GENERAL PUMP

LK

# Repair Manual

LK36-LK40-LK45

LK50-LK55-LK60

General Pump
is a member of
the Interpump Group

Ref 300772 Rev.B
03-20

**INDEX**

## 1. INTRODUCTION

This manual contains the instructions for repairing LK Series pumps, and must be carefully read and understood before performing any repair intervention on the pump. Correct use and adequate maintenance is fundamental for the pump's regular operation and long wear. General Pump declines any responsibility for damage caused by the misuse or the non-observance of the instructions described in this manual.

## 2. REPAIR INSTRUCTIONS

### 2.1 Repair of the Mechanical Parts

Repairs on the mechanical parts must be carried out after removing the oil from the crankcase. To remove the
oil, remove the oil fill plug, (pos. 1, fig. 1) and then the drain plug, (pos. 2, fig.1) present on both side of the crankcase.

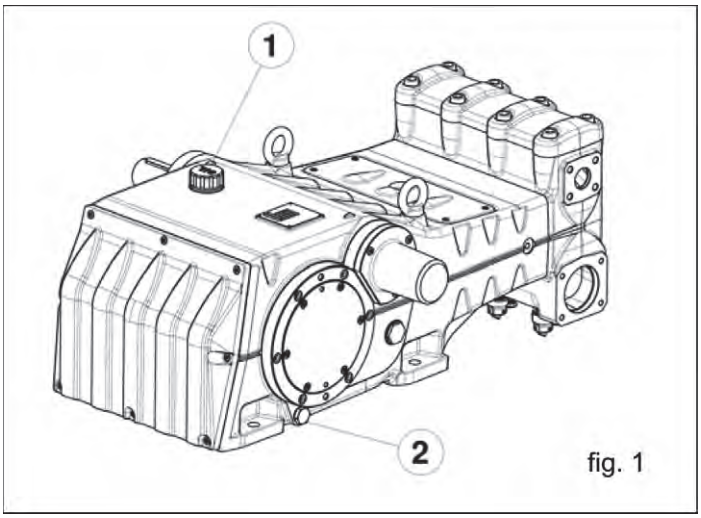


fig. 1

Exhausted oil must be collected in an appropriate container and disposed of in an authorized location. Do not under any circumstances discard into the environment.

**2.1.1 Dismantling the Mechanical Parts**
The correct sequence is the following:

Completely drain the oil of oil, as indicated in 2.1.

Remove the valve lifters from the head and the head from the pump casing as shown in 2.2.1 (from fig. 103 to fig. 105).

Detach the upper inspection cover and the lower inspection cover by unscrewing the 4 attachment screws, as shown in point 2.2.3 (fig. 129 and fig. 140). Slip off the O-rings and replace them if necessary.

Remove the three plungers and the liner/gasket support assemblies, as shown in 2.2.3 (fig. 138, fig. 141 and fig. 142).

Remove the three spray guard spacer rings and the spray guards, as shown in 2.2.3 (fig. 143 and fig. 144)

Unscrew the M6 locking grub screws from the three oil seal covers (pos.1, fig.2).

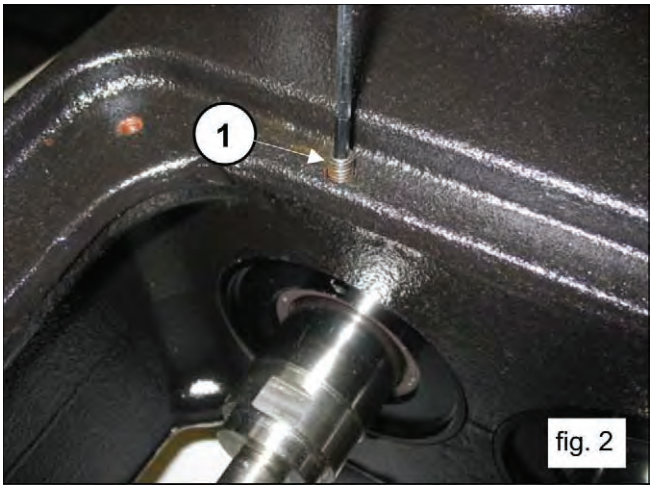


fig. 2

Screw in a threaded bar or an extractor M6 screw in the holes in the oil seal covers (pos. 1, fig.3) and remove the covers from the pump assembly (pos. 1, fig. 4).

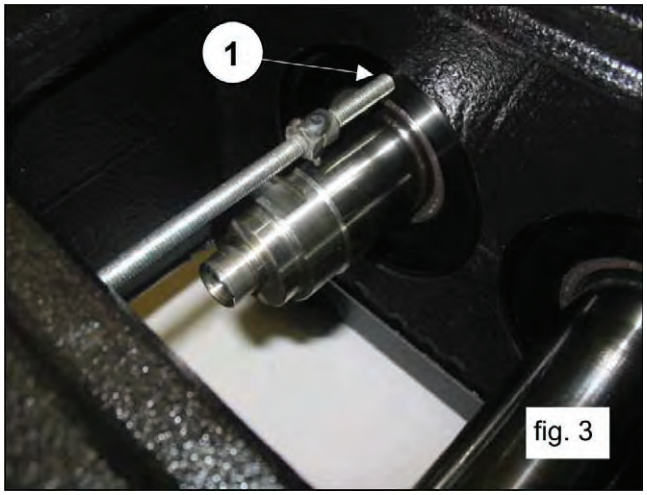


fig. 3

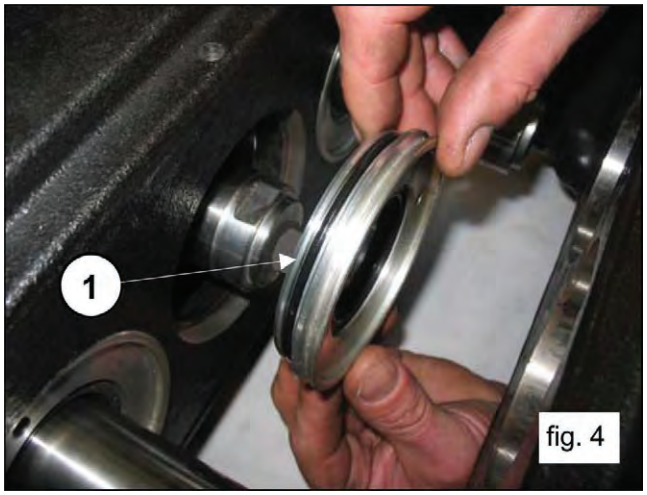
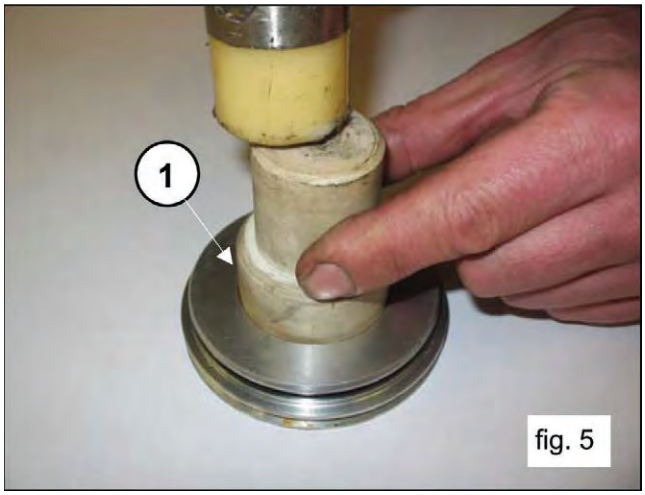
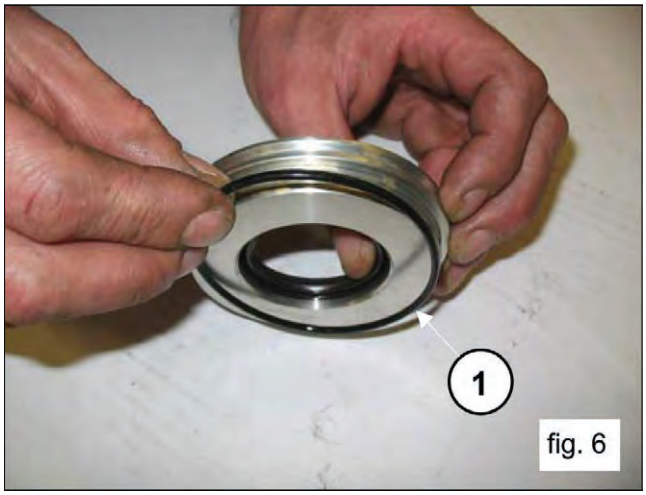


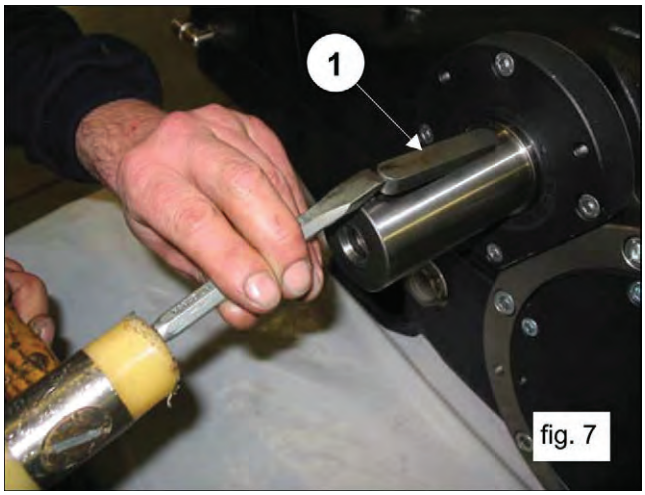
fig. 4

Take out the radial seal ring, (pos. 1, fig. 5) and the outside O-ring (pos.1, fig 6).

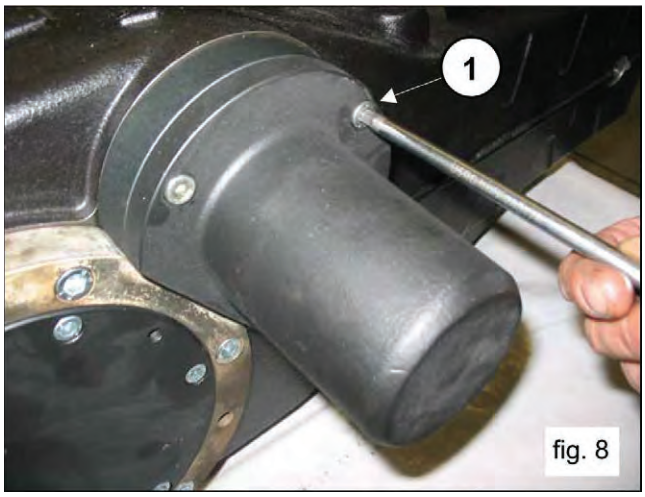


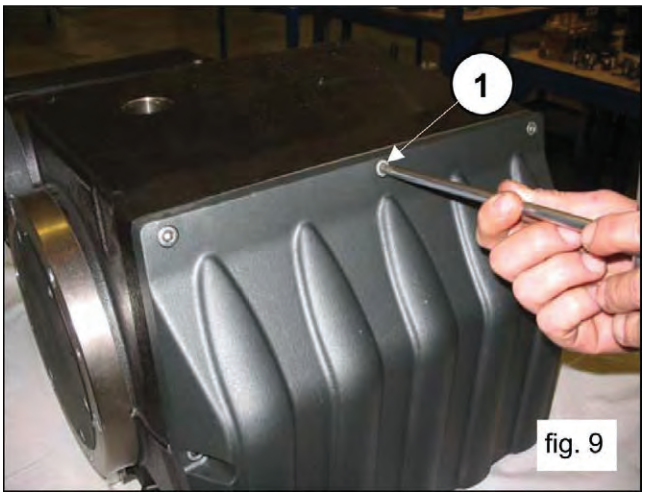

Remove the lug from the PTO shaft (pos. 1, fig. 7)



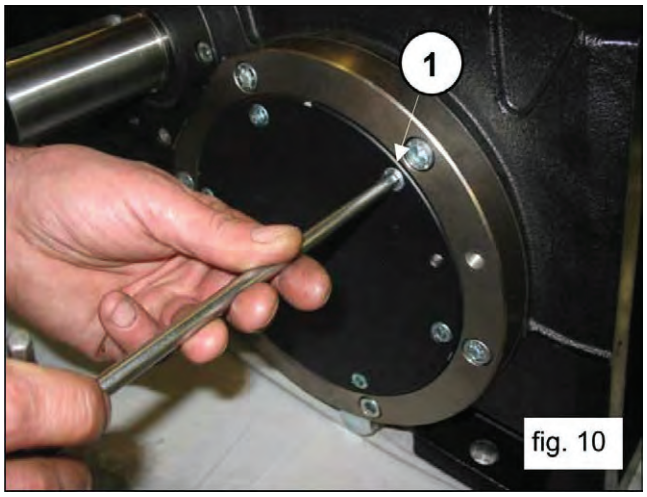

Unscrew the attachment screws from the shaft end cover (pos. 1, fig. 8) and slip the cover off the PTO shaft.

