LK Series

LK36 – LK40 – LK45

LK50 – LK55 – LK60

Repair Manual

INDEX

1. INTRODUCTION

This manual contains the instructions for the repair of the LK family of pumps. It must be carefully read and understood before any operation is carried out on the pump.
The proper functioning and lifetime of the pump depends on correct use and proper maintenance.
Interpump Group declines all responsibility for damage caused due to negligence and/or failure to observe the instructions described in this manual.

2. REPAIR INSTRUCTONS

2.1 Repair of the mechanical part

Repairs on the mechanical part must be carried out after removing the oil from the casing.

To remove the oil, remove the oil filling plug pos.①, fig.1 and then the drain plug pos.②, fig.1 present on both sides of the casing.

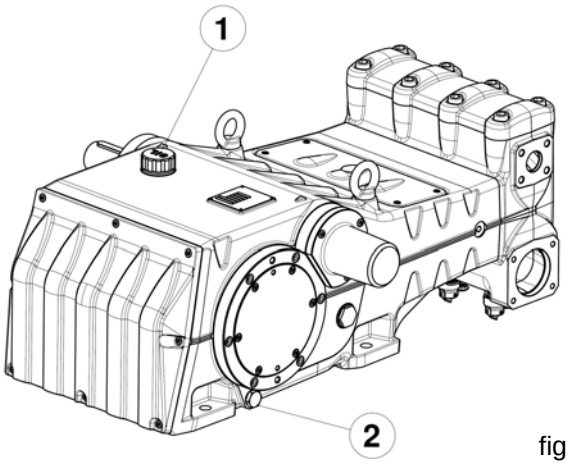

fig. 1

The spent oil must be placed in a suitable container and disposed of properly at an authorised centre.
Do not under any circumstances discard it in the environment.

2.1.1 Dismantling the mechanical part
The correct sequence is as follows:

Completely empty the pump 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+4 attachment screws, as shown in point 2.2.3 (fig.139 and fig.140).
Slip off the O-rings and replace them if necessary.

Remove the three pistons 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).

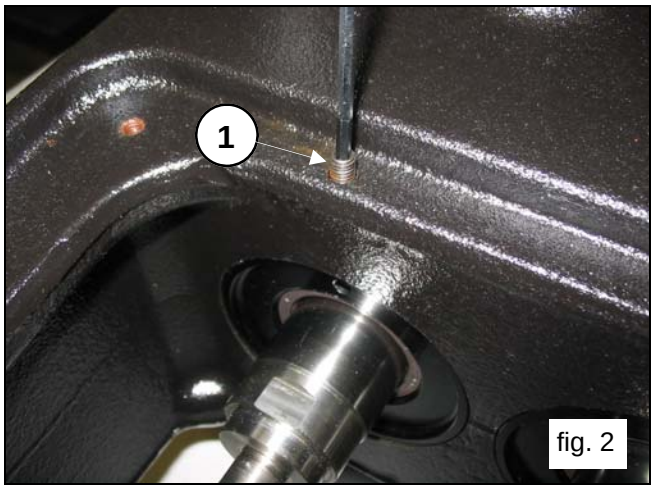

fig. 2

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).

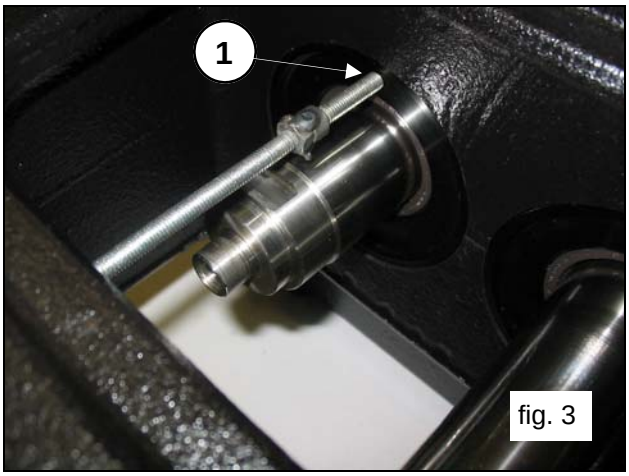

fig. 3

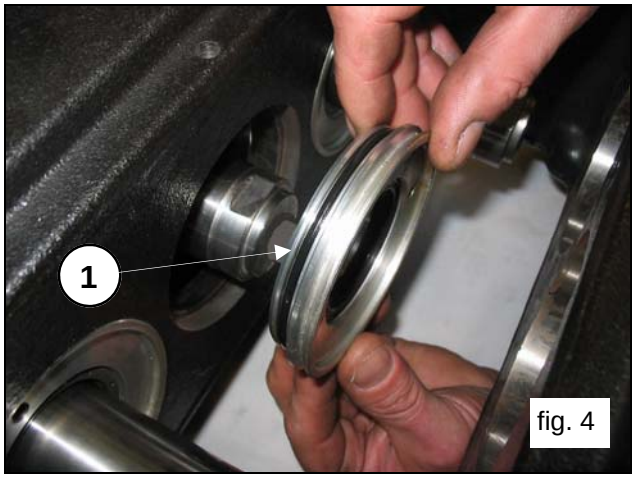

fig. 4

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

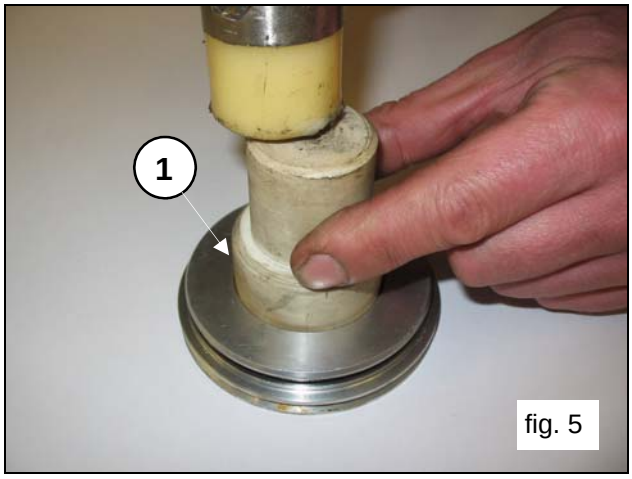

fig. 5

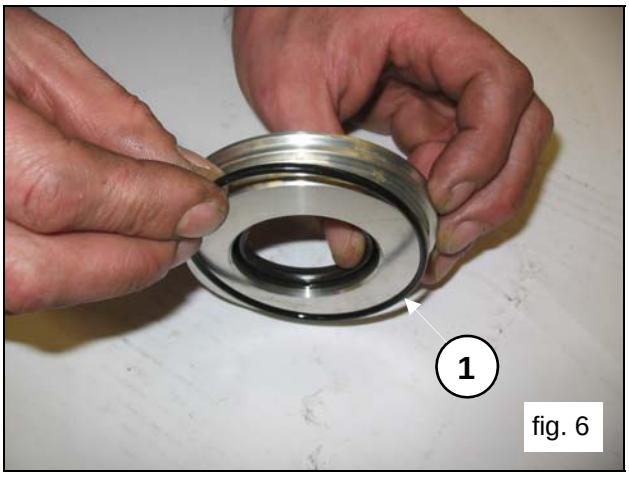

fig. 6

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

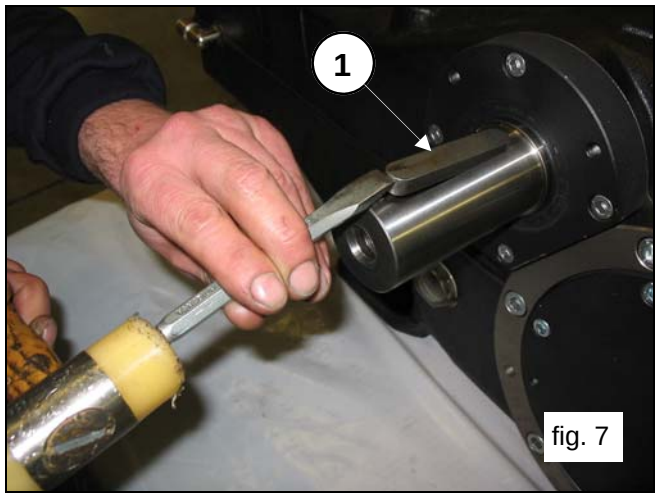

fig. 7

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

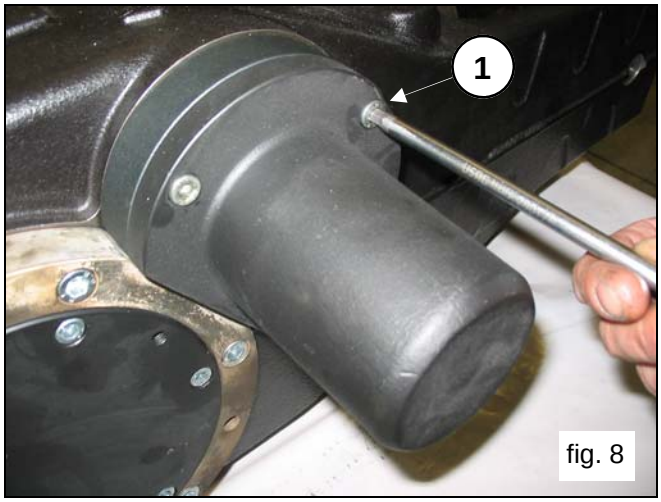

fig. 8

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

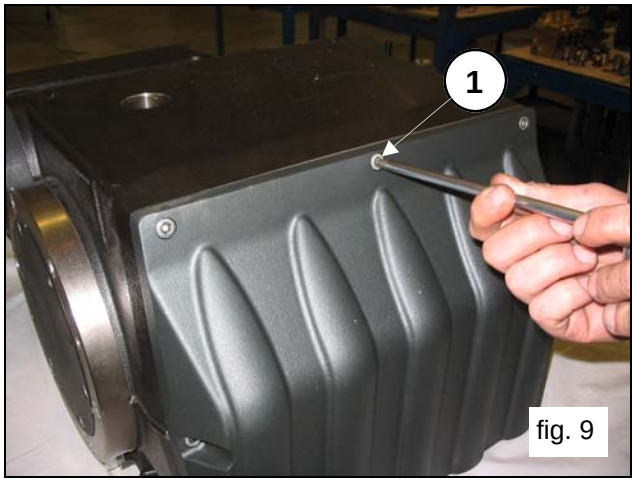

fig. 9

Now remove the two bearing covers by unscrewing the screws (pos.①, fig.10).

To help with their removal, use 2 x M8 grub screws or screws (pos.①, fig.11) as extractors.
Slip off the O-ring and replace it if necessary.

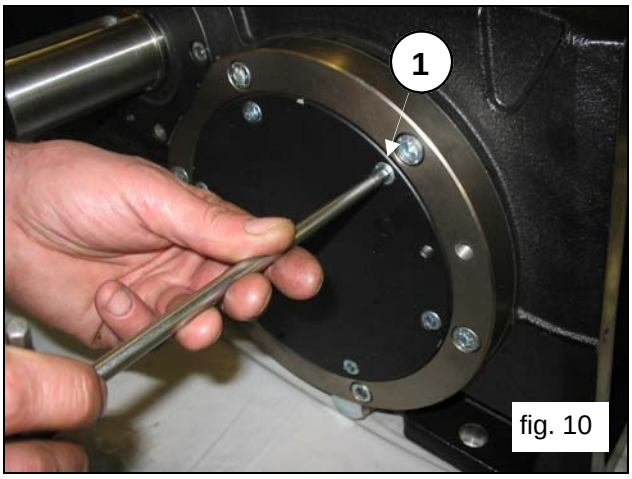

fig. 10

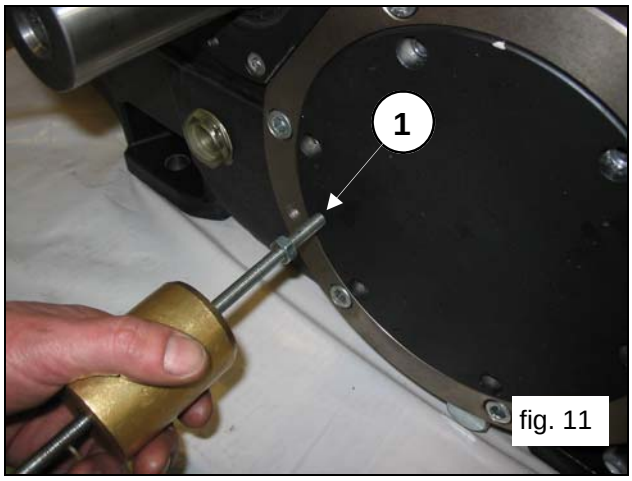

fig. 11

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

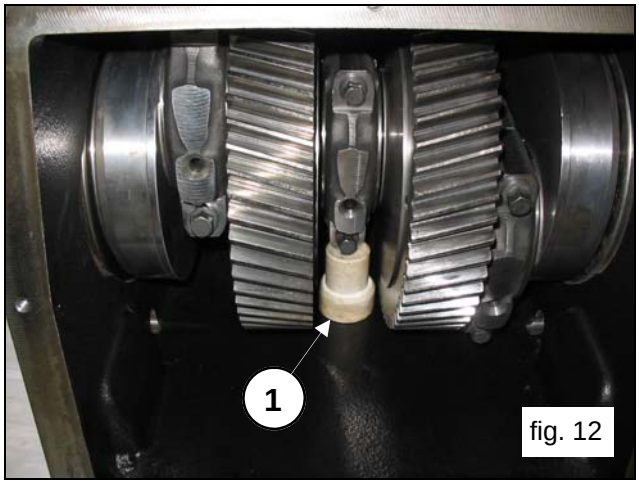

fig. 12

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

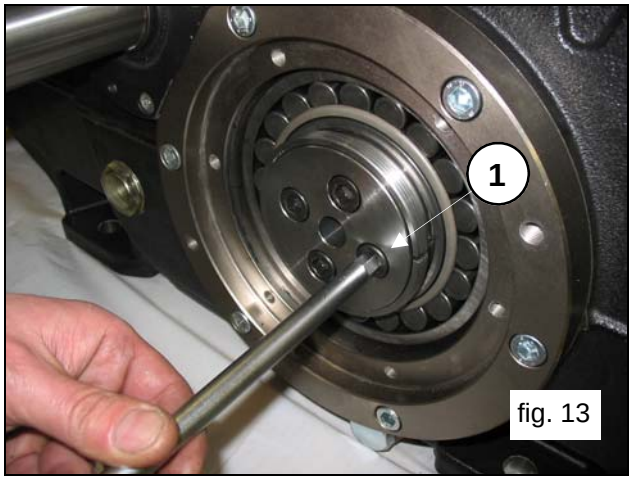

fig. 13

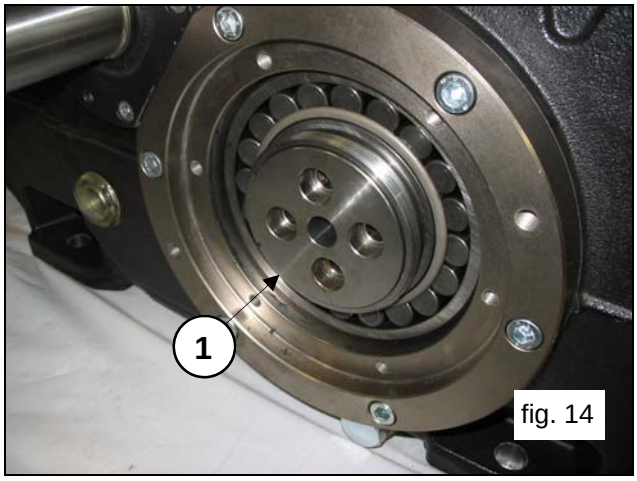

fig. 14

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

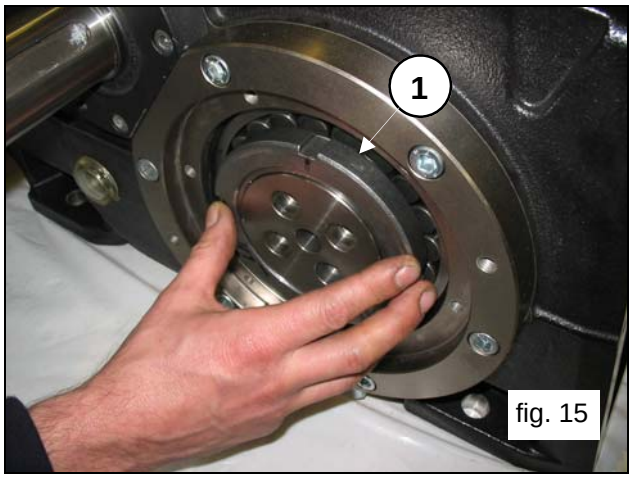

fig. 15

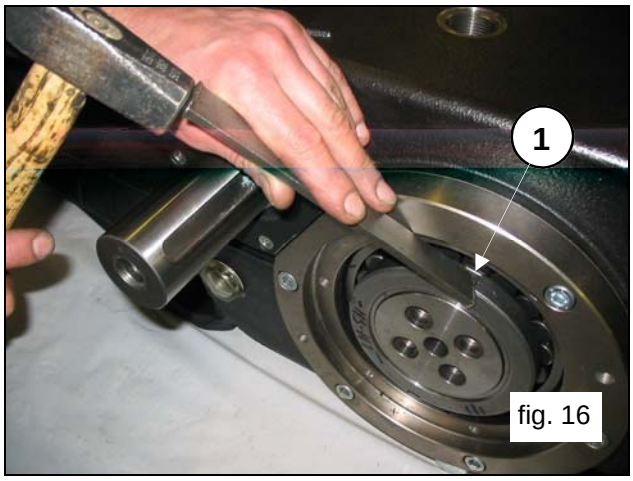

fig. 16

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

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

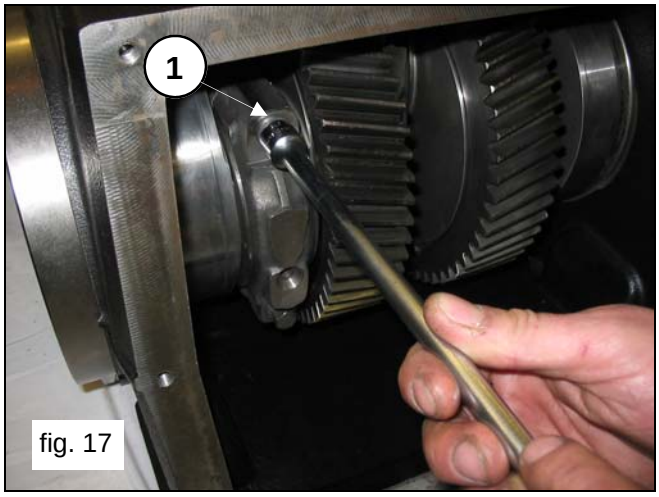

fig. 17

Dismantle the small ends of the connecting rods with the half-bearings. During this 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).

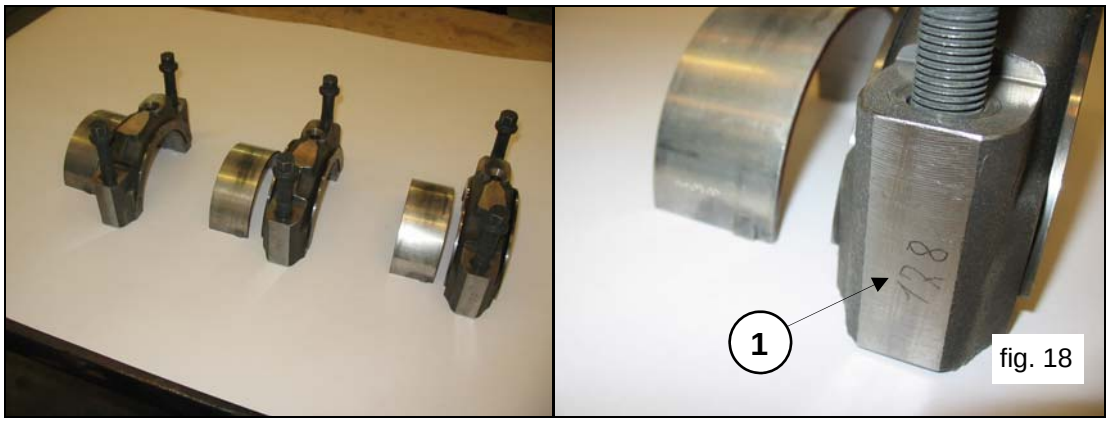

fig. 18

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 big end halves (pos.①, fig.19).

