

5-4. Vibrating system

During disassembly and reassembly work, pay attention not to damage any part(s). O-ring, oil seal, packing or the like must be replaced with new one.

(1) Disassembly

- a. Remove any hydraulic hose connection. Unscrew 5 pieces of the bolt (52) and separate the belt cover (51).

(Photo: 24 , 25)



Photo:24



Photo:25

- b. Unscrew the bolt (48), and withdraw the pulley (46). With the vibrating case mounting bolts removed, separate the vibrating case assembly from the vibrating plate.

(Photo: 26, 27)



Photo:26

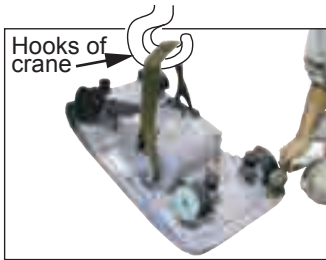


Photo:27

- c. With 4 bolts (34) removed, separate the cylinder (31). The cylinder is taking off by bolting into two screw holes which are provided on the cylinder (L) for this purpose only.

- d. Disassembling the piston

- ① With the vibrating case inverted upside down, rotate gear in either direction to cause the piston assembly (27) to be projected from the vibrating case, before removing the stop ring R-26 (29) from inside of the piston. (Use a bent nose type stop ring plier for this purpose) (Photo: 28)

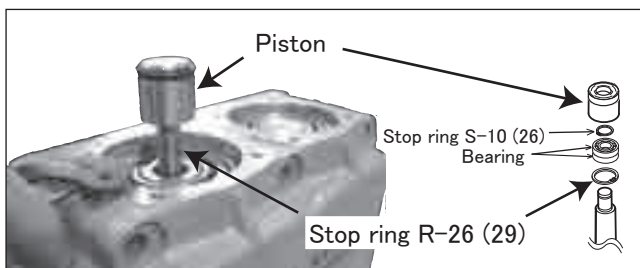


Photo:28

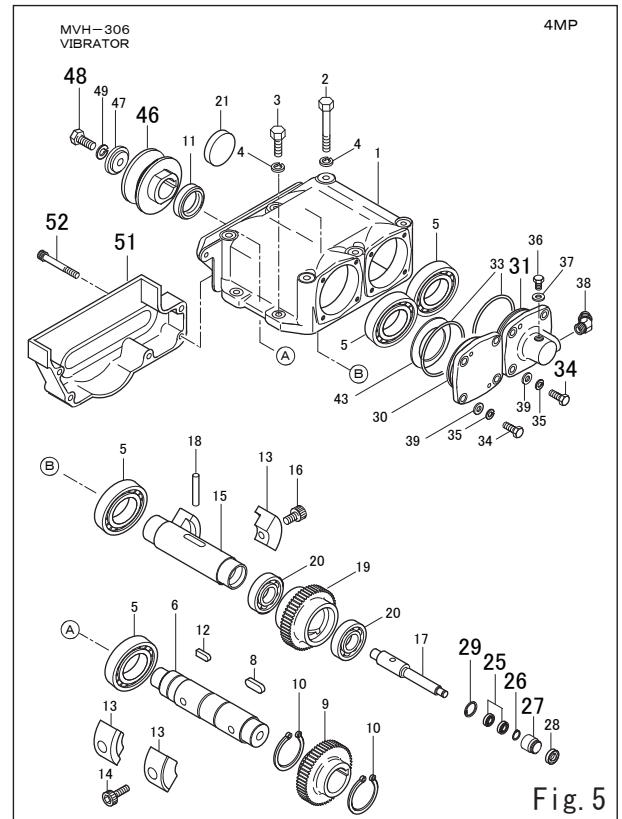


Fig. 5

- ② Withdraw the piston

- ③ With the contraction stop ring S-10 (26) removed, take off bearing (25) and stop ring (25) which had been removed earlier. (Photo: 29)

Stop ring R-26 (29) Bearing Stop ring S-10 (26)

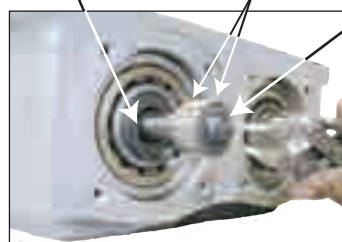


Photo:29

- e. Remove the eccentric rotator (13) from each rotary shaft (Fig. 6)

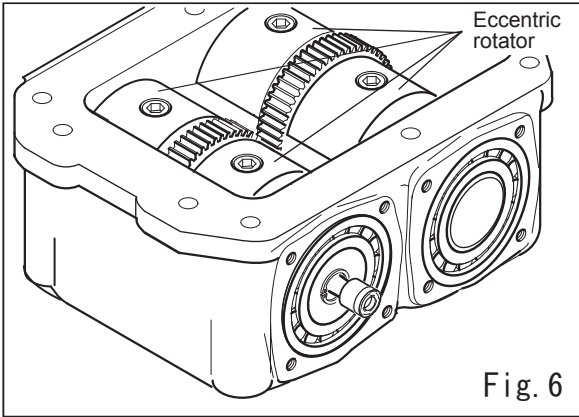


Fig. 6

- f. Shift the rotary shaft (driven shaft side) (15) to one side of the vibrating case and remove the outer bearing and withdraw the rotary shaft assembly from the vibrating case. (Fig. 7)

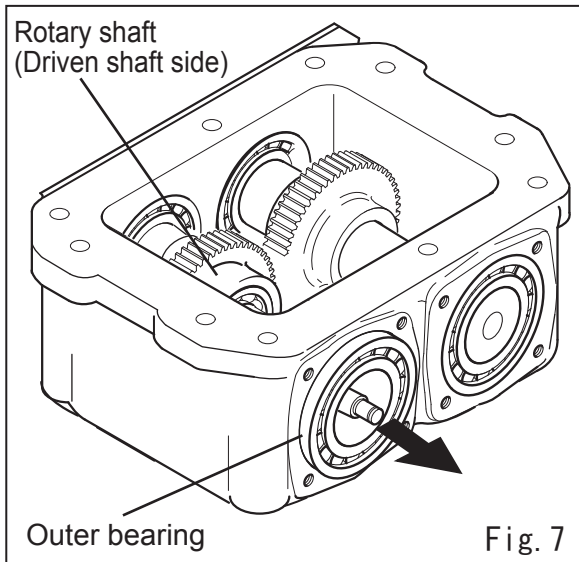


Fig. 7

- g. Withdraw inner bearing by using the pulley puller and push out the gear (driven shaft side) (19) to one side and pull it out. If the gear is hard to remove, use the press rather than tapping on it with hammer. (Fig. 8)

