

Repair Manual



MF7M5B - MF7M7B - MF7M5D - MF7M7D



General Pump is a
member of the
Interpump Group



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1. INTRODUCTION

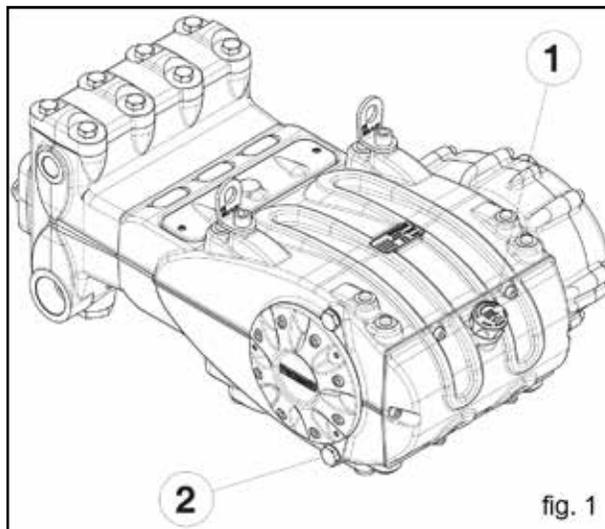
This manual describes the instructions for Repairing MF7M Series pumps, and must be carefully read and understood before performing any repair intervention on the pump. Correct use and adequate maintenance is fundamental for the pump's regular operation and long wear. General Pump declines any responsibility 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).



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:

Fully empty oil from the pumps, then disassemble the crankcase cover (and relative O-ring), unscrewing the 6 M10 screws (1, fig. 2).



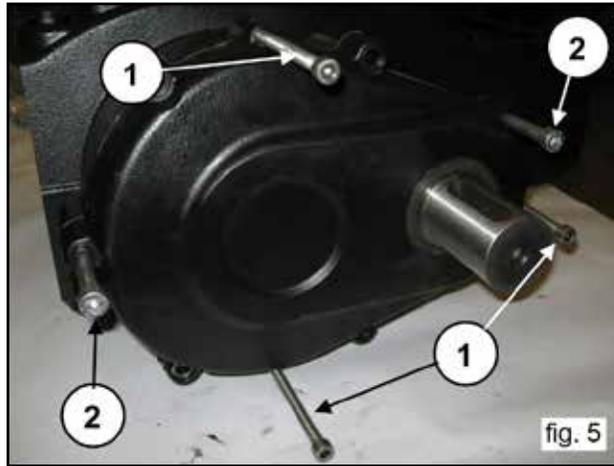
Remove the tab from the PTO shaft (1, fig. 3).



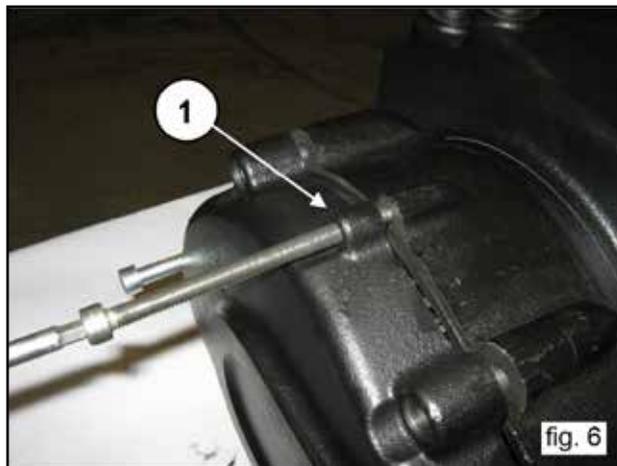
Unscrew the reduction gear cover fastening screws (1, fig. 4).



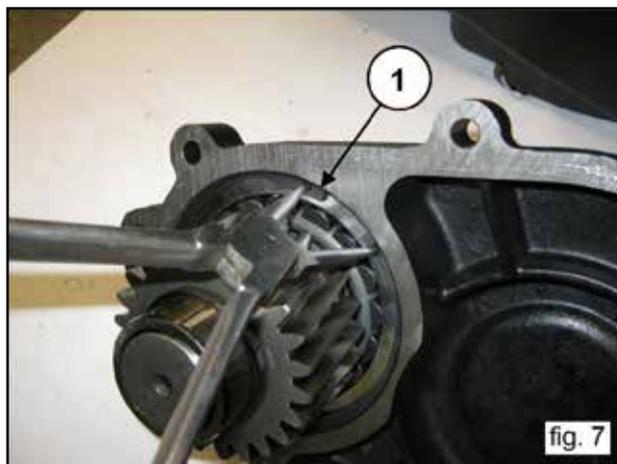
Position the 3 grub screws or M8 threaded screws (1, fig. 5) with the function of extractors in the holes and two sufficiently long M10 screws with the function of supporting the cover (2, fig. 5).



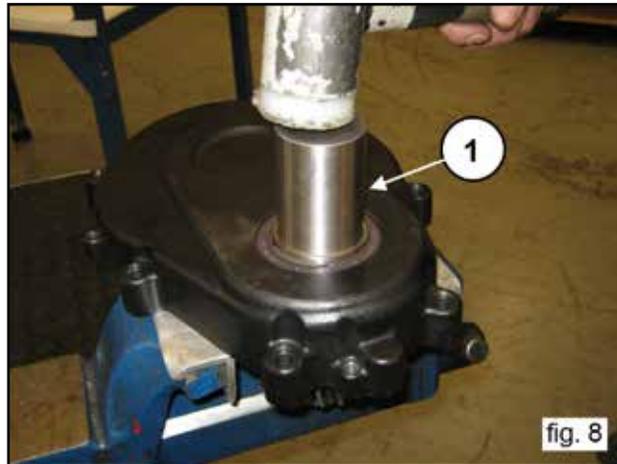
Slowly screw in th 3 M8 screws (1, fig. 6) with the function of extractors to fully remove the cover unit and pinion.



Complete disassembly of the reduction gear cover from the pinion is possible following these steps:
Remove the seeger ring Ø120 (1, fig. 7).



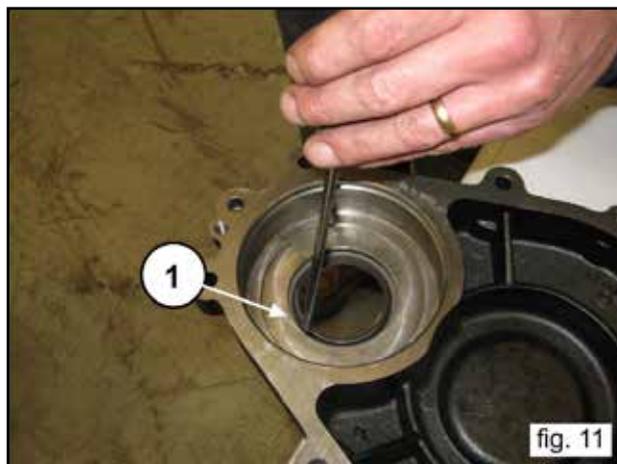
Separate the pinion from the cover, working with an extractor hammer on the pinion (1, fig. 8).



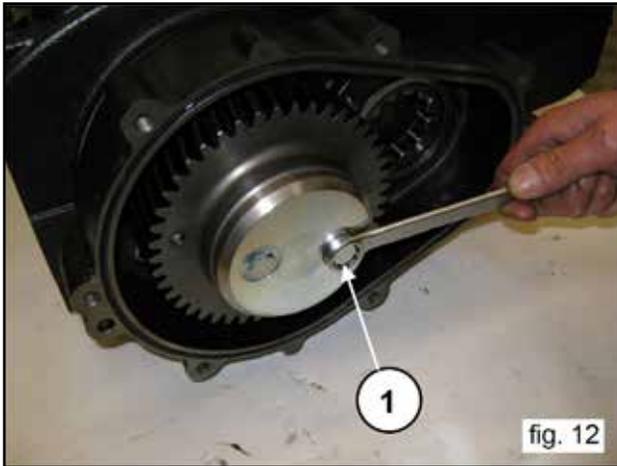
Remove the seeger ring Ø55 (1, fig. 9) and the bearing support ring (1, fig. 10) from the pinion.



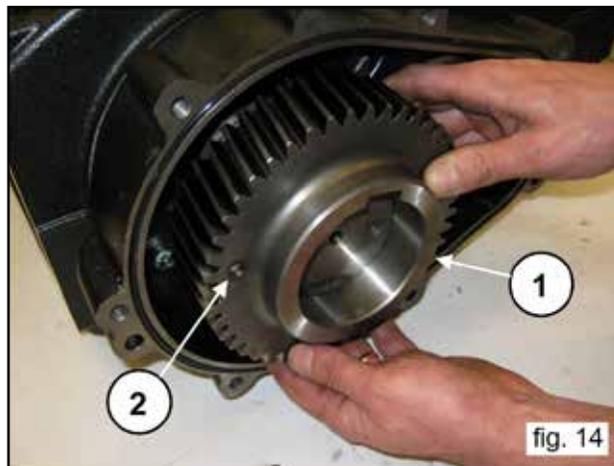
Extract the seal ring from the reduction gear cover, working from the inner side of the cover (1, fig. 11).



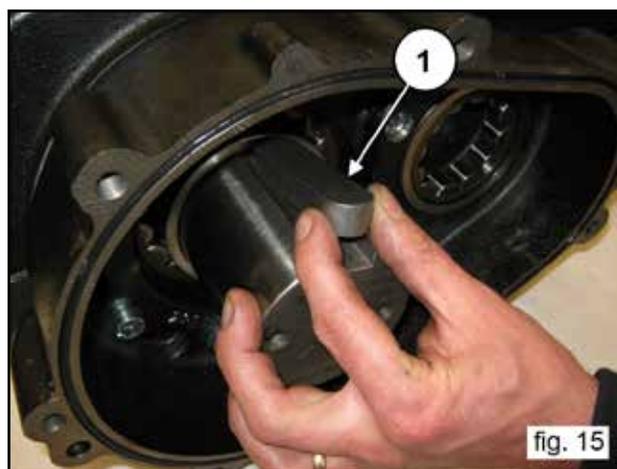
Unscrew the screws holding in the ring gear (1, fig. 12) and remove it (1, fig. 13).



Remove the ring gear (1, fig. 14). If necessary, it is possible to use an extractor hammer to be applied on the 2 M8 holes (2, fig. 14).



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



Remove the ring gear support ring (1, fig. 16).



Unscrew the con-rod screws (1, fig. 17).



Remove the con-rod caps with the lower semi-bearings, taking special care of the disassembly sequences during disassembly.

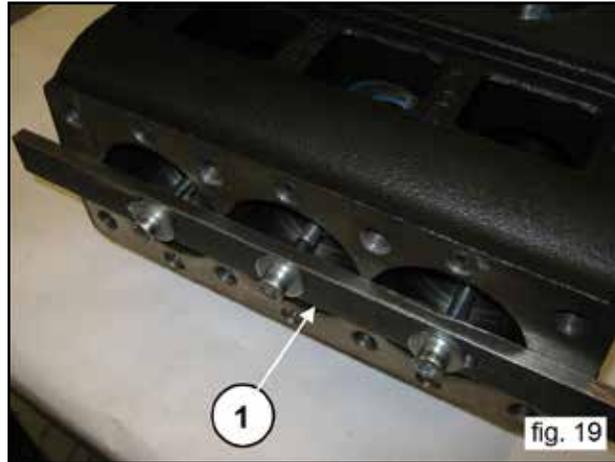


The con-rod caps and associated con-rods must be reassembled in exactly the same order and coupling with which they were disassembled.

