



YAMAHA

TZ500J

**OWNER'S
SERVICE MANUAL**

www.legends-yamaha-enduros.com

IMPORTANT NOTICE

THIS MACHINE IS DESIGNED STRICTLY FOR ROADRACE USE ONLY. IT IS ILLEGAL TO OPERATE THIS VEHICLE ON ANY PUBLIC STREET, ROAD OR HIGHWAY. PLEASE CHECK YOUR LOCAL LAWS AND REGULATIONS BEFORE USING.

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SAFETY WARNINGS

1. **GASOLINE IS HIGHLY FLAMMABLE:**
 - * Always turn off the engine when refueling.
 - * Take care not to spill any gasoline onto the engine or exhaust pipe(s)/muffler(s).
 - * If any gasoline does spill onto the engine or exhaust pipe(s)/muffler(s), wipe it off immediately.
 - * Never refuel while smoking or near an open flame.
2. If you swallow gasoline or inhale too much gasoline vapor, or gasoline gets into your eye(s), then see your doctor immediately. If any gasoline gets into your skin or clothing, wash immediately with soap and water and change your clothes.
3. Do not touch any moving or heated areas.
 - * The engine and exhaust pipe(s)/muffler(s) can become very hot. Do not park where pedestrians or children are likely to touch them.
 - * Do not park the machine on a slope or soft ground where it could be overturned easily.
4. When transporting the machine in another vehicle, be sure to keep it up right and turn the fuel cock to the "OFF" position. If it should lean over, gasoline may leak out of the carburetor or fuel tank.
5. Never start your engine or let it run for any length of time in a closed area. Exhaust fumes are poisonous and can cause loss of consciousness or death within a short time. Always operate your machine in an area with adequate ventilation.
6. Always wear a helmet, gloves, boots, and a racing suit.
7. Slick tires are standard for this machine. For safety replace with rain tires for use on wet ground surfaces.

TZ500J

OWNER'S SERVICE MANUAL

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INTRODUCTION

Congratulations on your purchase of the Yamaha TZ500J. This model represents the product of many years of Yamaha experience in the production of fine sporting, touring, and pacesetter racing machines. You can now appreciate the high degree of craftsmanship and reliability that have made Yamaha a leader in these fields.

This manual will provide you with a good basic understanding of the features, operation, basic maintenance, and inspection procedures for this vehicle.

PLEASE READ THIS MANUAL CAREFULLY AND COMPLETELY BEFORE OPERATING THIS MACHINE. If you have any questions regarding operation or maintenance, please consult your Yamaha dealer.

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

NOTE.

A NOTE provides key information to make procedures easier or clearer.

CAUTION:

A CAUTION indicates special procedures that must be followed to avoid damage to the machine.

WARNING:

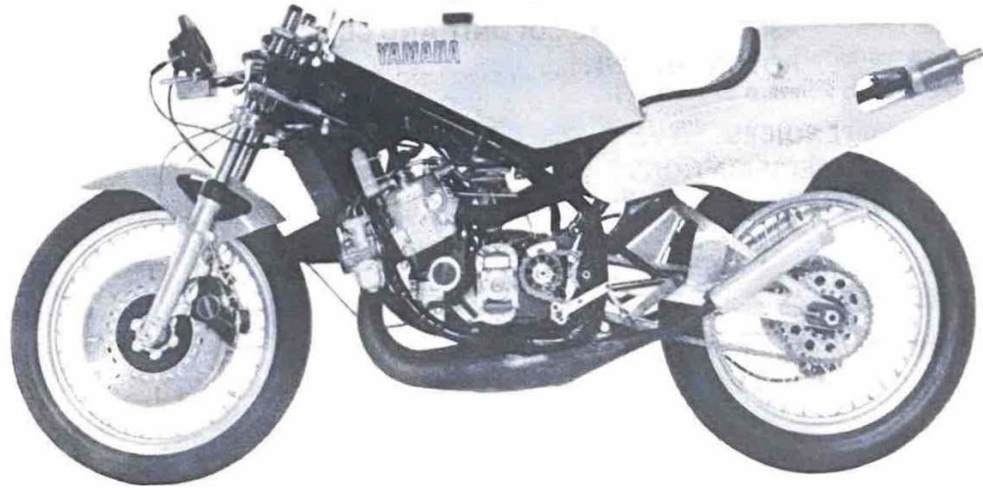
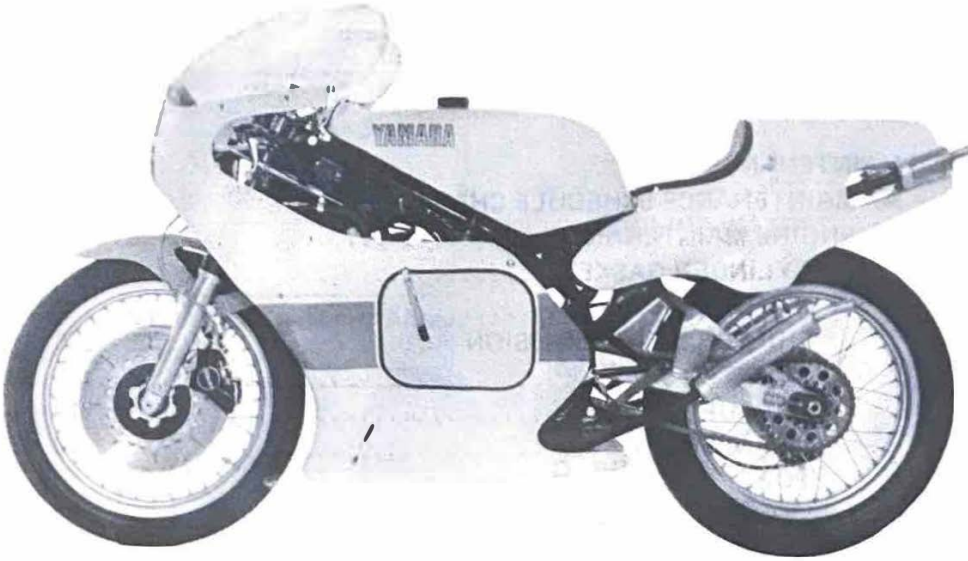
A WARNING indicates special procedures that must be followed to avoid injury to the machine user or a person inspecting or repairing the machine.

NOTICE

Some data in this manual may become outdated due to improvements made to future models. If you have any questions regarding this manual or your machine, please consult your Yamaha dealer.

SERVICE DEPT.
INTERNATIONAL DIVISION
YAMAHA MOTOR COMPANY, LTD.

EXTERNAL VIEW



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I. BASIC INSTRUCTION

A. ENGINE MIXING OIL

RECOMMENDED OIL	MIXING RATIO	
	BREAK-IN	RACE
YAMALUBE R	12 : 1	15 : 1
CASTROL R30	12 : 1	15 : 1
BEL-RAY MC-1	20 : 1	30 : 1

FUEL TANK CAPACITY:
32 L (7.04 Imp gal, 8.45 US gal)

CAUTION:

Do not retain mixed fuel overnight. Always prepare fuel afresh before racing.

B. TRANSMISSION OIL

RECOMMENDED OIL:

BEL-RAY MC4 SAE 80W or YAMALUBE 4-CYCLE OIL or CASTROL R30

OIL CAPACITY:

OVERHAUL:

940 cm³ (0.827 Imp qt, 0.993 US qt)

EXCHANGE:

750 cm³ (0.660 Imp qt, 0.793 US qt)
(Add the same amount of oil as drained off).

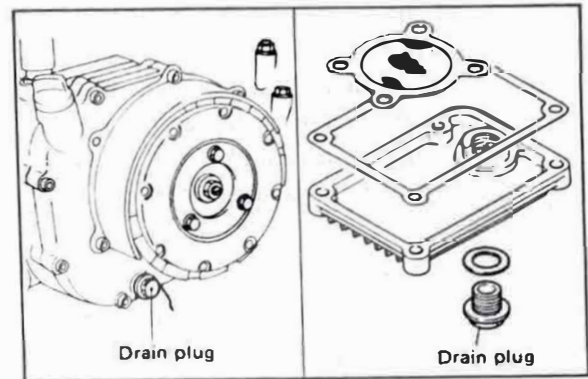
REPLACEMENT INTERVALS:

AFTER BREAK-IN PERIOD AND AFTER EVERY THIRD RACE

WARNING:

1. The oil drain plug should be torqued to specification and secured against loosening by using the locking wire.
2. Always check the oil level before running the engine.

DRAIN PLUG TORQUE:
23 Nm (2.3 m·kg, 17 ft·lb)



C. COOLING WATER

NOTE:

In certain areas the water contains salt. Take care that the cooling system does not become rusty.

D. BREAK-IN

1. Prior to starting, fill tank with a break-in fuel/oil mixture and install the hotter type spark plugs.
2. Allow engine to warm up. Check operating controls (shifting, clutch, brake) and engine stop button operation.
3. Operate machine with 9,000 r/min and run about 30 miles (50 km).
4. Remove the top end and inspect. Remove high spots on piston with No. 600 grit, wet sandpaper.
5. Check entire unit for loose or miss-adjusted fittings/controls/fasteners. Change gear oil. Retighten each bolt/nut. If excessive metallic dust is found, check the transmission gear case.
6. Remove break-in fuel. Refill with 15 : 1 (or 30 : 1) operation fuel.

NOTE:

After replacing the crankshaft assembly, cylinder, or piston, perform all the above operations, except 5.

7. After the break-in period, check the following items:

- a. Engine
 Oil leakage
 Water leakage
 Replacement of gear oil
 Ignition timing
 All fittings and fasteners

- b. Chassis
 All fittings and fasteners
 Cracking of chassis, rear arms
 Fork oil leakage
 Steering head free play
 Lever/pedal free play
 Condition of disc pad wear

II. PRE-OPERATION CHECKS

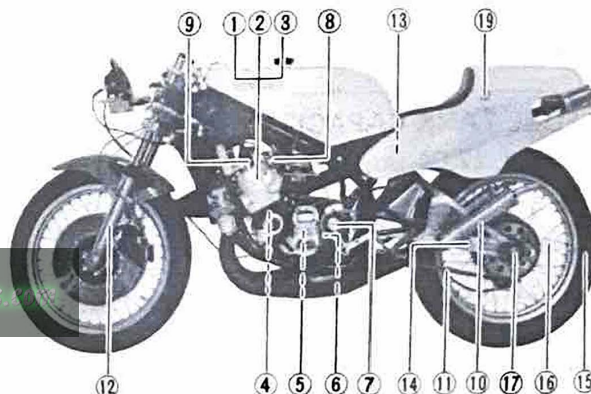
Check the operation of Y.P.V.S. and generally specified checking items.

III. MAINTENANCE

A. MAINTENANCE SCHEDULE CHART

- C: CHECK
 R: REPLACE
 A: ADJUST
 T: TIGHTEN

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ENGINE

		EVERY RACE	EVERY SECOND	EVERY THIRD	REMARKS
1	PISTON	C	R		REPLACE EVERY 5 RACES
2	PISTON RING			R	
3	CYLINDER & Y.P.V.S. VALVE	C			
4	CRANKSHAFT				
5	CLUTCH	C, A			
6	TRANSMISSION			C, R (OIL)	YAMALUBE 4-CYCLE OIL BEL-RAY MC4 80W, CASTROL R30
7	ROTOR SHAFT DRIVE GEAR HOLDING BOLT PRIMARY DRIVE GEAR LOCK NUT		C, T		
8	Y.P.V.S. LINKAGE & VALVE JOINT	C, T			
9	IGNITION	A			
10	SILENCER	T			

CHASSIS

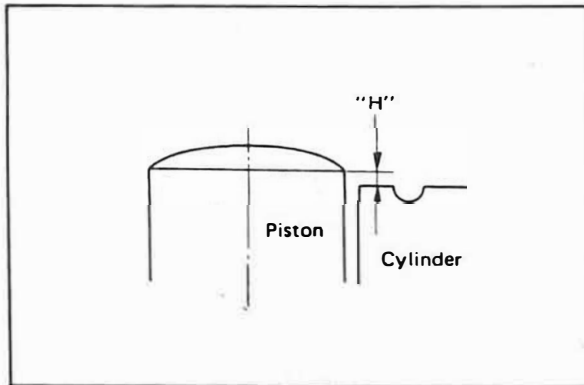
		EVERY RACE	EVERY SECOND	EVERY THIRD	REMARKS
11	DRIVE CHAIN	A			YAMAHA FORK OIL 10wt, 30 wt
12	FRONT FORK	C, T		R (OIL)	
13	REAR SHOCK ABSORBER	C, A, T			
14	SWING ARM	C, T			
15	WHEELS	C, T			
16	SPOKES	T			
17	SPACER FLANGE	T			
18	FRAME BOLTS			(EVERY SEASON)	
19	SEAT FITTING BOLTS	T			

B. ENGINE MAINTENANCE

CYLINDER GASKET

Cylinder gaskets of 0.8 mm (0.031 in) thickness are contained in the packing to allow the rider to obtain the better drive-ability.

If detonation feeling is severe, check the piston head "H" as shown in the illustration.

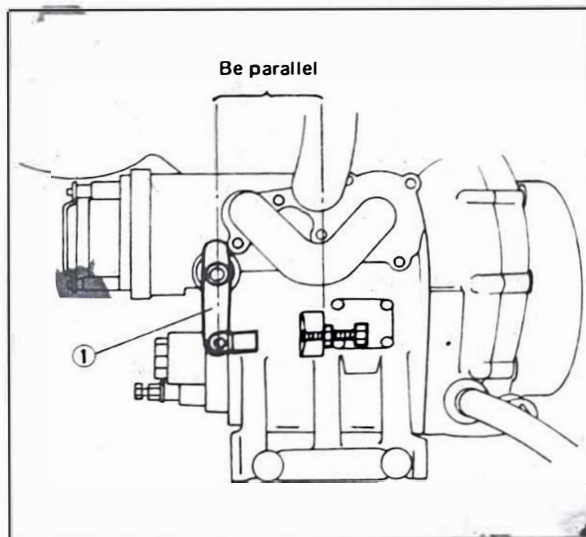


If the height "H" is bigger than zero, use the cylinder gaskets of 0.8 mm (0.031 in) thickness.

CLUTCH

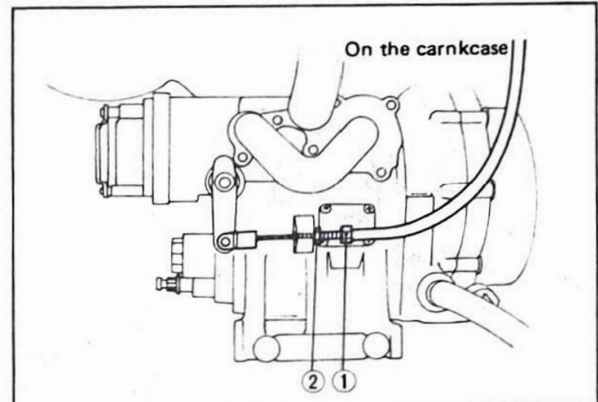
Mechanism adjustment

- 1) Loosen the adjuster lock nut on the pressure plate and turn the adjuster out.
- 2) Turn the adjuster on the lever holder in.

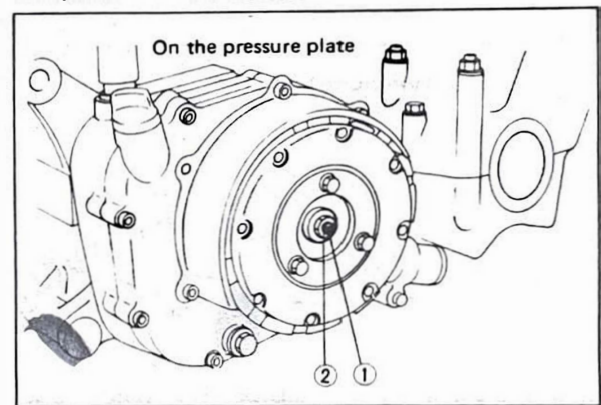


1. Push lever axle

- 3) Hold the push cam lever by turning the adjuster on the crankcase as illustrated, turn the adjuster in on the pressure plate until resistance is felt. Tighten the lock nut.



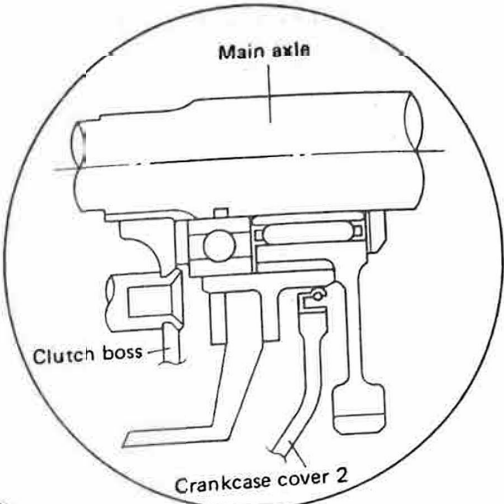
1. Adjuster 2. Lock nut



1. Adjuster 2. Lock nut

- 4) Adjust the clutch lever free play by turning the adjuster on the lever holder.

Maintenance



Apply locking agent



Crankcase cover (R)

Pressure plate 2

Pressure plate 1

Push crown bush

Oil

Lock nut torque:
48 Nm (4.8 m·kg, 35 ft·lb)

Clutch boss

Clutch housing

Primary driven gear

Lock nut torque:
100 Nm (10 m·kg, 72 ft·lb)
(Apply a screw locking adhesive.)

Primary drive gear

Thrust plate

Make sure the oil groove faces
towards the out side of the engine.

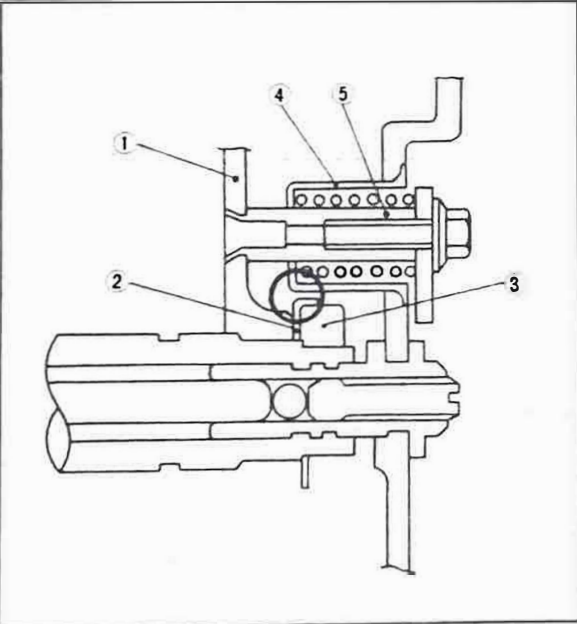
Oil



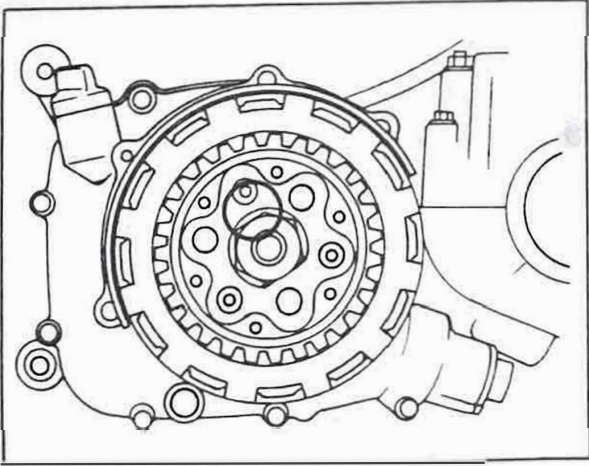
Clutch plate thickness/Quantity:
 2.0 mm (0.087 in)/6
 Friction plate thickness/Quantity:
 3.0 mm (0.12 in)/7
 Clutch spring constant:
 $k = 12.8 \text{ N/mm}$
 (1.31 kg/mm, 73.3 lb/in)
 Free length: 38.3 mm (1.50 in)
 Wear limit: 38.0 mm (1.49 in)
 Reduction ratio:
 32/31 (Crankshaft to countershaft)

CAUTION: _____

The gap between the clutch boss lock washer and clutch spring housing is small. Position the washer mounting carefully so that it does not contact the housing. If it contacts, the clutch will tend to drag or slip.



