MK2/MKS2

Repair Manual

MK240A - MK245A - MK250A
MKS240A - MKS245A - MKS250A

MK255A - MK260A - MK265A
MKS255A - MKS260A - MKS265A

General Pump is a Member of The Interpump Group

Ref 310200 Rev. A
02-21

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1. INTRODUCTION

This manual describes the instructions for Repairing MK2/MKS2 Series pumps, and must be carefully read and understood before performing any repair intervention on the pump. Correct use and adequate maintenance is fundamental for the pump's regular operation and long wear. General Pump declines any responsibility for damage caused by the misuse or the non-observance of the instructions described in this manual.

2. REPAIR INSTRUCTIONS

2.1 Crank Mechanism Repair

Crank mechanism repair operations must be carried out after draining the oil from the crankcase. To drain the oil, remove the oil refill cap 1, Fig. 1, and then the draining plug (2, fig. 1).

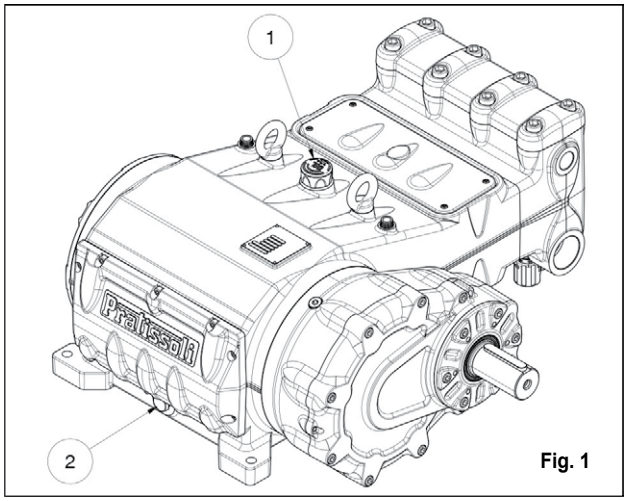


Fig. 1

The oil in the gearbox can be removed by unscrewing the plug on the bottom of the reduction gearbox, (1 Fig. 1/a).

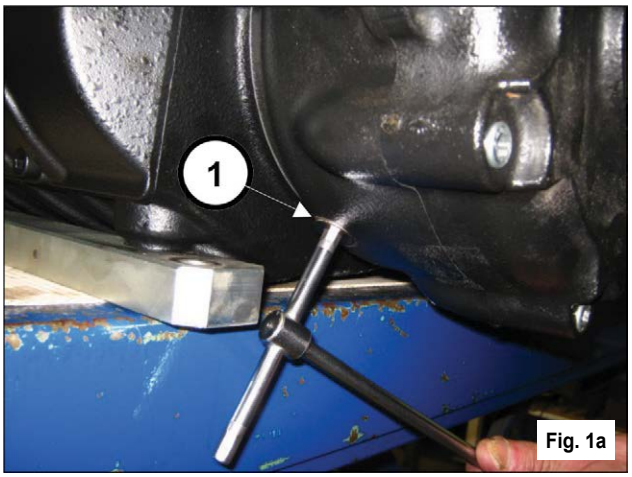


Fig. 1a

Exhausted oil must be collected in an appropriate receptacle and disposed of in designated locations. In absolutely no case may it be disposed of in the environment.

2.1.1 Crank Mechanism Disassembly
The correct sequence is the following

Completely drain the oil from the pump, then remove the key from the shaft (1, fig.2).

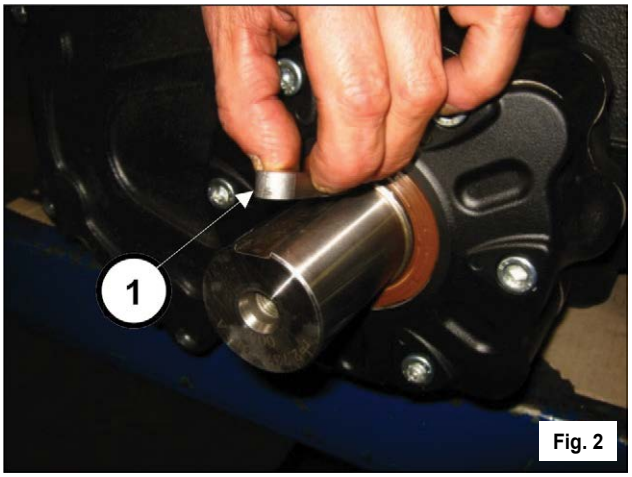


Fig. 2

Unscrew the reducer flange fastening screws (1, fig. 3) and remove the flange from the shaft.

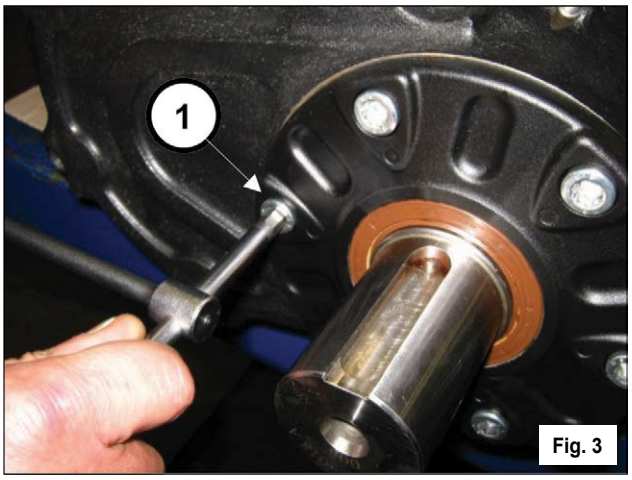


Fig. 3

On the opposite side, unfasten the screws (1, fig. 4) and therefore remove the bearing cover.

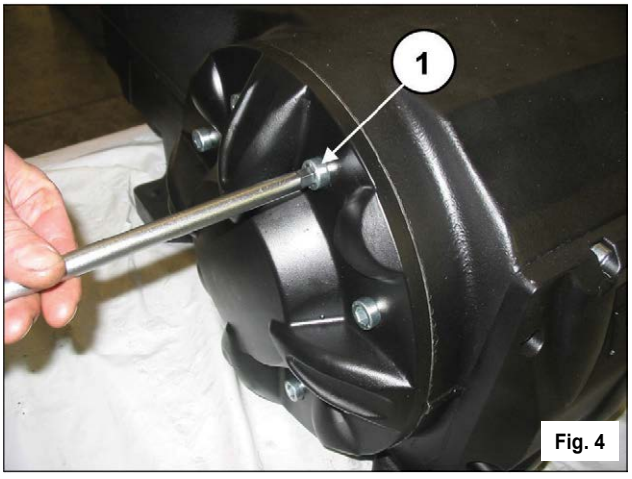


Fig. 4

Disassemble the crankcase cover by unfastening the relevant screws (1, fig. 5).

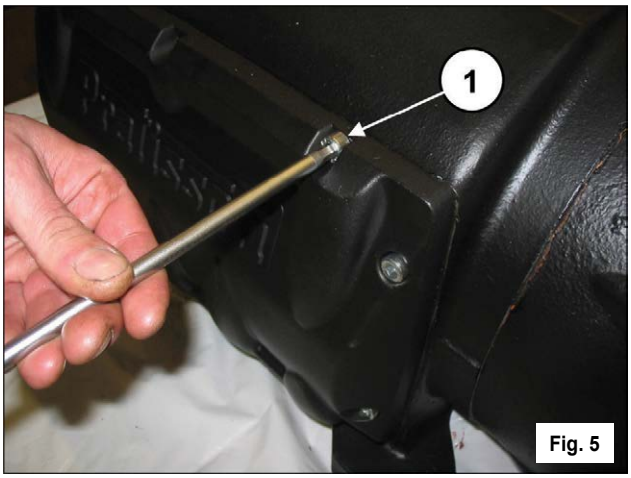


Fig. 5

Unfasten the reducer cover screws (1, fig. 6).

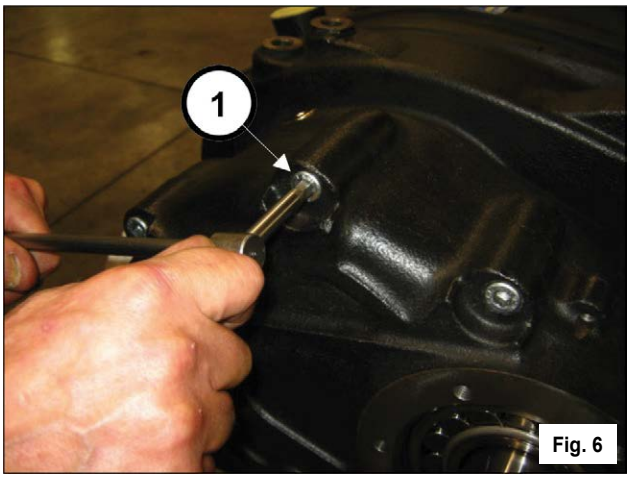


Fig. 6

Insert 3 dowels, or 3 M8 threaded screws (1, fig. 7) in the appropriate holes to aid extraction, and two sufficiently long M10 screws in order to support the cover (2, fig. 7).

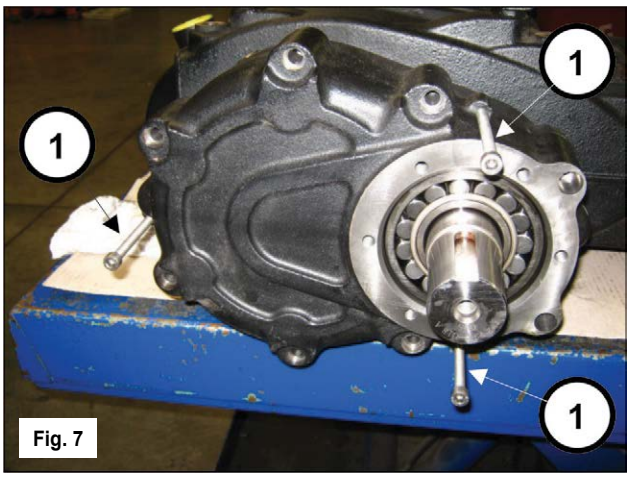


Fig. 7

Screw on the 3 threaded screws (1, fig. 8) and simultaneously, using the appropriate tool (p/n 27516700), hammer on the tool itself so that the bearing remains on the pinion when extracting the cover (1, fig. 9).

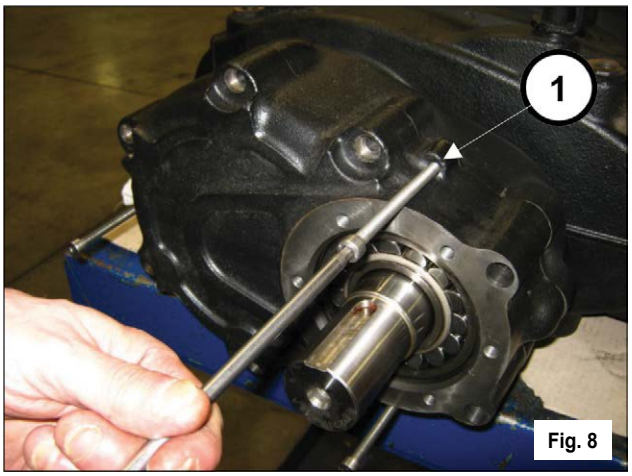


Fig. 8

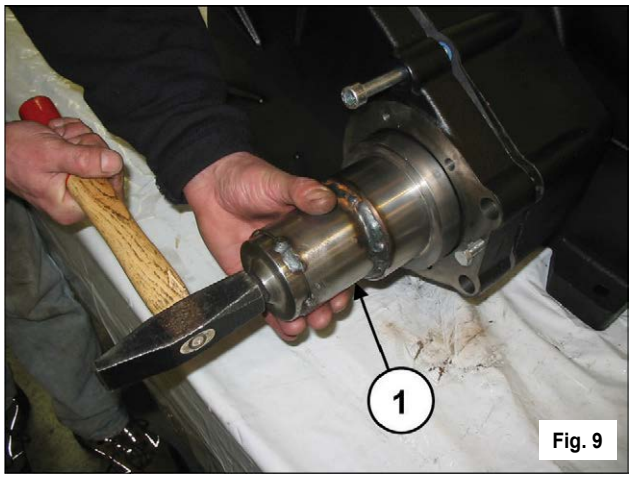


Fig. 9

When this operation is complete, remove the reducer cover and then slip off the bearing from the pinion. Remove the screws that fasten the ring gear stopper (1, fig. 10), and remove the stopper itself (1, fig. 11).

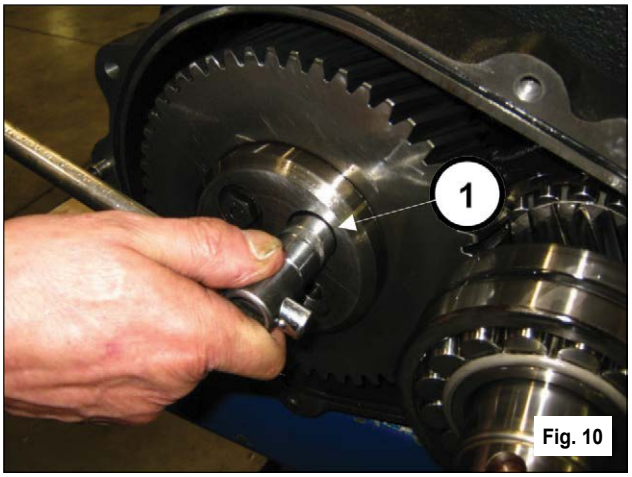


Fig. 10

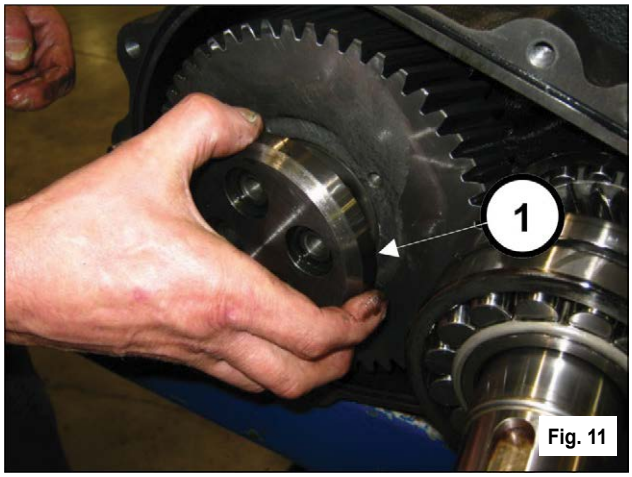


Fig. 11

In order to remove the pinion and ring gear it is necessary to apply extractor hammers to the 2 M8 holes of the ring gear (1, fig. 12) and to the pinion M14 hole (2, fig. 12).

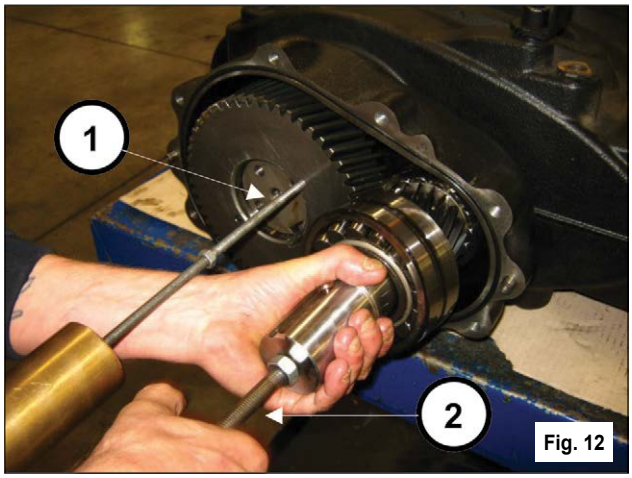


Fig. 12

Work alternately on the two extractor hammers until the pinion unit is completely extracted (1, fig. 13).

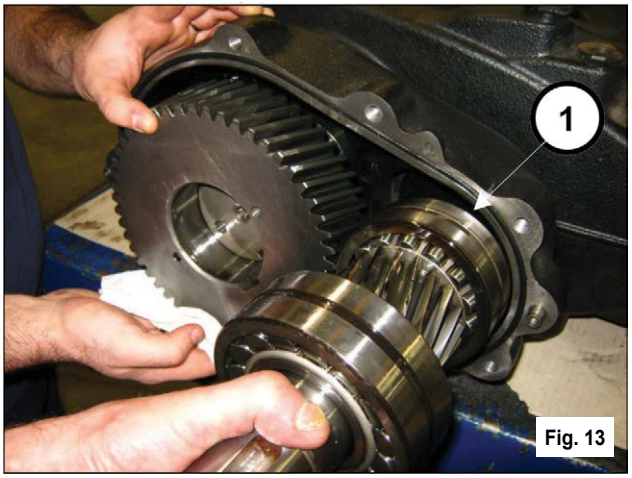


Fig. 13

Now it is possible to fully remove the ring gear (1, fig. 14).

Fig. 14

Remove the tab from the shaft (1, fig. 15).

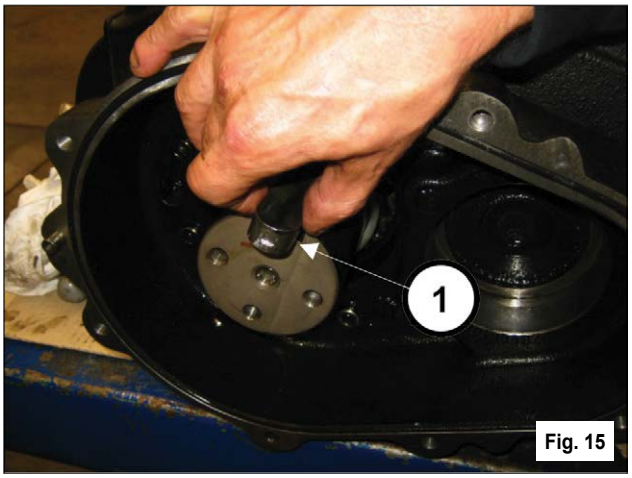
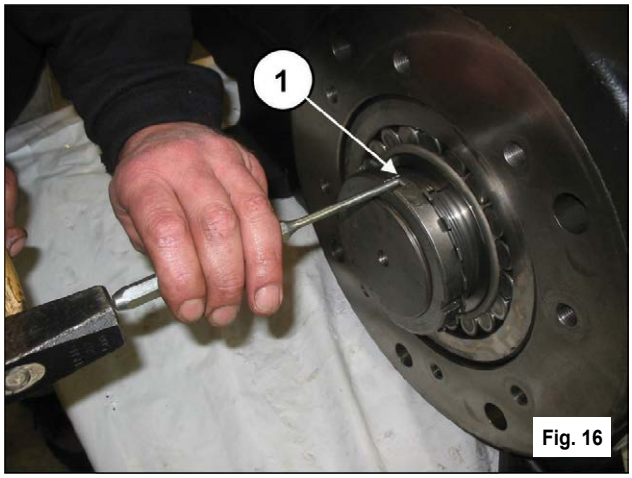
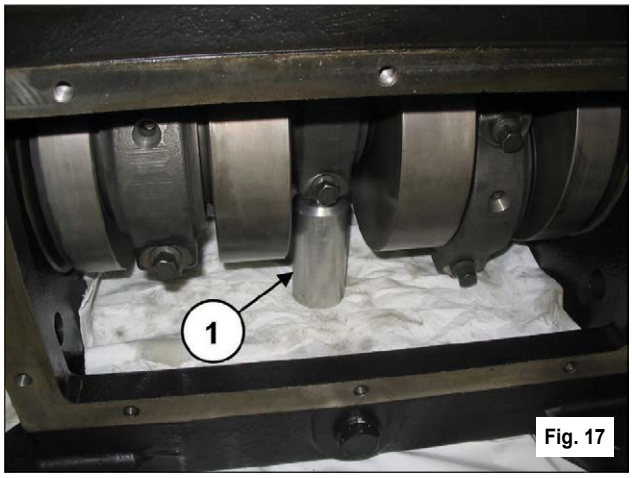


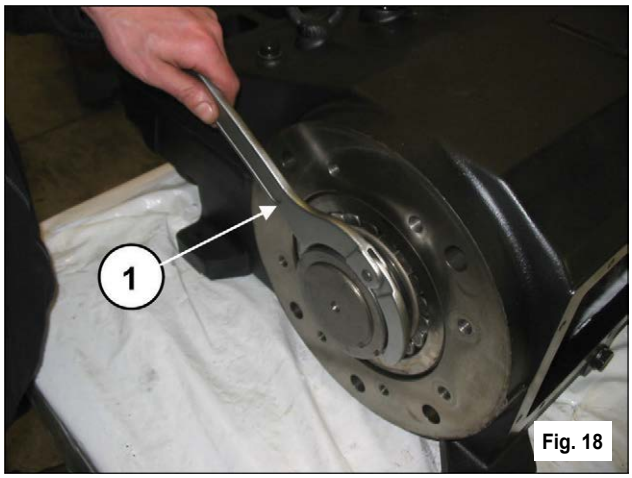
Fig. 15

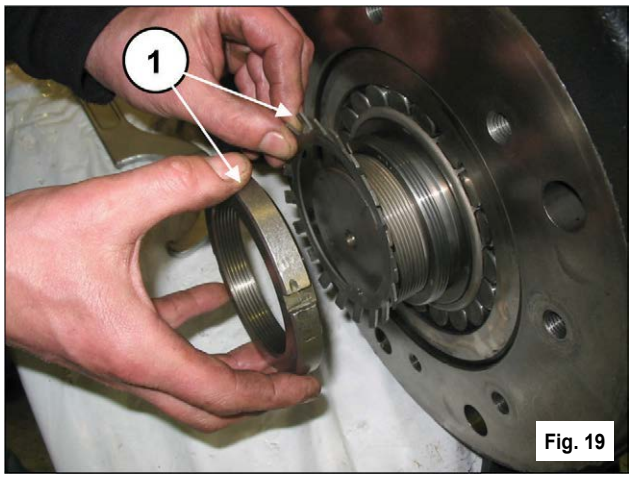
Raise the tab of the safety washer (1, fig. 16). Insert a spacer under the connecting rod to block shaft rotation (1, fig. 17).



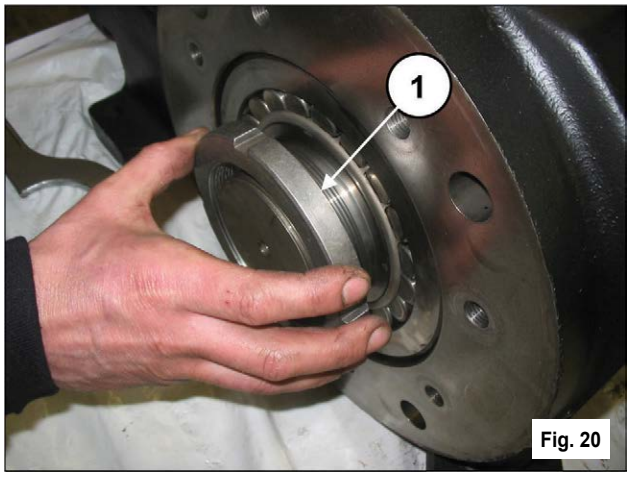


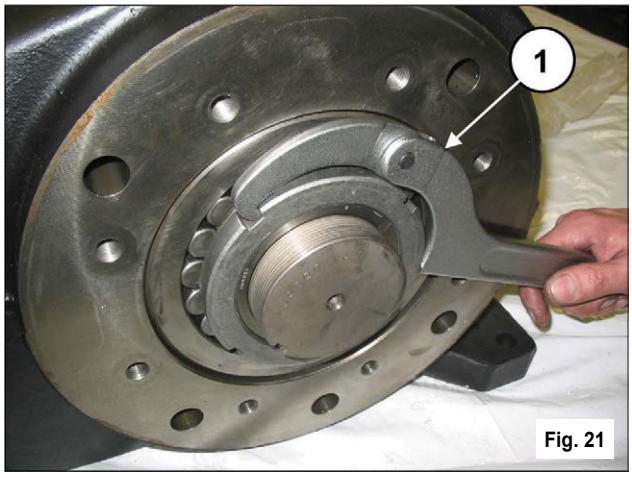
Using an appropriate wrench, unscrew and remove the ring nut (1, fig. 18) and then remove the safety washer (1, fig 19).





Screw a SKF KM19 type ring nut onto the pressure sleeve (1, fig. 20), then loosen the sleeve using an appropriate wrench (1, fig. 21).





On the opposite side, unfasten the reducer case screws (1, fig. 22), and then remove the case (1, fig. 23).

