'84 RD500

Service Guide

YAMAHA

90894-09308

RD500
SERVICE GUIDE

FORWORD

This service guide provides service information for new mechanism of the NEW RD500 and is intended for use in your new model service training school.
For detailed procedures, you can refer to the video program and service manual.
As this guide describes service notes, it also serves as a guide for initial inspection steps.
It is our sincere hope and belief that this guide will help enhance the technical knowledge and servicing ability of all of you.
Some specification in this guide may become outdated due to future improvement on this model.

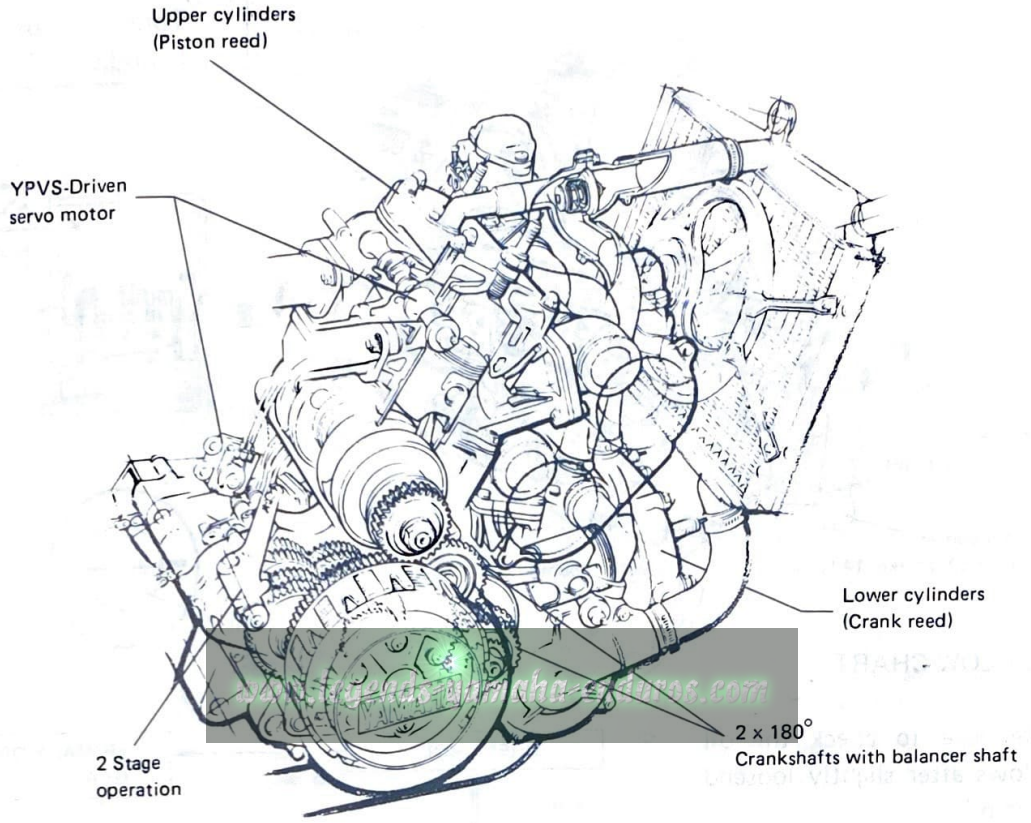
OVERSEAS SERVICE
OVERSEAS OPERATIONS
YAMAHA MOTOR CO., LTD.

CONTENTS

ENGINE

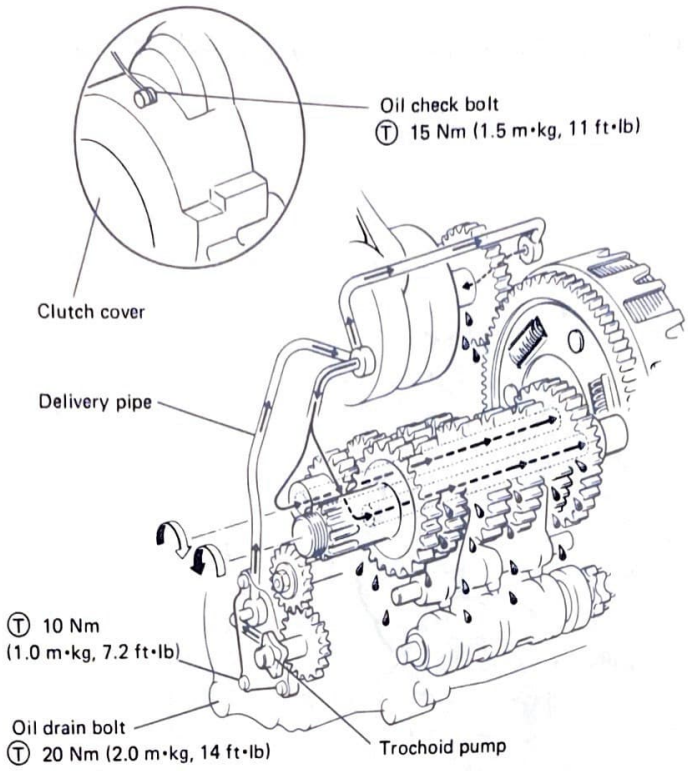
GENERAL

LIQUID-COOLED 2-STROKE, 50° V-4 ENGINE WITH PISTON REED VALVE AND CRANK REED VALVE INDUCTION.



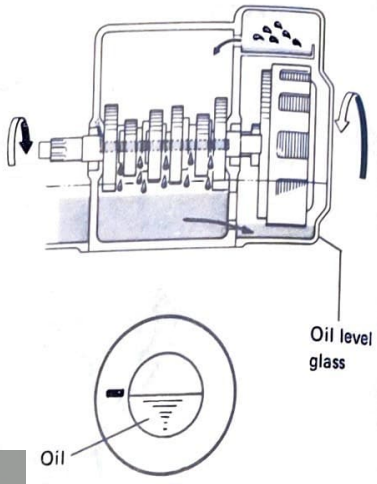
– MEMO –

TRANSMISSION LUBRICATION



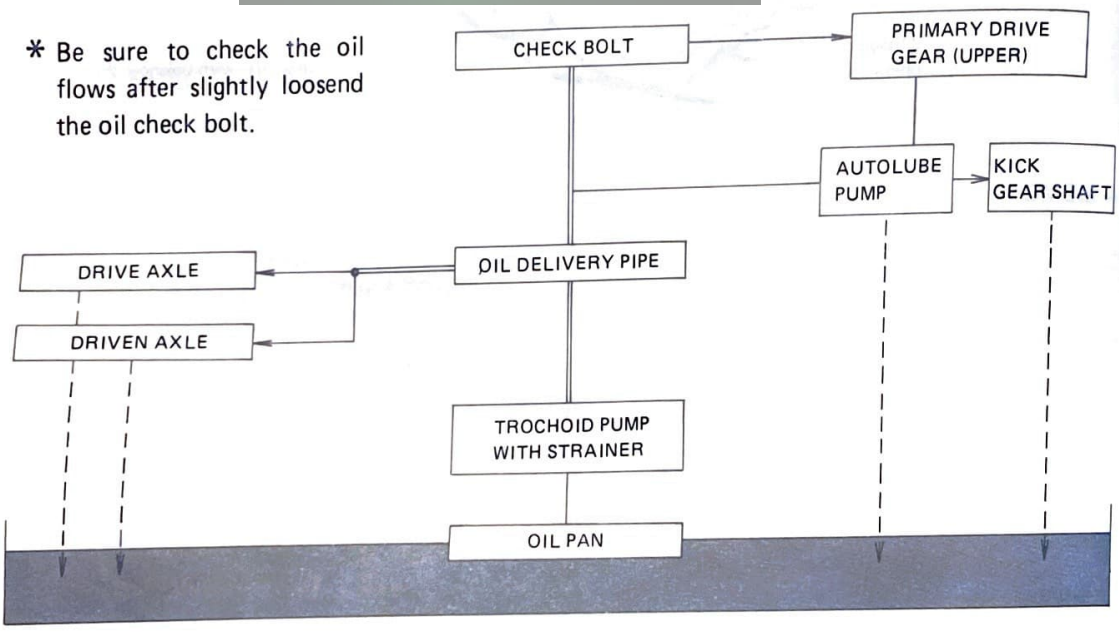
RECOMMENDED OIL:
SAE 10W/30 "SE"
MOTOR OIL

OIL QUANTITY:
Total: 1.6ℓ
Periodic: 1.5ℓ



OIL FLOW CHART

* Be sure to check the oil flows after slightly loosend the oil check bolt.



Checking the transmission oil level

Pay attention to check the oil level, since both the semi-dry and the wet sump lubrication systems are used in combination.

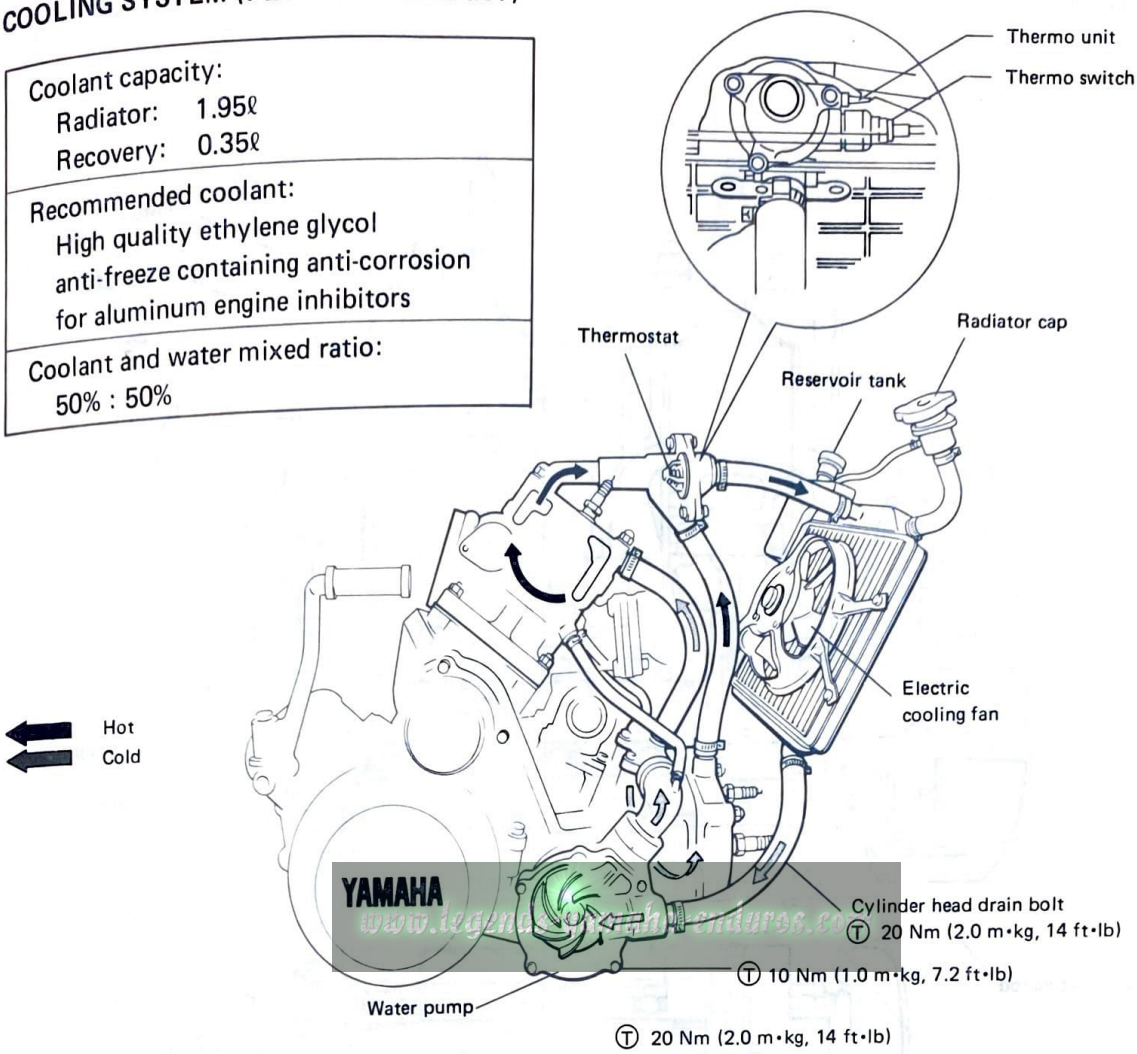
- Start the engine, and after three minutes or so, stop it. If the oil level rises gradually up to the specified level, oil level is correct. (The oil flows from transmission case to the clutch case.)

WARNING:

When replacing the transmission oil, oil amount should be measured.

COOLING SYSTEM (FLOW OF COOLANT)

Coolant capacity: Radiator: 1.95ℓ Recovery: 0.35ℓ
Recommended coolant: High quality ethylene glycol anti-freeze containing anti-corrosion for aluminum engine inhibitors
Coolant and water mixed ratio: 50% : 50%

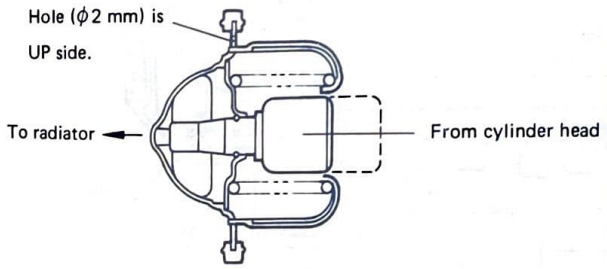


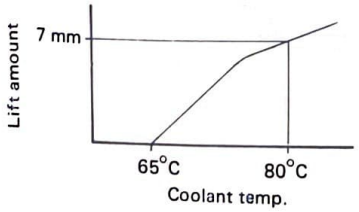
COOLANT FLOW:

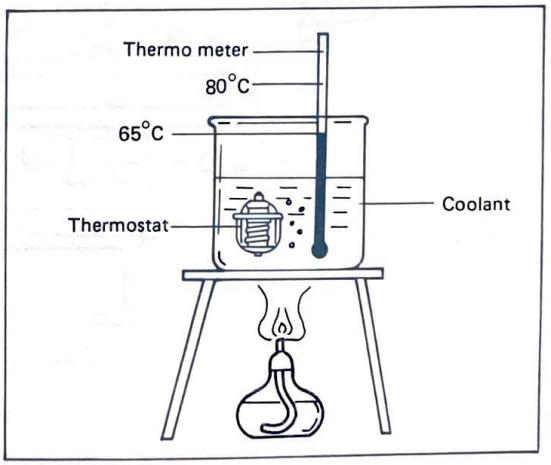
When the coolant temperature rises to more than 65°C, the thermostatic valve is opened, thus allowing the coolant to flow.

When the coolant temperature is over the 105°C, the thermoswitch is turned on, and the electric cooling fan operates, thus increasing cooling efficiency.

