FOREWORD

This service manual has been designed to furnish all dealers and service personnel with specific information concerning the TX750, including disassembly and assembly procedures, inspection and analyzation of worn parts, and subsequent repair or adjustment procedures.

The manual should be thoroughly read. This will provide full familiarity with the design of this machine and all correct repair procedures.

Because Yamaha engineers are constantly searching for new and more efficient engine advancements, it is possible that some of this information may be modified in the future. Any changes in design, adjustments, or repair procedures will be immediately forwarded to all Authorized Yamaha dealers through Service and/or Parts News Bulletins.

NOTICE

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

Without such basic knowledge, repairs or service to this model may render the machine unsafe, and for this reason we must advise that all repairs and/or service be performed by an Authorized Yamaha Dealer who is in possession of the requisite basic product knowledge.

Other information is produced by the U.S. distributor, Yamaha International Corporation, and is necessary to provide total technical coverage regarding the product.

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

YAMAHA TX750 SERVICE MANUAL

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I. GENERAL

FEATURES

A) Valve and Camshaft Mechanism

The use of a single overhead camshaft is beneficial in two ways: First, it contacts the rocker arm in a more positive manner than standard push rod valve arrangements, which allows the engine to rev higher. Secondly, there are less moving parts to wear. Also, the overhead camshaft is driven by a long-lasting single row endless chain that is directly connected to the crankshaft. An adjustable chain tensioner and several additional cushions keep chain noise at a minimum.

B) Twin, Constant Vacuum Carburetors

The throttle slide in this type carburetor is raised by engine vacuum, not a cable. The amount of vacuum to the carburetor is controlled by a butterfly valve in the carburetor venturi. The carburetor meters precisely the correct amount of fuel at all times because it is controlled by engine demand.

C) Five Speed Transmission

The wide ratio five speed synchromesh transmission permits full usage of engine power under all conditions.

D) Dry Sump System Lubrication

In the dry sump system, the oil is pressure-fed to the engine from the separate oil tank. For this pressure feed, two pumps feed and scavenging are used. This system features a high oil cooling efficiency and is suitable for a high-temperature operating engine. Both oil pumps are of trochoidal design.

E) Omni-phase Balancer

To reduce the vibration of the crankshaft, a pair of balancer weights are provided. The balancer weights are turned by an endless chain coming from the center of the crankshaft.

In addition, the crankshaft is a one-piece forged assembly and ensures high rigidity and better durability.

F) Safety Measures

1) Disc brake

For the front wheel, a hydraulic disc type brake is provided, which is fade-free even after a prolonged period of use.

2) Tire wear indicator

The tire is fitted with a wear indicator, which enables the rider to check the amount of wear on the tire.

3) Brake lining switch

If the rear brake lining wears to less than 2 mm thick, the pilot lamp lights up.

4) Oil pressure warning lamp

When oil pressure rises above 0.1 - 0.2 kg/cm^2 (1.4 - 2.8 psi) the oil pressure warning lamp goes off, indicating proper operation of the lubrication system.

5) Reserve lighting system

a. If either headlight filament burns out, the remaining headlight filament will come on and the "LAMP" light (on instrument cluster) will come on.

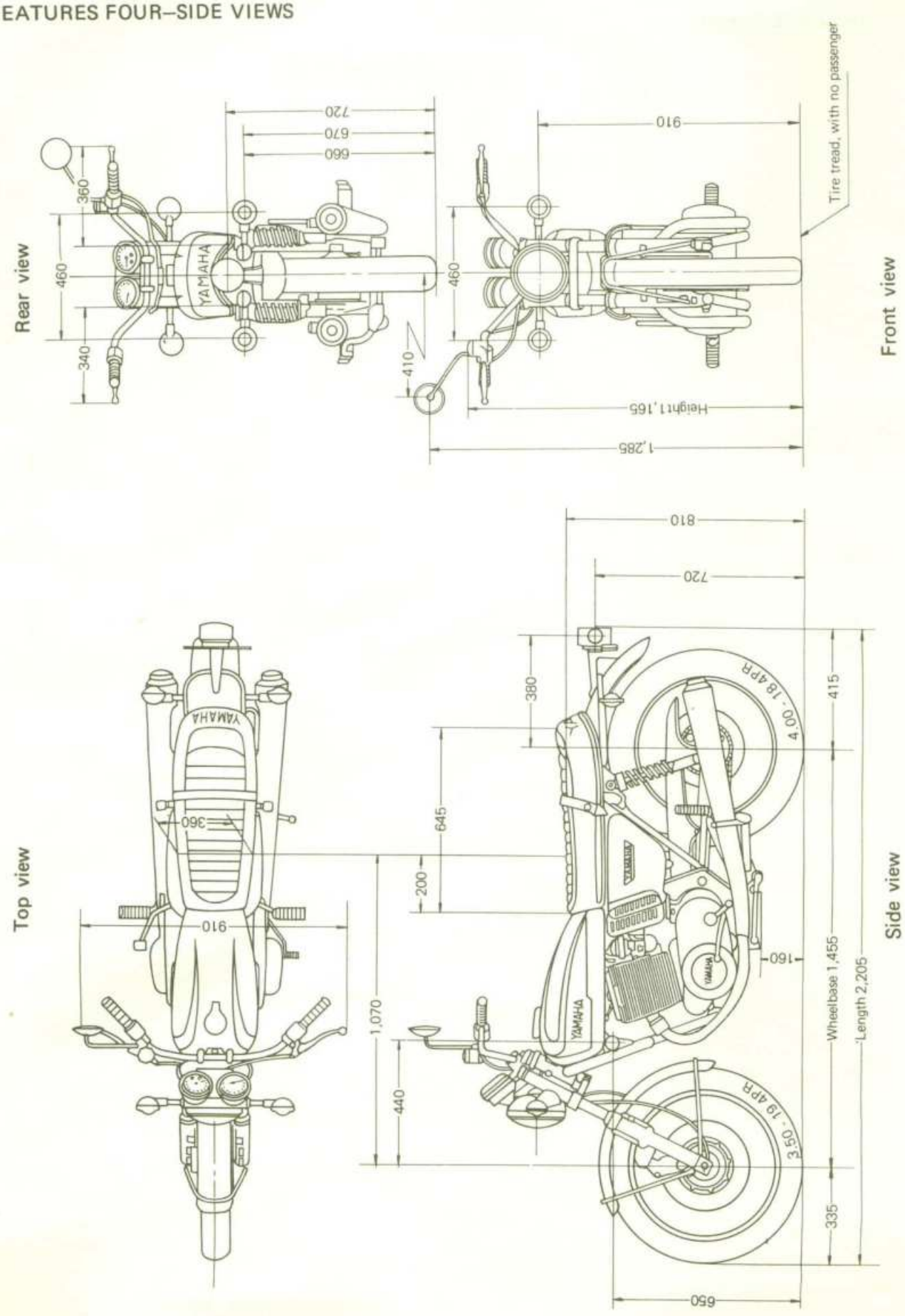
b. If the tail lamp filament burns out the stop lamp filament will automatically come on (at reduced brilliance) and the "TAIL LAMP" indicator (on instrument cluster) will come on (very dim).

GENERAL SPECIFICATION

Model	TX750	
Dimensions:		
Overall length	86.8 in. (2,205mm)	
Overall width	35.8 in. (910mm)	
Overall height	45.9 in. (1,165mm)	
Wheelbase	57.3 in. (1,455mm)	
Min. ground clearance	6.3 in. (160mm)	
Weight:		
Net	463 lbs (210kg)	
Performance:		
Max. speed	120 mph plug (195 km/h plus)	
Fuel consumption (on paved level road)	61.2 mile/US gal. at 37 mph (26 km/ℓ at 60 km/h)	
Climbing ability	26°	
Min. turning radius	94.5 in. (2,400mm)	
Braking distance	46 ft. at 31 mph (14 m at 50 km/h)	
Acceleration performance (SS ¼ mile)	12.3 seconds	
Engine:		
Type	Twin cylinder Air-cooled 4 stroke S.O.H.C.	
Bore and stroke	3.150 in. x 2.913 in. (80mm x 74mm)	
Displacement	45.3 cu.in. (743 cc)	
Compression ratio	8.8 : 1	
Max. power	63 B.H.P/6,500 r.p.m. (63 P.S/6,500 r.p.m.)	
Max. torque	50.6 ft-lbs/6,000 r.p.m. (7.0 kg-m/6,000 r.p.m.)	
Starting system	Electric and kick	
Ignition system	Battery ignition	
Carburetor:	Twin 38mm constant velocity Mikuni	
Air cleaner:	Dry paper x 1	
Transmission:		
Clutch	Wet, multi-disc	
Primary reduction system	Spur gear	
Primary reduction ratio	2.250 (72/32)	
Secondary reduction system	Single row chain	
Secondary reduction ratio	2.352 (40/17)	
Gear box:		
Type	Constant mesh, 5 speed forward	Overall
Reduction ratio 1st	2.461 (32/13)	13.032
Reduction ratio 2nd	1.588 (27/17)	8.408
Reduction ratio 3rd	1.300 (26/20)	6.882
Reduction ratio 4th	1.095 (23/21)	5.798
Reduction ratio 5th	0.956 (22/23)	5.064

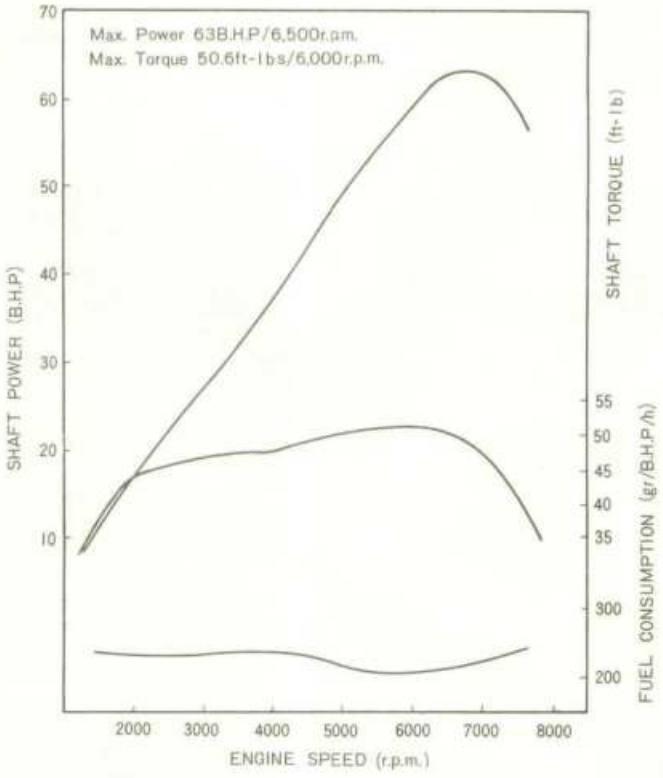
Chassis:	
Frame type	Tubular steel, double cradle type
Suspension system, front	Telescopic fork
Suspension system, rear	Swing arm
Cushion system, front	Coil spring, oil damped
Cushion system, rear	Coil spring, oil damped
Steering system:	
Caster	63 degrees
Trail	3.9 in. (99mm)
Braking system:	
Operation method, front	Hydraulic disc brake (fixed type)
Operation method, rear	Internal expansion, single leading shoe
Tire size:	
Front tire	3.50 - 19 - 4PR
Rear tire	4.00 - 18 - 4PR
Tank capacity:	
Fuel tank capacity	3.7 US gal. (14 liters)
Oil tank capacity	3.2 US qts. (3.0 liters)
Generator:	
Type	Alternator
Model	LD115-03
Manufacturer	HITACHI
Spark plug:	
Manufacturer	N.G.K.
Heat Range	(B-8ES) x 2
Battery:	
Model	(12N16-3B) x 1
Capacity	12V 16 A.H.
Lights:	
Headlight	12V, 50W/40W
Taillight	12V/8W
Stoplight	12V/27W
Flasher light	12V/27W
Parking light Front	12V/5W
Rear	12V/8W
Neutral light	12V/3W
High beam indicator light	12V/3W
Charging light	12V/3W
Flasher pilot light	12V/3W
Meter light	12V/4W x 4
Oil warning light	12V/3W
Taillight warning light (for outage)	12V/3W
Rear brake lining warning light (for wear)	12V/3W
Outage indicator	12V/3W

FEATURES FOUR–SIDE VIEWS



PERFORMANCE CURVES

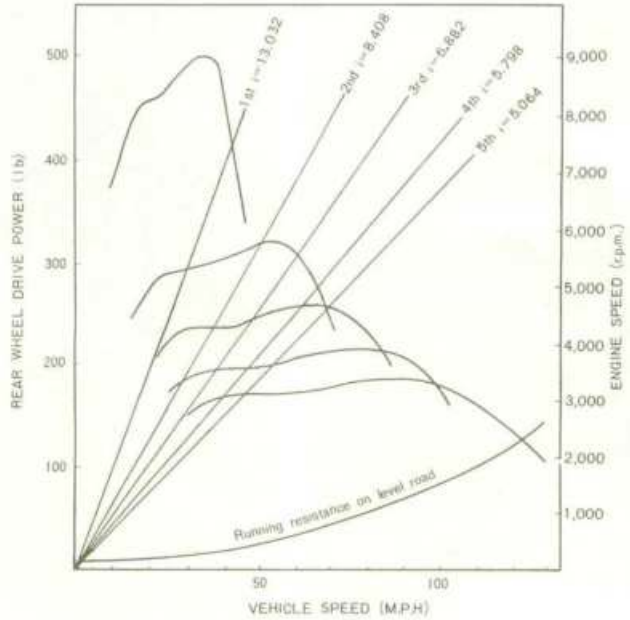
TX750 ENGINE PERFORMANCE CURVES



TX750 DRIVING PERFORMANCE CURVES

Max. Power 63B.H.P/6,500r.p.m.
Max. Torque 50.6ft-lbs/6,000r.p.m.
Primary reduction ratio 72/32 (2.250)
Secondary reduction ratio 40/17 (2.352)
Tire Size (F) 3.50—19—4PR
(R) 4.00—18—4PR

Gear ratio 1st 32/13 2.461
2nd 27/17 1.588
3rd 26/20 1.300
4th 23/21 1.095
5th 22/23 0.956



PERIODIC MAINTENANCE INTERVALS

Page	Item	Remarks	Preoperational Check	Initial				Thereafter every	
				250	500	1,000	2,000	1,000	2,000
91 105	Brake System (Complete)	Chk/Adj as req'd repair as req'd	0		0	0	0		0
66	Clutch	Check/Adjust as required	0		0	0	0		0
117	Battery	Top-Off/Ck spec. gr. as req'd - monthly - or	0	0	0	0		0	0
131	Spark Plug(s)	Inspect/Clean or replace as req'd	0	0	0	0		0	
106	Wheels & Tires	Pressure/Spoke Tension/Runout	0	0	0	0		0	
–	Fittings & Fasteners	Tighten before each trip and/or	0	0	0	0		0	
112	Drive Chain	Tension/Alingment #1	0	0	0	0		0	
65	Engine Oil Level	Unit level/Engine warm	0			0		0	
78	Air Filter					0	0		0
67	Fuel Petcock(s)	Clean/Flush tank as req'd	0	0		0	0		0
132	Ignition Timing	Adjust/Clean or repl. pts. as req'd			0	0	0		0
77	Carburetor Adjustment	Check Operation/Synch./Fittings.			0	0	0		0
76	Carburetor Overhaul	Clean/Repair as Req'd/Refit/ Adjust						4,000	
65	Cylinder Compression	Preventive Maintenance Check			0	0	0		0
–	Decarbonize Engine	Includes Exhaust System					4,000		8,000
31	Camshaft Drive Chain	Adjust Tension		0		0	0		0
65	Oil Filter Element	Replace		0	0	0	0		4,000
–	Oil Filter System	Clean All-Includes Traps, etc.							8,000
26	Valves	Adjust/Regrind per tests as req'd				0	0		0

DRIVE CHAIN: In addition to tension and alignment, chain must be lubricated every 200-250 miles. If unit is subjected to extremely hard usage, such as racing or dirt riding, chain must be checked constantly. See "Lubrication Intervals" for additional details.

LUBRICATION INTERVALS

Page	Item	Remarks	Preop ck	Type	Period						
					Initial				Thereafter every		
					250	500	1,000	2,000	1,000	2,000	4,000
65	Engine Oil Change	Warm engine before draining	0	#1	0	CHK	CHK	0	CHK	0	
112	Drive Chain	Lube/Adjust as req'd	0	#2	See Service Notes P. 7						
112	Drive Chain	Remove/Clean/Lube/Adjust		#2				0		0	
79	Air Filter		0				0	0		0	
–	Control & Meter Cables	All - Apply thoroughly		#3			0	0		0	
–	Throttle Grip & Housing	Light Application		#4				0		0	
–	Tach & Speedo Gear Hsgs.	Light Application		#4				0			0
88	Rear Arm Pivot Shaft	Zirc - Apply until shows		#5				0		0	
–	Brake Pedal Shaft	Light Application		#4				0		0	
–	Change Pedal Shaft	Light Application		#4				0		0	
–	Stand Shaft Pivot(s)	Light Application		#4				0		0	
82	Front Forks	Drain Completely - CK Specs.		#2		CHK		0		CHK	0
85	Steering Ball Races	Inspect Thoroughly/Med. pack		#6				0			0
127	Point Cam Lubr. Wick	Very Light Application		#7				0			0
96	Hyd. Brake Fluid Res.	Use New Fluid Only-Yearly or:		#8	CHK		CHK		CHK		8,000
109	Wheel Bearings.	Do Not Over-Pack		#6				0			0

Service Notes:

#1. For average operation at ambient temperatures of 30-90°F, use SAE 20W-40 type "SE" motor oil.
#2. Use Yamaha chain lube or equivalent. SAE 10W-30 type "SE" motor oil may be used in emergency.
NOTE: Drive chain must be lubricated every 200-250 miles. If unit is subjected to extremely hard usage, chain must be inspected constantly and serviced as required.
#3. Use SAE 10W-30 type "SE" motor oil. (If desired, or at ambient temperatures below 30°F., a graphite base "dry" lubricant of quality manufacture may be used.)
#4. Light duty: Lithium soap base (white) grease, Heavy duty: Standard 90 wt. lube grease (Do not use 90 wt. lube grease on throttle/throttle housing.)
#3. Use standard 90 wt. lube grease - - smooth, not coarse.
#6. Medium-weight wheel bearing grease of quality manufacture - - preferably waterproof.
#7. Light-weight machine oil.
#8. Change yearly or 8,000 miles. Use quality manufacture corresponding to DOT#3 or #4 specifications. Keep clean. Do not allow water, etc., to contaminate. Do not mix types when adding.

PRE–OPERATION CHECK CHART

BRAKES	Check Operation/Adjustment/Hydraulic Reservoir
CLUTCH	Check Operation/Lever Adjustment
ENGINE OIL	Check Tank Level/Top-up as required
DRIVE CHAIN	Check Alignment/Adjustment/Lubrication
BATTERY	Check Electrolyte Level Weekly/Top-up Monthly
SPARK PLUGS	After Break-In-Check Color and Cond'n Weekly
AIR FILTER	Dry Type-Clean Monthly/2,000 miles
WHEELS & TIRES	Check Pressure/Runout/Spoke Tightness/Axle Nuts
FITTINGS/FASTNERS	Check All-Tighten as Nec'y
LIGHTS/SIGNALS	Check headlight/tail-stop lights/turn sigs., etc.

Pre-operation checks should be made each time the machine is used. Such an inspection can be thoroughly accomplished in a very short time; and the added safety is assured is more than worth the time involved.

MAINTENANCE & LUBRICATION CHARTS

Interval recommendations and lubricant types listed in the Maintenance and Lubrication Charts are based upon general averages. Extreme in environment or usage may dictate shorter maintenance intervals, different lubricants or shorter lubrication intervals.
Therefore, all recommendations regarding types and intervals are to be considered a guide only. Intervals should not be exceeded but may be shortened as required. Lubricant types may be up-graded, but never down-graded.

CLEANING AND STORAGE

A. Cleaning

Frequent thorough cleaning of your motorcycle will not only enchance it's appearance but will improve general performance and extend useful life of many components.

1. Before cleaning the machine:
   a. Block off end of exhaust pipe to prevent water entry; a plastic bag and strong rubber band may be used.
   b. Remove air cleaner or protect it from water with plastic covering.
   c. Make sure spark plug(s), gas cap, oil tank cap, transmission oil filler cap and battery caps are properly installed.
2. If engine case is excessively greasy, apply degreaser with a paint brush. Do not apply degreaser to chain, sprockets, or wheel axles.
3. Rinse dirt and degreaser off with garden hose, using only enough hose pressure to do the job. Excessive hose pressure may cause water seepage and contamination of wheel bearings, front forks, brake drums, and transmission seals. Many expensive repair bills have resulted from improper high-pressure detergent applications such as those available in coil-operated car washes.
4. Once the majority of dirt has been hosed off, wash all surfaces with warm water and mild, detergent-type soap. An old tooth brush or bottle brush is handy to reach those hard-to-get-to places.
5. Rinse machine off immediately with clean water and dry all surfaces with a chamois skin, clean towel, or soft absorbent cloth.
6. Immediately after washing, remove excess moisture from chain and lubricate to prevent rust.
7. Chrome-plated parts such as handlebars, rims, spokes, forks, etc., may be further cleaned with automotive chrome cleaner.
8. Clean the seat with a vinyl upholstery cleaner to keep the cover pliable and glossy.
9. Automotive-type wax may be applied to all painted and chrome-plated surfaces. Avoid combination cleaner-waxes. Many contain abrasives which may mar paint or protective finish on fuel and oil tanks.
10. After finishing, start the engine immediately and allow to idle for several minutes.

B. Storage

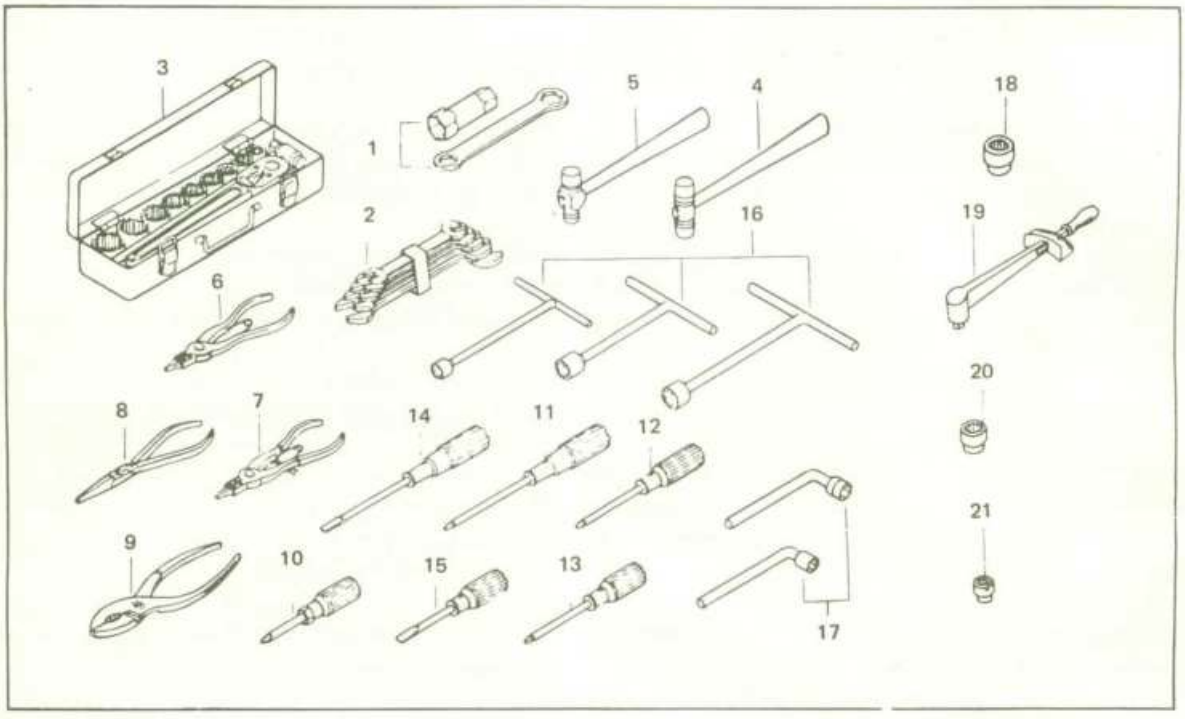
Long term storage (30 days or more) of your motorcycle will require some preventive procedures to insure against deterioration. After cleaning machine thoroughly, prepare for storage as follows:

1. Drain fuel tank, fuel lines, and carburetor float bowl(s).
2. Remove empty fuel tank, pour a cup of 10W to 30W oil in tank, shake tank to coat inner surfaces thoroughly and drain off excess oil. Reinstall tank.
3. Remove spark plug(s), pour about one tablespoon of 10W to 30W oil in spark plug hole(s) and reinstall spark plugs. Kick engine over several times (with ignition off) to coat cylinder walls with oil.
4. Remove drive chain. Clean thoroughly with solvent and lubricate with graphite-base chain lubricant. Reinstall chain or store in a plastic bag (tie to frame for safe-keeping).
5. Lubricate all control cables.
6. Remove battery and charge. Store in a dry place and re-charge once a month. Do not store battery in an excessively warm or cold place (less than 32°F or more than 90°F).
7. Block up frame to raise both wheels off ground. (Main stands can be used on machine so equipped.)
8. Deflate tires to 15psi.
9. Tie a plastic bag over exhaust pipe outlet(s) to prevent moisture entering.
10. If storing in humid or salt-air atmosphere, coat all exposed metal surfaces with a light film of oil. Do not apply oil to rubber parts or seat cover.

SERVICE TOOLS

The following additional tools are required to service the YAMAHA TX750.

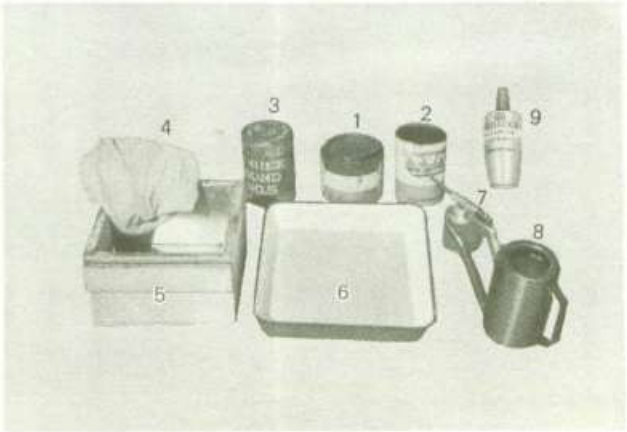
1. Standard Tools



1. Plug wrench
2. Open-end wrenches
3. Socket wrenches
4. Soft-faced hammer
5. Steel hammer
6. Circlip pliers ST type
7. Circlip pliers RT type
8. Needle nose pliers
9. Pliers
10. Phillips-head screwdriver (Small)
11. Phillips-head screwdriver (Large)
12. Phillips-head screwdriver (Medium)
13. Phillips-head screwdriver (Small)
14. Slot-head screwdriver (Medium)
15. Slot-head screwdriver (Small)
16. T-type socket wrench
17. L-type socket wrench
18. 29mm socket (for Torque wrench)
19. Torque wrench
20. 13mm Socket (for Torque wrench)
21. 10mm Socket (for Torque wrench)

In addition to the above tools, the YAMAHA electrotester, tachometer (engine speedometer) and battery specific gravity hydrometer are required.

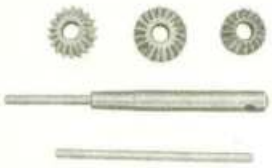
2. Miscellaneous



1. Grease
2. YAMAHA 4 stroke oil or Motor oil 20W-40 ("SE")
3. YAMAHA Bond (No.4 and No.5)
4. Wiping materials
5. Overhauling stand
6. Parts tray
7. Oil jug
8. Oil cup
9. Lock tite

3. Special Tools

①
②
③
④



⑤



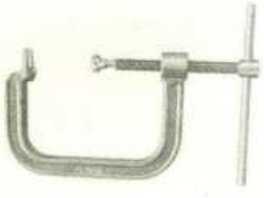
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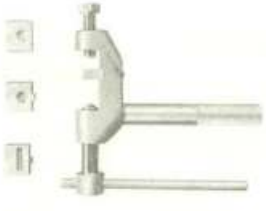
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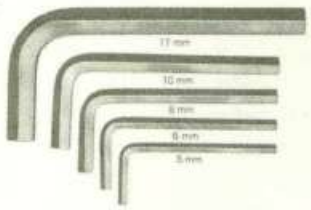
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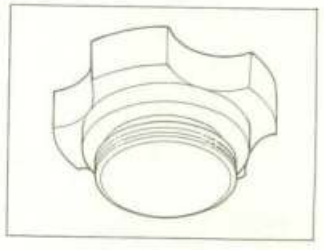
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Valve seat cutters: (1 ~ 4)
1. 45° – 40mm dia. (intake)
2. 45° – 34mm dia. (exhaust)
3. 65° – 42mm dia. (exhaust/intake)
4. Seat cutter pilot 8.0mm
5. Valve guide installation and removal tool
6. Cam chain link cutter
7. Cam chain link riveter
8. Valve spring compressor
9. Piston ring compressors
10. Piston support plates
11. Rotor puller
12. Clutch holding tool
13. Drive chain link cutter
14. Hexagon wrenches (5, 6, 8, 10, 17mm)
15. Rocket arm shaft puller
16. Balancer shaft puller
17. Governor checking attachment
18. Pump shaft oil seal installing tool

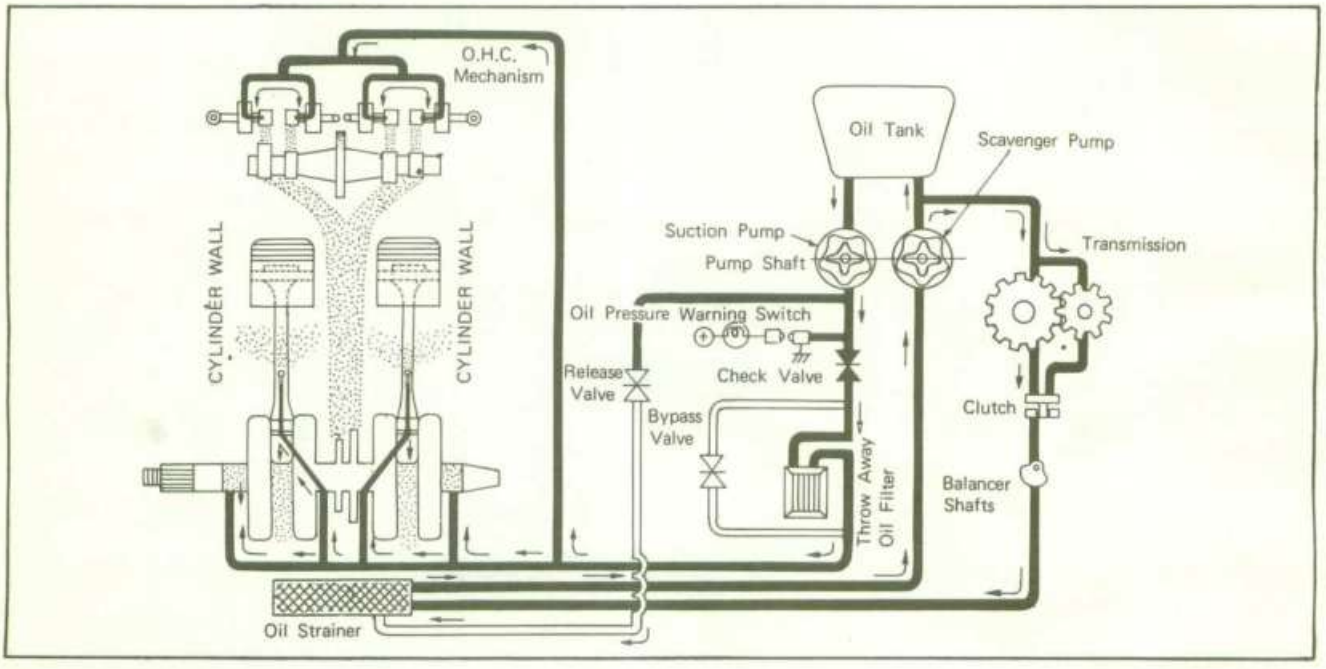
NOTE: See, also, Service and Parts News Bulletin Appendix.

DRY SUMP SYSTEM

Description

The TX750 dry sump system utilizes a suction pump to draw oil from the oil tank to the pump. The oil is then pressure-fed through the oil filter to the crankshaft and overhead camshaft mechanism.
From the camshaft, oil drops to the oil strainer area in the bottom of the engine. Additionally, crankshaft lubricating oil is forced out spigots in the rod lower ends where it is then flung onto the cylinder walls. After lubricating the cylinder walls, excess oil drops to the oil strainer area.
A scavenging pump is connected to the strainer. This pump has 25% more pumping capacity than the suction (delivery) pump. All excess oil is picked up and forced back to the oil tank. Prior to delivery to the tank, a portion of the return oil is routed to the transmission, clutch, and balancer shafts.

OIL DELIVERY SCHEMATIC



Features and Advantages

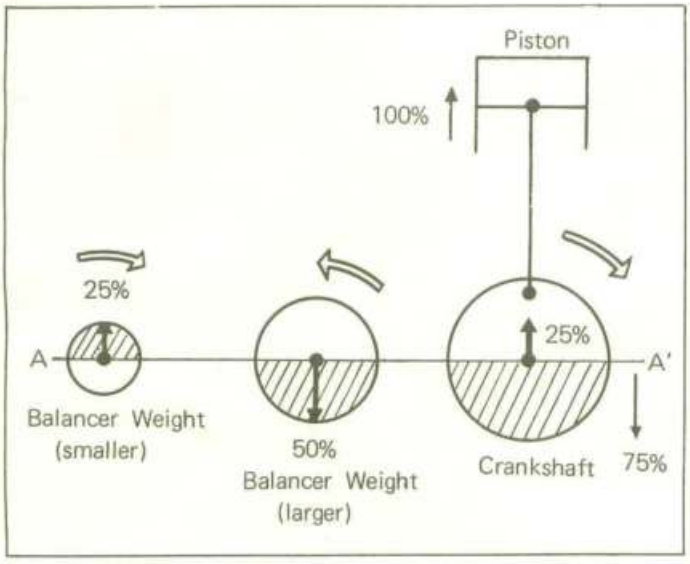
1. With no storage space needed within the engine, a lower overall height is allowed; improving looks, balance, and overall design.
2. With the dry sump system, as utilized in the TX750, lubricating oil is kept separate from the engine. This allows for more heat dissipation.
3. Filtered oil is fed to the engine by the trochoidal suction pump at a rate of over one gallon per minute with a minimum pressure of 15-20 psi at normal cruising speeds (approximately 4,000 rpm). This is considerably more than previous designs.
4. The oil pressure warning switch, which is located directly after the suction (delivery) pump, will operate immediately if oil pressure drops below approximately 5.5-6.0 psi. This provides an immediate warning should loss of pumping action occur for any reason.
5. Transmission, clutch, and balancer mechanism lubricating oil must pass through the filtering system prior to being sent to the camshaft and crankshaft. This improves lubricating oil quality and assures longer component life for these vital parts.
6. The check valve is located within the delivery circuit to prevent oil tank drainage through the suction pump when the machine is idle, thereby preventing "wet-sumping" of the engine. Additionally, the bypass valve mechanism in the filter circuit will function automatically should any blockage occur in this vital area, thereby assuring constant oil supply to all engine components.
7. The cartridge-type oil filter as installed on the TX750, assures ease of maintenance and an over-size filtering capacity. This extra capacity provides cleaner lubricating oil for longer engine life.
8. The connecting rod spigots (oil outlet holes) provide for a high pressure oil supply to the cylinder walls, supplementing and improving upon previous "splash" type systems.

OMNI–PHASE BALANCER

Description

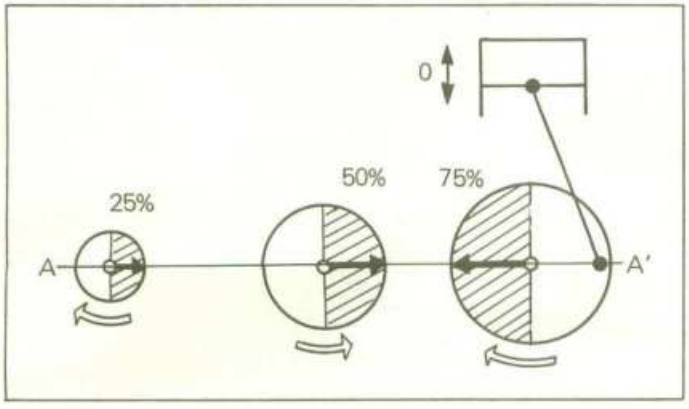
In a parallel twin-cylinder reciprocating engine, two types of vibrations are generated. One is the primary inertia force of reciprocating parts and the other is the rocking couple of revolving engine components.
The primary inertia force generated by a reciprocating piston causes a vertical vibration with a frequency equal to the rotation speed of the crankshaft, whereas the rocking couple of the revolving internal mechanism of the engine gives rise to vibration in reference to the center of gravity of the whole engine unit. These two types of vibrations are the main factors in overall engine vibration and can be counterbalanced to a great extent by means of special balancing devices. The Omni-phase balancer is such a device and is employed in the Yamaha TX750 in order to reduce engine vibration.

Method of Operation



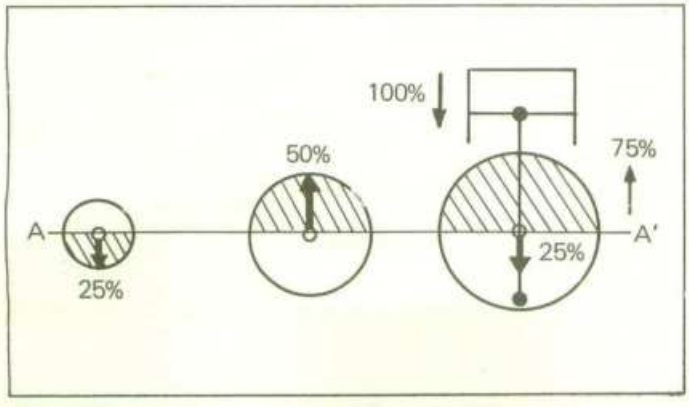
1. Zero degree crank angle

At this crank angle, the upward inertia force generated by the piston is taken as 100%, but it is reduced to 25% by the 75% inertia force of the crank web moving downward. On the other hand, the larger balancer weight generates an inertia force of 50% in a downward direction, and the smaller balancer weight an inertia force of 25%. The net result is (+25) + (-50) + (+25) = 0*. That is, the inertia forces completely counterbalance each other.
(*It is assumed that the crankshaft, larger and smaller balancer weights are arranged coaxially on the A-A' axis.)



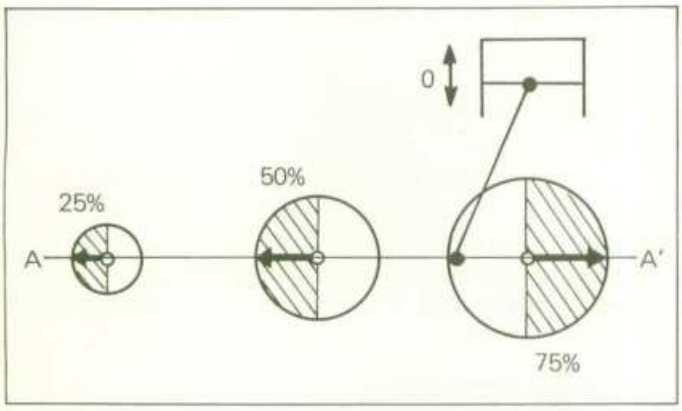
2. At the 90° crank angle

At this crank angle, the vertical inertia force of the piston is zero, but the leftward inertia force of the crank web is 75%.
Accordingly, if both larger and smaller balancer weights generate a total inertia force of 75% in the direction opposing the inertia force of the crnak web, the net result is zero.



3. At the 180° crank angle

At this crank angle, the downward inertia force of the piston is taken as 100%, but it is reduced to 25% by the 75% upward inertia force of the crank web. At the same time, the larger balancer generates an inertia force of 50% in an upward direction and the smaller balancer weight 25% in a downward direction. The net result is zero.

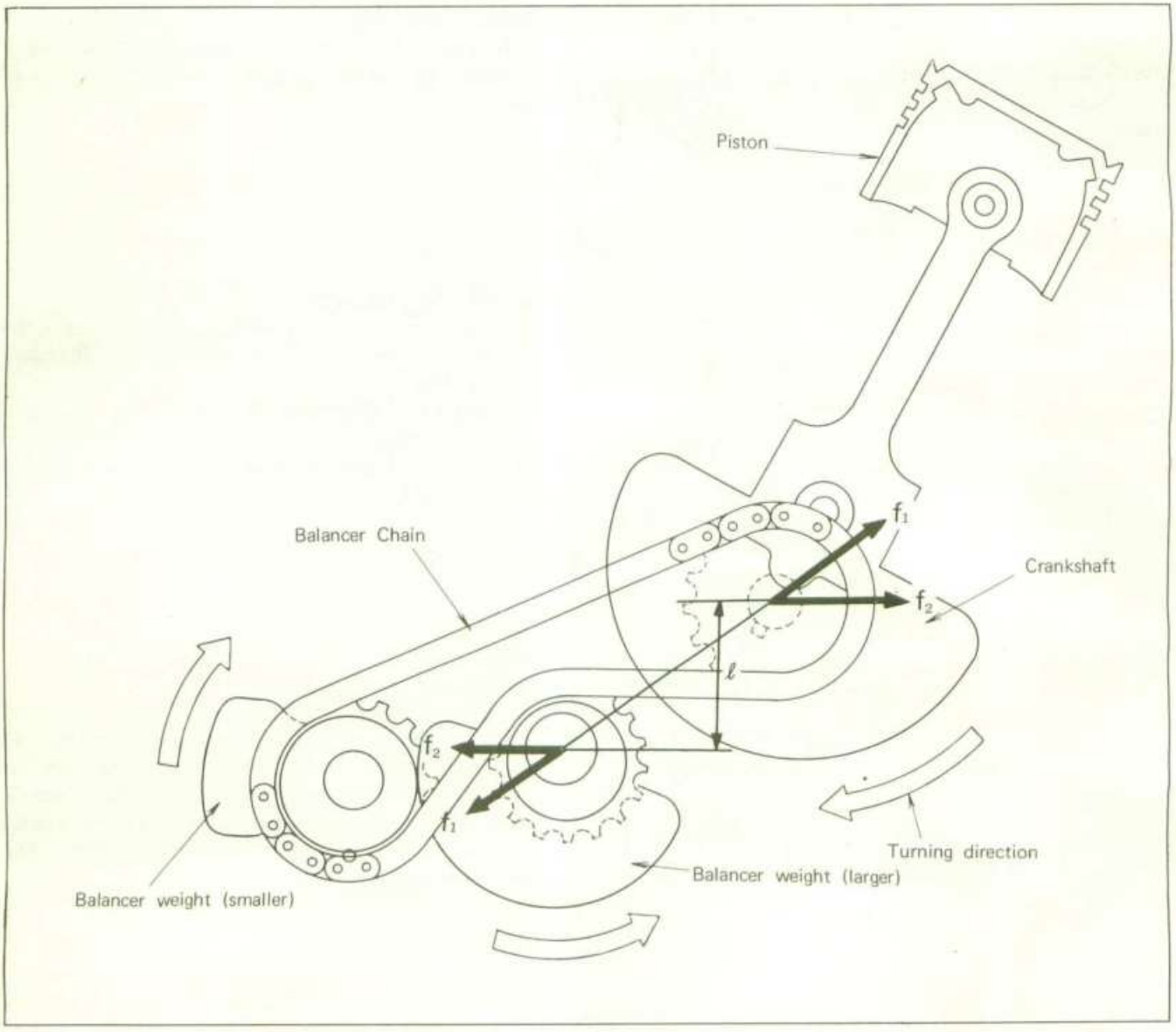


4. At the 270° crank angle

As in the case of the 90° crank angle, the vertical inertia force of the piston is zero, but the rightward inertia force of the crank is 75%. At the 270° crank angle, the larger balancer weight generates a leftward inertia force of 50% while the smaller balancer weight 25% in the same direction. The net result is zero.

As discussed previously, the primary inertia forces of the engine are counterbalanced by means of both larger and smaller balancer weights, but in the actual engine, the crankshaft and balancer shafts are not coaxially arranged on the axis A-A. For this reason, a rocking couple $f_2 \times \ell$ is generated in reference to the engine's center of gravity, as illustrated in the construction diagram.

To eliminate this rocking couple, the mass ratio of the two balancer weights, as well as the relative positions of the primary inertia forces generated, are varied accordingly.



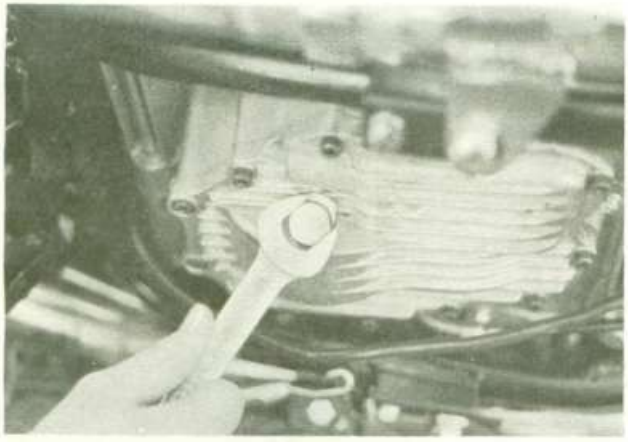
2. ENGINE

REMOVING THE ENGINE FROM THE FRAME

1. Remove the drain bolt from the crankcase bottom, and drain off any residual oil in the crankcase bottom.

Note:
When reassembling the engine, be sure to install the drain bolt gasket. The drain bolt should be tightened until firmly seated.

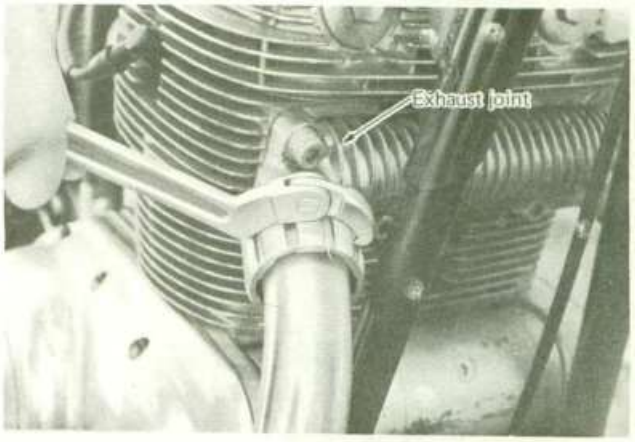
Tightening torque: 4.0 ~ 4.5 kg-m
(350~400 in-lbs.)



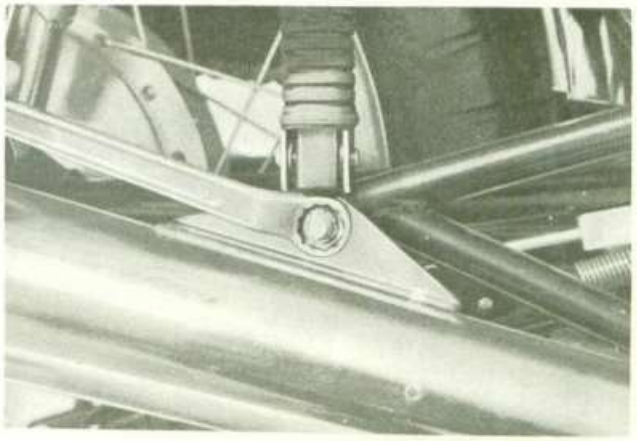
2. Remove the drain bolt from the bottom of the oil tank and drain.
To drain the oil quickly, it is advisable to remove the oil tank cap.



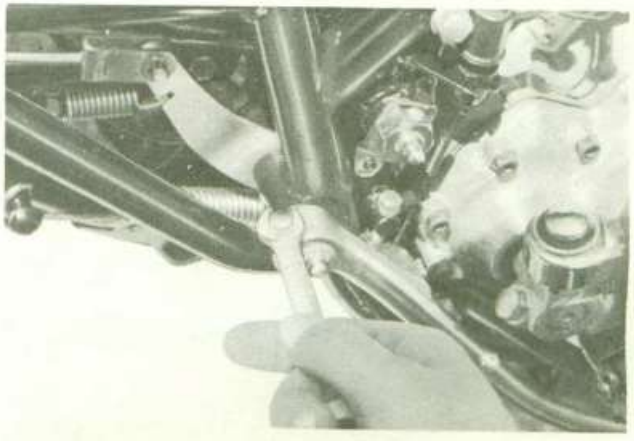
3. Remove the ring nut with the exhaust pipe ring nut wrench. Take care not to lose the exhaust joint gasket.



The exhaust pipe is held at the ring nut and at two other places with bolts and nuts. It is necessary to remove them and next remove the exhaust joint with an internal hexagon wrench.

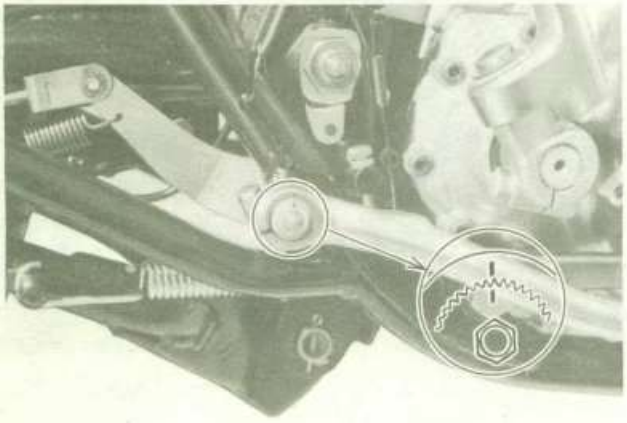


4. Remove the brake pedal
First remove the stop switch hook from the brake pedal, and then remove the brake pedal holding bolt.



When installing the brake pedal, the punched mark on the brake pedal should be alinged with the punched mark on the brake shaft end, and then they should be fitted together at the serrated portions.

Caution: See Service Bulletin Appendix.



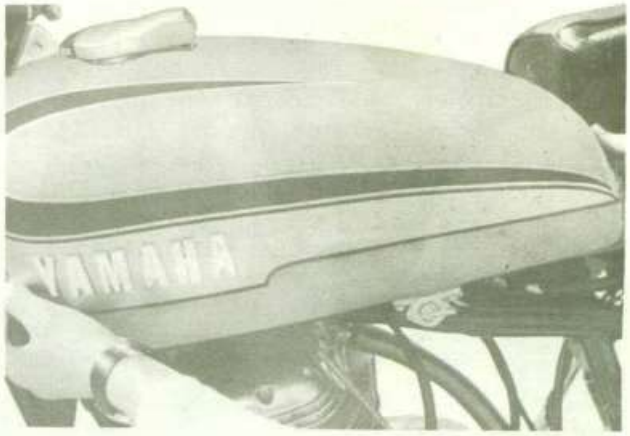
5. Remove the foot rests
   The foot rests are held with engine mounting bolt. Remove the nut, and pull out the bolt, both foot rests can be removed at the same time.



6. Remove the side cover (L).



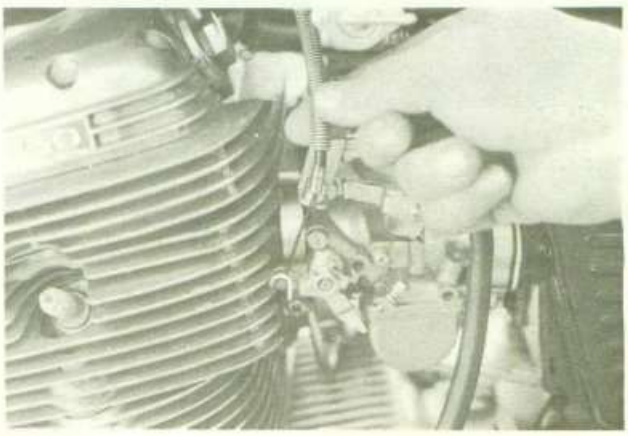
7. Turn both fuel petcock to STOP.
   Disconnect the fuel pipes at the fuel petcocks and raise the seat. Lift the rear of the tank, then slide the tank back to free it from the front tank mounts.



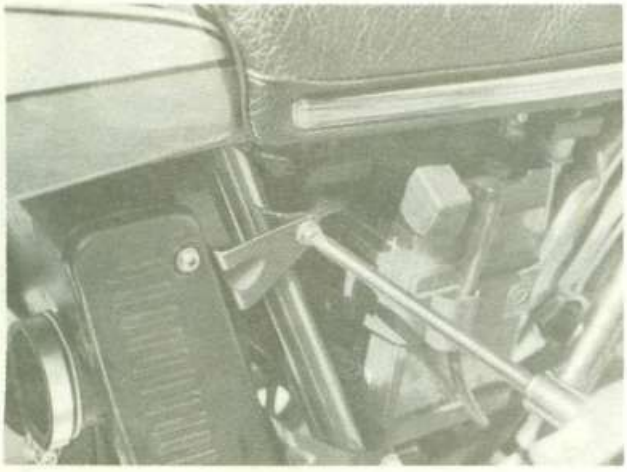
8. Fully loosen the air cleaner joint bands and carburetor joint bands.



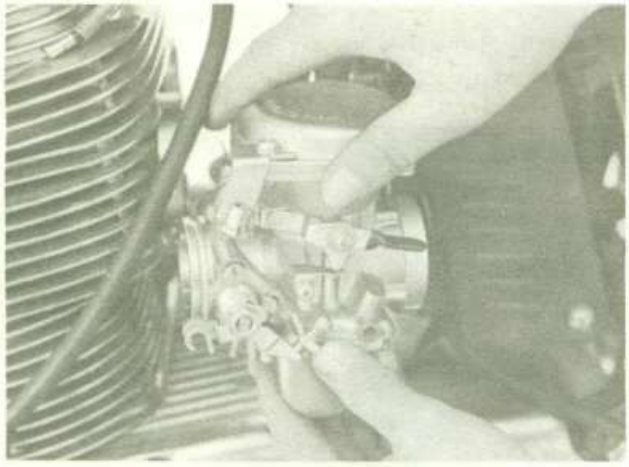
9. Fully open carburetor butterfly valves with the fingers to slacken the throttle wires, and then remove the throttle wires from the carburetors.



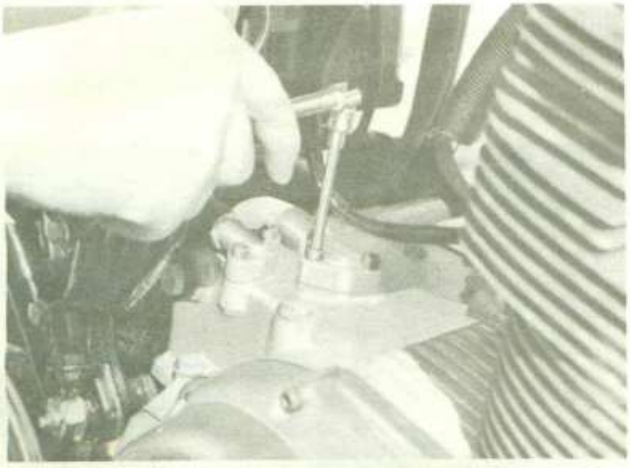
10. Remove the air cleaner case mounting screws. Next, pull air cleaner case backwards, and out towards you.



11. Remove the carburetors.



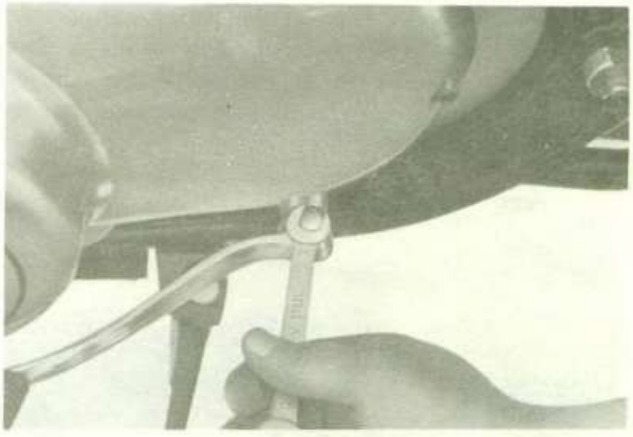
12. Remove the oil pipes (for suction and scavenger pumps) with a 5-mm internal hexagon wrench.
The oil pipes removed from the upper crankcase should be held properly until the engine is demounted.



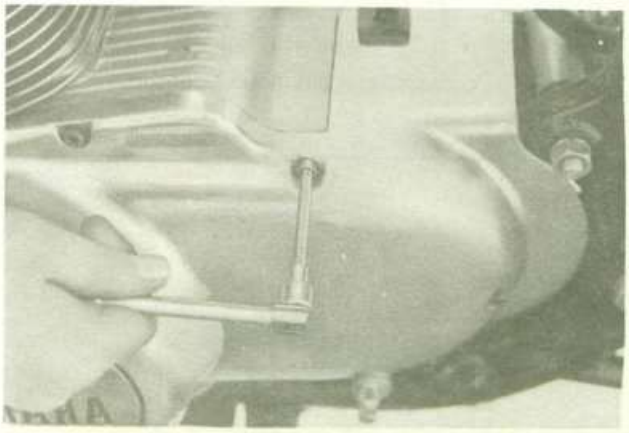
13. Disconnect the neutral lead wire, oil pressure switch lead wire and wires coming from the generator at the couplers.



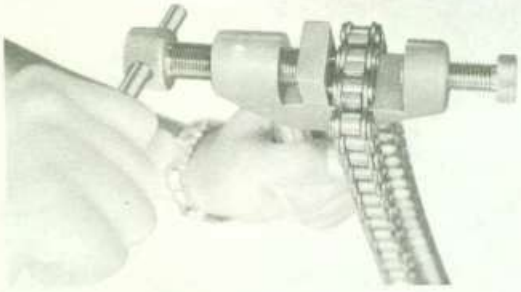
14. Remove the change pedal
When installing the change pedal, it should be positioned properly by taking into consideration the relative position from the foot rest.



15. Remove the crankcase cover (L) with a 5-mm internal hexagon wrench.
When installing the crankcase cover (L), take care not to allow the lead wires coming from the generator to slip out of the waterproofing grommet.

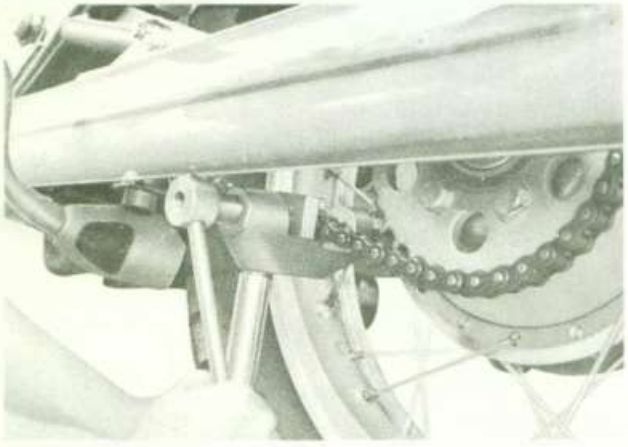


16. Disconnect the drive chain.

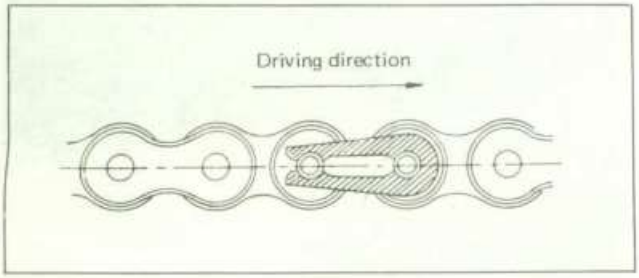


a) Removing the Chain
Fit the special tool with the adapter for removing the chain. Then place the chain joint on the special tool and put apart the chain by screwing in the pulling bolt.

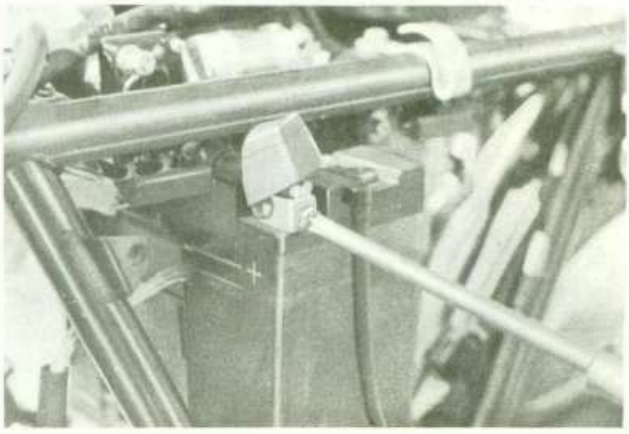
b) Installing Chain
Joint the chain ends on the rear wheel sprocket using a joint. Place the chain joint on the sprocket where it is easier to use the special tool. Use the special tool with a chain installing adapter to press the new joint plate by screwing in the pulling bolt.



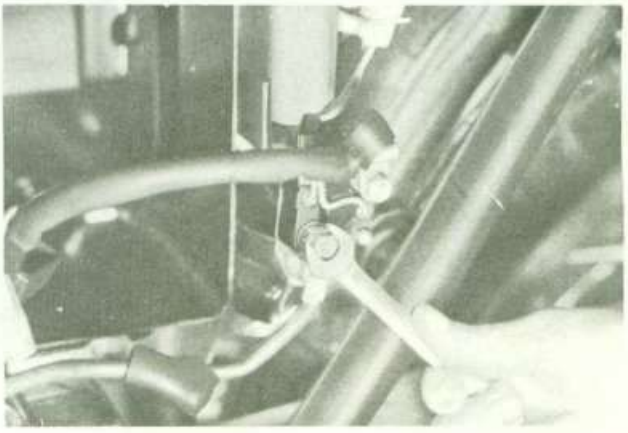
The drive chain clip should be installed as illustrated below. If it is installed in the opposite direction, it may contact adjacent parts and slip off.



17. Remove the battery band, and pull out the battery halfways toward you. Then disconnect the positive lead wire from the battery. Then pull out the battery, and disconnect the negative lead wire.
Refer to the electrical wiring diagram.



18. Remove the starter motor lead wires at the starter switch. Remember exactly where the lead wires are threaded through.



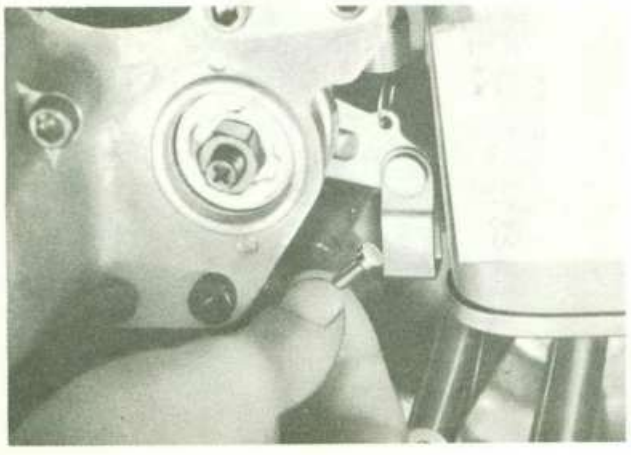
19. Remove the tachometer cable holding clip, and pull the cable out.

Note:
When installing the tachometer cable, grease the "O" ring, and make sure that the clip is firmly in position.



20. Turn the clutch cable length adjuster on the clutch lever all the way in. Align all of the cable access slots. Squeeze in on the clutch lever while holding firmly onto the cable outer housing. (Actuates clutch and lengthens inner cable)
Release the clutch lever while simultaneously pulling back on the outer cable housing.
The cable ferrule will be pulled back and can now removed from its seat in the cable length adjuster.
Next disconnect the clutch cable at the joint of the push lever ass'y.

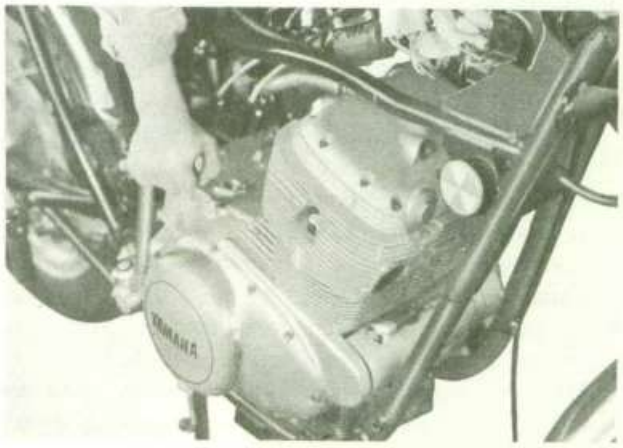




21. Remove the engine mounting bolts and brackets.



22. Hold the cylinder exhaust port with your left hand and the kick crank with your right hand, and then demount the engine from the right side of the motorcycle.

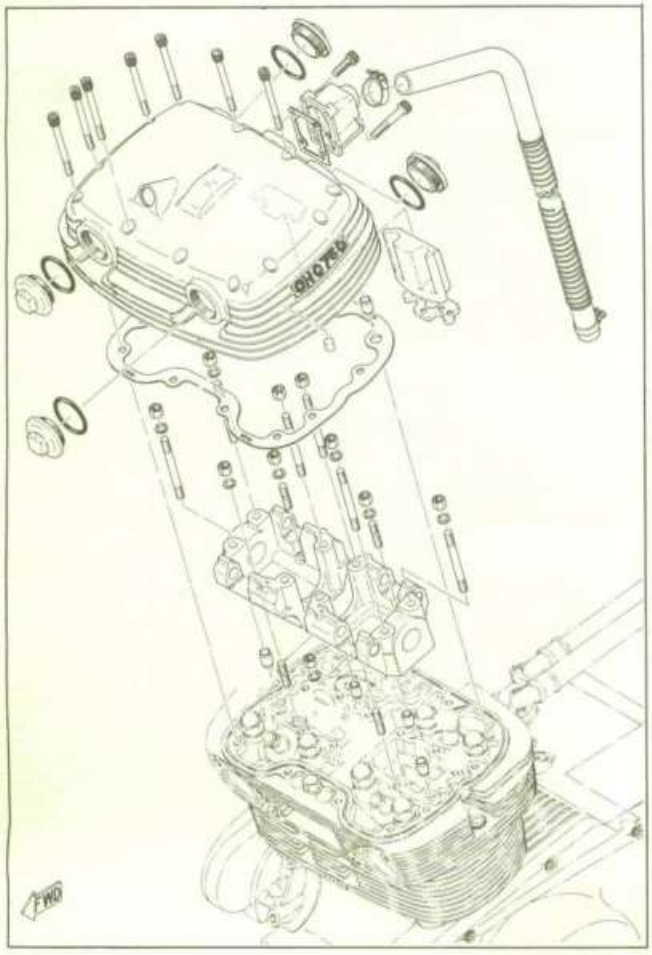


ENGINE DISASSEMBLY NOTES:

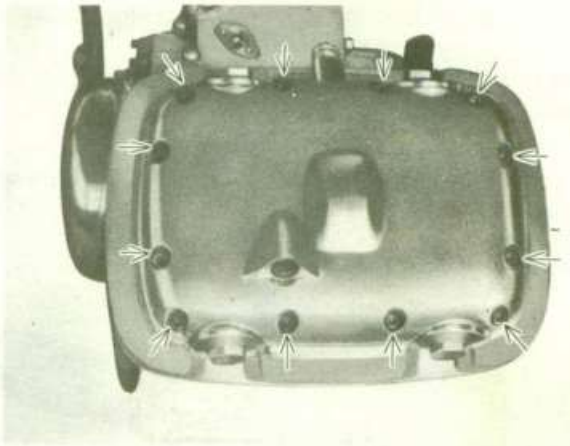
1) Keep all parts in separate sections to aid in reassembly.
2) All gaskets, cotter pins, O-rings, and circlips, if damaged or worn, should be replaced.
3) Always use proper tools (as listed in the Tools Section) and proper repair techniques. A set of metric Allen wrenches must be available for Allen head screws.
4) Clean all parts with solvent, and if any part has a drilled oil passage, blow the passage out with compressed air.
5) Tighten all nuts and bolts in proper rotation (in cases such as head nuts or case bolts) beginning with the larger bolts (if any) and then going back over and tightening the smaller bolts in the proper sequence.
6) Always check the torque specifications section for correct torque, and use a torque wrench.
7) After completing each section check to make sure every procedure has been done properly and completely to avoid having to go back and do it again.
8) Occasionally, after several hours of operation on a rebuilt engine, oil leaks will develop. This is caused by gasket compression. Re-torque all cylinder holding bolts, should this occur.

CYLINDER HEAD COVER

Disassembly

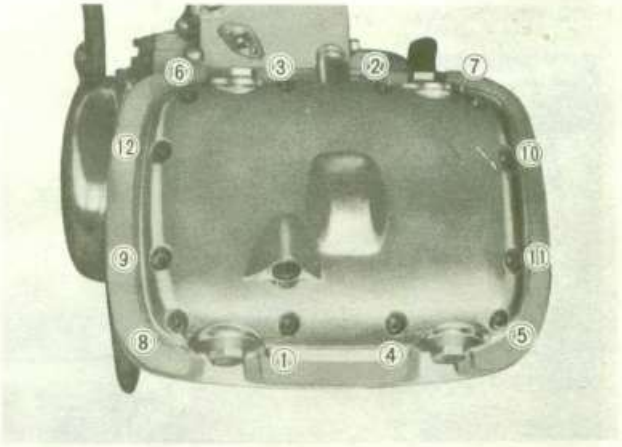


1. Remove the hexagon bolts holding the cylinder head cover.



Installation

1. Use a torque wrench for tightening the bolts. The bolts should be tightened crosswise in steps and finally with correct light torque (0.8 ~ 1.0 kg-m) (72 ~ 90 in-lbs.)



Note:

When installing the cylinder head cover, make sure that the tachometer drive gear is in correct mesh with the mating gear. If not, slightly move the tachometer drive gear for adjustment.

CYLINDER HEAD

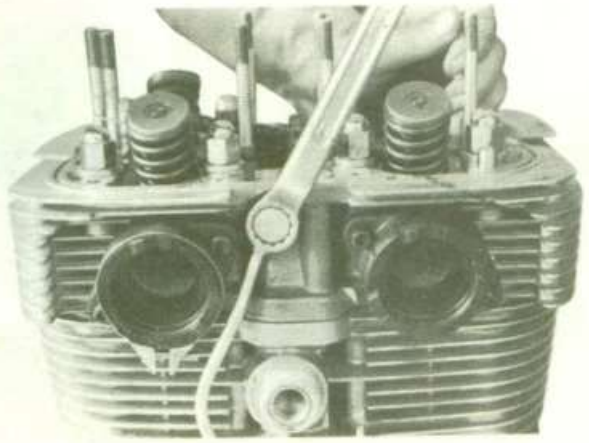
The cylinder head consists of

1. Oil delivery line (connected to head at top)
2. Rocker arm shaft
3. Cam shaft bracket (L.R)
4. Rocker arm
5. Cam shaft
6. Cylinder head
7. Valve spring
8. Valve (Ex, In)
9. Valve guide

1) Oil Delivery Line

The oil delivery line is located at the rear of the cylinder. Disconnect it at the crankcase and at the cylinder head where it is held in place by a banjo bolt.

Tightening torque for the banjo bolt is 2.0~2.3 kg-m. (180~207 in-lbs)



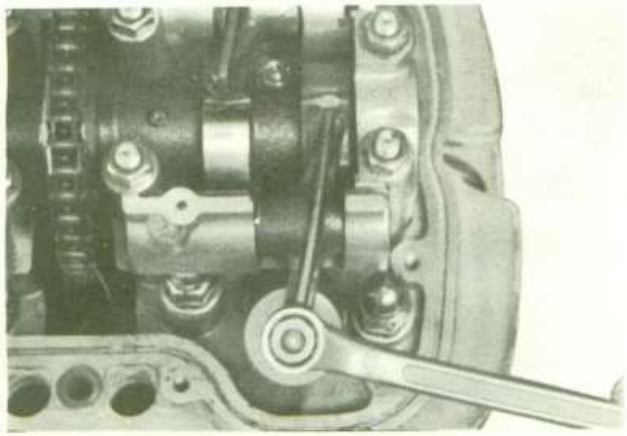
2) Rocker Arm Shaft, Rocker Arm

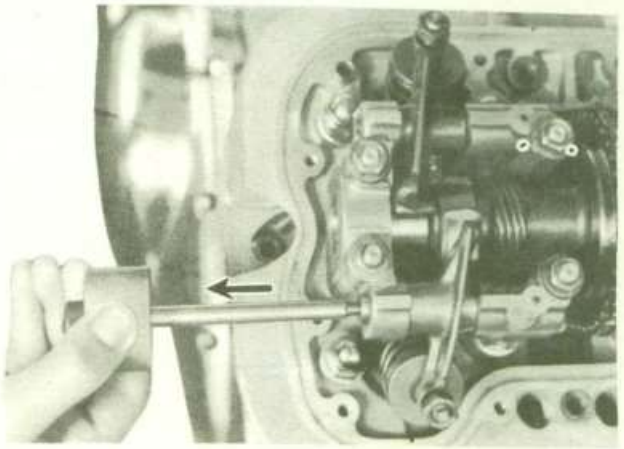
Set the special tool and withdraw the rocker shaft. It should slide out easily. Lift the rocker arm out of the way. Repeat this procedure for each rocker assembly.

Note:

Keep each mating rocker arm and shaft assembly separated. Reinstall them as a unit.

Fully loosen the adjust screw of the rocker arm before pulling out the rocker arm shaft.





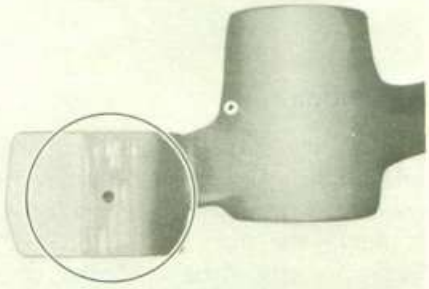
Inspection

1) Rocker Arm and Rocker Arm Shaft Wear

a) The rocker arm usually wears at two spots: (1) at the rocker arm shaft hole where it rubs against the rocker arm shaft, and (2) at the cam lobe contacting surface.

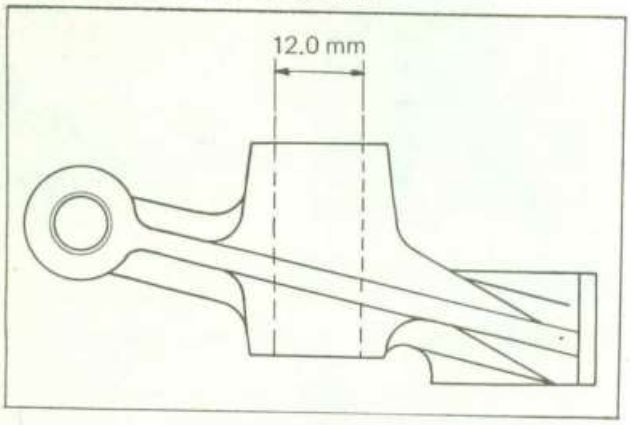


b) Check the cam lobe contacting surface of the rocker arm for grooved wear in the surface, for deep and obvious scratches, flaking of the hardened surface, or a blue discoloration of the metal (obvious evidence of too much heat). Check the mating cam lobes in the same manner.



c) If any grooved wear is readily apparent, replace the rocker arm. Do not try to repair the surface by cleaning with an oil stone or emery cloth as this will change the curvature of the follower and thereby the rate of valve opening.

d) Measure the rocker arm shaft hole in the rocker arm Standard size is 12.0mm.



e) Rocker arm shaft diameter measures 12.0mm when new.
The shaft has been hardened and it should not wear excessively. If a groove has developed in its surface that can be felt, or if it shows a blue discoloration, then the shaft should be replaced and the lubrication system (pump and passages) checked.



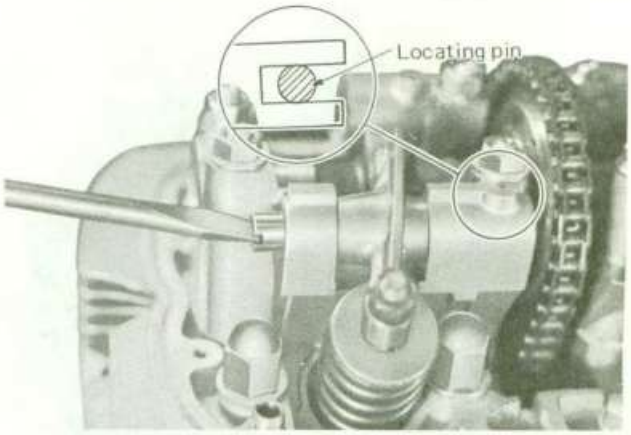
f) Standard clearance between the rocker arm shaft and hole should be 0.03mm. If measurement shows more than 0.10mm clearance, replace either or both parts as necessary.

	Clearance	Wear limit
Rocker arm/Rocker arm shaft	0.03 mm	0.10 mm

Installation

Reinstall the shafts using a 6mm screw. That way, the threaded hole will be properly positioned for future disassembly, without the hole and screw it is very difficult to remove the shaft.
The rocker arm shafts and rocker arm slippers should be oiled thoroughly. After installing the rocker arms, adjust the valve clearance. For details, refer to valve clearance Adjustment (Page30).

Note:
Insert the rocker arm shaft into the camshaft bracket so that **its end fits into a locating pin inside the camshaft** bracket. If it is not in correct position, turn the rocker arm shaft to align the pin and slot with a screw driver.

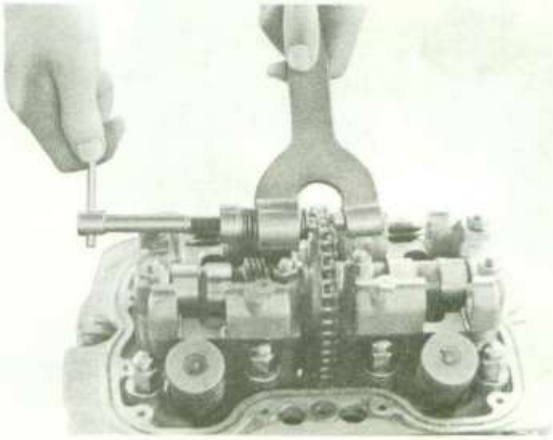


CAM CHAIN, CAMSHAFT BRACKET, CAMSHAFT

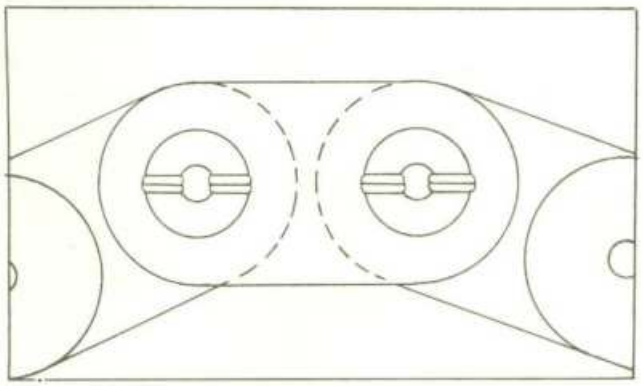
1) Cam Chain

a) The single row cam drive chain connects the camshaft to the crankshaft. The chain is "endless" in that there is no master link to disassemble it, other than the link riveted at the factory when the chain was first installed.

b) A chain cutter (in Special Tool kit) must be used to remove a selected link. Place a rag around the sprocket to prevent metal chips from falling into the engine.