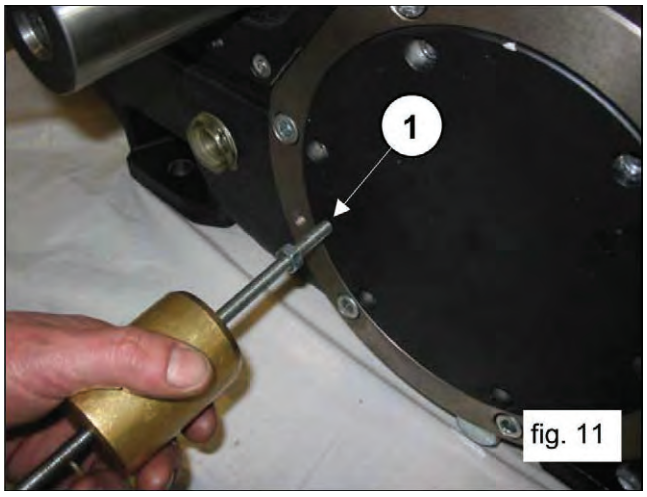


Unscrew the crankcase cover attachment screws (pos. 1, fig. 9) and remove it. Slip off the O-ring and replace it if necessary.

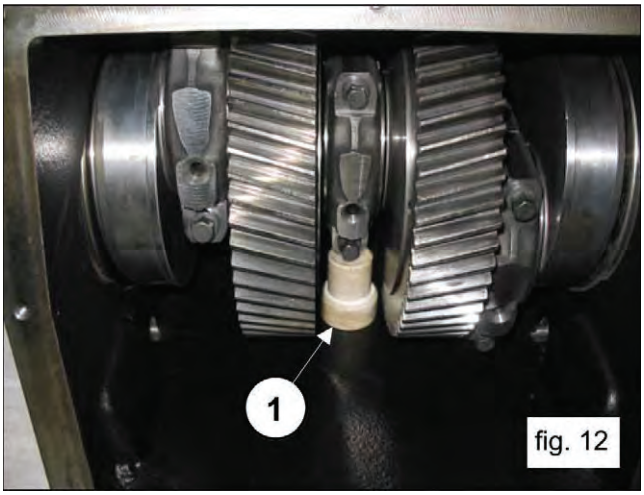



Now remove the two bearing covers by unscrewing the screws (pos. 1, fig10). To help with their removal, use 2 M8 grub screws or screws (pos. 1, fig 11) as extractors. Slip off the O-ring and replace if necessary.




Insert a shim under the shank of the central connecting rod, to stop the rotation of the crankshaft (pos. 1, fig. 12).



Unscrew and take out the bushing locking flange attachment screws, from both sides (pos. 1, fig. 13). The bushing locking flanges must be left in position (pos. 1, fig. 14).

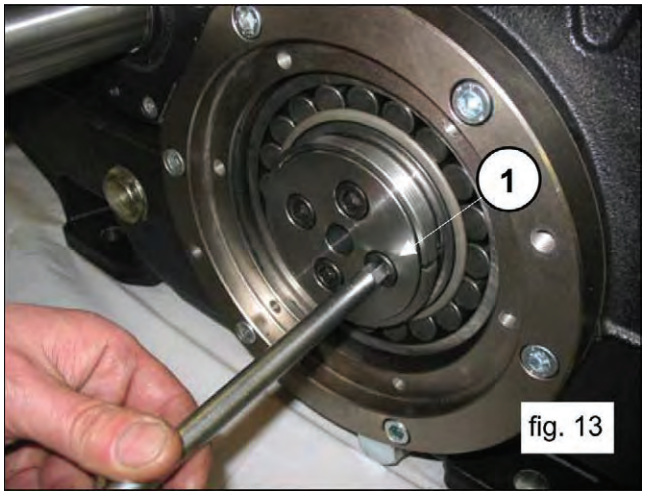


fig. 13

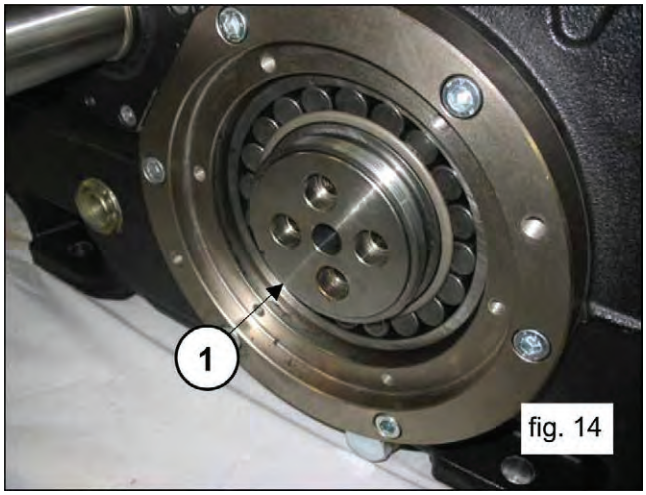


fig. 14

On one side, screw a ferrule (type SKF KM20) onto the pressure bushing (pos. 1, fig. 15), and then unblock the bushing using a striking hammer (pos. 1, fig 16), but do not remove it. Repeat the operation on the other side.

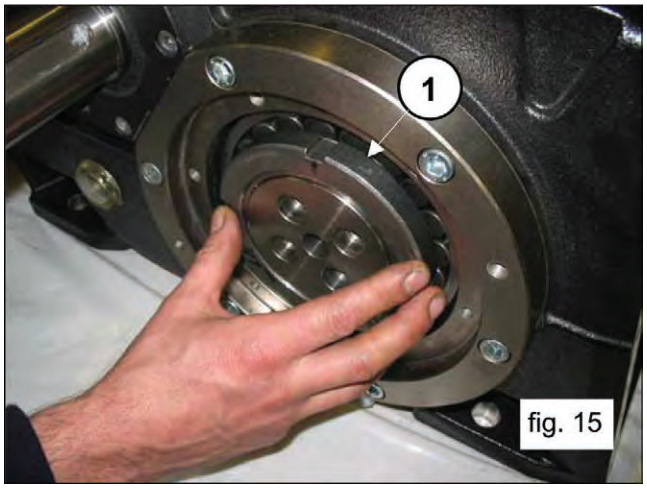


fig. 15

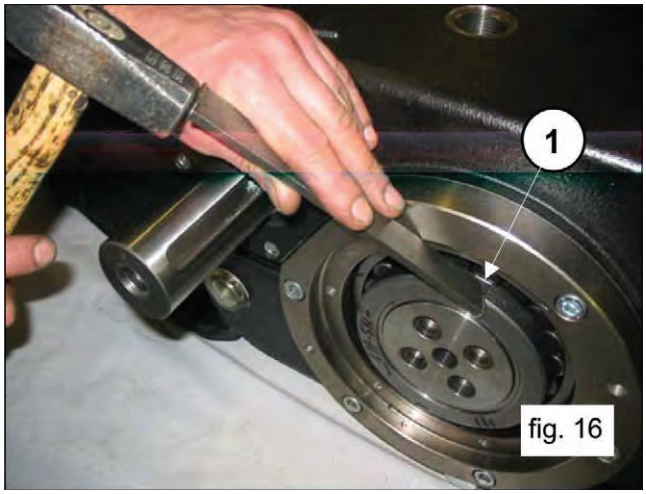


fig. 16

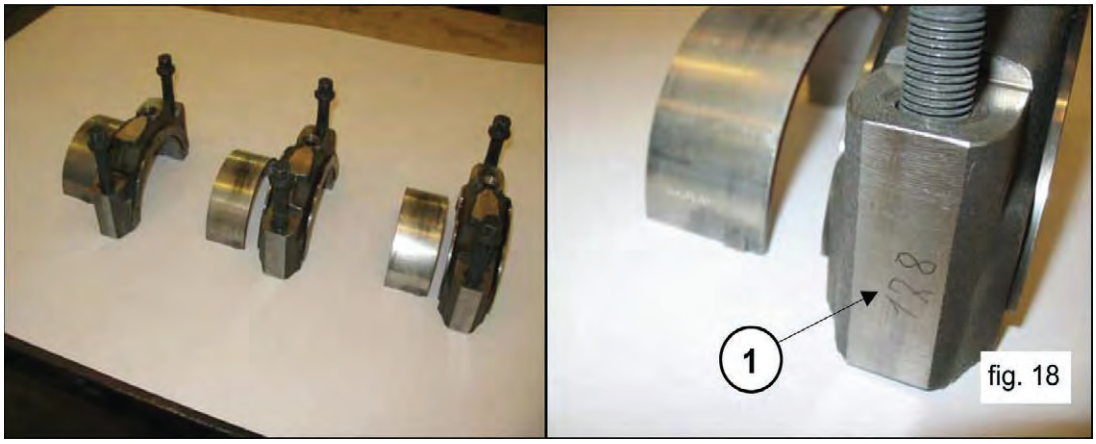
Remove the shim from under the shank of the central connecting rod.

Unscrew the connecting rod screws (pos.1, fig. 17).

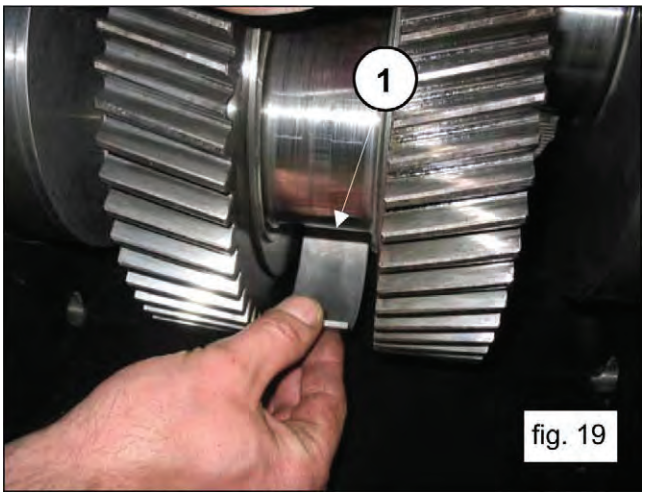

Dismantle the small ends of the connecting rods with the half-bearings. During the operation take particular care to note the order in which the parts are removed

The connecting rod small ends and the big end halves must be reassembled in exactly the same order and pairings in which they were dismantled.

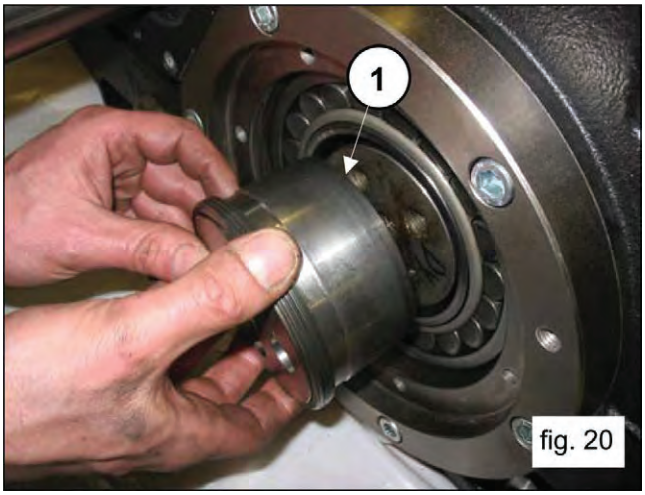
To prevent any errors, small ends and big end halves are numbered on one side (pos. 1, fig. 18).



