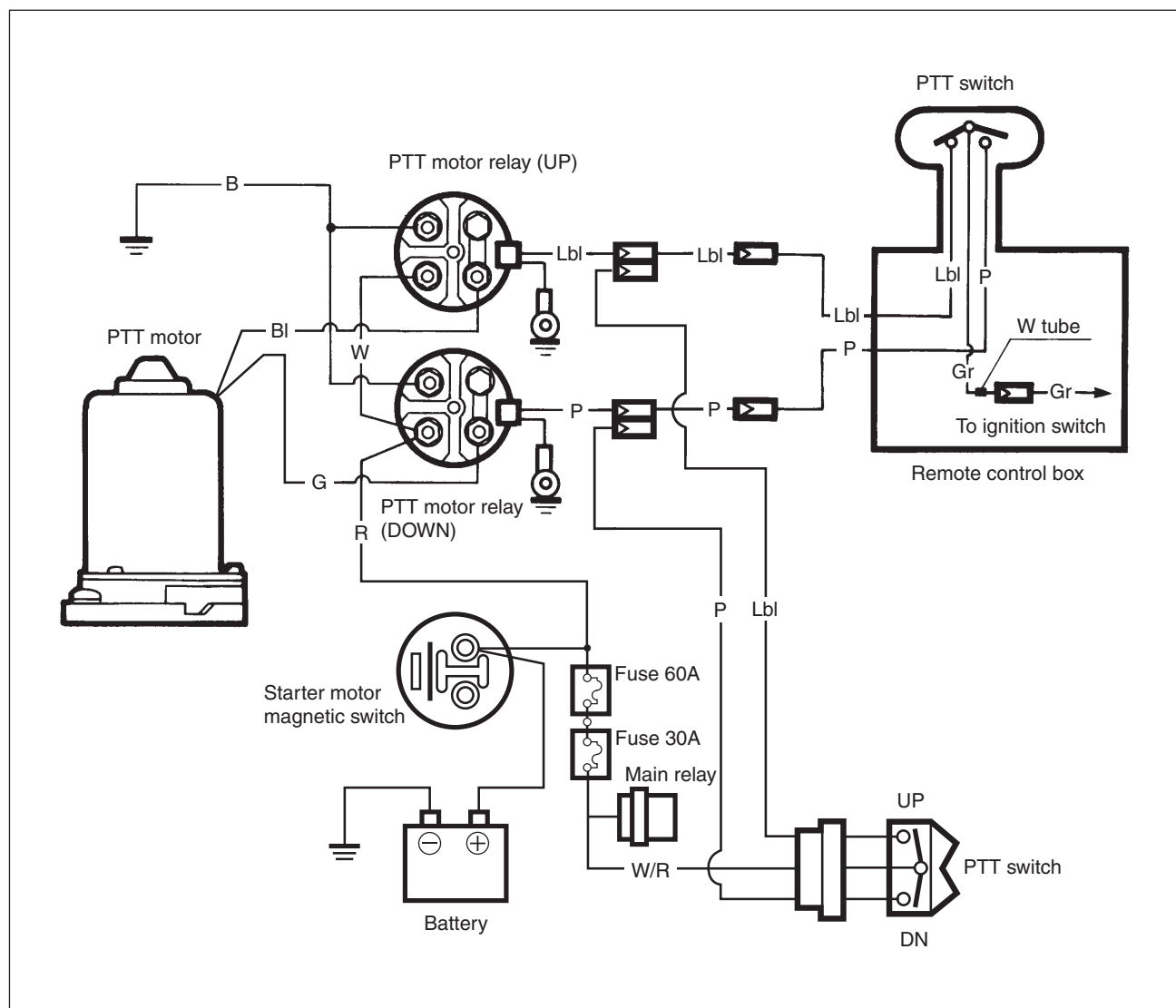




SERVICE PROCEDURE

OIL LEVEL

To check PTT oil level :

1. Raised engine to a full-tilt position.
2. Lower manual tilt lock lever ①.
3. Remove oil filler plug ②.
4. If oil can be seen at filler plug level, unit is full.
5. If oil level is low, refill with recommended oil.

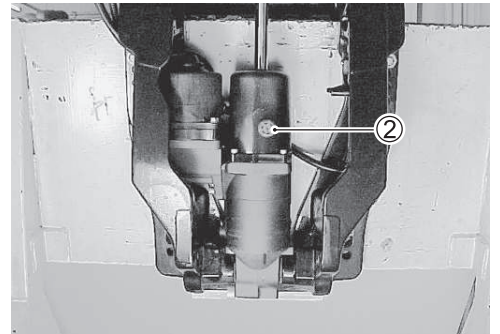
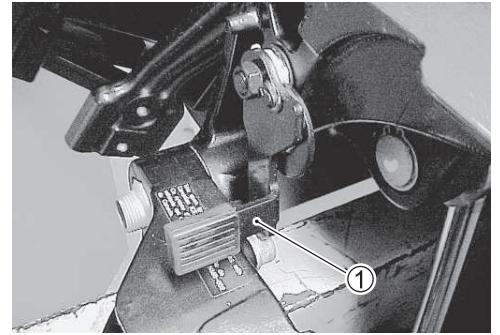
Recommended oil :

Dexron III automatic transmission fluid or equivalent

CAUTION

To ensure consistent pump operation, do not mix different types of oil.