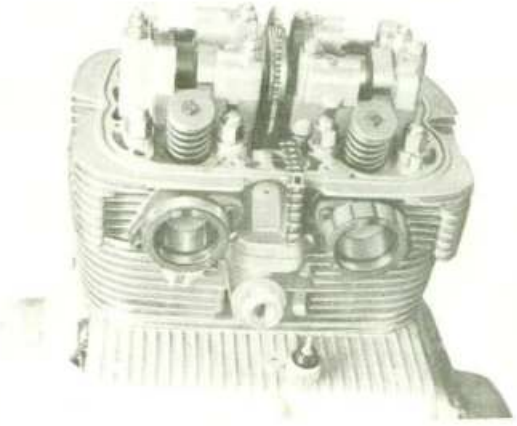


c) Separate the chain link that was originally riveted at the factory. The rivet heads on this link have punch marks and slots across the heads.



Caution

d) Attach a wire to a chain link on each side of the link to be separated. Do this before separating the chain to prevent the chain from dropping into the crankcase. After separating the chain anchor retaining both wires to prevent the chain from dropping down.

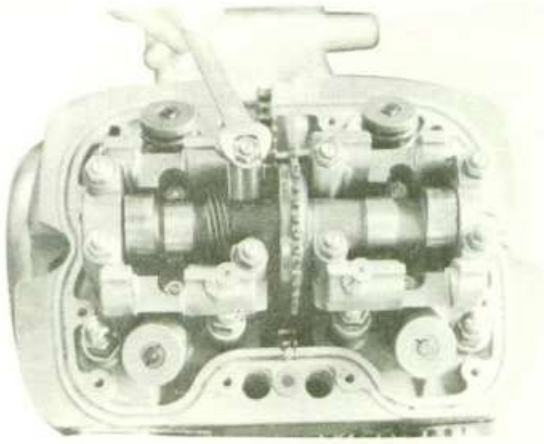


e) Remove the chain, clean it in solvent, then examine for wear.

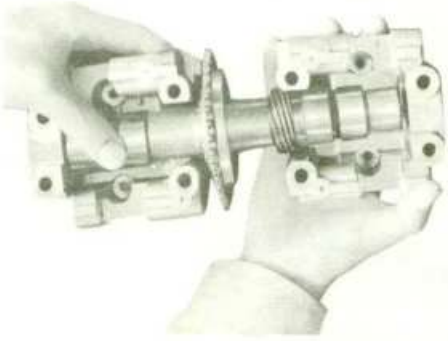
If the engine is not to be disassembled, pull a length of wire through with the chain during removal in order to provide a means of reinstalling the chain after cleaning and checking.
It is also a good idea to have a mechanic's mechanical claw on hand to help feed the chain around the guide bars on the lower drive sprocket during reassembly.

2) Camshaft Bracket

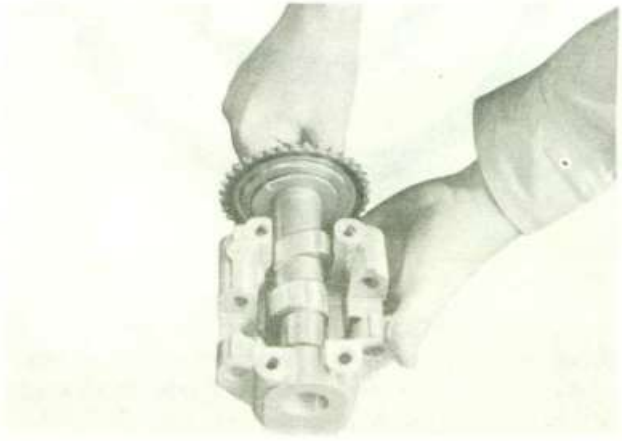
a) Remove the camshaft brackets and cam shaft as an *assembly*.
Take care not to allow nuts, and washers to fall in the crankcase.



b) Remove the camshaft bracket (R).
For removal, first pull out the camshaft bracket (R) to the right side taking care not to allow the cam heel to contact the bracket.

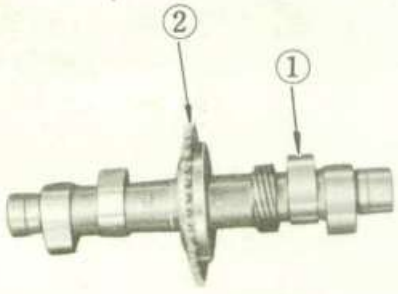


c) Remove the camshaft braket (L).
When the intake cam lift and exhaust cam lift are in the positions as shown below, removal is the easiest.

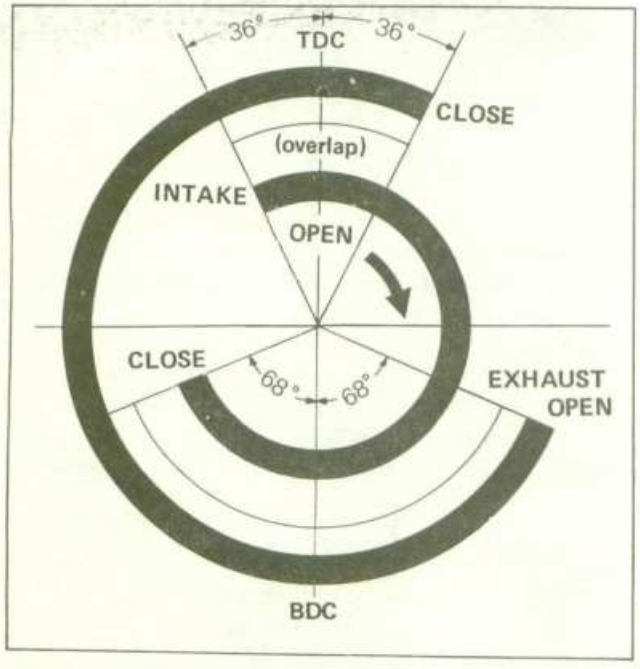


3) Camshaft

The engine uses a single overhead camshaft. All four cam lobes (2 intake and 2 exhaust) are located on one shaft. The cam lobes have been specially tempered to resist wear. The camshaft is connected to the crankshaft by a single row endless chain. Sprocket ratio is 2 : 1, which turns the camshaft at half crankshaft r.p.m. The camshaft is supported on top of the cylinder head.



1. Cam lobes
2. Camshaft sprocket (teeth)



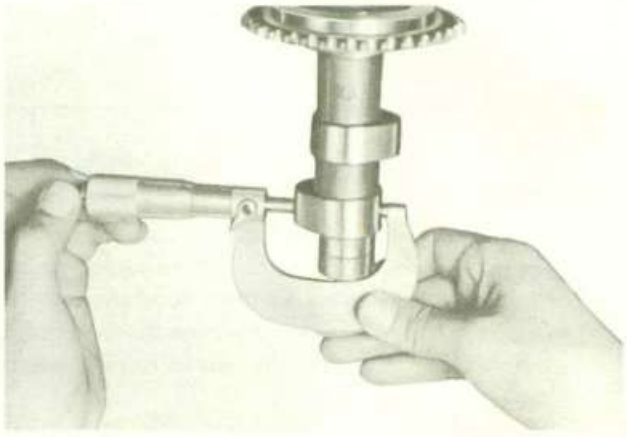
The intake valve opens 36° before top dead center and closes 68° after bottom dead center, which means the intake valve is held open 284°. The exhaust valve opens 68° before bottom dead center and closes 36° after top dead center. It remains open for a duration of 284°. At one point during cam rotation, both the intake and the exhaust valves are open. This is during the intake cycle and is called "overlap".

NOTE: When "degreeing" stock camshaft on machine, add manufacturing tolerance of ± 3° to figures.

Inspection

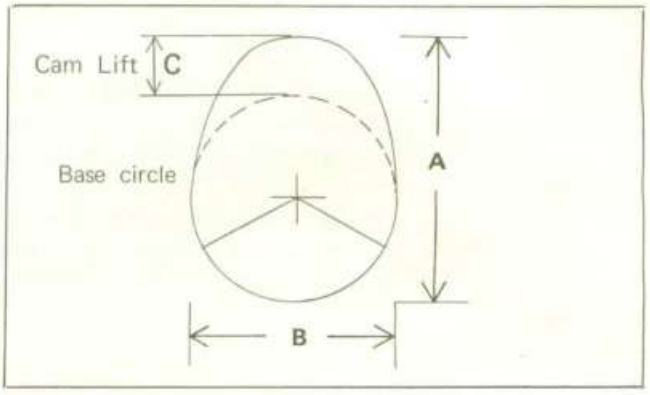
1) Checking cam chain wear.
Check the cam chain using the same methods as when the secondary drive chain is checked. (Refer to page117)

2) The cam lobe metal surface may have a blue discoloration due to excessive friction. The metal surface could also start to flake off or become pitted. This is due to poor lubrication, incorrect clearances (from poor adjustment or valve bounce), or due to normal wear.



3) If any of the above wear conditions are readily, visible, the camshaft should be replaced. Also, the corresponding rocker arm contacting surface should be checked for similar wear and replaced if obvious wear is noted.

4) Even though the cam lobe surface appears to be in satisfactory condition, the lobes should be measured with a micrometer. Cam lobe wear can occur without scarring the surface. If this wear exceeds a predetermined amount, valve timing and lift are affected. Replace the camshaft if wear exceeds the limits listed below.

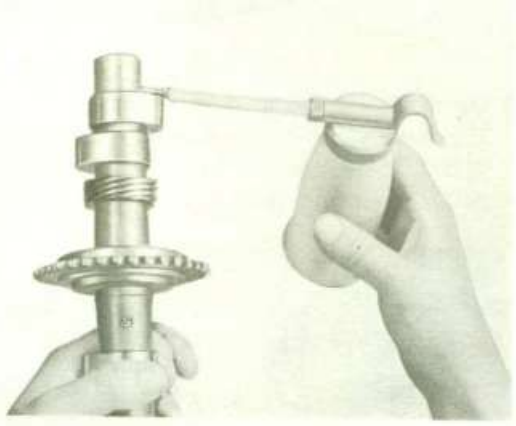


	A diameter		B diameter		Cam Lift(c)
	Standard Value	Wear Limit	Standard Value	Wear Limit	
Intake	39.31 ± 0.05	39.16	32.23 ± 0.05	32.08	7.31
Exhaust	39.34 ± 0.05	39.19	32.28 ± 0.05	32.13	7.34

(All dimensions given in millimeters.)

Installation

1) Clean the hole of the camshaft bracket, and oil them before installation.

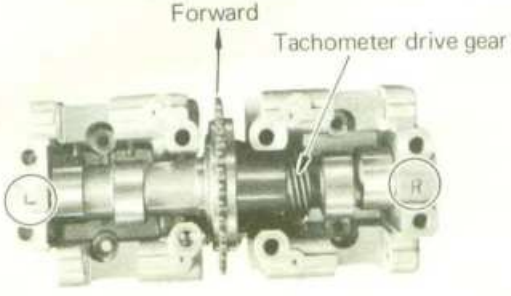


2) The camshaft is provided with the tachometer drive gear. Set the camshaft with the gear facing the right side viewed from the rear. The camshaft brackets must be installed correctly on the right and left sides, respectively. Take care not to install them in the reversed positions.

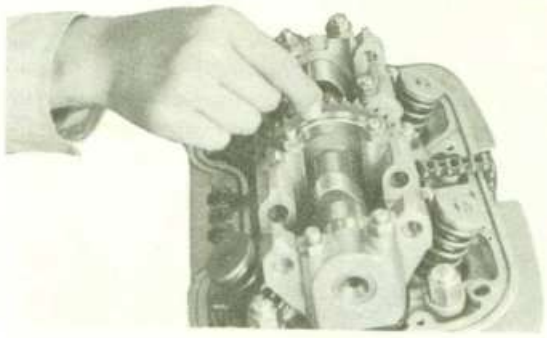
Tightening torque:

8-mm nut 2.0~2.3 kg-m (180~207 in-lbs.)
6-mm nut 0.8~1.0 kg-m (72 ~ 90 in-lbs.)

The cam surfaces of the camshaft should be oiled.

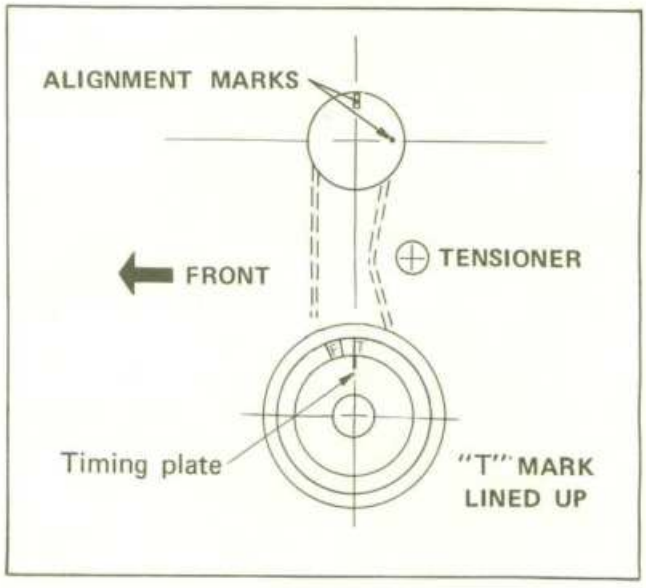


3) After tightening evenly both right and left camshaft brackets, check to see if the camshaft turns smoothly.



4) Next, rotate the pistons to TDC, as verified by lining up the field coil assembly timing plate with the "T" (top) mark on the rotor.

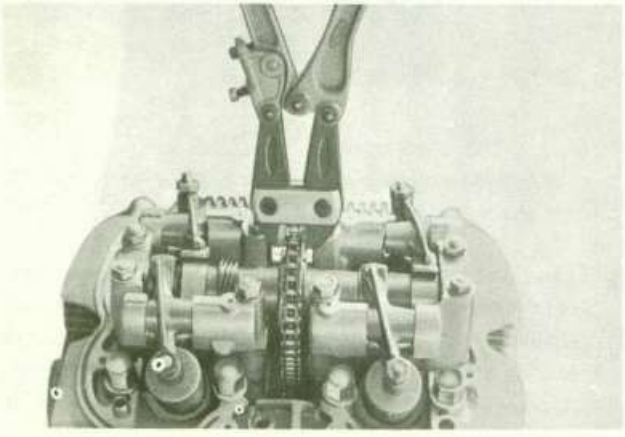
If the stator has been removed, use the "dowel pin" process described in the Valve Timing section carefully equalizing the "dead point" of piston travel by turning the crankshaft forward and backward a few degrees at TDC. Make sure the piston is at the top of its compression stroke first. Otherwise, an opening valve may catch the dowel pin.



5) There is a groove in the left side of the cam sprocket. Position this groove so that it lines up with the sprocket centers. This can be checked. The punch mark on the camshaft sprocket must be parallel with the head gasket surface. Lay a straight edge across the head surface and check the punch mark.

6) Reconnect the cam chain. The chain tensioner has been loosened during disassembly. Therefore, the cam chain will have excessive slack. To avoid incorrect timing the cam chain should be installed with no slack in the cam chain on the front portion (opposite side from the tensioner). Any slack on the back chain portion can be taken up with the tensioner.

7) Join the chain together by installing and riveting a new chain link. Always use a new link each time the chain is reconnected. (Use a chain riveter, not a hammer and punch, to mushroom the rivet ends).
The Parts Book lists the replacement link to use.

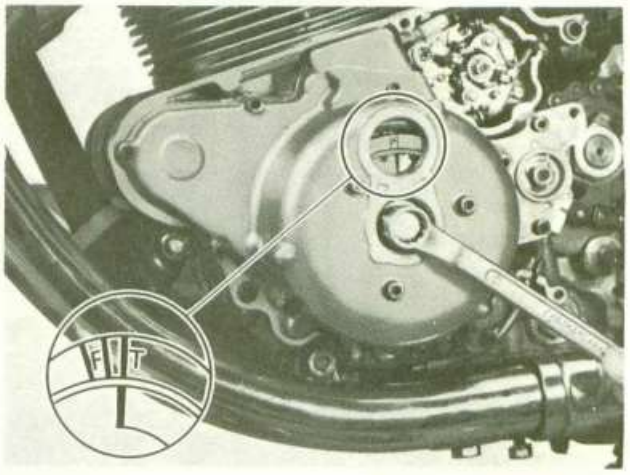


VALVE CLEARANCE ADJUSTMENT

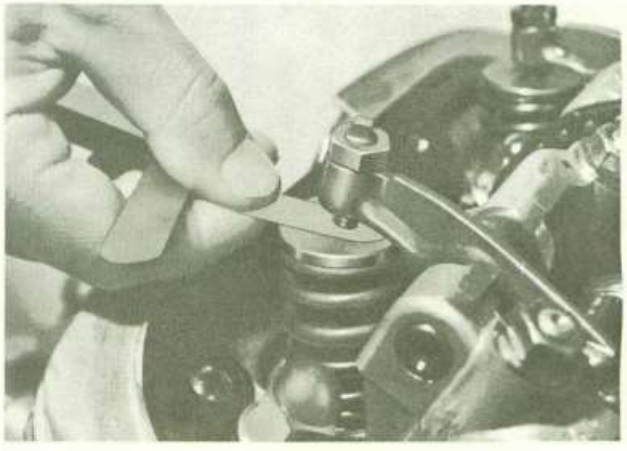
Improper valve clearance causes poor engine performance and possible engine damage. If there is too little clearance, the valve is held partially open. This permits blowby past the valve and drop in compression. If there is too much clearance there will be excessive engine noise and the valve will not open fully which will create partial blockage of airflow at the port.

a) Install all four rocker arms and remove the alternator cover and plug.

b) Next, align the "T" mark on the rotor with the timing plate on the field coil assembly. This places the pistons at top dead center. One of the cylinder is now at the top of its compression stroke. The cylinder that is on the compression stroke has both valves shut. This can be noted by observing which cylinder has clearance at both valve adjustors.



c) Use a feeler gauge to determine the existing clearance. The exhaust valve clearance should measure 0.05mm (0.002"), the intake clearance should measure 0.05mm (0.002"). (engine cold)



d) Loosen the lock nut and use the valve adjusting tool found in the Special Tool kit. Turn the adjustor in or out to obtain the correct clearance. Hold the adjustor solid to prevent it from moving and thoroughly tighten the lock nut. Recheck the clearance after tightening.

Tightening torque: 2.5~2.8 kg-m (225~252 in-lbs.)

e) Rotate the crankshaft one complete revolution and once again line up the rotor mark with the field coil assembly timing plate. The valve train of the other cylinder is now in position for adjustment.

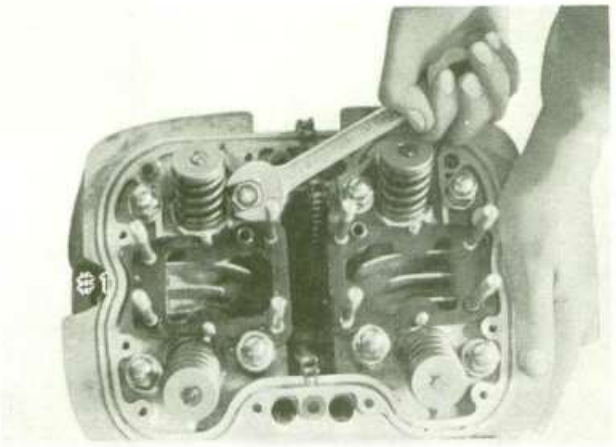
Caution

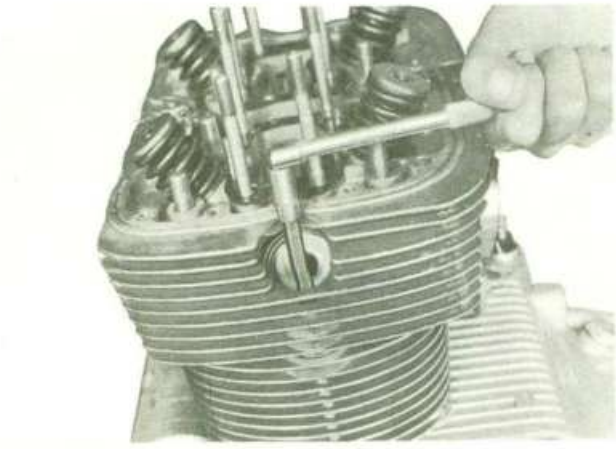
ADJUST VALVE CLEARANCE ONLY WHEN THE ENGINE IS COLD.

CYLINDER HEAD, VALVE SPRINGS, VALVES

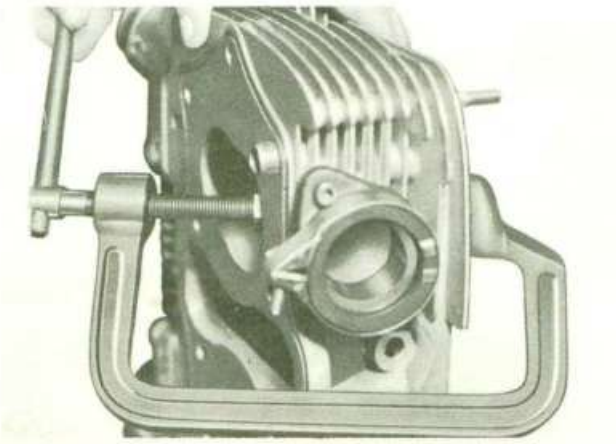
Disassembly

1) The head is now held in place by two hex-head screws (#1) beneath each spark plug hole and eight 10mm nuts and two 8mm bolts. Remove the bolts and slide the cylinder head up over the studs. While performing this operation, hold the safety wires so the cam chain does not fall into the crankcase.





2) Valve spring compressor is available in the Special Tool kit. Compress the valve spring and then remove both keepers. Remove the compressor and lift off the collar and springs.



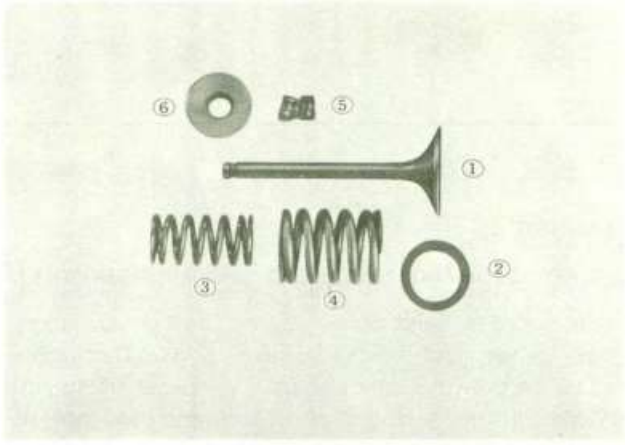
Note:
The keepers might be partially stuck in the collar. Use a rubber hammer to tap the edge of the collar a few times to loosen the keepers.

3) Pull the valve out. If the stem tip or keeper groove edges are slightly expanded, causing difficult removal, do not force the valve out as the valve guide inner diameter might be damaged. First, use a fine file to remove any lip that exists on the stem and then remove the valve.

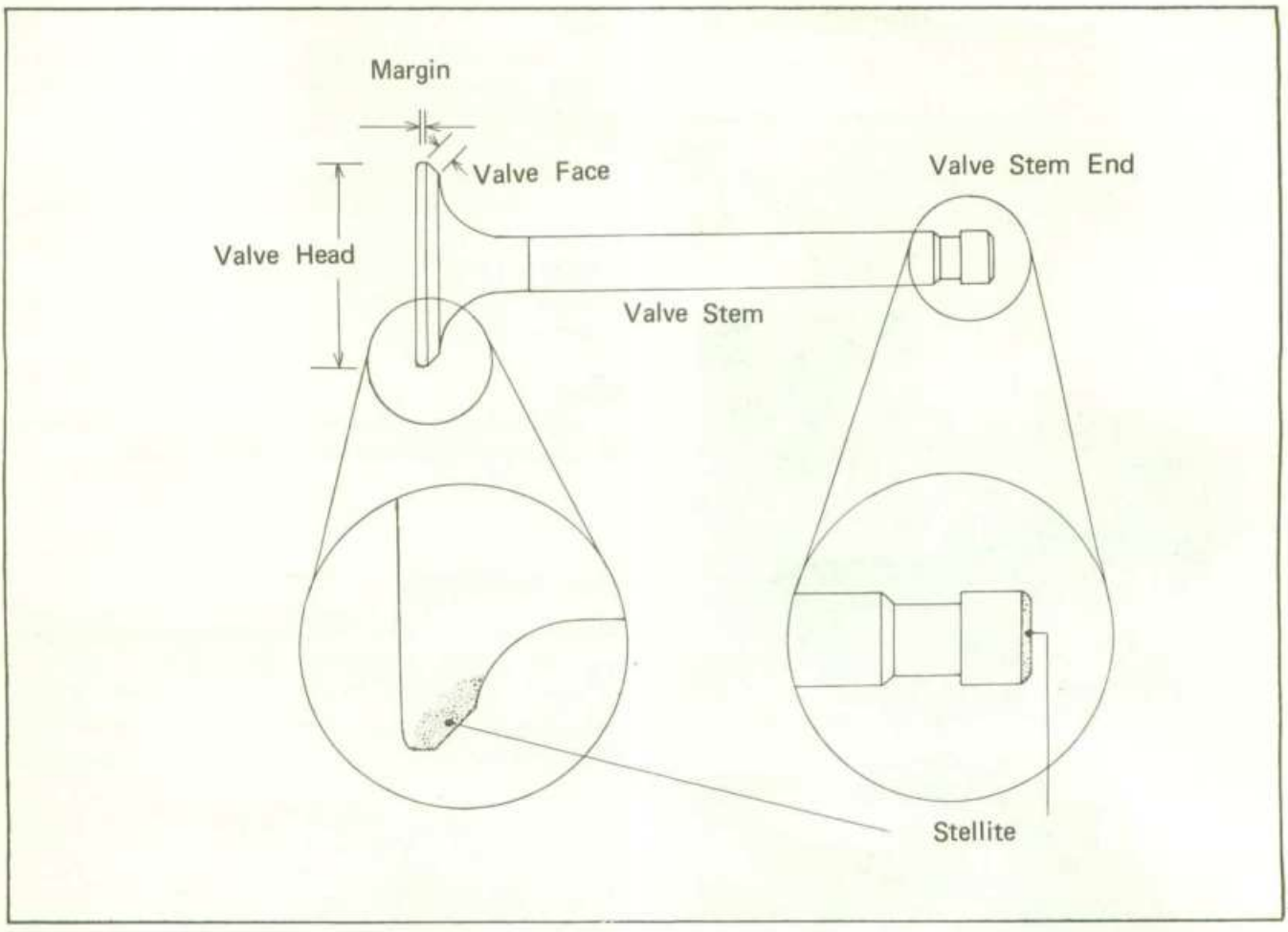
Note:
Be sure to remove the valve stem seal before removing the valve. Otherwise the seal could be damaged.

Valve Description

The head is equipped with four valves; two intake valves and two exhaust valves. The stem tip and valve face of each is plated with Stellite (hardened metal) to keep wear at a minimum. The intake valve diameters are larger to provide less restriction for the incoming fuel/air change.



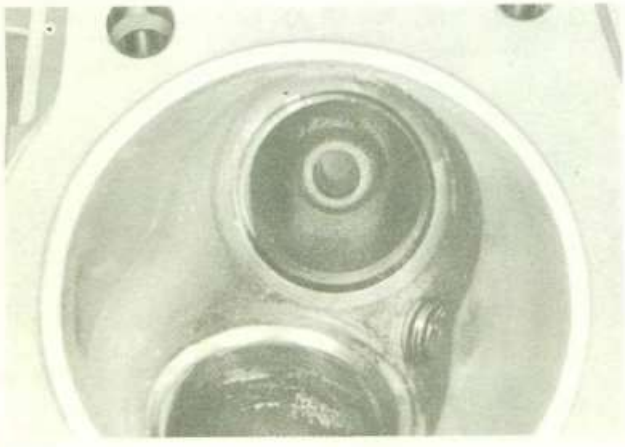
1. Valve
2. Valve spring seat
3. Inner valve spring
4. Outer valve spring
5. Keepers
6. Collar



Inspection

Decarbonization of the Head and Components

Carbon deposits build up in the combustion chambers, on the valves, and in the exhaust ports. Thoroughly clean all parts with a blunt scraper, then wash in solvent and dry with compressed air. The parts can then be examined and measured for wear.



Combustion chamber carbon deposits



Valve carbon deposits

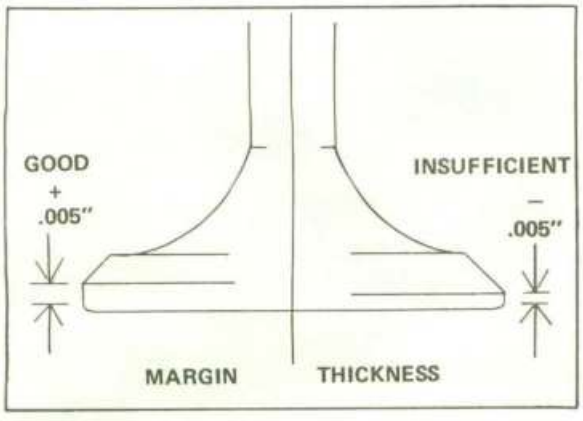
Valve wear

a) Check the valve *stem tip* for an indentation caused by the adjustor constantly striking the tip. If this indentation is 0.4~0.5 mm (0.015"~0.020") deep, or more, then regrind the tip surface flat. Remove only the material necessary, no more. Use a commercial valve grinder with the appropriate adaptor mounted on it to grind the tip.

b) Valve stem wear must be measured and then combined with valve guide measurements to arrive at a stem-to-guide clearance. This clearance must be within the tolerances. If it exceeds the maximum limit, then replace either or both parts as required.

c) The *valve should* also be checked for a bent stem. Roll the stem along the edge of a surface plate and visually check for stem warpage. Replace the valve if any warpage exists.

			Original Clearance	Replacement Clearance
Intake	Valve Guide ID	8mm $^{+.019}_{+.010}$	.020 – .044mm	.100mm
	Valve Stem OD	8mm $^{-.010}_{-.025}$		
Exhaust	Valve Guide ID	8mm $^{+.019}_{+.010}$	.035 – .059mm	.120mm
	Valve Stem OD	8mm $^{-.025}_{-.040}$		



Note:

When checking the stem for warpage, be sure all carbon has been cleaned off.
Otherwise, an accurate check cannot be made.

d) Check the valve for pits, carbon deposits, warpage (including the entier head), and actual chips broken off the margin. If warpage exists or if the surface is chipped, replace the valve. If it is just pitted and/or carboned up, lap it to the valve seat. If it does not clean up by lapping then use a mechanical grinder to resurface the valve face. After grinding, check valve margin thickness. If it has been reduced to a sharp edge because of grinding, the valve should be replaced as this thin edged margin can readily heat up and cause pre-ignition.

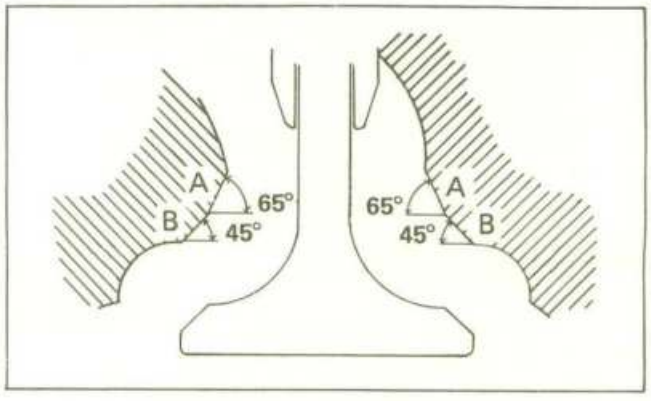
e) Check the stem for scratches. These occur when carbon collects in the valve guide and then hardens. As the stem continually rubs against this hard carbon, scratches are worn in the stem. Replace the valve if deep scratches are found.

Grinding the valve seat

a) The valve seat is subject to severe wear similar to the valve face. Whenever the valve face is resurfaced, the valve seat should also be resurfaced at a 45° angle. In addition, if a new valve guide has been installed (without any valve repair), the valve seat should be checked to guarantee complete sealing between the valve face and seat.

Caution

If the valve seat is obviously pitted or worn, it should be cleaned with a valve seat cutter. Use the 45° cutter, and when twisting the cutter, keep an even downward pressure to prevent chatter marks.
If cutting section "A" of the intake valve seat, use 65° cutter.
If cutting section "A" of the exhaust valve seat, use 65° cutter for exhaust.
If cutting section "B", use the 45° cutter.



b) Measure valve seat width. Apply mechanic's blueing dye (such as Dyken) to the valve face, apply a very small amount of fine grinding compound around the surface of the valve seat, insert the valve into position, and spin the valve quickly back and forth. Lift the valve, clean off all grinding compound, and check valve seat width. The valve seat will have removed the blueing wherever it contacted the valve face.
Measure the seat width with vernier calipers. It should measure approximately 1.3mm. Also, the seat should be uniform in contact area. If valve seat width varies, or if pits still exist, then continue to cut with the 45° cutter. Remove just enough material to achieve a satisfactory seat.

c) If the valve seat is uniform around the perimeter of the valve face, but is too wide or not centered on the valve face, it must be altered. Use either the 45° or 65° cutters to correct the improper seat location in the manner described below:

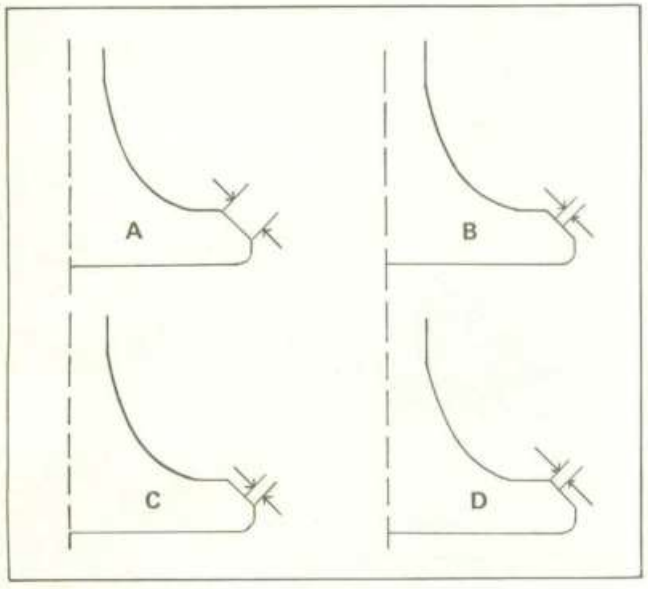
	Standard Width	Wear Limit
Seat Width	1.3mm (0.051")	2.0mm (0.078")

(A) If the valve face shows that the valve seat is centered on the valve face, but too wide, then lightly use both the 65° cutter to reduce the seat width to 1.3mm.

(B) If the seat shows to be in the middle of the valve face, but too narrow, use the 45° cutter until the width equals 1.3mm.

(C) If the seat is too narrow, and right up near the valve margin, then first use the 45° cutter to get the correct seat width.

(D) If the seat is too narrow and down near the bottom edge of the valve face, then first use the 65° cutter and then the 45° cutter.



Lapping the valve/valve seat assembly

a) The valve/valve seat assembly should be lapped if, (1) the seat or the valve face is severlly worn, or (2) if the valve face and valve seat have been resurfaced and now require a final light grinding operation for **perfect sealing, or, (3) if a new valve is being installed.**

b) Apply a small amount of coarse lapping compound to the valve face. Insert the valve into the cylinder head. Rotate the valve until there is a burnished spot all the way around the valve face. Clean off the coarse compound, then follow the same procedure with fine compound. Continue lapping until the valve face shows a complete and smooth surface all the way around. Clean off all compound material. Apply blueing dye to the valve face and rotate the valve face for full seat contact which is indicated by a shiny surface all around the fave face where the blueing has been rubbed away.

Note:

The valve can most easily be rotated if a section of flexible rubber hose of 5/16" ID is slipped over the valve stem and spun.

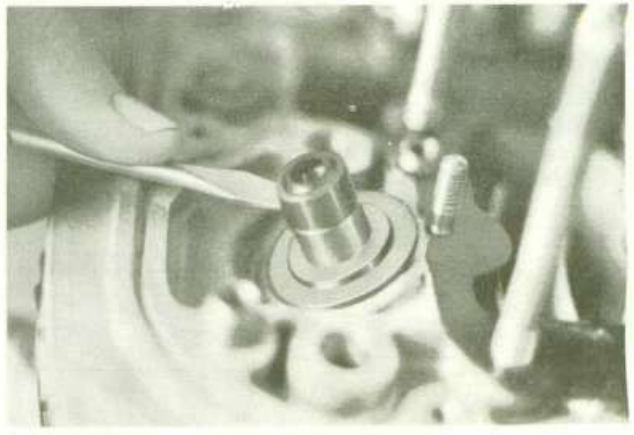
Valve leakage check

a) After all work has been performed on the valve and valve seat, and all cylinder head parts have been assembled, check for proper valve/valve seat sealing by pouring solvent into each of the intake ports, then the exhaust ports. There should be no leakage by the seat. If this fluid leaks, disassemble the valve assembly and continue to lap with fine compound. Clean all parts thoroughly, reassemble and check again with solvent. Repeat this procedure as often as necessary to obtain a satisfactory seal.

Valve stem seal

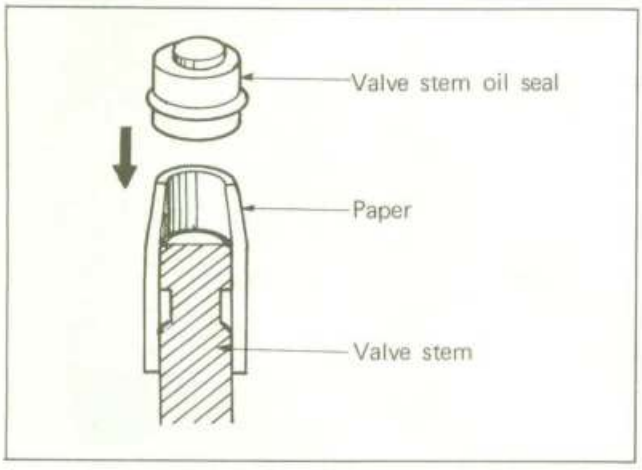
This seal slips down over the valve stem to prevent excessive amounts of oil from passing down stem and into the combustion chamber.

Therefore, when installing the seal, be sure to replace the valve stem seal with a new one.



Caution

Before installation of the valve stem oil seal on the valve stem, wrap the valve stem end with a piece of paper as shown in the illustration below and apply enough grease on the surface of the oil seal lip for prevention of possible scratches or cuts on the seal lip. Then fit the valve stem oil seal on the valve stem.



Valve springs

a) The TX750 engine uses two springs of different size to prevent valve from floating or surging.
The chart below shows the basic value characteristics.

VALVE SPRING SPECIFICATION CHART

	OUTER	INNER
Diameter of Wire	4.3mm	2.9mm
Direction of Winding	Right Hand	Left Hand
Total Windings	5.25	7.25
Free Length	44.0mm	46.0mm
Installed Length (Valve Closed)	40.0mm	38.0mm
Installed Pressure	18 ± 1 kg (40 lbs)	13 kg (26.7 lbs)
*Compressed Length (Valve Open)	30.0 mm	28.0mm
Compressed Pressure	64 ± 3 kg (140 lbs)	29 kg (64 lbs)

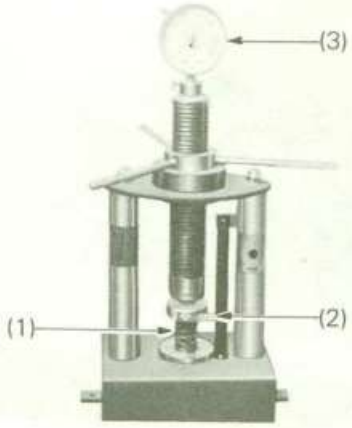
*Measured without collar
All measurements ± three percent

b) Even though the spring is constructed of durable spring steel, it gradually loses some of its tension. This is evidenced one way by a gradual shortening free length. Use a vernier caliper to measure spring free length. If the free length of any spring has reduced more than 2mm (0.080") from its specification, replace it.



c) Another symptom of a fatigued spring is insufficient spring pressure when compressed. This can be checked using a valve spring compression rate gauge.

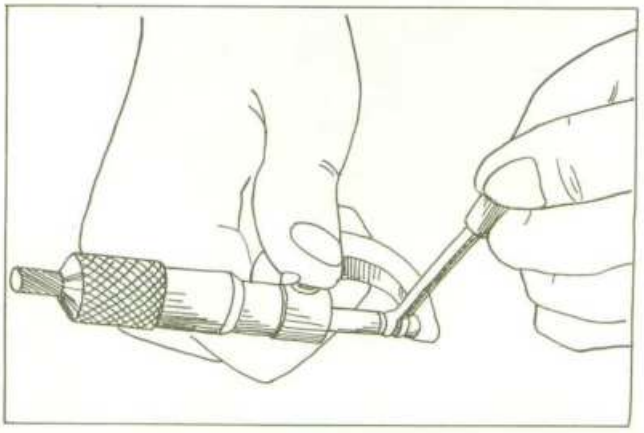
(1) Individual spring
(2) Length measuring scale
(3) Pounds pressure scale



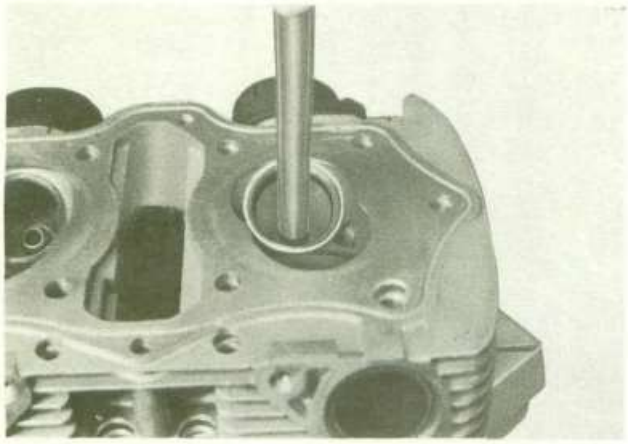
Test each spring individually. Place it in the gauge and compress the spring first to the specified compressed length with the valve closed (all spring specifications can be found in previous section, Valve Spring) then to the length with the valve open. Note the poundage indicated on the scale at each setting. This procedure must be performed on the outer springs, then the inner springs.

Valve guide

a) The inside diameter must be measured with a ball gauge. Measure at each end and in the center of the drilled passage. Compare this measurement, using the largest measurement of these spots, with factory specifications listed in Valve Description. If this measurement exceeds the maximum tolerance, replace the guide.



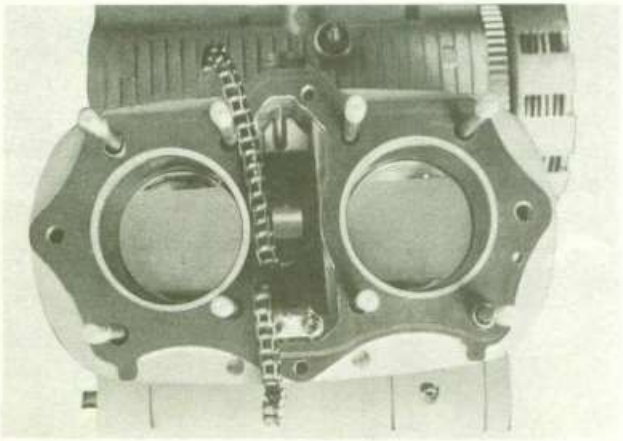
b) The valve guide is replaceable. It is held in the cylinder head by an interference fit of approximately 0.04mm (0.0015"). To ease guide removal and reinstallation, and to maintain the correct interference fit, heat the head to 200 - 400° Farenheit. If possible, use an oven to avoid any possibility of head warpage due to uneven heating.



c) Use the appropriate shouldered drift (Special Tools Kit) to drive the old guide out and the new guide in.

Installation

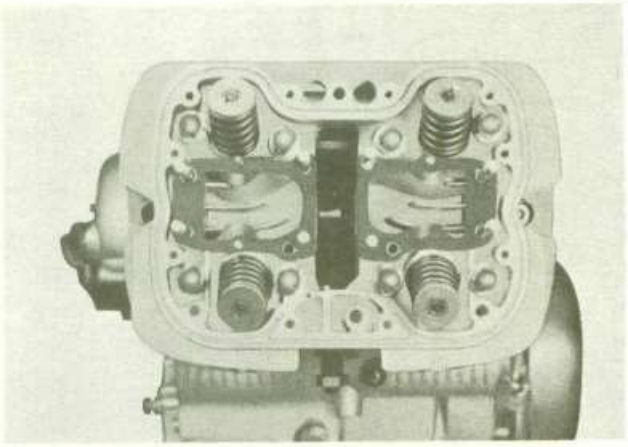
1) A new head gasket must be installed. The gasket can correctly fit only one way. Slip the cylinder head over the studs and onto the cylinder.



2) The cylinder head bolts must be tightened crosswise with a torque wrench and with correct torque.
Oil the threaded portion of each bolt, before tightening.
Tightening torque:
M8 . . . . . 2.0~2.3 kg-m (180~207 in-lbs.)
M10 . . . . . 3.7~4.0 kg-m (333~350 in-lbs.)

Note:

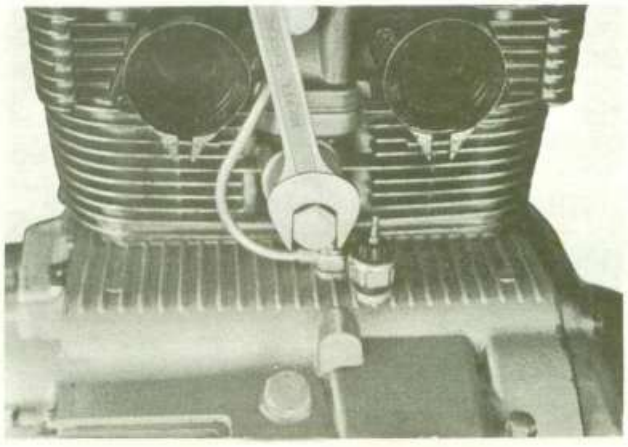
After completing this phase, plug the spark plug holes to prevent anything from dropping into the cylinder.



CHAIN TENSIONER

Disassembly

1) Remove the cover, lock nut and adjustor.
The vibration damper attached to the crank case can be removed after the cylinder is pulled out.



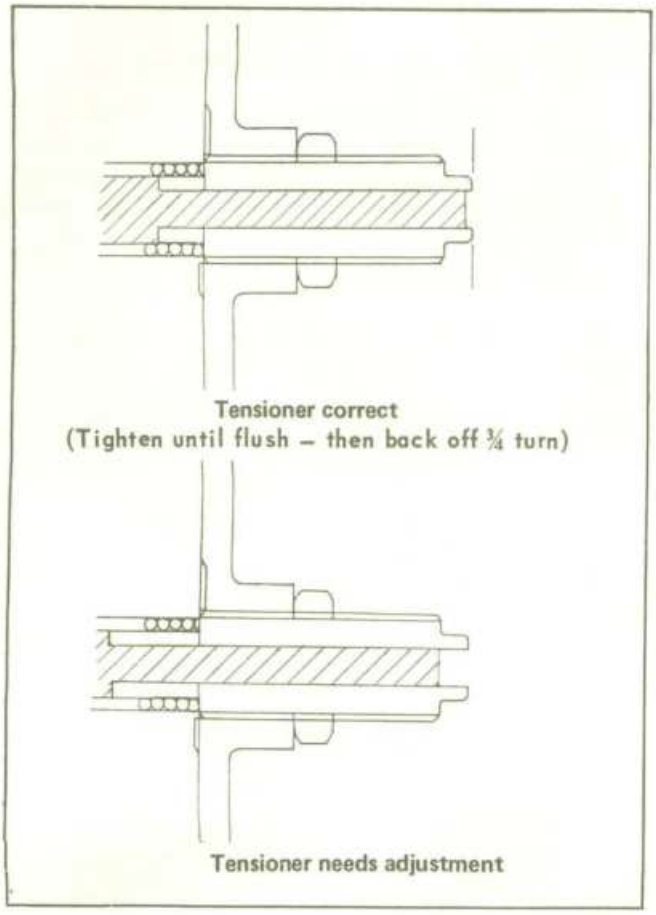
Adjustment

1) Rotate the crankshaft clockwise (from the left side of the engine) to place all slack in the area of the chain tensioner.

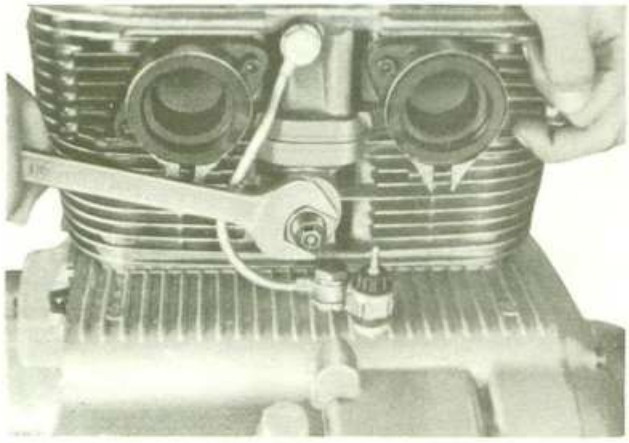
2) Remove the cast metal protective cover.

3) Loosen the tensioner lock nut.

4) Turn the adjustor in until the push rod is flush with the adjustor. Then back off ¾ turn and lock down.



5) Tighten the lock nut and install the cover. Check this adjustment every 2,000 miles. (1st 250, 500 miles new chain)



CYLINDER & PISTON

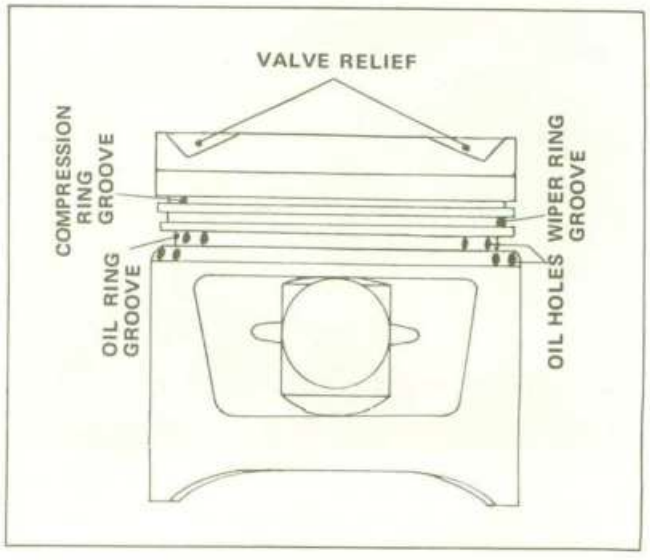
Cylinder

The cylinder is constructed of aluminum with cast iron sleeves. It has a cavity down the center of the cylinder that serves two purposes. First, it provides a channel for the cam chain to run in between the camshaft and the crankshaft. Secondly, it provides a space for air circulation that aids in cooling both cylinders.

Piston

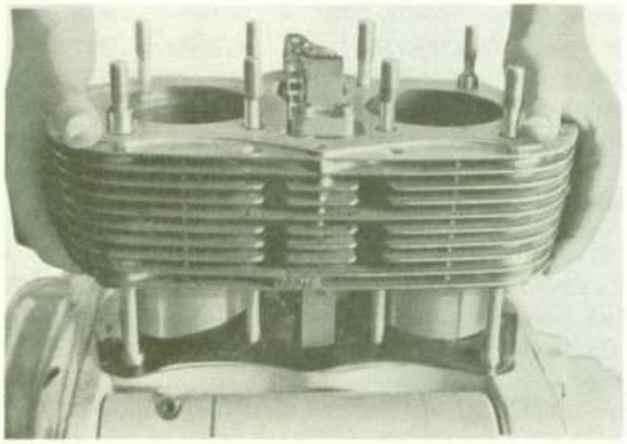
The piston crown is flat. It also has two relief areas for valve head clearance during engine operation. The relief areas are unequal in size since the intake valve is larger than the exhaust. An arrow is stamped on the crown to indicate piston position for installation. The piston should be installed with the arrow pointing forward.

Oil drain holes have been drilled in the oil scraper ring groove and in the piston wall just beneath the bottom groove. This provides an escape path for oil scraped off the cylinder wall. It also provides a path for lubrication of the piston pin and bearing.

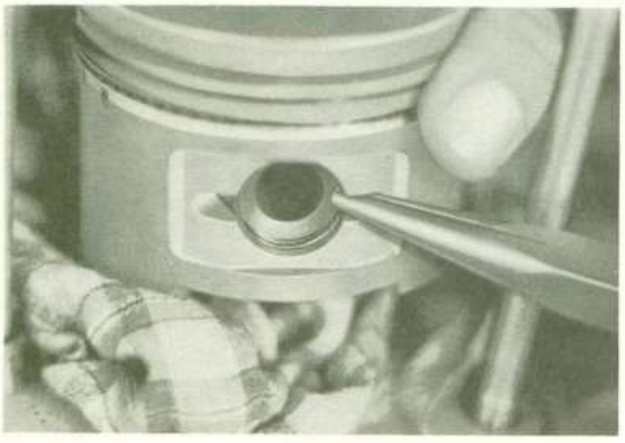


Disassembly

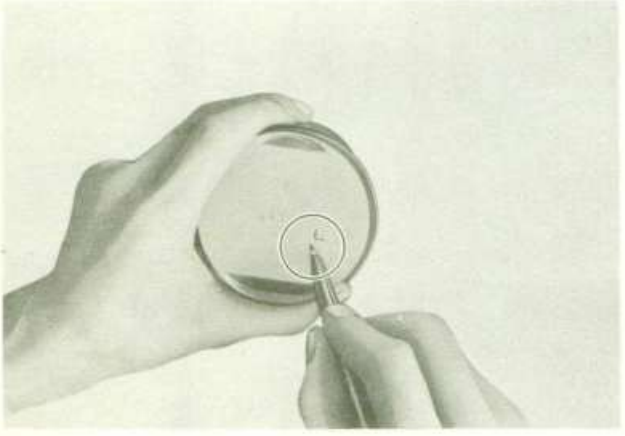
1) Remove the cylinder by tapping it with a soft hammer. Care should be taken not to break fins.



2) Remove the outer circlip from each piston. Support the piston by hand and push out the piston pin using a soft drift (do not use a hammer). Lift the piston off and set it to one side with the piston pin and needle bearing.



Each piston must be marked as to which cylinder it came from to ensure identical match-up during reinstallation. Lightly scribe an "L" inside the left piston skirt and an "R" inside the right piston skirt.

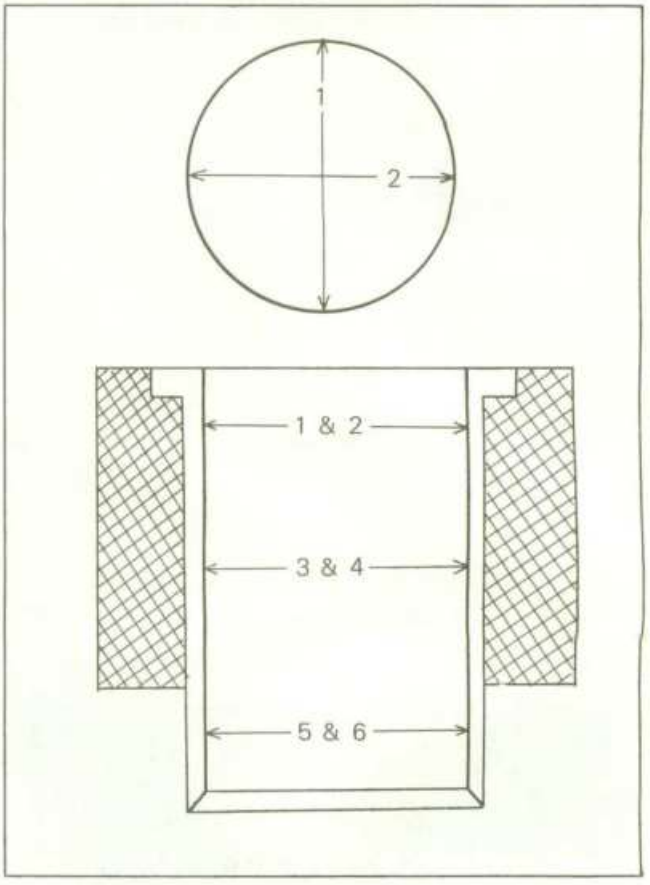


Inspection

Cylinder Wear and Repair Procedures

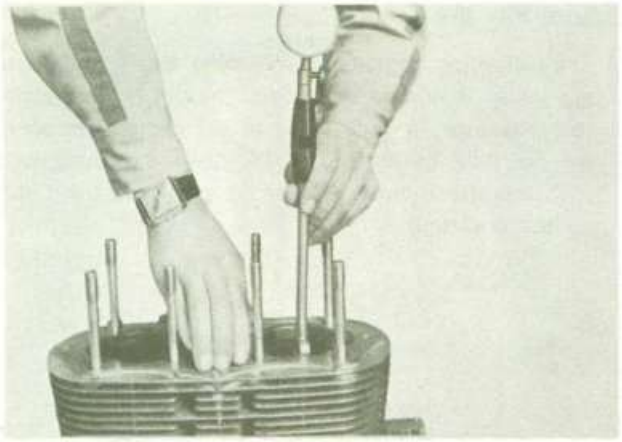
a) Constant friction between the bore and piston, plus microscopic particles of contamination that enter through the intake, cause a gradual wear of the bore. This wear can be detected by measuring various points in the bore and comparing these measurements against standard specifications.

b) This drawing shows the places to take bore measurements with a cylinder measuring gauge.



c) Subtract the bottom bore measurement from the top bore measurement. The difference between these two dimensions is called the cylinder "taper". Check to see if the amount of taper is still within specified limits.

	Standard	Wear Limit
Cylinder Bore (mm)	80	80.1
Cylinder Taper (mm)	0.008	0.05



d) The bore might be lightly damaged with scratches or nicks. Run a hone through the bore a few times to see if the bore cleans up. If these scratches are too severe, a hone cannot remove them, and a cylinder rebore would be necessary several over sizes.

Note:

The hone should be used in a low rpm drill and the hone should be moved through the entire bore at an even speed. This should result in a "cross-hatch" pattern which aids ring seating.

e) If the cylinder has been in use many miles, a ridge may form at the upper edge of the bore. This is mostly carbon. Normally this ridge can be removed by scraping with a soft scraper (to prevent damage to the bore). This ridge is automatically removed if the cylinder is bored out. Care should be taken that the ridge is completely removed if the cylinder is just to be honed. If scraping does not remove the ridge, previous to honing, a ridge reamer must be used to finish removing the ridge (reamer is commercially available).

Piston Wear

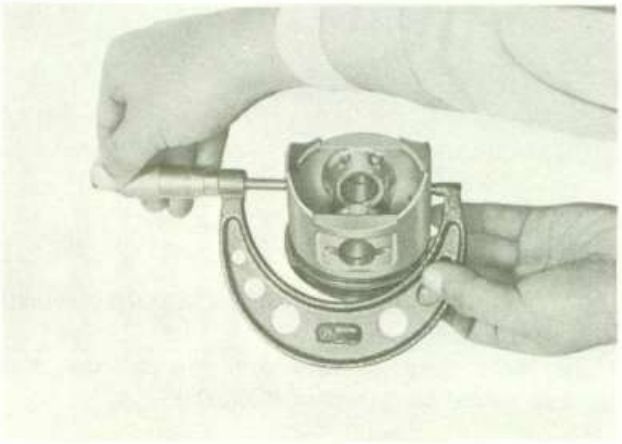
a) First, check the piston for cracked or broken sections, including the crown, ring lands, and skirt. Also check the piston crown for possible metal disintegration due to excessive heat in the combustion chamber.

b) If severe score marks are found on the skirt, this can be attributed to insufficient lubrication sometime during engine operation or improper clearance. If these marks can be removed with fine emery cloth the piston can be used again.

c) All of the above wear conditions may require piston replacement (except as noted). If a defective piston is reinstalled, the engine will not perform satisfactorily and premature engine failure may occur.

d) Check for additional wear by measuring piston diameter 10mm (3/8") from the bottom of the skirt and at right angles to the piston pin holes. Piston standard size is 80mm.

e) Standard piston wear usually does not exceed 0.05mm. This measurement is important when determining piston-to cylinder clearance.



Piston Clearance

a) Piston-to-bore clearance is the difference between minimum cylinder bore measurement and maximum piston diameter. Standard clearance is 0.050—0.055mm (0.0020"—0.0022"). If measurements prove that the clearance equals. 0.15mm or more, it is excessive, and one of two corrective measures must be taken to bring the clearance back within tolerances.

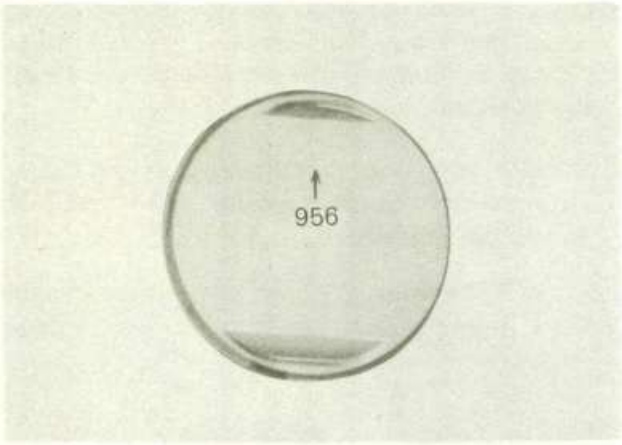
b) If cylinder taper is within tolerances, and if the cylinder can be cleaned up by honing then obtain a larger size standard piston that is large enough to obtain the correct clearance.

c) Bore and hone out the cylinder to the size of a first oversize piston, plus the correct clearance.

d) **How to Calculate Standard Size Piston-to-Cylinder Clearance from Stamped Numbers**
Nominal piston standard size is 80mm. The number stamped on the piston crown is the actual size. (The 80 is dropped.)

Example:

0.956 on crown really means 79.956mm piston diameter, or 0.044mm undersize.
Cylinder standard bore size is marked in large numbers on the very bottom of the cylinder. It equals 80mm PLUS the amount marked.



Example:

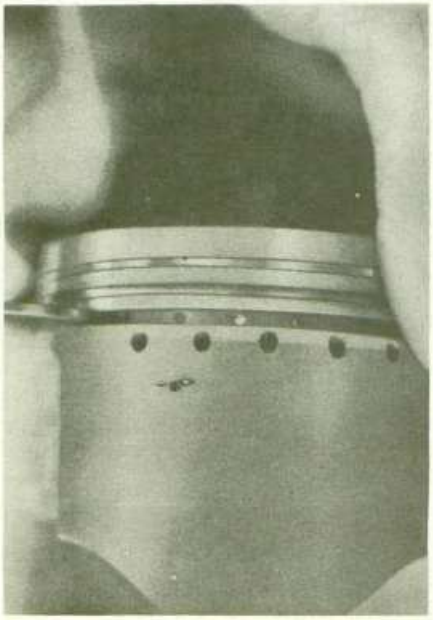
0.007 marked on cylinder really means 80.007mm cylinder bore, or 0.007mm oversize.
If the above piston is used with this cylinder, total clearance would be 0.051mm (0.0020").

Example:

80.007	(Cylinder)
−79.956	(Piston)
0.051	(Clearance)

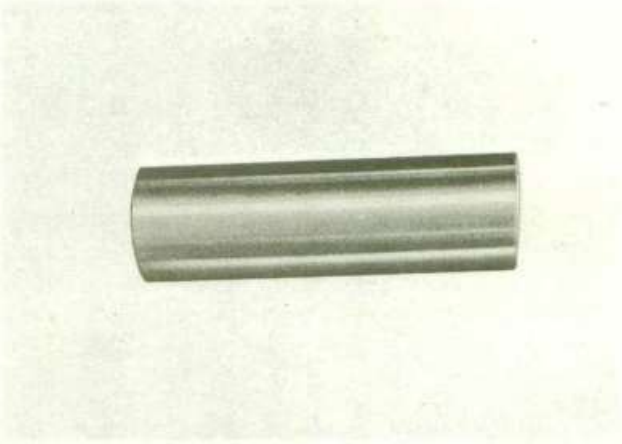
Clearance Piston Ring Grooves

Carbon and varnish gradually build up in the ring grooves. Remove the rings and use the blunt end of a discarded ring to clean all carbon from the grooves. The oil ring (bottom) should not require this procedure. Check to make sure the oil relief holes are not blocked.



Piston Pin Wear

a) The piston pin oscillates in a bushing. Check the piston pin wear. If any exist, replace the pin or connecting rod. However, a dull finish at the center section of the pin may be noticed. It is normal operating wear and does not indicate a defective pin (unless this dull surface is pitted).



b) Check the pin for blue discoloration. This discoloration is caused by heat and is an indication of inadequate lubrication. The pin should be replaced and the lubrication system checked.

Caution

Whenever the piston pin is replaced, also replace the needle bearing and check the connecting rod *small end* for wear which might require rod replacement.

Piston Installation

a) Lubricate all surfaces with oil prior to piston installation.

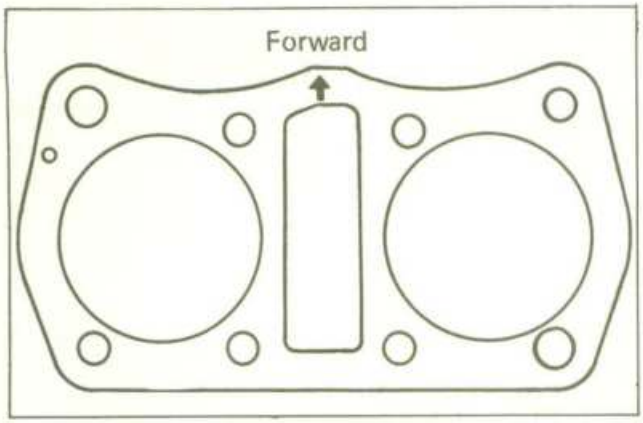
b) Mount the piston (rings installed) onto the connecting rods. Be sure the arrow stamped on the piston crown points forward. Also make sure that the left piston (already marked during removal) is fitted to the left-hand connecting rod. This guarantees that all previous clearances remain unchanged unless new parts are installed or cylinder work is done.

Note:

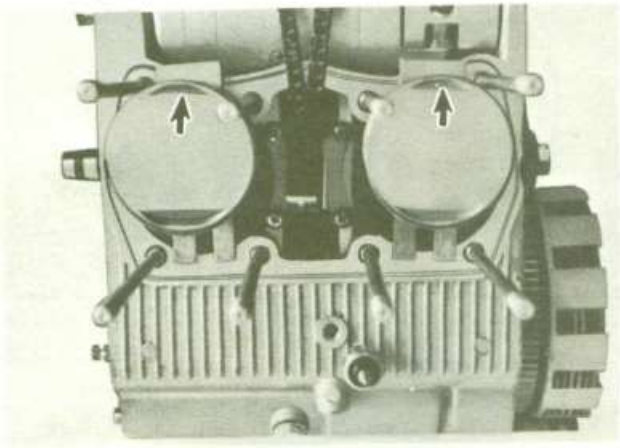
The piston pin should be a thumb-press fit into the piston. After the pin has been installed, lock it in place with two new circlips. Never use old circlips.

Installation

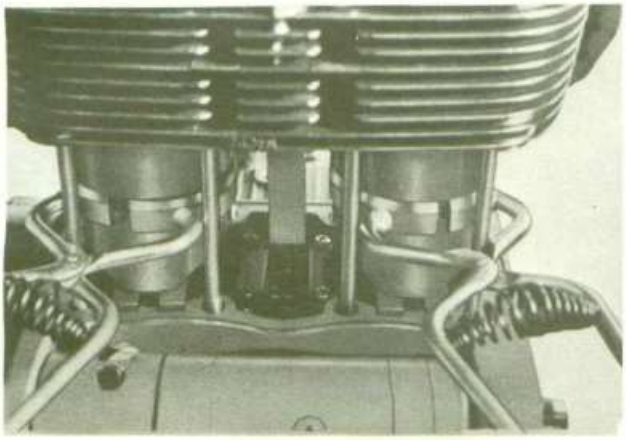
1) Make sure the crankcase and cylinder bottom matching surfaces are clean, then install a new base gasket.



2) Slip a piston support plate (found in Special Tool Kit) under each piston skirt. This prevents the pistons from being pushed down during cylinder installation. Place a rag under each base special tool to protect the new gasket.



3) Lubricating the piston pin, and rings.
Position and tighten the ring compressors (found in Special Tool Kit) so the rings can slip up into the cylinder without catching on the bottom of the cylinder. Lubricate both bores. Slip the cylinder down over the studs until it slips over the pistons and rests on the ring compressors.



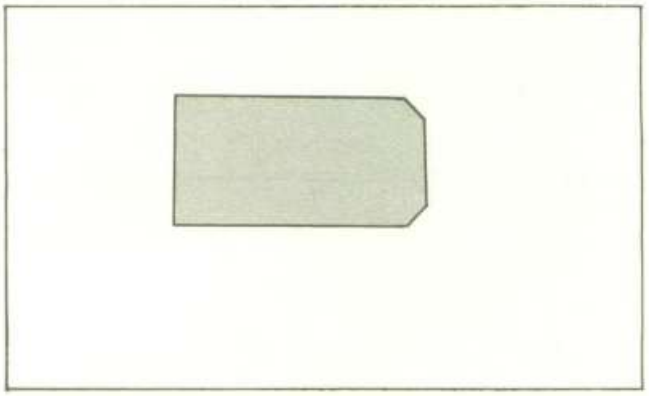
4) Rotate the crankshaft so that the pistons slide up into the bores. Remove the ring compressors and piston bases, then push the cylinder down until it butts against the crankcase.

Note:
All parts should be well lubricated during assembly. When a newly rebuilt engine is started for the first time the oil supply passages will be empty and there will be a short period when no oil is delivered to various parts. It is a good ideal to kick the engine over several times prior to starting to fill these passages.

PISTON RING

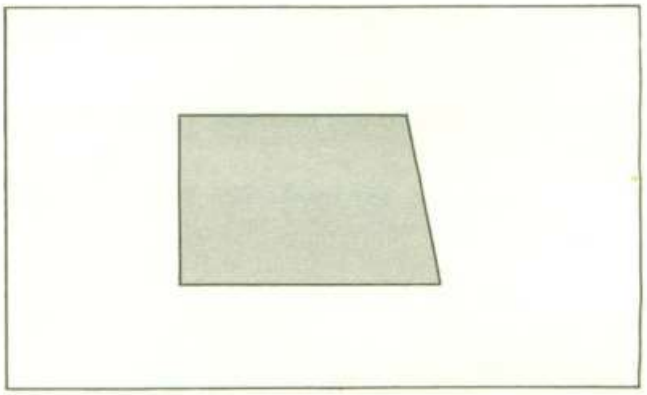
a) Top ring:

This is the compression ring. It must provide efficient sealing and must be able to withstand the greatest amount of heat. The outer edge is chrome plated for wear and heat resistance. Both outer edges of this ring are beveled (see the drawing of ring cross-sectional view) to provide a good compression sealing edge.



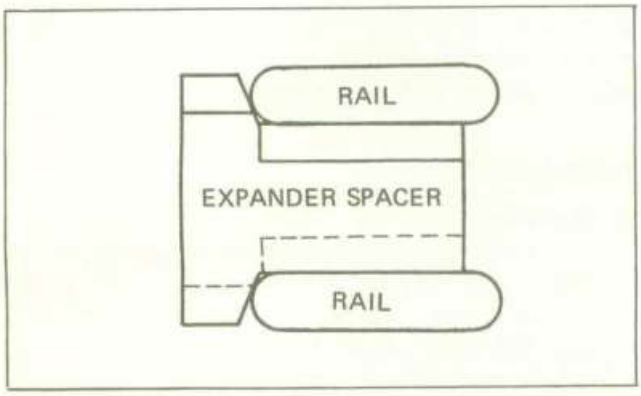
b) Middle ring:

This second ring is cast iron. It serves as a "wiper" ring to scrape excess oil from the cylinder wall. It flexes slightly whick provides a narrow and effective scraping edge.

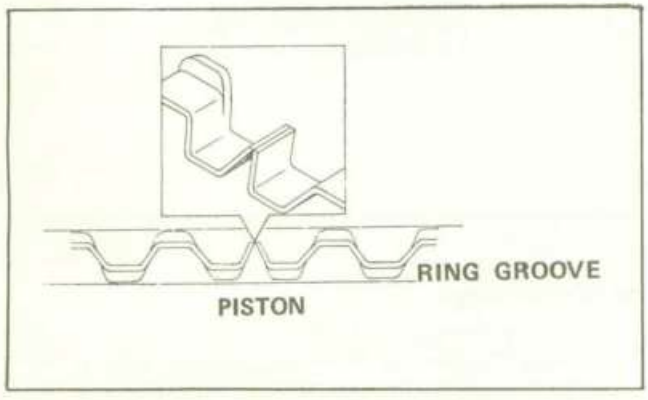


c) Bottom ring:

This ring's purpose is to trap and remove oil from the cylinder wall. The ring consists of three separate components: top and bottom spring steel rails, and a stainless steel wave type expanding spacer. Oil is trapped between the two rails and is forced out the holes drilled in the piston ring groove. The rail outer edge is chrome plated to resist wear.



The expander spacer, because of its design, pushes both rails against the ring groove sides. In addition, the spacer is equipped with a projecting inner lip that pushes both rails out, creating an excellent oil trapping action.



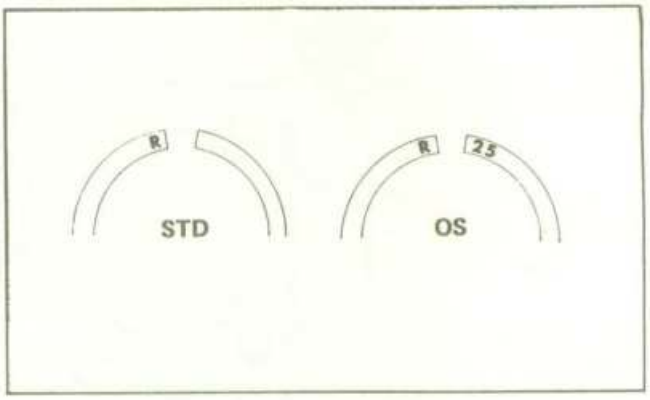
Caution

Install the cylinder after making sure that the ring ends meet perfectly.

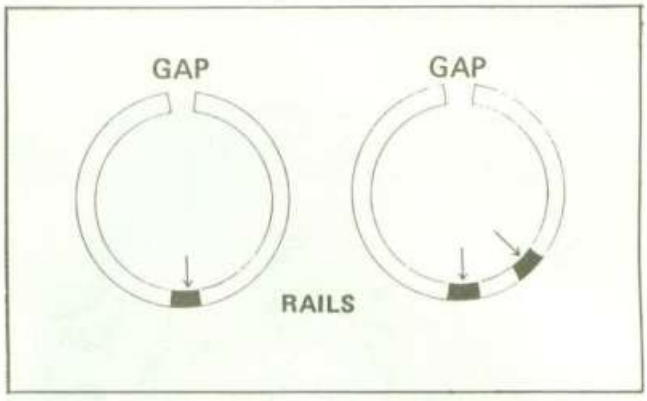
d) Piston ring (standard and oversize) identification Code

a) The oversize top and middle ring sizes are stamped on top of the ring.

Standard	Size (mm)
Oversize 1st	0.25
2nd	0.50



b) All three pieces of the bottom (oil control) ring are colorcoded to identify sizes. The color marks are painted on the ring, 180° opposite the end gap.

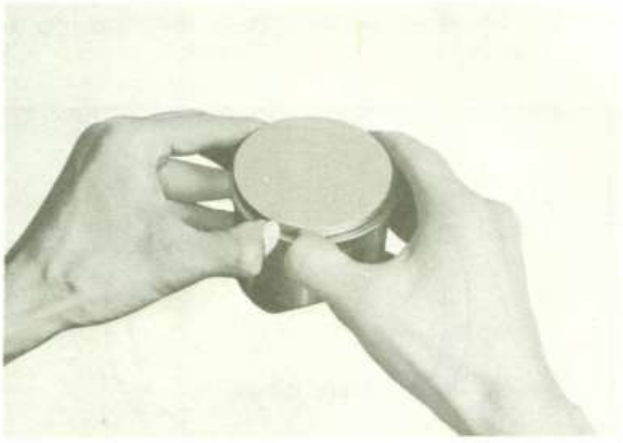


SIZE		COLOR	
Oversize 1st	25 (0.25mm)	Blue	(2 marks)
2nd	50 (0.50mm)	Red	(1 mark)

Disassembly

Push apart the piston ring ends with both thumbs so that the ring can be slipped out of the groove on the other side with the first fingers.

Avoid opening the ring ends too wide, or the ring may be broken. The top ring should be removed first.

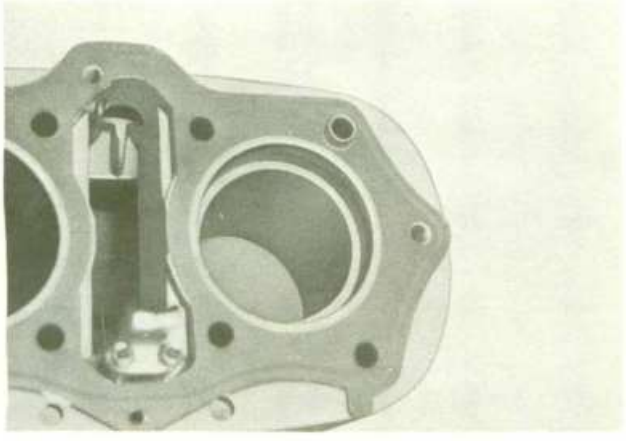


e) Piston ring wear

a) All three rings experience the same type of wear. Any check applied to one ring can be used to also test the others.

b) Before checking for wear, clean all carbon from the ring surface. This insures an accurate wear check.