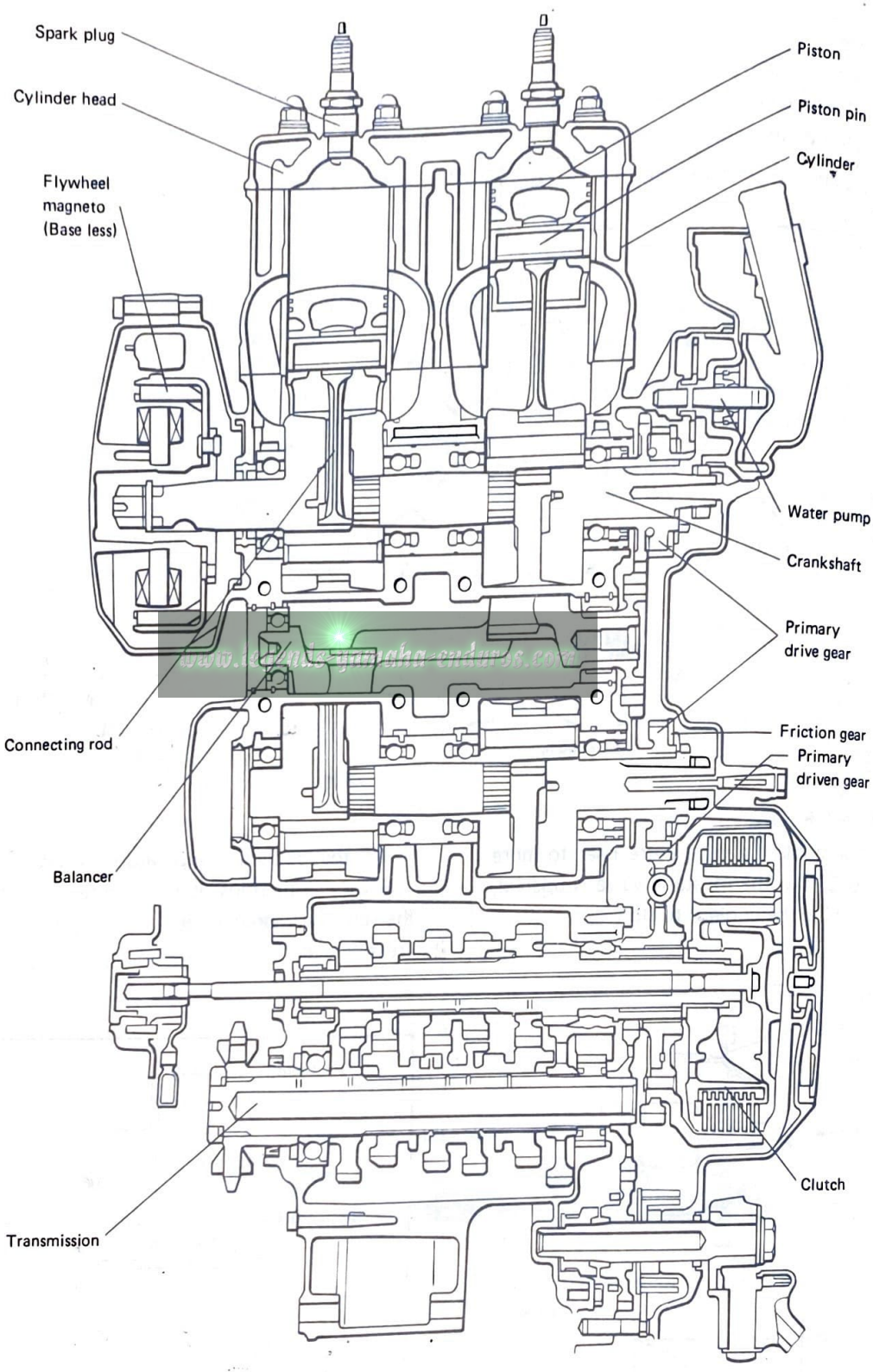
THERMOSTAT



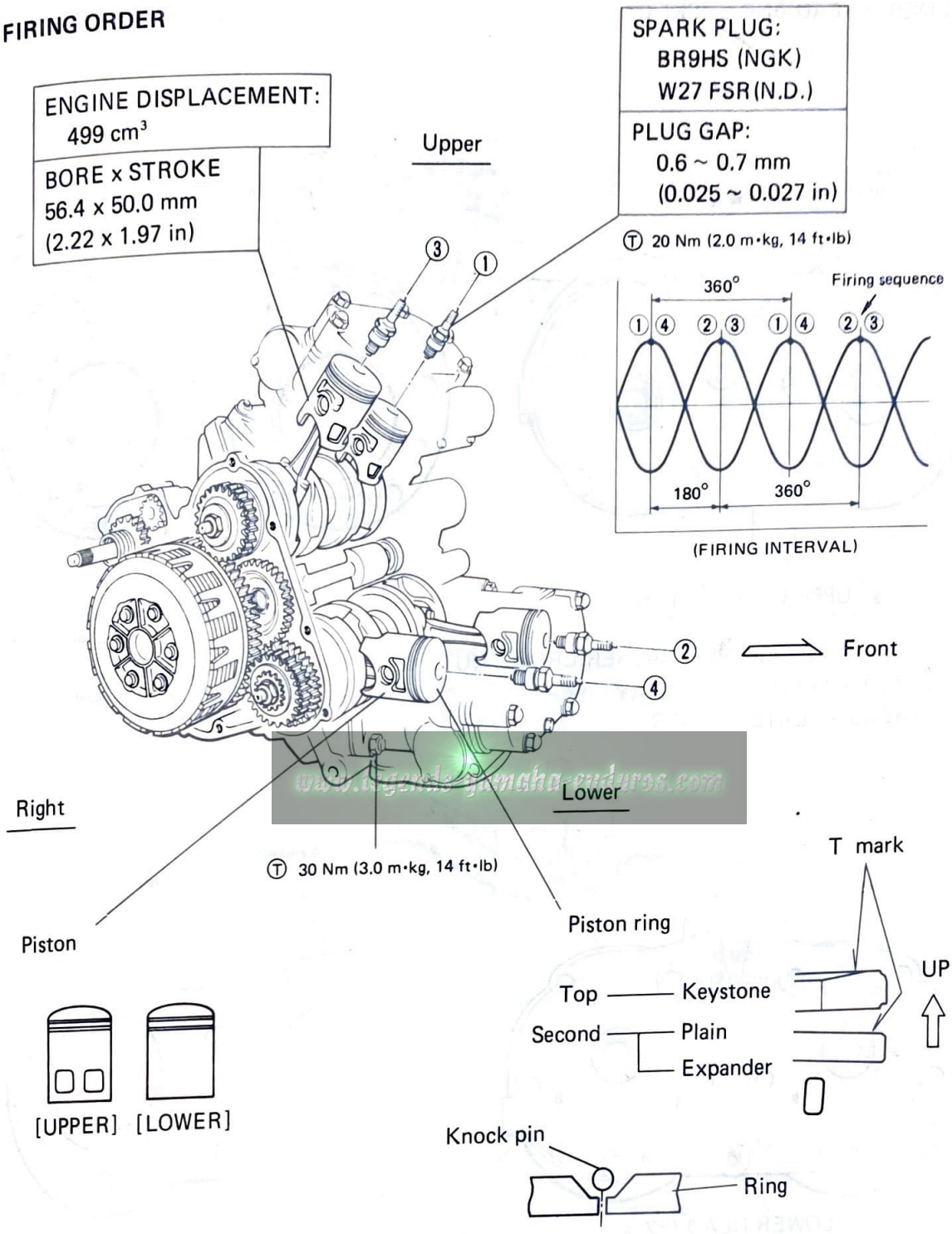




ENGINE ASSEMBLY

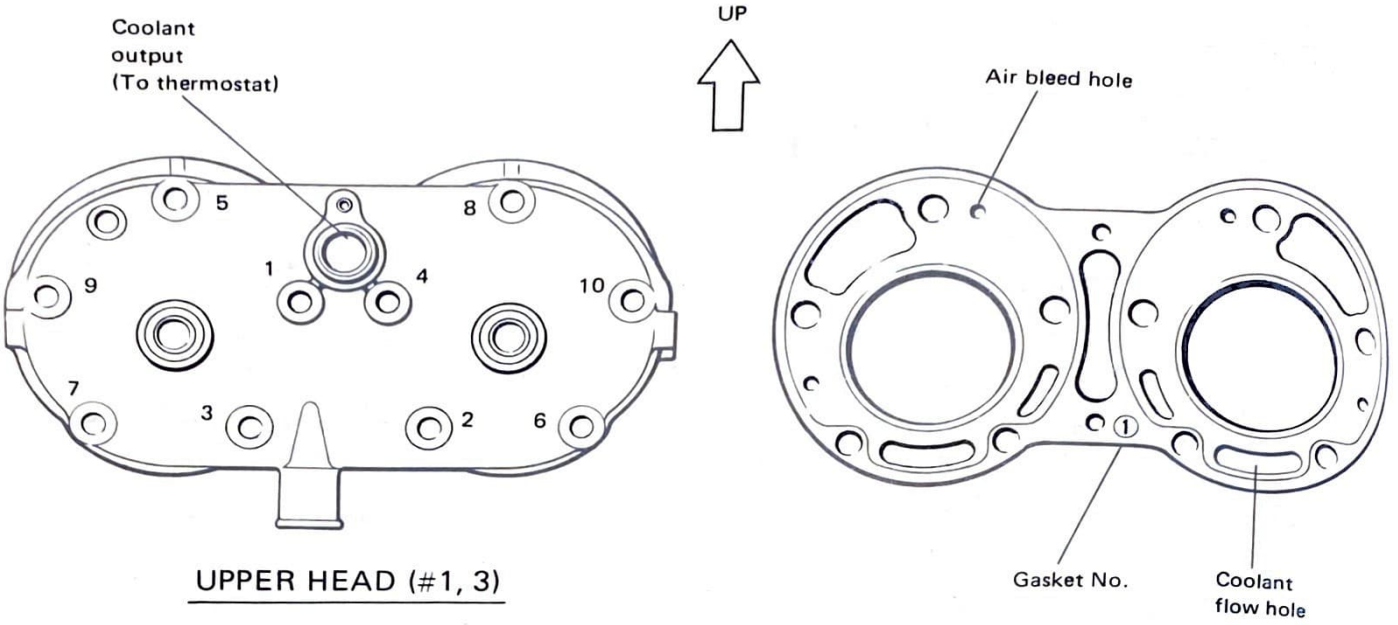


FIRING ORDER



Engine Numbering:
The upper left is #1, lower left is #2, upper right is #3, and lower right is #4.
Disassembly begin with lower cylinder (#2, 4).

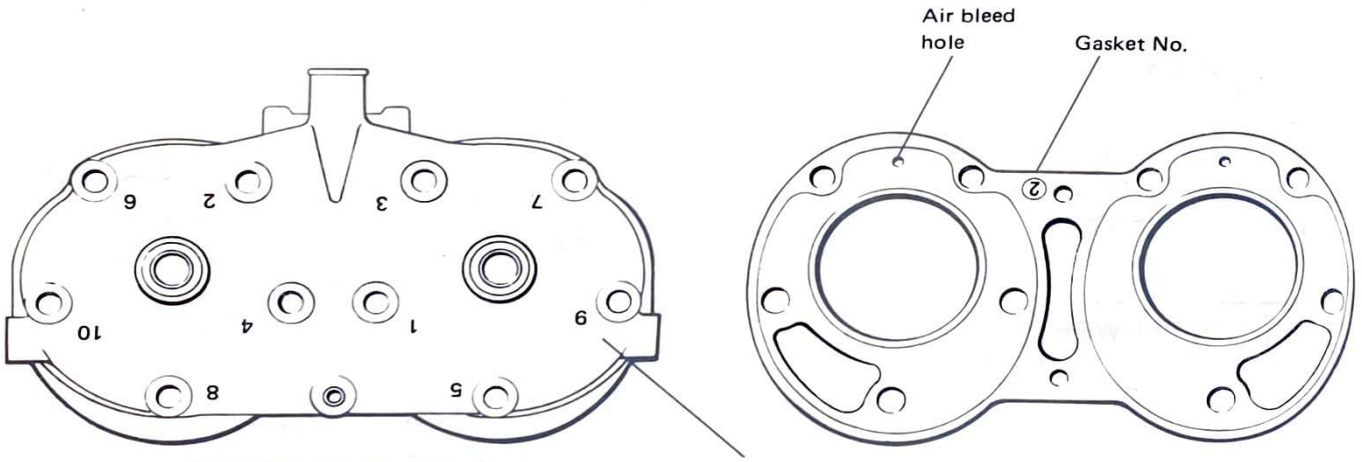
CYLINDER HEAD AND GASKET



UPPER HEAD (#1, 3)

- No. 1, 4, 9, 10 → COPPER WASHER/CROWN NUT
- No. 2, 3 → THERMOSTAT STAY
- OTHERS → PLATE WASHER

* White stamped number on gasket should be faced to cylinder head.



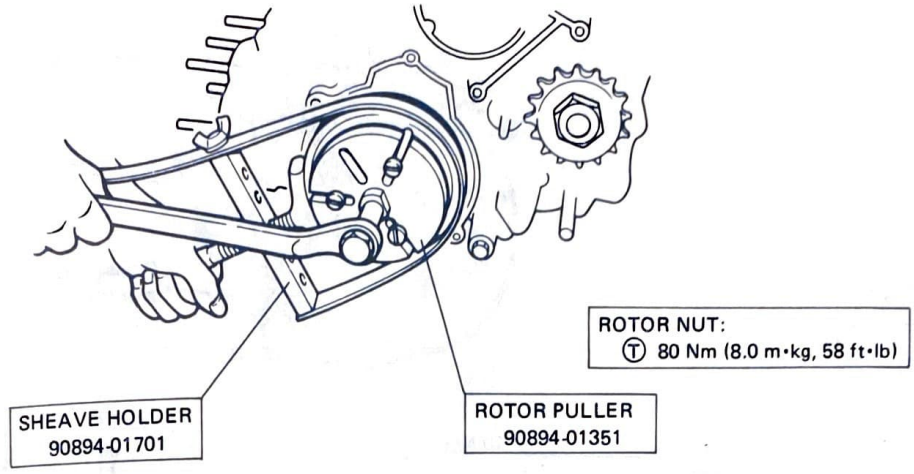
LOWER HEAD (#2, 4)

- No. 1, 4, 9, 10 → COPPER WASHER/ CROWN NUT
- OTHERS → PLATE WASHER

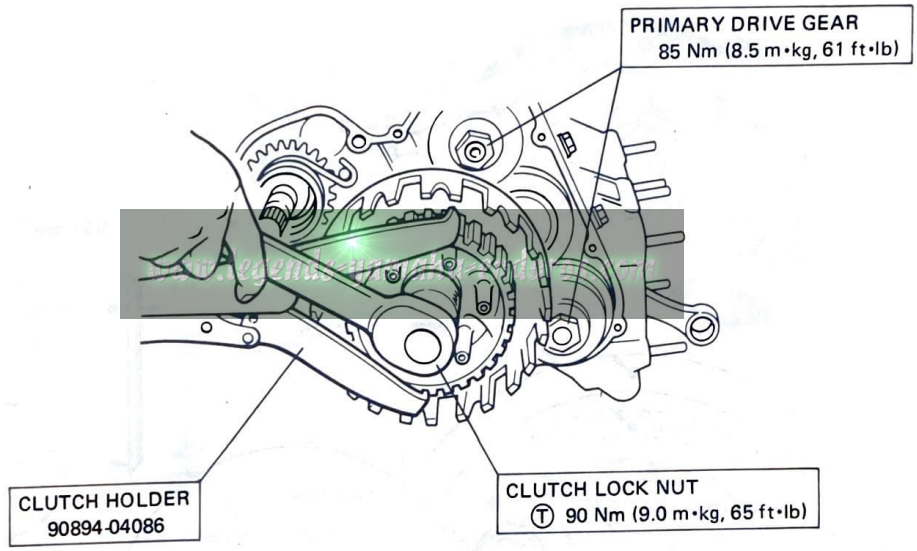
TIGHTENING SEQUENCE:
REMOVE – Starting with highest No. (10)
TORQUE – Starting with lowerest No. (1)

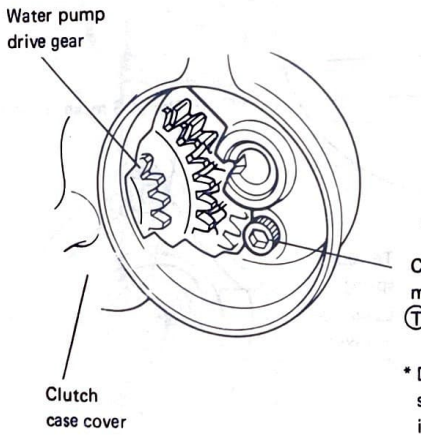
TIGHTENING TORQUE:
25 Nm (2.5 m·kg, 18 ft·lb)

MAGNETO REMOVAL



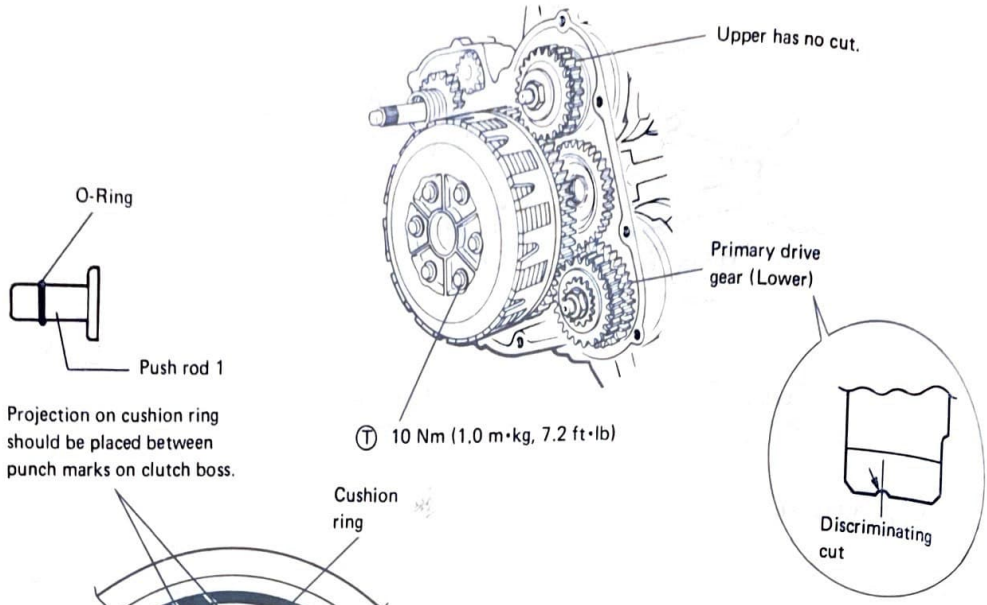
CLUTCH REMOVAL

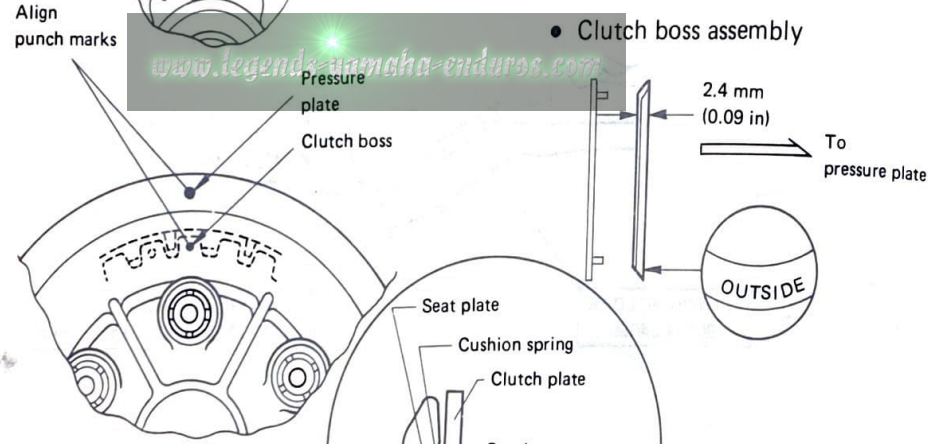




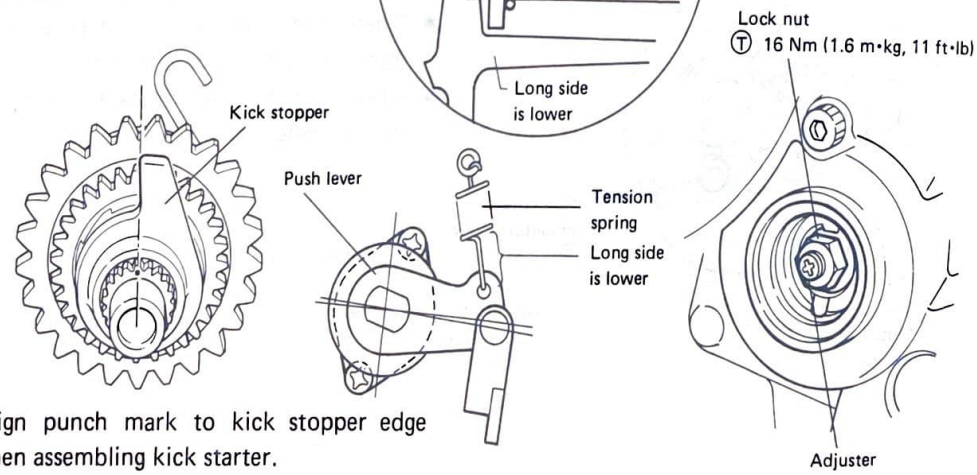
- When installing water pump assembly, bring gears of drive and driven to align.
- When remove clutch case cover, first remove water pamp assembly.

CLUTCH INSTALLATION



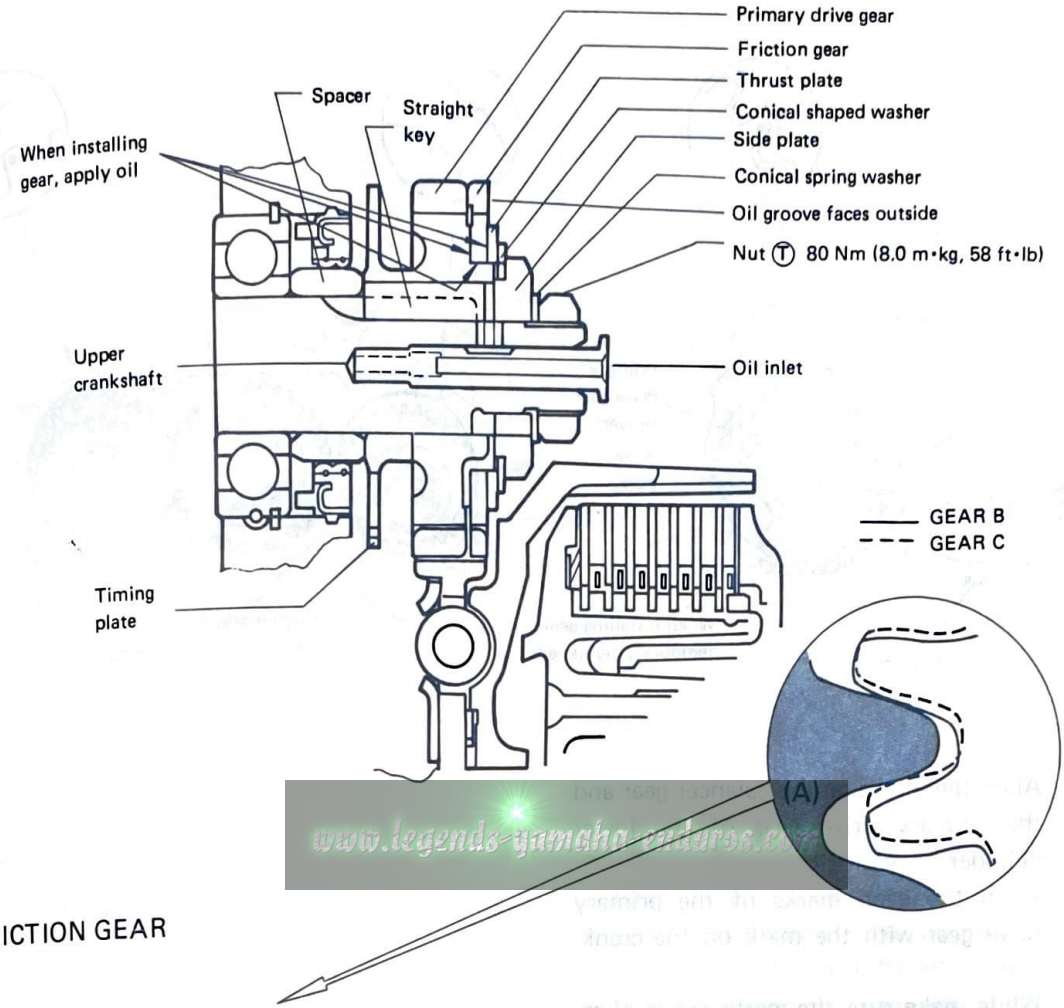


KICK STARTER INSTALLATION

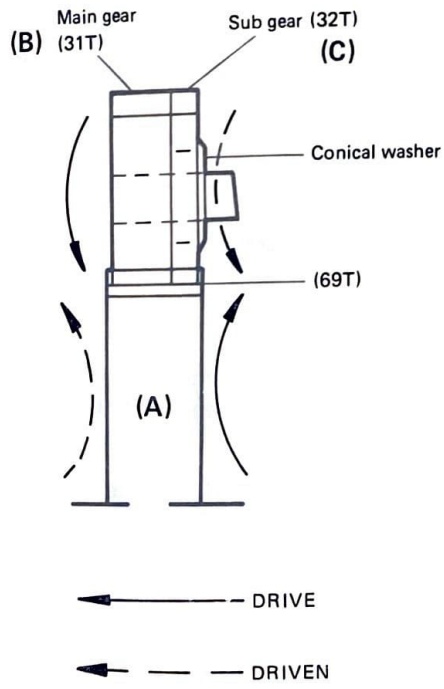


• Align punch mark to kick stopper edge when assembling kick starter.