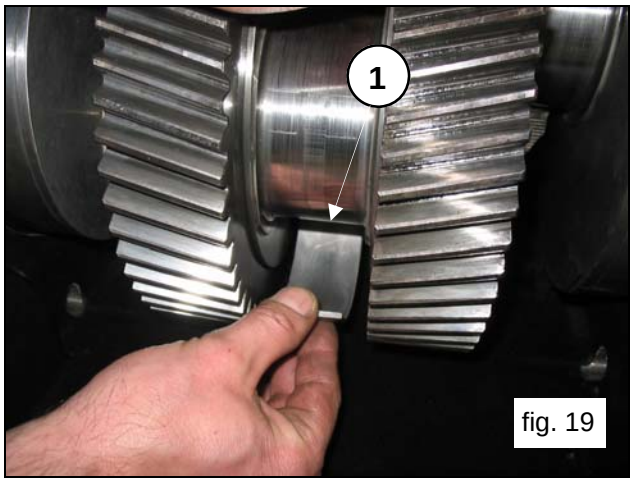

fig. 19

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

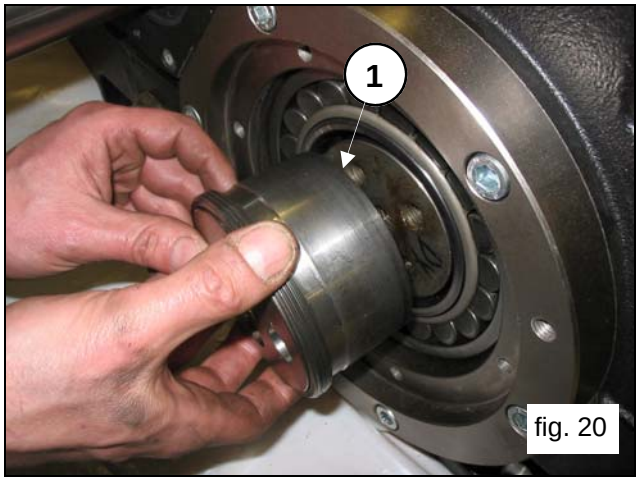

fig. 20

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

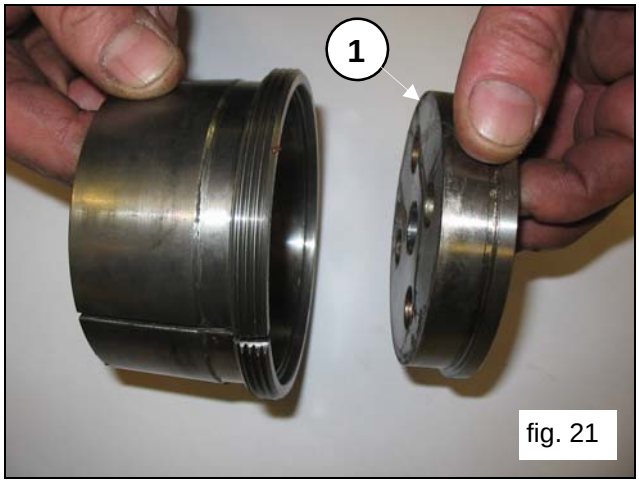

fig. 21

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

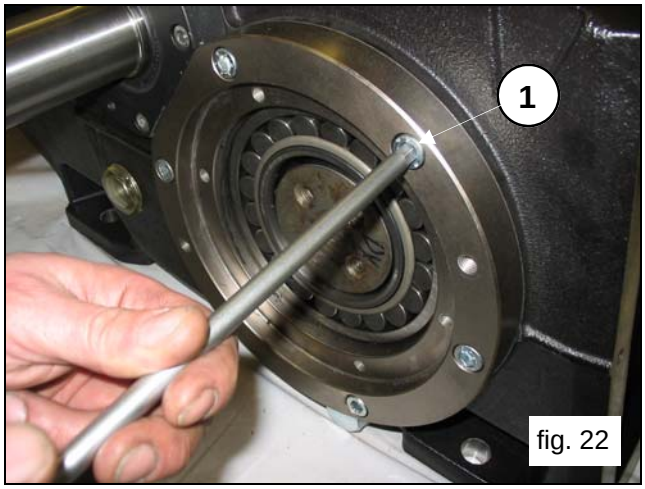

fig. 22

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 x M10 grub screws or screws (pos.②, fig.23) as extractors.
Repeat the operation on the other side.

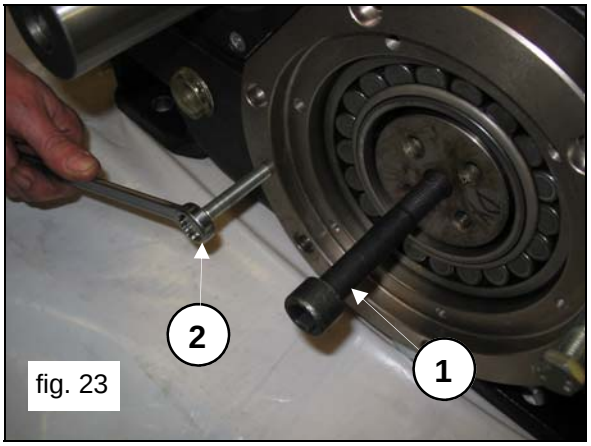

fig. 23

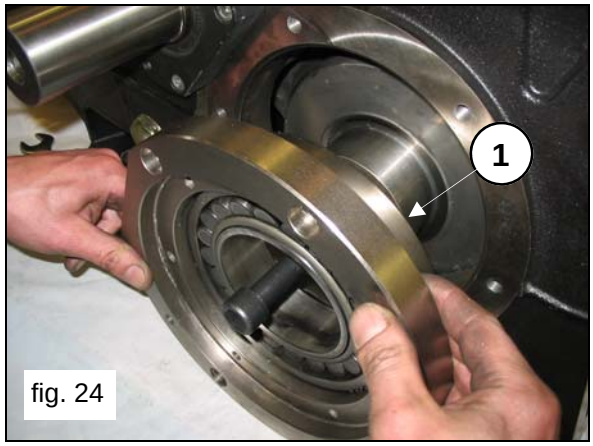

fig. 24

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

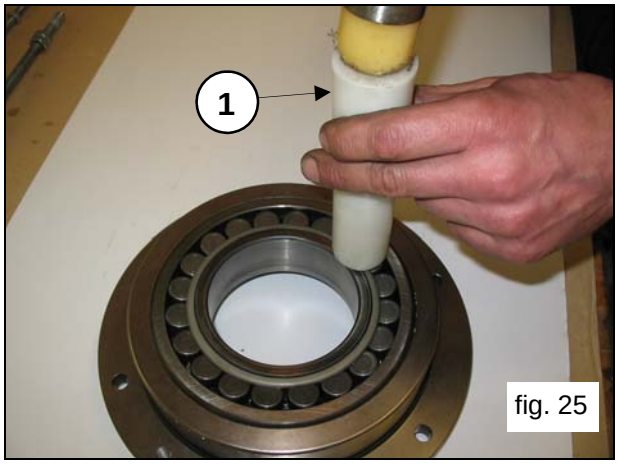

fig. 25

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 x M8 grub screws or screws (pos.①, fig.27) as extractors.

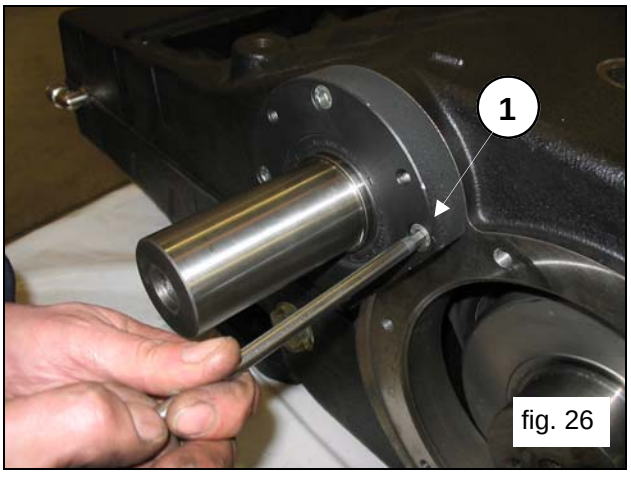

fig. 26

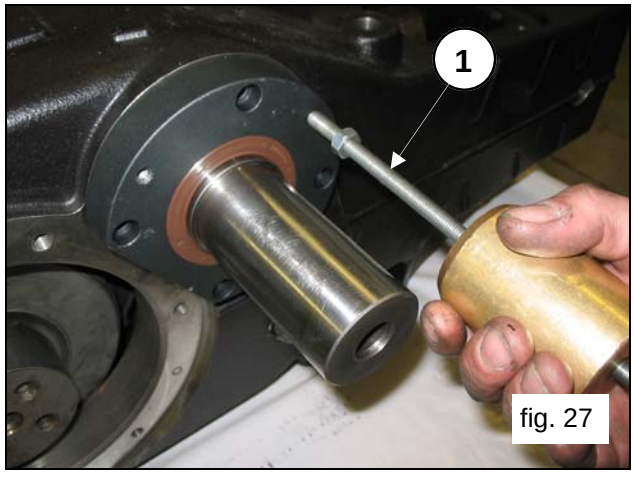

fig. 27

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).

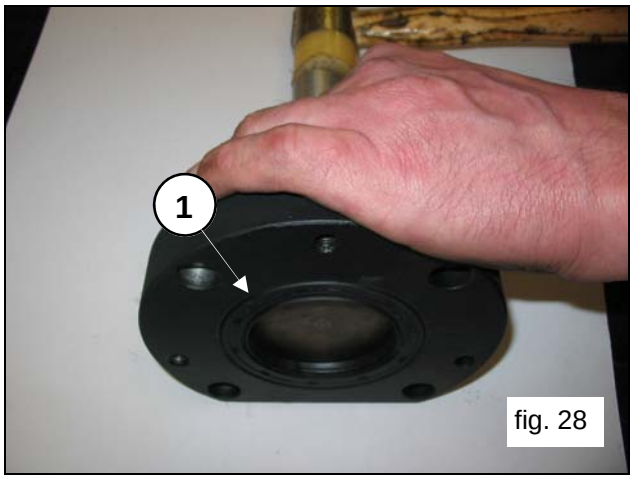

fig. 28

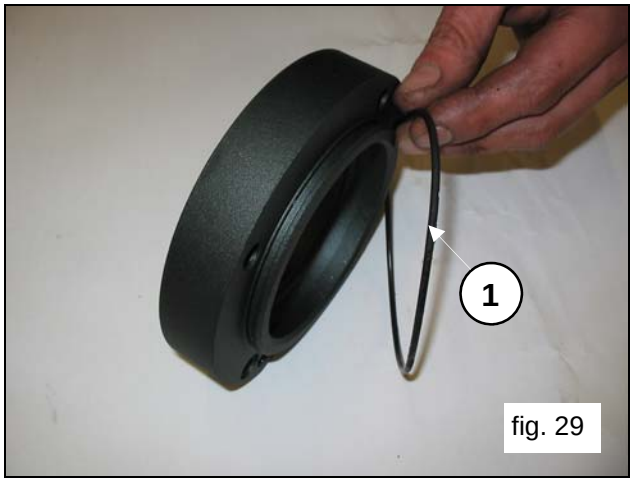

fig. 29

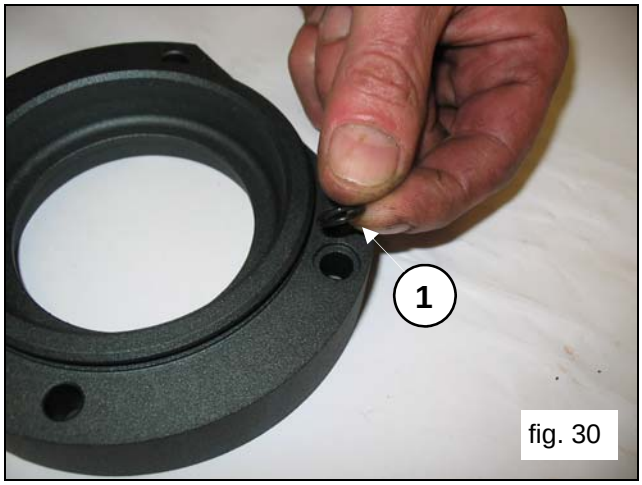

fig. 30

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).

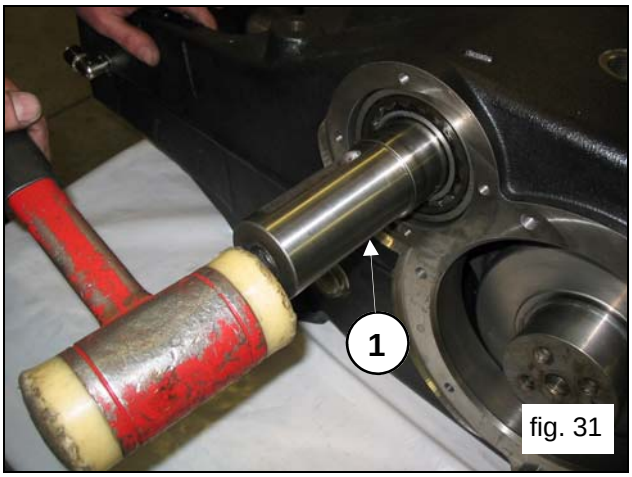

fig. 31

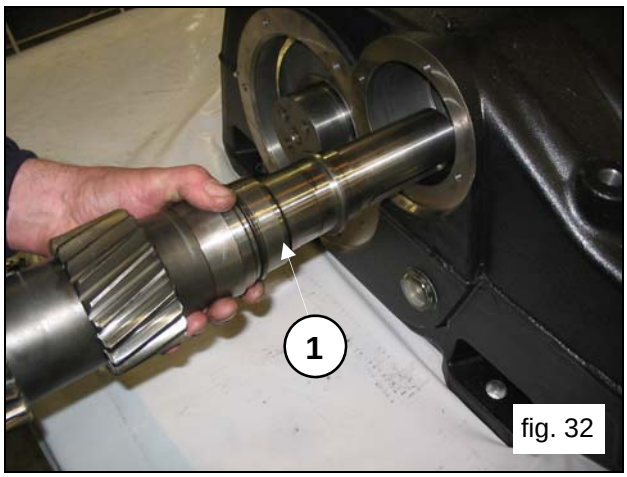

fig. 32

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).

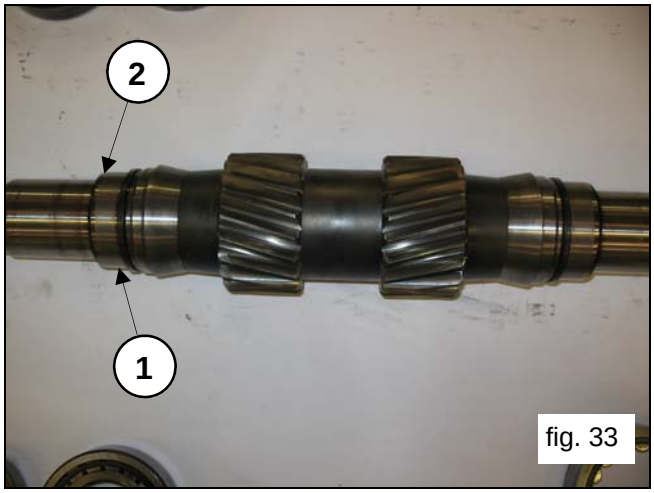

fig. 33

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 bearing spacer (pos.①, fig.36) and the bearing lubrication bush (pos.①, fig.37).

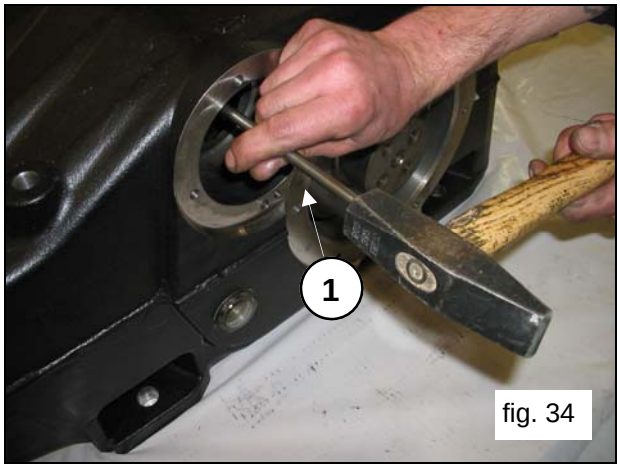

fig. 34

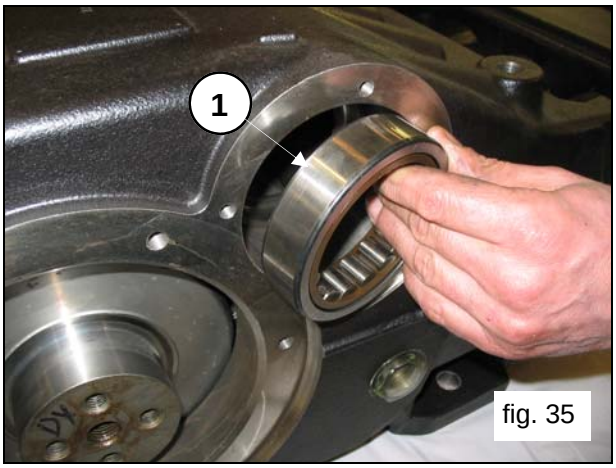

fig. 35

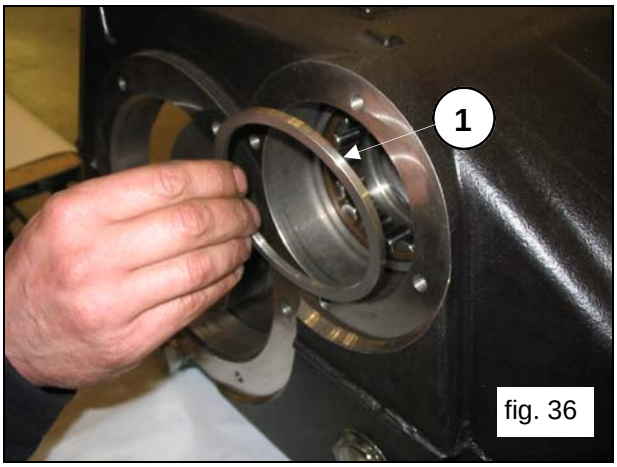

fig. 36

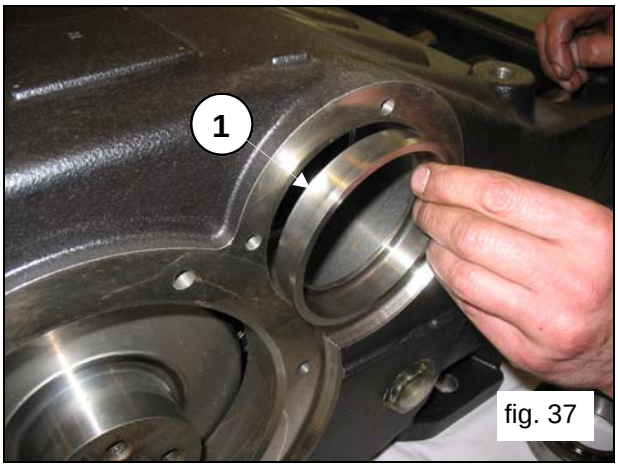

fig. 37

Advance the big end halves in the direction of the hydraulic part and lock them in place using the special device (order code 27566200) (pos.①, fig.38).

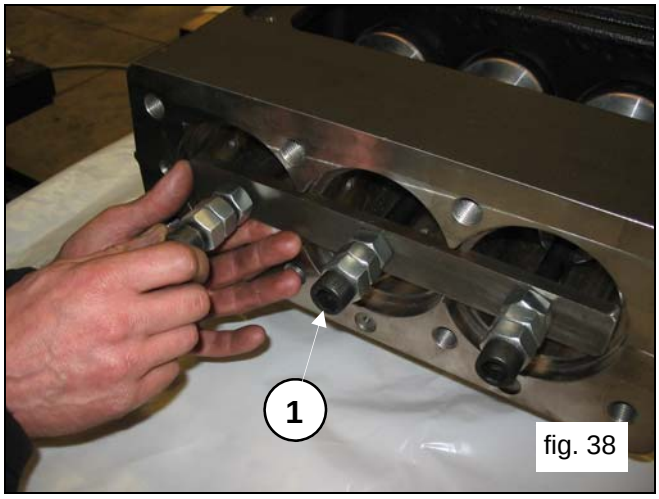

fig. 38

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

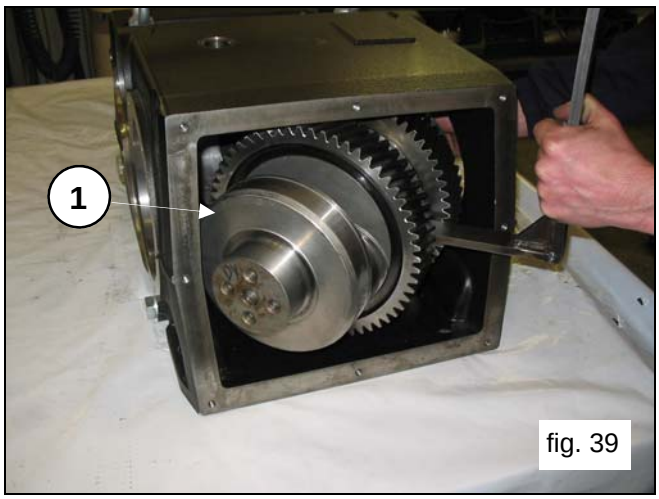

fig. 39

Proceed to unscrew the screws of the device (order code 27566200) 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).

