



CHAPTER 3 ENGINE OVERHAUL

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ENGINE OVERHAUL

ENGINE REMOVAL

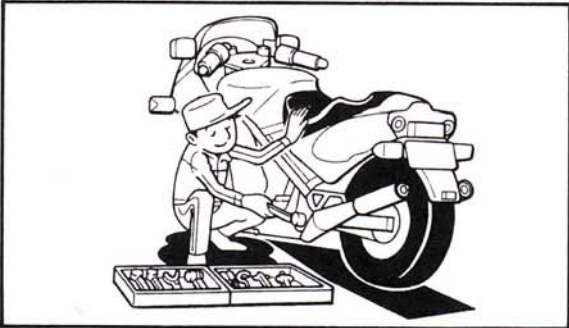
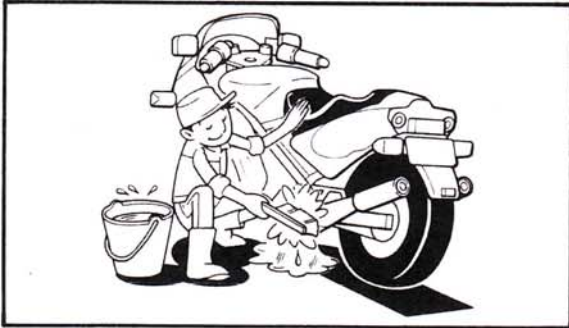
NOTE:

It is not necessary to remove the engine in order to remove the following components:

- Piston
- Clutch
- Carburetor

PREPARATION FOR REMOVAL

1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.

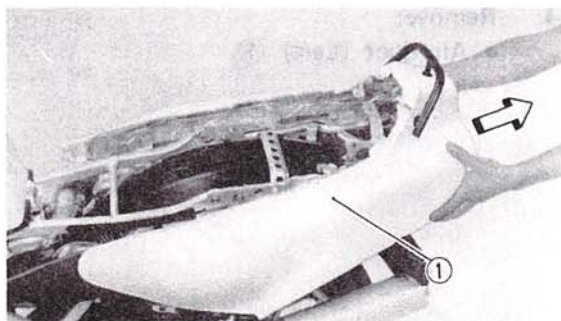
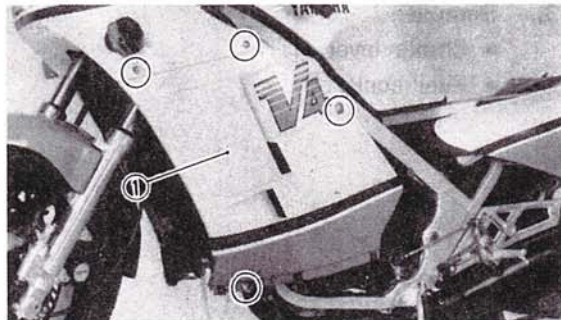
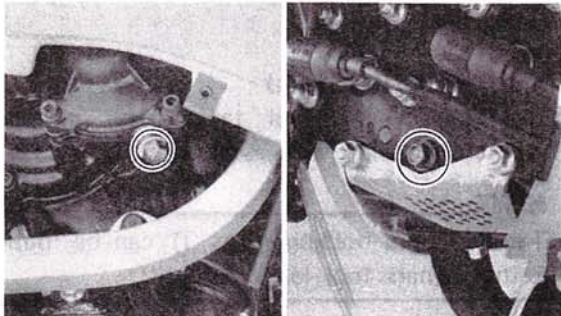
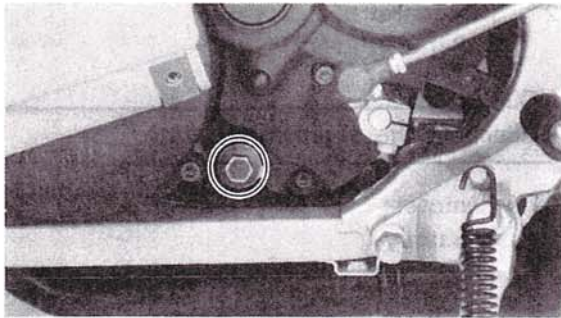
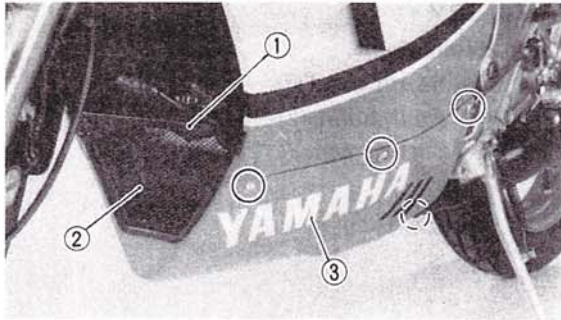


2. Use proper tools and cleaning equipment. Refer to CHAPTER 1, "SPECIAL TOOL."

NOTE:

When disassembling the engine, keep mated parts together. This includes gears, cylinders, pistons, and other parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.

3. During the engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.



COWLING

1. Remove:
 - Engine grille holder stay ①
 - Engine grille ②
 - Lower cowling ③
 Refer to CHAPTER 2, "COWLING".

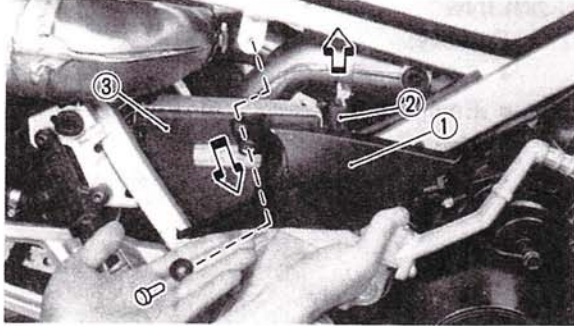
2. Drain:
 - Transmission oil
3. Remove:
 - Radiator cap

4. Drain:
 - Coolant

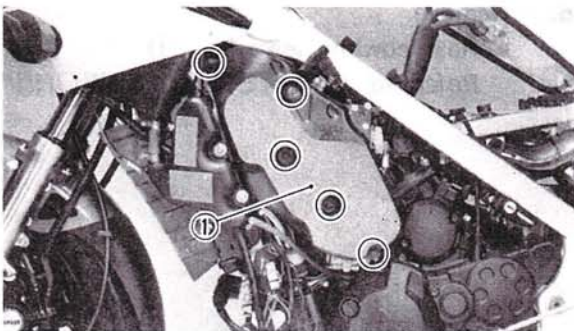
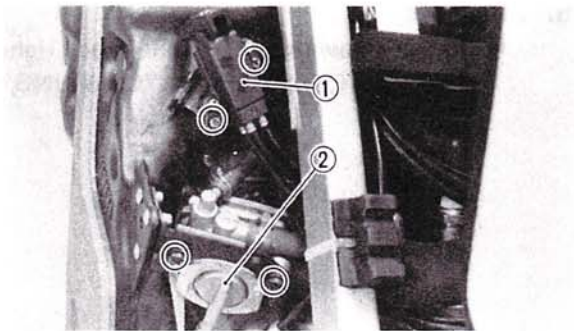
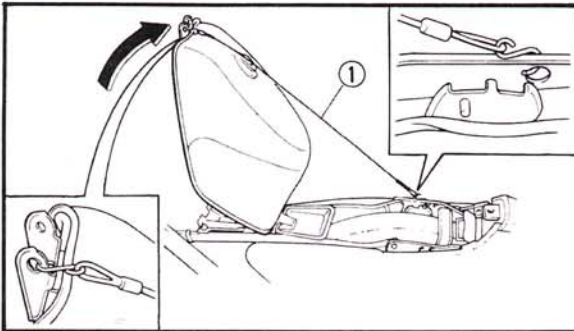
5. Remove:
 - Center cowling ① (Left and right)
 Refer to CHAPTER 2, "COWLING".

6. Remove:
 - Rear cowling assembly ①
 Refer to CHAPTER 2, "COWLING".

3



3



BATTERY

1. Remove:
 - Side cover ①
 - Fuse holder ②
 - Battery cover ③

2. Disconnect:
 - Battery leads

NOTE: _____
 Disconnect the negative lead first.

3. Remove:
 - Battery

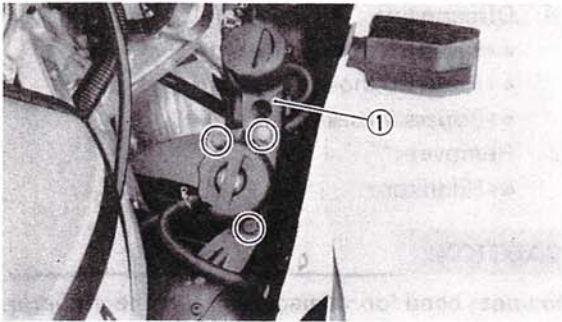
AIR FILTER

1. Remove:
 - Bolt (Fuel tank)
2. Pull up the fuel tank. Use the fuel tank holding wire as shown.

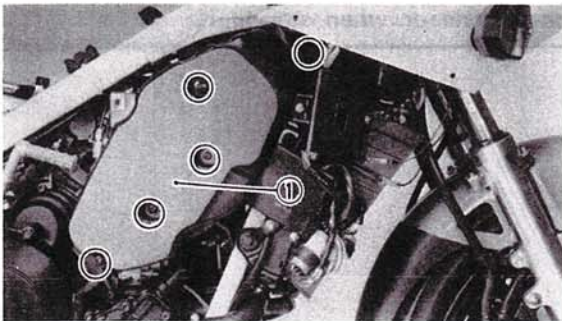
NOTE: _____
 The fuel tank holding wire ① can be found in the owners tool kit.

3. Remove:
 - Choke lever ①
 - Fuel cock ②

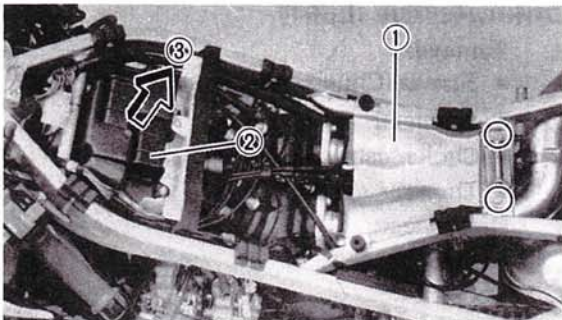
4. Remove:
 - Air duct (Left) ①



5. Remove:
- Cap retainer ①
 - Bolt (Hose holder)



6. Remove:
- Air duct (Right) ①



7. Remove:
- Heat protector ①
 - Air filter box ②

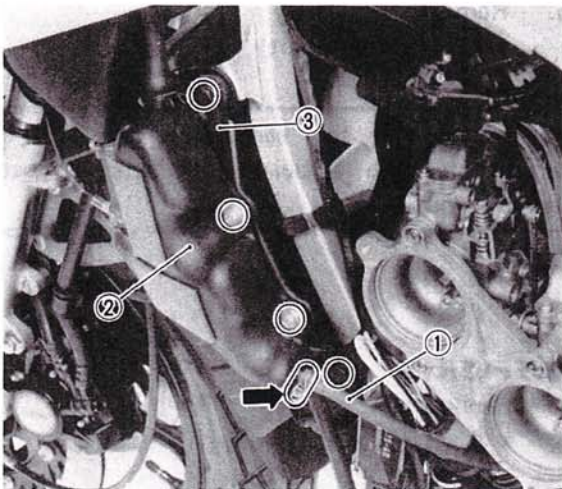
③ Pull out

RADIATOR

1. Disconnect:
- Electric fan motor lead
 - Engine oil hose ①

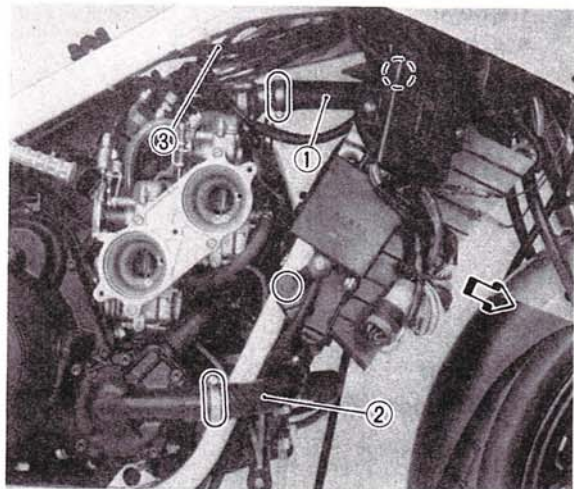
NOTE:

Plug the hose nozzle so oil will not run out of oil tank.



2. Remove:
- Screws (Sub oil tank ②)
 - Bolts (Radiator mount)
 - Stay ③
3. Remove:
- Bolts (Radiator mount)

3

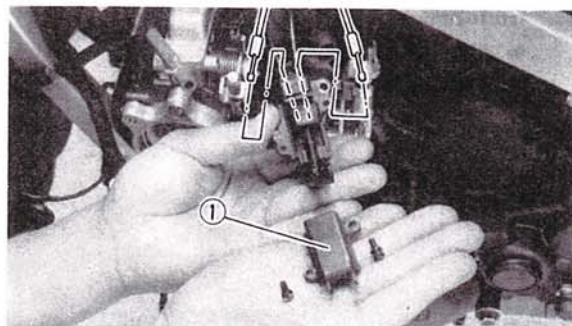


4. Disconnect:
 - Radiator hose (Inlet) ①
 - Radiator hose (Outlet) ②
 - Bypass hoses ③
5. Remove:
 - Radiator

CAUTION:

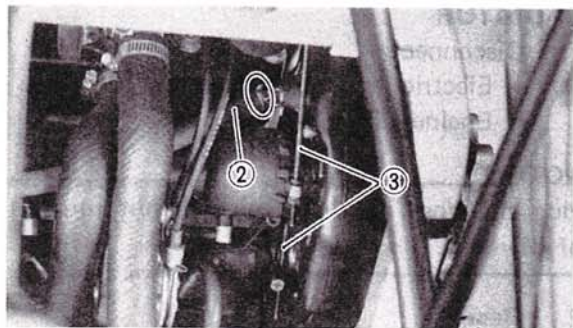
Do not bend or damage any of the radiator fins when removing the radiator from the motorcycle or when storing it.

3



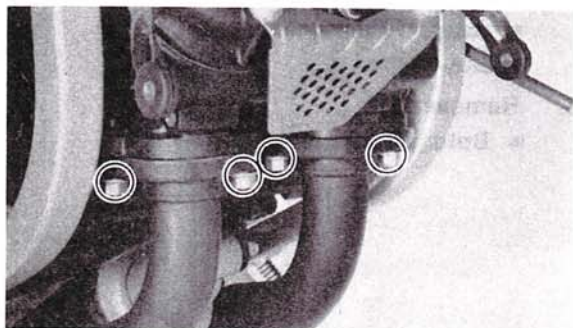
CARBURETOR (LEFT)

1. Remove:
 - Screws (Choke lever cover ①)
2. Disconnect:
 - Choke cables (Two cables)
 - Throttle cables
3. Disconnect:
 - Fuel hose ②
4. Loosen:
 - Clamp screws ③
5. Remove:
 - Carburetors (Left)



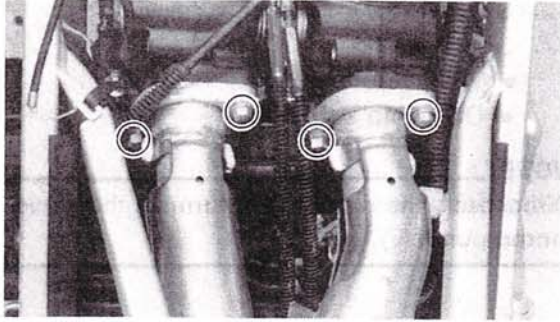
NOTE:

After removing the carburetors, cover the carburetors with a clean cloth to keep dust and dirt out.

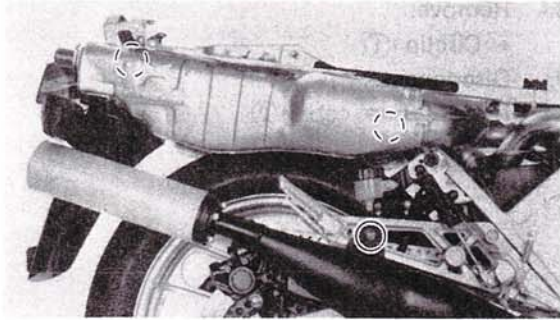


MUFFLER

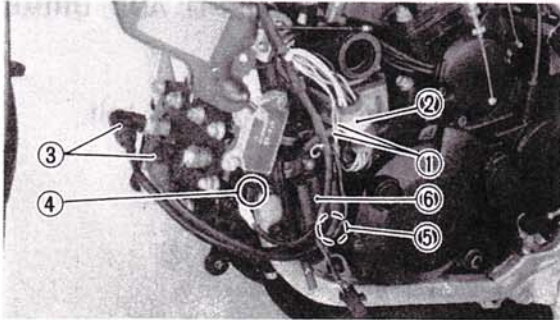
1. Remove:
 - Nuts (Lower cylinders)



2. Remove:
 - Bolts
 - Nuts (Upper cylinders)

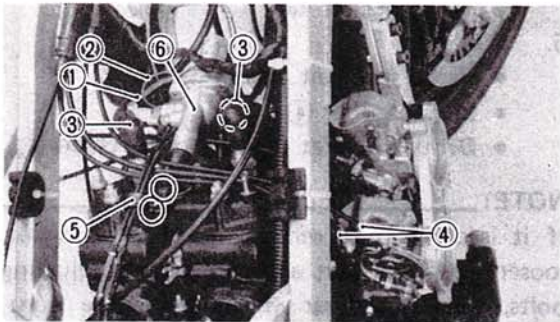


3. Remove:
 - Muffler mount bolts
 - Mufflers

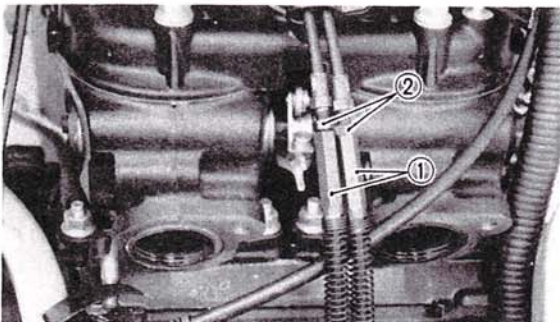


CONNECTOR AND CABLE

1. Disconnect:
 - Pickup coil lead ①
 - Generator lead ②
 - Spark plug lead ③ (Lower)
 - Rectifier/regulator lead ④
 - Ignition coil lead ⑤
2. Remove:
 - Ignition coil (Lower cylinder) ⑥



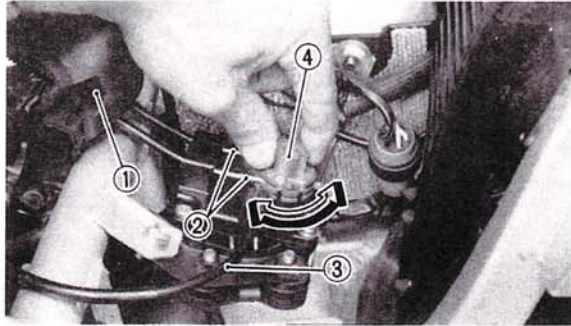
3. Disconnect:
 - Thermo unit lead ①
 - Thermo switch lead ②
 - Spark plug lead ③ (Upper)
 - Throttle cable ④
4. Remove:
 - Clamp ⑤
 - Thermostat housing assembly ⑥



5. Loosen:
 - YPVS cable adjusters ①

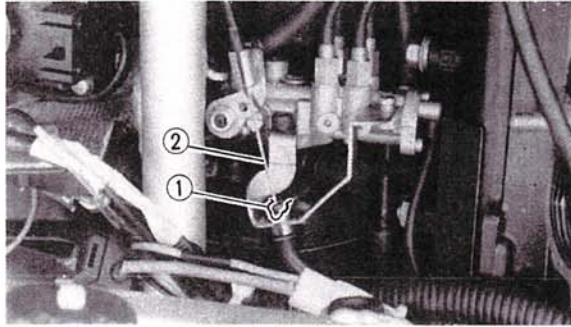
② Locknut

3



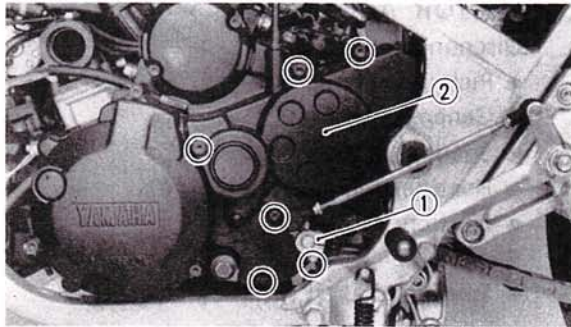
6. Uncover the servomotor cover ①.
7. Disconnect:
 - YPVS cables ②
 - Oil pump cable ③

NOTE: _____
 Disconnect the cables by turning the servomotor pulley ④.



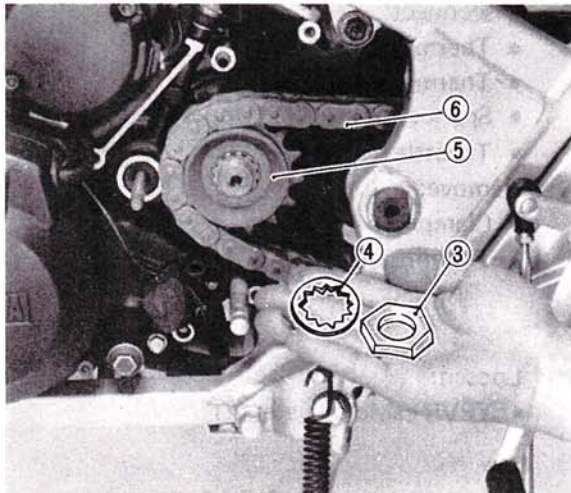
8. Remove:
 - Circlip ①
9. Disconnect:
 - Oil pump cable ②

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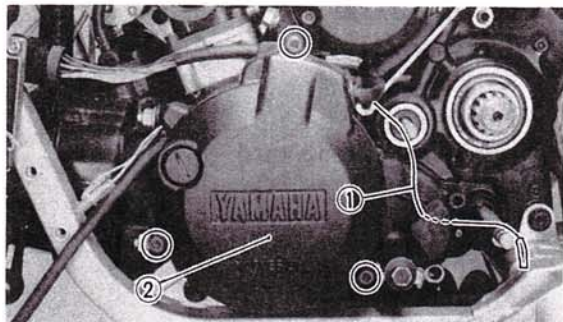


CRANKCASE COVER (LEFT) AND DRIVE CHAIN

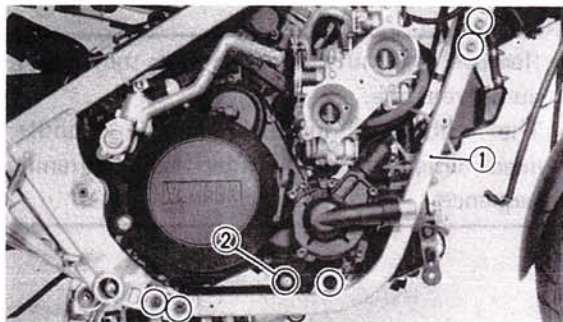
1. Remove
 - Change pedal arm securing bolt
2. Disconnect:
 - Change pedal arm ①
3. Remove:
 - Crankcase cover (Left) ②
 - Dowel pins
4. Bend:
 - Lock washer tab
5. Remove:
 - Drive sprocket securing nut ③
 - Lock washer ④
 - Drive sprocket ⑤ with drive chain ⑥



NOTE: _____
 If it is difficult to remove the drive sprocket, loosen the axle nut and chain slack adjusting bolts, then push rear wheel toward the front.