PRIMARY DRIVE/DRIVEN GEARS INSTALLATION

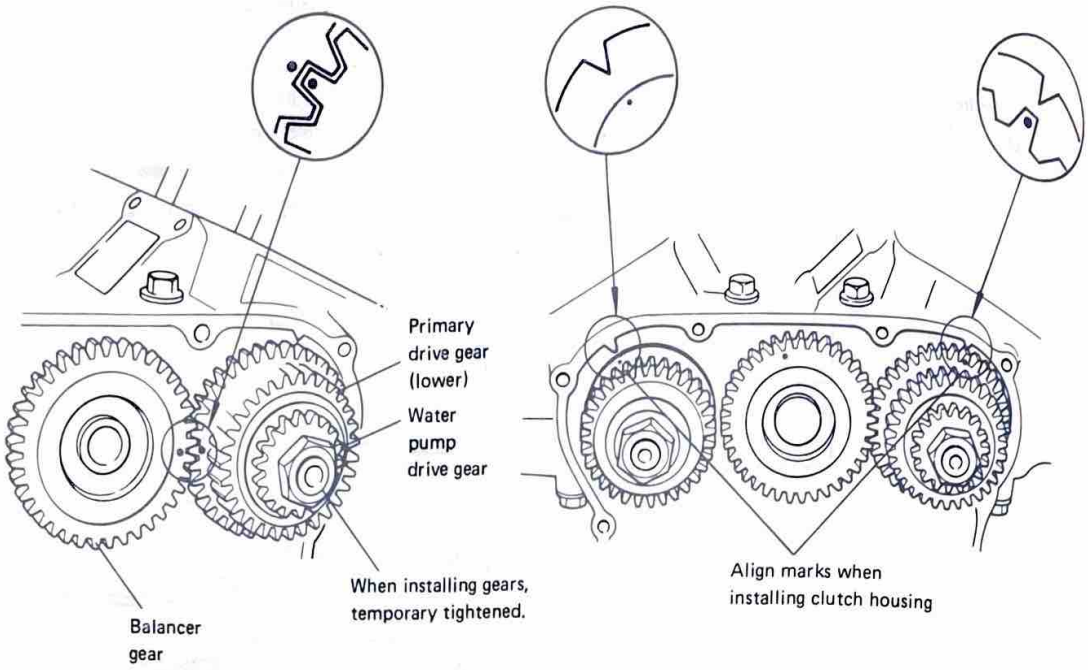


FRICTION GEAR



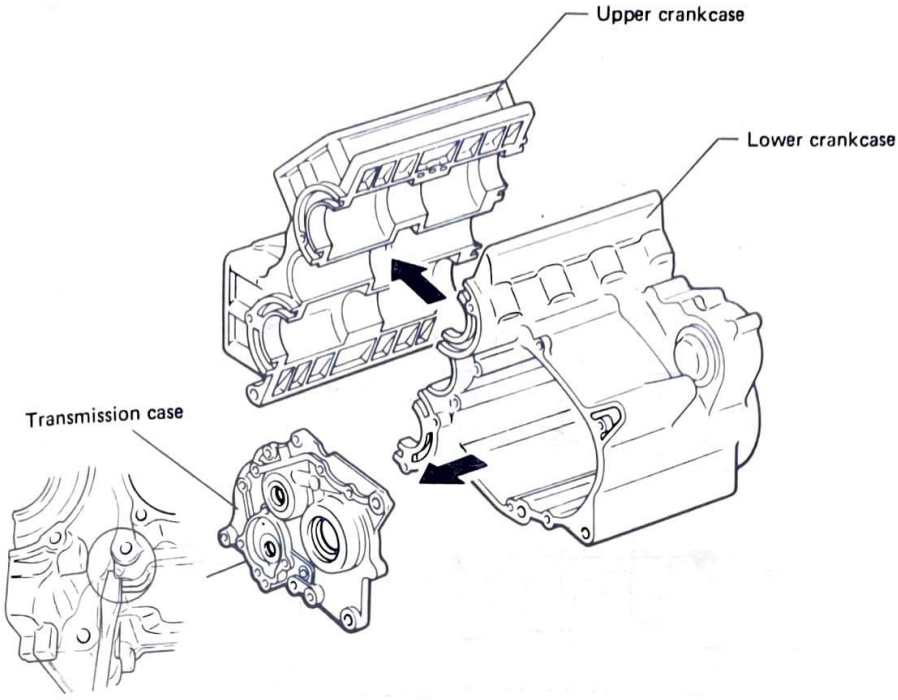
1. The primary drive gear consists of 2 gears on the crankshaft, the teeth number of each gear differing by one tooth.
2. Sub gear (Friction gear) C is free against the main gear B, but hold against it by friction of the conical washer.
3. Gear (A) is driven by gear (B) and gear (C) is driven by gear (A). However power is not actually transmitted between gears (A) and (C).
4. Therefore there is zero back lash between gears B, A and C.

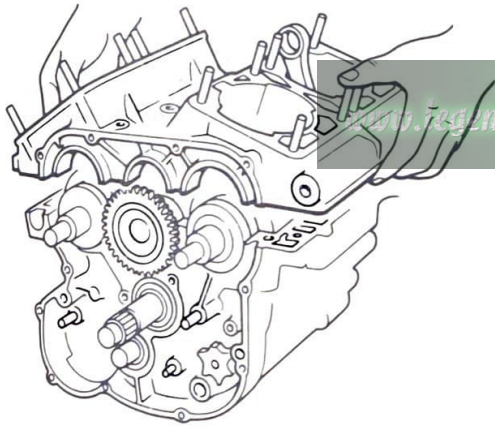
BALANCER INSTALLATION



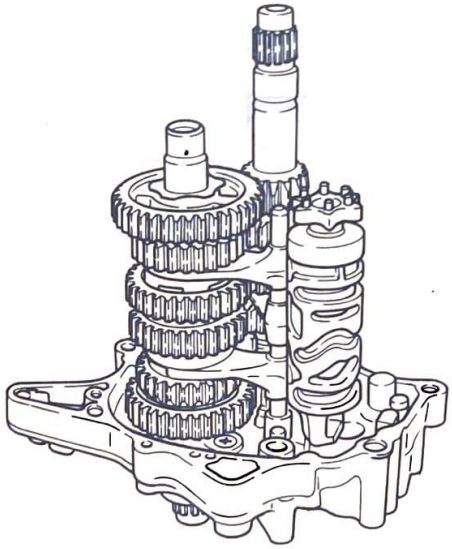
1. Align the marks on the balancer gear and the primary drive gear of the lower cylinder.
2. Align the each marks of the primary drive gear with the mark on the crankcase.
3. While make sure the marks are in alignment, install the clutch housing.

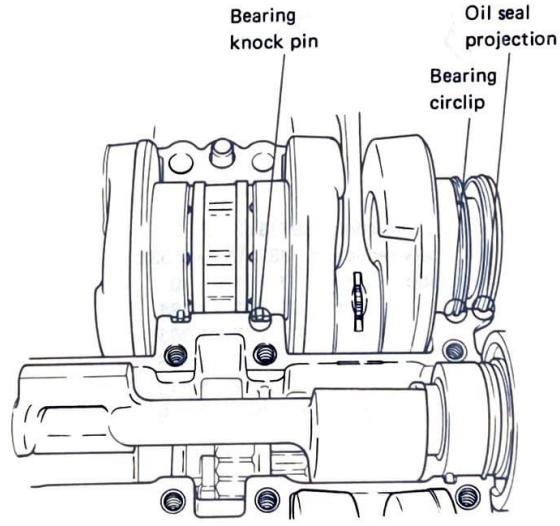
CRANKCASE SEPARATION



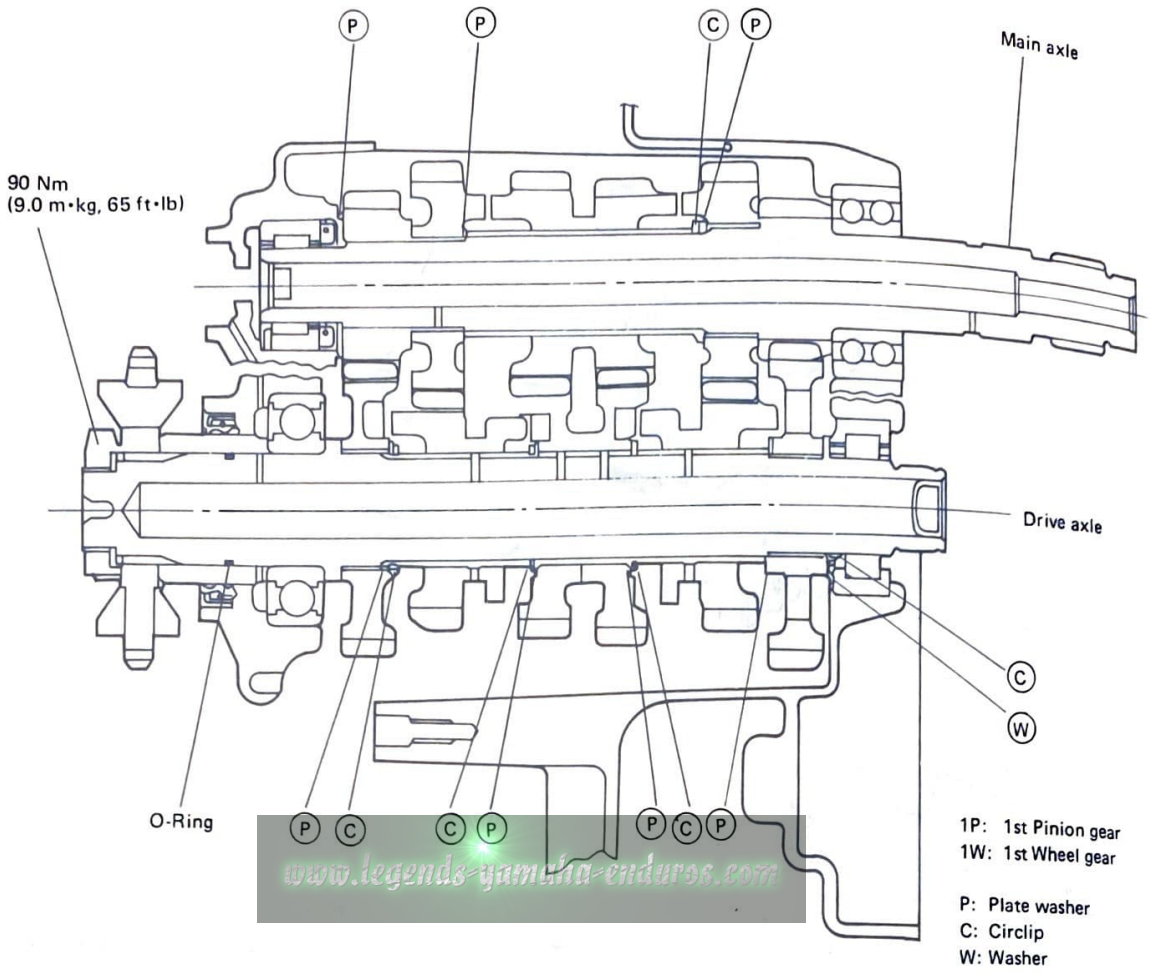


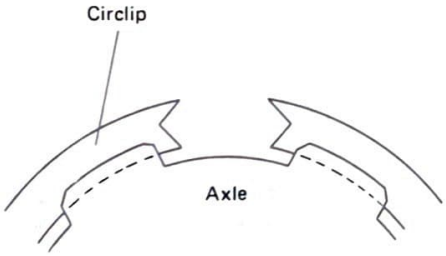
- The crankshaft can be serviced without removing the transmission.
- The transmission must be removed or installed together with transmission case.
- When removing the transmission case, use the flat head screw driver to separate it.

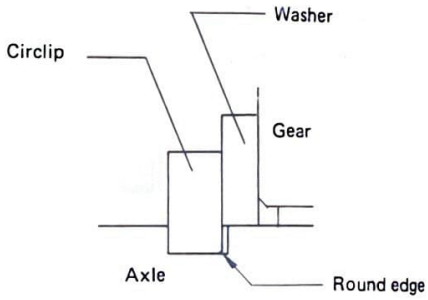




TRANSMISSION ASSEMBLY

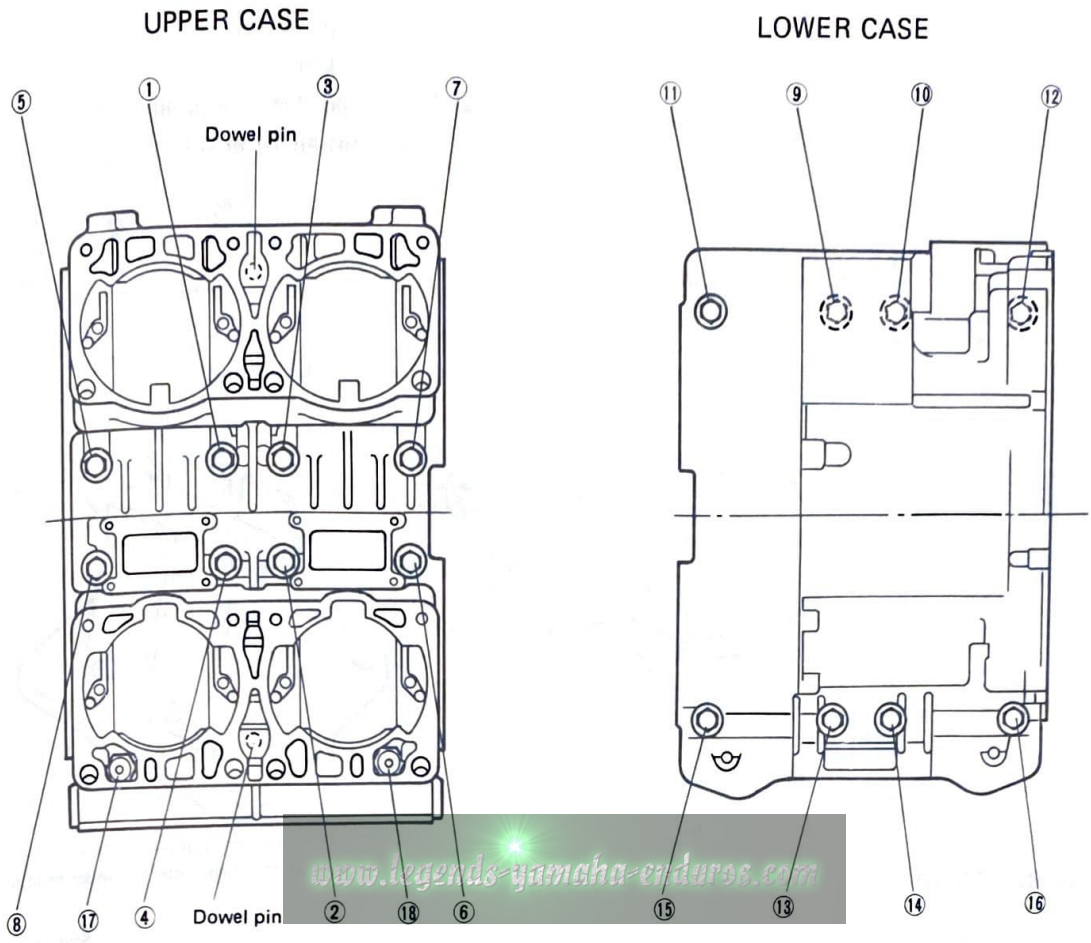






Primary reduction: 69T/31T = 2.225
Secondary reduction: 38T/15T = 2.533
Gear ratio: 1st: 36T/15T = 2.400
2nd: 32T/19T = 1.684
3rd: 30T/22T = 1.363
4th: 28T/24T = 1.166
5th: 24T/23T = 1.043
6th: 23T/24T = 0.958

CRANKCASE TIGHTENING SEQUENCE



Tighten torque

1st: ① ~ ⑧ Ⓣ 5 Nm (0.5 m·kg, 3.6 ft·lb)

2nd: ① ~ ⑧, ⑰ ⑱, ⑨ ~ ⑯ Ⓣ 25 Nm (2.5 m·kg, 18 ft·lb)

Components

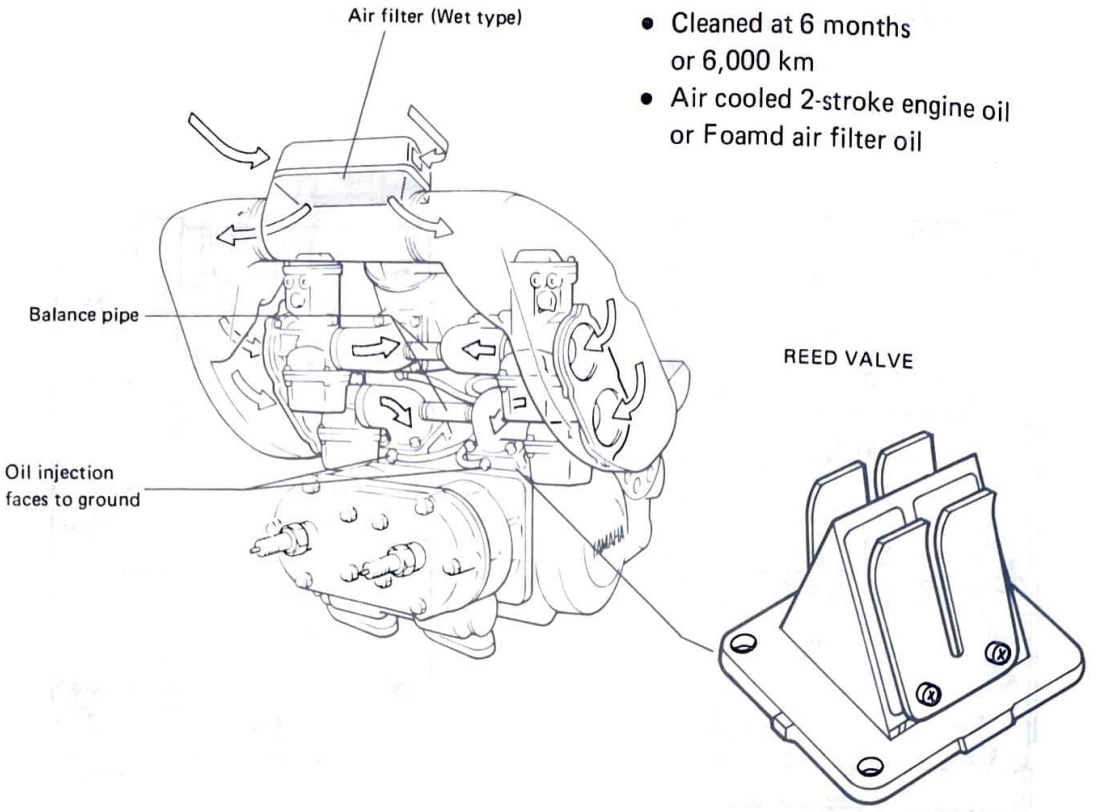
No. 5, 8 → Flange bolt (L = 65 mm (2.56 in)) and washer