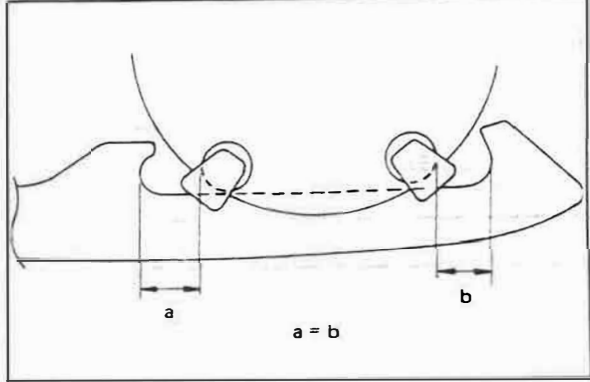
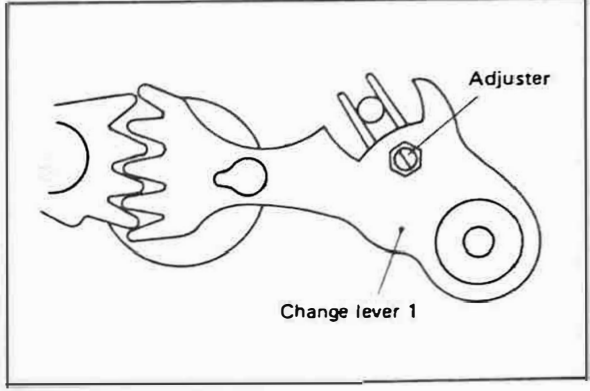
- 1. Clutch boss
- 2. Lock washer
- 3. Lock nut
- 4. Clutch spring housing
- 5. Spring screw boss



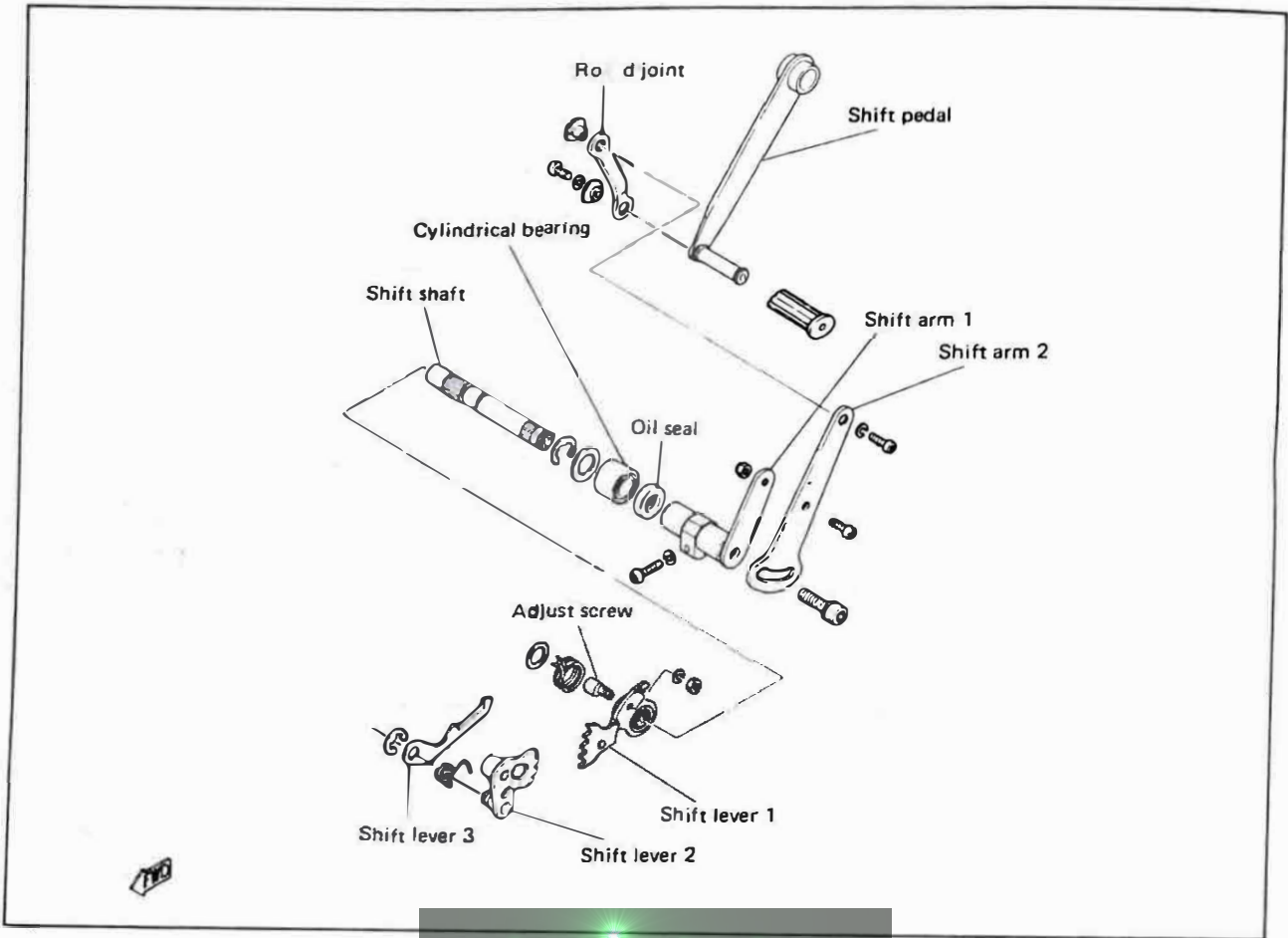
SHIFTER & TRANSMISSION

Adjustment

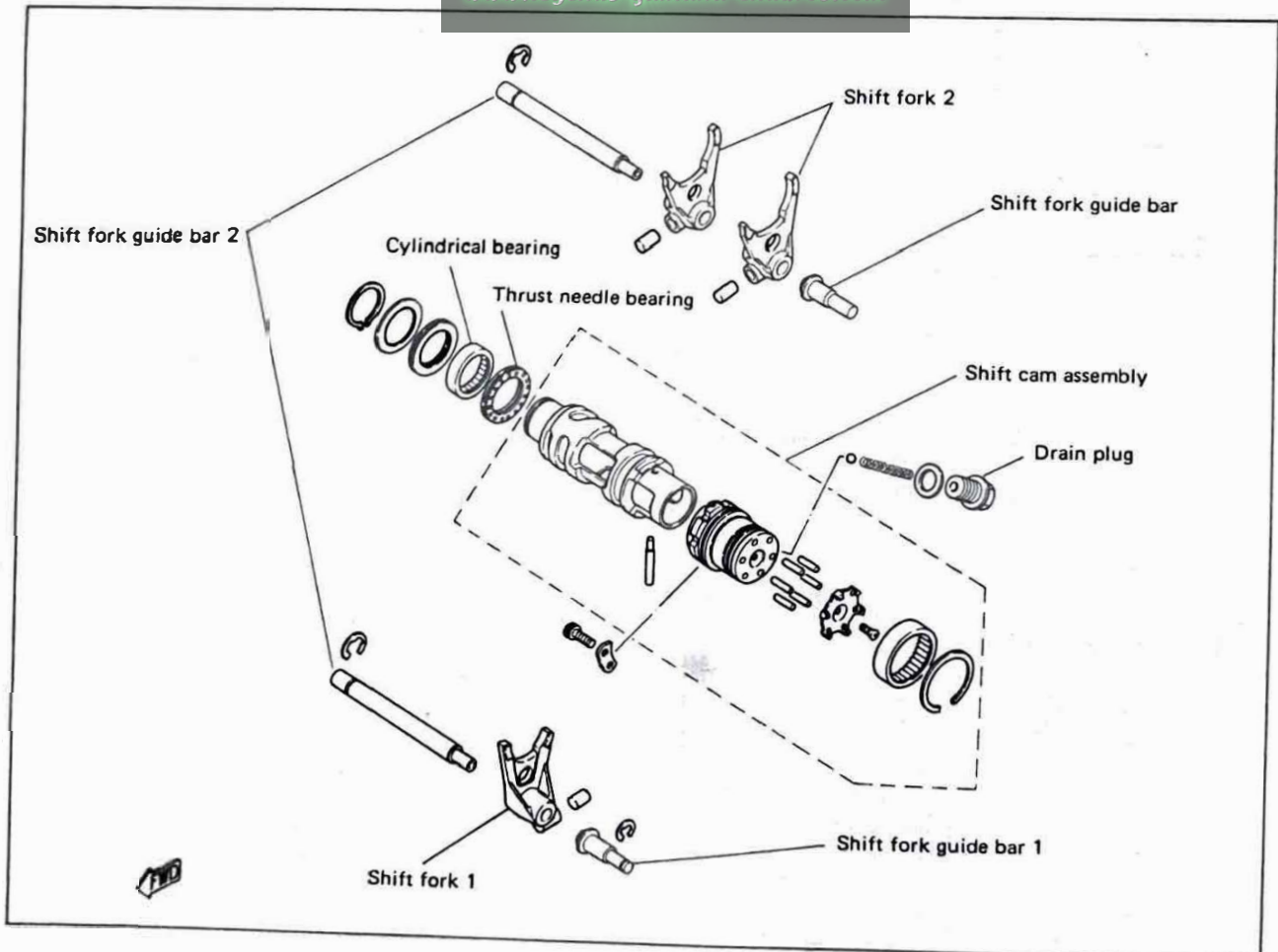
1. Set the gear in neutral position.
2. Adjust with the adjuster so that the distances "a" and "b" are equal.
3. Tighten the lock nut.



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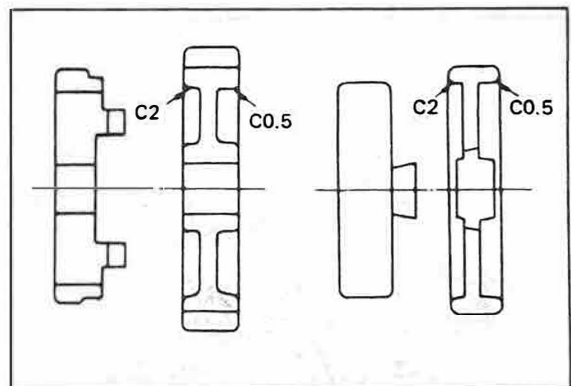
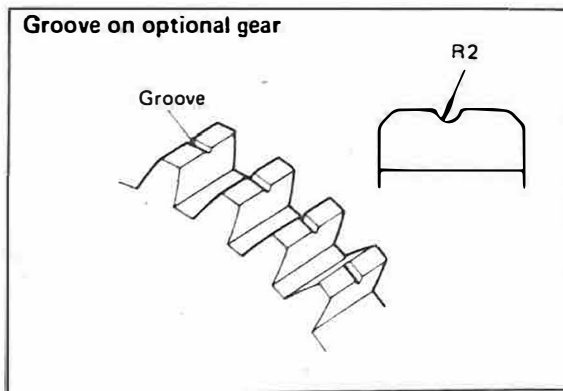
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Transmission gear ratio

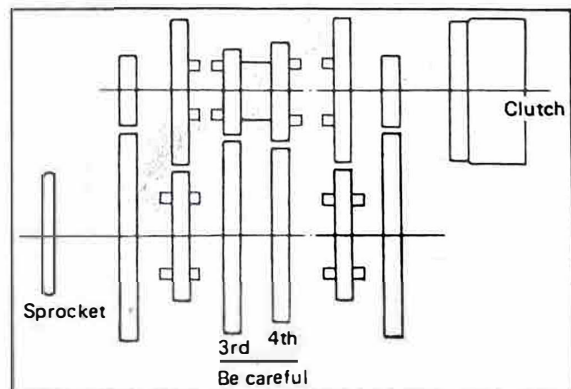
The following gear sets are contained in the packing to allow the rider to change the gear ratios according to the circuit conditions.

		Drive			Driven			Gear ratio
		Part name	Remarks	No. of teeth	Part name	Remarks	No. of teeth	
1st	LOW	1st pinion gear (Main axle) (Same as STD)	—	13	1st wheel gear	Two grooves	33	2.538
	STD	1st pinion gear (Main axle)	—	13	1st wheel gear	—	32	2.461
	HIGH	1st pinion gear (Main axle)	One groove	14	1st wheel gear	One groove	33	2.357
2nd	LOW	2nd pinion gear (same as STD)	—	16	2nd wheel gear	Two grooves	31	1.937
	STD	2nd pinion gear	—	16	2nd wheel gear	—	30	1.875
	HIGH	2nd pinion gear	One groove	16	2nd wheel gear	One groove	29	1.812
3rd	LOW	3rd pinion gear (same as STD)	—	20	3rd wheel gear	Two grooves	32	1.600
	STD	3rd pinion gear	—	20	3rd wheel gear	—	31	1.550
	HIGH	3rd pinion gear	One groove	18	3rd wheel gear	One groove	27	1.500
4th	STD	4th pinion gear	—	20	4th wheel gear	—	27	1.350
5th	STD	5th pinion gear	—	23	5th wheel gear	—	28	1.217
6th	STD	6th pinion gear	—	24	6th wheel gear	—	27	1.125

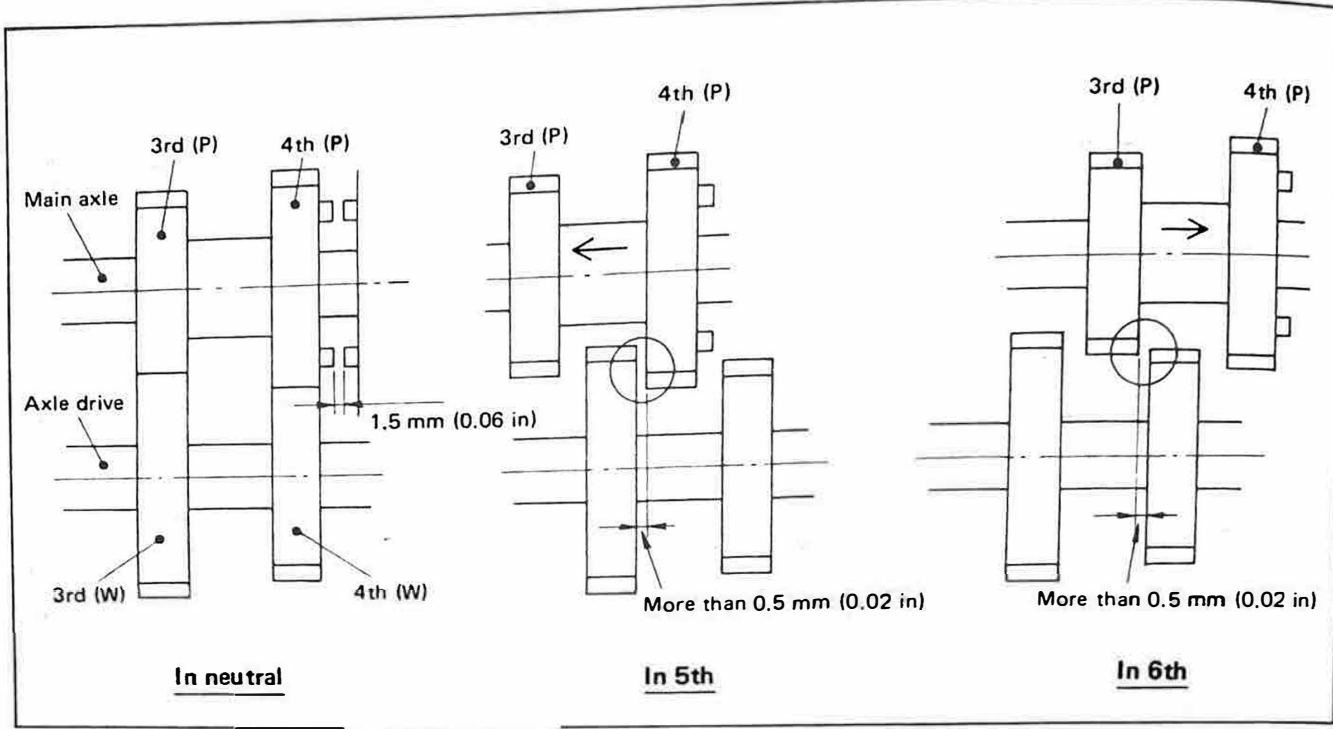


CAUTION:

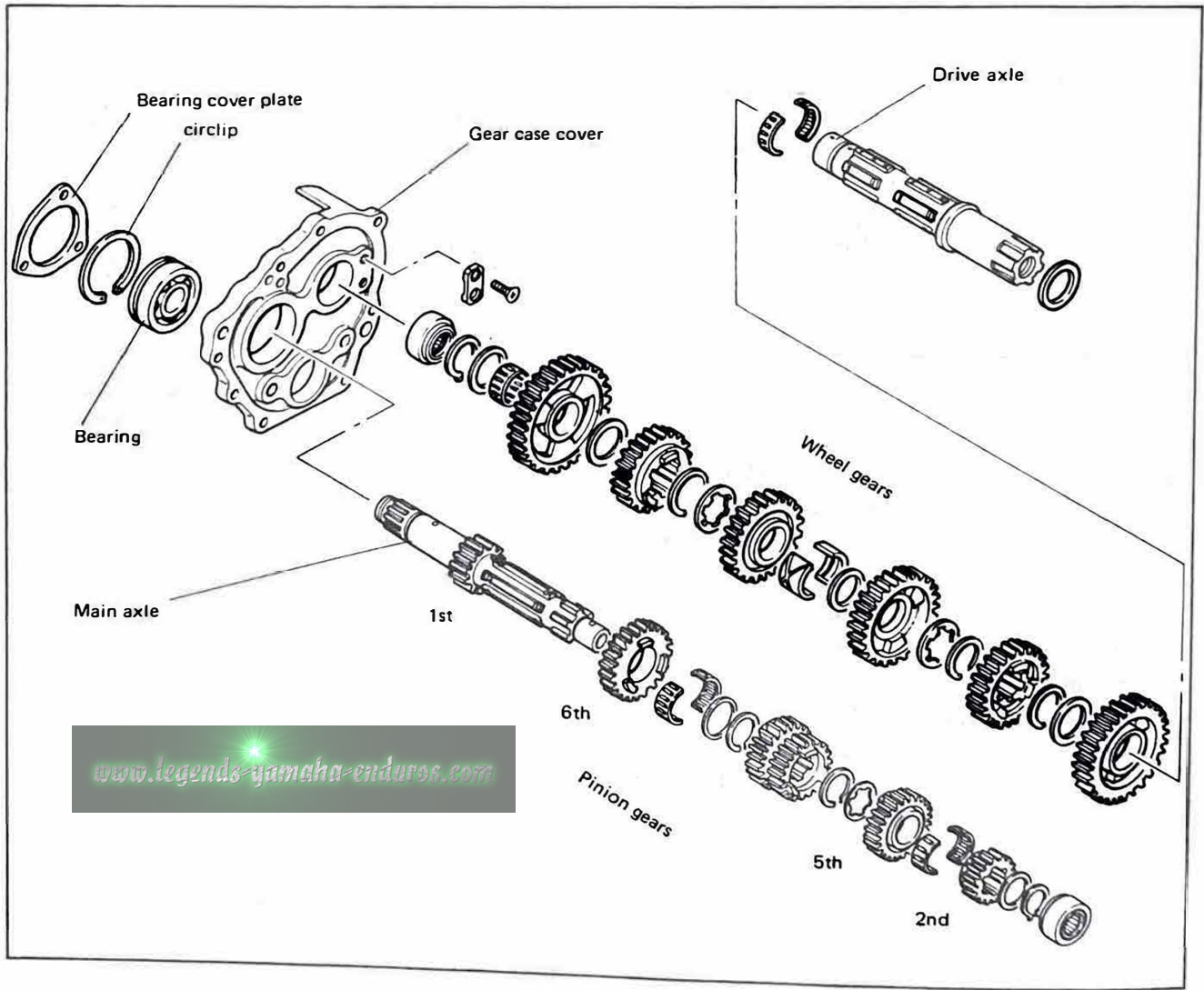
1. When any gear set has been replaced by another set, check the clearance between the gear dogs and gear teeth patterns, and if necessary, make an adjustment.
2. The 1st wheel gear should be installed so that the more chamfered side faces the mating gear. (as illustrated)
3. Be careful that the 3rd and 4th wheel gear mounting positions are not reversed. Install the 3rd wheel gear on the sprocket side and the 4th on the clutch side.



