



# KFZ

# Repair Manual



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## 1. INTRODUCTION

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

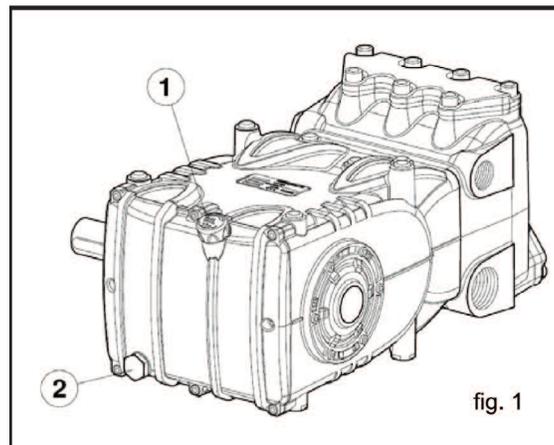
Correct use and adequate maintenance is fundamental for the pump's regular operation and long duration. General Pump declines any responsibility for damage caused by misuse or the non-observance of the instructions described in this manual.

## 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**.



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:

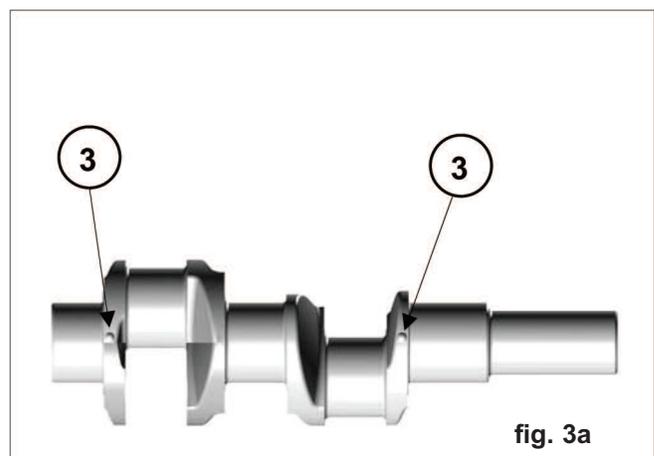
A) Dissassemble:

- 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.



B) Push the plunger guides and connecting rods forward in order to facilitate the lateral extraction of the crankshaft. Two marks are visible on the crankshaft (3), as shown in fig. 3 and fig. 3a; they must be turned towards the operator in order to facilitate extraction.

**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**

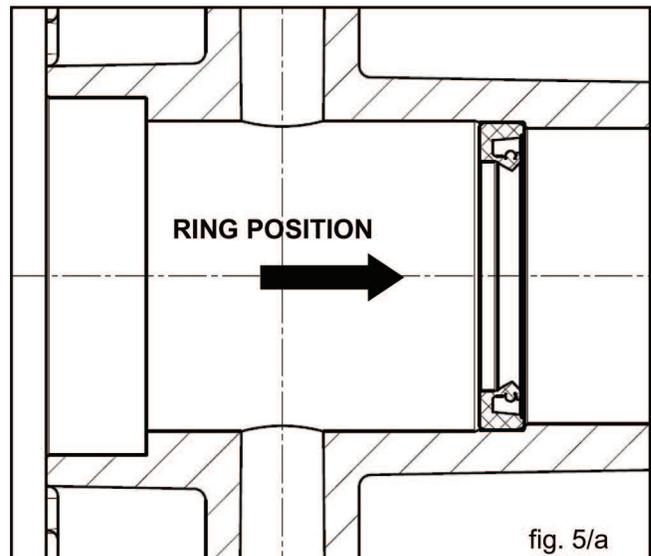
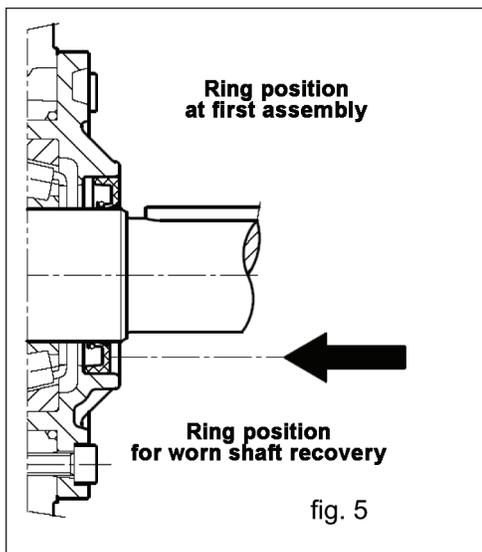
After cleaning the crankcase, reassemble the crankcase mechanism as follows:

A) Thoroughly fit the plunger guide seals into their seat on the crankcase as shown in fig. 5a using the proper tool (p/n F27904900).