6. Reinstall oil filler plug.



AIR BLEEDING

1. Check that manual release valve is tightened to specified torque.

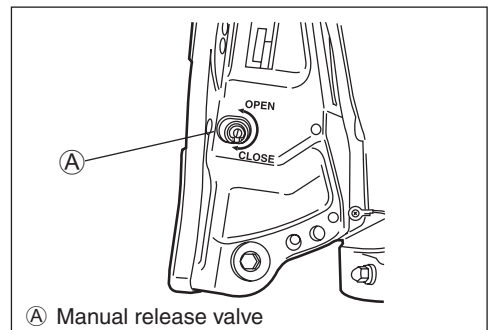
 **Manual release valve : 3.6 N·m (0.36 kg-m, 2.6 lb.-ft.)**

CAUTION

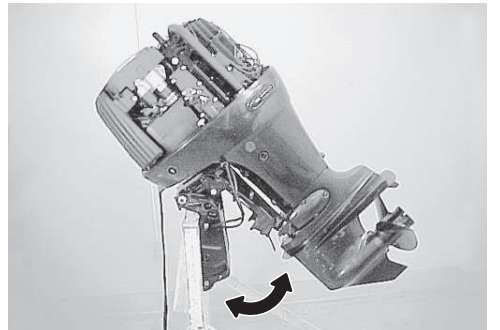
Do not over-tighten manual release valve.

Counterclockwise = open

Clockwise = close



2. Operate PTT switch, raising and lowering motor up and down (full tilt position to full trim down position) 4 to 5 times.
3. Check oil level, topping off if necessary.
4. Reinstall oil filler plug.

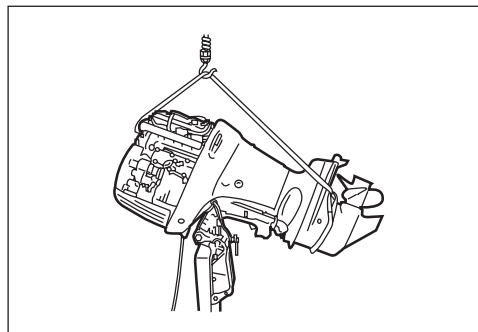


POWER TRIM AND TILT UNIT REMOVAL

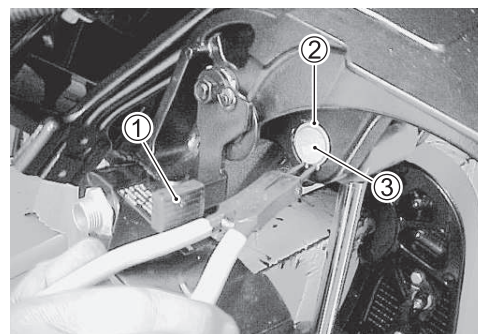
Raise engine to the full tilt position and lower manual tilt lock levers ①.

⚠ WARNING

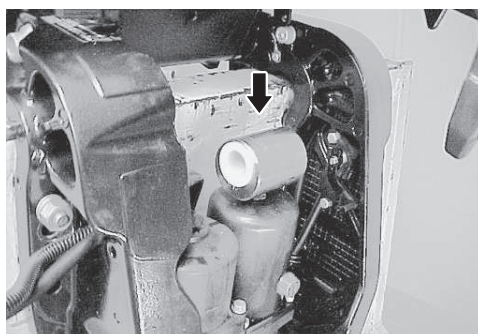
During the following procedures, the engine must be firmly secured and its weight fully supported. (See right)



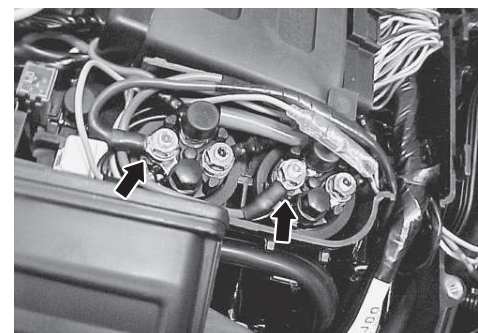
1. Remove tilt rod snap ring ② and push tilt cylinder upper shaft pin ③ out.



