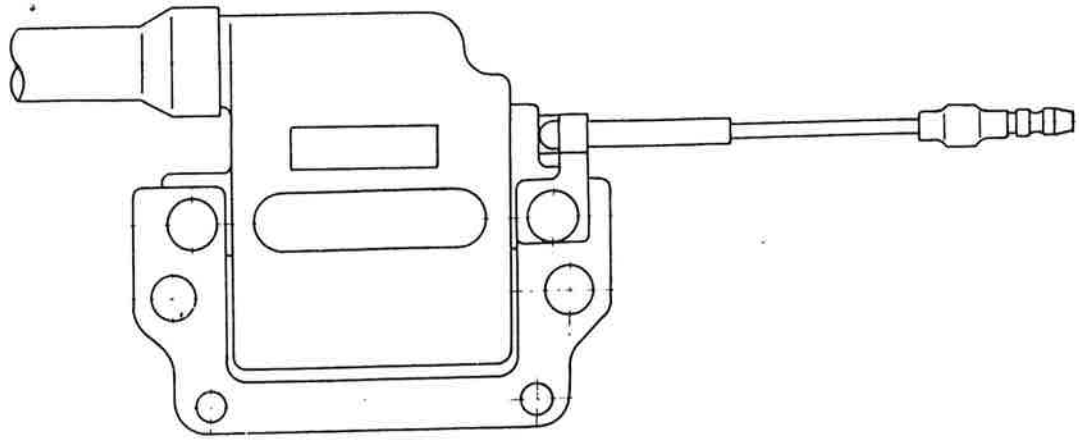
TIA01-03 (SC500)

C.D.I. Unit



TIA01-02 (MX250 · MX360)

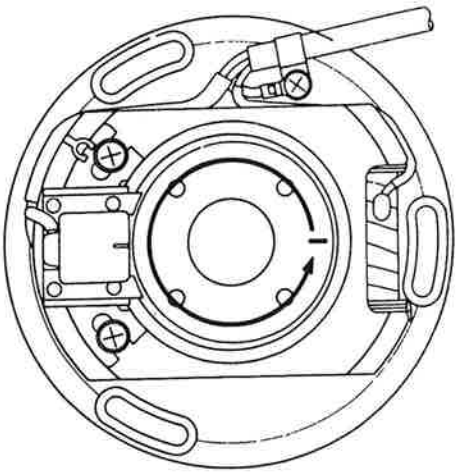
Ignition Coil

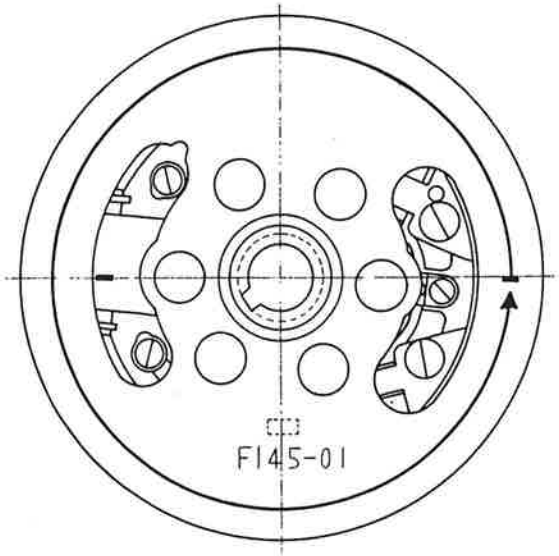


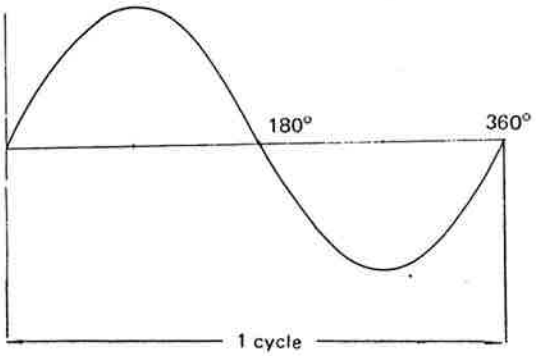
CM61-20M

11–3 OPERATION FUNDAMENTALS

The magneto is of bipolar type. That is, the current curve rises above and dips down the zero base line twice per revolution of the magneto (one positive and negative per revolution of the magneto two half waves per cycle). Through the half-wave rectification by the diode, the current is charged to the condenser up to 100 ~ 340 volts. For longer duration of spark, a thyristor is connected in series with the diode.







1) C.D.I. Unit Components

Diode:

Converts an alternating current into a direct current.

Condenser:

Stores a charge of electricity produced by the charge coil.

Thyristor:

Made conductive and non-conductive by signals from the pulser. (Effect is similar to a contact breaker.)

(1) With the rotor in the position shown in the diagram below, an e.m.f. is produced in the charge coil, and the current rectified by the diode begins to charge the ignition condenser (Fig. 1). As the rotor turns about 180° (the mark on the pulser aligns with the mark on the rotor) after the charging has started, the pulse coil (pulser) emits the pulse shown in the diagram, and the current (half-wave rectified by the diode) begins to flow thru the circuit shown in the diagram, sending a signal to the gate of the thyristor (Fig. 2).

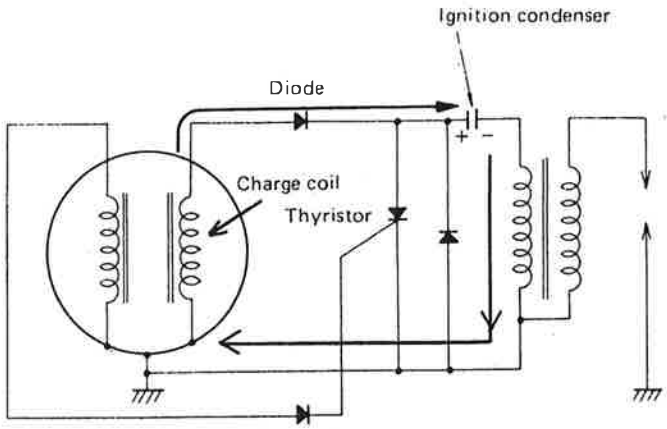
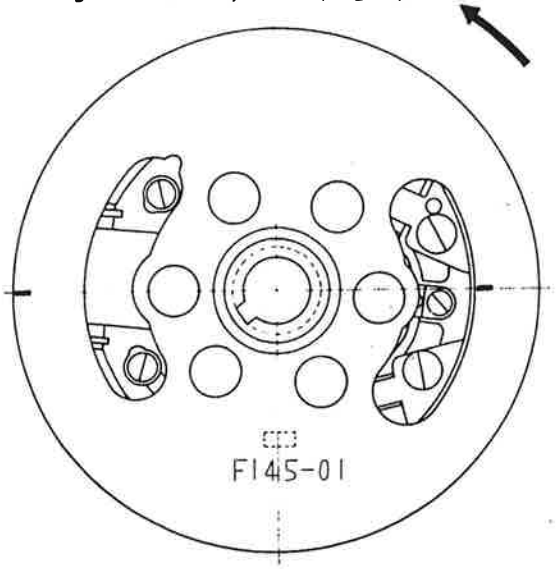
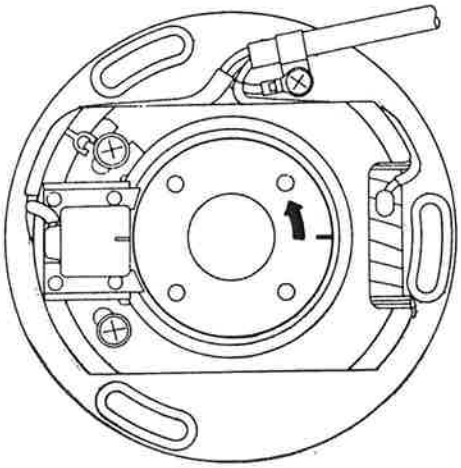
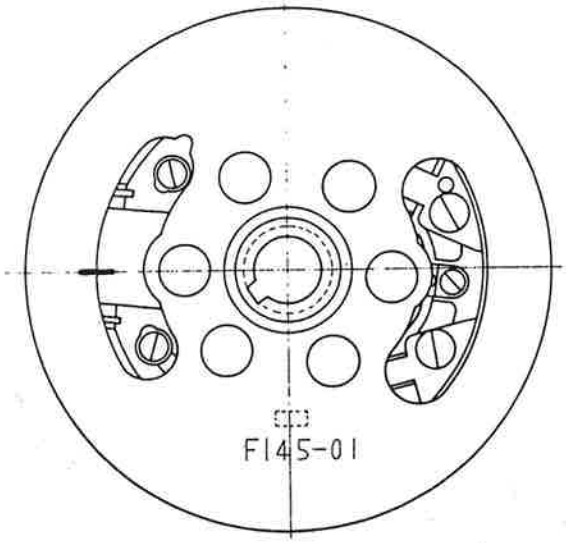


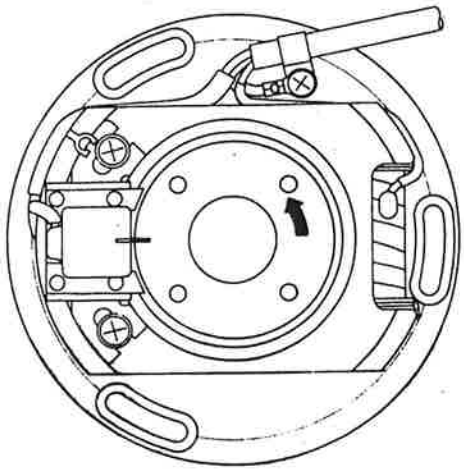
Fig. 1 Condenser Charged

(2) This makes the thyristor conductive. The moment that the thyristor becomes conductive, the ignition condenser begins to discharge its stored electricity quickly. This induces a high voltage in the secondary winding, thus causing a spark to jump across the spark gap (Fig. 3).









Timing Marks Aligned

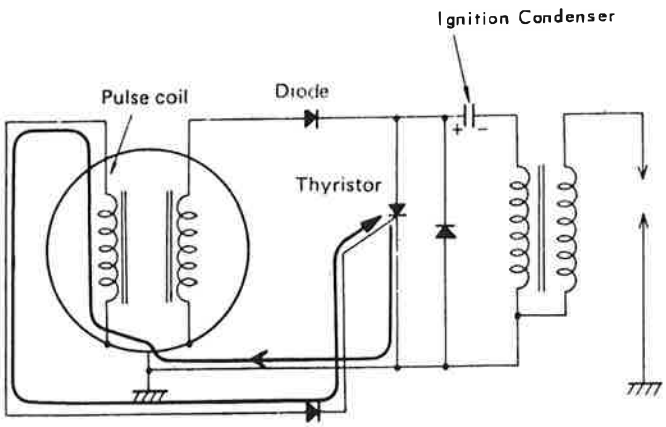


Fig. 2 Trigger Pulse to Thyristor

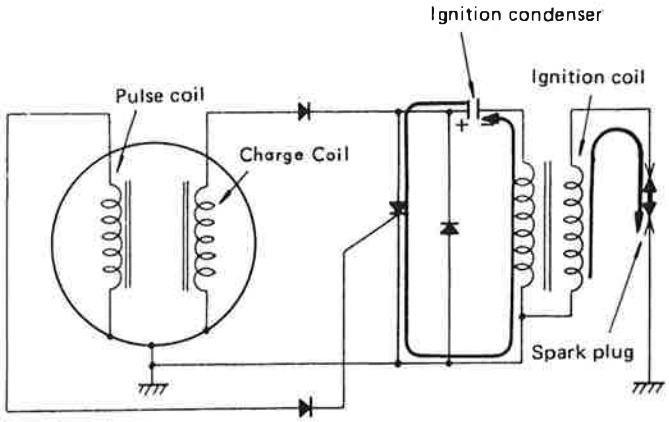
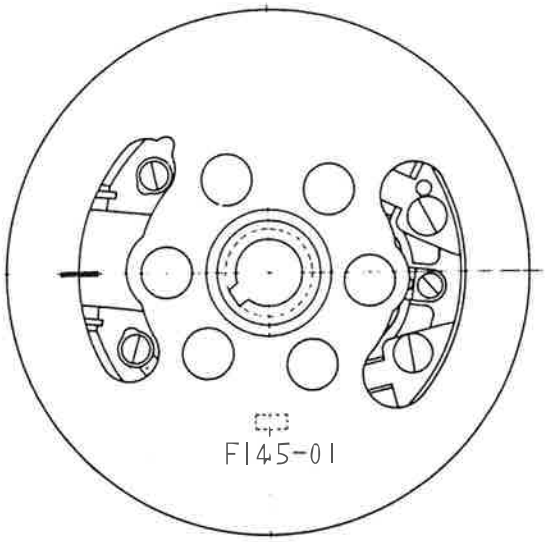
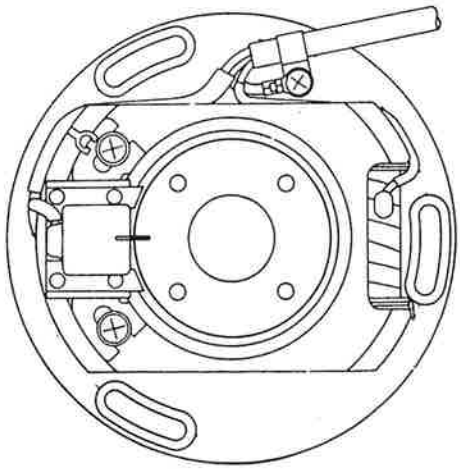


Fig. 3 Capacitor Discharges – Spark Plug Fires





(3) The moment that the ignition condenser is completely discharged, it begins to store a charge of electricity in the opposite phase, and at the same time, this applies a voltage of an opposite polarity to the gate of the thyristor. Thus the gate current becomes zero, making the thyristor non-conductive.

11–4 WIRE CONNECTION

The wiring between the magneto, C.D.I. unit, and ignition coil uses couplers for connection to prevent any wrong connection. But when connecting the ground circuit and the ignition coil, particular care should e taken. If these are connected in a wrong way, the C.D.I. unit will become inoperative.

1) Wiring Notes

(1) Connection must be done accurately.
Special are is required for connection of the ground circuit and ignition coil.