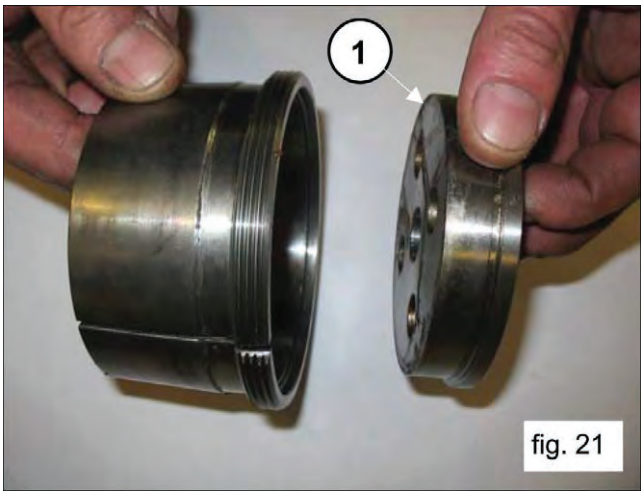

Advance the three big end halves as far as possible in the direction of the head. Slip off the three upper half-bearings of the beg end halves (pos. 1, fig 19).



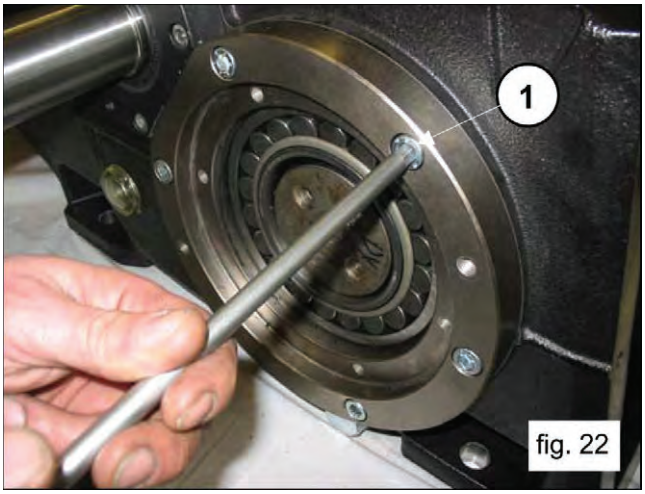
Take out both of the pressure bushings (pos. 1, fig. 20).




Separate the bushing locking flange from the pressure bushing (pos. 1, fig. 21).




Unscrew the screws of the two bearing support covers (pos. 1, fig. 22).



Apply an M16 threaded pin to one end of the crankshaft (pos. 1, fig. 23) and, while keeping it raised, take out the bearing support cover complete with bearing and O-ring (pos. 1, fig. 24). To help with their removal, use 2 M10 grub screws or screws (pos. 2, fig. 23) as extractors. Repeat the operation on the other side

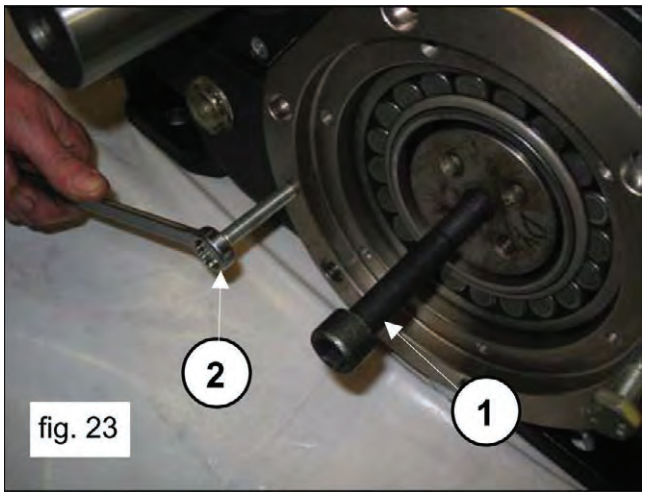


fig. 23

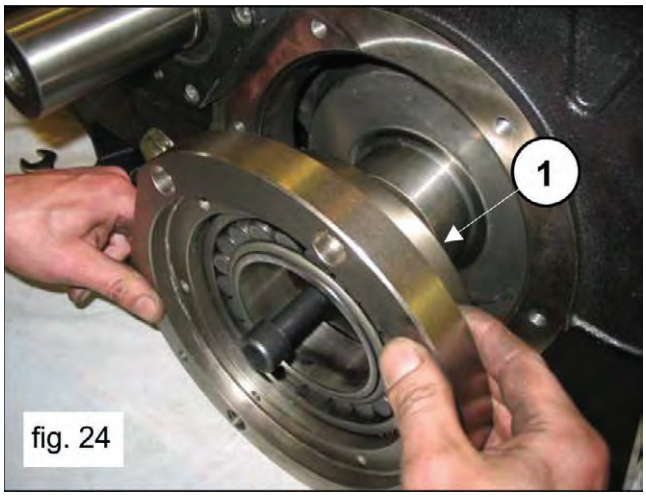


fig. 24

Lay the crankshaft on the bottom of the crankcase. Separate the bearing support cover from the bearing, using a striking hammer (pos. 1, fig. 25).

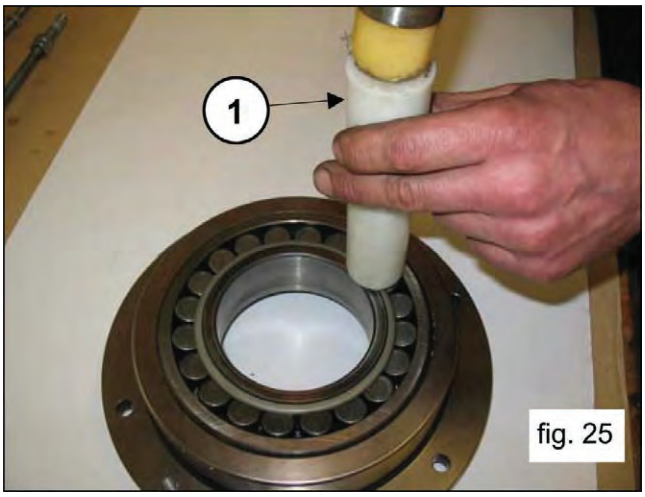


fig. 25

Unscrew the attachment screws of the left and right PTO bearing cover (pos. 1, fig. 26) and slip the two covers off the PTO shaft. To help with their removal, use 3 M8 grub screws or screws (pos. 1, fig. 27) as extractors.

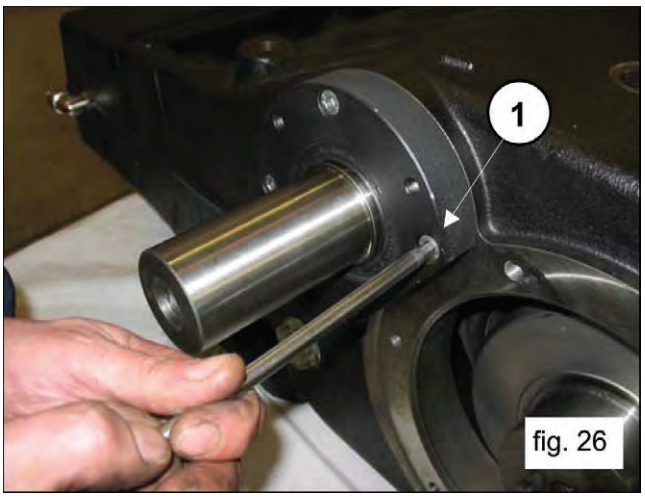


fig. 26

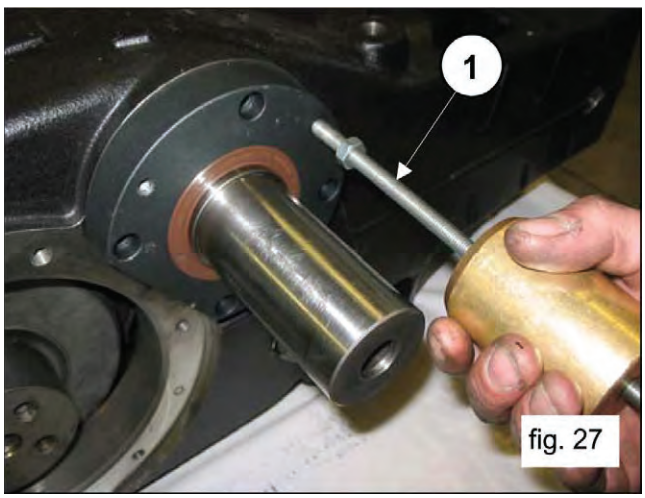
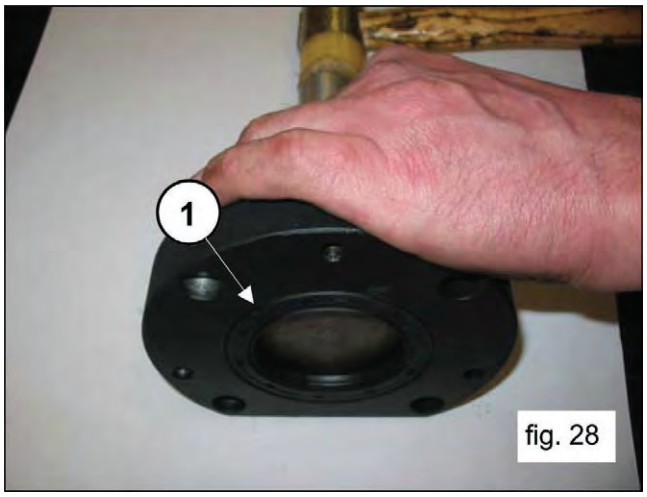
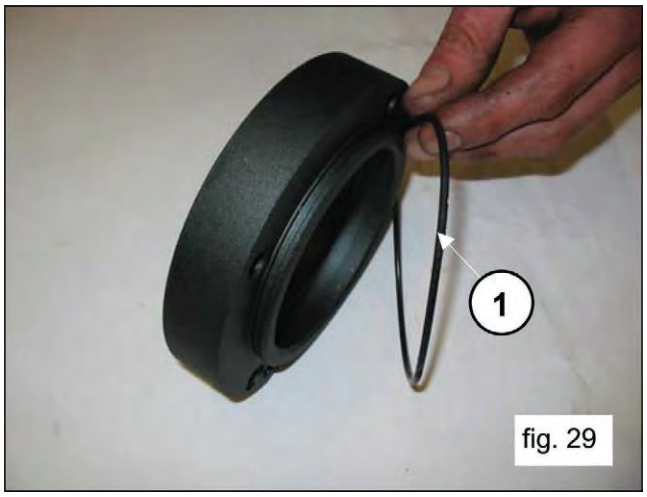
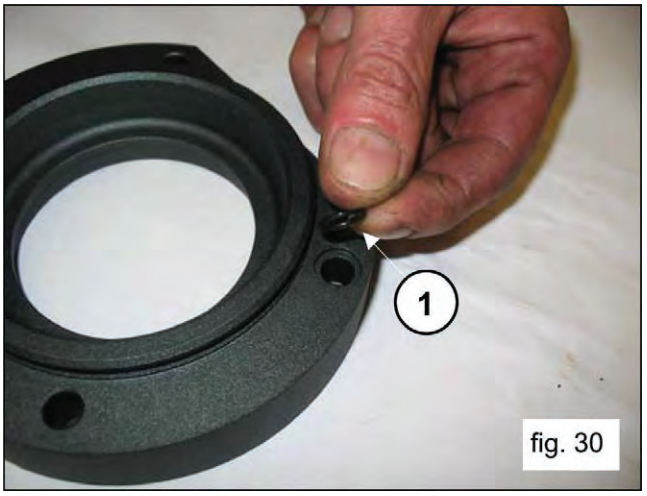


fig. 27

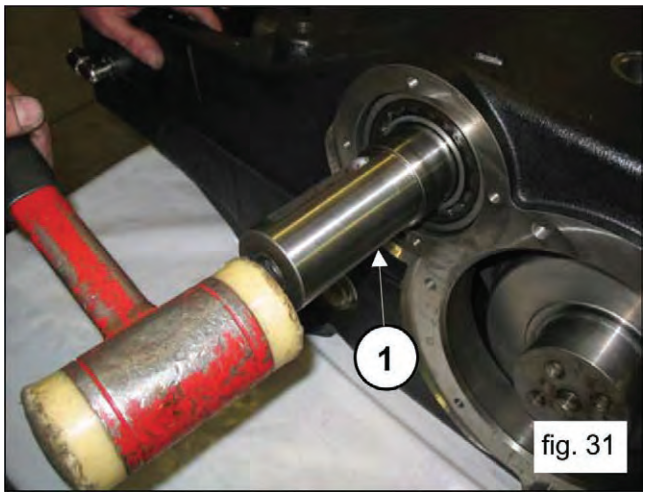
Take out the radial seal ring (pos. 1, fig. 28) and the outside O-ring (pos. 1, fig. 29) and the lubrication hole O-ring (pos. 1, fig. 30)