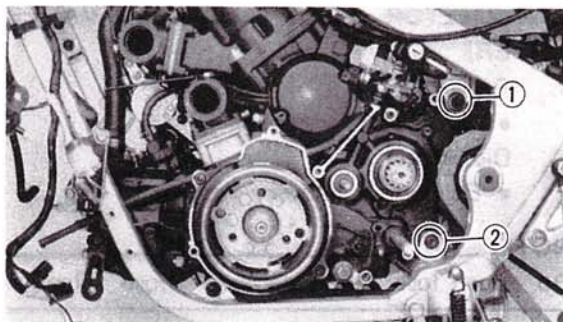


6. Disconnect:
 - Neutral switch lead ①
7. Remove:
 - Generator cover ②



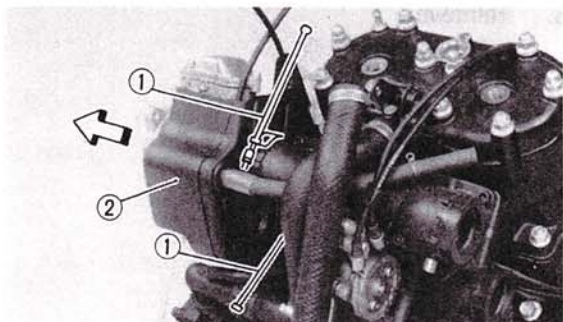
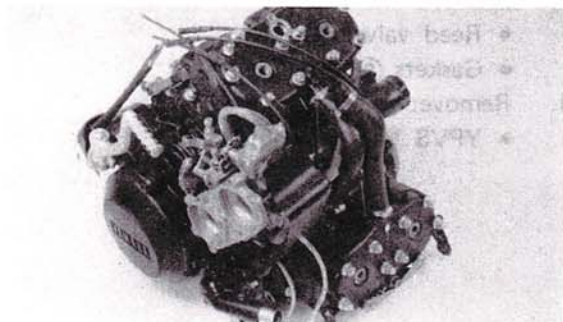
ENGINE REMOVAL

1. Remove:
 - Downtube frame ①
 - Tension rod mount bolt ②



2. Remove:
 - Engine mount (Rear upper) ①
 - Engine mount (Rear lower) ②
 - Engine assembly

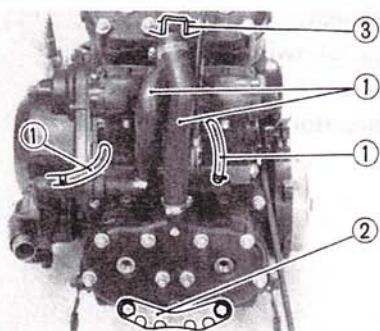
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ENGINE DISASSEMBLY

CARBURETOR (RIGHT)

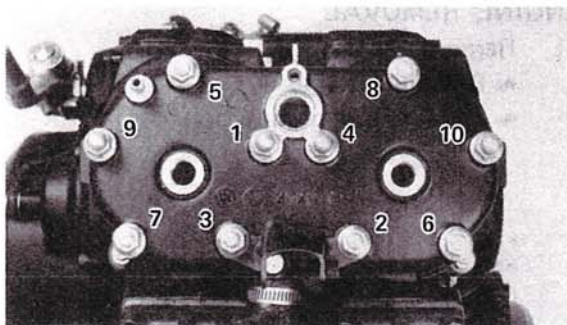
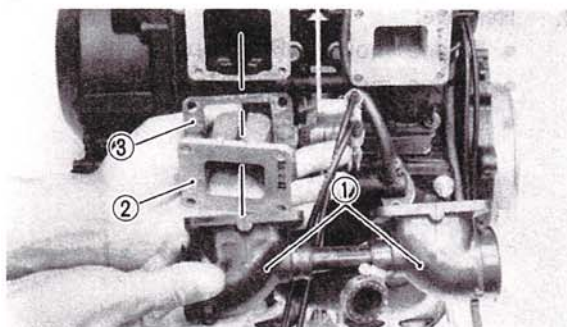
1. Loosen:
 - Clamp screws ①
2. Remove:
 - Carburetors (Right) ②
 - Clamps

**CYLINDER HEAD**

1. Disconnect:
 - Hoses ①
2. Remove:
 - Cylinder head nuts
 - Washers
 - Engine guard ②
 - Stay ③
 - Cylinder heads
 - Cylinder head gaskets

NOTE:

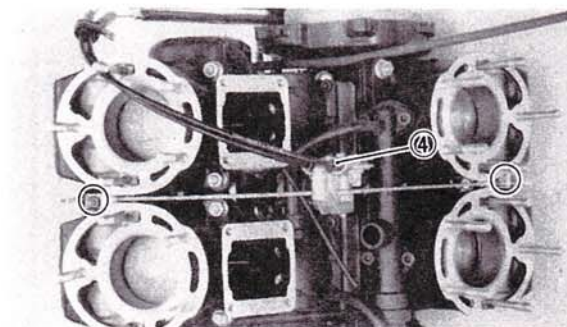
- Remove the nuts starting with the highest numbered one.
- The embossed numbers in the cylinder head designate the cylinder head tightening sequence.

**3****CARBURETOR JOINT AND REED VALVE (UPPER)**

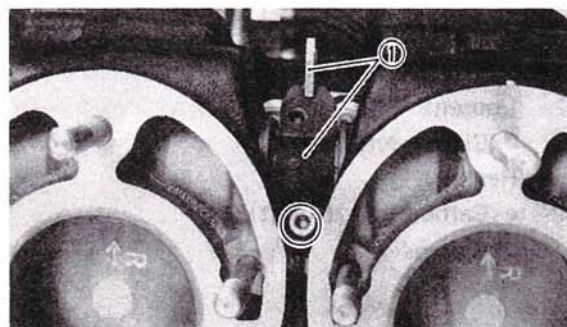
1. Remove:
 - Carburetor joints ①
2. Disconnect:
 - Engine oil delivery hoses

NOTE:

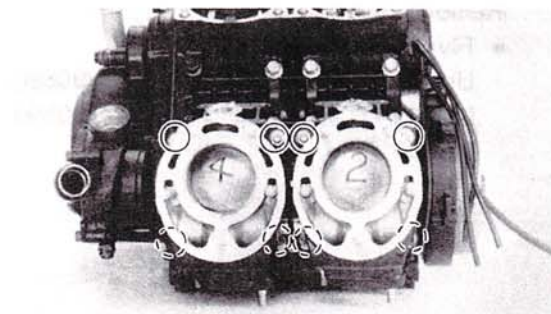
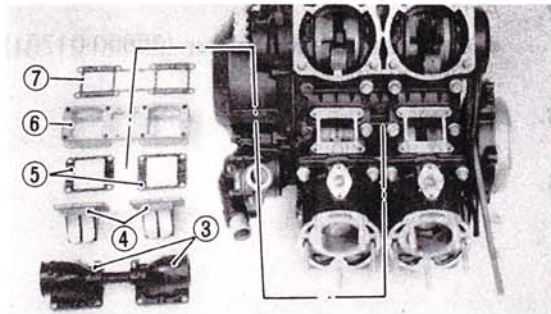
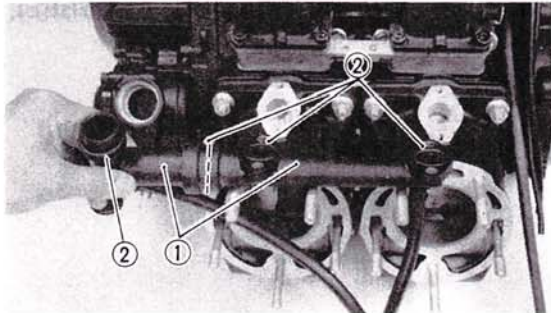
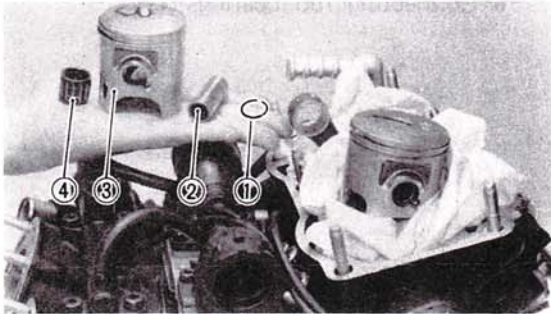
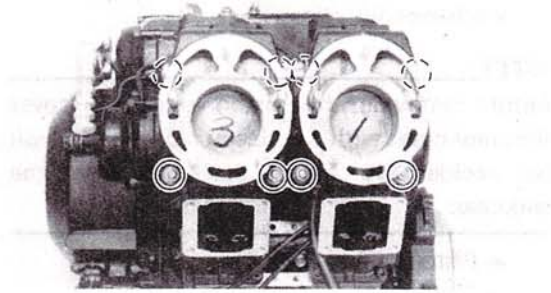
Do not lose the delivery hose clamps.



3. Remove:
 - Reed valves ②
 - Gaskets ③
4. Remove:
 - YPVS link assembly ④



5. Remove:
 - YPVS joints ①

**CYLINDER AND PISTON (UPPER)**

1. Remove:
 - Cylinder nuts
 - Dowel pins
 - Cylinder gaskets
2. Mark each piston so it can be reinstalled in the appropriate cylinder.
3. Remove:
 - Piston pin clips ①

NOTE:

Before removing the piston pin clip, cover the crankcase with a clean rag so you will not accidentally drop the clip into the crankcase.

- Piston pins ②
- Pistons ③
- Connecting rod bearings ④

3**WATER JACKET AND REED VALVES (LOWER)**

1. Remove:
 - Water jackets ①

NOTE:

Do not lose the O-rings ②.

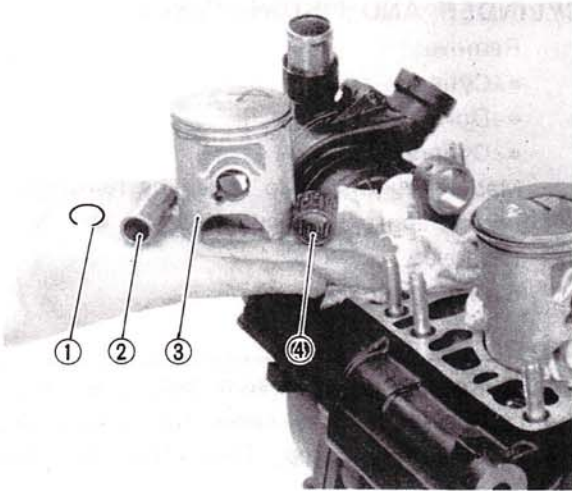
2. Remove:
 - Carburetor joints ③
 - Reed valve ④
 - Gaskets ⑤
 - Housing ⑥
 - Gasket ⑦
3. Disconnect:
 - Engine oil delivery hoses

NOTE:

Do not lose the delivery hose clamps.

CYLINDER AND PISTON (LOWER)

1. Remove:
 - Cylinder nuts
 - Dowel pins
 - Cylinder gaskets
2. Mark each piston so it can be reinstalled in the appropriate cylinder.



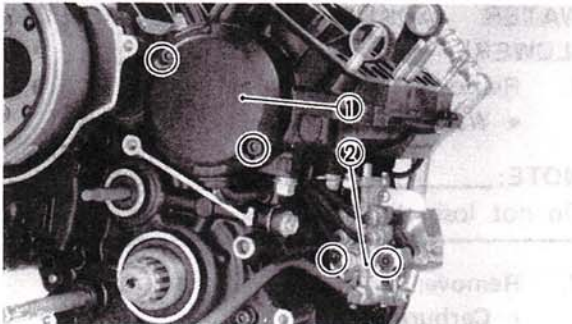
3. Remove:
 - Piston pin clips ①

NOTE:

Before removing the piston pin clip, cover the crankcase with a clean rag so you will not accidentally drop the clip into the crankcase.

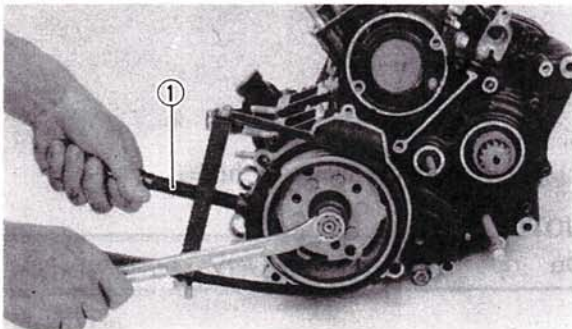
- Piston pins ②
- Pistons ③
- Connecting rod bearings ④

3

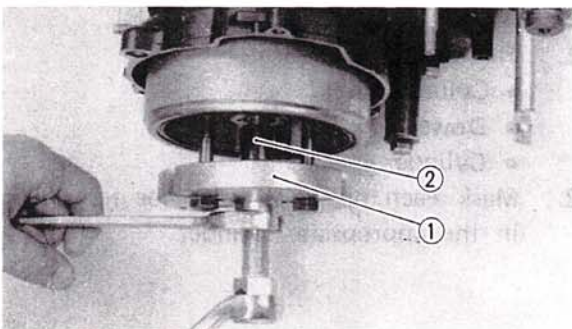


OIL PUMP (ENGINE OIL) AND FLYWHEEL

1. Remove:
 - Crankshaft end cover ①
 - Oil pump (Engine oil) ②

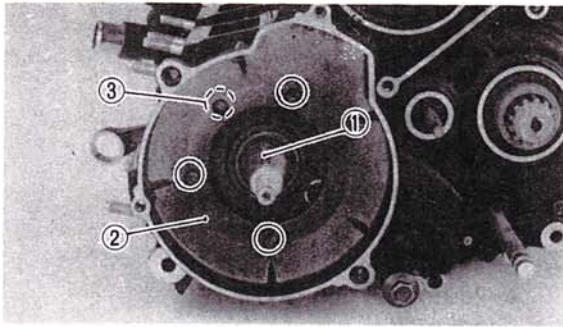


2. Attach:
 - Universal Sheave Holder (90890-01701) ①
3. Loosen:
 - Nut (Flywheel)
4. Remove:
 - Nut
 - Washers

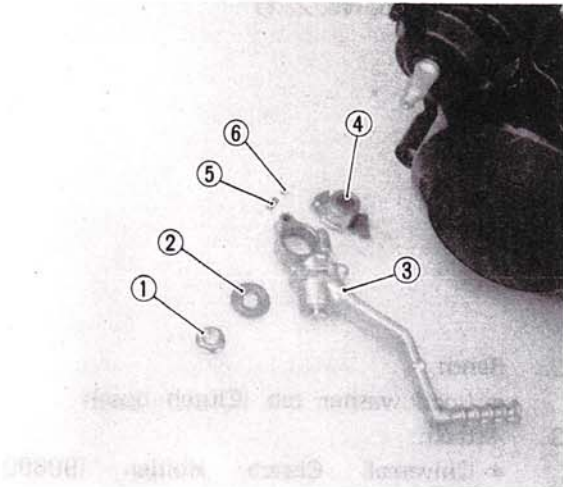


5. Remove:
 - Flywheel magneto

Use the Flywheel puller (90890-01362) ① with the Adapter (90890-04063) ②.



6. Remove:
- Key ①
 - Flywheel cover ②
 - Dowel pin ③

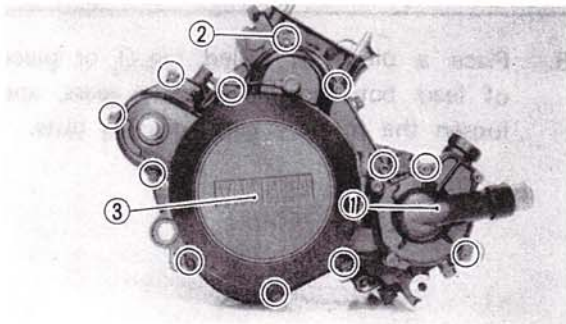


WATER PUMP AND CRANKCASE COVER (RIGHT)

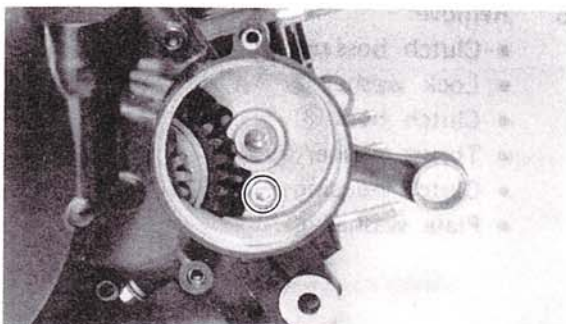
1. Remove:
- Nut (Kick crank) ①
 - Washer ②
 - Kick crank ③
 - Collar ④

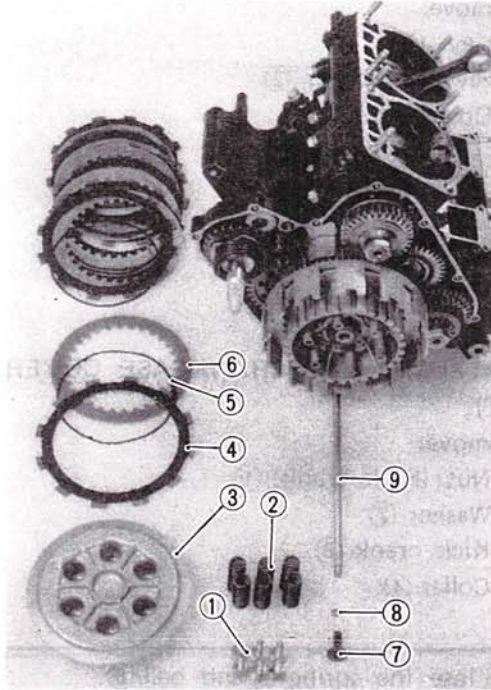
NOTE:

Do not lose the spring ⑤ and ball ⑥.

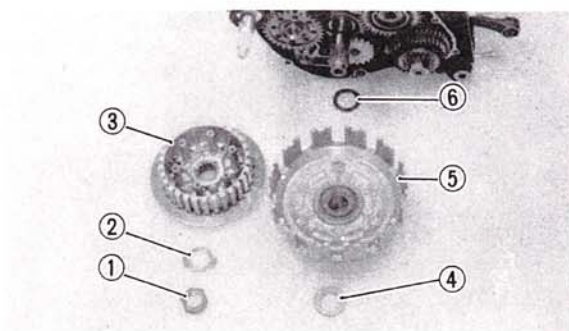
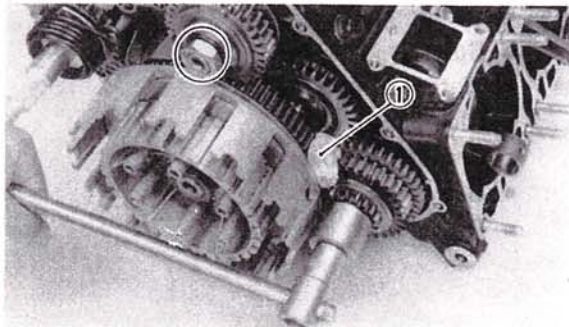
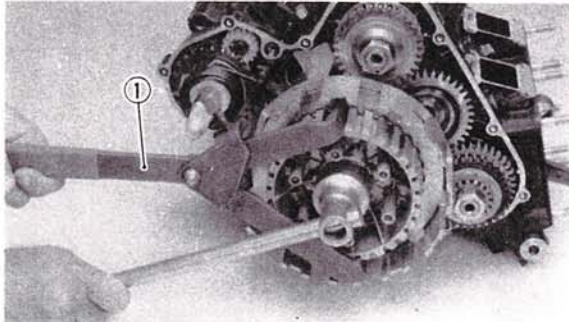
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2. Remove:
- Bolts
 - Water pump ①
 - Clamp ②
 - Crankcase cover ③
 - Gasket
 - Dowel pins





3

**CLUTCH AND KICK GEAR****1. Remove:**

- Clutch spring bolts ①
- Clutch spring ②
- Pressure plate ③
- Friction plates ④
- Ring-spring ⑤
- Clutch plate ⑥
- Push rod No. 1 ⑦
- Ball ⑧
- Push rod No. 2 ⑨

2. Bend:

- Lock washer tab (Clutch boss)

3. Attach:

- Universal Clutch Holder (90890-04086) ①

4. Loosen:

- Clutch boss nut

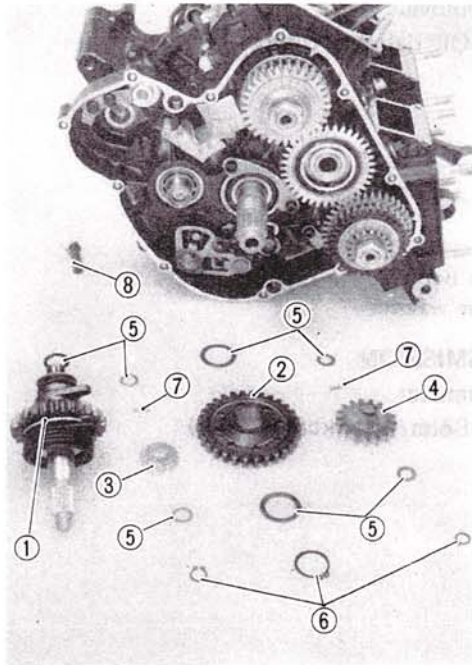
NOTE:

Do not remove the clutch boss and clutch housing at this point.

- 5. Place a piece of rolled rag ① or piece of lead between the primary gears, and loosen the primary gear securing nuts.**

6. Remove:

- Clutch boss nut ①
- Lock washer ②
- Clutch boss ③
- Thrust washer ④
- Clutch housing ⑤
- Plate washer ⑥

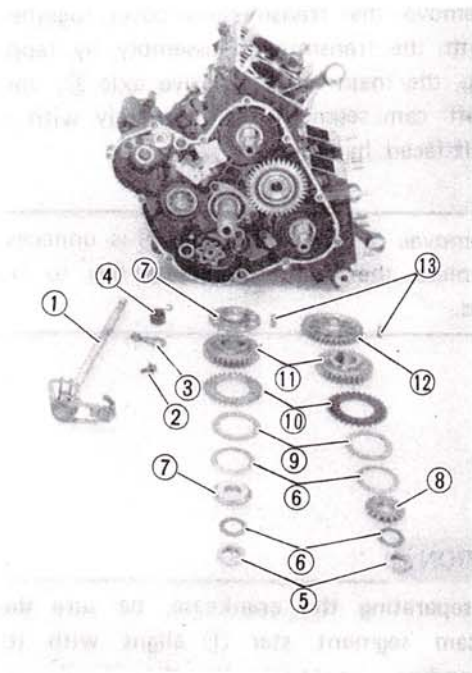


7. Remove:
- Kick gear ①
 - Kick idle gear ②
 - Oil pump gear (Engine oil) ③
 - Oil pump gear (Transmission oil) ④

- ⑤ Washer
- ⑥ Circlip
- ⑦ Dowel pin
- ⑧ Oil pump drive shaft

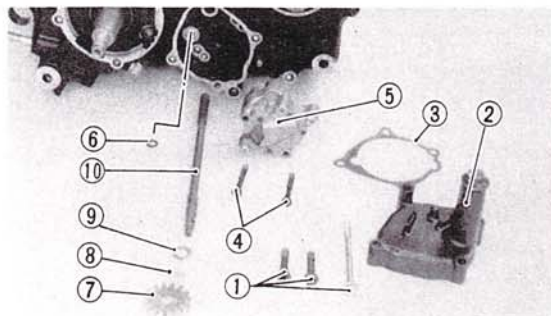
3

PRIMARY GEAR AND CHANGE SHAFT

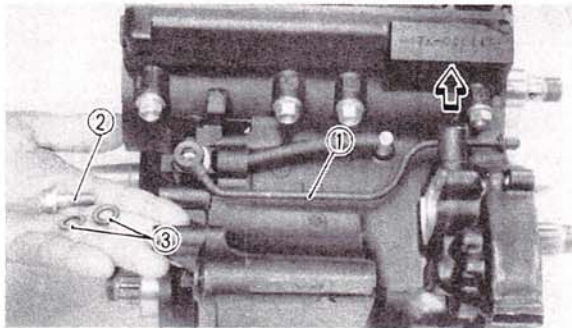


1. Remove:
- Change shaft ①
 - Bolt ②
 - Shift cam stopper lever ③
 - Stopper lever spring ④
 - Nuts ⑤
 - Conical washers ⑥
 - Collars ⑦
 - Drive gear (Water pump) ⑧
 - Plate washers ⑨
 - Zero lash gears ⑩
 - Primary gears ⑪
 - Drive gear (Balancer gear) ⑫
 - Keys ⑬

OIL PUMP (TRANSMISSION OIL)



1. Remove:
- Bolts ①
 - Cover ②
 - Gasket ③
 - Screws ④
 - Oil pump ⑤
 - O-ring ⑥
 - Idle gear ⑦
 - Dowel pin ⑧
 - Washer ⑨
 - Drive shaft ⑩

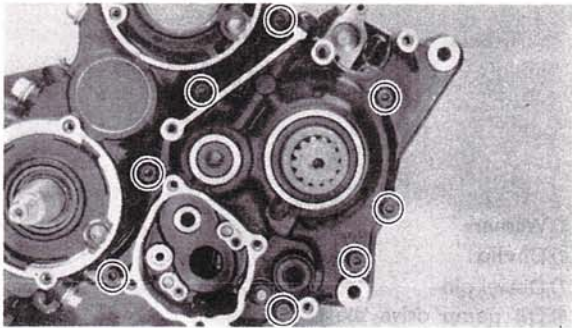


2. Remove:
 - Oil delivery pipe ①

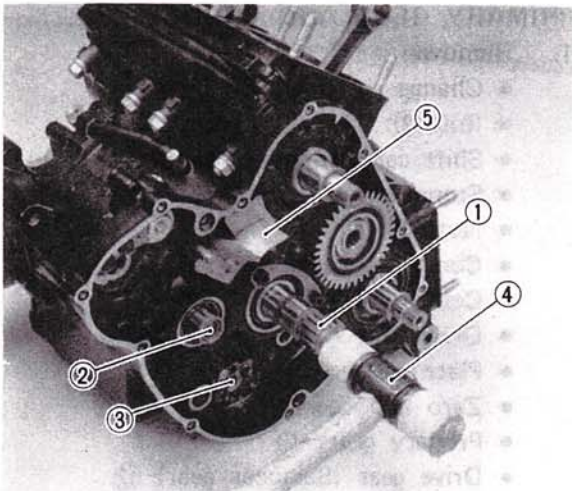
- ② Union bolt
③ Copper washers

TRANSMISSION

1. Remove:
 - Bolts (Crankcase cover)



3



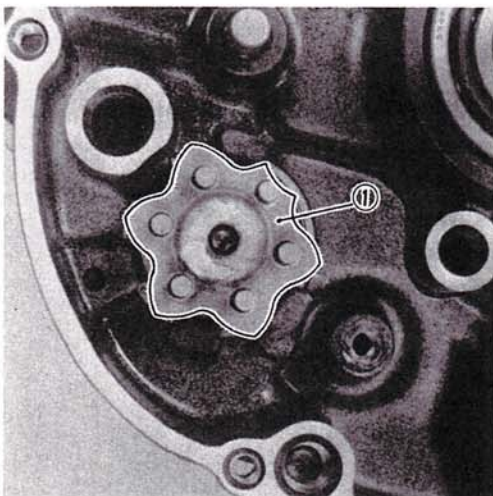
2. Remove the transmission cover together with the transmission assembly by tapping the main axle ①, drive axle ②, and shift cam segment ③ alternately with a soft-faced hammer ④.