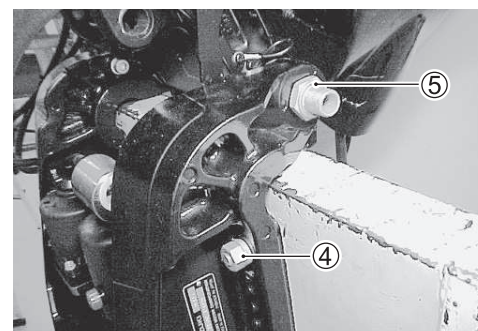
2. Lower tilt rod to full down position and disconnect battery cable.



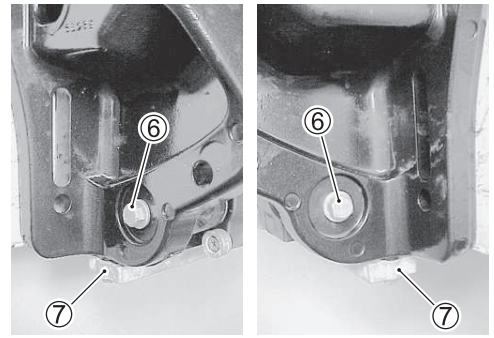
3. Disconnect PTT motor cable wire leads (Green, Blue) from PTT motor relays.
4. Remove PTT motor cable from engine lower cover.



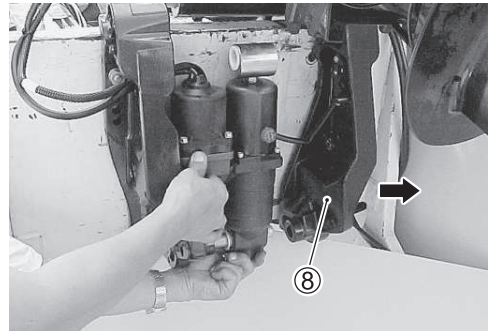
5. Remove STBD motor mounting bolts ④ and clamp bracket shaft nut ⑤.



6. Remove PTT cylinder lower shaft bolts ⑥.
7. Remove two bolts and anode ⑦.



8. Slide STBD clamp bracket ⑧ off clamp bracket shaft, then remove PTT unit.



DISASSEMBLY

NOTE:

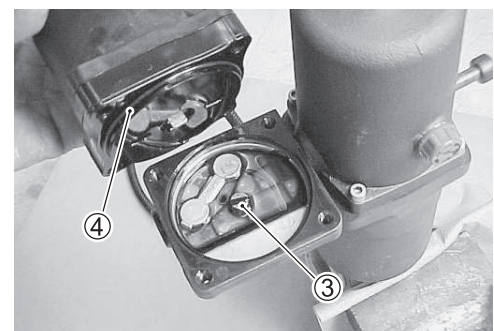
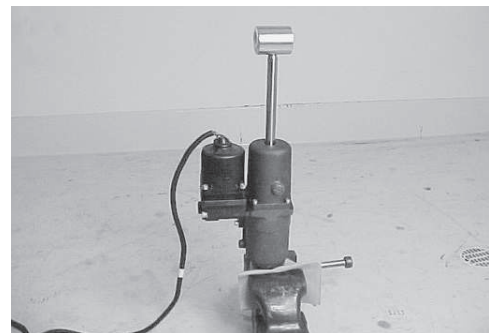
Before disassembly, wash PTT body with a stiff bristle brush and hot, soapy water to remove sand or dirt and dry PTT body with compressed air.

1. Place lower mounting eye of PTT cylinder in a vise. Tighten vise only enough to secure PTT unit, do not over tighten.

NOTE:

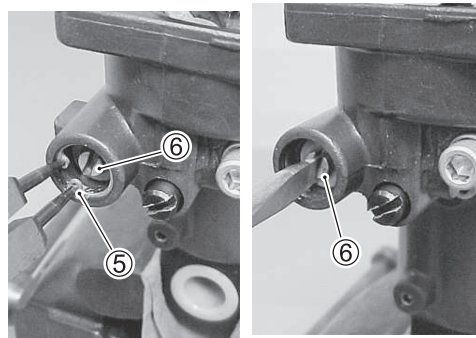
To prevent damage to PTT cylinder use wood blocks, vise jaw protectors, etc., between vise jaws and PTT components before tightening vise.

2. Connect PTT motor cable leads (Green, Blue) to battery and operate PTT motor until tilt piston rod is at maximum stroke. (full-tilt up position)
3. Remove PTT motor. (See page 8-10)
Note position of drive joint ③ and O-ring ④, before removing them.
4. Remove fill plug and drain PTT oil into suitable container.

