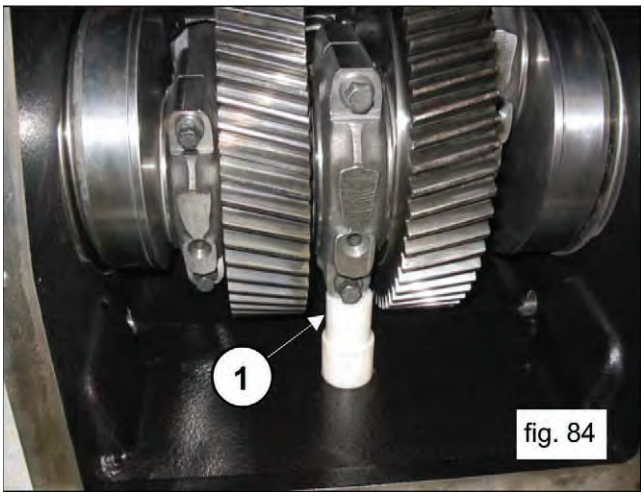
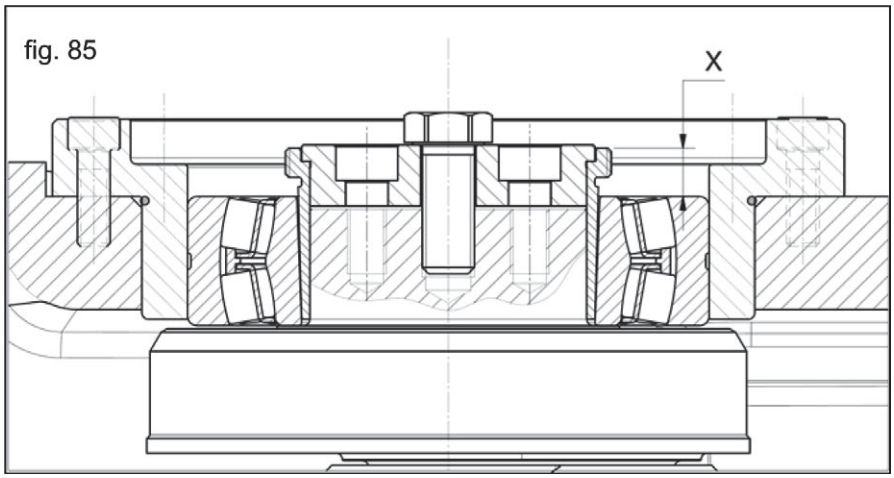
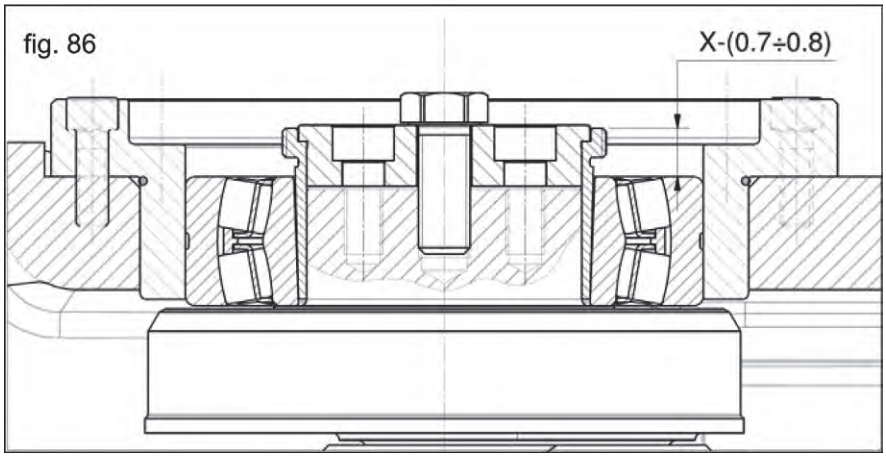
Insert a shim under the shank of the central connecting rod, to stop the rotation of the crankshaft (pos. 1, fig. 84).



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



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).



Repeat the operation on the other side.

Remove the M16 screw from the crankshaft. Screw the two bushing locking flanges onto the crankshaft using 4 M12X25 screws (pos. 1, fig. 87).

Apply LOCTITE 243 to the threads of the M12X25 screws (pos. 1, fig. 87).

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

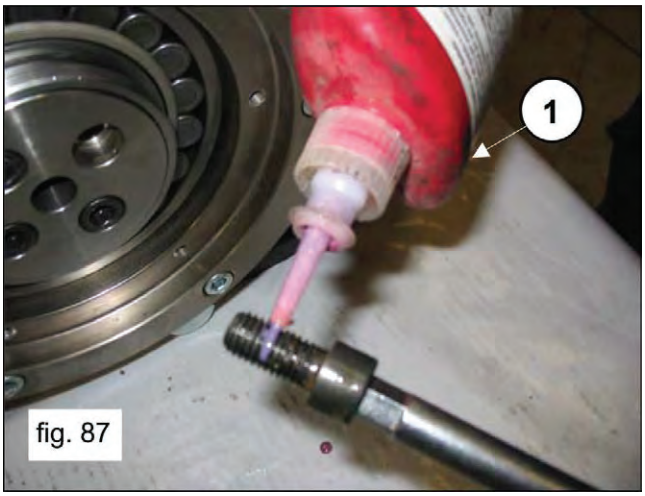


fig. 87

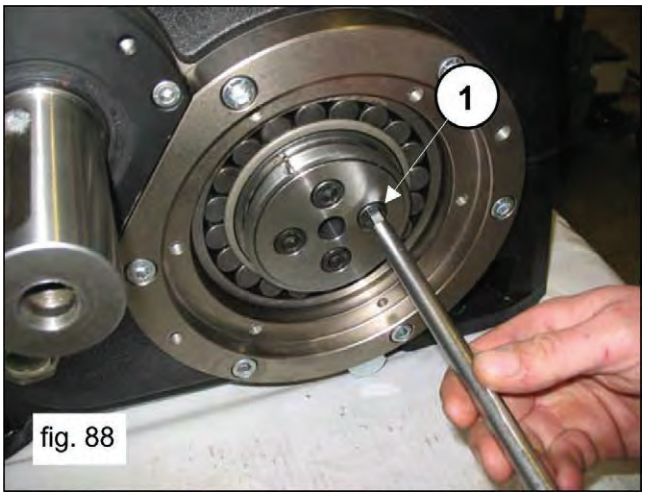


fig. 88

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 M8X20 screws (pos. 1, fig. 90). Tighten the screws with a torque wrench, as shown in section 3, “Screw Tightening Settings”.

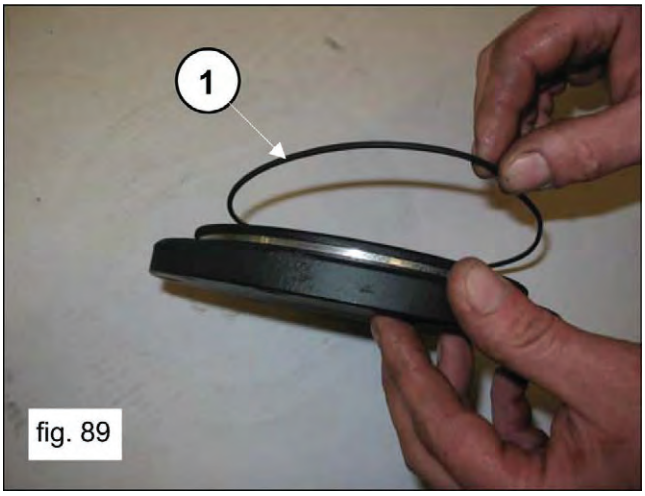


fig. 89

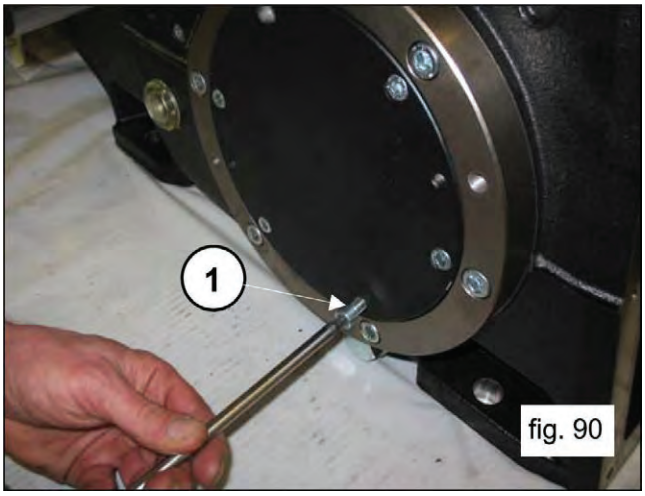
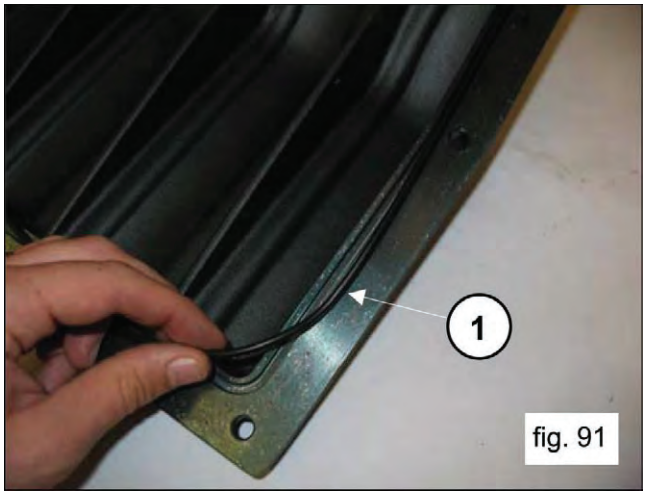
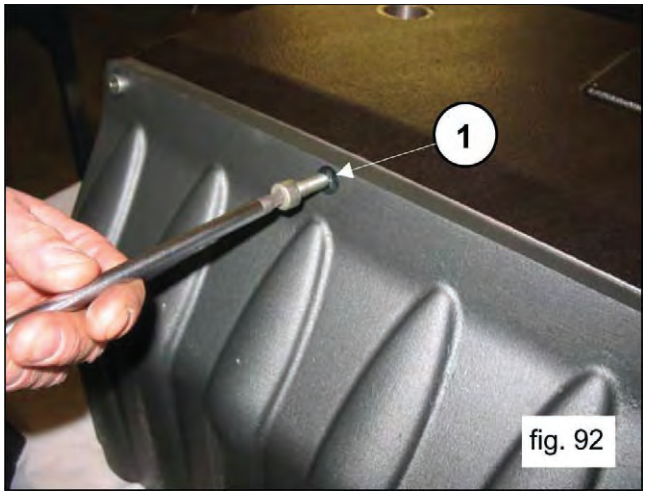


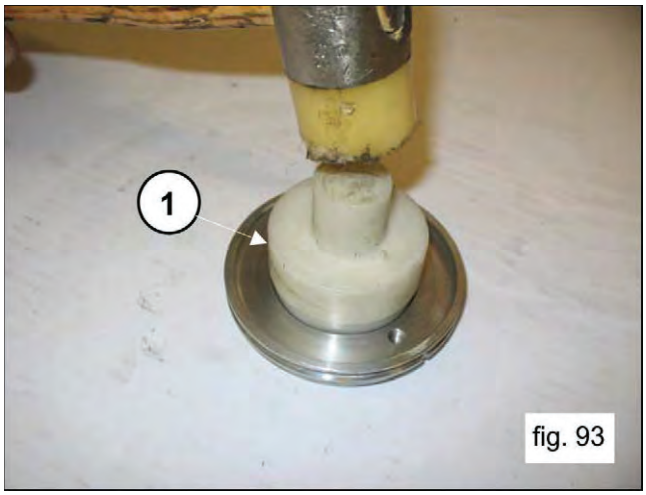
fig. 90

Insert the O-ring into the rear cover (pos. 1, fig. 91) and affix it to the casing using 10 M8X20 screws (pos. 1, fig. 92). Tighten the screws with a torque wrench, as shown in section 3 “Screw Tightening Settings”.

