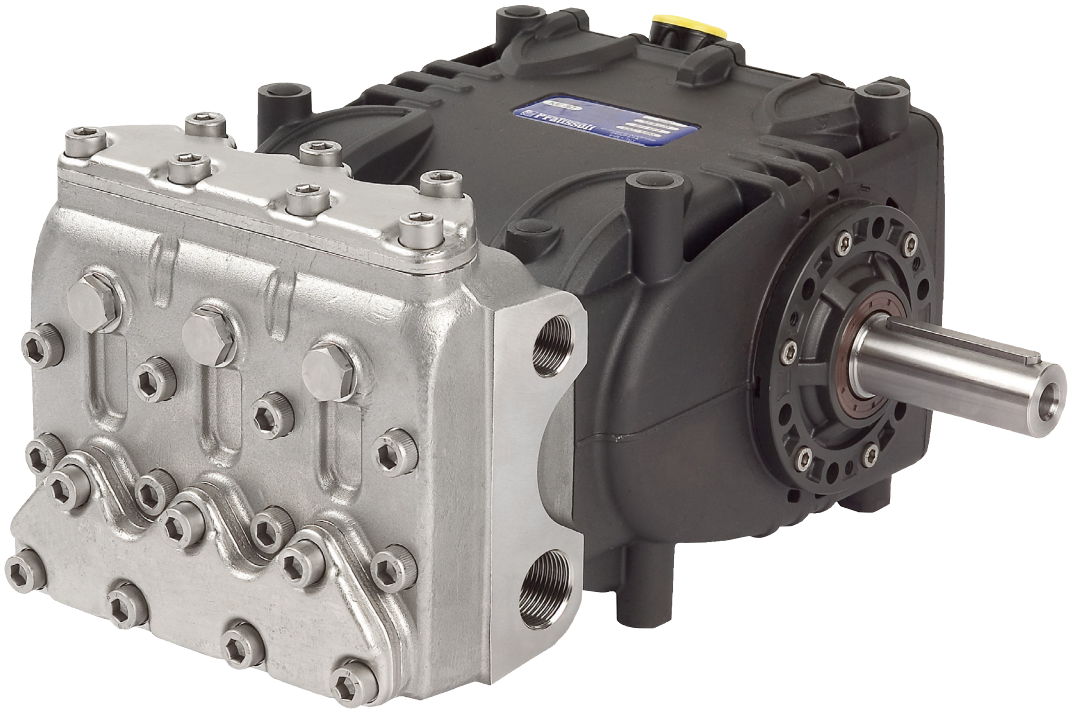
GENERAL PUMP

KEZ

Repair Manual



General Pump is part of the Interpump Group, the world leader in plunger pumps.

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1. INTRODUCTION

This manual describes the instructions for repairing the KEZ Pump, and must be carefully read and understood before performing any repair intervention on the pump.

Correct use and adequate maintenance is fundamental for the pumps regular operation and long duration. General Pump declines any responsibility for damage caused by 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 dipstick (1), and then the plug (2), in fig. 1.

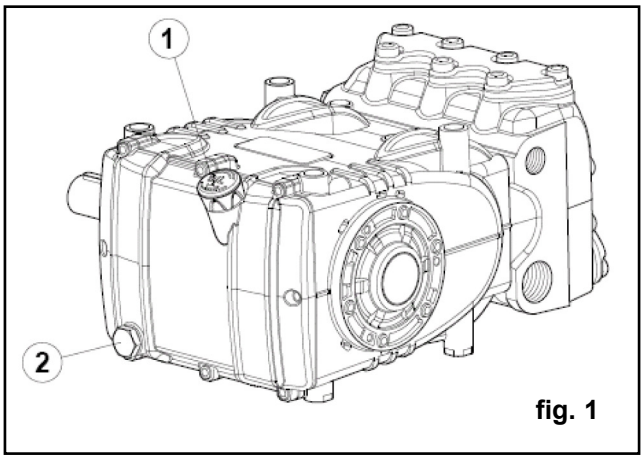

fig. 1

Exhausted oil must be collected in an appropriate container and disposed of in appropriate 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:

A) Dissasemble:

- pump shaft key
- rear cover
- connecting rod cap
- side covers, using 3 wholly threaded M6 x 50 screws, inserting them in the holes as shown in fig. 2.

fig. 2

B) Push the plunger guides and connecting rods forward in order to facilitate the lateral extraction of the crankshaft.