(2) The C.D.I. unit and ignition coil are installed in the specified position. If the position is to be changed, a dry and airy place should be selected.
Keep it free from the splash of mud and water.

(3) To remove the rotor, be sure to use the rotor puller (an accessory tool). Avoid using a hammer, or the rotor may be damaged.

(4) Handle the C.D.I. unit with special care. If you should drop it carelessly, the incorporated electronic components will be damaged.

11–5 CHECKING

Avoid using an improper tester (insulation resistance testers or other testers with a battery of large capacity).
The use of a large capacity tester may ruin the C.D.I. unit.

1) Checking the Magneto and Ignition Coil

The resistance of the magneto ignition coil windings is as specified below. To locate the cause of trouble (broken coil, short-circuit, etc.), measure the resistance of the magneto each winding.

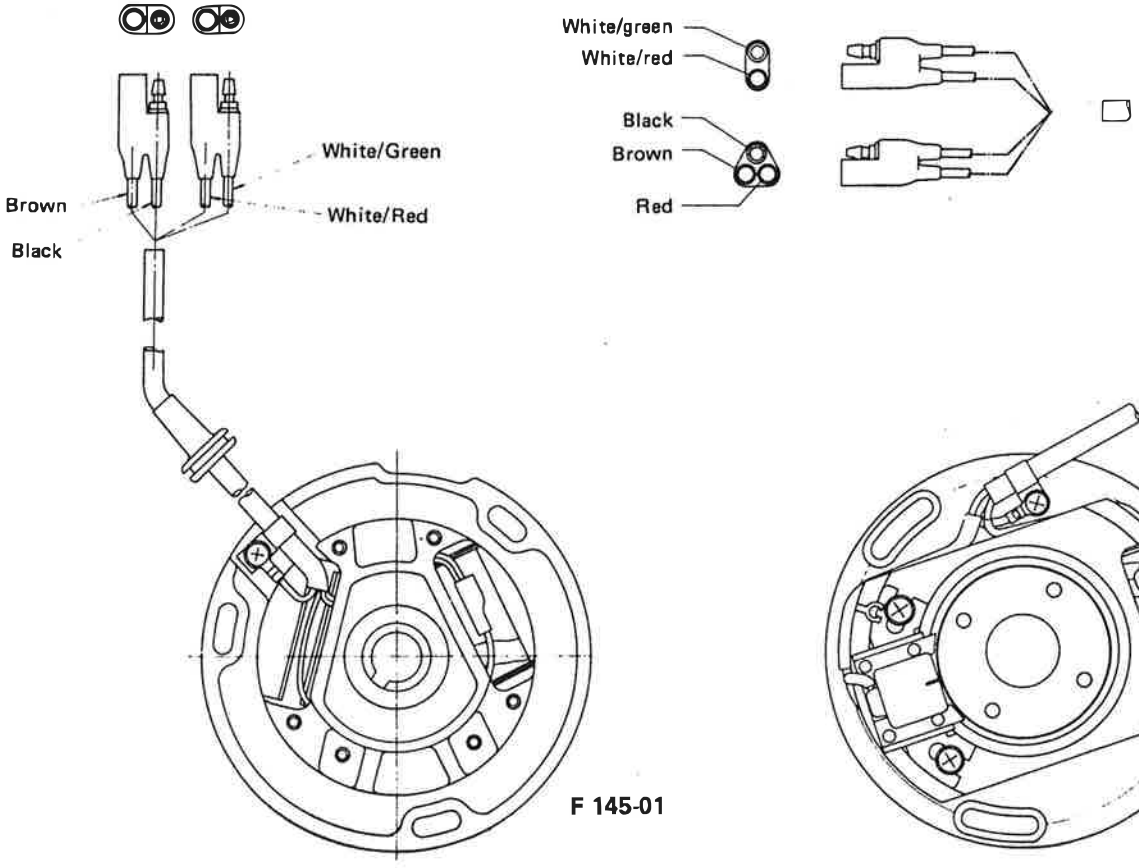
Magneto

Model	M100-08 (MX250, MX360)			
Measuring point	Charge coil		Pulser	
Color of lead wire	Brown-black	Red-black	White/red-white/green	White/red-black
Resistance (Ω)	Approx. 790	Approx. 84	Approx. 50	Approx. 0

F145-01 (SC500)	
Charge coil	Pulser
Brown-black Approx. 204	White/red-white/green Approx. 85

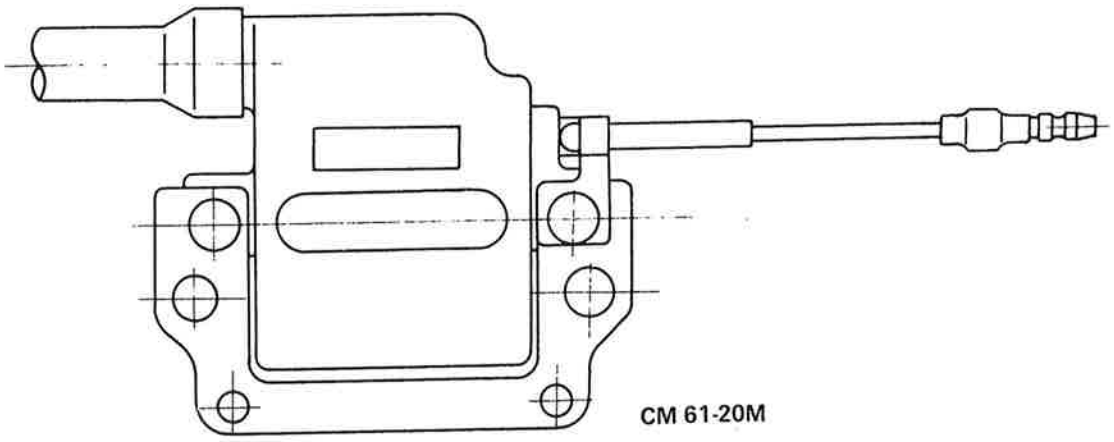
Ignition Coil

Model	Ignition Coil CM61-20 (C.D.I.)	
Measuring points Resistance (Ω)	Primary winding Approx. 0.7	Secondary winding Approx. 6,000



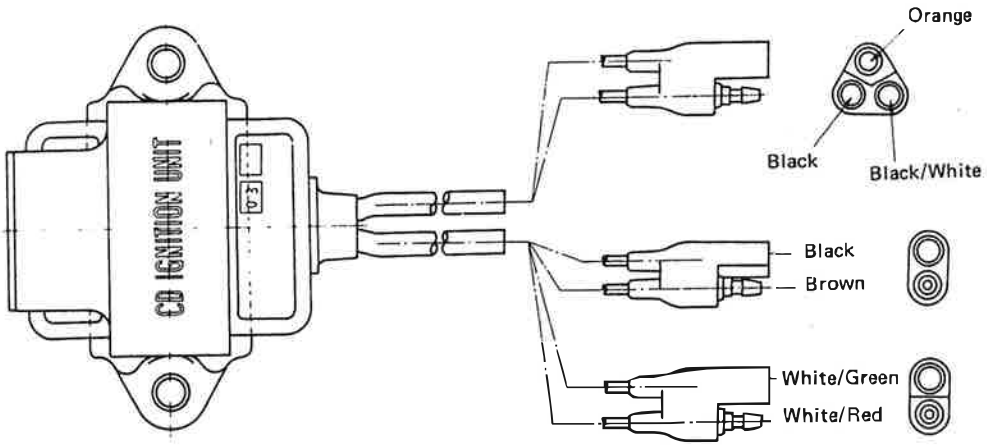
F 145-01

M 100-08

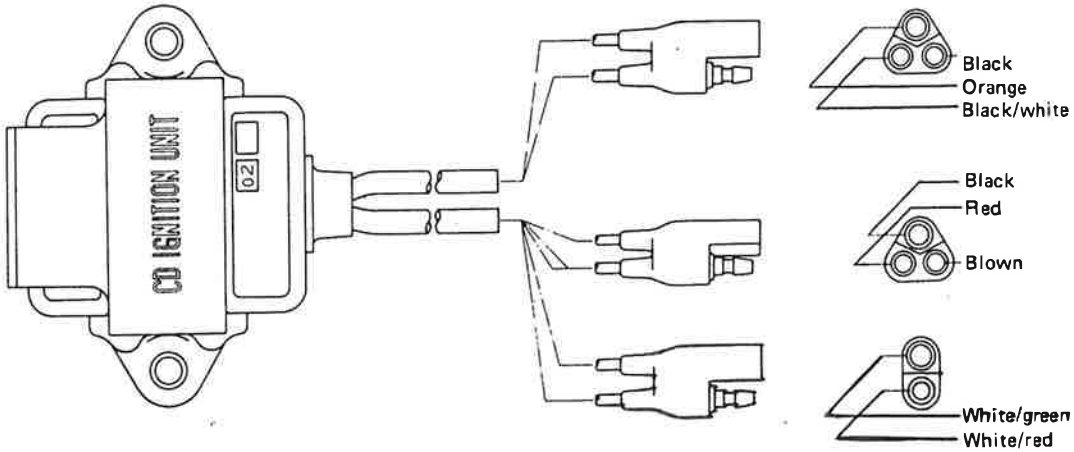


2) Checking the C.D.I. Unit

The following are the conditions of the C.D.I. unit which can be used to check electronic parts and connectors by applying the Yamaha pocket tester to couplers.



TIA 01-03 C.D.I. Unit SC500



TIA 01-02 C.D.I. Unit MX250/360

(1) TIA01-02 C.D.I Unit (MX250 · MX360) NOTE: THESE ARE APPROXIMATE VALUES ONLY.

Tester ⊖ \ Tester ⊕		Stop Black/white	Ground Black	Charge Brown	Charge Red	Pulser White/red	Pulser White/green	Ignition orange
Stop	Black/white		210	2,000	2,000	3,000	200	Needle swings once and returns to its original position
Ground	Black	190		3,000	3,000	55	10	Needle swings once and returns to its original position
Charge	Brown	20	330		3,000	500	400	Needle swings once and returns to its original position
	Red	20	330	3,000		500	400	Needle swings once and returns to its original position
Pulser	White/red	250	28	3,500	3,500		26	Needle swings once and returns to its original position
	White/green	250	28	3,500	3,500	40		Needle swings once and returns to its original position
Ignition	Orange	Needle swings once and returns to its original position.	Needle swings slightly, and returns to its original position.	Needle swings slightly, and returns to its original position.	Needle swings slightly, and returns to its original position.	Needle swings slightly, and returns to its original position.	Needle swings slightly, and returns to its original position.	

(2) TIA01-03 C.D.I Unit (SC500) NOTE: THESE ARE APPROXIMATE VALUES ONLY.

Tester ⊖ \ Tester ⊕		Stop Black/white	Ground Black	Charge Brown	Pulser White/red	Pulser White/green	Ignition orange
Stop	Black/white		210	2,000	3,000	260	Needle swings once and returns to its original position.
Ground	Black	190		3,000	55	10	Needle swings once and returns to its original position.
Charge	Brown	20	330		500	400	Needle swings once and returns to its original position.
Pulser	White/red	250	28	3,500		26	Needle swings once and returns to its original position.
	White/green	250	28	3,500	40		Neelde swings once and returns to its original position.
Ignition	Orange	Needle swings once and returns to its original position.	Needle swings slightly, and returns to its original position.	Needle swings slightly, and returns to its original position.	Needle swings slightly, and returns to its original position.	Needle swings slightly, and returns to its original position.	

Note 1:

"Needle swings once, and returns to its original position" is due to a condenser incorporated in the circuit. After the first inspection, it should be discharged for the subsequent check-ups.

Note 2:

With respect to "Needle swings once and returns to its original position" or "Needle swings slightly", it should be noted that the deflection of the needle is hardly appreciable. Therefore, in the test by using the Yamaha tester, the needle sometimes shows little deflection.

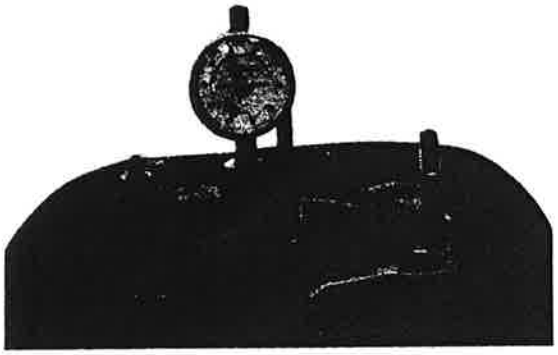
11–6 SPECIFICATIONS AND PERFORMANCE

1) Specifications and Performance

Model		MX250 MX360	SC500
Magneto - Model		M100-08	F145-01
C.D.I. - Model		TIA01-02	TIA01-03
Ignition coil - Model		CM61-20M	CM61-20M
Magneto	Turning direction (facing toward the engine) Outside dia. x length (mm) Moment of inertia of rotor (kg-cm²) Weight (kg)	Left 130 x 62 2.2 1.3	Left 130 x 62 42.5 2.3
Unit	Length x width x height (mm) Weight (kg)	62 x 48 x 33 0.22	70 x 64 x 44 0.24
Coil	Length x width x height (mm) Weight (kg)	66 x 57.5 x 40 0.45	MX360 2.5 mm SC500 2.0 mm
Performance	Spark length measured by tester (mm/rpm)	7/500 13/10000	7/500 13/10000

11–7 SETTING THE IGNITION TIMING

(1) Install a dial gauge.

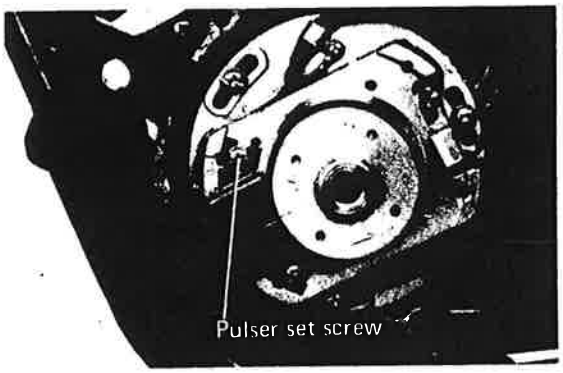


(2) Turn the crankshaft in the normal direction, and locate TDC. Then, set the 0 mark on the dial to the needle.