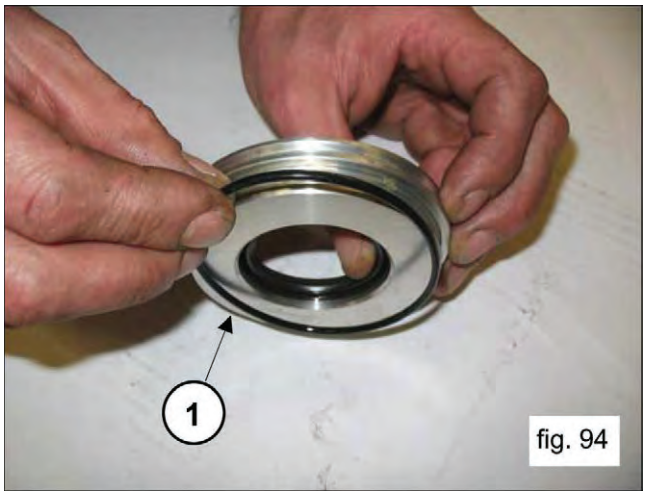




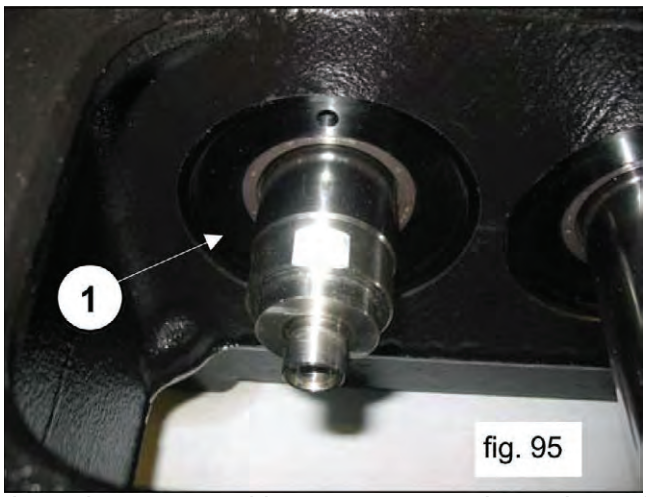
Mount the radial seal ring onto the oil seal cover (pos. 1, fig. 93) using a pad (F27910900).

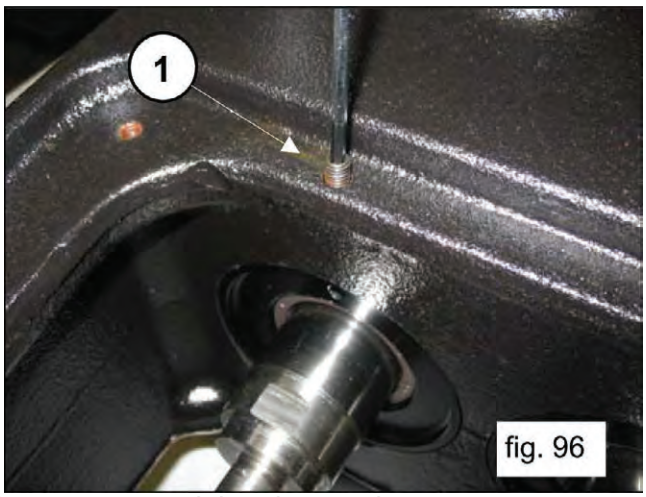


Position the O-ring (pos. 1, fig. 94) on the seat of the oil seat cover.



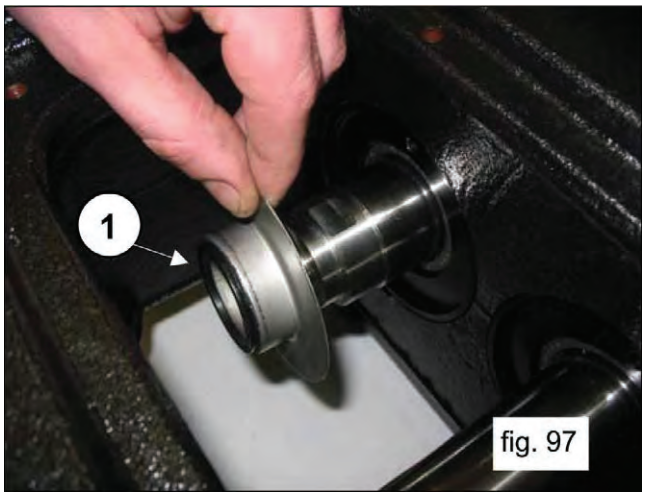
Insert the assembly into the casing and into the seat provided, making sure that the cover completely enters its seat (pos. 1, fig. 95), being careful not to damage the lip of the radial seal ring. Screw in the oil seal covers using 2 M6X30 grub screws (pos. 1, fig. 96).

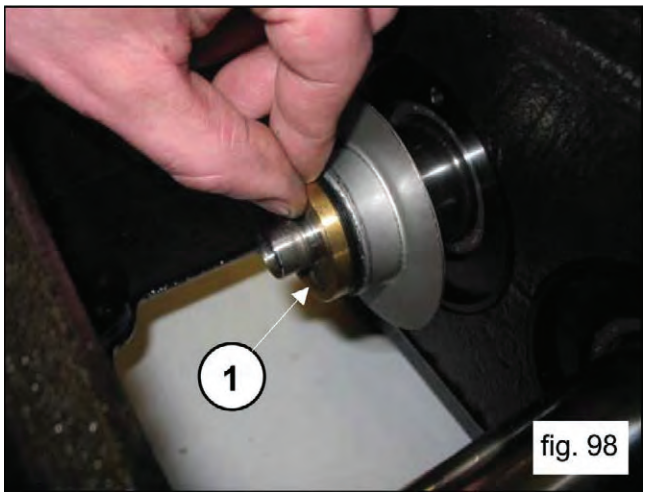




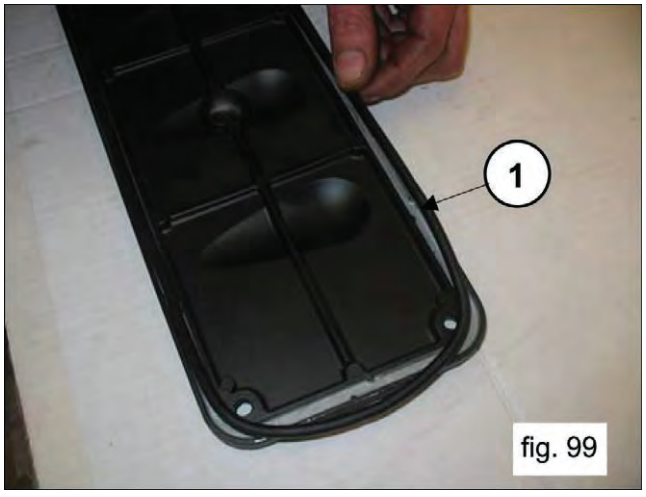
Tighten the screws with a torque wrench as shown in section 3, “Screw Tightening Settings”.

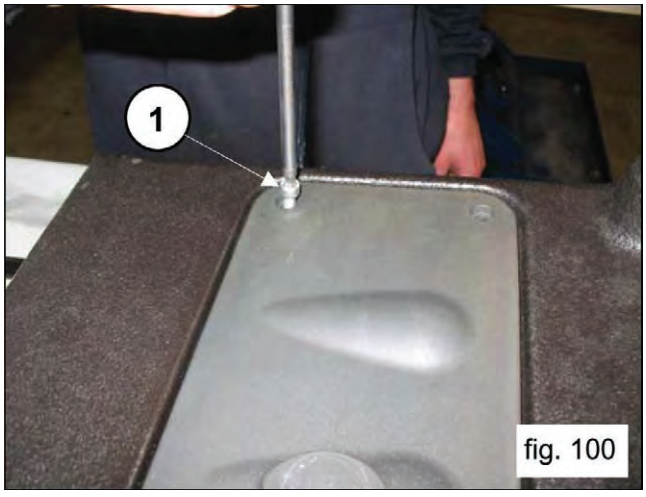
Position the spray guard and the spray guard spacer ring in the seat on the piston head stem (pos. 1, fig.97and fig. 98).





Insert O-rings on the two inspection covers (pos. 1, fig. 99) and mount the covers using 4 M6X14 screws (pos. 1, fig. 100).





Tighten 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 M8X20 screws (pos. 1, fig. 101). Tighten the screws with a torque wrench, as shown in section 3 “Screw Tightening Settings”.

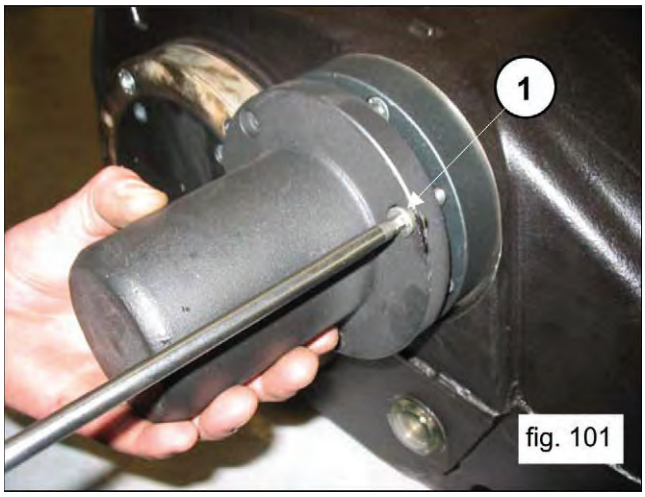


fig. 101

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

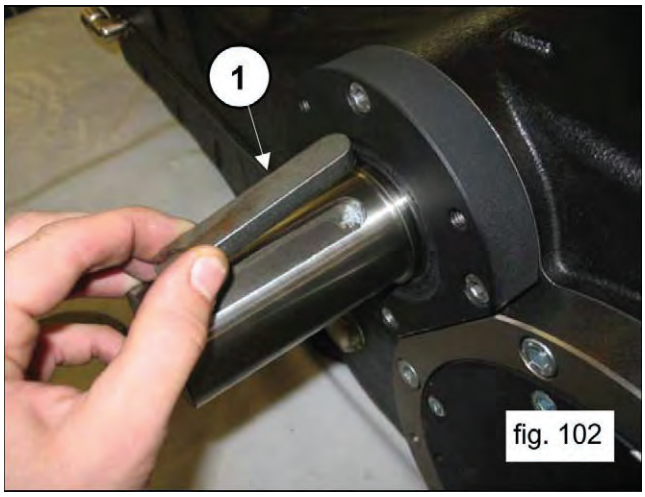


fig. 102

2.1.3 Classes of Increase

INCREASE TABLE FOR CRANKSHAFT AND CONNECTION ROD HALF-BEARINGS			
Recovery Classes (mm)	**Upper half bushing p/n**	**Lower half bushing p/n**	**Crank pin grinding measures (mm)**
0.25	90931100	90930100	Ø 92.75 0/-0.03 Roughness Ra 0.4 Rt 3.5
0.50	90931200	90930200	Ø 92.50 0/-0.03 Roughness Ra 0.4 Rt 3.5

INCREASE TABLE FOR PUMP CASING AND PISTON HEAD		
Recovery Classes (mm)	**Piston Head p/n**	**Crank pin grinding measures (mm)**
1.00	74050243	Ø 81 H6 + 0.22/0 Roughness Ra 0.8 Rt 6

2.2 Repair of the Hydraulic Parts

2.2.1 Dismantling the head - the valve assemblies

The head requires preventive maintenance as indicated in the Owner's Manual. 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).

