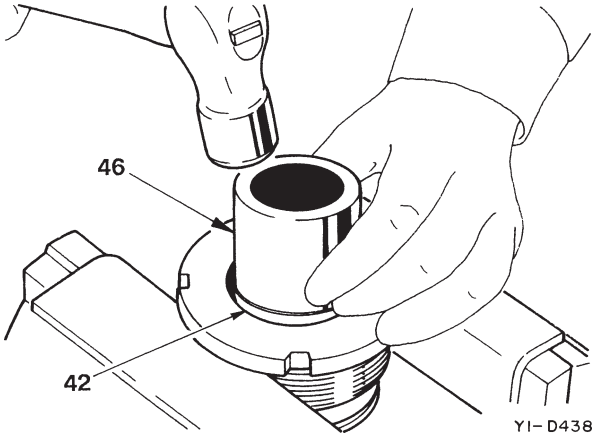
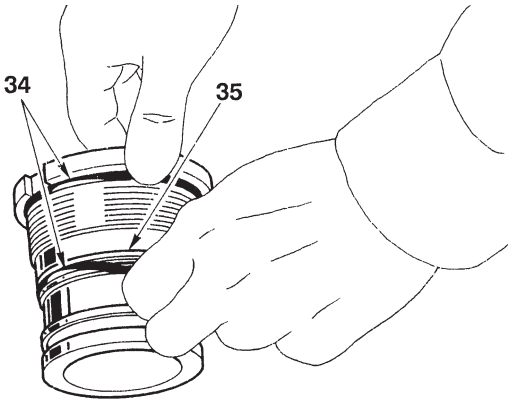
3. Install the dust seal (42).
   - In the case of a dust seal with a metal ring around the outer circumference, use a setting tool (46) to install it.



YI-D438

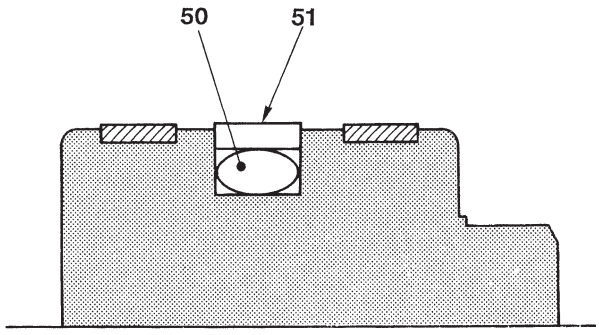
4. Install the backup ring (35) and fit the O-ring (34).
   - The cut portions of the backup ring should overlap correctly.



YI-D427

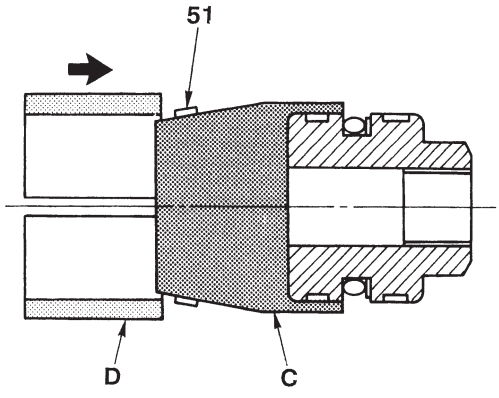
Piston

1. Assemble the piston assembly.
   a. Fit the O-ring (50).
      - If the O-ring is twisted after it is fitted, correct it.



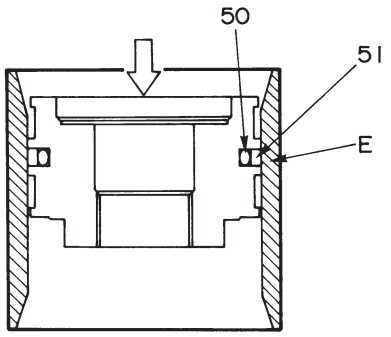
YI-D440

   b. Cover the piston with the sliding jig (C), then using the fitting jig (D), insert the slipper ring (51) rapidly.