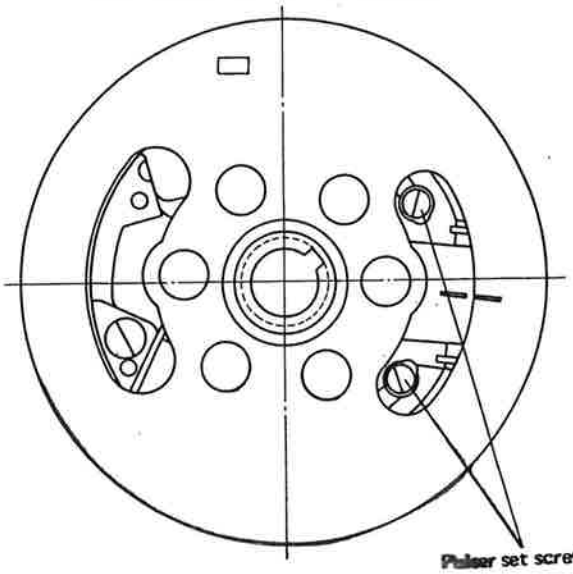
(3) Turn the rotor in the direction opposite to the turning direction of the crankshaft, and align the pulser match mark with the rotor match mark when the dial indicates (MX250 2.3 mm MX360 2.5 mm SC500 2.7 mm before TDC).

(4) If they do not align with each other, loosen the pulser set-screw and make adjustment.

INNER-ROTOR TYPE (MX250, MX360)



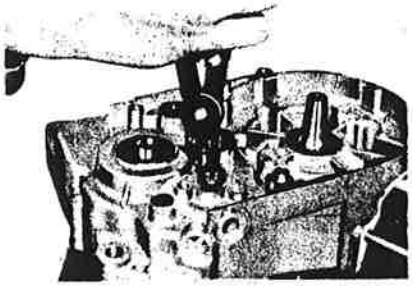
OUTER-ROTOR TYPE (SC500)



CHAPTER 12. MISCELLANEOUS BULLETINS AND INSTRUCTION

A. Removing the Change Axle Assembly

1) Remove the circlip and washer from the change axle (left side crank case).

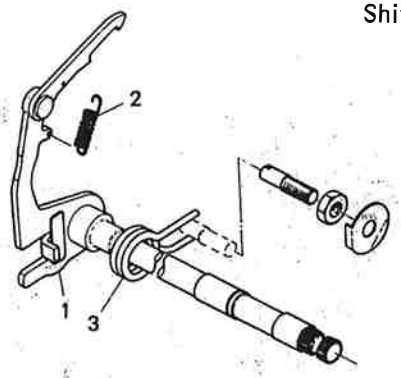


2) Turn the engine over, right side up, and pull out the change shaft assembly.

B. Checking the gear shift parts

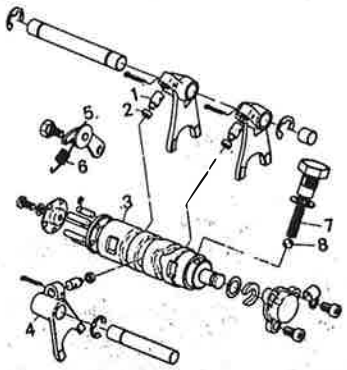
Checking the Gear Shift Return Spring. A broken or fatigued gear shift return spring will impair the return action of the shifting mechanism.

Shifter B



1	Cam follower pin	5	Stopper lever ass'y
2	Cam follower roller	6	Stopper spring
3	Shift cam	7	Neutral spring
4	Shift fork	8	Ball (5/16")

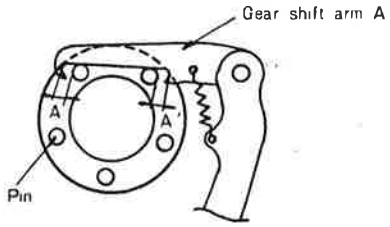
Shifter A



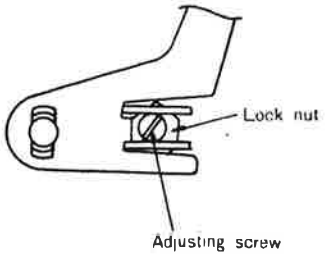
1	Change shaft ass'y
2	Shift arm spring
3	Shaft return spring

C. Adjusting the gear shift arm

Adjusting or correcting the travel of the gear shift arm to prevent improper shifting progression (excess feed or insufficient feed of the gear shift arm) is accomplished by turning the gear shift return spring stop screw (eccentric bolt) in or out. Adjust the eccentric bolt until distance A and A' are equal. Adjust in 2nd, 3rd, or 4th gear.



Tighten lock nut thoroughly and bend lock washer tab over nut.

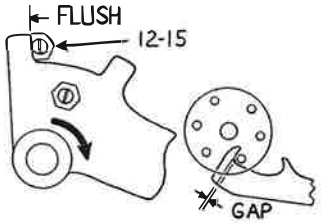


MISCELLANEOUS BULLETINS AND INSTRUCTIONS -

The following bulletins are correct as of the time of printing and are included as a guide to preventive maintenance procedures, etc. However, the procedures, parts, and other information contained within is subject to change at any time.

MX250/360 SHIFT DRUM SIDE)LATE, Modification to Shift Drum Pins & Side Plate (cont.)

b. Shift up from 2nd~4th. Shift completely until arm on change lever #1 (12-10) butts against adjusting screw (12-15).
c. While arm is butted against adjusting screw, measure clearance between Change Lever #3 (11-22) and shift drum dowel pin (11-2). See Drawing No. 4.
d. Repeat steps (b) and (c) shifting from 4th~2nd. Clearance must equal (c) above. Change adjustment using screw (12-15) as required.
e. Repeat Step (a).



Drawing No. 4

8. Finish reassembly. Thoroughly tighten all components.

WARRANTY/AFFECTED MACHINES

The above procedure should be performed as preventive maintenance on the following:

MX250 F/No. 000101~006472 MX360 F/No. 000101~002740

Use Job Code #2912. Time: 1.2 hours. Parts will be warranteed.

PARTS ORDERING

Modified parts will be available shortly. See M/C PNB #358. Order via standard procedure.

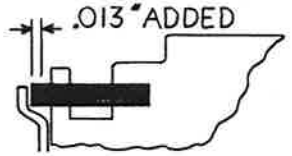
# # # #

MX250/360 SHIFT DRUM SIDE PLATE, Modification to Shift Drum Pins & Side Plate

* * * ATTENTION DEALER * * *
This bulletin replaces Page 1, SNB #306. See change below (Paragraph 5. NOTE).

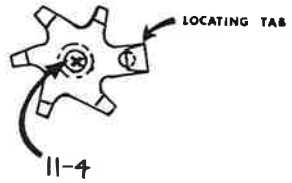
The following will prevent shift pin and/or drum failure due to side plate failure. See MX250/360 Parts List, Figs. 11 and 12 for callouts.

1. Remove R. Crankcase Cover.
2. Remove side plate (11-3). Discard.
3. Remove shift cam dowel pins (11-2). Discard.
4. Install 18.0mm (.013" longer) dowel pins, P/N 936-04181-00-00. See Drawing No. 1. Modified pins allow correct alignment with change lever stopper.



Drawing No. 1

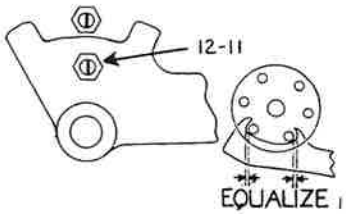
5. Install new side plate, P/N 363-18561-01-00. Plate has 0.5mm (.020") removed from "downshift" side of each arm. Provides clearance between arms and stopper on change lever #1 (12-10).



Drawing No. 2

NOTE: Side plate must be installed with transmission in neutral. Place locating tab (Drawing No 2) over pin at three o'clock position. Use "Loc-Tite" on side plate securing screw (11-4).

6. Install change levers. Note timing marks near gear teeth. Install with marks aligned.
7. Check shifter adjustment:
   a. In 2nd~4th gear, check for proper centering. Change adjustment on screw (12-11) as required. See Drawing No. 3.



Drawing No. 3

MOTORCYCLE SERVICE NEWS

YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 2/12/73

NUMBER 310
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LL 1973's MOTORCYCLE SERVICE DATA WALL CHART, Corrections

Please correct your 1973 Motorcycle Service Data wall chart as follows:

SC500

ITEM	CHART NOW READS	SHOULD READ
Carburetor:		
Main Jet	#360	#400
Needle Jet	Q-2	O-8
Jet Needle	6F13-2	6F16-2
Cut Away	1.5	3.5
Front Forks	194cc	175cc
Drive:		
Secondary	51/14 3.643	51/16 3.188
Trans. Ratio - 1st	19.430	17.002
2nd	13.290	11.630
3rd	9.715	8.501
4th	7.840	6.860

RD60

Front Forks	10W30	SAE10W30

RD350

Carburetor:		
Main Jet	#130	#140
Jet Needle	5J6-3	5I4-3
Cut Away	1.5	2.5
Air Screw	1-1/2	1-3/4

TX750

Carburetor:		
Jet Needle	GJ-3	4N8-4
Air Screw	1-1/4	3/4
Timing	4° BTDC (retard), 35° ± 2 BTDC advance	4° - 8° BTDC (retard), 37° ± 2 BTDC (advance)




MOTORCYCLE SERVICE NEWS

YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 2/14/73

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ALL '73 MAGNETO MODELS SET-UP PROCEDURE, Rotor Securing Nu

PROBLEM

Warranty Surveys indicate insufficient torque was applied to the Roto Securing Nut (Magneto Flywheel) on isolated models during assembly.

CURE

Add the following procedure to your new machine set-up Check List:

1. Prior to setting ignition timing, remove rotor securing nut.
2. Check for proper installation of flat and lock washers (see parts lists).
3. Install rotor securing nut and torque to:

FLYWHEEL NUT Thread Dia.	MINIMUM Torque Value
10mm (some earlier models)	325 in-lb.
12mm (all '73 magneto models)	450 in-lb.

ADDITIONAL SERVICE INFORMATION

Advise all Service Personnel to perform the above procedure as preventive maintenance to models currently in use as they are returned for Service Checks or routine maintenance.

WARRANTY

There will be no Warranty Allowance for this procedure.

# # # #



MOTORCYCLE SERVICE NEWS

YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 3/16/73

NUMBER 314
PAGE 1 of 2

MX250/360/SC500 — OIL PUMP COVER, Modification to increase clearance

Clearance between the Autolube pump adjust plate and front mounting screw boss on pump cover is critical. See No. 1, right.

No. 1 — CLEARANCE

PROBLEM

Clearances of mounting bolt holes allow cover to move to rear during installation causing pump adjust plate to strike boss during operation. This can prevent pump from turning, stripping worm wheel gear teeth.

CURE

1. Remove cover. See No. 2.
2. Grind or file 0.050" off boss. See No. 3.

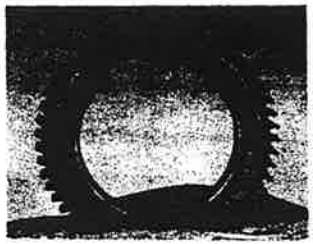
No. 2 — BEFORE

No. 3 — AFTER

NOTE: See "A" in No. 3, above. If circled area shows signs of wear, caused by guide pin cover, remove approximately 0.030" to 0.040" for clearance.

3. Remove Autolube pump mounting screws.
4. Slide pump off worm shaft.
5. Rotate pump body so worm wheel gear teeth are visible.
6. Rotating starter plate, inspect worm wheel gear for damage. See No. 4.

NOTE: Inspect carefully, through full rotation. Replace pump and/or worm shaft as required.



No. 4 — DAMAGE SAMPLE

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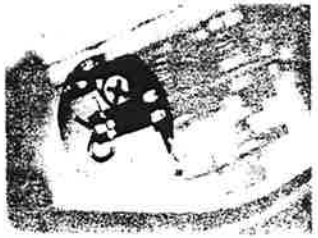
MX250/360/SC500 — OIL PUMP COVER, Modification to increase clearance (cont.)

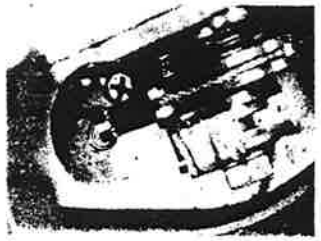
CURE (cont.)

7. Install pump making sure all fittings, cables and delivery lines are properly connected and adjusted.
8. Bleed pump and delivery lines. Check pump adjustment. Minimum pump stroke on all models = 0.5~0.6mm (0.020~0.024").

NOTE: To prevent the "hair pin" clip hanging up on the pump case cover securing screws, bend the clip ends as shown below:



No. 5 — BEFORE



No. 6 — AFTER

9. Install modified pump cover.

WARRANTY/AFFECTED MACHINES

This procedure should be performed as preventive maintenance on all units of affected models. Warranty allowance and procedure as follows:

PROCEDURE*	–	"Group Claim"
FAILURE	–	90B
JOB CODE	–	4006
TIME	–	.5 hours

*NOTE: If pump requires replacement, submit separate claim.

PARTS ORDERING

There are no modified covers available.

† † † †

MOTORCYCLE SERVICE NEWS

YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 3/20/73

NUMBER 315

SC500 SERVICE HINTS, Miscellaneous Piston and Exhaust Modification

PISTON

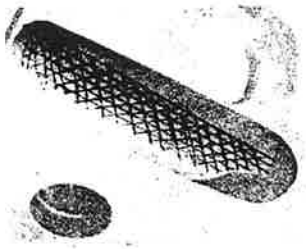
Piston cam grind clearance under extremely hard usage may be insufficient, resulting in seizures where the slipper areas meet the skirts.

No. 1 - MEASURING

CURE

1. Measure the piston diameter as shown in No. 1. Repeat this measurement for the other side.
2. Using a very fine file or whetstone, remove 0.0005" ~ 0.001" from the four points where the boss areas meet the skirts. See No. 2.

   NOTE: Re-measure often to see that not too much material is being removed.
3. Using No. 400 ~ 600 grit wet sandpaper, remove all file marks. Use a "cross-hatch" pattern.
4. When finished, repeat Step No. 1. Clearance should have increased a maximum of 0.0015".