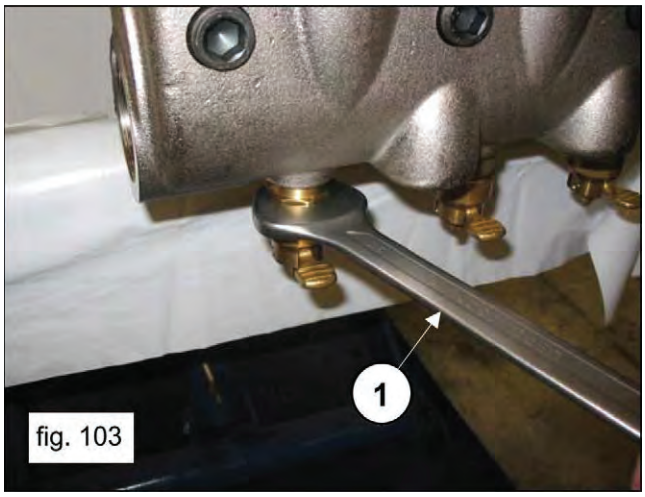


fig. 103

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 plungers to knocks or bumps when taking them out of the head.

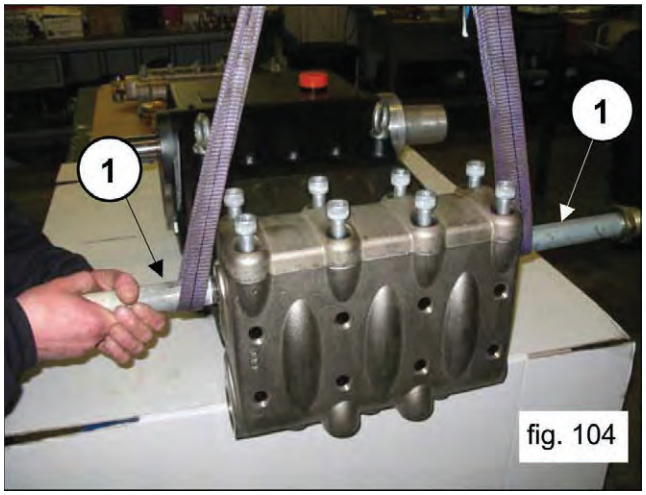


fig. 104

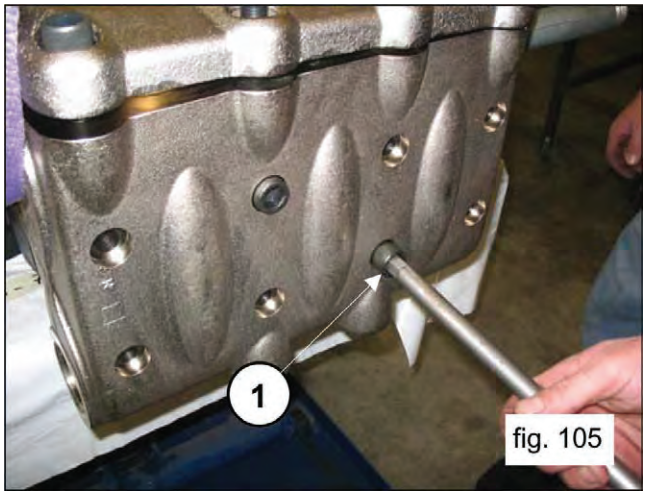


fig. 105

Unscrew and remove the 8 M16X55 screws of the valve cover (pos. 1, fig. 106) and remove the cover (pos. 1, fig. 107).

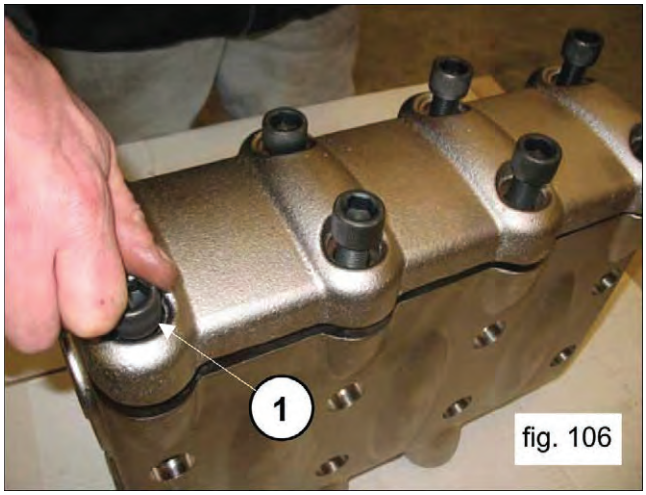


fig. 106

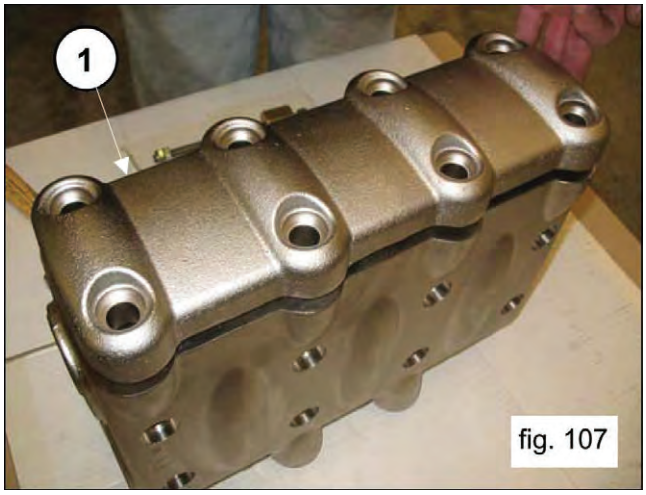


fig. 107

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

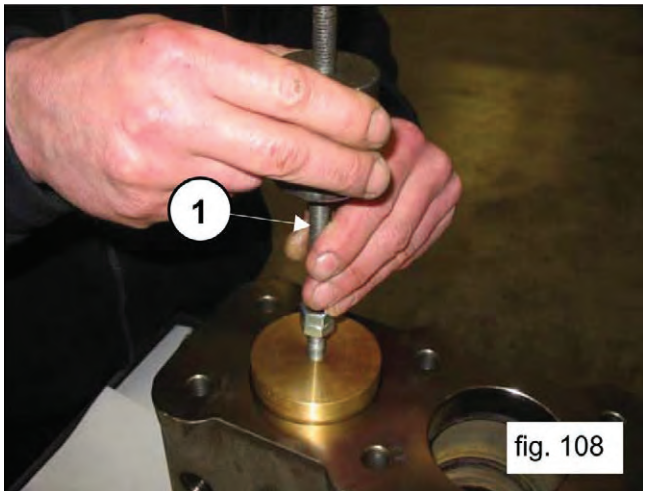
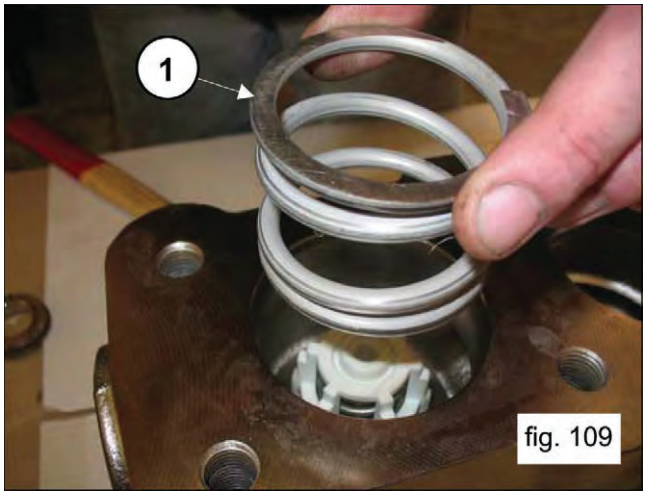
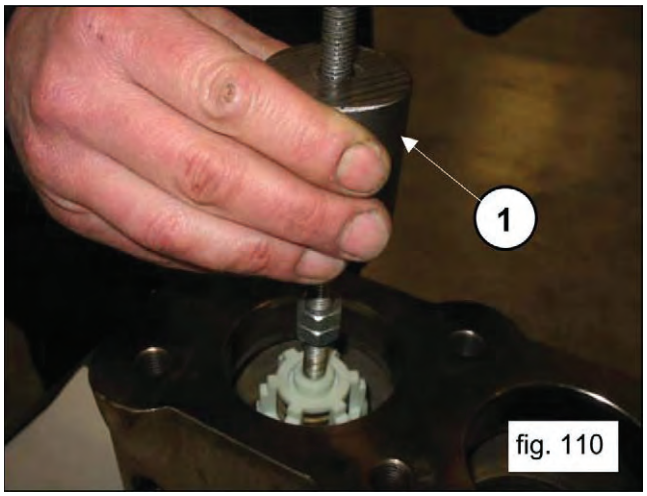


fig. 108

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

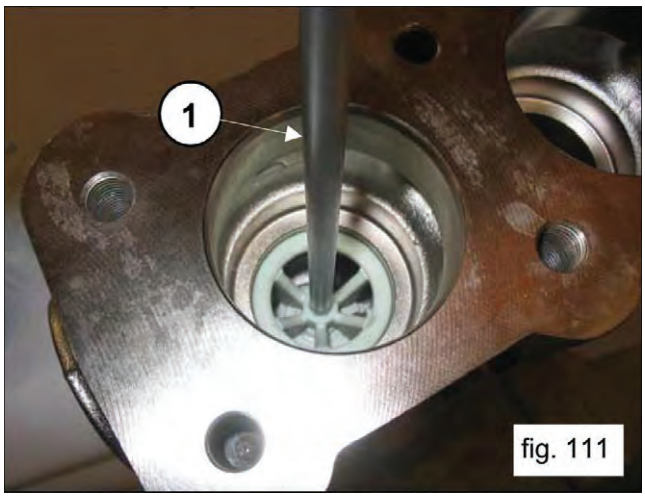


Remove the outlet valve assembly by using a slide hammer puller applied to the M10 hole in the valve holder (pos. 1, fig. 110).



If it is particularly difficult to remove the outlet valve assembly (e.g. there are build up deposits because the pump has not been used for a long period), use the extractor tool F27516400 (for LK36,40,45) or p/n F27516500 (for LK50, 55, 60).

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

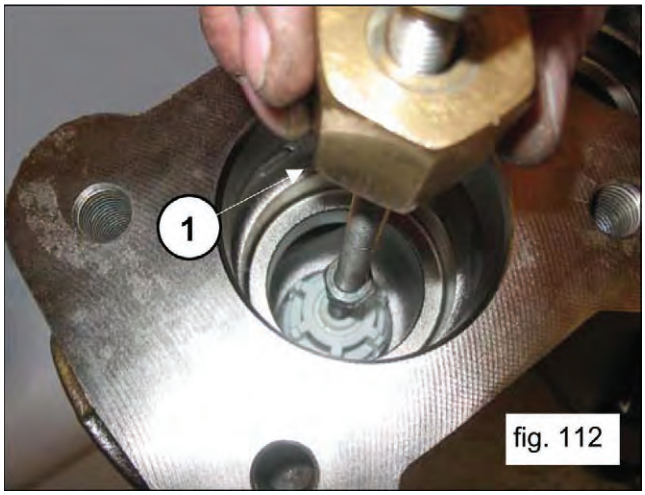


fig. 112

If it is particularly difficult to remove the outlet valve assembly (e.g. there are build up deposits because the pump has not been used for a long period), use the extractor tool F27516200 (for LK36,40,45) or p/n 27516300 (for LK50, 55, 60) (pos. 1, figs 113) and use it as shown in the diagram.

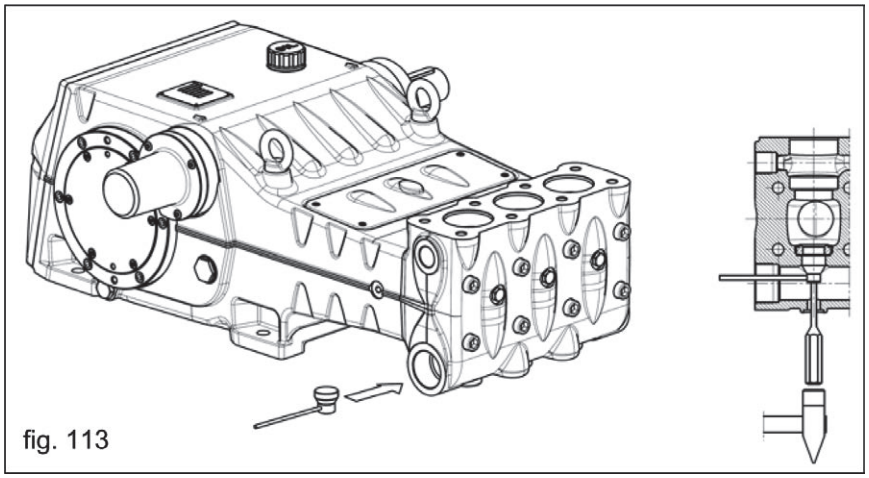


fig. 113

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).