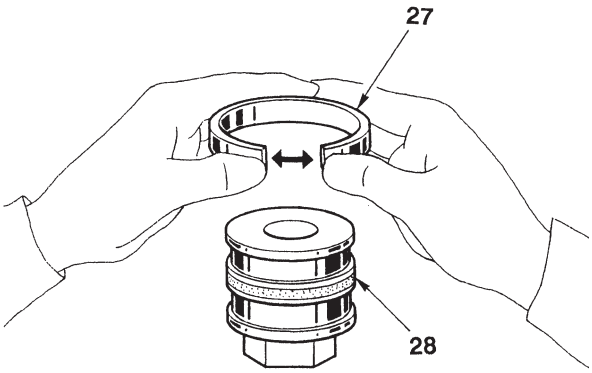
YI-D441

c. Since the slipper ring (51) is extended when it is installed, correct it using the corrective jig (E).



YI-D442

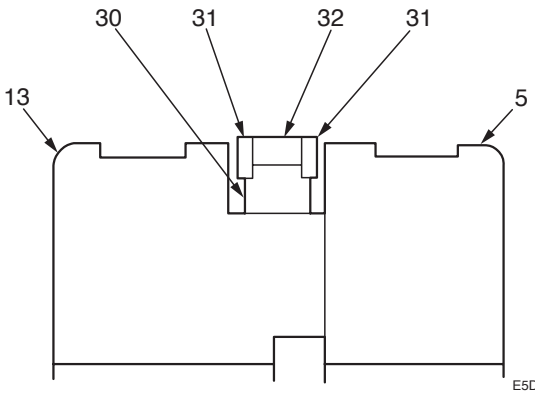
2. Install the wear ring (27).
   a. Spread the wear ring (27) at the cut portion the minimum amount necessary, installing it on the piston from the shaft direction.



YI-D424

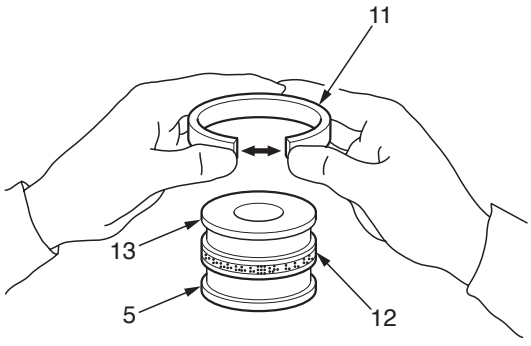
Piston (in two pieces)

1. Install the back ring (30), the backup ring (31), and the slipper ring (32) on the piston (13).



E5D432

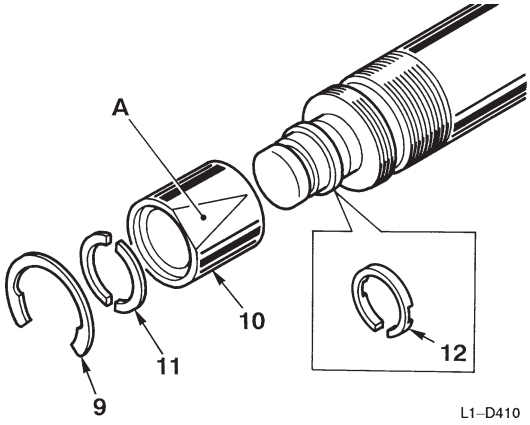
2. Install the wear ring (11) on the piston (13) and the packing holder (5).
   • Widen the cut part of the wear ring (11) only as far as required, and install it from the axial direction on the piston.



E5D415

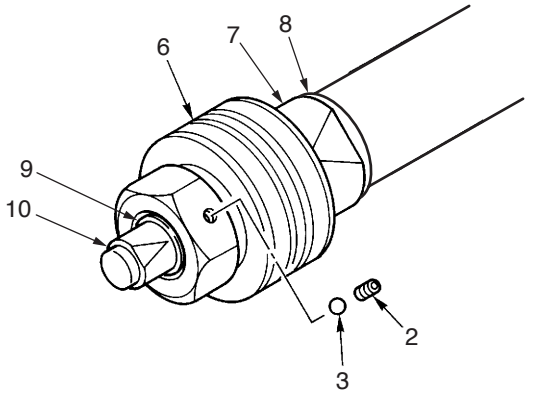
Piston Rod Assembly

1. Fasten the piston rod so that it is flat and install the rod cover.
   - Cover the piston rod thread with tape, etc., to protect the seals from being scratched.