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.



C) Before reassembly of the side covers, check the seal lips for wear. If replacement is necessary, position the new ring using the correct tool (#F27904800) as shown in fig. 5.



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

Before assembling the cover (sight glass side), be sure that the shim rings have been inserted. To help the covers fit onto the crankcase, we advise using 3 screws M6 x 40, and then finish the operation with the screws supplied (M6 x 18) as shown in 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) Install the rear cover positioning the oil dipstick hole upward.

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

#### **A) Disassembly/Assembly of the crankshaft without replacing the bearings**

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 at least 3 ft. lbs. (4 Nm), max 5 ft. lbs. (7 Nm). To position the two side covers on the crankcase, initially use 3 screws, M6 x 40 as shown in fig. 6, and then the fastening 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 extremities using a standard pin extractor or similar tool as indicated in figures 8 and 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°-300°F (120°-150°C), 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 2.1.2.
- D) Use a thickness gauge (see 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 3-5 ft. lbs. (4-7 Nm).

F) If the torque values is correct, connect the rods to the crankshaft; otherwise, reassemble 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:

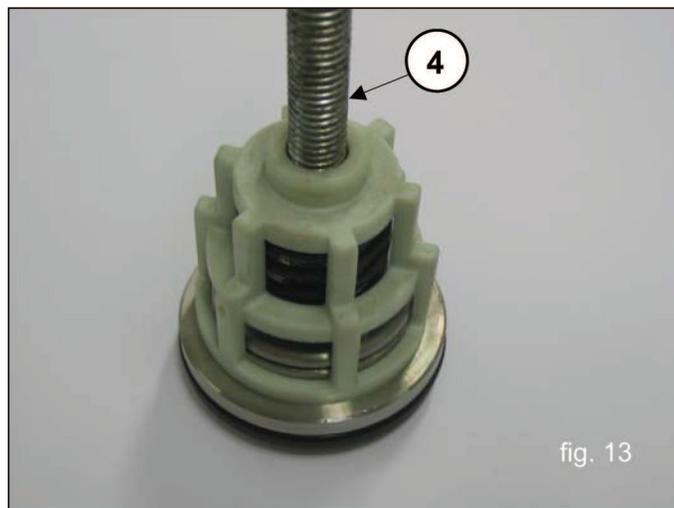


- A) Unfasten the 7 M12 x 35 valve cover screws, and remove the cover (fig. 12).
- B) Extract the valve plugs using a slide hammer (part #F26019400) (fig. 12).
- C) Pull out the valve assemblies by using the same tool (reverse hammer) as used for the valve caps (part #F26019400 combined with the tool #F27513600).



Should the suction or delivery valves get stuck inside the manifold (i.e. due to inactivity for a long period) make use of the extracting tool (part #F27516900 combined with the tool #26019400).

Disassembly 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 seats) 4, fig. 13.

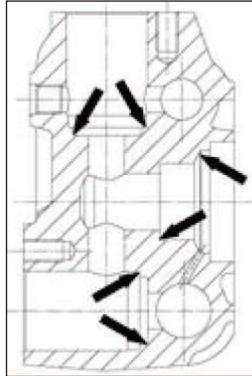


**2.2.2 Head assembly - valve units**

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 valve inspection, replace all valve units and valve plugs, o-rings and anti-extrusion rings.