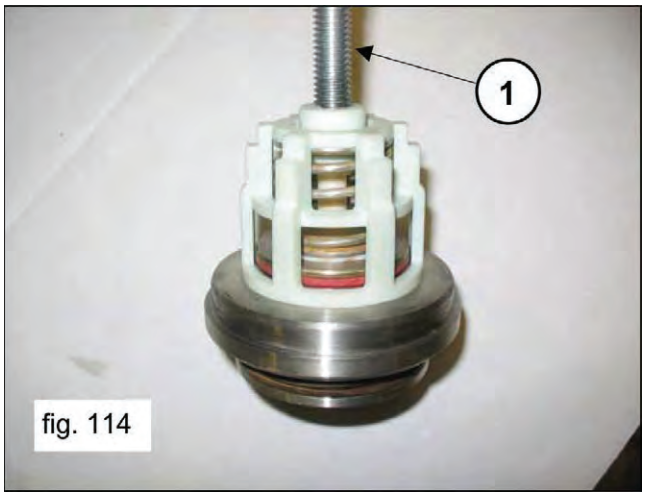


fig. 114

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, located by the arrows (pos. 1, fig. 115), and then dry these seats completely.

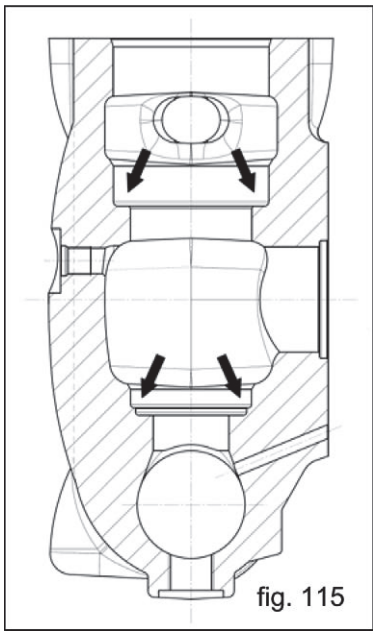


fig. 115

Proceed with the assembly, 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 surface of the holder (fig. 118) and use a mallet/striking hammer around the entire circumference.

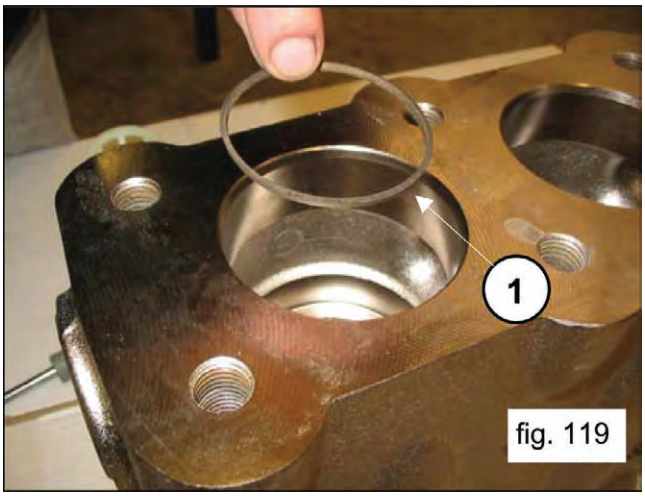
fig. 116

fig. 117

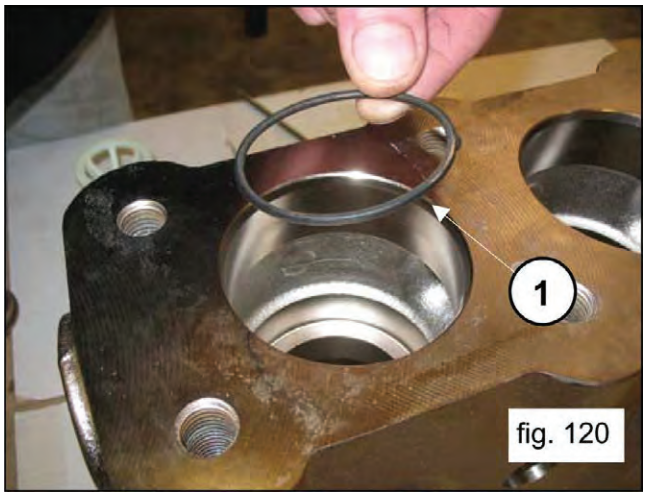
fig. 118

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 the anti-extrusion rings.

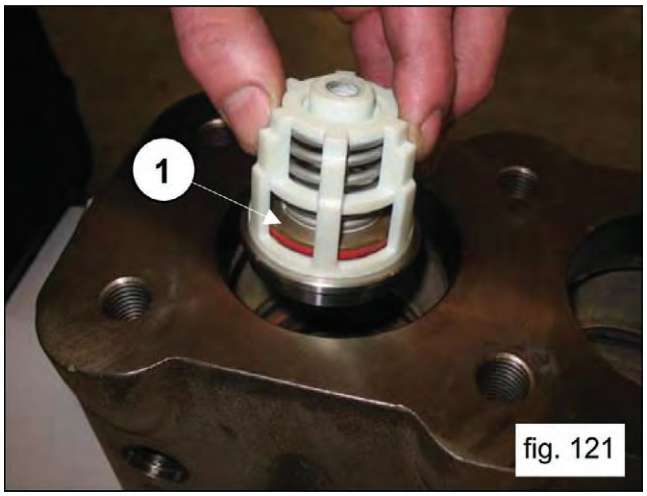
The correct assembly sequence for the valve assemblies in the head is as follows:
Insert the anti-extrusion ring, exploded Position #4, from Owner's Manual, (pos. 4, fig. 119).

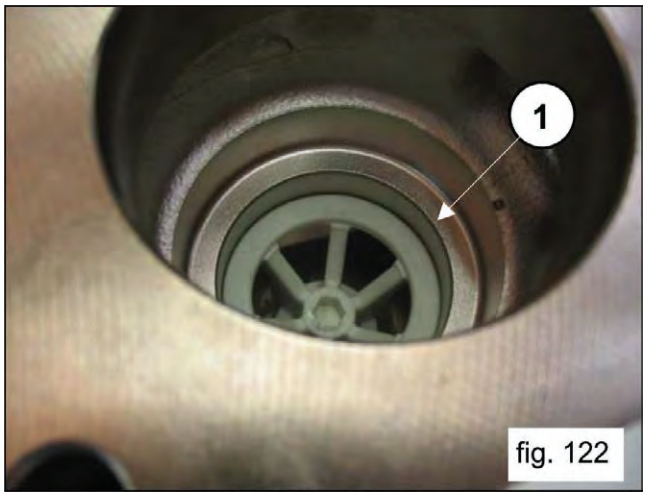


Insert the O-ring, exploded position #5, from Owner's Manual, (pos. 1, fig. 120).



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





Mount the O-ring, exploded position #5, from Owner's Manual, (pos. 1, fig. 123) and the anti-extrusion ring, exploded position #15 (pos. 2, fig. 123), onto the outlet valve seat.

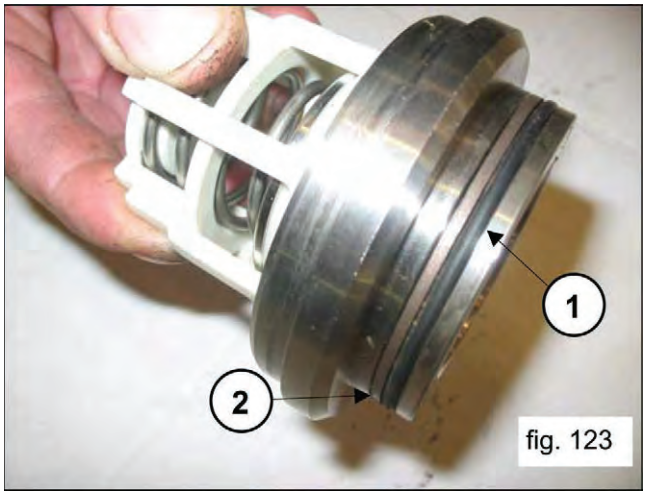


fig. 123

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.

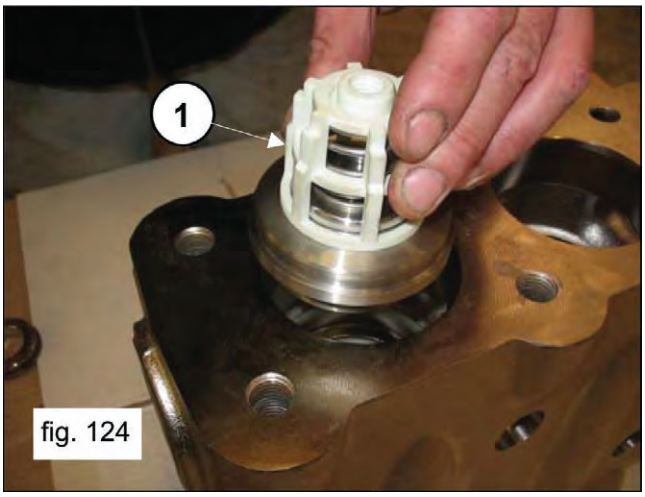


fig. 124

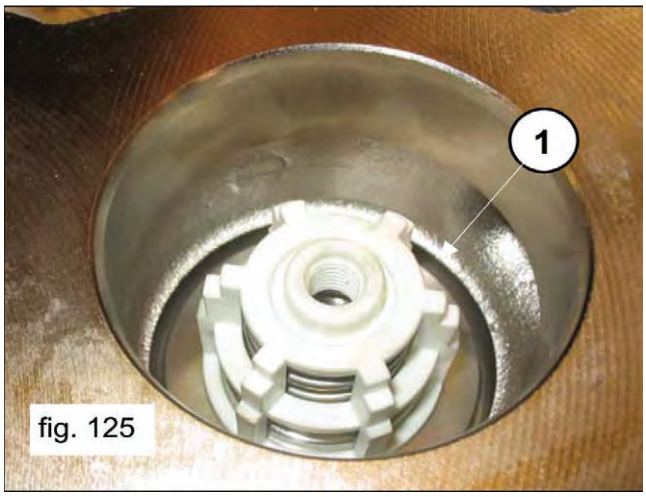


fig. 125

Insert the anti-extrusion ring, exploded position #16 (pos. 1, fig. 126).

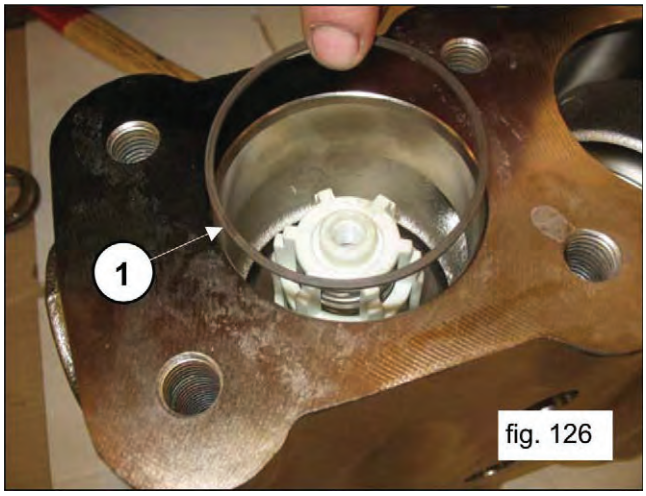


fig. 126

Insert the O-ring, exploded position #17 (pos. 1, fig. 127)

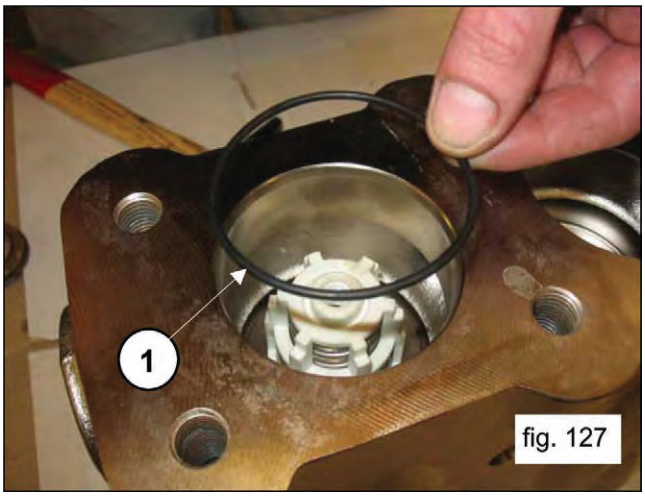


fig. 127

Be very careful when inserting the O-ring indicated in pos. 1, fig. 128. We recommend using the special tool, p/n F27516000 (for LK36, 40, 45) or p/n F27516100 (for LK50, 55, 60), to prevent the O-ring from being cut during insertion.