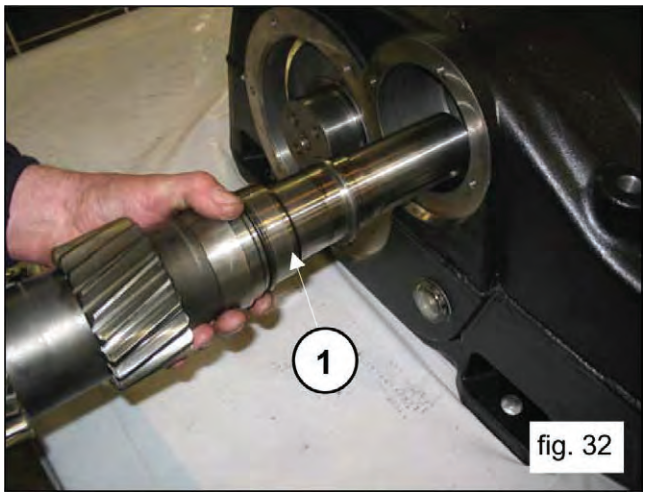


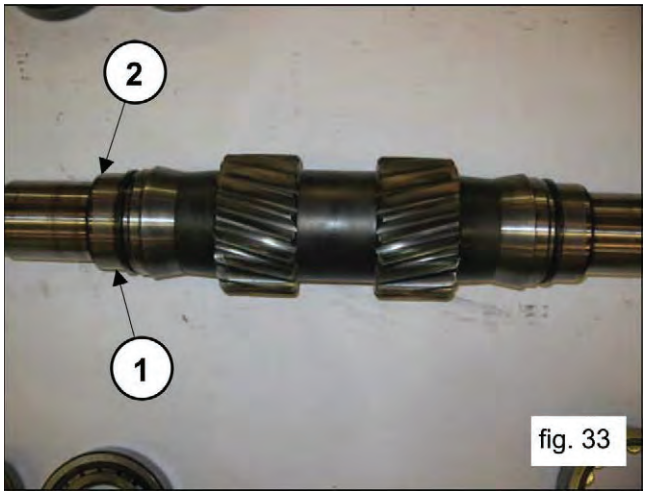




Roll back the three connecting rods as far as possible (until they touch the crankshaft). Using a striking hammer or mallet (pos. 1, fig. 31), take out the PTO crankshaft from either one of the two sides (pos. 1, fig. 32).



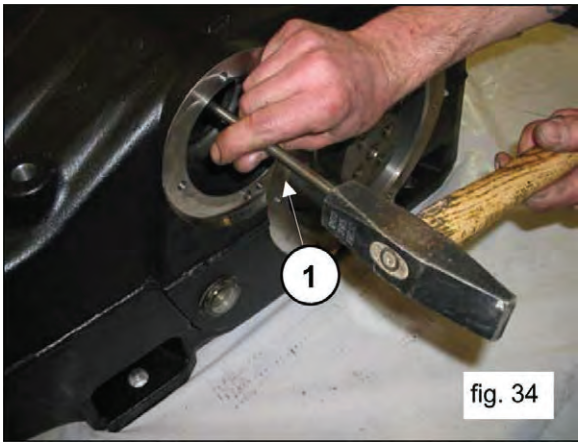



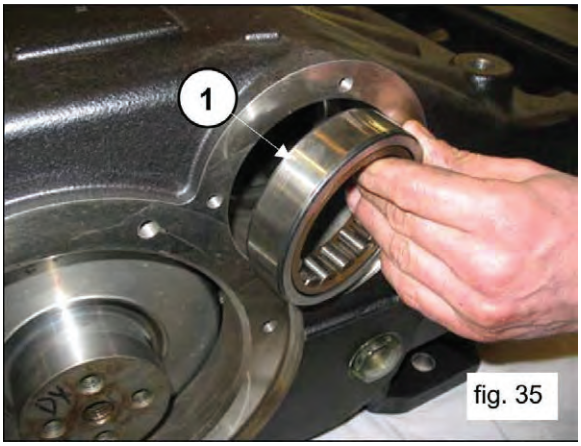
Slip the internal bearing rings off the PTO shaft (pos. 1, fig. 33) and also slip off the two internal bearing spacers (pos. 2, fig. 33).

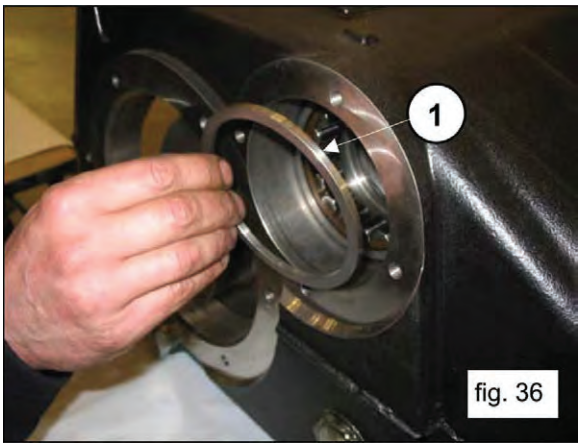


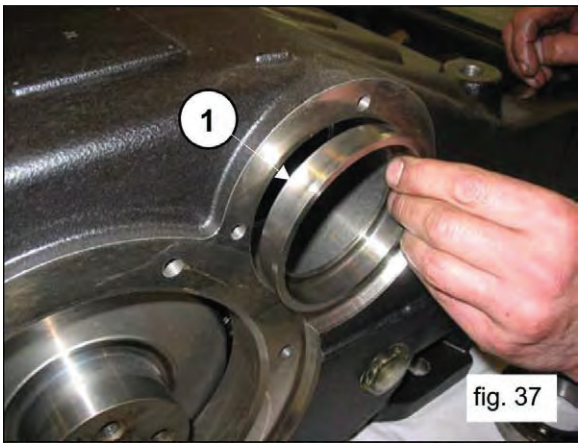

**The internal and external bearing rings must be reassembled in exactly the same order and pairings in which they were dismantled.**

Using a sufficiently long bar (pos. 1, fig. 34) and a striking hammer, take the bearing rings out of the pump casing (pos. 1, fig. 35), along with the external spacer (pos. 1, fig. 36) and the bearing lubrication bushing (pos. 1, fig. 37).

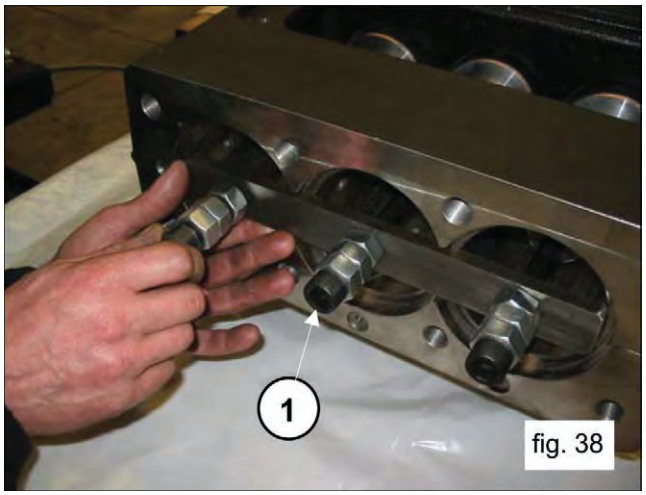


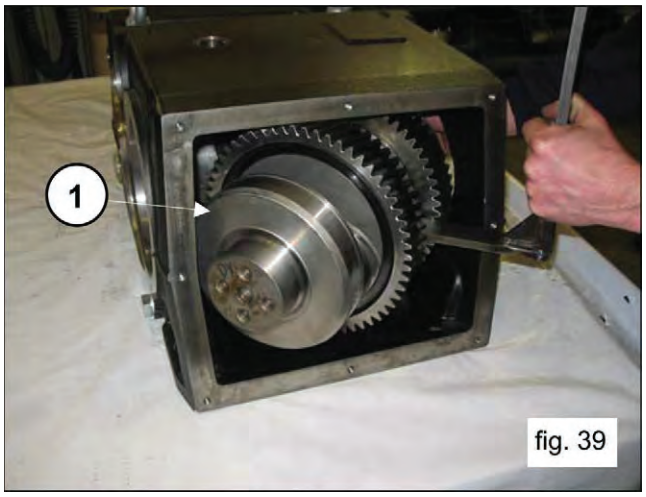



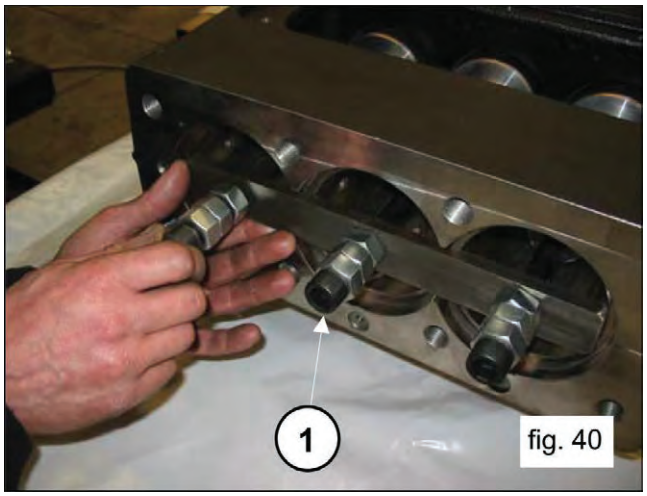
Advance the big end halves in the direction of the hydraulic part and lock them in place using the special tool (p/n F27566200) (pos. 1, fig. 38).

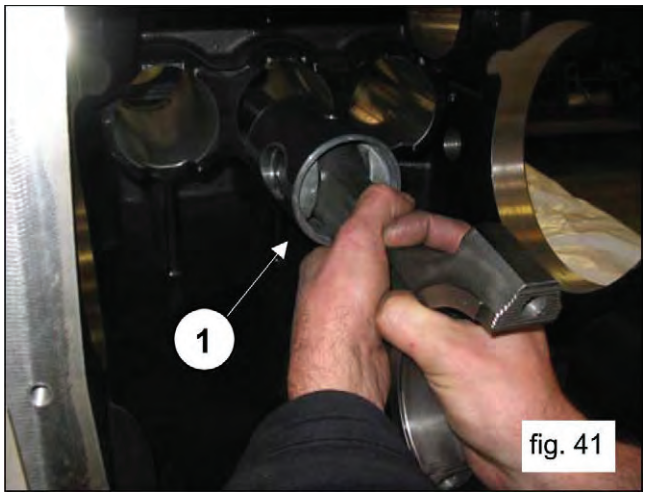



Move the crankshaft from the lower part of the casing (pos. 1, fig. 39).