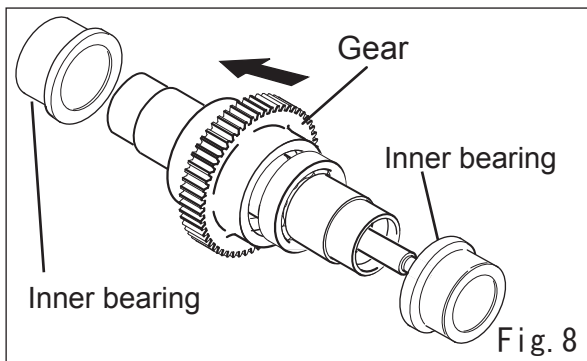


Fig. 8

- h. Push the knock pin (18) with your finger or by using a plastic hammer if it is sticky, which will allow to pull out the piston rod (17) from the rotary shaft. (Fig. 9)

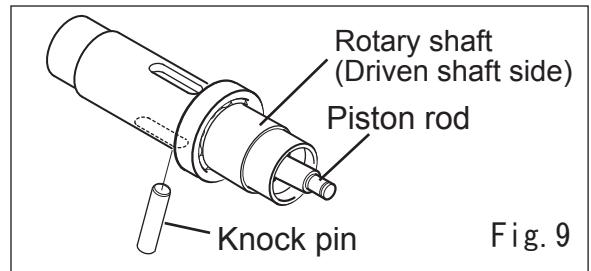


Fig. 9

- i. Disassembling of the rotary shaft (drive shaft side)

- ① Separate the bearing cover (30) from the vibrating case
- ② Push out the rotary shaft (drive shaft side) (6) to the opposite side of the pulley of the vibrating case, withdraw the bearing and take off the oil seal (11) also (Remove both outer and inner bearings).
- ③ Withdraw the rotary shaft (drive shaft side) from the vibrating case. (Fig. 10)

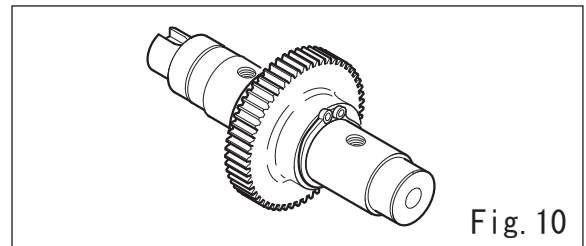


Fig. 10

- ④ Remove the stop ring and get out the gear by the press. (Fig. 11)

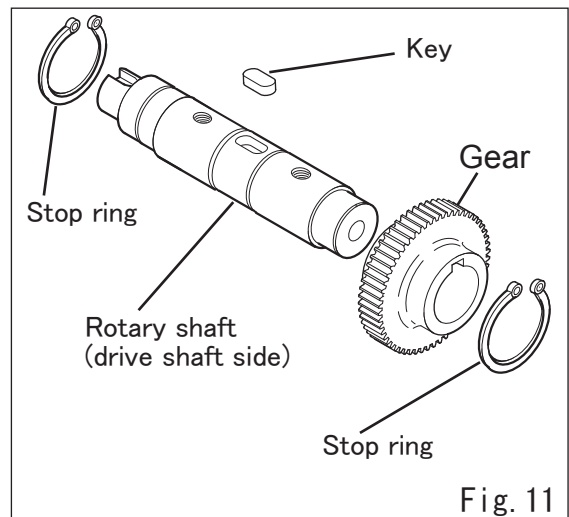


Fig. 11

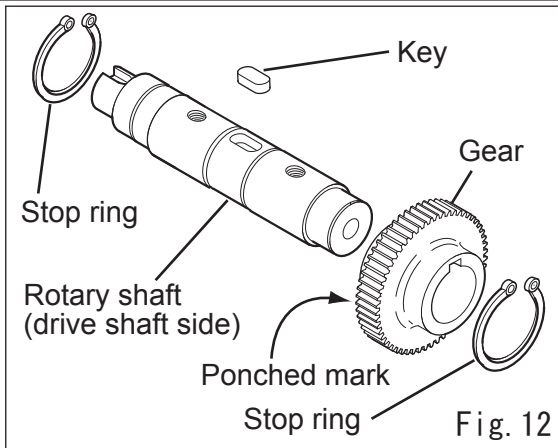
(2) Reassembling

Before proceeding with reassembly, remove residual liquid packing thoroughly from mating surface of vibrating case and vibrating plate. Clean and de-grease all the other parts as well.

a. Reassembling the rotary shaft (drive shaft side)

- ① After inserted the key in the rotary shaft (drive shaft side), press the drive gear into the rotary shaft (drive side) and fix it by both stop rings. (Fig. 12)

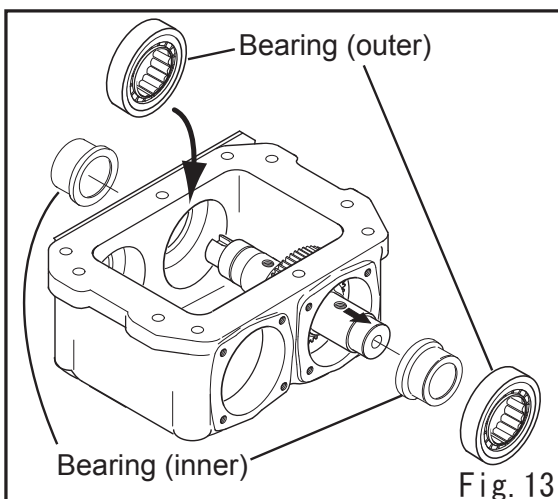
- Coat the press-fit area with molybdenum grease.
- Face the punched mark of the drive gear toward the pulley