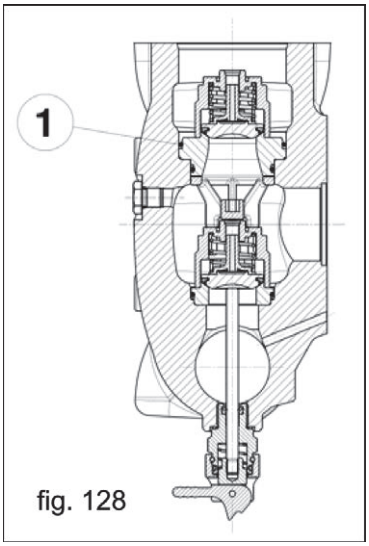


fig. 128

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

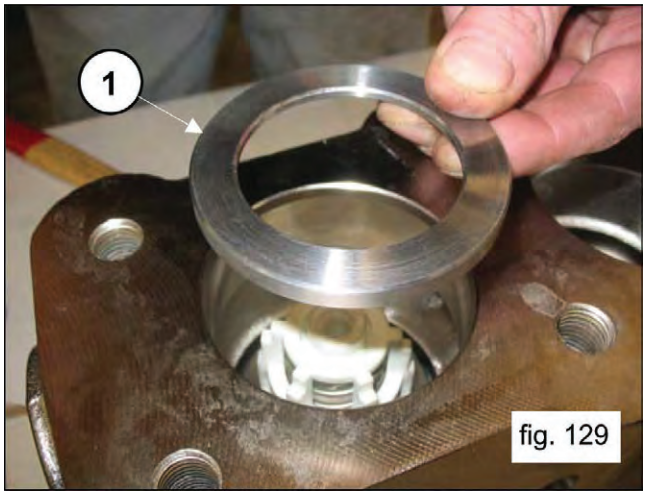


fig. 129

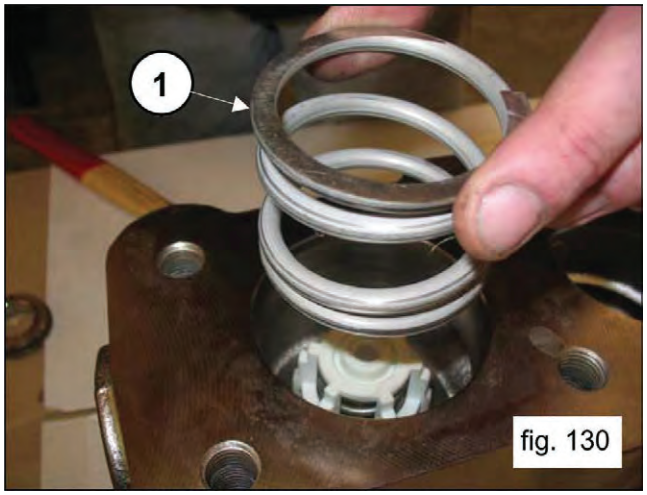


fig. 130

Mount the O-ring, exploded position #17 (pos. 1, fig. 131) and the anti-extrusion ring, exploded position #21 (pos. 2, fig 131), onto the outlet valve plug.

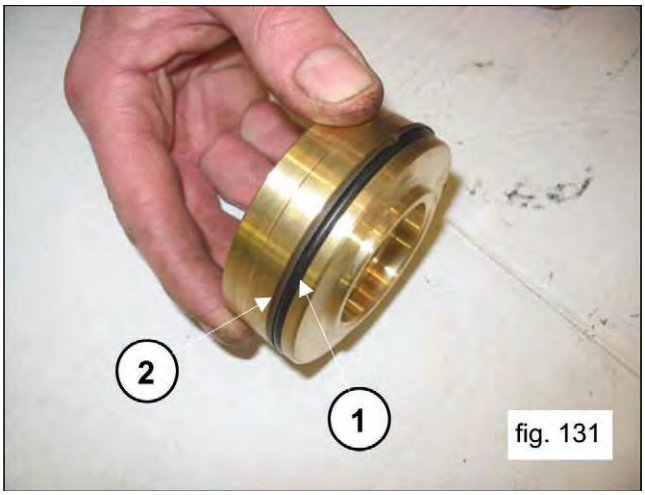


fig. 131

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).

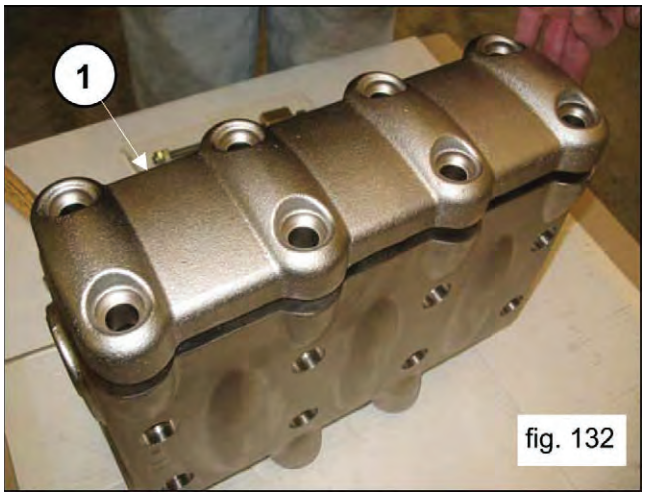


fig. 132

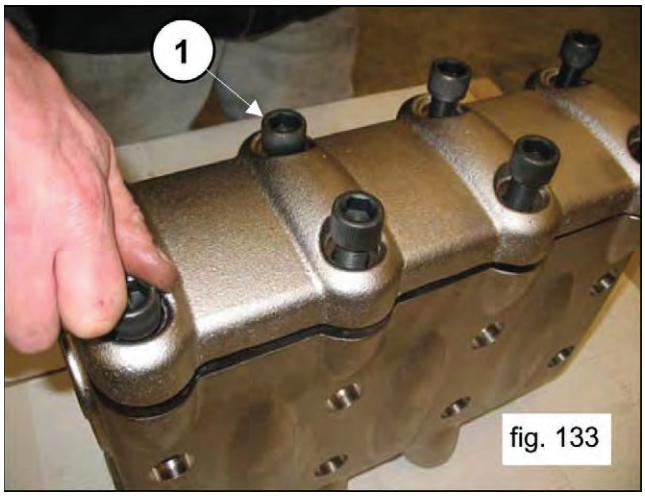


fig. 133

Attach the head to the pump casing (pos. 1, fig. 134) taking care not to subject the plungers to knocks or bumps, and screw in the 8 M16X150 screws (pos. 1, fig. 135).

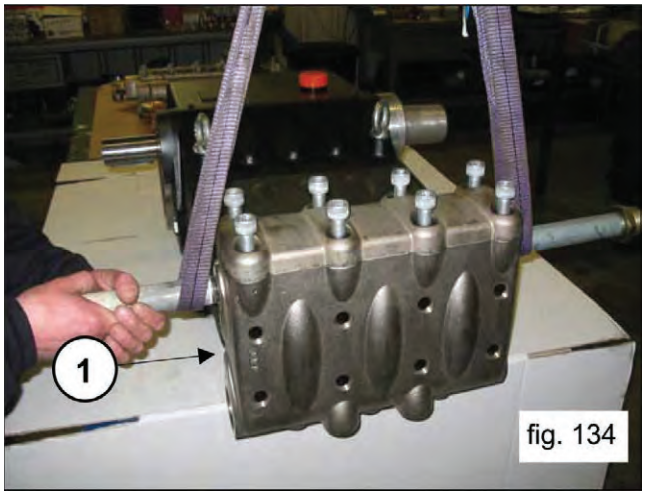


fig. 134

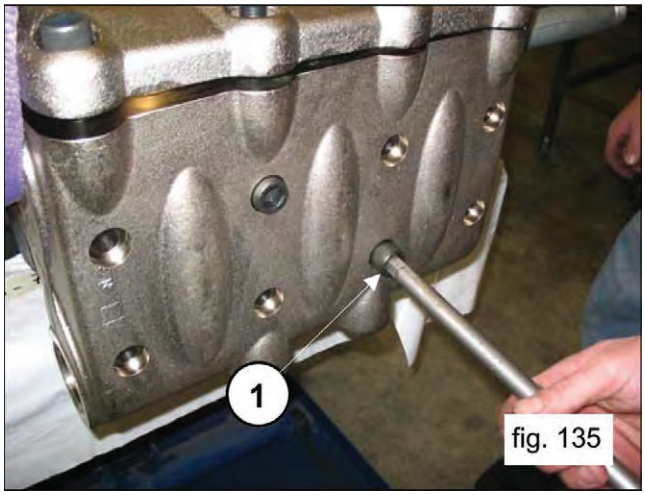


fig. 135

Proceed to tighten 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.

Tighten 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).

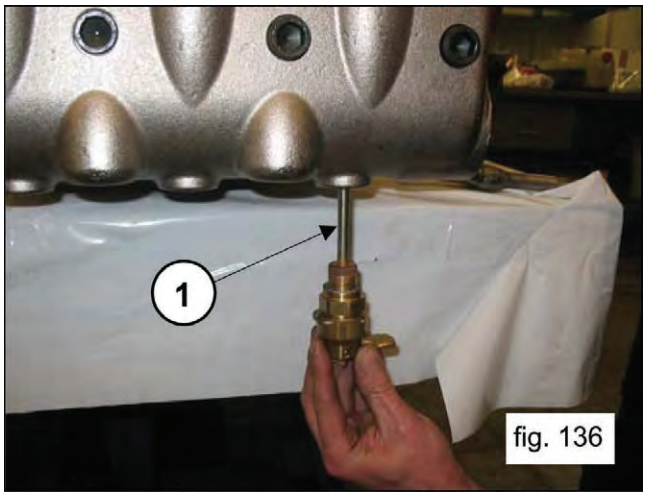


fig. 136

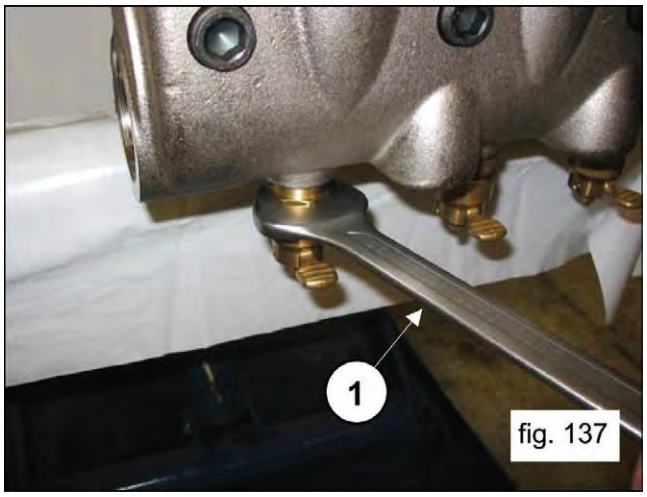


fig. 137

2.2.3 Dismantling the Plungers-Supports-Seals Assembly

The plunger assembly requires regular inspection as indicated in the preventive maintenance table in the Owner's Manual. 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 plunger assemblies, work as follows:

To access the plunger assembly, unscrew the M16X150 screws and dismantle the head.