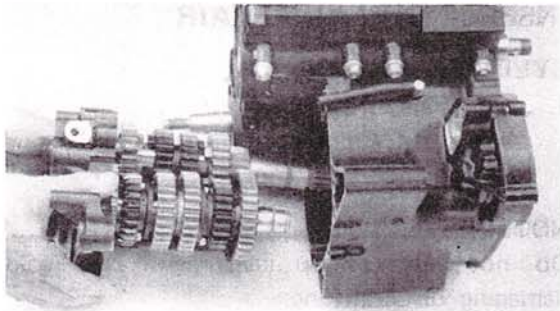
NOTE:

The removal of the oil baffle ⑤ is unnecessary unless the right crankcase has to be replaced.

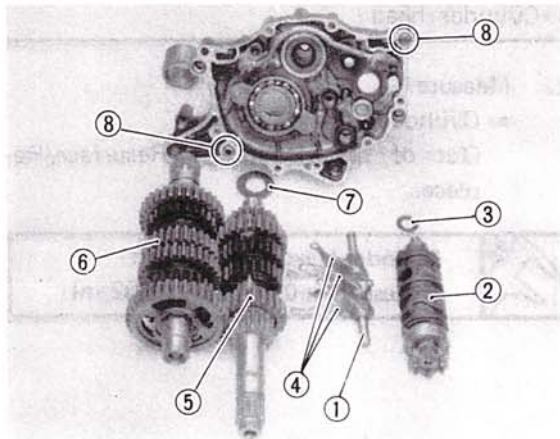
CAUTION:

When separating the crankcase, be sure the shift cam segment star ① aligns with its corresponding contours in the crankcase.



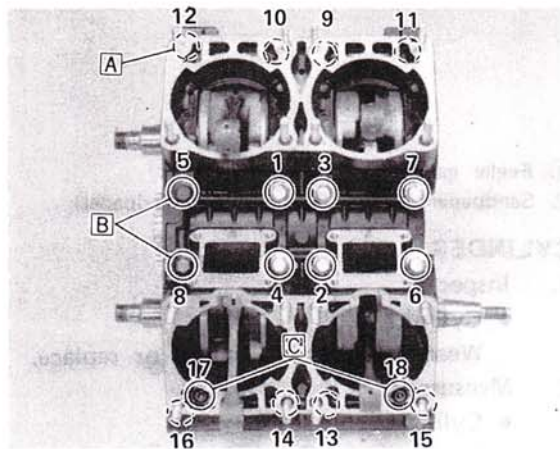


3. Pull out the transmission cover together with the transmission assembly.



4. Remove:
 - Guide bar ①
 - Shift cam ②
 - Washer ③
 - Shift forks ④
 - Main axle (Sub-assembly) ⑤
 - Drive axle (Sub-assembly) ⑥
 - Washer ⑦
 - Dowel pin ⑧

3

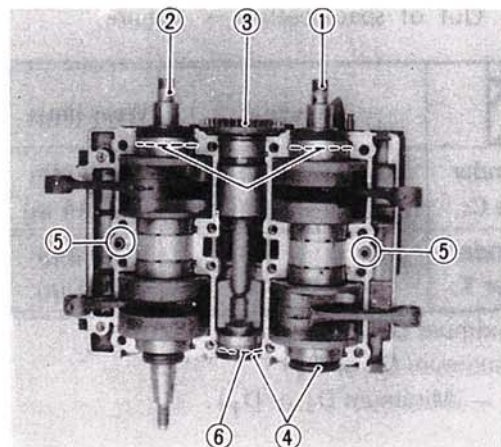


CRANKCASE, CRANKSHAFT, AND BALANCER SHAFT

1. Remove:
 - Bolts (Crankcase)
 - Nut (Crankcase)
 - Crankcase (Upper)

NOTE:

- Remove the bolts starting with the highest numbered one.
- The embossed numbers in the crankcase designate the crankcase tightening sequence.

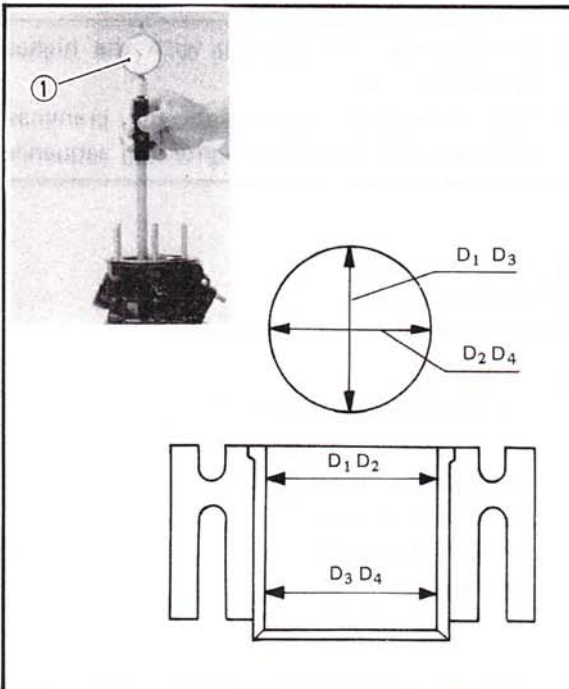
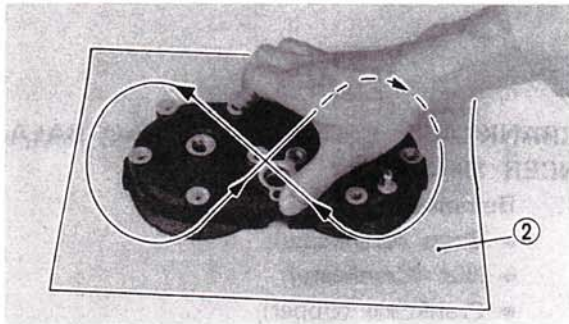
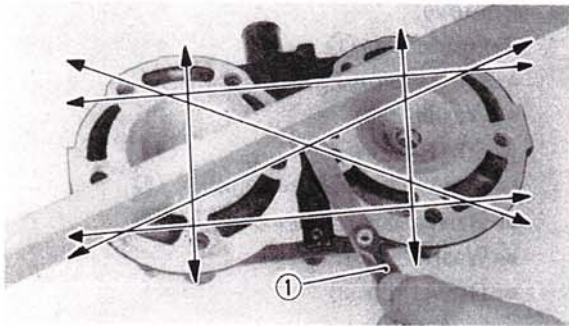


- A** Nut with washer
- B** Black color bolts
- C** Hexagon socket bolt with washer

2. Remove:
 - Crankshaft (Upper) ①
 - Crankshaft (Lower) ②
 - Balancer shaft ③
 - Blind seals ④
 - Dowel pins ⑤
 - Half clips ⑥



3



INSPECTION AND REPAIR

CYLINDER HEAD

1. Eliminate:
 - Carbon deposit
Use rounded scraper.

NOTE:
Do not use a sharp instrument and avoid damaging or scratching:

- Spark plug threads
- Cylinder head

2. Measure:
 - Cylinder head warpage
Out of specification → Resurface/Replace.

Cylinder Head Warp Limit:
Less than 0.05 mm (0.002 in)

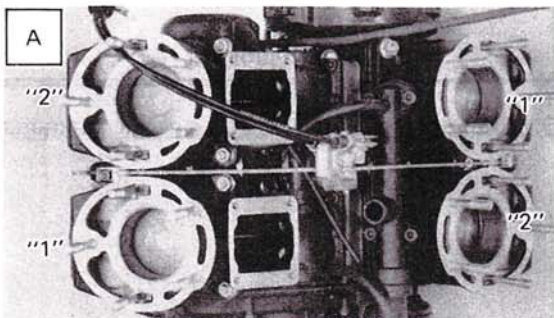
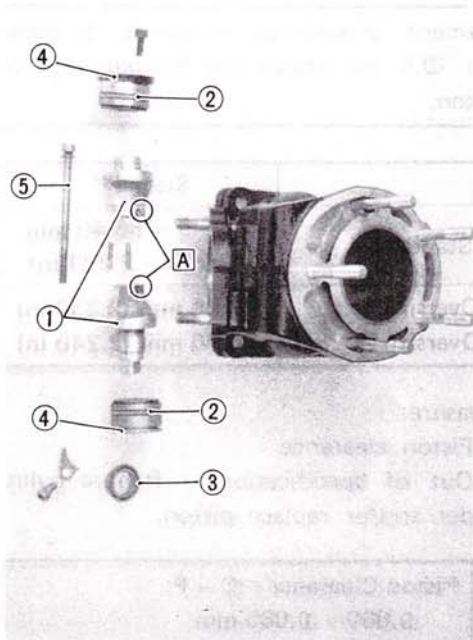
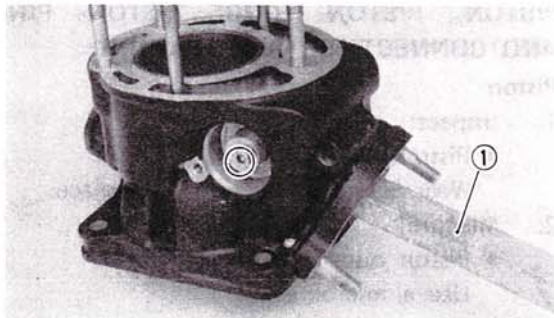
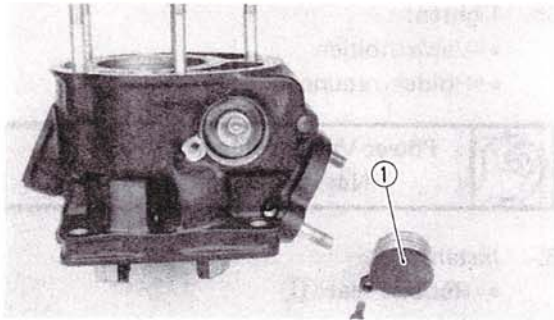
- ① Feeler gauge
- ② Sandpaper (400 ~ 600 grit wet sandpaper)

CYLINDER

1. Inspect:
 - Cylinder wall
Wear/Scratches → Rebore or replace.
2. Measure:
 - Cylinder bore "C"
Use Cylinder Bore Gauge ①.
Out of specification → Rebore.

	Standard	Wear limit
Cylinder Bore C:	56.40 ~ 56.42 mm (2.2205 ~ 2.2213 in)	56.50 mm (2.2244 in)
Cylinder Taper T:	—	0.05 mm (0.002 in)

C = Maximum D
T = (Maximum D₁ or D₂)
— (Minimum D₃ or D₄)



YPVS (YAMAHA POWER VALVE SYSTEM)

Removal

1. Remove:
 - Valve holder 1 ①
 - Holder retainer
 - Valve holder 2
 - Oil seal

2. Remove:
 - Valve securing bolt

NOTE: _____
 Use a wooden piece ① through the exhaust port to steady the valve.

- Valve
- Dowel pins


3

Inspection

1. Inspect:
 - Valve ①
Wear/Scratches → Replace.
 - O-rings ②
Wear/Damage → Replace.
 - Oil seal ③
Wear/Damage → Replace.
 - Holders ④
Wear/Scratches → Replace.


Assembly

1. Grease the valve holders ④, O-rings ②, and oil seal ③.

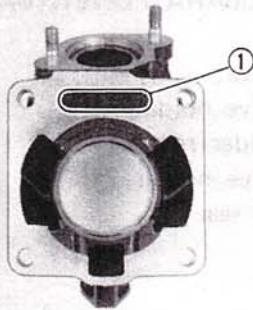
 **Molybdenum Disulfide Grease**

2. Install:
 - Valve ①
 - Dowel pins
3. Tighten:
 - Valve securing bolt ⑤

A VALVE MARK

 **Power Valve:**
 7 Nm (0.7 m·kg, 5.1 ft·lb)
 Do not over tighten.

4. Install:
 - Valve holders
 - Oil seal



5. Tighten:
 - Valve holder
 - Holder retainer



Power Valve Holders:
7 Nm (0.7 m·kg, 5.1 ft·lb)

6. Install:
 - Rubber seal ①

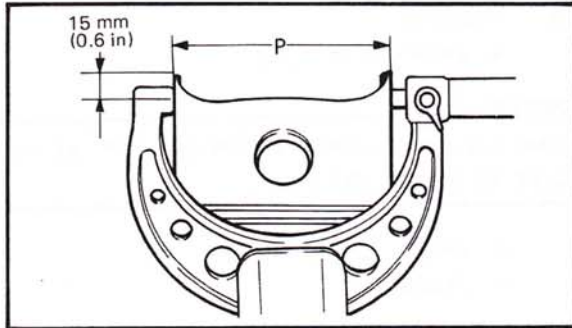
PISTON, PISTON RING, PISTON PIN, AND CONNECTING ROD BEARING

Piston

1. Inspect:
 - Piston wall
Wear/Scratches/Damage → Replace.
2. Measure:
 - Piston outside diameter "P"
Use a micrometer.
Out of specification → Replace.

NOTE:

Measurement should be made at a point 15 mm (0.6 in) above the bottom edge of the piston.



3

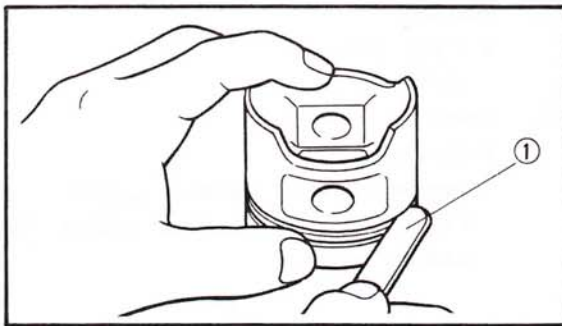
	Size "P"
Standard	56.39 ~ 56.40 mm (2.220 ~ 2.221 in)
Oversize 1	56.65 mm (2.230 in)
Oversize 2	56.90 mm (2.240 in)

3. Measure:
 - Piston clearance
Out of specification → Rebore cylinder and/or replace piston.



Piston Clearance = C – P:
0.060 ~ 0.065 mm
(0.0024 ~ 0.0026 in)
Limit:
0.10 mm (0.004 in)

C: Cylinder bore P: Piston outside diameter

**Piston Ring**

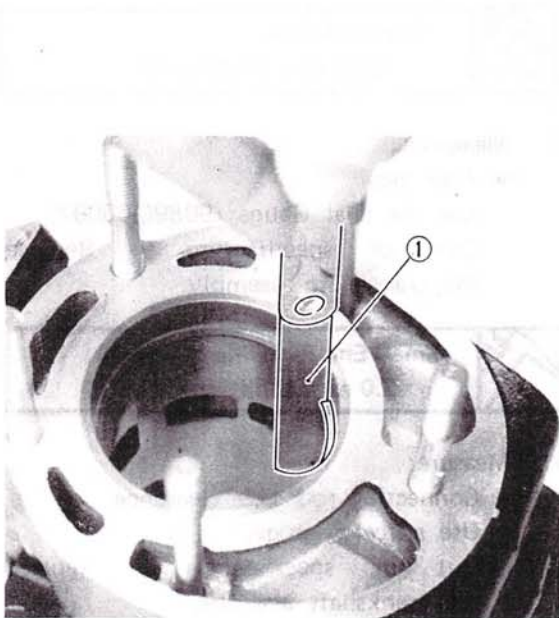
1. Measure:

- Side clearance

Use Feeler Gauge ①.

Out of specification → Replace piston and/or rings.

	Side Clearance:	
	Standard	Limit
Top Ring	0.030 ~ 0.050 mm (0.0012 ~ 0.0020 in)	0.10 mm (0.0039 in)
2nd Ring	0.030 ~ 0.065 mm (0.0012 ~ 0.0026 in)	0.11 mm (0.0043 in)



2. Position:

- Piston ring
(into cylinder)

Push the ring with the piston crown.

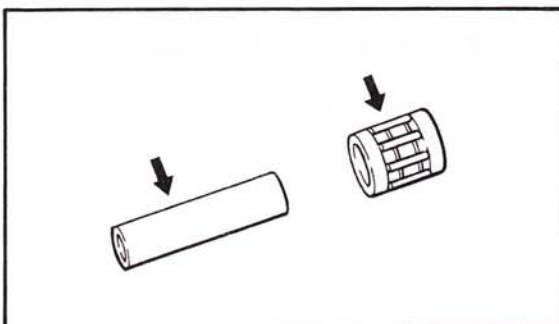
3. Measure:

- End gap

Use feeler gauge ①.

Out of specification → Replace rings as set.

	End Gap:	
	Standard	Limit
Top Ring	0.30 ~ 0.45 mm (0.012 ~ 0.018 in)	0.70 mm (0.028 in)
2nd Ring	0.30 ~ 0.45 mm (0.012 ~ 0.018 in)	0.70 mm (0.028 in)

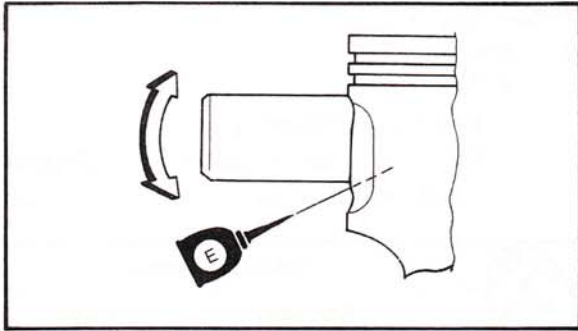
**Piston Pin and Connecting Rod Bearing**

1. Check:

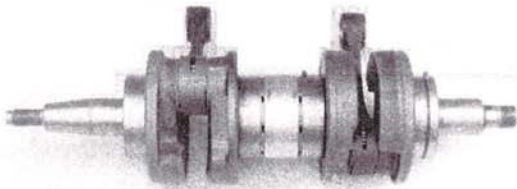
- Piston pin
- Connecting rod bearing

Wear/Scratches/Heat discoloration → Replace the piston pin and bearing as a set.

3



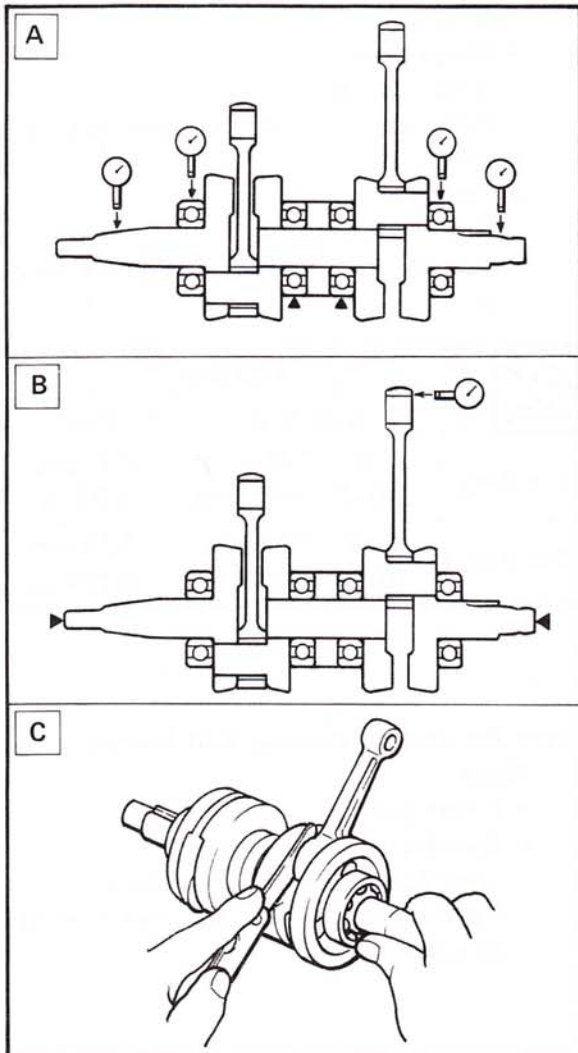
2. Position:
 - Piston pin
(into piston)
3. Check:
 - Free play
(when pin is in place in piston)
Free play → Replace piston pin
and/or piston.

**CRANKSHAFT**

1. Measure:
 - Runout
Use V-Blocks and Dial Gauge (90890-03097).
Out of specification → Replace.



Runout Limit A :
0.03 mm (0.0012 in)

3

2. Measure:
 - Free play
Use the Dial Gauge (90890-03097).
Out of specification → Replace
the crankshaft assembly.



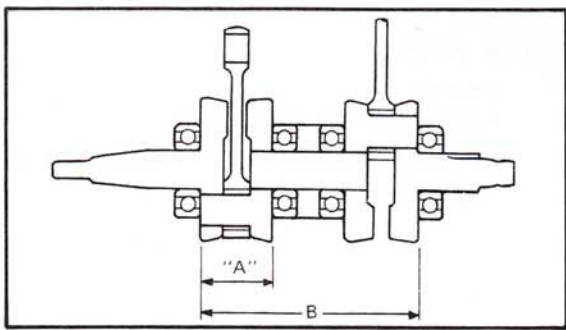
Small End Free Play Limit B :
2.0 mm (0.08 in)


3. Measure:
 - Connecting rod side clearance
Use a feeler gauge.
Out of specification → Replace
the crankshaft assembly.

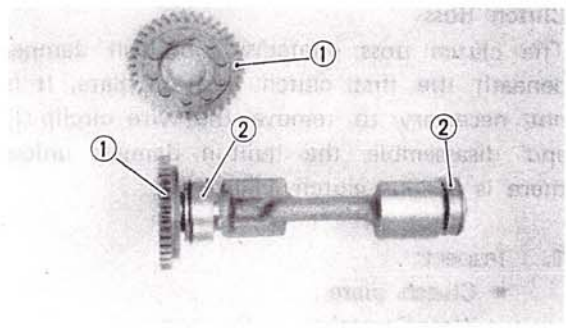


Side Clearance Limit C :
0.1 mm (0.04 in)

4. Inspect:
 - Bearings
Pitting/Damage → Replace the bear-
ing(s) or crankshaft assembly.

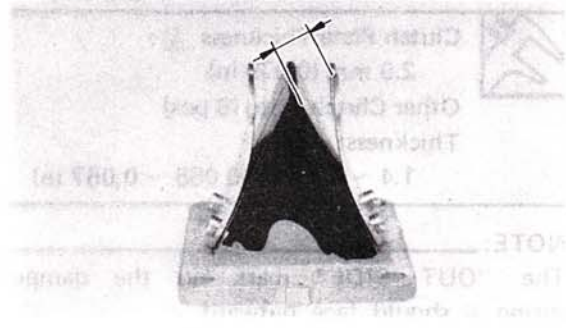


 CRANKSHAFT LENGTH:	
Crank Width "A":	55.95 ~ 56.00 mm (2.2028 ~ 2.2047 in)
Assembly Width "B":	167.85 ~ 168.00 mm (6.6083 ~ 6.6014 in)



BALANCER SHAFT

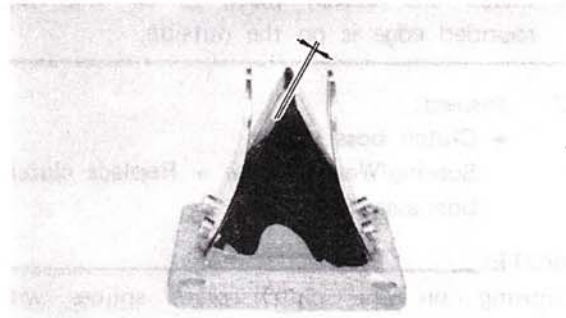
- Inspect:
 - Gears ①
Damage/Wear → Replace.
- Inspect:
 - Bearings ②
Pitting/Damage → Replace.