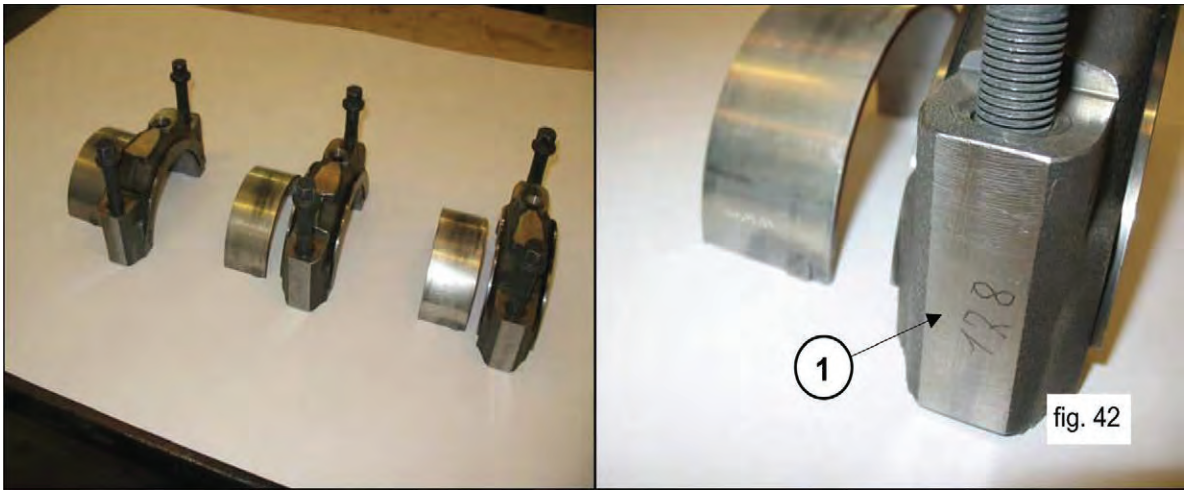



Proceed to unscrew the screws of the device (p/n) F2756620) to unlock the connecting rods (pos. 1, fig. 40) and then take out the connecting rod/piston head assemblies from the rear opening of the casing (pos. 1, fig. 41).

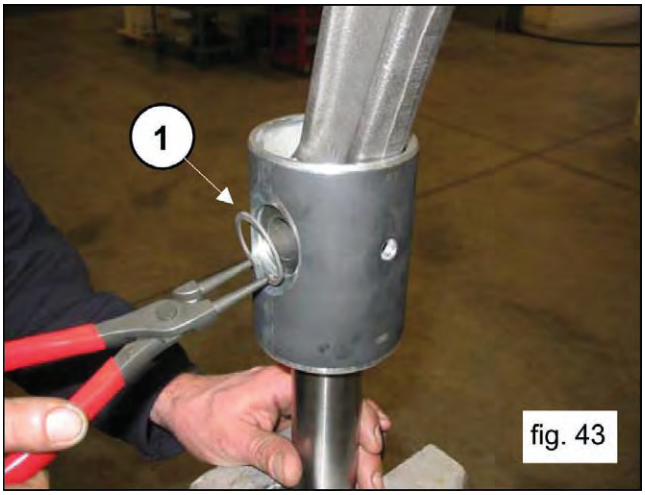


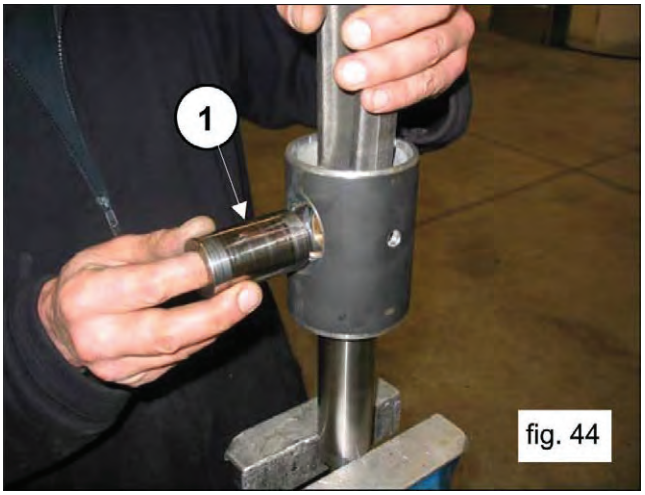
Couple the big end halves to the small ends that were previously dismantled, with reference to their numbering scheme (pos. 1, fig. 42).

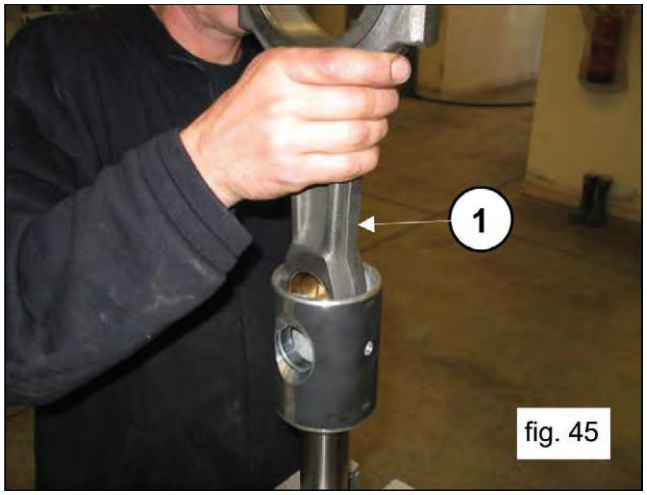



Remove the two pin-locking Seeger rings using the correct tool (pos. 1, fig. 43).

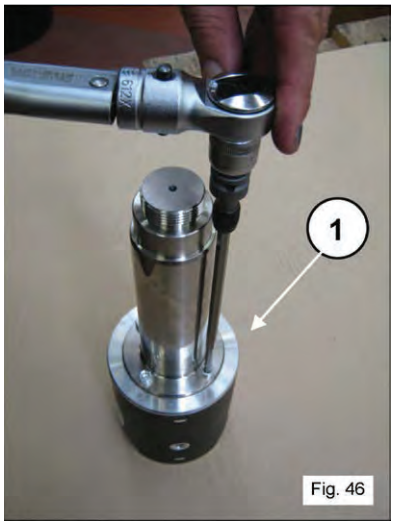


Slip out the pin (pos. 1, fig 44) and take out the connecting rod (pos. 1, fig. 45).




To separate the stem from the piston head, it is necessary to unscrew the hexagonal-head M10 screw using a no. 17 socket wrench (pos. 1, fig. 46).

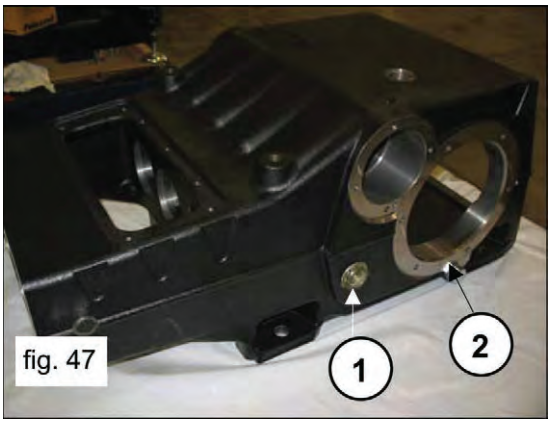



Complete the disassembly of the mechanical parts by removing the oil level lights and the eyebolts.

2.1.2 Assembling the Mechanical Parts

Proceed with the assembly, following the reverse of the procedure shown in 2.2.1/ The correct sequence is as follows:

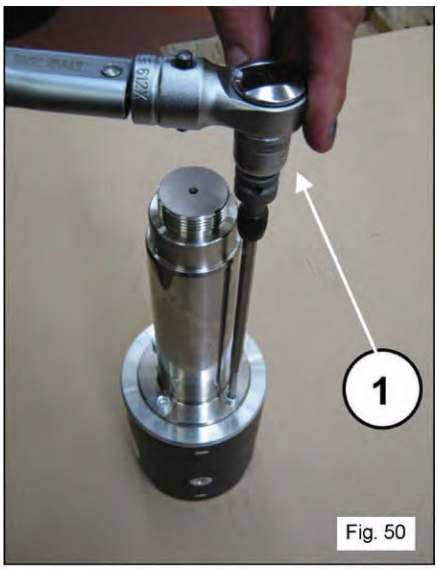
Attach the two oil level lights and the two oil drain plugs (pos. 1 and 2, fig. 47).



Connect the stem to the piston head. Insert the piston guide rod into its seat on the piston guide (pos. 1, Fig. 48) and join the rod to the piston rod using the 4 M6x20 screws (pos. 1, fig. 49).



Place the stem in a vice, closing the teeth of the vice on the two flat areas, and proceed with setting, using a torque wrench (pos. 1, fig. 50) as shown in section 3, “Screw tightening settings”.




Insert the connecting rod into the piston head (pos. 1, fig. 45) and then insert the pin (pos. 1, fig. 44). Apply the two shoulder Seeger rings using the correct tool (pos. 1, fig. 43).

**The assembly is correct if the small end, piston head and pin rotate freely.**

Separate the small ends from the big end halves. Correct pairing is ensured by the numbering on one side (pos. 1, fig. 42). After verifying that the casing is perfectly clean, insert the big end half/piston head assembly into the cylinder tube in the casing (pos. 1, fig. 41).

**The big end half/piston head assembly must be inserted into the housing with the numbering of the big end halves visible from above.**

Lock the three assemblies using the special device (p/n F27566200) (pos. 1, fig. 40). Lock the crankshaft through the rear opening of the casing and lay it on the bottom.

**The crankcase must be inserted into the casing so that the teeth on the ring bevel gears are oriented as shown in fig. 51.**

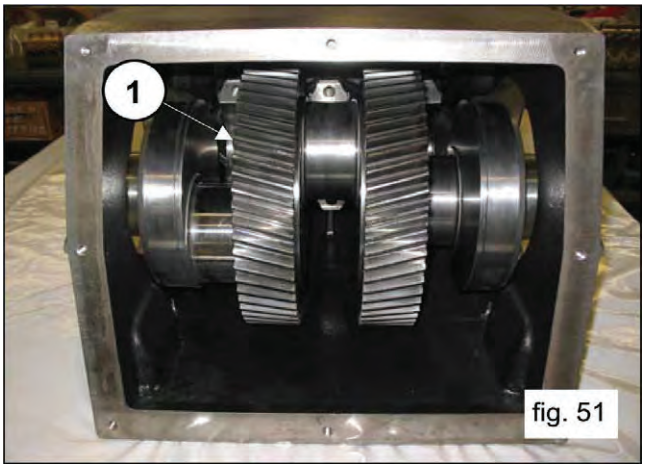


fig. 51

Pre-assemble the PTO shaft:
Onto the PTO shaft, slip on the 2 internal rings of the bearings (one per side) (pos. 1, fig. 52).

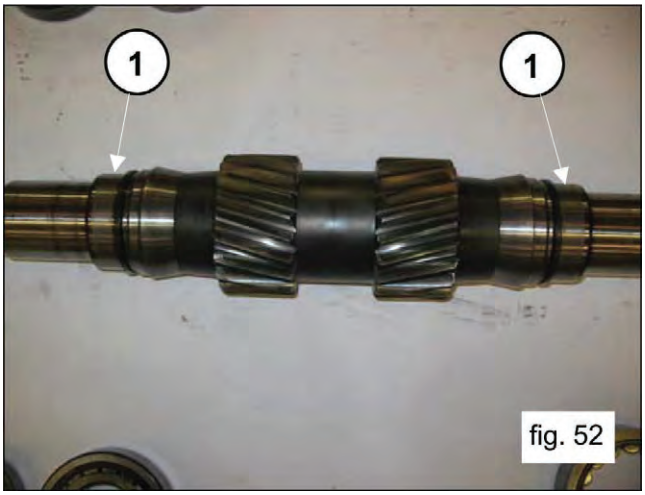


fig. 52

**The internal and external bearing rings must be reassembled in exactly the same order and pairings in which they were dismantled.**

From one side of the casing, insert the bearing lubrication bushing (pos. 1, fig. 53) and an external bearing ring (pos. 1, fig. 54) using a pad and a mallet or striking hammer.