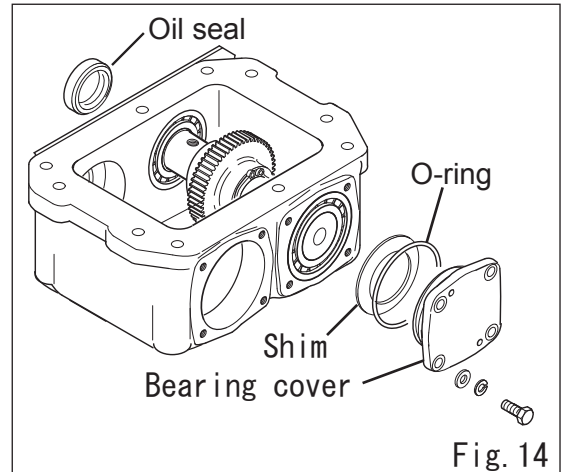
- ② After placing such rotary shaft assembly inside the vibrating case, have the bearing (inner) pressed-in.

Pay attention to the direction of bearing (inner) face to press-in.

- ③ Shift the rotary shaft to the opposite side of the pulley, and put the bearing (outer) of the pulley side into the vibrating case and insert the rotary shaft. Bearing (outer) of the opposite side of the pulley shall be pressed in from the outside of vibrating case. (Fig. 13)



- ④ Install o-ring (33) to the bearing cover (30) and fix to the vibrating case. After installation, check if there is a play of the thrust on the rotary shaft. (Within an allowance: 0.2 ~ 0.5mm). If a play is bigger than this allowance, adjust it by inserting a 0.5mm shim inside the bearing cover. (Fig. 14)



- ⑤ Insert oil seal into the vibrating case. (Fig. 14)

- Apply grease to the bearings
- Place the side with rib of inner ring toward the eccentric rotator.
- Apply grease to the o-ring
- Pay attention when insert oil seal into vibrating case not to having twisted and also not to scratch the lip.
- Apply Loctite #242 on the fixing bolts of the bearing cover. Tightening torque: 800kgf · cm ($\approx 7.85\text{kN} \cdot \text{cm}$)

b. Reassembling the rotary shaft (driven shaft side)

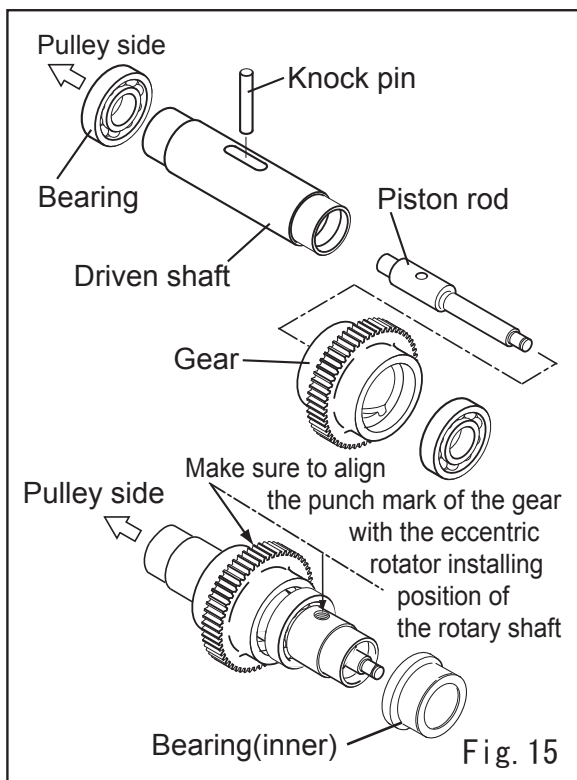
- ① Place the bearing (outer) of the pulley side in the vibrating case and insert it. (Fig. 16)
- ② Fit the piston rod to the rotary shaft, penetrate knock pin through center hole and push the gear to the middle of the rotary shaft before inserting bearings from each side. (Fig. 15)

When inserting the driven gear to the rotating shaft, make sure to align the punch mark of the gear with the eccentric rotator installing position of the rotary shaft, before placing the knock pin in the spiral groove. Installing with the phase displaced by 180°, will cause operation of forward and reverse travel to be reversed. Also make sure that piston rod and gear installed in proper direction. (Fig. 15)

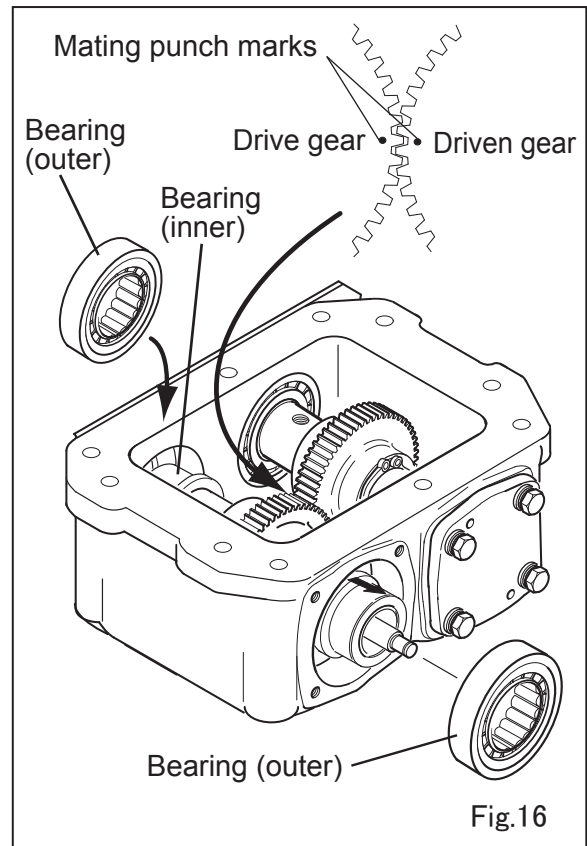
Be sure to apply molybdenum type extreme pressure grease sufficiently to the bore of eccentric rotator shaft, piston rod, spiral portion of the bore of gear, before assembling.