REED VALVE AND CARBURETOR JOINT

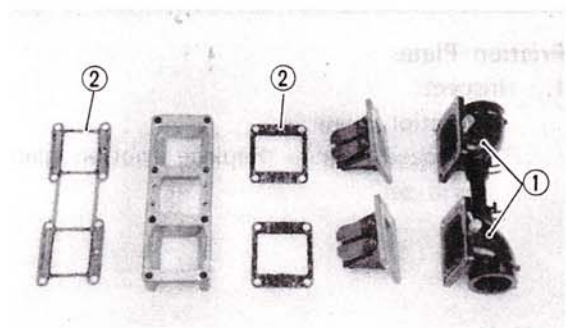
- Measure:
 - Valve stopper height
Out of specification → Replace.

 Valve Stopper Height: 8.7 ~ 9.3 mm (0.343 ~ 0.366 in)



- Measure:
 - Valve bending
Out of specification → Replace.

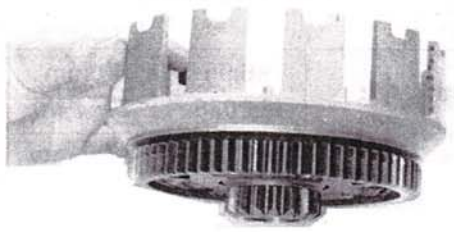
 Valve Bending Limit: 0.5 mm (0.02 in)



Carburetor Joint

- Inspect:
 - Carburetor joint ①
Cracks/Wear/Damage → Replace.
 - Gaskets ②
Damage → Replace.

3



CLUTCH

Clutch Housing

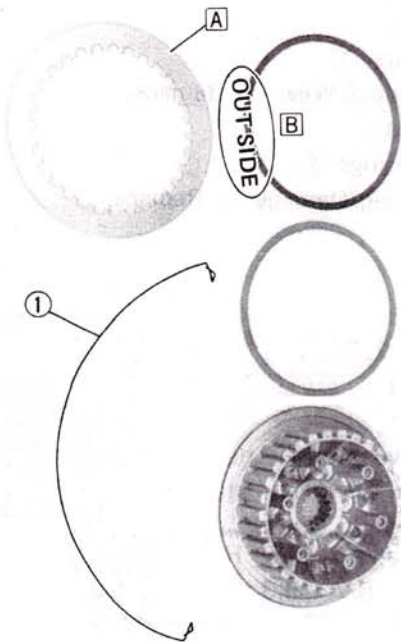
1. Inspect:
 - Dogs on the housing ①.
Cracks/Wear/Damage → Deburr or replace.

Clutch Boss

The clutch boss contains a built-in damper beneath the first clutch friction plate. It is not necessary to remove the wire circlip ① and disassemble the built-in damper unless there is serious clutch chattering.

1. Inspect:
 - Clutch plate
Wear/Scratches → Replace.

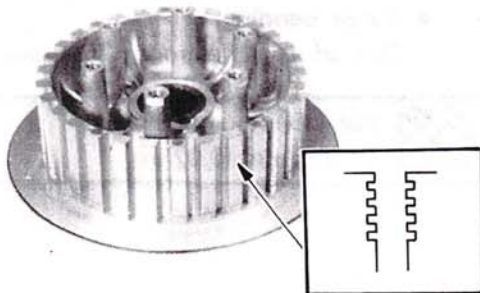
3



Clutch Plate Thickness [A] :
2.0 mm (0.079 in)
Other Clutch Plate (6 pcs)
Thickness:
1.4 ~ 1.7 mm (0.055 ~ 0.067 in)

NOTE:
 The "OUT SIDE" mark on the damper spring [B] should face outward.

- Install the clutch plate [A] so that the rounded edge is on the outside.

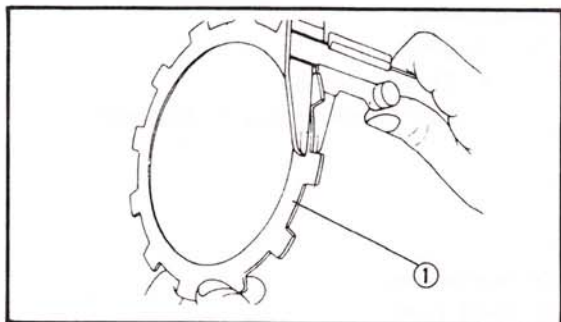


2. Inspect:
 - Clutch boss splines
Scoring/Wear/Damage → Replace clutch boss assembly.

NOTE:
 Scoring on the clutch plate splines will cause erratic operation.

Friction Plates

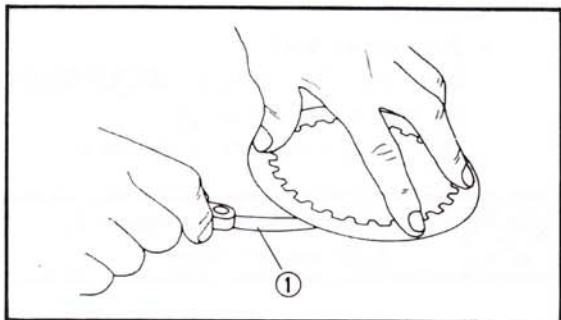
1. Inspect:
 - Friction plate ①
Damage/Wear → Replace friction plate as a set.



2. Measure:
 - Friction plate thickness
Measure at all four points.
Out of specification → Replace friction plate as a set.



Wear Limit:
2.8 mm (0.11 in)

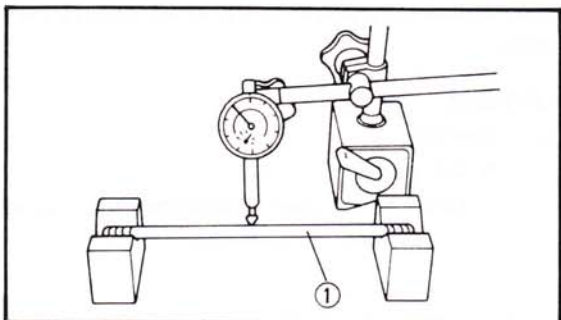


Clutch Plates

1. Measure:
 - Clutch plate warpage
Use surface plate and Feeler Gauge ①.
Out of specification → Replace.



Warp Limit:
0.1 mm (0.004 in)



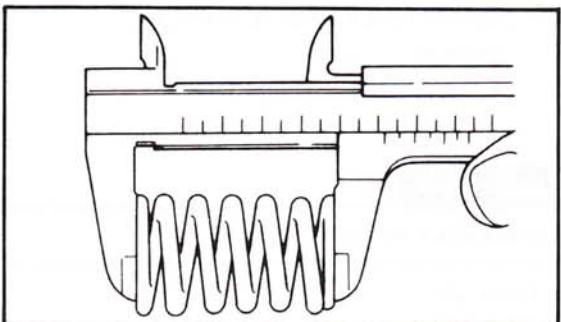
Push Rod

1. Measure:
 - Push rod runout (long rod) ①
Use V-Blocks and Dial Gauge (90890-03097)
Out of specification → Replace.



Bending Limit:
0.5 mm (0.020 in)

2. Inspect:
 - O-ring
(on short rod)
Wear/Cracks/Damage → Replace.



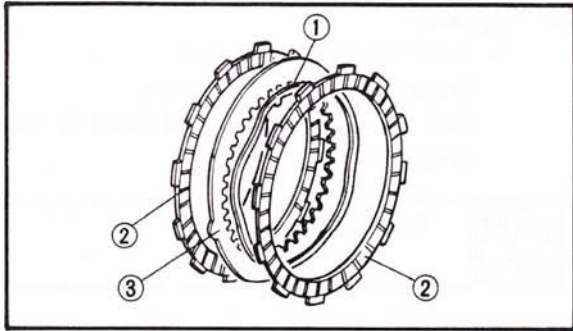
Clutch Spring

1. Inspect:
 - Clutch spring ①
Wear/Bends/Cracks → Replace.
2. Measure:
 - Clutch spring free length
Out of specification → Replace springs as a set.



Clutch Spring Minimum Length:
41.5 mm (1.634 in)

3



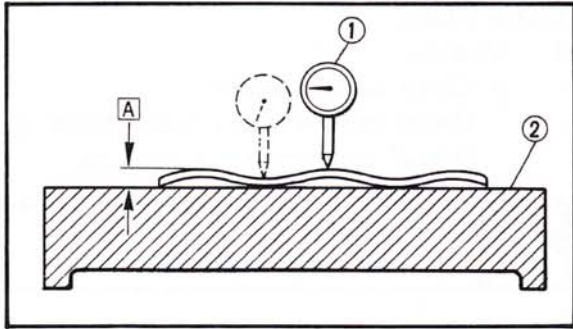
Ring-Spring

1. Inspect:
 - Ring-springs ①
Wear/Bends/Cracks → Replace.

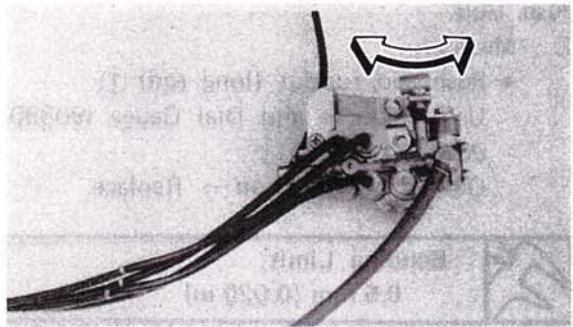
- ② Friction plate
③ Clutch plate

2. Measure:
 - Ring-spring height
Use the Dial Gauge (90890-03094)
① and surface plate ②.
Out of specification → Replace.

Ring-Spring Minimum Height [A] :
3.25 mm (0.128 in)



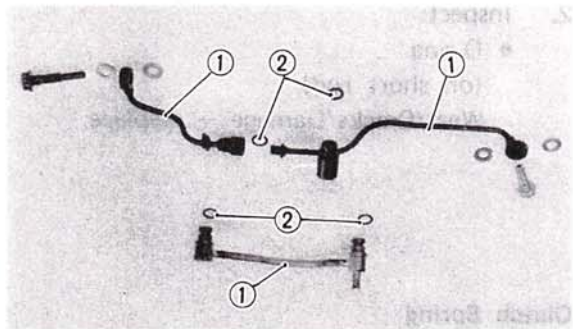
3



OIL PUMP (ENGINE OIL) AND DELIVERY PIPE

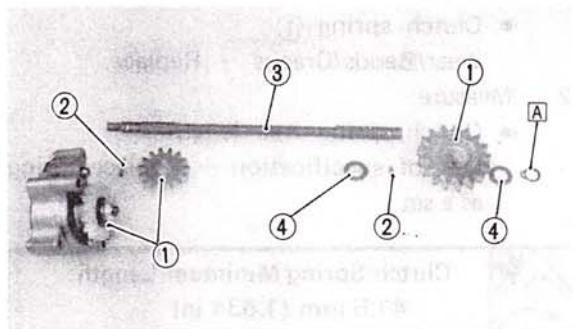
Oil Pump

1. Inspect:
 - Oil pump
Unsmooth lever operation/Oil leaks
→ Replace.



Delivery Pipe

1. Inspect:
 - Oil pipes ①
Contamination → Clean.
 - O-rings ②
Wear/Cracks/Damage → Replace.



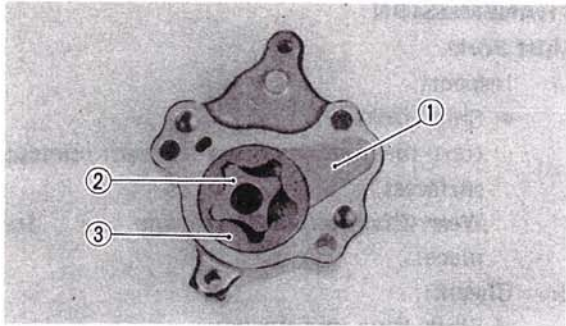
OIL PUMP (TRANSMISSION OIL)

1. Inspect:
 - Gears ①
Wear/Damage → Replace.

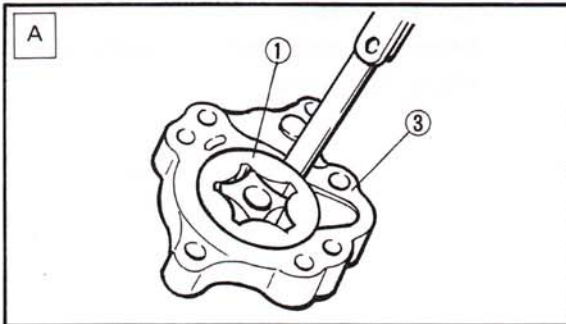
WARNING:

Always use a new circlip [A] .


- ② Dowel pin
- ③ Drive shaft
- ④ Washer

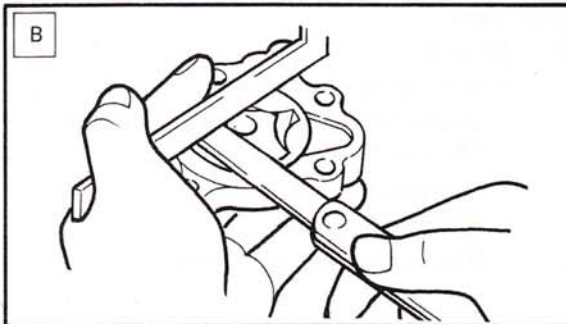


- ① Housing
- ② Inner rotor
- ③ Outer rotor




2. Measure:
 - Housing ③ /Outer rotor ① clearance
Use Feeler Gauge.
Out of specification → Replace oil pump assembly.

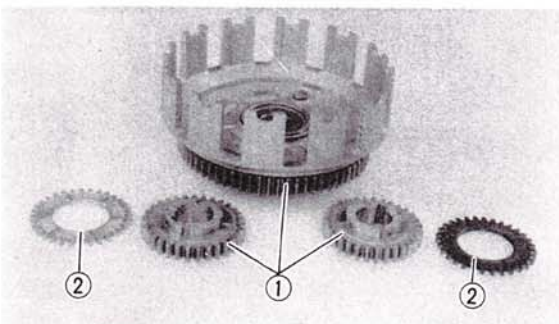
	Standard Clearance "A":
	0.10 ~ 0.15 mm (0.004 ~ 0.006 in)
	Limit: 0.17 mm (0.0067 in)



3. Measure:
 - Rotor/Housing clearance
Use a Feeler Gauge and straight edge.
Out of specification → Replace oil pump assembly.

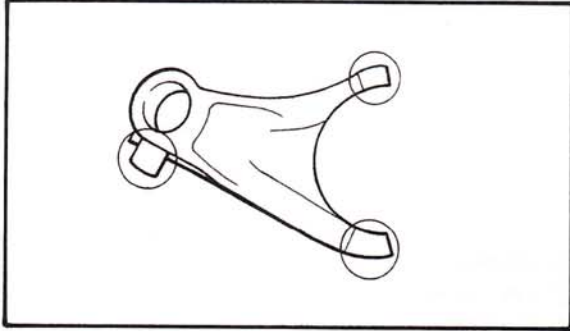
	Standard Clearance "B":
	0.04 ~ 0.09 mm (0.0016 ~ 0.0035 in)
	Limit: 0.12 mm (0.0047 in)

3



PRIMARY GEARS

1. Inspect:
 - Gears ①
Damage/Wear → Replace.
 - Gears (Zero lash gear) ②
Damage/Wear → Replace.

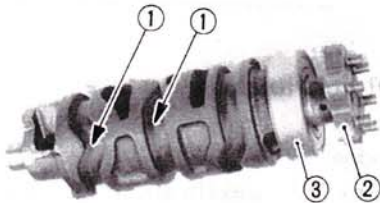


TRANSMISSION

Shift Fork

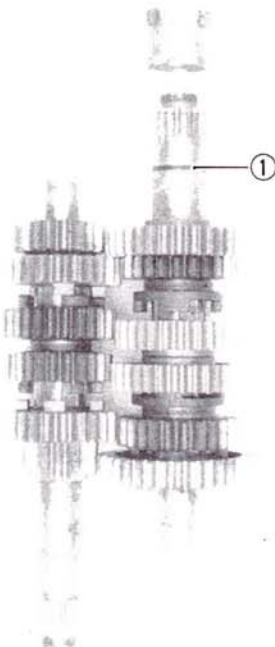
1. Inspect:
 - Shift forks
(on the gear and shift cam contact surfaces)
Wear/Chafing/Bends/Damage → Replace.
2. Check:
 - Shift fork movement
(on its guide bar)
Unsmooth operation → Replace fork and/or guide bar.

3



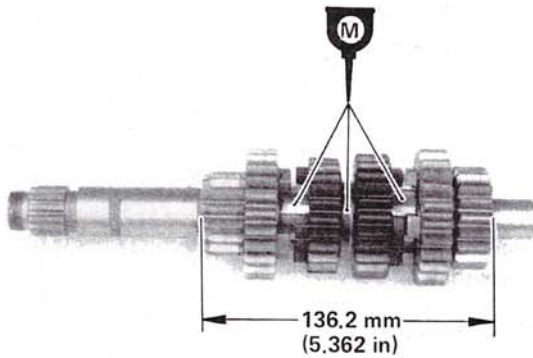
Shift Cam

1. Inspect:
 - Shift cam grooves ①
Wear/Damage/Scratches → Replace.
 - Shift cam segment ②
Damage/Wear → Replace.
 - Shift cam bearing ③
Pitting/Damage → Replace.



Gears

1. Inspect:
 - O-ring ①
Wear/Damage → Replace.
 - Gears
Damage/Wear → Replace.
 - Mating dogs
Cracks/Wear/Damage → Replace.
2. Check:
 - Gear movement
Unsmooth operation → Replace.

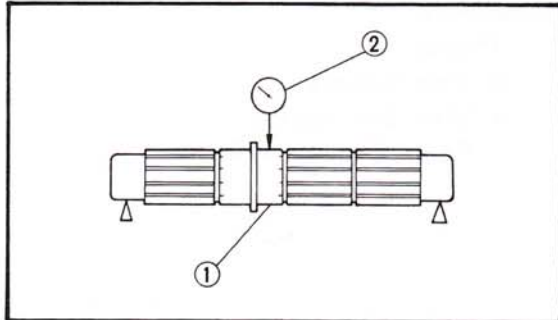


3. Measure:
 - Main axle (Assembled)

	Main Axle Length: 136.2 mm (5.362 in)
--	---

4. Lubricate:
 - Main axle
 - Drive axle

	Molybdenum Disulfide Oil
--	---------------------------------

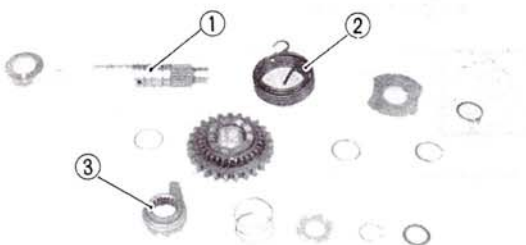
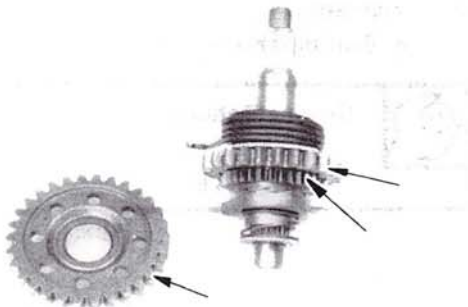


Main and Drive Axles

1. Measure:
 - Axle runout ①
 - Use centering device and Dial Gauge (90890-03097) ②.
 - Out of specification → Replace.

	Runout Limit: 0.08 mm (0.0031 in)
--	--

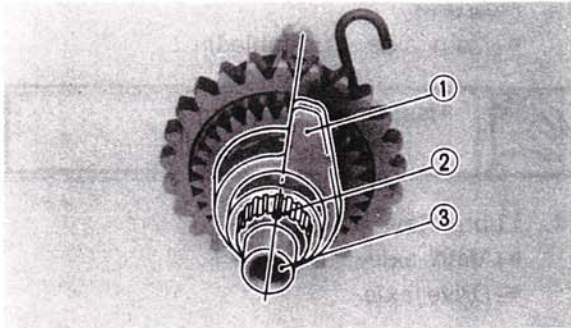
3



KICK STARTER

1. Inspect:
 - Gears
 - Wear/Damage → Replace.

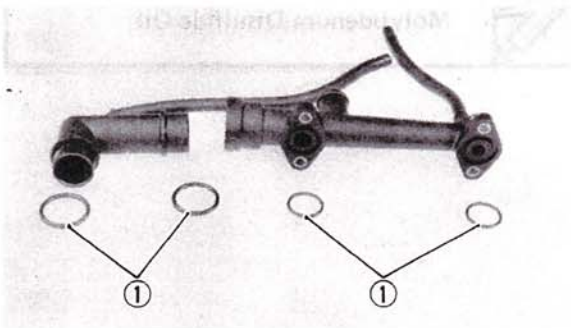
2. Inspect:
 - Kick shaft ①
 - Wear/Damage → Replace.
 - Springs ②
 - Wear/Damage → Replace.
 - Stopper (Ratchet wheel) ③
 - Wear/Damage → Replace.



3. Install:
 - Stopper ①
See photo.

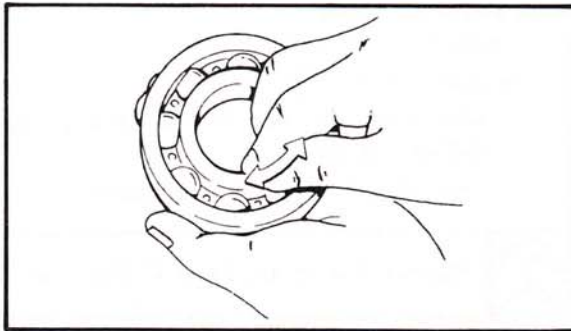
- ② Punch mark
- ③ Kick shaft

WATER JACKET



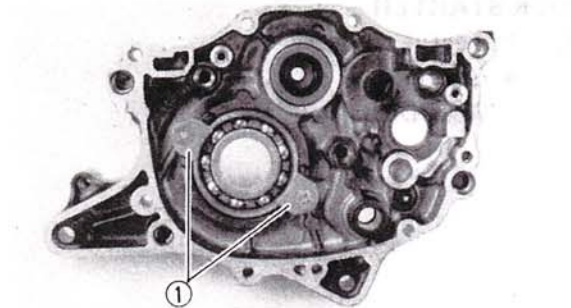
1. Inspect:
 - O-rings ①
Wear/Damage → Replace.
 - Hoses (All)
Wear/Cracks/Damage → Replace.