No. 17, 18 → Screw and washer

No. 12 → Nut and washer

OTHERS → Flange bolt and washer

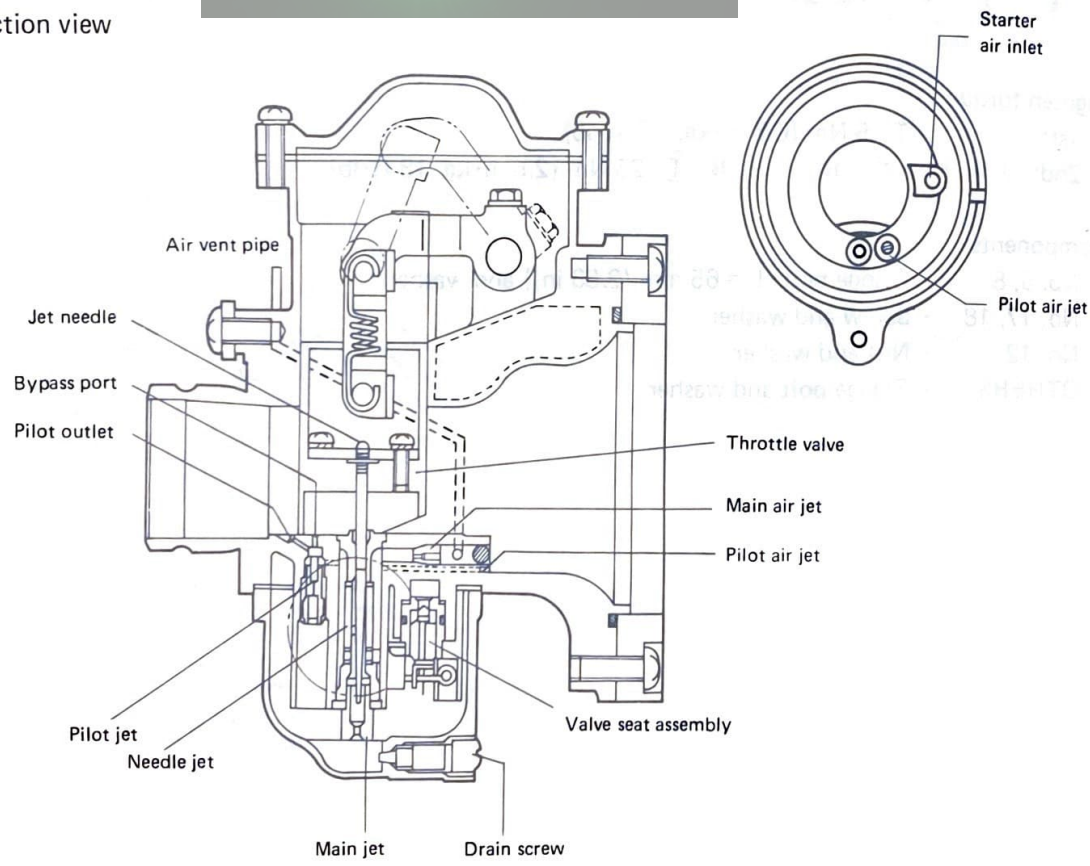
AIR FILTER



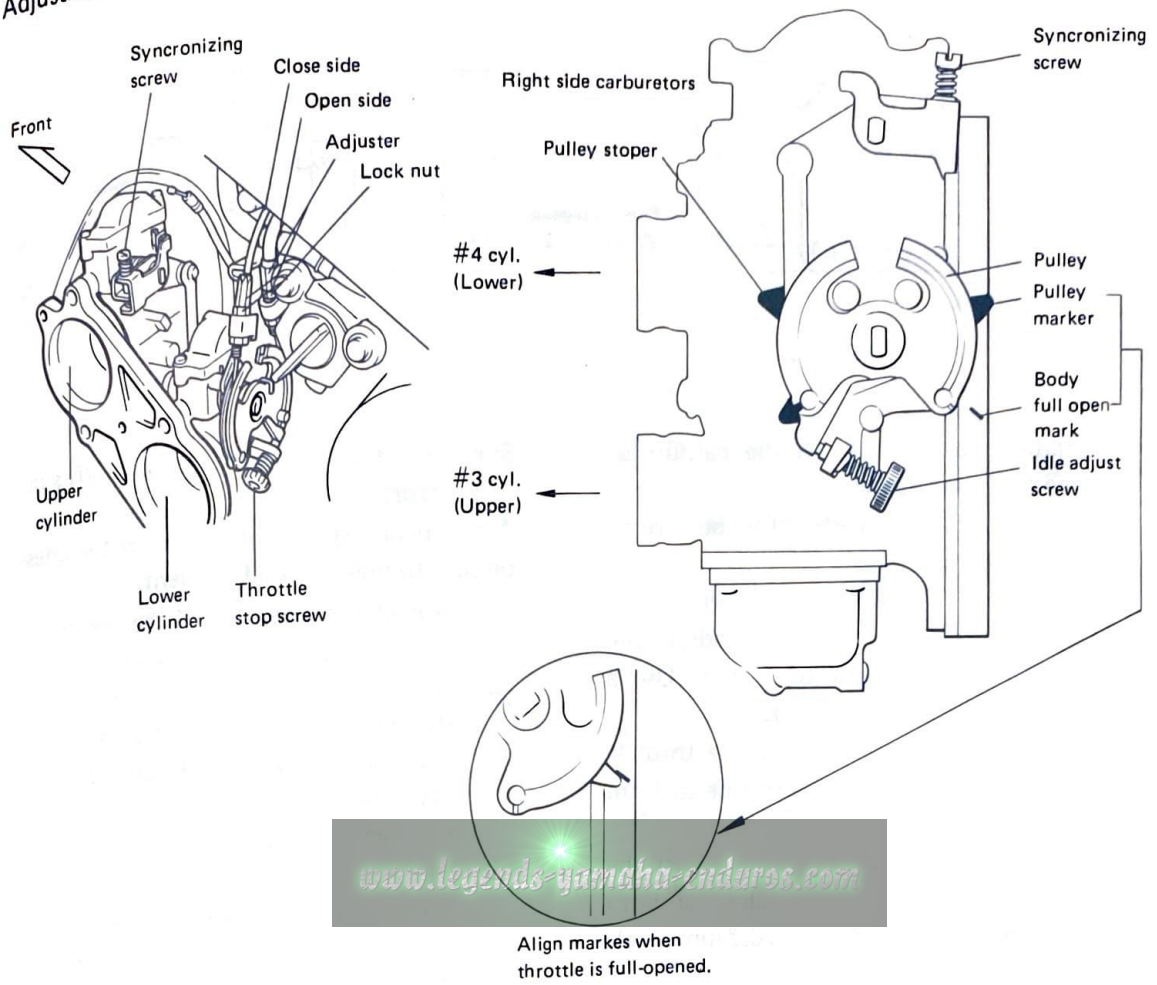
- Cleaned at 6 months or 6,000 km
- Air cooled 2-stroke engine oil or Foamd air filter oil

CARBURETOR

Section view

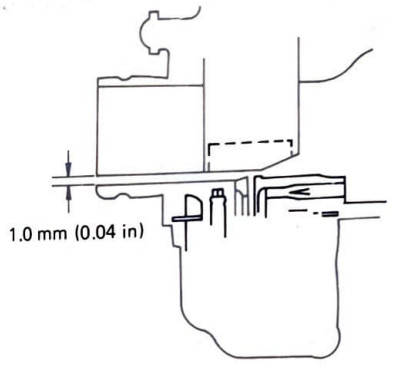


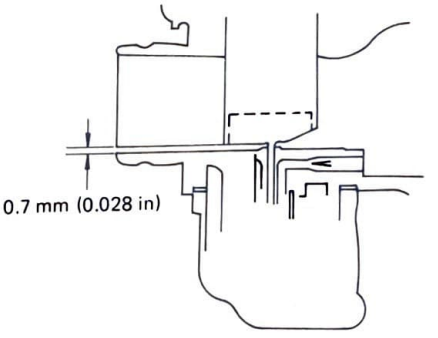
Adjustment



Align markes when throttle is full-opened.

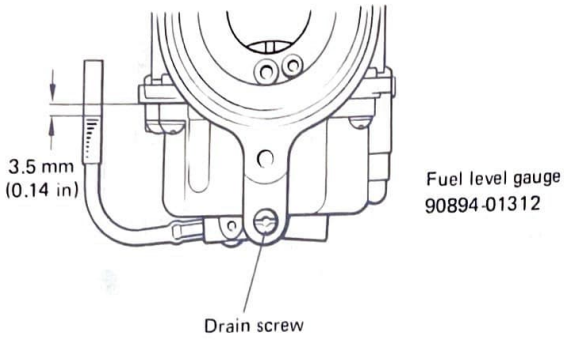
Syncronizing adjustment



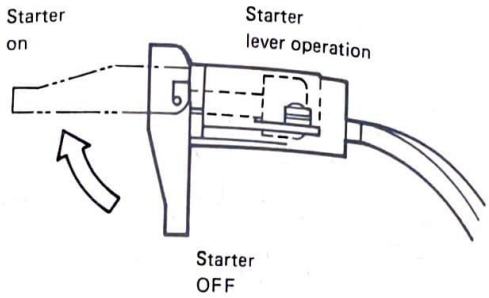


[For idling opening]

Fuel level



Starter



Carburetor adjustment (with the carburetor removed from the engine)

After reassembling the carburetor, be sure to make this adjustment first:

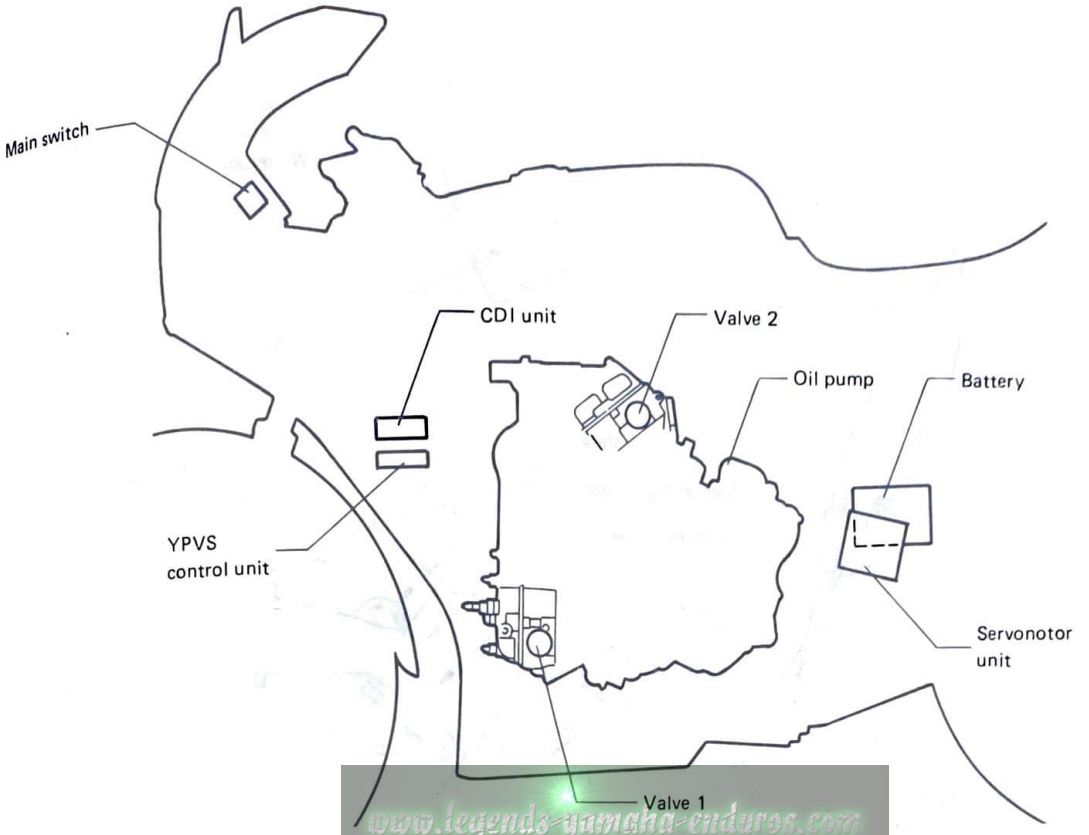
1. Carburetor for the lower cylinder
   Using the idle adjust screw, adjust the throttle valve height to 1 mm (Use a 1 mm wire as a thickness gauge).
2. Then adjust the height of the throttle valve for the upper cylinder side to 1mm using the syncronizing screw.
3. Using the idle adjust screw, adjust the heights of the throttle valve for both cylinders to 0.7 mm (Use a 0.7 mm wire).

Syncronization for both right and left side of carburetors

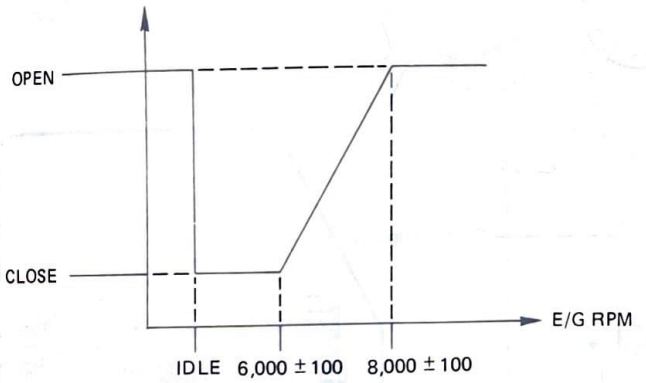
After installing the carburetor to the chessis, be sure to make this adjustment:

1. Adjust the free play of the throttle grip to 5 ~ 7 mm at the grip flange.
2. Make sure the pulley contacts the stopper at full-throttle and contacts the idle adjust screw at closed-throttle. Make the same check for both right and left carburetors.
3. When both side carburetors are opened fully, align the pulley marker with the full open mark by adjusting the open-wire.
4. With the closed-throttle, check to see if the close-wire has a little amount of free play.

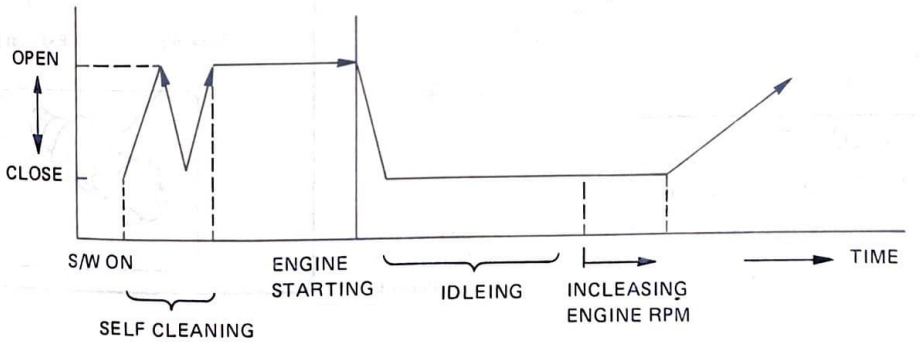
YPVS (Yamaha Power Valve System)

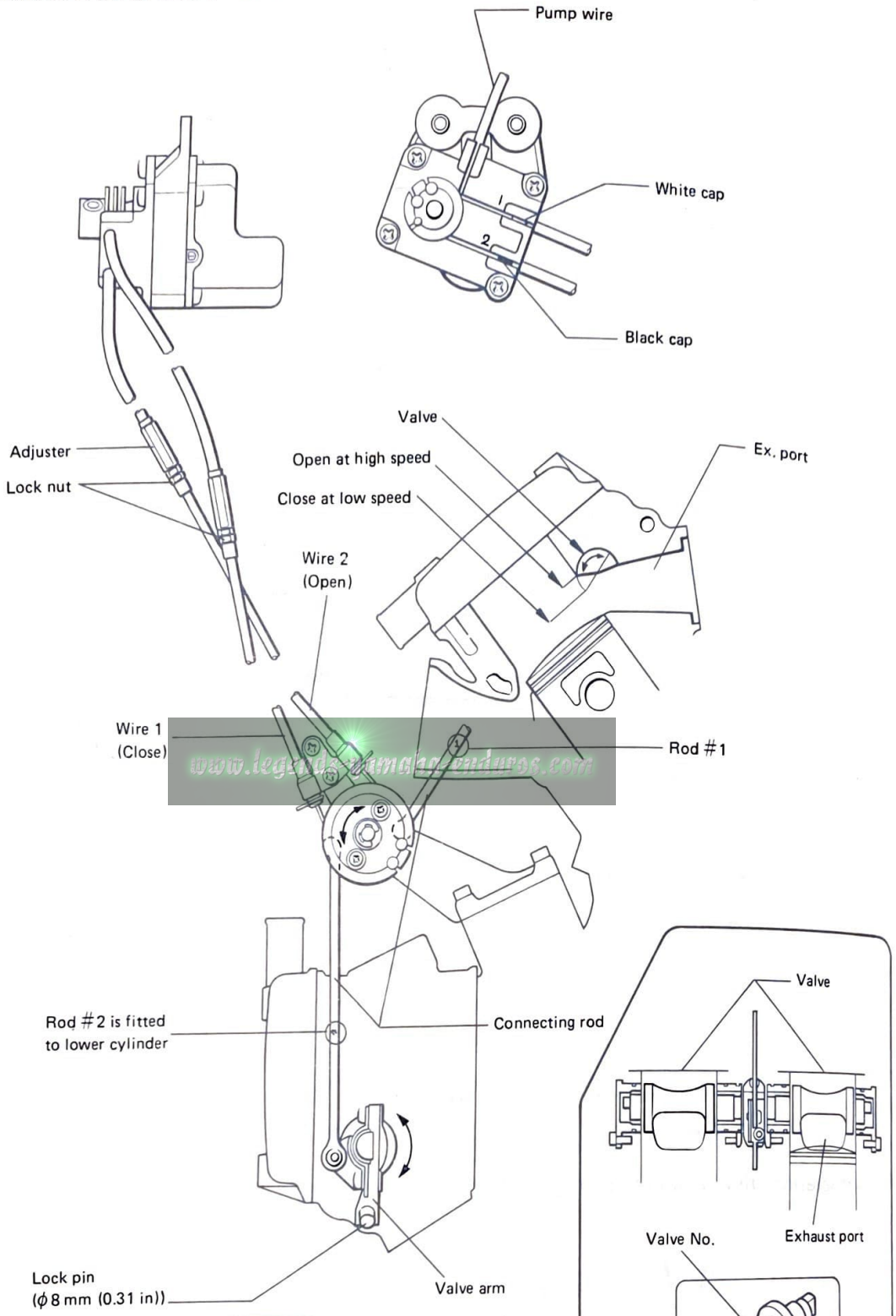


Basic operation (engine rpm vs. valve opening rate)



YPVS operation (time vs. valve opening rate)





VALVE LOCATION	
Valve number	Cylinder number
Valve 1	# 2 cyl. # 3 cyl.
Valve 2	# 1 cyl. # 4 cyl.