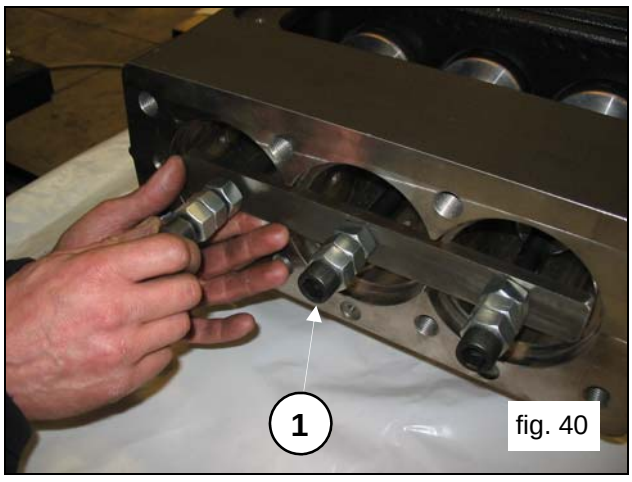

fig. 40

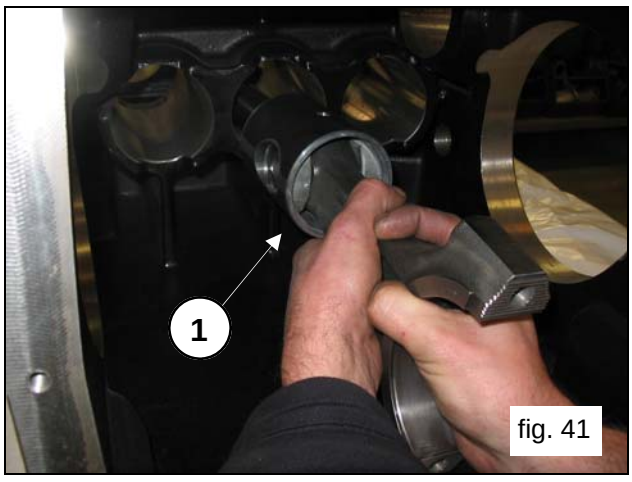

fig. 41

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

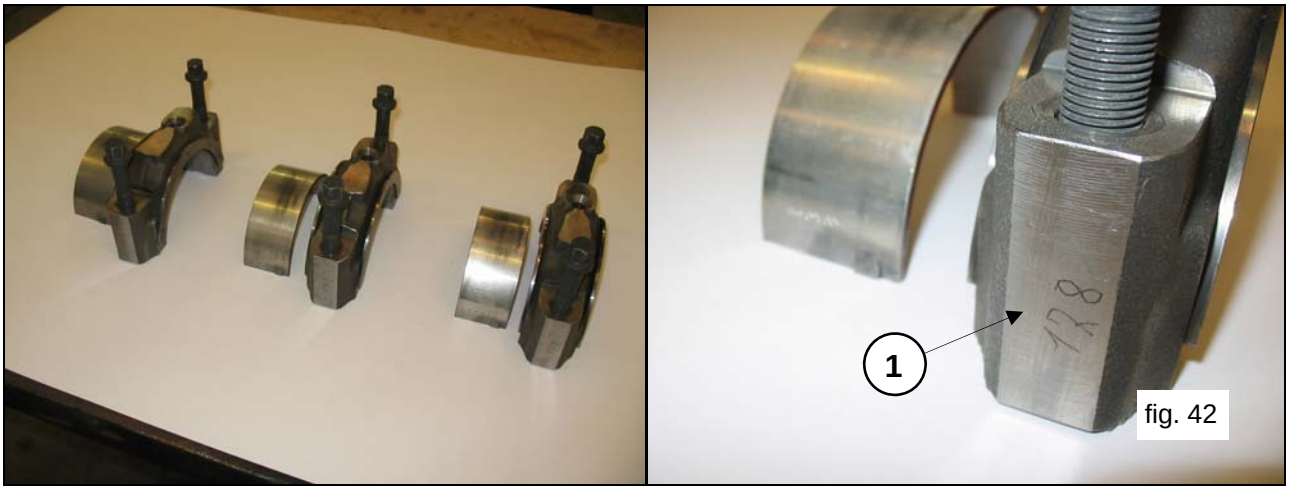

fig. 42

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

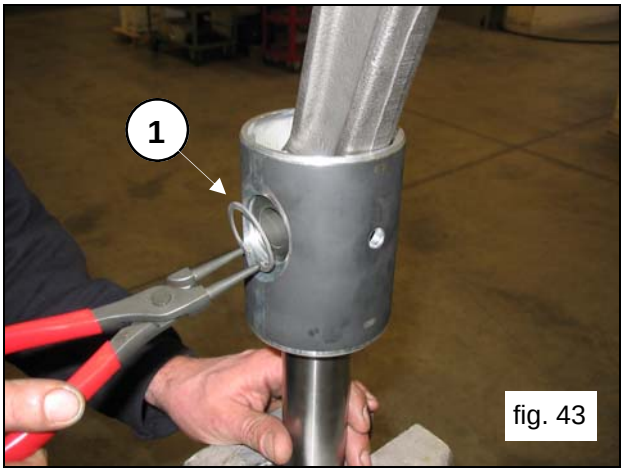

fig. 43

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

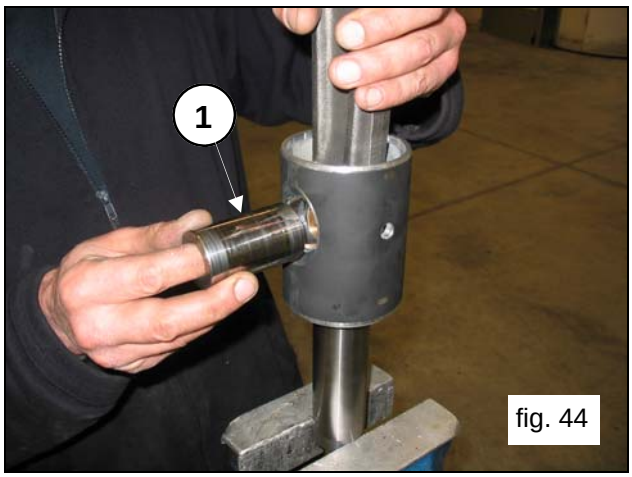

fig. 44

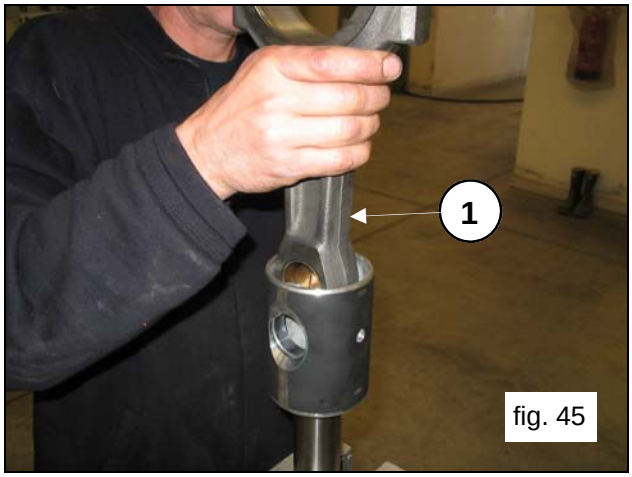

fig. 45

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).

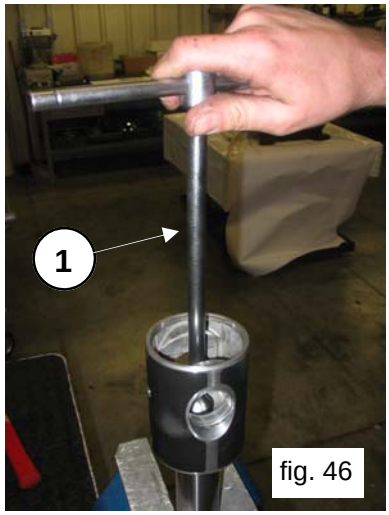

fig. 46

Complete the dissassembly of the mechanical part by removing the oil level lights and the eyebolts.

2.1.2 Assembling the mechanical part

Proceed with the assembly, following the reverse of the procedure shown in 2.1.1.
The correct sequence is as follows:
Attach the two oil level lights and the two oil drain plugs. (pos.① and ②, fig.47).

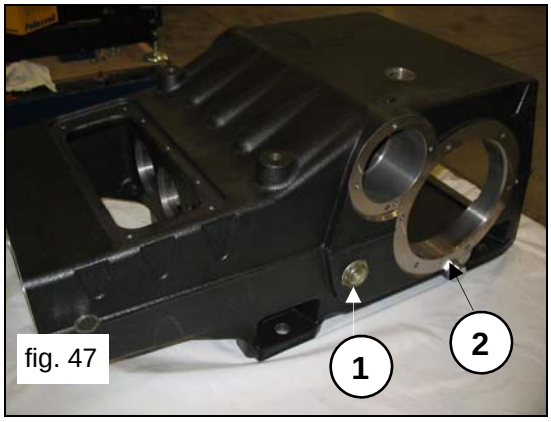

fig. 47

Connect the stem to the piston head.
Insert the Ø5 roll pin in the hole on the piston head (pos.①, fig.48) and connect the stem to the piston head using a M10x35 screw (pos.①, fig.49).

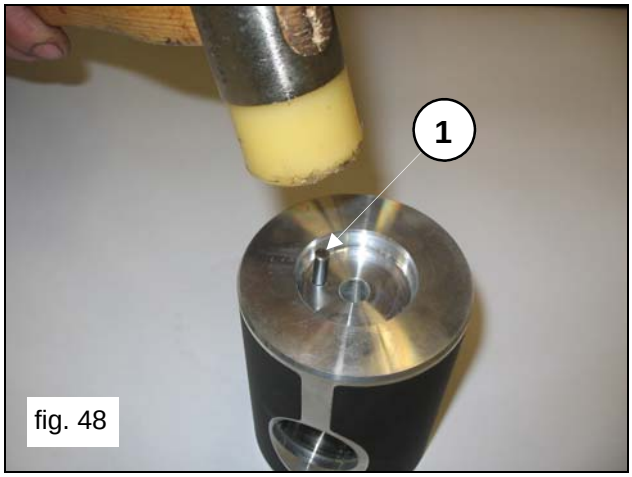

fig. 48

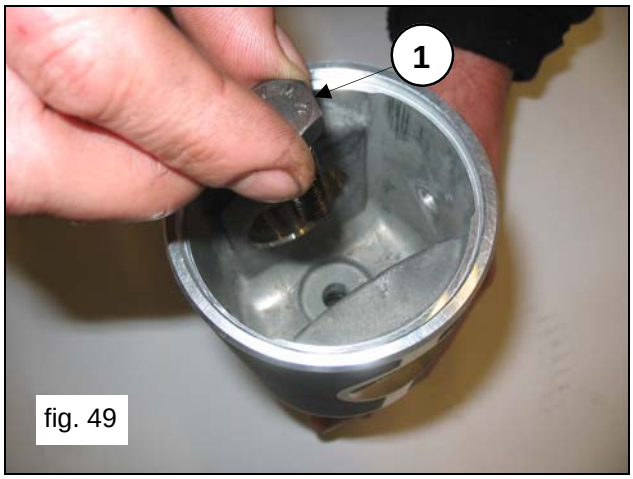

fig. 49

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".

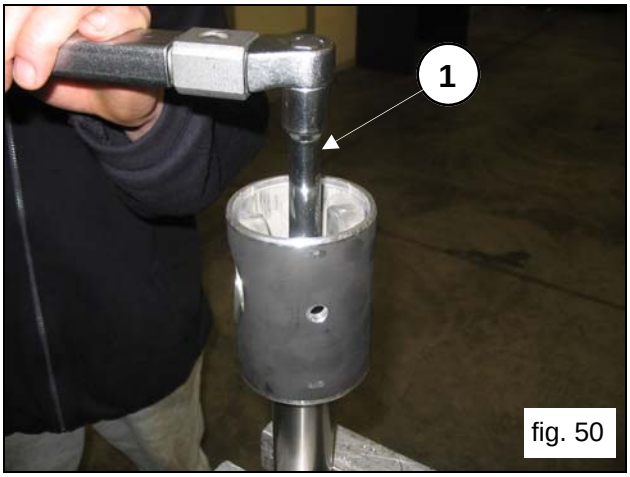

fig. 50

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 (order code 27566200) (pos.①, fig.40).
Insert the crankshaft through the rear opening of the casing and lay it on the bottom.

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

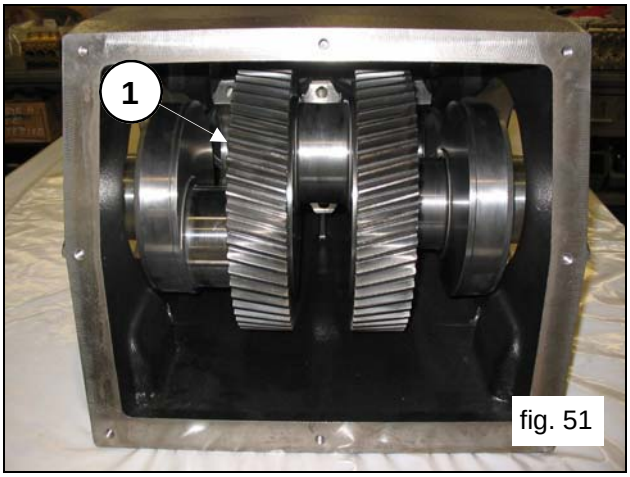

fig. 51

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).

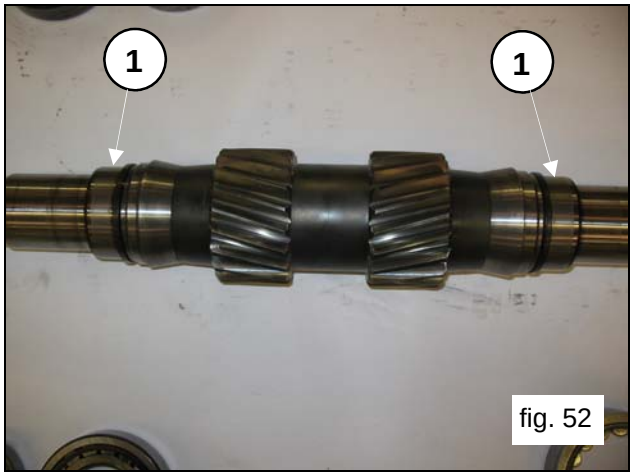

fig. 52

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 bush (pos.①, fig.53) and an external bearing ring (pos.①, fig.54) using a pad and a mallet or striking hammer.

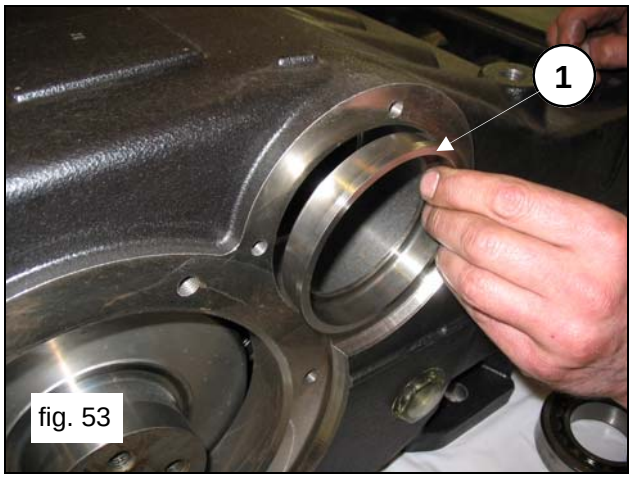

fig. 53

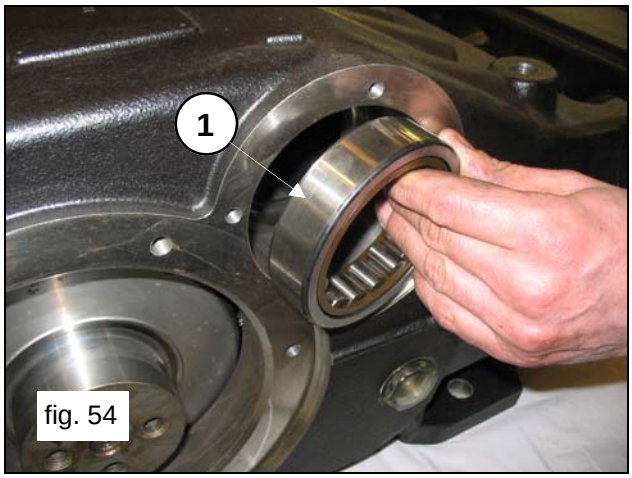

fig. 54

Remove the device for locking the connecting rods (order code 27566200) (pos.①, fig.40) and roll back the connecting rods until they touch 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 bush 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).

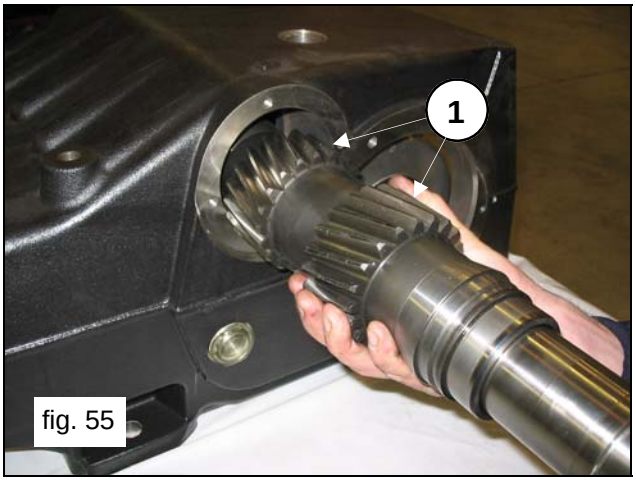

fig. 55

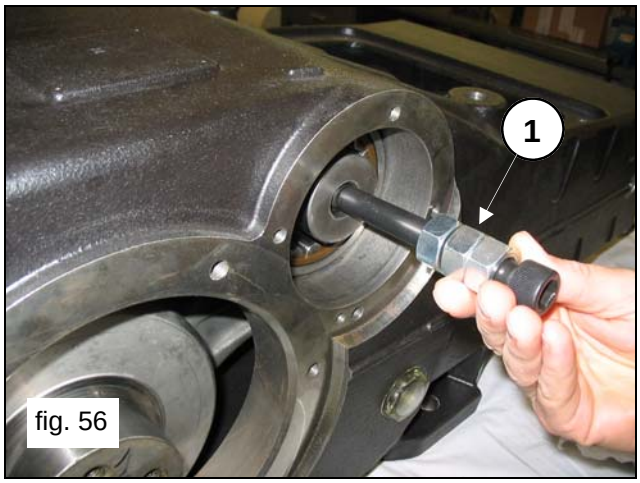

fig. 56

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

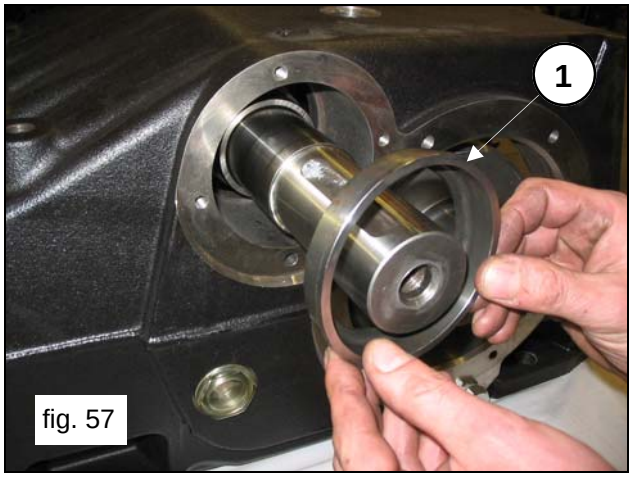

fig. 57

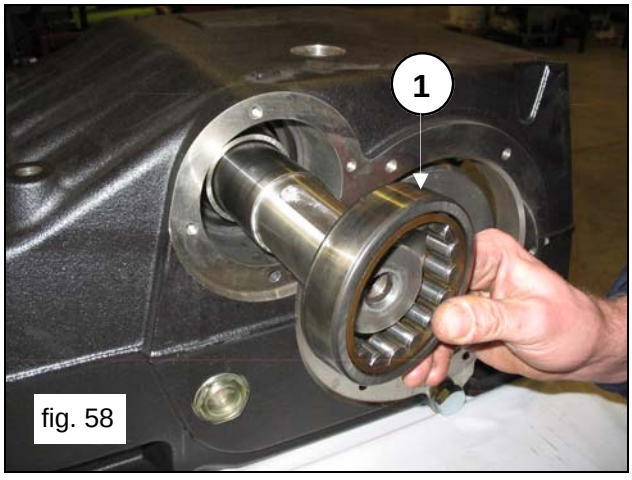

fig. 58

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

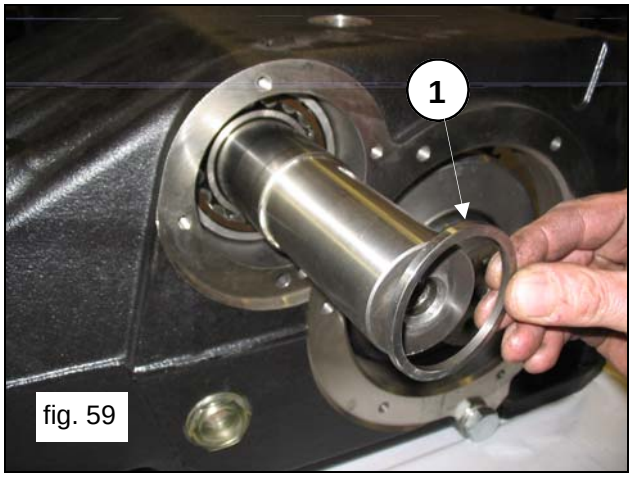

fig. 59

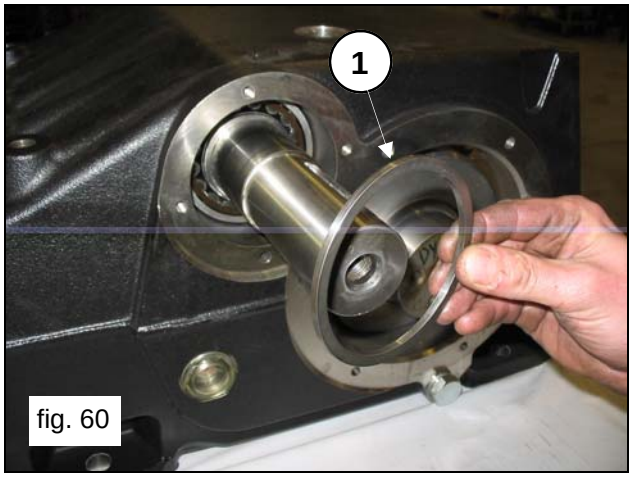

fig. 60

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.

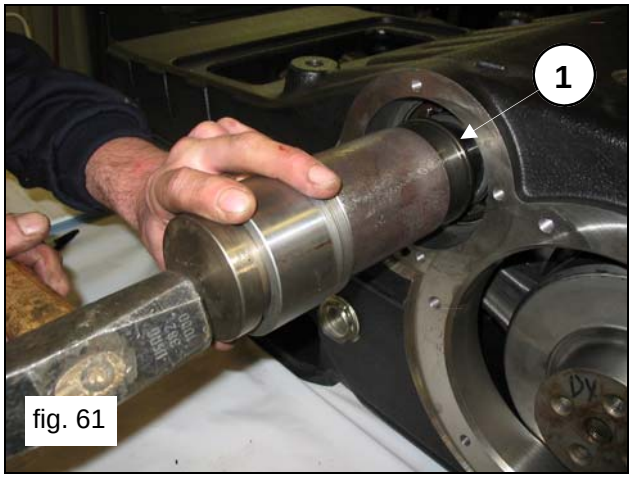

fig. 61

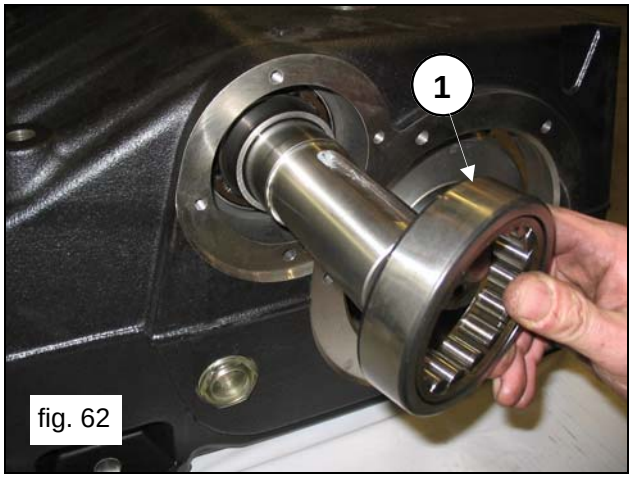

fig. 62

Pre-assemble the left and right PTO bearing covers:

Insert the radial seal ring into the PTO bearing cover using the device (order code 27539500) (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.