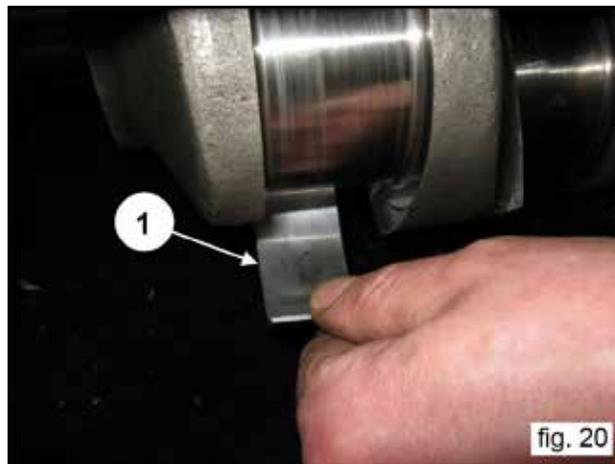
To avoid possible errors, caps and half supports have been numbered on one side (1, fig. 18).



Advance the con-rods completely in the direction of the hydraulic part to allow extraction of the crankshaft. To facilitate this operation, use special tool (#F27566200), (1, fig. 19).



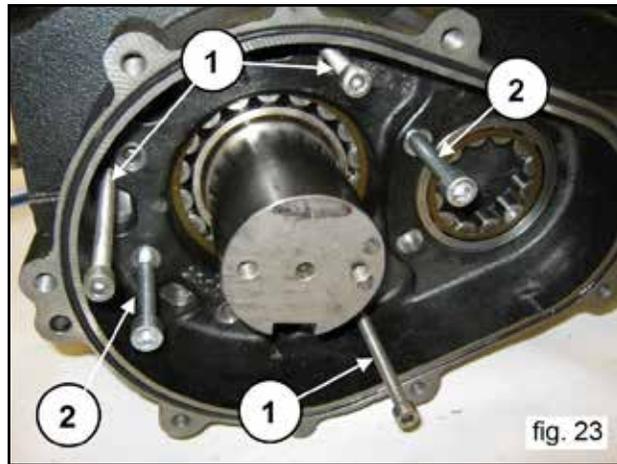
Remove the three upper half-bearings of the half supports (1, fig. 20).



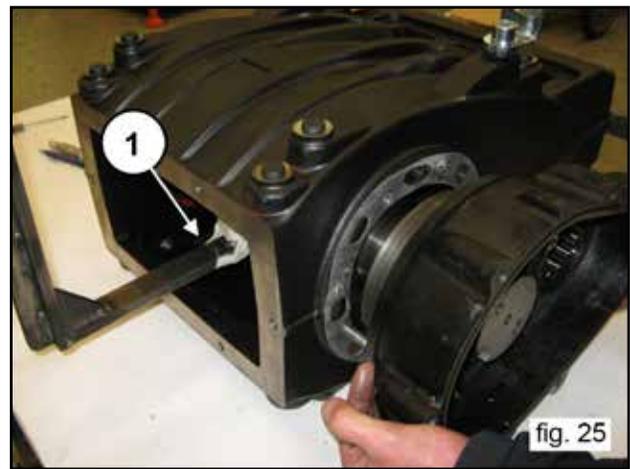
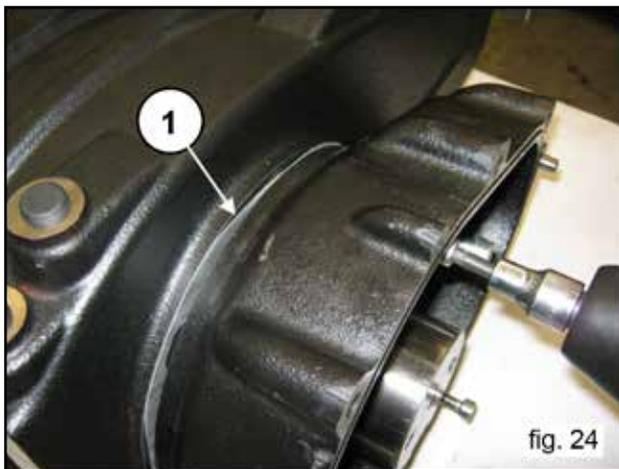
Unscrew the reduction gear box fixing screws (1, fig. 21 and fig. 22).



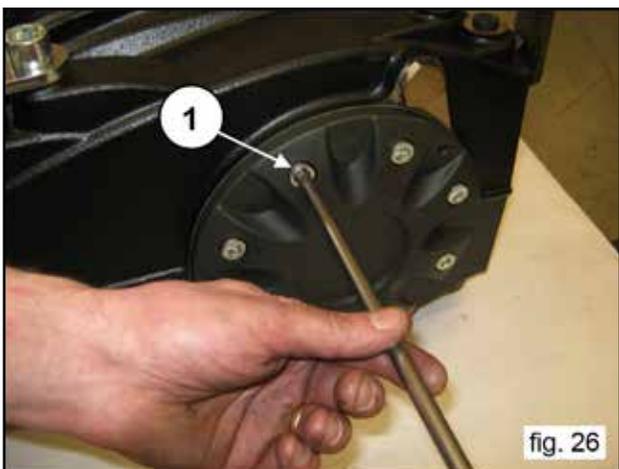
Position the 3 grub screws or M8 threaded screws (1, fig. 23) with the function of extractors in the holes and two sufficiently long M10 screws with the function of supporting the reduction gear box (1, fig. 23).



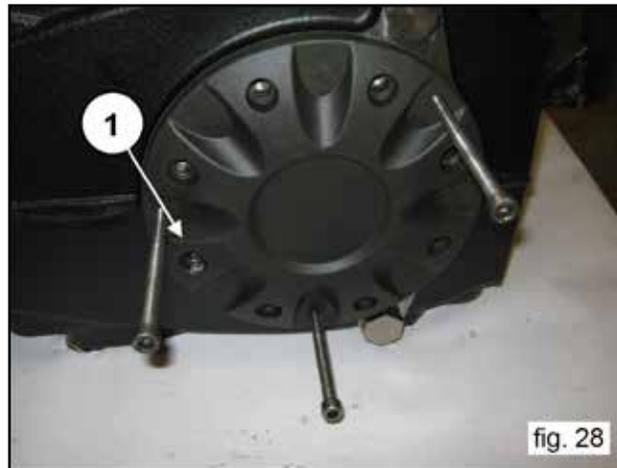
Slowly screw in the 3 M8 screws (1, fig. 24) to prevent that the box can tilt too far and get locked in the housing. Remove the box while supporting the shaft to prevent damage (1, fig. 25).



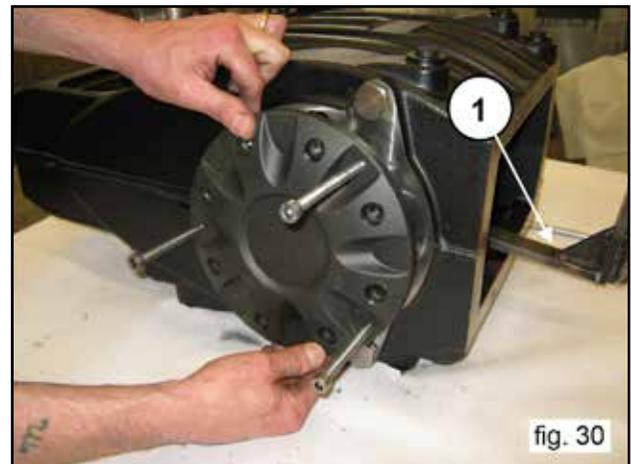
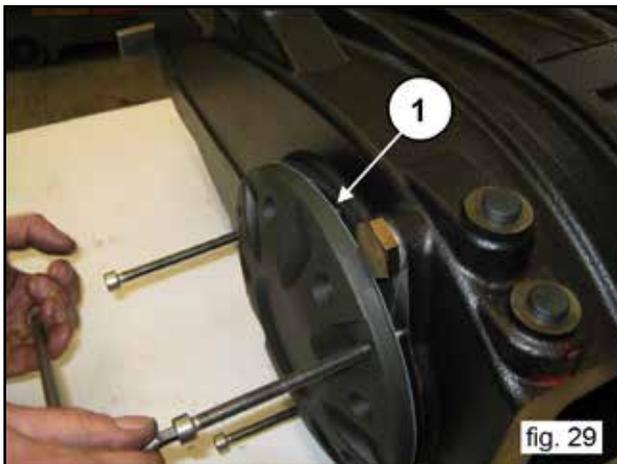
Unscrew the bearing cover fixing screws from the opposite side (1, fig. 26 and fig. 27).



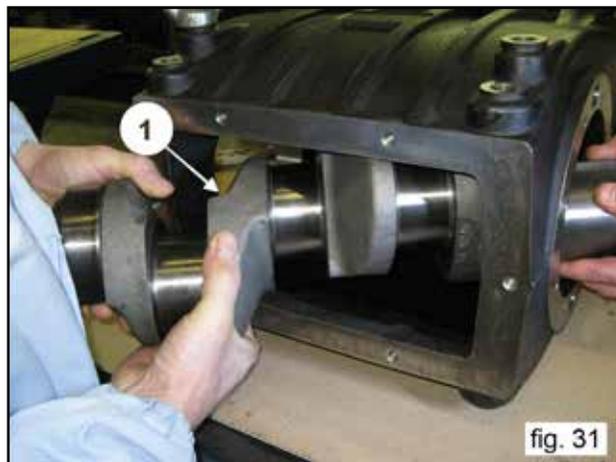
Position the 3 grub screws or M8 threaded screws (1, fig. 28) with the function of extractors in the holes.



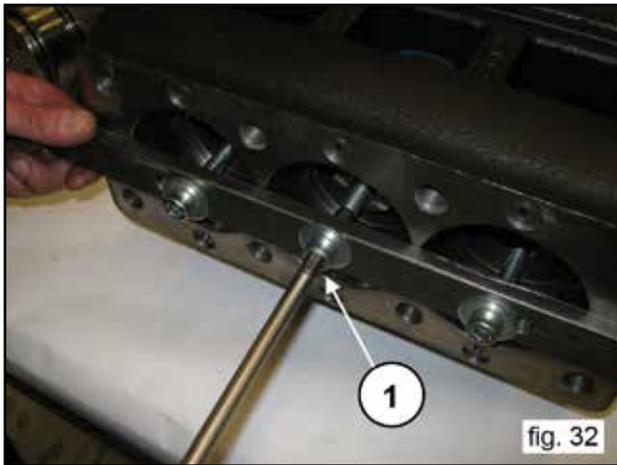
Slowly screw in the 3 M8 screws (1, fig. 29) to prevent that the cover can tilt too far and get locked in the housing. Remove the bearing cover while supporting the shaft to prevent damage (1, fig. 30).



Withdraw the crankshaft from the crankcase rear opening (1, fig. 31).



In the event that it is necessary to replace one or more con-rod or plunger guides, operate as follows: Unscrew the screws with tool code (#F27566200) to unlock the con-rods (1, fig. 32) and then extract the con-rod plunger guides units from the crankcase rear opening (1, fig. 33).

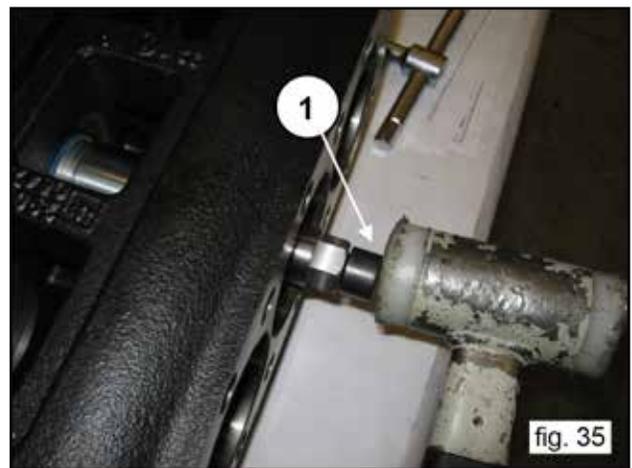


It is now possible to disassemble the plunger guide seal rings, taking care to not damage the plunger guide sliding rod.