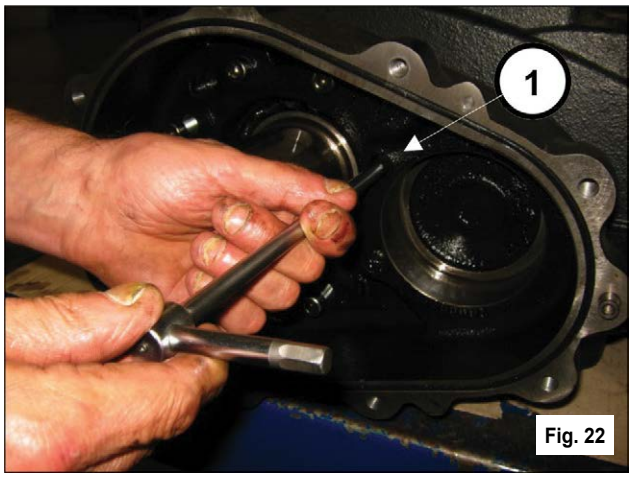


Fig. 22

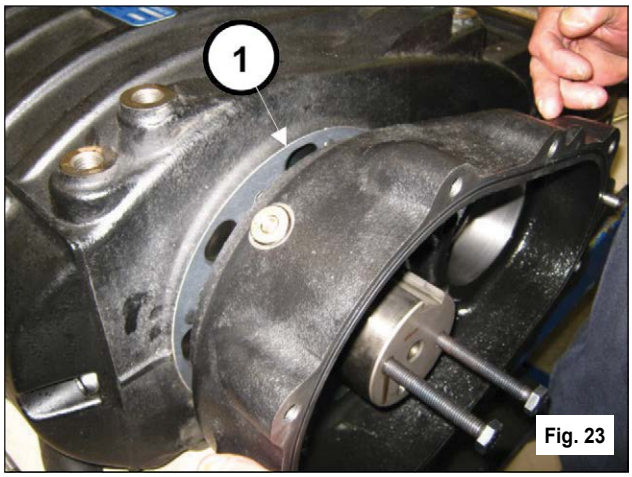


Fig. 23

Unscrew the connecting rod screws (1, fig. 24).

Fig. 24

Disassemble the connecting rod caps with the split bearings; be particularly aware of disassembly order.

The connecting rod caps and the related connecting rods must be reassembled in the exact order and coupling as during disassembly.

To avoid error, caps and connecting rods are numbered on one side (1, fig. 25).

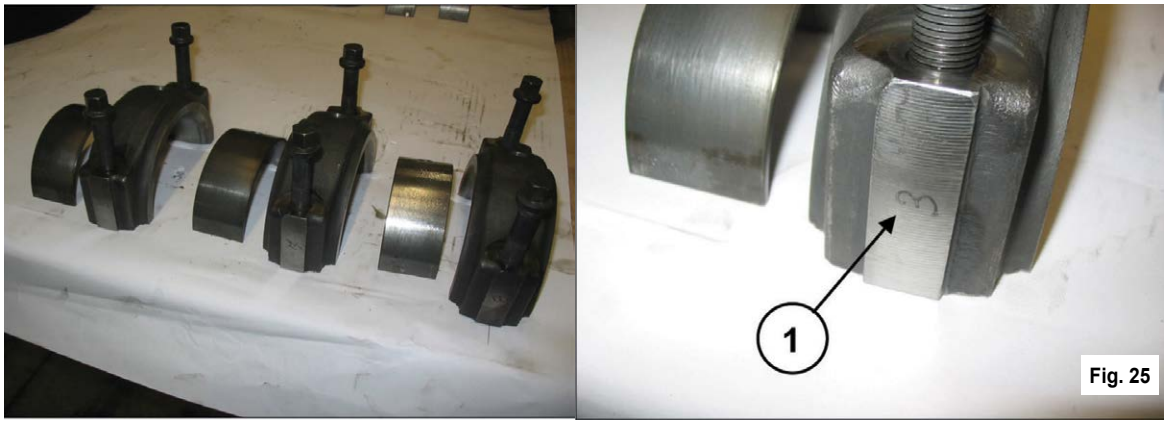


Fig. 25

Push the connecting rods forward in the direction of the hydraulic side in order to push out the crankshaft. Use the appropriate tool (p/n 27566200) to facilitate this operation (1, fig. 26)

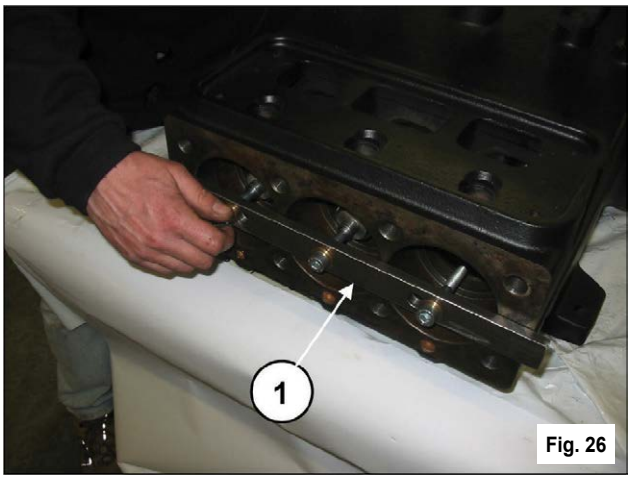


Fig. 26

Remove the pressure sleeve (1, fig. 27).

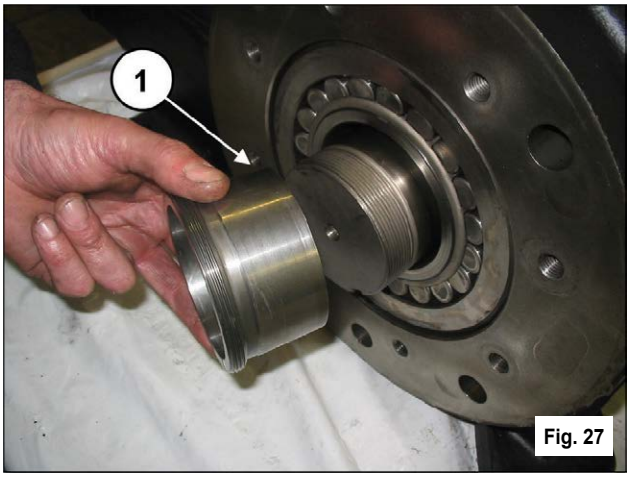


Fig. 27

Remove the upper split bearing of the connecting rods (1, fig. 28).

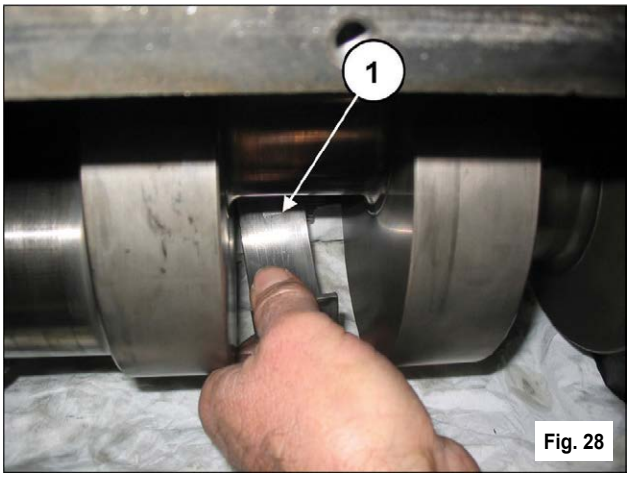


Fig. 28

Remove the crankshaft with the help of a hammer on the PTO side (1, fig. 29). Remove the shaft and the bearing (1, fig. 30).

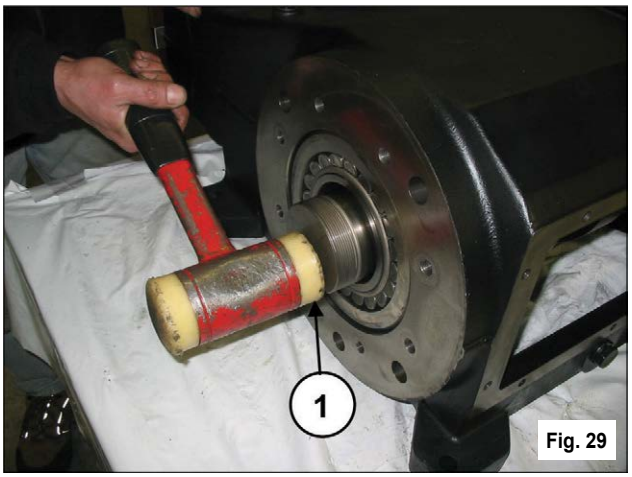


Fig. 29

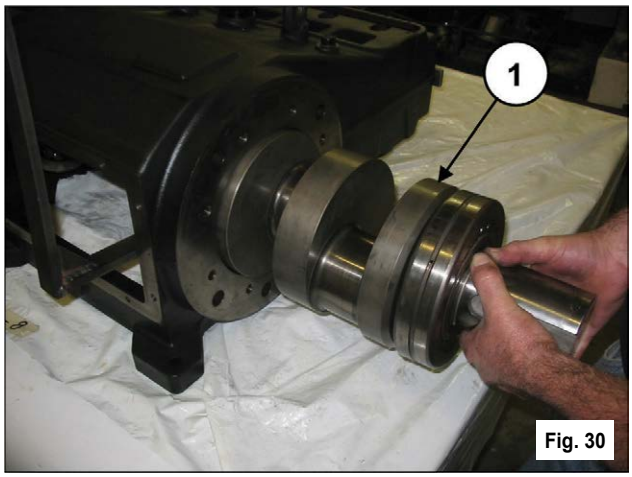


Fig. 30

On the opposite side, extract the bearing (1, fig. 31)

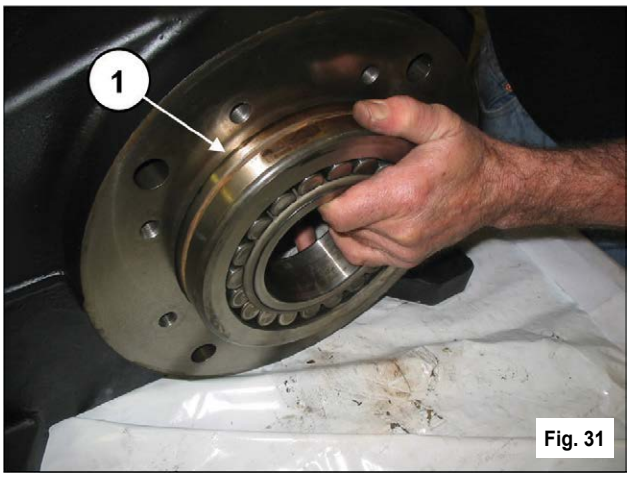


Fig. 31

If the replacement of one or more connecting rods or plunger guides is necessary, please operate as follows: Unfasten the screws of the tool (p/n 27566200 to unlock the connecting rods (1, fig. 32) and therefore extract the connecting rod-plunger guide units from the opening behind the crankcase (1, fig. 33).

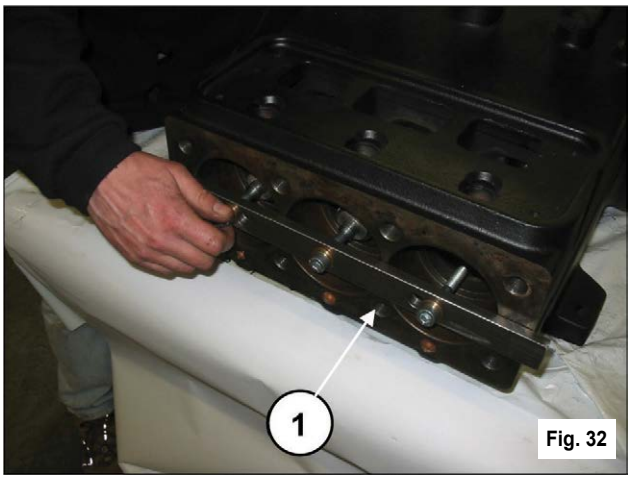


Fig. 32

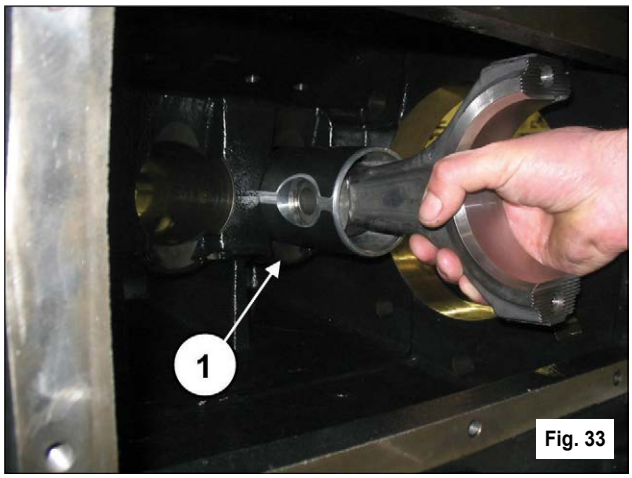
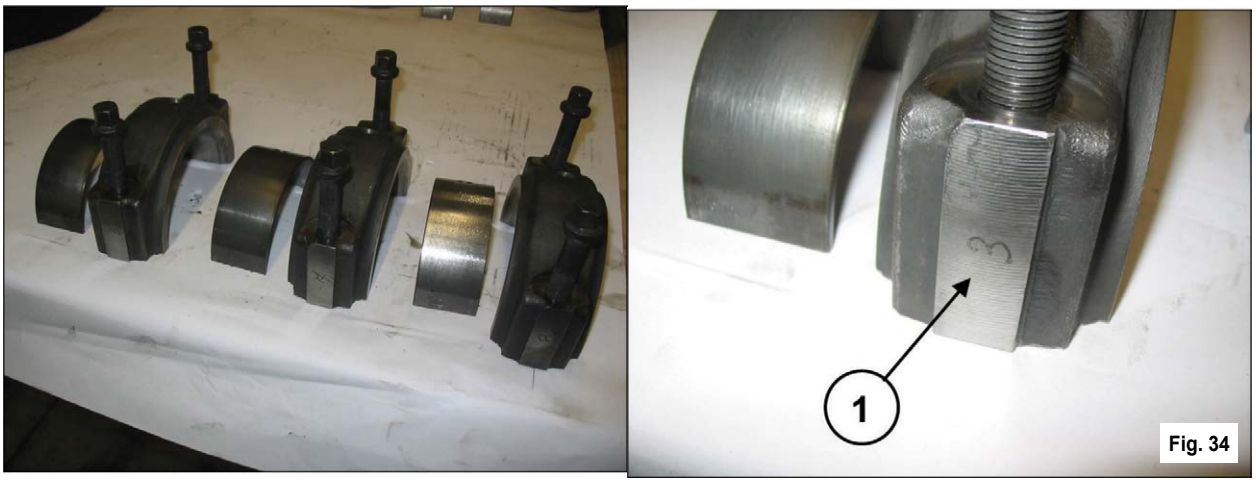
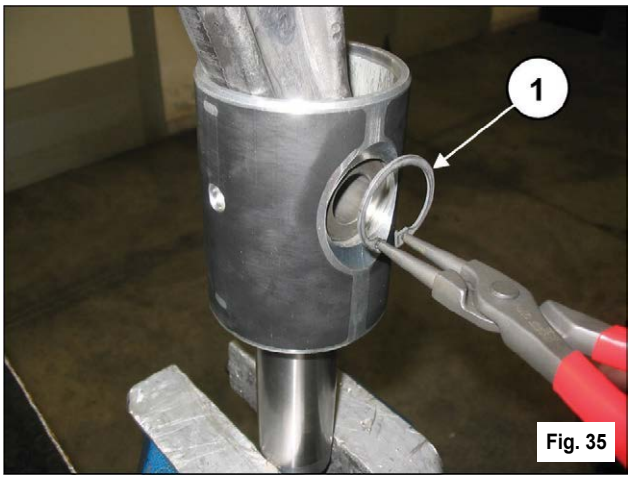


Fig. 33

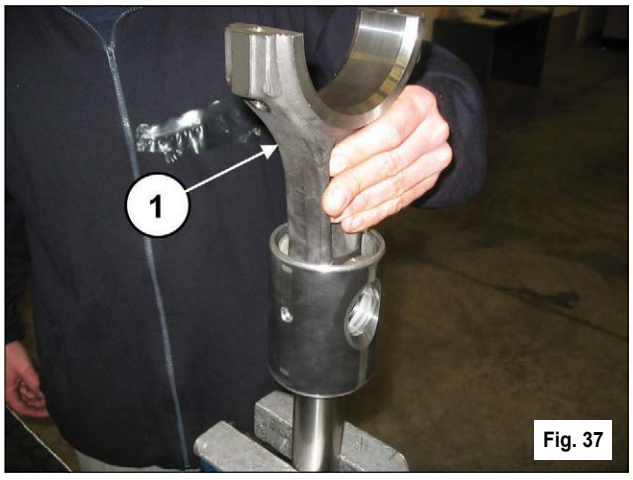
Couple the connecting rods with the previously disassembled caps; be sure to respect numbering (1, fig. 34).



Remove the two seeger rings that block the plunger pin by using the appropriate tool (1, fig. 35).



Remove the pin (1, fig. 36) and then remove the connecting rod (1, fig. 37).



To separate the rod from the plunger guide, unfasten the M10 hexagonal-head screws using a socket wrench (1, fig. 38).

Fig. 38

2.1.2 Crank Mechanism Assembly
Proceed with assembly by inverting the procedure indicated in paragraph 2.1.1.
The correct sequence is the following:

Connect the rod to the plunger guide
Insert the plunger guide rod into the plunger guide seat (1, fig. 39) and connect the rod to the plunger guide using M6 x 20 screws (1, fig. 40).

Fig. 39

Fig. 40

Block the rod using a clamp, and proceed with calibration using a torque wrench (1, fig. 41) as indicated in paragraph 3. “SCREW CALIBRATION”

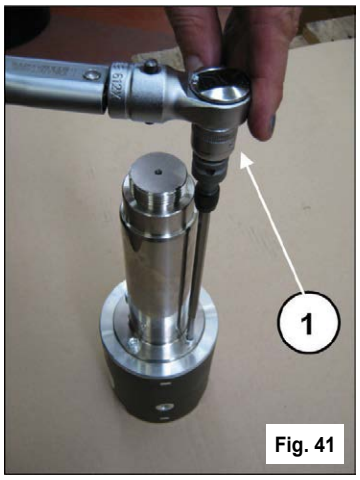


Fig. 41

Insert the connecting rod in the plunger guide (1, fig. 37) and then insert the pin (1, fig. 36). Apply the two seeger rings using the correct tool (1, fig. 35).

Make sure that con-rods, plunger guides and wrist pins can move freely after being assembled.

Separate the caps from the connecting rod; correct coupling is guaranteed by the numbering on the side (1, fig. 34).

After verifying the perfect cleaning of the crankcase, insert the connecting rod-plunger guide unit inside the cylinders of the crankcase (1, fig. 33).

The insertion of the connecting rod-plunger guide unit inside crankcase must be done by positioning the connecting rods with the numbering visible from above.

Block the three units using the correct tool, p/n 27566200(1, fig 32).

Pre-assemble the bearing, PTO side, on the shaft (1, fig. 42) and assemble the bearing on the opposite side on the crankcase (1, fig. 43).

The bearing in fig. 43 has a tapered internal ring. Verify that the taper goes from the outside towards the inside in order to allow the subsequent insertion of the sleeve.

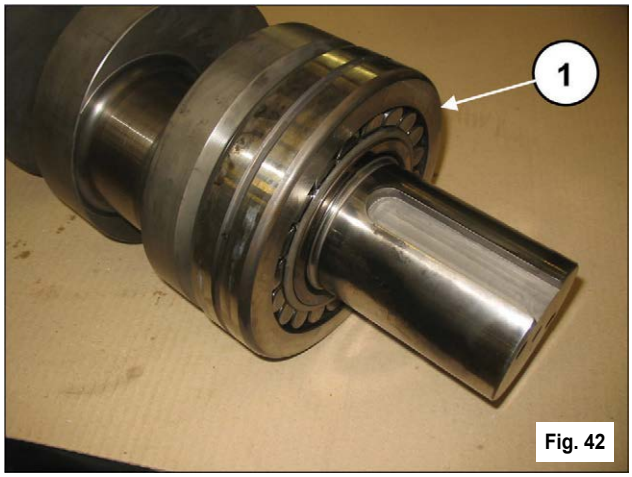


Fig. 42

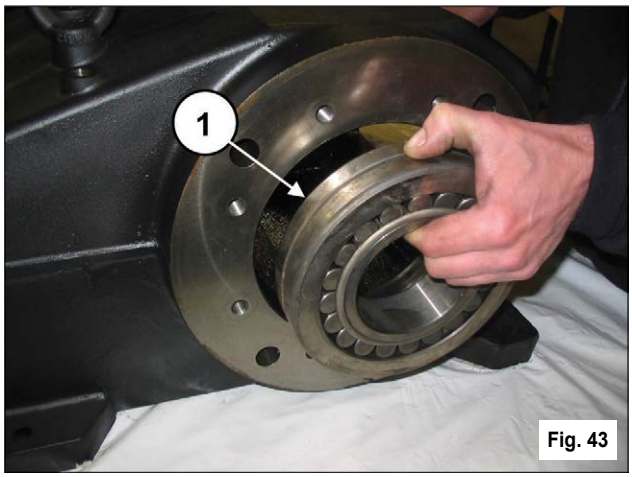


Fig. 43

Insert the shaft (1, fig. 30) until the pre-assembled bearing is aligned with the edge of the crankcase (1, fig. 44).

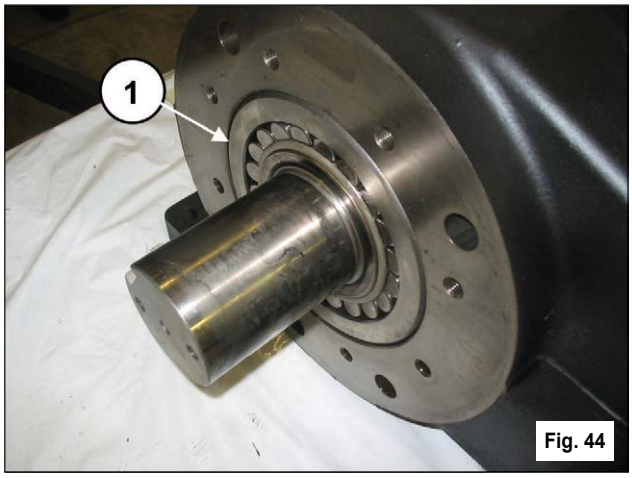


Fig. 44

Manually insert the pressure sleeve to maintain the shaft alignment (1, fig. 45).

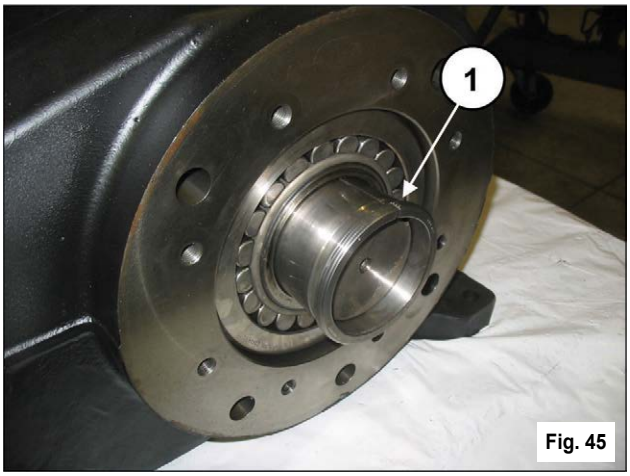


Fig. 45

Assemble the reducer case (1, fig. 46) and the related gasket (2, fig 46) using the 6 M12 x 40 screws (1, fig. 47), the 2 M12 x 50 screws (1, fig. 48) Calibrate the screws with a torque wrench (1, fig. 49) as indicated in paragraph 3. “SCREW CALIBRATION”

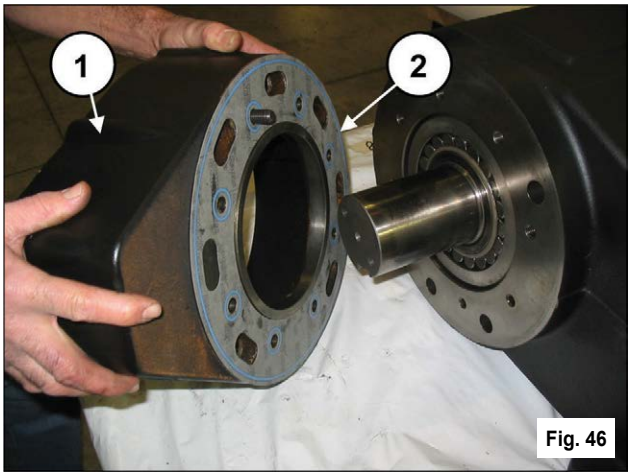


Fig. 46

Fig. 47

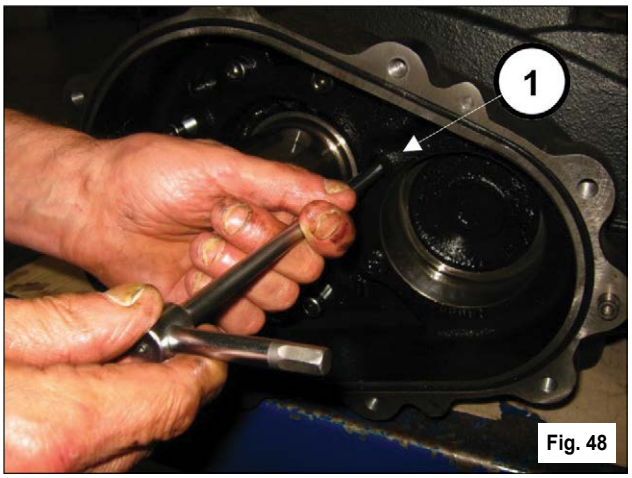


Fig. 48

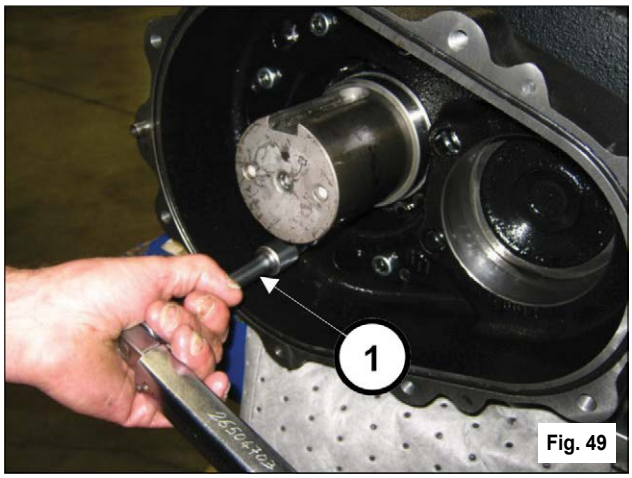


Fig. 49

Completely insert the pressure sleeve on the shaft from the opposite side of the PTO (1, fig. 50 and fig. 51).