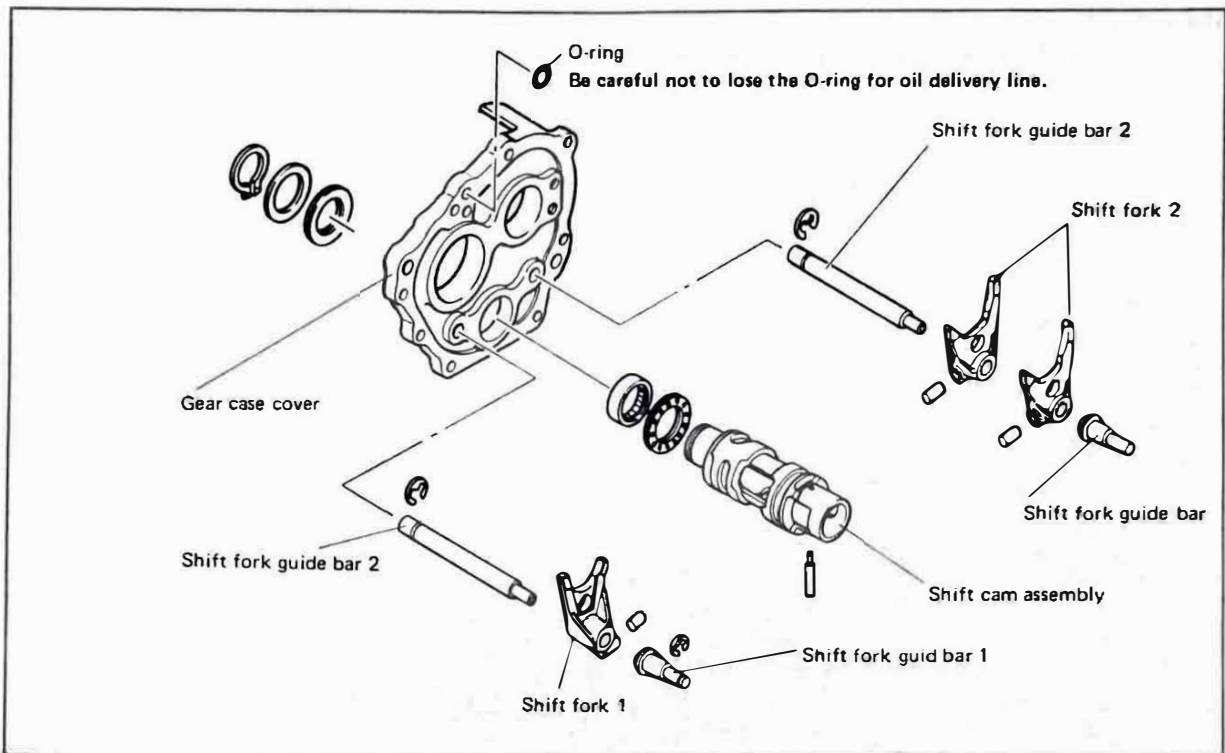
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(P): Pinion gear
(W): Wheel gear

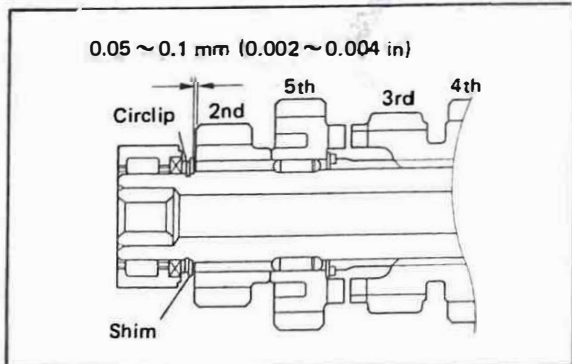
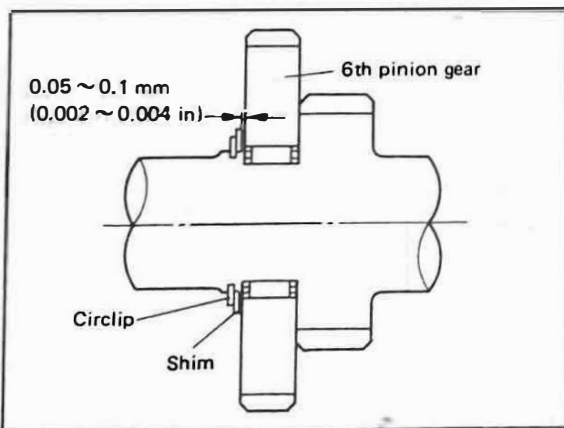


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CAUTION:

When idle gears – 1st (W), 2nd (P & W), 3rd (W), 4th (W), 5th (P) or 6th (P) – have been replaced, check the clearance between the shim and each gear. If the clearance is not within the specified range, make an adjustment by shims.



COUNTER SHAFT

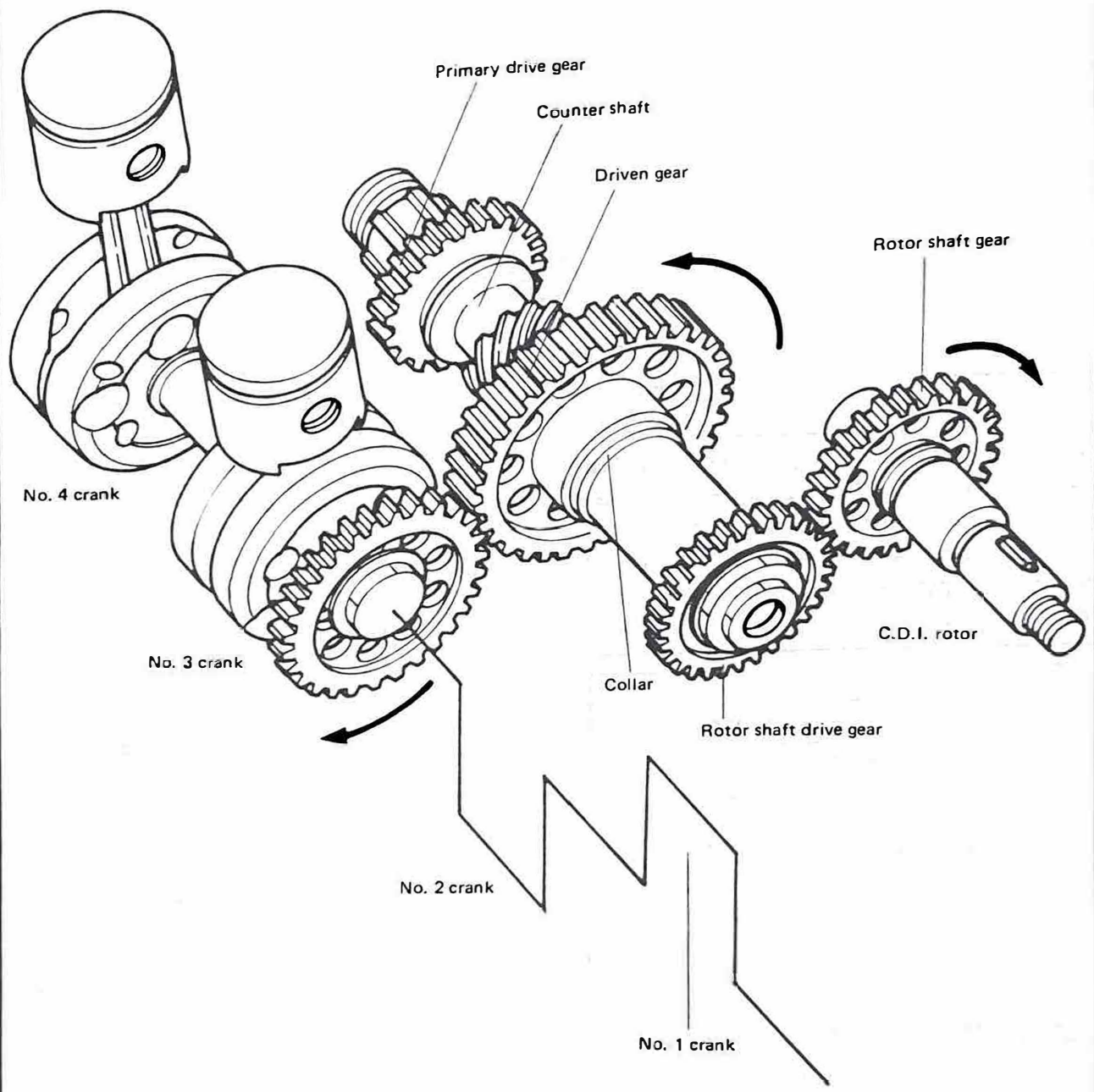
Disassembly

For counter shaft removal, proceed as follow:

- 1) Remove the transmission gear assembly and breaker shaft assembly.
- 2) Remove the lock nuts for primary drive gear and breaker drive gear.
- 3) Move the counter shaft to the right and the driven gear to the left. Now the gear holder can be removed.
- 4) Remove the breaker drive gear and collar.
- 5) Move the counter shaft to the left until it stops.
- 6) Remove the primary drive gear.
- 7) Pull out the counter shaft from the right of the crankcase.
- 8) Remove the driven gear from the crankcase.

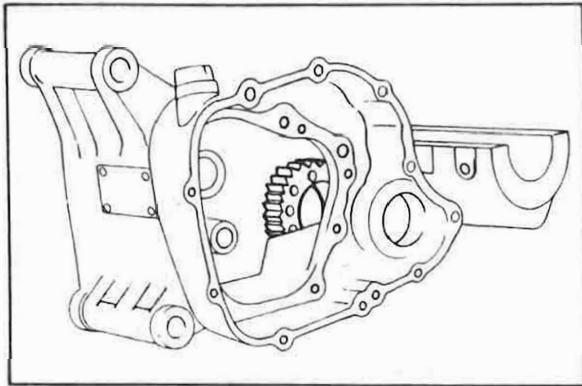


Reassembly



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- 1) Install the driven gear to the crankcase as illustrated.



- 2) Install the counter shaft to the crankcase from the right side of the case.
- 3) Pull the counter shaft to the left side of the crankcase then install the primary drive gear to the counter shaft.

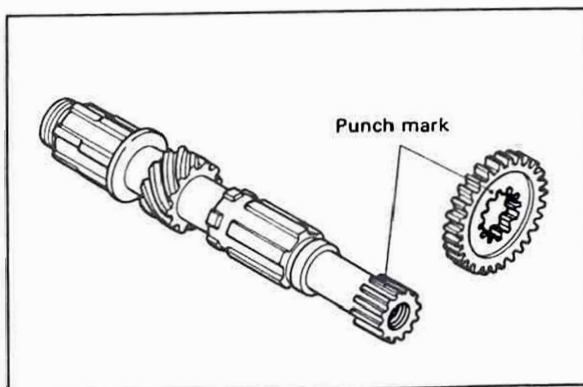
NOTE: _____

The driven gear has a punch mark on its right side and the counter shaft has a punch mark on its splined portion. Be sure to align these marks when assembling.

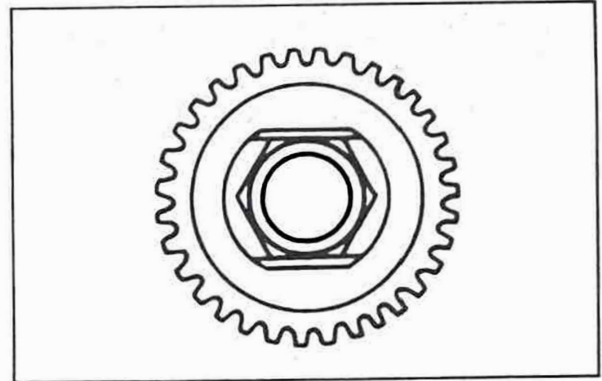
- 4) Move the counter shaft to the right until it stops.
- 5) Install the collar and rotor shaft drive gear on the left part of the counter shaft.

NOTE: _____

The rotor shaft drive gear has a punch mark on its outer side, and the counter shaft has a punch mark on its splined portion.



- 6) Fit the gear holders in the grooves around the counter shaft, move the driven gear to the right, and lock the gear holders.
- 7) Be sure to lock the rotor shaft drive gear holding bolt and the primary drive gear lock nut by bending the two sides of the lock washer as shown.



NOTE: _____

The rotor shaft drive gear holding bolt and primary drive gear lock nut should be tightened to specification, loosened, and then re-tightened to specification.

TORQUE:

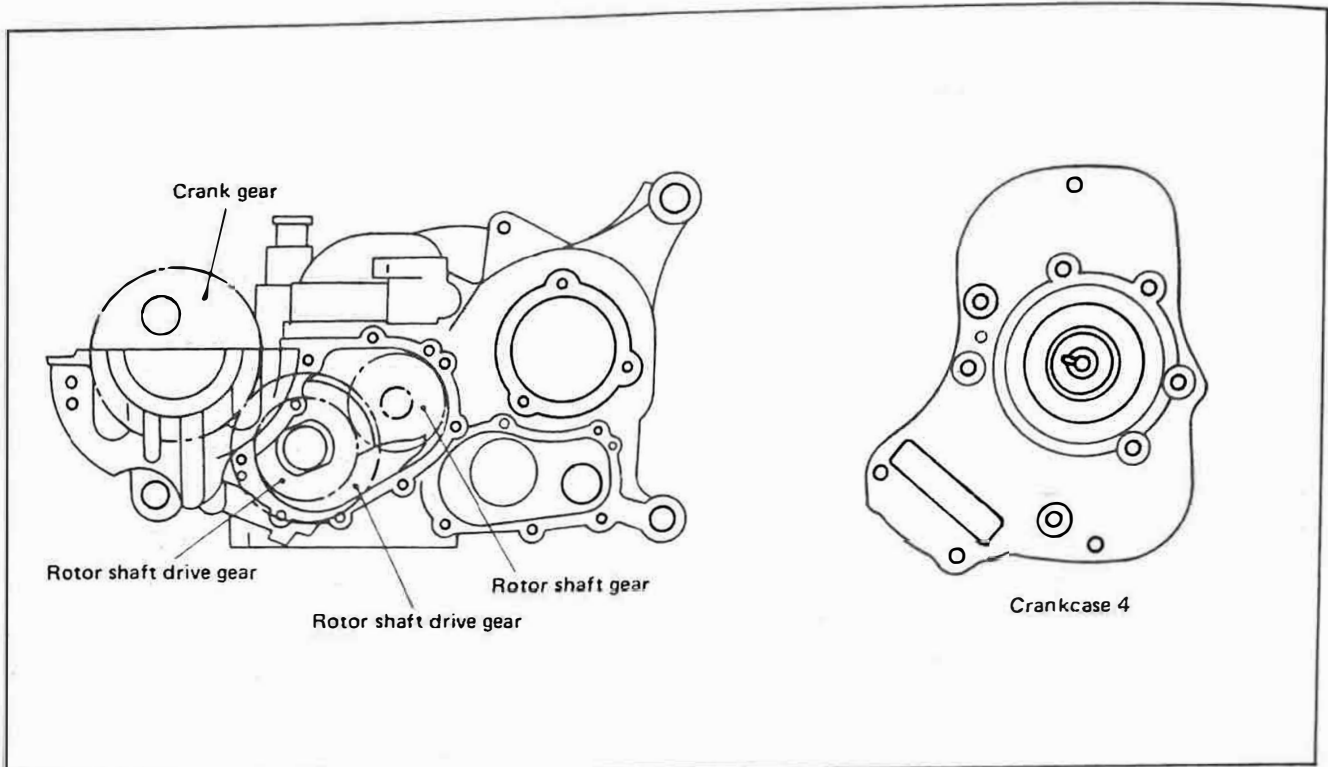
BREAKER DRIVE GEAR:
100 Nm (10 m·kg, 72 ft·lb)

PRIMARY DRIVE GEAR:
100 Nm (10 m·kg, 72 ft·lb)

Positional relation between crank gear and rotor shaft drive gear (For ignition timing)

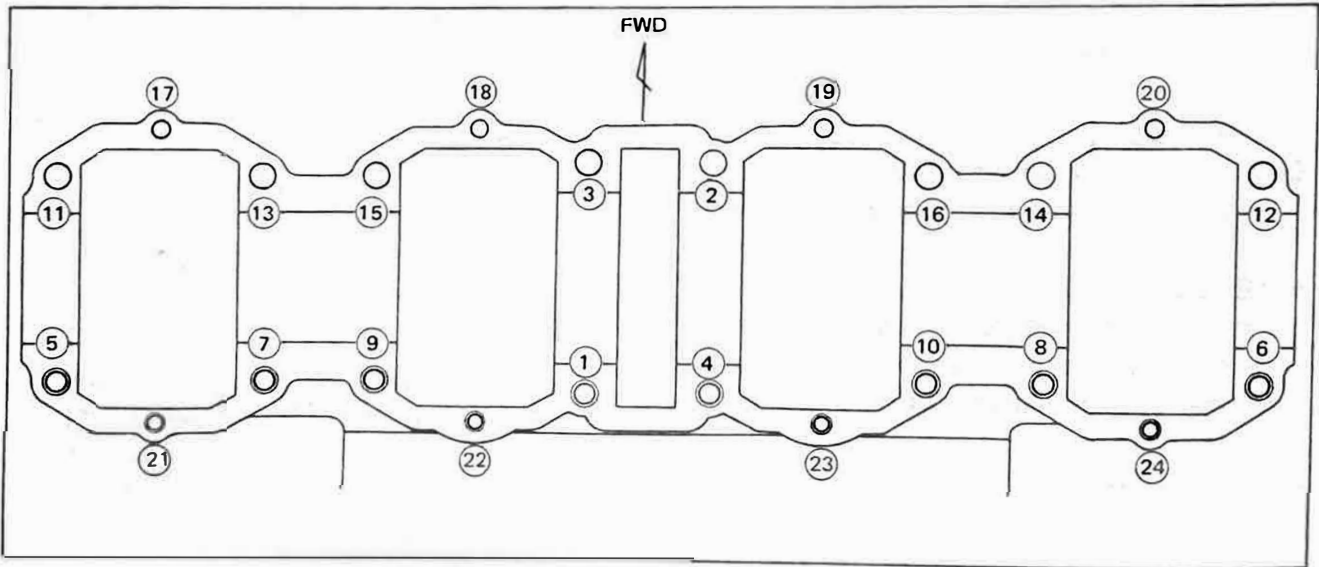
- 1) Align the crank pins on both the right and the left crank gears and then mesh them with the driven gears.
- 2) Install cylinders, Nos. 2 and 3, and bring the piston to TDC.
- 3) Align the keyway with the drilled mark in the crankcase Fig. 4, and install the case Fig. 4.

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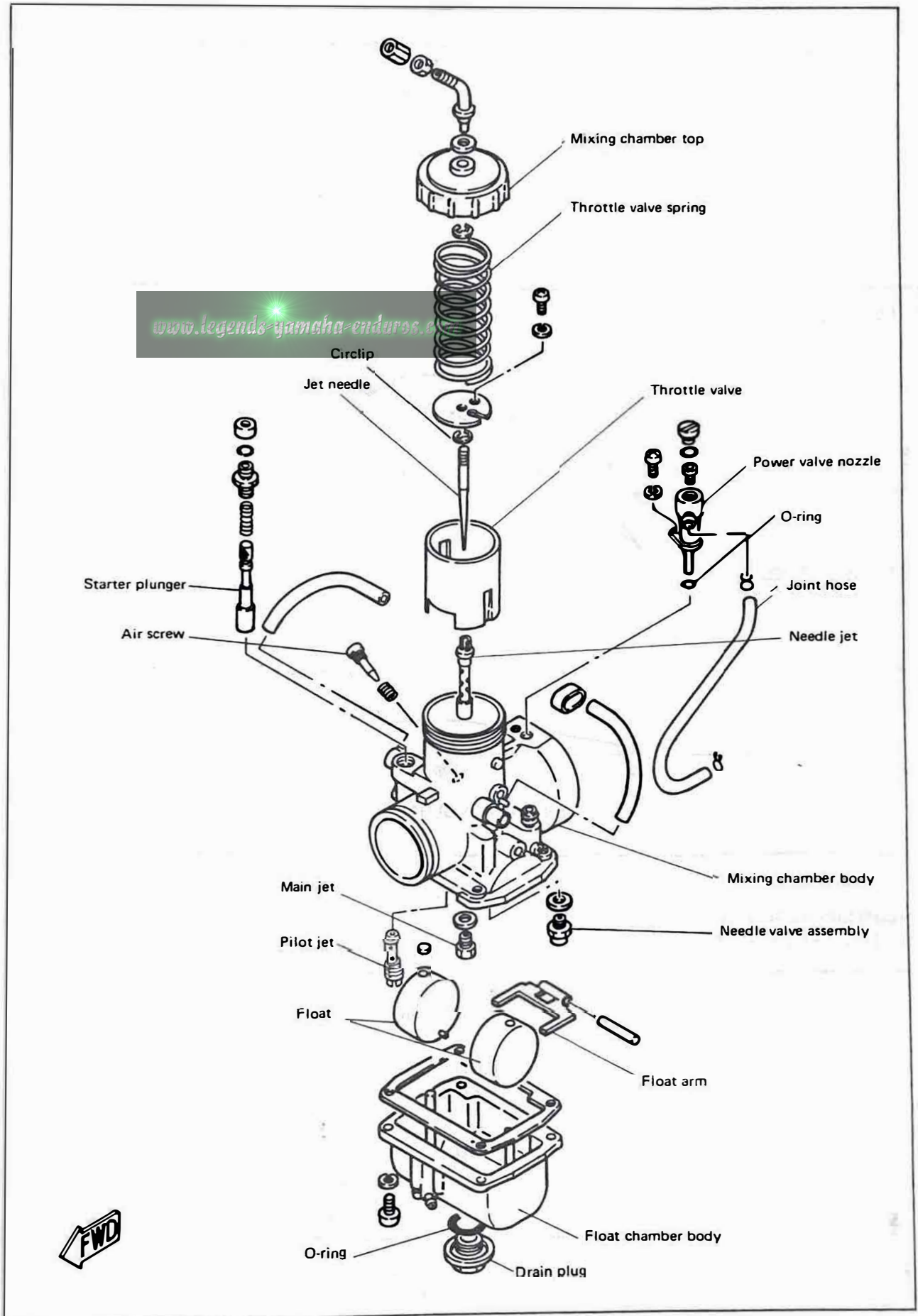