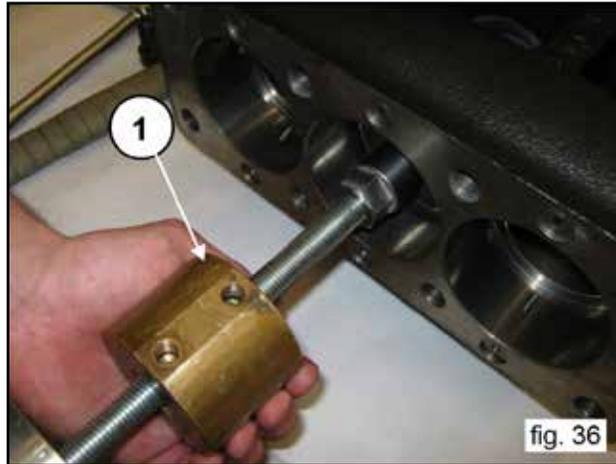


Whenever it becomes necessary to replace the plunger guide seal rings without dismantling the entire mechanical part, it is possible to extract the seal rings with the use of tool code (#F27918500) operating as follows:

Insert the tool between the rod and the seal ring (1, fig. 34) and, with the extractor hammer, complete insertion of the tapered section inside the seal ring (1, fig. 35).



Extract the seal ring using the tool extractor hammer (1, fig. 36).



Remove the two spindle locking seeger rings (1, fig. 37).



Remove the spindle (1, fig. 38) and extract the con-rod (1, fig. 39).



Couple the half support to the previously disassembled caps, referring to the numbering (1, fig. 40).



To separate the rod from the plunger guide, unscrew the round head M6 screws with a special wrench (1, fig. 41).



2.1.2 Crank Mechanism Assembly

Proceed with assembly by reversing the procedure indicated in paragraph 2.1.1.

The correct sequence is the following:

Connect the rod to the plunger guide

Assemble the rod to the plunger guide.

Insert the plunger guide rod into its seat on the plunger guide (1, fig. 42) and join the rod to the plunger guide by the means of 4 m6 x 20 screws (1, fig. 43).



Lock the plunger guide in a vice with the aid of a special tool and calibrate the screws with a torque wrench (1, fig. 44) as indicated in chapter 3 “SCREW CALIBRATION”.



Insert the con-rod in the plunger guide (1, fig. 39) and then insert the pin (1, fig. 38). Apply the two seeger rings using the correct tool (1, fig. 37).



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

Separate the caps from the half supports; correct coupling is guaranteed by the numbering on the side (1, fig. 40). 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 con-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, #F27566200 (1, fig 32).

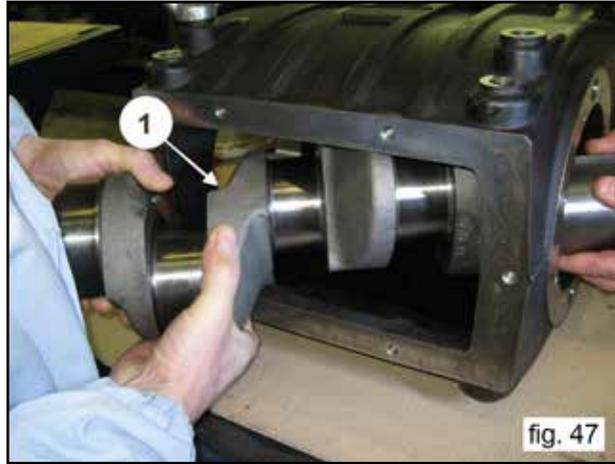
Pre-assemble the ring inside the crankshaft bearings (on both sides of shaft as far as possible) using special tool #F27604700 (1, fig. 45) (1, fig. 46).



The inner and outer rings of the bearings must be reassembled keeping the same coupling with which they were disassembled.

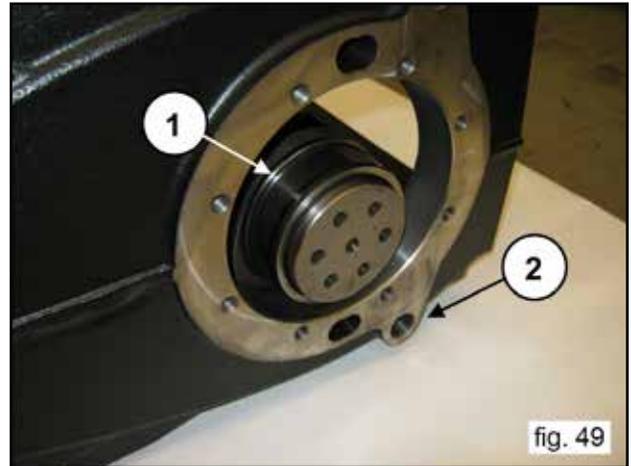


Insert the shaft from the crankcase opening, making sure no to strike the previously assembled con-rods (1, fig. 47).

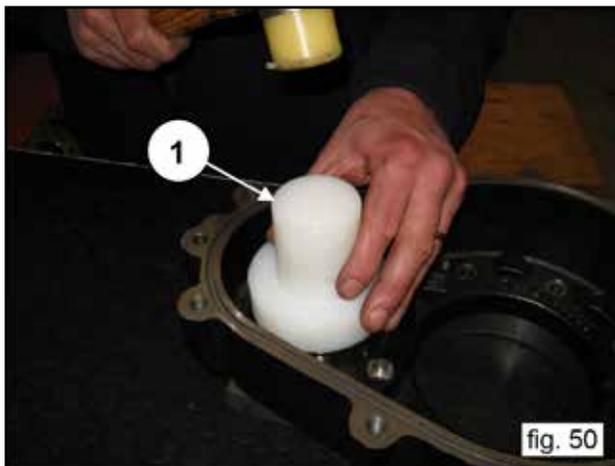


The crankshaft must always be reassembled with the PTO on the opposite side with respect to the G1/2" holes for the oil discharge plugs on the crankcase (2, fig. 49).

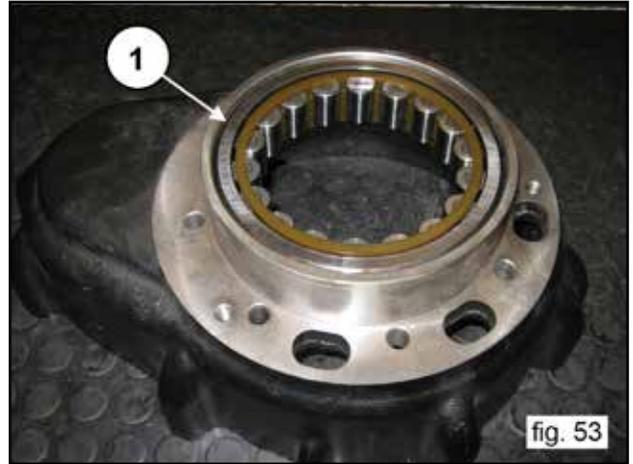
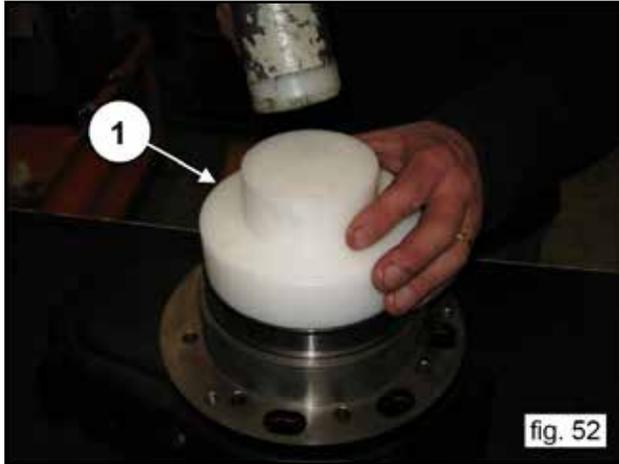
Fully insert the shaft into the crankcase (1, fig. 48) and (1, fig. 49).



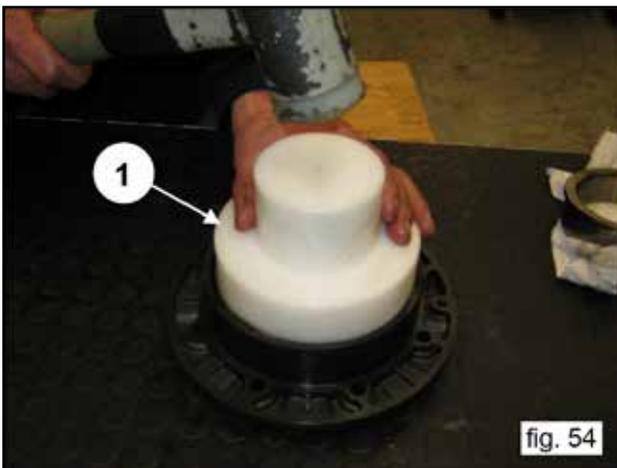
Pre-assemble the outer ring of pinion bearing on the reduction gear with the aid of special tool #F27614900 (1, fig. 50) inserting fully down to end stroke (1, fig. 51).



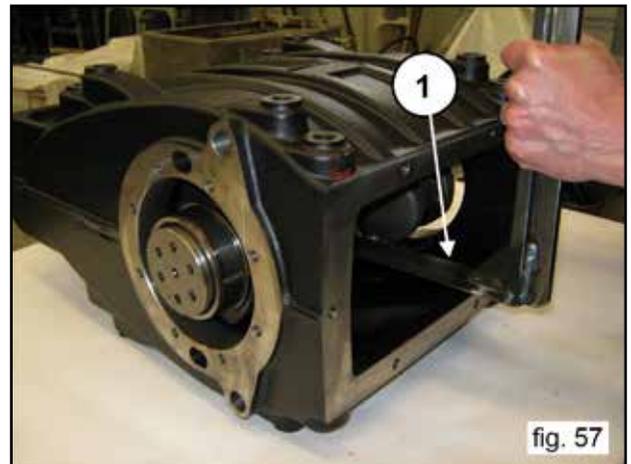
From the opposite side of the reduction gear box, pre-assemble the external ring of the crankshaft bearing using the tool #F27605000 (1, fig. 52) inserting fully down to end stroke (1, fig. 53).



Repeat this operation on the bearing cover, pre-assembling the external crankshaft bearing ring with the help of the tool #F27605000 (1, fig. 54) inserting fully down to end stroke (1, fig. 55).



Insert the side seal on the bearing cover (1, fig. 56) and lift the crankcase to facilitate the cover insertion (1, fig. 57).



Assemble the bearing cover (and relative seal) using an extrator hammer (1, fig. 58).



Position the bearing cover in such a way that the pump logo is perfectly horizontal.



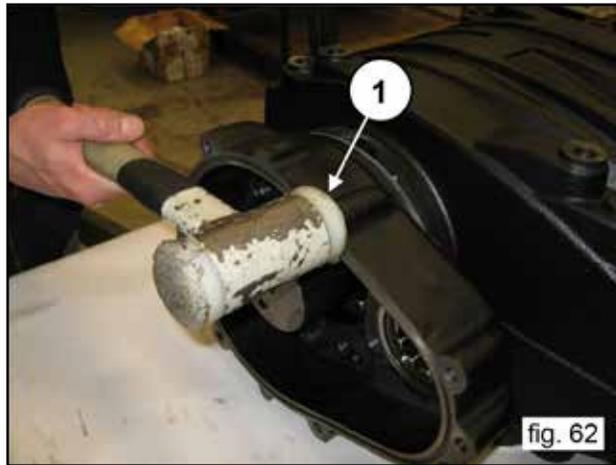
Tighten the 8 M10x30 screws (1, fig. 59). Calibrate the screws with a torque wrench as indicated in chapter 3 “SCREW CALIBRATION”.