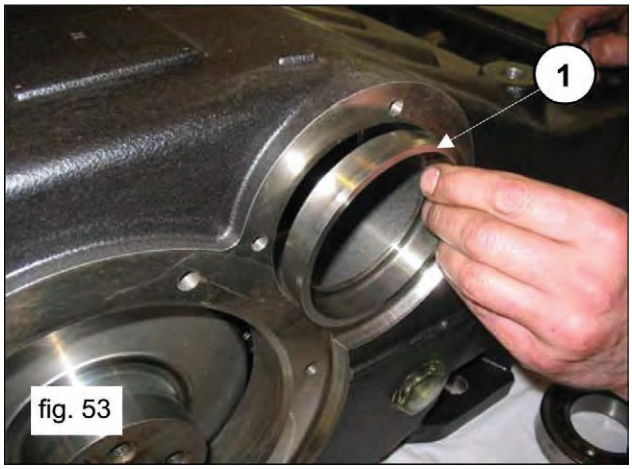


fig. 53

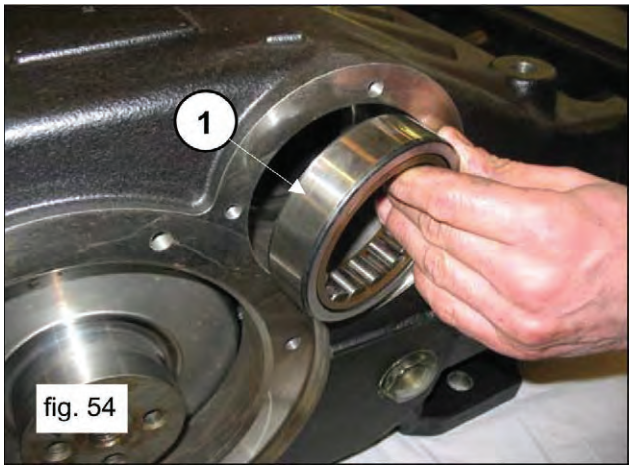


fig. 54

Remove the device for locking the connecting rods (p/n F27566200) (pos. 1, fig 40) and roll back the connecting rods until they tough the crankshaft.

Insert the pre-assembled PTO shaft into the casing (pos. 1, fig. 55). Insert it from the other side to the side where the external bearing ring and the bearing lubrication bushing were inserted.

**The PTO shaft must be inserted into the casing so that the teeth are oriented as shown in fig. 55.**

It is easier to insert the PTO shaft completely inside the bearing by applying an M16 screw to the end of the shaft being inserted, to keep the shaft lifted up (pos. 1, fig. 56).

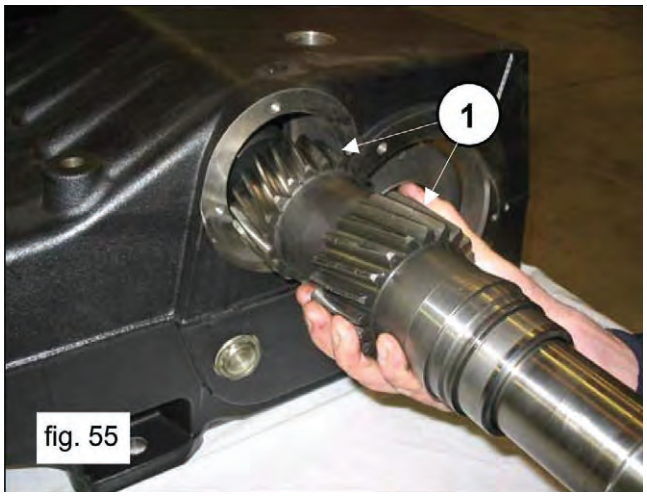


fig. 55

fig. 56

From the side of the casing where the PTO shaft was inserted, proceed to insert the bearing lubrication bushing (pos. 1, fig. 57) and an external bearing ring (pos. 1, fig. 58) using a pad and a mallet or striking hammer.

fig. 57

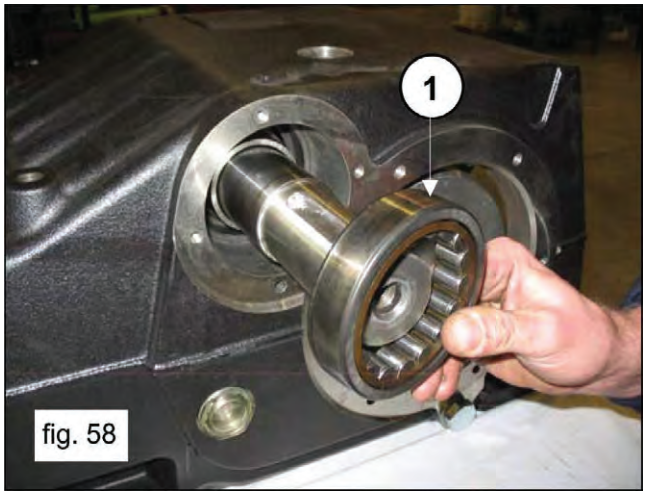


fig. 58

At both sides, insert the internal bearing spacers (pos. 1, fig. 59) and the external bearing spacers (pos. 1, fig. 60).

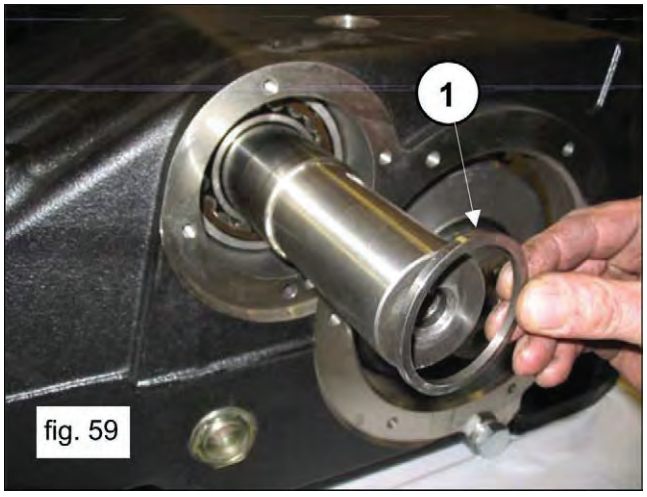


fig. 59

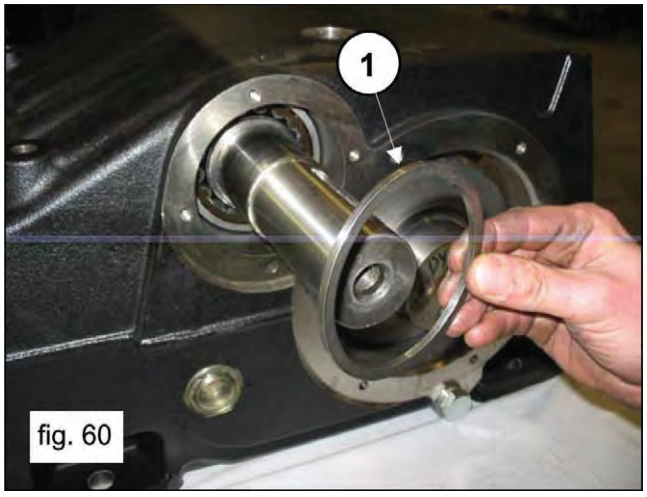


fig. 60

Insert the internal ring (pos. 1, fig. 61) and external ring (pos. 1, fig. 62) of a bearing from one side of the pump only.

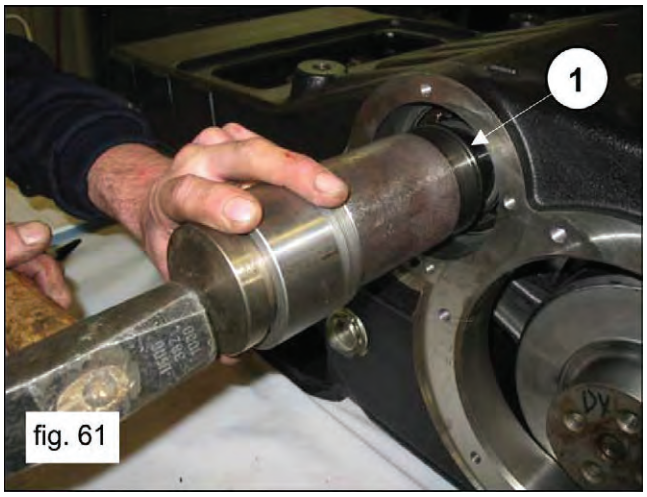


fig. 61

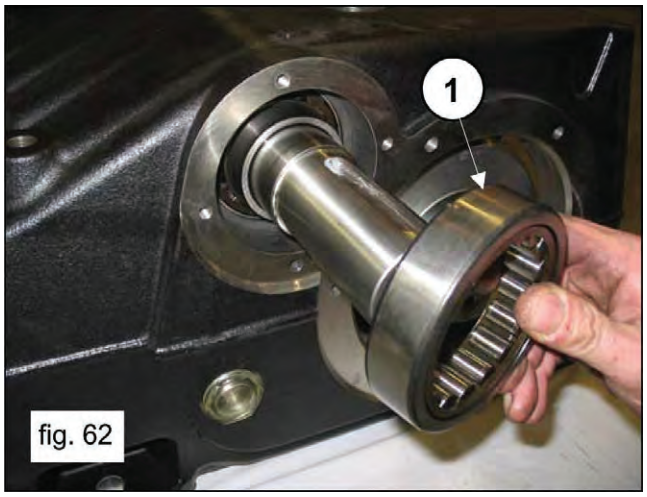


fig. 62

Pre-assemble the left and right PTO covers:
Insert the radial seal ring into the PTO bearing cover using the correct tool (F27539500) (pos. 1, fig. 63). Before proceeding with the assembly of the radial seal ring, verify the condition of the seal lip. If it is necessary to replace it, position the new ring as shown in fig. 64.

**If the PTO shaft shows diametral wear corresponding to the seal lip, then to avoid grinding you can position the ring as a second step as shown in fig. 64.**

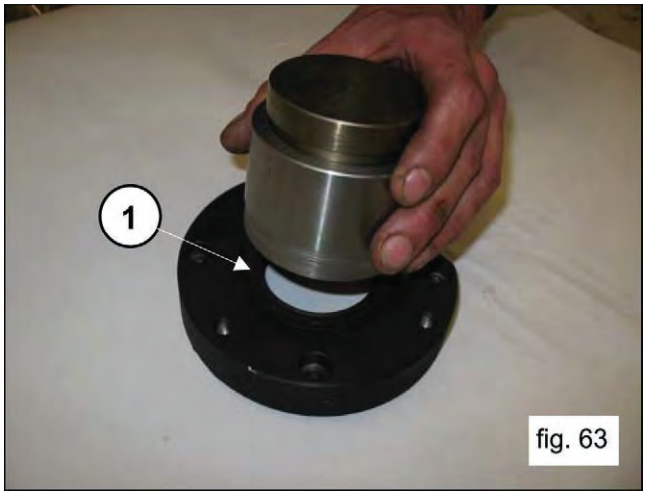


fig. 63

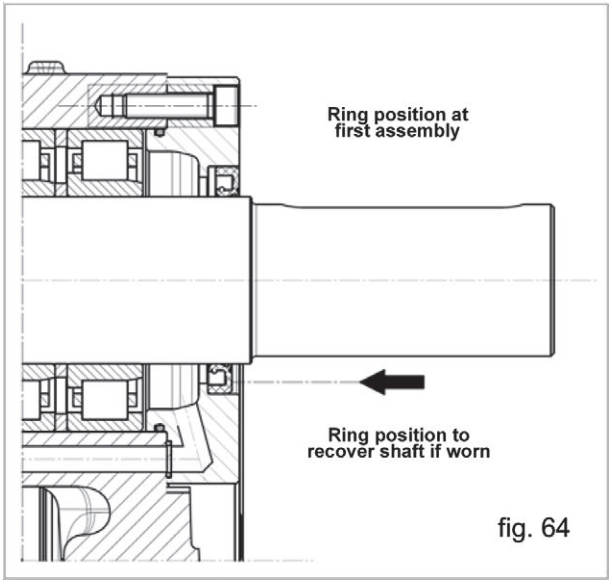


fig. 64

Apply the external O-ring (pos. 1, fig. 65) and the lubrication hole O-ring (pos. 1, fig. 66) to the PTO bearing covers.