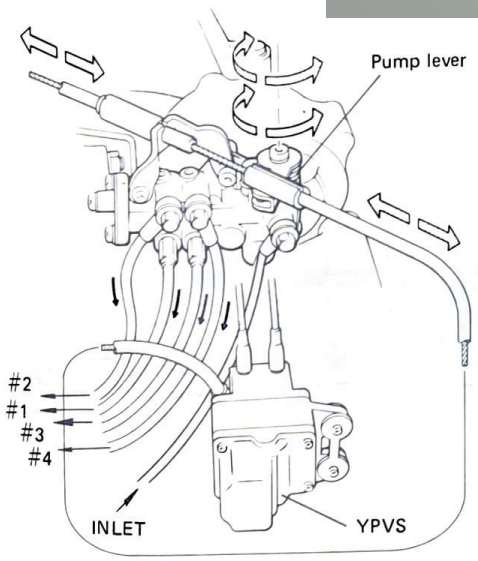
YPVS cable adjustment

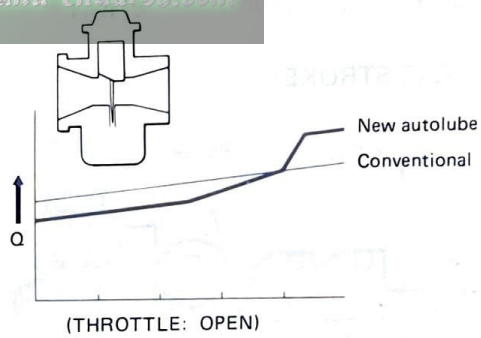
After assmbling the YPVS, make the following adjustment.

1. Turn on the main switch, and set YPVS in full-open position.
2. Using an 8 mm (0.31 in) diameter pin, and align the valve arm with the hole in the cylinder.
3. With this condition, loosen both adjuster of wires which have no free-play.
   Back off the adjuster 1/2 turn from this tightest position and lock the adjuster by the lock nut.
4. Remove the lock pin, and by turning the main switch on and off, make sure the valve arm aligns with the hole in the cylinder.

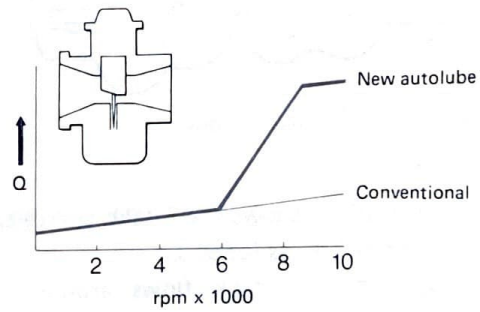
AUTOLUBE SYSTEM (OIL PUMP)

RECOMMENDED OIL
AIR COOLED 2-STROKE ENGINE OIL
2.0ℓ



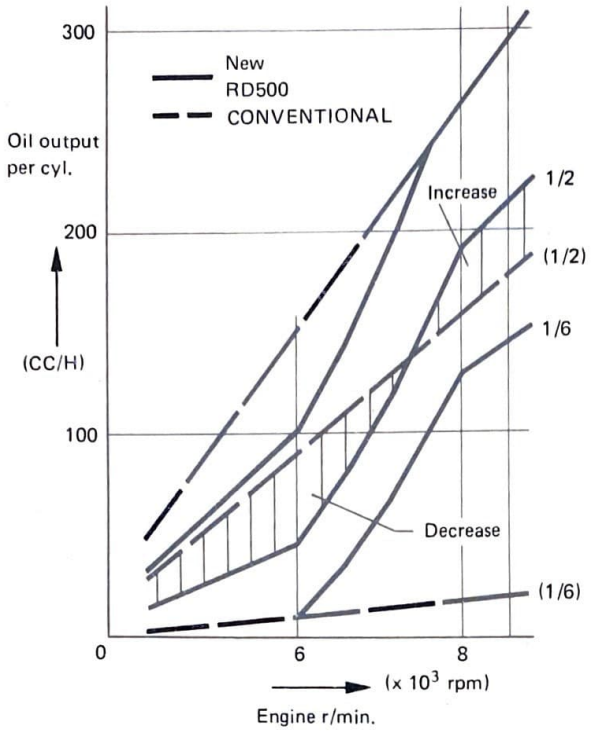


(THROTTLE: OPEN)



(THROTTLE: CLOSED)

OIL PUMP OUTPUT

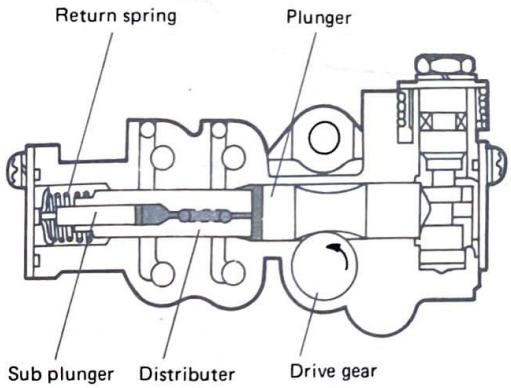


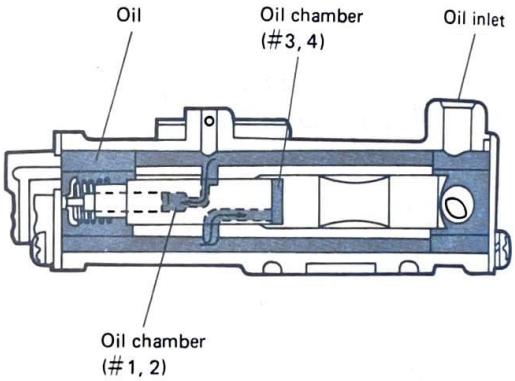
OIL OUTPUT

On the new RD500, Autolube oil is properly supplied to the engine depending on the engine load conditions. The oil output is controlled by the engine speed, throttle opening and YPVS operation. The oil outpus increases as the engine speed rises, and at 5,000 rpm or high where YPVS operates, and the oil output adds depending on YPVS opening (engine speed). As the throttle opening increases, the oil output is also increased. In this way, the oil output changes according to the variations in the throttle and YPVS openings. It is greatly affected by the YPVS opening when the throttle opening is smaller.

CONSTRUCTION AND OPERATION

[INTAKE STROKE]

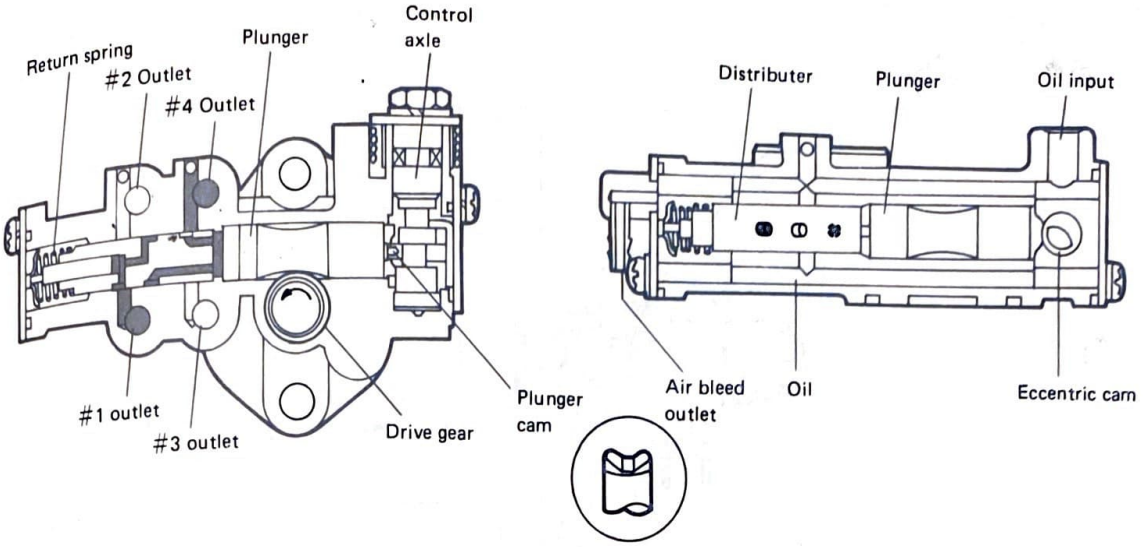




This illustrations shows the intake stroke and oil pump operates as follows.

1. Oil from oil tank flows around the plunger and the distributer.
2. The plunger is rotated by the drive gear, and plunger and distributer are moved to right side by the return spring, and a vacuum is produced in the oil chamber. When the oil inlet of the distributer aligns with the oil passage in the oil pump, oil flows into the oil chamber.

[OUTPUT STROKE]



3. When the plunger is turned further, it is moved to left side by the cam, thus compressing the oil. When oil outlet of the distributer alignes with the pump discharge port, the oil in the oil chamber overcomes the check ball spring force, and the oil is supplied to cylinders # 4 and # 1.

Operation of oil pump

Plunger and distributer

Both parts are rotated by the drive gear, and the oil is inhaled and discharged at every 90° turn of the plunger operated by the return spring and the plunger cam.

Control lever (axle)

The excentric cam on the axle is turned by the control lever to change the plunger stroke. The amount of lever movement is determined depending on opening of both the throttle and YPVS.

When the YPVS is in full-open position with the throttle narrow-opened, the control lever moves only half of fuel movement.

Sub plunger

Fixed to the pump body.

Oil chamber (# 1, 2)

When the plunger moves back and forth, the oil chamber volume changes, as the sub plunger is fixed to the oil pump.

Oil chamber (# 3, 4)

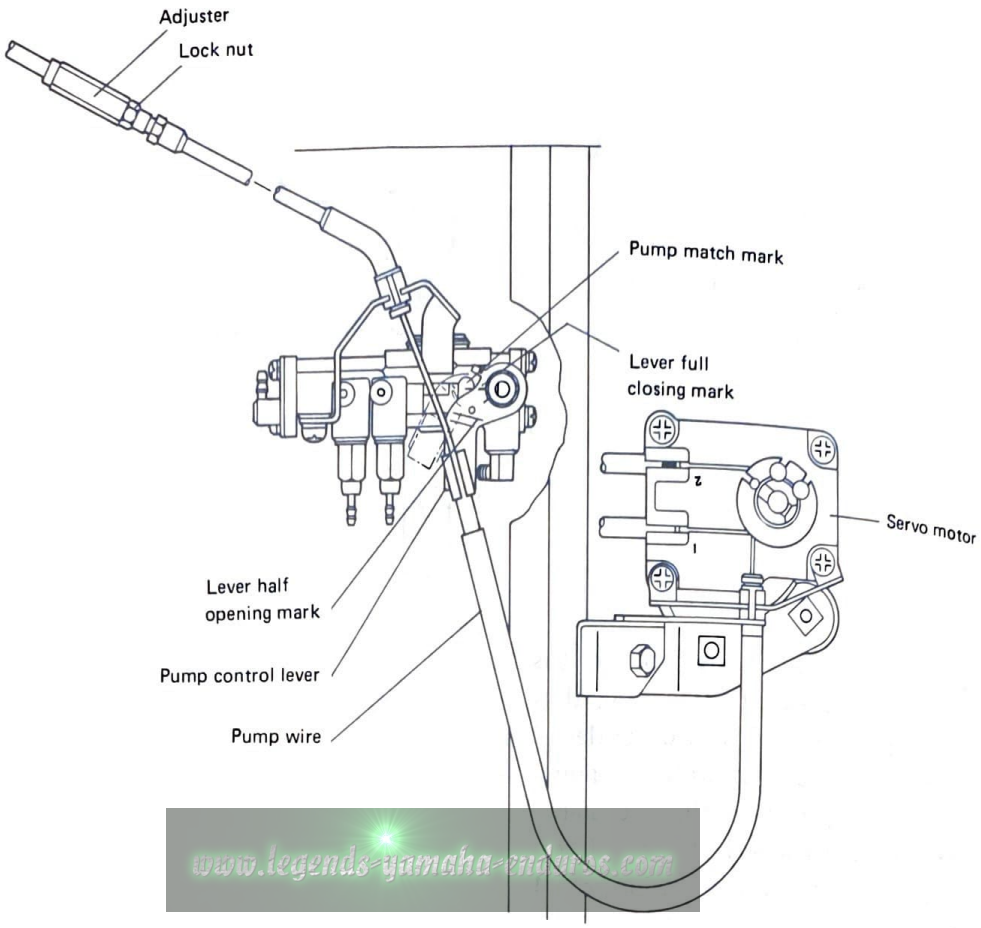
The oil chamber volume changes depending on plunger stroke.

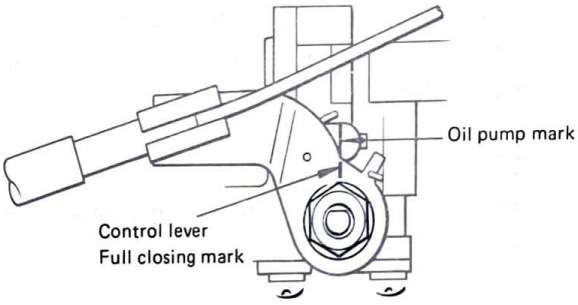
Oil pressure check ball

The check ball is installed in discharge port. It's check pressure is 0.2 kg/cm^2.

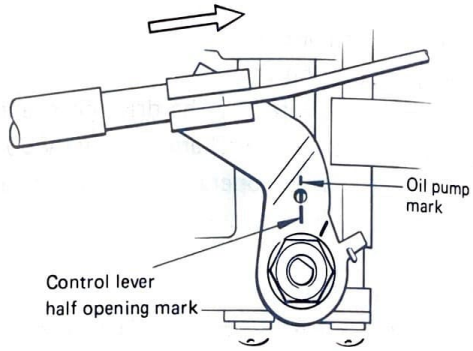
The check valve maintains a constant oil pressure and prevents oil from flowing directly into the engine.

PUMP WIRE ADJUSTMENT





[YPVS – Full close]



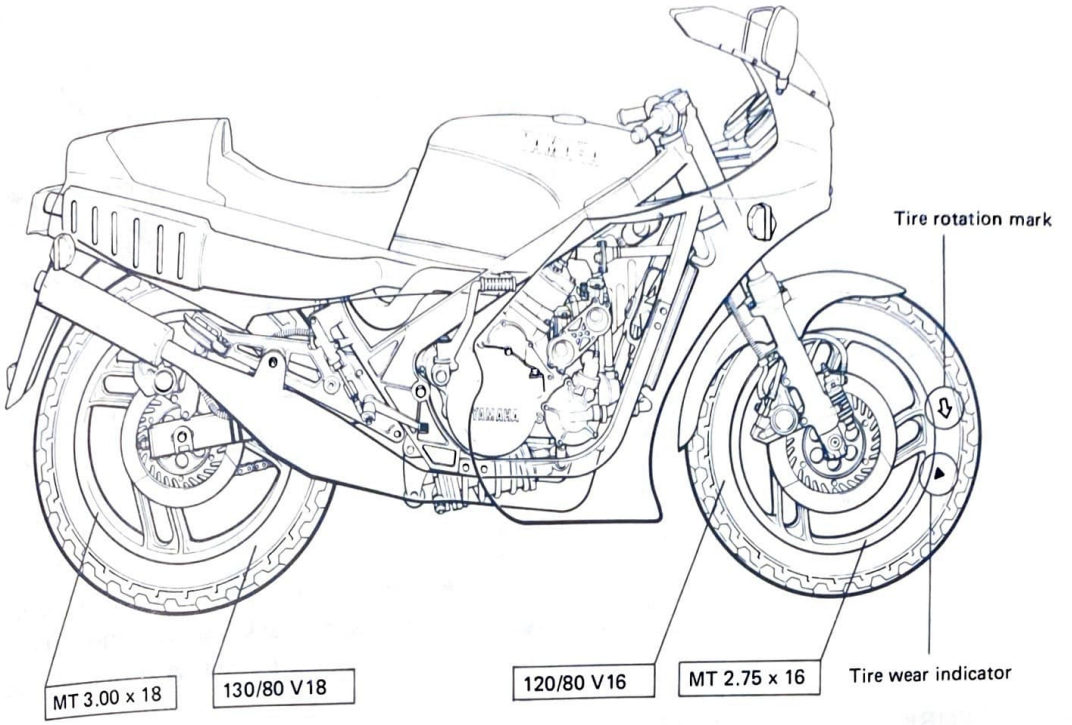
[YPVS – Full open]

OIL PUMP WIRE ADJUSTMENT

1. Turn on the main switch.
2. Twist the throttle grip a little so that the throttle wire has no free-play.
3. Then adjust the oil pump control lever so that the 1/2 open mark on the control lever aligns with the mark on the pump body.
4. Turn the main switch off and on, and make sure that the full-closed mark on controll lever aligns with the pump mark.

CHASSIS

TIRE



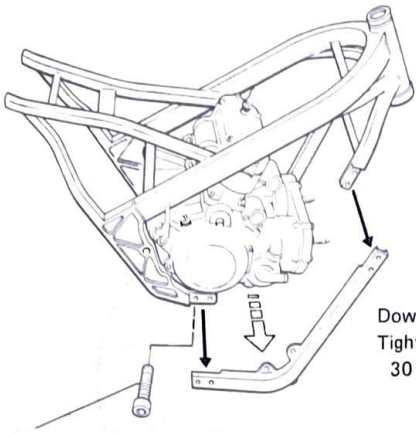
Manufacturer / Type	MICHELIN	DUNLOP	YOKOHAMA
FRONT	A48	K125	F101
Rear	M48	K225	R101

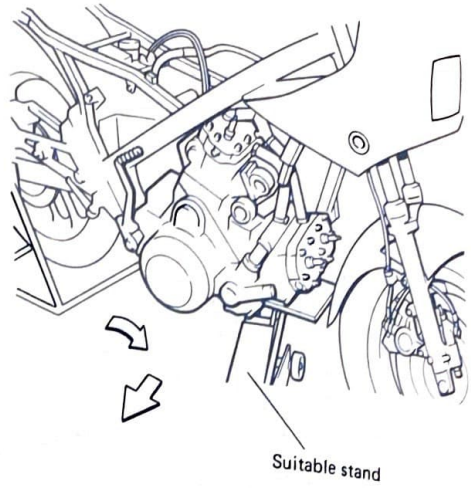
TIRE PRESSURE

	Solo	Hig speed or with passenger
FRONT	1.75 kg/cm²	2.0 kg/cm²
REAR	2.00 kg/cm²	2.25 kg/cm²

FRAME (DETACHABLE DOWNTUBE)

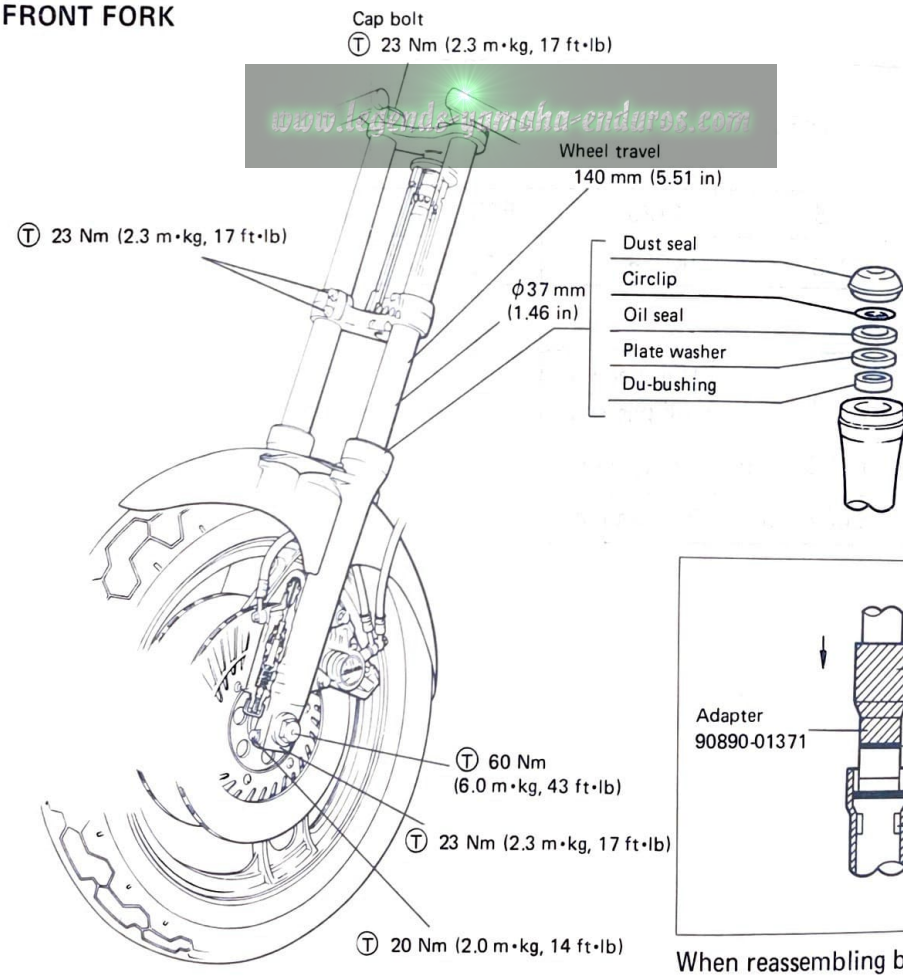
- To remove the engine, the down-tube must be removed.