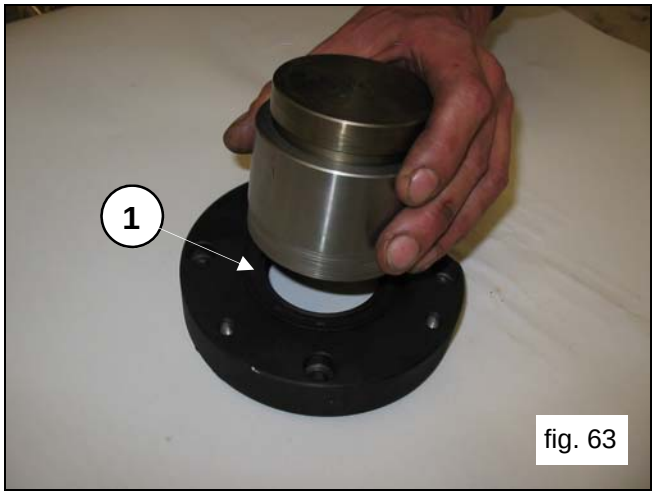

fig. 63

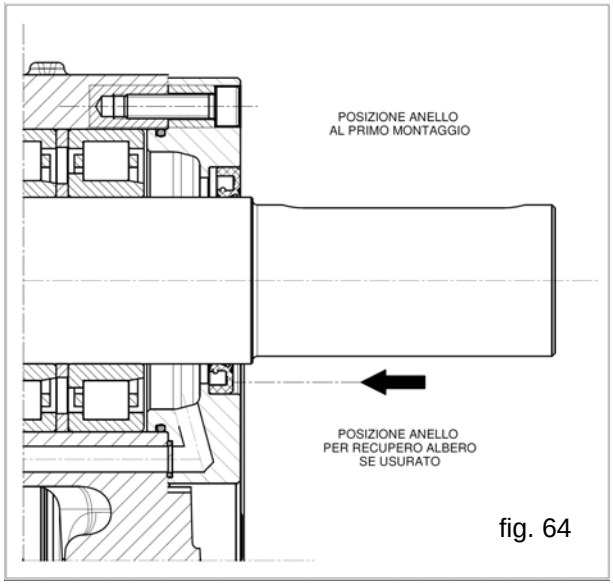

fig. 64

POSIZIONE ANELLO AL PRIMO MONTAGGIO = RING POSITION AT FIRST ASSEMBLY
POSIZIONE ANELLO PER RECUPERO ALBERO SE USURATO = RING POSITION TO RECOVER SHAFT IF WORN

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

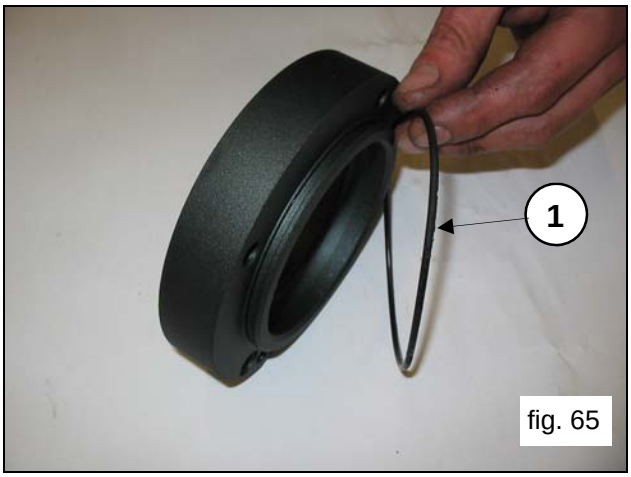

fig. 65

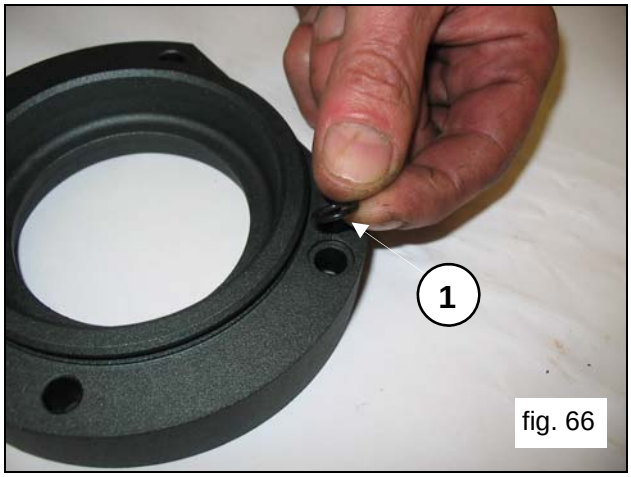

fig. 66

Mount one of the PTO bearing covers (left or right) on the pump casing (pos.①, fig.67) and attach it with 4 x M8x30 screws (pos.①, fig.68).

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

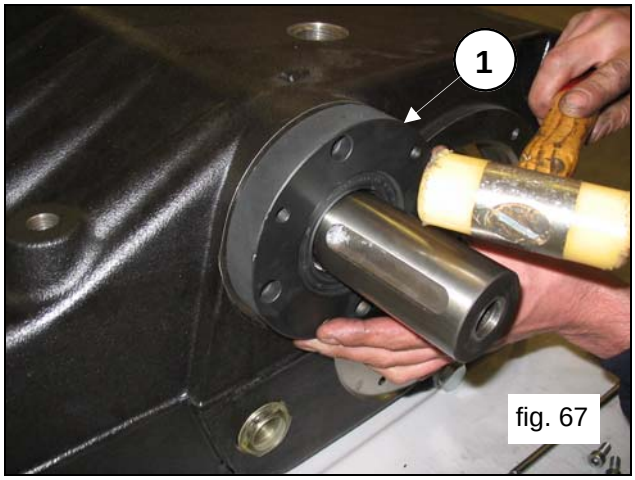

fig. 67

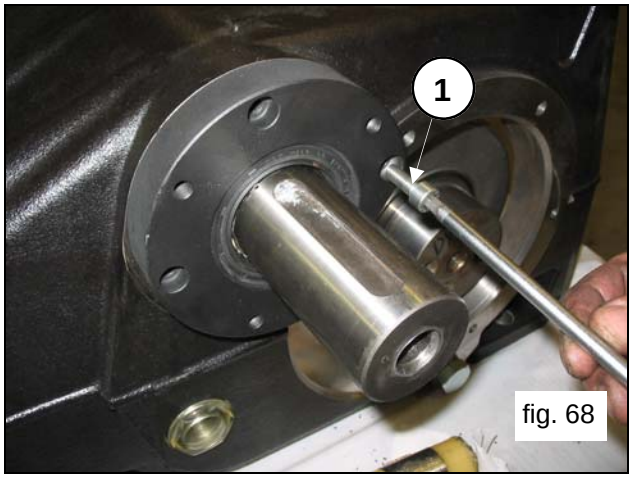

fig. 68

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 cover on the pump casing (pos.①, fig.67) and attach it with 4 x M8x30 screws (pos.①, fig.68).

Set the 4+4 screws with a torque wrench, as shown in section 3, "Screw tightening settings".

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

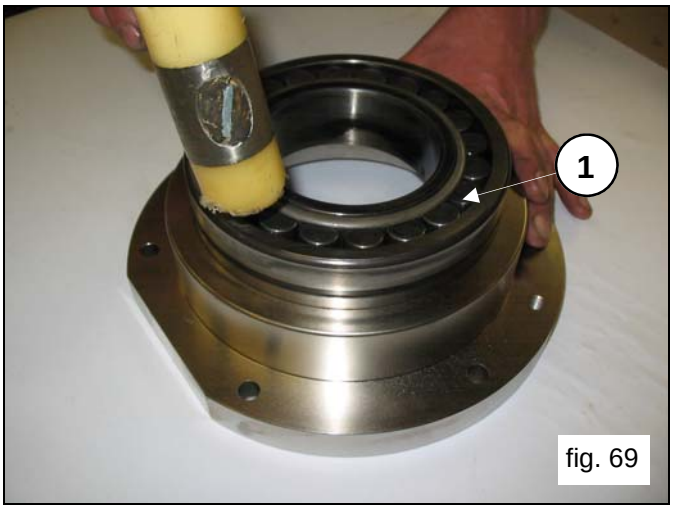

fig. 69

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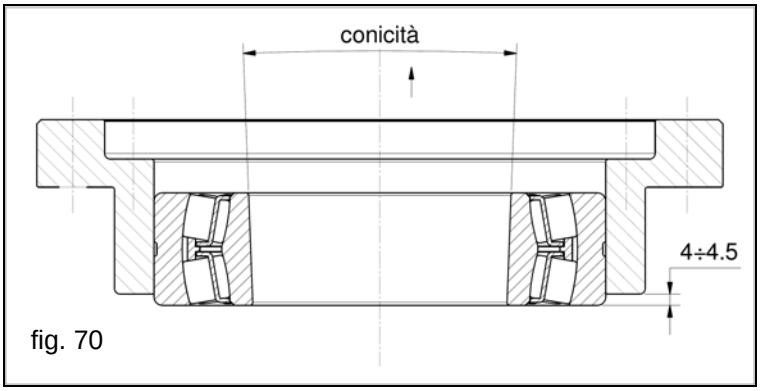


fig. 70

conicità = conicity

The bearing in fig.70 has a conical internal ring. Verify that the conicity is from the outside to the inside, to allow the subsequent insertion of the bush.

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

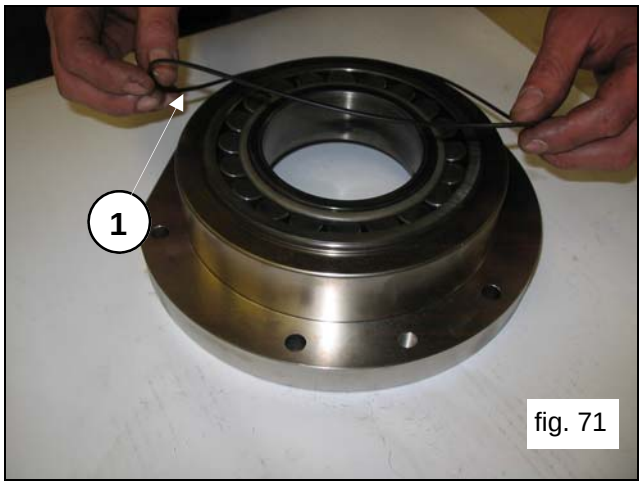


fig. 71

Repeat the operation with the other cover.
Lock the three connecting rod assemblies, using the special device (order code 27566200) (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.

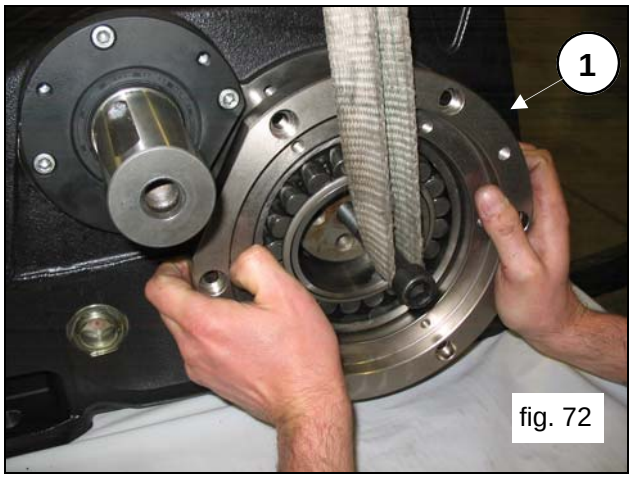


fig. 72

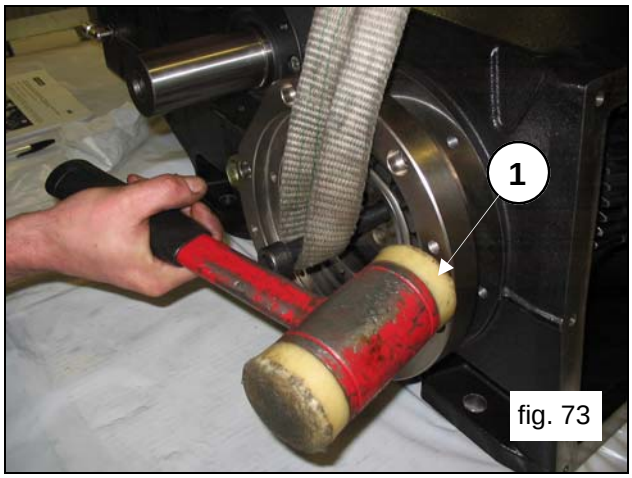


fig. 73

Fasten the bearing support covers with 6+6 x M10x30 screws (pos.①, fig.74).
Set the screws with a torque wrench, as shown in section 3, "Screw tightening settings".

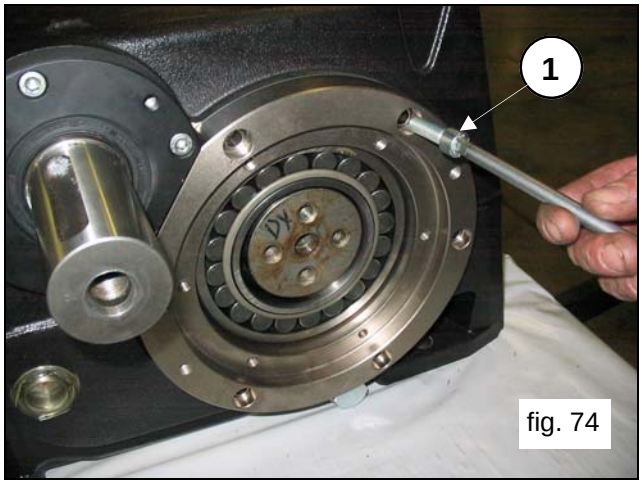


fig. 74

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

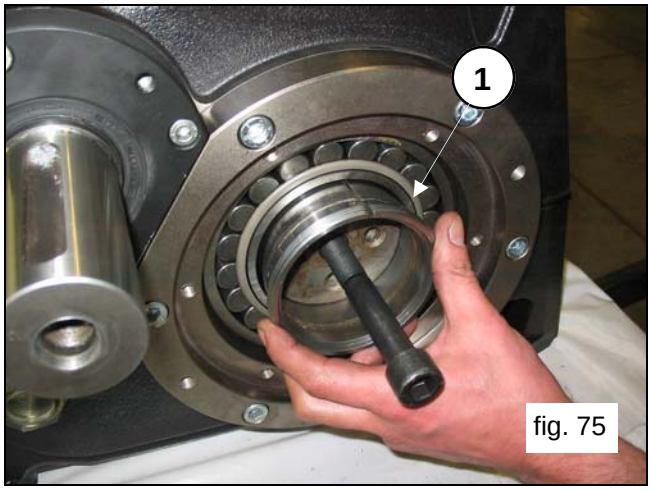


fig. 75

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

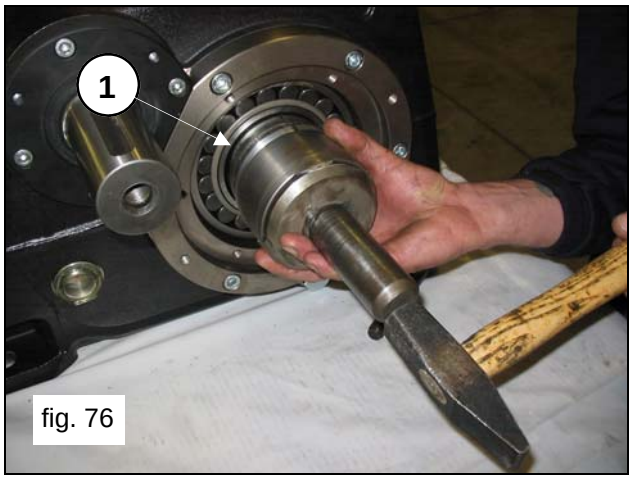


fig. 76

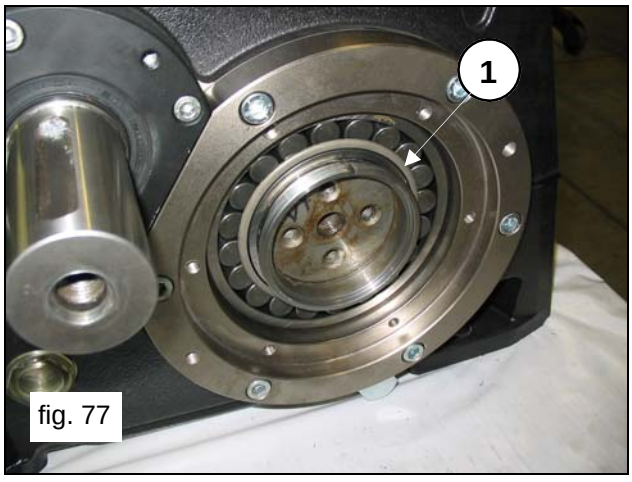


fig. 77

The pressure bush must be inserted dry (no lubricant oils).

Insert the bush 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 bush locking flanges into the conical bushes (pos.①, fig.78).
Apply a sufficiently long (35-40 mm) M16 screw to the M16 hole on the crankshaft and screw it in, until the flange is touching the bush (pos.①, fig.79). Do not tighten the screw.

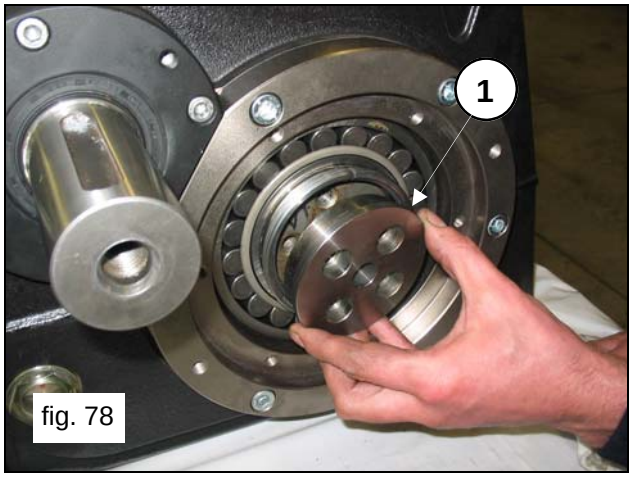


fig. 78

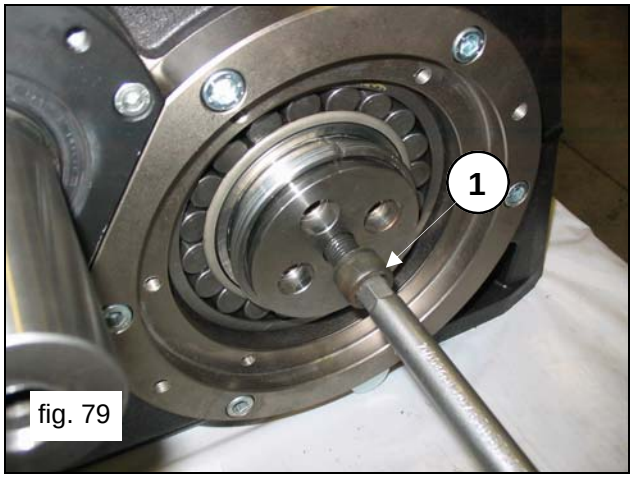


fig. 79

Repeat the operation on the other side.

Remove the device for locking the connecting rods (order code 27566200) (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).

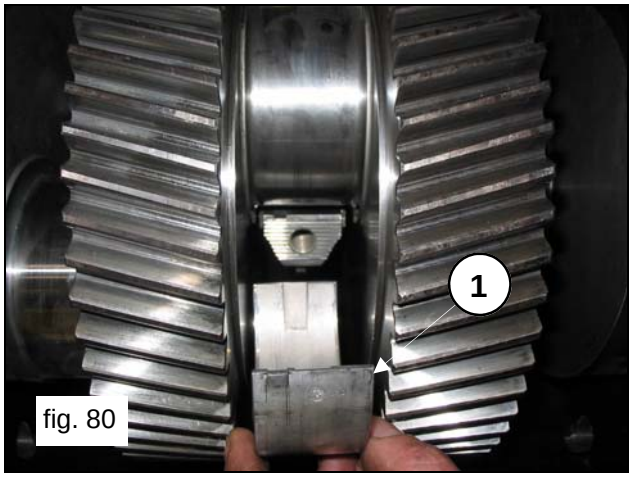


fig. 80

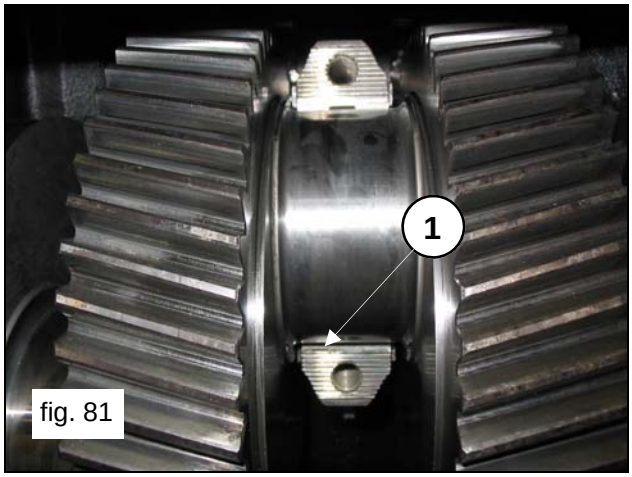


fig. 81

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. ②, fig.82).

Attach the small ends to the big end halves using the M12x1.25x87 screws (pos. ①, fig.83).
Set 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.

Be careful of the correct direction of assembly of the small ends. The numbering must face upwards.

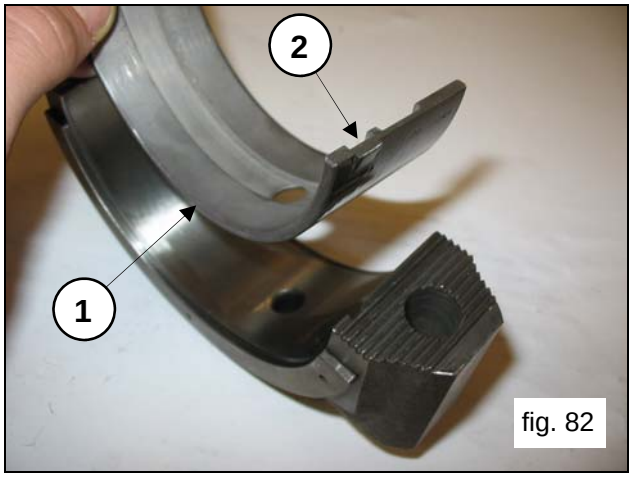


fig. 82

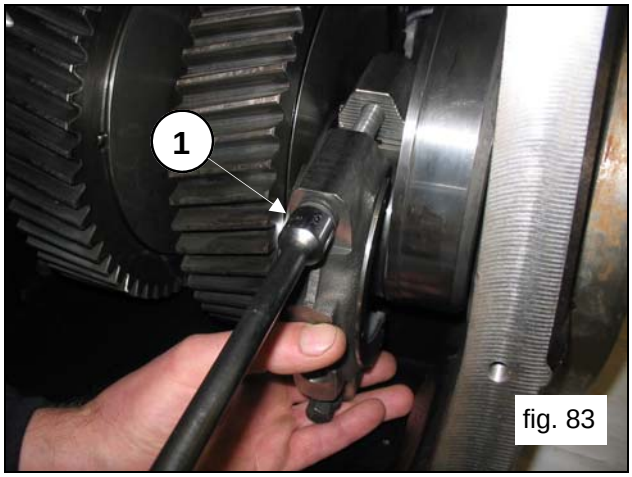


fig. 83

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

Insert a shim under the shank of the central connecting rod, to stop the rotation of the crankshaft (pos.①, fig.84).