Fig. 50

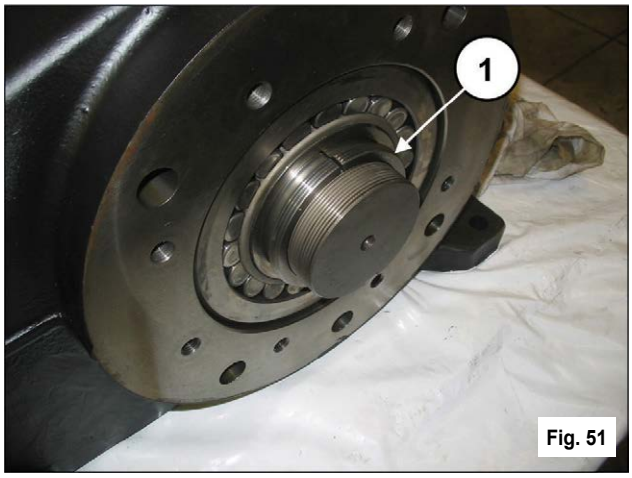


Fig. 51

Pressure sleeve insertion must be done without oil or lubricants.

Insert the sleeve until the external surface (tapered) couples perfectly with the inside of the bearing. During insertion, be sure that the bearing remains in contact with the shaft shoulder.

Measure the dimension “X” indicated in fig. 52.

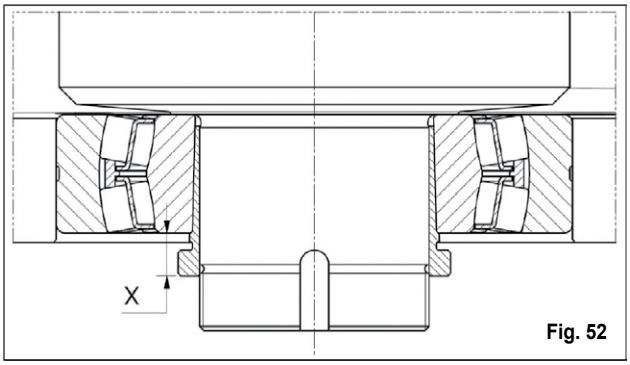


Fig. 52

Screw the ring nut and fasten the sleeve until the dimension “X” is reduced by a value ranging between 0.7 and 0.8 mm (fig. 53).

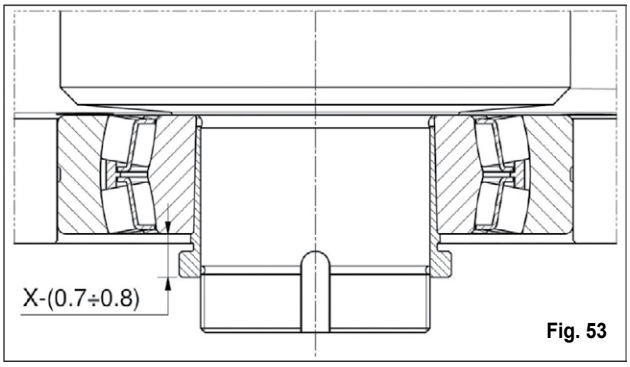


Fig. 53

Unscrew the ring nut, insert the safety washer (1, fig. 54) and completely screw the ring nut (1, fig. 55); then fold the washer’s locking key (1, fig. 56).

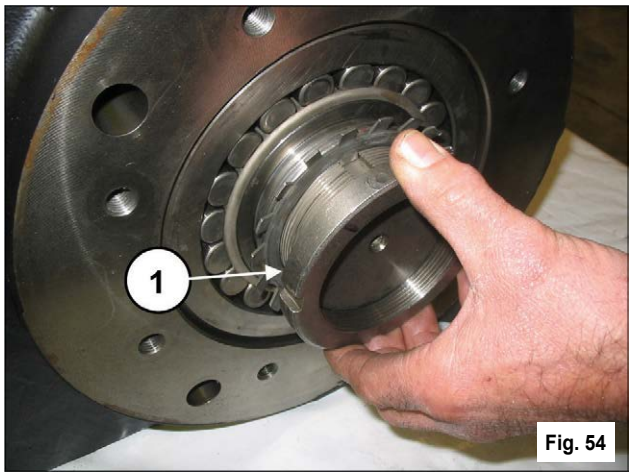


Fig. 54

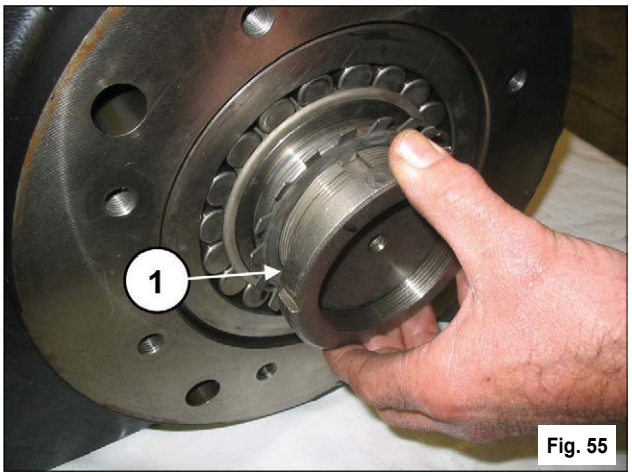
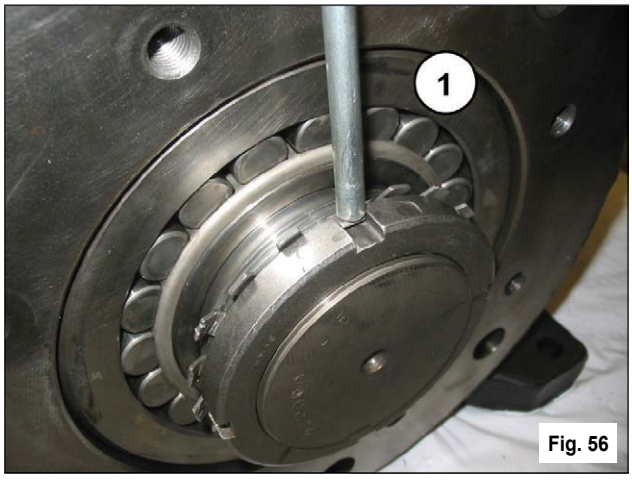


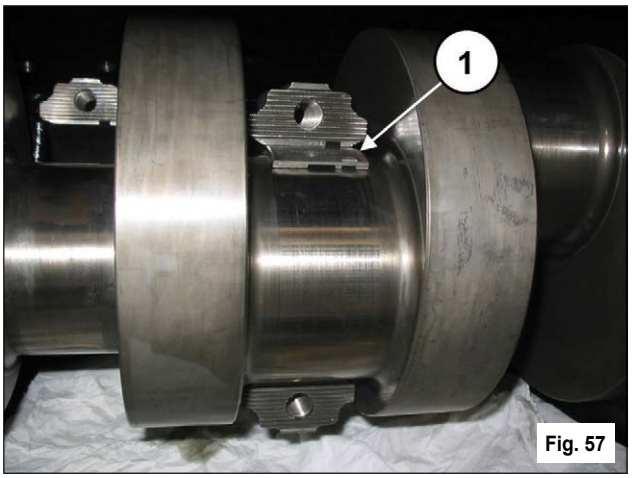
Fig. 55

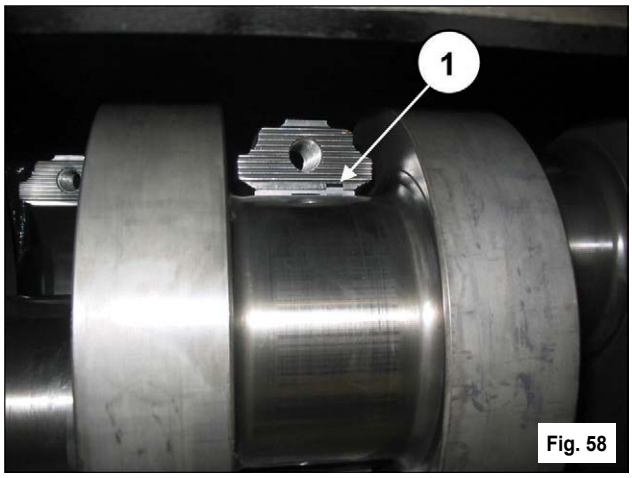


Remove the device that blocks the connecting rods using p/n 27566200 (1, fig. 32).

Insert the upper split bearings between the connecting rods and the shaft (1, fig. 57)

In order to correctly assemble the split bearings, be sure that the split bearings' reference key in the appropriate seat on the connecting rod (1, fig. 58).



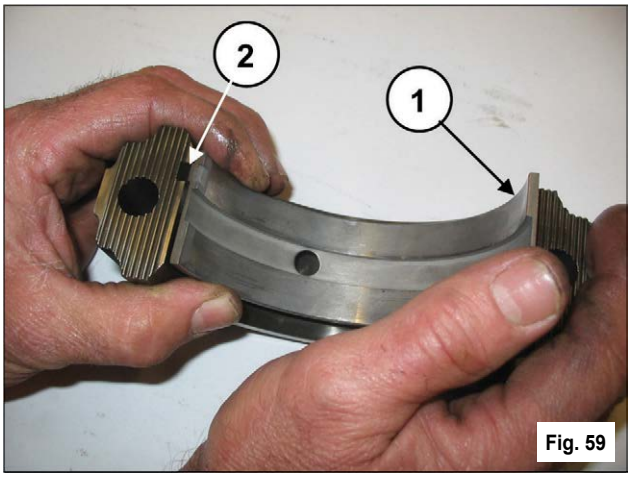


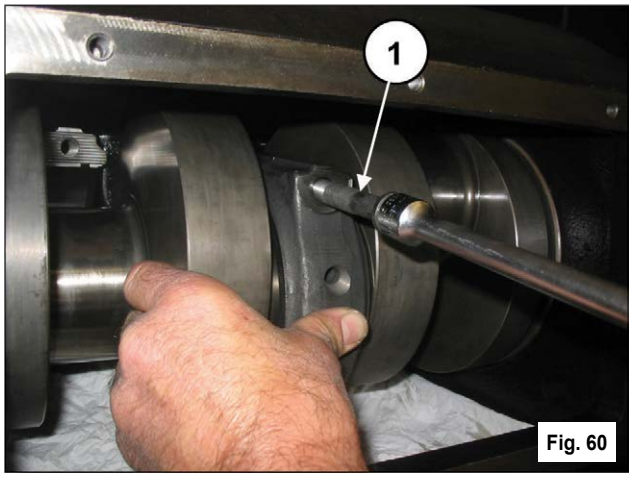
Apply the lower split bearings to the caps, (1, fig. 59) being sure that the split bearings' reference key is positioned in the appropriate seat on the cap (1, fig. 59).

Fasten the caps to the connecting rods using the M12 x 1.25 x 87 screws (1, fig. 60).

Pay attention to the correct assembly of the caps. the numbering must face upwards.

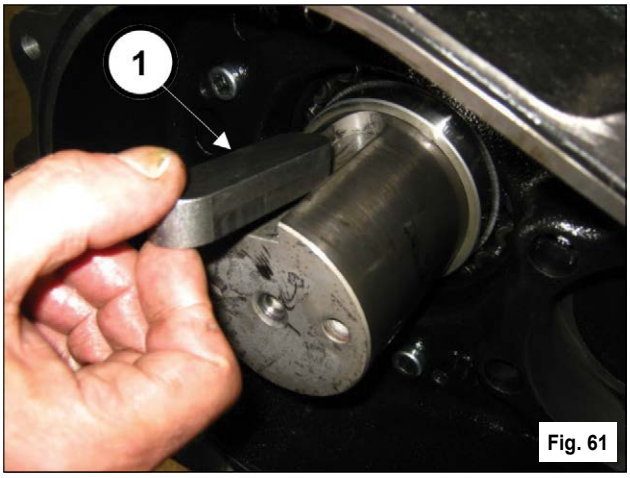
Tighten the screws with a torque wrench set as indicated in the SCREW CALIBRATION chart of paragraph 3. The con-rod screws should be tightened at intermediate incremental values.





Once tightened on the crankshaft, make sure that con-rods still have axial right-left end play.

Apply tab 22x 14 x 100 in the seat on crankshaft (1, fig. 61)



Assemble the 65 x 120 x 31 bearing on the pinion using p/n 27887100 (1, fig. 62). Assemble the pinion unit in the reduction gear box (fig. 63) and insert it in the housing using p/n 27935400 or p/n 27936500 (fig. 64).

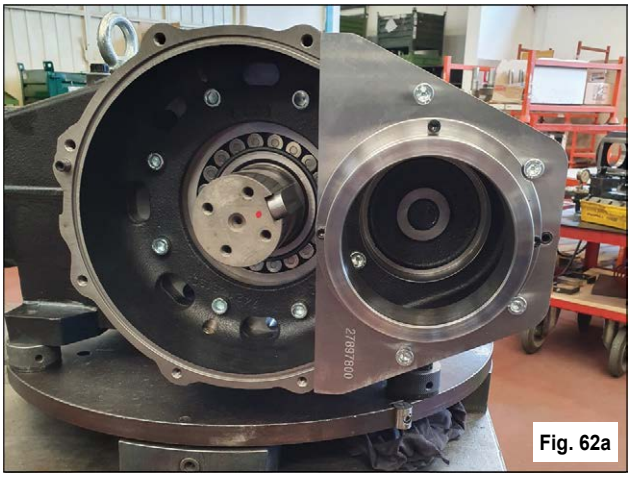



Fig. 63


Fig. 64

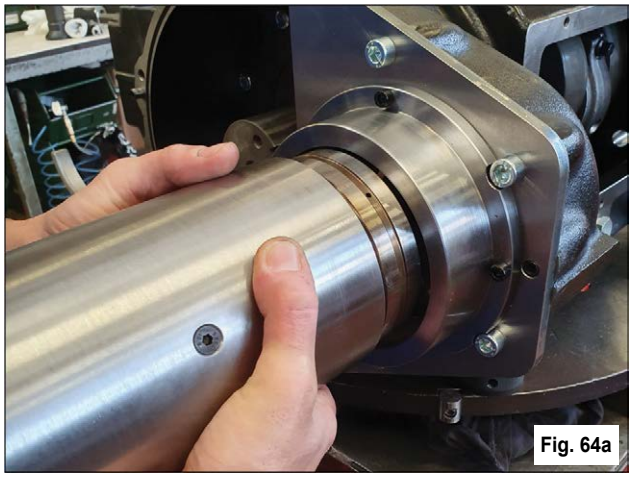


Fig. 64a

Position the bearing to the end stroke (1, fig. 65)

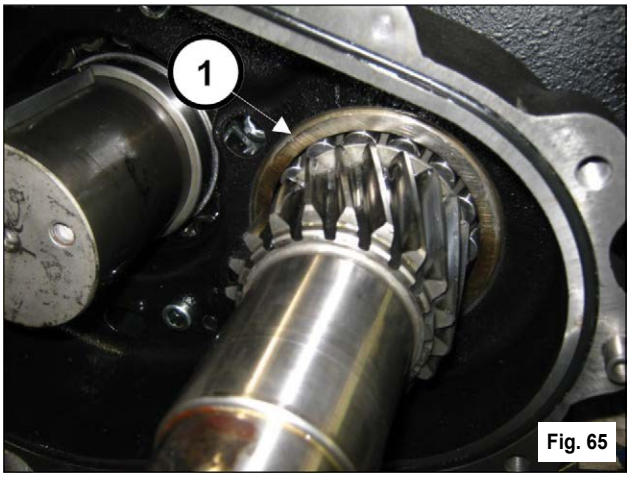


Fig. 65

Insert the ring gear on the shaft (1, fig. 66) and move it to end stroke using extraction hammer (1, fig. 67).

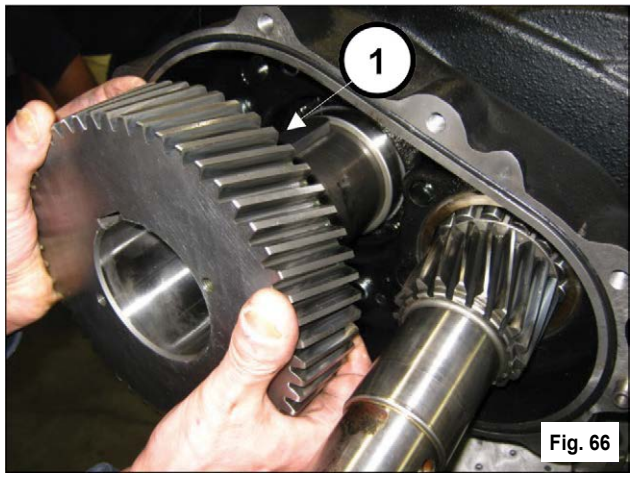


Fig. 66

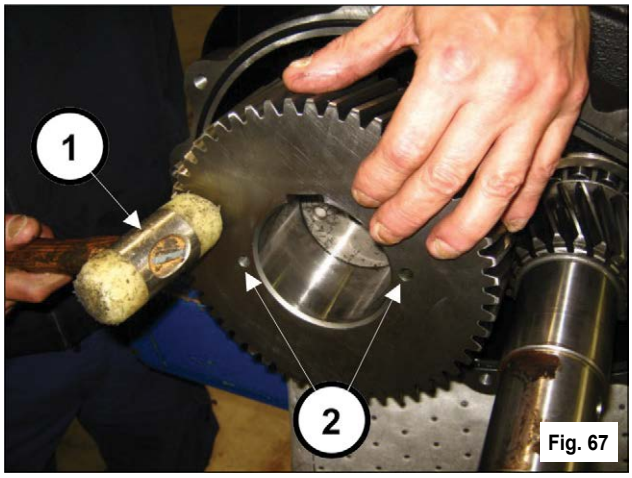


Fig. 67

The ring gear must be assembled with the two M8 holes (used for extraction) are facing out from the pump (2, fig. 67).

Fasten the ring gear stop (1, Fig. 68) using the 4 M10x30 screws. Calibrate the screws with a torque wrench as indicated in chapter 3 (1, Fig. 69).

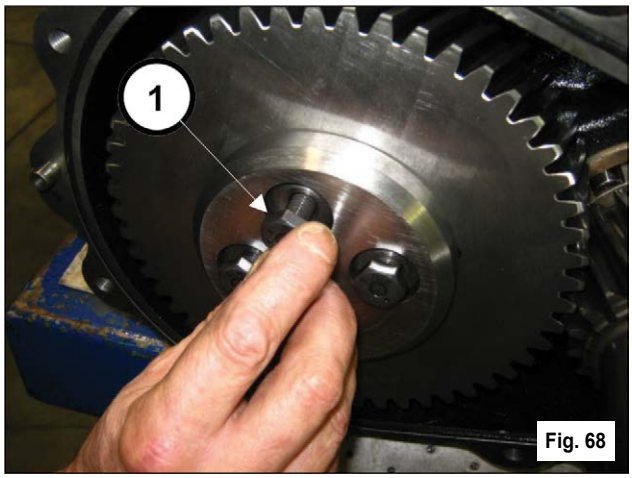


Fig. 68

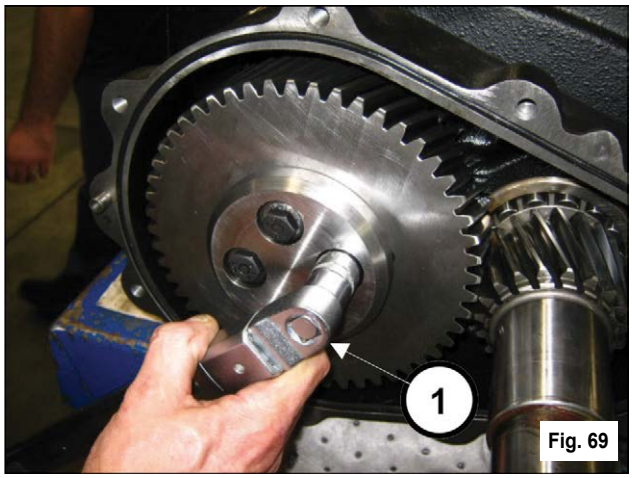


Fig. 69

Apply the 2 Ø10 x 24 pins on the reduction gear box (1, Fig. 70) and insert the O-ring (1, Fig. 71).

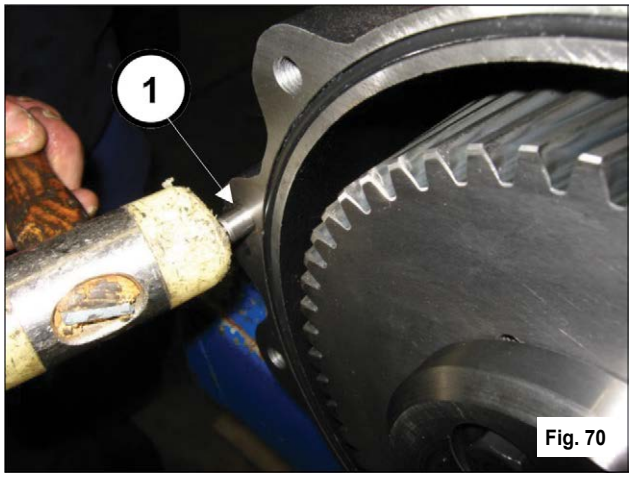


Fig. 70

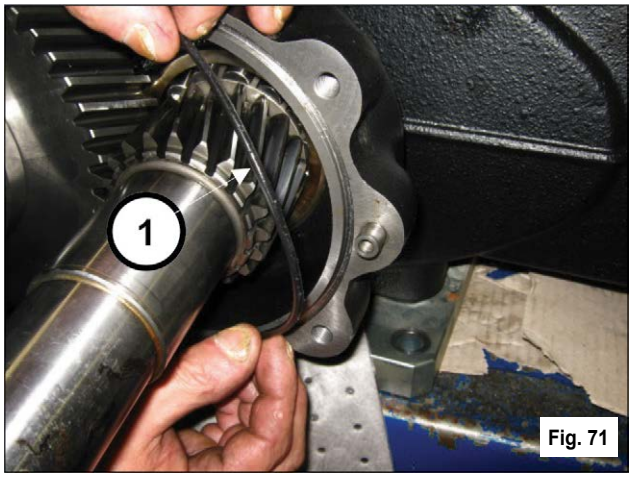


Fig. 71

Assemble the reduction gear cover (1, Fig. 72) and fasten it with 10 M10x50 screws (1, Fig. 73). Calibrate the screws with a torque wrench as indicated in chapter 3.

Fig. 72

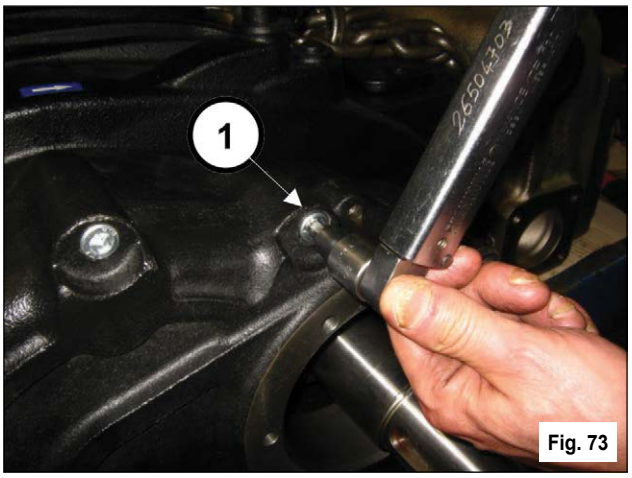


Fig. 73

Insert the 60x130x46 bearing on the pinion (1, Fig. 74).