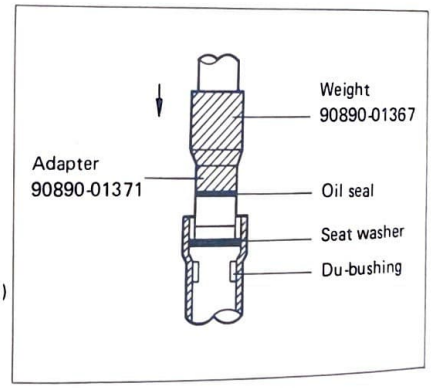




- Place a Jack (for automobile) under the engine, and jack it up to remove the engine. Pull it a little front ward, and pull it out to right side.

FRONT FORK

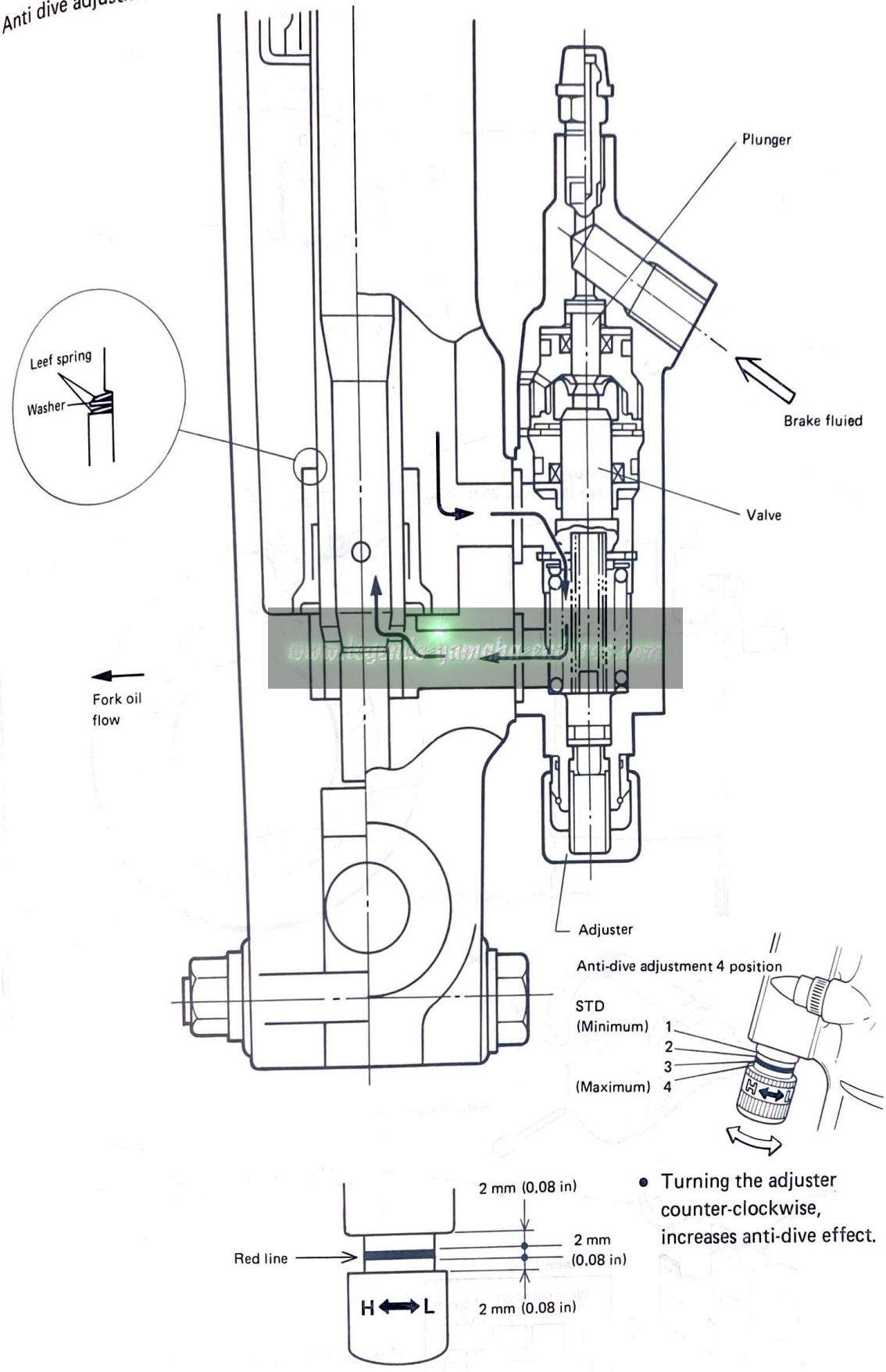




When reassembling bushing, oil seal and dust seal, use special tools.

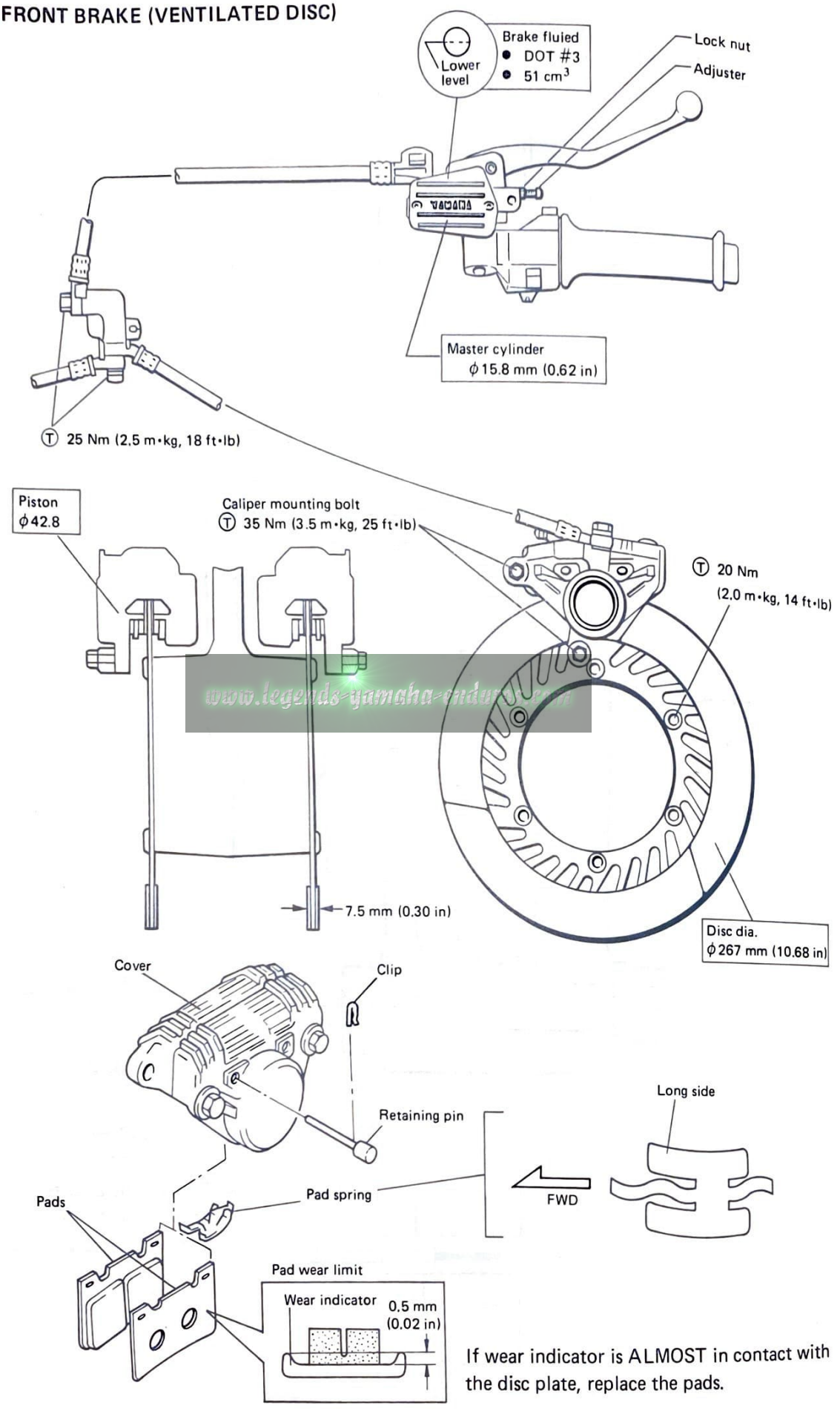
ANTI DIVE SYSTEM

Anti dive adjustment should be same both side.



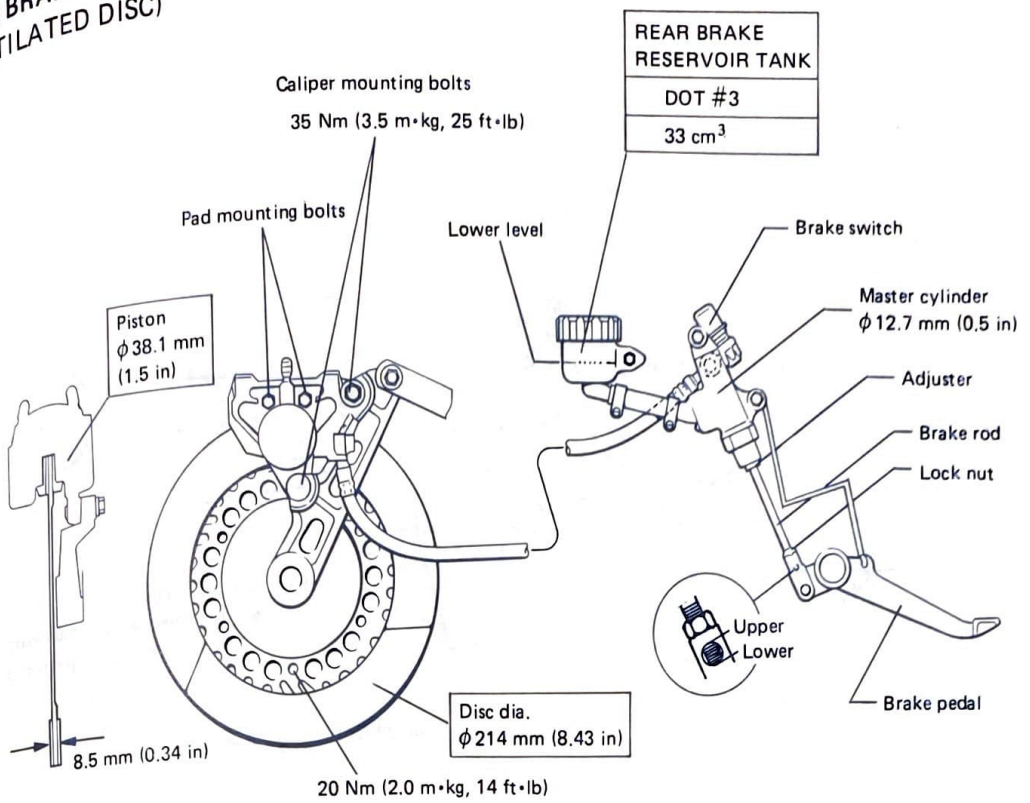
- Turning the adjuster counter-clockwise, increases anti-dive effect.

FRONT BRAKE (VENTILATED DISC)

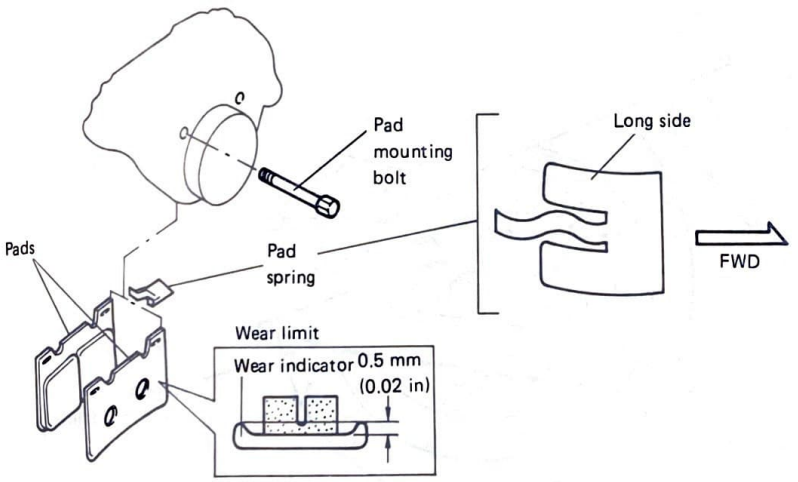


If wear indicator is ALMOST in contact with the disc plate, replace the pads.

REAR BRAKE (VENTILATED DISC)

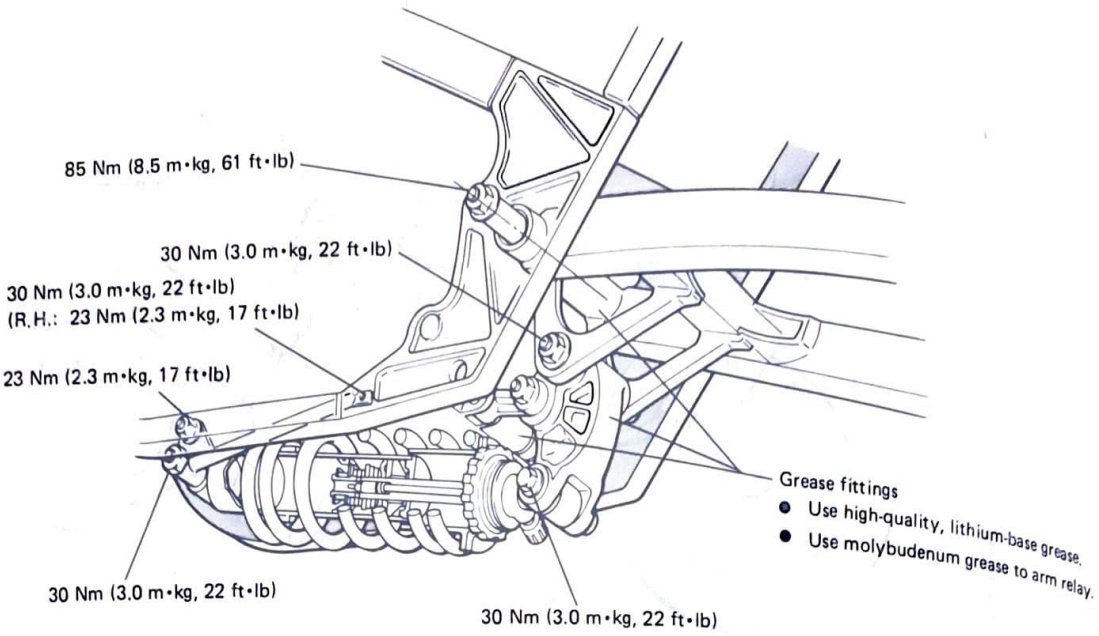


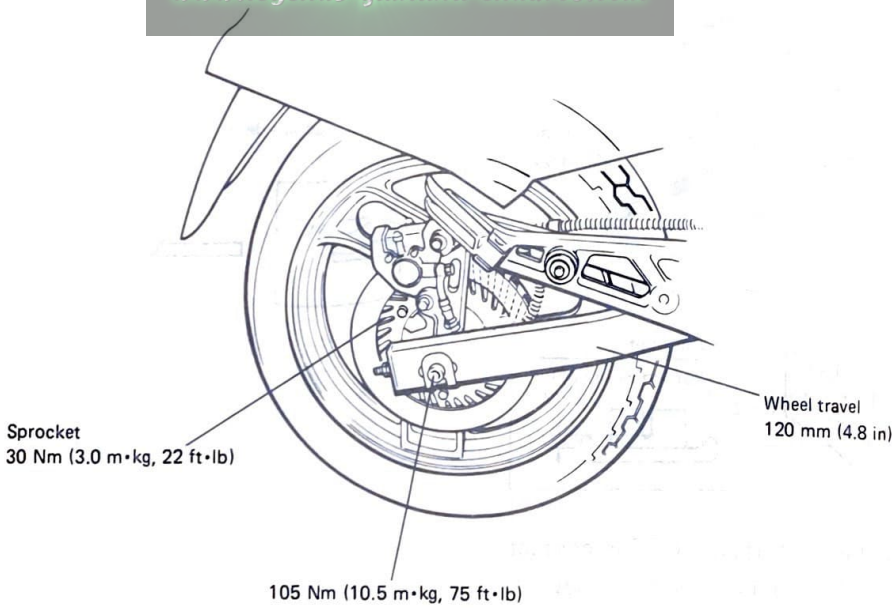
- Brake rod end should be positioned within upper and lower marks.



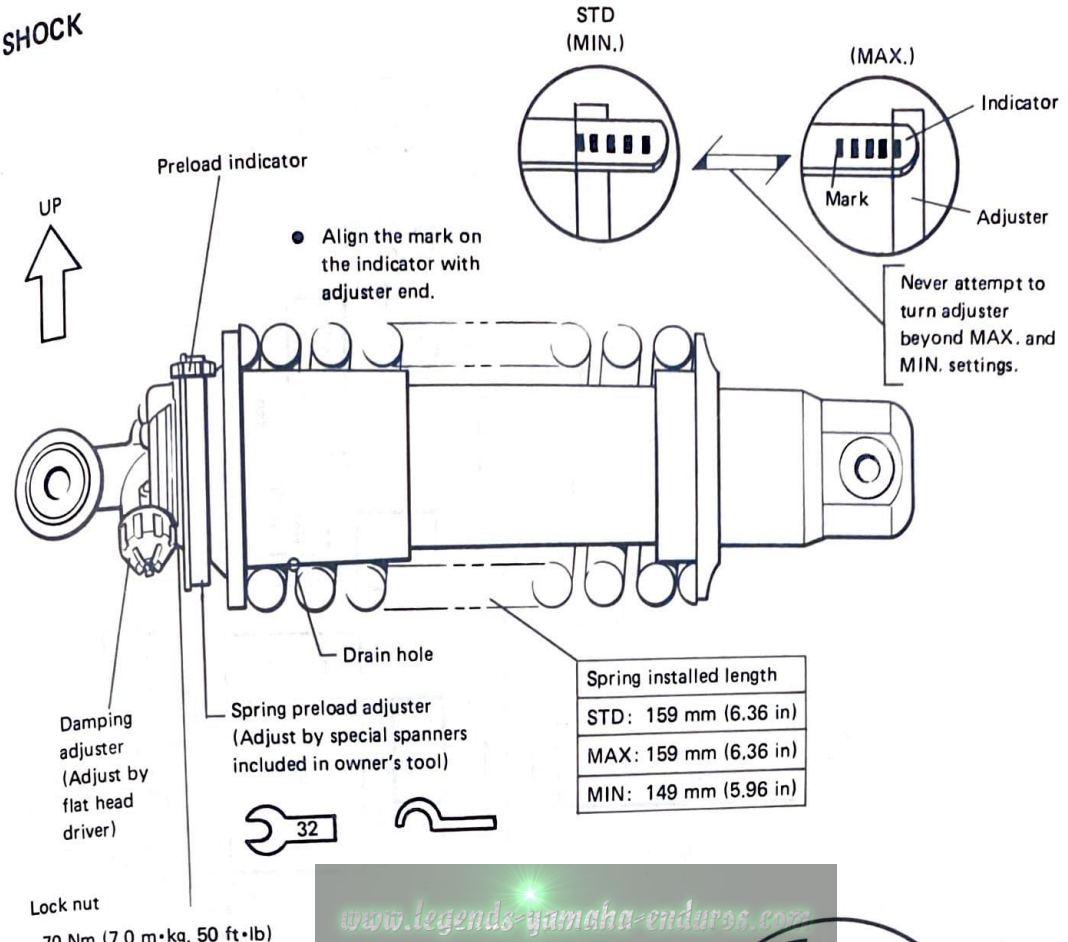
- If the wear indicator is ALMOST in contact with the disc plate, replace pads as a set.
- Before replacing pads, remove caliper mounting bolts first.