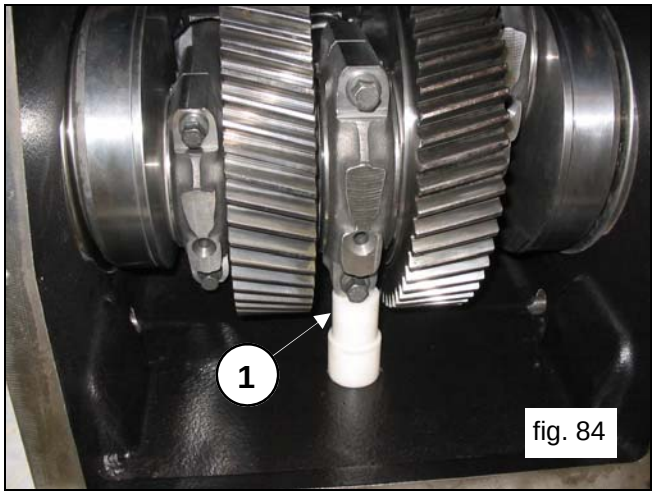
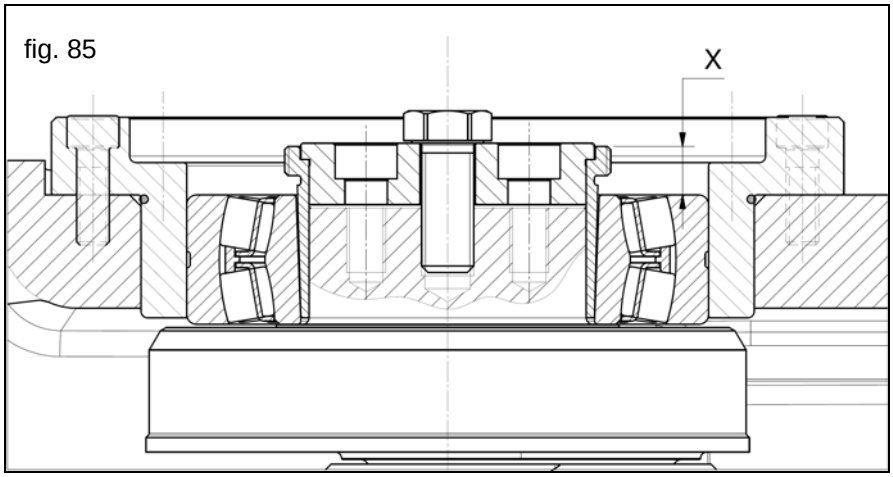


fig. 84

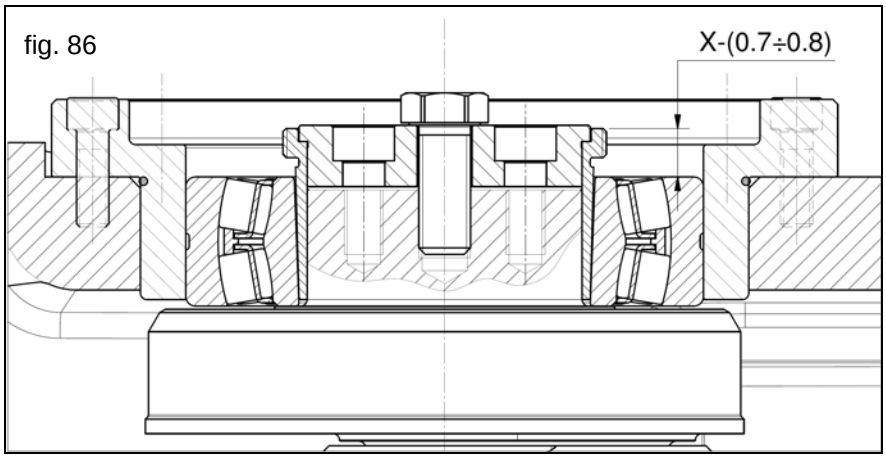
Measure the distance X indicated in fig.85 between the conical bush and the crankshaft bearing.

fig. 85



Screw in the M16 screw until there is a reduction in the distance X of between 0.7 mm and 0.8 mm (fig.86).

fig. 86



Repeat the operation on the other side.

Remove the M16 screw from the crankshaft.
Screw the two bush locking flanges onto the crankshaft using 4+4 x M12x25 screws (pos.①, fig.88).

Apply LOCTITE 243 to the threads of the M12x25 screws (pos.①, fig.87).

Set the screws with a torque wrench, as shown in section 3, "Screw tightening settings".

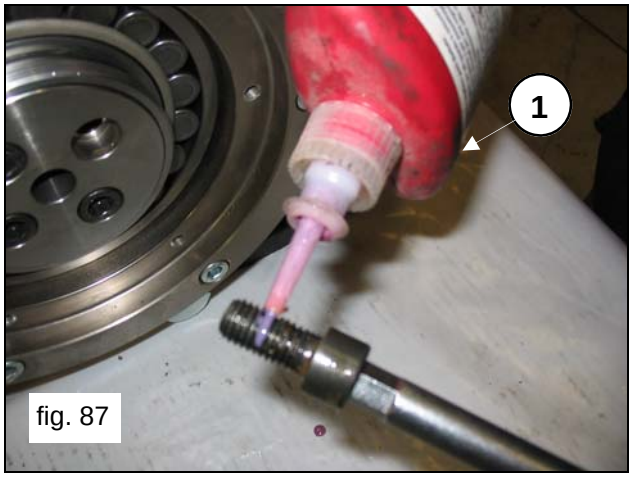


fig. 87

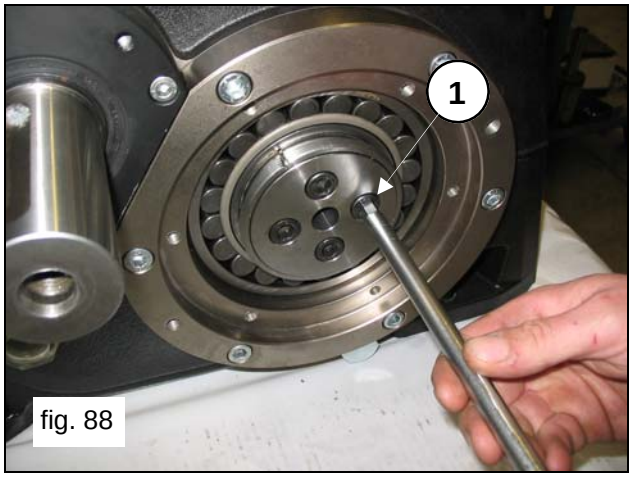


fig. 88

Remove the anti-rotation shim from under the shank of the central connecting rod.

Mount the two bearing covers (with their O-rings) (pos.①, fig.89) using 6+6 x M8x20 screws (pos.①, fig.90).
Set the screws with a torque wrench, as shown in section 3, "Screw tightening settings".

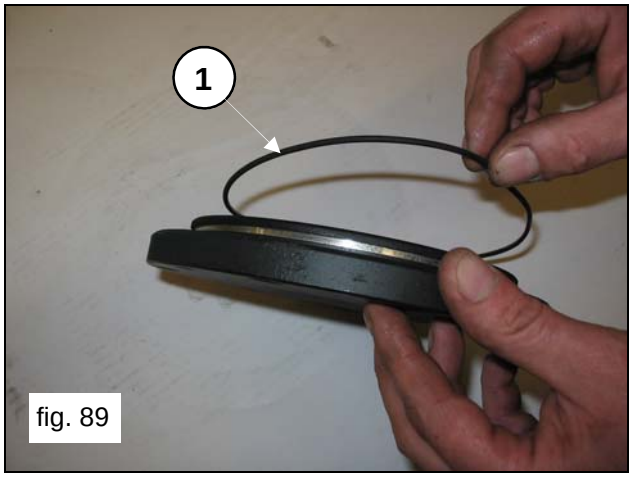


fig. 89

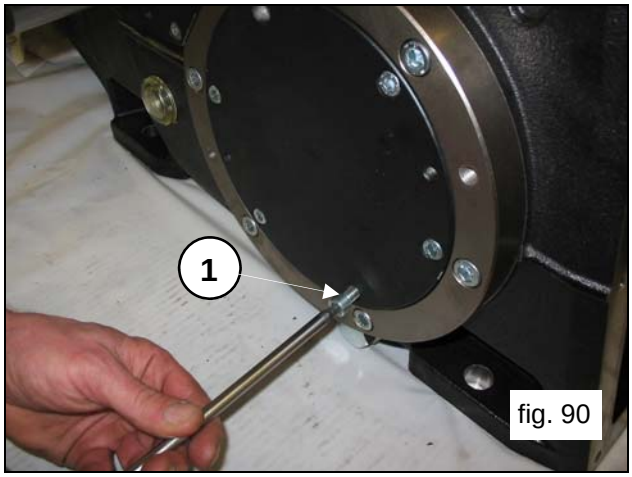


fig. 90

Insert the O-ring into the rear cover (pos.①, fig.91) and affix it to the casing using 10 x M8x20 screws (pos.①, fig.92).
Set the screws with a torque wrench, as shown in section 3, "Screw tightening settings".

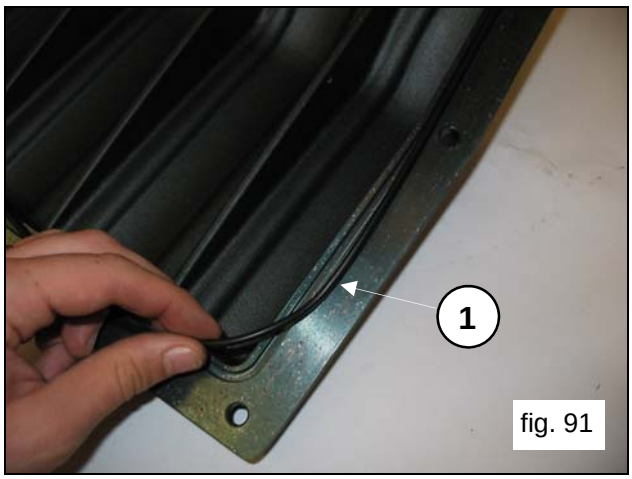


fig. 91

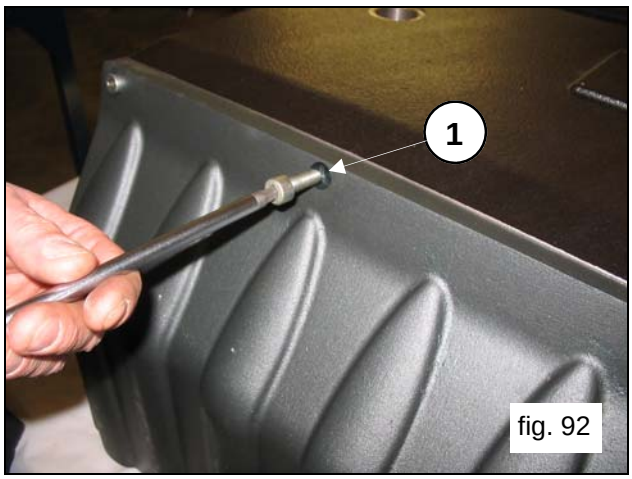


fig. 92

Mount the radial seal ring onto the oil seal cover (pos.①, fig.93) using a pad (order code 27910900).

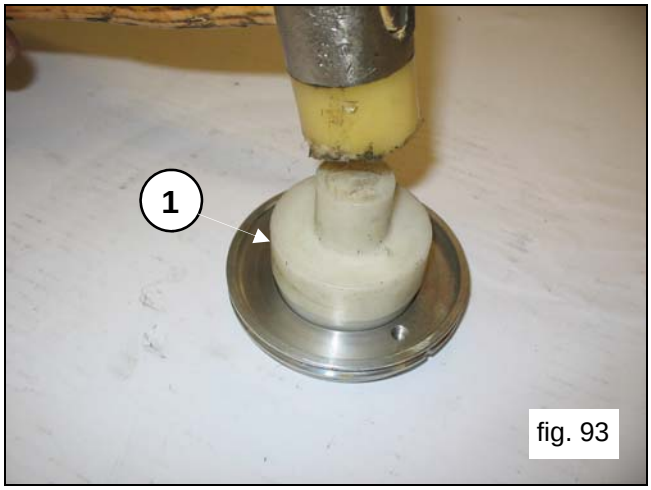


fig. 93

Position the O-ring (pos.①, fig.94) on the seat of the oil seal cover.

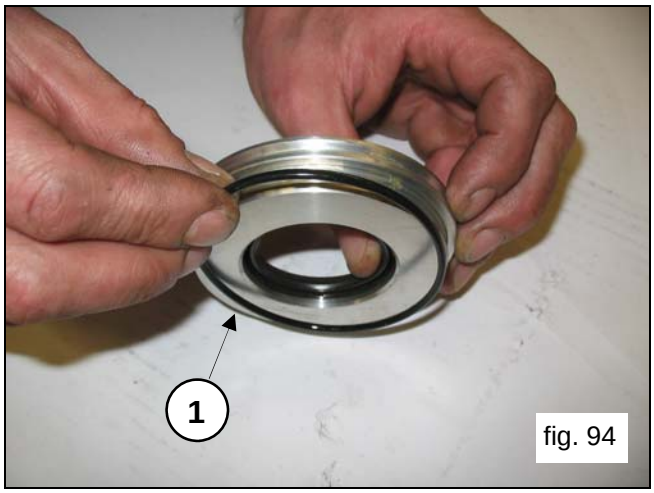


fig. 94

Insert the assembly into the casing and into the seat provided, making sure that the cover completely enters its seat (pos.①, fig.95), being careful not to damage the lip of the radial seal ring. Screw in the oil seal covers using 2 x M6x30 grub screws (pos.①, fig.96).

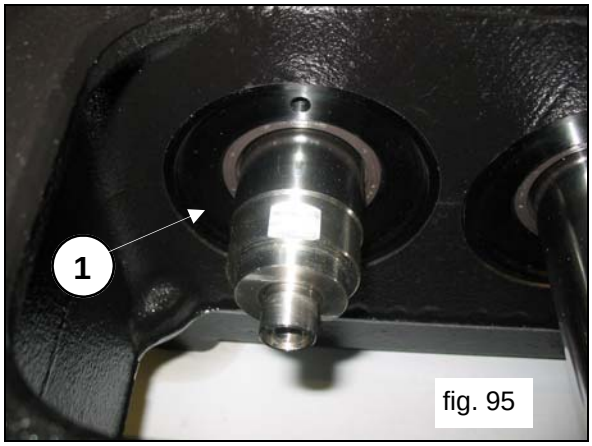


fig. 95

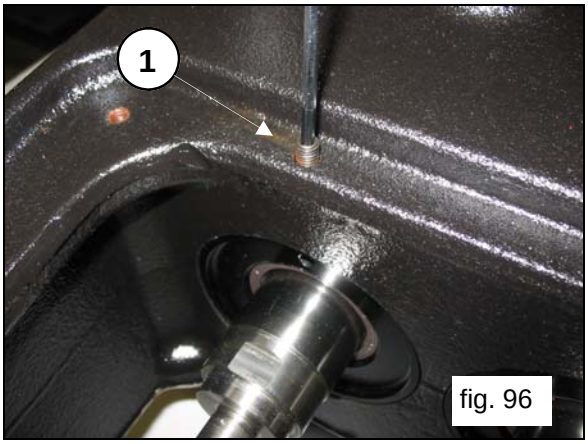


fig. 96

Set the screws with a torque wrench, as shown in section 3, "Screw tightening settings".

Position the spray-guard and the spray-guard spacer ring in the seat on the piston head stem (pos.①, fig.97 and 98).

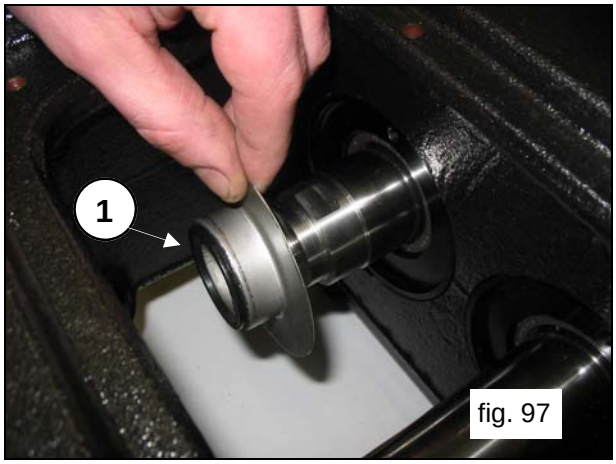


fig. 97

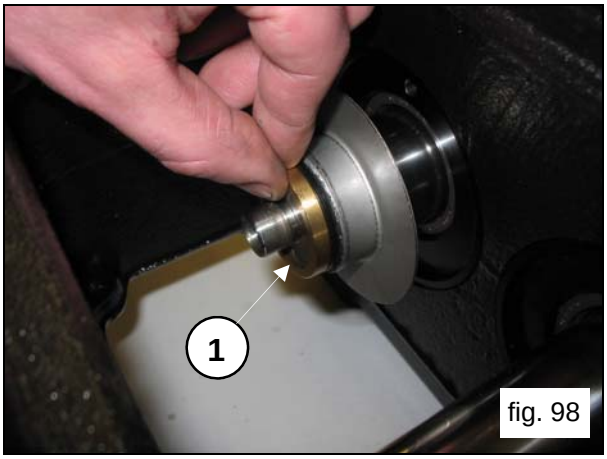


fig. 98

Insert the O-rings on the two inspection covers (pos.①, fig.99) and mount the covers using 4+4 x M6x14 screws (pos.①, fig.100).

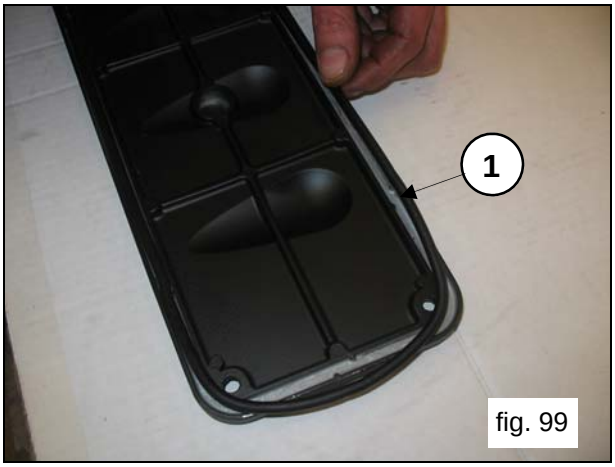


fig. 99

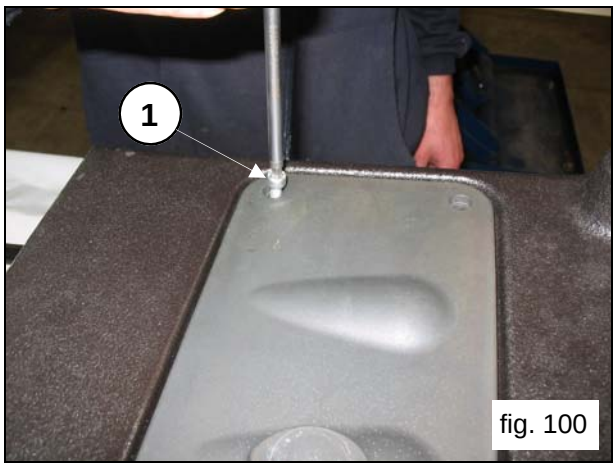


fig. 100

Set the screws with a torque wrench, as shown in section 3, "Screw tightening settings".

Mount the shaft end cover and affix it to the casing using 3 x M8x20 screws (pos.①, fig.101).
Set the screws with a torque wrench, as shown in section 3, "Screw tightening settings".

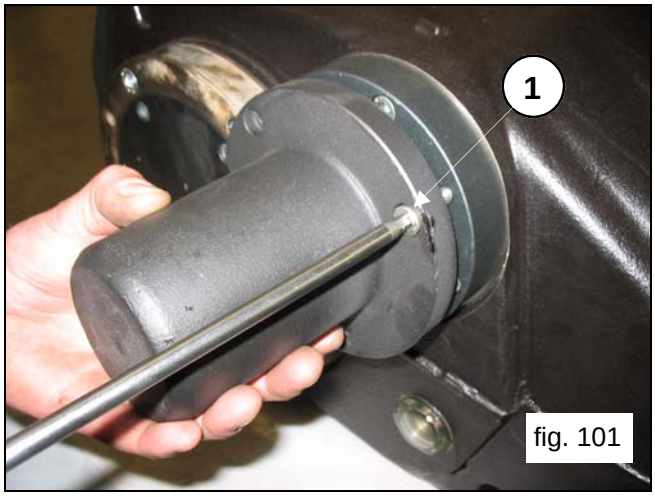


fig. 101

Apply the lug to the PTO shaft (pos.①, fig.102).