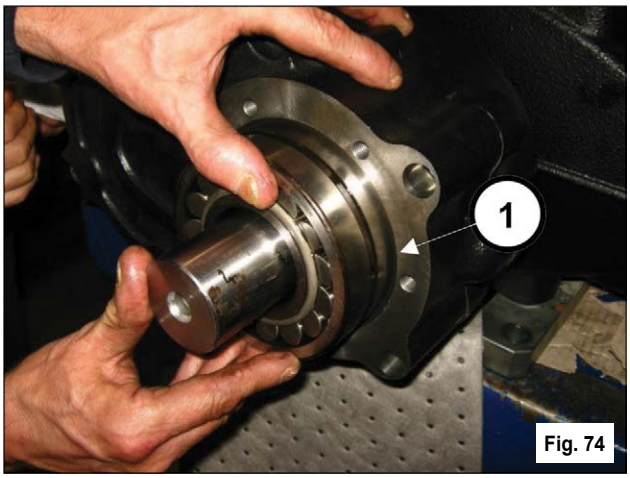


Fig. 74

Using the tool p/n 27887000 (1, Fig. 75) move the bearing to the end stroke (1, Fig. 76).

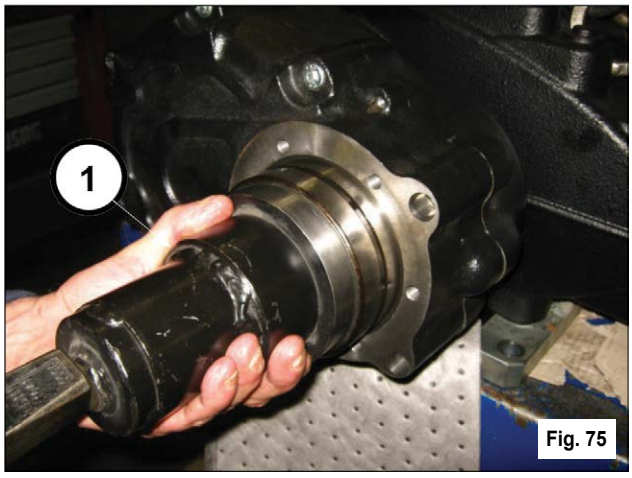


Fig. 75

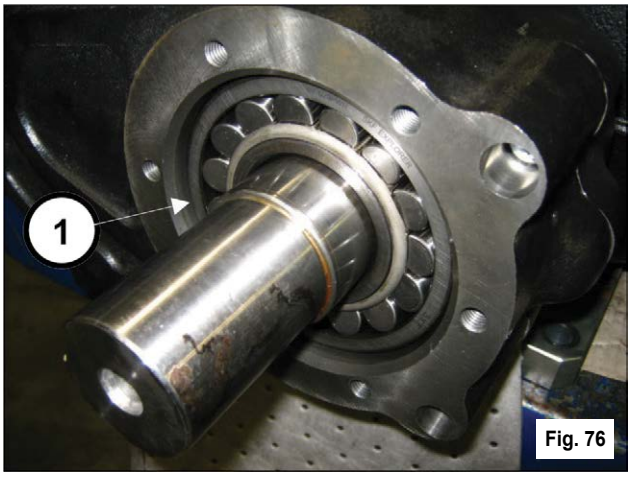


Fig. 76

Insert the seal ring inside the pinion cover using the special tool p/n 27548200 (1, Fig. 77).

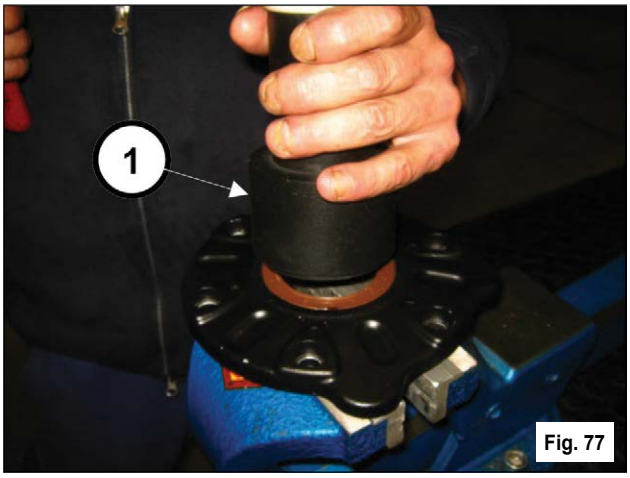


Fig. 77

Before proceeding with seal ring assembly, check lip seal conditions. Replace if necessary, position the new ring on the bottom of the groove as indicated in Fig. 78.

If the shaft should present a diameter wear corresponding to the lip seal, to prevent grinding, position the ring in the second stroke as indicated in Fig. 78.

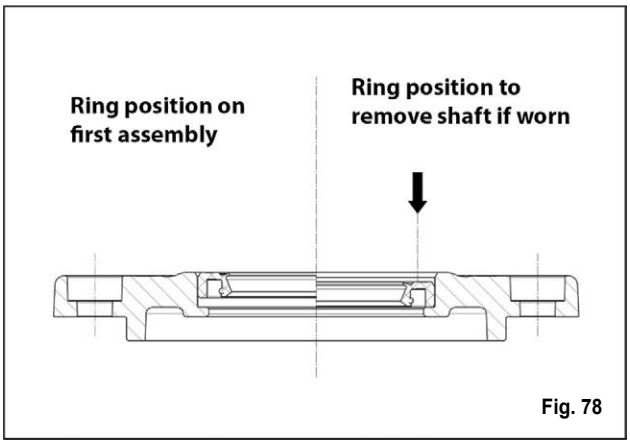


Fig. 78

Apply the O-ring to pinion cover (1, fig. 79). Insert the pinion cover in its housing, (1, fig. 80).

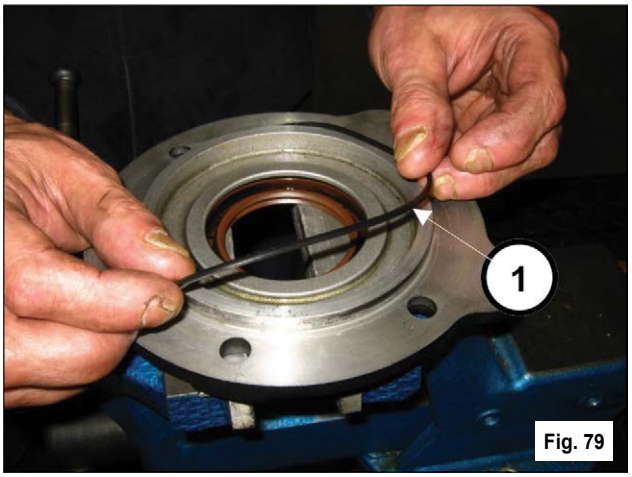


Fig. 79

Fig. 80

To prevent damage to the seal ring, take special care when inserting the seal ring on the pinion (1, fig. 81).

Fig. 81

Tighten the 6 M10x25 screws (1, fig. 82). Calibrate the screws with a torque wrench as indicated in chapter 3 SCREW TIGHTENING CALIBRATION.

Fit the 16 x 10 x 90 key in the pinion housing (1, Fig. 83).

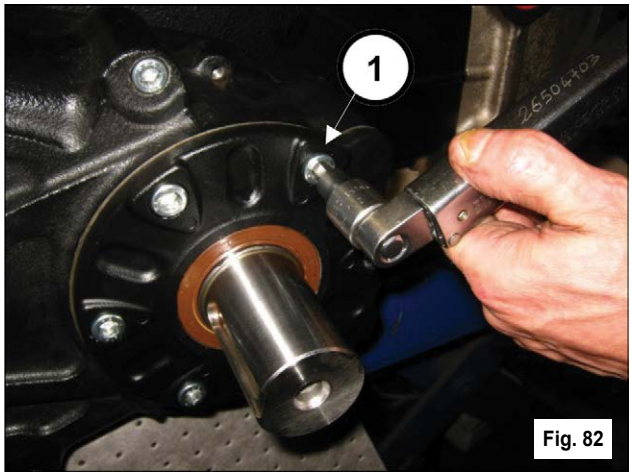


Fig. 82

Fit the 16 x 10 x 90 key in the pinion housing (1, Fig. 83).


Fig. 83

Insert the O-ring on the rear cover (1, fig. 84) and fasten it to the casing with 10 M8x18 screws (1, fig. 85). Calibrate the screws with a torque wrench as indicated in chapter 3.

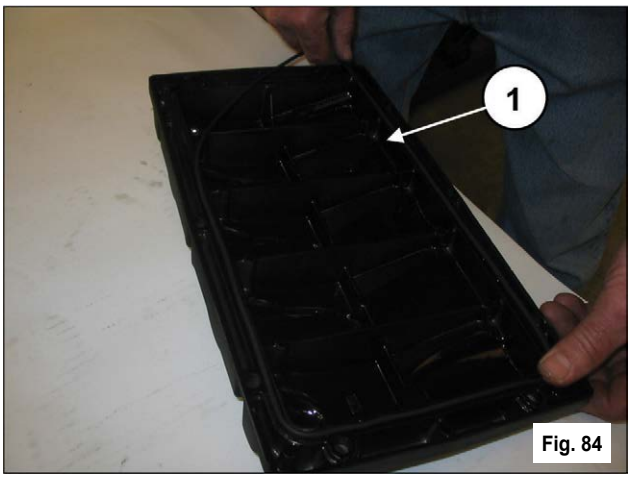


Fig. 84

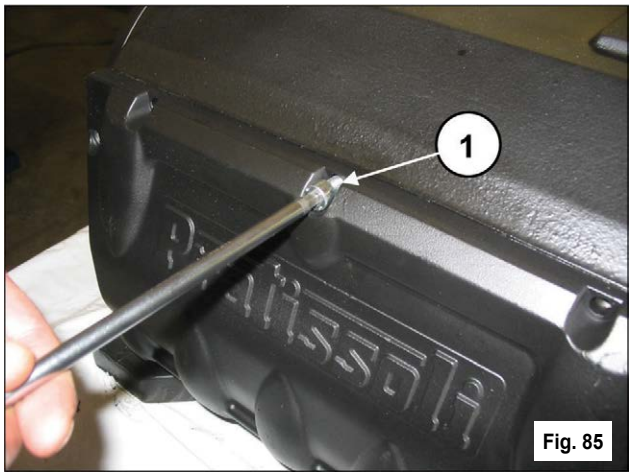


Fig. 85

Assemble the bearing cover (and relative seal) (1, fig. 86) with 8 M12x30 screws (1, fig. 87). Calibrate the screws with a torque wrench as indicated in chapter 3.

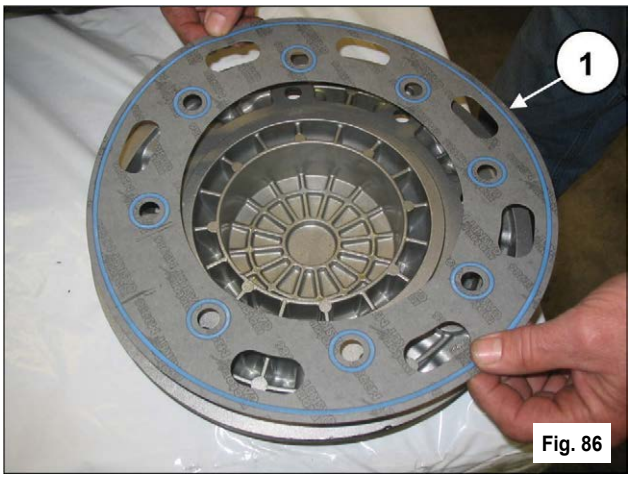


Fig. 86

Fig. 87

Complete the assembly of the mechanical part by fitting the plugs and lifting eyebolts with the relevant O-rings. Insert oil in the casing as indicated in the owner's manual, par. 7.4.

2.1.3 Refurbishing the crank mechanism

TABLE UNDERSIZED DIAMETERS FOR CRANKSHAFT AND CONROD BUSHINGS			
Max. Undersize (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

TABLE OVERSIZED DIAMETERS FOR CRANKCASE CYLINDER BORES AND PLUNGER GUIDES		
Max. oversize (mm)	**Plunger guide p/n**	**Crank pin grinding measures (mm)**
1.00	74050243	Ø 81 H6 + 0.022/0 Roughness Ra 0.8 Rt 6

2.2 Fluid End Repair

2.2.1 Head Disassembly - Valve Units

The head requires preventive maintenance as indicated in the owner's manual. Interventions may be limited to valve inspection, or replacement as needed.
To extract the valve units operate as follows:
Unfasten the 8 M16 x 55 screws of the valve cover (1, fig. 88) and remove the cover (1, fig. 89).

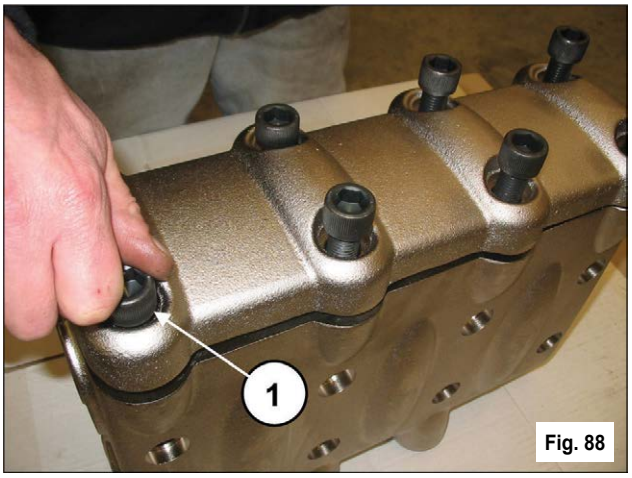


Fig. 88

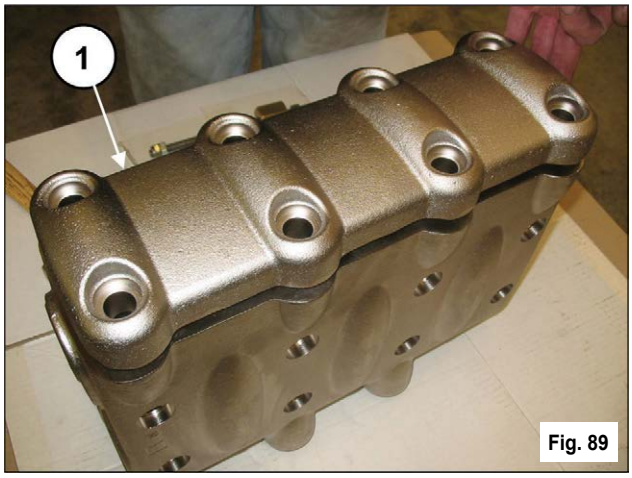


Fig. 89

Extract the valve plug using a slide hammer applied to the M10 hole of the valve plug (1, fig. 90).

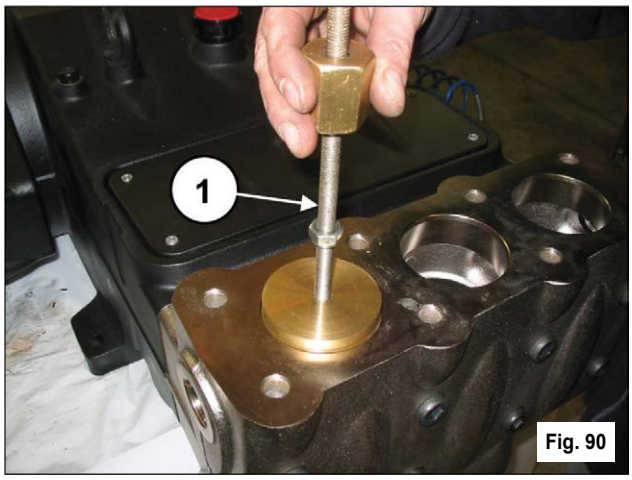


Fig. 90

Remove the spring (1, fig. 91).

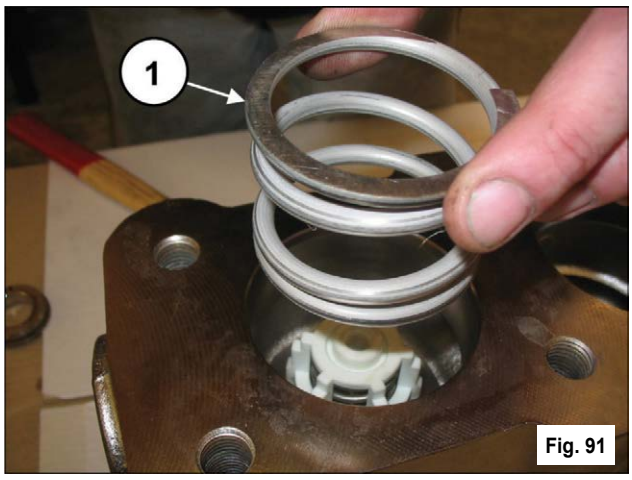


Fig. 91

Extract the delivery valve unit using a slide hammer applied to the M10 hole of the valve guide (1, fig. 92)

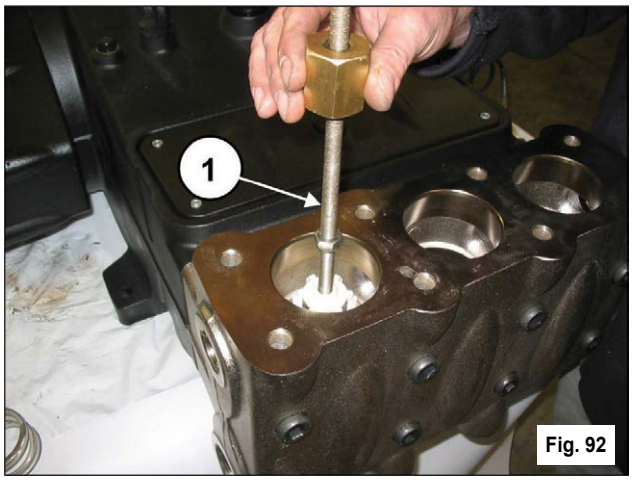


Fig. 92

If the extraction of the delivery valve unit is particularly difficult (for ex. due to incrustations caused by prolonged pump inactivity) use the extraction tool, p/n 27516400

Unfasten the valve guide spacer using an 8 mm allen wrench (1, fig. 93).

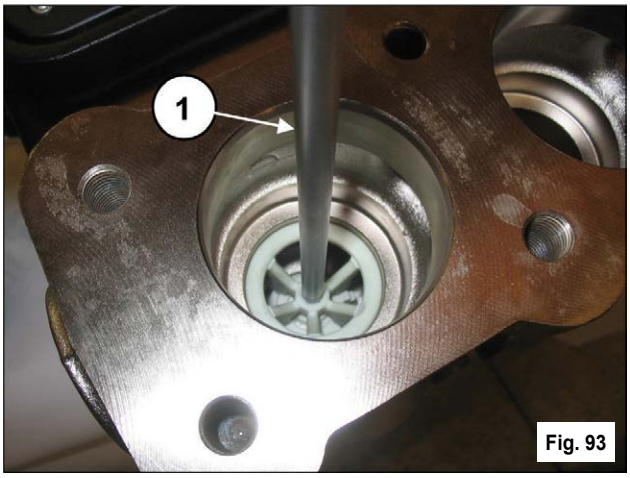


Fig. 93

Remove the suction valve unit using a slide hammer applied to the M10 hole of the valve guide (1, fig. 94).

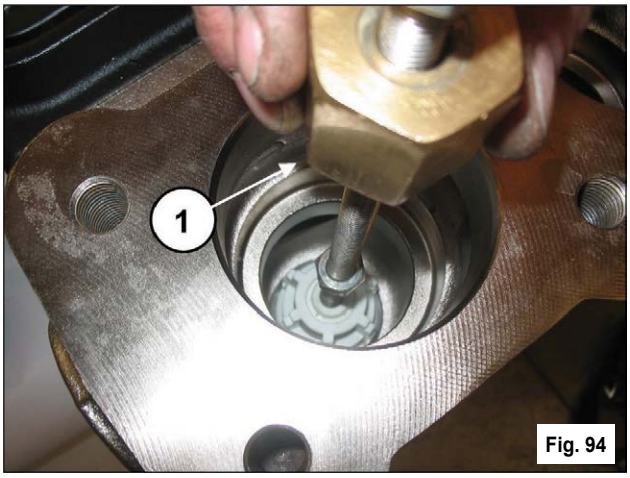


Fig. 94

If the extraction of the of the suction valve unit is particularly difficult (for ex. due to incrustations caused by prolonged pump inactivity) use the extraction tool p/n 27516200 (for MK2/MKS2 40A, 45A and 50A) or p/n 27516300 (for MK2/MKS2 55A, 60A and 65A) (1, fig. 95) and act as indicated.

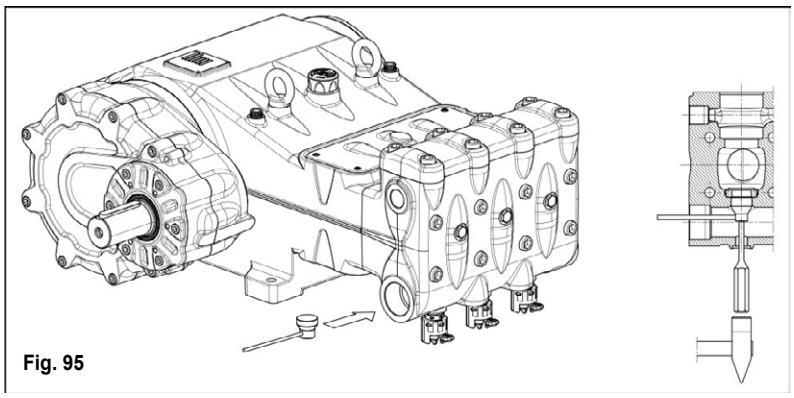


Fig. 95

Unscrew the valve opening device using a 30 mm wrench (1, fig. 96).

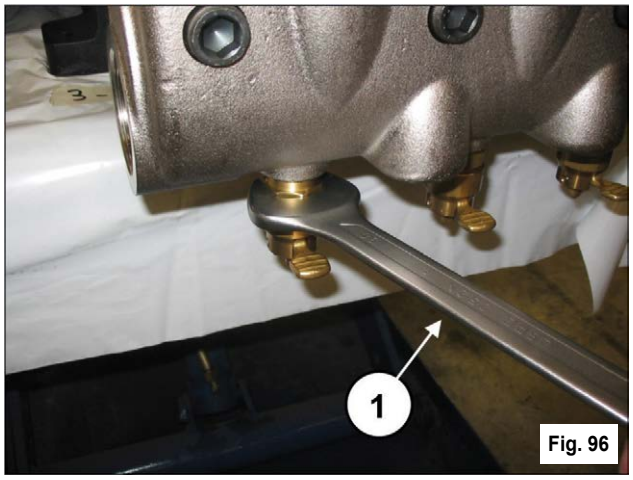


Fig. 96

Disassemble the suction and delivery valve units by screwing on an M10 screw long enough to act on the valve and extract the valve guide from the valve seat (1, fig. 97).

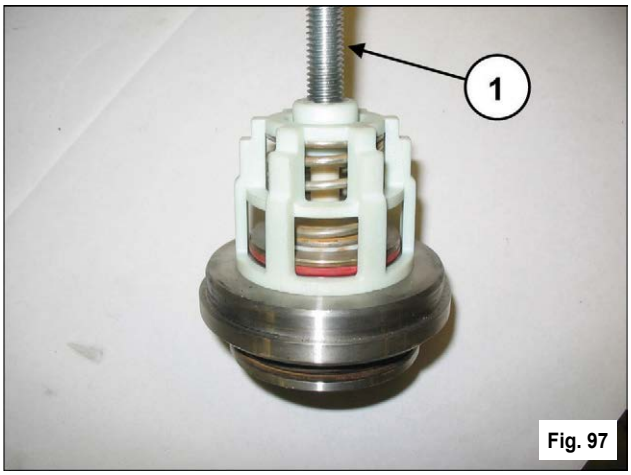


Fig. 97

2.2.2 Head Assembly - Valve Units

Pay careful attention to state of wear of the various components; replace them if necessary. At each valve inspection, replace all valve units and valve plug O-rings.

Before repositioning the valve units, clean and perfectly dry the relevant seats in the head indicated by the arrows (1, fig. 98).

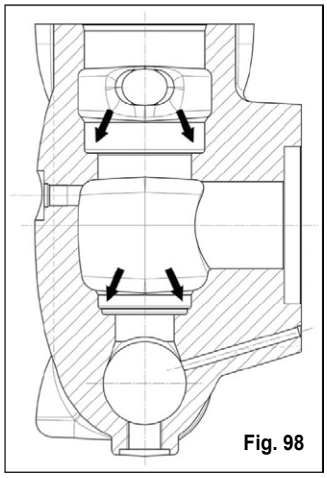


Fig. 98

Proceed with reassembly by inverting the procedure indicated in paragraph 2.2.1.

Assemble the suction and delivery valve units (fig. 99 and fig. 100) paying attention not to invert the previously disassembled springs.

To facilitate the insertion of the valve guide in its seat, use a pipe that lays on the horizontal shoulders of the guide (fig. 101), and use a hammer acting on the entire circumference.