NOTE: to extract the plunger guide it is necessary to remove the ceramic plunger and wiper first.

C) Disassemble the crankshaft oil seals and the plunger guides using standard tools.

2.1.2 Crank mechanism assembly

A) Fit the oil seals of guide plungers in the crankcase by sliding them all the way inside until they correctly seat in place (see fig. 5a). The use of the tool #F27904200 will facilitate the task.

B) Introduce the pre-assembled plunger guide/connecting rod units into their seat; to facilitate tightening of the connecting rod cap, we advise to position the connecting rod so you can easily read the number. To easily introduce the crankshaft, without the key, fully push in the plunger guide/connecting rod unit, as indicated in section B, paragraph 2.1.1, and shown in fig. 4.

fig. 4

B) Before reassembly of the side covers, check the seal lips for wear. If replacement is necessary, position the new ring using the correct tool (#F27904500) as shown in fig. 5.

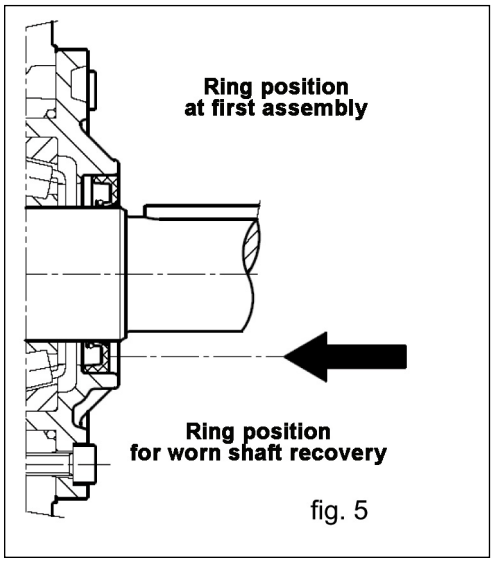

fig. 5

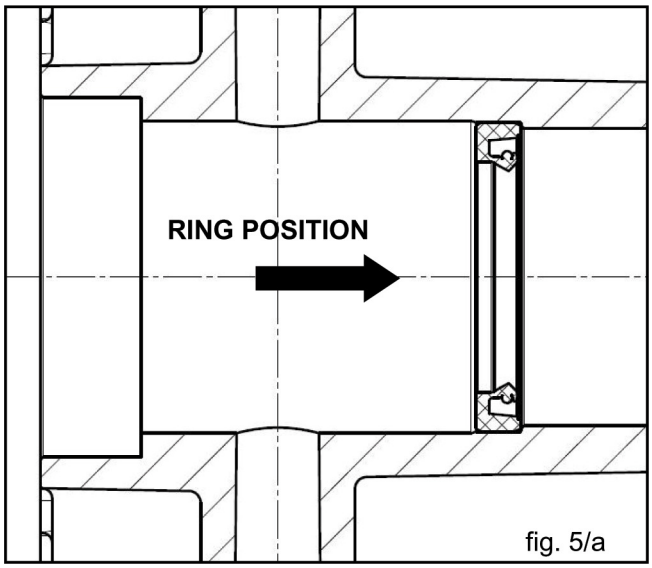

fig. 5/a

If the shaft presents diameter wear corresponding to the sealing lip, to avoid the need for griding it's possible to position the ring as indicated in fig. 5.

To help the covers fit onto the crankcase, we advise to use 3 screws, M6 x 40, and then finish the operation with the screws supplied (M6 x 18) as shown in fig. 6.