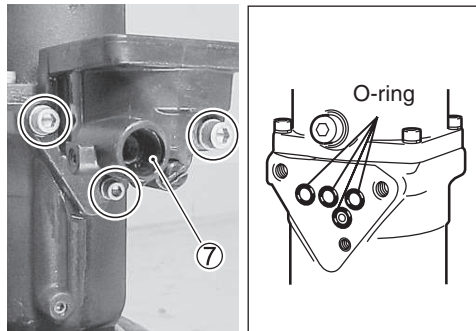


8-6 POWER TRIM AND TILT

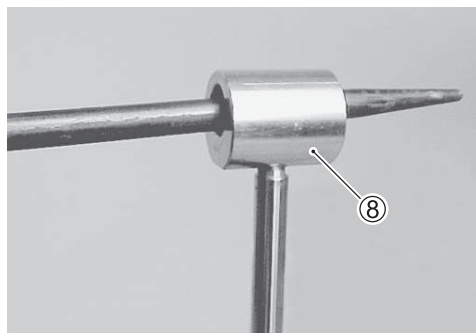
5. Remove manual release valve snap ring ⑤, then remove manual release valve ⑥.



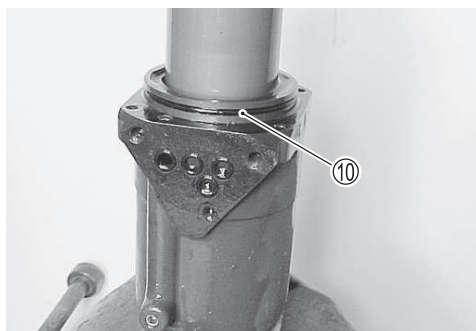
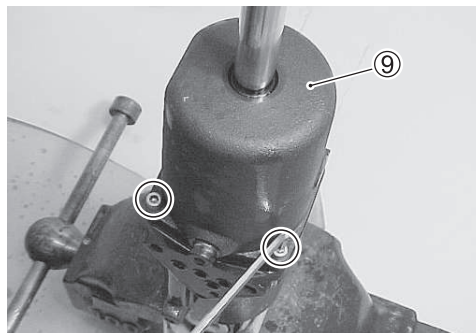
6. Remove three bolts securing PTT pump case ⑦, then detach PTT pump case from PTT body. Note position of O-rings and remove them.



7. Remove upper eye ⑧.



8. Remove four bolts securing cylinder cover ⑨, then detach cover from PTT body.
9. Remove O-ring ⑩.



INSPECTION

Arrange all components on a clean sheet of paper.

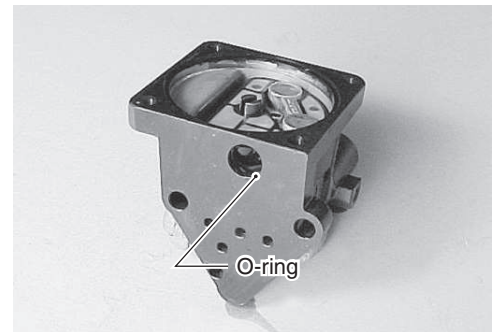
NOTE:

Do not lay PTT components out on a rag, as dirt or lint may be transferred to these items which may cause possible system operating problems.

NOTE:

If excessive wear, cracks, defective or other damage is found on any component, replace component.

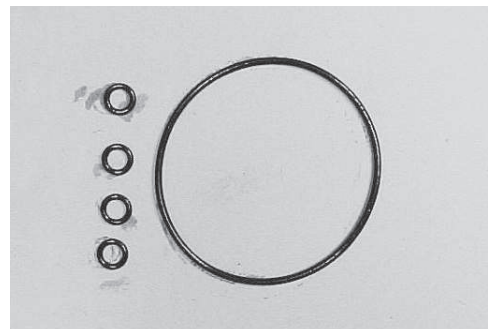
- Inspect PTT pump case for cracks, nicks, stripped threads and any other imperfections.
Replace if necessary.



- Inspect cylinder cover for cracks, nicks or damage.
Replace if necessary.
- Inspect cylinder cover seal for cuts, nicks or wear.



- Inspect all O-rings for cuts, nicks or tears.

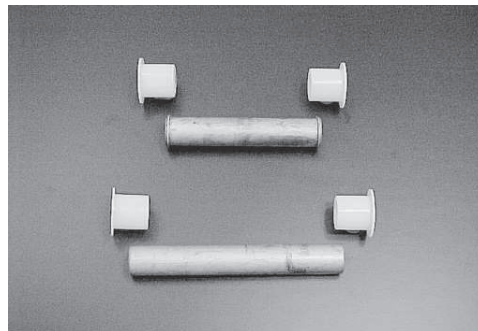


8-8 POWER TRIM AND TILT

- Inspect manual release valve for damage.
Replace if necessary.
- Inspect O-rings for cuts, nicks or tears.



- Inspect lower shaft and upper shaft for bent, twist or other damage.
Replace if necessary.
- Inspect all bushings for excessive wear or other damage.
Replace if necessary.
If bushing fit is loose when installing, replace bushing.



REASSEMBLY

Assembly is reverse order of disassembly with special attention to the following steps.