Fig. 99

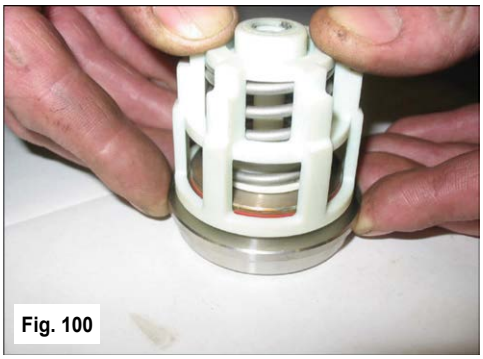


Fig. 100

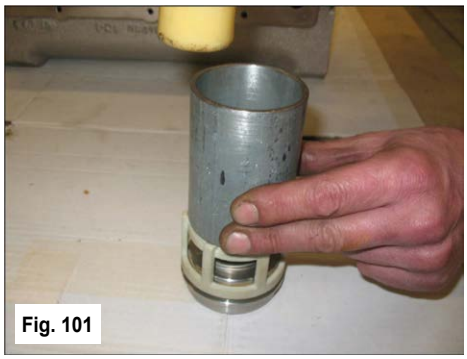


Fig. 101

Proceed with the insertion of the valve units (suction and delivery) into the head, paying attention to the correct insertion sequence of the O-rings and anti-extrusion rings.

The correct assembly sequence of the valve units in the head is the following:
Insert the anti-extrusion ring, exploded view item 4 from Owner's Manual (1, fig. 102).

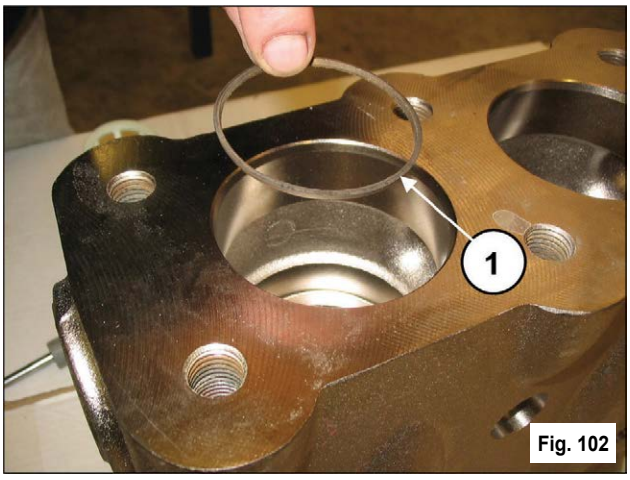


Fig. 102

Insert the O-ring, exploded view item 5 from Owner's Manual (1, fig. 103).

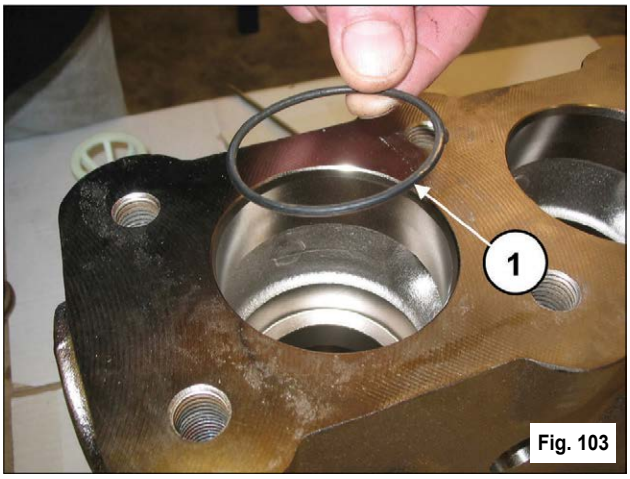


Fig. 103

Be sure that the O-ring and the anti-extrusion ring are perfectly fit into their seats. Insert the suction valve unit together with the spacer (1, fig. 104). The valve unit must be fully inserted, as shown in 1, fig. 105.

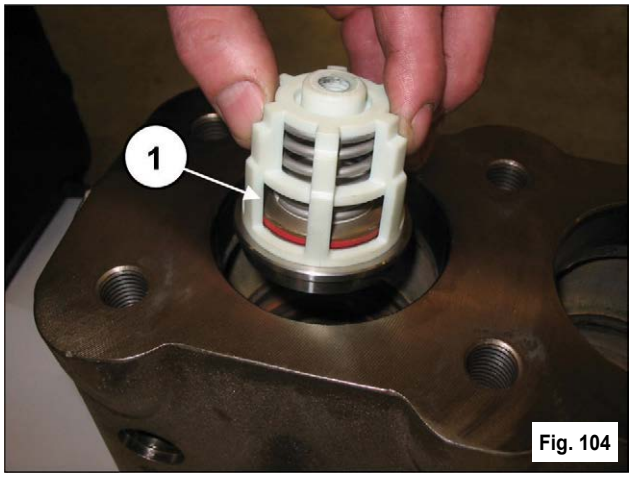


Fig. 104

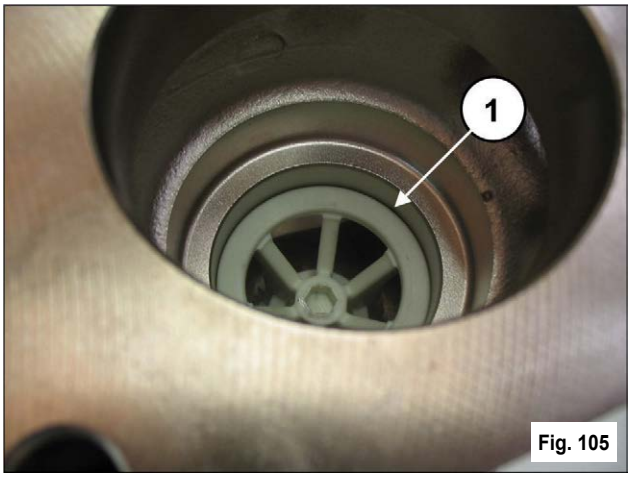


Fig. 105

Mount the O-ring, exploded view item 5 from Owner's Manual (1, fig. 106) and the anti-extrusion ring, exploded view item 15 from Owner's Manual (2, fig. 106) on the delivery valve seat.

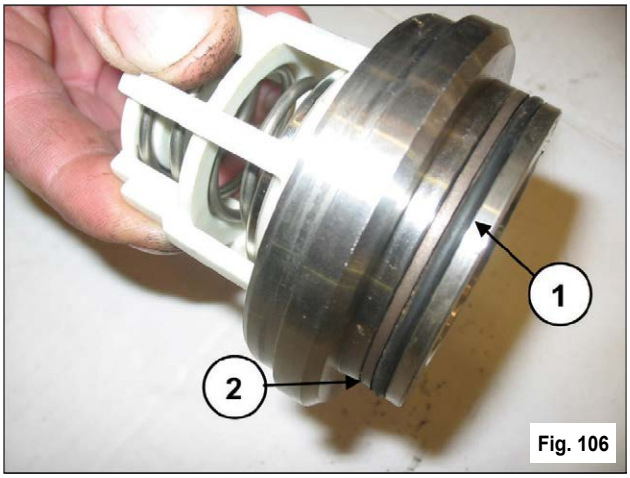


Fig. 106

Insert the delivery valve unit (1, fig. 107). The valve unit must be fully inserted as shown in 1, fig. 108.

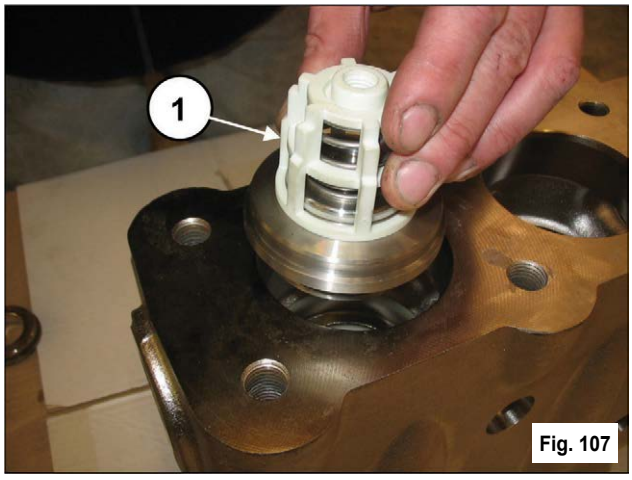


Fig. 107

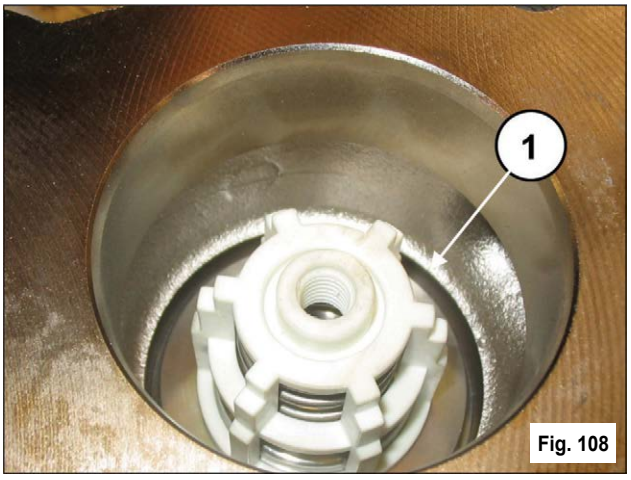


Fig. 108

Insert the anti-extrusion ring, exploded view item 16 in Owner's Manual (1, fig. 109).

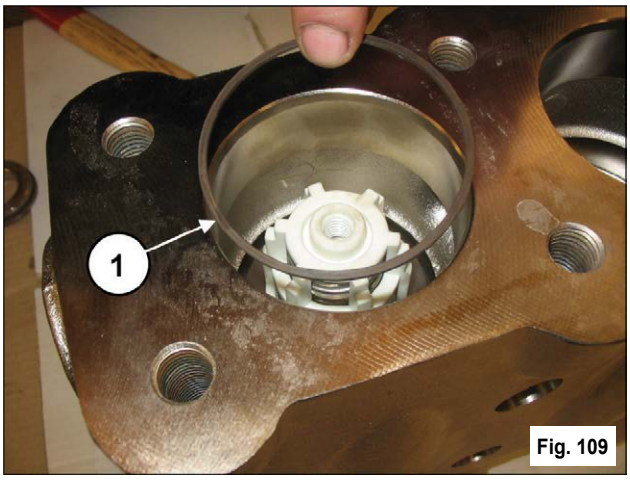


Fig. 109

Insert the O-ring, exploded view item 17 in Owner's Manual, (1, fig. 110).

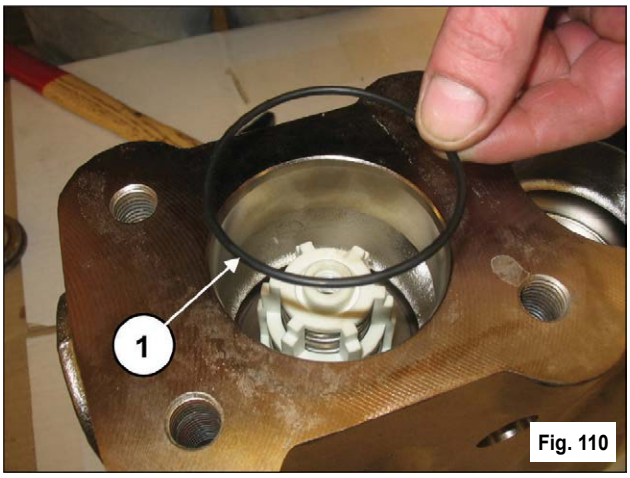


Fig. 110

Pay particular attention when inserting the O-ring indicated in 1, fig. 111. We advise to use the correct tool p/n 27516000 (for MK2/MKS2 40A, 45A and 50A) or p/n 27516100 (for MK2/MKS2 55A, 60A and 65A) in order to avoid cutting the O-ring during insertion.

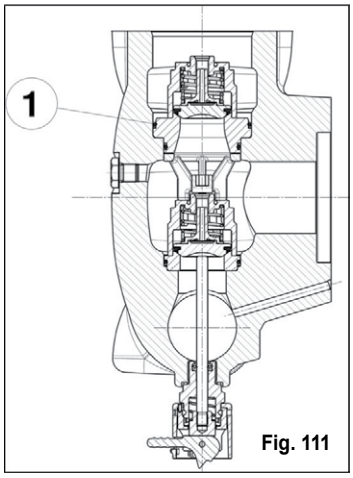


Fig. 111

Insert the valve seat ring (1, fig 112) and the spring (1, fig. 113).

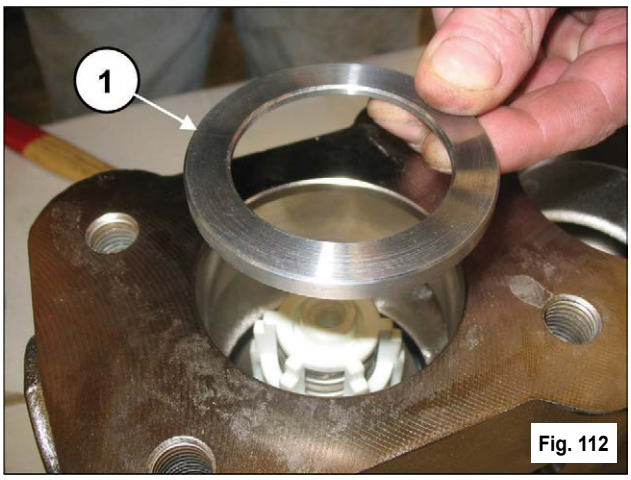


Fig. 112

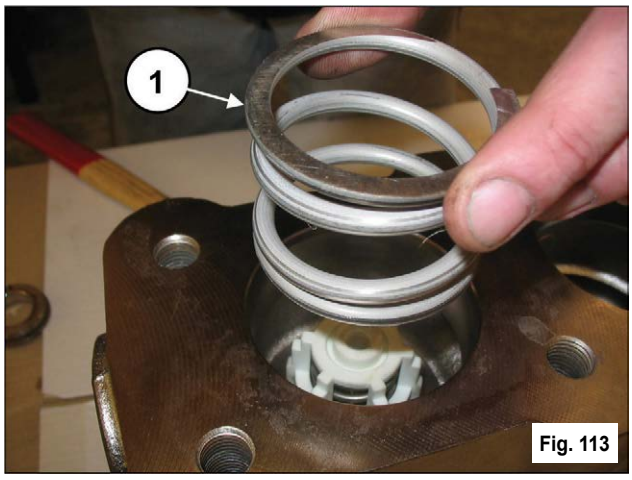


Fig. 113

Assemble the O-ring, exploded view item 17 in Owner's Manual, (1, fig. 114) and the anti-extrusion ring, exploded view item 21 in Owner's Manual (2, fig. 114) on the delivery valve plug.

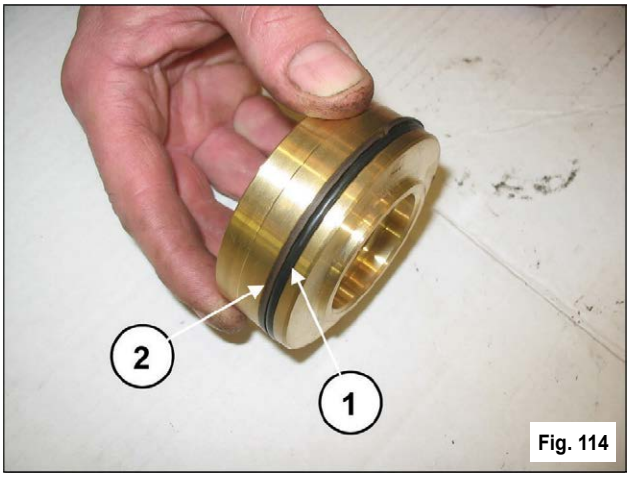


Fig. 114

Insert the valve plug complete with O-rings and anti-extrusion ring.

After assembling the valve unit and the valve plug, apply the valve cover (1, fig. 115) and screw on the 8 M16 x 55 screws (1, fig. 116).

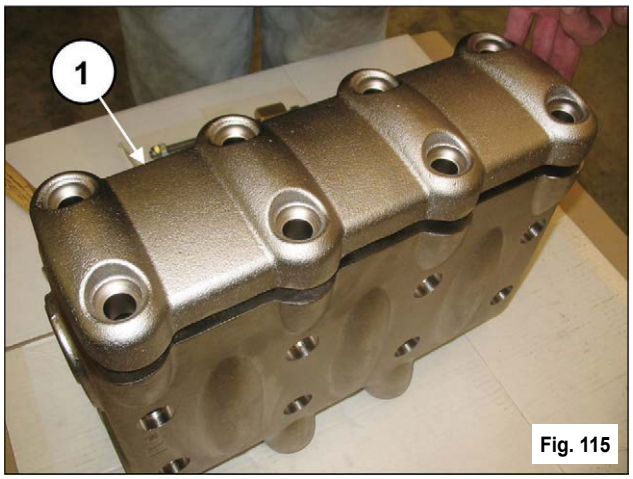


Fig. 115

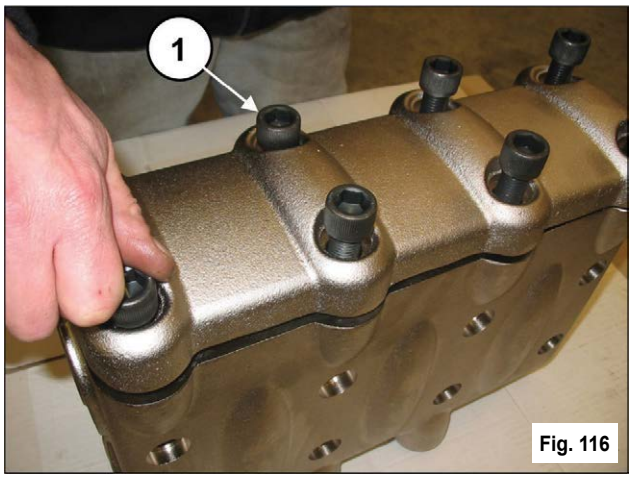


Fig. 116

Assemble the head on the pump casing (1, fig. 117) being careful not to bump against the plungers, and fasten the 8 M16 x 180 screws (1, fig. 118).

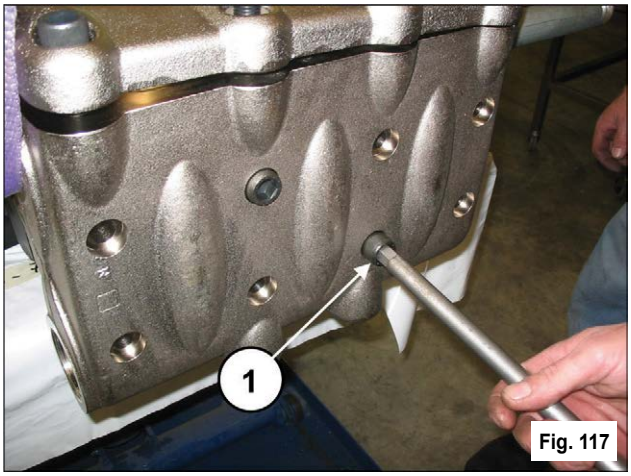


Fig. 117

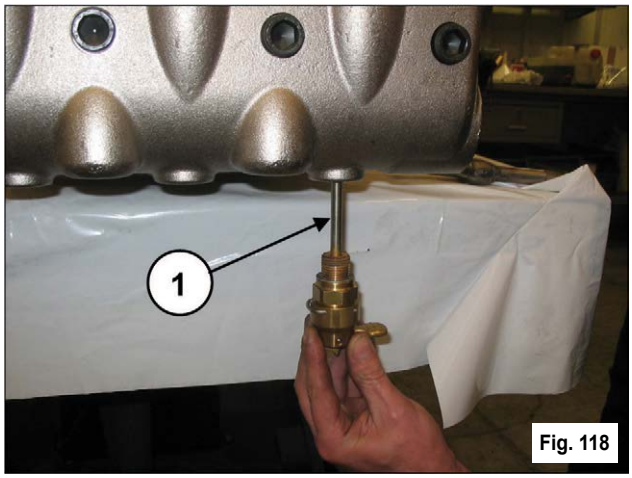


Fig. 118

Proceed with calibrating the M16 x 180 screws with the torque wrench as indicated in paragraph 3. “SCREW CALIBRATION”

Fasten the 8 M16 x 180 screws starting from the 4 internal screws cross-wise (see fig. 107), and then proceed with the 4 external screws, again fastening cross-wise.

Calibrate the M16 x 55 cover screws with the torque wrench as indicated in paragraph 3. “SCREW CALIBRATION”

Apply the valve opening devices (1, fig. 119) and fasten them using a 30 mm wrench (1, fig. 120).

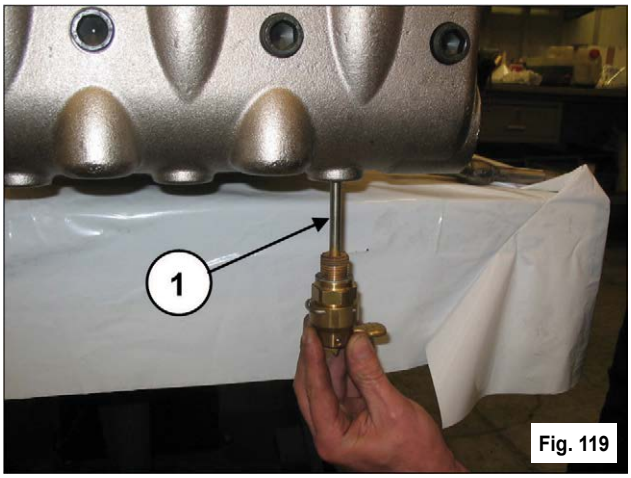


Fig. 119

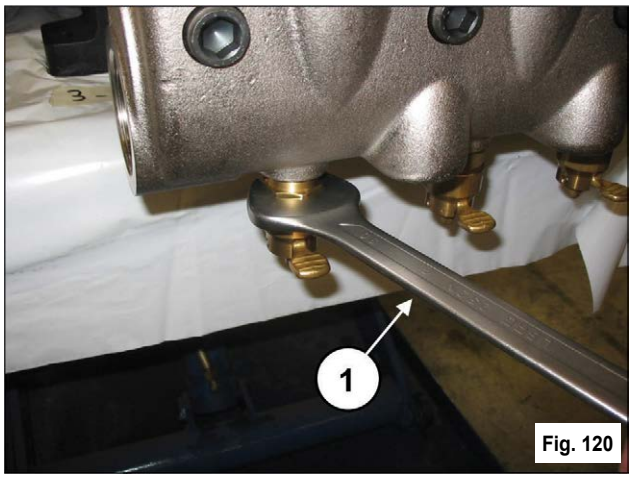


Fig. 120

2.2.3 Disassembling the Plunger Unit - Supports - Seals

The plunger unit requires a periodical inspection as indicated in the preventive maintenance table of the Owner's Manual. Interventions only require visual inspections of the draining from the hole in the lower cover. In case of anomalies/oscillations on the delivery pressure gauge, or leaking from the drain hole, proceed with seal inspection and replacement if necessary.
Operate as follows to extract the plunger units:

To access the plunger unit, unscrew the M16 x 180 screws and disassemble the head.

Remove the head with great care in order to avoid bumping against the plungers.

Disassemble the plungers by unfastening the screws (1, fig. 121).
Remove the plunger from the packing support and check that there are no scratches, or signs of wear or cavitation.

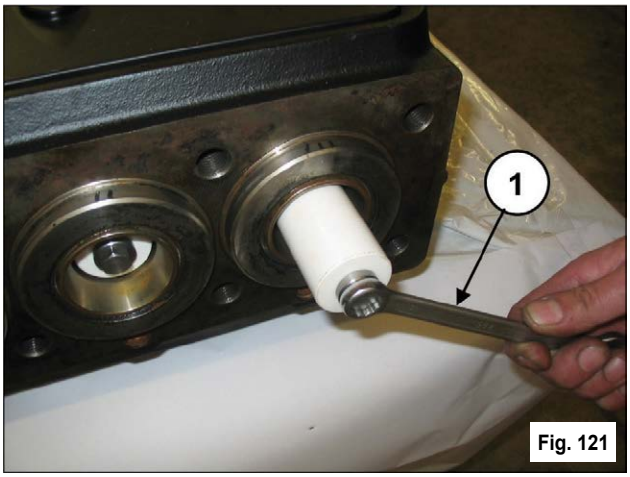


Fig. 121

Remove the upper inspection cover by unscrewing the 4 fastening screws (1, fig. 122).

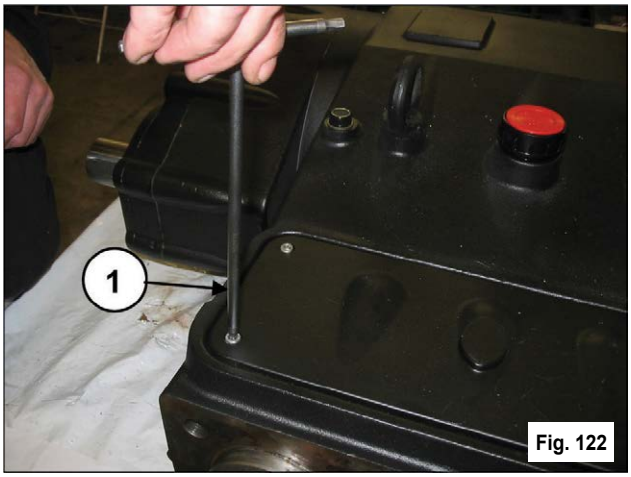


Fig. 122

Manually rotate the shaft so that the 3 plungers are in the top dead center position.
Insert the stopper tool p/n 27516600 between the plunger guide and the plunger (1, fig 123).