- ③ Insert bearings (inner) into both ends of the rotary shaft by press. (Fig. 15)

Place the side with rib of bearing (inner) toward inside of the vibrating case. Apply grease when press-in.

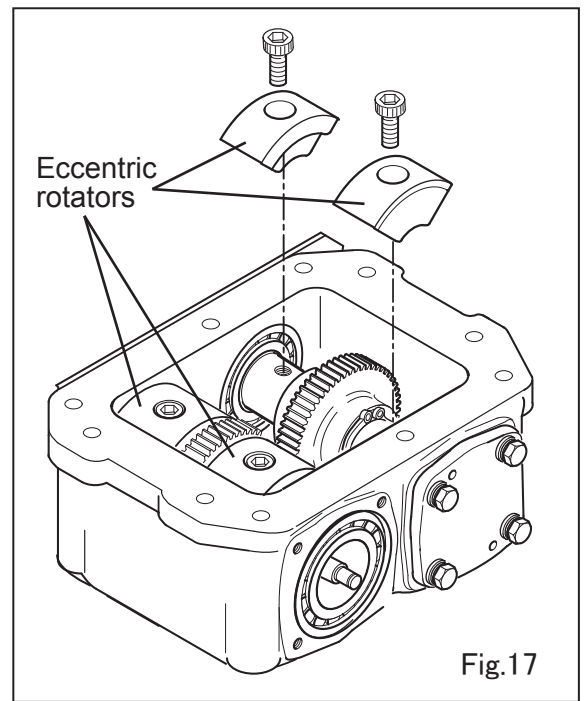


- ④ Fit the driven rotary shaft assembly to the vibrating case and after aligning the punch marks of the drive gear and driven gear, insert it to bearing. (Fig. 16)



- c. Each eccentric rotators are installed on the both drive and driven rotary shaft. (Fig.17)

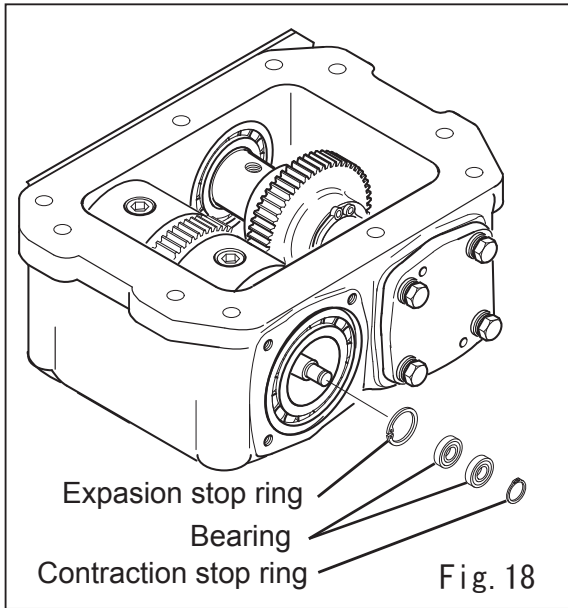
Apply Locktite #271 on the socket head bolts.
Tightening torque: 2,800kgf · cm



d. Reassembling the piston

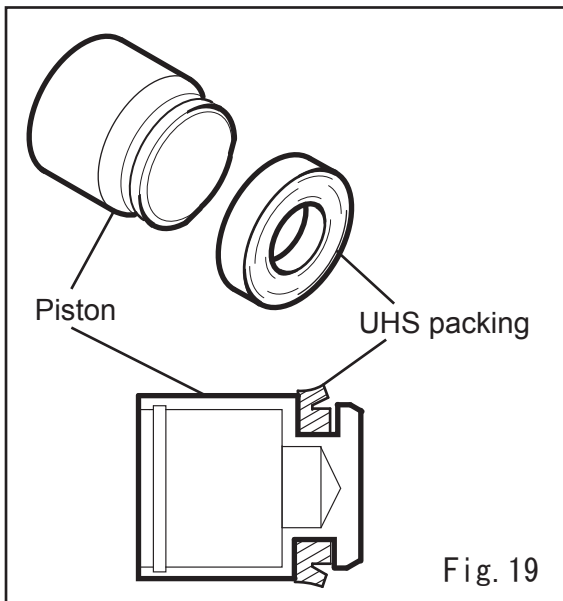
- ① Have the expansion stop ring installed over the piston rod and insert two bearings before retaining it with contraction stop ring. (Fig. 18)

Make certain the stop ring is firmly fixed.
When using commercially available bearing, use molybdenum extreme pressure type grease to pack.
Apply grease to the area of the piston rod where bearing is inserted.



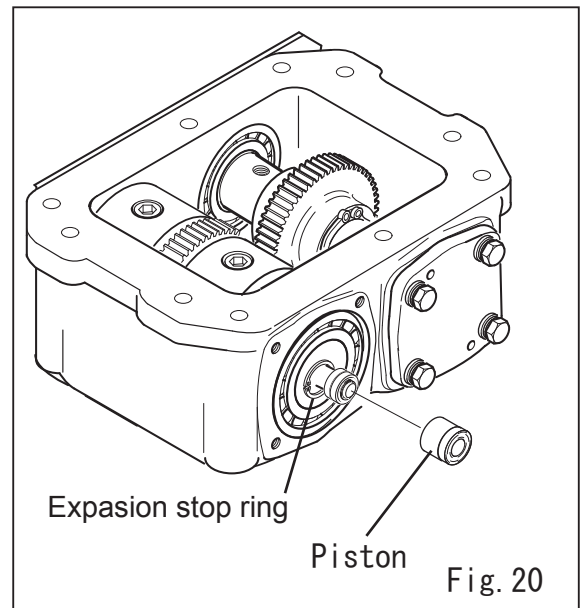
- ② Install UHS packing to the piston (Push it in with your finger after coating with oil.) (Fig. 19)

Make certain that piston has no scar or scratch.
Use care not to damage piston
Install packing in proper direction.