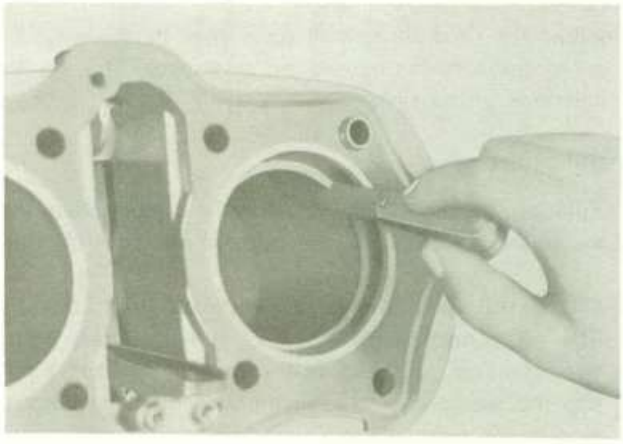
c) Check for gaps between the ring contacting edge and the cylinder wall. Push the ring into the bore (with an inverted piston to make sure it is not cocked). Slip a piece of white paper beneath the cylinder bore (for visual contrast) and check the outer perimeter for visible gaps between the ring and the cylinder wall.



d) With the ring still positioned in the bore, check end gap clearance with a feeler gauge. Standard specifications and maximum wear limits are listed below.

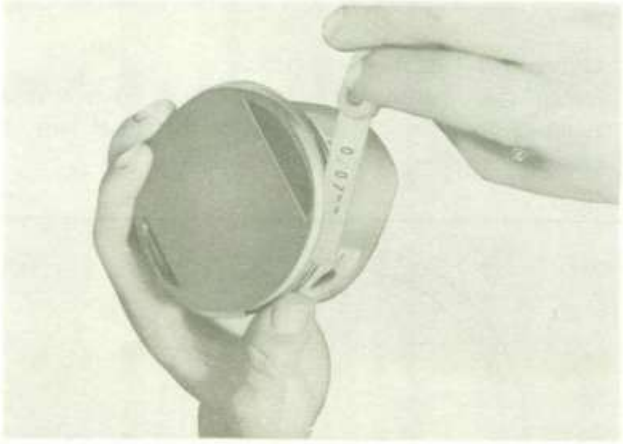
Note:

The end gap on the expander spacer of the oil control ring is unmeasurable. If the oil control ring rail show excessive gap all three components should be replaced.



	Standard Gap(mm)	Wear Limit (mm)
Compression Ring	0.2–0.4	0.8
Wiper Ring	0.2–0.4	0.8
Oil Control(Rails)	0.3–0.9	1.3

e) Piston ring/ring groove fit must have correct clearance. If the piston and ring have already been used in the engine, the ring must be removed, the ring groove cleaned of carbon, and then the ring should be reinstalled. Use a feeler gauge to measure the gap between the ring and the land. The standard tolerance is 0.04mm (0.0016") to 0.08mm (0.0032"). The wear limit is 0.15mm (0.006"). The 2nd tiny standard tolerance is 0.03mm (0.0012") to 0.07mm (0.0028").



Note:

f) There must be no side clearance at all on the oil control ring. If any clearance exists, the expander spacer has become fatigued. Replace the ring.

g) If any of the previous three wear checks prove any of the rings to be worn beyond acceptable tolerance. REPLACE THE ENTIRE SET.

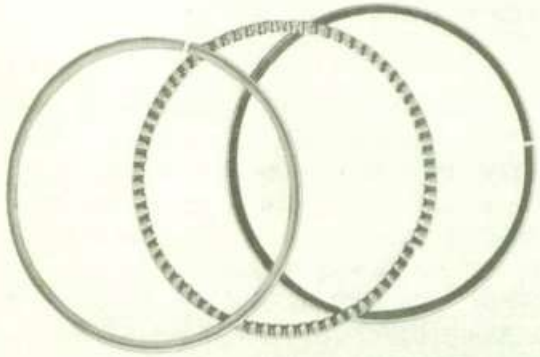
Caution

Whether the rings are new or used, they must always be checked for correct ring end gap clearances. This applies to all three piston rings.

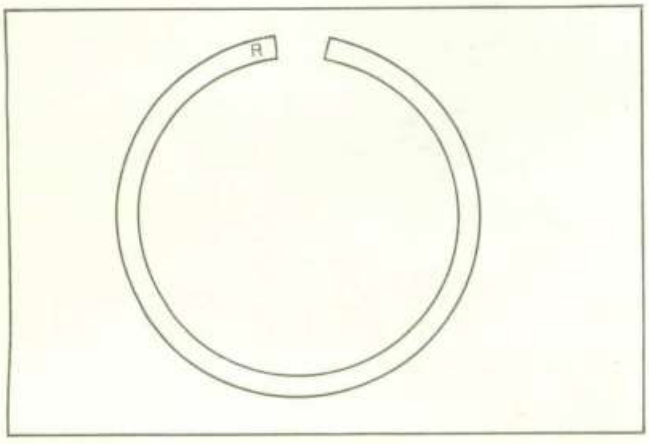
Installation

Installation of these rings is basically a reversal of the above process, except for the bottom (oil control) ring.

1) Oil control Ring Installation (Installed first):
The oil control ring consists of three separate parts, two identical rails and one expanding spacer. First, slip the spacer over the piston, and into the bottom groove. Neither rail has a particular top side. So install one rail into the bottom part of the groove and then position the last rail, either slide up, into the top part of the groove. Finally, position the three end gaps approximately 120° from each other.



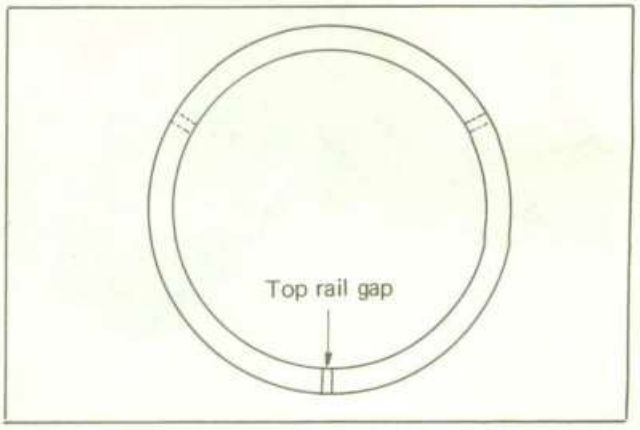
2) Middle and Top Ring Installation
Install the middle ring and top ring. Each ring is stamped with an "R" on one side that must face up toward the piston crown when installed.



3) Spacing of All Ring End Gaps
All ring end gaps must be off-set from one another to prevent the leakage of compression and oil.
Stagger their positions evenly around the perimeter of the piston.

Note:

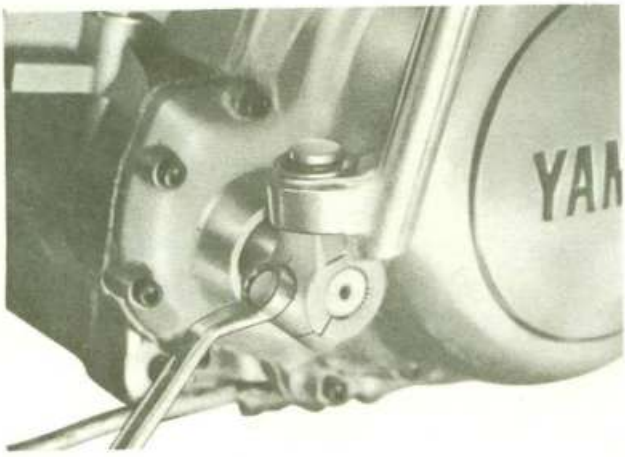
The oil control ring has three gaps. Use the top rails gap to judge where the compression and wiper ring gaps should be aligned.



KICK CRANK, CRANK CASE COVER

Disassembly

1) Remove the kick crank mounting bolt, and remove the kick crank ass'y.

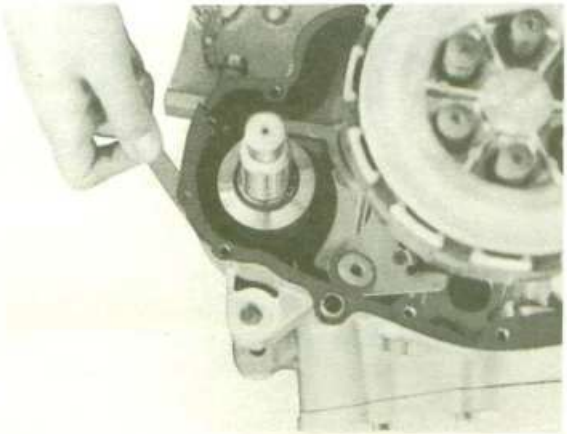


2) Remove the crankcase cover holding bolts (5-mm internal hexagon head) then remove crankcase cover.



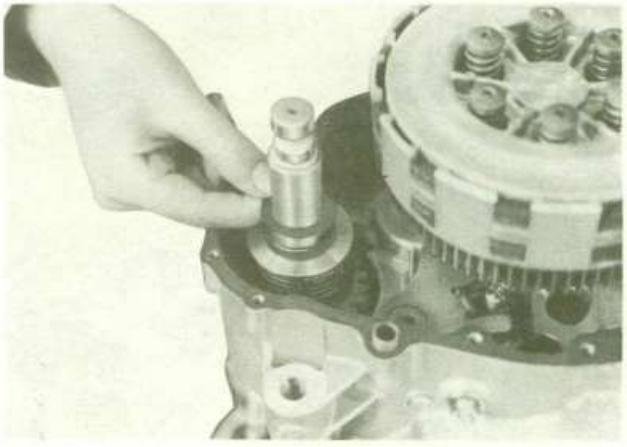
Installation

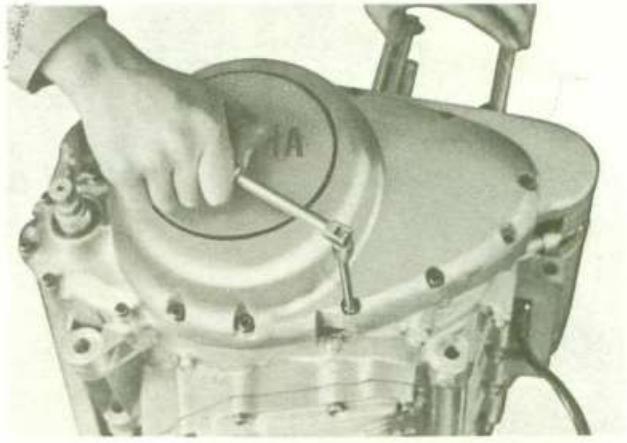
1) Thoroughly remove the gasket with the dull end of a saw blade, or other suitable scraper.
Also clean any oil off of the sealing surfaces.



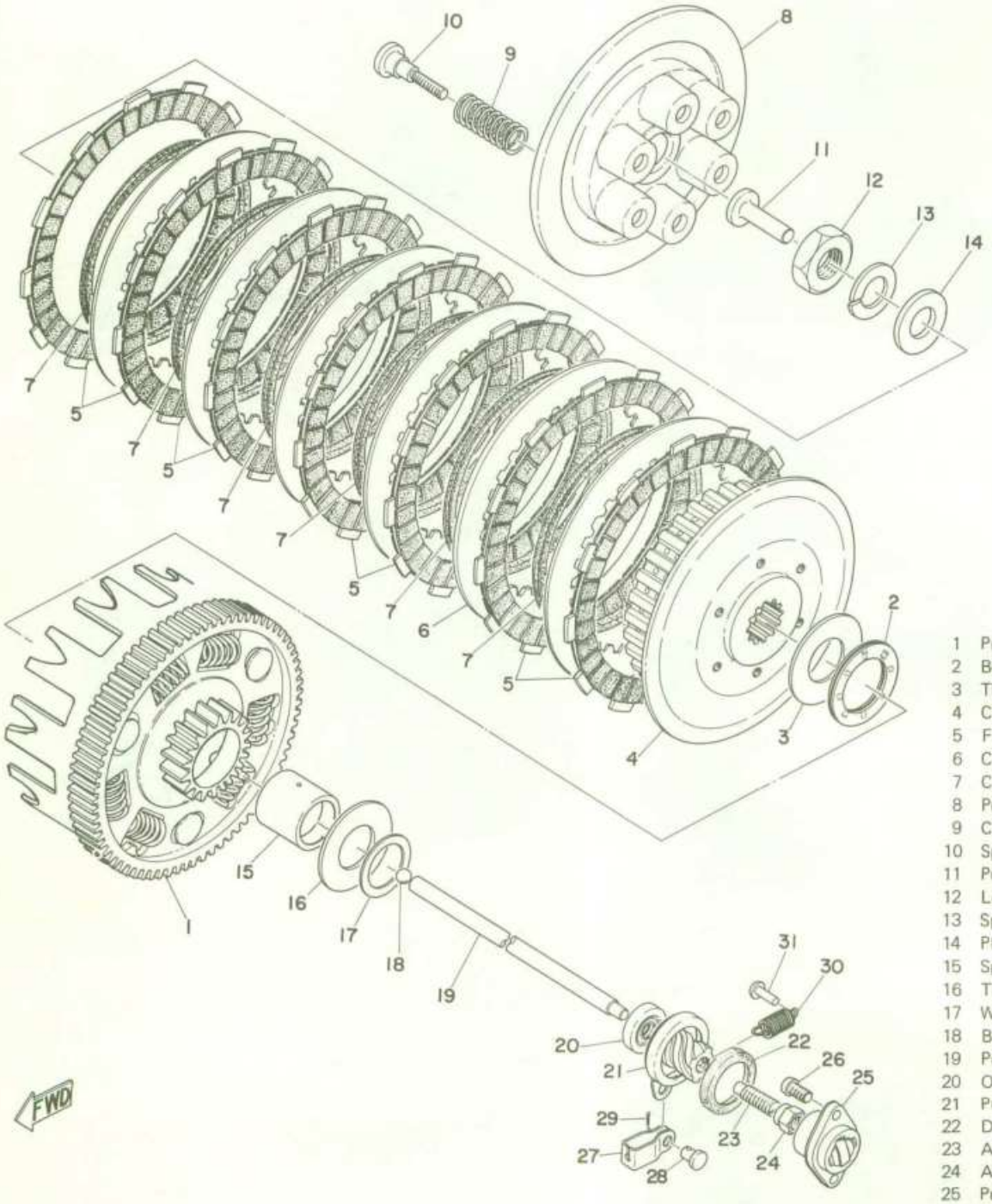
2) Install the crankcase cover gasket. Be sure to keep the knock pin fitted on the crankcase.

3) Grease the crankcase cover oil seal
Install the kick axle washer. Tightening torque for the crankcase cover hexagon bolts is 0.8 ~ 1.0 kg-m.
(72 ~ 90 in-lbs)





CLUTCH

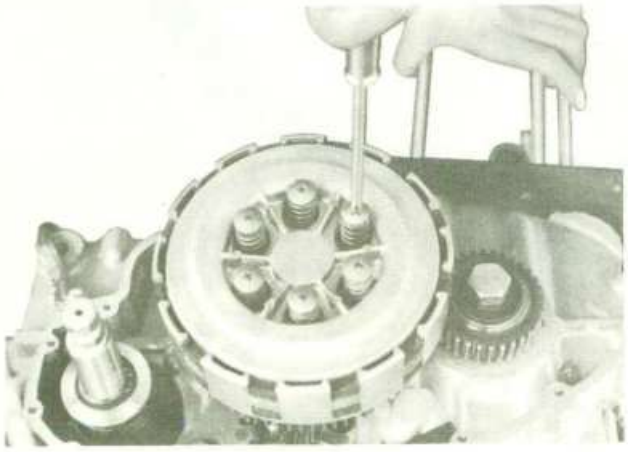


1 Primary driven gear comp.
2 Bearing
3 Thrust plate 2 (25-50-2)
4 Clutch boss
5 Friction plate 1
6 Clutch palte
7 Cushion ring
8 Pressure plate
9 Clutch spring
10 Spring screw
11 Push rod 1
12 Lock nut
13 Spring washer
14 Plain washer
15 Spacer 1
16 Thrust plate 2 (25-50-2)
17 Washer (25.2-36-1.0)
18 Ball (5/16 inch)
19 Push rod
20 Oil seal (SD-8-25-6)
21 Push lever ass'y
22 Dust seal
23 Adjusting screw
24 Adjusting nut
25 Push screw housing
26 Panhead screw
27 Joint
28 Pin
29 Cotter pin
30 Return spring
31 Spring hook

Disassembly

1) Remove all six clutch spring screws and pull off the pressure plate.

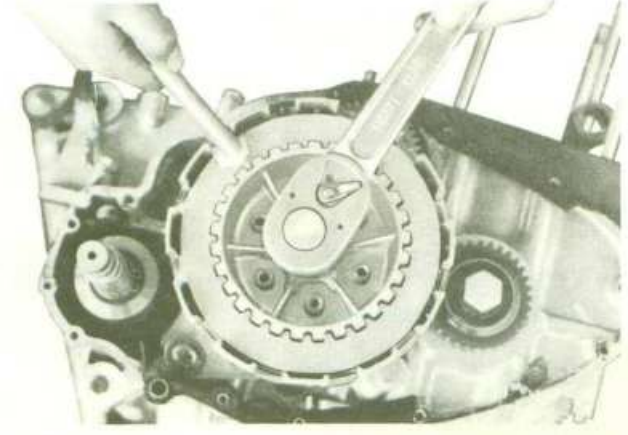
Note:
Loosen the screws in easy stages using a cross pattern.



2) Pull out the push crown, the ball directly behind the push crown, and the push rod behind the ball. The push rod is most easily removed from the other end of the main shaft.

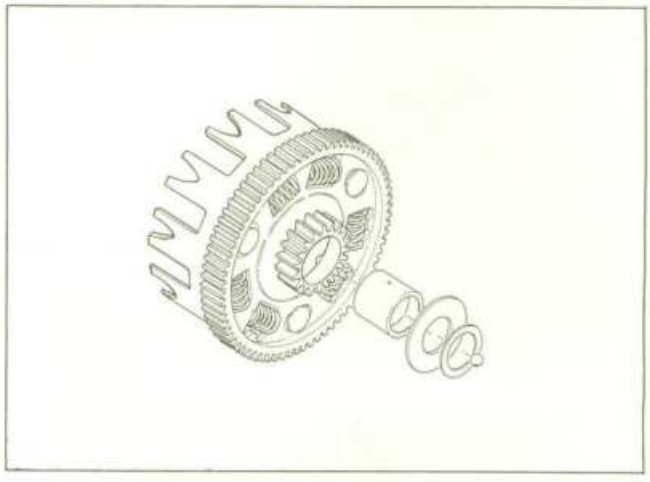


3) Hold the clutch unit with the holding tool (found in the Special Tool Kit), and unscrew the clutch boss lock nut.



4) Slide out the clutch boss and clutch plates. Behind the boss are two thrust washers with a flat thrust bearing between. Remove these parts.

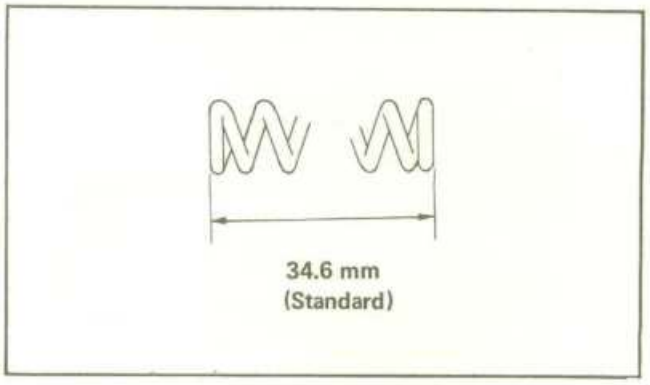
5) The clutch housing is now free. After pulling the housing off, slide off the clutch bushing spacer and thrust washers behind the spacer.

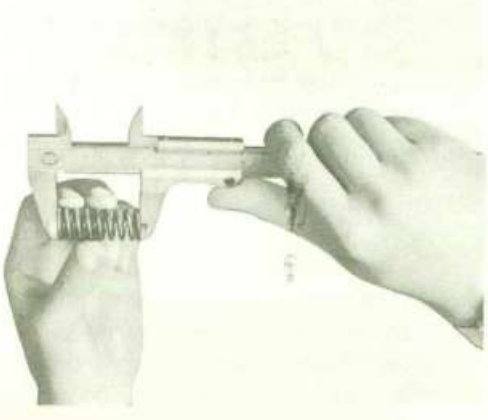


Inspection

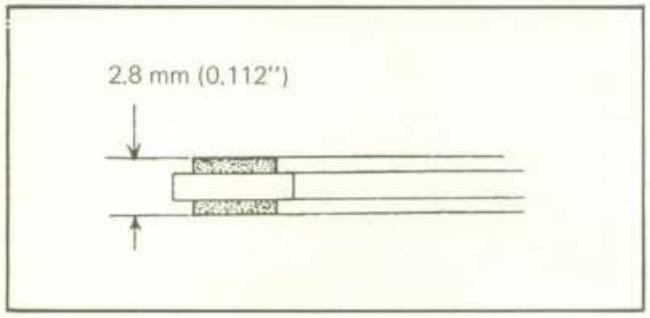
1) Clutch Spring Wear

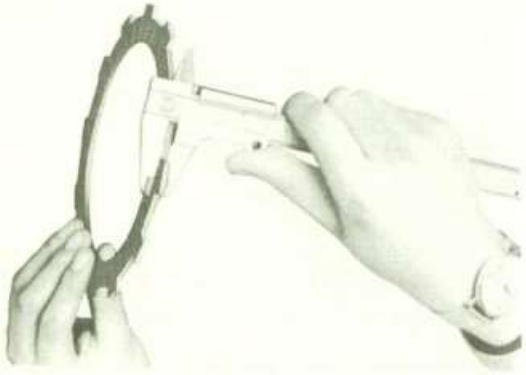
a) Measure the spring free length with vernier caliper. If standard length has shortened by 1mm (0.04") or more, replace the spring.





2) Friction Plate Wear
   a) Standard thickness is 2.8mm (0.112"). If wear has decreased the thickness to 2.6mm (0.104") replace the plate (measure at two or three points)





3) Clutch Plate Wear
   a) These plates must be flat. Lay each one on a surface plate and check both inner and outer edges for signs of "dishing" (a bow in the plate surface). Replace the plate if warpage exists.
   b) Run a feeler gauge around the inner and outer edges. Replace any plate that is warped sufficiently to permit a 0.2mm (0.008") feeler gauge to slide under either edge.

4) Push Rods

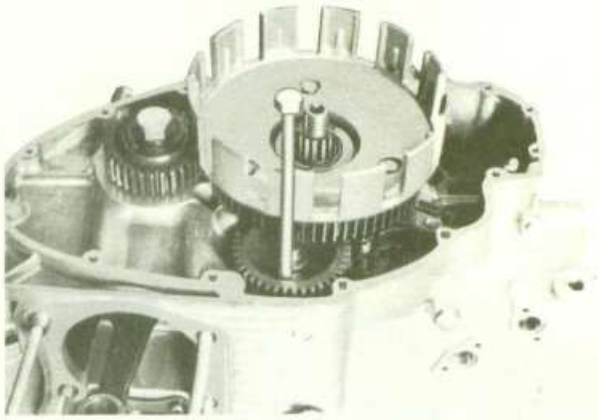
Roll the long push rod over a surface plate. If the rod is bent, or if deep grooves have been worn in the rod, replace it. Check the smaller, capped push rod for burrs which might cause jerky clutch engagement. Deburr.

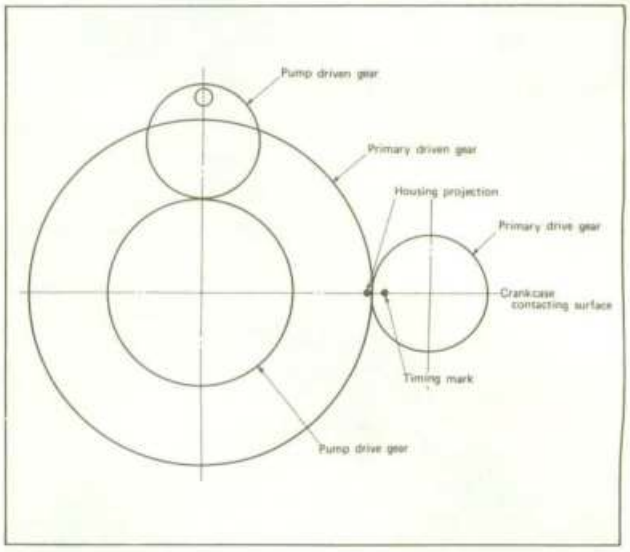
Installation

1) The pump drive gear must be installed with the step facing the case side. Be careful not to lose the key.

2) To lock the pump drive gear, insert a 8-mm-dia. shaft into the 8-mm-dia holes in the pump driven gear and pump cover. Next, align the housing projection with the reduction timing mark (on the end of the drill), and install the housing ass'y.

   In this case, it is necessary to keep the reduction gear mark aligned with the case sealing surface.





3) Reverse the clutch removal sequence. Tighten the clutch boss lock nut.

Caution

1) Be sure the two flat thrust washers and one flat thrust bearing are installed behind the clutch boss. Also, grease the flat thrust bearing and thrust washer closest to the clutch housing to prevent these parts from sliding forward, out of position, during clutch boss installation.

2) When installing the clutch spring bolts, screw them in until they bottom fully (approximately 0.8 kg-m-5 ft-lbs. torque).

Important

When installing the seven friction plates (between the metal clutch plates), install two fiber-backed plates, then both aluminum-backed plates, and finally the remaining two fiber-backed friction plates, with the appropriate clutch plates between each friction plate.

5) Primary Drive Gear

A bolt and lock *washer hold* the primary drive gear on the crankshaft. Remove the bolt and washer and slide the primary drive gear off. Use a gear puller if the primary drive gear does not come off easily. A square-shaped key fits into a crankshaft keyway to prevent the drive gear from spinning.

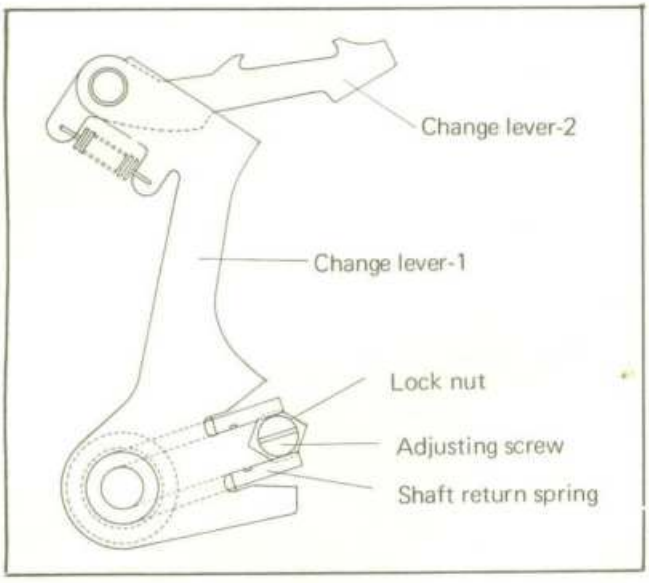
b) To install the primary drive gear, slide it onto the crankshaft. Next, line up the keyways in the gear and the shaft and insert the square-shaped key. Install and tighten the lock bolt to 12 kg-m (85 ft-lbs).

Caution

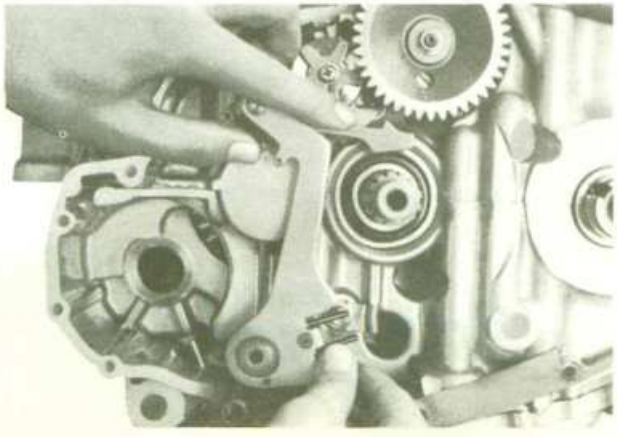
If the primary drive gear and primary driven gear teeth do not match up fully (if there is visible tooth overlay to one side), check the possibility of incorrect clutch installation.

SHIFT SHAFT ASSEMBLY

Disassembly



a) Remove the shift shaft retaining "E" clip and washer (left-hand side), then pull the entire assembly out from the right-hand side.



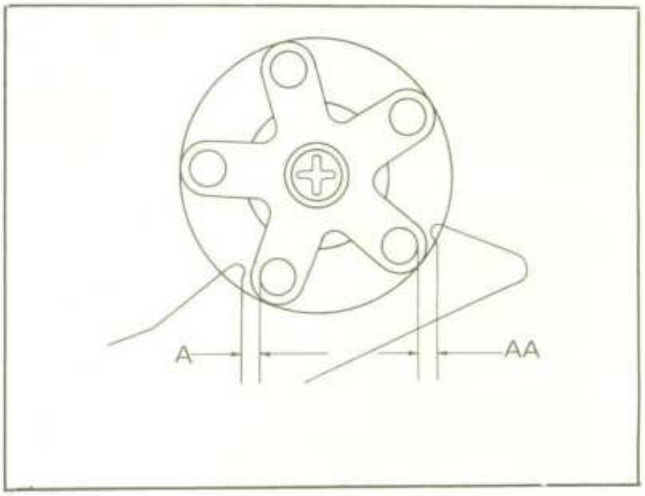
b) Installation is accomplished by inserting the shift shaft from the right-hand side and installing the washer and "C" clip.

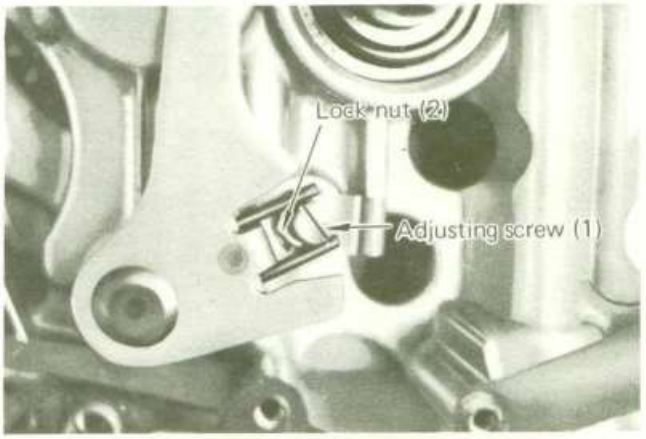
Shift Adjustment

a) If shifting adjustment is correct, distances "A" and "AA" will be equal (see this page). It these are not equal, loosen the screw lock nut (2) and rotate the adjusting screw (1) until "E" and "AA" become equal. Retighten the lock nut and bend up the tab.

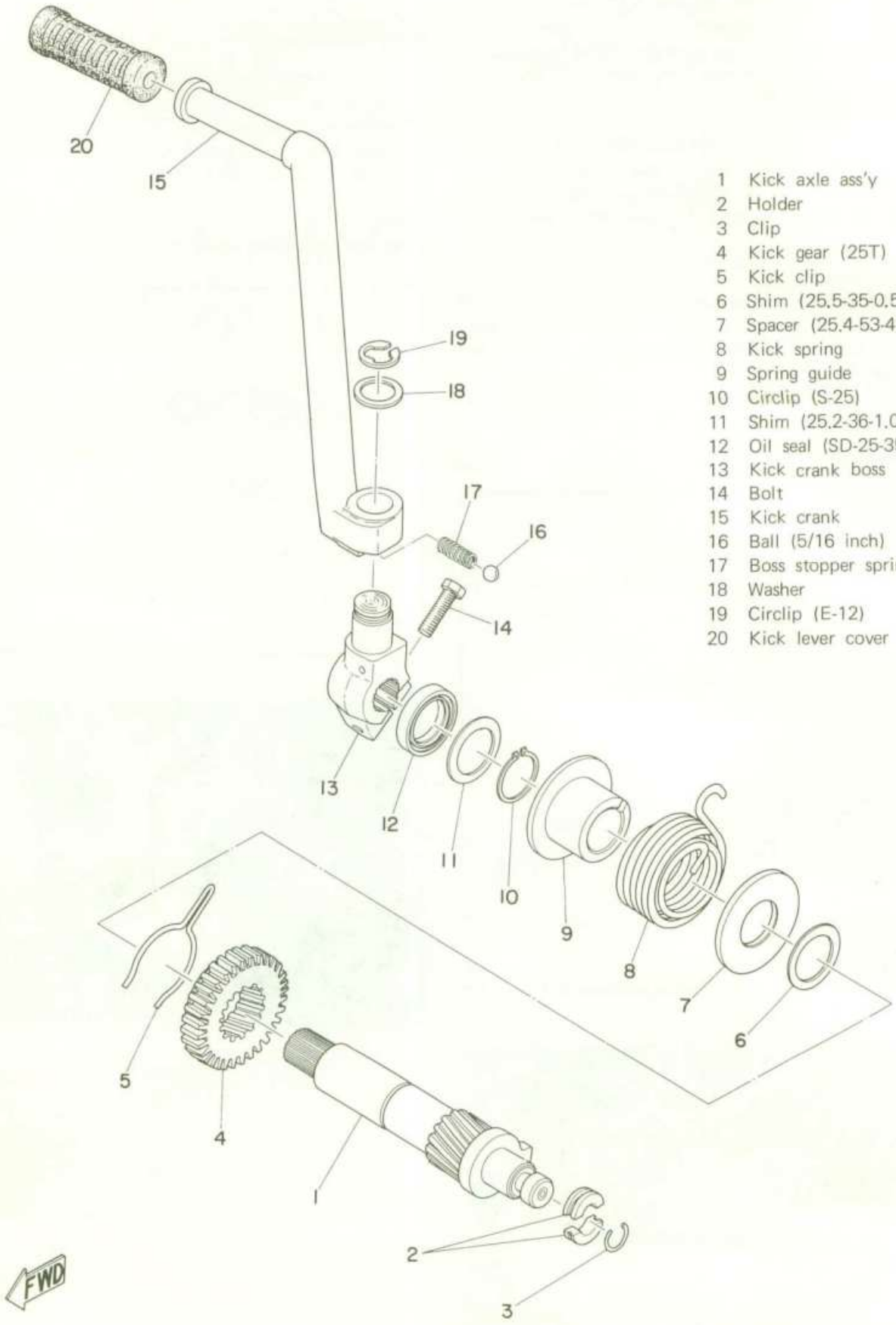
Note:

Make this adjustment in second, third, or fourth gear.



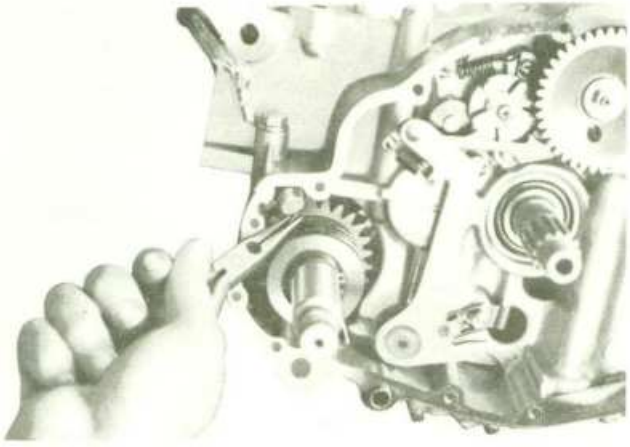


KICK MECHANISM

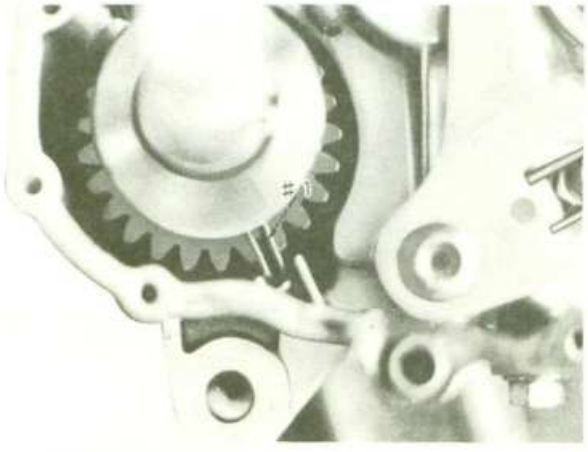


1 Kick axle ass'y
2 Holder
3 Clip
4 Kick gear (25T)
5 Kick clip
6 Shim (25.5-35-0.5)
7 Spacer (25.4-53-4)
8 Kick spring
9 Spring guide
10 Circlip (S-25)
11 Shim (25.2-36-1.0)
12 Oil seal (SD-25-35-7)
13 Kick crank boss
14 Bolt
15 Kick crank
16 Ball (5/16 inch)
17 Boss stopper spring
18 Washer
19 Circlip (E-12)
20 Kick lever cover

1) Slip the bent spring end off its anchor point and pull the kick starter *assembly* out of the case.

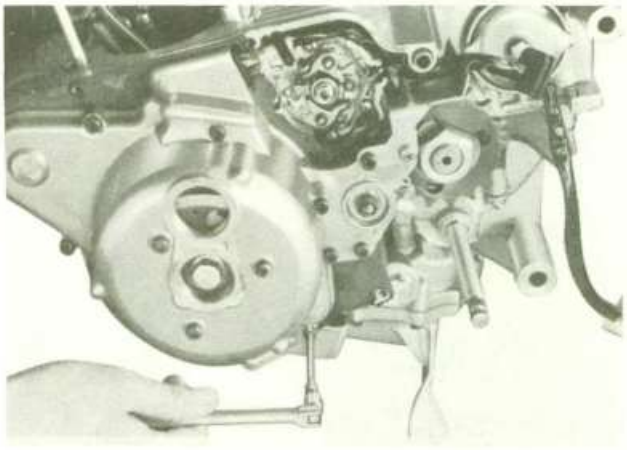


2) To install the kick assembly, partially insert the assembly until the return spring can be slipped over its anchor point, then rotate the kick clip (#1) until it slips into the appropriate recessed area in the case. Attach the kick lever and rotate the kick axle 1/2–3/4 revolution in a counter-clockwise direction. Push the axle in. The kick stopper will slip into its recessed area in the case.
The kickstarter is now pre-loaded to achieve positive kick return.

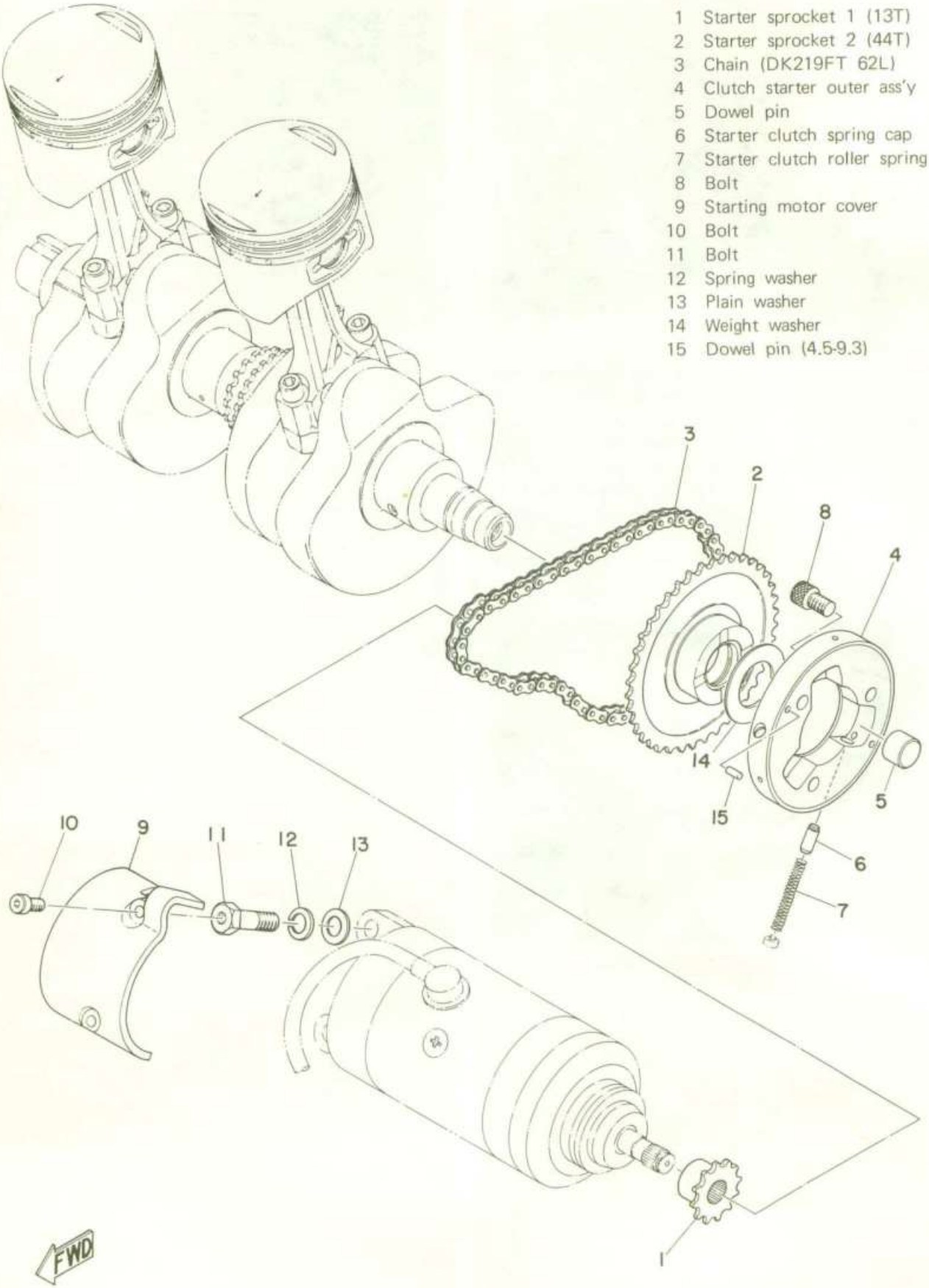


Generator Cover Removal and Installation

Remove the hexagon bolts holding the generator cover.



ROUTE OF POWER FLOW FROM STARTER MOTOR



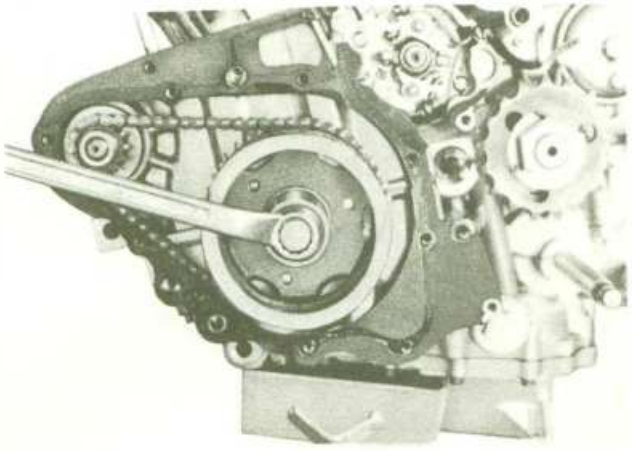
Description of Operation

As the starter button is depressed, the starter motor begins turning. As the starter motor turns, the sprocket held to the starter motor makes the sprocket wheel turn by means of the chain. The sprocket wheel is provided with a one-way roller lock mechanism. As the sprocket wheel begins turning, the one-way clutch is locked. Thus the turning force is carried from the sprocket to the crankshaft through the chain, sprocket wheel and rotor.
As the engine starts, the crankshaft keeps turning, and the roller lock is released, thus uncoupling the starter motor from the crankshaft.

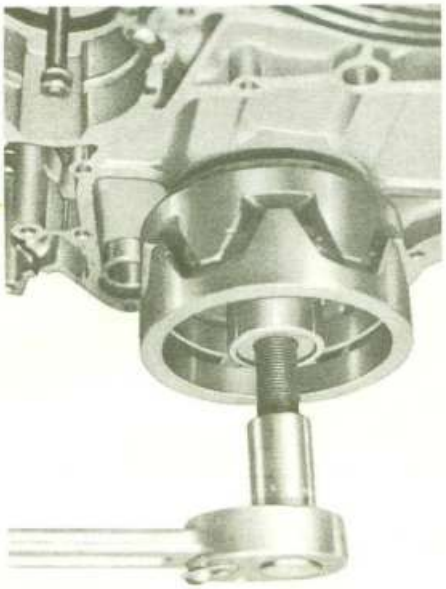
Outer Starter Clutch, Starter Sprocket 1,2

Disassembly

1) Remove the starter clutch holding bolt with a special tool, and remove the starter clutch. The woodruff key should also be removed.

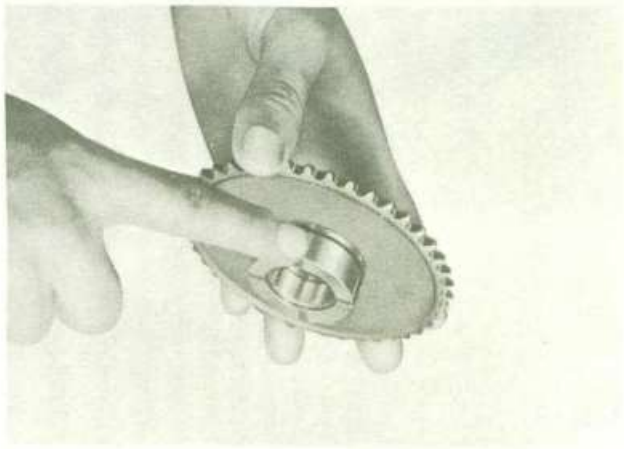


2) Remove the starter sprocket 1 and starter sprocket 2 at the same time. Next, remove the chain tensioner.



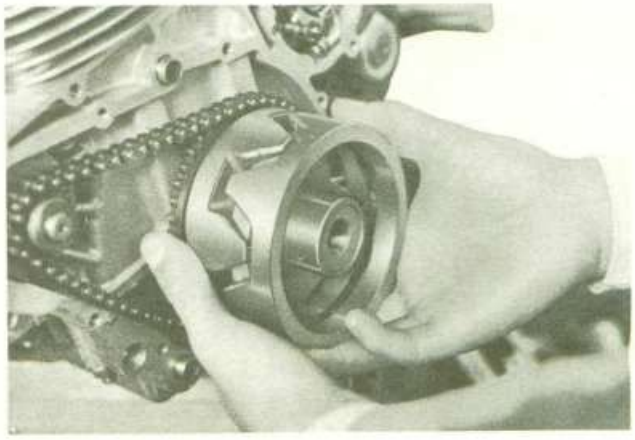
Inspection

Check the contact surface of the sprocket wheel with the roller. If it is excessively roughened, replace both sprocket wheel and roller.



Installation

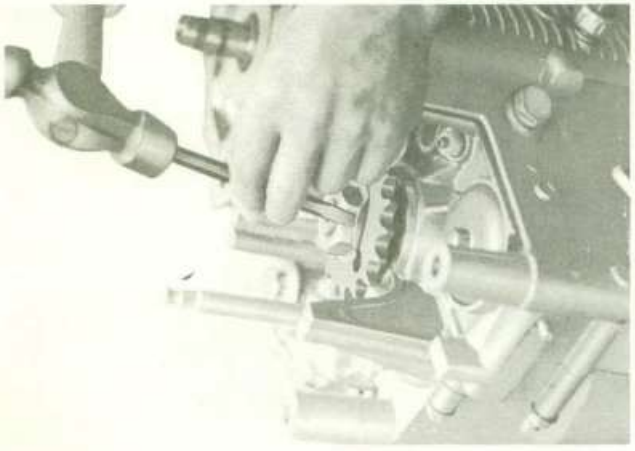
Place the chain around sprockets 1 and 2, and install sprockets 1 and 2 at the same time. Install the key, and coat the tapered end of the crankshaft with a morlybdenum disulfide grease, then install the starter clutch.

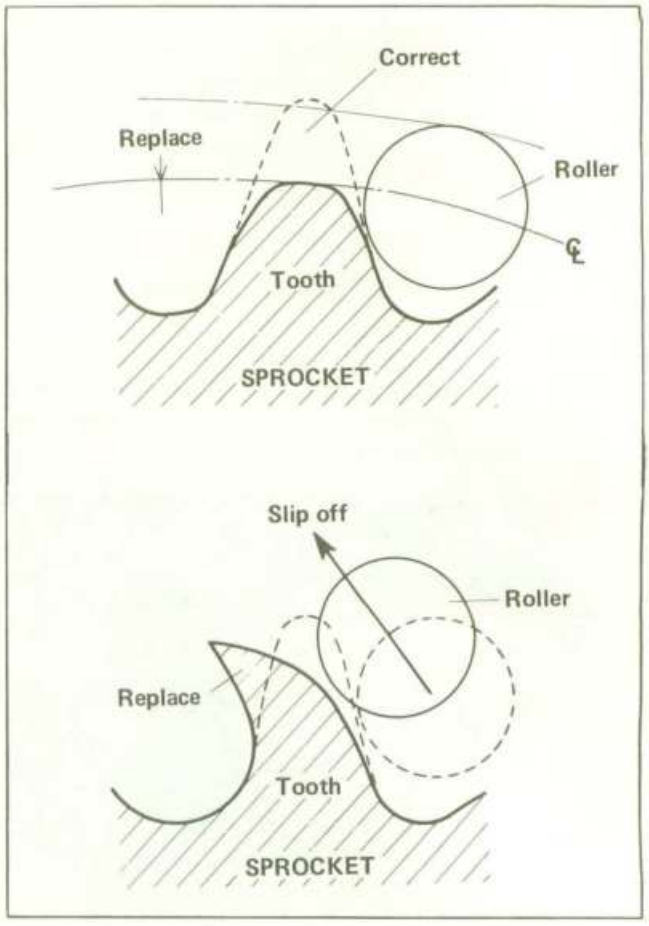


DRIVE SPROCKET

Disassembly

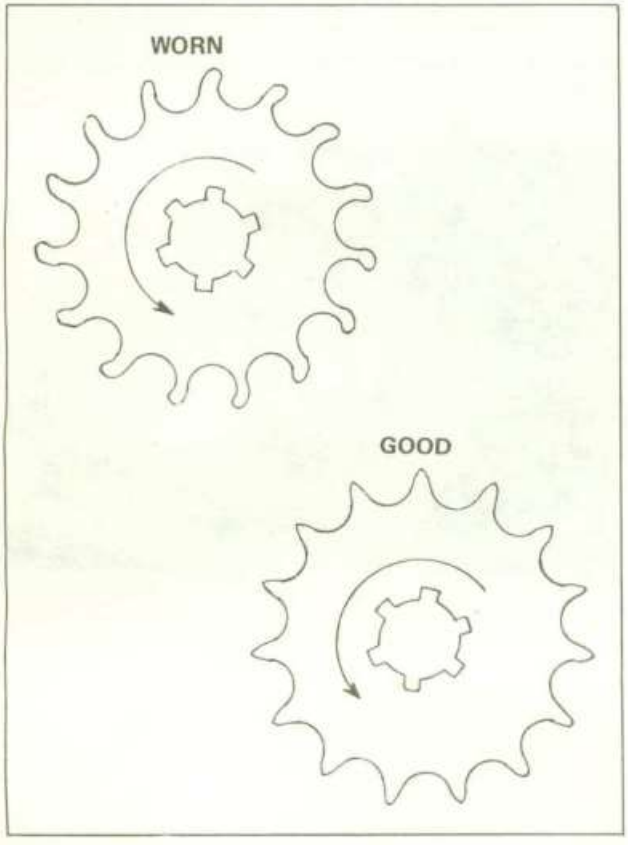
Flatten the bent lock tab. Place the transmission into gear (to keep the shaft from rotating) and remove the lock nut. The drive sprocket need only be removed if transmission repair is necessary. In addition, it can be removed prior to removing the engine from the frame. Reverse the above procedures to install the sprocket. Be sure to bend the lock tab back up.



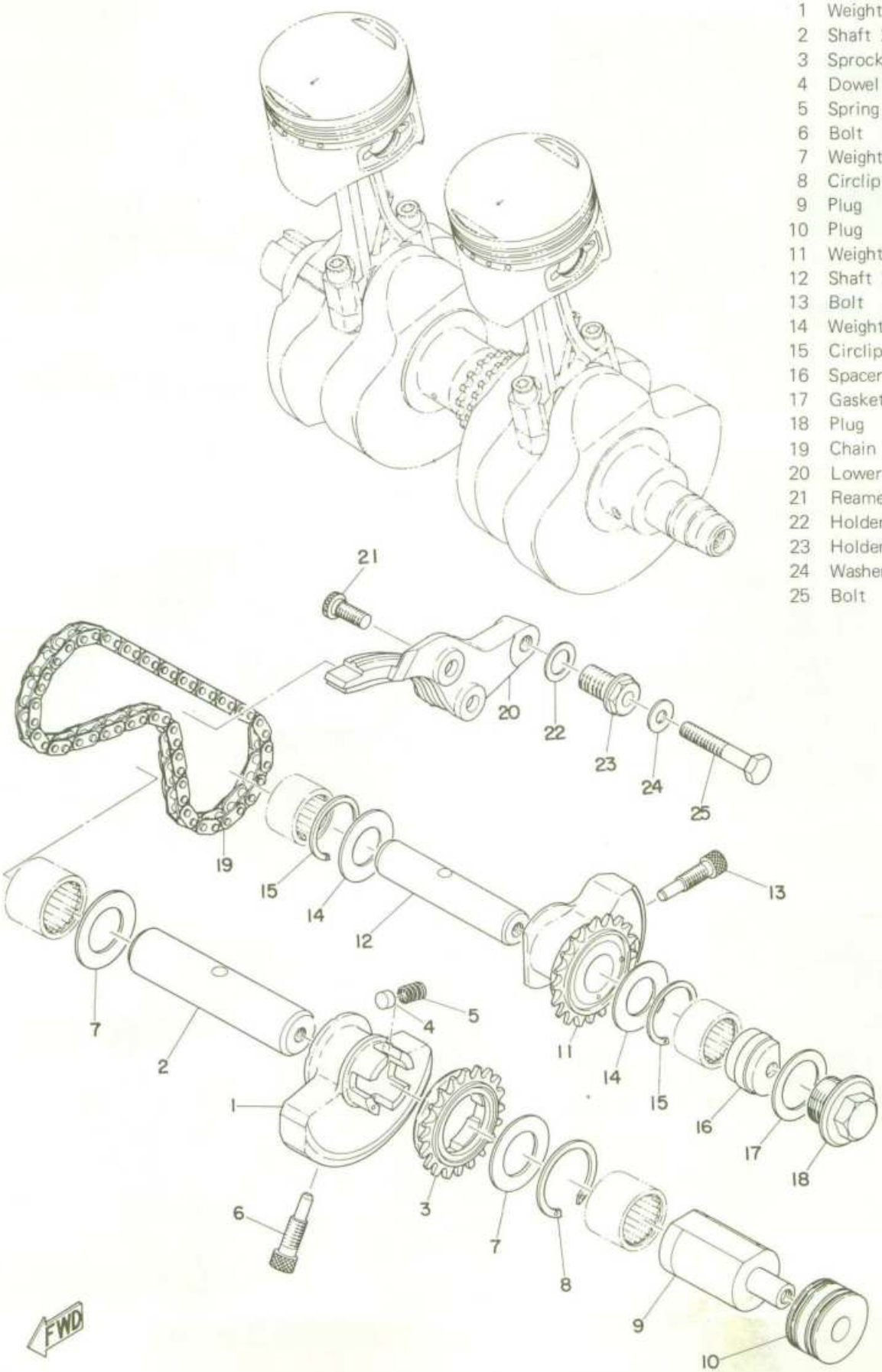


Inspection

Constant tension and friction from the drive chain eventually wears away the base of the sprocket teeth. The weakened teeth bend and do not mesh correctly with the chain. Replace an excessively worn sprocket.



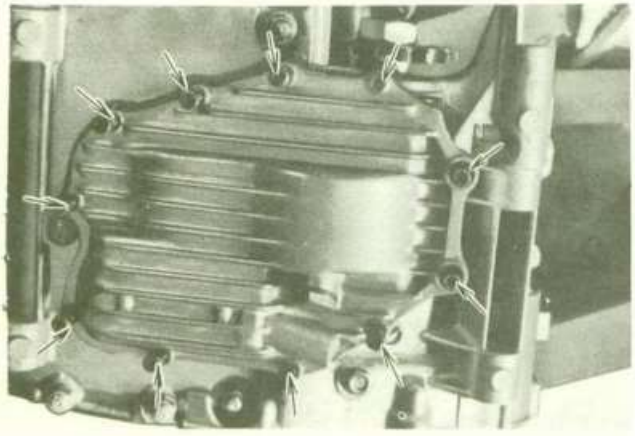
OMNI–PHASE BALANCER



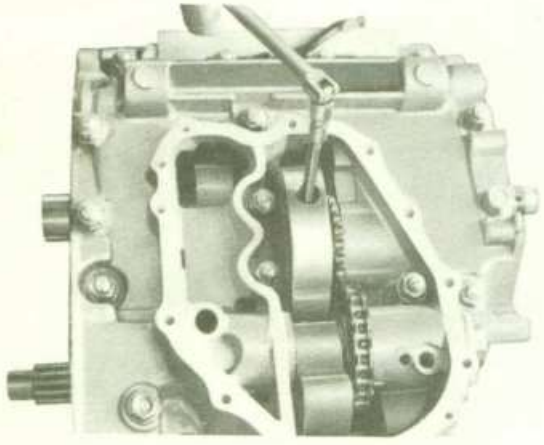
1 Weight 1
2 Shaft 2
3 Sprocket wheel
4 Dowel pin (4.5-9.6)
5 Spring
6 Bolt
7 Weight washer 1
8 Circlip 1 (36 ϕ special)
9 Plug
10 Plug
11 Weight 2
12 Shaft 2
13 Bolt
14 Weight washer 2
15 Circlip (30 ϕ special)
16 Spacer
17 Gasket
18 Plug
19 Chain (DK316FT54L)
20 Lower guide
21 Reamer bolt
22 Holder gasket
23 Holder
24 Washer
25 Bolt

Disassembly

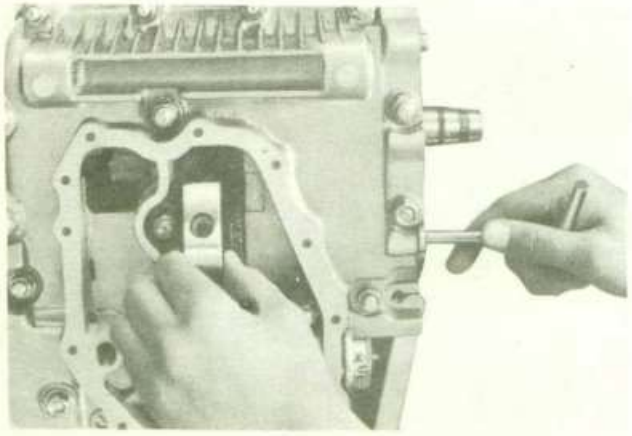
1) Remove the oil strainer cover.



2) Remove the balancer weight pinch bolts by use of a hexagon wrench.



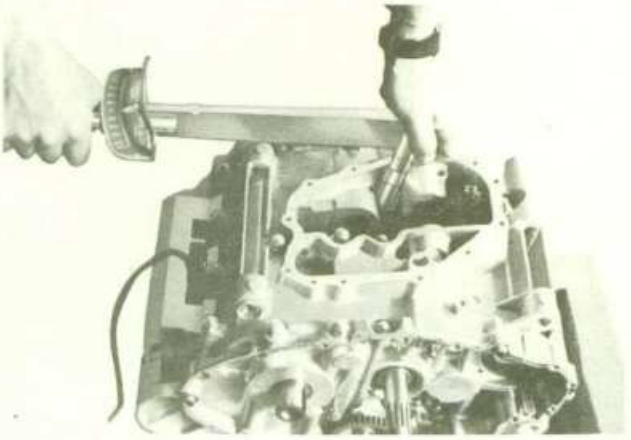
3) Pull out the balancer weight shaft with the balancer shaft puller.



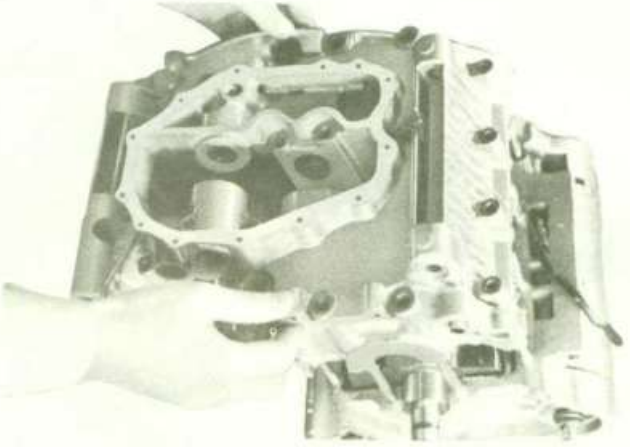
Crankcases

1) The TX750 unit construction crankcase contains the transmission, crankshaft, balancers, and associated parts such as oil strainer (in crankcase sump), etc.

2) Loosen and remove all case securing bolts located on the bottom of the case plus the case bolts around the dip stick on top. Start with # 21 and loosen each bolt to # 1. Loosen each bolt 1/4 turn at a time to avoid case warpage.

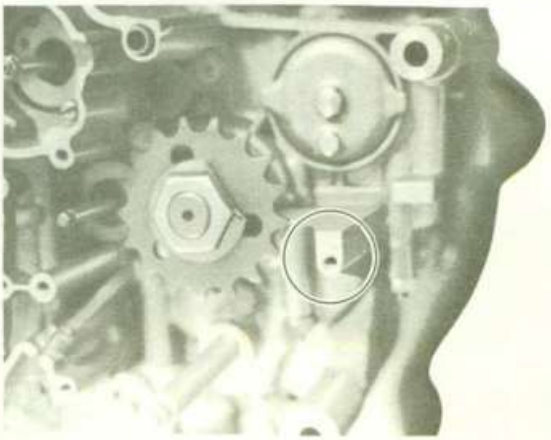


3) Separate the cases by lifting off the bottom case. It might be necessary to tap the case loose with a rubber hammer.



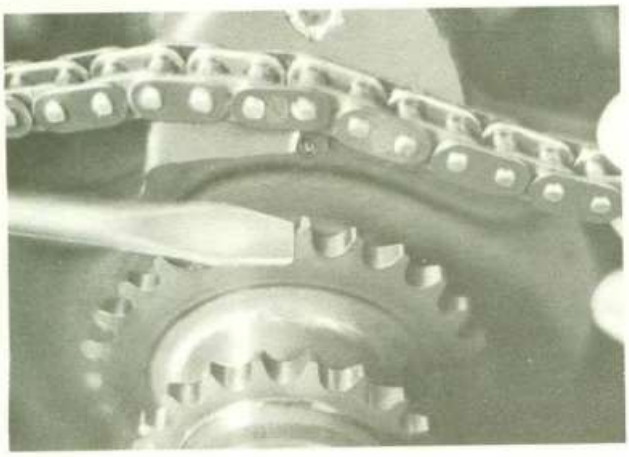
Caution

Do not hammer on the case cover mounting flange; it could easily break off.



Balance Weight Timing

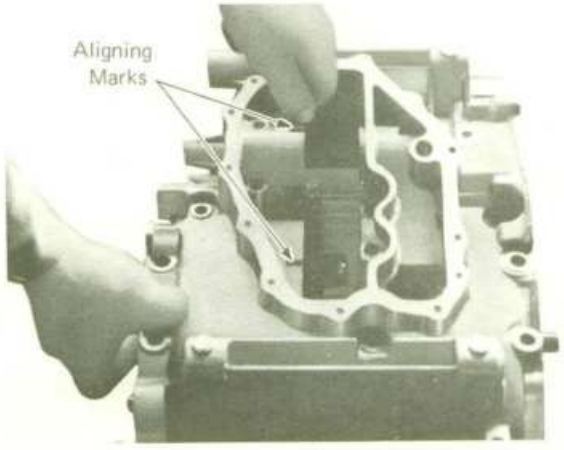
1) Place chain around balancer drive sprocket on crankshaft.



Note:
Install the cam chain at the same time of installing the crankshaft with the balancer chain set in the crankcase lower.

2) Thread the chain through the lower crankcase, and tie it to the crankcase with a wire. Then put together the upper and lower crankcases, and tighten the nuts. The nuts should be tightened in steps and in numerical order indicated on the crankcase.
Tightening torque:

M8	2.0–2.2 kg-m (180 – 198 in-lbs)
M10	3.7–4.0 kg-m (333 – 360 in-lbs)



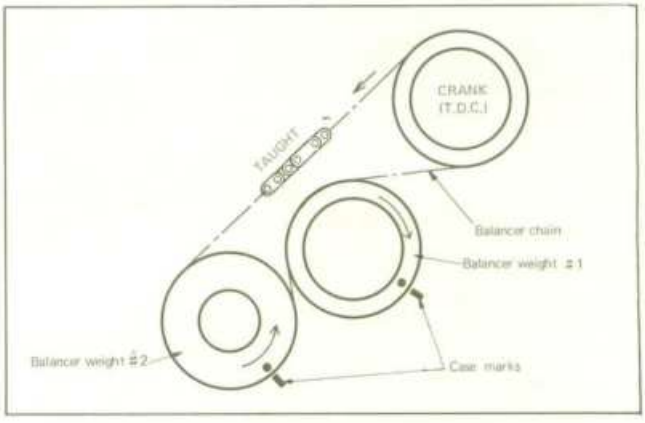
3) Rotate crankshaft until pistons are at T.D.C.
Place balancer # 2 (small balancer) in chain, at the same time aligning the mark on sprocket with mark on case. Keep bottom row of chain taut.

4) Place washers on both sides of the weight and insert the balancer shaft into the case and through the balancer shaft hole.

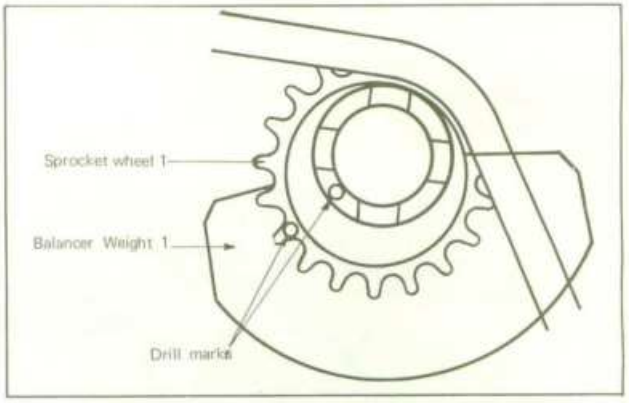
5) Make sure the balancer hole is aligned with the balancer shaft hole, and insert the pinch bolt into the holes to lock them together.
Tightening torque: 3.7 – 4.0 kg-m (333 – 360 in-lbs)

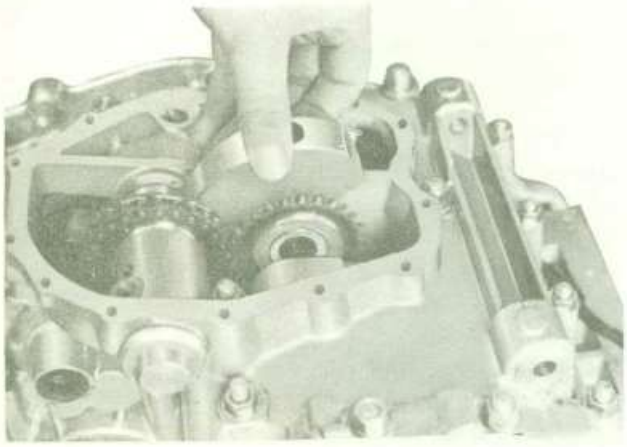
CAUTION:
Before tightening the pinch bolt, coat it with "LOCK TITE" and tighten with correct torque.

Note:
* Balancer shafts 1 and 2 are retained with roller bearings. Therefore make sure that the shafts come in smoothly before assembling the balancer.
* In assembling the balancer weight, apply grease on it so that the washers on both sides do not come off. Then go on to assemble the balancer weight.



6) Install sprocket wheel 1 and balancer weight 1 with the dowel pins and springs. Align the drill marks on these two parts.



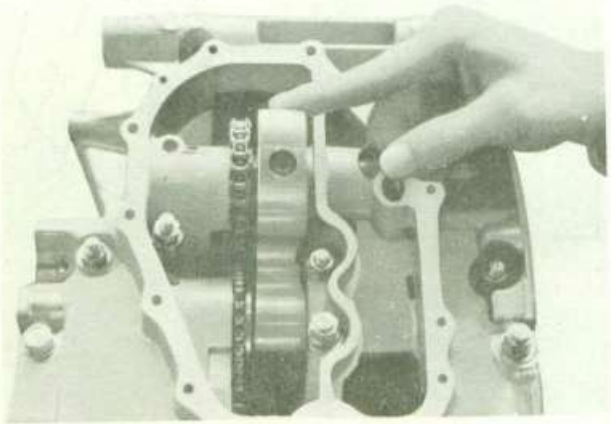


Note:
To insure correct balancer sprocket alignment, the balancer washers must be installed in their original positions.

7) Align mark on balancer # 1 (large balancer) sprocket teeth with mark on case. Place washers on both sides of the weight and insert the balancer shaft in the case and through the balancer.

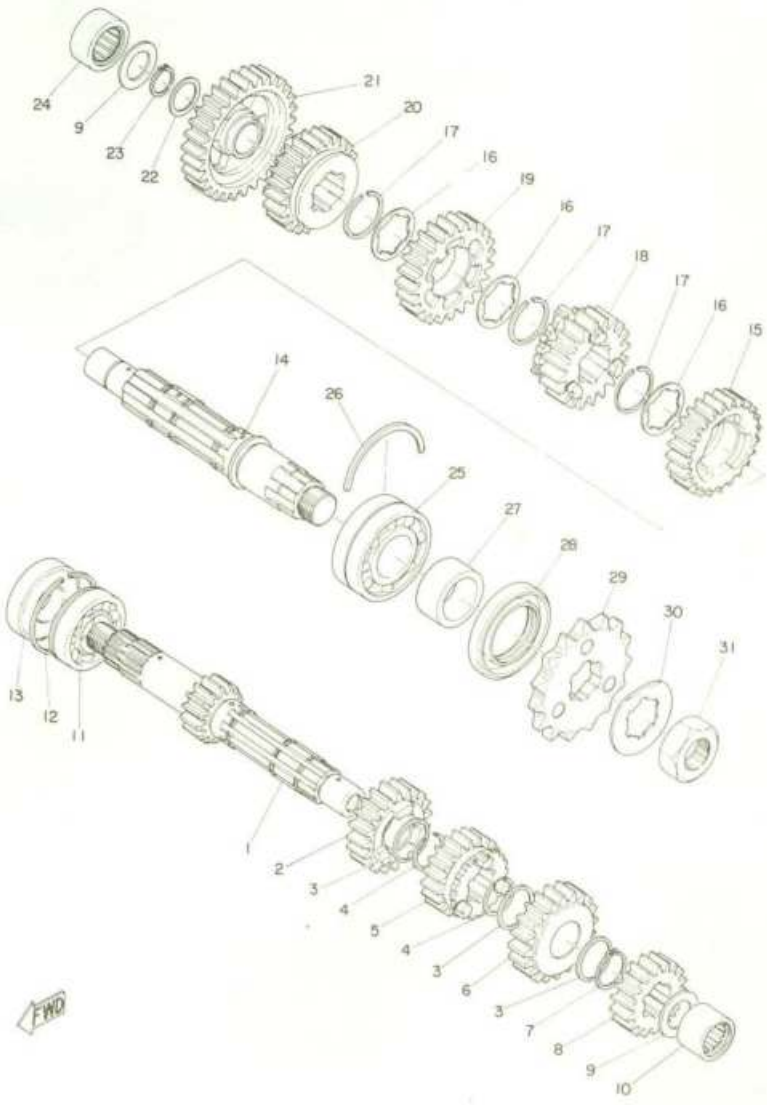
8) Make sure the balancer hole is aligned with the balancer shaft hole, and insert the pinch bolt into the holes to lock them together.
   Tightening torque: 3.7 ~ 4.0 kg-m (333~360 in-lbs)
   CAUTION:
   Before tightening the pinch bolt, coat it with "LOCK-TITE" and tighten with correct torque.

9) After installing the balancers, check to see that they don't contact each other by turning the crankshaft at least four revolutions.
   Be sure to oil the chain and shaft.

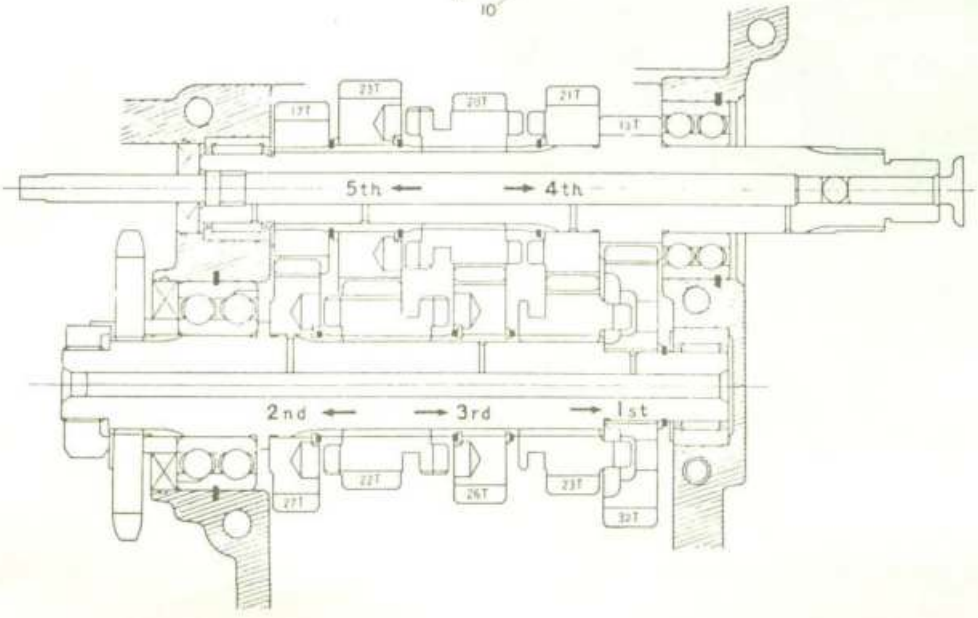


NOTE:
See Appendices for Adjustable Balancer Installation and Adjustment Procedure.

TRANSMISSION

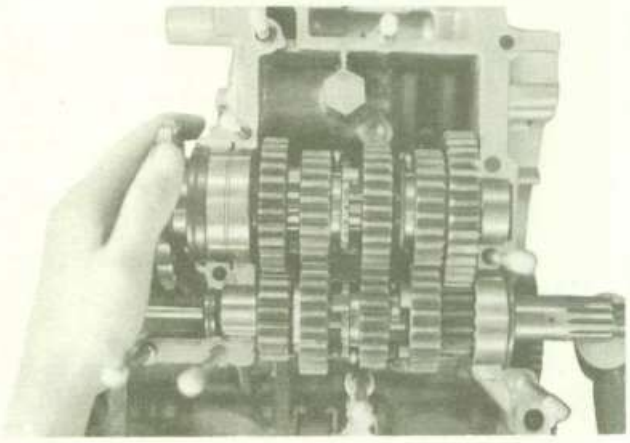


1 Main axle (13T)
2 4th pinion gear (21T)
3 Gear hold washer 5 (25.2-30-1.0)
4 Circlip (25 ϕ special)
5 3rd pinion gear (20T)
6 5th pinion gear (23T)
7 Circlip (S-25)
8 2nd pinion gear (17T)
9 Drive axle shim (20.2-23-1.0)
10 Bearing
11 Bearing (B5205)
12 Circlip (52 ϕ special)
13 Collar
14 Drive axle
15 2nd wheel gear (27T)
16 Gear hold washer 3 (26.2-34-1.0)
17 Circlip (30 ϕ special)
18 5th wheel gear (22T)
19 3rd wheel gear (26T)
20 4th wheel gear (23T)
21 1st wheel gear (32T)
22 Gear hold washer (20-25-1.0)
23 Circlip (S-20)
24 Bearing
25 Bearing (B5206)
26 Circlip
27 Distance collar
28 Oil seal (SDO-40-62-9)
29 Drive sprocket (17T)
30 Lock washer
31 Lock nut



Disassembly

Tap lightly with a rubber hammer to loosen the transmission, then lift it out.

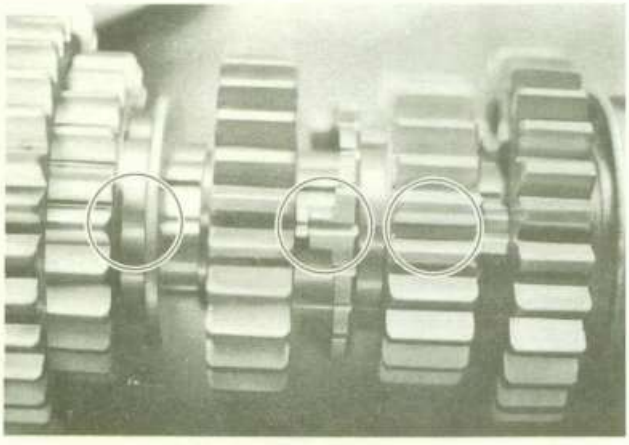


Inspection

a) Check the gears for chipped teeth.
b) Check engagement dogs and slots for rounded edges.
c) Check the sliding gear fork grooves for a blue discoloration. If any of the above mentioned conditions is obviously noticeable, replace the gears.

Note:

Especially in the case of damaged engagement dogs, check the mating gear for damage or excessive wear. It is sometimes necessary to replace the parts as a set.

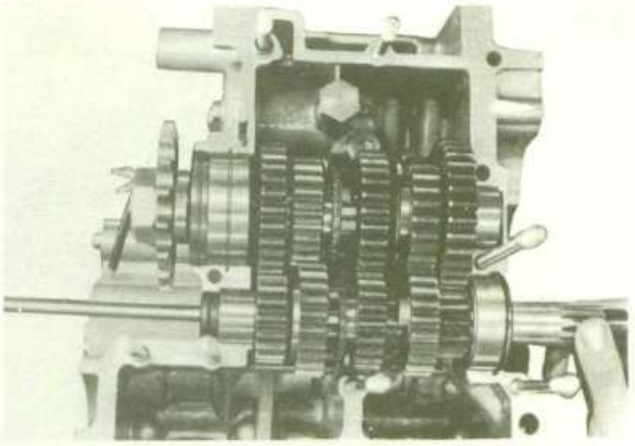


Installation

With both shafts assembled, including all bearings and seals, fit the transmission into the TOP CASE.
This permits the shift forks to slip over the sliding gears easily. Be sure both transmission shaft circlips are fitted to the bearings and the circlips have been positioned in the circlip grooves.