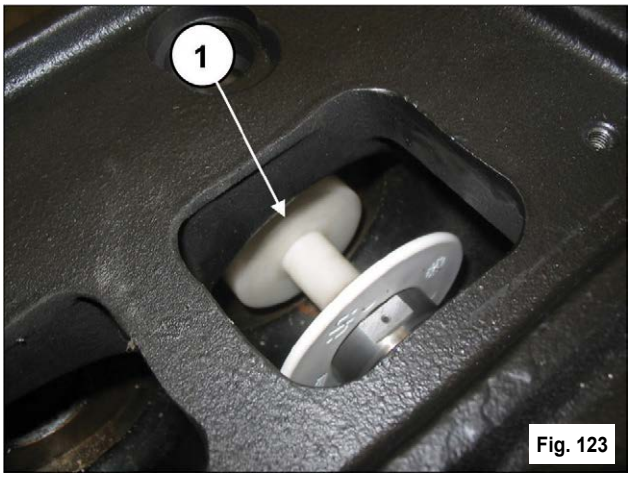


Fig. 123

Turning the shaft, move the plunger forward so that the stopper, moving forward itself, can push out the packing support and the entire plunger unit (1, fig. 124).

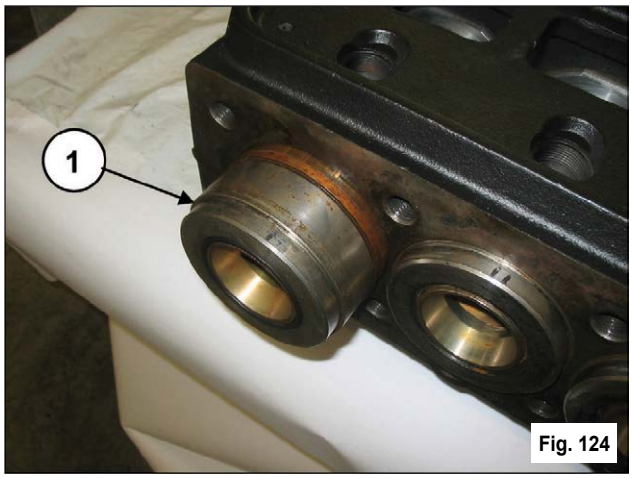


Fig. 124

Extract the packing support and the stopper tool.

Remove the packing support O-ring if it remains inside the pump case (1, fig. 125)

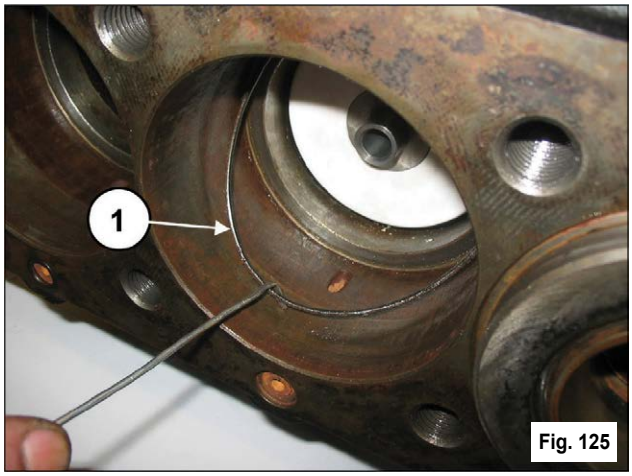


Fig. 125

Remove the wiper rings from the plunger guides (1, fig. 126).

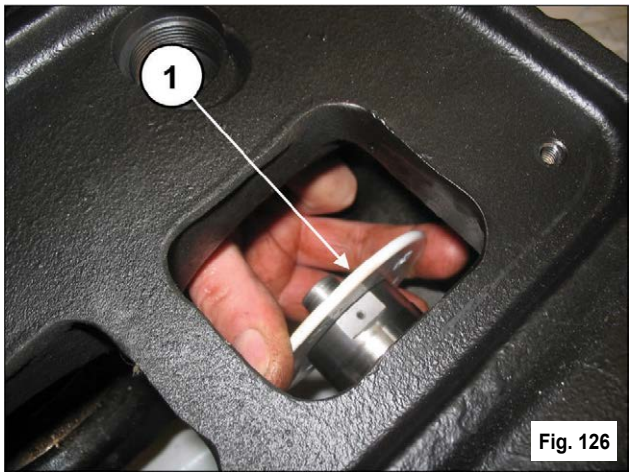


Fig. 126

If replacement of the plunger guide oil seal is needed, disassemble the oil seal cover by operating as follows: Unfasten the two screws of the oil seal cover (1, fig. 127).

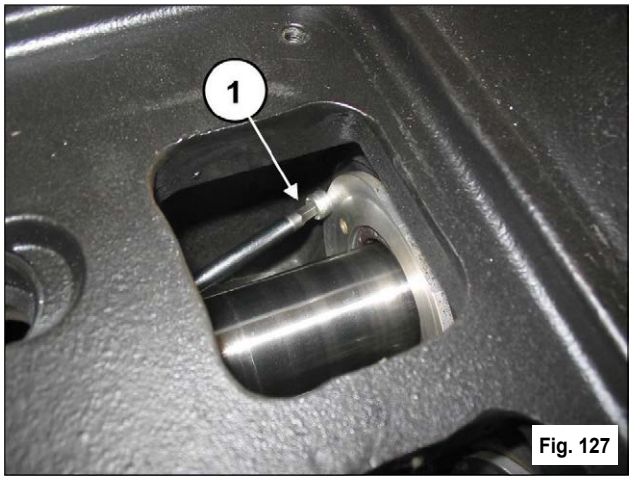


Fig. 127

Position the piston guide at bottom dead center, screw the extractor code 27516400 including the M5 adapter code p/n 27516500 in the holes in the cover (1, Fig. 128) and remove the oil seal cover from the pump assembly (1, Fig. 129).

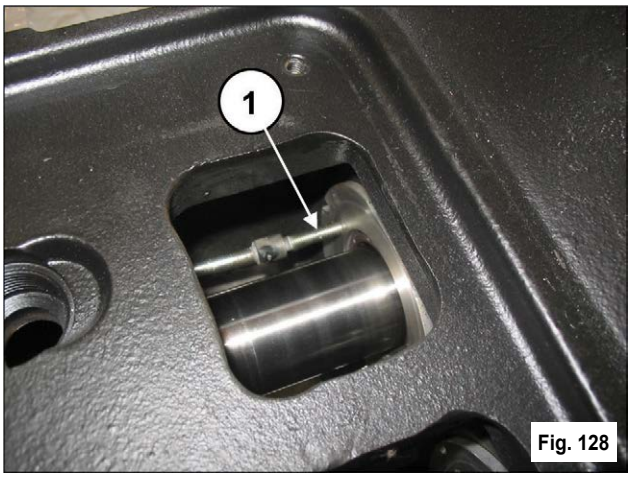


Fig. 128

Fig. 129

Replace the oil seal (1, fig. 130) and the external O-ring (2, fig. 130).

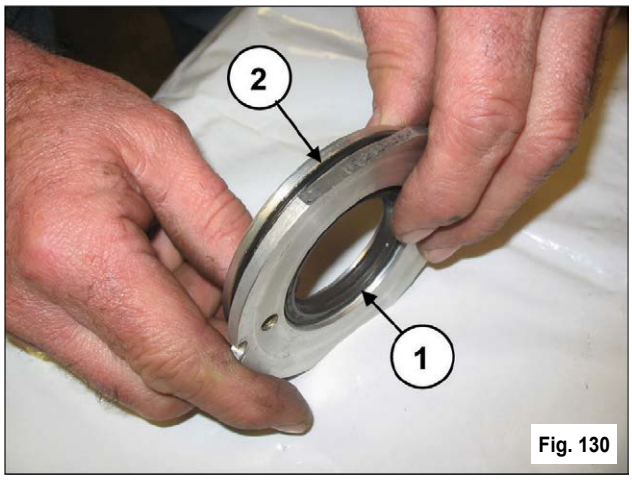


Fig. 130

Separate the packing support from the liner (1, fig. 131) to access the pressure packings (1, fig 132).

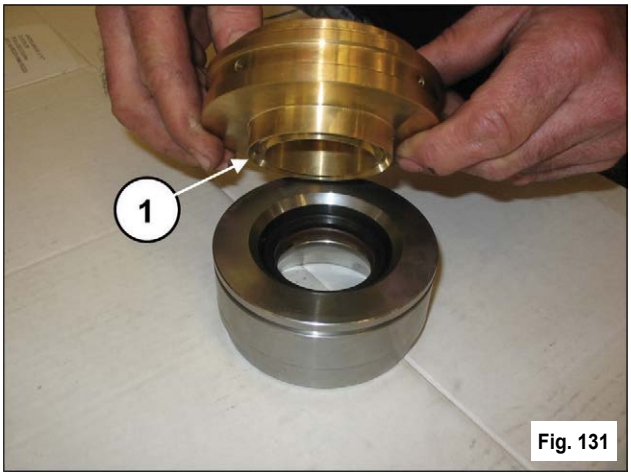


Fig. 131

Fig. 132

To remove the low pressure packing, use a shim or another tool that doesn't damage the seat of the packing support (1, fig. 133).

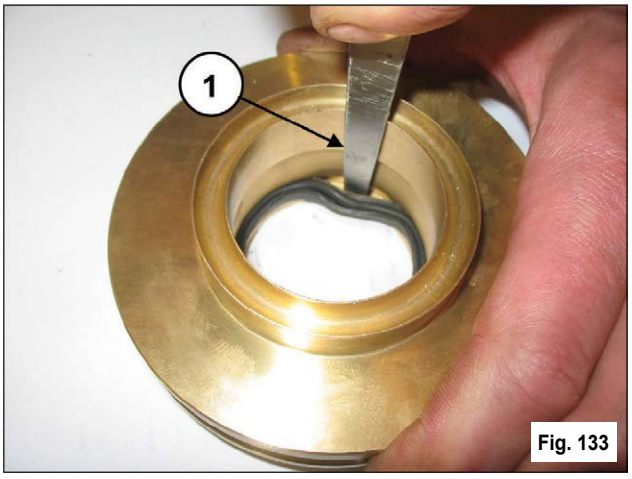


Fig. 133

2.2.4 Assembly of the Plunger Unit - Support - Seals

Proceed with reassembly by inverting the disassembly procedure indicated in paragraph 2.2.3.

Replace the pressure packings by applying a small amount of silicone grease to the lips, being careful not to damage them when inserting the liner.

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

Insert the low pressure packings in the packing support (1, fig 134), being careful that the sealing lips are facing frontwards (toward the head).

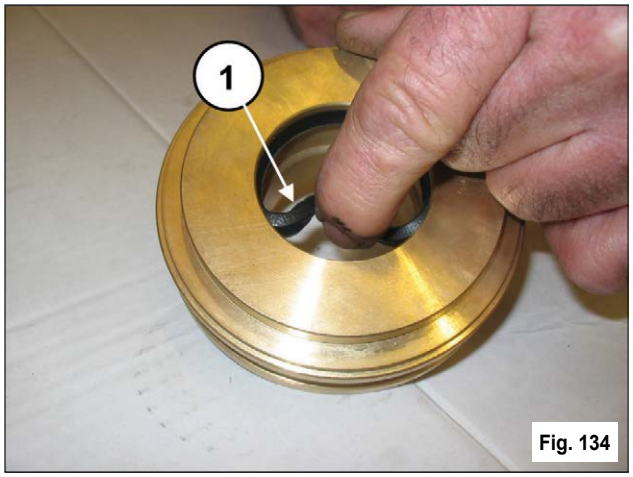


Fig. 134

Assemble the head ring (1, fig. 135), the high pressure packing (1, fig. 136) and the restop ring (1, fig. 137).

Fig. 135

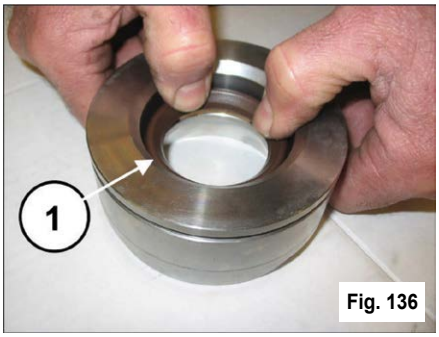


Fig. 136

Fig. 137

Couple the packing support to the liner (1, fig. 138).

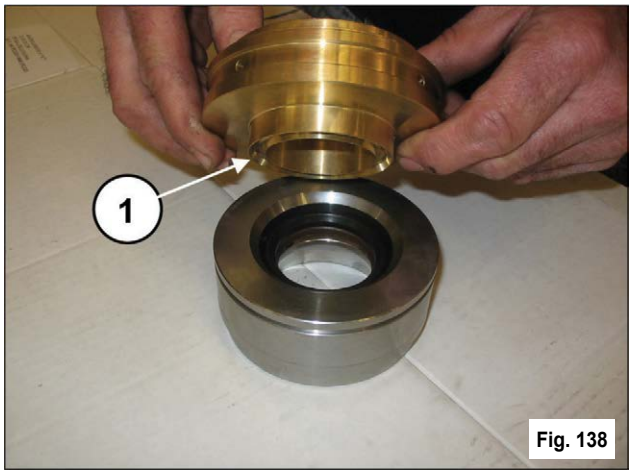


Fig. 138

Insert the oil seal in its cover (1, fig. 139) using a stopper p/n 27515800.

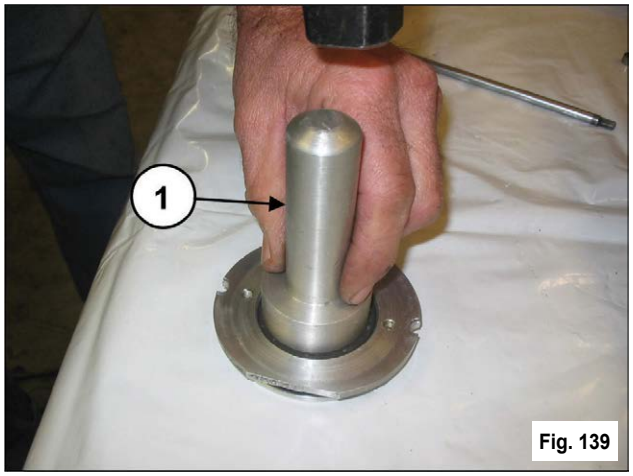


Fig. 139

Position the O-ring (1, fig. 140) in its seat on the oil seal cover, and insert the assembled unit inside the crankcase in the correct space (1, fig. 141).

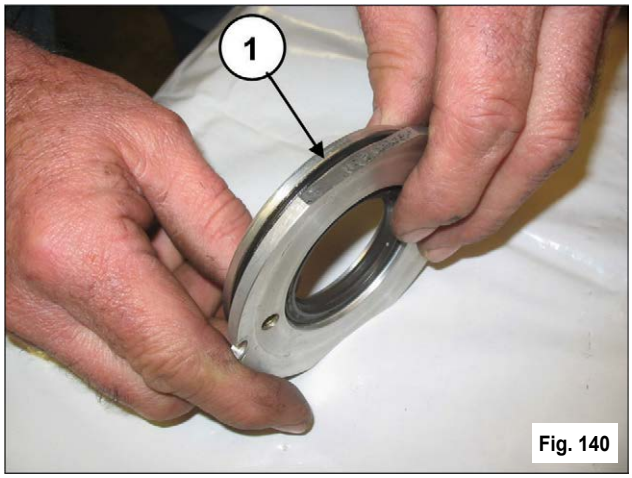


Fig. 140

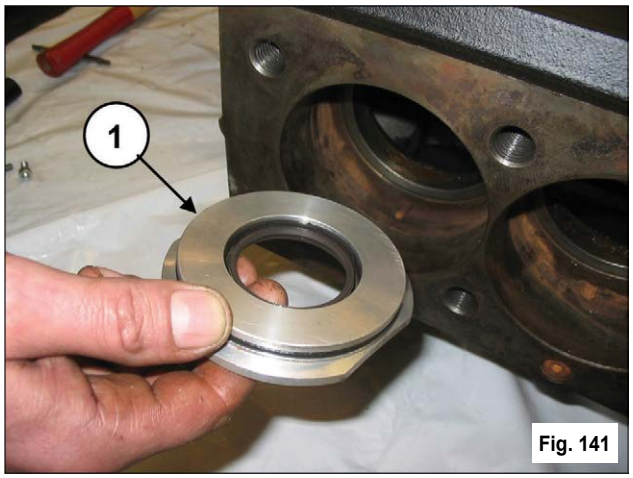


Fig. 141

Perfectly insert the cover into its seat (1, fig. 142) being careful not to damage the oil seal lip. Fasten the oil seal cover with 2 M6 x 14 screws (1, fig. 143).

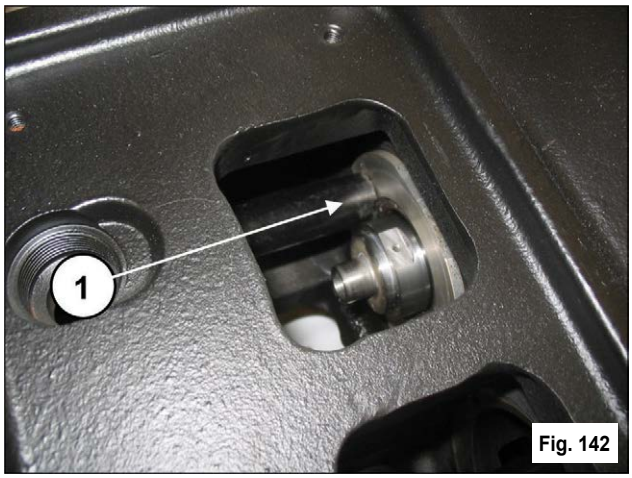


Fig. 142

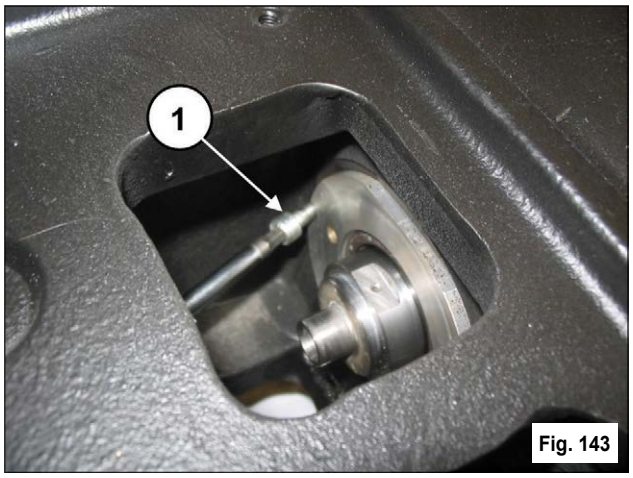


Fig. 143

Calibrate the screws using a torque wrench as indicated in paragraph 3. “SCREW CALIBRATION”

Position the wiper complete with its O-rings in its seat on the plunger guide (1, fig. 144 and fig. 145).

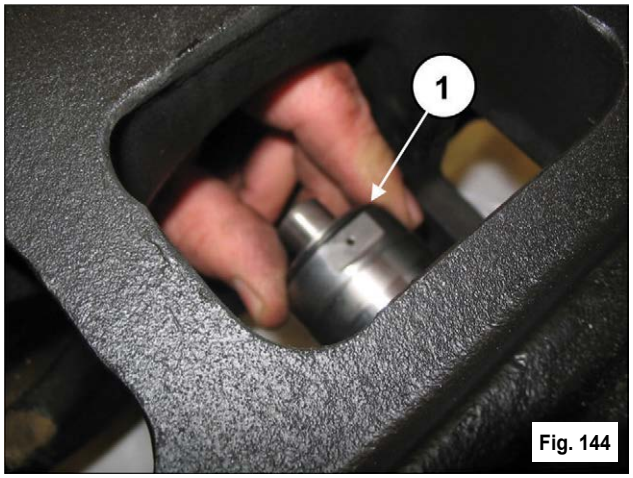


Fig. 144

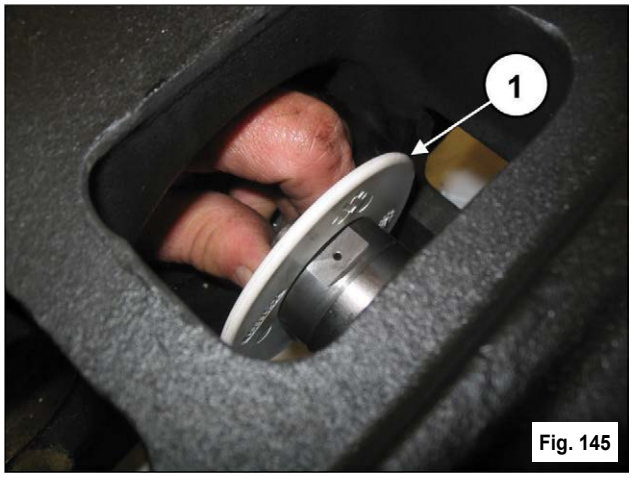


Fig. 145

Insert the 14 x 2 O-ring in its correct seat on the plunger bolt (1, fig. 146).

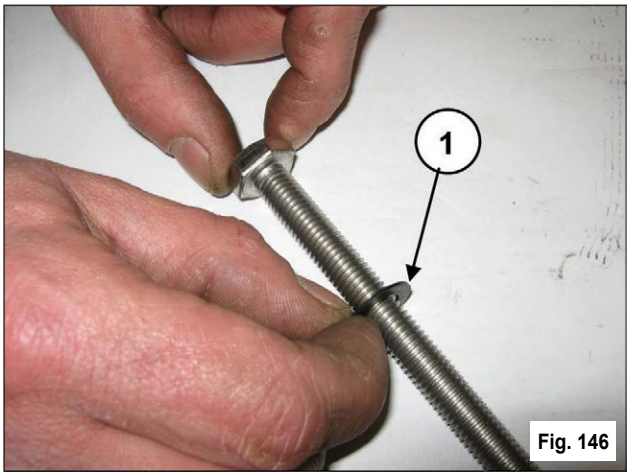


Fig. 146

Assemble the plungers on their respective guides (1, fig. 147) and fasten them as in 1, fig. 148).

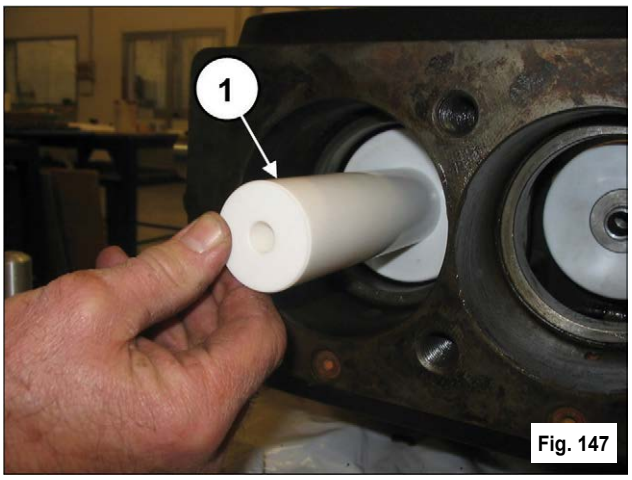


Fig. 147

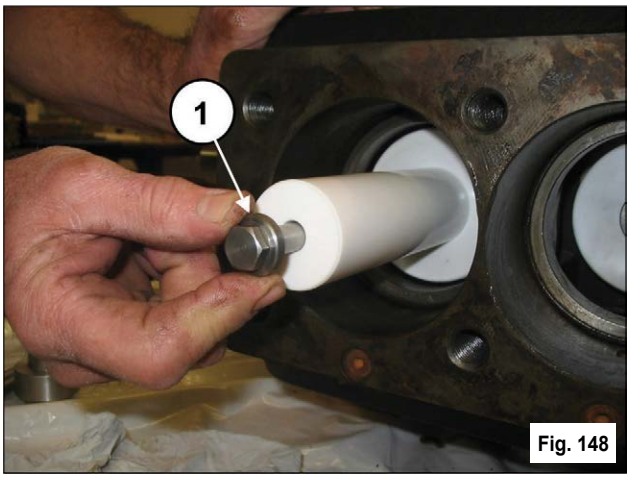


Fig. 148

Calibrate the screws using the torque wrench as indicated in paragraph 3. “SCREW CALIBRATION”

Insert the O-ring inside the pump case (1, fig. 149), followed by the previously assembled liner-packing support unit (complete with the O-ring), (1, fig. 150).