3



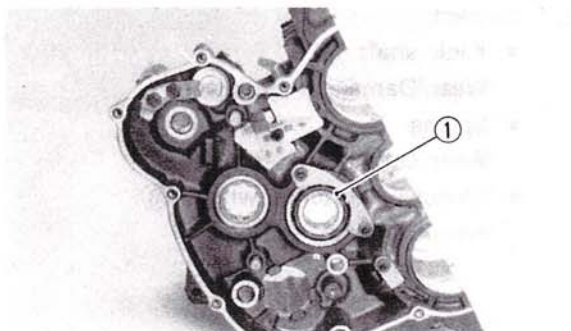
BEARINGS

1. Inspect:
 - Axle bearings
 - Shift cam bearing
Pitting/Damage → Replace.



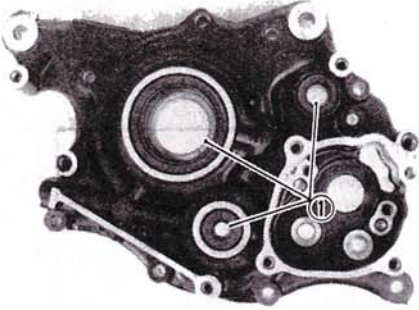
2. Tighten:
 - Bearing retainer ①

	<p>Bearing Retainer: 10 Nm (1.0 m·kg, 7.2 ft·lb) LOCTITE®</p>
--	--

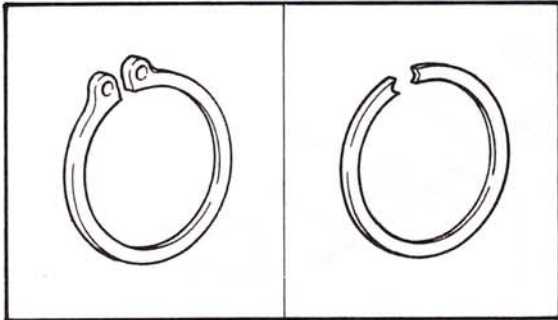


3. Tighten:
 - Bearing retainer ①

	<p>Bearing Retainer: 7 Nm (0.7 m·kg, 5.1 ft·lb) LOCTITE®</p>
--	---

**OIL SEALS AND BLIND SEALS**

1. Inspect:
 - Oil seals ①
Wear/Damage → Replace.
 - Blind seals
Wear/Damage → Replace.

**CIRCLIPS AND WASHERS**

1. Inspect:
 - Circlips
 - Washers
Damage/Looseness/Bends → Replace.



ENGINE ASSEMBLY AND ADJUSTMENT

CRANKCASE ASSEMBLY (1)

- 1. Baffle plate
- 2. Union bolt
- 3. Copper washer
- 4. Delivery pipe
- 5. O-ring
- 6. Dowel pin
- 7. Retainer
- 8. Breather hose
- 9. Crankcase
- 10. Transmission cover

ENGINE OIL:

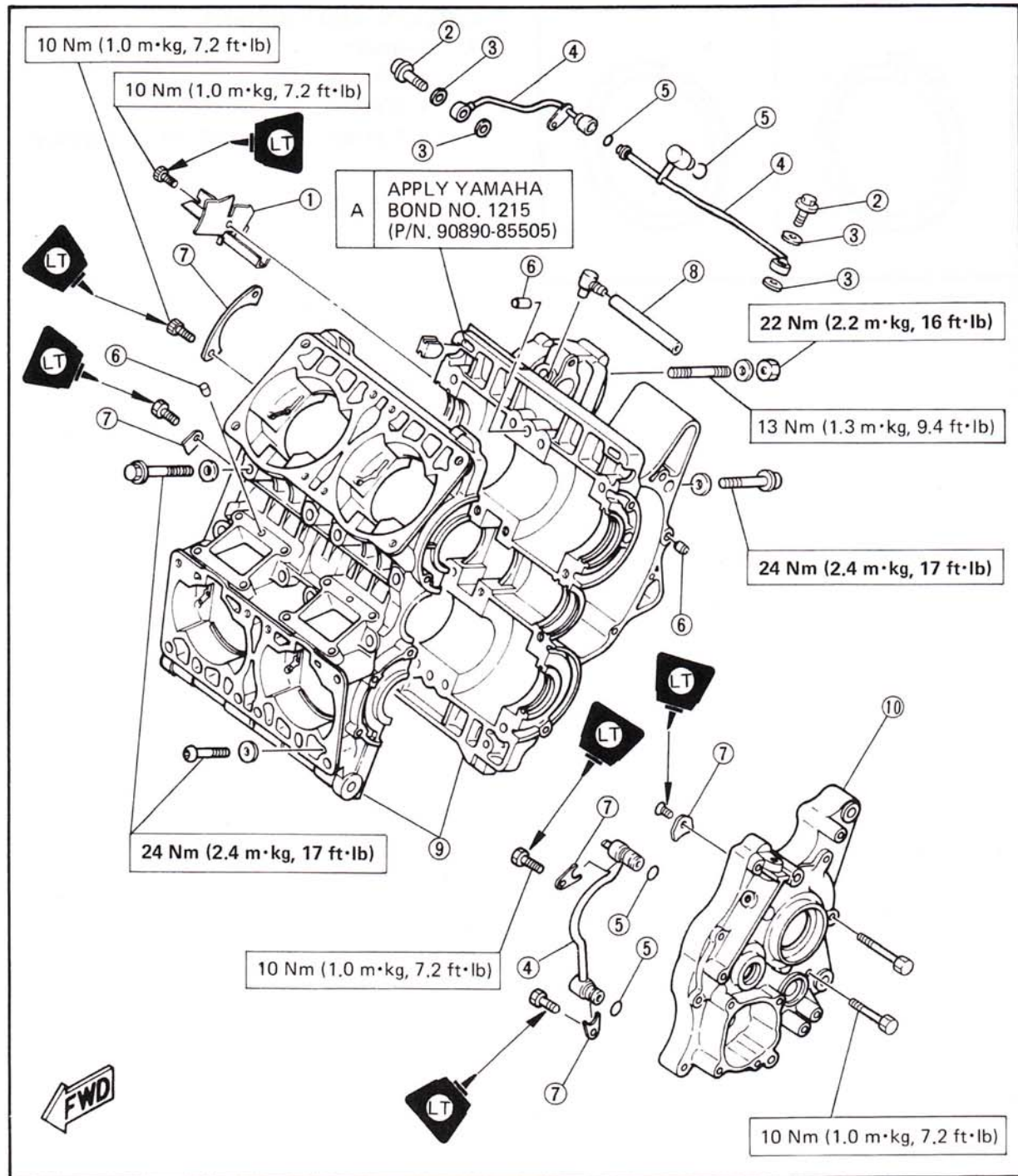
Recommended Oil:

Yamalube 2-cycle oil or
Air cooled 2-stroke engine oil

Oil Capacity:

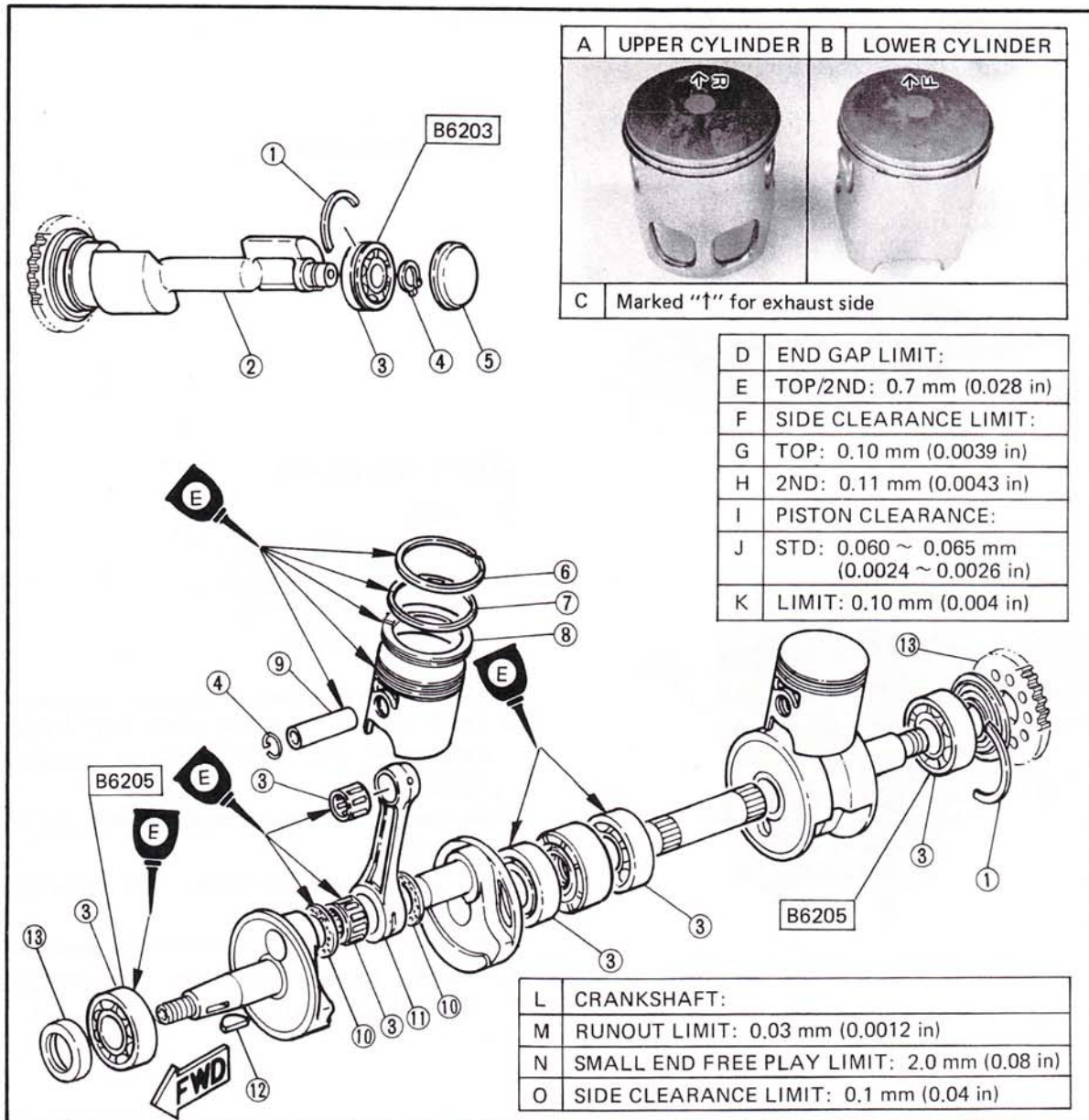
2.0 L (1.8 Imp qt, 2.1 US qt)

3

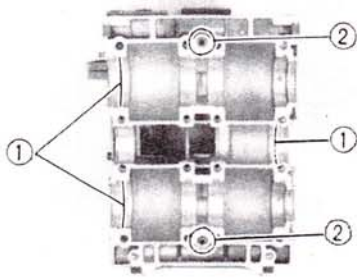


CRANKCASE ASSEMBLY (2)

- 1. Half clip
- 2. Balancer shaft
- 3. Bearing
- 4. Circlip
- 5. Blind seal
- 6. Top ring
- 7. 2nd ring
- 8. Expander
- 9. Piston pin
- 10. Thrust washer
- 11. Connecting rod
- 12. Woodruff key
- 13. Oil seal



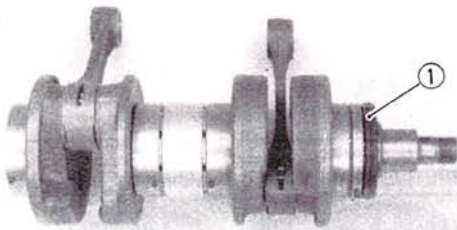
3



1. Install:
 - Half clips (Bearing clip) ①
 - Dowel pins ②

NOTE: _____
 Insert the bearing clips ① completely into the crankcase positioning grooves.

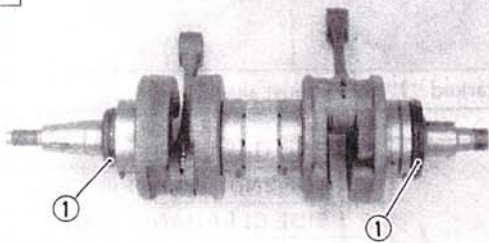
A



2. Place the oil seals ① onto the crankshafts.

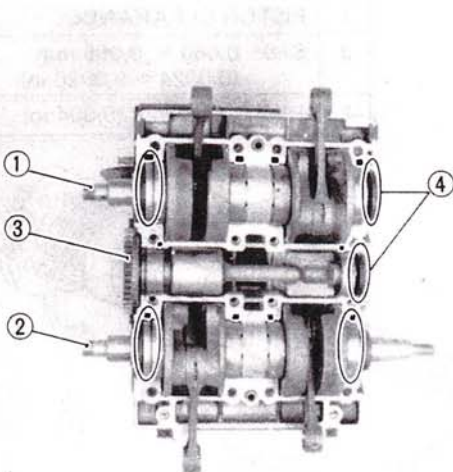
A UPPER CRANKSHAFT

B



B LOWER CRANKSHAFT

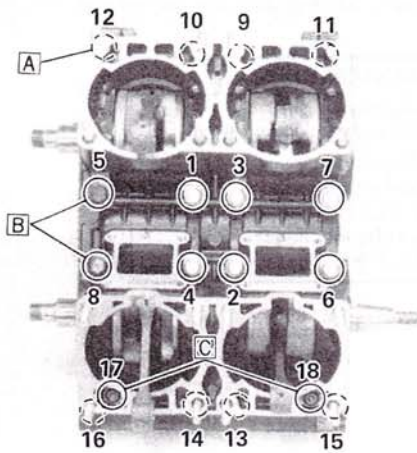
3



3. Install:
 - Crankshaft (Upper) ①
 - Crankshaft (Lower) ②
 - Balancer shaft ③
 - Blind seal ④


NOTE: _____
 • Insert the oil seal and blind seal flanges completely into the crankcase positioning grooves.
 • Be careful not to damage the seals during installation.
 • Be careful not to damage the crankcase during installation.

4. Apply Yamaha bond No. 1215 (90890-85505) to crankcase matching surfaces.



5. Install:
 - Crankcase (Upper)
6. Tighten:
 - Bolts
 - Nut

NOTE: _____
 The embossed numbers in the crankcase designate the crankcase tightening sequence.

	Crankcase:
	Bolt: 24 Nm (2.4 m·kg, 17 ft·lb)
	Nut: 22 Nm (2.2 m·kg, 16 ft·lb)

- A Nut with washer
- B Black color bolts
- C Hexagon socket bolt with washer

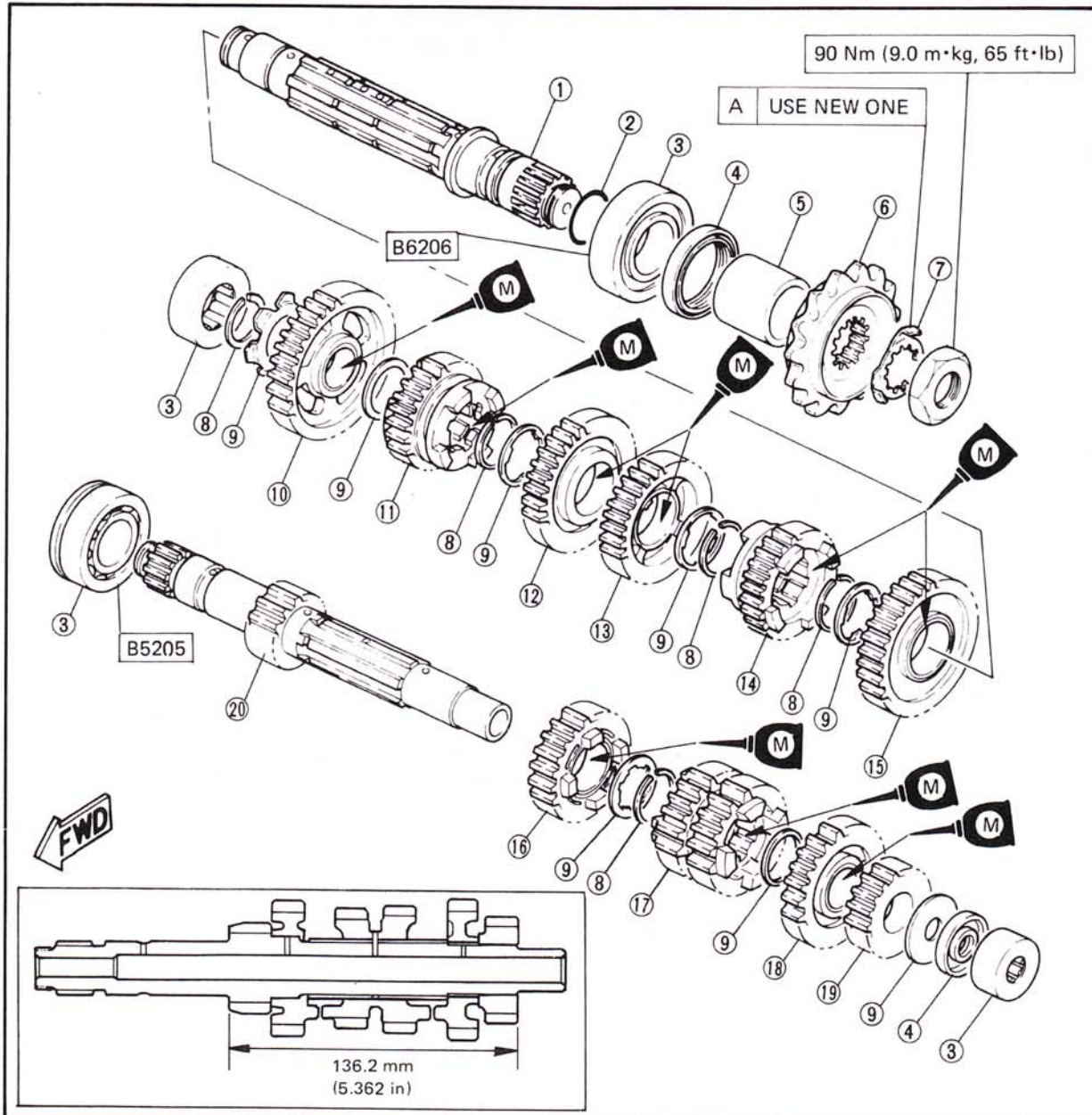


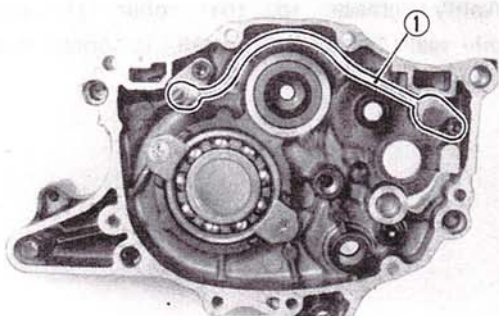
TRANSMISSION

- 1. Drive axle
- 2. O-ring
- 3. Bearing
- 4. Oil seal
- 5. Collar
- 6. Drive sprocket (15T)
- 7. Lock washer
- 8. Circlip
- 9. Washer
- 10. 1st wheel (36T)
- 11. 5th wheel (24T)
- 12. 3rd wheel (30T)
- 13. 4th wheel (28T)
- 14. 6th wheel (23T)
- 15. 2nd wheel (32T)
- 16. 5th pinion (23T)
- 17. 3rd/4th pinion (22T/24T)
- 18. 6th pinion (24T)
- 19. 2nd pinion (19T)
- 20. Main axle (15T)

TRANSMISSION OIL:
 Recommended Oil:
 SAE 10W30 type SE motor oil
 Oil Capacity:
 Total amount:
 1.6 L (1.4 Imp qt, 1.7 US qt)
 Periodic oil change:
 1.5 L (1.3 Imp qt, 1.6 US qt)

3

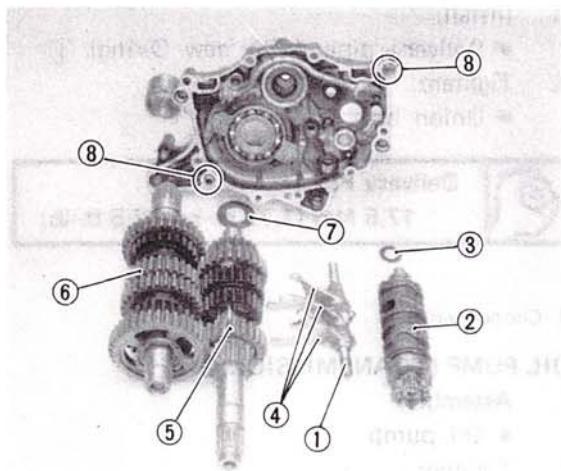




1. Install:
 - Delivery pipe (With new O-rings) ①
2. Tighten:
 - Retainers

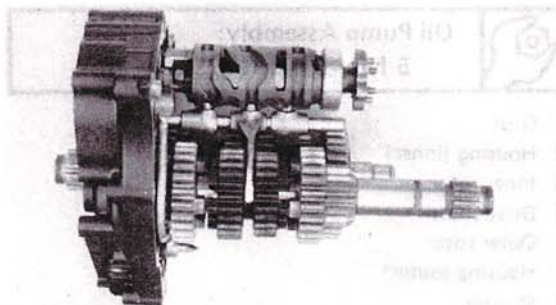


Delivery Pipe:
 10 Nm (1.0 m·kg, 7.2 ft·lb)
 LOCTITE®



3. Install:
 - Dowel pins ⑧
 - Washer ⑦
 - Drive axle (Sub-assembly) ⑥
 - Main axle (Sub-assembly) ⑤
 - Shift forks ④
 - Washer ③
 - Shift cam ②
 - Guide bar ①
 (onto the transmission cover)
4. Apply Yamaha Bond No. 1215 (90890-85505) to the transmission cover matching surface.

3



5. While holding the transmission assembly, install the transmission assembly into the crankcase.

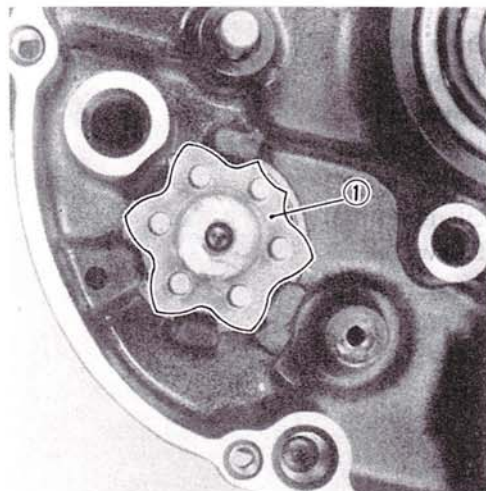
CAUTION:

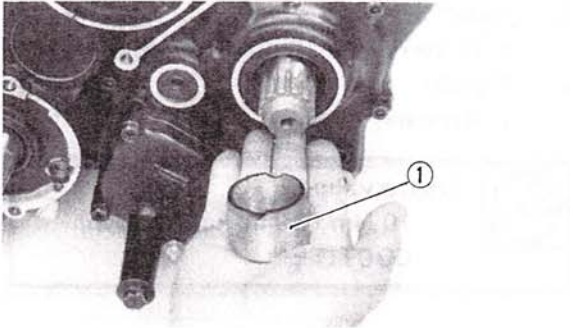
When installing the transmission assembly, be sure the shift cam segment star ① aligns with its corresponding contours in the crankcase.

6. Tighten:
 - Bolts

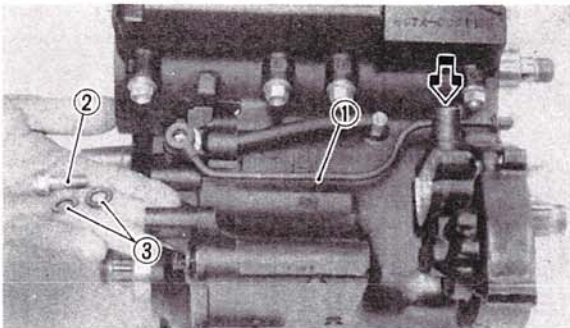


Transmission Cover:
 10 Nm (1.0 m·kg, 7.2 ft·lb)





7. Apply grease to the collar ① and oil seal lips, and install it onto the drive axle.



8. Install:
 - Delivery pipe (With new O-ring) ①
9. Tighten:
 - Union bolt ②

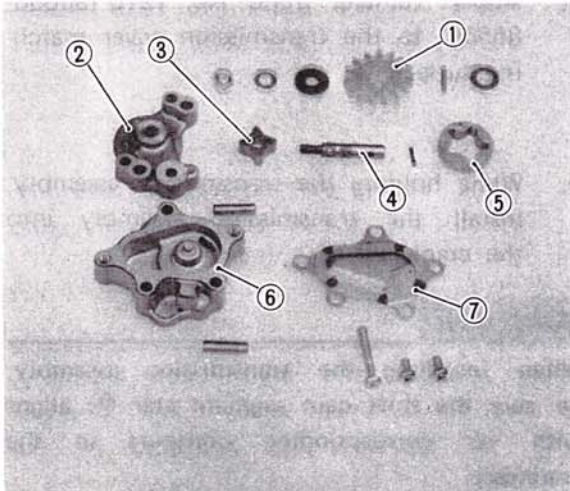


Delivery Pipe:
17.5 Nm (1.75 m·kg, 12.5 ft·lb)

- ③ Copper washer

3

OIL PUMP (TRANSMISSION OIL)



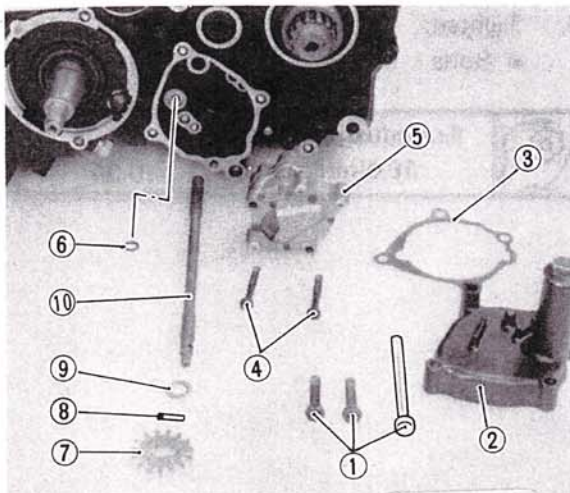
1. Assemble:
 - Oil pump
2. Tighten:
 - Screws

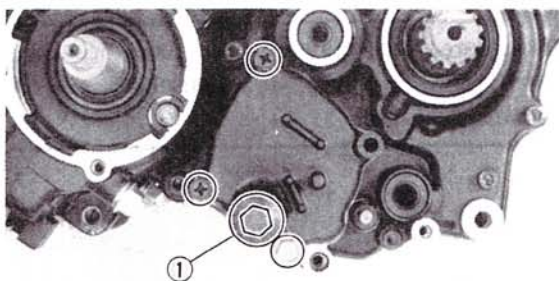


Oil Pump Assembly:
5 Nm (0.5 m·kg, 3.6 ft·lb)


- ① Gear
- ② Housing (inner)
- ③ Inner rotor
- ④ Drive shaft
- ⑤ Outer rotor
- ⑥ Housing (outer)
- ⑦ Strainer

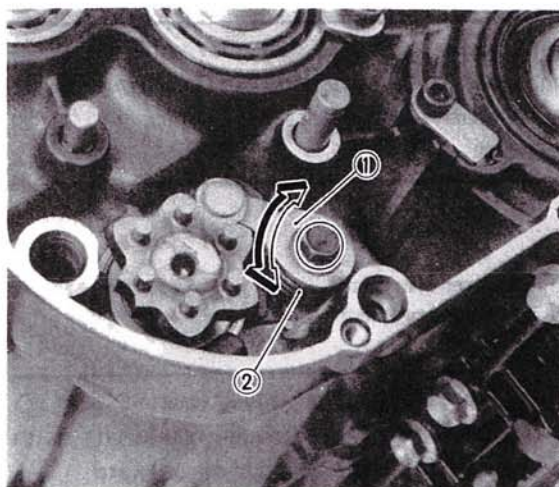
3. Install:
 - Drive shaft ⑩
 - Washer ⑨
 - Dowel pin ⑧
 - Idle gear ⑦
 - O-ring ⑥
 - Oil pump ⑤
 - Screws ④
 - Gasket ③
 - Cover ②
 - Bolts ①





4. Tighten:
 - Screws
 - Bolts
 - Drain plug ①

	Oil Pump Housing:
	5 Nm (0.5 m·kg, 3.6 ft·lb)
	Oil Pump Cover:
	10 Nm (1.0 m·kg, 7.2 ft·lb)
	Drain Plug:
	22 Nm (2.2 m·kg, 16 ft·lb)



PRIMARY GEAR AND CHANGE SHAFT
Change Shaft

1. Install:
 - Shift cam stopper lever ⑪ with the return spring ②
2. Tighten:
 - Bolt (Shift cam stopper lever)

3

	Stopper Lever:
	10 Nm (1.0 m·kg, 7.2 ft·lb)
	LOCTITE®

NOTE: _____
Check for smooth operation after tightening the stopper lever.