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Crankcase tightening order

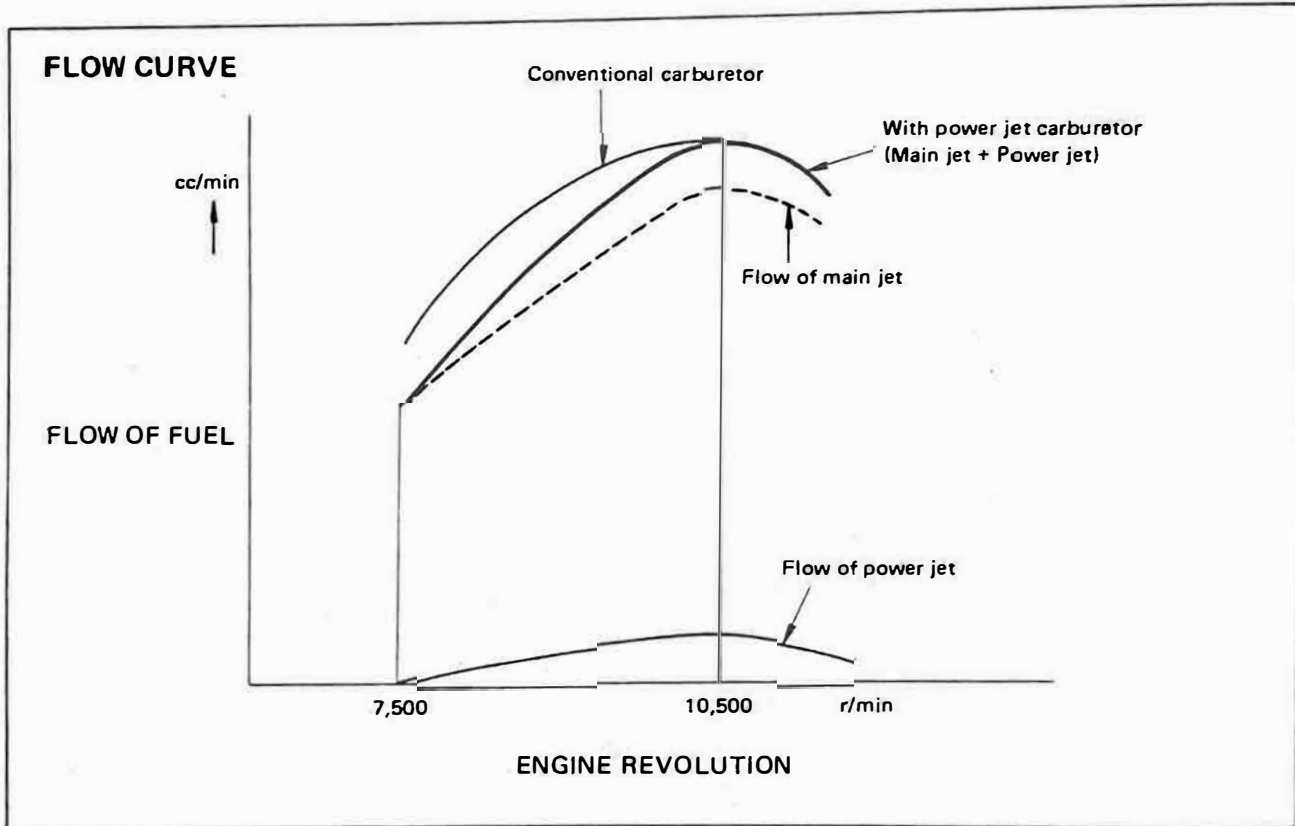


CARBURETOR



Power jet operation range

Setting part name	Throttle opening						
	0	1/8	1/4	1/2	3/4	7/8	1/1
Main jet							
Power jet							



Carburetion adjustment

1) Full throttle setting

		Engine revolution range		Necessary setting
		Max. revolution	8,000 ~ 9,000 r/min	
Mixture condition	1	RICH	RICH	Smaller MJ
	2	RICH	GOOD	Smaller power jet
	3	RICH	LEAN	Larger MJ and smaller power jet
	4	LEAN	RICH	Larger power jet and smaller MJ
	5	LEAN	GOOD	Larger power jet
	6	LEAN	LEAN	Larger MJ or power jet should be so selected that power output is larger in the mid-speed range.

2) Partial settings

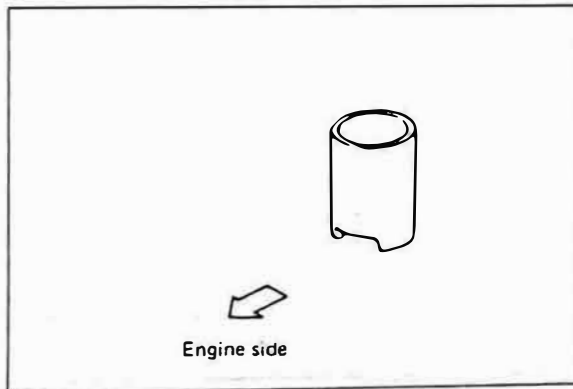
Partial settings follow the determination of the full throttle settings and these can be performed by usual procedure.

3) Standard carburetor setting

TYPE	VM36SS
I.D. MARK	5Y900
MAIN JET	#350
POWER JET	#80
NEEDLE JET	N-6
JET NEEDLE	6DAY23-3
CUTAWAY	#0
PILOT JET	#0 (Blind plug)
AIR SCREW (TURNS OUT)	0 (Fully closed)
STARTER JET	#80
FLOAT ARM HEIGHT	18.1 ± 1 mm (0.71 ± 0.04 in)

NOTE.

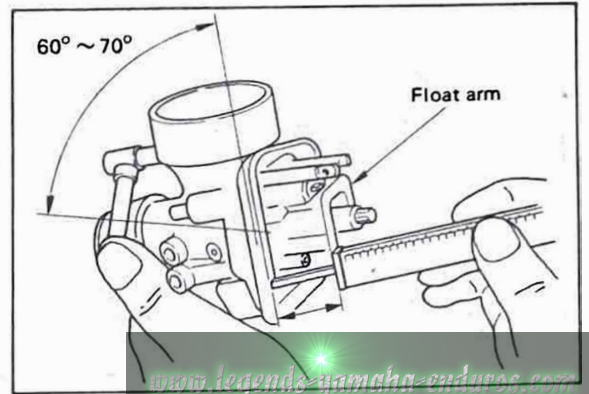
Install the thorttle valve with the cutaway edge facing towards the engine.



To check float arm height

Using a vernier caliper, measure from the float arm to the float chamber gasket seat (with the gasket removed). The arm height should be.

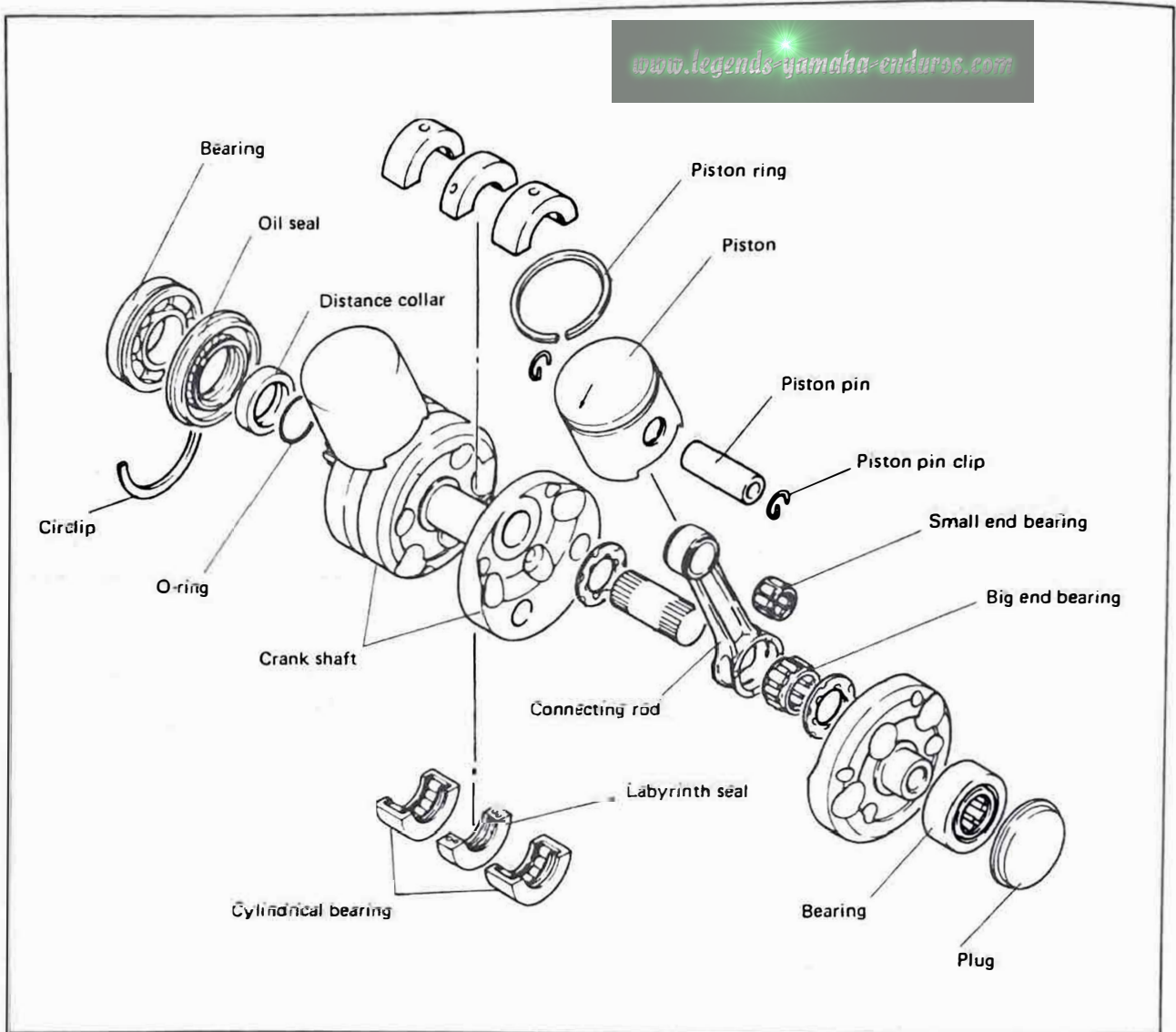
18.1 ± 1 mm (0.71 ± 0.04 in)



NOTE.

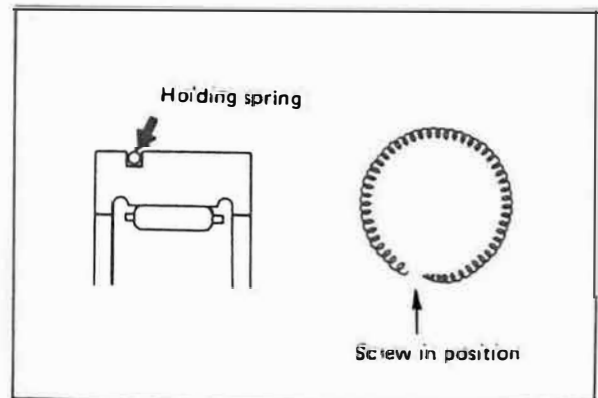
The float arm should be just resting on, but not depressing the spring loaded inlet needle.

CRANKSHAFT



Crank center bearing removal

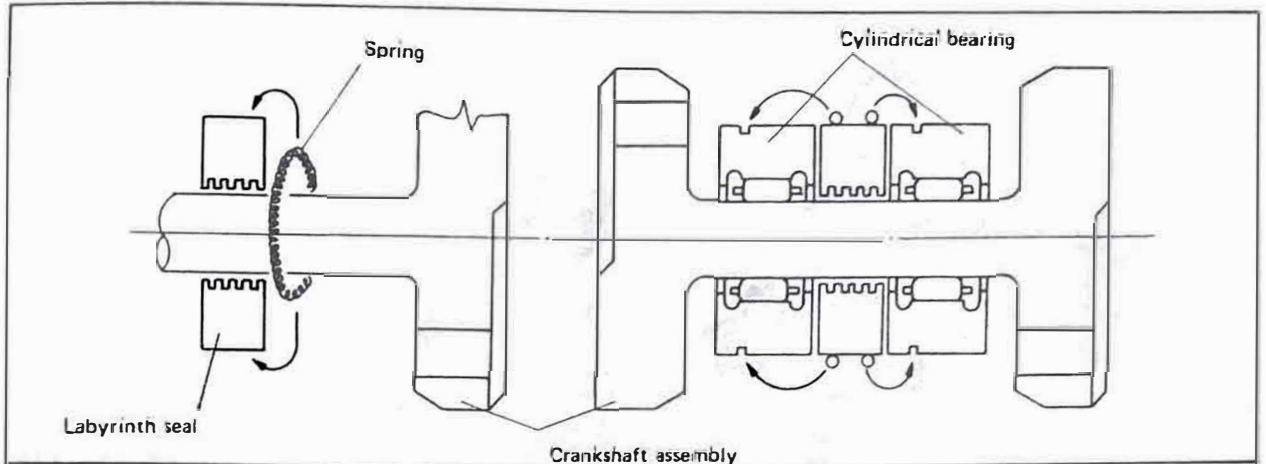
- 1) Remove the holding spring from the bearing groove.
- 2) The holding spring is screwed in. To remove, screw counterclockwise.



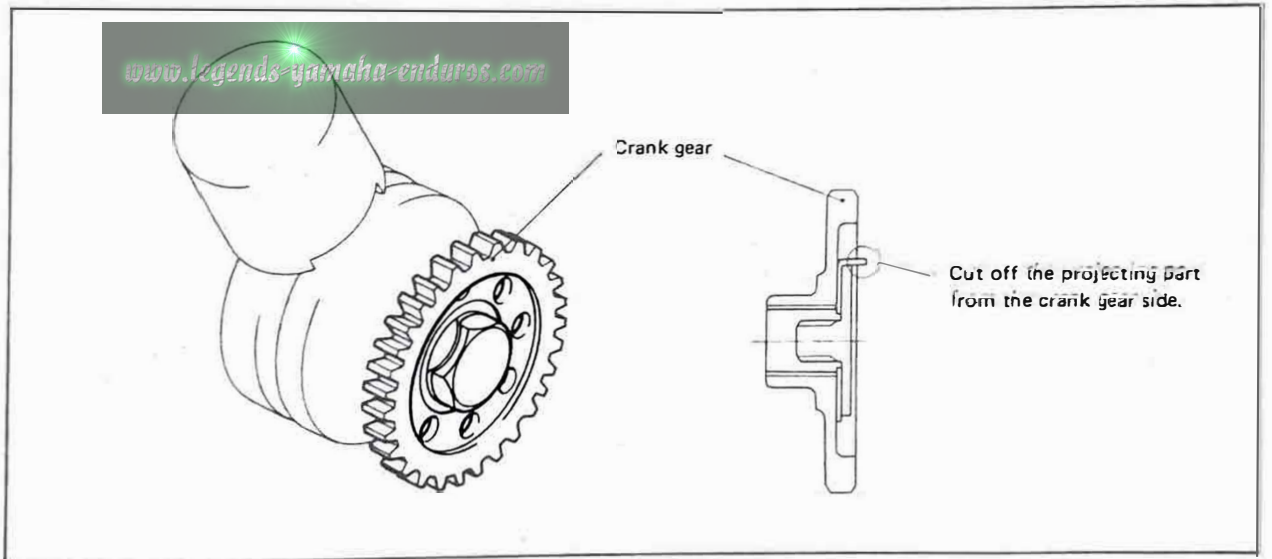
Crank center bearing installation

- 1) Assemble two holding springs and place them on the labyrinth seal.
- 2) Install the bearing on the crankshaft,

and slip the holding springs over the labyrinth seal, and fit them in the bearing groove. Apply a liberal amount of oil to the bearing roller.

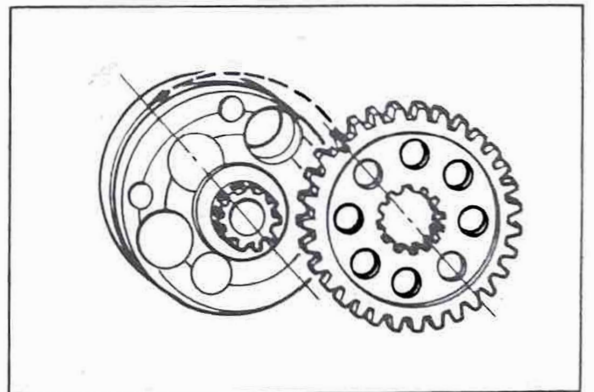


Crank gear lock washer



Crank gear installation

The crank gear has a punch mark on its tooth side. Align the mark with the crank pin and press-fit the gear over the shaft.



POWER VALVE

Connecting joint installation

Fig. 1

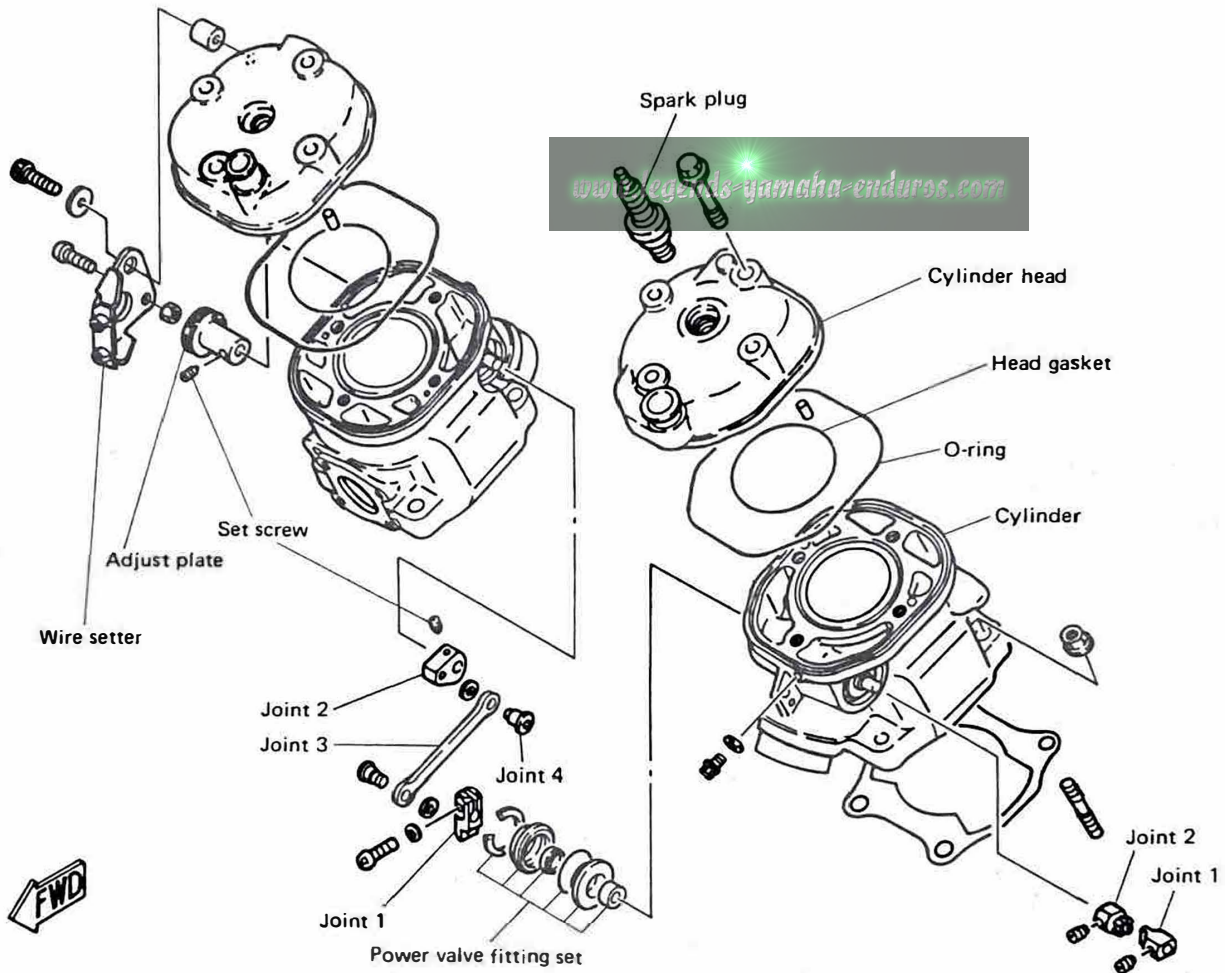
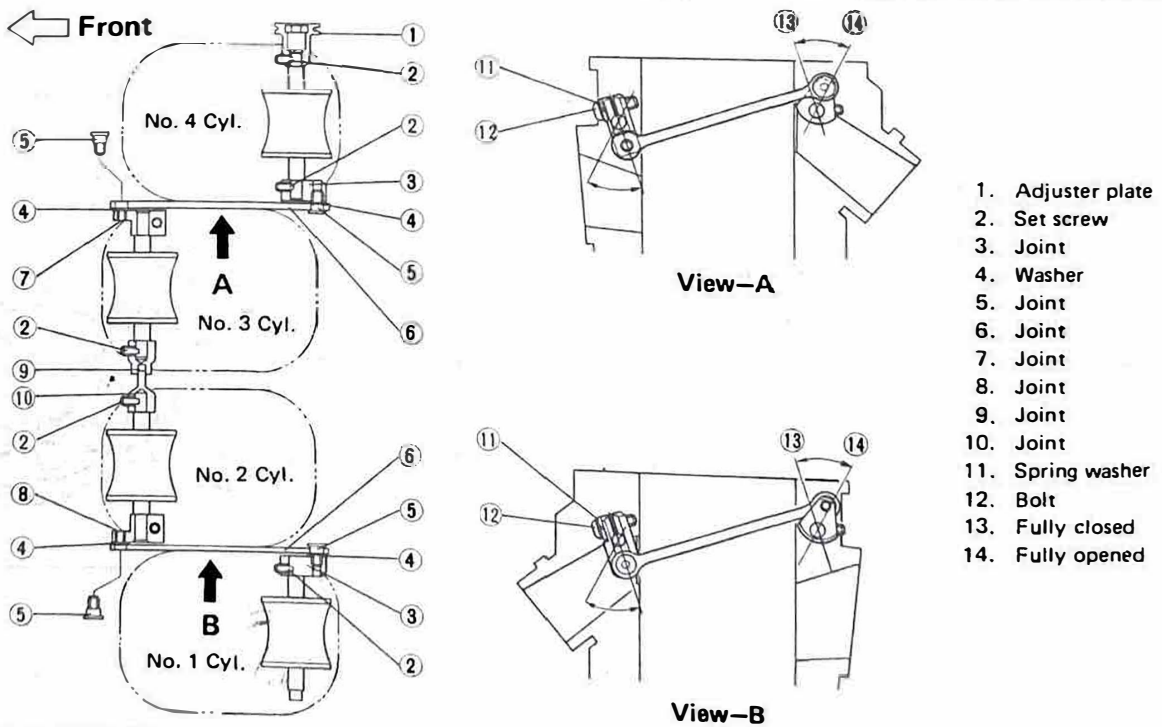


Fig. 2

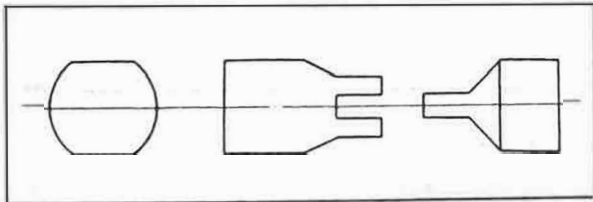


- 1) As illustrated, assemble the joint.
- 2) After tightening the cylinder securing nuts, tighten the joint 5 (See Fig. 2).
- 3) While fully opening the power valve for either of the No. 2 or No. 3 cylinder (which has a later timing for valve opening) determine the position for full valve opening on the No. 4 cylinder and tighten the bolt 12 for the No. 3 cylinder (See Fig. 2).
- 4) Tighten the bolt 12 for No. 2 cylinder with the No. 1 and No. 4 cylinder valves fully open.