Note:

Transmission installation is easier if the shift drum is rotated to the neutral position.



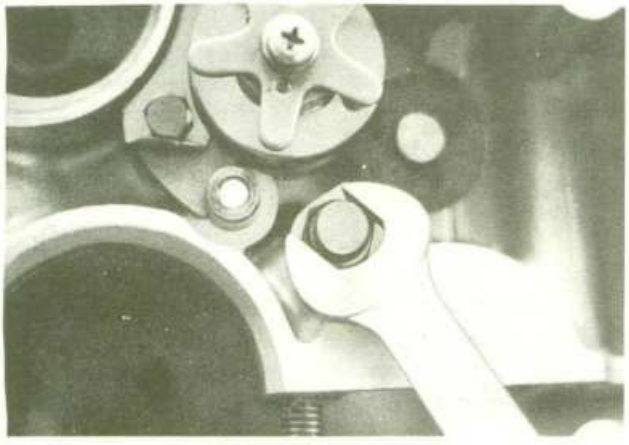
Very important

Check for smooth and complete shifting through all gears after installing the shift drum, shift forks, guide bar, and transmission. At the same time check for complete engagement of all engaging dogs into the appropriate gear slots.

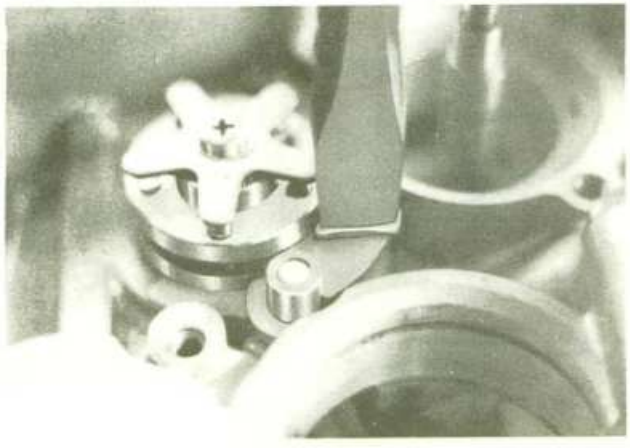
SHIFT DRUM ASSEMBLY

Fork Guide Bar Removal and Installation

1) On the exterior section of the right-hand case is the shift drum stopper. Release the stopper spring and remove the stopper unit. Bend the lock tabs down on the locating plate bolts and remove the plate.

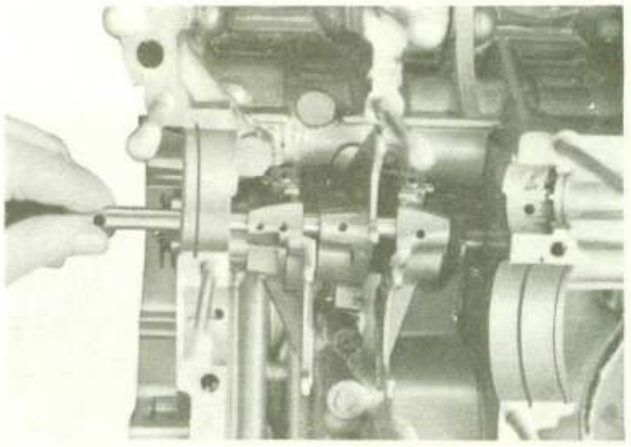


2) The fork guide bar is held in place by the shift drum stopper plate. With the plate removed, the bar can be pulled out.

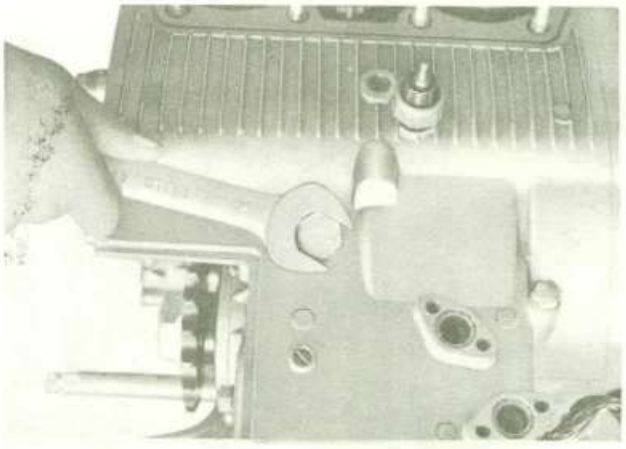


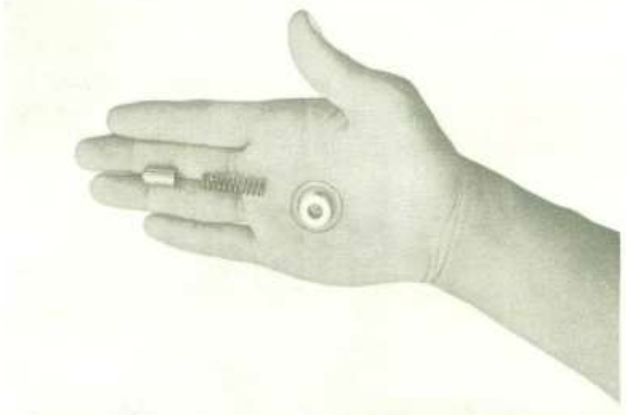
Caution

Note that the stopper plate has a locking tab to secure the two bolts holding the plate in place. During reassembly, always make sure the locking tabs are bent up firmly around the securing bolt heads.

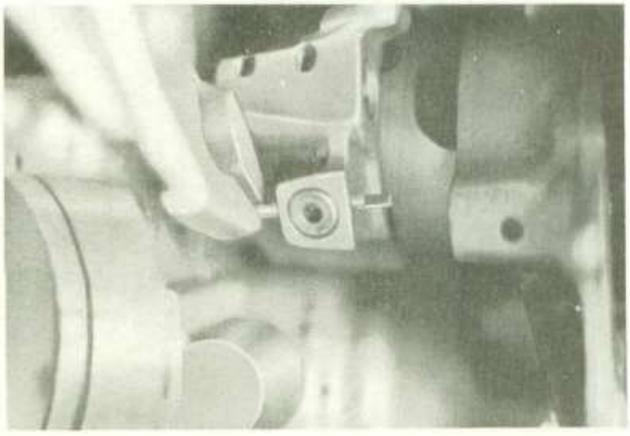


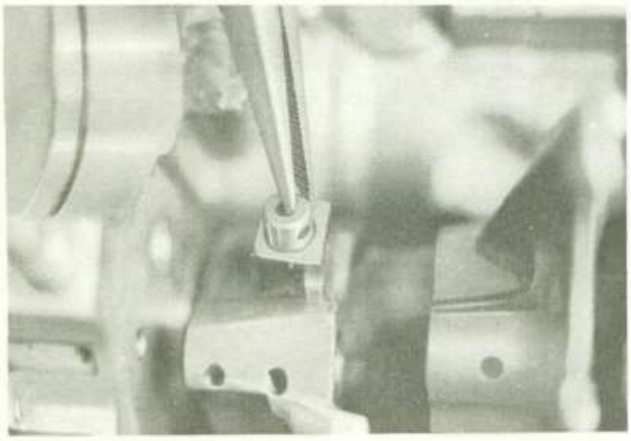
3) Remove the change stopper unit.



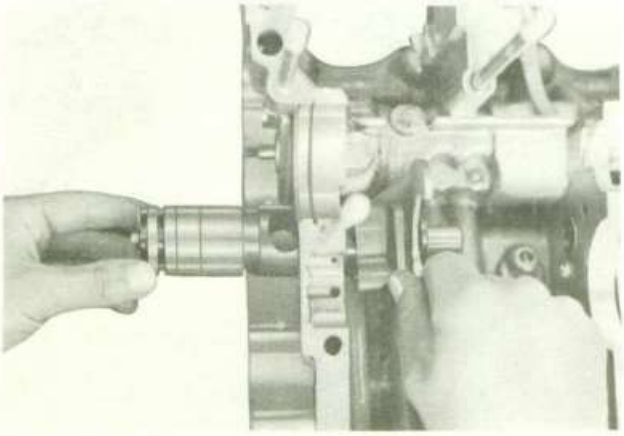


4) A cam follower pin mounted in each fork is held in place by cotter pin and cam follower roller.





5) Pull out the shift drum and remove all three shift forks from the case. Take care, when removing the shift drum to catch all three cam follower rollers that rest in the grooves in the drum.



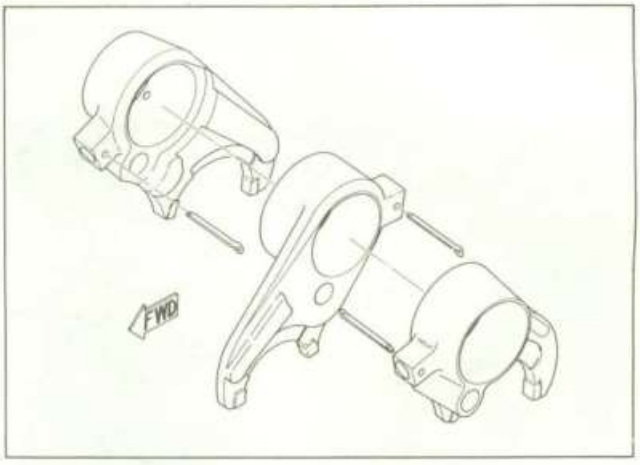
Inspection

Check the guide bar for alignment. Roll it over a surface plate and check for bends. If it is bent, replace it.

Shift drum and shift fork installation:

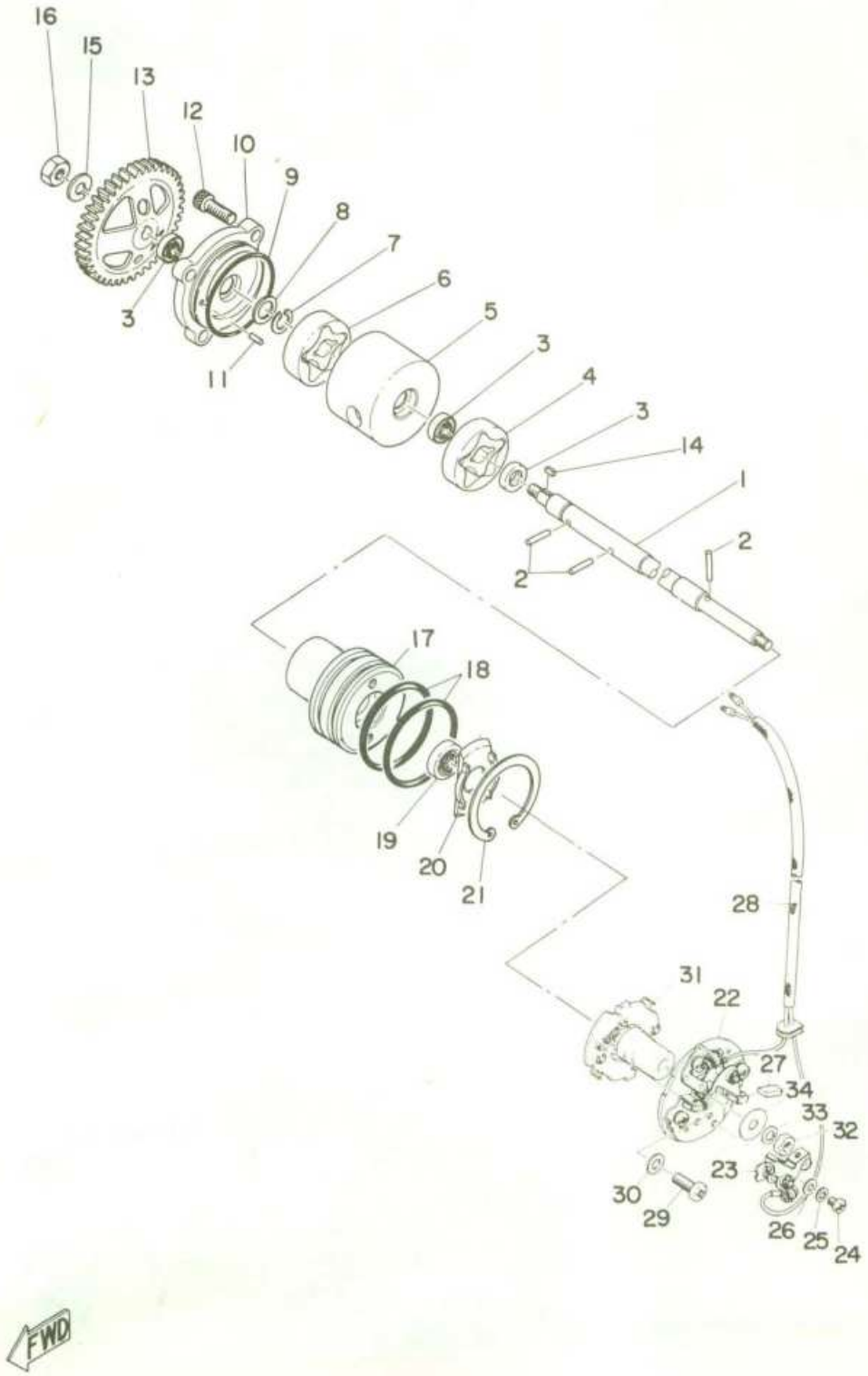
1) Pay particular attention to the direction and order of fork installation. Fifth gear wheel shift fork has a clearance notch machined into one side to allow clearance for the neutral light button. Fourth gear wheel shift fork is also notched on one side to provide clearance for the neutral position stopper. If these shift forks are incorrectly installed, the neutral stopper and neutral light button will not fit into position.

2) Installation of this unit is a reversal df the previous steps. Be sure to lubricate the shift drum and forks before installation. When installing the cam follower pin, always use new cotter pins. After bending the cotter pins, make sure the bent pin ends do not drag. Check for smooth fork movement on the shift drum after assembly.



CONTACT BREAKER ASS'Y, GOVERNOR ASS'Y, TROCHOIDAL PUMPS
(Suction and Scavenging Pumps)

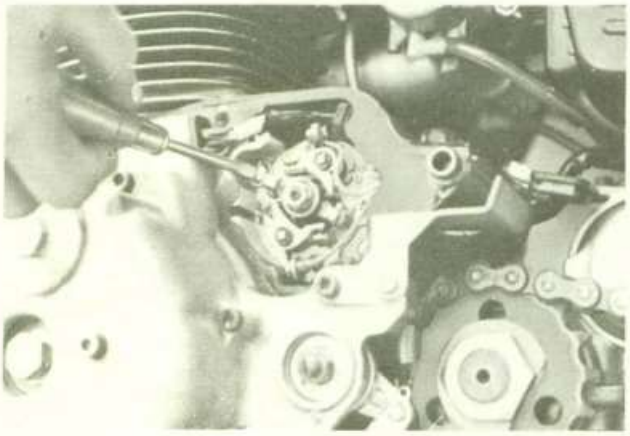
As the TX750 lubrication employs the dry sump system, both suction pump and scavenging pump are required. These pumps are installed on the pump shaft. In addition to the pumps, the contact breaker ass'y and governor ass'y are attached to the pump shaft. The pump shaft is driven by the crankshaft through the primary drive gear, pump drive gear and pump driven gear. It turns at half the speed of the crankshaft.



1 Pump shaft
2 Dowel pin (3-17)
3 Oil seal (SD-11-15-3)
4 Rotor 1 ass'y
5 Rotor housing
6 Rotor 2 ass'y
7 Circlip (11 ϕ special)
8 Washer (11.5-14.5-0.5)
9 O-ring (2.2-45.5)
10 Pump cover
11 Dowel pin (2.5-7.8)
12 Bolt
13 Driven gear
14 Woodruff key
15 Spring washer
16 Nut
17 Rotor filter cover
18 O-ring (2.2-45.5)
19 Oil seal (SD-11-22-7)
20 Rotor filter side plate
21 Circlip (R-52)
22 Breaker plate ass'y
23 Contact breaker
24 Panhead screw (4-6)
25 Spring washer
26 Plain washer
27 Lubricator
28 Lead wire ass'y
29 Brake plate screw
30 Plain washer
31 Governor ass'y
32 Nut
33 Spring washer
34 Special washer

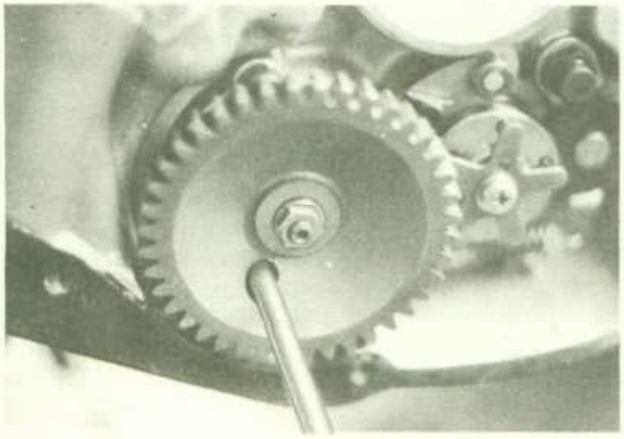
Disassembly

1) Remove the contact breaker ass'y.

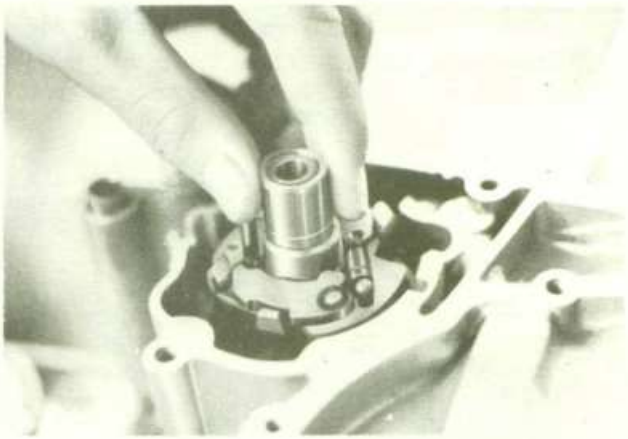


2) Remove the breaker cam holding nut.
If the pump shaft turns, lock it by inserting an 8-mm-dia. rod into the timing hole in the pump driven gear on the opposite side.

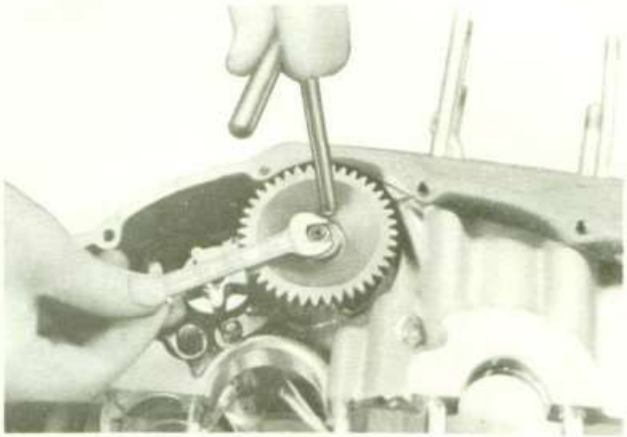




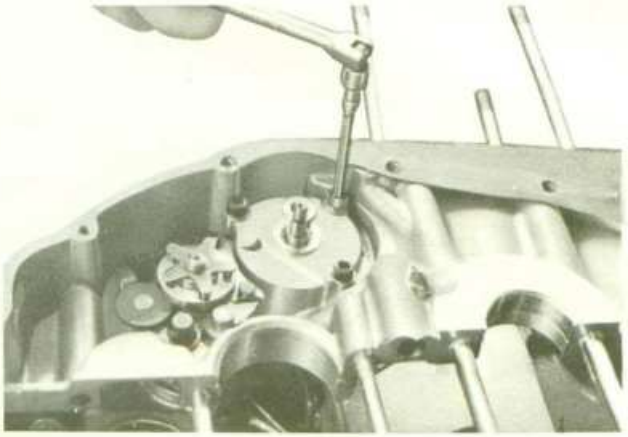
3) Pull out the governor ass'y.
The governor shaft is locked to the pump shaft with a pin. Remove this pin.



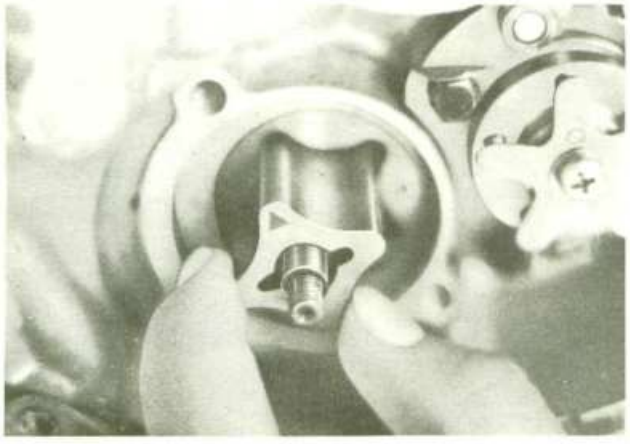
4) Remove the pump driven gear.
In this case, it is necessary to lock the pump shaft by inserting an 8-mm-dia. rod into the timing hole in the pump driven gear and the hole in the crankcase, and loosen the nut.
After removing the pump driven gear, be sure to remove the key.



5) Remove the pump cover, washer and circlip.



6) Remove the pumps (suction and scavenging) and rotor housing. Then remove the dowel pin.
The dowel pin is located in a very narrow space. Do not let the pin fall in the oil passage.



7) Remove the circlip. Insert the 6-mm bolt into the two holes located inside the body, and screw the bolt into the hole in the side plate. Pull the two bolts at same time, until the side plate can be removed and remove the side plate.
Take care not to be scratch the crankcase.



8) Remove the pump shaft from the left side.

Installation

1. Clean all component parts, and assemble them. To assemble, reverse the procedure for disassemble.
Oil all parts (Except the governor ass'y and breaker ass'y)

2. When installing the dowel pin for pump mounting, take special care not to drop it into the oil passage.

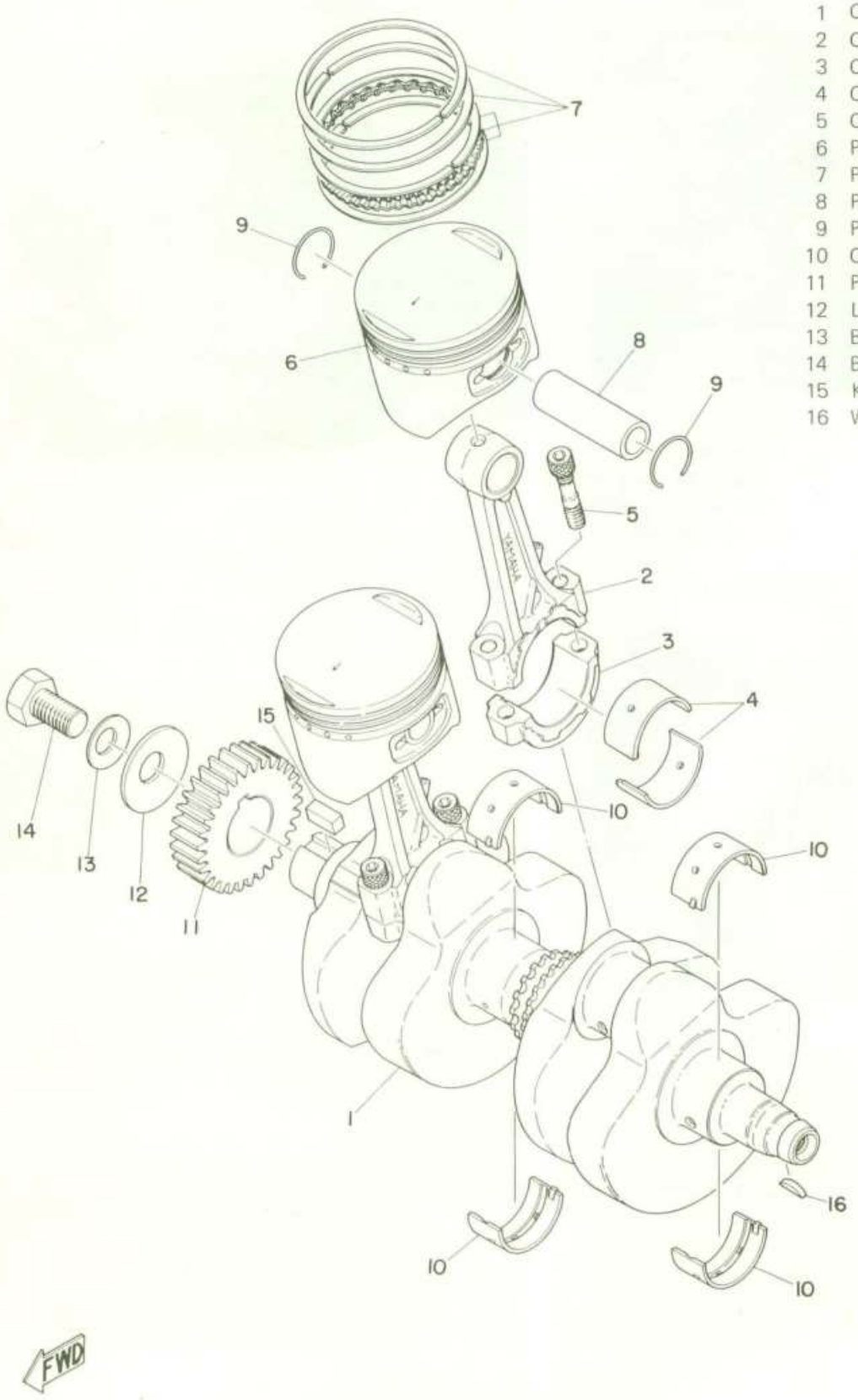
3. Grease and install the side plate "O" ring.
Be careful not to break the "O" ring.

Note:

The pump shaft oil seal must be installed with the special tool provided in order to prevent seal lip damage on the shaft shoulder with subsequent oil leakage into the points area.



CRANKSHAFT REPAIR



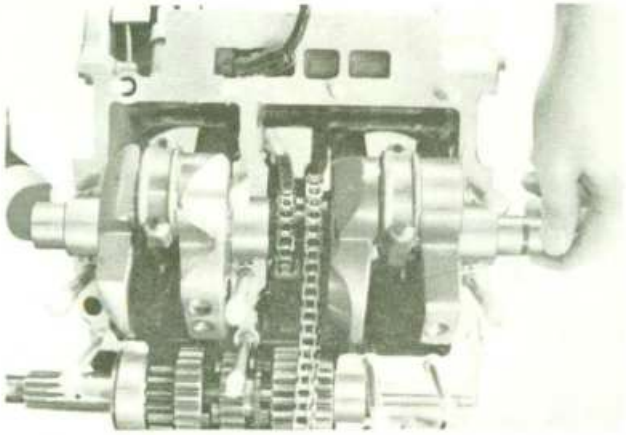
1 Crankshaft
2 Connecting rod
3 Connecting rod cap
4 Connecting rod bearing
5 Connecting rod bolt
6 Piston (STD)
7 Piston ring set (STD)
8 Piston pin
9 Piston pin clip
10 Crankshaft bearing
11 Primary drive gear (32T)
12 Lock washer
13 Bellevile spring
14 Bolt
15 Key
16 Woodruff key

Crankshaft Ass'y

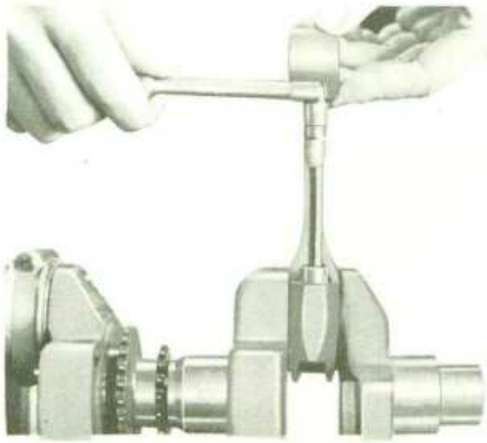
The crankshaft is a one piece forging to ensure high rigidity and easy accessivility for maintenance. It is designed for 360 ignition. The bearings, are of split type, and the connecting rod big end is also splited into two sections. In addition to the cam chain sprocket, the balancer drive sprocket is provided.

Disassembly

1) Remove the crankshaft ass'y by tapping the crankshaft with a soft-faced hammer.

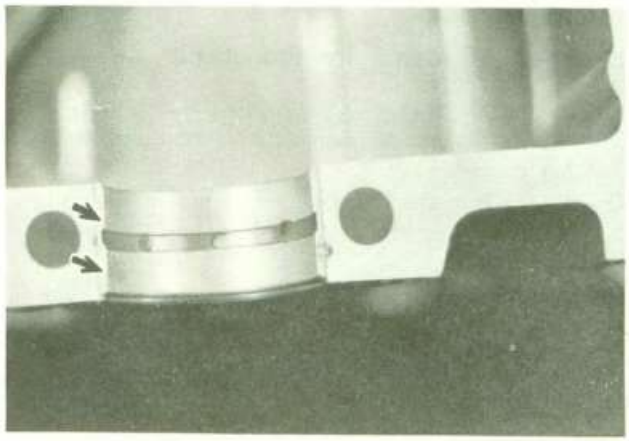


2) Remove the connecting rod by use of an internal hexagon wrench.



Removing the bearing inserts

The insert can easily be removed by a finger-tip pressure. Never strike it out with a hammer.
The inserts removed should be separately placed. Avoid putting one upon the other.



Inspection

1) Check the bearing metals. If the outer surface is found flaked, burned, rough, scratched or worn, the metal should be replaced.
The inner surface should also be checked, and if it is burned with oil, it is considered to lack enough tension and crush. This will result in warping or seizing up.

2) Clean the oil passages with compressed air.

Handling of the Plain Bearings (Inserts)

The inserts must be handled with special care, and the following three points must be adhered to.

1. Keep the inserts free from dust.
2. Take care not to scratch their mating surfaces during the installation and removal operations.
3. After installation, be sure to oil them amply.

Selection of Inserts for Proper Fit

There are five types of bearings (inserts) available, and they must be selected according to the crankcase housing diameter and crankshaft journal diameter, or according to the crank pin diameter, crankshaft journals diameter and crankcase housing diameter.

On the TX750, the inserts are selected in the following manner.

Crankshaft Inserts

The crankcase housing diameters are numbered 4,5 and 6, respectively, and these numbers are engraved on the crankcases. On the other hand, the crankshaft journals are numbered 1, 2 and 3, respectively, and these numbers are shown on the crank webs.

The inserts can be selected by the following formula:

Housing No. minus (–) Journal No. = Insert Metal No.

Example: If housing No. is 4 and journal No. is 1, the insert should be 4 - 1 = 3.
Each insert is marked with 1, 2, 3, 4 or 5 on the seat side.

Crankcase	–	Crankshaft	=	Insert

Connecting rod big end inserts

The connecting rod big end inserts should be selected in the same manner.

The housing is marked 4, 5 or 6, while the crankshaft journal is numbered 1, 2 or 3 on the crank web.

See table below.

	Center thickness T	Housing diameter	No.	Shaft diameter	No.	Oil clearance
BEARING 1	$1.5^{+0.001}_{-0.003}$	$41\phi^{+0.024}_{+0.016}$	4	$38\phi^{+0.001}_{-0.008}$	1	0.034~0.057
BEARING 2	$1.5^{-0.003}_{-0.007}$	$41\phi^{+0.016}_{+0.008}$	5	$38\phi^{-0.009}_{-0.016}$	2	0.034~0.057
BEARING 3	$1.5^{-0.007}_{-0.011}$	$41\phi^{+0.008}_{+0}$	6	$38\phi^{-0.017}_{-0.024}$	3	0.034~0.057
BEARING 4	$1.5^{-0.001}_{-0.055}$					
BEARING 5	$1.5^{-0.015}_{-0.019}$					

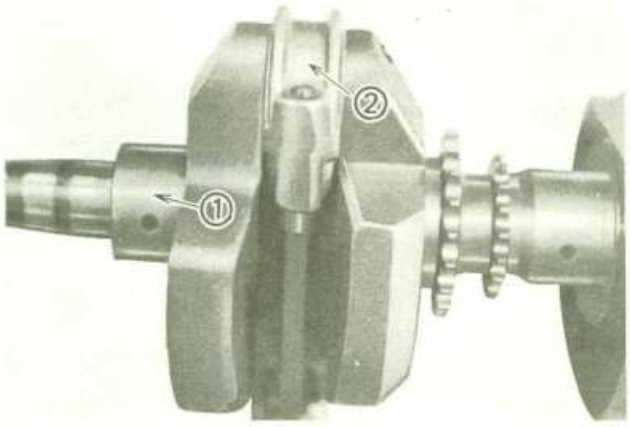
The insert should be selected by the following formula:

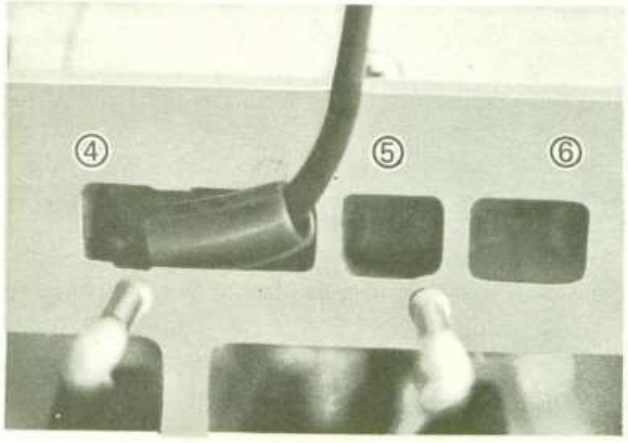
Housing No. minus (–) Journal No. = Metal No.

Example: If housing No. is 6 and journal No. is 2, the insert should be 6 - 2 = 4.
That is, insert No. is 4.

This allows for a standard clearance, when all securing bolts are properly torqued, of: 3.7 ~ 4.0 kg-m

ITEM	NOMINAL	WEAR LIMITS
Crankshaft/Case Journal	0.036mm to 0.059mm	If the oil clearance is beyond 0.0032 in. (0.08mm), the bearing should be replaced with new part.
Connecting Rod/Crank Pin Journal	0.034mm to 0.057mm	





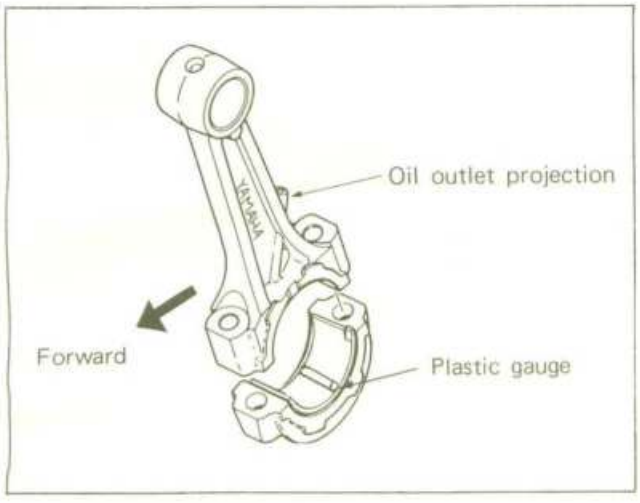
Installation

Bearing clearance measurement

Place the plastic gauge (a thin wire-shaped gauge) in the center of the bearing cap, and tighten the housing with the specified torque. Determine the bearing clearance by measuring the thickness of the flattened plastic gauge.

Caution

Install the connecting rod on the crankshaft, with the oil outlet projection toward the rear of the motorcycle. (See the illustration below.)



1) Thoroughly clean the connecting rod big end housing and inserts, and install the inserts in the housing by pushing them in.

2) Clean the crank pin, and oil it amply. Then install the connecting rod with the oil outlet projection toward the intake valve and with the arrow mark on the connecting cap facing.
Cap bolt tightening torque is 3.7~4.0 kg-m. (330~360 in-lbs.)
After installation, apply a MOLYBDENUM oil to the threaded portion of each cap bolt. Tighten the cap bolts gradually to 3.7 ~ 4.0 kg-m. Make sure that the connecting rod rotates smoothly.

SERVICE CHECK/ADJUSTMENT

1. Oil Filter Element Replacement

Remove the left-hand crankcase cover (2), remove the oil filter element mounting bolt and screws, and remove the oil filter element.

Caution

Whenever the oil filter element has been replaced, the "O" rings must also be replaced with new ones. Be sure to tighten the oil filter cover mounting bolt with correct torque.

Tighten Torque: 2.8 ~ 3.0 kg-m (252 - 270 in-lbs)

2. Carburetor Adjustment

To check whether both carburetor operate correctly, measure the vacuum in each carburetor.

(Refer to page 77,78)

3. Cylinder Compression Check

a) Low cylinder compression means that the combustion area is not sealing correctly. A leakage exists at one of the following points: Past one of the valves; out a defective gasket; through a warped head; down past the rings.



b) Remove both spark plugs and screw the compression gauge adaptor tightly into either spark plug hole.

c) Twist the throttle grip FULLY OPEN and kick the engine over several times.

d) With 5 or 6 full kicks the gauge should register 10.5 kg/cm^2 (145 lbs/in^2), but it could measure as low as 9.5 kg/cm^2 (130 lbs/in^2) and still be considered adequate. If compression reads lower than 9.5 kg/cm^2 (130 lbs/in^2), then a failure has occurred to one of the parts directly associated with the combustion chamber.

e) If cylinder compression reads more than 10.5 kg/cm^2 (145 lbs/in^2), then carbon has built up on the combustion chamber or piston crown, reducing combustion chamber volume. This in turn creates a higher compression ratio. This situation must be corrected by decarbonizing or excessive heat will develop.

f) Perform steps c) through e) on the other cylinder.

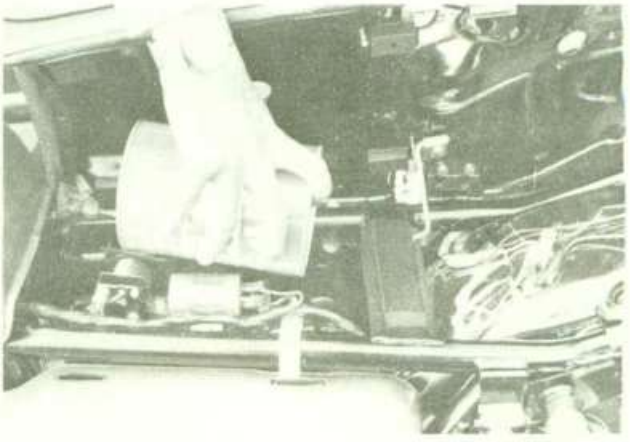
4. Engine Oil Replacement

a) First warm up the engine for a few minutes, then remove the crankcase drain bolt and the oil tank drain bolt.

Note:

To drain the oil, the motorcycle must be placed on a level ground, with the stand upright.

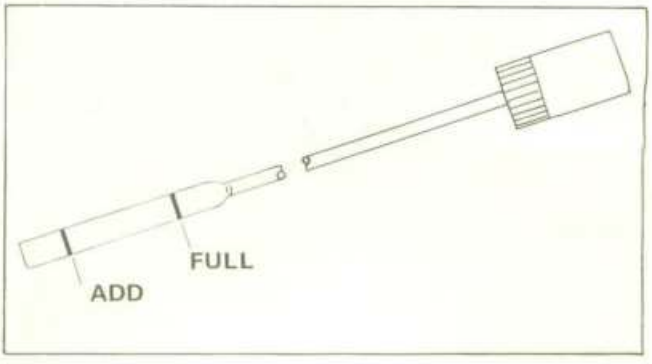
b) Fully tighten the drain bolts and feed 2 liters (2 qts) of oil through the oil tank filter.



c) Start the engine, run at idle speed and check oil tank level with gauge. After 2 ~ 3 minutes operation. Add oil as necessary until level is correct.

Note:

The engine must be run at idling speed for this operation.

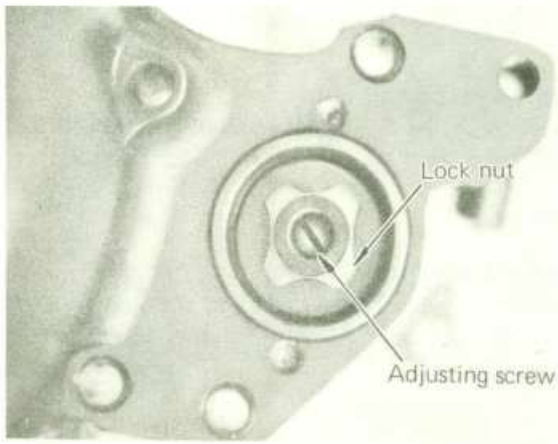


5. Clutch Adjustment

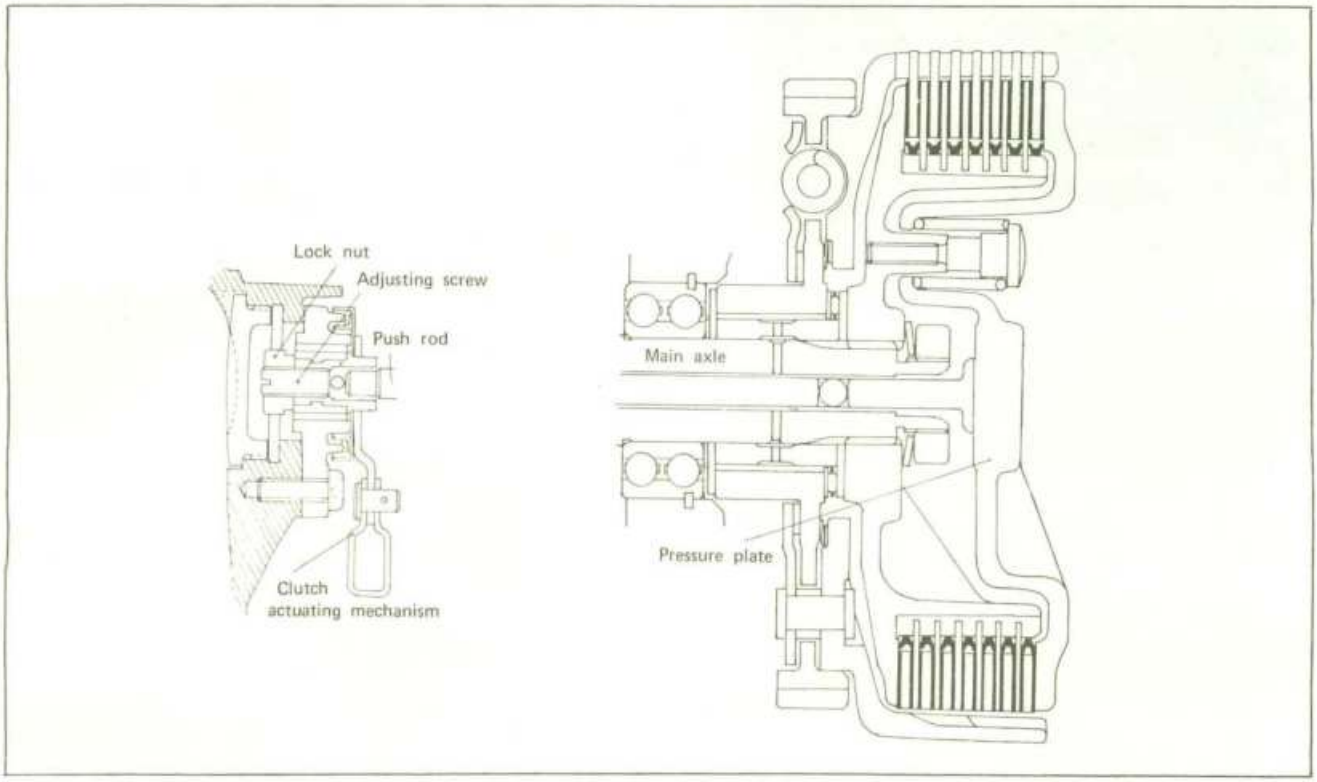
a) Two clutch adjustments are possible, depending on the action of the clutch and clutch lever. If clutch slippage or incomplete clutch disengagement occurs, adjustment is required at the clutch actuating mechanism.

b) Loosen the clutch lever adjustor to obtain as much cable slack as possible.

c) The clutch adjustor is located on the left crankcase cover.

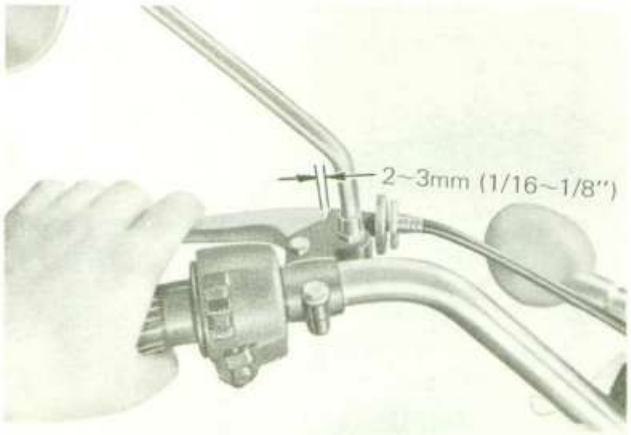


d) The adjustor consists of an adjustment screw and a lock nut. Loosen the lock nut. Turn the adjustment screw in until the screw lightly touches bottom. Back off 1/4 turn and tighten the lock nut.



e) Reinstall and tighten the crankcase cover.

f) The second adjustment at the clutch lever controls the amoutn of cable free play. Loosen the adjustor lock nut and turn the adjustor to obtain 2 – 3 mm (1/16" – 1/8") cable slack at the lever.



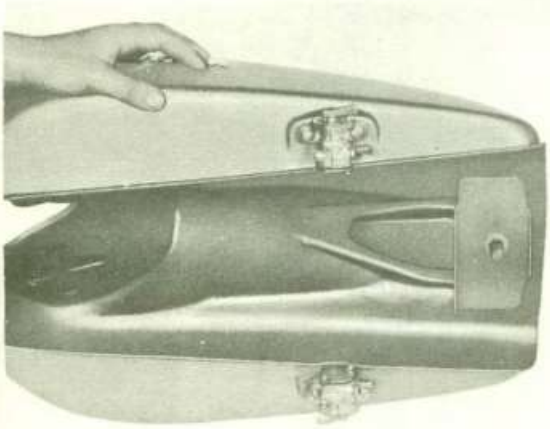
3. FUEL SYSTEM

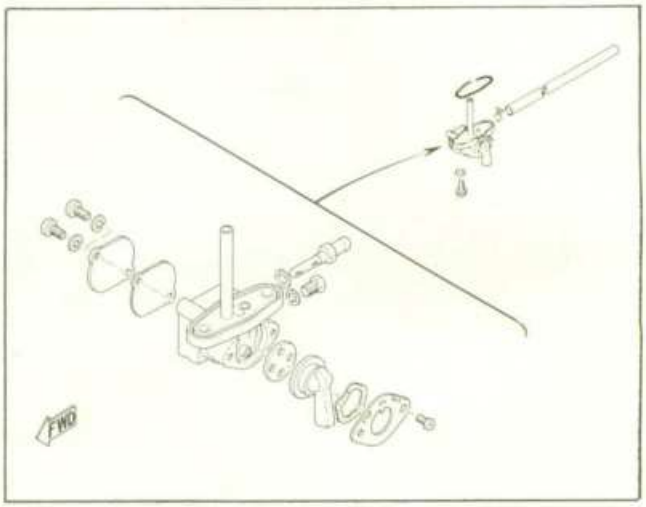
The fuel system consists of fuel tank, (petcock with integral filter), fuel delivery lines, and two constant vacuum carburetors. Each section of the fuel system should be checked for possible incorrect operation. Trace for fuel flow from the tank, through the petcock, and through the carburetor. Also check for possible air restrictions or leaks.

PETCOCK

1) Removal and Installation

a) The two petcocks are bolted to the rear under side of the fuel tank. Remove the two screws holding each petcock.





b) A neoprene O-ring fitted into a groove in the petcock mating surface seals the petcock to the fuel tank. Check the condition of this O-ring and replace if it is broken, flattened, or chipped.

c) Petcock installation is accomplished by fitting the O-ring in position and securing the petcock with the two screws.

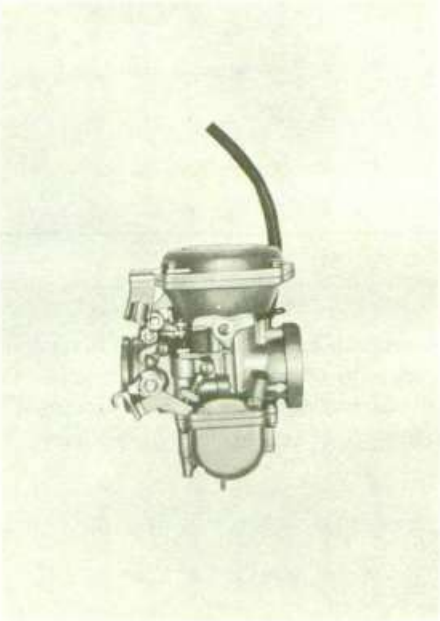
2) Cleaning

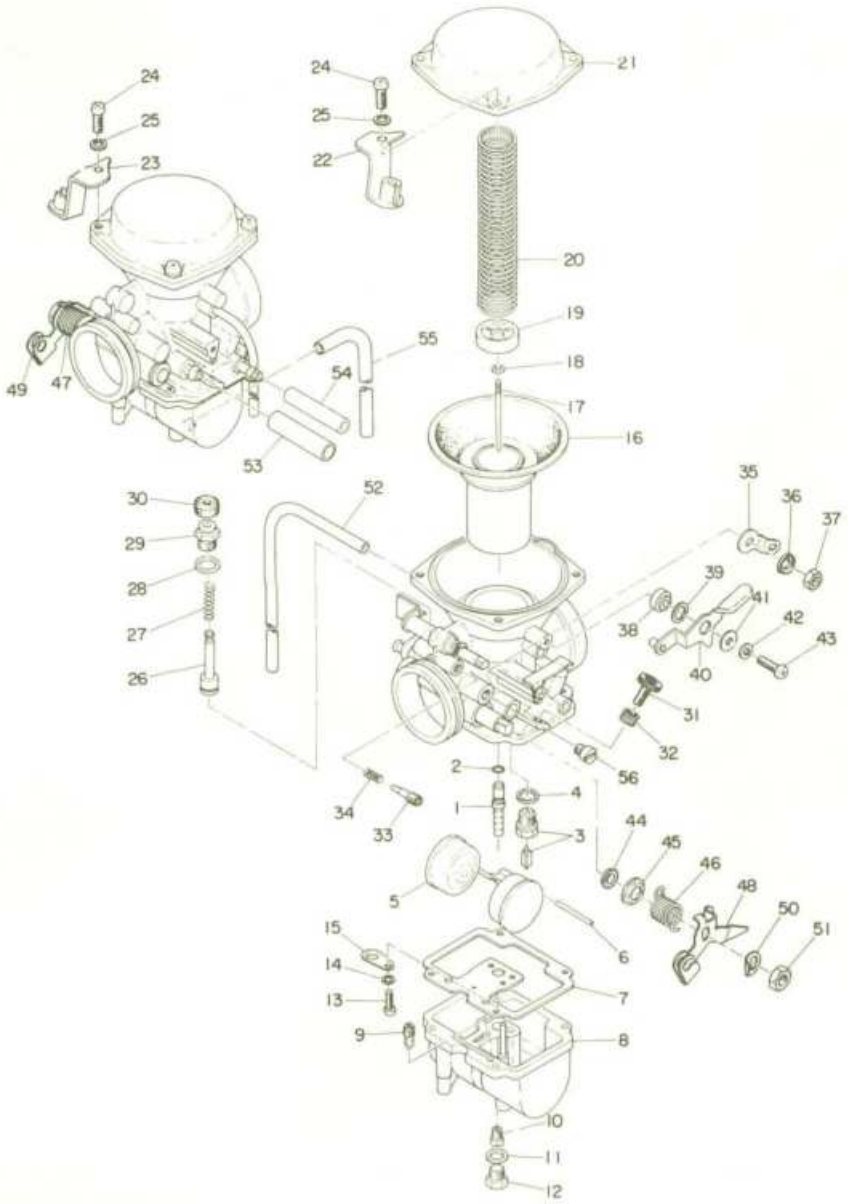
Sediment from the fuel tank (including water) can collect in the petcock chamber. A bolt beneath the fuel outlet can be removed to drain the petcock chamber. Larger obstructions can be removed by removing the screw-held plate at the opposite side of the fuel outlet.



CARBURETOR

The TX750 is equipped with two "constant vacuum" carburetors (design is similar in operation to the SU type carburetor) mounted on rubber intake manifolds. Air flow through the venturi is controlled by a throttle slide (vacuum piston). The slide is lifted and lowered by engine vacuum rather than a cable directly linked to the throttle grip.





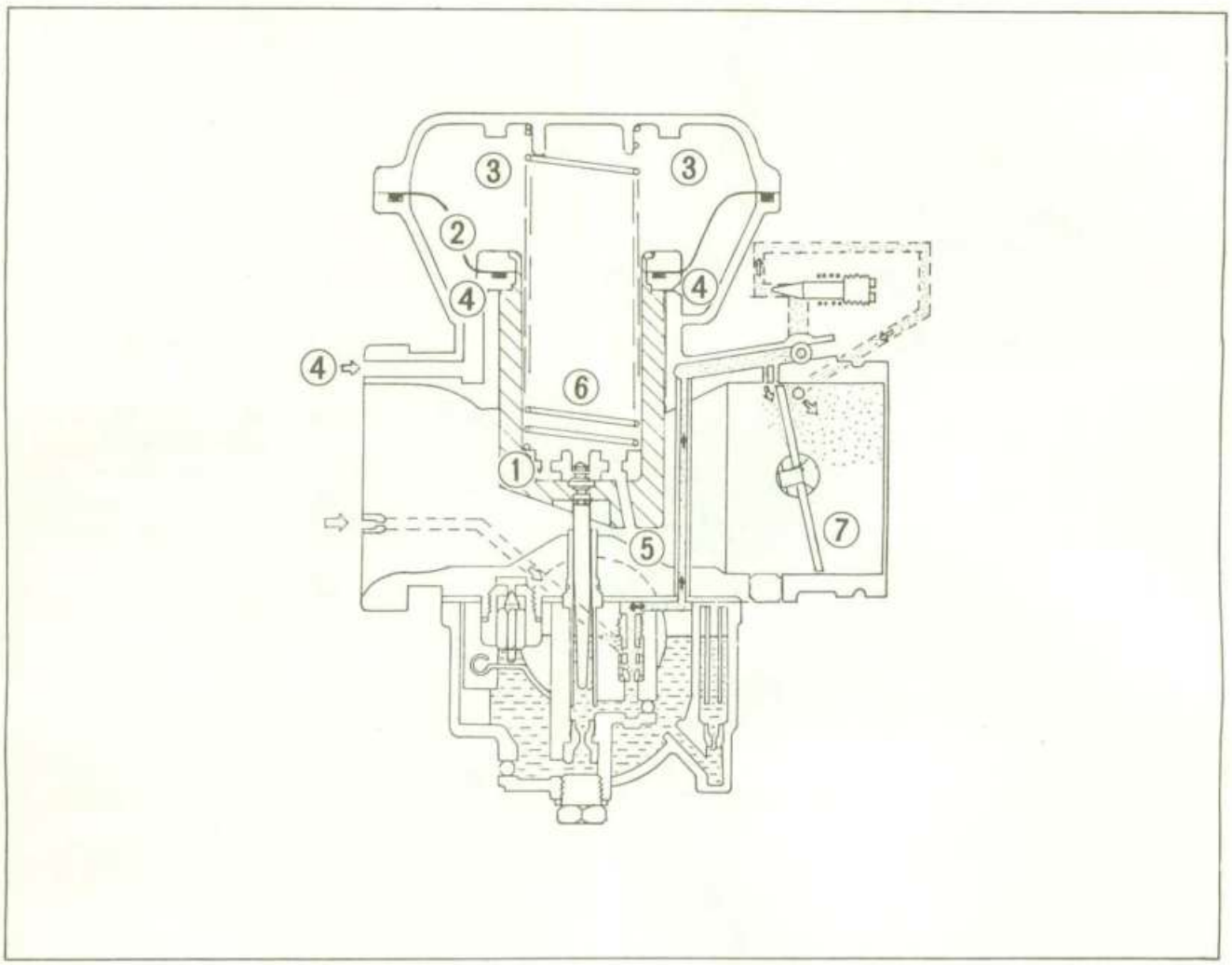
0-1 Left carburetor ass'y
0-2 Right carburetor ass'y
1 Main nozzle (Z-4)
2 O-ring
3 Valve seat ass'y (#2.0)
4 Washer
5 Float
6 Float pin
7 Float chamber packing
8 Float chamber body
9 Pilot jet (#45)
10 Main jet (#130)
11 Washer
12 Plug screw
13 Roundhead screw
14 Spring washer
15 Plate
16 Diaphragm ass'y
17 Needle (4N8-4)
18 Clip
19 Set needle plate
20 Diaphragm spring
21 Diaphragm cover
22 Left bracket throttle ass'y
23 Right bracekt throttle ass'y
24 Roundhead screw
25 Spring washer
26 Starter plunger
27 Plunger spring
28 Washer
29 Plunger cap
30 Plunger cap cover
31 Throttle stop screw
32 Throttle stop spring
33 Pilot screw
34 Pilot screw spring
35 Starter lever
36 Washer
37 Nut
38 Ring
39 Washer
40 Lever ass'y
41 Washer
42 Spring washer
43 Roundhead screw
44 Seal
45 Cap
46 Throttle, left spring
47 Throttle, right spring
48 Throttle, left lever
49 Throttle, right lever
50 Washer
51 Nut
52 Over flow pipe
53 Hose
54 Hose
55 Hose
56 Plug

Carburetor Specifications

Venturi Size (38mm measured)	32.0mm (effective)
Main Jet	# 130
Jet Needle	4N8-4
Needle Jet	Z-4
Pilot Jet	# 45
Butterfly (throttle) valve	# 115
Starter Jet	0.7
Floot Level	24 ± 2.5 mm
Pilot Screw (turns out)	¾
Fuel Valve Seat	2.0

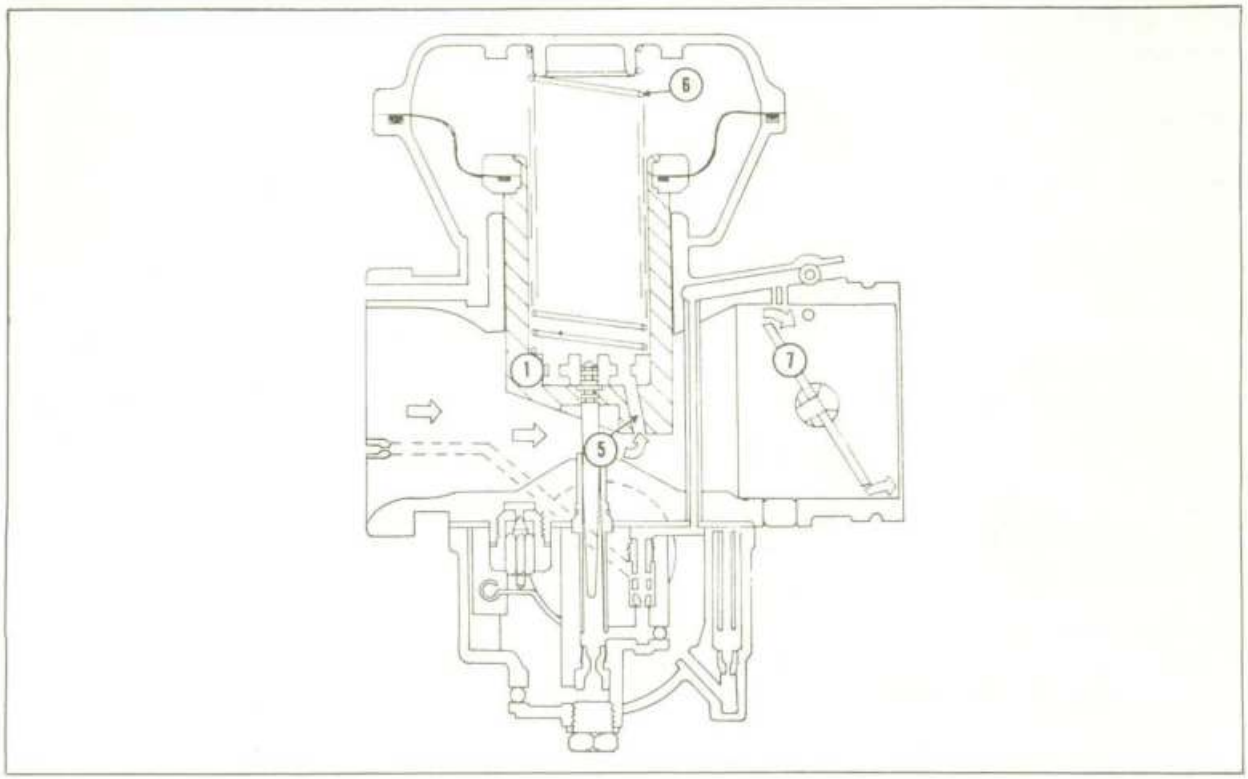
1) Method of Operation

a) Vacuum piston actuation:
The vacuum piston (#1) is lifted by engine vacuum. A flexible rubber diaphragm (#2) is attached to the piston top and to the housing. This diaphragm divides the top part of the carburetor into a vacuum chamber (#3) above the diaphragm and an atmospheric pressure chamber (#4) below the diaphragm.



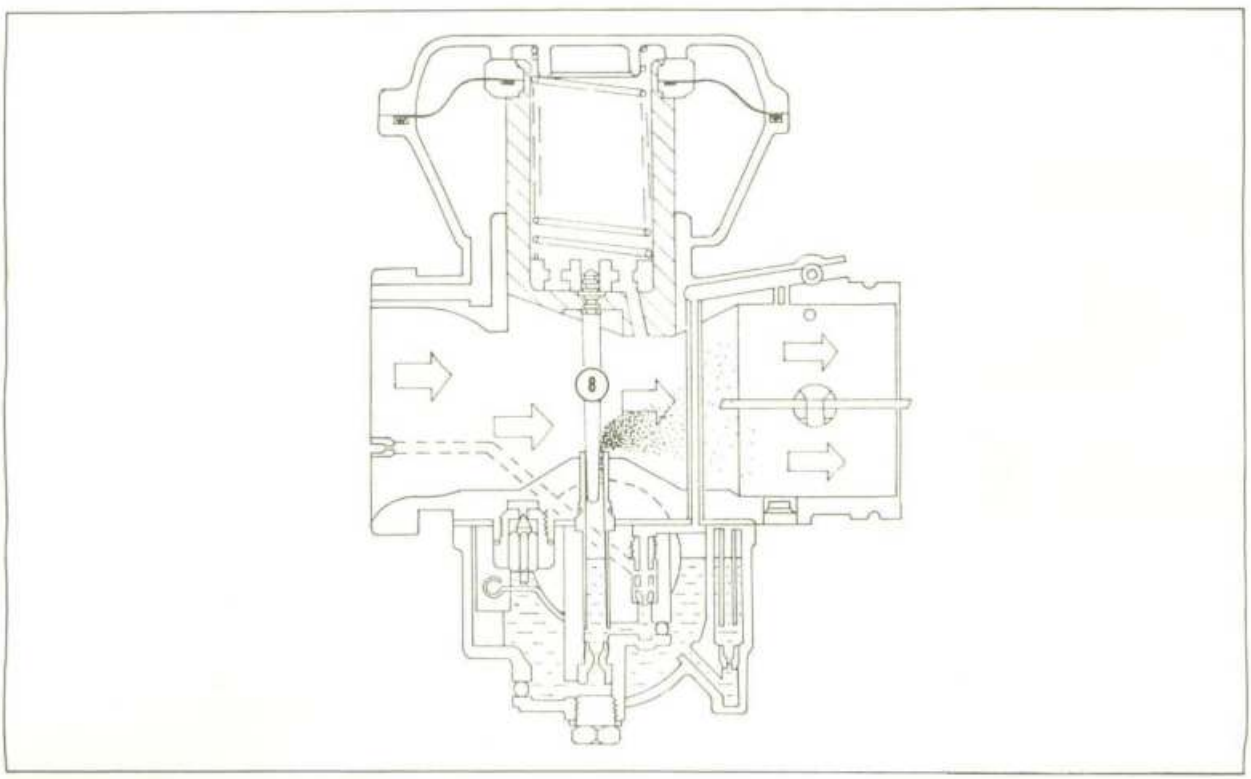
b) Atmopheric air pressure (approximately 15 lbs/in^2) passes through the air passage and occupies the space below the diaphragm. A drilled hole in the vacuum piston (#5) provides an unobstructed path up to the vacuum chamber. As air is pulled past the vacuum piston by engine vacuum – creating a low pressure area at this point – the piston hole permits this low pressure to fill the vacuum chamber. Unequal air pressure exists on either side of the diaphragm.
Atmospheric pressure pushes up on the diaphragm, lifting the vacuum piston (#1) as well. The diaphragm (and piston) continue to lift until the vacuum piston return spring (#6) and the low air pressure match the pushing atmospheric pressure below.

c) Air speed through the venturi, which controls the amount of low pressure in the vacuum chamber, is controlled by a butterfly valve (#7). A cable connects the throttle grip directly to this butterfly valve. Twisting the grip opens the butterfly valve.



d) As the butterfly valve opens, engine vacuum sucks air through the venturi at a greater speed. Faster air speed causes a greater air pressure drop. This dropping pressure immediately occupies the vacuum chamber, lifting the vacuum piston higher. The vacuum piston will continue to lift as the butterfly is opened further.

e) When the vacuum piston lifts, it also lifts, the jet needle (#8) below. This permits additional fuel to flow up the fuel outlet nozzle and to the engine in the standard method.

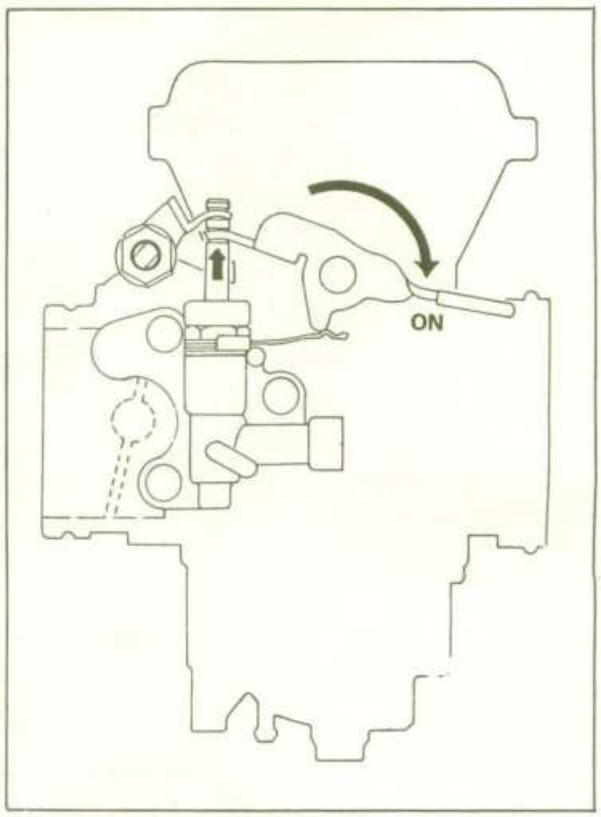


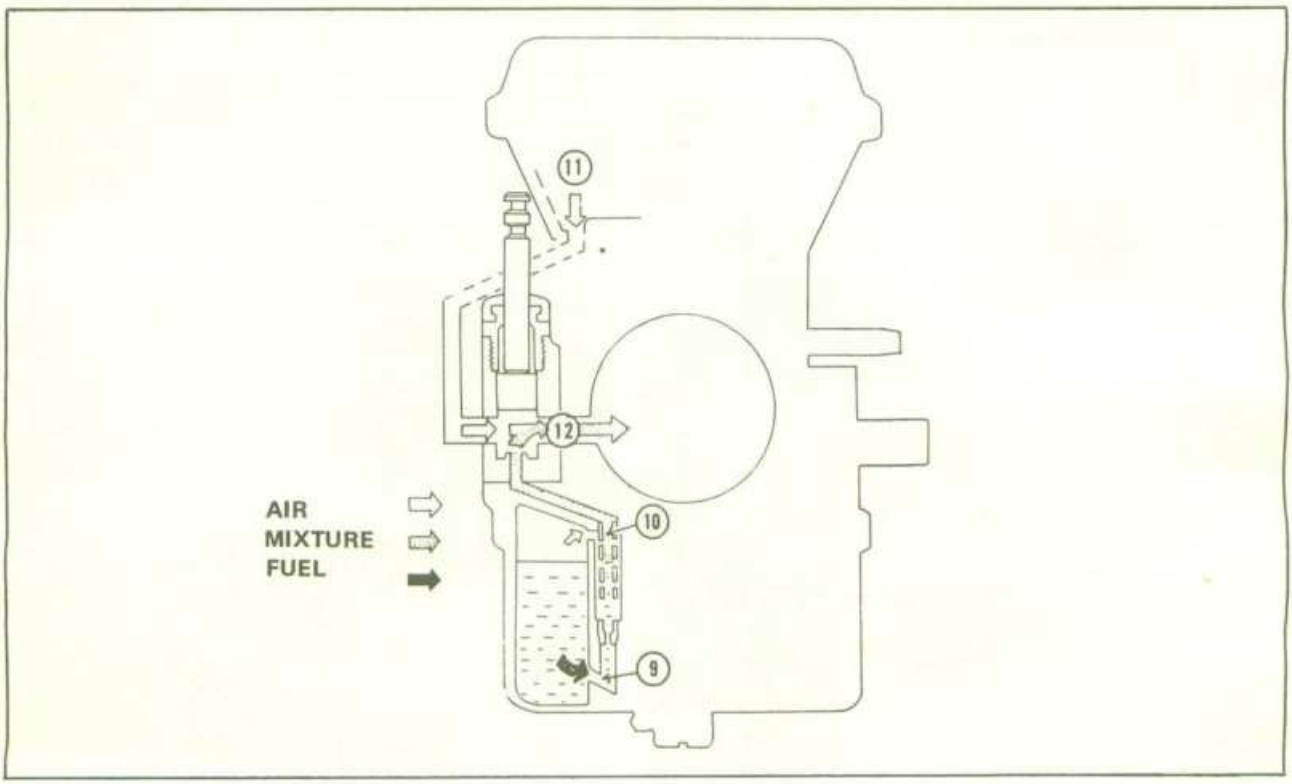
2) Starter System

a) This system is identical to the starter system used on all our two-stroke Yamaha. It consists of a separate fuel/air circuit that enriches the fuel/air mixture for easier starting. The starter housing, however, can be removed from the main carburetor body.
When the starter lever is pushed down, a rich starting mixture ratio of approximately 9 : 1 enters the engine.

b) Fuel for this starter system comes from the float bowl, through a drilled passage through the starter jet (#9). The fuel continues up through a mixing chamber (#10) where air begins to mix with the fuel. Air for the starter system is drawn down through a passage (#11) from the atmospheric chamber below the diaphragm.

c) The fuel and air meet and mix at the starter plunger chamber and are sucked out through the outlet passage (#12) into the venturi.

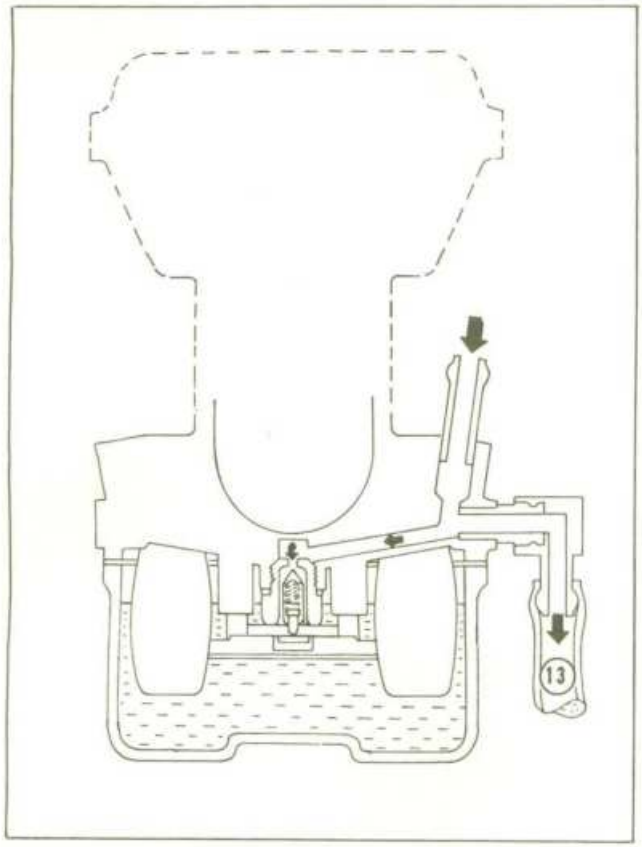




3) Float System

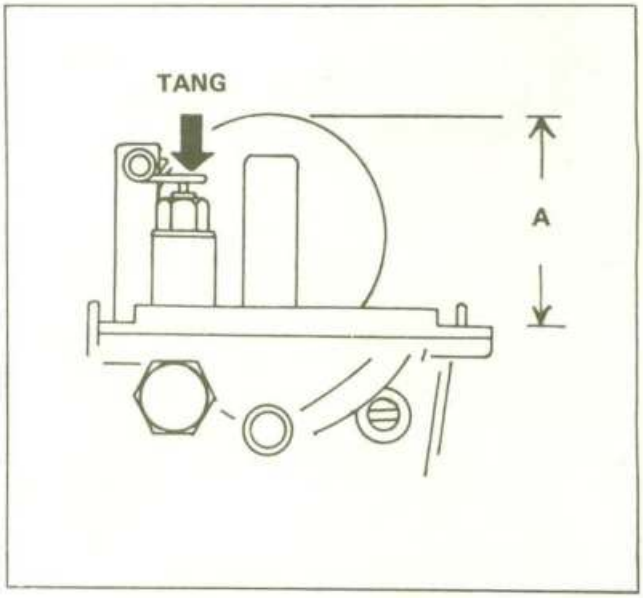
a) Proper fuel level is maintained in the float bowl via the standard method. Two interconnected floats pivot when the level of fuel rises until float/fuel level is high enough to force the inlet valve firmly atainst its seat. This shuts off the fuel supply from the gas tank.

b) An interconnecting fuel equalizer tube (#13) between both carburetors permits fuel to flow between them.



c) Gas flows from the tank, through both petcocks, and then to each carburetor. If fuel should cease to flow from one petcock, due to any sort of stoppage, fuel will still continue to flow to both carburetors through the equalizer tube. This eliminates the danger of one cylinder running lean due to lack of fuel.

d) Float level adjustment
The float level may change because of a worn needle valve or a bent float arm. If the fuel level rises above a specified level, the air/fuel mixture becomes rich. If the fuel level drops, the mixture becomes lean.



e) Remove the float chamber body and float bowl gasket. Invert the mixing chamber body. Slowly lower the float with your fingers until the float just contacts the top of the float needle, do not compress the spring in the float needle.

f) Measure height "A" from the top of the float chamber gasket seat (gasket removed).
Standard measurement: 25mm (0.98in.)

g) Bend the tang (which contacts the float needle) so that a correct measurement is obtained.

Caution

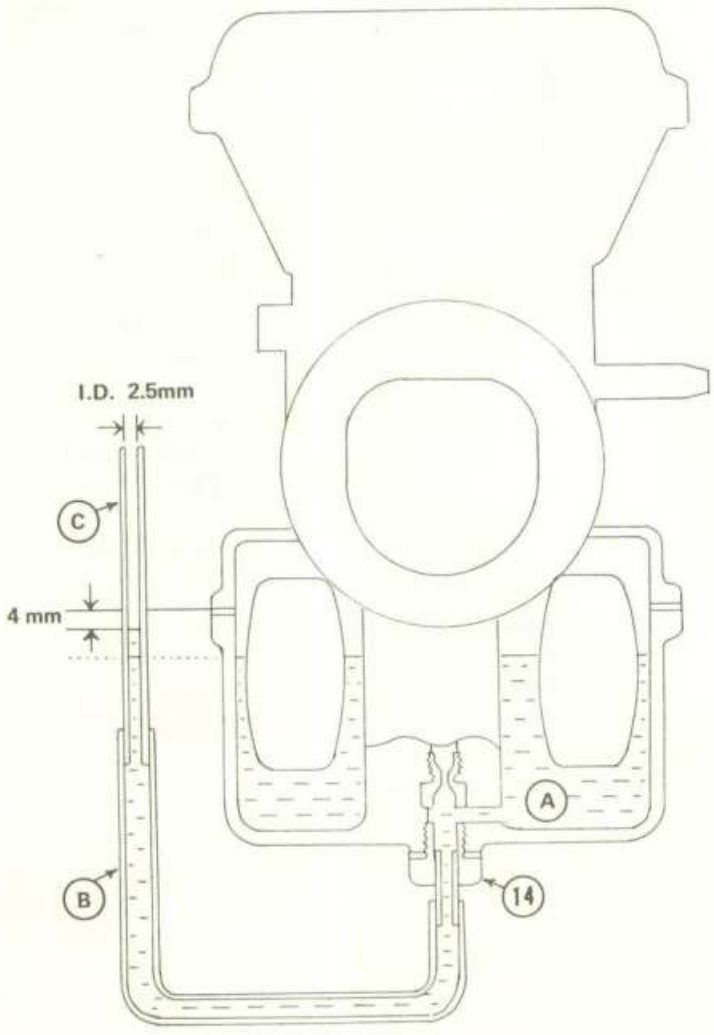
Both floats must be identical in height. If they are not, carefully bend the interconnecting bar between both floats until they have identical heights.

h) Carburetor fuel level can also be checked without removing the float bowl. Construct a special tool using a spare main jet cover nut (#14), rubber tubing (B), and a short length of clear plastic tubing (C). It must have an inside diameter of 2.5mm (0.10")

i) After constructing and installing the special tool, hold the clear tubing to the float bowl gasket surface on the main body (see drawing). The fuel level in the tubing must be 4mm (0.16") below the main body gasket surface (can be checked with the engine topped).