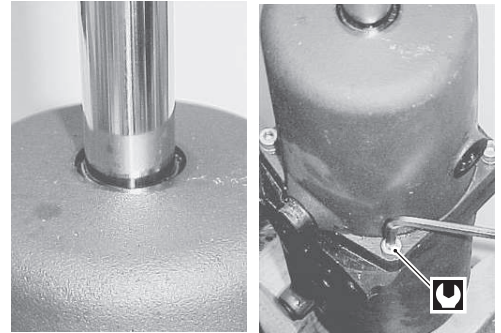
CAUTION

- Do not re-use O-ring and seal once removed. Always use new parts.
- Lubricate all components and O-rings with PTT fluid before assembly.
- Do not re-use PTT fluid. Always refill with new fluid.

TILT CYLINDER COVER

1. Apply PTT fluid to cylinder cover seal, then install cylinder cover.
2. Tighten four bolts securely.

 **Cylinder cover bolt : 4.7 N·m (0.47 kg-m, 3.4 lb.-ft.)**

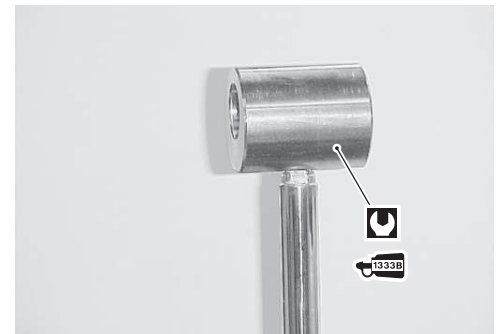


UPPER EYE

1. Apply Thread Lock super 1333B to threads of upper eye before threading it onto tilt rod.
2. Tighten upper eye to specified torque.

 **Upper eye : 108 N·m (10.8 kg-m, 78.0 lb.-ft.)**

 **99000-32020 : Thread Lock super 1333B**



PTT PUMP CASE

1. Install four O-rings to PTT body.

NOTE:

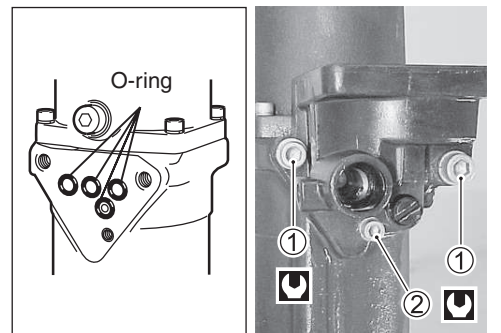
Lubricate O-ring with PTT fluid before installing PTT body.

2. Install PTT pump case, then tighten three bolts to specified torque.

 **PTT pump case bolt :**

① 8 N·m (0.8 kg-m, 5.8 lb.-ft.)

② 5.5 N·m (0.55 kg-m, 4.0 lb.-ft.)

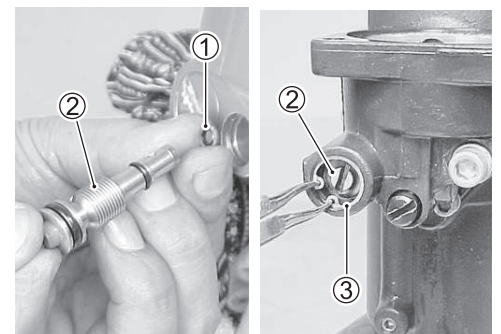


MANUAL RELEASE VALVE

1. Oil and install seal washer ① and manual release valve ②.
2. Tighten valve to specified torque.

 **Manual release valve : 3.6 N · m (0.36 kg-m, 2.6 lb.-ft.)**

3. Install snap ring ③.



PTT MOTOR

See PTT MOTOR INSTALLATION section on page 8-14.

AIR BLEEDING

- Pour recommended PTT fluid in to reservoir until specified level.
- Perform air bleeding procedure.
See AIR BLEEDING section on page 8-3.

PTT MOTOR

PTT MOTOR REMOVAL

NOTE:

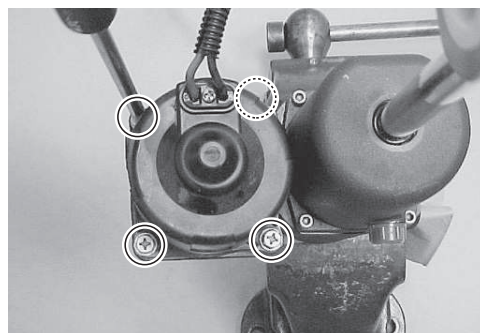
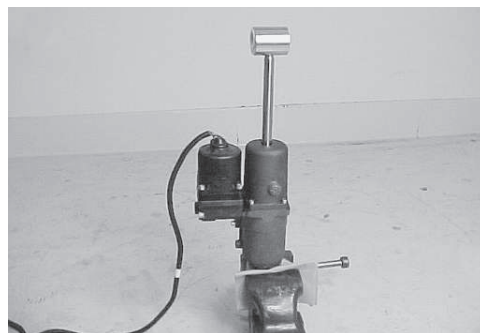
Before removing PTT motor, wash the PTT body with a stiff bristle brush and hot, soapy water to remove sand or dirt and dry PTT body with compressed air.