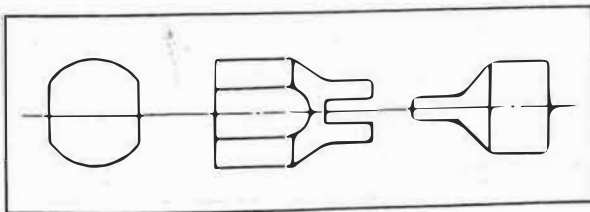
NOTE: _____

You can see whether the valve is fully opened on the outside of the exhaust port or on the upper side of the cylinder.

- 5) After installing all joints, check whether each valve can be turned lightly by moving the adjuster plate 1 for No. 1 cylinder.



- 6) If any valve is stiff to turn, turn the joint 90° as shown and reinstall the joint.

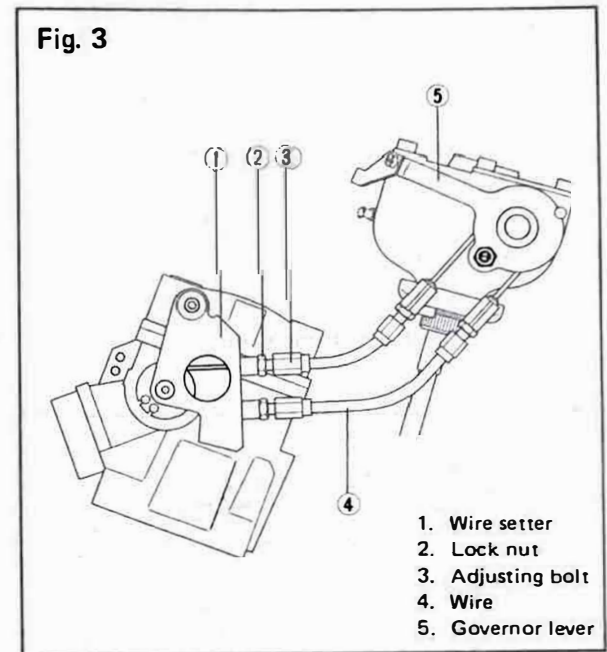


NOTE: _____

1. When connecting the valve using the joint, be sure that the valve is not reversed.
2. Apply NEJI-LOCK (screw locking adhesive) to the set screw 2 .
3. Joint 1 ~ 4 should be correctly installed as shown in Fig. 1 & Fig. 2.

YPVS valve adjustment

- 1) Install the wire setter 1 (See Fig. 3).



- 2) Install the wire 4 after loosening the lock nut 2 and the adjust bolt 3 .
- 3) Adjust the adjust bolt 3 so that the No. 4 cylinder valve is fully open. At the same time, the governor should be fully opened by hand.

NOTE: _____

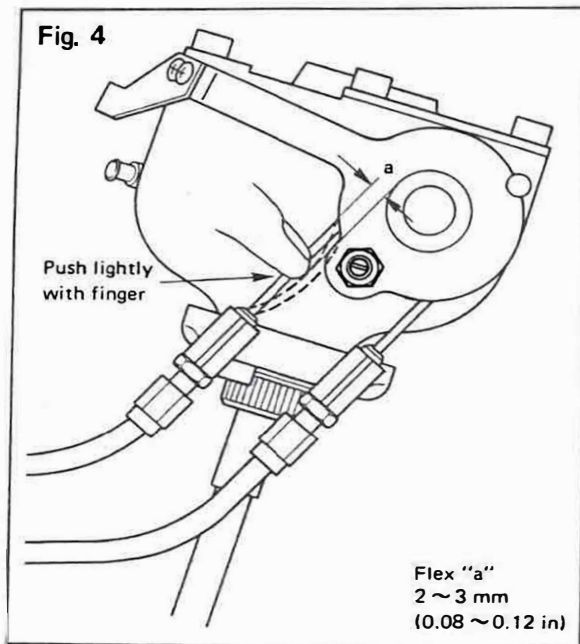
You can check the valve opening at the cylinder exhaust port.

- 4) Take off the inner wire slack and tighten the lock nut 2 .
- 5) Check whether each cylinder valve turns lightly by moving the governor lever 5 .

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NOTE:

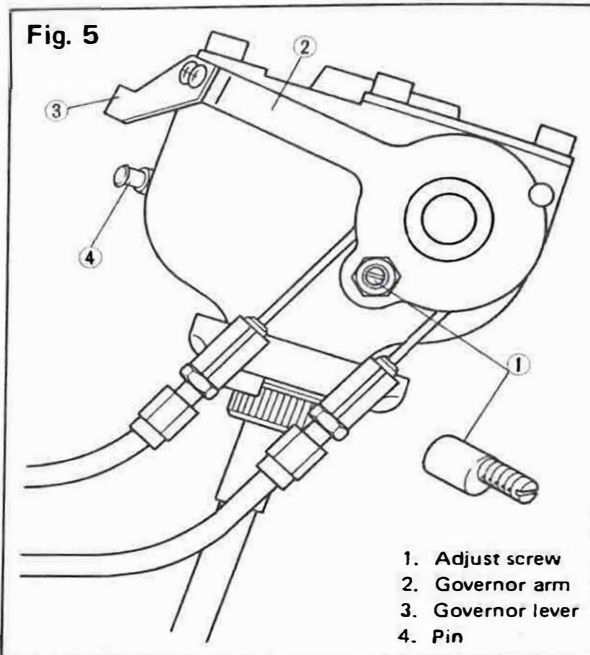
1. The above item (1) should be performed while assembling the engine.
Items (2) ~ (5) should be performed after mounting the engine to the frame. **CARRY OUT THESE PROCEDURES WHENEVER THE ENGINE IS RE-MOUNTED.**
2. Pay attention to the wire tension. Recommended practice is to push the wire lightly. 2 ~ 3 mm (0.08 ~ 0.12 in) wire play is required (See Fig. 4).



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Governor

Never attempt to disassemble or tamper with the governor, or engine performance will be greatly impaired. It is manufactured and delicately assembled and adjusted precisely of our factory, all under strict quality control conditions.



Push-starting of the engine:

Turn the governor arm 2 to the left and hook the lever 3 on to the pin 4. The engine compression pressure (in the cylinder head) will decrease making engine starting easy.

When the engine speed reaches 9,000 r/min or so, the governor is automatically restored to its original state.

CAUTION:

Except when push-starting the engine, do not hook the lever 3 on to the pin 4. It may fatigue the spring faster.

Governor adjustment

You can adjust the RPM at which the governor starts to operate by turning the adjust screw 1 (See Fig. 5).

	Governor Starts to Operate at:
Standard Setting	6,000 $\begin{smallmatrix} +300 \\ -400 \end{smallmatrix}$ r/min

By turning the adjust screw, you can change the spring pre-load and the governor opening timing.

The adjust screw has an offset shoulder, which helps change the spring pre-load, thus causing the corresponding change in the timing of the valve operation.

Spring Pre-load	Governor Operation Timing
Increase	Late
Decrease	Rapid

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COOLING SYSTEM

How to drain cooling water

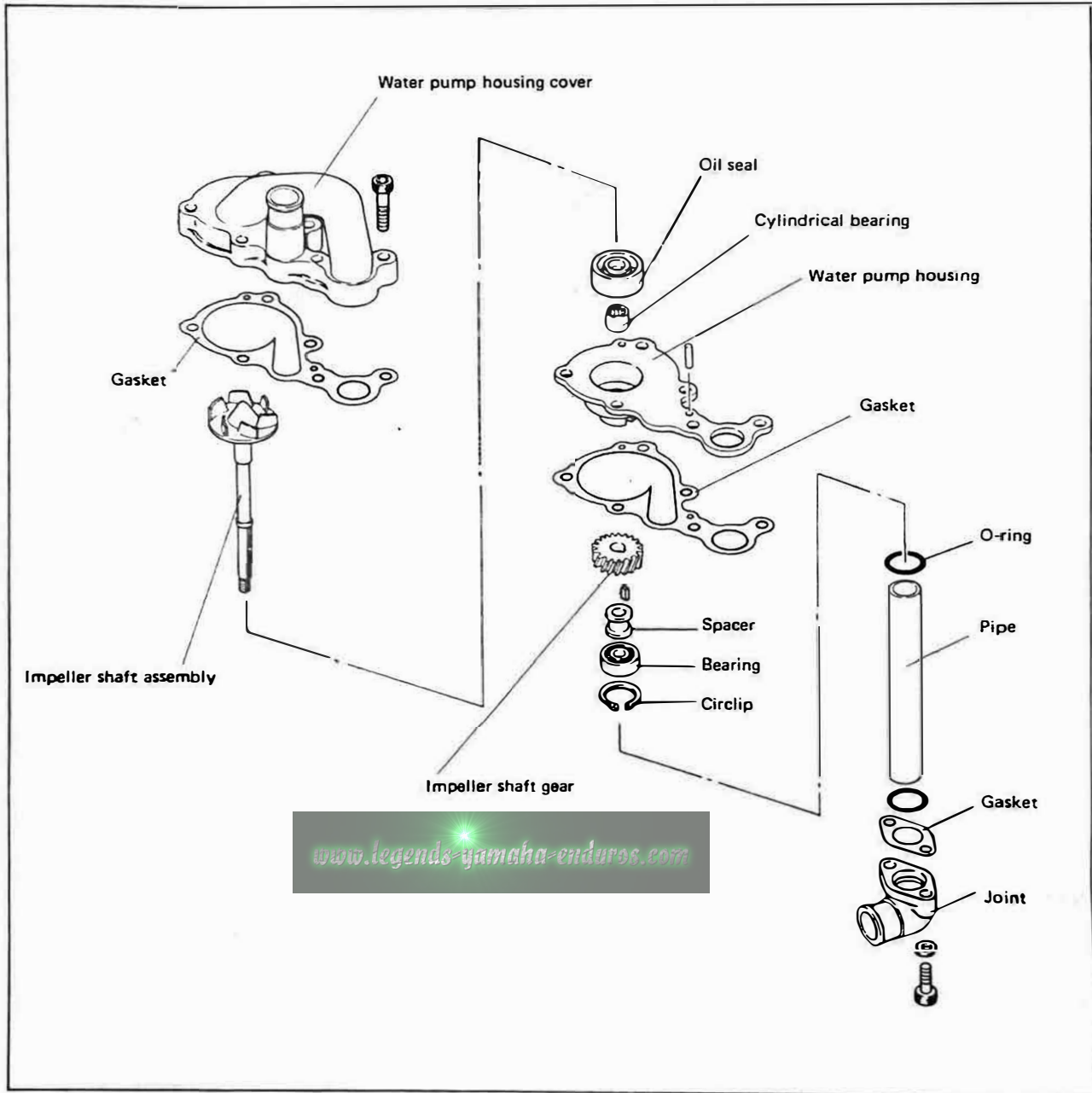
- 1) First, drain water from the radiator and crankcase passage by removing the hose beneath the radiator.
- 2) Drain water from the No. 2 & No. 3 cylinders by removing the drain bolts located in the cylinder front.

- 3) Before removing the No. 1 & No. 4 cylinder-heads, remove the spark plugs and bring the piston near to TDC by turning the rear wheel with gear engaged.

NOTE:

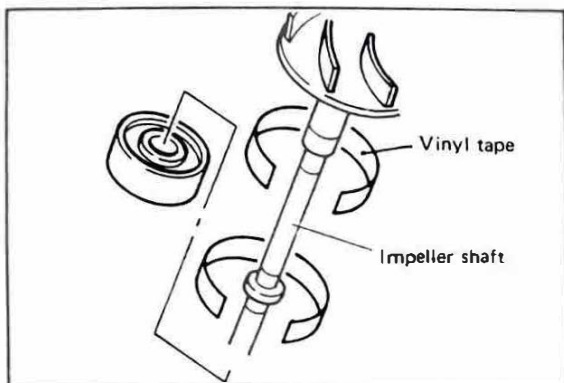
Wipe water off the piston head with clean cloth so that **WATER DOES NOT ENTER THE CRANKCASE.**

Water pump



NOTE: _____

1. Pack the oil seal lip with grease.
2. When installing oil seals on the impeller shaft, take care not to reverse the oil seal positions. Wind a vinyl tape 1 or 2 turns around the shaft to protect the lip against damage.

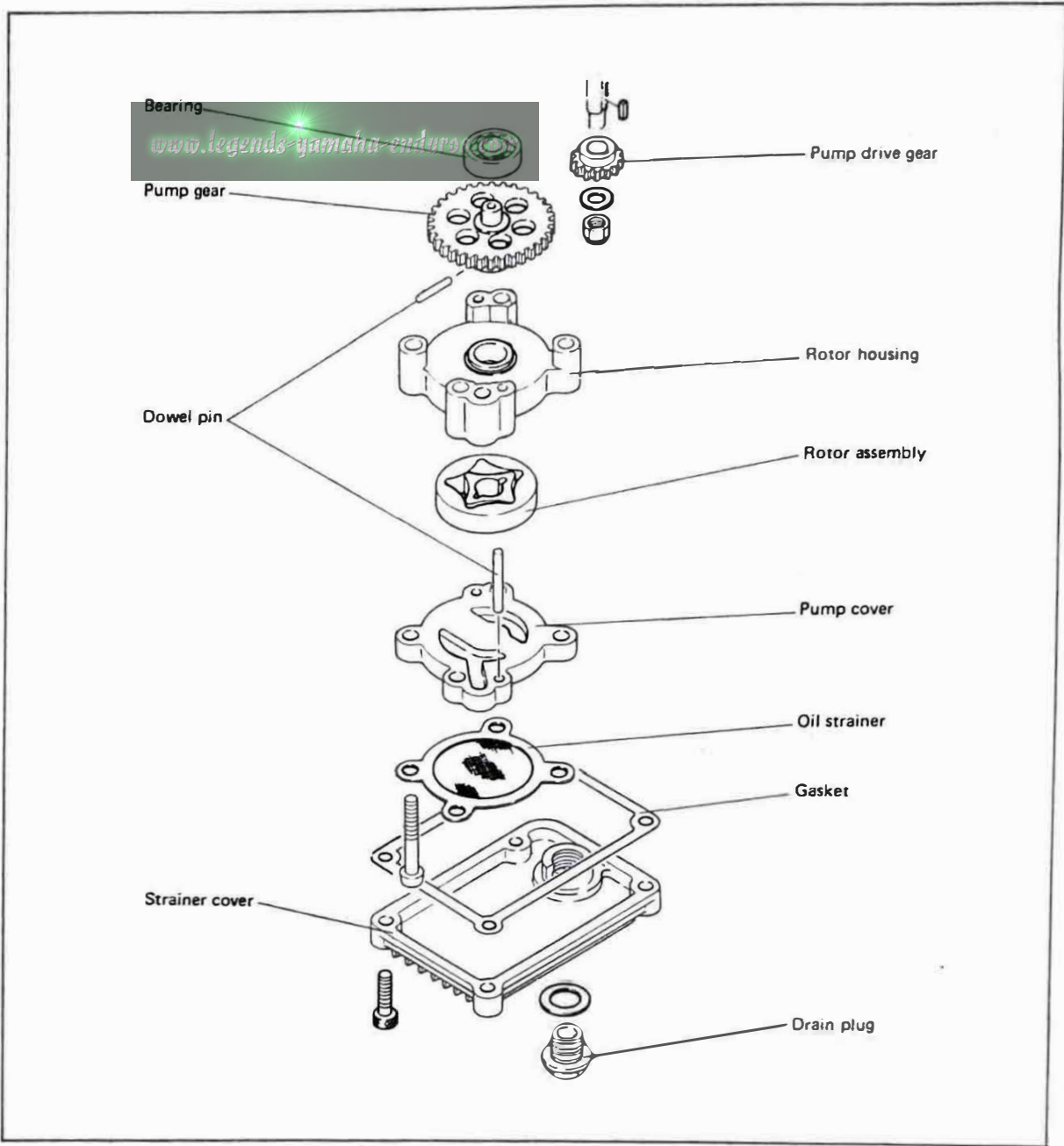


Radiator

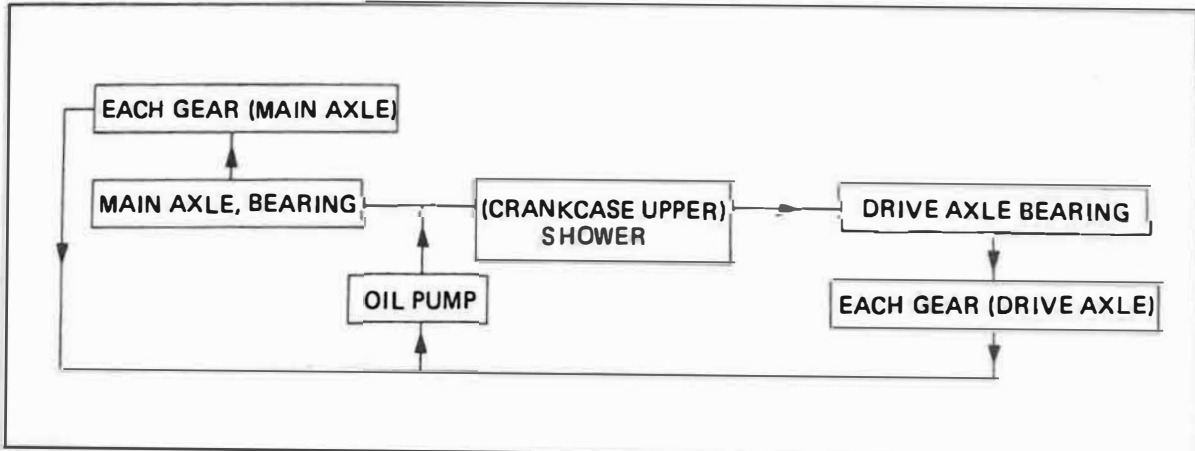
Cooling liquid capacity:
2.3 L (2.02 Imp qt, 2.43 US qt)
Radiator cap valve opening pressure:
88 kPa (0.9 kg/cm², 12.8 psi)



LUBRICATION SYSTEM



LUBRICATION CHART



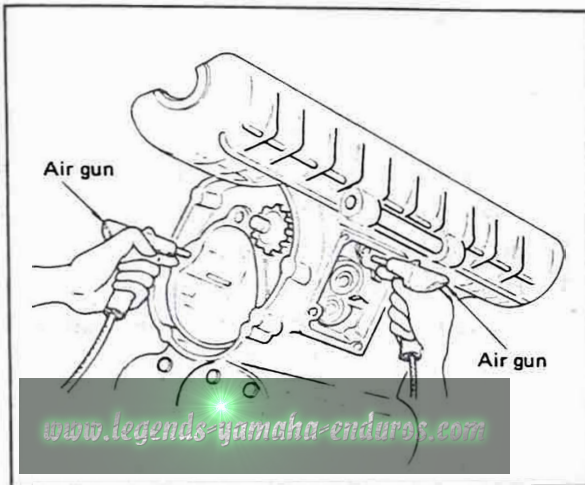
NOTE:

1. The pump rotor should be installed so that the mark Δ on both the inner and outer rotors faces towards the bottom of the engine.
2. The filter net should be periodically removed and cleaned.