- ③ Place the piston over the bearing and push the assembly into vibrating case, before retaining it with the expansion stop ring which had been installed earlier. (Fig. 20)

To install the piston, either push it in with hand or lightly tap on it with plastic hammer.
When installing the expansion stop ring, use bent nose type plier and make sure that it has seated properly in the groove.
After installation, make sure that the piston rotates smoothly.



- e. Assembling the cylinder to vibrating case.
Install o-ring to the cylinder and coat it with grease.
(Fig. 21)

Coat the cylinder mounting bolt with Loctite #242.
Tightening torque: 800kgf·cm
When inserting piston into cylinder, use sufficient care not to damage USH packing.

- f. Install 45° elbow and breather bolt on the cylinder.
(Fig. 21)

Bandage 45° elbow with sealing tape and position the elbow so that its tip points into vibrator.

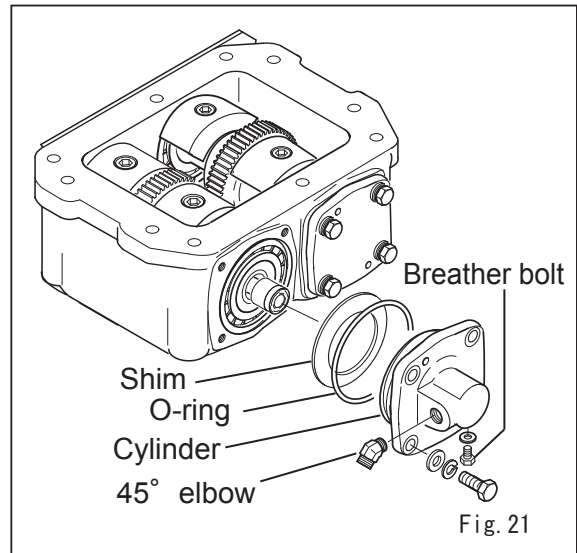


Fig. 21

- g. Install the seal cap to the vibrating case of the opposite side of the cylinder. Install o-ring to the bearing cover and coat it with grease. After installation, check if there is a play of the thrust on the rotary shaft (driven).
(Fig. 22)

(Within an allowance: 0.2 ~ 0.5mm)

If a play is bigger than this allowance, adjust it by inserting a 0.5mm thickness shim inside the bearing cover.

- h. That completes the reassembly of vibrator but make certain that it rotates smoothly by turning its rotary shaft manually.
If resistance is great, tapping on the gear side with plastic hammer lightly and it will help the rotation to be smooth.

Do not possibly tap on the gear tooth.

Install the vibrator assembly to compaction plate.

Thoroughly degrease the mating surfaces and coat the plate with liquid packing (Three Bond 1216 or equivalent) to the thickness of about 0.5mm on the plate side.

Apply Loctite #242 to bolts.
Tightening torque: 1,700kgf·cm
Tighten bolts alternately in diagonal order.

After the liquid packing has hardened (in about 15 to 16 hours) , feed oil to the vibrator .

Type of oil: Engine oil SAE10W-30
Capacity: 600cc (0.6 liter)

Be sure to fill the oil exactly same volume indicated.

Excessive filling causes over-load and shortage causes abnormal sound and shortage of bearing life.

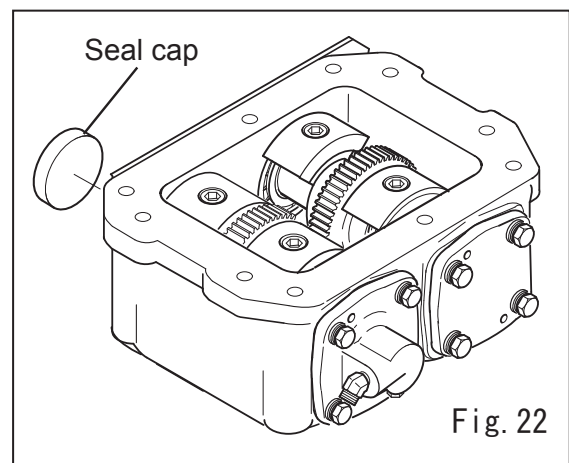


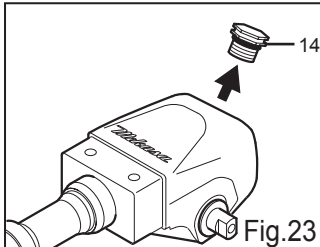
Fig. 22

5-5 Hand Pump

When disassembling and re-assembling, pay attention not to harm each part. O-ring, oil seal, packing etc should be replaced with new ones. Disassembly and re-assembly job should be conducted where it is free from dust.

(1) Disassembling

A. Remove breather plug (14) and drain off hydraulic oil completely (Fig.23)



B. Heat the Plug Center (11) about 200°C by torch and put the special jig and turn to counter-clockwise. (Photo 30, 31 and 32)

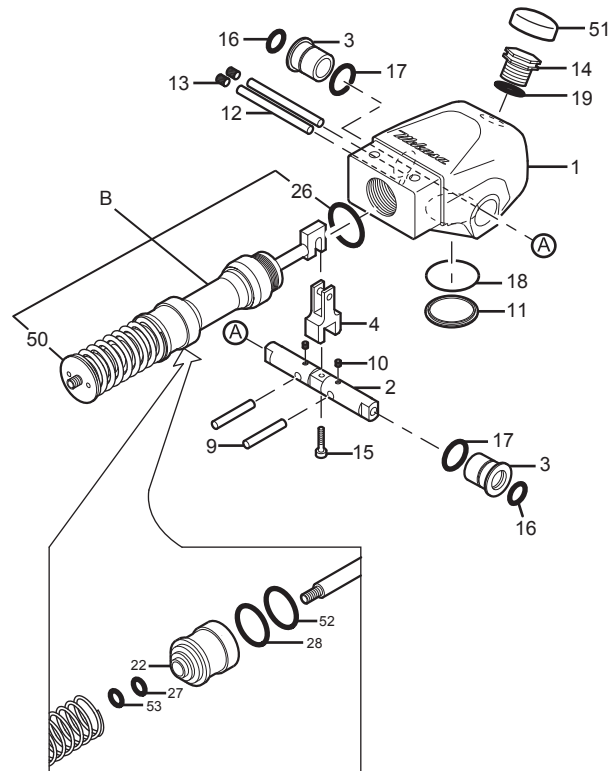
! NOTE: Pay attention not to be burned by torch