3. Install:
 - Change shaft

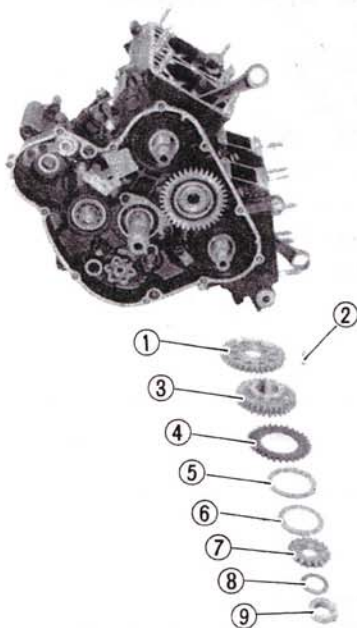
Primary Gear (Lower crankshaft)

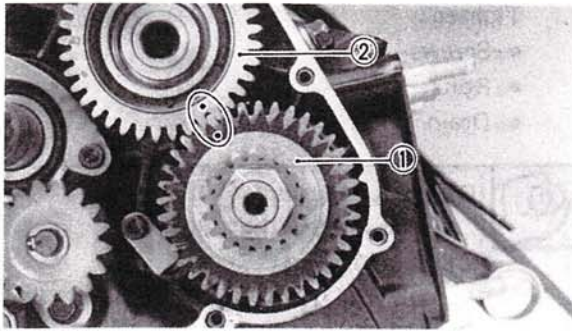
1. Install:
 - Drive gear (Balancer gear) ①
 - Key ②
 - Primary gear ③
 - Zero lash gear ④
 - Plate washer ⑤
 - Conical washer ⑥
 - Drive gear (Water pump) ⑦
 - Conical washer ⑧
 - Nut ⑨

NOTE: _____
Install the conical washer with the concave side facing inward.

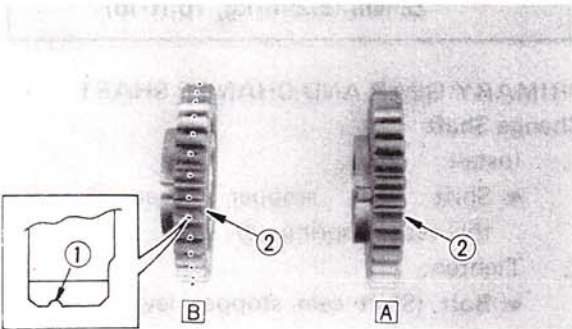
2. Finger tighten the nut ⑨.

NOTE: _____
Do not tighten the nut at this point.





NOTE:
 Make sure the punch mark on the drive gear ① aligns with the painted circle on the balancer gear ②.



NOTE:
 Make sure that the gear having discriminating cuts ① is installed on the lower crankshaft with the recessed surface ② facing outward.

- A] For upper crankshaft
- B] For lower crankshaft

NOTE:
 Make sure that the black coated gear ① is installed on the lower crankshaft with the recessed surface ② facing outward.

- A] For Upper crankshaft
- B] For lower crankshaft

Primary Gear (Upper crankshaft)

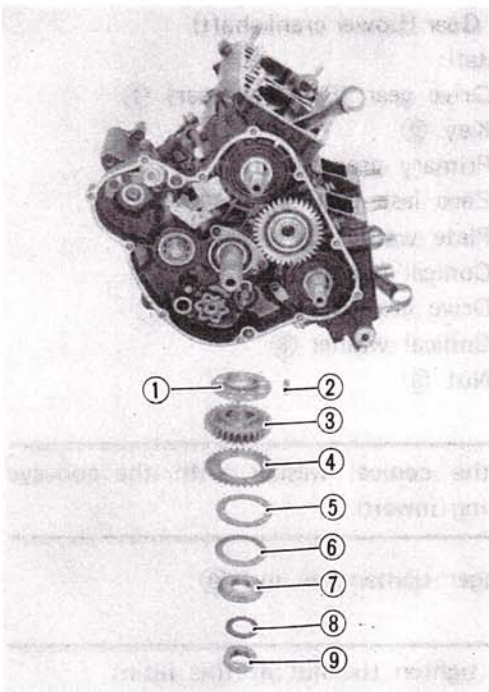
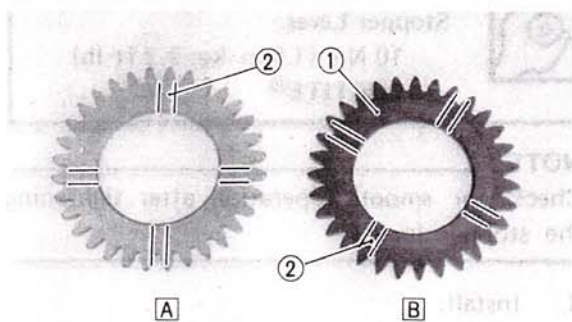
1. Install:
 - Collar ①
 - Key ②
 - Primary gear ③
 - Zero lash gear ④
 - Plate washer ⑤
 - Conical washer ⑥
 - Collar ⑦
 - Conical washer ⑧
 - Nut ⑨

NOTE:
 Install the conical washer with the concave side facing inward.

2. Finger tighten the nut ⑨.

NOTE:
 Do not tighten the nut at this point.

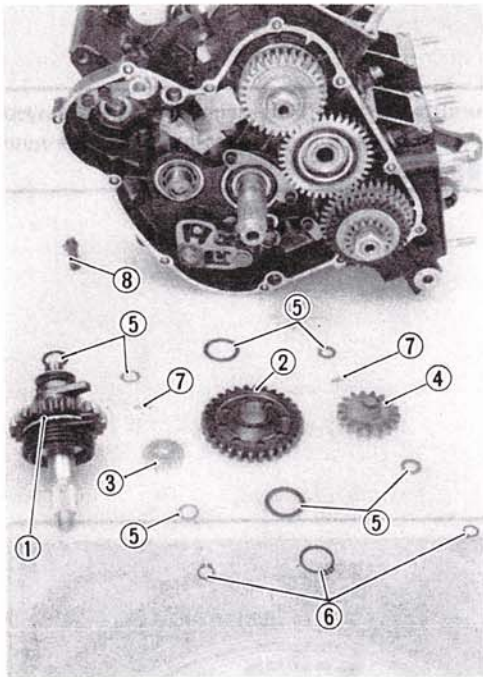
3



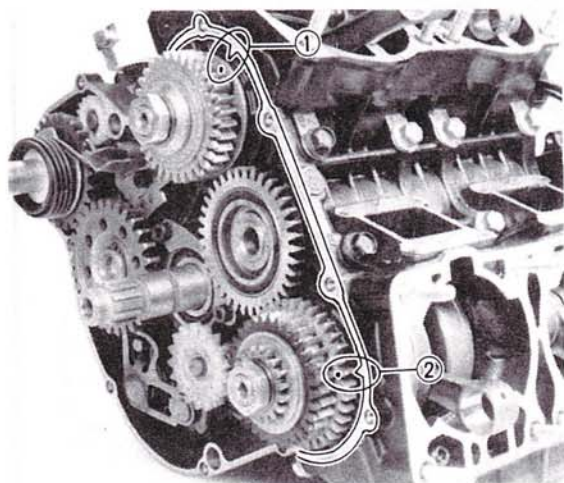
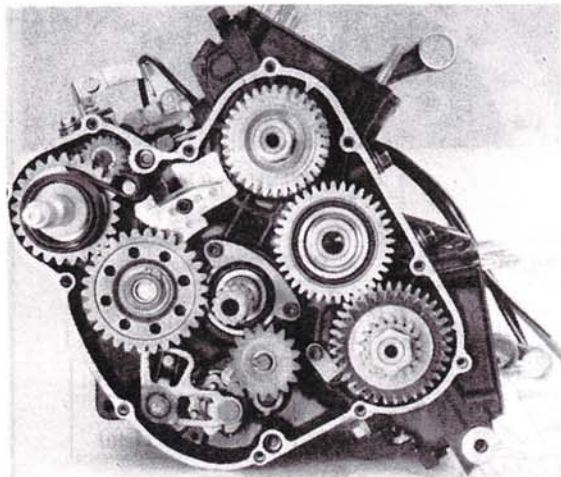
KICK GEAR AND PUMP GEAR

1. Install:

- Oil pump gear (Transmission oil) ④
- Oil pump gear (Engine oil) ③
- Kick idle gear ②
- Kick gear ①



- ⑤ Washer
- ⑥ Circlip
- ⑦ Dowel pin
- ⑧ Oil pump drive shaft



2. Align the punch marks on the collar ① and drive gear ② with the stationary pointers on the crankcase.



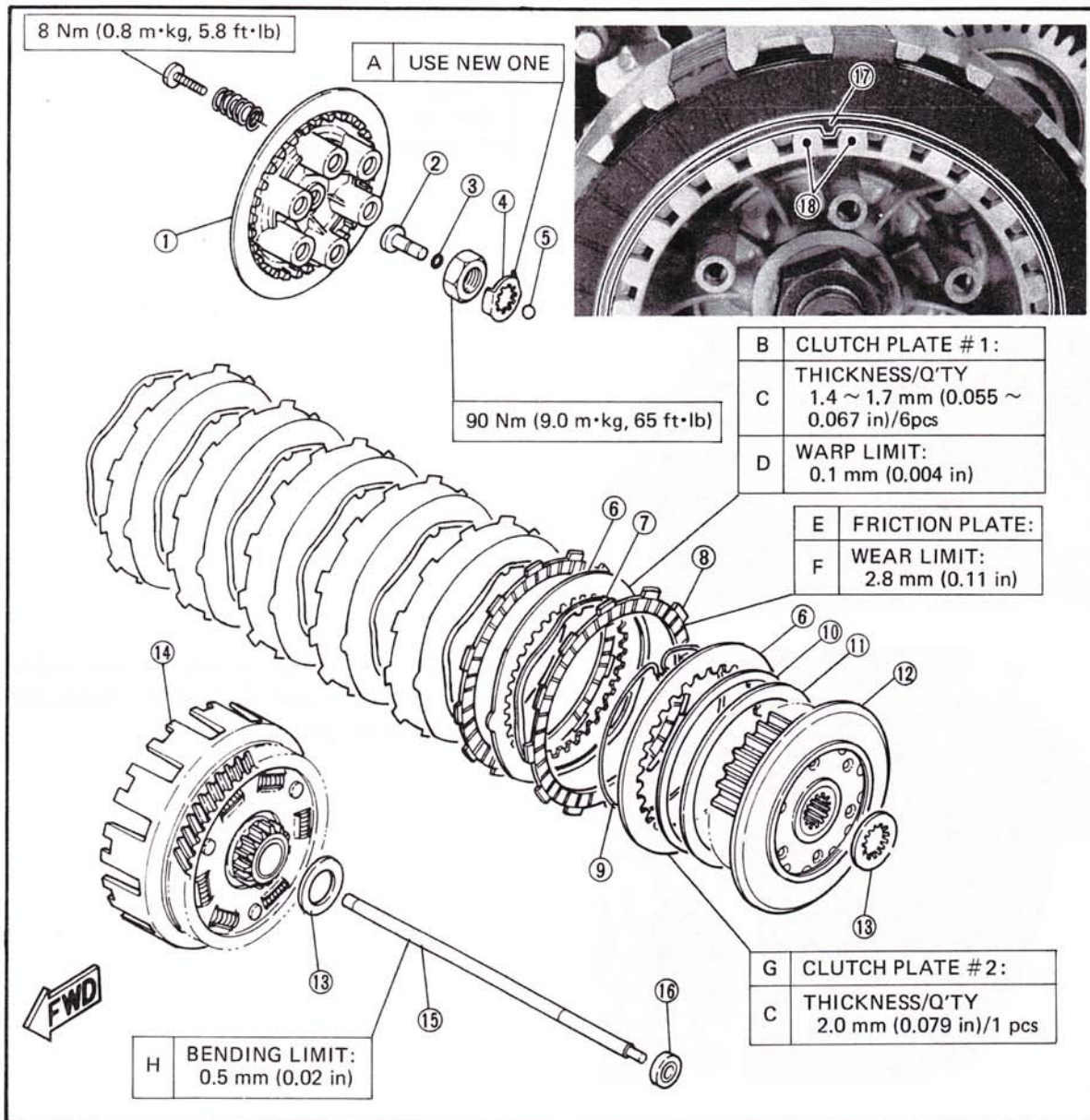
CLUTCH

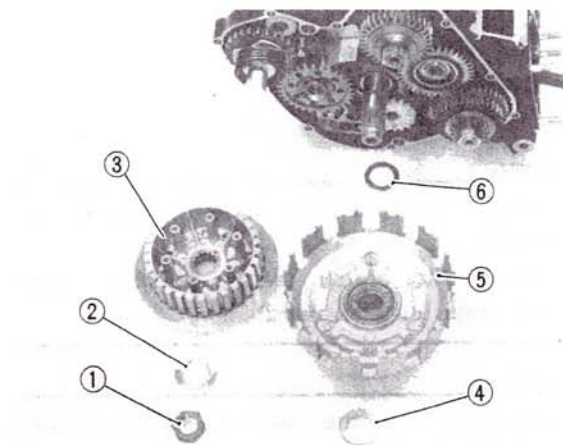
- 1. Pressure plate
- 2. Push rod (No. 1)
- 3. O-ring
- 4. Lock washer
- 5. Ball
- 6. Clutch plate
- 7. Spring-washer
- 8. Friction plate
- 9. Wire
- 10. Ring-spring
- 11. Washer
- 12. Clutch boss
- 13. Thrust washer
- 14. Clutch housing
- 15. Push rod (No. 2)
- 16. Oil seal
- 17. Ring-spring tab
- 18. Clutch boss mark

NOTE:

Make sure that the last Ring-spring (17) only is installed with any one of its tabs positioned between the round marks (18) as shown.

3

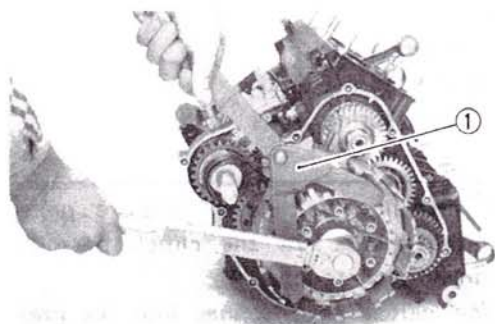




1. Install:
 - Plate washer ⑥
 - Clutch housing ⑤
 - Thrust washer ④
 - Clutch boss ③
 - Lock washer ②
 - Clutch boss nut ①
2. Turn the clutch housing clockwise a few turns to ensure that the main axle and crankshafts turns smoothly.

CAUTION:

Be sure the punch marks on the collar and drive gear are aligned with the stationary pointers on the crankcase.

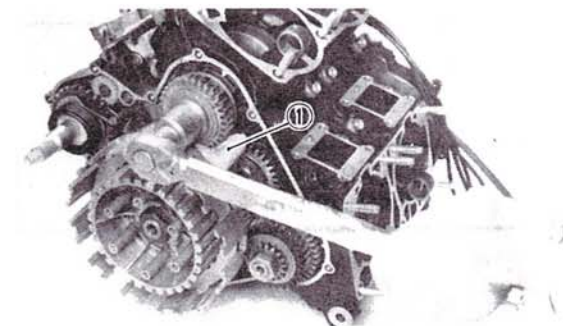


3. Attach:
 - Universal Clutch Holder (90890-04086) ①
4. Tighten:
 - Clutch boss nut

3



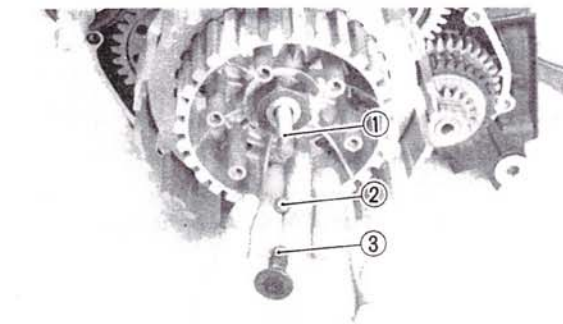
Clutch Boss:
90 Nm (9.0 m·kg, 65 ft·lb)



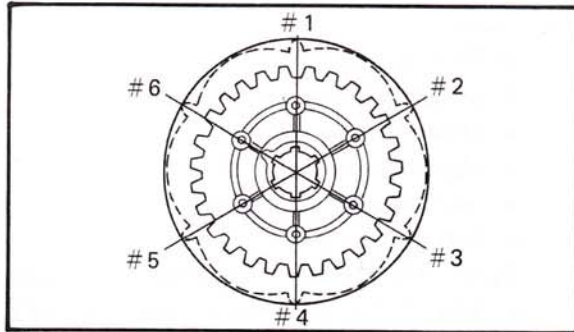
5. Bend:
 - Lock washer tab (Clutch boss)
6. Place a piece of rolled rag ① or piece of lead between the primary gears, and tighten the primary gear securing nuts.



Primary Gear:
85 Nm (8.5 m·kg, 61 ft·lb)



7. Install:
 - Push rod No. 2 ①
 - Ball ②
 - Push rod No. 1 ③ (With new O-ring)



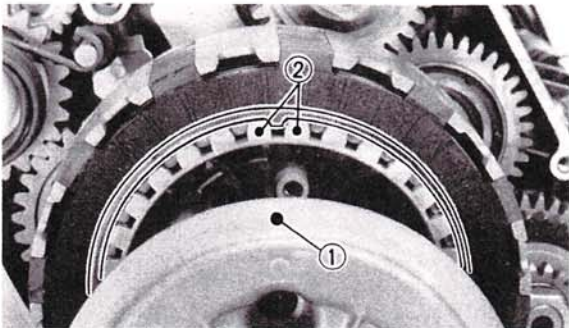
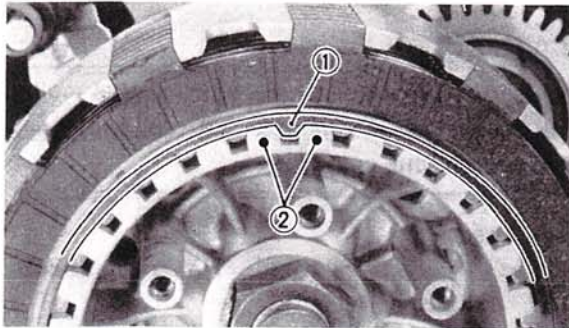
8. Install:
- Ring-springs
 - Friction plates
 - Clutch plates

NOTE:

- Mount friction and clutch plates alternately.
- Install the clutch plates as shown, with the mild edge outward.

NOTE:

Make sure that the last ring spring ① only is installed with any one of its tabs positioned between the rounded marks ② as shown.



9. Install:
- Pressure plate
 - Clutch springs
 - Clutch spring bolts

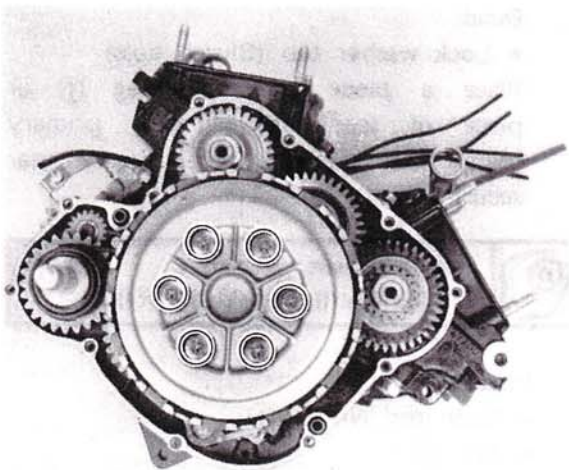
NOTE:

- When installing the clutch pressure plate, align the marks on the clutch boss ① and pressure plate ②.
- Fit the clutch boss splines into the pressure plate splines.