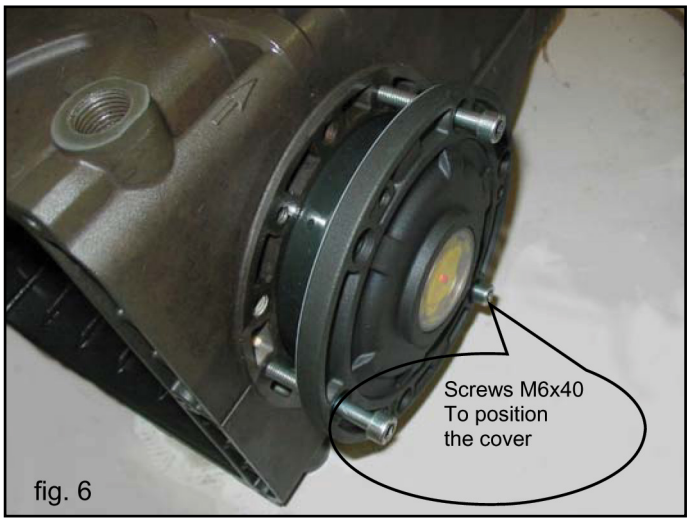

fig. 6

D) Install the connecting rod cap respecting numbering, and fasten the relevant bolts (lubricating both the head and the threaded stem) proceeding in three different steps, see fig. 7.

1. Approaching torque 4-6 ft. lbs. (6-8 Nm)
2. Pre-fastening torque 18-20 ft. lbs. (25-28 Nm)
3. Fastening torque 28 ft. lbs. (38 Nm)

E) After setting the torque, check that the big end of the connecting rod has a lateral play in both directions.
F) Install thr rear cover positioning the oil dipstick hole upward.
G) Fill the crankcase with oil as indicated in the owner's manual paragraph 7.4

2.1.3 Disassembly / Assembly of bearings and shims

The type of bearings used (taper roller bearings) ensures the absence of axial play on the crankshaft; the shims are to be determined to reach this purpose. Tp disassemble/assemble, or to replace them if needed, carefully follow the instructions below.

A) After removing the side covers, as indicated in paragraph 2.1.1, check the rollers and their faces for wear; if all parts are in good condition, accurately clean the components with a suitable degreaser and grease them again evenly using the same oil used in the crankcase.

The same shims can be used again, being careful to fit them under the cover on the sight glass side. After installing the complete unit (sight glass flange + shaft + engine side flange), check that the shaft's rolling torque - with the connecting rods free - is a least 3 ft. lbs. (4 Nm), max 4 ft. lbs. (6 Nm). To position the two side covers on the crankcase, initially use 3 screws, M6 x 40 as shown in fig. 6, and then fastening the screws.

The shaft's rolling torque (with the connecting rods coupled) must not exceed 6 ft. lbs. (8 Nm).

B) Disassembly/assembly of the crankshaft with bearing replacement
After disassembling the side covers as indicated in paragraph 2.1.1, remove the outer ring nut of the bearings from their covers and the inner ring nut, with the remaining part of the bearing, from the two shaft extremeties using a standard pin extractor or similar tool as indicated in figures 8 and 9.

fig. 8

fig. 9

The new roller bearing can be mounted at room temperature with a press or fly press; it is necessary to lay them on the lateral side of the relevant ring nuts with correct rings. The driving operation can be facilitated by heating the relevant parts at a temperature ranging between 250^0-300^0F (120^0-150^0C), making sure that the ring nuts are correctly fitted into their seats.

Never invert the parts of the two bearings.

The shim pack must be redefined as follows:

A) Insert the crankshaft in the crankcase, being sure that the P.T.O. shank comes out of the correct side.
B) Fit the P.T.O. side flange to the crankcase paying great attention to the seal lip as indicated in paragraph 2.1.2, section C.
C) Position the flange on the sight glass side as indicated in paragraph 2.1.1.
D) Use a thickness gauge (see fig. 10).

fig. 10

Determine the shim pack as indicated in the table below.