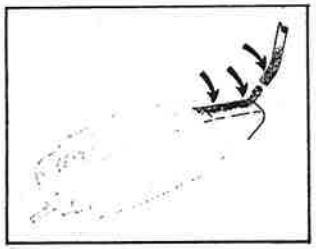
No. 2 - MODIFICATION

EXHAUST

The exhaust pipe convergent cone is larger in diameter where it passes over the oil tank vent. In some instances, the pipe may drop, heat the vent, melt it closed, shutting off or decreasing oil delivery.

CURE

1. Remove oil tank side cover.
2. Inspect tank for signs of heat damage at areas indicated in drawing, right. Repair or replace tank as necessary.
3. Loosen all exhaust pipe fittings.



No. 3 - OIL TANK

MOTORCYCLE SERVICE NEWS

YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 3/20/73

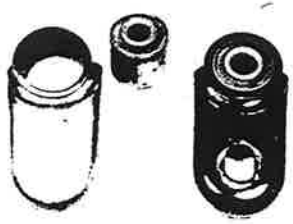
NUMBER 315

SC500 SERVICE HINTS, Miscellaneous Piston and Exhaust Modification (cont.)

4. Move exhaust pipe down to limits of travel. Clearance between pipe and tank should be 3/8" minimum.

   Insufficient clearance can be caused by:

   a. Excessive welding flash on pipe seams.
   b. Excessive downward travel allowed by muffler stay (Ref. 16-10).



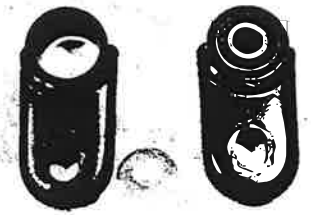
No. 4 - WELDED

5. If clearance is less than 3/8":

   a. Remove exhaust pipe and grind or file off flash.

   NOTE: A small indentation can be hammered into pipe to provide more clearance. Performance will not be affected if indentation is slight.

   b. (1) Remove muffler stay.
      (2) Press cushion bushing (Ref. 16-15) out.
      (3) Using arc or gas welder, fill in elongated mounting hole. See No. 4.
      (4) Relocate mounting hole at upper limits of stay. Use flat washer (Ref. 16-13) as guide. See No. 5.



No. 5 - DRILLED

   NOTE: This modification will prevent muffler from dropping. However, some slight adjustments to the rear stays (Refs. 16-16, 16-18) may be required during re-installation.

   (5) Re-install exhaust pipe. Check clearance.

WARRANTY/AFFECTED MACHINES

Modifications should be performed as preventive maintenance on all units. Warranty allowance and procedure as follows:

PROCEDURE*	–	"Group Claim"
FAILURE CODE	–	90D
JOB CODE	–	(Not applicable)
TIME	–	One (1.0) hour per unit

*NOTE: If any machine requires parts replacement, submit a separate claim for that repair.

PARTS ORDERING

Modified pistons and exhaust pipes are not available.

† † † †

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YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 3/28/73

MX250/360/SC500 AIR FILTER ASSEMBLY, Servicing and Installation

Improper servicing or installation of the air filter can result in excessive engine wear, spark plug gap bridging and subsequent poor performance when dirt enters the engine.

Also, the factory bonding material and method of application to the joint between the outlet funnel and filter chamber may allow air entry.

AIR FILTER MAINTENANCE

All foam type filters, particularly those used under adverse or racing conditions, must be serviced daily.

1. Remove the filter assembly.
2. Wash thoroughly in solvent.
3. Dry thoroughly.
4. Apply a light coating of 20 or 30wt. *petroleum base* oil, working thoroughly into material. Squeeze excess out.
5. Apply generous amount of heavy grease to both ends of foam element.

FILTER BOX PREVENTIVE MAINTENANCE

1. Remove seat.
2. Remove rubber joint between filter and carburetor.
3. Disconnect oil tank vent tube and C.D.I. circuit box wire harness.
4. Disengage oil tank filler pipe from air box. Attach pipe to frame with wire to prevent oil spillage.
5. Remove air box from frame. (Removal of rear wheel will make the job easier.)
6. Clean the air box thoroughly.
7. Seal gap between metal funnel and air box. Use General Electric or Dow-Corning R.T.V., Silicon Rubber Sealant. (Figure 1)
8. Seal seam around outside edge of air funnel. (It is a *two* piece item.) (Figure 2)

Fig. No. 1

Fig. No. 2

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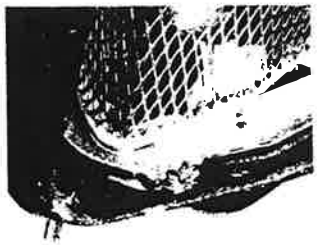
MX250/360/SC500 AIR FILTER ASSEMBLY, Servicing and Installation (cont.)

9. Seal gap between filter base and air box with the same sealant. Apply a large quantity and work it in thoroughly by hand. (Figure 3)
10. Allow R.T.V. to cure according to instructions.
11. Remove steel drain tube from bottom of fiberglass box and enlarge hole to 3/8". Excess dust will shake out through this larger hole.
12. Reassemble.

Fig. No. 3

AIR FILTER INSTALLATION

Note that both parts of filter assembly (Filter Guide, Figure 4, and Element, Figure 5) can become "cocked" allowing unfiltered air to enter engine. CAUTION: Over tightening hold-down bolt will buckle filter guide.



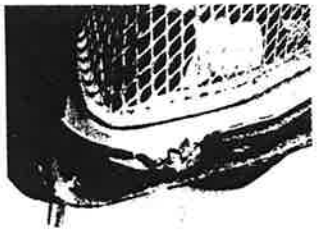


Fig. No. 5

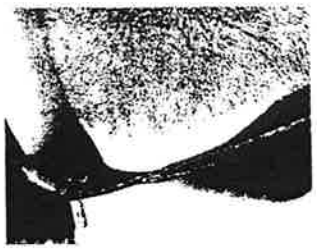


Fig. No. 6

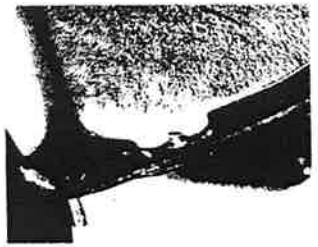


Fig. No. 7

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MX250/360/SC500 REAR CUSHION (Shock) REPAIR INSTRUCTIONS

Should seal or piston failure occur, use following procedure for repair. See also, M/C PNB No. 369.

INSTALLATION

1. Remove unit from machine.
2. Compress spring and remove upper spring seat.
3. Remove spring.
4. Remove reservoir cap bolt. Carefully pump out shock fluid.
5. Note punch marks and spanner holes in piston rod nut (Fig. 1). Clean out extruded metal between rod nut and cylinder housing. Remove nut.

   NOTE: A spanner can be manufactured from a piece of ¼" x 1½" steel strap. Cut a notch to clear piston rod. Drill a hole on each side to align with rod nut holes. Press-fit dowel pins of suitable O.D. into holes in strap.

   An alternate method is to drive nut off using a punch in the nut holes. This method may damage the cylinder housing (Ref. 1, Fig. 3). Use extreme care.

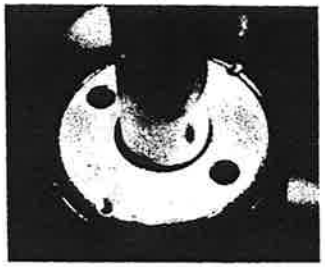

Fig. 1

6. With nut unscrewed, remove and discard piston rod assembly (Fig. 2).

   CAUTION: Do not compress piston rod assembly. With no seal on piston, any remaining shock fluid will escape under pressure.

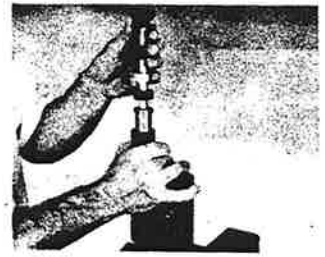

Fig. 2

7. Remove and discard cylinder (Ref. 2, Fig. 3).
8. Wash housing thoroughly in clean solvent.

   CAUTION: During washing and reassembly, take extreme care to see that all parts are thoroughly cleaned. The smallest foreign particle within the assembly can impair damping action by blocking the damping jets.

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MX250/360/SC500 REAR CUSHION (Shock) REPAIR INSTRUCTIONS (cont.)

9. Install replacement cylinder. Note location of coil spring around cylinder. This is an anti-foaming device and must be in place at the approximate center of cylinder (Ref. 4, Fig. 3).
10. Install replacement piston rod assembly. Check location of O-ring at base of rod nut. Piston seal is incorporated within rod nut (Ref. 3, Fig. 3).
11. Torque piston rod nut (new type has flats for wrench) to 80~100 in/lbs. Stake to prevent loosening (Fig. 1).
12. Add 175cc (6.0 oz.) shock fluid to reservoir. Install reservoir cap bolt. Torque to 175~200 in/lbs.

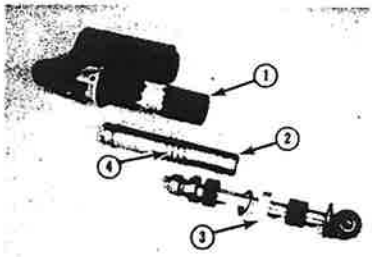

Fig. 3
(Old style piston)

PARTS ORDERING

See M/C PNB No. 369.

WARRANTY

There will be no Warranty Allowance for this procedure.

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SC500 — CRANKCASE AIR LEAK

EXPLANATION

To avoid the possibility of an air leak from the magneto area into the oil passage for the lefthand main bearing, perform this easy preventative maintenance on SC500's only.

CURE

1. Remove magneto cover.
2. Remove flywheel.
3. Remove upper front backing plate screw.
4. Apply Yamaha Bond No. 4 or equivalent to the threads.
5. Reassemble.

WARRANTY

No warranty allowance.

† † †

MOTORCYCLE PARTS NEWS

YAMAHA INTERNATIONAL CORPORATION
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MX250/360 — PARTS BOOK CORRECTION, Shift Drum Side Plate and Pins

The following parts will prevent shift pin and/or drum failure due to side plate failure. See MX250/360 Parts List, Figs. 11 and 12 for callouts and M/C SNB #306 for installation and warranty instructions.

PARTS ORDERING

Ref. No.	Old Part Number	New Part Number	Description	Qty.		Remarks
11-2	93604-18058	936-04181-00-00	PIN, Dowel	6		MX250 - 006473~ and MX360 - 002741~
11-3	363-18561-00	363-18561-01-00	PLATE, Side	1		

PLEASE BRING YOUR PARTS LIST UP TO DATE!

# # # #

MOTORCYCLE PARTS NEWS

YAMAHA INTERNATIONAL CORPORATION
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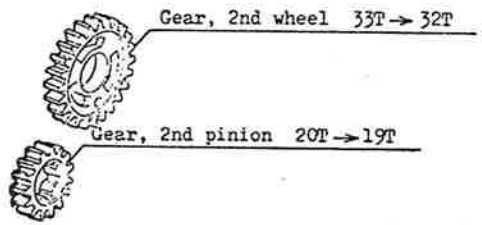
MX250/MX360 — TRANSMISSION, 2nd Gear Ratio Change

The transmission 2nd wheel gear and 2nd pinion gear have been modified to improve their strength. The new gears are not interchangeable with the old types. They must be used as a set. Set can be used in all previous DT/RT close ratio transmissions. The resultant ratio change due to fewer teeth is only 2% and will not be noticed.



ARTS ORDERING INFORMATION

Ref. No.	Old Part No.	New Part No.	Part Name	Qty.		Interchangeable
10-8	214-17121-60	365-17121-60	Gear, 2nd pinion	1		Yes, as a set
10-19	214-17221-60	365-17221-60	Gear, 2nd wheel	1		

AFFECTED MACHINES

MX250 Engine No. 008801~
MX360 Engine No. 005001~

SALES OF PARTS

Both old type and new type will be sold.

PLEASE BRING YOUR PARTS LISTS UP-TO-DATE!

† † † †

MOTORCYCLE PARTS NEWS

YAMAHA INTERNATIONAL CORPORATION
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MX250/360/SC500 — REAR CUSHION REPLACEMENT PARTS and SHOCK FLUID

Please add the following information to the appropriate Parts Lists.

PARTS ORDERING

PART NUMBER	DESCRIPTION		REMARKS
363-22250-09-00	CYLINDER ROD ASSY.		See No. 1.
ACC 11001-17-00	YAMAHA SHOCK FLUID		See No. 2.

NOTE 1: Cylinder rod assembly includes piston rod and cylinder.

NOTE 2: Yamaha Thermal Flow Shock Absorber Fluid is the only recommended shock fluid for use in Thermal Flow units. Available in 16 oz. re-sealable plastic containers.

INSTALLATION INSTRUCTIONS

See Motorcycle Service News Bulletin No. 317.

WARRANTY

There will be no Warranty Allowance for replacement of 1973 thermal flow shock components.

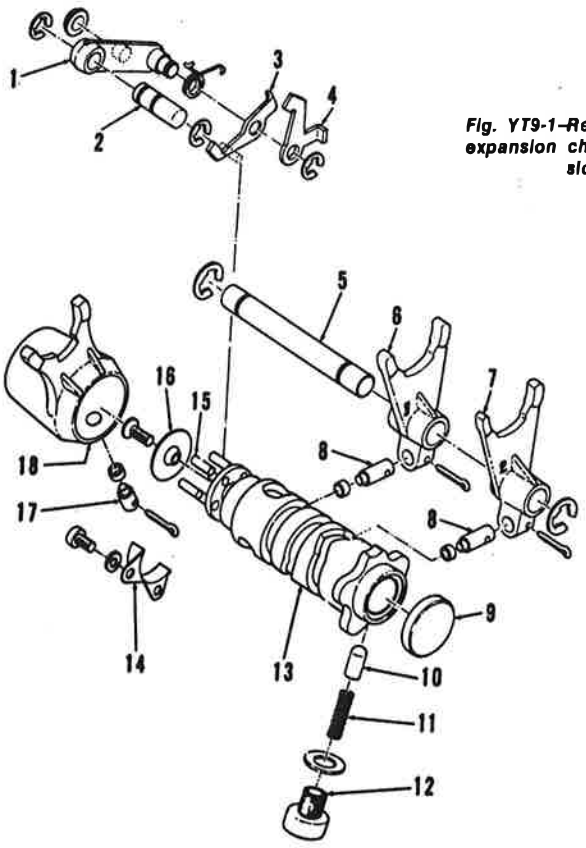

Fig. YT9-15–Exploded view of shift components used in all models.