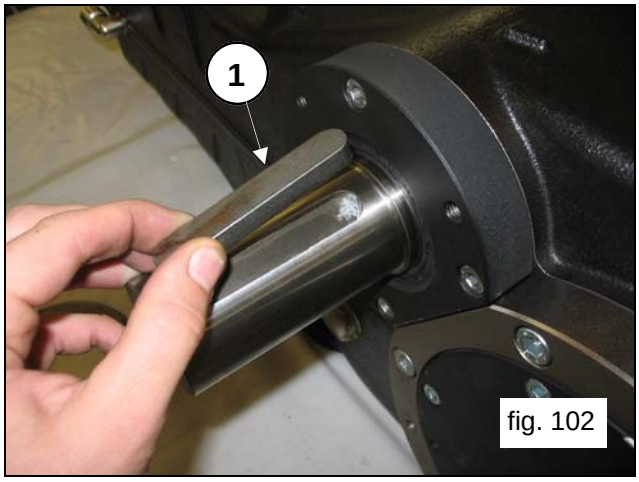


fig. 102

2.1.3 Classes of increase

INCREASE TABLE FOR CRANKSHAFT AND CONNECTION ROD HALF-BEARINGS			
Recovery classes (mm)	**Upper Half-bearing Code**	**Lower Half-bearing Code**	**Grinding on shaft pin diameter (mm)**
0.25	90931100	90930100	Ø92.75 0/-0.03 Ra 0.4 Rt 3.5
0.50	90931200	90930200	Ø92.50 0/-0.03 Ra 0.4 Rt 3.5

INCREASE TABLE FOR PUMP CASING AND PISTON HEAD		
Recovery classes (mm)	**Piston Head Code**	**Grinding on Pump Casing seat (mm)**
1.00	74050243	Ø81 H6 +0.022/0 Ra 0.8 Rt 6

2.2 Repair of the hydraulic part

2.2.1 Dismantling the head – the valve assemblies

The head requires preventive maintenance as indicated in the Manual for Use and Maintenance.
Operations are limited to inspection or replacement of the valves, when necessary.
To extract the valve assemblies work as follows:

Unscrew the valve lifter using a 30 mm spanner (pos.①, fig.103).

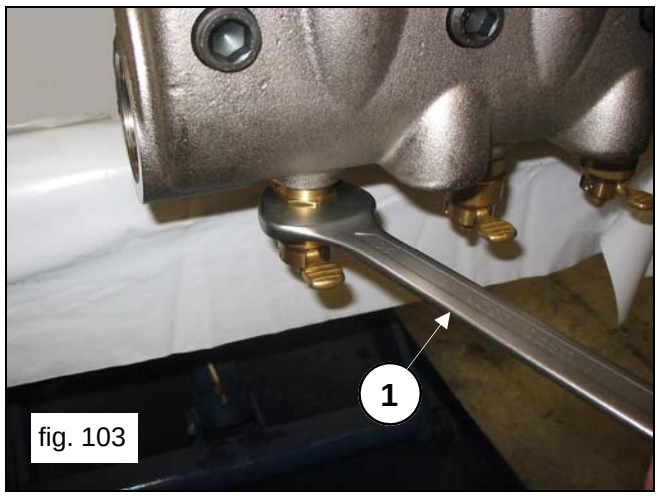


fig. 103

Apply two supports with G2" threading to the outlet connections of the head (pos.①, fig.104) and then unscrew the 8 M16x150 screws (pos.①, fig.105).
Take care to not subject the pistons to knocks or bumps when taking them out of the head.

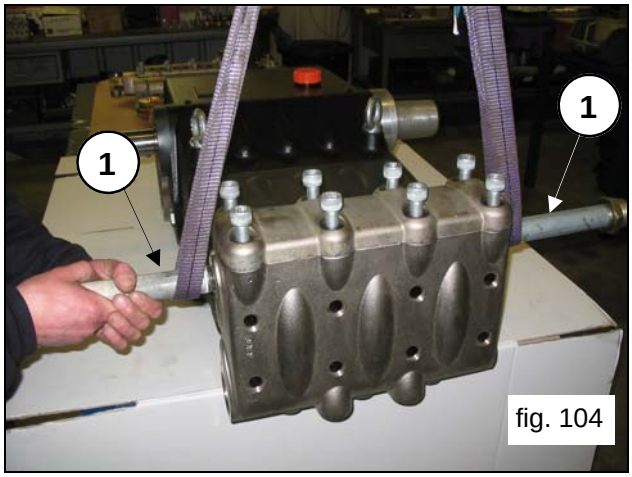


fig. 104

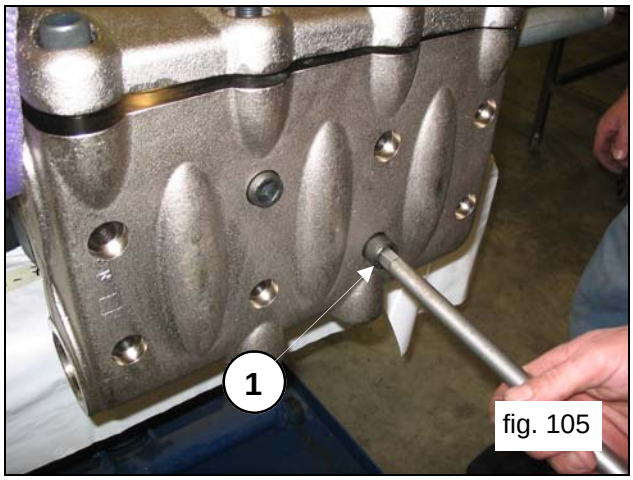


fig. 105

Unscrew and remove the 8 M16x55 screws of the valve cover (pos.①, fig.106) and remove the cover (pos.①, fig.107).

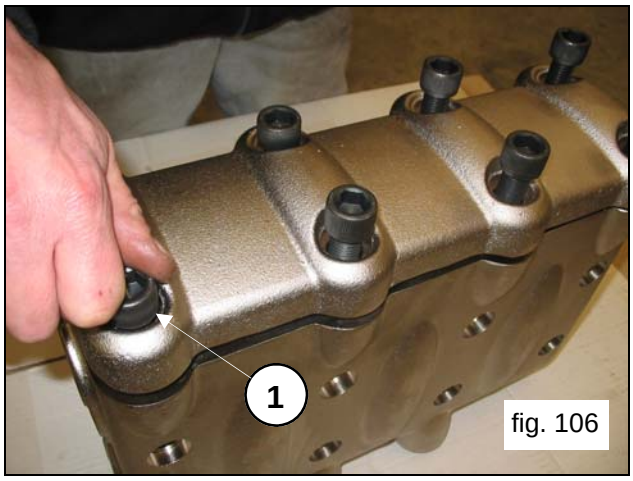


fig. 106

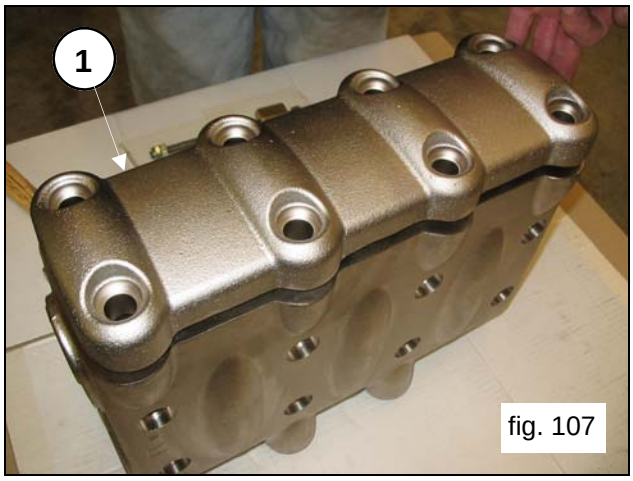


fig. 107

Remove the valve plug by using a slide hammer puller applied to the M10 hole in the valve plug (pos.①, fig.108).

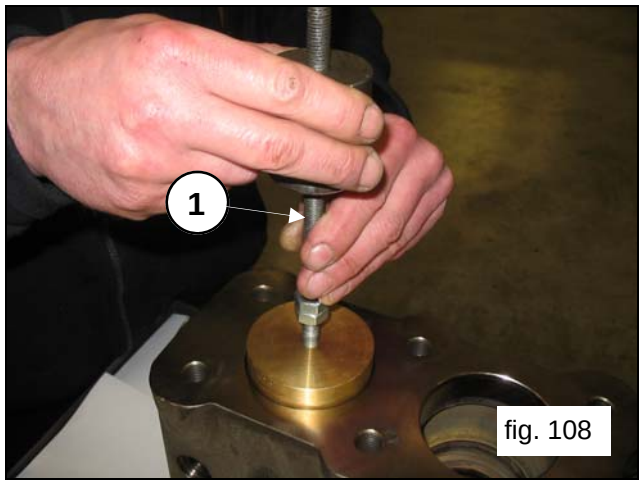


fig. 108

Slide out the spring (pos.①, fig.109).

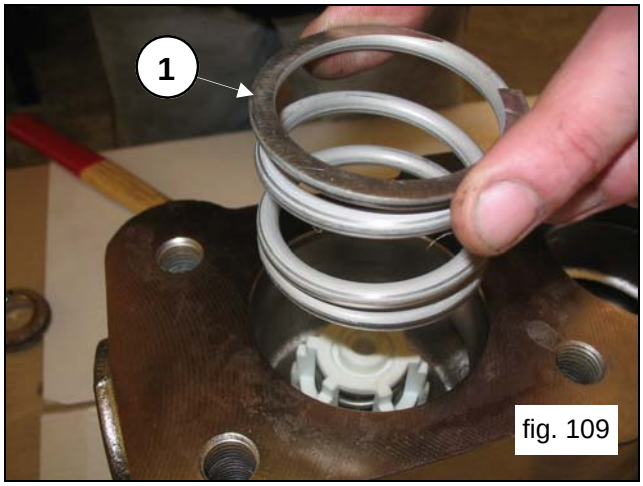


fig. 109

Remove the outlet valve assembly by using a slide hammer puller applied to the M10 hole in the valve holder (pos.①, fig.110).

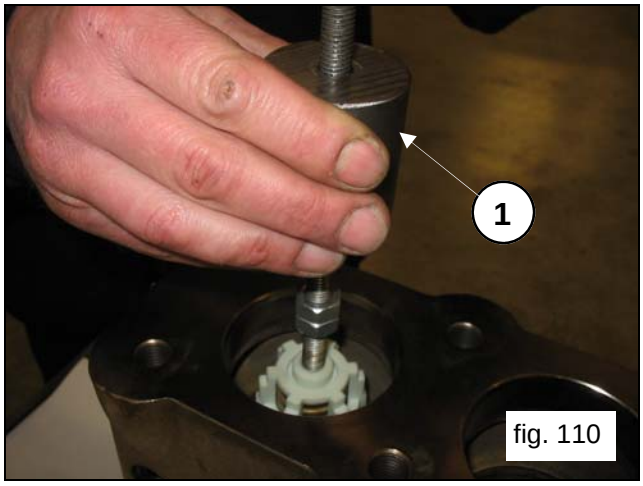


fig. 110

If it is particularly difficult to remove the outlet valve assembly (e.g. there are built-up deposits because the pump has not been used for a long period), use the extractor tool, order code 27516400 (for LK36-LK40-LK45) or order code 27516500 (for LK50-LK55-LK60).

Take out the valve holder spacer, using an 8 mm hexagonal key (pos.①, fig.111).

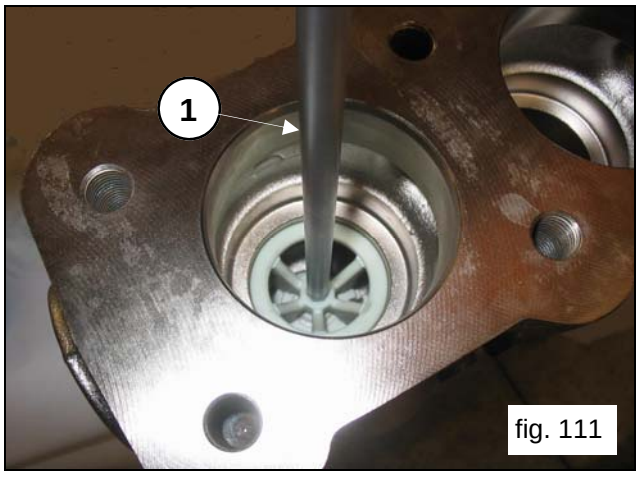


fig. 111

Remove the inlet valve assembly by using a slide hammer puller applied to the M10 hole in the valve holder (pos.①, fig.112).

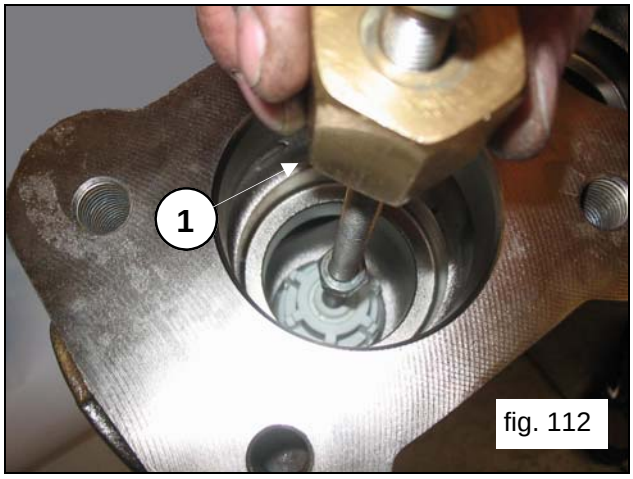


fig. 112

If it is particularly difficult to remove the inlet valve assembly (e.g. there are built-up deposits because the pump has not been used for a long period), use the extractor tool, order code 27516200 (for LK36-LK40-LK45) or order code 27516300 (for LK50-LK55-LK60) (pos.①, fig.113) and use it as shown in the diagram.

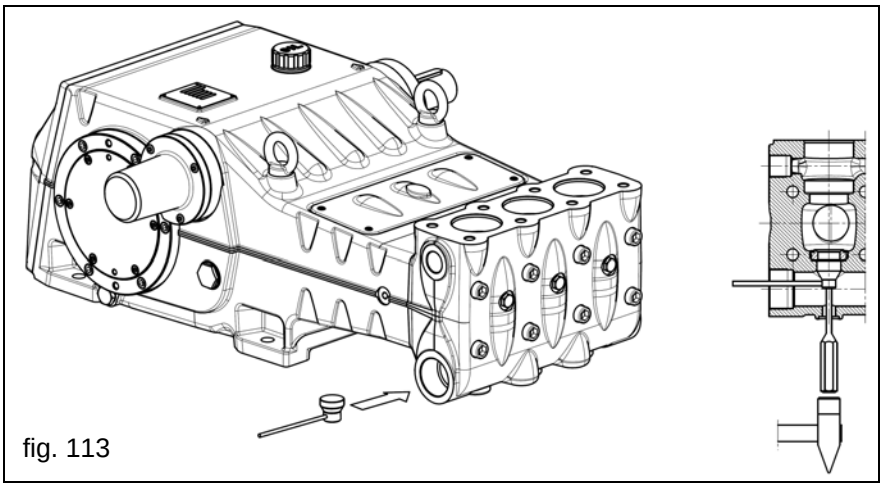


fig. 113

Remove the inlet and outlet valve assemblies by screwing in an M10 screw so as to attach it to the inside holder, and take out the valve holder from the valve seat (pos.①, fig.114).

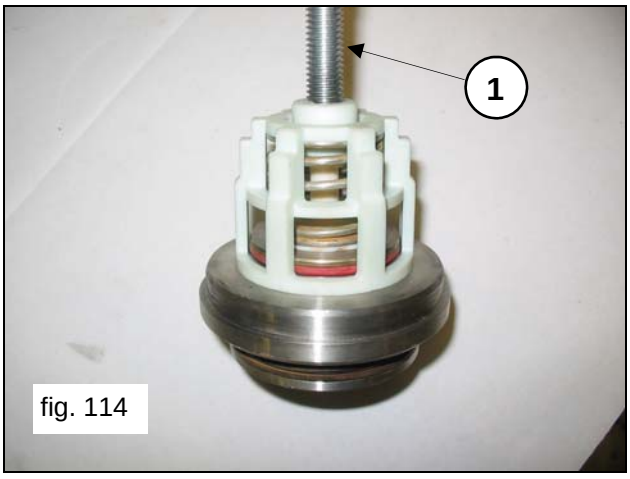


fig. 114

2.2.2 Assembling the head – the valve assemblies

Check the state of wear of the various components very carefully, and replace them if necessary.
At each inspection of the valves, replace all the O-rings, both for the valve assemblies and for the valve plugs.

Before repositioning the valve assemblies, clean their seats in the head, indicated by the arrows (pos.①, fig.115), and then dry these seats completely.

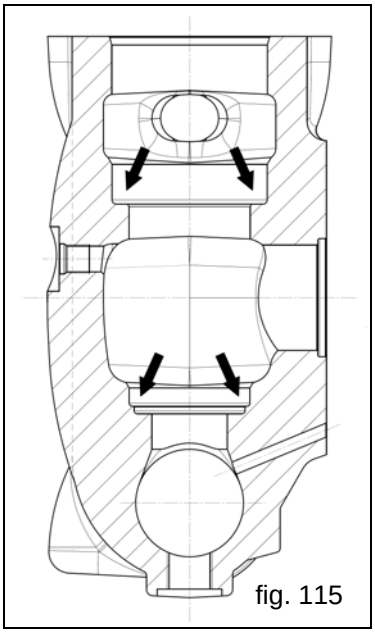


fig. 115

Proceed with the reassembly, following the reverse of the disassembly procedure shown in 2.2.1.

Assemble the inlet and outlet valve assemblies (fig.116 and fig.117), taking care not to reverse the springs that were previously removed.

To facilitate insertion of the valve holder into the seat, place a pipe on the horizontal flat surfaces of the holder (fig.118) and use a mallet/striking hammer around the entire circumference.

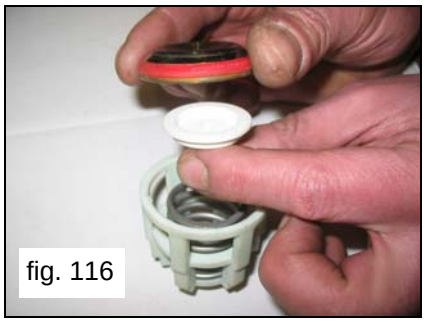


fig. 116

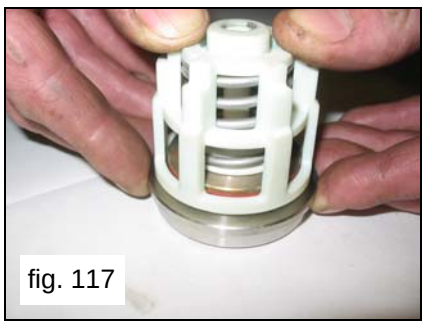


fig. 117

fig. 118

Proceed with the insertion of the valve assemblies (inlet and outlet) into the head, taking care to follow the correct insertion sequence of the O-rings and anti-extrusion rings.

The correct assembly sequence for the valve assemblies in the head is as follows:
Insert the anti-extrusion ring, exploded position no.4 (pos.①, fig.119).

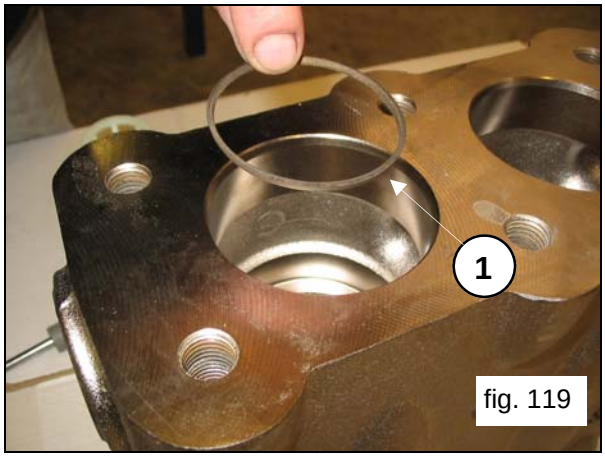


fig. 119

Insert the O-ring, exploded position no.5 (pos.①, fig.120).

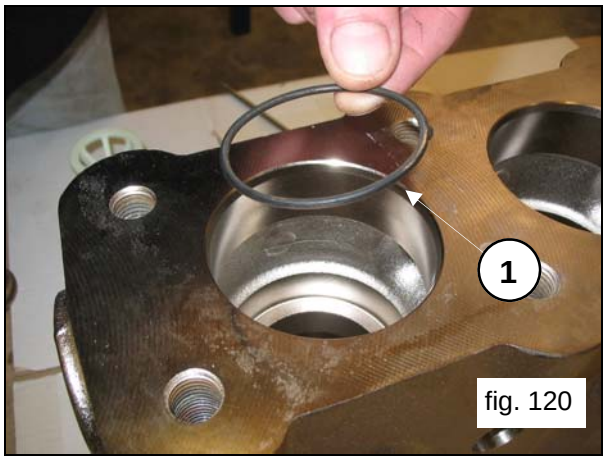


fig. 120

Make sure that the O-ring and anti-extrusion ring are perfectly seated in place.
Insert the inlet valve assembly (pos.①, fig.121) and then the spacer (pos.①, fig.122).
The complete valve assembly must be inserted all the way in, as shown in pos.①, fig.122.

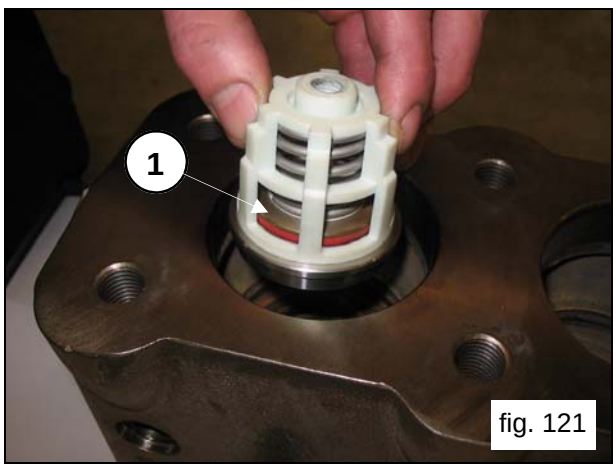


fig. 121

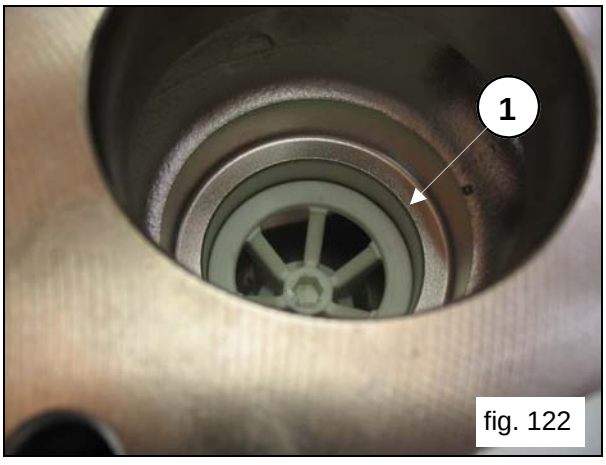


fig. 122

Mount the O-ring, exploded position no.5 (pos.①, fig.123) and the anti-extrusion ring, exploded position no.15 (pos.②, fig.123), onto the outlet valve seat.