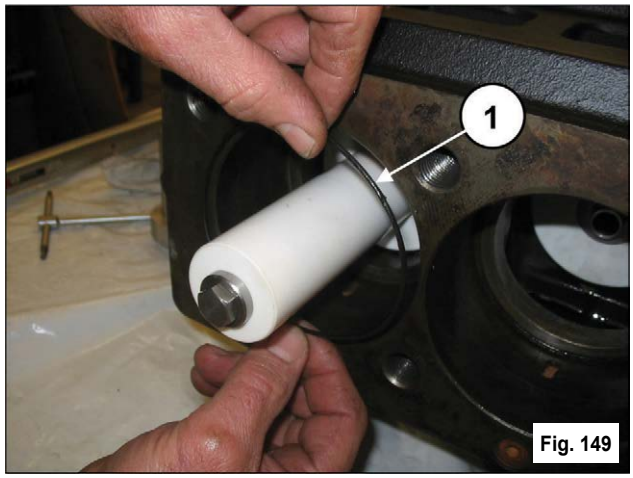


Fig. 149

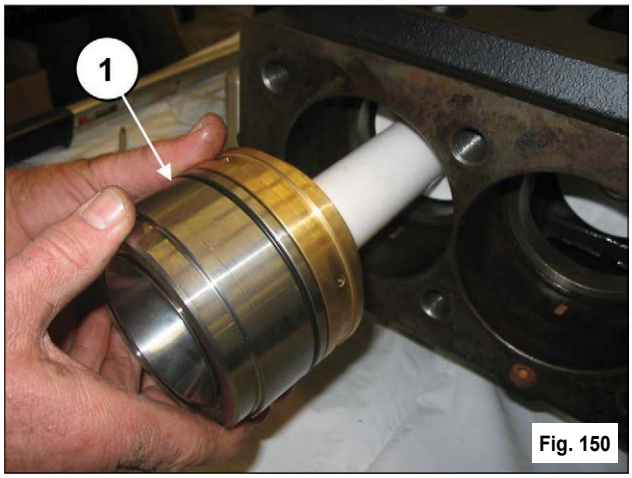


Fig. 150

Be sure that the liner-support unit is correctly positioned in its seat (1, fig. 151).

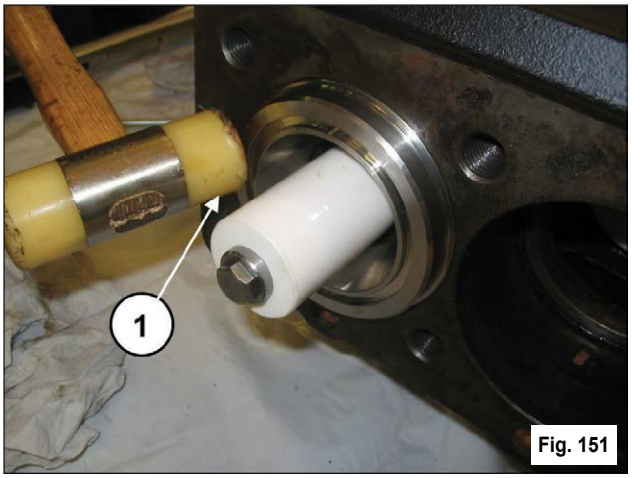


Fig. 151

Assemble the liner's front O-ring (1, fig. 152) and the O-ring of the recirculation hole (1, fig. 153).

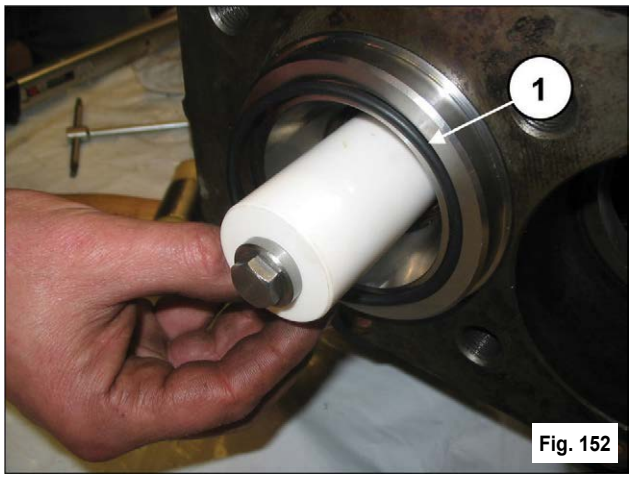


Fig. 152

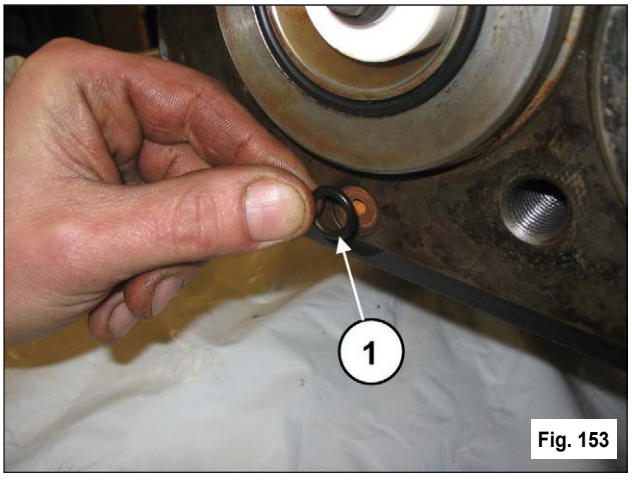


Fig. 153

Insert the O-ring on the inspection covers (1, fig. 154) and mount the covers using 4 + 4 M6 x 14 screws (1, fig. 155).

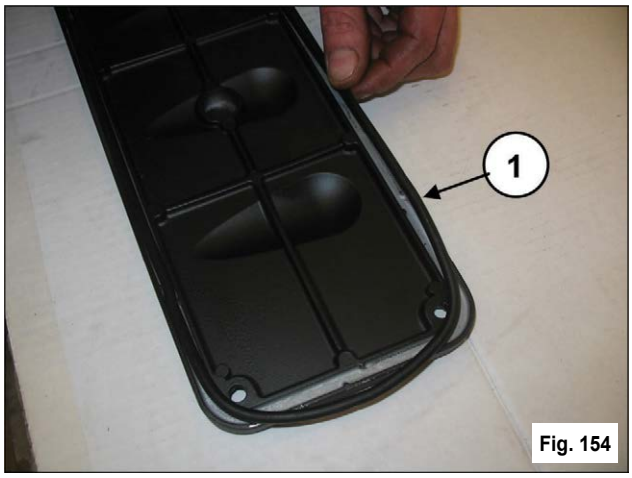


Fig. 154

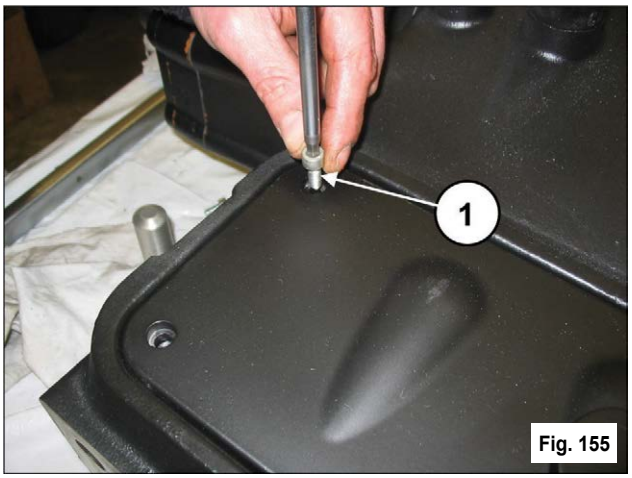


Fig. 155

Calibrate the screws with the torque wrench as indicated in paragraph 3. “SCREW CALIBRATION”

3. SCREW CALIBRATION

Screws are to be fastened exclusively using a torque wrench.

Description	Exp. View Position MK2 - MK2S (From Owner's Manual)	Exp. View Position MK2R - MK2SR (From Owner's Manual)	Fastening Ft. Lbs.	Fastening Nm
Crankcase cover screws M8x18	54 H.P. - 54 L.P	58 H.P. - 58 L.P.	14.8	20
Crankcase plug G1/2x13	55 H.P - 55 L.P.	59 H.P. - 59 L.P.	29.5	40
Reducer flange screw M8x18	50 H.P. - 50 L.P.	54 H.P. - 54 L.P.	33.2	45
Reducer cover screw M10x50	58 H.P - 70 L.P.	74 H.P. - 74 L.P.	33.2	45
Pinion screw M10x25	116 H.P - 115 L.P.	118 H.P. - 119 L.P.	33.2	45
Ring Gear screw M10x25	65 H.P. - 65 L.P.	69 H.P. - 69 L.P	59.0	80
Reducer case screw M12x40	75 H.P - 75 L.P	79 H.P. - 79 L.P.	54.2	73.5
Reducer case screw M12x50	64 H.P - 64 L.P.	68 H.P. - 68 H.P.	54.2	73.5
Upper and lower cover screw M6x14	41 H.P. - 41 L.P.	45 H.P. - 45 L.P.	7.4	10
Bearing cover screw M12x30	90 H.P. - 90 L.P.	94 H.P - 94 L.P.	29.5	40
Connecting rod screw M12x1.25x87	53 H.P. - 53 L.P.	57 H.P. - 57 L.P.	55.3*	75*
Plunger guide screw M6x20	49 H.P - 49 L.P.	53 H.P. - 53 L.P.	7.4	10
Oil seal cover screw M6x14	41 H.P. - 41 L.P.	45 H.P. - 45 L.P.	7.4	10
Plunger screw M10x160	27 H.P. - 27 L.P	27 H.P. - 27 L.P.	29.5	40
Valve cover screw M16x55	26 H.P - 26 L.P.	26 H.P. - 26 L.P.	245.6	333
Head plug G1/4"x13	13 H.P - 13 L.P.	13 H.P - 13 L.P.	29.5	40
Head screw M16x180	25 H.P. - 25 L.P.	25 H.P - 25 L.P.	245.6**	333**
Valve opening device	2 H.P - 2 L.P.	2 H.P. - 2 L.P.	29.5	40

* Screws should be tightened at intermediate incremental values

** Tightening sequence always cross-wise starting from the 4 internal screws then the 4 external screws (see fig. 118)

4. REPAIR TOOLS

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

For Assembly:

KIT	For Assembly:	
	• Plunger guide oil seal	F27910900
	• Pinion oil seal	F27515900 & F27548200
A	• Delivery valve O-ring seat (MK2/MKS2 40A, 45A, 50A)	F27516000
B	• Delivery valve O-ring seat (MK2/MKS2 55A, 60A, 65A)	F27516100

KIT	For Disassembly:	
A	• Suction valve seat (MK2/MKS2 40A, 45A, 50A)	F27516200
B	• Suction valve seat (MK2/MKS2 55A, 60A, 65A)	F27516300
A/B	• Slide hammer	F27516400
C	• Liner + packings support unit	F27516600
	• Reducer cover	F27516700
	• Shaft (connecting rod blocking)	F27566200
A/B	• 10 mm threaded bushing	800049
A/B	• Valve Cage Adapter	520426

RECOMMENDED REPAIR KITS

FKITMKVHP - MK2/MKS2 40A, 45A, 50A Valve removal / Installation Tool Kit A

Includes:	F27516000	Valve O-ring install	Qty. 1
	F27516200	F27513400 handle + F27627700 seat pusher	Qty. 1
	F27516400	Slide hammer	Qty. 1
	800049	10 mm threaded bushing	Qty. 1
	520426	Valve Cage Adapter	Qty. 1

FKITMKVLP - MK2/MKS2 55A, 60A, 65A Valve Removal / Installation Tool Kit B

Includes:	F27516100	Outlet valve O-ring assembly tool	Qty. 1
	F27516300	F27513400 handle + F27627800 seat pusher	Qty. 1
	F27516400	Slide hammer	Qty. 1
	800049	10 mm threaded bushing	Qty. 1
	520426	Valve Cage Adapter	Qty. 1

F27516600 - Cylinder Removal Tool with Handle - MK - Tool Kit C

530078 - Splined Dummy Shaft Tool - 14 TPI . . . . . Qty. 1
2500 RPM Gear Box Only

530090 - Splined Dummy Shaft Tool - 13 TPI . . . . . Qty. 1
1500 RPM Gear Box Only

5. SPECIAL VERSIONS

The instructions for repairing special versions are given below. Unless specified otherwise, refer to the information above for the standard MK2/MKS2 pump.

- MK2R/MK2SR pumps: for repair, follow the instructions for the standard MK2 pump with the exception of the pressure seals, for which it is necessary to follow the paragraphs below.

5.1 Disassembly of the Plunger Unit - Support - Seals

The plunger unit requires preventive checks as indicated in the preventive maintenance table in the owner's manual.

Maintenance is limited to visual inspection of any drainage from the hole present on the lower cover. If abnormalities / fluctuations on the outlet pressure gauge or dripping from the drainage hole circuit are detected, the seal pack must be checked and replaced.

Proceed as follows to extract piston units:

To access the piston unit, unscrew the M16x180 screws and remove the head.

Remove the head taking care to avoid hitting the plungers.

Disassemble the plungers by unscrewing the fixing screws (1, Fig. 156).

Remove the plunger from the seal support and check that its surfaces do not present any scratches, signs of wear or cavitation.

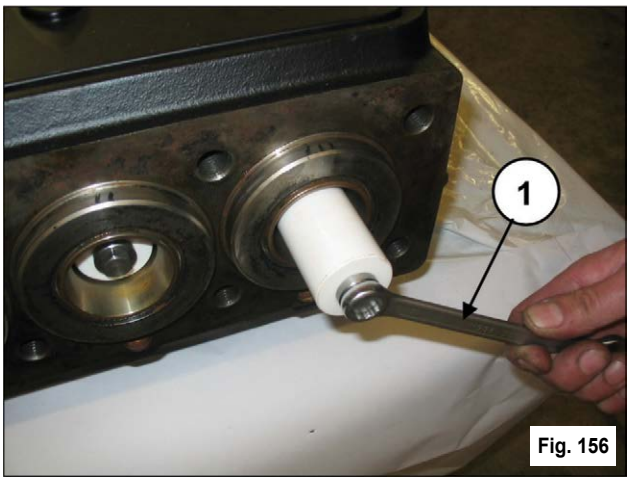


Fig. 156

Remove the upper inspection cover, unscrewing the 4 fixing screws (1, Fig. 157).

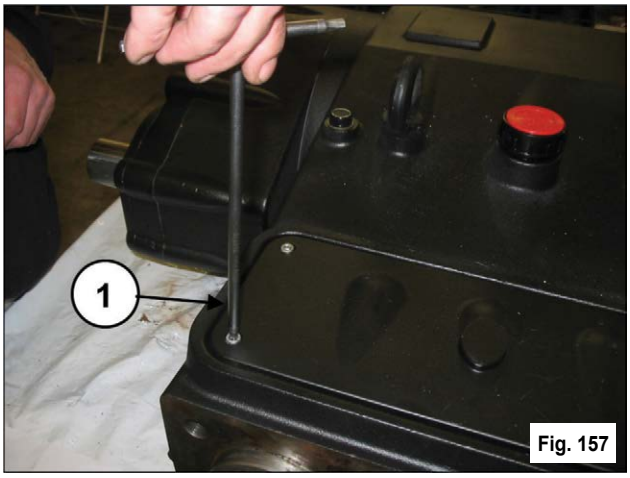


Fig. 157

Manually turn the shaft in such a way to bring the 3 plungers progressively to the top dead center position and insert the buffer tool p/n 27516600 between the piston guide and the piston (1, Fig. 158).

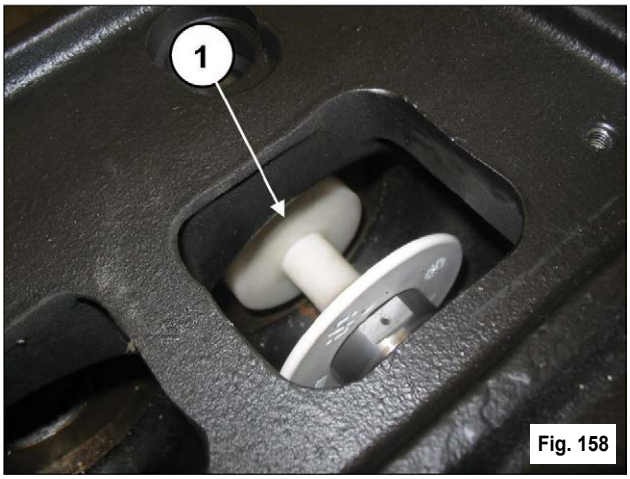


Fig. 158

Turning the shaft, have the plunger guide move forward so that the buffer, moving ahead, can expel the seal support, the spring and the entire piston unit (1, Fig. 159).

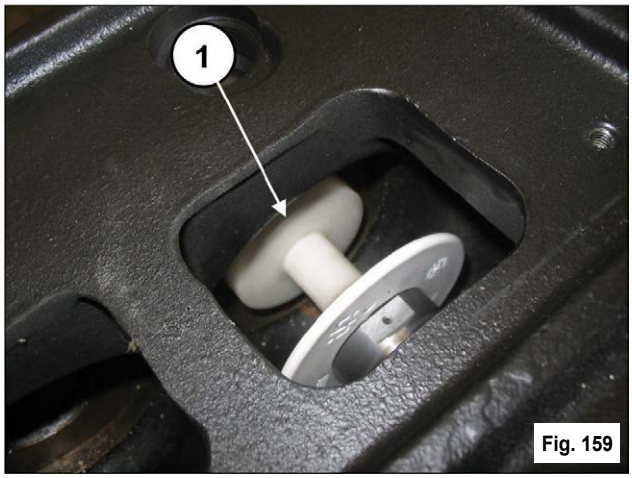


Fig. 159

Extract the seal support unit and the buffering tool.

Remove the seal support bottom O-ring should it remain inside the pump casing (1, Fig. 160).

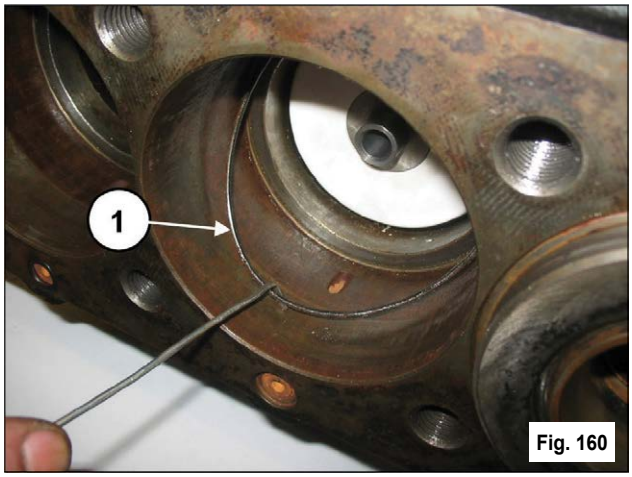


Fig. 160

Slip the splash-guard rings off the piston heads (1, Fig. 161).

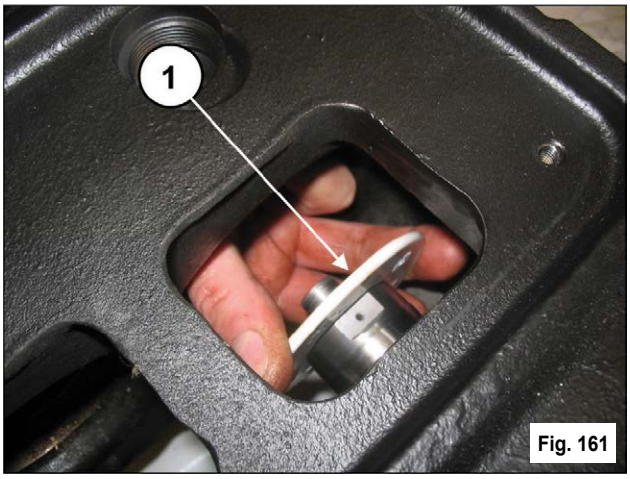


Fig. 161

If you need to replace the plunger guide seal ring, you need to remove the oil seal cover as follows: Unscrew the two screws locking the oil seal cover (1, Fig. 162).

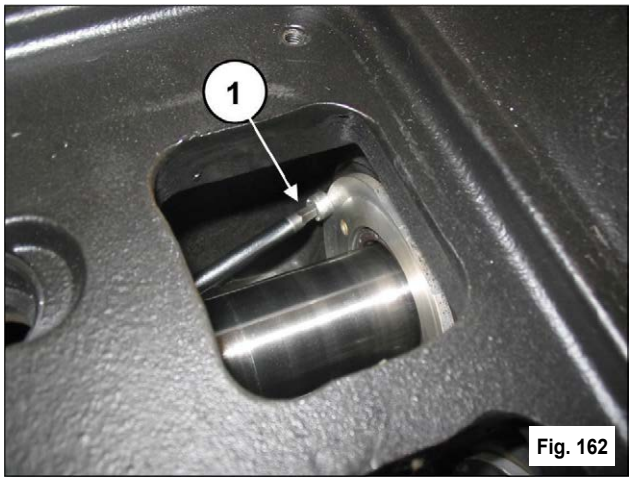


Fig. 162

Position the plunger guide at bottom dead center, screw the extractor p/n 27516400 including the M5 adapter p/n 27516500 in the holes in the cover (1, Fig. 163) and remove the oil seal cover from the pump assembly (1, Fig. 164).

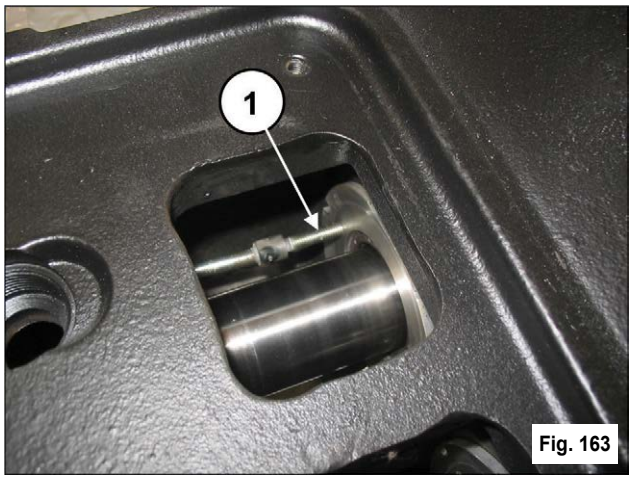


Fig. 163

Fig. 164

Replace the oil seal (1, Fig. 165) and the external O-ring (1, Fig. 165).

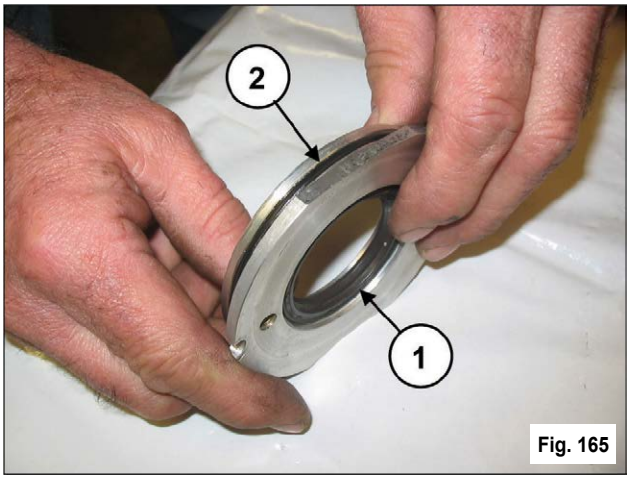


Fig. 165

Separate the seal support from the liner, remove the spring ring and scraper ring (1,2, Fig. 166) to access the pressure seals (1, Fig. 167).

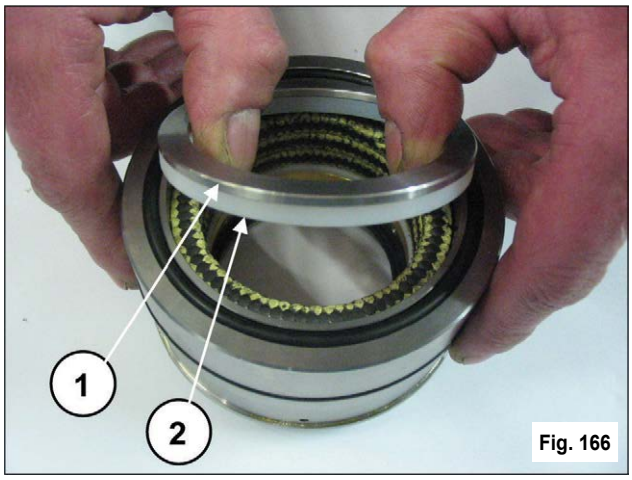


Fig. 166

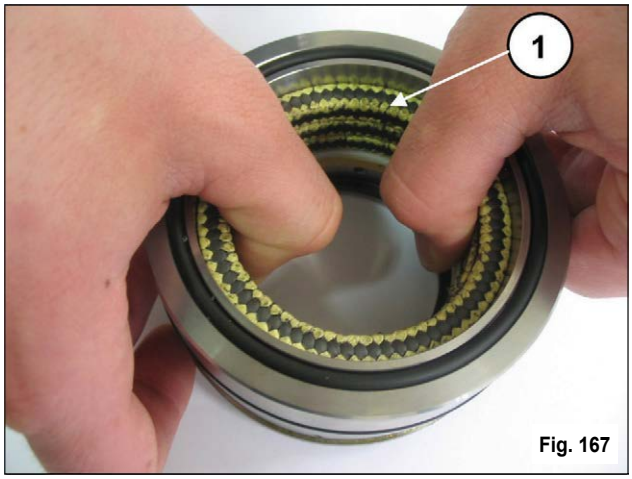


Fig. 167

To remove the low pressure seal, use a thickness gauge or another tool which will not damage the seal support housing (1, Fig. 168).