1. Change lever bracket
2. Bracket axle
3. Change lever
4. Change lever
5. Shift fork guide bar
6. Shift fork
7. Shift fork
8. Shift fork guide pins
9. Blind plug
10. Cam stopper
11. Cam stopper spring
12. Cam stopper plug
13. Shift cam
14. Change lever guide
15. Dowel pins
16. Side plate
17. Shift fork guide pin
18. Shift fork

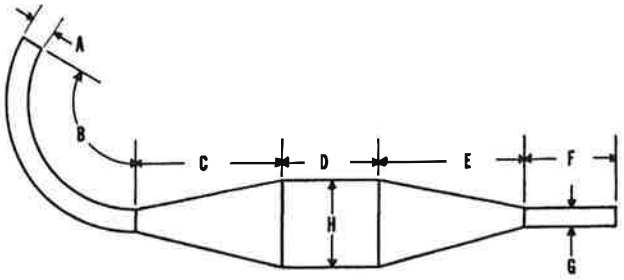

Fig. YT9-1–Refer to text for expansion chamber dimensions.

CRANKCASE AND GEAR BOX. The crankcase halves can be separated after removing the engine from the frame. Remove the piston, clutch, magneto, crankshaft primary drive gear, output sprocket and shift linkage. Remove the kickstarter idler gear from the right side, then remove the screws attaching crankcase halves together. Carefully separate the halves.

The shifter assembly and transmission assembly must be installed as a unit. The transmission must also be in the neutral position.

SPEED TUNING

The MX versions of DT1 and RT1 are basically standard models with special high performance parts installed and components nonessential for competition removed.

Many features of the MX models may be incorporated in standard parts for an increase in power. Any modifications of standard parts or installation of performance parts will void manufacturers warranty.

SPARK PLUG AND IGNITION. NGK racing type spark plugs are recommended. Standard spark plug for competition prepared 250cc models is B-10EN. Recommended spark plug for 360cc models is B-9EN.

Ignition should be carefully set to standard specifications. When removing unnecessary wiring from an Enduro model, connect black wire from magneto to orange lead of ignition coil and ground positive lead of ignition coil.

CARBURETOR. Carburetor assemblies from MX models may be adapted to Enduro models of the same displacement.

LUBRICATION: Automatic oil metering system is used on MX models. For added lubrication needs such as flat track racing, a 30:1 fuel to oil mixture should be used in fuel tank as well as the oil injection system.

If the oil metering system is removed a mixture of 15 parts gasoline to 1 part oil should be used in the fuel tank.

SUSPENSION. The weight and amount of oil used in front suspension units may be varied to tailor front fork action.

PISTON, CYLINDER AND CYLINDER HEAD. A DT1-MX piston has a 4mm (0.157 in.) shorter skirt than standard and transfer cutaways in side are also 4mm higher than standard. MX piston has only one ring groove. When using a modified standard piston, use only top piston ring.

Standard cylinder head used on 250cc Enduro models has a combustion chamber capacity of 37.5cc. Cylinder head used on 250cc MX models has a capacity of 27.5cc.

Refer to the following for a comparison of Enduro and MX port timing specifications:

	Intake Open Degrees BTDC	Exhaust Open Degrees ATDC	Transfer Open Degrees ATDC
250cc Enduro ...	80	94	123
250cc MX	91	91	124
360cc Enduro ...	80	98	125
360cc MX	79	94	121

EXPANSION CHAMBER. MX models are equipped with expansion chambers. An expansion chamber designed to increase performance in DT1 models may be constructed with the following dimensions: (Fig. YT9-1)

A. 47mm (1¾ in.)
B. 330mm (13 in.)
C. 280mm (11 in.)
D. 200mm (7⅞ in.)
E. 250mm (9 13/16 in.)
F. 254mm (10 in.)
G. 25mm (1 in.)
H. 95mm (3¾ in.)

YAMAHA 250, 360 and 500cc (1972-1974) ENDURO, MX AND SC MODELS

MODEL	ENDURO DT2 DT3 DT250A	MX DT2-MX MX250 MX250A	ENDURO RT2 RT3 DT360A	MX RT2-MX MX360 MX360A	SC SC500 SC500A
Displacement-cc	246	246	351	351	496
Bore-mm	70	70	80	80	95
Stroke-mm	64	64	70	70	70
Oil-Fuel ratio	Oil pump	Oil pump*	Oil pump	Oil pump*	Oil pump*
Spark plug—					
NGK	B-8ES	B-8EV	See Text	B-8EV	B-8EV
Electrode gap-mm	0.5-0.6	0.5-0.6	0.5-0.6	0.5-0.6	0.5-0.6
Inch	0.020-0.024	0.020-0.024	0.020-0.024	0.020-0.024	0.020-0.024
Ignition—					
Point gap-mm	0.35-0.50	0.3-0.4**	0.35-0.50**	None (CDI)	None (CDI)
Inch	0.014-0.020	0.012-0.016	0.014-0.020	None (CDI)	None (CDI)
Timing-mm BTDC	See Text	2.3	2.9	2.5	2.7
Electrical system voltage	6	....	6	....	....
Battery terminal grounded	Negative	....	Negative	....	....
Tire size-Front	3.00 x 21§	3.00 x 21	3.00 x 21§	3.00 x 21	3.00 x 21
Rear	4.00 x 18	4.00 x 18	4.00 x 18	4.00 x 18	4.60 x 18
Tire pressure—					
Front-kg/cm²	0.9	0.9	0.9	0.9	0.9
Psi	13	13	13	13	13
Rear-kg/cm²	1.2	1.1	1.2	1.1	1.1
Psi	17	15	17	15	15
Rear chain free play-mm	20	20	20	20	20
Inch	¾	¾	¾	¾	¾
Rear chain size	#520	#520	#520	#520	#520
Number of speeds	5	5	5	5	4
Weight (approx.)-kg	113	103	118	106	107
Pounds	271	227	282	234	236

*A 1:30 oil to fuel mix should be used in fuel tank in addition to oil pump.
**Some models are fitted with breakerless CDI type ignitions.
§Front tire on DT2 and RT2 is size 3.25 x 19
Illustrations courtesy of Yamaha International Corporation

MAINTENANCE

SPARK PLUG. Recommended spark plug for normal use in 250cc "Enduro" and DT360A models is NGK type B-8ES. RT2 and RT3 models should have NGK type B-9ES spark plugs. Recommended spark plug for all "MX" and "SC" models is NGK type B-8EV. Electrode gap should be set to 0.5-0.6mm (0.020-0.024 in.) on all models.

CARBURETOR. Mikuni sliding valve carburetors are used on all models. Refer to Fig. Y19-1 and following recommended carburetor specifications:

DT2 and DT3
Main jet (21) ..... #160
Needle jet (10) N-8
Jet needle (8) 5DP7
Pilot jet (17) ..... #30
Throttle slide (9) 1.5
Air screw (13) turns out 1¼
Clip (7) in third groove from top of needle (8).

DT250A
Main jet (21) ..... #140
Needle jet (10) 0-0
Jet needle (8) 5DP7
Pilot jet (17) ..... #60
Throttle slide (9) 2.0
Air screw (13) turns out 1½
Clip (7) in third groove from top of needle (8). Float arm should be parallel with gasket surface of throttle body.

DT2-MX and MX250
Main jet (21) ..... #250
Needle jet (10) P-5
Jet needle (8) ..... 6 F 5
Pilot jet (17) ..... #60
Throttle slide (9) 2.5
Air screw (13) turns out 1
Clip (7) in third groove from top of needle (8).

MX250A
Main jet (21) ..... #260
Needle jet (10) P-8
Jet needle (8) ..... 6 F 15
Pilot jet (17) ..... #50
Throttle slide (9) 3.0
Air screw (13) turns out 1½
Clip (7) in second groove from top of needle (8). Float level should be 23.4mm (0.92 in.)

RT2 and RT3
Main jet (21) ..... #230
Needle jet (10) 0-2
Jet needle (8) 6DH3
Pilot jet (17) ..... #45
Throttle slide (9) 3.0
Air screw (13) turns out 1½
Clip (7) in third groove from top of needle (8). Float level should be 21.4mm (0.85 in.).

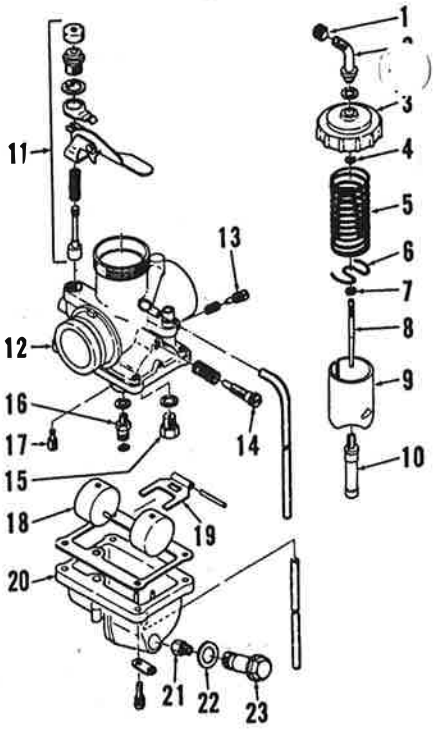

Fig. Y19-1–Exploded view of typical Mikuni carburetor assembly.

1. Lock nut
2. Cable guide
3. Mixing chamber cap
4. Clip
5. Throttle return spring
6. Retainer clip
7. Jet needle clip
8. Jet needle
9. Throttle slide
10. Needle jet
11. Starter valve
12. Throttle body
13. Pilot air screw
14. Idle speed screw
15. Inlet needle & seat
16. Jet setter
17. Pilot jet
18. Float arm
19. Floats
20. Float bowl
21. Main jet
22. Gasket
23. Jet holder

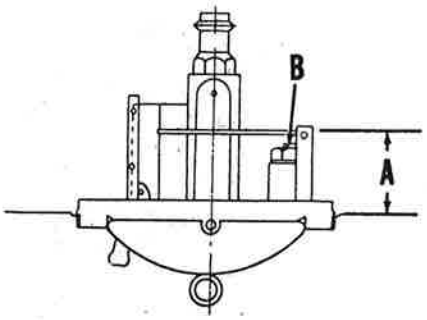

Fig. Y19-2–Float level (A) is adjusted by bending tang (B) on float arm. Float level should be correct when float arm is parallel with gasket surface of throttle body.

DT360A

Main jet (21) ..... #180
Needle jet (10) 0-8
Jet needle (8) 5EJ8
Pilot jet (17) ..... #50
Throttle slide (9) 3.0
Air screw (13) turns out 1½
Clip (7) in third groove from top of needle (8). Float arm should be parallel with gasket surface of throttle body.

RT2-MX and MX360

Main jet (21) ..... #310
Needle jet (10) P-8
Jet needle (8) 6F15
Pilot jet (17) ..... #50
Throttle slide (9) 3.0
Air screw (13) turns out 1
Clip (7) in third groove from top of needle (8). Float arm should be parallel with gasket surface of throttle body.

MX360A

Main jet (21) ..... #270
Needle jet (10) P-8
Jet needle (8) 6F15
Pilot jet (17) ..... #50
Throttle slide (9) 3.0
Air screw (13) turns out 1½
Clip (7) in second groove from top of needle (8). Float level should be 23.4mm (0.92 in.).

Fig. Y19-4–View of breaker point timed magneto used on DT2-MX. Stator should be adjusted so that marks (A & B) align when piston is at specified BTDC position for ignition. Breaker points should just open at this point.

SC500 and SC500A

Main jet (21)—
SC500 ..... #400
SC500A ..... #340
Needle jet (10) 0-8
Jet needle (8) 6F16
Pilot jet (17) ..... #80
Throttle slide (9) 3.5
Air screw (13) turns out—
SC500 ..... 1½
SC500A 1¾
Clip (7) in second groove from top of needle (8). Float level should be 17.8mm (0.7 in.).

Float level on all models is measured with float bowl and floats removed and throttle body inverted. Distance (A—Fig. Y19-2) from float arm to gasket surface of throttle body is float level. In most cases, float arm will be parallel with gasket surface when adjustment is correct.

IGNITION AND ELECTRICAL. An energy transfer type flywheel magneto is used on RT2, RT3 and all 250cc "Enduro" models. Breaker points on these models should be set to a maximum gap of 0.35-0.50mm (0.014-0.020 in.). A breaker point timed magneto with a small rotor turning inside the stator assembly is used on DT2-MX models. Maximum breaker point gap should be set to 0.3-0.4mm (0.012-0.016 in.). A C.D.I. (Capacitor Discharge Ignition) magneto is used on DT360A, MX250, MX250A, on all 360cc "MX" models and SC500 models.

A dial gage should be used to determine piston position for ignition timing check. Refer to the following timing specifications:

Model	Piston Position BTDC
DT2 and DT3	3.0mm (0.118 in.)
DT250A	3.2mm (0.126 in.)
DT2-MX, MX250 and MX250A	2.3mm (0.090 in.)
RT2, RT3 and DT360A	2.9mm (0.114 in.)
RT2-MX, MX360 and MX360A	2.5mm (0.098 in.)
SC500 and SC500A	2.7mm (0.106 in.)

On breaker point models, breaker points should just open as piston reaches correct BTDC position. A timing pointer, mounted on stator of "Enduro" models, should align with timing mark on flywheel at this point. Timing mark (A—Fig. Y19-4) on DT2-MX models, should align with mark (B) on rotor when piston is set to proper BTDC position. Adjust breaker point base plate so that points just open as marks (A&B) align.

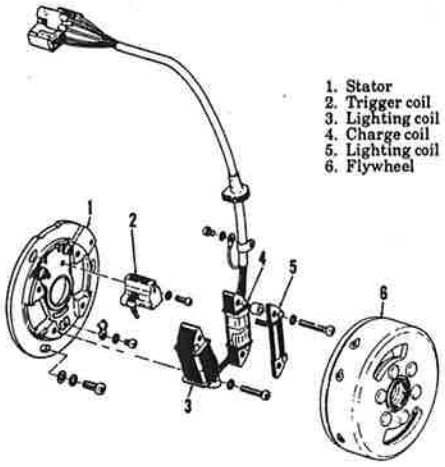

Fig. Y19-5–View of CDI magneto used on some 360cc "Enduro" models. Magneto used on SC500 models is similar but is not equipped with lighting coils.