10. Tighten:
- Clutch spring bolts

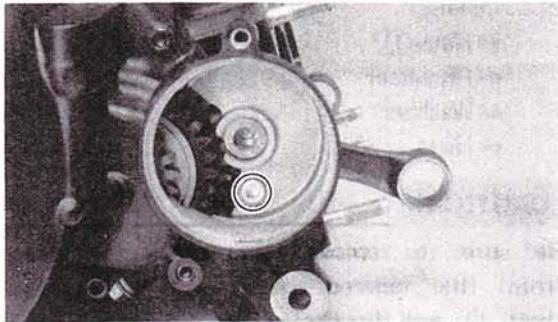


Clutch Spring:
8 Nm (0.8 m·kg, 5.8 ft·lb)



**CRANKCASE COVER AND WATER PUMP**

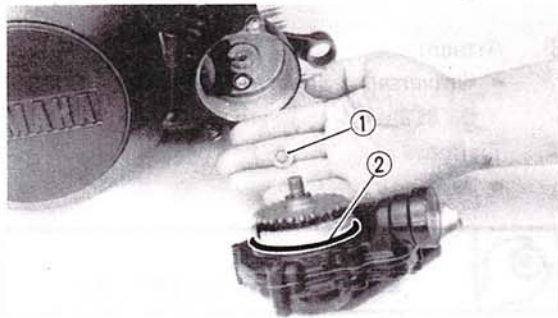
1. Install:
- Dowel pins
 - Gasket
 - Crankcase cover
 - Clamp
 - Delivery pipe (With new O-ring)

3




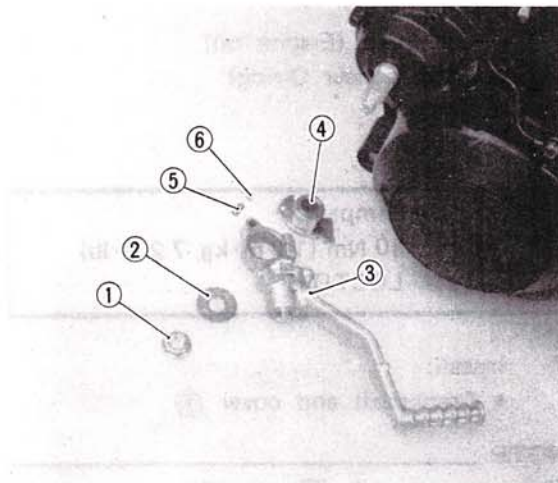
2. Tighten:
 - Bolts
 - Union bolt

	Crankcase Cover:
	10 Nm (1.0 m·kg, 7.2 ft·lb)
	Delivery Pipe:
	10 Nm (1.0 m·kg, 7.2 ft·lb)




3. Install:
 - Washer ①
 - Water pump (With new O-ring) ②
4. Tighten:
 - Bolts

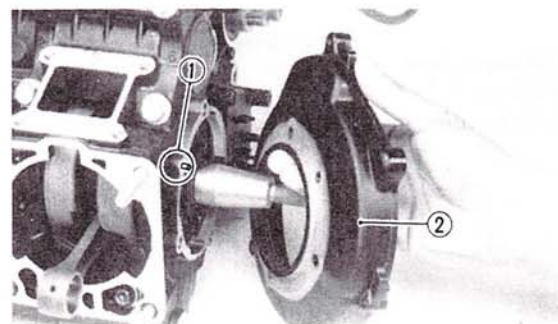
	Water Pump:
	10 Nm (1.0 m·kg, 7.2 ft·lb)



5. Apply grease to the collar ④.
6. Assemble:
 - Spring ⑤
 - Ball ⑥
(into the kick crank)
7. Install:
 - Kick crank ③
 - Washer ②
 - Nut ①
8. Tighten:
 - Nut


	Kick Crank:
	65 Nm (6.5 m·kg, 47 ft·lb)

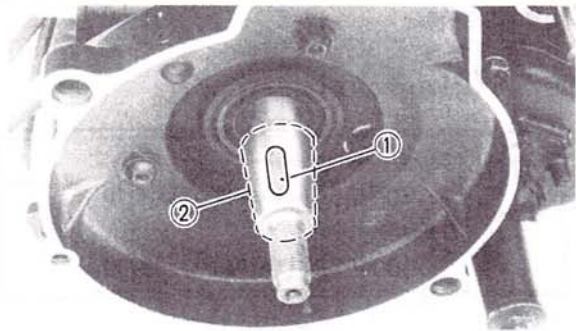
3



OIL PUMP (ENGINE OIL) AND FLYWHEEL

1. Install:
 - Dowel pin ①
 - Flywheel housing ②
 - Bolts

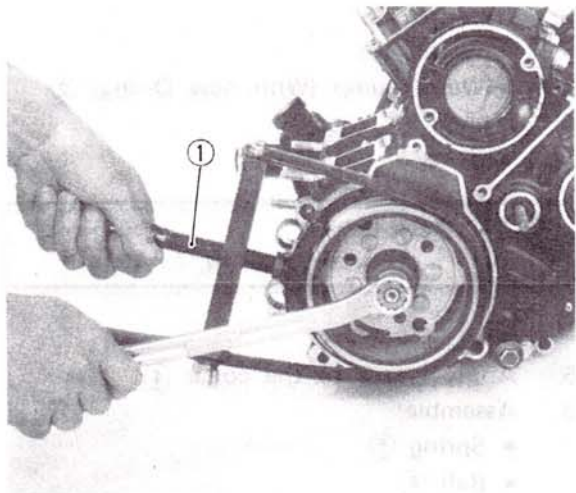
	Flywheel Housing:
	10 Nm (1.0 m·kg, 7.2 ft·lb)



2. Install:
 - Key ①
 - Flywheel
 - Washers
 - Nut

CAUTION:

Be sure to remove any oil and/or grease from the tapered portion of the crankshaft ② and flywheel with a thinner.



3. Attach:
 - Universal Sheave Holder (90890-01701) ①
4. Tighten:
 - Nut

**Flywheel:**

80 Nm (8.0 m·kg, 58 ft·lb)

5. Install:
 - Oil pump (Engine oil)
(With a new O-ring)
6. Tighten:
 - Bolt

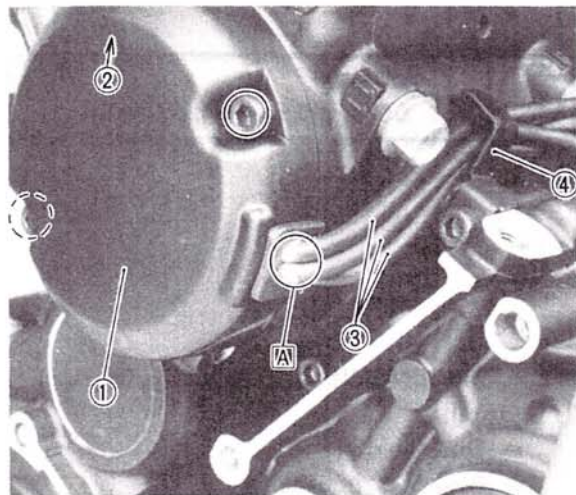
**Oil Pump:**

10 Nm (1.0 m·kg, 7.2 ft·lb)
LOCTITE®

7. Install:
 - Crankshaft end cover ①

NOTE:

The arrow mark ② on the cover should face upward.

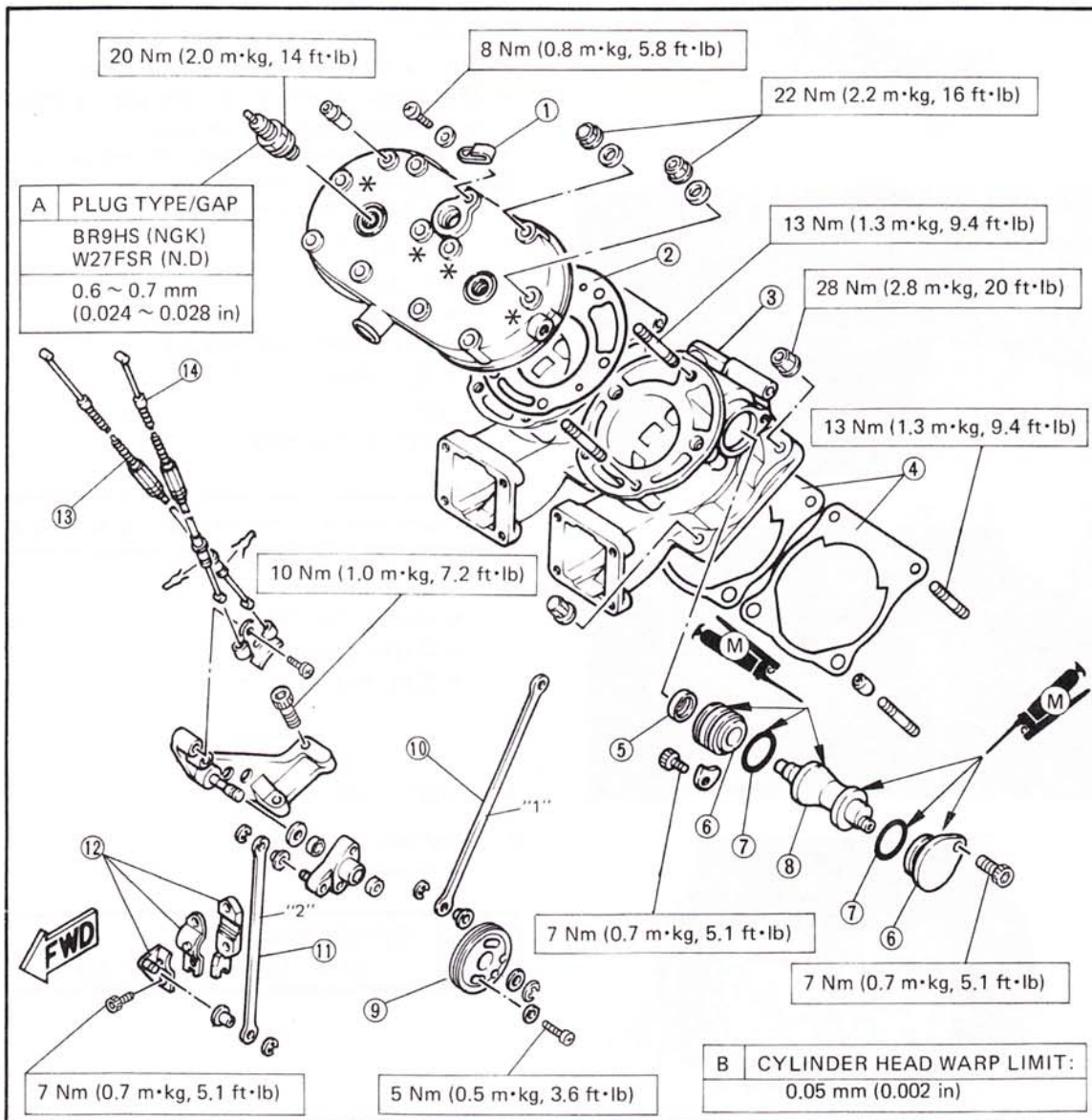


- ③ Delivery hose
- ④ Clamp
- A White paint mark

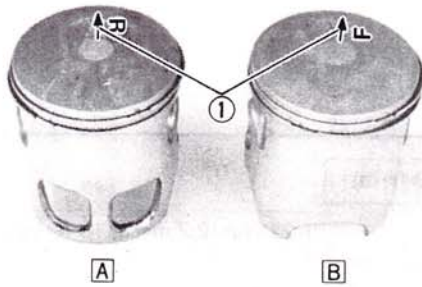
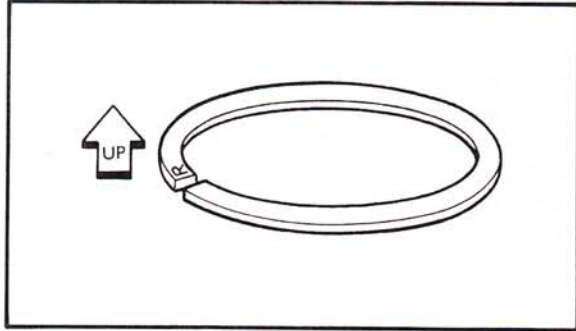
3

CYLINDER HEAD, CYLINDER AND YPVS

1. Clamp (YPVS Cables)
 2. Cylinder head gasket (Marked "1" for upper cylinder and marked face up)
 3. Cylinder
 4. Cylinder gasket (Bonded face up)
 5. Oil seal
 6. YPVS holder
 7. O-ring
 8. Power valve
 9. YPVS pulley
 10. YPVS arm (Marked "1" for upper cylinder)
 11. YPVS arm (Marked "2" for lower cylinder)
 12. YPVS joint holder
 13. YPVS cable "2" (Black color cap)
 14. YPVS cable "1"
- * Use the cap nut with a copper washer

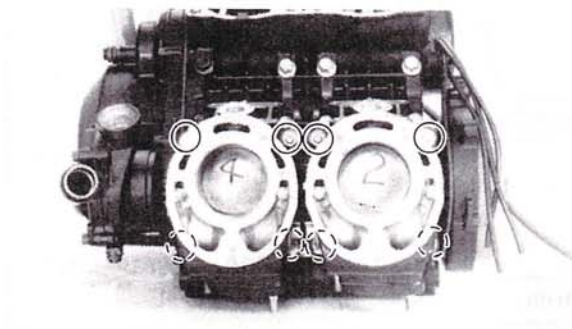
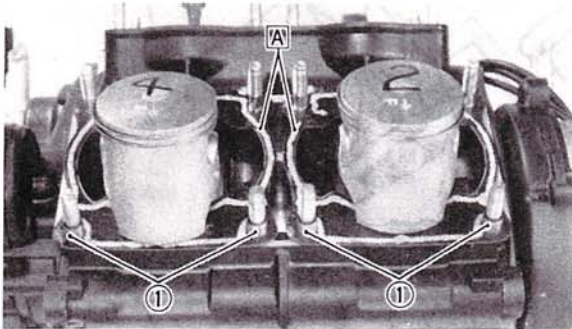


3



A

B



3

PISTON AND CYLINDER (LOWER)

1. Install:

- Piston rings
(onto the pistons)

NOTE:

Be sure to install the rings so that Manufacturer's marks or numbers are located on the top side of the rings. Oil the pistons and rings liberally.

2. Install:

- Pistons

NOTE:

- Be sure the pistons are positioned correctly.
- Always install new piston pin clips.
- The arrow mark ① on the piston should face toward the exhaust side.

- A FOR UPPER CYLINDERS
- B FOR LOWER CYLINDERS

3. Oil liberally:

- Pistons
- Rings
- Connecting rod bearings
- Cylinders

4. Set:

- Piston ring ends

NOTE:

Make sure the rings are properly positioned.

5. Install:

- Dowel pins ①
- Gaskets (New)
- Cylinders

A BONDED FACE UP

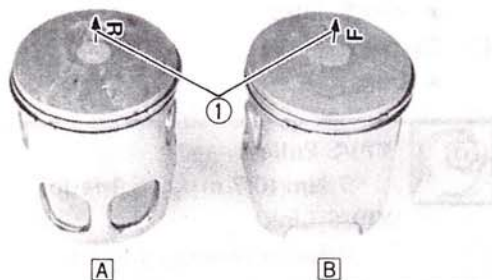
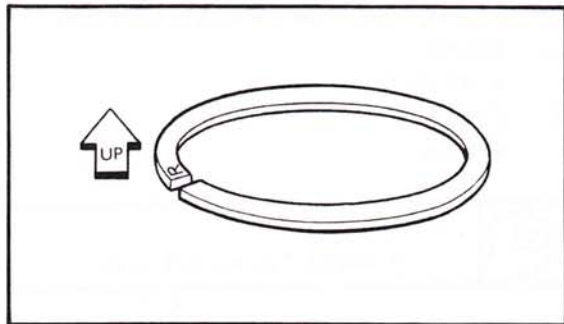
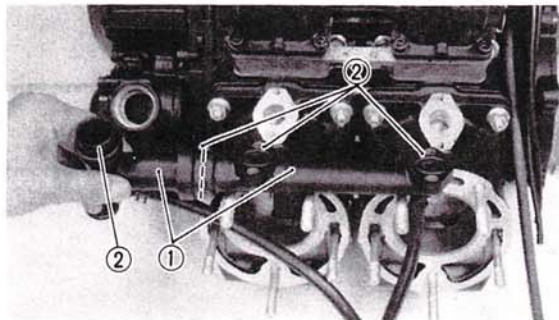
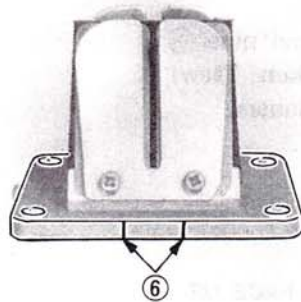
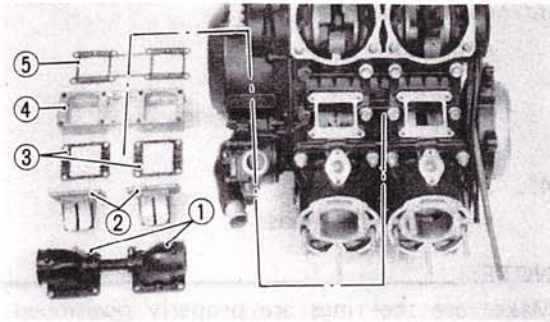
6. Tighten:

- Cylinder nuts



Cylinder Nut:

28 Nm (2.8 m·kg, 20 ft·lb)



REED VALVE AND WATER JACKET (LOWER)

Reed Valve:

1. Install:
 - Gasket (New) ⑤
 - Housing ④
 - Gaskets ③
 - Reed valves ②
 - Carburetor joint ①

NOTE:

When installing the reed valves, their identification slots ⑥ should face the cylinder head side.

2. Tighten:
 - Bolts



Carburetor Joint:

10 Nm (1.0 m·kg, 7.2 ft·lb)

3. Connect:
 - Engine oil delivery hoses

Water Jacket

1. Install:
 - O-rings (New) ②
 - Water jackets ①
2. Tighten:
 - Bolts



Water Jacket:

10 Nm (1.0 m·kg, 7.2 ft·lb)

PISTON AND CYLINDER (UPPER)

1. Install:
 - Piston rings
(onto the pistons)

NOTE:

Be sure to install the rings so that Manufacturer's marks or numbers are located on the top side of the rings. Oil the pistons and rings liberally.

2. Install:
 - Pistons

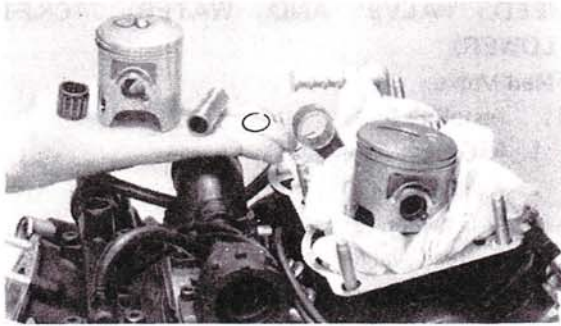
NOTE:

- Be sure the pistons are positioned correctly.
- Always install new piston pin clips.
- The arrow mark ① on the piston should face toward the exhaust side.

A FOR UPPER CYLINDERS

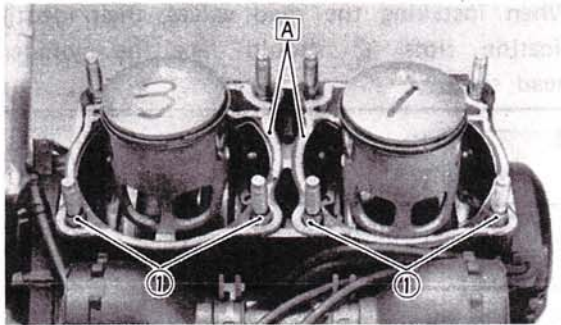
B FOR LOWER CYLINDERS

3



3. Oil liberally:
 - Pistons
 - Rings
 - Connecting rod bearings
 - Cylinders
4. Set:
 - Piston ring ends

NOTE: _____
 Make sure the rings are properly positioned.



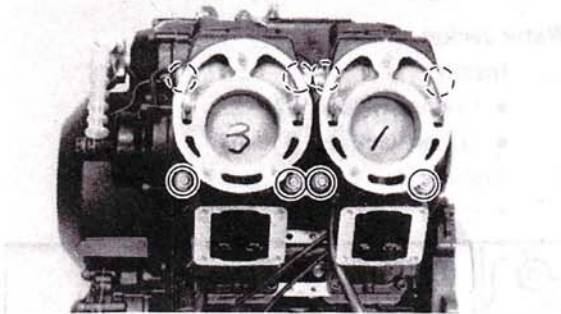
5. Install:
 - Dowel pins ①
 - Gaskets (New)
 - Cylinders

A BONDED FACE UP

6. Tighten:
 - Cylinder nuts

	Cylinder Nut:
	28 Nm (2.8 m·kg, 20 ft·lb)

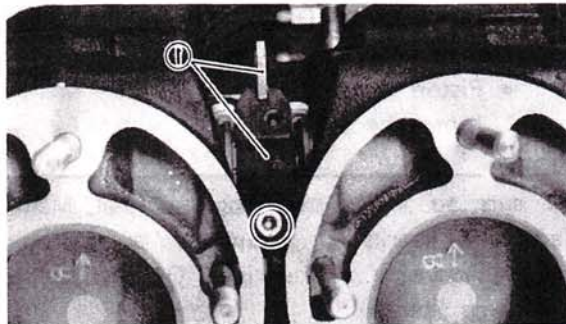
3



YPVS LINK AND REED VALVE (UPPER)

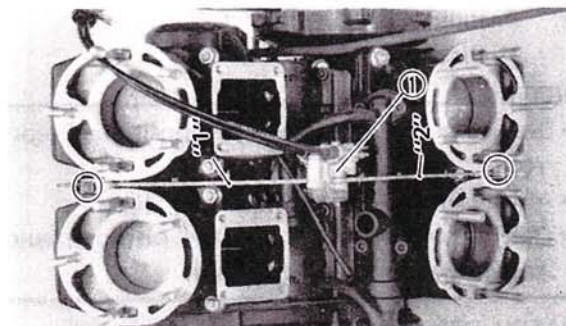
1. Install:
 - YPVS joints ①
2. Tighten:
 - Bolts

	YPVS Joint:
	7 Nm (0.7 m·kg, 5.1 ft·lb)

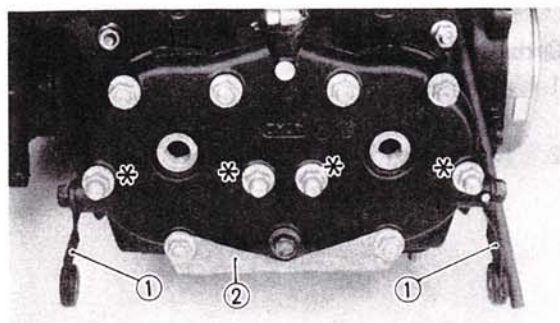
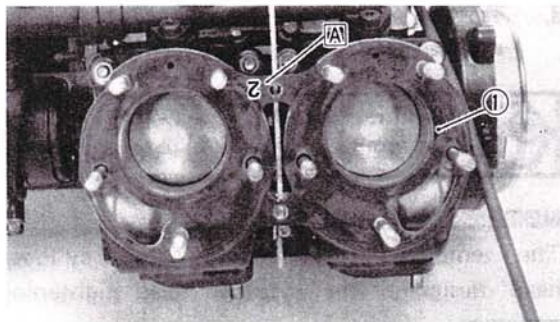
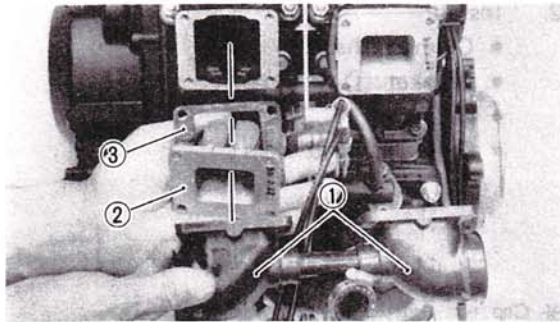
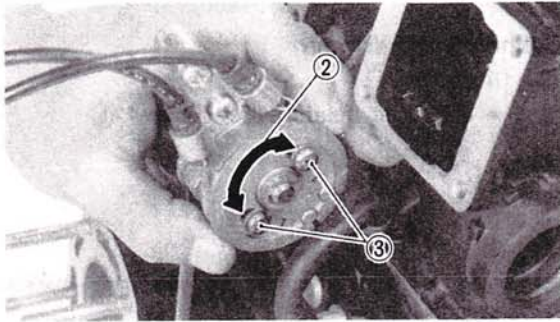
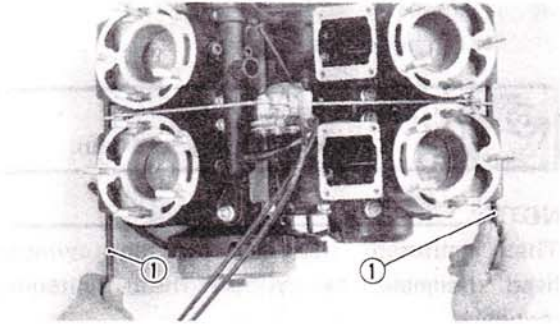


3. Install:
 - YPVS pulley bracket ①
 - YPVS links
4. Tighten:
 - Bolts

	YPVS Pulley:
	7 Nm (0.7 m·kg, 5.1 ft·lb)
	YPVS Link:
	7 Nm (0.7 m·kg, 5.1 ft·lb)



"1" For upper cylinders
 "2" For lower cylinders



5. Adjust:
 - YPVS link

YPVS link adjustment steps:

- Loosen the YPVS pulley securing screws.
- Insert the 8 mm dia. bolts (i.e. engine mounting bolts ①) to hold each of the YPVS's.
- Turn the YPVS pulley ② until it stops completely and while holding the pulley, tighten the screws ③.