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

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

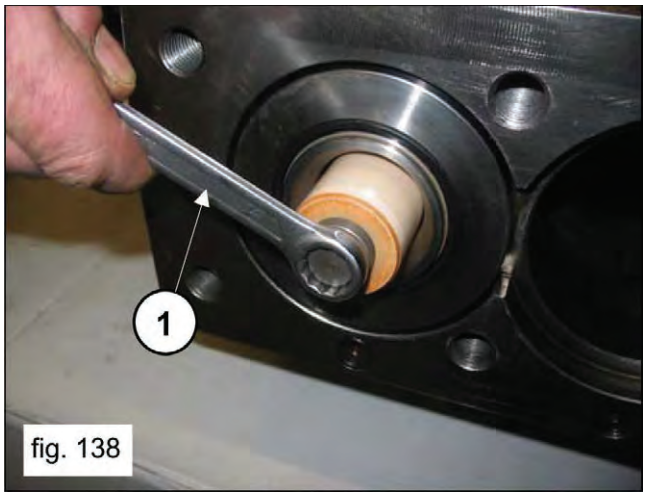


fig. 138

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

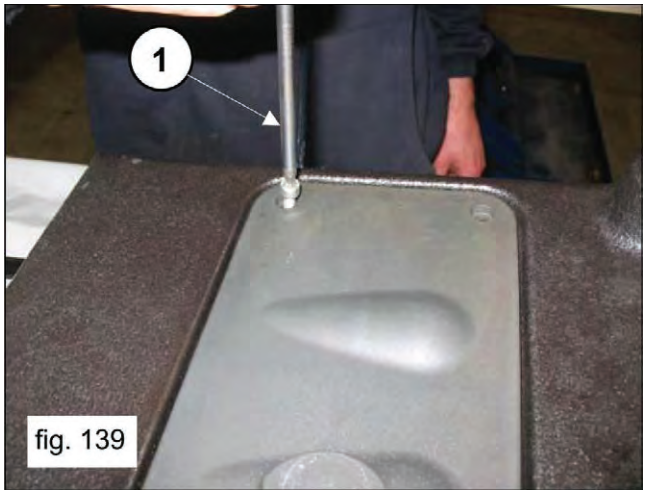


fig. 139

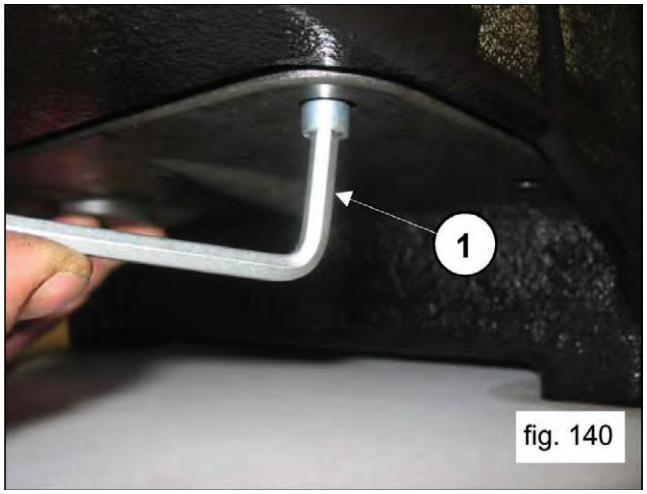
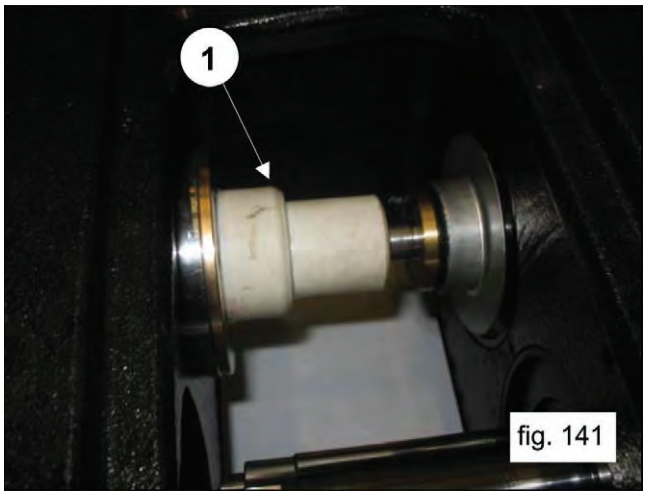
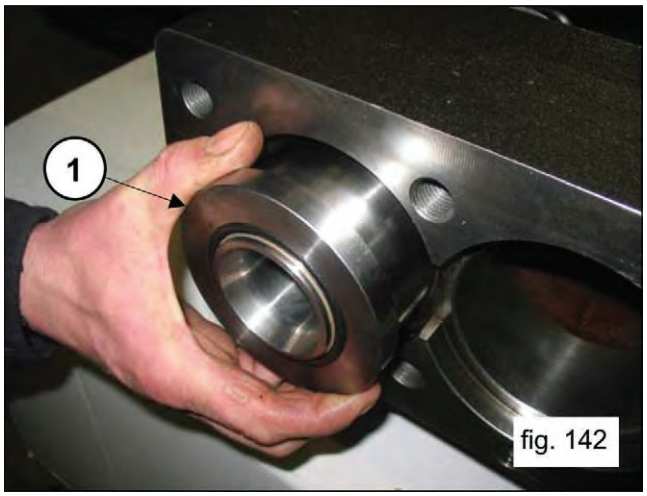


fig. 140

Manually rotate the shaft to bring the 3 plungers into the top dead center position. Insert the plastic buffer (p/n F27516600) between the plunger head and the plunger (pos. 1, fig. 141).

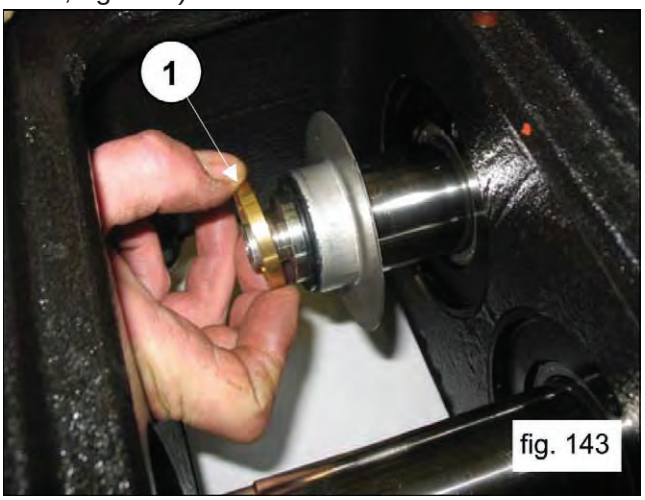


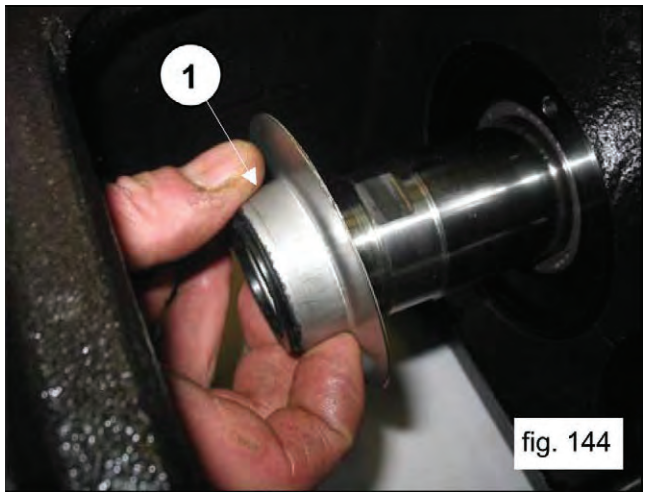
By rotating the shaft, advance the plunger head so that the plastic buffer advances in its turn and expels the gasket support and the entire plunger assembly (pos. 1, fig. 142).



Remove the gasket support assembly and the plastic buffer.

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





Separate the gasket support from the liner by using a compass spanner with Ø 5 round ends, available on the market, (pos. 1, fig. 145) and unscrew the support until it is completely removed (pos. 1, fig. 146).

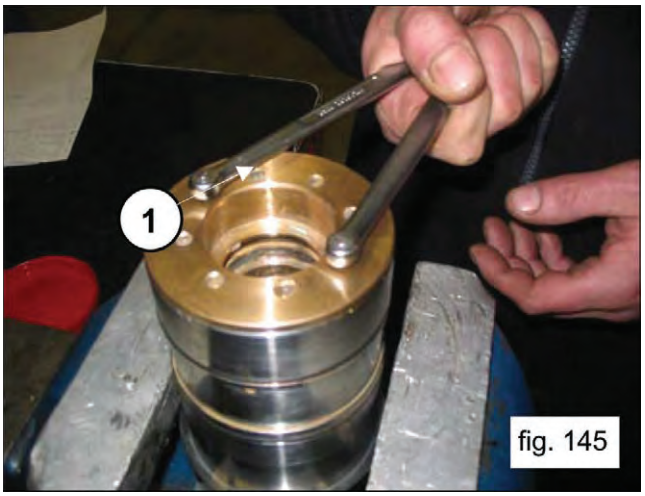


fig. 145

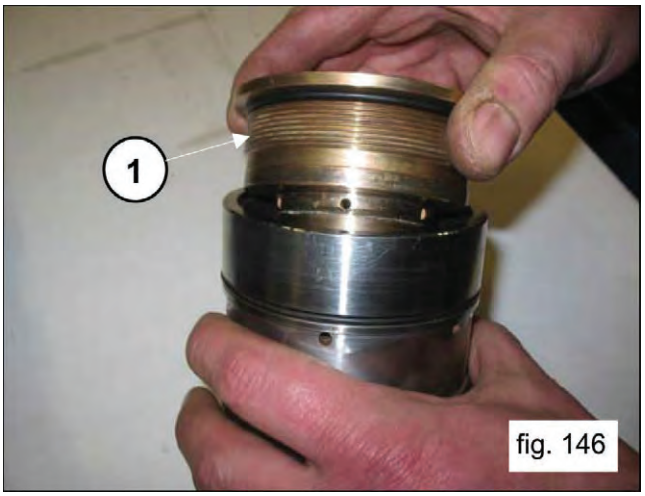


fig. 146

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

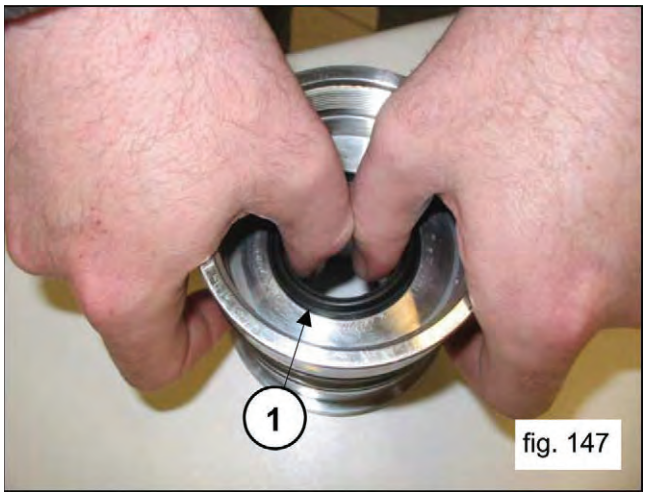


fig. 147

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).