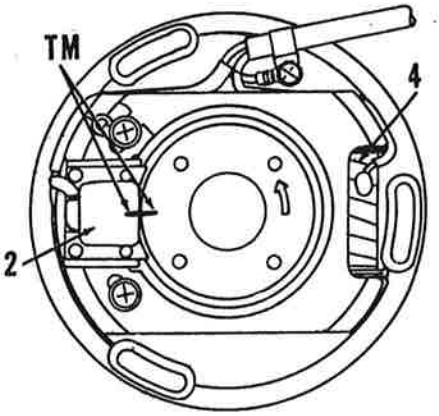

Fig. Y19-6–View of timing marks (TM) on CDI magneto used on some 250 and 360cc "MX" models.

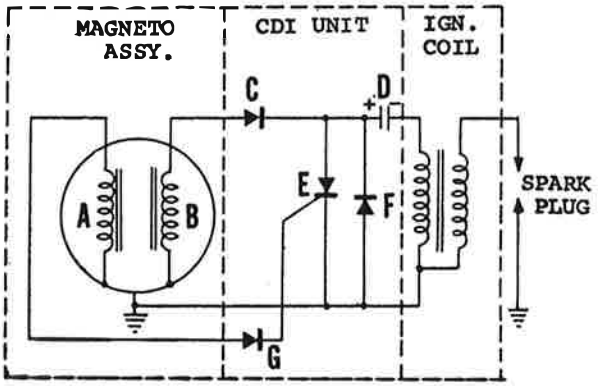

Fig. Y19-7–Simplified diagram of CDI system. Current produced in charge coil (B) is rectified by diodes (C & F) and stored in capacitor (D). Current from trigger coil (A), triggers thyristor (E) and allows stored current to flow to ignition coil.

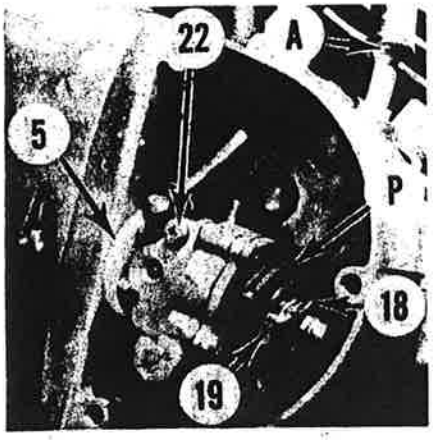

Fig. Y19-8–View of typical oil pump assembly. Pin, beneath cover plate (19), should align with mark on adjustment pulley (P) just before throttle slide begins to move. Use cable adjuster (A) to align marks.

On models equipped with capacitor discharge ignition system, timing mark on flywheel or magneto rotor, should align with mark on trigger coil (2—Fig. Y19-5 or Y19-6) when piston is at specified BTDC position. Adjust ignition timing by repositioning trigger coil. If stator has been removed from SC500 models, be sure to coat top, forward stator mount screw with gasket sealer before reinstalling. Crankcase pressure may leak through if screw hole is not sealed.

CDI magneto systems should be checked with a power timing light to make sure automatic advance is operating. An approximate 15 degree ignition advance should occur between 2500 and 3200 RPM. An additional 0.22 microfarad condenser fitted to ignition system of some SC500 models is used to change point of ignition advance. Advance of ignition should begin at approximately 1000 RPM on models equipped with additional condenser. Condenser is connected to red/white wire from trigger coil.

Some components of the CDI systems can be checked with an ohmmeter. Resistance between white/red wire and white/green wire of trigger coil on 250 and 360cc "MX" models should be 54 ohms. On DT360A models, resistance between white/red wire and white/green wire should be 100 ohms. On SC500 models, resistance between white/red and white/green wire on trigger coil should be 88 ohms. Charging coil on 250 and 360cc "MX" models should have 790 ohms resistance between brown wire and black wire; 84 ohms resistance between red wire and black wire. Charging coil on DT360A should show 125 ohms resistance between brown wire and black wire. Charging coil on SC500 models should have 204 ohms resistance between brown wire and black wire. A variation of 10% is allowed on resistance specifications of all coils.

LUBRICATION. Clutch and transmission components are lubricated by SAE 10W/30 motor oil contained in gearbox. Lubricant should be maintained at a level between two marks on filler plug dipstick with dipstick screwed in. Motorcycle should be held vertical, not on side stand, while making oil level check.

Engine lubrication is accomplished by an automatic oil metering system. Oil tank should not be allowed to run dry and only oils intended for use in air cooled, two stroke engines, should be used. On "MX" and "SC" models, manufacturer recommends using a 30:1 fuel to oil mixture in fuel tank in addition to automatic lubrication system.

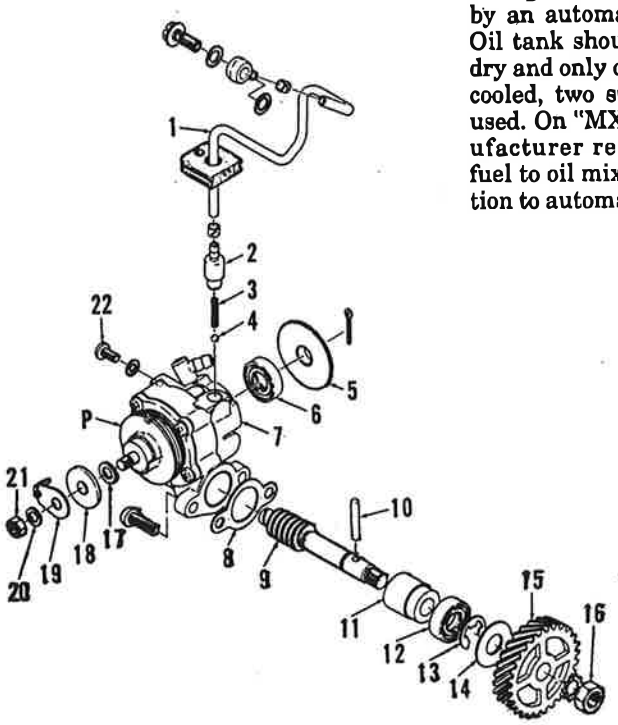

Fig. Y19-9–View of oil pump and related parts.

P. Pump pulley
1. Oil pressure line
2. Check valve
3. Spring
4. Check valve ball
5. Starter plate
6. Oil seal
7. Pump assembly
8. Gasket
9. Worm shaft
10. Pin
11. Worm shaft bushing
12. Oil seal
13. "E" ring
14. Washer
15. Drive gear
16. Nut
17. Shim
18. Adjusting plate
19. Cover plate
20. Lock washer
21. Nut
22. Bleed screw

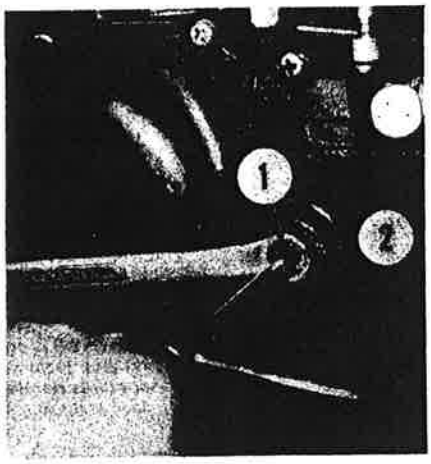

Fig. Y19-11–View of clutch adjuster used on some models. Turn screw (2) in until a resistance is felt then back out ¼ turn and tighten lock nut (1).

Oil pump must be bled if it has been removed or allowed to run dry. To bleed pump, remove bleeder screw (22—Fig. Y19-8) and turn starter plate (5) upward while holding throttle fully open. When air is no longer present in oil coming from bleed hole, replace screw. Oil pump adjustment should be checked whenever throttle has been adjusted. Mark on pump adjustment pulley (P) should be aligned with pin, located beneath cover plate (19), when slack has been taken up in the cable but throttle slide has not started to move. Minimum pump stroke should be 0.20-0.25mm (0.008-0.010 in.) on "Enduro" models and 0.60-0.65mm (0.024-0.026 in.) on "MX" and "SC" models. Minimum pump stroke is measured with throttle closed. Turn starter plate (5) until gap between adjuster plate (18) and pulley (P) is widest. Adjust gap to minimum stroke specification with various thicknesses of shim (17—Fig. Y19-9).

CLUTCH CONTROLS. Two types of clutch throw out mechanisms are used. Unit with lever arm exposed on lower side of engine (Fig. Y19-31) is primarily adjusted by turning adjusters in clutch control cable. Coarse adjustment is provided by eccentric screw (25). Turn eccentric screw until lever arm is positioned slightly behind center line of transmission shaft.

NOTE: Full range of adjustment is accomplished in 180 degrees of movement. Do not turn screw in far enough to bind lever arm shaft or out so far that it disengages. Turn clutch cable adjusters to obtain 2-3mm (⅛ in.) free play at gap of handlever pivot.

To adjust units with internal lever arm (Fig. Y19-30), back clutch cable adjusters off and loosen lock nut (1—Fig. Y19-11). Turn adjusting screw (2)

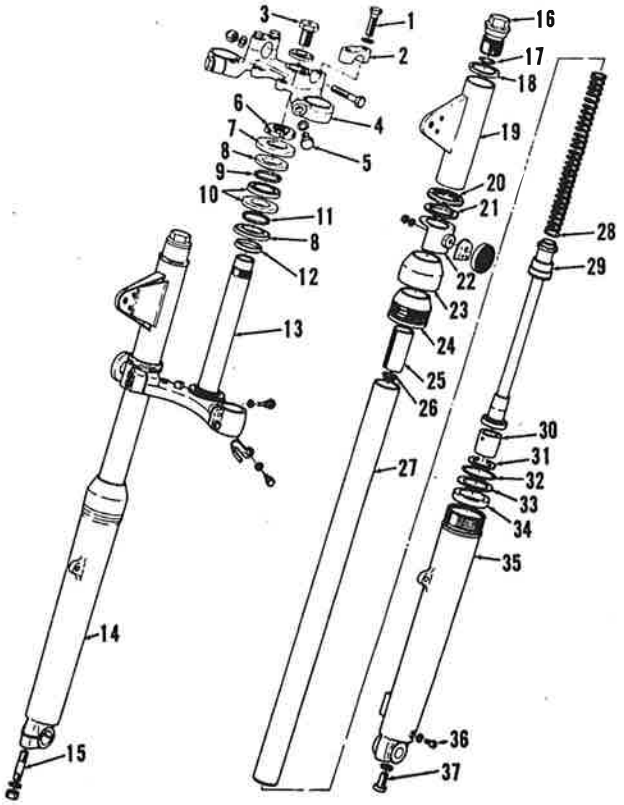

Fig. Y19-13–Exploded view of typical front suspension unit. Bearing balls (11) in lower race are larger than balls (9) in top race.

1. Bolt
2. Handlebar clamp
3. Stem bolt
4. Top crown
5. Pinch bolt
6. Stem nut
7. Cover
8. Bearing cones
9. Bearing balls (22 each)
10. Bearing cups
11. Bearing balls (19 each)
12. Dust seal
13. Steering stem
14. Fork leg assembly
15. Axle clamp stud
16. Fork top bolt
17. "O" ring
18. Guide
19. Headlight bracket
20. Guide
21. Rubber gasket
22. Reflector bracket
23. Dust cover
24. Dust seal
25. Spacer
26. Spring seat
27. Inner fork tube
28. Fork spring
29. Damper
30. Damper piston
31. Clip
32. Oil seal clip
33. Washer
34. Oil seal
35. Outer fork tube
36. Drain screw
37. Damper holding screw

out until loose then turn it back in until a resistance is felt. Turn adjusting screw back out ¼ turn and tighten lock nut. Use cable adjusters to obtain 2-3mm (⅛ in.) free play at gap of handlever pivot.

SUSPENSION. Front suspension units on all models should be serviced with SAE 10W/30 motor oil or motorcycle fork oil. Refer to the following recommended fork capacities:

Model	Amount of Oil Per Fork Leg
All "Enduro" models	175cc
DT2-MX, MX250, RT2-MX, MX360 and SC500	175cc
MX250A, MX360A and SC500A	194cc

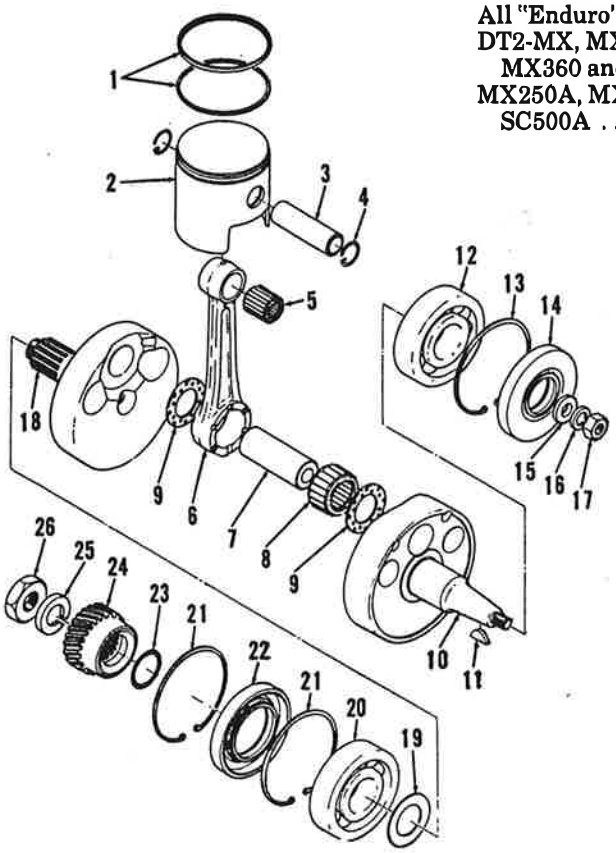

Fig. Y19-15–Exploded view of typical crankshaft assembly.