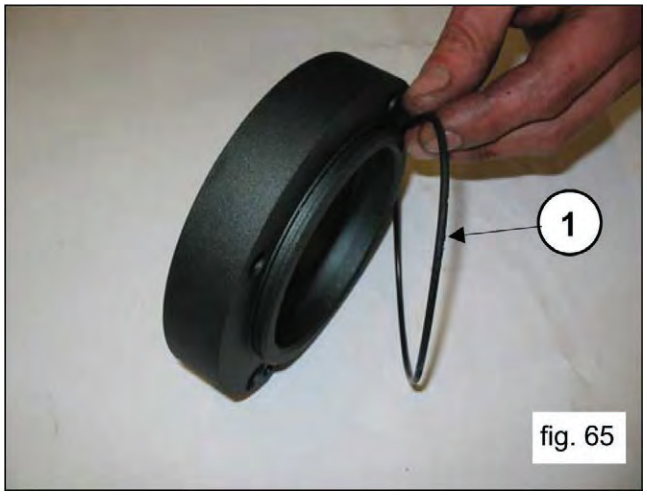


fig. 65

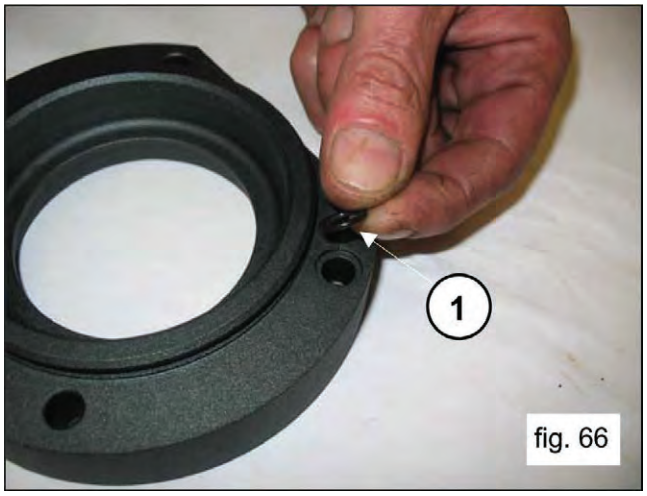
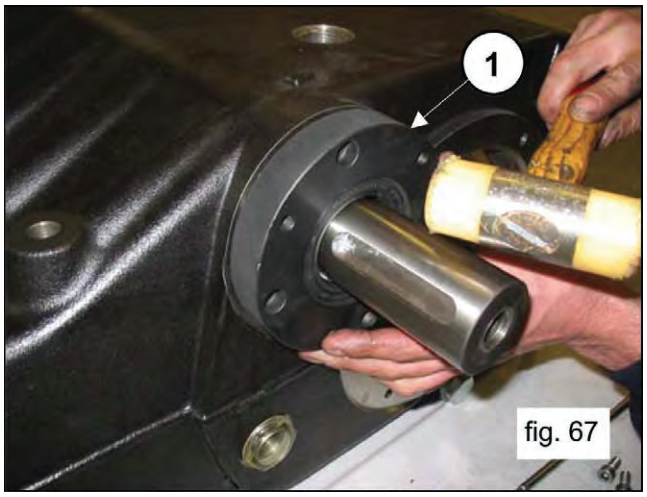
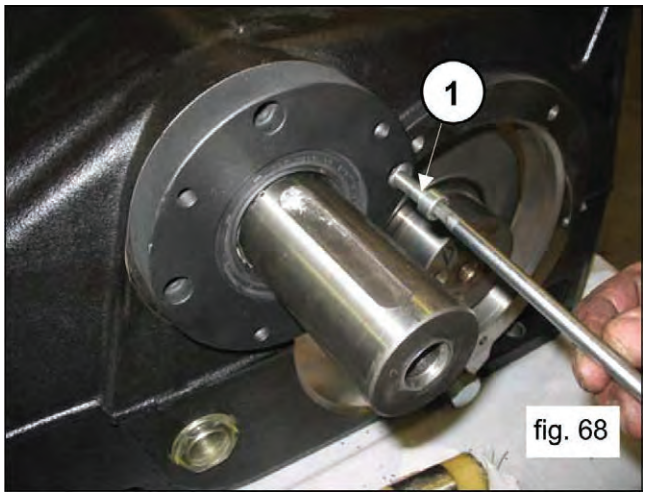


fig. 66

Mount one of the PTO bearing covers (left or right) on the pump casing (pos. 1, fig. 67) and attach it with four M8X30 screws (pos. 1, fig. 68).

**Be careful of the direction of assembly of cover. The lubrication hole in the cover must correspond to the hole in the casing.**



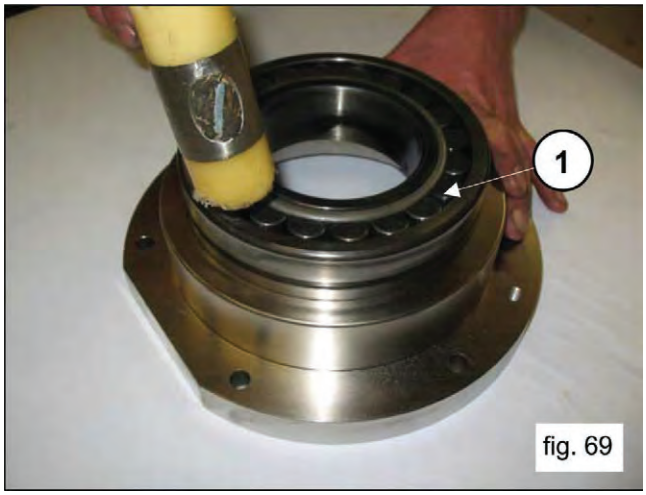




Repeat the operations on the other side:
Insert the internal ring (pos. 1, fig. 61) and external ring (pos. 1, fig. 62) of the second bearing.

Mount the second PTO bearing on the pump casing (pos. 1, fig. 67) and attach it with 4 M8X30 screws (pos. 1, fig. 68).

Tighten the 4 screws with a torque wrench, as shown in section 3, “Screw Tightening Settings”.

Pre-assemble the two bearing covers:
Insert the bearing using a mallet or striking hammer (pos. 1, fig. 69) until 4 to 4.5 mm of the bearing is still protruding, as shown in fig. 70



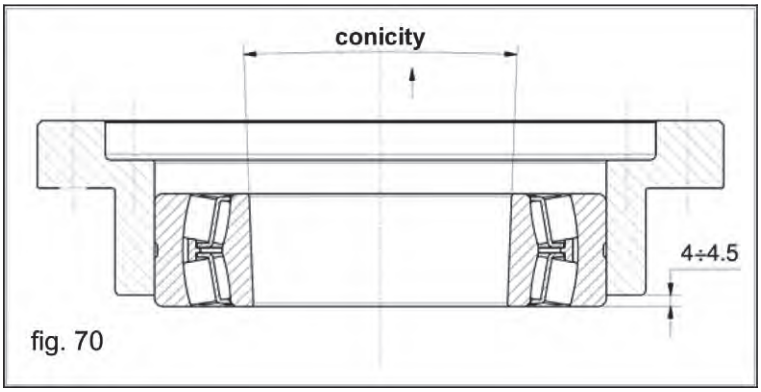



fig. 70

**The bearing in fig. 70 has a conical internal ring. Verify that the conicity is from the out side to the inside to allow the subsequent insertion of the bushing.**

Apply the O-ring to the outside of the bearing support cover (pos. 1, fig. 71).

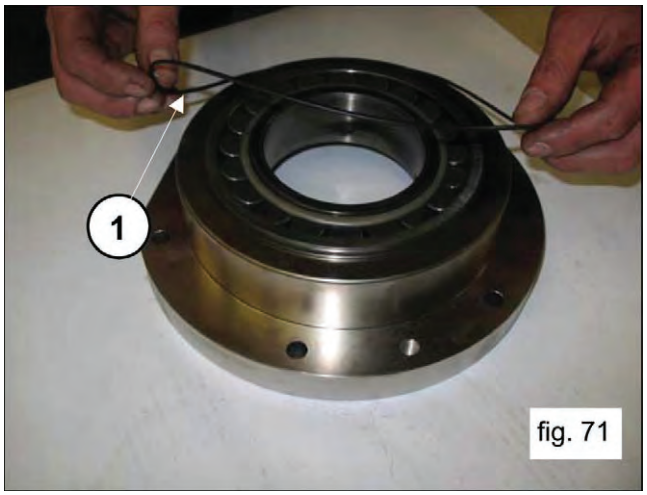



fig. 71

Repeat the operation with the other cover. Lock the three connecting rod assemblies, using the special tool (F27566200) (pos. 1, fig 40).

Apply two M16 threaded pins to the end of the crankshaft and, while keeping it raised (pos. 1, fig. 72), insert the bearing support cover complete with bearing and O-ring )pos. 1, fig. 73) using a mallet or striking hammer. Repeat the operation on the other side.

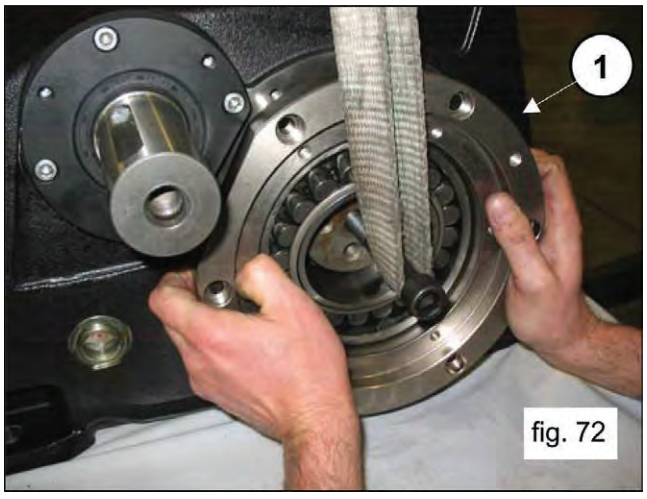



fig. 72

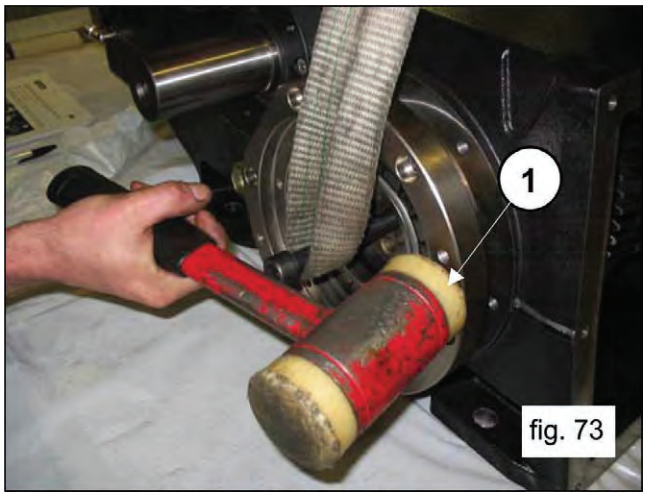



fig. 73

Fasten the bearing support covers with 6 M10X30 screws (pos. 1, fig. 74). Tighten the screws with a torque wrench, as shown in section 3. “Screw Tightening Settings”.