From the opposite side, insert the side seal on the reduction gear box (1, fig. 60) and lift the crankshaft to facilitate the cover insertion (1, fig. 61).



Assemble the reduction gear box (and relative seal) using an extractor hammer (1, fig. 62).



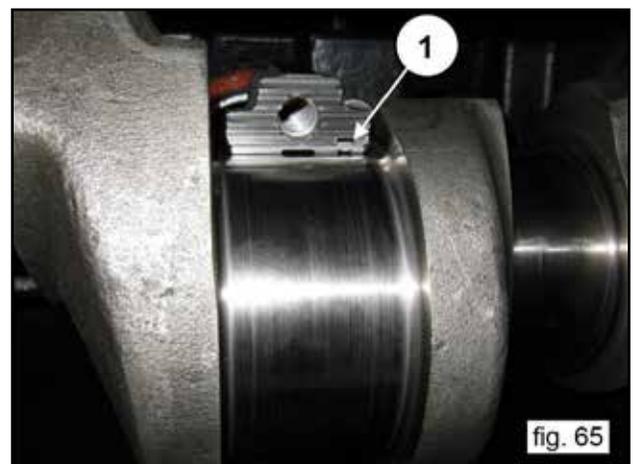
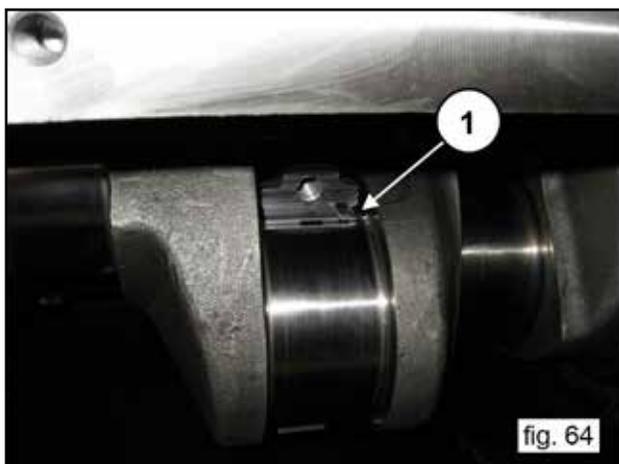
Tighten the 8 M10x40 screws (1, fig. 63). Calibrate the screws with a torque wrench as indicated in chapter 3 “SCREW CALIBRATION”.



Remove the tool for blocking the con-rods #F27566200 (1, fig. 32). Insert the upper half-bearings between the con-rods and the shaft (1, fig. 64).



For proper assembly for the half-bearings, ensure that the reference key on the half-bearings are positioned in their housing on the half support (1, fig. 65).

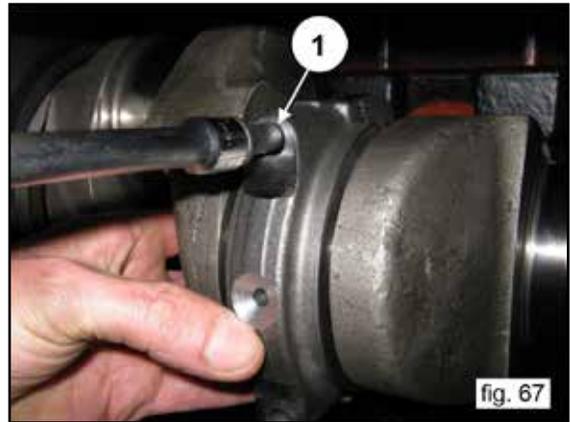
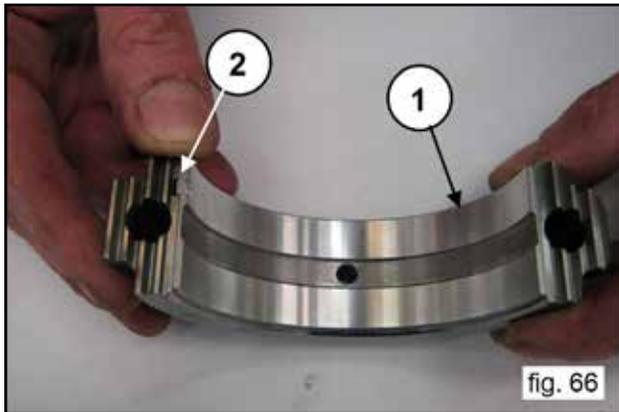


Apply the lower half-bearings to the caps (1, fig. 66) ensuring that the half-bearing reference notches are positioned in their housing on the cap (2, fig. 66). Fasten the caps to the con-rods by means of M10x1.5x80 screws (1, fig. 67).



Note the correct assembly direction of the caps. The numbers must face upward.

Calibrate the screws with a torque wrench as indicated in chapter 3 “SCREW CALIBRATION”, bringing the screws to tightening torque at the same time.



After finishing this operation, check that the con-rods have axial clearance in both directions.

Insert the plunger guide seal rings in their casting housing by means of special tool #F27605300 (1, fig. 68) and (2, fig. 69).



Insert the O-ring on the rear cover (1, fig. 70) and assemble the cover on the crankcase with the aid of 6 M10x30 screws (1, fig. 71).



Make sure to fully and properly insert the O-ring in it's housing on the cover to prevent it from becoming damaged during screw tightening.

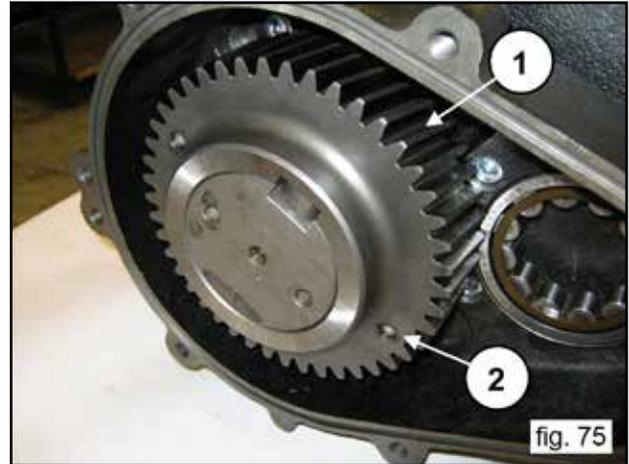
Calibrate the screws with a torque wrench as indicated in chapter 3 **“SCREW CALIBRATION”**.
Insert the ring gear support ring in the crankshaft shank (1, fig. 72) to end stroke (1, fig. 73).



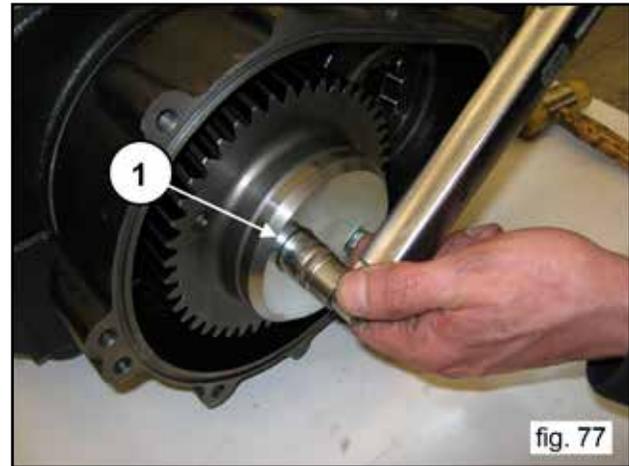
Fit the 22x14x80 key in the shaft keyway (1, fig. 74) and insert the ring gear on the shaft (1, fig. 75).



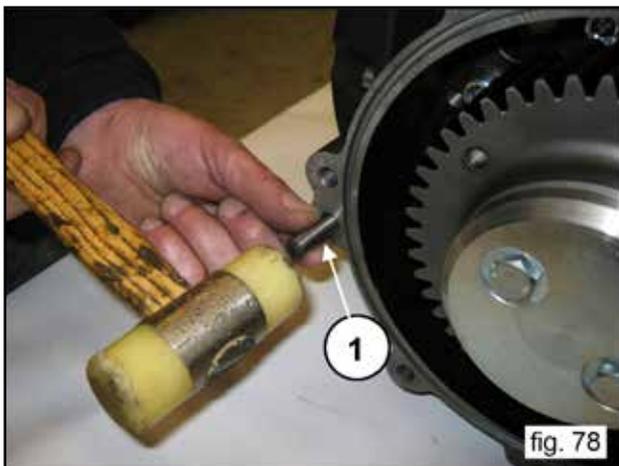
The ring gear must be assembled making sure that the two M8 holes (to be used for extraction) are facing the exterior of the pump (2, fig. 75).



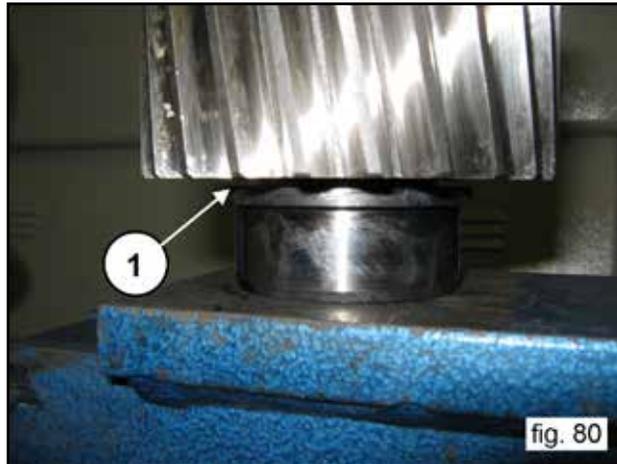
Fasten the ring gear stop (1, fig. 76) using 2 M10x25 screws. Calibrate the screws with a torque wrench as indicated in chapter 3 (1, fig. 77).



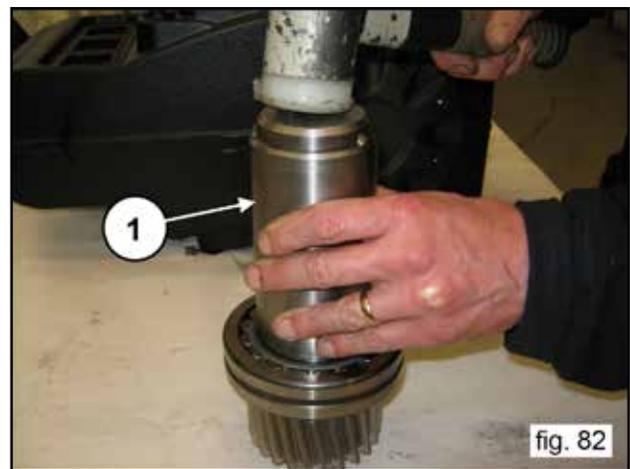
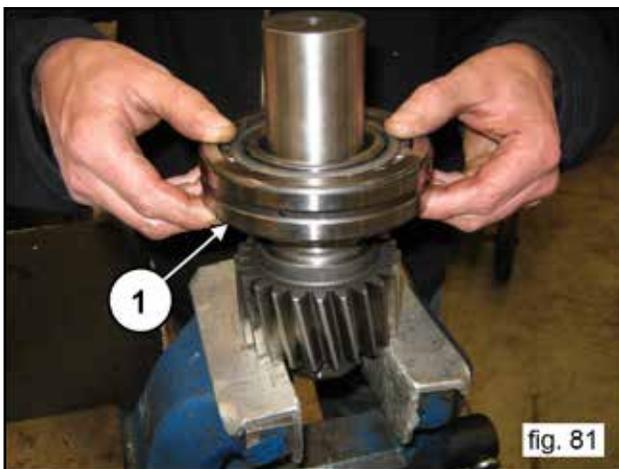
Apply the 2 Ø10x24 pins on the reduction gear box (1, fig. 78) and insert the O-rings (1, fig. 79).