1. Piston rings
2. Piston
3. Piston pin
4. Piston pin clip
5. Needle bearing
6. Connecting rod
7. Crank pin
8. Needle bearing
9. Side washer
10. Left crank wheel
11. Woodruff key
12. Ball bearing
13. Snap ring
14. Oil seal
15. Washer
16. Spring washer
17. Nut
18. Right crank wheel
19. Adjusting shim
20. Ball bearing
21. Snap rings
22. Oil seal
23. "O" ring
24. Primary gear
25. Lock washer
26. Nut

Rear suspension units with separate oil reservior attached to shock absorber body may be disassembled for service. Reservoirs should be serviced with 182.5cc of hydraulic shock fluid each. Shock absorbers without reservoir are not repairable and should be renewed if leaking, bent or otherwise damaged.

REPAIRS

PISTON, RINGS AND CYLINDER. Cylinder and piston may be serviced after disconnecting oil delivery line and removing exhaust pipe, carburetor and cylinder head. A shop towel should be placed around connecting rod as cylinder is lifted to prevent carbon particles or pieces of possible broken piston rings from falling into open crankcase. A suitable puller should be used to remove piston pin so that connecting rod is not damaged. Refer to the following repair specifications:

Piston skirt to cylinder clearance—

All 250cc "Enduro" models	0.040-0.045mm (0.0016-0.0018 in.)
RT2 and RT3	0.045-0.050mm (0.0018-0.002 in.)
DT360A	0.040-0.045mm (0.0016-0.0018 in.)
DT2-MX and MX250	0.040-0.045mm (0.0016-0.0018 in.)
RT2-MX, MX360 and SC500	0.055-0.060mm (0.0021-0.0024 in.)
MX250A and MX360A	0.045-0.050mm (0.0018-0.002 in.)
SC500A	0.050-0.060mm (0.002-0.0024 in.)

Piston ring end gap—

All 250cc "Enduro" models	0.2-0.3mm (0.008-0.016 in.)
All 360cc "Enduro" models	0.3-0.5mm (0.012-0.020 in.)
All 250 and 360cc "MX" models	0.4-0.5mm (0.016-0.020 in.)
SC500 and SC500A	0.3-0.5mm (0.012-0.020 in.)

Maximum allowable cylinder taper—

250 and 360cc models	0.05mm (0.002 in.)
SC500 models	0.065mm (0.0026 in.)

Arrow on top of piston should be toward front of engine (exhaust side). Markings on piston rings indicate top side of ring and proper ring groove. Pistons should be measured for cylinder clearance check at a point approximately 13mm (½ in.) from bottom of

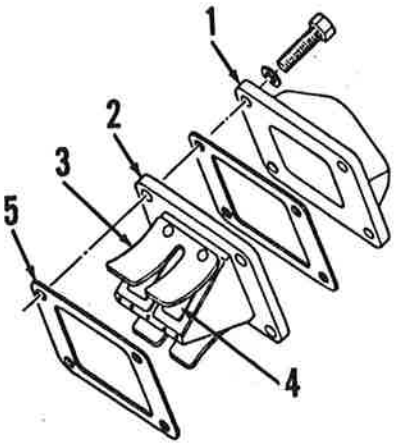

Fig. Y19-16–View of typical reed manifold assembly.

1. Manifold
2. Reed block
3. Reed stopper plate
4. Reed petal
5. Gasket

skirt on a right angle to piston pin hole. Piston pin should be snug fit in piston. Install new piston pin retaining clips on each reassembly. Tighten cylinder head retaining hardware to 3.5-4.0 kg-m (26-29 ft.-lbs.) torque.

Decompressor valve used on 500 and some 360cc models should be cleaned of carbon and checked for leaks. Make sure control cable has a small amount of free play to ensure that valve is not held off seat. Adjust control cable, on late models with kick starter actuated decompressor, so that valve of decompressor just opens as kick gear engages.

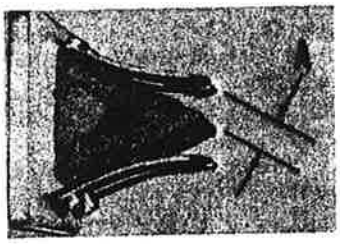

Fig. Y19-17–Height (A) of reed stopper plate should be 9.3-9.6mm.

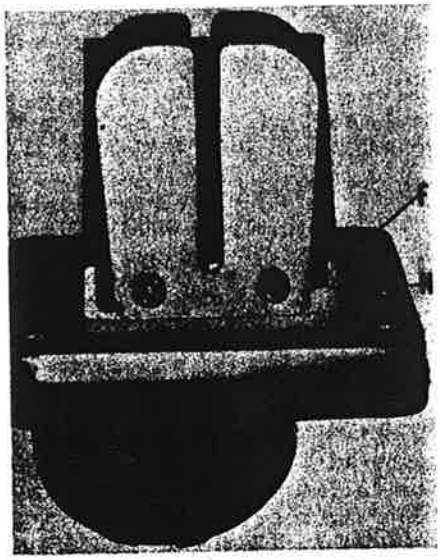

Fig. Y19-18–Cutaway (N) at edge of reed petal should be installed next to flat (F) on reed stopper plate.

Inspect reed petals (4—Fig. Y19-16) for cracks or tears. Petals should be renewed if any flaws are detected. Curve of reed stopper plate (3) should be smooth and free of kinks or rough spots. Check rubber coating on reed block (2) for cracking or peeling. Height (A—Fig. Y19-17) of reed stopper should be 9.3-9.6mm (0.36-0.38 in.). When reassembling unit, place corner of reed petal with notch (N—Fig. Y19-18) beneath corner of reed stopper plate with flat (F).

CRANKSHAFT AND CONNECTING ROD. Engine must be removed from frame and disassembled to service crankshaft assembly. Refer to CRANKCASE AND GEARBOX section for engine disassembly procedure.

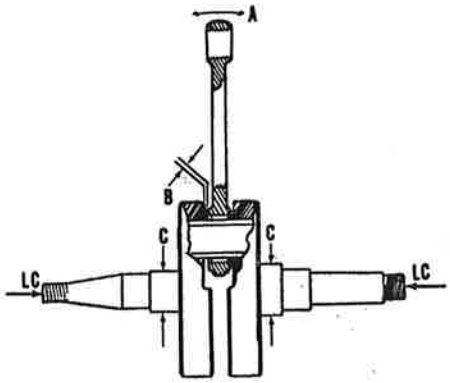

Fig. Y19-19–Crankshaft should be supported between lathe centers (LC) when making runout checks.

Crankshaft runout, measured on main bearing surfaces (C—Fig. Y19-19), should be no more than 0.0[illegible]m (0.0012 in.). Small end shake (B) should be no more than 2.0mm (0.078 in.). Side clearance (B) between large end of connecting rod and crank wheel should be 0.4-0.5mm (0.016-0.019 in.). Width of crankshaft, measured on flywheel outer faces, should be 64mm (2.52 in.) for "MX" models, "SC" models, DT250A and DT360A. Width of crankshaft for all other models is 62mm (2.44 in.).

CRANKCASE AND GEARBOX. Gearbox components may be serviced after separating crankcase sections. Drain gearbox lubricant and remove engine assembly from frame. Remove cylinder and piston. Remove left side engine covers and magneto assembly. Stator plate should be marked before removal so that it can be reinstalled in original position. Remove right side engine cover, primary drive gear retaining nut, clutch assembly and kick starter assembly.

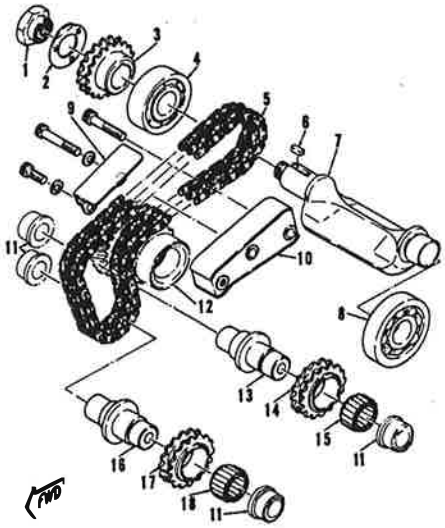

Fig. Y19-20–View of counterweight and drive components used on 500cc models.

1. Special nut
2. Lock washer
3. Drive sprocket
4. Bearing
5. Drive chain
6. Key
7. Counterweight
8. Bearing
9. Chain guide
10. Guide block
11. Bushings
12. Primary gear
13. Idler sprocket shaft
14. Idler sprocket
15. Needle bearing
16. Idler sprocket shaft
17. Idler sprocket
18. Needle bearing

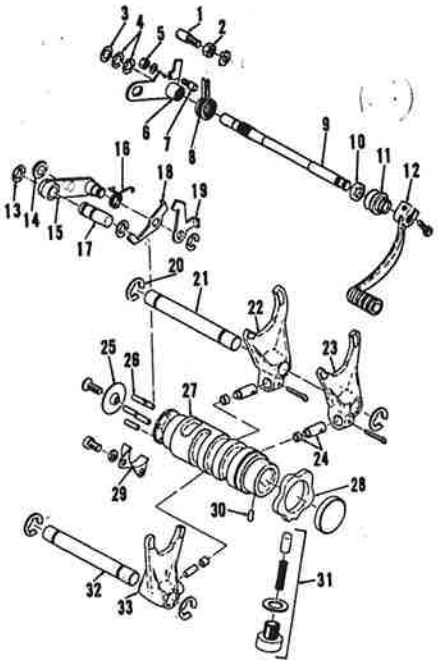

Fig. Y19-21–View of gearshift components used in early models.

1. Eccentric pin
2. Nut
3. Washer
4. Clips
5. Nut
6. Change arm
7. Eccentric pin
8. Centering spring
9. Change shaft
10. Oil seal
11. Boot
12. Change pedal
13. Clip
14. Roller
15. Lever arm
16. Spring
17. Axle
18. Lever arm
19. Lever arm
20. Clip
21. Shift fork axle
22. Shift fork "3"
23. Shift fork "2"
24. Shift fork guide & roller
25. Side plate
26. Pins
27. Shift dr[illegible]
28. Stopp[illegible]
29. Guide
30. Pin
31. Stopper detent assembly
32. Shift fork axle
33. Shift fork "1"

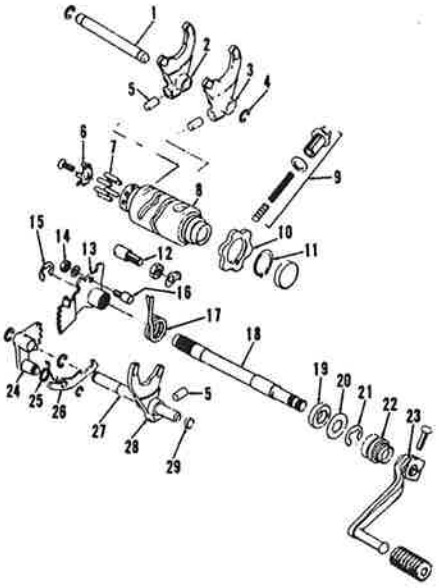

Fig. Y19-22–View of shifter components used on later models.

1. Shift fork axle
2. Shift fork
3. Shift fork
4. Clip
5. Shift fork guide
6. Side plate
7. Pins
8. Shift drum
9. Stopper detent assembly
10. Stopper plate
11. Snap ring
12. Stopper pin
13. Change lever
14. Nut
15. Clip
16. Eccentric pin
17. Centering spring
18. Change shaft
19. Oil seal
20. Washer
21. Clip
22. Boot
23. Change pedal
24. Change lever
25. Spring
26. Change arm
27. Shift fork axle
28. Shift fork
29. Plug

To remove counterweight drive chain on SC500 models, remove chain guide (9—Fig. Y19-20). Fold down bent portion of lock washer (2) and remove nut (1) on counterweight shaft (7). Pull idler sprocket shaft (13) and remove sprocket (14). Pull counterweight drive sprocket off shaft and remove drive chain. Pull primary gear from crankshaft.

Remove gear change shaft and gear change ratcheting mechanism from right side of engine case. Remove screws holding crankcase sections together and carefully separate the cases.

Inspect transmission gears for cracked or broken teeth and wear on engagement dogs. Check sliding gears for wear in shift fork groove. Check thrust pads on shift forks for signs of excessive wear or discoloration. Check shafts for wear of splines and seal contact areas.

Assemble transmission shift drum and shift forks and install as a unit in left engine case. Make certain that mating surfaces of crankcase sections are clean and free of nicks or burrs then apply an even coat of a non-hardening type gasket sealer and assemble. Tighten screws and check all shafts for freedom of movement.

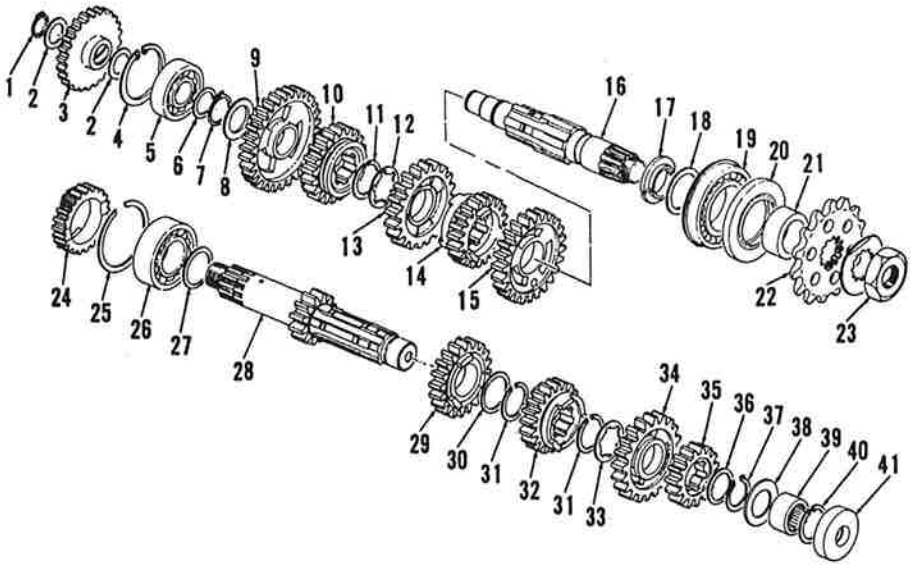

Fig. Y19-23–Exploded view of typical five speed transmission assembly. Four speed unit used in 500cc models is similar.