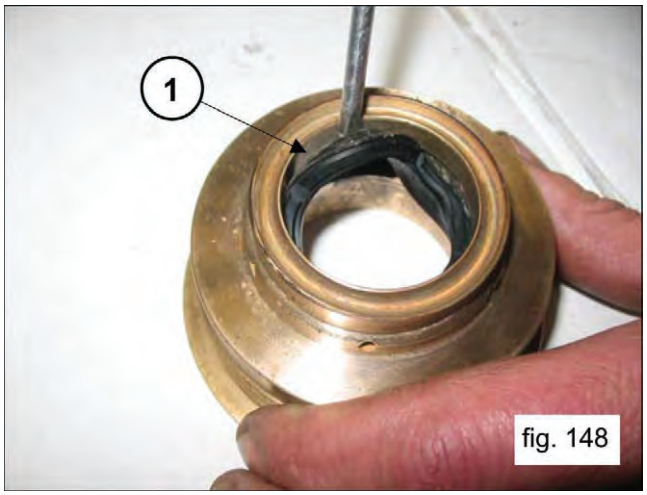


fig. 148

2.2.4 Assembling the Plungers - 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).

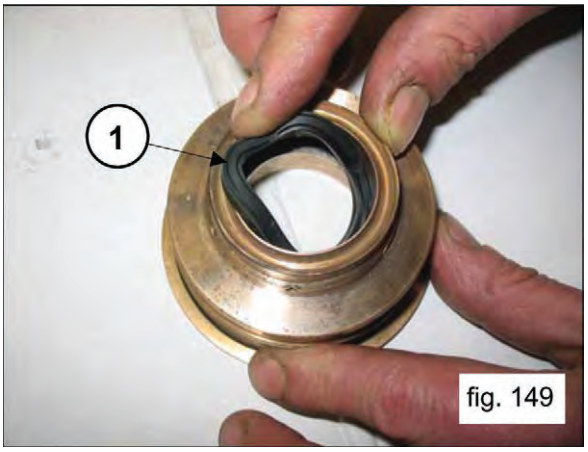


fig. 149

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

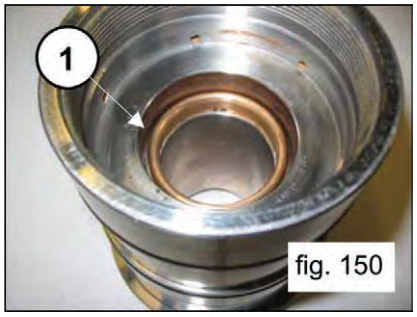


fig. 150

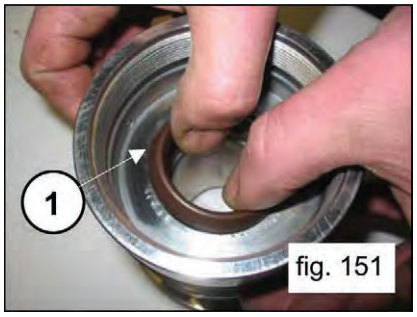


fig. 151

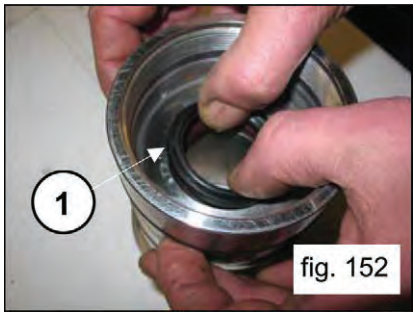


fig. 152

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

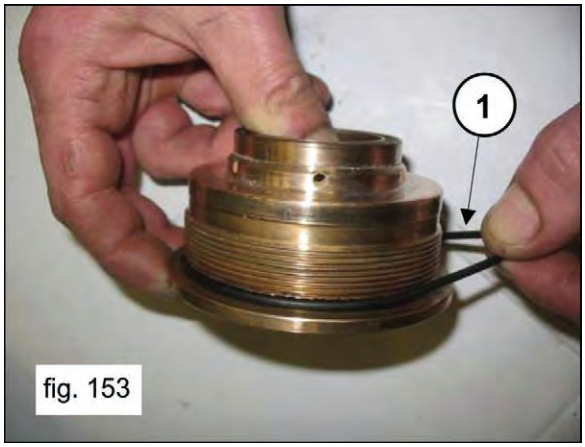
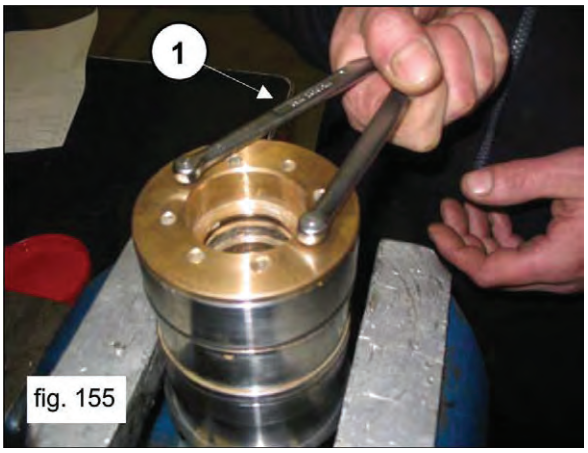
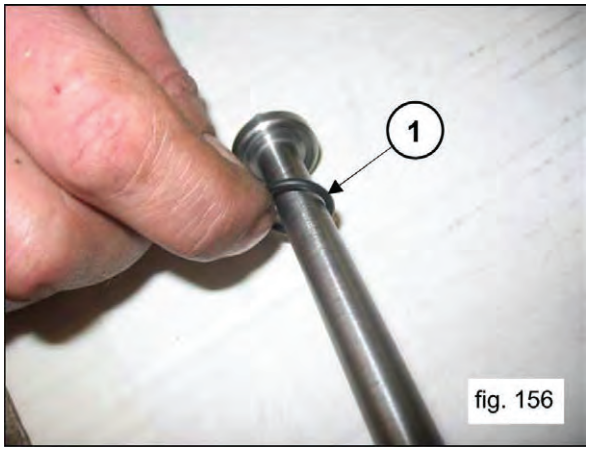


fig. 153

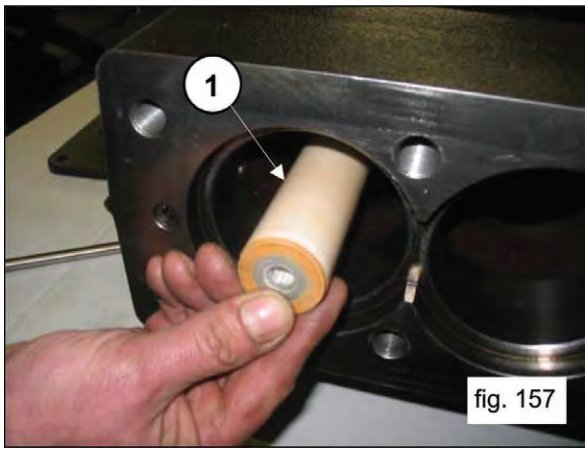
Screw the gasket support to the liner (pos. 1, fig. 154) and tighten using a compass spanner with Ø 5 round ends, available on the market (pos. 1, fig. 155), until the support abuts the liner.

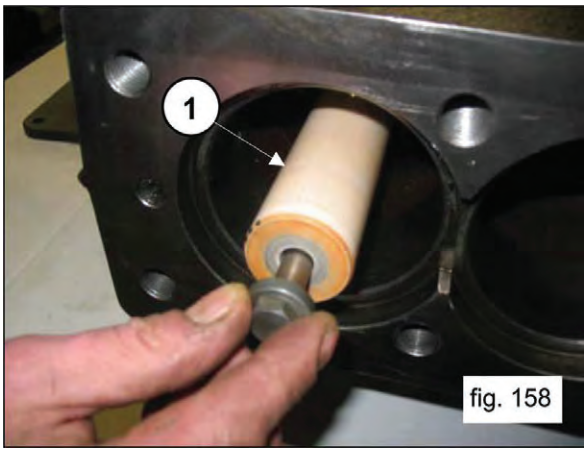


Place the 14x2 O-ring on its seat on the plunger attachment screw (pos. 1, fig. 156).



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





Tighten 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).

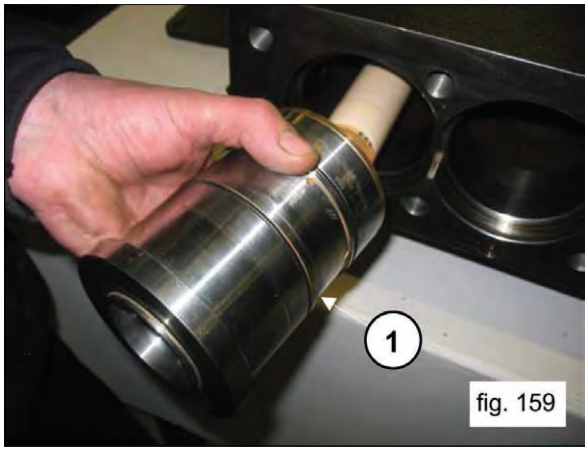


fig. 159

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

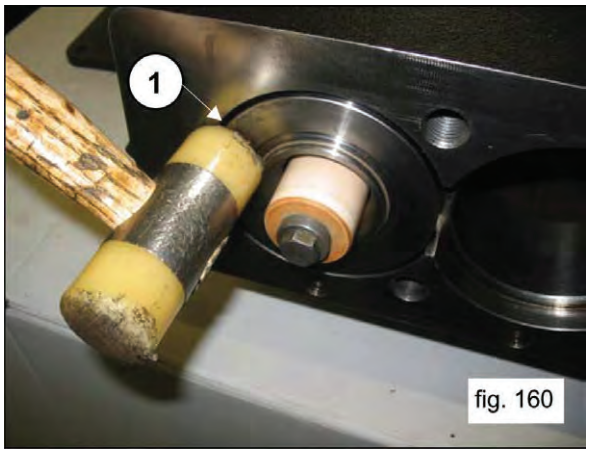


fig. 160

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).

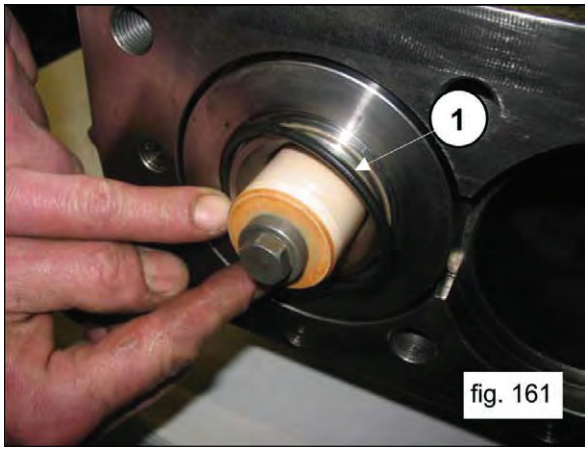


fig. 161

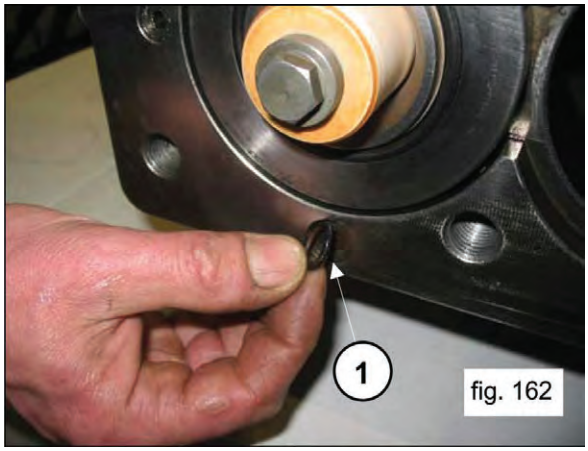


fig. 162

Insert the O-rings on the inspection covers (pos. 1, fig. 163) and mount the covers using 4 M6X14 screws (pos. 1, fig. 164).