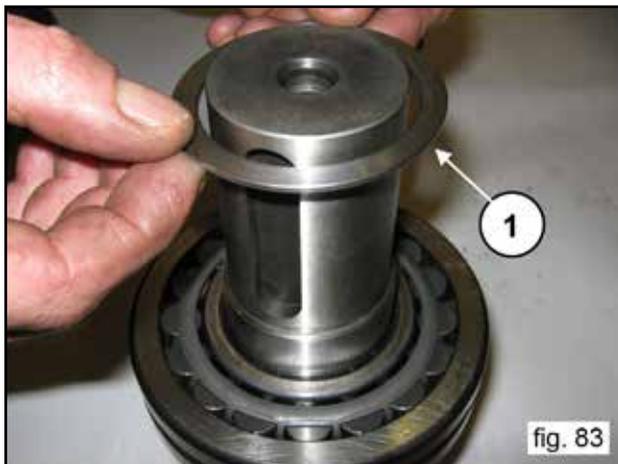
Complete assembly of the pinion on the reduction gear cover, proceeding as follows:
Pre-press the inner bearing ring 40x90x23 on the pinion (1, fig. 80) positioning it to end stroke.



From the other side of the pinion, pre-assemble the bearing 55x120x29 (1, fig. 81) positioning it to end stroke using tool #F27604800 (1, fig. 82).



Insert the bearing support ring (1, fig. 83) and position the seeger ring Ø55 (1, fig. 84).



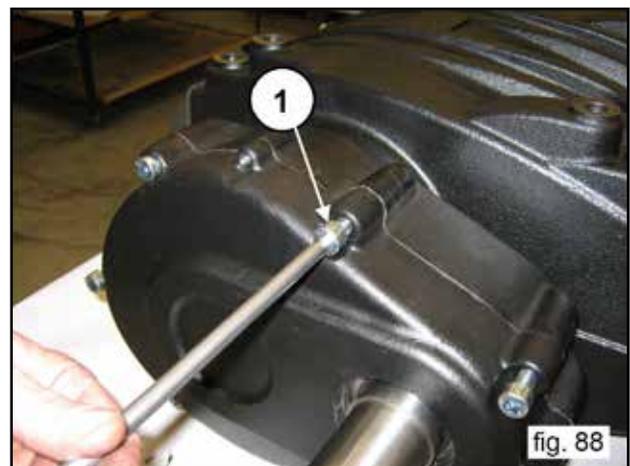
Insert the pinion pre-assembled inside its housing in the reduction gear cover, with the aid of an extractor hammer (1, fig. 85).



Insert the seeger ring Ø120 in the housing (1, fig. 86).

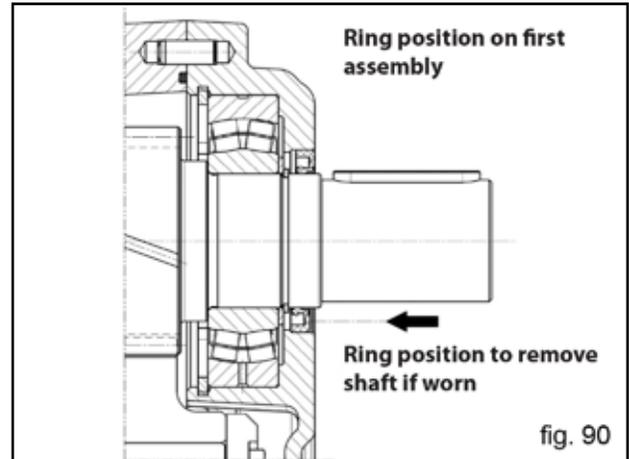


Assemble the reduction gear cover with the aid of an extractor hammer (1, fig. 87) and fasten it with 7 M10x40 screws (1, fig. 88). Make sure to properly couple the two components on the bearing 40x90x23. Calibrate the screws with a torque wrench as indicated in chapter 3 “**SCREW CALIBRATION**”.



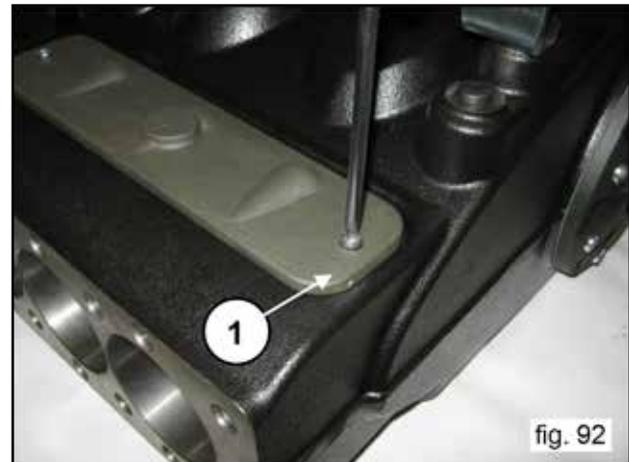
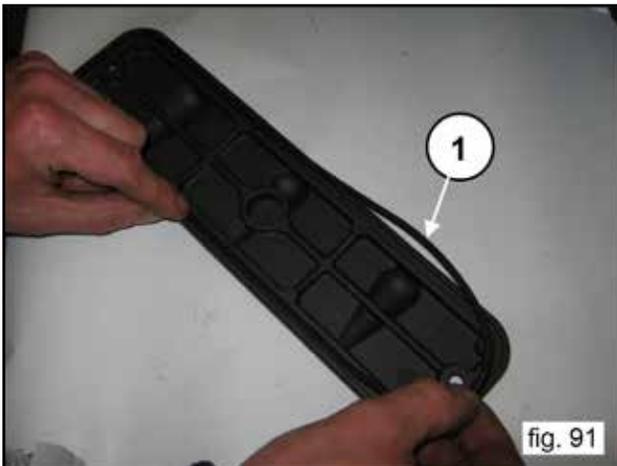
Insert the seal ring inside the reduction gear cover with the use of special too #F27605200 (1, fig. 89). Before proceeding with seal ring assembly, check lip seal conditions. If replacement is necessary, position the new ring on the bottom of the groove as indicated in fig. 90.

 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. 90.



 To prevent damage to the seal ring, take special care when inserting the seal ring on the pinion.

Apply O-ring on the inspection covers (1, fig. 91) and tighten with 2+2 M6x14 screws (1, fig. 92). Calibrate the screws with a torque wrench as indicated in chapter 3 “SCREW CALIBRATION”.



Insert the Key 14x9x60 on the pinion.

Apply plugs and lifting brackets with the use of M16x30 screws (1, fig. 93).

Calibrate the screws with a torque wrench as indicated in chapter 3 “**SCREW CALIBRATION**”.



Insert oil in the casting as indicated in the **Owner's Manual**, par. 7.6

2.1.3 Refurbishing the crank mechanism

TABLE UNDERSIZED DIAMETERS FOR CRANKSHAFT AND CON-ROD BUSHINGS			
Max. Undersize (mm)	Upper half bushing p/n	Lower half bushing p/n	Crank pin grinding measures (mm)
0.25	F90928100	F90928400	Ø 79.75 0/-0.02 Ra 0.4 Rt 3.5
0.50	F90928200	F90928500	Ø 79.50 0/-0.02 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	F79050543	Ø 81 H6 +0.19/0 Ra 0.8 Rt 6

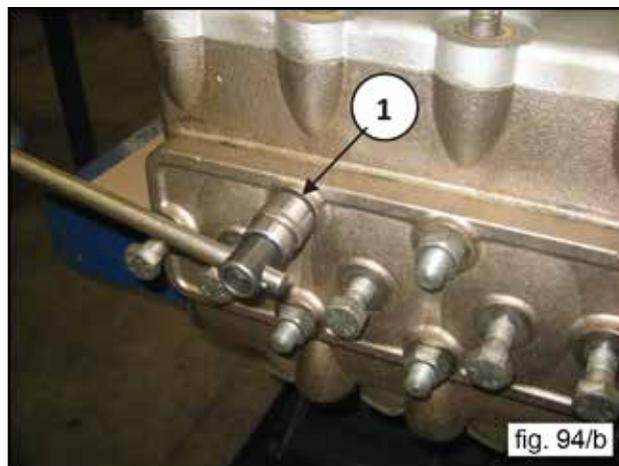
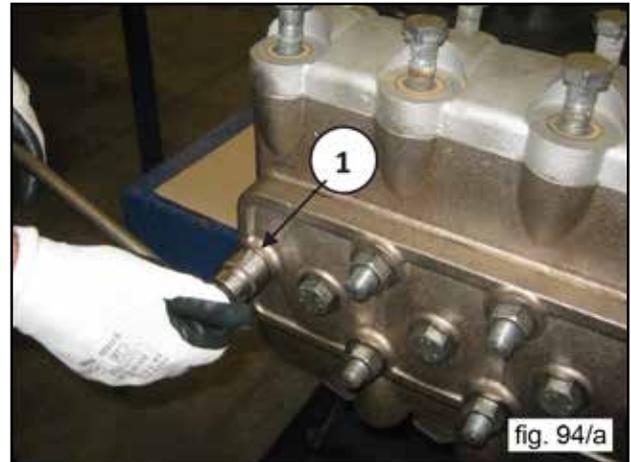
2.2 Fluid End Repair

2.2.1 Valve Units

2.2.1.1 Disassembling Valve Units for MF7M5B and MF7M7B

Operations are limited to inspection or replacement of valves, if necessary.
Proceed as follows to extract the valve units:

- A) Unscrew the 8 M16x55 screws of the valve cover (1, fig. 94), the 5 M16x55 screws of the front cover (1, fig. 94/a) and the 4 nuts M16 (1, fig. 94/b) of the valve cover.



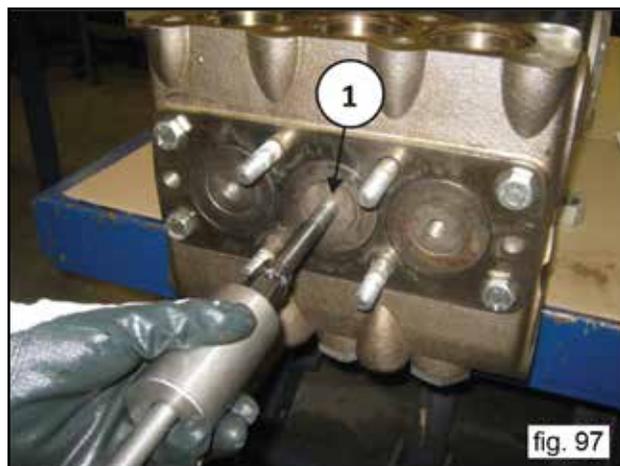
Then remove the covers (fig. 95).



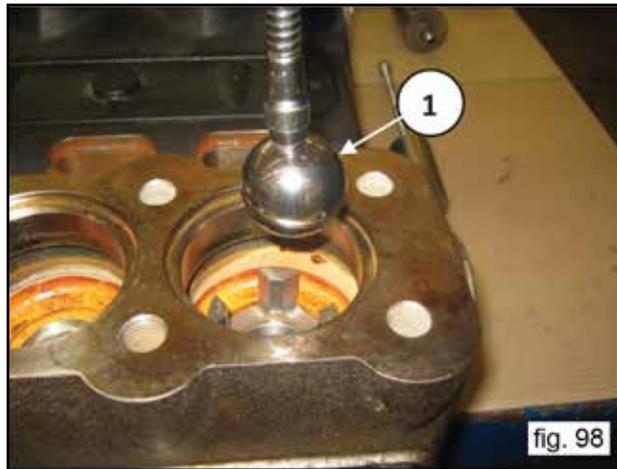
B) Remove the valve plugs by means of an M10 extractor hammer (1, fig. 96).



C) Remove the front plugs by means of an M16 extractor hammer (1, fig. 97).



D) Extract the balls using a magnet or other tool (1, fig. 98).



E) Extract the valves housings using the tool #F27931200 (see mechanical drawings in par. 4.1) as indicated in fig. 99 and fig. 99/a.



Before working as per point E, make sure that the plunger is at bottom dead center.