YPVS Pulley:

5 Nm (0.5 m·kg, 3.6 ft·lb)

3

6. Install:
 - Gaskets (New) ③
 - Reed valves ②
 - Carburetor joints ①
7. Connect:
 - Engine oil delivery hoses

CYLINDER HEAD AND CARBURETOR (RIGHT)

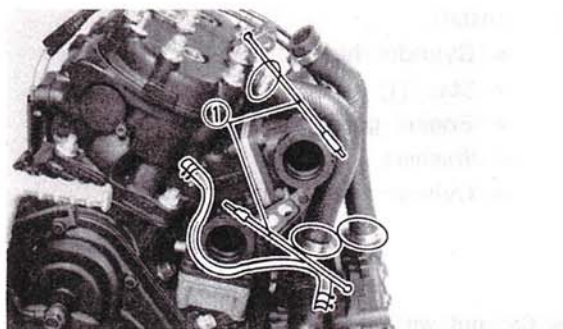
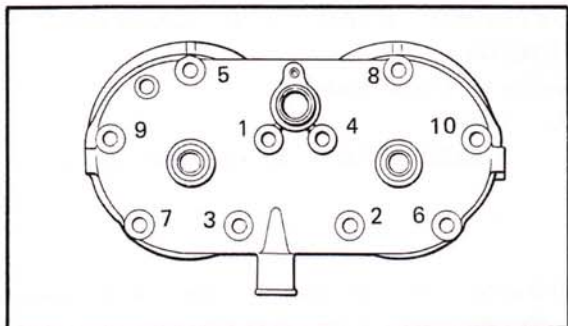
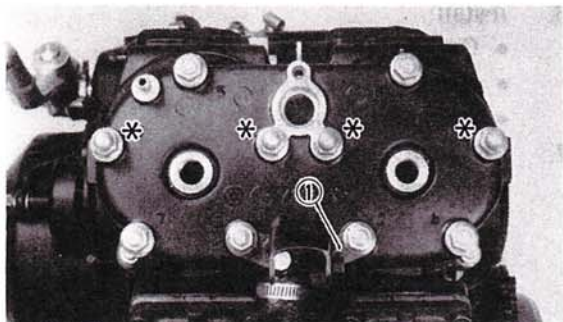
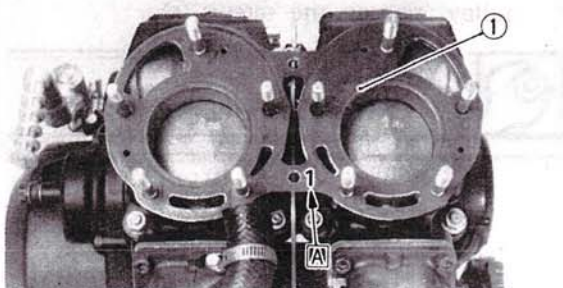
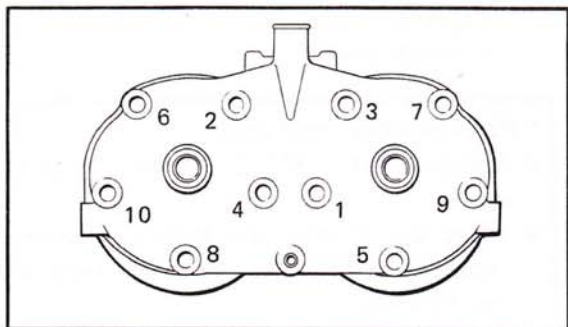
Cylinder Head (Lower)

1. Install:
 - Cylinder head gasket (New) ①

A Marked "2" for lower cylinder and marked face up

2. Install:
 - Cylinder head
 - Stay ①
 - Engine guard ②
 - Washers
 - Cylinder head nuts

* Cap nut with a copper washer



3. Tighten:
 - Cylinder head nuts

	Cylinder Head:
	22 Nm (2.2 m·kg, 16 ft·lb)

NOTE:
The embossed numbers in the cylinder head designate the cylinder head tightening sequence.

Cylinder Head (Upper)

1. Install:
 - Cylinder head gasket (New) ①

A Marked "1" for upper cylinder and marked face up

2. Install:
 - Cylinder head
 - Bracket ①
 - Washers
 - Cylinder head nuts

* Cap nut with a copper washer

3. Tighten:
 - Cylinder head nuts

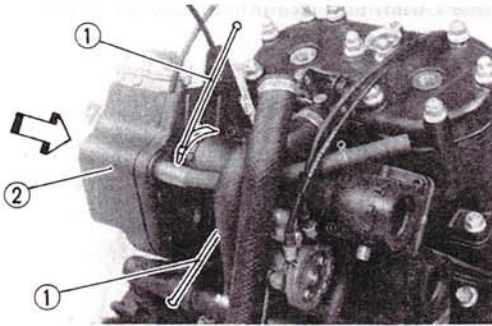
	Cylinder Head:
	22 Nm (2.2 m·kg, 16 ft·lb)

NOTE:
The embossed numbers in the cylinder head designate the cylinder head tightening sequence.

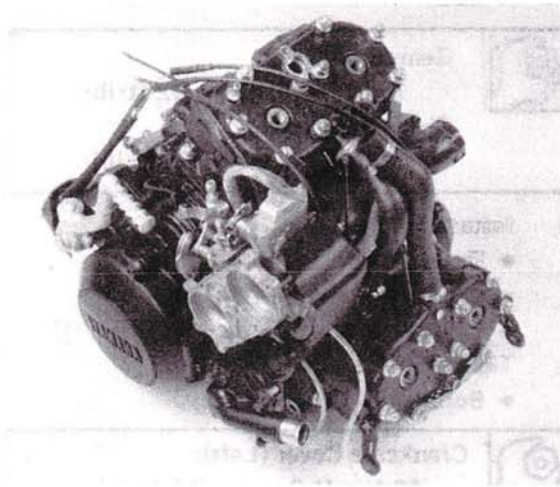
Carburetor (Right)

1. Connect:
 - Hoses
2. Install:
 - Clamp screws ①

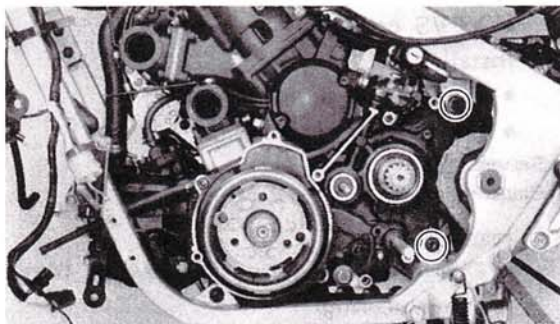
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3. Install:
 - Carburetors (Right) ②
4. Tighten:
 - Clamp screws ①

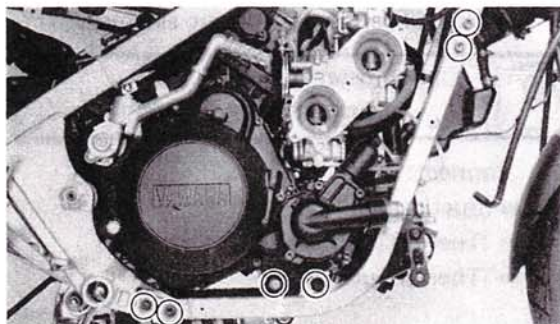


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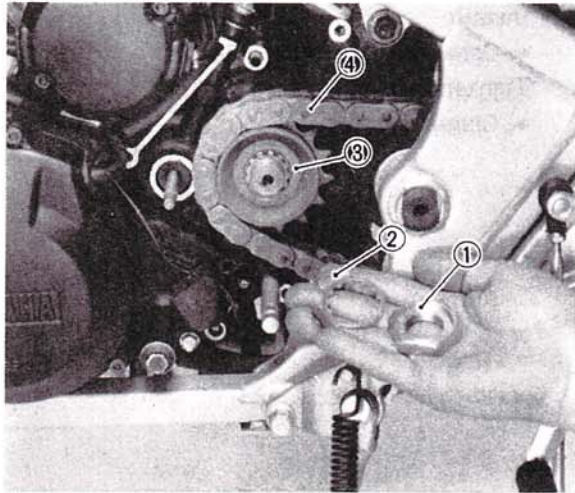


REMounting ENGINE

1. Refer to engine removal. Reverse those removal steps that apply.
2. Install:
 - Downtube frame
3. Tighten:
 - Engine mount bolts



	Engine Mount (Front Lower):
	32 Nm (3.2 m·kg, 23 ft·lb)
	Engine Mount (Rear Upper):
	32 Nm (3.2 m·kg, 23 ft·lb)
	Engine Mount (Rear Lower):
	32 Nm (3.2 m·kg, 23 ft·lb)
Tensionbar – Engine:	
23 Nm (2.3 m·kg, 17 ft·lb)	
Downtube frame:	
32 Nm (3.2 m·kg, 23 ft·lb)	

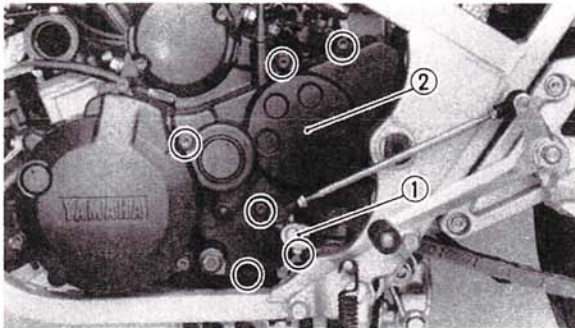


Drive Chain and Crankcase Cover (Left)

1. Connect:
 - Neutral switch lead
2. Install:
 - Generator cover
 - Drive sprocket ③ with drive chain ④
 - Lock washer (New) ②
 - Sprocket securing nut ③
3. Tighten:
 - Generator cover
 - Nut



Generator Cover:
 10 Nm (1.0 m·kg, 7.2 ft·lb)
Drive Sprocket:
 90 Nm (9.0 m·kg, 65 ft·lb)

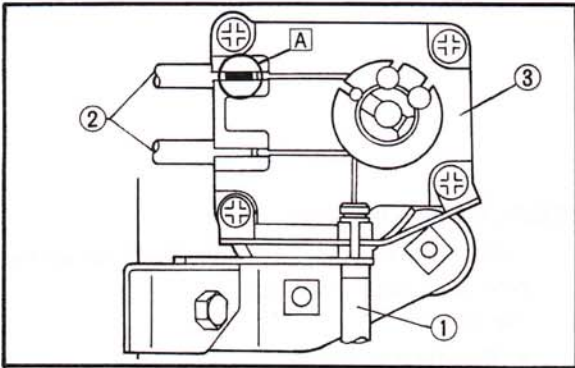


4. Install:
 - Dowel pins
 - Crankcase cover (Left) ②
 - Change pedal arm securing bolt ①
5. Tighten:
 - Bolts



Crankcase Cover (Left):
 10 Nm (1.0 m·kg, 7.2 ft·lb)
Change Pedal Arm:
 10 Nm (1.0 m·kg, 7.2 ft·lb)

3



CONNECTOR AND CABLE

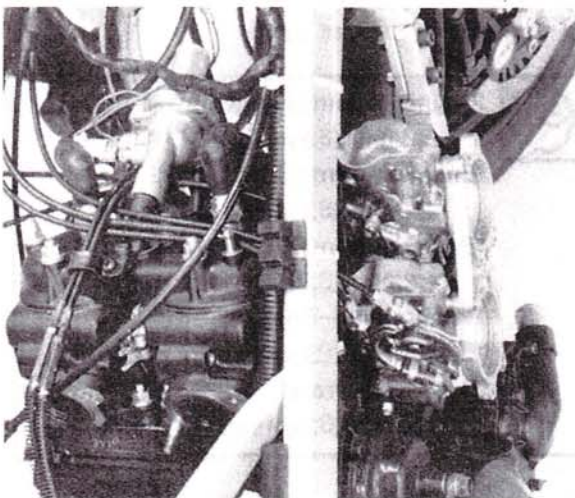
1. Connect:
 - Oil pump cable ①
 - YPVS cables ②
2. Install:
 - Circlip (Oil pump cable)
 - Servomotor cover

③ Servomotor
 [A] Black color cap

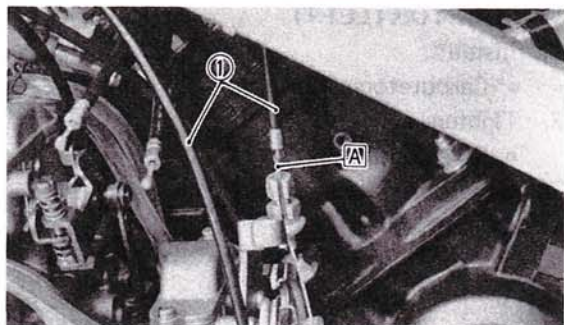
3. Install:
 - Thermostat housing assembly (With a new O-ring)
4. Tighten:
 - Bolt (Thermostat housing assembly)



Thermostat Housing:
 8 Nm (0.8 m·kg, 5.8 ft·lb)



5. Connect:
 - Spark plug lead
 - Thermo switch lead
 - Thermo unit lead

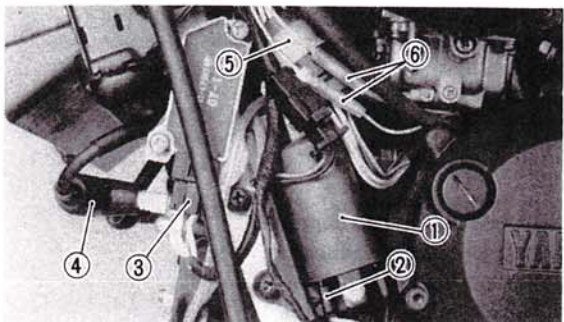


6. Connect:
 - Throttle cables ①

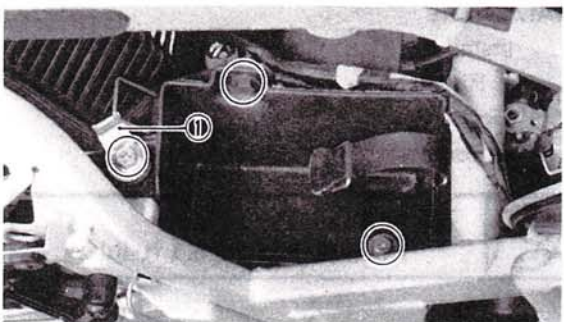
WARNING:

- See CHAPTER 8 "Cable Routing" for proper cable, lead, and hose routing.
- Make sure that the cables are not twisted.
- Be careful not to pinch the leads.

A Cable protector

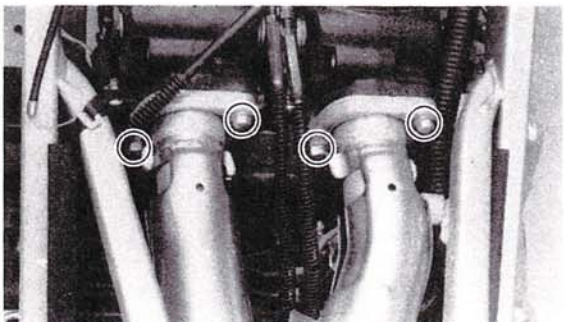


7. Install:
 - Ignition coil (Lower cylinder) ①
8. Connect:
 - Ignition coil lead ②
 - Rectifier/regulator lead ③
 - Spark plug lead ④
 - Generator lead ⑤
 - Pickup coil lead ⑥




MUFFLER

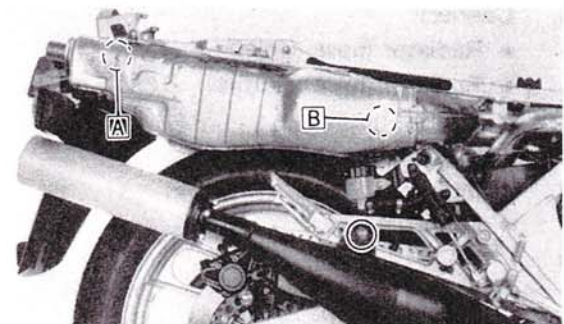
1. Install:
 - Battery box
 - Mufflers (With new gaskets)



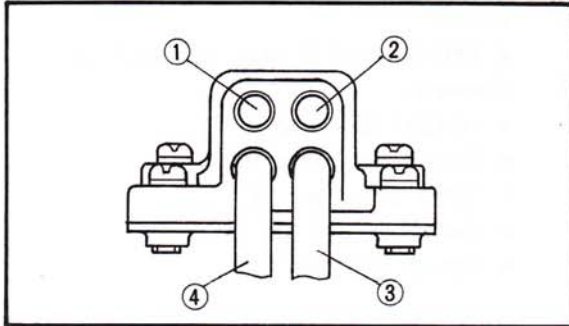
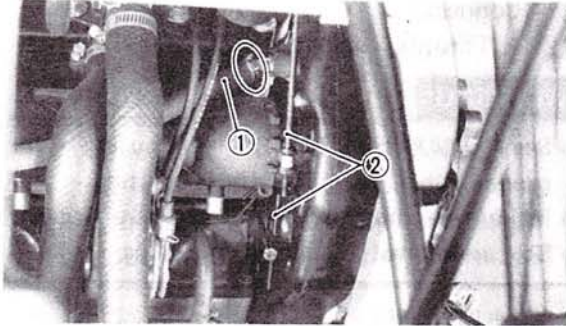
① Clamp

2. Install:
 - Mufflers
3. Tighten:
 - Mufflers

	Muffler – Cylinder:
	22 Nm (2.2 m·kg, 16 ft·lb)
	Muffler – Frame:
	16 Nm (1.6 m·kg, 11 ft·lb)
	Muffler – Muffler Bracket:
	25 Nm (2.5 m·kg, 18 ft·lb)



A Shorter bolt
B Longer bolt

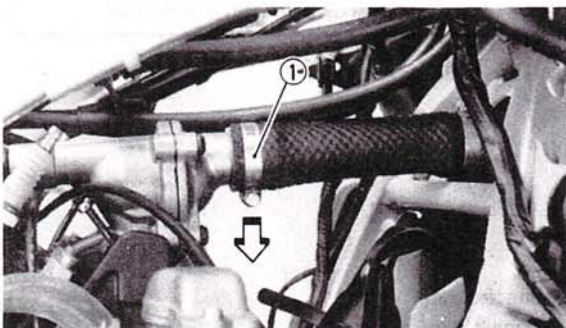
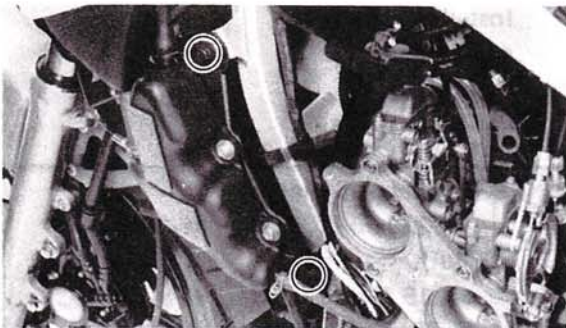
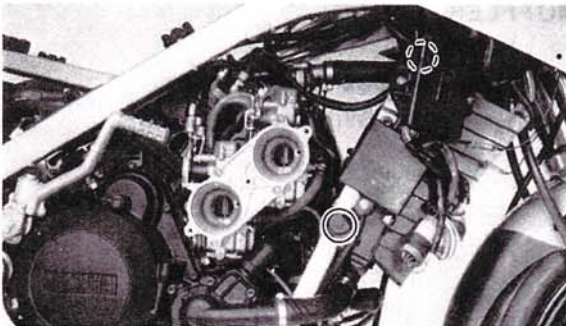
**CARBURETOR (LEFT)**

1. Install:
 - Carburetors (Left)
2. Tighten:
 - Clamp screws ②
3. Connect:
 - Fuel hose ①
4. Assemble:
 - Choke lever

- ① To right lower carburetor
 ② To right upper carburetor
 ③ To left lower carburetor
 ④ To left upper carburetor

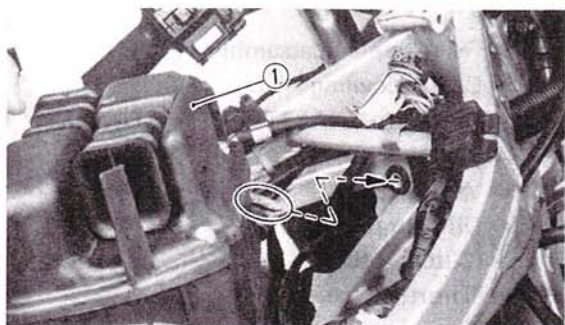
RADIATOR

1. Install:
 - Radiator
2. Tighten:
 - Bolts

**Radiator:****7 Nm (0.7 m·kg, 5.1 ft·lb)**

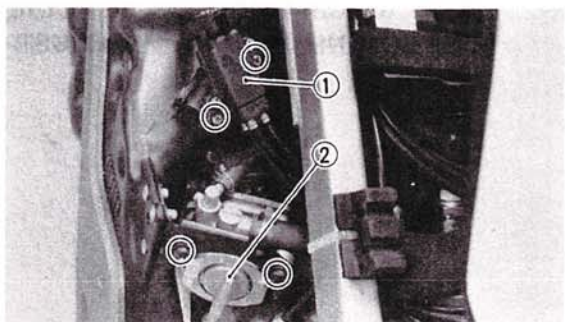
3. Connect:
 - Radiator hose (Inlet)
 - Radiator hose (Outlet)
 - Bypass hoses
 - Electric fan motor lead
4. Tighten:
 - Clamp ①

3

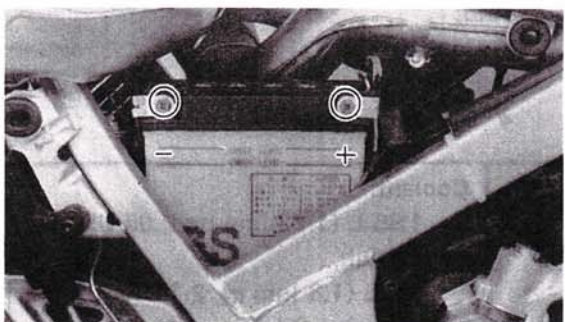


AIR FILTER

1. Install:
 - Air filter box
 - Air ducts ①



2. Install:
 - Fuel tank
 - Choke lever ①
 - Fuel cock ②

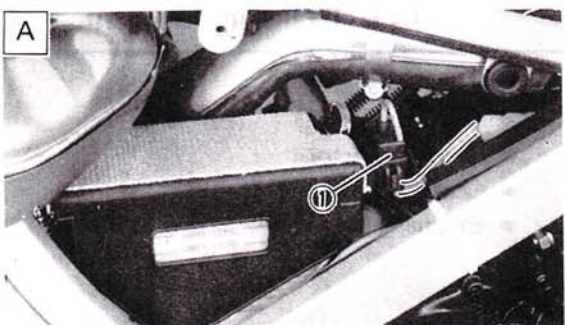


BATTERY AND COWLING

1. Install:
 - Battery
2. Connect:
 - Battery leads

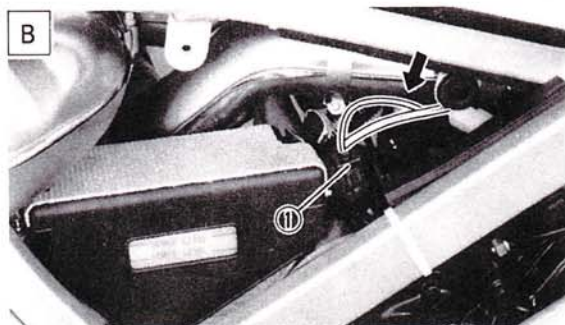
NOTE: _____
 Connect the positive lead first.

3

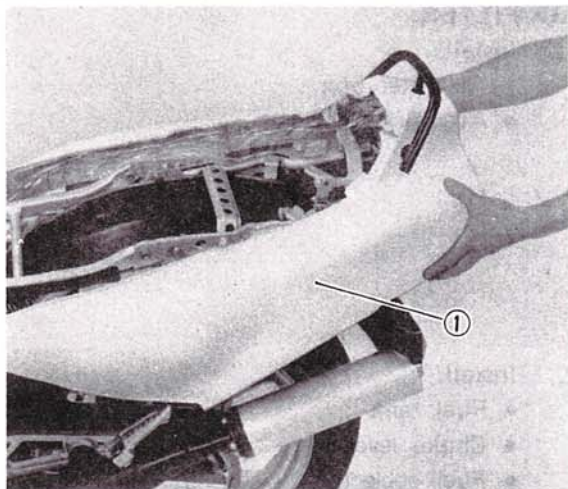


3. Install:
 - Battery cover
 - Fuse holder ①
 - Side cover

A CORRECT

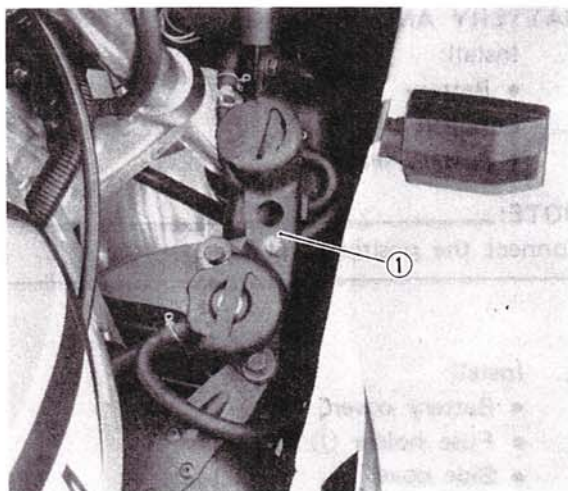


B INCORRECT




4. Install:
 - Rear cowling assembly ①
 - Center cowling
 Refer to CHAPTER 2, "COWLING".
5. Adjust:
 - YPVS cables
 - Oil pump cable
 - Clutch cable
 - Throttle cables
 - Drive chain
 Refer to CHAPTER 2, "PERIODIC INSPECTIONS AND ADJUSTMENTS".

3



6. Add:
 - Coolant
 - Engine oil
 - Transmission oil

	Coolant:
	1.95 L (1.72 Imp qt, 2.06 US qt)
	Engine Oil:
	2.0 L (1.8 Imp qt, 2.1 US qt)
	Transmission Oil:
	1.6 L (1.4 Imp qt, 1.7 US qt)

7. Install:
 - Cap retainer ①
 - Heat protector
 - Lower cowling
 - Engine grille