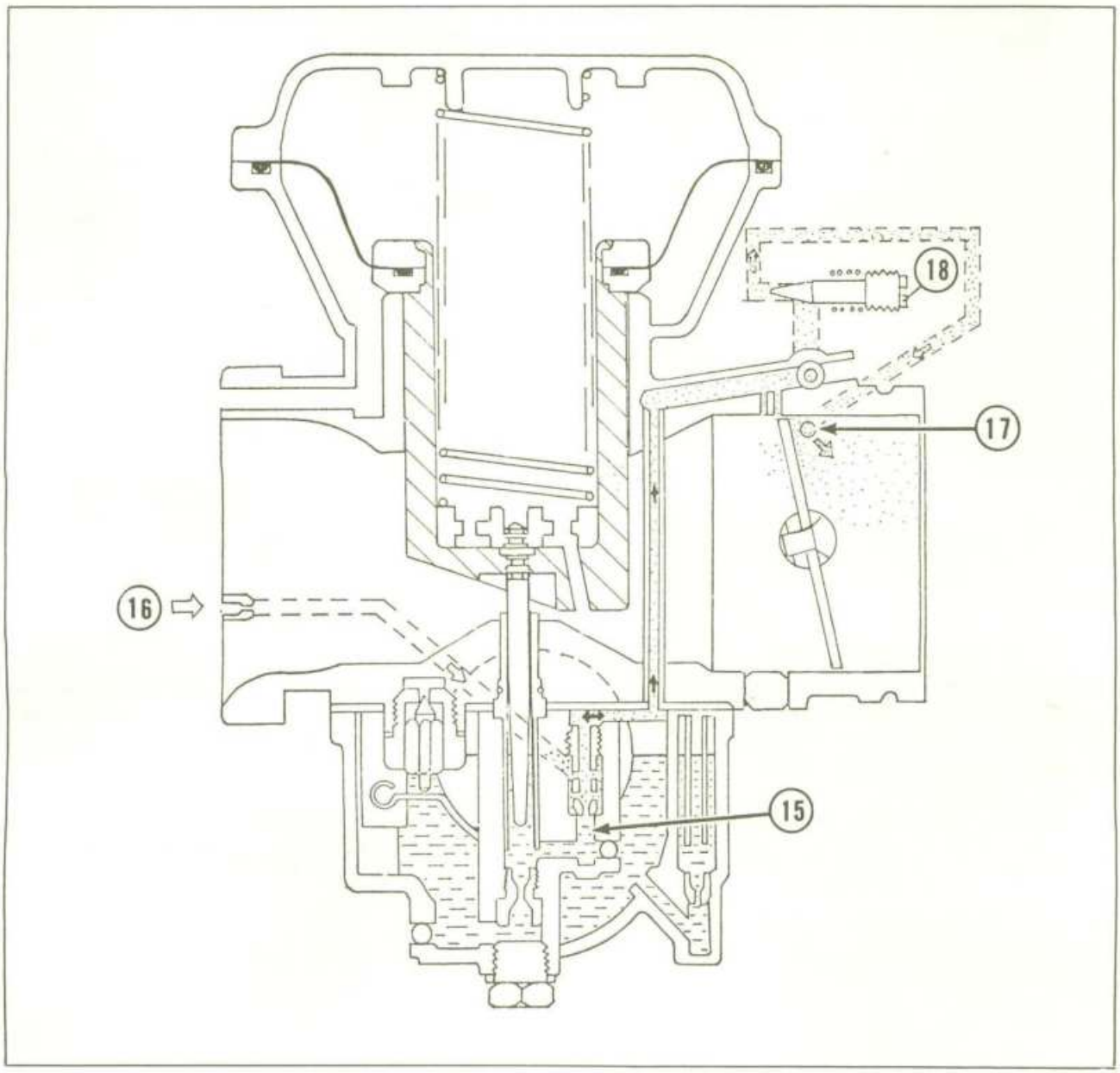
Note:

The carburetor must be positioned straight up (not tilted to one side, forward, or backward) to obtain an accurate reading. Also, if the clear tubing inside diameter is other than 2.5mm (0.10"), the fuel level shown will not be accurate.



14. Adaptor A. Fuel B. Flexible tubing C. Clear plastic tubing

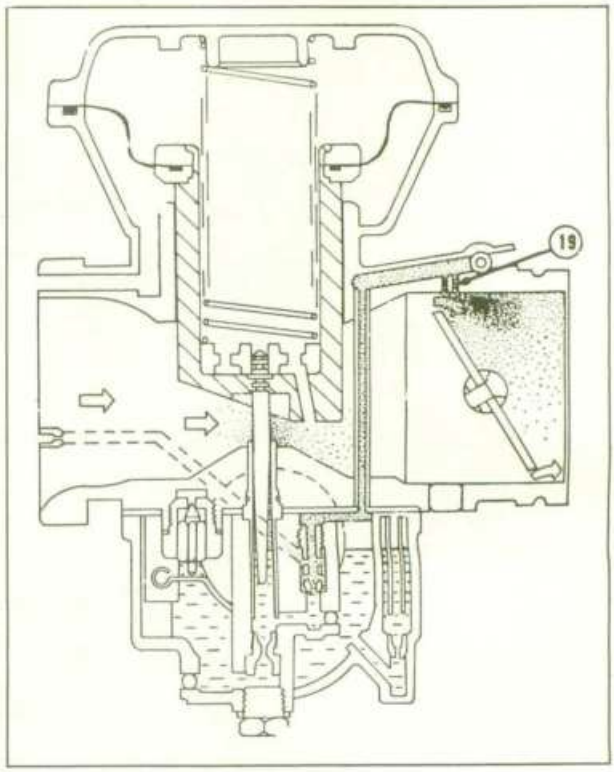
4) Idle Circuit



a) At idling rpm, air pressure in the venturi is not sufficiently low enough to draw fuel flow up through the needle jet nozzle. Fuel travels up through the main jet to the pilot jet (#15). At the same time air passes through the pilot air jet (#16) down through a drilled passage to the pilot jet, where it mixes with the fuel. This mixture passes up through a drilled passage to the pilot outlet (#17) at the upper edge of the venturi, just in front of the butterfly. The amount of fuel/air mixture to the engine is controlled by the pilot screw (#18).

b) To increase engine rpm the butterfly valve is opened further. The top edge of the butterfly uncovers first one bypass outlet (#19) (next page) and then a second bypass outlet. This permits more fuel to progressively enter the venturi and to mix with the additional air that begins to flow past the partially opened butterfly valve. In addition, fuel still flows out the pilot outlet.

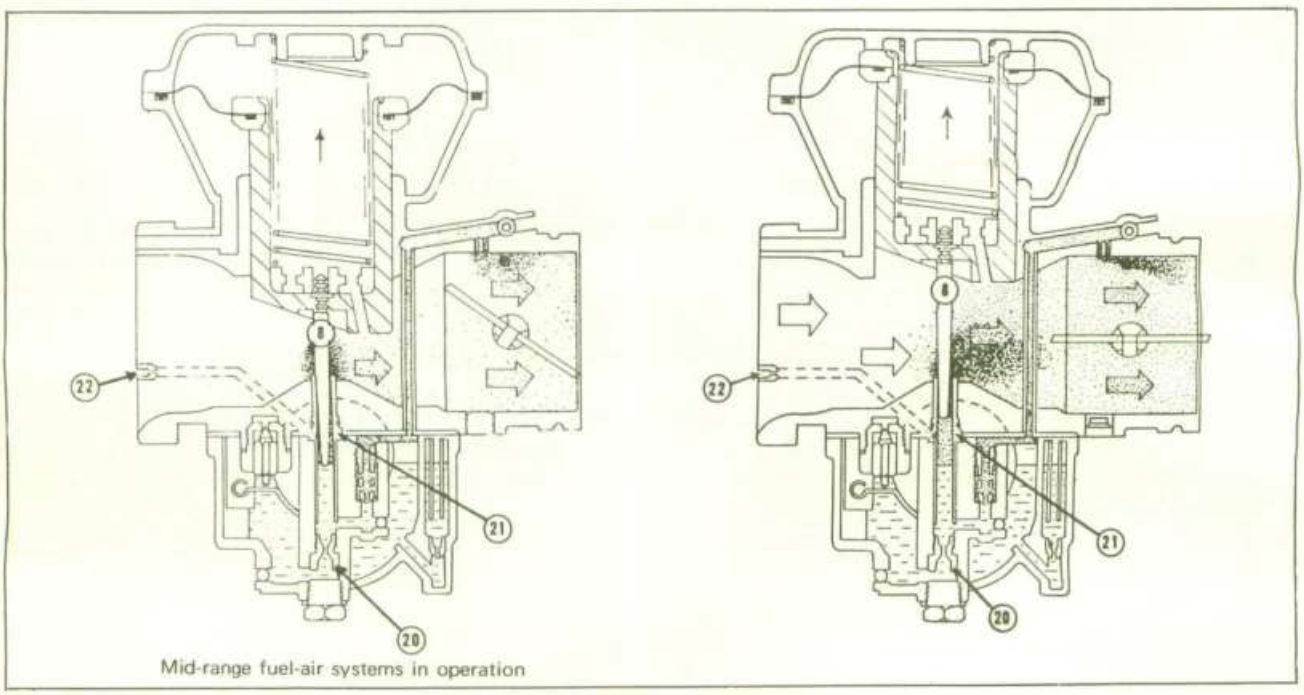
c) Fuel quantity through body bypass outlets is controlled by the diameter of the drilled passages. Both bypass outlets are drilled from the venturi straight into the pilot fuel/air mixture delivery passage.



5) Mid and High Speed System

a) Fuel flow for mid-range and high speed operation comes through the main jet (#20), through the needle jet (#21), and around the jet needle (#8) into the venturi. As engine rpm increases, venturi vacuum also increases (the butterfly valve is opened further). This causes the vacuum piston to lift, which in turn lifts the tapered jet needle. More fuel flows past the needle and to the engine.

b) Air enters the primary air jet (#22) and travles down a drilled passage to the needle jet. It mixes with the fuel at this point. Final air/fuel mixing is accomplished when this primary air/fuel mixture enters the venturi and mixes with the air passing through.



Mid-range fuel-air systems in operation

Disassembly and Assembly Procedures

(for replacement or cleaning)

1) The vacuum chamber cover on top is held in place by four screws. Remove these screws and lift off the chamber cover.

Note:

When installing the set screws, be sure to correctly position the throttle cable anchor bracket.



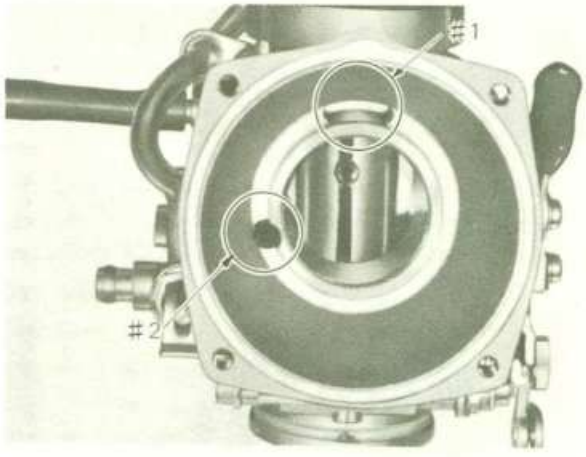
2) Once the cover has been removed, the spring, jet needle retainer, jet needle, and vacuum piston can be removed.



3) Installation of the vacuum piston is accomplished by inserting it into the carburetor body and lining up the small projection on the outer edge of the rubber diaphragm with the corresponding notch in the outer edge of the carburetor top mating surface.



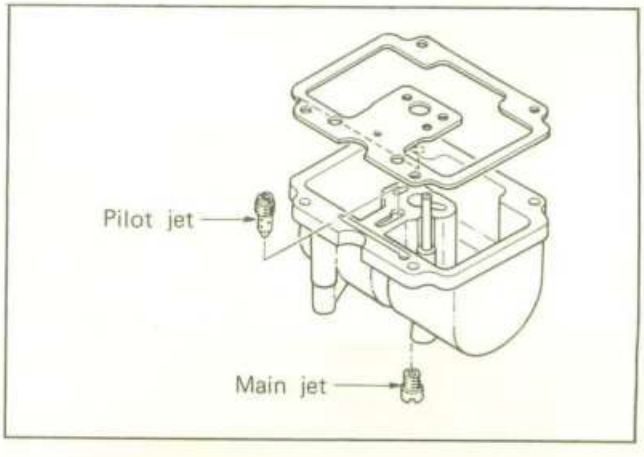
4) With the top removed, the inlet passage (#1) and air passage to the starter jet (#2) are visible.



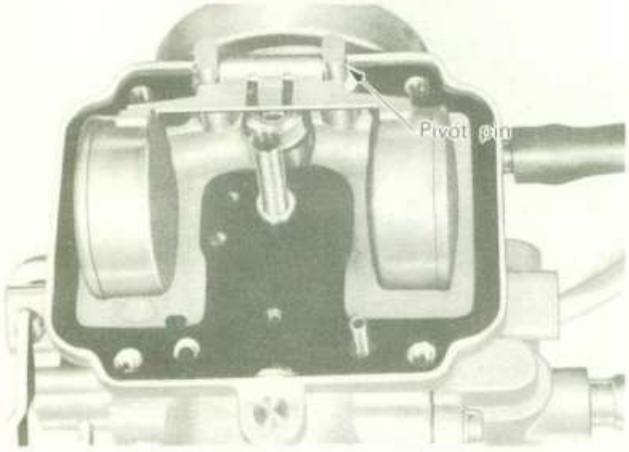
5) The starter jet housing mounts to the left side of the carburetor. It is held by three screws. A gasket fits between the starter jet housing and main housing.

6) The float bowl mounts to the bottom of the main housing. Remove the four retaining screw and then remove the float bowl.

7) Both the pilot jet and the main jet are screwed into orifices in the float bowl. The pilot jet is removed from the inside, the main jet is removed from the bottom, after first removing the cover screw.



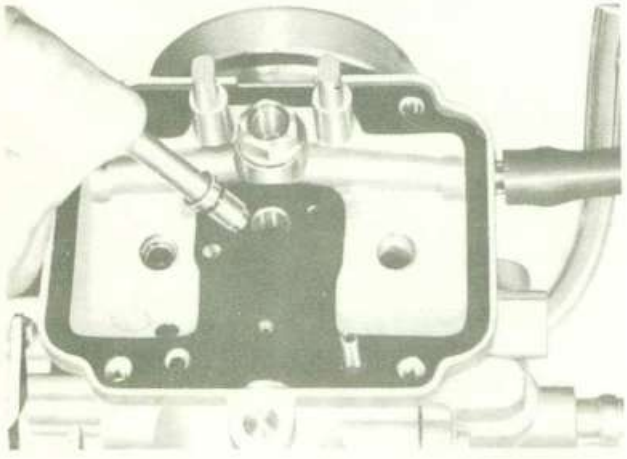
8) Turn the carburetor upside down, pull out the float pivot pin, and remove the float.



Caution

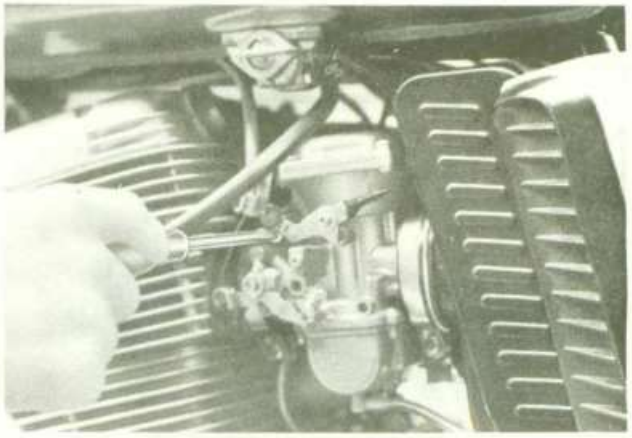
Directly beneath the float adjustment tang is the float valve. Remove this part immediately to prevent its loss.

9) The needle jet fits into the main housing from the bottom. If removal is required, pull it down and out by hand. Reverse this procedure to install the needle jet.

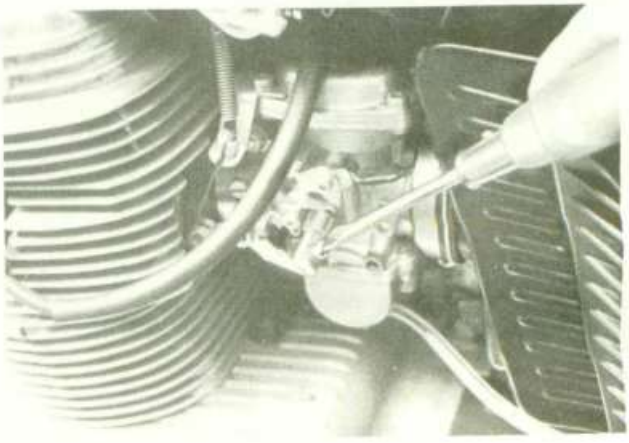


Adjustments

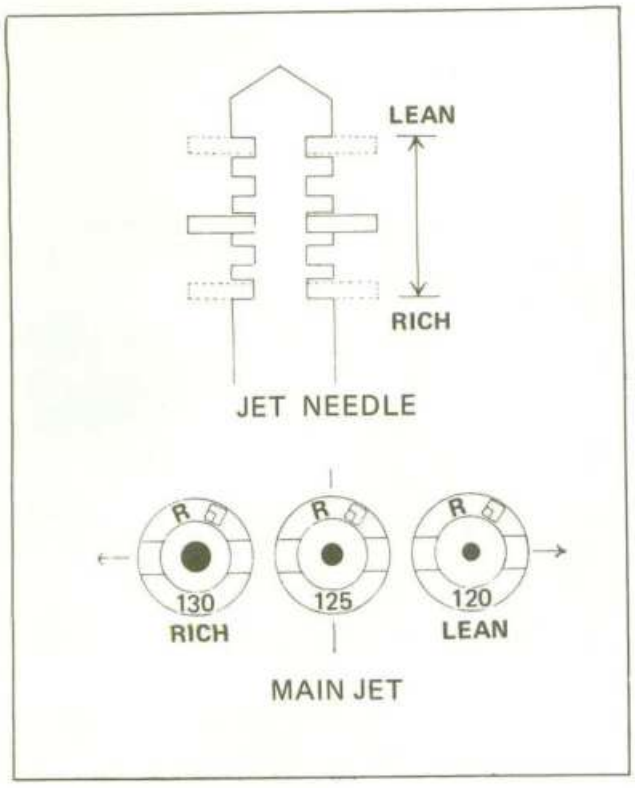
1) Idle mixture: turn the pilot screw in until lightly seats, then back it out 1½ turns.



2) Idle speed:
Set both idle screws so the engine idles fast. Pull off one spark plug high tension lead. Back out the idle speed screw on the running cylinder until the engine dies. Hook up the spark plug lead, start the engine, and pull off the opposite spark plug lead. Slowly back off the idle speed screw of the running cylinder until the engine dies. Attach the loose spark lead and start the engine. Both cylinders should be idling at the same speed, pulling evently. If engine rpm is too high, back off both idle speed screws an even amount until idle is 900—1,000 rpm.



3) Jet needle (mid-range): Mid-range fuel supply is controlled by the position of the needle in the needle jet. The needle clip comes standard in the **4th groove** from the top (4th stage). To lean out the mid-range mixture, move the clip one groove higher (dropping the needle). To richen the mixture, place the clip one groove lower (raising the needle).



4) Main jet (high speed): The carburetor comes equipped with a #130 main jet. Install a one step larger main jet (#135) to richen the high speed mixture. Install a one step smaller main jet (#125) to lean out the mixture.

5) Butterfly sunchronization: Both butterfly valves must be adjusted to open and close simultaneously. Fully close the throttle grip so that both butterfly valve actuator mechanisms rest against their throttle stop screws. Slowly twist the throttle grip and note whether both butterfly valves start to open at the same time. If this does not occur simultaneously, use the cable adjustor to lengthen or shorten one cable until correct action is achieved. In addition with the throttle fully closed, both throttle cables should bave approximately 1mm free play before both butterfly valves start to lift simultaneously.
The TX750 carburetors come equipped with a plug on the manifold side of the carbs. This plug can be removed and, using a 6mm banjo bolt and fitting, a manifold vacuum gauge can be fitted for idle synchronization.
Vacuum must be 2.3~2.5 lbs. on each side (120~130 mmHg), with idle at 900~1,000 rpm.

Note:
Idle speeds on both carburetors MUST BE SET before synchronizing butterfly operation.

Trouble-shooting

1) Fuel overflowing out of carburetor:
This condition is due to dirt holding the fuel valve open or a defective fuel float filling with gasoline and not shutting the fuel valve. Dirt can be quickly cleaned out of the fuel valve and valve seat. A punchtured float, however, must be replaced.

2) Vacuum slide lifting slowly or not at al:
If the throttle cable is properly opening the butterfly valve, but the vacuum slide still does not lift during engine operation, check the vacuum slide diaphragm. If this diaphragm is cracked or punctured, vacuum will not develop above the diaphragm. Replace the vacuum slide/diaphragm unit.

3) Fuel flowing to carburetor but not to engine:
First, water droplets can block up the main jet.
Secondly, an improperly adjusted float level holds the fuel level too low to be picked up by vacuum over the fuel outlet nozzle. Third, if the jet needle clip slips off, the jet needle drops down into the needle jet.
This prevents any fuel from entering the venturi.

Caution

If a passage is blocked, and high pressure air must be used to clear it, it is absolutely necessary that the float bowl be removed first. If this is not done, high pressure air can enter the float bowl and crush both floats.

AIR FILTER

A paper air filter element is used to filter the incoming air for both carburetors. It must be removed and cleaned after the initial 1,000 miles and every month or 2,000 miles thereafter.

REMOVAL AND CLEANING

1) Remove the left side cover to gain access to the air cleaner case.
2) Remove the air cleaner case cap and pull out the air filter element.
3) Using a soft brush, dislodge particles from the air filter element and blow clean by applying air pressure to the inside of the element.
4) Remove any residual contamination by lightly tapping the element and re-applying air pressure.
5) Replace the air filter element, air cleaner case cap, and the left side cover.

NOTE: The air filter element is made of paper and must be kept dry. DO NOT clean with any type solvent.

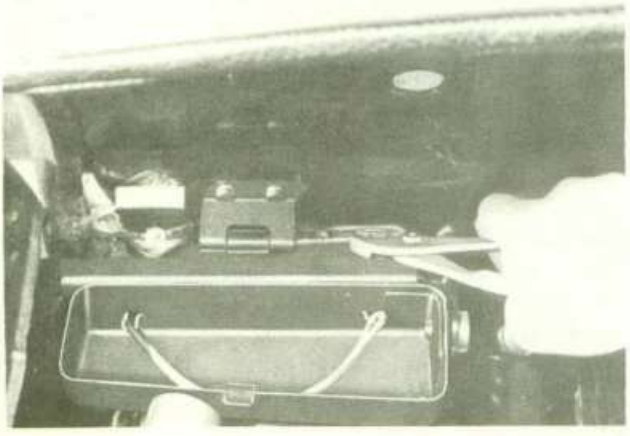
4. FRAME

The basic frame design consists of two down tubes, a large tank rail, and two main tubes. The engine is fully enclosed in the frame.

SEAT Removal

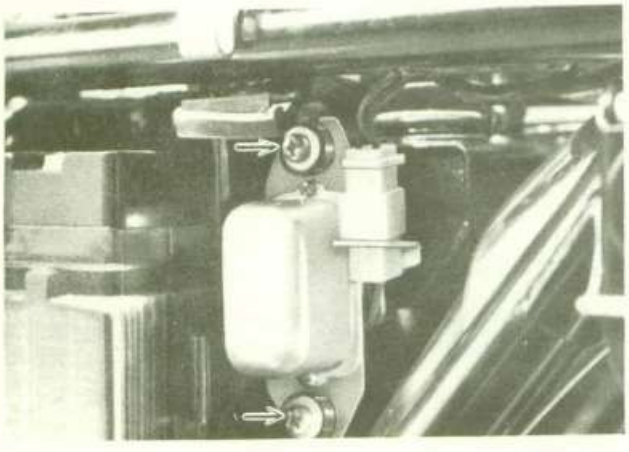
Raise the seat and remove the dowel pins. Lift seat off.

Note:
It is unnecessary to remove seat stopper.



VOLTAGE REGULATOR

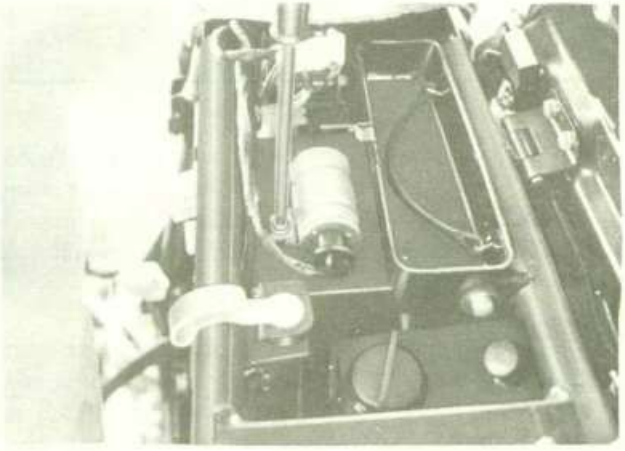
This unit is mounted to the left side of the battery box. Disconnect the multiple wirng connector, remove both mounting screws and set the unit off to one side.



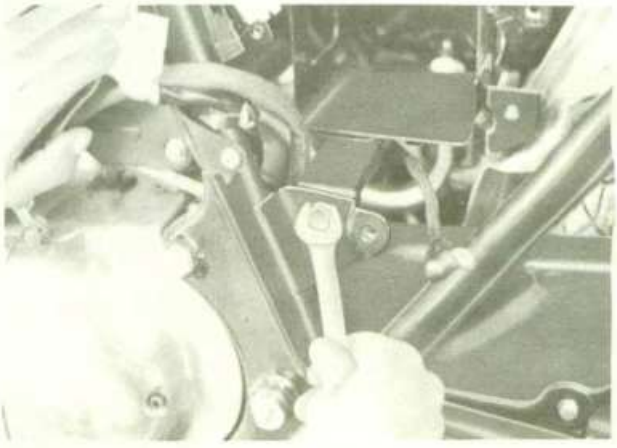
BATTERY BRACKET

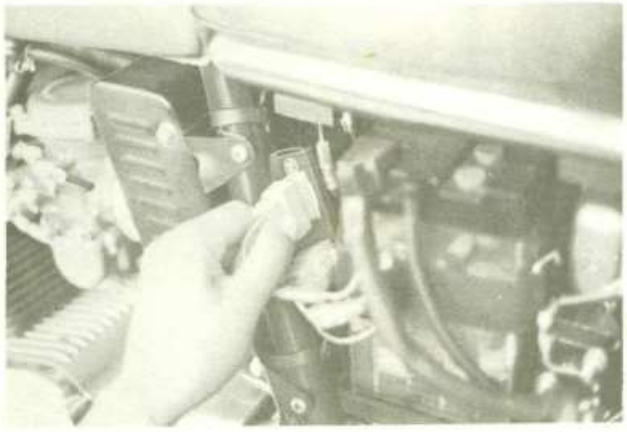
Remove the side cover (L) by loosening the installing bolts on it. Then take off the battery lead wire, rectifier, couple for the generator, and coupler holding plate.



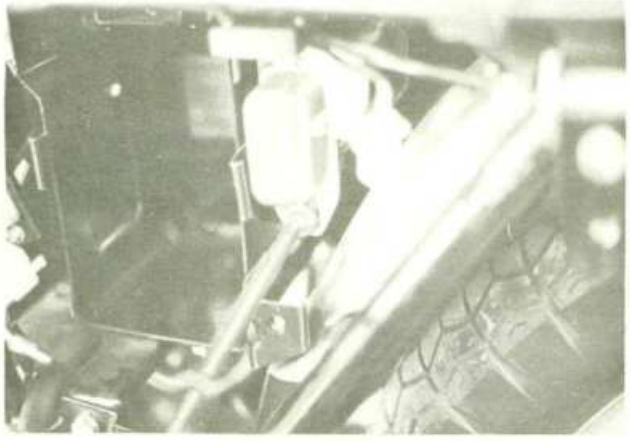


Remove the flasher relay installing screws, starter switch installing bolts, two regulator installing screws, and coupler for the regulator lead wire.

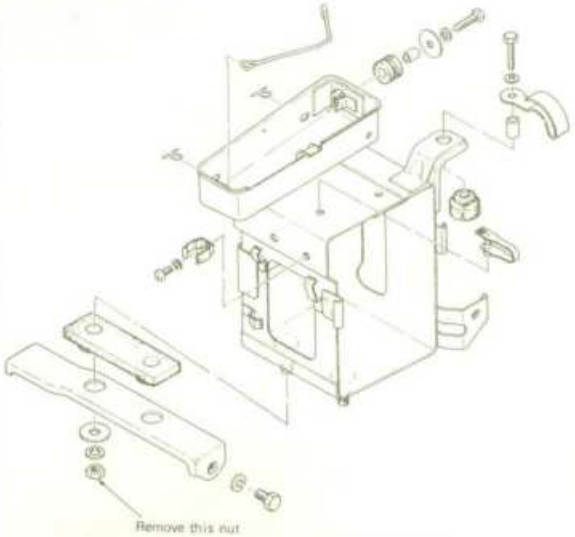




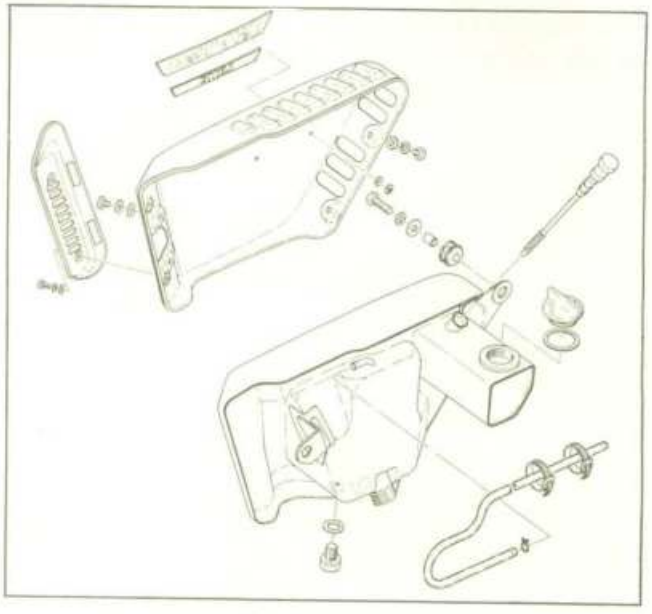
Remove the two battery box bracket installing bolts and battery box installing bolts (which also serve to fix the helmet holders. Then pull up the battery box. Next remove the two nuts which fasten the battery box and battery bracket. Together thus the battery box can be pulled out.



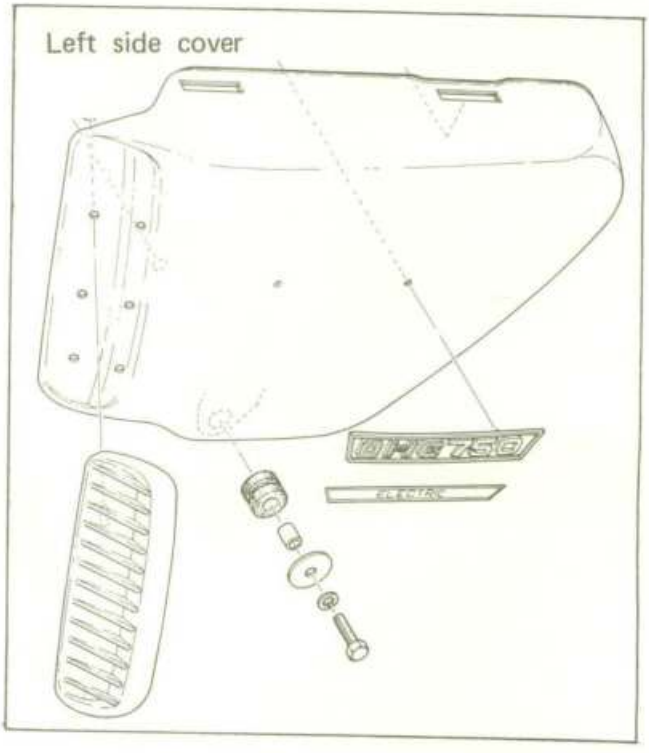
Battery box



Oil Tank · Side cover right

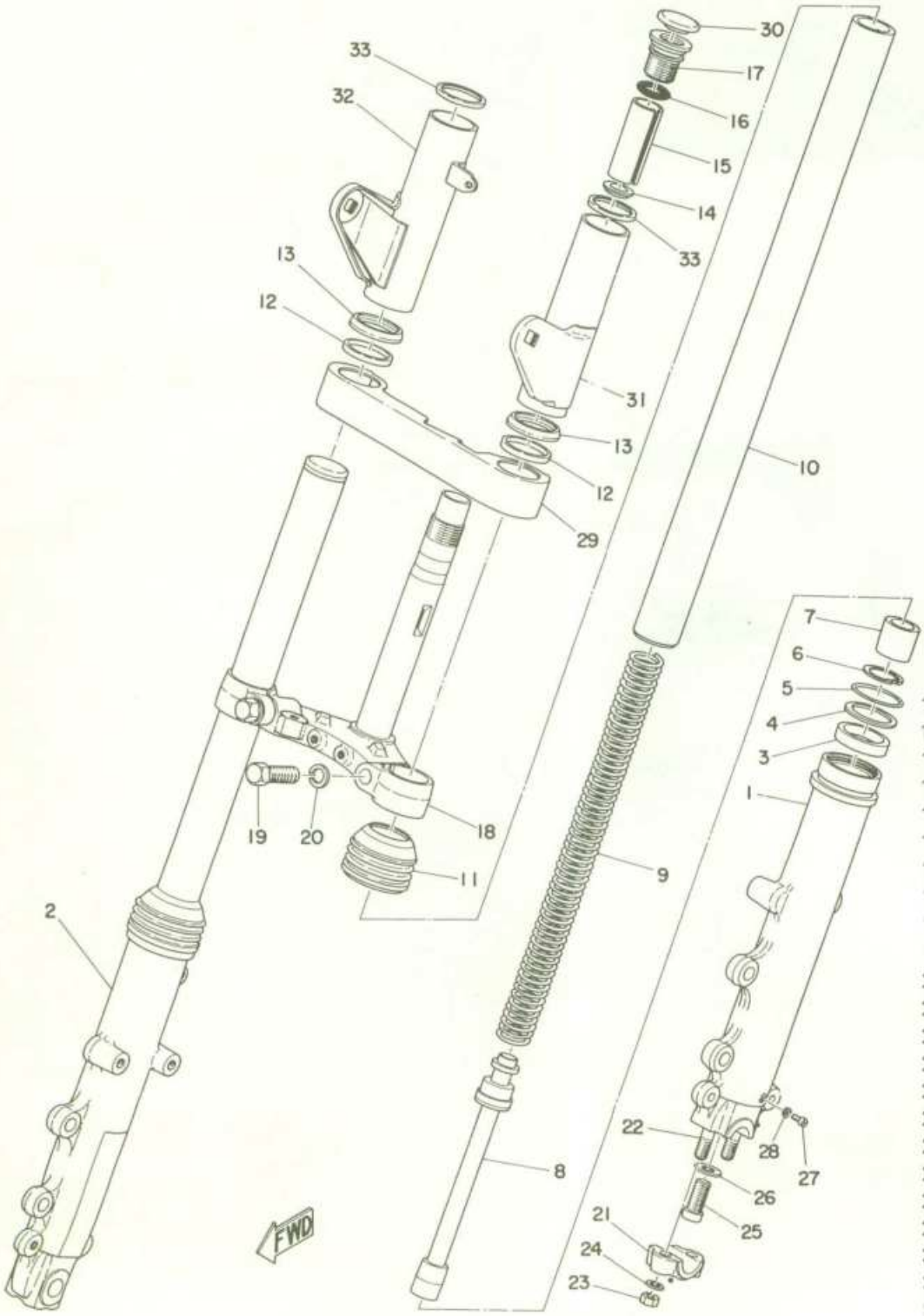


Left side cover



FRONT FORKS

The front forks consist of two individual fork legs, each one having a two-way hydraulic dampening action and an internal spring to extend the fork leg during operation. In addition, the forks are held solidly in place by an underbracket and top bracket commonly called the triple clamp.



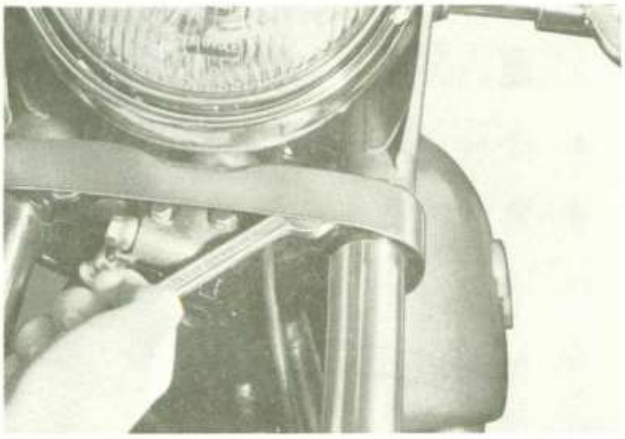
1 Outer left tube
2 Outer right tube
3 Oil seal
4 Oil seal washer
5 Oil seal clip
6 Circlip (R-28)
7 Piston
8 Cylinder comp.
9 Spring
10 Inner tube
11 Dust seal
12 Packing
13 Under cover guide
14 Spring upper seat
15 Spacer
16 Packing
17 Cap bolt
18 Under bracket comp.
19 Bolt
20 Spring washer
21 Axle holder
22 Stud bolt
23 Nut
24 Spring washer
25 Bolt
26 Packing
27 Drain plug
28 Packing
29 Outer cover
30 Cap
31 Upper left cover
32 Upper right cover
33 Cover upper guide

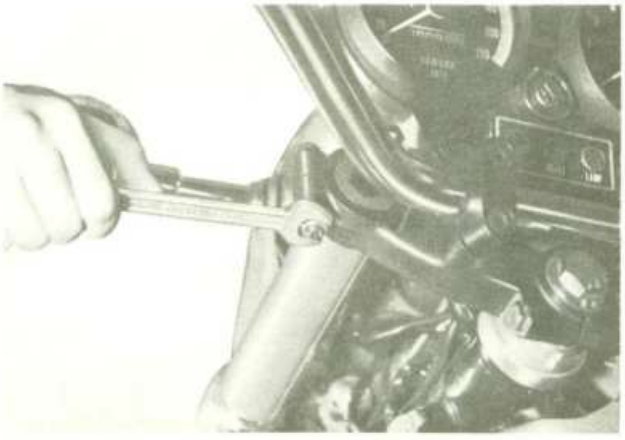
Disassembly

Note:

Remove the front wheel and front fender before starting this procedure.
To remove the front fork leg (right), the disc brake caliper must be removed.

1) Loosen the underbracket bolt inside the outer cover and front fork holding bolt.

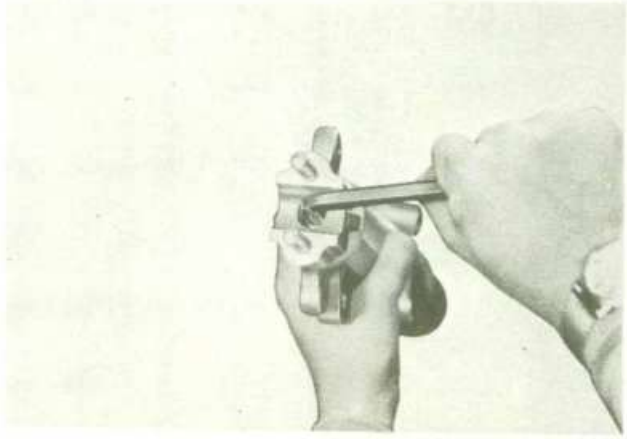




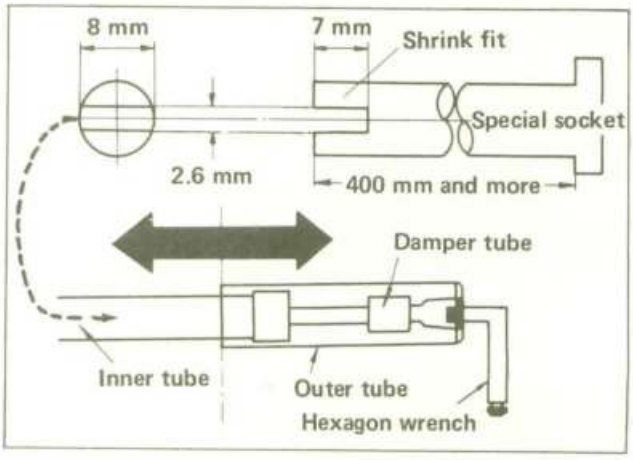
2) Pull the inner fork tube out of the mounting brackets.



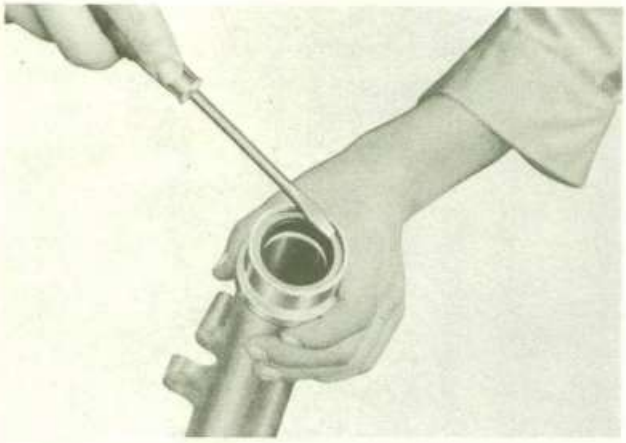
3) Remove the cylinder mounting bolt at the bottom end of the outer tube.
If it is difficult to remove the bolt because of the cylinder revolving, take the following steps.

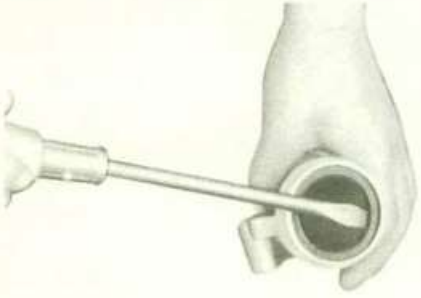


4) Remove the bolt by pulling the inner tube to the full limit of its travel. This will cause friction to be applied to the damper. If this is unsuccessfull, a special socket must be made to attach to the top of the damper tube inside the inner fork leg.

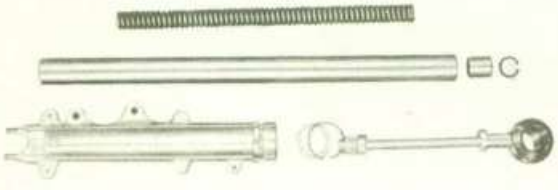


5) Oil Seal
The oil seal that is pressed into the top of the outer nut should be replaced whenever the forks are disassembled.





Note:
Whenever the inner tube is removed, be sure to replace the oil seal.



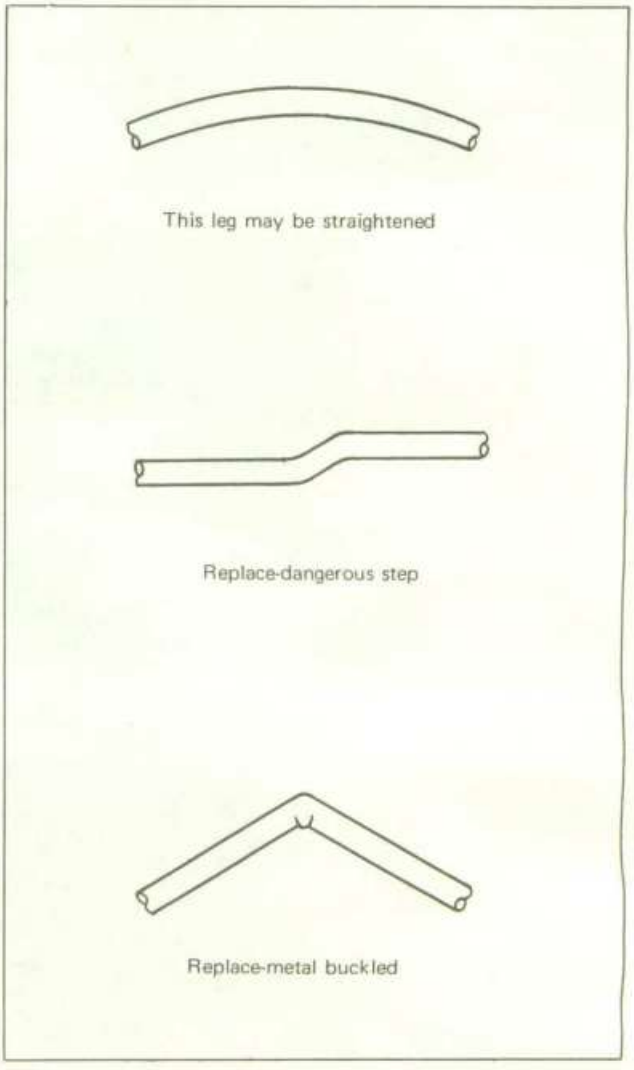
Inspection

Fork Wear

1) Inner fork tube:
   a) The inner fork tube must be checked for surface wear and bends. The tube gets scratched from dirt working past the seal and continually rubbing against the tube. In addition, the tube can become deeply grooved if it is bent.

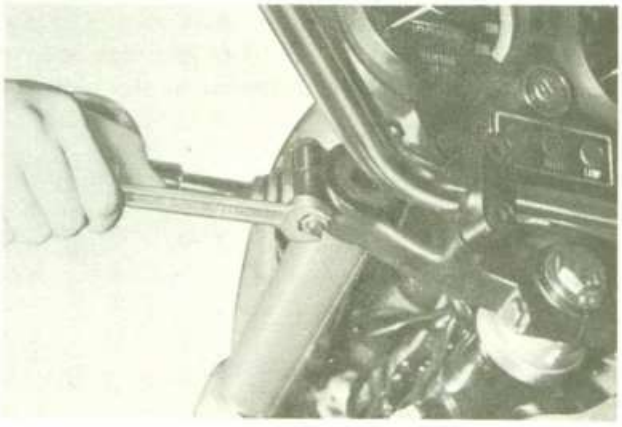
   b) Deep grooves, or nicks, can quickly wear out the seal lips and permit oil to blow past the seal. Replace the tube if these deep grooves are evident.

   c) Also check for a bent tube. If the tube is found to be bent for any reason, the safest procedure is to replace it.



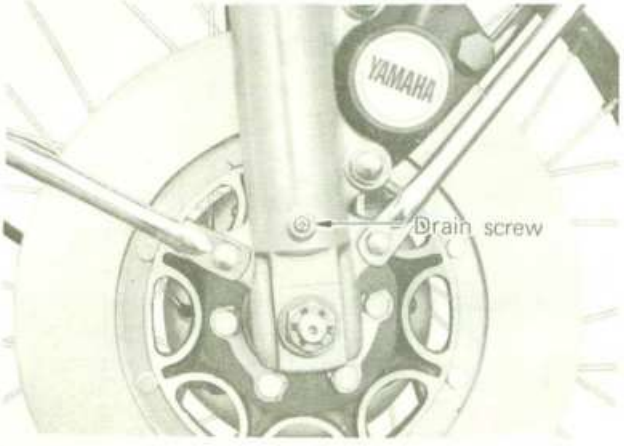
Fork Installation

a) Slide the inner fork leg up through the underbracket and handle crown and tighten the underbracket bolts and front fork installation bolts.
This firmly locks the inner tube in place.



Changing fork oil

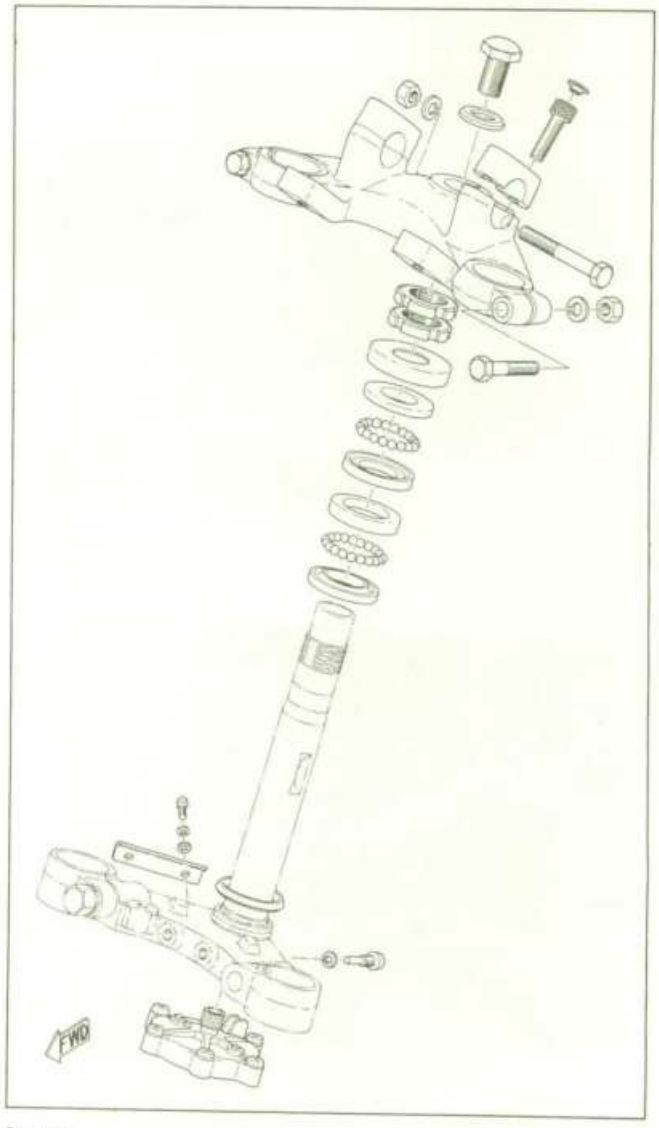
a) Remove the drain screw from the outside of both forks and allow the oil to drain out. Push down on the handlebar a few times to compress the forks and pump out any remaining oil.



b) Install both drain screws, then unscrew both fork cap screws. Pour 173cc (5.8 fl.oz) of 10W/30 into each leg. Install both cap screws.

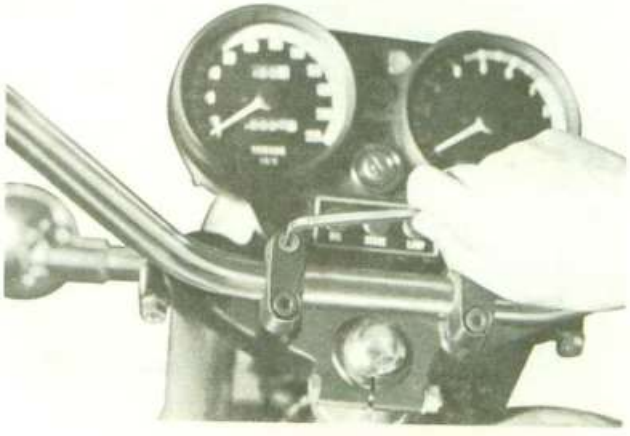


HANDLE CROWN/UNDERBRACKET



Note:
The following procedures can be performed with the entire fork unit still attached.

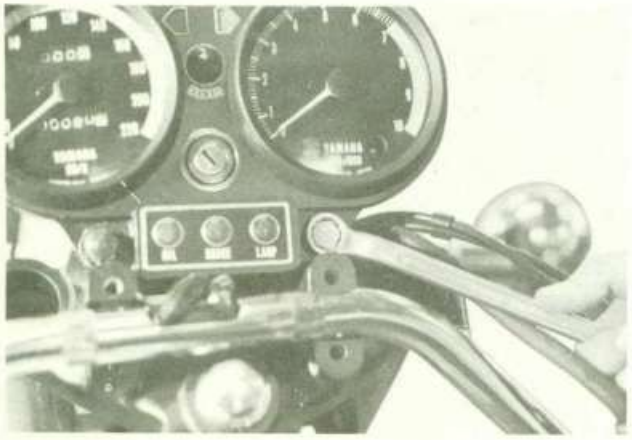
1) Remove the handlebar holder retaining bolts, then remove the holder.



2) Loosen the handle crown lock nut, unscrew the steering stem bolt, and remove the front fork bolts. The handle crown can now be removed.

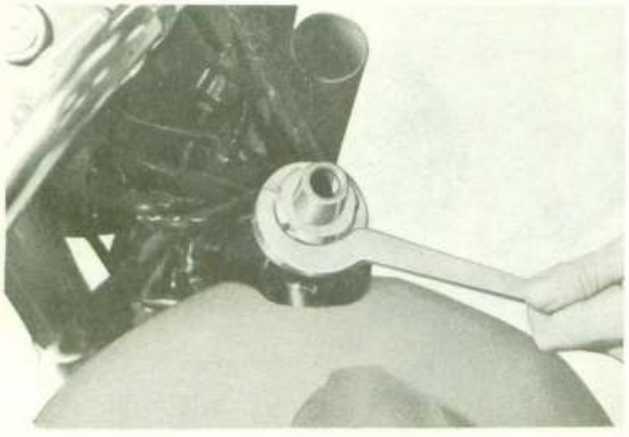


3) Remove the meter panel mounting bolts.



4) When removing the under bracket, it is necessary to remove the wiring inside the head lamp body, disc brake oil hose joint nut, and head lamp clamp bolt.

5) Beneath the handle crown are two stem ring nuts that holds the underbracket in place. Remove it.



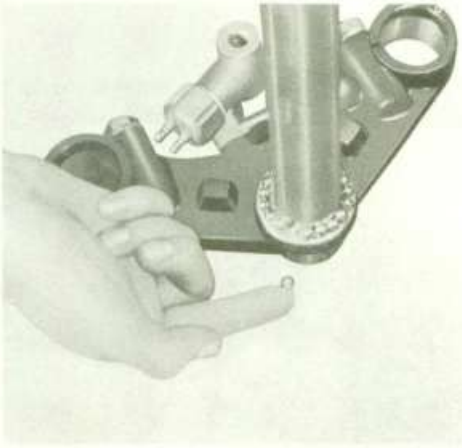
6) Take care when removing the bottom ring nut, as the underbracket will begin to drop down, away from the steering head.

Caution

The top and bottom steering head balls (including top and bottom races for each set of balls) are held in place by the underbracket and ring nut. Take care when removing the underbracket that none of the balls drop out and become lost.

7) Examine all the balls for pits or partial flatness. If any one is found defective, the entire set (including both races) should be replaced. If either race is pitted, shows rust spots, or is damaged in any way, replace both races and all balls.

8) Mount both bottom races and the balls onto the underbracket (balls completely greased).



9) Carefully slip the underbracket stem up into the steering head. Hold the top bearing assembly in place so the stem does not knock any balls out of position.

10) Install both top races and balls into the top of the steering head. Be sure the balls are completely greased during installation.



11) Thread the ring nut down over the stem to hold the underbracket in place.

Important

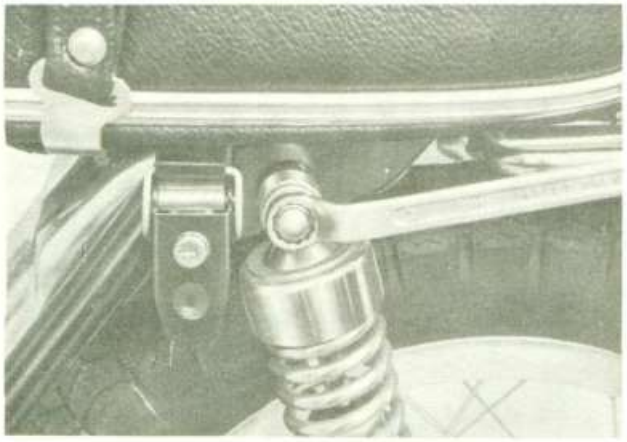
Tighten the lower ring nut so that all free play is taken up, but so the bracket can still pivot freely from lock to lock. Recheck for free play after the entire fork unit has been destall and tighten the upper ring nut reassembled.

12) Set the handle crown into position over the ring nut. Locate both crown arms over the upper covers and lock in place by threading on and tightening the stem lock nut.

REAR SUSPENSION UNIT

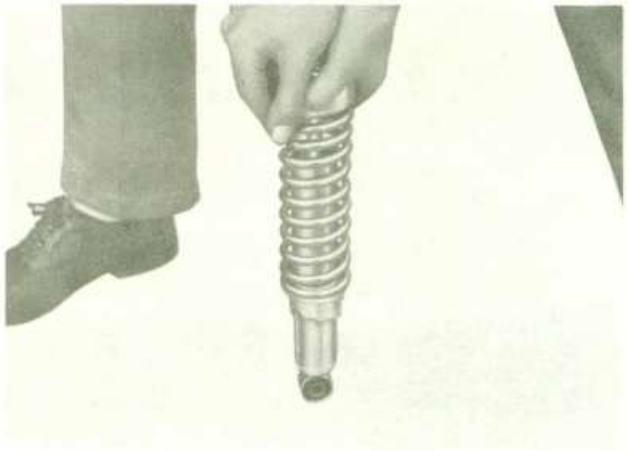
Disassembly

Remove both mounting bolts and pull the suspension unit out of the frame and swing arm mounts.



Inspection

A unit that has lost its suspension qualities will compress quite easily and rebound quickly. To test the effectiveness of the unit, compress it as far as possible and then immediately take all weight off the shock. A suspension unit that is working properly will rebound quickly halfway and then slowly expand the second half. A defective shock will rebound to its fullest length without hesitation.

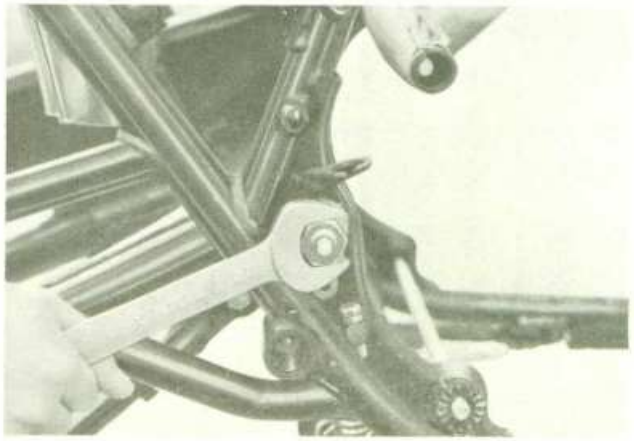


SWING ARM Removal

Note:

The rear wheel assembly and rear shock lower mounting bolts must be removed before the swing arm can be removed.

The swing arm is held to the frame by a pivot shaft. Bend the shaft lock tab down, remove the lock nut, and pull out the pivot shaft. The swing arm can now be removed from the frame.



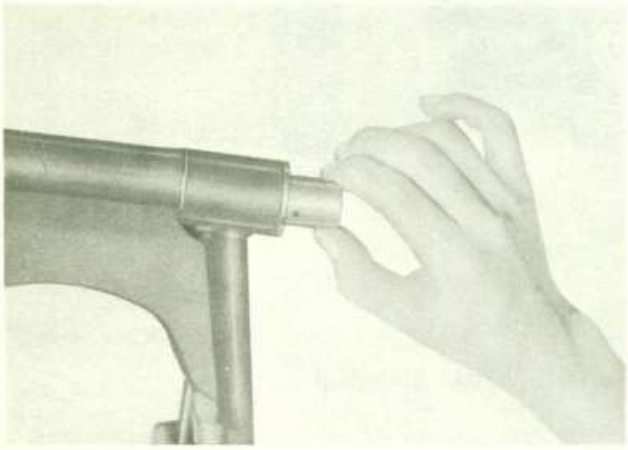
Inspection

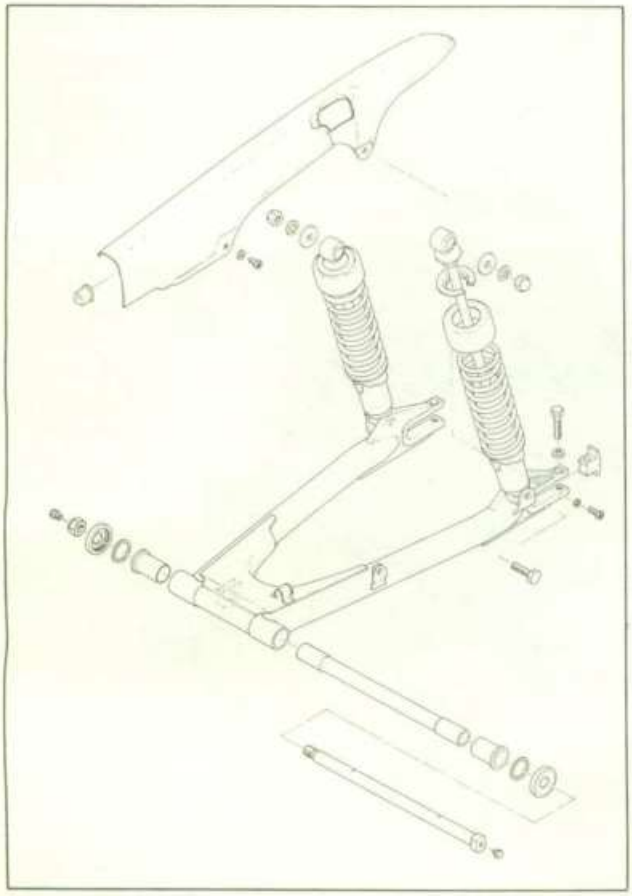
Wear

Wear of the swing arm pivot shaft bushings can cause wheel hop and wobble. With the swing arm installed (rear shocks and wheel removed) grasp the swing arm, twist slightly to feel for excessive shaft play in the bushings. There should be virtually no play at all for the bushings to be useable. If play exists, the bushings are worn. Press them out of the swing arm and install new ones.

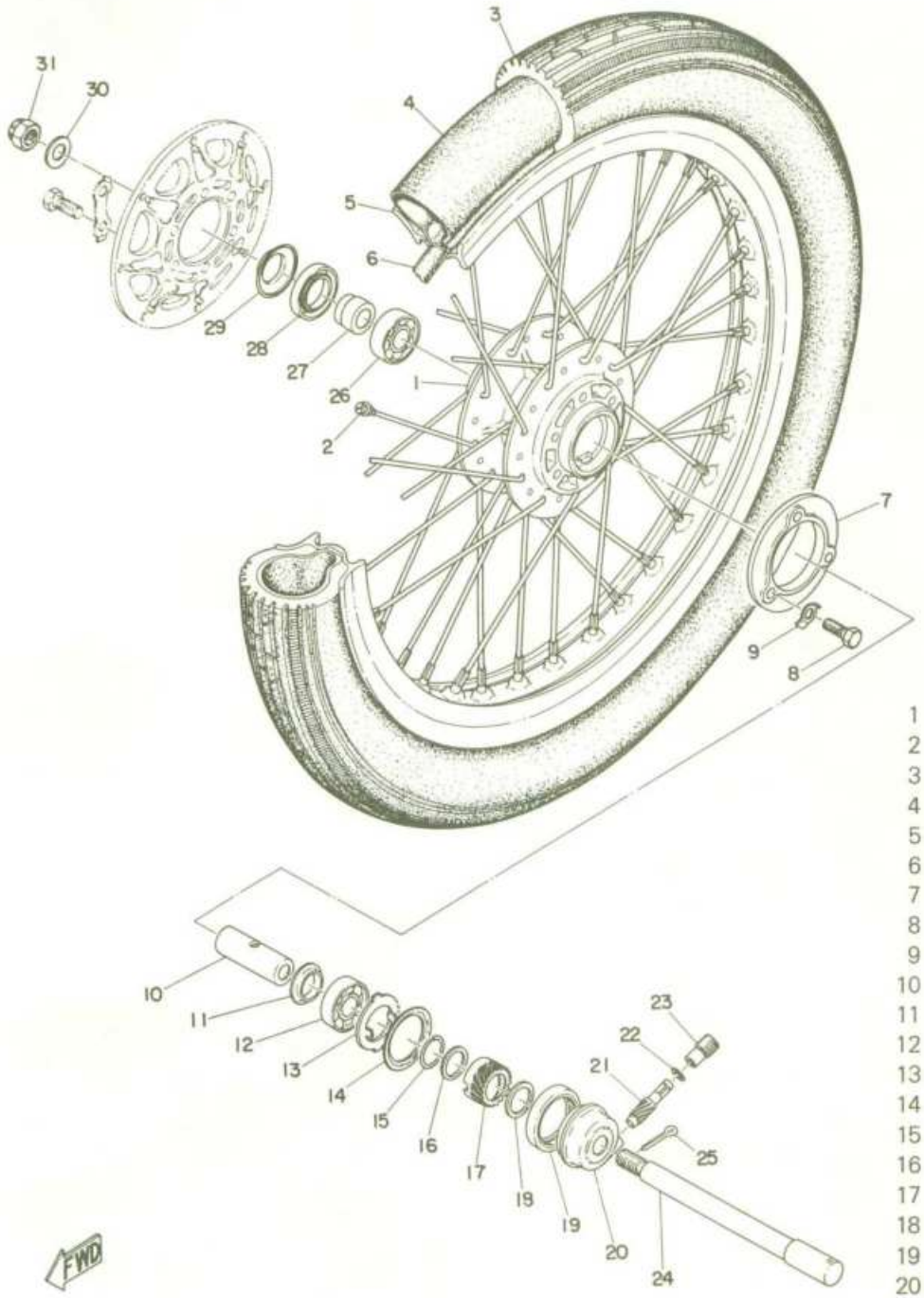
Lubrication

The swing arm pivot shaft end is fitted with a zirc grease fitting. Pressure feed a small amount of grease into this fitting every 2,000 miles.





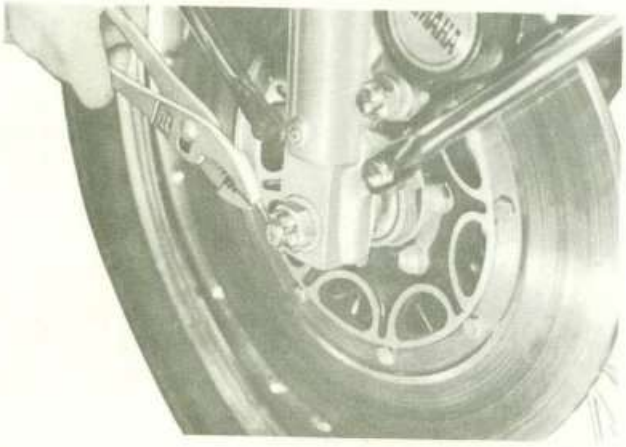
FRONT WHEEL



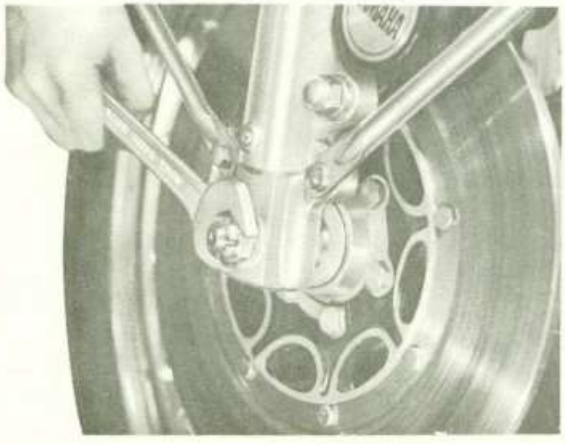
1 Front hub
2 Spoke set
3 Front tire (H3.50-19-4PR)
4 Tube (3.50-19)
5 Rim (1.85B-19)
6 Rim band (3.50-19)
7 Housing cover
8 Fitting bolt
9 Lock washer
10 Bearing spacer
11 Spacer flange
12 Bearing (B6303Z)
13 Meter clutch
14 Clutch meter betainer
15 Stop ring
16 Thrust washer 2 (25-29-1.0)
17 Drive gear
18 Thrust washer 1 (25-32-0.
19 Oil seal (SD28-47-7)
20 Gear unit housing
21 Meter gear
22 Washer (6.2-9.5-0.8)
23 Bushing
24 Wheel shaft
25 Cotter pin
26 Bearing (B6303)
27 Shaft collar
28 Oil seal (SDD-45-56-6)
29 Dust cover
30 Plain washer
31 Shaft nut

Disassembly

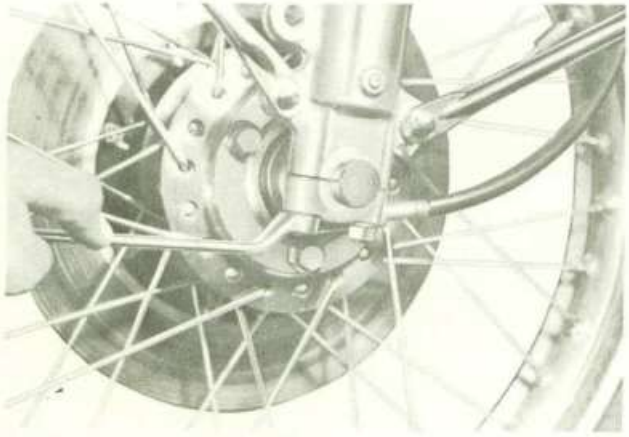
1) Remove the front wheel shaft nut lock pin.
The pin must be replaced with a new one each time it is removed.



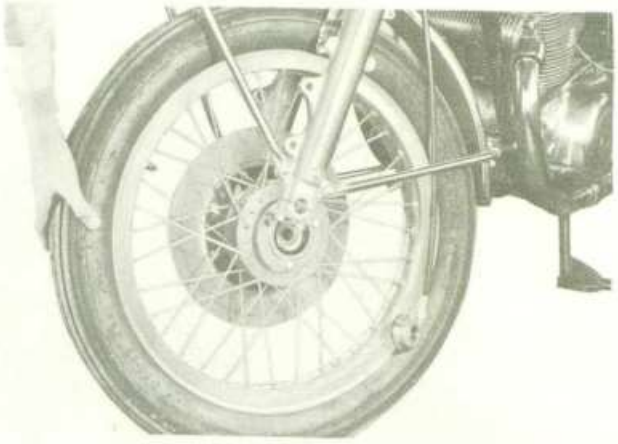
2) Remove the front wheel shaft nut.



3) Loosen the two front wheel shaft lock bolts.

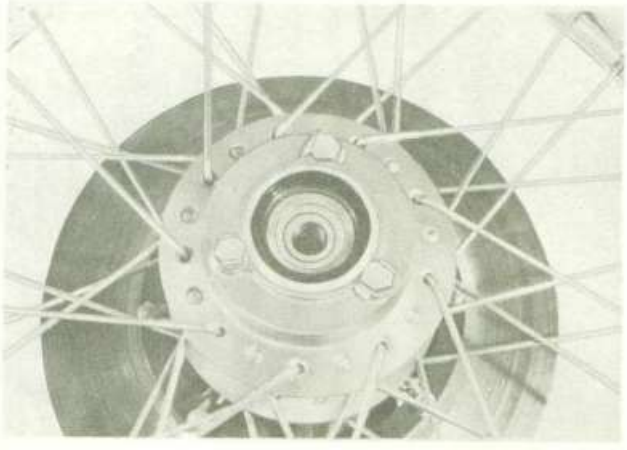


4) Pull out the front wheel shaft, and remove the front wheel ass'y. In this case, the speedometer houisng must be removed.

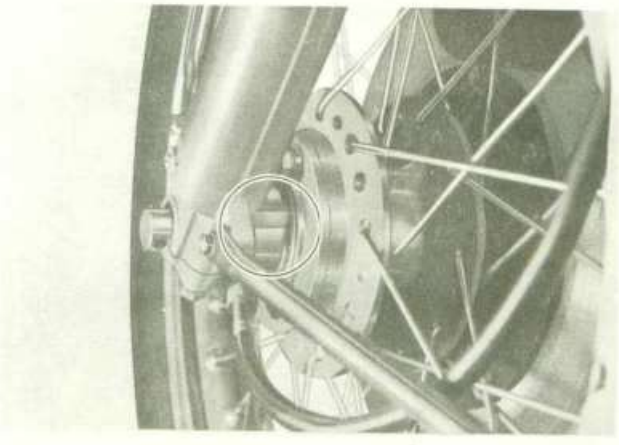


Installation

1) Grease the meter clutch and oil seal inside the meter housing.



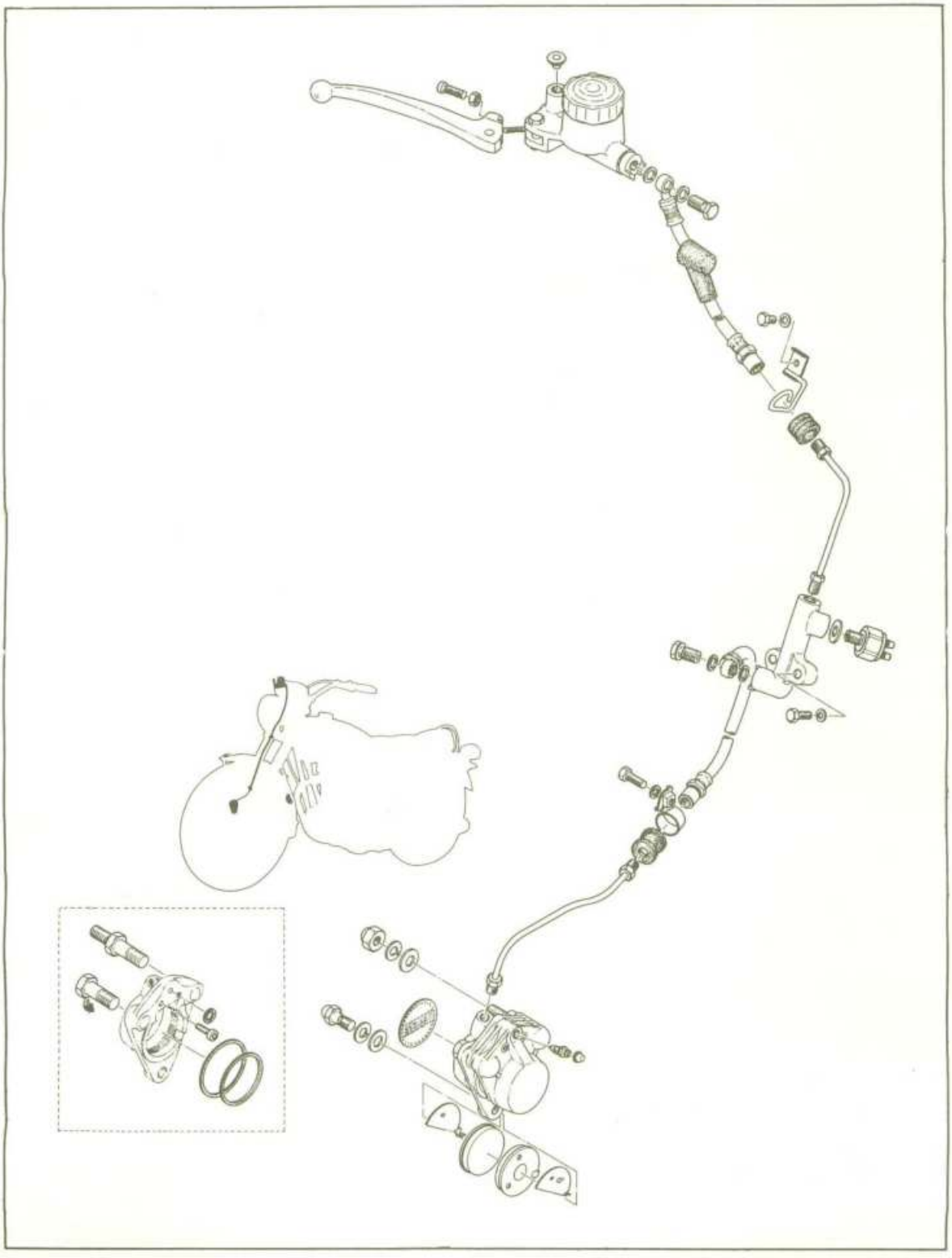
2) Sub-assemble the front wheel ass'y and meter housing and install this sub-assemble on the frame.
Be sure the produced portion (torque stopper) of the meter housing is positioned as below.



DISC BRAKE

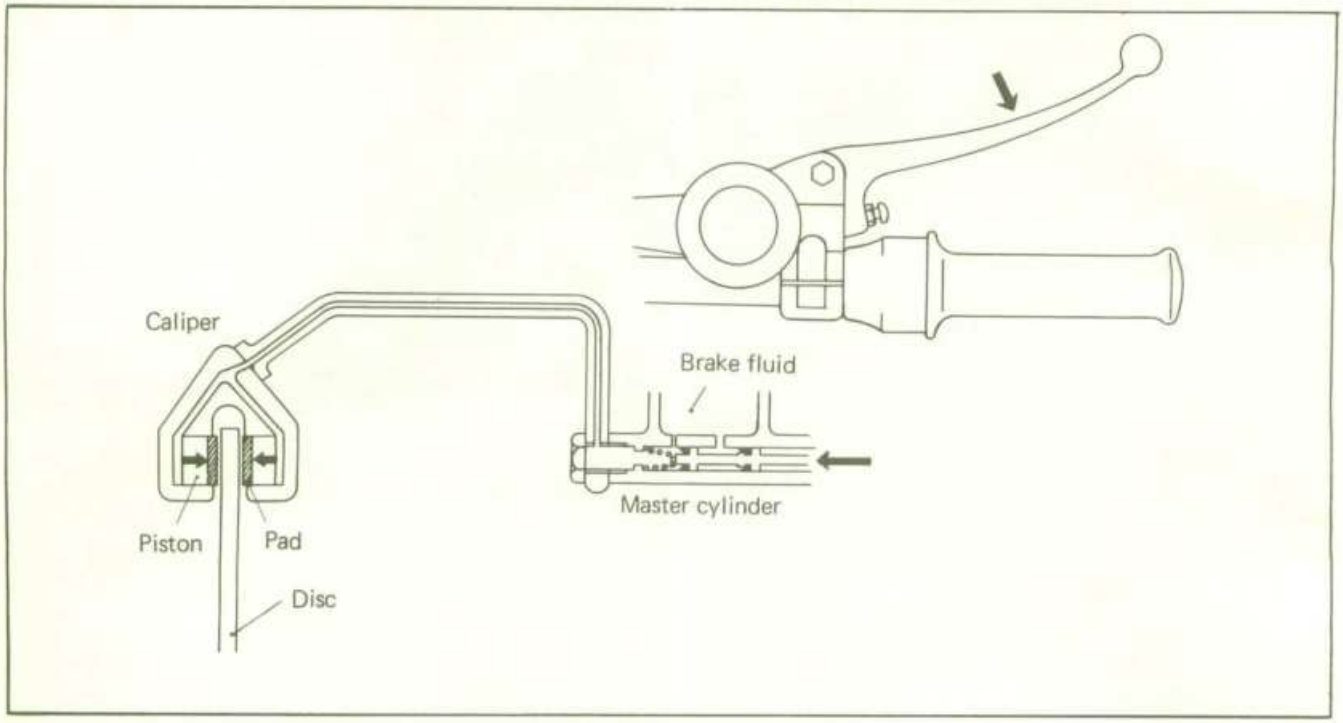
Construction

A fixed-caliper type disc brake, in which the two flat shoes grip the rotating disc, is in use. The right part of the handlebar has a brake lever and a master cylinder. The caliper are installed on the front fork, while the brake disc is mounted on the front hub. The master cylinder is connected to the calipers by a brake hose and pipe.