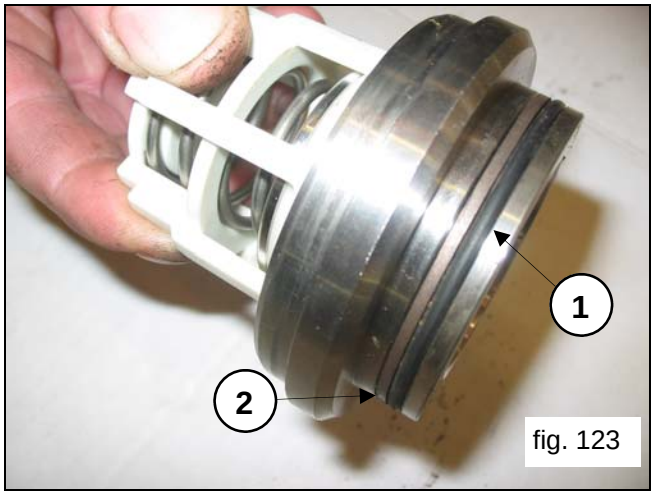


fig. 123

Insert the outlet valve assembly (pos.①, fig.124). The valve assembly must be inserted all the way in, as shown in pos.①, fig.125.

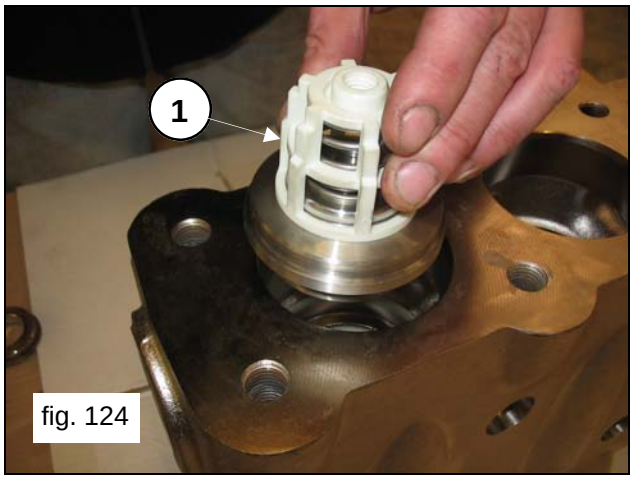


fig. 124

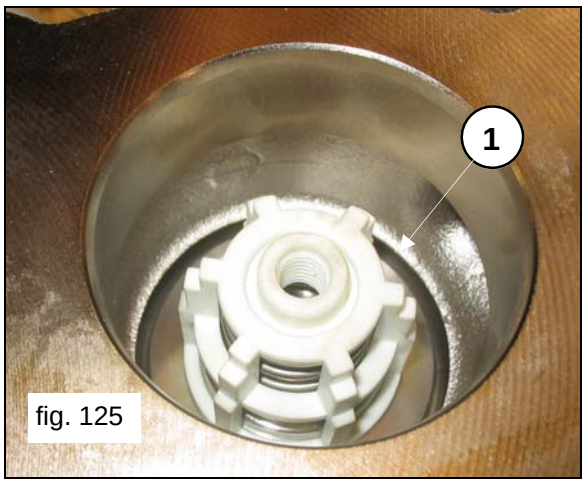


fig. 125

Insert the anti-extrusion ring, exploded position no.16 (pos.①, fig.126).

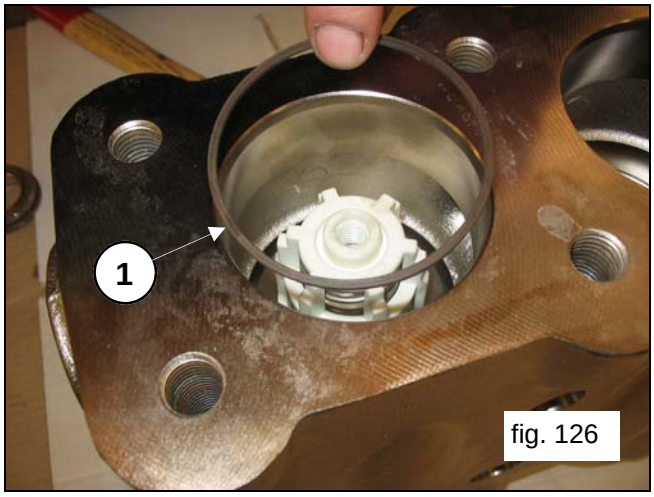


fig. 126

Insert the O-ring, exploded position no.17 (pos.①, fig.127).

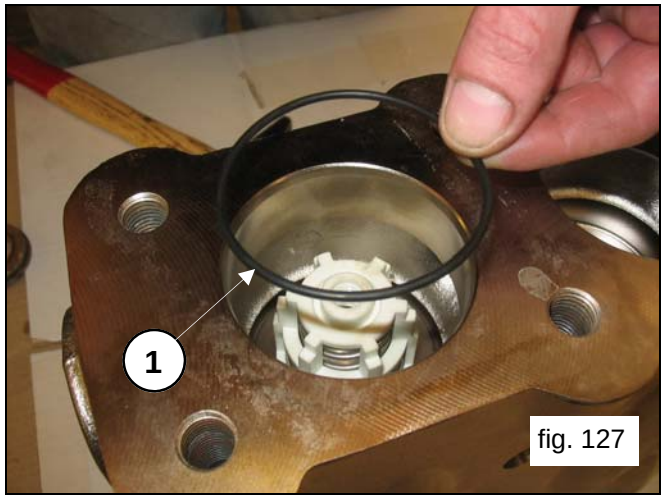


fig. 127

Be very careful when inserting the O-ring indicated in pos.①, fig.128.
We recommend using the special tool, order code 27516000 (for LK36-LK40-LK45) or order code 27516100 (for LK50-LK55-LK60), to prevent the O-ring from being cut during insertion.

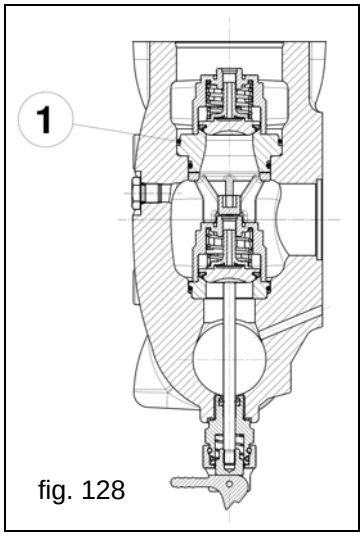


fig. 128

Insert the valve seat ring (pos.①, fig.129) and the spring (pos.①, fig.130).

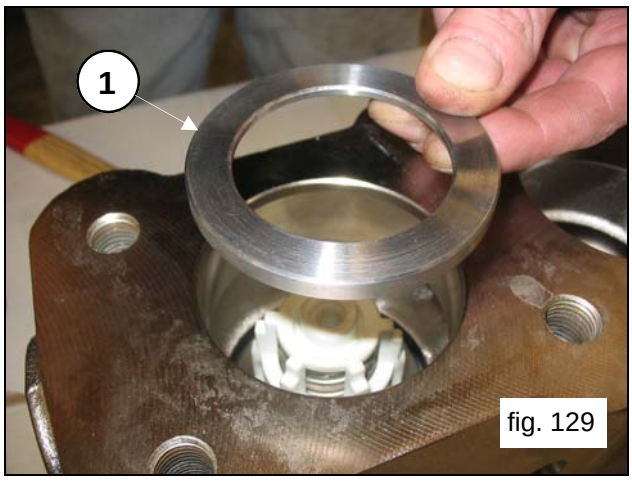


fig. 129

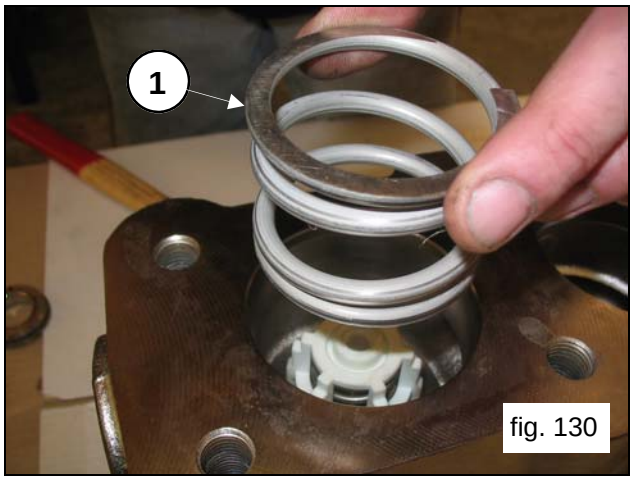


fig. 130

Mount the O-ring, exploded position no.17 (pos.①, fig.131) and the anti-extrusion ring, exploded position no.21 (pos.②, fig.131), onto the outlet valve plug.

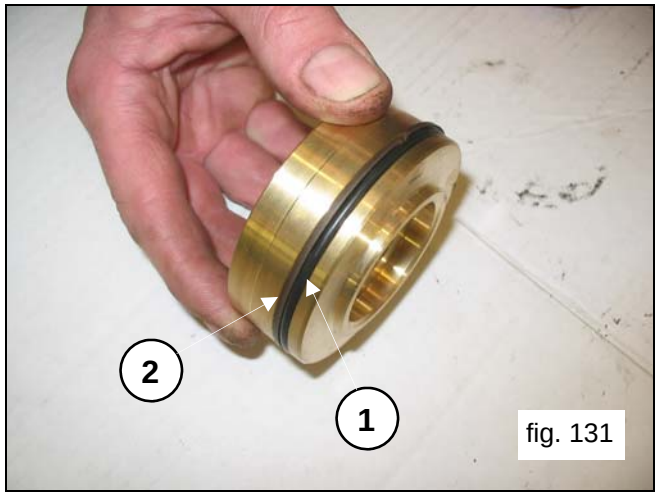


fig. 131

Insert the valve plug, complete with O-ring and anti-extrusion ring.
After insertion of the valve assemblies and the valve plugs is complete, replace the valve cover (pos.①, fig.132) and screw in the 8 M16x55 screws (pos.①, fig.133).

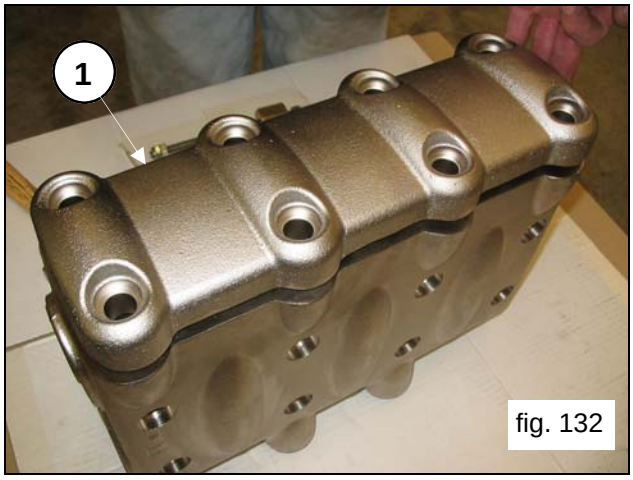


fig. 132

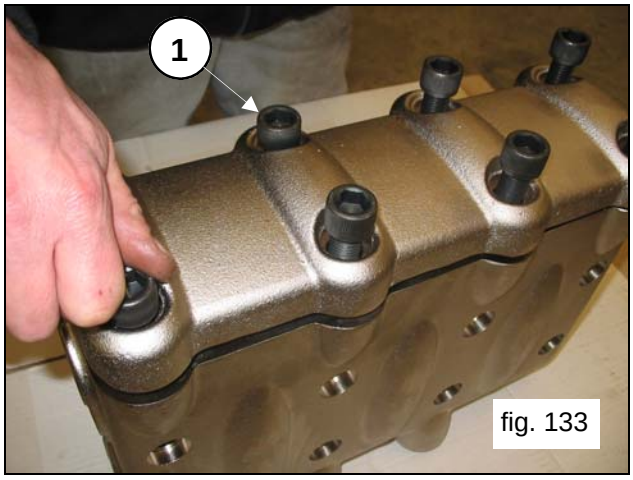


fig. 133

Attach the head to the pump casing (pos.①, fig.134) taking care not to subject the pistons to knocks or bumps, and screw in the 8 M16x150 screws (pos.①, fig.135).

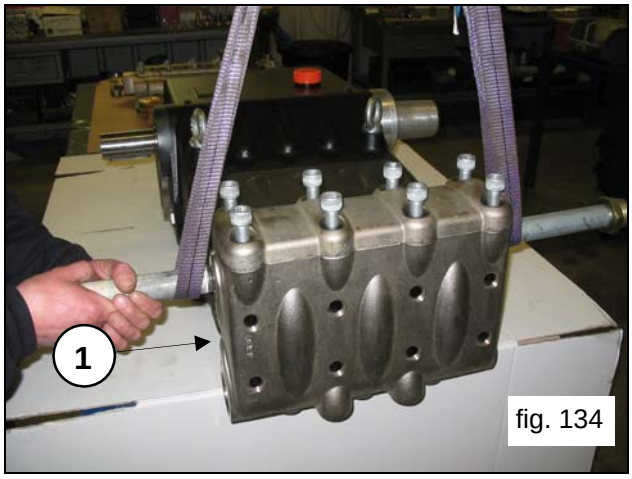


fig. 134

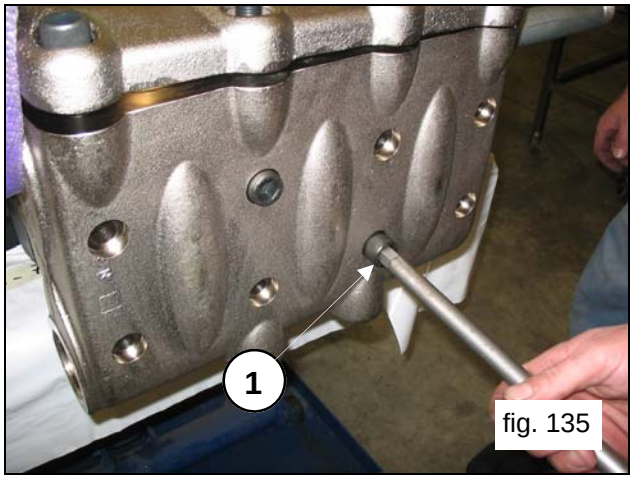


fig. 135

Proceed to set the M16x150 screws with a torque wrench, as shown in section 3, "Screw tightening settings".

Tighten the 8 M16x150 screws, beginning by cross-tightening the 4 inside screws (see fig.135) and then moving on to the 4 outside screws, again cross-tightening them.

Set the M16x55 screws of the cover with a torque wrench, as shown in section 3, "Screw tightening settings".

Insert the valve lifters (pos.①, fig.136) and screw them in using a 30 mm spanner (pos.①, fig.137).

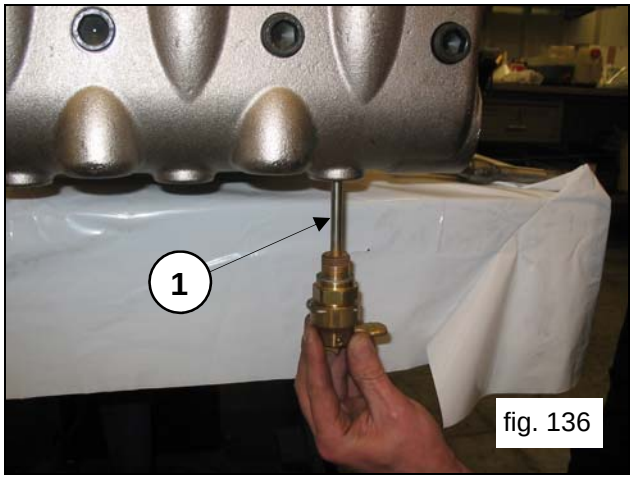


fig. 136

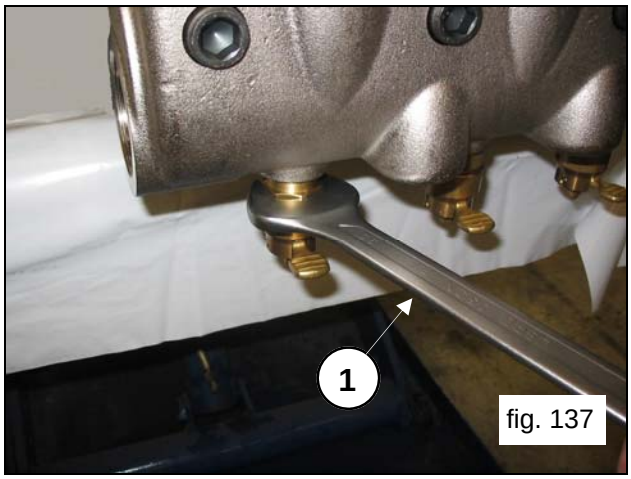


fig. 137

2.2.3 Dismantling the piston – supports – seals assembly

The piston assembly requires regular checking as indicated in the preventive maintenance table in the Manual for Use and Maintenance.
Operations are limited to a visual check for any draining from the hole in the lower cover. If there are anomalies/oscillations in the outlet pressure gauge, or drips from the drain hole, then the seal packing must be checked and, if necessary, replaced.
To extract the piston assemblies work as follows:

To access the piston assembly, unscrew the M16x150 screws and dismantle the head.

Take the greatest care when sliding out the head to avoid subjecting the pistons to knocks or bumps.

Remove the pistons by unscrewing the attachment screws (pos.①, fig.138).
Slide the piston from the gasket support and check that its surface does not have scratches, signs of wear or cavitation.

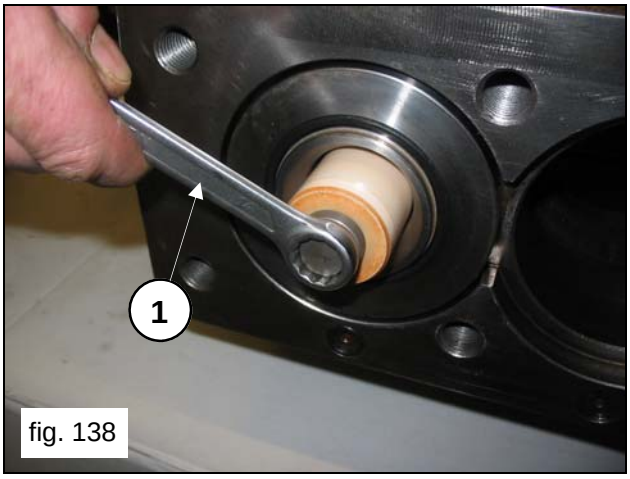


fig. 138

Remove the upper inspection cover (pos.①, fig.139) and the lower inspection cover (pos.①, fig.140) by unscrewing the 4+4 attachment screws.

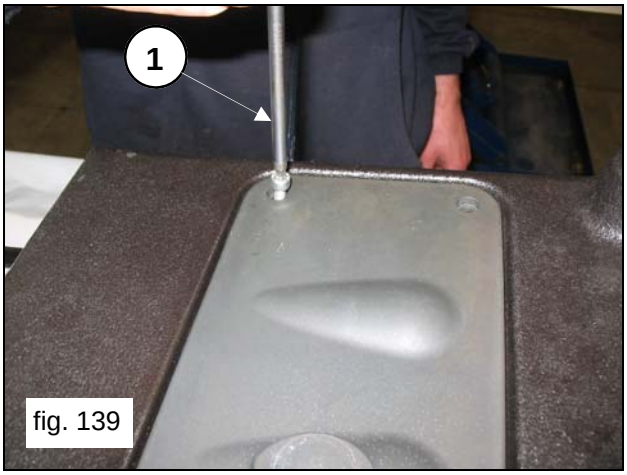


fig. 139

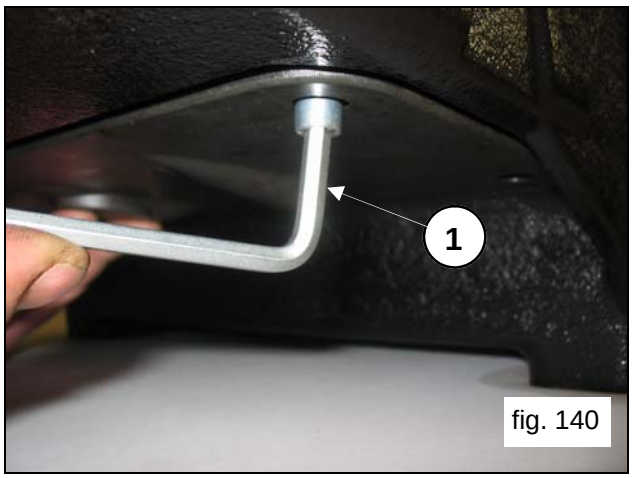


fig. 140

Manually rotate the shaft to bring the 3 pistons into the top dead centre position.
Insert the plastic buffer (order code 27516600) between the piston head and the piston (pos.①, fig.141).

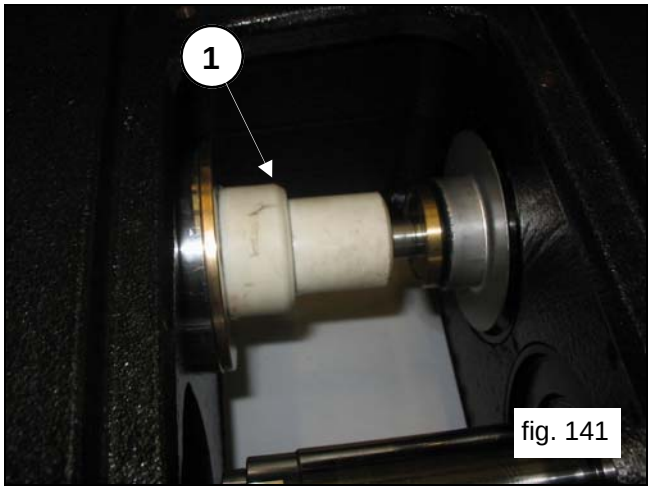


fig. 141

By rotating the shaft, advance the piston head so that the plastic buffer advances in its turn and expels the gasket support and the entire piston assembly (pos.①, fig.142).

fig. 142

Remove the gasket support assembly and the plastic buffer.

Slip the spray-guard spacer rings off the piston heads (pos.①, fig.143) and also the spray-guards (pos.①, fig.144).