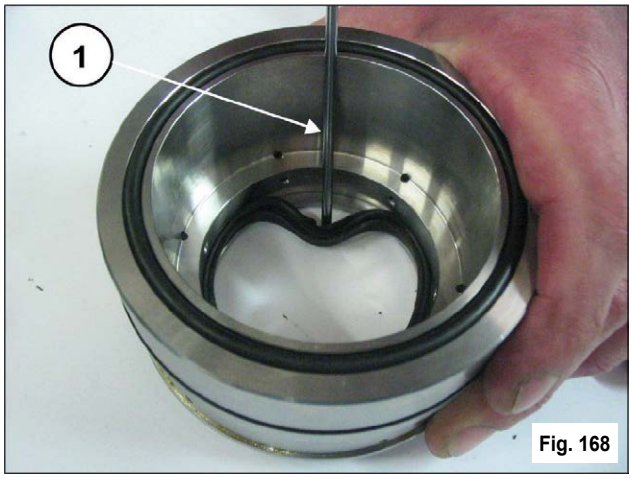


Fig. 168

5.2 Assembly of the Plunger Unit - Support - Seals

Proceed with reassembly following the reverse order indicated in par. 5.1.

Replace the pressure seals moistening the lips with silicone grease (without spreading it), taking extra care not to damage them during liner insertion.

The O-rings and the pressure seals must be replaced at each disassembly.

Insert the low pressure seal in the packing support (1, Fig. 169) paying attention to the mounting direction which requires that the sealing lip be set forward (towards the head) and the O-ring (2, Fig. 169).

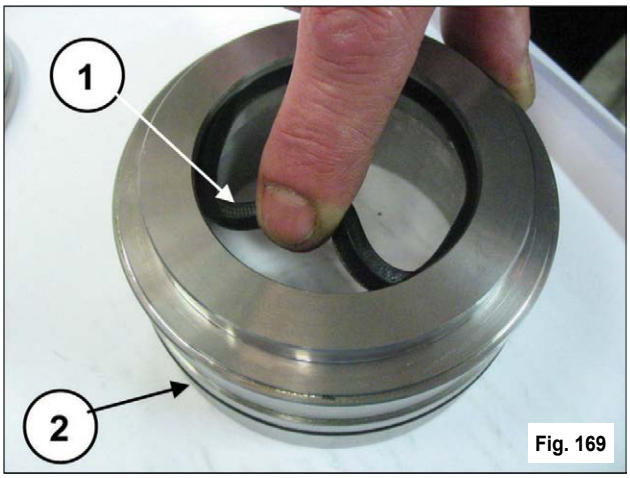


Fig. 169

Install the support ring and the back-up ring (1,2, Fig. 170), the three packings, making sure the notches are at 120° from each other (1, Fig. 171), the packing scraper ring and the spring ring (1,2, Fig. 172).

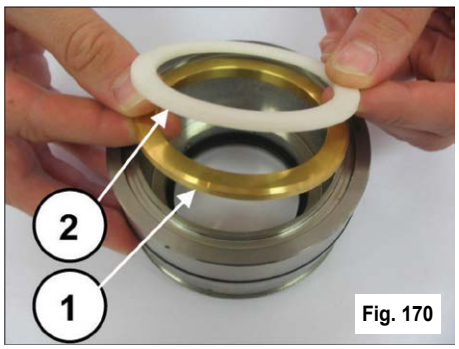


Fig. 170

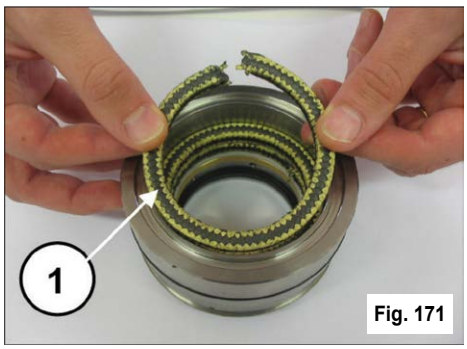


Fig. 171

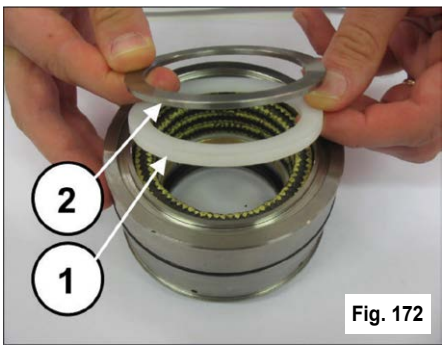


Fig. 172

Now assemble the O-ring (1, Fig. 173) on the packing head ring and position it in the seat on the head.

Fig. 173

Mount the oil seal in the oil seal cover (1, Fig. 174) using a buffer p/n 27910900.

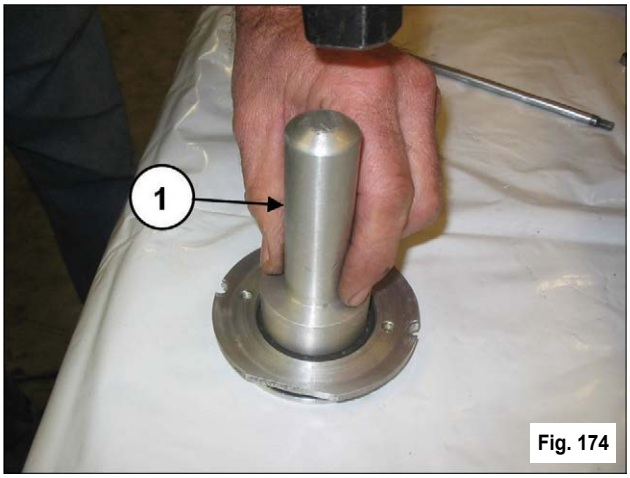


Fig. 174

Position the O-ring (1, Fig. 175) in the seat of the oil seal cover and insert the assembly mounted in the casing into the seat (1, Fig. 176).

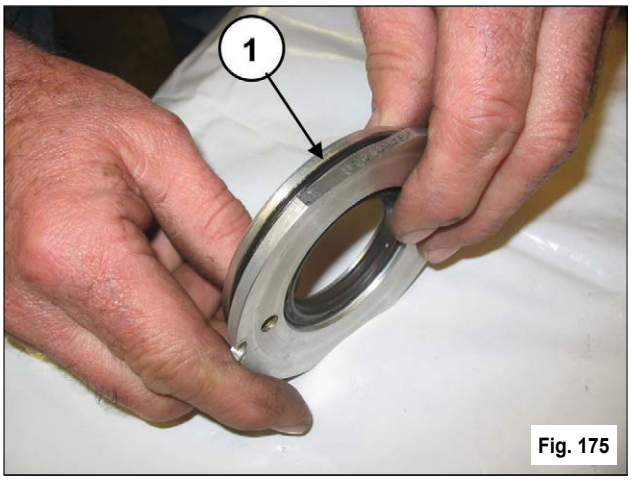


Fig. 175

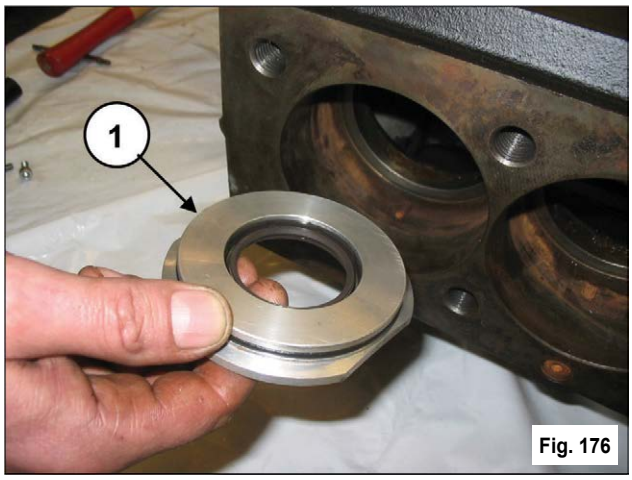


Fig. 176

Make sure that the cover completely enters its seat (1, Fig. 177) being careful not to damage the lip of the seal ring. Screw in the oil seal covers using 2 x M6x14 screws (1, Fig. 178).

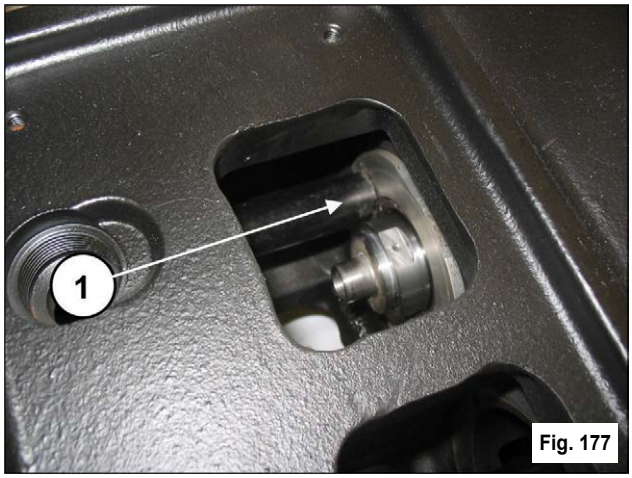


Fig. 177

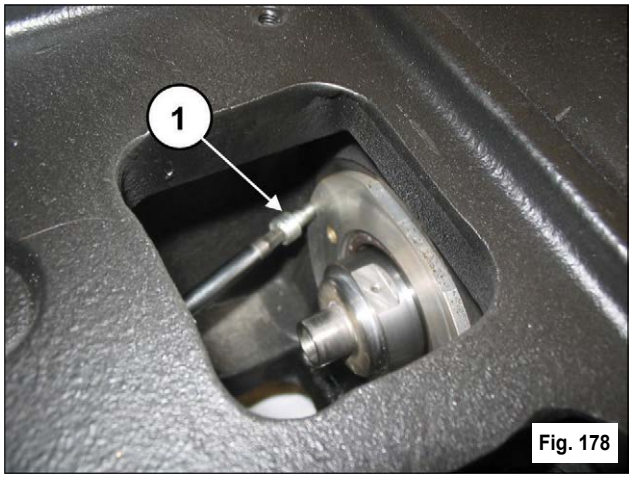


Fig. 178

Calibrate the screws with a torque wrench as indicated in chapter 3.

Position the spray-guard together with the O-ring in the housing on the plunger guide (1, Fig. 179 and Fig. 180).

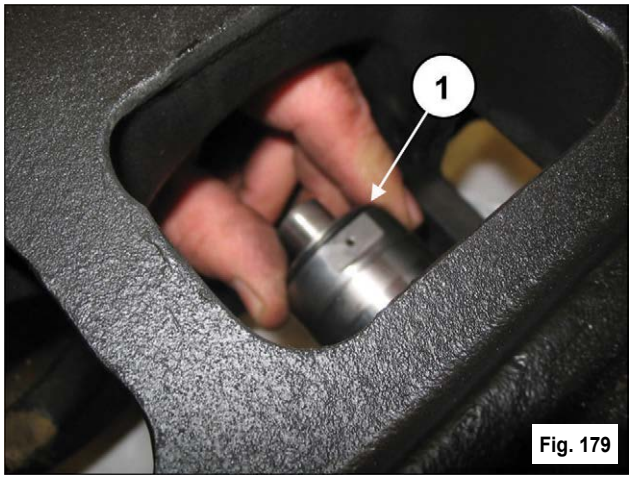


Fig. 179

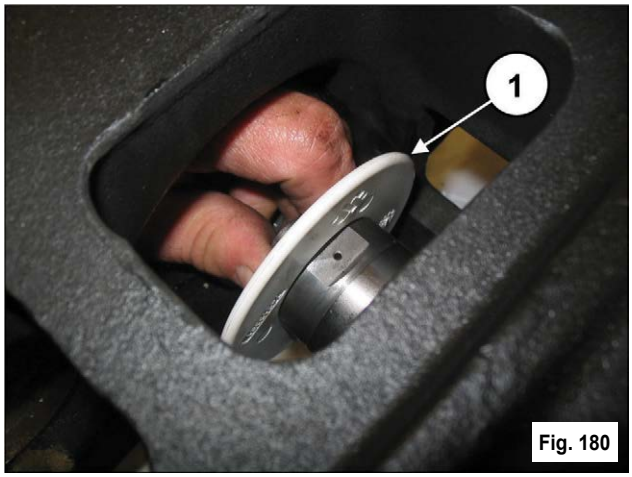


Fig. 180

Insert the Ø10x18x0.9 washer in the plunger fixing screw (1, Fig. 181).

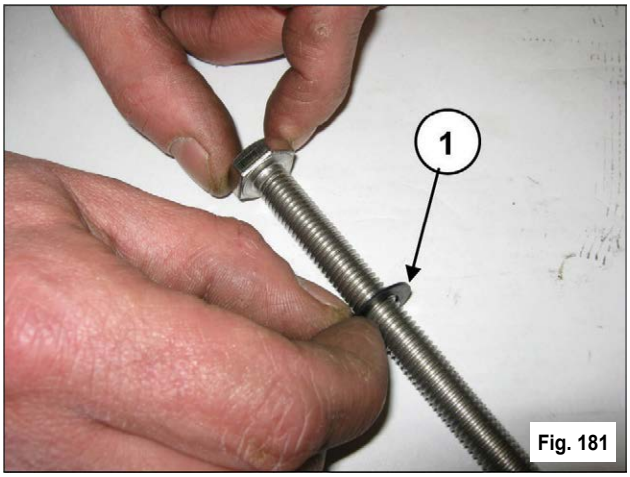
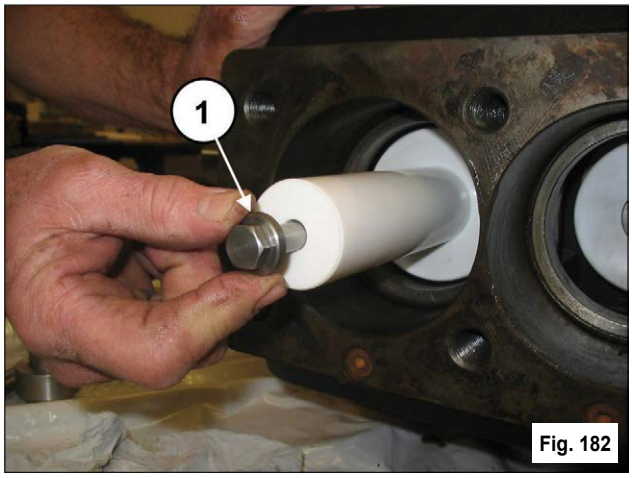
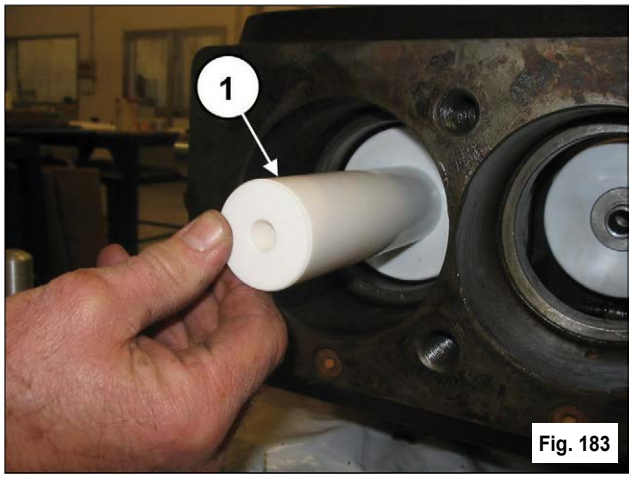


Fig. 181

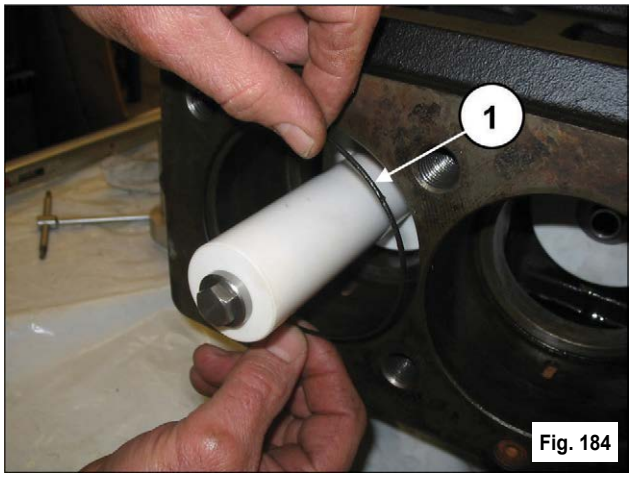
Install the plungers on their respective guides (1, Fig. 182) and fasten them as per 1, Fig. 183.

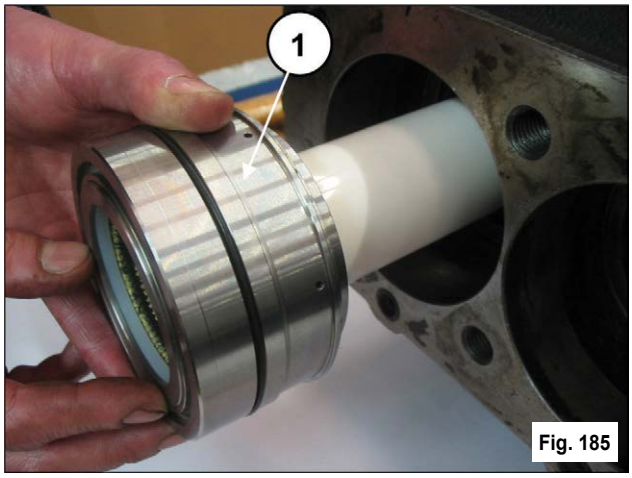




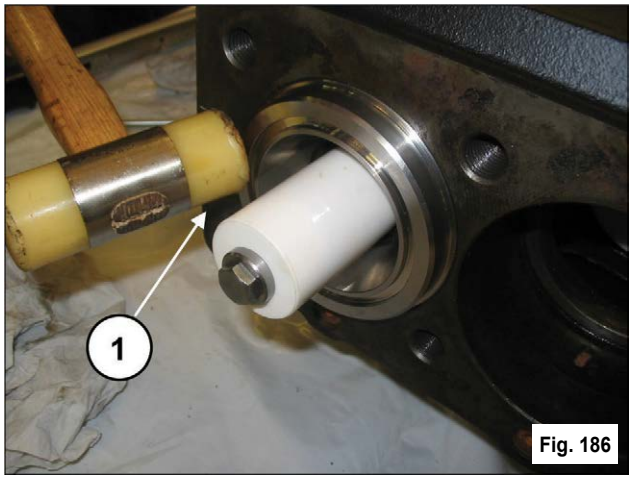
Calibrate the screws with a torque wrench as indicated in chapter 3.

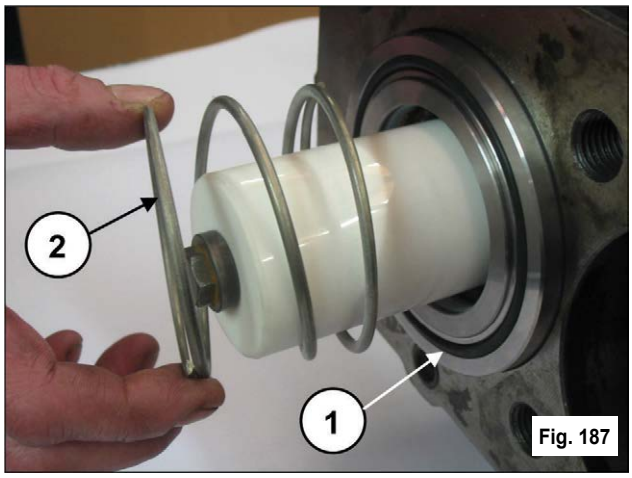
Insert the O-ring inside the pump casing (1, Fig. 184) and then the previously-assembled liner-seal support block (complete with the same O-ring) to end stroke (1, Fig. 185).





Ensure that the liner-support block is positioned correctly down to the bottom of the housing (1, Fig. 186); now mount the front O-ring of the liner and the spring (1,2, Fig. 187).





Mount the recirculation hole O-ring (1, Fig. 188). Facilitate keeping the O-rings in place with a light smearing of grease. Fig. 189 shows subsequent assembly of the head.

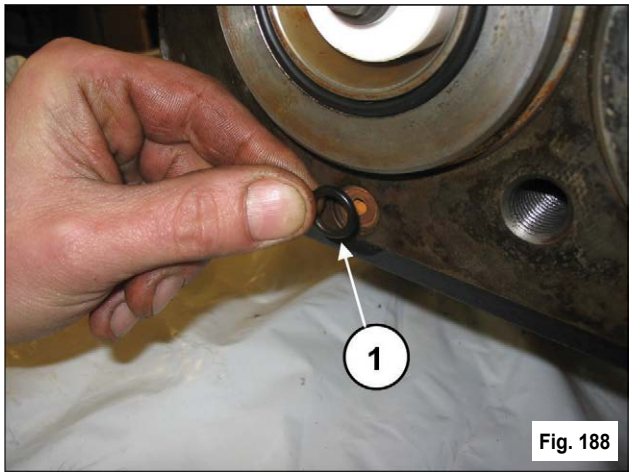


Fig. 188

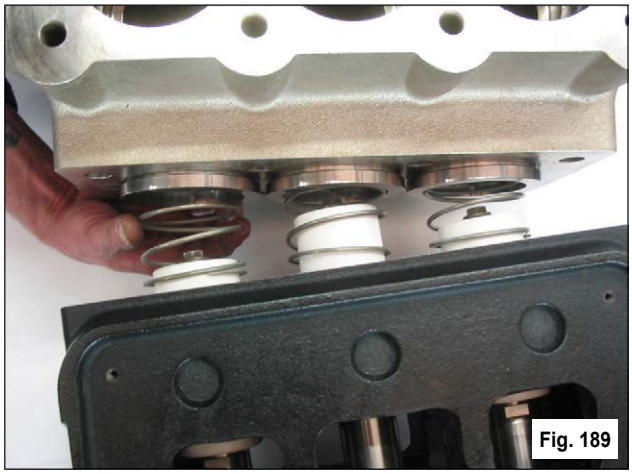


Fig. 189

On the inspection covers insert the O-ring (1, Fig. 190) and assemble the covers with the use of 4+4 M6x14 screws (1, Fig. 191).

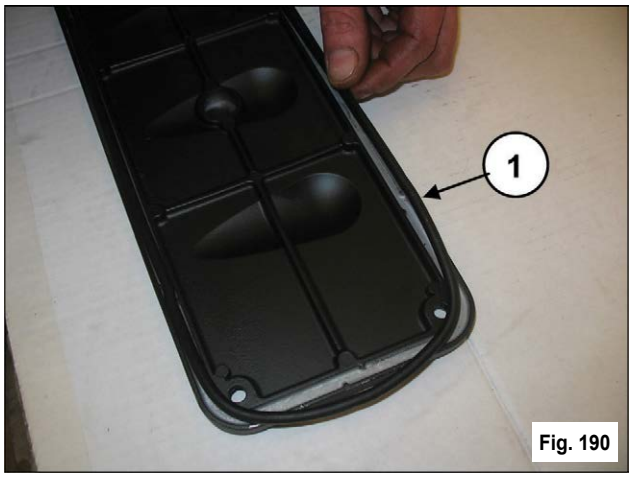


Fig. 190

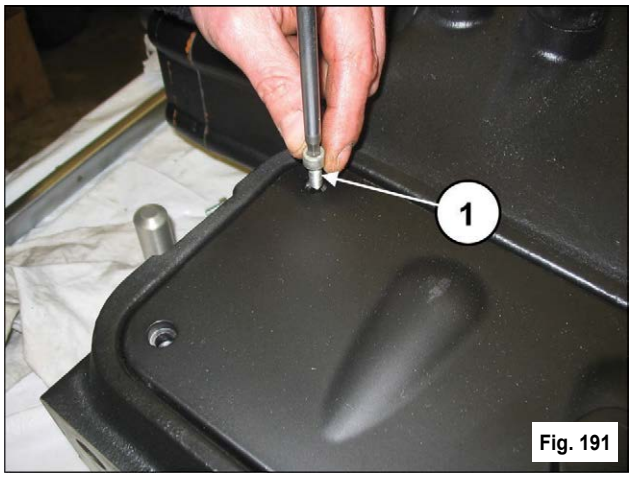


Fig. 191

Calibrate the screws with a torque wrench as indicated in chapter 3.

MAINTENANCE LOG

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

GENERAL PUMP

GP Companies, Inc.
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www.generalpump.com email: sales@gpcompanies.com