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

**fig. 14**

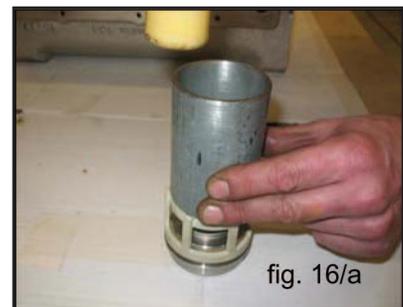
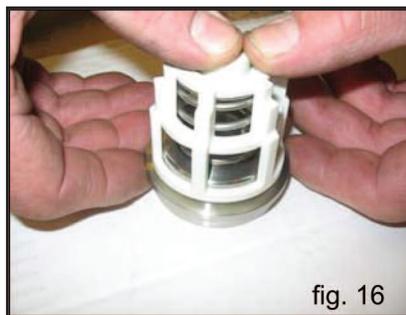
Proceed with reassembly by inverting the procedure indicated in paragraph 2.2.1.



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 insertion of the valve guide on the seat, you can use a pad placed on the horizontal surfaces of the guide (fig. 16a) and drive it with a sliding hammer.



Insert the suction and delivery valve units checking that they are thoroughly inserted in the head seat. Apply the valve covers and proceed with calibrating the related M12 x 35 screws with a torque wrench as indicated in Chapter 3.

### 2.2.3 Disassembly of the head - seals

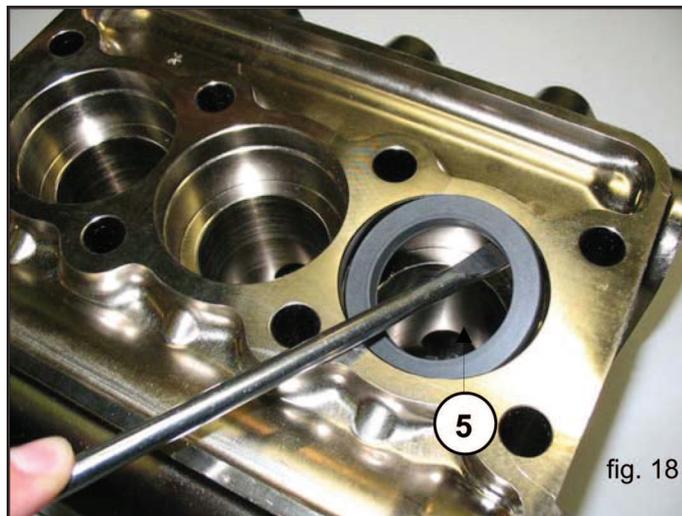
The replacement of the seals is necessary if water leaks are detected from the draining holes located at the rear of the crankcase, and in any case within the intervals indicated in the table in fig. 14, Chapter 11 of the Owner's Manual.

A) Unscrew the M12 x 150 head screws as shown in fig. 17.



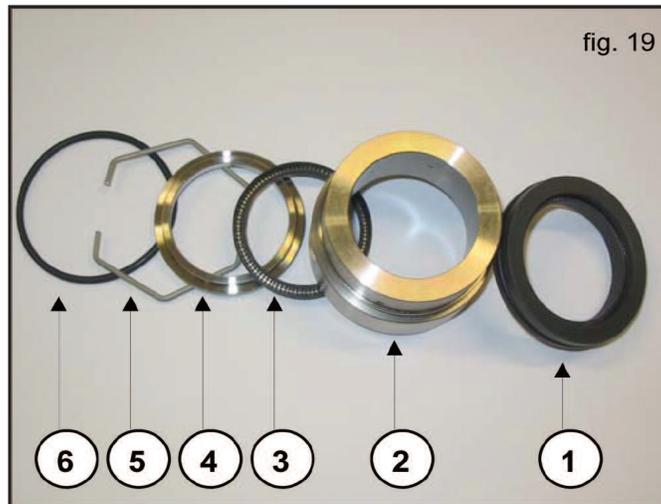
B) Remove the head from the crankcase.

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 (5); be careful not to damage the seats.



Pay careful attention to the order of seal packing disassembly as shown in fig. 19 composed of:

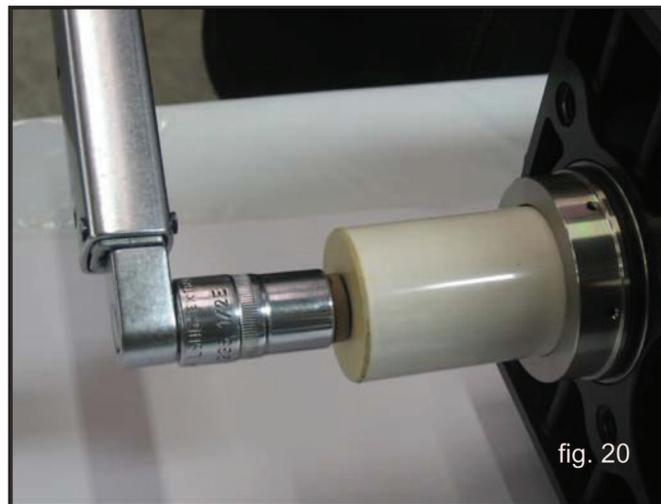
1. H.P. seal
2. Packings support
3. L.P. Seal
4. Sealing ring
5. Circlip
6. O-ring



### 2.2.4 Plunger Unit Disassembly

The plunger unit does not require periodic maintenance. Service interventions are limited to visual inspections only. For plunger unit extraction, operate as follows:

- A) Unfasten the M7 x 1 plunger screws as shown in fig. 20.



- B) Check and verify their state of wear, and replace them 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 1 and 3 with silicone grease type (#F12001600) only on the outside diameter.
- C) For correctly assembling the HP seals in their related seats on the head without damaging the lips, use the correct tools depending on the plumbing assembly diameters as indicated in Chapter 4.
- D) Reassemble the plungers by fastening the screws with a torque wrench, respecting the fastening torque value indicated in Chapter 3.
- E) Assemble the head: for fastening torque values and fastening sequences, follow the instructions in Chapter 3.

## 13. SCREW CALIBRATION

Description	Exploded View Position	Fastening Torque (ft. lbs.)	Fastening Torque (Nm)
Cover fastening screws	9	7	10
Plunger fastening screws	29	15	20
Connecting rod caps fastening screws	16	28*	38*
Head fastening screws	37	44**	60**
Valve cover screws	38	44***	60***
Lifting bracket fastening screws	58	74	100
Oil Discharge plug	11	30	40
Delivery duct plug	11	30	40

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

\*\* The head screws and nuts, exploded view position 45 and 48, must be fastened using a torque wrench, lubricating the threaded stem, respecting the order shown in the scheme in fig. 21

\*\*\* The valve cover screws, exploded position 29, must be fastened using a torque wrench, lubricating the threaded stem, respecting the order shown in the schematic in fig. 21.

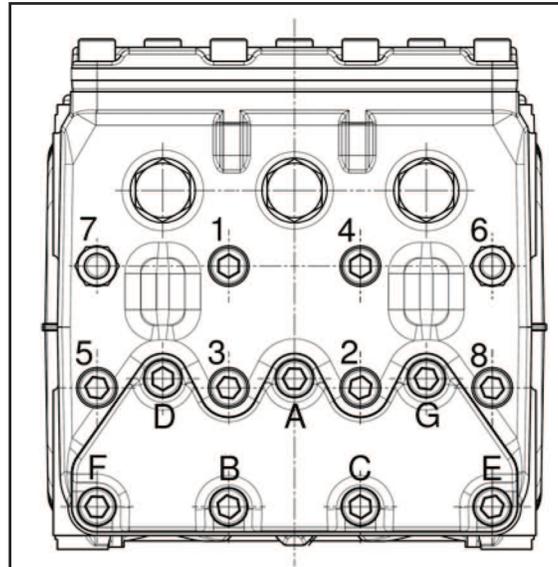


fig. 21

**4. REPAIR TOOLS**

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

**For Assembly:**

Basket Brush Øe 55; Alternative sealing ring H.P. Ø40 x 55 x 10	F27473100 F27356300
Basket Brush Øe 46.15; Alternative sealing ring L.P. Ø40 x 46.15	F27471200 F26406300
Pump Shaft Oil Seal Stopper	F27904800
Plunger Guide Oil Seal Stopper	F27904900

**For Disassembly:**

Suction/Delivery Valves	F26019400 F27513600
Suction/Delivery Valve Seats	F26019400 F27516900
Suction and Delivery Valve Plug	F26019400
Plunger Guide Oil Seal	F27503900

## MAINTENANCE LOG

### HOURS & DATE

<b>OIL CHANGE</b>							
<b>GREASE</b>							
<b>PACKING REPLACEMENT</b>							
<b>PLUNGER REPLACEMENT</b>							
<b>VALVE REPLACEMENT</b>							



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