REAR SHOCK/REAR BRAKE

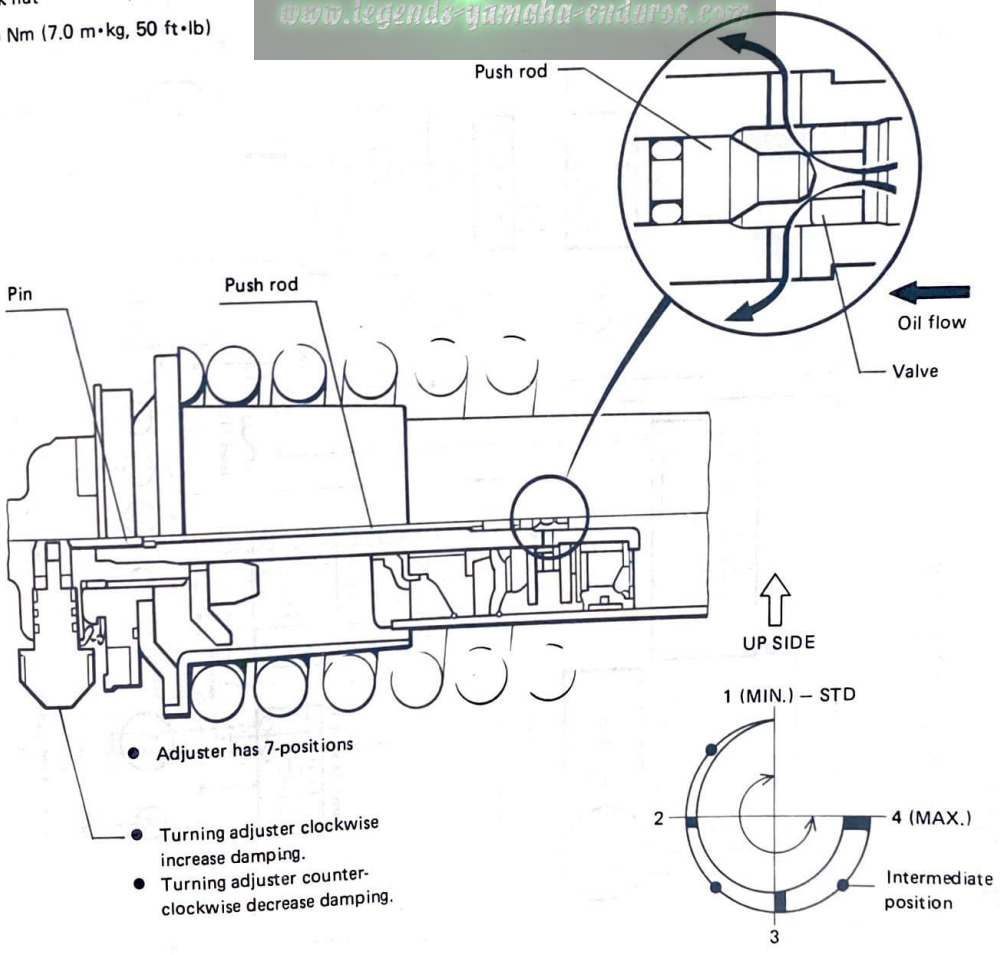




REAR SHOCK

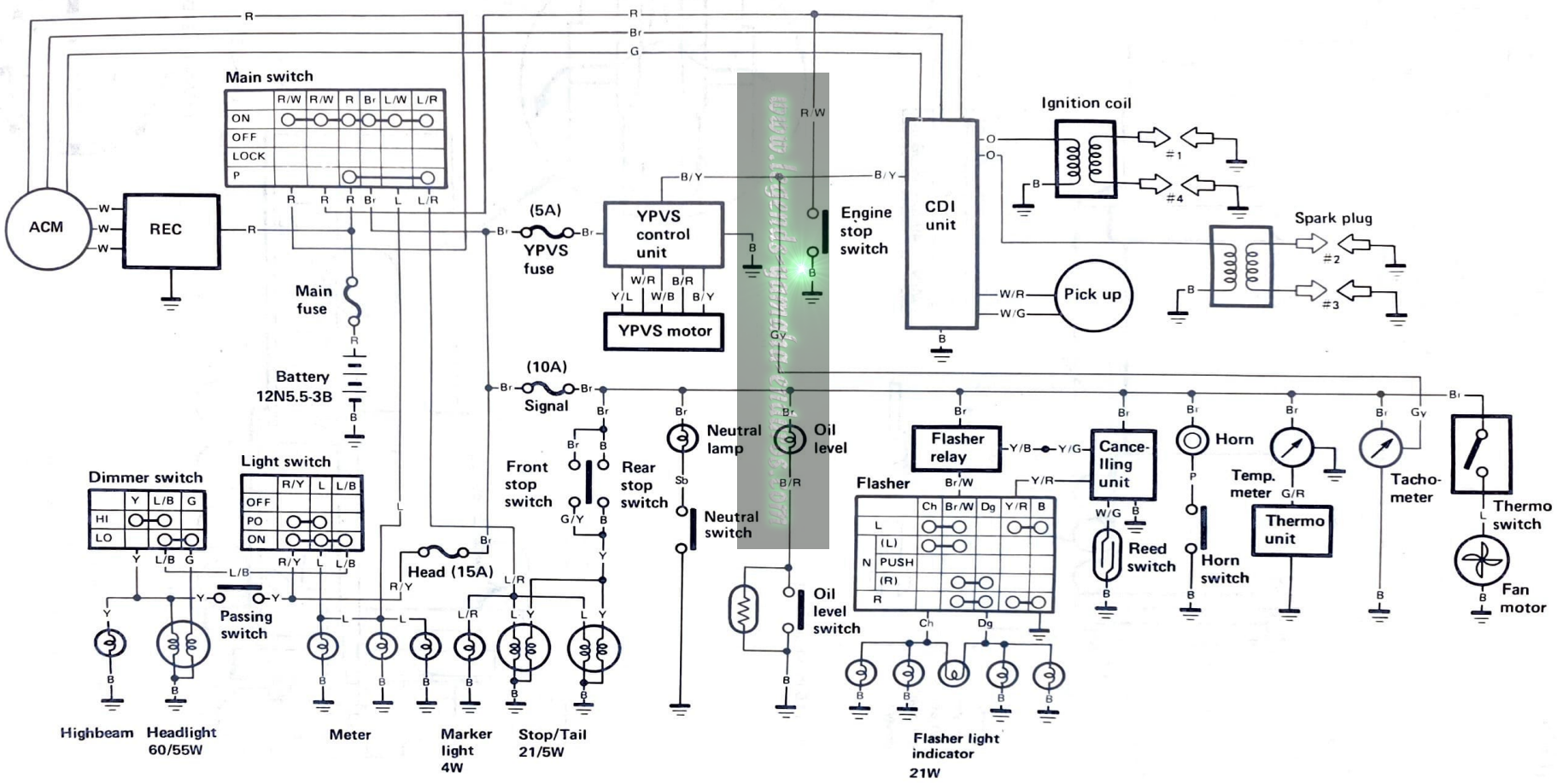


Spring installed length
STD: 159 mm (6.36 in)
MAX: 159 mm (6.36 in)
MIN: 149 mm (5.96 in)

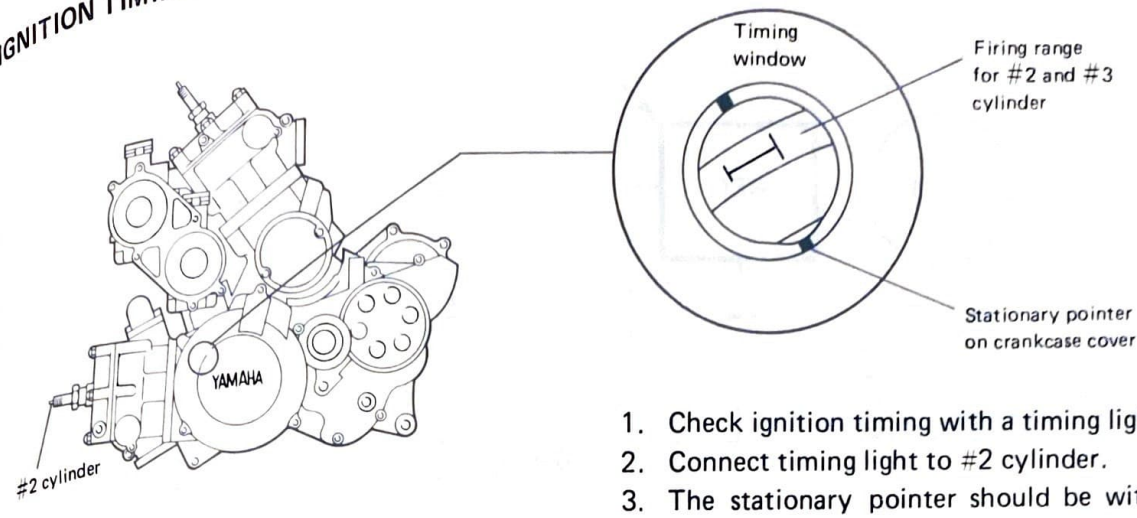


ELECTRICAL

BASIC CIRCUIT FOR RD500

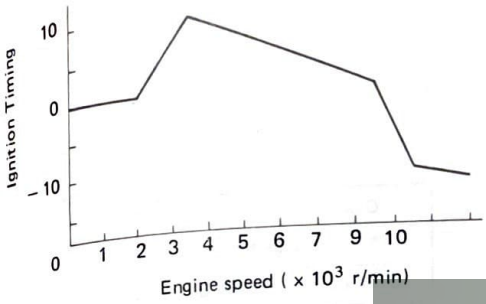


IGNITION TIMING

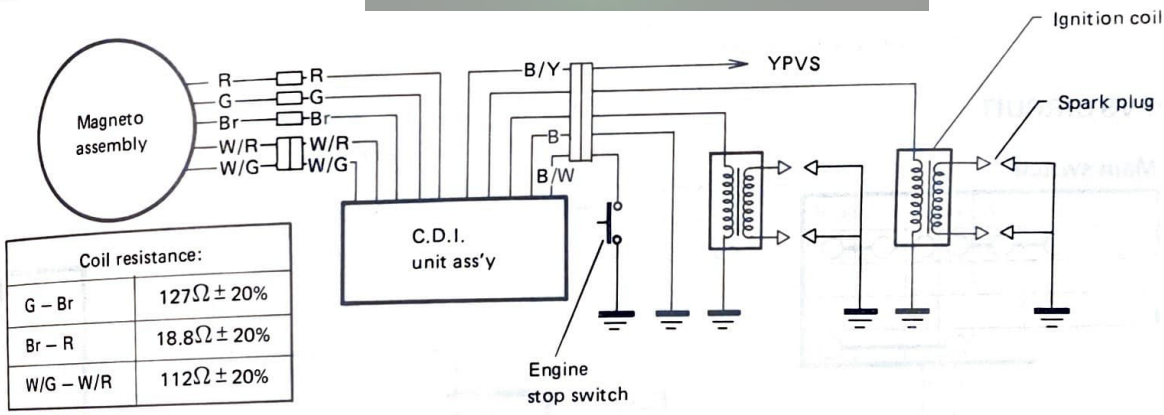


1. Check ignition timing with a timing light.
2. Connect timing light to #2 cylinder.
3. The stationary pointer should be within the firing range.

Specified ignition timing:
BTDC 19° at 1,250 r/min

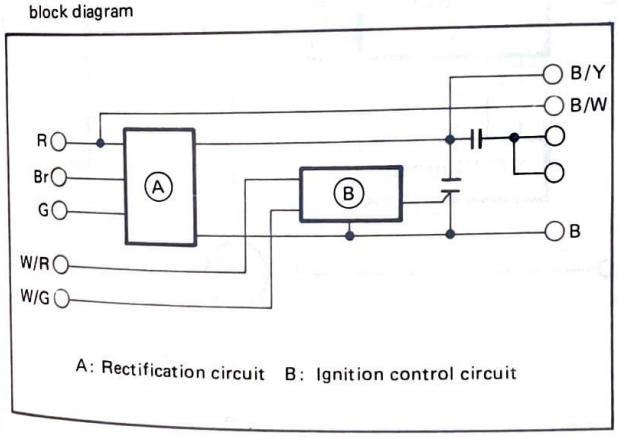


IGNITION CIRCUIT



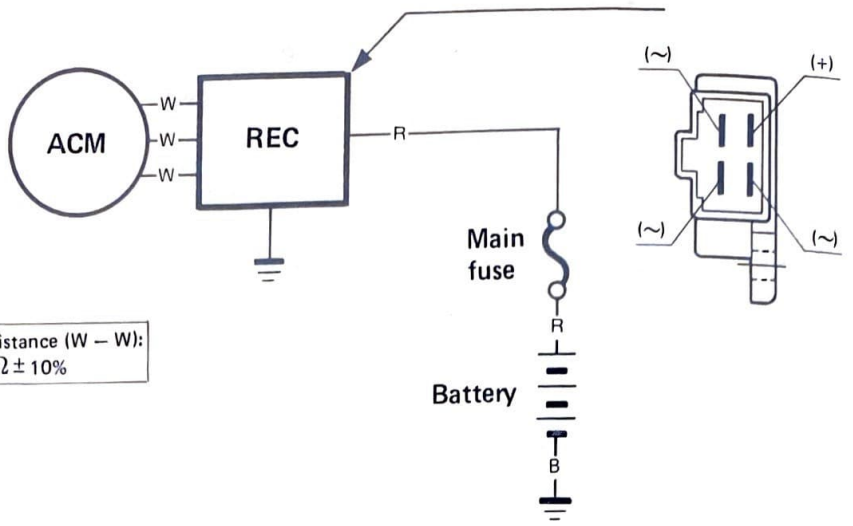
Coil resistance:	
G – Br	127Ω ± 20%
Br – R	18.8Ω ± 20%
W/G – W/R	112Ω ± 20%

C.D.I. unit block diagram

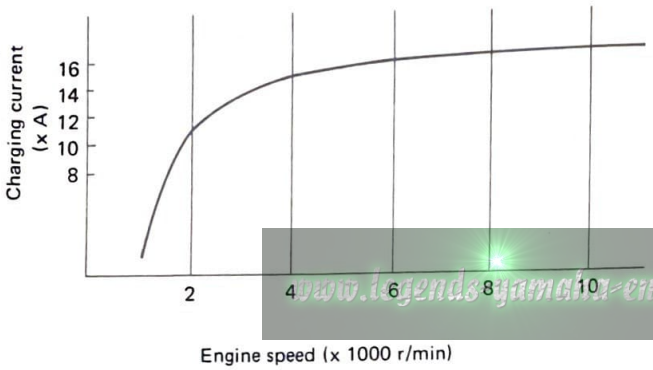


O: Orange (For Ignition Coil)
B: Black (For Ground)
B/Y: Black/Yellow (C.D.I. Stop Signal to YPUS)
B/W: Black/White (For Engine Stop)
W/G: White/Green (For Pick-up Signal)
W/R: White/Red (For Pick-up Signal)
G: Green (For Ignition Charge)
Br: Brown (For Ignition Charge)
R: Red (For Ignition Charge)

CHARGING CIRCUIT

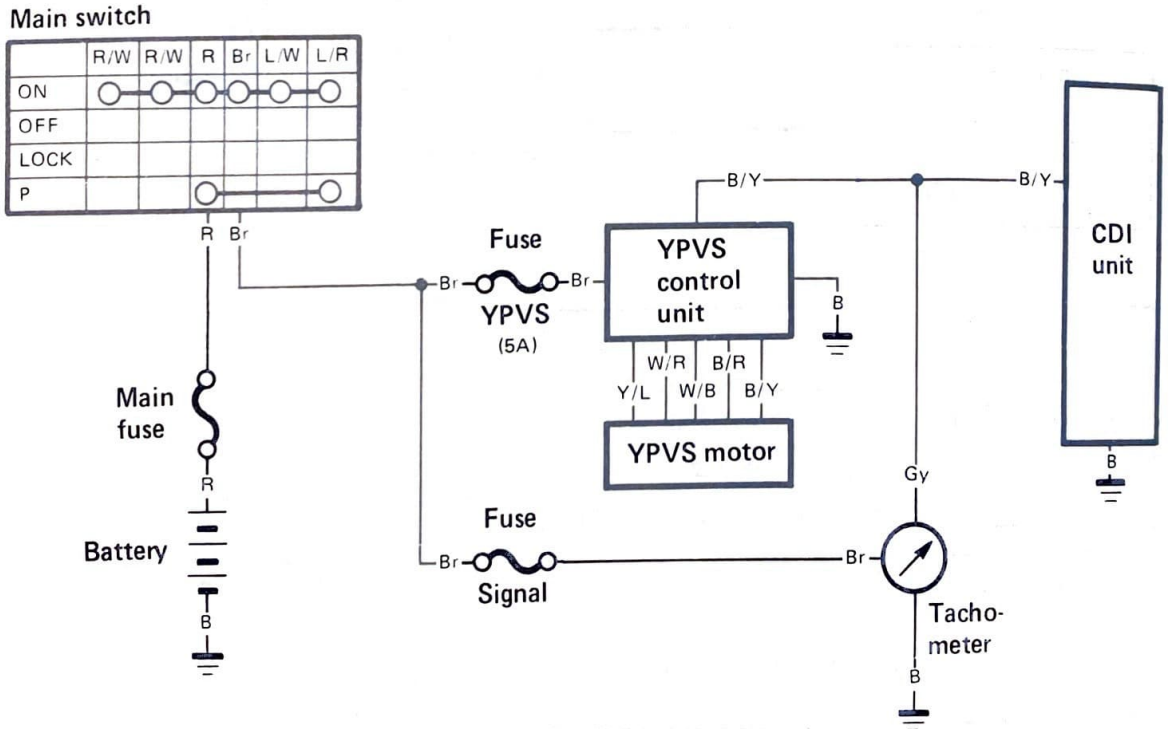


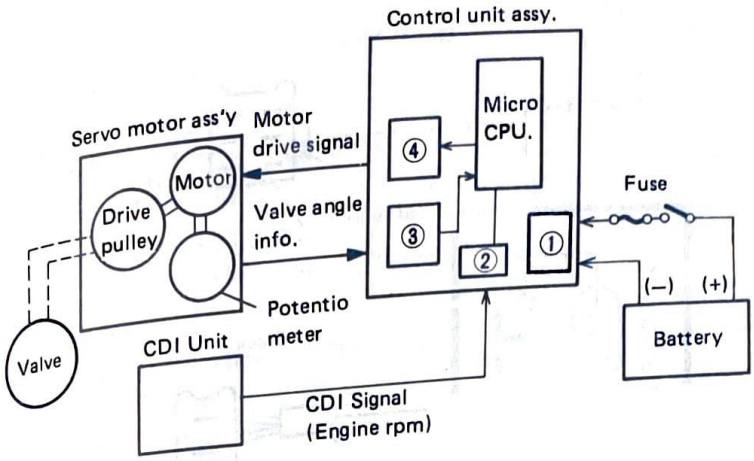
Coil resistance (W – W):
0.4Ω ± 10%



Chargine current:
7.8A or more at 1,800 r/min
13.0A or more at 5,000 r/min

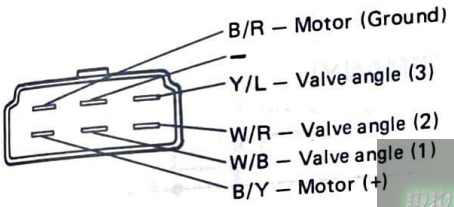
YPVS CIRCUIT

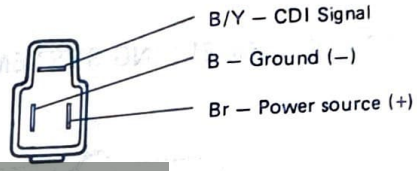




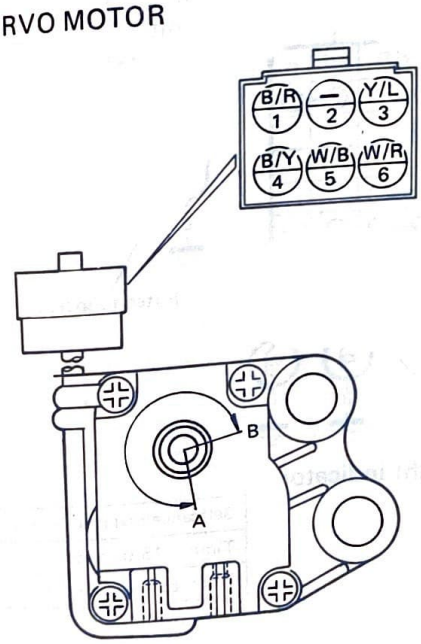
1. Voltage regulator
2. Input interface
3. Input interface
4. Output interface