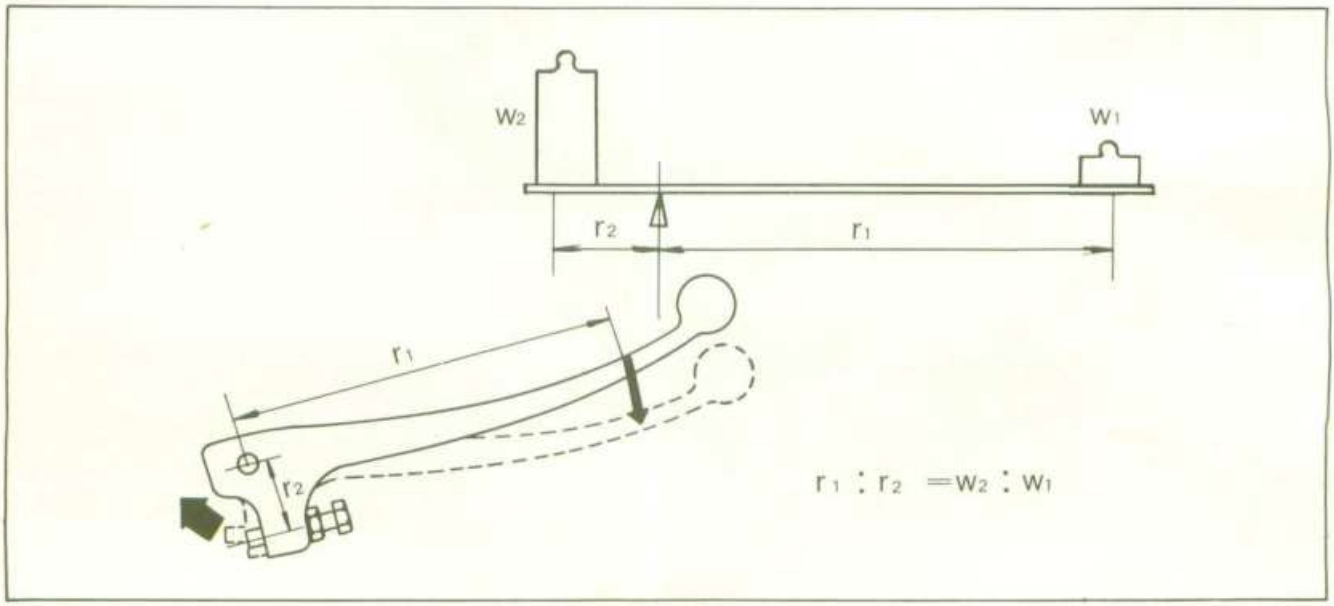
Operation

When the front brake lever is squeezed, it forces the master cylinder piston to move. As the piston cup moves past the compensating port, it traps the brake fluid in the cylinder. Pressure rises rapidly, and the fluid is forced through the brake hose to the caliper cylinders. The brake fluid forced the caliper cylinders pushes against the pistons in the cylinders, and the pads located on each side of the disc are forced against the disc. The friction between the pads and revolving disc then provides the braking action. As the brake lever is released, both brake lever and pistons are forced back to their respective original positions by the force of return springs, and seal elasticity.



Brake lever

When the brake lever is squeezed, it produces a push at the master cylinder piston about four times greater than the force applied to the brake lever.

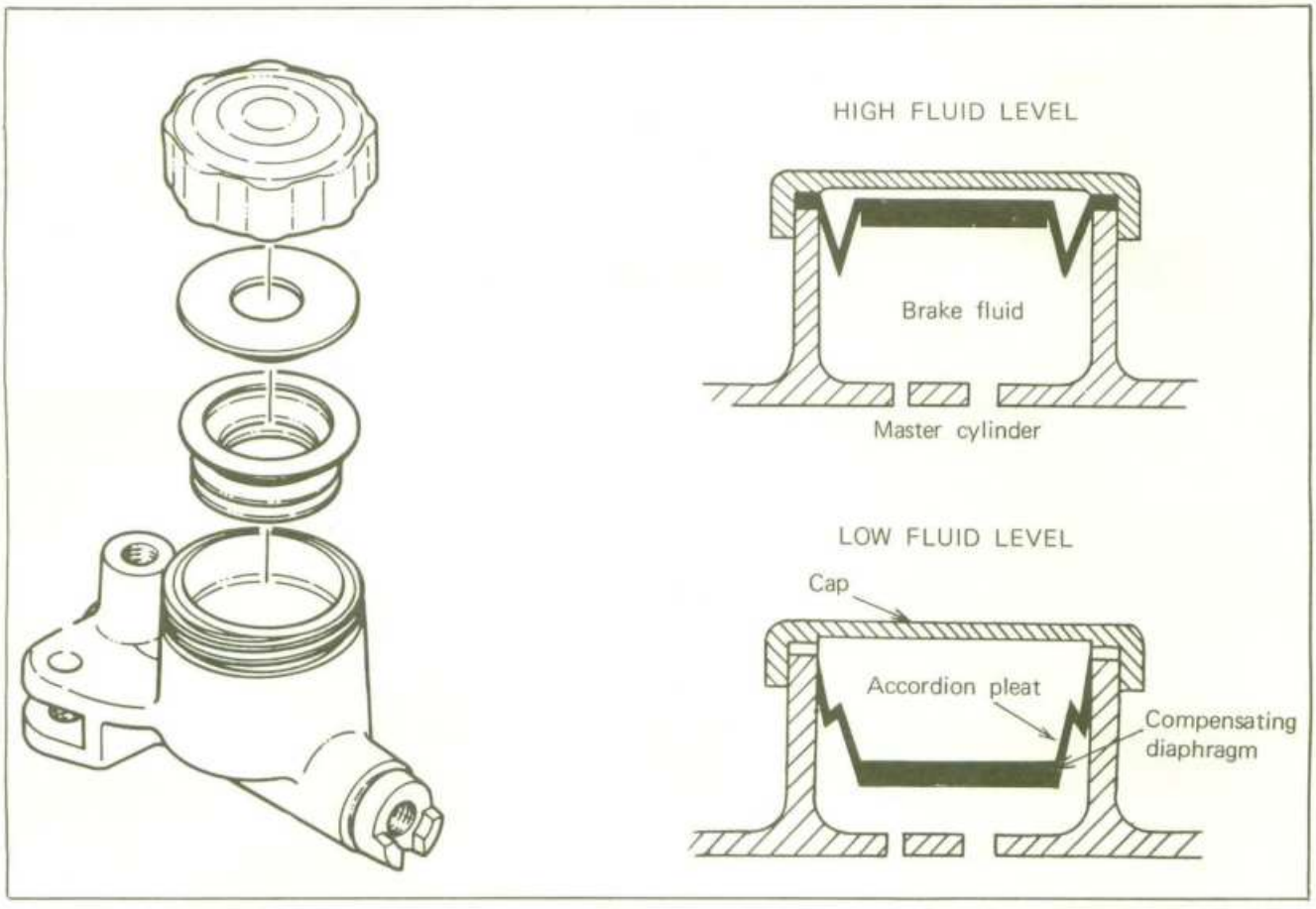


Master cylinder

The master cylinder piston is linked to the brake lever. When the brake lever is squeezed, the piston forces the brake fluid through the hose and pipe to the calipers.

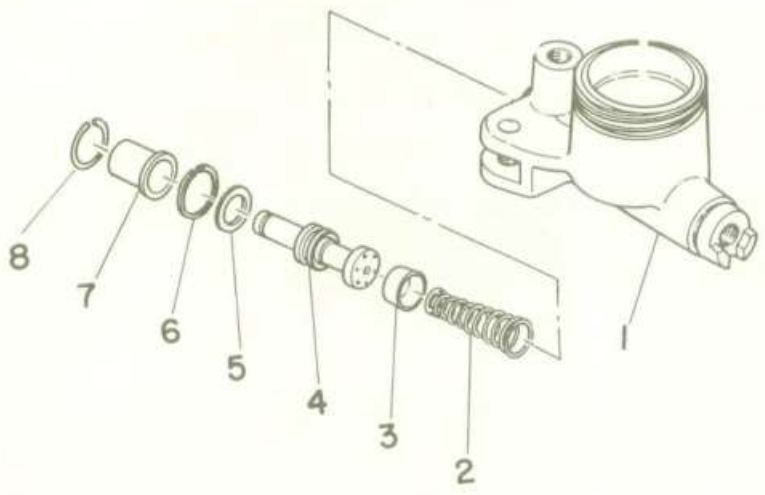
Reservoir tank

As wear on the brake pads increases, the amount of brake fluid must be increased to maintain proper hydraulic pressure. The reservoir tank supplies this brake fluid. (tank capacity is approximately 30cc). To prevent air from entering the brake line when the brake fluid level lowers, especially on a rough road or in an inclined position, a compensating diaphragm is provided for the reservoir tank.

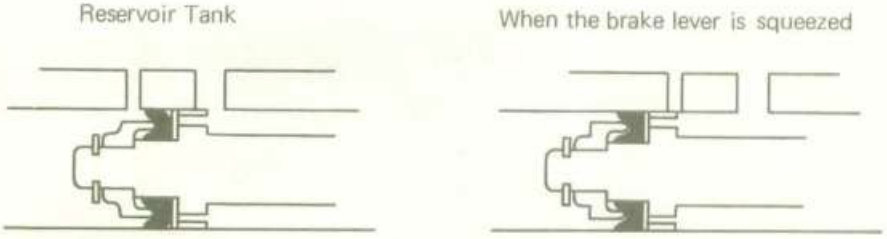


Piston

The master cylinder piston has two cups; one maintains good sealing between the cup and the cylinder wall of the master cylinder, and the other prevents the brake fluid from leaking out from the cylinder to the brake lever side. The return spring forces the brake lever to its home position, when the lever is released.



1 Master cylinder body
2 Conical spring
3 Cylinder cup
4 Piston ass'y
5 Spacer
6 Circlip
7 Master cylinder boot
8 Boot stopper

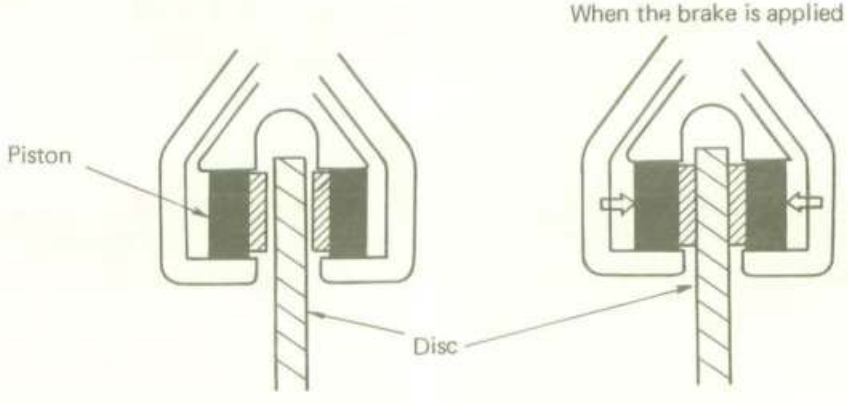


Brake hose and pipe

The brake hose and pipe carry hydraulic pressure to the calipers.
The brake hose is flexible and capable of withstanding a hydraulic pressure of 350 kg/cm^2 in conforming to SAEJ-1401.

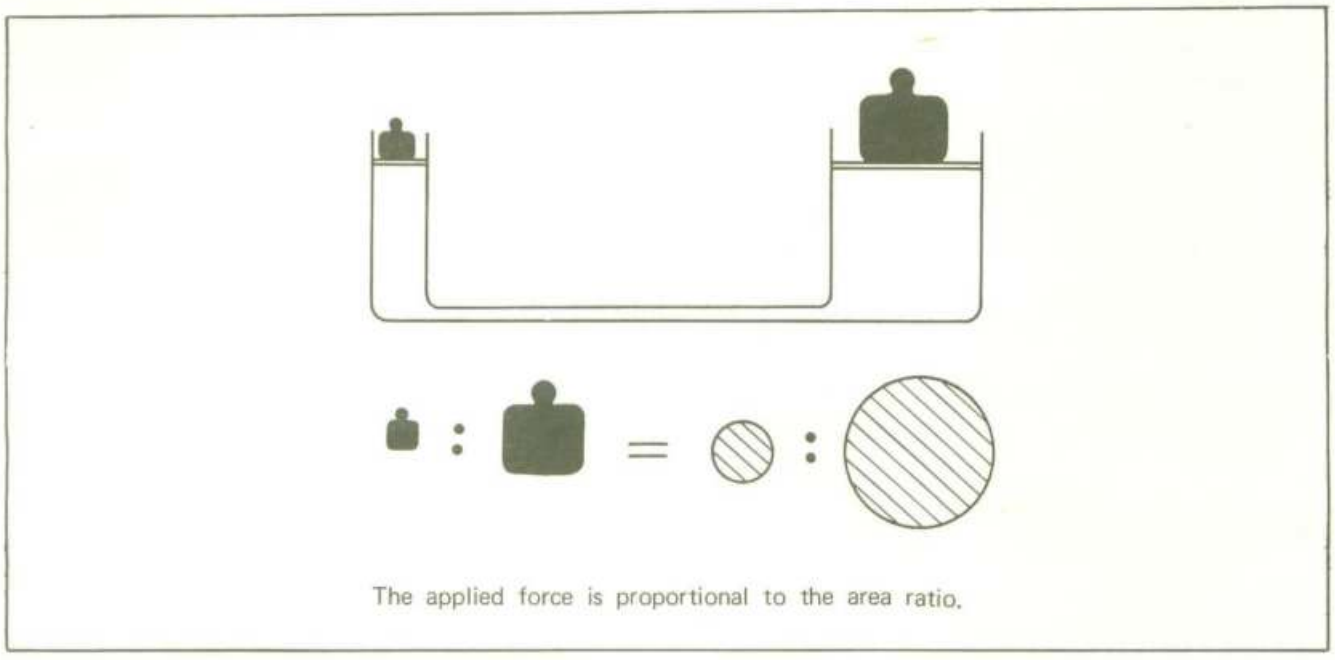
Calipers

The hydraulic pressure carried to the calipers forces the caliper pistons out; by which the pads are pushed out to grip the revolving disc.



Piston

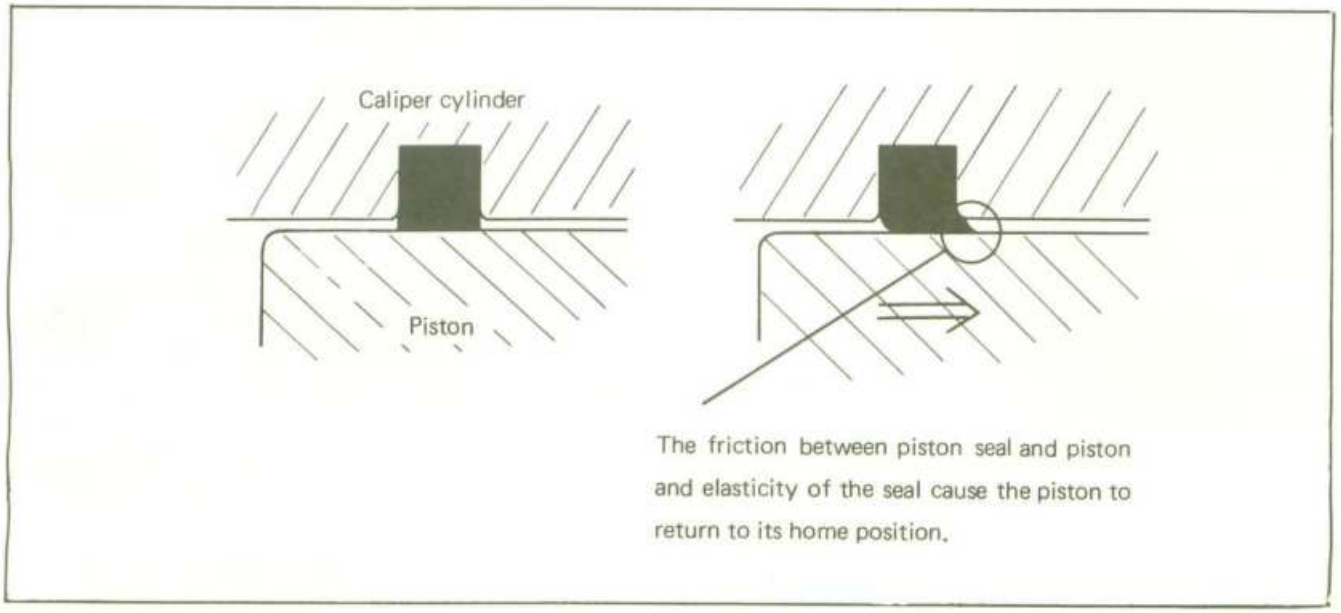
The caliper pistons are forced against the brake pads by hydraulic pressure. The force created is about nine times the force applied to the master hydraulic cylinder piston. Combined with the mechanical advantage of the brake hand lever, the total force applied to the brake disc is approximately 36 times the force applied to the brake hand lever.



The applied force is proportional to the area ratio.

Seals

Each caliper cylinder has a piston seal (to maintain good sealing between the piston and the caliper cylinder wall) and a dust seal (to prevent dirt and water from entering the cylinder).
The piston seal is designed to move the piston back to its home position by making use of its tortional moment after the brake lever is released. The tortional moment is produced by the frictional force and elasticity of the piston seal. The piston seal also serves as an automatic adjuster of the clearance between the disc and the pad. (The clearance between the disc and the pad is normally 0.1 to 0.3mm.)



The friction between piston seal and piston and elasticity of the seal cause the piston to return to its home position.

Pads

The pads are forced against the revolving disc by the caliper cylinder pistons to grip the disc. They are composed of resin molded asbentos.

Bleed Screw

Air in the hydraulic line impairs hydraulic action. To expel air out of the caliper cylinder, a bleed screw is provided on the caliper ass'y.

Disc

The stainless steel disk is attached to the front wheel hub, and it is gripped by the pads located on each side of the disc.

Brake Fluid

The brake fluid is compressed in the master cylinder, and the hydraulic pressure thus produced is carried to the caliper cylinder pistons. In this sense, the brake fluid plays a very important role.
The brake fluid must meet the following requirements:
1. Proper viscosity and liquidity must be maintained at working temperatures.
2. Good stability must be maintained. (That is, the fluid will not separate, change in viscosity, and/or precipitate.)
3. Boiling point is high. (No vapor lock will result.)
4. It will not deteriorate rubber.
5. Water resisting properties must be excellent.

Note that the disk brake fluid must be of genuine quality, because the fluid temperature tends to rise higher as compared with the drum brake.
Suggested brake fluid specifications: DOT #3 or #4.

Note:

Do not mix brake fluids with different brand names. Some brake fluids are not compatible with other.

Disassembly

The tire and bearings can be disassembled without removing the brake disc. Do not attempt to remove the brake disc unnecessarily.
Tools and Parts required for Disassembly:

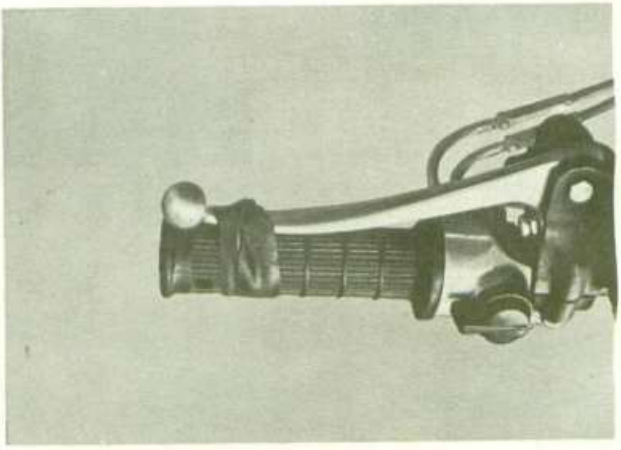
General service tools
Hexagon wrench, 5mm
Clip pliers
Air compressor
Rags
Torque wrench

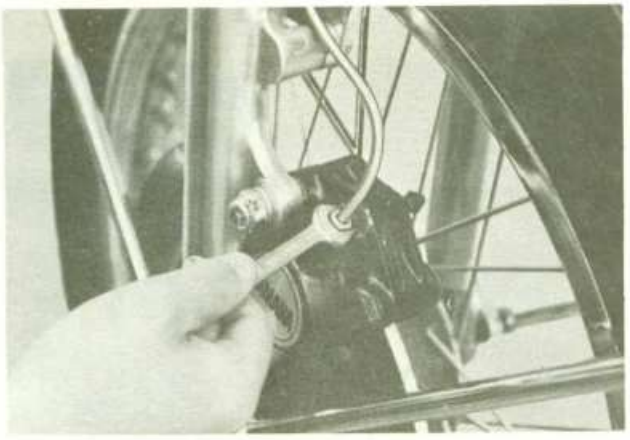
Removing the Caliper

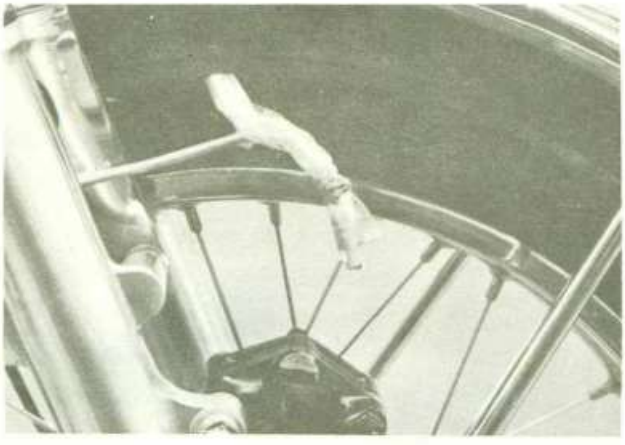
1) Remove the brake pipe from the caliper ass'y.
   Put the removed brake pipe in a clean vinyl bag so that it can be kept free from dust and dirt.

Note:

It is advisable to keep the brake lever squeezed, because this brake lever position prevents the fluid from leaking out of the reservoir. Tie the brake lever to the handle grip with a rubber band.

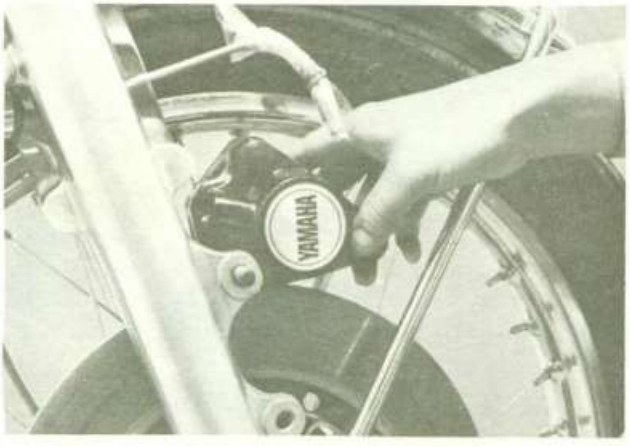






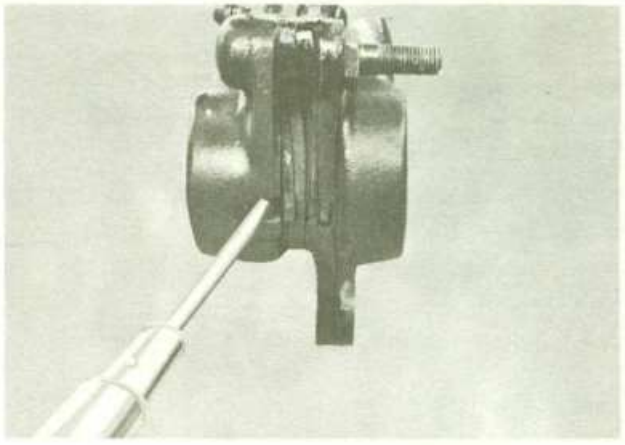
2) Remove the caliper mounting bolts and nuts.

3) Rotate the caliper ass'y upward, and remove it.



Removing the Pads

4) Remove the pads from their seats.

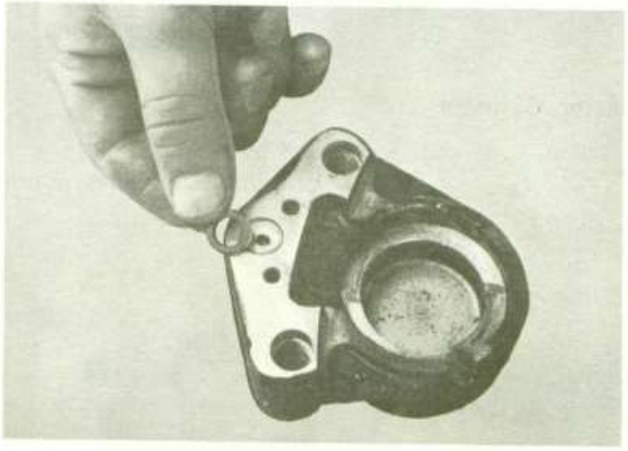


Removing the caliper Pistons and Seals:

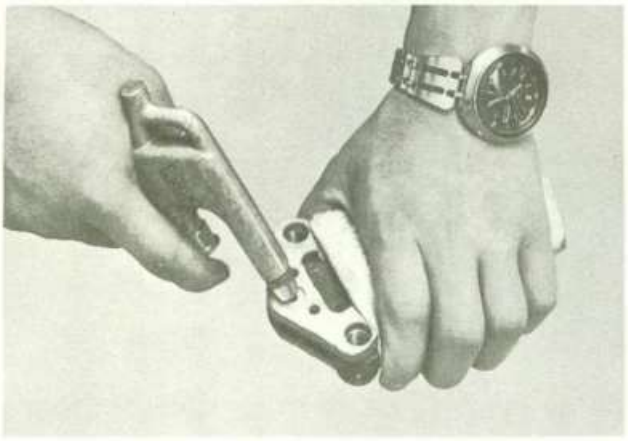
5) Remove the two bridge bolts and two hexagon bolts.

6) Remove the caliper seal.





7) Force the piston out from the caliper cylinder by feeding compressed air into the cylinder through the fluid inlet. Never attempt to push the pistons with a screw driver.



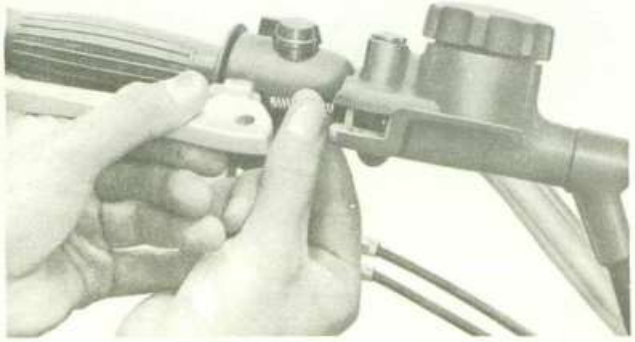
8) Remove the piston seal and dust seal from the caliper body.
The foregoing applies to both pistons.

Note:
The removed parts should be kept free from gasoline, kerosene, engine oil, etc. If any oil attaches to a seal, it will swell up or deteriorate.

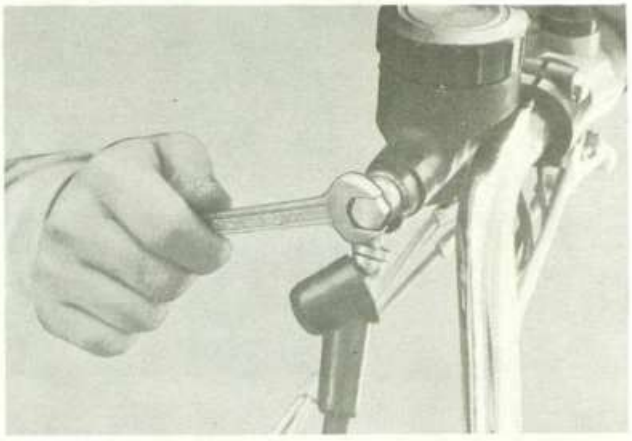


Master Cylinder

1) Remove the stop switch and brake lever.
(Take care not to misplace the brake lever return spring.)



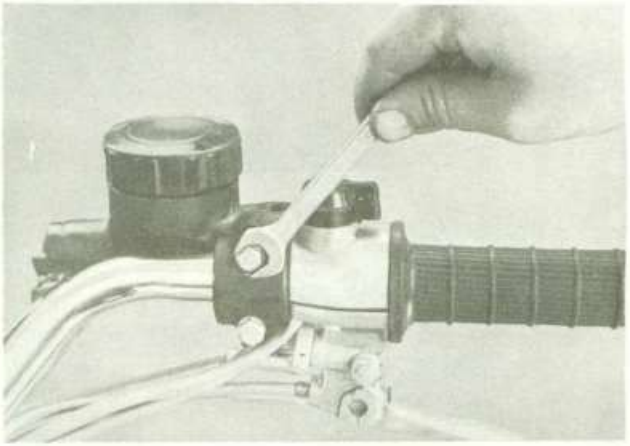
2) Remove the brake hose.



3) Remove the two master cylinder mounting bolts, and remove the master cylinder from the handlebar.

4) Remove the reservoir tank cap, and remove the diaphragm.

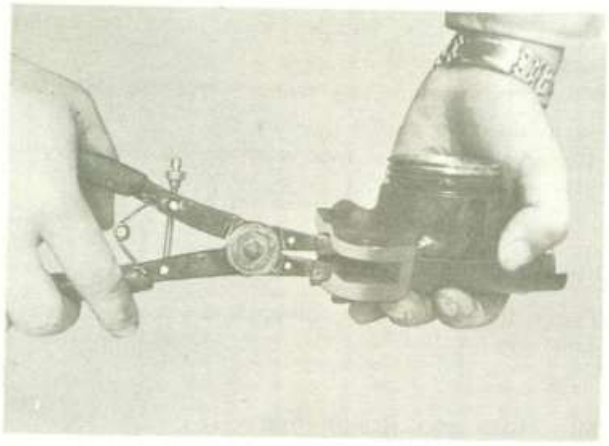
5) Drain the brake fluid from the reservoir tank.



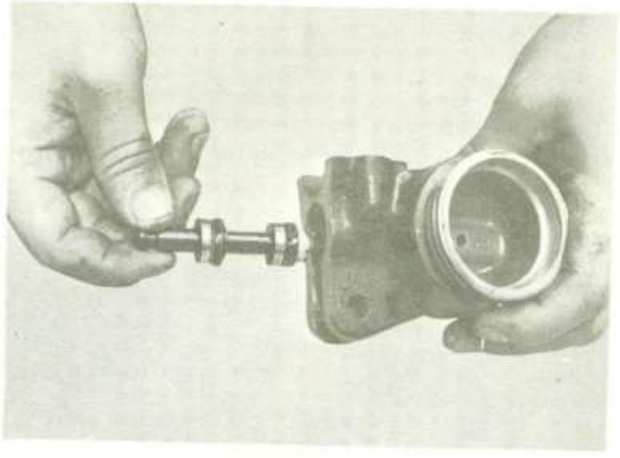
6) Remove the master cylinder boot.



7) Remove the snap ring with clip pliers.



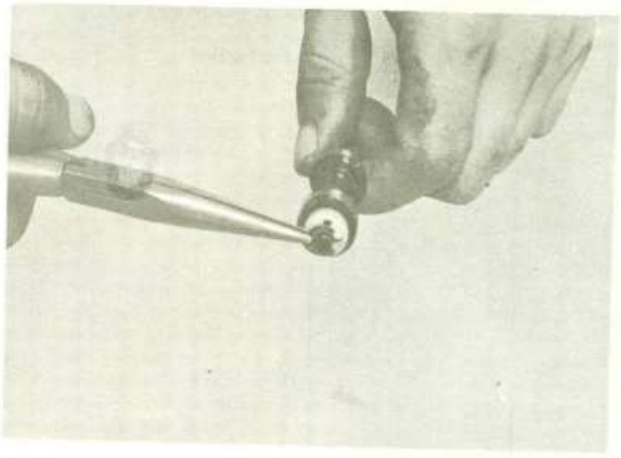
8) Remove the piston. (Note that a spring remains in the master cylinder.)



a) Remove the spring.



9) Remove the E clip, and remove the cylinder cup retainer.



10) Remove the cylinder cup.



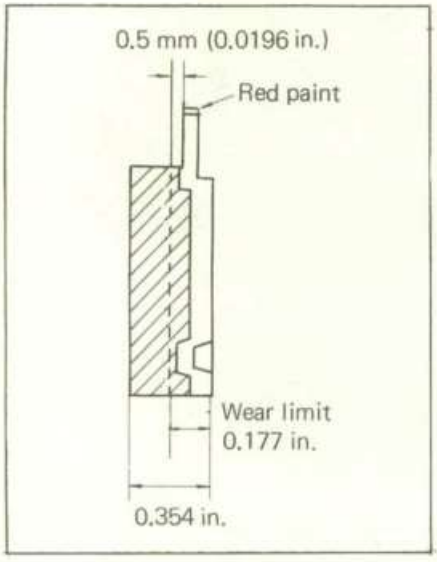
Inspection

Measuring Instruments required for Inspection

Dial gauge
Dial gauge adapter
Micrometer 9-25mm
Vernier calipers 150mm

Pads

If any pad is found excessively worn, replace it.
Min allow pad thickness: 0.5mm (0.0196 in.)



Pistons

If any piston is found scratched or worn, replace it.

Piston Seal and Dust Seal

If any seal is found damaged, replace it.
It is advisable to replace the seat every two years of use. Whether they appear damaged or not.

Bridge Bolt

Replace the bridge bolts each time they are removed for disassemble, whether damaged or not.

Master Cylinder Body

1) If the master cylinder has any streak or grooved wear on its wall, replace it.
2) If the outlet end has any scratch or dent, replace it.
3) Check the compensating port for clogging.
4) Check for any foreign matter inside the cylinder and the reservoir tank.

Piston

1) If the piston has any streak or grooved wear, replace it.
2) If the piston has any rust, replace it.

Cylinder Cups

1) If any cylinder cup has a streak or grooved wear on its contacting surface, replace it.
2) If any cylinder cup is found swollen, replace it together with the other seal and rubber parts.
   Thoroughly wash all areas which are exposed to the brake fluid and clean it, in new, brake fluid.
3) Whether worn or not, replace the cylinder cups every two years of use.

Reservoir Diaphragm and Master Cylinder Boot

1) Check the flange and accordion pleats for damage, cracks and aging.
2) Check for smelling. (If swollen, take the same steps as in the case of the cylinder cup.)
3) Replace both every two years of use, whether they are in good condition or not.

Conical Spring

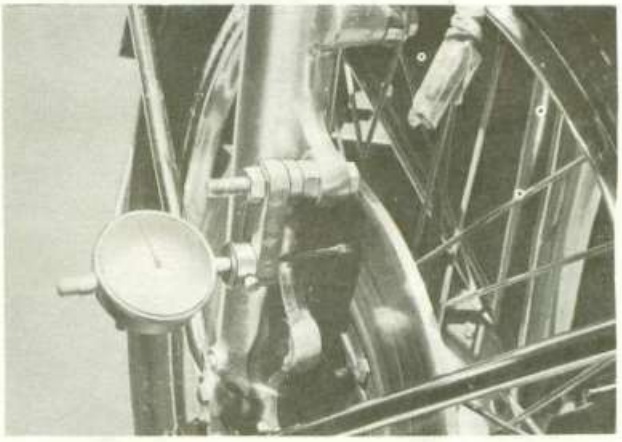
1) Check the spring for breakage and wear.
   Min. free length 60.4mm

Brake Hose and Brake Pipe

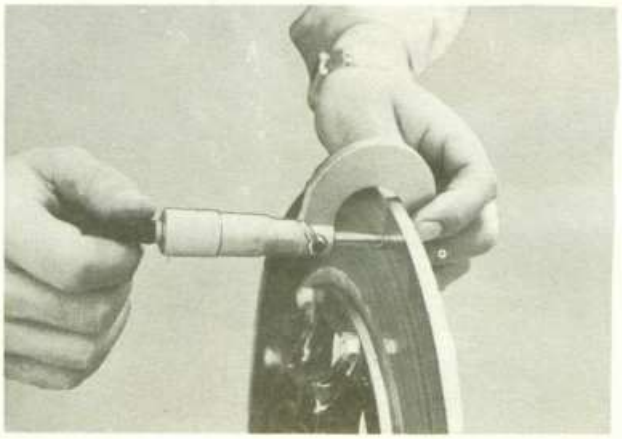
1) Check them for leakage and damage.
2) Replace the brake hose every four years of use, whether it appears to be in good condition or not.

Disc

1) Check the disc ass'y for run-out.
   If the disc shows a deflection of 0.15mm or more, check the disc itself and the wheel shaft bearings.



2) If the disc has excessive wear or damage, replace it.
   Min. allow. disc thickness: 6.5mm



Cleaning

All the removed parts should be washed in the following manner before they are installed.

1) New brake fluid should be used as a cleaning detergent. (The use of any mineral oil should be avoided, because it causes rubber parts to swell. The same can be said of alcohol. Any rubber dipped in alcohol will swell.)

2) If an oil of any other kind (such as mineral oil) is mixed in the system by mistake, the piston cups and seals should be replaced with new ones. All other parts should be washed with fresh, clean, new brake fluid. In addition, the lines, ports, passage, etc., should be thoroughly flushed with clean, new brake fluid.

Calipers

Piston Installation

1) Install the piston seal and dust seal in their seats in the caliper cylinder.

2) Coat the caliper cylinder walls and piston with new brake fluid.

3) Insert the piston into the caliper cylinder by hand. In inserting the piston, special care should be taken so that the piston goes into the cylinder smoothly.

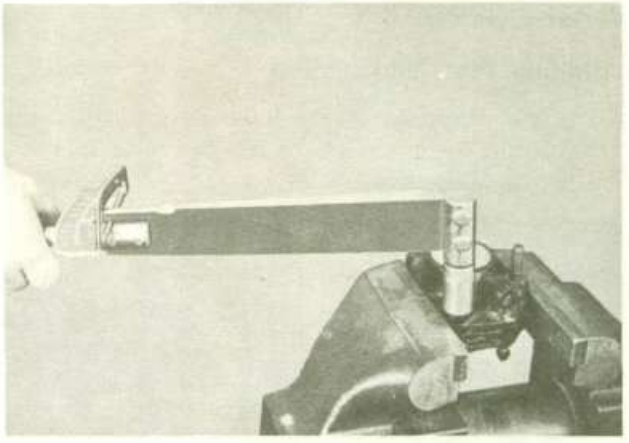


Assembling the outer and inner calipers

4) Install the caliper seals in their seats.

5) Put together the outer and inner calipers. (Make sure that no dust or dirt is attached to the mating surfaces.)

6) The two bridge bolts must be replaced with new ones. Tighten the two hexagon bolts. (The bridge bolts should be tightened later.)
Tightening torque: 60~100 kg-cm, (54 ~ 90 in-lbs)



7) They are very important parts viewed from operational safety, and therefore, the removed bridge bolts should always be replaced. Be sure they are tightened with correct torque;
Tightening torque: 750 ~ 950 kg-cm (675 ~ 855 in-lbs)

Pad Installation

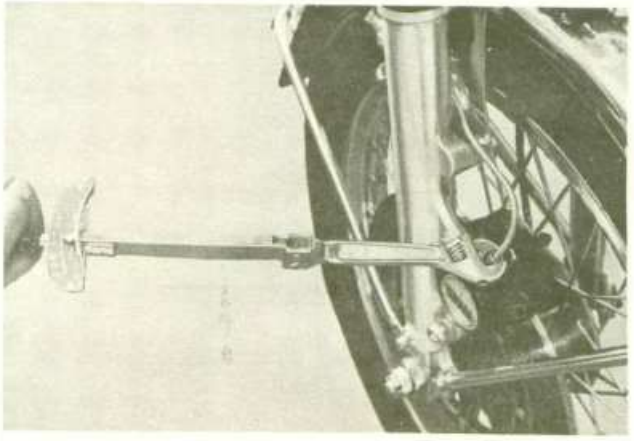
8) Install the pads in their seats.

9) When replacing the pads alone, it is necessary to push back the piston so that new pads can easily be installed. (When the piston is pushed back, and the compensating port is open, the brake fluid level in the reservoir tank will rise steeply. Loosen the bleed screw if necessary, and bleed off the excess brake fluid.

Installing the Calipers

10) To install the calipers on the front fork, reverse the procedures for removal.
Tightening torque: 400 ~ 500 kg-cm (360 ~ 450 in-lbs)

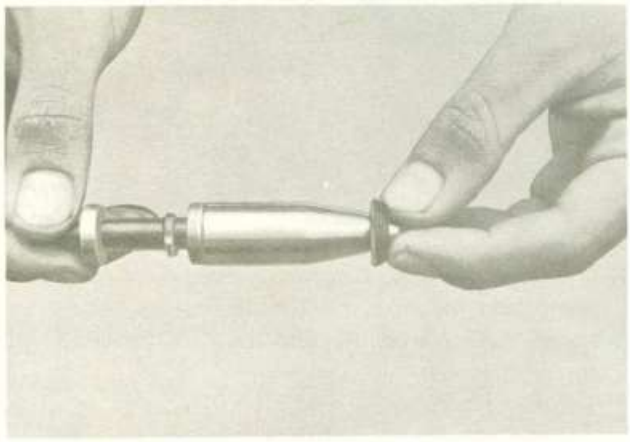
11) Install the brake pipe.
Tightening torque: 130 ~ 180 kg-cm (120~160 in-lbs)

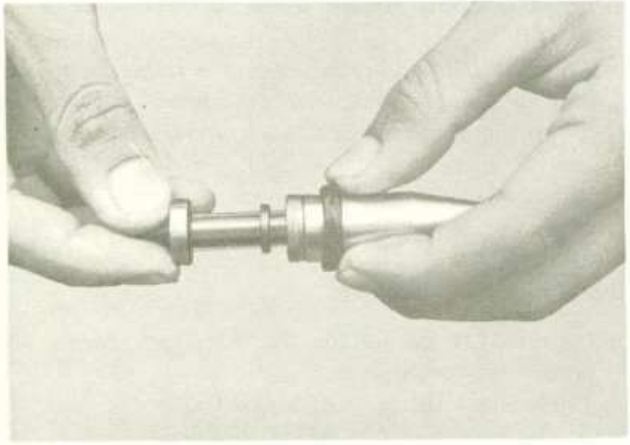


Master Cylinder

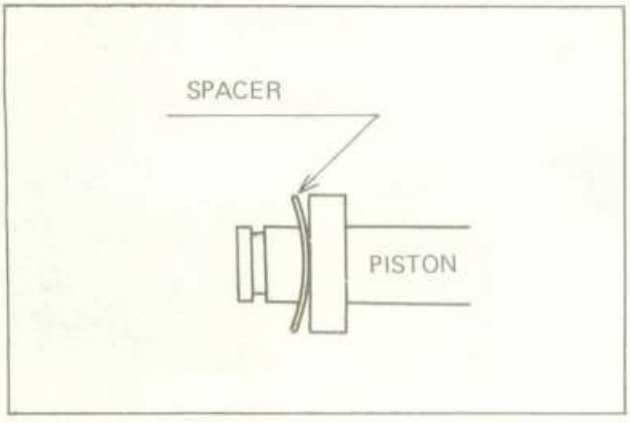
Installing the Cylinder Cup

1) Dip the cup in new brake fluid, and install it. Take care not to scratch the cup and the piston. (Use the jigs.)

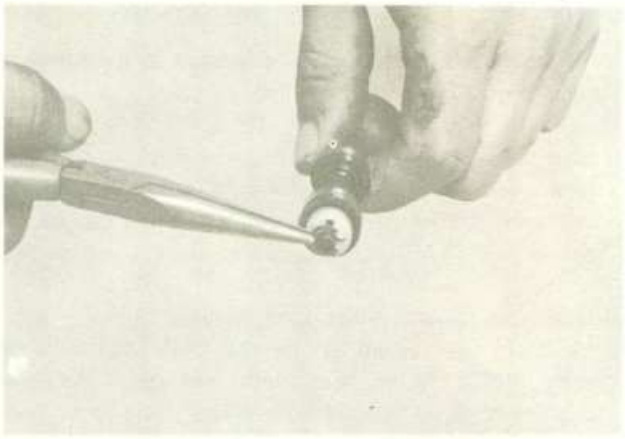




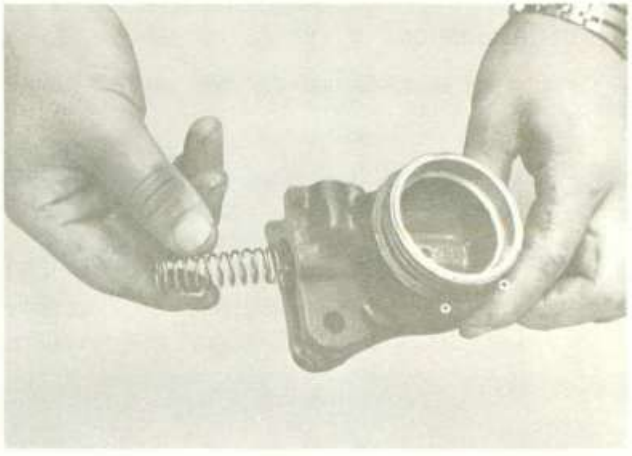
2) Install the spacer. Be sure that the spacer is positioned correctly.



3) Install the cup, retainer and E clip.



4) Insert the spring into the master cylinder body.



Installing the Piston

5) Check the piston surfaces and cup surfaces for scratches, and then, insert the piston into the cylinder. Avoid forcing the piston into the cylinder; otherwise, the cylinder wall will be scratched, thus allowing the brake fluid to leak past.

6) Install the snap ring.

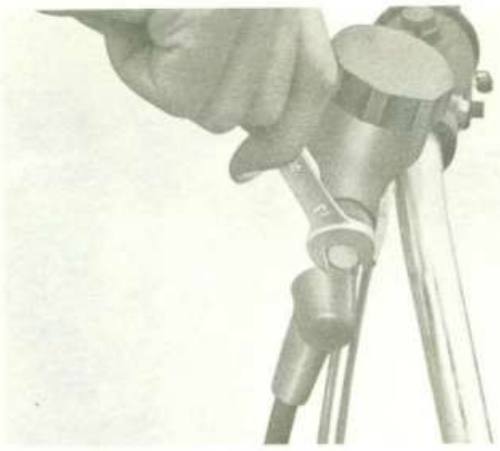
7) Install the boot in the master cylinder groove and the piston groove, respectively.

Installing the master cylinder on the *handlebar*

8) Install the master cylinder on the handlebar.

9) Adjust the clearance between the piston and the push rod.

Note:
Fully tighten the adjusting screw lock nut so that it will not become loose.



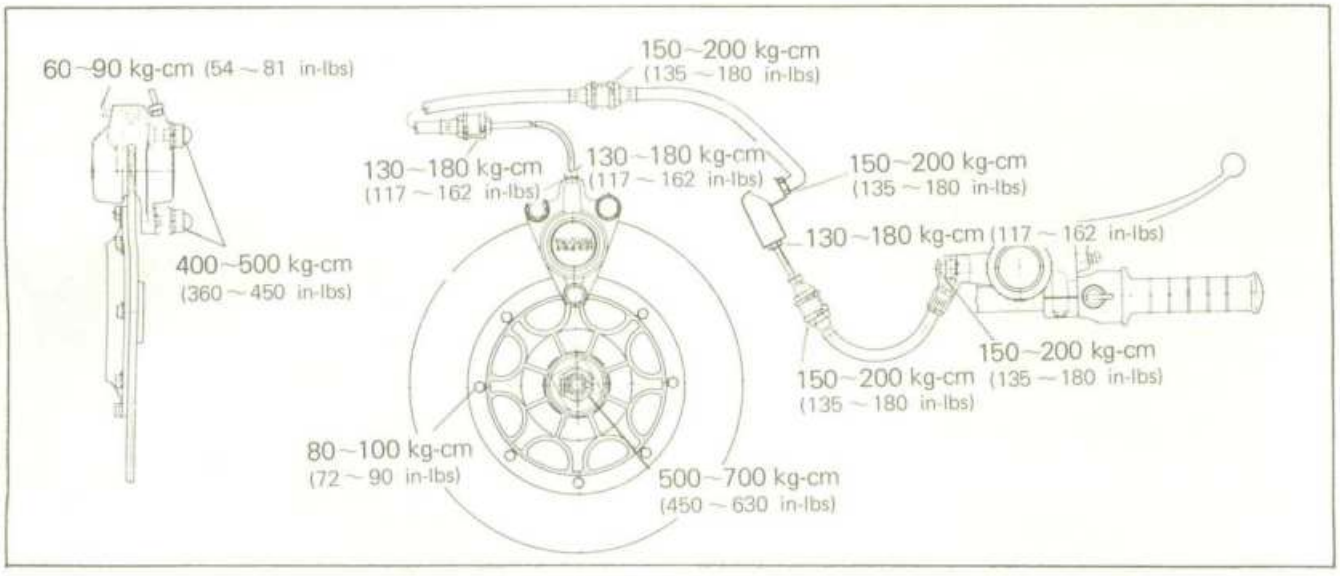
10) Fasten the brake hose to the master cylinder with the union bolt.

Note:
If the gasket is found scratched, it should be replaced.

11) Feed approximately 30cc of brake fluid into the reservoir tank prior to bleeding.

Brake Hose and Brake Pipe

The brake hose and brake pipe fittings should be fastened with the following torque.



Disc

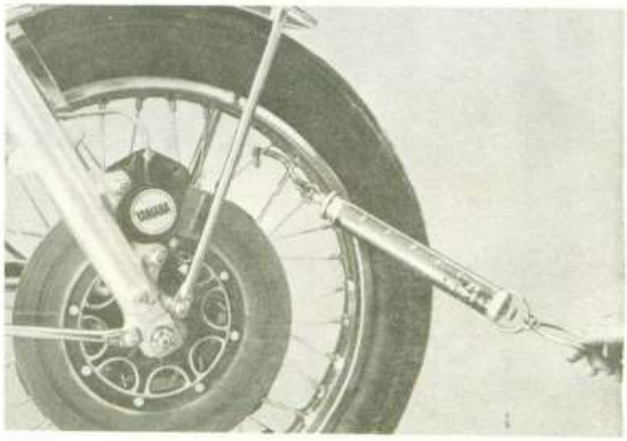
1) The disc mounting bolts should be tightened gently and in pattern with correct torque. The lock tabs should be properly positioned and bent tightly over the bolt heads.
Tightening torque: 80 ~ 100 kg-cm (70 ~ 90 in-lbs)

2) The deflection of the disc ass'y should be within the specified value (0.15mm)

3) The disc trailing torque drag should be within the specified amount after it is assembled.
Torque: 200 ~ 400 kg-cm (180 ~ 350 in-lbs) when assembled as shown in the figure.

If the value exceeds this limit, check the disc for run-out.

* On the disc brake, a slight drag can be neglected. A slight drag will not result in serious trouble, and will not develop into a worse condition.

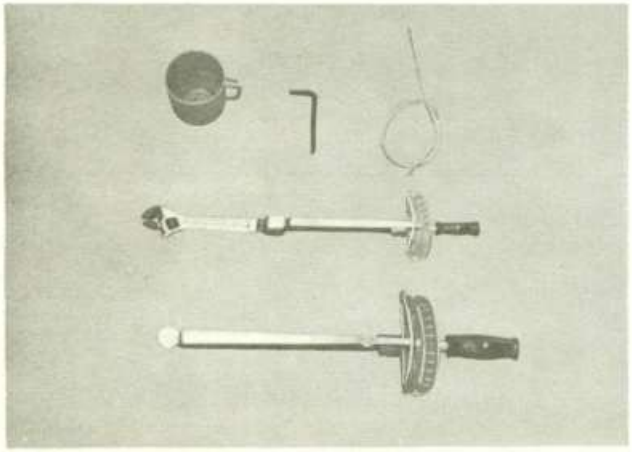


Air Bleeding

When any parts relating to the brake fluid are reinstalled, be sure that each metal fastner is fully tightened and then bleed.

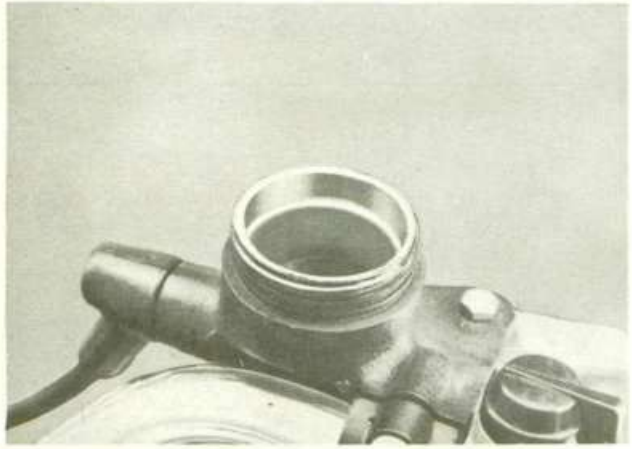
Tools and Parts

Wrench
Torque wrench
Vinyl tube inside dia 4mm
Brake fluid (DOT#3 or #4)
Brake fluid receiving vessel
Rags



1) Fill with fresh clean brake fluid so that the reservoir level reaches the specified line.

2) Install the diaphragm to prevent the brake fluid from escaping.



3) Connect the vinyl tube to the caliper bleed screw tightly so that no brake fluid will spill.



4) Place the brake fluid receiving vessel at the end of the vinyl tube.

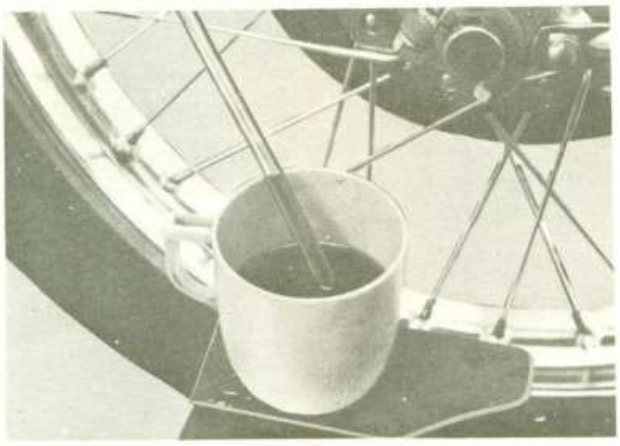


5) Apply the brake lever slowly a few times. With the brake lever squeezed, loosen the bleed screw.

6) As fluid and air escapes, the lever will close. Tighten the bleed screw before the lever bottoms on the handle bar grip.

Note:
When bleeding the air, do not operate the brake lever quickly. Otherwise, the air will turn into fine bubbles, thereby making the air bleeding difficult.

7) Repeat the procedures in 5. - 6. above until air bubbles will completely disappear in the vinyl tube.

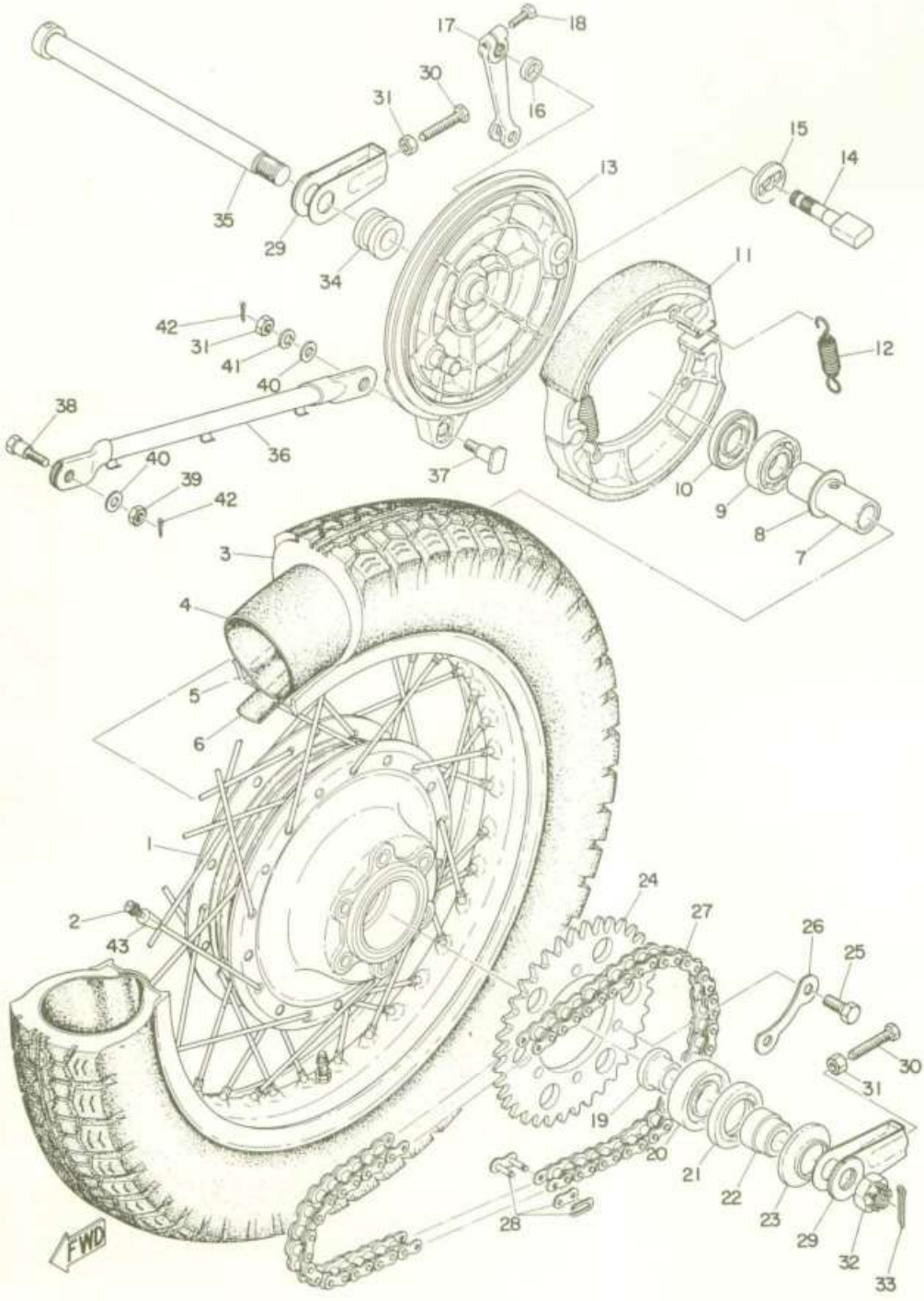


Note:

Bleed screw tightening torque: 60 ~ 90 kg-cm (54 ~ 81 in-lbs)

8) Refill with brake fluid so that the level will again reach the specified line.

REAR WHEEL

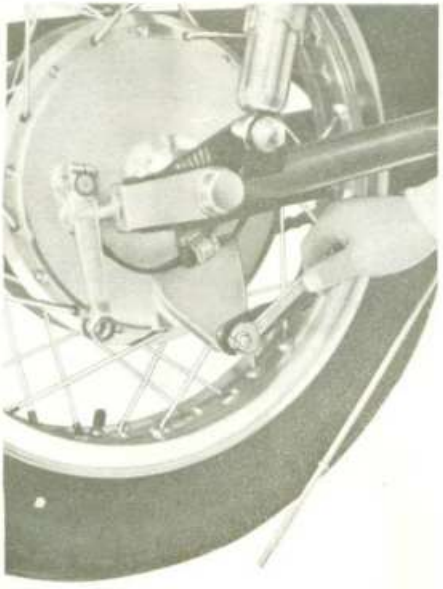


1 Rear hub
2 Spoke set
3 Rear tire
4 Tube (4.00-18)
5 Rim
6 Rim band (4.00-18)
7 Bearing spacer
8 Spacer flange
9 Bearing (B6304Z)
10 Oil seal (SO27-52-5)
11 Brake shoe comp.
12 Return spring
13 Brake shoe plate
14 Camshaft
15 Cam shaft shim
16 Cam shaft steal
17 Cam shaft lever
18 Bolt
19 Collar
20 Bearing (B6305Z)
21 Oil seal (SD35-62-9)
22 Shaft collar
23 Dust cover
24 Sprocket wheel gear (38T)
25 Fitting bolt
26 Lock washer
27 Chain (DK530HDS 106L)
28 Chain joint
29 Chain puller
30 Chain puller bolt
31 Nut
32 Shaft nut
33 Cotter pin
34 Wheel shaft collar
35 Wheel shaft
36 Tension bar
37 Tension bar bolt 2
38 Tension bar bolt 1
39 Nut
40 Plain washer
41 Spring washer
42 Cotter pin
43 Wheel balancer

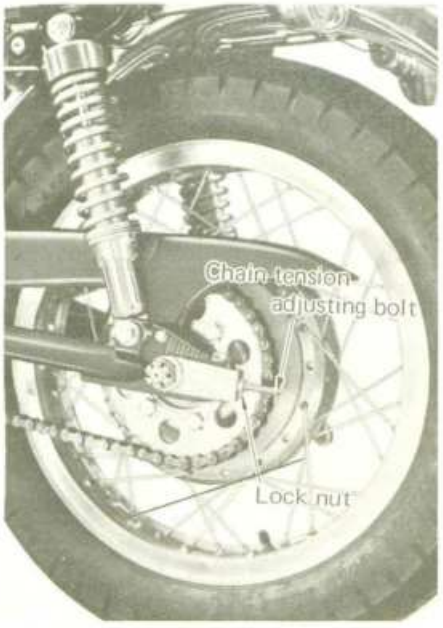
Disassembly

Remove the muffler ass'y.
Remove the drive chain by use of a special tool.

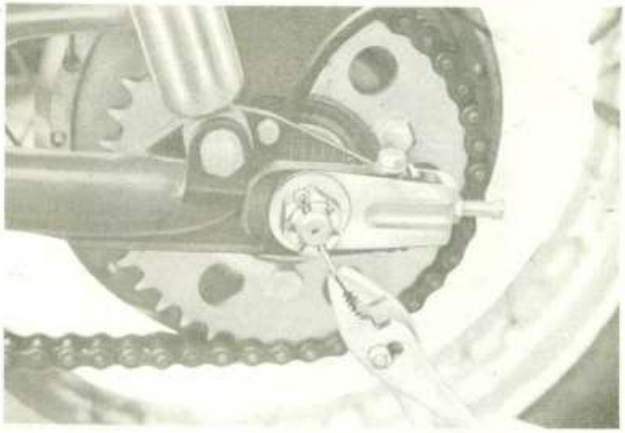
1) Disconnect the tension bar and the brake rod from the rear shoe plate. Pay strict attention to the presence and location of the tension bar lock washer and cotter key. These are safety parts and must be included during assembly.



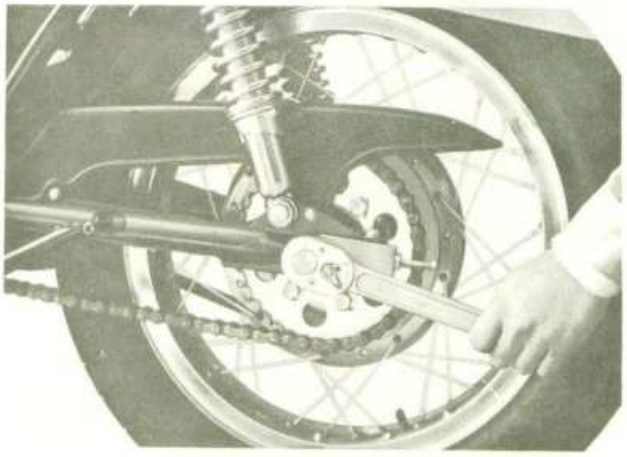
2) Loosen the lock nut and chain tension adjusting bolts on both right and left sides.



3) Remove the rear axle cotter pin.



4) Remove the rear axle securing nut.
Tightening torque: 20.0 kg-m (150 ft-lbs)



5) Remove the wheel shaft holding bolt (one per side).
Tightening torque: 2.0 kg-m. (180 in-lbs)



6) Lean the machine to the left and pull the rear wheel assembly back.



Disassembly and Assembly

a) Both sides of the single leading shoe unit are mounted on the brake plate. To remove the shoes, pull them out and away from the anchor pin and brake actuating cam.



b) Both wheel bearings are mounted in the hub. Their removal can be completed by following the removal procedures explained in the "Seals and Bearings" section, except that the rear wheel has two seals, located one outside each bearing.

Wheels

1) Tire and Tube Removal and Installation

a) Whether it is the front or rear tire to be changed, the procedure of tire and tube removal is identical. The explanation that follows is the proper method for both wheels.

b) Remove the valve cap, valve stem, and valve stem lock nut. Use two tire irons (with rounded edges) and begin to work the tire bead over the edge of the rim, starting opposite the tube stem. Take care to avoid pinching the tube. After one bead of the tire has been completely worked off the rim, slip the tube out. Be very careful not to damage the stem as it is pushed back out of the rim hole.



c) If the tire is to be completely removed, then work the tire off the same rim edge.

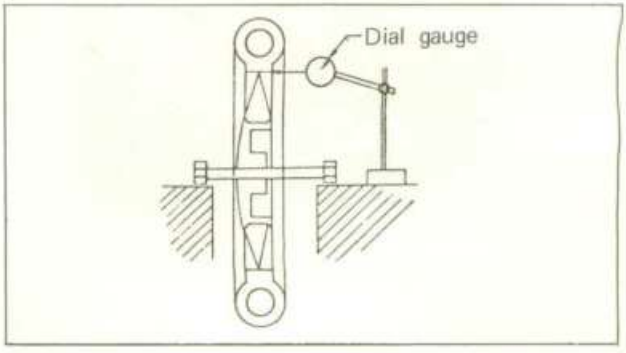
d) Installing the tire can be accomplished by reversing the disassembly procedure. The only difference in procedure would be to inflate the tube momentarily before both tire edges have been completely slipped onto the rim. This removes any creases that might exist. After the tire has been completely slipped onto the rim, check to make sure that the stem is squarely in the center of the hole in the rim. Then inflate the tube to 40(+) psi several times. Check for leaks, and set at prescribed pressure.

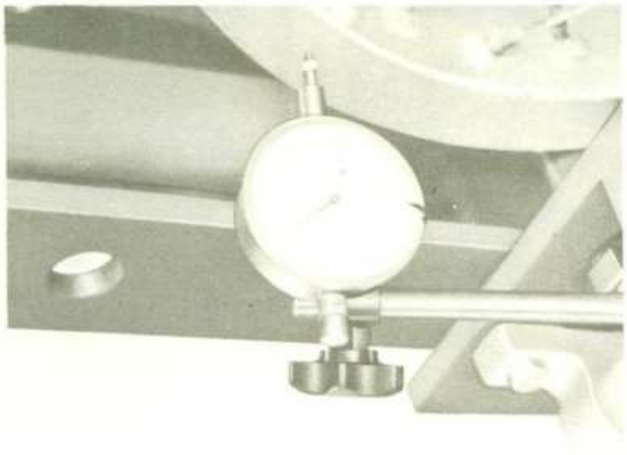
Standard pressure:

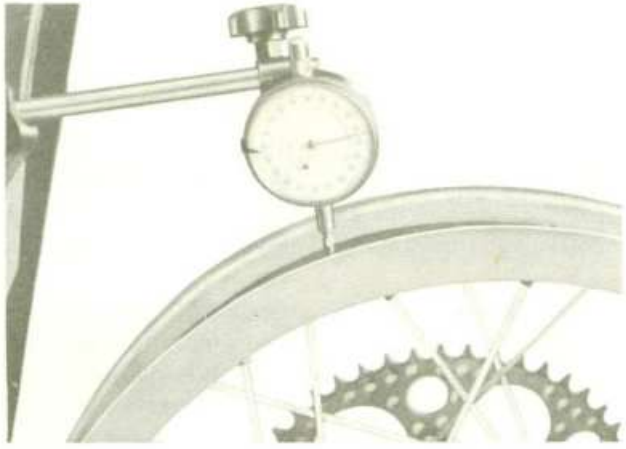
F	R
1.6 kg/cm^2 (23 lbs/in^2)	2.0 kg/cm^2 (29 lbs/in^2)

2) Rim and Spokes

a) A rim can develop warpage. It is due to (1) running the wheel into an object and bending the outer rim, or (2) one or more spokes loosening.





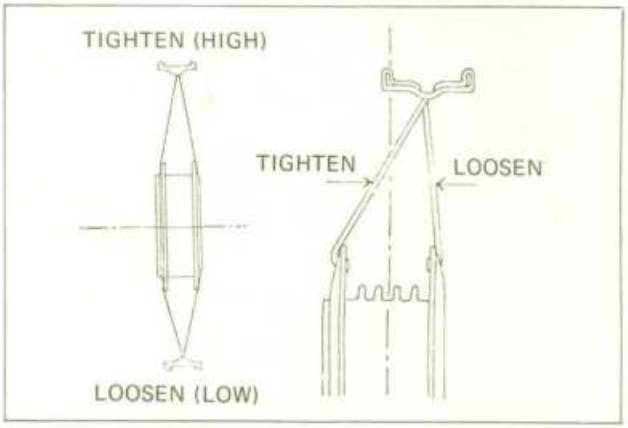


b) Check for warpage by mounting the wheel on a stand (or, if the wheel is attached to a motorcycle, it can be blocked up and held in place). Use some device to measure or detect movement then slowly spin the wheel and note the amount of rim "run-out". It should not exceed 1/16".

c) If all the spokes are tight, and the rim shows no obvious signs of damage, and yet run out is still excessive, do the following:

1) If the run out is up and down, loosen the spokes opposite the high spot and tighten the spokes at the high spot.

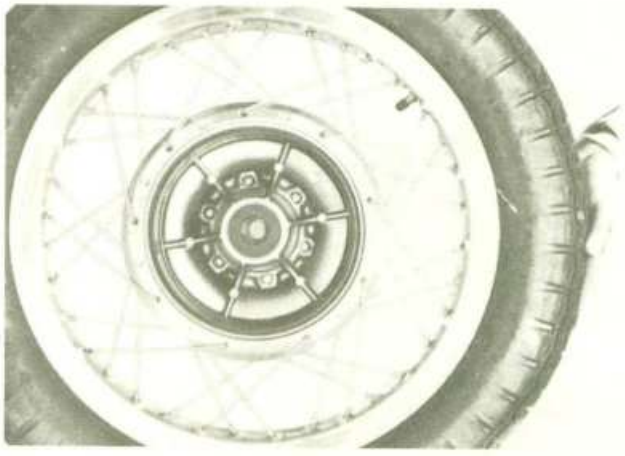
2) If the run out is sideways, loosen the spokes at the high spot, and tighten the spokes opposite the high spot.



3) Seals and Bearings

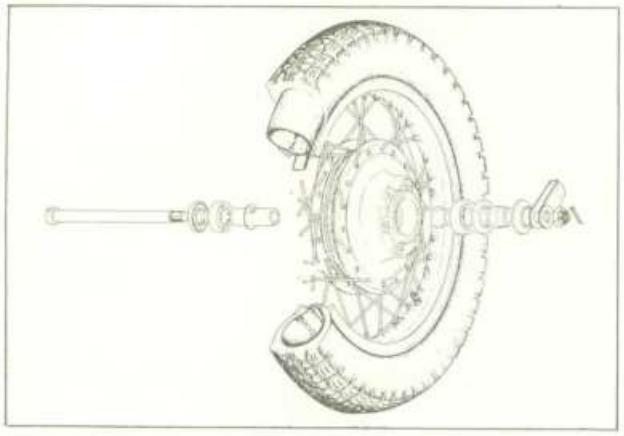
a) Wheel hub seals should be replaced every time they are pried out during repair, or if broken, cracked, or damaged in any way.

b) Check for smooth wheel bearing rotation. Dirt, rust spots, or any irregular surfaces will cause the bearing to hang up (will not spin smoothly). Remove the bearing, clean it, and check again. If the bearing still does not spin freely, replace it.

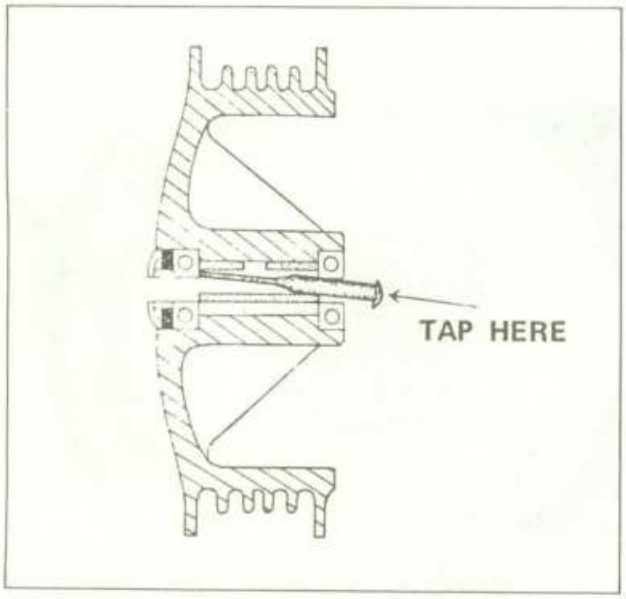


NOTE ON BEARING INSTALLATION: Be sure to grease the bearing before installation, using a quality bearing grease. In addition, during installation, protect the bearing to prevent dirt or contamination of any sort from entering the bearing.

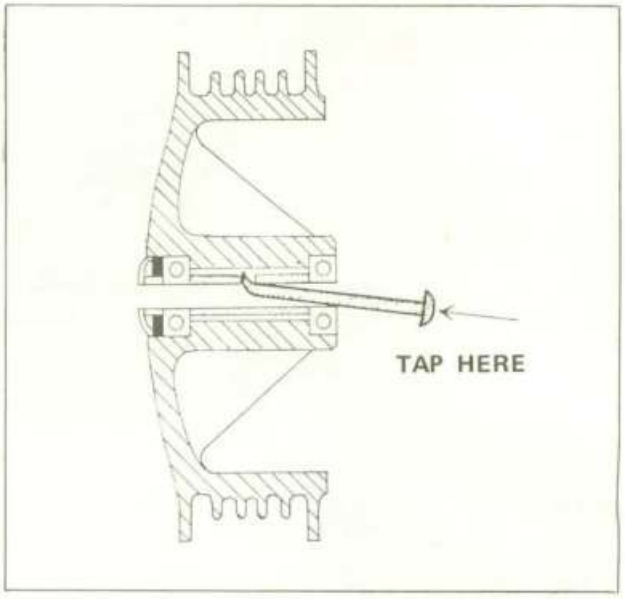
c) The wheel hub houses both bearings, a spacer between the bearings, an outer seal, and a metal cap outside the seal. Removal of the outer bearings requires that the seal be pried out.



d) Drive the bearing out by pushing the spacer to one side (the spacer "floats" between the bearings) and tapping around the perimeter of the bearing inner race with a soft metal drift pin and hammer. Either or both bearings can be removed in this manner.



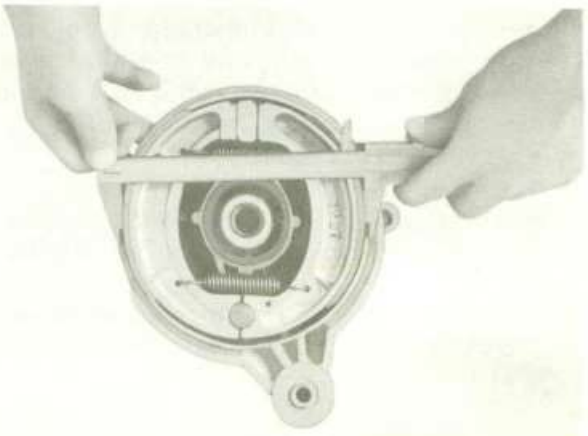
e) An alternative method of removing the bearings is to use a rod with a bent end. Insert the bent end into the hole drilled in the middle of the spacer and tap the other rod end with a hammer, driving the spacer (and bearing in front of it) out of the hub.



NOTE ON BEARING AND SEAL INSTALLATION: Be sure to use the special bearing installing tool which helps to prevent the bearing from going into the hub crocked and the seal from being bent during installation.

4) Brake Shoes

a) Use a vernier caliper to measure the outside diameter of the installed brake shoes and individual shoe linings. If either measurement proves any part of the brake unit to be excessively worn, replace both shoes with a new set.



	STD	Wear Limit
Shoe Outside Diameter	200mm (6.772")	196mm (6.612"))
Lining Thickness	4mm (0.160")	2mm (0.080")

c) Check for brake shoe high spots that cause uneven contact with the brake drum. Remove these high spots with a file or emery cloth.

d) Friction heat can glaze the brake shoe surface. This causes less than maximum stopping efficiency. Use a file or rough emery cloth to evenly rough up the surface.

5) Brake Drum

a) Grease on the brake drum causes improper braking performance. Thoroughly clean the surface with a rag soaked in solvent if any grease is found on the drum.

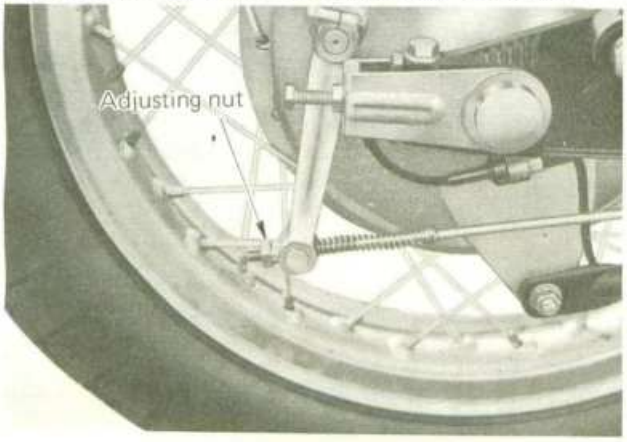
b) Any ridges or glozing that might exist on the brake drum surface can impair the operation. Use emery cloth to lightly sand out any ridges.



c) The single leading shoe rear brake is actuated by the right-side foot pedal. A rod connects the pedal to the brake. The adjustor is at the end of this rod. Spin the adjustor in or out, whichever direction is required to obtain approximately 1" (25mm) of pedal free play.

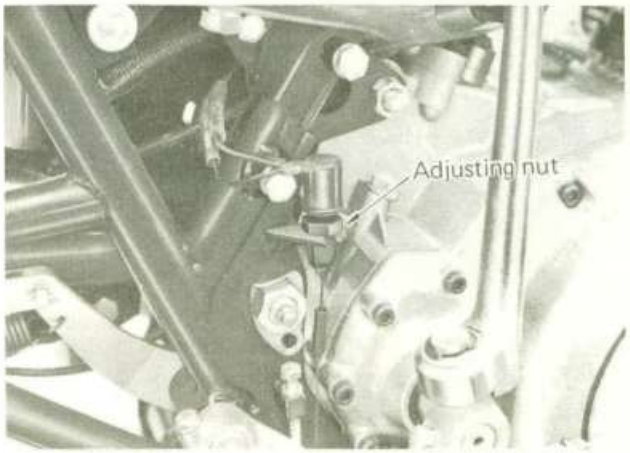
Note:

Rear brake adjustment should be checked any time the rear wheel is removed or the drive chain is adjusted.