Cleaning period:

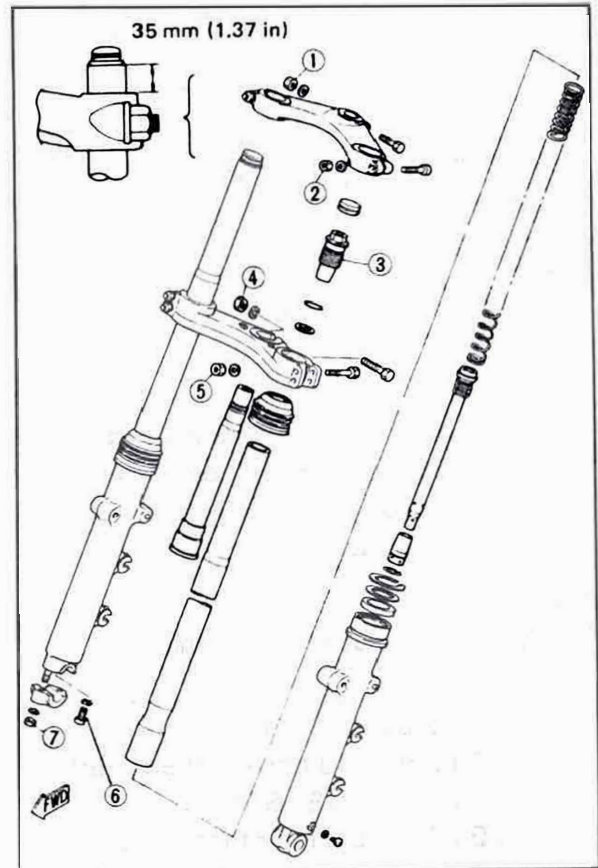
1. After break-in period.
2. Every 1,000 km (600 mi) of running.

3. The oil passages should be cleaned with compressed air each time the engine is overhauled.



C. CHASSIS MAINTENANCE

FRONT FORKS



TIGHTENING TORQUE:

- | | |
|---|----------------------------|
| 1 | 17 Nm (1.7 m·kg, 12 ft·lb) |
| 2 | 17 Nm (1.7 m·kg, 12 ft·lb) |
| 3 | 25 Nm (2.5 m·kg, 18 ft·lb) |
| 4 | 17 Nm (1.7 m·kg, 12 ft·lb) |
| 5 | 17 Nm (1.7 m·kg, 12 ft·lb) |
| 6 | 20 Nm (2.0 m·kg, 14 ft·lb) |
| 7 | 20 Nm (2.0 m·kg, 14 ft·lb) |

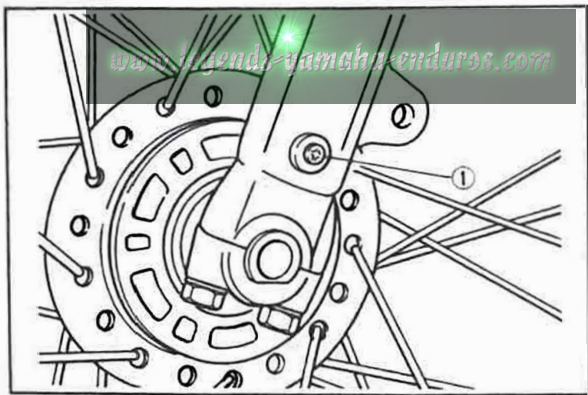
NOTE:

Fork springs must be installed with the smaller pitch upward as shown in the illustration.

Fork oil replacement

- 1) Remove the cap bolt assembly. Remove the spring seat and fork spring.
- 2) Place a suitable stand under the engine to keep the front of machine raised off the floor.

- Place an open container beneath each drain hole and remove the drain screws.



1. Drain screw

- After most of the oil has drained, slowly raise and lower outer tubes to pump out remaining oil.
- Install drain screws.

NOTE: _____

Check gasket, replace if damaged.

FORK OIL QUANTITY:

160 cm³ (140 Imp qt, 169 US qt)

FORK OIL GRADE: SAE 15

OIL LEVEL (from top of inner tube):

195 mm (7.68 in)

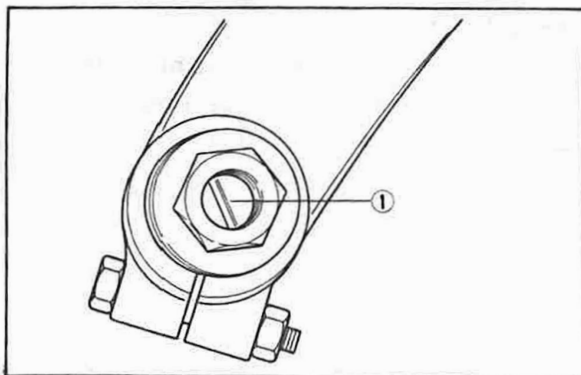
Fully bottomed, spring removed.

Fork spring pre-load adjustment

The fork spring pre-load is adjustable to suit the rider or road conditions. Using a slotted-head screwdriver, turn the adjuster in the fork cap bolt. To make it stiff, turn clockwise. To make it soft, turn counterclockwise.

	Hard	STD			Soft
Adjusting Position	5	4	3	2	1

One position adjustment gives a 5 mm (0.20 in) pre-load change.



1. Adjuster

NOTE: _____

Both left and right tensioner should be in the same position.

REAR SHOCK ABSORBER

WARNING: _____

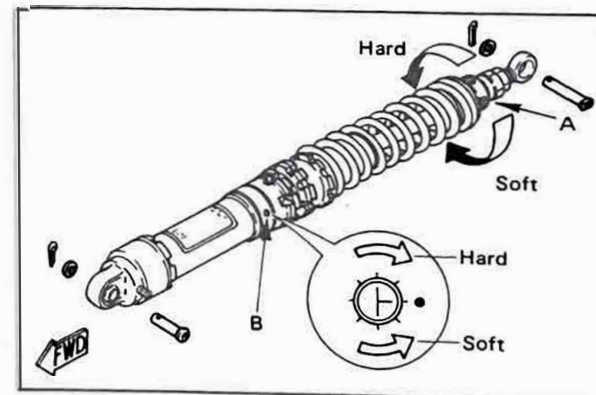
This shock absorber contains highly compressed nitrogen gas. Read and understand the following information before handling the shock absorber.

The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling.

- Do not tamper with or attempt to open the cylinder assembly. Injury may result.
- Do not subject shock absorber to an open flame or other high temperatures. This may cause the unit to explode due to excessive gas pressure.
- Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.
- Handle with great care, as a score or scratch in the piston rod sliding portion will cause oil leakage.
- Never remove the plug on the cylinder bottom. Injury may result.

This shock absorber is capable of independent damping force adjustment for expansion and contraction (see below).

For expansion, adjust at "A" and for contraction at "B".



Make contraction or expansion adjustment in not more than one or two steps at a time. Proceed to further adjustment according to riding feel.

WARNING:

Take care not to loosen and remove contraction adjuster "B", or the high pressure oil will spurt out.

For adjustment, do not unscrew more than 2 turns from the tightened position.

Notes on disposal (Yamaha dealers only)

Gas pressure must be released before disposal of shock absorber.

By inserting the injection needle into the rubber valve on the cylinder bottom. Most of the gas pressure will be released.

WARNING:

Wear an eye protector to prevent eye damage from escaping gas pressure.

Next, remove the plug (rubber valve assembly) on the cylinder bottom. Before removal, check the gas pressure with the checking gauge.

WARNING:

For disposal of damaged or worn-out shock absorbers, please take them to a Yamaha dealer.

NOTE:

Make sure the fuel tank does not contact the monocross suspension.

ABSORBER SPECIFICATIONS:

Stroke: 65 mm (2.6 in)

Set length (from eye to eye):

606 mm (23.9 in)

Adjustable length:

595 ~ 610 mm (23.4 ~ 24.0 in)

Spring adjustable range:

183 ~ 195 mm (7.2 ~ 7.6 in)

Initial setting length:

189 mm (7.4 in)

Free length: 200 mm (7.9 in)

An optional softer rear absorber spring is available.

P/No. 5Y9-22212-10

For identification, the spring end is red painted on the yellow paint.

Parts contained in the carton:

Rear shock spring (SOFT)
(Red painted)

K = 5.85 kg/m

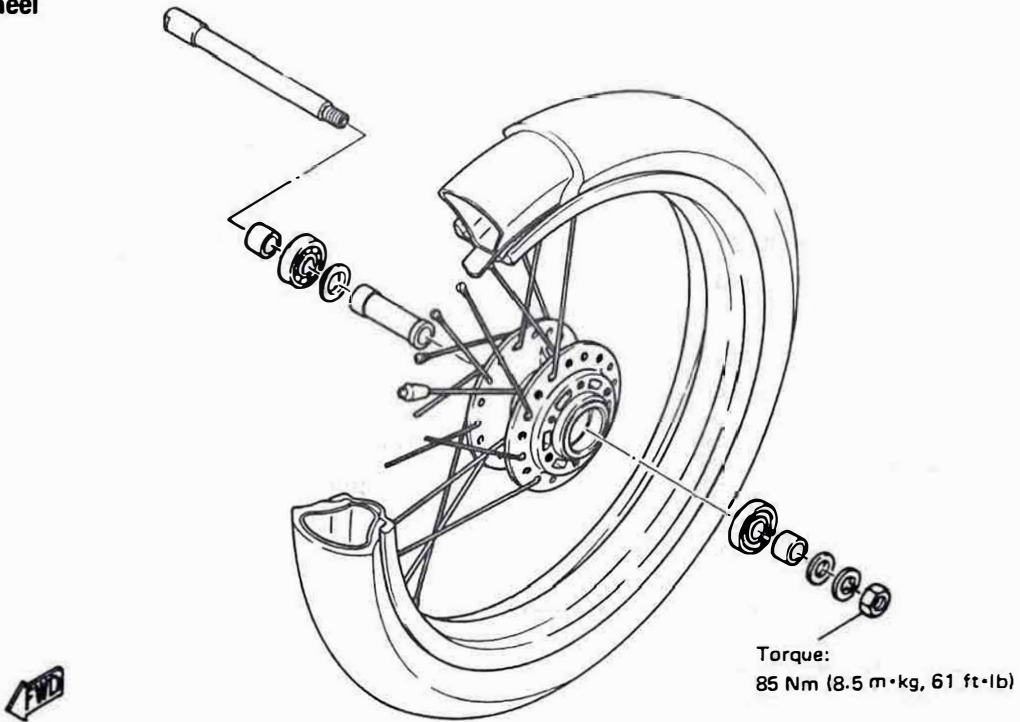
NOTE:

The initial spring adjustment should be made within the above range.

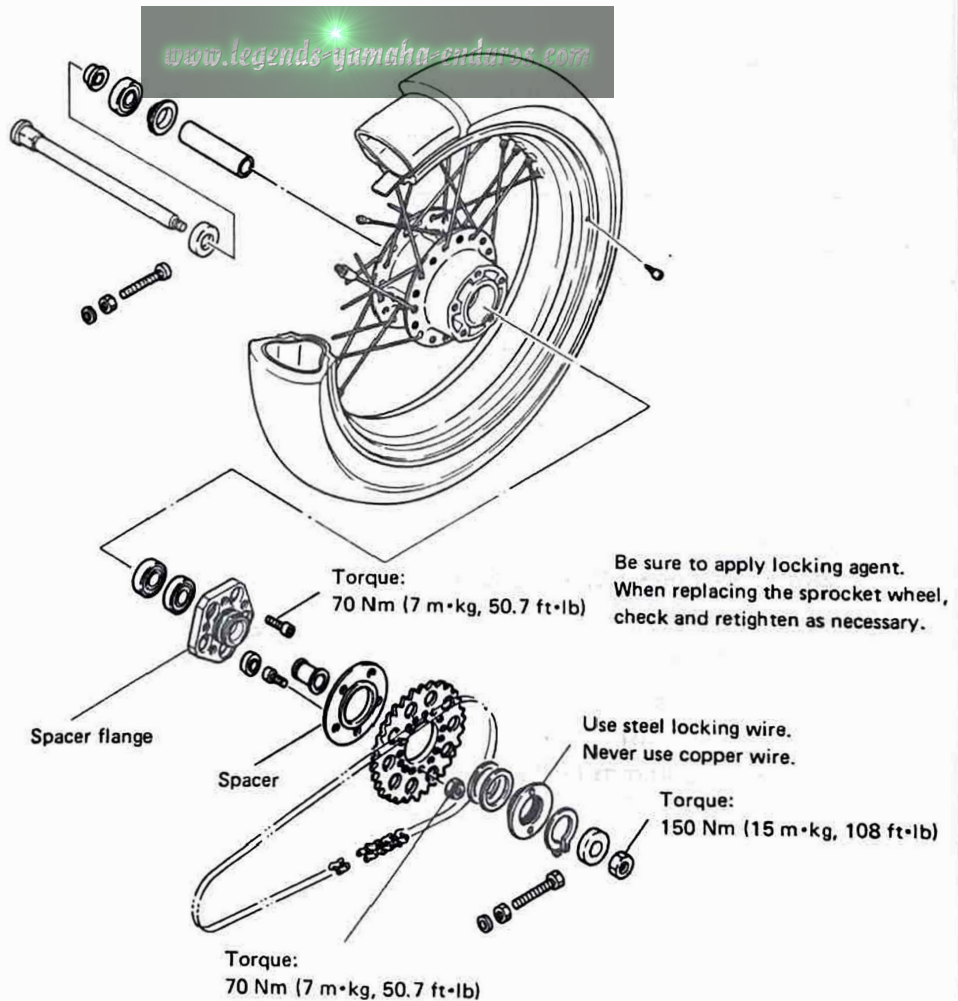
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WHEELS

Front wheel

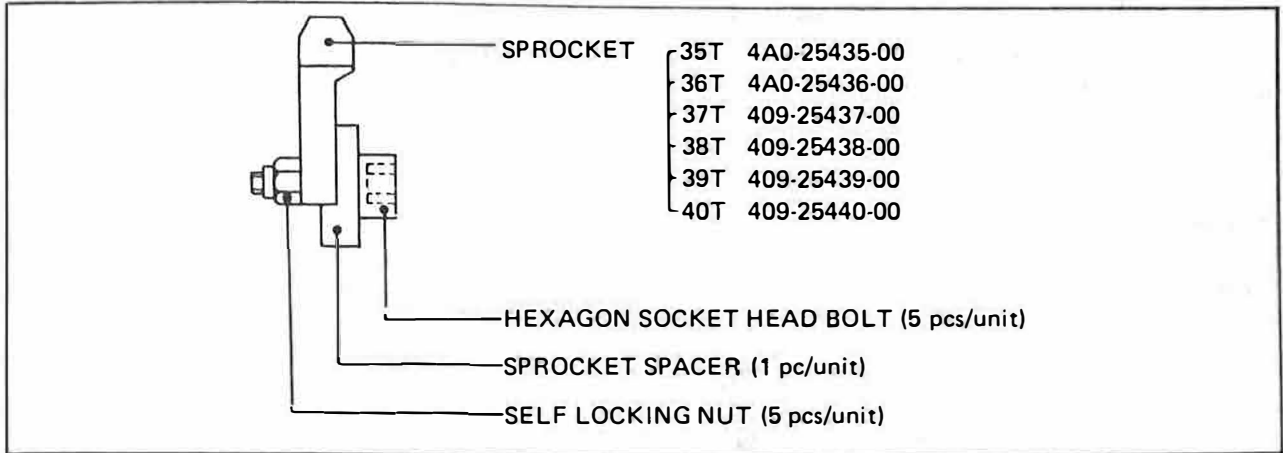


Rear wheel



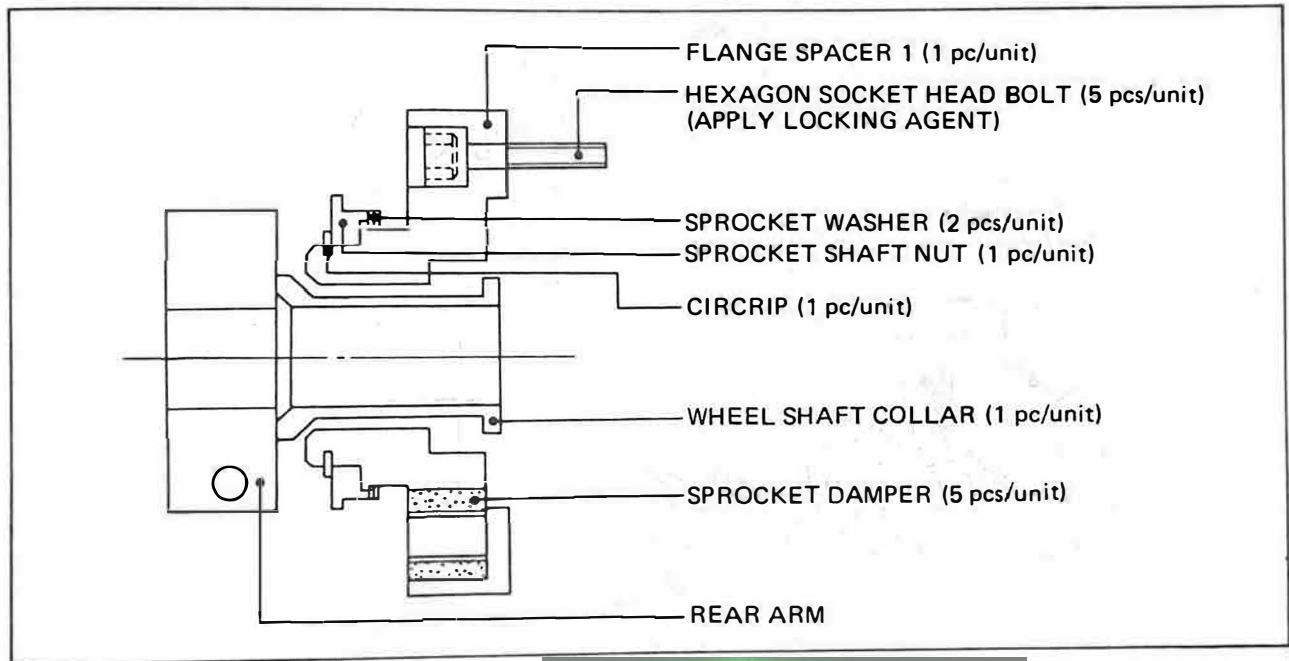
Rear wheel assembly diagram

1) Sprocket assembly



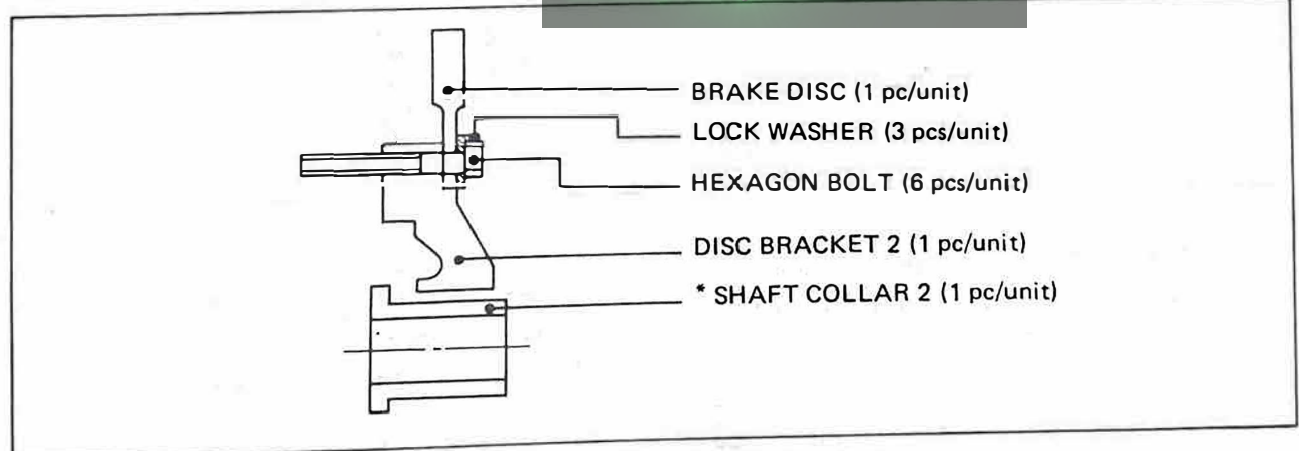
* The sprocket should be replaced as above.

2) Adaptor parts on the sprocket side (excluding the sprocket assembly)



3) Adaptor parts on the disc side

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* Be sure to install this collar before installing the disc bracket.

CHAIN

Chain free play adjustment

To check the chain play, stand the motorcycle vertically (without rider) with both wheels on the ground.