2. Install the cushion bearing.
   a. Install the cushion seal (12).
      - Set the side with the slits facing the screw side.
   b. Install the cushion bearing (10).
      - Be sure to set with the flat side (A) in the proper direction.
   c. Install the stopper (11) on the piston rod, and move the cushion bearing (10).
   d. Install the snap ring (9).

3. Install the spacer (8) and cushion bearing (7).
   - Set the side of the cushion seal with the slits facing the screw side.
   - Be sure to set with the flat side (A) of the cushion seal in the proper direction.



4. Install the piston.
   a. Install the piston nut (6) and tighten it.
      ⇨ Piston nut: Refer to the table below.
   b. Insert the steel ball (3).
   c. Tighten the set screw (2) and caulk it at two places with a punch.
      ⇨ Set screw: Refer to the table below.

⇨ Piston Nut, Set Screw Unit: N·m

Place	Piston Nut	Set Screw
Boom Cylinder	2650	31.5
Arm Cylinder	1510	16.2
Bucket Cylinder	824	15.6
Dozer Blade Cylinder	2256	31.5
Offset Cylinder	2060/1960*	31.5/16.2*

* Serial No. 15810019~

Cylinder Assembly

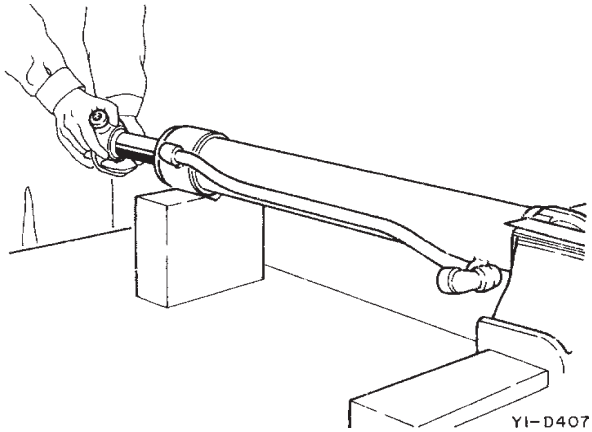
1. Fasten the tube in a horizontal position, then insert the piston rod assembly in the tube.
   - During insertion, align the center of the piston rod with the center of the tube, inserting it straight so the seals will not be scratched.

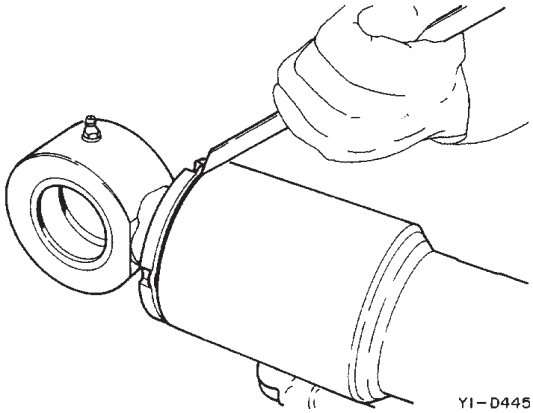
2. Tighten the rod cover.
   - Apply Three Bond #1901 or the equivalent to the rod cover tread.

   Rod cover Unit: N·m

Boom Cylinder	834
Arm Cylinder	530
Bucket Cylinder	539
Dozer Blade Cylinder	834 ±191.2
Offset Cylinder	647

3. Bend the lock rib on the tube down in a notch of the rod cover to lock it.





INSPECTION AND ADJUSTMENT

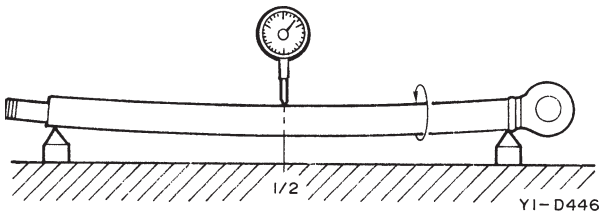
Inspection after Disassembly

Clean each part thoroughly with cleaning oil, then carry out the following checks. When a cylinder has been disassembled, replace all the seals with new ones.