1. Snap ring
2. Shim
3. Kick idle gear
4. Snap ring
5. Ball bearing
6. Shim
7. Snap ring
8. Washer
9. First gear
10. Fourth gear
11. Clip
12. Spline washer
13. Third gear
14. Fifth gear
15. Second gear
16. Output shaft
17. Spacers
18. Shim
19. Bearing
20. Oil seal
21. Spacer
22. Sprocket
23. Nut
24. Kick pinion gear
25. Clip
26. Bearing
27. Shim
28. Input shaft
29. Fourth gear
30. Washer
31. Clip
32. Third gear
33. Spline washer
34. Fifth gear
35. Second gear
36. Washer
37. Snap ring
38. Shim
39. Bearing
40. Snap ring
41. Oil seal

Shift mechanisms should be adjusted to provide proper gear engagement. Two different types of gear change mechanisms are used.

Early type shifter (Fig. Y19-21) is adjusted by turning eccentric pins (1 & 7—Fig. Y19-24). Loosen lock nut on eccentric (1) and move gear change pedal to full extent of travel in both directions. Turn pin (1) until clearances (B & BB) between lever arms and case bosses are equal when pedal is held to each extreme.

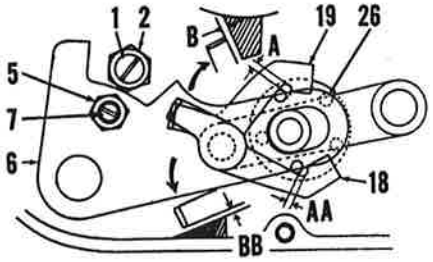

Fig. Y19-24–View of shift mechanism adjustment points for shifter shown in Fig. Y19-21. Refer to text and Fig. Y19-21 for legend.

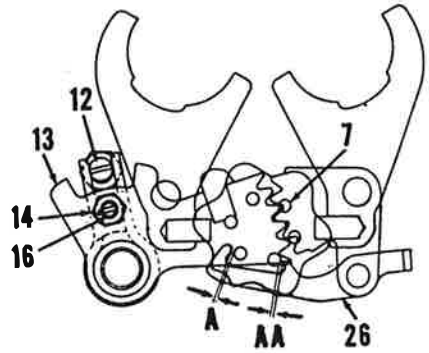

Fig. Y19-25–View of shift mechanism adjustment for unit shown in Fig. Y19-22. Refer to Fig. Y19-22 for legend.

Turn eccentric pin (7) until clearances (A & AA) between lever arms (18 & 19) and shift drum pins (26) are equal with pedal at rest.

Gear change mechanism (Fig. Y19-22) used on later models is adjusted by turning eccentric pin (16—Fig. Y19-25). Shift transmission into second or fourth gear and observe clearances (A & AA) between change arm (26) and shift drum pins (7). Loosen lock nut and turn eccentric pin (16) until clearances (A & AA) are equal.

Counterweight drive chain on SC500 models may be installed as follows: Install counterweight sprocket (3—Fig. Y19-26) then turn it to align punch mark with pointer cast into engine case. Install primary drive gear (12) with punch mark on gear aligned with

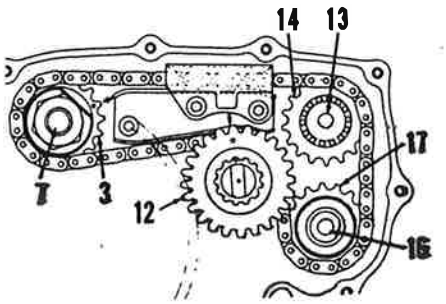

Fig. Y19-26–View of timing marks for installation counterweight drive chain on SC500 models. Refer to text for installation procedure.

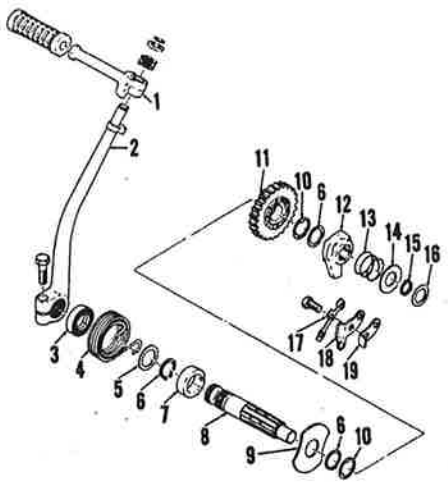

Fig. Y19-27–View of kickstarter assembly used on early models.

1. Pedal
2. Lever
3. Oil seal
4. Return spring
5. Shim
6. Snap ring
7. Spring guide
8. Kick shaft
9. Spring cover
10. Spline washer
11. Kick gear
12. Ratchet
13. Spring
14. Spring cover
15. Snap ring
16. Shim
17. Lock plate
18. Ratchet guide
19. Stopper

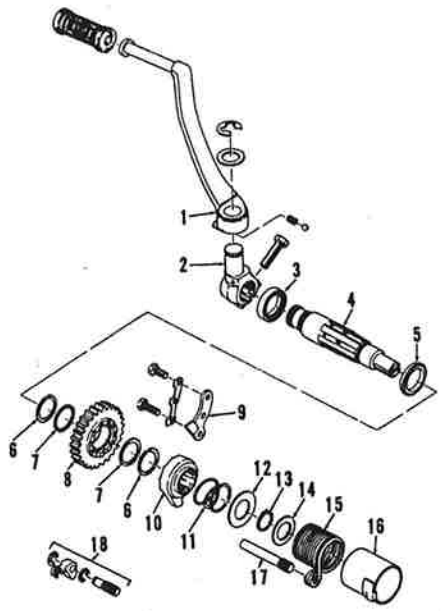

Fig. Y19-28–View of kickstarter assembly used on later models.

1. Pedal
2. Kick boss
3. Oil seal
4. Kick shaft
5. Spacer
6. Clip
7. Washer
8. Kick gear
9. Ratchet guide
10. Ratchet
11. Spring
12. Spring cover
13. Snap ring
14. Washer
15. Return spring
16. Spring guide
17. Pin
18. Decompressor lever (360 & 500cc models only)

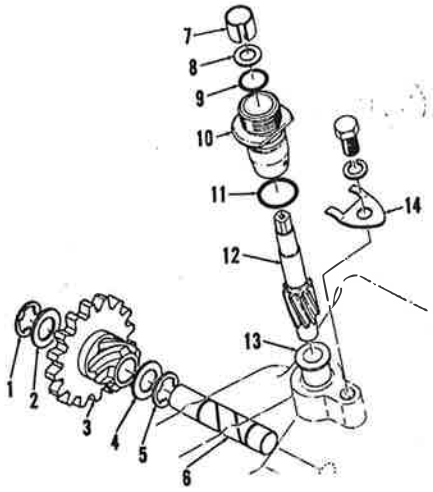

Fig. Y19-29–View of typical tachometer drive components. An oil seal is used instead of "O" ring (9) on some units.

1. Clip
2. Shim
3. Drive gear
4. Shim
5. Clip
6. Axle
7. Bushing
8. Shim
9. "O" ring
10. Housing
11. "O" ring
12. Drive shaft
13. Bushing
14. Set plate

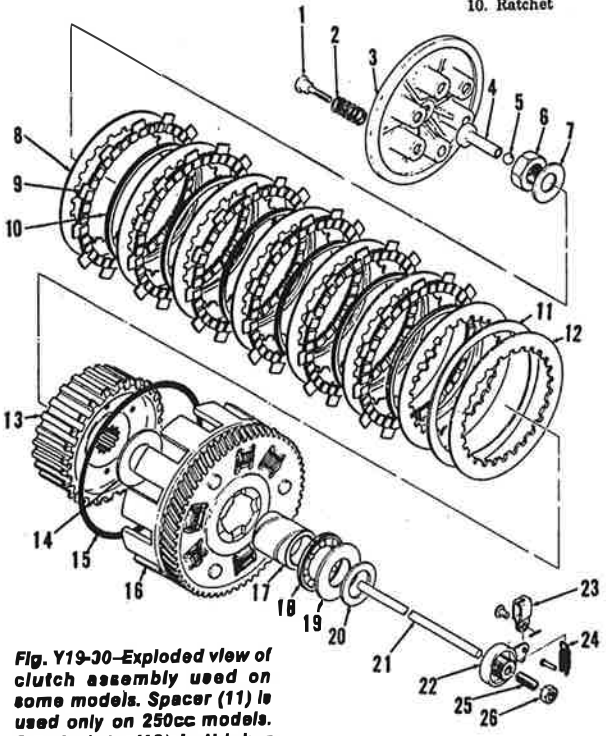

Fig. Y19-30–Exploded view of clutch assembly used on some models. Spacer (11) is used only on 250cc models. Steel plate (12) is thicker than other steel plates (8).

1. Clutch screw
2. Clutch spring
3. Pressure plate
4. Pusher piece
5. Steel ball
6. Nut
7. Belleville washer
8. Steel plate
9. Friction disc (7 each on 360cc models)
10. Cushion (7 each on 360cc models)
11. Spacer (250cc models only)
12. Steel plate (thick)
13. Hub
14. Thrust plate
15. "O" ring
16. Clutch housing/primary gear assembly
17. Spacer
18. Thrust washer
19. Thrust plate (50mm O.D.)
20. Thrust plate (34mm O.D.)
21. Push rod
22. Release lever
23. Release holder
24. Spring
25. Adjuster screw
26. Lock nut

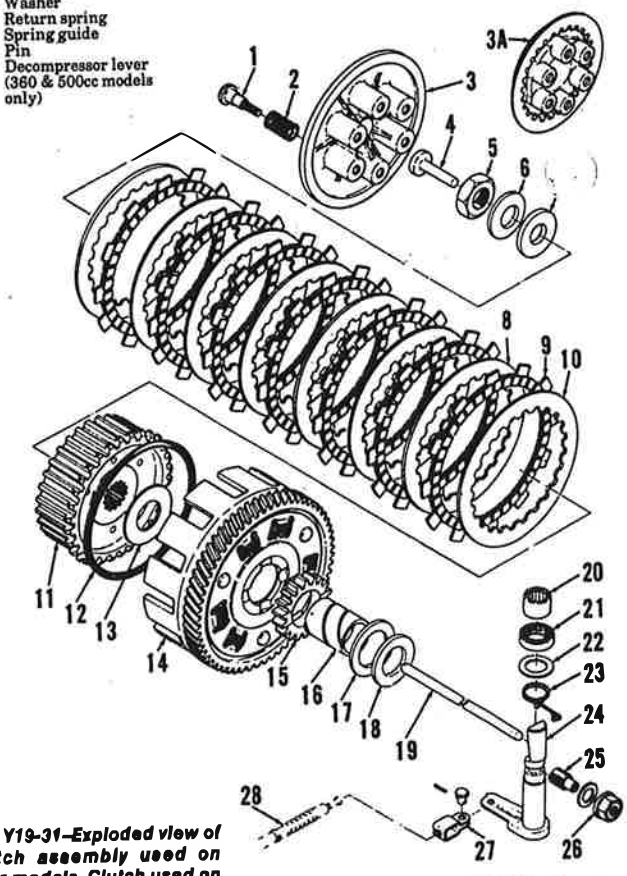

Fig. Y19-31–Exploded view of clutch assembly used on later models. Clutch used on SC500 models is of similar construction. An eighth friction disc (9) is used on 360 and 500cc models and is installed between last steel plate and pressure plate (3A).

1. Clutch screw
2. Clutch spring
3. Pressure plate (250cc only)
3A. Pressure plate (360 and 500cc)
4. Pusher piece
5. Nut
6. Lock washer
7. Flat washer
8. Steel plate (7 each)
9. Friction disc
10. Steel plate (thick)
11. Hub
12. "O" ring
13. Thrust plate
14. Clutch housing/primary gear assembly
15. Kick pinion gear
16. Spacer
17. Thrust bearing
18. Thrust plate
19. Push rod
20. Bearing
21. Oil seal
22. Washer
23. Spring
24. Lever arm shaft
25. Eccentric screw
26. Lock nut
27. Cable holder
28. Clutch cable end

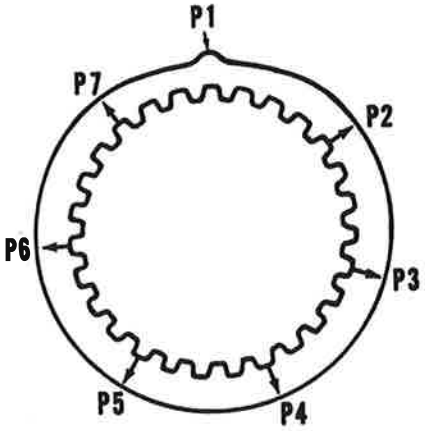

Fig. Y19-32–Steel plates (8–Fig. Y19-31) used in some clutches have asymmetrical shapes. Assemble clutch with point (P) of each plate positioned approximately 50 degrees from point of previous plate.

punched spline on crankshaft. Turn crankshaft until punch mark on primary gear is aligned with pointer cast in crankcase. Crankshaft will be at TDC at this point. Place chain around drive sprocket (3) and primary gear (12) without changing alignment of timing marks. Install idler sprockets (14 & 17) then slide shafts (13 & 16) into position.

Install kick starter assembly (Fig. Y19-27 or Y19-28). On 500cc and some 360cc models, the engine decompressor mechanism is linked, by cable, to kick-starter. Cable should have a small amount of slack to ensure full seating of decompressor valve and should be adjusted to actuate valve just as kick gear engages.

CLUTCH. The wet type, multiple disc clutch is located on right end of transmission input shaft. Standard thickness of friction disc (9—Fig. Y19-30 or Y19-31) is 3mm (0.118 in.). Friction discs should be renewed if worn to less than 2.7mm (0.106 in.) thick or if worn unevenly. Check steel clutch plate for warpage or signs of overheating. Steel plates in some clutches are built with an eccentric cut out of them. Each of these plates should be installed with point (P—Fig. Y19-32) placed approximately 50 degrees (4 teeth on clutch hub) from previous plate to prevent an unbalanced condition in assembled unit.