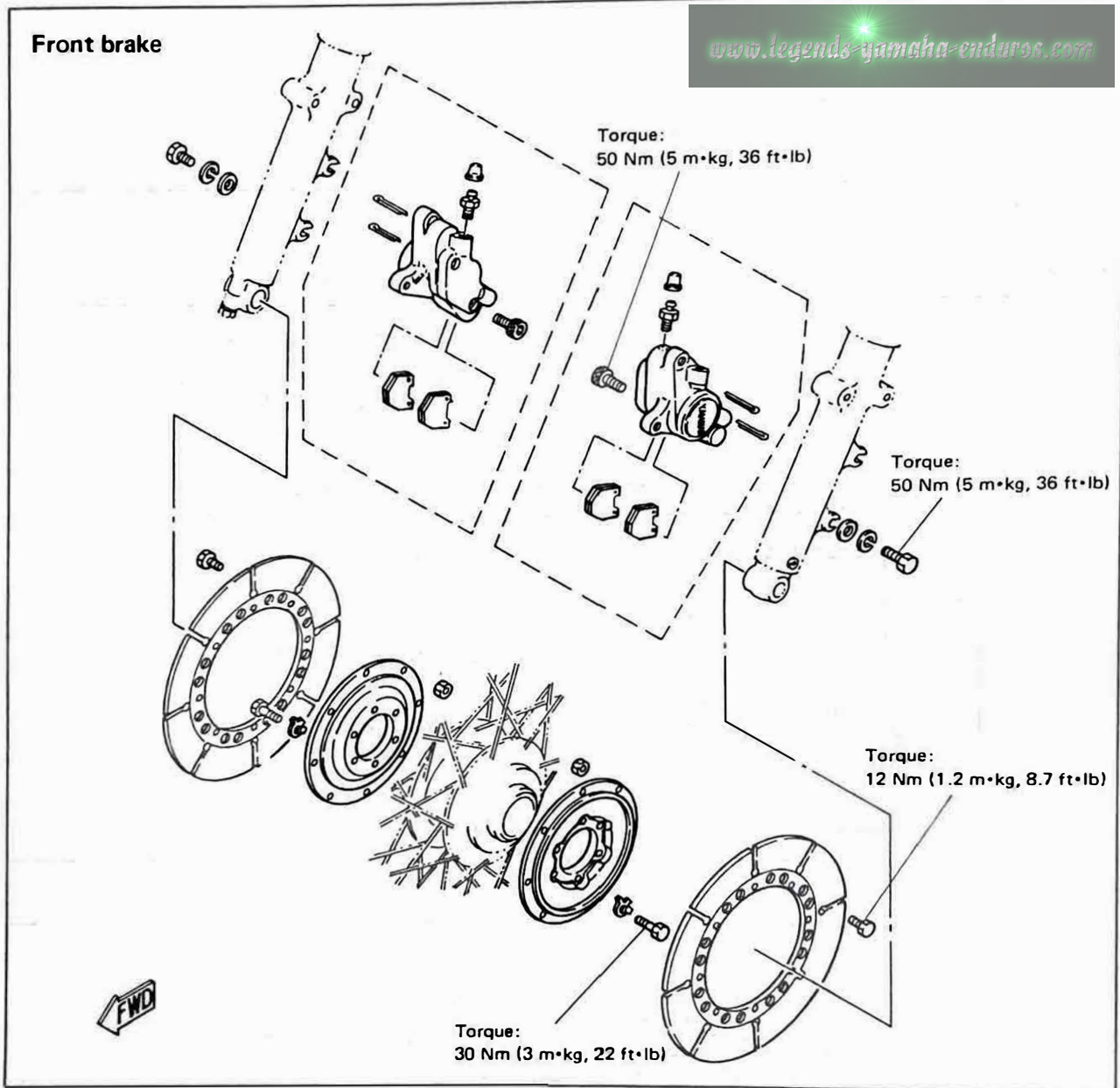
CHAIN FREE PLAY:

45 ~ 50 mm (1.8 ~ 2.0 in)

CHAIN TYPE: DID 50 HDS

NO. OF LINKS: 99 + Joint

BRAKES



PAD THICKNESS: 5.0 mm (0.20 in)

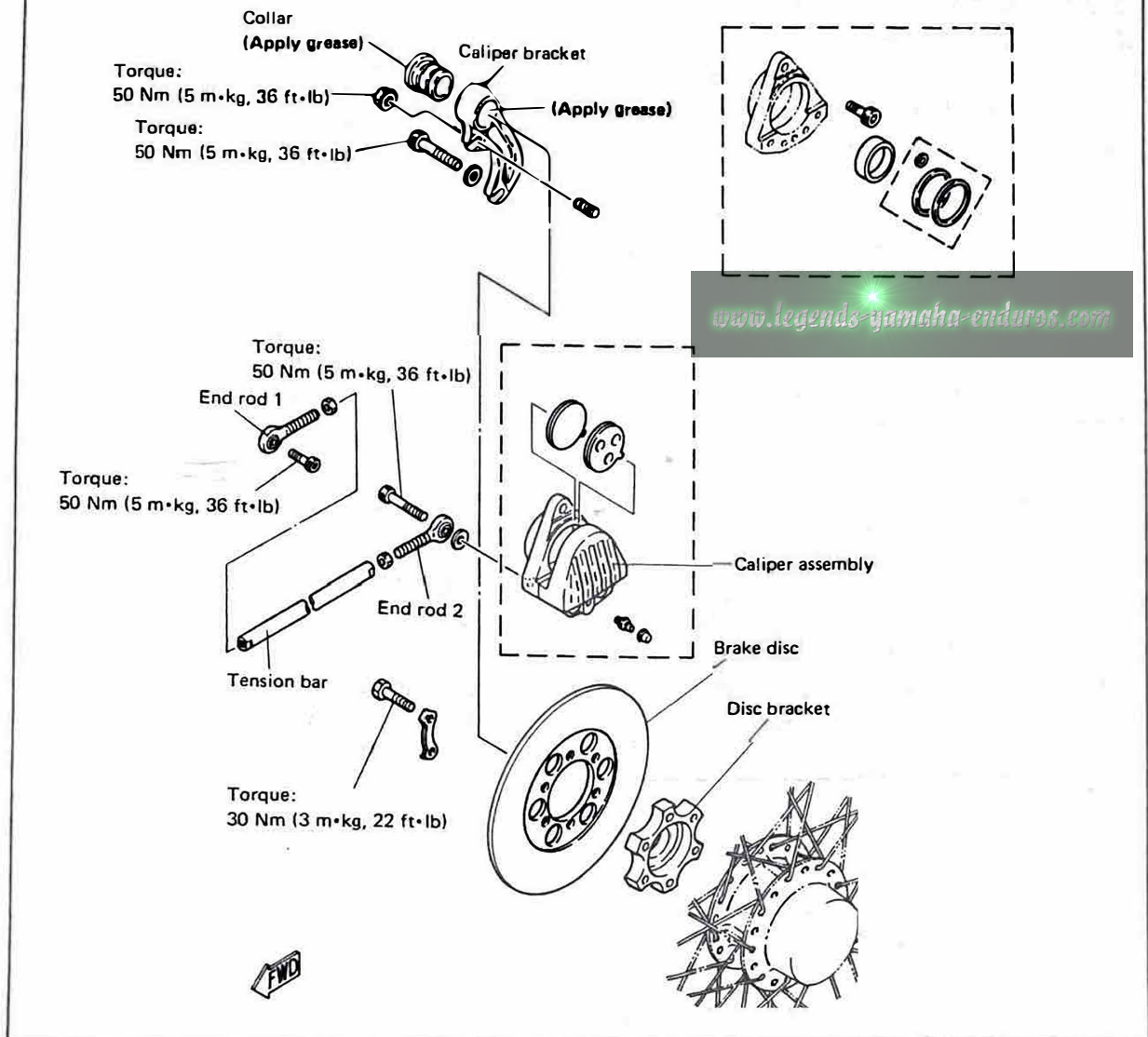
WEAR LIMIT: 0.5 mm (0.02 in)

NOTE:

1. The left brake hose is approximately 60 mm (2.36 in) longer than the right.

2. Pads can be easily changed without removing the caliper, by removing the cotter pins.
3. When installing the caliper, the cotter pins should be installed so that they do not touch the disc plate.

Rear brake



PAD THICKNESS: 4.5 mm (0.17 in)
WEAR LIMIT: 0.5 mm (0.02 in)

NOTE:

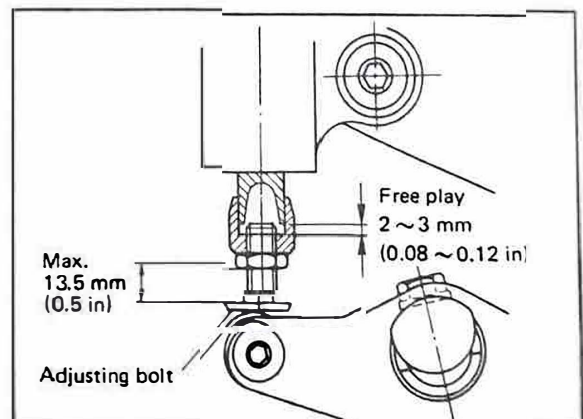
1. When removing the rear wheel, be careful the caliper assembly does not fall and bend the tension bar.
2. The tension bar should be installed with its groove facing outwards. Clamp the brake hose in the tension bar groove, making sure that it does not touch the wheel or muffler.

Brake pedal free play adjustment

Adjust with the adjusting bolt so that the free play is 2 ~ 3 mm (0.08 ~ 0.12 in).

When making this adjustment, bleed the brake fluid line first and add brake fluid.

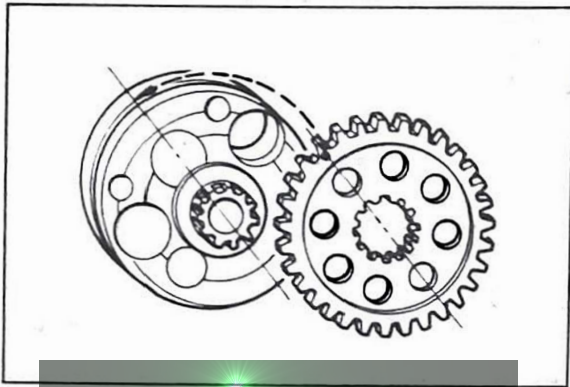
ADJUSTER MAX. LENGTH:
 13.5 mm (0.53 in)



D. ELECTRICAL SYSTEM MAINTENANCE
SYNCHRONIZING THE RIGHT AND LEFT
CRANKSHAFT (Overhauling)

When the right crankshaft or drive gear has been replaced, both crankshafts must be synchronized. To synchronize, proceed as follows:

- a. Install labyrinth seals, bearings, oil seals, etc. on both crankshafts, and press-fit the drive gear. When press-fitting the drive gear over the shaft, be sure to align the pin hole in the crankshaft with the punch mark on the drive gear.



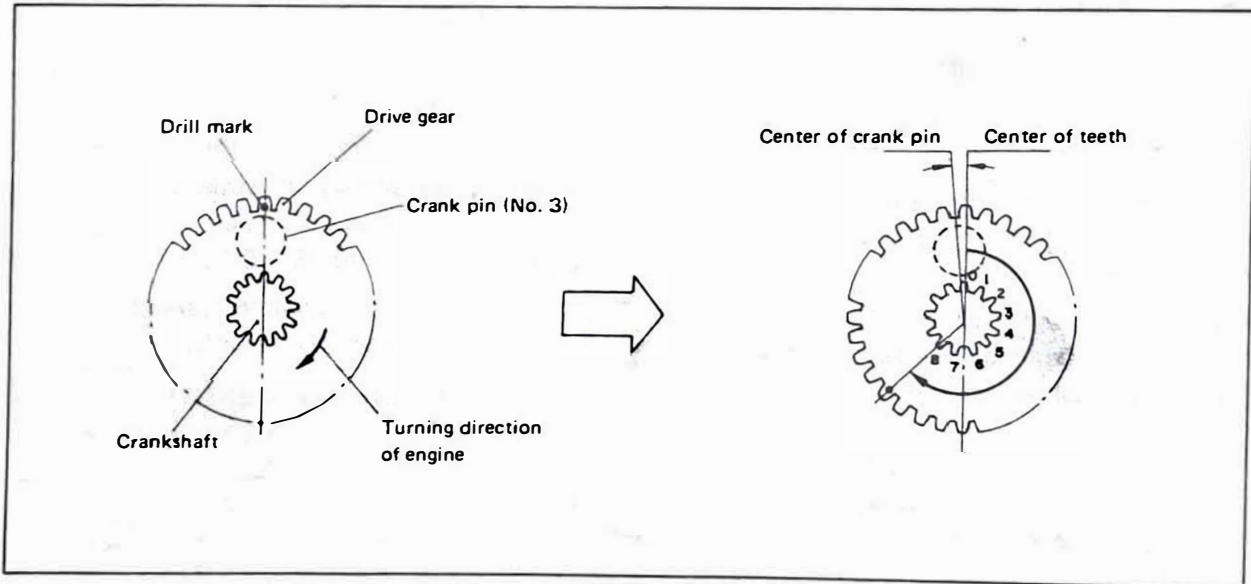
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- b. Align the right and left crank pins, and place the crankshaft in the crankcase, and install the pistons (for cylinders Nos. 2 and 3) and cylinder head. Next, install a dial gauge.
- c. Bring the No. 2 cylinder piston to 1.40 mm (0.0551 in) BTDC.

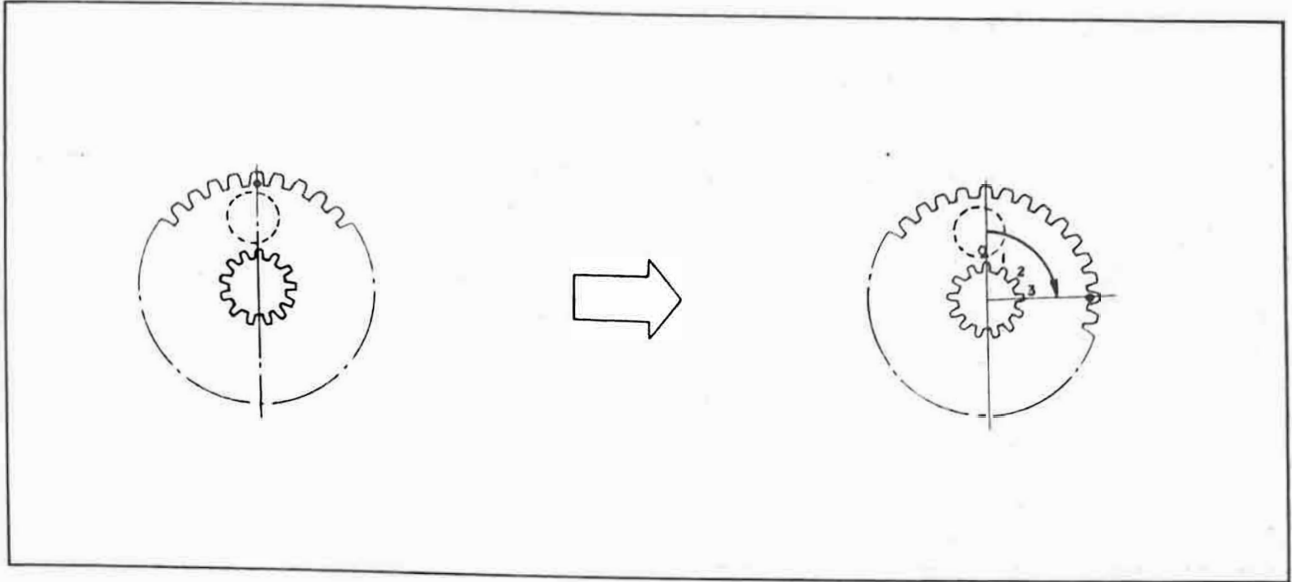
IGNITION TIMING:

1.40 ± 0.07 mm (0.0028 in) BTDC

- d. With the piston at this position, read the dial gauge installed in the No. 3 cylinder.
 - 1) The dial gauge reading should be 1.33 ~ 1.47 mm (0.0523 ~ 0.0579 in).
 - 2) If the dial gauge reading is 1.19 ~ 1.32 mm (0.0469 ~ 0.052 in) BTDC, pull out the right side crankshaft. Next, turn the drive gear to the right so that its punch mark position shifts 8 splines on the crankshaft, and press-fit the gear again. As a result, the center line of the tooth comes off the center line of the crank pin, and the piston shifts 0.14 mm (0.0055 in) off TDC.

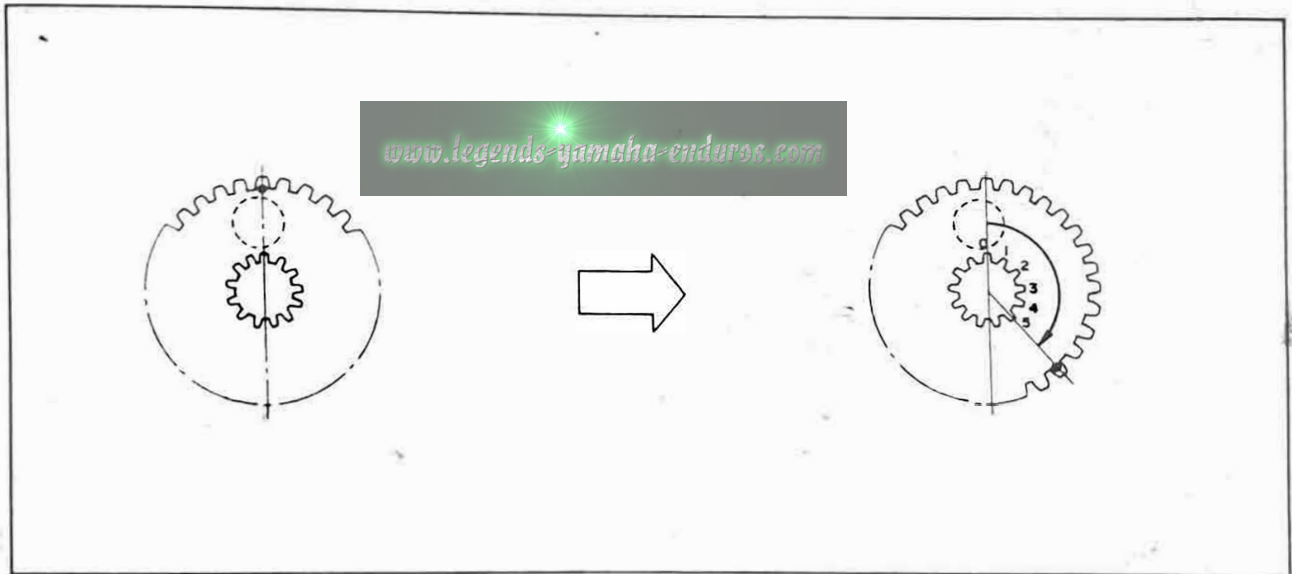


- 3) If the dial gauge reading is 1.18 mm (0.0465 in) off TDC.



- 4) If the dial gauge reading is 1.48 ~ 1.62 mm (0.0583 ~ 0.0637 in) BTDC, shift the drive gear punch mark 5 splines to

the right so that the piston moves 0.15 mm (0.0591 in) towards TDC.



- 5) If the dial gauge reading is 1.63 mm (0.0642 in) BTDC or more, shift the drive gear punch mark 10 splines to the right so that the piston moves 0.30 mm (0.0118 in) towards TDC.

NOTE.

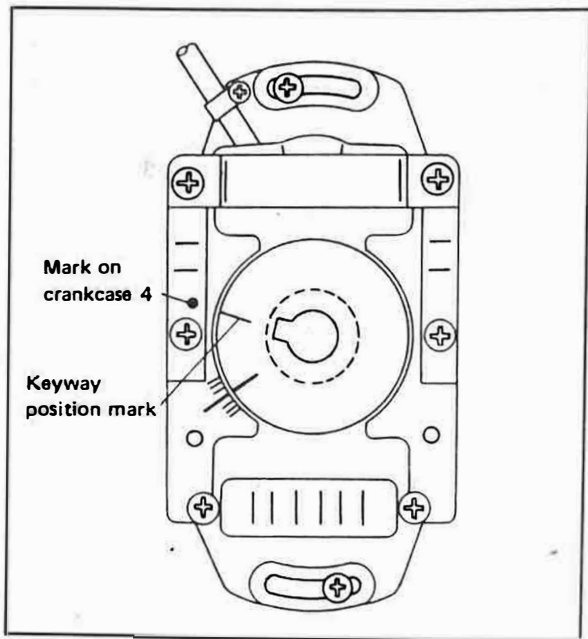
The keyway is covered by the rotor holding washer, and therefore a mark indicating the keyway position should be put on the rotor.

IGNITION TIMING ADJUSTMENT

Before adjusting the ignition timing, synchronize both right and left crankshafts.

- 1) Bring the pistons in cylinders, Nos. 2 and 3, to TDC.
- 2) Align the rotor keyway with the drilled mark in crankcase 4 (magneto case), and install the magneto case in the crankcase.