Measurement	Shim Type	# Pieces
From: 0.05 to: 0.10	/	/
From: 0.11 to: 0.20	0.1	1
From: 0.21 to: 0.30	0.1	2
From: 0.31 to: 0.35	0.25	1
From: 0.36 to: 0.45	0.35	1
From: 0.46 to: 0.55	0.35 0.10	1 1
From: 0.56 to: 0.60	0.25	2
From: 0.61 to: 0.70	0.35 0.25	1 1

E) Insert the shims under the cover on the sight glass side (see fig. 11), fixing it to the crankcase using the appropriate screws, and verifying that the stall torque is between 3-4 ft. lbs. (4-6 Nm).

F) If the torque values is correct, connect the rods to the crankshaft; other wise, redefing the shims again repeating the operations from point “C”.

2.2 Fluid End Repair

2.2.1 Disassembly of the head - valve units

Service operations are limited to valve inspection or replacement if needed.
To extract the valve units proceed as follows:

fig. 12

A) Unfasten the 7 M12 x 35 valve cover screws, and remove the cover (fig. 12).
B) Remove the valve plugs with an M6 threaded bolt (fig. 12).
C) Remove the valve assemblies with a pliers to grab the valve cages (fig. 12).

Should excessive scaling stick the valve seats down in the manifold (for example after inactivity for long period) then the use of the extractor tool #F26019400 is recommended (see fig. 12a).

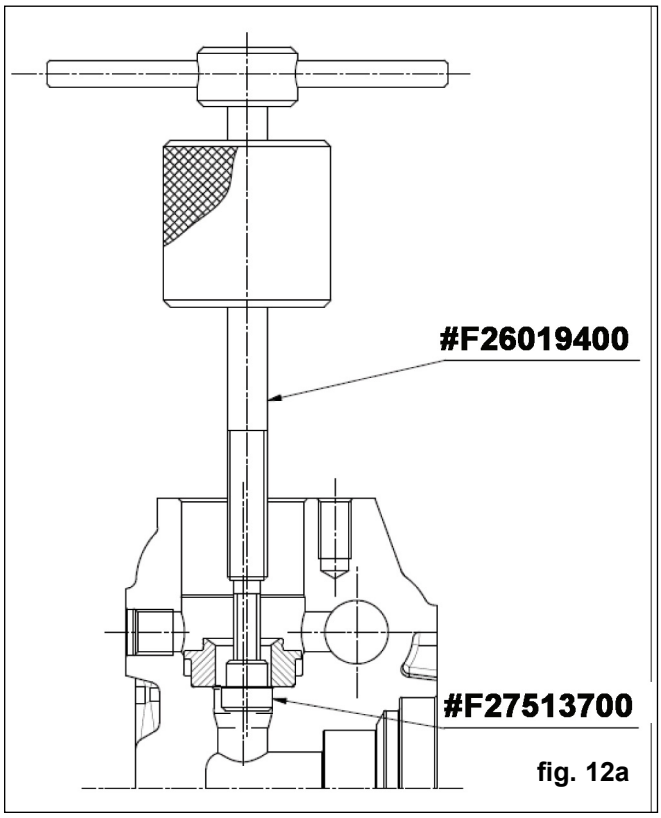

fig. 12a

Disassemble the valve assemblies with simple tools - a couple of screw drivers (fig. 13) would work more than fine. Components valve assemblies are pressed together with a minimal load, therefore the job results extremely easy to be carried out. Being the valve cages are made of polymer, attention should be taken during service in order to prevent the cage ribs from being damaged.

fig. 13

2.2.2 Head assembly - valve units

Pay careful attention to state of wear of the various components; replace them when necessary, and in any case within the intervals indicated in the table in fig. 14, Chapter 11 of the Owner's Manual. At each inspection, replace all valve units and valve plugs OR rings and enti-extrusion rings.

Before repositioning the valve units, clean and perfectly dry the relevant seats in the head as indicated in fig. 14.