Repeat points D) and E) to extract the balls and valves housings from the suction valve units (fig. 100).



2.2.1.2 Disassembling Valve Units for MF7M5D and MF7M7D

Operations are limited to inspection or replacement of valves if necessary.

Proceed as follows to extract the valve units:

Carry out the indications of points A), B), and C) of par. 2.2.1.1.

- D) Extract the outlet valve guide, spring and ball valve with an extractor hammer to be applied on the M10 hole of the valve guide (1, fig. 101).



- E) Extract the valves housings using the tool #F27931200 (see mechanical drawing in par. 4.1) as indicated in fig. 102 and fig. 102/a.



Repeat points D) and E) to extract the valves parts and valves housings from the suction valve units (fig. 103).



2.2.1.3 Reassembly



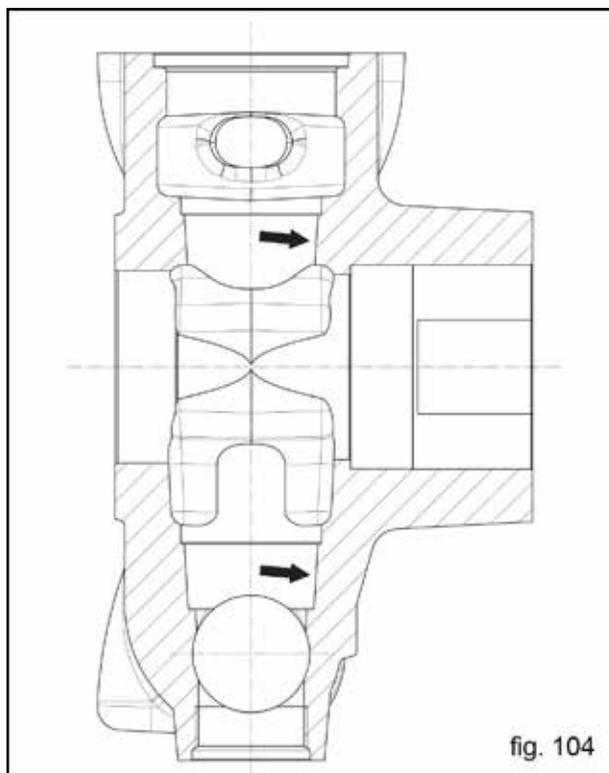
Pay particular attention to the conditions of the various components and replace if necessary. However, an indication of estimated component replacement intervals is present in the table of fig. 9 in chapter 11 of the **Owner's manual**.

It is plausible to think that the state of wear of the components will be strongly correlated with the type of fluid and the percentage of the presence of soild residues.

It is strongly advised to replace the O-rings on the valve caps at each inspection.



Before repositioning the valve seats, thoroughly clean and dry the relative housings in the head as shown in (fig. 104).



To reassemble the components, reverse the operations previously listed in point 2.2.1.1 from pumps MF7M5B and MF7M7B, or in point 2.2.1.2 for pumps MF7M5D and MF7M7D; in summary:

Pumps MF7M5B and MF7M7B:

Assemble the inlet and outlet valve seats using the buffer #F27812000, (see mechanical drawing in par. 4.1), ensuring that the tapered surfaces of said seats are locked in the tapered seats present on the head (fig. 105 and fig. 106).

Now position the ball in the housing (1, fig. 107), reassemble the valve caps and, at the front, reposition the valve covers. At the front, calibrate the respective M16x55 screws and M16 nuts with a torque wrench as indicated in chapter 3 **“SCREW CALIBRATION”**.



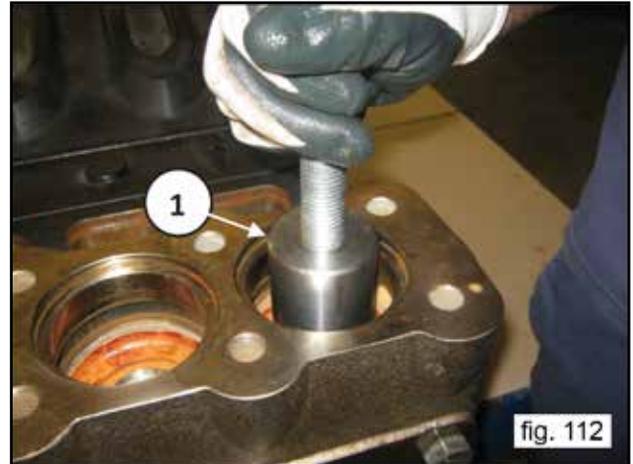
Pumps MF7M5D and MF7M7D

Assemble the suction and outlet valve units (fig. 108 and Fig. 109) taking care not to invert the previously disassembled springs.

To facilitate insertion of the valve guide in the housing, use a buffer #F27812000, (see mechanical drawing in par 4.1)(fig. 110) and use a hammer, acting on the whole circumference.



Assemble the inlet and outlet valve units using the buffer #F27812000, (see mechanical drawing in par. 4.1), ensuring that the tapered surfaces of said seat are locked in the tapered seats present on the head (fig. 111 and fig. 112).

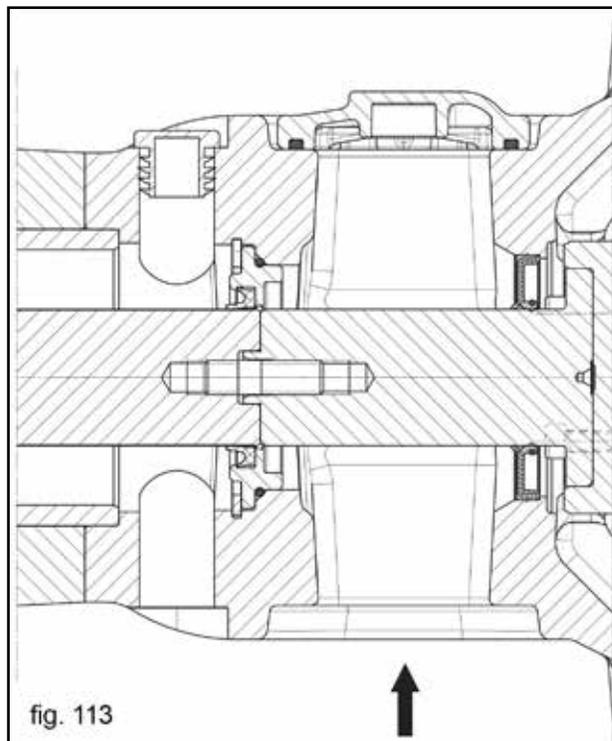


Reassemble the valve caps and, at the front, reposition the valve covers. At the front, calibrate the respective M16x55 screws and M16 nuts with a torque wrench as indicated in chapter 3 “**SCREW CALIBRATION**”.

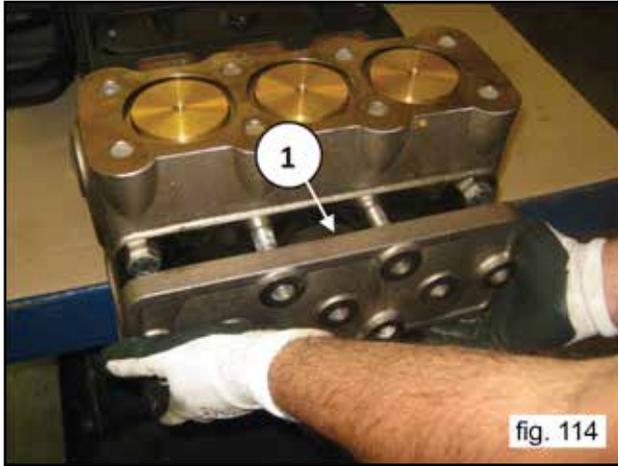
2.2.2 Wiper

2.2.2.1 Disassembly

Wiper replacement is necessary whenever bentonite leaks are detected from the second drainage chamber present in the crankcase (fig. 113). However, an indication of estimated component replacement intervals is present in the table pf fig. 9 in chapter 11 of the **Owner's Manual**.



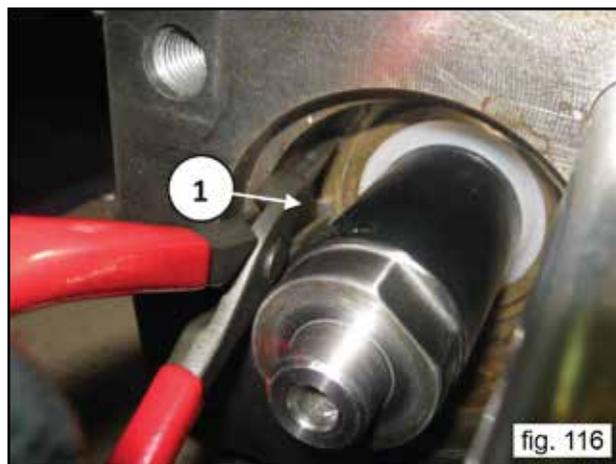
Remove the front cover as indicated in (1, fig. 144) and unscrew the 4 screw M16 as indicated in (1, fig. 144/a)



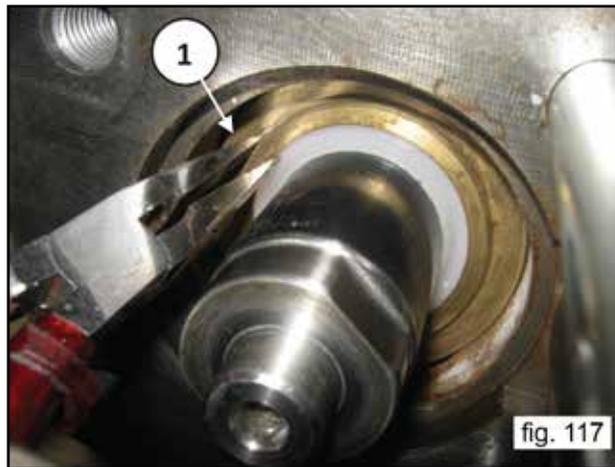
Remove the head from the pump crankcase (1, fig. 115).



Remove the seeger rings Ø78 (1, fig. 116).

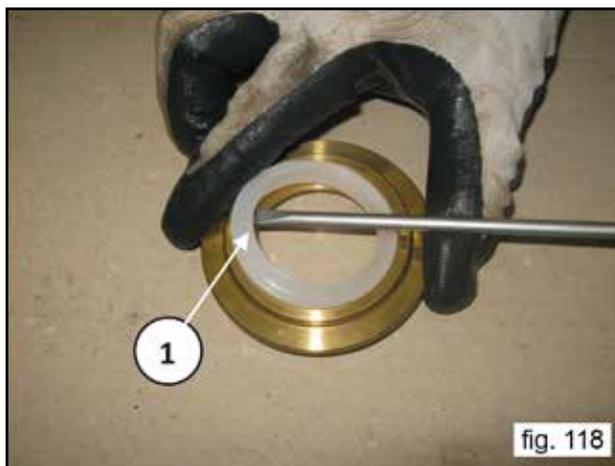


Extract the wiper support (1, fig. 117).



Now it is possible to remove the wiper using a simple tool as indicated in (1, fig. 118), being careful not to damage the housing.

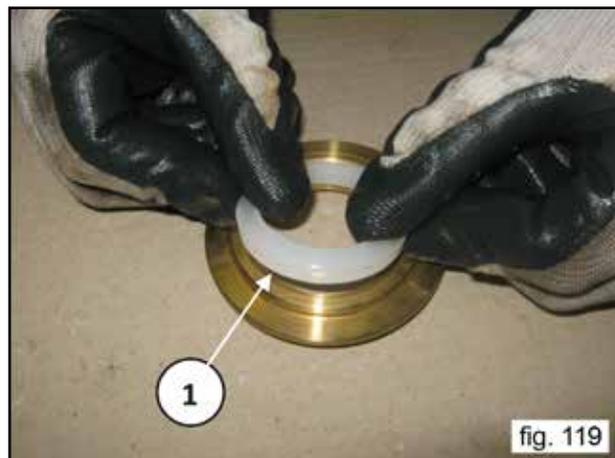
If necessary, remove the plunger spacer before removing the wiper support (see par. 2.2.3.1).