C. Loosen the Adapter Tube from Pump Body (1) but it is not come off because Hook is inserted in the Cam (4) of the Control Part which is equipped with Servo Rod (31) in Cylinder Tube.

Keep it on the way, and take next step (Photo 33)

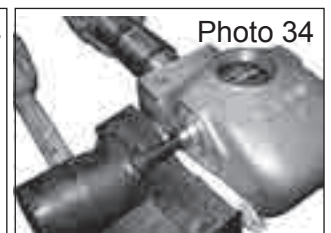
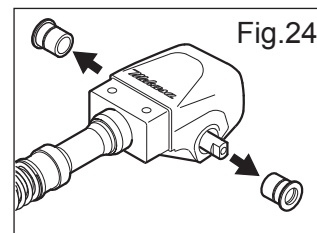
Fix Pump Body by vice, and engage Accumulator Tube with wrench to turn to counter-clockwise.



D. Remove Bush (3) from Pump Body. Screw in the M10 x P1.5 Bolt for both ends of Control Shaft (2) and tap on the Bolt center by Plastic Hammer to move. Bushes slide and come off from Pump Body.

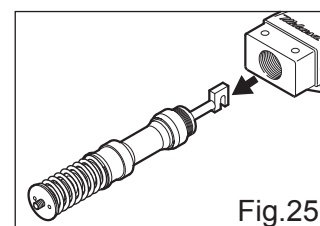
Pull off Bushes from Pump Body. At the same time, check any deformation of inserted parts of Lever (both end flat surface) for Control Shaft. If any, grind the surface smoothly before pulling off.

(Fig.24, Photo 34)

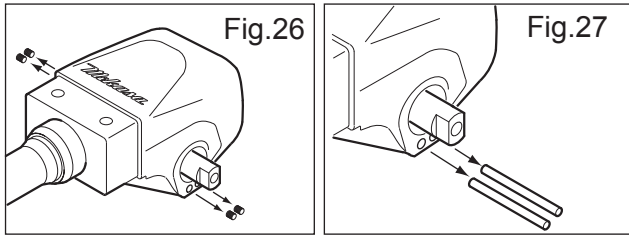


E. Hold the double-sided of the Adapter by hand and unscrew it until Accumulator Assembly (B) can be taking off.

(Fig.25)



F. Remove two pieces of PT1/8 Plugs (13) from Pump Body. Clamp the Stopper Pin (12) by the Plier to move from Pump Body. (Fig.26,27)



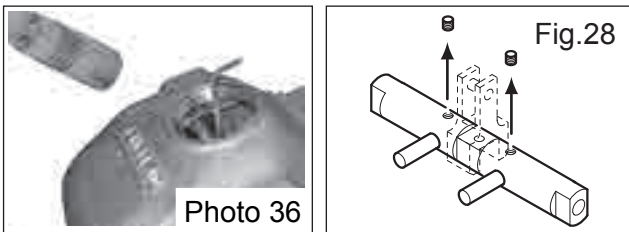
G. Slide Control Shaft to the position where the Hex. Socket Screw M5x5 (10) can unscrew properly and remove Stopper Pin. (Photo 35)



H. This Hex. Socket Screw (10) was applied Loctite 638, and therefore it is necessary to heat up at pin point. Heat up Hex. Socket Wrench indirectly to transfer the heat to wrench end. (Photo 36)

Use another Hex. Socket Wrench to remove Hex. Socket Bolt. Then take same manner to remove another Hex. Socket Screw at the opposite end. (Fig. 28)

! NOTE
Pay attention not to be burned by the heat. Never use the Hex. Socket Wrench which once the heat was added for other normal workshop job because it might be changed its quality.

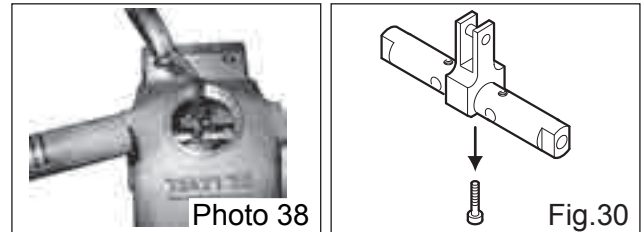


I. Tap on two pieces of Stopper Pins by small hammer, to remove from Control Shaft. (Photo 37 and Fig. 29)



J. Control Shaft and Cam can be separated by removing Hex. Socket Screw, but it was applied Loctite 638 to fix. So it is also required to heat up Hex. Socket Wrench indirectly after wrench engaged. Remove M6 Screw by Hex. Socket Wrench carefully. (Photo 38, Fig. 30)

! NOTE
Pay attention not to be burned by the heat.



K. Tap both ends of Cam, to remove from Control Shaft. (Photo 38)



Finally Hand Pump is completely disassembled, and take the opposite way to assemble.

(2) Cleaning

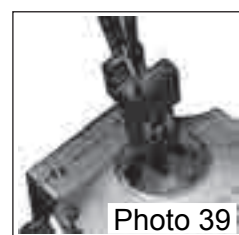
A. Brush up the adhesion of Loctite 638 at the threads of the bottom end of Body and inserted portion of Bush by the wire brush and others.