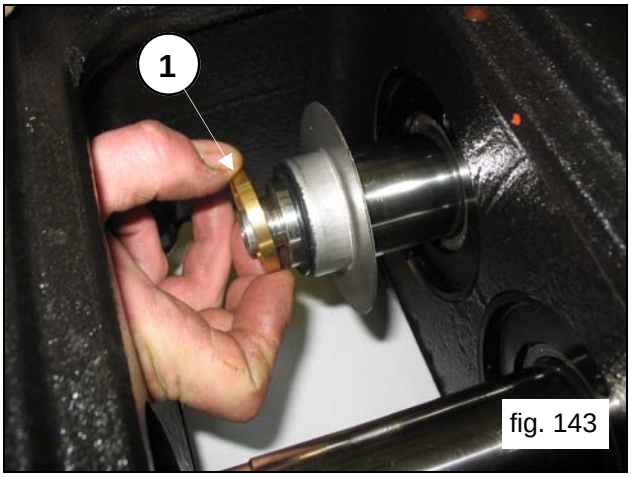


fig. 143

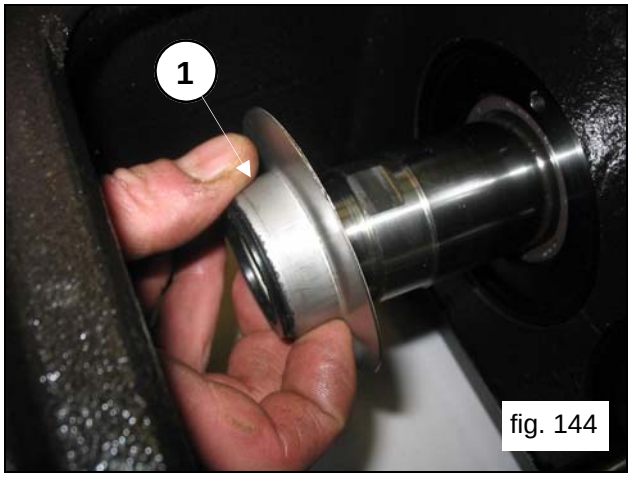


fig. 144

Separate the gasket support from the liner by using a compass spanner with Ø5 round ends, available on the market, (pos.①, fig.145) and unscrew the support until it is completely removed (pos.①, fig.146).

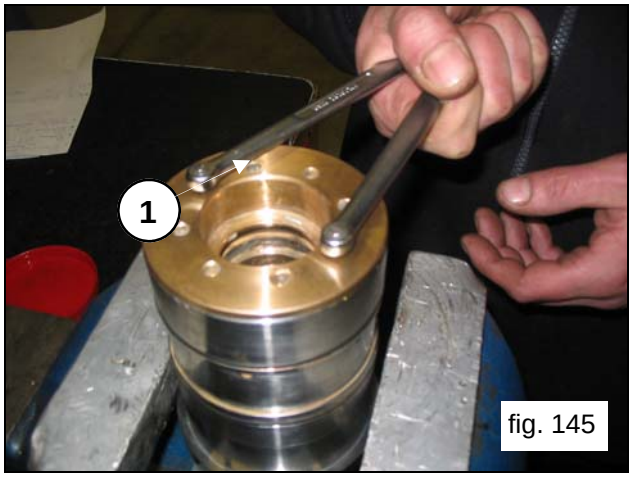


fig. 145

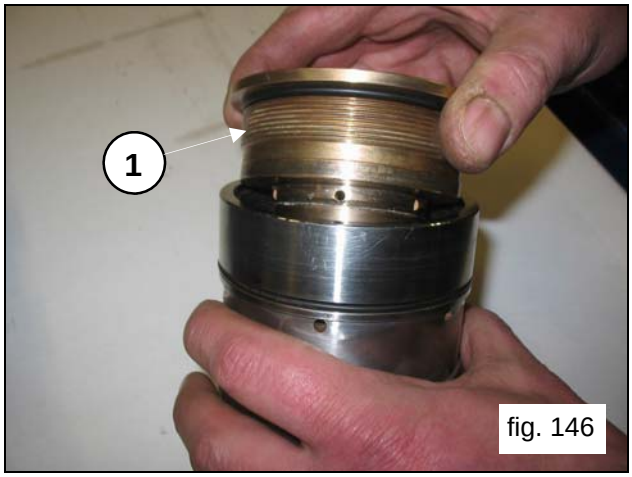


fig. 146

Manually remove the head rings, the pressure gaskets and the restop rings (pos.①, fig.147).

fig. 147

To remove the low-pressure gasket, use a feeler gauge or other tool that does not damage the gasket support seat (pos.①, fig.148).

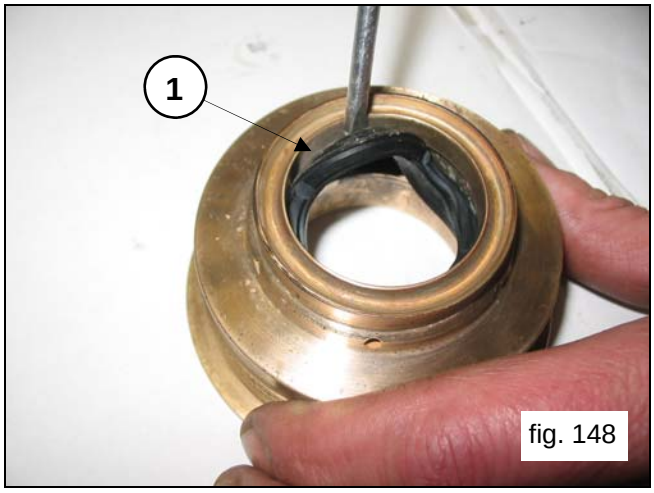


fig. 148

2.2.4 Assembling the piston – supports – seals assembly
Proceed with the reassembly, following the reverse of the disassembly procedure shown in 2.2.3.

Replace the pressure gaskets, moistening the lips with silicone grease (without covering the gaskets), and taking great care not to damage them while inserting them into the liner.

At every disassembly, the pressure gaskets must always be replaced, together with all the O-rings.

Insert the low-pressure gasket into the gasket support (pos.①, fig.149), taking care to follow the direction of assembly: the seal lip goes in front (towards the head).

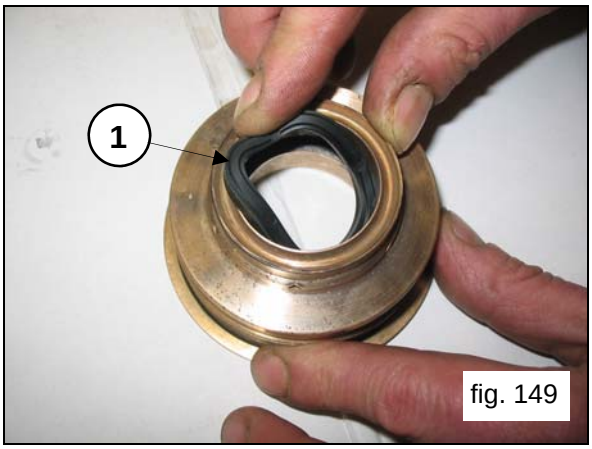


fig. 149

Insert the head ring (pos.①, fig.150), the high-pressure gasket (pos.①, fig.151) and the restop ring (pos.①, fig.152).

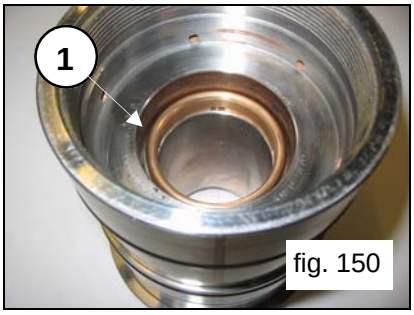


fig. 150

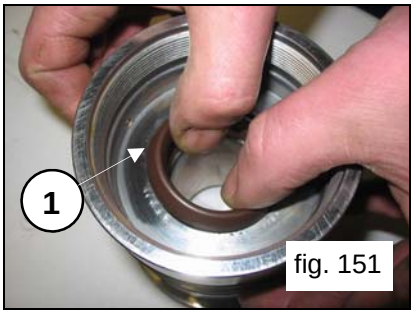


fig. 151

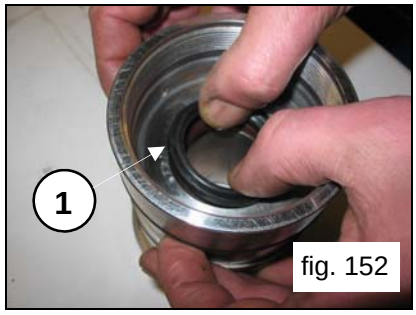


fig. 152

Place the O-ring for the gasket support on its seat (pos.①, fig.153).

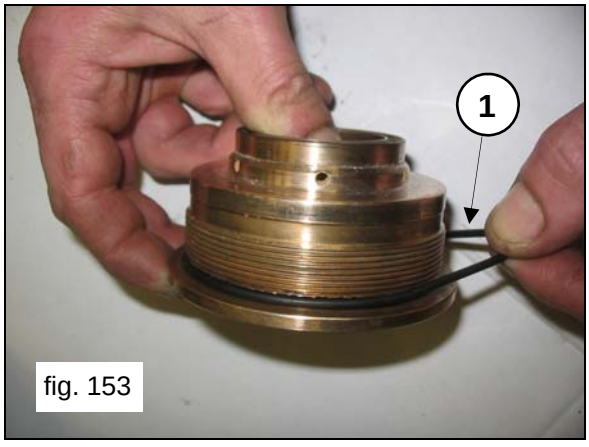


fig. 153

Screw the gasket support to the liner (pos.①, fig.154) and tighten using a compass spanner with Ø5 round ends, available on the market (pos.①, fig.155), until the support abuts the liner.

fig. 154

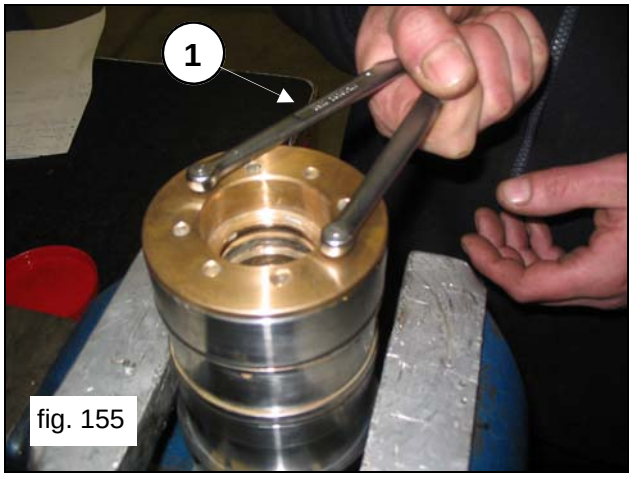


fig. 155

Place the 14x2 O-ring on its seat on the piston attachment screw (pos.①, fig.156).

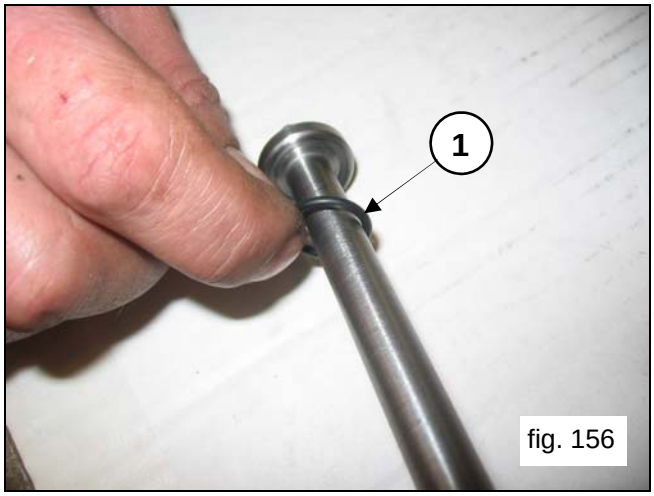


fig. 156

Place the pistons on their respective holders (pos.①, fig.157) and fix them in place as in pos.①, fig.158.

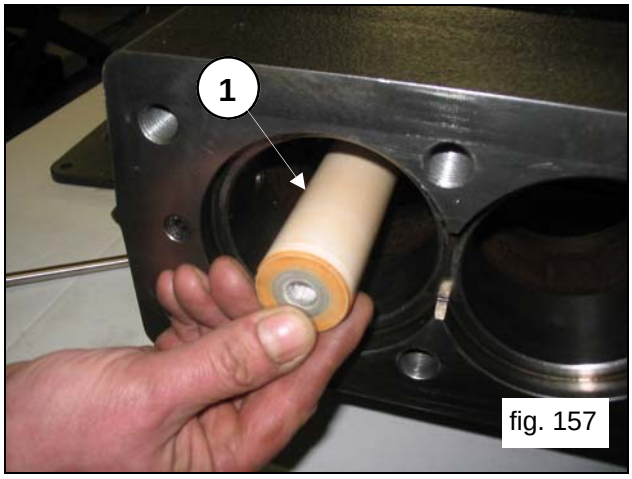


fig. 157

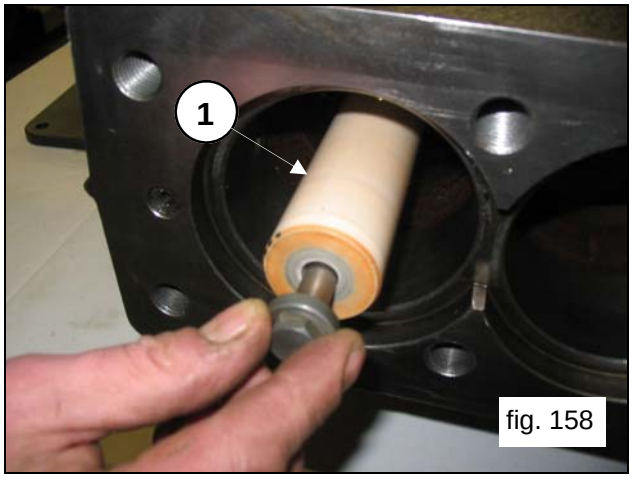


fig. 158

Set the screws with a torque wrench, as shown in section 3, "Screw tightening settings".

Insert the previously-assembled liner/gasket support block (complete with its two O-rings), until it is snugly in place (pos.①, fig.159).

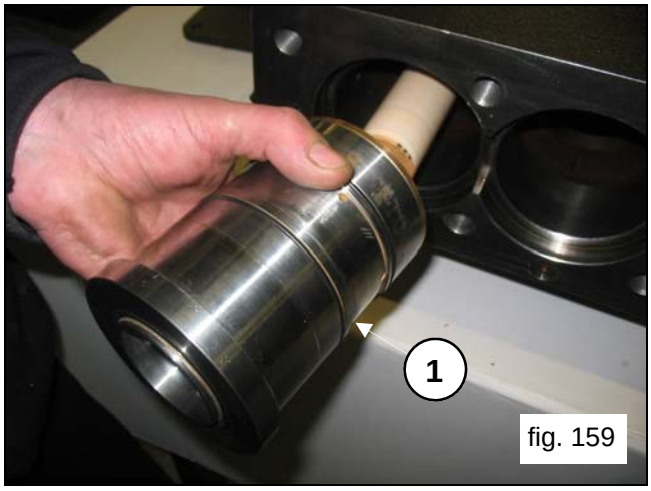


fig. 159

Make sure that the liner/support block goes all the way in and is correctly positioned on its seat (pos.①, fig.160).

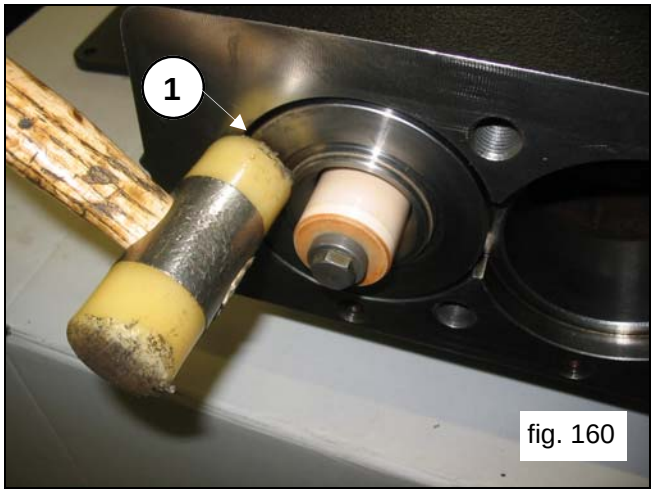


fig. 160

Place the frontal O-ring on the liner (pos.①, fig.161) and also the O-ring for the recirculation hole (pos.①, fig.162).

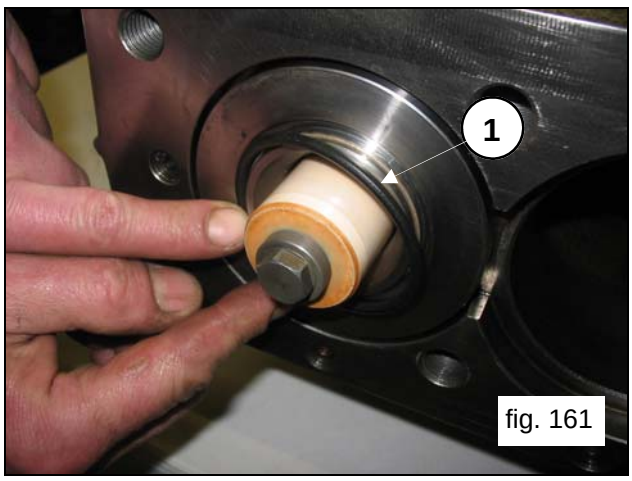


fig. 161

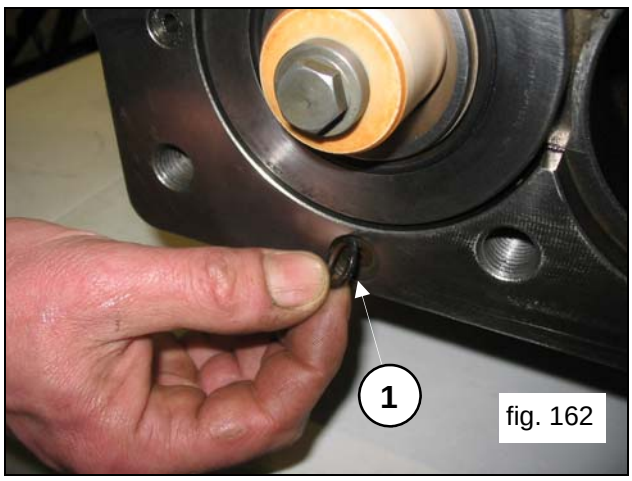


fig. 162

Insert the O-rings on the inspection covers (pos.①, fig.163) and mount the covers using 4+4 x M6x14 screws (pos.①, fig.164).

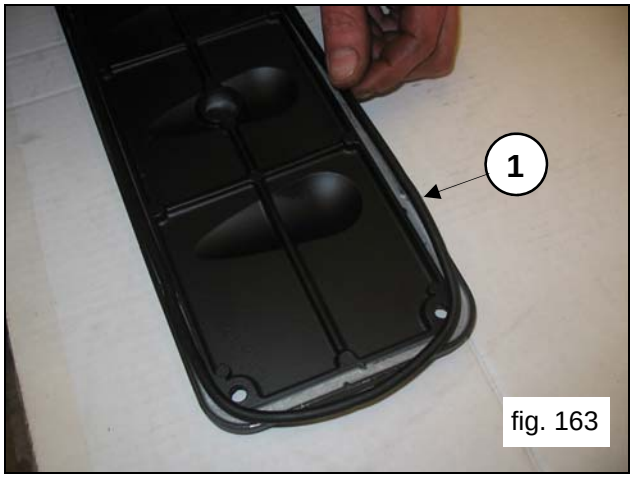


fig. 163

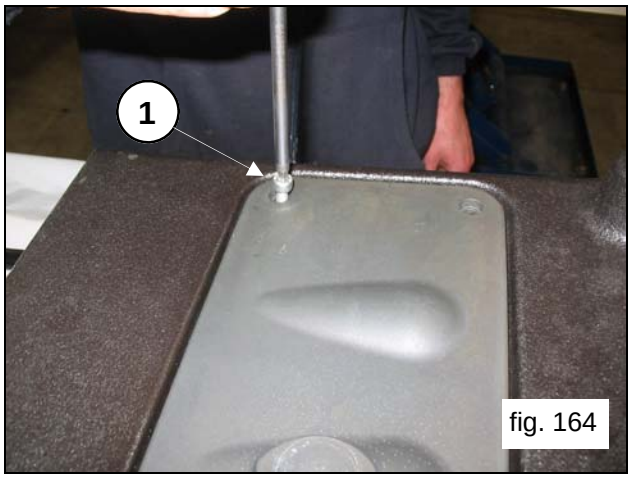


fig. 164

Set the screws with a torque wrench, as shown in section 3, "Screw tightening settings".

3. SCREW CALIBRATION

Screws must be tightened only with a torque wrench.

Description	Exploded Position	Tightening Torque Nm
M8x20 screw, casing cover	42	25
G1/2x13 plug, casing	66	40
M8x30 screw, PTO bearing cover	85	25
M8x20 screw, shaft end cover	42	25
M10x30 screw, bearing support cover	57	45
M6x14 screw, upper & lower covers	70	10
M8x20 screw, bearing cover	42	25
M12x1.25x87 screw, connecting rod tightening	40	75 *
M10x35 screw, piston head	38	60
M12x25 screw, bush locking flange	51	68.5
M10x160 screw, piston attachment	27	40
M16x55 screw, valve cover	26	333
G1/4”x13 plug, head	13	40
M16x150 screw, head	25	333 **
Valve lifter	2	40

* Reach the tightening torque by tightening the screws simultaneously

** Tighten the screws, beginning by cross-tightening the 4 inside screws (see fig.135) and then moving on to the 4 outside screws, again cross-tightening them.

4. REPAIR TOOLS

Pump maintenance can be carried out using simple equipment for dismantling and reassembling the components. The following equipment is available:

For assembly:

- Piston head radial seal ring — order code 27910900
- PTO shaft radial seal ring — order code 27539500
- O-ring, outlet valve seat LK36-LK40-LK45 — order code 27516000
- O-ring, outlet valve seat LK50-LK55-LK60 — order code 27516100

For disassembly:

- Inlet valve seat LK36-LK40-LK45 — order code 27516200
- Inlet valve seat LK50-LK55-LK60 — order code 27516300
- Outlet valve seat LK36-LK40-LK45 — order code 27516400
- Outlet valve seat LK50-LK55-LK60 — order code 27516500
- Liner + gasket support block — order code 27516600
- Shaft (for locking connecting rods) — order code 27566200

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