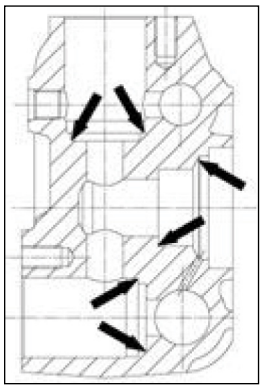

fig. 14

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

During the assembly of the suction and delivery valve units (fig. 15 - fig. 16) do not invert the suction springs with the previously disassembled delivery springs:

a) Suction springs "white"
b) Delivery springs "black"

To facilitate the insertion of the valve guide into its seat, use a tube that lays on the horizontal shoulders of the guide (fig. 16a and use a hammer acting on the entire circumference.

fig. 15

fig. 16

fig. 16a

Insert the suction and delivery valve units checking that they are thoroughly inserted in the head seat.
Therefore apply the valve covers and proceed with calibrating the related M10 x 25 screws with a torque wrench as indicated in Section 3.

2.2.3 Disassembly of the head - seats

The replacement of the seals is necessary if water leaks are detected from the drain holes located at the rear of the crankcase, and in any case within the intervals indicated in the table in fig. 14, Chapter 11 of the Owner's Manual.

A) Unfasten the M10 x 110 head screws as shown in fig. 17.

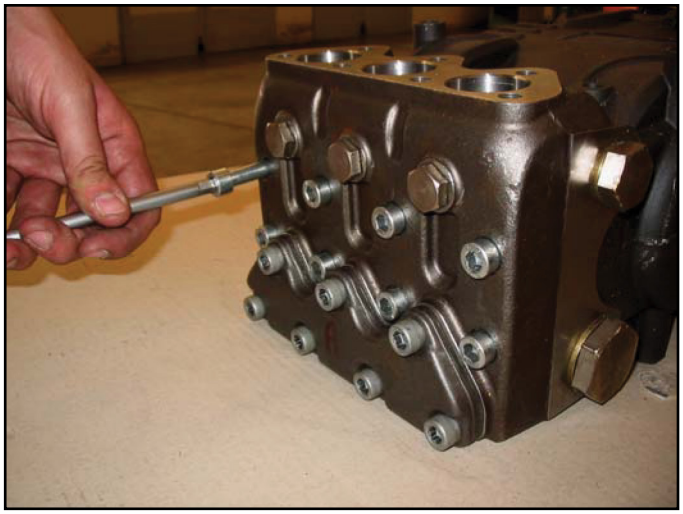

fig. 17

B) Remove the head from the crankcase.

C) Extract the high pressure seals from the head, and the low pressure seals from their related support by using standard tools as shown in fig. 18; be careful not to damage the seals.


fig. 18

Pay careful attention to the order of sealing pack disassembly as shown in Fig. 19, composed of:
1) Packing Retainer
2) O-ring
3) Low Pressure Packing Ring
4) Intermediate Ring
5) High Pressure Packing Ring

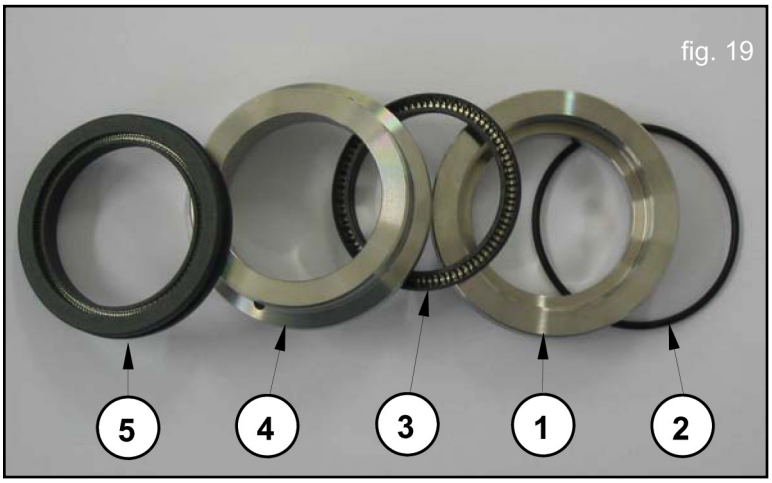

fig. 19

2.2.4 Plunger Unit Disassembly
The plunger unit does not require periodical maintenance. Service interventions are limited to visual inspections only. For plunger unit extraction, operate as follows:

A) Unfasten the plunger screws as shown in fig. 20.

fig. 19

B) Check for wear; replace if necessary.