B. After brushing up, clean up Pump Body by benzin thoroughly. Wipe off oil completely, and dry off by compressed air.

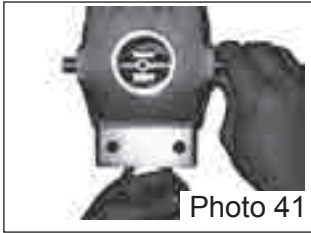
C. Clean off the remaining Loctite at the neck of the bolt and free from oil.

(3) Assembling

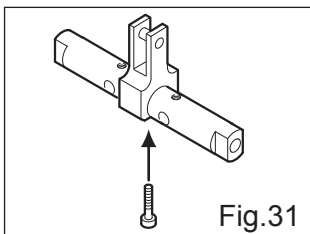
A. Fix Pump Body by vice, and insert Cam to the same direction of the Photo 39 and let Cam stand inside of Pump Body as per Photo 40.



B. Insert Control Shaft with the M5 Screw part upright. Clamp Cam by Plier from the bottom end, and adjust the position center to engage. Each between is clamped and assembled by hand pressed.
(Photo 41)



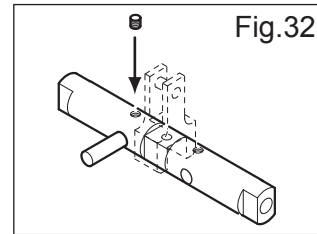
C. Apply Loctite 638 at the several screw threads of M6 Screw but not apply any Loctite on the edge and edge surface of the Bolt. Fix M6 Hex. Socket Screw vertically against Control Shaft and Cam. To get the ideal torque 1.25kg-m (0 ~ +10%) for M6 bolt to fix correctly, use M10xP1.5 bolt at the end of threads hole. Then ensure the correct torque again. (Fig. 31)



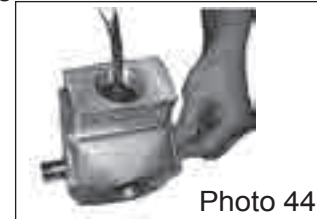
D. Hold the end of Control Shaft by hand, and turn 90 degrees to meet the position of Pin Insert (Photo 42), which shows the receptacle of Cam part at upright. Stopper Pin is inserted by small hammer for easiness. Fix the position of Stopper Pin to let the groove meet M5 screw center of Control Shaft. The edges of Stopper Pin elongate 15mm at both ends (Photo 43)



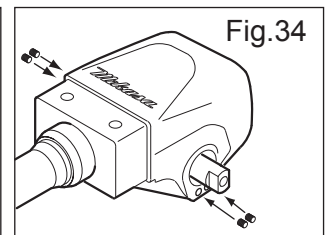
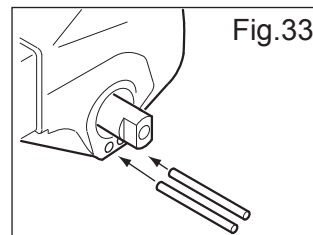
E. Apply Loctite at the threads of M5x5 Hex. Socket Head Screw and M5 threads of Control Shaft. (use a pin to apply Loctite for easy embrocation). Set Hex. Socket Head Screw to Control Shaft, and fix it completely at the torque of 0.3kg-m (0 ~ +10%)
(Fig. 32)



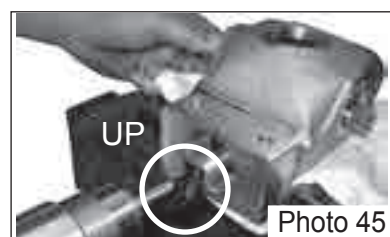
F. Then turn Pump Body as Photo 44, to fix Opposite side Pin with groove from the bottom end. Use Radio Nipper for this purpose. Take the same procedures of tightening above D. and E.



G. Insert Stopper Pin from each hole at the side end of Pump Body. Push Stopper Pin until the end of insert hole by suitable rod. Screw in PT 1/8 Plug rolled with sealing tape to the end of Stopper Pin in Pump Body. Fix it correctly at the suitable torque to avoid any deformation or damage. Take off excess sealing tape and do not let the tape inside of Pump Body.
(Fig. 33, 34)



H. Hold the end of Control Shaft, and turn the receptacle of Cam to let it come at front end. Then insert and engage Hooking Groove of Piston Assembly to Pump Body. Position the groove upright as referred to Photo 45. After confirming of the insertion of the Hooking Groove in Control Shaft, screw Piston Assembly in Pump Body slowly. Pay attention to avoid any damage of O-ring when it is screwed at the sealed face in Pump Body. Fix Piston Pin properly with Wrench at the torque of 25kg-m (0 ~ +10%).

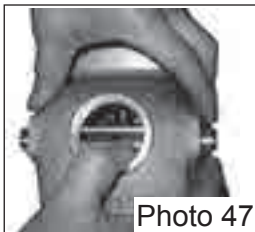


I. Remove both Inner and Outer O-ring from Bush, and wipe off Loctite completely. Use flat tip file or wire brush softly for removing the remaining Loctite, then dry off by compressed air. Use new O-rings.

J. Apply Loctite 638 equally at entire circumstance between the groove of O-ring and collar of Bush. (Photo 46)



Do not apply Loctite to the groove to refrain from loosening of sealing performance, which may cause leakage of oil from Pump. Insert Bush until the collar of Bush touches Pump Body (Photo 47).



To avoid any damage of O-ring by edge, insert slowly with turn or moving back if necessary. Do not have any space between Collar and Pump Body. Tap on the ring jig by hammer if necessary.

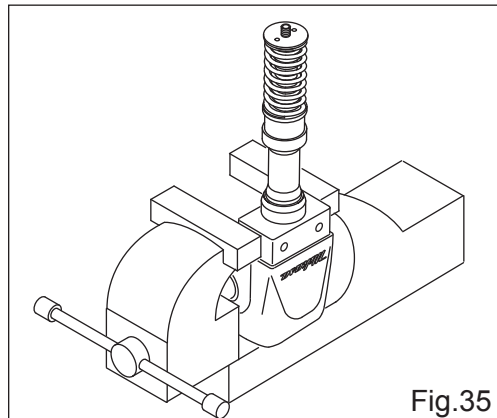
K. Equally apply Loctite 638 at all threads of Plug to fix at Pump Body. By using special jig screw it into Pump Body at the torque of 5kg-m (0 ~ +10%). Breather Plug shall be fixed after installing Hand Pump on the machine and after refilling hydraulic oil.