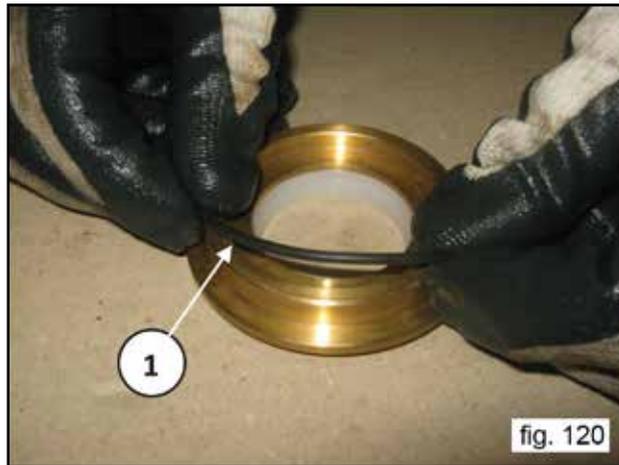
2.2.2.2 Wiper Assembly

To replace the wiper, proceed as follows:

Assemble the wiper in the housing on the support (1, fig. 119) using a buffer as necessary making sure not to damage the seal lip.



Position the O-ring on the wiper support (1, fig. 120).



Insert the support with scraper, after lubricating the sliding area on the plunger spacer (fig. 121).

If removed, replace the plunger spacer unit after lubricating the sliding zone on the plunger spacer (see par. 2.2.3.2). Make sure not to damage the seal lip.



Reposition the head on the casting.

Fasten the head, tightening the 4 M16 screws and then replace the front cover.

For the values of the torques and tightening sequences follow the instructions contained in chapter 3 **“SCREW CALIBRATION”**.

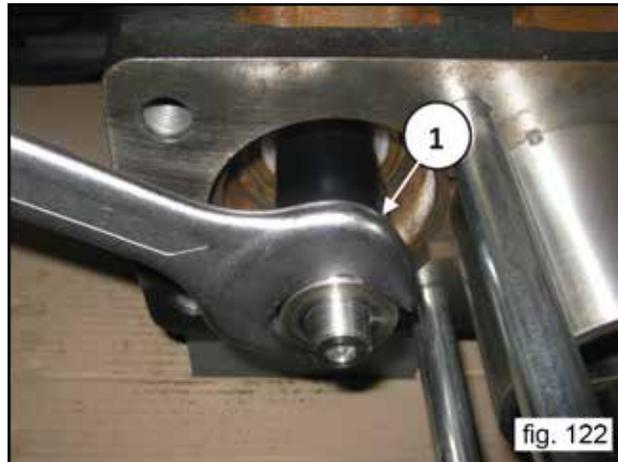
2.2.3 Plunger Spacer

2.2.3.1 Plunger Disassembly

The plunger spacer does not require any routine maintenance. Maintenance is limited to visual checks only.

Proceed as follows to extract:

After removing the head, release the spacers as shown in (1, fig. 122).



Check and verify the wear condition of the sliding area on the plunger spacer and replace if necessary.

2.2.3.2 Plunger Assembly

Fit the plunger spacer on the pump and tighten (1, fig. 123).



If the replacement is being carried out with the wiper already assembled, lubricate the sliding zone and make sure, during insertion, not to damage the wiper seal lip.
For torque requirements follow the instructions in chapter 3 “**SCREW CALIBRATION**”.

2.2.4 Plunger Seal

2.2.4.1 Plunger Seal Disassembly

Plunger seal replacement is necessary whenever heavy bentonite leaks are detected from the opening under the crank case.

The indication of estimated component replacement intervals is present in the fig. 9 in chapter 11 of the **Owner's Manual**. The state of wear of the components will be strongly correlated with the type of fluid and the percentage of the presence of solid residues.

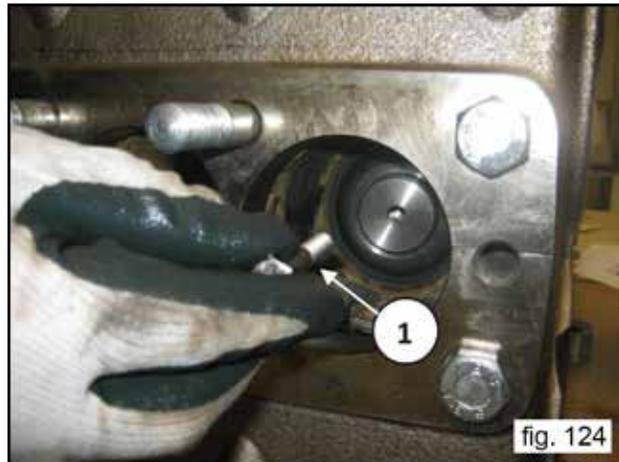
To extract the plunger seal, bring the entire unit to top dead center and operate as follows:

Remove the front cover as indicated in fig. 114.

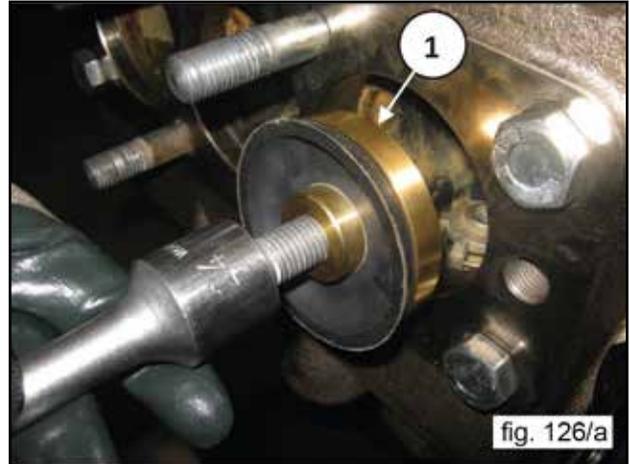
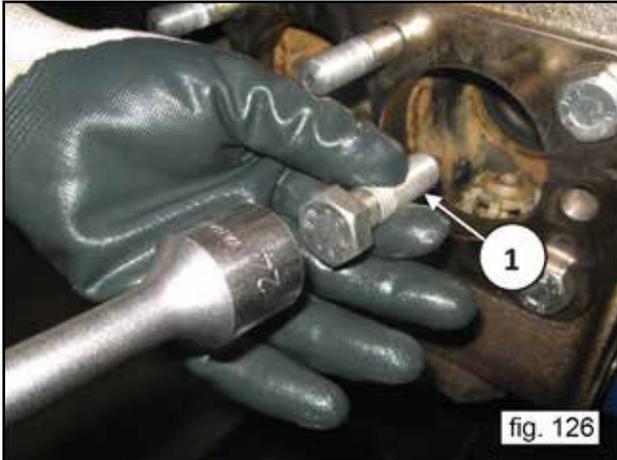
Remove the front plugs by means of an M16 extractor hammer (fig. 79).

Unscrew the M8 screws on the plunger unit and remove them together with the seal fastening bush (1, fig. 124).

If necessary, it is possible to use the M10 hole to extract the fastening bush seal with an extractor hammer (1, fig. 125).



Using a M16 cover screw, tighten using a T-handle wrench on the seal support so that it acts as an extractor (1, fig. 126), once the seat has come out, extract the pack, consisting of the support and the plunger seal (1, fig. 126/a).



The O-ring on the seal support should be replaced at each disassembly.

2.2.4.2 Plunger Seal Assembly

Assemble the plunger seal with the seal support (on which the O-ring will be replaced), the seal fastening bushing and the M8 screw (fig. 127).

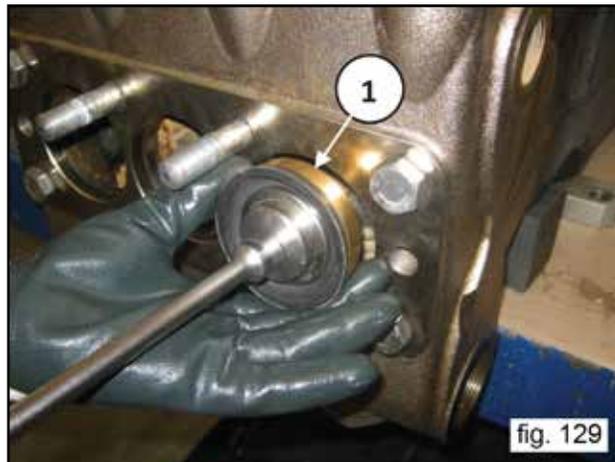


Lubricate the plunger seal with abundant OCILIC 250 silicone grease #F12001600 (fig. 128).



With the aid of a T-handle wrench, insert the plunger seal pack inside the cylinder (1, fig. 129) with the plunger spacer unit at TDC, making sure not to damage the seal lip.

Screw the M8 screws in so that the seal pack positions itself in the seat and tighten it with the torque requirements in chapter 3 “**SCREW CALIBRATION**”.



2.2.5 Cylinder

2.2.5.1 Cylinder Disassembly

Cylinder replacement is necessary whenever consistent bentonite leaks are detected from the opening under the crankcase. It is plausible to think that the state of wear of the component will be strongly correlated with the type of fluid and the percentage of the presence of solid residues.

Proceed as follows to extract the liner:

Remove the front cover as indicated in fig. 114 and unscrew the M16 screws as indicated in fig. 114/a. Separate the head from the crankcase (fig. 130) and extract the liner (1, fig. 131), with the aid of adjustable pliers, and the relative seal (1, fig. 132).



2.2.5.2 Cylinder Assembly

To replace the cylinder and the head, proceed as follows:

Insert the seals in the cylinder seat on the head (1, fig. 133) and also cylinders (1, fig. 134).



Assemble the head. Torque requirements and sequences are contained in chapter 3 “SCREW CALIBRATION”.

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
	MF7M5B MF7M7B	MF7M5D MF7M7D		
Crankcase cover screws M10x30	74	82	33.2	45
Crankcase plug G1/2x10	76	84	29.5	40
Lifting bracket screws M16x30	38	46	147.5	200
Reduction gear cover screws M10x40	67	75	33.2	45
Ring gear stopper screws M10 x 25	62	70	59	80
Reduction gear box screws M10x40	67	75	33.2	45
Upper cover screws M6x14	47	55	7.4	10
Bearing cover screws M10x30	74	82	33.2	45
Con-rod fixing screws M10x1.5x80	40	48	47.9*	65*
Plunger guide screws M6x20	34	42	7.4	10
Plunger fixing screws M8x45	20	28	14.6	20
Front cover nut M16	8	13	147.5**	200**
Head screw M16x220	29	37	147.5	200**
Stud bolt M16x234	9	14	29.5	40***
Front cover and valves cover screws M16x55	11	16	147.5**	200**
Stud bolt M10x25	27	35	14.6	20***
Plunger spacer	28	36	29.5	40
Plug G1-1/2"	1	1	29.5	40

* Screws should be tightened at intermediate incremental values.

** The head and cover fixing screws and nuts must be tightened with a torque wrench, lubricating the threaded shank, respecting the order shown in the diagram in fig. 135.

*** The stud bolts must be locked on the casing (M16x234) and on the plunger spacers (M10x25) with loctite 243, #F12006400.