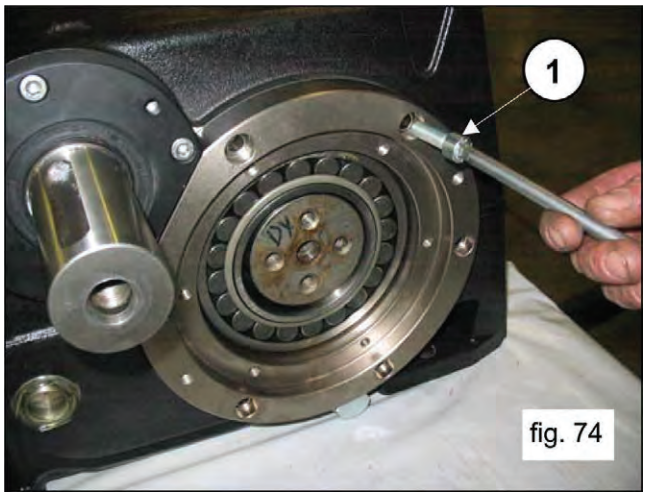


fig. 74

Partly insert the two pressure bushings, keeping the crankshaft lifted up by means of the previously mounted M16 pin (pos. 1, fig. 75).

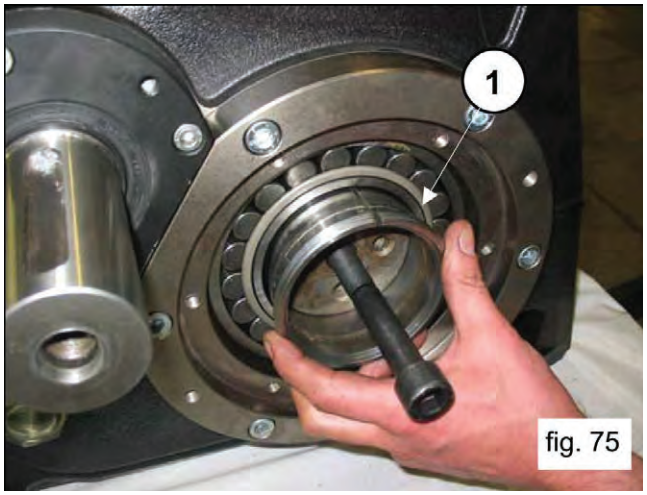


fig. 75

Insert the pressure bushing completely onto the crankshaft (pos. 1, fig. 76 and fig. 77) using a mallet or striking hammer and a pad.

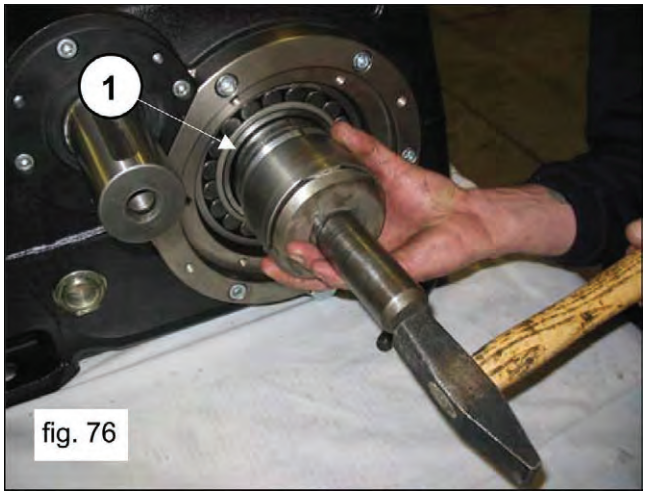


fig. 76

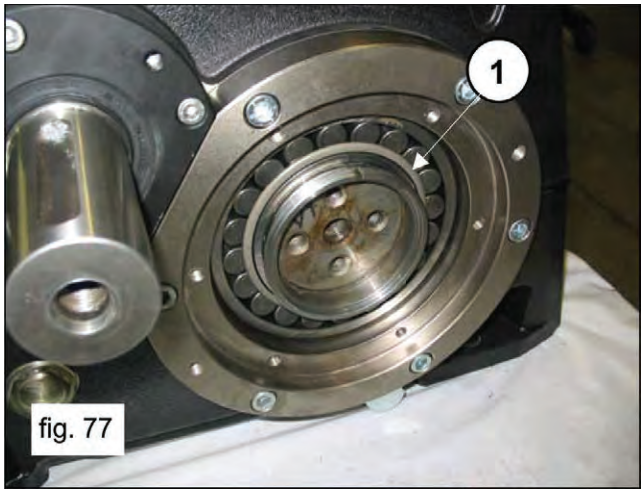


fig. 77

**The pressure bushing must be inserted dry (no lubricant).**

Insert the bushing until the outside (conical) surface perfectly couples with the inside of the bearing. During insertion, make sure that the bearing stays in contact with the crankshaft shoulder.

Repeat the operation on the other side.

Insert the bushing locking flanges into the conical bushings (pos. 1, fig. 78). Apply a sufficiently long (30-40 mm) M16 screw to the M16 hole on the crankshaft and screw it in, until the flange is touching the bushing (pos. 1, fig. 79). **DO NOT TIGHTEN THE SCREW.**

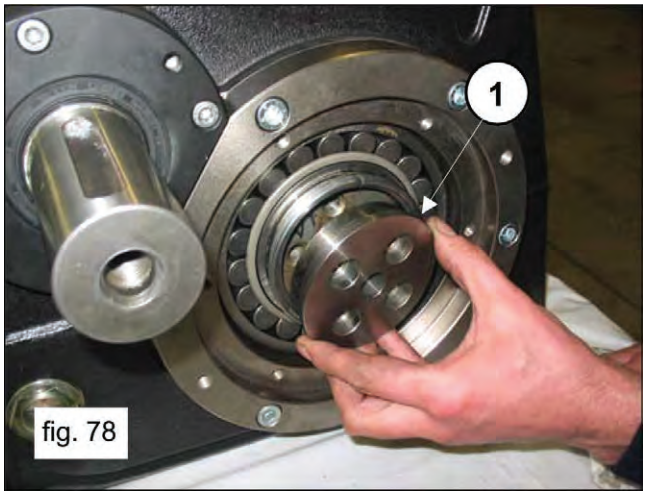


fig. 78

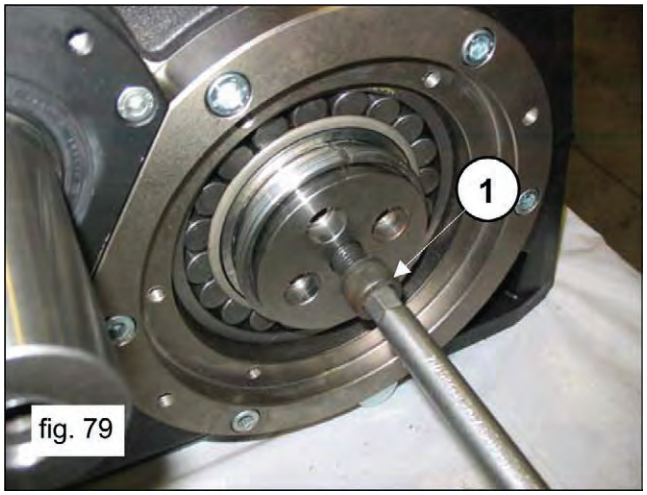


fig. 79

Repeat the operation on the other side.

Remove the tool for locking the connecting rods (F27566200) (pos. 1, fig. 40).

Insert the upper half-bearings between the connecting rods and the crankshaft (pos. 1, fig. 80)

**To correctly assemble the half-bearings, make sure that the lug on the half-bearing is positioned in the slot on the big end half (pos. 1, fig. 81).**

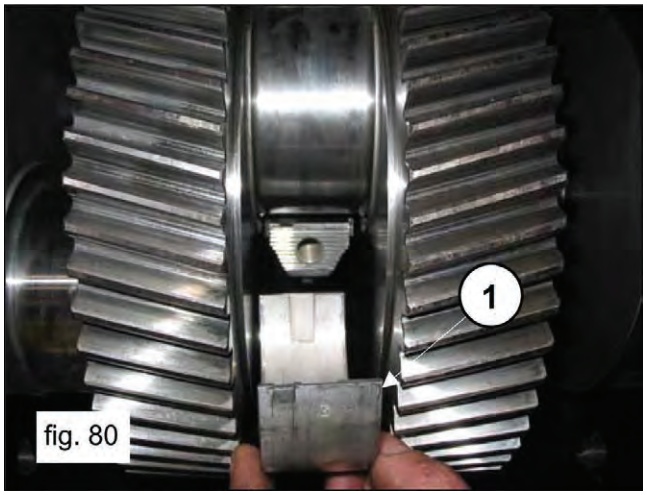


fig. 80

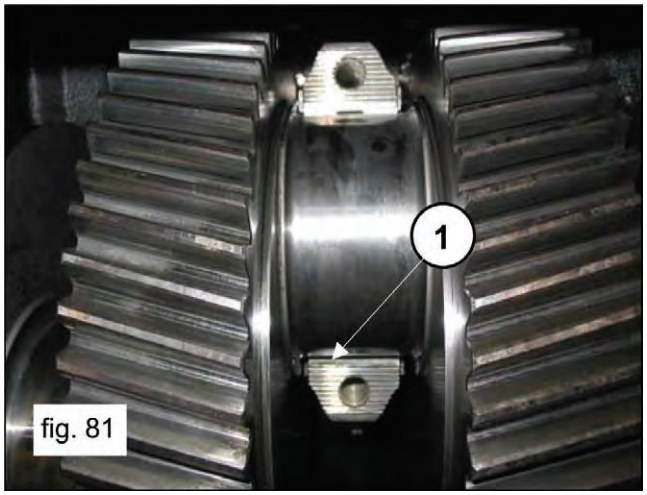


fig. 81

Apply the lower half-bearings to the small ends (pos. 1, fig. 82), making sure that the lugs on the half-bearings are positioned in the slots on the small ends (pos. 1, fig. 82)

Attach the small ends to the big end halves using the M12X1.25X87 screws (pos. 1, fig. 83). Tighten the screws with a torque wrench, as shown in Section 3, “Screw Tightening Settings”, bringing the screws to the tightening torque at the same time.

**When the operation is finished, check that the connecting rods have axial clearance in both directions.**

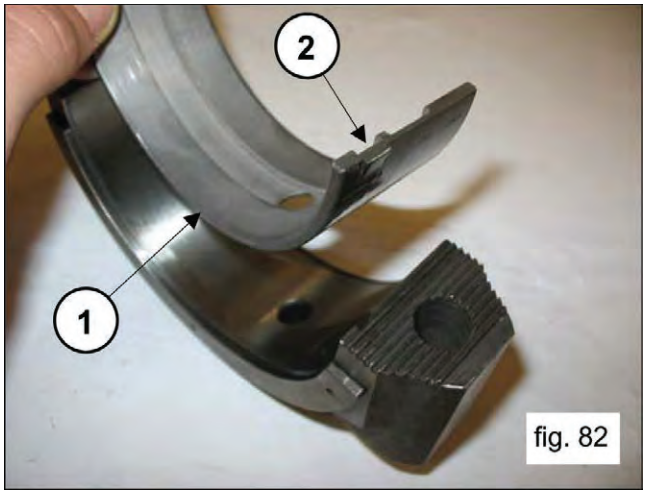


fig. 82

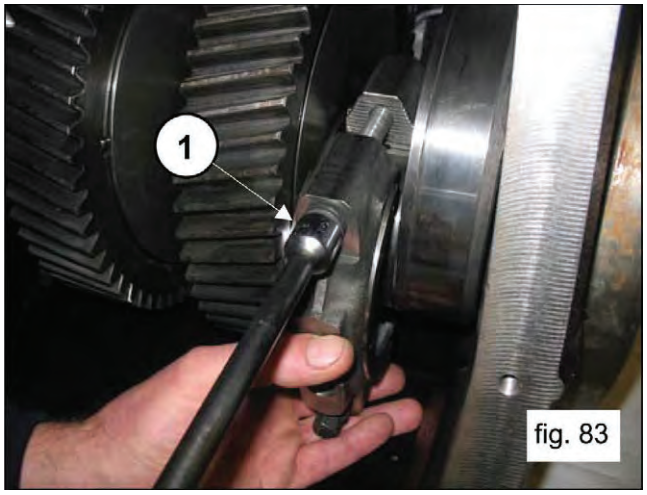


fig. 83

**When the operation is finished, check that the connecting rods have axial clearance in both directions.**