5-6 Hand Pump Accumulator

(1) Disassembling

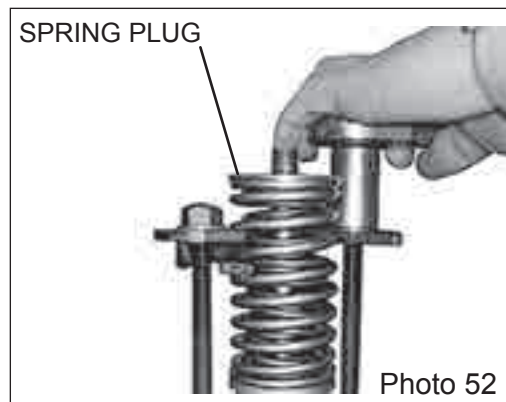
A. Fix the Pump Body by vice clamping the both sides of Pump Body (Fig 35)



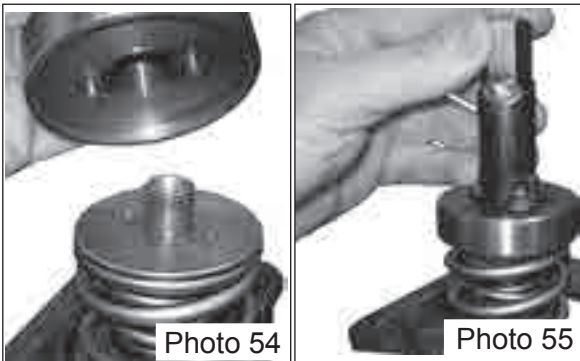
B. Prepare special jig of Spring Press Holder (Photo 50) and set Pump Body with it. Put the upper part of Spring Press into the Spring and lower part in the bump between Accumulator Case and Accumulator Tube firmly (Photo 51)



C. Adjusting the balance of either side of Spring, screw up the both bolts one after the other until the Spring Holder becomes free from Outer Spring strength. (Photo 52)



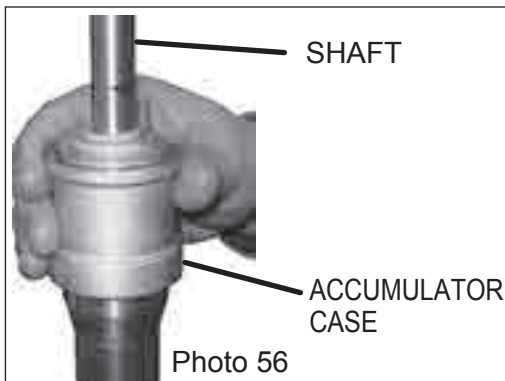
D. Prepare Special Jig for disassembling and assembling (Photo 53).
Set it in the correct position to meet the pins on Special Jig and holes on Spring Holder. (Photo 54 and 55)



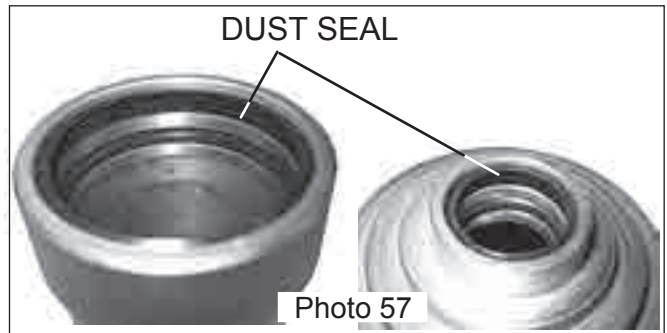
E. Unscrew the Spring Jig slowly and take off Spring Holder from Pump Body. At that time please pay attention that Spring Holder is yet receiving the pressure from Spring. Then three kind of Spring can be lifted up.

! NOTE
Spring Holder is still receiving the pressure from Inner Springs, therefore slowly taking off the Spring Holder and pay attention of your finger(s) not to be pinched by Springs.

F. Clean up Cylinder Shaft first and take off the Accumulator Case. When difficulty, take off Accumulator Case by revolving slowly. (Photo 56)

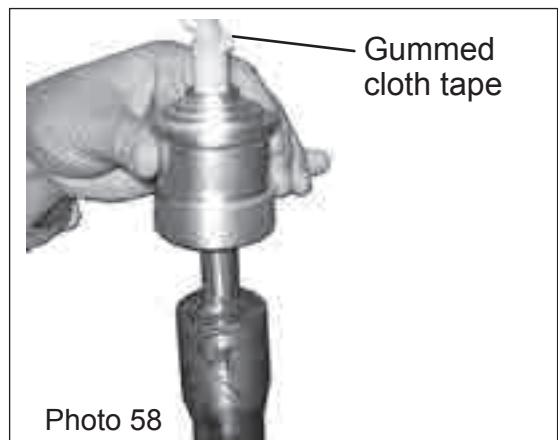


G. If the Accumulator Case is the old type which is not required dust seal, please change with the new type with dust seal. (Photo 57)
In case of the new type Accumulator Case, change with new O-ring and Dust Seal by all Means. Please put the Lip side of new Dust Seal to outside direction.



(2) Assembling

A. After molybdenum grease is applied to Dust Seal and O-ring of Accumulator Case, assemble with Cylinder Tube. At the same time, the screw threads portion of Cylinder Shaft should be covered by the gum tape avoiding any damage of Dust Seal and O-ring from the screw threads. (Photo 58)
If it can not smoothly enter, revolve Accumulator Case by hand and slowly slide it down.



B. Take off the gum tape from the screw threads portion and after degreasing and cleaning it, apply 2 ~ 3 drops of Loctite 638 on the screw threads. (Photo 59)