Rear Stoplight Switch Adjustment

1) The rear brake stoplight switch mounts to the frame just behind the right-hand case cover. A rod connects the switch to the brake pedal.



2) To make an adjustment, loosen one lock nut and spin the other nut. To raise the switch, loosen the bottom nut. To lower the switch, loosen the top nut.

Note:

Check rear stoplight switch adjustment whenever the rear brake is adjusted or the rear wheel is moved.

Rear Wheel Sprocket

1) Bend the lock washer ears flat.

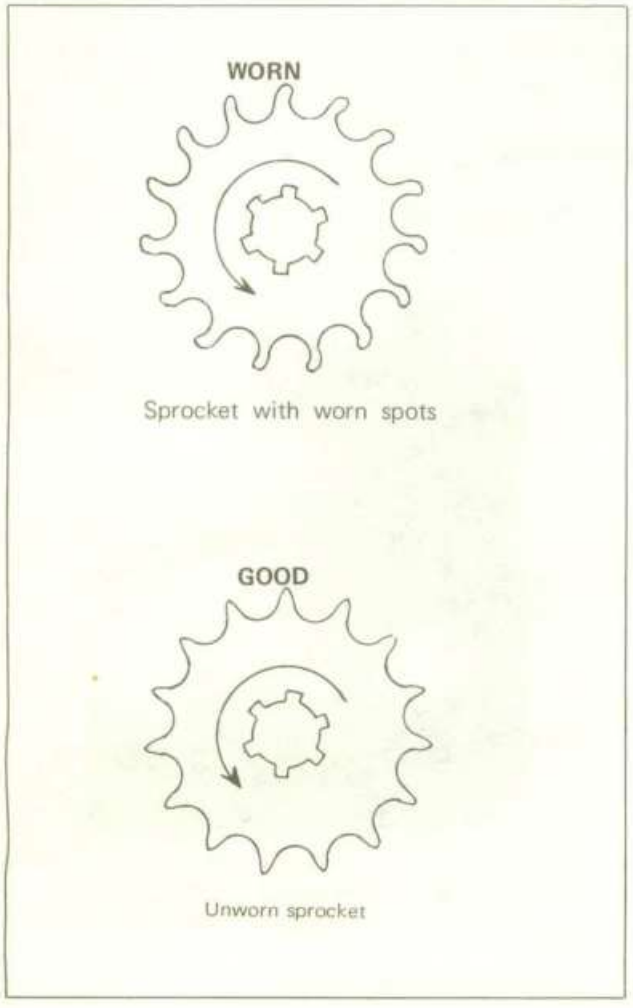


2) Remove the sprocket mounting bolts. Check the lock washer and bolt for damage. If the lock washer is not bent over the hexagon bolt head, or is broken, or the bolt is loose, the sprocket can come loose.



NOTE ON INSTALLATION: Be sure that all lock tabs are not cracked or broken and that they are all bent against the bolts.

3) Constant friction and force from the chain creates wear on the sprocket teeth. If wear has progressed to the extent shown in the illustration, replace the sprocket.

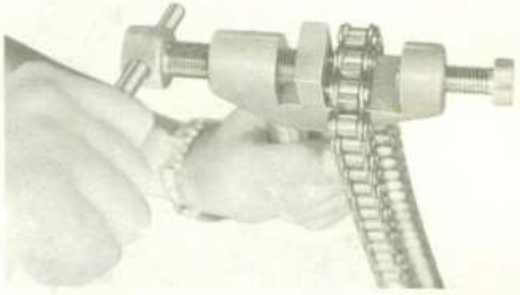


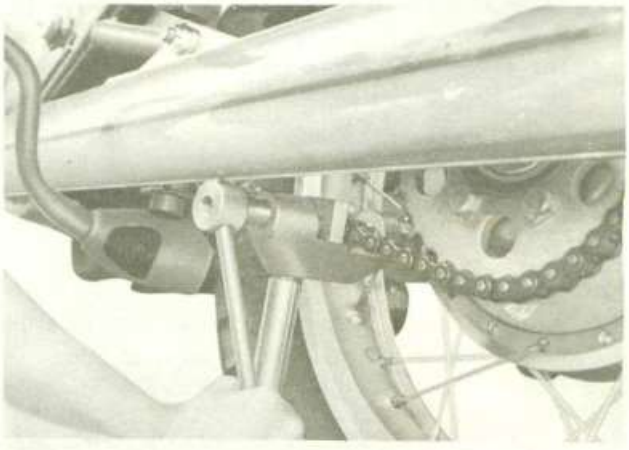
DRIVE CHAIN

Disassembly

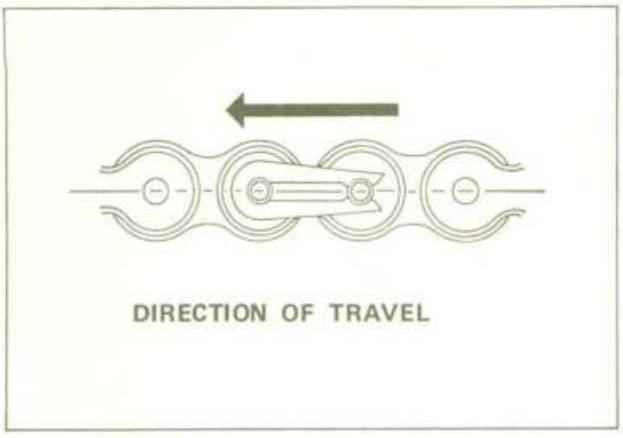
a) Removing Chain
Fit the special tool with an adapter for removing the chain. Then place the chain joint on the special tool and pull the chain apart by screwing in the pulling bolt.

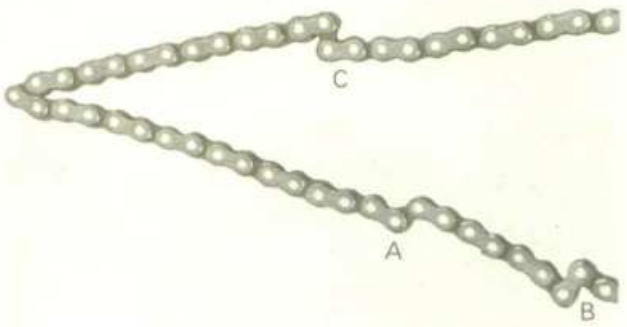
b) Installing Chain
Joint the chain ends on the rear wheel sprocket using a master joint. Place the chain joint on the sprocket where it is easier to use the special tool. Use the special tool with a chain installing adapter to caulk the new joint plate by screwing in the pulling bolt.





c) Whenever installing the chain, always install the master link retaining clip so that the rounded closed end faces the direction of travel.

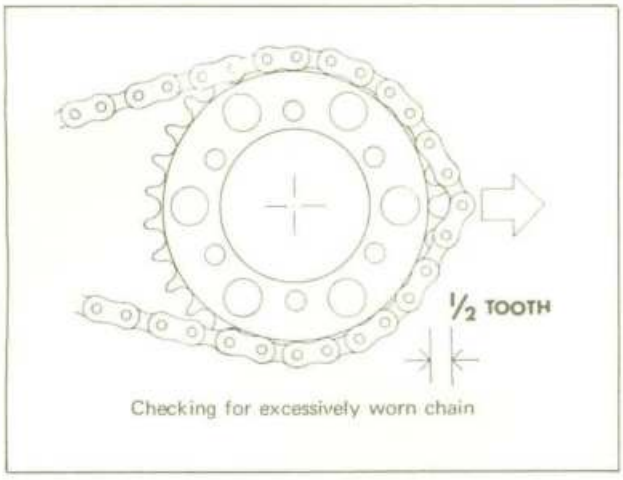




Inspection

Wear

a) With the chain still on the motorcycle, lift the chain away from the rear wheel sprocket. A chain is defective if it can be pulled away from the sprocket more than half the length of a link.



Checking for excessively worn chain

b) Check the chain for binding caused by dirt or rust. Hang the chain straight down and check all links for indications of binding (A, B & C in the picture). If soaking in a strong solvent does not remove the binding situation then replace the chain.

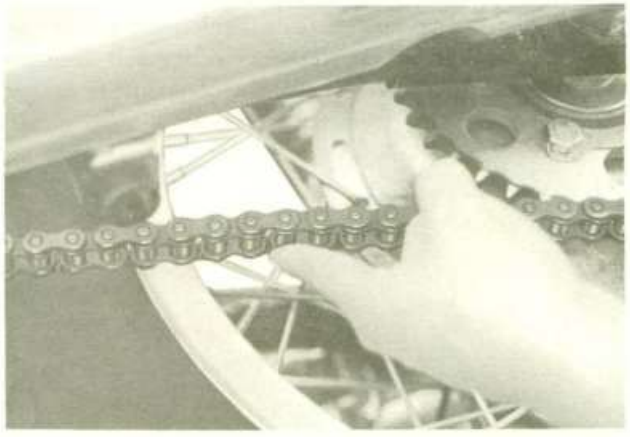
Maintenance

a) Lubrication. There are several pressure can lubricants available. Use a rag to wipe off any accumulation of dirt, then spray a liberal amount of lubricant on the chain at least every 200 miles.

b) Cleaning. The chain has to be periodically removed from the machine soaked in cleaning solvent.
Drain and dry the chain. Immediately after the chain has dried completely, lubricate to prevent any rust from forming.

Adjustment

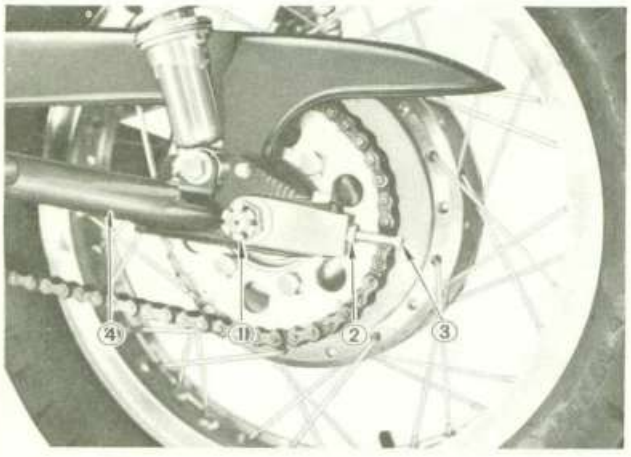
1) Proper drive chain up and down free play with the rider in position and both wheels on the ground should equal 20mm (3/4") when measured at the center of the lower section of chain. Follow these steps to obtain the correct free play.



2) Remove the cotter pin and loosen the rear wheel nut

3) Loosen the chain adjusting bolt lock nut 2 on each side.

4) Rotate both adjusting bolt 3 to obtain the correct free play, and at the same time make sure that both ends of the axle are positioned evenly. This can be done by matching the marks on the sides of the swing arm 4 just above and to the rear of the rear wheel nuts.



5) After completing the adjustment, retighten all lock nuts.

Tightening torque:
① 12.0 ~ 18.0 kg-m (90~135 ft-lbs)
② 1.0 kg-m (90 in-lbs)

6) Finally, check for correct brake pedal and stoplight operation as they could have changed due to the chain adjustment.

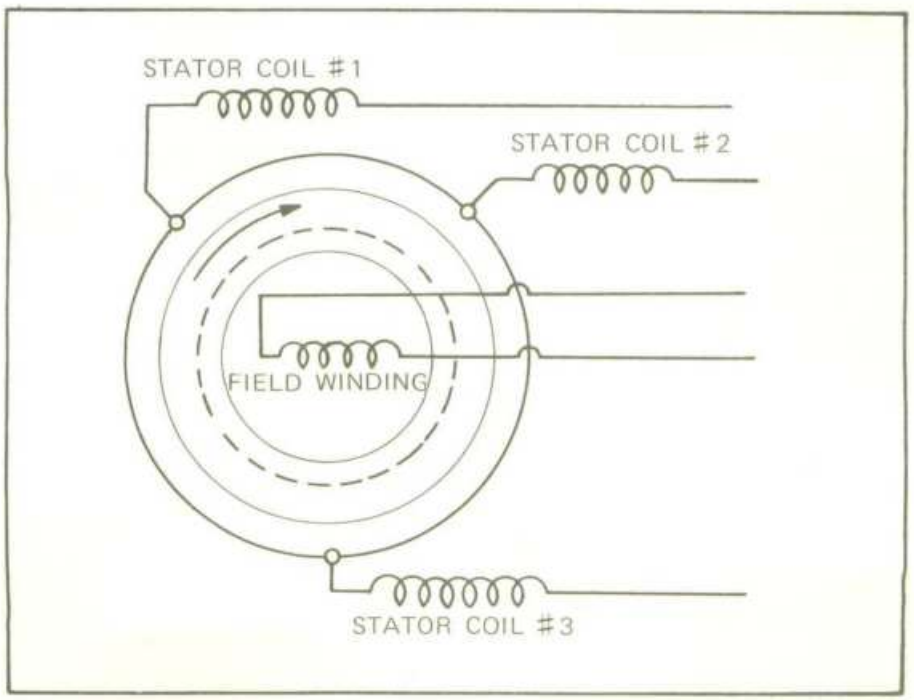
A worn chain causes wear to both sprockets. If either sprocket is excessively worn, it can cause a new chain to wear out prematurely. Strict attention should be paid to the condition of all three components if any one is replaced. Possiblly two or all three components might require replacement if wear is excessive.

5. ELECTRICAL EQUIPMENT

Unlike a conventional type alternator, the A.C. generator used in the TX750 has no brushes and slip rings, because the fixed coil does not rotate and is separated from the rotor. That is, it has no parts subject to wear.
This A.C. generator is of three-phase A.C. design and uses six silicon diodes for full-wave rectification.

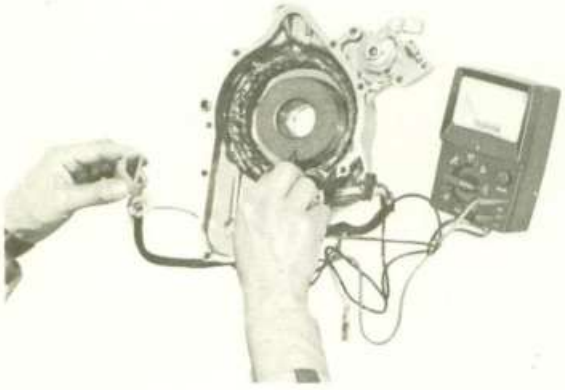
A.C. GENERATOR

The rotor is designed to interrupt the magnetic field created by the sationary field winding. Openings in the rotor are sinusoidal in shape and alternately make and break the magnetic field to the three stationary armature winding. See figure below.

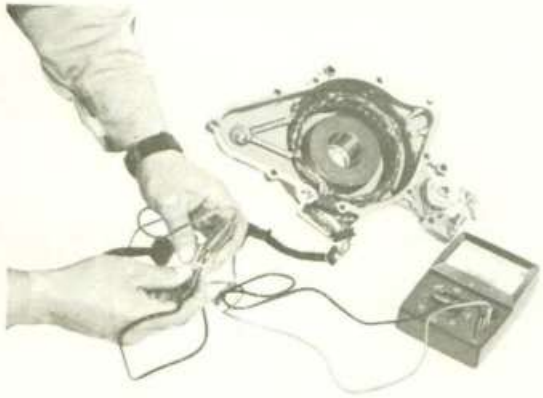


Inspection

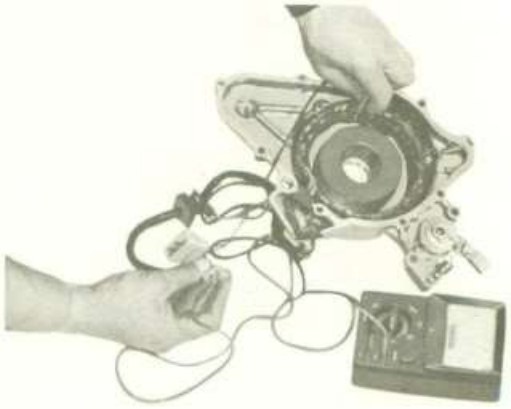
1) The field coil can be checked for insulation and wire breakage with an ohmmeter.
If there is continuity between the lead wire and the core, the core is grounded.
Look for broken insulation and lead wires touching backing plate, if ground cannot be eliminated, field coil must be replaced.

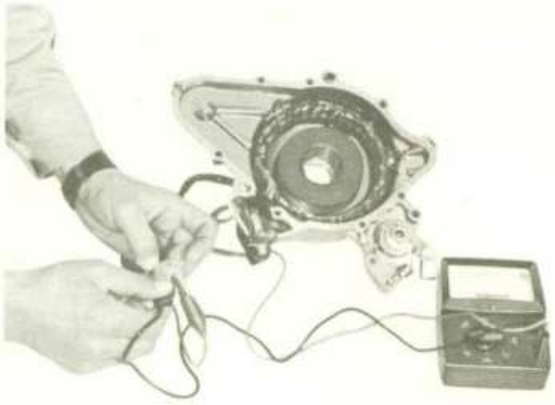


If there is no continuity between the two lead wires, the coil is considered to be broken, and should be replaced. If the resistance across the field coil measures 4.9 ohms, it is considered to be in good condition.



2) The stator coil can also be checked for insulation and wire breakage with a tester.
There are three stator coil terminals located in the 4-pin connector of the stator coil wiring harness. Measure the resistance between each of these terminals and the stator coil assembly core (there is no wire connected to the core; touch meter lead to bare metal of core). There should be infinite resistance (no continuity) between any stator coil terminal and the core itself. If there is, the stator coil assembly is shorted and must be replaced.
Stator coil windings may be checked for continuity by measuring between any two of the three-terminals (white wires). This must be done for all three combinations (A-B, A-C, B-C). In each case the resistance should be approximately 0.7 ohms. The stator coil assembly should be replaced if any other resistance is obtained.





Handling Notes:

The A.C. generator is used in combination with silicon rectifiers, and therefore, it should be handled with the following special care.

1) Be careful not to connect the battery to the generator in the wrong polarity. Otherwise, the silicon diodes establish a short-circuit in the battery, thus allowing a large amount of current to flow through the diodes. This will ruin the silicon diodes and burn the wire harness.

2) Be sure to connect the terminals correctly.

3) Do not turn the engine at high speeds with the P terminal circuit (of the silicon rectifier) disconnected. A high voltage will be generated and ruin the silicon rectifier.

4) During quick charging of the battery, the silicon rectifier must always be disconnected at the P terminal.

BATTERY

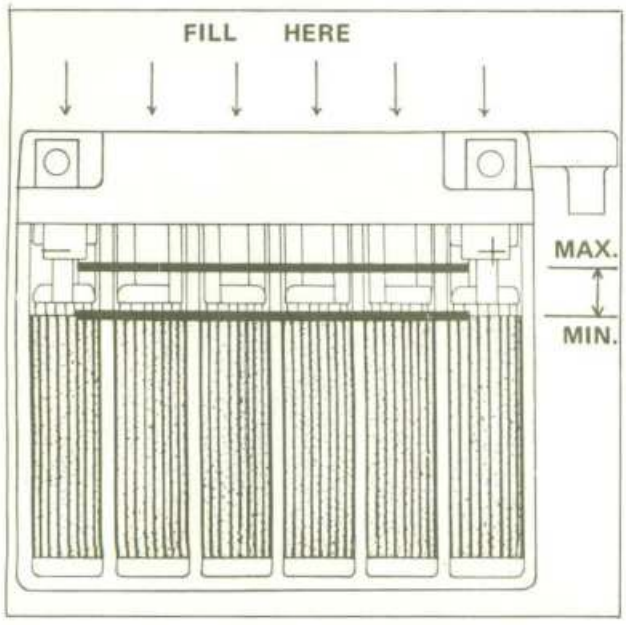
Servicing a new battery

a) Check battery housing for cracks or other damage. Fill the battery with electrolyte and let set for an hour. This allows the acid to soak into the paltes. With the caps off, hook up a trickle charger to the battery and charge it at 1 amp/hour rate or less. Check the specific gravity. Each cell should have a rating of 1.260 ~ 1.280. If the electrolyte has dropped below minimum level after charging, add electrolyte (rating of 1.260 - 1.280).

Battery maintenance

a) Periodic inspection can determine the condition of the battery housing and the condition of the internal parts. Check for cracks or holes in the housing. Check for broken plates, sulfation, low fluid level, or corroded terminals.

b) The battery housing is marked with a minimum and maximum fluid level. If any cell fluid level drops below the minimum level, fill with distilled water to correct height. Check once a month or more often in hot weather. DO NOT use tap water.



Charging

a) Remove the battery and check the specific gravity of each cell. A fully charged cell reads between 1.260 - 1.280. If the rating is less than 1.260, the battery needs charging.

b) Fill each cell to the proper level with distilled water. Leave the filler caps off until battery charging has finished. Use a battery charger that may be regulated for a maximum output of 1.6 amp. The TA750 battery uses a 16 amp/hour battery. DO NOT exceed a one amp input as excessive heat may be generated within the battery.

Note:

An autotransformer may be used to regulate output of an automobile battery charger.
Battery fluid level sometimes drops duirng charging. Refill if necessary, using distilled water.

Trouble-shooting

1) Excessive fluid evaporation from cells: Normal battery operation requires fluid to be added to the cells approximately once a month. If distilled water must be added every week or two, the battery is possibly being overcharged. Check voltage input from the alternator.

2) Low fluid level in one cell: If one cell continuously loses more fluid than others, check for a shorted cell. A shorted cell creates abnormal fluid evaporation. Check with a hydrometer for excessive difference in specific gravities between the cells.

3) Won't hold a full charge:
   a) First check the alternator output to eliminate the possibility of a low charging rate. Next, check for loose terminal connections (creating high resistance), or a build up of material in the bottom of the housing that could short the paltes. Nothing can be done about loose terminals chemselves except to replace the battery.

   Sediment at the bottom of the housing can sometimes be removed by flusing the battery out several times with distilled water if the cell is discharged; flush with electrolyte if fully charged. Dry the battery off and recharge for a few hours. If enough loose sediment is flushed out, the battery could hold a charge. If the battery still cannot hold a full charge, replace it.

4) Sulfation: Sulfation, in the form of a white, scaly material, gradually forms on the plates and at the bottom of the housing. It is created over a period of time as the sulfuric acid combines with the lead plates to produce lead sulbate (white particles of sulfation). It is a product of age and use. The battery usually needs to be replaced when sulfation reaches the point of shorting out the plates.

5) Make sure that the wires are hooked to the proper battery terminals, The red wire must be hooked to the "positive" terminal, the black lead must be hooked to the "negative" terminal. If the wires are reversed, the battery will quickly loose its charge. Very likely the battery will be destroyed if the reversed hook-up is left connected for any length of time.

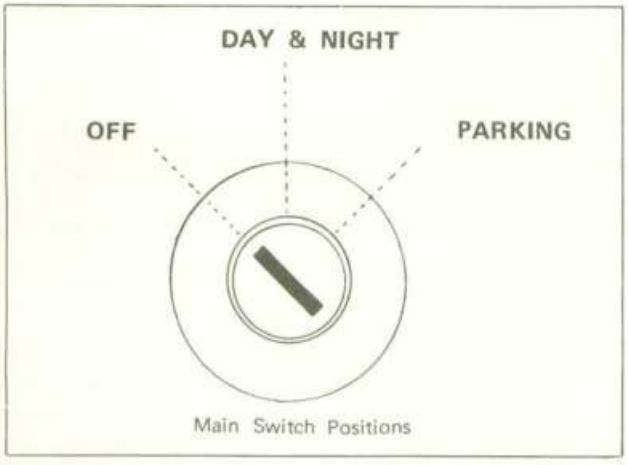
Storage

a) Whether it is a new battery or one that has been in service, preparation for storage of either one is almost identical. When new, the battery is dry charged (no electrolyte). Keep it away from moisture and heat. A stored dry-charged battery can last several months without losing a great deal of its charge.

b) A used battery should be filled to the maximum level with distilled water, given a complete charge and stored in a cool area (coldness slows the process of battery discharge). It should be given a booster charge every two months. When preparing to place a stored battery back into service, check for sufficient electrolyte and fully charge the battery.

MAIN SWITCH

The TX750 uses a three position switch that directs current from the battery (or alternator) to the various lighting and ignition circuits.



Main Switch Positions

1st position: Prevents current from flowing to any circuit.

2nd position: Supplies current to all day and night circuits, including (1) horn, (2) ignition coils, (3) front and rear stop switches, (4) turn signal switches, (5) all indicator lights, and headlight/taillight switches.

3rd position: Only the parking light is activated.

Location and Replacement

The switch is mounted on the bracket.

1) Remove the fuel tank and disconnected the lead wires from the speedo/tachometer and main switch.

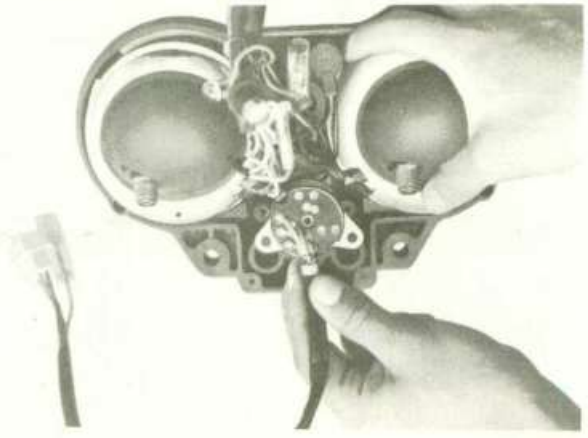
2) Remove the bracket with speedo/tachometer and main switch. After that, remove the cover and main switch mounting screws.
The main switch can now be removed from the bracket.



Trouble-shooting

1) If voltage from the battery (or alternator) reaches the main switch (through the red wire), but, the same voltage does not pass through the switch, then it should be checked.

a) Use a pocket tester or electro-tester with the meter set to register continuity (Ohms x 1). Make all continuity checks at this main switch multiple connector.



b) Three wires hook into the multiple connector; red, blue, and brown. Hook one lead of the tester to the red wire and use the other as a probe. First, check that there is no continuity between the red wire and the switch housing.

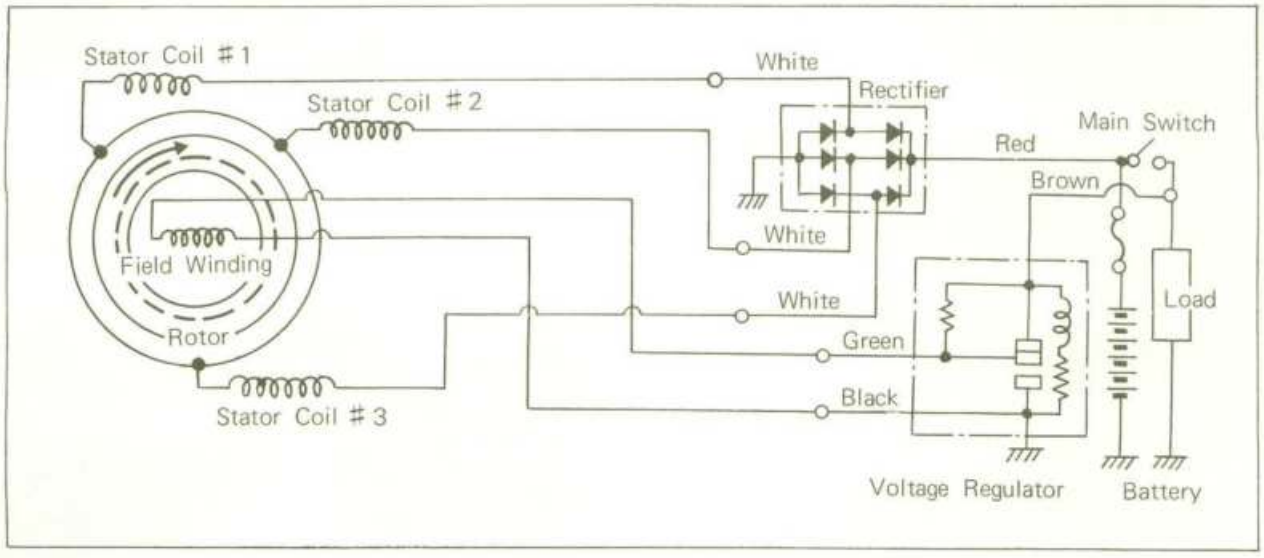
c) Turn the switch to the "Day-night" position. Probe with the unattached meter lead. Touch the brown wire end and then the red/red or blue wire end. Continuity must exist.

d) Turn the switch to the "Parking" position and touch the probe to the blue wire end. Continuity must exist.

e) If any of the previous tests reveal no continuity to exist check all main switch wires. If these wires appear to be in satisfactory condition (not broken or shorted to the frame), then the main switch itself is defective and must be repalced.

CHARGING CIRCUIT

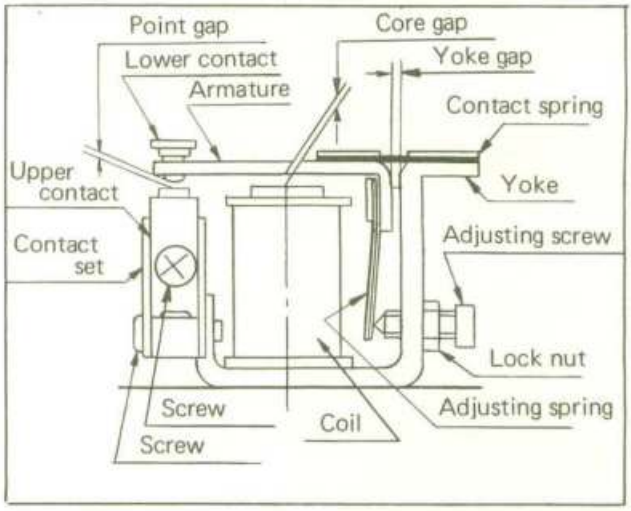
This circuit consists of the battery to first provide voltage to the field windings, regulator, and main switch.

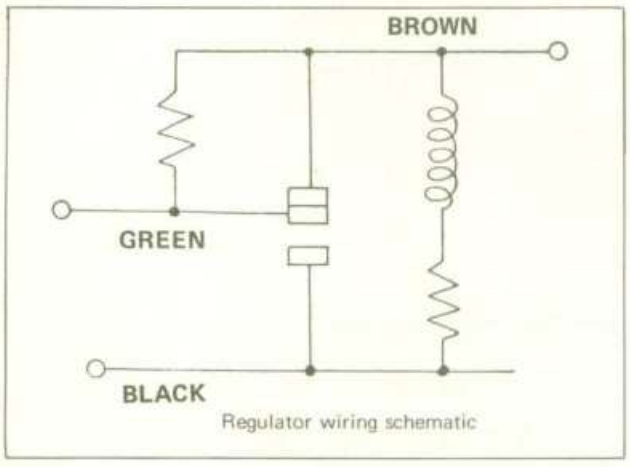


REGUALTOR

This circuit consists of the battery to first provide voltage to the field, windings, regulator, and main switch.

a) The regulator's function is to pass a controlled amount of current the field windings which creates a magnetic field that produces a charging voltage in the three stator windings.



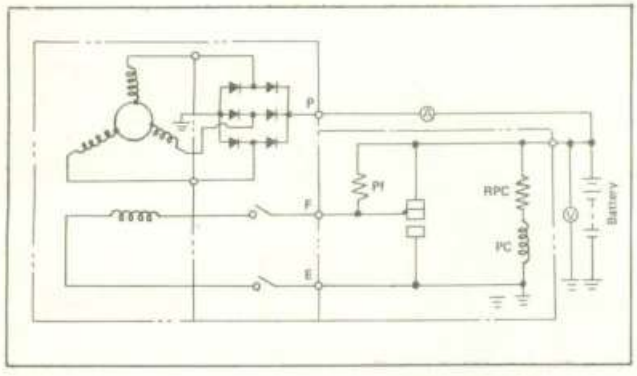


Regulator wiring schematic

b) The regulator operates as a magnetic switch. As charging voltage rises, part of this voltage is routed through an electro-magnet in the regulator. Rising voltage creates greater regulator magnetism, which in turn pulls the central contact point through different positions. Different resistors are switched into the circuit as this central contact point moves. These resistors cut down the amount of current passing to the field windings, which reduces the charging voltage output.

Adjustment

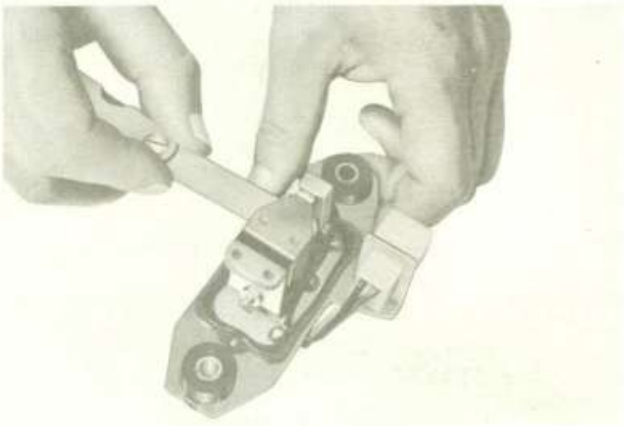
1. When adjusting the regulator, a D.C. voltmeter, ammeter, and tachometer are necessary. They are connected as illustrated, and adjustment should be made in the following sequence.



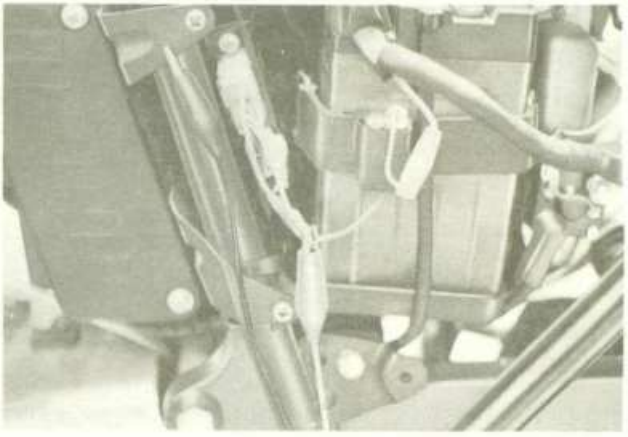
a) Remove the regulator from the frame, and check the contact points. If the point surfaces are rough, they should be smoothed away with sandpaper (#500) or #600).
After sandpapering, throughly clean contact points with point contact cleaner.

b) Check the core and points for gaps. If any gap is incorrect, it should be adjusted.
First adjust the core gap and then the point gap.
Core gap . . . . . 0.6 – 1.0mm
Point gap . . . . . 0.3 – 0.4mm

Note:
No adjustment is required for the yoke gap.

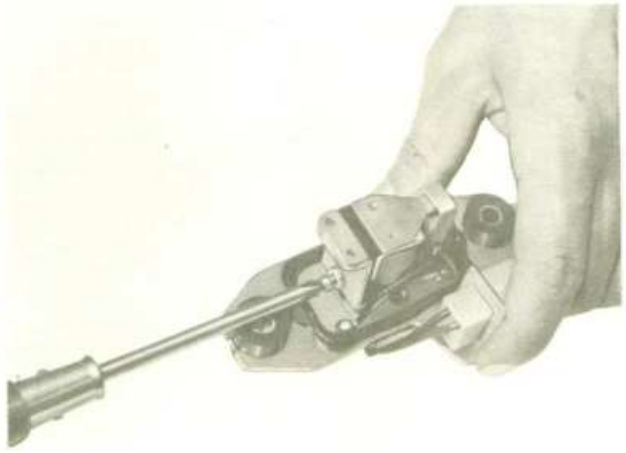


c) Charging voltage output can be controlled at the regulator. Inside the housing is a screw that pushes against a flat spring steel plate. This is the adjusting screw.

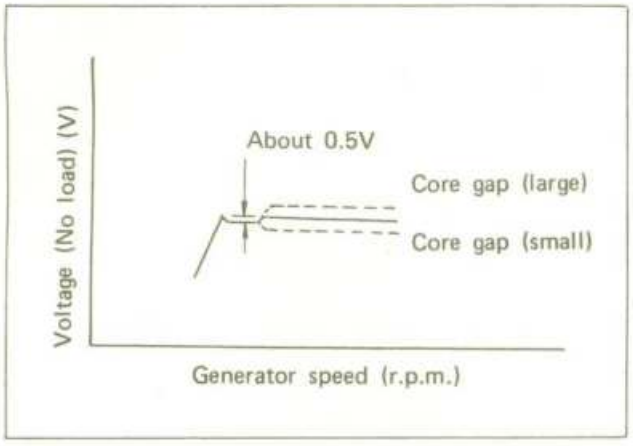


d) Start the engine. Disconnect the fuse box wire leading to the battery and hook up a voltmeter from the fuse box to ground. Accelerate the engine to 2,500 rpm. The voltmeter should read 14.5~15 volts. DC. If it varies from this amount twist the adjusting screw in to raise the charging voltage or out to reduce the voltage.





After the adjustment, the generated voltage shows slight fluctuations as illustrated below.
When the generator speed increases from low (the lower contact is in operation) to high (the upper contact is in operation), the voltage fluctuates slightly, but this is a normal phenomenon. If the voltage shows a 0.5 volt increase, the adjustment is considered to be correct. If the voltage increase is more or less than 0.5 volt, the core gap should be readjusted.

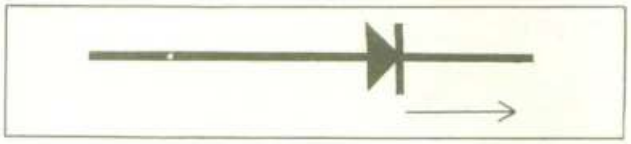


Note:
The regulator should be checked every 8,000 miles (12,000 km) of operation. For this check, the regulator should be removed from the generator.

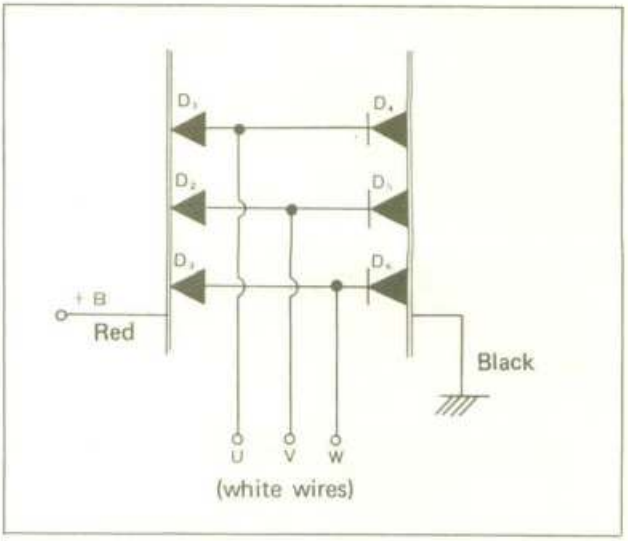
RECTIFIER

a) This unit is a full wave rectifier which changes the alternating current generated by the alternator to a direct current by passing the alternating current through six silicon diodes. The diodes permit only one-way electrical flow. The direct current is sent to the battery and main switch.

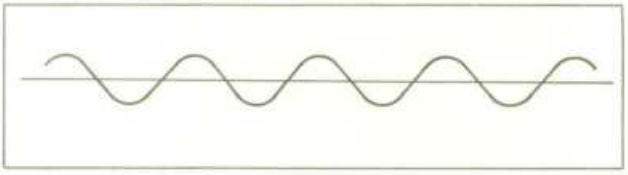
b) The sign below indicates a one-way diode. Current flows in the direction the sign is pointing.



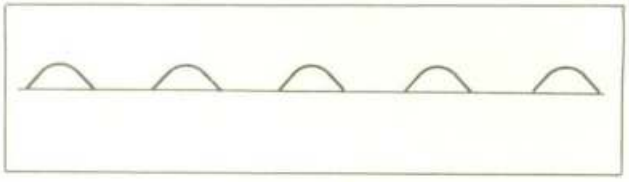
c) Schematic representation of the three phase, full wave rectifier in the TX750 generating circuit.



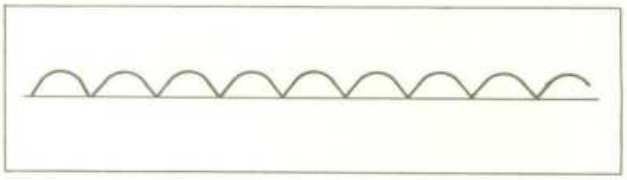
d) Wave form of standard alternating current.



e) Wave form of alternating current after half-wave rectification by one diode (now direct current).



d) Wave form of AC after full wave rectification.



Inspection

1) To check the silicon rectifier, the A.C. generator and silicon rectifier should be disconnected. Next, check the silicon rectifier by connecting it in the forward and reverse directions, alternately.
If current flows through the rectifier only when it is connected in the forward direction, it is in good condition. If current flows in both forward and reverse directions or will not flow in either direction, the rectifier is faulty. It should be replaced.



Note:

Do not use a high voltage megohm tester for this test. Its use may ruin the silicon diode.

Troubles and remedies

If any trouble occurs, refer to the following chart.

(1) The battery is not charged at all.

Trouble	Cause	Remedy
Wire or ammeter	Wire broken, short-circuit, or faulty wire joint.	Repair or replace.
Generator	Coil is broken, grounded or has a short-circuit.	Replace.
Silicon rectifier	Silicon diode is faulty.	Replace.
Regulator	Lead wires are broken or short- uricuted. No-load voltage is lower than specified.	Repair. Readjust.

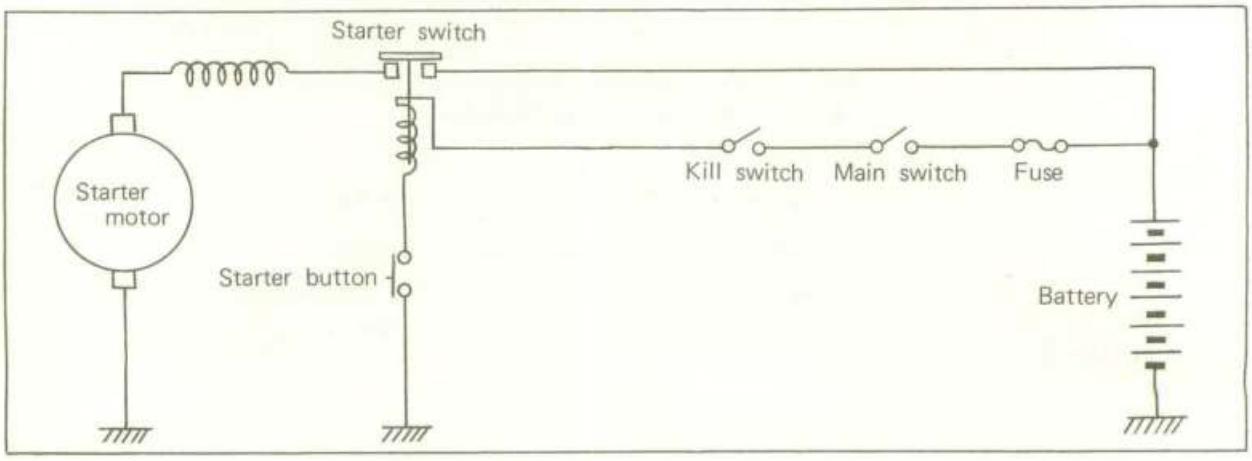
(2) The battery is undercharged or in a somewhat discharged state.

Trouble	Cause	Remedy
Wiring	Wire broken, short-circuit, or loose connection.	Repair or retighten.
Generator	1. Field coil has a short circuit. (Test resistance.)	Replace
	2. Stator coil has a short-circuit.	Replace.
	3. Stator coil has a broken wire.	Replace.
	4. Silicon diode is faulty.	Replace.
Regulator	1. No-load voltage is lower than specified.	Readjust.
	2. Contact points are dirty or dusty.	Clean.
	3. Coil or resistor has a short-circuit.	Replace.
Battery	1. Electrolyte level is lower.	Add distilled water.
	2. Plates are shorted.	Replace.

(3) The battery is overcharged or in a somewhat overcharged state.

Trouble	Cause	Remedy
Wiring	Shunt generator is faulty, because of a short-circuit between P-terminal and F-terminal circuits.	Remove short.
Battery	Internal short-circuit.	Replace.
Regulator	1. Abnormal rise in no-load voltage.	Readjust.
	2. Regulator grounding is faulty.	Correct grounding.
	3. Coil has a broken lead.	Repair or replace.

STARTOR MOTOR



When the solenoid (starting motor switch) closes, a direct circuit from the battery to ground through the motor circuit is created.
Resistance is extremely low in this circuit and, consequently, a heavy current flow passes through the motor to ground, causing the motor to turn.

Specifications

Note:
The following specifications should be refered to while disassembly and trouble-shooting (explained in following chapters) is taking place.

COMPONENT	ITEM	MAINTENANCE STANDARDS	REMARKS
Motor			Hitachi Type S108-37
FIELDS	Resistance	0.05 ohms (20°C)	
BRUSH	W x T x L	16 x 7 x 11 mm	
	Limit length	4.5 mm	
ARMATURE	Resistance	0.055 ohms (20°C)	No Grounded core
COMMUTATOR	Diameter	33 ϕstd	
	Wear limit	32 ϕ	
	Mica undercut	0.5~0.8 mm	
	Undercut limit	0.2 mm	
	Max. allow runout	0.15 mm	Out of roundness
BRUSH SPRING		800 gr pressure std.	(+10%, −25%)
STARTER SWITCH	Yoke gap		(solenoid)
	Core gap	1.55~1.88 mm	
	point gap	0.88~1.11 mm	
	magnet windings	3.5 ohms (20°C)	
	Cut-in Voltage	6.5 V or less	
	Cut out Voltage	4.0 V or less	
	Coil circuit	4A Draw. (20°C)	
MISCELLANEOUS ELECTRICAL			
STARTER MOTOR DRAW:		42A or less (12V)	No load
LOAD:		8.7 V 100 A (580 r.p.m.)	

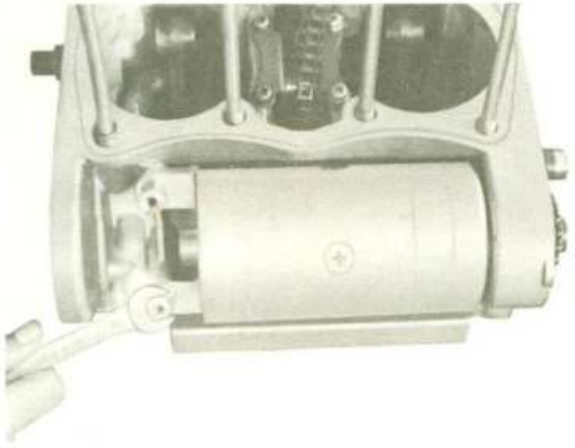
Disassembly

Starter motor

1) Remove the generator cover.

2) Remove the two cover installing bolts and the four motor mounting bolts.

3) Remove the motor. Pull straight back from its mounting location.



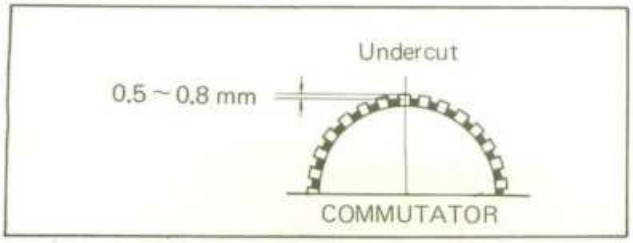
Servicing and troubleshooting

Armature

1) If the commutator surface is dirty, clean with #600 grit sandpaper as shown in the drawing at the right. After sanding, wash thoroughly with electrical contact cleaner and dry with high-pressure air stream.

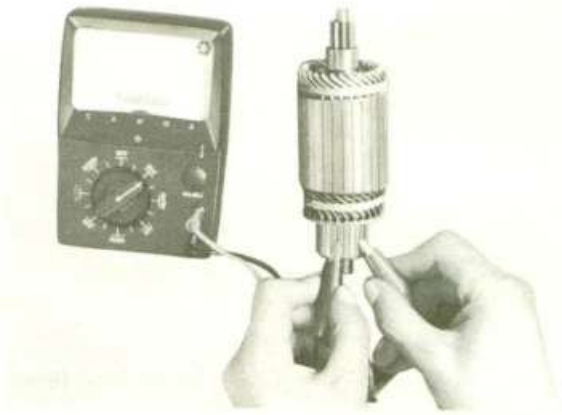


2) The mica insulation between commutator segments should be 0.5 ~ 0.8mm below the segment level. If not, scrape to proper limits with appropriately shaped tool. (A backsaw blade can be ground to fit.)



3) Each commutator segment should show zero ohm resistance to the others and at least three million ohms resistance to the core. If there is less than 3 meg ohms resistance to the core, or one of the segments is open, replace the armature.

In addition, the armature can be placed on a "growler" (testing device) and checked magnetically for internal shorts. Follow manufacture's test recommendations.



4) If the armature shows signs of having been in contact with the yoke windings check the front and rear cover bearings.
Replace as necessary.



5) If the commutator surface shows heavy scoring it can be turned down on a lathe or commutator turning machine. Check the specification chart for minimum allowable commutator diameter. Recut the mica after turned down.



Note:
Should turning be required, check the condition of the cover bearings, armature electrical properties, starter amperage draw and rpm and, finally, carbon brushes.

Carbon brushes

1) Check brush length and replace if at or near limits.
   Minimum length . . . . . 4.5 mm
2) Check brush spring pressure. Replace if over/under specs.

Note:
Spring pressure is measured with a nominal length brush installed. Lift until spring starts to lift off brush and note reading on scale. (Nominal : 800 gr.)

3) Clean the brush holders thoroughly. Use clean solvent, a soft-bristled brush, and dry with high-pressure air stream.

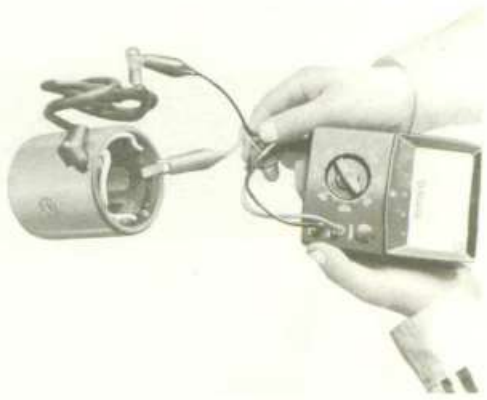


Yoke

1) If the yoke area is dirty, clean with clean solvent and dry with high-pressure air.

2) Yoke coil resistance is 0.05 ohms.
   If coil resistance is more than 0.055 ohms or less than 0.045 ohms, replace it.

   If the yoke shows leakage to ground (resistance is less than 0.1 million ohms) replace it. (20 °C)



Note:
Immediately after cleaning, the yoke may show some insulation leakage. Wait for it to thoroughly dry before checking or reinstalling.

Covers

1) Check oil seals for hardening, cracking, and worn lips. Replace as necessary.

Note:
During reassembly, pre-lube the lips of all seals with "white" grease. (lithium soap base grease)

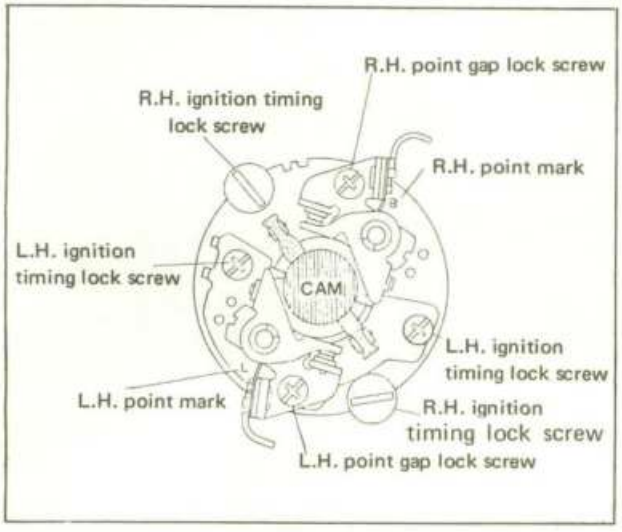
2) Clean the bearings thoroughly, lightly oil each and check for hard spots during rotation, cracked or broken balls and/or races, etc.
   Replace as necessary.

Note:
During reassembly, all non-sealed bearings should be given a light coating of 20W or 30W "SE" (MS) Motor oil.

IGNITION BREAKER POINTS

This unit is equipped with two independent sets of ignition points; one for each cylinder. They are both located in a single housing mounted on the middle of the crankcase (L). The points act as circuit breakers for the ignition system. A point cam spins counterclockwise in the center of the ignition unit. A lobe on the cam controls the opening and closing of the points.

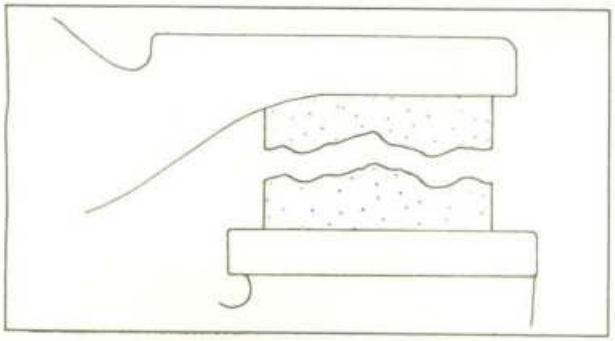
When the points are closed, current flows to the primary coil (which begins to build a magnetic field). At a precisely calculated point of crankshaft rotation, the cam forces the points apart, which stops current flow to the primary winding in the ignition coil. High voltage is then generated in the coil's secondary winding and causes a spark to jump the plug electrodes.

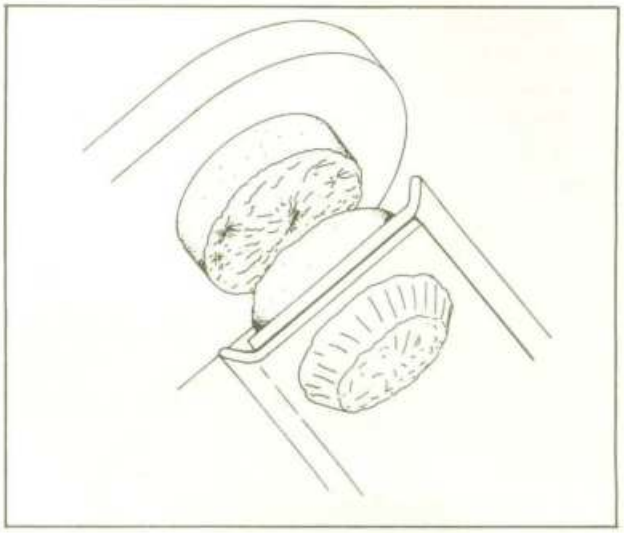


Inspection

Wear

a) The points gradually become burnt and pitted. This is normal wear. However, metal from one point might transfer to the other. If this metal build-up cannot be cleaned off with a point file, the points should be replaced.





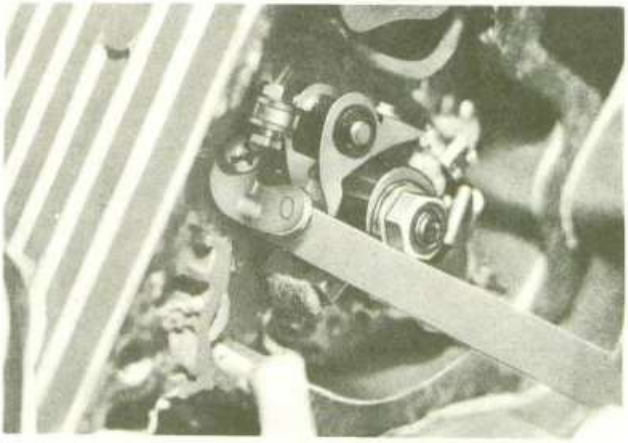
b) Oil may gradually seep past the seal and coat the points or wiring. This will burn onto the points creating an insulating film. It must be cleaned off with ignition cleaning solvent.

c) The fiber cam follower mounted on the pivoting point arm rubs against the cam Eventually this block wears down which results in a reduction of the point gap and retarded timing of the cylinder. The remedy is to regap the points and check the timing (timing should be checked any time the points are regapped.)

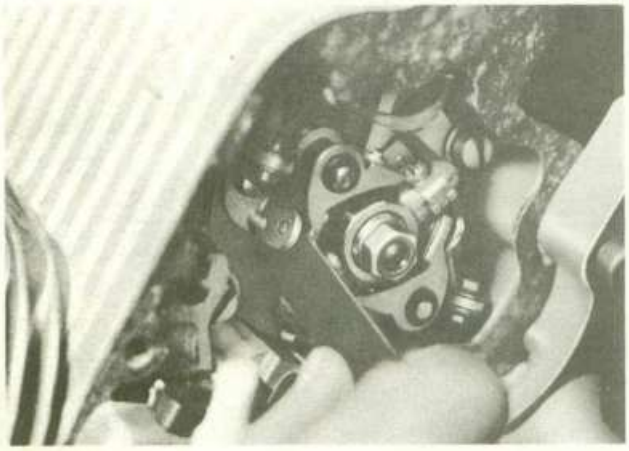
d) If a point return spring becomes weak or broken, the pivoting point will bounce. Timing will become erratic and ignition firing will be uneven. Measure spring tension by attaching a scale (measured in grams) to the pivoting point. It should take 650 ~ 850 g to cause the points to separate. (Use a point checker to measure the separation electrically).

Repair

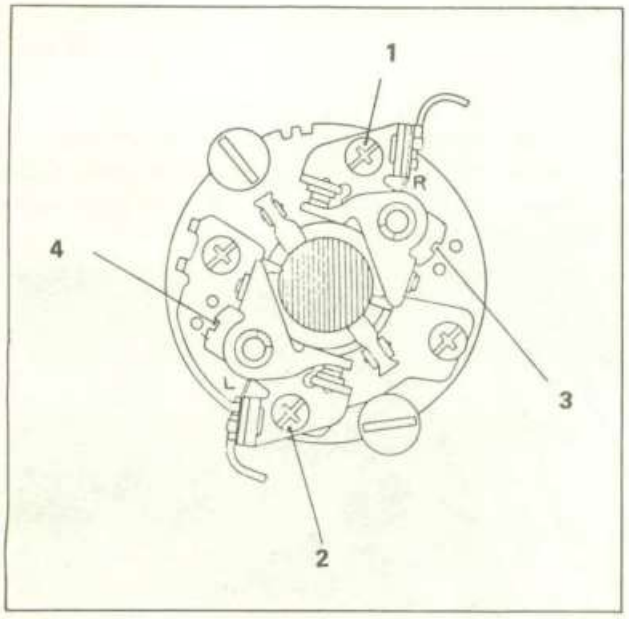
a) Point gap on each set of points must be set at 0.3 ~ 0.4 mm (0.012" ~ 0.016"). Constant electrical arcs across the points cause some metal to burn away, changing point gap. Clean and regap the points every 2,000 miles. Check timing after regapping.



b) To clean the points, run a point file between the points until the gray deposits and pits have been removed. Spray the points with ignition point cleaner or lacquer thinner, then snap the points shut on a white business card (or paper of hard texture) and repeatedly pull the card through until no more carbon or metal particles come off on the card. (The card may be dipped in lacquer thinner or other cleaner to facilitate this procedure)



c) To gap the points, first rotate the engine until the ignition cam opens the points to their widest position. Slip a 0.4mm feeler gauge into the gap. It must be a tight slip fit. If an adjustment is necessary, loosen the point lock screw (1 or 2) as shown in the accompanying drawing, insert a screwdriver into the adjustment slots (3 or 4), and open or close the points until the feeler gauge indicates the correct gap. Retighten the lock screw and recheck the gap.



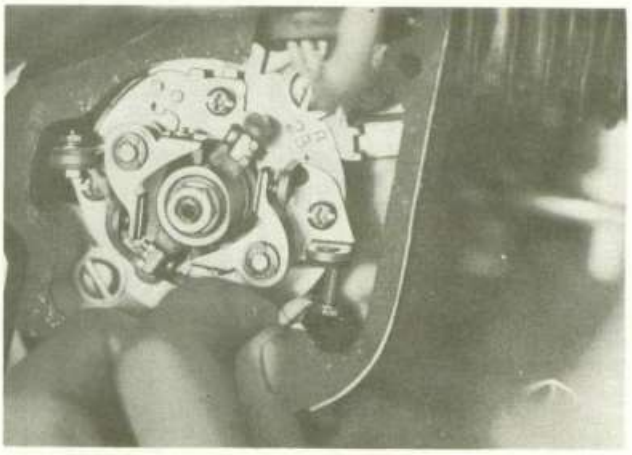
d) Next, rotate the camshaft until the second set of points opens to its widest point. Then perform the same steps as described in the previous paragraph.

Note:

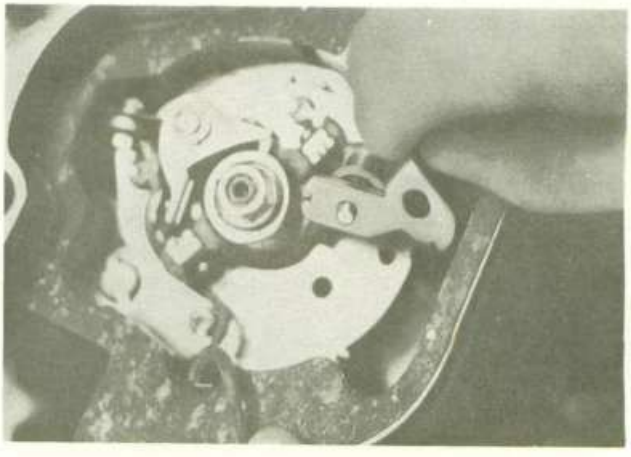
Add a few drops of light-weight oil onto the felt rubbing pad after each point adjustment to lubricate the point cam surface. Do not overoil.

Replacement

1) Unscrew the point wire securing screw. Completely remove the point lock screw. Lift the entire point assembly up off the point base plate.



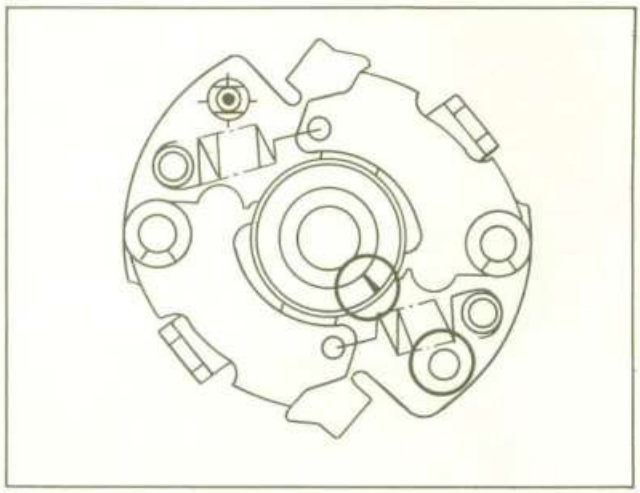
2) Locate the new set of points into position by slipping the point assembly locating pin into the appropriate locating hole in the base plate.



3) Insert and tighten the point lock screw. Finish this replacement by attaching the point wire to the stationary point and regapping the new point assemble.

ADVANCE ASSEMBLY





4) The point cam is not integral with the assembly. During installation, align the mark on the cam with the pin on the assembly shaft. If reversal, ignition timing will be reversal.



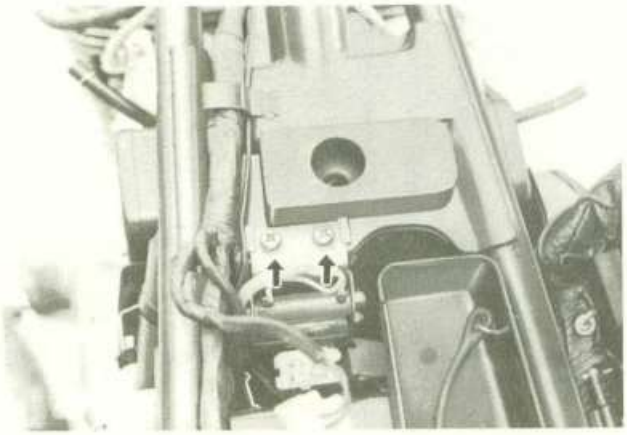
1) The governor is attached to the oil pump shaft. Two centrifugal weights pivot on pins. Each weight has a small extension that fits into the disk notch. As engine rpm increases, both weights begin to swing out on their pivot pins due to centrifugal force acting on the rotating unit. The weights continue to swing outward as rpm's increase until the weights are stopped by fixed stopper pins. As these weights pivot, the extensions in the disk notches cause the disk to rotate. Since the disk is directly attached to the point cam rod, the ignition point cam also rotates, which causes ignition timing to advance.

2) Both weights must pivot smoothly or ignition advance will not occur at the proper rpm, nor will it advance to its fullest extent. On occasion, light-weight grease must be applied to the weight pivot pins.

3) The advance unit mechanically changes ignition firing from 6° BTDC at low rpm to 37° BTDC at high rpm (full advance). The ignition point cam is attached to the camshaft.

CONDENSER

1. Two ignition condensers are located on the front of the seat under the fuel tank. They are mounted as a single assembly and must be replaced as a set in the event of failure.

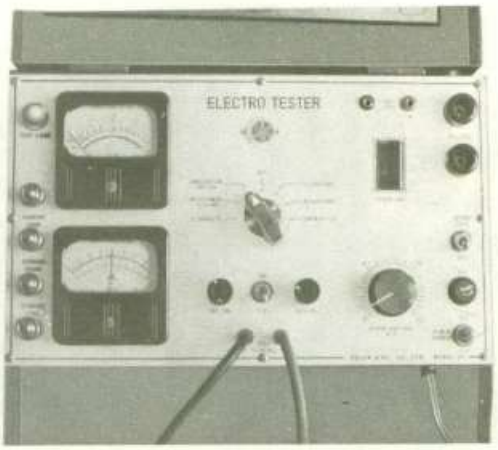




2. The condensers serve as a storage device to decrease arcing across the ignition points. Should one fail there could be either no spark or severe point pitting due to arcing. In the vent of severe arcing there is also the possibility that the strength of the ignition spark may be decreased.

3. To test the condition of either condenser, pull the male/female connection apart.

4. Hook an ohmmeter to the condenser. Black (Neg) lead to the condenser case, Red (Pos) lead to the wire running from the center of the condenser. There will be a momentary flow of current and then the condenser should show at least 5+ million ohms resistance between the positive terminal and ground.



5. Next, hook up an electrotester to the condenser. (Leads in the same position). Turn the main function switch to "C.CAPACITY" and the calibration switch to "CAL".



6. Turn the "CAP CAL" knob until the meter needle points to .22μF on the red meter scale for "Capacitance".

7. Turn the Calibration switch to "TEST". The needle should stay in approximately the same position. If it moves very far into the red, replace the condenser assembly.



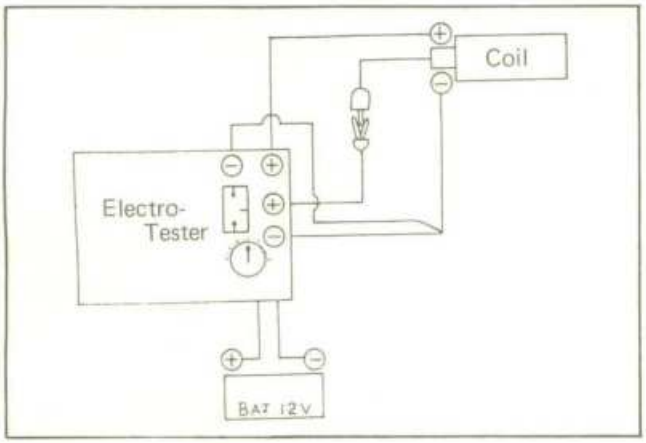
IGNITION COIL

1. Location
   The ignition coils are mounted to a bracket directly in back of the steering head. They can not be removed until the gas tank is removed.

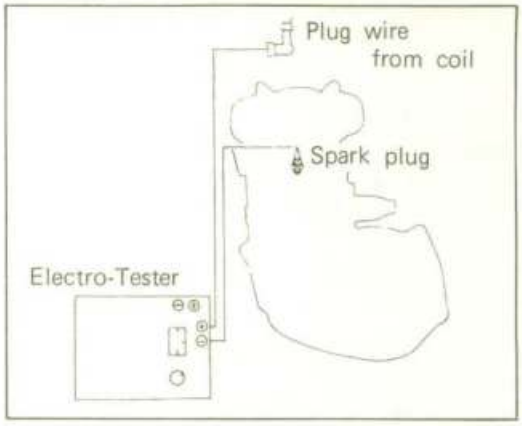


2. The ignition coils can be checked on the machine. It is not necessary to remove either the coil or the gas tank unless the coil is defective and needs replacing.

3. Static Test:
   Follow the diagram below to check the coil. Leave the ignition key off and block the points open with a piece of paper. The coil should show at least 7mm spark gap. (Instruction for setting up the Electro-tester can be found on the Electrotester cover.)



4. Dynamic Test:
   Follow the diagram below for setting up. Close the point gap on the Electrotester to zero. Turn the ignition on and start the machine. Rev the machine to 2~3,000 rpm (or the rpm you wish to test at) and begin opening the tester's point gap. When the engine begins to misfire, close the point gap until it runs smooth again. Point gap should be at least 7mm.



SPARK PLUGS

1. Standard spark plug is an NGK B-8ES which is a 19mm, 3/4" reach, fairly cold plug.

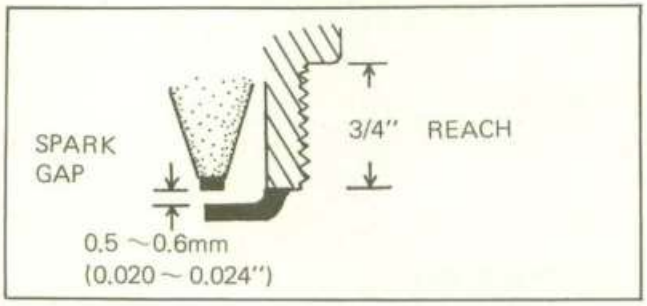
2. Under normal conditions the spark plug should show no deposits on the porcelain insulator around the positive electrode. The porcelain should be a light to medium tan color. After 2,000 ~ 4,000 miles fuel deposits will begin to build up on the plug. Fuel deposits are easily cleaned off but as this is the period for a tune-up it is advisable to replace the spark plug.

3. If one or both plugs are wet, black, and/or heavily sooted, this is an indication that temperatures within the combustion chamber are too low. Check with the rider as to his habits. The plug is designed to give best performance during moderate to medium-high speed cruising.

4. If one or both plugs are white, blistered, and/or the electrode has melted away, this is an indication of excessive combustion chamber temperature.

5. Under normal circumstances it is best to tune carburetion to achieve a correct spark plug reading. However, if the situation is only slightly incorrect then one step hotter (B-7ES) or colder (B-9ES) spark plug can be installed. If the machine is being driven under extremely adverse conditions it may be necessary to change carburetion, timing, and one or more heat ranges in the plug.

6. Servicing
   Clean the electrodes of carbon and adjust the electrode gap to 0.5 ~ 0.6mm (0.020" ~ 0.024"). Be sure to use the specified plug, B-8ES, when replacing.

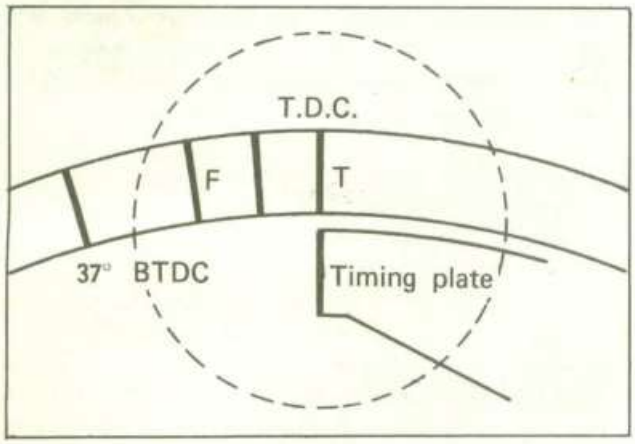


SETTING IGNITION TIMING

Caution

1. Ignition timing is checked by observing the position of the timing marks on the rotor in relation to the timing plate on the field coil assembly.

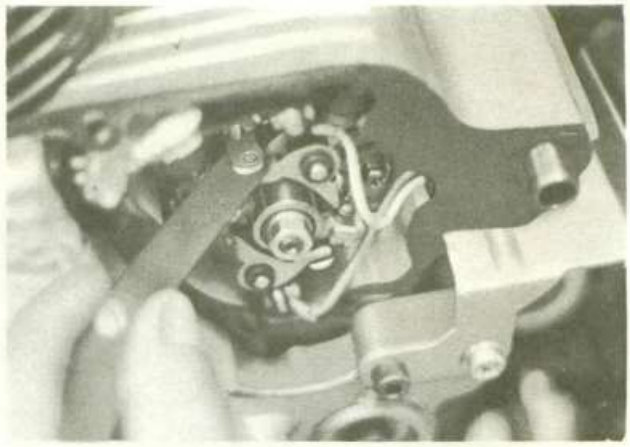
2. The field coil assembly has one timing plate. The rotor has four timing marks. The first mark is identified by the letter "T". This means the piston is at "Top Dead Center".
   The next two marks, identified by the letter "F" stamped counterclockwise from them, is the point of proper ignition timing when fully retarded (engine stopped or idling). When setting ignition timing, set it so both cylinders fire between the marks (both ignition advance weights completely closed).



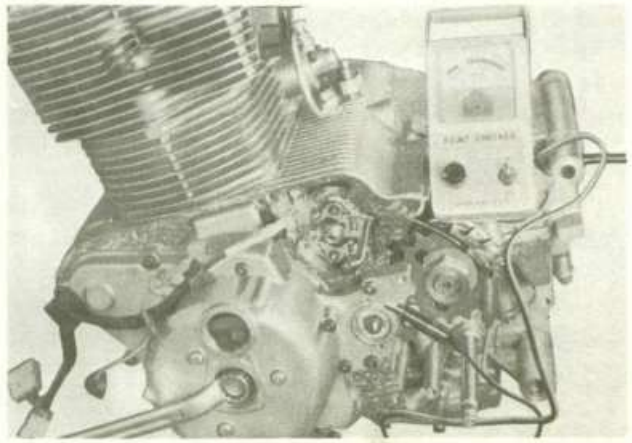
3. The fourth timing mark indicates 37° before TDC, the fully advanced ignition position.

Note:

Each point gap should be checked first, and adjusted, if necessary. Then proceed with the timing adjustment.



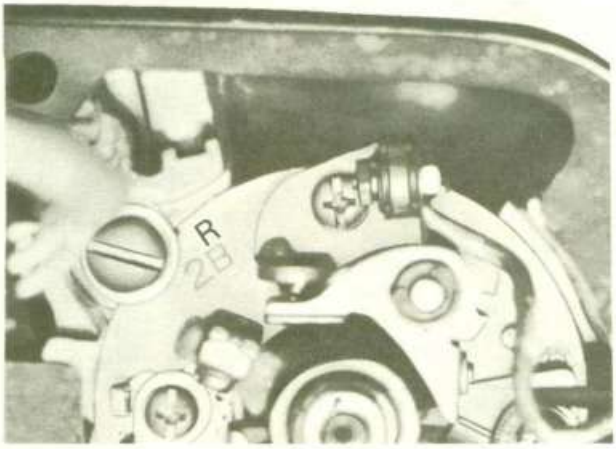
4. Check the point checker for full scale deflection (Infinity to Zero resistance), then hook the black lead to a good ground; the red lead to the gray point wire (right cylinder).



Caution:

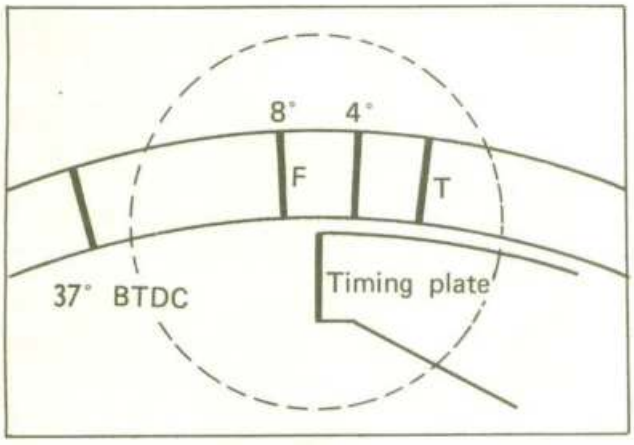
Ignition timing for each cylinder is set separately. However, it is absolutely necessary that the right cylinder points are timed BEFORE the left cylinder points. The right cylinder points are mounted directly to the ignition point base plate. The left cylinder points however mount, on a separate plate that is in turn mounted to the large ignition base plate. If the left cylinder points are timed first, they will shift out of position when the base plate is pivoted to time the right cylinder points.

5. The letter "L" (for left cylinder) is stamped next to one set of points, the letter "R" (for right cylinder) is stamped next to the other set. This indicates which set of point fires which cylinder.

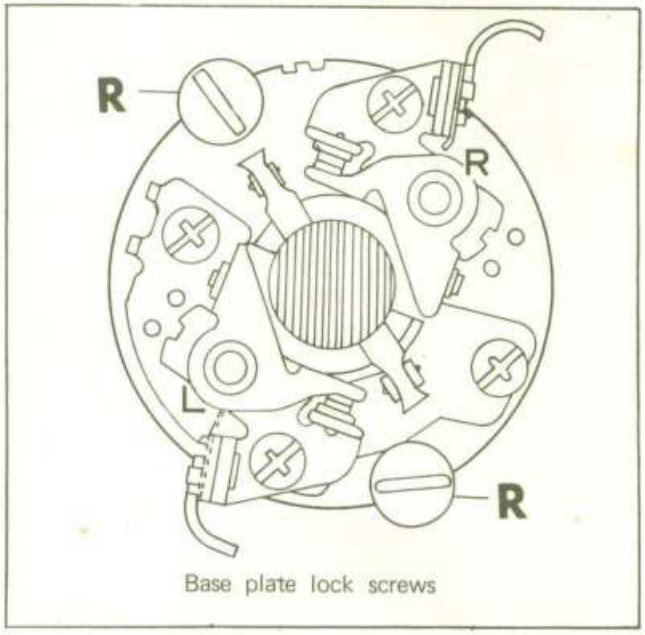


6. Rotate the crankshaft in the direction of running rotation (counterclockwise when viewed from the left side) until the right-hand set of points just start to open, as indicated by the point checker.

7. Check the rotor timing mark position. If the right-hand points are timed correctly, the timing plate will position between "F" stamped two timing marks on the rotor.
   If timing plate does not full between the lines a corrective adjustment must be made to the points.