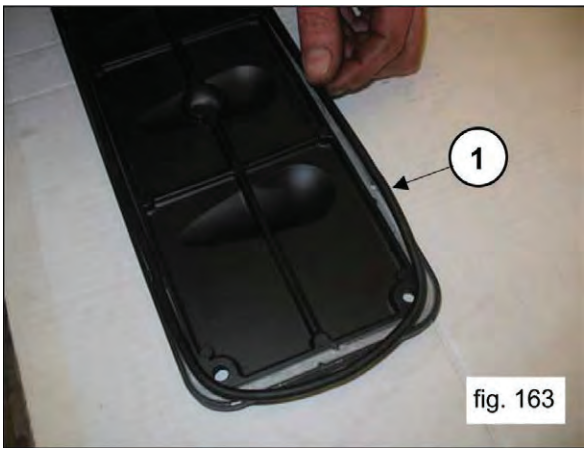


fig. 163

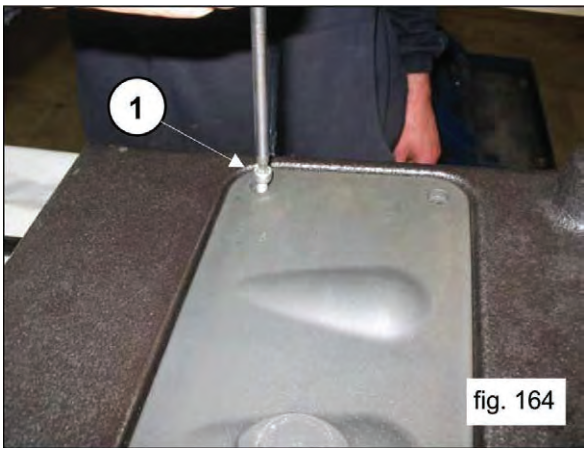


fig. 164

2.2.5 Manifold Bushings

If the insides of the plunger chamber on the manifold show clear signs of cavitation, due to incorrect pump feeding, it is possible to remove the manifold bushings to avoid replacement of the manifold.

In order to recover the manifold, preform the operations in fig. 165 for LK36-40-45 and in fig. 166 for LK50-55-60:

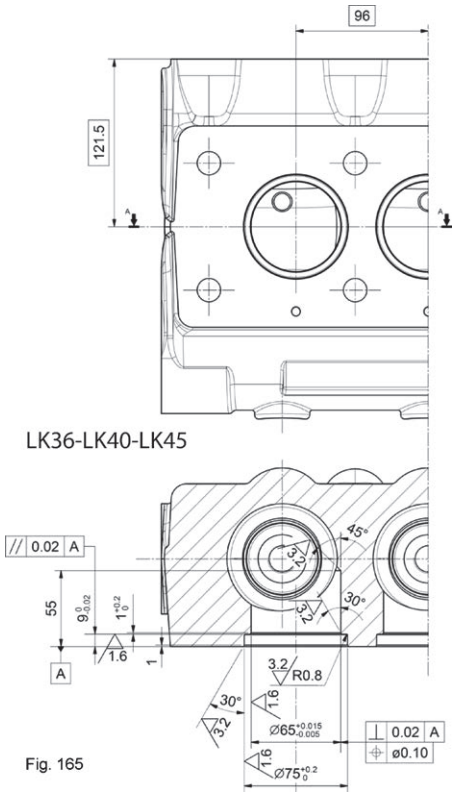


Fig. 165

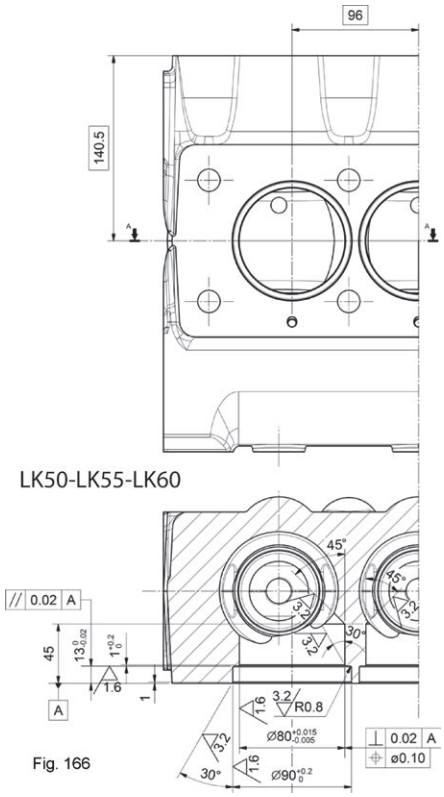


Fig. 166

The manifold bushing must be assembled by driving bushes (pos.1) together with the anti-extrusion rings (pos. 2) and O-rings (pos. 3) and shown in fig. 167 for LK36-40-45 and fig. 168 for LK50-55-60.

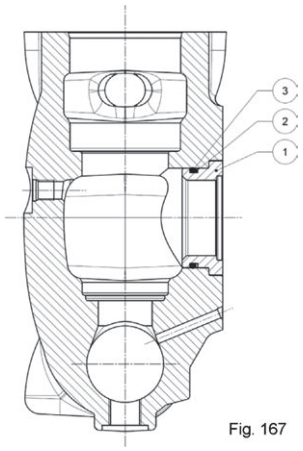


Fig. 167

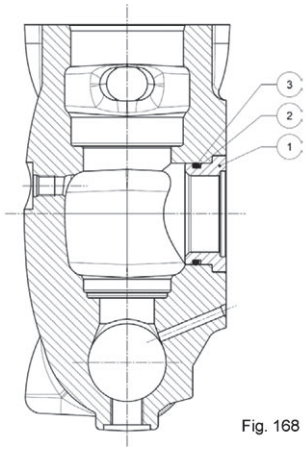


Fig. 168

No. 1 - Bush LK36-40-45 - Part # 78216756 - Qty. 3
No. 2 - Anti-extruding Ring - Part # 90526880 - Qty. 6
No. 3 - O-ring - Part # 90410200 - Qty. 6

No. 1 - Bush LK50-55-60 - Part # 78216656 - Qty. 3
No. 2 - Anti-extruding Ring - Part # 90528500 - Qty. 6
No. 3 - O-ring - Part # 90412900 - Qty. 6

3. SCREW CALIBRATION

Screws are to be fastened exclusively using a torque wrench.

Description	Exploded View Position (From Owner's Manual)	Fastening Ft. Lbs.	Fastening Nm
M8x20 screw, casing cover	54	18.44	25
G1/2x13 plug, casing	78	29.5	40
M8x30 screw, PTO bearing cover	95	18.44	25
M8x20 screw, shaft end cover	54	18.44	25
M10x30 screw, bearing support cover	69	33.2	45
M6x14 screw, upper & lower covers	82	7.38	10
M8x20 screw, bearing cover	54	18.44	25
M12x1.25x87 screw, connecting rod tightening	52	55.32	75*
M6x14 screw, plunger head	49	7.38	10
M12x25 screw, bushing locking flange	63	50.52	68.5
M10x160 screw, plunger attachment	27	29.5	40
M16x55 screw, valve cover	26	245.6	333
G1/4"x13 screw, head	13	29.5	40
M16x150 screw, head	25	245.6	333**
Valve lifter	2	29.5	40

* Reach the tightening torque by tightening the screws simultaneously.

** Tightening sequence always cross-wise starting from the 4 internal screws (see fig. 135) then the 4 external screws.

4. REPAIR TOOLS

Pump maintenance may be carried out using simple tools for assembling and disassembling components. The following tools are available:

For Assembly:

- Plunger head radial seal ring . . . . . p/n F27910900
- PTO shaft radial seal ring. . . . . p/n F27539500
  . . . . . p/n F27548200
- O-ring, outlet valve seat (LK36, LK40, LK45). . . . . p/n F27516000
- O-ring, outlet valve seat (LK50, LK55, LK60). . . . . p/n F27516100

For Disassembly:

- Inlet valve seat (LK36, LK40, LK45). . . . . p/n F27516200
- Inlet valve seat (LK50, LK55, LK60). . . . . p/n F27516300
- Outlet valve seat (LK36, LK40, LK45) . . . . . p/n F27516400
- Outlet valve seat (LK50, LK55, LK60) . . . . . p/n F27516500
- Liner + gasket support block . . . . . p/n F27516600
- Shaft (for locking connecting rods). . . . . p/n F27566200

5. Special Versions

The instructions for repairing special versions are given below. Unless specified otherwise, refer to the information in this repair manual for standard LK pump

- LKN pumps: for repair, follow the instructions for the standard LK pumps.

6. Replacing the connecting rod bushing

Perform cold-driving of the bushing and the subsequent work bearing in mind the dimensions and tolerances shown in fig. 169 below.

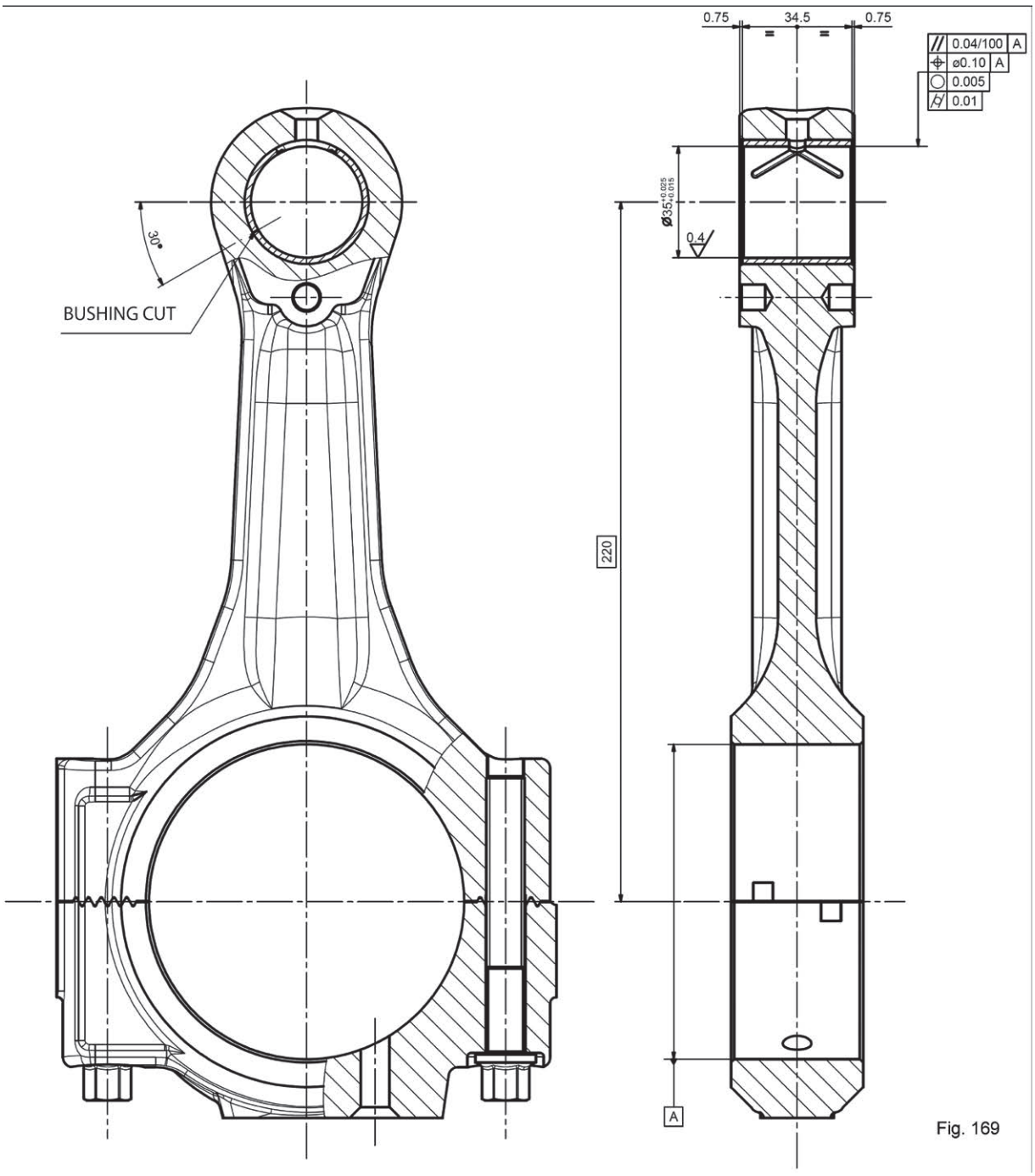


Fig. 169

MAINTENANCE LOG

	HOURS & DATE						
OIL CHANGE							
GREASE							
PACKING REPLACEMENT							
PLUNGER REPLACEMENT							
VALVE REPLACEMENT							

GENERAL PUMP

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