Piston Rod

- Replace the rod if there are cracks.
- If the threads are damaged, repair them or replace it.
- If the plating layer of the plated portion is broken, rusted or scratched, replace it.
- If the rod is bent more than the limit of 1 mm in 1 m, replace it. (Measure by the method shown in the figure at right.)
  If the bending of the rod is within the above limit, yet is bent a lot in a small distance so that it won't move smoothly, replace the rod if it makes a squeaking sound in the operation test after reassembly or if it catches during movement.
- If the inner diameter of the clevis bushing is worn, replace the bushing.

Measuring the Bend



a. Support the portion of the rod with the same diameter at both ends on V-blocks.
b. Set a dial gauge at the center between the two blocks.
c. Rotate the rod and take a reading of the maximum and minimum runout indicated by the dial gauge.

Tube

- If there are cracks in the welded portion, replace it.
- Replace the tube if the inside surface is scratched or if it leaks hydraulic oil.
- If the inner diameter of the clevis bushing is worn, replace the bushing.

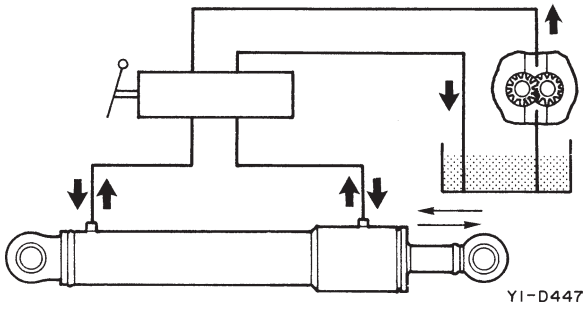
Rod Cover

- If the bushing inner diameter is worn and the clearance with the piston rod is greater than 0.25 mm, replace the bushing.
- If the inside surface of the bushing is scratched, and the scratches are deeper than the depth of the coating layer, replace the bushing.

Inspection after Assembly

No Load Operation Test

1. Place the cylinder in a horizontal position with no load.
2. Apply gentle pressure alternately to the ports at both ends, operating the piston rod 5 or 6 times.
3. Make sure there is no abnormality in the operating condition.



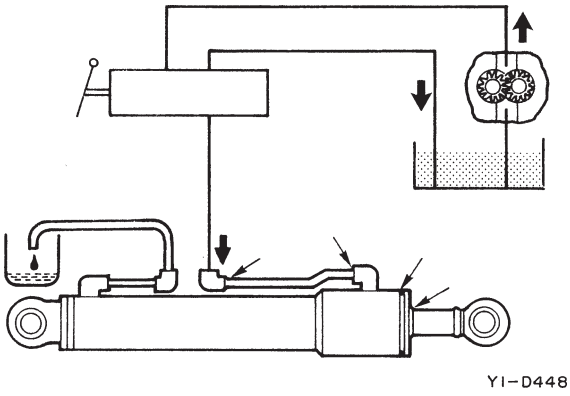
Leak Test

External Leakage

1. Apply test pressure for 3 minutes each to the retraction side and the extension side.
2. Make sure there are no abnormalities such as external leakage or permanent deformation, etc. in the rod seal, the rod cover mount, or in any welded portion.

Internal Leakage

1. Disconnect the extension side hose.
2. Apply test pressure to the retraction side for 3 minutes.
3. Measure the amount of oil that has leaked from the extension side.
   - The amount of leakage should be 1 cm^3 / 3min or less.



Bleeding Air from the Hydraulic Cylinder

Bleed the air out of the cylinder when the cylinder is removed or when the hydraulic piping, etc. is disconnected.

1. Start the engine and let it idle for approximately 5 minutes.
2. With the engine running at slow speed, extend and retract the cylinder 4 or 5 times.
   - Move the piston rod to a position 100 mm before the end of the stroke, being careful not to apply any relief at all.
3. With the engine at top speed, repeat the operation in (2), then with the engine running at slow speed, move the piston rod to the stroke end and apply relief.