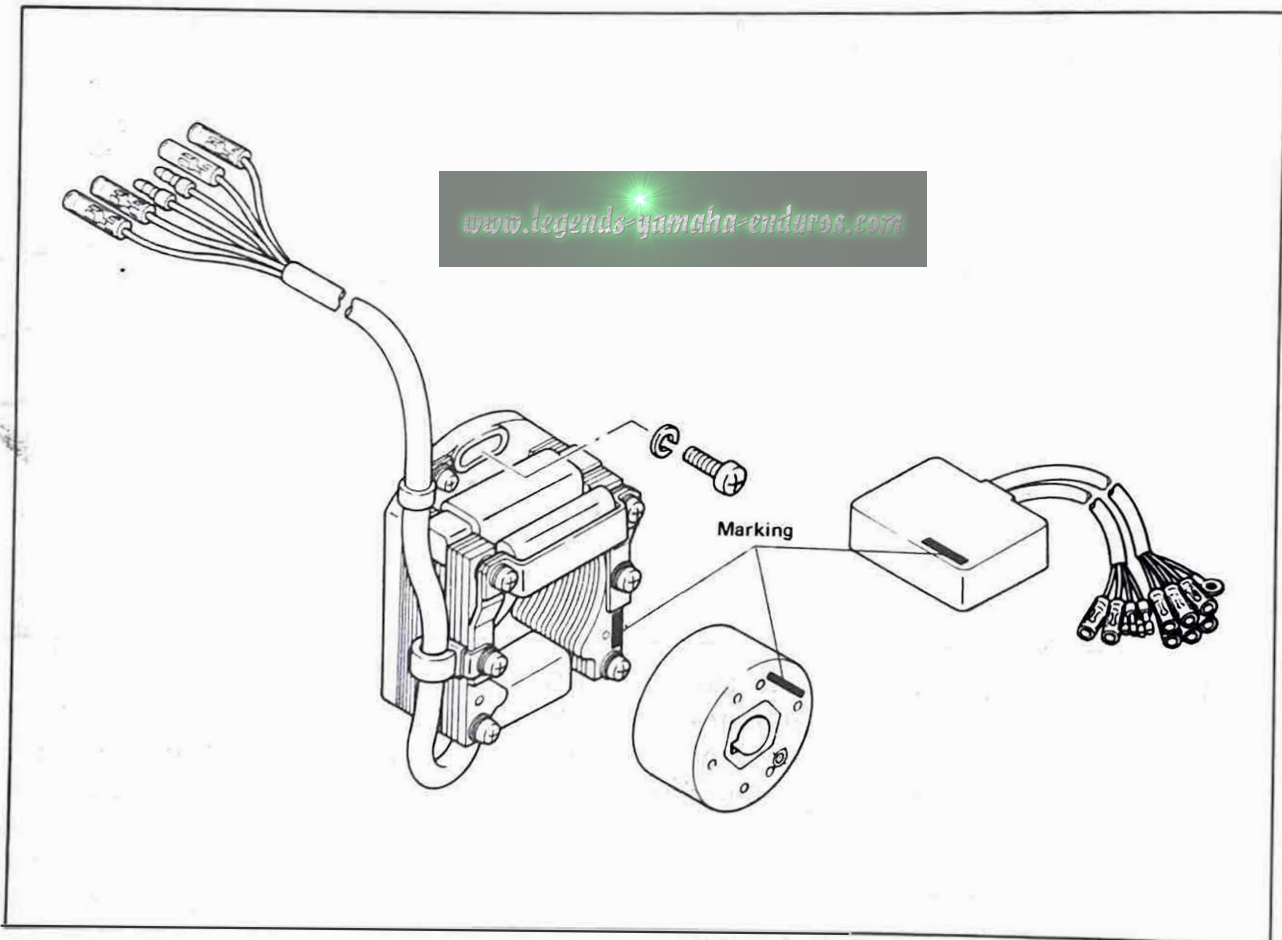
- 3) Bring the No. 2 cylinder piston to 1.4 mm (0.0551 in) BTDC and read the No. 3 cylinder piston position. Next, calculate the average reading of the No. 2 and No. 3 cylinders, and bring the piston to this position.
- 4) Align the timing mark on the rotor with the mark (central) on the stator.



ASSEMBLING THE CDI UNIT AND CDI MAGNETO

If either the CDI unit or the CDI magneto assembly has to be replaced, then replace them as a set. The rotor, stator and unit have a five-digit number indicating the production No. Always use those with identical numbers as a set. If you do not, it will be necessary to make an ignition timing adjustment while checking the engine performance at high speeds in actual running conditions.

MARKING POSITION



ROTOR PULLER

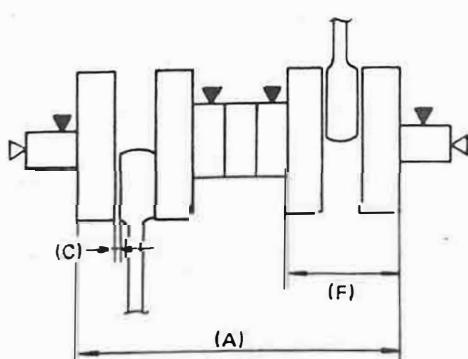
The rotor puller for this model is available at the Yamaha parts departments.

P/No.: 90890-01260

IV. APPENDICES

A. SPECIFICATIONS

ENGINE

<p>Bore and stroke Displacement Engine type Compression ratio Lubricating system: Engine</p> <p>Transmission Cylinder head volume with spark plug (N-84G) Head gasket material</p>	<p>56 x 50.7 mm (2.205 x 1.996 in) 499 cm³ Water cooled, 2-stroke piston valve with Y.P.V.S. 7.74 : 1</p> <p>Mixed gasoline 15 : 1 – Castrol R30, Yamalube R 30 : 1 – Bel-Ray MC-1 Dry sump (Tróchoid pump) 12.8 cm³ (0.45 Imp oz, 0.43 US oz) Silicon rubber</p>
<p>Cylinder: Material Liner material</p>	<p>All aluminum alloy Porous chrome plated</p>
<p>Piston: Piston clearance Measuring point</p>	<p>0.040 ~ 0.045 mm (0.0016 ~ 0.0018 in) 5.0 mm (0.2 in) from piston bottom</p>
<p>Piston ring: Ring design Ring end gap Ring groove side clearance</p>	<p>Plain ring 0.4 ~ 0.5 mm (0.016 ~ 0.019 in) 0.03 ~ 0.07 mm (0.0012 ~ 0.0027 in)</p>
<p>Crankshaft: Crank width (A) (F) Crankshaft deflection (▲) Big end side clearance (C)</p>	<p>167 mm (6.57 in) 53.5 $\begin{smallmatrix} 0 \\ -0.05 \end{smallmatrix}$ mm (2.10 $\begin{smallmatrix} 0 \\ -0.002 \end{smallmatrix}$ in) 0.03 mm (0.0012 in) max. Checking position: ▲ 0.25 ~ 0.75 mm (0.01 ~ 0.03 in)</p>
	
<p>Crank oil seal (L & R)</p>	<p>SW38-62-6.5</p>
<p>Clutch: Type Primary reduction ratio Friction plate Q'ty Thickness/Wear limit Clutch plat Q'ty Thickness/Warp limit</p>	<p>Dry multi-disc 47/22 (2.136) 7 3 mm/2.7 mm (0.12 in/0.11 in) 6 2 mm/0.05 mm (0.08 in/0.002 in)</p>

Clutch spring Q'ty	6
Free length/Wear limit	38.3 mm/38.0 mm (1.51 in/1.49 in)
Spring rate	1.31 kg/mm
Clutch housing thrust clearance	0.12 ~ 0.41 mm (0.005 ~ 0.016 in)
Push rod bending limit	0.2 mm (0.008 in)
Transmission:	
Type	Constant-mesh, 6-speed, return
Gear ratio	1st 32/13 (2.461)
	2nd 30/16 (1.875)
	3rd 31/20 (1.550)
	4th 27/20 (1.350)
	5th 28/23 (1.217)
	6th 27/24 (1.125)
Transmission oil quantity	Total: 940 cm ³ (0.827 Imp qt, 0.993 US qt) Exchange: 750 cm ³ (0.660 Imp qt, 0.793 US qt)
Type	(Bel-ray MC-4) SAE 80W
Bearing type:	
Main axle (L)	(22 x 36 x 17)
(R)	5205
Drive axle (L)	5206
(R)	(25 x 38 x 16)
Drive axle oil seal type (L)	SD40 x 62 x 6
Secondary reduction ratio	36/17 (2.117)
Shifting mechanism:	
Oil seal type	S12 x 22 x 5
Carburator:	
Type and manufacturer	VM36SS/MIKUNI
I.D. mark	5Y900
Main jet (M.J.)	#350
Power jet (P.J.)	#80
Jet needle-clip position (J.N.)	6DAY23-3
Cutaway (C.A.)	#0
Pilot jet (P.J.)	#0 (Blind plug)
Air screw turns out (A.S.)	0 (Fully closed)
Starter jet (G.S.)	#80
Float arm height	18.1 ± 1 mm (0.71 ± 0.04 in)

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Tightening torque

Item	Thread size	Tightening torque		
		Nm	m·kg	ft·lb
Engine:				
Cylinder head	M8	20	2.0	14
Spark plug	M14	23	2.3	17
Cylinder (Nut)	M8	20	2.0	14
Primary drive gear (Nut, Lock)	M24	100	10.0	72
Clutch boss (Nut, Lock)	M20	48	4.8	35
Clutch spring (Bolt, Flange)	M6	9	0.9	6.5
Drive sprocket (Bolt)	M20	53	5.3	38
Change pedal (Bolt)	M6	9	0.9	6.5
Generator (Rotor, Nut)	M12	43	4.3	31
(Stator, Bolt)	M6	9	0.9	6.5
Crank gear (Bolt, Hex.)	M14	43	4.3	31
Breaker gear (Bolt)	M14	100	10.0	72
Crank case (Nut)	M8	20	2.0	14

CHASSIS

Frame:	Tubular steel double cradle
Steering: Caster Trail Head pipe bearing type	27.5° 112.5 mm (4.43 in) Taper roller bearing
Front suspension: Type Damper type Fork travel Front fork spring, free length spring rate Fork oil quantity Type Oil seal type	Telescopic fork Coil spring, and oil damper 130 mm (5.12 in) 426.5 mm (16.8 in) K ₁ = 4.9 N/mm (0.5 kg/mm, 28 lb/in) K ₂ = 7.8 N/mm (0.8 kg/mm, 44.8 lb/in) 160 cm ³ (140 Imp qt, 169 US qt) G15 (SAE #15) SW36-48-10.5
Rear suspension: Type Damper type Rear shock absorber spring: Free length Spring rate Rear shock absorber travel Rear wheel travel Swingarm length deflection (rear end) free play (pivot shaft) Pivot shaft-bearing type	Swingarm (Monocross suspension) Coil spring, Gas-oil damper 200 mm (7.87 in) 61.3 N/mm (6.25 kg/mm, 350 lb/in) [Option: 57.4 N/mm (5.85 kg/mm, 327 lb/in)] 65 mm (2.56 in) 135 mm (5.31 in) 470 mm (18.5 in) 0 ~ 1.0 mm (0 ~ 0.04 in) 0.1 ~ 0.2 mm (0.004 ~ 0.008 in) TA2525Z, NTB2542
Fuel tank: Capacity	31.5 L (6.93 Imp gal, 8.32 US gal)
Wheels: Tire size (F) (R) Manufacturer Model Pressure (F) (R) Rim size (F) (R) Run out (vert.): Front-limit Rear-limit Bearing type and size: Front wheel (L) (R) Rear wheel (L) (R)	3.25-18 4.00/5.75-18 SUMITOMO F. KR-104/R. KR-133 177 kPa (1.8 kg/cm ² , 26 psi) 206 kPa (2.1 kg/cm ² , 30 psi) 2.50-18 3.50-18 0.7 mm (0.027 in) 0.7 mm (0.027 in) 6303Z 6303Z 6204Z 6204ZZ
Drive chain: Type Number of links Chain pitch Free play	DID 50HDS 99 + JOINT 15.875 mm (0.625 in) 45 ~ 50 mm (1.8 ~ 2.0 in)

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Brakes (Front and Rear):	Type (F)	Disc brake, dual	
	(R)	Disc brake, single	
Disc O.D. (F)	(R)	$\phi 298 \times 5 \text{ mm}$ (11.7 x 0.2 in) $\phi 218 \times 5 \text{ mm}$ (8.6 x 0.2 in)	
		Front	Rear
Pad diameter		—	$\phi 47 \text{ mm}$ (1.85 in)
Area		20.8 cm^2 (3.22 in ²)	17.3 cm^2 (1.85 in ²)
Thickness		5.0 mm (0.20 in)	4.5 mm (0.18 in)
Wear limit		0.5 mm (0.02 in)	0.5 mm (0.02 in)
Brake fluid type		DOT #3	

Tightening torque

Item	Thread size	Tightening torque		
		Nm	m·kg	ft·lb
Chassis:				
Engine mounting bolt:				
Front	M10	48	4.8	35
Rear	M10	48	4.8	35
Engine mount stay	M8	30	3.0	22
Handle crown:				
Steering shaft	M14	95	9.5	68
Inner tube	M8	18	1.8	13
Front fork:				
Cap bolt	M28	28	2.8	20
Under brakcet and Inner tube	M8	18	1.8	13
Steering shaft	M10	18	1.8	13
Cylinder complete	M8	28	2.8	20
Front wheel axle	M14	85	8.5	61
Front wheel axle holder	M8	19	1.9	13
Pivot shaft	M16	110	11.0	80
Sprocket spacer	M10	64	6.4	46
Rear wheel axle	M18	150	15.0	110
Sprocket wheel	M10	64	6.4	46
Suspension upper brakcet and extension	M18	85	8.5	61
Footrest	M6	13	1.3	9.4
Brake disc (F)	M8	26	2.6	19
(R)	M8	30	3.0	22
Disc bracket	M6	11	1.1	8.0
Brake hose bolt (All)	M10	16	1.6	11
Caliper brakcet	M10	48	4.8	35
Bleed screw	M8	6	0.6	4.3

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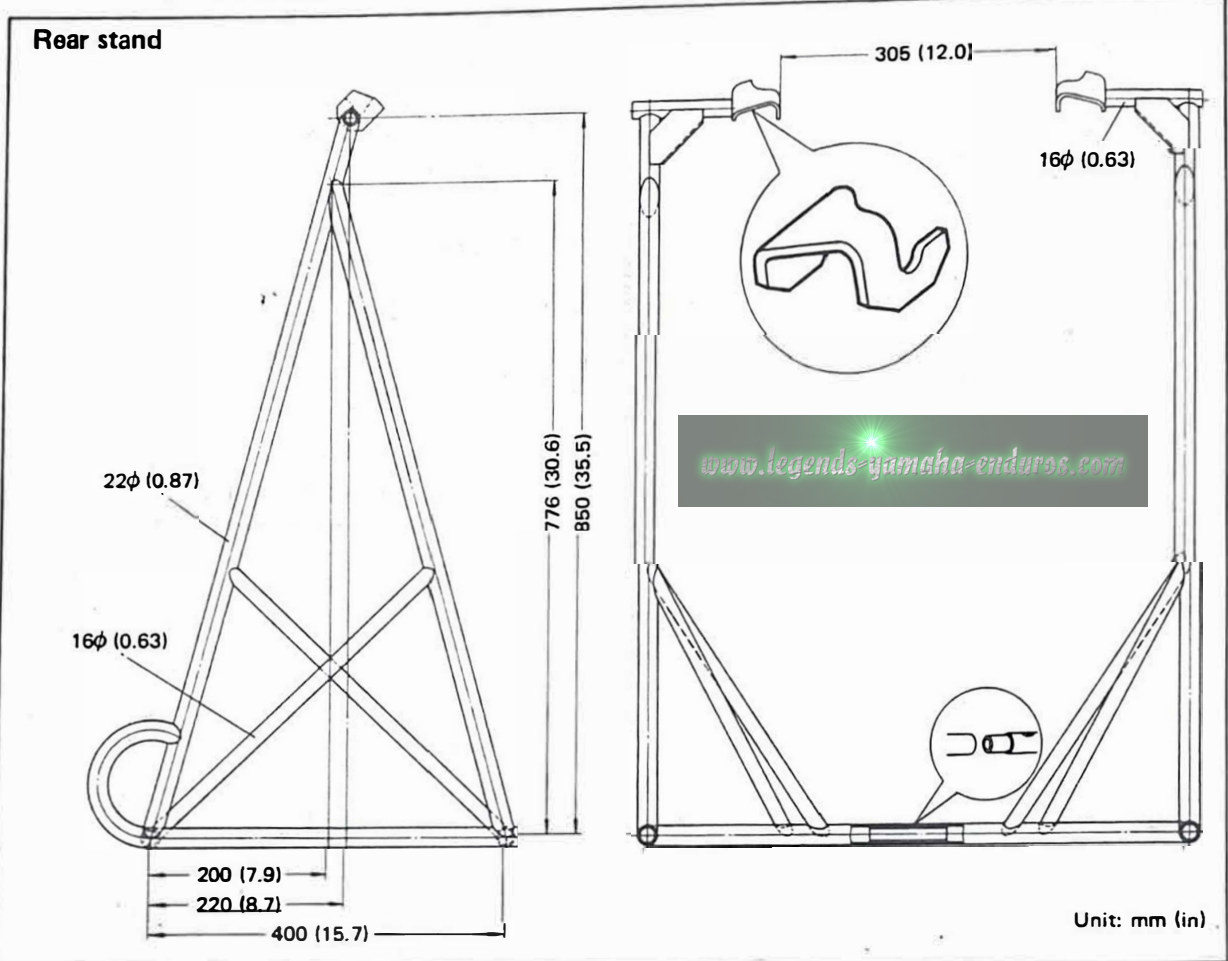
ELECTRICAL

CDI magneto: Model/Manufacturer Winding resistance, pulser coil charge coil	M400-03/HITACHI 36Ω ± 10% (at 20°C) 2.180Ω ± 10% (at 20°C): High speed 195Ω ± 10% (at 20°C): Low speed
Ignition timing (B.T.D.C.):	1.4 mm/10.000 r/min (17°)
Ignition coil: Model/Manufacturer Winding resistance, primary secondary	CM61-20CA/HITACHI 0.60Ω ± 10% (at 20°C) 6.2 kΩ ± 20% (at 20°C)
CDI unit: Model/Manufacturer	T1A-0,4-03/HITACHI
Spark plug: Model/Manufacturer Spark plug gap	N84G/CHAMPION 0.5 ~ 0.6 mm (0.0197 ~ 0.0236 in)

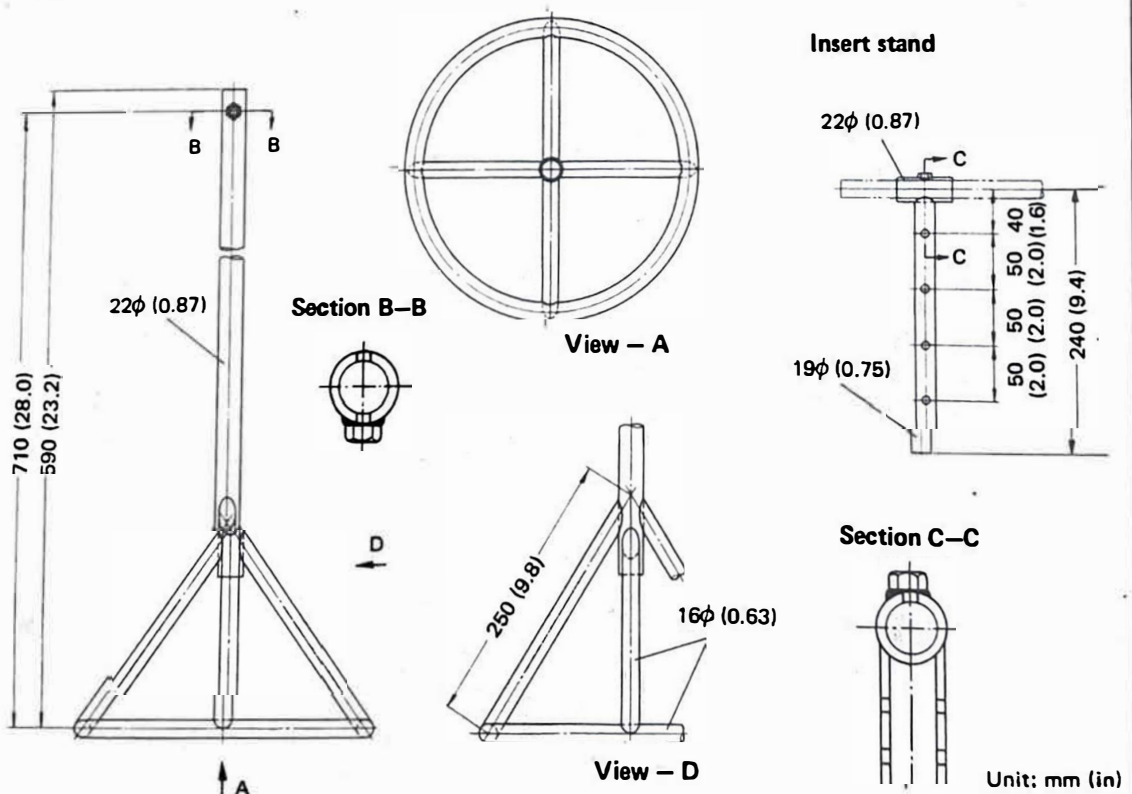
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B. MACHINE STAND

The following diagram indicates the machine stand for the TZ500.



Front stand



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