1. Place lower mounting eye of PTT cylinder in a vise. Tighten vise only enough to secure PTT unit, do not over tighten.

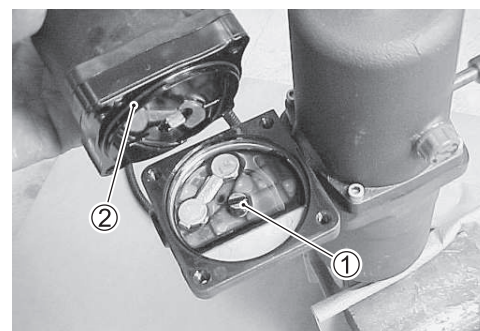
NOTE:

To prevent damage to PTT cylinder use wood blocks, vise jaw protectors, etc., between vise jaws and PTT components before tightening vise.

2. Remove four bolts securing PTT motor to PTT pump case.

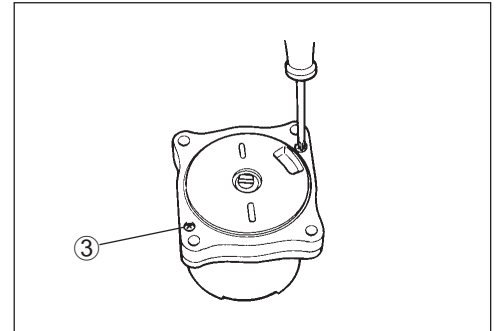
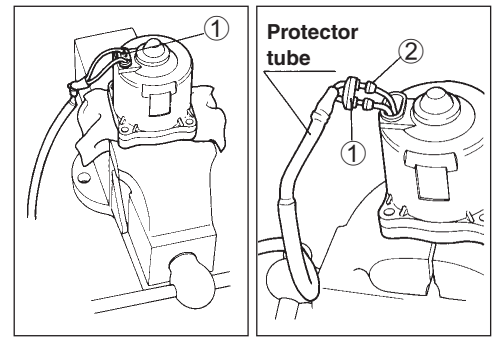


3. Detach PTT motor from PTT pump case.
Note position of drive joint ① and O-ring ② and remove them.



PTT MOTOR DISASSEMBLY

1. For correct assembly, scribe an alignment mark on field case and brush holder.
2. Remove tape from PTT motor cables and cable protector tube, then slide cable protector tube upward.
3. Remove screw securing motor cable holder ①, then slide motor cable holder and grommets ② out as shown in figure.
4. Remove two screws ③ securing field case to brush holder.



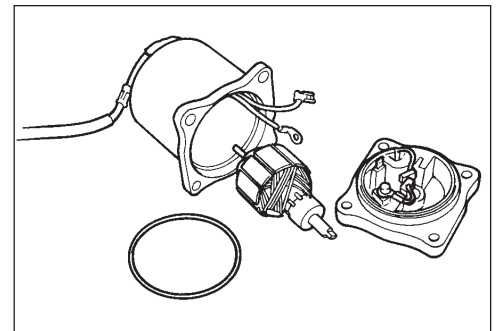
5. Slide field case upward and away from brush holder.

NOTE:

When separating field case from brush holder, proceed by pushing PTT motor cables into brush holder side.



6. Disconnect PTT motor cables from brush holder.
7. Remove armature from field case.
Note position of O-ring encircling brush holder.



PTT MOTOR INSPECTION

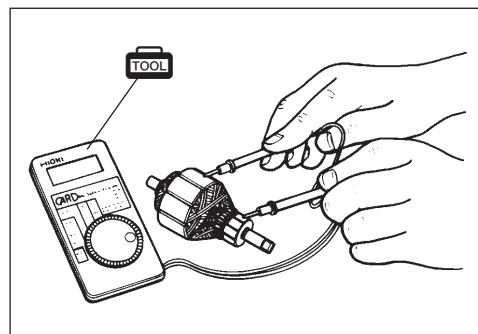
Armature and Commutator

1. Inspect continuity between commutator and armature core / shaft.

If continuity exists, replace armature.

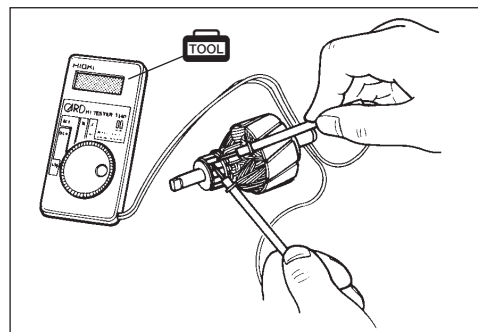
 **09930-99320 : Digital tester**

 **Tester range :  (Continuity)**



2. Inspect continuity between adjacent commutator segments.

If no continuity exists, replace armature.