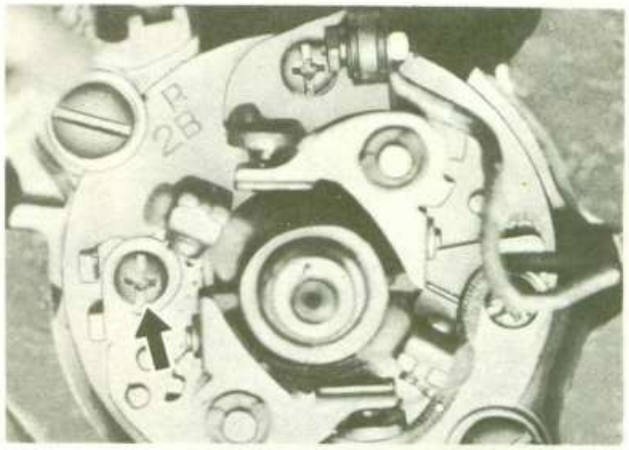
8. With the timing marks lined up correctly, loosen both base plate lock screws. Pivot the entire plate until the right cylinder points just start to open, (as indicated by the point checker).



Base plate lock screws

9. Tighten down both lock screws and check the timing again to make sure the base plate has not moved.

10. To set left cylinder timing, repeat steps 4 thru 8, except to switch the point checker probe from the gray wire to the orange wire. The left cylinder points are held in place on the base plate by two different lock screws. Loosen both lock screws as shown in the accompanying figure and make the necessary adjustments.



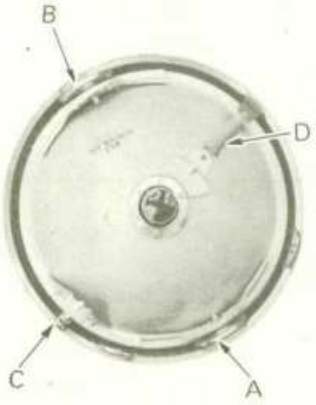
11. With the point checker hooked up to the orange wire, rotate the crankshaft. The left-hand points must now open when the rotor mark lines up with the stator full advance mark. Switch the point checker lead to the right-hand cylinder and re-check.

LIGHTING CIRCUIT

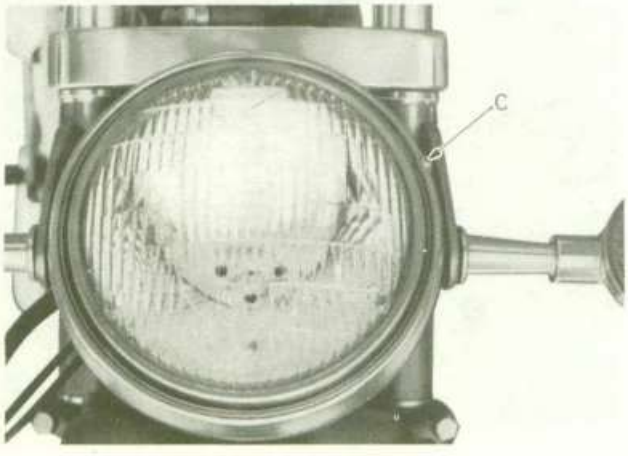
1. Headlight

a) The headlight is a semi-sealed unit with a non-replaceable filament. If the headlight burns out, replace the entire headlight bulb unit.

b) Replacement:
Remove screws "A", "B" and "C' ("C" is the side adjustment screw). Unhook spring "D" and pull the defective unit out of its shell. Slip a new unit into position and install parts "A", "B", and "C".

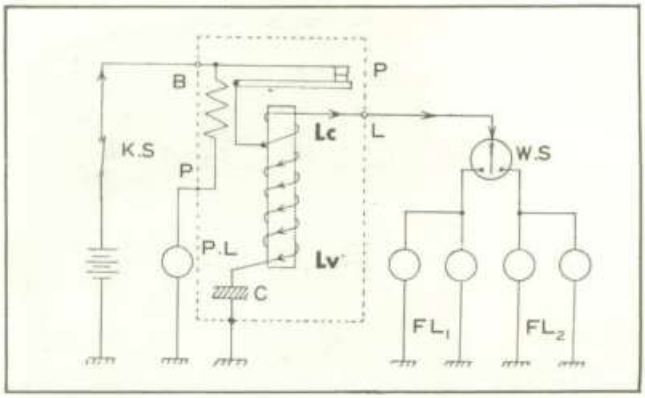


c) Adjustment:
Screw "C" controls side-to-side headlight movement. Screw it in or out until the headlight beam is centered.

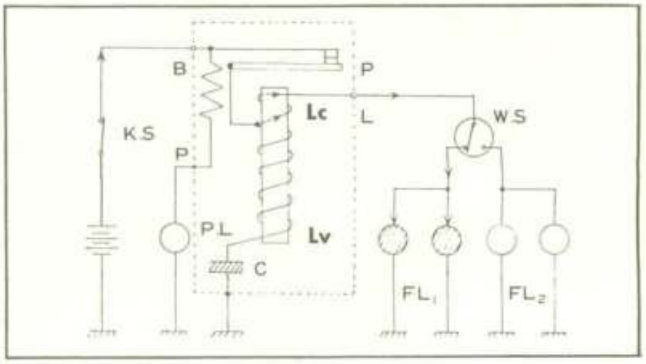


2. Turn Signals

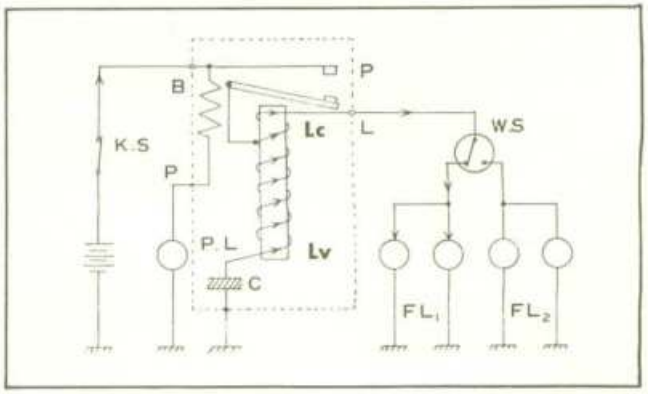
a) Voltage flows from battery to the relay condenser. The condenser becomes fully charged (including wire to flasher switch) and all voltage flow stops in the relay)



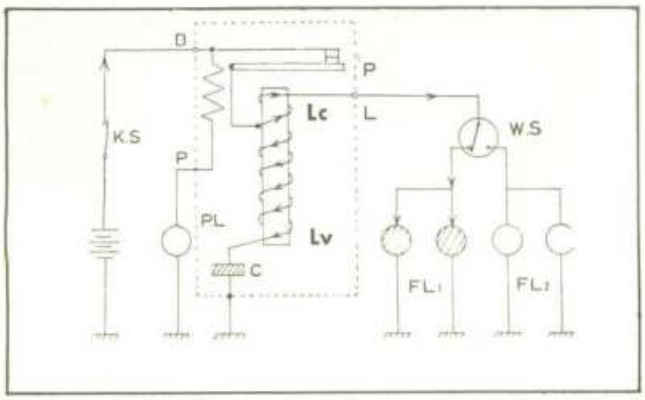
b) When the relay switch is activated, voltage flows from the battery through the "Lc" winding and causes the flasher to light.



c) At the same time that voltage lights the flasher, the "Lc" winding around the metal core creates an electromagnet that pulls the contact points apart. Voltage flow stops and the flasher lights go out. Magnetism to hold the points apart is momentarily maintained because the stored electrical charge in the condenser discharges back through "Lv" and "Lc" winding. The stored condenser amperage, however, is not sufficient to light the flasher lights (due to their being a high resistance load), so both flasher lights do not light again.



As soon as the condenser becomes sufficiently discharged, magnetism ceases and the point spring pulls one point into the other. Voltage once again flows to the flasher lights, causing them to light. At the same time some voltage charges the condenser. The process continues to repeat itself until the switch is turned off.



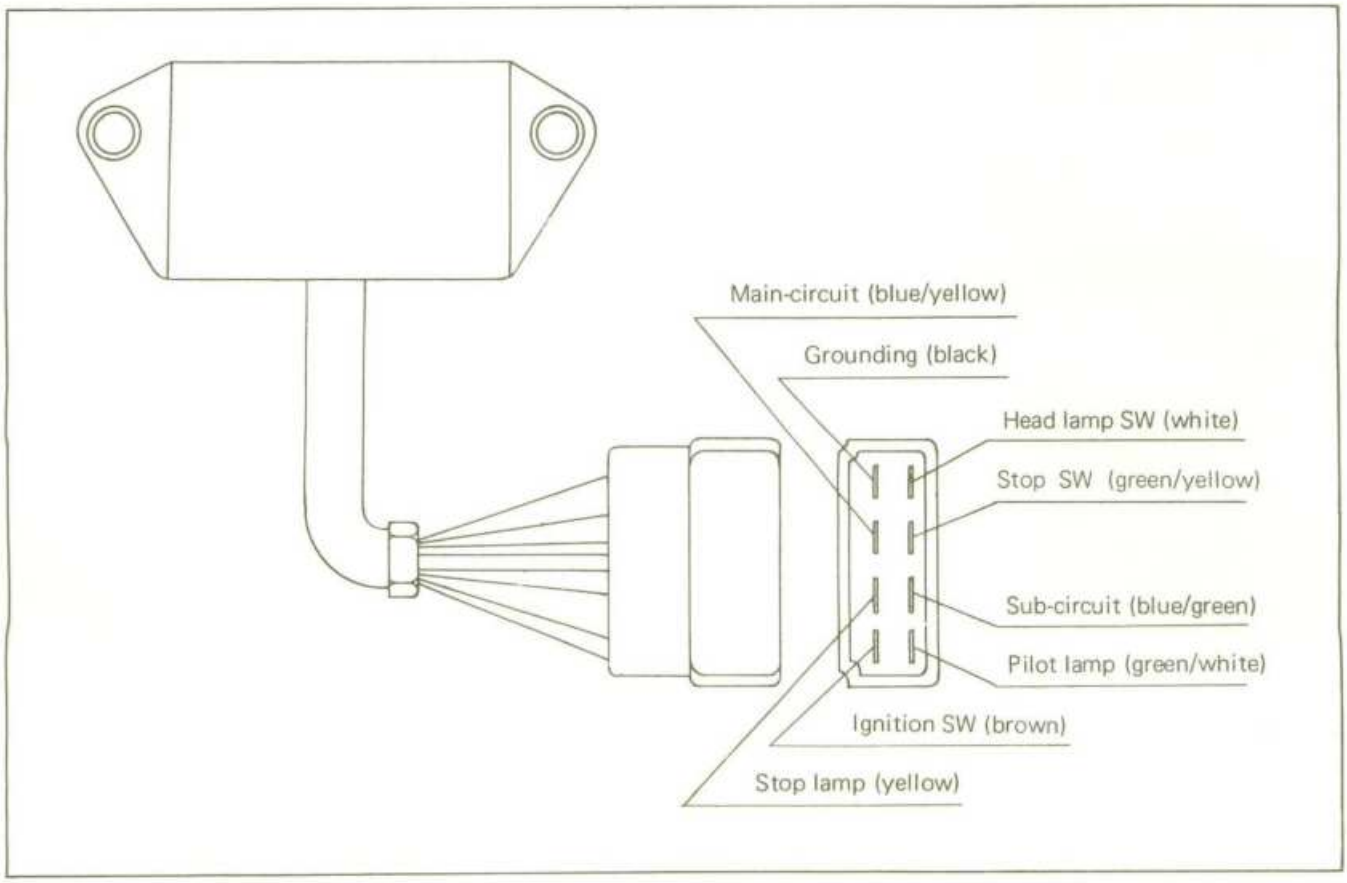
d) Improper Operation

d-1) No flasher action at all:
Check for a broken or shorted wire in the turn signal circuit.

d-2) Too slow or too fast flasher action:
A burned out flasher bulb will slow the flasher action. Check the condition of all flasher bulbs. If flashing action is too slow, and all bulbs are good, the flasher relay (condenser inside) is defective. Replace the relay.

Note:
A bulb of incorrect watt rating will also affect flasher speed - doublecheck all bulbs for correct voltage and/or wattage.

RESERVE LIGHTING SWITCH

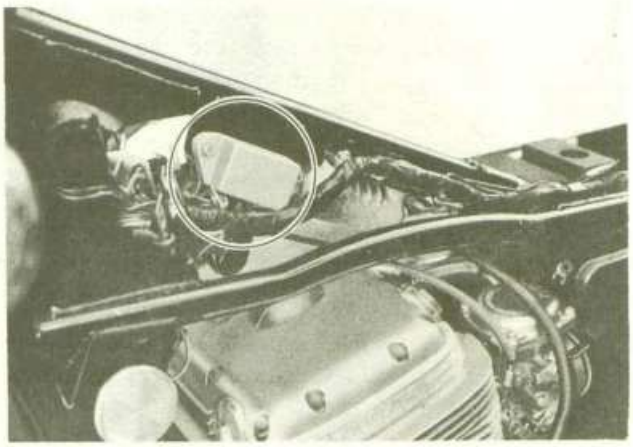


Functions and Operation

The reserve lighting switch has the following three functions:

a. Automatic switch-over of headlight to the other beam when one beam gets faulty.
b. Automatically decreased lighting on the stop lamp in the event of tail lamp failure.
c. Warning of the rider of stop lamp malfunction.

See table below for operating characteristics.



Reserve Lighting Switch Operation

	OPERATING CONDITION	INDICATOR	RESERVE LIGHTING FUNCTION
HEAD LAMP Low Beam:	Normal	None	None
	Faulty	"LAMP" (white)	High beam comes on at low brilliance
High Beam:	Normal	Blue lamp in tachometer	None
	Faulty	"LAMP" (white)	Low beam comes on
TAIL LAMP	Normal	None	None
	Faulty	"TAIL LAMP" (dim red)	Stop lamp comes on at low brilliance and stays on
STOP LAMP	Normal	"TAIL LAMP" (bright red)	None
	Faulty	None (absense of red "TAIL LAMP" denotes failure to rider)	None

Checkout of Reserve Lighting Switch

A. Head Lamp Circuit

1. Turn Main Switch (keyswitch) to position II.
2. Push headlight on-off switch to ON (red dot) (R handle).
3. Place headlight high-low switch to high (H) (L handle).
   The blue high beam indicator lamp will come on (tachometer).
4. Remove head lamp unit from head lamp body.
5. Disconnect yellow wires (2) from yellow wire to head lamp socket (yellow is high beam filament). The high beam filament will go out and the low beam filament should come on. Also, the white "LAMP" indicator should come on. The high beam indicator (blue) in the tachometer will go out.
6. Reconnect the yellow wires (3). The low beam filament and "LAMP" (white) indicator will go out. The high beam filament and high beam indicator (blue) will come on.
7. Place headlight high-low switch to low (L) (L handle).
8. Disconnect green wire (low beam filament) from green wire going to head lamp socket. The low beam filament will go out and the high beam filament will come on with reduced brilliance (lower intensity than low beam). The white "LAMP" indicator should come on.
9. Reconnect green wires and replace head lamp unit in head lamp body.
10. Operate headlight high-low switch to ensure that headlight and high beam indicator (blue) are working in a normal manner.
11. Turn Main Switch and headlight on-off switch to off positions.

B. Stop Lamp and Tail Lamp Circuits

1. Turn Main Switch (keyswitch) to position II.
2. Push headlight on-off switch to ON (red dot) (R handle).
3. Apply front brake to check stop lamp operation. The red "TAIL LAMP" indicator (instrument cluster) should come on (very bright) each time either brake is applied.
4. Disconnect blue wire (tail lamp filament) at wire bundle under seat. The tail lamp filament will go out and the stop lamp should come on at about the same brilliance of the tail lamp filament. The red "TAIL LAMP" indicator (instrument cluster) will come on (very dim), indicating to rider that tail lamp is not on, but stop lamp is on continuously.
5. Apply front brake. The stop lamp and red "TAIL LAMP" indicator should increase in brilliance to normal intensity. Release front brake.
6. Reconnect blue wire (tail lamp filament). The tail lamp filament will come on and the red "TAIL LAMP" indicator will go out.
7. Disconnect yellow wire (stop lamp filament) at wire bundle under seat.
8. Apply front brake. Stop lamp will not come on. The red "TAIL LAMP" indicator will not come on, indicating to rider that stop lamp filament is not on.
9. Reconnect yellow wires under seat.
10. Operate brakes to ensure that both stop lamp and tail lamp are operating normally.
11. Turn Main Switch and headlight on-off switch to off positions.

Checking Switch in Faulty Function (Refer to the exterior wiring diagram.)

Failure 2–1: The low beam filament does not light even though the high beam filament is broken.

Do the head lamp terminals (PASS terminals) indicate 12V?

- No → Is the "LAMP" indicator shining brightly?
  - No → Does the head lamp switch (W) indicate 12V?
    - No → Faulty head lamp switch.
    - Yes → Faulty unit or breaking of filament in "LAMP" indicator.
  - Yes → Faulty dimmer switch.
- Yes → Breaking of low beam filament or faulty grounding.

Failure 2–2: The high beam filament does not light even though the low beam filament is broken.

Is the high beam indicator lamp lighting normally?
- Yes → Breaking of high beam filament or faulty grounding.
- No → Does the resistor (YB) indicate 12V?
  - Yes → Breaking of high beam indicator lamp filament or faulty grounding.
  - No → Does the register (Y) indicate 12V:
    - Yes → Faulty register assembly.
    - No → Is the "LAMP" indicator shining brightly?
      - Yes → Faulty dimmer switch.
      - No → Does the head lamp switch (W) indicate 12V:
        - Yes → Faulty unit, breaking of filament in "LAMP" indicator, or faulty grounding.
        - No → Faulty head lamp switch.

Failure 2–3: The "LAMP" indicator is not lighting although the low (high) beam filament is lighting normally as a result of the broken high (low) beam filament.

Does the head lamp outage (LG) indicate 12V?
- Yes → Breaking of "LAMP" indicator filament or faulty grounding.
- No → Faulty unit.

Failure 2–4: The low(high) beam filament is also lighting, while the high(low) beam is lighting.

Does the head lamp terminals (DRIVE terminals) indicate 12V when the dimmer switch is set to the low beam?
- Yes → Faulty dimmer switch.
- 40 to 50% of normal voltage → Faulty unit

Failure 2–5: The stop lamp does not light even when the tail lamp filament breaks (with the stop switch OFF in this instance).

Does the stop lamp (Y) indicate 12V?
- Yes → Breaking of stop lamp filament or faulty grounding.
- No → Does the stop switch (GY) indicate 12V?
  - Yes → Faulty unit.
  - No → Does the register (YR) indicate 12V?
    - Yes → Faulty register assembly.
    - No → Is the "TAIL LAMP" indicator lighting a little dimly.
      - Yes → Faulty unit.
      - No → Does the tail lamp switch (BW) indicate 12V.
        - Yes → Faulty unit, breaking of filament in "TAIL LAMP" indicators, or faulty grounding.
        - No → Faulty tail lamp switch.

Failure 2–6: The "TAIL LAMP" indicator does not light (with the stop switch OFF in this instance) though the stop lamp is lighting normally as a result of the broken tail lamp filament.

Does the rear lamp outage (GW) indicate 12V?

- No → Faulty unit.
- Yes → Breaking of filament in "TAIL LAMP" indicator or faulty grounding.

Failure 2–7: The tail lamp is lighting normally, while the stop lamp is also lighting (with the stop lamp switch OFF in this instance).

Does the stop lamp (Y) indicate 12V?

- No → Faulty unit. (40 to 50% of normal voltage)
- Yes → Faulty stop lamp switch.

Failure 2–8: The "TAIL LAMP" indicator does not light (with the tail switch OFF in this instance) even though the stop lamp is lighting.

Does the rear lamp outage (GW) indicate 12V?

- No → Faulty unit.
- Yes → Breaking of filament in "TAIL LAMP" indicator or faulty grounding.

Failure 2–9: The "TAIL LAMP" indicator lights (with the tail switch OFF in this instance) even though the stop lamp filament is broken.

Does the tail switch (BW) indicate 12V with the tail lamp unlighted?

- No → Faulty unit.
- Yes → Faulty tail switch.

Failure 2–10: The "TAIL LAMP" indicator does not light even though the filament of the tail and stop lamps are broken (with the switches both for the tail and stop lamps ON in this instance).

Does the rear lamp outage (GW) indicate 12V?

- No → Faulty unit.
- Yes → Breaking of filament in "TAIL LAMP" indicator or faulty grounding.

6. TROUBLE SHOOTING

A. No start or difficult to start

1. Ignition System

Possible Causes	Inspection and Repair
1. Carbon-fouled or worn out spark plug.	Clean or replace plug. Gap to 0.5 ~ 0.6 mm
2. Gap incorrect or bridged.	
3. Contact breaker point burned up or won out.	Clean or change points.
4. Point gap incorrect.	Set point gap (0.3 ~ 0.4 mm)
5. Ignition timing out of adjustment.	Set ignition timing.
6. Ignition coil failed.	Use electro-tester to measure primary and secondary winding resistance. Also make a standard coil test.
7. Condenser shorted out.	Use electro-tester to check capacity and insulation.
8. Brown or red ignition wires broken or shorted.	Turn on main switch. Hit horn and stoplight. No operation means possible broken wire.
9. Main switch no good.	Check main switch.
10. Blown fuse.	Replace.
11. Battery discharged or defective.	Check specific gravity of each cell with hydrometer.

2. Fuel System

Possible Causes	Inspection and Repair
1. No gas.	Disconnect fuel line at carburetor; turn fuel petcock, on, check for fuel flow.
2. Tank cap vent hole plugged.	
3. Petcock defective.	
4. Fuel line plugged.	
5. Carburetor not level.	
6. Carb equalizer tube has hole or loose connection.	

3. Compression-Cylinder Compression Measure Shows Low Pressure

Possible Cause	Inspection and Repair
1. Lack of tappet clearance; valve held open.	Adjust tappet.
2. Valve timing incorrect.	Camshaft improperly installed or cam chain loose.
3. Cylinder head gasket broken.	Check for combustion gases blowing out past gasket.
4. Valve seat defective.	See Valve Seat Repair Section.
5. Piston rings(s) defective.	Too much smoke while riding motorcycle, Especially blue smoke indicating oil burning. See individual wear sections for inspection methods.
6. Cylinder tapered or out of round.	
7. Valve guide(s) worn out.	
8. Guide seals bad.	

B. Poor idle and/or low speed performance

1. Ignition System

Possible Cause	Inspection and Repair
1. Spark plug fouled or incorrect gap.	Clean and gap, or replace if necessary.
2. Contact points bad.	Clean and gap, or replace if necessary.
3. Incorrect ignition timing.	Reset timing.
4. Weak spark.	Check ignition coil and condenser.
5. Partially discharged or defective battery.	Weak horn and lights-check fluid level; recharge;

2. Fuel System

Possible Cause	Inspection and Repair
1. Tank cap vent plugged.	Clean or repair as necessary.
2. Fuel petcock plugged.	
3. Carburetor slow speed system inoperative.	
4. Pilot screw out of adjustment or plugged.	
5. Carburetor float level incorrect.	
6. Starter levers on.	
7. Air leak.	Manifold equalizer tube cracked, or rubber carburetor manifold cracked.
8. Carburetor not level.	
9. Equalizer tube has hole or loose connection.	

3. Compression System

Possible Cause	Inspection and Repair
1. Incorrect tappet clearance.	
2. Valve timing (camshaft) incorrect.	
3. Valve seat leakage.	
4. Valve guide worn.	

C. Poor mid-range and high speed performance

1. Ignition System

Possible Cause	Inspection and Repair
1. Spark plug incorrect	Clean and gap to 0.5～0.6mm or change plug if necessary.
2. Advance (or spring) defective.	Advance not able to turn, governor weight not pivoting Check for correct "retard" to 'full' advance" position.
3. Ignition timing off	
4. Points set too close	Re-gap to 0.3～0.4 mm

2. Fuel System

Possible Cause	Inspection and Repair
1. Butterfly valve not opening completely or in synchronization.	Make corrective adjustment.
2. Dirty air filter element.	Clean with high pressure air.
3. Carburetor float level incorrect.	Measure and change if required.
4. Incorrect main jet size.	Remove jet and check stamped size.
5. Incorrect jet needle clip location.	Check position of clip in needle.
6. Cracked and leaking vacuum diaphragm.	Remove air cleaner and observe vacuum piston operation while running engine.
7. Carburetor not level.	Level carburetors.
8. Choke half on.	Check chokes.

3. Compression System

Possible Cause	Inspection and Repair
1. Weak or broken valve spring.	Make valve spring tests, replace if weak.
2. Valve timing (camshaft) incorrect.	Check cam chain tension.
3. Broken piston rings.	Compression abnormal. Replace.

D. Engine overheating

1. Ignition

Possible Cause	Inspection and Repair
1. Ignition timing too advanced or retarded.	Check timing.
2. Malfunctioning governor.	Check action of governor rod and pivot weights.
3. Too hot spark plug heat range.	Check heat range.

2. Fuel System

Possible Cause	Inspection and Repair
1. Too lean air-fuel mixture.	Any jet plugged or too small. Air leak in carburetion intake system.
2. Bad gasoline.	Listen for detonation: check for unusual deposits on spark plug.

3. Oil System

Possible Cause	Inspection and Repair
1. Oil level too low.	Check and refill.
2. Oil too thin.	Improper weight or too contaminated-change oil.
3. Oil pump defective.	Loosen oil delivery line to head and check for oil flow.
4. Oil passage plugged.	Disassembly engine pour solvent or direct air through oil passages.

4. Too Much Blue Exhaust Smoke

Possible Cause	Inspection and Repair
1. Too much engine oil.	Check oil level and drain some if necessary.
2. Breather plugged up.	Check and clean if necessary.
3. Cylinder and/or piston rings worn.	Make necessary measurements and replace as necessary.
4. Worn or cracked valve guide.	Make necessary measurements and replace as necessary.
5. Cracked valve guide seals.	Make necessary inspection and replace as necessary.

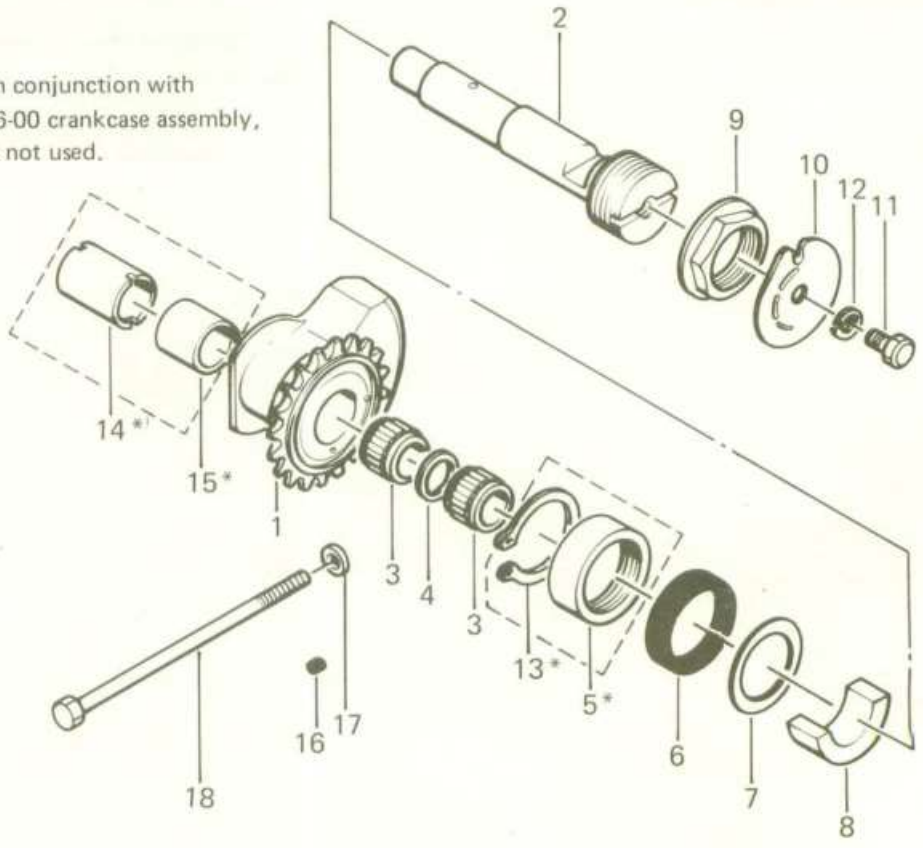
TX 750
ADJUSTABLE BALANCER SHAFT SET

P/N 341-10000-00-00

INSTALLATION PROCEDURE

This kit replaces balancer weight No. 2 and shaft No. 2, provides a means of adjusting balancer chain tension and may reduce engine noise.

* When kit is used in conjunction with P/N 341-15109-16-00 crankcase assembly, 5, 13, 14 and 15 are not used.



Ref.	Part Number	Description	Qty.	Ref.	Part Number	Description	Qty.
1	341-11464-20-00	Weight 2	1	10	90215-08042-00	Lock washer	1
2	341-11465-81-00	Shaft 2	1	11	91201-08018-00	Bolt	1
3	93310-41887-00	Bearing	2	12	92901-08100-00	Spring washer	1
4	90560-18056-00	Spacer	1	13*	93450-30019-00	Circlip 2	1
5*	90387-20236-00	Collar 2	1	14*	90387-16235-00	Collar	1
6	93101-20064-00	Oil Seal	1	15*	90387-16234-00	Collar 1	1
7	90201-20270-00	Shim	1	16	90336-05010-00	Plug	1
8	341-11445-01-00	Spacer	1	17	341-11175-00-00	Washer	1
9	90179-31055-00	Nut	1	18	90101-08194-00	Bolt	1

NOTE: Refer to Parts List for reference number information.

1) Drain engine oil.

2) Remove battery and fuel tank.

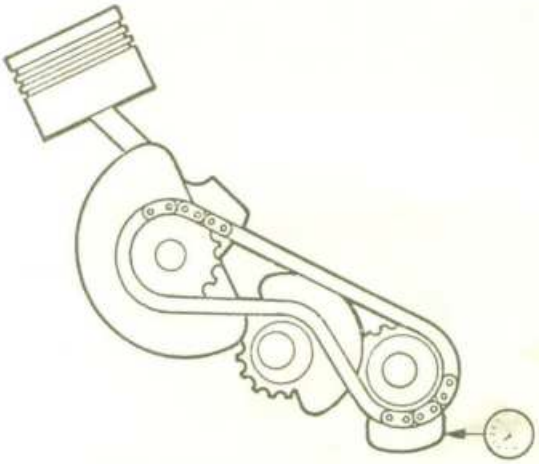
3) Lay motorcycle on right side and block.

4) Remove L.H. engine side case, Ref. No. 19-1.

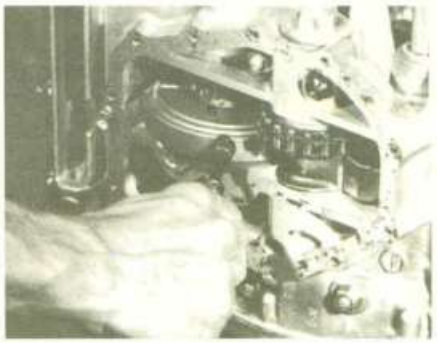
5) Remove alternator cover, Ref. No. 19-6.

6) Remove strainer cover at bottom of engine, Ref. No. 12-22.

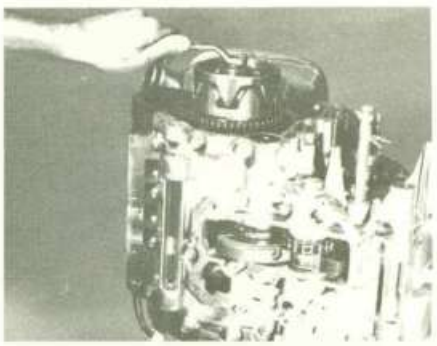
7) Set pistons at approximately 90° BTDC. Note the position of balancer weight No. 2. Attach dial indicator solidly to motorcycle. Position indicator to small weight (No. 2) as shown. Rotate weight back and forth. Replace chain if movement exceeds 3.5 mm.



8) Remove allen-head bolts from both balancer weights.



9) Rotate engine to T.D.C. Note the location of balancer weights and location marks of case and sprockets; during reassembly, the weights will be properly timed with marks that are lined up at this point.



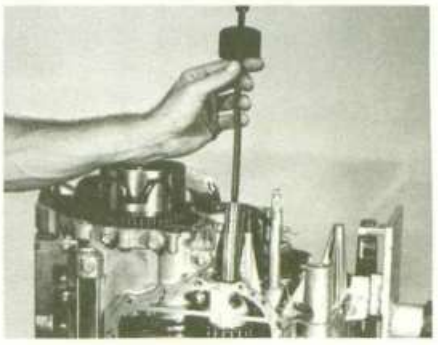
10) Remove plug, gasket, and spacer from end of balancer shaft No. 2. Discard these parts as they will not be used during final assembly.



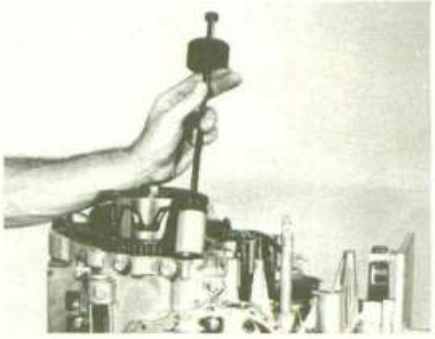
11) Remove crankcase bolt nearest shaft No. 2. It will interfere with shaft removal. Discard the bolt and its flat washer; a new short-headed bolt and washer are provided.



12) Remove shaft No. 2 with the 8mm slide hammer bolt.



13) Remove plug assembly from balancer Shaft No. 1, using the 8mm slide hammer bolt.



14) Remove balancer shaft No. 1 using the 8mm slide hammer.



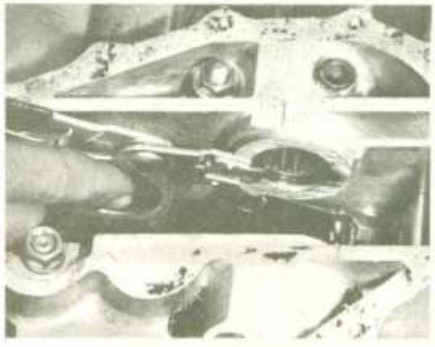
15) Remove weight No. 1. Wire shims to weight; they must be installed in same location. *CAUTION: Shims on either side of weight have difference thicknesses.*



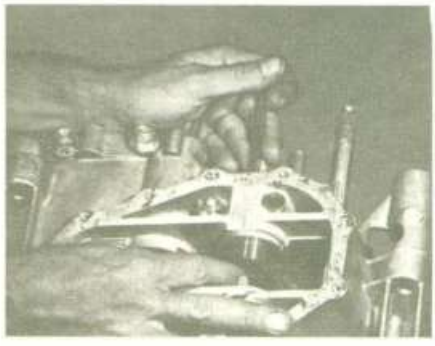
16) Remove weight No. 2 and wire shims in place. Shims will be used in identical position on the new weight.



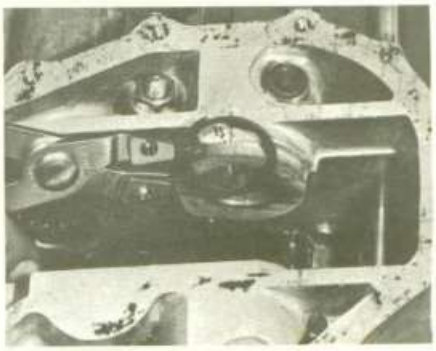
17) Remove circlip located under L.H. bearing of balancer shaft No. 2.



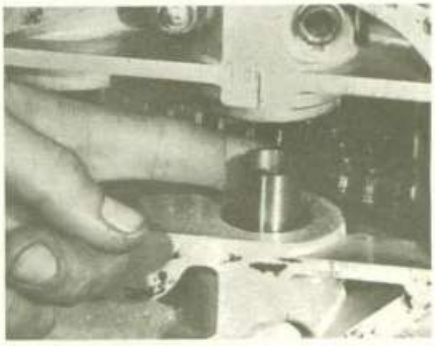
18) Remove L.H. bearing. Knock out from left side toward right side. Do not remove the bearing on the R.H. side.



19) Install new circlip (Kit Ref. No. 13).
CAUTION: Fully seat circlip.



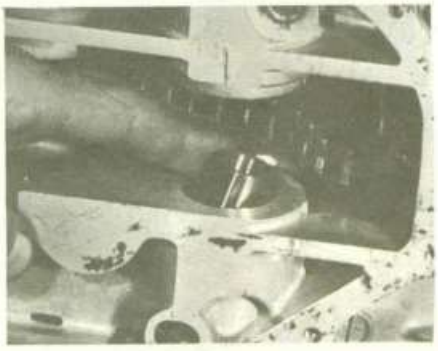
20) Install 30mm notched spacer (Kit Ref. No. 14) in through the R.H bearing. Push in until it seats at bottom of hole in crankcase.



21) Install 14mm long collar (Kit Ref. No. 5) in place of removed L.H. bearing. Tap into place (until collar lightly bottoms on circlip) using old shaft as a guide. (Note: Collar is interference fit into bearing cavity.) Old shaft (No. 2) may now be discarded.



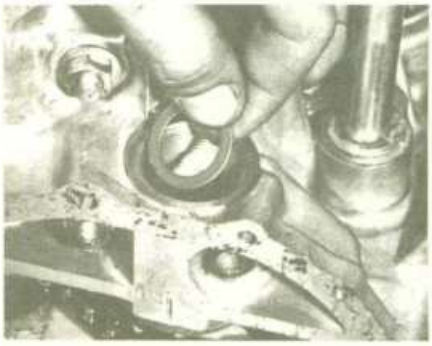
22) Install 20mm long collar (Kit Ref. No. 15) in R.H. bearing, Ref. No. 6-17.



23) Grease seal (Kit Ref. No. 6) and install with closed end facing out.



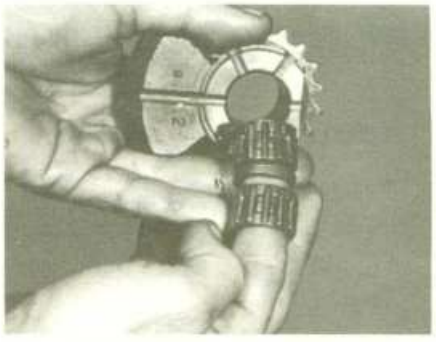
24) Install 1mm thick shim (Kit Ref. No. 7) on top of seal.



25) Install spacer (Kit Ref. No. 8) (17mm long half circle) on top of shim. Position to allow installation of new crankcase bolt.



26) Grease and install 4mm thick spacer (Kit Ref. No. 4) and two new bearings (Kit Ref. No. 3) into new weight No. 2. Spacer goes between bearings.



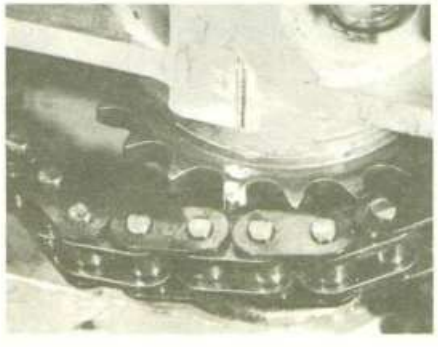
27) Check to be sure crank has not moved. Pistons must be at T.D.C.

28) Engage new weight No. 2 (Kit Ref. No. 1) with balancer chain and set into place with shims properly installed on each side.



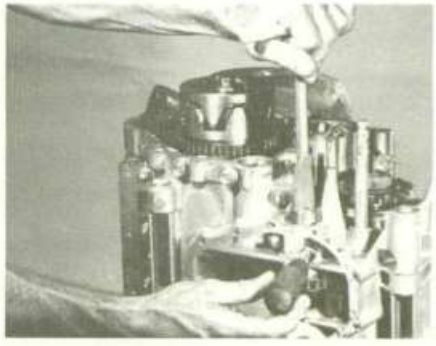
29) Turn weight until marked tooth aligns with mark on crankcase.

NOTE: Remove slack from top of chain when timing weight No. 2.



30) Screw in new adjustable balancer shaft No. 2 until it lightly bottoms.





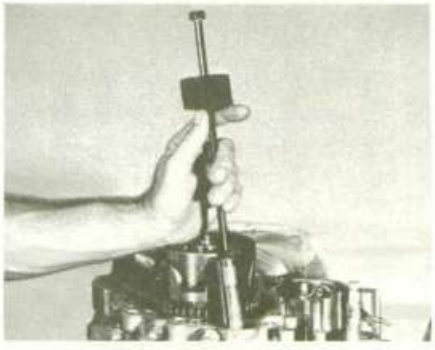
NOTE: Temporarily install a thin object in crankcase bolt hole to prevent 17mm half circle spacer from rotating and blocking hole while shaft is being installed.

31) Reinstall weight No. 1 and properly time using the marks on tooth and crankcase as guide.

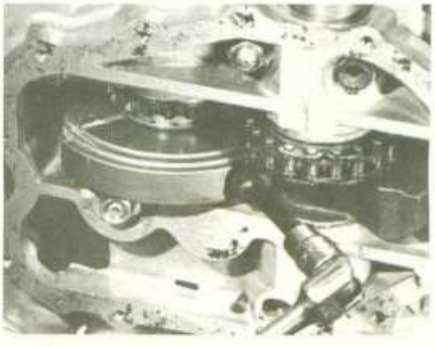
NOTE: For more details on balancer timing, see Page 52, TX 750 Service Manual (3rd edition).



32) Install shaft No. 1 using 8mm slide hammer bolt to push it into place.



33) Install Allen-head bolt in weight No. 1. *CAUTION: Make sure bolt seats in dimple on shaft. Use Loc-Tite.*

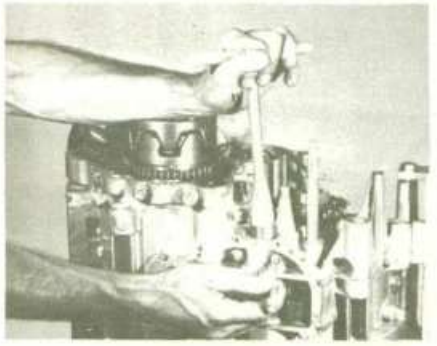


34) Complete assembly of shaft No. 1 (front weight) by dropping in plug, Ref. No. 9-10, and pushing in rubber-covered plug, Ref. No. 9-11.



35) Turn shaft No. 2 counter-clockwise just enough to allow installation of crankcase bolt. Use new bolt (Kit Ref. No. 18) and copper washer (Kit Ref. No. 17).

CRANKCASE BOLT TORQUE: 15 ft-lbs



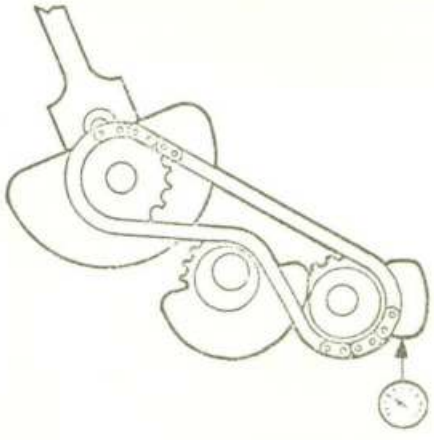
36) Install large nut on balancer shaft. Tighten slightly.



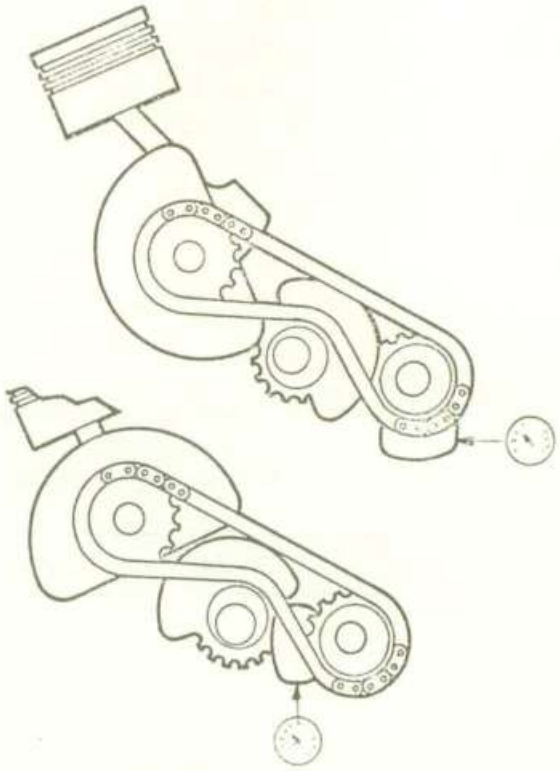
37) Apply RTV sealant or Yamabond No. 4 or No. 5 to small rubber plug (Kit Ref. No. 16) and install in 4mm oil hole near crankcase vertical bolt.



38) Clamp dial gauge on crankcase. Position indicator as shown. Check chain freeplay at T.D.C. (Move weight No. 2 to check chain play.)

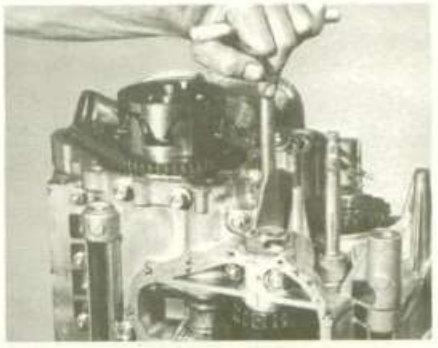


39) Turn crankshaft to 90° B.T.D.C. Reposition dial gauge and measure freeplay of weight No. 2. Chain tension will vary slightly because sprocket holes cannot be perfectly centered.



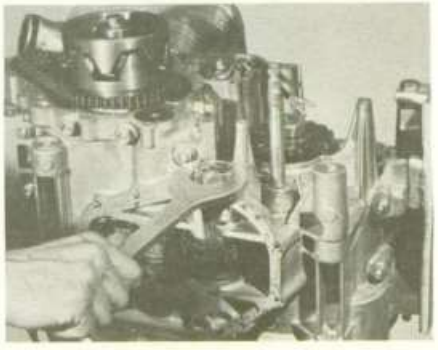
40) Turn crankshaft to bottom dead center. Reposition dial gauge and check freeplay.

41) Choose crankshaft location where balancer chain is tightest, loosen large nut and adjust chain tension to 0.3 ~ 0.4mm by turning shaft with screwdriver (clockwise = loose, counter-clockwise = tight).



42) Tighten locknut with special 35mm wrench. Recheck chain tension. Readjust if necessary.

43) Install engine sump cover, alternator cover (new gaskets) and L.H. outer crankcase cover. Replace engine oil.



44) Start engine and check noise level. If O.K., go on to step 46. If not O.K., with engine running, loosen adjust shaft locknut and loosen chain slightly (just enough to eliminate noise). Choose setting with minimum noise. *CAUTION: Do not tighten chain to less than .3mm freeplay; engine vibration and noise will result.*

45) Place large flat washer (Kit Ref. No. 10) on top of balancer shaft with open slot around crankcase web. Install bolt (Kit Ref. No. 11) and lockwasher (Kit Ref. No. 12) and tighten. Bend flat of washer up against two flats of the nut.



CONVERSION TABLE

Metric to Inch System

	KNOWN	MULTIPLIER (Rounded off)	RESULT
TORQUE	kg-m	7.235	ft-lbs
	kg-m	86.82	in-lbs
	kg-cm	.0724	ft-lbs
	kg-cm	.8682	in-lbs
WT.	kg	2.205	lb
	g	.03527	oz
FLOW/DISTANCE	Km/l	2.352	mpg
	Km/hr	0.6214	mph
	Km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in
	mm	0.03937	in
VOL./CAPACITY	cc (cm^3)	0.03381	oz (U.S. liq.)
	cc (cm^3)	0.06102	cu in
	1 (liter)	2.1134	pt (U.S. liq.)
	1 (liter)	1.057	qt (U.S. liq.)
	1 (liter)	0.2642	gal (U.S. liq.)
MISC.	kg/mm	56.007	lb/in
	kg/cm^2	14.2234	psi (lb/in^2)
	Centigrade	$(^oC \times \frac{9}{5}) + 32$	Fahrenheit (^oF)

Inch to Metric System

	KNOWN	MULTIPLIER (Rounded off)	RESULT
TORQUE	ft-lbs	0.13826	kg-m
	in-lbs	0.01152	kg-m
	ft-lbs	13.825	kg-cm
	in-lbs	1.1518	kg-cm
WT.	lb	0.4536	kg
	oz	28.35	g
FLOW/DISTANCE	mpg	0.4252	Km/l
	mph	1.609	Km/hr
	mi	1.609	Km
	ft	0.3048	m
	yd	0.9144	m
	in	2.54	cm
	in	25.4	mm
VOL./CAPACITY	oz (U.S. liq.)	29.57	cc (cm^3)
	cu in	16.387	cc (cm^3)
	pt (U.S. liq.)	0.4732	1 (liter)
	qt (U.S. liq.)	0.9463	1 (liter)
	gal (U.S. liq.)	3.7853	1 (liter)
MISC.	lb/in	0.017855	kg/mm
	psi (lb/in^2)	0.07031	kg/cm^2
	Fahrenheit	$(^oF \times \frac{5}{9}) - 32$	Centigrade(^oC)

DEFINITION OF TERMS

kg-m = Kilogram meters: usually torque.
g = Gram(s).
kg = Kilogram(s): 1,000 grams.
km = Kilometer(s).
l = Liter(s).
km/l = Kilometer(s) per liter: Mileage.
cc = Cubic centimeter(s) (cm^3): Volume or capacity.
kg/mm = Kilogram(s) per millimeter: usually spring compression rate.
kg/cm^2 = Kilogram(s) per square centimeter: pressure.

Tightening Torque for Engine and Frame Parts

(Multiply Kg-m by 87 to Obtain In-Lbs.)

Section	Part to tightened	Tightening Torque
Engine	Sutd bolts, crankcase stud bolts	M8-P1.25 (1.5～2.0 kg-m) M10-P1.25 (2.0～2.5 kg-m)
	Cap connecting clamp bolts	3.5～4.0 kg-m
	Upper and lower crankcase clamp bolts	M8- (2.0～2.2 kg-m) M10 (3.7～4.0 kg-m)
	Oil filter	2.0～2.3 kg-m
	Warning switch	2.0～2.3 kg-m
	Electric motor mounting bolts	2.0～2.3 kg-m
	Stop valve mounting bolts	4.0～4.5 kg-m
	Relief valve mounting bolts	4.0～4.5 kg-m
	Straigher cover mounting bolts	With hexagon hole 0.8～1.0 kg-m
	Drain plugs	4.0～4.5 kg-m
	Crankcase cover (L) mounting bolts	With hexagon hole 0.8～1.0 kg-m
	Rotor and crankshaft mounting bolts	3.7～4.0 kg-m
	Generator cover mounting bolts	With hexagon hole 0.8～1.0 kg-m
	Cylinder holding bolts (stud)	M10-P1.25 (2.0～2.5 kg-m)
	Cylinder holding bolts	M8-P1.25 (2.0～2.3 kg-m)
	Bracket and cam shaft	M10-P1.25 (3.7～4.0 kg-m) On exhaust valve side
		M6-P1.0 (0.8～1.0 kg-m)
		M8-P1.25 (2.0～2.3 kg-m)
	Rocker arm, valve lock nuts	M8-P1.0 (2.5～2.8 kg-m)
	Delivery pipe banjo bolt	2.0 -1.3 kg-m
	Cylinder head cover holding bolts	With hexagon hole 0.8～1.0 kg-m
	Tachometer gear set screws	M6-P1.0 (0.8～1.0 kg-m)
	Tappet cover holding screws	2.0～2.3 kg-m

Section	Parts to tightened	Tightening torque
Frame	Front wheel shaft and nut	7.00 ~ 10.00 kg-m
	Front fender and fender stay (F) (R)	0.60 ~ 0.95 kg-m
	Fender stay (F) (R) and front fork	0.60 ~ 0.95 kg-m
	Front fender center stay and front fork	0.80 ~ 1.25 kg-m
	Handle crown and inner tube	0.80 ~ 1.25 kg-m
	Handle crown and steering shaft	0.80 ~ 1.25 kg-m
	Handle crown and steering shaft	4.20 ~ 6.50 kg-m
	Handle crown and handle upper holder	1.80 ~ 2.50 kg-m
	Front flasher and headlight	0.80 ~ 1.25 kg-m
	Master cylinder and brake hose 1	1.50 ~ 2.00 kg-m
	Brake hose 1 and brake pipe 3	1.30 ~ 1.80 kg-m
	Brake pipe 3 and joint	1.30 ~ 1.80 kg-m
	Brake hose 2 and joint	1.50 ~ 2.00 kg-m
	Brake hose 2 and brake pipe 1	1.30 ~ 1.80 kg-m
	Brake pipe 1 and caliper	1.30 ~ 1.80 kg-m
	Caliper (L) and caliper (R)	7.50 ~ 9.50 kg-m
	Caliper (L) and caliper breed screw	0.60 ~ 0.90 kg-m
	Caliper (R) and front fork outer tube	4.00 ~ 5.00 kg-m
	Disc to disc bracket	0.80 ~ 1.00 kg-m
	Disc bracket and hub	1.70 ~ 2.20 kg-m
	Stop switch and joint	1.50 ~ 2.00 kg-m
	Engine mounting nut	2.70 ~ 3.40 kg-m
	"	2.70 ~ 3.40 kg-m
	"	2.70 ~ 3.40 kg-m
	"	5.00 ~ 7.00 kg-m
	Engine front bracket and frame	1.40 ~ 2.20 kg-m
	Engine rear bracket and frame	1.40 ~ 2.20 kg-m
	Oil tank and oil hose	6.00 ~ 9.00 kg-m
	Battery box stay to frame	0.80 ~ 1.25 kg-m
	Pivot shaft and frame	5.00 ~ 8.00 kg-m
	Rear wheel shaft and rear arm	12.00 ~ 18.00 kg-m
	Rear fender and frame	0.80 ~ 1.25 kg-m
	Tension bar and brake plate	1.40 ~ 2.20 kg-m
	Tension bar and rear arm	1.40 ~ 2.20 kg-m
	Muffler and frame	4.00 ~ 7.50 kg-m
	Exhaust pipe and frame	1.60 ~ 2.60 kg-m
	Handle crown and meter bracket	1.40 ~ 2.20 kg-m
	Neutral switch and engine	1.00 ~ 1.50 kg-m
	Meter bracket and meter cover	0.20 ~ 0.30 kg-m
	Rear arm and rear end arm	0.80 ~ 1.25 kg-m
	Rear stay and frame	0.80 ~ 1.25 kg-m
	Rear flasher light and stay	0.80 ~ 1.25 kg-m
	Cramp coupler and frame	0.20 ~ 0.30 kg-m
	Axle holder and front fork	0.80 ~ 1.25 kg-m
	Oil tank and frame	0.75 ~ 1.20 kg-m
	Battery box and frame	0.75 ~ 1.20 kg-m
	Battery box stay and battery box	1.10 ~ 1.80 kg-m
	Frame and rear cushion	2.30 ~ 3.70 kg-m
	Frame and rear cushion	3.00 ~ 4.80 kg-m

MOTORCYCLE PARTS NEWS

YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 12/28/72

NUMBER 353

TX750 SPECIAL TOOL KIT, and Miscellaneous Special Tools

Please add the following information to your 1972 Special Tools Catalog:

ITEM	PART NUMBER	DESCRIPTION	QUANT.	PRICE	DISC.	REMARKS
	908-90097-50-73	KIT, TX750 SPECIAL TOOLS	1			
#1*	908-90010-80-00	.PULLER, Rotor	1			
#2*	908-90010-82-00	.SLIDER, Piston Ring	2			Price Each
#3*	908-90010-81-00	.BREAKER, Chain, Set	1			for rivetted chains
#4-1	908-90010-84-00	PULLER WEIGHT, Rocker Arm Shaft	1			
#4-2	908-90010-83-00	PULLER, Rocker Arm Shaft	1			
#4-3	908-90010-85-00	PULLER, Balancer Shaft	1			
#5	908-90011-03-00	ATTACHMENT, Governor Testing	1			
#6	908-90010-95-00	COMPRESSOR, Valve Spring	1			
#7-1	908-90010-89-00	SOCKET, Hexagonal, 5mm	1			3/8" drive
#7-2	908-90010-90-00	SOCKET, Hexagonal, 6mm	1			3/8" drive
#7-3	908-90010-91-00	SOCKET, Hexagonal, 8mm	1			3/8" drive
#8	908-90011-05-00	TOOL, Pump Shaft Cover Installing	1			

*NOTE: Items 1~3 only included in kit. ALL items, 1~8, may be ordered individually.

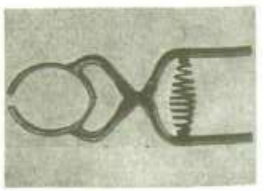
1. ROTOR PULLER - Install the rotor puller as illustrated, and tighten with a socket wrench or a box wrench while the piston is on the compression stroke.





Part No.
90890-01080

2. PISTON RING SLIDER - When the piston is inserted into the cylinder, set the piston slider over the piston rings. Make sure the piston ring ends are tightly forced into their grooves. Hold the piston with the piston base, and place the cylinder over the piston.
*The same piston base is usable for all XS/TX series models. (908-90010-67-00)



Part No. 90890-01082



Ring End Positions

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3. DRIVE CHAIN TOOL - (1) Separating the chain joint. Set the tool on the chain as illustrated in Fig. A, and tighten the bolt by turning the handle. The chain will be disconnected at the joint.
(2) Press-fitting the chain joint. Set the tool as illustrated in Fig. B, and screw in the bolt by turning the handle.



Part Set No.
90890-01081



Fig. A



Fig. B

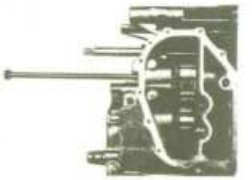
4. ROCKER ARM SHAFT PULLING BOLT AND WEIGHT - Insert the rocker arm shaft pulling bolt into the weight, and install it on the end of the rocker arm shaft as illustrated. Then remove the rocker arm shaft by giving impact to the bolt with the weight.
*During this operation, be sure to set the camshaft at T.D.C. on the compression stroke.
Follow same procedure for Balancer Shaft.



Part No.
① 90890-01084
② 90890-01083
③ 90890-01085



Rocker Shaft
Pulling Bolt



Balancer Shaft
Pulling Bolt

5. GOVERNOR TESTING ATTACHMENT - First, remove the crankcase cover 1 (L), and then generator cover 2 from the ignition timing checking window. In turn, fit the governor checking attachment on the window. Next start the engine and check the advancement of the governor or ignition timing using a timing light.



Part No. 90890-01103



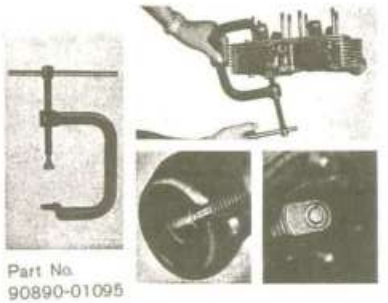
Governor checking attachment

MOTORCYCLE PARTS NEWS

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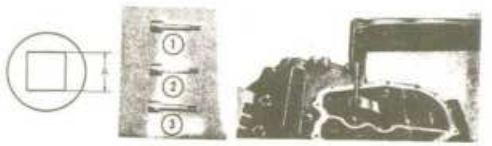
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6. VALVE SPRING COMPRESSION TOOL - Set the valve spring compressor on a valve in the cylinder head, then tighten the bolt by turning the handle and remove the valve spring retainer lock and spring.
*Make sure the valve spring compressor is correctly set on the center of the valve and the valve spring retainer.



Part No.
90890-01095

7. HEXAGONAL SOCKETS - These hexagonal sockets are used to tighten hexagon socket head bolts for which tightening torque is specified. (3/8" drive)



A = 3/8 in.

Part No.
(1) 90890-01089
(2) 90890-01090
(3) 90890-01091

8. OIL PUMP COVER INSTALLING TOOL - This tool must be used to install the pump cover into its housing. It guides the pump shaft seal lips over the shoulder on the shaft, keeping them from becoming rolled under. Install the seal in the cover, Teflon lip facing in towards the engine. Place the tool over the pump shaft, against the shaft shoulder. Lubricate the seal lips, and install the cover using the tool as a guide.



908-90011-05-00



PLEASE BRING YOUR SPECIAL TOOLS CATALOG UP-TO-DATE!

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TX750 SPECIAL TOOL KIT, Miscellaneous Special Tools (Add)

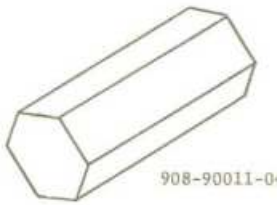
THIS BULLETIN SUPPLEMENTS #353.
DO NOT DESTROY PNB #353.

Please add the following information to your 1972 Special Tools Catalog.

ITEM	PART NUMBER	DESCRIPTION	QTY.	PRICE	DISC.	REMARKS
#9	908-90011-04-00	ADAPTOR, Socket (17mm)	1			TX750

#9. SOCKET ADAPTOR, 17mm. Fork tube cap bolt has hex socket. Remove cap bolt cover, install socket adaptor. Using standard 17mm socket and ratchet wrench, remove bolt.

NOTE: Loosen handle crown pinch bolt prior to turning cap bolt.



908-90011-04-00

PLEASE BRING YOUR PARTS LISTS UP-TO-DATE!

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MOTORCYCLE PARTS NEWS

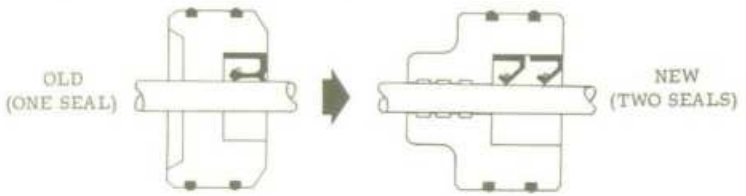
NUMBER 359

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BUENA PARK, CALIFORNIA 90620
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TX750 ROTOR COVER, Design Modification

Rotor Cover, Ref. 11-19, Part Number 341-13452-00-00, design has been changed to stop oil leakage into ignition point area. See drawing below.



PARTS ORDERING

REF. NO.	OLD PART NUMBER	NEW PART NUMBER	DESCRIPTION	QTY.	"A" PRICE EACH
11-19-1	ø	341-13450-00-00	COVER ASSY.*	1	
11-19	341-13452-00-00	. 341-13452-01-00	COVER, Rotor	1	
11-20	932-10461-74-00	. (no change)	O-RING	2	
11-21	931-02111-03-00	. 931-01110-63-00	OIL SEAL	1→2	

*NOTE: New Cover Assembly includes Ref. Nos. 19~21.
New Cover designed to hold two oil seals, Ref. No. 11-21.
Old parts discontinued. New Parts, 11-19~11-21, not available individually until 3/20/73.

INTERCHANGEABILITY

The assembly is interchangeable as a set only.

AFFECTED MACHINES

Change occurred on production units Engine No. 341-015512~.

SERVICE AND WARRANTY INFORMATION

See also M/C SNB #302, #302A, #305. Any unit exhibiting leakage must have the above Assembly installed. Standard Warranty procedure. Job Code #8100 Time - 1.1 hours. Problem Code #90-A.

PLEASE BRING YOUR PARTS LISTS UP-TO-DATE!

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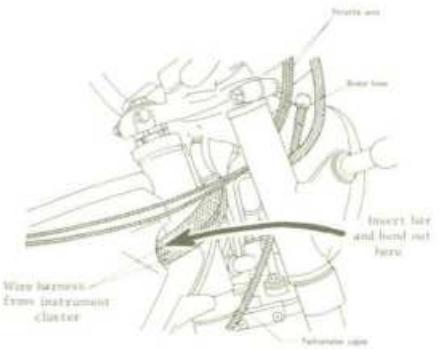
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YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 10/13/72

TX750 HEADSTOCK GUSSET, Enlargement of wiring hole

On some TX750 machines, the wiring hole on the right-hand headstock gusset is not large enough to pass the main switch harness connector. This hole may be enlarged by inserting the chisel end of a 24" (+) crowbar between the gusset and head pipe, and carefully and slowly bending out the gusset.

Be careful when using the crowbar that wiring inside frame near headstock is not damaged. See drawings below for correct routing of electrical wiring and control cables in headstock area.



Right Side



Left Side

AFFECTED MACHINES: Frame No. 001628~003344

NOTE: Not all frames in this sequence are affected.

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YAMAHA INTERNATIONAL CORPORATION
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TX750 MISCELLANEOUS SERVICE INSTRUCTIONS

OIL LEAKAGE. Listed below are some points where oil leakage may occur on early production engines.

Point of Leakage	Corrective Action
Blind plug on upper crankcase.	Remove old sealant and apply new "Devcon" type sealant.
Joint between oil filter cartridge and crankcase (behind L.H. crankcase cover).	Replace oil filter O-rings and install oil filter with RTV sealant*.
Cylinder head cover gasket.	Replace the gasket using RTV sealant*.
Cylinder head gasket.	Replace gasket and re-torque head to 180~225 in-lbs.
Oil tank check valve (located on the rear of upper crankcase).	Replace copper gasket using RTV sealant*.
Clutch cover gasket.	Replace gasket using RTV sealant*.
L.H. (generator) cover gasket.	Replace gasket using RTV sealant*.
Tachometer drive fitting on cylinder head cover.	Replace O-ring and replace seal if required.
L.H. pump shaft seal (behind governor assembly).	Replace the seal using the special tool. See M/C SNB #305 for exact procedure.

*NOTE: "RTV sealant" is a silicon adhesive sealant which vulcanizes or "cures" at room temperature.

MOTORCYCLE SERVICE NEWS

YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 12/8/72

TX750 MISCELLANEOUS SERVICE INSTRUCTIONS (cont.)

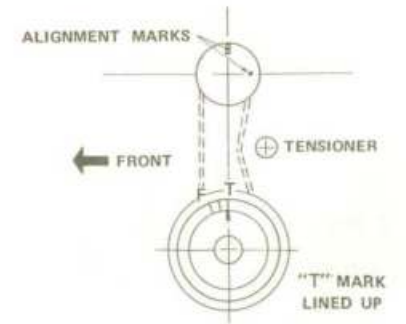
STARTER CHAIN AND SPROCKETS. The pitch of the starter chain and sprockets has been changed from 7.774mm (E/N~3264) to 9.525mm (E/N 3265~). If the chain or either sprocket must be replaced, convert to the new chain and corresponding sprockets. Old type will not be stocked. Conversion to the larger pitch requires that both chain and sprockets be changed as a set. See Table below for part numbers of both types.

NOTE: Starter Chain Guide Assembly (Ref. #7-14, 1st Edition Parts List) must be removed when new type parts are installed.

REF. NO.	PART NAME	OLD PART NO.	NEW PART NO.
7-1	SPROCKET, starter 1	341-15518-00-00	341-15518-01-00
7-2	SPROCKET, starter 2	341-15519-04-00	341-15519-05-00
7-3	CHAIN	945-62190-62-00 (DK219FT 62L)	945-63160-52-00 (DID316FT 52L)

NOTE: When installing starter sprocket 2 (Parts List, Ref. #7-2), either old or new type, apply molybdenum disulfide grease to the bushing during assembly.

CAMSHAFT TIMING. The illustration on Page 22, TX750 Service Manual is incorrect. The cam sprocket punchmark should be 90° clockwise of the groove. See illustration at right and correct manual accordingly.



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TX750 MISCELLANEOUS SERVICE INSTRUCTIONS (cont.)

ENGINE LUBRICATION. Disregard engine oil and filter change intervals printed in 1st edition of TX750 Service Manual and on oil filter cartridge decal. Recommended mileage intervals between changes are:

MILEAGE	ENGINE OIL	OIL FILTER
1st 250 miles	X	
at 1,000 miles	X	X
at 2,000 miles	X	X
Thereafter, every 2,000 miles	X	X

SELECTION OF CRANKSHAFT AND CONNECTION ROD INSERTS

There are five sizes of inserts available for crankshaft journals and five sizes for connecting rod journals. They are numbered 1 to 5 by an ink stamp on one end of the insert.

NOTE: Inserts are stamped with a manufacturer's number and the letters "STD". Disregard this number and the "STD" stamp.

To select insert size, respective diameters of crankshaft journal, crankpin journal, crankshaft housing and connecting rod big end must be known.

Crankshaft journals and crankpin journals are numbered 1, 2, or 3, according to size. These numbers are engraved on crankshaft webs.

Crankcase housing diameters and connecting rod big end diameters are numbered 4, 5, and 6, according to size. These numbers are engraved on crankcases and ink-stamped on connecting rods.

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TX750 MISCELLANEOUS SERVICE INSTRUCTIONS (cont.)

SELECTION OF CRANKSHAFT AND CONNECTION ROD INSERTS (cont.)

The correct insert can be determined by one of the following formulas.

Crankshaft Inserts

Crankshaft Housing No. minus (-) Crankshaft Journal No. = Crankshaft Insert No.

Example: If Crankcase Housing No. is 6 and Crankshaft Journal No. is 2, then, 6 - 2 = 4; No. 4 insert should be used.

Connecting Rod Inserts

Connecting Rod No. minus (-) Crankpin Journal No. = Connecting Rod Insert No.

Example: If Connecting Rod No. is 5 and Crankpin Journal No. is 2, then, 5 - 2 = 3; No. 3 insert should be used.

OIL CLEARANCE

Oil clearance after installation may be determined by the "Plastigage" method. Correct oil clearance will be:

Crankshaft bearings - .036~.059mm (.0014"~.0023")
Connecting Rod bearings - .034~.057mm (.0013"~.0022")

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TX750 MISCELLANEOUS SERVICE INSTRUCTIONS

This bulletin supplements M/C SNB #302.
Do not destroy SNB #302.

THROTTLE WIRES. Remove coiled spring protectors from both throttle wires (Ref. 32-14, 32-15, Parts List) to prevent electrical discharge between high tension coil wires and protector springs. Remove protector as follows:

1. Disconnect throttle wire from carburetor.



2. Protector spring will not slide over end of throttle wire.



3. Stretch spring out and remove as shown.
   CAUTION: Do not twist throttle wire.

4. Reassemble and check carburetor synchronization.



MOTORCYCLE SERVICE NEWS

YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 12/29/72

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TX750 MISCELLANEOUS SERVICE INSTRUCTIONS (cont.)

CLUTCH. If operation faulty, proceed as follows:

1. Check clutch adjustment:
   a. Loosen clutch lever adjuster (lock) nut.
   b. Turn adjusting bolt completely into seat.
   c. Remove L. Crankcase Cover (2).
   d. Loosen adjuster (lock) nut.
   e. Turn adjusting screw in, until lightly seated; back out 1/4 turn. Tighten adjuster nut and replace cover.
   f. Back cable adjusting bolt out until play at pivot point of lever is 2~3mm.
   g. Tighten adjuster nut.

2. Check cable routing.
   a. Clutch cable must be routed per Page 31, TX750 Assembly Manual and cable routing insert sheet, TX750 Service Manual.
   b. Check for kinked cable directly under front of engine. If damaged, replace cable.

3. Check right crankcase cover.
   a. The right crankcase cover has protrusion inside (See Drawing, right) which may interfere with clutch pressure plate movement. Remove 2~3mm for added clearance.



4. Change clutch plates.
   a. If, after performing steps 1~3, clutch operation remains "jerky", lacking smooth engagement, replace clutch plates with XS2 type, P/N 256-16325-00-00.



TX750



XS2

TX750 MISCELLANEOUS SERVICE INSTRUCTIONS (cont.)

ELECTRIC STARTER. If starter clutch slips, proceed as follows:

1. Clutch slips; engine cold, weather cold.

   a. Drain crankcase and oil tank. Install SAE 10W-30 type "SE" motor oil, 3,000cc (3.2 qts.).

NOTE: As temperatures increase or owner usage becomes more severe (constant high speed driving, etc.) remove 10W-30 oil and re-install SAE 20W-40 type "SE".

2. Clutch slips; engine cold or hot.

   a. Remove left crankcase cover and generator cover.
   b. Remove starter clutch outer assembly.
   c. Check assembly for proper roller action.
   d. Check securing bolts (Ref. 7-8) for tightness. If loose, remove, clean threads, re-install using "Loc-Tite". Torque to 2.5 Kg/m (220 in/lb).
   e. Check shoulder on starter sprocket (2). Replace if severely galled or worn.

HEAD GASKET. When re-torquing to cure leakage problem, torque hex head bolts (Ref. 3-16) to 2.0~2.3 Kg/m (180~200 in/lb). See also, Page 1, SNB #302.

FUEL TANK. Some units have debris in tank. Check fuel filter(s) first 100. 250, 500 miles. Clean filter(s), flush tank as required.

BATTERY VENT TUBE. Routing should be through clip on bottom of battery box, then exit at center or right side between rear of engine and swing arm to prevent acid damage to drive chain.

IGNITION POINTS.

1. In cases of severe point erosion, check condenser capacity. If capacity checks okay, machine may have bad or recently repaired pump shaft seal. Replace points. Replace seal as required.

MOTORCYCLE SERVICE NEWS

YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 12/29/72

TX750 MISCELLANEOUS SERVICE INSTRUCTIONS (Cont.)

IGNITION POINTS (Cont.)

2. Ignition point gap must be 0.3~0.4mm (0.012~0.016").

   a. Rotate cam. With points at widest opening, set gap.

NOTE: Too narrow point gap will cause arcing.
Excessive point gap can cause misfire, poor performance.

IGNITION TIMING. Factory altered advance mechanism after rotor manufactured. Ignition points should open at approximately 4~8° BTDC at retard. In fully advanced position, points should open 37° ± 2° not 35° ± 2° as stated in Specification Sheet.

NOTE: Ignition timing tolerance is therefore 35°~39° when governor fully advanced. Additionally, timing balance between cylinders must be ± 2°. Use strobe light to check (No E/N at this time on advance mechanism change. Will issue PNB later.)



OIL LEAK INTO IGNITION POINT AREA.

See SNB #305. If leakage persists, check wiring loom grommet between generator cover and case. See Drawing, right.

Remove cover. Seal grommet lips with RTV (silicon) sealant. Re-install making sure gromment is correctly seated.



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YAMAHA INTERNATIONAL CORPORATION
BUENA PARK, CALIFORNIA 90620
DATE 12/4/72

TX750 DEFECTIVE PUMP SHAFT COVER OIL SEAL, R and R Procedure

Oil leakage past the Rotor Cover Seal (22) will cause engine misfire and hard starting. An improved oil seal, P/N 931-02111-18-00 is standard on F/Nos. 006041 ~ .

REPAIR PROCEDURE

1. Remove shift lever and left crankcase cover.
2. Remove breaker plate holding screws (32) and breaker plate assembly (25).
3. Remove nut (35) and governor/point cam assembly (34).

   NOTE: Although not shown in Parts List or Service Manual, Governor Assembly (34) is two-piece. If disassembled, install cam with index mark aligned with locating pin on advance assembly collar.



20 Rotor cover
21 O-ring
22 Oil seal
23 Rotor side plate
24 Circlip
25 Breaker plate assy.
32 Breaker plate screw
33 Plain washer
34 Governor assy.
35 Nut
36 Spring washer
37 Special washer

Figure #1

4. Remove governor locating pin (not shown).
5. Remove circlip (24) and side plate (23).
6. Thread two 6mm screws into rotor cover (20) and use them to pull the cover out.
7. Replace oil seal (22). Note: Use only new type. The brown teflon sealing edge must go inward.
8. Replace cover "O" rings (21).



Figure #2

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TX750 DEFECTIVE PUMP SHAFT COVER OIL SEAL, R and R Procedure (cont.)

9. Place special tool (Photo #1) over pump shaft. Apply grease to seal lip and "O" rings. Slip cover (20) into place. Install circlip (24). Remove 6mm rotor cover disassembly screws and tool.

   Special tool, P/N 908-90011-05-00, (See Figure #3) guides seal over shaft shoulder preventing seal lip from rolling under.



Photo #1

10. Install governor and breaker plate assemblies. Clean.
11. Reset point gap (.014") and ignition timing. Replace cover and shift lever.



P/N 908-90011-05-00

Figure #3

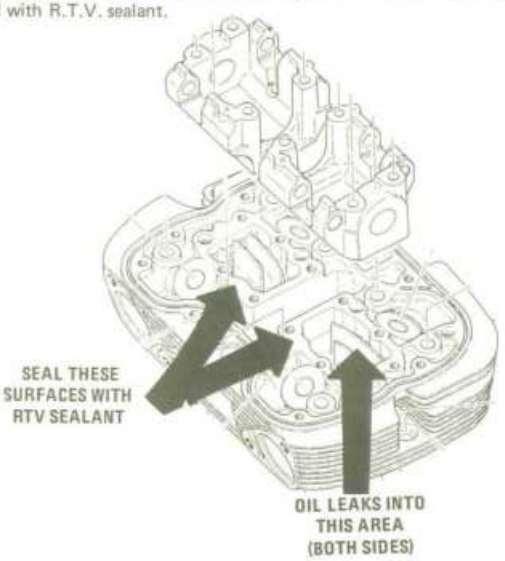
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BUENA PARK, CALIFORNIA 90620
DATE 6/7/73

TX750 — OIL LEAK AT CAMSHAFT CARRIER BASE

Oil around the head gasket joint on TX750's may be caused by leakage between the cam carrier base and head. (See illustration below.) Oil will leak under carrier into air passages between cylinders. Check carefully around the spark plug area and front and rear of head to determine if cam carrier or head gasket leaks. If cam carrier leaks, remove and seal with R.T.V. sealant.



WARRANTY

Use Failure Code 21. Use Job Code 1400 camshaft exchange at 3.8 hours. One claim per machine.

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BUENA PARK, CALIFORNIA 90620
DATE 6/1/73

TX750 — RIGHT FOOT REST & BRAKE PEDAL INSTALLATION

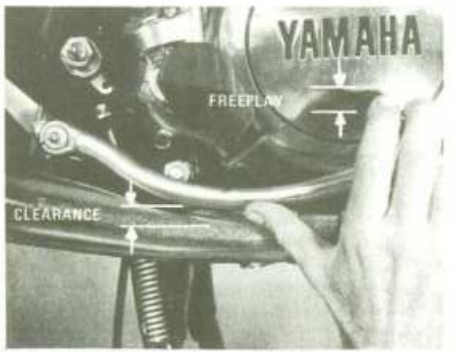
1. Install right foot rest. Securing bolt holds both rests in position. Torque to 450-650 in-lbs.

   CAUTION: The right foot rest can obstruct brake pedal return if installed too low. Install so that foot rest is as close as possible to kick lever or in next serration clockwise. Installing foot rest any further clockwise will obstruct brake lever.

2. Install brake pedal. Align punchmarks on pedal and mounting shaft. Torque securing bolt to 175 in-lbs.

3. Install stop switch actuating rod in hole provided on brake pedal. Operate brake pedal. Check for proper stop light operation.

   NOTE: With brake pedal and foot rest properly installed, there should be approximately ¾" freeplay before actuation and approximately ¾ – 1" clearance between brake arm and muffler when brake is applied hard. See illustration below.



† † † †