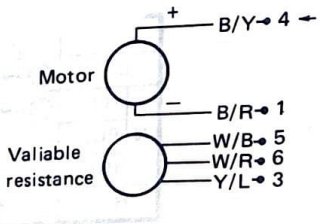
Control unit connector:





SERVO MOTOR



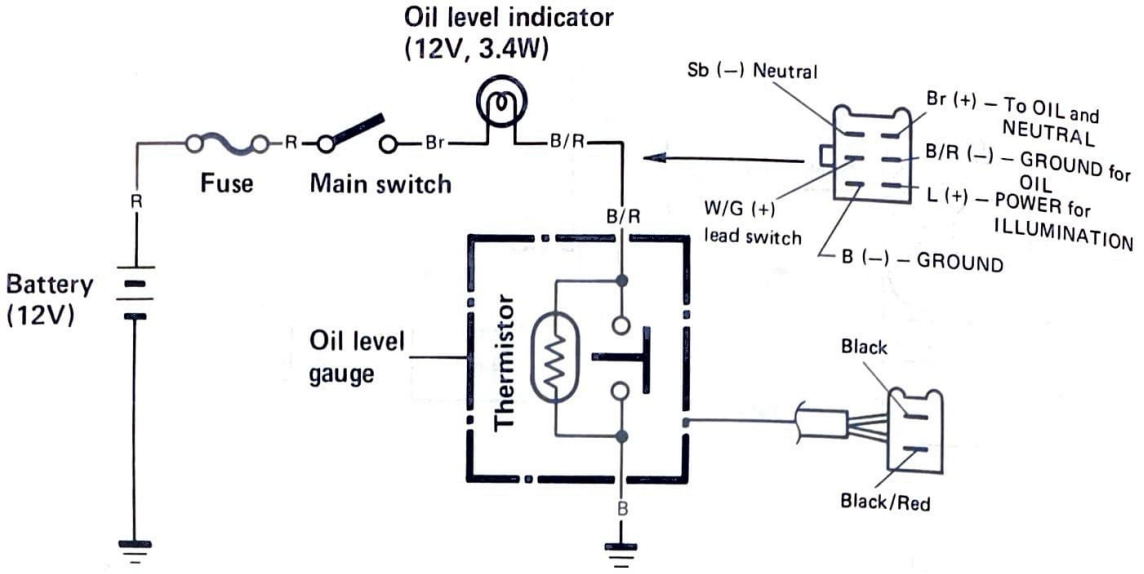


Normal connection	B/Y (+) B/R (–)	Turn clockwise
Reverse	B/Y (–) B/R (+)	Turn counterclockwise

Axle position	Pin position	Resistance
A	W/B – W/R	Less than 5Ω
	W/R – Y/L	7.5 kΩ ± 30%
B	W/B – W/R	7.5 kΩ ± 30%
	W/R – Y/L	Less than 5Ω

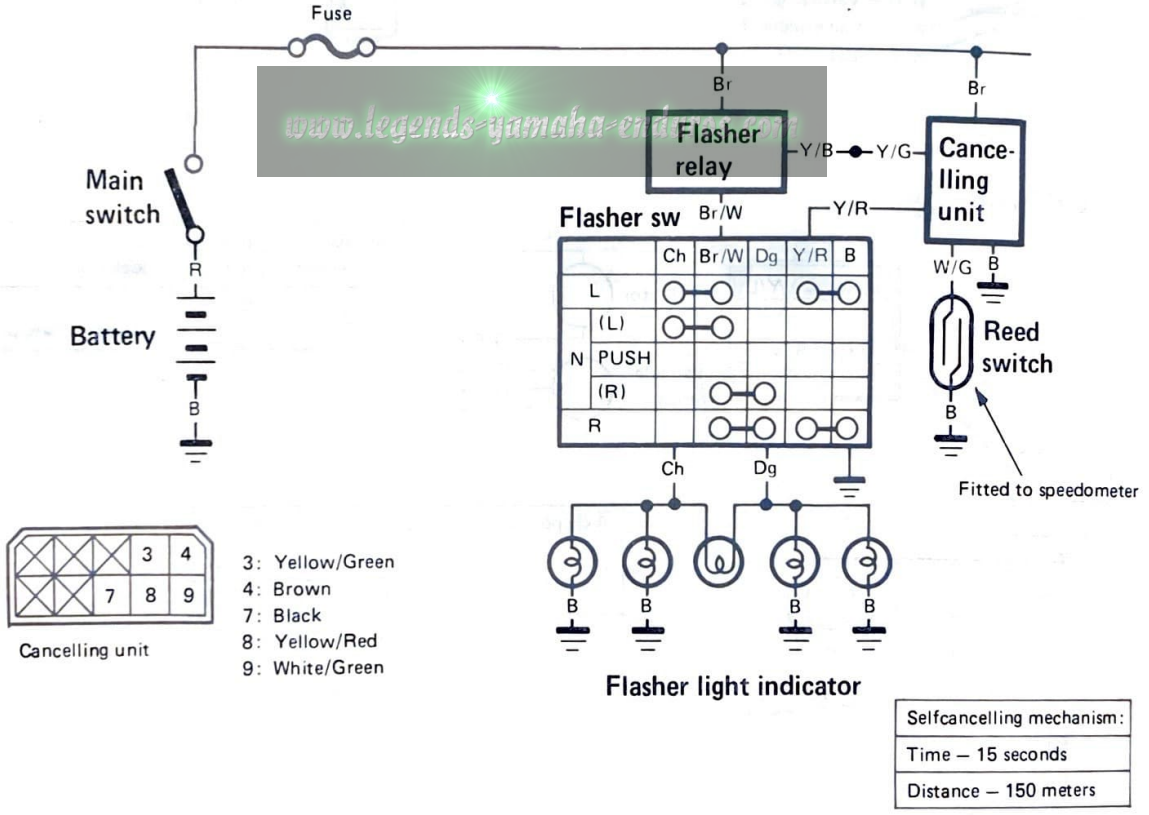
* Checking is servomotor only.

OIL LEVEL INDICATOR



* Detailed of troubleshooting, refer to DT125/200's Service Guide.

FLASHER CANCELLING SYSTEM (EXCEPT FOR WEST GERMANY)

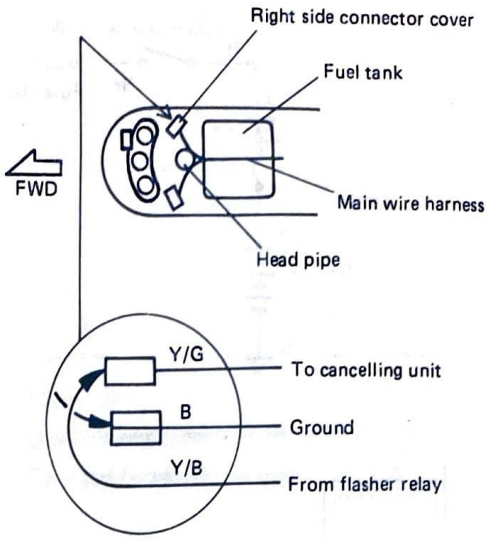


Selfcancelling mechanism:
Time – 15 seconds
Distance – 150 meters

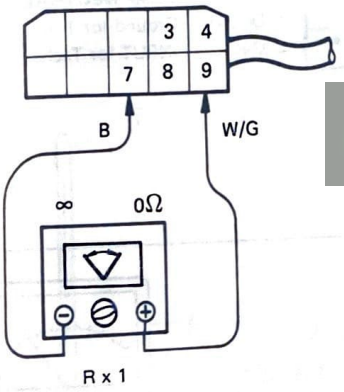
TOURBLESHOOTING

Cancelling unit does not work.

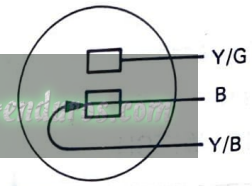
1. Disconnect the Y/B lead from the Y/G lead, connect it to the B lead.
2. Check the operation of flasher system.
3. If the flasher system works properly, cancelling system will be damaged.
4. Disconnect the 6-PIN connector from the cancelling unit, and connect the pocket tester a cross the W/G and B leads on wire harness side.
   Turn the front wheel. If the tester needle swings back and forth between 0Ω to ∞, the reed switch is in good condition. Replace the cancelling unit.
5. If the above test is not, the reed switch or W/G lead may be inoperative.



Normal connection

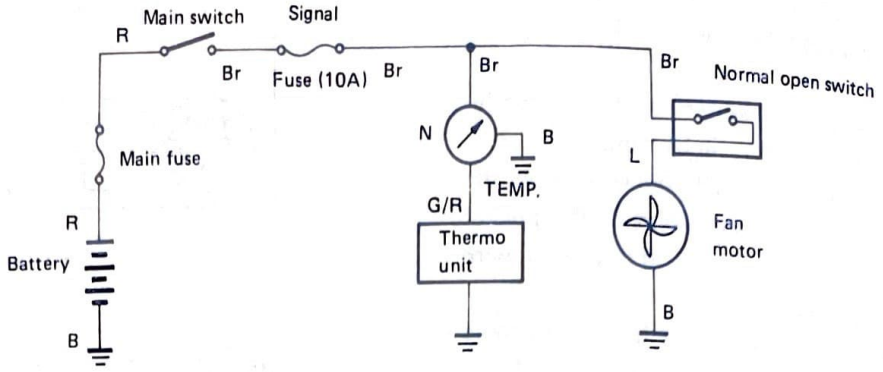


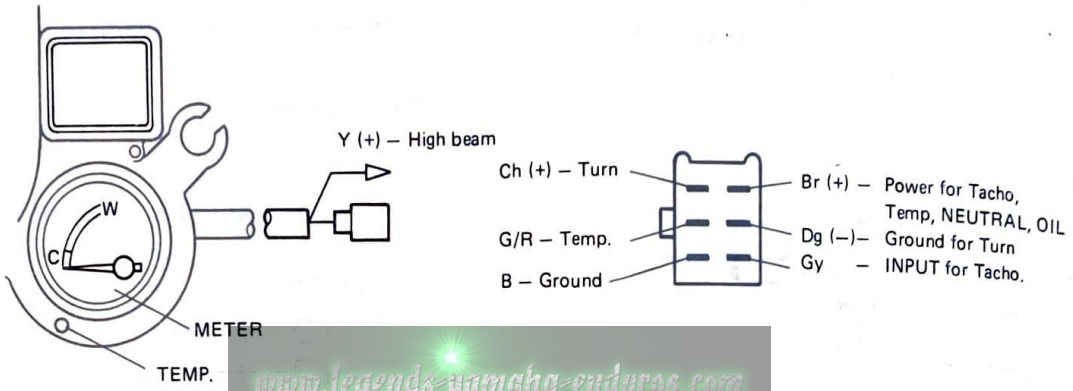
From main wire harness



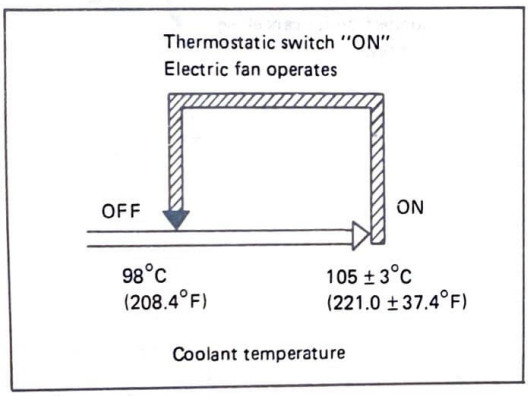
Connection for cancelling unit test

COOLING SYSTEM



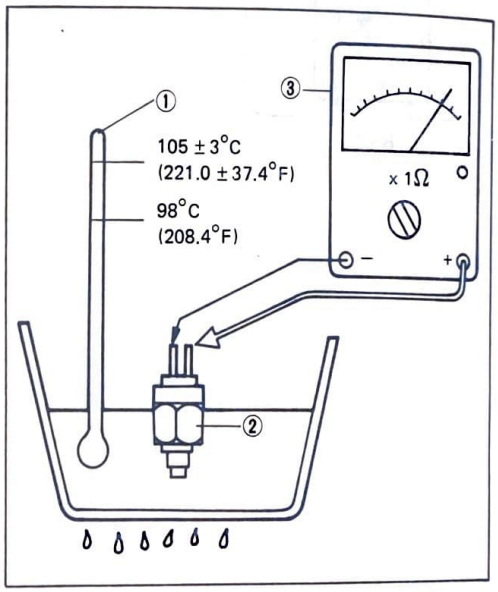


THERMOSTATIC SWITCH



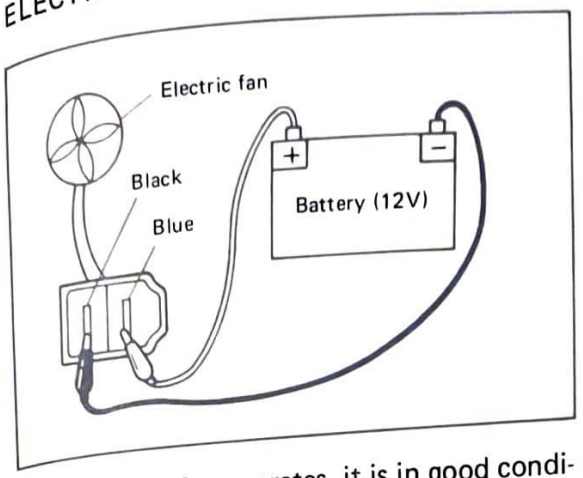
Test step	Water temperature	Pocket tester (Ω x 1)
1	0 ~ 98°C (32 ~ 208.4°F)	Discontinuity
2	more than 105 ± 3°C (more than 221.0 ± 37.4°F)	Continuity
3*	105 to 98°C (221 to 208.4°F)	Continuity
4*	less than 98°C (less than 208.4°F)	Discontinuity

Test 1 & 2: Heat-up tests
Test 3* & 4*: Cool-down tests



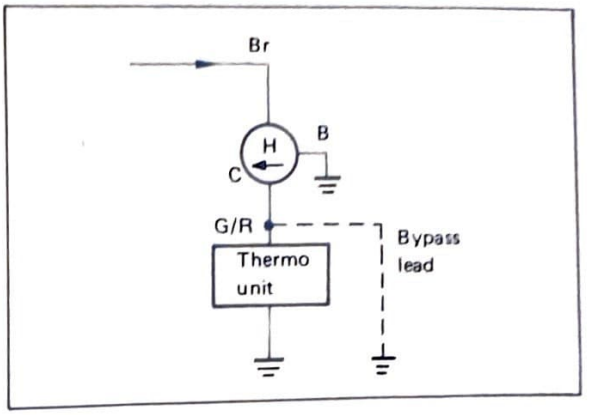
1. Temperature gauge
2. Thermostatic switch
3. Pocket tester

ELECTRIC FAN



If the electric fan operates, it is in good condition:

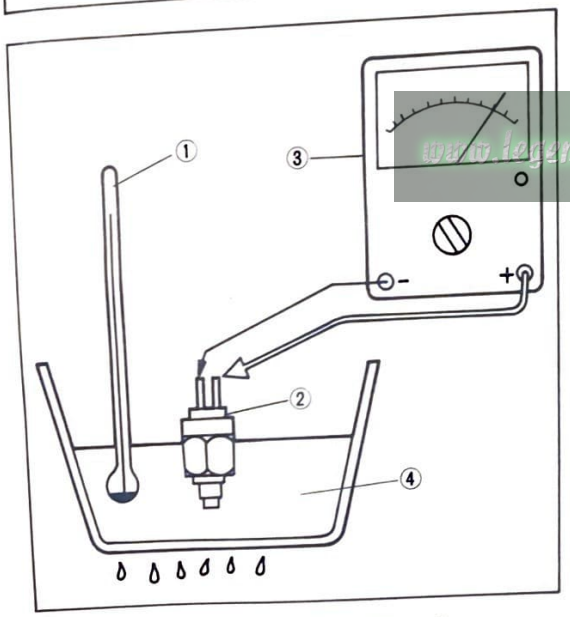
TEMP. METER



1. Main switch in ON.
2. Disconnect Green/Red lead → Swings to C
   Ground Green/Red lead → Swing to H

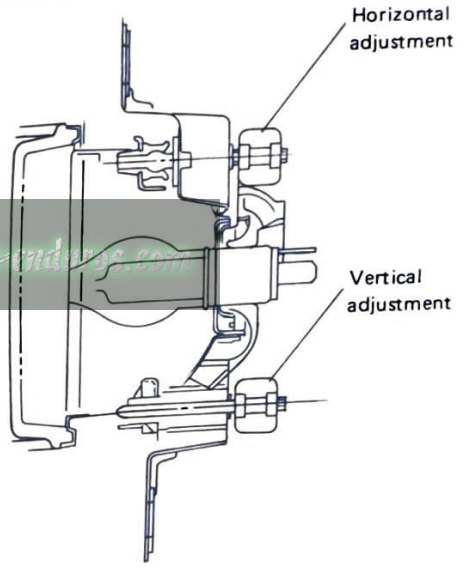
THERMO-UNIT

Water temperature	60°C	80°C	115°C
Resistance	107Ω	52Ω	18Ω



1. Temperature gauge
2. Thermo-unit
3. Pocket tester
4. Water

HEADLIGHT



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