3. Inspect commutator surface for gum or dirt.
Clean with #500 grit emery paper if necessary.

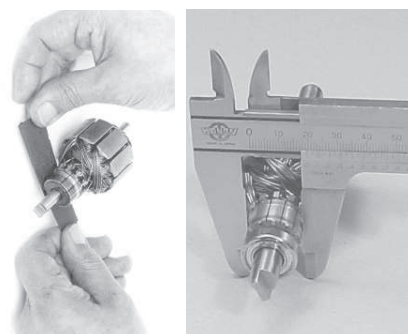
Measure commutator outside diameter.

 **09900-20101 : Vernier calipers**

Commutator outside diameter :

Standard : 22.0 mm (0.87 in.)

Service limit : 21.0 mm (0.83 in.)



If measurement exceeds service limit, replace armature.

4. Measure commutator undercut (depth) between mica (insulator) and segments.

Commutator undercut ① (depth) :

Standard : 1.6 – 1.9 mm (0.06 – 0.07 in.)

Service limit : 1.3 mm (0.05 in.)

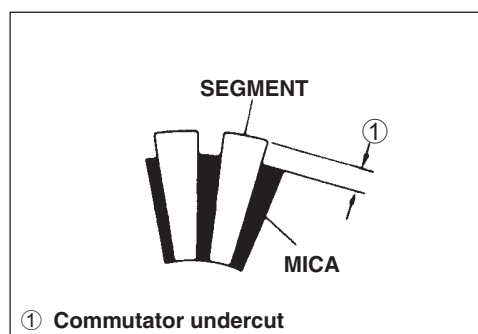
If measurement exceeds service limit, cut mica to specified depth.

NOTE:

Remove all particles of mica and metal using compressed air.

WARNING

Wear safety glasses when using compressed air.



Brushes

Measure length of each brush.



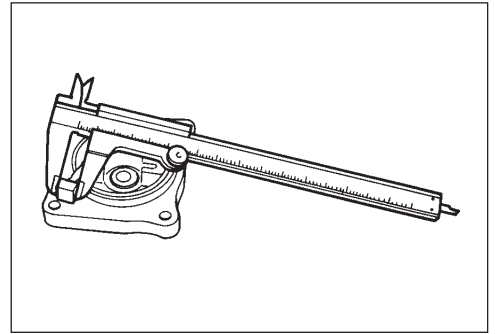
09900-20101 : Vernier calipers

Brush length :

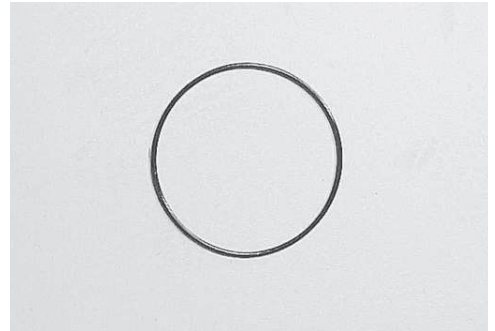
Standard : 9.8 mm (0.39 in.)

Service limit : 5.5 mm (0.22 in.)

If measurement exceeds service limit, replaced brush.

**O-ring**

Inspect O-ring between PTT motor and PTT pump case for cuts, nicks or tears.

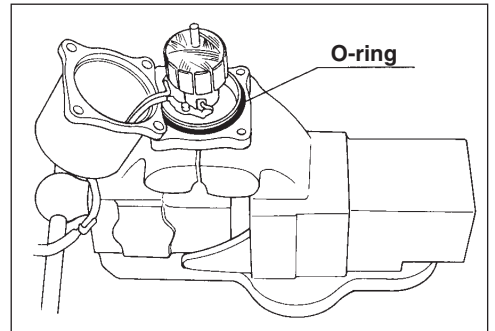
**PTT MOTOR ASSEMBLY**

Assembly is reverse order of disassembly with special attention to the following steps.

1. Install armature to brush holder first.

CAUTION

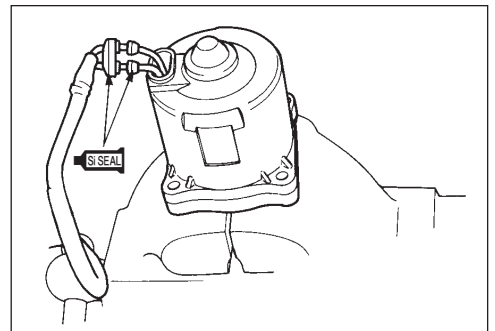
When installing armature, exercise care to avoid breaking brushes.



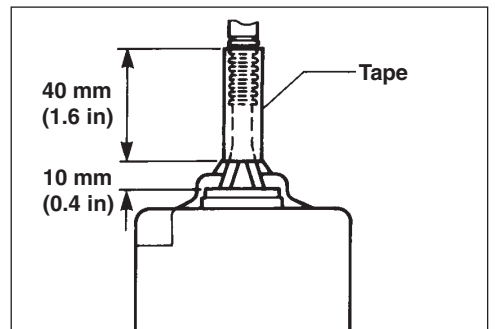
2. Match up previously scribed alignment marks.
3. When assembling field case to brush holder, proceed by pulling PTT motor cables out of field case.
4. Apply Silicone Seal to PTT motor cable holder and grommets, then install cable holder screw.