⚠ At each disassembly, all plunger unit O-rings MUST be replaced.

2.2.5 Head assembly - seals - plunger unit
Reassemble the various components by inverting the operations previously listed in paragraph 2.2.3, paying careful attention to the following:

A) Seal packing: respect the same order followed during disassembly.

B) Lubricate components 3 and 5 with silicone grease type (#F12001600) on outer diameter only.

C) Fore correctly assembling the HP and LP seals in their related seats on the head, use the correct tools as indicated in Section 4.

D) Reassemble the plungers by fastening the screws with a torque wrench, respecting the fastening torque value inicated in Section 3.

E) Assemble the head: for fastening torque values and fastening sequences, follow the instructions in Section 3.

13. SCREW CALIBRATION

Description	Exploded View Position	Material	Fastening Torque (ft. lbs.)	Fastening Torque (Nm)
Cover fastening screws	9	Stainless Steel	7	10
Plunger fastening screws	28	8.8	15	20
Connecting rod caps fastening screws	16	12 R	28*	38*
Valve cover screws	36	Stainless Steel	26**	35**
Head fastening screws	35	Stainless Steel	26***	35***
Service plug	51	Nickel Plated Brass	30	40

* The connecting rod caps fastening screws must be tightened respecting the phases indicated in “Point D” of page 6.

** The valve cover screws, exploded view position 36, must be fastened using a torque wrench, respecting the order shown in the schematic in fig. 21.

*** The head fastening screws, exploded position 35, must be fastened using a torque wrench, lubricating the threaded stem, respecting the order shown in the schematic in fig. 21.

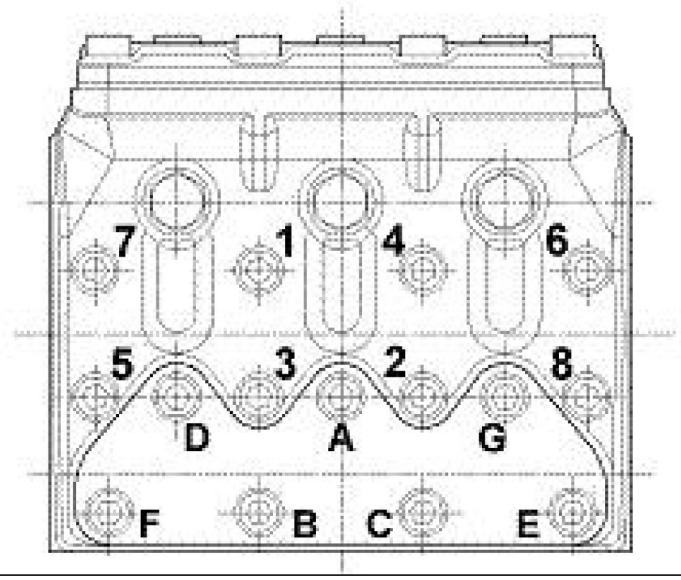

fig. 21

4. REPAIR TOOLS

Pump repair may be facilitated by using the proper tools. See Below.

For Assembly:

Packing Insertion Guide, HP, Dia. 36 x 48 x 8	F27465800 F26406300
Packing Insertion Guide, LP, Dia. 36 x 42 x 15	530083
Pump Shaft Oil Seal Stopper	F27904500
Plunger Guide Oil Seal Stopper	F27904200

For Disassembly:

Suction/Delivery Valves and Seats	F26019400 F27513700
Plunger Guide Oil Seal	F26019400 F27503800

MAINTENANCE LOG

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

GENERAL PUMP

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