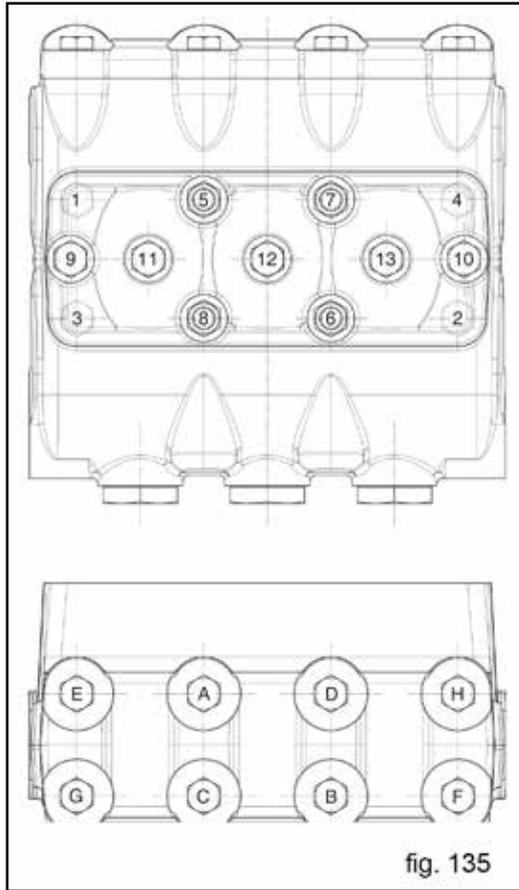


fig. 135

4. REPAIR TOOLS

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

For Assembly:

For Assembly:

- Shaft (con-rods locking) F27566200
- Bearing on crankshaft F27604700
- Pinion bearing on reduction gear box F27604900
- Crankshaft bearing on reduction gear box. F27605000
- Crankshaft bearing on the bearing cover. F27605000
- Plunger guide oil seal. F27605300
- Bearing on pinion. F27604800
- Pinion oil seal. F27605200
- Inlet/outlet valve seats (see par. 4.1). F27812000

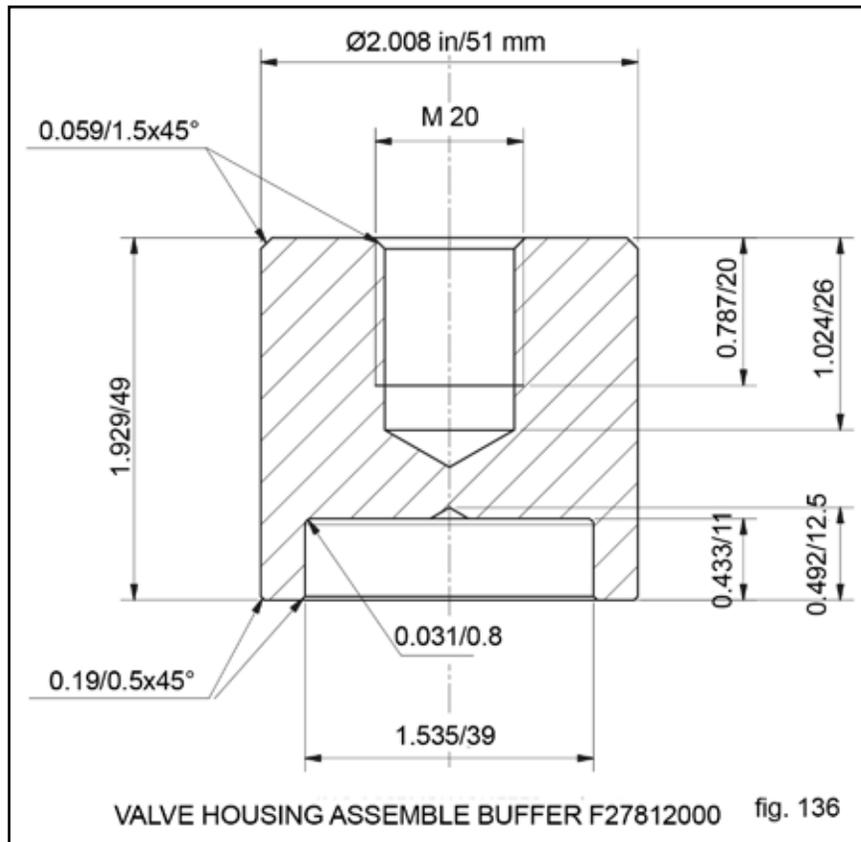
For Disassembly:

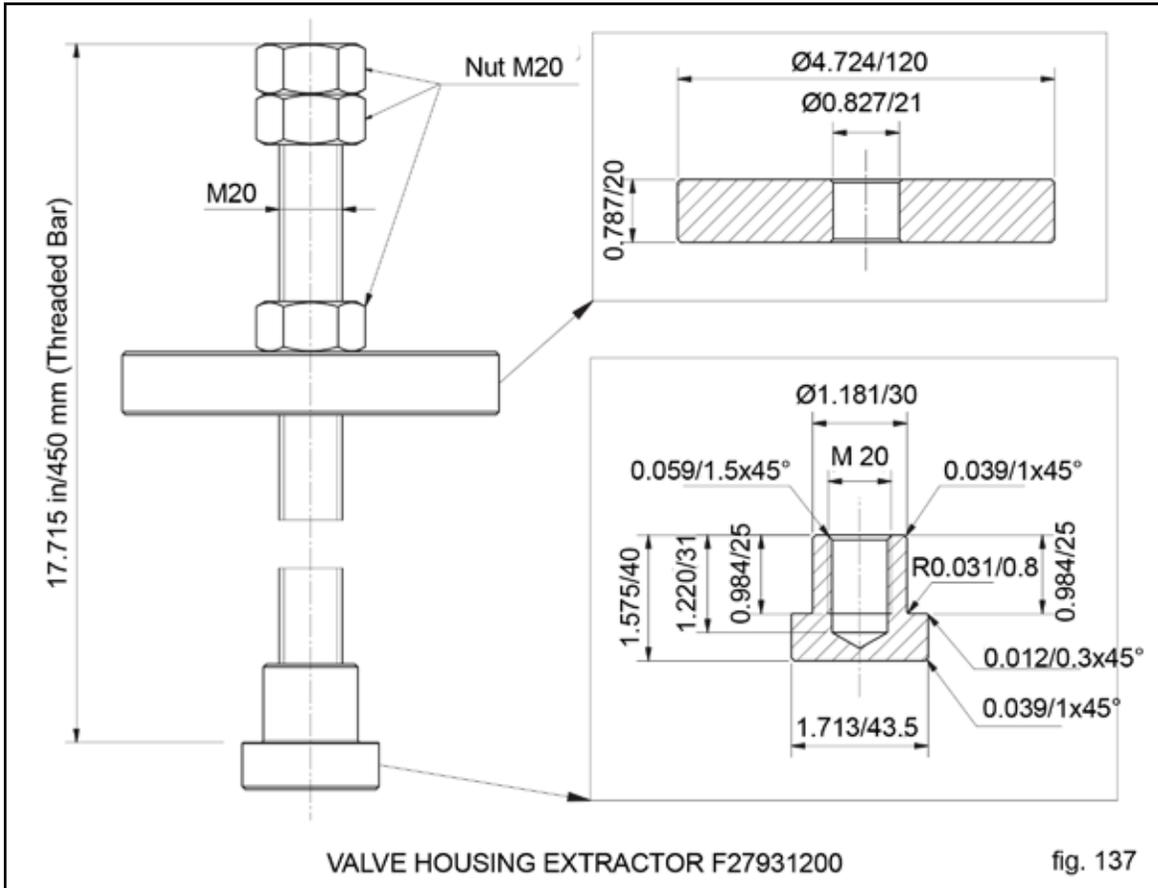
- Plunger guide oil seal. F27918500
- Shaft (con-rods locking) F27566200
- Inlet/outlet valve seats (see par. 4.1). F27931200
- Valve plug and front plug Extractor hammer



For proper assembly of the valve seats and relative disassembly, use tools #F27812000 and #F27931200.

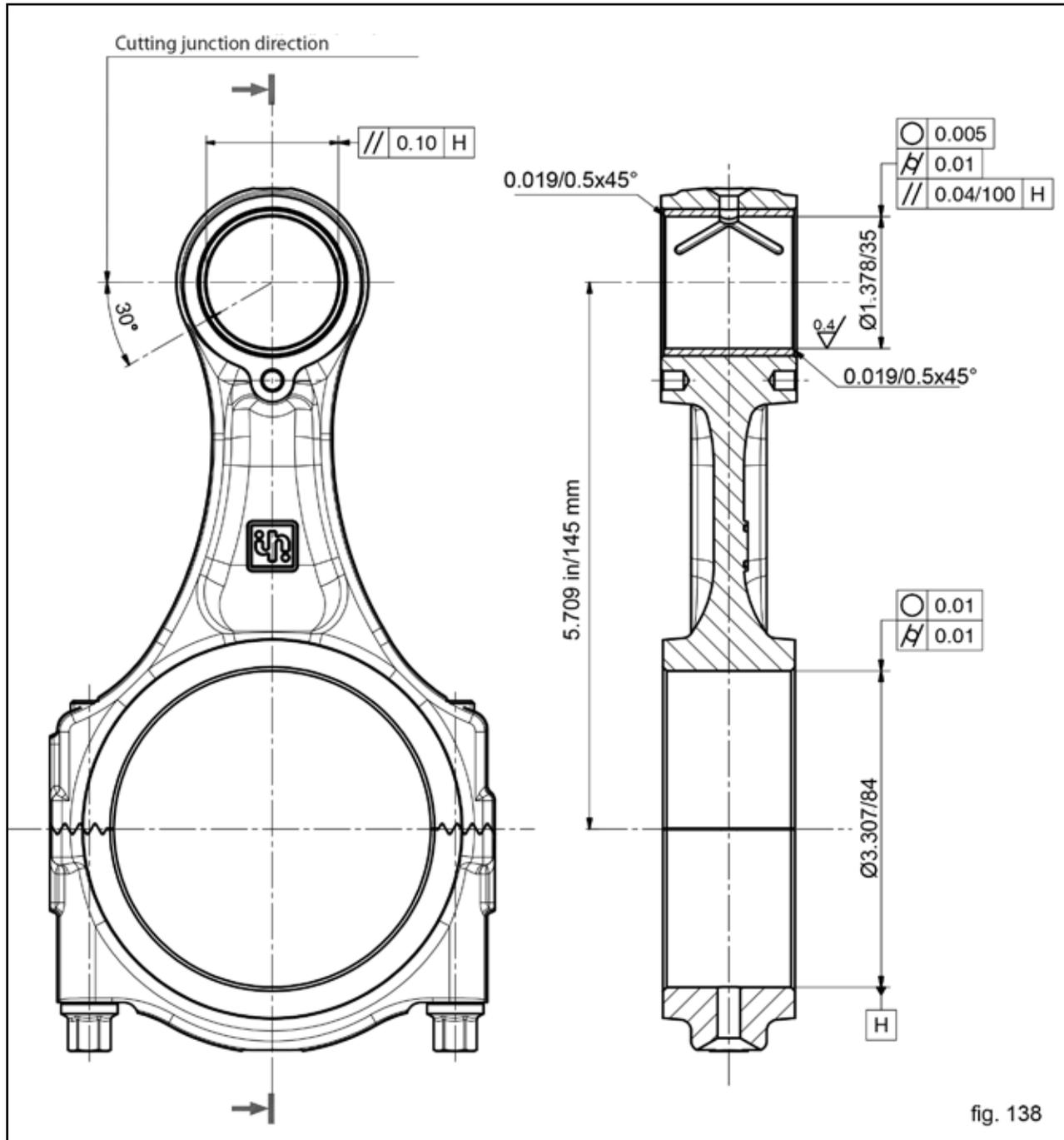
4.1 Valve seat assembly / disassembly tool mechanical drawings





5. REPLACING THE CON-ROD FOOT BUSHING

Perform cold-driving of the bushing and the subsequent work keeping in mind the dimensions and tolerances shown in fig. 138 below.



6. MAINTENANCE LOG

HOURS & DATE

OIL CHANGE							
GREASE							
PACKING REPLACEMENT							
PLUNGER REPLACEMENT							
VALVE REPLACEMENT							



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