99000-31120 : Suzuki Silicone Seal



5. Fix cable protector tube to PTT motor cables with heat-resisting tape.



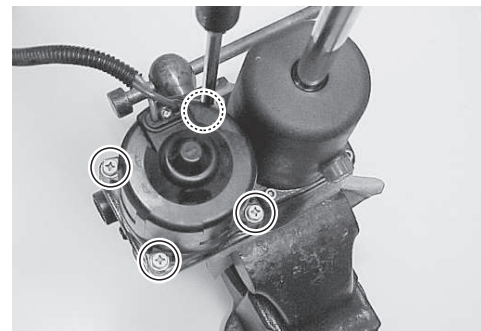
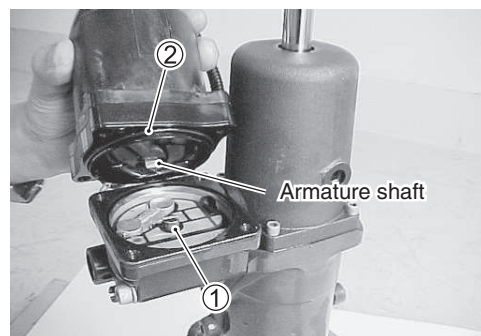
PTT MOTOR INSTALLATION

Installation is reverse order of removal with special attention to the following steps.

1. Ensure that drive joint ① is aligned and firmly inserted into gear pump assembly.
2. Fit O-ring ② to PTT motor.
3. Check level of PTT fluid contained in PTT pump case. If level is low, add recommended PTT fluid until level with mating surface of PTT motor.
4. Ensure that faces of PTT motor and pump unit are free of dirt or debris.
When attaching PTT motor to PTT pump case, ensure that tip of armature shaft fits firmly into drive joint ①.
5. Tighten four bolts to specified torque.

 **PTT motor screw : 5 N·m (0.5 kg-m, 3.6 lb.-ft.)**

6. Pour recommended PTT fluid into reservoir until specified level.
7. Perform air bleeding procedure.
See AIR BLEEDING section on page 8-3.



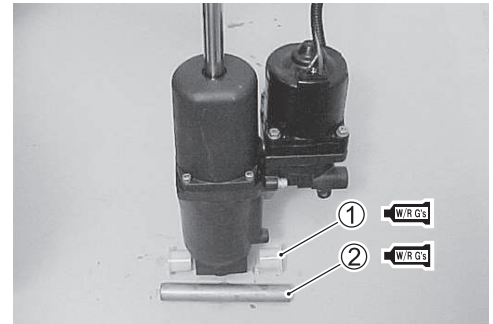
INSTALLATION

Installation is reverse order of removal with special attention to the following steps.

1. Lower tilt rod to full down position.

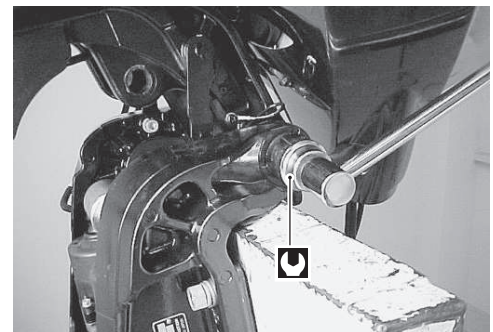
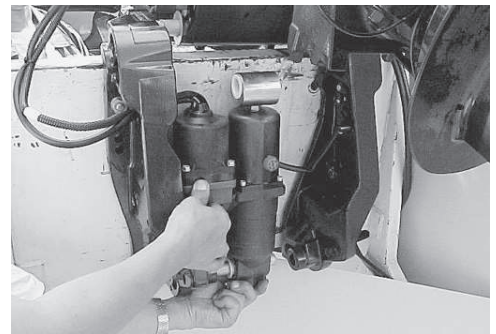
2. Apply Water Resistant Grease to tilt cylinder lower shaft and lower shaft bushes.
3. Install bushings ① and cylinder lower shaft ② to PTT unit.

 **99000-25161 : Water Resistant Grease**



4. Place PTT unit in position, then install clamp bracket.
5. Tighten clamp bracket shaft nut to specified torque.

 **Clamp bracket shaft nut :**
43 N · m (4.3 kg-m, 31.0 lb.-ft.)



6. Tighten lower shaft bolts ④, pre-coated with thread lock, to specified torque.

 **99000-32050 : Thread Lock “1342”**

 **Cylinder lower shaft bolt : 50 N · m (5.0 kg-m, 36.0 lb.-ft)**

7. Install anode ⑤, then tighten bolts securely.

